CESVA

SC202

Sound level meter

Spectrum Analyser

USER'S MANUAL

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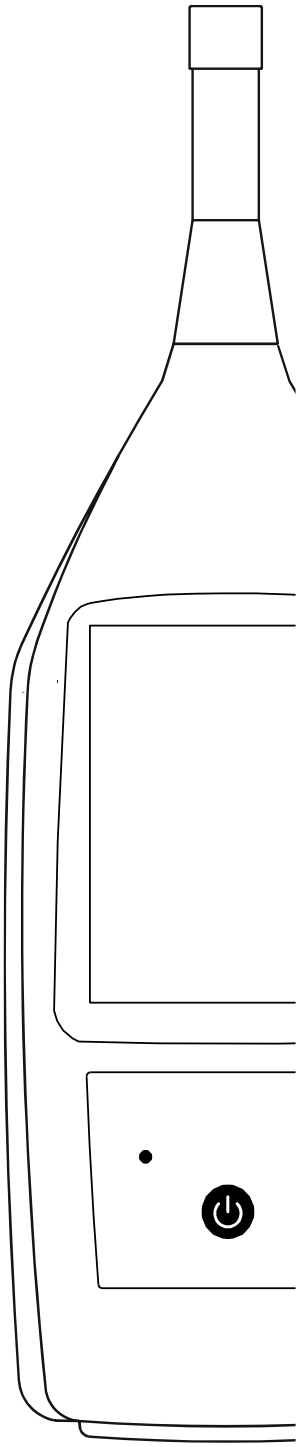

CESVA, founded in 1969 in Barcelona, has always engaged in the manufacturing of sound equipment and instruments with in-house R&D&I and patents.

We belong to national and international committees for the establishment and revision of standards.

CESVA has a fast and efficient distribution network in over 40 countries around the world.

We offer our customers an after-sales service to ensure the long life of our instruments. Periodic tests and calibration services are also available.

Our website is the focal point for finding information on our products, requesting no-obligation quotes, downloading software, contacting us and being kept updated about all the training events and exhibitions we are present at on a regular basis.

Taking care of and listening to our customers brings us closer to them and allows us to provide them with a measuring solution that is totally adapted to their needs.

The *Bluetooth*® trademark is owned by *Bluetooth* SIG, Inc.

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What does this manual cover? 1

This manual provides you with all the information you need to make the most of your new device.

The information is divided into 6 sections:

A **first** section that brings together the chapters with the main characteristics of the device and its physical parts (chapters 3, 4, 5, 6, 7 and 8).

The **second** shows the operation of the device to be able to carry out the measurements (chapters 9, 10, 11, 12, 13 and 14).

The **third** section focuses on the configuration of the device: menu options and procedures for making the various settings (chapters 15 and 16).

The **fourth** section develops other important topics such as the connection to the PC and accessories (chapters 17 and 18).

The **fifth** section contains the technical specification of the *SC202* sound level meter to know in detail the device you are working with (chapter 19).

And finally, the **sixth** section includes several chapters that collect information such as: maintenance and precautions, tips for taking measurements, nomenclature and description of functions, etc. (chapters 20, 21, 22, 23 and 24).

NOTE: If you already know the device and only want to consult the information to carry out measurements, see chapters 9, 10, 11, 12, 13 and 14.

Equipment and literature 2

The first step is to check that all the equipment and literature supplied with the device is there.

Material included:

- *SC202* sound level meter
- *FN004* case
- *PV009* windscreen
- 3 x 1.5 volt alkaline batteries, AA (LR6) size
- USB connection cable - USB type C *CN500*

Literature included:

- Quick start guide
- Warranty

If any of these items are missing, please contact your CESVA official distributor.

General device description 3

This chapter provides an overview of the *SC202* sound level meter. It describes its main characteristics and identifies its different parts.

3.1 SC202 sound level meter and spectrum analyser

The *SC202* perfectly combines versatility with ease of use.

Thanks to its touch screen and its menu, the operation of this device is extremely fast, simple and intuitive.

In addition, the device measures all the parameters simultaneously with the different time bases, frequency and temporal weightings.

The *SC202* is a sound level meter that complies with the specifications of the international standard IEC 61672 for Class 2, and the American standards ANSI S1.4 and ANSI S1.43 for Type 2, both for the response to incident sound waves on the microphone in the reference direction in a free field and for the response to waves with random incidence in a diffuse field.

The *SC202* can be upgraded with the *FR202* module. It activates the spectral analysis in octave band (1/1) and third octave band (1/3).

The SC202 has advanced features, such as the management of the sound level meter from a mobile phone or the tablet through the SC202 Link App, or uploading the measurements made to the CESVACloud server (it is necessary to have an active CESVACloud account), so that they are available from anywhere.

3.2 Main features of the SC202

The *SC202* includes the following main features:

COLOUR TOUCHSCREEN:

- The *SC202* has a colour touchscreen for performing all the device's operations.
- The 3.5" screen, with a resolution of 320x240, is conducive to any action that you want to perform being very fast and intuitive, since everything is done through the touchscreen.
- The sound level meter has only one key, to turn it on.

- The screen of the *SC202* provides a clear, sharp view in broad daylight; it also lights up automatically when the equipment turns on, allowing you to work even in low-light environments.

CESVA PHILOSOPHY:

- The *SC202* maintains the philosophy of the CESVA instruments: versatility, simplicity and easy handling.
- No scales: there is no need to configure the measurement range of the *SC202* according to the dynamic range of the sound event to be measured.
- The *SC202* measures all functions simultaneously, with different time and frequency weightings (A, C and Z) and with different time bases (t, T, 1 s, 20 ms*), as well as global and spectral parameters.

  ** 20 ms optional (see 15.1.7)*

MEMORY:

- The *SC202* has internal memory to store the recordings and final results. As well as date and time change logs, sensitivity settings and firmware version (see 16).

BACKERASE:

- With the BACKERASE option, the *SC202* can erase the last 10 seconds of the current measurement. This option is perfect when unwanted sound events appear during measurement (see 14.2).

ZOOM:

- The automatic ZOOM option allows you to view very stable sound events in more detail (see 14.1).

AUTOMATIC STOP (AUTOSTOP):

- The AUTOSTOP option allows programming the sound level meter so that the measurement stops automatically without having for the user to be present.

ICON MENU:

- The device is configured through a menu composed only of easily identifiable and recognisable icons and without the need to configure languages.

COMMUNICATIONS:

- The *SC202* can communicate with a PC through the USB Type-C port (see 17.2.1), or through *Bluetooth*® communication (see 17.2.2). It is also possible to communicate via WIFI (see 17.2.3).
- The *SC202* can also be handled using the SC202 *Link app*CESVA via *Bluetooth*®.

The *Bluetooth*® trademark is owned by *Bluetooth* SIG, Inc.

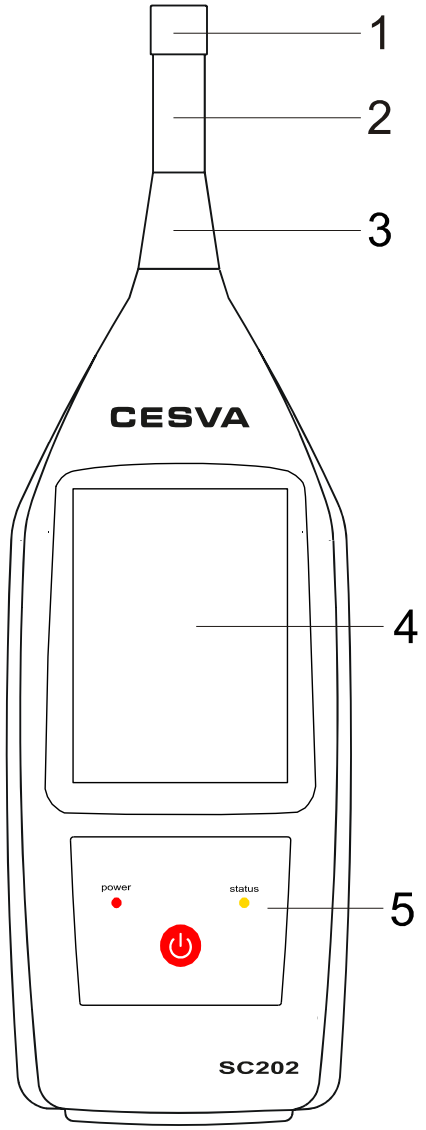
SC202 Link App available for download from the Google Play platform

3.3 Device parts

The following figure describes the most important parts of the *SC202*:

1. **Precision ½" condenser microphone**· The *SC202* works with the P008 microphone. This type of microphone is removable. To move it away from the SC202 body, use the CN105 or CN110 cable.
2. **Preamplifier** · The preamplifier is not removable.
3. **Protective cone** · Conical piece that covers the junction between the preamplifier and the sound level meter to protect them.
4. **Screen** · 3.5” backlit colour touch screen.
5. **Membrane keypad** · Extra-thin keypad minimises reflections.
6. **Manufacturer's information**· Area where the brand and origin of design and manufacture are indicated.
7. **UNE-EN Marking** · In this area the model and serial number of the sound level meter are detailed, as well as the UNE-EN standards that it complies with.

   (The IEC and ANSI standards it complies with are specified in the information screen (see 15.1.14))
8. **Class information** · This area details the class with which the sound level meter meets the standards specified in the UNE-EN, IEC and ANSI.
9. **Tripod support** · Recessed tripod support with standard ¼’’ W thread. (*TR040* and *TR050*).
10. **RAEE Marking** · Indicates the separate collection of electrical/electronic equipment.
11. **CE Marking** · European conformity mark.
12. **Battery cover** · Battery protection cover, it should only be removed to change them. This is held in place by a screw. The ⍰ symbol is shown on the cover (see 19.9.1).
13. **Protective cover for the connectors** · Cover to protect the connectors from possible damages.
14. **USB type C connector** · USB C connector for power and digital communication.
15. **AC output** · Direct output from the preamplifier without frequency weighting. Notable among its utilities is the audio recordings.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2
3
CESVA
4
power
status
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SC202
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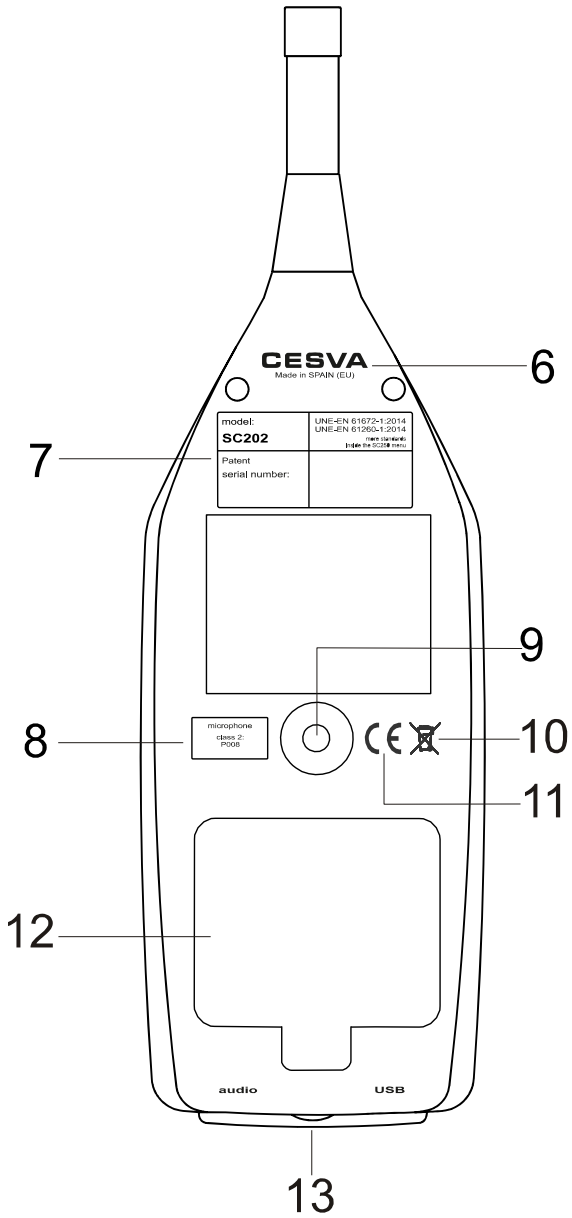
CESVA
Made in SPAIN (EU)
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model:
SC202
UNE-EN 61672-1:2014
UNE-EN 61260-1:2014
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Patent
serial number:
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8
microphone
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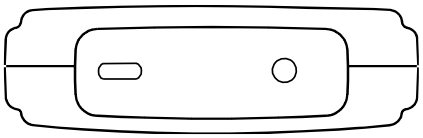
audio
USB
13

Inputs and outputs 4

This chapter lists the inputs and outputs of the *SC202*. It indicates how to identify them and how to extract data from them.

The inputs and outputs of the *SC202* are on the bottom of the device, protected by a removable protective cover. To access them, remove the cover. Remember to put it back once the operation is finished.

The *SC202* has the following inputs and outputs:



4.1 Communication inputs/outputs

1. **USB C [14]** Bidirectional input/output for communication with a PC and to power the device (see 17.2.1). To connect the *SC202* to a PC through this input use the *CN500* cable.
2. ***Bluetooth*® communication.** Wireless input/output for two-way digital communication with a PC or with a device (tablet, mobile, ...) via radio frequency (see 17.2.2).
3. **WIFI** Connection to a wireless WIFI network to access the CESVACloud server (see 17.2.3).

4.2 AC output

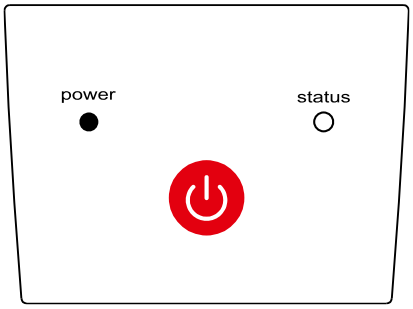
The **AC output [15]** contains an AC signal proportional to the output of the preamplifier (see 17.1). This allows:

- Listen to the sound event being measured and determine if it is influenced by noises other than those to be measured.
- To record this signal on a recording device for recognition of the sound event being measured.

NOTE: Be aware that very low sound levels may not be heard.

Keypad 5

This chapter describes the elements that comprise the keypad.



The *SC202* has a touchscreen, so that the keypad area contains only one key and two LEDs.

KEY		FUNCTION
	ON/OFF	Key to turn the *SC202* on and off and the screen. To turn on the device, keep the key pressed down for a few seconds. To turn off the device, press the key for a few seconds. The sound level meter cannot be turned off while a measurement or recording is in progress. When the device is on, to turn off the screen, press the key once. Then to turn it on, press the key again. It also allows you to start and stop a measurement or recording depending on the configuration (see 15.1.12)

LED		FUNCTION
power	**POWER**	LED that indicates if the device and the screen are on or off. The POWER LED has 3 operating modes: **POWER OFF:** The device is off The device is on and the screen is also on.

		POWER ON: The device is on and the screen is off (sleep) **INTERMITTENT POWER**: The device is on and the batteries are running low.
status ○	**STATUS**	LED indicating the status of the measurement. The STATUS LED has 3 operating modes when the device is on: **STATUS OFF:** The measurement is stopped (■) **STATUS ON:** The measurement is paused (▮▮) **INTERMITTENT STATUS**: The device is measuring (▶) or recording (●).

In summary:

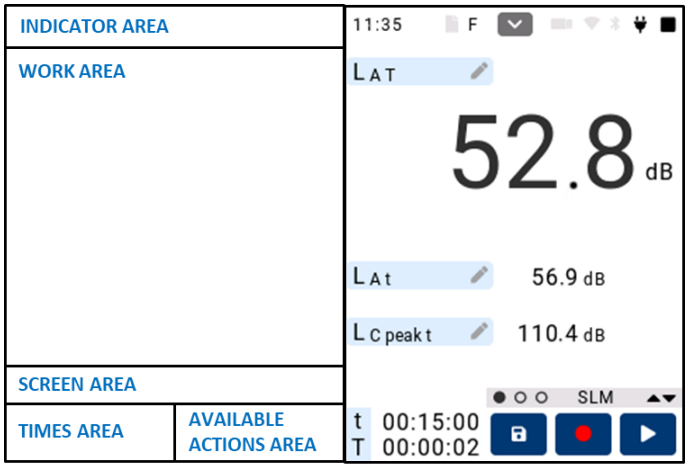
SC202	Screen	Measurement	LED POWER	LED STATUS
Off	Off	-	OFF	OFF
On	On	STOP	OFF	OFF
		PAUSE	OFF	ON
		PLAY / REC	OFF	ON (INTERMITTENT)
	Off	STOP	ON	OFF
		PAUSE	ON	ON
		PLAY / REC	ON	ON (INTERMITTENT)
The battery is running low		-	ON (INTERMITTENT)	-

Screen 6

This chapter defines the characteristics of the screen and details the information it displays.

The *SC202* has a 3.5” backlit colour touchscreen that allows immediate access to any type of screen or menu on the device. The data are presented both numerically and graphically.

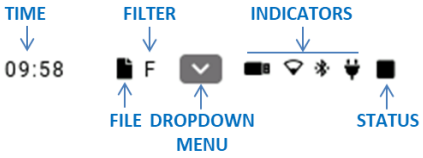
The *SC202* screen is divided into 5 areas.



6.1 Areas of the screen

6.1.1 Indicator area

The information that appears on it varies depending on whether it is a measurement, a recording, the configuration of the *SC202* or the measurement status.



TIME:

Shows the current time of the *SC202* (hh:mm:ss).

FILE:

INDICATION	SITUATION
	The final results are saved (see 16.1) A recording is made (see 16.2) A measurement that is stored in memory is displayed (see 16.4)
	There is no measurement on the screen A measurement is made (see 11.2)

FILTER:

Indicates the correction (filter) applied to the measurement. There are two options available.

INDICATION	SITUATION
F	Free field correction
D	Diffuse field correction

To change the filter (see 15.1.9).

DROPDOWN MENU ( ):

Shows all available menu options (see 15.1).

INDICATORS:

INDICATION	INFORMATION
	Sound level meter configured as a mass storage device (see 15.1.3)
	WIFI wireless communication activated (see 15.1.5)
	Bluetooth® communication activated (see 15.1.4)
	Power by USB (see 7.1.2)

STATUS:

Shows the measurement status of the *SC202*.

INDICATION	SITUATION
■	Stopped
▶	Measurement in progress
●	Recording in progress
❚❚	Measurement temporarily stopped (Pause)
❚❚	Recording temporarily stopped (Pause)

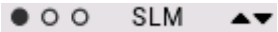
6.1.2 Work area

This area shows the value for the functions during the process of measurement, recording or display of records (see 13).

6.1.3 Screen area

The *SC202* has different screens for displaying the data (see 13).

This area indicates which screen is being displayed (SLM, 1/1 or 1/3).



To change the screen that is displayed see 13.1.

6.1.4 Time area

This area is visible during a measurement, recording, or while viewing a register.

The time area shows the following information:

- The elapsed integration time T
- The elapsed measurement time t

6.1.5 Available actions area

This area shows the available actions corresponding to the measurement.

ICON		FUNCTION
	PLAY	Key to start a measurement or resume after a pause.
	STOP	Key for stopping a measurement.
	PAUSE	Key to temporarily stop a measurement/recording (pause).
	BACKERASE	Key to erase backwards (Backerase) the last 10 seconds.
	REC	Key to start a recording or resume after a pause.
	SAVE	Key to save the final result in memory (It does not save the time history of the measurement).

6.2 Turn off the screen

Turning off the device's screen while it is running saves energy. To turn off the screen without turning off the device, press ⏻ momentarily. The screen will automatically turn off and the power ● LED will turn on in power ON mode (see 5).

NOTE If the SC202 is to be left to measure for a long period of time, a image persistence effect may occur, to avoid this possible consequence it is recommended to turn off the screen.

Power 7

The first operation to be performed, before switching on the *SC202*, is to power it. This chapter explains the different ways to do this, as well as the configuration options that affect power.

7.1 Types of power

The *SC202* can be powered by batteries or via a USB connection. If both systems are used at the same time (batteries + USB port), the *SC202* chooses whichever one offers the highest voltage.

7.1.1 Battery power

The *SC202* sound level meter is powered by three 1.5V batteries. The sound level meter accepts four types of batteries: alkaline, lithium, rechargeable and rechargeable lithium (see 19.9.1). Make sure all three batteries are of the same type.

To insert/replace the batteries, remember that the device must be turned off. Unscrew the battery cover screw [12], open the battery compartment. If they are going to be replaced, first remove the batteries, by pulling the ribbon until the first two come out, then press the last battery against the spring and pull upwards, holding the battery by its positive pole. Finally, place the three batteries in the compartment, as indicated, and replace the battery cover by screwing in the screw until it is securely fastened.

When the batteries are fully charged, the symbol is displayed on the display. The symbol becomes emptier as the batteries gradually lose their charge. When the batteries are very low, the symbol will be displayed indicating that the batteries should be replaced.

RECOMMENDATIONS:

- It is advisable to always carry spare batteries.

NOTE: The symbol is on the battery cover (see 19.9.1).

7.1.2 Power by USB

The *SC202* can also be powered via the USB port.

It allows you to use a PC, a charger or a Power Bank as a power source. To do so, connect the *SC202* USB port to another device with the *CN500* cable. On connecting it, the symbol will appear instead of the battery symbol.

NOTE: The *SC202* draws a current of 1A at the instant it is turned on. Therefore, if the sound level meter is to be connected to a device that cannot supply this minimum current, the *SC202* must also be powered by batteries.

RECOMMENDATIONS:

- When using external power (USB), it is recommended that you insert new batteries (see 7.1.1).
- If you do not expect to use the *SC202* for an extended period, remove the batteries from the *SC202* to avoid potential damage caused by the batteries leaking.
- When the *SC202* is powered through the USB port by means of a power supply this should be certified according to IEC 61010-1:2010/AMD1:2016/COR1:2019 ED3 with reinforced isolation between the mains and the output, limited power output and protected against short circuits.

7.2 Energy saving

The use of *Bluetooth*® or WIFI communication and screen light considerably decrease the life of the batteries. In the case of powering the sound level meter exclusively with batteries, it is recommended:

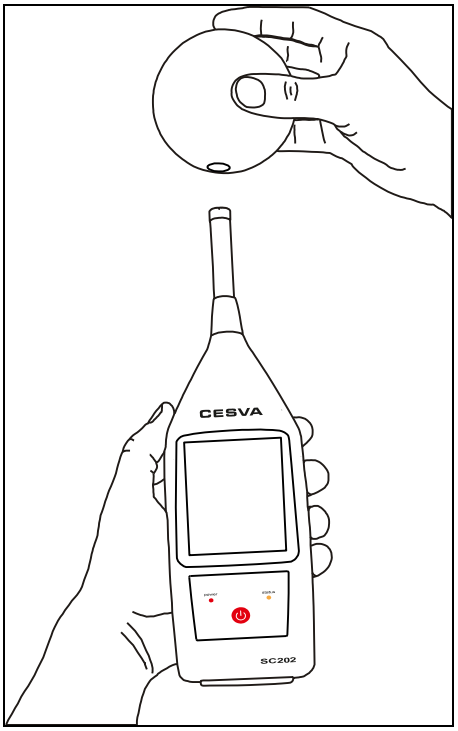
- To disable *Bluetooth*® communication when you are not using it (see 15.1.4).
- To disable WIFI communication when you are not using it (see 15.1.5).
- To turn off the screen or configure a short time for the power off automatically (screen idle) (see 15.1.11).

Assembling and dismantling the device 8

This chapter shows how to attach the microphone and preamplifier to the *SC202*, as well as all the accessories that can be installed around the microphone: windscreen, extension cable and outdoor kit.

8.1 Windscreen

To avoid the effects of wind noise, you can attach the CESVA *PV009* windscreen to the microphone, as shown in the figure below.



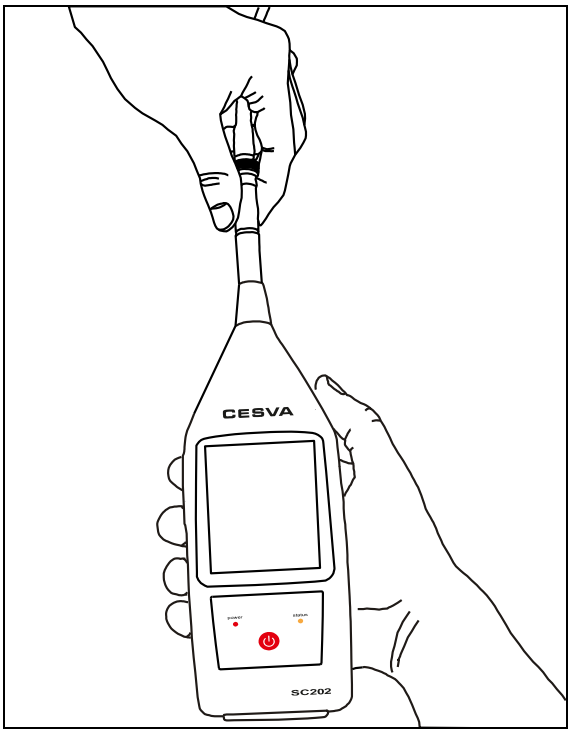
8.2 Extension cable

The *SC202*'s microphone is removable. This allows the microphone to be separated from the sound level meter and the operator. By doing so, the *SC202* can be operated at a distance from the measurement point, avoiding potential interference. To perform this operation, CESVA extension cable models *CN105* (5 metres) or *CN110* (10 metres) must be used.

Remember that the preamp is not removable. Do not pull it as this would cause damage to the equipment.

To remove the microphone from the sound level meter, unscrew the microphone just using your hands (do not use any tool).

Next screw the extension cable connector to the preamplifier carefully. And on the other side screw the microphone.



NOTE: CESVA will not be held responsible for handling by unauthorised personnel, thus leaving the device out of warranty.

WARNING! The sound level meter must be turned off to couple or uncouple the microphone or preamplifier.

NOTE: The cables do not interfere with the measurement frequency band. No type of correction is necessary because of the extension cables. Extension cords are an optional accessory and are not included in the normal run mode.

Switching the device on and off 9

This chapter indicates how to switch the *SC202* on and off.

9.1 Turn on the device

The *SC202* can be turned on in two different ways:

- By pressing the ⏻ key for 2 seconds, it will turn on as usual.
- Powering the *SC202* through the USB input. The sound level meter turns on automatically without having to press the ⏻ key.

PRESSING THE BUTTON ⏻

To turn on the *SC202,* press the ⏻ key for a couple of seconds.

BY POWER

To turn on the *SC202*, you only need to power the sound level meter through the USB port.

To switch on the sound level meter by means of the power, the option ⏻ + ⏻ must be activated (see 15.1.10).

When the *SC202* is turned on, the device performs a self-test and then the CESVA logo will appear on the screen along with the *SC202* model, the process symbol ◯ and the percentage (%) of the warm-up time elapsed.

The numerical sound level meter screen will then appear.

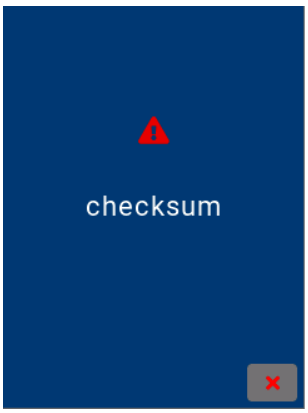
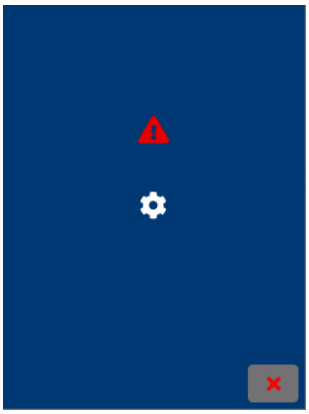
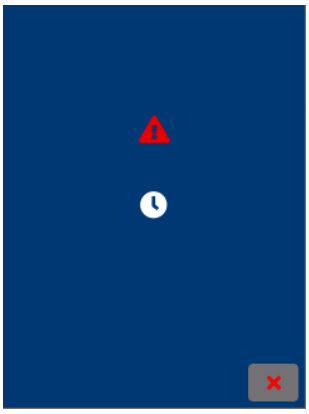
NOTE: When turning on the *SC202*, the WIFI option is disabled by default.

NOTE: In the event that the *SC202* does not turn on, check that it is powered correctly.

IMPORTANT: All LCD screen models experience the “image persistence or image retention” effect. To prevent this from happening, we recommend that when the SC202 is to be turned on for a long period of time, you should turn the display off (whenever possible). This action, in addition to protecting the screen, will also save batteries (when running on batteries).

9.1.1 *SC202* Initial Self-Test

If an error is detected during the initial self-test of the *SC202*, an alert screen will appear. Each of them is detailed below and how to proceed if any appears.

SCREEN	REASON AND WHAT TO DO
	A serious devices failure has occurred. You will need to turn it off and contact your CESVA official retailer.
	There is a failure in some of the device's programming parameters. Close the screen. If you wish, you can continue working normally. Check the programming.
	The date/time is incorrect. Close the screen. If you wish, you can continue working normally. Review the date/time.

If there are several errors, they will be displayed on the screen.

Close the screen to continue working.

9.1.2 Check the firmware version of the *SC202*

To check the firmware version of the SC202, access the INFORMATION option in the menu (see 15.1.14).

9.2 Turn off the device

To turn off the *SC202*, check that there are no measurements in progress ■ and press ⏻ for a couple of seconds or remove the power from the USB port (when the *SC202* does not have batteries).

NOTA: By pressing ⏻ briefly, the *SC202* will perform a measurement, a recording or will turn off the screen depending on how the key is configured (see 15.1.12) but the equipment will continue on.

NOTE: After turning off the equipment, it is recommended to wait a few seconds, approximately 5 seconds, before turning it back on.

NOTE: If the equipment is turned off by pressing ⏻, all the parameters are saved (screen, zoom, selected octave, …) and when it is turned on, it will do so with the same parameters as when it was turned off.

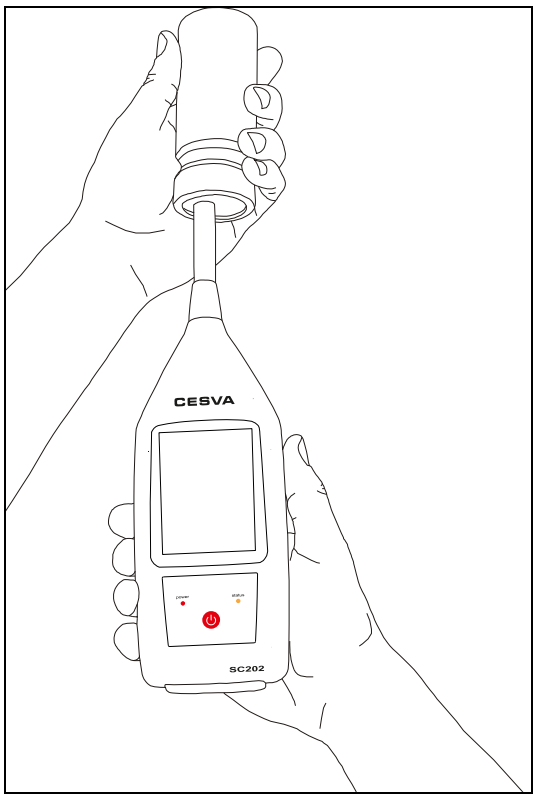
Check the device 10

Before and after a measurement, is advisable to check of the sound level meter with an acoustic calibrator. A measurement is considered valid if it is made between two successful verifications.

10.1 Checking the SC202

To check the *SC202*, use the **CESVA** acoustic calibrator, model *CB004* or *CB012* Class 2, and follow the steps below:

Place the *SC202* in the calibrator, inserting the part of the microphone in the calibrator cavity. Make sure it has gone all the way into the cavity. There may be a certain amount of resistance since the calibrator fits onto the sound level meter tightly. Insert the *SC202* gently to avoid damaging the microphone.



Turn on the calibrator and check the battery status. The LED indicator must remain lit throughout the entire calibration process (see the calibrator manual). The calibrator generates a 94 dB tone at 1 kHz.

Select the free field correction from the Microphone settings option. Apply the free-field pressure field corrections of the microphone at 1 kHz. This CESVA *P008* microphone correction is -0.1 dB; i.e. the *SC202* must be checked at 93.9 dB.

Set the *SC202* on a numerical sound level meter screen (see 13).

As function to be displayed, select the sound pressure level with fast time averaging (FAST) L_{AF}. The frequency weighting A does not matter since the calibration is performed at 1 kHz.

Start measuring with the *SC202* (see 11.2).

Check that the value of the function on the screen matches the value of 94.0 dB corrected with the corresponding corrections (93.9 dB).

If the reading value is within the range of ±0.5 dB, the verification is correct.

IMPORTANT: The *SC202 is* factory set with calibrated standards according to current regulations. It is recommended that the sensitivity of the sound level meter be adjusted by technically competent personnel. The readjustment of sensitivity leads to loss of traceability in the calibration of the device.

CESVA declines any responsibility due to sensitivity settings made by unauthorised personnel.

NOTE: To set the sensitivity, see 15.1.9.

NOTE: The acoustic calibrator *CB004* or *CB012* has internal static pressure compensation to keep the generated level within tolerance limits, between 65 kPa and 108 kPa of static pressure. Thus, no further correction is necessary.

Measuring and recording 11

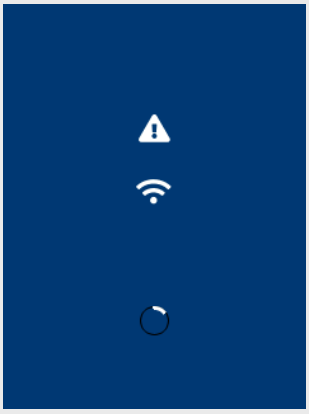
This chapter details the basic steps for manual measurement and recording.

IMPORTANT: The difference between MEASURING and RECORDING is that, with the measurement, the parameters being measured are displayed on the screen and the moment the device is turned off, the data are lost. However, with the recording, as they are measured, they are also saved in the memory of the *SC202*. So if the device is turned off, the data are preserved.

At the end of a RECORDING, the time history of the measured functions and the final results will be saved in a register. At the end of a MEASUREMENT, nothing will have been saved and only the final results of the measurement can be saved using the icon , never the time history.

NOTE: It is advisable to disable WIFI communication before measuring or recording.

In the event that the WIFI communication is not disabled at the time of measuring or recording, the SC202 will disable the WIFI and meanwhile it will show the following screen:



Once the WIFI communication is disabled ( ), the measurement or recording will start automatically.

Please note that after measurement or recording, WIFI communication will remain disabled ( ).

11.1 Prior steps

Once the *SC202* is turned on, and the device verification has been carried out (see 10.1), verify that there is no measurement in progress ■. Then make the prior adjustments (see 15).

11.2 Measuring

With the sound level meter on, press ▶ or ⏻ (see 15.1.12) to start a measurement.

During measurement, the measurement in progress indication ▶ will appear.

Once the measurement has started, you can:

- Momentarily stop the measurement, press ⏸. The status indication will change to measurement temporarily stopped ⏸.
- End the measurement by pressing ■ or ⏻ (see 15.1.12). The status indication will change to measurement completed ■. For an automatic stop of the measurement, see 15.1.6.
- In the graphic screens, perform an automatic zoom of the data presented on the screen using 🔍 or return to full range display (see 14.1).

After the measurement is complete, you can:

- Save the final results by pressing 💾. The final data corresponding to the measurement carried out will be automatically saved in memory (see 16.1). The indicator 📄 will appear in the indicator area.

NOTE: The values of the functions are updated on the screen every second.

If measurement has been stopped momentarily ⏸, the device allows:

- Perform a backerase of the last 10 seconds using ↺ (see 14.2).
- To resume the measurement press ▶ or ⏻ (see 15.1.12). While the measurement is stopped, the elapsed measurement time stops.

NOTE: Regardless of the measurement status (▶, ⏸ or ■) it is possible to choose the function shown on the screen (see 13.3), change the display screen and consult the integration times T, τ1, τ2 on the menu screen (see 12.2).

11.3 Make a recording

With the sound level meter on, start a recording by pressing ● or ⏻ (see 15.1.12).

During the recording, the recording in progress indication ● and the measurement stored in memory indication 🗎 appear.

Once the recording has started, you can:

- Momentarily stop recording with ⏸. The status indication will change to recording temporarily stopped ⏸.
- End the recording by pressing ■ or ⏻ (see 15.1.12). The status indication will change to recording completed ■. For an automatic stop of the recording, see 15.1.6.
- In the graphic screens, perform an automatic zoom of the data presented on the screen using 🔍 or return to full range display (see 14.1).

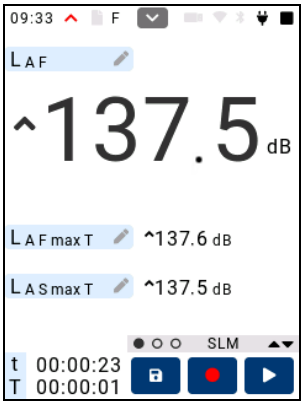
If the recording has been stopped momentarily ⏸, the device allows:

- a backerase of the last 10 seconds to be performed using ↺ (see 14.2).
- the resumption of the recording press ● or ⏻ (see 15.1.12). While the recording is stopped, the elapsed measurement time stops.

> **NOTE:** Regardless of the recording status (●, ⏸ or ■) the type of display screen can be changed.

11.4 Overload indicator

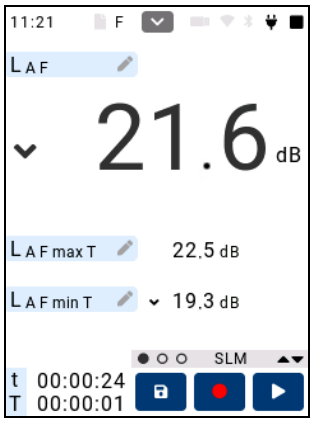
The *SC202* has an overload indicator for each function. If an overload occurs during the measurement, the indication ^ will be added in front of the value of the function that has been affected by it. When a function registers overload, its corresponding measurement will be incorrect.



While there is an overload, the indication ⌃ appears on the display in the indicator area.

11.5 "Under range" indicator

The *SC202* has an under-range indicator for each function. If the value displayed on the screen is lower than the lower limit of the linearity range, the indication ⌄ will appear in front of the value of the function that meets this condition. This indication will only appear while this condition exists.



When a function registers under range, this indicates that it is a limit of the measurement.

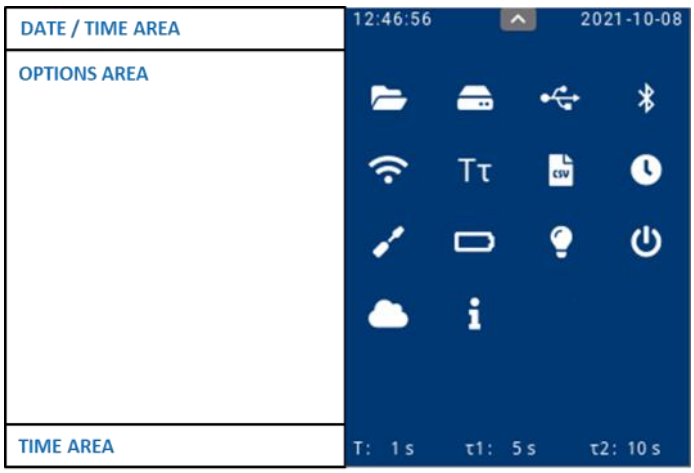
Menu 12

With the *SC202* menu it possible to:

- Manage memory and the saved registers.
- View the registers.
- Configure the settings of the *SC202.*
- Consult the device's own information.

12.1 Access the menu

Once the *SC202* is on, click on ☑. The menu screen will automatically be displayed.



- To access a menu option, click on the icon corresponding to the desired option.
- Click on ⌃ to exit the menu.

12.2 Areas of the menu

The *SC202* menu screen has the following areas:

- DATE/TIME AREA: Shows the current time and date of the *SC202*. It also shows ⌃ to exit the menu (see 12.1).
- OPTIONS AREA: Shows the options available from the *SC202* menu (see 15.1).
- TIME AREA: Shows the configured times (T: integration time, τ1: sliding time 1 and τ2: sliding time 2) in the *SC202*.

12.3 Move through the menu

To access a menu option, click on the icon corresponding to the desired option.

Screens 13

The *SC202* measures all functions simultaneously (these are detailed in Chapter 23). These functions are grouped into different screens for easy viewing.

This chapter explains all the information about these screens.

13.1 Change screen

When you turn on the sound level meter, the numeric sound level meter screen is displayed.

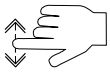
To identify the screen shown, refer to the SCREEN type area.

During measurement or recording, it is possible to change the screen that is displayed without affecting the measurement (or recording).

CHANGE THE SCREEN TO DISPLAY

- To choose the screen between the Sound Level Meter (SLM), Octave Analyser (1/1)* and Third octave band analyser (1/3)* screens: slide the screen horizontally.

- To choose the screen between the Numeric Sound Level Meter, Graphic Sound Level Meter and Pass/Fail Sound Meter or 1/1 Numeric Analyser* and 1/1 Curve Analyser* screens: swipe the screen vertically.



** Optional screens available with the FR202 module*

13.2 Actions in the display

The actions that are allowed in the display of some screens are:

- Change the function to be displayed (see 13.3)
- Modify the threshold value. To do so, use [+] and [−] until the desired value is obtained.
- Zoom [⊕] (see 14.1).
- Change the display between the times of T, t and 1s. To do so, click on [T/t].
- Change the selected band. To change it, use the directional buttons [<] [>]. To scroll faster, keep the button pressed.
- Change the display of curves from NC to NR and vice versa. To do so, press [C/R].

13.3 Screens

The *SC202* has the following screens:

- Sound level meter display (Numeric, Graphic and Pass/Fail)
- 1/1 Analyser screen * (Graph and Curves)
- 1/3 Analyser screen*

  ** Optional screens available with the FR202 module*

On the Sound Level Meter Screens the global levels of sound pressure are measured, both instantaneous and averaged values based on integration (equivalent level). The *SC202* shows the functions with all the frequency weighting (A, C and Z) and the statistical data as maximum and minimum values and percentiles. It also measures certain functions every 20 ms*. This is ideal for analysing very short duration sound events, source recognition, transient detection, etc.

** 20 ms optional (see 15.1.7)*

The parameters that can be displayed are:

TIME BASE	FUNCTIONS
t **Measurement time**	L_{At}, L_{AIt}, $L_{A\tau 1maxt}$, $L_{A\tau 1mint}$, $L_{A\tau 2maxt}$, $L_{A\tau 2mint}$, L_{AF5t}, L_{ATmaxt}, L_{ATmint}, L_{Ct}, $L_{C\tau 1maxt}$, $L_{C\tau 1mint}$, $L_{C\tau 2maxt}$, $L_{C\tau 2mint}$, L_{CTmaxt}, L_{CTmint}, L_{Zt}, L_{ZTmaxt}, L_{ZTmint} L_{AFmaxt}, L_{AFmint}, L_{ASmaxt}, L_{ASmint}, L_{AImaxt}, L_{AImint}, L_{CFmaxt}, L_{CFmint} L_{Cpeakt} L_{1t}, L_{5t}, L_{10t}, L_{50t}, L_{90t}, L_{95t}, L_{99t}
T **Integration time**	L_{AT}, L_{AIT}, $L_{A\tau 1maxT}$, $L_{A\tau 1minT}$, $L_{A\tau 2maxT}$, $L_{A\tau 2minT}$, L_{AF5T}, L_{CT}, $L_{C\tau 1maxT}$, $L_{C\tau 1minT}$, $L_{C\tau 2maxT}$, $L_{C\tau 2minT}$, L_{ZT} L_{AFmaxT}, L_{AFminT}, L_{ASmaxT}, L_{ASminT}, L_{AImaxT}, L_{AIminT}, L_{CFmaxT}, L_{CFminT} L_{CpeakT} L_{1T}, L_{5T}, L_{10T}, L_{50T}, L_{90T}, L_{95T}, L_{99T}
1 s	L_{A1s}, $L_{A\tau 1}$, $L_{A\tau 2}$, L_{AF51s}*, L_{C1s}, $L_{C\tau 1}$, $L_{C\tau 2}$, L_{Z1s} L_{AF}, $L_{AFmax1s}$*, $L_{AFmin1s}$*, L_{AS}, $L_{ASmax1s}$*, $L_{ASmin1s}$*, L_{AI}, $L_{AImax1s}$*, $L_{AImin1s}$*, L_{CF}, $L_{CFmax1s}$*, $L_{CFmin1s}$*, $L_{Cpeak1s}$*
20 ms	L_{AF20ms}*, L_{A20ms}* *(these functions are optional; to enable them see 15.1.7)*

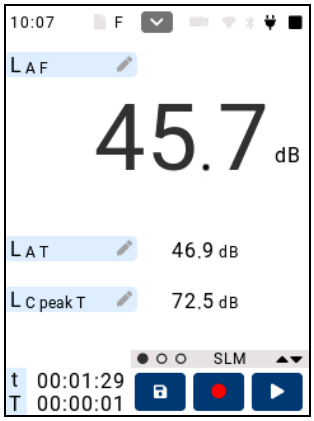
** These functions are not displayed on the screen. The way to obtain the results of these functions is by making a recording and later accessing the corresponding .CSV file.*

The percentiles are calculated from the LAF function sampled every 20 ms and with 0.1 dB classes.

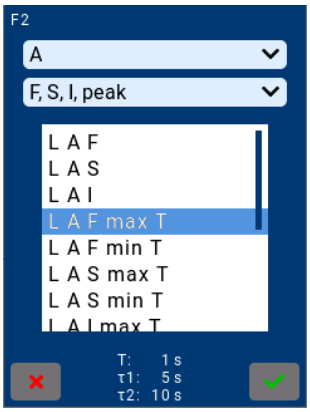
In the menu, the integration times can be configured: T, τ1 and τ2 (see 15.1.6).

<u>SOUND LEVEL METER NUMERIC SCREEN:</u>

It shows 3 functions, F1, F2 and F3, on the same screen.



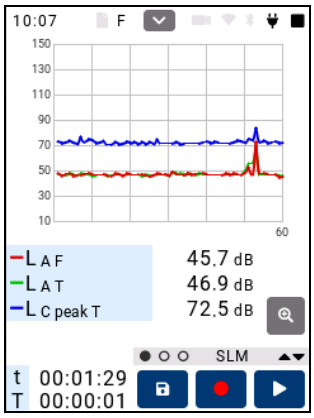
To modify the function to be displayed, click on the function edit icon ✎. A screen is automatically displayed, in which the desired function will be selected.



The SC202 allows you to modify the function to be displayed regardless of the status (▶, ●, ▮▮/▮▮ or ■).

SOUND LEVEL METER GRAPHIC SCREEN:

It shows the time history and the value of the functions F1, F2 and F3. It graphically represents the last 60 measured values.

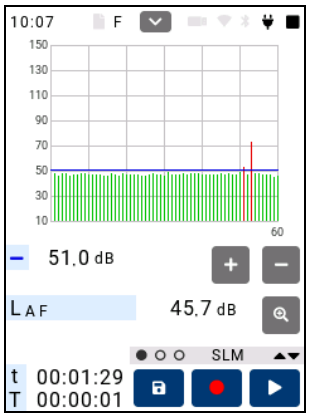


PASS/FAIL SOUND LEVEL METER SCREEN:

It graphically displays the values of the F1 function together with the threshold level.

The *SC202* compares them, and if the F1 value is greater than the threshold value, the F1 will be represented in red; otherwise, it will be represented in green.

Below the graph, the F1 value and the configured threshold level are shown numerically.



The 1/1 Analyser Screens show in real time the equivalent continuous sound pressure level in octave bands centred on frequencies 8, 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hz (without frequency weighting). Simultaneously, they show the equivalent global level with the frequency weightings (A, C and Z). They also show the background noise of rooms: NC (Noise Criterion) and NR (Noise Rating) curves.

> **NOTE:** 1/1 Analyser Screens are optional and available on the optional *FR202* module.

The parameters that can be displayed are:

TIME BASE	FUNCTIONS
t: Measurement time	L_{At}, L_{Ct} and L_{Zt} L_{ft} Evaluation of the NC (63 Hz – 8 kHz) and NR (31.5 Hz – 8 kHz) curves
T: Integration time	L_{AT}, L_{CT} and L_{ZT} L_{fT} Evaluation of the NC (63 Hz – 8 kHz) and NR (31.5 Hz – 8 kHz) curves
1 s	L_{A1s}, L_{C1s} and L_{z1s} L_{f1s}

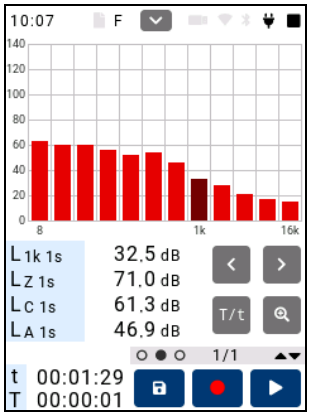
f: indicates the octave band filter with centre frequency 8, 16, 31.5, 63, 125, 250, 500, 1000 (1k), 2000 (2k), 4000 (4k), 8000 (8k) and 16000 (16k) Hz. All functions are measured simultaneously with all octave band filters and without frequency weighting.

The integration time T can be set in the menu (see 15.1.6).

1/1 GRAPHIC ANALYSER SCREEN:

It shows in real time the spectral graph of the equivalent levels by octave bands 8 Hz - 16 kHz (without frequency weighting) for the consecutive integration time T, for the measurement time t and for the integration time of 1 second.

It also shows the numerical value of the global equivalent level with the frequency weighting A, C and Z and that corresponding to the octave band selected in the graph (cursor) for T, t and 1s.



1/1 CURVE ANALYSER SCREEN:

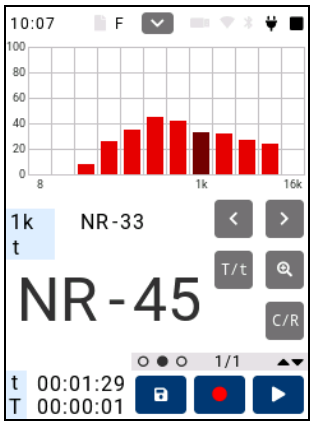
It shows the evaluation of the spectrum according to the families of NC (Noise Criterion) and NR (Noise Rating) curves for the consecutive integration time T and for the measurement time t.

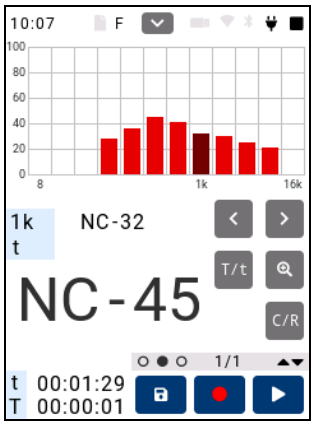
The graph shows the value of the curve that has not been exceeded in each octave band.

It also displays the numerical value of the NC and NR curve corresponding to the octave band selected in the graph (cursor) for T and t.

And in the lower left part of the work area, it shows the numerical value of the curve that does not exceed the measured spectrum, i.e. the value of the curve that defines the spectrum.

This information is useful for ascertaining which octave band is the one that fixes the value of the total spectrum curve, i.e. there must be at least a spectral value equal to the value of the curve that defines the total spectrum.





The Analyser Screen (1/3) displays in real time, for the entire dynamic measurement range, the equivalent continuous sound pressure level in the 1/3 octave bands from 6.3 Hz to 20 kHz (without frequency weighting). Simultaneously, it shows the global equivalent level with frequency weighting A, C and Z.

The parameters that can be displayed are:

TIME BASE	FUNCTIONS
t: Measurement time	L_{At}, L_{Ct} and L_{zt} L_{ft}
T: Scheduled integration time	L_{AT}, L_{CT} and L_{zT} L_{fT}
1 s	L_{A1s}, L_{C1s} and L_{z1s} L_{f1s}

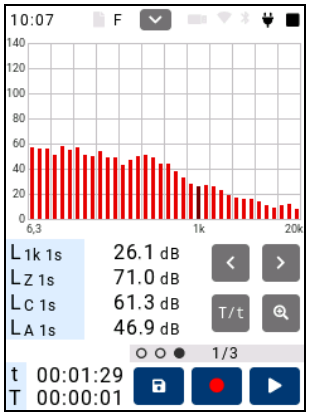
f: indicates the third octave band filter with central frequency 6.3, 8.10, 12.5, 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000 (1k), 1250 (1.25k), 1600 (1.6k), 2000 (2k), 2500 (2.5k), 3150 (3.15k), 4000 (4k), 5000 (5k), 6300 (6.3k), 8000 (8k), 10000 (10k), 12500 (12.5k), 16000 (16k) and 20000 (20k) Hz. All functions are measured simultaneously with all third octave band filters and without frequency weighting.

The integration time T can be configured in the menu (see 15.1.6).

1/3 ANALYSER SCREEN:

It displays, in real time, the spectral graph of the equivalent levels by 1/3 octave bands 6.3 Hz - 20 kHz (without frequency weighting) for the consecutive integration time T, for the measurement time t, and for the integration time of 1 second.

It also displays the numerical value of the global equivalent level with the frequency weightings A, C, and Z and that corresponding to the third octave band selected in the graph (cursor) for T, t, and 1s.



Supplementary options 14

The following options have been included in the *SC202* for user assistance during measurement: automatic Zoom in graphic displays, and Backerase.

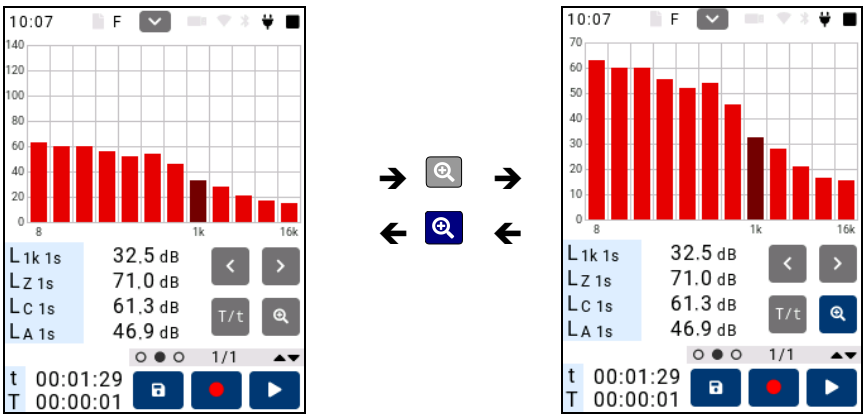
14.1 Zoom

The graphic representation of the wide dynamic range of measurement of the *SC202* does not allow the correct appreciation of highly stable sound events in the time history and spectral content in graphic screens.

A sound event with temporal variations of a few decibels will be represented as a practically constant event. Likewise, a spectrum with small differences in level between bands will appear practically represented as pink noise.

The graphical display screens of the *SC202* have the ZOOM option that adapts the scale of the Y axis to the dynamic range of the segment or spectrum of the represented sound event.

By pressing , an automatic zoom of the Y axis is carried out. At each instant, the scale of the axis varies to obtain the best possible display of the represented interval or spectrum. It is therefore possible to see variations that would otherwise be invisible.



By pressing it returns to normal display (without zoom).

14.2 Backerase

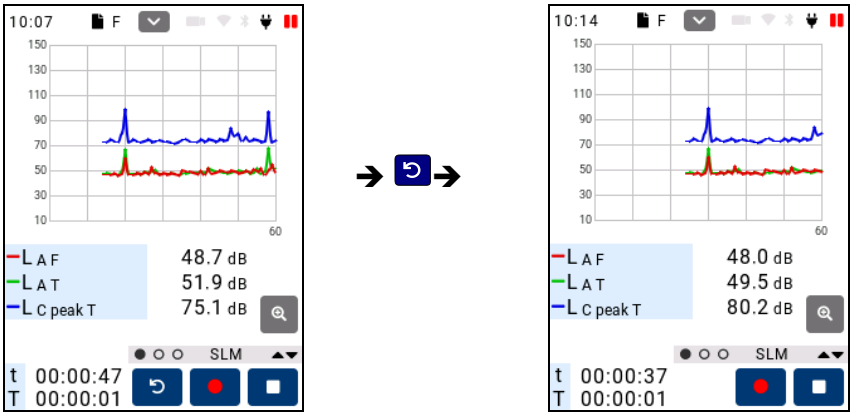
During the measurement of a sound event, especially during background noise measurements, unexpected sounds may appear that do not correspond to the sound event to be evaluated and which the sound level meter can measure. In these situations, it may be interesting to use the BACKERASE option.

This option, while the measurement is temporarily stopped / , allows the deletion of the last 10 seconds of the measurement or recording. For practical purposes, it is as if had been pressed ten seconds before it was made.

To use the BACKERASE option:

Stop the measurement or recording momentarily by pressing . The status indication will change to measurement/recording temporarily stopped / .

And by pressing , the last 10 seconds of measurement/recording will be completely erased.



The BACKERASE option is available on any display screen while measuring or recording is temporarily stopped / .

> **NOTE:** The Backerase function can be used after 10 seconds have elapsed from the start of measurement or recording.
>
> The Backerase function can only be used once during a temporary stop / . Once the measurement is resumed, it can be used again after 10 seconds.
>
> **IMPORTANT:** The use of the Backerase function may imply the loss of information from the percentile functions of some T integration period.

Settings and adjustments 15

From the menu, all the features of the *SC202* can be configured: date and time, sensitivity, *Bluetooth*® communication, WIFI network, etc.

To access the menu and move through it, see 12.

15.1 Menu options

The configuration submenu has the following options:

OPTION		FUNCTION
	REGISTERS	Access the registers stored in the memory of the *SC202*.
	MEMORY	Show information about the memory. It also allows you to erase the memory.
	USB	Configure the *SC202* as a mass storage device to download .csv files to the PC.
	BLUETOOTH®	Enable and disable *Bluetooth®* communication and select the desired Bluetooth® type.
	WIFI	Enable and disable *WIFI* communication. And enter the WIFI network.
T/τ	**TIMES**	Set the T integration time and the τ1 and τ2 sliding integration time.
CSV	**CSV**	Assign a label to the register nomenclature. And incorporate the 20 ms time base into the saved registers data.
	DATE AND TIME	Set the date and time of the *SC202*.
	MICROPHONE SETTINGS	Set the sensitivity of the *SC202*. *Select the microphone correction.*
	POWER	Configure the power.

	BRIGHTNESS	Set the screen.
	key	Configure the key.
	CLOUD	Check the connection of the SC202 with the server CESVACloud and carry out firmware updates and modules extensions.
	INFORMATION	Show information corresponding to the *SC202*.

Once in the selected option, you can make the changes you want.

ACTIVATE/DEACTIVATE AN OPTION

- To activate a menu option, slide the selector to the right .
- To deactivate a menu option, slide the selector to the left .

WRITE IN THE TEXT BOX

- To write in a text box, press on it and an on-screen keypad will automatically appear after typing the desired information, press on the keyboard to hide it.

> **NOTE:** To toggle the keypad between UPPER CASE, lower case and numeric press and .

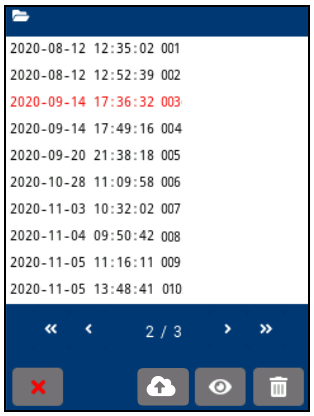
RETURN TO THE MENU SCREEN

- To accept the changes made and return to the menu screen, press .
- To reject the changes made and return to the menu screen, press .

15.1.1 REGISTERS option

With this option you can view or delete a register stored in memory, whether is a recording or a final result. It also allows you to upload the registers to the CESVACloud server (it is necessary to have an active CESVACloud account).

After selecting the REGISTERS option, the following screen will appear.



The upper part shows the list of the names of the registers stored in memory (see 16.3).

Below the list appears the number of pages of registers that there are and the number corresponding to the current page.

To scroll through the pages, use the «, <, > and » icons.

To upload the registers to the cloud and have them available from anywhere, press . Remember that you must be connected to a WIFI net (see 15.1.5), you should be connected to the CESVACloud server (see 15.1.13) and to have an active CESVACloud account.

To select a register, click on the name of the desired register. The selected register is displayed in red.

Then select the action to be carried out, view or delete the register.

SEE REGISTERS

After selecting the register, press . The final results of that record will automatically be displayed. The icon will appear in the indicator area, showing that it is a saved register.

Pressing returns to the list of registers in the memory of the *SC202*.

DELETE REGISTERS

After selecting the register, press . It then asks for confirmation to delete the register (up to 8 registers can be deleted at a time).

Press to delete it or press to return to the previous list without deleting the register.

15.1.2 MEMORY option

This option displays the information about the memory of the device. Also, allows you to delete all the registers in the memory of the *SC202*.

Once the MEMORY option is selected, a screen with the following information is displayed:

- The capacity of all memory in KiB (Kibibytes).
- The memory capacity used in KiB (Kibibytes) and in %.
- Number of registers stored in memory.

NOTE: This information belongs to drive A of memory (see 16).

To erase the memory completely, press , then confirmation is requested to erase the memory.

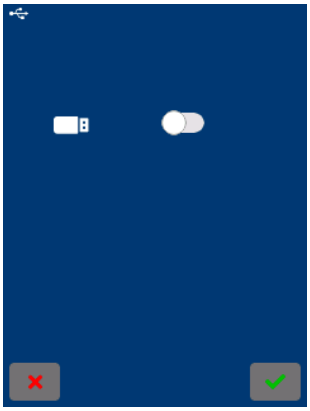
Press to delete it or press to return to the previous screen without deleting it.

NOTE: When the memory (drive A) is erased, if the label in 15.1.7 CSV Option is blank, the memory counter is reset to 1.

15.1.3 USB option

This option allows you to configure the *SC202* as a mass storage device.

After selecting the USB option, the following screen will be displayed:



For the SC202 behaves as a mass storage device when it is connected to the PC, the USB option must be enabled.

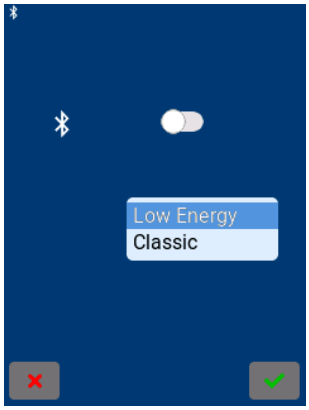
While the sound level meter is configured to behave as a mass storage device, the SC202 does not allow any measuring or recording and the menu options REGISTERS, MEMORY, DATE/TIME and MICROPHONE settings are disabled.

NOTE: For the SC202 to communicate through the protocol, disable the USB option (see 17.2.1).

15.1.4 *BLUETOOTH*® option

This option allows *Bluetooth*® communication to be activated and select the type of Bluetooth® to be used.

Once the *BLUETOOTH*® option is selected, this screen is displayed:



There the option can be enabled or disabled, as appropriate.

And from the drop-down menu you can select the desired Bluetooth® type:

- Low Energy (BLE)
- Classic (SPP)

> **NOTE:** The dropdown menu appears as of firmware version 1.03 (see 15.1.14). If you have version 1.03 or higher and the drop-down menu does not appear, contact your official distributor CESVA.

In order for the sound level meter to connect via Bluetooth®, this option must be activated.

The *Bluetooth*® symbol appears in the indicators area.

INDICATOR	DESCRIPTION
	Bluetooth disabled.
	Bluetooth enabled.
	Bluetooth enabled (Classic SPP).
(o)	Bluetooth enabled and showing (Advertising).
(o)	Bluetooth enabled and connected with another *Bluetooth*® *device (mobile phone, tablet, etc.).*

For more information about *Bluetooth*® wireless communication see 17.2.2.

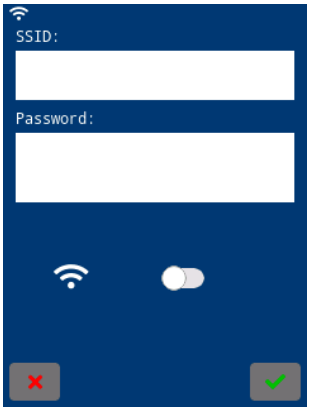
The *Bluetooth*® trademark is owned by *Bluetooth* SIG, Inc.

NOTE: To save battery, disable *Bluetooth*® communication when it is not needed.

15.1.5 *WIFI* option

This option allows to enable and disable the WIFI wireless communication and enter the WIFI network to which the *SC202* will connect to.

Once the WIFI option is selected, this screen is displayed:



Write the WIFI network in the SSID text box and the password in the Password text box.

For the sound level meter to connect to the entered WIFI network, the selector must be enabled.

While the WIFI option is disabled, the CLOUD option remains disabled.

NOTE: To save battery, disable communication through the WIFI network when it is not needed.

NOTE: To measure or record, you must have communication via the WIFI network disabled.

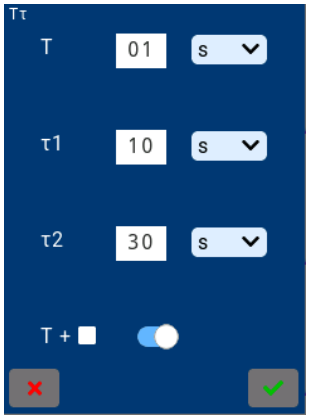
The WIFI symbol appears in the indicator area.

INDICATOR	DESCRIPTION
	WIFI activated and connected with maximum coverage.
	WIFI activated and connected with little coverage
	WIFI activated, connected but without coverage
	WIFI activated but not connected to the network.

15.1.6 TIMES option

This option allows you to configure the T integration time and the τ1 and τ2 sliding integration time. And activate or deactivate the automatic stop.

After selecting the TIMES option, the following screen is automatically displayed



Write the desired time in each text box and then click on the drop-down menu to select the time units (seconds, minutes or hours).

For automatically stop the measurement or recording, after the time T has elapsed, the T+ ■ option must be activated.

15.1.7 CSV option

This option allows you to assign a label to the register nomenclature; then the text entered in the label field will be incorporated into the name of all the measurements performed from that moment on. This tool greatly facilitates the identification of each register.

The CSV option also allows to indicate that the functions with a 20 ms time base will be saved, to later obtain the .csv files with that time base.

In addition, this option allows to define the decimal separator.

When the CSV option is selected, the following screen is displayed:

LABEL

Write the name of the label that you want to assign to the next measurements and recordings.

20 ms

Enable or disable the option as appropriate.

DECIMAL SEPARATOR **XXX X**

Set the decimal separator using the drop-down menu.

15.1.8 DATE AND TIME option

This option allows you to set the date and time (and the time offset) of the *SC202*, with which the *SC202* references the measurements and recordings.

After selecting the DATE AND TIME option, the following screen is automatically displayed:

The *SC202* allows to set the date and time manually or automatically.

MANUALLY

Write the date and time in the corresponding text box.

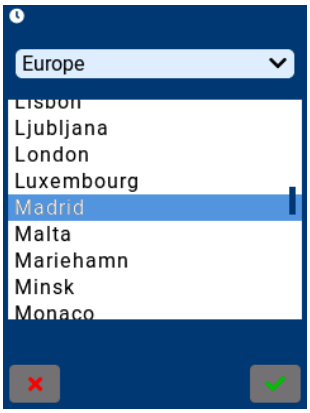
YYYY - MM - DD (year - month - day)

HH - MM - SS (hour - minutes - seconds)

To modify the time offset, press − + as required. Each press of + or − equals an increase or decrease of 15 minutes.

AUTOMATICALLY

Pressing ☁, the *SC202* displays the following screen with a drop-down menu of zones along with a list of cities that define the different time zones. The desired time zone must be selected.



NOTE: In order to make the settings automatically, the device must be connected to the CESVACloud server (see 15.1.13).

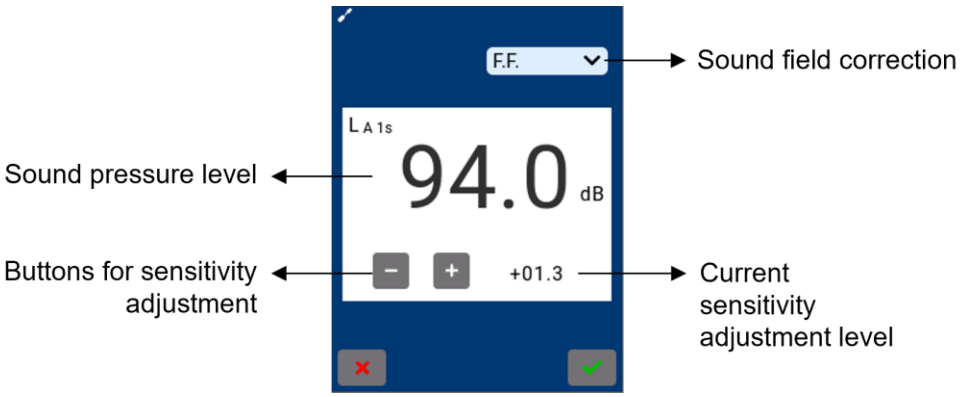
15.1.9 MICROPHONE SETTINGS option

This option allows you to select the sound field correction and set the sensitivity of the *SC202*.

NOTE: It is recommended that the sensitivity of the sound level meter be adjusted by technically competent personnel. The readjustment of sensitivity leads to loss of traceability in the calibration of the device.

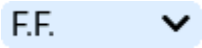
For the verification process before and after the measurement with a calibrator, it is recommended to perform it as detailed in 10.1.

By selecting this option, the display will show the sound pressure level measured by the *SC202* and the following parameters: the sound field correction and the sensitivity settings level currently configured.



MICROPHONE CORRECTION

Select the desired correction from the corresponding drop-down menu



The available options are:

F.F. Free field

D.F. Diffuse field

SENSITIVITY SETTINGS

To set the sensitivity, you will need an acoustic calibrator. Before adjusting this setting, carefully read section 10.1 and obtain the value to which you must set the *SC202*.

Make sure the calibrator is correctly positioned and turned on. To set the sound level meter reading to the value calculated with the pressure-free field correction (see 10), press and . If you press , then it asks for confirmation to make the change of sensitivity setting.

Press to confirm it or press to return to the previous list without making the sensitivity adjustment.

Each time a sensitivity setting is made, the sound level meter saves a log in drive B of the internal memory (see 17.2.1)

IMPORTANT: The *SC202 is* factory set with calibrated standards according to current regulations. Nótese que el nivel de ajuste de sensibilidad no tiene por qué ser 00.0 dB. It is recommended that the sensitivity of the sound level meter be adjusted by technically competent personnel. The readjustment of sensitivity leads to loss of traceability in the calibration of the device.

NOTE: For the verification process before and after the measurement with a calibrator, it is recommended to perform it as detailed in 10.1.

15.1.10 POWER option

In this option, the type of batteries used is indicated.

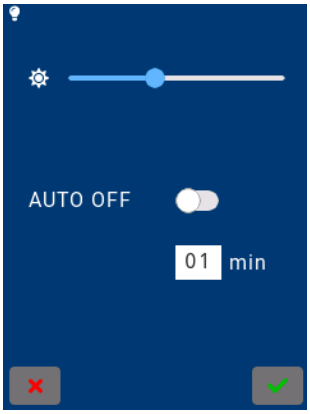
Select the type of batteries using the drop-down menu.

It also allows to activate or deactivate the option to turn on the sound level meter through USB (see 9.1).

15.1.11 BRIGHTNESS option

This option allows to set the screen brightness. As well as the automatic screen lock time; that is to say, the time it takes for the screen to turn off by itself (if it is not touched).

When the BRIGHTNESS option is selected, the following screen is displayed:



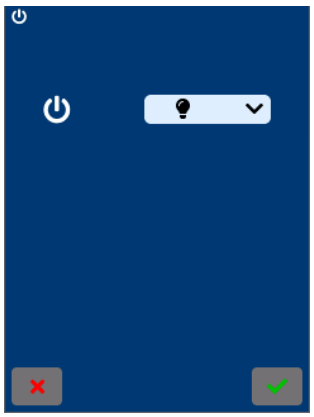
To set the brightness of the screen, move the slider until the desired brightness is achieved.

To set a waiting time, type the desired minutes in the text box and then enable AUTO OFF.

15.1.12 KEY OPTION

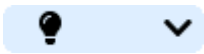
This option allows to select the action to be performed when the key is pressed briefly, when the SC202 is on.

When selecting the KEY option from the menu, the following screen appears:



KEY ACTIONS

Select the desired option from the drop-down menú.



The available options are:

Turn ON /OFF the screen

Start and stop a measurement

Start and stop a recording

15.1.13 CLOUD option

This option allows to verify that the SC202 has successfully connected to the CESVACloud server. The connection to CESVACloud is automatic and is done through the internet connection offered by WIFI communication.

> **NOTE:** The device will be connect to the server CESVACloud,while the WIFI option es enabled and has internet access.

By selecting the CLOUD option, the screen will show the connection status:

The SC202 is connected to the CESVACloud server

The SC202 is not connected to the CESVACloud server

NOTE: Check the settings and WIFI connection and internet access.

If there is a firmware update pending for installation and/or a module has been purchased, a list will appear at the bottom. If you wish to update the firmware and/or activate a module, see chapter 22.

15.1.14 Option INFORMATION

This option displays the information pertaining to the *SC202* itself.

When selecting the INFORMATION option, the following information is displayed on screen:

- Model
- Serial number
- Checksum
- Optional *SC202* modules purchased
- Optional *SC202 Link* modules purchased
- WIFI MAC address
- BT address
- BT name
- Standards met by the sound level meter

Registers and memory management 16

The *SC202* memory is structured into two units (drive A and drive B).

The values of the measured functions can be stored in the memory of the *SC202*. By turning it off, saved data are not lost and can be retrieved, viewed and erased directly from the *SC202* itself or copied from memory to a computer.

.

The types of registers that are kept in drive A are:

- Final results of a measurement
- Continuous recordings of measured functions

If a recording is made, the time history of all the functions and, when the measurement is finished, the final results of the measurement are automatically saved in the memory.

Another option is to measure and at the end save the results. This register will not contain the time history of the functions, only the final results.

The history* of the adjustments made is saved in drive B.

** The history can only be consulted through the PC (see 17.2.1).*

The total memory capacity of the SC202 is more than 16 GB and 13.3 GB of this memory belongs to A drive.

Next an example of how much memory space takes a 24-hour register:

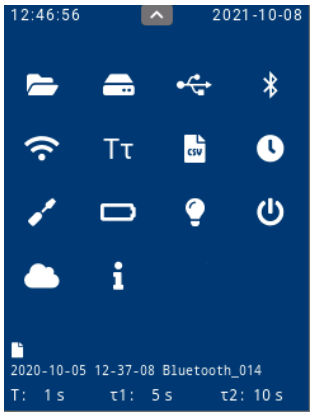
REGISTER	SIZE
24h register	92 MB
24h register (20 ms time base included)	153 MB
Final results	6 KB

16.1 Save a final result

To save a final result in memory (does not save the time history of the measurement), once a measurement has been made (■), press 💾.

This will save the final result of all the measured functions.

If the menu is then accessed, the last saved register will be displayed at the bottom of the screen.



The saved functions are detailed below:

TIME BASE		FUNCTIONS FINAL RESULT
t **Measurement time**	SLM	L_{At}, L_{Alt}, $L_{A\tau 1maxt}$, $L_{A\tau 1mint}$, $L_{A\tau 2maxt}$, $L_{A\tau 2mint}$, L_{AF5t}, L_{ATmaxt}, L_{ATmint}, L_{Ct}, $L_{C\tau 1maxt}$, $L_{C\tau 1mint}$, $L_{C\tau 2maxt}$, $L_{C\tau 2mint}$, L_{CTmaxt}, L_{CTmint}, L_{Zt}, L_{ZTmaxt}, L_{ZTmint} L_{AFmaxt}, L_{AFmint}, L_{ASmaxt}, L_{ASmint}, L_{AImaxt}, L_{AImint}, L_{CFmaxt}, L_{CFmint} L_{Cpeakt} L_{1t}, L_{5t}, L_{10t}, L_{50t}, L_{90t}, L_{95t}, L_{99t}
	1/1	L_{ft} *f: 8, 16, 31.5, 63, 125, 250, 500, 1000 (1k), 2000 (2k), 4000 (4k), 8000 (8k) and 16000 (16k) Hz.*
	1/3	L_{ft} *f: 6.3, 8.10, 12.5, 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000 (1k), 1250 (1.25k), 1600 (1.6k), 2000 (2k), 2500 (2.5k), 3150 (3.15k), 4000 (4k), 5000 (5k), 6300 (6.3k), 8000 (8k), 10000 (10k), 12500 (12.5k), 16000 (16k) and 20000 (20k) Hz.*

NOTE: The functions of screen types 1/1 and 1/3 will only be saved if the *FR202* module is available.

The nomenclature used for each of the measured functions as well as their definition can be found in chapter 23.

16.2 Make a recording

A recording consists of measuring by storing in memory (Drive A) the functions measured with a certain periodicity (the time history). At the end of the recording, the final results are also saved.

To make a recording, press ● (see 11.3).

The saved functions are detailed below:

TIME BASE		FUNCTIONS
t **Measurement time**	SLM	L_{At}, L_{AIt}, $L_{A\tau 1maxt}$, $L_{A\tau 1mint}$, $L_{A\tau 2maxt}$, $L_{A\tau 2mint}$, L_{AF5t}, L_{ATmaxt}, L_{ATmint}, L_{Ct}, $L_{C\tau 1maxt}$, $L_{C\tau 1mint}$, $L_{C\tau 2maxt}$, $L_{C\tau 2mint}$, L_{CTmaxt}, L_{CTmint}, L_{Zt}, L_{ZTmaxt}, L_{ZTmint} L_{AFmaxt}, L_{AFmint}, L_{ASmaxt}, L_{ASmint}, L_{AImaxt}, L_{AImint}, L_{CFmaxt}, L_{CFmint} L_{Cpeakt} L_{1t}, L_{5t}, L_{10t}, L_{50t}, L_{90t}, L_{95t}, L_{99t}
	1/1	L_{ft} Evaluation of the NC (8 Hz – 16 kHz) and NR (8 Hz – 16 kHz) curves f: 8, 16, 31.5, 63, 125, 250, 500, 1000 (1k), 2000 (2k), 4000 (4k), 8000 (8k) and 16000 (16k) Hz.
	1/3	L_{ft} f: 6.3, 8.10, 12.5, 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000 (1k), 1250 (1.25k), 1600 (1.6k), 2000 (2k), 2500 (2.5k), 3150 (3.15k), 4000 (4k), 5000 (5k), 6300 (6.3k), 8000 (8k), 10000 (10k), 12500 (12.5k), 16000 (16k) and 20000 (20k) Hz.
T: Integration interval	SLM	L_{AT}, L_{AIT}, $L_{A\tau 1maxT}$, $L_{A\tau 1minT}$, $L_{A\tau 2maxT}$, $L_{A\tau 2minT}$, L_{AF5T}, L_{CT} $L_{C\tau 1maxT}$, $L_{C\tau 1minT}$, $L_{C\tau 2maxT}$, $L_{C\tau 2minT}$, L_{ZT} L_{AFmaxT}, L_{AFminT}, L_{ASmaxT}, L_{ASminT}, L_{AImaxT}, L_{AIminT}, L_{CFmaxT}, L_{CFminT} L_{CpeakT} L_{1T}, L_{5T}, L_{10T}, L_{50T}, L_{90T}, L_{95T}, L_{99T}
	1/1	L_{fT} Evaluation of the NC (8 Hz – 16 kHz) and NR (8 Hz – 16 kHz) curves f: 8, 16, 31.5, 63, 125, 250, 500, 1000 (1k), 2000 (2k), 4000 (4k), 8000 (8k) and 16000 (16k) Hz.
	1/3	L_{fT} f: 6.3, 8.10, 12.5, 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000 (1k), 1250 (1.25k), 1600 (1.6k), 2000 (2k), 2500 (2.5k), 3150 (3.15k), 4000 (4k), 5000 (5k), 6300 (6.3k), 8000 (8k), 10000 (10k), 12500 (12.5k), 16000 (16k) and 20000 (20k) Hz.
1 s	SLM	L_{A1s}, $L_{A\tau 1}$, $L_{A\tau 2}$, L_{AF51s*}, L_{C1s}, $L_{C\tau 1}$, $L_{C\tau 2}$, L_{Z1s} L_{AF}, $L_{AFmax1s}$*, $L_{AFmin1s}$*, L_{AS}, $L_{ASmax1s}$*, $L_{ASmin1s}$*, L_{AI}, $L_{AImax1s}$*, $L_{AImin1s}$*, L_{CF}, $L_{CFmax1s}$*, $L_{CFmin1s}$*, $L_{Cpeak1s}$*
	1/1	L_{f1s} f: 8, 16, 31.5, 63, 125, 250, 500, 1000 (1k), 2000 (2k), 4000 (4k), 8000 (8k) and 16000 (16k) Hz.

	1/3	L_{f1s} f: 6.3, 8.10, 12.5, 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000 (1k), 1250 (1.25k), 1600 (1.6k), 2000 (2k), 2500 (2.5k), 3150 (3.15k), 4000 (4k), 5000 (5k), 6300 (6.3k), 8000 (8k), 10000 (10k), 12500 (12.5k), 16000 (16k) and 20000 (20k) Hz.
20 ms	SLM	L_{AF20ms}*, L_{A20ms}* *(these functions are optional; to enable them see 15.1.7)*

** These functions are not displayed on the screen. The way to obtain the results of these functions is by making a recording and later accessing the corresponding .CSV file.*

> **NOTE:** The functions of screen types 1/1 and 1/3 will only be saved if the *FR202* module is available.
>
> The functions belonging to the 20 ms time base will only be saved if it has been previously configured (see 15.1.7)

16.3 Structure of a register

Each time a final result is saved or a recording is made, the *SC202* stores a register in memory.

The name for each register consists of:

DATE and TIME (of start)	LABEL_ (see 15.1.7)	REGISTER No.
2020-10-05 12:37:08	Bluetooth_	014
2020-10-05 14:23:26	Bluetooth_	015
2020-10-06 09:10:43	Bluetooth_	016

Each register corresponds to a folder. This contains the files belonging to the measurement carried out. There will be one file for each time base. Therefore, if a final result is saved, there will be a single file in the folder, and this will correspond to the time base of t. However, if a recording is made, the folder will contain 3 (or 4) files belonging to the time bases of t, T, 1s (and 20ms*).

** 20 ms, optional time base. To enable it see 15.1.7*

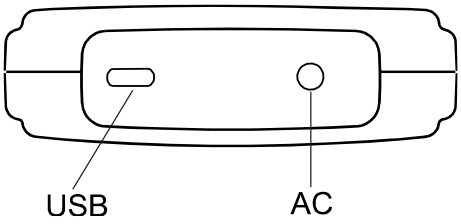
16.4 View and delete registers

To view or delete a register stored in memory, it doesn't matter if it is a recording or a final result, verify that there is no measurement in progress ■ and access the menu (see 12.1). The menu screen will automatically appear, select the REGISTERS option, which allows you to view and delete the desired record (see 15.1.1).

16.5 Erase the memory

To completely erase the memory of the *SC202*, verify that there is no measurement in progress ■ and access the menu (see 12.1). The menu screen will automatically be displayed; select the MEMORY option, which allows you to erase the *SC202* memory completely (see 15.1.2).

Use of the inputs and outputs 17



The digital inputs and outputs and the AC output of the *SC202* are detailed below.

- **AC output:** Analogue output

Communication inputs/outputs:

- **USB**: Digital communication. Compliant with USB 2.0 Type C full-speed
- ***Bluetooth*® wireless communication**: BLE or classic wireless digital communication
- **WIFI communication**: Wireless digital communication.

17.1 AC output

The AC (alternating current) output is an analogue output directly proportional to the preamplifier output without frequency weighting and is available in the AC output connector [15] on the bottom of the device.

The AC output connector is mono female mini jack type. To connect it to any audio device (PC sound card, DAT, digital recorder, headphones, etc.), use a standard audio cable (on one end it must have a mono male mini jack connector and on the other the appropriate connector to the audio device).

The AC output allows you to listen to the signal being measured by simply connecting a pair of headphones and thus determine if it is influenced by noises other than those to be measured.

It is also possible to record this signal in an audio recording device for recognition of the measured sound event, or for later analysis, by performing a calibrated

recording with a lossless recording system and with sufficient linear dynamic recording range.

A calibrated recording consists of recording a calibration signal before and after recording the measurement and without varying recording gains. Typically, the 1 kHz 94 dB tone generated by the *CB004* or *CB012* acoustic calibrator is used. The input gain of the measurement device is then adjusted so that it correctly measures the recorded calibration signal.

NOTE: Be aware that very low sound levels may not be heard.

17.2 Digital inputs and outputs

17.2.1 USB communication

The USB is a digital communications input/output and is available on the bottom of the *SC202*.

The USB connector [14] is of the USB type C. To connect with a computer, use the *CN500* cable.

With this input/output it is possible to:

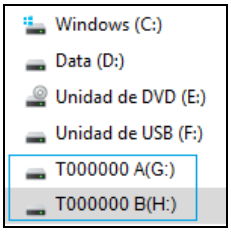
- Power the *SC202* by connecting it to a PC, a power bank or a power supply.
- Access data stored in memory.

  To do so:

  - Enable the USB option in the menu (see 15.1.3).
  - When connecting the *SC202* to a PC, it behaves like a mass storage device, in such a way that the PC recognises it as two external drives (read-only), drive A and drive B*.

    ***** *To view drive B, use a PC with Microsoft Windows (Windows10), Mac OS X, or Linux operating system. Display of drive B with other operating systems cannot be guaranteed.*

    Example:

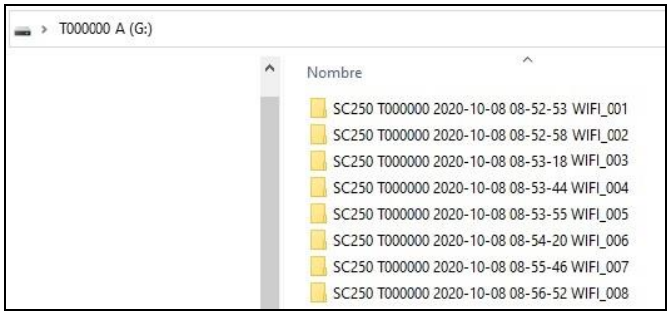


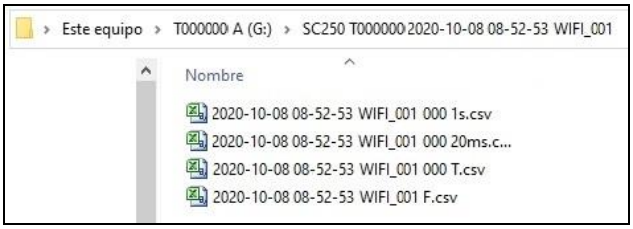
Windows 10 operating system

Drive A contains the folders with the csv files corresponding to final results (see 16.1) and recordings (see 16.2). These csv files can be opened directly from Microsoft® Excel. They can also be

exported to the *CESVA Lab* application (available at www.cesva.com).

The folders with the csv files are structured as follows: each folder corresponds to a measurement and within each folder there is a csv file for every 24 hours of recording for each time base (T, t, 1s, 20ms*).

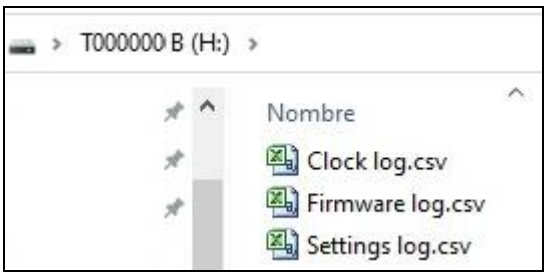




** To save the data with the 20ms time base see 15.1.7.*

Drive B* includes csv files that list the settings made (Clock, Firmware and Settings).

***** *To view drive B, use a PC with Microsoft Windows (Windows10), Mac OS X, or Linux operating system. Display of drive B with other operating systems cannot be guaranteed.*



NOTE: Drives A and B are read-only. Therefore, they cannot be written to or erased from the PC, thus avoiding data loss.

NOTE: To view drive B use a PC with Microsoft Windows (Windows10), Mac OS X or Linux operating system. Display of drive B with other operating systems cannot be guaranteed.

- Communicate via the protocol. To communicate via the protocol, it is essential to have the USB option disabled (see 15.1.3).

  To obtain the protocol, contact your CESVA official retailer.

17.2.2 Bluetooth ®communication.

The *SC202* has Class 1 internal *Bluetooth*® communication.

From the *BLUETOOTH*® option of the menu, this input/output can be enabled or disabled and select the desired Bluetooth® type (see 15.1.4).

To carry out *Bluetooth*® communication via radio frequency, the device must have *Bluetooth*® communication.

With this input/output it is possible:

- To connect the *SC202* sound level meter to the CESVA*SC202* Link App
- To communicate the *SC202* with a device (PC, Tablet, mobile, etc.) via a protocol. To obtain the protocol, contact your CESVA official retailer.

NOTE: To save battery, disable *Bluetooth*® communication when this communication is not needed.

17.2.3 WIFI

The *SC202* has WIFI communication.

From the WIFI option of the menu, this input/output can be enabled or disabled (see 15.1.5).

With this input/output it is possible to:

- Send the registers to the CESVACloud server and thus access them from anywhere. To send the registers it is necessary to have an active CESVACloud account.
- Synchronise the date and time of the *SC202* sound level meter with the CESVACloud server (see 15.1.8).
- Update the firmware of the *SC202* sound level meter without having to send it to the technical service (see 22.1).
- Activate of an expansion module (see 22.2).

NOTE: To save battery, disable the WIFI option when this communication is not needed.

Accessories 18

The accessories supplied with the *SC202* and the optional accessories that can be purchased additionally are listed below.

18.1 Accessories supplied

The following accessories are supplied with the *SC202*:

MODEL	DESCRIPTION
CN500	PC connection cable (USB type C – USB A)
PV009	Windscreen
FN004	Case
	3 units 1.5 V batteries

18.2 Optional accessories

The following optional accessories are available for the *SC202*:

MODEL	DESCRIPTION
CB004	Class 2 acoustic calibrator
CB012	Class 2 acoustic calibrator
TR040	Tripod (height 1.10 m)
TR050	Tripod (height 1.50 m)
ML043	Transport briefcase (48x37x16 cm)
ML013	Transport briefcase (39x32x12 cm)
ML063	Special outdoors transport briefcase (51x38x15 cm)
AM300	Mains transformer, usb-C (V= 100/240 V, 50/60 Hz)
CN105	Microphone extension cable (5 m)
CN110	Microphone extension cable (10 m)

TR002	Tripod adaptor
PR003	Extendable pole of 3 m

NOTE: CESVA only guarantees that the device will work properly when original CESVA accessories are used. Any damage caused to the device due to the use of non-original accessories is excluded from the guarantee.

Technical specifications 19

This chapter contains the technical specifications of the CESVA *SC202* sound level meter designed to comply, among others, with the following standards:

- IEC 61672-1:2013, Class 2, Group X and Z
- IEC 61260-1:2014, Class 2

The class of the *SC202* according to the IEC 61672-1 standard for the response to sound waves incident on the microphone in the reference direction in a free field depends on the microphone incorporated.

CLASS	MICROPHONE
2	*P008*

When the field correction is configured for diffuse field, the *SC202* complies with the class indicated above according to the IEC 61672-1 standard for the response with random incidence in a diffuse field and with the ANSI S1.4:2014 / Part 1 standards and ANSI S1.43:97 (R2007) type 2.

NOTE: The corrections indicated in this chapter have been made and are expressed according to the IEC 62585: 2012 standard.

NOTE: Specifications in bold include, in parentheses, the section in chapter 9.3 on the IEC 61672-1 standard regarding information for sound level meter tests.

19.1 REFERENCE CONDITIONS

REFERENCE DIRECTION	Perpendicular to the microphone diaphragm	
MICROPHONE REFERENCE POINT (c): P008	Central point of the microphone diaphragm	
REFERENCE RANGE OF LEVELS (b)	There is only one range of levels and this is the reference range	
REFERENCE SOUND PRESSURE LEVEL (a)	94 (referred to 20 μPa)	dB
REFERENCE FREQUENCY	1	kHz
REFERENCE TEMPERATURE	23	°C
REFERENCE RELATIVE HUMIDITY	50	%
REFERENCE ATMOSPHERIC PRESSURE	101.325	kPa

19.2 MICROPHONES AND PREAMPLIFIERS

The table below shows the technical features of the microphones and the accessories that attach to them.

19.2.1 Microphone models and their main features

The *SC202* as Class 2 can incorporate the following microphone models of the CESVA brand: *P008*.

MICROPHONE	MICROPHONE *P008*
TYPE, SIZE and FIELD:	Condenser, ½" prepolarized and free field
REFERENCE DIRECTION	Perpendicular to the microphone diaphragm
POLARISATION	0 V
NOMINAL SENSITIVITY: in reference conditions	16.0 mV/Pa
MAXIMUM SPL LEVEL (i): that the microphone can measure without damaging the device	145 dB
ELECTRICAL CHECKING ADAPTOR (g)	*ADM0CP05* adapter
MAXIMUM VOLTAGE APPLICABLE WITH THE ADAPTER (j):	16.5 Vpp
ADAPTOR FOR ELECTRICAL NOISE TESTS (h)	*ADM0P05* adapter + *TP001* closure
ADM0P05 IMPEDANCE:	100 Ω

19.2.2 Sound field correction for periodic tests

To carry out periodic tests, the use of the B&K model 4226 multifunction acoustic calibrator or the B&K model UA035 (d) electrostatic actuator, is recommended.

CORRECTION OF THE SOUND FIELD GENERATED BY THE MULTIFUNCTION ACOUSTIC CALIBRATOR, BRAND B&K, MODEL 4226 TO FREE FIELD:

	P008	
FREQUENCY [Hz]	**Correction [dB]**	**Uncertainty [dB]**
31.5	0.01	0.15
63	-0.07	0.14
125	-0.05	0.13
250	0.00	0.13

500	-0.02	0.14
1000	-0.09	0.14
2000	0.08	0.16
4000	0.54	0.21
8000	3.35	0.28
12500	6.02	0.35
16000	3.66	0.43

19.2.3 Frequency response

RESPONSE TO PLANE PROGRESSIVE SOUND WAVES INCIDENT IN THE REFERENCE DIRECTION

Correction for the average frequency microphone response for plane progressive sound waves incident in the reference direction:

		P008	
	FREQUENCY [Hz]	**Correction**	**Uncertainty**
	Exact in base 10	**[dB]**	**[dB]**
63	**63,0957**	0.02	0.02
80	**79,4328**	0.03	0.02
100	**100**	0.02	0.02
125	**125,893**	0.02	0.02
160	**158,489**	0.00	0.02
200	**199,526**	0.04	0.02
250	**251,189**	0.00	0.00
315	**316,228**	-0.01	0.00
400	**398,107**	-0.04	0.00
500	**501,187**	-0.09	0.00
630	**630,957**	-0.18	0.00
800	**794,328**	-0.24	0.00
1000	**1000**	-0.30	0.00
	1059,25	-0.27	0.00
	1122,02	-0.32	0.00
	1188,50	-0.34	0.00
1250	**1258,93**	-0.34	0.00
	1333,52	-0.36	0.00
	1412,54	-0.36	0.00
	1496,24	-0.38	0.00

1600	**1584.89**	-0.40	0.00
	1678. 80	-0.43	0.00
	1778.28	-0.47	0.00
	1883.65	-0.50	0.00
2000	**1995.26**	-0.52	0.00
	2113.49	-0.56	0.00
	2238.72	-0.57	0.00
	2371.37	-0.59	0.00
2500	**2511.89**	-0.62	0.00
	2660.73	-0.68	0.00
	2818.38	-0.69	0.00
	2985.38	-0.74	0.00
3150	**3162.28**	-0.82	0.00
	3349.65	-0.87	0.00
	3548.13	-0.94	0.00
	3758.37	-1.03	0.00
4000	**3981.07**	-1.16	0.00
	4216.97	-1.25	0.00
	4466.84	-1.35	0.00
	4731.51	-1.49	0.00
5000	**5011.87**	-1.64	0.00
	5308.84	-1.74	0.02
	5623.41	-1.95	0.02
	5956.62	-2.04	0.02
6300	**6309.57**	-2.10	0.02
	6683.44	-2.12	0.02
	7079.46	-2.17	0.02
	7498.94	-2.10	0.02
8000	**7943.28**	-1.85	0.02
	8413.95	-1.59	0.02
	8912.51	-1.31	0.02
	9440.61	-0.96	0.02
10000	**10000**	-0.62	0.02
	10592.5	-0.27	0.02
	11220.2	0.19	0.02
	11885.0	0.56	0.02
12500	**12589.3**	0.85	0.02
	13335.2	0.98	0.02

	14125.4	0.90	0.02
	14962.4	0.18	0.02
16000	**15848,9**	-1.45	0.05

Free-field response of the *SC202* to sinusoidal plane waves relative to the corresponding free-field response in the reference direction

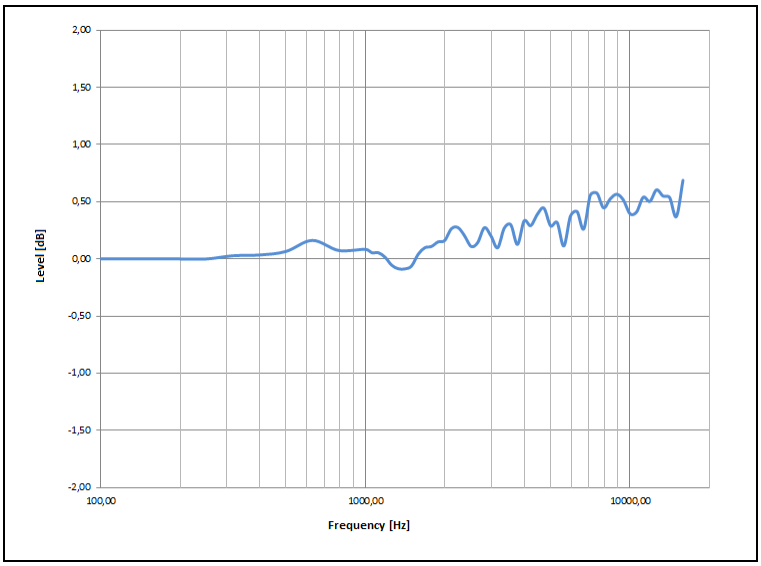
		SC202	
	FREQUENCY [Hz]	**Correction**	**Uncertainty**
	Exact in base 10	**[dB]**	**[dB]**
250	**251,189**	0.00	0.00
315	**316,228**	0.01	0.00
400	**398,107**	-0.02	0.00
500	**501,187**	-0.03	0.00
630	**630,957**	-0.01	0.00
800	**794,328**	-0.15	0.00
1000	**1000**	-0.20	0.00
	1059,25	-0.20	0.00
	1122,02	-0.25	0.00
	1188,50	-0.30	0.00
1250	**1258,93**	-0.38	0.00
	1333,52	-0.42	0.00
	1412,54	-0.42	0.00
	1496,24	-0.42	0.00
1600	**1584.89**	-0.33	0.00
	1678. 80	-0.30	0.00
	1778.28	-0.32	0.00
	1883.65	-0.30	0.00
2000	**1995.26**	-0.31	0.00
	2113.49	-0.24	0.00
	2238.72	-0.24	0.00
	2371.37	-0.33	0.00
2500	**2511.89**	-0.43	0.00
	2660.73	-0.45	0.00
	2818.38	-0.33	0.00
	2985.38	-0.44	0.00
3150	**3162.28**	-0.60	0.00

	3349.65	-0.47	0.00
	3548.13	-0.50	0.00
	3758.37	-0.74	0.00
4000	**3981.07**	-0.65	0.00
	4216.97	-0.77	0.00
	4466.84	-0.77	0.00
	4731.51	-0.85	0.00
5000	**5011.87**	-1.17	0.00
	5308.84	-1.26	0.04
	5623.41	-1.72	0.04
	5956.62	-1.59	0.04
6300	**6309.57**	-1.66	0.04
	6683.44	-1.87	0.04
	7079.46	-1.64	0.04
	7498.94	-1.57	0.04
8000	**7943.28**	-1.46	0.04
	8413.95	-1.11	0.04
	8912.51	-0.78	0.04
	9440.61	-0.47	0.04
10000	**10000**	-0.22	0.04
	10592.5	0.19	0.04
	11220.2	0.80	0.04
	11885.0	1.19	0.04
12500	**12589.3**	1.65	0.04
	13335.2	1.79	0.04
	14125.4	1.79	0.04
	14962.4	1.05	0.04
16000	**15848,9**	-0.13	0.09

Correction for the average effects of the reflections of the sound level meter case and the diffraction around the microphone for plane progressive sound waves incident in the reference direction:

		SC202	
	FREQUENCY [Hz]	Correction	Uncertainty
	Exact in base 10	[dB]	[dB]
63	**63,0957**	0.00	0.00
80	**79,4328**	0.00	0.00
100	**100**	0.00	0.00
125	**125,893**	0.00	0.00
160	**158,489**	0.00	0.00
200	**199,526**	0.00	0.00
250	**251,189**	0.00	0.00
315	**316,228**	0.03	0.00
400	**398,107**	0.03	0.00
500	**501,187**	0.07	0.00
630	**630,957**	0.16	0.00
800	**794,328**	0.07	0.00
1000	**1000**	0.08	0.00
	1059,25	0.05	0.00
	1122,02	0.05	0.00
	1188,50	0.02	0.00
1250	**1258,93**	-0.06	0.00
	1333,52	-0.09	0.00
	1412,54	-0.09	0.00
	1496,24	-0.06	0.00
1600	**1584.89**	0.04	0.00
	1678. 80	0.10	0.00
	1778.28	0.11	0.00
	1883.65	0.15	0.00
2000	**1995.26**	0.16	0.00
	2113.49	0.26	0.00
	2238.72	0.28	0.00
	2371.37	0.20	0.00
2500	**2511.89**	0.11	0.00
	2660.73	0.14	0.00
	2818.38	0.27	0.00
	2985.38	0.20	0.00

3150	**3162.28**	0.10	0.00
	3349.65	0.27	0.00
	3548.13	0.30	0.00
	3758.37	0.13	0.00
4000	**3981.07**	0.33	0.00
	4216.97	0.29	0.00
	4466.84	0.39	0.00
	4731.51	0.44	0.00
5000	**5011.87**	0.29	0.00
	5308.84	0.32	0.03
	5623.41	0.11	0.03
	5956.62	0.38	0.03
6300	**6309.57**	0.42	0.03
	6683.44	0.26	0.03
	7079.46	0.56	0.03
	7498.94	0.58	0.03
8000	**7943.28**	0.45	0.03
	8413.95	0.52	0.03
	8912.51	0.57	0.03
	9440.61	0.52	0.03
10000	**10000**	0.40	0.03
	10592.5	0.41	0.03
	11220.2	0.54	0.03
	11885.0	0.50	0.03
12500	**12589.3**	0.60	0.03
	13335.2	0.55	0.03
	14125.4	0.54	0.03
	14962.4	0.37	0.03
16000	**15848,9**	0.69	0.08



Correction for the average effects of the *PV009* windscreen on the frequency response of the sound level meter in the absence of wind:

		PV009	
	FREQUENCY [Hz]	**Correction**	**Uncertainty**
	Exact in base 10	**[dB]**	**[dB]**
1000	**1000**	0.27	0.00
1250	**1258,93**	0.40	0.00
1600	**1584.89**	0.56	0.00
2000	**1995.26**	0.76	0.00
2500	**2511.89**	0.94	0.00
3150	**3162.28**	0.67	0.00
4000	**3981.07**	0.28	0.00
5000	**5011.87**	0.26	0.00
6300	**6309.57**	0.50	0.03
8000	**7943.28**	0.04	0.03
10000	**10000**	0.35	0.03
12500	**12589.3**	-0.32	0.03
16000	**15848,9**	-2.72	0.08

The deviations between the effects measured in the frequency response of the different microphones, the reflection, the diffraction and the windscreen, extended with the uncertainty, do not exceed the tolerance limits specified in section 19.3.6.

RESPONSE WITH RANDOM INCIDENCE IN A DIFFUSE FIELD:

Correction for the average frequency response of the *SC202* sound level meter, with the sound field correction set for diffuse field, for the response with random incidence in a diffuse field:

		SC202
	FREQUENCY [Hz]	**Correction**
	Exact in base 10	**[dB]**
250	**251,189**	0.11
315	**316,228**	0.07
400	**398,107**	-0.01
500	**501,187**	-0.08
630	**630,957**	0.00
800	**794,328**	-0.15
1000	**1000**	-0.17
1250	**1258,93**	-0.26
1600	**1584.89**	-0.25
2000	**1995.26**	-0.51
2500	**2511.89**	-0.54
3150	**3162.28**	-0.85
4000	**3981.07**	-1.06
5000	**5011.87**	-1.53
6300	**6309.57**	-1.79
8000	**7943.28**	-1.30
10000	**10000**	0.02
12500	**12589.3**	2.05
16000	**15848,9**	0.41
20000	**19952,6**	-3.03

Correction for the average frequency response of the *SC202* sound level meter with *PV009* windscreen, with the sound field correction set for diffuse field, for the response with random incidence in a diffuse field:

		SC202 +PV009
	FREQUENCY [Hz]	**Correction**
	Exact in base 10	**[dB]**
1000	**1000**	0.13
1250	**1258,93**	0.16
1600	**1584.89**	0.34
2000	**1995.26**	0.31
2500	**2511.89**	0.48
3150	**3162.28**	-0.04
4000	**3981.07**	-0.67
5000	**5011.87**	-1.32
6300	**6309.57**	-1.35
8000	**7943.28**	-1.17
10000	**10000**	0.33
12500	**12589.3**	1.73
16000	**15848,9**	-2.34

19.2.4 Effect of the optional accessories on the microphone

The *SC202* conforms the specifications of this standard for the same class of operation when the following accessories are installed: the extension cables and the *TR002* tripod support.

CABLES

The cables do not have any effect inside the measuring frequency band. A recalibration is not necessary when using the extension cables.

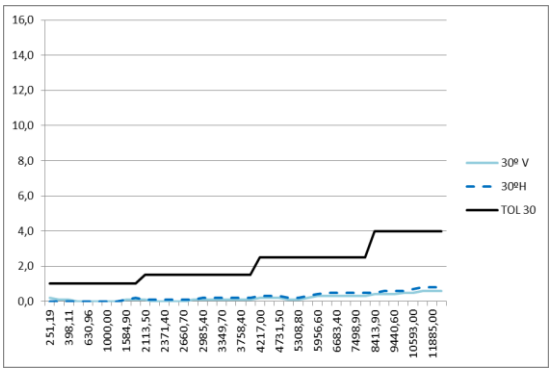
TRIPOD ADAPTOR

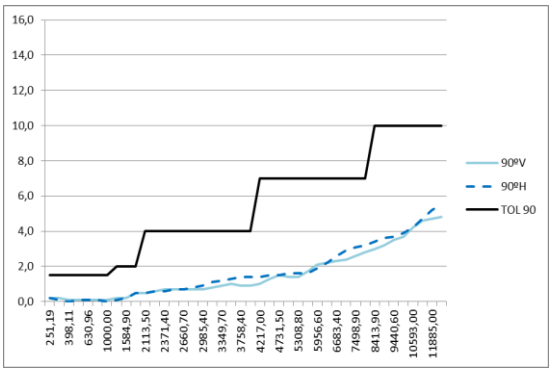
The *TR002* tripod adaptor has negligible influence on frequency response and directivity.

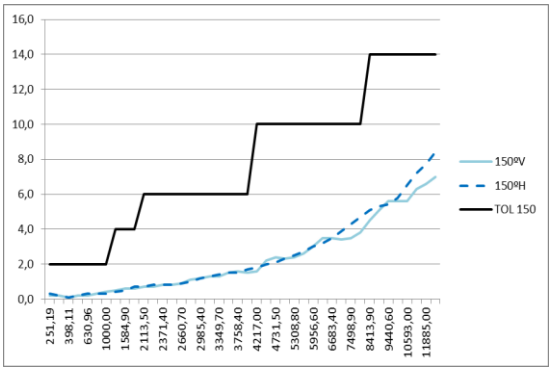
19.2.5 Directional response

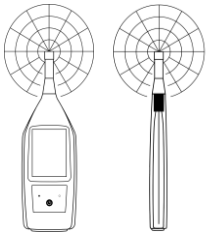
Sound level meter directional response to plane progressive waves with 30°, 90° and 150º angles of incidence, including the reference direction.

Maximum variation of sensitivity at 30°, 90° and 150° with respect to the reference direction extended with the expanded measurement uncertainty *SC202* Vertical and Horizontal Plane							
FREQUENCY [kHz]	Variation at 30º [dB]		Variation at 90º [dB]		Variation at 150º [dB]		
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Inc.
0.25 to 1	0.20	0.00	0.20	0.20	0.40	0.30	0.20
>1 to 2	0.10	0.20	0.50	0.50	0.60	0.70	0.20
>2 to 4	0.10	0.20	1.00	1.40	1.60	1.70	0.40
>4 to 8	0.30	0.50	2.80	3.20	3.80	4.70	0.80
>8 to 12.5	0.60	0.80	4.80	5.50	7.00	8.40	1.00









SOUND LEVEL METER: HORIZONTAL PLANE DIRECTIVITY DIAGRAMS:

HORIZONTAL PLANE DIRECTIVITY (SC202) WITHIN ±Θ from the reference direction

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
251,189	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,1	0,1	0,2	0,0	0,0	0,2	0,1	0,1	0,2	0,2	0,2	0,2
316,228	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,1	0,0	-0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,1
398,107	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	0,0	0,0	0,0	0,0
501,187	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,2	-0,2	-0,2	-0,1	-0,1	-0,1	-0,1
630,957	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	-0,2	-0,3	-0,2	-0,2	-0,2	-0,2	-0,1	-0,1
794,328	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	-0,2	-0,3	-0,3	-0,3	-0,3	-0,2	-0,2	-0,1
1000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,3	-0,3	-0,3	-0,2	-0,1	-0,1
1258,93	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,1	0,1	0,0	-0,3	-0,2	-0,2	-0,2	0,0	0,1
1584,89	0,0	0,0	-0,1	-0,1	-0,2	-0,2	-0,2	-0,1	-0,1	-0,1	-0,1	0,0	0,1	-0,2	-0,4	-0,4	-0,3	-0,2	-0,1
1995,26	0,0	0,0	-0,1	-0,2	-0,3	-0,4	-0,5	-0,5	-0,5	-0,4	-0,4	-0,5	-0,3	-0,3	-0,7	-0,7	-0,7	-0,4	-0,3
2238,72	0,0	0,0	-0,1	-0,1	-0,2	-0,3	-0,5	-0,6	-0,6	-0,5	-0,4	-0,5	-0,4	-0,3	-0,7	-0,8	-0,8	-0,5	-0,3
2511,89	0,0	0,0	-0,1	-0,1	-0,2	-0,3	-0,4	-0,6	-0,7	-0,6	-0,5	-0,5	-0,6	-0,4	-0,6	-0,8	-0,9	-0,6	-0,4
2818,38	0,0	0,0	-0,1	-0,1	-0,2	-0,2	-0,4	-0,6	-0,8	-0,8	-0,6	-0,5	-0,7	-0,6	-0,5	-1,0	-0,9	-0,7	-0,5
3162,28	0,0	0,0	-0,1	-0,2	-0,3	-0,3	-0,4	-0,6	-1,0	-1,1	-1,0	-0,6	-0,8	-0,8	-0,6	-1,3	-1,1	-0,9	-0,6
3548,13	0,0	0,0	-0,1	-0,2	-0,3	-0,5	-0,5	-0,6	-0,9	-1,3	-1,3	-0,9	-0,8	-1,1	-0,9	-1,5	-1,3	-1,1	-0,7
3981,07	0,0	0,0	-0,1	-0,2	-0,4	-0,6	-0,7	-0,8	-1,0	-1,4	-1,7	-1,4	-1,0	-1,3	-1,3	-1,4	-1,5	-1,3	-0,9
4466,84	0,0	-0,1	-0,2	-0,3	-0,5	-0,7	-0,9	-1,1	-1,2	-1,5	-2,0	-1,9	-1,4	-1,3	-1,5	-1,5	-1,9	-1,7	-1,2
5011,87	0,0	0,0	-0,1	-0,2	-0,5	-0,8	-1,0	-1,3	-1,4	-1,6	-2,1	-2,3	-1,8	-1,6	-1,9	-1,5	-2,2	-2,0	-1,4
5623,41	0,0	-0,1	-0,2	-0,3	-0,4	-0,7	-1,0	-1,3	-1,6	-1,6	-2,1	-2,7	-2,3	-1,7	-2,2	-1,9	-2,6	-2,2	-1,5
6309,57	0,0	-0,1	-0,2	-0,5	-0,8	-1,0	-1,3	-1,7	-2,1	-2,2	-2,4	-3,2	-3,1	-2,3	-2,3	-2,7	-3,2	-2,9	-2,0
7079,46	0,0	-0,1	-0,2	-0,5	-0,8	-1,3	-1,5	-1,9	-2,4	-2,9	-2,7	-3,5	-3,9	-2,9	-2,7	-3,5	-3,6	-3,5	-2,5
7943,28	0,0	-0,1	-0,2	-0,5	-0,8	-1,3	-1,9	-2,2	-2,7	-3,2	-3,4	-3,6	-4,7	-3,7	-3,4	-3,7	-3,9	-4,1	-2,8
8413,95	0,0	-0,1	-0,3	-0,5	-0,9	-1,3	-2,0	-2,4	-2,8	-3,4	-3,8	-3,6	-5,1	-4,1	-3,5	-3,8	-4,0	-4,6	-3,1
8912,51	0,0	-0,1	-0,3	-0,6	-1,0	-1,4	-2,0	-2,7	-2,9	-3,6	-4,2	-3,8	-5,3	-4,6	-3,7	-4,1	-4,2	-5,1	-3,5
9440,61	0,0	-0,1	-0,3	-0,6	-1,1	-1,5	-2,0	-2,8	-3,2	-3,7	-4,6	-4,1	-5,4	-5,2	-4,0	-4,3	-4,5	-5,4	-3,8
10000	0,0	-0,1	-0,3	-0,6	-1,1	-1,6	-2,2	-2,8	-3,6	-3,9	-4,9	-4,5	-5,5	-5,8	-4,2	-4,5	-4,9	-5,8	-4,2
10592,5	0,0	-0,1	-0,4	-0,7	-1,2	-1,8	-2,4	-2,9	-4,0	-4,2	-5,1	-5,2	-5,6	-6,5	-4,7	-4,8	-5,2	-6,2	-4,8
11220,2	0,0	-0,1	-0,4	-0,8	-1,3	-1,9	-2,6	-3,2	-4,1	-4,7	-5,2	-5,9	-5,6	-7,2	-5,3	-5,2	-5,6	-6,5	-5,3
11885,0	0,0	-0,1	-0,4	-0,8	-1,4	-2,0	-2,8	-3,5	-4,2	-5,2	-5,3	-6,6	-5,7	-7,7	-5,8	-5,9	-6,2	-6,5	-5,9
12589,3	0,0	-0,1	-0,4	-0,8	-1,4	-2,1	-2,9	-3,7	-4,3	-5,5	-5,6	-7,1	-5,8	-8,4	-6,1	-6,6	-6,8	-6,6	-6,5

SOUND LEVEL METER: VERTICAL PLANE DIRECTIVITY DIAGRAMS:

VERTICAL PLANE DIRECTIVITY (SC202) WITHIN ±Θ from the reference direction

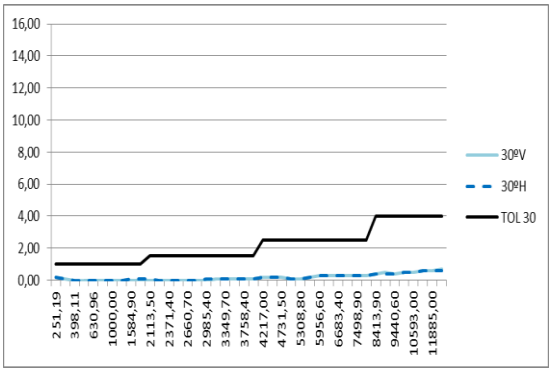
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
251,189	0,0	0,0	0,1	0,1	0,2	0,1	0,0	0,2	0,1	0,2	0,1	0,0	0,2	0,2	0,2	0,2	0,3	0,3	0,2
316,228	0,0	0,0	0,1	0,0	0,1	0,1	0,0	0,1	0,1	0,1	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,1
398,107	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,1	0,1	0,1	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0
501,187	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1
630,957	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,2	-0,2	-0,2	-0,2	-0,1	-0,1
794,328	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,2	-0,2	-0,2	-0,2	-0,2	-0,2	-0,1
1000	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,1	0,1	0,1	-0,1	-0,2	-0,2	-0,3	-0,2	-0,1	0,0
1258,93	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,2	0,1	0,1	0,2	0,3	0,1	-0,1	-0,2	-0,2	-0,1	0,0	0,1
1584,89	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,2	-0,1	0,0	0,1	-0,1	0,1	0,3	0,1	-0,3	-0,3	-0,3	-0,1	0,0
1995,26	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,3	-0,4	-0,5	-0,3	-0,2	-0,4	-0,1	0,0	-0,5	-0,7	-0,7	-0,4	-0,2
2238,72	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,3	-0,4	-0,5	-0,6	-0,3	-0,4	-0,3	-0,1	-0,5	-0,8	-0,9	-0,5	-0,2
2511,89	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,4	-0,5	-0,7	-0,5	-0,4	-0,5	-0,1	-0,3	-0,9	-1,0	-0,6	-0,3
2818,38	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,3	-0,6	-0,7	-0,9	-0,4	-0,7	-0,2	-0,1	-1,1	-1,0	-0,8	-0,4
3162,28	0,0	0,0	-0,1	-0,1	-0,2	-0,2	-0,3	-0,4	-0,6	-0,8	-1,1	-0,8	-0,7	-0,6	-0,2	-1,3	-1,3	-1,0	-0,5
3548,13	0,0	0,0	0,0	-0,1	-0,2	-0,4	-0,4	-0,5	-0,6	-1,0	-1,0	-1,5	-0,7	-1,2	-0,3	-1,3	-1,5	-1,2	-0,6
3981,07	0,0	0,0	-0,1	-0,1	-0,2	-0,4	-0,7	-0,7	-0,9	-0,9	-1,4	-1,5	-1,2	-1,4	-0,6	-0,9	-1,8	-1,6	-0,8
4466,84	0,0	0,0	-0,1	-0,2	-0,4	-0,5	-0,7	-1,1	-1,1	-1,3	-1,5	-1,5	-2,2	-1,3	-1,2	-0,7	-2,3	-2,0	-1,0
5011,87	0,0	0,0	0,0	-0,1	-0,3	-0,5	-0,8	-1,0	-1,4	-1,4	-1,4	-2,2	-2,3	-1,4	-2,1	-0,6	-2,7	-2,4	-1,3
5623,41	0,0	0,0	-0,1	-0,2	-0,3	-0,5	-0,8	-1,0	-1,4	-1,8	-2,0	-2,0	-2,0	-2,2	-2,6	-0,8	-3,0	-2,7	-1,4
6309,57	0,0	0,0	-0,1	-0,3	-0,6	-0,8	-1,0	-1,4	-1,7	-2,2	-2,2	-2,3	-3,1	-3,5	-2,2	-1,6	-3,3	-3,5	-1,9
7079,46	0,0	0,0	-0,1	-0,3	-0,6	-1,0	-1,4	-1,6	-2,1	-2,4	-3,1	-3,1	-3,4	-3,3	-2,5	-2,7	-3,1	-4,4	-2,3
7943,28	0,0	0,0	-0,1	-0,3	-0,7	-1,0	-1,5	-2,1	-2,3	-2,8	-3,2	-3,4	-3,4	-3,8	-3,6	-3,9	-2,7	-5,3	-2,7
8413,95	0,0	0,0	-0,2	-0,4	-0,7	-1,1	-1,5	-2,2	-2,5	-3,0	-3,3	-4,1	-3,9	-4,3	-4,2	-4,6	-2,5	-5,9	-2,9
8912,51	0,0	0,0	-0,2	-0,4	-0,8	-1,1	-1,7	-2,2	-2,9	-3,2	-3,6	-4,5	-4,6	-5,1	-5,0	-5,1	-2,5	-6,5	-3,3
9440,61	0,0	0,0	-0,2	-0,4	-0,8	-1,3	-1,8	-2,3	-3,1	-3,4	-4,0	-4,5	-4,6	-5,5	-5,5	-5,1	-2,6	-7,0	-3,5
10000	0,0	0,0	-0,2	-0,5	-0,8	-1,4	-1,9	-2,5	-3,2	-3,7	-4,3	-4,6	-4,7	-5,2	-5,5	-5,0	-2,7	-7,5	-3,9
10592,5	0,0	0,0	-0,2	-0,5	-1,0	-1,4	-2,1	-2,7	-3,3	-4,2	-4,6	-4,8	-5,5	-5,2	-5,5	-4,8	-3,0	-7,9	-4,4
11220,2	0,0	0,0	-0,2	-0,6	-1,1	-1,6	-2,3	-3,0	-3,7	-4,5	-4,9	-5,3	-6,3	-5,8	-5,6	-5,0	-3,5	-8,1	-4,8
11885,0	0,0	0,0	-0,3	-0,6	-1,1	-1,8	-2,4	-3,1	-3,9	-4,6	-5,2	-5,9	-6,6	-6,7	-6,1	-5,5	-4,2	-8,2	-5,2
12589,3	0,0	0,0	-0,2	-0,6	-1,1	-1,8	-2,5	-3,3	-4,1	-4,8	-5,8	-6,2	-6,7	-6,9	-7,2	-5,9	-5,0	-8,3	-5,8

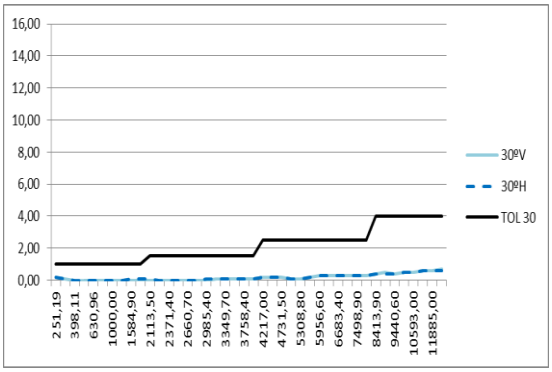
Directional response of the sound level meter with PV009 windscreen to progressive plane waves with 30°, 90° and 150° angle of incidence including the reference direction:

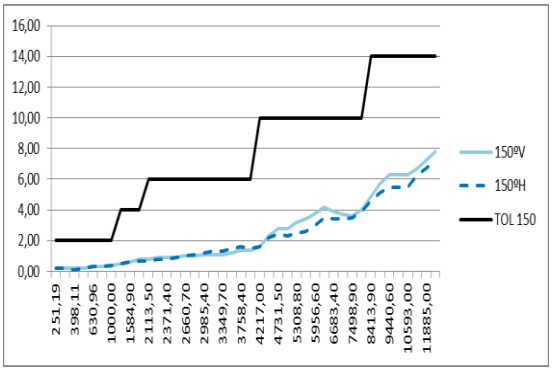
Maximum variation of sensitivity at 30°, 90° and 150° with respect to the reference direction extended with the expanded measurement uncertainty

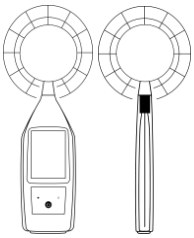
***SC202 + PV009* Vertical and Horizontal Plane**

FREQUENCY [kHz]	Variation at 30º [dB]		Variation at 90º [dB]		Variation at 150º [dB]		
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Inc.
0.25 to 1	0.20	0.20	0.20	0.20	0.40	0.40	0.20
>1 to 2	0.00	0.10	0.40	0.50	0.80	0.70	0.20
>2 to 4	0.10	0.10	0.80	1.00	1.40	1.60	0.40
>4 to 8	0.30	0.30	2.90	2.80	4.20	3.90	0.80
>8 to 12.5	0.70	0.60	5.20	4.80	7.80	7.20	1.00

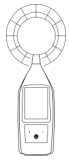








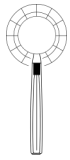
SOUND LEVEL METER + WINDSCREEN: HORIZONTAL PLANE DIRECTIVITY DIAGRAMS:



HORIZONTAL PLANE DIRECTIVITY (SC202 + PV009) WITHIN ±Θ from the reference direction

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
251,189	0,0	0,0	0,1	0,1	0,2	0,1	0,0	0,2	0,1	0,2	0,1	0,0	0,2	0,2	0,2	0,2	0,3	0,3	0,2
316,228	0,0	0,0	0,1	0,0	0,1	0,1	0,0	0,1	0,1	0,1	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,1
398,107	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,1	0,1	0,1	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0
501,187	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1
630,957	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,2	-0,2	-0,2	-0,2	-0,1	-0,1
794,328	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,2	-0,2	-0,2	-0,2	-0,2	-0,2	-0,1
1000	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,1	0,1	0,1	-0,1	-0,2	-0,2	-0,3	-0,2	-0,1	0,0
1258,93	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,2	0,1	0,1	0,2	0,3	0,1	-0,1	-0,2	-0,2	-0,1	0,0	0,1
1584,89	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,2	-0,1	0,0	0,1	-0,1	0,1	0,3	0,1	-0,3	-0,3	-0,3	-0,1	0,0
1995,26	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,3	-0,4	-0,5	-0,3	-0,2	-0,4	-0,1	0,0	-0,5	-0,7	-0,7	-0,4	-0,2
2238,72	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,3	-0,4	-0,5	-0,6	-0,3	-0,4	-0,3	-0,1	-0,5	-0,8	-0,9	-0,5	-0,2
2511,89	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,4	-0,5	-0,7	-0,5	-0,4	-0,5	-0,1	-0,3	-0,9	-1,0	-0,6	-0,3
2818,38	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,3	-0,6	-0,7	-0,9	-0,4	-0,7	-0,2	-0,1	-1,1	-1,0	-0,8	-0,4
3162,28	0,0	0,0	-0,1	-0,1	-0,2	-0,2	-0,3	-0,4	-0,6	-0,8	-1,1	-0,8	-0,7	-0,6	-0,2	-1,3	-1,3	-1,0	-0,5
3548,13	0,0	0,0	0,0	-0,1	-0,2	-0,4	-0,4	-0,5	-0,6	-1,0	-1,0	-1,5	-0,7	-1,2	-0,3	-1,3	-1,5	-1,2	-0,6
3981,07	0,0	0,0	-0,1	-0,1	-0,2	-0,4	-0,7	-0,7	-0,9	-0,9	-1,4	-1,5	-1,2	-1,4	-0,6	-0,9	-1,8	-1,6	-0,8
4466,84	0,0	0,0	-0,1	-0,2	-0,4	-0,5	-0,7	-1,1	-1,1	-1,3	-1,5	-1,5	-2,2	-1,3	-1,2	-0,7	-2,3	-2,0	-1,0
5011,87	0,0	0,0	0,0	-0,1	-0,3	-0,5	-0,8	-1,0	-1,4	-1,4	-1,4	-2,2	-2,3	-1,4	-2,1	-0,6	-2,7	-2,4	-1,3
5623,41	0,0	0,0	-0,1	-0,2	-0,3	-0,5	-0,8	-1,0	-1,4	-1,8	-2,0	-2,0	-2,0	-2,2	-2,6	-0,8	-3,0	-2,7	-1,4
6309,57	0,0	0,0	-0,1	-0,3	-0,6	-0,8	-1,0	-1,4	-1,7	-2,2	-2,2	-2,3	-3,1	-3,5	-2,2	-1,6	-3,3	-3,5	-1,9
7079,46	0,0	0,0	-0,1	-0,3	-0,6	-1,0	-1,4	-1,6	-2,1	-2,4	-3,1	-3,1	-3,4	-3,3	-2,5	-2,7	-3,1	-4,4	-2,3
7943,28	0,0	0,0	-0,1	-0,3	-0,7	-1,0	-1,5	-2,1	-2,3	-2,8	-3,2	-3,4	-3,4	-3,8	-3,6	-3,9	-2,7	-5,3	-2,7
8413,95	0,0	0,0	-0,2	-0,4	-0,7	-1,1	-1,5	-2,2	-2,5	-3,0	-3,3	-4,1	-3,9	-4,3	-4,2	-4,6	-2,5	-5,9	-2,9
8912,51	0,0	0,0	-0,2	-0,4	-0,8	-1,1	-1,7	-2,2	-2,9	-3,2	-3,6	-4,5	-4,6	-5,1	-5,0	-5,1	-2,5	-6,5	-3,3
9440,61	0,0	0,0	-0,2	-0,4	-0,8	-1,3	-1,8	-2,3	-3,1	-3,4	-4,0	-4,5	-4,6	-5,5	-5,5	-5,1	-2,6	-7,0	-3,5
10000	0,0	0,0	-0,2	-0,5	-0,8	-1,4	-1,9	-2,5	-3,2	-3,7	-4,3	-4,6	-4,7	-5,2	-5,5	-5,0	-2,7	-7,5	-3,9
10592,5	0,0	0,0	-0,2	-0,5	-1,0	-1,4	-2,1	-2,7	-3,3	-4,2	-4,6	-4,8	-5,5	-5,2	-5,5	-4,8	-3,0	-7,9	-4,4
11220,2	0,0	0,0	-0,2	-0,6	-1,1	-1,6	-2,3	-3,0	-3,7	-4,5	-4,9	-5,3	-6,3	-5,8	-5,6	-5,0	-3,5	-8,1	-4,8
11885,0	0,0	0,0	-0,3	-0,6	-1,1	-1,8	-2,4	-3,1	-3,9	-4,6	-5,2	-5,9	-6,6	-6,7	-6,1	-5,5	-4,2	-8,2	-5,2
12589,3	0,0	0,0	-0,2	-0,6	-1,1	-1,8	-2,5	-3,3	-4,1	-4,8	-5,8	-6,2	-6,7	-6,9	-7,2	-5,9	-5,0	-8,3	-5,8

SOUND LEVEL METER + WINDSCREEN: VERTICAL PLANE DIRECTIVITY DIAGRAMS:



VERTICAL PLANE DIRECTIVITY (SC202 + PV009) WITHIN ±Θ from the reference direction

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
251,189	0,0	0,0	-0,1	0,1	0,0	0,1	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,1	-0,1
316,228	0,0	0,0	-0,1	0,0	0,0	0,1	0,0	0,0	0,1	0,0	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	0,0	0,0	-0,1
398,107	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1
501,187	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,2	-0,2	-0,2	-0,2	-0,1	-0,1
630,957	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	-0,1	-0,2	-0,2	-0,2	-0,2	-0,2	-0,2	-0,1
794,328	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	-0,1	-0,2	-0,2	-0,3	-0,3	-0,2	-0,2	-0,1
1000	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,1	0,0	0,1	0,1	0,0	-0,1	-0,2	-0,3	-0,3	-0,2	-0,2	-0,1
1258,93	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,2	0,1	0,1	0,2	0,2	0,1	-0,2	-0,2	-0,3	-0,2	-0,1	0,0
1584,89	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,1	0,0	0,0	-0,1	0,1	0,2	-0,1	-0,5	-0,5	-0,5	-0,3	-0,2
1995,26	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,3	-0,3	-0,4	-0,3	-0,2	-0,4	-0,1	-0,1	-0,6	-0,8	-0,9	-0,6	-0,4
2238,72	0,0	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,3	-0,5	-0,5	-0,3	-0,4	-0,3	-0,1	-0,5	-0,8	-1,0	-0,7	-0,4
2511,89	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,3	-0,4	-0,6	-0,4	-0,3	-0,5	-0,1	-0,3	-0,9	-1,0	-0,7	-0,4
2818,38	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,4	-0,5	-0,7	-0,3	-0,6	-0,1	-0,1	-1,0	-1,0	-0,8	-0,4
3162,28	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,2	-0,2	-0,4	-0,6	-0,9	-0,6	-0,5	-0,4	0,0	-1,1	-1,1	-0,8	-0,3
3548,13	0,0	0,0	0,0	-0,1	-0,2	-0,3	-0,3	-0,4	-0,4	-0,8	-0,7	-1,2	-0,4	-0,9	-0,1	-1,0	-1,2	-1,0	-0,3
3981,07	0,0	0,0	0,0	-0,1	-0,2	-0,4	-0,6	-0,6	-0,8	-0,8	-1,3	-1,4	-1,0	-1,3	-0,4	-0,7	-1,6	-1,3	-0,6
4466,84	0,0	0,0	-0,1	-0,2	-0,4	-0,5	-0,8	-1,1	-1,2	-1,4	-1,6	-1,7	-2,3	-1,4	-1,2	-0,8	-2,4	-2,0	-1,1
5011,87	0,0	0,0	0,0	-0,1	-0,3	-0,6	-0,8	-1,1	-1,7	-1,7	-1,7	-2,6	-2,8	-1,9	-2,6	-1,1	-3,1	-2,9	-1,7
5623,41	0,0	0,0	-0,1	-0,2	-0,3	-0,6	-0,9	-1,3	-1,7	-2,2	-2,5	-2,6	-2,7	-3,0	-3,4	-1,7	-3,9	-3,6	-2,3
6309,57	0,0	0,0	-0,1	-0,3	-0,6	-0,9	-1,1	-1,5	-1,9	-2,5	-2,6	-2,9	-3,7	-4,2	-3,0	-2,4	-4,1	-4,4	-2,8
7079,46	0,0	0,0	-0,1	-0,3	-0,5	-0,9	-1,4	-1,6	-2,1	-2,4	-3,2	-3,3	-3,7	-3,6	-2,8	-3,0	-3,5	-4,8	-2,6
7943,28	0,0	0,0	-0,1	-0,3	-0,7	-1,0	-1,5	-2,1	-2,4	-2,9	-3,3	-3,6	-3,6	-4,0	-3,7	-4,0	-2,8	-5,3	-2,7
8413,95	0,0	0,0	-0,2	-0,4	-0,8	-1,2	-1,7	-2,4	-2,8	-3,3	-3,6	-4,4	-4,3	-4,7	-4,6	-4,9	-2,7	-6,1	-3,1
8912,51	0,0	0,0	-0,2	-0,5	-0,9	-1,3	-1,9	-2,6	-3,3	-3,7	-4,1	-5,0	-5,2	-5,7	-5,6	-5,6	-3,0	-7,0	-3,7
9440,61	0,0	0,0	-0,2	-0,4	-0,9	-1,4	-1,9	-2,6	-3,6	-4,0	-4,6	-5,2	-5,3	-6,3	-6,3	-5,9	-3,3	-7,7	-4,3
10000	0,0	0,0	-0,2	-0,5	-0,8	-1,4	-2,0	-2,8	-3,6	-4,2	-4,9	-5,3	-5,5	-6,0	-6,3	-5,8	-3,5	-8,2	-4,8
10592,5	0,0	0,0	-0,2	-0,5	-1,0	-1,5	-2,2	-2,8	-3,5	-4,6	-5,0	-5,4	-6,1	-5,9	-6,3	-5,5	-3,7	-8,5	-5,2
11220,2	0,0	0,0	-0,2	-0,6	-1,1	-1,7	-2,3	-3,0	-3,8	-4,7	-5,2	-5,6	-6,7	-6,4	-6,1	-5,5	-3,9	-8,3	-5,2
11885,0	0,0	0,0	-0,3	-0,6	-1,2	-1,9	-2,6	-3,3	-4,0	-4,9	-5,5	-6,2	-7,0	-7,2	-6,6	-5,9	-4,4	-8,4	-5,4
12589,3	0,0	0,0	-0,3	-0,7	-1,2	-2,0	-2,8	-3,7	-4,5	-5,2	-6,2	-6,6	-7,2	-7,4	-7,8	-6,4	-5,4	-8,5	-5,9

19.2.6 Directivity indexes

The directivity indexes to determine the relative frequency weighted response for random incidence of the *SC202* sound level meter are shown below.

	FREQUENCY [Hz]	SC202
	Exact in base 10	Correction [dB]
250	251.19	0.11
315	316,23	0.05
400	398.11	0.00
500	501.19	-0.05
630	630,96	-0.08
800	794.33	-0.09
1000	1,000.00	-0.06
1250	1,258.92	0.03
1600	1584.89	-0.09
2000	1995.26	-0.35
	2113.49	-0.38
	2238.72	-0.40
	2371.37	-0.42
2500	2511.89	-0.43
	2660.73	-0.45
	2818.38	-0.49
	2985.38	-0.55
3150	3162.28	-0.63
	3349.65	-0.70
	3548.13	-0.76
	3758.37	-0.83
4000	3981.07	-0.93
	4216.97	-1.04
	4466.84	-1.15
	4731.51	-1.23
5000	5011.87	-1.28
	5308.84	-1.31
	5623.41	-1.41
	5956.62	-1.60
6300	6309.57	-1.81
	6683.44	-1.97

	7079.46	-2.13
	7498.94	-2.26
8000	7943.28	-2.40
	8413.95	-2.57
	8912.51	-2.78
	9440.61	-2.93
10000	10,000.00	-3.06
	10,592.54	-3.27
	11,220.18	-3.52
	11,885.02	-3.73
12500	12,589.25	-3.90
	13,335.21	-4.14
	14,125.38	-4.31
	14,962.36	-4.55
16000	15,848.93	-4.63
	16,788.00	-4.72
	17,782.80	-4.87
	18,836.50	-5.15
20000	19,952.60	-5.56

The directivity indexes to determine the relative frequency weighted response for random incidence of the *SC202* sound level meter and *PV009* windscreen are shown below.

	FREQUENCY [Hz]	***SC202* + PV009**
	Exact in base 10	**Correction [dB]**
250	251.19	0.07
315	316,23	0.03
400	398.11	0.00
500	501.19	-0.03
630	630,96	-0.05
800	794.33	-0.05
1000	1,000.00	-0.02
1250	1,258.92	0.06
1600	1584.89	-0.07
2000	1995.26	-0.30
	2113.49	-0.32
	2238.72	-0.33

	2371.37	-0.34
2500	2511.89	-0.35
	2660.73	-0.36
	2818.38	-0.38
	2985.38	-0.43
3150	3162.28	-0.49
	3349.65	-0.56
	3548.13	-0.62
	3758.37	-0.69
4000	3981.07	-0.82
	4216.97	-0.96
	4466.84	-1.12
	4731.51	-1.24
5000	5011.87	-1.33
	5308.84	-1.39
	5623.41	-1.53
	5956.62	-1.71
6300	6309.57	-1.87
	6683.44	-1.97
	7079.46	-2.07
	7498.94	-2.15
8000	7943.28	-2.32
	8413.95	-2.58
	8912.51	-2.87
	9440.61	-3.02
10000	10,000.00	-3.10
	10,592.54	-3.24
	11,220.18	-3.45
	11,885.02	-3.68
12500	12,589.25	-3.91
	13,335.21	-4.18
	14,125.38	-4.35
	14,962.36	-4.56
16000	15,848.93	-4.66
	16,788.00	-4.70
	17,782.80	-4.79
	18,836.50	-5.01
20000	19,952.60	-5.40

19.3 MEASUREMENT

19.3.1 Warm-up time

The warm-up time is 5 seconds.

19.3.2 Measurement range

Measurement range at 1 kHz for the *SC202* sound level meter with the *P008* microphone ***(h)***:

FUNCTIONS: L_F, L_S, L_I, L_t and L_T (including L_{AeqT}):

Microphone and preamplifier	Weighting A [dB]	Weighting C [dB]	Weighting Z [dB]
P008	from 30.5 to 137.0	from 34.1 to 137.0	from 38.3 to 137.0

FUNCTION: L_{Cpeak}:

Microphone and preamplifier	Weighting C [dB]
P008	from 55.0 to 140.0

19.3.3 Linearity range

The starting point for linearity tests is 94.0 dB (g).

FUNCTIONS: L_F, L_S, L_I, L_t and L_T (including L_{AeqT}):

Tables of nominal A-weighted sound levels at the upper and lower limits of the linear operating ranges in each level range (f).

Typical linearity range for *SC202* sound level meter with *P008* microphone:

Frequency [Hz]	Weighting A [dB]	Weighting C [dB]	Weighting Z [dB]
31.5	from 30.5 to 97.6	from 34.1 to 134.0	from 38.3 to 137.0
1000	from 30.5 to 137.0	from 34.1 to 137.0	from 38.3 to 137.0
4000	from 30.5 to 138.0	from 34.1 to 136.2	from 38.3 to 137.0
8000	from 30.5 to 135.9	from 34.1 to 134.0	from 38.3 to 137.0
12500	from 30.5 to 132.7	from 34.1 to 130.8	from 38.3 to 137.0

FUNCTION: L_{Cpeak}:

Tables of nominal C-weighted peak levels at the upper and lower limits of the linear operating ranges in each level range (f).

Typical linearity range for *SC202* sound level meter with *P008* microphone:

Frequency [Hz]	Weighting C [dB]
31.5	from 55.0 to 137.0
1000	from 55.0 to 140.0
4000	from 55.0 to 139.2
8000	from 55.0 to 137.0
12500	from 55.0 to 133.8

19.3.4 Noise

Highest anticipated self-generated noise produced when the sound level meter is placed in a low level sound field and when a specified electrical input device is installed in place of the microphone and terminated in a specified manner (i):

Self-generated noise of the *SC202* sound level meter with *P008* microphone:

		A Weighting [dB]	C Weighting [dB]	Z Weighting [dB]
ELECTRICAL NOISE (replacing the microphone with its adapter and corresponding closure)		12,7	12,5	17,7
TOTAL NOISE at 20 ºC: (electrical + thermal of the microphone):	Typical	25,5	29,1	33,3
	Max	26,8	30,9	35,4

NOTE: For electrical noise tests, use the appropriate adapter and closure for each microphone.

NOTE: Self-generated noise is measured with equivalent levels with integration time greater than 30 seconds.

19.3.5 Time and clock performance

TIME

The screen refresh time is 1 s.

When a measurement starts, the value of the functions that depend on the integration time (T) will appear when the time (T) is finished. This value is updated every second, although no changes will be appreciated until the time T has elapsed.

The cleaning of the maintenance device for carrying out the measurements of the maximum and minimum time-weighted sound level and the peak sound level is automatic and is carried out at the end of each period of the time base: 1 s, T or t; thus, its operation is intrinsic to the definition of the functions themselves.

The minimum integration time is 20 ms; the programmable integration time T can take values from 1 s to 99 hours (1 to 99 seconds, minutes or hours).

The time τ is a programmable sliding integration time. The time τ can take values from 1 s to 99 hours (1 to 99 seconds, minutes or hours).

CLOCK

The clock has a deviation of less than 17 seconds over a time of 24 hours.

19.3.6 Frequency weighting

The following table lists the frequency weightings available for each function

FUNCTION	WEIGHTING
L_{peak}	C
L_F	A or C
L_S	A
L_I	A
L_T	A, C or Z
L_t	A, C or Z
L_τ	A or C
L_{IT}, L_{F5T}	A

The following table shows the A, C and Z frequency weightings and tolerance for Class 2.

FREQUENCY [Hz]	A WEIGHTING [dB]	C WEIGHTING [dB]	Z WEIGHTING [dB]	TOLERANCE CLASS 2 [dB]
10	- 70.4	- 14.3	0.0	+ 5,0; - ∞
12.5	- 63.4	- 11.2	0.0	+ 5; - ∞
16	- 56.7	- 8.5	0.0	+ 5; - ∞
20	- 50.5	- 6.2	0.0	± 3,0
25	- 44.7	- 4.4	0.0	± 3,0
31.5	- 39.4	- 3.0	0.0	± 3,0
40	- 34.6	- 2.0	0.0	± 2,0
50	- 30.2	- 1.3	0.0	± 2,0
63	- 26.2	- 0.8	0.0	± 2,0
80	- 22.5	- 0.5	0.0	± 2,0
100	- 19.1	- 0.3	0.0	± 1,5
125	- 16.1	- 0.2	0.0	± 1,5
160	- 13.4	- 0.1	0.0	± 1,5
200	- 10.9	0.0	0.0	± 1,5
250	- 8.6	0.0	0.0	± 1,5
315	- 6.6	0.0	0.0	± 1,5
400	- 4.8	0.0	0.0	± 1,5
500	- 3.2	0.0	0.0	± 1,5
630	-1.9	0.0	0.0	± 1,5
800	-0.8	0.0	0.0	± 1,5
1000	0	0	0	± 1,0
1250	+ 0.6	0.0	0.0	± 1,5
1600	+ 1.0	- 0.1	0.0	± 2,0
2000	+ 1.2	- 0.2	0.0	± 2,0
2500	+ 1.3	- 0.3	0.0	± 2,5
3150	+ 1.2	- 0.5	0.0	± 2,5
4000	+ 1.0	- 0.8	0.0	± 3,0
5000	+ 0.5	- 1.3	0.0	± 3,5
6300	- 0.1	- 2.0	0.0	± 4,5
8000	- 1.1	- 3.0	0.0	± 5,0
10000	-2.5	- 4.4	0.0	+ 5,0; - ∞
12500	-4.3	-6.2	0.0	+ 5,0; - ∞
16000	- 6.6	- 8.5	0.0	+ 5,0; - ∞
20000	-9.3	- 11.2	0.0	+ 5,0; - ∞

19.4 CALIBRATION

Use the CESVA *CB004 or CB012* acoustic calibrator and consult section 10.1.

19.5 OCTAVE AND THIRD OCTAVE BAND FILTERS

The *SC202* has Class 2 octave band and third octave band filters according to the IEC 61260-1:2014 standard.

19.5.1 Octave and third octave band filters

FREQUENCY EVALUATION SYSTEM	Base 10
REFERENCE ATTENUATION	0 dB
LINEARITY OPERATING RANGE	Same as the measurement range
ANALYTICAL FILTER DESIGN METHOD	Optimised Z-transform for Butterworth analogue filters
SAMPLING FREQUENCY:	
Octave band filters	48 kHz
Third octave band filters	48 kHz
REAL TIME OPERATING FREQUENCY RANGE:	Central frequencies
Octave band filters	from 8 to 16000 Hz
Third octave band filters	from 6.3 to 20000 Hz

OCTAVE BAND FILTERS		THIRD OCTAVE BAND FILTERS	
NOMINAL CENTRAL FREQUENCY [Hz]	EXACT BASE 10 FREQUENCY [Hz]	NOMINAL CENTRAL FREQUENCY [Hz]	EXACT BASE 10 FREQUENCY [Hz]
		6.3	6.310
8	7.943	8	7.943
		10	10,000
		12.5	12,589
16	15,849	16	15,849
		20	19.953
		25	25,119
31.5	31.623	31.5	31.623
		40	39,811
		50	50,119
63	63.096	63	63.096
		80	79,433
		100	100,00
125	125.89	125	125.89
		160	158,49
		200	199.53
250	251.19	250	251.19
		315	316,23
		400	398.11
500	501.19	500	501.19
		630	630,96
		800	794.33
1000	1000	1000	1000,0
		1250	1258,9
		1600	1584,9
2000	1995.30	2000	1995.3
		2500	2511,9
		3150	3162,3
4000	3981.10	4000	3981,1
		5000	5011,9
		6300	6309,6
8000	7943.30	8000	7943,3
		10000	10000
		12500	12589
16000	15849	16000	15849
		20000	19953

19.5.2 Measurement range (octave band spectrum analyser)

Measurement range (with linearity error lower than 0.4 dB):

MICROPHONE	*P008*
FREQUENCY [Hz]	Range [dB]
8	from 34.2 to 137
16	from 31.9 to 137
31.5	from 29.6 to 137
63	from 27.3 to 137
125	from 25.2 to 137
250	from 23.7 to 137
500	from 23.1 to 137
1000	from 23.2 to 137
2000	from 23.7 to 137
4000	from 23.9 to 137
8000	from 22.9 to 137
16000	from 26.1 to 137

19.5.3 Measurement range (third octave band spectrum analyser)

Measurement range (with linearity error lower than 0.4 dB):

MICROPHONE	*P008*
FREQUENCY [Hz]	Range [dB]
6.3	from 30.2 to 137
8	from 29.4 to 137
10	from 28.6 to 137
12.5	from 27.8 to 137
16	from 27.1 to 137
20	from 26.3 to 137
25	from 25.5 to 137
31.5	from 24.8 to 137
40	from 24.0 to 137
50	from 23.2 to 137
63	from 22.4 to 137
80	from 21.7 to 137
100	from 21.1 to 137
125	from 20.4 to 137

160	from 19.8 to 137
200	from 19.3 to 137
250	from 18.9 to 137
315	from 18.6 to 137
400	from 18.4 to 137
500	from 18.3 to 137
630	from 18.3 to 137
800	from 18.3 to 137
1000	from 18.4 to 137
1250	from 18.6 to 137
1600	from 18.8 to 137
2000	from 18.9 to 137
2500	from 19.1 to 137
3150	from 19.2 to 137
4000	from 19.2 to 137
5000	from 19.2 to 137

6300	from 19.0 to 137
8000	from 18.1 to 137
10000	from 17.2 to 137
12500	from 16.8 to 137
16000	from 24.4 to 137
20000	from 20.9 to 137

19.6 ENVIRONMENTAL, ELECTROSTATIC AND RADIO FREQUENCY CRITERIA

19.6.1 Stabilisation time

The stabilisation time after changes in environmental conditions (I) is 5 minutes.

19.6.2 Environmental criteria

INFLUENCE OF STATIC PRESSURE:

MAXIMUM ALTITUDE:		up to 3,500	m		up to 2,000	m
OPERATING RANGE:		65 to less than 85	kPa		85 to 108	kPa
MAXIMUM ERROR (1 kHz and 94 dB or 104 dB):	Class 2	± 1.6	dB	Class 2	± 0.7	dB

INFLUENCE OF TEMPERATURE:

OPERATING RANGE:	Class 2	0 to +40	°C
MAXIMUM ERROR (-10 to +50°C):	Class 2	1.0	dB
STORAGE WITHOUT BATTERIES:		-20 to +60	°C

INFLUENCE OF HUMIDITY:

OPERATING RANGE (IN ABSENCE OF CONDENSATION):		25 to 90	%
MAXIMUM ERROR (25% < R.H. < 90% at 40°C and 1 kHz):	Class 2	1.0	dB
STORAGE WITHOUT BATTERIES:		< 93	%

19.6.3 Electrostatic criteria

EFFECTS OF STATIC ELECTRICITY DISCHARGES:	The instrument does not suffer permanent degradation or loss of functionality after exposure to electrostatic discharge. During the application of the downloads, there may be a change in the screen presentation mode, without this affecting the operating state, or causing any change in the configuration of the device; the measured reading value may also be slightly affected during this exposure.

19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.

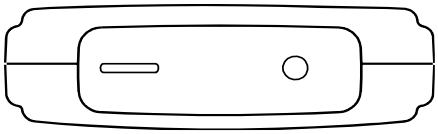
CLASSIFICATION FOR SUSCEPTIBILITY TO RADIO FREQUENCY FIELDS:	Groups X and Z
NORMAL OPERATING MODE:	Configuration with *CN105* and *CN110* extension cable of microphone and *SC202* sound level meter with function L_{AF}
REFERENCE ORIENTATION:	*SC202* in vertical position, with the principal axis of the *SC202* perpendicular to the direction of propagation of the field in horizontal polarisation. With all the cables connected and with the *AM300* mains transformer
SET OF ACCESSORIES TESTED IN THE VERIFICATION OF THE ELECTROMAGNETIC COMPATIBILITY REQUIREMENTS:	*AM300* mains transformer, *CN500* USB type C power and connection cable for communication with the PC, *CN110* 10m extension cable,
SOUND LEVEL AT WHICH THE *SC202* MEETS THE REQUIREMENTS FOR RADIATED ELECTROMAGNETIC FIELD AND FIELD AT THE	74 dBA

FREQUENCY OF THE POWER NETWORK:	
INFLUENCE OF MAGNETIC FIELDS:	In a magnetic field of 80 A/m (1 oersted) at 50 Hz or 60 Hz, there is no variation in the reading that shows an effect.
CONFIGURATION FOR THE NORMAL OPERATING MODE AND POSITION THAT PRODUCES THE MAXIMUM EMISSION OF RADIOFREQUENCY (n):	(*) Sound level meter with L_{AF} function. *SC202* in vertical position, with the principal axis of the *SC202* perpendicular to the direction of propagation of the field with horizontal polarisation. With all the cables connected and with the *AM300* mains transformer

CONFIGURATION FOR NORMAL MODE OF OPERATION AND POSITION THAT PRODUCES MAXIMUM SUSCEPTIBILITY (MINIMUM IMMUNITY) TO RADIATED OR CONDUCTED FIELDS THROUGH POWER (o):	(*) Sound level meter with L_{AF} function. *SC202* in vertical position, with the principal axis of the *SC202* perpendicular to the direction of propagation of the field with horizontal polarisation. With all the cables connected and with the *AM300* mains transformer

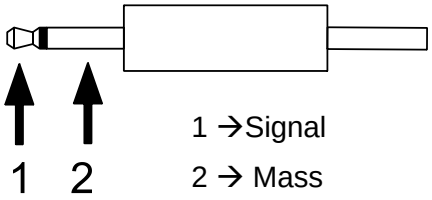
The sound level meter complies with the basic specifications of IEC 61672-1 on the immunity required for fields at the frequency of the alternating power supply (50Hz and 60 Hz) and radio frequency fields
No emission difference is observed with respect to the normal operating mode with the device in a vertical position, with all cables connected and with the *AM300* mains transformer

19.7 INPUTS AND OUTPUTS



19.7.1 AC output

TYPE OF OUTPUT:	analogical output directly proportional to the preamplifier output
FREQUENCY WEIGHTING:	Without weighting
TYPICAL VOLTAGE AT 94 dB and 1 kHz:	46 mVrms
MAXIMUM VOLTAGE:	24 Vpp (usual)
OUTPUT IMPEDANCE:	100 Ω
RECOMMENDED RANGE OF OUTPUT LOAD IMPEDANCE:	RL ≥ 10 kΩ
OUTPUT CONNECTOR:	female mini jack type
INTERCONNECTION CABLE:	Standard audio cable of maximum length 1.5 m and with mono male minijack connector (∅ 3.5 mm)



19.7.2 USB communication

TYPE:	Digital complies with USB rev. 2.0. full-speed
CONNECTOR:	USB type C
CONNECTION CABLE:	*CN500* 0.5 m in length

19.7.3 Wireless communication

TYPE:	*Bluetooth*® v 4.2 BLE
	Bluetooth® v 4.2 classic BLE
RANGE:	50 m

TYPE:	WIFI (2.4 GHz)

19.8 SCREEN

The technical characteristics of the screen of the *SC202* are detailed below:

TYPE:	320 x 240 colour TFT IPS
SIZE:	3.5 “
RESOLUTION IN THE PRESENTATION OF SOUND LEVELS:	0.1 dB

19.9 POWER

19.9.1 Batteries

The *SC202* can be powered by four types of batteries, so the type of battery to be used must be indicated (see 15.1.10).

TYPES OF BATTERIES:	3 x 1.5 V alkaline batteries, AA (LR6) size
	3 x 1.5 V lithium batteries, AA (LR6) size
	3 x 1.2 V rechargeable batteries AA size. NiMH
	3 x 1.5 V lithium rechargeable batteries AA size. Li-ion

NOTE: Remember that different types of batteries cannot be used together. All three batteries must be of the same type.

NOTE: The symbol ⍰ is on the battery cover. This symbol indicates that for ambient temperatures between 40 and 50 ºC, only batteries certified by the IEC 60086-4 standard can be used, protected against short circuits and that withstand an ambient temperature of 60 ºC; the Energizer L91 Li/FeS2 model is recommended; for other models consult the manufacturer.

Typical life with continuous operation depends on the type of battery.

TYPICAL DURATION WITH CONTINUOUS OPERATION:		
Alkaline:	11:00	hours
Lithium:	21:00	hours

Rechargeable (2650mAh):	12:00	hours
Rechargeable Li-ion (2200mAh):	12:00	hours

Typical duration with display light on can be shortened by 50%.

19.9.2 External power

INPUT VOLTAGE RANGE (k):	5 V DC ± 5%	
MINIMUM TURN ON CURRENT:	1	A
TYPICAL RECORDING CURRENT:		
display on	230	mA
display off	125	mA

To power the *SC202* from a mains supply, the use of the *AM300* mains transformer and the *CN500* cable is recommended.

CESVA declines all responsibility for the use of power supplies other than those recommended.

IMPORTANT: When the *SC202* is powered through the USB C port, a power supply certified according to UNE-EN 61010-1:2011+A1:2020 must be used with reinforced isolation between mains and output, limited power output and protected against short circuits.

AM300 MAINS TRANSFORMER		
SUPPLY VOLTAGE:	100 a 240	Vac
SUPPLY FREQUENCY:	50 – 60	Hz

19.10 DIMENSIONS AND WEIGHT

DIMENSIONS:	296 x 85 x 26.5	mm
WEIGHT:	with batteries 358	g
	without batteries 288	g

19.11 STANDARDS

19.11.1 Standards

The *SC202* complies with the following national and international standards:

IEC 61672-1:2013 Class 2. EN 61672-1:2013 Class 2 UNE-EN 61672-1:2014 Class 2
IEC 61260-1:2014 Class 2, EN 61260-1:2014 Class 2 UNE-EN 61260-1:2014 Class 2
OIML R88 type2, OIML R58 type2
ANSI/ASA S1.4:2014/Part1 Type 2, ANSI S1.43:97 (R2007) Type 2, ANSI S1.11:04 Class 2
DIN 45657:2014 in reference to the Taktmaximalpegel function

IEC 61010-1:2010+A1:2016 Pollution degree II. EN 61010-1:2010+A1:2019 II Pollution degree. UNE-EN 61010-1:2011+A1:2020 II Pollution degree
CE Mark. It complies with the low voltage directive 2014/35/EU and the EMC directive 2014/30/EU.
It complies with directive 2014/53/EU on the harmonisation of the laws of the Member States on the marketing of radio equipment
CESVA instruments, s.l.u as a manufacturer of electrical or electronic devices, informs you that the product you have just purchased complies with Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). Similarly, the product includes the following symbol, which indicates that it is subject to selective waste collection:

19.11.2 Certificates

Type approval Certificate for Spain

19.11.3 Notes

If your *SC202* stops complying with any of these specifications, contact your nearest official CESVA dealer for inspection, adjustments or repair.

Maintenance and precautions 20

The precautions and warnings to be considered with regard to the *SC202* are specified below:

- Only attach or detach the microphone using your hands, never use tools. Never do this when the *SC202* is operating.
- Never dismantle the microphone, as this may cause permanent damage.
- Keep the microphone dust free and away from sharp-pointed objects.
- Avoid excessive humidity and sudden temperature changes since this may cause condensation on the microphone.
- To clean the *SC202*, turn off the device and use a damp cloth
- To manipulate the device (remove the microphone, etc.) the device must be switched off and disconnected from any power sources.
- Different types of batteries cannot be used together. All three batteries must be of the same type.
- Remove the batteries if you will not be using the *SC202* for a long period.
- When the *SC202* is powered through the USB C port, a power supply certified according to IEC 61010-1:2011+A1:2020 must be used with reinforced isolation between the mains and the output, limited power output and protected against short circuits.
- The *SC202* sound level meter is designed to provide reliable measurements for a long time. If any malfunction cannot be corrected by changing the batteries or checking the manual, send the *SC202* to an official CESVA dealer. Never try to have it repaired by unauthorised personnel.
- The *SC202* has an internal clock powered by a cell battery that saves the time. This battery has an average life of 10 years. When the battery runs out, it must be replaced immediately. Contact your official technical service.
- The *SC202* is factory set with calibrated standards according to current regulations. It is recommended that the sensitivity of the sound level meter be adjusted by technically competent personnel. The readjustment of sensitivity leads to loss of traceability in the calibration of the device. CESVA declines any responsibility due to sensitivity settings made by unauthorised personnel.
- Use the *SC202* only for the purpose for which it was designed. If the user works with the device for other purposes, the device could be damaged.
- CESVA accepts no responsibility for any operations by unauthorised personnel, this will lead the device is no longer covered by its warranty.

- This device can only work with the accessories described in the Accessories section. In case of using a different accessory, and this accessory causes a failure in the device, CESVA accepts no responsibility for this failure, thus leaving the device out of warranty.
- **WARNING:** The symbol is located on the battery cover. This symbol indicates that for ambient temperatures between 40 and 50 ºC, only batteries certified by the IEC 60086-4 standard can be used, protected against short circuits and that withstand an ambient temperature of 60 ºC; the Energizer L91 Li/FeS2 model is recommended; for other models consult the manufacturer.

Tips for taking measurements 21

Here are some tips to bear in mind when taking measurements:

- It is advisable to check the *SC202* before and after each measurement. Use the *CB004* or *CB012* acoustic calibrator (see. 10.1).
- Remember that the preamplifier is not removable. Do not pull it as this would cause damage to the equipment.
- When making measurements holding the *SC202* in your hand, it should be done with your arm extended (making its reading compatible) to avoid any operator influence on the measurements (screen effect).
- To avoid interference, we recommend operating the *SC202* using the CESVA *SC202 Link* application, so that the operator can keep away from the sound level meter.
- The axis of the microphone should be pointed towards the noise source.
- For indoor measurements it is also advisable to keep the sound level meter away from reflective surfaces: walls, objects, floors, etc.
- For acoustic measurements outside, the sound level meter microphone must be protected by the windscreen provided so that wind noise does not interfere with the measurement result. It is advisable to check the environmental conditions (temperature, humidity, atmospheric pressure).
- For the measurement of very low-level sound fields, the measurement range specifications must be observed. If you want to measure a level lower than the specified lower limit of measurement, the characteristics of the device's own noise must be considered.
- Any impact on the *SC202* will be picked up by the microphone and may affect the measurement value and permanently damage it.
- When the *SC202* is exposed to vibrations, it is advisable to isolate it. This can normally be achieved using pads made of foam rubber or similar materials.

Firmware update and module activation 22

The *SC202* offers the possibility of:

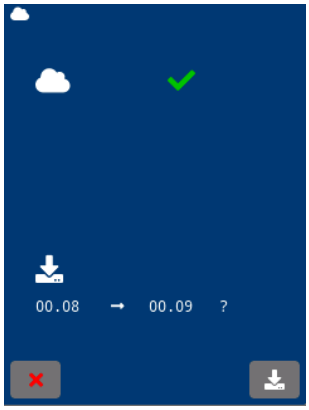
- Updating the firmware of the device
- Activating a module for the *SC202*
- Activating a module for the *SC202 Link*

Without the need to send the device to the technical service. This saves a great deal of time and money.

Optional modules can be purchased at the time of purchase of the *SC202* or later. To incorporate them, simply contact your official CESVA retailer and provide them with the serial number of your sound level meter and manage the procedures for purchasing the module.

22.1 Firmware update

To update the firmware of the *SC202*, enable the WIFI from the WIFI option (see 15.1.5) and access the CLOUD option in the menu (see 15.1.13) to check that the connection is correct:



At the bottom of the screen it shows if there is a firmware update available.

NOTE: To update the firmware, it is essential that the sound level meter is powered through the USB connector.

To update the firmware press . The process will automatically start, showing the percentage of progress on the screen.

The update can only be stopped before the progress reaches 100% on screen. To stop the update, press . The update will stop and the sound level meter will return to the CLOUD option screen, keeping the previous firmware version.

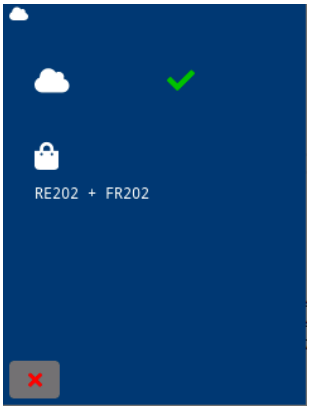
When the sound level meter reaches 100% progress, the screen turns off and the power LED automatically turns on; after approximately 9 seconds, the status LED starts flashing; and after around 4 or 5 seconds both LEDs turn off, indicating that the firmware update is complete.

At this moment, the sound level meter can be turned on.

22.2 Activation of an optional module of the SC202

Optional modules can be purchased at the time of purchase of the *SC202* or at a later date. To incorporate them, simply contact your official CESVA retailer and provide them with the serial number of your sound level meter and manage the procedures for purchasing the module.

Next, to activate the optional module, access the CLOUD menu option (see 15.1.13). If the communication is correct, the activation of the option module is carried out automatically. The lower part of the screen shows the activated module(s).



Optional modules currently available:

FR202: Octave band (1/1) and third octave band (1/3) spectral analysis module

22.3 Activating an optional SC202 Link module

To incorporate an optional module to the *SC202 Link* application, simply contact your official CESVA retailer and provide them with the serial number of your sound level meter and manage the module acquisition procedures.

Next, to activate the optional module, access the CLOUD menu option (see 15.1.13). If the communication is correct, the activation of the option module is carried out automatically. The lower part of the screen shows the activated module(s).

Functions 23

23.1 Nomenclature of functions

The functions that the *SC202* measures, their nomenclature and a brief definition of these are specified below.

23.1.1 Sound level meter parameters

FUNCTION	DESCRIPTION
L_{AF}	Sound pressure level with A frequency weighting and fast time weighting (Fast)
L_{CF}	Sound pressure level with C frequency weighting and fast time weighting (Fast)
L_{AFmax}	Maximum sound pressure level with A frequency weighting and fast time weighting (Fast) during the time of T, t and 1s
L_{CFmax}	Maximum sound pressure level C with frequency weighting and fast time weighting (Fast) during the time of T, t and 1s
L_{AFmin}	Minimum sound pressure level with A frequency weighting and fast time weighting (Fast) during the time of T, t and 1s
L_{CFmin}	Minimum sound pressure level with C frequency weighting and fast time weighting (Fast) during the time of T, t and 1s
L_{AS}	Sound pressure level with A frequency weighting and slow time weighting (Slow)
L_{ASmax}	Maximum sound pressure level with A frequency weighting A and slow time weighting (Slow) during the time of T, t and 1s
L_{ASmin}	Minimum sound pressure level with A frequency weighting and slow time weighting (Slow) during the time of T, t and 1s
L_{AI}	Sound pressure level with A frequency weighting and impulsive time weighting (Impulse)
L_{AImax}	Maximum sound pressure level with A frequency weighting and impulsive time weighting (Impulse) during the time of T, t and 1s
L_{AImin}	Minimum sound pressure level with A frequency weighting and impulsive time weighting (Impulse) during the time of T, t and 1s

L_{Cpeak}	Peak sound pressure level of T and t time with C frequency weighting
$L_{Cpeak1s}$*	Peak sound pressure level of 1 s with C frequency weighting
L_{nt}	Total percentiles
L_{nT}	Partial percentiles of T integration time **n**: 1%, 5%, 10%, 50%, 90%, 95%, 99%. The percentiles are calculated from a sampling time of 20 ms and with classes of 0.1 dB
L_{Xt}	Equivalent continuous sound pressure level with t integration time with X frequency weighting
L_{XT}	Equivalent continuous sound pressure level with T integration time with X frequency weighting
L_{XTmaxt}	Maximum equivalent continuous sound pressure level with T integration time with X frequency weighting during time t
L_{XTmint}	Minimum equivalent continuous sound pressure level with T integration time with X frequency weighting during time t
L_{X1s}	Equivalent continuous sound pressure level with 1 s integration time with X frequency weighting
L_{AIT}	Equivalent continuous sound pressure level with impulsive time weighting (Impulse) and with T integration time with A frequency weighting
L_{AIt}	Equivalent continuous sound pressure level with impulsive time weighting (Impulse) and with t integration time with A frequency weighting
L_{AI1s}	Equivalent continuous sound pressure level with impulsive time weighting (Impulse) and with 1 s integration time with A frequency weighting **X**: A, C or Z
$L_{X\tau}$	Equivalent continuous sound pressure level with τ sliding integration time with A and C frequency weighting.
$L_{X\tau maxT}$	Maximum equivalent continuous sound pressure level with a τ sliding integration time with A and C frequency weighting during the time T
$L_{X\tau maxt}$	Maximum equivalent continuous sound pressure level with a τ sliding integration time with A and C frequency weighting during the time t
$L_{X\tau minT}$	Minimum equivalent continuous sound pressure level with a τ sliding integration time with A and C frequency weighting during the time T
$L_{X\tau mint}$	Minimum equivalent continuous sound pressure level with a τ sliding integration time with A and C frequency weighting during the time t
L_{AF5t}	Taktmaximal-Mittelungspegel, corresponding to the measurement time, in compliance with standard DIN 45641
L_{AF5T}	Taktmaximal-Mittelungspegel, corresponding to a programmable T integration time, according to DIN 45641.
L_{AF51s}*	Taktmaximal-Mittelungspegel, corresponding to 1 s integration time, according to DIN 45641.

L_{AF20ms}*	Sound pressure level with A frequency weighting and F time weighting every 20 milliseconds
L_{A20ms}*	Equivalent continuous sound pressure level with A frequency weighting and 20 milliseconds integration time
t	Measurement time
T	Programmable integration time
1s	Integration time of 1 second
τ_1, τ_2	Programmable τ sliding integration time

*: These functions are measured by the *SC202* but are not displayed on the screen. The way to obtain the results of these functions is by making a recording and later viewing the csv file from the PC (see 17.2.1).

23.1.2 1/1 octave band parameters

FUNCTION	DESCRIPTION
L_{ft}	Equivalent continuous sound pressure level with t integration time of the octave band centred on frequency f
L_{fT}	Equivalent continuous sound pressure level with T integration time of the octave band centred on the frequency f
L_{f1s}	Equivalent continuous sound pressure level with 1 second integration time of the octave band centred on the frequency f **f**: 8, 16, 31.5, 63, 125, 250, 500, 1000 (1k), 2000 (2k), 4000 (4k), 8000 (8k) and 16000 (16k) Hz
NC	Value of the NC (Noise Criterion) curve corresponding to the measured spectrum
NC_f	Value of the NC curve that has not been exceeded in the octave band centred on frequency f
NR	Value of the NR (Noise Rating) curve corresponding to the measured spectrum
NR_f	Value on the NR curve that has not been exceeded in the octave band centred on frequency f
t	Measurement time
T	Programmable integration time
1 s	Integration time of 1 second

23.1.3 1/3 third octave band parameters

FUNCTION	DESCRIPTION
L_{ft}	Equivalent continuous sound pressure level with t integration time of the third octave band centred on frequency f
L_{fT}	Equivalent continuous sound pressure level with T integration time of the third octave band centred on the frequency f
L_{f1s}	Equivalent continuous sound pressure level with 1 second integration time of the third octave band centred on the frequency f
	f: 6.3, 10, 12.5, 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000 (1k), 1250 (1.25k), 1600 (1.6k), 2000 (2k), 2500 (2.5k), 3150 (3.15k), 4000 (4k), 5000 (5k), 6300 (6.3k), 8000 (8k), 10000 (10k), 12500 (12.5k), 16000 (16k) and 20000 (20k) Hz.
t	Measurement time
T	Programmable integration time
1 s	Integration time of 1 second

23.2 Description of functions

This section briefly describes the functions that the *SC202* measures for the various measurement modes.

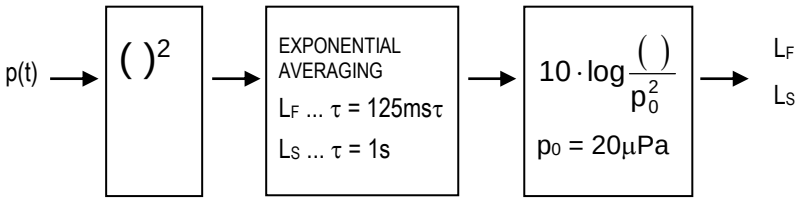
23.2.1 Sound pressure level with Fast and Slow time weighting

L_F (Fast)

RMS value with 125 ms fast exponential averaging, in decibels.

LS (Slow)

RMS value with 1 s slow exponential averaging, in decibels.



p(t): instantaneous sound pressure

To obtain a stable reading, sound level meters feature two kinds of responses, known as fast and slow. The fast response has an exponential averaging circuit time constant of τ = 125 ms and the slow response has one of τ = 1 s.

The "fast" response is indicated in the measurement of noise levels that fluctuate relatively little. Meanwhile, the "slow" response is recommended for noises of greater variation.

$$L_{S,F} = 20 \cdot \log \left(\frac{\left(\frac{1}{\tau} \int_{-\infty}^{T} p^2(\zeta) \cdot e^{-(t-\zeta)/\tau} d\zeta \right)^{1/2}}{p_o} \right)$$

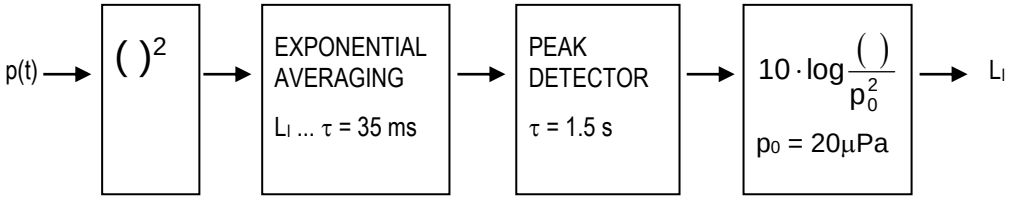
p(t): instantaneous sound pressure

p_0: reference sound pressure (20 μPa)

23.2.2 Sound pressure level with Impulse time weighting

L_I (Impulse)

Maximum short-term RMS value with exponential averaging of 35 ms, in decibels.



p(t): instantaneous sound pressure

The Impulse feature is designed to detect impulse noise, like shots or blows. The impulse function has a very fast exponential averaging circuit time constant of τ = 35ms and a peak detector that retains the measured value for long enough to be viewed.

23.2.3 Peak sound pressure level

Lpeak (Peak)

The highest absolute instantaneous sound pressure value from the beginning of the measurement, in decibels.

23.2.4 Equivalent continuous sound pressure level

L_T, L_t and $L\tau$

The linear averaged of the square of the instantaneous sound-pressure from the very start, t1, until the end, t2. The duration of the averaged is therefore T= t2 - t1

$$L_T = 10 \cdot \log\left(\frac{1}{T}\int_{t_1}^{t_2}\frac{p^2(t)}{p_0^2}dt\right)$$

p(t): instantaneous sound pressure

p_0: reference sound pressure (20 μPa)

T: duration of the averaged

The equivalent sound pressure level is the pressure level that, kept constant throughout the entire measurement interval, has the same sound energy as the sound event measured.

The equivalent continuous sound pressure level function is ideal for measuring variable sound events such as road traffic or sound events that due to their long duration cover a wide range of sound pressure levels, such as environmental measurements.

Percentile levels are the perfect complement to the equivalent continuous sound pressure level function.

The *SC202* measures the equivalent continuous sound pressure level L_t, L_T and $L\tau$.

The equivalent level Lt is the equivalent level of the interval measured, that is, for each instant it gives us the value of the equivalent level from the beginning of the measurement to that instant. When measurement has been completed, the Lt value corresponds to the equivalent level of the entire measurement from beginning to end.

The equivalent level L_T is the equivalent level corresponding to T integration time (a programmable parameter). Every time T interval is presented. That is, every T interval, the *SC202* shows the equivalent level of the last T interval.

The equivalent level $L\tau$ is the equivalent level corresponding to the τ sliding integration time each second. And it is displayed on screen every second; i.e., every second the *SC202* shows the equivalent level corresponding to the last τ time interval.

23.2.5 Taktmaximal-Mittelungspegel

L_{AF5T}(t) (Taktmaximal-Mittelungspegel)

The maximum value of the Fast level L_F(t) measured for a time interval of 5 seconds, with A frequency weighting.

L_{AF5t} and L_{AF5T} (Taktmaximal-Mittelungspegel)

L_{AF5t}

The equivalent continuous sound pressure level of the measured values of L_{AF5T} (t), corresponding to the measurement time.

L_{AF5T}

The equivalent continuous sound pressure level of the measured values of L_{AF5T}(t), corresponding to T integration time (programmable parameter).

23.2.6 Percentiles

L_{99}, L_{95}, L_{90}, L_{50}, L_{10}, L_5 and L_1

These are the levels that have been exceeded for 99%, 95%, 90%, 50%, 10%, 5% and 1% of the measurement time, in decibels.

On the sound level meter screen, they are calculated with 0.1 dB classes from a sampling time of 20 ms.

Reference to standards 24

This instruction manual contains the information requested by the international sound level meter standards.

Below are cross-references between specific paragraphs of these standards and the corresponding sections of this manual where the required information is displayed.

If you need more information, please contact your official retailer.

24.1 Standard UNE-EN 61672-1:2014

PARAGRAPH UNE-EN 61672-1	DESCRIPTION	SECTION Manual *SC202*
4	**REFERENCE ENVIRONMENTAL CONDITIONS**	19.1 REFERENCE CONDITIONS
5	**OPERATING SPECIFICATIONS**	
5.1	**General information**	
5.1.4	Configuration of the complete sound level meter Normal operating mode	8 Assembling and dismantling the device 19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.
5.1.5	Instrument class	19 Technical specifications
5.1.6	Microphone models Procedures for the use of the sound level meter	19.2MICROPHONES AND PREAMPLIFIERS 11 Measuring and recording
5.1.7	Assembling the microphone	8 Assembling and dismantling the device 20 Maintenance and precautions
5.1.8	Computer programs that are an integral part of the sound level meter	No computer program is an integral part of the sound level meter
5.1.10	Description of the frequency weightings provided	19.3.6 Frequency weighting
5.1.12	Description of the level range with the nominal value A-weighted at 1 kHz Recommendation for selecting the optimal range	19.3.2 Measurement range The *SC202* has one unique range

5.1.13	Reference sound pressure level Reference level range Reference orientation Reference direction for each microphone Microphone reference point	19.1 REFERENCE CONDITIONS 19.1 REFERENCE CONDITIONS 19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields. 19.1 REFERENCE CONDITIONS 19.1 REFERENCE CONDITIONS
5.1.14	Operation of the maintenance device	19.3.5 Time and clock performance
5.1.15	Means for inserting electrical signals	19.2.1 Microphone models and their main features
5.1.17	Highest sound pressure level applicable to the microphone and input peak-to-peak voltage value	19.2.1 Microphone models and their main features
5.1.18	Description of each independent input channel	The *SC202* has only one input channel
5.1.19	Initial time interval after power on	19.3.1 Warm-up time
5.2	**Adjustments to the calibration check frequency**	
5.2.1	Acoustic calibrator model	10 Check the device 19.4 CALIBRATION
5.2.3	Procedure and settings data for using the acoustic calibrator	15.1.9 MICROPHONE SETTINGS option
5.3	**Corrections to the indicated levels**	
5.3.1.1	Corrections to the influence of various effects.	19.2 MICROPHONES AND PREAMPLIFIERS
5.3.2	**Reflections and diffraction**	
5.3.2.1 **5.3.2.2**	Corrections and their associated uncertainties for typical effects of reflections and diffraction owing to the case.	19.2 MICROPHONES AND PREAMPLIFIERS
5.3.3	**Windscreens**	
5.3.3.1	Corrections for measured effects of a windscreen on frequency and directional response	19.2 MICROPHONES AND PREAMPLIFIERS
5.3.5	**Corrections to use during periodic verification**	
5.3.5.1 **5.3.5.3**	Recommended multi-frequency acoustic calibrator, comparison coupler, or electrostatic actuator for periodic verification and correction to obtain frequency-weighted sound levels. These must be provided at least for 125 Hz, 1 kHZ, and 4 kHz or 8 kHz.	19.2.2 Sound field correction for
5.4	**Directional response**	
5.4.2	Directional response requirements for normal operating mode	19.2.5 Directional response
5.5	**Frequency weightings**	
5.5.8	Optional frequency weightings	The *SC202* does not provide optional frequency responses.
5.6	**Level linearity**	
5.6.3	Starting point for linearity test at 1 kHz	19.3.3 Linearity range

5.6.10	Linear operating range	19.3.3 Linearity range
5.5.11	Starting point for linearity test	19.3.3 Linearity range
5.7	**Intrinsic noise**	
5.7.1	Intrinsic noise level in the most sensitive range for each microphone model: total noise	19.3.4 Noise
5.7.2	Noise levels as time-weighted levels or as time-averaged levels	19.3.4 Noise
5.7.3	Intrinsic noise level with adapter and closure: electrical noise	19.2.1 Microphone models and their main features 19.3.4 Noise
5.7.5	Instructions for the measurement of low-level sounds with consideration of the influence of intrinsic noise.	21 Tips for taking measurements
5.8	**F and S temporal weightings**	
5.8.1	Description of the temporal weightings	23 Functions
5.11	**Overload indication**	
5.11.1	Description of the operation and interpretation of overload indications.	Overload indicator
5.12	**"Under range" indication**	
5.12.2	Operation and interpretation of “under range” indications.	The lower limit of which is determined by the inherent noise of the microphone and electronic components within the sound level meter. 11.5 "Under range" indicator
5.13	**Peak C-weighted sound level**	
5.13.1	Nominal range of peak C-weighted sound levels.	19.3.3 Linearity range
5.17	**Thresholds** Indication of the properties and method of operation, in the case of providing selectable thresholds.	The *SC202* does not provide thresholds.
5.18	**Presentation of results**	
5.18.1	Description of the indications of the functions presented in the results presentation device, including frequency weighting, time weighting and averaging period.	The indication of the functions is carried out by means of literal symbols. 23 Functions
5.18.2	Description of the results presentation device	6 Screen
5.18.3	Identification of the displayed functions	The displayed functions are always identified by literal symbols. 23 Functions
5.18.4	Results update frequency	19.3.5 Time and clock performance
5.18.5	Method of transferring or downloading measurement results via digital output	17 Use of the inputs and outputs
5.15.6	Alternative results presentation devices	The *SC202* does not have any alternative results presentation devices.

5.19	**Analogue or digital output**	
5.19.1	Features of the analogue or digital outputs	4 Inputs and outputs 17 Use of the inputs and outputs 19.7 INPUTS AND OUTPUTS
5.20	**Possibility of measuring times**	
5.20.1	Procedure for preselecting an integration time interval and for setting the time of day. Nominal time of day drift.	15 Settings and adjustments 15.1.7 CSV option 19.3.5 Time and clock performance
5.20.2	Maximum and minimum averaging and integration times.	19.3.5 Time and clock performance
5.21	**Radio frequency emissions and disturbances on a public electricity grid**	
5.21.1	Length and type of interconnection cables and features of the devices to which they are expected to be connected.	4 Inputs and outputs 17 Use of the inputs and outputs 19.7 INPUTS AND OUTPUTS
5.21.2	Mode of operation that produces the highest radio frequency emissions	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.
5.22	**Crosstalk**	
5.22.2	Termination devices to be installed in place of microphones in multichannel equipment	The *SC202* has only one channel
5.23	**Electrical power**	
5.23.2	Maximum and minimum supply voltages	19.9 POWER
5.23.3	Battery types	19.9 POWER
5.23.4	Continuous operating time when fully charged batteries are installed	19.9 POWER
5.23.5	Recommended medium for the sound level meter to work with external power	19.9 POWER
5.23.6	Voltage and frequency of the power from a public alternating current network	19.9 POWER
6	**ENVIRONMENTAL, ELECTROSTATIC AND RADIO FREQUENCY CRITERIA**	
6.1	**General information**	
6.1.2	Time interval required for the sound level meter to stabilise after changes in environmental conditions	19.6.1 Stabilisation time
6.2	**Static pressure**	
6.2.2	Using the sound level meter when the static pressure is lower than 85 kPa	10 Check the device
6.3	**Air temperature**	
6.3.2	Components designed to work in an environmentally controlled enclosure	None
6.5	**Electrostatic discharges**	
6.5.2	Degradation due to exposure to electrostatic discharge.	19.6.3 Electrostatic criteria

6.6	**Fields at the frequency of the alternating power network and radio frequency**	
6.6.1	Configuration that produces the maximum susceptibility (minimum immunity) to the fields at the frequency of the alternating power network and radio frequency	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.
6.6.3	Orientation of the sound level meter with greater susceptibility to fields at the frequency of the alternating power network	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.
6.6.5	If applicable, the sound level meter meets specifications at unmodulated electric field strengths of root mean square values greater than the specified field strengths.	
6.6.10	Possibility of indicating a sound level lower than 74 dB for which the sound level meter meets the specifications for the exposure of radio frequency fields.	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.
6.7	**Mechanical vibration** Tips on means of minimising the influence of mechanical vibrations on sound levels. Notice that mechanical vibration can significantly affect the lower limit of the measurement range.	21 Tips for taking measurements
7	**PROVISIONS FOR USE WITH AUXILIARY DEVICES**	
7.1	Correction to be applied when using microphone extension cables	19.2.4 Effect of the optional accessories on the microphone
7.2	Typical effect of accessories (windscreen and outdoor kit): microphone sensitivity, directional response and frequency weighting.	19.2 MICROPHONES AND PREAMPLIFIERS
7.3	Indication of compliance with the specifications for the same class when an optional accessory is installed	19.2.4 Effect of the optional accessories on the microphone
7.4	Description of using the sound level meter to measure sound levels filtered with the internal band pass filters	13 Screen
7.5	Connection of supplied auxiliary devices and their effects	8 Assembling and dismantling the device 19.2 MICROPHONES AND PREAMPLIFIERS
9	**INSTRUCTION MANUAL**	
9.1 b)	Necessary components of the sound level meter and their mutual influence	8 Assembling and dismantling the device 19.2 MICROPHONES AND PREAMPLIFIERS
9.2.1	**General information**	
9.2.1 a)	Description of classification group (X, Y, Z) and class (1, 2)	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields. 19 Technical specifications
9.2.1 b)	Description of the complete sound level meter and its configuration for the normal operating mode including a windscreen.	8 Assembling and dismantling the device

9.2.1 c)	Microphone models	19.2 MICROPHONES AND PREAMPLIFIERS
9.2.1 d)	Need to use a microphone extension cable to meet specifications.	There is no need to use a microphone extension cable to meet the specifications.
9.2.1 e)	Characteristics and operation of each independent channel.	The *SC202* has only one channel
9.2.1 f)	It should be indicated how to minimise the influences due to mechanical vibrations and alert that these vibrations can alter the lower limit of the linear operating range.	21 Tips for taking measurements
9.2.2	**Design aspects**	
9.2.2 a)	Description of the acoustic magnitudes that the sound level meter is capable of measuring.	23 Functions
9.2.2 b)	Optionally, a tabular description, as a function of the angle of incidence and the frequency, of the relative free-field response to sinusoidal plane waves of the sound level meter for the normal operating mode.	This information is not included in the user's manual. If you need this information, consult your official retailer.
9.2.2 c)	Description of the frequency weightings	19.3.6 Frequency weighting
9.2.2 d)	Description of the temporal weightings	19.3 MEASUREMENT
9.2.2 e)	Identification of level ranges using nominal A-weighted sound levels at 1kHz.	The *SC202* has only one range. 19.3.2 Measurement range
9.2.2 f)	Operation of the level range controls	There is no level range control. The *SC202* has only one range.
9.2.2 g)	A description of the results presentation devices and the frequencies for updating the results.	6 Screen 19.3.5 Time and clock performance
9.2.2 h)	The full range of A-weighted sound level that can be measured at 1kHz with the applicable tolerance limits.	19.3 MEASUREMENT 19.3.2 Measurement range 19.3.3 Linearity range
9.2.2 i)	If available, C-weighted sound level ranges that can be measured at each level range.	19.3 MEASUREMENT 19.3.2 Measurement range 19.3.3 Linearity range
9.2.2 j)	A means of identifying the version of all software that is integral to the operation of the sound level meter.	No software is required for the sound level meter to work.
9.2.2 k)	Information on the target design characteristics and the limits of acceptance that should be maintained for the quantities that the sound level meter is capable of indicating but for which performance specifications are not provided in this standard. They include optional frequency weights.	All additional functions to those specified in this standard meet the characteristics specified in the standard that is contained in its definition. 23 Functions
9.2.3	**Electrical power**	
9.2.3 a)	Acceptable battery types and their nominal lives	19.9.1 Batteries
9.2.3 b)	The method of confirming that the power is sufficient for the sound level meter to function within the specifications of this standard.	7 Power

9.2.3 c)	Means of making the sound level meter work on external power.	19.9.2 External power
9.2.3 d)	The mean square voltage and the nominal frequency of the supply and the acceptance limits around the nominal values.	19.9.2 External power
9.2.4	**Adjustments to the calibration check frequency**	
9.2.4 a)	Identification of the calibrator model that can be used	10 Check the device
9.2.4 b)	The calibration check frequency	10 Check the device
9.2.4 c)	The procedure for checking and the data for adjustment, the indication of the sound level meter in response to the application of the recommended calibrator.	10 Check the device 15.1.9 MICROPHONE SETTINGS option
9.2.5	**Corrections to the indicated levels**	
9.2.5 a)	Correction and uncertainty data	19.2 MICROPHONES AND PREAMPLIFIERS
9.2.5 b)	Corrections for typical effects of case reflections and diffraction around the microphone	19.2 MICROPHONES AND PREAMPLIFIERS
9.2.5 c)	Corrections for the average effects of a windscreen on the directional and frequency response in the reference direction or for random incidence, if applicable.	19.2 MICROPHONES AND PREAMPLIFIERS
9.2.5 d)	Corrections for periodic checks to determine the sound level in an equivalent free field when evaluated with a multi-frequency calibrator, coupler, or electrostatic actuator.	19.2 MICROPHONES AND PREAMPLIFIERS
9.2.6	**Handling the sound level meter**	
9.2.6 a)	The reference direction	19.1 REFERENCE CONDITIONS
9.2.6 b)	Procedures for measuring sounds and recommendations to minimise the influence of the instrument housing and the observer	21 Tips for taking measurements
9.2.6 c)	Procedure for measuring low-level sound fields	21 Tips for taking measurements
9.2.6 d)	After turning on the sound level meter, the time that must elapse before the sound level meter can be used	19.3.1 Warm-up time
9.2.6 e)	Procedure for taking measurements in places where the static pressure is between 65 and 85 kPa	10 Check the device
9.2.6 f)	Procedure for preselecting an integration time interval and for setting the time of day	15 Settings and adjustments 15.1.1 REGISTERS option 15.1.7 CSV option
9.2.6 g)	The maximum and minimum integration times	19.3.5 Time and clock performance
9.2.6 h)	The operation of the maintenance device and the means of cleaning a held reading.	19.3.5 Time and clock performance

9.2.6 i)	Reset device operation for L_T, L_E, Lmax and L_{Cpeak} measurements and for overload indication. The nominal delay between the operation of the reset device and the restarting of a measurement.	19.3.5 Time and clock performance 11.4Overload indicator
9.2.6 j)	The operation of the overload and "under range" indications and the means of cleaning them.	11.4Overload indicator 11.5 "Under range" indicator
9.2.6 k)	Operation of any user-selectable threshold for measurements of time-averaged sound levels or sound exposure levels.	The *SC202* does not provide thresholds
9.2.6 l)	The method of downloading digital data to a PC	17 Use of the inputs and outputs
9.2.6 m)	Lengths and types of interface cables and characteristics of the devices to which the cables are expected to be connected.	19.7 INPUTS AND OUTPUTS
9.2.6 n)	Characteristics of the electrical outputs	19.7 INPUTS AND OUTPUTS
9.2.7	**Accessories**	
9.2.7 a)	Effects of using the windscreen, a rain protection device, or other supplied or recommended accessory.	19.2.3 Frequency response
9.2.7 b)	Correction that must be applied when using microphone extension cables.	19.2.4 Effect of the optional accessories on the microphone
9.2.7 c)	Use of the sound level meter when it is equipped with band pass filters.	13 Screen
9.2.7 d)	Connection of auxiliary devices supplied by the manufacturer to the sound level meter and their effects	Auxiliary devices are not supplied.
9.2.8	**Influence of variations in environmental conditions**	
9.2.8 a)	Identification of the sound level meter components designed to function only in an environmentally controlled room.	There are no sound level meter components designed solely for operation in environmentally controlled rooms.
9.2.8 b)	Effects of electrostatic discharges on the performance of the sound level meter	19.6.3 Electrostatic criteria
9.2.8 c)	Declaration of conformity with the specifications of immunity to fields at the frequency of the alternating power network or radio frequency. Possibility of indicating a sound level lower than 74 dB for which the sound level meter meets the specifications for the exposure of radio frequency fields.	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.
9.3	**Information for tests**	
9.3 a)	Reference sound pressure level	19.1 REFERENCE CONDITIONS
9.3 b)	Reference level range	19.1 REFERENCE CONDITIONS
9.3 c)	Microphone reference point	19.1 REFERENCE CONDITIONS

9.3 d)	Correction data for levels equivalent to free-field response or random incidence, where applicable, associated with sound levels in response to sound pressure produced by a multi-frequency calibrator, a comparison coupler, or an electrostatic actuator.	
9.3 e)	Directivity index to indicate the relative response for random incidence.	
9.3 f)	Tables of nominal A-weighted sound levels at the upper and lower limits of the linear operating ranges in each level range, preferably for all available frequency weights.	19.3.3 Linearity range
9.3 g)	Starting point for starting level linearity error tests in the range of reference levels.	19.3.3 Linearity range
9.3 h)	Electrical design objective and tolerance limits, of the input device for inserting electrical signals	19.2.1 Microphone models and their main features
9.3 i)	Highest anticipated intrinsic noise level produced when the sound level meter is placed in a low-level sound field and when a specified electrical input device is installed in place of the microphone and terminated in a specified way.	19.2.1 Microphone models and their main features
9.3 j)	The highest sound pressure level at the microphone and the highest peak-to-peak voltage at the electrical input device, which the sound level meter is designed to withstand.	19.2.1 Microphone models and their main features
9.3 k)	The maximum and minimum voltages	7 Power
9.3 l)	Stabilisation time following changes in environmental conditions.	19.6.1 Stabilisation time
9.3 m)	If applicable, the root mean square intensity of the unmodulated electric field greater than 10 V/m for the sound level meter to meet the standard	Not applicable
9.3 n)	Configuration that produces the highest levels of emission of radio frequency fields	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.
9.3 o)	Configuration that produces the maximum susceptibility (minimum immunity) to the fields at the frequency of the alternating power network and radio frequency	19.6.4 Criteria of the fields at the frequency of the mains supply and radio frequency fields.

24.2 Standard UNE-EN 61260-1:2014

PARAGRAPH IEC 61260	DESCRIPTION	SECTION Manual *SC202*
5	**PERFORMANCE REQUIREMENTS**	
5.1.4	The configuration of the filter for one of the normal modes of operation, including required accessories.	13 Screen
5.9	**Reference attenuation**	
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7.3 i)	The mode of operation and connecting devices that produce minimum immunity to power frequency and radio-frequency fields	19.6 ENVIRONMENTAL, ELECTROSTATIC AND RADIO FREQUENCY CRITERIA
7.3 j)	The setting and configuration for greatest radio-frequency emissions	19.6 ENVIRONMENTAL, ELECTROSTATIC AND RADIO FREQUENCY CRITERIA
7.3 k)	Any additional information required to conduct tests to verify that the filters in a set of band-pass filters conform to the performance requirements of this standard	19.6 ENVIRONMENTAL, ELECTROSTATIC AND RADIO FREQUENCY CRITERIA

CESVA instruments, s.l.u reserves the right to modify the characteristics and accessories in this manual without prior notice.

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