

SV 104A

ACOUSTIC DOSIMETER

USER'S MANUAL



SVANTEK Sp. z o.o.

WARSAW, January 2017

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Thank you for buying and using this SVANTEK product!

GENERAL WARNINGS, SAFETY CLAUSES, AND STANDARD INFORMATION



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



Note: When in normal use, always fit the **SA 122A** windshield provided.



Note: 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.



Note: 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.svante.com. This user's manual presents the firmware revision named 1.02.1 (see the **Unit Label** review chapter 4.5 to check version details). This user's manual presents some aspects of **Supervisor** software revision named 1.8.10 and **Assistant** application for mobile devices 2.1.19 (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.



Notice: Dosimeter incorporates Bluetooth[®] wireless communication operating in 2.4GHz RF band and transmit power up to +9dBm.



Notice: For air-transport turn off **Bluetooth interface** (see chapter 3.7.3, 6.5.7.4 and 4.6).



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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SPECIAL PRECAUTIONS WHEN USING AND CHARGING LITHIUM BATTERIES

SV 104A instrument contains extremely high energy density lithium-ion cell. Use special caution when working with lithium-ion cells. They are very sensitive to charging conditions and may explode or burn if mishandled.

- Do not replace battery yourself. The battery is only manufacturer replaceable.
- Do not charge the instrument underground (mining) or in other hazardous locations.
- Always charge lithium batteries in/on a fire-proof surface.
- Do not charge the instrument near flammable materials such as boxes, paper and furniture.
- Immediately discontinue use of the instrument, while using, charging, or storing the instrument, if the instrument emits an unusual smell, feels hot, changes colour, changes shape, swells, or appears abnormal in any other way. Contact your sales location or **SVANTEK** if any of these problems are observed.
- Use caution to prevent puncturing or rupture of the instrument and cell within. Do not penetrate the instrument with nails, strike the instrument with a hammer, step on the instrument, or otherwise subject it to strong impacts or shocks.
- Do not place the instrument on or near fires, stoves, or other high-temperature locations. Do not use or store the battery inside cars in hot weather. Do not place the instrument in direct sunlight or use or store the instrument near a source of heat. Doing so may cause the battery contained inside to generate heat, explode, or ignite. Using the instrument in this manner may also result in a loss of performance and a shortened life expectancy.
- Do not place the instrument in microwave ovens, high-pressure containers, or on induction cookware.
- Although the instrument is IP65 protected do not expose it extensively to water conditions which could cause the contained battery to get wet.
- The temperature range over which the instrument can be charged is **0°C to 40°C**. Charging the instrument at temperatures outside of this range may cause the battery to become hot or to break. Charging the instrument outside of this temperature range may also harm the performance of the battery or reduce the battery's expectancy.

Assure that all of these precautions are observed before leaving the instrument charging unattended.

- The temperature range over which the battery can be stored is -20°C to +50°C and the temperature range over which the battery can be discharged is -10°C to +50°C. Use of the battery outside of this temperature range may damage the performance of the battery or may reduce its life expectancy.
- If you notice a performance decrease of greater than 20% in instrument, the battery is at the end of its life cycle. Do not continue to use, and ensure the battery is disposed of properly. Contact your sales location or **SVANTEK**.

ENVIRONMENTAL PROTECTION MARKING OF THE UNIT

Marking on the Unit	Explanation
IP65	Dust-tight. Protected against water jets

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1

INTRODUCTION

Now, the **SV 104A** instrument is even more revolutionary 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 **ST 104A**) 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) pre-set, second profile set to OSHA HC (Occupational Safety and Health Administration - Hearing Conversation) pre-set 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 104A** instrument can simultaneously measure the dosimeter results and perform real time **1/1 Octave & 1/3 Octave** analyses including the calculations of the statistical levels.

An inbuilt tri-axial accelerometer for **vibration shock detection** firmly places **SV 104A** as both the most technically advanced and the most robust personal dosimeter out there providing also information on the time when dosimeter is not used by the worker.

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 Li-ion **rechargeable batteries** offering circa **48 hours²** of continuous operation. Ultra-low battery self-discharge is about 1% per year. The **powering and charging of the instrument from the USB** interface is provided which also enables easy data exchange connection between the **SV 104A** and a PC without the requirement of a special docking station. Alternatively, powering and charging of the instrument is possible with one of **SB 104A-X series docking station** with the USB interface which also enables easy data exchange with PC.

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

Robust and lightweight design and Low Energy **Long Range Bluetooth® Smart** wireless interface 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 104A**, the first part of the manual describes basic noise dosimetry information followed by a guide to setting up the dosimeter and running measurements.

² 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 104A** noise dosimeter is extremely well suited to ISO, OSHA, ACGIH, MSHA, NIOSH, CFR 1910.95, HSE L108 workplace noise measurements in noise exposure assessments. NIHL: Noise Induced Hearing Loss remains noticeably significant occupational disease. It is notably severe in the mining, construction, oil & gas industry but also in a wide variety of manufacturing sectors and other commercial operations. 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, noise induced hearing loss (NIHL)
- transportation noise studies
- personal noise verifications
- peak dosimeter for example in military applications

One of the most desirable **SV 104A** 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.

Due to the unattended nature of noise dosimetry it is important for workers to be fully engaged with the risk assessment process. Motion sensing (No Motion Time) is particularly useful in cases of cheating to tamper with the instrument or try to impact on the results, by for example instrument being taken off for the majority of the time.

The addition of Bluetooth® wireless connectivity and the supporting mobile devices **Assistant** application enables remote control and monitoring of the instrument's status such as battery usage, memory capacity and measurement progress without having to disturb the worker.

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 104A** 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 pre-set start and end time without the need for any onsite supervision.

Additionally, the **SV 104A** 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 104A dosimeter short form specification

- Acoustic Dosimeter conforming to international standards **IEC 61252; ANSI S1.25;**
- Class 2 Microphone, MEMS type: **ST 104A**, 1/2" housing with **LIFETIME WARRANTY!**
- **OLED colour display** with super brightness and contrast
- Large **8GB memory**
- Wireless connectivity with low energy **Long Range Bluetooth® Smart** (4.0) interface
- **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 **53 dBA RMS ÷ 141 dBA Peak**
- Dynamic Range better than **98 dB**
- Exchange rates **2, 3, 4, 5, 6**
- Measurement results: **Run Time (TIME), Lpeak, Lmax, Lmin, L, DOSE (%), D_8h, PrDOSE, Leq, LAV, LE, SEL8, E, E_8h, LEPd, PSEL, Ltm3, Ltm5, Lstat, PTC, PTP, ULT, TWA, PrTWA, Lc-a, OVL, No Motion Time**
- **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 104A-OCT)
- **1/3 Octave** real time analysis - 28 filters with centre frequencies 20 Hz ÷ 10 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 104A-3OCT)
- **Audio events recording**, triggered and continuous mode, 12/24 kHz sampling rate, wav format (as option called SF 104A-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 **> 48 hours** (*display off, Bluetooth® off, octave analysis off*)
- Extremely **compact, lightweight and robust case with IP65 ingress protection**



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

2.2 Accessories included

- **ST 104A** - ½" MEMS microphone for SV 104A dosimeter
- **SA 122A** - windshield
- **SC 156/1m** - micro USB 2.0 cable
- **CD with instruction**
- **Built-in rechargeable batteries** (charger/ power supply wall adapter not included)

2.3 Accessories available

- **ST 104A** – ½" MEMS microphone for SV 104A dosimeter
- **SA 122A_3** – Windscreens for SV 104A dosimeter 3 pcs per pack
- **SV 34A** – Class 2 acoustic calibrator: 1000Hz/114dB
- **SC 156/1m** – micro USB 2.0 cable
- **SA 54** – Charger/power supply for 1 x SV 104A
- **SA 73** - Carrying case for 5 x SV 104A dosimeters and accessories (waterproof)
- **SA 147** - Carrying case for 1 x SV 104A dosimeters and accessories (waterproof)
- **SA 156** – optional USB HUB for charging and data download from 5 x SV 104A dosimeters
- **SC 104AT** – Equivalent Impedance for electrical calibration
- **NM10411Z** – Technological wrench to unscrew the microphone
- **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
- **SB 104A-1, SB 104A-3, SB 104A-5** – optional docking stations with power supply and electrical communication contacts;

2.4 Instrument Software (Firmware) options available

- **SF 104A OCT** – real time 9 band 1/1 Octave analysis option
- **SF 104A 3OCT** – real time 9 band 1/1 Octave and 28 band 1/3 octave analysis option
- **SF 104A WAV** – Audio events recording option



Note: 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 System description

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



Figure 3-1 SV 104A at a glance

3.2 Input output interfaces description

SV 104A 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 communication port (reserved for docking station)
- Bluetooth® 4.0 wireless connectivity and the supporting mobile devices **Assistant** application enables remote control and monitoring of the instrument's results and status (see chapter 5 for details)



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

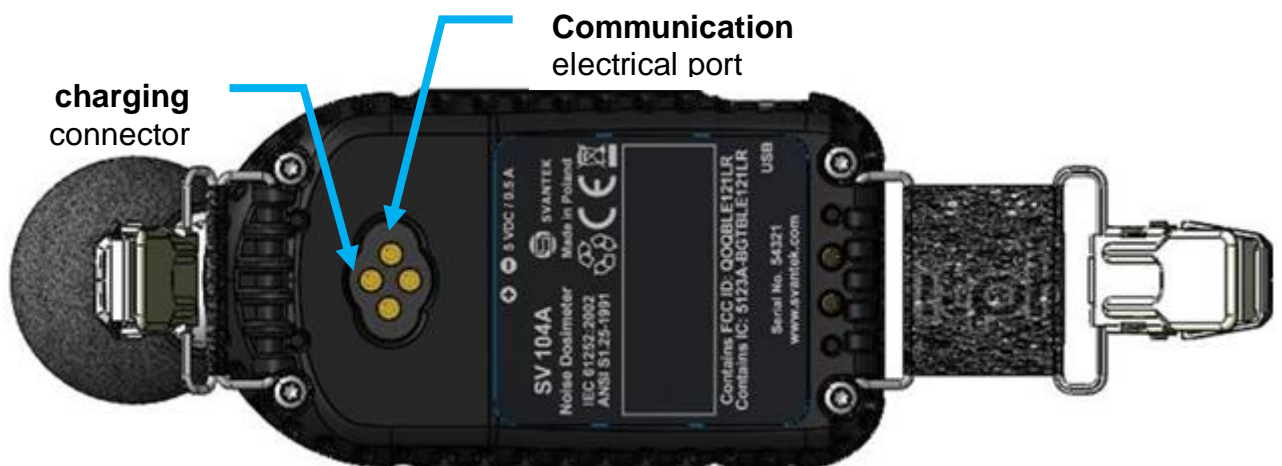


Figure 3-3 SV 104A back view - charging and communication port (reserved for docking station)

3.3 The windshield

During use, it is strongly recommended that the **SV 104A** is fitted with the supplied **SA 122A** 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 104A** uses anti-clockwise thread technique to fit tightly onto the microphone housing. To remove the windshield, unscrew the windshield holding the lower half of the foam and lift the windshield off the microphone housing. Once the **SV 104A** has been calibrated, refit the windshield by carefully screw it clockwise over the microphone again.



Figure 3-4 SA 122A windshield

3.4 The mounting clips

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



Figure 3-5 SV 104A standard mounting clips

3.5 LED status indicator There is a three-colour instrument LED status indicator on the SV 104A, 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.

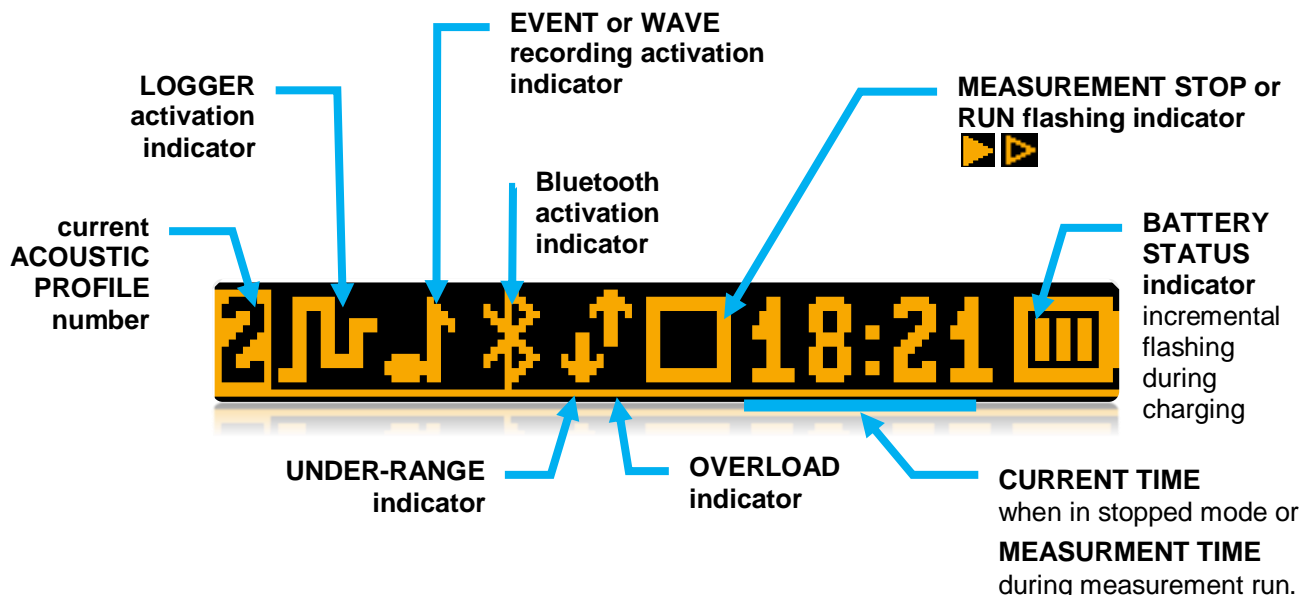







Figure 3-6 SV 104A display icons description

 **Note:**  Bluetooth icon displayed inversely as negative means that the dosimeter is connected with remote application such as Assistant - see chapter 5.

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**³ mode with the **<ENTER>**  key
- select the required **ACOUSTIC PROFILE**⁴ with the **<PROFILE>**  key
- and **SCROLL** through the results with the **<SCROLL>**  key



Note: To save power consumption and extend battery life **SV 104A 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.**

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:

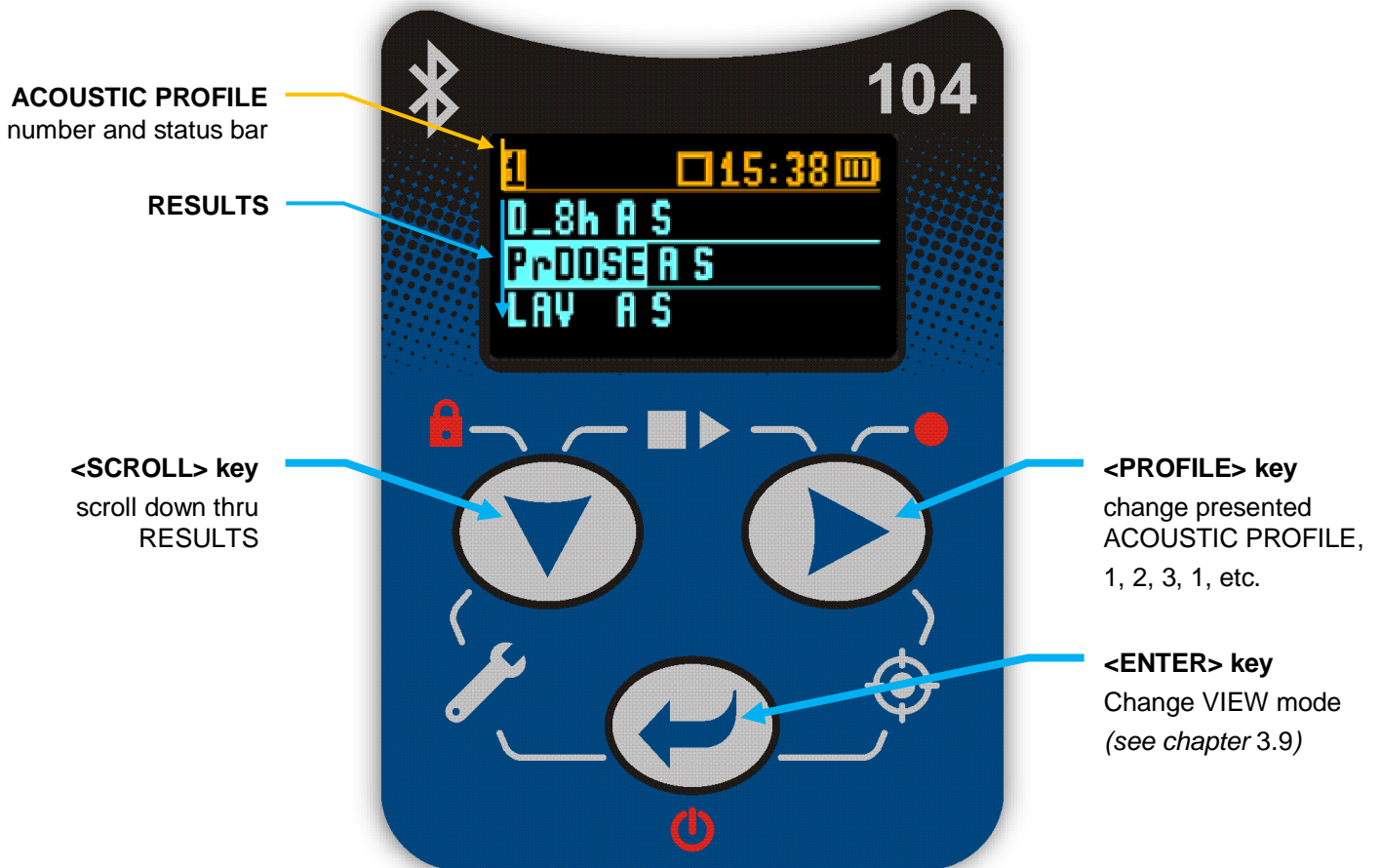





Figure 3-7 Control keypad on the front panel – primary key functions

³ See chapter 3.9 about VIEW modes

⁴ See chapter 3.8 about “3in1” functionality (3 independent acoustic profiles)

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

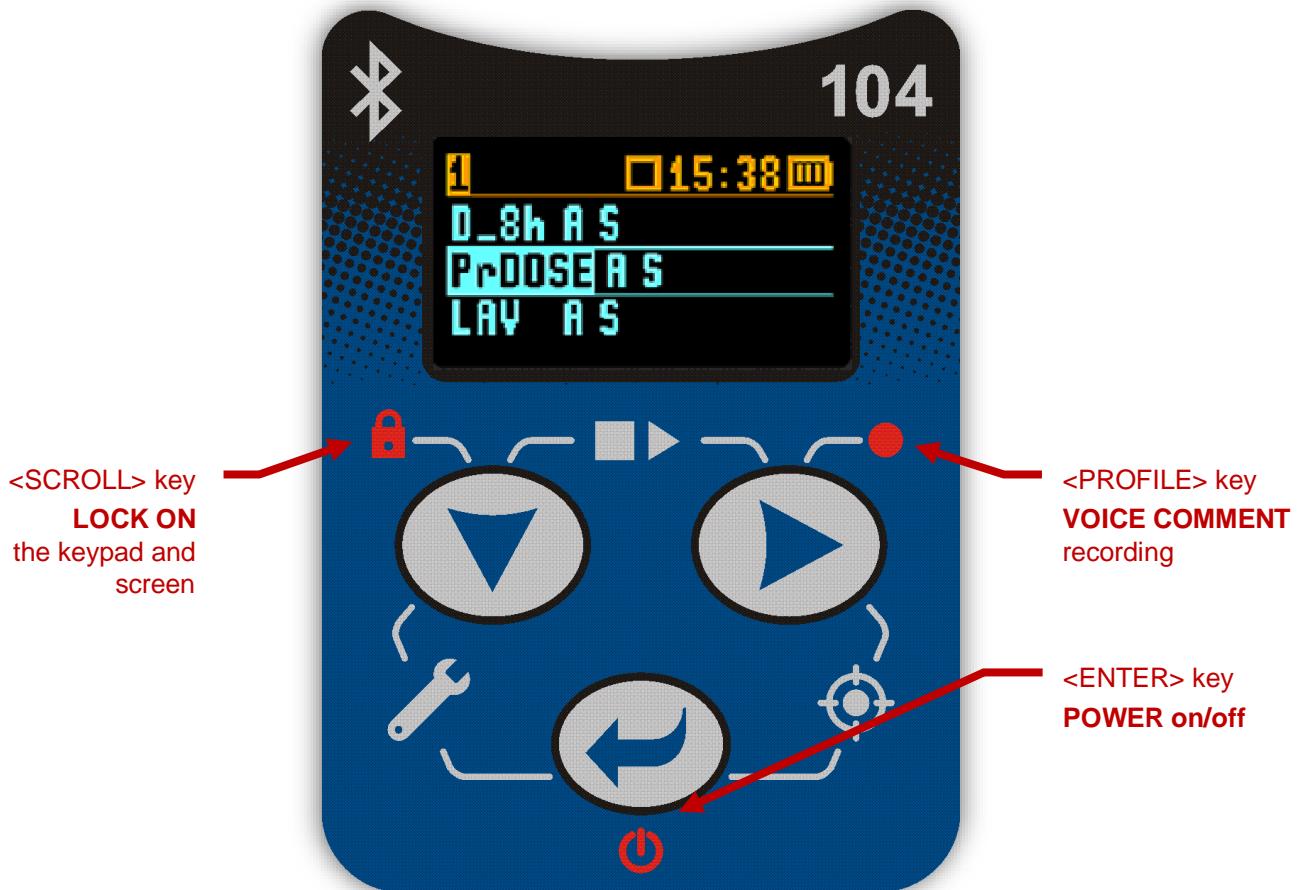





Figure 3-8 Control keypad on the front panel – alternate key functions

Holding down individual key for few seconds during which a countdown is displayed the SV 104A 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 104A** 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.

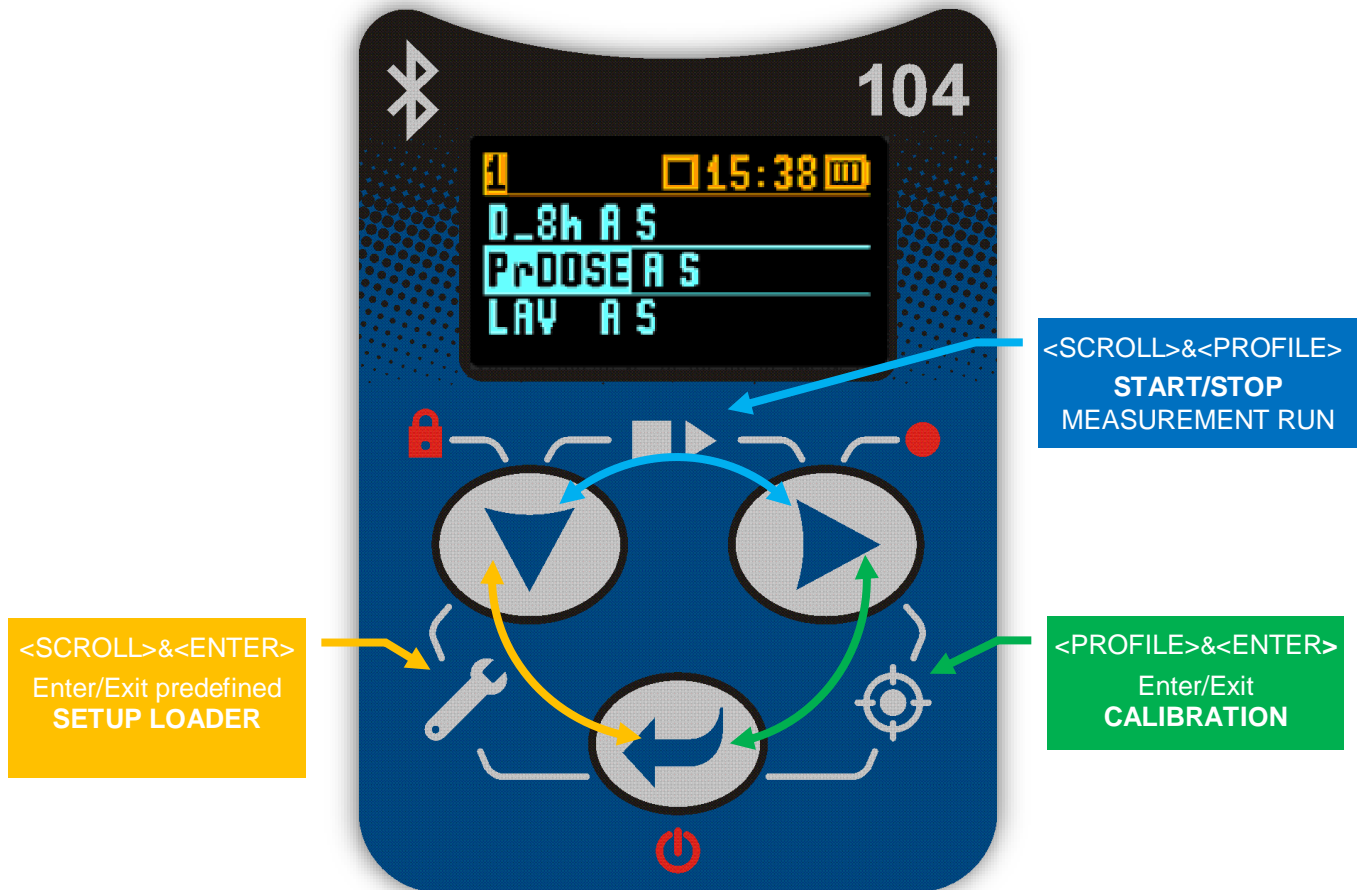






Figure 3-9 Control keypad on the front panel – alternate combined keys function

 **Note:** 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**.

 **Note:** Press **<SCROLL>**  and **<ENTER>**  keys simultaneously **twice** to access Bluetooth menu.

 **Note:** 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 104A 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 104A** 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 104A 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*
- 1/3 Octave analysis spectrum LEQ view mode (3.9.5) - *can be disabled with PC software*
- 1/3 Octave analysis spectrum MAX view mode (3.9.5) - *can be disabled with PC software*
- Instrument Status view mode (3.9.6) - *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.

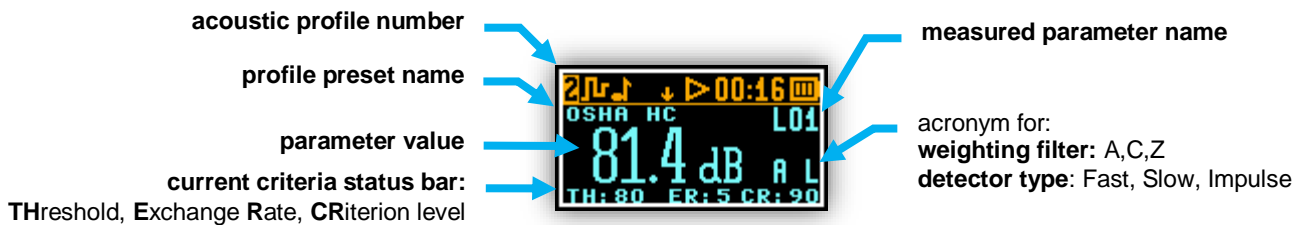


Figure 3-11 Primary ONE RESULT view mode screen

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.

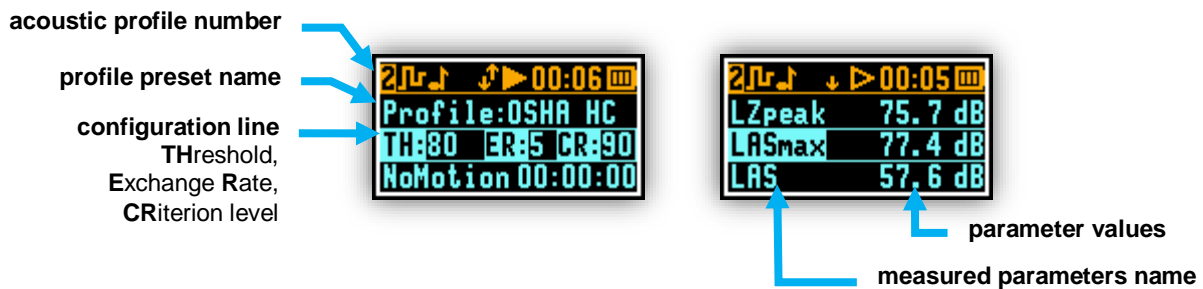





Figure 3-12 RESULTS LIST view mode screens

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 dosimeter 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.

 **Note:** 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.

With the use of Supervisor software, the user can select which spectrum (LEQ, MAX or both) will be available for view (see chapter 6.5.5).

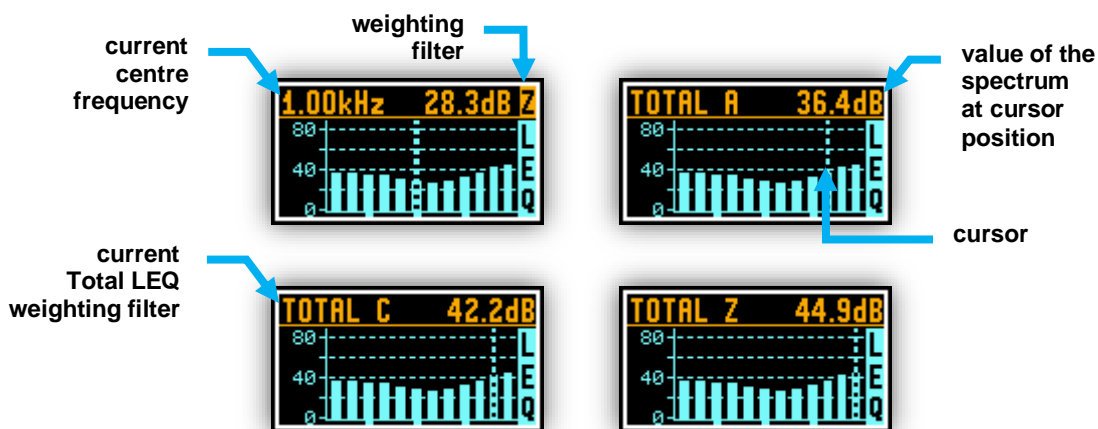


Figure 3-13 1/1 Octave analysis spectrum graph LEQ view mode screens

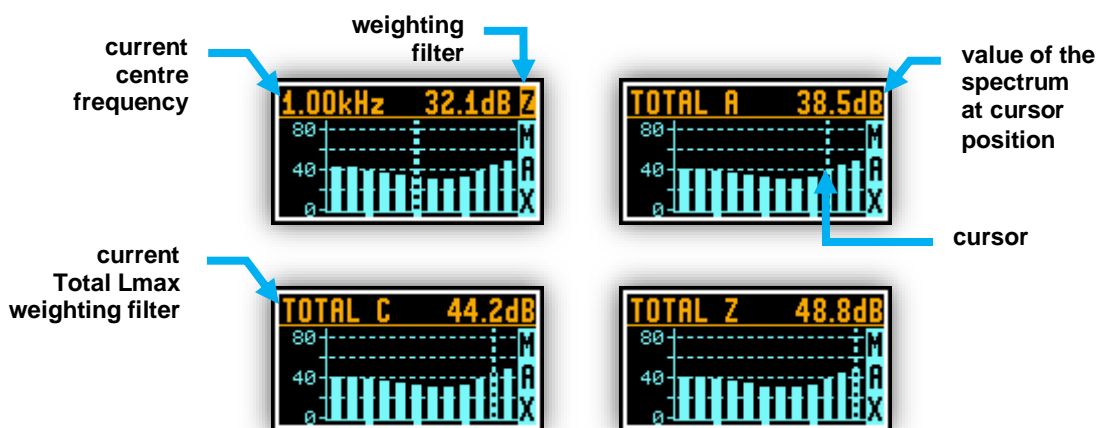


Figure 3-14 1/1 Octave analysis spectrum graph MAX view mode screens

3.9.5 THIRD OCTAVE analysis spectrum view mode

The instrument can also operate as a real time 1/3 octave band analyser (RTA). In addition and if enabled, 1/3 octave analysis is performed in parallel with the dosimeter operations. All 1/3-octave digital pass-band filters (with 28 centre frequencies from 10 kHz down to 20 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.



Note: 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 1/3 octave band analysis can be different from those obtained for the profiles (if the LEQ Integration was set as Exponential).

The results of 1/3 Octave analysis (so-called spectrum) can be examined by the user on a display in Spectrum VIEW presentation mode. 1/3 Octave spectra for all 28 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> (left arrow), <PROFILE> (right arrow) keys respectively.

With the use of Supervisor software, the user can select which spectrum (LEQ, MAX or both) will be available for view (see chapter 6.5.5).

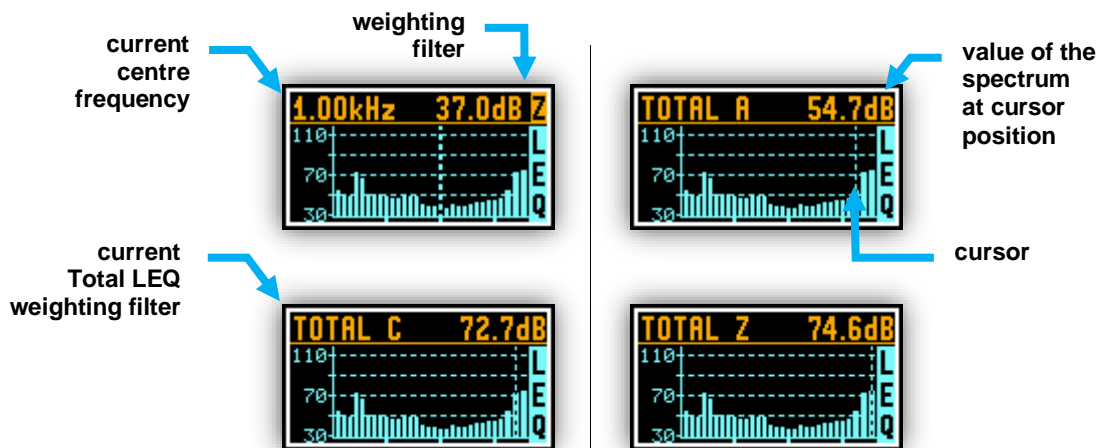


Figure 3-15 1/3 Octave analysis spectrum graph LEQ view mode screens

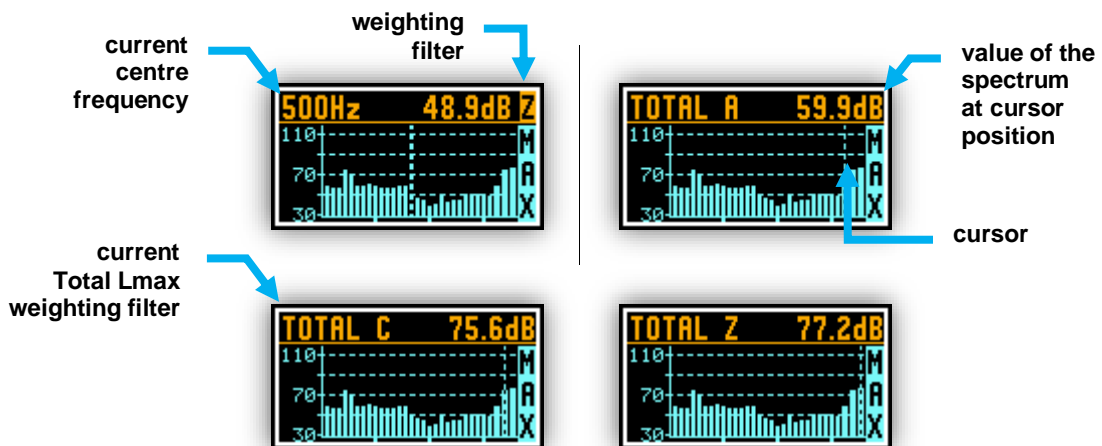




Figure 3-16 1/3 Octave analysis spectrum graph MAX view mode screens

3.9.6 INSTRUMENT STATUS view mode and Bluetooth security PIN code

Instrument Status view presents:

- the battery charge status (**Bat.Charge**) along with estimated working time which is left until the battery is expected to be completely drained (**Bat.Left**)
- current configuration information (**Setup**),
- Bluetooth status (**On** or **Off**) and PIN code,
- Timer status (**On** or **Off**) and time left to start.

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

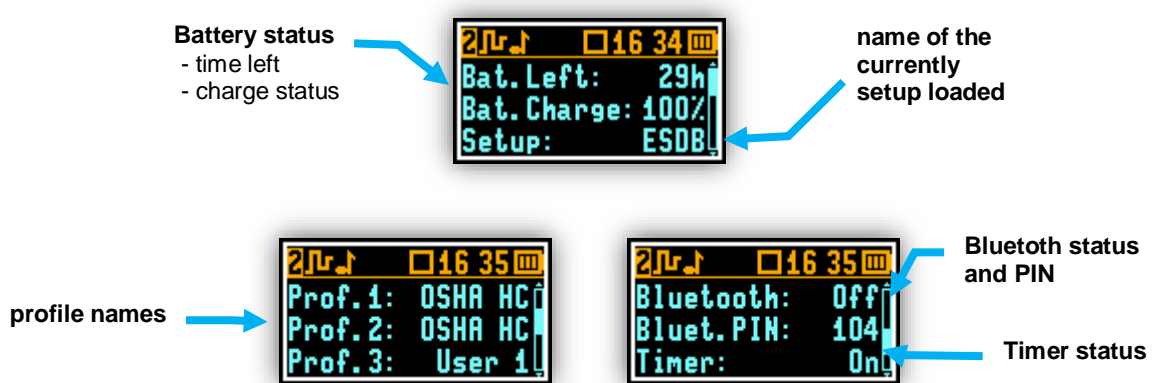


Figure 3-17 INSTRUMENT STATUS view mode screens

The Bluetooth security PIN enables the user to protect the instrument's access via Bluetooth® by **Assistant** mobile application. PIN is defined in the Supervisor software (see chapter 6.5.7.4).

When **Timer** is **On** there are additional positions in the Status list with time left to start.



Figure 3-18 Timer information

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 104A** 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.

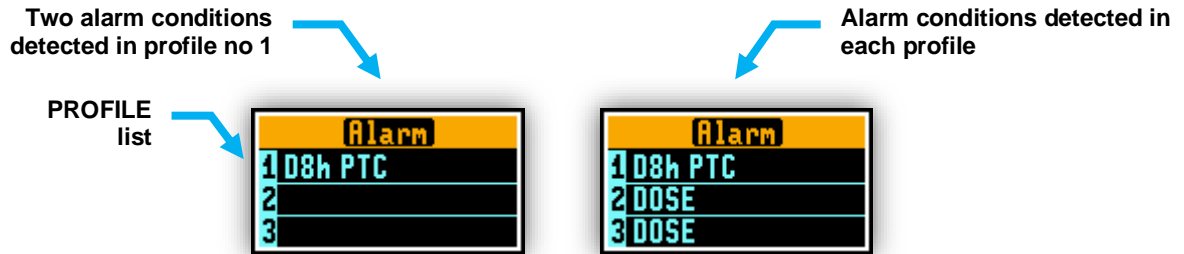


Figure 3-19 ALARM view screens



Note: 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 USB Charging

The battery inside **SV 104A** uses lithium-ion technology which requires special consideration and handling techniques due to the extremely high energy density (see “SPECIAL PRECAUTIONS WHEN USING AND CHARGING LITHIUM BATTERIES” clause on page 4).

Note that **SV 104A** 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**: universal micro-USB charger).

Ensure the **SV 104A** 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 104A** will automatically turn on the display during charging and present how much charge is within the instrument. The **SV 104A** 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 48 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 104A** 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 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.



Note: To charge a fully discharged battery, it would take approximately 2 to 2.5 hours or about 7-7.5 hours when using low power USB interface.



Note: 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 104A** 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



Note: 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.

4.1 DOCK STATION Charging

The battery inside **SV 104A** uses lithium-ion technology which requires special consideration and handling techniques due to the extremely high energy density (see “SPECIAL PRECAUTIONS WHEN USING AND CHARGING LITHIUM BATTERIES” clause on page 4).

Ensure the **SV 104A** is fully charged prior to use by placing it onto the docking station charger. Ensure the power supply is connected and the supply is switched on. **SV 104A** will automatically turn on the display during charging and present how much charge is within the instrument. The **SV 104A** will display ‘Fully charged’ once charging is complete. This should take approximately 4 hours from a fully discharged state. A charging time of about 1 hour will be sufficient to perform greater than 10 hours of measurement. A fully charged instrument holds enough charge to run for approximately 48 hours.

Note that once disconnected from docking station, the dosimeter will automatically switch off. If put again onto the docking station the internal battery is float charged. This keeps the battery performance in steady condition. If the battery is fully discharged prior to being placed on a charger, it trickle charges for a maximum 1h 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 10 hours remaining on the battery and you wish to charge the battery, the approximate charging time is 3 hours.

Charger LED status indication	Description
OFF	Dock station is not powered on.
GREEN	Indicates the dock station is powered on and fully operational.
RED	Dock station is powered on, but not fully operational

Table 4-1 Charger instrument LED status description

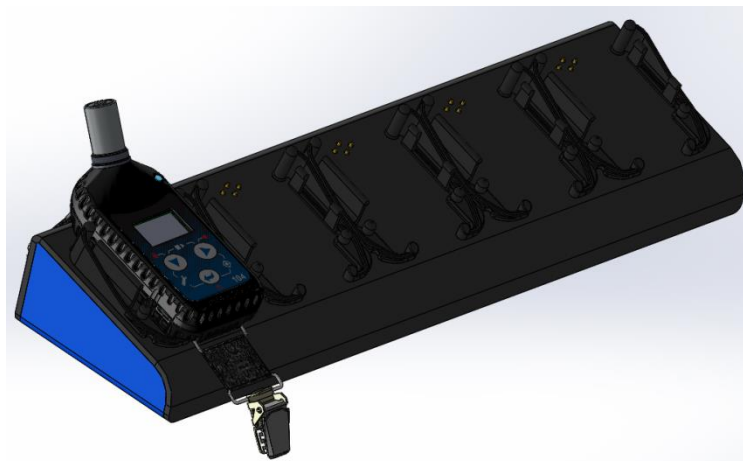


Figure 4-1 5-bay docking station (SB 104A-5)



Note: To charge a fully discharged battery, it would take approximately 4 hours.




Note: To charge multiple dosimeters at the same time via the docking station, ensure your 12V AC/DC power supply such as the **SA 33** is capable in terms of providing enough current performance. Current estimation: Assume the current consumption on 0.24A level, and calculate required minimum power supply current ($5 \times 0.24A = 1.2A$). Power wattage estimation: With nominal voltage of 12V the power supply wattage should be minimum 2.88W per dosimeter ($5 \times 2.88W = 14.4W$).

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 122A** 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 104A** 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.




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



Note: 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.



Note: **SV 104A** 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 104A** gives you time to decide if you really want to turn off the instrument. If you release the key too early, the **SV 104A** 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:

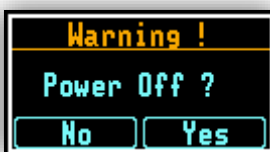


Figure 4-2 Power-off warning screen




Note: **SV 104A** will automatically shut down after 5 minutes in stopped mode.



Note: If **auto-run** (timer) mode is active, **SV 104A** 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).

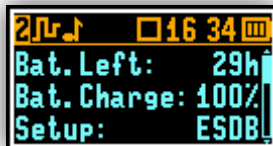







Figure 4-3 Instrument Status - Battery state

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

 **Note:** 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.,


 **Note:** 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 (C)**
- Instrument name: **SV 104A**
- Unit serial number: **SN XXXXX**
- ST 104A microphone serial number: **SN ST104A XXXXX**
- Unit name: **XXXXXXXX** [user programmable name]
- Firmware version: **Version X.XX.X**
- File system version: **FS Version X.XX**
- CRC value: **CRC(OK) XXXX**
- Standards list, that dosimeter conforms to:
 - **IEC 61252:2002**
 - **ANSI S1.25:1991 (R2007)**
 - **Class 2: IEC 61672:2013**
 - **Class 1: IEC 61260:1995 [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:

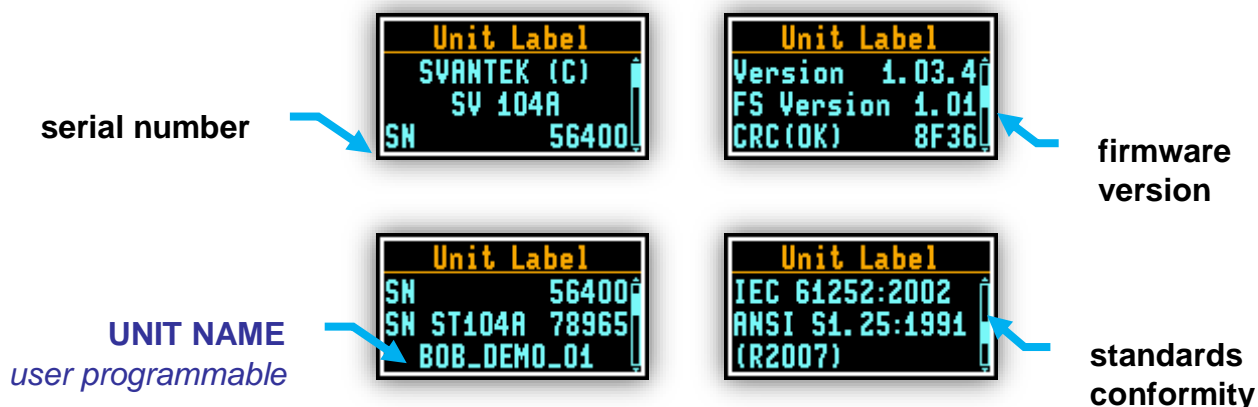




Figure 4-4 Unit label screens

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

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

 **Note:** The personalized *Unit Name* can be set arbitrarily with *Supervisor* software.

4.6 Measurement setup - 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.

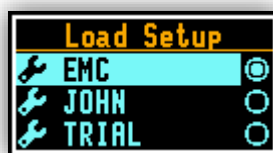







Figure 4-5 Load setup menu

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:

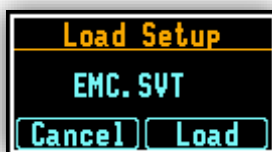




Figure 4-6 Load setup confirmation

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:

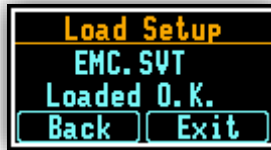




Figure 4-7 Status of setup loading


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.



Note: Detailed description of uploading setup files onto the SV 104A can be found in chapter 6.5.1 of this manual.

4.7 CALIBRATION

The SV 104A dosimeter is offered with the dedicated ST 104A 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.



Note: 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.





Note: The calibration factor is always added to the results in the Dosimeter or 1/1 Octave or 1/3 Octave analyses modes.



Note: 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.

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

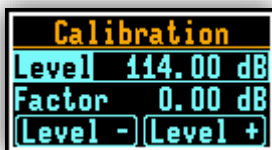






Figure 4-8 Calibration menu

- 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



Note: 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 104A** is equal to 114 dB).

- Switch on the calibrator and wait ca 30 seconds for the tone to stabilise before starting the calibration measurement
- Start the calibration measurement by pressing the <ENTER>  key
- 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> .

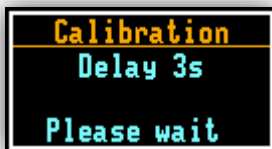


Figure 4-9 Calibration - initial delay screen

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

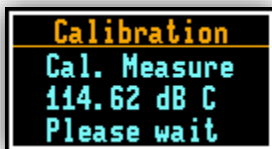






Figure 4-10 Calibration in progress screen




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

- 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

 **Note:** 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.

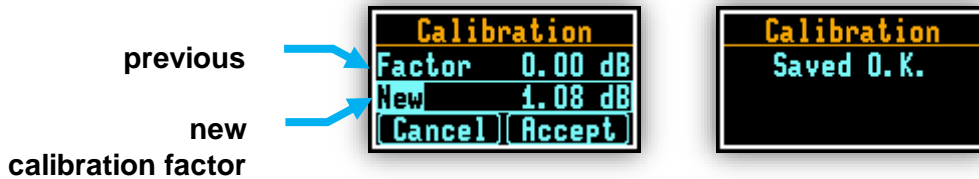



Figure 4-11 Calibration confirmation screen

 **Note:** 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 4-12.

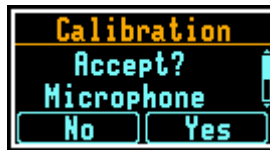




Figure 4-12 Calibration - microphone not in tolerance screen

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

 **Note:** 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 104A** 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 104A gives you time to decide if you really want to record a voice comment. In case you release the key too early, SV 104A 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.

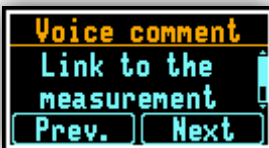


Figure 4-13 Voice comment linking screen

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

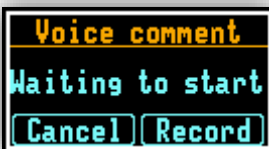



Figure 4-14 Voice comment recording command screen

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



Figure 4-15 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.".

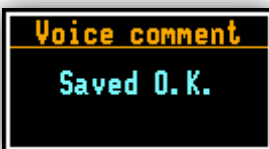



Figure 4-16 Voice comment record confirmation screen

 **Note:** 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 104A** 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.

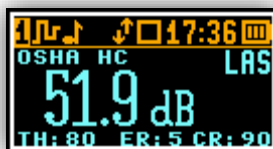


Figure 4-17 One profile mode screen view

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.



Note: The instrument can be started or stopped remotely thru wireless Bluetooth® interface. See chapter 5 for mobile application description.

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 4-18 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 104A** can be set up to automatically go into locked mode when it starts (see chapter 6.5.7.3). That automatically prevents any tampering, but the unit can still be unlocked if necessary with proper sequence of key presses.

Locking SV 104A 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 104A** returns to the last presented **VIEW** mode.


Unlocking SV 104A 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 6.5.7.3). 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 4-19 Unlocking the unit sequence screens

4.13 Mounting and positioning the SV 104A

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 104A** shape and microphone height ensures proper instrument position. see Figure 4-20 below.






Figure 4-20 SV 104A 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




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



Note: 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 Control of the instrument via Bluetooth® wireless interface

The Long-Range Bluetooth® Low Energy wireless connectivity and the supporting **Assistant** mobile application enables remote control and monitoring of the instrument's status such as battery usage, memory capacity and measurement progress and results without having to disturb the worker. You can be sure, that confidence in the measurement minimises the likelihood of having to repeat an examination due to potentially impaired data and therefore maximises your performance. For more detailed remote control description see chapter 5.



Note: The instrument can be even remotely turned on or off if Bluetooth® interface is enabled in uploaded and applied setup file.

The Bluetooth connection between the instrument and **Assistant** mobile application can be established after setting up the PIN code. PIN code is defined through the Supervisor software (see chapter 6.5.7.4).





By pressing <SCROLL>  and <ENTER>  keys simultaneously **twice** the user can enter the **Bluetooth** menu. Pressing <ENTER>  key the user can turn the Bluetooth® on or off. Press Accept to confirm active Bluetooth®.



Figure 4-21 Switching the Bluetooth® on




Note: By default, **Bluetooth®** is disabled. For Air-transport **Bluetooth® should be turned off**. Make sure that correct settings file is applied, or turn it off manually: see chapter 3.7.3.


4.16 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).



Note: 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 ASSISTANT BASIC OPERATIONS

Assistant is an application for mobile devices (smartphones and tablets) running on Android platform (5.0 or higher) and iOS platform (9.0 or higher) extending functionalities of **SV 104A**. The application uses the Low Energy Bluetooth® 4 interface enabling current results to be previewed on a mobile device as well as controlling the measurement Start / Stop.

Assistant also signals an alarm when the certain limits are exceeded. The unique feature of the application is functionality of sending email or SMS on pre-programmed alarm conditions.

The Assistant application supports also SV 100A vibration whole-body dosimeter.

5.1 Installation on mobile device

- 1) Login to svantek.com website and download **Assistant** from the support page to your smartphone / tablet with Android 5.0 and iOS 9.0 or higher systems,
- 2) Install Assistant on your smartphone/tablet,
- 3) Tap the icon to open the **Assistant** application,
- 4) The Assistant may ask you to enable Bluetooth® and Localization services on your smartphone or tablet,
- 5) The Assistant will detect visible instruments automatically.



Figure 5-1 Assistant welcome screen

5.2 Connection via Bluetooth®

With Bluetooth® enabled, **Assistant** compatible products will always broadcast their basic status and some basic data will be visible on mobile devices running the application.

Instruments with Bluetooth® interface enabled and powered off are detected and displayed. To turn on turned-off device just tap the desired collapsed bar. Shortly afterwards, the turned-on instrument will broadcast its certain basic status information. See Figures below for some exemplary displayed screens.

To start work with **Assistant** application, select its icon in your device and run it. If you have some SV 104A nearby with active Bluetooth® the Assistant will detect them and ask you to select these new Bluetooth connections.

If some SV 104A are switched off they appear on the instrument list with the comment “Turned off”. You may switch them on by clicking on the specific instrument.

If instrument is protected by the PIN code you will be asked to enter this code in a special screen, otherwise Assistant will not be able to download data from SV 104A.

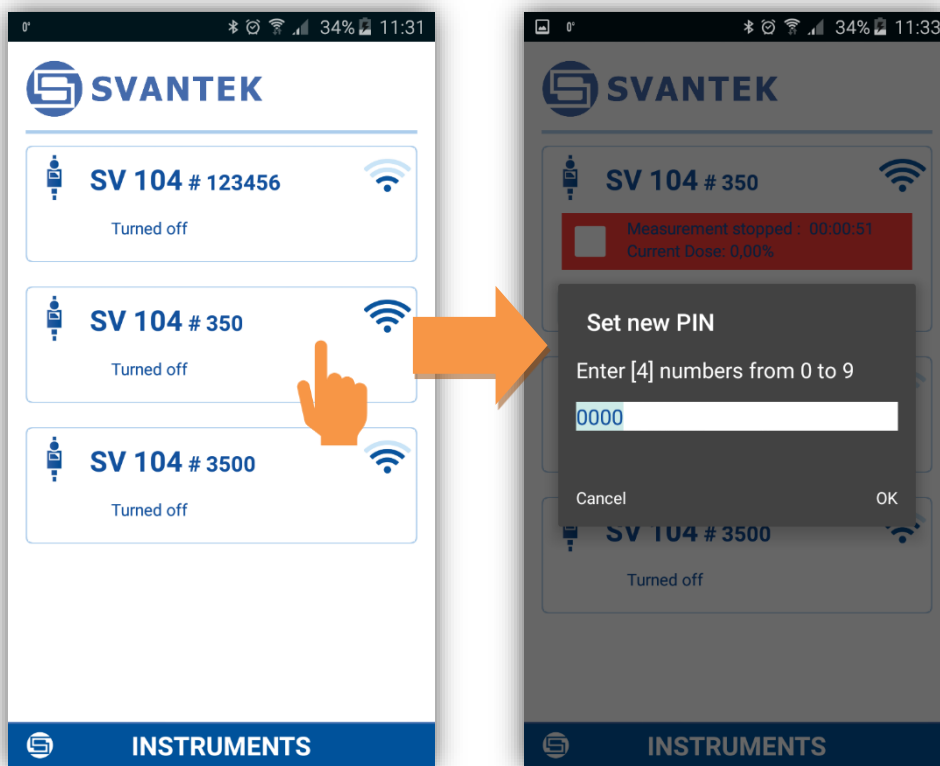


Figure 5-2 Assistant scanning/status screen



Note: You will not get access to instruments that are under control of other simultaneously running **Assistant** application on another mobile device.



Note: It is recommended that the **SV104A** is in locked mode to discourage the wearer from tampering and is described in chapter 4.12.

5.3 Control via Bluetooth®

All parameters and certain control be checked discretely without having to disturb the worker who may be performing a critical task or be inaccessible.

The **Assistant** application has two main screens: scanning/status screen and result view/control screen.

Tapping the fields inside the instrument frame you can go to the instrument's results view and measurement control screen.

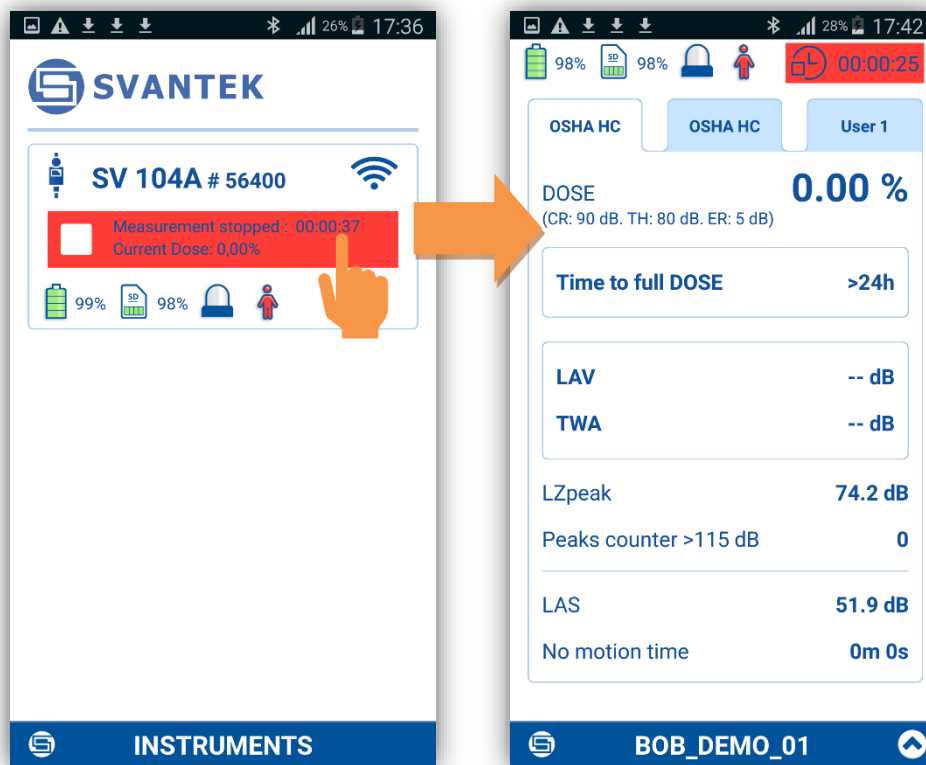


Figure 5-3 Changing main view screens

If you wish to come back to the scanning/status screen just press “Exit” button on your device.

5.3.1 Instruments' status screen

From the scanning/status screen you may observe status of the set of instruments.

Each instrument status is displayed in the frame that contain up to three fields. First field displays the instrument name and serial number. Instrument's unique name can be defined by the user via Supervisor software (see chapter 6.3). Second field shows the instrument status (**Turned off**) or if it is turned on – the measurement status. If measurement is stopped the field is red, if in progress it is green, if in pause – yellow.

The third field contains several icons that inform you about:



Internal **battery** status of selected SV 104A. The battery capacity is displayed in percentage. If battery is close to be empty its colour changes to red.



Internal **memory** status of selected SV 104A. The green area and the percentage display the empty memory capacity.



Dose **alarm**. If dose is above the threshold level the icon is red and the device starts to vibrate.



Movement of the controlled person. If the controlled person is moving the icon is green, otherwise the icon is red.



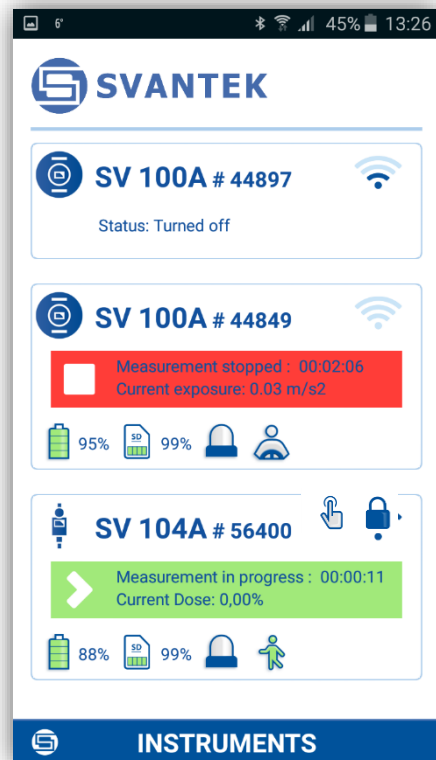
Someone is using the instruments **keyboard**.



Blocking status because of other current device control over this instrument.

As an example:

- The instrument SV 100A #44897 is switched off.
- The instrument SV 100A #44897 is switched on and measurement is stopped. Battery charging is 95%, free memory is 99%, no alarm, the controlled person in not driving a vehicle.
- The instrument SV 104A #56400 is switched on and measurement is running. Current Dose value is displayed. The controlled person presses the instrument's button and this instrument is already controlled by another mobile device. Note, that since scanning there may be a few seconds' delay.



5.3.2 Working with the results view and control screen

From the result view/control screen you may view measured results and control the measurement of the particular instrument.

From this screen, you can **Pause**, **Start** or **Stop** a measurement run. Touch the appropriate icon on the bottom bar of the mobile device screen. Stopping the measurement run requires double confirmation.

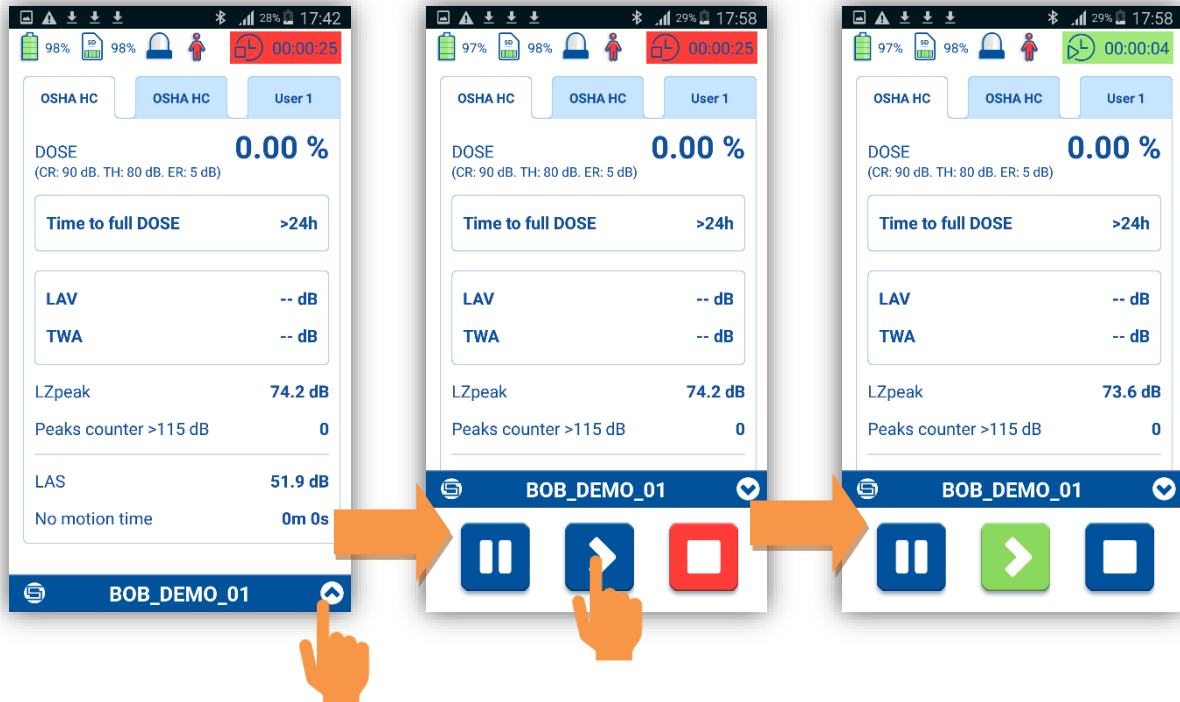


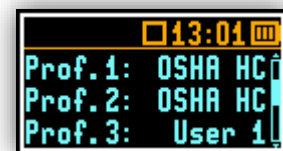
Figure 5-4 Assistant results review and pause/start/stop screen

As in the scanning/status screen the same icons in the upper screen line describe the instrument status. In addition to them integration time is displayed.



Integration time. If the measurement is running this icon is green and time is counting. If the measurement stopped or paused the icon changes its colour to red or yellow and time counting stops.

You can also navigate thru **acoustic profiles** (3.8) by pressing certain tab at the top of the screen with profile's names, defined in the setup.



Note that you can change the **Time to full DOSE** parameter within **Assistant** application by pressing its bar on the screen.

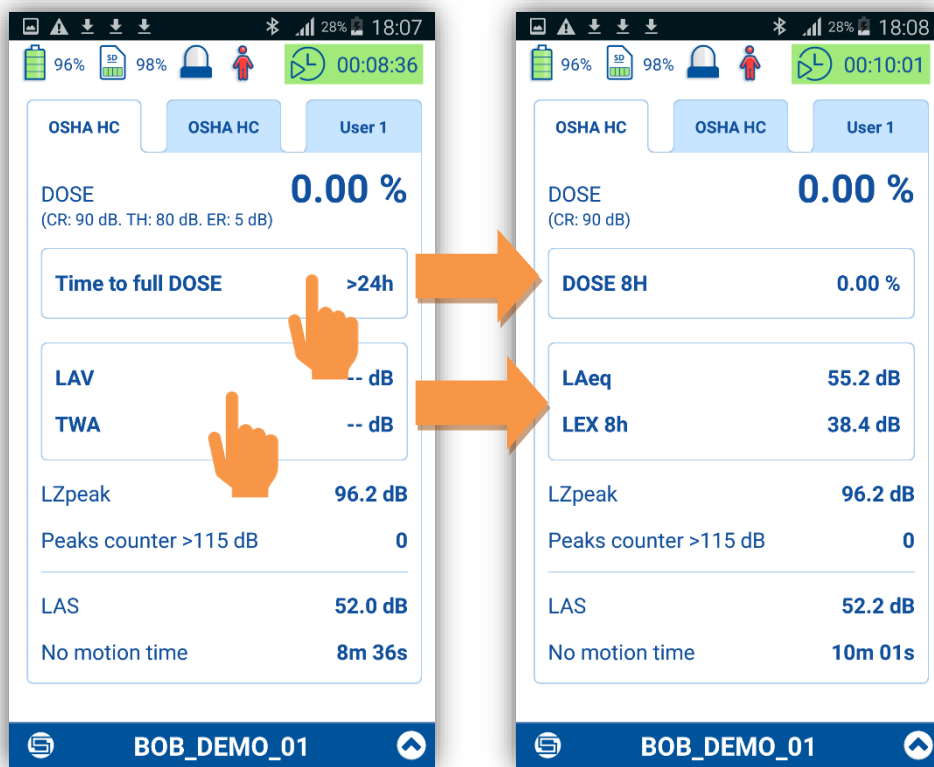
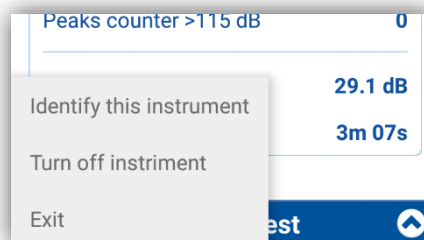


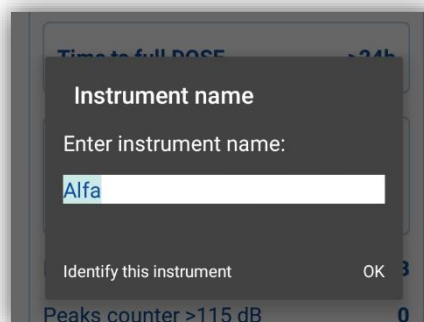
Figure 5-5 Changing of results view

After pressing the  button the popup menu appears in which you can:

- Turn the instrument off.
- Exit the application.
- Identify corresponded SV 104A.




After clicking the **Identify this instrument** position the corresponded instrument will display its current name. This name will blink during 5 seconds then the instrument returns to the previous screen. At the same time your device will propose you to change the name of this instrument.



5.3.3 SMS and e-mail notification

The **Assistant** is also capable of sending e-mail/SMS directly from application or send auto SMS notification on pre-programmed alarm conditions. Alarm conditions are set within **Supervisor** software and uploaded as **setup** configuration files (see chapters: 4.6 and 6.5.1).

E-mail and SMS recipient is defined by pressing the  button, and then selecting appropriate command from popup menu.

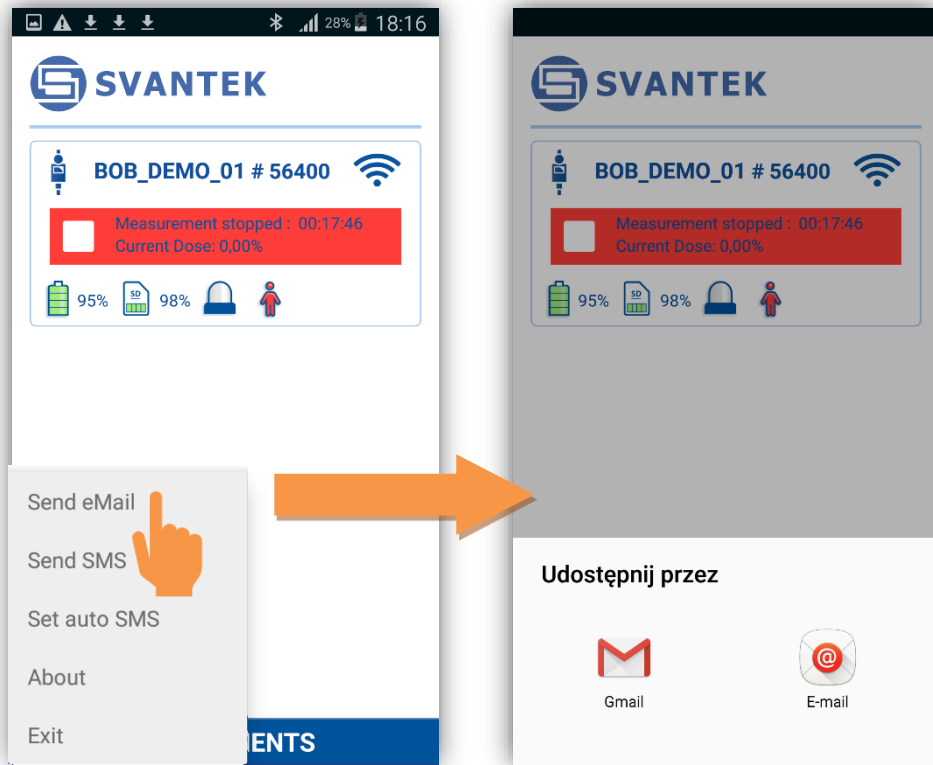


Figure 5-6 Sending e-mail

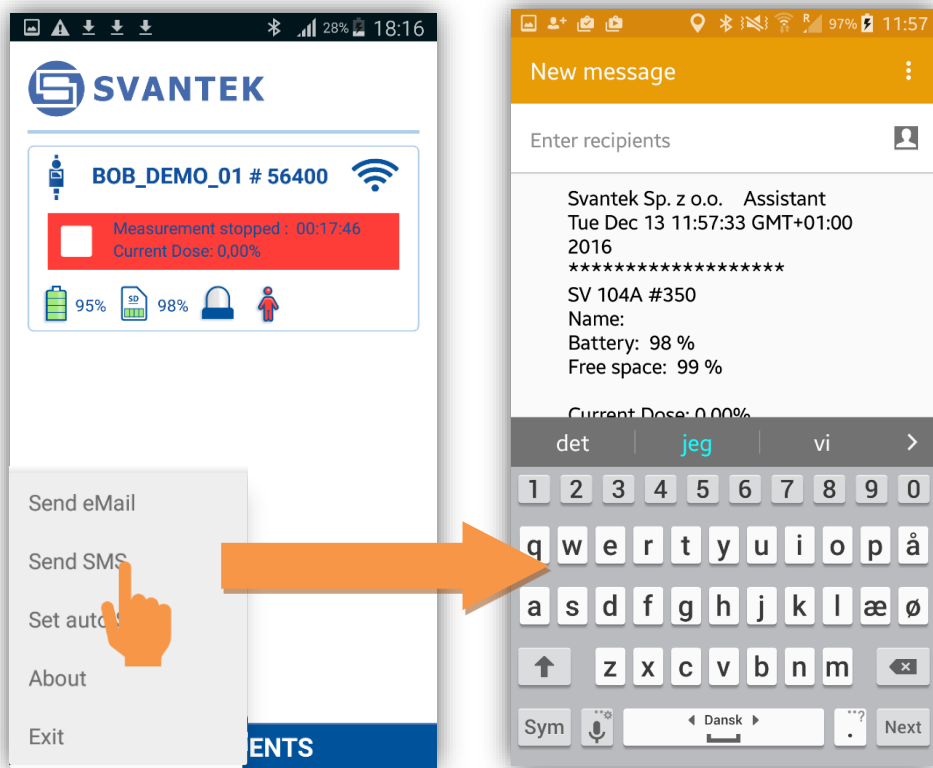


Figure 5-7 Sending SMS

Furthermore, you can set auto SMS recipient phone number selecting **Set auto SMS** command, entering phone number and pressing OK button.

Consecutive notification is send when the certain alarm limits are exceeded.

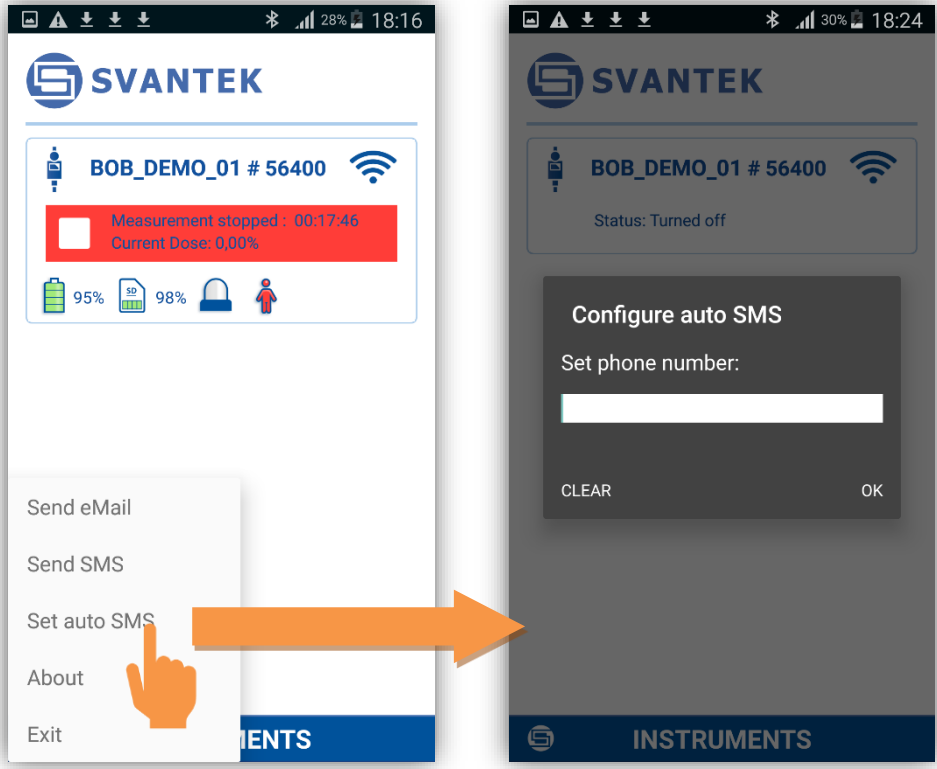



Figure 5-8 Auto SMS configuration screen

5.4 Leaving the application and software version information

You can exit application by pressing in the lower left corner the  button, and then select **Exit** command. To see the software version, choose the **About** command.

6 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 104A**, it is easy to:

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

6.1 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 104A** dosimeter.

3. Plug the USB cable into the computer
4. Plug the opposite end of the cable (micro USB) into the dosimeter itself
5. The **SV 104A** 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
6. Turn on the dosimeter (see chapter 4.3) - long press of the **<ENTER>**  key
7. Windows will install drivers for Svantek instruments if not previously installed
8. Once switched on, run the **Supervisor** software.

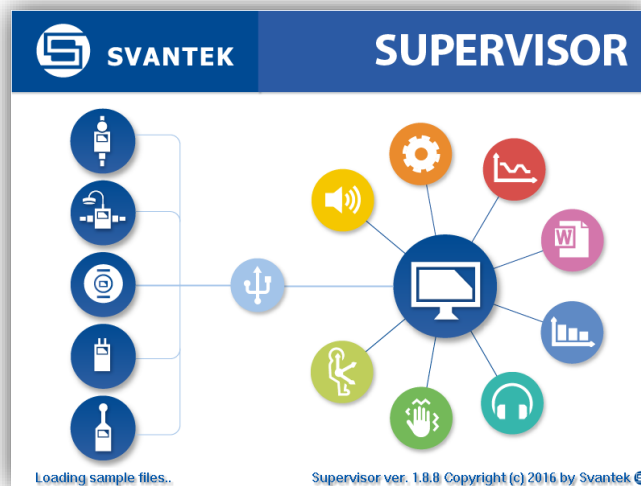


Figure 6-1 Supervisor splash screen



Note: *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).

6.2 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 104A** device selection, or other Health and Safety dedicated instruments
- Inventory panel detects all **SV 104A** connected devices (see chapter 6.3)
- Quick access file manager enables you to copy configuration setup files between computer and instrument internal memory (see chapter 6.5.1)
- Instrument configuration panel enables access to all measurement run configuration settings (see chapter 6.5.1 for details)

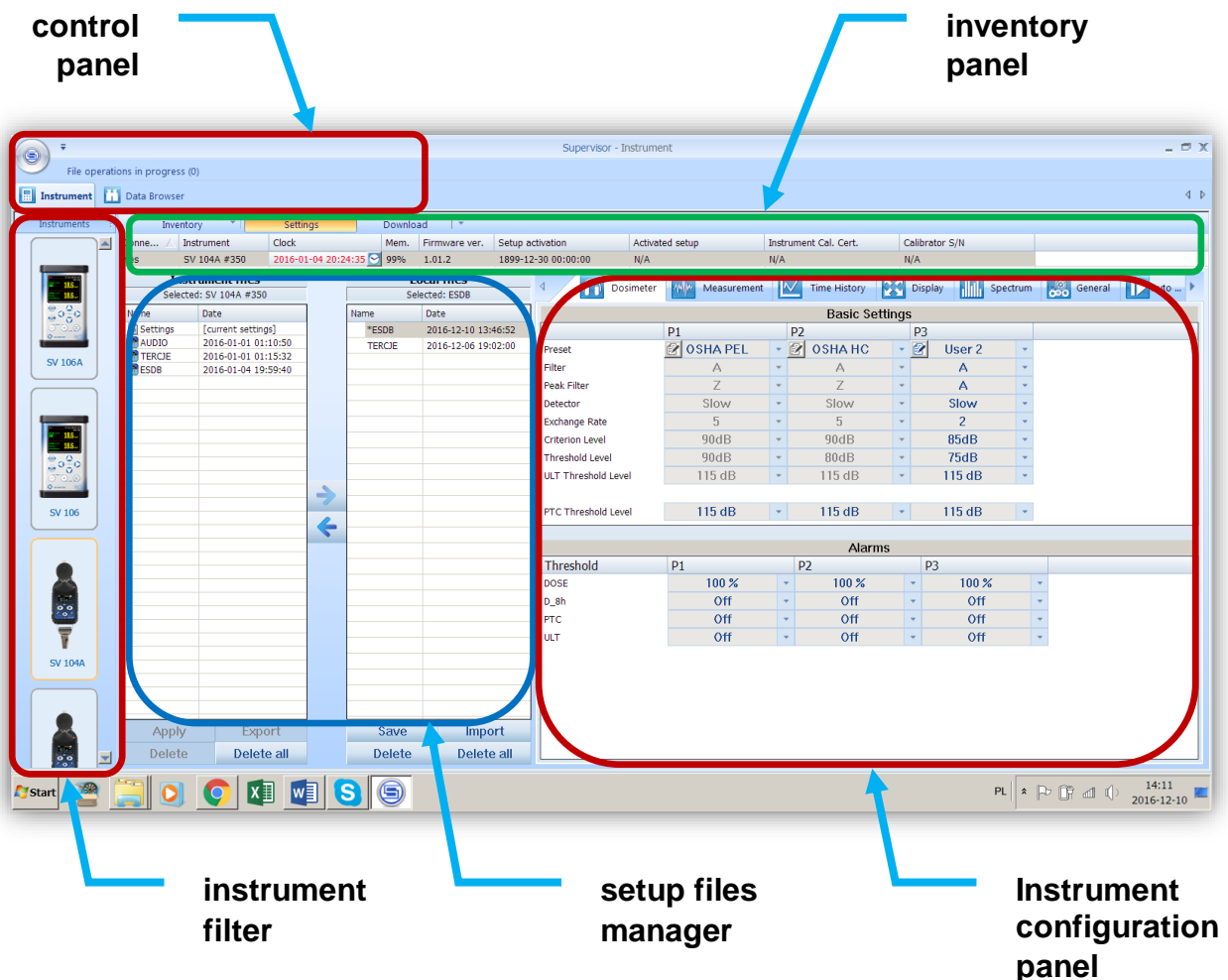


Figure 6-2 Supervisor main window

6.3 Instruments inventory panel

Click the **SV 104A** instrument icon in the left “Instrument filter” Panel (see Figure 6-2) to get access to the devices.

Inventory panel (Figure 6-3) 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.

The screenshot shows the 'Inventory' panel with a table of instrument data. Annotations point to various features:

- “Settings” configure setup files and the dosimeter”**: Points to the 'Settings' button in the top menu.
- “Download” download measurement data from the device**: Points to the 'Download' button in the top menu.
- small clock update icon button**: Points to the small clock icon in the 'Clock' column of the table.
- configurable columns** and **possible context operations**: Point to the 'Name' column header and the context menu options, respectively.

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	[Icons]
No	SV 104 #47	2013-07-31 03:08:20	N/A	N/A	N/A	[Icons]
No	SV 104 #42	2013-07-31 03:08:30	N/A	N/A	N/A	[Icons]
No	SV 104 #41	2013-07-31 03:08:33	N/A	N/A	N/A	[Icons]

Name context menu options:

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


Refresh catalogue context menu options:


- 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
- View instrument calibration history
- Instrument details

Figure 6-3 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 104A** dosimeter;
- Download button enables to navigate and download files directly from the dosimeter.

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

 **Note:** **Edit name** is very useful option which allows you to give an unique name to the instrument. A unique name will help you to identify the instrument in the group of instruments that are in use during the measurement session (see chapter 0).

6.4 Instrument options unlock

Certain features of **SV 104A** such as 1/1 octave or 1/3 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:

1. Connect the dosimeter to a computer
2. Launch **Supervisor** software
3. In the instruments inventory panel (Chapter 6.3) locate the instrument that you wish to unlock, and right click onto it to open context menu.
4. Select **Manage options/functions** command

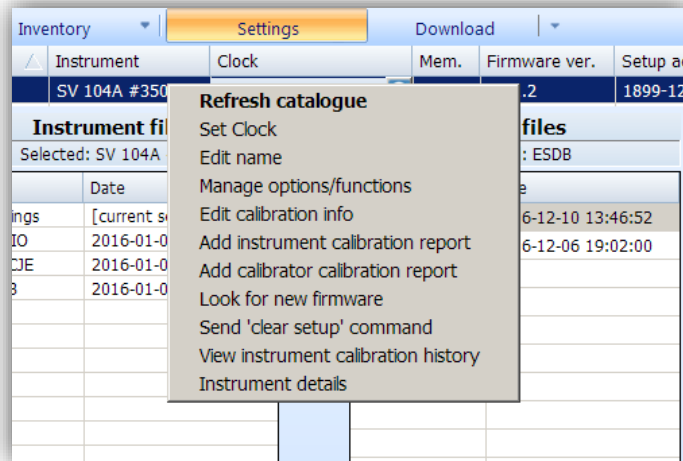
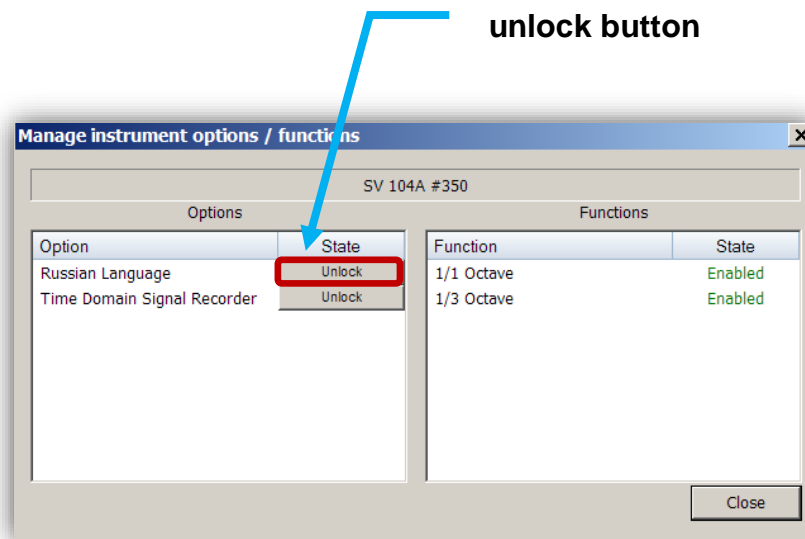


Figure 6-4 Unlocking the firmware options

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



6. Enter the code and confirm with **OK** button

6.5 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 104A** 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 6.3)

6.5.1 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.

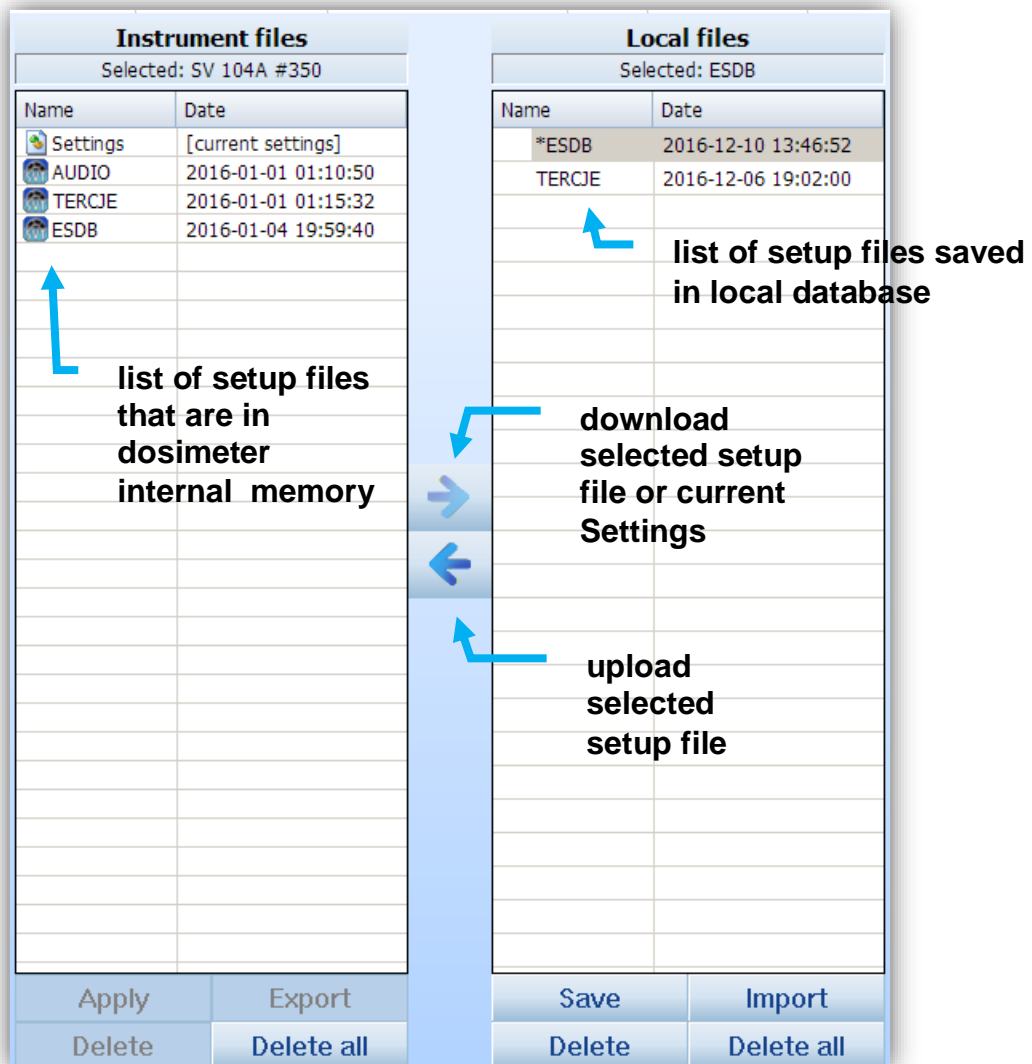


Figure 6-5 Setup files manager panel

For example: To download current settings file from the **SV 104A**, 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 6-3) **SV 104A** dosimeter is ready for the operation:

1. Select the **“Settings”** row position in left side panel named **“Instrument files”** (Figure 6-5)
2. Click the right arrow pictogram to download instrument **“Settings”** configuration setup to **“Local files”** right side panel (Figure 6-5)
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 6-2)
4. Go through all the tabs to verify, or change required parameters of the measurement runs. Follow the chapters from 6.5.2 to 6.5.9 to understand and configure the instrument
5. Once configured, come back to setups file manager (Figure 6-5) and click the just edited **“Settings”** in **“Local files”** panel
6. Next click the **“Save”** button in bottom area of the panel (Figure 6-5)
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.

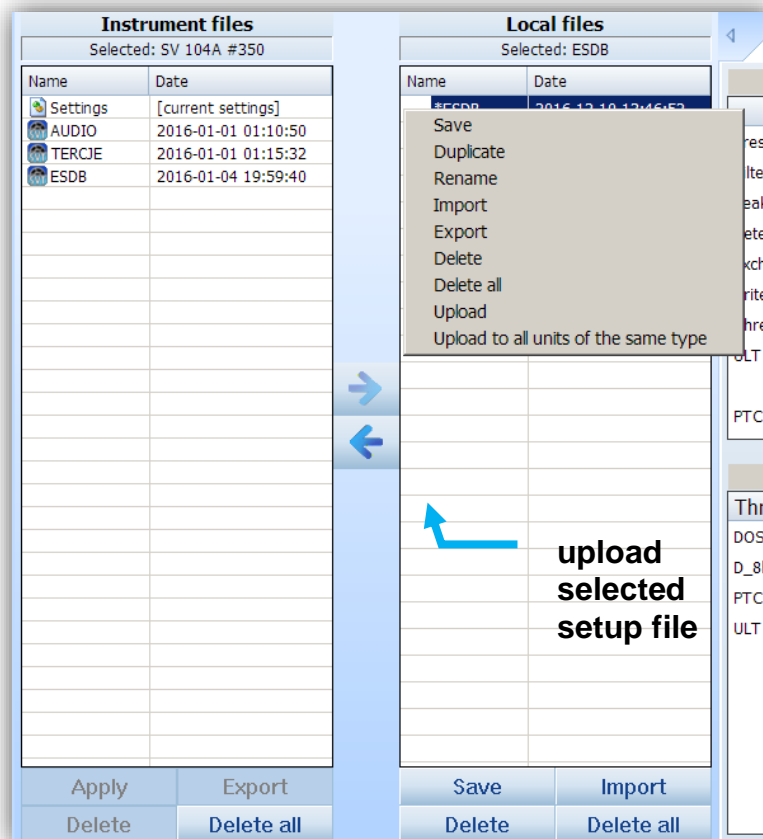


Figure 6-6 Exporting the configuration setup file

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 6-7). 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.

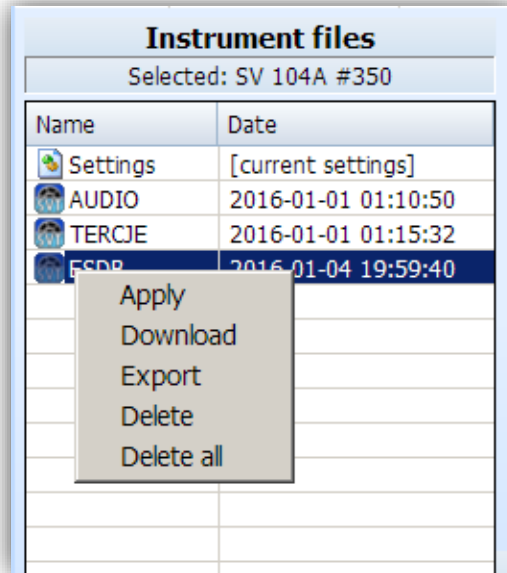


Figure 6-7 Instrument files panel and context commands

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.



Note: 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.

6.5.2 Profile settings tab

The main settings where specific acoustic profile configuration can be set are located under “Dosimeter” tab. There are already predefined pre-sets 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 pre-sets, 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.

change user defined preset name

Basic Settings			
	P1	P2	P3
Preset	OSHA PEL	OSHA HC	User 2
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	90dB	80dB	75dB
ULT Threshold Level	115 dB	115 dB	115 dB
PTC Threshold Level	115 dB	115 dB	115 dB

Alarms			
Threshold	P1	P2	P3
DOSE	100 %	100 %	100 %
D_8h	Off	Off	Off
PTC	Off	Off	Off
ULT	Off	Off	Off

change additional source of alarm

Figure 6-8 Dosimeter settings - profile configuration tab




chapter

Note: Note, that some profiles can be disabled to be seen later during measurement run (see 6.5.5)

6.5.3 Measurement parameters settings tab

Within the measurement tab you can choose in which mode of operation the **SV 104A** should work: Dosimeter, or Dosimeter with 1/1 octave or 1/3 octave analysis.



Note: Enabling 1/1 or 1/3 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:

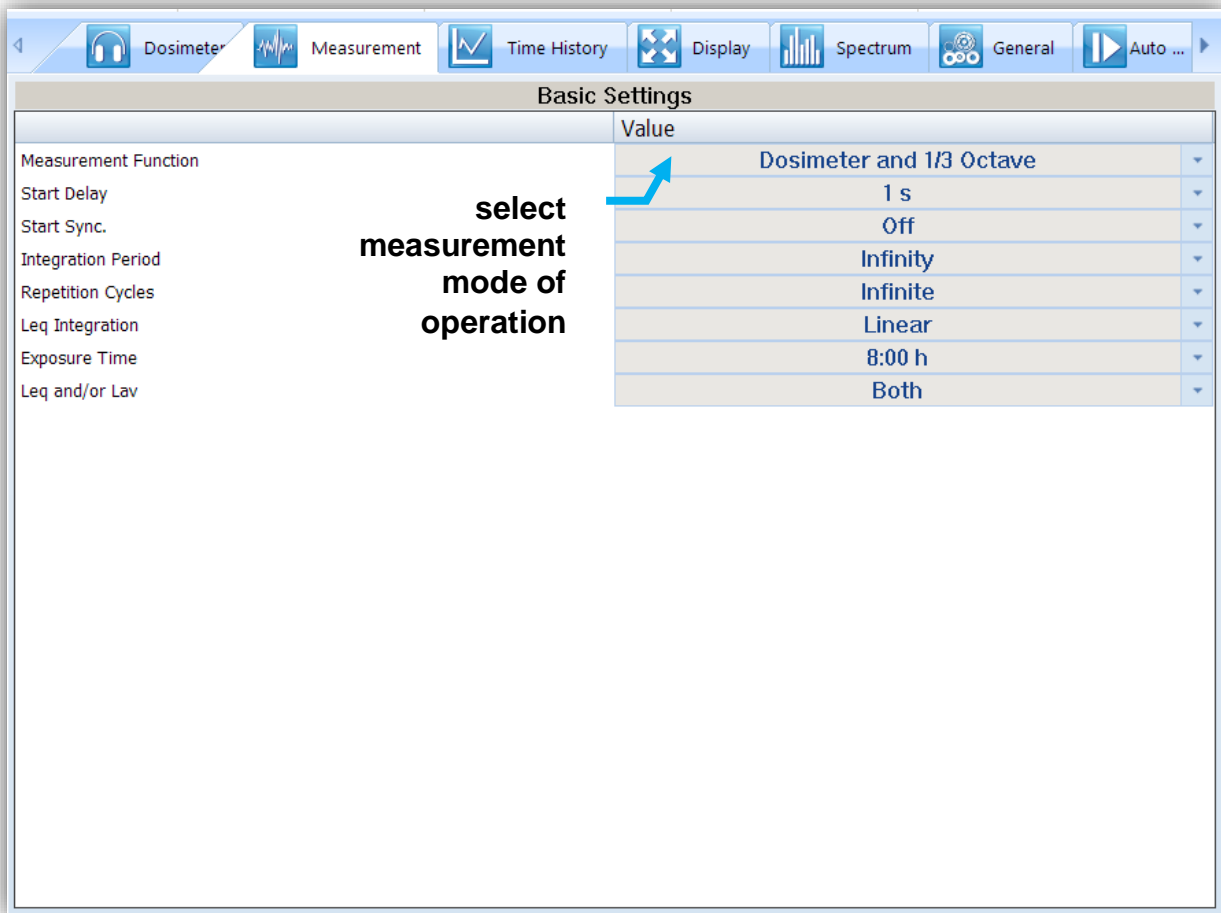


Figure 6-9 Measurement configuration settings tab

6.5.4 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.



Note: Summary results are saved on **“Integration Period”** basis (not on **“Logger Step”** time). See Figure 6-9 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.

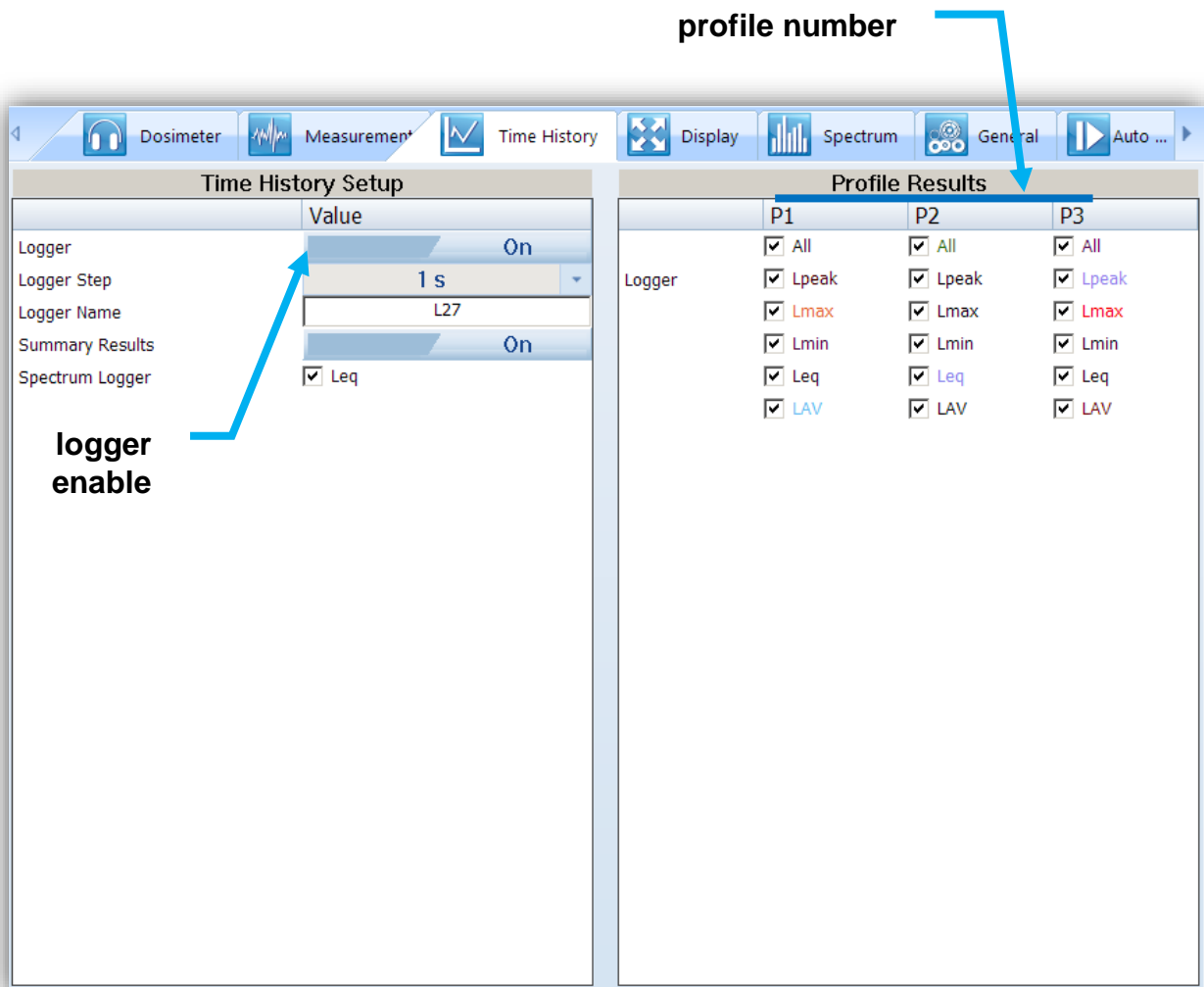





Figure 6-10 Time History (logger) settings tab


6.5.5 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

 **Note:** 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.

 **Note:** 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 104A** display, when you press <SCROLL>  key. See Appendix D to review acronyms for each parameter.

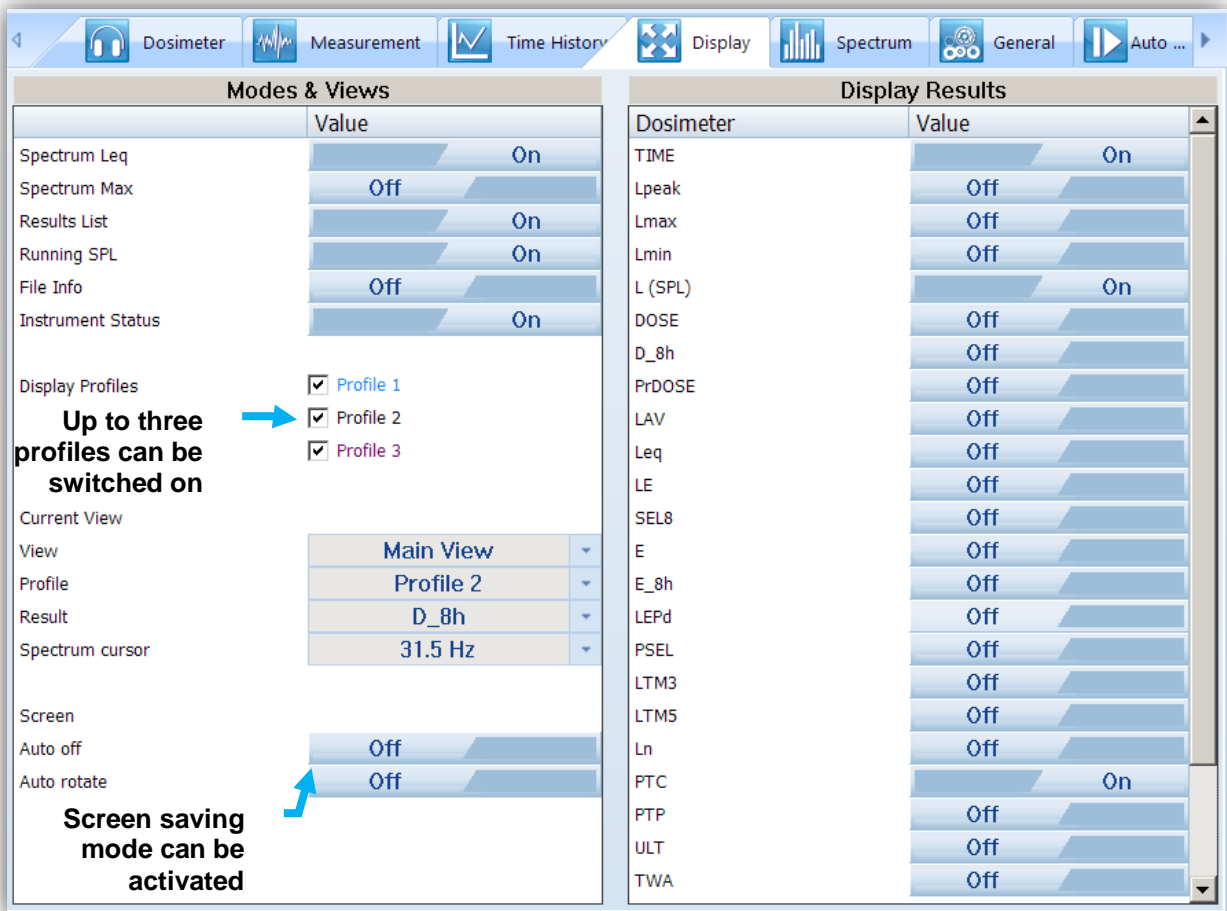


Figure 6-11 Display VIEW configuration tab

6.5.6 Octave analysis Spectrum configuration tab

Real time 1/1 or 1/3 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

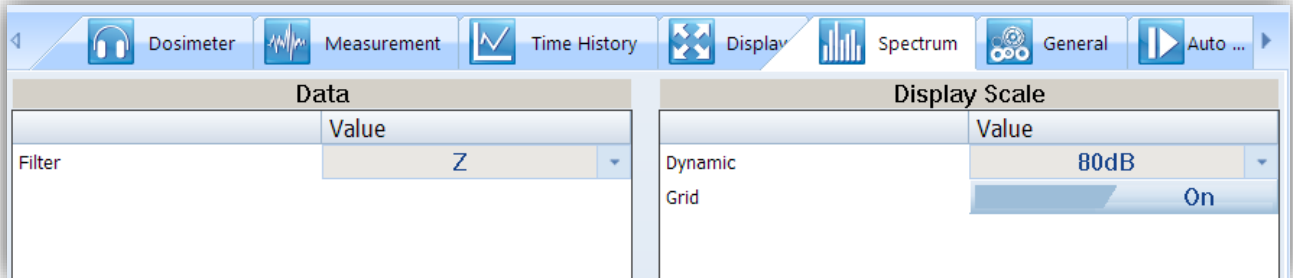


Figure 6-12 Spectrum configuration tab

6.5.7 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.

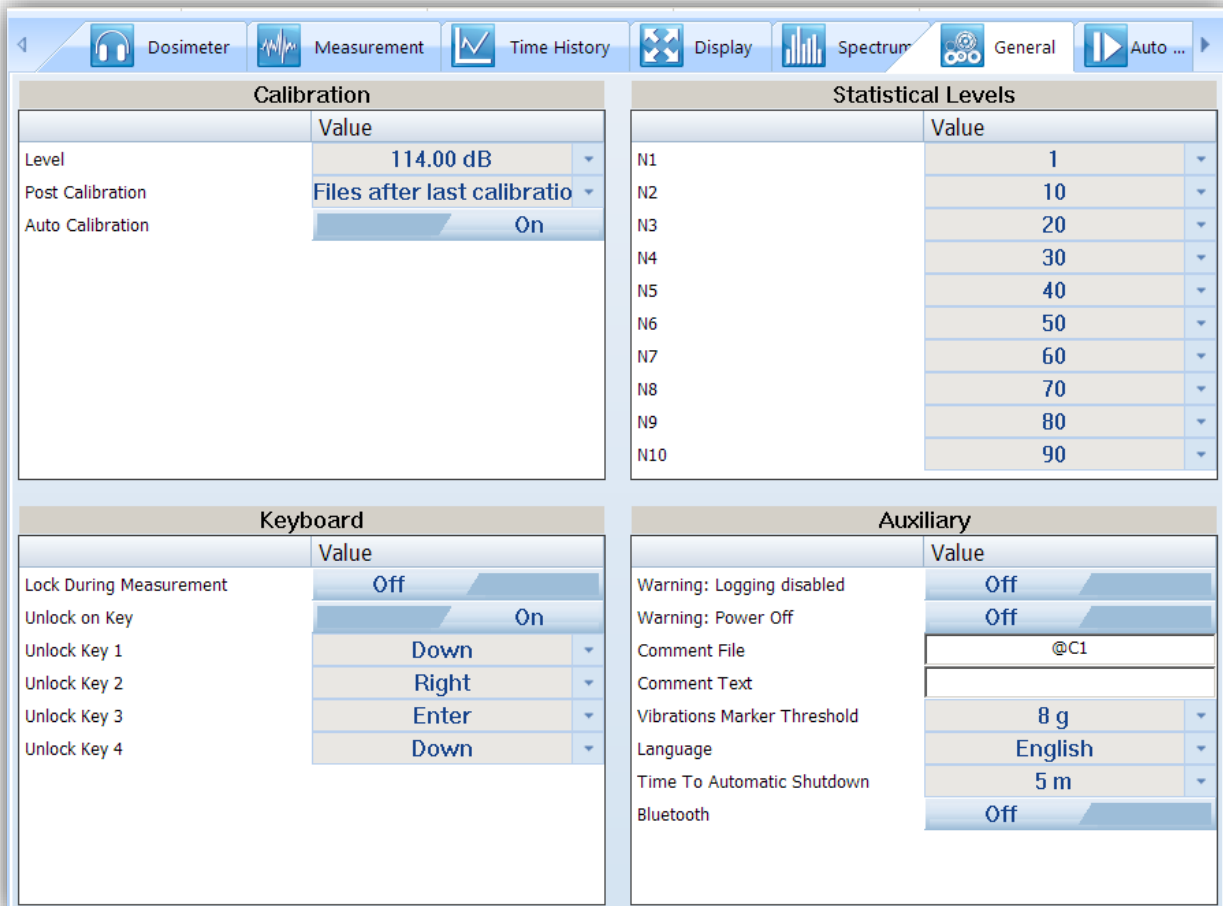


Figure 6-13 General settings tab

6.5.7.1 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.

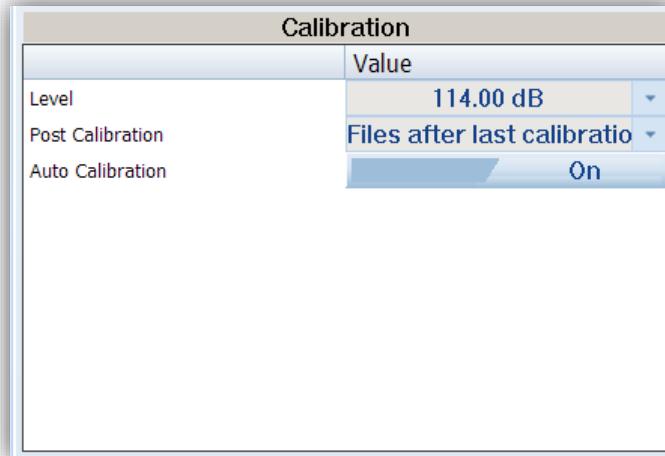


Figure 6-14 Calibration settings panel

6.5.7.2 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.

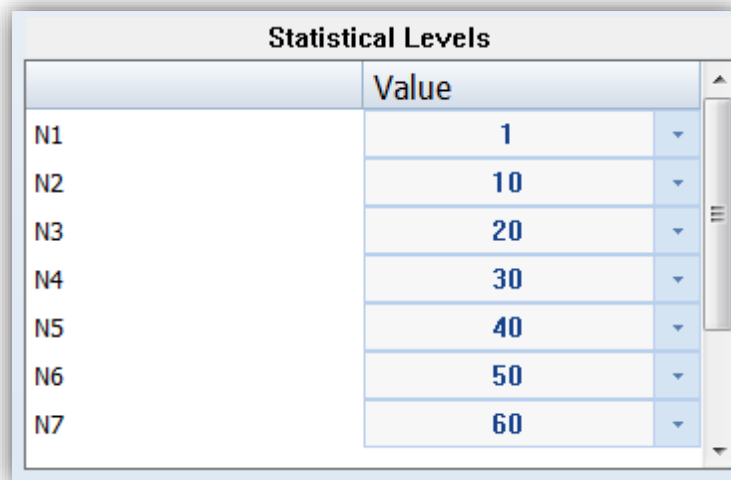


Figure 6-15 Statistical levels settings panel


6.5.7.3 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 104A** will disable the keyboard every time, the measurement run is started.

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

If **"Unlock on Key"** is set to **On**, **SV 104A** 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 104A** 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.

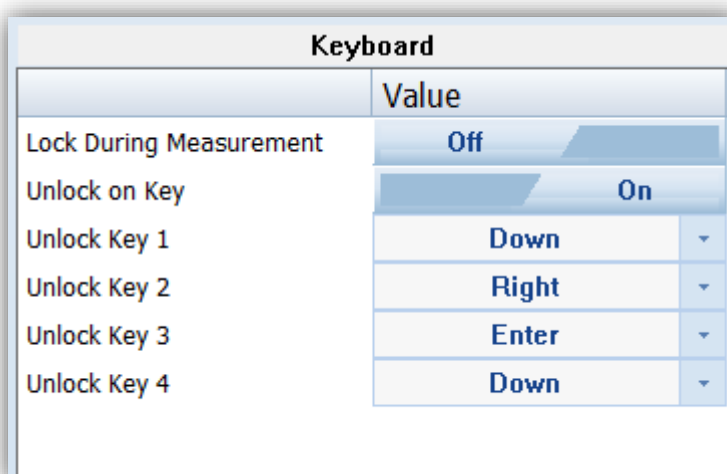


Figure 6-16 Keyboard security settings panel

6.5.7.4 Auxiliary settings panel and Bluetooth PIN code

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
- **"Time To Automatic Shutdown"** enables the user to change time period after which the unit will be shut down if no key will be pressed
- **"Bluetooth"** enables the user to switch on or off the Bluetooth® connection.
- **Note: "Bluetooth PIN" code** configuration is required to establish connection;



Note: For Air-transport **Bluetooth®** interface should be turned off. Make sure that correct settings file is applied.

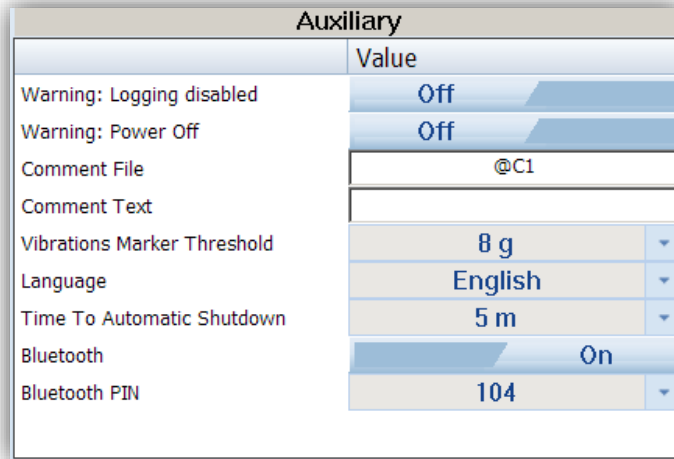


Figure 6-17 Auxiliary settings panel

6.5.8 Auto-Run settings (timer, pauses) tab

In the **Pause** panel the user may program five independent **PAUSES** in real time – **Begin** and **End** of the pause.

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 period, such as a week-long study.

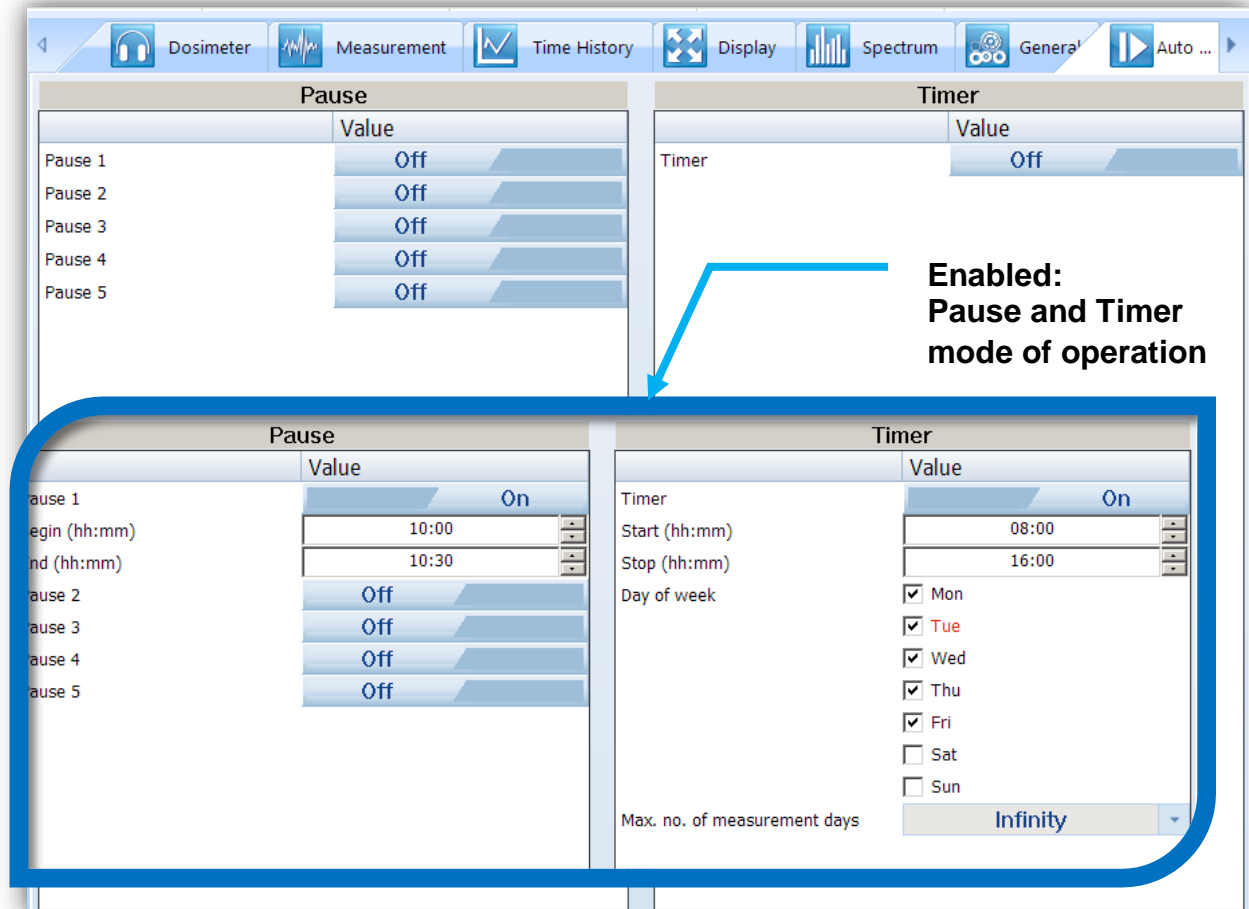


Figure 6-18 Auto-run configuration tab

The timer can be switched off – “Off”, switched on– “On”.

In case the timer function is active (On) and the instrument is switched on the **Time** screen appears until the programmed measurement runs are finished.

The **Start (hh:mm)** and **Stop (hh:mm)** positions determines the time for the measurement to start and to stop automatically. The required hour and minute should be selected.

The **Day of week** determines the days in a week when the measurements should start. The timer can be programmed (**Max. no. of measurement days**) up to 100 days ahead or without limitation (**Inf**) and during these days’ settings of the current state of the **Real Time Clock** is taken into account. Make sure to check that the real-time clock settings for the measurement location are correct before beginning a delayed timer measurement.

6.5.9 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.

6.5.9.1 Event and Wave recording configuration panel

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

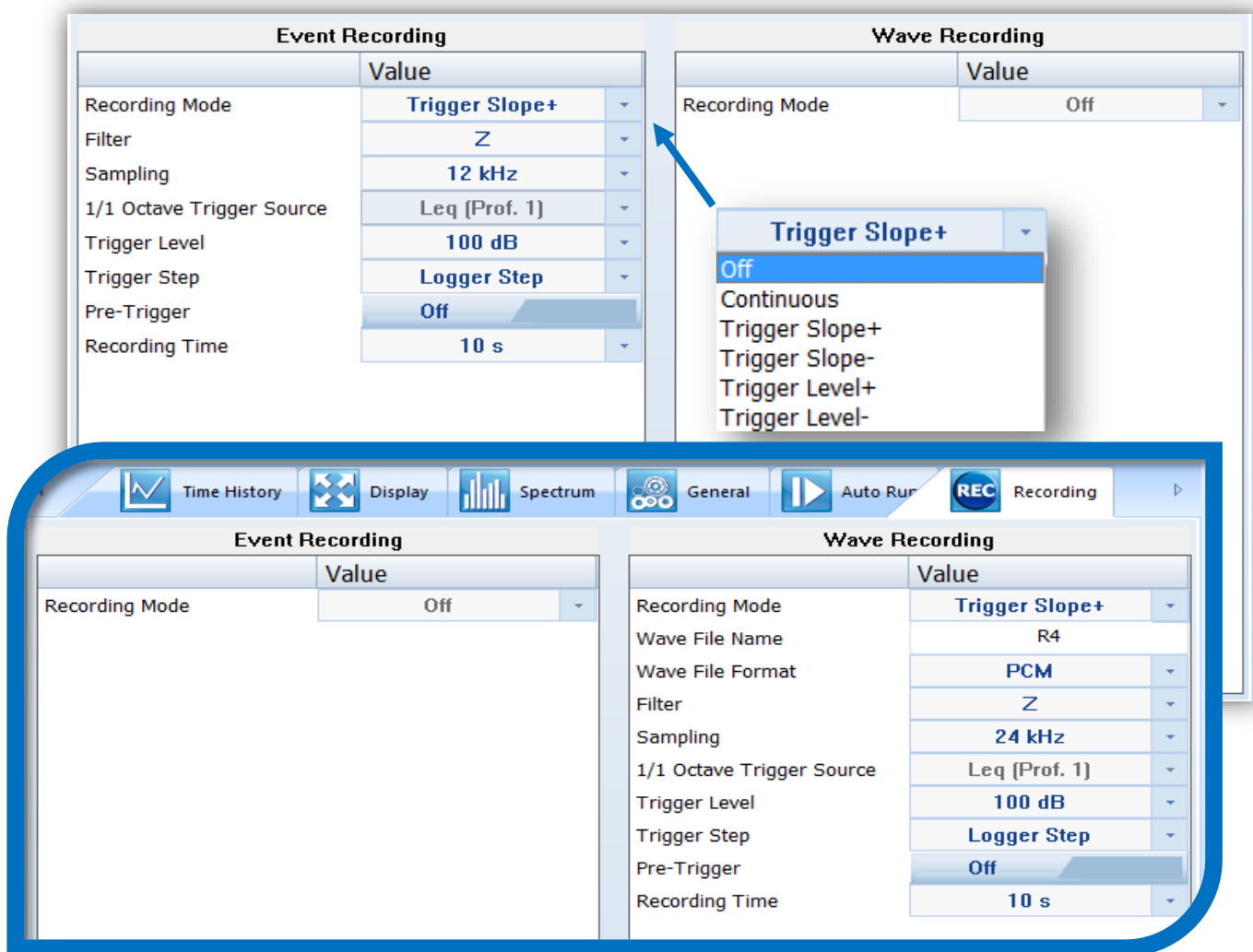


Figure 6-19 Audio Event and Wave recording configuration panels

6.6 Working with data files

6.6.1 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.

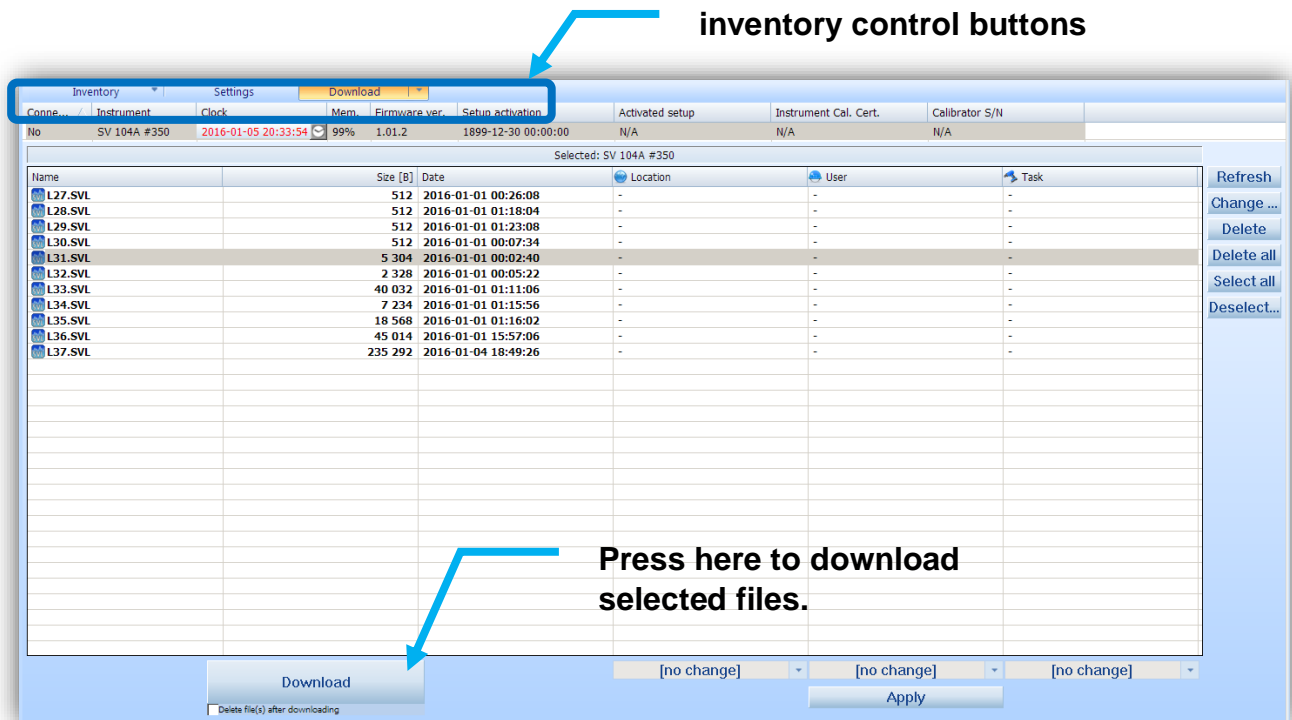


Figure 6-20 SV 104A Download window

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 6.6.2) 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.

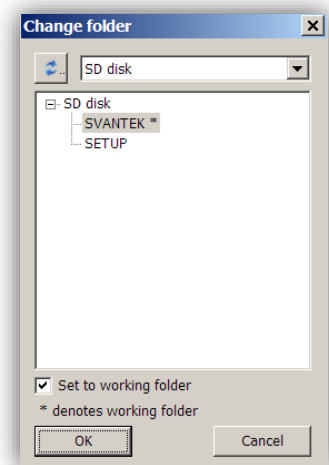


Figure 6-21 Change instrument working directory window

6.6.2 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 6.7), where the reporting tool will allow you to quickly and professionally review and assess the data.

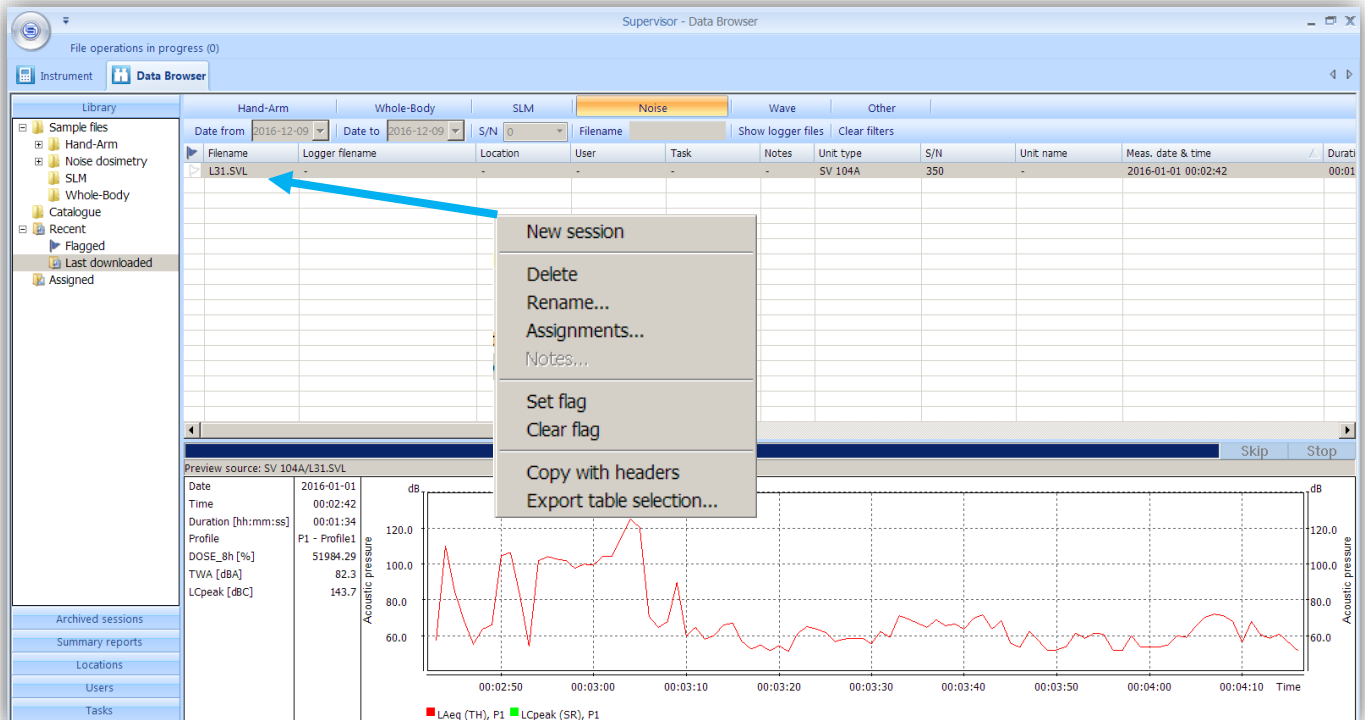


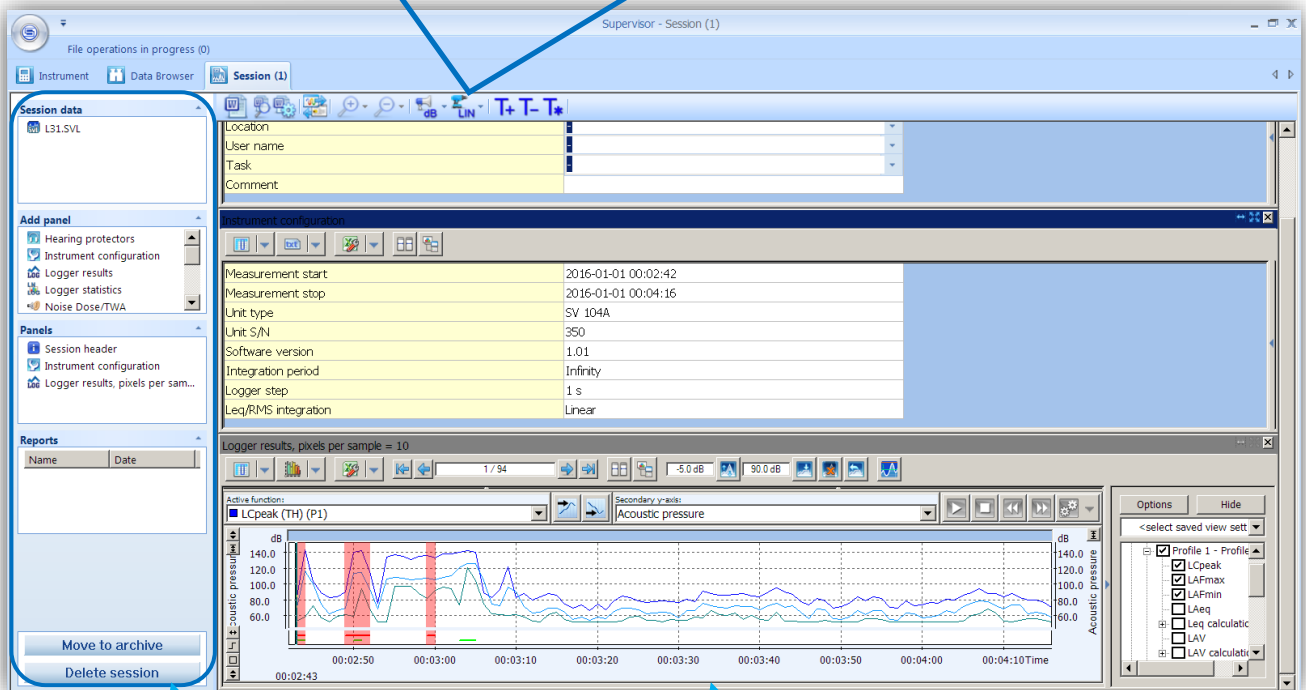
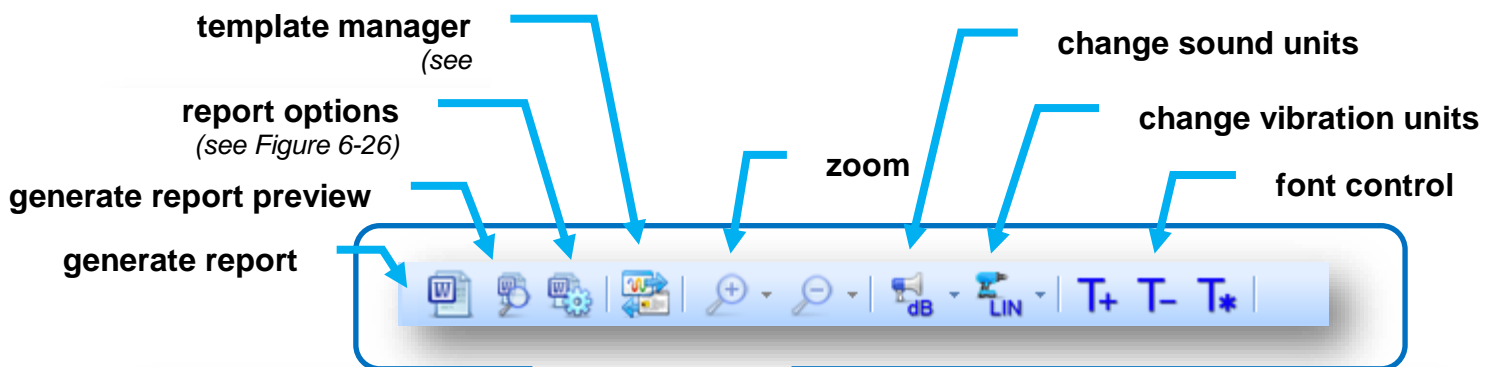
Figure 6-22 Local files “Data Browser” - window layout

6.7 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.

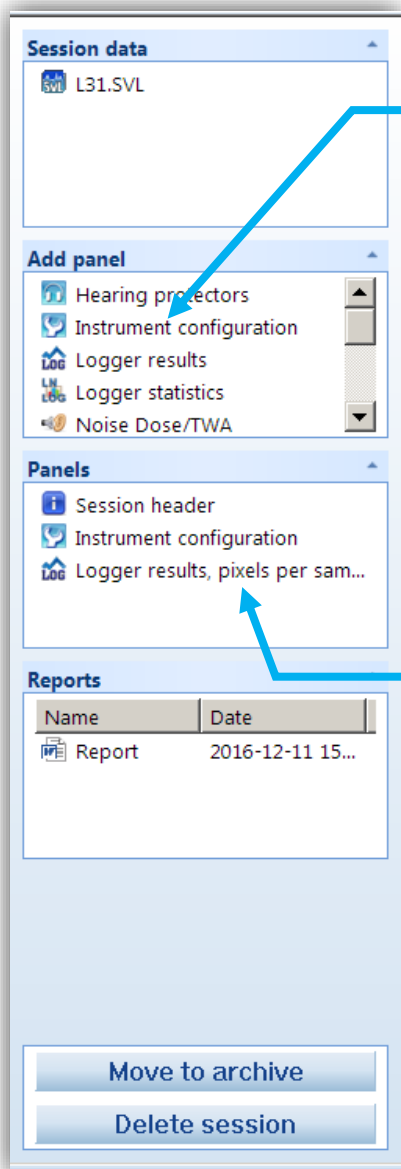
Each **SESSION** is highly configurable and the **template** of a document once created (Figure 6-25) can be saved for future use with other measurement data. That gives the operator quick solutions at the fingertip. **The information is divided into panels** and viewable in customizable graphs and/or with selected measurement data/parameters.



SESSION configuration panel
see detailed Figure 6-24

report detailed configuration area

Figure 6-23 Supervisor main SESSION window



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

double click to add panel to the report

“**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.

double click to jump to the selected panel

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

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

Figure 6-24 SESSION configuration panel

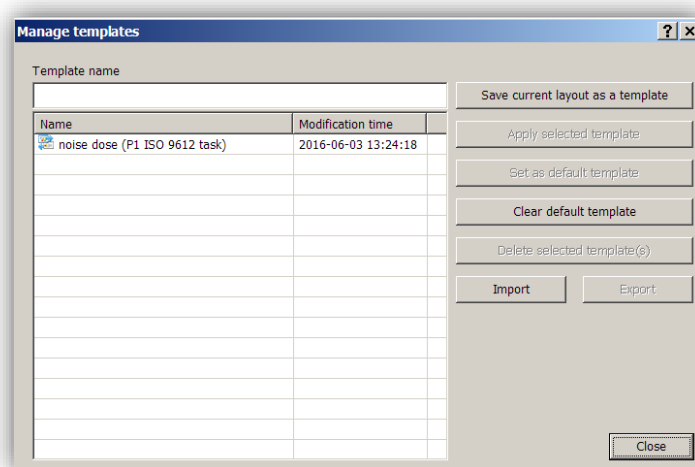


Figure 6-25 Managing templates with Supervisor

6.7.1 Report panels

See the following panels, then configure, and generate report.

Report options: With “Report options” window it is very straightforward to edit basic report information and predefined graphics, colour and style.

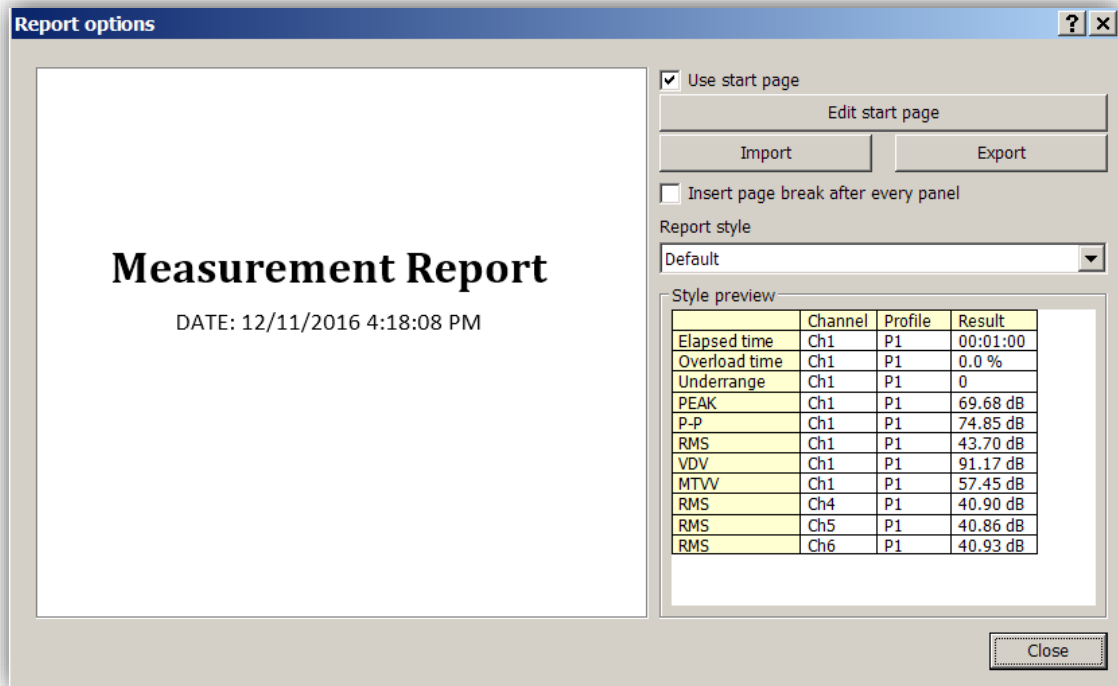


Figure 6-26 Supervisor Report Options

Hearing protectors		
Mode	Summary results	Manage database
File	Channel	
L31	Ch1	
Protector	example hp 1	
Method:		
[-] SNR (ISO 4069-2)		
L _r [dB]	111.5	
SNR [dB]	36	
Current L _A [dB]	76	Good
		Compare protectors
[-] HML (ISO 4069-2)		
L _A [dB]	107.2	
L _r [dB]	111.5	
H [dB]	37	
M [dB]	35	
L [dB]	26	
Current L _A [dB]	75	Acceptable
		Compare protectors

Figure 6-27 Hearing protectors panel

Instrument configuration	
Measurement start	2016-01-01 00:02:42
Measurement stop	2016-01-01 00:04:16
Unit type	SV 104A
Unit S/N	350
Software version	1.01
Integration period	Infinity
Logger step	1 s
Leq/RMS integration	Linear

Figure 6-28 Instrument configuration panel

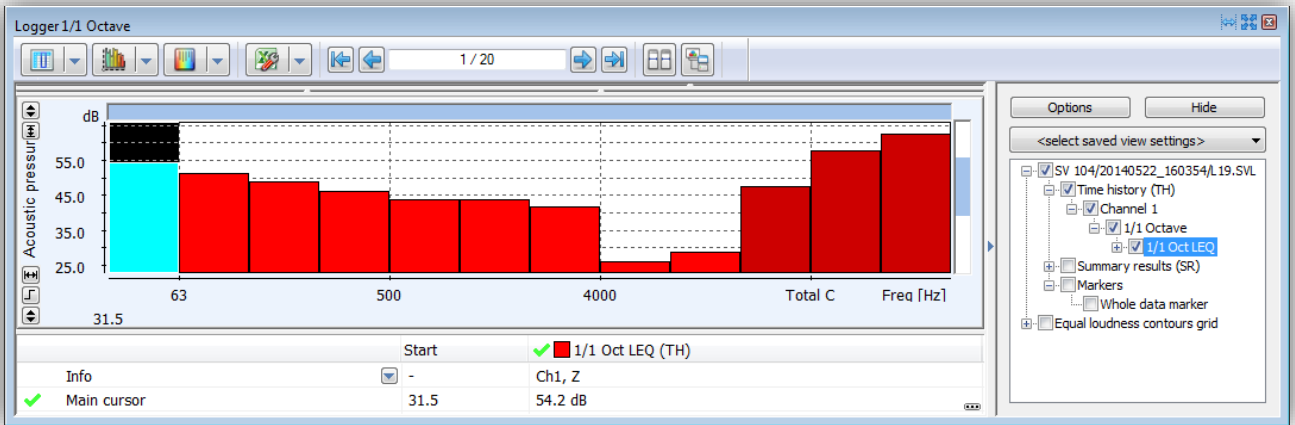


Figure 6-29 Logger 1/1 Octave panel

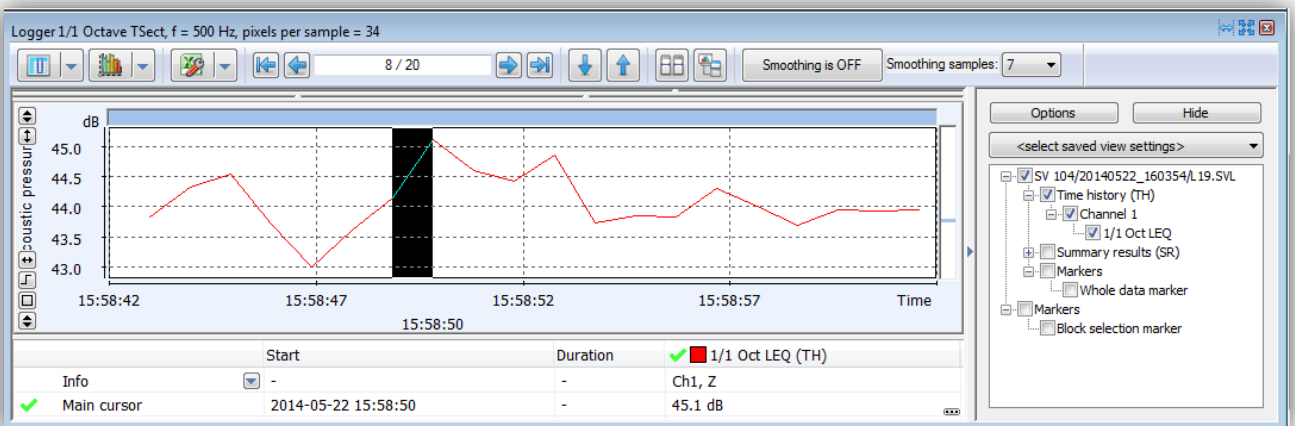


Figure 6-30 Logger 1/1 Octave Tsect panel

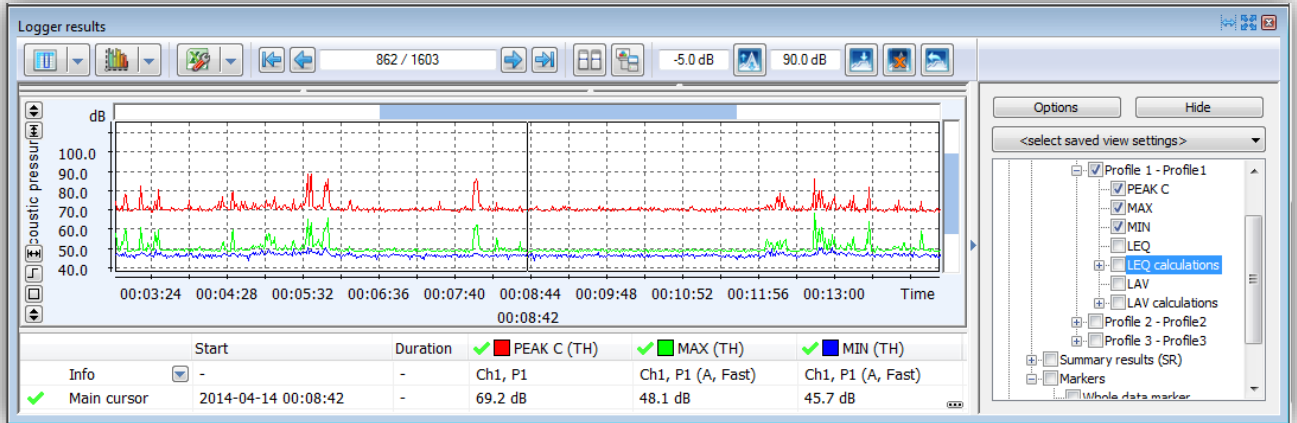


Figure 6-31 Logger results panel

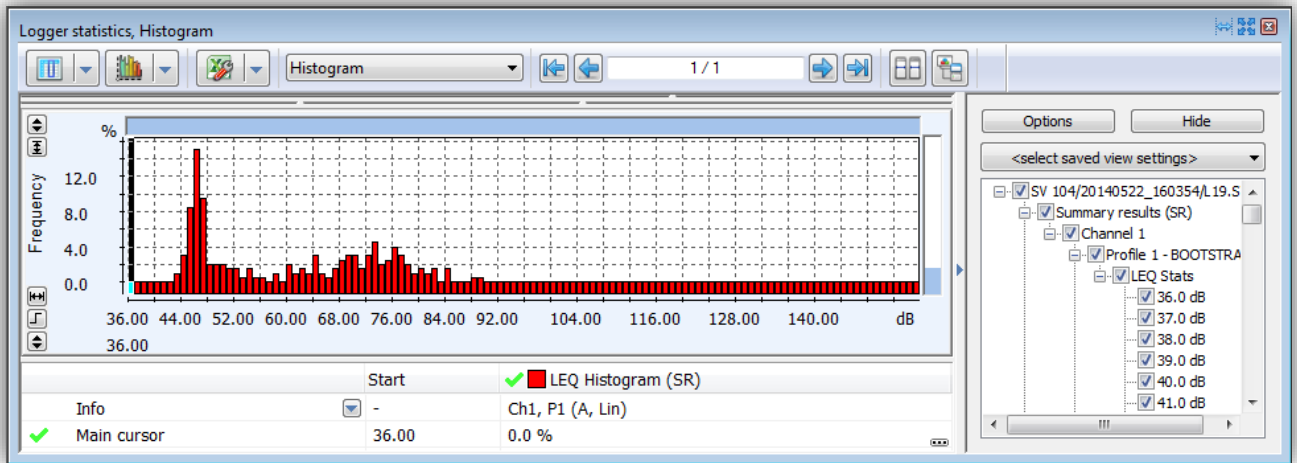


Figure 6-32 Logger Statistics panel

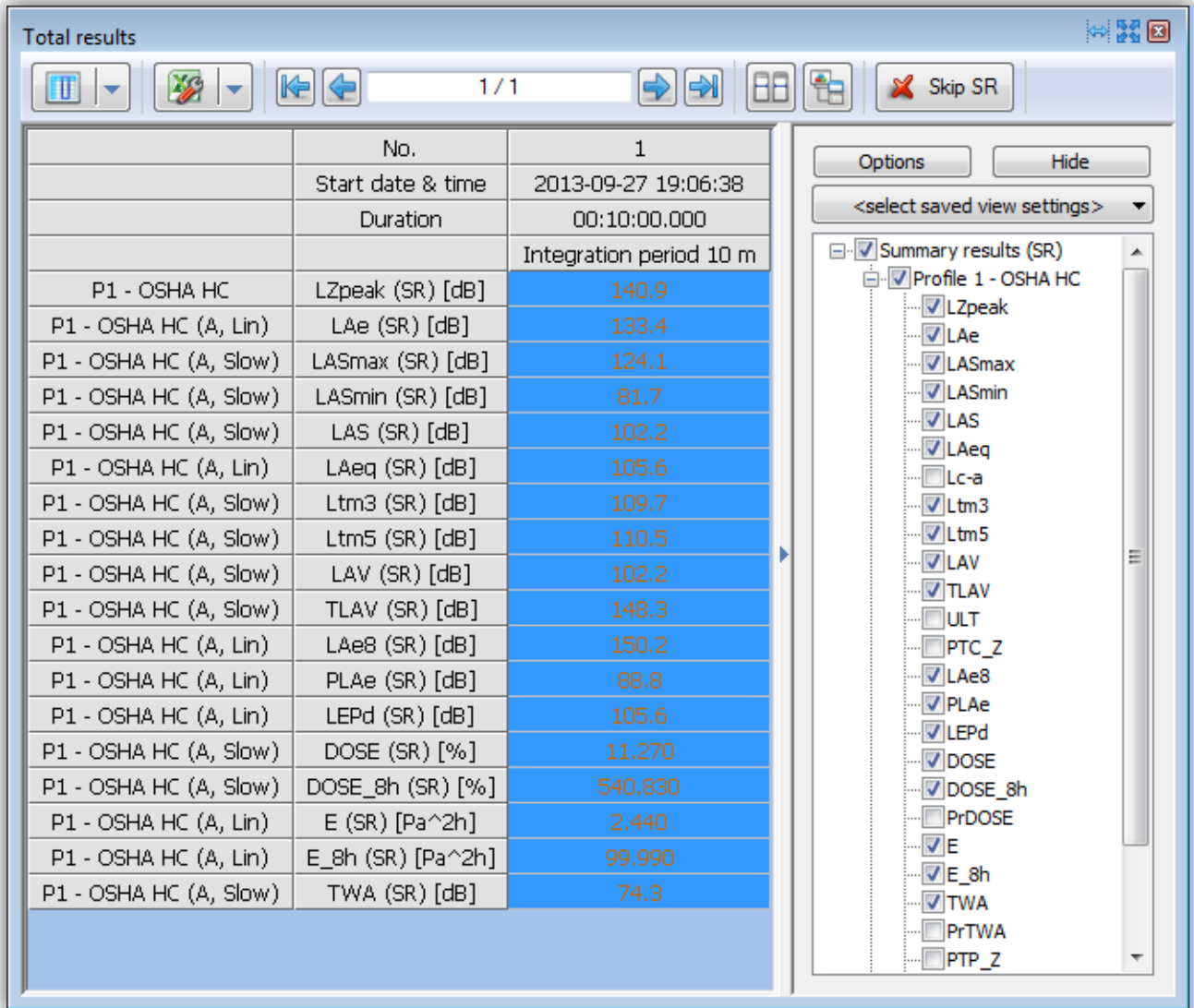


Figure 6-33 Totals results panel

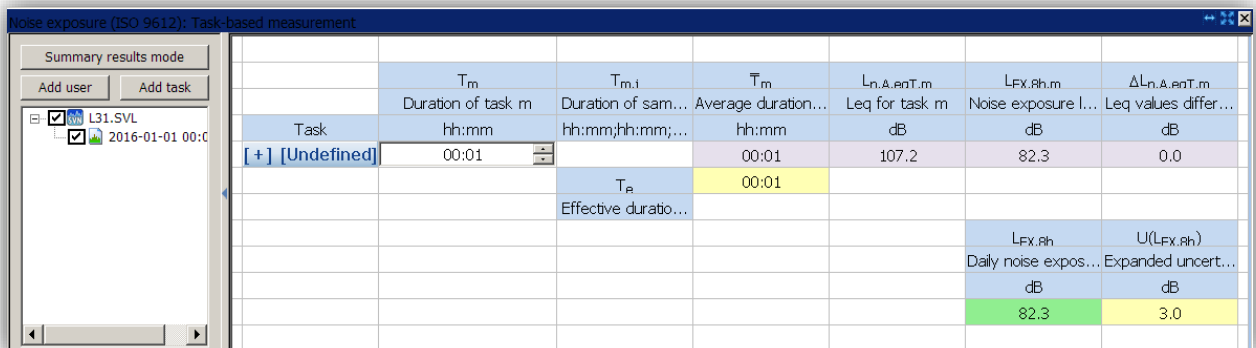


Figure 6-34 Noise exposure (ISO 9612) panels

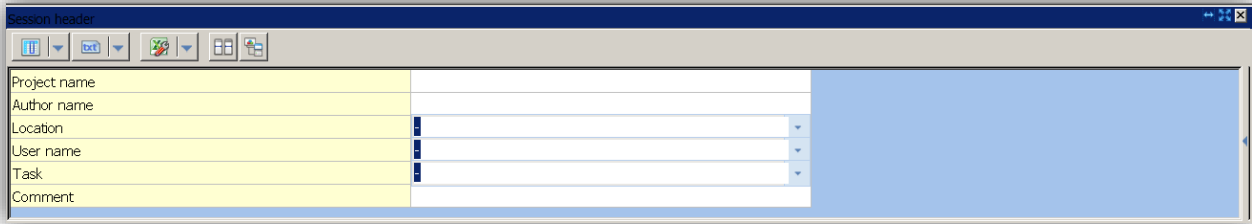


Figure 6-35 Session header panel

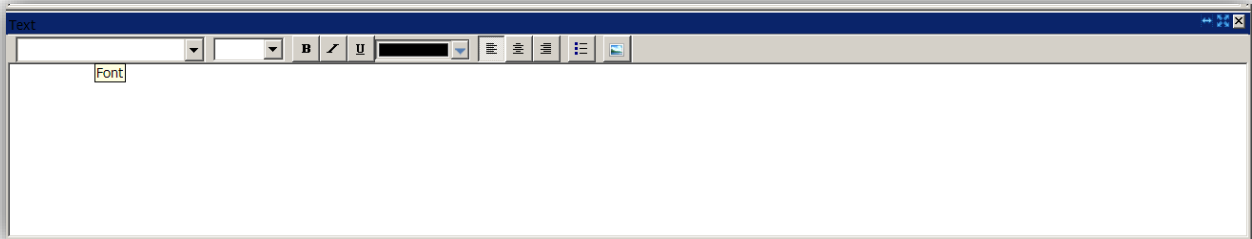


Figure 6-36 Configurable Text panel

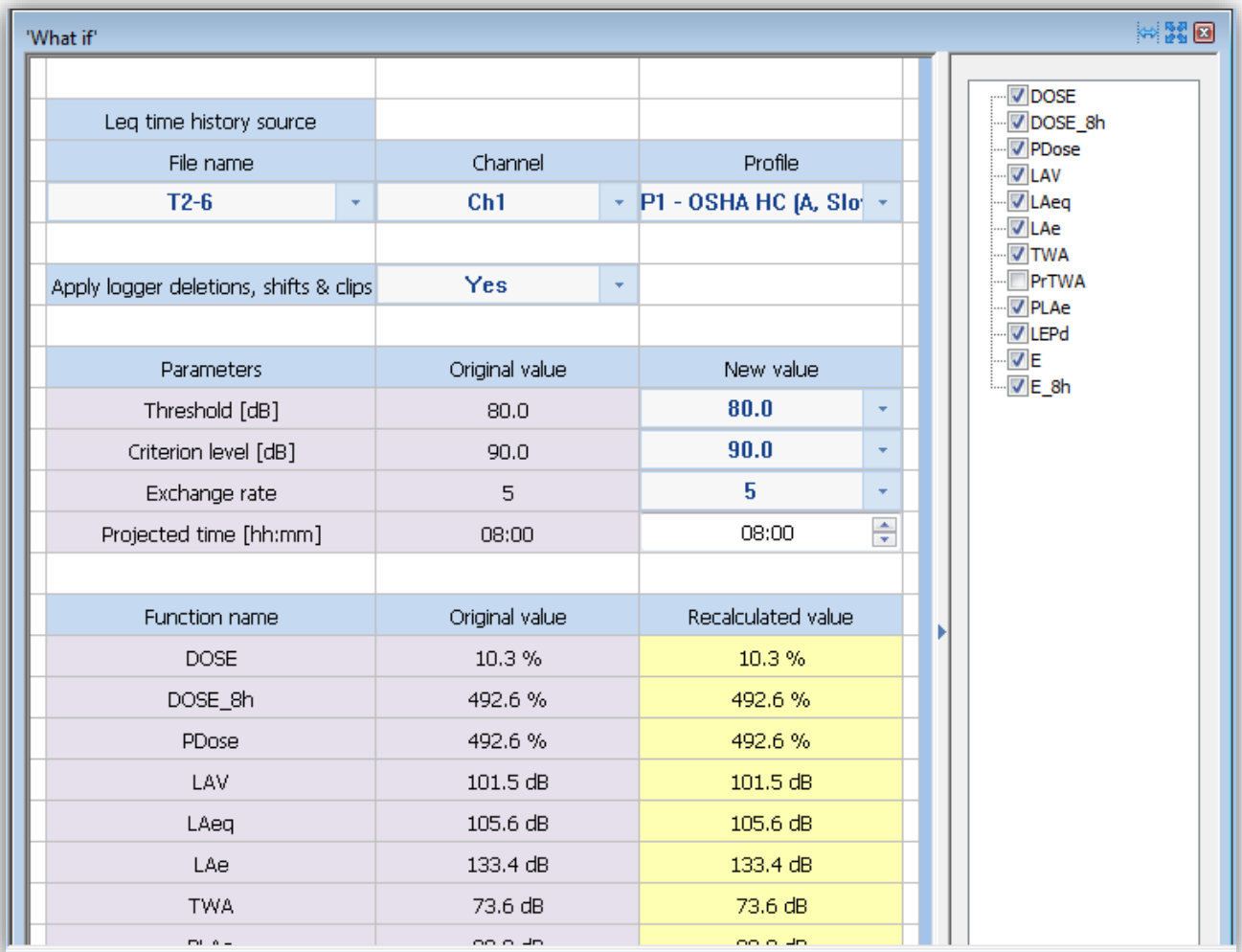


Figure 6-37 Powerful "What if" panel

7

SV 104A MAINTENANCE

7.1 General recommendations for use

7. 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
8. 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.
9. 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.

7.2 Cleaning

Few things to remember:

- Every time the **SV 104A** gets too dirty, clean the surface of the dosimeter with damp soft cloth.
- Pay special attention that the provided **SA 122A** 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 122A_3**.
- Pay special attention that the **ST 104A** 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.

7.3 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.

7.4 Periodic testing

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



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

7.5 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.** Use the NM10411Z wrench but be gently and be aware not to break or strip the thread.



Note: Note, when the microphone is changed, the new **microphone serial number** is automatically stored into the **SV 104A** internal memory.

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 122A_3** three pcs per pack (windscreens for **SV 104A** dosimeter).

7.6 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 7-1 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.



Note: With use of **Supervisor** software it is very easy to check if there are any new firmware releases available for download (see Figure 6-3 commands).

7.7 Storing the instrument

- To preserve the life of the internal batteries, it is recommended that the **SV 104A** instrument is turned off when it is stored, and battery charge at half the capacity.
- Do not store the instrument permanently connected to the USB port or put on docking station. It shortens battery lifecycle.
- It is recommended to turn off the Bluetooth® interface in applied settings;
- When the **SV 104A** is turned off, it still draws a small amount of battery power. Therefore, it is recommended to 50% charge of the cell every few months if it is not going to be used regularly.

7.8 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.



Note: For Air-transport **Bluetooth®** interface should be turned off. Make sure that correct settings file is applied.

7.9 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 0)
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 0).
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 0).
6. In case the reset does not help proceed to chapter 9.

8

RISK ASSESSMENT AND MITIGATION OF RISK

Electrical safety HAZARDS are fully addressed by 6-16 clauses of the IEC 61010-1.

For details see:

GENERAL WARNINGS, SAFETY CLAUSES, AND STANDARD INFORMATION, page 2

SPECIAL PRECAUTIONS WHEN USING AND CHARGING LITHIUM BATTERIES, page 4

ENVIRONMENTAL PROTECTION MARKING OF THE UNIT, page 4

HAZARDS related to reliable function, performance and wrong software setup are covered by:

- Chapter 4, RUNNING AND OPERATING BASIC PROCEDURES, page 29
- Chapter 6, SUPERVISOR BASIC OPERATIONS, page 50
- Chapter 7, SV 104A MAINTENANCE, page 75

9 **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



Note: 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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