

SV 104

ACOUSTIC DOSIMETER

USER'S MANUAL



*SVANTEK Sp. z o.o.
WARSAW, June 2014*



Notice: The SV 104 dosimeter contains no user serviceable parts. Opening product case invalidates the warranty.



Notice: When in normal use, always fit the SA 122 windshield provided.



Notice: Battery power indicator - To improve accuracy of remaining battery life indicator, run the dosimeter until it is fully discharged; then proceed with a full charge via the micro USB port. The procedure is recommended before first use. Repeat this procedure every few months of use to maintain more accurate current battery condition indication.



Notice: On account of continuous product improvement SVANTEK reserves the right to make changes to product specifications without notice. To download the most up to date user's manual please visit our web site at www.svanteke.com. This user's manual presents the firmware revision named 1.07.3 (see the **Unit Label** review chapter 4.5 to check version details). This user's manual presents some aspects of SUPERVISOR software revision named 1.3.18 (see the software start-up splash screen). The succeeding software revisions (marked with the higher numbers) can change the view of some displays presented in the text of the manual.



WEEE Notice: Do not throw the device away with the unsorted municipal waste at the end of its life. Instead, hand it in at an official collection point for recycling. By doing this you will help to preserve the environment.

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1

INTRODUCTION

The **SV 104** instrument is a revolutionary new approach to occupational health and safety noise monitoring offering **voice comments**, **audio events recording** and **vibration shock detection** functions which are new and useful concepts in an instrument of this size. It is a cable-free dosimeter and is typically attached to the user's shoulder, close to the ear using the mounting clips supplied.

This personal dosimeter has an **incredibly robust** 1/2" MEMS microphone (part number **SV 27**) enabling easy and automatic calibration using most commonly available acoustic calibrators.

The class beating, high resolution, **amazing colour OLED** screen displays information in both text and graphical form and offers excellent visibility in dark sites as well as in full daylight conditions. This makes taking noise measurement a real pleasure.

Three independent acoustic profiles allow parallel measurements with separately defined filters and RMS detector time constants. Each profile provides an extensive number of results (like **Leq, Lmax, Lmin, Lpeak, L, LE,...**). All required weighting filters (**A, C, Z**) can be calculated in parallel.

For instance, it is trivial to set one profile to monitor noise parameters using the ACGIH (American Conference of Governmental Industrial Hygienists) preset, second profile set to OSHA HC (Occupational Safety and Health Administration - Hearing Conversation) preset and simultaneously monitor noise with the OSHA PEL (Occupational Safety and Health Administration – Permissible Exposure Level) settings.

Using the computational power of its digital signal processor the **SV 104** instrument can simultaneously measure the dosimeter results and perform real time **1/1 Octave** analysis including the calculations of the statistical levels.

An inbuilt tri-axial accelerometer for **vibration shock detection** firmly places **SV 104** as both the most technically advanced and the most robust personal dosimeter out there.

Advanced **time history logging** for each profile provides safe and complete information about measured signal in the internal **large 8GB memory**.

The instrument is powered from internal new generation Ni-MH **rechargeable batteries** offering circa **40 hours**¹ of continuous operation. This new cell technology offers up to **1800 charge cycles** in comparison to standard maximum 500 cycles. Low battery self-discharge is about 3% per month in comparison to 40% per month in standard NiMH technology. The **powering and charging of the instrument from the USB** interface is provided which also enables easy data exchange connection between the **SV 104** and a PC without the requirement of a special docking station.

The instrument works with Svantek's specialist health and safety software package - **Supervisor**, and also with the full analysis package **SVAN PC++**.

Robust and lightweight design including innovative **magnetic mounted windshield** enhances the exceptional features of this new generation instrument. Add to it the **automatic calibration** feature and one can say: "Never before has a noise dosimeter been so accomplished yet so affordable, making your measurements more **accurate and reliable than ever before**".

To get started quickly with the **SV 104**, the first part of the manual describes basic noise dosimetry information followed by a guide to setting up the dosimeter and running measurements.

¹ Display off. Octave analysis off;

1.1 Sound pressure

The human ear responds to audible sound pressure levels in the range from 20 μ Pa (hearing threshold) to 20 Pa (pain threshold), resulting in the enormous scale 1:10,000,000. Since using such a large arithmetic scale is not practical, a logarithmic scale in decibels (dB) was introduced which is also in agreement with physiological and psychological hearing sensations. Therefore it is common that sound pressure is measured in decibels. Below there is sample information about expected sound levels for different sources.

Sound source	Sound level [dB]
Jet aircraft, 50 m away, or gunshot at close range	140
Threshold of pain	130
Threshold of discomfort	120
Chainsaw, 1 m distance	110
Disco, 1 m from speaker	100
Vacuum cleaner, distance 1 m	70
Conversational speech, 1 m	60
Quiet library	40
Rustling leaves	10
Hearing threshold	0

Table 1-1 Example sound source levels

1.2 Dosimetry

Noise is definitely a serious hazard in many workplaces. In case exposure to noise from machinery processes and equipment is not correctly eliminated or controlled, it may cause permanent hearing loss in workers. The, so called, inner ear is very fragile part of our hearing sense, which with current knowledge in medicine, cannot be truly repaired. Therefore it is of great importance to protect our senses from excessive noise. Exposure to high levels of noise may also create physical and psychological stress, reduce productivity and interfere with normal communications. This may lead to accidents and injuries by making it difficult to hear moving equipment, other workers, and warning signals. Undoubtedly hearing loss has a very significant impact on the quality of life for many workers and their families.

Therefore measuring noise exposure in the workplace is fundamental part of all good hearing conservation and noise reduction programs. The aim of taking a measurement with a noise dosimeter is to evaluate the average exposure of employees to noise during a normal shift. Wherever the worker goes the noise dosimeter goes too so that it captures all of the harmful noise during the typical day.

The dosimeter may be worn for the complete shift if the work pattern is so variable that it is difficult to predict exactly what will occur or it may be worn for a shorter but representative period and then the full day's dose extrapolated from that sample.

1.3 Standards

The effects of high sound exposure on hearing have been studied for many years. As far back in 1954 AIHA (American Industrial Hygiene Association) – Rosenwinkel & Stewart – described a “new device which integrates sound energy over finite time periods.” In 1956 – von Witternand & von Gierke obtained a patent for a noise exposure meter for “indicating the total time that noise exceeded a certain predetermined levels.” Since then, measurements could be conducted over long periods of time and the instrument was worn by personnel under normal work conditions.

Finally, organizations developed standards to regulate personal noise exposure. International standards are specified by health and safety regulations such as the European Union Parliament and Council Directive 2003/10/EC of February 6, 2003 on minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) or International Electrotechnical Commission IEC-61252 guidelines. The EU directive links to the ISO 9612-2009 Acoustics – Determination of occupational noise exposure – Engineering method.

In the United States, the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910 General Industry Regulations: Standard No. 1910.95 Occupational noise exposure, the Mine Safety and Health Administration (MSHA), and the American Conference of Governmental Industrial Hygienists (ACGIH) have created slightly different regulations and limitations on tolerable noise exposure. Noise requirements are to ensure that the hazards associated with the exposure of workers to noise are eliminated or properly controlled.

Organization	Website address
ISO	http://www.iso.org
IEC	http://www.iec.ch
OSHA	http://www.osha.gov
MSHA	http://www.msha.gov
NIOSH	http://www.cdc.gov/niosh
ACGIH	http://www.acgih.org
CCOHS	http://www.ccohs.ca
...	

Table 1-2 Standardization organizations' websites

Additionally, at present dosimeters should meet relevant accuracy and performance requirements defined by:

- **IEC 61252**
- **ANSI S1.25**

1.4 Applications

The SV 104 noise dosimeter is extremely well suited to ISO, OSHA, ACGIH, MSHA, NIOSH, workplace noise measurements in noise exposure assessments. The dosimeter comes with pre-defined setups that suit different measurement requirements and offer versatile possibilities to be specifically configured by the user for special requirements if needed:

- Measurement and control of the industrial noise
- work site assessments
- sites/plants/facilities survey monitoring systems
- hearing conservation compliance
- transportation noise studies
- personal noise verifications
- peak dosimeter for example in military applications

One of the most desirable **SV 104** feature is the unique data logging function that stores significant number of noise parameters at regular intervals and superimposed random vibration shock or audio events during a run.

Noise profiled results can be easily transferred to the **Supervisor** or **SvanPC++** software packages. The noisiest times can be immediately seen in the graphical report and actions directed to the appropriate area. This makes checking for different regulatory bodies' compliance and ensuring if hearing conservation programs are needed definitely easier than ever before. The **SV 104** answers all the important questions such as WHEN? and HOW? did the noise exposure appear? The data logging measurements can be started immediately or they can be pre-programmed in advance so that measurement run can begin and end automatically at a preset start and end time without the need for any onsite supervision.

Additionally the **SV 104** allows for custom **voice note comments** to be added before or after the measurement run, and therefore this is the ideal instrument for the professional occupational hygienist to use for all noise exposure studies.

1.5 Measurement procedures

Preferably, when taking measurements, the noise dosimeter should be attached to the employee at the start of a shift and collected at the end of the whole shift. In case a shorter period is sampled then care should be taken to ensure that the result is representative of the full shift exposure. Shorter sampled periods require that the sampler has a deep and full understanding of the expected working tasks during the shift and the duration cycles of those tasks.

Before performing any noise measurements, ensure that employees selected for evaluation are operating equipment or performing tasks under normal (representative) conditions, and emphasise the importance of continuing to work in their usual manner (wearing the dosimeter should not interfere with normal duties). Explain the purpose and procedures of sampling to the employee who will be wearing the dosimeter and the importance of not touching, tapping or interfering with the microphone. Instruct the employee not to remove the dosimeter unless absolutely necessary.

The general procedure for taking measurements could be as follows:

1. Check that the indicated instrument battery life is at least twice the time required for the measuring period
2. Check the instrument setup mode is appropriate and change if necessary
3. Check the calibration of the instrument and adjust the settings if required
4. Secure the instrument onto the shoulder of the employee selected for sampling. Refer to the chapter with specific requirements regarding orientation of the microphone
5. Start the recording session manually if it is not programmed for an automatic timed start
6. At the end of the measurement period, stop the recording session, and remove the dosimeter from the employee
7. Recheck the dosimeter's calibration. If the instrument is not within the calibration limits then the results are invalid (usually if a discrepancy is found between two successive checks of more than $\pm 0.5\text{dB}$ in the reference level, then the results of the measurements taken between the two checks should be considered invalid and the cause investigated and the measurement repeated).
8. Follow your organisation's specific procedure for personal noise exposure recordings analysis
9. Ensure the report is submitted to the appropriate person
10. Distribute copies of noise exposure recordings to test participants, explain the results and ensure that their hearing protection adequately protects against the recorded noise exposure levels.

2

KIT COMPONENTS

2.1 SV 104 dosimeter short form specification

- Acoustic Dosimeter conforming to international standards **IEC 61252; ANSI S1.25;**
- Class 2 Microphone, MEMS type: **SV27**, 1/2" housing
- **OLED colour display** with super brightness and contrast
- Large **8GB memory**
- **USB 2.0** high speed interface
- Parallel **Slow, Fast, Impulse** detectors for the measurements with **A, C, Z** filters
- Frequency Range **20 Hz ÷ 10 kHz**
- Measurement range better than **60 dBA RMS ÷ 140.1 dBA Peak**
- Dynamic Range better than **90 dB**
- Exchange rates **2, 3, 4, 5, 6**
- Measurement results: **Run Time, Lpeak, Lmax, Lmin, Lp, DOSE (%), D_8h, PrDOSE, Lav, Leq, LAV, LE, SEL8, E, E_8h, LEPd, PSEL, Ltm3, Ltm5, Lstat, PTC, PTP, ULT, TWA, PrTWA, Lc-a**
- **3** independent user configurable acoustic measurement profiles
- Easy in use **predefined setups**
- **Time-history data logging** of Leq/Lav/Lmax/Lmin/Lpeak with variable 0.1 s to 1 hr logger step and separate summary results intervals with statistical levels
- **1/1 Octave** real time analysis - 9 filters with centre frequencies 31 Hz ÷ 8 kHz, Type 2 – IEC 1260; presented as a bar graph with Leq and Lmax band levels plus overall A, C and Z broadband weightings (as option called SF 104-OCT)
- **Audio events recording**, triggered and continuous mode, 12/24 kHz sampling rate, wav format (as option called SF 104-WAV)
- **Voice Comments** records audio on demand, created before or after measurement, added to measurement file
- **Vibration shock detector** with user selectable variable threshold: 1g-15g
- **Automatic acoustic field calibration** with one touch activation before and after measurement
- Operational time **> 40 hours** (*display off, octave analysis off*)
- Extremely **compact, lightweight and robust case with IP65 ingress protection**



Figure 2-1 SV 104 instrument with the microphone and windshield

2.2 Accessories included

- **SV 27** - ½" MEMS microphone for SV 104 dosimeter
- **SA 122** - windshield
- **SC 156** - micro USB 2.0 cable
- **CD with instruction**
- **Built-in rechargeable batteries** (charger/ power supply wall adapter not included)

2.3 Accessories available

- **SV 27** – ½" MEMS microphone for SV 104 dosimeter
- **SA 122_3** – Windscreens for SV 104 dosimeter 3 pcs per pack
- **SV 34** – Class 2 acoustic calibrator: 1000Hz/114dB
- **SC 156** – micro USB 2.0 cable
- **SA 54** – Charger/power supply for 1 x SV 104
- **SA 73** - Carrying case for 5 x SV 104 dosimeters and accessories (waterproof)
- **SA 156** – USB HUB for charging and data download from 5 x SV 104 dosimeters
- **Supervisor Software** for configuration, viewing and exporting data, USB drivers (MS Windows XP, Vista, Windows 7) for 32 and 64 bit operating systems available as freeware

2.4 Instrument Software (Firmware) options available

- **SF 104 OCT 1/1** – real time 9 band 1/1 Octave analysis option
- **SF 104 WAV** – Audio events recording option



Notice: *The software options can be purchased in any time as only the introduction of a special code is required for their activation.*

3 GETTING STARTED

3.1 System description

The following Figure 3-1 shows the **SV 104** controls and ports:



Figure 3-1 SV 104 at a glance

3.2 Input output interfaces description

SV 104 instrument is equipped with a set of useful interfaces:

- microphone connector (essential for measuring)
- micro USB connector (charging, and data download)
- charging connector (reserved for future use)
- fast infrared port (reserved for future use)



Figure 3-2 SV 104 side view – microphone and micro USB connector



Figure 3-3 SV 104 back view - charging and infrared port (reserved for future use)

3.3 The windshield

During use, it is strongly recommended that the **SV 104** is fitted with the supplied **SA 122** windshield. To calibrate the dosimeter it is necessary to remove the windshield to gain access to the microphone. It is not necessary to remove the windshield to record the voice note comments.

The **SV 104** uses an innovative windshield magnetic technique to fit tightly onto the microphone housing. To remove the windshield just put more force holding the lower half of the foam and lift the windshield off the microphone housing. Once the **SV 104** has been calibrated, refit the windshield by carefully placing it back over the microphone again.



Figure 3-4 SA 122 windshield

3.4 The mounting clips

Upon delivery, the **SV 104** will be fitted with the standard mounting clips. Mounting clips can be changed using a pair of pliers.



Figure 3-5 SV 104 standard mounting clips

3.5 LED status indicator

There is a three-colour instrument LED status indicator on the SV 104, located to the right of the microphone mounting head and above the display. Table 3-1 explains conditions under which the specific LED colour appears.

LED status indication	Description
GREEN flashing once per second	Indicates the measurement is running and the dose alarm level has not been exceeded.
AMBER flashing once per over a dozen seconds	Indicates the measurement is stopped and the dose alarm level has not been exceeded.
RED single isolated flashes with a duration of nominally one second	Indicates vibration shock threshold has been detected . This will go off once the high vibration shock has ceased.
RED flashing quickly , four times per second	Indicates the alarm conditions : for instance: the dose has exceeded the alarm level.

Table 3-1 LED status description

3.6 Status bar icons

The upper part of the display is designed as basic status information provider. See the description below.

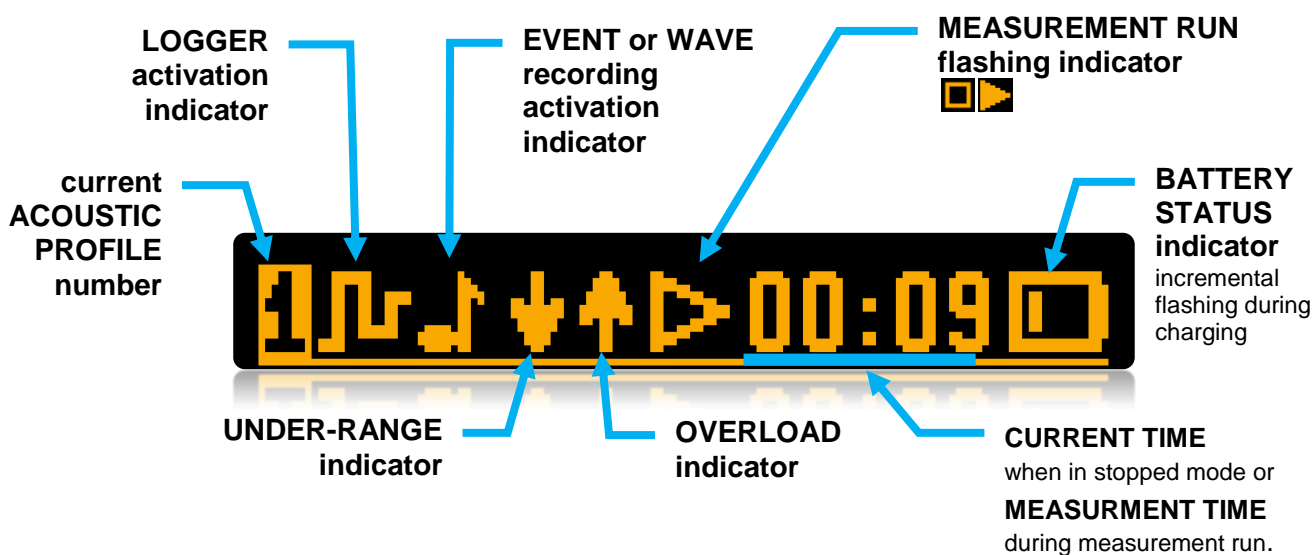





Figure 3-6 SV 104 display icons description

3.7 Manual control of the instrument

Although the Instrument is small, its keypad is designed to be minimal, but still highly ergonomic and easy to use providing effective operational capabilities. Thanks to that, the number of the control push-buttons of the instrument is reduced to only three.

Generally the user can operate the instrument by:

- change the **VIEW**² mode with the <ENTER>  key
- select the required **ACOUSTIC PROFILE**³ with the <PROFILE>  key
- and **SCROLL** through the results with the <SCROLL>  key



Notice: To save power consumption and extend battery life **SV 104** will automatically switch off the display after 30 seconds if no button on the keypad is pressed. The LED indicator will still inform the user about the current state of operation and any possible alarm conditions. Press any key, to reactivate the display.

² See chapter 3.9 about VIEW modes

³ See chapter 3.8 about “3in1” functionality (3 independent acoustic profiles)

3.7.1 Primary key functions

On the front panel of the instrument the following control push-buttons are located. See below for primary (short press) key functions description:

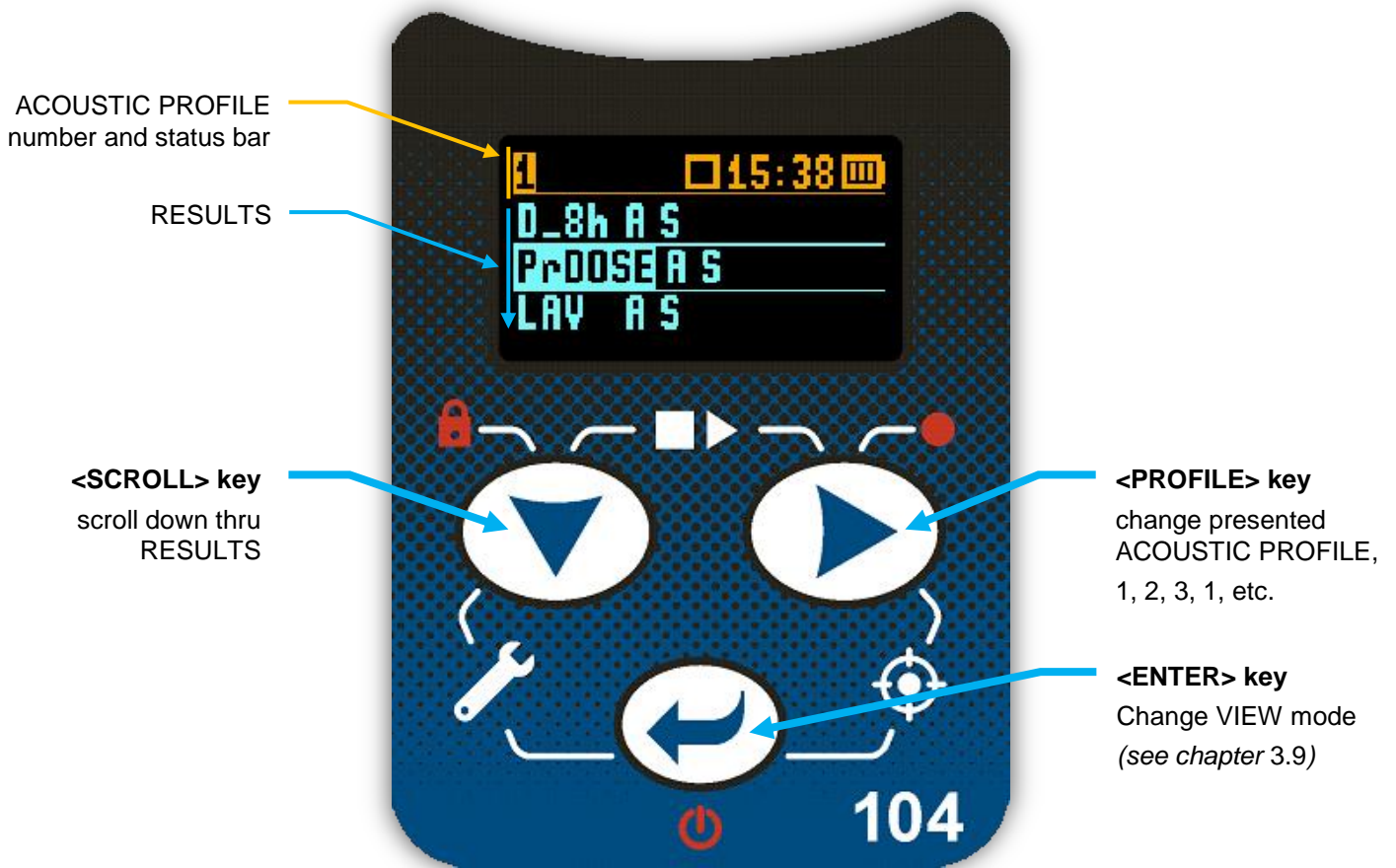





Figure 3-7 Control keypad on the front panel – primary key functions

3.7.2 Alternate key functions

Alternative **long press of single key** (keypad icons marked with red colour) allows quick access to special functions:

- **POWER ON/OFF** the unit by holding down the **<ENTER>**  key
- Record the **VOICE COMMENT** by holding down the **<PROFILE>**  key
- **LOCK** keypad and screen by holding down the **<SCROLL>**  key

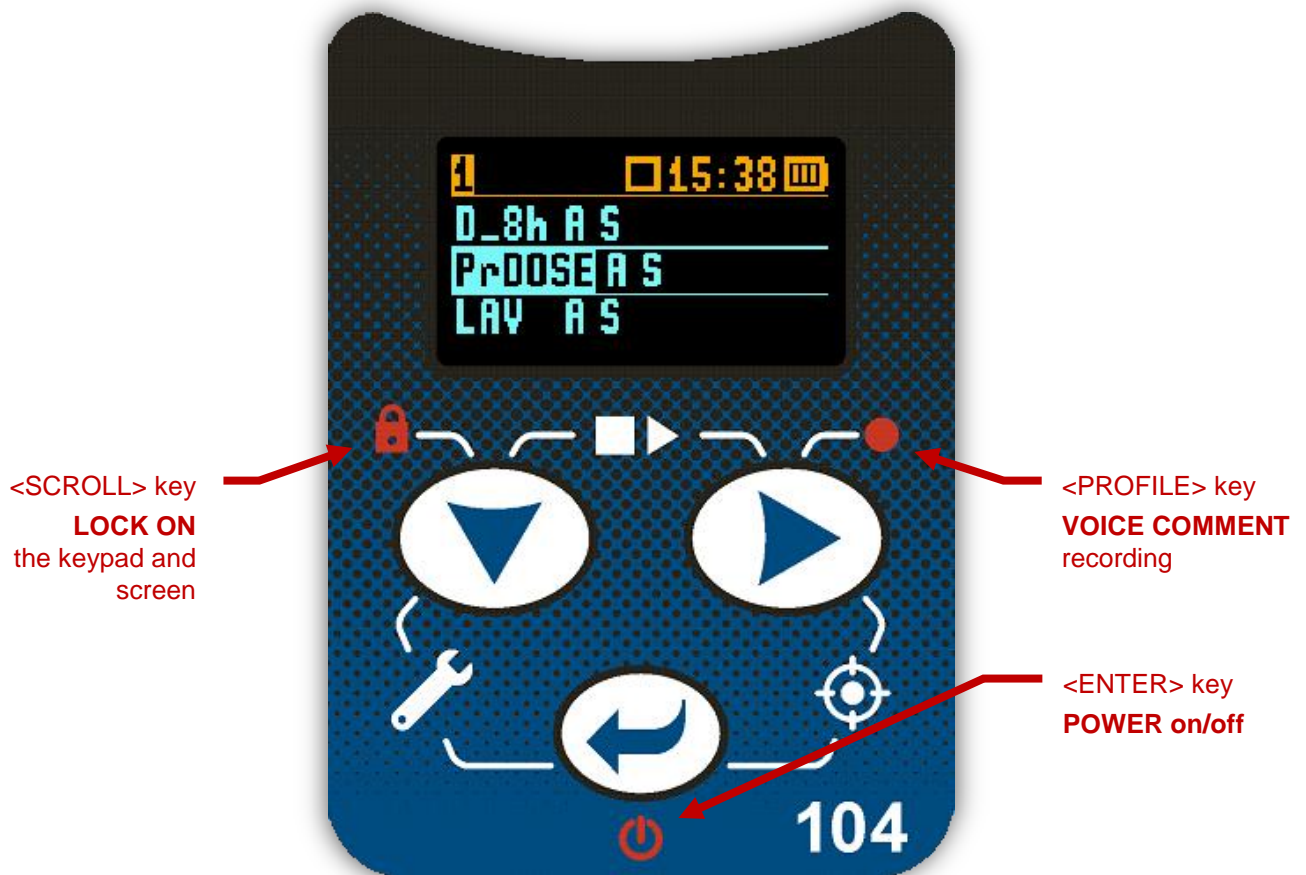





Figure 3-8 Control keypad on the front panel – alternate key functions

Holding down individual key for few seconds during which a countdown is displayed the SV 104 gives you time to decide if you really want to access the function that is going to be executed:

- Shutting down 3... 2... 1... for the **<ENTER>**  key
- Keyboard lock 3... 2... 1... for the **<SCROLL>**  key
- Voice comment 3... 2... 1... for the **<PROFILE>**  key

If you release the key too early, **SV 104** returns to the last used **VIEW** mode and the selected control is not executed.

3.7.3 Alternate combined keys functions

Additionally, **combined short press of two keys simultaneously** (keypad icons marked with white colour) allow quick access to even more functionalities.

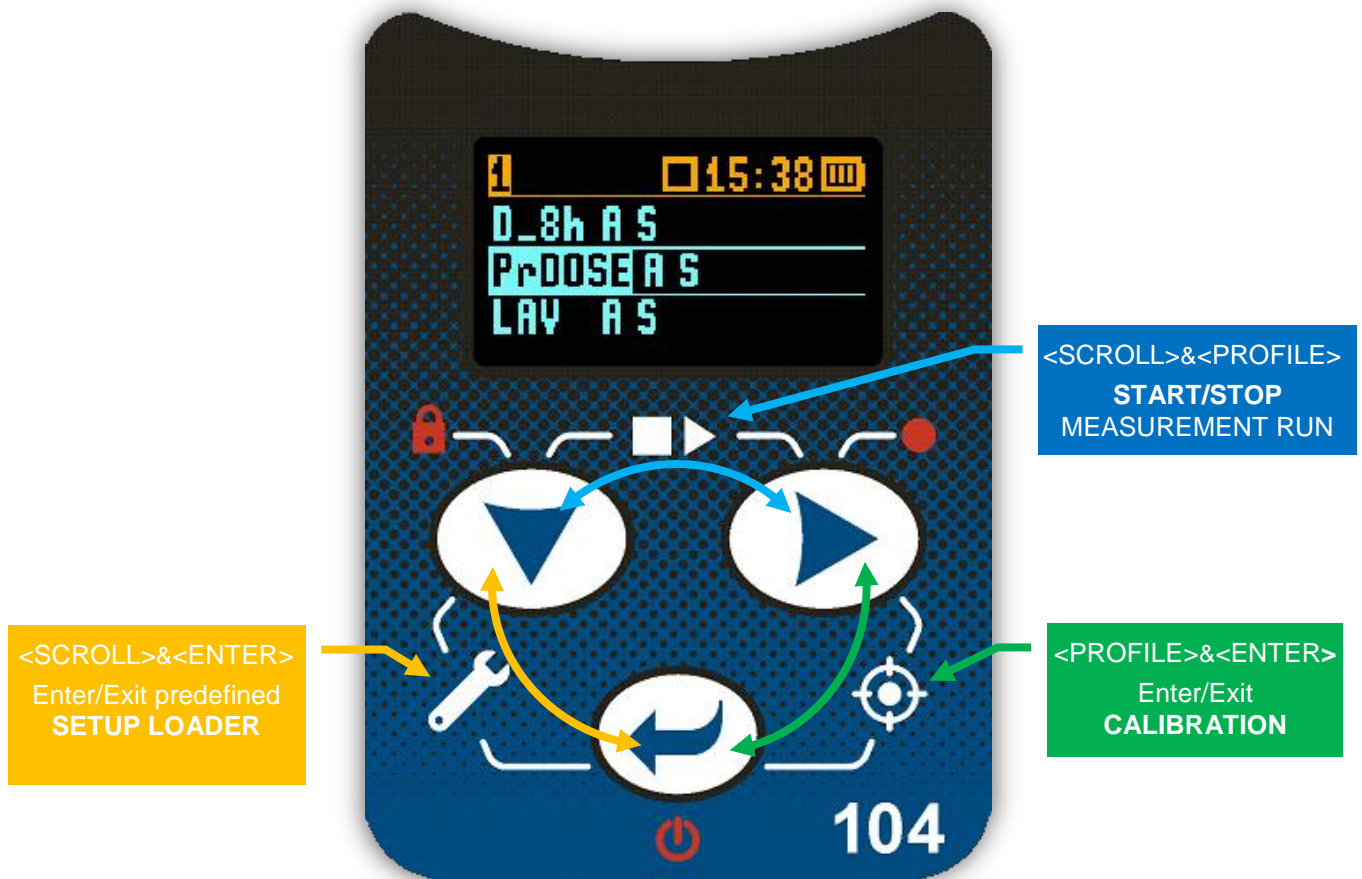




Figure 3-9 Control keypad on the front panel – alternate combined keys function



Notice: Extra additional keypad functionality is also available to display the instrument's **Unit Label** screen showing the current firmware revision number. It is accessible by a **short press of all three keys at once**.



Notice: Microphone compensation filter setting is accessible by holding down **<SCROLL>**  and **<ENTER>**  keys simultaneously for three seconds.

Warning: Changing microphone compensation filter setting is not recommended for purposes other than laboratory calibration!

3.8 Three instruments in one – ACOUSTIC PROFILE concept

SV 104 is able to monitor and log noise by enabling up to three different parameter configuration settings, also referred to as “**ACOUSTIC PROFILE**”. One can set profile no 1 to run measurements using the OSHA HC (Occupational Safety and Health Administration - Hearing Conversation) parameters and at the same time set profile no 2 to monitor the noise with the OSHA PEL (Occupational Safety and Health Administration – Permissible Exposure Level) parameters while profile no 3 is set to ACGIH parameters. This is the true triple instrument in one.

3.9 The VIEW mode presentation concept

Such an advanced noise dosimeter as the **SV 104** offers a large amount of parameters for the operator to inspect. Therefore all information is divided in a neatly organized manner as VIEW modes for each PROFILE.

The **VIEW** mode is a way in which the measurement parameters are presented to the operator. In other words, when you change the VIEW mode, specific measurement parameters and status information will be presented in different manner as distinct screen content.

SV 104 features the following VIEW modes, where most of them can be individually disabled:

- Running instantaneous SPL view mode (3.9.1) - *can be disabled with PC software*
- Primary “one-result” parameters view mode (3.9.2) - *cannot be disabled*
- Results list view mode (3.9.3) - *can be disabled with PC software*
- Octave analysis spectrum LEQ view mode (3.9.4) - *can be disabled with PC software*
- Octave analysis spectrum MAX view mode (3.9.4) - *can be disabled with PC software*
- Instrument Status view mode (3.9.5) - *can be disabled with PC software*

3.9.1 Running SPL view mode

Running SPL presentation mode is used when measurement run is not actually running, that is when the instrument is in standby mode before or after a measurement. In this mode the current SPL result is calculated and displayed, but not stored in the instrument's memory. The purpose of this information is to give the user a first indication of the sound levels about to be measured. This can be useful for some measurements. The instrument behaves as a simple general purpose sound pressure level meter in this view mode.



Figure 3-10 Running SPL view mode screen

3.9.2 Primary “ONE-RESULT” view mode



The one result mode is always available in all measurement modes, and cannot be disabled. In one result mode any measurement result, selected via <SCROLL> , may be presented. The user may change the actual profile view by pressing <PROFILE>  key. This view mode is useful if in low vision conditions or is suitable for operators with some visual impairment.



Figure 3-11 Primary ONE RESULT view mode screen

3.9.3 RESULTS LIST view mode

To get information about a number of results at one time it is handy to switch to the “results list” view mode. Up to three parameters at a time are accessible for the operator.

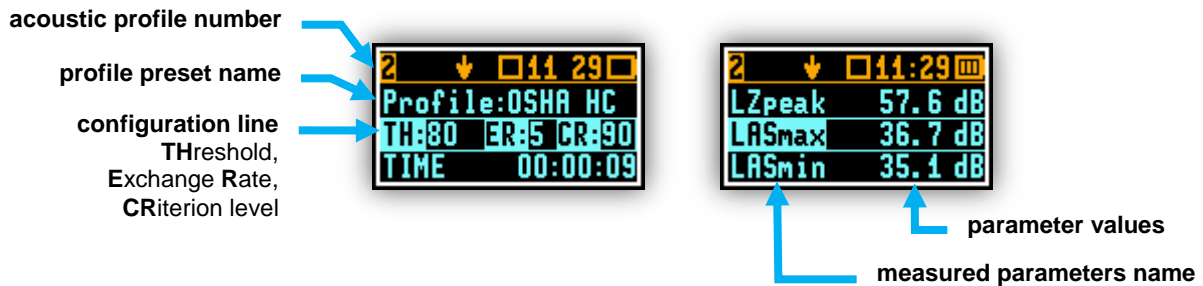





Figure 3-12 RESULTS LIST view mode screens

3.9.4 OCTAVE analysis spectrum view mode

The instrument operates as a real time 1/1 octave band analyser (RTA). In addition and if enabled, 1/1 octave analysis is performed in parallel with the dose meter operations. All 1/1-octave digital pass-band filters (with 9 centre frequencies from 8 kHz down to 31.5 Hz; in base two system) are working in real-time with the broadband frequency weighting filters (Z, A or C) and the linear LEQ (LEQ) detector. This enables the user to pre-weight a spectrum with one of the selected broadband frequency curves if required for a particular application such as the provision of hearing protectors in the control of high workplace noise levels.



Notice: The three overall TOTAL LEQ results are measured with the weighting filters (A, C, Z) without taking into account the settings of the level meters for profiles. The spectra are always linearly averaged. Thus, the TOTAL values from 1/1 octave band analysis can be different from those obtained for the profiles (if the LEQ Integration was set as Exponential).

The results of 1/1 Octave analysis (so-called spectrum) can be examined by the user on a display in Spectrum VIEW presentation mode. 1/1 Octave spectra for all 9 centre frequencies of pass-band filters together with the 3 TOTAL overall values measured with the user selected frequency weighting filters are presented in the Spectrum mode if enabled in configuration setup. Spectrum cursor can be moved left and right with <SCROLL> , <PROFILE>  keys respectively.

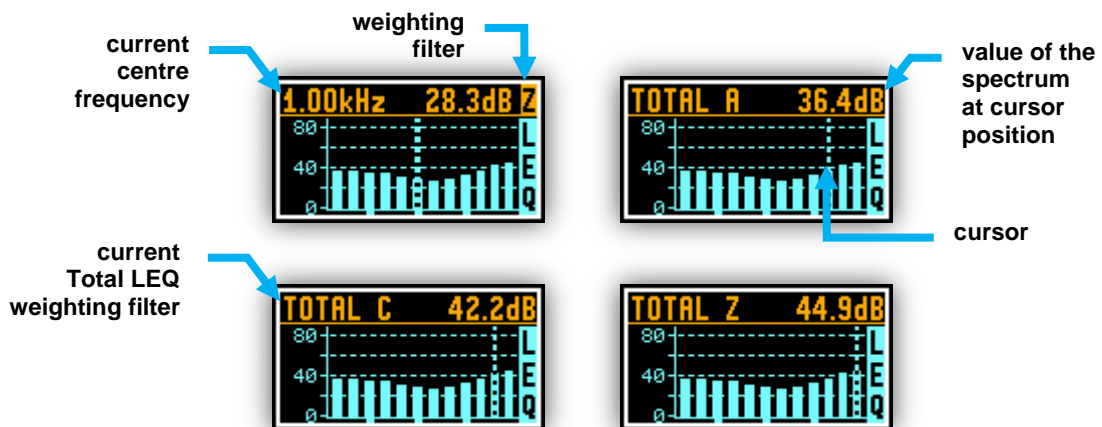


Figure 3-13 OCTAVE analysis spectrum graph LEQ view mode screens

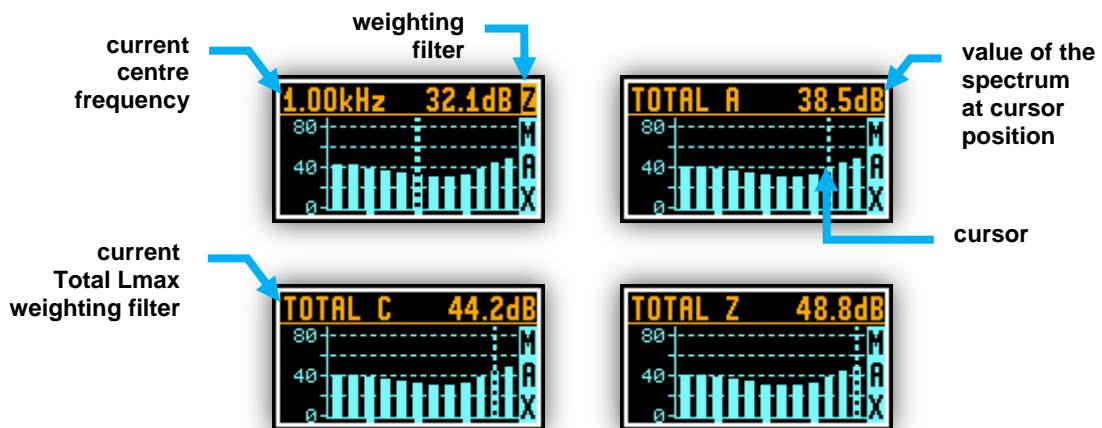




Figure 3-14 OCTAVE analysis spectrum graph MAX view mode screens

3.9.5 INSTRUMENT STATUS view mode

Instrument Status view presents:

- the battery charge status
- along with estimated working time which is Left until the battery is expected to be completely drained
- and current configuration information

Instrument status screen is moved down and up with <SCROLL> , <PROFILE>  keys respectively.

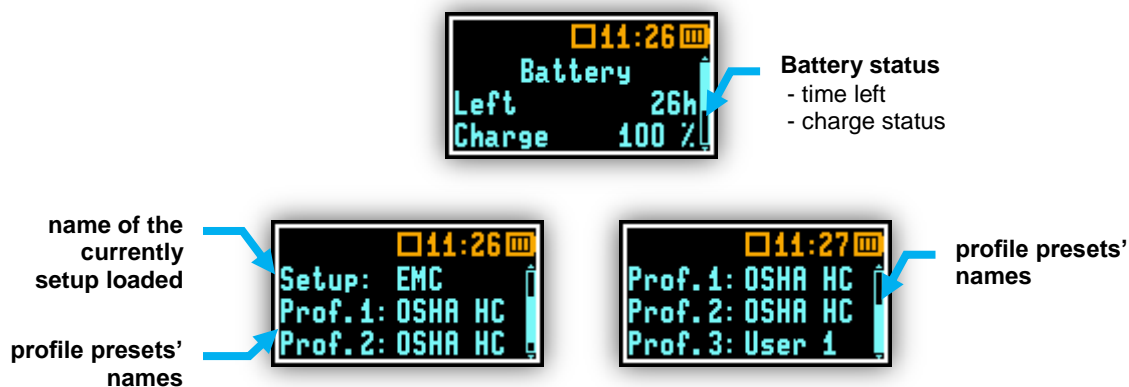


Figure 3-15 INSTRUMENT STATUS view mode screens

3.10 ALARM screen review

Apart from simple LED alarm indications (see chapter 3.5) there are a few alarm conditions, when ALARM presentation screens will appear. During a measurement run the SV 104 will immediately turn on the display at the time that the programmable alarm condition is exceeded. The detailed alarm state condition for each profile is presented to the user. Press any key, to confirm the information.

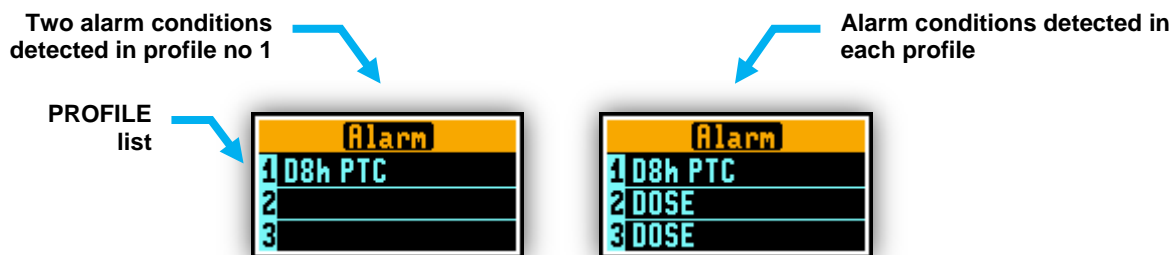


Figure 3-16 ALARM view screens



Notice: At any time when battery power is almost exhausted the “low battery” alarm screen may inform you about immediate recharging requirement.

4 RUNNING AND OPERATING BASIC PROCEDURES

4.1 Charging

SV 104 dosimeter is equipped with an internal charger, so that the fixed internal batteries can be charged directly from computer USB port or optionally provided charger (**SA 54**).

Ensure the **SV 104** is fully charged prior to use by connecting it to a USB port or to USB charger. Ensure the power supply is connected and the supply is switched on. The **SV 104** will automatically turn on the display during charging and present how much charge is within the instrument. The **SV 104** will display 'Fully charged' once charging is complete. This should take approximately 2 hours from a fully discharged state. A charging time of about 30 minutes will be sufficient to perform greater than 8 hours of measurement. A fully charged instrument holds enough charge to run for approximately 40 hours.

Note that once disconnected from USB power supply, the dosimeter will automatically switch off. If returned to the USB connection or put again onto the docking station the dosimeter keeps trickle charging regardless of whether or not it is fully charged. This keeps the battery performance in steady condition. If the battery is fully discharged prior to being placed on a charger, the **SV 104** trickle charges for a short time prior to the fast charge cycle, this prevents damage to the batteries.

The number of hours you have used your dosimeter from your last charge will impact your total charge time. For example, if the battery clock indicator displays 40 hours remaining on the battery and you wish to charge the battery, the approximate charging time is 1 hour.



Notice: To charge a fully discharged battery, it would take approximately 1.5 to 2.5 hours.

Note also, that instrument under charging condition is slightly warm. It is normal state for NiMH type cells and does not affect the measurement accuracy.



Notice: To charge multiple dosimeters at the same time via the USB port, ensure your computer or possibly the powered USB hub such as the **SA 156** or switch is capable in terms of providing enough current performance. Standard hub or switches without external power supply are not capable to charge multiple SV 104 dosimeters due to insufficient current supply.

Current estimation: Assume the current consumption on 0.5A level, and calculate required power supply requirement ($N \times 0.5A$).

Power wattage estimation: With nominal voltage of 5V per USB, the power supply wattage should be 2.5W per dosimeter ($N \times 2.5W$).

For example 5 dosimeters charged at once require: 2.5A/12.5W USB power supply

For example 3 dosimeters charged at once require: 1.5A/7.5W USB power supply

For example 1 dosimeter charged alone requires: 0.5A/2.5W USB power supply




Notice: Use only high quality USB cables, such as **SC 156**. Many poor quality cables do not ensure low resistance of the cable, thus disabling proper charging of the internal cells.

4.2 Before you turn the instrument on

There are only a few things to remember:

- Make sure the microphone is properly fastened onto mounting head before turning on the instrument.
- When in use for a measurement run, always use the **SA 122** windshield provided.

4.3 Turning on/off

TURNING ON: To switch the power on the operator should hold the **<ENTER>**  key for a couple of seconds. The instrument switches on and goes the self-test routine (during this time the manufacturer's logo, the name of the instrument and firmware version is displayed).

Then the **SV 104** will run through a short start-up sequence, showing the current configuration setup loaded along with the names of all of three profiles, followed by battery state screen. After this, the instrument will enter the stopped (ready to measure) mode and enter the running instantaneous SPL mode if enabled.




Notice: Warm up time - After power on, the instrument should be warmed up for at least 60 seconds before starting measurement.



Notice: If you leave the instrument in stopped (ready to measure) mode, the display will be switched off after 30 seconds, and the unit will turn off after approximately 5 minutes of no keypad activity to save the batteries.



Notice: SV 104 will show a warning screen if the battery capacity is below 2 hours of potential measurement time.

TURNING OFF: To shut down the unit the operator should hold the <ENTER>  key for a couple of seconds during which a countdown (“Shutting down” 3... 2... 1...) is displayed. Thus, the **SV 104** gives you time to decide if you really want to turn off the instrument. If you release the key too early, the **SV 104** returns to the last presented **VIEW** mode.

If enabled in the configuration setup there may be presented an additional, double-check, warning screen. This is for the operator to be aware and convinced the unit is really to be turned off. See figure below:

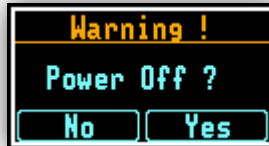


Figure 4-1 Power-off warning screen



Notice: SV 104 will automatically shut down after 5 minutes in stopped (ready to measure) mode.



Notice: If **auto-run** (timer) mode is active, **SV 104** will automatically stop the measurement when the set time is over and then turn off. If no **auto-run** mode is used and specific time has not been preset, the unit will continue to measure until the battery is exhausted. Just before switch off, the measurement run will be stopped and all data until that point will be saved securely for later download to the PC.

4.4 Battery check





Observe the battery icon in the instrument's icon status bar or press the <ENTER>  key until the Instrument Status **VIEW** mode is presented and check the battery state. If it is too low, charge the batteries (chapter 4.1).



Figure 4-2 Instrument Status - Battery state

Battery status screen is moved down and up with <SCROLL> , <PROFILE>  keys.
Press <ENTER>  to change to the next **VIEW** mode.



Notice: Battery state of charge calculation is based on internal charge counter and should be considered only as an overall, not very precise estimation. Therefore the time left could be noticeably different. Although the newest technology cells are used the slight degradation over time is inevitable thus aging requires occasionally factory based (or authorised service centre) replacement of the rechargeable battery cells.,



Notice: Battery power indicator - To improve accuracy of remaining battery life indicator, run the dosimeter until it is fully discharged; then proceed with a full charge via the micro USB port or docking station. The procedure is recommended before first use. Repeat this procedure every few months of use to maintain more accurate current battery condition indication.

4.5 Reviewing unit label

Unit label screen provides information about elementary dosimeter properties such as:

- Copyrighted manufacturer name: SVANTEK
- Instrument name: SV 104
- Unit serial number (SN): ...
- SV 27 microphone serial number (MicSN): ...
- Unit name: **John_Smith** *[user programmable name]*
- Firmware version: 1.07.3
- File system version: 1.02
- CRC(OK): F4B5
- Standards list, that dosimeter conforms to:
 - IEC 61252:2002
 - ANSI S1.25:R2007 *[meaning ANSI S1.25:1991 (R2007)]*
 - Type 2: IEC 61672:2002
 - Type 1: IEC 61260:1995 *[meaning with +Am1 2001]*

To access Unit Label screen short press all three keys:

<SCROLL> , <PROFILE>  and <ENTER>  at the same time.

The following screen will be presented:

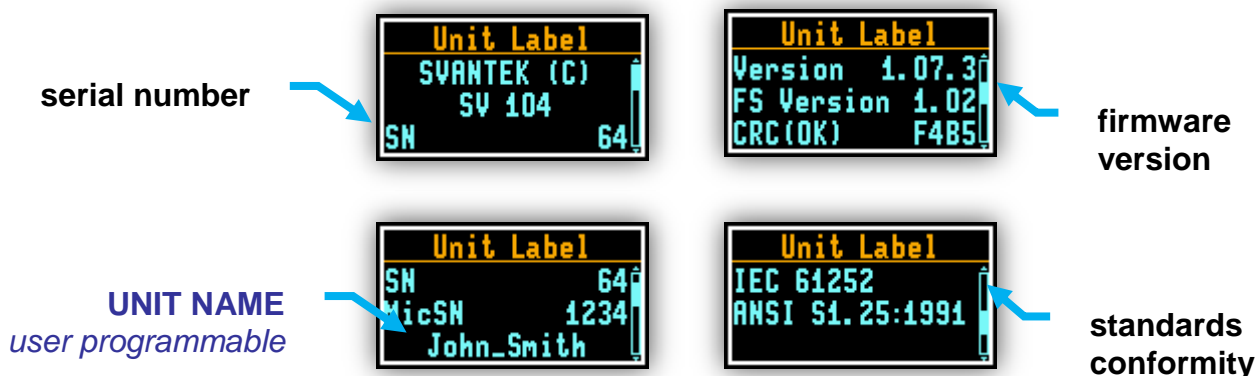






Figure 4-3 Unit label screens

Unit label screen is moved with <SCROLL> , <PROFILE>  keys.

To exit the Unit Label screen just short press the <ENTER>  key. Then **SV 104** will return to the last presented **VIEW** mode.

 **Notice:** The personalized **Unit Name** can be set arbitrarily with SUPERVISOR software.

4.6 Measurement setups - basic configuration

Press two keys <SCROLL>  and <ENTER>  at the same time. The “Load Setup” menu will appear with the list of loaded configuration setups to choose.

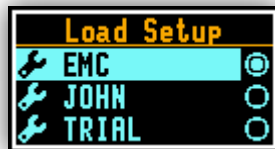







Figure 4-4 Load setup menu

To abandon setup selection, press again the <SCROLL>  and <ENTER>  at the same time. Otherwise select the required configuration setup with <ENTER>  key navigating thru the list with <SCROLL>  or <PROFILE>  key.

The following screen will appear, that will allow you to confirm you really want to load the selected setup or cancel the selection and return to configuration setup list:

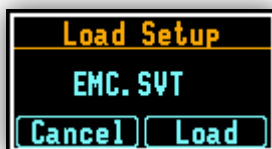




Figure 4-5 Load setup confirmation

Press <SCROLL>  key to cancel the setup loading, or <PROFILE>  key to confirm loading selected setup configuration.

Confirming the loading of configuration setup leads to the screen with status of the loading procedure:

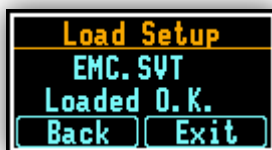





Figure 4-6 Status of setup loading

After successfully setup loading it is possible to return back to list of predefined setups by pressing the <SCROLL>  key, or go further to measurement screen by pressing the <PROFILE>  key.



Notice: Detailed description of uploading setup files onto the SV 104 can be found in chapter 5.5.1 of this manual .

4.7 CALIBRATION

The SV 104 dosimeter is offered with the dedicated **SV 27** MEMS microphone with 1/2" housing. It makes the calibration very easy by direct usage of commonly available acoustic calibrators with a 1/2" cavity. 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, the absolute calibration of the measurement channel should be performed locally. The instrument performs the acoustic calibration automatically, when the calibrator is placed over the microphone (first remove the windshield). The calibrator level is automatically detected and the calibration procedure is started.

The user simply has to press **<ENTER>**  key to confirm the calibration results. Calibration is only allowed in the stopped mode. A sound measurement cannot be in progress while the calibration is being performed.



Notice: It is advised to perform an acoustic calibration of the instrument each time before and after the measurement run. A single calibration at the start of each day of use is usually sufficient for most regulations.





Notice: The calibration factor is always added to the results in the Dose Meter or 1/1 Octave analysis mode.



Notice: The manufacturer's recommended factory calibration interval is every 12 months for this instrument to be confident in its continuing accuracy and compliance with the international specifications. Please contact your local SVANTEK distributor for further details.

To calibrate the instrument manually the user has to enter the Calibration menu.

1. Adjust the actual calibration level of the calibrator to be used with the **<SCROLL>**  and **<PROFILE>**  keys

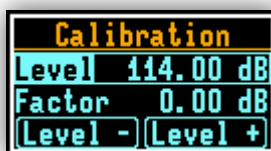





Figure 4-7 Calibration menu

2. Attach the acoustic calibrator, **SV 30A**, **SV 31**, **SV 34**, **B&K 4231** (or equivalent 114 dB / 1000 Hz) carefully yet tightly over the microphone of the instrument. The presence of the calibrator will be detected automatically



Notice: It is also possible to use an electro-mechanical pistonphone, which generates the signal (ca 124 dB) or different type of acoustic calibrator dedicated for 1/2" microphones with an alternative output level such as 94 dB at 1 kHz. In any case, before starting the calibration measurement, the user has to set the level of the signal generated by the given calibrator (Level position), which is stated in the calibration certificate of the unit (the default expected value of the Calibration Level set by the manufacturer of **SV 104** is equal to 114 dB).

3. Switch on the calibrator and wait ca 30 seconds for the tone to stabilise before starting the calibration measurement
4. Start the calibration measurement by pressing the <ENTER>  key
5. The calibration measurement time is set to 1 second with 3 seconds delay and stops until the same result is obtained 3 consecutive times. It is possible to stop the calibration measurement by pressing two keys at the same time <PROFILE>  and <ENTER> .

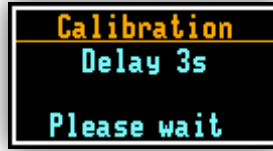


Figure 4-8 Calibration - initial delay screen

6. Delay before starting calibration measurement is counted down on the display. After the measurement, its result is presented on the display.

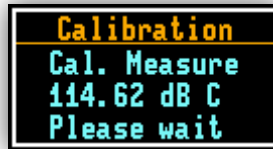






Figure 4-9 Calibration in progress screen




Notice: To quit the calibration procedure without saving the calibration factor press <PROFILE>  and <ENTER> .

7. It is recommended to repeat the calibration measurement a 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 acoustic disturbances such as high noise levels close by
 - the calibrator or the measurement channel (for example the microphone) is damaged



Notice: During the calibration measurement, the external disturbances (acoustic noise or vibrations) should not exceed a value of 100 dB (when using a calibrator that generates a level of 114 dB).

8. Press the <ENTER>  key in order to accept the measurement result.

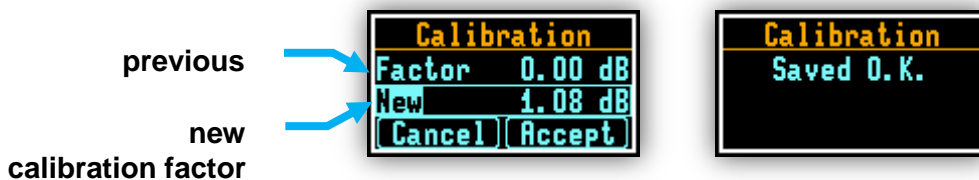



Figure 4-10 Calibration confirmation screen



Notice: If a calibration factor does not meet tolerance criteria ± 2 dB, you still can manually accept the microphone, but the results could possibly be affected - see Figure 4-11.

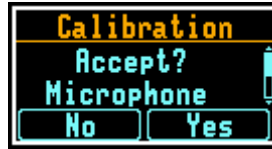



Figure 4-11 Calibration - microphone not in tolerance screen

9. Post calibration. If enabled, the post processing is performed automatically under acceptance of calibration measurement.



Notice: If it is required to perform so called post-calibration of the instrument. In case the Post Calibration is pre-programmed within configuration setup the **SV 104** automatically adds the results to the previously saved files.

4.8 Voice comments recording

In order to record a comment, the user should press <PROFILE>  key for a few seconds during which a countdown ("Voice comment" 3... 2... 1...) is displayed. Thus the SV 104 gives you time to decide if you really want to record a voice comment. In case you release the key too early, SV 104 returns to the last used VIEW mode.

Entering the voice comment recording usually brings up a window with a question to which logger file the voice comment is to be linked - to the previous or to the next one. NOTE: This window will be skipped if there are no previous logger files or the unit is just turned on.

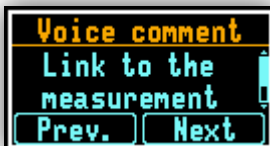


Figure 4-12 Voice comment linking screen

After selecting an answer by pressing the <SCROLL>  or the <PROFILE>  key the record command window will open.

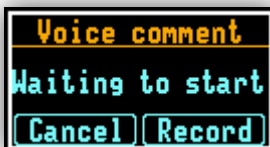



Figure 4-13 Voice comment recording command screen

Starting the recording by means of the <PROFILE>  - key flashing circle that indicates recording in progress will appear on the screen.



Figure 4-14 Voice comment recording in progress screens

Further, one can continue to record a comment about the measurement and press <PROFILE>  key to finish recording. The recording end will be confirmed with the screen comment "Saved O.K.".

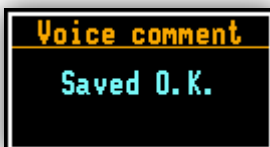



Figure 4-15 Voice comment record confirmation screen

 **Notice:** The voice comment can be recorded before or after the measurement run takes place and linked to the Previous or the Next measurement run. But be beware, that linking to the previous measurement will not be possible in case when the unit is switched off and on again or there are no previous logger files. In this case the recording screen will appear (with default linking the comment to the next logger file).

4.9 Before and after measurement run

Before starting a measurement ensure:



- 1 the instrument is turned on (see chapter 4.3)
- 2 there is sufficient battery operating life and free memory by checking the status screen (see chapter 4.4)
- 3 required configuration setup is selected (see chapter 4.6)
- 4 the **SV 104** is calibrated, because it affects the results (see chapter 4.7)
- 5 the windshield is put on because it protects the microphone from industrial environment such as dust and moisture or from effects of impact (see chapter 3.3)

After stopping the measurement run, make sure:

- 1 the calibration is still maintained (see chapter 4.7)
- 2 the data is properly downloaded to PC for further analysis (see chapter 5)
- 3 the instrument is turned off (see chapter 4.3)

4.10 Starting and stopping measurement run

START:

To start the measurements the user has to press the **<SCROLL>**  and **<PROFILE>**  keys at the same time. The results of the measurement are displayed in the last used result's display view mode. As an example ONE RESULT view mode is displayed. ONE RESULT view mode is always available for most functions of the instrument. The results of the measurements can also be presented in other view modes, which can be enabled or disabled and adjusted to the user's needs.

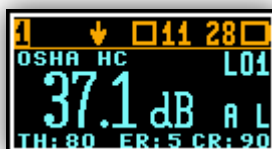


Figure 4-16 One profile mode screen view

STOP:

The same combination of keys: **<SCROLL>**  and **<PROFILE>**  allows the user to stop the measurement run. All run results are always saved automatically, there is no need to save them manually.

4.11 Auto-run mode information


Note, that when auto-run mode (timer and/or pause) is configured, there is information on the screen available for the user. There is no need to turn on the instrument manually. All the timer procedures can be easily pre-programmed with the use of the **SUPERVISOR** software.



Figure 4-17 Auto-run mode – timer and programmable pause screen

4.12 Security lock

Please consider locking the keypad and display during the measurement to prevent the wearer or anybody else from tampering with the measurement run. The **SV 104** can be set up to automatically go into locked mode when it starts (see chapter 5.5.7.3). That automatically prevents any tampering, but the unit can still be unlocked if necessary with proper sequence of key presses.

Locking SV 104 unit: To lock the instrument the operator should hold the **<SCROLL>**  key for a couple of seconds during which a countdown ("Keyboard lock" 3... 2... 1...) is displayed and the unit gives you time to decide if you really want to activate security lock. If you release the key too early, **SV 104** returns to the last presented **VIEW** mode.


Unlocking SV 104 unit: To unlock the unit one has to press the keys in the correct sequence. The sequence is pre-programmed in the configuration setup (look the chapter 5.5.7.3). Note that in case the security sequence is configured via SUPERVISOR software, the simple hold of **<SCROLL>**  key for a couple of seconds during which a countdown ("Keyboard unlock" 3... 2... 1...) is displayed and the unit gives you time to decide if you really want to deactivate security lock.



Figure 4-18 Unlocking the unit sequence screens

4.13 Mounting and positioning the SV 104

Unless specified by local legislation, personal noise dosimeters should always be mounted on the shoulder, circa 10 cm from the most exposed ear, with the microphone approximately a few cm above the shoulder. SV 104 shape and microphone height ensures proper instrument position. see Figure 4-19 below.






Figure 4-19 SV 104 Positioning

4.14 Reviewing measurements

Most of the parameters can be inspected in real-time during either measurement run or stopped mode of operation. If the display screen is turned off just press any key (but watch notice below).

The keys on the keypad of the instrument enable you to navigate thru most of the parameters. For specific information on the VIEW modes, please see chapter 3.9.

- Use the <SCROLL>  key to move down the list through the various measurements
- Use the <PROFILE>  key to change the ACOUSTIC PROFILE you would like to inspect
- Use the <ENTER>  key to change the VIEW mode



Notice: In most cases the keypad will be probably locked. To gain access to the results and unlock the keypad see chapter 4.12.




Notice: After reviewing results remember to lock the keypad again in order to maintain the integrity of the measurement run by preventing uncontrolled access to the instrument.

4.15 Resetting the dosimeter

- **SYSTEM RESET:** (internal software reset clears any setup configuration, and brings back the default factory settings).

See **Appendix A** for remote control commands description.

- **HARDWARE RESET:** (internal hardware reset, no user data is changed)

Make sure the battery is not exhausted, and the unit is turned off. Hold down the <ENTER>  key for more than 15 seconds, and then release it. Turn on the instrument as usually (see chapter 4.3).



Notice: Hardware reset is only to be used in extreme situations such as an instrument hang-up.

Be aware, that a hardware reset:

- will stop any pre-programmed auto-run modes
- will stop measurement run
- **HARDWARE RESET** works, even if the keyboard becomes locked out!

5

SUPERVISOR BASIC OPERATIONS

This chapter explains data storage, the configuration setup of the dosimeter, and how to customize the parameters via the Supervisor software.

With use of micro USB cable, software, and **SV 104**, it is easy to:

- set up required configuration parameters and upload these, so called **SETUPS**, straight to the **SV 104** instrument
- retrieve time history data to view and analyze your noise recorded charts, graphs, with extended reporting functionality

5.1 Installing and connecting to PC

Insert the **Supervisor** software CD/DVD into your PC and run the installation program. After installation you are ready to connect the **SV 104** dosimeter.


- Plug the USB cable into the computer
- Plug the opposite end of the cable (micro USB) into the dosimeter itself
- The **SV 104** is powered and charged directly through the computer; thus, you do not need separate charger. The dosimeter screen will be switched on automatically with current charging information only
- Turn on the dosimeter (see chapter 4.3) - long press of the **<ENTER>**  key
- Windows will install drivers for Svantek instruments if not previously installed
- Once switched on, run the **Supervisor** software.



Figure 5-1 Supervisor splash screen



Notice: Supervisor software enables communication with multiple dosimeters. Therefore, with the use of a USB hub such as the **SA 156** it is pretty straightforward to connect all of them at the same time. Just make sure your computer system has enough power capability (see chapter 4.1 for details).

5.2 Main software window

The main screen of the SUPERVISOR is divided into few panels. Panels expose areas of interest of professional users and satisfy user's needs to find, configure, download, review and assess stored data in a very simple but still professional way.

- Control panel enables you to select: Instrument control, Data browser or Session you work with
- Instrument filter enables SV 104 device selection, or other Health and Safety dedicated instruments
- Inventory panel detects all SV 104 connected devices (see chapter 5.3)
- Quick access file manager enables you to copy configuration setup files between computer and instrument internal memory (see chapter 5.5.1)
- Instrument configuration panel enables access to all measurement run configuration settings (see chapter 5.5.1 for details)

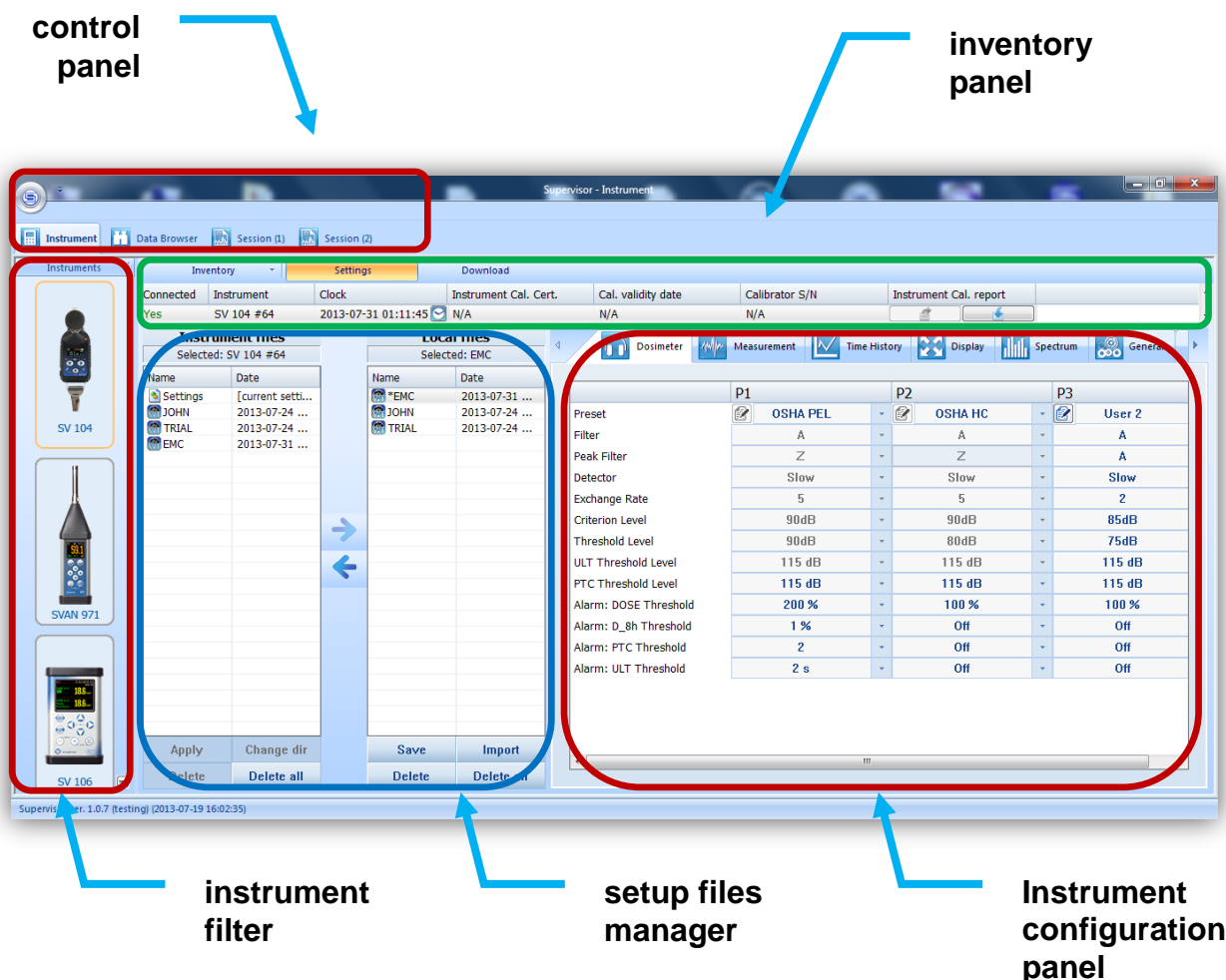


Figure 5-2 Supervisor main window

5.3 Instruments inventory panel

Click the **SV 104** instrument icon in the left “Instrument filter” Panel (see Figure 5-2) to get access to the devices.

Inventory panel (Figure 5-3) enables you to see all currently connected, or previously connected instruments of the same type. There are a number of columns with information related to each particular instrument related to the correct allocation of instrument and calibrator calibration report details.

**“Settings”
configure setup files and the dosimeter”**

**“Download”
download measurement data from the device**

Connected	Instrument	Clock	Instrument Cal. Cert.	Cal. validity date	Calibrator S/N	Instrument Cal. report
Yes	SV 104 #64	2013-07-31 03:08:31	N/A	N/A	N/A	
No	SV 104 #47	2013-07-31 03:08:20	N/A	N/A	N/A	
No	SV 104 #42	2013-07-31 03:08:30	N/A	N/A	N/A	
No	SV 104 #41	2013-07-31 03:08:33	N/A	N/A	N/A	

small clock update icon button

**configurable columns
right click
on top menu row**

- Clock
- Firmware version
- Last setup upload date
- Last uploaded setup name
- Last setup activation date
- Last setup activation name
- Instrument calibration certificate
- Calibration validity date
- Calibrator Serial Number
- Instrument Calibration Report
- Calibrator Calibration Report


**possible context operations
right click on instrument row**

- Refresh catalogue
- Set Clock
- Edit name
- Manage options/functions
- Edit calibration info
- Add instrument calibration report
- Add calibrator calibration report
- Look for new firmware
- Send 'clear setup' command

Figure 5-3 Inventory panel and its capabilities

There are two control buttons near the Inventory Panel top menu:

- Settings button enables to configure current local configuration file, that can be later uploaded to the SV 104 dosimeter;
- Download button enables to navigate and download files directly from the dosimeter.



Notice: To download any setup, or data file, first click the row related to the chosen dosimeter.

5.4 Instrument options unlock

Certain features of **SV 104** such as 1/1 octave measurement or time domain signal recorder are not available before activation. Activation of these options is fairly easy and can be done in a few steps:

- Connect the dosimeter to a computer
- Launch Supervisor software
- In the instruments inventory panel (Chapter 5.3) locate the instrument that you wish to unlock, and right click onto it to open context menu.
- Select **Manage options/functions** command

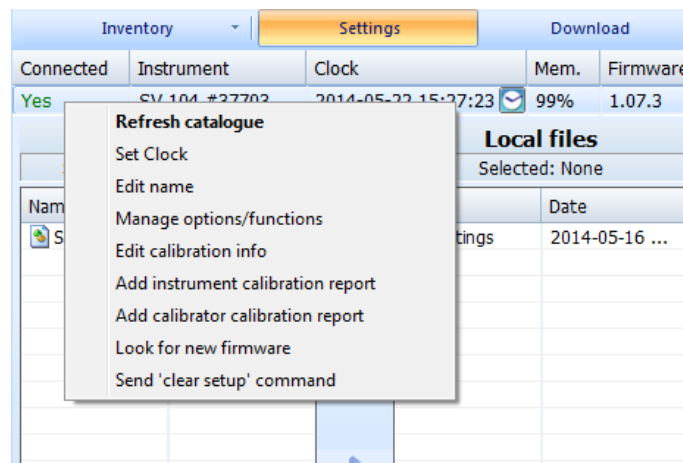
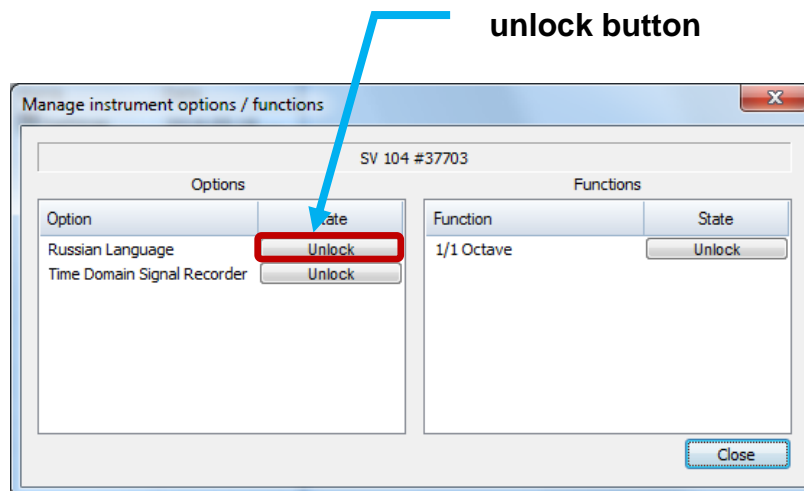


Figure 5-4 Unlocking the firmware options

- In the **Manage options / functions** window click the Unlock button next to the feature you wish to unlock



- Enter the code and confirm with **OK** button

5.5 Advanced configuration setup

Customizing and saving set-ups are performed via the Supervisor. The following sections discuss each of the setup screens and explain how to save and send the parameters to the multiple dosimeter(s).

Setting described here apply to the type **SV 104** model. If you are also using other instruments and have them connected, they will appear in the Inventory section panel, but no device will appear unless you first select the appropriate model picture on the left side of the application in instrument filter section. The clicked instrument picture denotes that the models are selectable from inventory panel when setup changes are applied and the “send setup to instruments” is selected.

To gain access to settings window click the “**Settings**” button near the Inventory panel (see chapter 5.3)

5.5.1 Working with configuration setup files

The idea behind the configuration setup is to download the configuration setup file from the instrument to the computer you are working on and referred as “**Local files**” destination. Then it is possible to modify the settings, and save with a custom name.

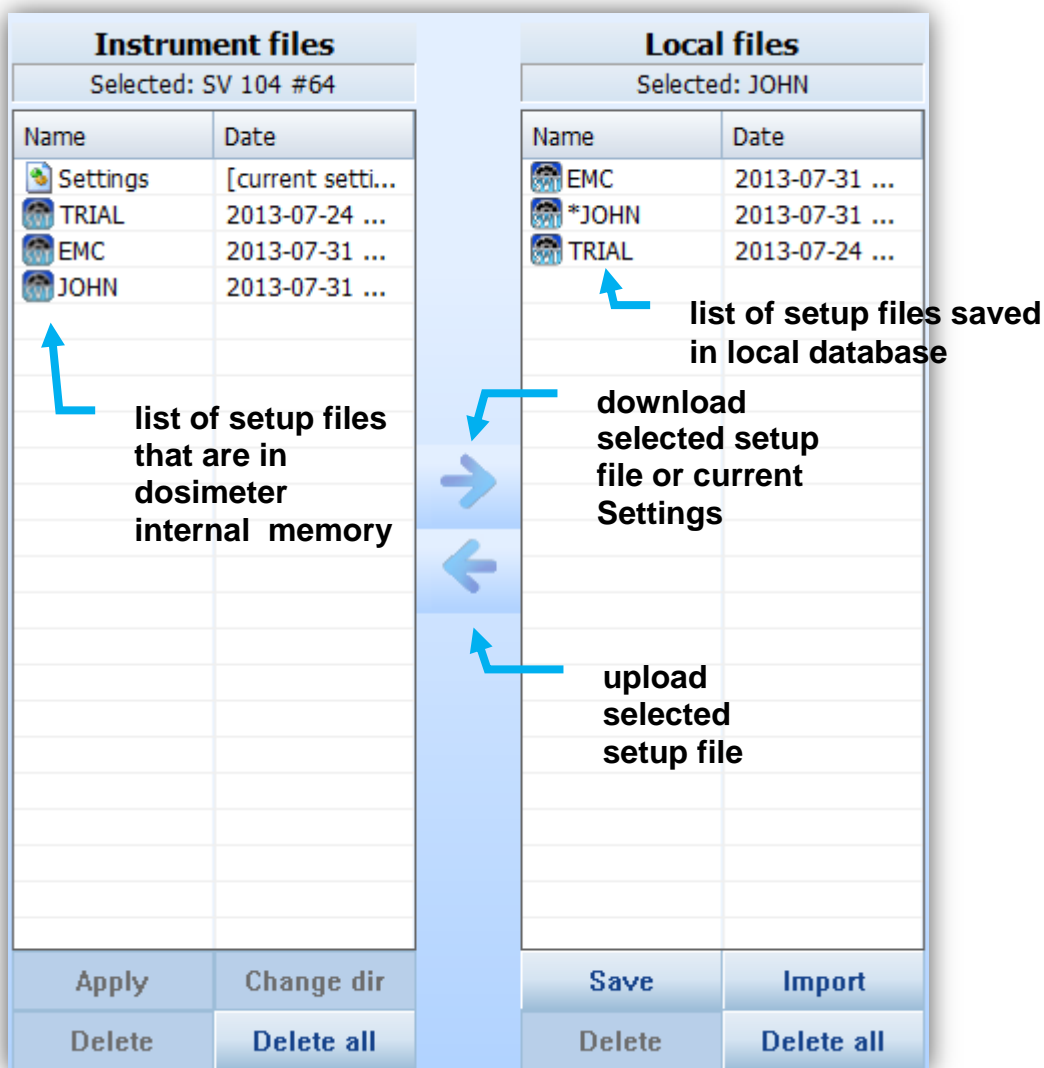


Figure 5-5 Setup files manager panel

For example: To download current settings file from the **SV 104**, modify it, save with custom name, send it back to the device, export the setup to USB flash memory, and make sure the uploaded settings are applied in the dosimeter follow the presented procedure described below:

Once connected and selected in the inventory panel (Figure 5-3) **SV 104** dosimeter is ready for the operation:

1. Select the **“Settings”** row position in left side panel named **“Instrument files”** (Figure 5-5)
2. Click the right arrow pictogram to download instrument **“Settings”** configuration setup to **“Local files”** right side panel (Figure 5-5)
3. Select the just copied **“Settings”** with a click: this will display quite a few configuration tabs on the right side so called Instrument configuration panel of the main **Supervisor** window (Figure 5-2)
4. Go through all the tabs to verify, or change required parameters of the measurement runs. Follow the chapters from 5.5.2 to 5.5.9 to understand and configure the instrument
5. Once configured, come back to setups file manager (Figure 5-5) and click the just edited **“Settings”** in **“Local files”** panel
6. Next click the **“Save”** button in bottom area of the panel (Figure 5-5)
7. To change the name right click on the selected row, and choose **“Rename”** command, which enables you to input a custom name for the setup that has just been edited (see the figure below)
8. To export the setup file right click again on the selected row to open context menu and select the **“Export”** command (see the figure below). This will open standard save file window, where you can choose the USB flash memory disk, and save the configuration file to use on a different PC. Note, it is also possible to import the previously saved settings file to re-use a created setup configuration.
9. To import the setup file right click on the **“Local files”** panel, and choose **“Import”** command (see the figure below). This will open standard open file window, where you can choose previously created setup and load it into the **“Local files”** panel.

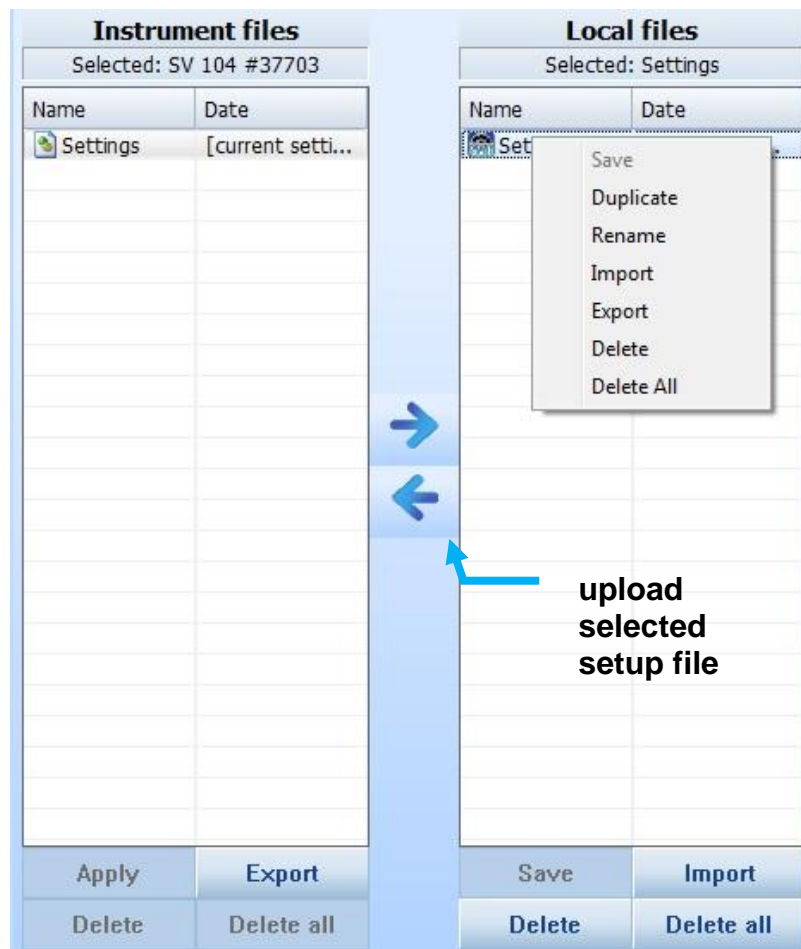


Figure 5-6 Exporting the configuration setup file

10. Now it is time to upload the configuration back to the instrument. Just click the left arrow pictogram.
11. Once copied select the copied file in the Instrument files, and right click onto it to open context menu. Then choose “**Apply**” command (Figure 5-7). Alternatively you can enter the “**Load Setup**” menu directly in the instrument and load it as the current configuration. See chapter 4.6 for details.

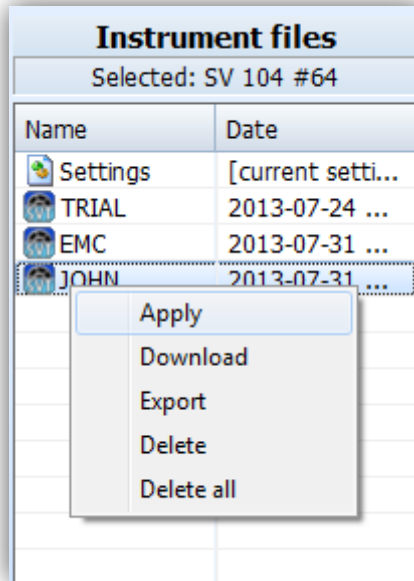


Figure 5-7 Instrument files panel and context commands

12. This ends the procedure. Disconnect the dosimeter and the instrument is now ready for a new measurement run using the settings you have just uploaded.



Notice: During configuration there are quite a number of parameters to set. To understand detailed meaning of parameters and how the results are calculated refer to Appendix D and check the following by chapters.

5.5.2 Profile settings tab

The main settings where specific acoustic profile configuration can be set are located under “Dosimeter” tab. There are already predefined presets in each profile column. By choosing predefined configuration some obvious fields will be automatically greyed. Others must be setup by the user.

There are three additional user defined presets, whose name can be changed during configuration with use of the little icon (notes with a pen) which is then enabled.

Apart from alarm **DOSE threshold** there are three additional source of warning alarm, which can be set. See figure below.

	P1	P2	P3
Preset	OSHA HC	OSHA PEL	User 1
Filter	A	A	A
Peak Filter	Z	Z	A
Detector	Slow	Slow	Slow
Exchange Rate	5	5	2
Criterion Level	90dB	90dB	85dB
Threshold Level	80dB	90dB	75dB
ULT Threshold Level	115 dB	115 dB	115 dB
PTC Threshold Level	115 dB	115 dB	115 dB
Alarm: DOSE Threshold	200 %	100 %	100 %
Alarm: D_8h Threshold	Off	Off	Off
Alarm: PTC Threshold	Off	Off	Off
Alarm: ULT Threshold	Off	Off	Off

Figure 5-8 Dosimeter settings - profile configuration tab




(see chapter

Notice: Note, that some profiles can be disabled to be seen later during measurement run
5.5.5)

5.5.3 Measurement parameters settings tab

Within the measurement tab you can choose in which mode of operation the **SV 104** should work: Dosimeter, or Dosimeter with 1/1 octave analysis.

 **Notice:** Enabling octave analysis shortens battery life, so take it into consideration and double check the battery status before measurement run.

Other basic parameters configuration is per figure provided below:

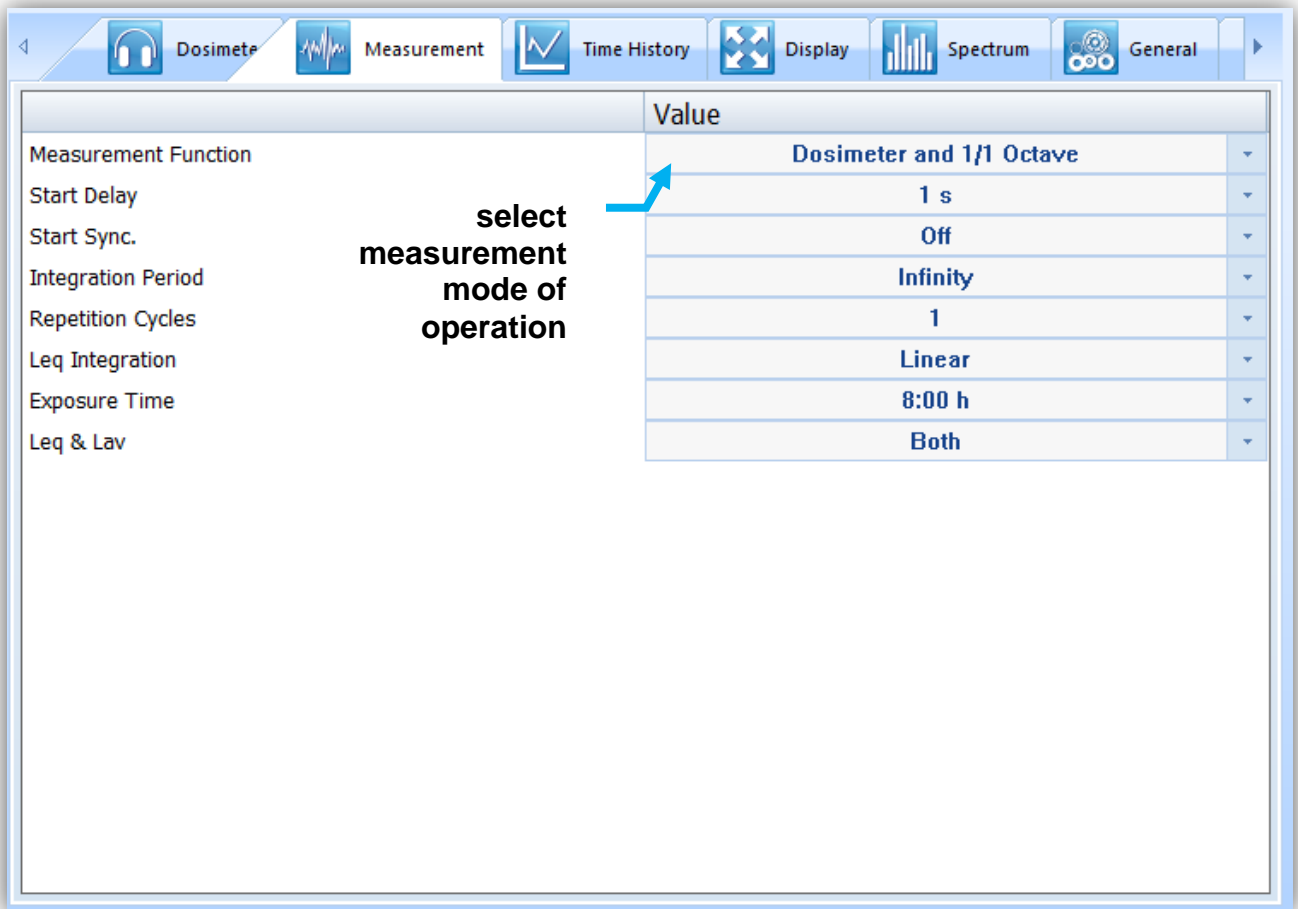



Figure 5-9 Measurement configuration settings tab

5.5.4 Time-history data logging settings tab

To enable logging time-history data go to the **“Time History”** settings tab and switch the very first switch button on the left panel.

- In the **left panel** named **“Time History Setup”** there are basic configuration fields related to: how frequently do you want to log the parameters, what name the logger file should have, and if extended summary results should be saved.



Notice: Summary results are saved on **“Integration Period”** basis (not on **“Logger Step”** time). See Figure 5-9 how to set **“Integration Period”** parameter.

- **Right panel** named **“Results”** is accessible only if **“Logger”** switch button is set to **“On”**. You have the ability to choose, which basic results for each acoustic profile should be logged during measurement run and saved in internal storage memory.

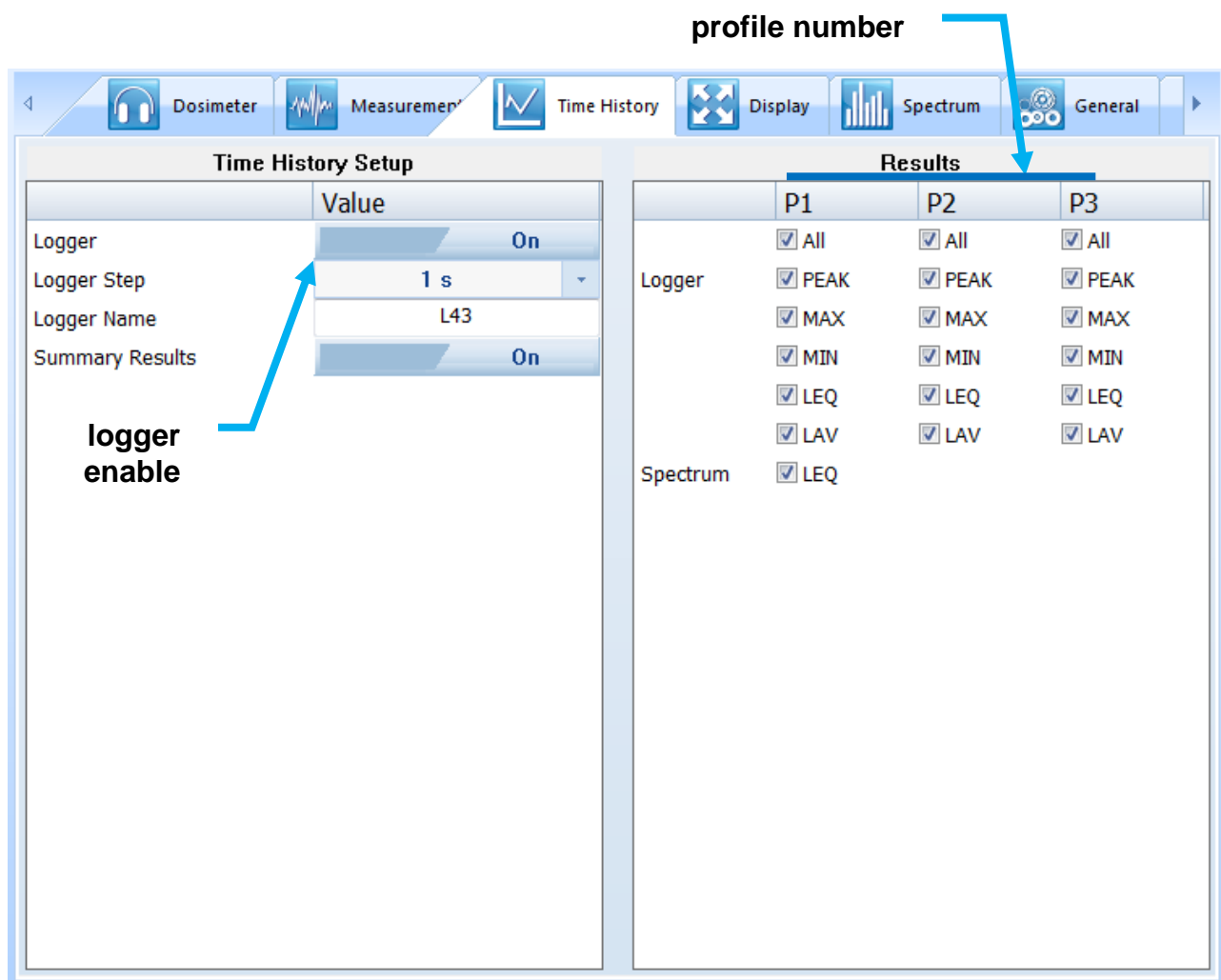





Figure 5-10 Time History (logger) settings tab


5.5.5 Display VIEW configuration tab

As mentioned in chapter 3.9 there are quite a few VIEW modes accessible on the display, when the dosimeter is performing a measurement run.

- In the **left panel** named “**Modes views**” you can select which VIEW mode will be present when you press the **<ENTER>**  key on the dosimeter keypad

 **Notice:** If you do not want to use all three ACOUSTIC PROFILES it would be convenient for you to enable only one acoustic PROFILE to be displayed – just select the required one.

 **Notice:** The “ONE-RESULT” (chapter 3.9.2) is the only VIEW mode that is always present, and cannot be disabled.

- In the **right panel** named “**Display Results**”, you will find a list of over a dozen measurement parameters, that can be configured to be presented on the **SV 104** display, when you press **<SCROLL>**  key. See Appendix D to review acronyms for each parameter.

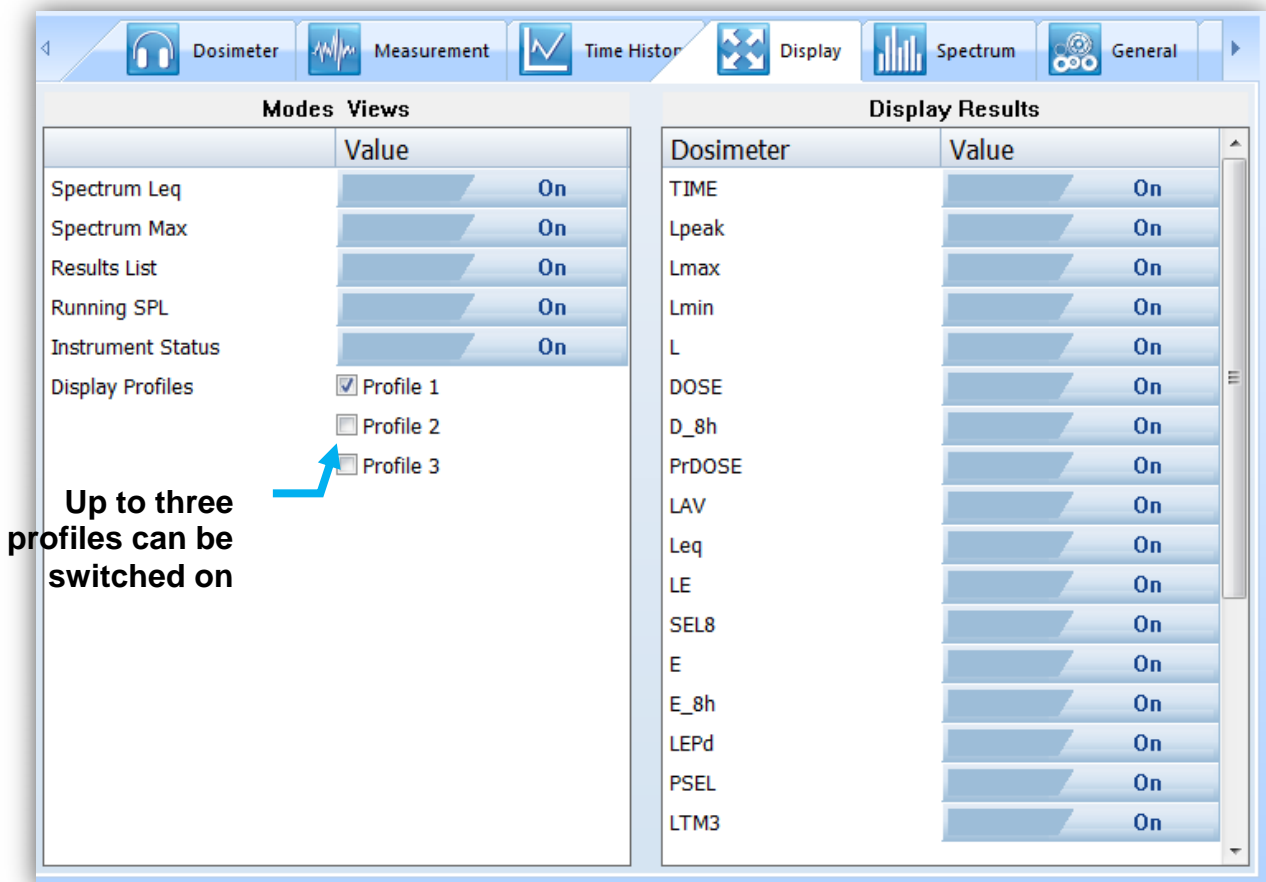


Figure 5-11 Display VIEW configuration tab

5.5.6 Octave analysis Spectrum configuration tab

Real time 1/1 octave analysis is an additional optional feature. Therefore it has its own settings tab. Within this tab there are the following panels:

- named **“Data”**: This configures the weighting filter that is to be used with octave calculation.
- named **“Scale”**: Here the visible dynamic range of the graphical plot can be set, as well as the grid visibility enabled

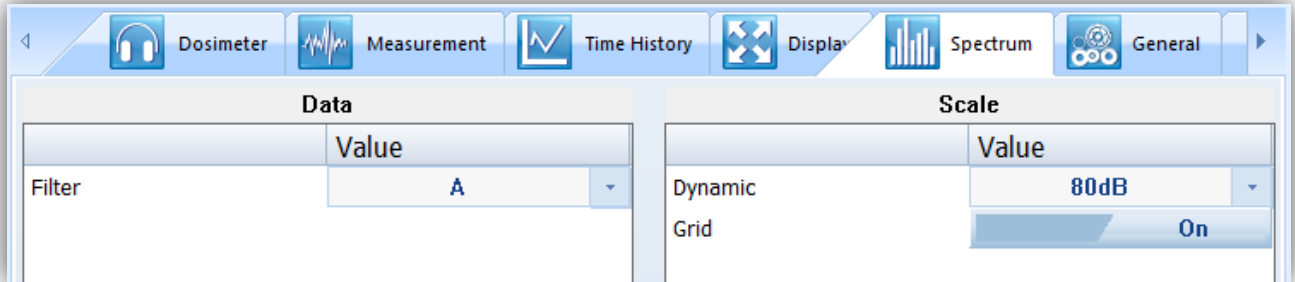


Figure 5-12 Spectrum configuration tab

5.5.7 General settings tab

General settings tab concerns to many different usability options: See the followed by chapters to understand exactly how to configure these instrument settings.

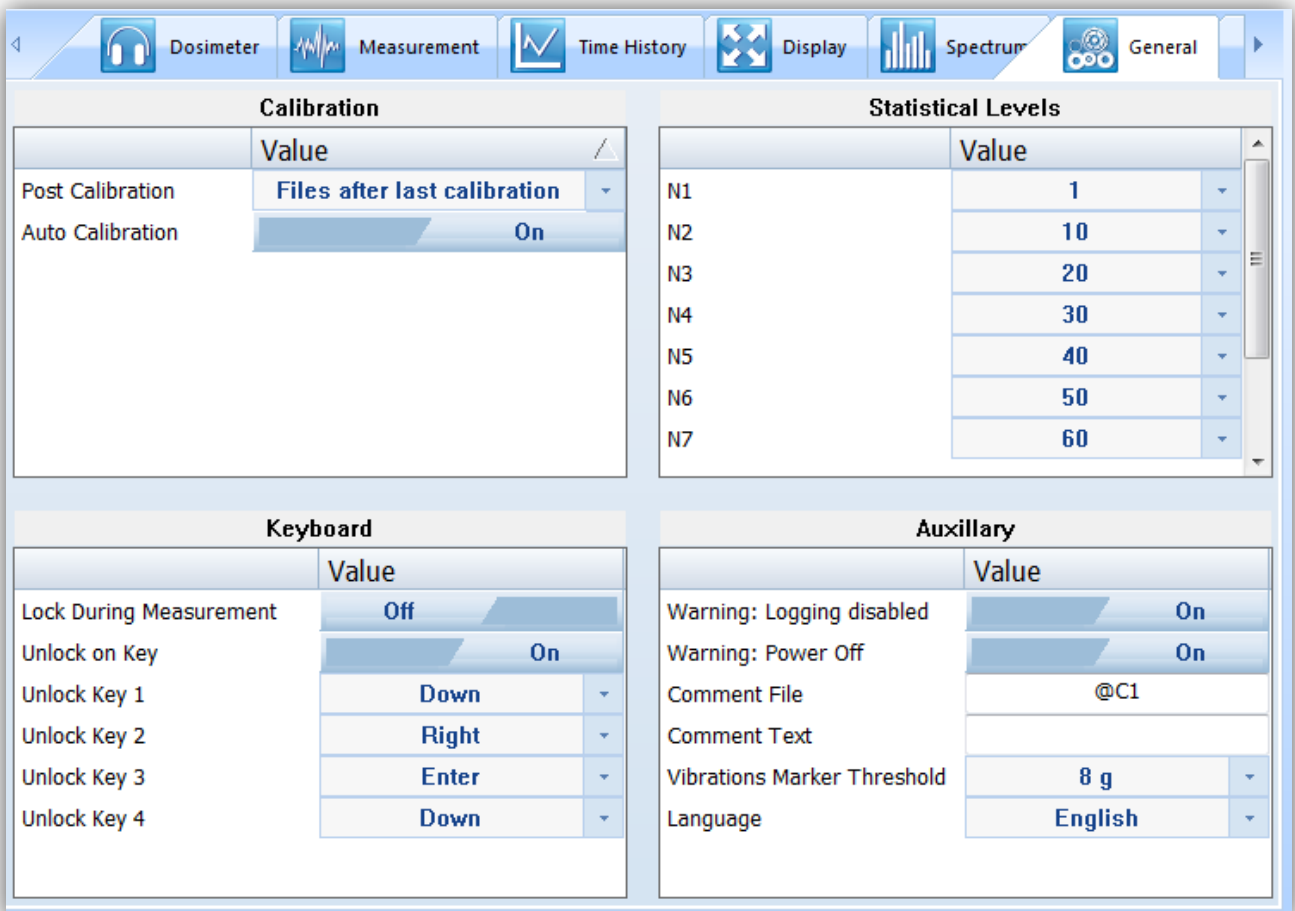


Figure 5-13 General settings tab

5.5.7.1 Calibration settings panel

Sometimes it is required to perform so called post-calibration of the instrument. The position Post Cal. enables the user to perform additional calibration after a measurement session and add the results to the file saved in the memory. In the panel below, there are three options for saving results: not to save “Off”, save in the last file “Last File” or save in the files which will be created after last calibration (“Files after last calibration”). Auto-calibration can be disabled if required for any reason.

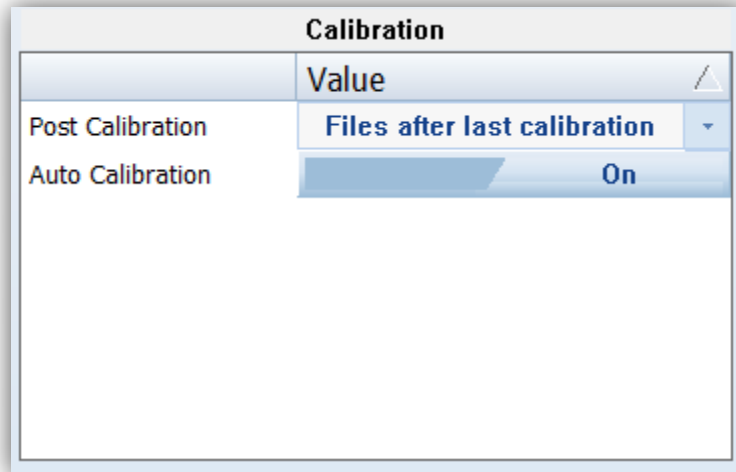


Figure 5-14 Calibration settings panel

5.5.7.2 Statistical levels settings panel

In the Statistical Level panel it is possible to define ten percentile statistical levels, named from N1 to N10. The default statistical levels have the following settings: 1, 10, 20, 30, 40, 50, 60, 70, 80 and 90. All values have to be within the integer range [1, 99]. Each value can be set independently from the others.

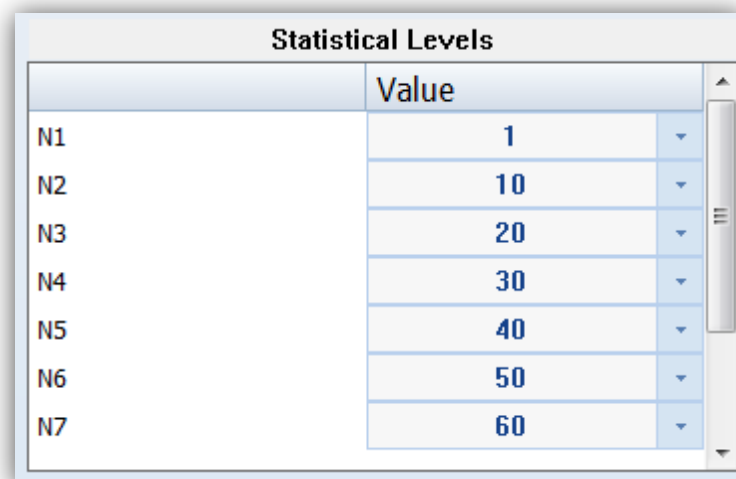


Figure 5-15 Statistical levels settings panel


5.5.7.3 Keyboard security settings panel

The security setting enables you to protect access to the instrument when in use with a simple keypad password to prevent users from inadvertently terminating a measurement run. This feature is set through the Supervisor's "General" settings tab.

To turn on the security option: switch on "Lock During Measurement" button. Once turned on, the SV 104 will disable the keyboard every time, the measurement run is started.

See the chapter 4.12 how to lock, and unlock the SV 104 instrument.

If "Unlock on Key" is set to On, SV 104 will require special code to be input by pressing four keys defined in this panel in a particular sequence

If "Unlock on Key" is set to Off, SV 104 can be locked/unlocked without providing Lock/Unlock sequence. Simply hold the <SCROLL>  key for a couple of seconds during which a countdown ("Keyboard lock/unlock" 3... 2... 1...) is displayed and the unit gives you time to decide if you really want to activate/deactivate the security lock. If you release the key too early, the operation will be cancelled.

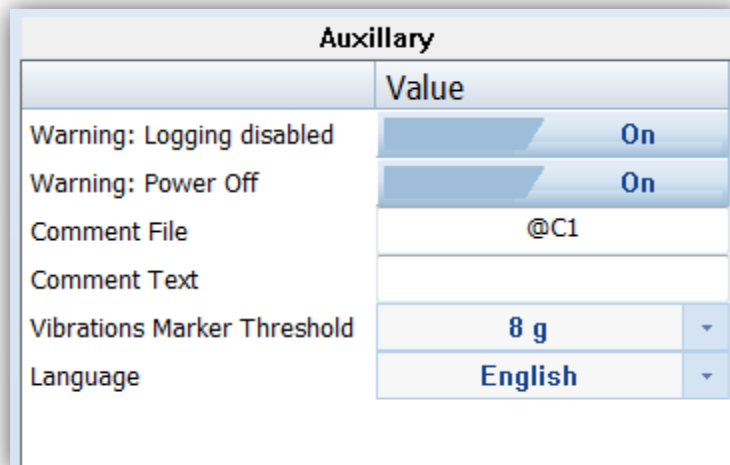
Keyboard	
	Value
Lock During Measurement	Off
Unlock on Key	On
Unlock Key 1	Down ▾
Unlock Key 2	Right ▾
Unlock Key 3	Enter ▾
Unlock Key 4	Down ▾

Figure 5-16 Keyboard security settings panel

5.5.7.4 Auxiliary settings panel

Under auxiliary settings panel it is possible to:

- Enable additional warning screens to be displayed under certain conditions:
 - **“Logging disabled”** it warns the operator that time history results will not be stored.
 - **“Power off”** additional confirmation just before switching off (see chapter 4.3)
- **“Comment file name”** defines the name of the Voice note comment file. **“Comment Text”** is also able to be entered here if required
- **“Vibration Marker”** is used on the basis of acceleration threshold setting (**Off, 1g,...15g**) the lower the threshold level selected then the more sensitive the dosimeter will be to possible bumps and shocks during use
- **“Language”** enables the user to change the menu language displayed on the screen of the dosimeter. The default language is English.



Auxillary	
	Value
Warning: Logging disabled	On
Warning: Power Off	On
Comment File	@C1
Comment Text	
Vibrations Marker Threshold	8 g
Language	English

Figure 5-17 Auxiliary settings panel

5.5.8 Auto-Run settings (timer, pauses) tab

The **Timer** panel enables the user to program the internal real time clock to act as a delayed start and stop timer. The instrument can be switched on by itself at the pre-selected programmed time and it can then perform the measurement run, which was used before it was last switched off. Auto-run feature is useful if you wish to pre-set the instruments to run and stop for a specific time period, such as a week long study.

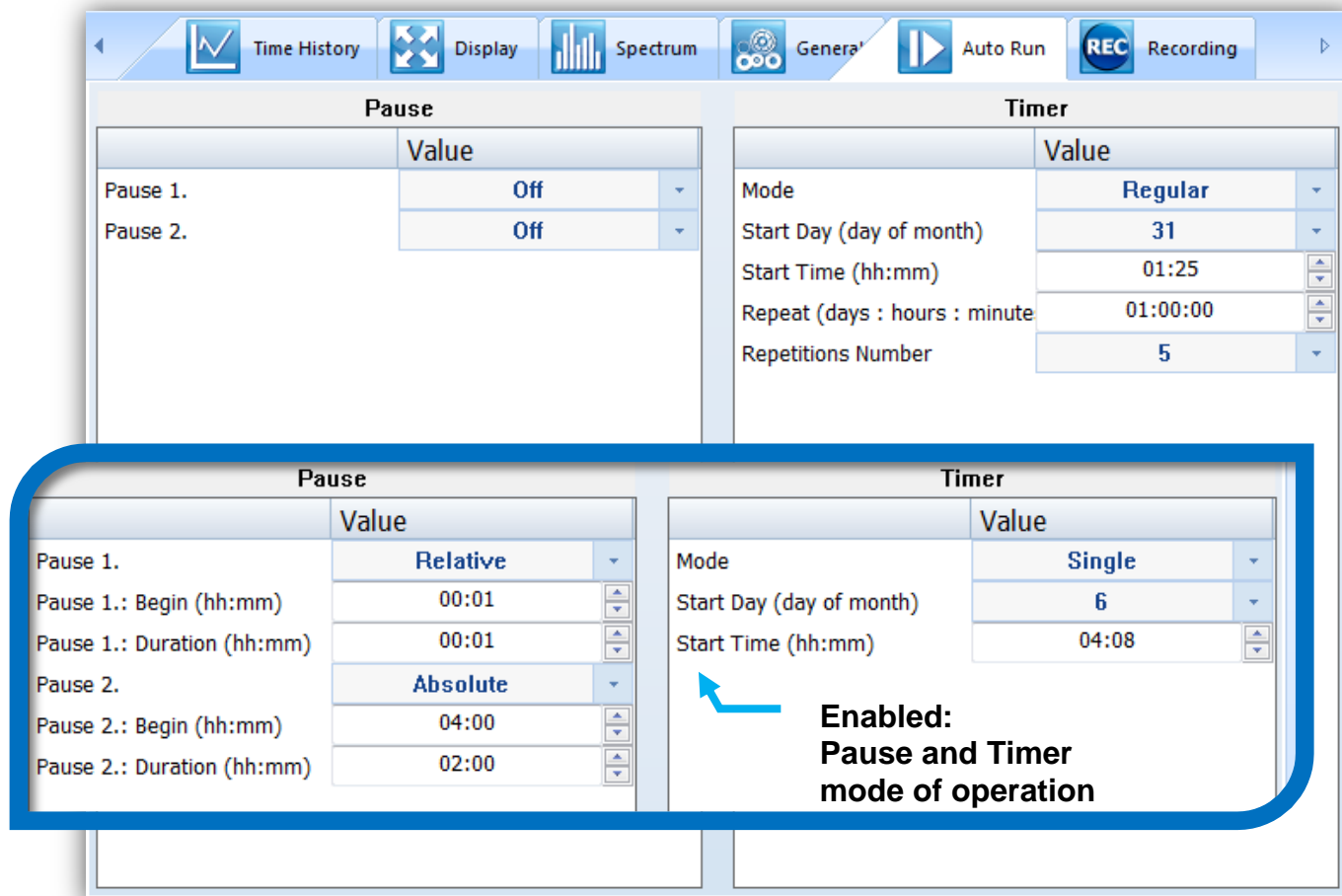


Figure 5-18 Auto-run configuration tab

Selecting the mode of the timer function

The timer can be switched off – “Off”, switched on only once – “Single”, or switched on many times regularly – “Regular” multiple times with the period between two consecutive measurements set in the “Repetitions Number” line. In the Simple instrument interface mode the Timer position doesn’t appear in the Measurement list.

In the case when the timer function is active (“Single” or “Regular”) and the instrument is switched on the Time screen appears until the programmed measurement runs are finished.

Setting hour and day of the measurement's start

The "**Start Time**" determines the time for the measurement to start. The required hour and minute can be selected.

The "**Start Day**" determines the date of the measurement start. The timer can be programmed up to one month ahead and during the date setting the current state of the **Real Time Clock** is taken into account. The required date can be selected. Make sure to check that the real time clock settings for the measurement location are correct before beginning a delayed timer measurement.

Selecting the period between two consecutive measurements

The "**Repetitions Number**" position is displayed when "**Regular**" mode is selected. This parameter can be programmed from **1** up to **100**. The required date can be selected.

There is also possibility to program two independent **PAUSES** in the form of **Relative**, or **Absolute** time programming. See Figure 5-18 for detailed settings in magnified area.

5.5.9 Recording options tab

Event and wave recording are mutually exclusive functions and as such you need to turn off the one option in order enable the other one.

5.5.9.1 Event and Wave recording configuration panel

Audio Event and Wave Recording may be configured to measure in different “Recording Mode”: See figure below.

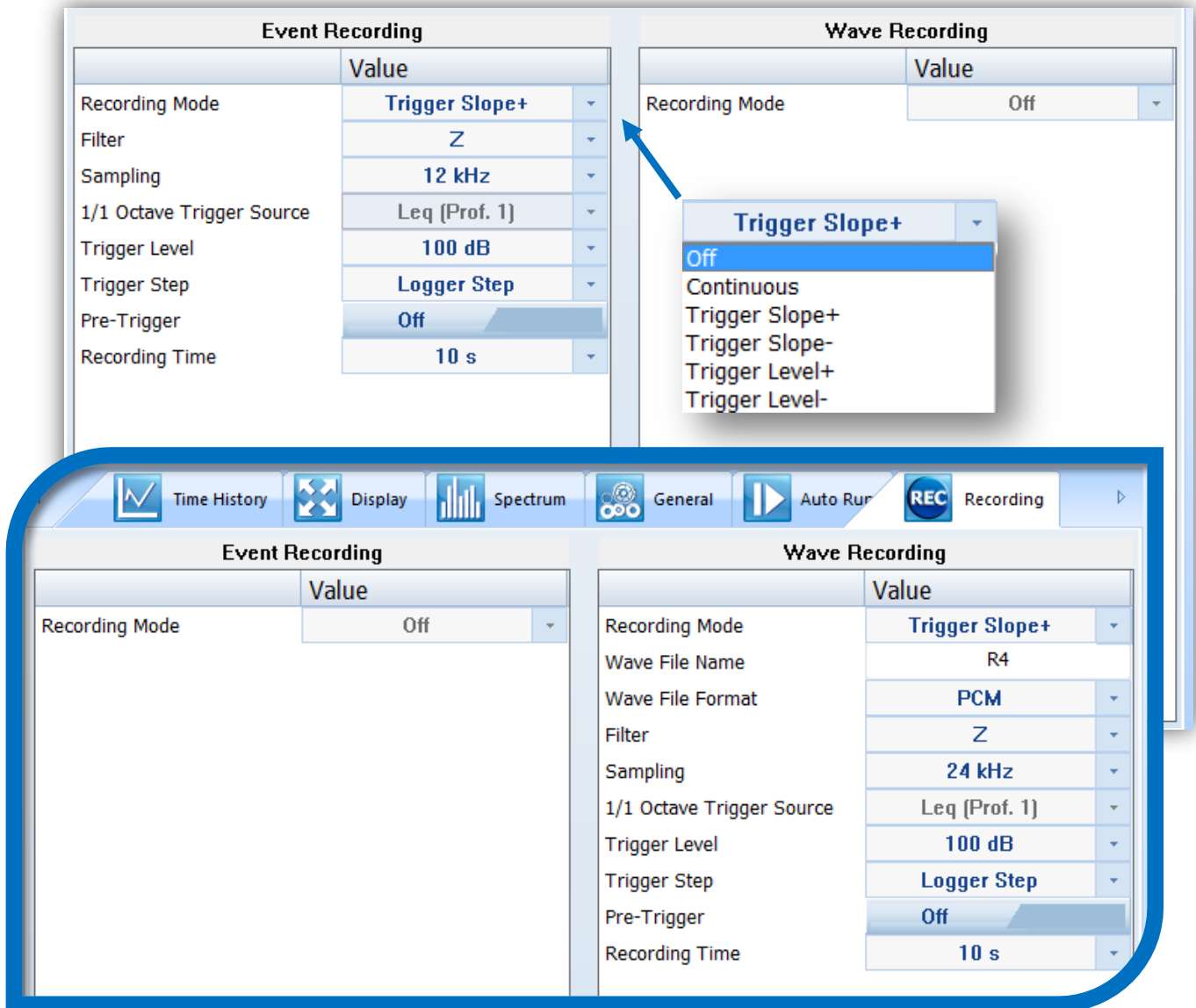


Figure 5-19 Audio Event and Wave recording configuration panels

5.6 Working with data files

5.6.1 Instrument files

If you want to download any recorded files, regardless the type: logger, voice comment, or audio events files, you should click the “**Download**” button on the control area.

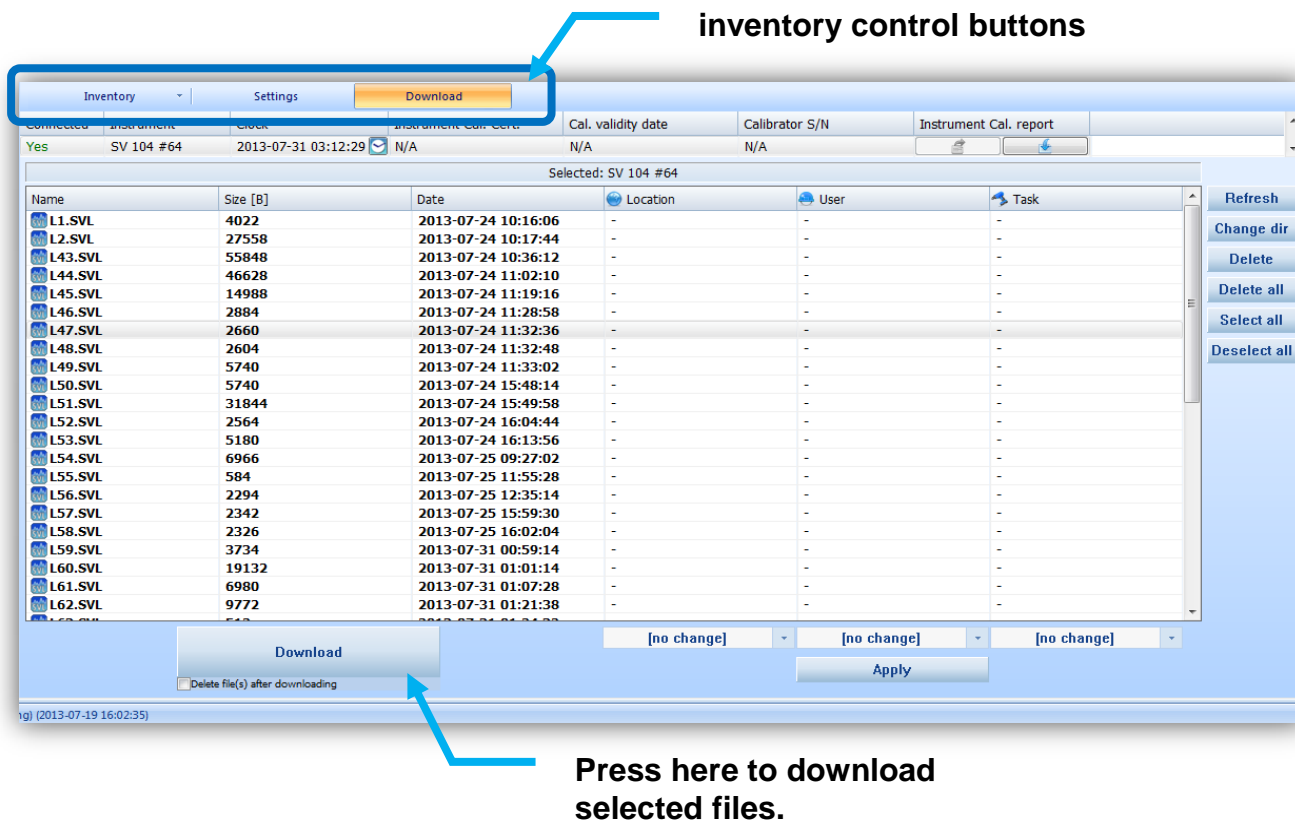


Figure 5-20 SV 104 Download window

Press the “**Download**” button, located in bottom area, and the previously selected run data files will be downloaded to local computer and the **SUPERVISOR** will enter “**Data Browser**” (see chapter 5.6.2) to further manage downloaded files. Run data files in the instrument can be optionally deleted after download by checking the box under the Download button.

To change the working directory or scan other folders, press the “**Change dir**” button, and appropriate window will appear, see figure below.

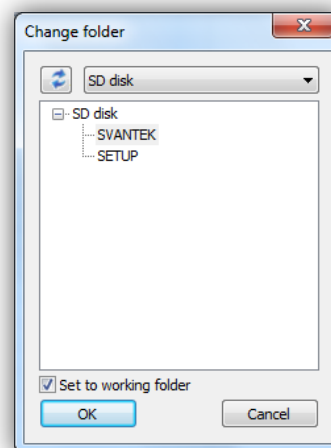


Figure 5-21 Change instrument working directory window

5.6.2 Local files “Data Browser”

Within the Data Browser tab you can see the list of previously downloaded files ready for further processing. Note that selected files will generate a short preview in the bottom area giving the operator an initial idea of the time history of the measurement results.

All files are simply divided per specific function: In the case of a dosimeter: Noise dosimetry and Wave are relevant file groups.

To further process the selected file or files, right click on selection, and choose “**New session**” command. This will bring you to the “**Session**” window (see chapter 5.7), where the reporting tool will allow you to quickly and professionally review and assess the data.

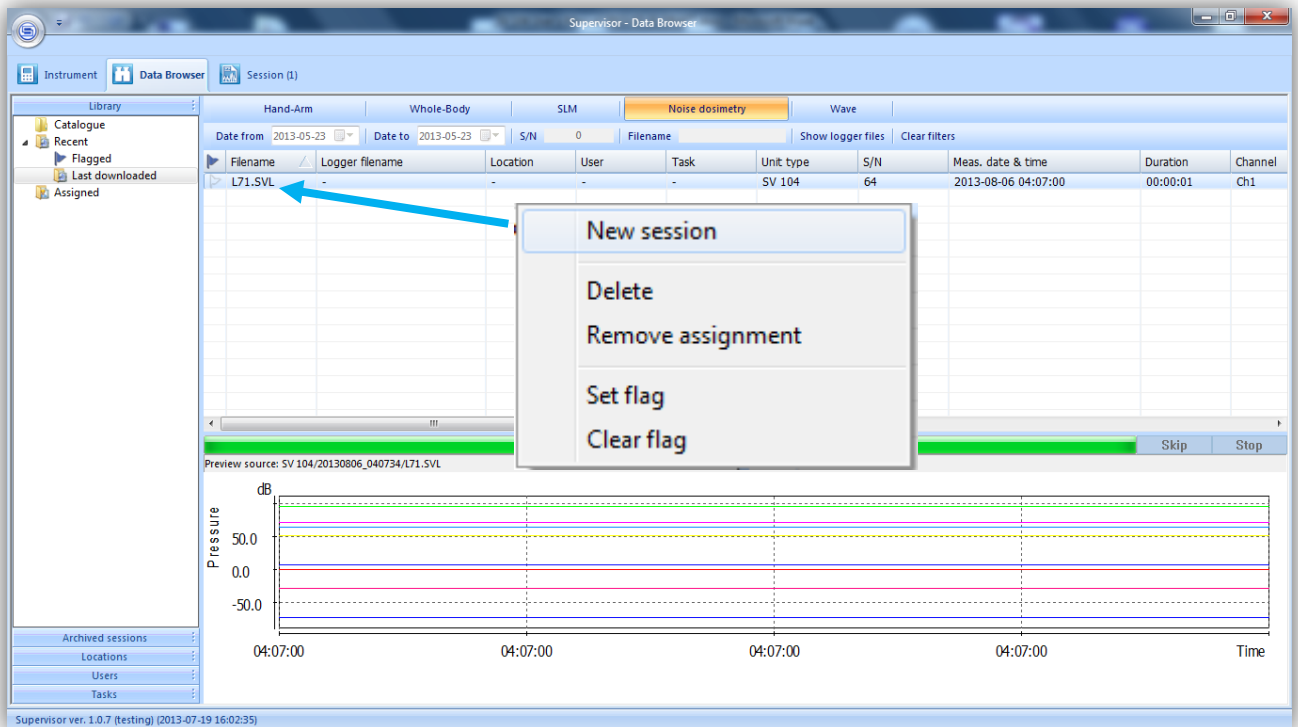


Figure 5-22 Local files “Data Browser” - window layout

5.7 Working with sessions and reporting

One of the main advantages of the SUPERVISOR is its incredibly simple but professional and user customizable report creation. Once you get familiar with the power of document design you will love it and probably never come back to the old fashioned way of reporting.

When the measurement data is downloaded via the download feature, the data is stored and viewable via the local file “Data Browser” window. Further work with data downloaded from dosimeter is based on, so called, **SESSIONS** – the most advanced charting, tables, and reporting capability in its class.

Each **SESSION** is highly configurable and the **template** of a document once created (Figure 5-25) can be saved for future use with other measurement data. That gives the operator quick solutions at the fingertip. **The information is divided into panels** and viewable in customizable graphs and/or with selected measurement data/parameters.

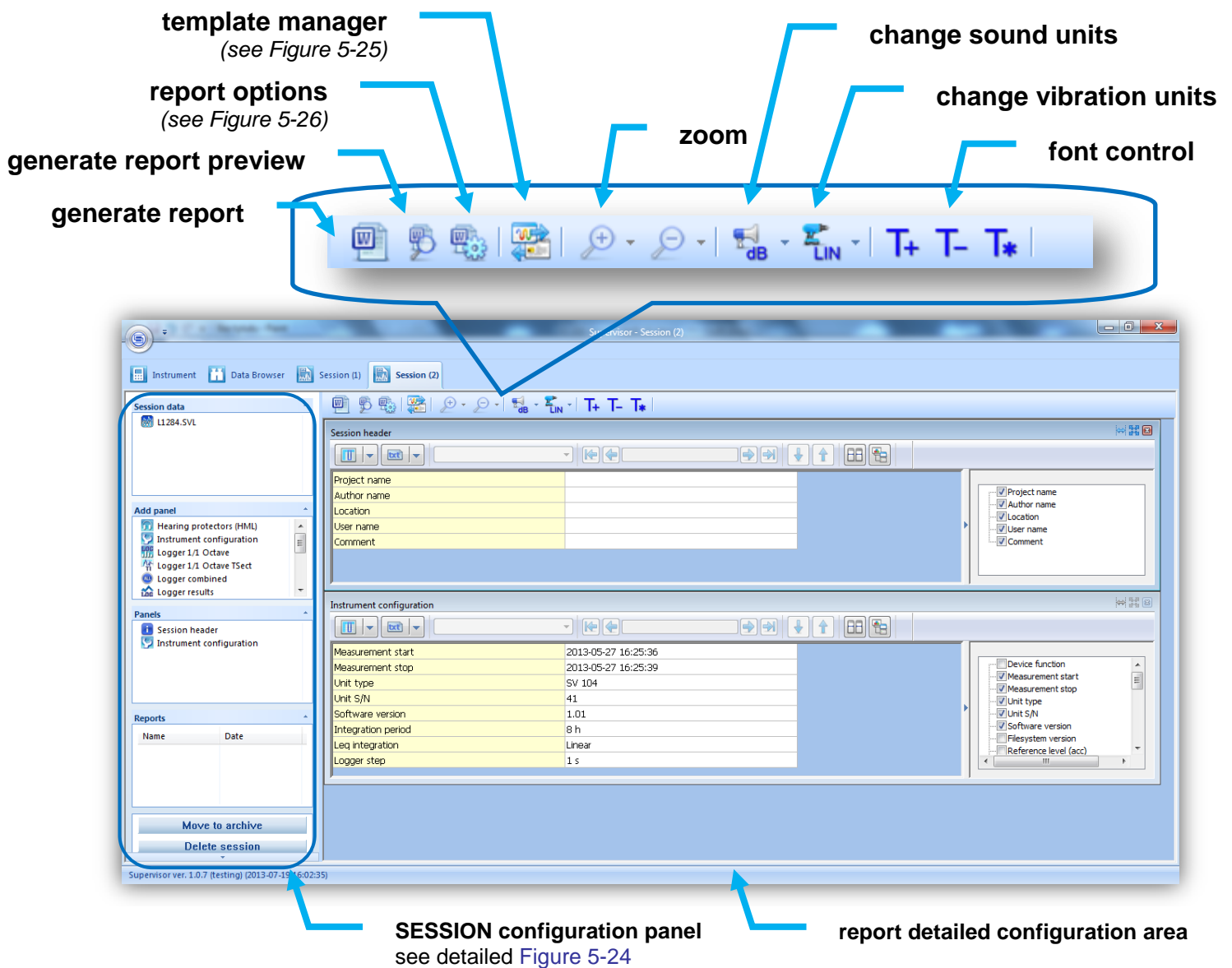
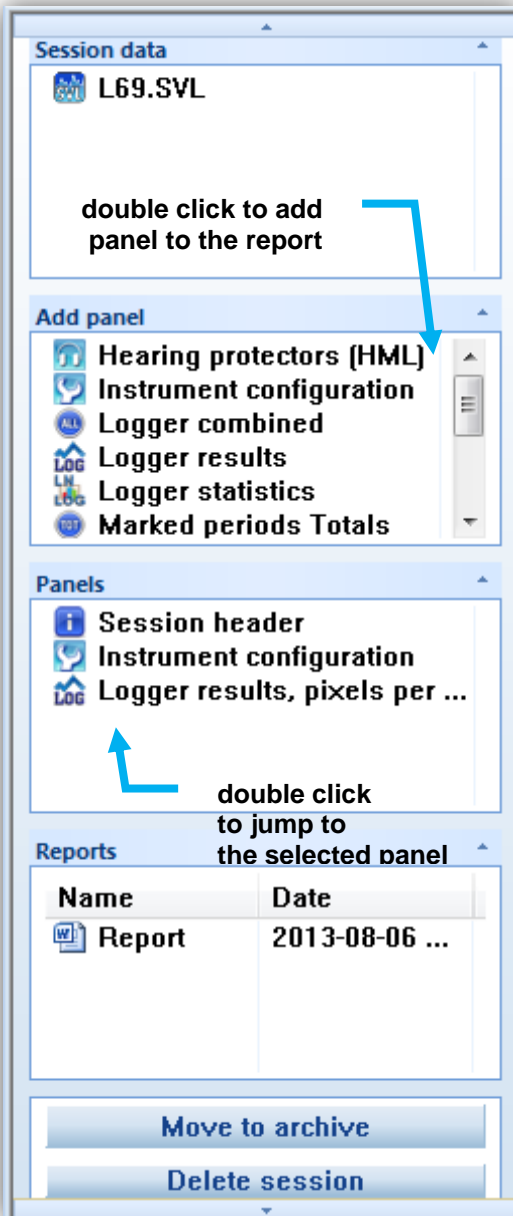


Figure 5-23 SUPERVISOR main SESSION window



SESSION configuration panel enables you to see the currently selected measurement data in the “Session data” sub-panel.

“**Add panel**” contains a list of available information sections or chunks so called panels that are available to place in the report. Just double click to add a new panel section to the report detailed configuration area. Note, that each panel can be added more than once. It is possible to change the information in each panel: for example: one panel with parameters sorted in a table layout, and the other with a graph, or a zoomed graph.

“**Panels**” contains the list of currently added information chunks to the report detailed configuration area. Here you can change the names of the individual added panels.

“**Reports**” contains information about user generated documents saved by the software.

SESSIONS can be archived, or deleted with single button click.

Figure 5-24 SESSION configuration panel

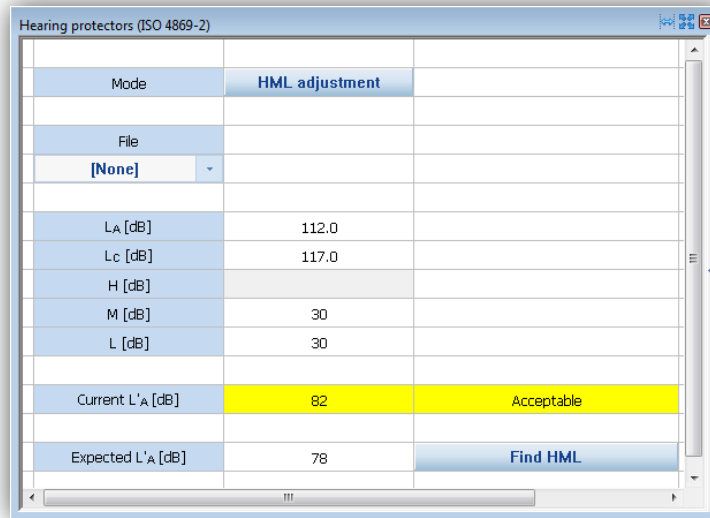


Figure 5-27 Hearing protectors (HML) panel

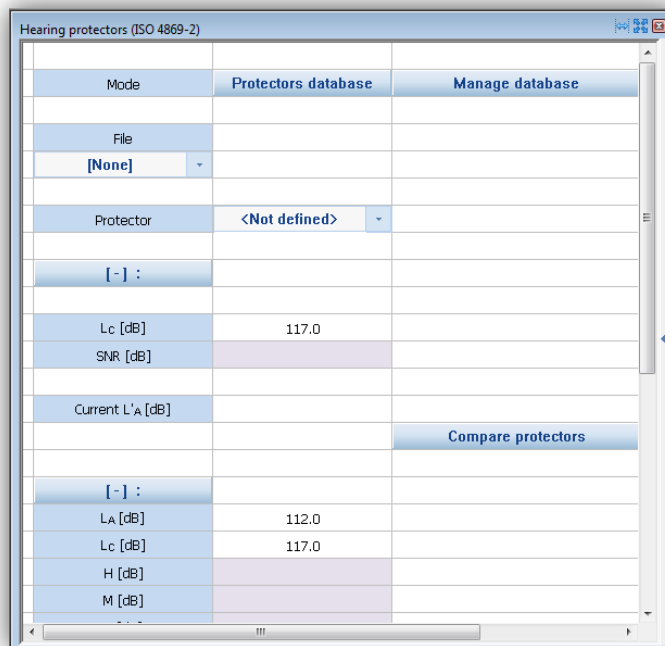


Figure 5-28 Hearing protectors database panel

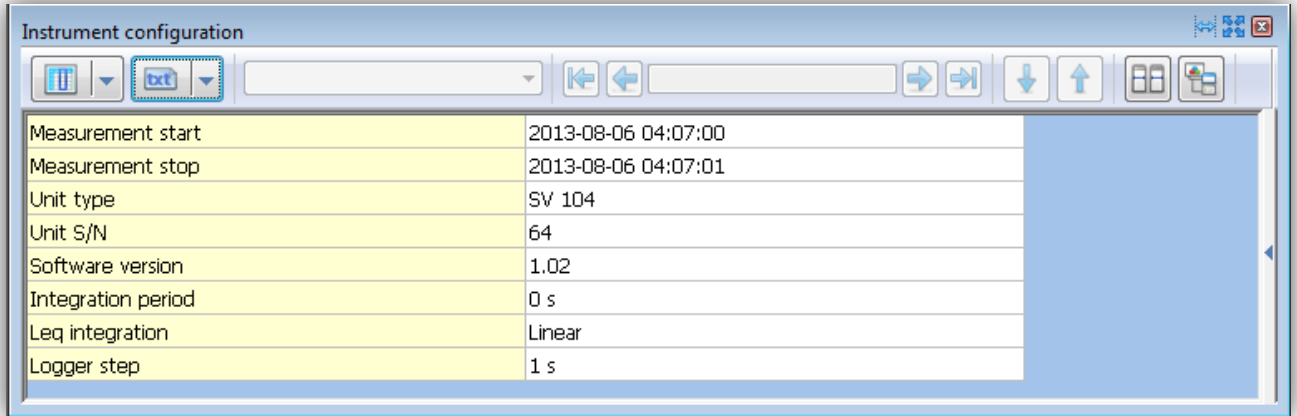


Figure 5-29 Instrument configuration panel

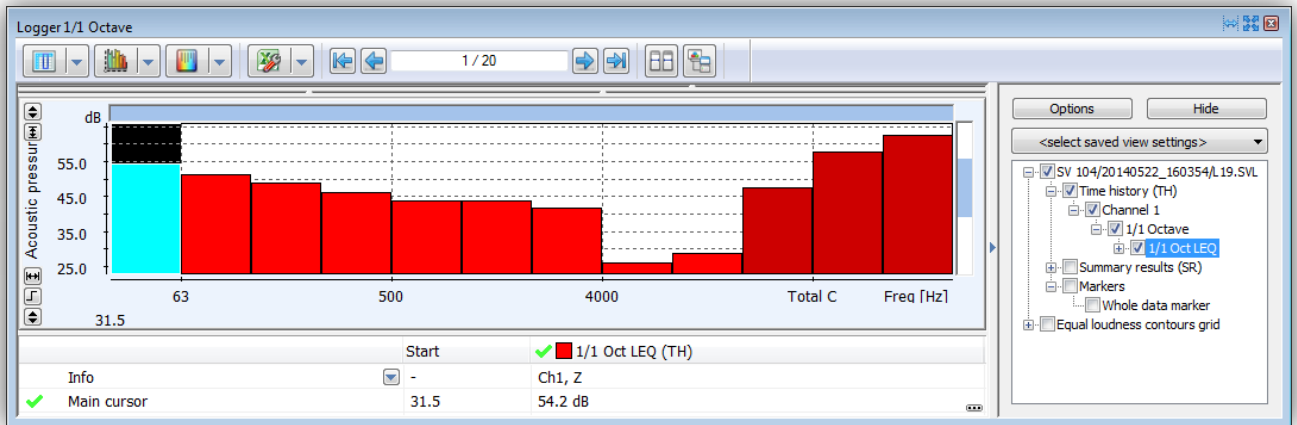


Figure 5-30 Logger 1/1 Octave panel

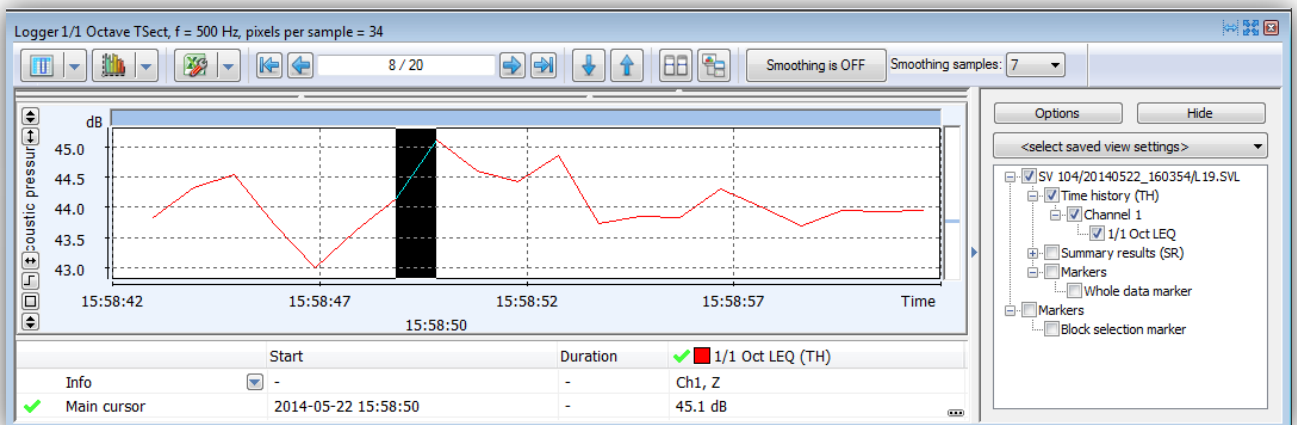


Figure 5-31 Logger 1/1 Octave Tsect panel

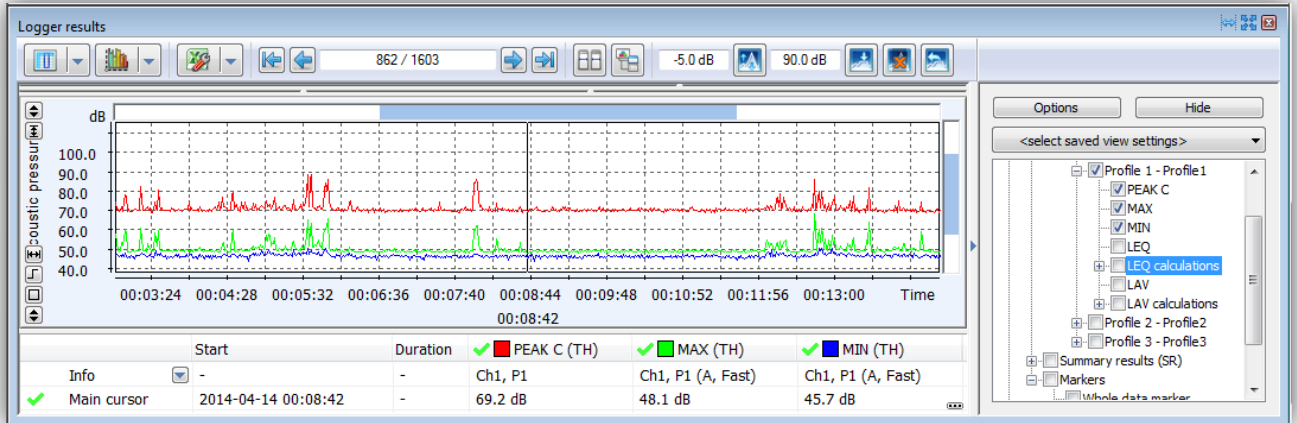


Figure 5-32 Logger results panel

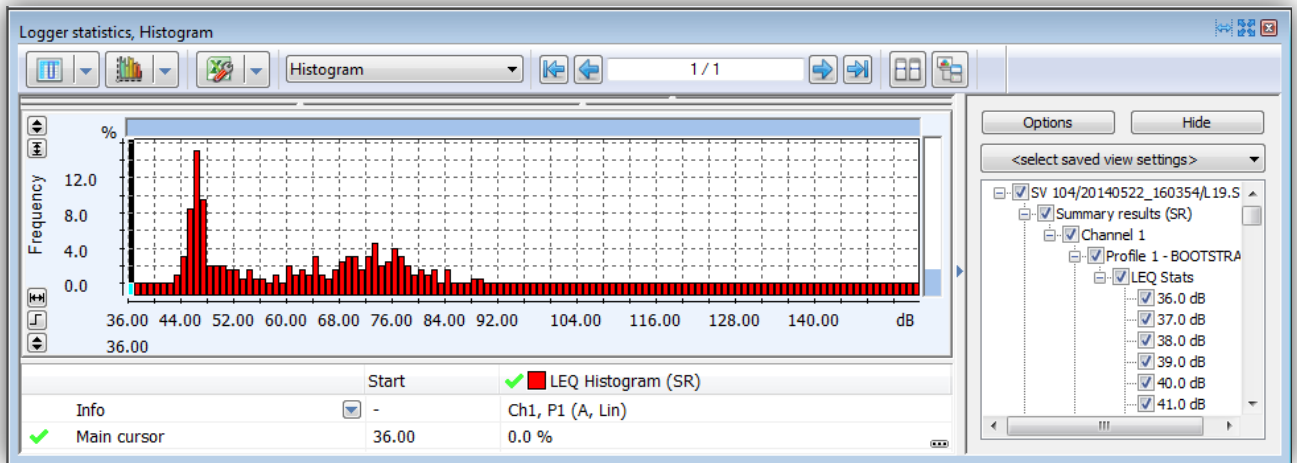


Figure 5-33 Logger Statistics panel

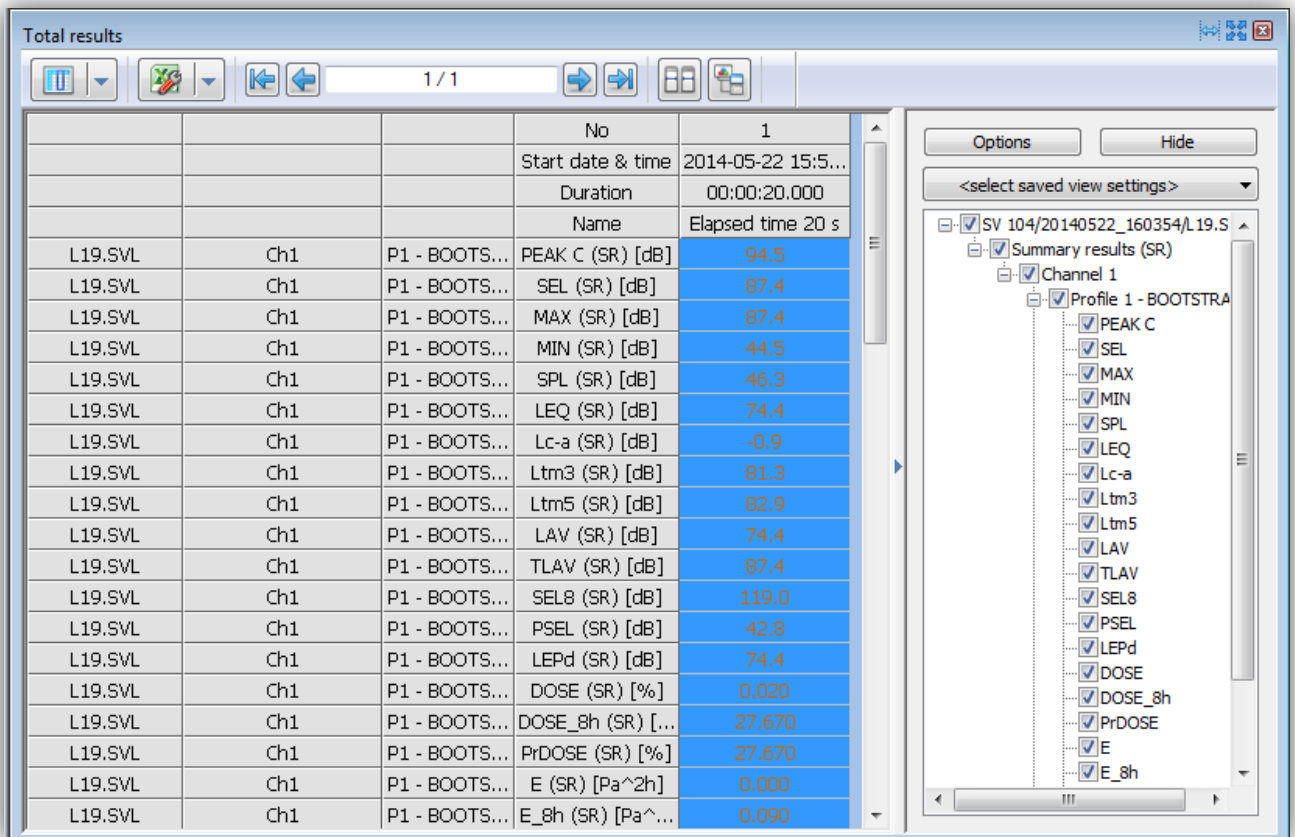


Figure 5-34 Totals results panel

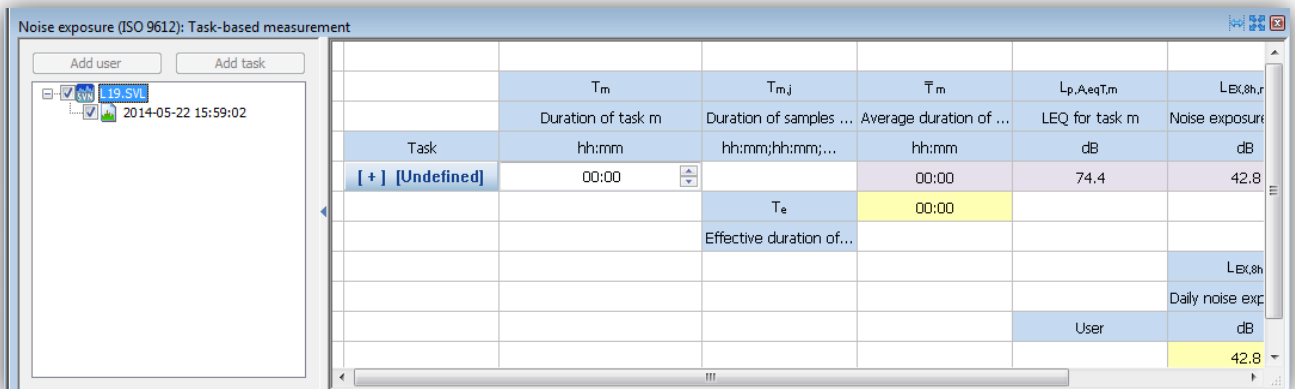


Figure 5-35 Noise exposure (ISO 9612) panels

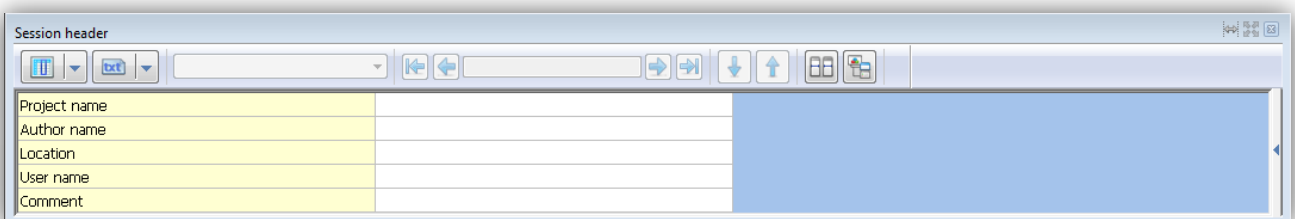


Figure 5-36 Session header panel

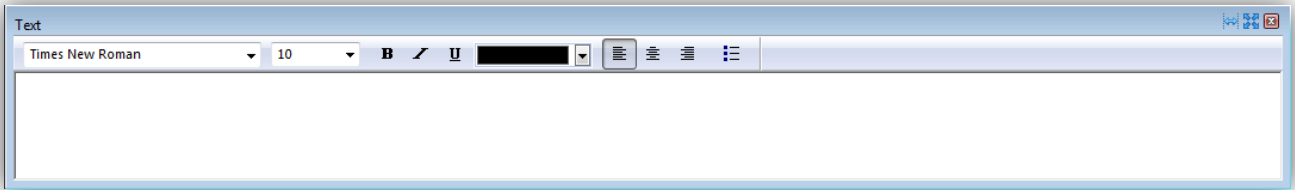


Figure 5-37 Configurable Text panel

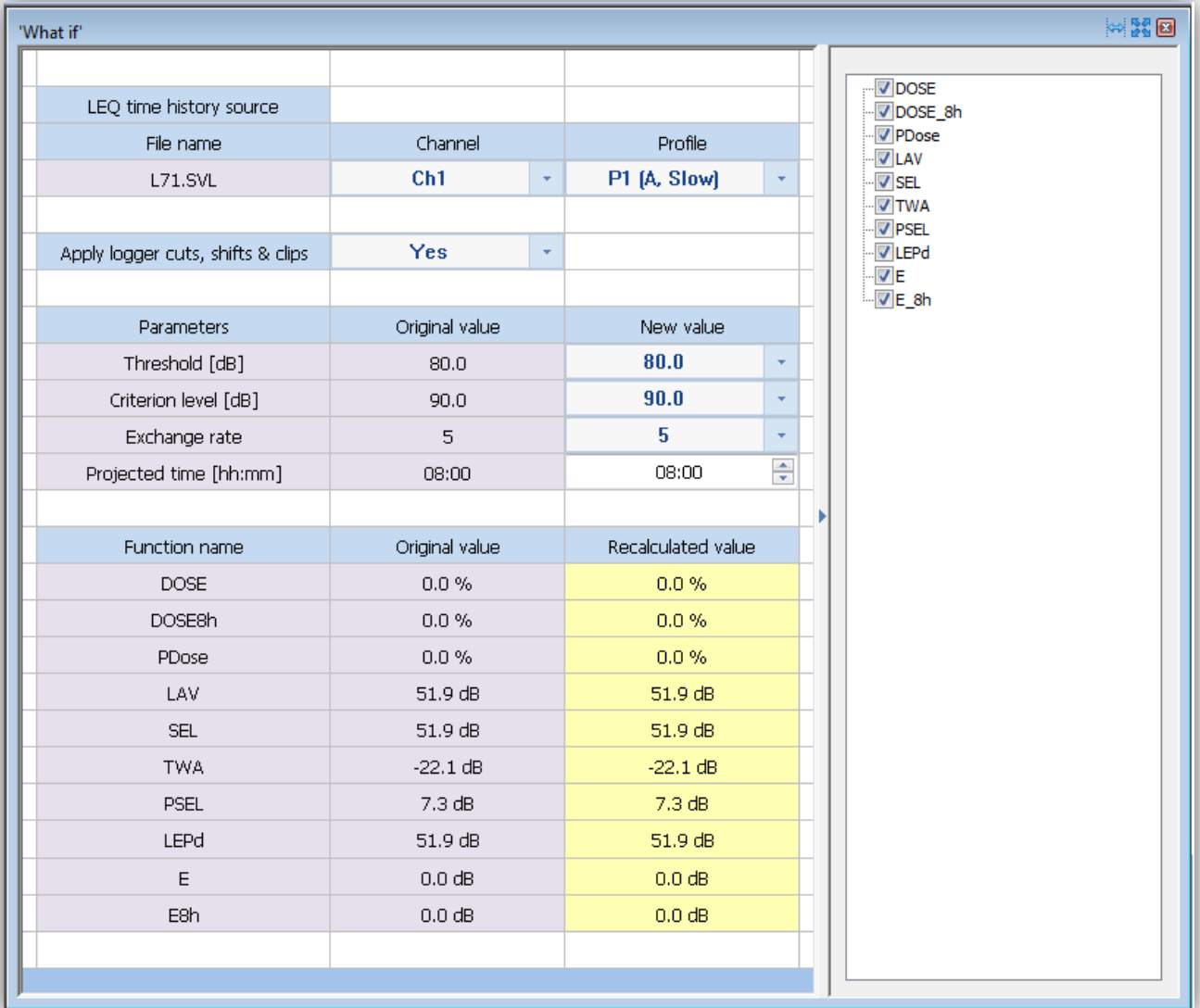


Figure 5-38 Powerful “What if” panel

6

SV 104 MAINTENANCE

6.1 General recommendations for use

- Use only high quality USB cables, such as **SC 156**. Many poor quality cables do not ensure low resistance of the cable, thus disabling proper charging of the internal cells
- It is not recommended to leave the instrument in direct sunlight conditions for prolonged periods of time. Extended exposure such as behind the car window may affect the performance.
- To improve accuracy of remaining battery life indicator, run the dosimeter until it is fully discharged; then proceed with a full charge via the micro USB port. The procedure is recommended before first use. Repeat this procedure every few months of use to maintain more accurate current battery condition indication.

6.2 Cleaning

Few things to remember:

- Every time the **SV 104** gets too dirty, clean the surface of the dosimeter with damp soft cloth.
- Pay special attention that the provided **SA 122** windshield is clean because dirtiness can affect the measurements. Take off the windshield, shake off any dirt, and clean it with damp cloth. If necessary change the windshield to new one. The foam windshield is considered a consumable item and will need replacing if it becomes lost or its condition deteriorates too much. Packs of 3 replacement windshields are available under the part number **SA 122_3**.
- Pay special attention that the **SV 27** microphone front part is clean because dirtiness can affect the measurements. Avoid the small inlet hole getting too dirty. Clean carefully with a dry and soft non-fraying cloth.

6.3 In situ calibration

It is advised to perform an acoustic calibration of the instrument each time before and after the measurement run. A single calibration at the start of each day of use is usually sufficient for most regulations. See chapter 4.7 for calibration details, please.

6.4 Periodic testing

The manufacturer's recommended factory calibration interval is every **12 months** for **SV 104** to be confident in its continuing accuracy and compliance with the international specifications.



Notice: Please contact your local SVANTEK distributor for further details on traceable recalibrations that are recommended by most regulatory authorities.

6.5 Changing the microphone and windshield

To change the microphone, take off the windshield first (see chapter 3.3). Now, you need to unfasten the microphone from the mounting head. Unscrew the microphone in a counter-clockwise direction.

To attach a new microphone, screw the microphone on clockwise until it fits tightly. It is critical to make sure the sensor is tightly fitted. Be gently and be aware not to break or strip the thread.



Notice: Note, when the microphone is changed, the new **microphone serial number** should be programmed into the **SV 104** internal memory. It can be easily programmed through the freely provided **SUPERVISOR** software.

In case the windshield is destroyed/lost by any accident, or it gets too dirty to afford the microphone the best protection then **SVANTEK** offers **SA 122_3** three pcs per pack (windscreens for **SV 104** dosimeter).

6.6 Firmware update

SVANTEK is committed to continuous innovation path of development, and as such reserves the right to provide firmware enhancements based on user's feedback.

To update the instrument firmware:



- Unpack the provided firmware package (provided as a suitable compressed file).
- Make sure the unit is turned off.
- Hold down the **<PROFILE>**  key and press the **<ENTER>**  key to turn on the unit. This ensures the unit will switch on and enter the special reprogramming **BOOTLOADER** mode.



Figure 6-1 Bootloader update mode view

- Then connect the USB cable. The **<USB>** text will now appear on the instrument display.
- Run the **start.bat** file.
- Successful firmware update will be indicated by relevant message.
- Turn off the unit.



Notice: With use of **SUPERVISOR** software it is very easy to check if there are any new firmware releases available for download (see Figure 5-3 commands).

6.7 Storing the instrument

- To preserve the life of the internal batteries, it is recommended that the **SV 104** instrument is turned off when it is stored.
- Do not store the instrument permanently connected to the USB port. It shortens battery lifecycle

- When the **SV 104** is turned off, it still draws a small amount of battery power. Therefore it is recommended to charge the cell every few months if it is not going to be used regularly.

6.8 Transportation and carrying

For transportation or storage purpose, always use the packaging provided by the manufacturer. In a potentially dirty industrial environment it is advisable to use the carrying case provided by the manufacturer such as the **SA 73** (see chapter 2.3), which ensures excellent mechanical and environmental protection and long term storage conditions.

6.9 Troubleshooting

1. Upon connection to the USB port, if automatic charging is not started: check the USB cable and power supply ratings of the source.
2. If the incorrect time or date is displayed when turning on the instrument connect the device to the computer and use Supervisor software to set the time and date (see) ensuring PC clock is set correctly
3. In case the instrument is not able to turn on ensure the unit is charged by connecting to USB or recommended charger. This ensures the battery is not exhausted. Then proceed with hardware reset (chapter 4.15)
4. In case your dosimeter does not respond proceed with turn-off/turn-on procedure (chapter 4.3), and hardware reset of the instrument (chapter 4.15).
5. In case the measurement of the sound level is frozen or set to a fixed value proceed with turn-off/turn-on procedure (chapter 4.3), then with hardware reset of the instrument (chapter 4.15).
6. In case the reset does not help proceed to chapter 7.

7

SVANTEK SERVICE

Should your SVANTEK professional measurement equipment need to be returned for repair or for calibration, please contact the service office at the following number or contact via the SVANTEK's website.

Service Office: +48 (22) 51-88-320 or +48 (22) 51-88-322.

Office hours are 8:00 a.m. to 4:00 p.m. Central European Time.

- E-mail at office@svantek.com
- Internet at www.svantek.com
- Address:

SVANTEK Sp. z o.o.
Strzygłowska 81
04-872 Warszawa,
Poland



Notice: International customers:

Contact your local authorized distributor from whom the product was purchased. You can obtain the name and contact information of your local authorized distributor from SVANTEK by using the e-mail or telephone information listed above or use our website to find nearest distributor office.

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