

Sound level meter

Class 1: DB300/1

Class 2: DB300/2



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1 Introduction

The DB300 sound level meter is an acoustic measurement instrument with main features of a conventional and integrating-averaging sound level meter and analyzer with storage.

With its memory, DB300 sound level meter stores measurement datasets. Then they are transferred to a computer and processed through LDB23 software.

According to international standards, sound level meter calculates and displays on its graphical backlight LCD-screen values used for a fast and complete study of the noise environment.

To simplify and make nice its use, 5 measurement modes have been preselected:



Mode 1: conventional sound level meter and averaging-integrating with storage



Mode 2: integrating-averaging sound level meter – A and C weighted



Mode 3: integrating-averaging sound level meter – A, C and Z weighted and analyzer by octave bands filters

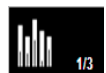


Mode 4: analyzer sound level meter for the measurement according to the NR curves (as per NF S 30-010 standard)



Mode 5: Sound level meter "calculator" of two sound sources

Other *optional* modes are available and mainly:



Mode 6: integrating-averaging sound level meter, and A, C and Z weighted and analyzer by third octave bands filters



Mode 7: building acoustics for the control and the reception of places

In the different modes, in addition to measured values, the sound level meter can display:

- results for a better definition of the acoustic environment:

Maximum and minimum values, peak values, statistics distribution of measured levels

- indications required for the proper validation of the measurement:

Presence and percentage of overload input stages, duration of the measurement

- other information:

Battery autonomy, remaining measuring capacity

Start or stop a measurement are very easy to perform:

- **Directly with the keyboard in instantaneous mode or scheduled later**

or

- **With an automation (I/O plug)**

The sound level meter also communicates with an automaton through I / O plugs:

- 0-10 V DC analog output
- Control bit activated as per pre-programmed threshold
- Threshold detection for external alarm

2 Vocabulary

L-Leq: represents the measurement mode: conventional and integrating-averaging. Values are measured simultaneously.

Leq-St: represents the measurement mode: integrating-averaging sound level meter with storage function. The equivalent continuous sound level on the logging time (DI) is stored into the memory.

1/1 oct: analyser integrating-averaging sound level meter with storage function and with filter by octave bands

1/3 oct: analyser integrating-averaging sound level meter with storage function and with filter by third octave bands

NR: mode to measure noise level of machines or installations according to NR curves.

S1+S2: denomination for measuring or calculating the levels of 2 sound sources.

LXeq: X-weighted equivalent continuous sound level on the logging time or on the total time of the measurement.

LXeqM: Maximum X-weighted equivalent continuous sound level on the logging time, on the total time of the measurement.

LXeqm: Minimum X-weighted equivalent continuous sound level on the logging time, on the total time of the measurement.

LXE: X-weighted sound exposure level.

LXY: X-weighted acoustic pressure level ; time weighting: Y

LXYmax: Maximum X-weighted sound pressure level ; time weighting: Y

LXYmin: Minimum X-weighted sound pressure level ; time weighting: Y

LUpK -LUpKmax: U-weighted peak sound level – maximum U-weighted peak sound level.

DI: Programmable logging time for the calculation of the equivalent continuous sound level stored into the memory, also called: elementary integration time.

X: generic marking for standardized frequency weightings, A - C - Z or filters by octave bands (L, Leq, LE values)

U: generic marking for frequency weightings, C or Z standardized (Lpk values)

Y: generic marking for time weightings with: “F” for Fast, “S” for Slow or “I” for Impulse.

BE: Back-Erase: deletion function of the measurement preceding the press of the BE key (adjustable duration)

SP: Specific marking: function allowing to find during the measurement one or several specific sources without distinction.

Man: manual mode of measurement launching

I/O: Launching mode of the measurement controlled by I/O plugs.

SXXX: order number of the measurement sessions. Limited to 999.

RST: reset of calculations of maximum or minimum values memorized – erasing of measurement session or of the whole memory.

Sto.: storage of measurement session into the memory.

S1: name for measuring or calculating the equivalent continuous sound level of a first sound source.

S2: name for measuring or calculating the equivalent continuous sound level of a second sound source.

S1+S2: name for measuring or calculating the equivalent continuous sound level of the two sound sources.

00/00:00:00: format of the measurement time in Days/hours:minutes:seconds

00/00:00: format of the measurement time in Days/hours:minutes

00:00:00: format of the measurement time in Days/hours:minutes:seconds or format of the current time

18/11: format of date

00:00: format of current time in hours/minutes

Pond.: A, C or Z frequency weightings

Cte: time weighting or time constant: Fast – Slow - Impulse

S/S: integration time controlled in Manuel mode: **Start/Stop**

C.CI: free field correction term in calibration mode.

Corr.: corrective term of nominal benefit in calibration mode.

L01 – L10 – L50 – L90 – L95: Normalized statistics distribution, used in environmental studies

🔊 : audio recording on threshold active function

● : audio recording in progress

3 Presentation of the sound level meter

3.1 Overview



The back of the instrument contains a battery compartment door, a threaded hole for mounting on a tripod, a location for the nameplate and a location for the calibration label.

3.2 Presentation of the screen-keyboard group

The **screen/keyboard** group gives to the instrument a modern ergonomics. It mainly participates to the quick familiarization of the sound level meter.

A press, a touch or a very light finger slipped on keyboard icon is enough to trigger the corresponding action of the sensitive key.

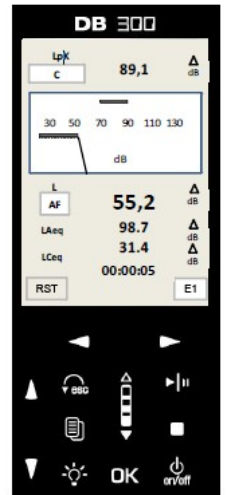
The **measurement configuration** is made by moving a reversed video cursor in reserved areas, then by choosing the concerned parameter or function.

For instance:

- Time weighting and time constant selection: **A or C** and **Slow, Fast or Impulse**.
- Selection of measurement mode

Reserved areas appear according to two 3D type formats:

- **Inner shadow to the frame:** simulates a shifted back area in which parameters can be modified or displayed measurement results.
- **External shadow to the frame:** simulates a shifted forward area in which different propositions of the menu can be chosen to go to an other configuration or validation screen.



A push on each arrow moves the cursor on the horizontal left-right axis.



A push on each arrow moves the cursor on the vertical up-down axis.



Scrolling knob key : increases or decreases suggestions in the area according the principle of front or back circular permutation. The finger must slide from an arrow to the other one, simulating a scroll wheel action.

From the bottom to the top to increase or from the bottom to the top to back to the previous proposal.



Validate a suggestion or an action to lead present in an outer shaded frame.



Go to the main menu to return to the previous screen.



Exit a menu screen to return to the previous screen.



Launch a measurement, then pause it if necessary.



Finally stop measurement.



Enable-disable the backlight.

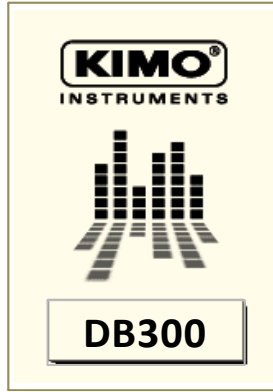


On-Off

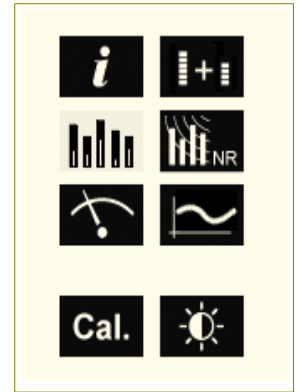
3.3 Screens overview



Press **On-Off** key



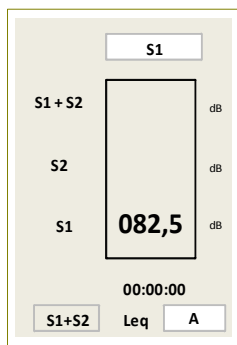
Press **OK**
on the **DB300**
pictogram in 3D :
the main screen
appears.



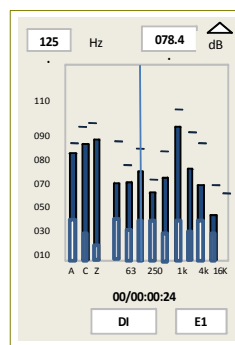
- Move the cursor on the icon corresponding to the required menu that becomes reversed-video, then press **OK**.



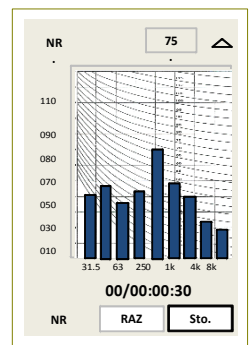
General information
about the instrument



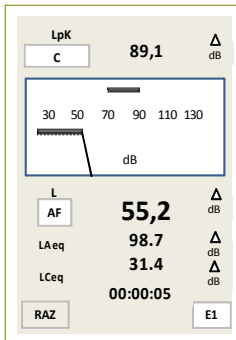
Amount-difference
between 2 sources



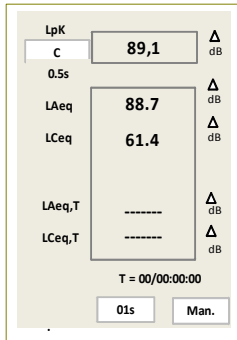
Analyser with storage
function by octave
bands



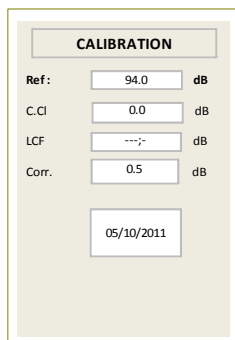
Measurement of
sound of installation:
NR curves



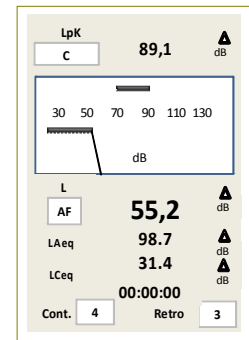
Conventional sound level
meter and integrating-
averaging mode



Integrating-averaging
mode with storage : A and
C weightings



Calibration



Set contrast and
backlight



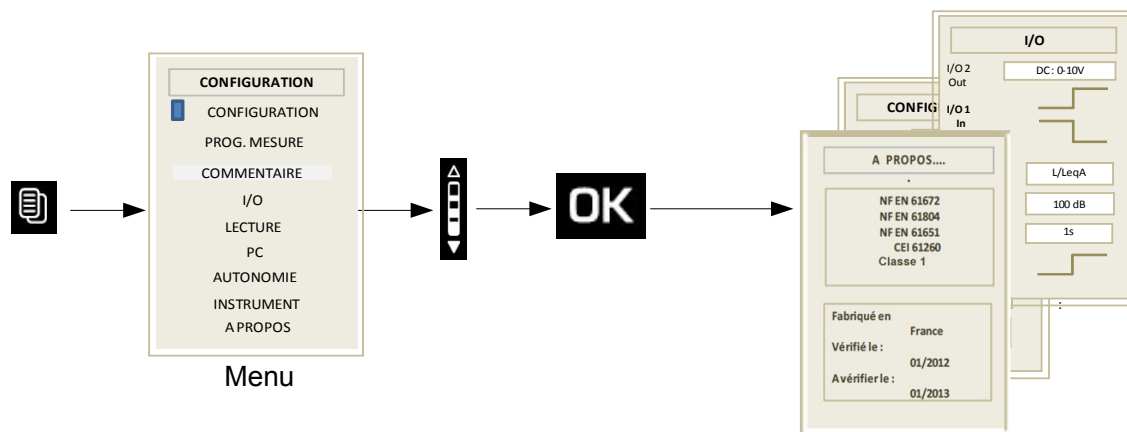
: Back to selection screen.

From the  key a screen lists the different settings or information about the instrument.

To have access to one of those screens, scroll with the scrolling knob key and validate with **OK** key.

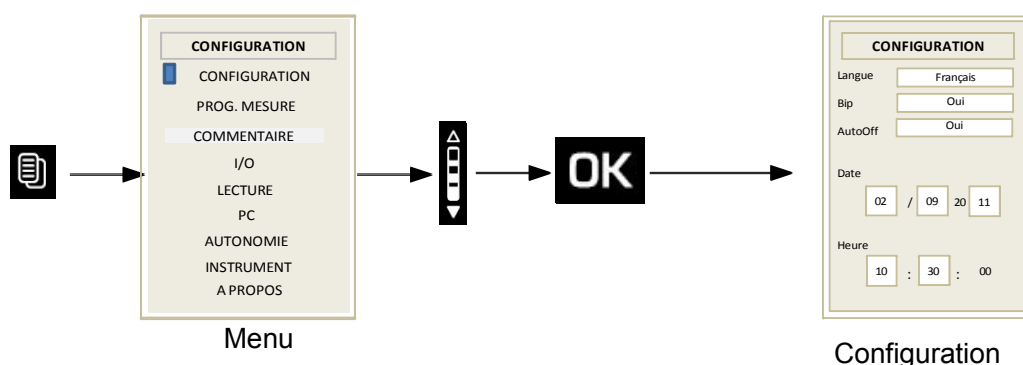
To quit each screen and back to main menu, use  key.

4.1 Configuration



This screen allows configuration for some functions. To have access to those functions:

Press  key then choose **CONFIGURATION** with the scrolling knob key and **OK** key to validate.



From this screen, use arrow keys to move the cursor in the desired area and modify with the scrolling knob key the proposition. Various parameters to adjust are:

- **Lang.:** user language: **French** or **English**.
- **Bip:** the presence or absence of tone when pressing a key. The beep disappears by itself if it interferes with the measurement.
- **AutoOff:** yes or no. If yes is selected, the instrument will stop after 15 min of non-use. This disposal allows to save battery if there is no measurement launched.
- **Date / Hour:** Set date and time

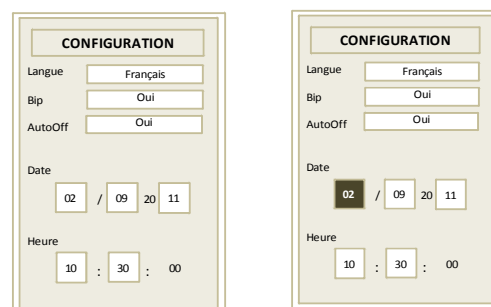
To return to main screen, press .

4.2 Set time

From “**Configuration**” screen, use the arrows to move the cursor in the date/time area.

Date: the cursor is put successively with the arrows on days, months and years then use the scrolling knob key to select the correct number.

Time: setting time must be done by comparison with a reference clock, for example, the speaking clock. The simultaneity must occur



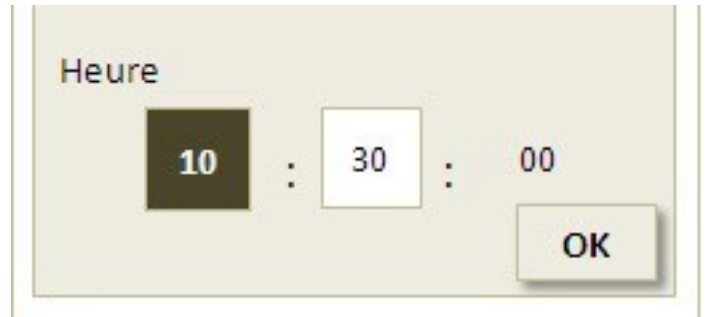
at the beginning of the minute when the seconds display 00 of the reference clock.

Proceed as follows:

- Move the cursor from date to hour, a 3D **OK** appears.
- Adjust hours then minutes and validate with **OK** key when the reference clock is at 00 second.

The 3D **OK** disappears.

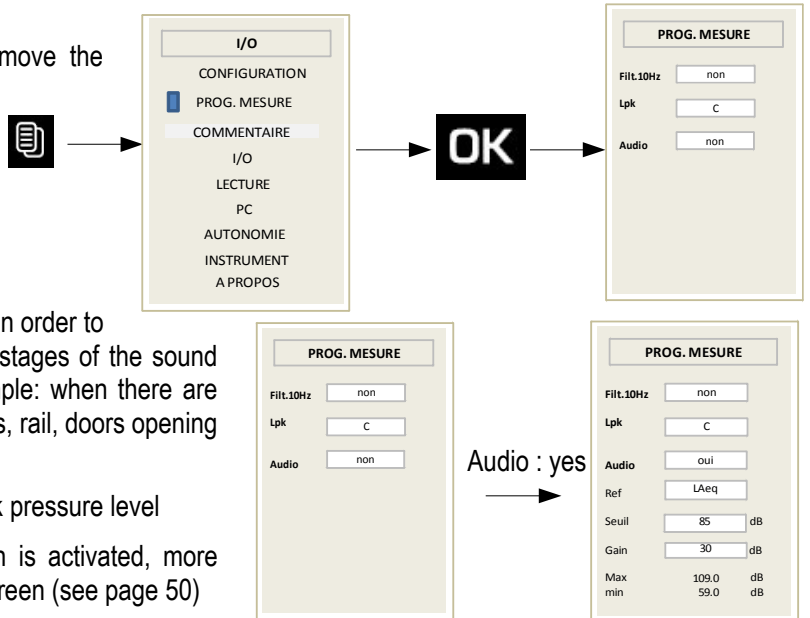
To back to main screen, press .



4.3 Measurement programming

From “**MENU**” screen, use the scrolling knob key to move the cursor in the **PROG.MESURE**. area then press **OK**.

Then move the cursor and make a selection a for each parameter.



This screen allows to set the following parameters:

- **High-pass filter 10Hz:** it preferable to activate it in order to avoid overloads of low frequencies of the input stages of the sound level meter before digital processing. Use example: when there are strong wind movements in the environment, roads, rail, doors opening or closing in rooms etc...
- **C or Z** weighting for the measurement of the peak pressure level
- **Audio recording on threshold:** if this function is activated, more parameters are displayed on the bottom of the screen (see page 50)

4.4 Coding_ BE Back-Erase_SM Specific marking

This screen allows to set the events coding and the Back-Erase_Specific marking function **BE_SP**.

- Move the cursor in the area and select the proposal.

Coding_ it can be performed:

- manually through the “**keypad**” item
- directly by I/O linking from a PLC or other compatible process (see page 22).

BE: action duration of the function: back-erasing of calculations in non-storage mode

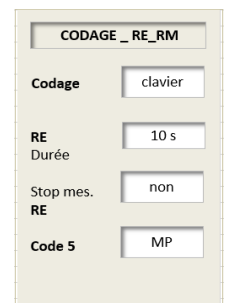
- Choose between:
 - 5 s or 10 s

BE: systematically activated at the end of the measurement in order not to take into account possible interferences (eg: sound level meter handling,...)

- Choose between:
 - Yes or No.

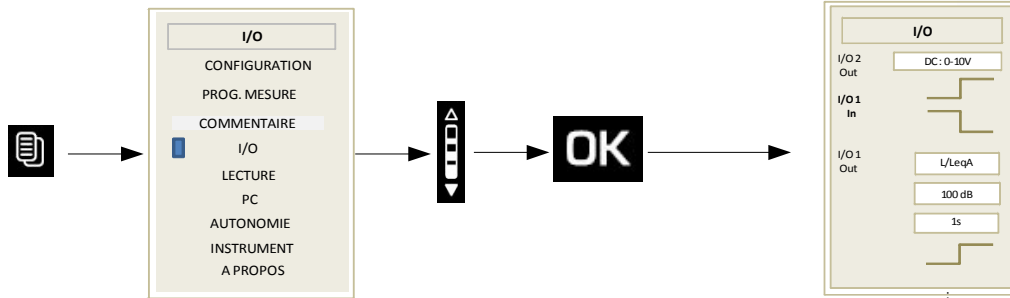
The last choice is about the Code 5 specificity that can stay Code 5 or become a code of SM type for specific marking: (cf pages 20_21_22)

- Choose between **Code 5** or **PM**



4.5 I/O

The I/O input/output allows to connect 2.5 mm jacks. It is located at the bottom of the unit behind the rubber breastplate.



I/O 2 out: DC continuous analogue output: 0-10V for connection to a recorder or industrial controller.

I/O 1 in corresponds to the **input** for the launch and stop measurement from an industrial controller and is for **Leq-St – 1/1 oct – NR** measurement modes. Launching of the measurement is made for a continuous high level and stopping the measurement is made for a continuous low level.

I/O 1 Out corresponds to the **detection output** compared to a preset sound level and is for **L- Leq-St – 1/1 oct** measurement modes. A high level appears in output when the sound peak pressure level reaches and exceeds a certain value.

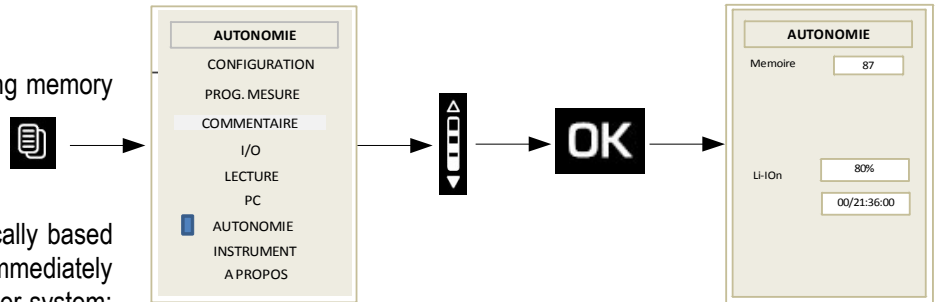
For this type of output, the following items must be configured:

- The level type: choose L, Leq or LPK depending on the mode of measurement.
- Programming with scrolling knob key the desired level of detection by 1 dB steps.
- Set a timer for maintaining the continuous signal detection after sub-overshoot sound level (from 1s to 10s by 1s pitch).

4.6 Autonomy

Autonomy provides information on the remaining memory capacity and allows time measurement according to the chosen method of measurement.

The measurement time is calculated automatically based on the remaining memory capacity. It is immediately compared to the remaining capacity of the power system: batteries, battery or AC adapter.

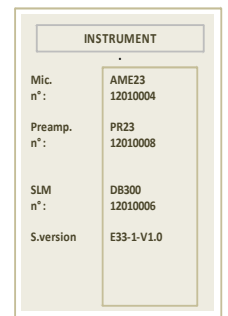


Menu

4.7 Instrument

This screen reminds main components of the sound level meter:

- microphone and its serial number
- preamplifier and its serial number
- sound level meter housing
- version number of the firmware.



4.8 About

This screen shows the various European standards and the accuracy class of the instrument.

It also specifies the date of the last checking and remains the next one.

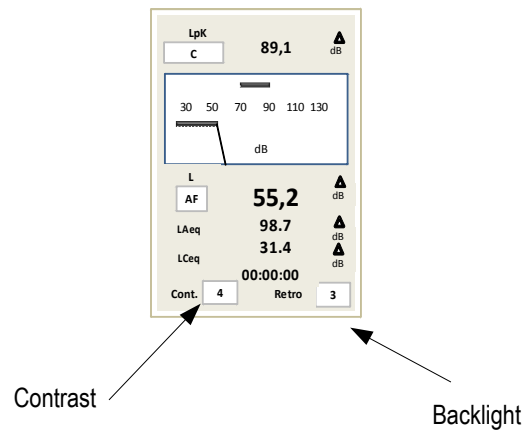


4.9 Contrast - backlight

- From starting screen, select icon  and press **OK** to validate.

To optimize reading of the display, from this screen:

- Position the cursor on **Cont.** and adjust the contrast by choosing with scrolling knob key a level from 1 to 7.
- Position the cursor on **Retro.** and adjust backlight by choosing with scrolling knob key a level from 1 to 3.



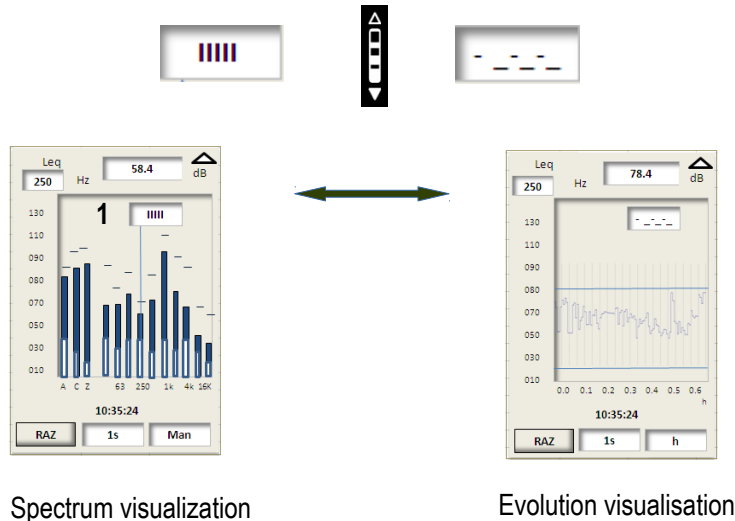
5 Time evolution

5.1 Principle and use

The drawing of the evolution of the short equivalent continuous levels is displayed according to a weighting or a filter following a time-related adjustment suitable for the measurement. It is linked with the screen of the spectral representation by frequency band, before and during the data storage.

From the screen of spectrum visualization:

- Move the cursor in **1** on **Spectrum** icon and with the wheel select **Evolution** icon.



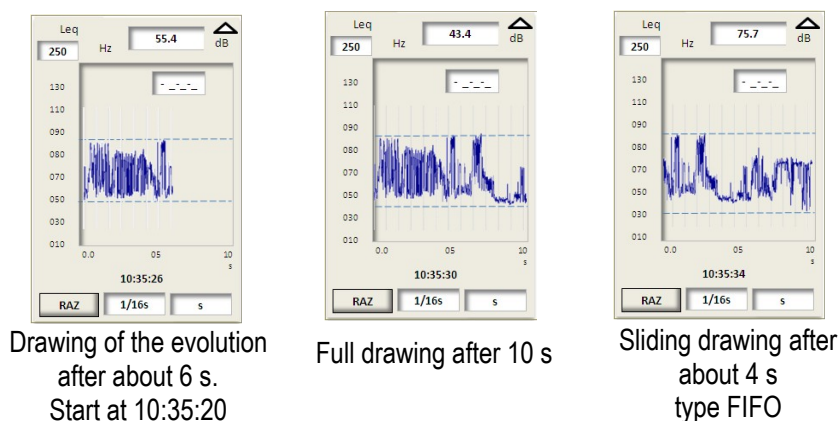
The time evolution is about:

- the succession of elementary equivalent continuous levels (short Leq) whose duration varies from 1/16°s to 60 s by programming.

It is limited to the screen width dedicated to the spectrum.

This width is representative of a duration that is also adjustable. Beyond this time, the evolution slides across the screen losing the first values to display the new ones. This is the FIFO (first in, first out) process.

Example : DI = 1/16s _ Evolution duration on the screen = 10s



There are 2 ways to use this function:

1. with a short duration of the Leq and a few seconds of scrolling time on the screen, you control in real time the immediate evolution of the noise environment
2. with a short duration of the Leq and an adapted scrolling time on the screen, you can visualize in real time and in the long term a many hours to several days measurement.

The table below lists every possibilities linking integration duration of the short Leq and displaying duration on the screen in sliding mode. **Possible = X / impossible = KO**

Example : for a short Leq of 1 second, the time evolution in sliding mode on the screen can be from **10 s to 62 days!**

	Scrolling duration of the evolution on the screen																										
	second								minute								hour						day				
Short Leq (s)	1	2	3	5	10	15	30	60	2	3	5	10	15	30	60	2	3	6	12	24	2	3	7	14	31	62	
0.0625	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
0.125	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
0.25	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
0.5	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
1	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2	KO	KO	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3	KO	KO	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5	KO	KO	KO	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10	KO	KO	KO	KO	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
15	KO	KO	KO	KO	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
30	KO	KO	KO	KO	KO	KO	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
60	KO	KO	KO	KO	KO	KO	KO	KO	KO	KO	KO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

The sound level meter controls automatically these durations when configuring and does not allow the “KO” combinations.

Note: there is no saving of the time evolution in sliding mode on the screen, so a drawing of several hours or several days is not saved **at the end of the measurement** for reading after storage. It is only visible during and at the end of the measurement before storage. The full drawing is accessible through the computer with the processing software.

5.1.1 Configuration before the measurement

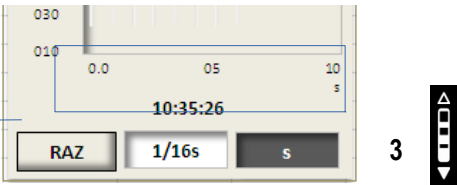
From the 1st screen of measurement modes:
(follow the synoptic below)



- Configure the integration duration of the short Leq (between 1/16 s and 60 s) in area 1.
- Move the cursor in position 2 and select **Evolution** icon with the scrolling knob key.
The short Leq drawing starts.
- Move the cursor in 3 and activate scrolling knob key to select the time unit and the different durations in **seconds (s)**, **minutes (mn)**, hours (h) and **days (d)** - (cf table above).

From: 0.....1 s to 0.....62 j

The different durations are displayed under the time axis of the screen.



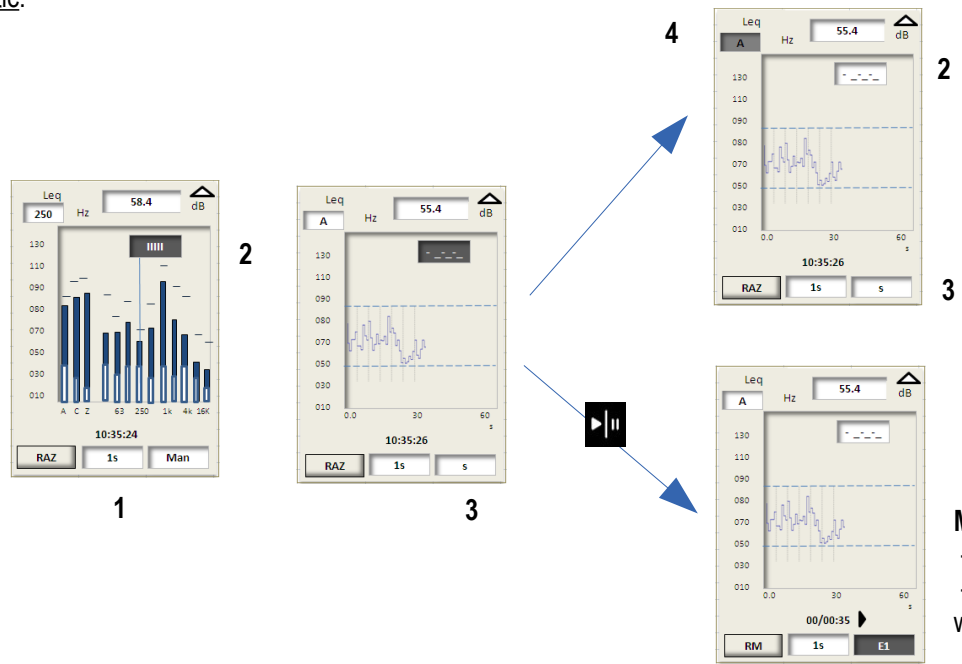
Info: A press on the RST key erases the drawing in progress and starts it again.

From this moment, you can:

- Use the sound level meter without storage only to visualize the evolution of the weighted-A, C, Z short Leq and filtered according the choice in 4.
- Launch a measurement with data storage pressing start key

In this case, during the storage, the configuration is inhibited. You can consult the sliding drawings according to the different weightings or filters without interrupt them or erase them.

Synoptic:



Consultation without storage:

- Free configuration
- Sequential viewing of the weighted and filtered drawings

Measurement launched:

- Inhibited configuration
- Possible sequential viewing of the weighted and filtered drawings

6.1 Principle

In a great majority of acoustic investigations, it is desirable to perform a tracking of specific events in direct connection with the noise environment.

It can be performed a posteriori when reading the file on a computer, but also during the measurement by pressing directly the keypad of the sound level meter.

The normal way to code an event is mainly based on viewing, recognition, listening, measurement of associated levels....

So you code the source if you see it, hear it and identify it or if the sound level meter shows a global or frequency level in dB or via the time evolution on the LCD screen.

In other circumstances, unforeseeable events disrupts the measurement, such as a door slamming or more simply a measurement stop because of an unexpected press on the keypad.

So the DB300 sound level meter allows you to:

- to visualize in real time **the time evolution** or **the frequency division** (noise spectrum) of the elementary equivalent continuous levels (short Leq)
- to **code** the specific events with the keypad or to mark an unexpected specific event **PM**
- to delete retrospectively a disruptive part of the measurement (Back-Erase – BE – function).

6.2 Affected measurement modes

These functions do not affect all the measurement modes of DB300 instrument.

- **Events coding:**

These two additional functions are only accessible with the following modes:



Integrating-averaging sound level meter – A and C weighted and analyzer by octave bands filters 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8 kHz (class 2)



Integrating-averaging sound level meter – A and C weighted and analyzer by third octave bands filters from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2) _ (option) .

- **Particular marking: PM**

This simple tracking of sources without distinction affects:



Integrating-averaging sound level meter – A and C weighted and analyzer by octave bands filters 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8 kHz (class 2)



Integrating-averaging sound level meter – A and C weighted and analyzer by third octave bands filters from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2) _ (option).



Integrating-averaging sound level meter – A and C weighted

- **BE_ Back-Erase**

Useful for a measurement without possibility of further processing to eliminate in situ some disrupting events. It affects the following mode:



Conventional sound level meter and averaging-integrating with storage of the global results

6.3 BE – Back-Erase

6.3.1 Principle

This function is active only during a measurement, it allows to remove in real time acoustic values produced from events that have just happened.

Typically, a door slamming, conversations, an unexpected event or falling objects that change the measurement.

When you perform a measurement in storage mode, it is easy to remove or modify a posteriori these areas with the software. Here, it is not possible in a start/stop mode without storage. So, it's in this mode that the function is of particular importance.

It is also possible to activate it automatically at the end of the manual measurement to remove the potential finger noises on the keypad when stopping it (cf page 13).

In mode without storage:



Once you activate the **BE** key, the duration of the measurement in progress is reduced by 5 s or 10 s (according to the initial configuration) and the corresponding acoustic energy.

Example :

BE duration = 10s _ Measurement configured for a T duration of 60 s _ **BE** after 25 s of measurement

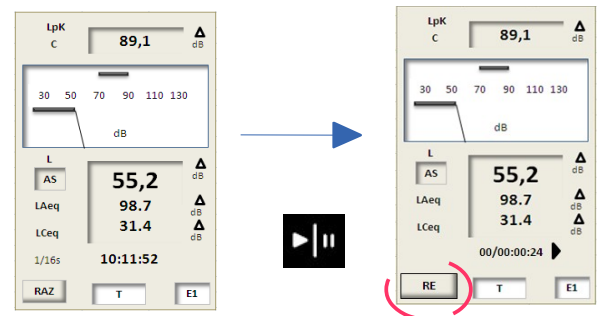
- the chronometer goes from 25 s to 15 s
- Leq values are refreshed in real time
- the chronometer keeps going until 60 s
- the total measurement lasts 70 s for an effective measurement of 60 s.

Note: for a duration of measurement in progress lower than the BE duration, the chronometer restarts from 0 to reach the duration initially configured.

Control screen before launching the measurement

First screen **S1** after launching the measurement

The **BE** function appears.



➤ Action:

- Press **OK** to activate the instantaneous **BE** mode according to disruptions and according to the principle described above.

Important: when the configuration always includes a **BE** at the end of the measurement, the BE is activated only when the measurement has been manually stopped with the keypad (Start/Stop mode with free T duration).

In case of automatic stop linked to a fixed duration (30 s for example), the BE function is not activated because, a priori, you don't have to touch the keypad

6.4 Events coding

The analysis a posteriori of the noise environment file often needs to collect information in situ. Indeed, the recognition of noisy sources or emerging sources makes easier the creation of the final report.

The sound level meter has a specific function called “**Events coding**”. It allows to detect noise sources or specific events at the same time of short Leq acoustic data.

6.4.1 Coding principle

When an event appears, expected or not, you code by pressing on the keypad at the pace of appearances and disappearances. So each measurement of the short Leq is noted with a code specific to the event.

The more detailed study is performed further with the LDB300 software.

The sound level meter can follow up to **5 events** simultaneously.

The coding can also be performed automatically through an external instruction of type I/O instead of the manual action with the keypad (cf page 22).

6.4.2 To code: using of the screen and keypad

This function is only accessible with the following modes:



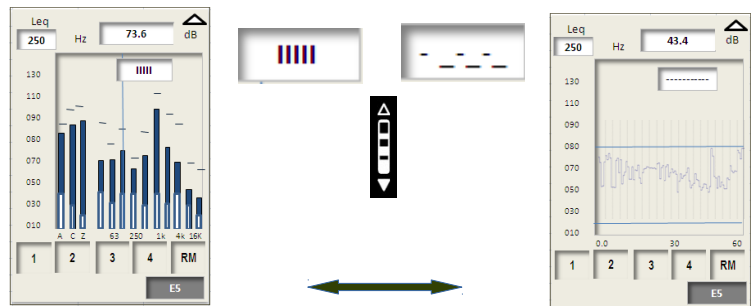
Integrating-averaging sound level meter – A and C weighted and analyzer by octave bands filters or third octave band filters (option)

It is activated after the measurement launching through a specific screen inserted in the chain results. Boxes for 5 codes appear on the bottom of the screen or 4 with a 5th marked PM allowing to activate easily this function during the coding without changing screen (cf page 13).

The coding can be performed from:

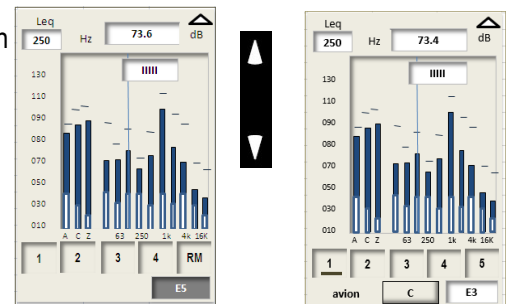
- **Spectrum** screen if you have to detect and mark frequency a type information (very particular spectrum, etc.)
- **Evolution** screen in case of remarkable modification of the drawing (level, exceeding, etc.)

From the viewing screen, move the cursor in 1 with the scrolling knob key to select **Spectrum** or **Evolution**.



➤ To code:

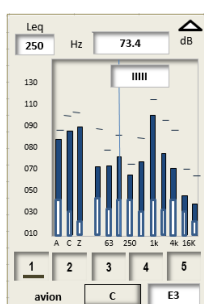
The black cursor in the frame **E3** (in the example) can be moved with the up and down arrow keys in the line of codes (1 to 5). This black cursor turns into underlining that takes place by default in the square of the code n°1.



From that moment, the area in relief **3D** marked **C** (code) appears. It means that by pressing on the **OK** key the **code** function is activated. It is deactivated by pressing **OK** key that validates the no-code function marked **NC**. To change the code, move the black underlining with the left and right arrow keys:

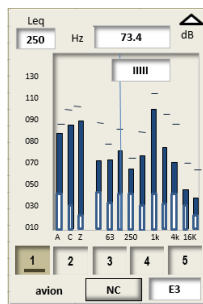
➤ Actions:

- code selection with the left and right arrow keys indicated by a **black underlining**
- press **OK** to code: **C** _ the selected code turns grey _ **NC** is indicated
- press **OK** for no-code: **NC** _ the code backs to normal color



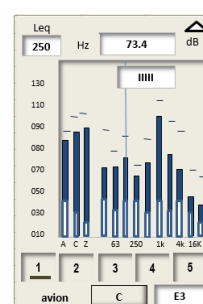
OK

OK = code
source 1: plane



OK

OK = uncode
source 1: plane



.... and so on and / or :
change code



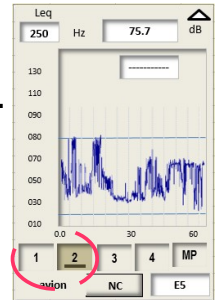
Important: it is possible to activate several codes by moving the underlining towards other code before

uncoding... and so on. Several cases or events are juxtaposing. For example: Factory + plane.
So we can code up to 5 sources simultaneously.

Note: the access to the field to select the weighting or filter on the top left of the screen remains possible, as well as the switching between spectrum and time evolution. In this case, the area **C _ NC** disappears and pressing OK has no incidence on the coding which is no more accessible, but not stopped. It becomes active again when the black area of selections returns to its place in the codes line as an underlining.

6.4.3 Identification of the sources to code

Identification texts of events can be assigned through the **LDB300 software** (see user manual of the software).
The inscription appears when coding on the bottom left of the screen.
If there is no text, the location stays empty.



6.4.4 Activate the particular marking function: PM

(see below)

6.4.5 Using in I/O mode

In case of monitoring of an event or of a noise source with a PLC, it is possible to link the sound level meter to code the time evolution of the noise environment at the pace of the PLC order without being on-site.

For that:

- Configure in the **CODING_BE_PM** menu the **I/O** proposal in front of **Coding** (cf page 13).
- Connect a suitable cable between the PLC and the sound level meter (cf page 65).

The **I/O** code is placed imperatively in box **1**, it replaces automatically the manual coding when the PLC reports the an emergence of the event.

- Anyway, you can take control of the PLC and code in **I/O** box with the keypad if you want to mark a particular moment linked to this event even if it is not really present (simulation, connected situation,...)

The **I/O** automatic coding programing also allows the manual coding of the others codes (**2 to 4 and PM**) according to the fundamental principle (see page 21).

6.5 Particular marking

The sound level meter has a function called “**Particular Marking**” that simplify the events coding.

6.5.1 Principle

This marking allows a specific identification of the short Leq data without distinction in order to remind you when processing the presence of specific events that caught your attention.

6.5.2 Mark: scree/keypad use

This function is only accessible with the following modes:



Integrating-averaging sound level meter – A and C weighted and analyzer by octave bands filters or third octave band filters (option)

It is activated after the measurement launching through a specific screen inserted in the chain results.



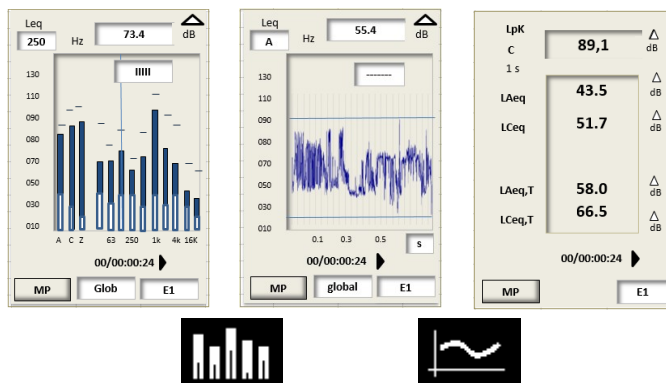
Integrating-averaging sound level meter with storage – A and C weighted

This function is activated with a simple **continuous press** on the **OK** key as long as the particular source remains active. The elementary durations are coded for a further processing by the software.

Note: this key is different from the coding principle that requires a press on OK for Code and a press on OK for no Code.

The marking is performed from:

- **Spectrum** screen if you have to detect and mark frequency a type information (very particular spectrum, etc.)
- **Evolution** screen in case of remarkable modification of the drawing (level, exceeding, etc.)
- the 1st screen for the 3rd measurement mode

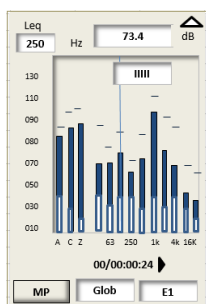


6.5.3 Linked particular marking and events coding

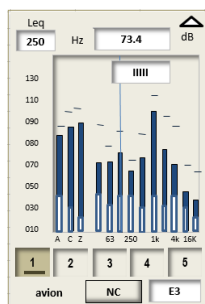
In some applications you can be brought to code known events and to mark in addition unexpected sources but sensitive in relation to the file processing.

The **PM** button is initially accessible in **S1** screen and the coding buttons in S3 or S5 (*option 1/3 octave*) screen, you can group the coding and the marking on a same screen (S3/S5) by bringing the codes number from **5 to 4** and by changing the code 5 as **PM** function.

- For that perform the appropriate configuration (see page 13).



Separated coding and PM



Configuration: Code 5 = PM

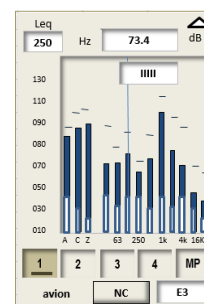
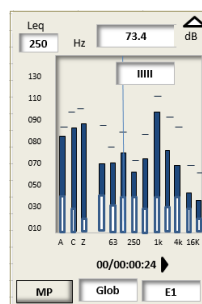
CODAGE_RE_RM

Codage:

RE Durée:

Stop mes. RE:

Code 5:



PM in S1 screen
and
PM in S3/S5 screen

The use stays the same, you get to the codes **1 to 4** or to the **PM** marking by moving the black underlining.

7 Perform some measurements

7.1 Conventional and averaging integrator sound level meter with storage function

Select **L-Leq mode**: move the cursor with arrow keys on icon  then press **OK**.

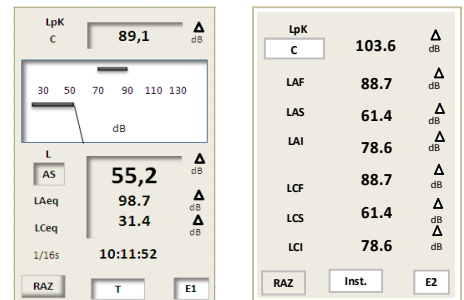
7.1.1 Conventional or classical mode

The measurement is immediate, yet it is interrupted and reset with each change. The sound level meter processes the sound pressure signal and displays simultaneously the following information on S1 and S2 screens.

- **LXY**: sound pressure levels weighted temporally
- **LXYmax and LXYmin**: maximum and minimum values of sound pressure level since the beginning of the measurement.
- **LUpk**: maximum peak level of sound pressure.
- **09:16:50**: current time

Info: Integrating-averaging mode starts only after pressing  pictogram.

LAeq and **LCeq** values are integrated on 1/16s in conventional mode for instantaneous information, the timer remains at zero.



7.1.2 Possible selection for the measurement

1 – Select the weighting frequency and the time constant in direct visualization on the analog indicator with hand.

1

For each time weighting, the sound level meter proposes the measurement according to 3 time constants: Fast (F) - Slow (S) - Impulse (I). Possible selections are:

A-weighting: LAF – LAS – LAI

C-weighting: LCF – LCS – LCI

- Place the cursor with arrow key on the area 1 and select with scrolling knob identified measurement criteria among the possibilities listed above.

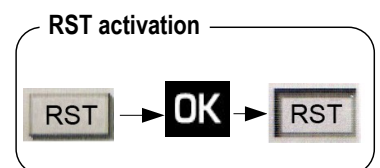
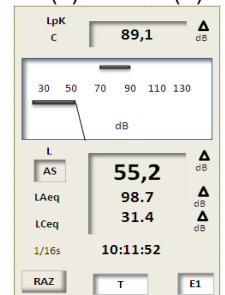
2 – The selection of the frequency weighting for the sound peak pressure level **C** or **Z** is performed in the main menu “**PROG.MESURE**”.

3 – During measurement, two actions are possible:

- Reset the memorized levels, mainly the peak pressure level **LCpk**
- Go to **S2** screen to read the different values: instantaneous, minimum or maximum values.

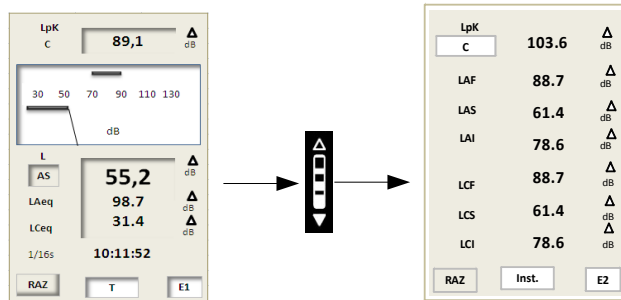
4- To reset all the values:

- Press **OK** key, **RST** function is activated and is about:
 - Maximum and minimum sound pressure levels available on **S2** screen
 - The maximum peak pressure value and the linked bargraph
 - Overload information



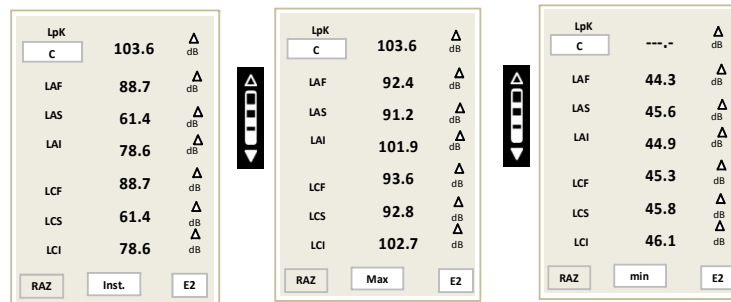
7.1.3 Screens during measurements

1- From **S1** screen, press the scrolling knob key to display **S2** screen.



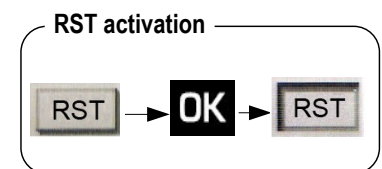
2- Move the cursor with the arrows on the item **1** and select with the scrolling knob key among:

Inst. - Max – min to read instantaneous, maximum and minimum values of **LXY** sound pressure levels.



3 – To reset all the values:

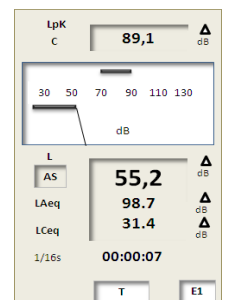
- Press **OK** key, **RST** function is activated and is about:
 - Maximum and minimum sound pressure levels
 - The maximum peak pressure value
 - Overload information



7.1.4 Conventional and integrating-averaging with storage mode

The integrator-averager mode completes the conventional mode always active (read above). It allows to specify an acoustic situation indicating simultaneously:

- The instantaneous, maximum or minimum sound pressure levels: **LXY**
- The equivalent continuous levels: **LAeq** and **LCeq** with a pre-programmed duration of **5 s, 10 s, 15 s, 30 s, 60 s**, or free **T**.
- The maximum peak pressure level: **Lcpk**
- Measurement duration: **00:00:05**
- Main data are stored at the end of the measurement in order to get a usable file by the software supplied with the instrument.



To start this mode:

- Choose an integration time among **5 s, 10 s, 15 s, 30 s, 60 s** or free **T**.
- Press **▶||** key.

LAeq and **LCeq** values are indicated, the timer indicates the measurement duration instead of time.

Note: **RST** function is not available anymore in this mode.

During measurement:

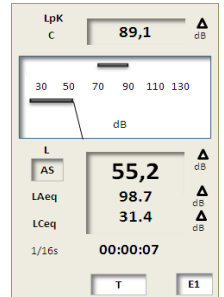
It is possible to watch S1 or S2 screen with the scrolling knob key (also for conventional mode).

7.1.5 Screens during measurements

During measurement, **three screens** inform the current measurement. They are accessible through the scrolling knob key .

S1: it is the main screen that displays the instantaneous measurements:

- **LXY:** sound pressure level temporally weighted according to the selection
- **LAeq:** equivalent continuous level of sound pressure **A**-weighted on the measurement duration
- **LCeq:** equivalent continuous level of sound pressure **C**-weighted on the measurement duration
- **LUpk:** maximum peak level of sound pressure on the measurement duration
- **Measurement duration** in HH:MM:SS



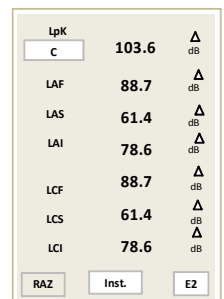
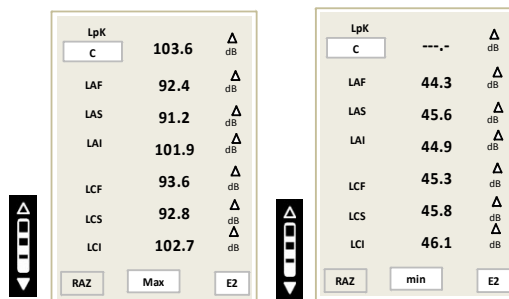
S2: This screen contains results of values that will be stored in memory at the end of measurement:

- **LUpk:** maximum peak level of sound pressure on the measurement duration
- **LXY Inst.:** instantaneous values of sound pressure levels temporally weighted met since the beginning of the measurement
- **LXYmax:** maximum value of sound pressure level weighted temporally met since the beginning of the measurement.
- **LXYmin:** minimum value of sound pressure level weighted temporally met since the beginning of the measurement..

To see these different results:

- Move the cursor with arrows keys on the item **1** and select with the scrolling knob key:

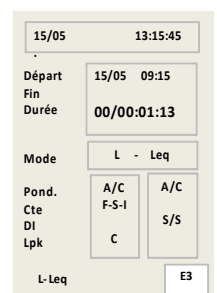
Inst. – Max – min to read instantaneous, maximum and minimum values of sound pressure levels **LXY**



1

S3: this screen reminds the general format of the session of measurement:

- **Start:** date of measurement start
- **End:** date of measurement end (here, not entered because measurement is still ongoing)
- **Duration:** measurement duration (here, on going)
- **Mode:** measurement mode (here, L- Leq)
- **Pond.:** Frequency weightings
- **Cte:** time constant
- **S/S:** Integration mode Start/Stop
- **Lpk:** frequency weighting of the peak pressure level



7.1.6 Stop the measurement

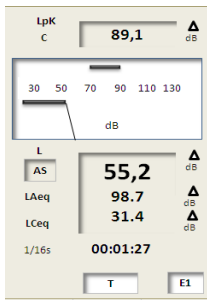
- Press  key to stop the measurement.
- Validate with **OK**.



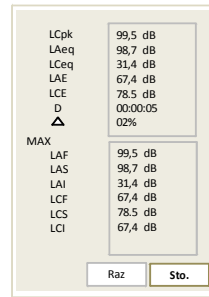
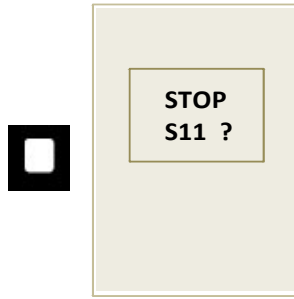
7.1.7 Store data

At the end of the measurement, a screen of all results is displayed. It is then possible to:

- Accept measurements and store them: move the cursor on **Sto.** and press once on **OK** key to confirm. A banner displays the storage phase.



Ongoing measurement

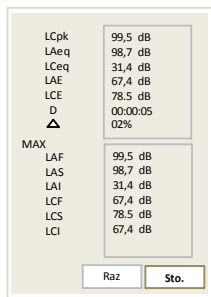


Results screen

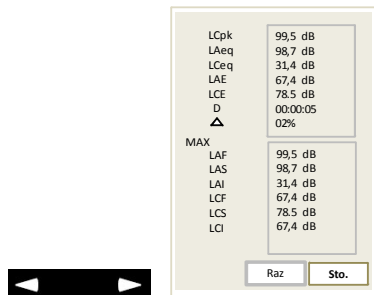


Storage

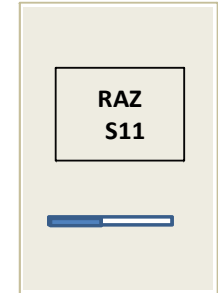
- Reject measurements and not store them: move the cursor on **RST** and press **twice** on **OK** key to confirm. A banner displays the phase of suppression of data.



Results screen



RST active



Deletion

7.2 Sound level meter and averaging integrator with storage function

- Select **Leq-St** mode: move the cursor with the arrows on the icon  then press **OK**.

The sound level meter processes the acoustic signal for each elementary integration time and stores results in a saved memory.

Measured and stored data for each integration time:

- **LAeq, DI:** equivalent continuous level of sound pressure on the elementary integration time.
- **LCEq, DI:** equivalent continuous level of sound pressure on the elementary integration time.
- **LUpk:** level of maximum peak of sound pressure on the elementary integration time.
- **Measurement duration** in DD/HH:MM:SS

Integration time:

Data storage is made according to logging time (DI) to choose from: **1/16 s, 1/8 s, 1/4 s, 1/2 s, 1 s, 2 s, 3 s, 5 s, 10 s, 15 s, 30 s, 60 s**.

Note: In order to have permanent control of the sound pressure level before the launch of measurement, the sound level meter calculates and displays the equivalent continuous level of acoustic pressure on a logging time of 0.5s.

7.2.1 Setting to perform before a measurement

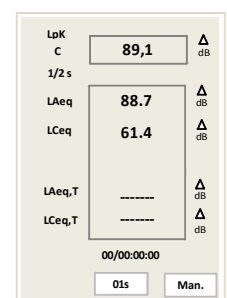
1 – Select the frequency weighting of the peak level of sound pressure C or Z: see **PROG.MESURE** in the main menu.

2 – Select the logging time (DI):

Move the cursor in **1** and select with the scrolling knob key among: **1/16s, 1/8s, 1/4s, 1/2s, 1s, 2s, 3s, 5s, 10s, 15s, 30s, 60s**

3 – Select the mode of measurement start in **2** with the scrolling knob key among: **Man** (manual) – **Tim** (timer) – **I/O** (with I/O signal)

Info: current time is displayed before launching measurement



1 2

7.2.2 Launch the measurement

In **manual** mode: press  key, the timer starts and indicates the measurement duration.

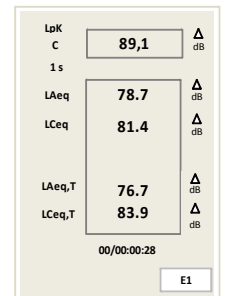
Timer and I/O modes: see page 37)

7.2.3 During measurement

During measurement, three screens give information about the current measurement. They are accessible with the scrolling knob key.

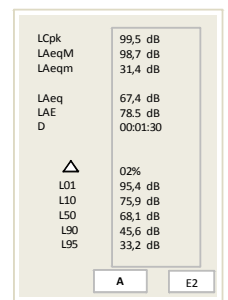
S1: it is the main screen that displays the instantaneous measurements:

- **LAeq, DI:** equivalent continuous level of sound pressure on the elementary integration time.
- **LCeq, DI:** equivalent continuous level of sound pressure on the elementary integration time.
- **LAeq,T:** equivalent continuous level of sound pressure A-weighted on the current measurement duration.
- **LCeq,T:** equivalent continuous level of sound pressure C-weighted on the current measurement duration.
- **LUpk:** level of maximum peak of sound pressure on the selected integration time.
- **Measurement duration** in DD/HH:MM:SS



S2: this screen displays the results of values that will be stored in the memory at the end of the measurement.

- **LUpk:** level of maximum peak of sound pressure on the measurement duration.
- **LAeqM:** maximum value of the equivalent continuous level of sound pressure A-weighted of all the logging times.
- **LAeqm:** minimum value of the equivalent continuous level of sound pressure A-weighted of all the logging times.
- **LAeq:** equivalent continuous level of sound pressure A-weighted on the whole measurement duration.
- **LAE:** level of noise exposure A-weighted.
- **D:** measurement duration in DD/HH:MM:SS
- **%:** saturation percentage of the input stage
- **Statistics indexes:** L01 – L10 – L50 – L90 – L95. They are calculated from stored samples.

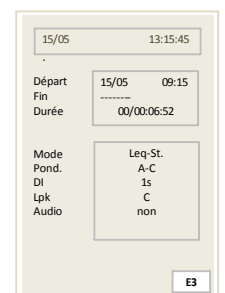


To access to the same results for the C-weighting:

- Move the cursor in **1** then select **C** with the scrolling knob key.

S3: this screen remains the general format of the measurement session:

- Date of measurement start
- Date of measurement end: not entered because measurement is still ongoing.
- Measurement time: not entered because measurement is still ongoing.
- Measurement mode: Leq-St
- A and C frequency weightings for Leq: **Pond.**
- Elementary integration time for Leq in second: **DI**
- Frequency weighting of the level of pressure peak: **Lpk**
- Audio recording on threshold: **Audio**



7.2.4 Stop the measurement

- Stop the measurement pressing .
- Press **OK**.

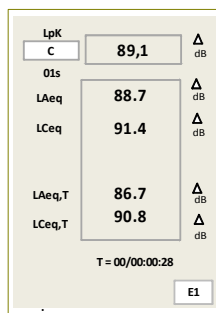
Note: When **STOP?** is displayed, it is possible to press  key to back to measurement screens and keep going.

Note: It is not possible to stop the measurement as long as the first logging time (ex: DI=60) is not completed. Pressing  key will be inoperative.

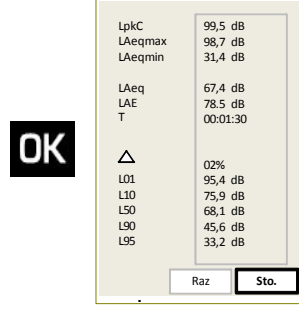
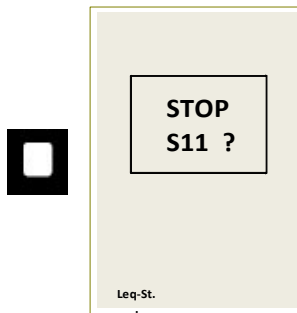
7.2.5 Store data

At the end of the measurement, in manual made, a screen of all results is displayed. It is then possible to:

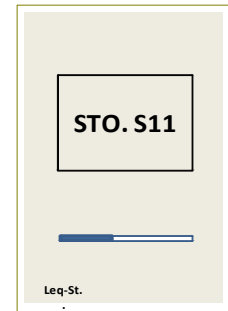
- Accept measurements and store them: move the cursor on **Sto.** and press once on **OK** key to confirm. A banner displays the



Ongoing measurement storage phase.

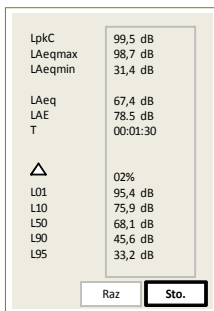


Results screen

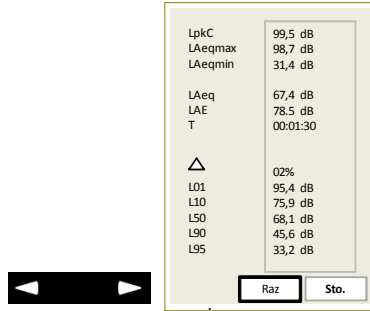


Storage

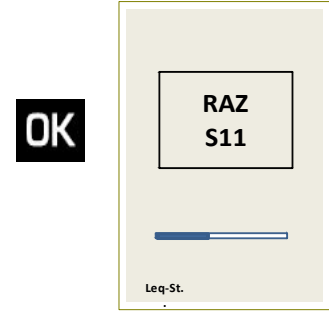
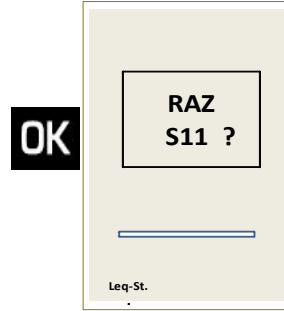
- Reject measurements and not store them: move the cursor on **RST** and press **twice** on **OK** key to confirm. A banner displays the phase of suppression of data.



Results screen



RST active



Deletion

Timer and I/O modes: data storage is automatically made without intervention

7.3 Analyzer integrating - averaging with storage sound level meter function

- Select **mode 1/1 oct** mode: move the cursor with the arrows to  then press **OK**.

The sound level meter runs as a frequency analyzer and processes the acoustic signal according to the temporal mode:

On a T(D) measurement duration with data storage for each DI elementary integration time

Measured and stored data for each integration time:

- **LAeq, DI:** equivalent continuous level of sound pressure on the elementary integration time.
- **LCeq, DI:** equivalent continuous level of sound pressure on the elementary integration time.
- **LXeq, DI:** equivalent continuous level of sound pressure on the elementary integration time filtered by octave bands from 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8 kHz (class 2).
- **LU_{pk}:** level of maximum peak of sound pressure on the elementary integration time.
- **Measurement duration** in DD/HH:MM:SS

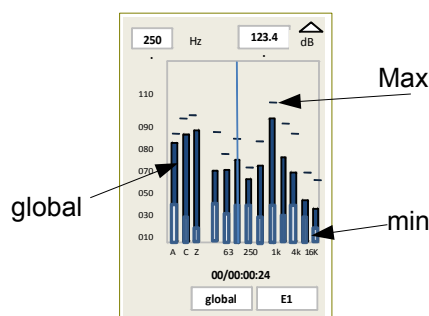
Integration time:

The data storage is made according to an integration time DI to select: **1/16 s, 1/8 s, 1/4 s, 1/2 s, 1 s, 2 s, 3 s, 5 s, 10 s, 15 s, 30 s, 60 s.**

Read values: In order to have permanent control of the sound pressure level before the launch of measurement, the sound level meter calculates and displays the equivalent continuous level of acoustic pressure on a logging time of 1/8 s.

These different values are shown as:

- A horizontal line for the maximum level
- A full colored bar for the global level
- An empty bar for the minimum level

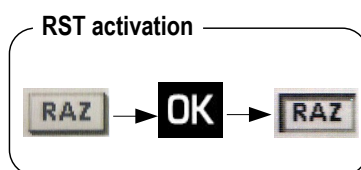


- Move the cursor in position **1** with the vertical arrows then choose with the scrolling knob key the weighting or filter value and read the result displayed in the box **2**.

A vertical line is moving on the screen and is overlapped to the bar corresponding with the chosen weighting or filter in 1.

To reset all the minimal and maximal value:

- Press **OK** key, the **RST (3)** function is activated, the different representations (line, full bar and empty bar) are reset.



7.3.1 Settings to perform before the measurement

1 – Select the DI logging time:

- Move the cursor in **1** and select with the scrolling knob key among: **1/16 s, 1/8 s, 1/4 s, 1/2 s, 1 s, 2 s, 3 s, 5 s, 10 s, 15 s, 30 s, 60 s.**

2 – Select the mode of measurement start in **2** with the scrolling knob key among: **Man** (manual) – **Tim** (timer) – **I/O** (with I/O signal)

Timer and I/O modes: see page 37

Info: current time is displayed before launching measurement

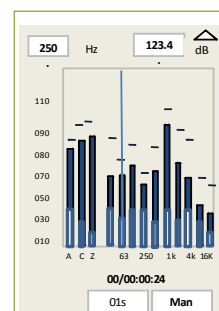
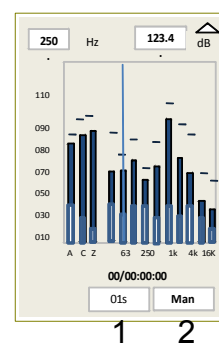
7.3.2 Launch the measurement

In **manual** mode: press  key to launch the measurement with elementary data storage according to the selected integration time (1s for example), timer starts and indicates the duration.

7.3.3 During measurement

During measurement, three screens give information about the ongoing measurement. They are accessible with the scrolling knob key.

S1: it is the main screen, it displays values and graphical representation (spectrum type).



The different bars stand for:

- **LAeq - LCeq - LZeq:** equivalent continuous levels of sound pressure A, C and Z-weighted
- **LXeq:** equivalent continuous levels of sound pressure filtered by octave bands from 16 Hz to 16kHz (class 1) or from 31.5 Hz to 8 kHz (class 2).
- Measurement duration in DD/HH:MM:SS

Read values:

- Move the cursor in **1** with the arrows and select among **DI - global – Max - min**
- Move the cursor in **2** with the arrows and select with scrolling knob key the value of weighting or filter and read the result displayed in the box **3**.

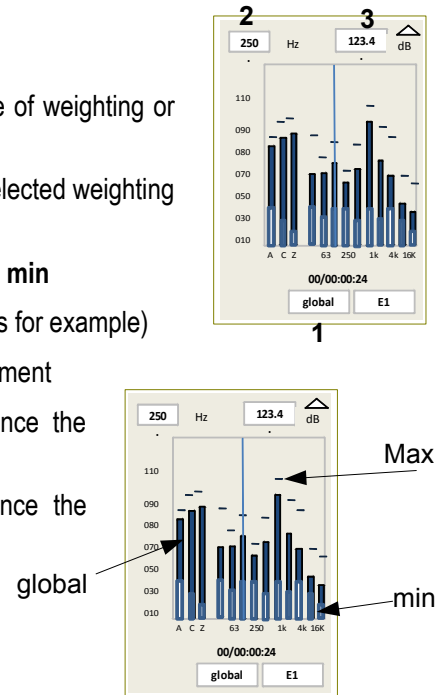
A vertical line is moving on the screen and superimposes on the bar corresponding to the selected weighting or filter.

Do the same to read the different values according to the selection in 1: **DI – global – Max - min**

- **DI:** equivalent continuous levels weighted and filtered for each DI logging time (01 s for example)
- **Global:** equivalent continuous levels weighted and filtered of the ongoing measurement
- **Max:** maximum equivalent continuous levels weighted and filtered reached since the beginning of the measurement (base: DI logging time)
- **Min:** minimum equivalent continuous levels weighted and filtered reached since the beginning of the measurement (base: DI logging time)

These different values are shown as:

- A horizontal line for the maximum level
- A full colored bar for the global level
- An empty bar for the minimum level

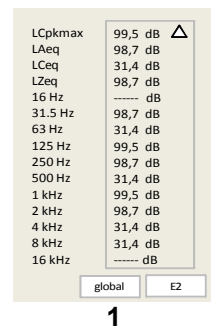


S2: this screen displays the results of current values that will be stored at the end of the measurement.

- Move the cursor in **1** with the arrows and select with the scrolling knob key among **DI - global - Max - min**

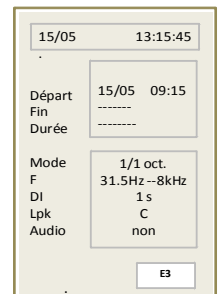
Read the different values according to the selection.

- **DI:** equivalent continuous levels weighted and filtered for each DI logging time (01 s for example)
- **Global:** equivalent continuous levels weighted and filtered of the ongoing measurement
- **Max:** maximum equivalent continuous levels weighted and filtered reached since the beginning of the measurement (base: DI logging time)
- **Min:** minimum equivalent continuous levels weighted and filtered reached since the beginning of the measurement (base: DI logging time)



S3: this screen remains the general format of the measurement session:

- Date of measurement start
- Date of measurement end: not entered because measurement is still ongoing.
- Measurement time: not entered because measurement is still ongoing.
- Measurement mode 1/1 oct: **Mode**
- Filters by octave bands from 16 Hz to 16kHz (class 1) or from 31.5Hz to 8 kHz (class 2).
- LXeq logging time: **DI**
- Frequency weighting of the peak pressure level: **Lpk**
- Audio recording: **Audio**



7.3.4 Stop the measurement

- Press  to stop the measurement.
- Validate with **OK**.

Note: When **STOP ?** is displayed, it is possible to press  key to back to measurement screens and keep going.

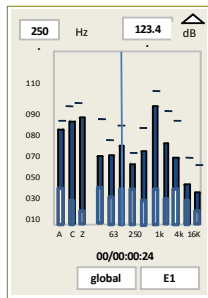
Note: It is not possible to stop the measurement as long as the first logging time (ex: D1=60) is not completed. Pressing  key will be inoperative.



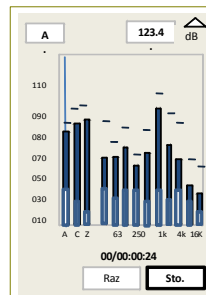
7.3.5 Store data

At the end of the measurement, in manual mode, a screen of all results is displayed. It is then possible to:

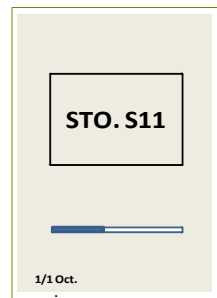
- Accept measurements and store them: move the cursor on **Sto.** and press once on **OK** key to confirm. A banner displays the storage phase.



Ongoing measurement

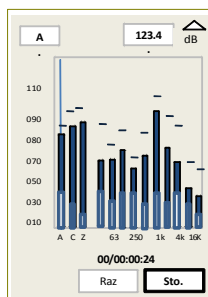


Results screen

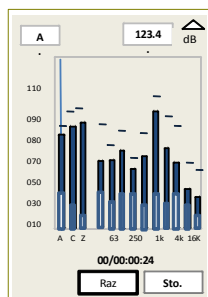


Storage

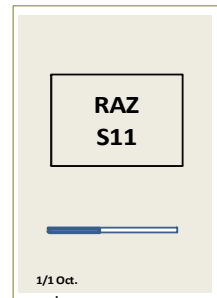
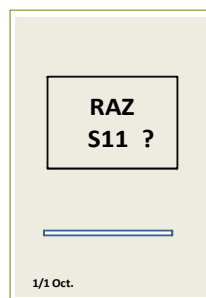
- Reject measurements and not store them: move the cursor on **RST** and press **twice** on **OK** key to confirm. A banner displays the phase of suppression of data.



Results screen



RST active



Deletion

7.4 Measurement of noise equipment: NR mode

- Select **NR mode**: move the cursor with the arrows on the icon  then press **OK**.

The sound level meter works as a frequency analyzer to determinate the noise level compared to a network of evaluation curves, called NR (Noise Rating) curves as per NF S 30-010 standard.

It processes the sound signal according to two temporal modes:

- On a free **T** measurement duration left to the initiative of the user with data storage for the determination of the NR index.
- On a predefined measurement duration ranging from **3 s** to **60 s** with data storage for the determination of the NR index.

Measured and stored data at the end of the measurement:

- **LAeq, T**: equivalent continuous level of sound pressure on the T duration
- **LCeq, T**: equivalent continuous level of sound pressure on the T duration
- **LXeq, T**: equivalent continuous level of sound pressure on the T duration filtered by octave bands from 31.5Hz to 8 kHz
- **LU_{pk}**: maximum peak level of sound pressure on the T duration
- Measurement duration in **DD/HH:MM:SS**

Measurement duration:

T left to the initiative of the user according to the manual start/stop mode (with the keyboard)

Predefined T to select between the durations: **3 s, 5 s, 10 s, 15 s, 30 s, 60 s**.

Note: In order to have permanent control of the sound pressure level before the launch of measurement, the sound level meter calculates and displays the equivalent continuous level of acoustic pressure on a logging time of 1/8 s.

7.4.1 Settings to perform before a measurement

1 – Select the **T mode** or the **predefined mode**

Move the cursor in 1 and select with the scrolling knob key: **T** or **3 s, 5 s, 10 s, 15 s, 30 s, 60 s**.

T mode: by selecting **T** the measurement begins with a manual start

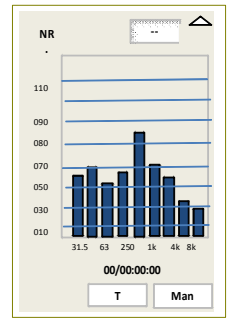
Data are stored at the end of the measurement with a manual stop.

Predefined mode: by selecting a value between **3 s, 5 s, 10 s, 15 s, 30 s, 60 s**, the measurement begins with a manual start.

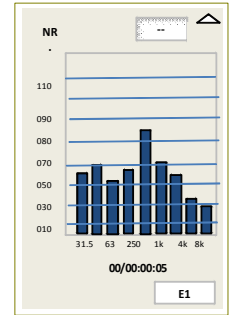
2 – Select the launching mode in 2 with the scrolling knob key: **Man** (manual) – **Tim** (timer) – **I/O** (with I/O signals):



In predefined mode of the measurement duration (3 s, 5 s, 10 s, 15 s, 30 s, 60 s), only the manual mode is accessible.



1



Tim. and I/O modes: (see page 37)

Note: current time is displayed before launching the measurement

7.4.2 Launch the measurement

Type of launch: **Manual**

Tim. and I/O mode: (see page 37)

1 – Select the measurement duration:

- Move the cursor in 1 and select with the scrolling knob key: **T** or a predefined duration between **3 s and 60 s**
- Press  key, the timer starts and indicates the measurement duration.

7.4.3 During the measurement

During the measurement, three screens give information about the ongoing measurement. They are accessible with the scrolling knob key.

S1: it is the main screen, it displays values and graphical representation (spectrum type):

The different bars stand for:

- **LXeq:** equivalent continuous levels of sound pressure on the measurement duration filtered by octave bands from 31.5 Hz to 8 kHz
- Measurement duration in DD/HH:MM:SS

S2: this screen displays the results of values that will be stored at the end of the measurement.

- **LCpkMax:** maximum peak pressure level of the ongoing measurement
- **LAeq - LCeq - LZeq:** equivalent continuous levels of sound pressure A, C and Z-weighted on the duration of the ongoing measurement.
- **LXeq:** equivalent continuous levels of sound pressure on the duration of the ongoing measurement filtered by octave bands from 31.5Hz to 8 kHz

S3: this screen reminds the general format of the measurement session

- Date of measurement start
- Date of measurement end: not entered because measurement is still ongoing.
- Measurement time: not entered because measurement is still ongoing.
- NR measurement mode: **Mode**
- Filters by octave bands from 31.5Hz to 8kHz: **F**
- LXeq logging time: **DI**
- Frequency weighting of the peak pressure level: **Lpk**

7.4.4 Stop the measurement

- Press  to stop the measurement.
- Validate with **OK**.

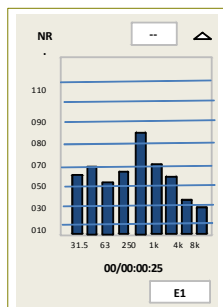
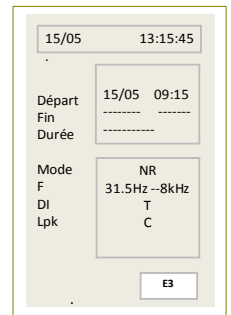
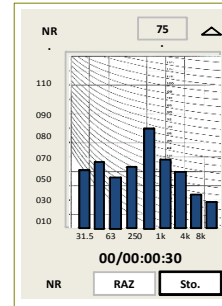
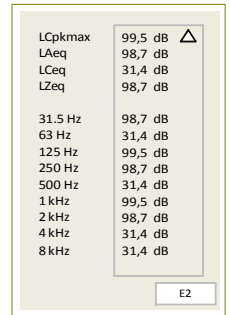
Note: When **STOP ?** is displayed, it is possible to press  key to back to measurement screens and keep going.

When a predefined duration (**from 3s to 60s**) has been selected, the measurement stops automatically at the end of this duration. Screen of data storage is displayed to validate or reject the measurement.

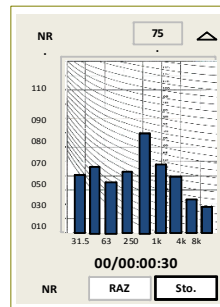
7.4.5 Store data

At the end of the measurement, in manual mode, a screen of all results is displayed. It is then possible to:

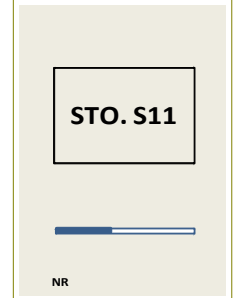
- Accept measurements and store them: move the cursor on **Sto.** and press once on **OK** key to confirm. A banner displays the storage phase.



Ongoing measurement

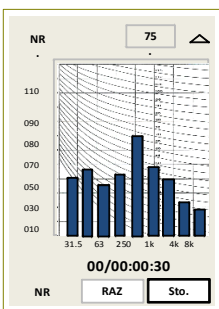


Results screen

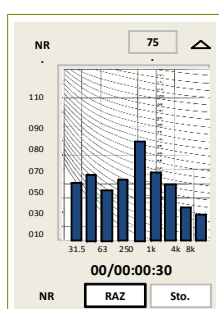


Storage

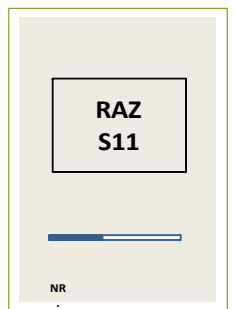
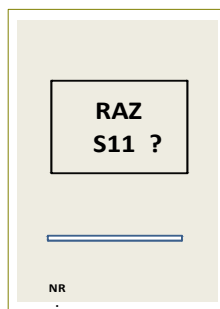
- Reject measurements and not store them: move the cursor on **RAZ** and press **twice** on **OK** key to confirm. A banner displays the phase of suppression of data.



Results screen



RST active



Deletion

7.5 Calculate two sound sources

The sound level meter processes the acoustic signal of several sound sources over a time left to the free initiative of the operator. The measured value here is the equivalent continuous level over this time.

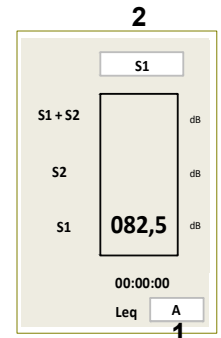
7.5.1 Settings to perform before measurement

1 – Select **S1 + S2 mode**: move the cursor with arrow keys on the icon  then press **OK**.

2 – Select the frequency weighting

Possible choices are: **A** frequency weighting - **C** frequency weighting - **Z** frequency weighting (LIN).

Place the cursor with arrow keys on the area 2 and select with scrolling knob **A**, **C** or **Z**.



7.5.2 Make calculation of two sound sources

- Measure **S1** sound source
- Move the cursor to 3 and select **S1** with the scrolling knob key then launch the measurement with  pictogram.
- Stop the measurement when it seems representative (stabilized evolution of the LXeq value).
- Measure **S2** sound source:
- Move the cursor to 3 and select **S2** with the scrolling knob key then launch the measurement with  pictogram.

The measure will stop by itself after time T previously chosen for the measurement of the S1 source.

The equivalent continuous level calculated from the two combined sources is displayed in front of “**S1 + S2**”.

7.6 Determine a sound source among two



The determination of a sound source among a set of two can not run unless the operator can interrupt one of the two sources, the aim being to estimate the sound level of a source without the presence of the other source.

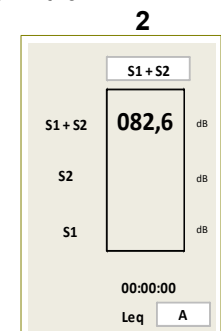
Example: outdoor heating pump in a background noise during the day.

Estimate the sound level of a heat pump without the background noise of day, to estimate the possible nuisance of the heat pump in a noise environment less noisy as the one present the night.

7.6.1 Perform the measurement

- Move the cursor to 3 and select “**S1 + S2**” with the scrolling knob key to measure the two sound sources. In the example, outdoor heat pump (**S1**) in a background noise during the day (**S2**).
- Launch the measurement with the  pictogram.
- Stop the measurement when it seems representative (stabilized evolution of the LXeq value) with the  pictogram.
- Stop the **S1** sound source (in the example, heat pump).
- Launch the measurement of the **S2** sound source (background noise) with the  pictogram.

*Measurement of the **S2** sound source will stop by itself after time T chosen for the measurement of the **S1+S2** sound source and the **S1** and **S2** sound source level is displayed on the sound level meter.*



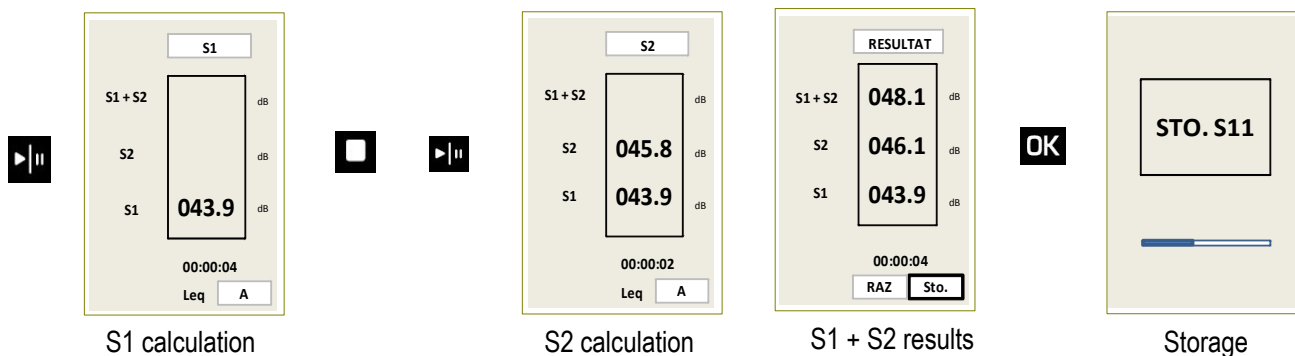
Note: In case of improper handling and/or of calculation impossibility, result will not be displayed.

Example: S1+S2 level is lower than S1, so S2 can not be calculated. Dashes will appears on the screen instead of numbers.

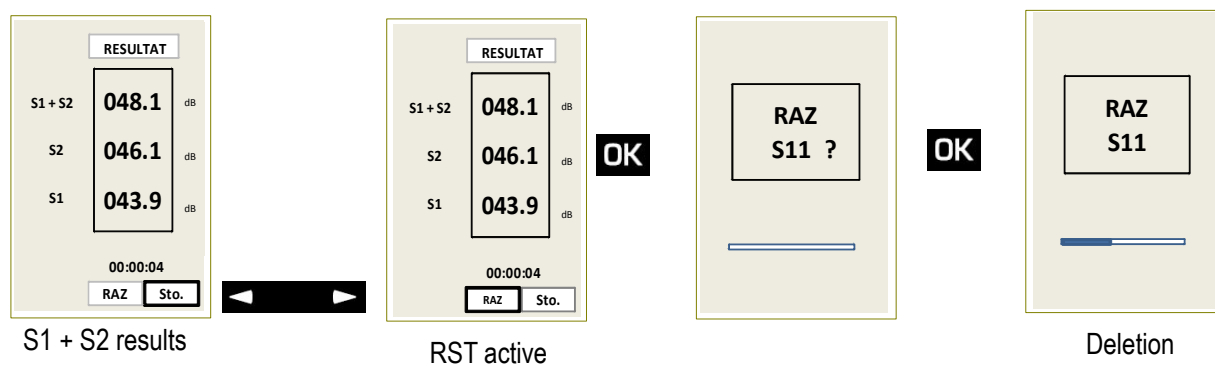
7.6.2 Store data

At the end of the measurement, the screen of all results is displayed (example: adding of two sound sources). It is then possible to:

- Accept measurements and store them: move the cursor on **Sto.** and press once on OK key to confirm. A banner displays the storage phase.



- Reject measurements and not store them: move the cursor on **RST** and press **twice** on OK key to confirm. A banner displays the phase of data deletion.
- Reject measurements without storage: move the cursor on **RST** and press twice on OK key to confirm. A banner displays the deletion phase.



8 Modes of measurement launching

8.1 Generalities

DB300 instrument has four modes of measurement launching:

- **Immediate mode:** manual launching with the keypad.
- **Delayed mode - Tim.:** programmable launching and stop on a free duration
- **Repetitive delayed mode – Tim.:** launching from 2 to maximum 10 times of a daily programming limited to 24H59M00S.
- **I/O mode:** launching by order of an electronic signal (Example: industrial controller)

The following modes: **Delayed – Tim mode / Repetitive delayed – Tim mode and I/O mode** are related to the following measurements modes.



Integrating – averaging with storage sound level meter – A and C weightings



Integrating – averaging with storage sound level meter – A, C and Z weightings and analyzer by filters of octave bands from 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8kHz (class 2)



Analyzer sound level meter to measure the noise of equipment in correspondence with NR curves (as per NF S 30-010 standard)



Integrating-averaging sound level meter, and A, C and Z weighted and analyzer by third octave bands filters (option)

Information:

When using the instrument in analyzer mode for the measurement of noise equipment in correspondence with NR curves (as per NF S 30-010):

- Measurement start in **Tim.** mode only works for a T free duration programming and not for predefined durations (3 – 5 – 10 – 15 – 30 – 60 s).
- When 0 VDC electrical voltage of control is reached in I/O mode or generally with the delayed programming **Tim.**:
- The measurement stops after at least one elementary logging time (from 1 s to 60 s). The current last elementary logging time is not taking into account in data.
- The instrument saves metrological and audio data (if activated) at the end of the session
- Every other start linked to a back of 5 VDC of control voltage in I/O mode or to a **Tim.** programming is performed after the end of storage (see page 37).

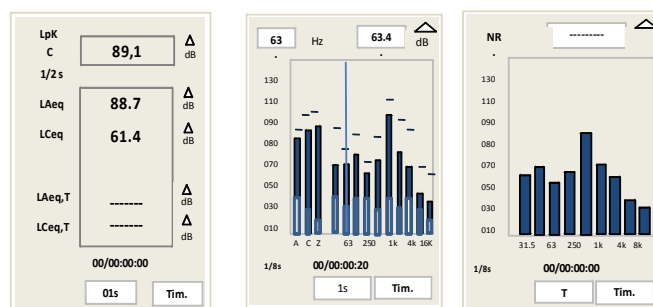
8.2 Immediate mode

➤ Press  key to launch the measurement.

8.3 Delayed – Tim. mode

It is possible to program the beginning and the end of the measurement (date-time) of a free duration that can exceed several days. For example: preparing the instrument for measurement during the night.

- Select icon **Tim.** at the bottom right of the screen when set the instrument before the measurement.
- Press **OK** to go the programming screen.



The screen of measurement programming is displayed:

- Move the cursor on the different items and set date and time with the scrolling knob key.
 - Beginning: date and time of the measurement beginning
 - End: date and time of the measurement end
- Move the cursor on the **Repeat** item to validate the value at **01**: OK appears.
- Press **OK** key.

DIFF.-JOUR.-REPET.		
Début	15	/ 05
	09	: 15
Fin	15	/ 05
	16	: 30
Repet.	1	
Mém.:	OK	
Alim.:	OK	
OK		

The programming of measurement launching is performed.

The two last lines of the screen indicates:

- That the memory capacity for the number of sessions is enough (**999 max**): **OK**
- That the power capacity allows the measurement: **OK**.

In case of incompatibility:

- **KO** is displayed instead of **OK**: in this case, empty the memory of the instrument.
- Load the battery or change batteries.

If the **power adapter logo blinks**, it is imperative to use a power adapter.

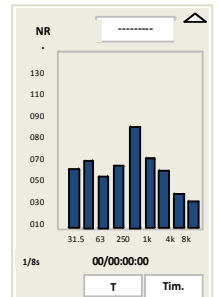
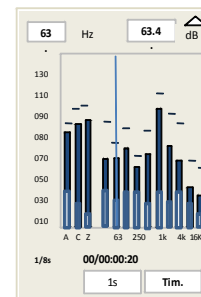
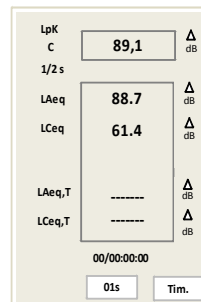
When the logo stops blinking, it means that the power adapter is connected.

Note: Using the delayed mode without programming the date and time of measurement beginning (current date and time still present) but by programming the date and time of measurement end, the measurement starts immediately after the validation and will stop at the programmed hour. This type of programming allows to stop the measurement and the instrument without being present.

8.4 Repetitive delayed mode – Tim.

It is possible to program the beginning and the end of the measurement (date-time) on a daily duration (see page 37) that has to be repeated from 2 to 10 times the following days at the same hours. Example: following of a sound source that is marked every days of the week.

- Select the icon **Tim.** at the bottom right of the screen when set the instrument before the measurement.
- Press **OK** to go the programming screen.



The screen of measurement programming is displayed:

- Move the cursor on the different items and set date and time with the scrolling knob key.
 - Beginning: date and time of the measurement beginning
 - End: date and time of the measurement end
- Move the cursor on the item **Repeat** to program the repetition value (from 2 to 10): OK appears.
- Press **OK** key.

DIFF.-JOUR.-REPET.		
Début	15	/ 05
	09	: 15
Fin	16	/ 05
	06	: 30
Repet.	5	
Mém.:	OK	
Alim.:	OK	
OK		

The programming of measurement launching is performed.

Note: in case of exceeding of the daily duration of programming, the instrument will correct automatically the date and time of the end of measurement.

The two last lines of the screen indicates:

- That the memory capacity for the number of sessions is enough (**999 max**): **OK**
- That a power adapter must be used

In case of incompatibility:

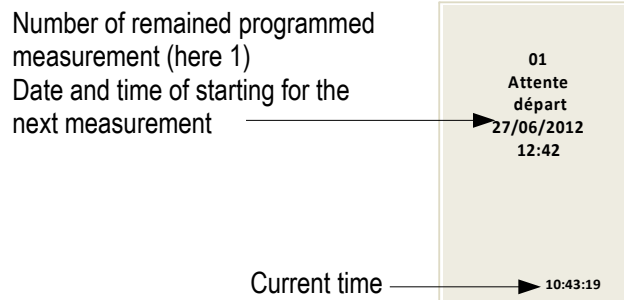
- **KO** is displayed instead of **OK**: in this case, empty the memory of the instrument.
- If the **power adapter logo blinks**, it is imperative to use a power adapter.
- When the logo stops blinking, it means that the power adapter is connected.

8.4.1 Delayed mode: Tim. – waiting for measurement

The principle of a free delayed measurement or of a repetitive daily delayed measurement requires a temporal management of the instrument:

- The programming has been prepared and validated
- A screen displays the waiting mode. This screen is displayed a few moments then it turns off.
- The instrument is in sleep mode to save battery capacity. It is reactivated a few moments before the measurement.
- The measurement is performed, data are stored, the instrument activates its sleep mode until the following measurement and so on.

Screen details:



Important: it is possible at any time to stop the waiting mode or the sleep mode and launch the measurement.

In waiting mode: just press the  key. The measurement starts immediately.

In sleep mode:

- Press **on/off** key to reactivate the instrument.

The waiting screen is displayed.

- Press  key to start the measurement.

In all cases, there is only the launching of measurement that is modified, programming of end and daily repetitive remain the same as the ones initially scheduled.

8.4.2 Delayed mode: Tim. – interrupt the programming

It is possible to interrupt at any time the waiting or sleep modes and stop the current mode.

In waiting mode:

- Press **Esc** key. The screen of timer exit is displayed.
- Select **Yes** with the arrows then press **OK**.

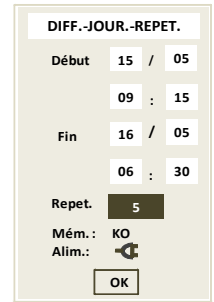
In sleep mode:

- Press **on/off** key to reactivate the instrument.

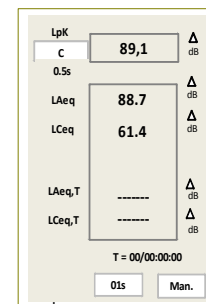
The waiting screen is displayed.

- Press **Esc** key. The screen of timer exit is displayed.
- Select **Yes** with the arrows then press **OK**.

The programming is canceled and the instrument backs to the screen of initial measurement.



Yes
OK



8.4.3 Delayed mode: Tim. – Data storage and audio files

At the end of each measurement, files of metrological data and audio files (if the function is activated) are stored on the SD card.

This is how it works:

Simple delayed mode (01 repetition): storage is made at the end of the measurement. The instrument stays active and the storage time depends on the importance of metrological data and of the number and size of audio files.

- Metrological data: brief time
- Audio file: it can last from a few seconds to 40 min

At the end of the storage, the instrument turns off.

Repetitive delayed mode (from 2 to 10 repetitions) without Audio function: storage is made at the end of the measurement if the daily duration does not exceed 23H59M00S. The last minute is for the storage of metrological data.

At the end of the storage, the instrument activates its sleep mode and starts again at the next period, etc....

Conclusion: all periods will start at the same time, but the daily durations will be limited to **23H59M00S**.

Repetitive delayed mode (from 2 to 10 repetitions) with audio function: storage is made at the end of the measurement if the daily duration does not exceed 23H20M00S. The last 40 minutes are for the data storage.

At the end of the storage, the instrument activates its sleep mode and starts again at the next period, etc....

Conclusion: all periods will start at the same time, but the daily durations will be limited to **23H20M00S**.

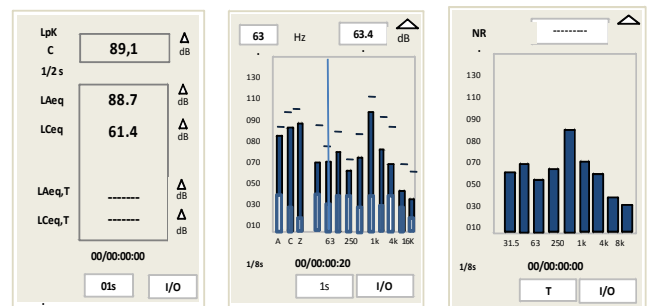
Note: if there is no audio file, then the maximum daily duration will be 23H59M00S

Additional information: for acoustic studies on successive days, it is advised to perform a single measurement of several days or weeks and to reorganize in daily periods with the operating software.

8.4.4 I/O mode

It is possible to launch and stop the measurement with an external electronic command. The signal comes from every electronic system that can provide a continuous electrical signal of 5V maximum (called TTL) - Ex: controller for the monitoring of industrial process.

- Select **I/O** icon at the bottom right of the screen when set the instrument before the measurement.
- Connect at the bottom of the instrument in the **I/O 1** plug a 2.5 mm of diameter Jack cable.



Principle:

A measurement launching according to the I/O mode is performed once an electrical voltage of maximum 5 VDC appears on the **I/O1 In**. It stops once this same electrical signal backs to 5 VDC (see page 64 for the features).



Schema

9 Read the stored files

After a controlled stopping of the measurement and a data storage, it's possible to see on the screen measurement dataset results.

9.1 Access to files

- Press  menu key then go to **Read** then press **OK**.

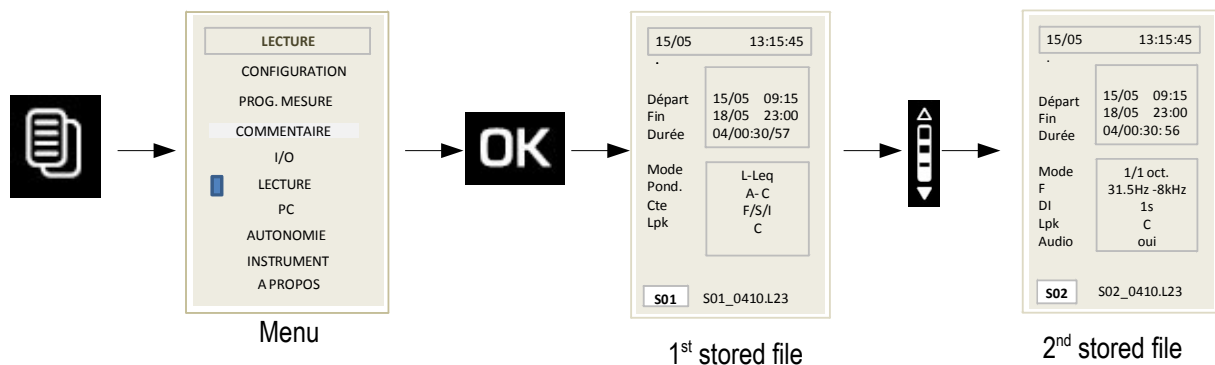
Information of the last stored file is displayed.

In order to make easier its identification, the screen displays the entire configuration of the measurement:

- **The mode:** L-Leq, Leq-St, 1/1 oct, NR, S1 + S2.
 - **According to the mode:** the different frequency and temporal weightings or filters, the logging times, date and duration...
- Scroll stored files with the scrolling knob key.

Each file is identified by an order number (**type S001**) and a file name (format: **S001_1811.L23**). This file name will be displayed uploading to a computer.

- When the file has been identified by its identification number, press OK key to view the different results screens.



- Press **Esc** key to quit this file and back to file selection main screen.
- Press **Esc** another time to back to main screen of the instrument.

9.2 Read data of the file

9.2.1 L-Leq mode file

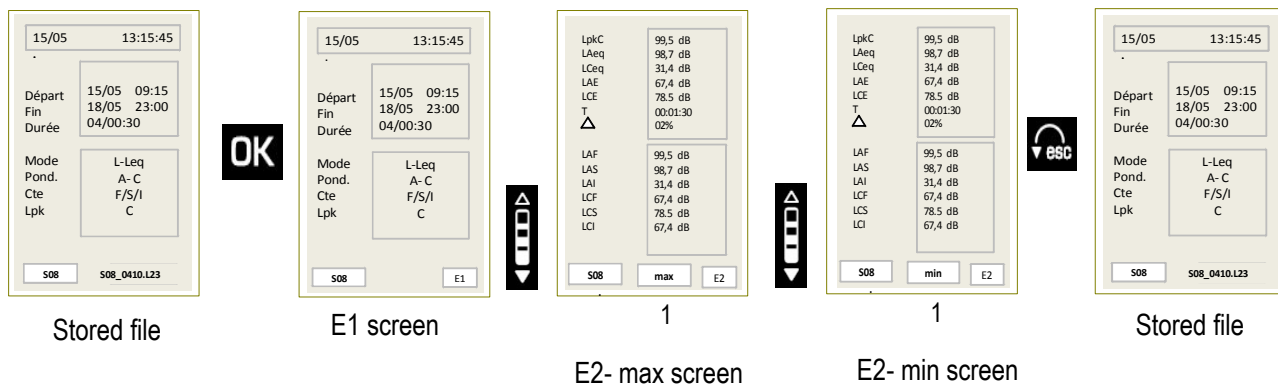
When the file has been identified by its identification number:

- Press **OK** to go to S1 screen which remains the measurement configuration.
- Date of measurement start
 - Date of measurement end
 - Measurement time expressed in **DD / HH: MM: SS**.
 - Measurement mode: **L-Leq**
 - Frequency weighting for L and Leq: **Weig**.
 - Time weighting for L: **Cst**
 - Frequency weighting of the level of peak pressure for L: **LpK**

With scrolling knob key, go to **S2** results screen:

- **LUpk**: level of maximum peak of sound pressure on the measurement time.
- **LAeq**: equivalent continuous level of sound pressure A-weighted on the total measurement duration
- **LCeq**: equivalent continuous level of sound pressure C-weighted on the total measurement duration

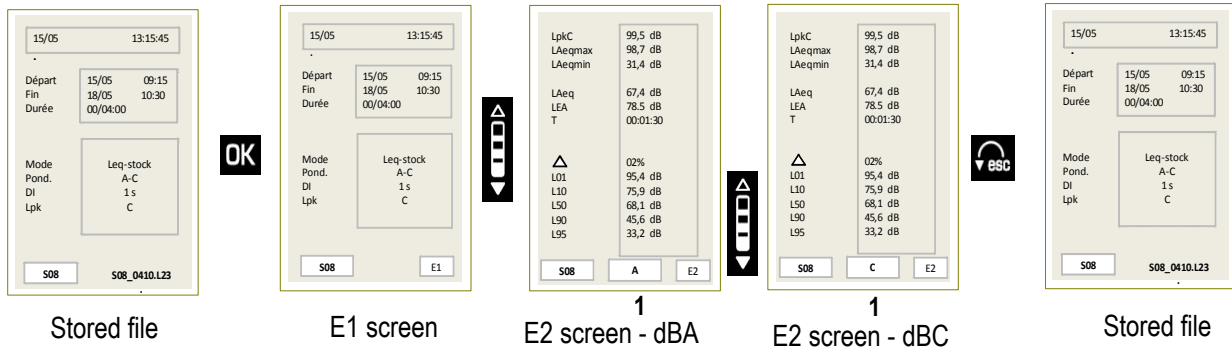
- **LAE**: A-weighted sound exposure
 - **LCE**: C-weighted sound exposure
 - **T**: measurement duration in DD/HH:MM:SS
 - **%**: percentage of saturation of the input stage
 - **LAF - LAS - LAI**: max or min levels of sound pressure A-weighted according to the time constants: Fast (F) – Slow (S) – Impulse (I)
 - **LCF - LCS - LCI**: max or min levels of sound pressure C-weighted according to the time constants: Fast (F) – Slow (S) – Impulse (I)
- Select **Max** or **Min** in 1 with the scrolling knob key to go from maximum values to minimum values.
- Press **Esc** key to quit this file and back to main screen of files selection.



9.2.2 Leq-St mode file

When the file has been identified by its identification number:

- Press **OK** to go to S1 screen which remains the measurement configuration.
- Date of measurement start
 - Date of measurement end
 - Measurement time expressed in **DD / HH: MM: SS**.
 - Measurement mode: **mode**
 - Frequency weighting for the Leq: **Weig**.
 - Elementary integration time for Leq: **DI**
 - Frequency weighting of the level of peak pressure for L: **LpK**
 - Audio recording: **Audio**
- With scrolling knob key, go to **S2** screen for the A and C weighted results:
- **LUpk**: level of maximum peak of sound pressure on the measurement time.
 - **LAeqM**: maximum value of the equivalent continuous level of sound pressure A-weighted of all the elementary integration time
 - **LAeqm**: minimum value of the equivalent continuous level of sound pressure A-weighted of all the elementary integration time
 - **LAeq**: equivalent continuous level of sound pressure A-weighted on the total measurement duration
 - **LAE**: A-weighted sound exposure
 - **T**: measurement duration in DD/HH:MM:SS
 - **%**: percentage of saturation of the input stage
 - **Statistical indexes**: L01 -L10 – L50- L90- L95
- Select **A** or **C** in 1 with the scrolling knob key to go from A-weighted values to C-weighted values.



- Press **Esc** key to quit this file and back to main screen of files selection.

9.2.3 1/1 oct file mode

When the file has been identified by its identification number:

- Press **OK** to go to S1 screen which remains the measurement configuration.
- Date of measurement start
- Date of measurement end
- Measurement time expressed in **DD / HH: MM: SS**
- Measurement mode 1/1 oct: **Mode**
- Filters by octave bands from 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8 kHz (class 2): **F**
- Elementary integration time for LXeq: **DI**
- Frequency weighting of the peak pressure level: **Lpk**

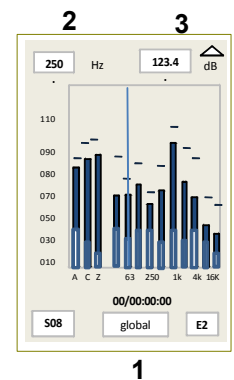
S2 is the main screen that displays the values and a graphical representation (spectrum type):

The different bars are for:

- **LAeq - LCeq - LZeq**: equivalent continuous levels of sound pressure A, C and Z-weighted.
- **LXeq**: equivalent continuous levels of sound pressure filtered by octave bands from 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8 kHz (class 2)
- **Measurement duration** in DD/HH:MM:SS

Read values:

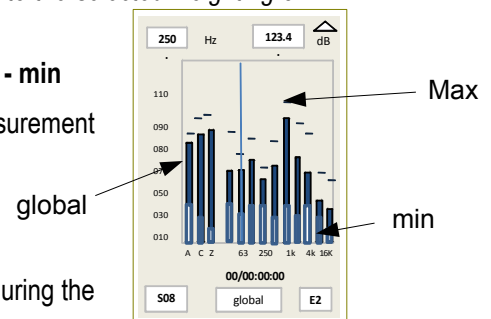
- Move the cursor in **1** with the arrow keys and select with the scrolling knob key between **global - Max - min**
- Move the cursor in **2** with the vertical arrow keys then select with the scrolling knob key the weighting value or the filter value and read the result displayed in **3**.



A vertical line is moving on the screen and is superimposed on the bar corresponding to the selected weighting or filter.

Do the same to read the different values according to the selection in **1: Global - Max - min**

- **Global**: weighted and filtered equivalent continuous levels on the measurement duration
- **Max**: weighted and filtered maximum equivalent continuous levels reached during the measurement (base: DI elementary integration time)
- **Min**: weighted and filtered minimum equivalent continuous levels exceeded during the measurement (base: DI elementary integration time)



These different values are shown as:

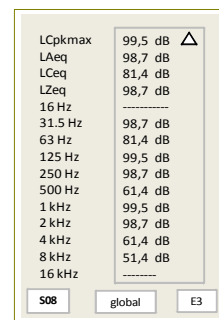
- A horizontal line for the maximum level
- A full colored bar for the global level
- An empty bar for the minimum level

S3: this screen displays the results of current values that will be stored at the end of the measurement

- Move the cursor in **1** with the arrow keys and select with the scrolling knob key between **global – Max - min**

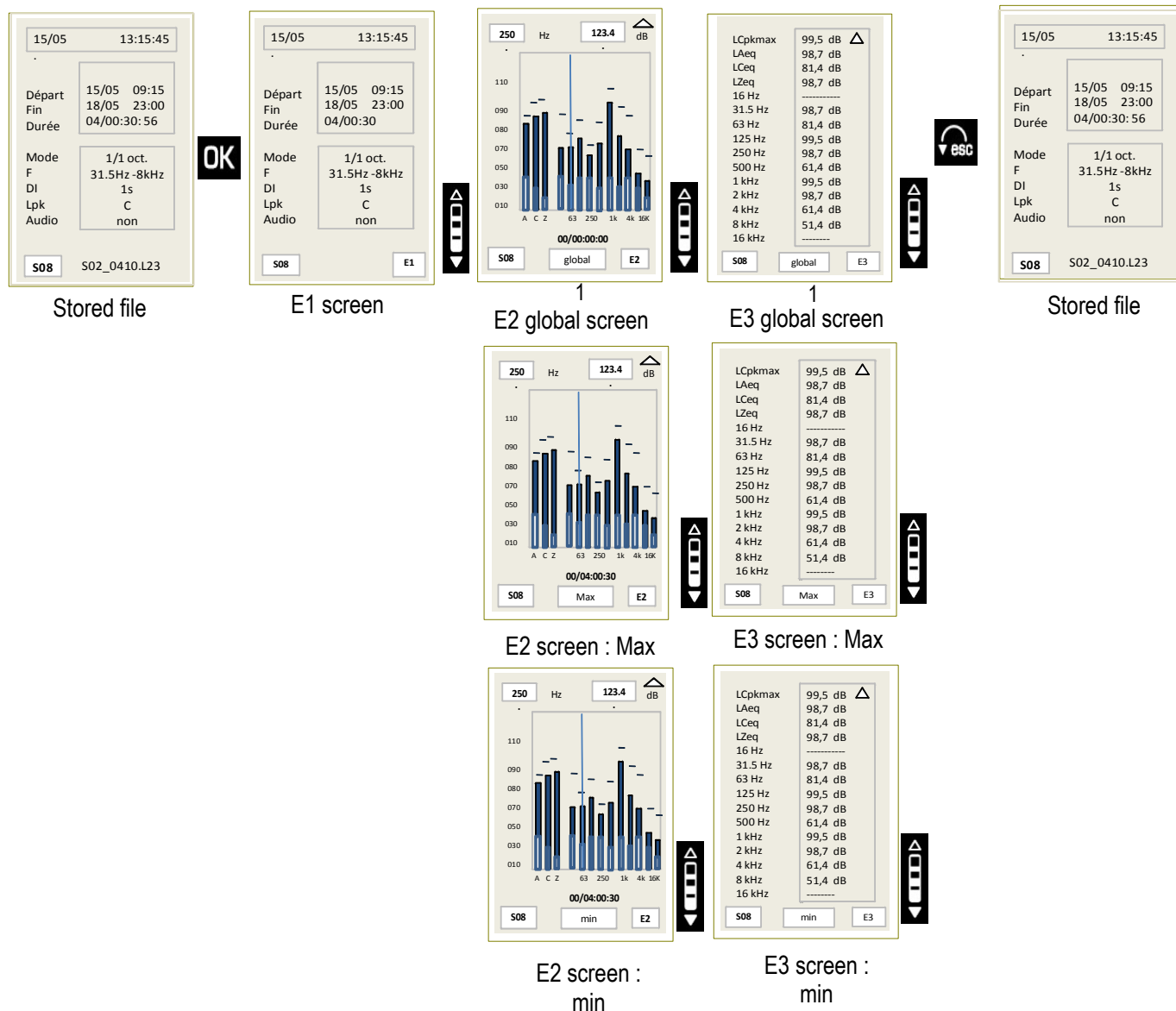
Read the different values according to the selection: **global – Max - min**

- **Global:** weighted and filtered equivalent continuous levels of the measurement
- **Max:** weighted and filtered maximum equivalent continuous levels reached during the measurement (base: DI elementary integration time)
- **Min:** weighted and filtered minimum equivalent continuous levels exceeded during the measurement (base: DI elementary integration time)



1

Main synoptic:



- Press **Esc** key to quit this file and back to main screen of files selection.

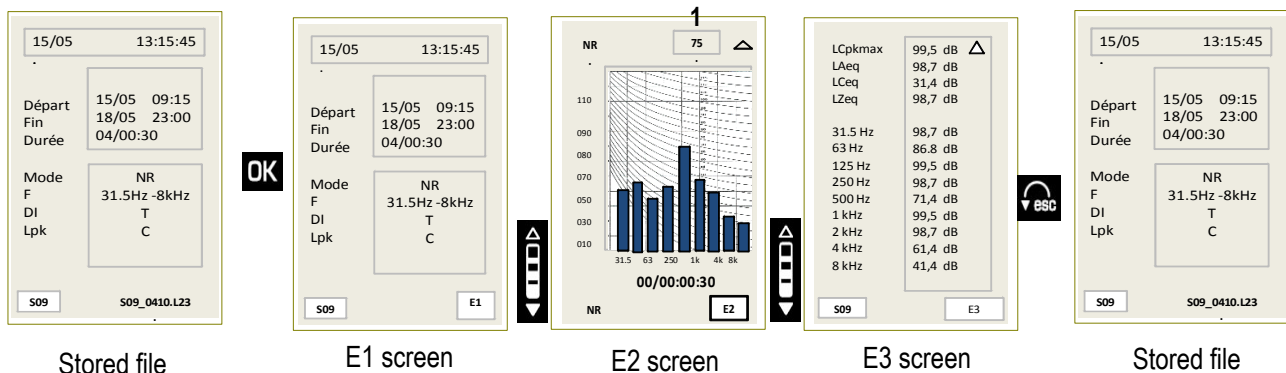
9.2.4 NR noise equipment file

When the file has been identified by its identification number:

- Press **OK** to go to S1 screen which remains the measurement configuration.
- Date of measurement start
- Date of measurement end
- Measurement duration
- Measurement mode NR: **Mode**
- Filters by octave bands from 31.5Hz to 8kHz: **F**
- Elementary integration time for LXeq: **DI**
- Frequency weighting of the peak pressure level: **Lpk**
- Date of measurement start
- Date of measurement end
- Measurement duration
- Measurement mode NR: **Mode**
- Filters by octave bands from 31.5Hz to 8kHz: **F**
- Elementary integration time for LXeq: **DI**
- Frequency weighting of the peak pressure level: **Lpk**

S3: this screen displays results values that are stored in the memory.

- **LCpkMax:** maximum peak pressure level noted during the measurement
- **LAeq - LCeq - LZeq:** equivalent continuous levels of sound pressure A, C and Z-weighted on the measurement duration.
- **LXeq:** equivalent continuous levels of sound pressure on the measurement duration filtered by octave bands from 31.5 Hz to 8 kHz



- Press **Esc** key to quit this file and back to main screen of files selection.

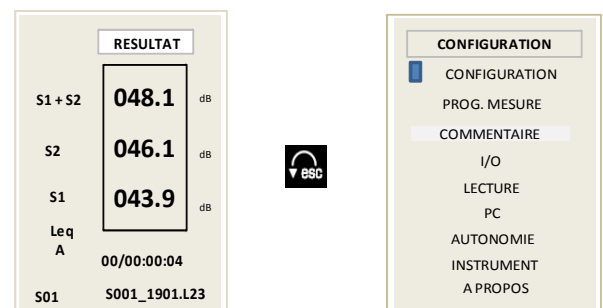
9.2.5 S1+S2 mode file

When the file has been identified by its identification number, you access to the main single screen of results.

It shows:

- **S1 + S2:** equivalent continuous level of the two sound sources
- **S2:** equivalent continuous level of **S2** sound source
- **S1:** equivalent continuous level of **S1** sound source
- The frequency weighting of the equivalent continuous level
- The measurement duration for the calculation of the equivalent continuous level

- Press **Esc** key to quit this file and back to main screen of files selection.



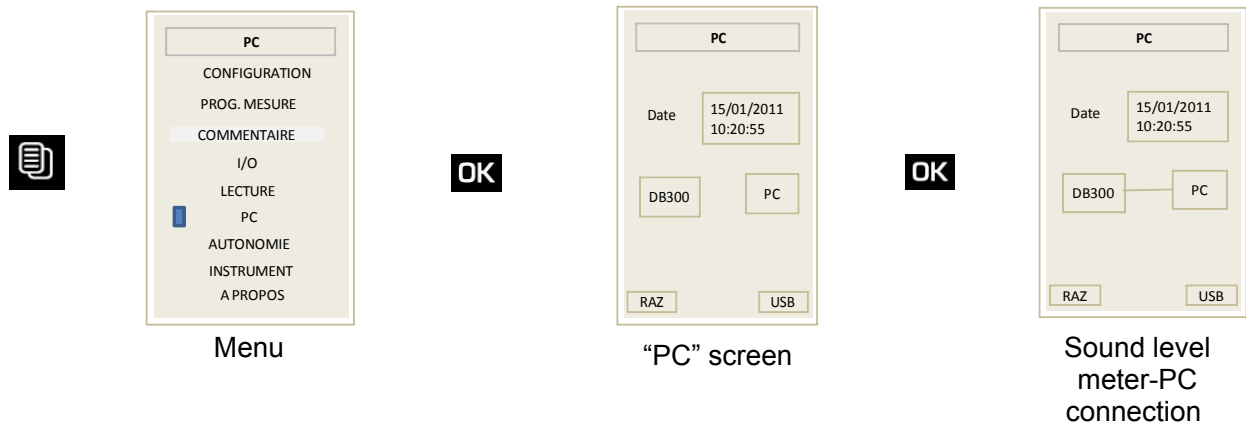
10 Transfer files to a PC

10.1 Transfer

This function allows to transfer data towards a computer through a USB cable. The operating software must be installed on the computer.

- Connect the instrument to the PC through the USB cable.
- Go to “**PC**” screen of the sound level meter: from the menu icon, select **PC** then press **OK**.
- Press **OK** key again to activate **USB** icon.

The connection to the PC is shown on the screen of the sound level meter.



- After the transfer, turn off the instrument or quit PC screen by pressing **Esc** key.

The instrument is considered by the computer as a removable disk. Files transfer can be perform according to two ways:

- With the **LDB23** software (see user manual of the software)
- Directly by activating the files manager of the operating system of the PC (for example: copy/paste function, send to,...) to move files of the removable disk (DB300) to the repertory the directory for the classification of the measurements.

10.2 Files format and structure on the micro SD card

Files have a generic termination: Example: S005_2409.L23

With **S005**: order number ; **2409**: day month ; **.L23**: extension

Audio files are in a same directory which have the name of the metrological data file.



In case of audio files recording, the measurement file and the *.**wav** audio files are in a same sub-directory when transferring to a PC with the software.

LDB23 software (supplied with **DB300**) does not allow an automatic processing of *.**wav** files (see page 50).

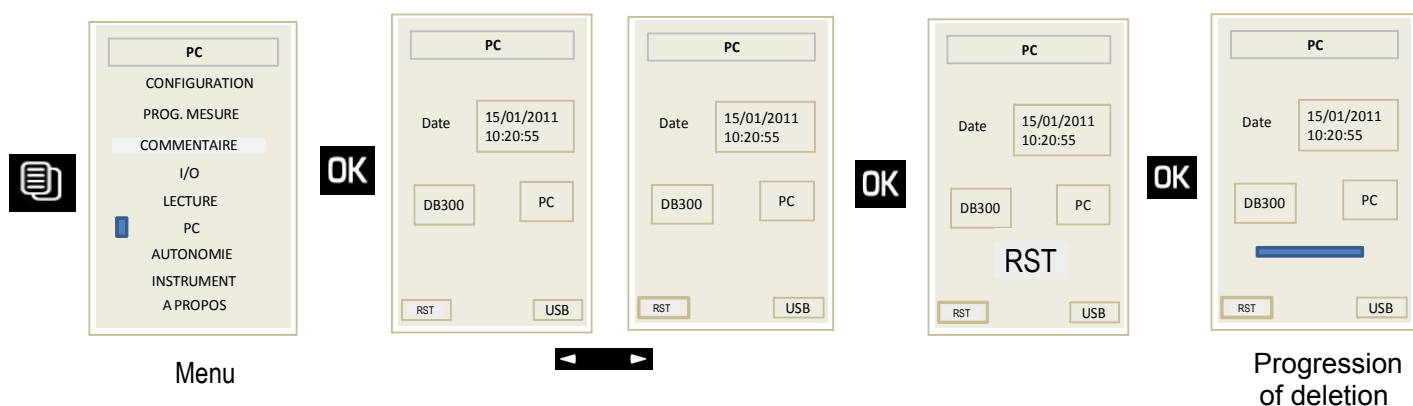
11 Reset memory

After datasets storing thanks to the transfer to computer, it's possible to erase sound level meter memory. There are two methods:

- Through sound level meter (see below)
- Through computer (see LDB23 software user manual)

Through the sound level meter:

- Go to “**PC**” screen of the sound level meter: from the menu icon, select **PC** then press **OK**.
- Move the cursor to **RST** with left arrow key.
- Press **OK** key, **RST** blinks.
- Press **OK** key to delete all data, progress bar is displayed.



All the sessions in the sound level meter will be permanently deleted.

- Press **Esc** key to quit this file and back to MENU main screen.

12 Audio recording function

When studying a measurement and after the visualization of the temporal evolution with the software, some results can be surprising and can raise questions:

What is the sound source of the this level?

In order to help you, **DB300** instrument has an “**Audio Recording**” function that is automatically activated when a previously set threshold is exceeded.

This detection on threshold is about:

- The equivalent continuous level A-weighted on an elementary integration time of 1 second: **LAeq,1s**

or

- The maximum peak pressure level C or Z-weighted (according to the programmed weighting: usually C): **LCpk**

This function is only available with the two following modes:



Integrating-averaging sound level meter with storage – A and C weightings



Integrating-averaging sound level meter with storage – A, C and Z weightings and analyzer by filters of octave bands from 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8kHz (class 2)



Integrating-averaging sound level meter with storage – A, C and Z weightings and analyzer by filters of octave bands of third octave bands from 12.5 Hz to 20 kHz (class 1) or from 31.5 Hz to 8kHz (class 2) (option)

The principle of recording after a threshold detection suggests that sound source that caused the threshold exceeding can become inactive after the detection. Therefore, **DB300** instrument systematically performs a sliding recording of **Tgl** duration (4 s) that is retained after detection of an exceeding.

The recording keeps going on the total duration of the exceeding and after sub-overshoot of the threshold, and on the same **Tgl** duration previously used.

This process allows an “**Audio recording**” of the sound source that causes the exceeding and makes easier its identification.

As it is a help for the recognition of sound sources and in order to optimize material resources, the audio recording format on the SD card is defined as follows:

- Accuracy: 16 bits
- Sampling: 12 kHz

DB300 instrument having a wide measurement dynamic, 107 dB it is likely that the re-listening with a computer does not allow an easy identification according to the selected detection threshold.

To optimize the listening, the audio recorder incorporates an adjustable digital gain from 24 to 48 dB with a step of 6 dB. This adjustment has no incidence on the measurement and interferes on audio files only.

So, according to measurement conditions and selection criteria, this adjustment allows to adjust the reduced dynamic of audio listening (computer + ear + environment = about 50 dB) to this more extensive of **DB300** instrument (107 dB)

Important: to make more comfortable the re-listening on PC, we advise the use of an external amplified speaker system to the PC.

12.1 Temporal synoptic



Area of exceeding of sound level on threshold : ex : 87 dB

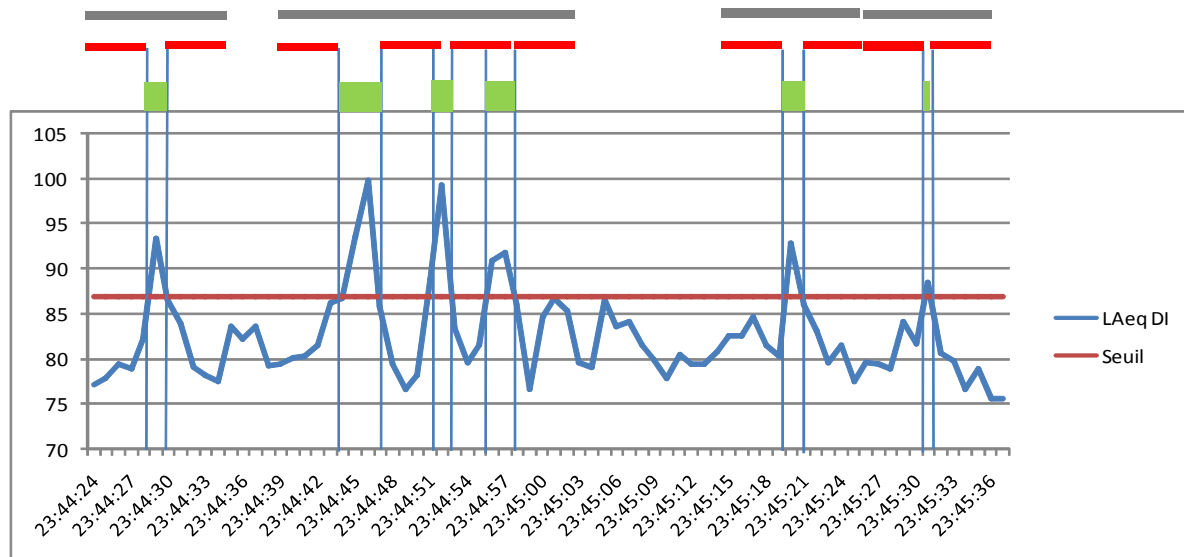


Tgl : pre and post recording set at 4 seconds for supervision of audio exceeding on threshold



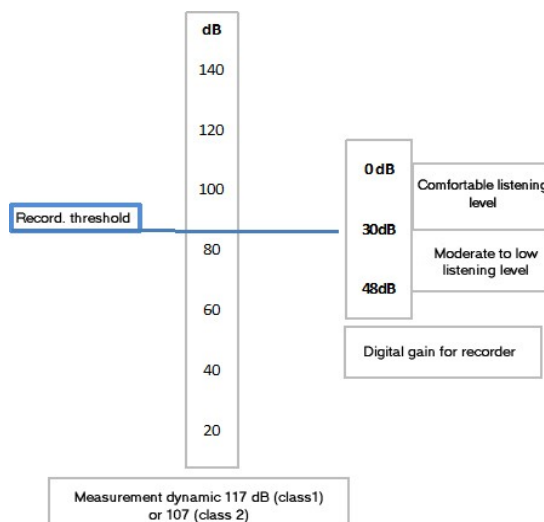
Final recording : pre and post exceeding + exceeding

VERY IMPORTANT : when audio function is activated, the DI duration of elementary integration for calculation of the LAeq, LCEq and LXeq equivalent continuous level is automatically set at 1 second.



12.2 Synoptic of the management of the recording dynamic

The gain is initially set at 30 dB.



Selection of a detection level for an audio recording: it must be on the planned measuring range from 20 to 137 dB (class 1) or from 30 to 137 dB (class 2).

Setting of the digital gain for audio recording: the recorder dynamic is set in factory at **30 dB**.

This means that the recorder has 30 dB in storage in peak pressure value beyond the selected detection threshold in LAeq or LCpk.

Example: detection level = LAeq 1s: 105 dBA

Sound sources higher to this level are recorded without distortion if and only if the maximum peak level does not exceed: $105+30 = 135\text{dB}$ peak.

Generally, sound sources have some high peak factors, pretty much from 20 to 30dB. That's why it is not possible to set the gain at a value lower than 24dB. However, in situations where sound sources are elaborated with very high peak factors, it is possible to choose the digital gain beyond 30 dB between: **36-42-48 dB**

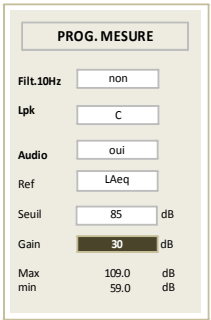
During programming, **DB300** instrument displays maximum and minimum peak pressure levels properly recordable according to the selected criterion (reference threshold and digital gain).

Listening comfort:

It is recommended to keep the factory setting which is 30 dB. Eventually, after experience on site, it is possible to bring it to 24 dB.

In this case, the re-listening allows a correct identification for the 4 seconds before and after the adjustable threshold exceeding.

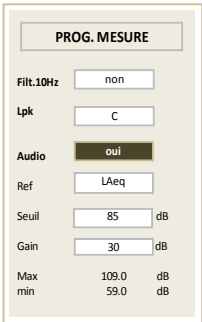
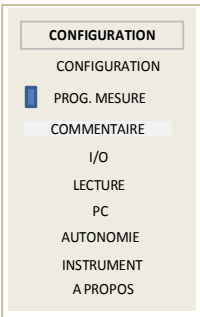
Note: to make more comfortable the re-listening on PC, we advise the use of an external amplified speaker system to the PC.



12.3 Use of audio recording

From **MENU** screen, select “**PROG.MESURE**”

- Press **OK** to validate.
- Move the cursor on “**Audio**”.
- Select **YES** in reverse video.
- Move the cursor to select successively:
 - The used reference for the detection: **LAeq** or **Lpk**.
 - The threshold beyond which the recording starts. This threshold can be set with the scrolling knob key in step of 1 dB and concerns either the **LAeq** or the **Lpk** according to the previous selection.
 - The gain of the recording chain adjustable from **24 dB** to **48 dB** in step of **6 dB**. According to this selection, maximum and minimum recordable values of peak pressure levels correctly calculated are displayed.



Note: Durations of pre and post recordings supervising the exceeding are not adjustable and fixed at 4 seconds.

Measurement in progress:

Different recordings are performed automatically without intervention and without affect metrological calculations. Total recording time available being limited (see page 65), be selective to select the detection threshold value in order to not use too quickly memory space and get repetitive and insignificant recordings.

Audio files:

All recordings are linked to the corresponding metrological file and saved as ***.wav** audio format on the micro SD card. During data transfer on a PC, the software (LDS300 or LDB300) processes all the files and the re-listening of files to help about sound sources recognition.

Listening of the audio files without software:

Audio files can be processed by a software (LDS300 or LDB300). However, if you don't have software, it is possible to listen to the ***.wav** files with any kind of software suitable with *.wav and PC . It is possible to listen to the recording but it is not possible to link them with metrological data.

Audio files are on the same directory and its name is the name of the metrological data file.

Metrological data file →

Directory of *.wav files →

prod33.prd

S0152806.L23

S0152806

Detail of *.wav files

A001.WAV	258 Ko	Son Wave
A002.WAV	235 Ko	Son Wave
A003.WAV	212 Ko	Son Wave

Memory space:

Available memory on micro SD card is divided into 2 areas: the 1st one contains the metrological files and the 2nd one contains audio files for re-listening. Before starting a new measurement, it is advisable to check the remaining measurement capacity expressed in number of event timers and battery capacity.

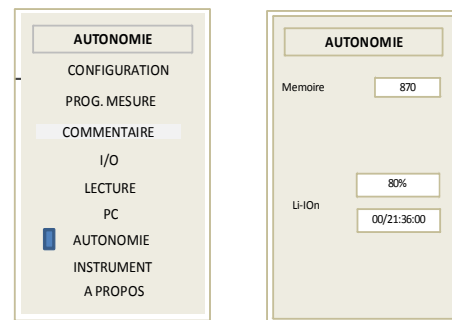
For that, from **MENU** screen:

- Select **AUTONOMIE**.
- Press **OK** to validate.
- Check the number of sessions and the remaining battery life.

Ex: 870 sessions and 80% of remaining battery life in DD/HH/MMSS

In case of shortage, all data in the micro SD card must be deleted:

- With the keypad (see page Error: Reference source not found)
- With a software



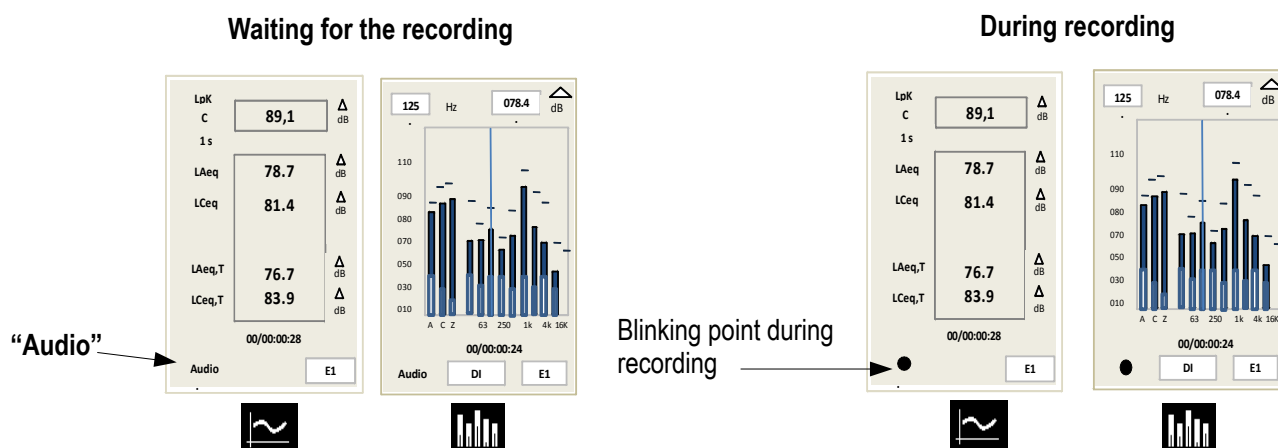
Only the person in charge of the measurement has the responsibility to process recordings.

12.4 Measurement in progress – Data reading

Audio function generates an additional screen control which completes the screen chain during measurement or at the end for reading of results.

During measurement:

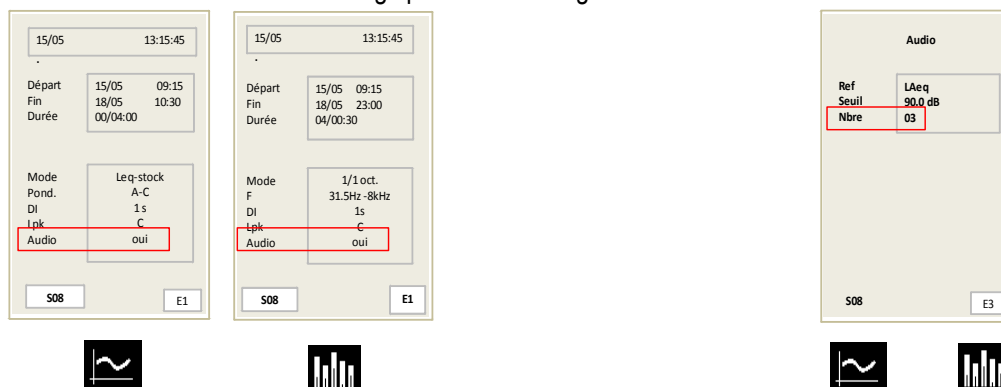
“Audio” appears in the different screens, and during recording a blinking point replaces “Audio”.



Reading:

In the S1 screen which remains the measurement configuration, “Yes” is indicated in front of “Audio”.

An additional screen indicates the number of recordings performed during the measurement.



13 Direction for use and maintenance of the sound level meter

13.1 Use warnings

The sound level meter is a measuring instrument using the latest technologies. To maintain accuracy and required reliability, avoid any chock of the housing and the microphone and keep them away from humidity and corrosive steams.

13.2 Direction for use

For each application, you should check measurement technique and conditions in order to get valid and coherent results. The way of using the instrument has at least as much importance on result than device quality. You have to take into account at least the following parameters:

- The sound level meter is designed for a free-field acoustic measurement
- The instrument is held with reached out arm for short-time measurement or positioned on a tripod for long-time measurement.
- The axis of the instrument must face sound source, do not interfere with your own body or with any close material item (furniture, machines, low wall, trees, etc...).
- Protect the instrument from bad weather, and use as much as possible the windscreen. It protects the microphone and minimizes the disruptive effects linked to air currents during measurement.
- Calibrate the instrument regularly with a suitable calibrator CAL300 (class 1) or CAL200 (class 2) type.

13.3 Calibration

A calibration must be performed regularly with a suitable calibrator.

- Insert the adapter ring according to the diameter of the microphone sound level meter.
- Place the calibrator on the microphone, until the microphone reaches the end of the ring. Do this move slowly and smoothly so as not to damage the microphone.
- Put vertically the sound level meter and the calibrator.
- Turn on the calibrator.
- Wait for a moment a correct level of acoustic pressure of the calibrator: for example 94.0 dB .
- You can begin the procedure of calibration of the instrument as explained below.

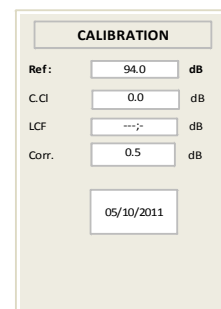
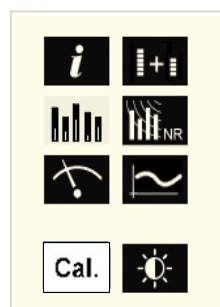
Reminder: free-field coefficient

An acoustic reference source, a calibrator or a pistonphone supplies a level of acoustic pressure. During a free-field measurement, phenomenons of diffraction caused by the microphone and the housing come to affect the measurement. This perturbation est minimized if the microphone is far from the housing.

For this sound level meter, the induced free-field perturbation is very low, and it is not necessary to introduce a free-field correction.

Operating mode

- From starting screen, select **Cal.** with arrows keys then press **OK**.



The instrument displays a new screen:

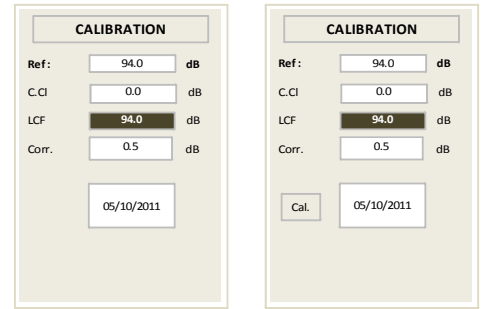
- Check that the reference value **Ref:** is equivalent to the value of the used calibrator and to the value of free-field correction (C.Cl) (0.0 dB for the sound level meter).
- Put the operating calibrator on the microphone.
- Put the cursor with the arrow keys on **LCF**.

The instrument automatically adjusts the gain of the chain to get the coincidence of the displayed levels in **Ref** and **LCF**.

- Once the measurement is stabilized, "**Cal.**": press **OK** key to validate.

The correction value of the gain and the calibration date are memorized and visible for the next calibration.

- Press **Esc** key to quit this function.



Note : This correction can not exceed **+/- 1.5 dB (class 1)** or **+/- 2 dB (class 2)**. If the correction exceeds **+/- 2 dB**, the coincidence values in **Ref** and **LCF** is not obtained. Reasons of this difference shall be identified (defective microphone, level value of the calibrator not adapted...).

Modification of the reference value:

The reference value preset during the manufacturing process shows that we use calibrator with rated value of 94 dB at 1000 Hz.

If the proposed reference is not the one of the available calibrator, follow the instruction below:

- Move the cursor on **Ref.** With arrow key  adjust to the desired value dB per dB with the scrolling knob key .

This new value is memorized until the next change.



This new value must be set between 70 dB and 130 dB.

13.4 Maintenance

The sound level meter conception allows a reduced maintenance which consists in changing batteries and cleaning the instrument with a slightly cloth. A particular attention must be paid to the microphone sensor, which is the element the most sensitive of the metrological chain.

13.5 Regular checking

Like most measuring instruments, it is strongly recommended to regularly control and calibrate the sound level meter. Return to the manufacturer each year will provide necessary metrological traceability.

13.6 Replace the battery by a batteries pack

In case of impossibility to load the battery, it is sometimes unavoidable to replace it by a batteries pack. The batteries life will decrease from 8 to 10 hours in continuous operating.

- **Turn off the sound level meter.**
- Remove the battery (do not forget to disconnect the cable).
- Connect the battery respecting its insertion direction (mechanical keying of security).
- Slide the battery into the housing.
- Close the back hatch.

13.7 Replace the batteries (if equipped)

- Turn off the sound level meter.
- Return the instrument.
- Open the back hatch.
- Remove the 3 batteries and replace them respecting the meaning.
- Put the back hatch.

13.8 Load the battery

Use a USB power adapter which serves as a charger.

It's also possible to connect the sound level meter to USB port of a running computer. Battery will load according available current at the USB output, about 500 mA.

A time of about 8 to 10 hours is needed to obtain a full charge.

Meaning of warning light located next to USB port:

- **Red warning light:** ongoing load
- **Green warning light:** completed load
- **Blinking red /green warning light:** battery is disconnected, check the connection or contact customer support
- **Orange warning light after a load period:** load or battery trouble: disconnect then connect again the charger. Red warning light must be turned on to finish loading. If orange warning light appears, contact customer support.

13.9 AC adapter

For measurements over long periods, if possible, use the AC adapter supplied with the instrument. Battery pack (or optional battery) must stay inside the instrument in order to preserve measurement in case sudden failure of the sector.

14 Running information

14.1 Over-range

Under conditions of measuring range excess, defined at **140.2 dB**, Z peak, an over-range icon appears. Its displaying differs with the measuring mode selected:

- **L-Leq mode:**

- LXY: it comes fleetingly for each exceeding. It stays visible at least 1s for a better readability.

- LXpk and Leq: warning light appears during the first overload of the input stage, it stays visible during all the measurement.

- **Leq-St – 1/1 oct – NR modes:**

- Leq 0.5s: warning light appears for each overload of input stage, it stays visible during the integration time of 0.5 s, then switches off and so on...

- Leq, DI and LXpk: both warning lights appear for each input stage, they stay visible during the integration time (from 1/16 s to 60s), then switch off and so on...

- Leq, T: warning light appears during the first overload of the input stage, it stays visible until the end of the measurement.

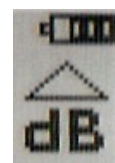
- **S1+S2 mode:**

- Warning light appears at the first overload of input stage for each measurement, it stays visible until the end of the measurement.

- **% of presence of overloads of the input stage:**

This information can be required during a mid and long term measurement, when overload indicator is displayed. Its presence does not provide information about the frequency of occurrence of the overload but the percentage calculation provides a level of alert about measured and displayed levels by the instrument.

Note: A LXY minimum value may have been overloaded, for example a level of 110 dBA with a high peak factor, while a LXY maximum value of 125 dBA with a low peak factor can not be overloaded.



14.2 Power supply

When the instrument is equipped with alkaline batteries or with a battery, a symbol informs the user about the remaining power. In case of low power, less than one bar on the pictogram, the pictogram starts blinking, the instrument stops the measurement, saves the results and switches off.

During a mains connection for long term measurements, the pictogram automatically changes to represent a plug.



In case of sudden failure of the sector, the measurement is not saved. To avoid this trouble, let the batteries or the rechargeable battery inside the instrument.

14.3 Inputs / outputs / I/O programming

14.3.1 I/O 1 In

Adapted to launch a measurement from an external electronic order of 0-5 VDC maximum. Compatible with the following measurement modes:

- Integrating-averaging sound level meter with storage – A and C weighted
- Integrating-averaging sound level meter – A and C weighted and analyzer by octave bands filters from 16 Hz to 16 kHz (class 1) or from 31.5Hz to 8 kHz (class 2) with storage
- Analyzer sound level meter for the measurement according to the NR curves (as per NF S 30-010 standard)
- Integrating-averaging sound level meter – A and C weighted and analyzer by third octave bands filters from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2) _ (option).

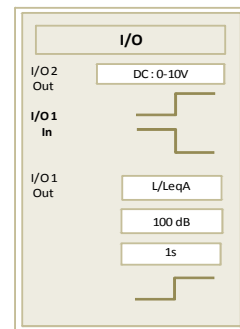
When the instrument is used in analyzer mode for the measurement noise equipment in correspondence with NR curves (as per NF S 30-010 standard):

Measurement beginning in **Tim** mode works only for a programming of free duration **T** and does not work for preset durations (3 - 5 - 10 - 15 - 30 - 60 s).

14.3.2 I/O 1 Out

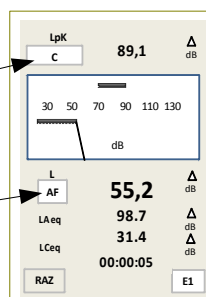
It is the output detection in relation to a preset sound level and concerns **the measurement modes below**. A high level appears in output when the value of sound pressure level reaches and exceeds some value. Settings are made in the menu **I/O**.

- Select the type of level: **L/Leq** or **Lpk**
- Set the desired detection level with the scrolling knob key (by step of 1 dB).
- Select a time-delay of stability of the continuous signal of detection after being below the sound level (from 1s to 10s by step of 1s).



Conventional sound level meter and averaging-integrating with storage

- For **LpK** selection: the detection comes from the peak pressure level C or Z-weighted according to the measurement programming.
- For **L/leq** selection: the detection comes from the level of sound pressure LXY indicated under “**L**”

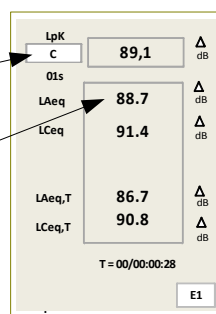


The sampling rate of the value is fixed at 16 Hz, that is a comparison to LXY threshold every 63 ms.



Integrating-averaging sound level meter with storage – A and C weighted

- For **LpK** selection: the detection comes from the peak pressure level
- For **L/leq** selection: the detection comes from the **LAeq** equivalent continuous level only



The comparison is made for each duration of elementary integration (from 1/16°s to 60s)

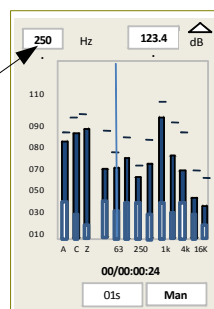


Integrating-averaging sound level meter – A and C weighted and analyzer by octave bands filters from 31.5Hz to 8 kHz with storage



Integrating-averaging sound level meter – A and C weighted and analyzer by third octave bands filters from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2) _ (option).

- For **LpK** selection: the detection comes from the peak pressure level
- For **L/leq** selection: the detection comes from the **LXeq** equivalent continuous level chosen in the selection of reading values



The comparison is made for each duration of elementary integration (from 1/16°s to 60s)

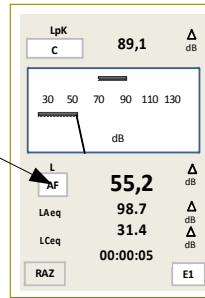
14.3.3 I/O 2 Out

It is the analog output 0-10VDC of the selected value **L/Leq** only, no peak pressure and concerns the **measurement modes below**.



Conventional sound level meter and averaging-integrating with storage

- For **L/leq** storage: DC output is for the level of sound pressure LXY indicated under “L”

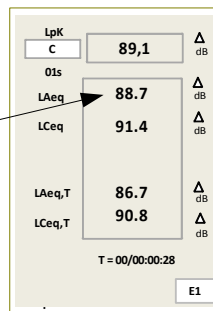


The sampling rate of output is fixed at 16 Hz, that is a DC value every 63 ms.



Integrating-averaging sound level meter with storage – A and C weighted

- No **LpK** selection possible
- For the **L/leq** selection: DC output corresponds to the **LAeq** equivalent continuous level only



DC output is for each duration of elementary integration (from 1/16°s to 60s)

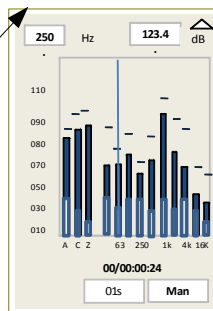


Integrating-averaging sound level meter – A and C weighted and analyser by octave bands filters from 31.5 Hz to 8 kHz with storage



Integrating-averaging sound level meter – A and C weighted and analyzer by third octave bands filters from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2) _ (option).

- No **LpK** selection possible
- For the **L/leq** selection: DC output corresponds to the LXeq equivalent continuous level chosen of the selection of reading values.



DC output is for each duration of elementary integration (from 1/16°s to 60s)

15 Technical features

15.1 Microphone and windscreen of the class 1 DB300 sound level meter

The instrument is equipped with an electret microphone with an integrated preamplifier of standardized diameter of ½ inch. Fixed at the top of the sound level meter, it gives to the group (microphone and housing) free field features compatible with standards.

15.1.1 Sheet

Brand: PCB - 377B02

Type: condenser with electret

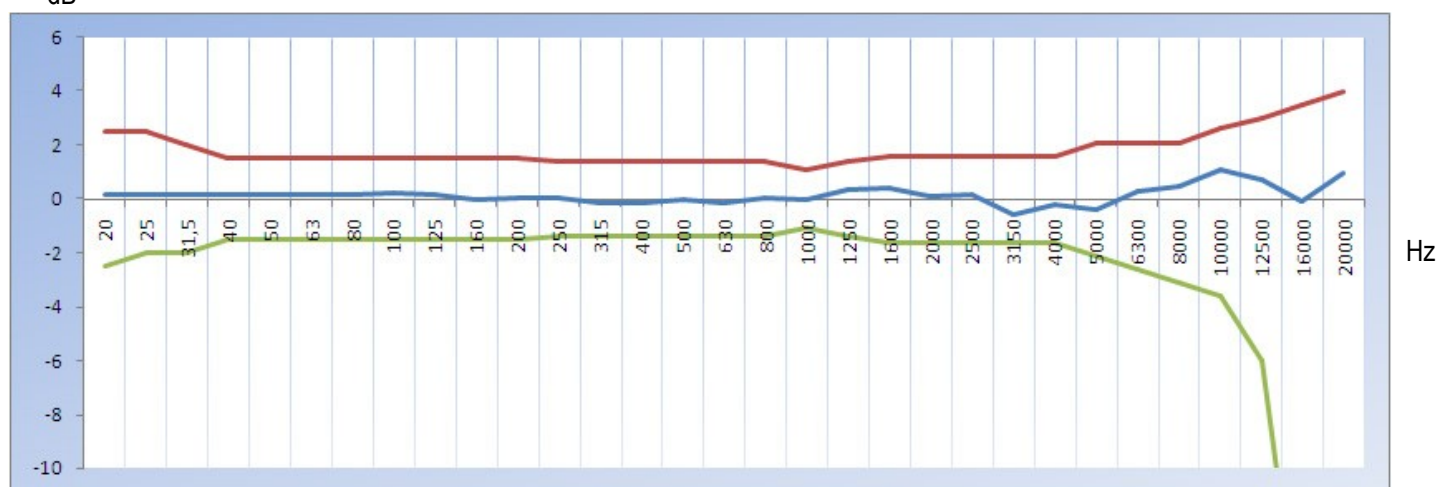
External diameter of the grid: 13.2 mm (½ inch)

Nominal sensitivity for preamplifier output: 45 mV/Pa

Equivalent capacity: about 12 pF

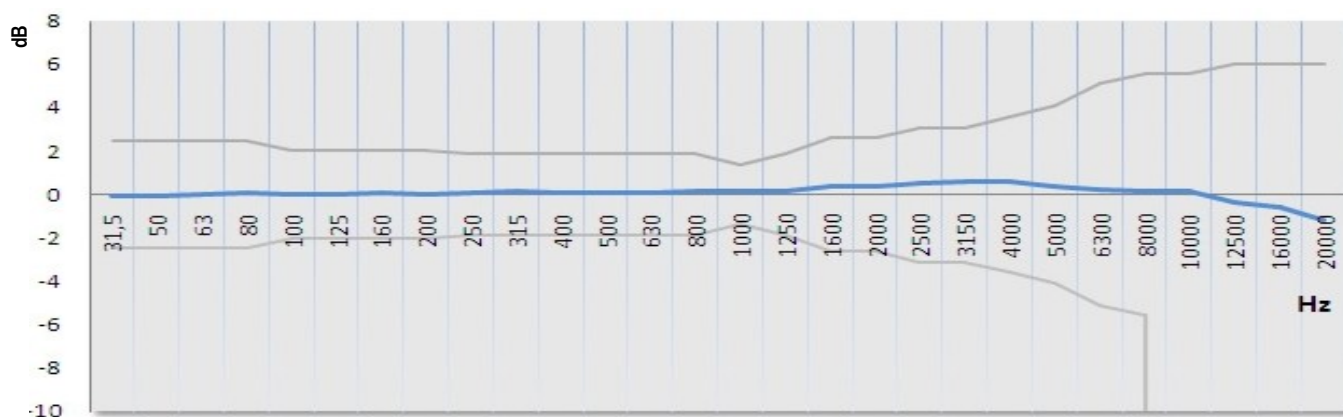
15.1.2 Normal frequency response in free-field

Free-field frequency response type – incidence 0 ° on the sound level meter housing - template class 1 NF EN 61672-1 dB



15.1.3 Windscreen

B-DB23 windscreen creates modifications of free field response that comes in addition to initial features of the microphone on the housing. The whole stays compliant to requirements class 1 reference standard. So, when using the windscreen, there is no need to take into account a correction term free field.



Free-field response microphone type +B-DB23 – template class 1 EN NF 61672-1

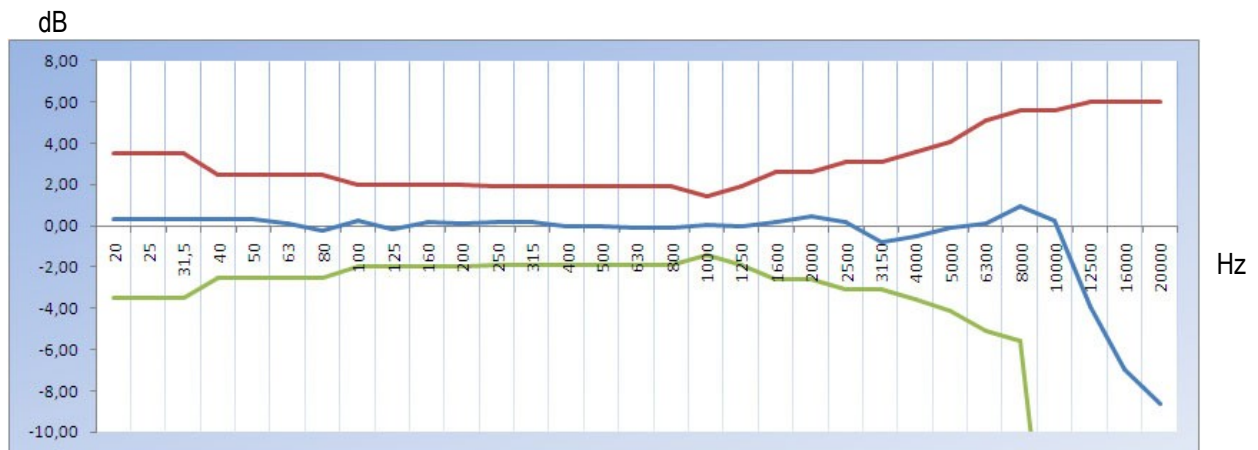
15.2 Microphone and windscreen of the class 2 DB300 sound level meter

15.2.1 Sheet

- Brand: KIMO - AME23
- Type: condenser with electret
- External diameter of the grid: 13.2 mm (½ inch)
- Nominal sensitivity for preamplifier output: 20mV/Pa
- Equivalent capacity: about 10pF

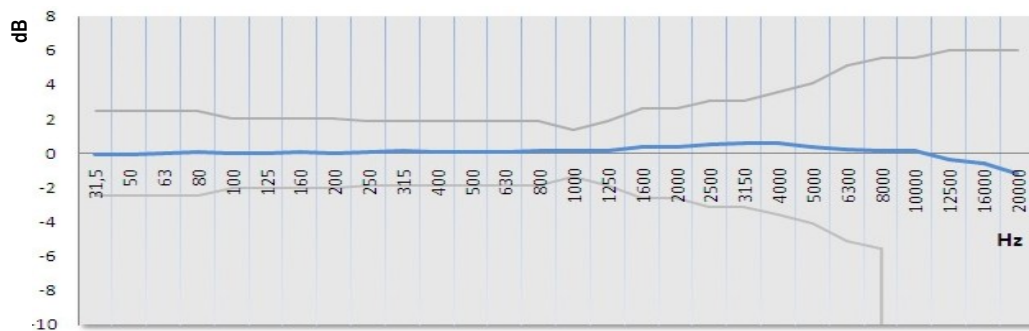
15.2.2 Normal frequency response in free-field

Free-field frequency response type – incidence 0 ° on the sound level meter housing - template class 2 NF EN 61672-1



15.2.3 Windscreen

B-DB23 windscreen creates modifications of free field response that comes in addition to initial features of the microphone on the housing. The whole stays compliant to requirements class 2 reference standard.



B-DB23 free field response – template class 2 NF EN 61672-1

15.3 Preamplifier PR23

The preamplifier is an essential system to adapt the microphonic sensor to the input electronic of the sound level meter.

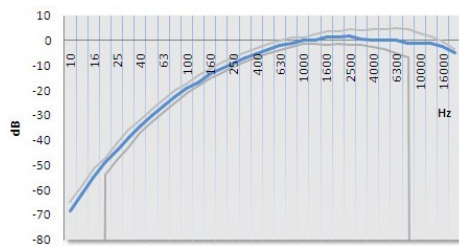
It is directly connected on the housing or through a cable of variable length (from 3 to 10 m in standard up to 100 m on request)

Features	Preamplifier PR23	Unit
Supply voltage	24	V
Supply current	<1	mA
Input resistance	>30	GΩ
Input capacitance	0,38	pF
Nominal gain	-0,01	dB
Bandwidth (-3 dB)	3-100 k	Hz
Bandwidth with extensions from 3 to 10 m (-3 dB)	3-22k	Hz
Noise (A-weighted)	<3	μV
Size: L - Diam	87	mm
Weight	< 55	gr

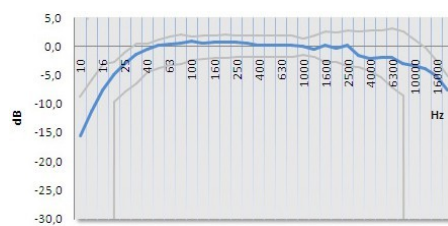
15.4 Class 1 A – C – Z weightings and free field response

The frequency response of the whole **microphone / windscreen / A, C or Z weightings (sound level meter)** is in compliance with standards in a given template according to the accuracy class of the instrument: **NF EN 61672-1 / class 1**.

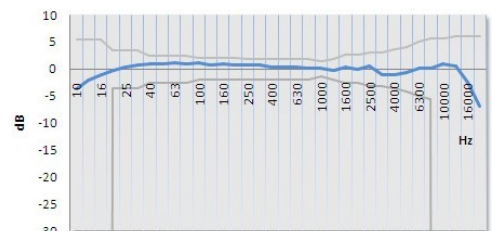
Plots types of free field sound level meter are given below:



Free-field response with A weighting
Template class 1 NF EN 61672-1



Free-field response with Z weighting (LIN)
Template class 1 NF EN 61672-1

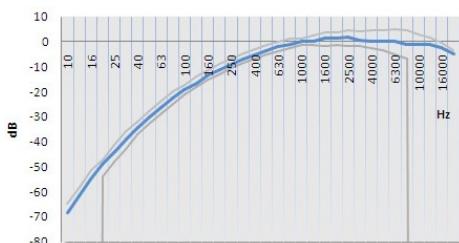


Free-field response with C weighting
Template class 1 NF EN 61672-1

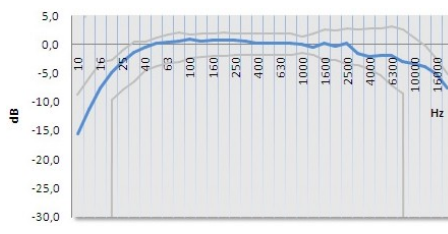
15.5 Class 2 A – C – Z weightings and free field response

The frequency response of the whole **microphone / windscreen / A, C or Z weightings (sound level meter)** is in compliance with standards in a given template according to the accuracy class of the instrument: **NF EN 61672-1 / class 2**.

Plots types of free field sound level meter are given below:



Free field response
with A weighting



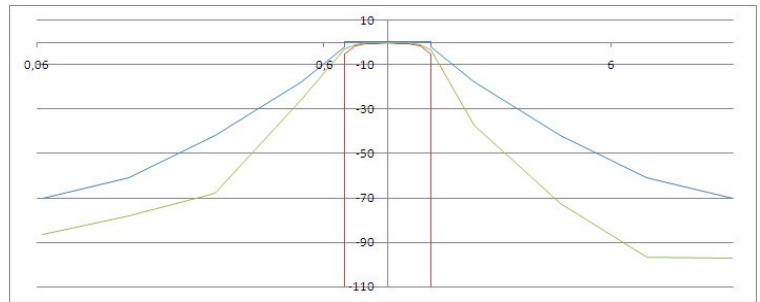
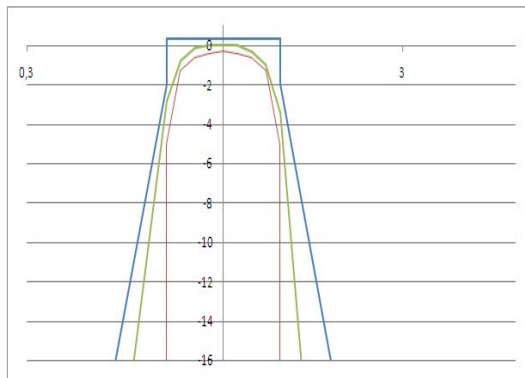
Free field response
with C weighting



Free field response
with Z weighting

15.6 Filters by octave bands: from 16 Hz to 16 kHz (class 1) and from 31.5 Hz to 8 kHz (class 2)

The sound level meter has filters to perform spectral analysis. These filters are in accordance with standards in a given template according to the accuracy class of the instrument: **CEI 61260 / class 1 and class 2**.



f/f_m

Relative response type of the filter by octave band as per CEI61260- template class 1 standard

15.7 Measured and displayed values

- Sound pressure level A and C frequency weighted and temporally weighted according to times constants Slow, Fast and Impulse. Ex: **LAF**
- Maximum sound pressure level A and C frequency weighted and temporally weighted according to times constants Slow, Fast and Impulse on a measurement duration. Ex: **LAFMax**
- Minimum sound pressure level A and C frequency weighted and temporally weighted according to times constants Slow, Fast and Impulse on a measurement duration. Ex: **LAFmin**
- Peak pressure level C or Z frequency weighted. Ex: **LCpK**
- Equivalent continuous level of sound pressure A, C or Z frequency weighted or filtered by octave bands from 31.5 Hz to 8 kHz on a T measurement duration.

Ex: **LXeq,T** or **LXT**

- Equivalent continuous level of sound pressure A, C or Z frequency weighted or filtered by octave bands from 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8 kHz (class 2) on a DI elementary measurement duration. Ex: **LXeq,DI**
- Equivalent continuous maximum level of sound pressure on a DI elementary measurement duration measured on the entire measurement. Ex: **LXeq,M**
- Equivalent continuous minimum level of sound pressure on a DI elementary measurement duration measured on the entire measurement. Ex: **LXeq,m**
- Exposure level to noise A, C or Z frequency weighted on a T measurement duration related to a reference duration of 1 s. Ex: **LAE**

Statistical indexes:

Definition: When the noise level is fluctuating, the distribution of the measured levels can be characterized by statistical indexes. These indexes are statistically calculated from the time evolution of the noise level measured on site. These levels correspond to the sound pressure level X weighted which is exceeded during N% of the considered time interval. It is noted LN.

Therefore, the L1 statistical index corresponds to the noise level exceeded during 1% of the time of observation, L50 during 50% of the time.

The calculated indexes are: **L01 – L10 – L50 – L90 – L95**

15.8 Metrology of the class 1 DB300

Main features

DB300/1 sound level meter	Conventional mode	Integrating-averaging mode
Electromagnetic compatibility – CE marking	As per 2004/108/CEE guideline and product standards	
Standards	NF EN 61672-1 (2003)- NF EN 60651 (1994) (1995)	NF EN 61672-1 (2003)- NF EN 60804 (2000) – CEI 61260 (1995)
Accuracy class	1	
Reference		
Pressure level	94dB	
Frequency	1000 Hz	
Caliber	20-137 dB	
Direction	0°: microphone axis	
Measuring range		
A-weighted	20-137 dB	
C-weighted	25-137 dB	
Z-weighted	25-137 dB	
Filters by octave bands	15-137 dB	
Peak channel measuring range	83-140 dB	
Resolution	0.1 dB	
Sound referred to input	Compatible with the linear range	
X frequency weightings	A – C – Z	
Filters by octave bands	16 Hz – 31.5Hz – 63Hz – 125Hz – 250Hz – 500Hz – 1kHz – 2 kHz – 4 kHz – 8 kHz – 16 kHz	
Filters by third octave bands (1/3) - option	12.5 Hz - 16 Hz - 20 Hz - 25 Hz – 31.5 Hz - 40 Hz - 50 Hz - 63 Hz - 80 Hz- 100 Hz - 125 Hz - 160 Hz - 200 Hz - 250 Hz - 315 Hz - 400 Hz - 500 Hz - 630 Hz - 800 Hz - 1 kHz – 1.25 kHz – 1.6 kHz - 2 kHz – 2.5 kHz – 3.15 kHz - 4 kHz - 5 kHz – 6.3 kHz - 8 kHz - 10 kHz – 12.5 kHz - 16 kHz - 20 kHz	
Y frequency weightings	Fast (F), Slow (S), Impulse (I)	
Overload indicator (min)	140.5 dB	
Adjustable elementary integration duration of the LXeq for storage		1/16 s,1/8 s,1/4 s,1/2 s,1 s, 2 s, 3 s, 5 s, 10 s, 15 s, 30 s, 60 s
Integration duration – Start/Stop (max) order		Unlimited
LXN statistical indexes	Calculation based on LXY or LXeq, DI stored data, rounded up to the next dB on a dynamic of 117 dB	
Clock accuracy	Better than 0.005 %	
Reference environment	23°C – 50% HR – 1013 hPa	
Operating environment	From -10°C to +50°C / 650 hPa at 1080 hPa / from 25% to 90% HR	
Storage temperature	From 0°C to +50°C	
Size (L x l x e)	270 x 70 x 40 mm	
Weight (battery include)	335 gr	
Fixing	Fixation on the back of the instrument for tripod	

15.9 Metrology of the class 2 DB300

Main features

DB300/2 sound level meter	Conventional mode	Integrating-averaging mode
Electromagnetic compatibility – CE marking	As per 2004/108/CEE guideline and product standards	
Standards	NF EN 61672-1 (2003)- NF EN 60651 (1994) (1995)	NF EN 61672-1 (2003)- NF EN 60804 (2000) – CEI 61260 (1995)
Accuracy class	2	
Reference		
Pressure level	94dB	
Frequency	1000 Hz	
Caliber	30-137 dB	
Direction	0°: microphone axis	
Measuring range		
A-weighted	30-137 dB	
C-weighted	35-137 dB	
Z-weighted	35-137 dB	
Filters by octave bands / third octave bands (option)	25-137 dB	
Peak channel measuring range	83-140 dB	
Resolution	0.1 dB	
Sound referred to input	Compatible with the linear range	
X frequency weightings	A – C – Z	
Filters by octave bands	31.5Hz – 63Hz – 125Hz – 250Hz – 500Hz – 1kHz – 2 kHz – 4 kHz – 8 kHz	
Filters by third octave bands (1/3) - option	25 Hz – 31.5 Hz - 40 Hz - 50 Hz - 63 Hz - 80 Hz- 100 Hz - 125 Hz - 160 Hz - 200 Hz - 250 Hz - 315 Hz - 400 Hz - 500 Hz - 630 Hz - 800 Hz - 1 kHz – 1.25 kHz – 1.6 kHz - 2 kHz – 2.5 kHz – 3.15 kHz - 4 kHz - 5 kHz – 6.3 kHz - 8 kHz - 10 kHz	
Y frequency weightings	Fast (F), Slow (S), Impulse (I)	
Overload indicator (min)	140.5 dB	
Adjustable elementary integration duration of the LXeq for storage		1/16 s, 1/8 s, 1/4 s, 1/2 s, 1 s, 2 s, 3 s, 5 s, 10 s, 15 s, 30 s, 60 s
Integration duration – Start/Stop (max) order		Unlimited
LXN statistical indexes		Calculation based on LXY or LXeq, DI stored data, rounded up to the next dB on a dynamic of 107 dB
Clock accuracy	Better than 0.005 %	
Reference environment	23°C – 50% HR – 1013 hPa	
Operating environment	From -10°C to +50°C / 650 hPa at 1080 hPa / from 25% to 90% HR	
Storage temperature	From 0°C to +50°C	
Size (L x l x e)	270 x 70 x 40 mm	
Weight (battery include)	335 gr	
Fixing	Fixation on the back of the instrument for tripod	

15.10 Plugs and connections

15.10.1 Removable preamplifier PR23

It is often indispensable to remove the preamplifier from the sound level meter to connect it on an extension.

The preamplifier is fixed on the sound level meter with a Push-pull mechanism.

This mechanical protection avoids any unexpected removal of the preamplifier or of the extension.



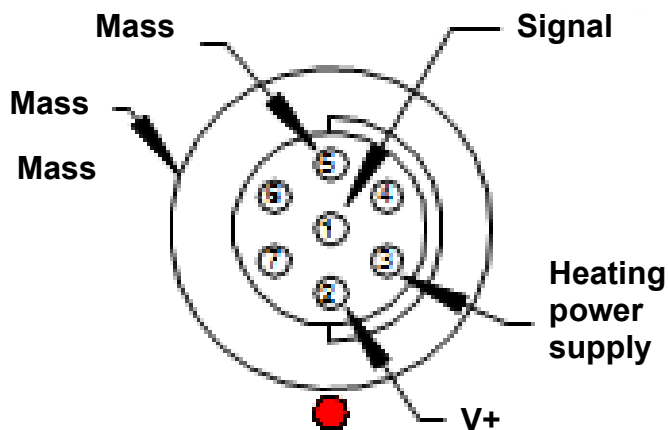
To remove the preamplifier, proceed as follows:

Do not turn or pull the body of the amplifier.



Take the black part between your thumb and forefinger and pull firmly.

To reintroduce the preamplifier, put it in position in the plug with the red mark positioned toward the back on the housing. Push in it:



Wiring of the input connection 7 points (on sound level meter)

1 – Signal

2 – V+ power supply: 24 Volts DC

3 – Heating power supply: Not active

4 – Not connected

5 – Power supply ground

6 – Not connected

7 – Not connected

Plug body: linked to the ground

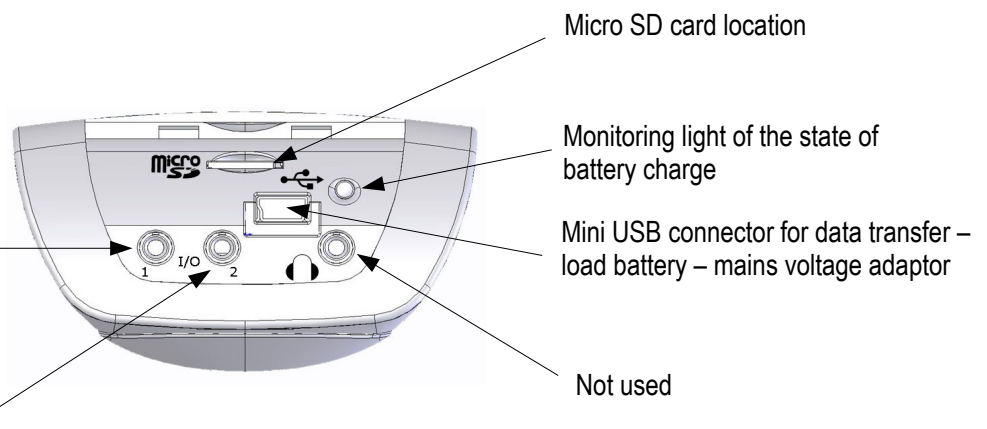
15.10.2 Plugs

Located under the breastplate in soft rubber, the different plugs and connections allow to:

- Communicate with external items: I/O interface
- Load the battery and/or power supply
- Access to the micro SD card

I/O 1 In : Input : allows the launching of a measurement
I/O 1 Out : Output : detection of levels

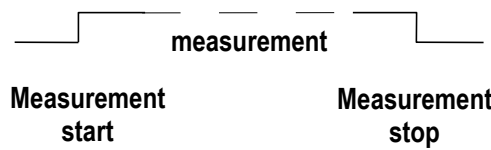
I/O 2 In : Input : not used
I/O 2 Out : Output : DC - 0-10V



15.10.3 I/O interface

I/O 1 In - input : start-stop control for measurement :

TTL level maximal 5V – input impedance > 15 k Ω – jack : 2,5 mm diameter



I/O 1 Out- output :to activate alarm - maintains high state after detecting a LX or planned LXeq level . Variable time selected from 1s to 10s by 1s steps.

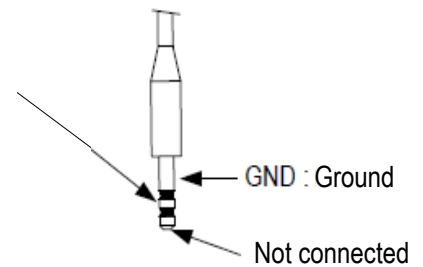
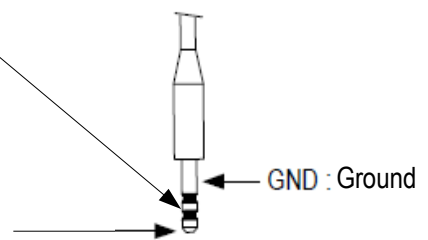
TTL level 3.3 V – input impedance < 100 Ω - jack : 2.5 mm diameter

I/O 2 Out : DC output : 0-10 Volts – input impedance < 100 Ω - jack : 2.5 mm diameter

Dynamic range : 0-137dB

Step : 0,073 mV/dB

Accuracy : ± 0.5 dB



15.10.4 Transfer plug / load / mains voltage adapter

This plug is for data transfer, battery load (optional) or power. It's a mini USB format.

- **Data transfer:** USB mode
- **Data Format:** proprietary
- **Mains supply – charger:** type universal USB format – ref: **AS-123**

PRI: 100V-240V-60/50Hz – 150 mA

SEC: 5V - 1000mA - 5VA

15.11 Memory and storage autonomy

- **Memory:** micro SD card. Storage capacity can be divided into **999 sessions**.
- **Minimum capacity:** micro SD Card – **2GB**

The opposite table shows the measurement duration (1 session) according to the logging time DI for the storage in **1/1 oct** mode.

Logging time DI	Maximum duration measurement (in hour)	Maximum duration measurement (in day)
1 s	3240	135
½ s	1620	67
¼ s	810	33
1/8 s	405	16
1/16 s	200	8

For logging times greater than 1s, the maximum measurement duration is related to the obtained result with 1 second:

EX: DI = 15 s Maximum measurement duration = 135 days x 15/1



In the event of a reset of the memory by the sound level meter or through the LDB23 software, all the memory is erased.

15.12 Audio recording capacity

The audio recording brings information to identify sources and the correspondence with the measured sound levels. It is characterized by a frequency sampling and an accuracy expressed in number of bits. The result is a certain recording capacity.

Sampling	Pre and post recording	Accuracy	Recording capacity (HH:MM:SS)
12 kHz	4 s	16 bits	00:45:00

15.13 Power and operating autonomy

Measurement autonomy linked to power supply are given for an operating at 20°C and with the backlight off. Beware of declining capacity of the battery or batteries for measurement at low temperature.

- **Batteries pack:** 3 alkaline batteries 1.5V – LR6/AA type

Autonomy (20°C): <8H in continuous

- **Battery:** rechargeable Li-Ion type: 3.7 V – 4400 mAh.

Caution: Li-Ion battery is a delicate element. Take care when manipulating or storing.

Autonomy (20°C): > 24H in continuous

- **Mains supply – charger:** type universal USB format – ref: AS-123

PRI: 100V – 240V - 60/50Hz – 150 mA

SEC: 5V - 1000mA - 5VA

Autonomy: unlimited, depending on memory capacity of the measurement (see table above).

Note: When a connection to a PC for data transfer, the USB computer delivers a voltage of 5V DC 500mA under.

This power supply has priority over the battery pack or battery that is recharged through this power supply.

16 Packaging and accessories

16.1 Supplied with

The sound level meter is supplied in its transport case with its microphone and preamplifier, a battery and a batteries pack (3 x LR6/AA), a USB charger, a windscreen, a USB cable, a CD-ROM with LDB23 software and user manuals. A calibration certificate is also supplied.

16.2 Optional

- Acoustic calibrator class 2: CAL200 - Acoustic calibrator class 1: **CAL300**
- Telescopic tripod: **PPCX**
- Jacks cables I/O interface: on request
- Extension for preamplifier: on request

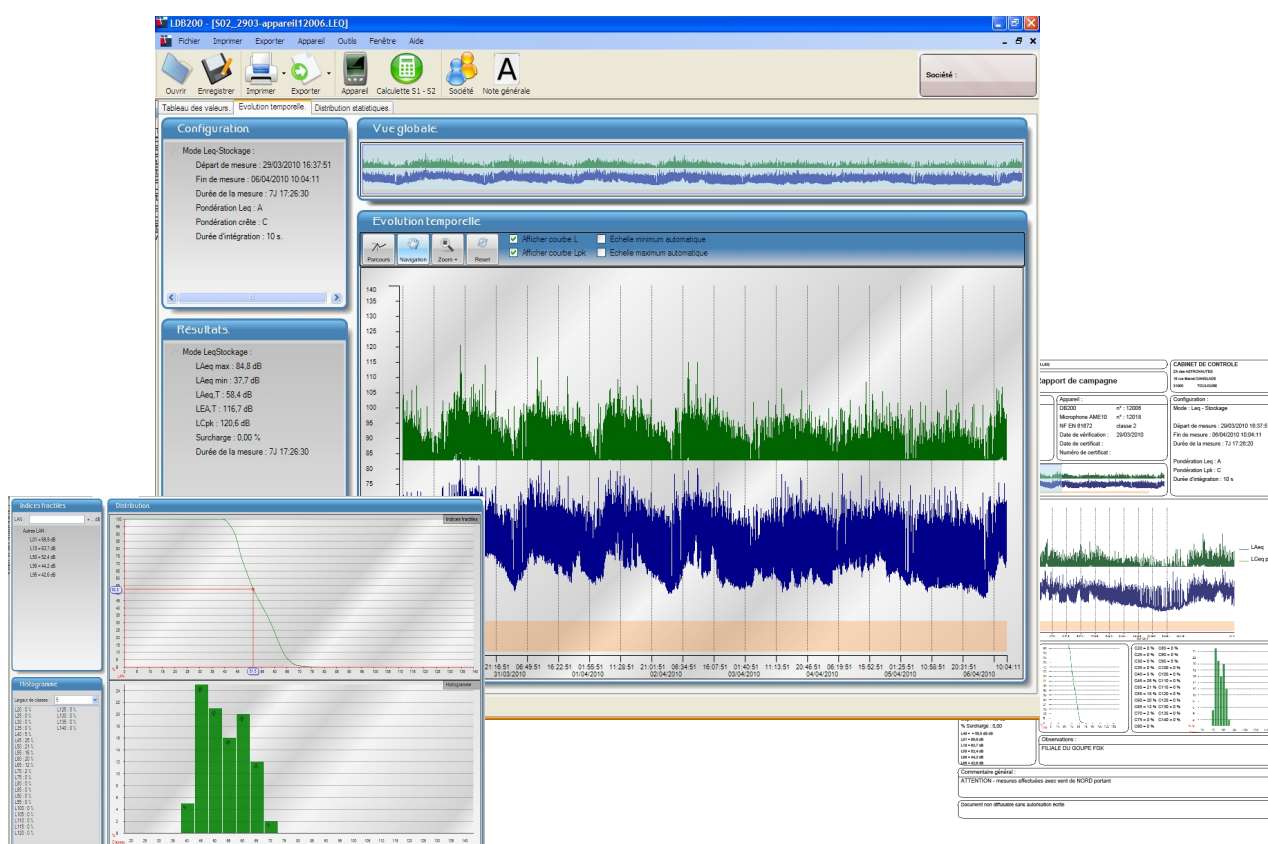
17 LDB23 software

Supplied with the sound level meter, **LDB200** software allows the configuration, data recovery and exploitation stored in the memory of the instrument.

Easy to use, it requires a smaller learning and allows immediate management of data.

Main functions:

- Visualization and results of the different measurement mode
- Zoom function for more detailed study of a period
- Statistical distribution of data
- Formatting and editing of measurement report.
- Data recovery and creation of text files.



18 Options

In complement of the five measurement modes in the device, **DB300** proposes optional modes and processing software which enlarge the user investigation domain.

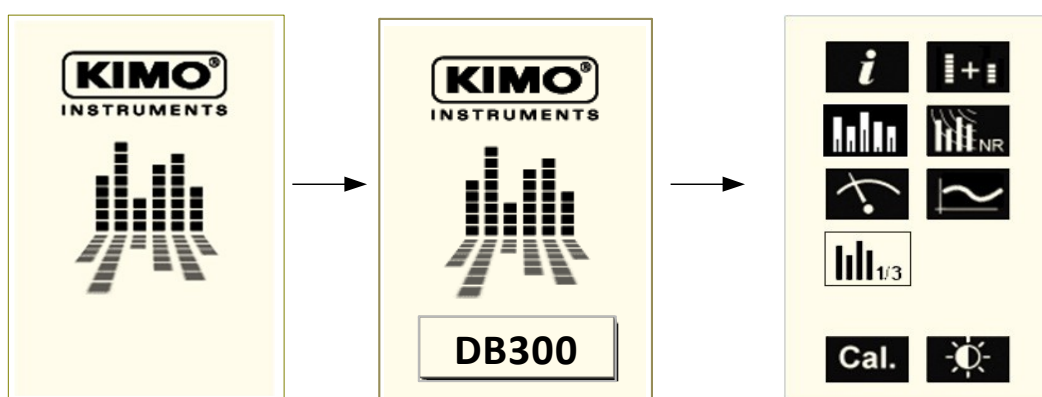
F-13: Analyzer – integrating averaging with storage sound level meter function – filters by third octave bands from 12,5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2)

The spectral analysis by filters of **third octave** bands enables a specific description of sound ambiance in industry, building and environment, in matter of marked tonalities.

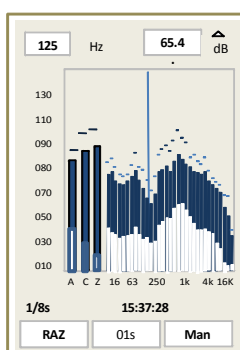
The operating principle of this mode is the same as the one integrating the filters by octave bands. For any use which is not detailed below, please see the following mode: **Analyzer – integrating averaging with storage sound level meter function – filters by octave bands from 16 Hz to 16 kHz (class 1) or from 31.5 Hz to 8 kHz (class 2).**

During operation: synoptic

- Press the On/Off button until the display of the start screen.
- Press OK after a time delay of a few seconds.



- Move the cursor on the corresponding icon to the filters by third octave bands analyzer mode which becomes video reversed, then **OK** on this area.



Analyzer with storage and filters
by third octave bands

- Press Esc to go back to the general screen.



18.1 Analyzer – integrating averaging with storage sound level meter function – filters by third octave bands: 1/3 octave

- Choose the **1/3 oct** mode: move the cursor with the arrows on the  icon then press **OK**.

The sound level meter works like a frequency analyzer, it treats the acoustic signal according to the temporal mode: on a T(D) measurement duration with data storage for each DI elementary integration time.

Measured and stored data for each integration time:

- **LAeq, DI**: continuous equivalent level of A weighted acoustic pressure on the elementary integration time.
- **LCeq, DI**: continuous equivalent level of C weighted acoustic pressure on the elementary integration time.
- **LXeq, DI**: continuous equivalent levels of acoustic pressure on the elementary integration time filtered by third octave bands from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2).
- **LUpk**: maximum peak level of acoustic pressure on the elementary integration time.
- Measurement duration expressed in **DD/HH:MM:SS**

Integration time

The data storage is carried out according to a DI elementary duration to choose among: **1/16 s, 1/8 s, 1/4 s, 1/2 s, 1 s, 2 s, 3 s, 5 s, 10 s, 15 s, 30 s, 60 s**.

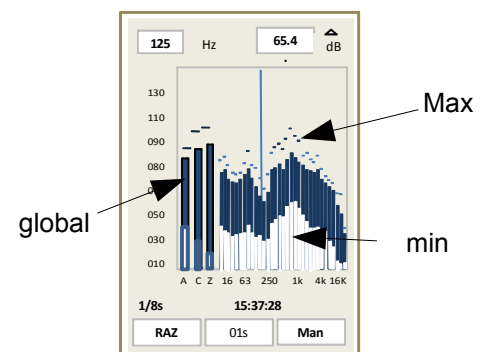
Read the values before launching the measurement:

In order to dispose of a permanent control of the acoustic pressure level before the real measurement launch, the sound level meter calculates and displays the continuous equivalent acoustic pressure level on an elementary integration time of **1/8 s**. The result in dB is displayed with a 2 times per second cadence and 8 times per second for the spectral graphical representation.

Different values are represented:

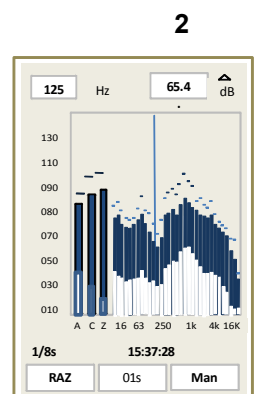
- by a horizontal line for the **max** level
- a full colored bar for the **global** level
- an empty bar for the **min** level

Graphical representation: the bars relative to the different filters by third octave bands are regrouped by octave bands areas.



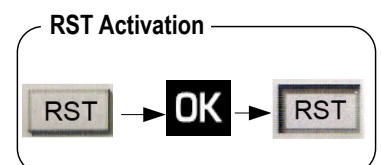
Read the values:

- Move the cursor in position **1** with the vertical arrows then choose with the scrolling knob key the weighting or filter value, the **LXeq, 1/8 s** result is displayed in box **2**.
A vertical line is moving on the screen and is overlapped on the bar corresponding with the weighting filter chosen in 1.
- or



To reset all of the graphical maximal and minimal representations:

- Press on the **OK** icon, the **RST (3)** function is activated, the different representations (line-full bar-empty bar) are reset to zero.



18.1.1 Settings before measurement

1 – Choose the DI elementary integration time:

- Put the cursor on box **1** and choose with the scrolling knob key among: **1/16 s, 1/8 s, 1/4 s, 1/2 s, 1 s, 2 s, 3 s, 5 s, 10 s, 15 s, 30 s, 60 s**.

2 – Choose the launch mode of measurement in **2** with the scrolling knob key among 3: **Man** (manual) – **Tim** (programmer) – **I/O** (through the I/O signal). For the Timer and I/O modes, see page 37.

Note: the current time is displayed before the measurement launch: 15:37:28 and the elementary integration time **1/8 s** for the calculation of the continuous equivalent level displayed for control.

18.1.2 Measurement launch

Measurement launch type: manual **Man**

In **manual** mode: press directly the  icon to launch the measurement with elementary data storage according to the integration time chosen (1 s for example), the chronometer starts and indicates the duration: for example 00/00:00:24

18.1.3 During measurement

During measurement, three screens inform on the current measurement. They are accessible through the scrolling knob key.

S1: is the main screen which displays the values and a spectral type graphical representation.

The different bars represent:

- **LAeq - LReq - Lzeq:** continuous equivalent levels of A,C, Z weighted acoustic pressure.
- **LXeq:** continuous equivalent levels of acoustic pressure filtered by third octave bands from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2).
- The **Measurement duration** expressed in DD/HH:MM:SS completes the display

Read the values:

- Put the cursor in position **1** with the arrows among **DI - global - Max - min**
- Move the cursor in position **2** with the vertical arrows then choose with the scrolling knob key the weighting or filter value and read the result displayed in box **3**.

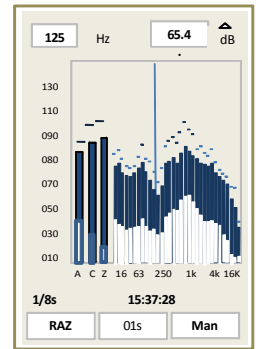
A vertical line is moving on the screen and is overlapped with the bar corresponding to the weighting filter chosen in 2.

or

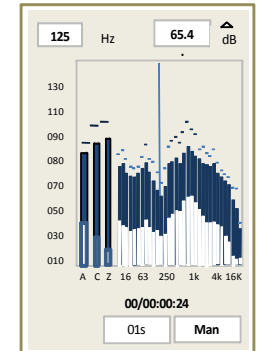
- Proceed the same way to read the different values according to the choice in 1: **DI - global - Max - min**
 - **DI:** weighted and filtered continuous equivalent levels for each DI elementary integration time (01 s for example)
 - **Global:** weighted and filtered continuous equivalent levels of the current measurement
 - **Max:** maximum weighted and filtered continuous equivalent levels reached since the measurement start (basis: DI elementary integration duration)
 - **min:** minimum weighted and filtered continuous equivalent exceeded since the measurement start (basis: DI elementary integration duration)

These different values are represented:

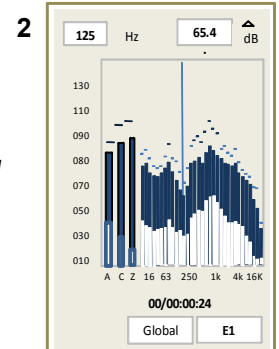
- by a horizontal line for the level **max**
- a full colored bar for the **global** level
- an empty bar for the **min** level



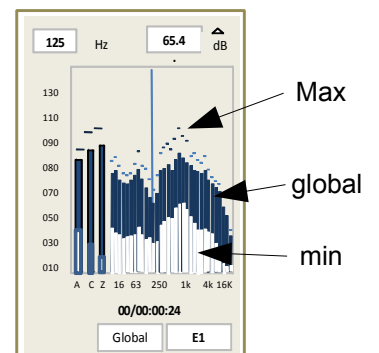
1 2



3



1



S2 / S3 / S4: these screens regroup the current magnitude results which will be stored in the memory at the end of the measurement. The filters by third octave from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10kHz (class 2) are listed on the three successive screens.

Note: The A,C, Z weighted values and LCpk peak pressure are kept at the top of each screen.

Screen	LCpkmax	LAeq	LCEq	LZeq
S2	101,3 dB	65,7 dB	68,4 dB	69,7 dB
S3	101,3 dB	65,7 dB	68,4 dB	69,7 dB
S4	101,3 dB	65,7 dB	68,4 dB	69,7 dB

1

- Read the different values according to the choice: **global – Max - min**
 - **Global:** weighted and filtered equivalent continuous levels of the current measurement.
 - **Max:** maximum weighted and filtered equivalent continuous levels reached since the measurement start (DI basis)
 - **min:** minimum weighted and filtered equivalent continuous levels reached since the measurement start (DI basis)

S5: this screen reminds the general format of the measurement session.

- Date of measurement start
- Date of measurement end: not informed because the measurement is still current
- Measurement duration: current
- 1/3 oct measurement mode: **Mode**
- Filters by third octave bands from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10kHz (class 2): **F**
- Elementary integration time for LReq: **DI**
- Frequency weighting of the peak pressure level: **Lpk**
- Audio record: **Audio**

18.1.4 Stop the measurement

- Stop the measurement by pressing the  icon.
- Confirm with **OK**.

The measurement really stops only after confirmation with **OK**.

Note: At the question **STOP?**, you can press the  Escape key to go back to the measurement screens and continue.

Note: You can not stop the measurement if the first elementary integration time is not achieved (ex: DI = 60 s). Pressing  stop is inoperative.

18.1.5 Store data

Same as the 1/1 octave mode operating: please see the chapter **Store data** page 29.

18.1.6 Read the file data in 1/3 octave mode

When the file is found by its identification number:

➤ Press **OK** to access the **S1** general screen which displays the measurement configuration:

- Date of measurement start
- Date of measurement end
- Measurement duration in **DD/HH:MM:SS**
- 1/3 oct measurement mode: **Mode**
- Filters by octave bands from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10kHz (class 2): **F**
- Elementary integration time for LXeq: **DI**
- Frequency weighting of the peak pressure level: **Lpk**
- Audio record activated or not: **Audio**

S2: main screen which displays the values and a spectral type graphical representation.

The different bars represent:

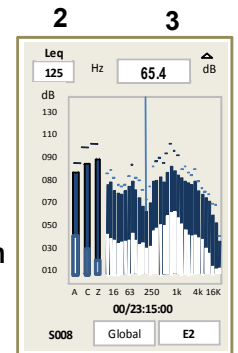
- **LAeq - LCeq - LZeq:** equivalent continuous levels of A, C, Z weighted acoustic pressure
- **LXeq:** equivalent continuous levels of acoustic pressure filtered by third octave bands from 12.5 Hz to 20 kHz
- The **Measurement duration** expressed in DD/HH:MM:SS completes the display

Read the values:

- Put the cursor in position **1** with the arrows and choose among **DI - global - Max - min**
- Move the cursor in position **2** with the vertical arrows then choose with the scrolling knob key the weighting or filter value and read the result display in box **3**.

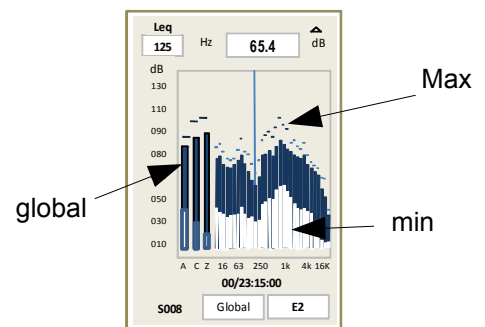
A vertical line is moving on the screen and is overlapped with the bar corresponding to the weighting or filter chosen in 2.

- Proceed the same way to read the different values according to the choice in 1: **DI - global - Max - min**
 - **DI:** weighted and filtered continuous equivalent levels for each DI elementary integration time (01 s for example)
 - **Global:** weighted and filtered continuous equivalent levels of the current measurement
 - **Max:** maximum weighted and filtered continuous equivalent levels reached since the measurement start (basis: DI elementary integration duration)
 - **min:** minimum weighted and filtered continuous equivalent exceeded since the measurement start (basis: DI elementary integration duration)



These different values are represented:

- by a horizontal line for the level **max**
- a full colored bar for the **global** level
- an empty bar for the **min** level



S3 / S4 / S5: these screens regroup the current magnitude results which will be stored in the memory at the end of the measurement. The filters by third octave from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10kHz (class 2) are listed on the three successive screens.

Note: The A,C, Z weighted values and LCpk peak pressure are kept at the top of each screen.

Screen	LCpkmax	LAeq	LCeq	LCeq
S3 (E3)	101,3 dB	65,7 dB	68,4 dB	69,7 dB
S4 (E4)	101,3 dB	65,7 dB	68,4 dB	69,7 dB
S5 (E5)	101,3 dB	65,7 dB	68,4 dB	69,7 dB

- Put the cursor in position **1** with the arrows and choose with the scrolling knob key among **DI - global - Max - min**
- Read the different values according to the choice: **global - Max - min**
 - **Global:** weighted and filtered equivalent continuous levels of the current measurement.
 - **Max:** maximum weighted and filtered equivalent continuous levels reached since the measurement start (DI basis)
 - **min:** minimum weighted and filtered equivalent continuous levels reached since the measurement start (DI basis)

S6: this screen reminds the general format of the measurement session.

- Date of measurement start
- Date of measurement end: not informed because the measurement is still current
- Measurement duration: current
- 1/3 oct measurement mode: **Mode**
- Filters by third octave bands from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10kHz (class 2): **F**
- Elementary integration time for LXeq: **DI**
- Frequency weighting of the peak pressure level: **Lpk**
- Audio record: **Audio**

15/05		13:15:45	
Départ	15/05	09:15	
Fin	-----		
Durée	-----		
Mode	1/3 oct.		
F	12.5Hz - 20kHz		
DI	1 s		
Lpk	C		
Audio	Non		
E5			

General synoptic: from 12.5 Hz to 20 kHz (class 1) or from 25 Hz to 10 kHz (class 2)

17/0513:15:45

Départ15/05 09:15

Fin16/05 08:30

Durée00/23:15:00

Mode1/3 oct.

F12.5Hz -20kHz

DI1 s

LpkC

AudioNon

S008

S008_1605.L23

OK

17/0513:15:45

Départ15/05 09:15

Fin16/05 08:30

Durée00/23:15:00

Mode1/3 oct.

F12.5Hz -20kHz

DI1 s

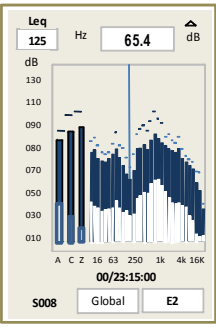
LpkC

AudioNon

S008

E1

S1 screen



S2 screen - global

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
12.5 Hz	54,6 dB
16 Hz	55,7 dB
20 Hz	54,4 dB
25 Hz	46,5 dB
31.5 Hz	42,7 dB
40 Hz	41,4 dB
50 Hz	43,5 dB
63 Hz	44,7 dB
80 Hz	43,4 dB
100 Hz	46,1 dB
125 Hz	54,4 dB

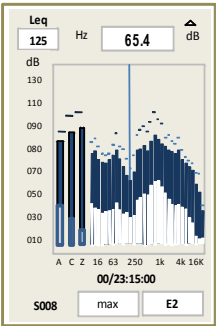
S3 screen - global

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
160 Hz	49,6 dB
200 Hz	51,7 dB
250 Hz	55,4 dB
315 Hz	58,5 dB
400 Hz	55,7 dB
500 Hz	57,4 dB
630 Hz	54,5 dB
800 Hz	46,7 dB
1.0 kHz	48,4 dB
1.25 kHz	51,1 dB
1.6 kHz	44,4 dB

S4 screen - global

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
2.0 kHz	41,6 dB
2.5 kHz	51,7 dB
3.15 kHz	48,4 dB
4 kHz	39,5 dB
5 kHz	35,7 dB
6.3 kHz	35,4 dB
8 kHz	35,5 dB
10 kHz	30,7 dB
12.5 kHz	24,4 dB
16 kHz	16,1 dB
20 kHz	13,4 dB

S5 screen - global



S2 screen - Max

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
12.5 Hz	54,6 dB
16 Hz	55,7 dB
20 Hz	54,4 dB
25 Hz	46,5 dB
31.5 Hz	42,7 dB
40 Hz	41,4 dB
50 Hz	43,5 dB
63 Hz	44,7 dB
80 Hz	43,4 dB
100 Hz	46,1 dB
125 Hz	54,4 dB

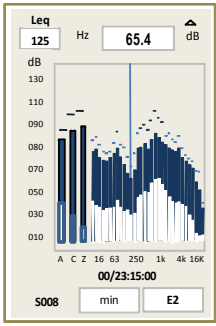
S3 screen - Max

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
160 Hz	49,6 dB
200 Hz	51,7 dB
250 Hz	55,4 dB
315 Hz	58,5 dB
400 Hz	55,7 dB
500 Hz	57,4 dB
630 Hz	54,5 dB
800 Hz	46,7 dB
1.0 kHz	48,4 dB
1.25 kHz	51,1 dB
1.6 kHz	44,4 dB

S4 screen - Max

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
2.0 kHz	41,6 dB
2.5 kHz	51,7 dB
3.15 kHz	48,4 dB
4 kHz	39,5 dB
5 kHz	35,7 dB
6.3 kHz	35,4 dB
8 kHz	35,5 dB
10 kHz	30,7 dB
12.5 kHz	24,4 dB
16 kHz	16,1 dB
20 kHz	13,4 dB

S5 screen - Max



S2 screen - min

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
12.5 Hz	54,6 dB
16 Hz	55,7 dB
20 Hz	54,4 dB
25 Hz	46,5 dB
31.5 Hz	42,7 dB
40 Hz	41,4 dB
50 Hz	43,5 dB
63 Hz	44,7 dB
80 Hz	43,4 dB
100 Hz	46,1 dB
125 Hz	54,4 dB

S3 screen - min

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
160 Hz	49,6 dB
200 Hz	51,7 dB
250 Hz	55,4 dB
315 Hz	58,5 dB
400 Hz	55,7 dB
500 Hz	57,4 dB
630 Hz	54,5 dB
800 Hz	46,7 dB
1.0 kHz	48,4 dB
1.25 kHz	51,1 dB
1.6 kHz	44,4 dB

S4 screen - min

LCpkmax	101,3 dB ▲
LAeq	65,7 dB
LCeq	68,4 dB
LZeq	69,7 dB
2.0 kHz	41,6 dB
2.5 kHz	51,7 dB
3.15 kHz	48,4 dB
4 kHz	39,5 dB
5 kHz	35,7 dB
6.3 kHz	35,4 dB
8 kHz	35,5 dB
10 kHz	30,7 dB
12.5 kHz	24,4 dB
16 kHz	16,1 dB
20 kHz	13,4 dB

S5 screen - min

Press **Esc** to quit this file and go back to the general screen of file choice



17/0513:15:45

Départ15/05 09:15

Fin16/05 08:30

Durée00/23:15:00

Mode1/3 oct.

F12.5Hz -20kHz

DI1 s

LpkC

AudioNon

S008

S008_1605.L23

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