SVANTEK

USER MANUAL

SV 100A

WHOLE-BODY VIBRATION DOSIMETER

Warsaw, 2024-07-31
Rev.1.03

Note: *Due to continuous product improvement SVANTEK reserves the right to make changes to product specifications without notice. To download the most up to date User Manual please visit our web site at www.svantek.com.*

This User Manual presents the firmware revision named 1.05.2 (see the Unit Label review in Chapter 0 to check version details).

This User Manual presents some aspects of Supervisor software revision named 2.0.17 and Assistant Pro application for mobile devices 1.3.3.

The succeeding software revisions (marked with the higher numbers) can change the view of some displays presented in the text of this manual.

Note: *It is essential that the USB cable is disconnected during measurement. Failure to follow these recommendations will invalidate the warranty.*

Note: *Battery power indicator - To improve accuracy of remaining battery life indicator, run the instrument until it is fully discharged; then proceed with a full charge via the mini-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.*

WEEE Note: *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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Technical Support Contact Information:

web: www.svantek.com

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1 INTRODUCTION

1.1 Vibration risk and its assessment

When a person comes into contact with the surface of a vibrating machine, mechanical vibrations are transmitted directly to the human body, affecting individual tissues or even the whole body. The vibrations that affect humans are called human vibrations and are divided into whole-body vibrations (WBV) and hand-arm vibrations (HAV).

Whole-body vibration is transmitted through the seat or feet of workers whose main job involves driving mobile machinery or other work vehicles over rough and uneven surfaces. Large shocks and jolts can cause health risks, including back pain.

The measurement of whole-body vibration is carried out under typical working conditions, with employees performing tasks that are part of their normal routine, with normal use of a tool, machine or piece of equipment. For each selected activity performed by the employee, the weighted vibration acceleration is measured in three mutually perpendicular directions: a_{wx}; a_{wy}; a_{wz}.

The assessment of the level of exposure to vibration is based on the calculation of the daily exposure A(8) expressed as the equivalent continuous acceleration over an eight-hour period, calculated as the highest (RMS) value or the highest vibration dose value (VDV) of the frequency-weighted accelerations determined in three orthogonal axes (1.4awx, 1.4awy, awz for a seated or standing worker) according to ISO 2631-1 (1997). The use of the 1.4 weighting in the x and y axes is associated with a higher risk of adverse effects of horizontal vibration on human health.

1.2 SV 100A as a new generation vibration exposure meter

The new SV 100A is a wireless whole-body vibration meter suitable for whole-body measurements in accordance with ISO 2631-1 and European Parliament Directive 2002/44/EC. Suitable for both seat and seat-back measurements, it uses the latest technology and is easy to use. The device is equipped with 4 push buttons and a small OLED display that allows basic configuration in the field.

Figure 1-1 SV 100A application

The wireless BT communication interface allows current results to be previewed on a smartphone or tablet using our Assistant mobile application. The mobile application can also trigger an alarm when vibration limits are exceeded.

The ISO 2631-1 standard implies that it is desirable for the measurement report to include information on any changes in conditions over time. The SV 100A allows GPS data to be correlated with vibration data and plotted on a map where colour indicates vibration magnitudes. This simple solution provides a powerful tool for projecting A(8) vibration exposure in relation to vehicle speed and road conditions.

The instrument is equipped with both RMS and RMQ detectors which allow the calculation of the daily vibration exposure A(8) based on RMS and VDV simultaneously. In addition to the A(8) Daily Exposure, the SV 100A provides results such as: **a_w (RMS), a_{wmax} (RMS MAX), VDV, MaxVDV, a_{wv} (VECTOR), A(8) Daily Exposure, ELV Time (TIME LEFT TO LIMIT), EAV Time (TIME LEFT TO ACTION), MTVV, Max, Peak, Peak-Peak** (with selectable weighting filters). All measurement results are stored in a large 8 GB internal memory.

For advanced users, the SV 100A offers options for frequency analysis in 1/1 or 1/3 octaves and time signal recording to WAV format in accordance to ISO 2631-5 that is compatible with popular recalculation software.

The SV 100A is fully configurable using the Supervisor software. It can be quickly and easily set up for all the weighting filters required by ISO standards for estimating of the effects of vibration on health, comfort, perception and motion sickness. The dedicated Whole-Body Vibration Exposure panel within the Supervisor software makes reporting extremely easy.

The instrument is powered by internal new generation Ni-MH rechargeable batteries, providing approximately 30 hours of continuous operation. The instrument is powered and charged via the USB interface, which also allows easy data exchange between SV 100A and a PC without the need for a special docking station.

2 SV 100A SYSTEM DESCRIPTION

2.1 SV 100A key features

- Whole-body Vibration Exposure Meter complying to ISO 8041:2021
- Wireless instrument with rechargeable battery
- Unattended measurement of seat-pad or seat-back vibration
- Wireless BT communication
- Auto-detection of the operator
- Weighting filters complying to ISO 2631-1
- Calculation of A(8) Daily Exposure
- Results both in ms^{-2} and exposure points
- Large 8 GB memory
- USB 2.0 interface
- OLED display with super brightness and contrast and push-buttons
- Digital true RMS detector with Peak detection, resolution 0.1 dB
- Frequency range 0.1 Hz ÷ 180 Hz
- Measurement range 0.018 ms^{-2} RMS ÷ 157 ms^{-2} PEAK
- Simultaneous measurement results: aren, VDVR, PEAK, P-P, MAX, CExp, A(8), EAVTT, EAVTL, ELVTT, ELVTL, OVL, TIME, aw (RMS), VDV, CRF, MSDV, awv (Vector), CDose, DDose, CExp, spectra (RMS/MAX/MIN) for three channels with the Integration Time step from 1 to 1000, or Infinity
- Three user configurable measurement channels
- Easy in use predefined setups
- Time-history data logging of PEAK, P-P, MTVV, aw, VDV, awv for three channels with the Logger Step from 0.1 s to 1 h
- Time-domain signal recording (optional)
- 1/1 Octave or 1/3 Octave real time analysis (optional)
- Operational time > 30 hours *(display off, octave analysis off)*
- Assistant – application for mobile devices (smartphone/tablet) allows full distant control and additional GPS data logging (speed and location of the vehicle)

2.2 Kit components

- **SV 100A** – vibration dosimeter (with rechargeable batteries)
- **SA 54** – charger/power supply for SV 100A
- **SC 56 -** mini USB 2.0 cable
- **SA 145** - carrying case for SV 100A instrument and accessories (waterproof)
- **Screw** for fixing SV 100A to SV 111
- **Mounting belt** to SV 100A

2.3 Related optional equipment & accessories

- **SV 111** – Vibration calibrator for in-situ check per ISO 8041:2021
- **SA 136** – Calibration adapter for SV 100A periodical verification

2.4 Instrument Software (Firmware) options available

- **SF 100A_OCT** – 1/1 Octave real time analysis option
- **SF 100A_3OCT** – 1/1 and 1/3 Octave real time analysis option
- **SF 100A_WAV** - Time domain signal recording option
- **SF 100A_Wf** - Motion sickness measurement option per ISO 2631-1

Note: *The software options can be purchased in any time as they only require the introduction of a special code to activate.*

3 GETTING STARTED

3.1 SV 100A control panel, interface

The following Figure shows controls and connections of the SV 100A.

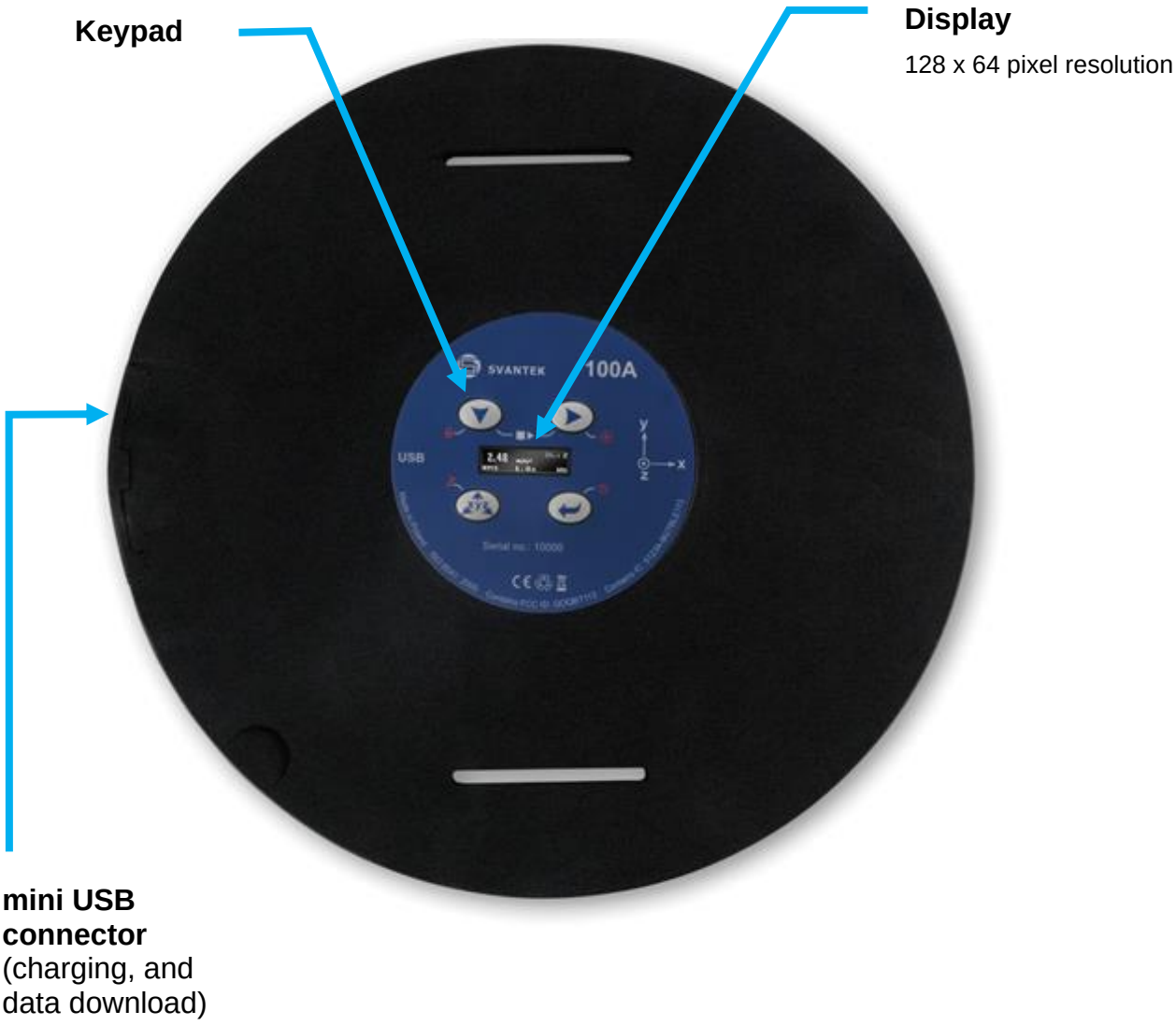


Figure 3-1 SV 100A front view

3.2 Measurement with SV 100A vibration exposure level meter

To perform measurements with SV 100A, follow the next steps:

- Configure the instrument using the *Assistant* mobile application or *Supervisor* PC software or load an existing setup (see chapter 4.4).
- Place the instrument on a vehicle seat to be monitored (e.g. truck seat) and start the measurement manually or remotely from the *Assistant* mobile application (*Assistant* allows you to monitor and control measurements).
- Download measurement results to a PC using *Assistant* or *Supervisor* for data visualisation, processing and reporting (see chapter **Error! Reference source not found.**).

3.4 Manual control of the instrument

The Instrument keypad has been designed to be minimal, yetl highly ergonomic and easy to use, ensuring effective operation. As a result, the number of the control keys on the instrument has been reduced to just four.

The user can operate the instrument by:

- changing the **VIEW** mode with the key,
- selecting the desired **VIBRATION AXIS** with the key,
- scrolling through the results with the or keys.

Note: *To reduce power consumption and prolong battery life,* ***SV 100A*** *will automatically turns off the display after 30 seconds if no key is pressed on the keypad.*

3.4.1 Primary key functions

The following primary (short-press) control buttons are located on the front of the instrument:

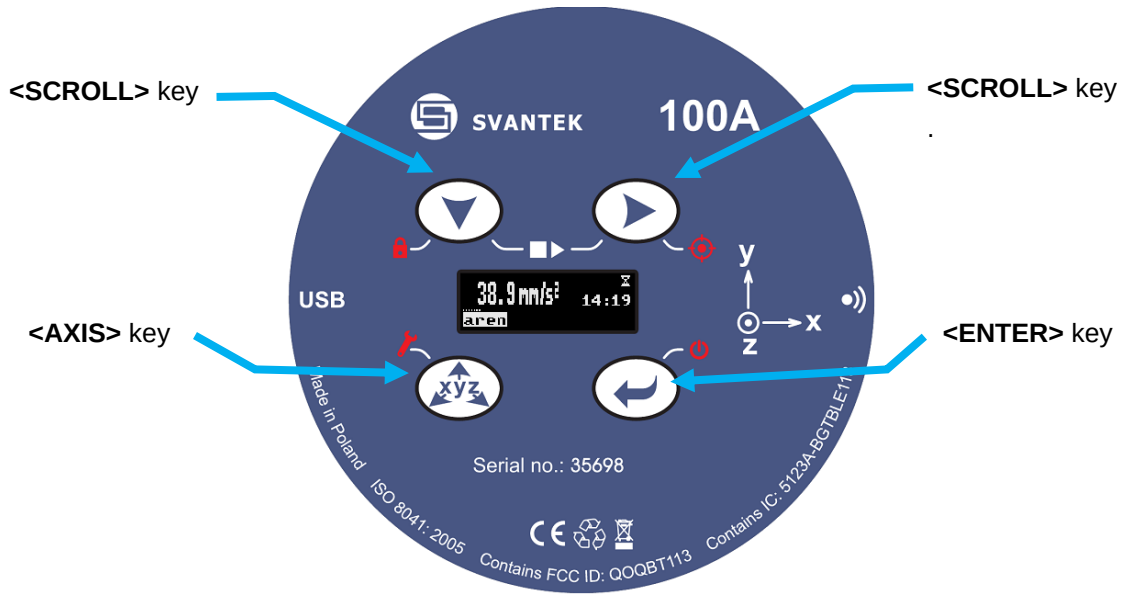


Figure 3-2 Control keypad on the front panel – primary key functions

The  or  keys allow you to:

- scroll down through results in the RESULTS VIEW modes,
- scroll down and up through the **Calibration** menu items,
- scroll down and up through setups in the **Load Setup** menu,
- decrease and increase the values of the **Level** parameter in the **Calibration axis** screens.

The **<ENTER>**  key allows you to:

- change VIEW modes,
- enter menu items in the **Calibration** screens,
- confirm changed parameters (for example, **Level** parameter in the **Calibration axis** screens),
- acknowledge warnings or other confirmation messages.

The **<AXIS>**  key allows you to:

- change the vibration channels displayed,
- exit all screens,
- reject warnings or other confirmation messages.

3.4.2 Alternate key functions

For quick access to special functions, press and hold individual keys (keypad icons marked in red):

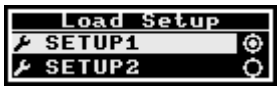
 - switching the instrument on or off

 - activating the screen when the keypad is locked

 - activating the **Calibration** menu

 - locking the keypad and screen

 - loading the setup



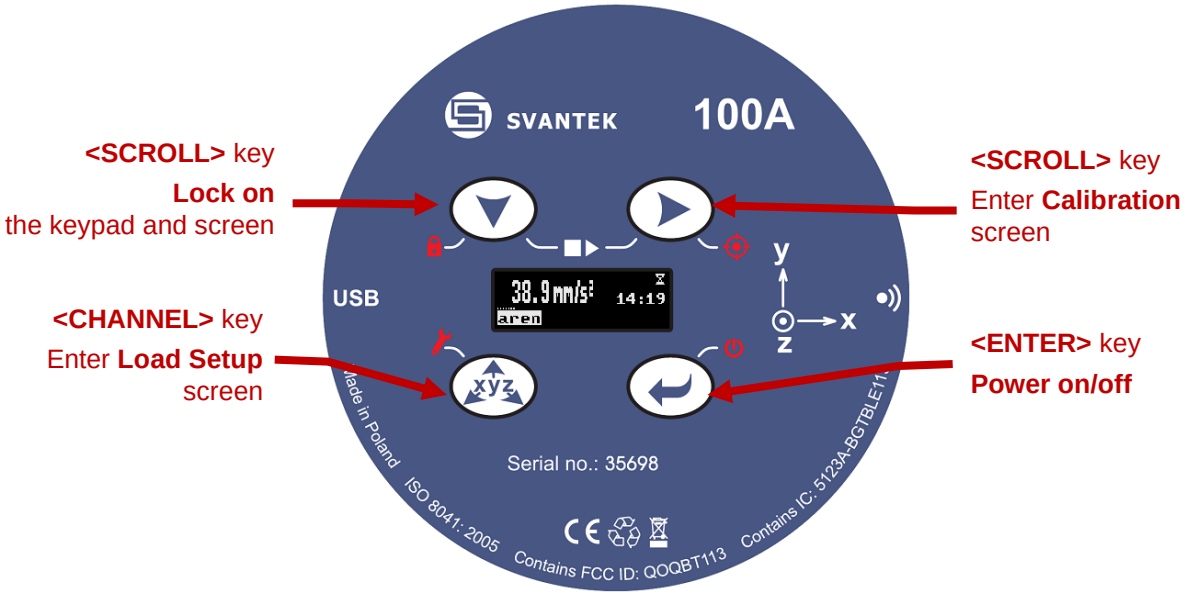


Figure 3-3 Control keypad on the front panel – alternate key functions

If a button is held down for a few seconds, a countdown is displayed. If you release the button too early, SV 100A will return to the last used VIEW mode and the selected control function will not be performed.

3.4.3 Alternate combined keys function

In addition, you can quickly access even more functions by pressing two buttons at the same time:

and - Start/Stop the measurement

and - enter **Units** screen

and - **e**nter **Unit Label** screen

3.5 Charging

The SV 100A is equipped with an internal charger so that the built-in batteries can be charged directly from the USB port or the **SA 54** charger.

When SV 100A is connected to a USB port or USB charger, it will automatically switch on during charging and display the status of the instrument's internal battery. SV 100A will display 'Fully charged' when charging is complete. A full charge from **SA 54** should take approximately 4 hours from a fully discharged state. Charging from a PC via the USB port is much slower. It takes about 10 hours to charge a fully discharged battery. A

charging time of approximately 2 hours is sufficient for at least 8 hours of measurements. A fully charged instrument will hold enough charge to operate for approximately 30 hours. The instrument automatically switches off when the USB power supply is disconnected.

Ensure that the SV 100A is fully charged before using it for dose measurements.

Note: *Charging a fully discharged battery takes approximately 3-5 hours. Also note that the instrument is slightly warm when charging. This is normal for NiMH cells and does not affect the accuracy of the measurement.*

Note: *Only use high quality USB cables. Many inferior cables do not ensure low cable resistance, thus preventing proper charging of the internal cells.*

3.6 Turning the instrument on/off

TURNING ON: To switch on the instrument, press and hold the key for a few seconds. The instrument will switch on and run a self-test routine during which the manufacturer's logo, unit name and firmware version will be displayed.

In ready to measure mode, the SV 100A displays the running instantaneous RMS view (if enabled):

Note: *Warm up time - after switching on, the instrument should warm up for at least 60 seconds before taking a measurement.*

Note: *If you leave the instrument in Stop (ready to measure) mode, the display will turn off after 30 seconds, and the instrument will turn off after this period of inactivity to conserve the batteries. The power off time can be programmed and is set to 1 hour by default.*

Note: *SV 100A will display a warning screen when the battery capacity is less than 2 hours of potential measurement time.*

TURNING OFF: To switch off the instrument, press and hold the key for a few seconds, during which time a countdown will be displayed (“Shutting down” 3… 2… 1…). This gives you time to decide if you really want to switch off the instrument. If you release the key too early, SV 100A will return to the last **VIEW** mode displayed.

If enabled in the configuration setup, an additional warning screen may be displayed. This is to ensure that the operator is aware that the unit is to be switched off.

Note: *If the* ***auto-run*** *(timer) mode is active, SV 100A will automatically stop measuring when the set time has elapsed and then switch off. If the auto-run mode is not used and no specific time has been set, the instrument will continue to measure until the battery is exhausted. Just before switching off, the measurement run is stopped and all data up to that point is safely stored for later download to a PC.*

3.7 Starting and stopping measurement run

START:

Before starting a measurement, ensure that:

1 the instrument is switched on,
2 there is sufficient battery operating life and free memory by checking the status screen,
3 the required configuration setup is selected,
4 the instrument is calibrated as this will affect the results.

To start the measurements, the user must press the  and  keys simultaneously. The results of the measurement are displayed in the view mode of the last result used. One profile mode is always available for most functions of the instrument. Measurement results can also be displayed in other display modes which can be enabled or disabled to suit the user's needs

Keyboard is always locked when measurement starts.

STOP:

The same key combination  and  allows you to stop the measurement, but before stopping it you should unlock the instrument.

If the auto save function is not disabled, all run results will always be saved automatically, there is no need to save them manually.

After stopping the measurement, ensure that:

1 the data is downloaded to the PC for further analysis,
2 the instrument is switched off.

4 BASIC OPERATION OF THE INSTRUMENT

4.1 VIEW modes

The SV 100A provides many measurement results for the operator to review. For this reason, all information is clearly organised manner as **VIEW** modes for each channel.

The **VIEW** mode is a way of presenting measurement results to the operator. In other words, when you change the **VIEW** mode, certain measurement parameters and status information are presented differently to suit the user's needs.

SV 100A has the following **VIEW** modes:

- **Running RMS** - three channels view mode
- **Basic View** - one result primary view mode
- **Large View -** additional one result view mode
- **3 channels** view mode
- **Instrument Status** view mode
- **File Information** view mode

To enable or disable the view modes, use *Supervisor* or *Assistant Pro*.

To switch between the view modes, use the  key.

4.1.1 "Running RMS" view mode

Running RMS view mode is used when the measurement is not actually running, e.g. when the instrument is in standby mode before or after a measurement. In this mode, the current RMS results for all the channels are calculated and displayed, but they are not stored in the instrument memory. The purpose of this is to give the user an initial indication of the vibration levels. In this view mode the instrument behaves as a simple general purpose vibration level meter.

Figure 4-1 Running RMS view mode screen

4.1.2 "Basic View" mode

The **Basic View** mode is a primary measurement mode and it can be enabled or disabled like any other measurement mode, but if all modes are disabled, the **Basic View** mode will be active. In **Basic View** mode, any measurement result can be displayed and selected using the ▼ or ▶ key. The user can change the current channel by pressing the xyz key.

Figure 4-2 Basic View mode screen

For some results, no filters, units or channels are displayed.

4.1.3 "Large View" mode

The **Large View** mode is similar to the **Basic View** mode but is useful in low vision conditions or is suitable for operators with some visual impairment.

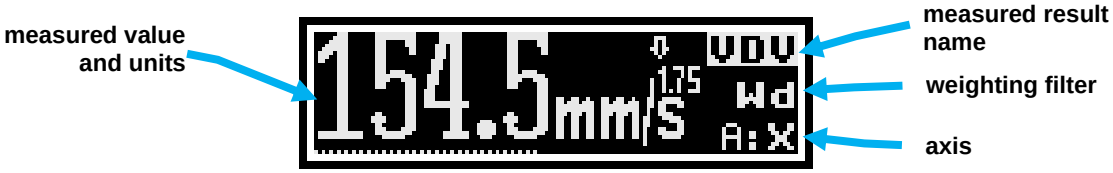


Figure 4-3 Large View mode screen

For some results, no filters, units or channels are displayed.

4.1.4 "3-channel View" mode

The **3 channels** mode is used when you need to display measurement results for three axes at the same time.

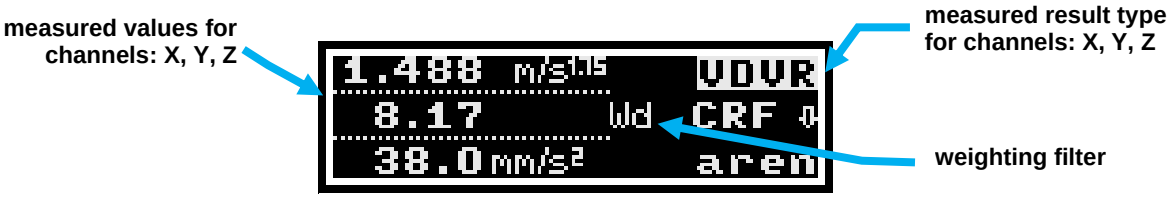


Figure 4-4 Results list view mode screens

4.1.5 "Instrument Status" view mode

The **Instrument Status** view shows:

- The estimated amount of working time that is **Left** before the battery is expected to be completely discharged,
- the battery **Charge** status,
- current **Setup** information,
- used **Standard** for Exposure Limits,
- **Timer** mode.

The **Instrument Status** screen is scrolled down and up with the ▼ and ▶ keys respectively.

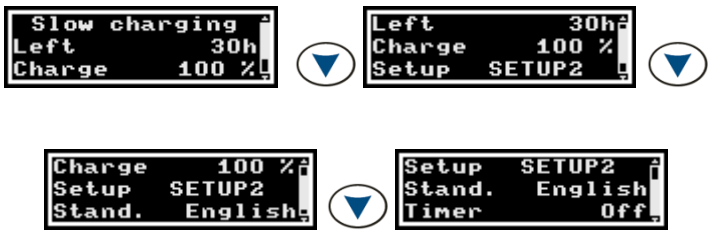


Figure 4-5 Instrument Status view mode screens

Note: *The calculation of the battery charge level is based on the internal charge counter and should only be considered as a rough estimate. The time remaining may therefore vary considerably. Although the latest technology cells are used, some degradation over time is unavoidable and may require occasional replacement of the battery cells by the factory (or authorised service centre)*

Note: *To improve accuracy of the remaining battery life indicator, allow the unit to fully discharge, then fully recharge via the mini-USB port. This procedure is recommended before first use. Repeat this procedure after every few months of use to maintain more accurate battery life indication.*

4.1.6 "File info" view mode

The **File information** view displays the current file name and size.

4.2 ALARM screen review

There are a two alarm conditions (EAV and ELV) when the ALARM screen appears. During a measurement, SV 100A will immediately switch on the display when the programmable alarm condition is exceeded. Press any key, to acknowledge the information.

Note: *At any time when the battery power is low, the "low battery" alarm screen may alert you to the need for immediate recharging.*

4.3 Reviewing unit label

The **Unit Label** screen is accessed by pressing the  and  keys simultaneously and provides information on basic instrument characteristics such as:

- Protected manufacturer name: SVANTEK (C)
- Instrument name: SV 100A
- Instrument serial number: SN …
- Instrument name: *[user programmable name]*
- Firmware version: 1.02.1
- CRC(OK) number: ED39
- Standards to which the instrument conforms: ISO 8041:2021

The **Unit Label** screen is scrolled down and up using the  or  keys.

To exit the **Unit Label** screen, press and release the  or  key. SV 100A will then return to the last **VIEW** mode displayed.

***Note:** The personalised **Unit Name** can be set using the Supervisor software.*

4.4 Loading Measurement Setups

To load the configuration setup, press and hold the  key. The **Load Setup** menu will appear with the list of setups.

To load the desired configuration setup, scroll through the list using the  or  keys and select the setup using the  key. To exit the **Load Setup** menu, press the  key.

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

Press the  key to confirm loading of the selected setup and exit the **Load Setup** menu (**Exit**) or press the  key to cancel loading of the setup (**Back**).

Confirming the loading of the configuration setup will take you to the status of the loading procedure screen.

4.5 Calibration and verification of the instrument

The instrument is factory calibrated with the accelerometer supplied. However, in order to comply with the local and international, standards it is necessary to periodically check and calibrate the instrument.

International Standard ISO 8041:2021 defines three levels of performance testing, including: sample evaluation, aimed at manufacturers; periodic verification, aimed at manufacturers and users; and in-situ verification, aimed at user.

Periodic verification includes an intermediate set of tests to be performed periodically (e.g. before or at the time of purchase, and every one or two years thereafter) to verify that performance remains within the specifications of this International Standard, to demonstrate that one-of-a-kind equipment systems meet the requirements of this International Standard, and following any modification or repair that may affect the performance of the equipment.

In-situ check, which is mainly aimed at the user and consists of minimum level tests that indicate that the instrument is likely to operate within the required performance specification. These tests are carried out immediately before and after measurements.

The SV 100A is equipped with both periodic verification (**By Measurement** calibration) and in-situ verification (**System Check**) functions which can be performed using the **Calibration** menu. The **Calibration** menu is accessed by pressing and holding the key.

Note: *The manufacturer recommends that a factory calibration is performed every 12 months to ensure the continued accuracy of the instrument and compliance with international specifications. Please contact your local SVANTEK representative for further details.*

The SV 100A has a dedicated triaxial MEMS-based accelerometer located in the central metal housing with keypad and display. The accelerometer with this housing can be removed from the rubber disc and calibrated using commercially available vibration calibrators. In this case, the **SA136** calibration adapter should be used to mount the accelerometer on a vibration table.

If you have the **SV 111** calibrator supplied by Svantek, you can check and calibrate the SV 100A without removing the accelerometer.

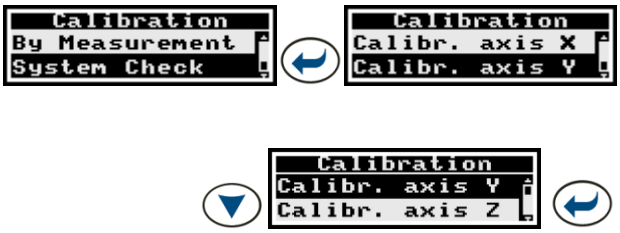
Figure 4-6 Using the SV 111 calibrator

Note: *Please refer to the SV 111 manual for details on the correct installation of SV 100A on SV 111.*

4.5.1 Periodical verification - Calibration

To calibrate the instrument, follow the next steps:

1. Select the **By Measurement** item in the **Calibration** menu and press the key, select the appropriate channel (X, Y or Z axis) and press the key again.



2. Use the or keys to set the calibration level of the calibrator being used. The **Factor** item indicates the current calibration factor.

3. Mount the triaxial accelerometer or SV 100A to the **SV 111** calibrator as shown above.

4. Switch on the calibrator and allow it to stabilise for approximately 30 seconds before starting the calibration measurement.

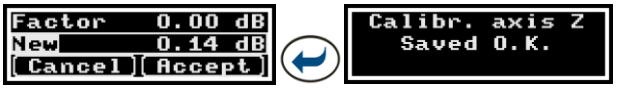
5. Press the key to start the calibration measurement. The delay before starting the calibration measurement is counted down on the display.

The calibration measurement lasts 60 seconds and stops when the same result is obtained 3 times in a row. It is possible to stop the calibration measurement by pressing the key. After the measurement, the result is shown on the display.

It is recommended to repeat the calibration measurement several times. The results obtained should be almost the same (with a difference of ±0.1 dB). The reasons for the unstable results are as follows:

- the calibrator is not properly attached to the instrument,
- there are external vibration disturbances,
- the calibrator or the measurement channel is damaged.

6. Press the key to accept the measurement result.



Note: *If a calibration factor does not meet the tolerance criteria, the instrument will inform you and offer to exit the calibration measurement without saving the results.*

Note: *The calibration factor is always taken into account in all instrument functions (such as 1/1 octave or 1/3 octave analysis).*

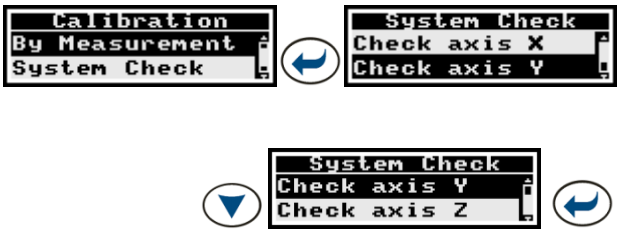
4.5.2 Post-calibration

If it is necessary to perform a so-called post-calibration of the instrument (if post-calibration is pre-programmed in the configuration setup), SV 100A automatically adds the calibration factor to the header of the result files. This doesn't change the stored results and gives the user the possibility to compare the possible changes of the accelerometer sensitivity before and after the measurements.

4.5.3 In-situ check – System Check

To check (verify) the calibration factor, follow the next steps:

1. Select the **System Check** item in the **Calibration** menu and press the key, select the appropriate channel (**X**, **Y** or **Z** axis) and press key again.



2. Use the or keys to set the calibration level of the calibrator being used. The **Factor** item indicates the current calibration factor.

3. Mount the triaxial accelerometer or SV 100A to the **SV 111** calibrator as shown above.

4. Switch on the calibrator and allow it to stabilise for approximately 30 seconds before starting the calibration measurement.

5. Press the key to start the measurement. The delay before starting the calibration measurement is counted down on the display.

The measurement lasts 60 seconds and stops when the same result is obtained 3 times in a row. It is possible to stop the calibration measurement by pressing the key. After the measurement, the result is shown on the display.

After the measurement, the result is shown on the display. The user can now check if the result of the measurement result is close to the calibration level.

6. Press the key to return to the **System Check** screen.

4.5.4 Viewing the instrument calibration

To view the current calibration factor, select the **Calibr. View** item in the **Calibration** menu and press the key.

4.6 Auto-run mode information

When the auto-run mode is enabled, there is no need to switch on the instrument manually. The instrument is switched on automatically and the measurement starts on the programmed time. To program the auto-start mode, use *Supervisor* or *Assistant Pro*.

At the pre-set date and time, the instrument is switched on and begins to count down the delay time. After the warm-up time, the instrument starts the measurement and is locked all the time. The measurement status is indicated by a change in the measurement time.

Figure 4-7 Auto-run mode – delay count down and measurement run time screens

4.7 Security lock

The keypad and display are automatically locked during measurement to prevent tampering. If necessary, the instrument can be unlocked by pressing the correct sequence of keys.

The lock/unlock function of the instrument can be programmed using *Supervisor* (see Chapter 5.4.7).

Locking SV 100A:

The **SV 100A** is always automatically locked when it is started.

It is always possible to lock the instrument manually. In this case, the user should press and hold the  key for a few seconds, during which time a countdown (“Keyboard lock” 3… 2… 1) will be displayed, giving you time to decide whether you really want to activate the security lock. If you release the key too early, SV 100A will return to the last **VIEW** mode displayed.

Unlocking SV 100A:

SV 100A can be unlocked by a sequence of keys programmed via *Supervisor* or *Assistant Pro*. To unlock the instrument, press the keys in the correct sequence.

Figure 4-8 Unlocking the unit sequence screens

4.8 Measurement procedures

For vibration measurements, the instrument should preferably be placed on the vehicle seat or backrest at the beginning of a shift and collected at the end of the entire shift. If a shorter period is sampled, care should be taken to ensure that the result is representative of the whole shift exposure. Shorter sampling periods require the sampler to have a thorough and complete understanding of the work tasks expected during the shift and the duration cycles of those tasks.

Before taking any vibration measurements, ensure that the employees selected for assessment are operating equipment or performing tasks under normal (representative) conditions and stress the importance of continuing to work in their normal manner (the instrument should not interfere with normal duties). Explain the purpose and procedures of the sampling to the employee who will be using the instrument and the importance of not interfering with it. Instruct the worker not to remove the instrument unless absolutely necessary.

The general procedure for taking measurements could be as follows:

1. Check that the indicated battery life of the instrument is at least twice the time required for the measurement period.
2. Check that the instrument setup mode is appropriate and change it if necessary.
3. Check the instrument calibration and adjust if necessary.
4. Start the measurement manually if it is not programmed for an automatic timed start.
5. At the end of the measurement period, stop the measurement, and remove the instrument from the seat.
6. Follow your organisation's specific procedure for analysing personal vibration exposure recordings.
7. Ensure that the report is submitted to the appropriate person.
8. Distribute copies of the exposure records to the test persons and explain the results.

4.9 Reviewing measurements

Most results can be viewed in real time either during a measurement or when the instrument is stopped. If the display is switched off, simply press the  key to "wake up" the instrument, then press the sequence of unlock keys.

The keys on the instrument keypad allow you to navigate through most of the parameters. For specific information on the VIEW modes:

- use the  or  keys to scroll through the measurement results,
- use the  key to change the channel you wish to view,
- use the  key to change the VIEW mode

Note: *In most cases the keypad is likely to be locked. To access the results and unlock the keypad, see chapter 0.*

Note: *After reviewing the results, remember to lock the keypad again to maintain the integrity of the measurement run by preventing uncontrolled access to the instrument.*

5 BASIC OPERATIONS WITH THE SUPERVISOR PC SOFTWARE

This chapter explains how to download data and configure dosimeter settings as well as analyse data and generate reports using the **Supervisor** software.

Supervisor can be used in two modes - *Advanced* or *Lite*. *Supervisor Lite* is recommended for health and safety professionals who are just starting work with the software. This manual provides an overview of the basic features of the Lite option. Both options are widely described in detail in the Supervisor User Manual.

5.1 Installing and connecting to PC

Download the **Supervisor** installation file to your PC and run the installer. The USB drivers are included in the installation file, and you do not need to download them yourself from the website.

After installation, you are ready to connect the SV 100A dosimeter.

- Plug the USB cable into the computer
- Plug the opposite end of the cable (mini-USB) into the instrument itself
- SV 100A is powered and charged directly through the computer; thus, you do not need separate charger. The instrument will be switched on automatically
- Run the *Supervisor* software and select its mode – *Advanced* or *Lite*.

Figure 5-1 Choosing the Supervisor mode

When Supervisor is running, you can switch between modes by clicking on the Svantek icon and selecting **Run as Supervisor Advanced** or **Run as Supervisor Lite** from the menu.

Note: *This user manual describes the basic features of the* ***Supervisor Lite*** *mode and the main operations with the SV 100A instruments, such as: instrument configuration, data download and report generation. For a full description of the Supervisor software, please refer to the Supervisor User Manual.*

5.2 Supervisor main window

The **Supervisor** main window is divided into a number of panels. Panels expose areas of interest to professional users and satisfy the user's need to find, configure, download, review and evaluate stored data in a very simple but professional way.

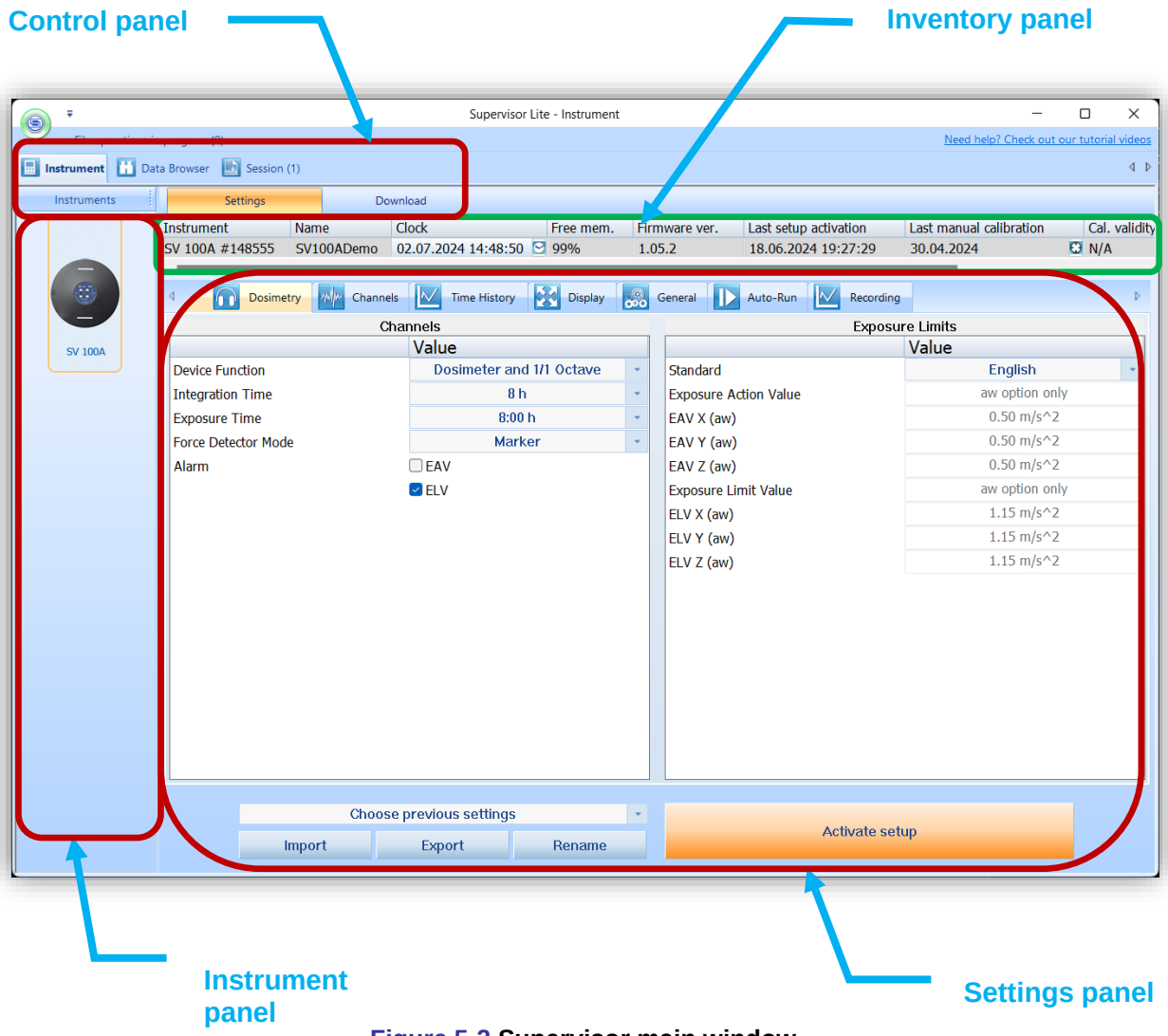


Figure 5-2 Supervisor main window

When a connected Svantek instrument is detected by Supervisor, it is added to the *Instruments* panel. The currently selected instrument is shown in the orange frame. The instrument information is displayed in the Inventory panel.

The *Settings* and *Download* tabs refer to the selected instrument type. When you click on the instrument in the *Instruments* panel, the program automatically downloads the setup file from this instrument and displays its settings in the *Settings* panel. At the same time, the program downloads the list of instrument files and displays them it in the *Download* panel.

If you have more than one instrument of the same type, the Inventory panel will be extended to display the credentials of all these instruments. The *Settings* panel displays the setup of the first connected instrument, and the *Download* panel displays the file list of all connected instruments.

The Inventory table contains information about the Svantek instruments:

- *Instrument* – the instrument type and number.
- *Name* – the name of the instrument.
- *Clock* – the date and time set in the real-time clock of the Svantek instrument; you can adjust it to the PC's date and time by pressing the button. You can also right-click on the row corresponding to the selected instrument to open a context menu that allows you to set the date and time manually.
- *Free memory* – the percentage of free space on the instrument's memory. This option is only available for selected types of Svantek instruments.
- *Firmware version* – the version number of the firmware installed on the instrument.
- *Last setup upload date* – the date and time when the last setup file was uploaded from Supervisor to the Svantek instrument.
- *Last uploaded setup name* – the name of the last setup file uploaded from Supervisor to the Svantek instrument.
- *Last setup activation date* – the date and time when the last setup file was activated (applied) in the Svantek instrument using Supervisor.
- *Last activated setup name* – the name of the last setup file activated (applied) in the Svantek instrument using Supervisor.
- *Last manual calibration* – the date of the last manual calibration.
- *Instrument calibration certificate* – the title of the calibration certificate.
- *Calibration validity date* – the validity date of the calibration certificate.
- *Calibrator Serial Number* – serial number of the calibrator.
- *Instrument Calibration Report* and *Calibrator Calibration Report* – documents available for download.

You can customise the Inventory table by right-clicking on it and selecting or deselecting items from the pop-up menu.

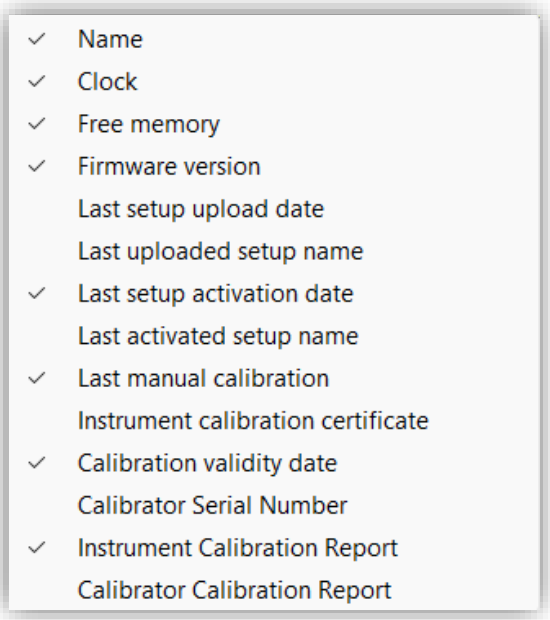


Figure 5-3 Inventory panel customisation menu

The Inventory panel gives you more possibilities to manage the selected instrument, such as Refresh Catalogue, Set Clock, Edit name, etc., by right-clicking on the instrument's row.

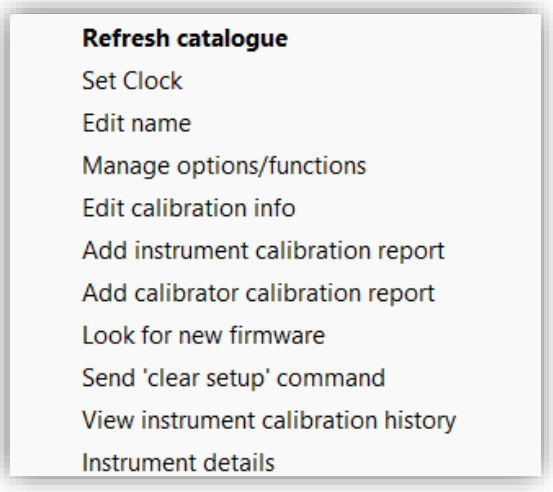


Figure 5-4 Inventory panel menu

5.3 Unlocking optional functions

To unlock additional options or measurement functions of the SV 100A instrument that are available for purchase, use the *Manage options/functions* command in the instrument's context menu. When you click on this command, Supervisor downloads a list of available functionalities from the connected instrument and displays it in the form of two lists: one for options and one for measurement functions.

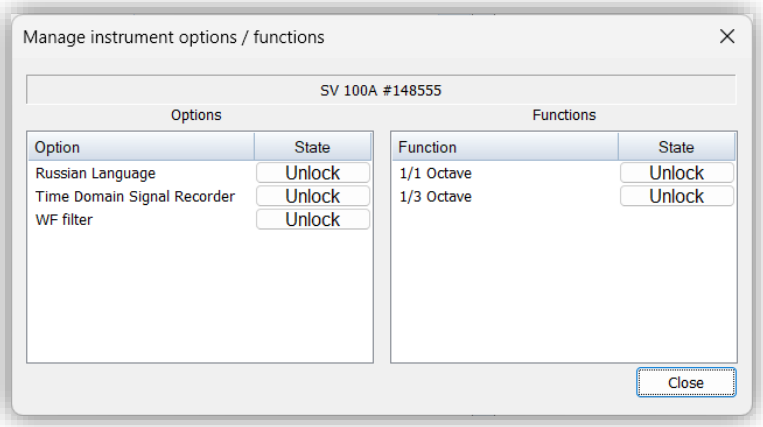


Figure 5-5 Manage instrument options / functions dialog box

The *State* column to the right of each option/function contains the 'Enabled' label for unlocked options/ functions and the 'Unlock' button for those that have not yet been unlocked. To unlock a purchased option or function, press the 'Unlock' button and enter the unlock code in the window that appears.

Note: If an incorrect code is entered three times since the last time the instrument was turned on, any subsequent attempt to lock or unlock an option will fail (whether the code entered is correct or not) until the instrument is restarted.

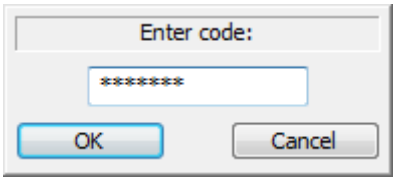


Figure 5-6 Entering code for unlocking an additional option or measurement function

You can also lock again an unlocked option/function by right-clicking on its name, selecting 'Lock' and entering the same code that was used to unlock it.

To search the Internet for the latest firmware for your instrument, right-click on the instrument's line in the Inventory table and select the *Look for new firmware* command from the context menu.

5.4 Configuring the instrument settings

The *Settings* tool of Supervisor allows you to change the instrument's settings and activate them on the connected instruments of the same type, using a clear graphical interface. To use the *Settings* tool, open the *Settings* tab in the *Instrument* window.

When you click on the instrument in the *Instruments* panel, the program automatically downloads the setup file of this instrument and displays its settings in the *Settings* panel.

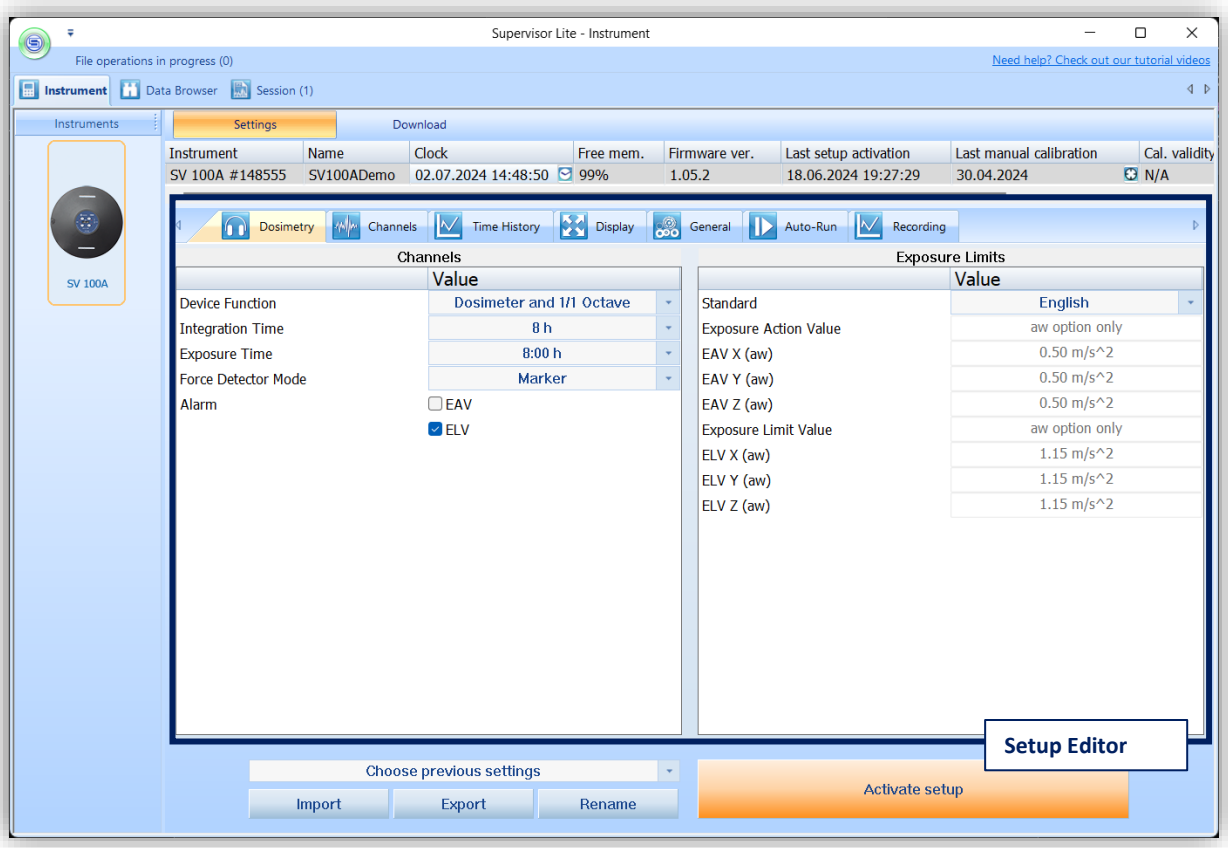


Figure 5-7 Using Supervisor to edit Svantek instruments' settings

The buttons below the Setup Editor allow you to:

- select up to ten previous settings that were last used with this type of instrument,
- *Import* a setup file from a PC catalogue,
- *Export* the current settings as a setup file to a PC catalogue,
- *Rename* previous settings.

5.4.1 Editing settings

The settings are divided into several categories, such as *Dosimetry*, *Channels*, *Time History*, etc. They can be accessed via the tabs located in the bar at the top of the Setup Editor panel. The availability of certain categories depends on the type of instrument with which the edited setup file is compatible. If there are too many categories to display all the tabs at once, you can use the and buttons to scroll the bar.

Settings can be easily edited using the following elements of the Setup Editor graphical interface:

- checkboxes – allowing you to select some of several options,
- list boxes – allowing you to select one of several options,
- text fields – allowing you to specify a text value (e.g., a file name),
- binary buttons – allowing you to enable or disable an option.

5.4.2 Applying settings

Changes made to setup files using the Setup editor are not automatically applied. To apply settings, press the *Activate setup* button.

After the settings have been changed, the *Activate setup* button changes colour.

If you have changed the settings for an instrument type but haven't activated them, the program will warn you before exiting the Setup editor.

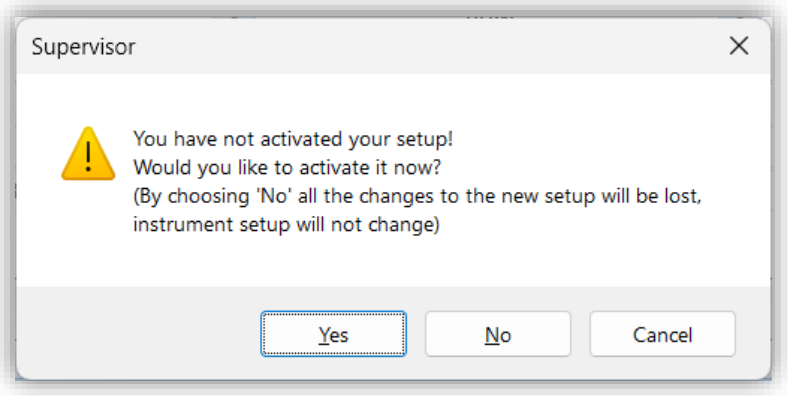


Figure 5-8 Warning that the setup was not activated

If you want to reinstall previous settings, press the *Choose previous settings* button and select the date of the previous settings.

5.4.3 Dosimetry settings

The *Dosimetry* tab contains two panels: *Measurement* and *Exposure Limits*. There are predefined parameters with grey text. Other parameters must be set up by the user.

In the *Measurement* panel, you can select the function: *Dosimeter*, *Dosimeter and 1/1 Octave* or *Dosimeter and 1/3 Octave*.

***Note:** Enabling octave analysis will reduce battery life, so be aware of this and check the battery status before running a measurement.*

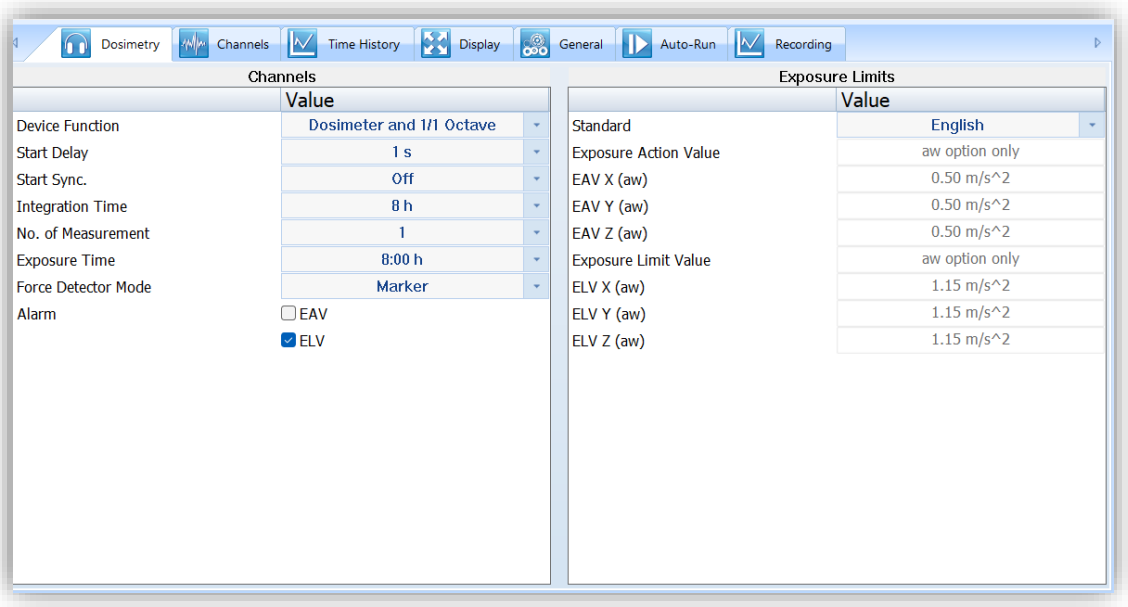


Figure 5-9 Dosimetry settings tab

Other basic configuration parameters for the *Measurement* panel:

- The *Start Delay* parameter defines the delay time between the moment the **<Start/Stop>** key is pressed and the start of the measurement (the instrument's digital filters continue to analyse the input signal even when the measurement is stopped). This delay can be set between **0 second** and **5 minutes**.
- The *Start Sync.* parameter defines the maximum delay between the moment the **<Start/Stop>** key is pressed and the start of the measurement to allow synchronisation with the instrument's RTC. The *Start Sync.* parameter can be set to: *Off, 1m, 15m, 30m* and *1h*. For example, if *1h* is selected, each measurement will start from the first second of the next real time hour after the **<Start/Stop>** key is pressed, and then each hour after *Integr. Per* if *Rep. Cycles* is greater than one.
- The *Integration Time* parameter defines the period during which the signal is measured (integrated) and stored as a set of *Summary Results*.
- The *No. of Measurements* parameter defines the number of cycles (with the measurement period defined by the *Integration Time*) to be performed by the instrument. The *No. of Measurements* number values are within the limits [*1, 1000*] or infinitive (**I***nf.*).
- The *Exposure Time* parameter defines the desired value of the workday exposure time to be used in the calculation of hand-arm Dose results.

- The *Force Detector Mode* parameter defines the mode of the force detector that detects the driver's sitting position. If *Marker* is selected, the marker is recorded when the driver sits down and the marker recording is stopped when the driver stands up. If *Pause* is selected, the measurement starts when the driver sits down and pauses when the driver stands up. When the driver sits down again after the pause, the measurement starts again.
- The *Alarm* parameter defines whether the alarm is to be set for *EAV* or/and *ELV*.

The *Exposure Limits* panel consists of limits applied for different standards or limits defined by the user:

- The *Standard* parameter defines the Exposure Action Value (*EAV*) and Exposure Limit Value (*ELV*) limits for hand-arm vibration measurements, which are mandatory in: *England, France, German, Italy* and *Poland*. It is also possible to define **User defined** limits.

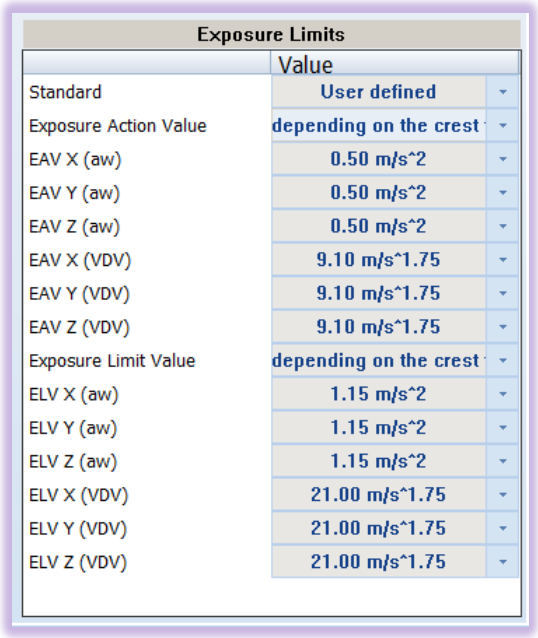


Figure 5-10 Example of user defined limits

5.4.4 Channel parameters settings

The main settings where specific vibration configuration can be set are located under *Channels* tab, which enables the user to select weighting filter (*Filter: Wc, Wm, Wf*), multiplying factors (*Multiplying Factor: 0.1-2.0*) and vector coefficients (*avw Coefficient: 1.0-2.0*) for all channels.

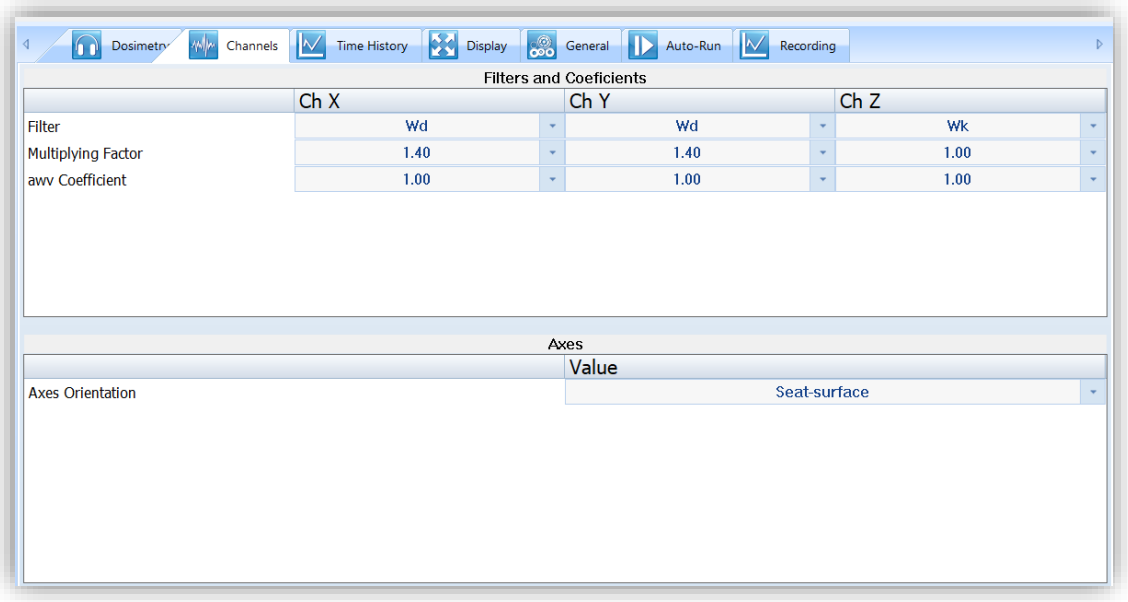


Figure 5-11 Channels configuration settings tab

Since the axes orientation is fixed (X - forward/backward, Y - sideways, Z - vertical), it is necessary to redefine the axes if the instrument orientation changes. The *Axes Orientation* position allows the axes orientation to be adapted to the instrument position:

- *Seat-surface* option is selected when measuring for a sitting position. The instrument is flat, and the direction of the measurement axes corresponds to that indicated on the front of the instrument.
- *Seat-back* option is selected when the unit is mounted on the backrest. In this case, the X axis becomes the Z axis. The Z and Y axes are automatically assigned based on the acceleration measurements.
- *Autodetection* means that the orientations of all the axes are defined automatically.

The automatic change of the axis position for the *Seat-back* and *Autodetection* options is performed all the time until the start of the measurement. The instrument should be placed in a specific orientation for at least 4 seconds. Therefore, when measuring with the *Seat-back* and *Autodetection* options, the user must first place the instrument in the measurement position and then wait at least 4 seconds before starting the measurement.

Automatic axis orientation is disabled during calibration.

5.4.5 Time history data logging settings

Summary Results (aren, VDVR, PEAK, P-P, MAX, CExp, A(8), EAVTT, EAVTL, ELVTT, ELVTL, OVL, TIME, aw (RMS), VDV, CRF, MSDV, awv (Vector), CDose, DDose, CExp and spectra (RMS/MAX/MIN) are measured and saved in the file with the step defined by the **Integration Time** parameter (from 1 second to 1 day, or Infinity) as many times as defined by the **No. of Measurement** parameter (from 1 to 1000, or Infinity).

The instrument enables also additional registration of some results with the step defined by the **Logger Step** parameter (from 100 milliseconds to 1 hour) called Logger results or **Time History Results** (PEAK, P-P, MTVV, aw, VDV, awv). Therefore, it is possible to save in parallel two sequences of measured results with different intervals – one for **Summary Results** and another for **Time History Results**.

When logging is enabled, selected logger results taken from three independent profiles will be saved simultaneously. Recording of logger results to a file is stopped after the period, which is equal to **Integration Time** multiplied by **No. of Measurement** or after stopping a measurement manually.

Summary Results and Time History Results are saved in the same file.

The figure below illustrates principles of logging measurement results.

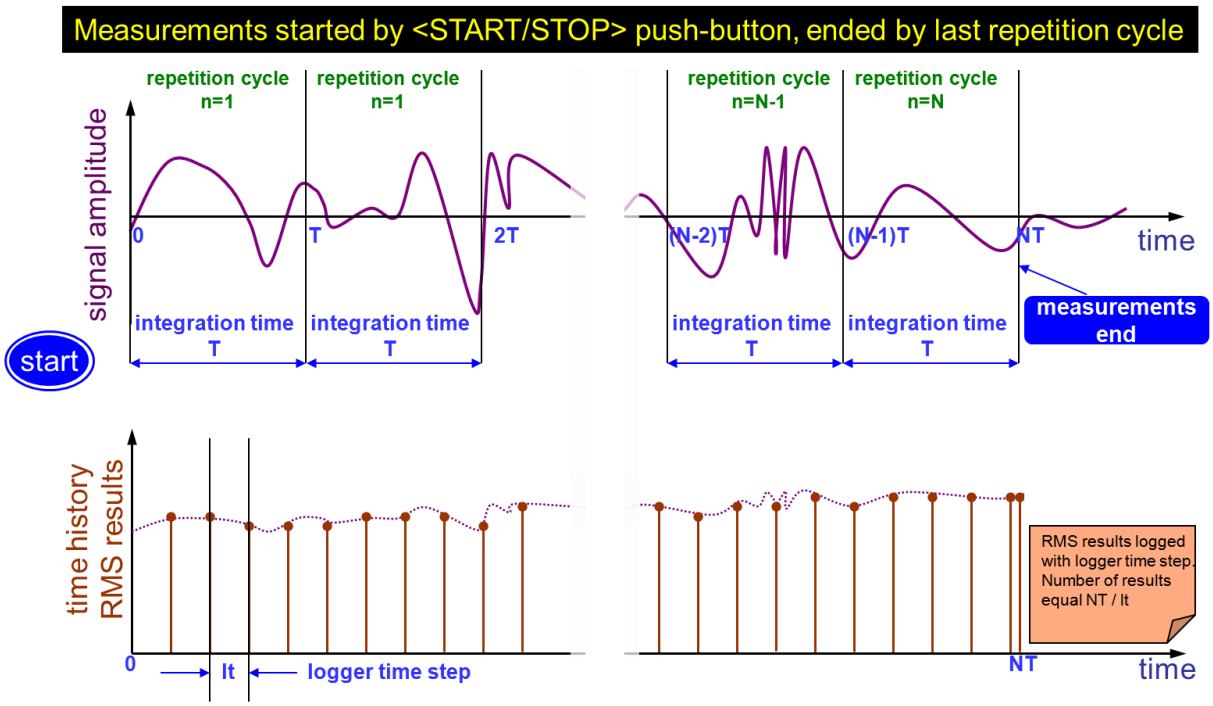


Figure 5-12 Summary Results and Logger Results saving

To enable logging of time history data, go to the *Time History* tab and toggle the *Logger* button on the left panel.

- The *Time History Setup* panel allows you to set the step at which the results are to be logged, the name of the logger file and to enable storage of the additional summary results.

  Note: Summary Results are stored with the *Integration Time* step.

- The *Profile Results* panel is only accessible when the *Logger* is switched on. You can select results for each profile to be logged during the measurement and stored in the instrument's memory.

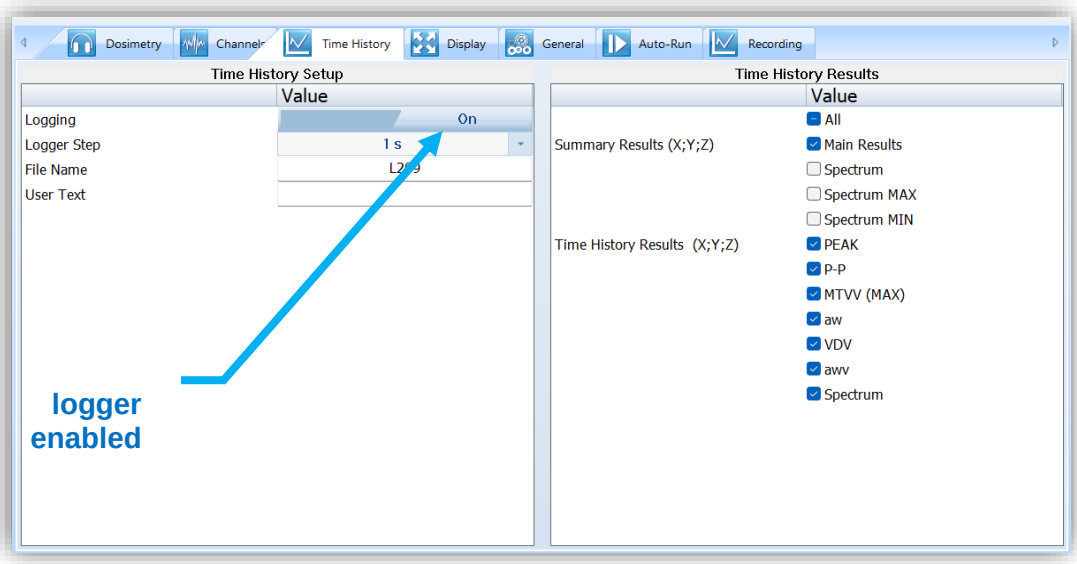


Figure 5-13 Time History (logger) settings tab

5.4.6 VIEW configuration

There are several VIEW modes that can be accessed on the dosimeter display when it is performing a measurement run.

- In the left-hand panel *Modes & Views*, you can select which VIEW mode will be present when you press the  key on the instrument keypad.
- In the right-hand panel *Display Results*, you will find a list of over a dozen measurement results that can be displayed on the SV 100A display when the  key is pressed. See Appendix D for the acronyms of each result.

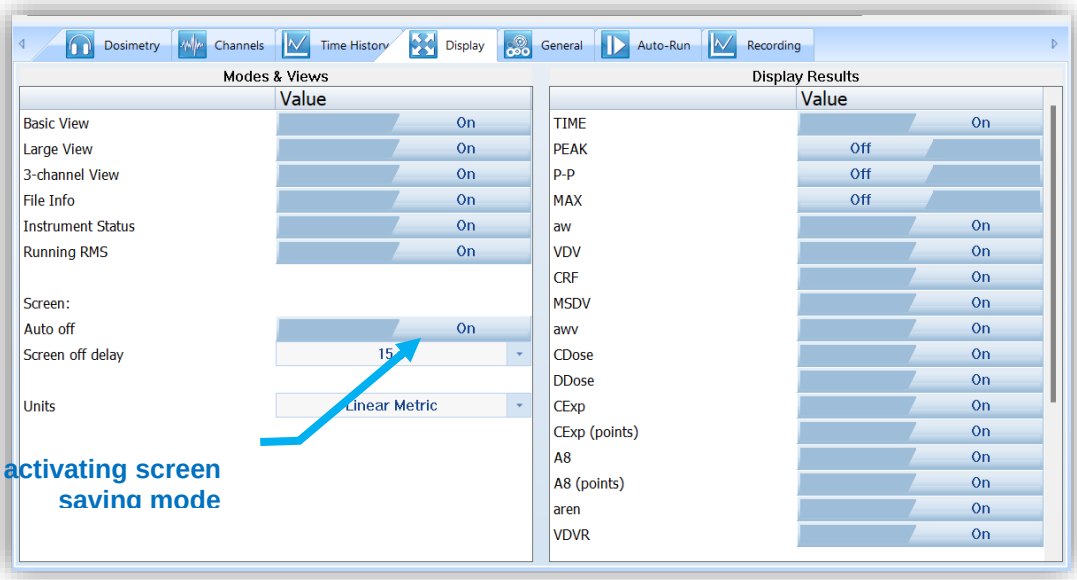


Figure 5-14 Display VIEW configuration tab

In this panel, you can also activate the automatic screen off function (*Auto off*), which saves power, and the display rotation function, which always positions the screen text horizontally. You can select the **Units** of the displayed results: *Logarithmic*, *Linear Metric* or *Linear Non-Metric*.

5.4.7 General settings

The *General* settings tab contains two panels: *Keyboard*, which allows you to block access to the instrument when it is in use, and *Auxiliary*, which allows you to calibrate the instrument, set warnings and reference levels for measurement results, and turn on the wireless interface.

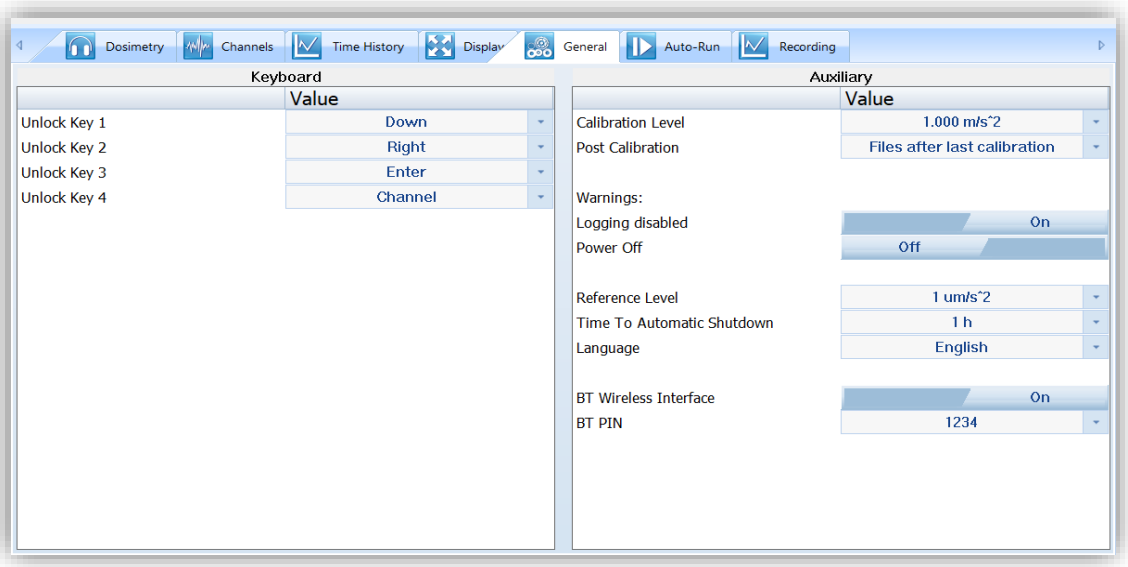


Figure 5-15 General settings tab

The *Keyboard* setting allows you to protect access to the instrument when it is in use with a simple keypad password to prevent users from accidentally cancelling a measurement run.

SV 100A will lock the keypad each time a measurement run is started (see chapter 4.7 how to lock and unlock SV 100A).

SV 100A requires a special code to be entered by pressing four keys defined in this panel in sequence.

In the *Auxiliary* panel, you can:

- Set the *Calibration Level* of the calibrator in use and enable the *Post Calibration*, which allows you to perform an additional calibration after a measurement session and to add the calibration results to the measurement file. There are three options for saving the calibration results: do not save (*Off*), save in the last measurement file (*Last File*) or save in the files which will be created after the last calibration (*Files after last calibration*).
- Enable additional warning screens to be displayed under certain conditions:
  - *Logging disabled*, warning the operator that time history results will not be stored.
  - *Power off*, which requires additional confirmation just before the instrument is switched off (see chapter 3.6)
- Set the *Reference Level* for results display in logarithmic units.
- Set the time after which the unit will be shut down if no key will be pressed (*Time To Automatic Shutdown*).
- Select the language of the dosimeter menu (*Language*). The default language is English.
- Turn the *BT Wireless Interface* connection on or off.
- Enter the PIN code to pair the devices **(***BT PIN***).**

5.4.8 Auto-Run settings

The *Auto-Run* settings tab contains two panels: *Pause*, which allows you to program five independent pauses in real time, and *Timer*, which allows you to program the internal real-time clock to act as a delayed start and stop timer.

In the *Pause* panel, you can set the start (*Begin*) and *End* of the pause.

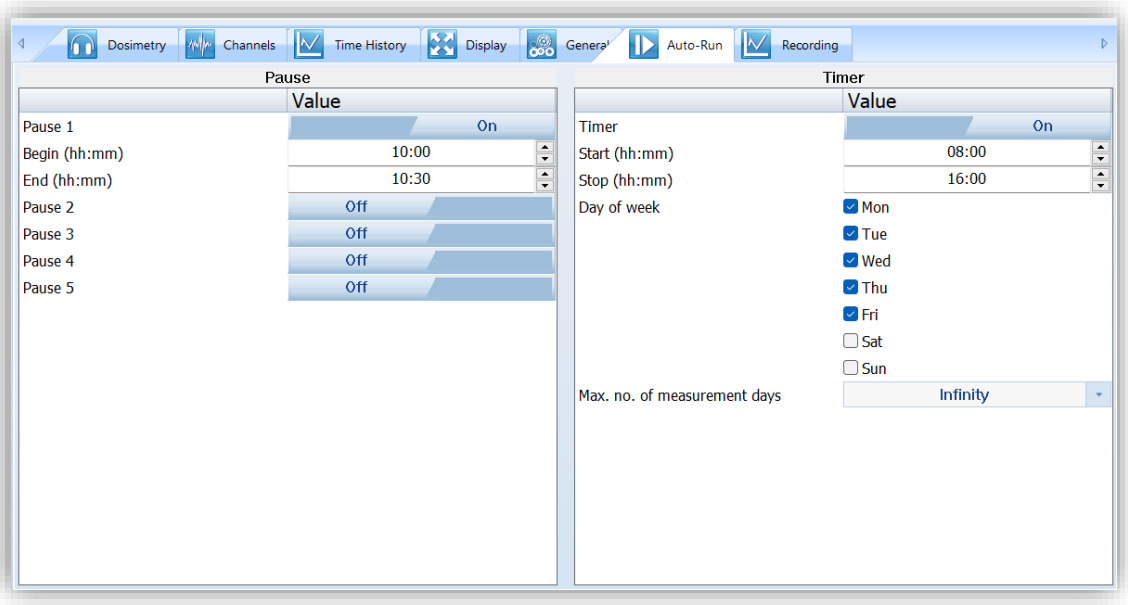


Figure 5-16 Auto-Run configuration tab

The *Timer* function allows the instrument to switch on automatically at a pre-selected programmed time and then perform the measurement using the settings that were in use before the last time it was switched off. The *Timer* is useful if you wish to pre-set the instrument to run and stop for a specific period of time, for example, for a week's study.

If the timer is switched on and the instrument is switched on, the *Time* screen will appear until the programmed measurements are completed.

The *Start (hh:mm)* and *Stop (hh:mm)* items define the time at which the measurement will automatically start and to stop.

The *Day of week* determines the days of the week on which the measurements are to start. The timer can be programmed up to 100 days in advance (*Max. no. of measurement days*) or without limitation (**Inf**) and during these days the current state of the real time clock is taken into account. Check that the real time clock settings for the measurement location are correct before starting a delayed timer measurement.

5.4.9 Signal recording settings

The signal can be recorded in the same file as the measurement results (*Time Domain*), or as a separate PCM or extensible format file (*Wave*). Both options are mutually exclusive, and the one should be disabled to enable the other.

The signal can be recorded in various ways (*Recording Mode),* during the *Whole Measurement* or triggered with the *Slope* or *Level* trigger. You can set *Sampling* frequency (*750 Hz*) and weighting *Filter* (*Unweighted* or *BL*).

***Note: Recording** is an optional function and should be activated before use. The optional functions can be activated using the Supervisor software (see Chapter 5.3).*

Continuous recording

If *Whole Measurement* is selected, the recording starts when the measurement starts and stops when the measurement stops. You can select three signals to record (*Record*) from triaxial transducer.

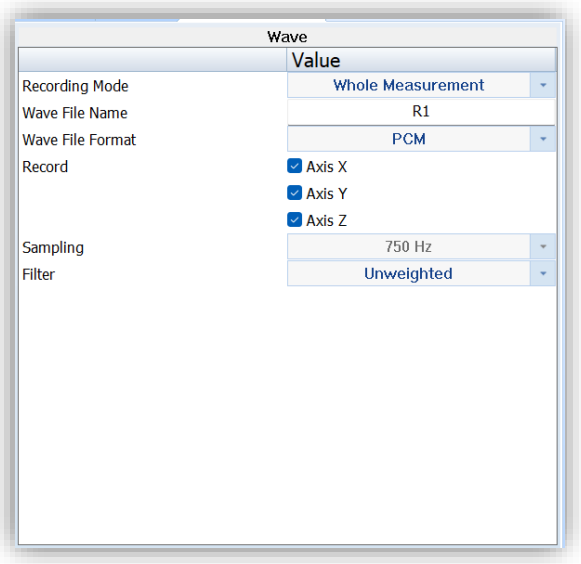


Figure 5-17 Continuous recording configuration

Recording on trigger

If *Trigger Slope+/-* or *Trigger Level+/-* is selected, the recording starts when the trigger condition appears. You must select sources to check the trigger condition (**Trigger Source**), set the threshold (**Trigger Level**), time of recording after triggering (**Recording Time**) and step of checking the triggering condition (**Step**).

The *Trigger Slope + / Trigger Slope –* modes mean that the recording starts when the rising value of the *Trigger Source* measured with the **Step** period (with a value equal to the *Logger step*, *5 ms*, *100 ms* or *1 s*) goes above/below the threshold (**Trigger Level**), which for *Slope +* means that the previous result was below the threshold, and the next one is above the threshold. The recording lasts for the minimum time, defined by the **Recording Time** parameter, and during this time the instrument continues to check the trigger condition with the **Step** interval. Provided that the **Step** is shorter than the **Recording Time,** if the next trigger condition is met during the **Recording Time**, the instrument triggers the recording again, so that from that moment it continues with the additional **Recording Time**, and so on. If there are no triggers during the next recording time, recording will stop after the last trigger plus the **Recording** Time.

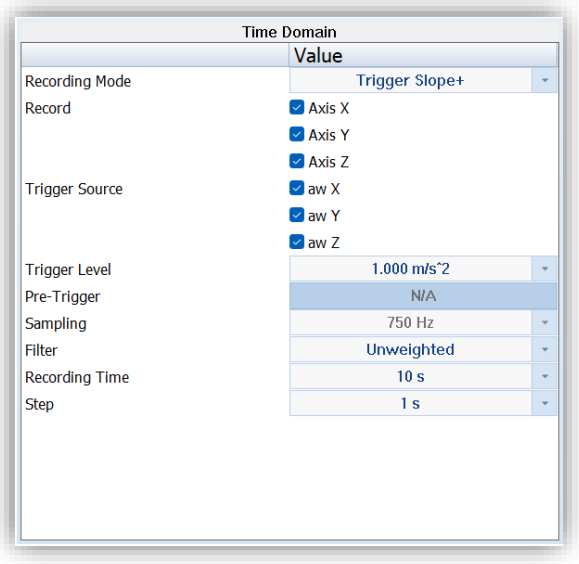


Figure 5-18 Recording on trigger configuration

Trigger Level + / *Trigger Level* – modes mean that the audio recording starts when the *Trigger Source* measured with the **Step** period (with a value equal to the *Logger step*, *5 ms*, *100 ms* or *1 s*) is greater/less than the threshold (**Trigger Level**). In other cases, recording doesn't start, but if it has already started, it can continue until the **Recording Time** has elapsed. If a trigger condition occurs during the **Recording Time**, the recording will be extended for another **Recording Time** from the time of the trigger condition, and so on. If there are no triggers during the next recording time, the recording will stop after the last trigger plus the **Recording Time**.

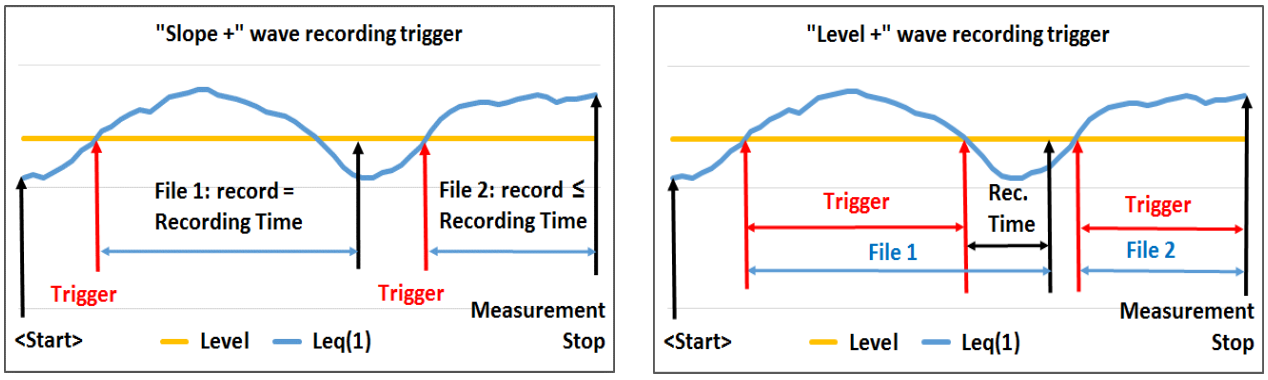


Figure 5-19 *Slope* + vs *Level* + recording trigger

5.5 Working with data files

5.5.1 Downloading files

To download files from the connected Svantek instrument(s), open the **Download** tab in the **Instrument** window.

The **Download** panel contains a list of files stored in the instrument's memory in the form of a table. It shows different types of files, e.g. measurement files, wave files, etc. The first three columns of the table contain basic information about the files: name, size in bytes and creation date. The last three columns contain additional information (about location, users and tasks) associated with the files. Files that have not yet been downloaded are shown in bold.

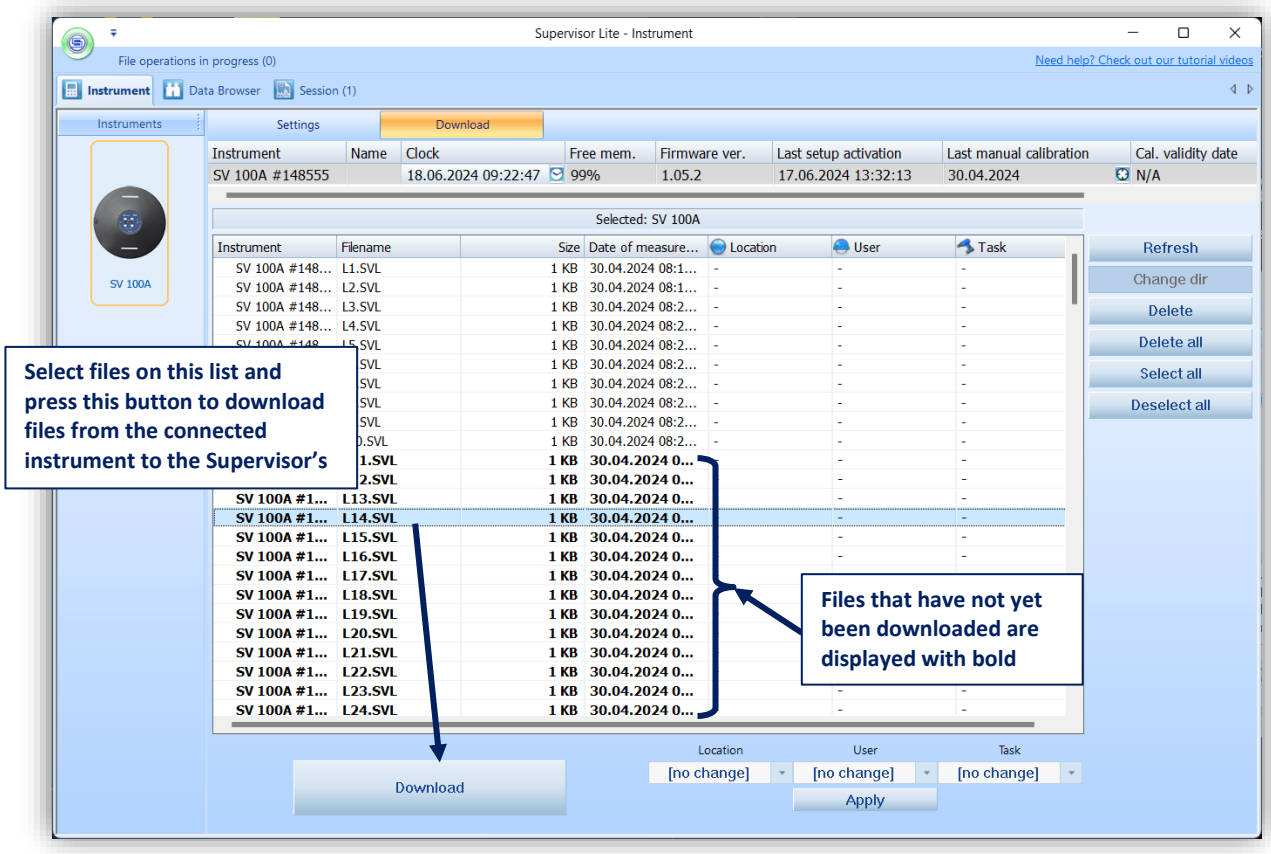


Figure 5-20 SV 100A Download window

To download files, use the *Download* button below the file table. If one or more files are selected in the table, pressing the *Download* button will download the selected files. Otherwise, pressing this button will download all files stored on the connected instrument.

Note: You can select files by clicking on a row in the table. You can select multiple files by clicking with the CTRL or SHIFT keys held down.

Note: You can download individual files by double-clicking on them.

Files from the instrument are downloaded to the special internal Supervisor catalogues, which are automatically created in the parent catalogue called "Catalogue". By default, the catalogues created are named after the instruments, e.g. SV 100A, etc.

When the download is complete, a window will appear with information about the success or failure of the download.

The buttons on the right side of the Download panel allow you to perform some basic operations with the files stored in the connected instrument:

- *Refresh* – updates the list of files, so that all the files created since entering the Download panel are displayed.

  Note: Each time the list of files is updated, a new "download session" is started, i.e. a new subdirectory is created for the downloaded files. This is why the overwrite warning sometimes does not appear when two files with the same name are downloaded - after a new download session is started, the file is stored in a different location, eliminating the possibility of overwriting.
- *Change dir* – this button is inactive for SV 100A instruments.
- *Delete* – deletes a selected file from the instrument's memory.
- *Delete all* – deletes all result, logger, and WAVE files in the instrument's current working directory.
- *Select all* – selects all files in the table.
- *Deselect all* – deselects all files.

All downloaded files are stored in the Supervisor's database and can be viewed and processed using the Data Browser described in the following chapter. The Data Browser is automatically opened each time files are downloaded from a connected Svantek instrument.

Whenever you download/upload files to/from a connected instrument, Supervisor displays the progress in the **File operations** panel at the top left-hand corner of the application window.

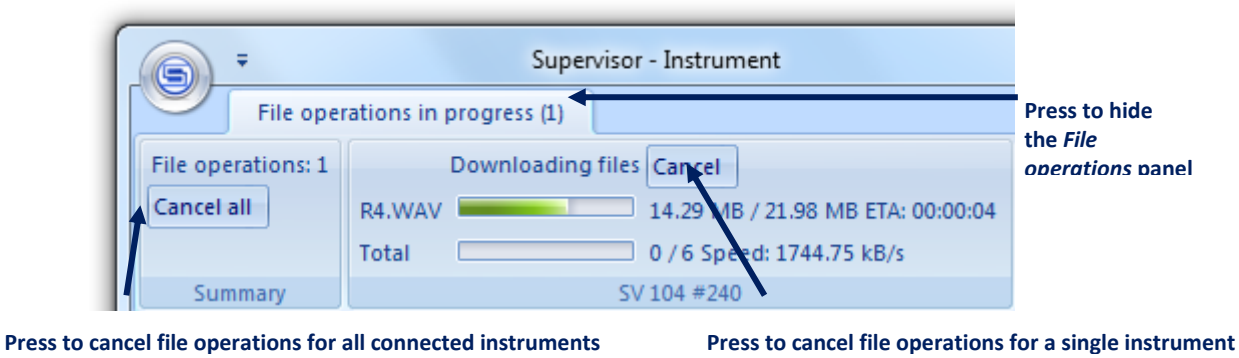


Figure 5-21 File operations panel

Each instrument can perform one operation at a time. If multiple instruments are connected and performing file operations at the same time, you can cancel them all by clicking the **Cancel all** button.

You can show/hide the **File operations** panel by clicking on the **File operations in progress** tab.

5.5.2 Data Browser

To view all files downloaded from Svantek instruments and stored in the Supervisor database, open the Data Browser using the button in the top left corner of the Supervisor window.

The Data Browser consists of three panels:

- On the left side of the window, the File manager panel contains a list of all the files stored in the Supervisor database and allows you to select a group of files to view in detail.
- On the right side of the window, the File list panel contains a list of files belonging to a selected group and allows you to open a file for further processing.
- Below the file list panel, the File preview panel allows you to preview the data contained in a selected file.

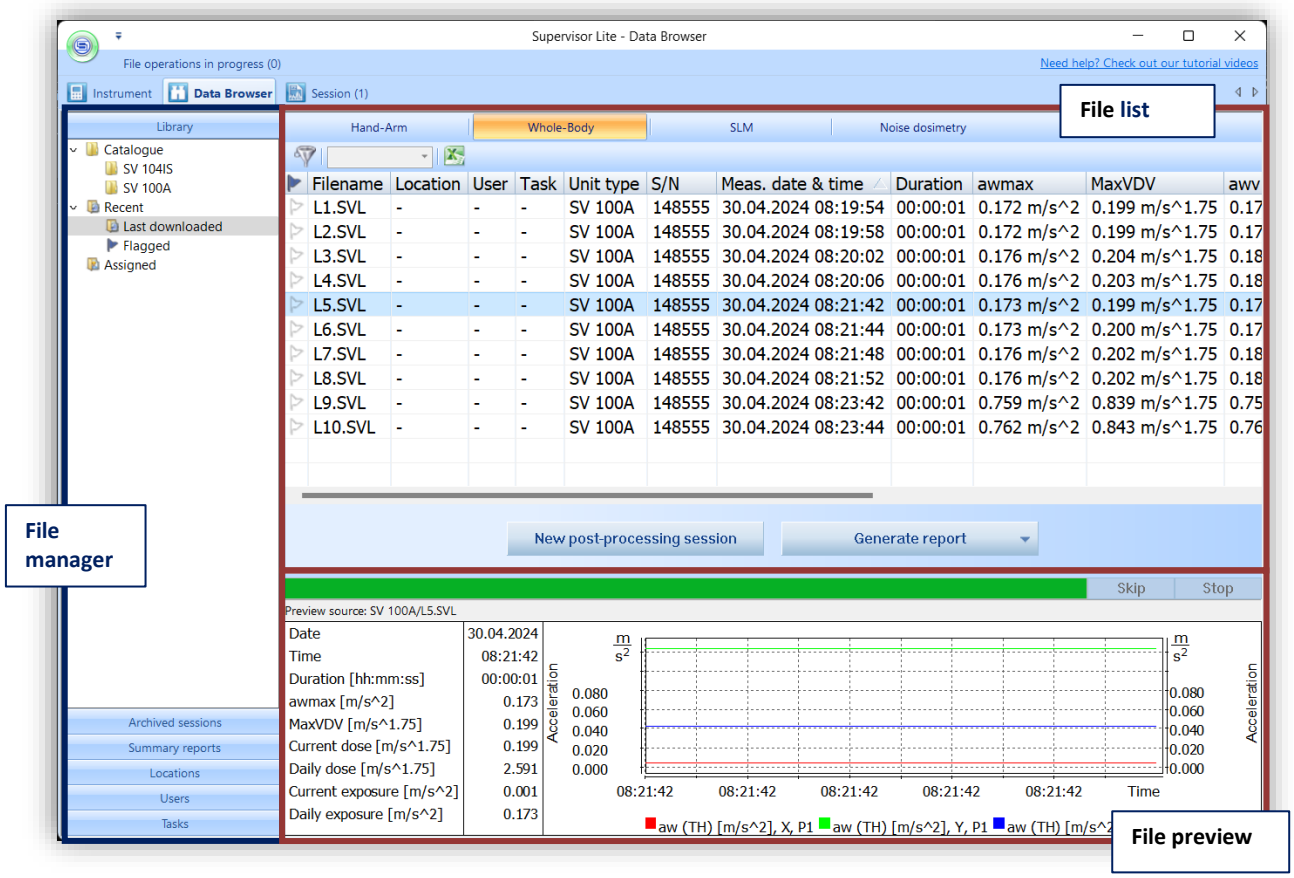


Figure 5-22 Data Browser window

5.5.2.1 File Manager

The File Manager panel allows you to select a group of files to view in detail. It is divided into six sub-panels: *Library*, *Archived sessions*, *Summary reports*, *Locations*, *Users*, and *Tasks*. Each can be accessed by pressing the horizontal bar with the corresponding name.

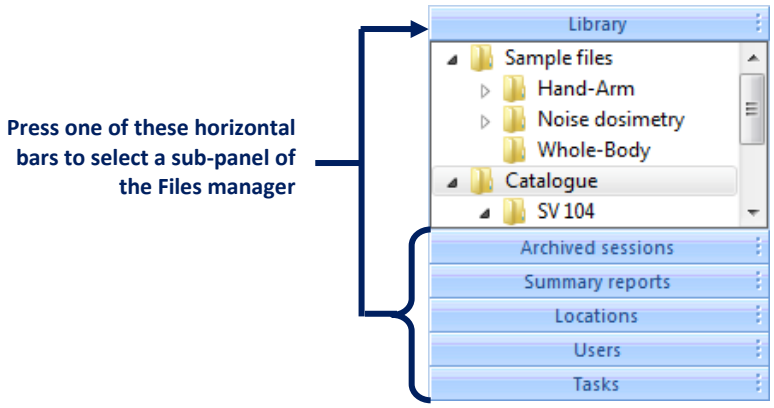


Figure 5-23 File manager

The *Library* sub-panel lists all the files stored in the database in a tree view. It contains four basic items:

- *Sample files*, containing some of the sample files supplied with Supervisor, further grouped according by the type of measurement to which they relate.
- *Catalogue*, containing all files downloaded from instruments. You can arrange the Catalogue as you wish by adding, deleting, moving and renaming files and folders. You can easily drag and drop files and folders from anywhere on your PC to add them to the database. You can also use the right-click context menu to perform various operations on files and folders.

  Note: It is also possible to export files from the Supervisor's database by dragging and dropping them outside the application window (dropping files into Windows Explorer).

  Note: The catalogues for the downloaded files are automatically created in the *Catalogue*. By default, the catalogues created are named after the instruments, e.g. SV 100A, etc.

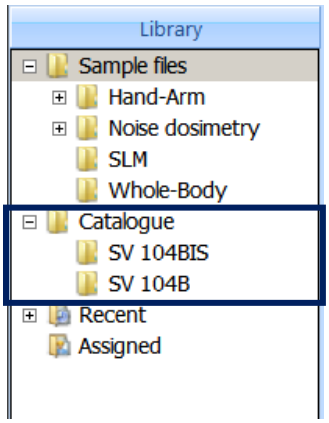


Figure 5-24 Example of the Catalogue content

- *Recent*, containing two items: **Flagged**, which is a folder for grouping a number of selected files - to add a file to this group, you must set its *flag*, which can be done in the File details panel; and **Last downloaded**, which contains a list of files downloaded since the last time you started Supervisor.
- *Assigned*, containing all files that have been assigned additional information about the location, user and task performed during the measurement.

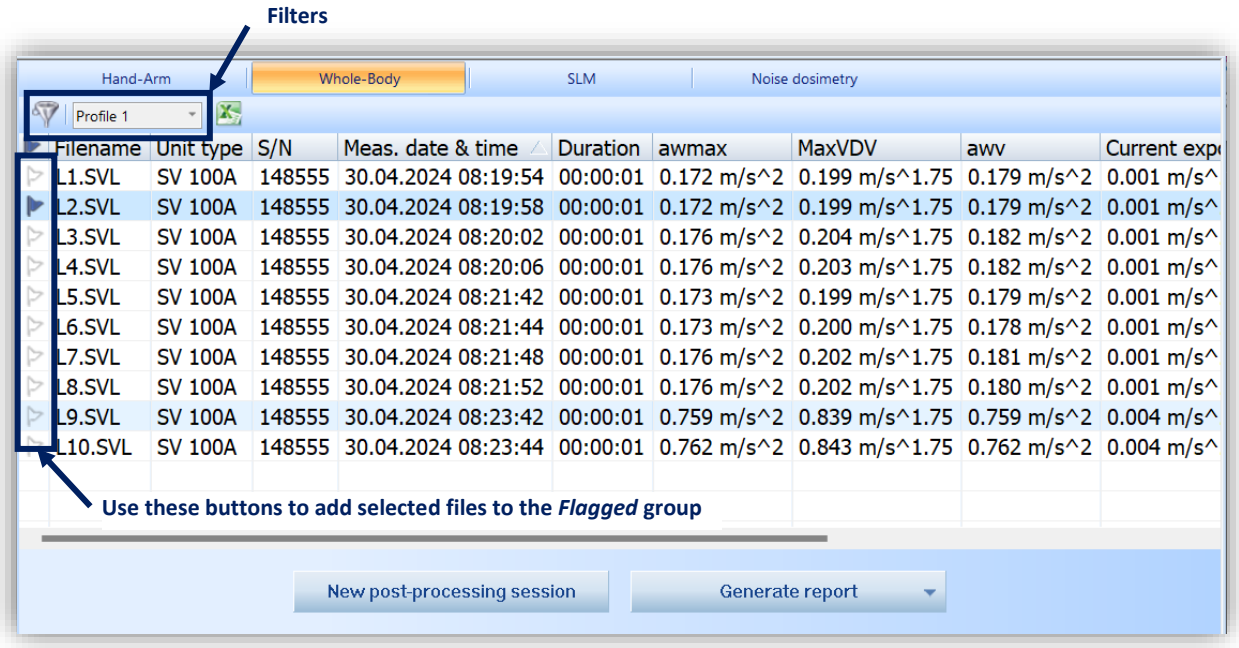
The *Archived sessions* sub-panel contains a list of all the sessions that have been moved to the archive. You can use this list to restore an archived session to view and process it again, or to use the files that were used to create the session. If many sessions have been archived, you can use filters to display only some of them.

The *Summary reports* sub-panel contains a list of Summary reports that you have created. The Summary reports can be used to collect selected measurement results according to additional information assigned to them.

The last three sub-panels of the File manager contain files listed according to the additional information assigned to them.

5.5.2.2 File details

The File details panel contains a table listing the files corresponding to the selected item in the File manager. The files corresponding to all the sub-items of the selected item are also displayed in the Files details panel. Files can be further processed by using them for sessions. To create a session, select one or more files and press the *New post-processing session* button. If you want to create a session starting with a single file, you can do so by double-clicking on the row of the table corresponding to that file.



Filename	Unit type	S/N	Meas. date & time	Duration	awmax	MaxVDV	awv	Current exp
L1.SVL	SV 100A	148555	30.04.2024 08:19:54	00:00:01	0.172 m/s^2	0.199 m/s^1.75	0.179 m/s^2	0.001 m/s^
L2.SVL	SV 100A	148555	30.04.2024 08:19:58	00:00:01	0.172 m/s^2	0.199 m/s^1.75	0.179 m/s^2	0.001 m/s^
L3.SVL	SV 100A	148555	30.04.2024 08:20:02	00:00:01	0.176 m/s^2	0.204 m/s^1.75	0.182 m/s^2	0.001 m/s^
L4.SVL	SV 100A	148555	30.04.2024 08:20:06	00:00:01	0.176 m/s^2	0.203 m/s^1.75	0.182 m/s^2	0.001 m/s^
L5.SVL	SV 100A	148555	30.04.2024 08:21:42	00:00:01	0.173 m/s^2	0.199 m/s^1.75	0.179 m/s^2	0.001 m/s^
L6.SVL	SV 100A	148555	30.04.2024 08:21:44	00:00:01	0.173 m/s^2	0.200 m/s^1.75	0.178 m/s^2	0.001 m/s^
L7.SVL	SV 100A	148555	30.04.2024 08:21:48	00:00:01	0.176 m/s^2	0.202 m/s^1.75	0.181 m/s^2	0.001 m/s^
L8.SVL	SV 100A	148555	30.04.2024 08:21:52	00:00:01	0.176 m/s^2	0.202 m/s^1.75	0.180 m/s^2	0.001 m/s^
L9.SVL	SV 100A	148555	30.04.2024 08:23:42	00:00:01	0.759 m/s^2	0.839 m/s^1.75	0.759 m/s^2	0.004 m/s^
L10.SVL	SV 100A	148555	30.04.2024 08:23:44	00:00:01	0.762 m/s^2	0.843 m/s^1.75	0.762 m/s^2	0.004 m/s^

Figure 5-25 File details panel

Setting flags

By pressing the button in the first column on the left side of the File details table, you can set a flag for a selected file. As a result, the file will be accessible in the File manager in the *Recent* → *Flagged* group. You can tag multiple files for quick and easy access.

Dragging files outside of Supervisor

You can easily export files from the Supervisor database to a selected location on your PC using drag and drop technique outside the application window.

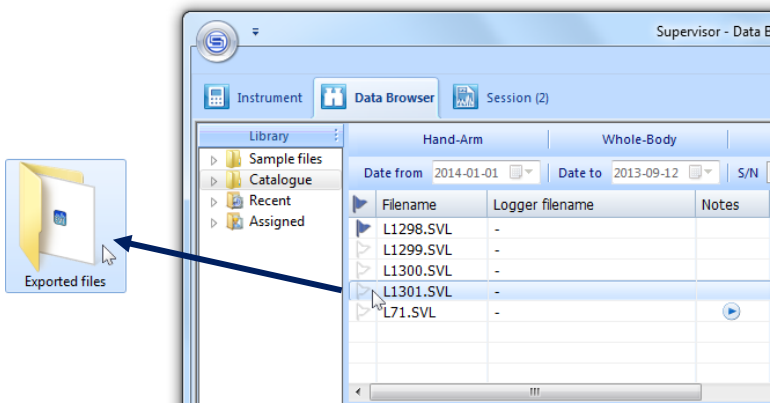


Figure 5-26 Using the drag & drop technique to export files outside the Supervisor's database

Note: Exporting measurement files with comments attached (e.g., WAV files) automatically exports the comment files as well. To export a single file without the attached comments, use the drag and drop technique with the CTRL key held down.

Creating reports

The *Generate report* button allows you to create a report of the selected file(s) based on a number of templates. After pressing this button, you should select a template for the report. All reports are stored in the *Summary reports* sub-panel.

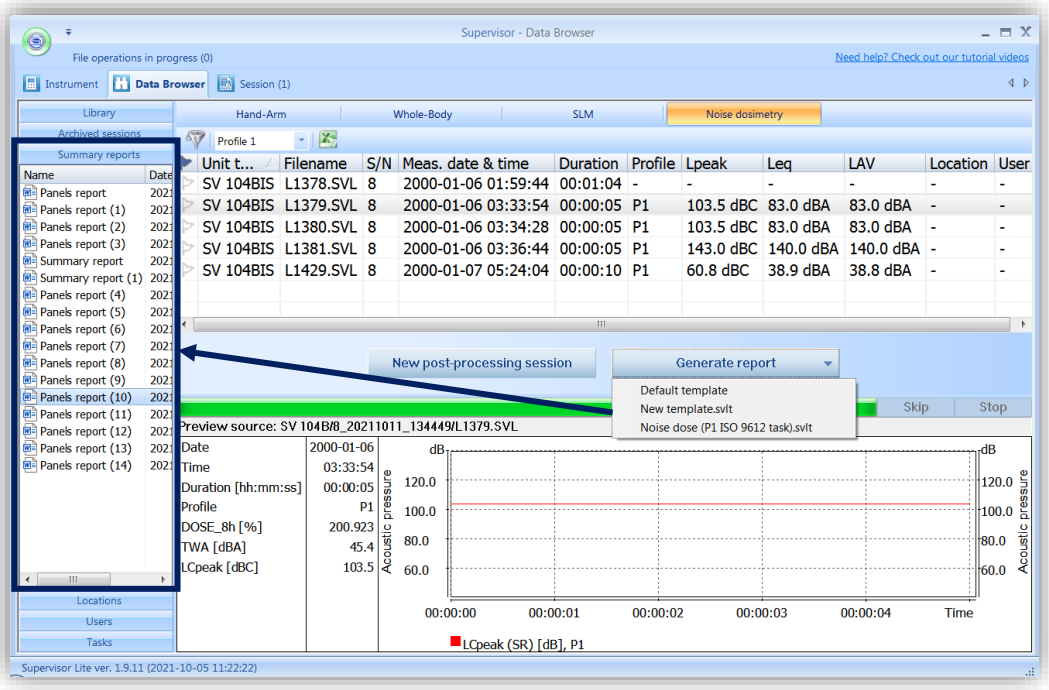


Figure 5-27 Creating general reports

5.5.2.3 File preview

The panel below the File details table provides a brief preview of the data stored in the selected file, giving an initial idea of the time history of the measurement results. If multiple files are selected, the file actually used as the source of the data displayed is indicated in the top left corner of the Preview panel.

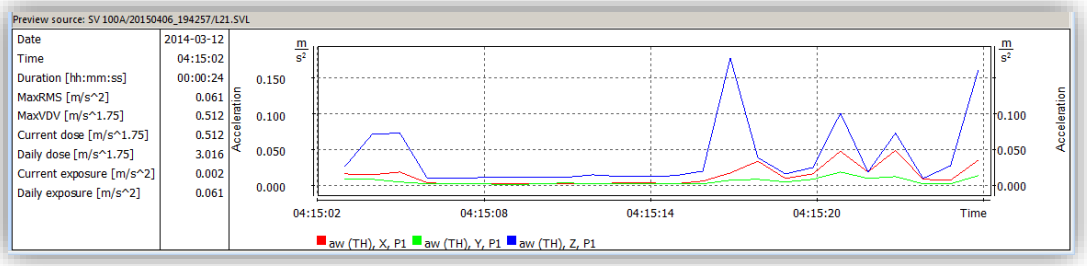


Figure 5-28 Preview panel

You can copy the contents of the *Preview* panel by right-clicking in the area and selecting the *Copy* command. It can then be pasted as an image into another application, such as MS Word.

You can use the Preview settings in the *Main Options* dialog box to specify the type of data (and its order of their priority) to be displayed in the *Preview* panel. Different types of data are available for different applications. To select the application, use the list box at the top of the *Preview* panel. It is possible to select different types of data for the Parameters & results panel (on the left-hand side of the *Preview* panel, which displays data in numerical form) and for the Plot panel (on the right-hand side of the *Preview* panel, which displays data in graphical form).

5.5.2.4 Using assignments

Three types of additional information can be associated with each file downloaded from a Svantek instrument:

- *Location* (where the measurement was made),
- *User* (who made the measurement),
- *Task* (what the user was doing during the measurement).

This information can then be used to facilitate searching the search for specific measurement results and to generate summary reports.

You can assign this additional information to the files when you download them from the connected instrument. To do this, select one or more files in the *Instrument → Download* panel, then select the *Location* / *User* / *Task* in the list box at the bottom right of the window, and press *Apply*. If you want to add a new location, user or task, select *[new...]* from the list box. If you want to delete information that has already been assigned, select *[none]*. The selected values are assigned when files are downloaded to the Supervisor database.

Figure 5-29 Assigning additional information to downloaded files in the Instrument → Download panel

You can also assign additional information to files in a number of ways using the *Data Browser*. In the File details table, left-click on the *Location* / *User* / *Task* field corresponding to a selected file and select a value from the menu.

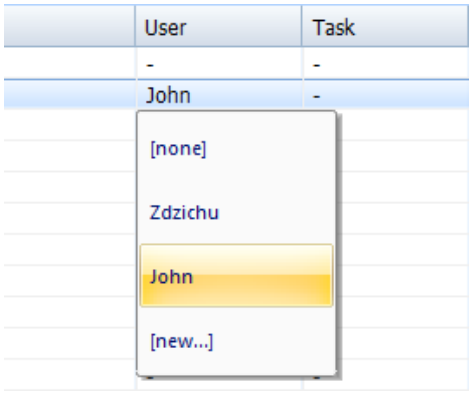


Figure 5-30 Assigning User information to a file in the File details table

Another method of assigning information to files is to drag and drop a file from the File details table onto a particular item in the *Assigned* sub-tree in the *Library*. Note that if, for example, you drop a file on a sub-sub-item that corresponds to both a User and a Task, both of these values will be assigned to the file.

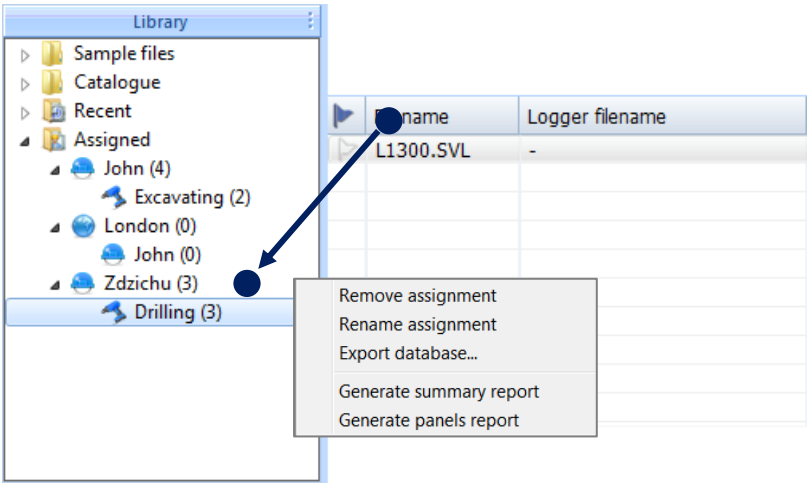


Figure 5-31 Assigning additional information to files using the drag & drop technique

Right-click on the item in the Assigned section to remove and rename assignments.

5.5.2.5 Summary reports

The summary reports can be used to collect measurement results for selected locations, users, or tasks in the form of MS Word documents. To create a summary report, right-click an item corresponding to an object in the *Assigned* sub-tree in the *Library* sub-panel of the File Manager and select *Generate summary report*. This command opens the *Summary report wizard*. You can also use the *Assigned* item to create a summary report for all the files that have a location, user and/or task value assigned to them.

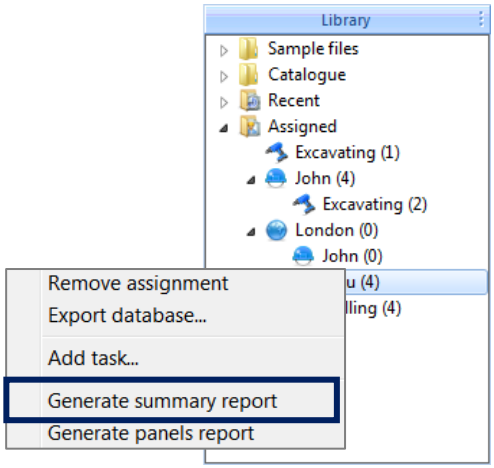


Figure 5-32 Using the Library to generate a summary report

A summary report must be created from a template. The first window that appears when you open the *Summary report wizard* allows you to select a template for the report. When you create your first summary report, you will need to create a new template, but the template will be saved and you can use it later to create other reports. To create a template, press the *Create new* button. The Summary report template editor window will appear.

Note: You can also create more than one templates; you will be able to select one of them later each time you create a summary report.

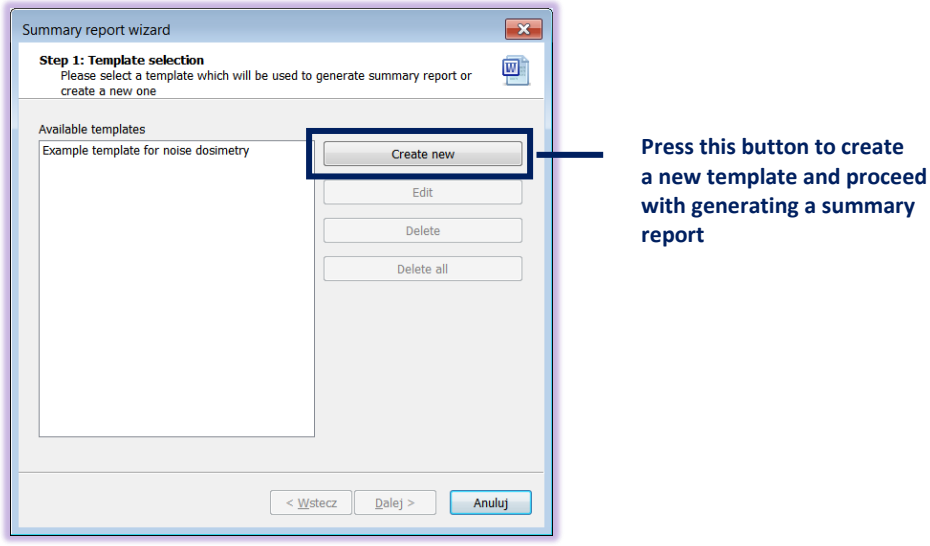


Figure 5-33 Summary report wizard initial window

A summary report template consists of one set of parameters (i.e. Svantek instrument parameters, measurement parameters and measured quantities) to be displayed in numerical views and another set of parameters to be displayed in graph views. To create a template, first specify the application for which you want to use it for, as this determines the availability of certain parameters. The application can be specified using the list box in the top right corner of the window. Next, use the template editor to select the parameters to be included in the report.

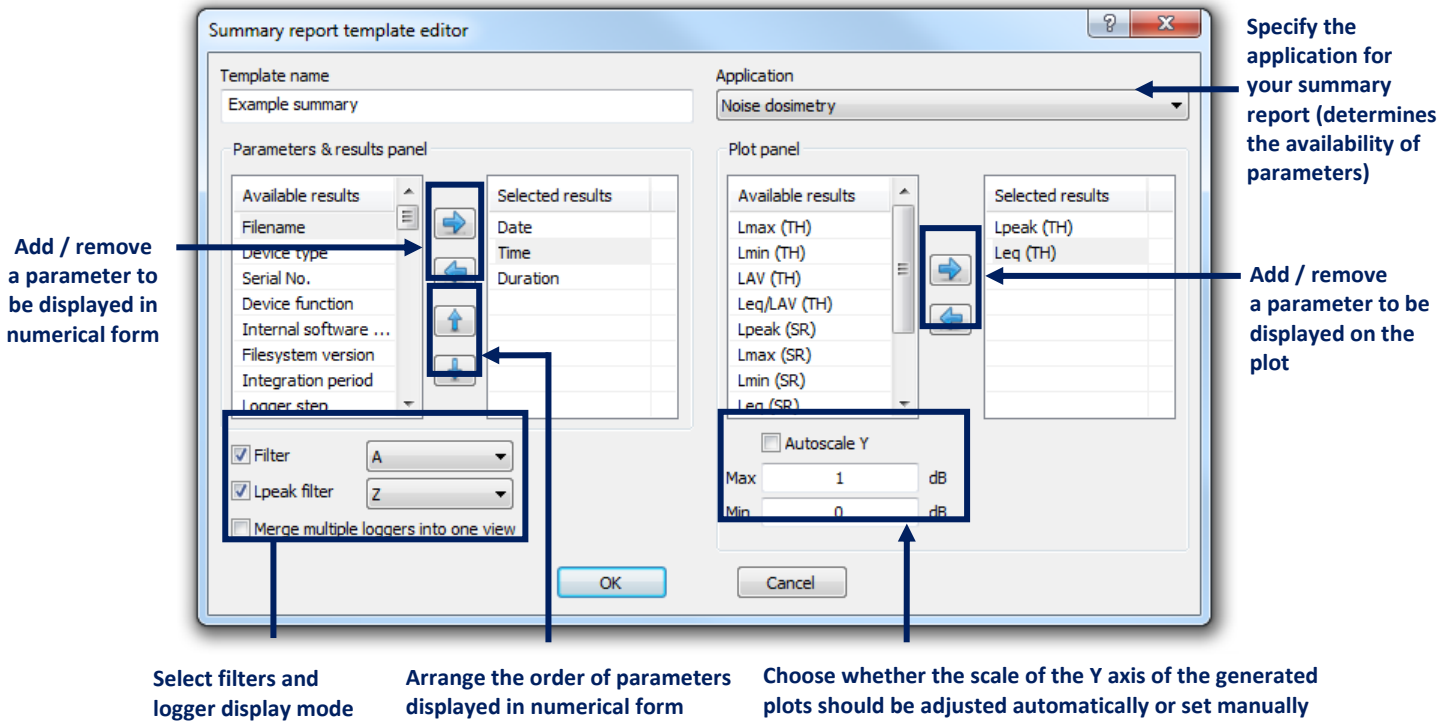


Figure 5-34 Summary report template editor dialog box

Once you have created a report template, you can select it from the list in the *Summary report wizard* and click *Continue* to proceed. In the second step of creating the summary report, you can select the time interval from which the results will be included. After specifying the minimum and maximum dates, press *Finish* to generate the report.

5.6 Sessions and reporting

Sessions can be used to work with data downloaded from Svantek instruments and to create reports using this data.

5.6.1 Creating and managing sessions

To create a session, go to the *Data Browser*. In the File details table, select the files containing the data you wish to work with, click the *New post-processing session* button or right-click and select the **New post-processing session** command from the menu that opens. You can create a session from one or more files. To create a session from a single file, simply double-clicking the file.

Note: You cannot create sessions directly from the wave file itself.

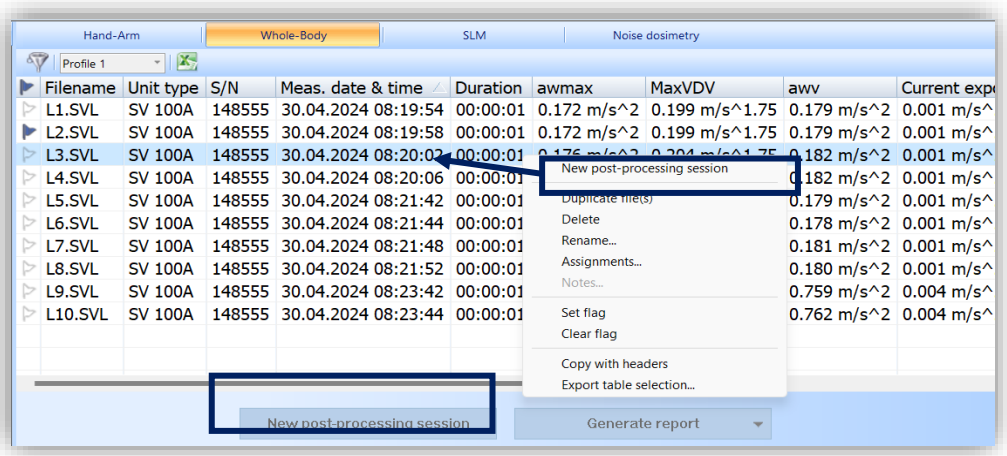


Figure 5-35 Creating a new session using the Data Browser

After using commands mentioned above, the special window will appear in which you should select the template for the post-processing session.

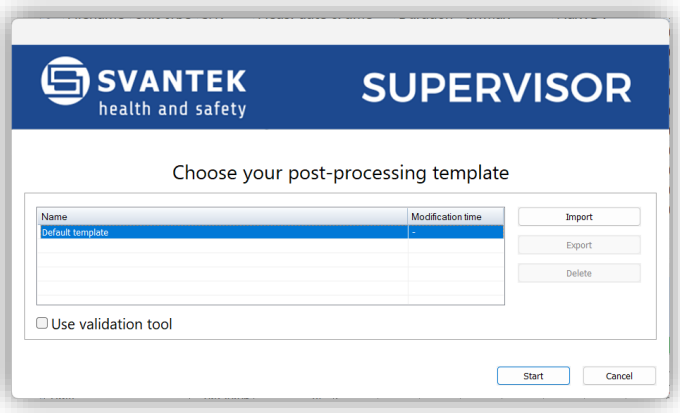


Figure 5-36 Choosing post-processing template

Each new session creates a tab in the bar at the top of the application window. To open a session, click the tab. Right-clicking on a tab opens a context menu that allows you to specify a custom name for a session or to close it. You can close a session in two ways: by deleting it (permanently) or by moving it to the archive, which allows you to work with it again later. Deleting a session does not delete any measurement files. The archived sessions are available in the Data Browser, in the Archived Sessions subpanel of the File Manager. The Delete All Sessions command can be used to delete all currently open sessions at once. You can also close a session using the *Move to archive* and *Delete session* buttons in the bottom left corner of the window.

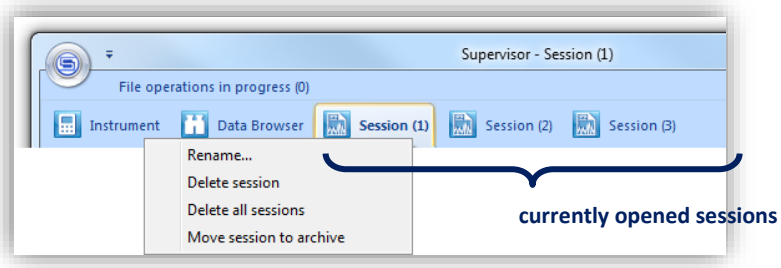


Figure 5-37 Tabs corresponding to the opened sessions

5.6.2 Session source data

The measurement data used to create sessions is contained in files stored in the Supervisor database. Several files can be used to create a single session. A list of the files used to create the currently open session is displayed in the *Session data* panel at the top left of the window.

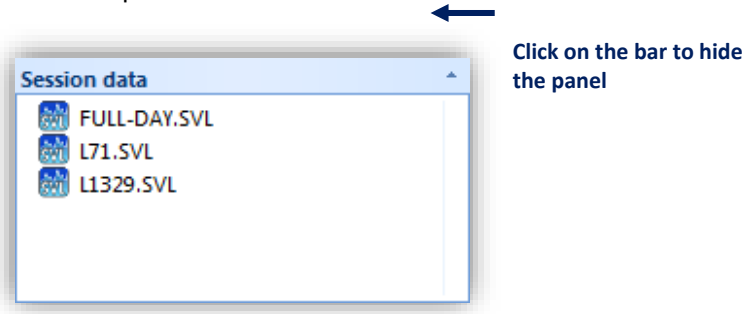


Figure 5-38 Session data panel, containing a list of files which have been used to create the current session

Once a session is created, you cannot change its data source. If you want to use different files in a session, you must create a new session with those files.

5.6.3 Session's Tollbar

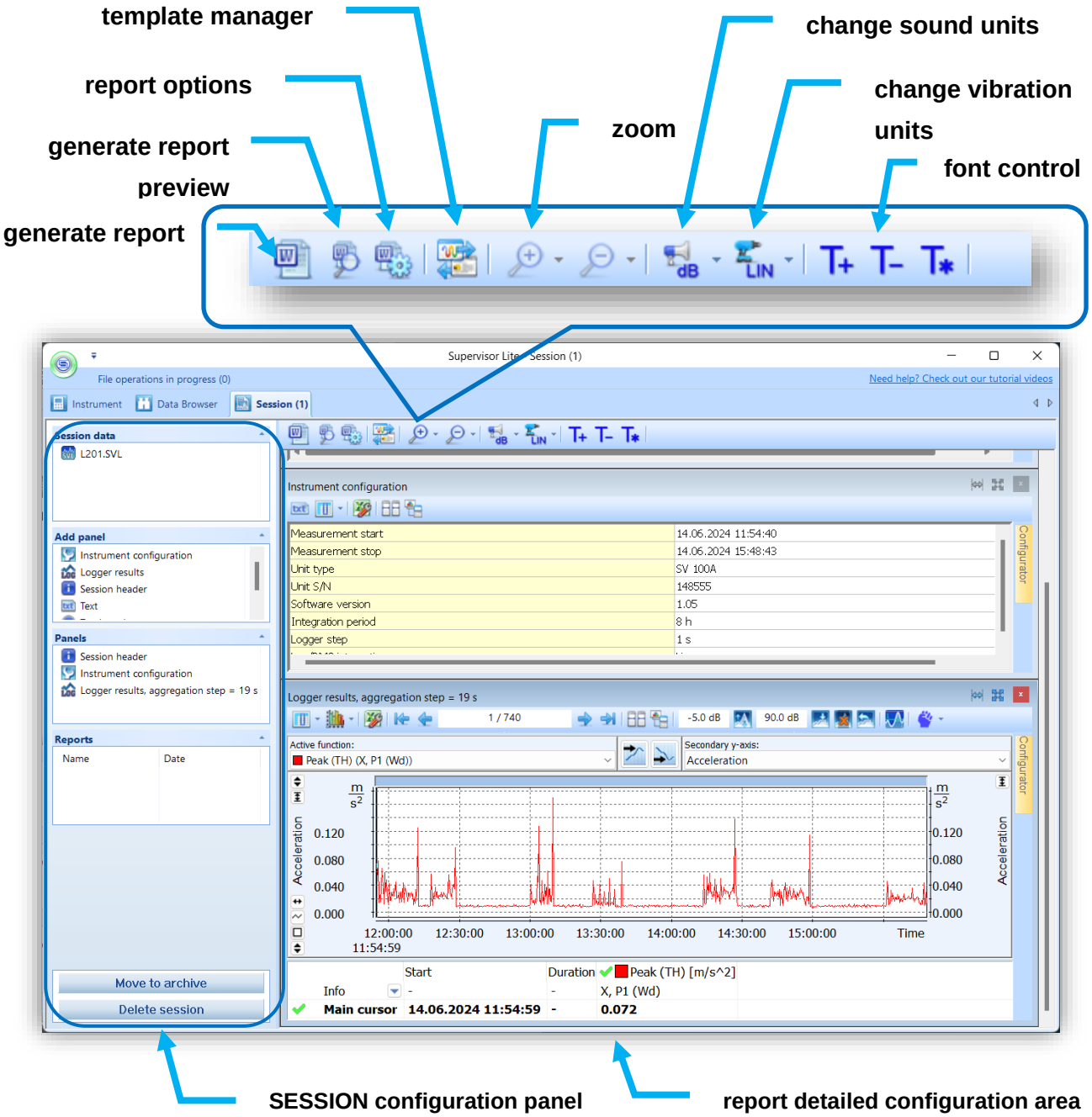


Figure 5-39 Supervisor main SESSION window

5.6.4 Session Panels

Panels are the basic building blocks of the reports created using Supervisor sessions. They can be used to configure the way data is displayed in the report.

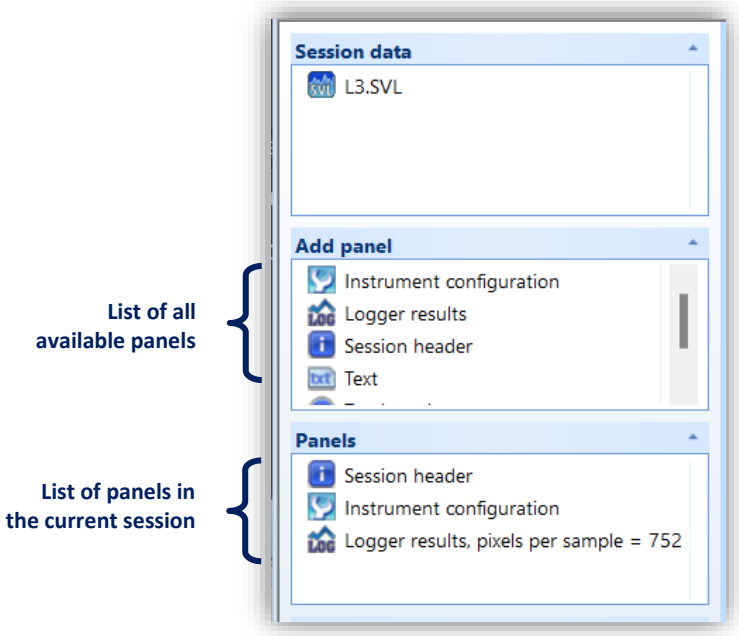


Figure 5-40 Panels in the Session window

The *Add panel* list (on the left of the window) shows all the types of panel available for the current data. You can add a panel to the current session by double-clicking on its name in this list.

You can add any number of panels, including multiple panels of the same type. All panels added to the current session are listed in the *Panels* list on the left of the window. You can use this list to jump to a selected panel by double-clicking on it. You can also rename a panel by selecting it and clicking on its name, or by pressing F2 when a panel is selected.

To delete a panel, use the button in the top right corner of the panel. To fill the entire panel area, use the button. Clicking the button again to return the panel to its previous size.

Panels are automatically scaled horizontally to fit the size of the panel area. Their vertical order determines the order in which the data is presented in the report. You can change the position of a panel using the drag and drop technique.

Each panel is equipped with the *Configurator* tool, which allows you to select the information to be displayed on the panel.

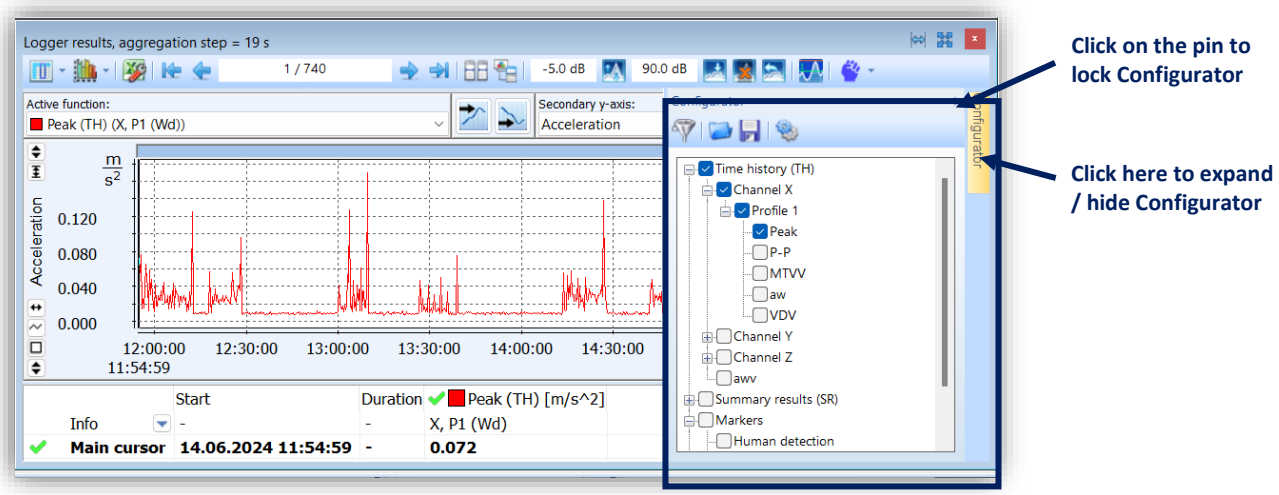


Figure 5-41 Configurator tool

The panel types available for the SV 100A instruments are listed in the table below. For a detailed description of the panels, refer to the Supervisor User Manual.

Icon	Name
	Session header
	Instrument configuration
	Logger results
	Total results
	Logger 1/x Octave
	Time Intersection
	Text
	Whole-Body vibration exposure
	Wave

5.6.5 Generating reports from sessions

You can easily generate a report with measurement data displayed in the same way as in the current session by clicking on the button on the Toolbar.

The report can be created in one of the following formats:

- DOC (if MS Word 2003 or newer is installed),
- PDF (if MS Word 2007 or newer is installed),
- RTF.

The generated file will contain a start page and all the contents of the panels (in the same order and with the same graphical settings).

All the reports created during the current session are listed in the *Reports* panel in the bottom left of the window. Double-click on a report name to open it in MS Word.

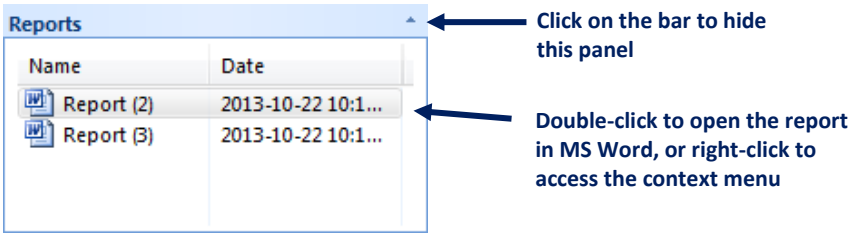


Figure 5-42 Reports panel

Right-click to open a context menu that allows you to open, rename and delete reports.

The report start page and the style can be customised using the *Report options* dialog box, which can be opened by clicking the button. Instead of customising the start page, you can choose not to include it in the reports at all.

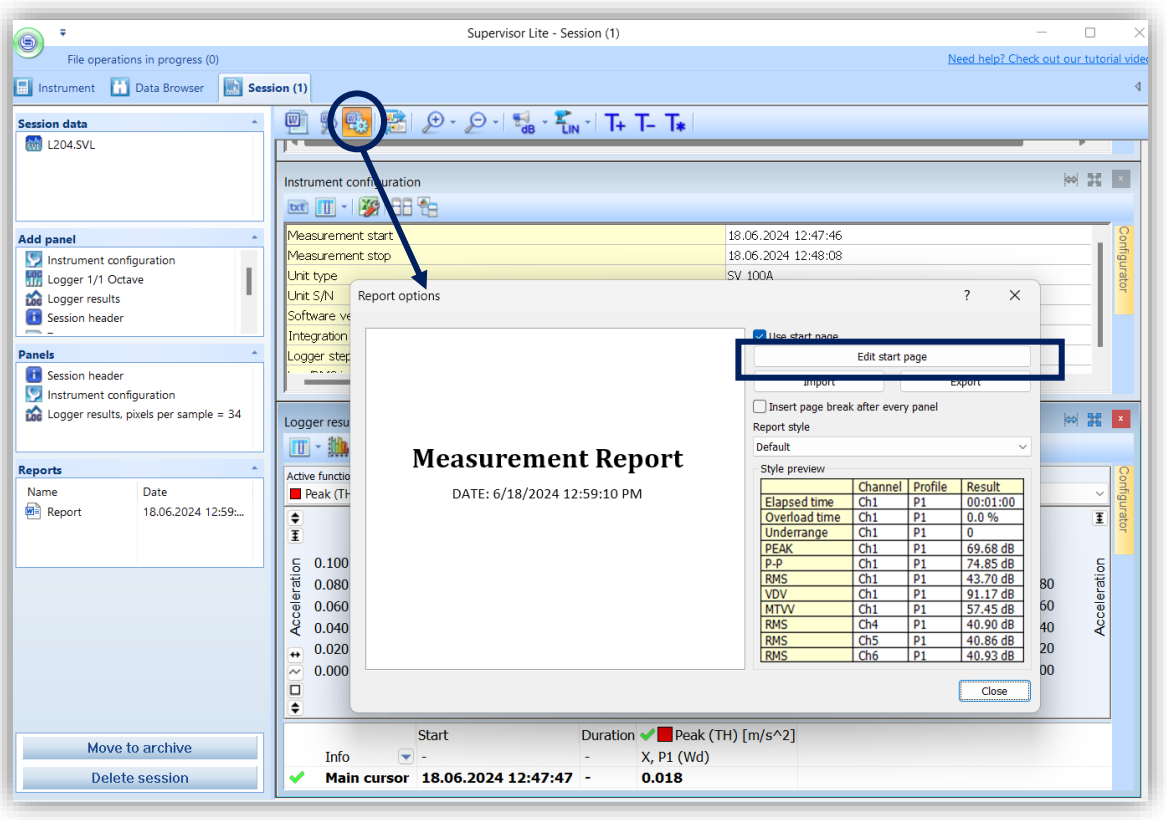


Figure 5-43 Report options dialog box

6 ASSISTANT MOBILE APPLICATIONS

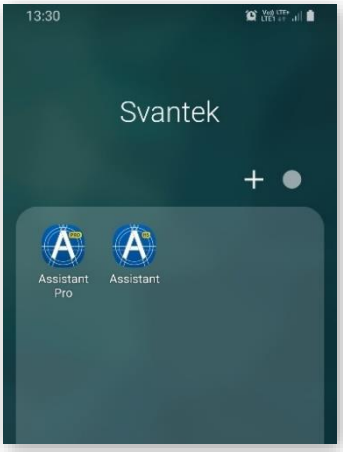
Svantek offers applications for mobile devices (smartphones and tablets) that extend functionality of SV 100A - ***Assistant Pro*** and ***Assistant HS***. These applications use the Bluetooth® interface to view current results and control the measurement from a mobile device.

Assistant Pro allows management of instrument settings, download of data files, and create markers for special events that occur during the measurement.

Assistant HS can send e-mail notifications if the certain thresholds are exceeded.

6.1 Installing the Svantek application on a mobile device

You can download the Svantek application from *Play Store*.



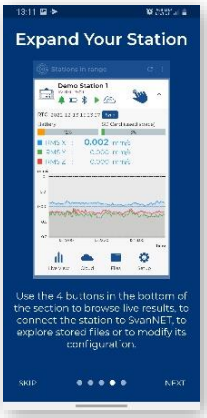
To start working with the Svantek application, tap the application icon on your mobile device.

The application may ask you to enable Bluetooth®, location services, and access files, photos, and media on your mobile device.

The instruments with Bluetooth® enabled will broadcast their basic status and some basic data will be visible on a mobile device running the application.

The application will detect visible instruments and, if the automatic connection feature is enabled, will attempt to connect to them.

The first time you use the application after installation, the Welcome screen will appear, providing quick tips on how to start using the application.



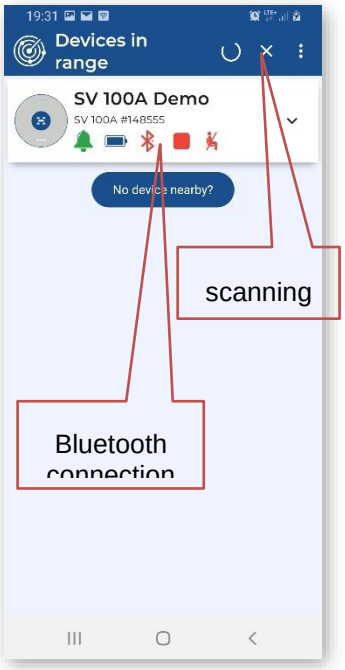
6.2 Assistant Pro

Assistant Pro compatible instruments with Bluetooth® enabled will broadcast their basic status and some basic data will be visible on a mobile device running the application.

While scanning the instruments, the “scanning” icon is displayed in the upper right corner. You can stop scanning by tapping . When scanning is complete, the “scanning” icon changes to . To start scanning, tap .

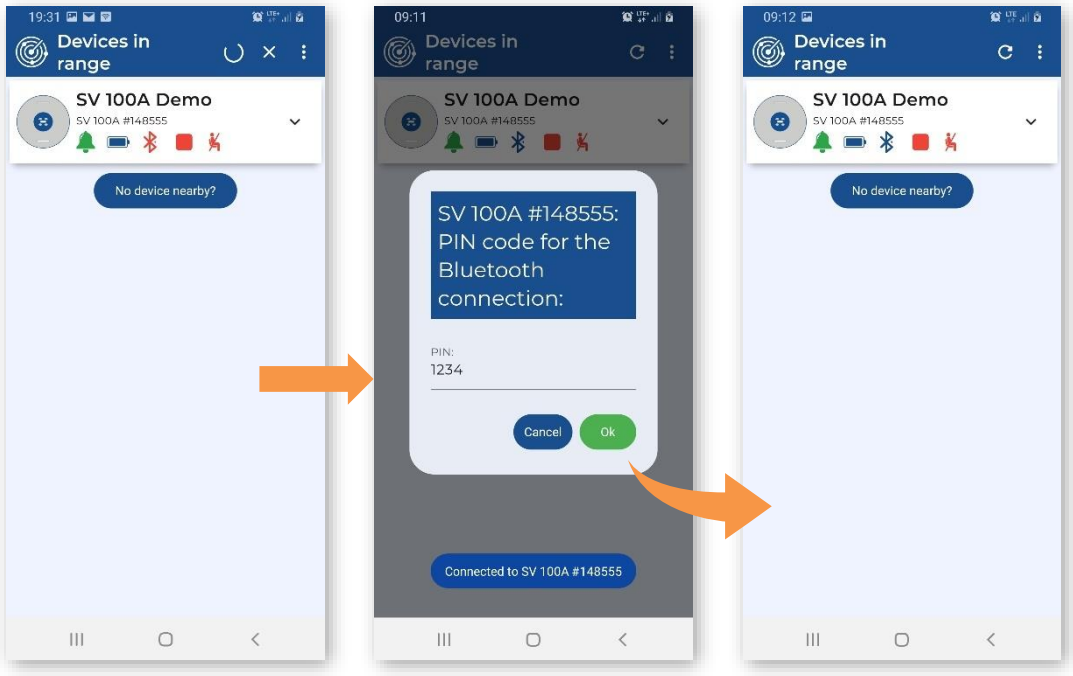
If there is no connection to the instrument, the Bluetooth icon on the instrument bar will be red. During the connection, it “emits waves”. If the connection is successful, the Bluetooth icon changes to blue.

The “No device nearby?” button opens a quick guide on how to prepare an instrument for use with the *Assistant* mobile application.



Note: *You cannot have access to the instruments controlled by other users who are simultaneously running Assistant Pro applications on other mobile devices.*

The first time you pair the instrument, the application will try to use the default PIN code (1234). If it does not match, you will be prompted to enter the PIN code. The same effect occurs if you have changed the PIN code on another mobile device and then try to connect to the previous mobile device.



When the connection is established, you can control this instrument and view measurement results.

6.2.1 Description of the status icons

The instrument status icons have the following meanings:


Event alarms. If the icon is green there is no current event alarm; if it is red, there is a current event alarm.


Battery status. When the battery is low, the icon changes colour to red.

Bluetooth – connection being used by another mobile device.


Bluetooth – not connected.


Bluetooth – connected.


The instrument is measuring.


The instrument is not measuring.


The operator is siting


The operator is not siting

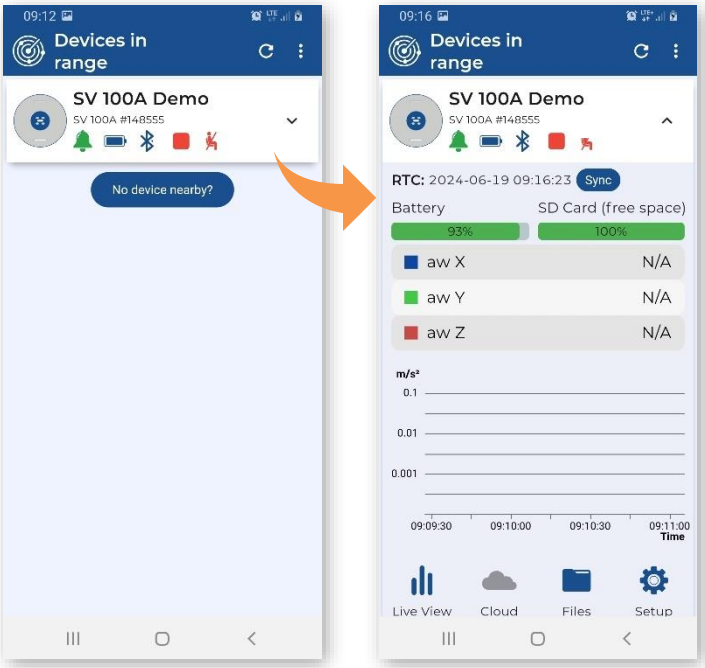
6.2.2 Controlling the instrument

The visible instruments appear on the **Stations in range** screen as a bar that can be expanded by tapping it. Once expanded, the instrument panel displays the real-time clock (**RTC**), the status of the instrument's battery (**Battery**) and memory (**SD Card (free space)**) status as well as the values of some predefined readings.

To synchronise the real-time clock with the clock on the mobile device, tap the **Sync** button.

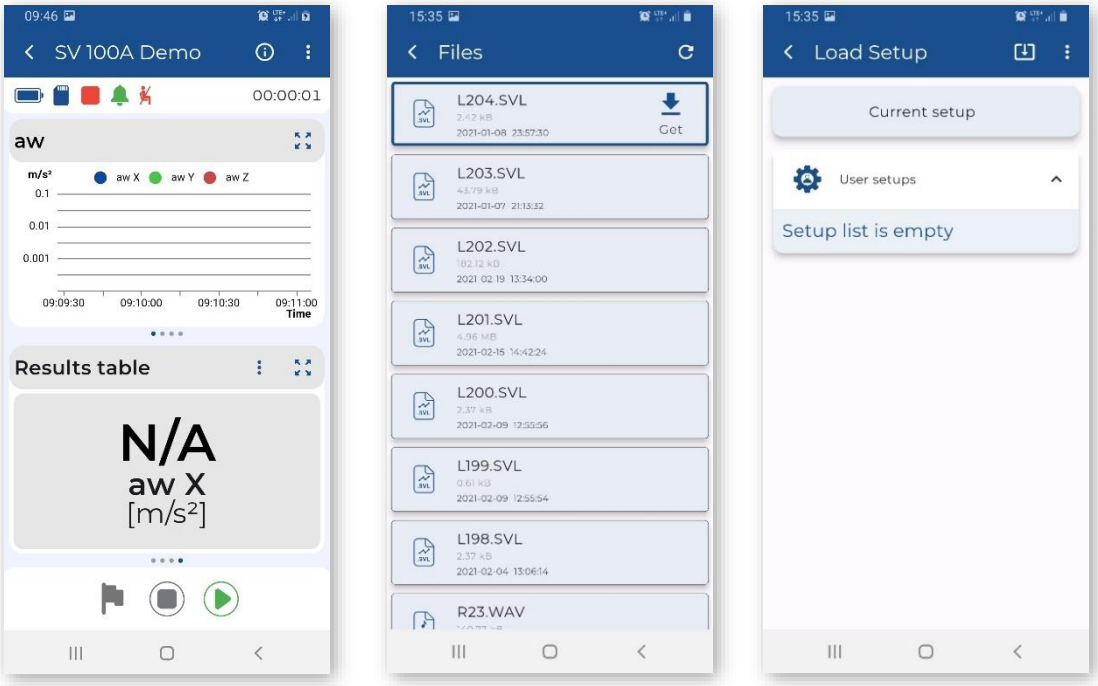
Four icons at the bottom of the panel give you quick access to some functions:

- **Live View** – viewing live results with the possibility to start/stop the measurement,
- **Cloud** – connecting to the *SvanNET* web service (this icon is inactive for SV 100A),
- **Files** – downloading instrument files (the icon is hidden by default),
- **Setup** – configuring instrument settings



***Note:** The **Files** icon is hidden by default. To make it visible and to be able to manage instrument files, you should activate it (see Chapter 6.2.9).*

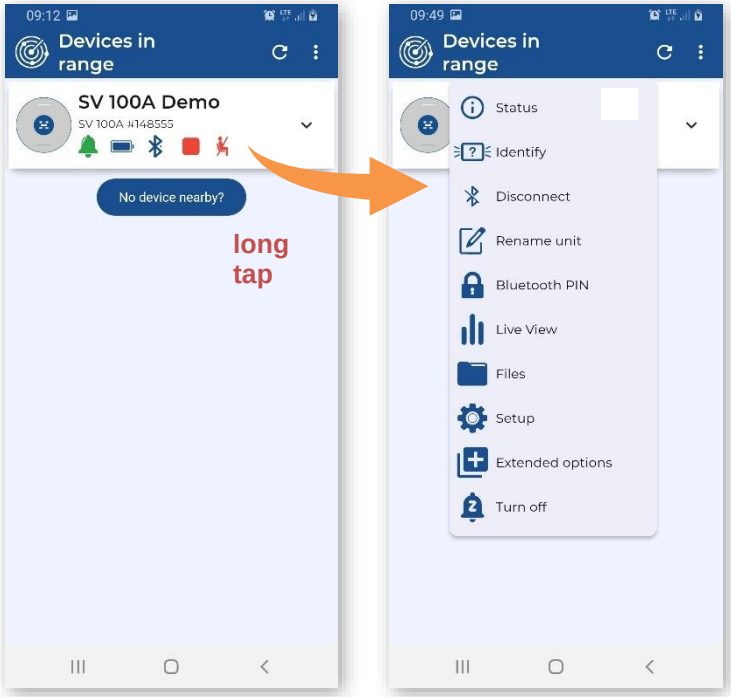
Below are screens after tapping function icons: **Live View**, **Files** and **Setup**.



You can access these and other functions by long tapping on the instrument bar.

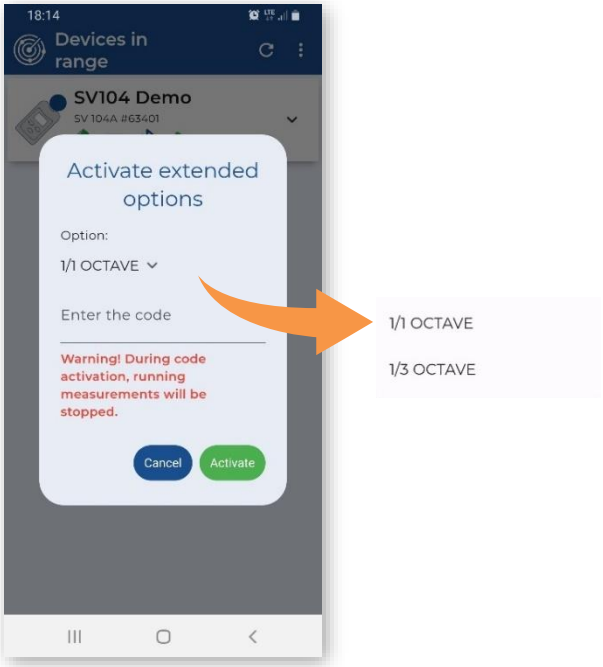
The pop-up menu that appears after a long tap on the instrument bar allows you to:

- check the **Status** of the instrument,
- **Identify** the instrument connected,
- **Connect** or **Disconnect** the instrument,
- **Rename unit** for personalisation,
- enter the **Bluetooth PIN** during connection or change the PIN in the instrument after successful connection,
- view current measurement results - **Live View**,
- open the file list - **Files**; this icon can be hidden (see Chapter 6.2.9),
- configure instrument settings - **Setup**,
- unlock **Extended options**,
- **Turn off** the instrument.



6.2.3 Activating optional functions

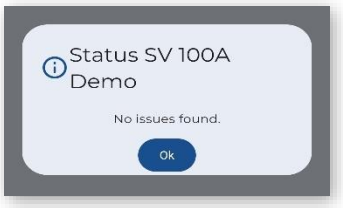
The optional functions can be activated by entering the special code that unlocks this option. Once unlocked, the option is permanently available.



6.2.4 Auxiliary commands

When you tap **Status**, the **Status** dialogue box will tell you if the measurement and communication configurations are correct. If not, the anomalies are listed.

When you tap **Identify**, the instrument name will flash on the instrument's display to indicate which device you are currently working with.



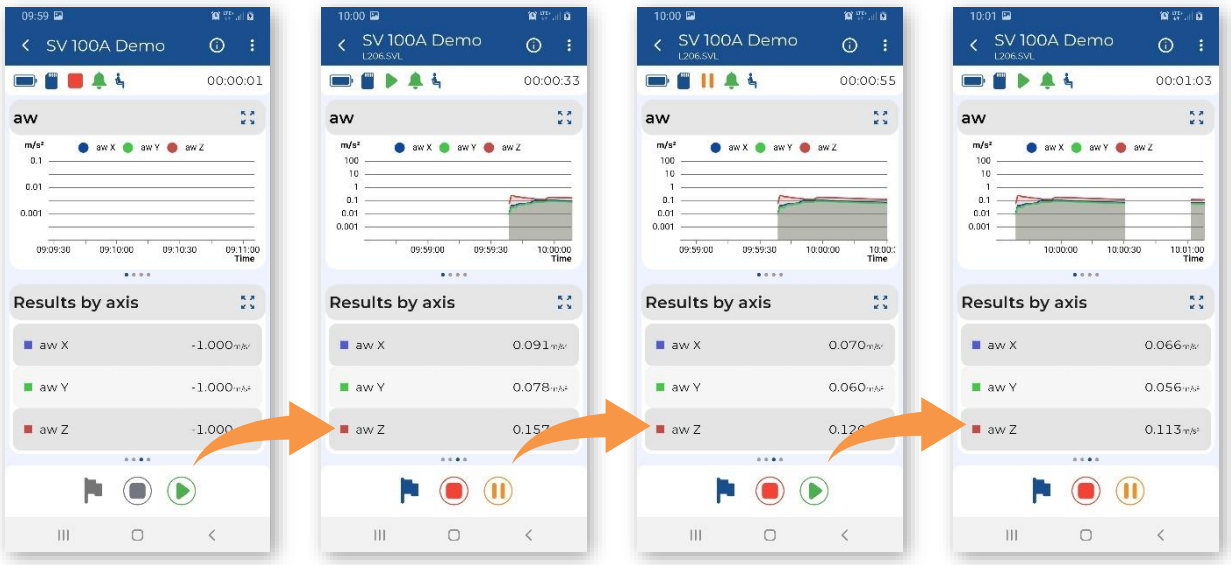
When you tap **Connect**, your mobile device begins to connect to this instrument via Bluetooth. When the connection is successful, this command changes to **Disconnect**. And vice versa.

When you tap **Rename Unit**, the **Device Name** dialogue box appears with the current instrument name, which you can edit.

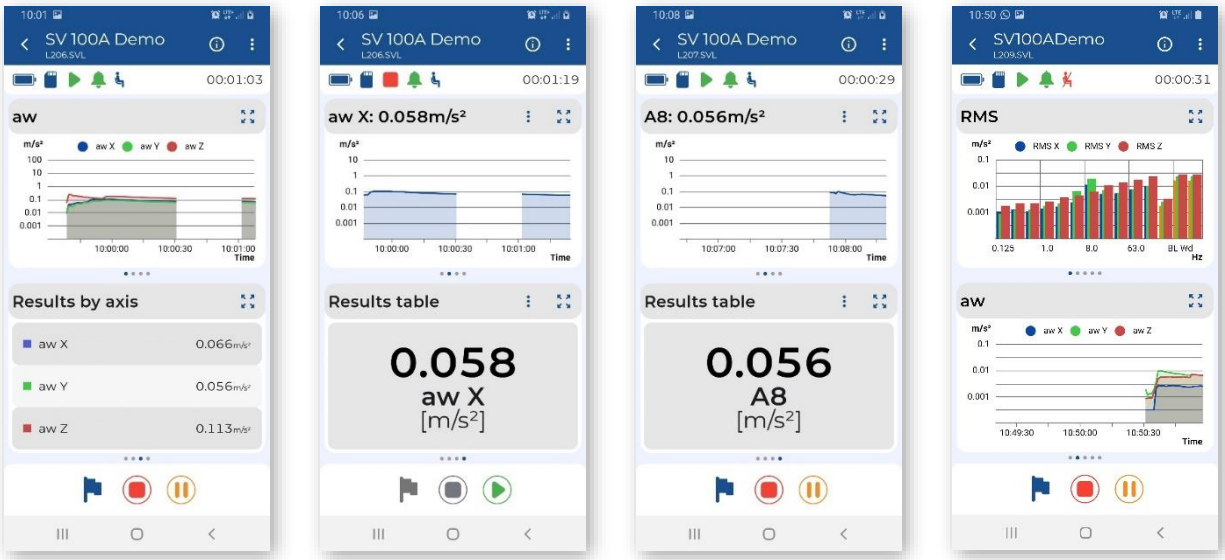
When you tap **Bluetooth PIN**, the dialog appears where you can change the Bluetooth PIN code.

6.2.5 Live View

From the **Live View** screen, you can start or stop the measurement and set a marker - a note during the measurement. The measurement results are displayed in two sections which you can adjust by scrolling through the presentation views. The top line shows the battery, memory, and measurement status, as well as the integration time.



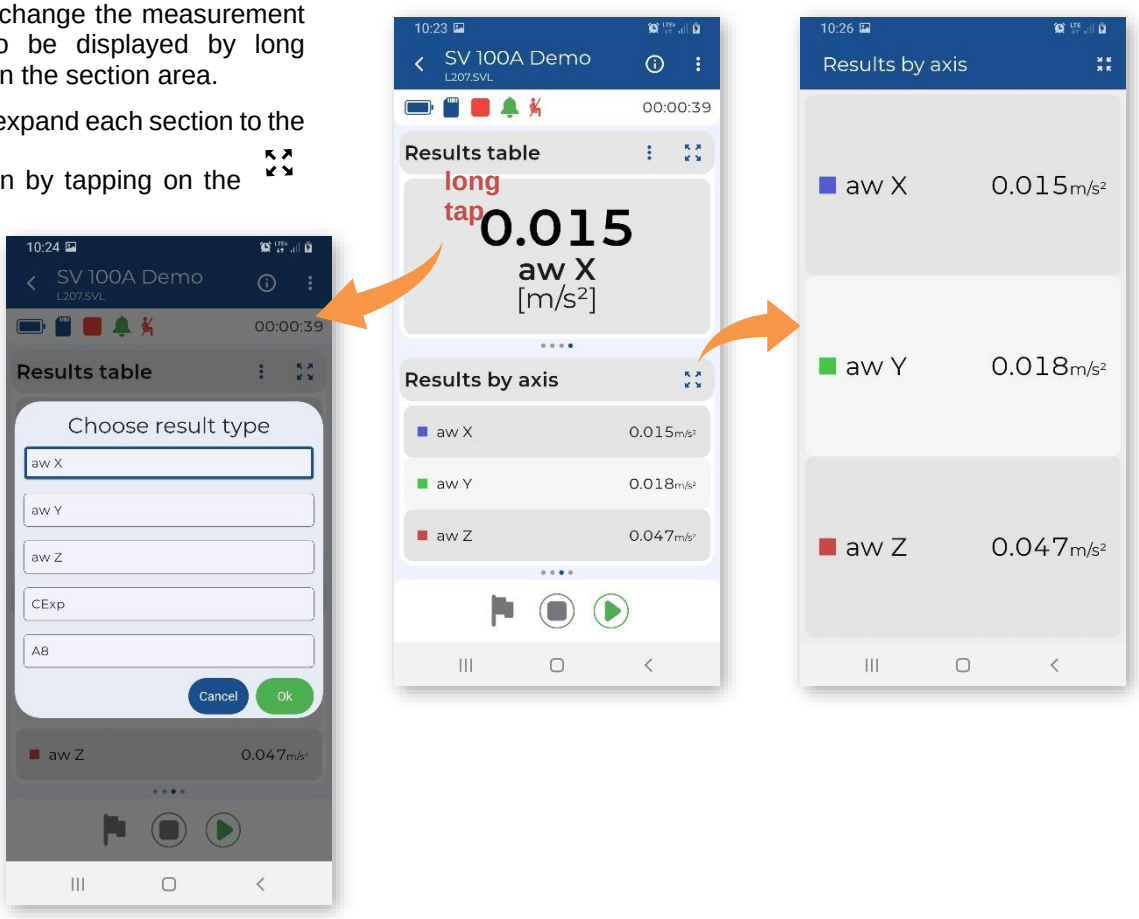
Below are some combinations of view, including spectra, time-histories of some results, current results values.



***Note: Live view** shows the limited set of measurement results. The full set of measurement results is stored in the instrument files and can be viewed using Supervisor.*

You can change the measurement results to be displayed by long tapping on the section area.

You can expand each section to the full screen by tapping on the icon.



If you rotate the smartphone, the results will be displayed in the horizontal scheme.

Tap on the graph area to activate the cursor with readings.

To deactivate the cursor, tap outside the graph area.

You can zoom in and zoom out the selected time or frequency range using two fingers or the bar below the graph.

During the measurement, you can tap the marker icon to open the **Create Marker** dialogue box, where you can activate the marker and assign to this marker the photo, video, or audio recording.

Tap **Title** to enter the marker name.

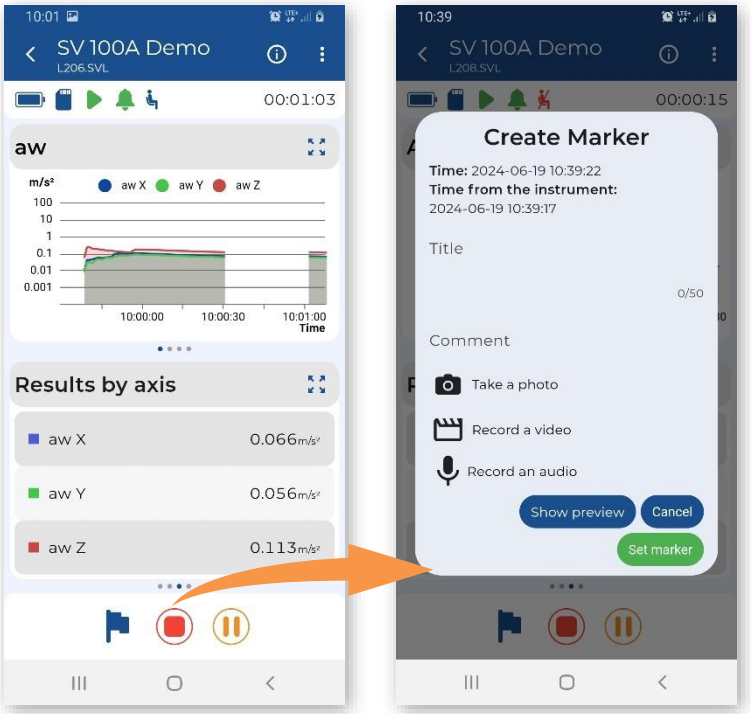
Tap **Comment** to enter the comment text.

Tap **Take a picture** to add a picture to this marker.

Tap **Record a video** to add a video to this marker.

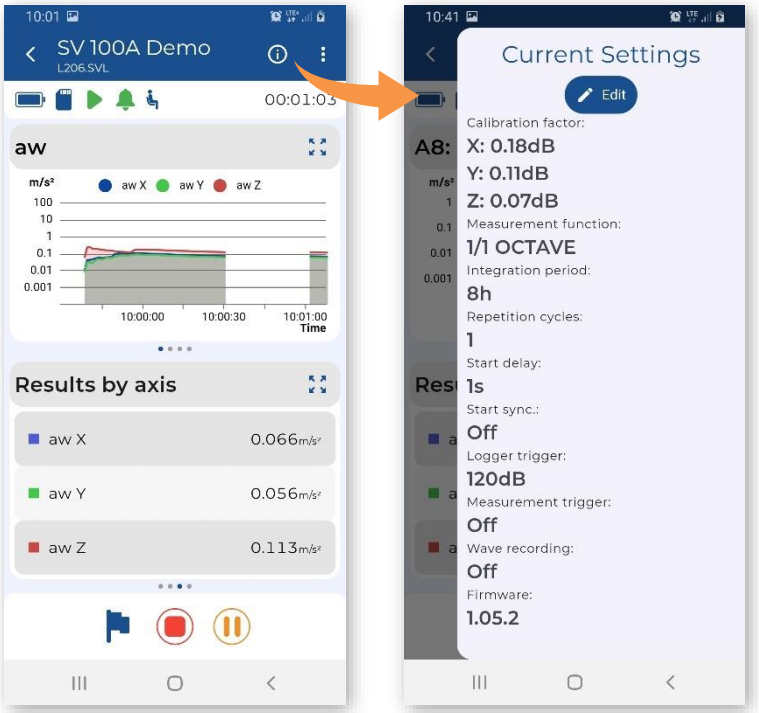
Tap **Record an audio** to add an audio to this marker.

Tap **Set marker** to set a marker.

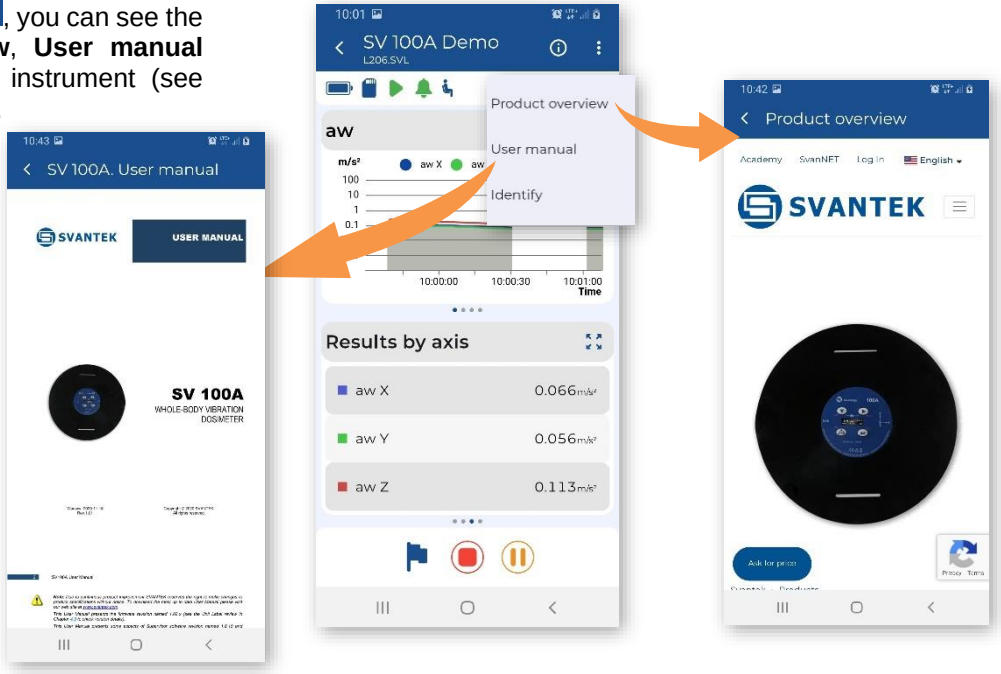


Tap the ⓘ icon to display the current settings for the device.

Tap **Edit** to edit them.



When you tap  , you can see the **Product overview**, **User manual** and **Identify** the instrument (see Chapter 6.2.4).

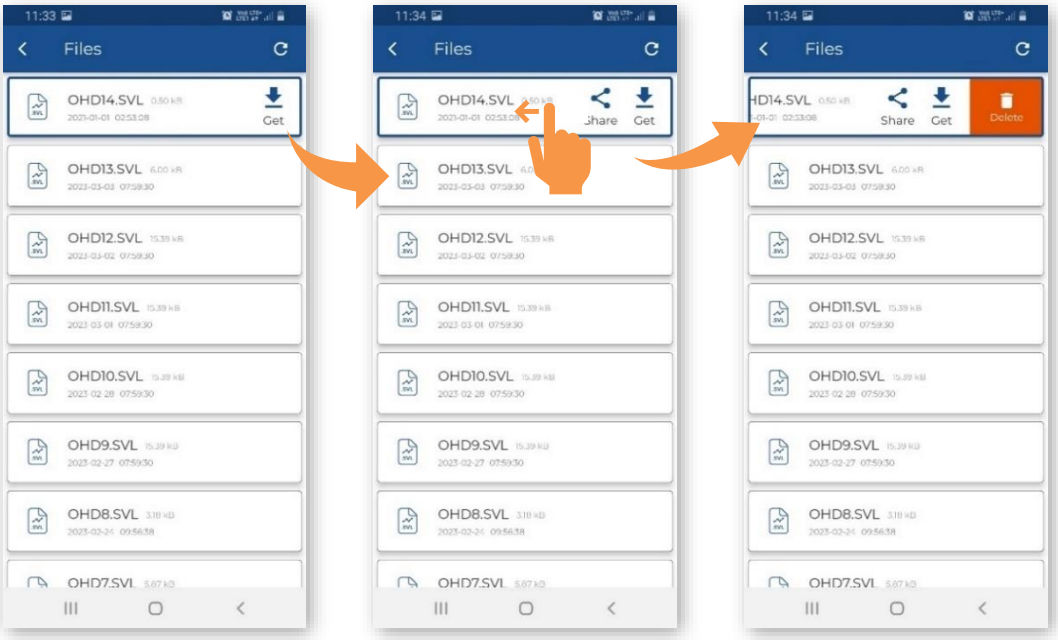


When you tap **Identify**, the name of the device appears on the display.

To return to the “Stations in range” screen, tap the  icon.

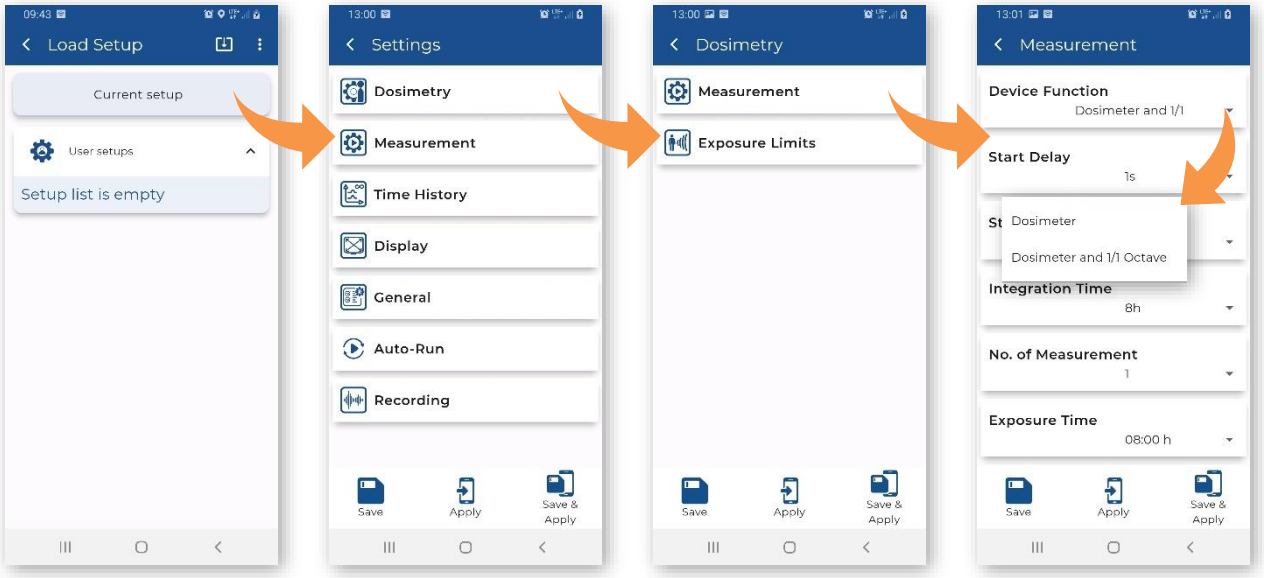
6.2.6 Files

The **Files** section displays the list of files created by the instrument on the instrument’s memory card. You can tap on each file to download it to your mobile device (**Get**). Once the file has been downloaded, you can share it. To delete the file, swipe left on the file ribbon and tap the  icon.



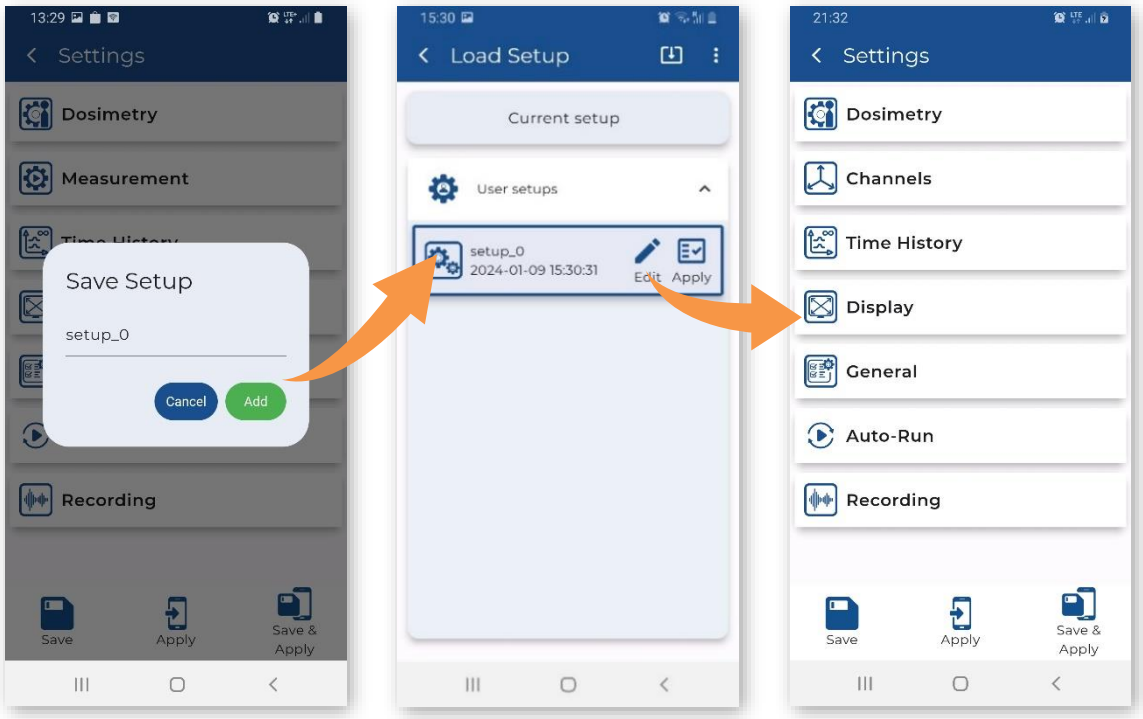
6.2.7 Instrument and measurement settings

The **Settings** section allows you to configure the measurement and specific instrument settings. The settings are grouped in sections such as **Dosimetry**, **Measurement**, etc., which contain sub-sections, etc. The last item in such a hierarchy consists of parameters that you can set, e.g., **Device Function**: *Dosimeter* or *Dosimeter and 1/1 Octave*.



After configuring the settings, you can save them to the mobile device catalogue (**Save**), load them to the instrument as the current settings (**Apply**), or save and load them simultaneously (**Save & Apply**).

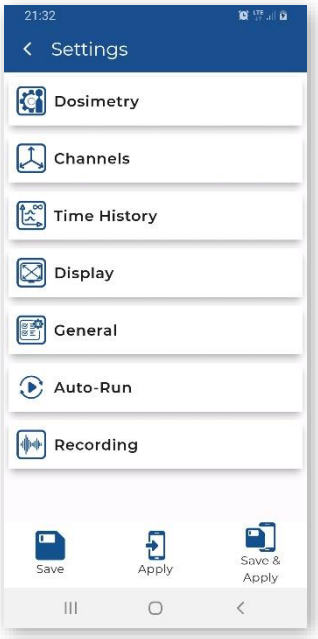
When you save settings, a new setup file is created in the dedicated application's directory on your mobile device, but the current instrument settings are not changed. You can load the settings saved in the file to the instrument. To do this, open the **User Setups** section, select the file with the desired settings, tap it, and select **Apply**. You can **Edit** these settings if necessary.



The measurement and instrument settings generally have a similar structure as in the *Supervisor* PC software (see Chapter 5.4).

The configuration menu (**Settings**) contains the following sections which allow you to:

- **Dosimetry** – set the measurement function and basic measurement parameters for all channels,
- **Channels** – set the channel specific parameters,
- **Time History** – configure the logging of time history data,
- **Display** – configure the presentation of measurement results on the instrument display,
- **General** – set the access to the instrument and configure auxiliary settings,
- **Auto-Run** – program five independent pauses and the timer,
- **Recording** – configure signal recording (time domain).

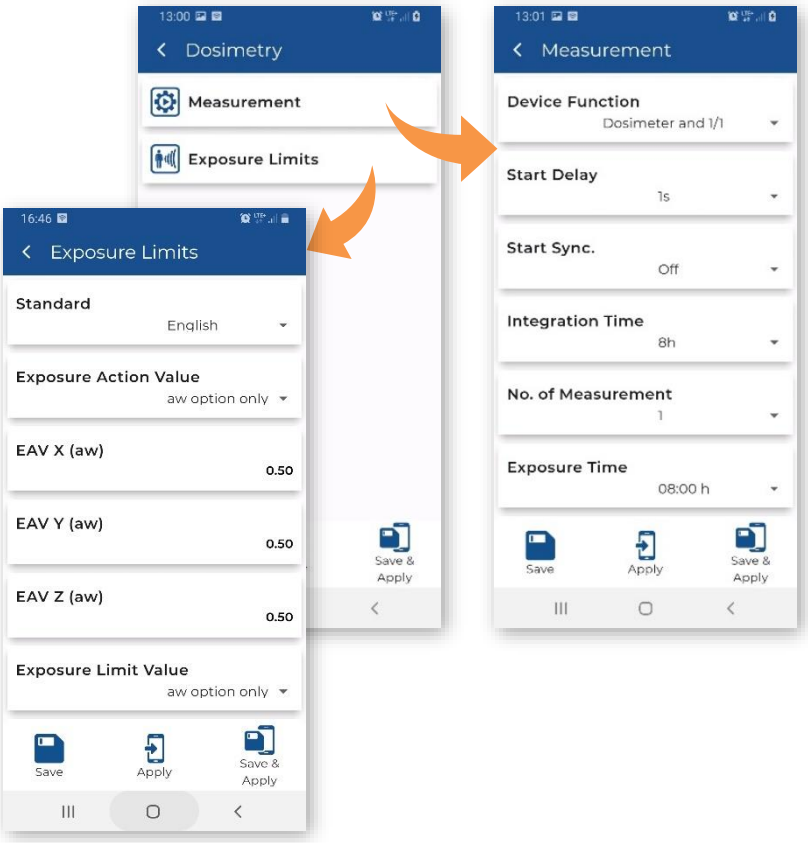


6.2.7.1 Setting the measurement function and basic measurement parameters – Dosimetry

The **Dosimetry** section includes two sub-sections: **Measurement** that allows you to select the measurement function and set measurement parameters common for all channels and **Exposure Limits** that allows you to set exposure limits for hand-arm vibration measurements (see Chapter **Error! Reference source not found.** 5.4.3).

If optional functions are available, you can select them in the **Device function**: *Dosimeter*, *Dosimeter and 1/1 Octave* or *Dosimeter and 1/3 Octave*.

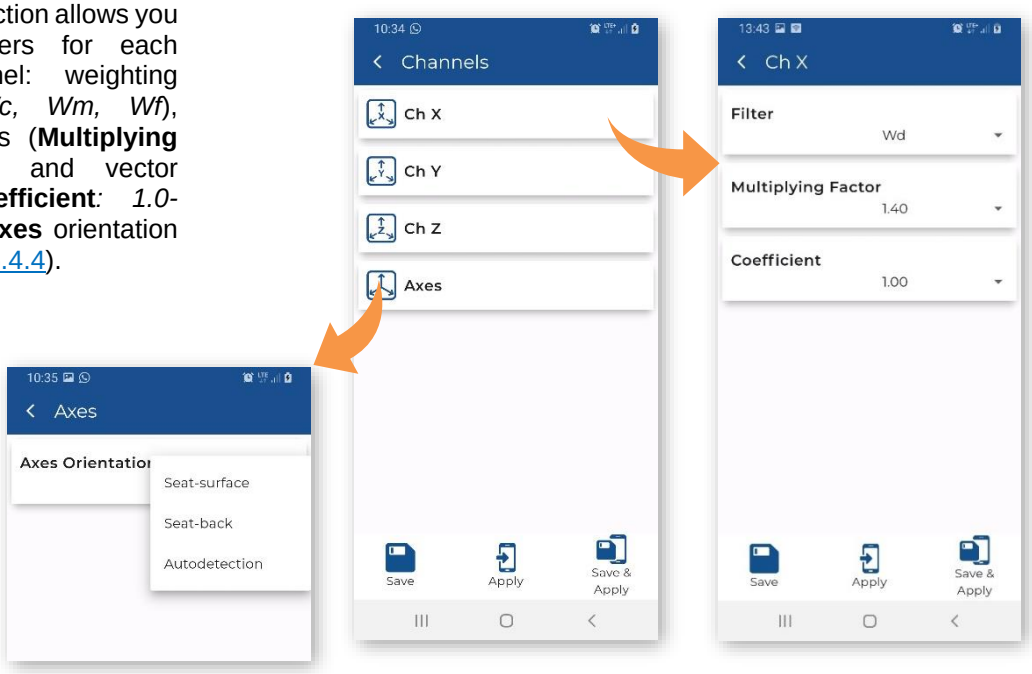
Note: 1/1 and 1/3 octave analysis are optional functions, so if you haven't ordered them while buying the instrument you should activate them (see Chapter 6.2.3).



Note: *The setting screens are shown for the "Dosimeter and 1/1 Octave" function, which also includes settings for the 1/1 octave or 1/3 octave.*

6.2.7.2 Setting channels specific parameters – Channels

The **Channels** section allows you to set parameters for each individual channel: weighting filter (**Filter***: Wc, Wm, Wf*), multiplying factors (**Multiplying Factor***: 0.1-2.0*) and vector coefficients (**Coefficient***: 1.0-2.0*) as well as **Axes** orientation (see Chapter 5.4.4).



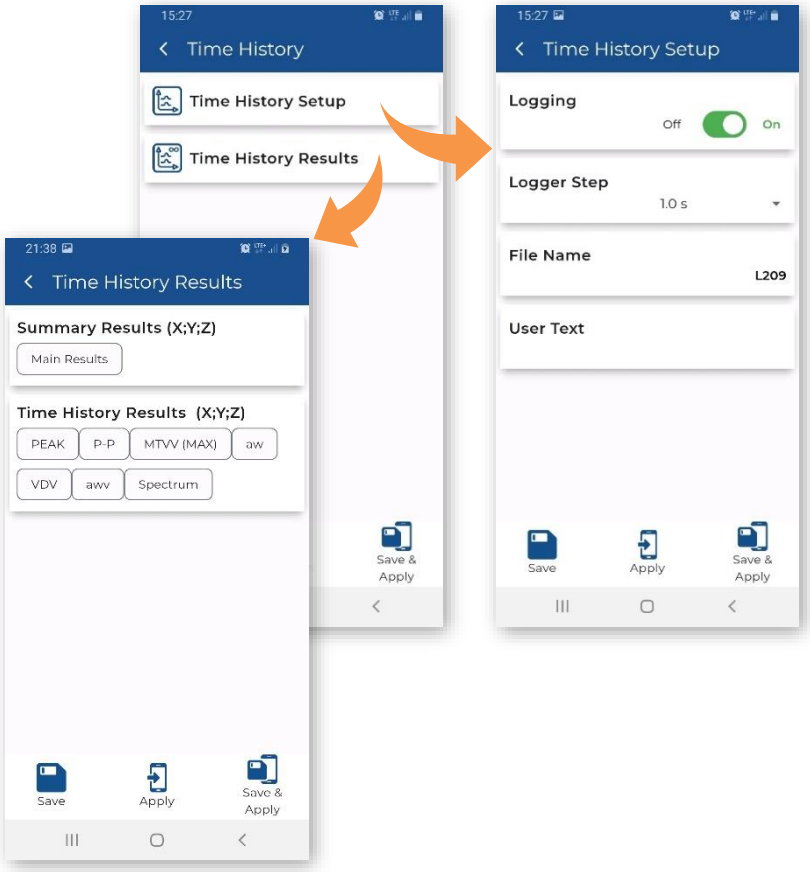
6.2.7.3 Setting time history data logging – Time History

The **Time History** section contains two sub-sections: **Time History Setup** and **Time History Results**.

The **Time History Setup** sub-section allows you to enable the logging of history results to the .svl file (**Logging**) and to set the step at which the results are to be logged (**Logger Step**), the name of the logger file (**File Name**) and the **User Text**.

The **Time History Results** sub-section allows you to select the results for each profile to be logged in the .svl file.

See Chapter 5.4.5.

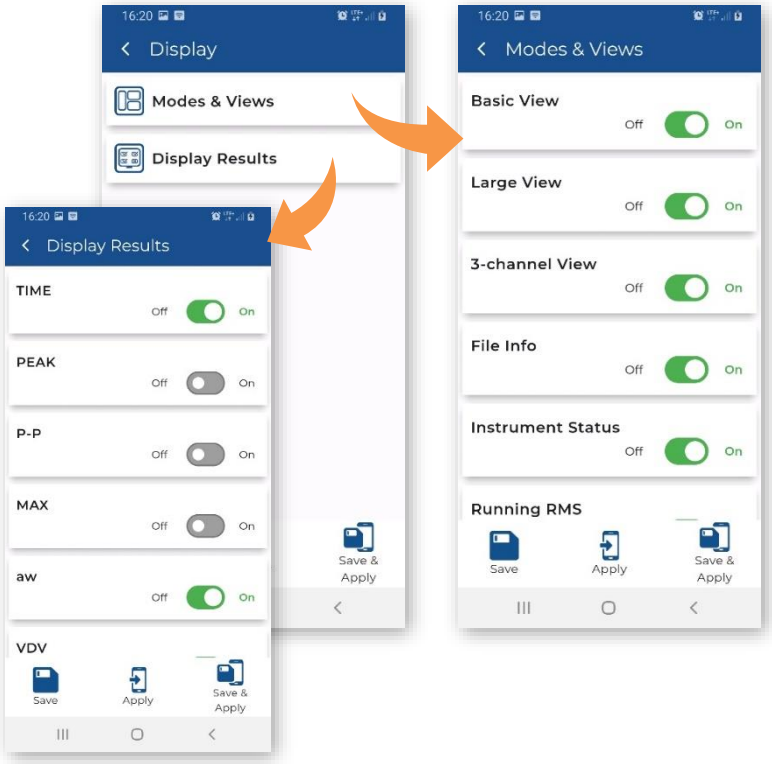


6.2.7.4 Setting the way the results are displayed – Display

The **Display** section allows you to:

- enable views of the measurement results presentation (**Modes & Views**)
- select results to be presented in different views (**Display Results**).

See Chapter 5.4.6.

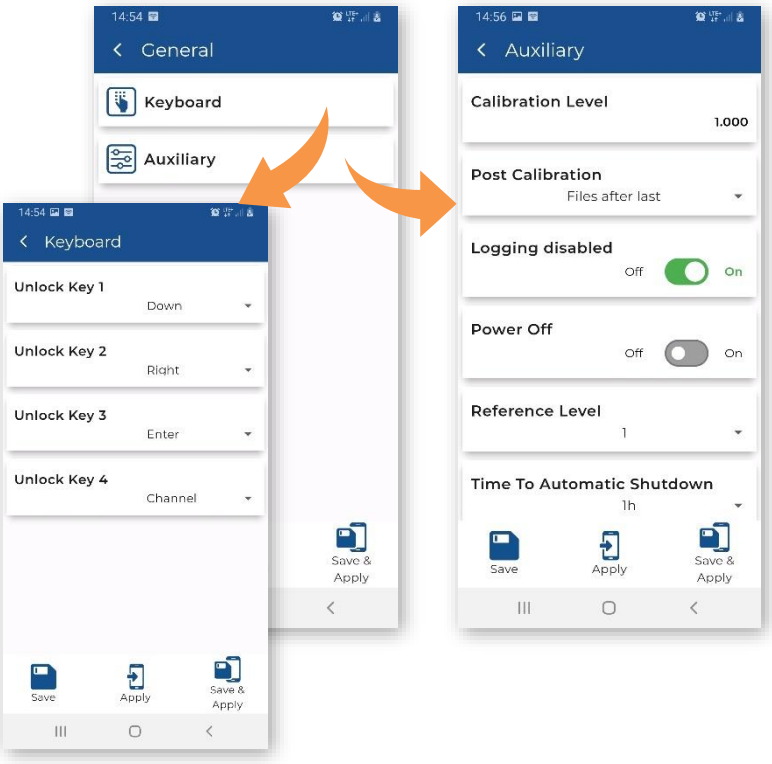


6.2.7.5 Setting the general parameters – General

The **General** section allows you to:

- block access to the instrument when it is in use contains two panels (**Keyboard)**,
- calibrate the instrument, set warnings and reference levels for measurement results, and turn on the wireless interface (**Auxiliary**).

See Chapter 5.4.7.

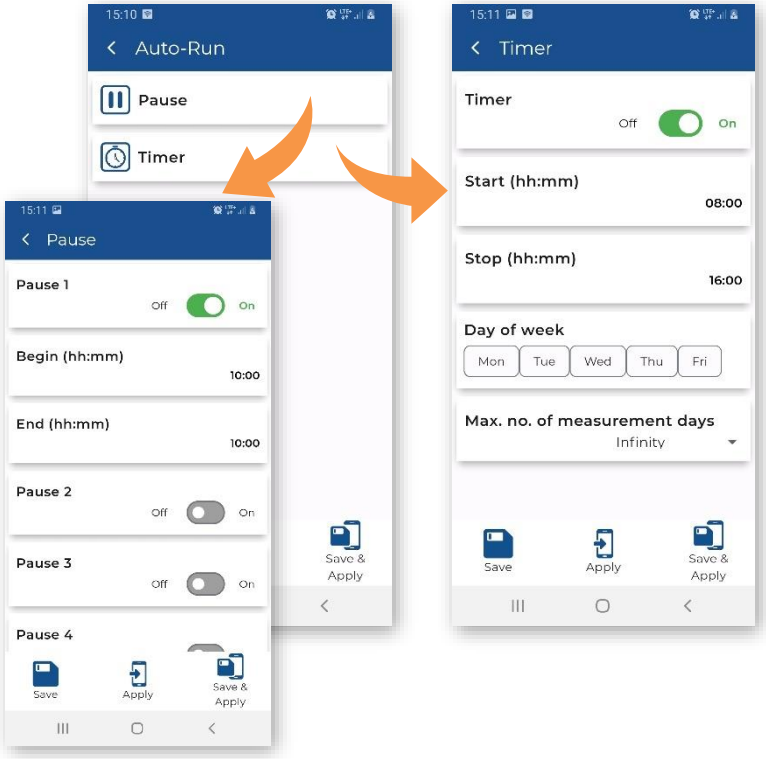


6.2.7.6 Pause and Timer settings – Auto-Run

The **Auto-Run** section allows you to:

- program five independent pauses in real time (**Pause**),
- am the internal real-time clock to act as a delayed start and stop timer (**Timer**).

See Chapter 5.4.7 5.4.8.



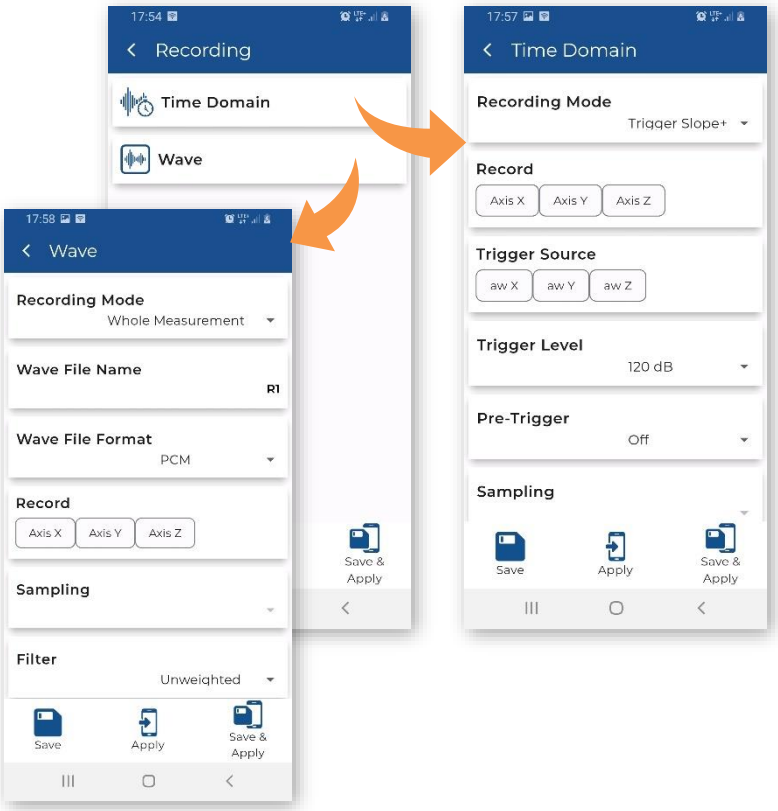
6.2.7.7 Signal recording settings – Recording

The **Recording** section allows you to program signal recording:

- in the same file as the measurement results (**Time Domain**), or
- as a separate PCM or extensible format file (**Wave**).

Both options are mutually exclusive, and the one should be disabled to enable the other.

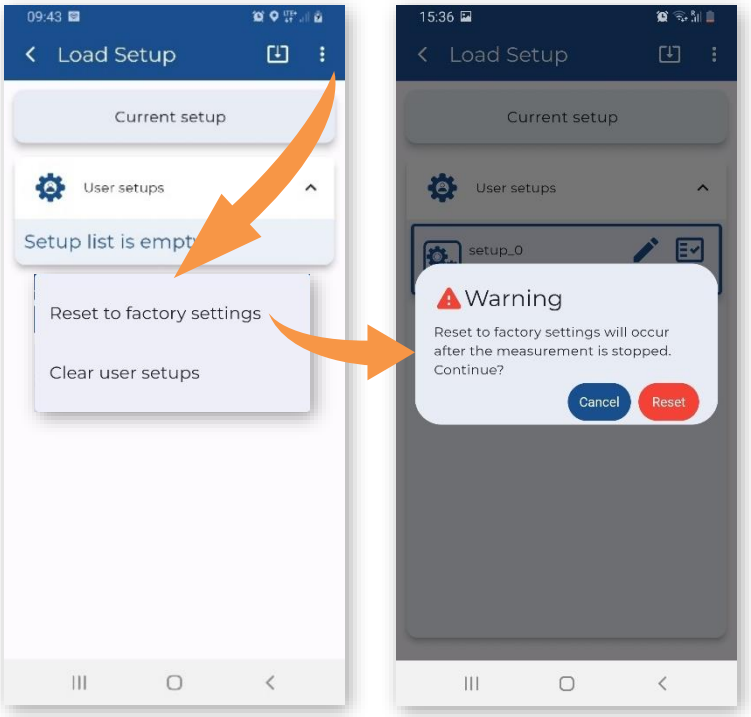
See Chapter 5.4.7 5.4.9.



6.2.8 Restoring factory settings

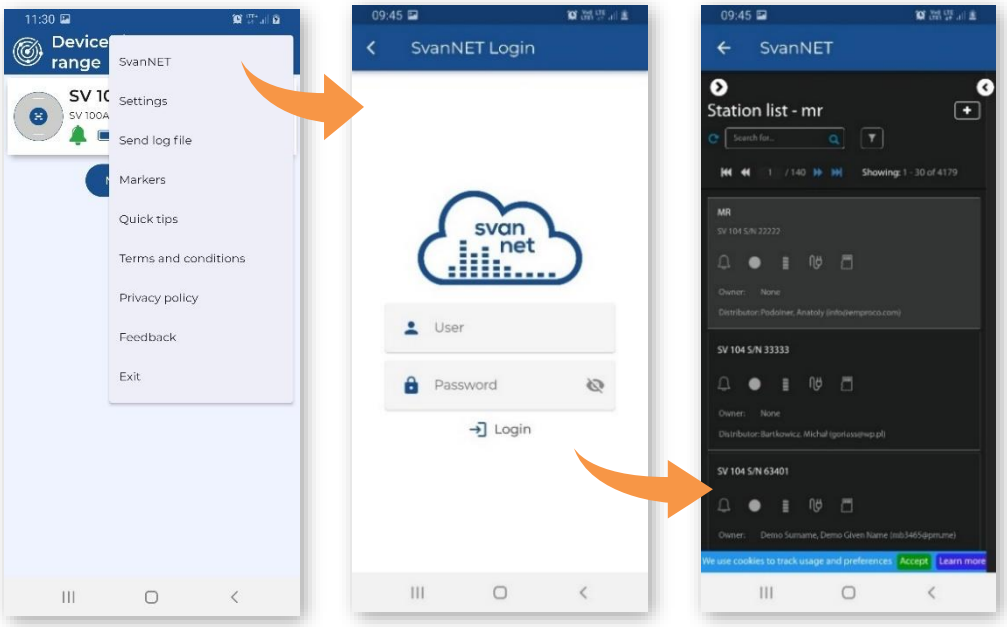
By tapping in the **Load Setup** screen, you can:

- **Reset to factory settings** and
- **Clear user setups**.

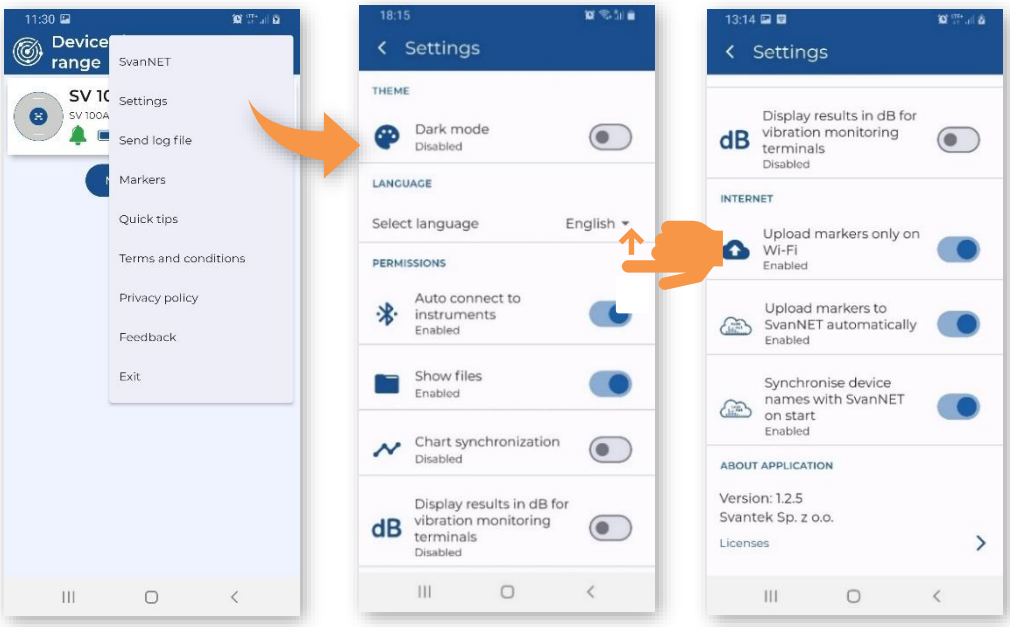


6.2.9 Assistant Pro auxiliary functions and settings

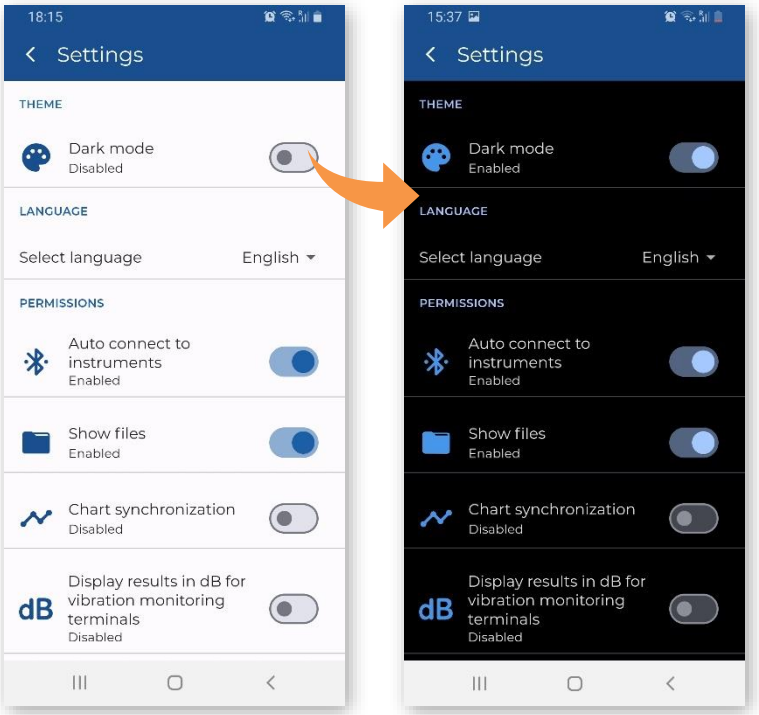
By tapping in the **Devices in range** screen, you can open *SvanNET* in your mobile device, configure *Assistant Pro* settings, view, edit and share previously created markers, get quick tips, read the terms and conditions and privacy policy, get feedback, for example, from the Svantek support team and exit the application.



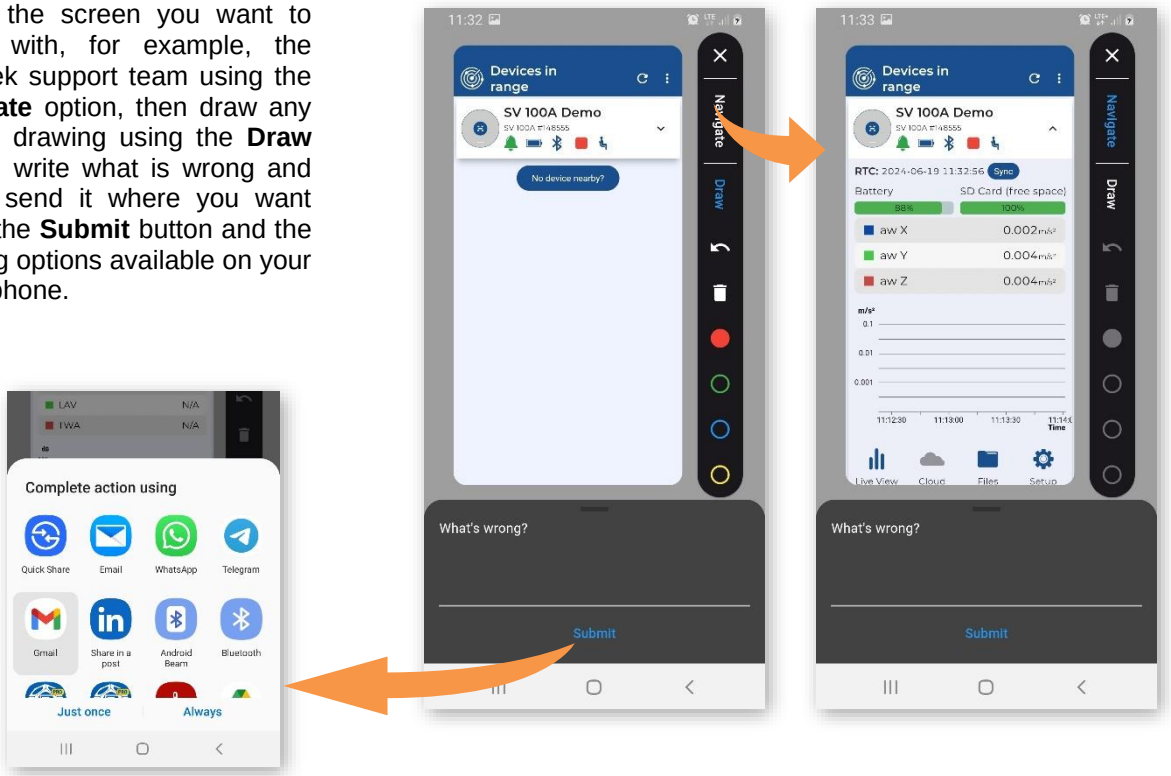
In the *Settings* screen, you can choose the application THEME (enable or disable the **Dark Mode**), choose the application *LANGUAGE*, enable or disable some *PERMISSIONS*: automatic connection with the visible instruments (**Auto connect to instruments**), add/delete the Files item in the pop-up menu (**Show files**), switch on/off synchronization of cursors on different charts (**Chart synchronization**), enable uploading markers (**Upload markers only on Wi-Fi**, **Upload markers to SvanNET automatically**), enable synchronization of the station name (**Synchronization station name with SvanNET on start**) and get information about the application version (***ABOUT APPLICATION***).



You can enable **Dark mode** to save your device power.



In the Feedback screen, you can select the screen you want to share with, for example, the Svantek support team using the **Navigate** option, then draw any helpful drawing using the **Draw** option, write what is wrong and finally send it where you want using the **Submit** button and the sharing options available on your smartphone.



7 MAINTENANCE

7.1 General recommendations for use

- Use only high-quality USB cables, such as **SC 56**. Many poor-quality cables do not ensure low resistance of the cable, thus disabling proper charging of the internal cells
- It is not recommended to leave the instrument in direct sunlight conditions for prolonged periods of time. Extended exposure such as behind the car window may affect the performance.
- To improve accuracy of remaining battery life indicator, run the instrument 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

It is recommended to clean the surface of the SV 100A instrument with a damp soft cloth.

7.3 Firmware upgrade

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 and disconnected from the USB.
- Hold down the  key and press the  key to turn on the unit. This ensures the unit will switch on and enter the special reprogramming **BOOTLOADER** mode.
- Then connect the USB cable. The **<USB>** text will now appear on the instrument display.
- Run the **start.bat** file on connected by USB cable PC.
- Successful firmware update will be indicated by relevant message.
- Turn off the unit.

Note: *With use of the Supervisor software, it is very easy to check if there are any new firmware releases available for download (see* **Error! Reference source not found.** *commands)***.**

7.4 Storing the instrument

- To preserve the life of the internal batteries, it is recommended that SV 100A is turned off when it is stored.
- Do not store the instrument permanently connected to the USB port. It shortens battery lifecycle
- When SV 100A is turned off, it still draws a small amount of battery power. Therefore, it is recommended to charge the cell every few months if it is not going to be used regularly.

7.5 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 145** (see chapter 2.3), which ensures excellent mechanical and environmental protection and long term storage conditions.

7.6 Resetting the instrument

- **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. Insert some needle (or paper clip) into the hole on the back panel of the instrument and press it for more than 3 seconds, and then release it. Turn on the instrument as usually.

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!

7.7 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 the USB or recommended charger. This ensures the battery is not exhausted. Then proceed with hardware reset (see chapter 7.6).
4. In case your instrument does not respond proceed with turn-off/turn-on procedure (see chapter 3.6), and hardware reset of the instrument (see chapter 7.6).
5. In case the measurement of the vibration level is frozen or set to a fixed value proceed with turn-off/turn-on procedure (see chapter 3.6), then with hardware reset of the instrument (see chapter 7.6).
6. In case the reset does not help call Local Authorized Distributor or Svantek Service Office.

If your Svantek professional measuring equipment needs to be returned for repair or calibration, please contact the service office at the following number or contact via the Svantek website.

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

Office hours are 9:00 a.m. to 5:00 p.m. Central European Time.

Internet: www.svantek.com

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

APPENDIX A. REMOTE CONTROL

The USB 2.0 interface is the serial one working with 480 MHz clock which enables one to control remotely the unit. Its speed is relatively high and it ensures the common usage of USB in all produced nowadays Personal Computers.

The functions, which are developed in order to control data flow in the serial interfaces, ensure:

- Bi-directional data transmission,
- Remote control of the instrument.

The user, in order to programme the serial interface, has to:

1. send "the function code",
2. send an appropriate data file

or

3. receive a data file.

A.1. Input / Output transmission types

The following basic input / output transmission types (called functions) are available:

#1 input/output of the control setting codes,

#2 read-out of the measurement results in the **VLM** mode,

#**3** read-out of the measurement results in the **1/1 OCTAVE** or **1/3 OCTAVE** analysis mode

#4 read-out of the data file from the internal flash-disc or RAM memory,

#7 special control functions,

#9 writing the data file into the internal flash-disk.

#D read/write the data file from the external memory (SD Card),

A.2. Function #1 - Input/Output of the control setting codes

#1 function enables the user to send the control setting codes to the instrument and read out a file containing the current control state. A list of the control setting codes is given in Tab. A.1. The format of #1 function is defined as follows:

#1,Xccc,Xccc,(...),Xccc;

or

#1,Xccc,X?,Xccc,(...),X?,Xccc;

where:

X - the group code, **ccc** - the code value,

X? - the request to send the current X code setting.

The instrument outputs in this case a control settings file for all requests X? in the following format:

#1,Xccc,Xccc,(...),Xccc;

In order to read out all current control settings the user should send to the device the following sequence of characters:

#1;

The instrument outputs in this case a file containing all control settings given in Tab. A1 in the format:

#1,Xccc,Xccc,(...),Xccc;

Example: The instrument sends the following sequence of characters as an answer for the mentioned above request:

#1,U100,N1234,W1.02.5,Q0.01:1,Q0.03:2,Q0.05:3,q120.00,M4,I17:1,I17:2,I16:3,G9,g1,d1s,D10s,K5,Y3,y0,S0,T1,e480,J1.40:1,J1.40:2,J1.00:3,m0,s4,l120,k1,p0,n10,Xa1,Xe0,XE0,Xf50:1,Xf50:2,Xf50:3,XF910:1,XF910:2,XF910:3,Xb110:1,Xb110:2,Xb110:3,XB2100:1,XB2100:2,XB2100:3,XV2,XG0,XJ2,XK120,XP0,Xc10,XC4,XD0;

means that:

- the SV 100 is investigated (U100);
- its number is 1234 (N1234);
- the software version number 1.02.5 (W1.02.5);
- the calibration factor is equal to 0.01 dB (Q0.01:1) in channel X, calibration factor is equal to 0.03 dB (Q0.03:2) in channel Y and calibration factor is equal to 0.05 dB (Q0.05:3) in channel Z;
- the calibration level is equal to 120.00 dB (q120.00);
- the **DOSE METER** mode is selected (M4);
- the **Wd** filter is selected in channel X (I17:1);
- the **Wd** filter is selected in channel Y (I17:2);
- the **Wk** filter is selected in channel Z (I16:3);
- the **PEAK** and **RMS** values are stored in the files of the logger from all channel (G9);
- the summary results **MAIN** are stored in the files of the logger from all channel (g1);
- the results are stored in a logger's file every 1 second (d1s);
- the integration period is equal to 10 seconds (D10s);
- the measurement has to be repeated 5 times (K5);
- the delay of the start of the measurements is equal to 3 seconds (Y3);
- the synchronization the start of measurement with RTC is switched off (y0);
- the instrument is in the Stop state (S0);
- the logger is active (T1);
- the exposition time is set to 8 hours (e480);
- the **1.40** coefficient is selected in channel X, for calculating Vector (J1.40:1);
- the **1.40** coefficient is selected in channel Y, for calculating Vector (J1.40:2);
- the **1.00** coefficient is selected in channel Z, for calculating Vector (J1.00:3);
- the time-domain signal recording is switched off (m0);
- the RMS value from channel Z is treated as a source for trigger in the time-domain signal recording (s4);
- the time-domain trigger level is equal to 120 dB (l120);
- the signal from channel X will be recorded in time-domain signal recording (k1);
- the additional recording time before the triggering in time-domain signal recording is switched off (p0);
- the recording time in time-domain signal recording is equal to 10 seconds (n10).
- the reference level is equal 1 $\mu m/s^2$ (Xa1)
- the **E**xposure **A**ction **V**alue calculation base on aw results only (Xe0)
- the **E**xposure **L**imit **V**alue calculation base on aw results only (XE0)
- the **E**xposure **A**ction **V**alue base on ***aw*** result in channel X is equal to 0.5 m/s^2 (Xf50:1);
- the **E**xposure **A**ction **V**alue base on ***aw*** result in channel Y is equal to 0.5 m/s^2 (Xf50:2);
- the **E**xposure **A**ction **V**alue base on ***aw*** result in channel Z is equal to 0.5 m/s^2 (Xf50:3);
- the **E**xposure **A**ction **V**alue base on ***VDV*** result in channel X is equal to 9.1 $m/s^{1.75}$ (XF910:1);
- the **E**xposure **A**ction **V**alue base on ***VDV*** result in channel Y is equal to 9.1 $m/s^{1.75}$ (XF910:2);

- the **E**xposure **A**ction **V**alue base on ***VDV*** result in channel Z is equal to 9.1 $m/s^{1.75}$ (XF910:3);
- the **E**xposure **L**imit **V**alue base on ***aw*** result in channel X is equal to 1.1 m/s^2 (Xb110:1);
- the **E**xposure **L**imit **V**alue base on ***aw*** result in channel Y is equal to 1.1 m/s^2 (Xb110:2);
- the **E**xposure **L**imit **V**alue base on ***aw*** result in channel Z is equal to 1.1 m/s^2 (Xb110:3);
- the **E**xposure **L**imit **V**alue base on ***VDV*** result in channel X is equal to 21.0 $m/s^{1.75}$ (XB2100:1);
- the **E**xposure **L**imit **V**alue base on ***VDV*** result in channel Y is equal to 21.0 $m/s^{1.75}$ (XB2100:2);
- the **E**xposure **L**imit **V**alue base on ***VDV*** result in channel Z is equal to 21.0 $m/s^{1.75}$ (XB2100:3);
- the **ELV** alarm source is selected (XV2);
- the wave trigger signal recording is switched off (XG0);
- the RMS value from channel Y is treated as a source of the wave triggering signal (XJ2);
- the wave trigger level is equal to 120 dB (XK120);
- the additional recording time before the triggering in wave trigger is switched off (XP0);
- the recording time in wave trigger mode is equal to 10 seconds (Xc10).
- the time-domain signal from channel Z will be recorded in wave trigger (XC4);
- the PCM wave file format is selected (XD0),

Note: *All bytes of that transmission are ASCII characters****.***

A.3. Function #2 - measurement results read-out in the VLM mode

#2 function enables one to read-out the current measurement result from the selected channel in the **VLM** mode.

Note: *This function can also be programmed while measurements are taking place. In this case, the RMS values measured* ***after entering #2 function*** *are sent out****.***

#2 function has the format defined as follows:

#2,p,X?,X?,X?,(...),X?;

where:

X - the code of the result,

p - the number of channel:

1 - channel **X,** profile 1 (channel filter),

2 - channel **Y,** profile 1 (channel filter),

3 - channel **Z,** profile 1 (channel filter).

4 - channel **X,** profile 2 (Band Limiting of channel filter),

5 - channel **Y,** profile 2 (Band Limiting of channel filter),

6 - channel **Z,** profile 2 (Band Limiting of channel filter).

Note: *After finishing the measurement,* ***#2*** *function is no longer active and has to be reprogrammed in order to read-out successive measurements.*

The instrument sends the values of results in the format defined as follows:

#2,p,Xccc,Xccc,Xccc,(...),Xccc; (where **p** - the number of channel)

or

#2,?; (when the results are not available).

The codes of the results from the **DOSE METER** mode are defined as follows:

v the under-range flag (ccc equals to 0 when the overload did not occur, 1 when the under-range took place during the last measurement period);
V the overload flag (ccc equals to 0 or 1);
T time of the measurement (ccc – value in seconds);
P the **PEAK** value (ccc – the value in dB);
Q the **P_P** value (ccc – the value in dB);
M the **MAX** value (ccc – the value in dB);
R the **aw** value (ccc – the value in dB);
H the **VDV** value (ccc – the value in dB);
F the **CRF** value (Crest Factor);
s the **MSDV** value (ccc – the value in dB);
O the **awv** result (ccc – the value in dB);
a the **CDose** result (ccc – the value in dB);
b the **DDose** result (ccc – the value in dB);
c the **CExp** result (ccc – the value in dB);
o the **CExp** result (ccc – the value in points);
f the **A(8)** result (ccc – the value in dB);
p the **A(8)** result (ccc – the value in points);
r the **aren** result (ccc – the value in dB);
t the **VDVR** result (ccc – the value in dB);
g the **EAVTT** result (ccc – the value in s);
h the **EAVTL** result (ccc – the value in s);
i the **ELVTT** result (ccc – the value in s);
j the **ELVTL** result (ccc – the value in s);

The exemplary results of the instrument's response after sending to it the following sequence of characters: **#2,1;** coming from the channel **X** are given below:

#2,1,v0,V0,T3,P107.82,Q112.84,M96.45,R94.06,H102.58,F4.88,s98.83,O115.12,a123.40,b143.31,c75.21,o0,f115.03,p127,r115.12,t143.31,g0,h0,i12,j9;

Note: *The presented above order of the measurement results sent out by the instrument does not depend about the characters sent to the unit.*

Example: After sending to the instrument the string:

#2,1,T?,R?,V?,P?;

the unit sends out the results of measurement coming from the channel X in predefined, described above, order:

#2,1,V0,T3,P107.82,R94.06;

Note: *The value displayed on the screen during the result's presentation is sent out from the instrument in the case when* ***nn*** *is not given after* ***X*** *character.*

Note: *All bytes of that transmission are ASCII characters.*

A.4. Function #3 - Read-out of the measurement results in 1/1 octave or 1/3 octave modes

#3 function enables one to read out the current measurement results in **1/1 OCTAVE** or **1/3 OCTAVE** mode.

#3 function format is defined as follows:

#3; The device responds, sending the last averaged spectrum.
#3,A; The device responds, sending the last averaged spectrum
#3,I; The device responds, sending the last instantaneous spectrum
#3,M; The device responds, sending the last max spectrum
#3,N; The device responds, sending the last min spectrum

The device responds, sending the last measured spectrum (when the instrument is in STOP state) or currently measured spectrum (when the instrument is in RUN state) in the following format:

#3;<Status Byte> <LSB of the transmission counter> <MSB of the transmission counter> <X channel data byte> (...) <X channel data byte> <Y channel data byte> (...) <Y channel data byte> <Z channel data byte> (...) <Z channel data byte>

Status Byte gives the information about the current state of the instrument.

D7	D6	D5	D4	D3	D2	D1	D0

where:

D7 = 0 means that "overload does not happen" in Z channel,
= 1 means that "overload appeared" in Z channel,
D6 = 0 means that "overload does not happen" in Y channel,
= 1 means that "overload appeared" in Y channel,
D5 = 0 means that "overload does not happen" in X channel,
= 1 means that "overload appeared" in X channel,
D4 = 0 the instantaneous current result (RUN State),
= 1 the final result (STOP State),
D3 = 1 the **1/3 OCTAVE** results,
D2 = 1 the **1/1 OCTAVE** results,

D1,D0 – type of spectrum:

00 means that averaged spectrum,

01 means that instantaneous spectrum,

10 means that max spectrum,

11 means that min spectrum,

Note: *The measurement result is coded in binary form as dB•100 (e.g. 34.52 dB is sent as binary number 3452).*

A.5. Function #4 - read-out of the data file from the internal flash-disc

#4 function enables the user to read-out the data file from the internal Flash-disc memory. The data file formats are given in Appendix B.

#4 function formats are defined as follows:

#4,0,\; the file containing the catalogue,

#4,0,?; the count of the files,

#4,0,index,count; the part of the file containing the catalogue,

where:

index - first record,

count - number of records in the catalogue.

#4,1,fname; the file containing the measurement results,

#4,1,fname,?; file size,

#4,1,fname,offset,length; the part of the file containing the measurement results,

where:

fname - name containing not more than eight characters,
offset - offset from the beginning of the file,
length - number of bytes to read,

#4,4; the Settings file,

#4,4,?; size of Settings file,

#4,4,offset,length; the part of Settings file,

where:

offset - offset from the beginning of the Settings file,
length - number of bytes to read,

Note: *The "\" character is treated as the file name of the catalogue and must be sent to the instrument.*

All data words are sent as **<LSB>**,**<MSB>**.

When an error is detected in the file specification or data, the instrument will send:

#4,?;

The catalogue of the files is a set of the records containing 16 words (16 bits each). Each record describes one file saved in the instrument's Flash-disc. The record structure is as follows:

words 0 - 3	8 characters of the file name,
word 4	file type (binary number),
word 5	reserved,
word 6	the least significant word of the file size,
word 7	the most significant word of the file size,
words 8 - 15	reserved.

A.6. Function #D - Read / Write the data files from the external memory (SD Card)

<disk>	logical disk number: 0 – SD Card, 1 – USB Disk (not implemented), 2 – Internal Memory (not implemented)
<address>	directory address (cluster numer) – for internal memory 0
<offsetB>	offset the first byte to read (an even number).
<nB>	number of bytes to read (an even number)
<data>	binary data.
<count>	directory size in bytes
<name>	file name in format XXXXXXXX.YYY (XXXXXXXX – file name, YYY- file name extension)
<dirName>	directory name
<nBwr>	number of bytes to write

1) #D,c,?; this function returns the list of available disks in format:

   #D,c,<disk1>[,<disk2>[,<disk3>]];

2) #D,d,?; this function returns the parameters of the working directory in format:

   #D,d,<disk>,<address>,<count>;

3) #D,d,<disk>,<address>; this function enables to change the working directory

   Response:

#D,d;	- command was executed
#D,d,?;	- command cannot be executed

4) #D,r,<disk>,<address>,<offsetB>,<nB>; function enables the user to read the file (except of internal memory):

Response:

#D,r,<disk>,<address>,<offsetB>,<nB>; [<data>]

5) #D,w,<name>,<nBwr>;<data> function enables the user to write the file to working directory:

Response:

#D,w; - command was executed

#D,w,?; - command cannot be executed

6) #D,e,<name>; function enables the user to delete the file in working directory:

Response:

#D,e; - command was executed

#D,e,?; - command cannot be executed

7) #D,e; function enables the user to delete all files in in working directory:

Response:

#D,e; - command was executed

#D,e,?; - command cannot be executed

8) #D,m,<address>,<dirName>; function enables the user to create a subdirectory in the directory defined by <address>:

Response:

#D,m; - command was executed

#D,m,?; - command cannot be executed

9) #D,f,<address>; function enables the user to delete directory and its contents (files and subdirectories):

Response:

#D,f; - command was executed

#D,f,?; - command cannot be executed

A.7. Function #7 - special control functions

#7 function enables the user to perform special control functions. **Some of them should be used with the extreme care.**

#7 function formats are defined as follows:

#7,AF;

Get Alarm Flags.

Response format:

#7,AF,xx;

where **xx** defined as a sum of the following flags:

1 – EAV.

2 – ELV.

#7,AS;

Get settings for the Auto-Run function.

Response format:

#7,AS,e,HH,MM,hh,mm,dW,mR;

where:

e – On (e=1), Off (e=0),

HH – hour of the measurement start,

MM – minutes of the measurement start,

hh – hour of the measurement stop,

mm – minutes of the measurement stop,

dW – day of week in which the measurement will be done:

bit:0 – Monday,

...

bit:6 – Sunday

mR – maximum number of the measurement days,

#7,AS, e,HH,MM,hh,mm,dW,mR;

where:

e – On (e=1), Off (e=0),

HH – hour of the measurement start,

MM – minutes of the measurement start,

hh – hour of the measurement stop,

mm – minutes of the measurement stop,

dW – day of week in which the measurement will be done:

bit:0 – Monday,

...

bit:6 – Sunday

mR – maximum number of the measurement days,

Response format:

#7,AS;

#7,BC;

Reserved.

#7,BD;

Reserved.

#7,BN;

Get number of logger files created to the current time.

Response format:

#7,BN,xxx;

where:

xxx – number of logger files.

#7,BS;

Get battery state.

Response format:

#7,BS,x;

where:

x – battery state in [%].

#7,BV;

Get battery voltage.

Response format:

#7,BV,xxx;

where:

xxx – battery voltage in [10 mV].

#7,CA;

Get the charger and charging status.

Response format:

#7,BS,x,y;

where:

x=0 – charger: off.

x=1 – charger: slow charge.

x=2 – charger: fast charge.

y**=0** – charging: no charging.

y**=1** – charging: charging.

y**=2** – charging: charging failure.

#7,CP;

Get selected **Standard**.

Response format:

#7,CP,xx;

where:

xx = **EC** – Directive 2002/44/EC,

xx = **BR** – Brazilian,

xx = **FR** – French,

xx = **GE** – German,

xx = **IT** – Italian,

xx = **UD** – User defined,

xx = **UK** – English,

xx = **PL** – Polish,

#7,CP,xx;

Set **Standard** for.

where:

xx = **EC** – Directive 2002/44/EC,

xx = **BR** – Brazilian,

xx = **FR** – French,

xx = **GE** – German,

xx = **IT** – Italian,

xx = **UD** – User defined,

xx = **UK** – English,

xx = **PL** – Polish,

Response format:

#7,CP;

#7,CS;

Clear setup (restore factory settings).

Response format:

#7,CS;

#7,DS,name;

Delete setup file in SETUP directory.

where:

name – setup file name,

Response format:

#7,DS;

#7,DU;

Get display units.

Response format:

#7,DU,x;

where:

x = 0 – logarithmic,

x = 1 – linear metric,

x = 2 – linear non-metric.

#7,DU,x;

Set display units.

where:

x = 0 – logarithmic,

x = 1 – linear metric,

x = 2 – linear non-metric.

Response format:

#7,DU;

#7,ED;

Delete all files and directories on SD card. The function is not accepted while the instrument is in the RUN state.

Response format:

#7,ED;

#7,EW;

Get event/wave recording state.

Response format:

#7,EW,r,t;

where:

r – event/wave recording state,

r = 1 - event/wave recording is performed,

r = 0 - no event/wave is recording,

t – back counting timer [s] of event /wave recording, works only in the recording with time limit

#7,EW,s;

Start/stop event/wave recording. This command will work only if one of event/wave trigger recording mode is set.

where:

s = 1 - Start event/wave recording with no time limit,

s = 0 - Stop event/wave recording,

Response format:

#7,EW;

#7,EW,1,t;

Start event/wave recording with time limit. This command will work only if one of event/wave trigger recording mode is set.

where:

t - Recording time limit in seconds in range <1 – 28800>,

Response format:

#7,EW;

#7,EV;

Get external supply voltage.

Response format:

#7,EV,xxx;

where:

xxx – external supply voltage in [10 mV].

#7,FS;

Get file system version.

Response format:

#7,FS,x.xx;

where:

x.xx – file system version number.

#7,FT;

Get SD-card fat type.

Response format:

#7,FT,x;

where:

x = -1 – SD-card is not available,

x = 1 – FAT16,

x = 2 – FAT32,

x = 3 – FAT12.

#7,IC;

Reserved.

#7,KL;

Get the states of keyboard lock.

Response format:

#7,KL,x;

where:

x = 0 – keyboard lock off,

x = 1 – keyboard lock on.

#7,KL,x;

Get the states of keyboard lock.

where:

x = 0 – keyboard lock off,

x = 1 – keyboard lock on.

Response format:

#7,KL;

#7,LA;

Get interface language.

Response format:

#7,LA,name;

where:

xx = **GE** – German,

xx = **EN** – English,

xx = **IT** – Italian,

xx = **PL** – Polish,

xx = **HU** – Hungarian,

xx = **TU** – Turkish,

xx = **RU** – Russian,

xx = **NL** – Flemish,

xx = **FR** – French,

xx = **SP** – Spanish,

#7,LB;

Get the name of the last logger filename.

Response format:

#7,LB,name;

where:

name – last logger filename.

#7,LN;

Get the name of the next logger filename.

Response format:

#7,LB,name;

where:

name – next logger filename.

#7,LS,name;

Load setup and writes settings into EEPROM. The selected file must exist.

where:

name – setup file name.

Response format:

#7,LS;

#7,LW;

Get name of last created wave file**;**

Response format:

#7,LW,name;

where:

name – wave file name.

#7,MC;

Get acceleration sensor compensation.

Response format:

#7,MC,x;

where:

x = 0 – Off,

x = 1 – On,

#7,MC,x;

Set acceleration sensor compensation.

where:

x = 0 – Off,

x = 1 – On,

Response format:

#7,MC;

#7,MG,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15,p16,p17,p18,p19,p20;

Set GPS marker. All parameters are optional.

where:

p1 – signal quality,

p1 = 0 - no signal,

p1 = 1 - GPS fix,

p2 – Seconds part of time,

p3 – Minutes part of time,

p4 – Hours part of time,

p5 – Day,

p6 – Month,

p7 –Year,

p8 – Degree part of latitude,

p9 – Minutes part of latitude,

p10 – Seconds part of latitude,

p11 – Miliseconds part of latitude,

p12 – Latitude direction: N, S,

p13 – Degree part of longitude,

p14 – Minutes part of longitude,

p15 – Seconds part of longitude,

p16 – Miliseconds part of longitude,

p17 – Longitude direction: E, W,

p18 – Altitude in meters,

p19 – Decimal part of altitude,

p20 – Speed * 100 (km/h),

Response format:

#7,MG;

#7,MM;

Get last remote marker parameter.

Response format:

#7,MC,x,y,name;

where:

x – number of the marker (1-16, 0 - end of all block markers when y=2),

y – type of the marker:

y = 0 - point,

y = 1 - block (start),

y = 2 - block (stop),

y = 3 - time,

name – name of the marker,

#7,MM,x,y,b1,b2,b3,b4,b5,b6,e1,e2,e3,e4,e5,e6,name;

Set remote marker.

where:

x – number of the marker (1-16, 0 - end of all block markers when MarkerType=2),

y – type of the marker:

y = 0 - point,

y = 1 - block (start),

y = 2 - block (stop),

y = 3 - time,

b1 – marker start date: year

b2 – marker start date: month

b3 – marker start date: day of the month

b4 – marker start time: hour

b5 – marker start time: minute

b6 – marker start time: second

e1 – marker end date: year

e2 – marker end date: month

e3 – marker end date: day of the month

e4 – marker end time: hour

e5 – marker end time: minute

e6 – marker end time: second

name – name of the marker,

b1,b2,b3,b4,b5,b6,e1,e2,e3,e4,e5,e6 – Fields are optional and are only present for MarkerType=3.

Response format:

#7,MM;

#7,NF;

Get SD-card number of free sectors (sector = 512 bytes).

Response format:

#7,NF,x;

where:

x – number of free sectors (in case of **x = -1** SD-card is not available).

#7,NS;

Get SD-card number of sectors (sector = 512 bytes).

Response format:

#7,NS,x;

where:

x – number of sectors (in case of **x = -1** SD-card is not available).

#7,PC;

Get Post Calibration.

Response format:

#7,PC,x;

where:

x = 0 – off,

x = 1 – last file,

x = 2 – files after last calibration.

#7,PC,x;

Set Post Calibration.

where:

x = 0 – off,

x = 1 – last file,

x = 2 – files after last calibration.

Response format:

#7,PC;

#7,PF;

Get Force Detector Mode.

Response format:

#7,PF,x;

where:

x = 0 – Marker Mode,

x = 1 – Pause Mode,

#7,PF,x;

Set Force Detector Mode.

where:

x = 0 – Marker Mode,

x = 1 – Pause Mode,

Response format:

#7,PF;

#7,PI;

Get internal microcontroller firmware version.

Response format:

#7,PI,x.xx;

where:

x.xx – internal microcontroller firmware version number.

#7,PO;

Power off the instrument.

Response format:

#7,PO;

#7,PR;

Get force detector result.

Response format:

#7,PR,x;

where:

x = 0 – Absent,

x = 1 – Present,

#7,RT;

Get current real time clock settings.

Response format:

#7,RT,hh,mm,ss,DD,MM,YYYY;

where:

hh:mm:ss – time,

DD/MM/YYYY – date.

#7,RT,hh,mm,ss,DD,MM,YYYY;

Set current real time clock and date settings;

where:

hh:mm:ss – time,

DD/MM/YYYY – date.

Response format:

#7,RT;

#7,SC;

Reserved.

#7,SD;

Get date and time of last loaded setup file;

Response format:

#7,RT,hh,mm,ss,DD,MM,YYYY;

where:

hh:mm:ss – time,

DD/MM/YYYY – date.

#7,SE;

Reserved.

#7,SF;

Reserved.

#7,SL;

Get the number of setup files

Response format:

#7,SL,xxx;

where:

xxx – number of setup files.

#7,SL,xxx;

Get the setup file name with the specified number

Response format:

#7,SL,name;

where:

name – setup file name.

#7,SN;

Get last loaded setup file name;

Response format:

#7,SN,name;

where:

name – setup file name.

#7,SP;

Reserved.

#7,SS,name;

Create setup file based on the current settings and save on SD card.

where:

name – name of the setup file.

Response format:

#7,SS;

#7,ST;

Get Standby Delay.

Response format:

#7,ST,xxx;

where:

xxx – time to standby in [s].

#7,ST,x;

Set Standby Delay.

where:

xxx – time to standby in [s].

Response format:

#7,ST;

#7,TH,mmmm,d;

Get Time history.

where:

mmmm – the mask of selected results (hexadecimal):

b0 - **PEAK**, channel X,

b1 - **P-P**, channel X,

b2 - **MAX**, channel X,

b3 - **aw**, channel X,

b4 - **VDV**, channel X,

b5 - **PEAK**, channel Y,

b6 - **P-P**, channel Y,

b7 - **MAX**, channel Y,

b8 - **aw**, channel Y,

b9 - **VDV**, channel Y,

b10 - **PEAK**, channel Z,
b11 - **P-P**, channel Z,
b12 - **MAX**, channel Z,
b13 - **aw**, channel Z,
b14 - **VDV**, channel Z,
b15 - **awv,**

d – fifo buffer pointer:
d = 0 - set fifo pointer to the beginning before sending
d = 1 - auto-incrementing of the fifo pointer
d = 2 - set fifo pointer to the last measured result before sending

Response format:

#7,TH,r,mmmm,s,rn,rl,date,time,res1..resN;

where:

r – state of the instrument:
r0 - RUN state,
r1 - STOP state,

mmmm – the mask of selected results (hexadecimal):
b0 - **PEAK**, channel X,
b1 - **P-P**, channel X,
b2 - **MAX**, channel X,
b3 - **aw**, channel X,
b4 - **VDV**, channel X,
b5 - **PEAK**, channel Y,
b6 - **P-P**, channel Y,
b7 - **MAX**, channel Y,
b8 - **aw**, channel Y,
b9 - **VDV**, channel Y,
b10 - **PEAK**, channel Z,
b11 - **P-P**, channel Z,
b12 - **MAX**, channel Z,
b13 - **aw**, channel Z,
b14 - **VDV**, channel Z,
b15 - **awv,**

s – logger step in seconds,

rn – the number of transmitted logger records,

rl – the number of records in the fifo,

date – the date of the first of the transferred records in format DD/MM/YYYY,

time – the time of the first of the transferred records in format HH/MM/SS,

res1..resN - the results in accordance with the mask (N records). The results of each record contains as many results as there are set bits in the mask

#7,TP;

Get temperature;

Response format:

#7,TP,xx.x;

where:

xx.x – temperature in °C.

#7,UF;

Get usb speed;

Response format:

#7,UF,x;

where:

x = 0 – High speed (480Mbps).

x = 1 – Full speed (12Mbps).

#7, UF,x;

Set usb speed;

where:

x = 0 – High speed (480Mbps).

x = 1 – Full speed (12Mbps).

Response format:

#7,UF;

#7,UN;

Get unit name;

Response format:

#7,UN,name;

where:

name – unit name.

#7,UN,name;

Sets the unit name;

where:

name – unit name.

Response format:

#7,UN;

#7,US;

Get unit subtype.

Response format:

#7,US,x;

where:

x – subtype number.

#7,UV;

Get USB voltage.

Response format:

#7,UV,xxx;

where:

xxx – USB voltage in [10 mV].

#7,VB;

Get bootstrap program version.

Response format:

#7,VB,x.xx;

where:

x.xx – bootstrap program version number.

#7,VH;

Get hardboot program version.

Response format:

#7,VH,x.xx;

where:

x.xx – hardboot program version number.

For the unknown function and/or in the case of the other error, all these functions return the following sequence of characters: **#7,?;**

A.8. Function #9 - write-in the data file into the internal flash-disc

#9 function enables the user to write-in the data file into the internal Flash-disc memory. The data file formats are given in Appendix B.

#9 function formats are defined as follows:

#9,FILE_TYPE,FILE_LENGTH,DATA

where:

FILE_TYPE type of the file

	1 - result file, 2 - setup file,
FILE_LENGTH	length of the file in bytes,
DATA	binary content of the file.

A.9. Control setting codes

The control setting codes used in the SV 100A instrument (the internal software revision 1.02.5) are given in the table below.

Table A.1. Control setting codes

Group name	Group code	Code description
Unit type	**U**	`U100` (read only)
Serial number	**N**	`Nxxxx` (read only)
Software version	**W**	`Wx.xx.x` x.xx.x - revision number (read only)
Calibration factor	**Q**	`Qn.nn:c` `n.nn` - real number with the value of the calibration factor ∈(-2.0 ÷ 3.0) for X, Y, Z channel `c` - the number of channel: 1:X, 2:Y, 3:Z
Calibration level	**q**	`Qn.nn` n.nn - real number with the value of the calibration level ∈(100.0 ÷ 145.0)
Measurement function	**M**	`M2` - **1/1 OCTAVE** analyser `M3` - **1/3 OCTAVE** analyser `M4` - **DOSE METER**
Filter type	**I**	Filter type in channel `n` `I16:n` **Wk** filter for profile 1, channel n `I17:n` **Wd** filter for profile 1, channel n `I20:n` **Wm** filter for profile 1, channel n `I23:n` **Wb** filter for profile 1, channel n `I24:n` **Wf** filter for profile 1, channel n

Group name	Group code	Code description
Logger type	**G**	`Gx` - x - sum of the following flags flags: `1` - logger with **PEAK** values `2` - logger with **P–P** values `4` - logger with **MAX** values `8` - logger with **aw** values `16` - logger with **VDV** values `32` - logger with **awv** values `64` - logger with **Spectrum** values
Summary results	**g**	`gx` - x - sum of the following flags flags: `1` - **Main Results** values `2` - **Spectrum** values `4` - **Spectrum MAX** values `8` - **Spectrum MIN** values
Logger step	**d**	`dn` n = number in milliseconds ∈ (**100**, **200**, **500**, **1000**) `dns` n = number in seconds ∈ (1 ÷ 60) `dnm` n = number in minutes ∈ (1 ÷ 60)
Integration period	**D**	`D0` - infinity (measurement finished by pressing the **<STOP>** push-button or remotely by sending S0 control code) `Dnns` nn number in seconds `Dnnm` nn number in minutes `Dnnh` nn number in hours
Repetition of the measurement cycles (RepCycle)	**K**	`K0` - infinity (measurement finished by pressing the **Stop** or remotely - by sending S0 control code) `Knnnn`- nnnn number of repetitions ∈(1 ÷ 1000)
Exposure Time	**e**	`ennn` - nnn time in minutes ∈(1 ÷ 720)
Logger	**T**	`T0` - switched **Off** `T1` - switched **On**
Delay in the start of measurement	**Y**	`Ynn` - nn delay given in seconds ∈(0 ÷ 60)
Synchronization the start of measurement with RTC	**y**	`y0` - switched off (**OFF**) `y1` - synchronization to 1 min. `y15` - synchronization to 15 min. `y30` - synchronization to 30 min. `y60` - synchronization to 1 hour.

Group name	Group code	Code description
State of the instrument (Stop, Start or Pause)	**S**	`S0` - **STOP** `S1` - **START** `S2` - **PAUSE**
awv (vector) coefficient	**J**	`Qn.nn:c` `n.nn` - real number with the value of the **awv** result coefficient for X, Y, Z channel `c` - the number of channel: 1:X, 2:Y, 3:Z
Time-domain signal recording mode	**m**	`m0` - switched off (**OFF**) `m1` - recording all measurement `m2` - recording on trigger **SLOPE +** `m3` - recording on trigger **SLOPE –** `m4` - recording on trigger **LEVEL +** `m5` - recording on trigger **LEVEL –**
Time-domain signal recording: stored channel	**k**	`kx` - x - sum of the following flags: `1` - channel X `2` - channel Y `4` - channel Z
Time-domain signal recording: source of the triggering signal	**s**	`sx` - x - sum of the following flags: `1` - the RMS in channel X `2` - the RMS in channel Y `4` - the RMS in channel Z
Time-domain signal recording: triggering level	**l**	`lnnn` - nnn level in dB $\in$(80 ÷ 160)
Time-domain signal recording: pre-trigger time	**p**	`p0` - switched **Off** `p1` - switched **On**
Time-domain signal recording: recording time	**n**	`nkkk` - kkk time in second $\in$(1 ÷ 1800) `n0` - recording to the end of measurement
Reference Level	**Xa**	`Xax` - x = reference level $\in$(1 ÷ 100) in µm/s^2
Exposure **A**ction **V**alue calculation mode	**Xe**	`Xe0` - **aw** option only `Xe1` - **VDV** option only `Xe2` - depending on the crest factor `Xe3` - **aren** and **VDVR**
Exposure **L**imit **V**alue calculation mode	**XE**	`XE0` - **aw** option only `XE1` - **VDV** option only `XE2` - depending on the crest factor `XE3` - **aren** and **VDVR**

Group name	Group code	Code description
Exposure **A**ction **V**alue (aw or aren limit)	**Xf**	`Xfnnn:c` nnn **E**xposure **A**ction **V**alue given in 0.01 m/s^2 for channel `n`
Exposure **A**ction **V**alue (VDV or VDVR limit)	**XF**	`XFnnn:c` nnn **E**xposure **A**ction **V**alue given in 0.01 m/s$^{1.75}$ for channel `n`
Exposure **L**imit **V**alue (aw or aren limit)	**Xb**	`Xbnnn:c` nnn **E**xposure **L**imit **V**alue given in 0.01 m/s^2 for channel `n`
Exposure **L**imit **V**alue (VDV or VDVR limit)	**XB**	`XBnnn:c` nnn **E**xposure **L**imit **V**alue given in 0.01 m/s$^{1.75}$ for channel `n`
Alarm Mask	**XV**	`XVx` - x - activated alarm defined as a sum of the following flags: `1` - **EAV** `2` - **ELV**
Wave signal recording mode	**XG**	`XG0` - switched off (**OFF**) `XG1` - recording all measurement `XG2` - recording on trigger **SLOPE +** `XG3` - recording on trigger **SLOPE –** `XG4` - recording on trigger **LEVEL +** `XG5` - recording on trigger **LEVEL –**
Wave signal recording: stored channel	**XC**	`XCx` - x - sum of the following flags: `1` - channel X `2` - channel Y `4` - channel Z
Wave signal recording: source of the triggering signal	**XJ**	`XJx` - x - sum of the following flags: `1` - the RMS in channel X `2` - the RMS in channel Y `4` - the RMS in channel Z
Wave signal recording: triggering level	**XK**	`XKnnn`- nnn level in dB $\in$(80 ÷ 160)
Wave signal recording: pre-trigger time	**XP**	`XP0` - switched **Off** `XP1` - switched **On**
Wave signal recording: recording time	**Xc**	`Xckkk`- kkk time in second $\in$(1 ÷ 1800) `Xc0` - recording to the end of measurement
Wave signal recording: File format	**XD**	`XD0` - PCM wave file format `XD1` - Extensible wave file format

APPENDIX B. DATA FILE STRUCTURES

B.1. General structure of the SV 100A file

Each file containing data from the **SV 100A** instrument consists of several groups of words. In the case of the **SV 100A** (the internal file system rev. **1.03**), there are different types of files containing:

- the results stored in the file (cf. App. B.2)
- the setup data (cf. App. B.3)

Each file has the following elements:

- the SvanPC file header (cf. Tab. B.1.1)
- the file header (cf. Tab. B.1.2)
- the unit and internal software specification (cf. Tab. B.1.3)
- the calibration settings (cf. Tab. B.1.23)
- the user's text (a header) stored together with the measurement data (cf. Tab. B.1.4)
- the Unit text info (cf. Tab. B.1.22);
- the parameters and global settings, common for all axes (cf. Tab. B.1.5)
- the time-domain signal recording parameters (cf. Tab. B.1.8)
- the wave-file recording parameters (cf. Tab. B.1.9)
- the special settings for axes (cf. Tab. B.1.10)
- the awv measurement settings (cf. Tab. B.1.11)
- the display settings of the main results (cf. Tab. B.1.12)
- the logger settings (cf. Tab. B.1.15)
- the data stored during the measurements in the file of the logger (cf. Tab. B.1.16)
- the main results saved in Summary Results Record (cf. Tab. B.1.17)

The other elements of the file structure are not obligatory for each file type stated above. They depend on the file type (**VLM**, **DOSE METER**, **1/1 OCTAVE**, **1/3 OCTAVE**). These elements are as follows:

- the settings of the instrument saved in the setup file (cf. Tab. B.1.13)
- the results coming from **1/1 OCTAVE** analysis saved in Summary Results Record (cf. Tab. B.1.18)
- the results coming from **1/3 OCTAVE** analysis saved in Summary Results Record (cf. Tab. B.1.19)

Below, all file structure groups are described separately in Tab. B.1.1 – Tab. B.1.20. The format used in the columns, named **Comment** with the square parenthesis ([xx, yy]), means the contents of the word with; **xx** is the most significant byte (MSB) and **yy** the lowest significant byte (LSB) of the word. The format 0xnnnn means that the nnnn is four-digit number in hexadecimal form.

In the logger and results files the result value equal to -12288 (0xd000) denotes the undefined value.

Table B.1.1. SvanPC file header

Word number	Name	Comment
0..2	“SvanPC”	reserved
3	26	reserved
4	32	reserved
5	3	reserved
6..15	Reserved	reserved
…	…	…

Table B.1.2. File header

Word number	Name	Comment
0	0xnn01	[01, nn=header’s length]
1..4	FileName	name of the file (8 characters)
5	Reserved	reserved
6	CurrentDate	file creation date (cf. App. B.4)
7	CurrentTime	file creation time (cf. App. B.4)
8..13	Reserved	reserved
…	…	…

Table B.1.3. Unit and software specification

Word number	Name	Comment
0	0xnn02	[02, nn=specification’s length]
1	UnitNumberL	unit number (LSB word)
2	UnitType	type of the unit: 100
3	SoftwareVersion	software version: 103
4	SoftwareIssueDate	software issue date
5	DeviceMode	mode of the instrument: 0 - **Vibration Level Meter** / **Analyser**
6	UnitSubtype	subtype of the unit: 2 - SV 100A
7	FileSysVersion	file system version:103
8	reserved	reserved
9	SoftwareSubversion	software subversion: 1
10	UnitNumberH	unit number (MSB word)
…	…	…

Table B.1.4. USER's text

Word number	Name	Comment
0	0xnn03	[03, nn=specification's length]
1…	title text	the user's text (two characters in a word) finished with one or two null bytes

Table B.1.5. Parameters and global settings

Word number	Name	Comment
0	0xnn04	[04, nn=block's length]
1	MeasureStartDate	measurement start date (cf. App. B.4)
2	MeasureStartTime	measurement start time (cf. App. B.4)
3	DeviceFunction	device function: 1 - **LEVEL METER** 2 - **1/1 OCTAVE** analyser 3 - **1/3 OCTAVE** analyser 4 - **DOSE METER**
4	MeasureInput	measurement input type: 5 - **Accelerometer**
5	Range	measurement range: 2 - **SINGLE**
6	UnitFlags	calibration flags: b0 - if set to 1: calibration coefficient is used in X axis b1 - if set to 1: calibration coefficient is used in Y axis b2 - if set to 1: calibration coefficient is used in Z axis
7	RepCycle	repetition cycle: 0 - infinity nnnn - number of repetitions $\in(1 \div 1000)$
8	NofAxes	number of axes (3)
9	NofProf	number of profiles (2)
10	TimeToStart	start-delay-time specified in seconds: 0..300
11..12	IntTimeSec	integration time specified in seconds
13		reserved
14	RmsInt	detector's type in the **aw** function: 0 - **LINEAR** 1 - **EXPONENT.**
15	SpectrumFilter	**1/1 OCTAVE** or **1/3 OCTAVE** analysis filter: 1 – HP1 in other cases: reserved
16	SpectrumBuff	**1/1 OCTAVE** or **1/3 OCTAVE** logger: 0 - **OFF**, 1 - **ON**

		in other cases: reserved
17	ExposureTime	exposure time: 0xffff - Exposure Time is equal to time of the measurement 1..480 (min)
18	RefLev_a	reference level for acceleration given in 0.01dB referenced to 1 μms^{-2}
19	Reserved	reserved
20	Reserved	reserved
21	Country	**Standard**: 0 - **User defined** 1 - **Directive 2002/44/EC** 2 - **German** 3 - **English** 4 - **Italian** 5 - **French** 6 - **Polish** 7 - **Brazilian**
22	MainResBuff	Summary results. Contents defined as a sum of: 0 - none 1 - **Main Results** 2 - **Spectrum** 4 - **Spectrum MAX** 8 - **Spectrum MIN**
23	AccComp	compensating filter for acceleration sensor: 0 - switched off, 1 - switched on
24	EAVlimit	Exposure Action Value calculation mode: 0 - aw option only 1 - VDV option only 2 - depending on the crest factor 3 - aren or VRVR depending on the crest factor (only for Brazilian standards)
25	EAV X (aw limit)	Exposure Action Value in **X axis** given in 0.01 m/s^2 (aw limit) or Exposure Action Value given in 0.01 m/s^2 (aren limit) for Brazilian standard
26	EAV Y (aw limit)	Exposure Action Value in Y **axis** given in 0.01 m/s^2 (aw limit)
27	EAV Z (aw limit)	Exposure Action Value in Z **axis** given in 0.01 m/s^2 (aw limit)
28	EAV X (VDV limit)	Exposure Action Value in **X axis** given in 0.01 $m/s^{1.75}$ (VDV limit) or Exposure Action Value given in 0.01 $m/s^{1.75}$ (VDVR limit) for Brazilian standard
29	EAV Y (VDV limit)	Exposure Action Value in Y **axis** given in 0.01 $m/s^{1.75}$ (VDV limit)
30	EAV Z (VDV limit)	Exposure Action Value in Z **axis** given in 0.01 $m/s^{1.75}$ (VDV limit)
31	ELVlimit	Exposure Limit Value calculation mode: 0 - aw option only

		1 - VDV option only 2 - depending on the crest factor 3 - aren or VRVR depending on the crest factor (only for Brazilian standards)
32	ELV X (aw limit)	Exposure Limit Value in **X axis** given in 0.01 m/s^2 (aw limit) or Exposure Limit Value given in 0.01 m/s^2 (aren limit) for Brazilian standard
33	ELV Y (aw limit)	Exposure Limit Value in Y **axis** given in 0.01 m/s^2 (aw limit)
34	ELV Z (aw limit)	Exposure Limit Value in Z **axis** given in 0.01 m/s^2 (aw limit)
35	ELV X (VDV limit)	Exposure Limit Value in **X axis** given in 0.01 $m/s^{1.75}$ (VDV limit) or Exposure Limit Value given in 0.01 $m/s^{1.75}$ (VDVR limit) for Brazilian standard
36	ELV Y (VDV limit)	Exposure Limit Value in Y **axis** given in 0.01 $m/s^{1.75}$ (VDV limit)
37	ELV Z (VDV limit)	Exposure Limit Value in Z **axis** given in 0.01 $m/s^{1.75}$ (VDV limit)
38	AlarmMask	activated alarm defined as a sum of: 0 - none 1 - **EAV** 2 - **ELV**
39	SpectrumFilterTotal[1]	**1/1 OCTAVE** or **1/3 OCTAVE** analysis filter for Total 1: 124 - band Limit of **Wf** in other cases: reserved
40	SpectrumFilterTotal[2]	**1/1 OCTAVE** or **1/3 OCTAVE** analysis filter for Total 2: 117 - band Limit of **Wd** in other cases: reserved
41	SpectrumFilterTotal[3]	**1/1 OCTAVE** or **1/3 OCTAVE** analysis filter for Total 3: 120 - band Limit of **Wm** in other cases: reserved
42	Pause[1]	Programmable pause no. 1.
43	PauseBegin[1]	The start time of the pause no. 1 in format 0xhhmm hh – hour mm – minute
44	PauseEnd[1]	The end time of the pause no. 1 in format 0xhhmm: hh – hour mm – minute
45	Pause[2]	Programmable pause no. 2.
46	PauseBegin[2]	The start time of the pause no. 2 in format 0xhhmm hh – hour mm – minute
47	PauseEnd[2]	The end time of the pause no. 2 in format 0xhhmm: hh – hour mm – minute
48	Pause[3]	Programmable pause no. 3.
49	PauseBegin[3]	The start time of the pause no. 3 in format 0xhhmm hh – hour mm – minute
50	PauseEnd[3]	The end time of the pause no. 3 in format 0xhhmm: hh – hour

		mm – minute
51	Pause[4]	Programmable pause no. 4.
52	PauseBegin[4]	The start time of the pause no. 4 in format 0xhhmm hh – hour mm – minute
53	PauseEnd[4]	The end time of the pause no. 4 in format 0xhhmm: hh – hour mm – minute
54	Pause[5]	Programmable pause no. 5.
55	PauseBegin[5]	The start time of the pause no. 5 in format 0xhhmm hh – hour mm – minute
56	PauseEnd[5]	The end time of the pause no. 5 in format 0xhhmm: hh – hour mm – minute
57	PressForceMode	Force Detector Mode: 0 – marker 1 – pause
58	MultiplyingFactor[0]	Multiplying Factor value from the **X** axis (*100)
59	MultiplyingFactor[1]	Multiplying Factor value from the **Y** axis (*100)
60	MultiplyingFactor[2]	Multiplying Factor value from the **Z** axis (*100)
61	AxesOrientation	Axes Orientation mode: 0 - Seat-surface 1 - Seat-back 2 - Autodetection
62	Orientation	Axes Orientation for measurement: 0 - axes orientation consistent with the marking on the device 1 - axis assignment: X: Z marked on the device Y: Y marked on the device Z: X marked on the device 2 – axis assignment: X: Z marked on the device Y: X marked on the device Z: Y marked on the device
…	…	…

Table B.1.8. Time-domain signal recording parameters

Word number	Name	Comment
0	0xnn31	[31, nn=block's length]
1	Mode	mode: 0 - **OFF**

		1 - recording whole measurement 2 - recording on trigger **SLOPE+** 3 - recording on trigger **SLOPE–** 4 - recording on trigger **LEVEL+** 5 - recording on trigger **LEVEL–**
2	TriggerSource	source of the triggering signal defined as a sum of: 1 - the **aw** in axis **X** 2 - the **aw** in axis **Y** 4 - the **aw** in axis **Z**
3	TriggerLevel	level of triggering: 80 ÷ 160 dB (*10)
4	TriggerGrad	Reserved
5	TriggerPre	recording before triggering 0 - **OFF**, 1 - **ON**
6	TriggerPost	reserved
7	Sampling	sampling frequency in 1Hz
8	RecTime	recording time of single data block: 0 - recording to the end of measurement 1..28800 (sec)
9	BitsPerSample	bits/sample (16)
10	Axes	signal recorded form axes defined as a sum of: 1 - axis **X** 2 - axis **Y** 4 - axis **Z**
11	Range (X)	range value of the **X** axis in 0.01dB
12	Range (Y)	range value of the **Y** axis in 0.01dB
13	Range (Z)	range value of the **Z** axis in 0.01dB
14	RefLev	**reference level given in 0.01dB referenced to 1 μms^{-2}**
15	Step	trigger period given in 0.1 ms. If zero Step is equal to logger time-step (cf. Tab. B.1.15)
16	Filter	frequency weighting filter: 0 –unweighted, 1 - band limit filter (cf. App. B.1.10)
…	…	….

Table B.1.9. Wave-file recording parameters

Word number	Name	Comment
0	0xnn2D	[2D, nn=block's length]
1	Mode	mode: 0 - **OFF** 1 - recording whole measurement 2 - recording on trigger **SLOPE+**

		3 - recording on trigger **SLOPE–** 4 - recording on trigger **LEVEL+** 5 - recording on trigger **LEVEL–**
2	TriggerSource	source of the triggering signal defined as a sum of: 1 - the **aw** in axis **X** 2 - the **aw** in axis **Y** 4 - the **aw** in axis **Z**
3	TriggerLevel	level of triggering: 80 ÷ 160 dB (*10)
4	TriggerGrad	reserved
5	TriggerPre	recording before triggering 0 - **OFF**, 1 - **ON**
6	TriggerPost	reserved
7	Sampling	sampling frequency in 1Hz (6000 Hz)
8	RecTime	recording time of single data block: 0 - recording to the end of measurement 1..28800 (sec)
9	BitsPerSample	bits/sample (16)
10	Axes	signal recorded form axes defined as a sum of: 1 - axis **X** 2 - axis **Y** 4 - axis **Z**
11	Range (X)	range value of the **X** axis in 0.01dB
12	Range (Y)	range value of the **Y** axis in 0.01dB
13	Range (Z)	range value of the **Z** axis in 0.01dB
14	RefLev	**reference level given in 0.01dB referenced to 1 μms^{-2}**
15	Step	trigger period given in 0.1 ms. If zero Step is equal to logger time-step (cf. Tab. B.1.15)
16	Filter	frequency weighting filter: 0 –unweighted, 1 - band limit filter (cf. App. B.1.10)
…	…	….

Table B.1.10. Special settings for axes

Word number	Name	Comment
0	0xnn05	[05, nn=block's length]
1	0x0607	[used_profile, profile's mask]
2	0xmm06	[06, mm=sub-block's length]
3	DetectorP[1][1]	detector type in the 1st profile, **X** axis: 0 - **100ms** 1 - **125ms** 2 - **200ms** 3 - **500ms**

		4 - **1s** 5 - **2s** 6 - **5s** 7 - **10s**
4	FilterP[1] [1]	filter type in the 1st profile, **X** axis: 17 - **Wd** 20 - **Wm** 24 - **Wf**
5	LoggerP[1] [1]	logger contents in the 1st profile, **X** axis defined as a sum of: 0 - none 1 - **PEAK** 2 - **P–P** 4 - **MAX** 8 – **aw** 16 - **VDV**
6	CalibrFactor[1] [1]	reserved
7	ProfileFlags[1] [1]	reserved
8	0xmm06	[06, mm=sub-block's length]
9	DetectorP[1] [2]	detector type in the 1st profile, **Y** axis: 0 - **100ms** 1 - **125ms** 2 - **200ms** 3 - **500ms** 4 - **1s** 5 - **2s** 6 - **5s** 7 - **10s**
10	FilterP[1] [2]	filter type in the 1st profile, **Y** axis: 17 - **Wd** 20 - **Wm** 24 - **Wf**
11	LoggerP[1] [2]	logger contents in the 1st profile, **Y** axis: defined as a sum of: 0 - none 1 - **PEAK** 2 - **P–P** 4 - **MAX** 8 - **aw** 16 - **VDV**
12	CalibrFactor[1] [2]	reserved
13	ProfileFlags[1] [2]	reserved
14	0xmm06	[06, mm=sub-block's length]
15	DetectorP[1] [3]	detector type in the 1st profile, **Z** axis: 0 - **100ms** 1 - **125ms** 2 - **200ms** 3 - **500ms**

		4 - **1s** 5 - **2s** 6 - **5s** 7 - **10s**
16	FilterP[1] [3]	filter type in the 1st profile, **Z** axis: 16 - **Wk** 20 - **Wm** 23 - **Wb** 24 - **Wf**
17	LoggerP[1] [3]	logger contents in the 1st profile, **Z** axis defined as a sum of: 0 - none 1 - **PEAK** 2 - **P–P** 4 - **MAX** 8 - **aw** 16 - **VDV**
18	CalibrFactor[1] [3]	reserved
19	ProfileFlags[1] [3]	reserved
20	0xmm06	[06, mm=sub-block's length]
21	DetectorP[2] [1]	detector type in the 2nd profile, **X** axis: 0 - **100ms** 1 - **125ms** 2 - **200ms** 3 - **500ms** 4 - **1s** 5 - **2s** 6 - **5s** 7 - **10s**
22	FilterP[2][1]	filter type in the 2nd profile, **X** axis: 117 - band Limit of **Wd** 120 - band Limit of **Wm** 124 - band Limit of **Wf**
23	LoggerP[2] [1]	logger contents in the 2nd profile, **X** axis defined as a sum of: 0 - none
24	CalibrFactor[2] [1]	reserved
25	ProfileFlags[2] [1]	reserved
26	0xmm06	[06, mm=sub-block's length]
27	DetectorP[2] [2]	detector type in the 2nd profile, **Y** axis: 0 - **100ms** 1 - **125ms** 2 - **200ms** 3 - **500ms** 4 - **1s** 5 - **2s**

		6 - **5s** 7 - **10s**
28	FilterP[2] [2]	filter type in the 2nd profile, **Y** axis: 117 - band Limit of **Wd** 120 - band Limit of **Wm** 124 - band Limit of **Wf**
29	LoggerP[2] [2]	logger contents in the 2nd profile, **Y** axis: defined as a sum of: 0 - none
30	CalibrFactor[2] [2]	reserved
31	ProfileFlags[2] [2]	reserved
32	0xmm06	[06, mm=sub-block's length]
33	DetectorP[2] [3]	detector type in the 2nd profile, **Z** axis: 0 - **100ms** 1 - **125ms** 2 - **200ms** 3 - **500ms** 4 - **1s** 5 - **2s** 6 - **5s** 7 - **10s**
34	FilterP[2] [3]	filter type in the 2nd profile, **Z** axis: 116 - band Limit of **Wk** 120 - band Limit of **Wm** 123 - band Limit of **Wb** 124 - band Limit of **Wf**
35	LoggerP[2] [3]	logger contents in the 2nd profile, **Z** axis defined as a sum of: 0 - none
36	CalibrFactor[2] [3]	reserved
37	ProfileFlags[2] [3]	reserved
…	…	…

Table B.1.11. awv (vector) measurement settings

Word number	Name	Comment
0	0xnn40	[05, nn=block's length]
1	VectorLoggerP	awv result logging: 0 - **OFF**, 1 - **ON**
2	VectorCoeff[1]	awv coefficient for the **aw** value from the **X** axis (*100)
4	VectorCoeff[2]	awv coefficient for the **aw** value from the **Y** axis (*100)

5	VectorCoeff[3]	awv coefficient for the **aw** value from the **Z** axis (*100)
6	VectorOn[1]	**aw** value from the **X** axis used for calculation: 0 - no, 1 - yes
7	VectorOn[2]	**aw** value from the **Y** axis used for calculation: 0 - no, 1 - yes
8	VectorOn[3]	**aw** value from the **Z** axis used for calculation: 0 - no, 1 - yes
9	VectorResult	reserved
…	…	…

Table B.1.12. Display settings of the main results

Word number	Name	Comment
0	0xnn48	[48, nn=header's length]
1	0x0607	[used_profile, profile's mask]
2	0xnn01	[profile number, mm=sub-block's length]
3	TIME[1]	0 – TIME result not displayed, 1 - TIME result displayed
4	PEAK[1]	0 – PEAK result not displayed, 1 - PEAK result displayed
5	P-P[1]	0 – P-P result not displayed, 1 – P-P result displayed
6	MAX[1]	0 – MAX result not displayed, 1 – MAX result displayed
7	aw[1]	0 – aw result not displayed, 1 - aw result displayed
8	CRF[1]	0 – CRF result not displayed, 1 – CRF result displayed
9	MSDV[1]	0 – MSDV result not displayed, 1 – MSDV result displayed
10	awv[1]	0 – awv result not displayed, 1 - awv result displayed
11	CExp[1]	0 – CExp result not displayed, 1 - CExp result displayed
12	A8[1]	0 – A8 result not displayed, 1 – A8 result displayed
13	EAVTT[1]	0 – EAVTT result not displayed, 1 - EAVTT result displayed
14	EAVTL[1]	0 – EAVTL result not displayed, 1 - EAVTL result displayed
15	ELVTT[1]	0 – ELVTT result not displayed, 1 – ELVTT result displayed
16	ELVTL[1]	0 – ELVTL result not displayed, 1 - ELVTL result displayed
17	VDV[1]	0 – VDV result not displayed, 1 - VDV result displayed
18	OVL[1]	0 – OVL result not displayed, 1 - OVL result displayed
19	CDose [1]	0 – CDose result not displayed, 1 – CDose result displayed
20	DDose [1]	0 – DDose result not displayed, 1 – DDose result displayed
21	aren [1]	0 – aren result not displayed, 1 – aren result displayed
22	VDVR [1]	0 – VDVR result not displayed, 1 – VDVR result displayed
23	0xnn02	[profile number, mm=sub-block's length]
24	TIME[2]	reserved
24	PEAK[2]	0 – PEAK result not displayed, 1 - PEAK result displayed
26	P-P[2]	reserved
26	MAX[2]	reserved
28	aw[2]	0 – aw result not displayed, 1 - aw result displayed
29	CRF[2]	reserved
30	MSDV[2]	reserved

31	awv[2]	reserved
32	CExp[2]	reserved
33	A8[2]	reserved
34	EAVTT[2]	reserved
35	EAVTL[2]	reserved
36	ELVTT[2]	reserved
37	ELVTL[2]	reserved
38	VDV[2]	reserved
39	OVL[2]	reserved
40	CDose[2]	reserved
41	DDose [2]	reserved
42	aren [2]	reserved
43	VDVR [2]	reserved

Table B.1.13. SETUP DATA

Word number	Name	Comment
0	0x0041	[41, 00]
1	BlockLength	length of the block
2..BlockLength-1	SetupTextData	saved setup values

Table B.1.15. Logger settings

Word number	Name	Comment
0	0xnn0F	[0F, nn=header's length]
1	BuffTSec	logger time-step - full seconds part
2	BuffTMilisec	logger time-step - milliseconds part
3	LowestFreq	the lowest **1/1 OCTAVE** or **1/3 OCTAVE** frequency (*100 Hz)
4	NOctTer	number of **1/1 OCTAVE** or **1/3 OCTAVE** results per axis
5	NOctTerTot	number of **TOTAL** values per axis
6..7	BuffLength	logger length (bytes)
8..9	RecsInBuff	number of records in the logger
10..11	RecsInObserv	number of records in the observation period equal to: number of records in the logger + number of records not saved
12..13	TDRecs	number of time-domain signal records in the logger
…	…	…

Note: *The current logger time-step in seconds can be obtained from the formulae:*
T = BuffTSec + BuffTMillisec / 1000.

Table B.1.16. Contents of the file from the logger

Word number	Name	Comment
0..(BuffLength/2-1)		result#1, result#2, ... result#(BuffLength/2-1)

Table B.1.17 Main results (saved in Summary Results Record)

Word number	Name	Comment
0	0xnn07	[07, nn=block's length]
1	0x0607	[used_profile, profile's mask]
2	0xmm08	[08, mm=sub-block's length]
3..4	MeasureTime	time of the measurement
5..6	OVL[1]	overload time in the **X** axis
7	Result[1][1]	**PEAK** value in the **X** axis (*100 dB)
8	Result[1][2]	**P–P** value in the **X** axis (*100 dB)
9	Result[1][3]	maximal value (**MAX**) in the **X** axis (*100 dB)
10	Result[1][4]	**aw** value in the **X** axis (*100 dB)
11	Result[1][5]	**VDV** value in the **X** axis (*100 dB)
12	Result[1][6]	**awv** value (*100 dB)
13	Result[1][7]	reserved
14	UnderRes[1]	under-range value in the **X** axis
15	UnitFlags	measurement flags: b0 - if set to 1: calibration coefficient is used in X axis b1 - if set to 1: calibration coefficient is used in Y axis b2 - if set to 1: calibration coefficient is used in Z axis b3 - if set to 1: overload occurred in X axis b4 - if set to 1: overload occurred in Y axis b5 - if set to 1: overload occurred in Z axis
16	0xmm08	[08, mm=sub-block's length]
17..18	Reserved	reserved
19..20	OVL[2]	overload time in the **Y** axis
21	Result[2][1]	**PEAK** value in the **Y** axis (*100 dB)
22	Result[2][2]	**P–P** value in the **Y** axis (*100 dB)
23	Result[2][3]	maximal value (**MAX**) in the **Y** axis (*100 dB)

24	Result[2][4]	**aw** value in the **Y** axis (*100 dB)
25	Result[2][5]	**VDV** value in the **Y** axis (*100 dB)
26	Result[2][6]	reserved
27	Result[2][7]	reserved
28	UnderRes[2]	under-range value in the **Y** axis
29	UnitFlags	flags word for measurement cycle (definition in table B.1.17 nr 15)
30	0xmm08	[08, mm=sub-block's length]
31..32	Reserved	reserved
33..34	OVL[3]	overload time in the **Z** axis
35	Result[3][1]	**PEAK** value in the **Z** axis (*100 dB)
36	Result[3][2]	**P–P** value in the **Z** axis (*100 dB)
37	Result[3][3]	maximal value (**MAX**) in the **Z** axis (*100 dB)
38	Result[3][4]	**aw** value in the **Z** axis (*100 dB)
39	Result[3][5]	**VDV** value in the **Z** axis (*100 dB)
40	Result[3][6]	reserved
41	Result[3][7]	reserved
42	UnderRes[3]	under-range value in the **Z** axis
43	UnitFlags	flags word for measurement cycle (definition in table B.1.17 nr 15)
44	0xmm08	[08, mm=sub-block's length]
45..46	MeasureTime	reserved
47..48	OVL[4]	reserved
49	Result[4][1]	**PEAK** value in the **X** axis (calculated with band limiting filter) (*100 dB)
50	Result[4][2]	reserved
51	Result[4][3]	reserved
52	Result[4][4]	**aw** value in the **Z** axis (calculated with band limiting filter) (*100 dB)
53	Result[4][5]	reserved
54	Result[4][6]	reserved
55	Result[4][7]	reserved
56	UnderRes[4]	under-range value in the **X** axis (calculated with band limiting filter)
57	UnitFlags	flags word for measurement cycle (definition in table B.1.17 nr 15)
58	0xmm08	[08, mm=sub-block's length]
59..60	Reserved	reserved
61..62	OVL[5]	reserved
63	Result[5][1]	**PEAK** value in the **Y** axis (calculated with band limiting filter) (*100 dB)
64	Result[5][2]	reserved

65	Result[5][3]	reserved
66	Result[5][4]	**aw** value in the **Y** axis (calculated with band limiting filter) (*100 dB)
67	Result[5][5]	reserved
68	Result[5][6]	reserved
69	Result[5][7]	reserved
70	UnderRes[5]	under-range value in the **Y** axis (calculated with band limiting filter)
71	UnitFlags	flags word for measurement cycle (definition in table B.1.17 nr 15)
72	0xmm08	[08, mm=sub-block's length]
73..74	Reserved	reserved
75..76	OVL[6]	reserved
77	Result[6][1]	**PEAK** value in the **Z** axis (calculated with band limiting filter) (*100 dB)
78	Result[6][2]	reserved
79	Result[6][3]	reserved
80	Result[6][4]	**aw** value in the **Z** axis (calculated with band limiting filter) (*100 dB)
81	Result[6][5]	reserved
82	Result[6][6]	reserved
83	Result[6][7]	reserved
84	UnderRes[6]	under-range value in the **Z** axis (calculated with band limiting filter)
85	UnitFlags	flags word for measurement cycle (definition in table B.1.17 nr 15)
…	…	…

Table B.1.18. 1/1 OCTAVE analysis results (saved in Summary Results Record)

Word number	Name	Comment
0	0xnn0E, 0xnn26, 0xnn27	[block_id, nn=block_length] 0xnn**0E** - averaged spectrum results, 0xnn**26** - min. spectrum results, 0xnn**27** - max. spectrum results
1	0x0303	[used_axis, axis's mask]
2	LowestFreq	the lowest **1/1 OCTAVE** frequency (*100 Hz)
3	NOct	number of **1/1 OCTAVE** values
4	NOctTot	number of **TOTAL** values
	Octave[0][i]	1/1 octave[i] value (*100 dB); i=1..NOct+NoctTot (1..10) in X axis
	Octave[1][i]	1/1 octave[i] value (*100 dB); i=1..NOct+NoctTot (1..10) in Y axis
	Octave[2][i]	1/1 octave[i] value (*100 dB); i=1..NOct+NoctTot (1..10) in Z axis
…	…	…

Table B.1.19. 1/3 OCTAVE analysis results (saved in Summary Results Record)

Word number	Name	Comment
0	0xnn10, 0xnn28, 0xnn29	[block_id, nn=block_length] 0xnn**10** - averaged spectrum results, 0xnn**28** - min. spectrum results, 0xnn**29** - max. spectrum results
1	0x0303	[used_axis, axis's mask]
2	LowestFreq	the lowest **1/3 OCTAVE** frequency (*100 Hz)
3	NTer	number of **1/3 OCTAVE** values
4	NTerTot	number of **TOTAL** values
	Tercje[0][i]	1/3 octave[i] value (*100 dB); i=1..NTer+NTerTot (1..10) in X axis
	Tercje[1][i]	1/3 octave[i] value (*100 dB); i=1..NTer+NTerTot (1..10) in Y axis
	Tercje[2][i]	1/3 octave[i] value (*100 dB); i=1..NTer+NTerTot (1..10) in Z axis
…	…	…

Table B.1.20. File-end-marker

Word number	Name	Comment
0	0xFFFF	file end marker

Table B.1.22. Unit text info

Word number	Name	Comment
0	0xnn58	[58, nn=block's length]
1	"UN"	Unit name header
2..8	UnitName	Unit name
9	"SE"	Setup name header
10..14	SetupName	Setup name
.....	.....	.....

Table B.1.23. Calibration settings

Word number	Name	Comment
0	0xnn47	[47, nn=header's length]
1	0x0307	[used_channel, channel's mask]
2	0xmm06	[06, mm=sub-block's length]
3	Channel[1]	channel : 0 - **X**, 1 - **Y**, 2 - **Z**,
4	PreCalibrType[1]	type of calibration performed prior to measurement: 0 - none 1 - by measurement 2 - by sensitivity 3 - factory calibration
5	PreCalibrDate[1]	date of calibration performed prior to measurement (cf. App. B.4)
6	PreCalibrTime[1]	time of calibration performed prior to measurement (cf. App. B.4) Value of -1 (0xffff) means an unknown calibration time.
7	PreCalibrFactor[1]	factor (*100 dB) of calibration performed prior to measurement
8	PostCalibrType[1]	type of calibration performed after the measurement: 0 - none 1 - by measurement 2 - by sensitivity 3 - factory calibration 0xFFFF - **Calibration not performed**
9	PostCalibrDate[1]	date of calibration performed after the measurement (cf. App. B.4)
10	PostCalibrTime[1]	time of calibration performed after the measurement (cf. App. B.4) Value of -1 (0xffff) means an unknown calibration time.
11	PostCalibrFactor[1]	factor (*100 dB) of calibration performed after the measurement
12	0xmm06	[06, mm=sub-block's length]
13	Channel[2]	channel: 0 - **X**, 1 - **Y**, 2 - **Z**,
14	PreCalibrType[2]	type of calibration performed prior to measurement: 0 - none 1 - by measurement 2 - by sensitivity 3 - factory calibration
15	PreCalibrDate[2]	date of calibration performed prior to measurement (cf. App. B.4)
16	PreCalibrTime[2]	time of calibration performed prior to measurement (cf. App. B.4) Value of -1 (0xffff) means an unknown calibration time.

17	PreCalibrFactor[2]	factor (*100 dB) of calibration performed prior to measurement
18	PostCalibrType[2]	type of calibration performed after the measurement: 0 - none 1 - by measurement 2 - by sensitivity 3 - factory calibration 0xFFFF - **Calibration not performed**
19	PostCalibrDate[2]	date of calibration performed after the measurement (cf. App. B.4)
20	PostCalibrTime[2]	time of calibration performed after the measurement (cf. App. B.4) Value of -1 (0xffff) means an unknown calibration time.
21	PostCalibrFactor[2]	factor (*100 dB) of calibration performed after the measurement
22	0xmm06	[06, mm=sub-block's length]
23	Channel[3]	channel : 0 - **X**, 1 - **Y**, 2 - **Z**,
24	PreCalibrType[3]	type of calibration performed prior to measurement: 0 - none 1 - by measurement 2 - by sensitivity 3 - factory calibration
25	PreCalibrDate[3]	date of calibration performed prior to measurement (cf. App. B.4)
26	PreCalibrTime[3]	time of calibration performed prior to measurement (cf. App. B.4) Value of -1 (0xffff) means an unknown calibration time.
27	PreCalibrFactor[3]	factor (*100 dB) of calibration performed prior to measurement
28	PostCalibrType[3]	type of calibration performed after the measurement: 0 - none 1 - by measurement 2 - by sensitivity 3 - factory calibration 0xFFFF - **Calibration not performed**
29	PostCalibrDate[3]	date of calibration performed after the measurement (cf. App. B.4)
30	PostCalibrTime[3]	time of calibration performed after the measurement (cf. App. B.4) Value of -1 (0xffff) means an unknown calibration time.
31	PostCalibrFactor[3]	factor (*100 dB) of calibration performed after the measurement
…	…	…

B.2. Structure of the file containing results

SvanPC file header - cf. Tab. B.1.1.

File header - cf. Tab. B.1.13
Unit and software specification - cf. Tab. B.1.3.
Calibration settings cf. Tab. B.1.23.
USER'S text - cf. Tab. B.1.4.

Unit text info - cf. Tab. B.1.22.
Parameters and global settings - cf. Tab. B.1.5.
Time-domain signal recording parameters - cf. Tab. B.1.8.
Wave-file recording parameters - cf. Tab. B.1.9.
Special settings for axes - cf. Tab. B.1.10.
The awv measurement settings - cf. Tab. B.1.11.
Display settings of the main results - cf. Tab. B.1.12.
Logger settings - cf. Tab. B.1.15.
Contents of the file from the logger - cf. Tab. B.1.16. and the description in B.2.1.

B.2.1. The contents of the files in the logger

The records with the results and the records with the state of the markers as well as the records with the breaks and pause in the results registration are saved in the files in the logger. Unless otherwise stated the results are written in dB*100. Summary Results are also saved in the files in the logger.

B.2.1.1. Record with the results

The content of the record with the results depends on the selected measurement function and the value set in the **LOGGER** position. The following elements can be present (in the given sequence):

- flag record

  < flags > :

  - b0: 1- the overload detected in X axis, 0 - the overload not detected in X axis

  - b1: 1- the overload detected in Y axis, 0 - the overload not detected in Y axis

  - b2: 1- the overload detected in Z axis, 0 - the overload not detected in Z axis

- results of the measurement from the **X** axis; up to four words are written:

<result1> - **PEAK** result, depending on the value of LoggerP[1] (cf. Tab. B.1.10)
<result2> - **P–P** result, depending on the value of LoggerP[1] (cf. Tab. B.1.10)
<result3> - **MAX** result, depending on the value of LoggerP[1] (cf. Tab. B.1.10)
<result4> - **aw** result, depending on the value of LoggerP[1] (cf. Tab. B.1.10)
<result5> - **VDV** result, depending on the value of LoggerP[1] (cf. Tab. B.1.10)

- results of the measurement from the **Y** axis; up to four words are written:

<result1> - **PEAK** result, depending on the value of LoggerP[2] (cf. Tab. B.1.10)
<result2> - **P–P** result, depending on the value of LoggerP[2] (cf. Tab. B.1.10)

<result3> - **MAX** result, depending on the value of LoggerP[2] (cf. Tab. B.1.10)
<result4> - **aw** result, depending on the value of LoggerP[2] (cf. Tab. B.1.10)
<result5> - **VDV** result, depending on the value of LoggerP[2] (cf. Tab. B.1.10)

- results of the measurement from the **Z** axis; up to four words are written:

<result1> - **PEAK** result, depending on the value of LoggerP[3] (cf. Tab. B.1.10)
<result2> - **P–P** result, depending on the value of LoggerP[3] (cf. Tab. B.1.10)
<result3> - **MAX** result, depending on the value of LoggerP[3] (cf. Tab. B.1.10)
<result4> - **aw** result, depending on the value of LoggerP[3] (cf. Tab. B.1.10)
<result5> - **VDV** result, depending on the value of LoggerP[3] (cf. Tab. B.1.10)

- results of the measurement from the all axes; up to two word is written:

<result1> - **awv** result, depending on the value of VectorLoggerP[1] (cf. Tab. B.1.11)

- results of **1/1 OCTAVE** or **1/3 OCTAVE** analysis from **X** axis if **1/1 OCTAVE** or **1/3 OCTAVE** analysis was selected as the measurement function and the **LOGGER SPECTRUM** was activated (SpectrumBuff in Tab. B.1.5);

  the sequence of words is written:

<Octave[1]> <Octave[2]> ... <Octave[Noct+NOctTot]>

where:

Octave[i] - the result of **1/1 OCTAVE or 1/3 OCTAVE** analysis (*100 dB); i = 1..NOct+NOctTot

- results of **1/1 OCTAVE** or **1/3 OCTAVE** analysis from **Y** axis if **1/1 OCTAVE** or **1/3 OCTAVE** analysis was selected as the measurement function and the **LOGGER SPECTRUM** was activated (SpectrumBuff in Tab. B.1.5);

  the sequence of words is written:

<Octave[1]> <Octave[2]> ... <Octave[Noct+NOctTot]>

where:

Octave[i] - the result of **1/1 OCTAVE or 1/3 OCTAVE** analysis (*100 dB); i = 1..NOct+NOctTot

- results of **1/1 OCTAVE** or **1/3 OCTAVE** analysis from **Z** axis if **1/1 OCTAVE** or **1/3 OCTAVE** analysis was selected as the measurement function and the **LOGGER SPECTRUM** was activated (SpectrumBuff in Tab. B.1.5);

  the sequence of words is written:

<Octave[1]> <Octave[2]> ... <Octave[Noct+NOctTot]>

where:

Octave[i] - the result of **1/1 OCTAVE or 1/3 OCTAVE** analysis (*100 dB); i = 1..NOct+NOctTot

B.2.1.2. Record with the state of the markers

The record with the state of the markers consists of one word:

<0x8nnn>

in which 12 bits nnn denote the state of the markers:

b11 = state of #12 marker

b10 = state of #11 marker

...

b1 = state of #2 marker

b0 = state of #1 marker (human detection marker if Force Detector Mode set to "marker" (cf. App.B.1.5))

B.2.1.3. Record with the breaks in the results registration

The record with the breaks in the results registration consists of four words:

<0xB0ii> <0xB1jj> <0xB2kk> <0xB3nn>

in which ii, jj, kk, nn bytes denote 4-bytes counter of left or skipped records: nnkkjjii (ii is the least significant byte, nn - the most significant byte).

B.2.1.4. Record with the breaks account PAUSE in the results registration

The record with the breaks in the results registration consists of four words:

<0xA0ii> <0xA1jj> <0xA2kk> <0xA3nn>

in which ii, jj, kk, nn bytes denote 4-bytes counter duration of PAUSE in milliseconds:

nnkkjjii (ii is the least significant byte, nn - the most significant byte).

B.2.1.5. Record with the wave file name

The record with the wave file name consists of six words:

<0xC2aa>

<0xccbb>

<0xeedd>

<0xggff>

<0xiihh>

<0xCAaa>

in which:

aa - size of records,

bb cc dd ee ff gg hh ii - 8-bytes name of wave file name

B.2.1.6. Record with Summary Results

The format of the data frame is as follows:

HS	L (optional)	D	L (optional)	HE

where:

HS starting header (1 word)

L length of the block (field is optional and occurs only when b7..b0 in header are set to zero)

D Summary Data:
- Main results (cf. Tab. B.1.17)
- 1/1 OCTAVE analysis results (optional, cf. Tab. B.1.18)
- 1/3 OCTAVE analysis results (optional, cf. Tab. B.1.19)

HE ending header (1 word), which differs from the HS only on b11 bit (thanks to it, it is possible to analyse the recorded file starting from its end)

The HEADER format is as follows:

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0

where:

b15 - 1
b14 - 1
b13 - 0
b12 - 0,
b11 - header type:

0 - HS

1 - HE

b10 - 0

b9 - 1

b8 - 1

b15÷b8 – HS (0xC3), HE (0xCB)
b7÷b0 – length of the block (if zero length of the block is saved in additional word L)

B.2.1.7. Record with Time-domain signal data

This record exists only in the case when the **Time-domain signal recording** is active. The samples of the signal are saved in the blocks. Each block is divided into frames, which are stored in a file among the logger results. The frame starting block and the frame ending it are marked with the b10 and b9 bits set in the header of the frame, respectively. It happens in the case of stopping the recording that the ending frame does not exist.

The format of the data frame is as follows:

HS	L	S	L	HE

where:

HS starting header (1 word)
L block length (1 word), expressed in words (4 + number of samples)
S samples of the measured signal (each sample is written in two bytes; the recording starts with the least significant byte)
HE ending header (1 word), which differs from the HS only on b11 bit (thanks to it, it is possible to analyse the recorded file starting from its end)

The HEADER format is as follows:

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0

where:

b15 - 1
b14 - 0
b13 - 0
b12 - 1, bits b15 ÷ b12 = 9 constitute the marker of the frame
b11 - header type:

0 - HS

1 - HE

b10 - 1 denotes the first frame in the block

b9 - 1 denotes the last frame in the block

b7 - 1 denotes an error (the samples were overwritten in the cycle buffer, which means that the recording in the analysed block is not correct)

b8, b6÷b0 – reserved

B.2.1.8. Record with remote marker data

Word number	Name	Comment
0	0xC702	record ID (start)
1	Length	length of the block together with IDs, [words]
2	MarkerNr	Number of the marker (1-16, 0 - end of all block markers when MarkerType=2)
3	MarkerType	Type of the marker: 0 - point 1 - block (start) 2 - block (end) 3 - time
4	MNL	Marker Name Length in words. Field is optional and is absent for MarkerType = 2.
5 .. 5+MNL	MarkerName	Name of the marker. In case of odd number of MarkerName bytes last byte is 0x00. Field is optional and is absent for MarkerType = 2.
5+MNL+1	StartDate	Marker start date (cf. App. B.4). Field is optional and is only present for MarkerType = 3.
5+MNL+2 .. 5+MNL+3	StartTime	Marker start time (seconds). Field is optional and is only present for MarkerType = 3.
5+MNL+4	EndDate	Marker end date (cf. App. B.4). Field is optional and is only present for MarkerType = 3.
5+ MNL+5 .. 5+ MNL+6	EndTime	Marker end time (seconds). Field is optional and is only present for MarkerType = 3.
5+MNL+1+ 6*(MarkerType=3)	Length	length of the block together with IDs, [words]
5+ MNL+2+ 6*(MarkerType=3)	0xCF02	record ID (end)
…	…	….

B.2.1.9. Record with GPS data

The value equal to -12288 (0xd000) denotes the undefined value.

Word number	Name	Comment
0	0xC703	record ID (start)
1	Length	length of the block together with IDs, [words]
2	Quality	Signal quality: 0 - GPS_NOT_FIX (no signal) 1 - GPS_FIX 2 - GPS_FIX_DIF
3	Time.Sec	Seconds part of time
4	Time.Min	Minutes part of time
5	Time.Hour	Hours part of time
6	Date.Day	Day

7	Date.Month	Month
8	Date.Year	Year
9	Latitude.Deg	Degree part of latitude
10	Latitude.Min	Minutes part of latitude
11	Latitude.Sec	Seconds part of latitude
12	Latitude.MiliSec	Miliseconds part of latitude
13	Latitude.Dir	Latitude direction: N, S
14	Longitude.Deg	Degree part of longitude
15	Longitude.Min	Minutes part of longitude
16	Longitude.Sec	Seconds part of longitude
17	Longitude.MiliSec	Miliseconds part of longitude
18	Longitude.Dir	Longitude direction: E, W
19	Altitude	Altitude (meters)
20	Altitude.10	Decimal part of altitude
21	Speed	Speed * 100 (km/h)
22	Length	length of the block together with IDs, [words]
23	0xCF03	record ID (end)
…	…	….

B.3. Structure of the SETUP file

SvanPC File header - cf. Tab. B.1.1.

File header - cf. Tab. B.1.2.

Unit and software specification - cf. Tab. B.1.3.

SETUP DATA - cf. Tab. B.1.13.

File-end-marker - cf. Tab. B.1.20.

B.4. Date and time

Following function written in C explain how the date and time are coded:

```
void ExtractDateTime(int date, int time, int dt[])
{
      int sec,year;

      sec = ((0xffff&time)<<1); /* time<<1; */
```

```
    dt[0] = sec%60; /* sec */
    dt[1] = (sec/60)%60; /* min */
    dt[2] = sec/3600; /* hour */

    dt[3] = date&0x1F; /* day */
    dt[4] = (date>>5)&0x0F; /* month */
    year = (date>>9) & 0x07F;
    dt[5] = year+2000; /* year */
}
```

APPENDIX C. SV 100A SPECIFICATION[1]

Standards	ISO 8041:2021, ISO 2631-1:1997	
Meter Mode	a_w (RMS), a_{wmax} (RMS MAX), VDV, MaxVDV, a_{wv} (VECTOR),	
	A(8) Daily Exposure, ELV Time (TIME LEFT TO LIMIT), EAV Time (TIME LEFT TO ACTION), MTVV, Max, Peak, Peak-Peak	
	Simultaneous measurement in three channels	
Filters	Wd, Wk, Wm, Wb (ISO 2631) and corresponding Band Limiting filters	
	Wf for motion sickness measurements according to ISO 2631 (option)	
RMS & RMQ Detectors	Digital true RMS & RMQ detectors with Peak detection, resolution 0.1 dB	
Measurement Range	0.018 ms^{-2} RMS ÷ 157 ms^{-2} PEAK	
Frequency Range	0.1 Hz ÷ 180 Hz	
Data Logger	Time-history data including meter mode results and spectra	
Time-Domain Recording	Simultaneous 3-channel time-domain signal recording (option)	
Analyser	1/1 octave real-time analysis meeting Class 1: IEC 61260 (option)	
	1/3 octave real-time analysis meeting Class 1: IEC 61260 (option)	
Accelerometer	Tri-axial MEMS based	
Display	OLED 128 x 32 pixels	
Memory	8 GB	
Interfaces	USB 2.0 client, BT wireless communication	
Keyboard	4 push buttons	
Power Supply	Ni-MH rechargeable cells: operation time > 24 hours	
USB interface:	500 mA HUB	
Environmental Conditions	Temperature:	from -10°C to 50°C
	Humidity:	up to 90% RH, non-condensed
Dimensions	235 mm x 12 mm	
Weight	0.5 kg	

[1] Our Company's policy is based upon continuous product development and innovation. Therefore, we reserve the right to change the specifications without any prior notice whatsoever

APPENDIX D. DEFINITIONS AND FORMULAS FOR MEASURED VALUES

D.1. Basic terms and definitions

T — Current time period of the measurement in seconds.

τ — Detector time constant (τ =1s).

T_E — Exposure time in seconds (period during which a person is exposed to the action of vibration)

T_0 — Reference duration of 8 hours (28 800 seconds)

EAV — **E**xposure **A**ction **V**alue – constant value defined by local standards

ELV — **E**xposure **L**imit **V**alue – constant value defined by local standards

EAV_A — **E**xposure **A**ction **V**alue expressed in $\frac{m}{s^2}$

ELV_A — **E**xposure **L**imit **V**alue expressed in $\frac{m}{s^2}$

EAV_V — **E**xposure **A**ction **V**alue expressed in $\frac{m}{s^{1.75}}$

ELV_V — **E**xposure **L**imit **V**alue expressed in $\frac{m}{s^{1.75}}$

W — Frequency-weighting filter.

Filters in Profile (1): **Wd**, **Wk**, **Wm**, **Wb**, **Wc**, **Wf** (ISO 2631) and Band Limiting according to ISO 8041:2021.

$a_W(t)$ — Temporary value of the measured vibration with the weighting filter **W** (e.g. **Wd**) on the input of the RMS detector

$p_W(t)$ — Temporary value of the measured vibration with the weighting filter **W** (e.g. **Wd**) on the output of the RMS detector

$$p_W(t) = \left(\frac{1}{\tau} \int_{-\infty}^{t} a_W^2(t_x) \exp\left(\frac{t_x - t}{\tau} \right) dt_x \right)^{1/2}$$

t_x - time (variable of the integration)

P_E Number of exposure points

$$P_E = \max\left\{ k_X P_{EX}, k_Y P_{EY}, k_Z P_{EZ} \right\}$$

where:

$$P_{E(X,Y,Z)} = \left(\frac{k_{(X,Y,Z)} a_{W(X,Y,Z)}}{0.5 m/s^2} \right)^2 \frac{T}{8 hours} 100$$

MAX (RMS) Highest **RMS** value taken from three axis

$$MAX(RMS) = \max\left\{ k_X RMS_x, k_Y RMS_y, k_Z RMS_z \right\}$$

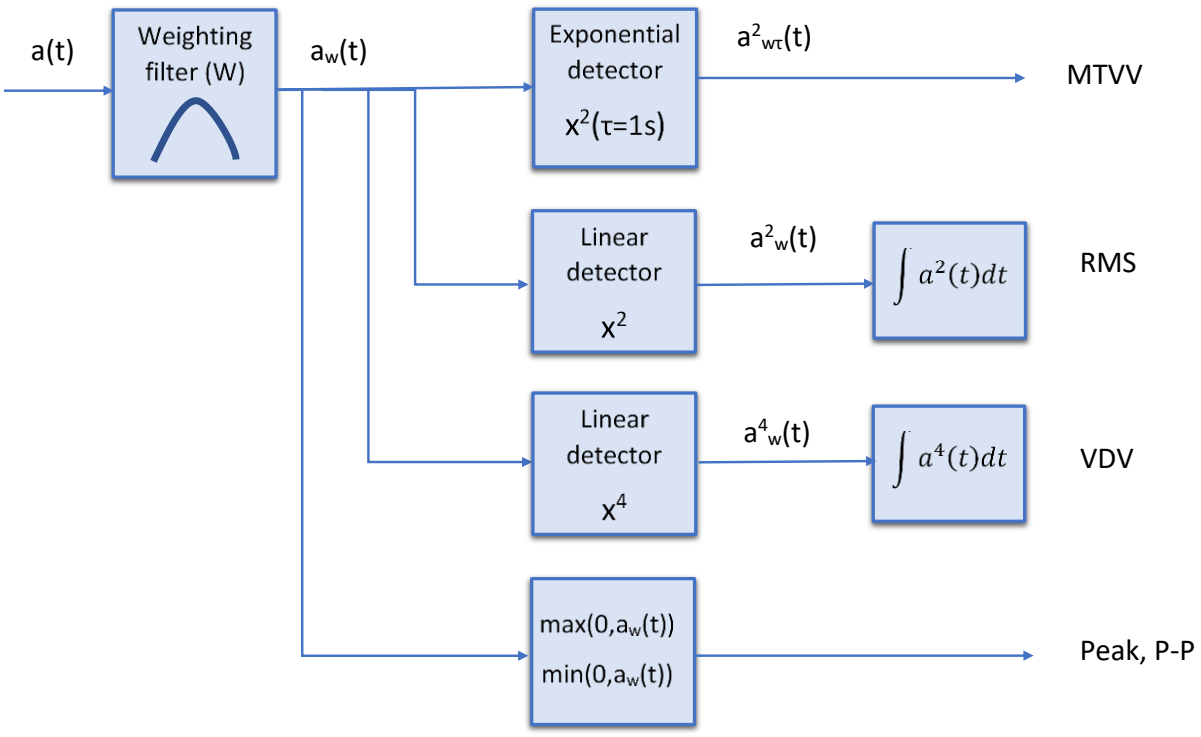
MAX (VDV) Highest weighted **VDV** value taken from three axis

$$MAX(VDV) = \max\left\{ k_X VDV_x, k_Y VDV_y, k_Z VDV_z \right\}$$

Note: *In all formulas the multipliers* ***k_x***, ***k_y*** *and* ***k_z*** *mean the coefficients which are defined in the applicable software in the „Multiplying Factor" screen. By default:* ***k = 1.4*** *for x- and y-axis and* ***k = 1.0*** *for z-axis.*

D.2. Definitions and formulas of the VLM mode results

The instrument calculates the vibration measurement results for three channels. The calculation flow diagram for one channel is presented below:



OVL Overload result presents the percentage of the overloaded input signal, which occurred during the current time period of the measurement (**T**)

PEAK Peak value is calculated for the given **T**

$$\mathbf{PEAK} = \max_T |a_w(t)|$$

P–P Peak-to-peak (**P-P**) result is the difference between highest and lowest value of the signal. It is calculated for the given **T**

$$\mathbf{P-P} = \max_T(0, a_w(t)) - \min_T(0, a_w(t))$$

MAX Maximum value of the time-weighted signal for current time period of the measurement (**T**)

$$\mathbf{Max} = \max_T(a_{w\tau}(t))$$

aw **RMS** (root mean square) result for current time period of the measurement (**T**)

$$\mathbf{RMS} = \left(\frac{1}{T}\int_0^T a_w^2(t)\,dt\right)^{1/2}$$

VDV **V**ibration **D**ose **V**alue result expressed in $m/s^{1.75}$

$$\mathbf{VDV} = \left(\int_0^T a_w^4(t)\,dt\right)^{1/4}$$

CRF **CRF** value (**Cr**est **F**actor) is obtained from the proportion **PEAK**/**RMS**

MSDV **M**otion **S**ickness **D**ose **V**alue

$$\mathbf{MSDV} = \left(\int_0^T a_w^2(t)\,dt\right)^{1/2}$$

MTVV **M**aximum **T**ransient **V**ibration **V**alue - **MTVV**, saved as the main result, is defined according to the **ISO 8041** standard

$$\mathbf{MTVV} = \max_T(p_w(t))$$

T=1s

awv Vibration total value of weighted rms determined from vibration in orthogonal coordinates (Vector). The weight coefficients w_x, w_y and w_z can be defined in the applicable software.

$$\mathbf{awv} = \sqrt{(w_x RMS_x)^2 + (w_y RMS_y)^2 + (w_z RMS_z)^2}$$

Default **awv** calculation uses formula:

$$\mathbf{awv} = \sqrt{RMS_x^2 + RMS_y^2 + RMS_z^2}$$

PEAK (BL) Peak value measured with **B**and **L**imiting filter

aw (BL) RMS value measured with **B**and **L**imiting filter

D.3. Definitions and formulas of the Whole-Body vibration results

CDose

Current Dose - VDV exposure to vibration measured from the measurement start

$$CDose = MAX(VDV)$$

DDose

Daily Dose - VDV exposure to vibration measured based on the T_E exposure time

$$DDose = MAX(VDV)\sqrt[4]{\frac{T_E}{T}}$$

CExp

Current Exposure to vibration measured from the measurement start

$$CExp = MAX(RMS)\sqrt{\frac{T}{T_0}}$$

CExp (points)

Current Exposure to vibration calculated from the exposure point measured from the measurement start

$$CExp(points) = 100(CExp / 0.5m/s^2)^2$$

A8

Daily Exposure to vibration measured based on the T_E exposure time

$$A8 = MAX(RMS)\sqrt{\frac{T_E}{T_0}}$$

A8 (points)

Daily Exposure to vibration calculated from the exposure point based on the T_E exposure time

$$A8(points) = 100(A8 / 0.5m/s^2)^2$$

EAVTT

Time to reach Exposure Action Value from beginning of measurement

$$EAV_{TT} = \begin{cases} EAV_{TTA} \text{ if EAV limit is in } \frac{m}{s^2} \\ EAV_{TTV} \text{ if EAV limit is in } \frac{m}{s^{1.75}} \end{cases}$$

where:

$$EAV_{TTA} = \min\left\{ EAV_{TTAx}, EAV_{TTAy}, EAV_{TTAz} \right\}$$

$$EAV_{TTAx} = T_0\left(\frac{EAV_{Ax}}{k_X RMS_x}\right)^2 \quad EAV_{TTAy} = T_0\left(\frac{EAV_{Ay}}{k_Y RMS_y}\right)^2 \quad EAV_{TTAz} = T_0\left(\frac{EAV_{Az}}{k_Z RMS_z}\right)^2$$

$$EAV_{TTV} = \min\left\{ EAV_{TTVx}, EAV_{TTVy}, EAV_{TTVz} \right\}$$

$$EAV_{TTVx} = T\left(\frac{EAV_{Vx}}{k_X VDV_x}\right)^4 \qquad EAV_{TTVy} = T\left(\frac{EAV_{Vy}}{k_Y VDV_y}\right)^4 \qquad EAV_{TTVz} = T\left(\frac{EAV_{Vz}}{k_Z VDV_z}\right)^4$$

EAVTL Current time to reach Exposure Action Value during the measurement

$$EAV_{TL} = EAV_{TT} - T$$

ELVTT Current time to reach Exposure Limit Value during the measurement

$$ELV_{TT} = \begin{cases} ELV_{TTA} \text{ if ELV limit is in } \frac{m}{s^2} \\ ELV_{TTV} \text{ if ELV limit is in } \frac{m}{s^{1.75}} \end{cases}$$

where:

$$ELV_{TTA} = \min\left\{ ELV_{TTAx}, ELV_{TTAy}, ELV_{TTAz} \right\}$$

$$ELV_{TTAx} = T_0\left(\frac{ELV_{Ax}}{k_X RMS_x}\right)^2 \qquad ELV_{TTAy} = T_0\left(\frac{ELV_{Ay}}{k_Y RMS_y}\right)^2 \qquad ELV_{TTAz} = T_0\left(\frac{ELV_{Az}}{k_Z RMS_z}\right)^2$$

$$ELV_{TTV} = \min\left\{ ELV_{TTVx}, ELV_{TTVy}, ELV_{TTVz} \right\}$$

$$ELV_{TTVx} = T\left(\frac{ELV_{Vx}}{k_X VDV_x}\right)^4 \qquad ELV_{TTVy} = T\left(\frac{ELV_{Vy}}{k_Y VDV_y}\right)^4 \qquad ELV_{TTVz} = T\left(\frac{ELV_{Vz}}{k_Z VDV_z}\right)^4$$

ELVTL Current time to reach Exposure Limit Value during the measurement

$$ELV_{TL} = ELV_{TT} - T$$

D.4 **Additional** Whole Body results for the Brazilian Standard

aren Normalized resulting acceleration exposure (**aren**): is the resulting acceleration exposure (**are**) converted to a standard 8 hours workday,

$$aren = \sqrt{(1.4RMS_x)^2 + (1.4RMS_y)^2 + RMS_z^2}\sqrt{\frac{T_E}{T_0}}$$

measured on three orthogonal axes "x", "y" and "z"

VDVR

Resulting vibration dose value corresponds to the value representative of the vibration dose daily occupational exposure, whereas the resultant of the three measurement axes

$$VDVR = \sqrt[4]{(1.4VDV\,exp_x)^4 + (1.4VDV\,exp_y)^4 + VDV\,exp_z^4}$$

where:

$$VDV\,exp_{x,y,z} = VDV_{x,y,z}\sqrt[4]{\frac{T_E}{T_0}}$$

DECLARATION OF CONFORMITY

SVANTEK

INSTRUMENTATION FOR SOUND & VIBRATION
MEASUREMENTS AND ANALYSIS

ISO 9001 ZETOM-CERT

EC Declaration of Conformity
No. SV100A-CE-EN/07/2015

Manufacturer:	**SVANTEK Sp. z o. o**
Address:	Strzyglowska 81 04-872 Warszawa Poland
Kind of product:	HUMAN VIBRATION METER & ANALYSER
Type:	**SV 100A**
Directive:	**Low Voltage Directive** (LVD) 2014/35/EU
Standard:	EN 61010-1: 2010 *Safety requirements for electrical measurement equipment*
Directive:	**Electromagnetic Compatibility Directive** (EMC) 2014/30/EU
Standards:	EN 61326-1:2013 *Measurement equipment: EMC emission and immunity* EN 55022:2010 *Information technology equipment, Class B*
Directive:	**Radio Equipment Directive** (RED) 2014/53/EU
Standards:	
a.3.1a: SAFETY	EN 60950-1: 2006 *Information technology equipment, class B*
art.3.1b: EMC	ETSI EN 301 489-1 V1.9.2:2011 *Radio transmission systems* ETSI EN 301 489-17 V2.2.1:2012 *Broadband transmission systems*
art.3.2: RADIO	ETSI EN 300 328 V1.8.1:2012 *Wideband transmission systems (2.4GHz)*
	Auxiliary industry standards:
	EN ISO 8041:2005 *Human response to vibration - Measuring instrumentation*

I, the undersigned, representing the manufacturer, declare in sole responsibility, that the product specified above, to which this declaration relates, conforms to the above mentioned Directives and Standards:

Place of issue: **Warsaw, Poland**

Date of issue: 03 07 2015

Wiesław Barwicz, General Manager ..... (signature)

SVANTEK Sp. z o. o. www.svantek.com e-mail: office@svantek.com.pl
Headquarters: Strzyglowska 81, 04-872 Warsaw, Poland tel./fax: +48 22 51 88 320; +48 22 51 88 312
VAT EU PL5270105272 REGON 002175672 KRS 000192065
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