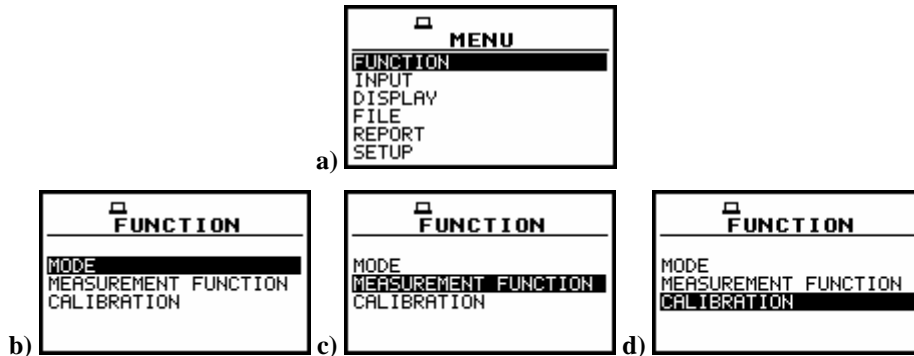


4 FUNCTIONS OF THE INSTRUMENT - FUNCTION

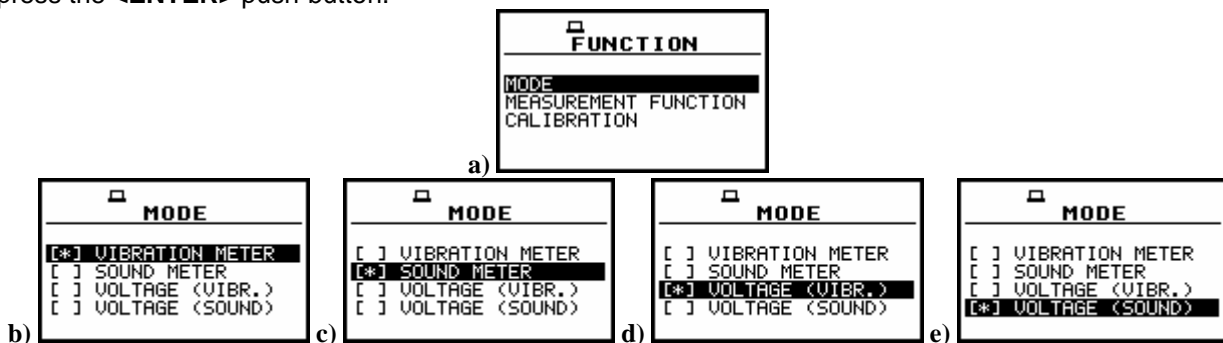
In order to select the **FUNCTION** list one has to press the **<MENU>** push-button, select by means of the **<▲>**, **<▼>** (or **<◀>**, **<▶>**) push-buttons the **FUNCTION** text and press the **<ENTER>**. The **FUNCTION** list contains three elements: **MODE**, **MEASUREMENT FUNCTION** and **CALIBRATION**. The list is closed and the instrument returns to the presentation mode after pressing the **<ESC>** push-button.



Displays with the main list, the **FUNCTION** text selected (a) and the **FUNCTION** list opened; the **MODE** selected (b) the **MEASUREMENT FUNCTION** selected (c) and the **CALIBRATION** selected (d)

4.1 Selecting the mode of the instrument - MODE

In order to select the required mode the user has to enter the **MODE** position in the **FUNCTION** sub-list using **<▲>**, **<▼>** push-buttons and press the **<ENTER>** one. A mode is selected by placing the special character in the line with the mode's name. The position of the character can be changed using the **<▲>**, **<▼>** push-buttons. After placing the character in the line with the option's name the user has to press the **<ENTER>** push-button.

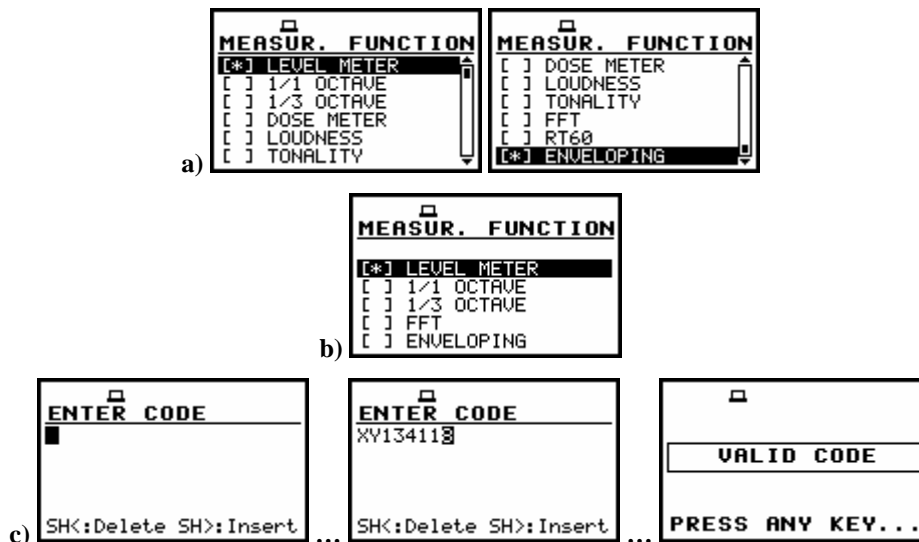


FUNCTION list opened, **MODE** selected (a) and **MEASUR. FUNCTION** sub-list opened with all available modes b), (c), (d), (e)

4.2 Measurement functions of the instrument - MEASUREMENT FUNCTION

In order to select the required function the user has to enter the **MEASUREMENT FUNCTION** sub-list (to select the **MEASUREMENT FUNCTION** text using the **<▲>**, **<▼>** or **<◀>**, **<▶>** push-buttons and press the **<ENTER>** one, when this text is displayed inversely).

After entering the **MEASUREMENT FUNCTION** sub-list, the set of the available functions appears on the display (**LEVEL METER**, **1/1 OCTAVE**, **1/3 OCTAVE**, **DOSE METER**, **LOUDNESS**, **TONALITY**, **FFT**, **RT60**, **ENVELOPING** and **AEM** in the case **SOUND METER MODE** and **LEVEL METER**, **1/1 OCTAVE**, **1/3 OCTAVE**, **FFT**, **ENVELOPING** in the case of **VIBRATION METER MODE**). The special character marks currently active function.




MEASUREMENT FUNCTION window opened in SM (a), in VM (b) and the activation of the optional function (c)

The main function of the instrument is the **measurement of sound or vibration level**. The other functions are optional and they broaden the applications of the instrument. They can be supported by the producer or purchased later. The producer activates the optional function bought with the instrument. The user should activate by himself the function purchased later.

The **sound LEVEL METER (SLM) mode** provides the user with the functions of the **SLM** meeting the IEC 61672:2002 standard for Type 1 accuracy and the functions of **VLM** meeting the ISO 8041:2005 standard. The instrument can also be used for the long-term acoustic monitoring using for this purpose the huge logger, in which the measurement results are stored.

The **required function** is selected by placing the special character in the line with the **proper** text. The position of the character can be changed using the <▲>, <▼> (or <◀>, <▶>) push-buttons. After placing the character in the line with the function's name the user has to press the <ENTER> push-button, which closes the **MEASUR. FUNCTION** sub-list.

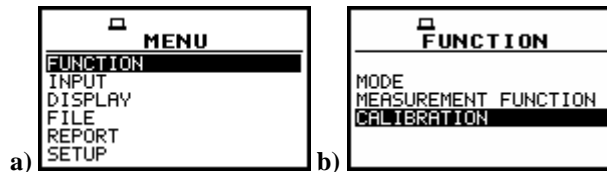


Notice: It is not possible to change the measurement function during the measurements. The instrument displays in this case for about 3 seconds the text: **"MEASUREMENT IN PROGRESS"**. In order to change the mode of the instrument the measurement must be finished!

4.3 Instrument's calibration - CALIBRATION

The instrument is factory calibrated with the supplied microphone for the standard environmental conditions. Because the microphone sensitivity is a function of the temperature, ambient pressure and humidity, when 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 **CALIBRATION** sub-list (to select the **CALIBRATION** text using the <▲>, <▼> or <◀>, <▶> push-buttons and press the <ENTER> one, when this text is displayed inversely).

The **CALIBRATION** sub-list consists of four positions: **BY SENSITIVITY**, **BY MEASUREMENT**, which are used to perform the calibration, **LAST CALIBRATION**, which contains the list of the performed in the past the calibration measurements and the obtained results and **TEDS**, which is used for automatical reading of vibration transducer parameters.



Displays with the main list, the **FUNCTION** text selected (a), the **FUNCTION** list opened, the **CALIBRATION** text selected (b)

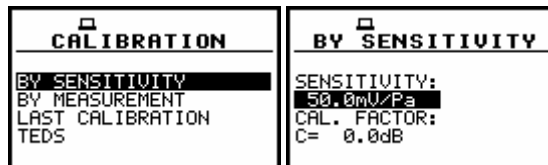


Note: The calibration level and the calibration result is expressed in different units depending on the settings of the instrument. The metric or non-metric vibration units are set in the **VIBRATION UNITS** (path: MENU / SETUP / VIBRATION UNITS). Additionally, the linear or logarithmic units are set in the **DISPLAY SCALE** (path: MENU / DISPLAY / DISPLAY SETUP / DISPLAY SCALE).

4.3.1 Calibration BY SENSITIVITY in the case of acoustic signal

The calibration by the microphone's sensitivity introduction can be conducted in the following way:

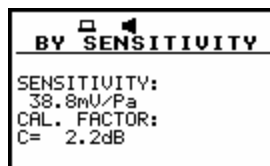
1. Select this type of the calibration (highlight the **BY SENSITIVITY** text) from the **CALIBRATION** sub-list and press the <ENTER> push-button.



Displays with the selected calibration mode and after entering this mode



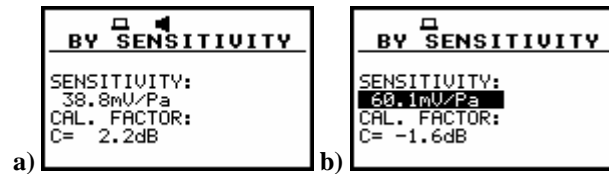
Notice: It is not possible to calibrate the instrument during the execution of the measurements. It is possible to open different lists and sub-lists but the positions in these lists are not displayed inversely and so - not accessible. The "Loudspeaker" icon indicates that the instrument is in the measurement process. In order to change the sensitivity the measurement must be finished!



Displays with the **SENSITIVITY** positions (path: MENU / FUNCTION / CALIBRATION / BY SENSITIVITY) not accessible

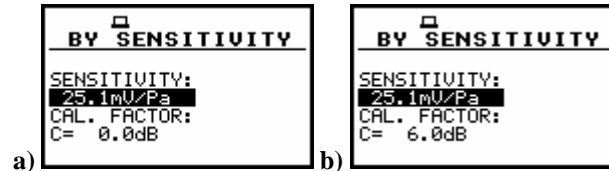
2. Set the sensitivity of the microphone taken from its calibration certificate using the <◀>, <▶> push-buttons and then press the <ENTER> one.

The calibration factor is calculated, after pressing the <ENTER> push-button, in the relation to 50.0 mV / Pa. In order to avoid the calculation the user has to leave the **CALIBRATION** without pressing <ENTER>. For the sensitivity of the microphone higher than 50.0 mV / Pa the calibration factor is negative.



Displays during setting the sensitivity higher than 50.0 mV / Pa (a) and after pressing the <ENTER> push-button with the calibration factor calculated (b)

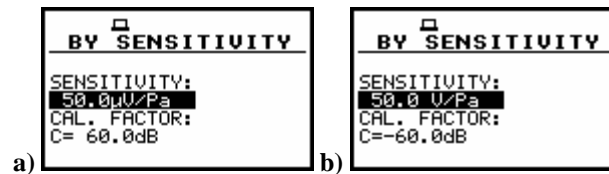
For the sensitivity of the microphone lower than 50.0 mV / Pa the calibration factor is positive.




Displays during setting the sensitivity lower than 50.0 mV / Pa (a) and after pressing the <ENTER> push-button with the calibration factor calculated (b)

The lowest applicable value of the sensitivity to be introduced is equal to 50.0 μ V / Pa (it conforms to the calibration factor equal to 60.0 dB) and the highest one – 50.0 V / Pa (calibration factor equal to -60.0 dB).

In order to return to the **CALIBRATION** sub-list the user has to press the <ESC> push-button.



Displays with the lowest possible sensitivity and the highest calibration factor (a) and the highest sensitivity and the lowest calibration factor (b)

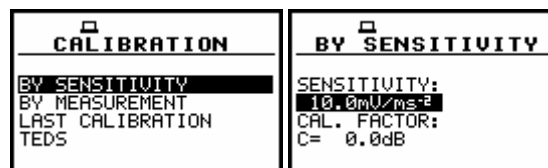


Notice: The calibration factor is always added to the results of measurements and analysis (1/1 OCTAVE, 1/3 OCTAVE, FFT, etc.).

4.3.2 Calibration BY SENSITIVITY in the case of vibration signal

The calibration by the accelerometer's sensitivity introduction can be conducted in the following way:

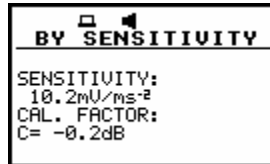
1. Select this type of the calibration (highlight the **BY SENSITIVITY** text) from the **CALIBRATION** sub-list and press the <ENTER> push-button.



Displays with the selected calibration mode and after entering this mode



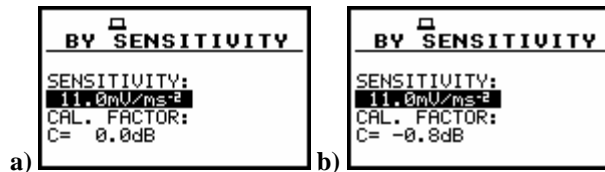
Notice: It is not possible to calibrate the instrument during the execution of the measurements. It is possible to open different lists and sub-lists but the positions in these lists are not displayed inversely and so - not accessible. The “Loudspeaker” icon indicates that the instrument is in the measurement process. In order to change the sensitivity the measurement must be finished!



Displays with the SENSITIVITY positions (*path: MENU / FUNCTION / CALIBRATION / BY SENSITIVITY*) not accessible

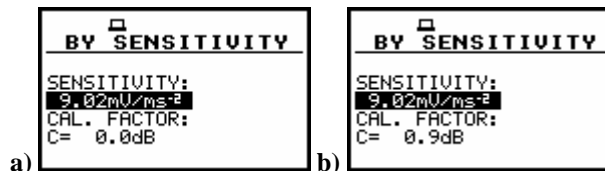
2. Set the sensitivity of the accelerometer taken from its calibration certificate using the <◀>, <▶> push-buttons and then press the <ENTER> one.

The calibration factor is calculated, after pressing the <ENTER> push-button, in the relation to $10.0 \text{ mV} / \text{ms}^{-2}$. In order to avoid the calculation the user has to leave the CALIBRATION without pressing <ENTER>. For the sensitivity of the accelerometer higher than $10.0 \text{ mV} / \text{ms}^{-2}$ the calibration factor is negative.



Displays during setting the sensitivity higher than $10.0 \text{ mV} / \text{ms}^{-2}$ (a) and after pressing the <ENTER> push-button with the calibration factor calculated (b)

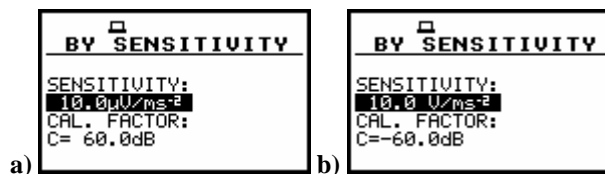
For the sensitivity of the accelerometer lower than $10.0 \text{ mV} / \text{ms}^{-2}$ the calibration factor is positive.



Displays during setting the sensitivity lower than $10.0 \text{ mV} / \text{ms}^{-2}$ (a) and after pressing the <ENTER> push-button with the calibration factor calculated (b)

The lowest applicable value of the sensitivity to be introduced is equal to $10.0 \mu\text{V} / \text{ms}^{-2}$ (it conforms to the calibration factor equal to 60.0 dB) and the highest one – $10.0 \text{ V} / \text{ms}^{-2}$ (calibration factor equal to -60.0 dB).

In order to return to the CALIBRATION sub-list the user has to press the <ESC> push-button.



Displays with the lowest possible sensitivity and the highest calibration factor (a) and the highest sensitivity and the lowest calibration factor (b)



Note: The calibration factor is always added to the results in the **VIBRATION LEVEL METER** mode (**VLM**), **1/1 OCTAVE**, **1/3 OCTAVE** and the **FFT** analysis modes.

4.3.3 Calibration BY MEASUREMENT in the case of acoustic signal

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

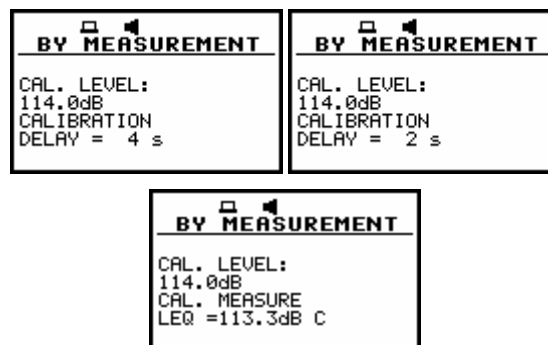
1. Select the calibration by measurement (highlight the **BY MEASUREMENT** text) from the **CALIBRATION** sub-list and press the **<ENTER>** push-button.
2. Attach the acoustic calibrator **SV 30A** (or equivalent **114 dB / 1000 Hz**) to the microphone of the instrument.



Notice: It is also possible to use the pistonphone, which generates the signal ca 124 dB or different type of acoustic calibrator dedicated for $\frac{1}{2}$ " 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 **BY MEASUREMENT** sub-list), which is usually stated in the calibration certificate of the unit (the value of the **CAL. LEVEL** set by the producer of **SVAN 959** is equal to 114 dB).**

3. Switch on the calibrator and wait ca 30 seconds before starting the calibration measurement.
4. Start the calibration measurement by pressing the **<START / STOP>** push-button.

The measurement time is set to 5 seconds with 5 seconds delay. During the calibration measurement the **<ESC>** and **<PAUSE>** push-buttons do not operate but it is possible to stop the measurement using the **<START / STOP>** one. It is not recommended to stop the calibration measurement before programmed 5 seconds period!



Displays during the calibration measurement

Waiting for the start of the measurements the **DELAY** is counted down on the display. After the end of the measurement, its result is displayed 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 ± 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.



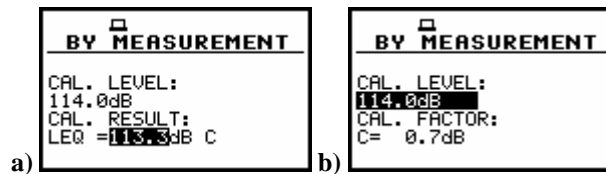
Notice: During the calibration measurement, the external disturbances (acoustic noise or vibrations) should not exceed the value of 100 dB.

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

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



Notice: The user has to press the <ESC> push-button in order to quit the calibration procedure without saving the calibration factor.

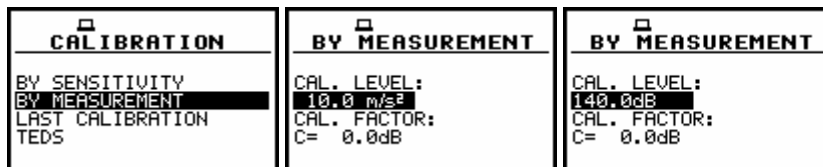


Displays after the measurements (a) and after the acceptance of the value of the calibration factor (b)

4.3.4 Calibration BY MEASUREMENT in the case of vibration signal

The calibration by measurements can be conducted in the following way:

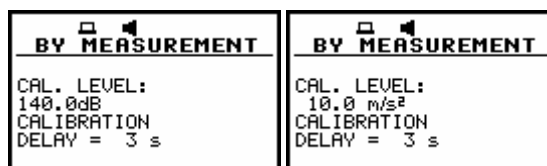
1. Select the calibration by measurement (highlight the **BY MEASUREMENT** text) from the **CALIBRATION** sub-list and press the <ENTER> push-button.



Displays with the selected calibration mode and after entering this mode

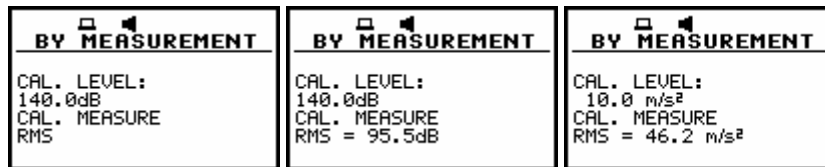
2. Attach the vibration calibrator to the instrument's accelerometer.
3. Switch on the calibrator and wait approximately 30 seconds before starting the calibration measurement.
4. Start the calibration measurement by pressing the <START / STOP> push-button.

The measurement starts after 5 seconds delay. The measurement time is also predefined to 5 seconds. During the calibration period, the <ESC> and <PAUSE> push-buttons do not operate but it is possible to stop the measurement using the <START / STOP> push-button. Waiting for the calibration measurement to begin, a **DELAY** is counted down.

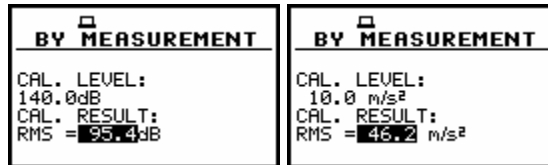


Displays while the instrument is waiting for the calibration measurement to commence

At the end of the measurement, the result is displayed on the display in the bottom line.



Displays during the calibration measurements



Displays after the calibration measurements

The calibration procedure should be repeated a few times to ensure the integrity of the calibration. The obtained results should be almost identical (with ± 0.1 dB difference). The reasons for unstable results are as follows:

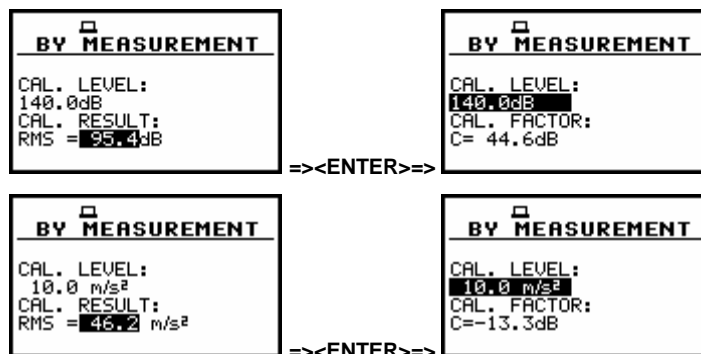
- the calibrator is not properly attached to the instrument,
- there are external disturbances,
- the calibrator or the measurement channel (the accelerometer or the instrument itself) are damaged.



Note: During the calibration period, external disturbances (vibrations or acoustic noise) should not exceed 100 dB.

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

The calibration factor is calculated, stored and displayed (cf. Fig. below for logarithmic and linear scale – path: MENU / DISPLAY / DISPLAY SETUP / DISPLAY SCALE / SCALE) after pressing the <ENTER> push-button.



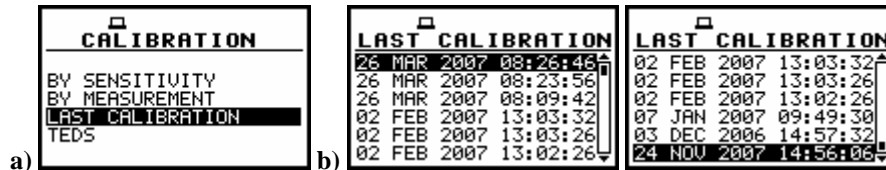
Displays after pressing the <ENTER> push-button (after calculation of the calibration factor value)



Note: The calibration factor is always added to the measurement results in the LEVEL METER mode and to those coming from the frequency analysis (1/1 OCTAVE, 1/3 OCTAVE, FFT and ENVELOPING).

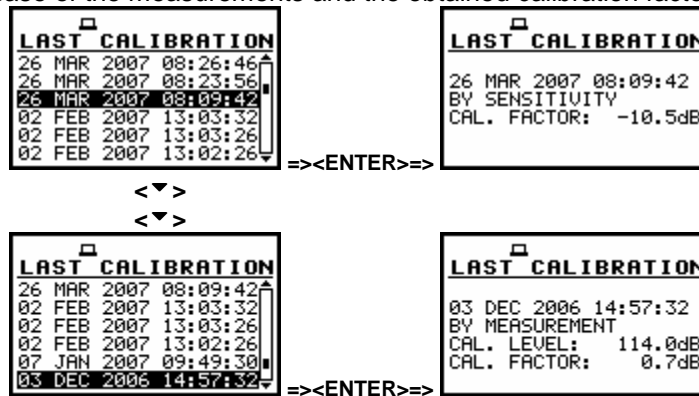
4.3.5 History of the calibration - LAST CALIBRATION

In order to enter the **LAST CALIBRATION** window in which up to last ten calibration records are remembered, the user has to select the proper text in the **CALIBRATION** window using the <▲>, <▼> push-buttons and press the <ENTER> one.



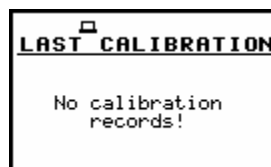
Displays in the **CALIBRATION** window, the **LAST CALIBRATION** text selected (a)
the **LAST CALIBRATION** window opened with ten calibration records (b)

In order to review the calibration record, the user has to select the required line in the **LAST CALIBRATION** window using the <▲>, <▼> push-buttons and press the <ENTER> one. The opened window contains the date and time of the performed calibration measurement, the way the calibration was done (**BY MEASUREMENT** or **BY SENSITIVITY**), the desired calibration level (**CAL. LEVEL**) in the case of the measurements and the obtained calibration factor (**CAL. FACTOR**).



Displays with the **LAST CALIBRATION** records

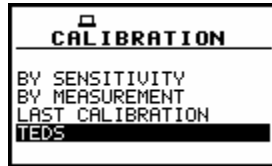
In the case when the calibration measurements were not performed, the **LAST CALIBRATION** window does not contain any record. The contents of this window is cleared after the **CLEAR SETUP** operation.



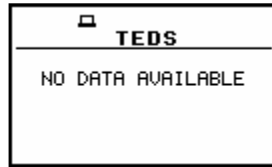
Display with the empty **LAST CALIBRATION** window

4.3.6 Automatic reading of a vibration transducer parameters - TEDS

The **TEDS (Transducer Electronic Data Sheet)** function enables automatic reading by the instrument the sensitivity and other electronics parameters of vibration transducer. This function will be available soon. In order to enter the **TEDS** window the user has to select the **TEDS** text in the **CALIBRATION** list using <▲>, <▼> push-buttons and press the <ENTER> one.



CALIBRATION window, TEDS text highlighted



TEDS window opened, NO DATA AVAILABLE message