

## 4. MEASUREMENT FUNCTIONS OF THE INSTRUMENT

The **SVAN 943** is a unique pocket instrument combining functions of a **sound level meter** (SLM), with the Type 2 accuracy (according to IEC 651, IEC 804 and IEC 61672-1 standards), **1/1 OCTAVE** and **1/3 OCTAVE** real time analyser in which in parallel operate the digital pass-band filters. The values of the central frequencies of these filters are defined in the sequence conforming to the base two system. All 1/1 octave & 1/3 octave filters are Type 1 (according to IEC 1260 standard). The instrument can also be used as a **dose meter**.

Thanks to the application of the state of the art in the digital signal processing in the instrument work in parallel **three independent sound level meters, so-called here profiles**, which perform the measurement of the acoustic signal with the selectable combination of **A, C** or **LIN (Z)** weighting filters (conforming to IEC 61672-1 standard) and **SLOW, FAST** or **IMPULSE** RMS detectors. **1/1 OCTAVE or 1/3 OCTAVE analyser can work simultaneously with the mentioned above profiles.**

The measurement of **SPL, LEQ, SEL, Ltm3, Ltm5, PEAK, MAX, MIN, statistics (LN)** and **time history** are performed simultaneously in all profiles (cf. Appendix D for the definitions). In the case when the SVAN 943 is used as a **DOSE METER** some additional quantities are measured, namely: **DOSE, D\_8h, LAV, SEL8, E, E\_8h, LEPd** and **PSEL**.

The measurement results can be presented on the display of the instrument in the different modes depending on the selected function and the setting of the parameters. In the case of the sound level meter or the dose meter the following display modes (the ways of the measurement results presentation) are available:

- One Profile, **3 PROFILES, STATISTICS** and **PLOT**.
- In the case of **1/1 OCTAVE & 1/3 OCTAVE analysis** the possibility of the spectra presentation is also available (**SPECTRUM** mode).
- The **selection of the display mode** is made by pressing the **<ENTER>** push-button.
- The **switching between the profiles** is possible by pressing the **<ENTER>** and **<SHIFT>** push-buttons (**<ESC>**).
- The **switching between the results in the selected profile** is made by pressing the **<◀>**, **<▶>** push-buttons (in One Profile or **3 PROFILES**).
- The **changing of the statistics class, 1/1 octave or 1/3 octave filter** and the **value in the buffer** is done by pressing the **<◀>**, **<▶>** push-buttons (in **STATISTICS, SPECTRUM** and **PLOT**).
- The pressing of the **<◀>**, **<▶>** together with **<SHIFT>** push-button enables the user to **change the relation between the vertical and horizontal axis** for the **SPECTRUM** and **PLOT** presentations and to **change the statistics class** in One Profile or **3 PROFILES** presentation.
- The pressing of the **<INPUT>** and **<FILE>** push-button enables the user to see the spectra registered in the buffer's file of the instrument.

The acoustic measurement channel consists of the instrument, the preamplifier SV 11 and the microphone. This channel is factory calibrated and prepared for the work in the standard environmental conditions. The calibration of the measurement channel has to be done when the absolute sound pressure level value is important. It is because the microphone sensitivity is a function of the temperature, ambient pressure and humidity. The calibration procedure is described in Chapter 4.1.

The main function of the instrument is the **measurement of sound level. 1/1 OCTAVE or 1/3 OCTAVE** analysis and the dose meter are the optional functions, which broaden the applications of the instrument. They can be supported by the producer or purchased later. The producer activates the optional functions bought with the instrument. The user should activate the functions purchased later. The way of this activation is presented in Chapter 4.3.

The detailed description of the usage of the instrument to:

- **The calibration of the measurement channel** is shown in **Chapter 4.1**.
- **The measurement of sound level** is given in **Chapter 4.2**.
- **1/1 OCTAVE analysis** is presented in **Chapter 4.4**.
- **1/3 OCTAVE analysis** is discussed in **Chapter 4.5**.
- **The setting of the dose meter parameters** is described in **Chapter 4.6**.

The additional functions of the instrument, namely: the available modes of the measurement results presentation (the **DISPLAY** window), the settings (the **SETUP** window), the storing of the measurement results (the **FILE** window) and the printing of the reports (the **REPORT** window), are described in Chapter 5.

## 4.1. CALIBRATION

The instrument is factory calibrated with the supplied microphone for the standard environmental conditions. The microphone sensitivity is a function of the temperature, ambient pressure and humidity. If the absolute sound pressure level value is important, the calibration of the measurement channel has to be done. In order to select a calibration function the user has to enter the *FUNCTION* window by pressing the <FUNC> push-button (the <DISPLAY> in conjunction with the <SHIFT> one). This window contains two sub-windows: **FUNCTION** and **CALIBRATION**. Next, the user has to open the **CALIBRATION** sub-window (one has to select the **CALIBRATION** text using the <◀>, <▶> push-buttons and press the <ENTER> push-button when this text is displayed inversely).



The view of the displays with the *FUNCTION* window and after entering the *CALIBRATION* sub-window

### Calibration procedure of the instrument

The calibration for the sound measurements can be done in the following way:

1. Attach the SV 30 acoustic calibrator (or equivalent 94 dB / 1000 Hz) to the instrument's microphone. In the case of the SV 30 one has to use the special adaptor for the reduction of the diameter from 1/2" to 1/4".



**Notice:** It is also possible to use the pistonphone, which generates the signal ca 124 dB or different type of acoustic calibrator dedicated for 1/4" microphones. **In any case, before starting the calibration measurement, the user has to set (by means of the <◀>, <▶> push-buttons) the level of the signal generated by the given calibrator (CAL. LEVEL position of CALIBRATION sub-window), which is usually stated in the calibration certificate of the unit (the value of the CAL. LEVEL set by the producer of SVAN 943 is equal to 94.0 dB).**

2. Switch on the calibrator and wait ca 30 seconds before starting the calibration measurement.
3. Start the calibration measurement by pressing the <ST/SP> push-button (the <PAUSE> in conjunction with the <SHIFT>). The measurement time is set to 5 seconds with 5 seconds delay. During the calibration measurement the <ESC> push-button does not operate but it is possible to stop the measurement using the <ST/SP> push-button.



The view of the displays during the calibration measurement

Waiting for the start of the measurements the **DELAY** is counted down on the display and the **CALIBRATION** text is changing (from big letters to small and vice versa). During the measurements the **cal. measure** text is changing. After the end of the measurement its result is presented on the display in the bottom line.

It is recommended to repeat the calibration measurement few times. The obtained results should be almost the same (with  $\pm 0.1$  dB difference). The reasons for the unstable results are as follows:

- the calibrator is not properly attached to the instrument,
- there are external disturbances,
- the calibrator or the measurement channel (the microphone, the preamplifier or the instrument itself) are damaged.



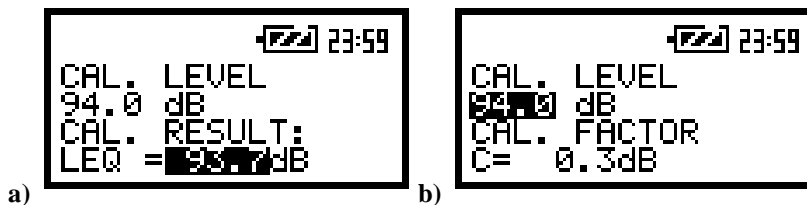
**Notice:** During the calibration measurement the external disturbances (acoustic noise or vibrations) should not exceed the value of 100 dB.

4. Press the **<ENTER>** push-button in order to accept the measurement result.

After pressing the **<ENTER>** push-button the calibration factor is calculated, stored and displayed (cf. next Figure).



**Notice:** The user has to press the **<ESC>** push-button (the **<SHIFT>** with the **<ENTER>**) in order to quit the calibration procedure without saving the calibration factor.



The display after the measurements (a) and after the acceptance of the value of the calibration factor (b)

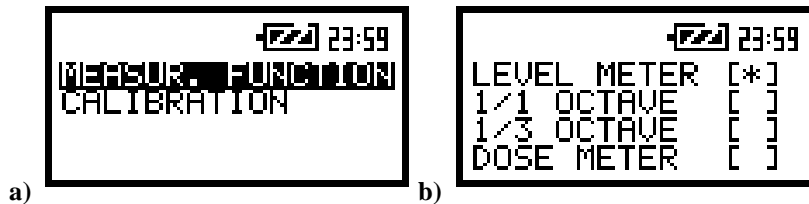


**Notice:** The calibration factor is always added to the results of the sound level meter (SLM), dose meter and 1/1 OCTAVE & 1/3 OCTAVE analysis.

## 4.2. SOUND LEVEL METER

The **SOUND LEVEL METER mode** provides the user with the functions of the **SLM** meeting the IEC 651, IEC 804 and IEC 61672-1 standards for the Type 1 accuracy. Using the measurement results logged in the huge buffer the instrument can also be used for the long-term acoustic monitoring.

In order to select the **SLM** mode the user has to enter the **FUNCTION** window by pressing the **<FUNC>** push-button (the **<DISPLAY>** in conjunction with the **<SHIFT>**). This window contains two sub-windows: **MEASUREMENT FUNCTION** and **CALIBRATION**. The user has to open next the **MEASUREMENT FUNCTION** sub-window (to select the **MEASUR. FUNCTION** text using the **<◀>**, **<▶>** push-buttons and press the **<ENTER>** push-button when this text is displayed inversely).



The view of the displays with the **FUNCTION** window opened (a) and after entering the **MEASUREMENT FUNCTION** sub-window (b)

The **SLM** mode is selected by placing the special character in the line with the **LEVEL METER** text. The position of the character can be changed using the **<◀>**, **<▶>** push-buttons. After placing the character in the line with the **LEVEL METER** text the user has to press the **<ENTER>** push-button. This operation closes the **MEASUREMENT FUNCTION** sub-window.



**Notice:** It is not possible to change the mode during the measurements. The instrument displays in this case for about 3 seconds the text: “**measurement in progress / MEASUREMENT IN PROGRESS**”. In order to change the mode of the instrument the measurement must be finished!

The operation in **one measurement RANGE** from **26 dBA<sub>RMS</sub>** to **133.5 dBA<sub>RMS</sub>** (**136.5 dB<sub>PEAK</sub>**) is the main distinguishing feature of the **SLM mode** of the instrument (for 1/4” electret microphone with the sensitivity of 50 mV/Pa supplied with the unit).

The second distinguishing feature of the instrument is that **sound is always measured in three parallel “profiles” which are in fact three separate sound level meters working independently.**



**Notice:** **SOUND LEVEL METER** is the main mode of the instrument. In the **SLM** mode there is no access to **1/1 OCTAVE** or **1/3 OCTAVE** analysis.




For each of the profiles the **RMS detector type** and the **weighting filter** can be defined **independently** (see the **INPUT** window).

The “main results” of the profiles are presented on the display in the form described below. For each profile the selected result is displayed on the left side followed by its value, unit, the type of the weighting filter and the type of the detector. The usage of the weighting filter selected for the given profile is indicated as follows:

- the usage of **A** weighting filter is indicated by **A** letter,
- the usage of **C** weighting filter is indicated by **C** letter,
- the usage of **LIN** weighting filter is indicated by the space character.

The **RMS detector type** (selected for each of three profiles) is indicated by the proper letter (in one profile display mode) or by the proper text (in **3 PROFILES** display mode):


- the **SLOW** type RMS detector is indicated by the **S** letter or the **SLOW** text,
- the **FAST** type RMS detector is indicated by the **F** letter or the **FAST** text,
- the **IMPULSE** type RMS detector is indicated by the **I** letter or the **IMP.** text.

 23:59		 23:59		 23:59	
PEAK	67.1dB A	PEAK	67.1dB A	PEAK	67.1dB A
LEQ	50.3dB C	LEQ	50.3dB C	LEQ	50.3dB C
SPL	81.7dB S	SPL	81.7dB S	SPL	81.7dB S

The view of the instrument's displays in 3 PROFILES display mode

For each of the profiles (three independent measurement modules) the following results are measured in parallel (see Appendix D for the definitions):

- **PEAK**,
- **MAX**,
- **MIN**,
- **SPL** (the displayed **SPL** value is the biggest measured result for the selected RMS detector **over the last second** of the measurement),
- **LEQ**,
- **SEL**,
- **Ltm3**,
- **Ltm5**,
- **LN** selected by the user statistics class (where N is from 1 to 99),
- **Current measurement time** (this time is available in the result's field only in **3 PROFILES** display mode).

 23:59	
TIME	00:00:01
SPL	95.8dB C I
Ltm3	90.3dB S

The view of the instrument's display in 3 PROFILES display mode with the current measurement time



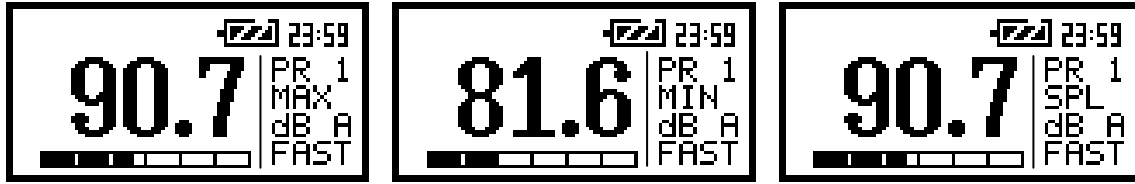
**Notice:** Switching between the profiles is possible by pressing the **<ESC>** push-button (**<ENTER>** together with **<SHIFT>**). Switching between the results for the selected profile is made by pressing only the **<◀>**, **<▶>** push-buttons. In order to change the **N** in statistical level the user has to press the **<◀>**, **<▶>** push-buttons together with the **<SHIFT>** one.

By pressing the **<ENTER>** push-button the user can switch the display mode (the way of the measurement results presentation) to:

- One Profile,
- **3 PROFILES**,
- **STATISTICS**,
- **PLOT**.

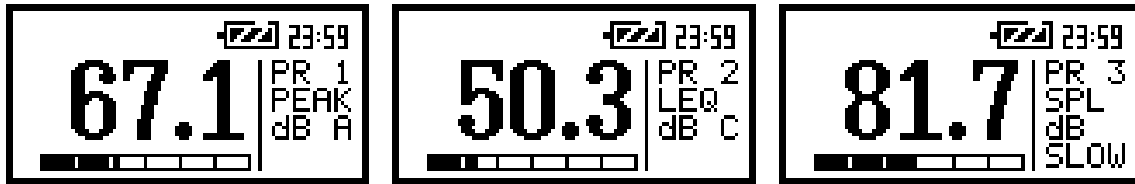
In the case when the results of the measurement from each profile were stored in the files of the buffer; the number of the profile is displayed along with the name of the result, i.e. **PEAK1**, **MAX 2**, **RMS 3**, etc. In this case each pressing of the **<ENTER>** push-button causes the change not only the change of the display mode but also - in the **PLOT** mode - the change of the profile. So, after each pressing of the **<ENTER>** push-button one can observe on the display the following sequence of the results: one profile, **3 PROFILES**, **STAT1**, **PEAK1**, **MAX 2**, **RMS 3**, one profile, etc.





The view of the displays in one profile presentation; the switching between the results in a profile

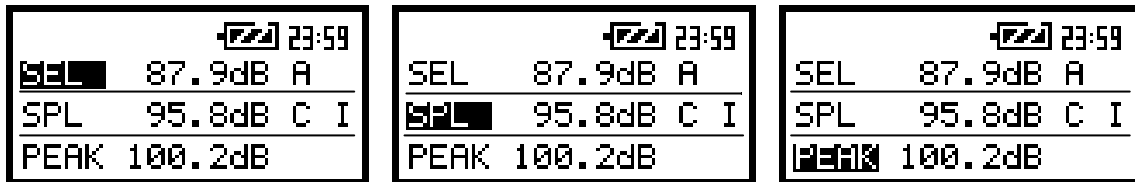
The change of the profile is achieved by pressing the <ESC> push-button (<ENTER> together with <SHIFT>). The selection of the statistical level number needs in this presentation mode pressing the <◀>, <▶> push-buttons together with the <SHIFT> one.



The view of the displays in one profile presentation – the changing of the profiles

### 3 PROFILES mode of the measurement results presentation

In 3 PROFILES mode of result's presentation the selected results from each profile are displayed in three consecutive lines. In each line the name of the measurement result, its value, the weighting filter in the profile and the detector time constant are presented. The profiles are separated by two straight horizontal lines. These line are dotted in other modes than sound level meter.

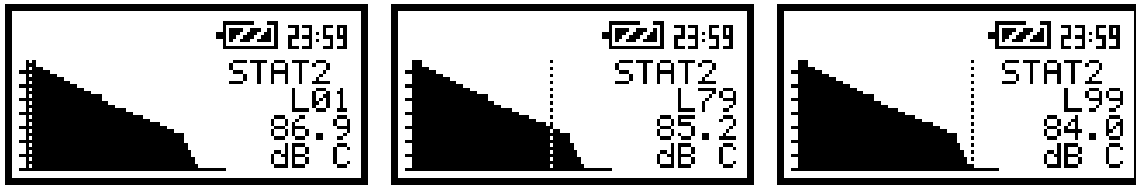


The view of the displays in 3 PROFILES presentation in the SLM mode– the changing of the profiles

The change of the active profile (this in which the name is displayed inversely) is performed by means of the <ESC> push-button (<ENTER> together with <SHIFT>). The switching between the simultaneously calculated results is performed by means of the of the <◀>, <▶> push-buttons. The selection of the statistical level number needs in this presentation mode pressing the <◀>, <▶> push-buttons together with the <SHIFT> one.

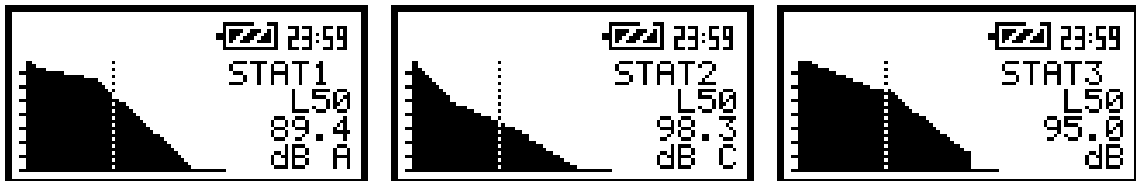
### Presentation of the statistical analysis results – STATISTICS

In the STATISTICS presentation all LN (from N = 1 up to N = 99) values for the selected profile are presented. The read-out of the interested LN value can be done using the cursor controlled by the <◀>, <▶> push-buttons. In this way of presentation the selected profile's number, the statistics class, its value and units are given on the right side of the display.



The view of the displays in STATISTICS mode of presentation; the change of the cursor position in an active profile

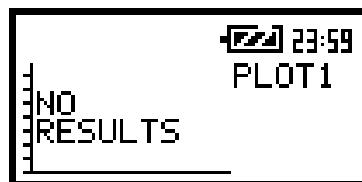
The active profile can be changed in this mode by pressing the <ESC> push-button. The position of the cursor remains in the same position with the change of the profiles.



The view of the displays in STATISTICS mode of presentation; the change of the active profile

### **Presentation of time history – PLOT**

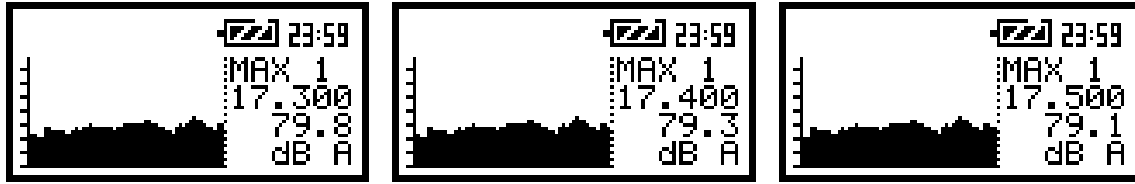
The **PLOT** mode of results presentation is available if data from at least one profile are logged in the buffer's file. If the **PLOT** option is switched on ([✓]) but there was nothing stored in the buffer's file (in the selected profile there was **BUFFER:None** instead of **PEAK**, **MAX**, **MIN** or **RMS**) the **NO RESULTS** text is displayed after the first input to this mode (see Figure below). When the **PLOT** is selected as active and the **BUFFER:None** for all profiles is set, the **PLOT** mode of results presentation is skipped.



The view of the display in the PLOT mode when there is nothing in the buffer to be displayed (after setting PLOT as active)

In the **PLOT** presentation the results logged in the file of the buffer of the instrument are also given on the display in the time history form. Each line corresponds to one measurement result (the results are registered with the step set in the **BUF. STEP** option of the **MEASURE SETUP** window). There are 62 lines presented on the screen with the dynamics not greater than 80 dB.

The read-out of the interested value can be done using the cursor controlled by the <◀>, <▶> push-buttons. The selected profile's number, time of the measurement and the measured result with its unit are presented on the right side of the display. Each new measurement result saved in the file of the buffer during the **PLOT** mode shifts the cursor position to the right. When the cursor achieved the right limit of the screen, new measurement results appears on the right end of the screen and the results from  $63 \cdot \text{BUF. STEP}$  disappears from the left end of the screen. It looks like the movement of the presentation to the left. The screen is updated every **BUF. STEP** time for the **BUF. STEP** greater than or equal to 1 second and every second for the **BUF. STEP** smaller than 1 second.



The displays in the PLOT presentation mode; the overview of the values later stored in the buffer

After finishing the registration it is possible to overview all saved results. For this reason the cursor has to be placed to the left or right limit of the presentation. Each pressing of the <◀>, <▶> push-buttons results in the appearing of the screen, respectively - the earlier or later value. The whole presented time history is shifted one position to the right (or to the left).



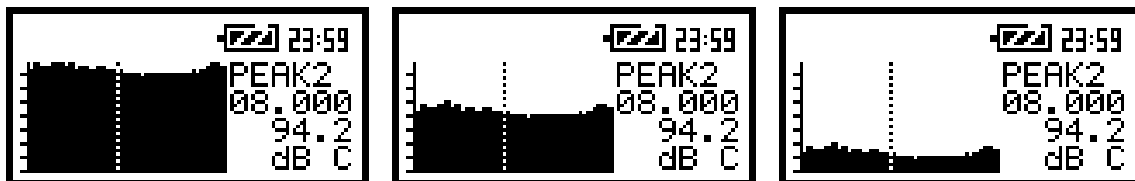
The displays in the PLOT presentation mode; the overview of the values earlier stored in the buffer

If in each profile a selected result is saved, in order to view time history in all profiles the user has to press the <ENTER> push-buttons.



The displays in the PLOT presentation mode; the change of the profile

In the PLOT it is possible to shift the horizontal axis in relation to the vertical one using the <◀>, <▶> push-buttons together with the <SHIFT> one. Each pressing of the <◀> push-button together with the <SHIFT> one results in 10 dB shifting down of the presentation and each pressing of the <▶> push-buttons together with the <SHIFT> one - 10 dB shifting up.



The view of the screens in the PLOT presentation mode with the shifted axes



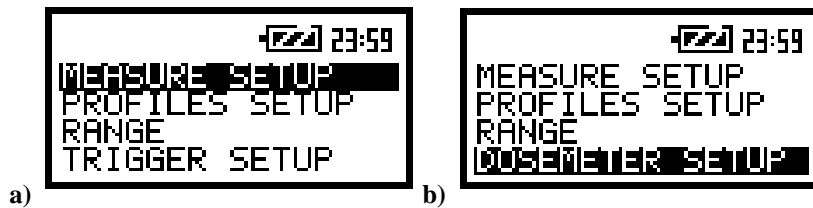
**Notice:** In the buffer many time histories can be stored, registered during the measurements. The user can select for the presentation the required time history in the **BUFFER VIEW** window available in the **DISPLAY** window (see Chapter 5 for details).

### 4.2.1. Measurement parameters setting

The important parameters for the measurement are programmed by means of the *INPUT* and *SETUP* windows.

#### *Measurement parameters setting – INPUT window*

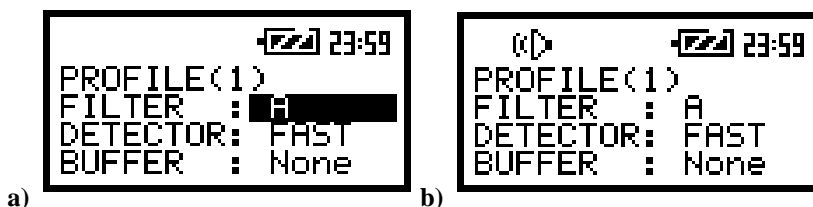
Setting of the profiles parameters can be done by means of the *INPUT* window after pressing the **<INPUT>** push-button. This window enables one the independent programming of the measurement parameters (**MEASURE SETUP** window), the parameters of three profiles and 1/1 OCTAVE & 1/3 OCTAVE analysis (**PROFILES SETUP** window), common for all profiles setting of the input range (**RANGE** window) and the trigger function (**TRIGGER SETUP** window). In the case of the **DOSE METER** mode the **DOSEMETER SETUP** window is displayed instead of the **TRIGGER SETUP** one.



The view of the displays with the *INPUT* window opened in the SLM, 1/1 OCTAVE and 1/3 OCTAVE modes (a) and in the DOSE METER mode (b)



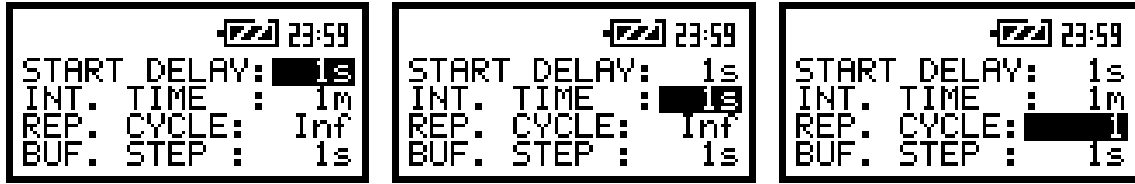
**Notice:** Any parameter in the *INPUT* window can be changed only when the instrument does not execute a measurement. The possibility of a change is signalled by displaying inversely a parameter's field. And in opposite, normally displayed field means that the parameter cannot be changed. The "Loudspeaker" icon indicates that the instrument is performing the measurements.



The view of the display with the active (a) and not active (b) the PROFILE x sub-window

#### *Selection of measurement parameters – MEASURE SETUP window*

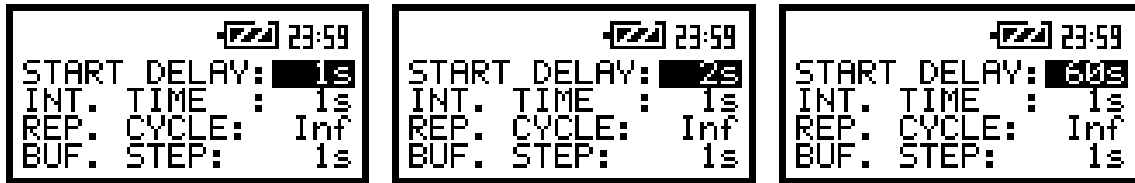
The **MEASURE SETUP** window is opened after the selection of the **MEASURE SETUP** text from the *INPUT* window by means of the **<◀>**, **<▶>** push-buttons and pressing the **<ENTER>** one. The **MEASURE SETUP** window consists of the parameters, which can be set, switched on or off, namely: the delay of the start of measurements (**START DELAY**), the integration time (**INT. TIME**), the repetition of the measurements (**REP. CYCLE**), the buffer's step (**BUF. STEP** position) and the number of the repetition of measurement cycles (**REP. CYCLE** position). The change of the displayed inversely parameter is performed by pressing the **<ENTER>** push-button. The **MEASURE SETUP** window is closed after pressing in any time the **<ESC>** push-button or pressing the **<ENTER>** one, when the last parameter available for changing is displayed inversely. The confirmation of any change made in the window requires pressing the **<ENTER>** push-button. The **MEASURE SETUP** window is closed ignoring any changes made, after pressing in any time the **<ESC>** push-button.



The view of the display with the MEASURE SETUP window opened

*Setting time delay before the start of measurements – START DELAY*

The **START DELAY** defines the delay from the pressing the <ST/SP> push-button (the <PAUSE> together with the <SHIFT>) to the start of the measurements (the digital filters of the instrument analyse constantly the input signal even when the measurements are stopped). This delay can be set from **1 second** to **60 seconds** (with 1 second step by means of the <◀>, <▶> push-buttons and with 10 seconds step with the <◀>, <▶> push-buttons pressed together with the <SHIFT> one). The <ENTER> push-button must be pressed for the confirmation of the setting.



The view of the displays with the MEASURE SETUP window opened; the setting of the START DELAY



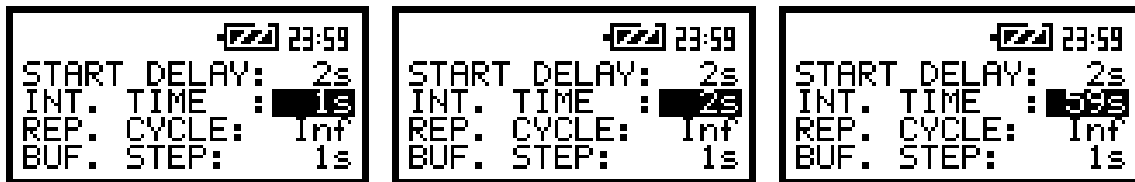
**Notice:** The minimum delay time is equal to 1 second. It protects from the registration by the instrument the effects of the push-button pressing. In the **CALIBRATION** mode the delay time is equal to 5 seconds.

*Setting the integration time – INT. TIME*

The **INT. TIME** defines the time period in which the signal is being averaged during the sound level measurements. The required parameter can be set by means of the <◀>, <▶> and confirmed by the <ENTER> push-button.

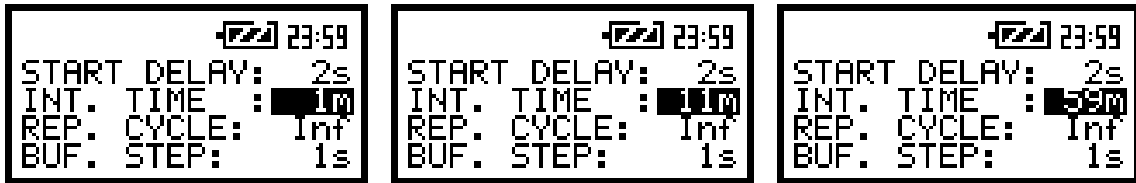
The integration time (**INT.TIME**) can be set (by pressing the <▶> or <▶> with <SHIFT> push-buttons):

- from 1 s to 59 s (with 1 second or 10 seconds step),



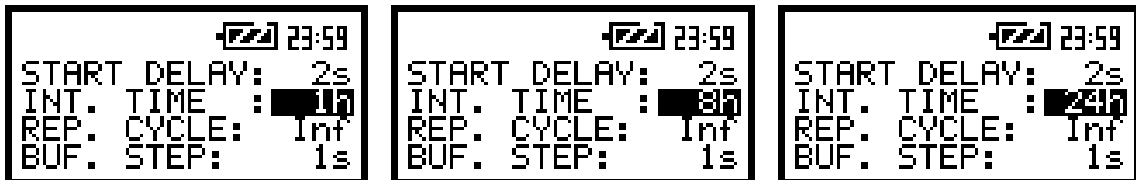
The view of the displays during setting the INT. TIME; time expressed in seconds

- from 1 m (min) to 59 m (with 1 minute or 10 minutes step) and



The view of the displays during setting the INT. TIME; time expressed in minutes

- from 1 h to 24 h (with 1 hour or 10 hours step).



The view of the displays during setting the INT. TIME; time expressed in hours

Additionally, the predefined periods: 1 m, 5 m, 15 m, 1 h, 8 h and 24 h, which are enumerated in the standards, are also available (by pressing the <◀> push-button or <◀> with <SHIFT>; these values are placed in the mentioned above sequence on the left in relation to 1 s).



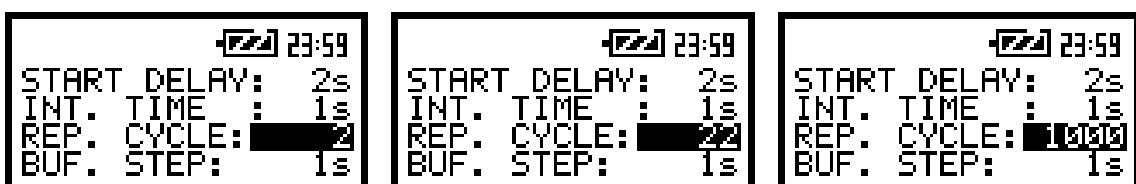
**Notice:** The measurement can also be **temporary stopped** by pressing the <PAUSE> push-button. It inserts an arbitrary long **PAUSE**. The measurements can be continued after pressing the <ST/SP> push-button (the <PAUSE> together with the <SHIFT>). The subsequent pressing of the <PAUSE> push-button causes the cancellation of the last second of the measurement. This procedure can be repeated up to fifteen times (last 15 seconds of the measurement can be cancelled and erased from the memory).



**Notice:** In the case of switching on the **AUTO SAVE** and **AUTO REPEAT** functions the minimum value of the integration time is equal to 5 seconds (cf. Chapter 5).

### Setting number of repetition of measurement cycles – REP. CYCLE

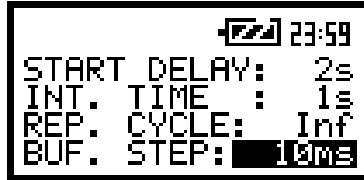
The **REP. CYCLE** defines the number of cycles (with the measurement time defined in the **INT. TIME**) which should be performed by the instrument. The required parameter can be set by means of the <◀>, <▶> push-buttons (with the step equal to 1) or by means of the <◀>, <▶> push-buttons pressed together with the <SHIFT> one (with the step equal to 20). The selected value is accepted by pressing the <ENTER> push-button. The **Inf** value denotes the infinite repetition of the measurements (till the pressing of the <ST/SP> push-button or by remote control code). The **REP. CYCLE** values are within the limits [1, 1000].



The view of the displays during setting the REP. CYCLE; available number of cycles: 1..1000, Inf

**Setting time between two writings to the buffer's file – BUF. STEP**

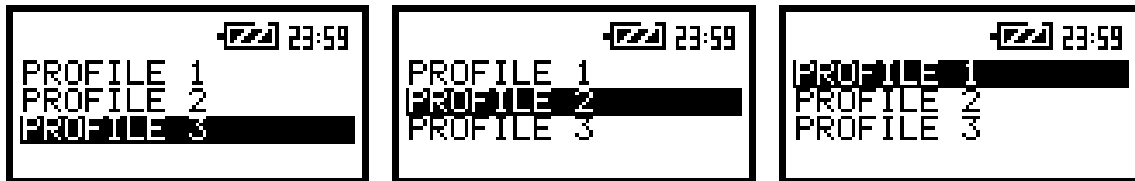
The **BUF. STEP** defines the time period of the data logging in the buffer's file. It can be set from **10 ms** to **1 s** in 1, 2, 5 sequence and the values from 1 second to 59 seconds, from 1 minute to 59 minute and 1 hour. The required parameter can be set by means of the <◀>, <▶> push-buttons and accepted by the <ENTER> one, which closes simultaneously the **MEASURE SETUP** window. Any changes are ignored after pressing the <ESC> push-button.



The view of the display during setting the BUF. STEP; available values in a sequence 1, 2, 5

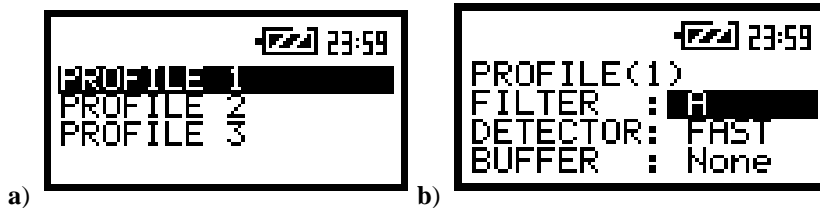
**Setting parameters in profiles and for octave analysis – PROFILES SETUP window**

The user enters the **PROFILES SETUP** window after pressing the <ENTER> push-button on the displayed inversely the **PROFILES SETUP** text. This window, in the case of sound level meter mode, consists of three **PROFILE x** windows (each for one profile).



The view of the displays with the **PROFILES SETUP** window opened; the selection of a profile

The next pressing of the <ENTER> push-button opens the window for a profile which number is displayed inversely.



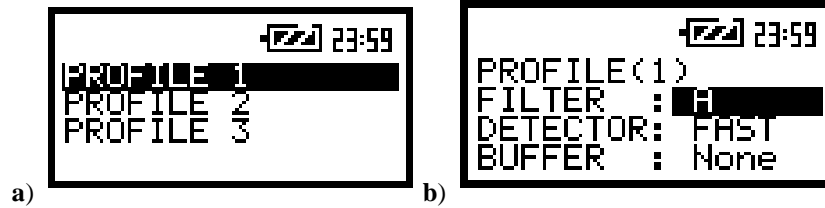
The view of the windows: **PROFILES SETUP** (a) and **PROFILE 1** (b)

**Setting parameters in a profile – PROFILE x sub-window**

In the **PROFILE x** sub-window the following parameters can be programmed independently for each profile:

- the weighting filter,
- the RMS detector type,
- the profile's result logged in the buffer's file.

Passing throughout the sub-window is possible by pressing the <ENTER> push-button.



The view of the windows: PROFILES SETUP (a) and PROFILE x (b)

### *Selection of the weighting filter in SLM – FILTER*

The following weighting filters are available in a profile of the instrument:

- **A** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **C** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **LIN** conforms to the requirements for the **Z** filter of type 1 according to the IEC 61672-1 standard.

The characteristics of the filters are given in the Appendix D. The selection of the required filter is made with the <◀>, <▶> push-buttons. The user can pass to the selection of the next parameter from the **PROFILE x** sub-window pressing the <ENTER> push-button. The return to the **PROFILES SETUP**, ignoring any changes made in the sub-window, is made after pressing the <ESC> push-button.



The view of the displays in the PROFILE 1 sub-window; the selection of the weighting filter

### *Selection of the RMS detector – DETECTOR*

In the instrument three RMS detectors are available: **IMPULSE**, **FAST** and **SLOW**. The selection of the required detector is made with the <◀>, <▶> push-buttons. The user can pass to the selection of the next parameter from the **PROFILE x** sub-window pressing the <ENTER> push-buttons. The return to the **PROFILES SETUP** window ignoring any changes made in the sub-window is made after pressing the <ESC> push-button.



The view of the displays in the PROFILE 3 sub-window; the selection of the detector time constant

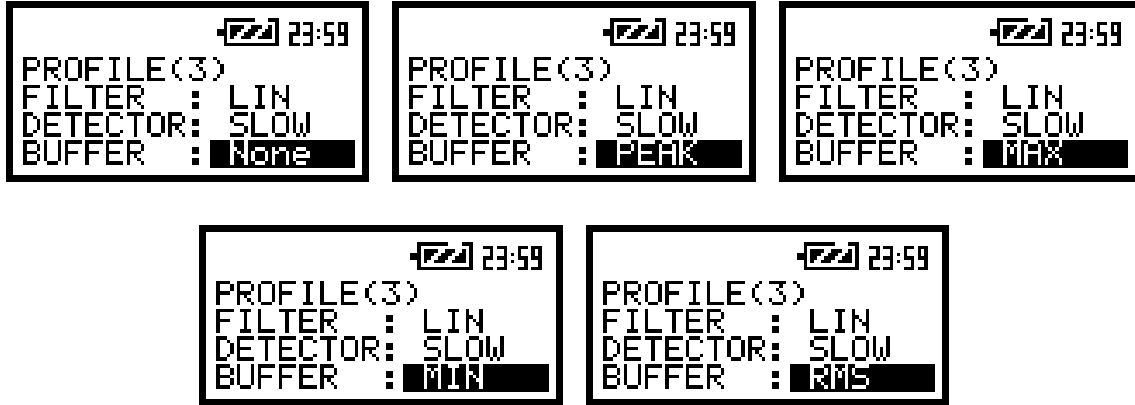
### *Selection of the SLM result to be saved in the buffer's file – BUFFER*

One measurement result from each profile can be saved in the buffer's file of the instrument. The following results can be saved: **PEAK**, **MAX**, **MIN** and **RMS**. The selection of the required result is made with the <◀>, <▶> push-buttons. The selection of the **None** text means that from this profile no result is to be saved in the buffer's file. The user causes the return to the **PROFILES SETUP** window, accepting

any changes made in the sub-window, pressing the **<ENTER>** push-button in the **BUFFER** line. The return to the **PROFILES SETUP** window is also possible after pressing the **<ESC>** push-button. In this case any changes made in the sub-window are ignored.



**Notice:** The change of the profiles parameters is not possible when the measurement is performed. The user has to finish the current measurement.



The view of the displays in the PROFILE 3 sub-window; the selection of the result to be saved in the buffer



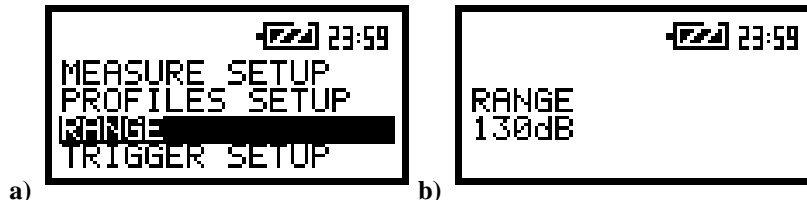
**Notice:** Setting **BUFFER:None** results in bypassing the storing of the given profile's results in the buffer's file. It creates more space in the buffer for other profiles (see Chapter 5 for details).



**Notice:** The buffer is updated in the time periods (steps) defined in the **BUF. STEP**. The way the measurement results are stored is described in Chapter 5.

**Selection of the measurement range in SLM – RANGE window**

After entering the **RANGE** window (the selection of the **RANGE** text from the **INPUT** window by means of the **<◀>**, **<▶>** push-buttons and pressing the **<ENTER>** push-button) the change of the input range is possible. In the **SLM** mode the instrument operates in **one, wide 125 dB** dynamic range and **no other ranges are available**. The return to the **INPUT** window is made after pressing the **<ESC>** or **<ENTER>** push-buttons.



The view of the displays in the **INPUT** window; the **RANGE** text selected (a) and the **RANGE** window opened (b)

### Selection of mode and parameters of triggering – TRIGGER SETUP window

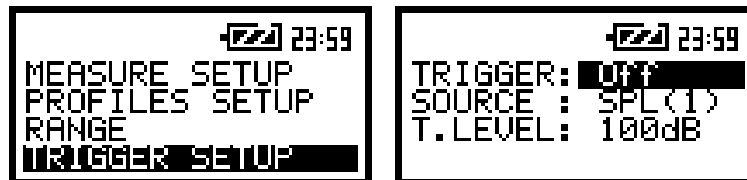
The **TRIGGER SETUP** window is opened after the selection of the **TRIGGER SETUP** text from the **INPUT** window by means of the <◀>, <▶> push-buttons and pressing the <ENTER> one. The **TRIGGER SETUP** window consists of the options, which can be set or selected. These options are as follows:

- The triggering of the measurements (**TRIGGER**).
- The source of the triggering signal (**SOURCE**).
- The level of the triggering (**TRG. LEVEL**).

In order to change the displayed inversely parameter the user has to press the <ENTER> push-button. The confirmation of any change made in the window requires also pressing the <ENTER> push-button. The **TRIGGER SETUP** window is closed ignoring any changes made, after pressing in any time the <ESC> push-button.

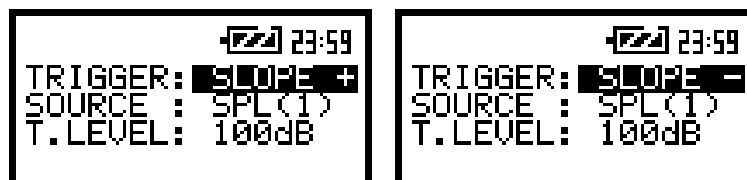
### Switching the triggering on and off – TRIGGER

The triggering of the measurements (**TRIGGER**) can be switched off using the <◀> push-button.



The view of the displays in the **TRIGGER SETUP** window

The triggering is switched on if one off its four modes is selected: **SLOPE +**, **SLOPE -**, **LEVEL +** or **LEVEL -**. The selection of the triggering mode is performed using the <◀>, <▶> push-buttons. If the instrument works with the triggering switched on the “Tree” icon is flashing on the screen in the case when the measurement are performed and the triggering condition is not fulfilled.



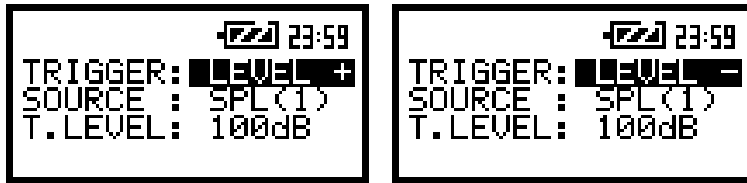
The view of the displays in the **TRIGGER SETUP** window with the **SLOPE** modes selected

In the case when the **SLOPE +** is selected, the measurement starts when the arising signal will pass the level determined in the **T. LEVEL**. The measurement is stopped when the conditions set in the **MEASURE SETUP** window are fulfilled, after pressing the <ST / SP> push-button or after receiving remotely the proper control code.



**Notice:** In the **SLM** mode only one available, so-called “triggering signal” is the signal coming from the **RMS** detector of the first profile.

In the case when the **SLOPE -** is selected, the measurement starts when the falling down signal will pass the level determined in the **T. LEVEL**.



The view of the displays in the TRIGGER SETUP window with the LEVEL modes selected

In the case when the **LEVEL +** is selected, in each second of the measurement the triggering condition is checked; the measurement is registered only when the signal has the greater level then this determined in the **T. LEVEL** and in the other case the measurement result is skipped.

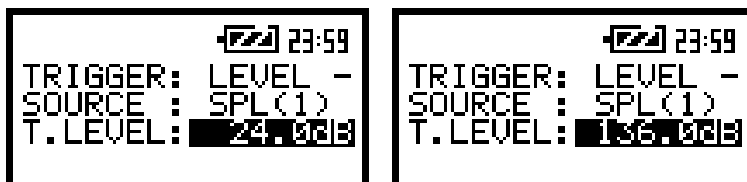
In the case when the **LEVEL -** is selected, in each second of the measurement the triggering condition is checked; the measurement is registered only when the signal has the lower level then this determined in the **T. LEVEL** and in the other case the measurement result is skipped.

*Selection of the triggering signal – SOURCE position*

It is assumed that in the **SLM** mode there is only one triggering signal available. It is the output signal from the RMS detector coming from the first profile which is denoted here as SPL(1). This position never becomes active (it is never displayed inversely) and the text stated here remains unchanged in the **SLM** mode.

*Setting the level of triggering – TRG. LEVEL*

The level of the triggering (**TRG. LEVEL**) can be set in 1 dB step (or 10 dB steps) from 24 dB to 136 dB range using the <◀>, <▶> push-buttons (or <◀>, <▶> with <SHIFT>). The user can confirm the selection of the parameter and return to the **INPUT** window after pressing the <ENTER> push-button. The return to the **INPUT** window ignoring the setting of the triggering level is made after pressing the <ESC> push-button.



The view of the displays in the TRIGGER SETUP window; the T.LEVEL setting

The other parameters important for the sound measurements can be set by means of the **SETUP** window after pressing the <SETUP> push-button (the <INPUT> push-button together with the <SHIFT> one).



The view of the SETUP window

In the *SETUP* window the following elements are available:

- window which enables the user to set the Timer function (**TIMER**);
- window which enables the user to set the Real Time Clock. (**RTC**);
- window which enables the user to set the parameters of the RS232 interface (**RS232**);
- window which enables the user to set the operating mode of the push-buttons (**SHIFT MODE**);
- window which enables the user to return to the producer's set up (**CLEAR SETUP**);
- window which enables the user to select the way of integration for the **LEQ** and **SEL** measurements (**LEQ INTEGRATION**);
- window which enables the user to switch on or off the warnings which can be displayed during the operation of the instrument (**WARNINGS**).

The detailed description of the elements of the *SETUP* window is presented in Chapter 5. For the sound measurements performed by the SVAN 943 instrument only one window is important: the setting of the **LEQ INTEGRATION** parameter.

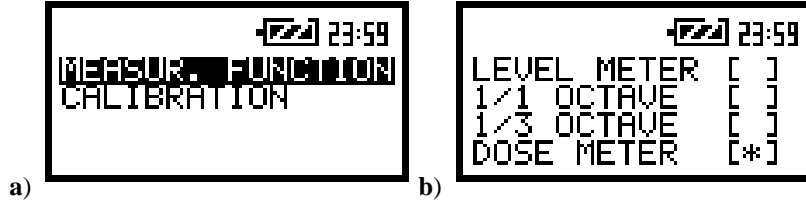
The **LEQ INTEGRATION** window enables the user to select the detector type for the calculations of the **LEQ** function. The required parameter can be set by means of the <◀>, <▶> push-buttons. The formulae used for the **LEQ** calculation are given in Appendix D. The return to the *SETUP* window is performed after pressing in any time the <ESC> push-button (ignoring the changes) or the <ENTER> push-button (accepting the changes).



The displays in the *SETUP* window (a) and with the possible options of **LEQ INTEGRATION** sub-window (b), (c)

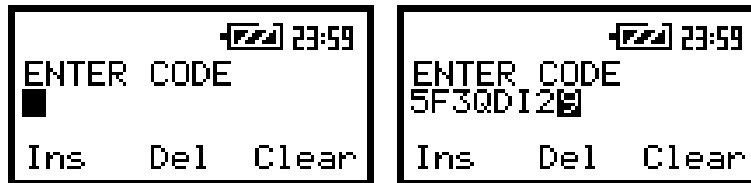
### 4.3. ACTIVATION OF OPTIONAL FUNCTIONS

The **DOSE METER** mode and **1/1 OCTAVE** & **1/3 OCTAVE** analysis are the optional functions broadening the applications of the instrument. The function names are specified in the **MEASUREMENT FUNCTION** sub-window of the **FUNCTION** window.



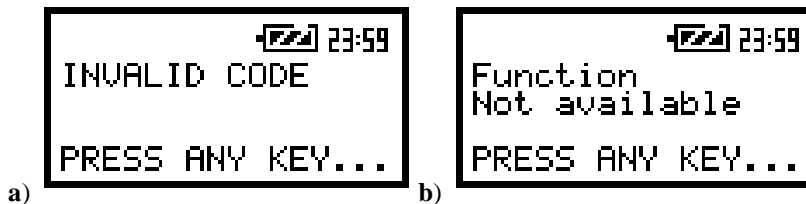
The view of the displays with the **FUNCTION** window opened (a) and the **MEASUREMENT FUNCTION** sub-window opened with the **DOSE METER** selected (b)

A function is selected by placing the special character in the line with the function's name. The position of the character can be changed using the <◀>, <▶> push-buttons. After placing the character in the line with the function's name the user has to press the <ENTER> push-button. The window for entering the access code to a function is opened in the first essay of its execution (after pressing the <ENTER> push-button) in the case when a function was not purchased together with the instrument.



The view of the displays during the entering of the access code to a function

The introduction of the access code is performed in the same way as the edition of the other text variables using the <INPUT> push-button (the **Insert** function), the <DISPLAY> push-button (the **Delete** function), the <FILE> push-button (the **Clear** function) and the <◀>, <▶> push-buttons in the conjunction with the <SHIFT> push-button (for the entering of characters). The verification is made after pressing the <ENTER> push-button. If the entered code was wrong the message is displayed and the instrument waits for the reaction of the user. After pressing the <ENTER> or the <ESC> push-button the message that the function is not available is displayed and the instrument once more waits for the reaction of the user.



The view of the displays after the unsuccessful verification of the access code (a) and with the text displayed after the negative verification (b)

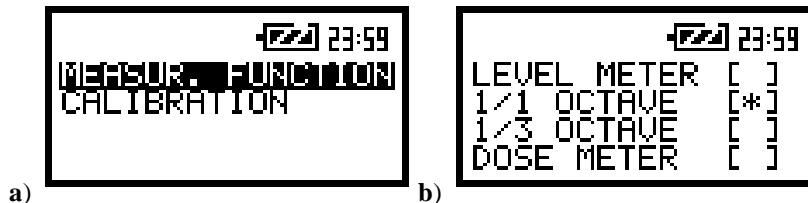
After pressing the <ENTER> or the <ESC> push-button the instrument returns to the **FUNCTION** window. After successful verification of the access code the windows described above are no more displayed. Once activated function is always available.



**Notice:** The number of the attempts for the access code entering is limited. After three unsuccessful essays the possibility is blocked.

#### 4.4. 1/1 OCTAVE ANALYSER

In order to select the **1/1 OCTAVE** analysis mode the user has to enter the **FUNCTION** window by pressing the **<FUNC>** push-button (the **<DISPLAY>** in conjunction with the **<SHIFT>**). This window contains two sub-windows: **MEASUREMENT FUNCTION** and **CALIBRATION**. Next, the user has to open the **MEASUREMENT FUNCTION** sub-window (to select the **MEASUR. FUNCTION** text using the **<▲>**, **<▶>** push-buttons and press the **<ENTER>** push-button when this text is displayed inversely).



The view of the displays with the **FUNCTION** window opened (a) and **1/1 OCTAVE** analysis mode selected in the **MEASUREMENT FUNCTION** sub-window (b)

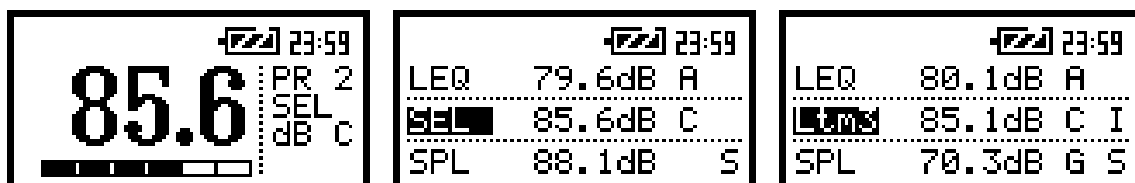
**1/1 OCTAVE** analysis mode is selected by placing the special character in the line with **1/1 OCTAVE** text. The position of the character can be changed using the **<▲>**, **<▶>** push-buttons. After placing the character in the line with **1/1 OCTAVE** text the user has to press the **<ENTER>** push-button. After this the instrument closes the **MEASUREMENT FUNCTION** window confirming the selection. After pressing the **<ESC>** push-button the window is also closed but **any changes are ignored**.



**Notice:** It is not possible to change the mode during the measurements. The instrument displays in this case for about 2 seconds the text: **“measurement in progress / MEASUREMENT IN PROGRESS”**. In order to change the mode the measurement must be finished!

The instrument's operation as **1/1 OCTAVE** analyser is similar to the **SLM** measurement mode with two important exceptions.

- In **1/1 OCTAVE** analysis the spectrum is available in parallel to the **SLM** operation. All 10 digital pass-band filters (with the centre frequencies from 16 kHz down to 31.5 Hz; in base two system) are working in the real time with **the weighting filters: LIN, A or C** selected in the **SPECTRUM** sub-window of the **PROFILES SETUP** window **and the linear RMS detector**. Additionally, the **TOTAL RMS** values for the full frequency range with the **A, C** and **LIN (Z)** weightings are displayed. In order to inform the user about the working mode of the instrument, in one profile and **3 PROFILES** modes of result's presentation the **dotted line** are used for the indication that the instrument **do not work in the SLM** mode. In the **SLM** mode the continuous lines are used.



The view of the displays in one profile and **3 PROFILES** result's presentation mode with the dotted lines indicating that the instrument do not work in the **SLM** mode



**Notice:** The **TOTAL RMS** results are measured with the weighting filters: **A, C** and **LIN** without taking into account the setting of the **SLM** profiles. The **spectra are always linearly averaged**. Thus, the **TOTAL** values from **1/1 OCTAVE** analysis can be different from those obtained for the **SLM** profiles (if the **LEQ INTEGRATION** was set as **EXPONENTIAL**).

2. As **1/1 OCTAVE** analyser the instrument operates in three input ranges **95 dB**, **110 dB** and **125 dB**, which can be selected by means of the **RANGE** window (see below).

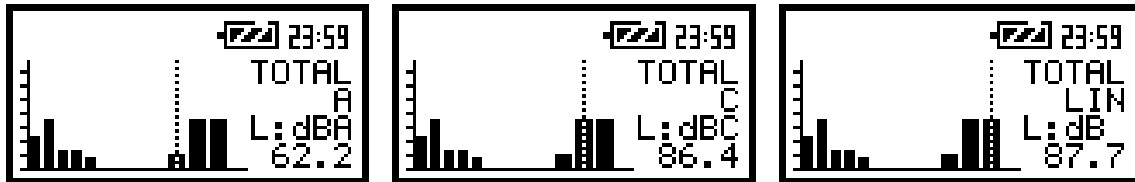
In order to change the mode of the measurement results presentation the user has to press the **<ENTER>** push-button. The following modes are available:

**One Profile, 3 PROFILES, SPECTRUM, STATISTICS** and **PLOT**.



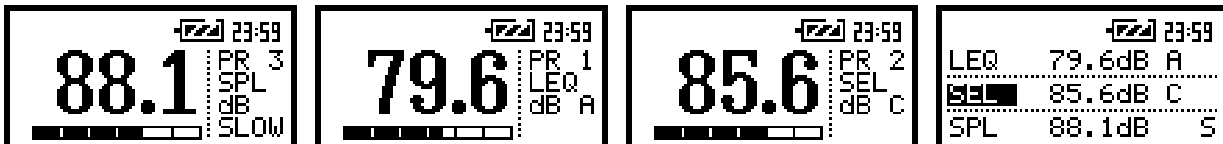
**Notice:** The user can select the number of the currently active modes of the measurement results presentation switching on ([✓]) or off ([ ]) the given mode in the **DISPLAY** sub-window of the **DISPLAY** window. Only one profile mode **cannot be switched off**. See Chapter 5 for the details about the display modes control.

**One Profile, 3 PROFILES, STATISTICS** and **PLOT** display modes are identical as for the **SLM**. The **SPECTRUM** mode displays **1/1 OCTAVE** analysis results (so-called spectrum) together with the **TOTAL RMS** values measured with **A**, **C** and **LIN** weighting filters. The read-out of the interested spectrum value can be done by means of the cursor controlled by the **<◀>**, **<▶>** push-buttons. On the right side of the display the selected **1/1 octave** filter centre frequency (or the selected **TOTAL**) is given, the units with the weighting filter (**dB A**, **dB C** or **dB** in the case of the **LIN**) and the numerical value are displayed.



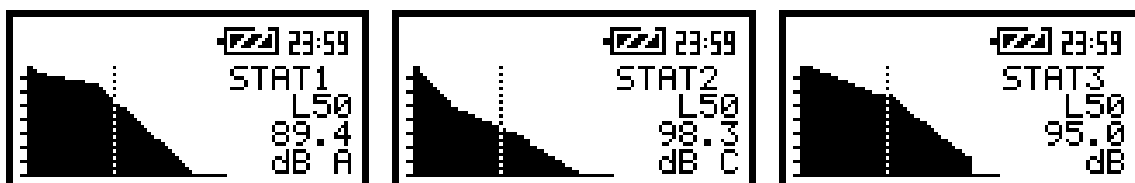
The view of the displays in **1/1 OCTAVE** analysis in the **SPECTRUM** display mode

In **one profile** and **3 PROFILES** modes the results are presented in the same way as in the case of the **SLM** mode with only one difference that instead of the continuous line the dotted one is used. The active profile is changed after each pressing of the **<ESC>** push-button. The change of the result from the same profile is done by pressing the **<◀>**, **<▶>** push-buttons. The **LN** value is changed after pressing the **<SHIFT>** and **<◀>** or **<SHIFT>** and **<▶>** push-buttons.



The view of the displays in **1/1 OCTAVE** analysis in **one profile** and **3 PROFILES** modes of result's presentation

In the **STATISTICS** mode it is possible to select the **LN** value using the **<◀>**, **<▶>** push-buttons. The active profile is displayed in the first line at the right side of the screen. **LN** corresponding to the current position of the cursor is displayed in the second line, value of **LN** - in the third line and the units together with the indicator of the weighting filter - in the fourth. When the **STATISTICS** mode of result's presentation is entered in order to change the active profile the **<ESC>** push-button should be pressed.



The view of the displays in **1/1 OCTAVE** analysis with presentation of the statistical analysis in all profiles

In the **PLOT** mode the results are presented which are saved in the buffer from the profiles (in the case when in the **BUFFER** positions of the **PROFILE x** sub-window the other texts than **None** were selected) with the step set for all profiles in the **BUF. STEP** option. The active profile is changed after pressing the **<ENTER>** push-button. The position of the cursor can be done after pressing the **<◀>**, **<▶>** push-buttons. it is also possible to shift the horizontal axis in relation to the vertical one of the presented results using the **<◀>**, **<▶>** push-buttons pressed in conjunction with the **<SHIFT>** one (similarly as in the **SPECTRUM** mode).



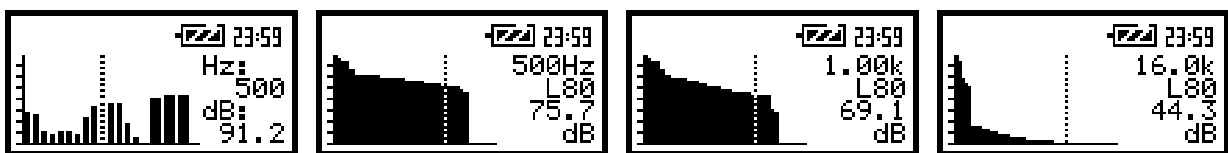
The view of the displays in 1/1 OCTAVE analysis in the PLOT mode; the registered results from all profiles

In the **SPECTRUM** mode it is possible to shift the horizontal axis in relation to the vertical one of the presented results using the **<◀>**, **<▶>** push-buttons pressed in conjunction with the **<SHIFT>** one. After each pressing of these buttons the presented picture moves 10 dB down or up - respectively.



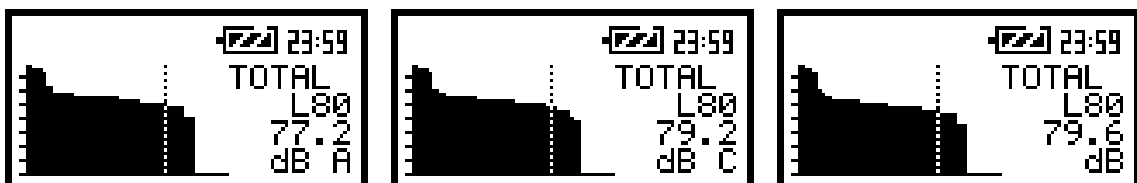
The view of the displays in 1/1 OCTAVE analysis with the shifted horizontal axis in relation to vertical one

The statistical analysis is also performed in **1/1 OCTAVE** analysis. The results of this analysis are presented on the screen after pressing the **<ESC>** push-button in the case when the instrument is in the **SPECTRUM** mode of result's presentation. After this pressing the statistical analysis performed for the selected **1/1 OCTAVE** filter is shown on the screen. The centre frequency of the filter for which the analysis was made, the **LN** number corresponding to the cursor position, the **LN** value and the units are presented on the right side of the screen. The **LN** value can be changed by pressing the **<◀>**, **<▶>** push-buttons. After pressing the **<◀>** and **<SHIFT>** the **L01** statistical level is displayed and after pressing the **<▶>** and **<SHIFT>** push-buttons - the **L99** is presented.



The view of the displays in SPECTRUM mode and after entering the presentation of the statistical analysis results performed for each 1/1 OCTAVE filter

The selection of **1/1 OCTAVE** filter in the **SPECTRUM** mode is performed after pressing the **<◀>** or **<▶>** push-buttons. The statistical analysis is also made for all **TOTAL** values of **1/1 OCTAVE** analysis. The **<ESC>** push-button has to be pressed in order to leave the presentation of the statistical analysis performed in **1/1 OCTAVE** analysis and return to the **SPECTRUM** mode of result's presentation.



The displays with the statistical analysis results presentation made for TOTAL results of 1/1 OCTAVE analysis

The spectra registered in the buffer's file can be presented on the screen in the **BUFFER VIEW** sub-window of the **DISPLAY** window. These spectra are saved with the same step as selected in the **SLM** profiles (see the description of the **BUF. STEP** position of the **MEASURE SETUP** window).

In order to display the registered in the buffer's file spectra the user has to:

- press the **<FILE>** push-button for the spectra stored later;
- press the **<INPUT>** push-button for the spectra saved earlier.

In the **BUFFER VIEW** window it is also possible to examine the time history for **1/1 OCTAVE** filter selected by the cursor (cf. the description of the **BUFFER VIEW** window in Chapter 5).



**Notice:** Many time histories can be saved in the buffer's file of the instrument during the measurements performed in different sessions. The presentation of these results is possible using the **BUFFER VIEW** window of the **DISPLAY** window (cf. Chapter 5).

### Selection of the measurement range in 1/1 OCTAVE analysis – RANGE

The selection of the input range is possible after entering the **RANGE** window (from the **INPUT** window by means of the **<◀>**, **<▶>** push-buttons and pressing the **<ENTER>** one). In **1/1 OCTAVE** analyser the user can select (by means of the **<◀>**, **<▶>** and **<ENTER>** push-buttons) the input ranges specified in Appendix C. The return to the **INPUT** window is made after pressing the **<ESC>** push-button (ignoring the changes) or **<ENTER>** push-button (confirming the selection).



The view of the displays with the **RANGE** window in **1/1 OCTAVE** analyser



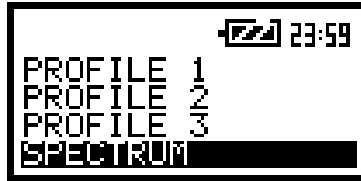
**Notice:** It is not possible to change the range during the measurement process. The instrument displays in this case for about 2 seconds the text: **"measurement in progress / MEASUREMENT IN PROGRESS"**. In order to change the range the measurement must be finished!



**Notice:** If an **OVERLOAD** occurs it is signalled by the **"Bell"** icon (cf. Chapter 3 for details).

### Selection of 1/1 OCTAVE analysis parameters – SPECTRUM window

The **SPECTRUM** is a context element, which appears on the **PROFILES SETUP** window in **1/1 OCTAVE** or **1/3 OCTAVE** mode. Using the **SPECTRUM** window one can select in **1/1 OCTAVE** analysis the weighting filter and the result which has to be saved in the buffer's file of the instrument.

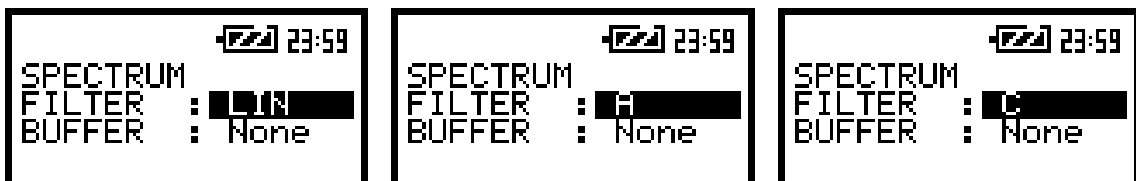


The view of the displays in the PROFILES SETUP window with the SPECTRUM in 1/1 OCTAVE analyser

### *Selection of the weighting filter in 1/1 OCTAVE analysis – FILTER*

The following weighting filters are available in 1/1 OCTAVE analysis:

- **A** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **C** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **LIN** conforms to the requirements for the Z filter of type 1 according to the IEC 61672-1 standard.

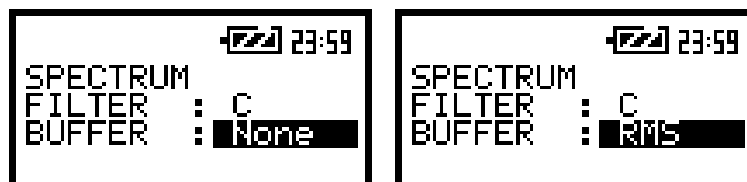


The view of the displays with the SPECTRUM window opened, the selection of the weighting filter

The characteristics of the filters are given in the Appendix D. The selection of the required filter is made with the <◀>, <▶> push-buttons. The user can pass to the selection of the next parameter from the **SPECTRUM** sub-window pressing the <ENTER> push-button. The return to the **PROFILES SETUP** sub-window is made after pressing the <ESC> push-button but in this case the selection is ignored.

### *Selection of 1/1 OCTAVE analysis result to be saved in the buffer's file – BUFFER*

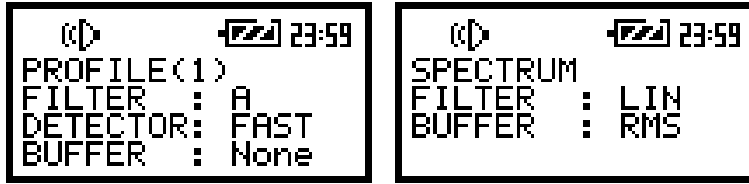
The **RMS** result from 1/1 OCTAVE analysis can be saved in the buffer's file of the instrument. The selection of the required result is made with the <◀>, <▶> push-buttons. The selection of the **None** text means that the **RMS** results are not saved in the buffer's file. The user causes the return to the **PROFILES SETUP** window pressing the <ENTER> push-button with the confirmation of the selections made in the window. The return to the **PROFILES SETUP** window is also possible after pressing the <ESC> push-button but all changes are in this case ignored.



The view of the displays in the SPECTRUM window, the selection of the BUFFER contents



**Notice:** It is not possible to change the values of the parameters during the execution of the measurements. It is possible to open different windows and sub-windows but the positions in these windows are not displayed inversely and so - not accessible. The "Loudspeaker" icon indicates that the instrument is in the measurement process.



The view of the displays with not accessible parameters of the PROFILES SETUP windows

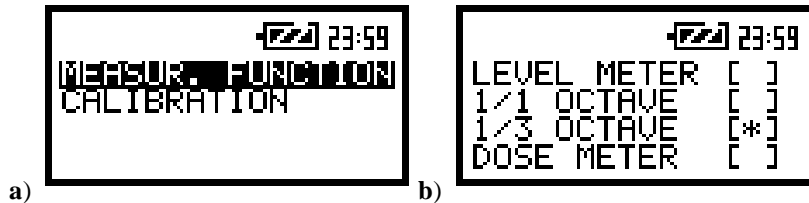


**the SLM.**

*Notice: All other settings of the instrument are common for 1/1 OCTAVE analyser and*

## 4.5. 1/3 OCTAVE ANALYSER

In order to select the **1/3 OCTAVE** analysis mode the user has to enter the **FUNCTION** window by pressing the **<FUNC>** push-button (the **<DISPLAY>** in conjunction with the **<SHIFT>**). This window contains two sub-windows: **MEASUREMENT FUNCTION** and **CALIBRATION**. Next, the user has to open the **MEASUREMENT FUNCTION** sub-window (to select the **MEASUR. FUNCTION** text using the **<▲>**, **<▶>** push-buttons and press the **<ENTER>** push-button when this text is displayed inversely).



The view of the displays with the **FUNCTION** window opened (a) and **1/3 OCTAVE** analysis mode selected in the **MEASUREMENT FUNCTION** sub-window (b)

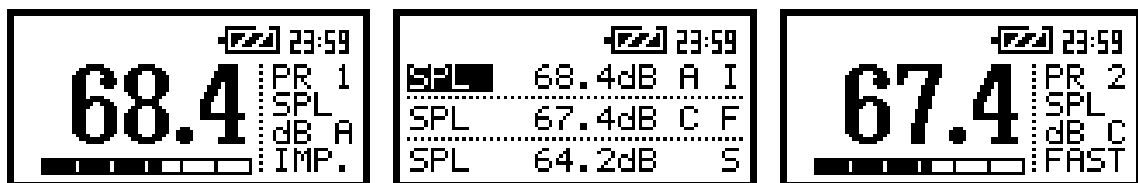
**1/3 OCTAVE** analysis mode is selected by placing the special character in the line with **1/3 OCTAVE** text. The position of the character can be changed using the **<▲>**, **<▶>** push-buttons. After placing the character in the line with **1/3 OCTAVE** text the user has to press the **<ENTER>** push-button. After this the instrument closes the **MEASUREMENT FUNCTION** window confirming the selection. After pressing the **<ESC>** push-button the window is also closed but **any changes are ignored**.



**Notice:** It is not possible to change the mode during the measurements. The instrument displays in this case for about 3 seconds the text: **“measurement in progress / MEASUREMENT IN PROGRESS”**. In order to change the mode the measurement must be finished!

The instrument's operation as **1/3 OCTAVE** analyser is similar to the **SLM** measurement mode with two important exceptions.

- In **1/3 OCTAVE** analysis the spectrum is available in parallel to the **SLM** operation. All 30 digital pass-band filters (with the centre frequencies from 20 kHz down to 25 Hz; in base two system) are working in the real time with **the weighting filters: LIN, A or C** selected in the **SPECTRUM** sub-window of the **PROFILES SETUP** window **and the linear RMS detector**. Additionally, the **TOTAL RMS** values for the full frequency range with the **A, C** and **LIN (Z)** weightings are displayed. In order to inform the user about the working mode of the instrument, in one profile and **3 PROFILES** modes of result's presentation the **dotted line** are used for the indication that the instrument **do not work in the SLM** mode. In the **SLM** mode the continuous lines are used.



The view of the displays in one profile and **3 PROFILES** result's presentation mode with the dotted lines indicating that the instrument do not work in the **SLM** mode



**Notice:** The **TOTAL RMS** results are measured with the weighting filters: **A, C** and **LIN** without taking into account the setting of the **SLM** profiles. The **spectra are always linearly averaged**. Thus, the **TOTAL** values from **1/3 OCTAVE** analysis can be different from those obtained for the **SLM** profiles (if the **LEQ INTEGRATION** was set as **EXPONENTIAL**).

2. As **1/3 OCTAVE** analyser the instrument operates in three input ranges **95 dB**, **110 dB** and **125 dB**, which can be selected by means of the **RANGE** position (see below).

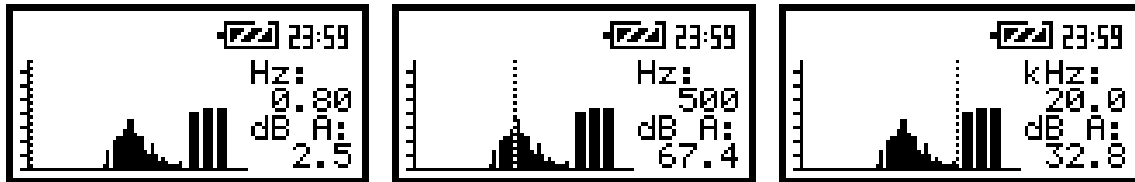
In order to change the mode of the measurement results presentation the user has to press the **<ENTER>** push-button. The following modes are available:

**One Profile, 3 PROFILES, SPECTRUM, STATISTICS** and **PLOT**.



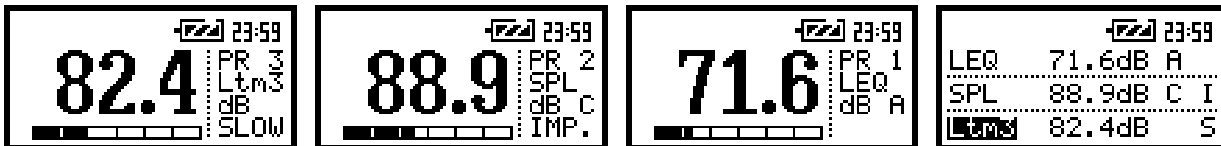
**Notice:** The user can select the number of the currently active modes of the measurement results **presentation** switching on ([√]) or off ([ ] ) the given mode in the **DISPLAY MODES** sub-window of the **DISPLAY** window. Only one profile mode **cannot be switched off**. See Chapter 5 for the details about the display modes control.

**One Profile, 3 PROFILES, STATISTICS** and **PLOT** display modes are identical as for the **SLM**. The **SPECTRUM** mode displays **1/3 OCTAVE** analysis results (so-called spectrum) together with the **TOTAL RMS** values measured with **A**, **C** and **LIN** weighting filters. The read-out of the interested spectrum value can be done by means of the cursor controlled by the **<◀>**, **<▶>** push-buttons. On the right side of the screen the selected 1/3 octave filter centre frequency (or the selected **TOTAL**) is given, the units with the weighting filter (**dB A**, **dB C** or **dB** in the case of the **LIN**) and the numerical value are displayed.



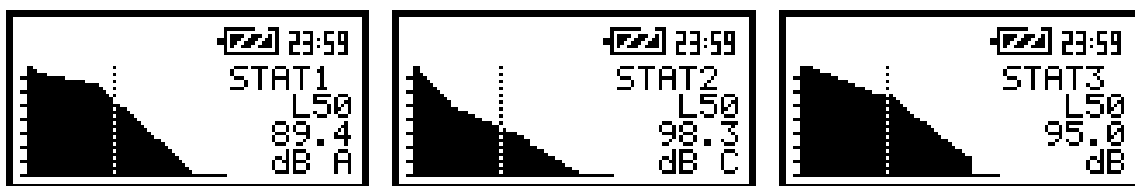
The view of the screens in 1/3 OCTAVE analysis in the **SPECTRUM** display mode

In one profile and **3 PROFILES** modes the results are presented in the same way as in the case of the **SLM** mode with only one difference that instead of the continuous line the dotted one is used. The active profile is changed after each pressing of the **<ESC>** push-button. The change of the result from the same profile is done by pressing the **<◀>**, **<▶>** push-buttons. The **LN** value is changed after pressing the **<SHIFT>** and **<◀>** or **<SHIFT>** and **<▶>** push-buttons.



The view of the displays in 1/3 OCTAVE analysis in one profile and **3 PROFILES** modes of result's presentation

In the **STATISTICS** mode it is possible to select the **LN** value using the **<◀>**, **<▶>** push-buttons. The active profile is displayed in the first line at the right side of the screen. **LN** corresponding to the current position of the cursor is displayed in the second line, value of **LN** - in the third line and the units together with the indicator of the weighting filter - in the fourth. When the **STATISTICS** mode of result's presentation is entered in order to change the active profile the **<ESC>** push-button should be pressed.



The view of the displays in 1/3 OCTAVE analysis with presentation of the statistical analysis in all profiles

In the **PLOT** mode the results are presented which are saved in the buffer from the profiles (in the case when in the **BUFFER** positions of the **PROFILE x** sub-window the other texts than **None** were selected) with the step set for all profiles in the **BUF. STEP** option. The active profile is changed after pressing the **<ENTER>** push-button. The position of the cursor can be done after pressing the **<◀>**, **<▶>** push-buttons. it is also possible to shift the horizontal axis in relation to the vertical one of the presented results using the **<◀>**, **<▶>** push-buttons pressed in conjunction with the **<SHIFT>** one (similarly as in the **SPECTRUM** mode).



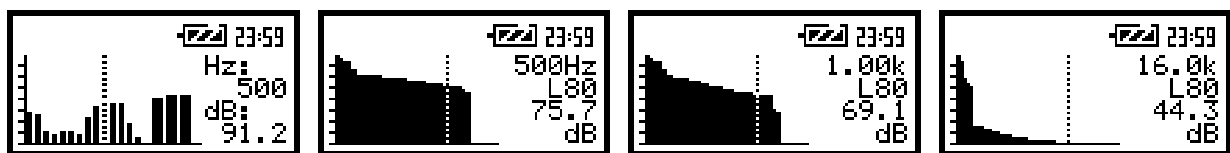
The view of the displays in 1/3 OCTAVE analysis in the PLOT mode; the registered results from all profiles

In the **SPECTRUM** mode it is possible to shift the horizontal axis in relation to the vertical one of the presented results using the **<◀>**, **<▶>** push-buttons pressed in conjunction with the **<SHIFT>** one. After each pressing of these buttons the presented picture moves 10 dB down or up - respectively.



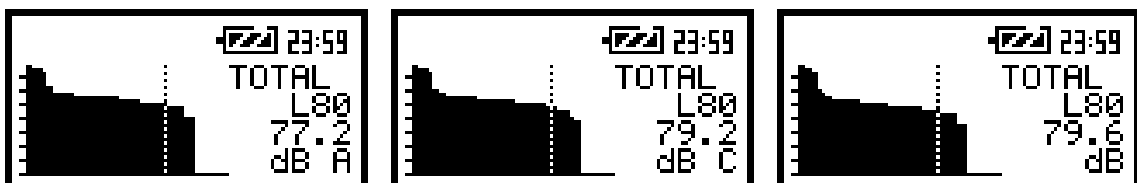
The view of the displays in 1/3 OCTAVE analysis with the shifted horizontal axis in relation to vertical one

The statistical analysis is also performed in **1/3 OCTAVE** analysis. The results of this analysis are presented on the screen after pressing the **<ESC>** push-button in the case when the instrument is in the **SPECTRUM** mode of result's presentation. After this pressing the statistical analysis performed for the selected **1/3 OCTAVE** filter is shown on the screen. The centre frequency of the filter for which the analysis was made, the **LN** number corresponding to the cursor position, the **LN** value and the units are presented on the right side of the screen. The **LN** value can be changed by pressing the **<◀>**, **<▶>** push-buttons. After pressing the **<◀>** and **<SHIFT>** the **L01** statistical level is displayed and after pressing the **<▶>** and **<SHIFT>** push-buttons - the **L99** is presented.



The view of the displays in SPECTRUM mode and after entering the presentation of the statistical analysis results performed for each 1/3 OCTAVE filter

The selection of **1/3 OCTAVE** filter in the **SPECTRUM** mode is performed after pressing the **<◀>** or **<▶>** push-buttons. The statistical analysis is also made for all **TOTAL** values of **1/3 OCTAVE** analysis. The **<ESC>** push-button has to be pressed in order to leave the presentation of the statistical analysis performed in **1/3 OCTAVE** analysis and return to the **SPECTRUM** mode of result's presentation.



The displays with the statistical analysis results presentation made for TOTAL results of 1/3 OCTAVE analysis

The spectra registered in the buffer's file can be presented on the screen in the **BUFFER VIEW** sub-window of the **DISPLAY** window. These spectra are saved with the same step as selected in the **SLM** profiles (see the description of the **BUF. STEP** position of the **MEASURE SETUP** window).

In order to display the registered in the buffer's file spectra the user has to:

- press the **<FILE>** push-button for the spectra stored later;
- press the **<INPUT>** push-button for the spectra saved earlier.

In the **BUFFER VIEW** window it is also possible to examine the time history for **1/3 OCTAVE** filter selected by the cursor (cf. the description of the **BUFFER VIEW** window in Chapter 5).



**Notice:** Many time histories can be saved in the buffer's file of the instrument during the measurements performed in different sessions. The presentation of these results is possible using the **BUFFER VIEW** window of the **DISPLAY** window (cf. Chapter 5).

### Selection of the measurement range in 1/3 OCTAVE analysis – RANGE

The selection of the input range is possible after entering the **RANGE** window (from the **INPUT** window by means of the **<◀>**, **<▶>** push-buttons and pressing the **<ENTER>** one). In **1/3 OCTAVE** analyser the user can select (by means of the **<◀>**, **<▶>** and **<ENTER>** push-buttons) the input ranges specified in Appendix C. The return to the **INPUT** window is made after pressing the **<ESC>** push-button (ignoring the changes) or **<ENTER>** push-button (confirming the selection).



The view of the displays with the **RANGE** window in 1/3 OCTAVE analyser



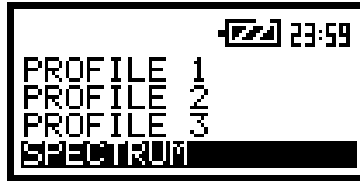
**Notice:** It is not possible to change the range during the measurement process. The instrument displays in this case for about 2 seconds the text: **"measurement in progress / MEASUREMENT IN PROGRESS"**. In order to change the range the measurement must be finished!



**Notice:** If an **OVERLOAD** occurs it is signalled by the **"Bell"** icon (cf. Chapter 3 for details).

### Selection of 1/3 OCTAVE analysis parameters – SPECTRUM window

The **SPECTRUM** is a context element, which appears on the **PROFILES SETUP** window in **1/1 OCTAVE** or **1/3 OCTAVE** mode. Using the **SPECTRUM** window one can select in **1/3 OCTAVE** analysis the weighting filter and the result which has to be saved in the buffer's file of the instrument.

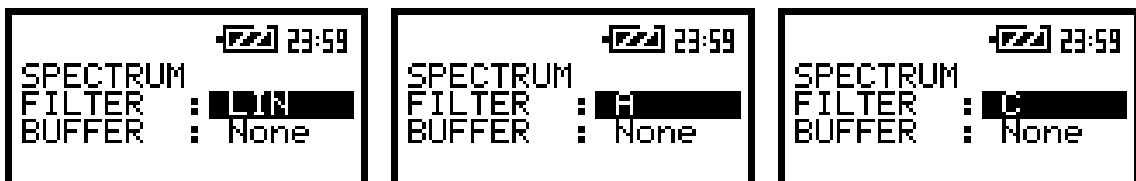


The view of the displays in the PROFILES SETUP window with the SPECTRUM in 1/3 OCTAVE analyser

### *Selection of the weighting filter in 1/3 OCTAVE analysis – FILTER*

The following weighting filters are available in 1/3 OCTAVE analysis:

- **A** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **C** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **LIN** conforms to the requirements for the Z filter of type 1 according to the IEC 61672-1 standard.



The view of the displays with the SPECTRUM window opened, the selection of the weighting filter

The characteristics of the filters are given in the Appendix D. The selection of the required filter is made with the <◀>, <▶> push-buttons. The user can pass to the selection of the next parameter from the **SPECTRUM** sub-window pressing the <ENTER> push-button. The return to the **PROFILES SETUP** sub-window is made after pressing the <ESC> push-button but in this case the selection is ignored.

### *Selection of 1/3 OCTAVE analysis result to be saved in the buffer's file – BUFFER*

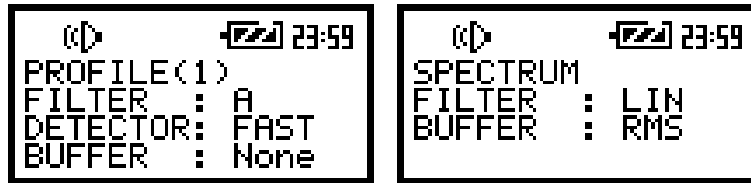
The **RMS** result from 1/3 OCTAVE analysis can be saved in the buffer's file of the instrument. The selection of the required result is made with the <◀>, <▶> push-buttons. The selection of the **None** text means that the **RMS** results are not saved in the buffer's file. The user causes the return to the **PROFILES SETUP** window pressing the <ENTER> push-button with the confirmation of the selections made in the window. The return to the **PROFILES SETUP** window is also possible after pressing the <ESC> push-button but all changes are in this case ignored.



The view of the displays in the SPECTRUM window, the selection of the BUFFER contents



**Notice:** It is not possible to change the values of the parameters during the execution of the measurements. It is possible to open different windows and sub-windows but the positions in these windows are not displayed inversely and so - not accessible. The "Loudspeaker" icon indicates that the instrument is in the measurement process.



The view of the displays with not accessible parameters of the PROFILES SETUP windows

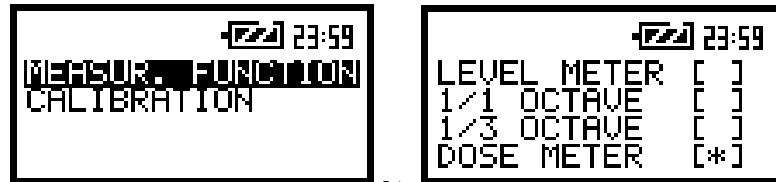


**the SLM.**

*Notice: All other settings of the instrument are common for 1/3 OCTAVE analyser and*

## 4.6. DOSE METER MODE

In order to select the **DOSE METER** mode the user has to enter the *FUNCTION* window by pressing the <FUNC> push-button (the <DISPLAY> in conjunction with the <SHIFT>). This window contains two sub-windows: **MEASUREMENT FUNCTION** and **CALIBRATION**. The user has to open next the **MEASUREMENT FUNCTION** sub-window (to select the **MEASUR. FUNCTION** text using the <◀>, <▶> push-buttons and press the <ENTER> push-button when this text is displayed inversely).



a) b)

The view of the displays with the *FUNCTION* window opened (a) and the **DOSE METER** selected in the **MEASUREMENT FUNCTION** sub-window (b)

The **DOSE METER** mode is selected by placing the special character in the line with the **DOSE METER** text. The position of the character can be changed using the <◀>, <▶> push-buttons. After placing the character in the line with the **DOSE METER** text the user has to press the <ENTER> push-button. After this the instrument closes the **MEASUREMENT FUNCTION** window confirming the selection. After pressing the <ESC> push-button the window is also closed but **any changes are ignored**.



**Notice:** It is not possible to change the mode during the measurements. The instrument displays in this case for about 3 seconds the text: **“measurement in progress / MEASUREMENT IN PROGRESS”**. In order to change the mode the measurement must be finished!