SVANTEK

USER MANUAL

SV 803

VIBRATION MONITORING TERMINAL

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airmet
Air-Met Scientific
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Warsaw, 2023-04-21

Rev. 1.03

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*This user manual presents the SV 803 firmware revision **1.03**. and the Assistant Pro software revision **1.0.5**.*

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

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Technical Support Contact Information:

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IMPORTANT NOTES BEFORE USE

GENERAL WARNINGS, SAFETY CLAUSES

- ✓ *If SV 803 is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.*
- ✓ *All measurements should always be taken with the cover in the closed position and tightened to a torque of 1.1 Nm.*
- ✓ *SV 803 cannot be submerged in water.*
- ✓ *Do not use SV 803 in the presence of flammable vapours or gases or in an explosive atmosphere.*
- ✓ *Safe operating ambient temperature range is -20 to +50ºC (+14 to +122ºF).*
- ✓ *SV 803 can operate in the sun with an ambient temperature of up to +50ºC. Above this temperature, the instrument should be protected from the sun.*
- ✓ *The instrument must be switched off for air transport.*
- ✓ *Only the battery and the geophones can be disconnected and removed from the SV 803 housing by the user. All other disassembly work should only be carried out strictly by an authorised service team.*
- ✓ *The ambient temperature range for charging the instrument battery is 0°C to 45°C.*
- ✓ *SV 803 should not be stored for long periods with the battery discharged. Storage with a discharged battery may damage the battery. In this case the warranty for the Li-ion battery is void.*
- ✓ *If SV 803 is to be stored for a long period, it is recommended that the battery is charged to 60% capacity. The battery should be charged at least once every 6 months.*
- ✓ *When not in use, WEIPU connectors must be capped.*

SAFETY AND ENVIRONMENTAL PROTECTION MARKING OF THE UNIT

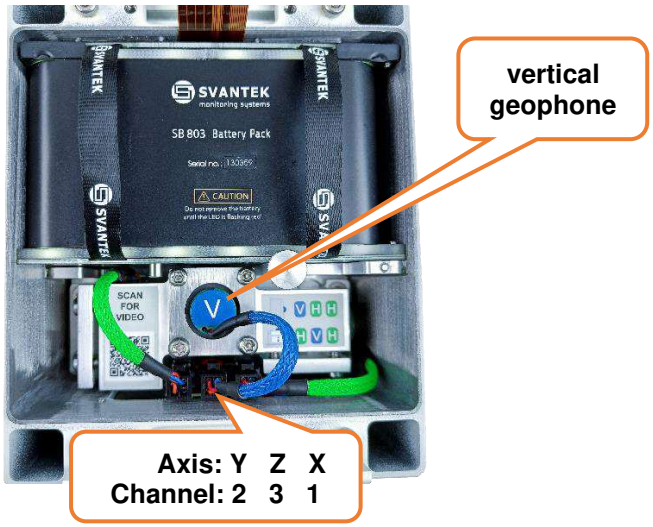
Marking on the Unit	Explanation
UK CA	This product meets UK consumer safety, health or environmental requirements
CE	This product meets EU consumer safety, health or environmental requirements
	Do not throw into standard municipal waste containers. The user is obliged to deliver used equipment to the manufacturer or to the recycling collection point
	This product can be recycled (sign is placed on the battery)

INSTRUMENT ORIENTATION

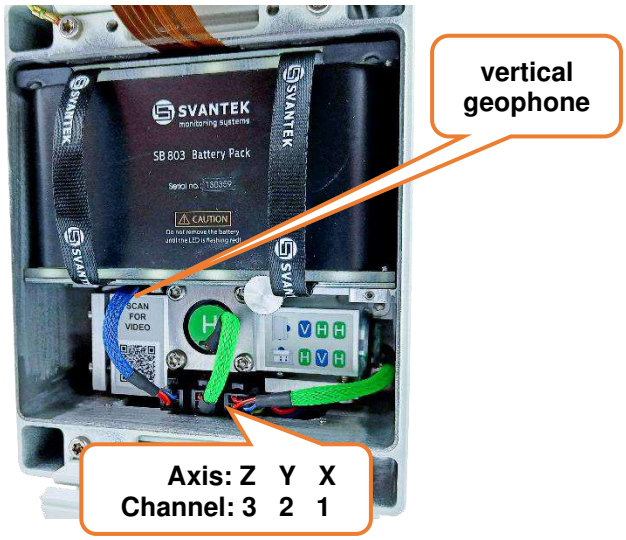
The instrument can be mounted horizontally (on the ground) or vertically (on the wall). Each position must correspond to a specific arrangement of geophones in the geophone pack.

Axes are assigned to the channels of the SV 803: the X-axis is assigned to channel 1, the Y-axis is assigned to channel 2 and the Z-axis is assigned to channel 3.

- In the horizontal position, the central geophone must be of the vertical type *).



- In the vertical position, the left geophone (with the QR code) must be of the vertical type.



*) The geophone of the vertical type is equipped with the blue cable!

SV 803 is equipped with a gyroscope to identify its mounting position and automatically assign the channels to the axes. If there is an inconsistency between the position of the instrument and the arrangement of the geophones, the instrument detects this and informs the user via the *Assistant Pro* mobile application and the *SvanNET* web service.

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1 INTRODUCTION

SV 803 is an outdoor monitoring system dedicated for ground and building vibration applications such as construction site monitoring, tunnelling and blasting. It uses three geophones measuring vertical, longitudinal, and transverse vibration, which can be easily removed for calibration.

The instrument can be fully controlled via the *SvanNET* web service and also via the *Assistant Pro* mobile application, which connects a mobile device to the instrument via Bluetooth®. The control possibilities include data presentation, reporting, alarms, configuration of the measurement and settings of the instrument.

The instrument's enclosure is IP 67 rated and has very robust, waterproof connectors. It can be fitted with an IP 65 external power supply.

SV 803 measures vibration velocity in three directions and simultaneously calculates both Peak Particle Velocity and Dominant Frequency values. The instrument uses FFT to determine the dominant frequency according to BS and DIN standards. It also has the option of using the RMS or PEAK velocity spectrum in 1/3 octave bands for comparison with user defined curves. In addition, SV 803 can measure Vibration Dose Value (VDV).

One of the biggest advantages of the SV 803 is its energy efficiency. It can run on the battery up to 180 days. The instrument can be powered by the internal battery or an external DC power supply, such as a solar panel.

1.1 KEY FEATURES

- **Peak Particle Velocity (PPV) and Dominant Frequency** are measured simultaneously in three axes according to DIN 4150-3 and BS 7385-2.
- **Other** Building Vibration Standards and methods including customized criterion curves based on FFT or 1/3 octave (RMS or PEAK) can be used.
- **Human Vibration** in buildings measurements in accordance with DIN 4150-2 (**KB**) and BS 6472-1 (**VDV**).
- **Time history** logging of measurement results.
- **Time domain signal** recording that opens wide possibilities for post-processing analysis using SvanPC++ software.
- **Bluetooth®** enabling the remote control by the *Assistant Pro* smartphone application.
- **4G modem** enabling the remote control and fast data transfer over the Internet to a PC through the *SvanNET* web service.
- **GPS** module for localization of the instrument and time synchronization (option).
- Internal and external (optional) **4G antennas**.
- Powering from the removable **internal battery**, **external DC** source (option), and dedicated **solar** panel (option).
- Charging the instrument's battery using a standard **indoor USB-C wall adapter**.
- Charging and powering the instrument using the waterproof **outdoor power supply** (option).
- Waterproof **connectors** providing reliable external power supply and communication with external devices.
- **Weather Station** and **Dust Monitor** integration into the measurement system with the use of optional SD 310 monitoring system controller (future option).

1.2 ACCESSORIES INCLUDED

SV 803	Outdoor monitoring station including built-in 4G modem, Bluetooth
SB 803	Exchangeable battery
SB 83	AC charger for SB 803 (USB-C)
SA 800	Levelling mounting base with four sleeves with bolts for mounting SV 803 on the SA 800, wall pin, three levelling studs and the Allen key 4mm for them to attach SV 800 on the wall
SA 801	Sharp short spikes for levelling mounting base on the floor
SC 816	Communication cable for SV 803 (1 m, WEIPU5 - USB-A)
ST 801	Vertical geophone (one pcs.)
ST 802	Horizontal geophone (two pcs.)
SA 82	Torque screwdriver
SA 83	32 GB memory card
SA 85	Key to unfasten geophone plugs

Note: *SV 803 is delivered in protective packaging. Please keep it for use when transporting your equipment.*

1.3 ACCESSORIES AVAILABLE

SV 110	Hand-held vibration calibrator (80Hz & 160Hz) including carrying case
SA 803	Calibration adapter for geophones with cable
SB 871	Solar panel for SV 803
SB 274	Waterproof mains power supply for SV 803
SC 270	Mains cable for SB 274 (5 m)
SC 803	DC cable for SB 274 and SV 803 (5 m, WEIPU2)
SC 833	Solar panel power cable for SV 803 (2 m, WEIPU2)
SA 802	Ground spike 40 centimetres including impact protector
SA 804	External 4G antenna with cable (xx m)
SA 805	Carrying case for SV 803 and accessories

1.4 COMING OPTIONS

Light and sound alarm, battery powered, Bluetooth® controlled
LAN (PoE)
RS232 cable
External Li-Ion battery
External digital triaxial geophone
External digital triaxial accelerometer
Light barrier – sensor for information about e.g., a passing train

1.5 SYSTEM EXTENSIONS

SV 803 will be integrated in the measurement system with other devices:

SP 276	Weather Station
SP 280	Dust Monitoring

2 SV 803 DESCRIPTION

2.1 KEYPAD AND LEDS

SV 803 has two keys on the front panel to:

- - wake up the 4G modem when it is operating in periodic mode
- - turn on the status LED (short press) and, if the lid is opened, turn on Bluetooth (long press > 5 sec)

and three status LEDs that indicate:

- (left) - 4G modem status,
- (middle) - charging/ powering status,
- (right) - measurement status,

and the external antenna socket.

Press both buttons simultaneously to turn on the instrument.

Note: *If the 4G modem is switched off, the* *key will not switch it on. To switch on the modem, use Assistant Pro or SvanNET.*

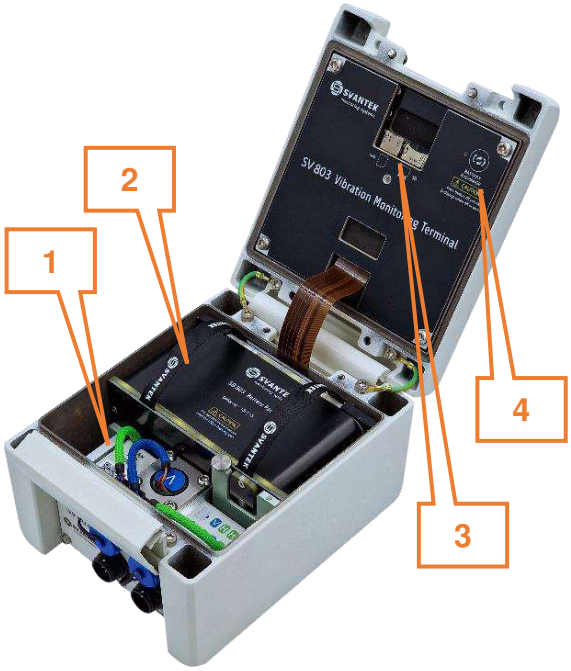
2.2 INSTRUMENT CONTROL

SV 803 can be controlled via the Bluetooth connection, 4G connection or USB. Each type of connection is supported by special software: *Assistant Pro* mobile device application (see Chapter 4) that supports the Bluetooth connection, *SvanNET* web-service that supports the 4G connection to the Internet (see Chapter 5) and *SvanPC++* software that supports either the USB or 4G connection (see Chapter 6).

2.3 WATERPROOF HOUSING

The waterproof (IP 67) SV 803 housing houses and protects the main elements of the monitoring station, including:

- geophone pack (1),
- li-ion battery pack (2),
- nano-SIM card and micro-SD memory card slots (3),
- button to indicate a safe battery change and the power status LED (4). The button turns on the instrument and also turns it off when no external power supply is available,
- analogue and digital processing parts,
- other internal elements such as: connectors, cables, circuit boards.



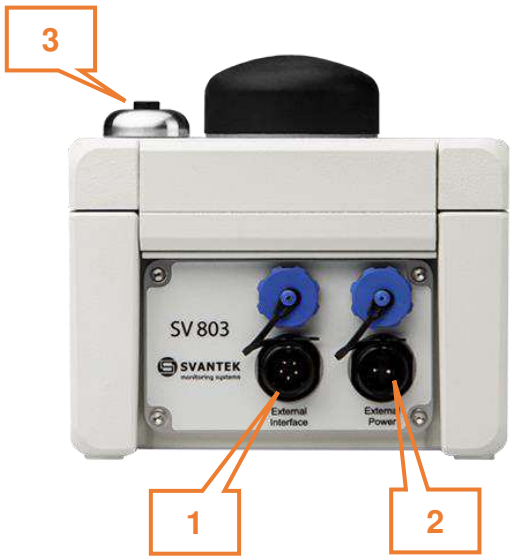
***Note**: SVANTEK does not provide a SIM card for the instrument. It is necessary to purchase the SIM card with the **data plan**. If the instrument is to be used for continuous monitoring, choose a service provider that guarantees good reception at the measurement point.*

***Note**: Make sure the SIM card has the PIN code disabled before inserting it into the SV 803.*

To open the housing, loosen the clamp and then using the torque screwdriver, unscrew the two screws under the clamp that ensure the watertightness of the SV 803.

The station housing is equipped with two connectors:

1. **External Interface** (WEIPU5 type) for USB connection to PC, Weather or Dust monitors or SD 310 Monitoring System Controller, connection of external geophones, alarm lamp or LAN adapter. This connector can also be used for any type of external power source equipped with the WEIPU2 plug.
2. **External Power** (WEIPU2 type) for any type of external power source equipped with the WEIPU2 plug.
3. optional external antenna.



To connect a cable to the WEIPU socket, first align the markings on the plug and socket, then turn the ring near the socket clockwise.

To disconnect a cable from the WEIPU socket, turn the ring near the socket counter-clockwise. New connectors require more force, so using a closed hand is more effective than using only fingers.

***Note**: Use caps to protect connectors when not in use.*

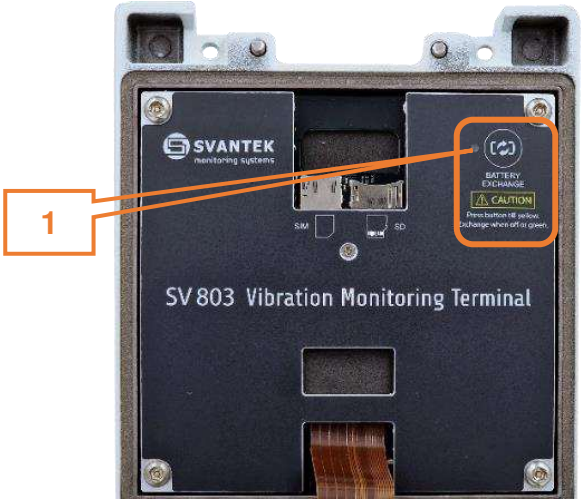
2.4 BATTERY REMOVAL AND CHARGING

The battery must be removed from the instrument housing to be charged using the SV 83 mains charger.

***Note:** If SV 803 is not supplied via the WEIPU5 connector, it is necessary to turn off SV 803 before removing the battery.*

To remove the battery, follow next steps:

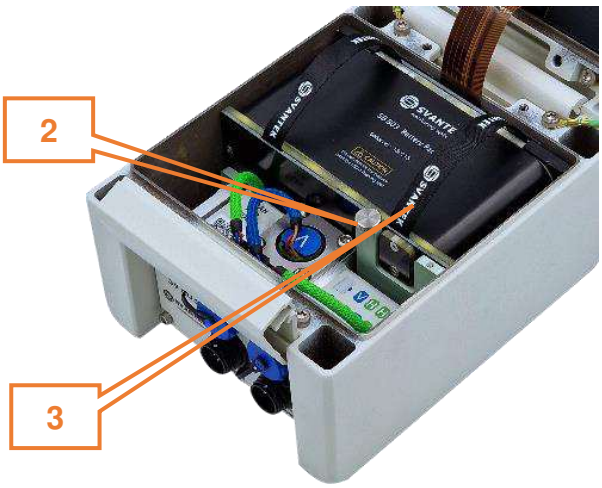
1. Open the lid, press the button on the lid and observe the LED (marked “BATTERY EXCHANGE”); when the LED goes out or turns green (if the WEIPU5 is powered), you can safely remove the battery.



***Note**: Do not remove the battery if the LED is red (steady or flashing).*

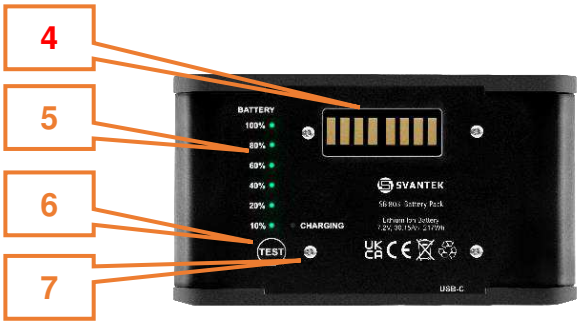
2. Unscrew the screw securing the battery to the housing.
3. Pull out the battery by the straps.

After inserting the battery, tighten the screw (not too tight) to secure the battery in the housing.



The battery has:

4. contacts for connecting the battery to the SV 803 circuit,
5. six green LEDs indicating the state of charge,
6. TEST button for checking the state of charge of the battery,
7. red LED to indicate battery charging,
8. pin that prevents the battery from being inserted incorrectly,
9. USB-C socket for charging the battery.



Normally all the LEDs are off.

Pressing the TEST button causes the green LEDs to turn on from the 10% LED to the LED indicating the current charge.

When the battery is fully discharged, all LEDs will be off.

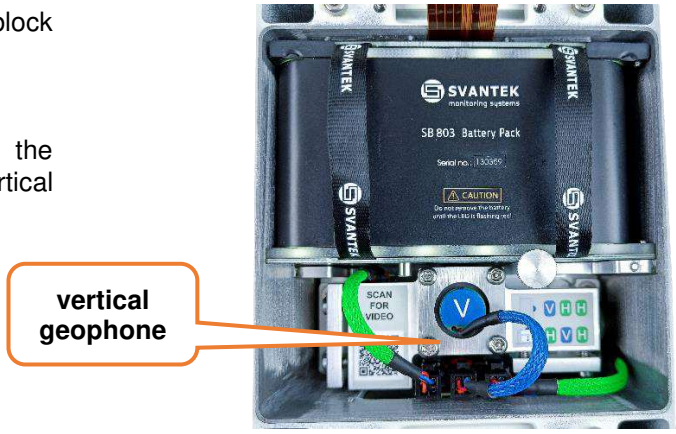
During charging a red LED and a series of green LEDs will light up.

2.5 REPLACING GEOPHONES

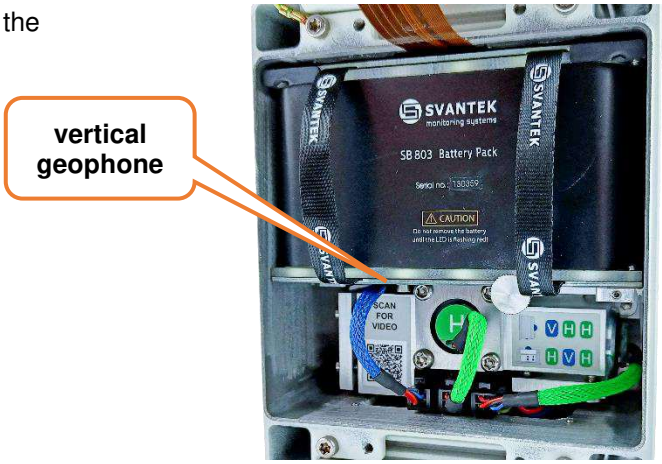
Note: *Before removing the geophones, the SV 803 must be switched off.*

Geophones must be placed in the geophone block according to the SV 803 position.

If SV 803 is positioned horizontally (usually on the ground), the central geophone must be of the vertical type.



If SV 803 is positioned vertically (usually on the wall), the left geophone must be of the vertical type.



Note: *The geophone of the vertical line is equipped with the blue cable.*

To replace the geophones to fit the SV 803 position, first remove the geophone block from the case.

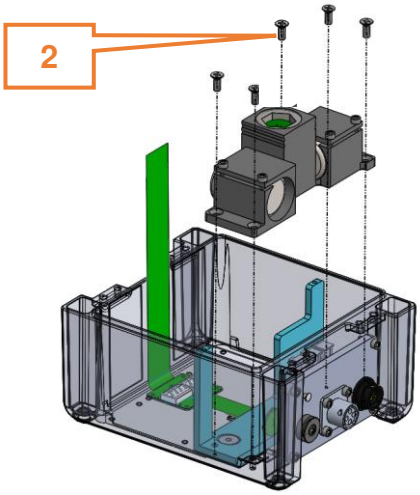
Before removing the geophone block, disconnect all tree cables from the connector panel.

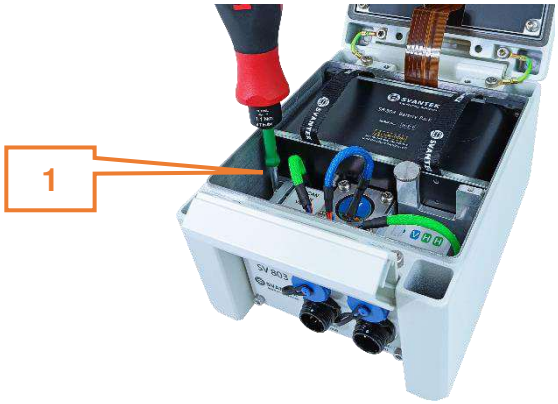
The geophone connectors have special locks that should be pressed when disconnecting. To make this process easier, use the special key to unlock the geophone connectors as shown in the illustration.

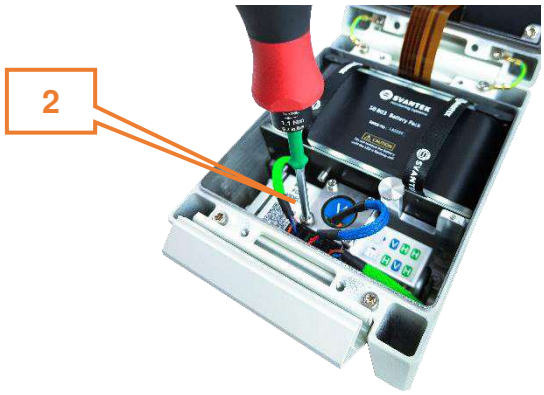
To disconnect the geophone cable, place the key on the connector and lean towards the battery.

To remove the geophone block:

- unscrew the four screws that fix the base of the geophone block to the housing of the geophone. (1) and
- unscrew the left-down long screw on the central geophone (2).





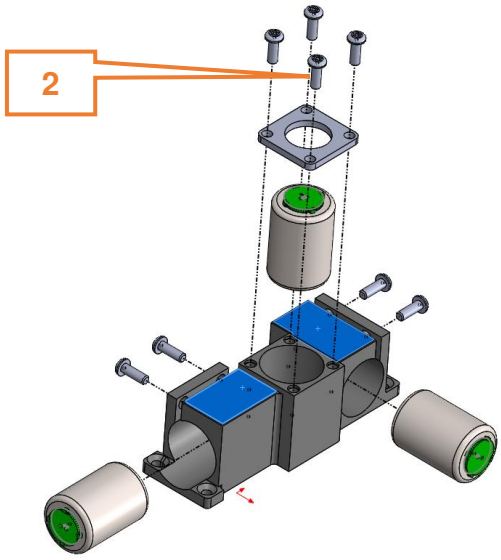


Once the geophone block has been removed, use the torque screwdriver to unscrew the geophone cups and remove the geophone from the box.

Place the geophones in the appropriate boxes and tighten the screws to secure them.

Then insert the geophone block into the instrument housing and screw four bolts to secure the geophone block to the housing.

In the end, tight the left-down long screw on the central geophone (2).



2.6 OPTIONAL ACCESSORIES FOR SV 803

2.6.1 External power adapter

SB 274 is waterproof single output switching power supply which is characterised by:

- Universal AC input / Full range (90 ~ 305V AC)
- Rated power 40W
- Built-in active PFC function
- Class 2 power unit
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Fully encapsulated with IP 66 waterproof level

2.6.2 Solar panel

The **SB 871** solar panel (40 W, 17.5V DC) extends the working time of the monitoring terminal. The size and weight of the panel enables easy transportation in the dedicated carrying bag.

The SB 871 solar panel does not require additional batteryies or external controllers.

SB 871 is equipped with the cable with the WEIPU2 connector.

3 OPERATING SV 803

3.1 POWERING

SV 803 operates from internal rechargeable battery (SB 803).

When the battery is completely discharged, monitoring will be stopped, and the SV 803 will switch itself off.

The battery can be charged inside or outside the instrument. In the first case one of the optional power sources equipped with a WEIPU2 type connector should be connected to the instrument:

- external power adapter (SB 274) or
- solar panel (SB 871).

***Note**: External power sources with WEIPU2 connectors can be connected to both WEIPU connectors on the instrument. The difference is that if it is the WEIPU5 connector, you can remove the battery without switching off the instrument, if it is the WEIPU2 connector, you cannot.*

***Note**: SV 803 should not be stored for long periods with the battery discharged. Storage with the discharged battery may damage the battery. In this case, the warranty for the Li-Ion battery is void.*

***Note**: If SV 803 is to be stored for a long period, it is recommended that the battery is charged to 60% capacity. The battery should be charged at least once every 6 months.*

3.2 LED INDICATORS

External LEDs

SV 803 has three external LEDs on the keyboard panel that indicate the status of:

- 4G modem (left): red – when the modem is switched on, blue – when the modem is connected to *SvanNET*,
- charging/powering (centre): off – when charger is not connected, red – when battery is charging, green – when charging is complete, flashing red - when a battery fault is detected,
- measurement status (right): blinking green – when measurement is running, blinking red for at least 30 seconds – when measurement is running and the overload is detected, yellow – when measurement is stopped.

When the instrument is turning on, three external LEDs flash orange in sequence; after a while they show the status and then go out.

A short press of the ⓘ key activates all three external LEDs for 15 seconds. During this time, the LEDS will show the current status and then turn off.

When the mobile device sends the identification command from the Assistant Pro application, all three external LEDs will flash alternately red and green for a certain time.

Internal LED

The internal LED indicates whether the instrument is on or off and whether the battery can be removed or not.

If the internal LED is:

- red and blinking– the instrument is switched on and there is no external power supply, or
- red – the instrument is switched on and there is an external power supply, or
- orange – the instrument is changing the mode or shutting down,

it is forbidden to remove the battery!

If the internal LED is:

- green – the instrument is switched on and there is an external power supply on the WEIPU5 connector, or
- off – the instrument is switched off and there is no external power supply on the WEIPU5 connector,

it is permissible to remove the battery!

During shutdown, the orange light will be on continuously and when it goes out, the instrument will switch off.

After closing the lid the internal LED switches off automatically.

3.3 ESTABLISHING 4G CONNECTION

***Note**: To save the power of the instrument, the 4G modem works by default in periodic mode, connecting to SvanNET to download data files or to send alarm messages when an alarm occurs. To change the modem mode to continuous, use Assistant Pro or SvanNET.*

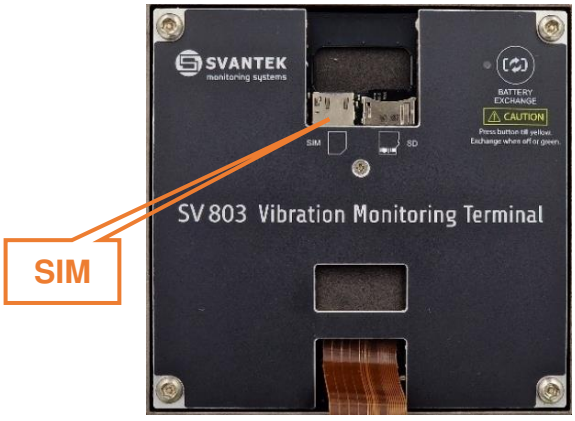
It is strongly recommended that you configure remote communication before you go on site.

Open the lid of SV 803 and insert a nano-SIM card into the slot on the inside of the lid. The instrument will automatically connect to *SvanNET*.

The station is programmed to automatically establish a 4G connection with the *SvanNET* web service.

If you want to wake up the modem working in periodical mode and force the connection to *SvanNET*, press the key on the SV 803 keypad.

The default APN setting is "internet". It is possible that your Internet provider uses a different APN. In this case, the APN must be entered manually using the *Assistant Pro* application (see Chapter 4.6.6) or the *SvanPC++* program (see Chapter 6.4).



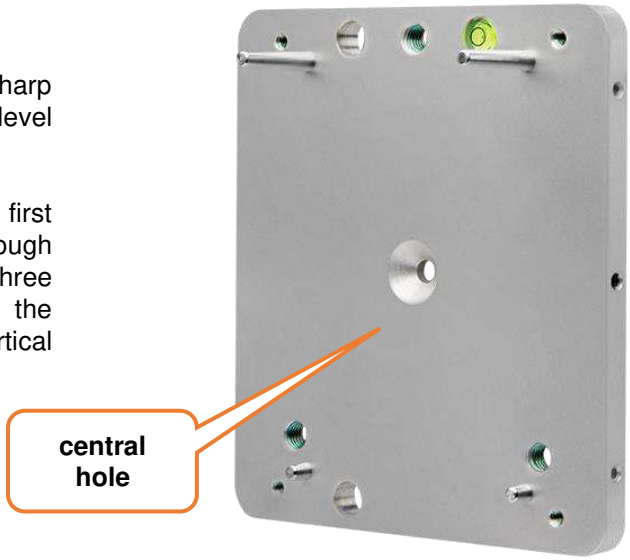
***Note**: If the connection to SvanNET fails, contact your local distributor or the SVANTEK support team.*

3.4 MOUNTING THE INSTRUMENT

SV 803 can be placed on the ground or mounted on the wall using the mounting plate.

If you are measuring on the ground, attach four sharp spikes to the mounting base and check the spirit level indicator.

If you wish to mount SV 803 on the wall, you should first attach the mounting base to the wall with the pin trough the central hole in the base. To control the level use three studs and the Allen key. The mounting angle of the instrument must not exceed 5º in relation to the vertical plane.



After fixing the mounting base to the wall, fix the SV 803 to the mounting base with four screws using four sleeves.

To do this, insert four sleeves with screws into the groves in the instrument housing and tighten them with a torque screwdriver.

3.5 TURNING THE INSTRUMENT ON/OFF

Turning On

SV 803 switches on automatically when the external power supply is connected.

If the instrument was automatically switched off due to a discharged battery, it will switch on automatically when a charged battery is inserted.

In other cases, you should turn on SV 803 manually by pressing two keys and at the same time (for appx. 2 seconds) until all the LEDs light up.

SV 803 can also be turned on using the instrument's Timer or remotely.

While turning on, the system integration is checked and if successful, the firmware program is started. This program activates Bluetooth and the 4G modem and establishes a connection to the SvanNET web server (if the SIM card is inserted).

Turning Off

To turn the instrument off manually:

1. Press and hold two buttons for approximately 5 seconds (all LEDs will turn orange) or
2. If there is no power supply on the WEIPU5 connector, open the lid and press and hold the button on the top right corner of the lid marked “BATTERY EXCHANGE” until the LED is orange.

3.6 MEASUREMENT RUN AND DATA STORAGE

After turning on, SV 803 starts the measurement process according to the current settings – factory settings or user settings.

3.6.1 Factory settings

The instrument is supplied with default/factory settings:

- Standard: BS-7385-2
- Building type: L2
- Events, Wave recording, and CSV recording functions are disabled.

By default, the instrument measures PPV, Peak, Max, RMS and DF and stores the results in a file named “Lxx” in steps of 30s.

If some configured events are happened, the instrument analyses them and logs the spectrum to the logger file and records the domain signal to the wave recording file. At the same time, SMS and/or E-mail alarm notifications may be sent to the selected recipients.

You can restore the factory settings using the *Assistant Pro* application – see Chapter 4.4.6.

3.6.2 User settings

You can change the factory settings using one of three software applications (*Assistant Pro*, *SvanNET* or *SvanPC++*) and restart the measurement with new settings.

Measurement and instrument settings are described in Chapter 4.6 and 5.2.5.1.

3.6.3 Data Storage

SV 803 creates measurement files that are stored on the micro-SD memory card. These files can be downloaded manually using any of the software applications.

When SV 803 uses the 4G connection to *SvanNET*, it can periodically transfer data files to the Cloud in automatic mode (and, if configured, delete transferred files). The programmable periodic connection mode is used to prolong the battery life.

When the event occurs, SV 803 also connects to *SvanNET* and sends alarm notifications to the recipients.

3.6.4 Overload indication

If an overload occurs in one or more samples during the measurement, the overload period is marked with an overload flag. Overload is also indicated by the measurement LED which will blink red for 30 seconds.

3.7 CALIBRATION

The instrument channels with the supplied geophones are factory calibrated for the reference environmental conditions (see Appendix C). If geophones other than those supplied are used, calibration of the channels should be carried out by the user. Periodic calibration of the instrument is also required.

SV 803 should be calibrated by an authorised laboratory.

Note: *SV 803 is sensitive to shock. If it is dropped on a hard surface, it must be recalibrated.*

Note: *The recommended factory calibration interval is 12 months to ensure continued accuracy and compliance with international specifications. Please contact your local Svantek representative for further details.*

3.8 GEOPHONE IN SITU CHECK

The geophone check can be performed by the user using the SV 110 Handheld Vibration Calibrator.

To do this you should:

- remove the tested geophone from the geophone pack,
- prepare the SA 803 calibration adapter and the cable connecting the geophone to the SV 803,

- attach the geophone to the SV 110 calibrator using the SA 803 calibration adapter,

- connect the geophone to the SV 803 using the extension cable,
- set the SV 110 shaker amplitude and frequency (10 m/s^2 or 20 mm/s @ 79.58 Hz).

- switch on the SV 803 and SV 110 and
- perform the geophone check using the *Assistant Pro* application.

Note: *Assistant Pro has a dedicated Wizard for calibration and geophone check that guides you through the process step by step.*

3.9 SYSTEM CHECK

SV 803 has a special mechanism for testing the measurement chain, so called System Check, by triggering an electronic pulse and then evaluating the response of the sensor signal.

If the System Check finds an error, the warning about this is displayed in the *Assistant Pro* application and in the *SvanNET* web service.

System Check can be scheduled by the user – see Chapters 4.6.4 and 5.2.5.1.

4 APPLICATION FOR MOBILE DEVICES – Assistant Pro

Assistant Pro is an application for mobile devices (smartphones and tablets) running on the Android and iOS platforms that allows you to control SV 803. The application uses the Bluetooth® interface, which allows full control of the instrument, such as view current measurement results, start/stop measurements, change current settings, download files with measurement results, connect to the *SvanNET* web service and more.

Assistant Pro also sends alarms to the specified recipients when the certain events occur. A unique feature of the application is the ability to send an email or SMS on pre-programmed alarm conditions.

The *Assistant Pro* application also supports other Svantek instruments that are equipped with Bluetooth® (e.g., SVAN 977/979 sound and vibration level meters, SV 100A whole-body vibration dosimeters, SV 104 sound exposure meters, SV 971A/973A/975 sound level meters etc.).

4.1 INSTALLING ASSISTANT PRO ON A MOBILE DEVICE

To install *Assistant Pro* on your mobile device:

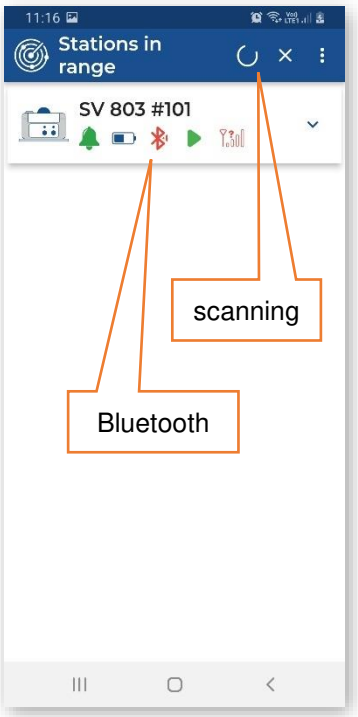
1. Download the application installation file from the svantek.com website to your mobile device - smartphone / tablet with Android 5.0+ or iOS 9.0+ systems.
2. Go to the folder on your mobile device containing the downloaded *AssistantPro V x.x.x.apk* installation file, tap it and follow the installation procedure.

You can also download *Assistant Pro* from the *Play Store*.

To start working with *Assistant Pro*, tap the icon on your device.

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

The application detects visible instruments and, if the automatic connection feature is enabled, tries to connect to them.



Note: *The geophone positions in the geophone pack should match the SV 803 position (on the ground or on the wall) – see Chapter 2.5. If the geophones do not match the SV 803 position, the instrument icon will start flashing red.*

4.2 CONNECTING WITH INSTRUMENTS

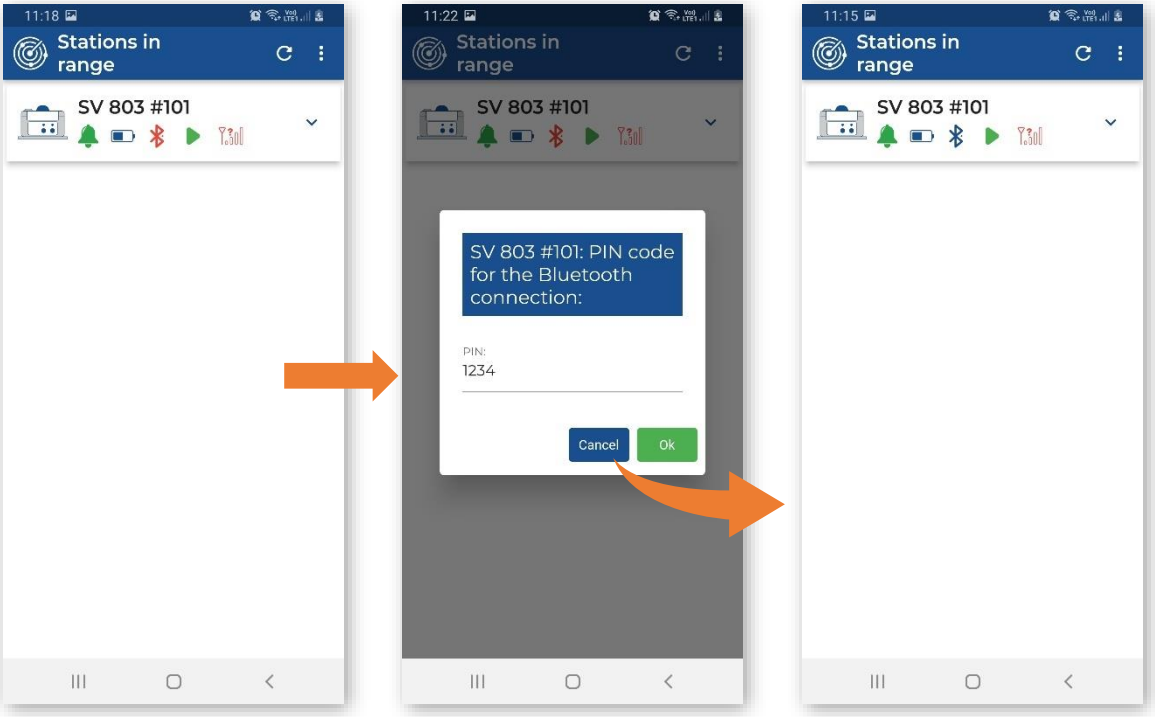
Assistant Pro compatible instruments with Bluetooth® enabled will broadcast their basic status and some basic data will be visible on a mobile device running the application.

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.

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.

4.3 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 isa 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 – during connection.

Bluetooth – connected.

The instrument is measuring.

The instrument is not measuring.

4G modem – not connected.

4G modem – connected to the Internet.

4G modem – connected to *SvanNET*.

4.4 CONTROLLING THE INSTRUMENT

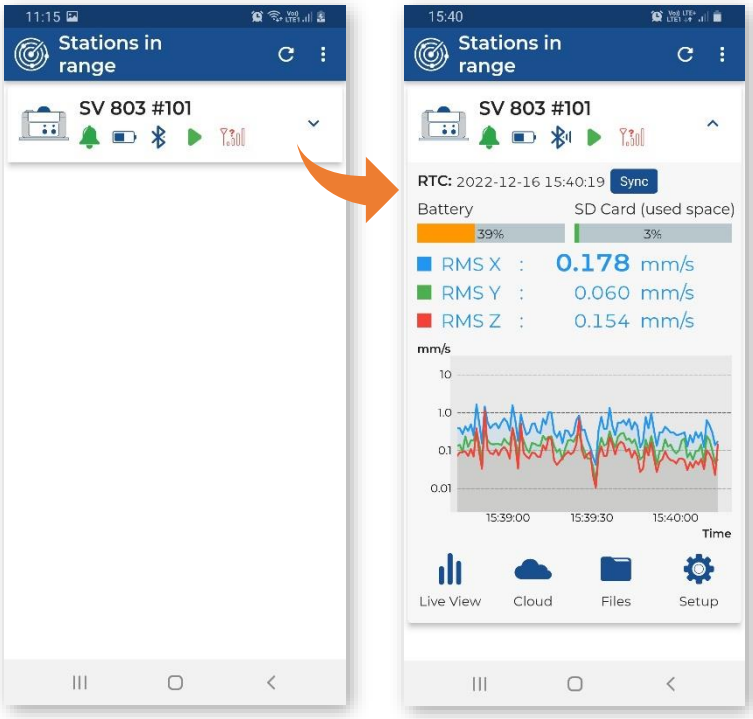
The visible instruments appear on the Assistant Pro screen as a bar that can be expanded by tapping it. Once expanded, the instrument panel displays the device's battery and memory status, as well as the values of some predefined readings.

After expansion the instrument bar, the instrument panel displays the real-time clock (**RTC**), the status of the instrument's battery (**Battery**) and memory (**SD Card (used space)**) as well as the values of some predefined measurement results.

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

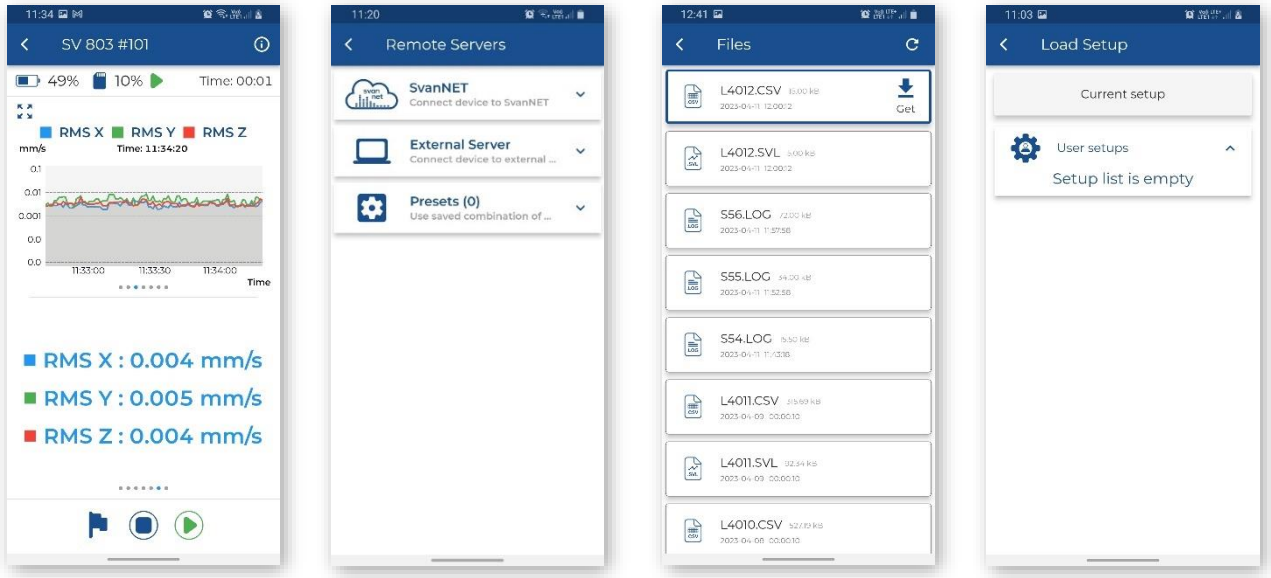
Four icons at the bottom of the panel give you quick access to some functions:

- **Live View** – viewing live results with the possibility to start/stop the measurement,
- **Cloud** – connecting to the *SvanNET* web service (see Chapter 4.4.3),
- **Files** – downloading instrument files (the icon is hidden by default – see Chapter 4.5),
- **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 4.5.*

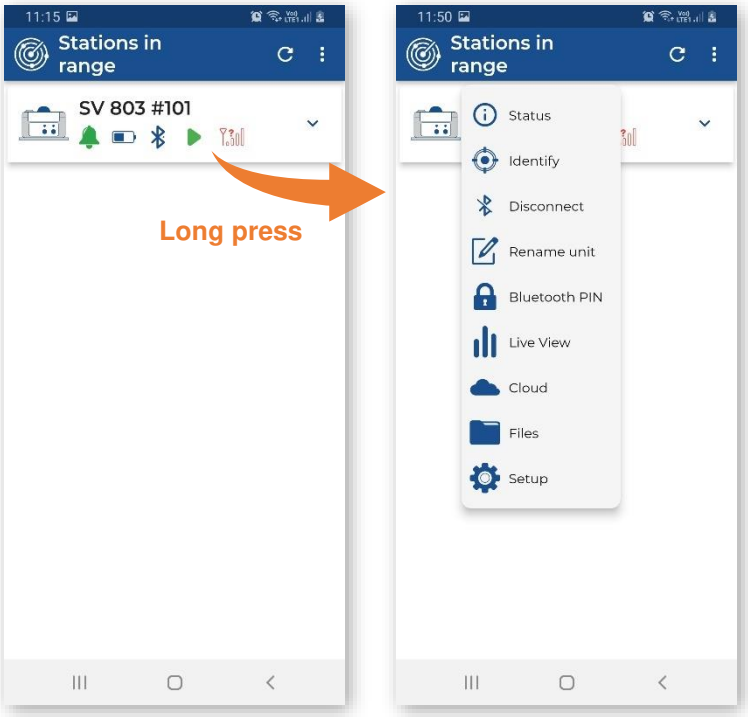
Below are screens after tapping function icons: **Live View**, **Cloud**, **Files** and **Setup**.



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

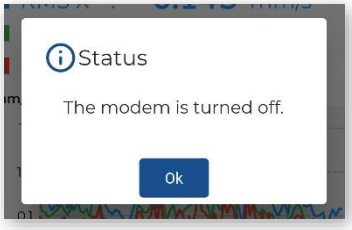
The pop-up menu allows you to:

- 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**,
- access the **Cloud** (*SvanNET* web service, see Chapter 4.4.3),
- open the file list - **Files**; this icon can be hidden, see Chapter 4.5,
- configure instrument settings - **Setup**.



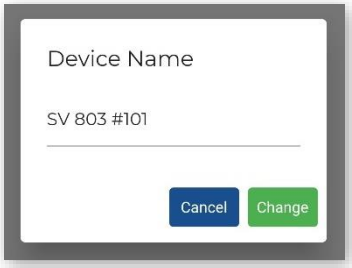
4.4.1 Auxiliary commands

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 three LEDs on the front of the instrument will flash red four times to indicate which unit 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.

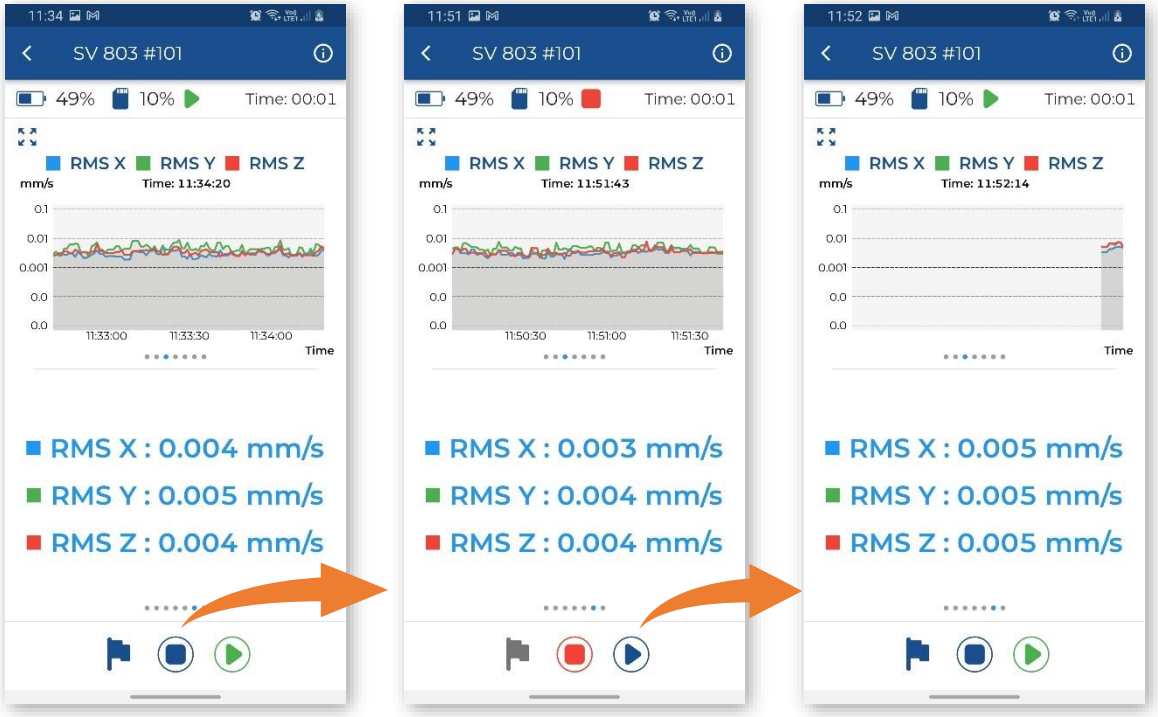


When you tap **Rename Unit**, the **Device Name** dialogue box appears with the current instrument name, which you can edit.

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

4.4.2 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.



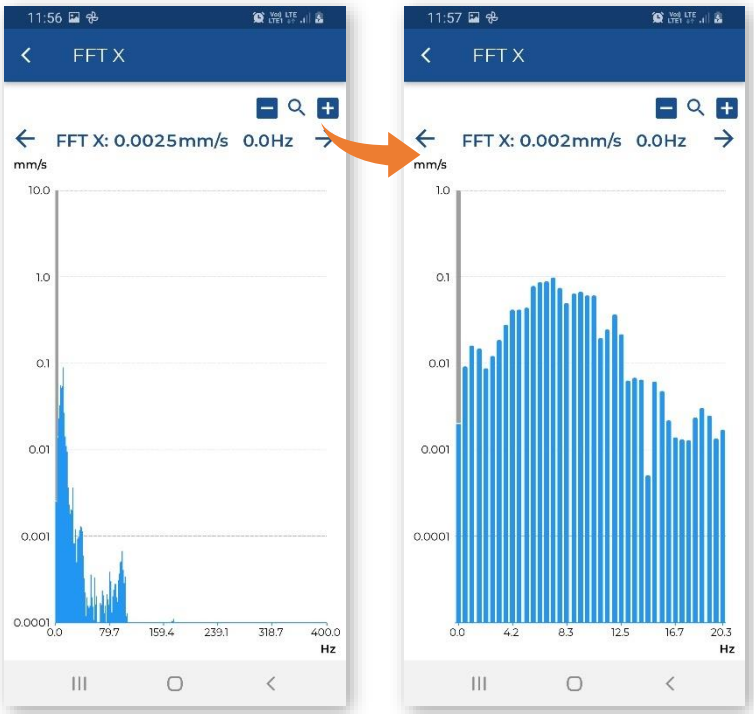
***Note: Live view** shows the limited set of measurement results. The full set of measured results is stored in the instrument files and can be viewed using of SvanNET or SvanPC++.*

Below are some combinations of view, including FFT or 1/3 octave spectra, time-histories of some results, current result values.

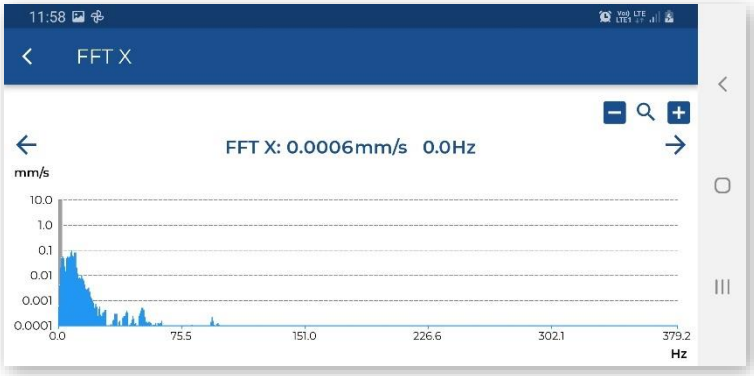
Note: *The FFT or 1/3 octave spectra views depend on the selected standard – see Chapter 4.6.1.1. FFT spectra are displayed for most standards based on the PPV and its dominant frequency analysis. 1/3 octave spectra are displayed for the User standard based on the 1/3 octave analysis.*

The FFT spectrum can be expanded to the full screen.

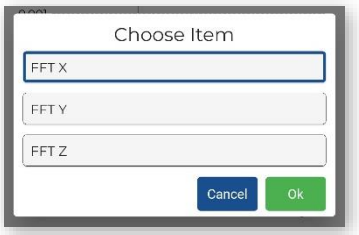
You can zoom in and out of the spectrum.



You can also rotate the screen to view the FFT spectrum in higher resolution.



To change the spectrum displayed, long press on the spectrum area and select the desired spectrum in the dialogue box.



Tap the marker icon to open the **Create Marker** dialogue box, where you can activate the marker to which you can assign the photo, video, or audio recording.

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

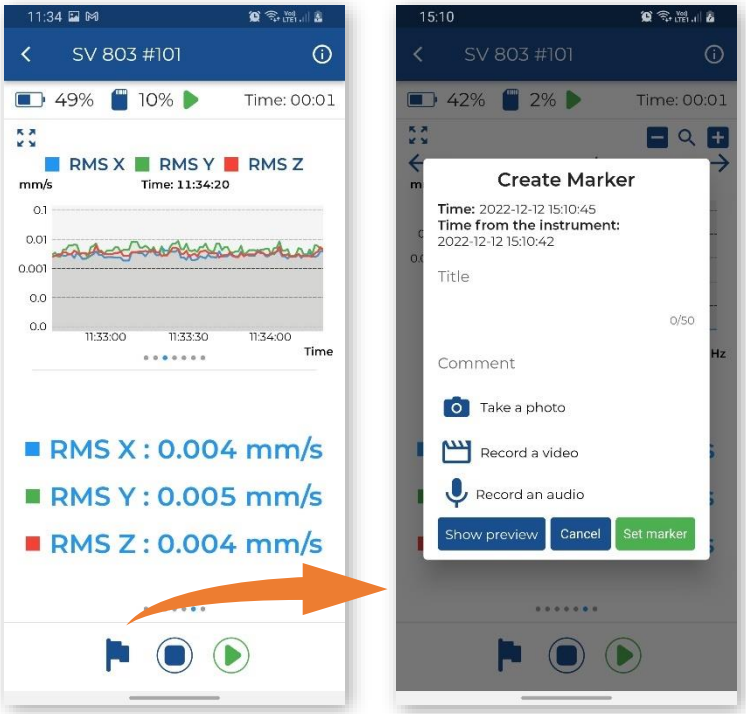
Tap **Comment** to enter the comment text.

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

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

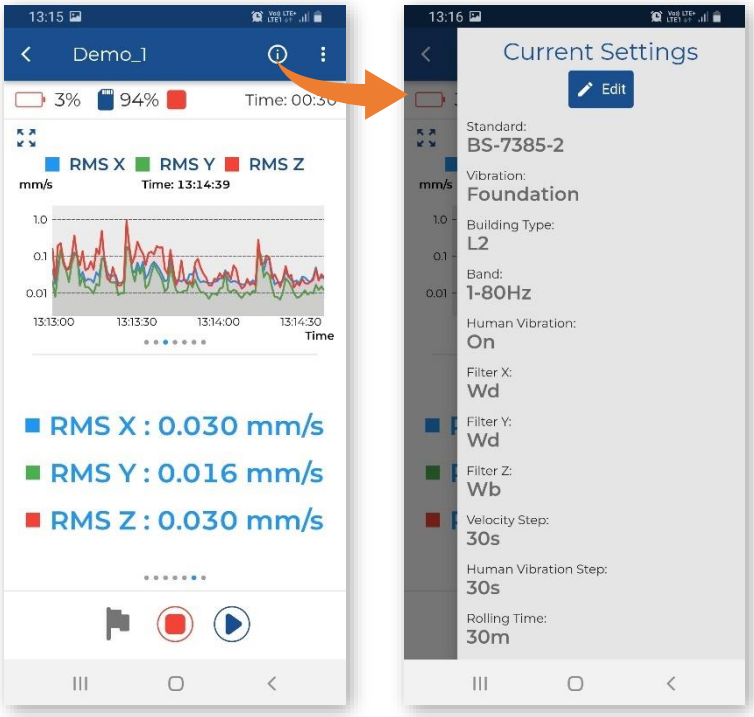
Tap **Record an audio** to add an audio to this marker.

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



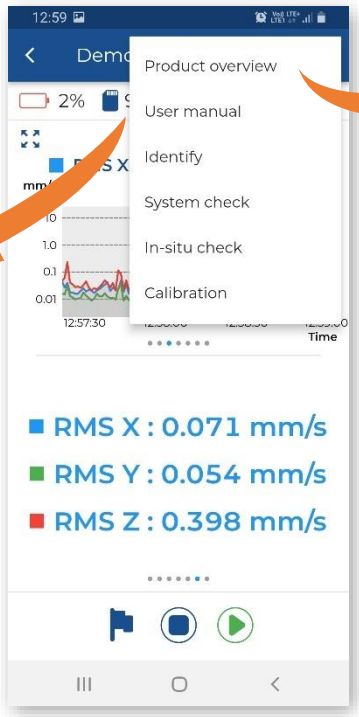
Tap the ⓘ icon to display the current settings for the device.

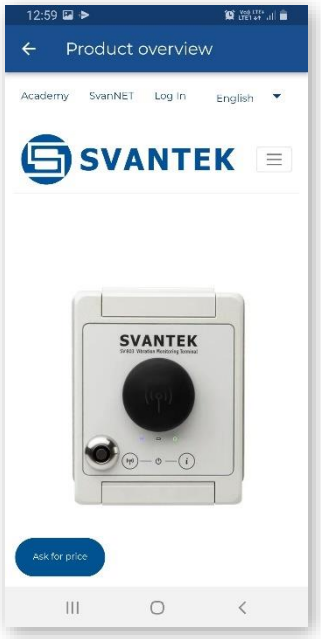
Tap **Edit** to edit them.



When you tap , you can:

- see the **Product overview**,
- see the **User manual**,
- **Identify** the instrument, see Chapter 4.4.1,
- perform **Systen check**, **In-situ check** and **Calibration**.

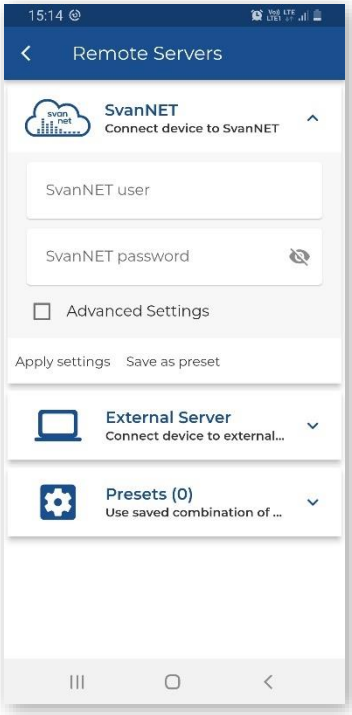


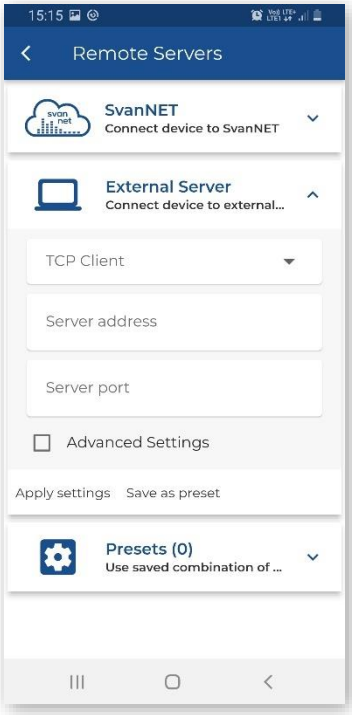


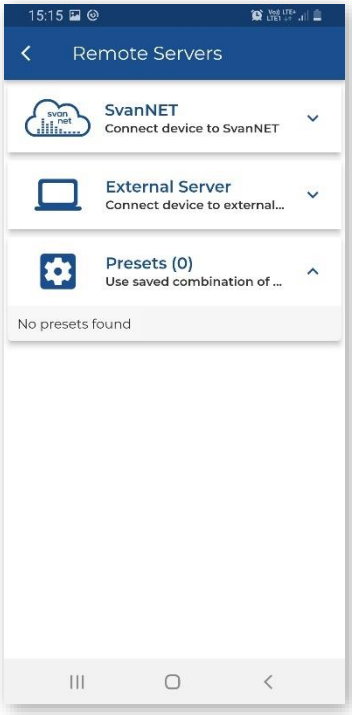
To return to the “Stations in range” screen, tap the icon.

4.4.3 Cloud

Tap **Cloud**, to open the **Remote Connection** screen.



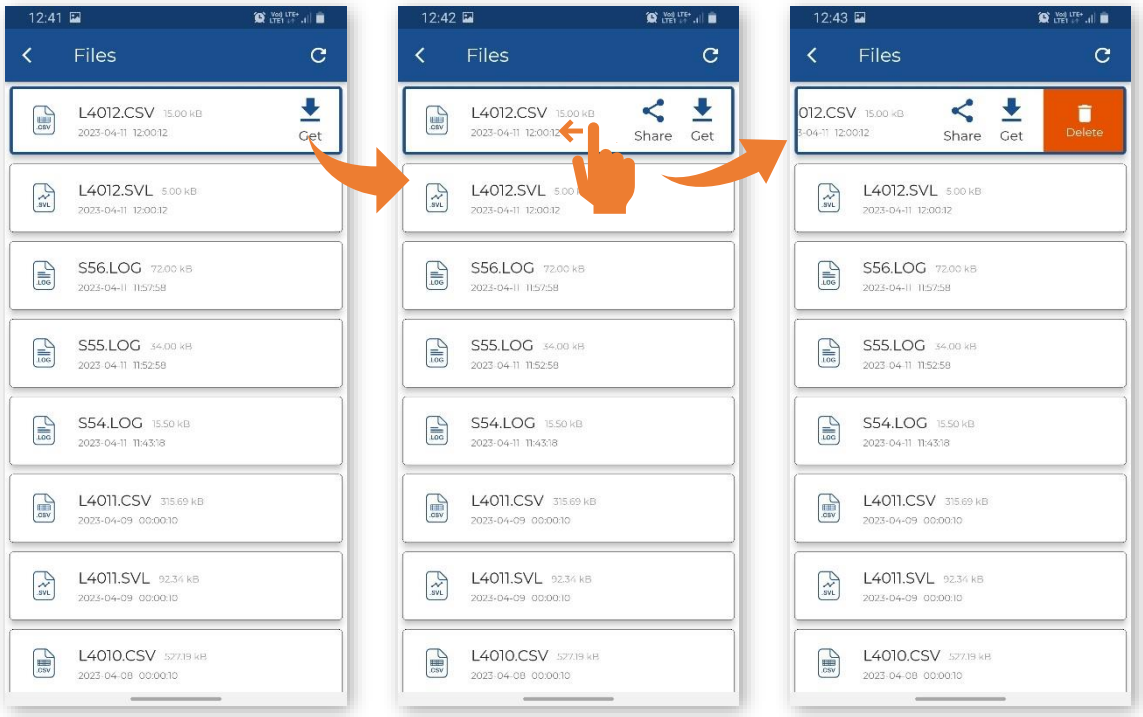




4.4.4 Files list

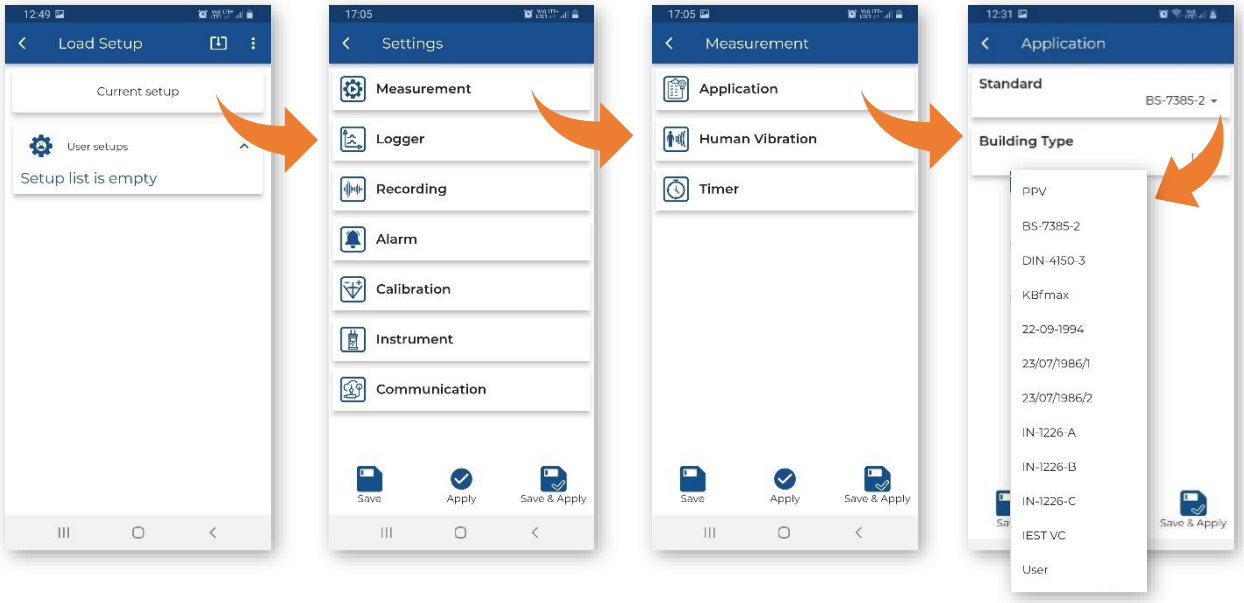
The **Files** section displays the list of files created by the instrument on the instrument's memory card.

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.



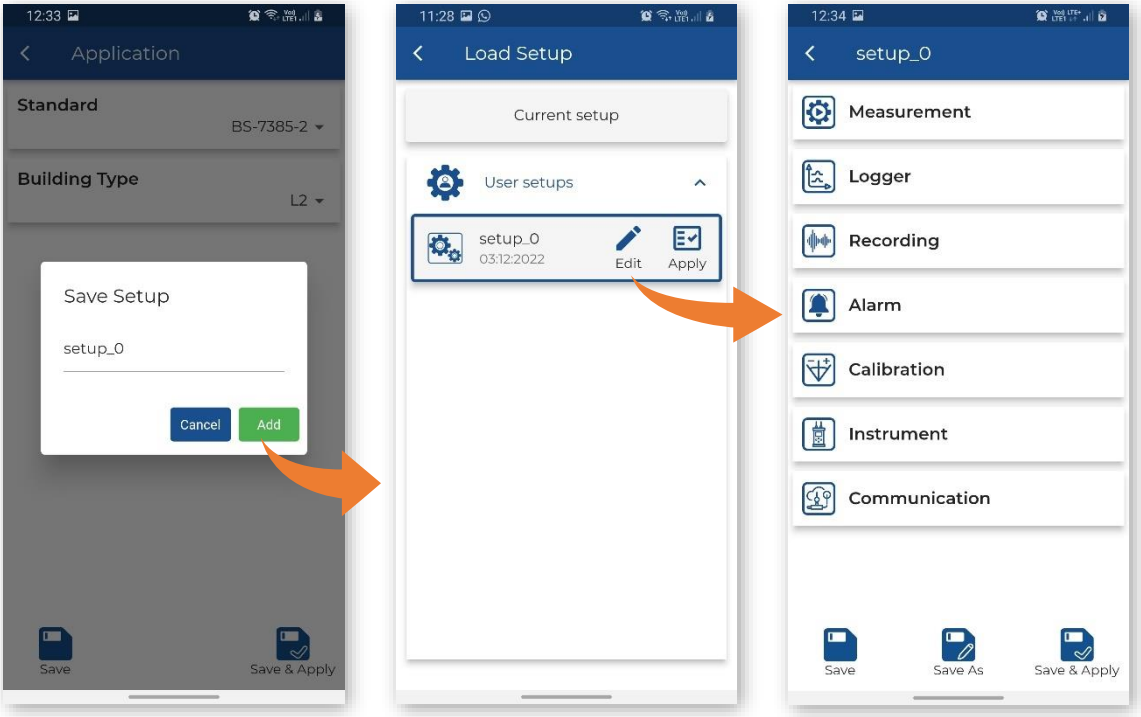
4.4.5 Instrument settings

The **Settings** section allows you to configure the measurement and specific instrument settings. The settings are grouped in sections such as **Measurement**, **Logger** etc., which contain sub-sections etc. The last item in such a hierarchy consists of parameters that you can set, e.g., **Standard**: *PPV*, *BS-7385-2* etc.



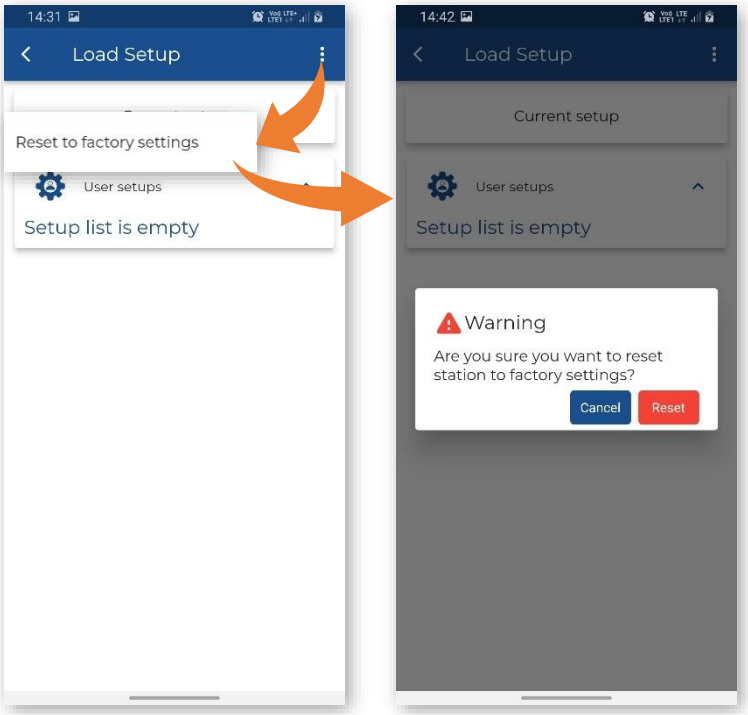
After configuring the settings, you can save them to the mobile device catalogue (**Save**), load them to the instrument as the current settings (**Apply**), or save and load them simultaneously (**Save & Apply**).

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.



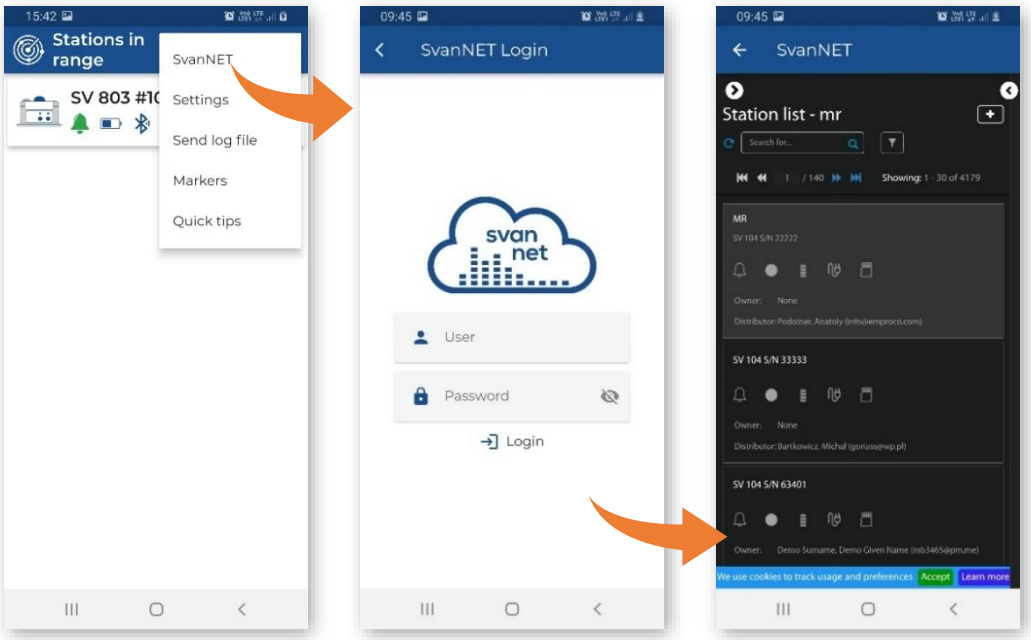
4.4.6 Restoring factory settings

You can restore the factory settings by tapping , then tapping **Reset to factory settings** and then tapping the *Reset* button in the **Warning** dialogue box.

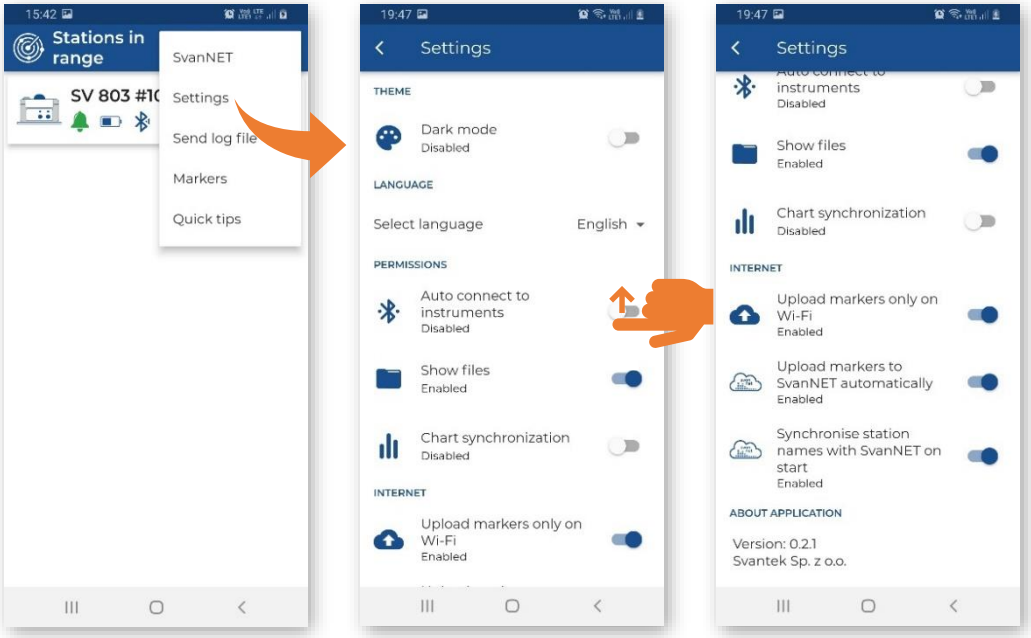


4.5 ASSISTANT PRO AUXILIARY FUNCTIONS AND SETTINGS

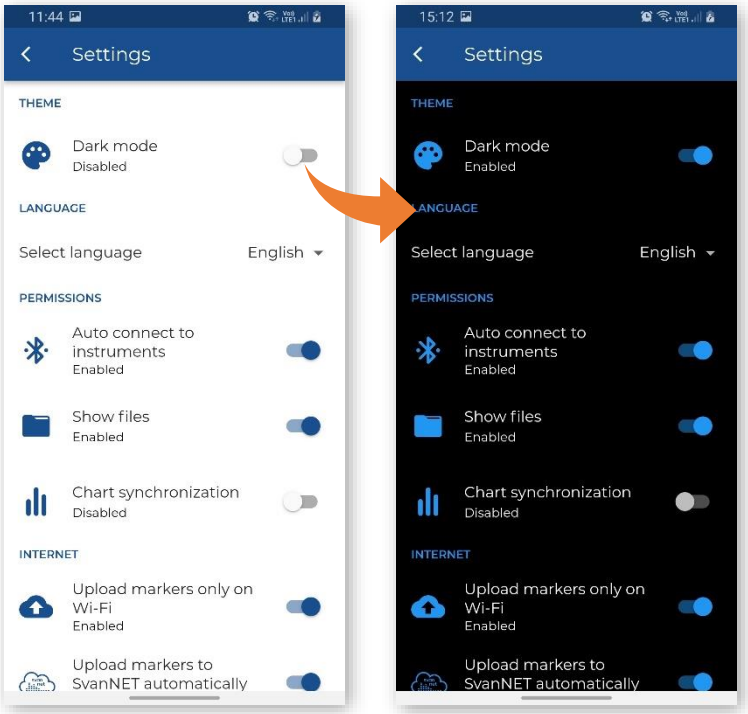
By tapping , you can open *SvanNET* in your mobile device, configure *Assistant Pro* settings, share the log file with Android applications and view, edit and share previously created markers, get quick tips, read the terms and conditions and privacy policy and exit the application.



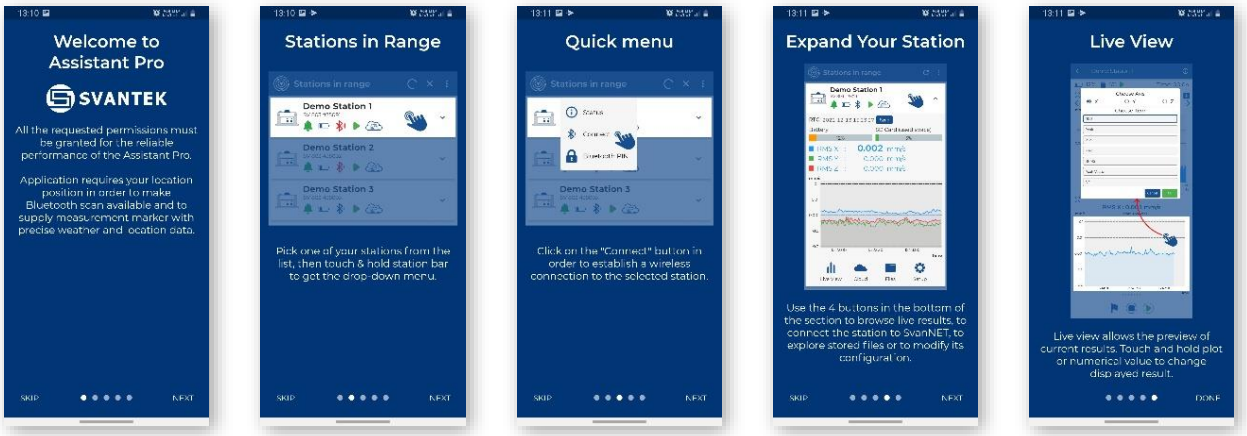
In the *Settings* screen, you can select the application THEME (enable or disable the **Dark Mode**), select the application *LANGUAGE*, enable or disable some *PERMISSIONS*: automatic connection to visible instruments (**Auto connect to instruments**), add/delete the **Files** icon and item in the pop-up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



If your mobile device has an OLED or AMOLED screen, you can turn on **Dark mode** to save the power.



Quick tips give you a quick overview of the *Assistant Pro*.

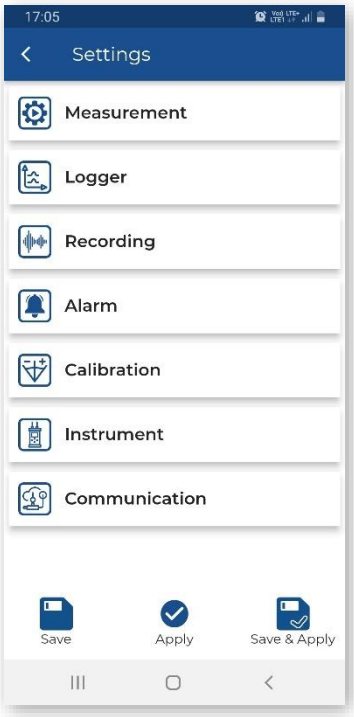


4.6 INSTRUMENT SETTINGS

The configuration menu (**Settings**) contains the following sections:

- **Measurement** – to configure the measurement parameters,
- **Logger** – to configure data storage in a logger file,
- **Recording** – to configure signal recording to a WAV file,
- **Alarm** – to configure alarm conditions and notifications,
- **Calibration** – to view the last calibration data and set the system check schedule,
- **Instrument** – to configure parameters related to the instrument hardware,
- **Communication** – to configure remote control settings.

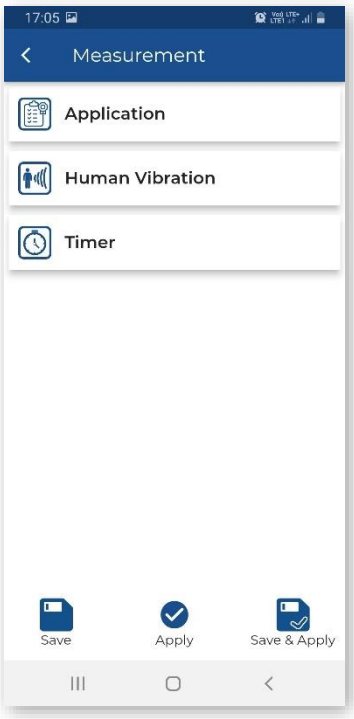
In the case of the *User* standard, three **Curve** sections appear in the main menu, allowing you to define/edit your own criterion curves.



4.6.1 Measurement settings – Measurement

The **Measurement** section allows you to configure measurement parameters and contains tree subsections:

- **Application** – to select the application standard and other associated parameters,
- **Human Vibration** – to define weighting filters for VDV measurements,
- **Timer** – to programme the instrument's internal timer to start measurements at the desired time.

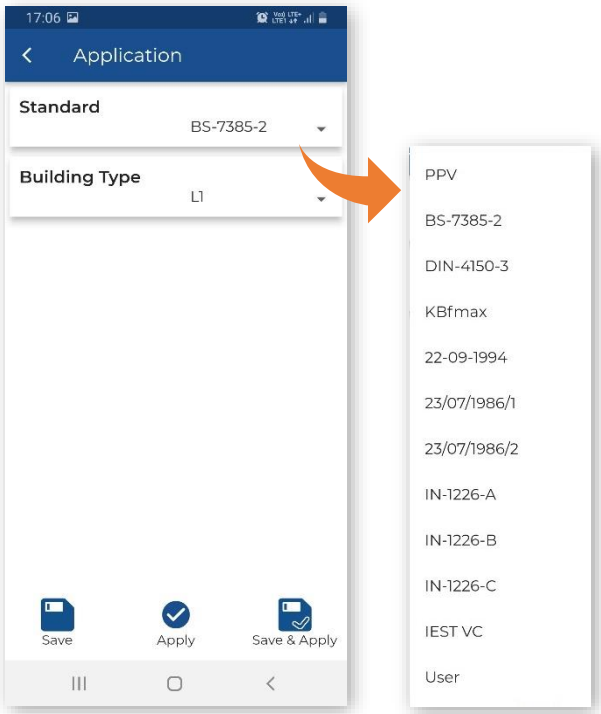


4.6.1.1 Standard settings – Application

In the **Standard** field, you can select the application method/standard: *PPV*, *BS-7385-2*, *DIN-4150-3*, *KBfmax*, *22/09/1994*, *23/07/1986/1*, *23/07/1986/2*, *IN-1226-A*, *IN-1226-B*, *IN-1226-C*, *IEST VC or User*.

The content of the **Application** sub-section depends on the selected standard and may include the following settings:

- **Building Type** for all methods except *PPV*, *KBfmax* and *User*,
- **Vibration Type** for the *DIN-4150-3* method,
- **Band** for the PPV, *DIN-4150-3*, *KBfmax* and *User* methods,
- **Spectrum** for the *User* method.



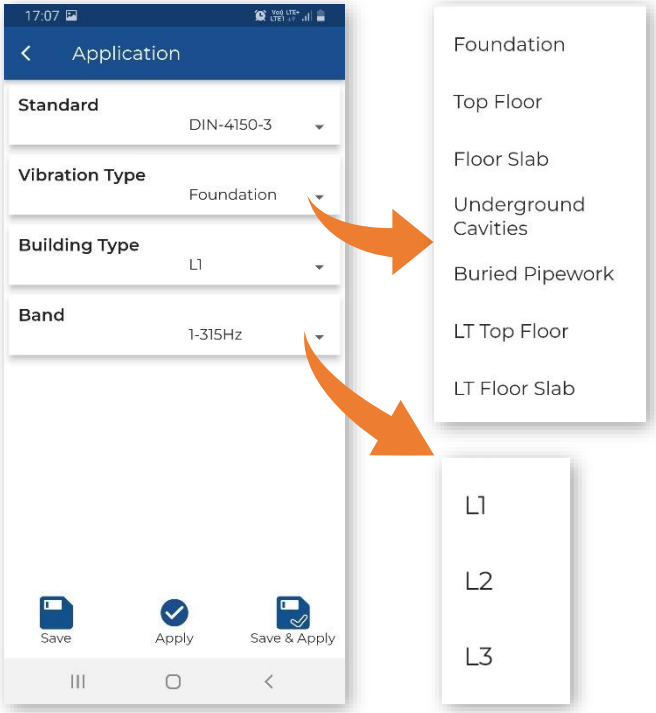
Building Type defines the criterion curve for most standards: **L1**, **L2**, etc.

Vibration Type defines the building element for the *DIN-4150-3* standard: *Foundation*, *Top Floor*, *Floor Slab*, *Underground Cavities*, *Buried Pipework*, *LT Top Floor* or *LT Floor Slab*.

The content of the settings depends on the selected method.

For example, the *IEST VC* method uses specific criterion curves for the special building types: *Workshop*, *Office*, *Residential*, *Theatre*, *VC-A*, *VC-B*, *VC-C*, *VC-D* and *VC-E*.

In the **Band** position, wo bands can be selected: *1-80Hz* and *1-315Hz*.



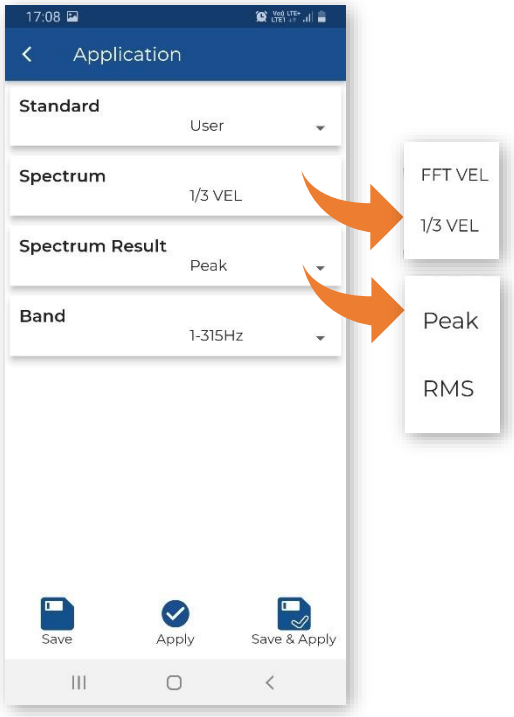
The table below describes the application methods/standards used:

Standard / Method	Reference	Filtering	Method
PPV	DIN-4150-3 Part 3: Effects of vibration on structures	DIN 80 bandpass DIN 315 bandpass	Measurement of unweighted PPV without frequency analysis
BS-7385-2	BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration	VEL 1 Unweighted	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 4 - 250 Hz
DIN-4150-3	DIN-4150-3 Part 3: Effects of vibration on structures	DIN 80 bandpass DIN 315 bandpass	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 1 - 100 Hz
KBfmax	DIN 4150-2 Part 2: Human exposure to vibration in buildings	KB Weighting filter	Measurement of frequency weighted KBfti and KBfmax in the frequency band 1 - 80 Hz
22/091994	French regulations decree of 22/09/94 «Carrières»	VEL 1 Unweighted	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 5 – 80 Hz
23/07/1986/1	French regulation text of 23rd of July 1986. «classified installations» FRENCH-A CONTINOUS	VEL 1 Unweighted	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 4 – 100 Hz
23/07/1986/2	French regulation text of 23rd of July 1986. «classified installations» FRENCH-B SHORT-TERM	VEL 1 Unweighted	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 4 – 100 Hz
IN-1226-A	French Recommendation from National Railway company (SNCF) «Explosives»	VEL 1 Unweighted	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 5 - 100 Hz
IN-1226-B	French Recommendation from National Railway company (SNCF) « French-A Continuous »	VEL 1 Unweighted	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 5 – 100 Hz
IN-1226-C	French Recommendation from National Railway company (SNCF) « French-B Short-Term »	VEL 1 Unweighted	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 5 – 100 Hz
IEST VC	IEST American Vibration Criteria For Facilities With Sensitive Equipment	VEL 1 Unweighted	Measurement of unweighted velocity signal in 1/3 octave RMS spectra
User Velocity or acceleration	User defined criteria	VEL 1 DIN 80 DIN 315	User defined method based on PPV and FFT or 1/3 octave velocity spectra or 1/3 octave acceleration

If you don't find the application method in the **Standard** list, you can customise your own parameters for a criterion curve based on the FFT or 1/3 octave velocity spectra (RMS and Peak) and create your own criterion curve.

In this case, select **User** in the **Standard** list and define **Spectrum**: *FFT VEL* or *1/3 VEL*.

For the *1/3 VEL* spectrum you can also select **Spectrum Result**: *Peak* or *RMS*.

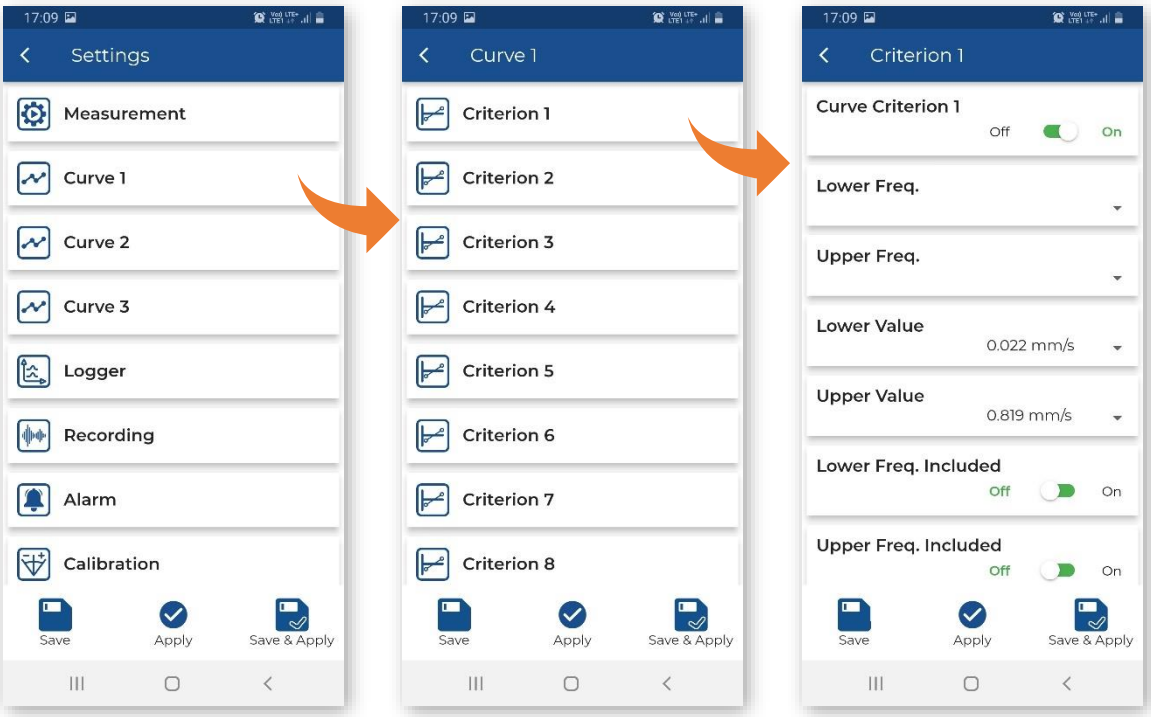


Note: *The FFT spectrum parameters for all methods using FFT analysis are set by default as follows: power spectrum - 411 lines, time window – Hanning.*

In the case of the *User* standard, three **Curve** sections appear in the main menu allowing you to define/edit your own criterion curves, segment by segment (**Criterion**).

To create a new segment of the building type criterion curve for the *User* standard:

1. Activate it by switching on **Curve Criterion**.
2. Select the lower and upper frequencies of the criterion curve segment, lower and upper values.
3. If necessary, include the lower and/or upper parts of the segment.

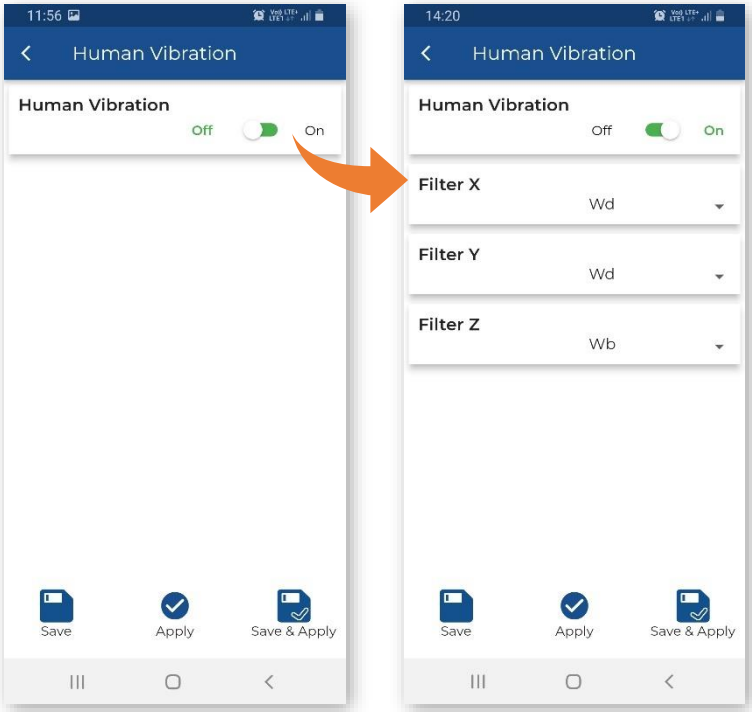


4.6.1.2 Human vibration measurements – Human Vibration

The instrument can simultaneously measure vibration acceleration, allowing VDV to measured measurement with a different recording step to PPV. The instrument has built-in weighting filters according to ISO 2631-1 and ISO 2631-2 and BS 6472-1.

In the **Human Vibration** section, you can switch *On/Off* the human vibration measurements. This option allows the acceleration vibration results to be measured in parallel.

When the human vibration measurements are anabled, the weighting filters for the three axes X, Y and Z (*Wd*, *Wd* and *Wb* respectively) are displayed. These filters are predefined and cannot be changed.



4.6.1.3 Programming instrument internal timer – Timer

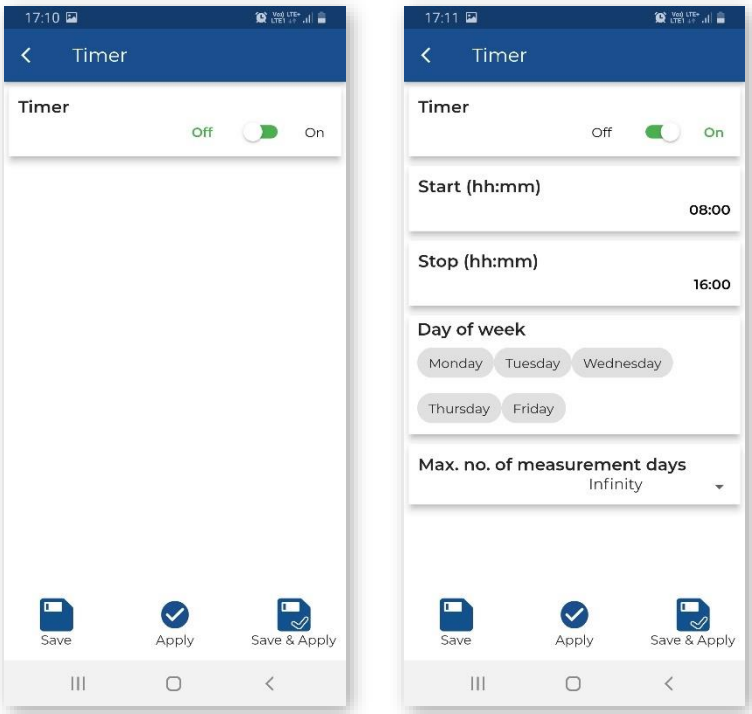
The **Timer** function is used to program the automatic start and stop of the measurement. When the instrument is switched off, the timer switches it on, then starts the measurement and switches it off when the measurement has finished.

The start and stop time are set by the **Start (hh:mm)** and **Stopt (hh:mm)** settings.

The timer operates on the days of the week set in the **Day of week**.

You can limit the number of measuring days by selecting a number other than *Infinity* in the **Max. no. of measurement days**.

Based on the example settings, the instrument will start the measurement at 08:00 and will stop it at 16:00 during the working days of each week without limitation.



4.6.2 Configuring data storage – Logger

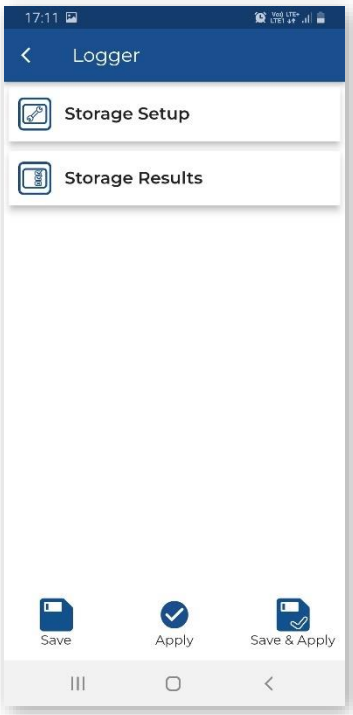
The **Logger** section allows you to configure the way in which the measurement results are stored in files.

The instrument performs measurements of velocity vibration (according to the selected standard) and acceleration vibration (if activated in the **Human Vibration**) for measurement periods (called Steps) that can be set. Both velocity and acceleration results are stored in a "logger file". Velocity signals can also be additionally recorded in a "wave file".

The logger file can contain three types of records:

1. velocity vibration results with **Velocity Step**,
2. FFT or 1/3 octave velocity spectra of signals with **Velocity Step**,
3. acceleration vibration results with **Human Vibration Step.**

The **Logger** section consists of two sections for configuring the storage of measurement results in a logger file (**Storage Setup**) and selecting the results to be stored (**Storage Results**).



4.6.2.1 Configuring measurement results storage – Storage Setup and Storage Results

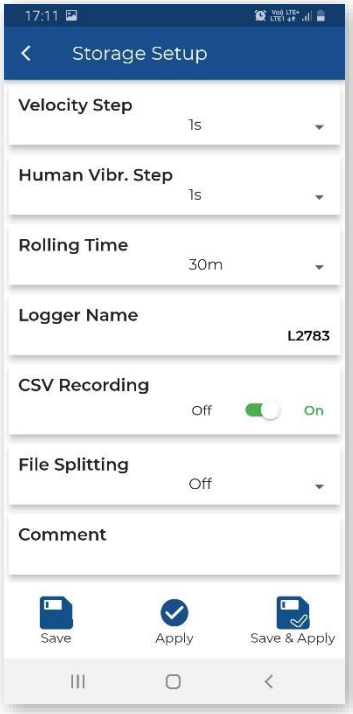
The **Storage Setup** section allows you to set:

- recording step for velocity vibration results including FFT or 1/3 octave velocity spectra (**Velocity Step**): *1s..59s, 1m..59m, 1h,*
- recording step for acceleration vibration results (**Human Vibration Step**): *1s*, *30s..59s, 1m..59m, 1h*,
- time window for measuring the rolling RMS (**Rolling Time**): *1s..59s, 1m..59m, 1h*,
- name of the logger file (**Logger Name**),
- logger file splitting mode (**File Splitting**): *Off*, *Velocity Step*, *Sync. to full 15m*, *Sync. to full 30m*, *Sync. to full hour*, *Specified Time*,

and

- enable **CSV Recording**,
- write **Comment** that will be visible in *SvanPC++.*

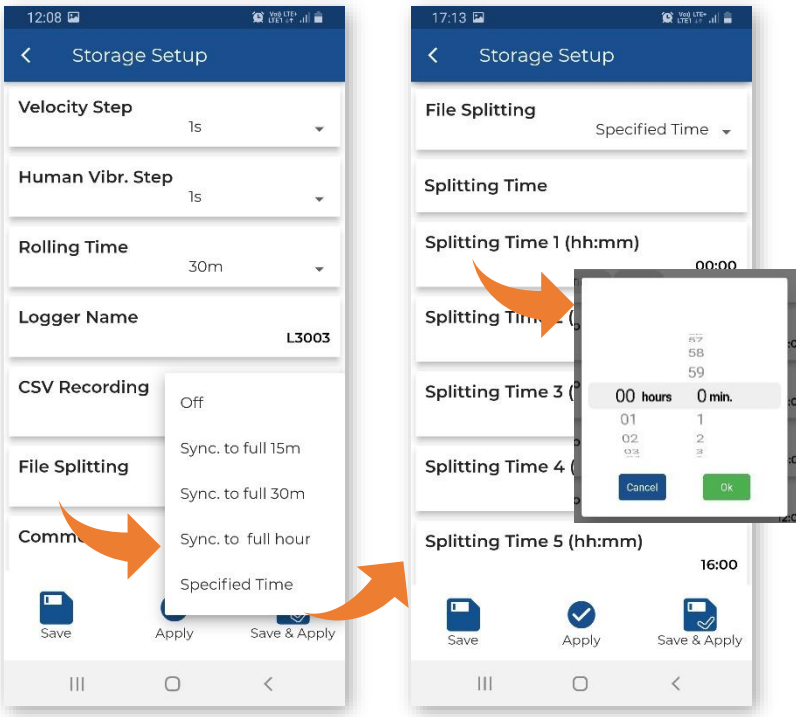
File Splitting allows splitting the logger data registration into separate files. If it is *Off*, the measurement results are continuously recorded in one logger file with the name defined in the **Logger Name**.



In other cases, the logging is done in separate files and the logging in a new file is synchronised to every quarter of the RTC (*Sync. to full 15m*), or to every half an hour of the RTC (*Sync. to full 30m*), or to every hour of the RTC (*Sync. to full hour*), or the logging in a new file starts at the time specified by the user (*Specified Time*).

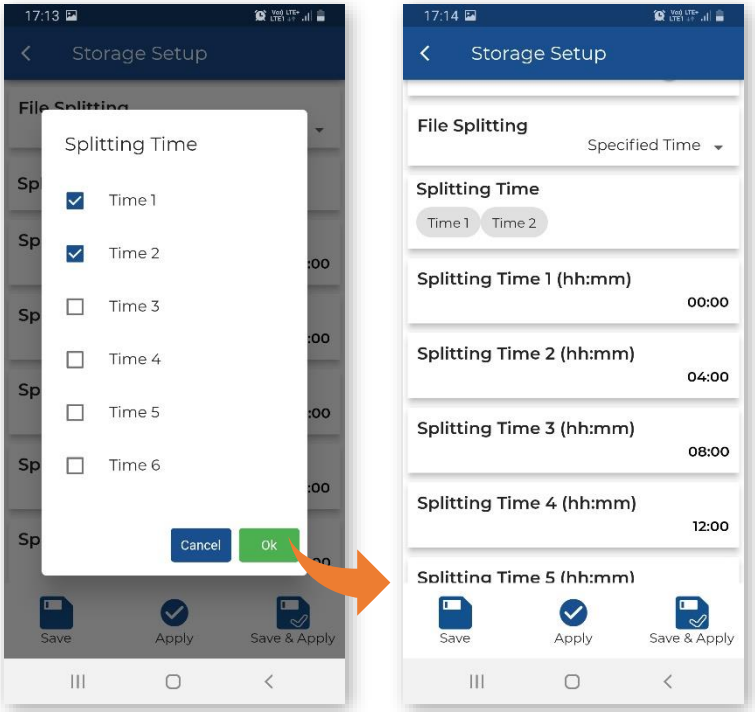
Whenever the split time is reached, the logger file is closed, and a new file is opened with a new number in the file name.

If *Specified Time* is selected, additional positions appear for setting up to six split times (**Splitting Time x**).



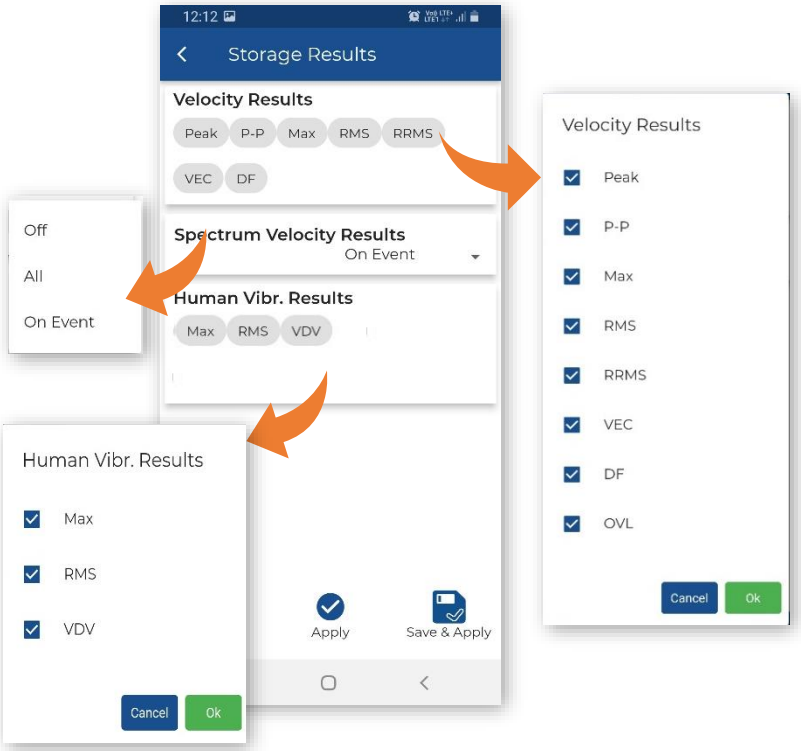
By tapping **Splitting Time**, you can check the splitting times to activate them.

After activating the splitting times and confirming with OK, the active splitting times are displayed in the **Splitting Time** bar.



The **Storage Results** section allows you to select the results for logging in the logger file:

- **Velocity Results**: *PPV, P-P* (Peak-to-Peak), *Max, RMS, RRMS* (Rolling RMS), *VEC* (Vector PPV), *DF*, *OVL* (Overload time),
- spectrum results (**Spectrum Velocity Results**): *Off* (switched off), *All* (continuous recording from measurement start to measurement stop) or *On Event* (when an event occurs),
- acceleration results (**Human Vibr. Results**): *Max, RMS and VDV*.



4.6.2.2 Configuring signal recording – Recording

The velocity vibration signal in the form of WAV files for three vibration channels can be used for post-analysis of the frequency content in the SvanPC++ PC software.

In the **Recording Mode** position, you can disable the recording (*Off*) or select the way the signal will be recorded: continuously from the start of the measurement (*Continuous*), or from the event trigger (*On Event*).

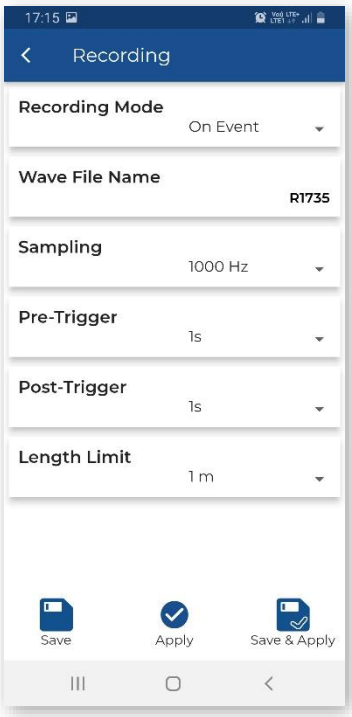
The instrument creates a WAV file in which the velocity vibration time-domain signals from three channels are recorded.

In the case of *On Event*, signals are recorded when an event occurs. The duration of such a recording is calculated as follows: **Pre Trigger** + **Event Duration** + **Post Trigger**, where **Event Duration** is defined in the **Event** list (see Chapter 4.6.3.2). If a new event occurs while recording, recording will continue without interruption.

The WAV file name can be edited by tapping on **Wave File Name**.

Wave recording settings include:

- **Sampling** frequency: *1000 Hz*, *500 Hz* or *250 Hz*,
- pre-trigger recording (**Pre-Trigger**): *Off*, *1..60* (s), *1m,*
- post-trigger recording (**Post-Trigger**): *0s..59s, 1m..59m, 1h..8h*,
- wave file size limit (**Lenght Limit**): *Off*, *1..59m*, *1:00..8:00 h*. When this limit is reached, the file is split.

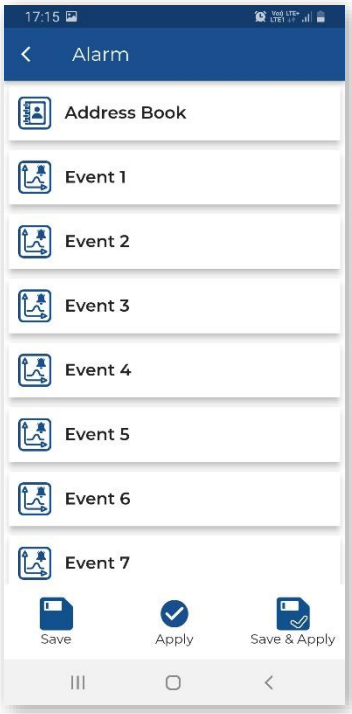


4.6.3 Configuring alarms – Alarm

SV 803 can generate SMS and e-mail notifications as well as visual and audible alarms when a specific event occurs. You can configure alarms when either some PPV, RMS etc. values or some standard's criterion curves (e.g., DIN 4150-3) or user's criterion curves based on FFT, or 1/3 octaves are exceeded. The criterion curve can be moved up or down the scale so that the alarm is generated earlier or later. Event records are stored in the logger file.

You can configure up to ten independent events associated with alarm conditions that are checked simultaneously. Based on the event alarms the instrument sends SMS and/or e-mail alarm notifications to different recipients.

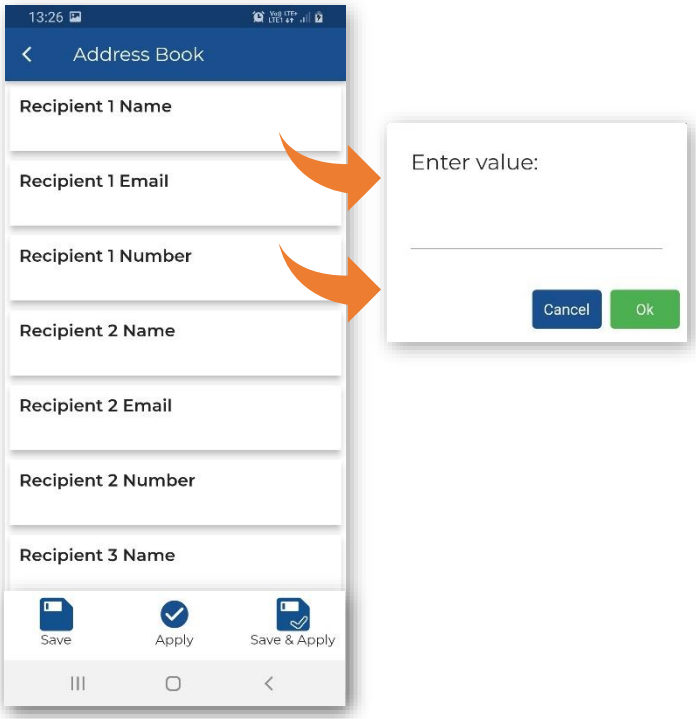
The duration of the event is configurable. When the event time has elapsed, the instrument starts analysing the data and defines the highest PPV value and, for some methods, the dominant frequency.



4.6.3.1 Alarms recipients – Address Book

You can send alarms to up to 15 recipients from the **Address Book**.

In the **Address Book**, you can specify the recipient's name, email address and phone number.



4.6.3.2 Configuring events – Event

The **Event x** sub-section allows you to configure the event.

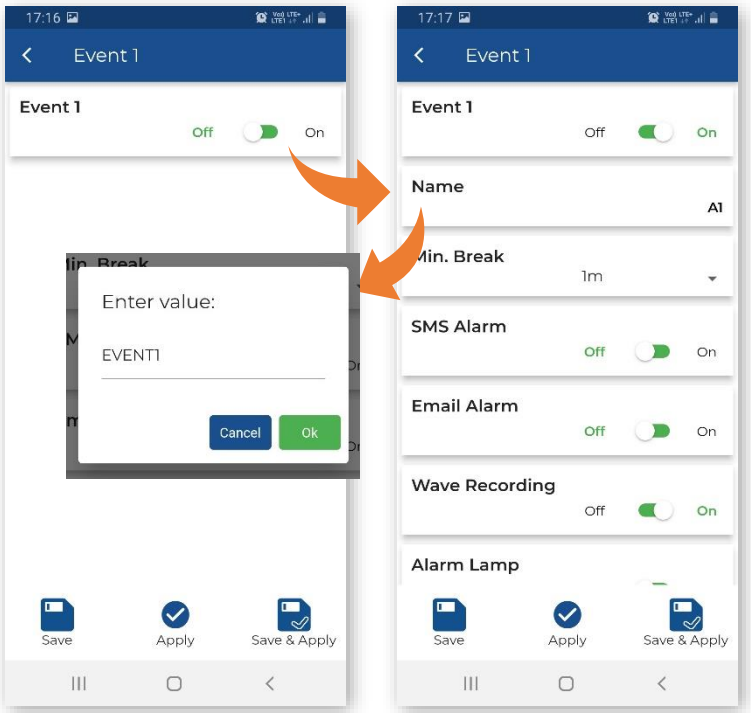
When the event is active (On), you can define its **Name**, enable specific alarms, set the trigger source, threshold level(s) and set time frames for alarms notifications.

When the event occurs, it triggers the alarm(s) – SMS, Email or/and alarm lamp.

Min. Break defines minimum time between SMS or email messages to limit the repetition of the same alarm messages.

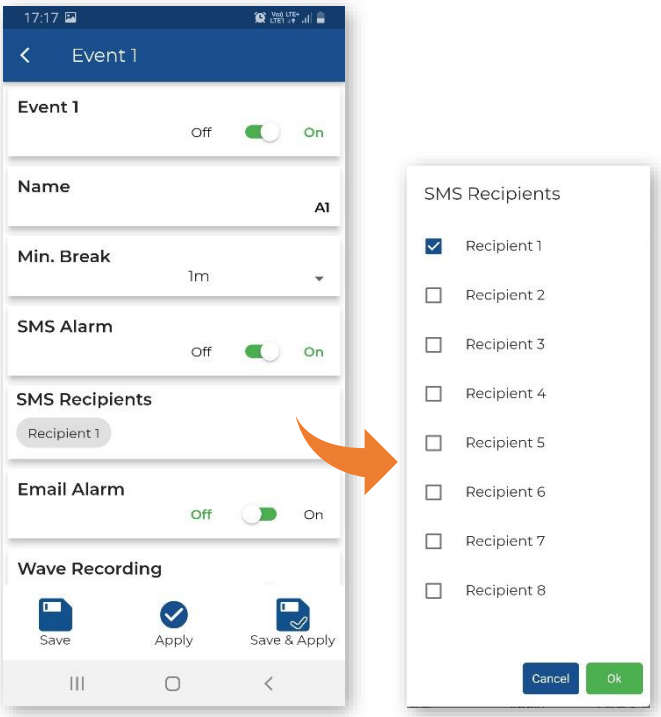
Four types of alarms can be enabled:

- **SMS Alarm** - SMS notification to the selected recipients,
- **Email Alarm** – email notification to the selected recipients,
- **Wave Recording** – recording of the input signal to the wave file in the *On Event* recording mode,
- **Alarm Lamp** - alarm signal on the **EXTERNAL INTERFACE** instrument's socket to which the alarm lamp is connected,



If the **SMS Alarm** and/or **Email Alarm** is enabled, the **SMS/Email Recipients** item(s) appears allowing you to select recipients from the **Address Book**.

The duration of the lamp alarm can be extended beyond the duration of the event by setting an additional **Lamp Hold Time** in the **Auxiliary** section (see Chapter 4.6.5.1).



The settings of some parameters depend on the selected standard/method.

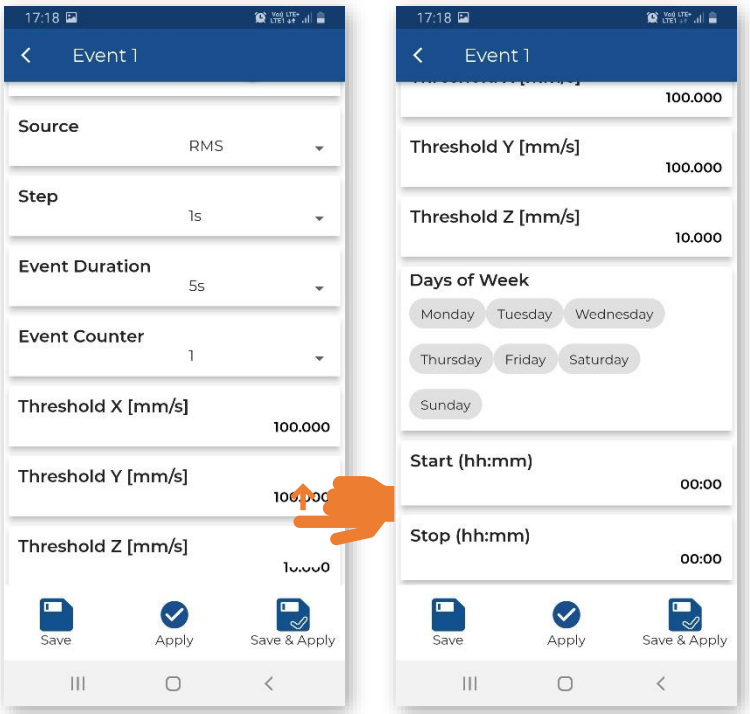
As the **Source** of the event trigger, you can select: *System*, *PPV*, *RMS*, *RRMS* (Rolling RMS), *Vector PPV* which will be compared with the threshold level(s) or select the building type criterion curve (*Curve*) to be checked for exceedance.

If *RMS* is selected as the source, the **Step** with which the RMS result is integrated can be selected (*1s*, *Velocity Step* or *Human Vibr. Step*).

For the *PPV*, *RMS*, *RRMS* sources, you should set the **Threshold** levels for three axes.

For the *Vector PPV* source, you should set the **Threshold** level for the vector.

When the criterion curve for a given building type is used as an event trigger, the PPV at its dominant frequency is compared with the curve multiplied by the **Reduction Factor** in the in the range**:** *0.001, 0.01, 0.1 ÷ 1.9*. The event is triggered when the PPV value exceeds the limit of the curve.

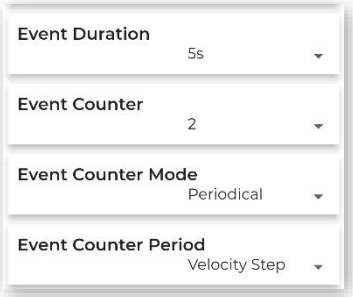


The **Event Duration** item allows you to set the duration of the Event from its start. For this period, the instrument defines the maximum PPV values and the dominant frequencies for the X, Y and Z axes.

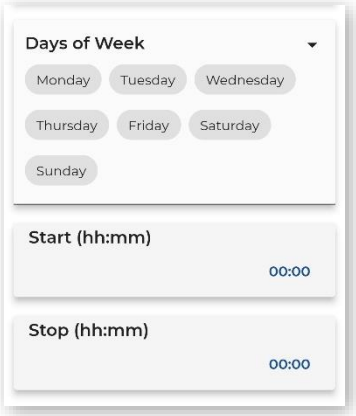
In the **Event Counter** item, which appears for the specified **Source** (RMS, RRMS, PPV, Vector), you can select a number of conditions to be met before the event and alarms are triggered.

If **Event Counter >1**, the **Event Counter Mode** item appears, allowing you to select the way in which events are counted (*Consecutive* or *Periodical*):

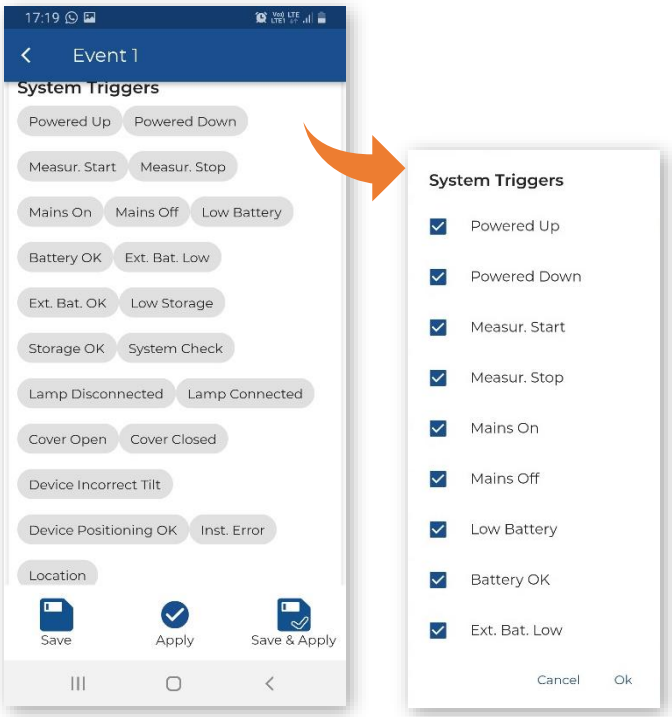
- In the case of the *Consecutive* option, an event will occur when a trigger condition occurs **Event Counter** times in succession.
- In the case of the *Periodical* option, an event will occur when a trigger condition occurs **Event Counter** times in succession periodically with a period (**Event Counter Period**) equal to *1s*, *Human Vibr. Step* or *Velocity Step*.



The **Days of Week** item allows you to select the days of the week, and the **Start (hh:mm)** and **Stop (hh:mm)** items allow you to define the time frame in which alarms are generated.



If *System* is selected as the **Source**, the **System Triggers** bar will appear allowing you to select the system event that will trigger the alarm(s):



- **Powered Up** - instrument power up
- **Powered Down** - instrument power down (SMS or email will be sent just before power down)
- **Measur. Start** – start of the measurement
- **Measur. Stop** – stop of the measurement
- **Mains On** - detection of external power supply
- **Mains Off** - external power disconnect detection
- **Low Battery** - low battery condition; the alarm is generated when the instrument detects a low battery condition and when the low battery condition disappears (when it is recharged). The threshold is 25%
- **Battery OK** – restoration of the required battery level; the alarm is generated after the **Low Battery** alarm
- **Ext. Bat. Low** - low external battery condition; the alarm is generated when the low external battery condition is detected and the power from the external battery power is disconnected; the alarm is also generated when the low battery condition disappears
- **Ext. Bat. OK** – restoration of the required battery level; the alarm is generated after the **Ext. Bat. Low** alarm
- **Low Storage** – low memory (less than 25%) of the instrument memory detected; the alarm is generated when the memory space drops below the threshold and when there will be more memory space
- **Storage OK** – restoration of the required storage level; the alarm is generated after the **Low Storage** alarm
- **System Check** - status after performing a system check
- **Lamp Disconnected** – disconnection of the alarm lamp; the alarm is generated after disconnection of the alarm lamp

- **Lamp Connected** – the alarm lamp is connected; the alarm is generated after the **Lamp Disconnected** alarm
- **Cover Open** – opening of the instrument lid; the alarm is generated when the lid is opened
- **Cover Closed** - closing of the instrument lid; the alarm is generated after the **Cover Open** alarm
- **Device Incorrect Tilt** – vertical position; the alarm is generated when the instrument is tilted more than a few degrees from vertical
- **Device Positioning Ok** - vertical position; the alarm is generated in case of restoration of the instrument vertical position; the alarm is generated after the **Device Tilt** alarm
- **Instr. Error** - instrument error:
    - RTC error; the alarm is generated when the RTC reset is detected or when the GPS time differs from the instrument time by more than 1 minute
    - SD card error; the alarm is generated when there is an SD card error
    - battery error; the alarm is generated when the temperature of the battery pack is above 68°C or when there is no communication with the battery pack.
- **Location** - movement of the instrument detected (based on GPS data) by more than 1.5" (geographic seconds, about 30 metres in Poland).

The table below summarises the event parameters displayed on the **Event** list when **Event** is On:

Parameter	Value	Presence	Description	Additional[1] logging results for the event duration
Name		always	event name given by the user	
Min. Break		always	minimum time interval between consecutive E-mail / SMS alarms notifications	
Source	**Vector PPV**	always	triggering after exceeding the threshold level by the 1s PPV vector	Vector PPV
	PPV	always	triggering when 1s PPV in any axis exceeds the threshold level	
	RMS	always	triggering when RMS exceeds the threshold level	RMS
	RRMS	always	triggering when RRMS exceeds the threshold level	RRMS
	Curve 1/2/3	always	triggering when any spectrum line (depending on the **Standard** setting) exceeds the criterion curve considering the reduction factor	

[1] For the FFT based methods, the instrument logs Peak, DF, Vector PPV and optionally FFT spectra for all channels at the moment of Peak.

For the 1/3 Octave based methods, the instrument logs Peak and Vector PPV for all channels at the time of Peak and optionally the 1/3 Octave spectra for the event/alarm period.

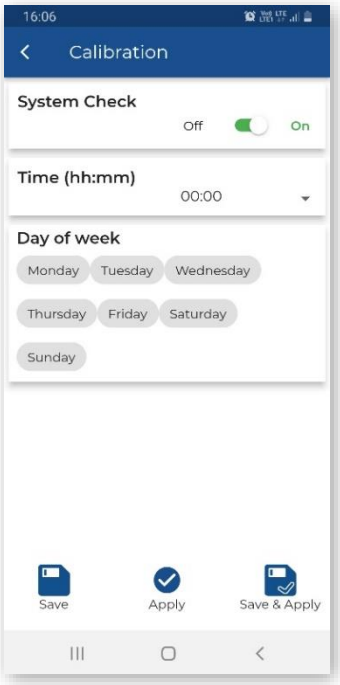
Threshold X/Y/Z		for **RMS** or **RRMS** or **PPV** trigger	Event trigger level for each axis. For triggering, it is sufficient to exceed the value of one axis	
Threshold		for **Vector PPV** trigger	Event trigger level for **Vector PPV** (in m/s)	
Step		for **RMS** source	averaging period of the result which is compared with the threshold	
Reduction Factor		for **Curve 1/2/3** source	scaling factor of the criterion curve	
Event Duration		always	duration of the event from the moment the trigger condition is met	
Event Counter		for **RMS, PPV, RRMS, Vector PPV** source	counter of event occurrences necessary to generate an alarm and send notifications	
Lamp Alarm		always	Ext.I/O output signal according to the event state. If there is an event, there is the signal at the Ext.I/O	
Sms Alarm		always	enable / disable SMS notifications about alarms	
Sms Recipient		for **SMS Alarm**	notification recipient selection list	
Email Alarm		always	enable / disable E-mail notifications about alarms	
Email Recipient		for **Email Alarm**	notification recipient selection list	
Days of Week		always		
Start (hh:mm)		always		
Stop (hh:mm)		always		

4.6.4 System checking – Calibration

SV 803 has a special mechanism for testing the measurement chain, called the system check, by triggering an electronic pulse and then evaluating the response of the sensor signal.

The **Calibration** section allows you to enable the system check and set the time and days of the week when the instrument will be performing the system check.

If the system check indicates an error, the information is displayed in the *SvanNET* web service.



4.6.5 Configuring instrument parameters – Instrument

The **Instrument** section consists of two items: **Auxiliary** and **GPS**.

4.6.5.1 Auxiliary settings – Auxiliary

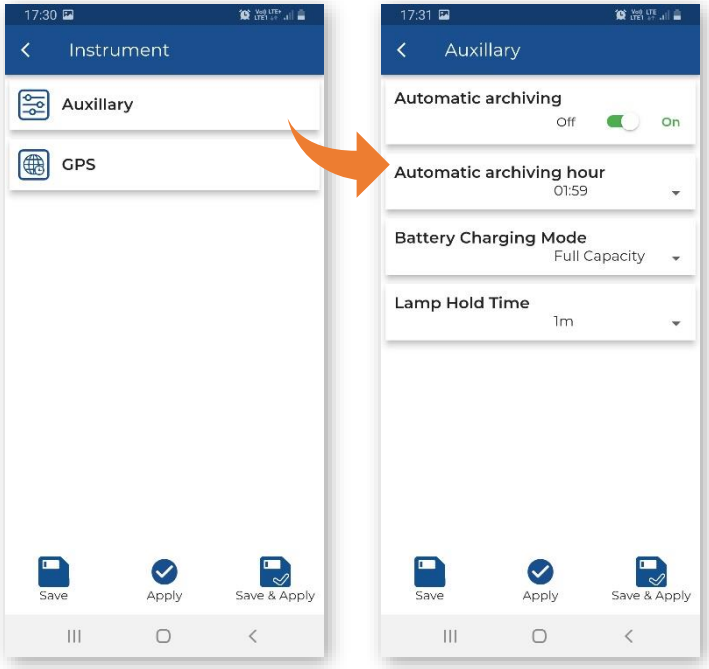
The **Auxiliary** section allows you to:

- Activate the **Automatic archiving** mode and set the **Automatic archiving hour**.

  If automatic archiving is enabled, when the number of files in the instrument's working directory reaches 5000, the measurement is stopped and the entire working directory with the current date is transferred to the ARCHIVE directory.

- Select the **Battery Charging Mode**: *Full Capacity* or *Optimised*.

  In the *Full Capacity* mode, the battery is charged to 100% of its capacity. In the *Optimised* mode, the battery is charged to about 85%. This option allows you to extend the life cycle of the battery.



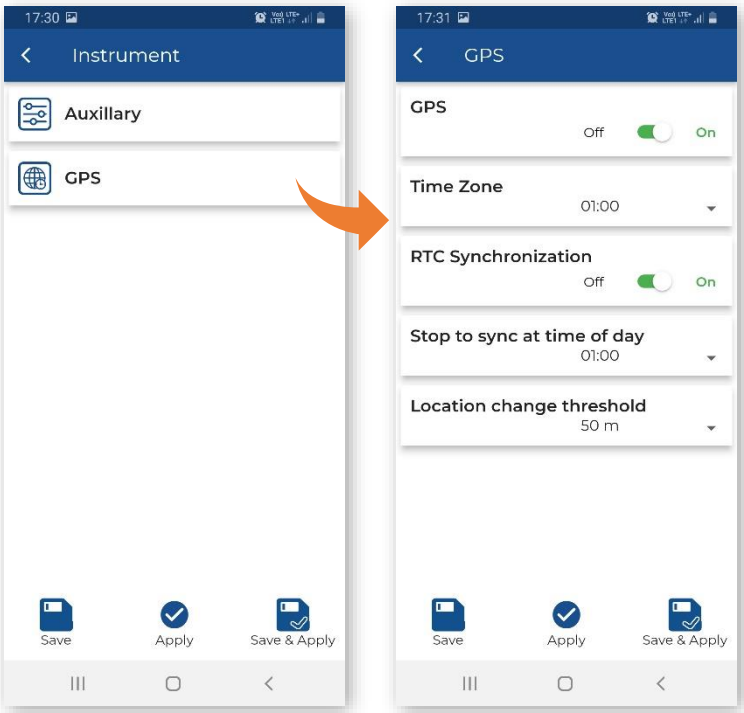
- Select **Lamp Hold Time** – additional time for the lamp alarm after the event stop (see Chapter 4.6.3.2).

4.6.5.2 Configuring internal GPS – GPS

The **GPS** item allows you to switch GPS on/off, select the **Time Zone**, switch RTC synchronization on/off and set the synchronisation time.

If **RTC Synchronization** is *On*, the **Stop to sync at time of day** item allowing you to enabling you to program the time of the measurement stop before synchronisation,

The **Location change threshold** item allows you to set the threshold in metres above which the GPS reports a new position. This function excludes the display of GPS fluctuations.



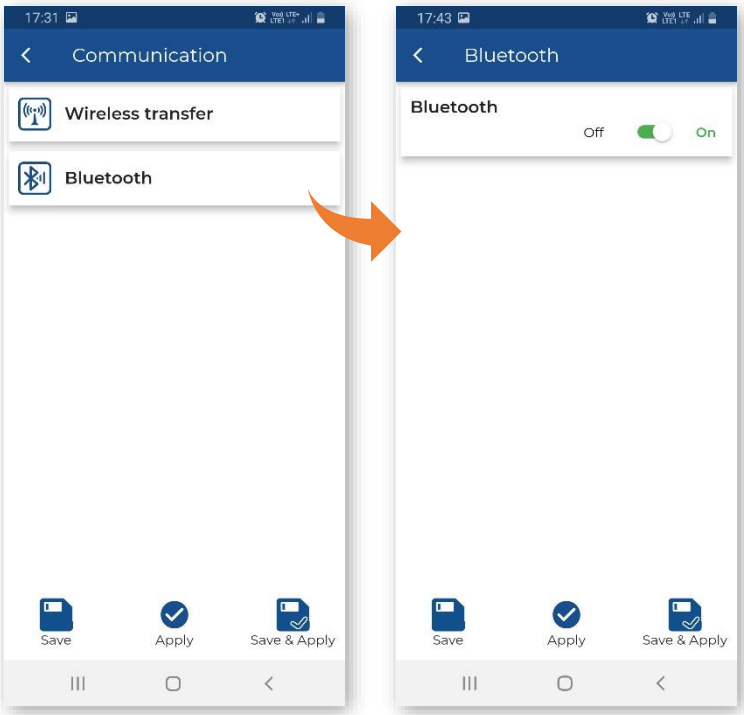
4.6.6 Configuring remote communication – Communication

The Communication section allows you to set the parameters for communication via the 4G modem (**Wireless transfer**) and to enable **Bluetooth**.

4.6.6.1 Turning on Bluetooth – Bluetooth

The low energy Bluetooth module is normally turned on, but if you are not using it, we recommend that you turn it off.

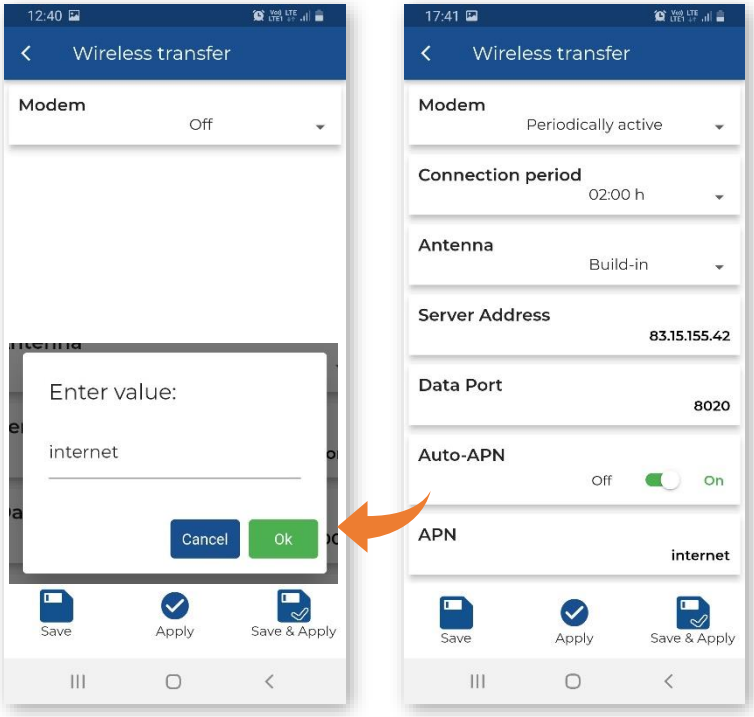
Bluetooth can be turned on by pressing and holding the ⓘ button for 5 seconds.



4.6.6.2 Configuring 4G modem – Wireless transfer

In the Wireless transfer sub-section, you can switch *Off* the 4G modem, or select its mode (**Modem**): *Continuous* or *Periodically active*.

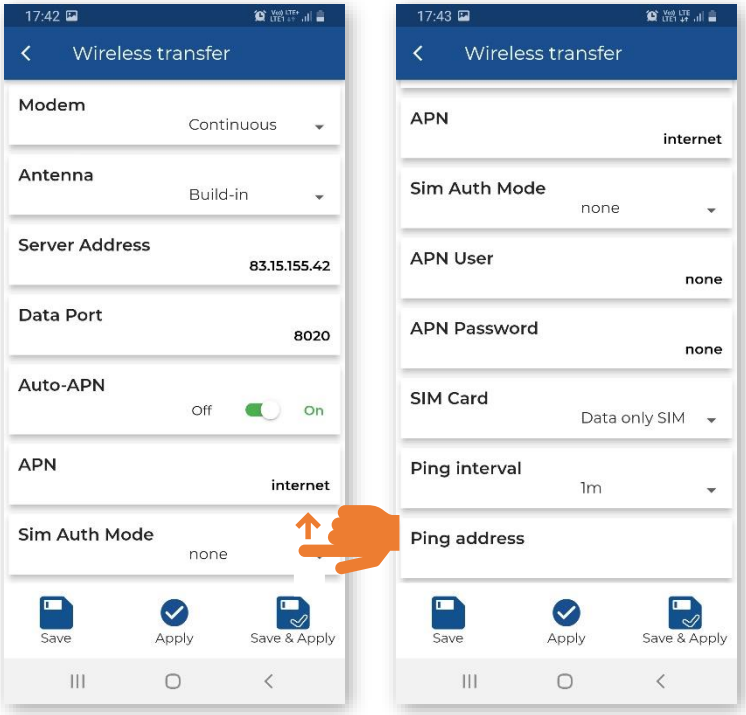
In continuous mode, the modem is active all the time. However, this mode is energy-intensive and if the continuous data transfer is not required, it is recommended to use the *Periodically active* mode, which ensures low energy consumption.



In the *Periodically active* mode, the modem will switch on and connect to *SvanNET* according to the **Connection Period** settings.

In the **Wireless transfer** menu, you can also:

- choose the type of **Antenna** (*Build-In* or *External*),
- enter **Server Address**,
- enter **Data Port**,
- switch on **Auto-APN**,
- choose **Sim Auth Mode** (*none* or *PAP*),
- enter **APN User** login,
- enter **APN Password**,
- choose the **SIM Card** type (*Standard SIM* or *Data only SIM*),
- choose **Ping interval** (*Modem PING Off*, *1m ÷ 5m*),
- enter **Ping address**.



5 INTERNET SERVICE PLATFORM – SvanNET

The SV 803 station is designed for remote operation via *SvanNET*, he Internet service platform (web service) provided by Svantek.

The Internet connection is provided by the 4G modem of the SV 803.

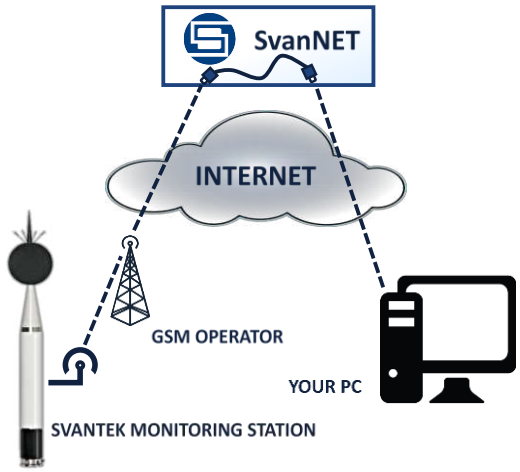
After successful configuration of the 4G modem and connection to the *SvanNET* web service, you can start working with the monitoring station remotely.

5.1 SVANNET WEB SERVICE

SvanNET is an Internet service that simplifies the remote connection between a PC and Svantek monitoring stations.

SvanNET allows the usa of all types of SIM cards with the station's mobile modem regardless of whether they have a public or private IP.

The connection via the *SvanNET* allows users to view real time measurement results, control monitoring stations and measurements, download files (manually or automatically), configure monitoring stations using any available Internet browser.



***Note**: The mobile connection requires the use of a SIM card without PIN code protection and with activated Internet access. Installation of the SIM card is described in Chapter 2.3.*

***Note:** To have access to the SvanNET web service the local SVANTEK distributor should create the user's account and assign monitoring stations to it.*

By default, SV 803 is configured for the periodic connection to *SvanNET*. When the station is turned on, the 4G modem works for two hours and then goes into sleep mode. If you want to wake up the 4G modem, press the key on the SV 803 keypad and after a while SV 803 will be connected to *SvanNET* again.

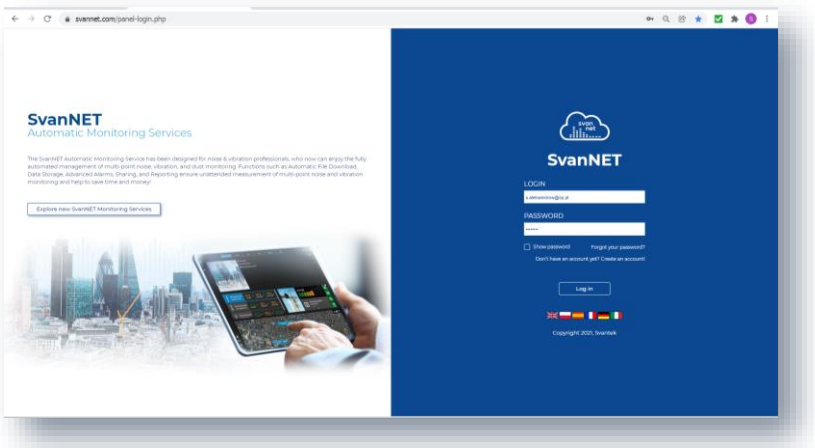
***Note:** If there is a Bluetooth connection, the station will not enter or exit sleep mode.*

To access *SvanNET*, log in to your account at:

https://www.svannet.com/

Select your language before logging in.

Once logged in, you can use the web interface to work remotely with the monitoring station.



SvanNET includes the standard function - *Remote Communication Services*, which is available to all *SvanNET* users, and the optional extension - *Automatic Monitoring Services*, which is offered via a licence.

Remote Communication Services maintain a remote connection to the monitoring devices and the service includes status alarms (e.g., battery, memory), remote access to device settings and measurement files stored in the device, and preview of current results and the latest time-history graph.

Automatic Monitoring Services offers automatic control of many measurement points, data sharing with other *SvanNET* users and data preview in the form of a customised website with either public or restricted access. The preview website can be customised with a logo and individual project name. Access to the preview can either be public or password protected.

Both services can be toggled using icons in the main panel:

– *Remote Communication Services* (**Station list**).

– *Automatic Monitoring Services* (**Project list**)

***Note**: For more information about all the functions of SvanNET, see SvanNET User Manual.*

5.2 REMOTE COMMUNICATION SERVICE – STATIONS

Station list displays all the stations assigned to your account – turned on and off. Clicking on a station will make it active and the tools in the right pane will be dedicated to that particular station.

The station bar contains six icons indicating the status of the station. If a station is disconnected from *SvanNET* all icons are grey.

If you click on the station name, the station information is displayed. If you click on the icon, this icon status information is displayed. The icons have the following descriptions:

Project status: this icon appears when the station is involved in the project. Clicking on this icon displays the project name and a link to it.

Alert status: blue - everything is OK, red – an irregular event is happening.

Station connection status: green – online; grey – offline; yellow - the station doesn't respond to the command for a long time.

If the station is in sleep mode - flashing blue, otherwise it changes to the Station connection status icon.

Battery status. Click this icon displays information about the battery status information.

External power status: blue – the instrument is powered by the external source, grey - there is no external power.

Memory status. Clicking this icon displays information about the available memory.

Icons in the Main panel tool allows you to:

display alarms for all stations

manage user account

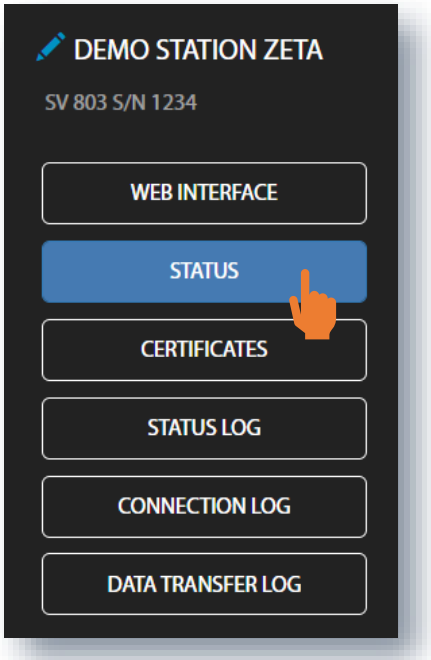
activate licences

contact Svantek Support team

change the colour scheme of *SvanNET* from "dark" to "light"

logout from *SvanNET*.

The Tool panel provides a number of functions for controlling the station. To change the function, place the cursor on the appropriate button (it will turn blue) and click.



The **WEB INTERFACE** button switches to the Live data view (see Chapter 5.2.4), where you can view measurement results and use additional tools to configure station parameters, download data files, start/stop measurements and perform station checking. This button is available for the stations connected to *SvanNET*.

The **STATUS** button switches to the Station status view (see Chapter 5.2.1), where you can check the station status and configure status alarms.

The **CERTIFICATES** button activates the dialog box that shows the available certificates for this instrument and allows you to add a new certificate (see Chapter 5.2.2).

The **STATUS LOG** button switches to the Status log view (see Chapter 5.2.3), where you can check the power source (type and charge level), free memory space and signal quality.

The **CONNECTION LOG** button switches to the Connection log view (see Chapter 5.2.3), where you can check the history of station connections.

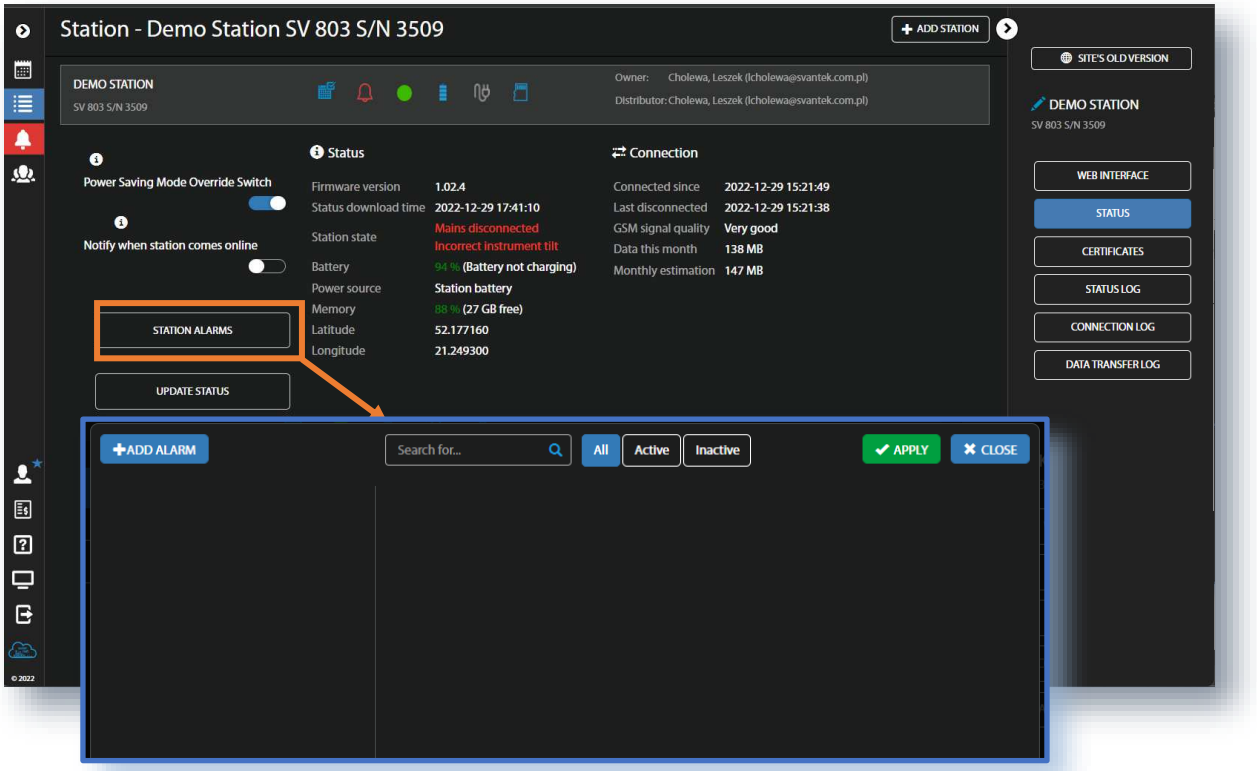
The **DATA TRANSFER LOG** button switches to the Data transfer log view (see Chapter 5.2.3), where you can check the history of data transfers (uploads).

Click to set the new station name instead of the default.

5.2.1 STATUS view

From the **STATUS** view you can check status of the station and:.

- switch the modem mode (**Power Saving Mode Override Switch**),
- enable e-mail notification when the station is reconnected to *SvanNET* (**Notify when station comes online**),
- update the status of the instrument (**UPDATE STATUS**),
- configure status alarms Conditions and related Actions for the measurement points (**STATIONS ALARMS**).



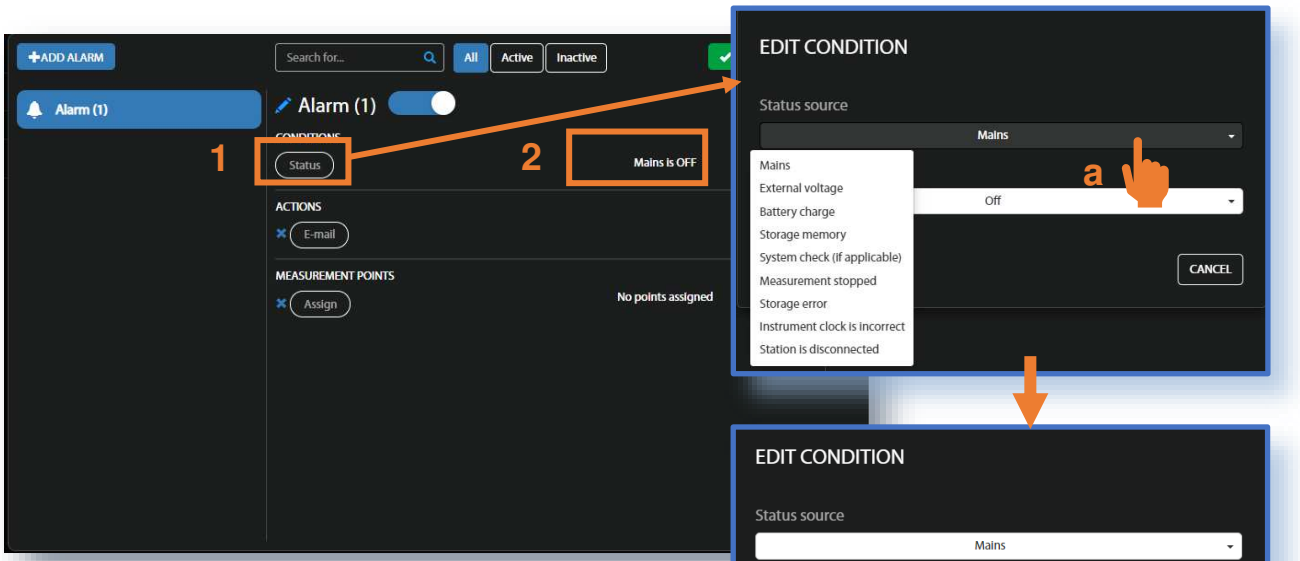
Power Saving Mode Override Switch can be activated to prevent the station from entering into the configured Power Save Mode. The next time the station connects to *SvanNET* (either due to a scheduled connection cycle or due to an event being triggered), the station will remain online with its modem running if the switch is activated.

***Note**: Leaving this option ON will prevent the station from switching off the modem. This will significantly reduce the expected battery life.*

SvanNET sends an e-mail to the station owner when the station connects to *SvanNET* because it is coming out of Power Saving Mode

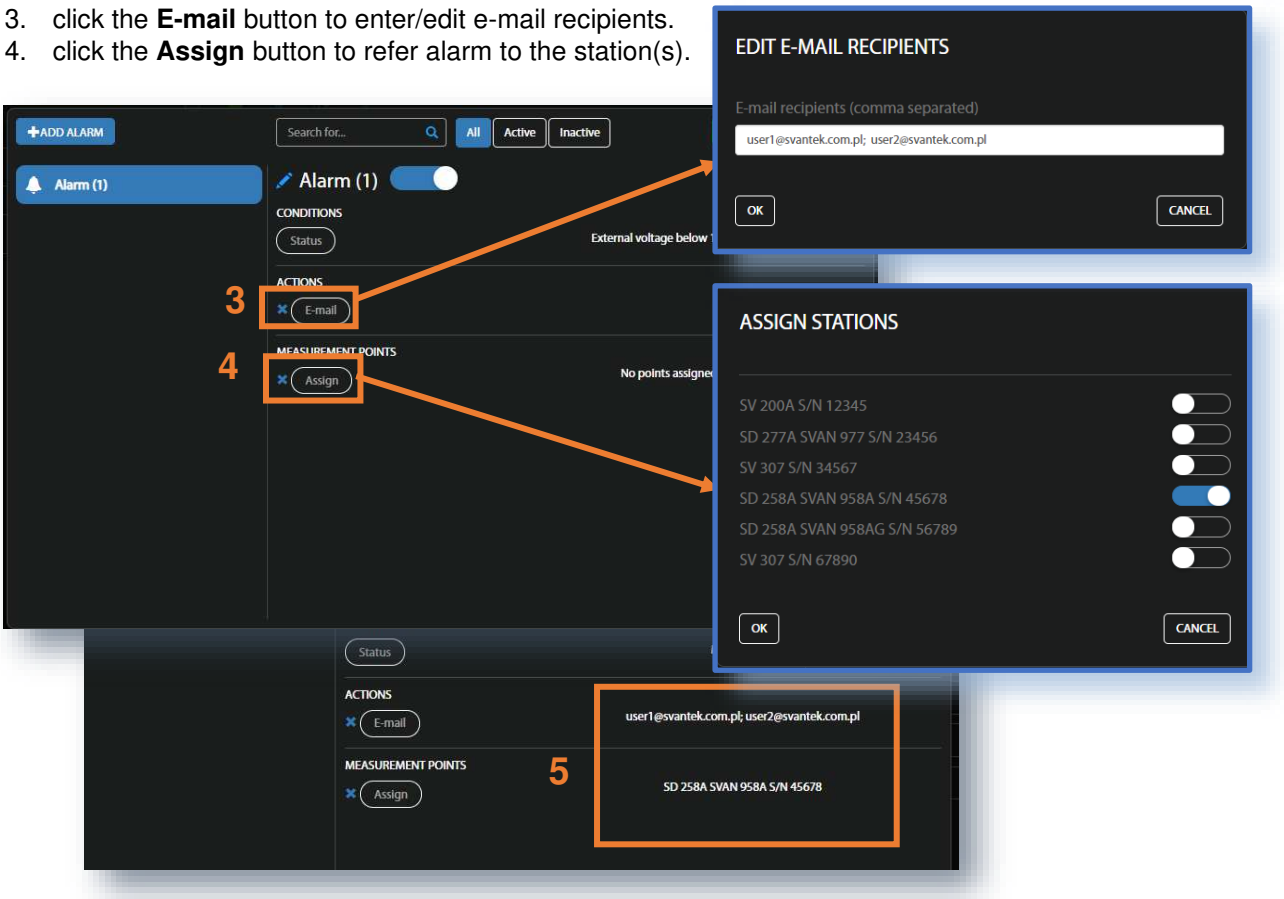
After clicking on STATION ALARMS, click on **+ADD ALARM** in the pop-up box and a new **Alarm(1)** will appear with CONDITIONS, ACTIONS and MEASUREMENT POINTS settings. Alarms are based on Conditions and relate to Actions, which are default emails to the specified recipients, and refer to Measurement points. To configure Alarm:

1. Click the **Status** button and in the EDIT CONDITIONS configuration box:
   a. select **Status source**: **Mains**, **External voltage**, **Battery charge**, **Storage memory**, **System check** ect.,
   b. click the **Trigger value** selector and choose the required value of the selected **Status source**.



2. click **OK** and new condition will be displayed in the CONDITIONS area.

3. click the **E-mail** button to enter/edit e-mail recipients.
4. click the **Assign** button to refer alarm to the station(s).



5. Made selections are displayed in the ACTIONS and MEASUREMENT POINTS areas.

The Status sources have the following meanings:

- **Mains**
  - Trigger Value: Off – an alarm is generated when the system detects loss of power supply
  - Trigger Value: On – an alarm is generated when the system detects the occurence of power supply
- **External voltage**
  - Trigger Value: xx.xx V – an alarm is generated when the system detects an external power drop below the selected value. In this case, external power means the power supply and all various battery packs
- **Battery charge**
  - Trigger Value: xx % - an alarm is generated when the system detects a drop in the percentage of battery charge below the selected threshold.
- **Storage memory**
  - Trigger Value: xx MB/GB – an alarm is generated when the system detects a decrease in the free storage memory below the selected threshold.
- **System check (if applicable)**
  - An alarm is generated when the system detects failure in execution of the system check procedure (not live check).
- **Measurement stopped**
  - An alarm is generated when the system detects that the measurement has been stopped. Applies to stopped measurements only - conditions such as start delay, waiting for synchronisation and pause are treated as running measurements
  - Instrument action: Start measurement
- **Storage error**
  - An alarm is generated when the system detects an SD card error. The check assumes that a measurement is running and data is being recorded; the writing of the logger file is checked by changing of the free space on the card (which means that the instrument is writing data).
  - Instrument action: Restart measurement
- **Instrument clock is incorrect**
  - Trigger value: xx seconds / xx minutes – alarm is generated if the RTC indication of the instrument differs from the current system time (based on the owner's time zone) by ± of the selected value
  - Instrument action: Set instrument clock to server time (based on the owner's time zone) – measurement is stopped, instrument clock is set (based on the owner's time zone), measurement is resumed
- **Station is disconnected**
  - Trigger value: xx minutes / xx hours – alarm is generated when the station remains disconnected from SvanNET for a time equal to the selected value.

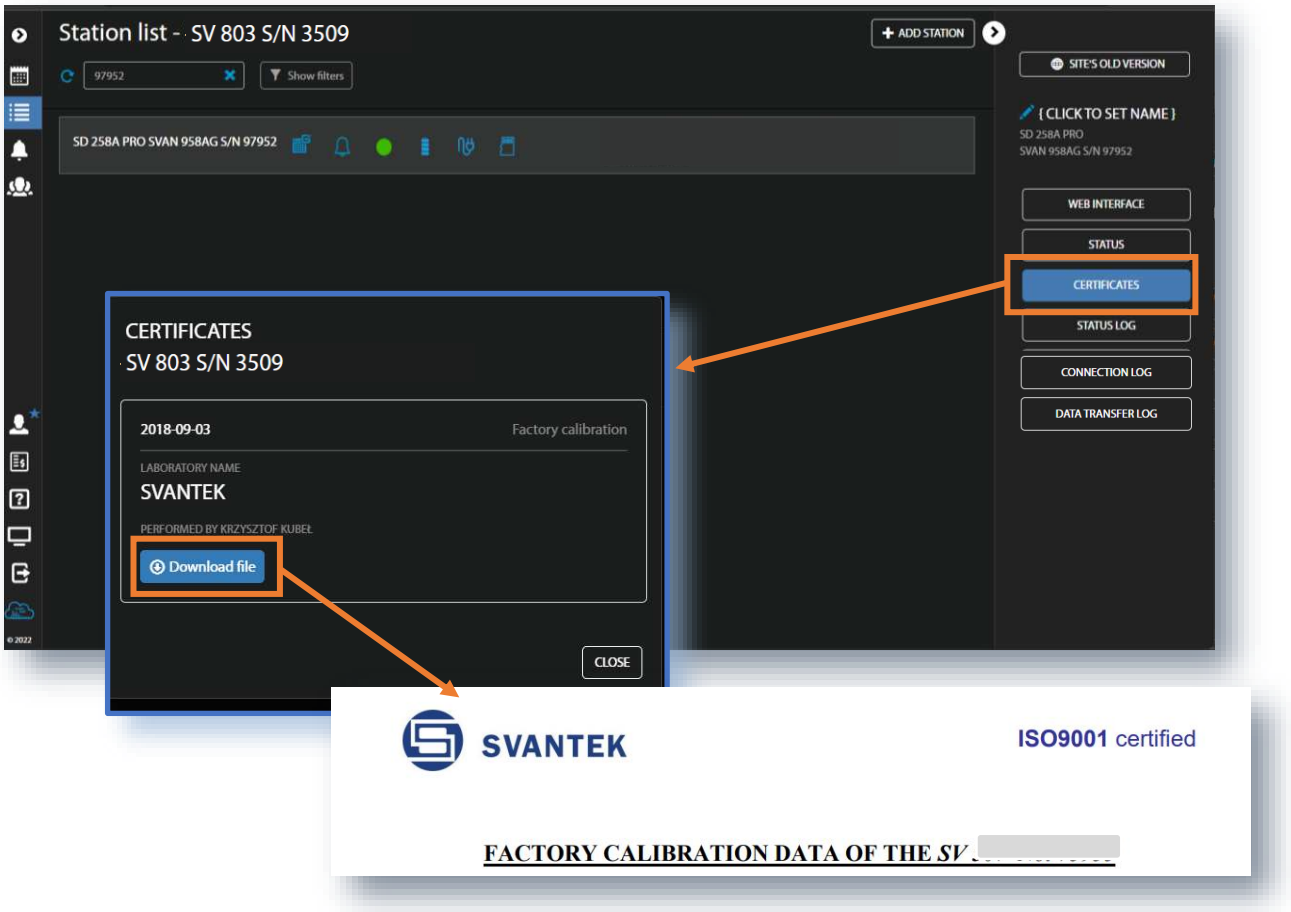
Alarms are reported once after the occurrence of an alarm condition. The occurrence of an alarm condition will generate selected actions (e.g., email) at the moment of status changes compared to the previous check (i.e., if at 8:15 there is power, at 8:30 the power is off, at 8:45 the power is still off, the system will generate an alarm at 8:30 and will remain silent until the power is on and off again).

5.2.2 CERTIFICATES dialog box

The **CERTIFICATES** button opens the CERTIFICATES dialogue box showing a list of available certificates for this station.

The certificate is attached to each instrument and contains a calibration card and instrument specifications.

You can download the certificate as a PDF file by clicking **Download file**.

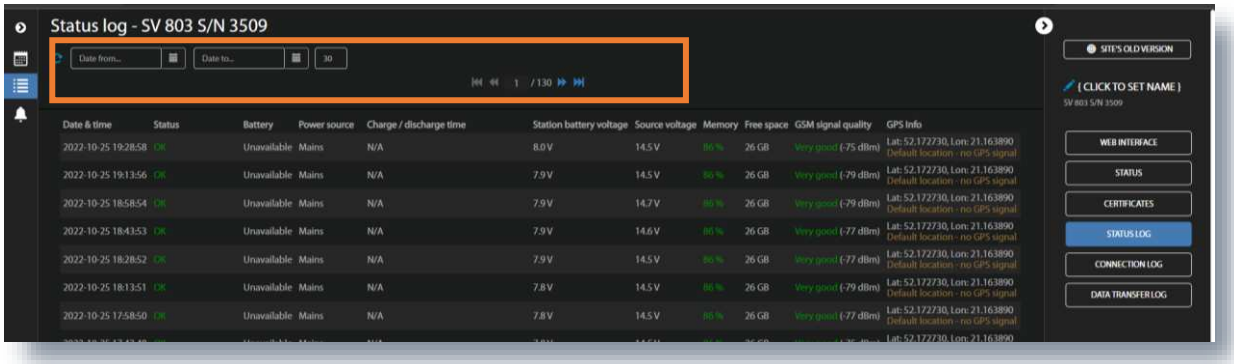


5.2.3 LOG views

There are three station logs, that record system events, connections, and data transfer:

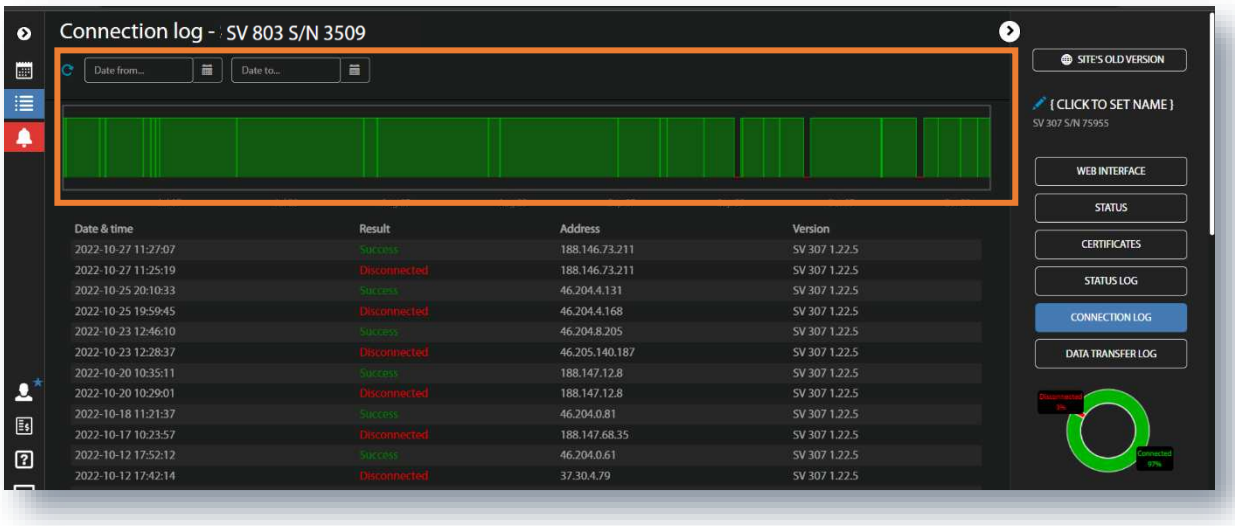
- **Status log** that records the type of power source and charge level, free memory space, GSM signal quality, system check history and GPS information.

  In the top line you can: refresh the log, select the period of records to view and rewind records.



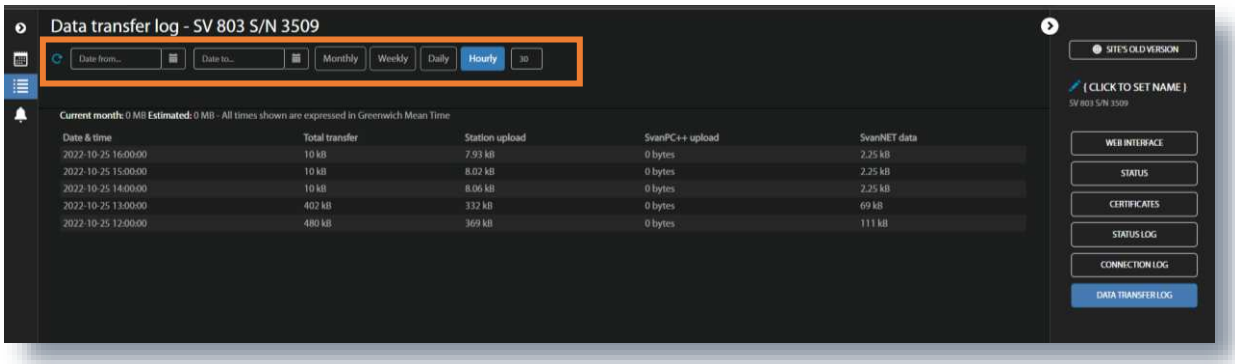
- **Connection log** that registers the history of station connections – result (successful or disconnected), IP address, firmware version and reason for disconnection.

  In the top line you can: refresh the log, select the period of records to be viewed and rewind records. Below is the time-history of connections with *SvanNET* and the pie chart showing the total connection time as a percentage of the total working time.



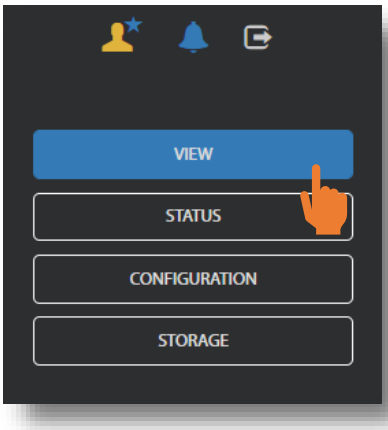
- **Data transfer log** that registers history of data transfers (uploads).

  In the top line you can: refresh the log, select the period of records to be viewed, and select the period for viewing the data transfer: Monthly, Weekly, Daily or Hourly.



5.2.4 WEB INTERFACE view

The **WEB INTERFACE** view is available for the stations connected to *SvanNET* and allows viewing measurement results, configuring station parameters, downloading files and start/stop measurements.



The **VIEW** button switches to the **Live data** view (see Chapter 5.2.4.1), where you can view broadband results, time-history results and event presentation.

The **STATUS** button switches to the station status view (see Chapter 5.2.5), where you can check the station status and start/stop measurements.

The **CONFIGURATION** button switches to the station **Configuration** view (see Chapter 5.2.5.1), where you can configure measurement and instrument parameters.

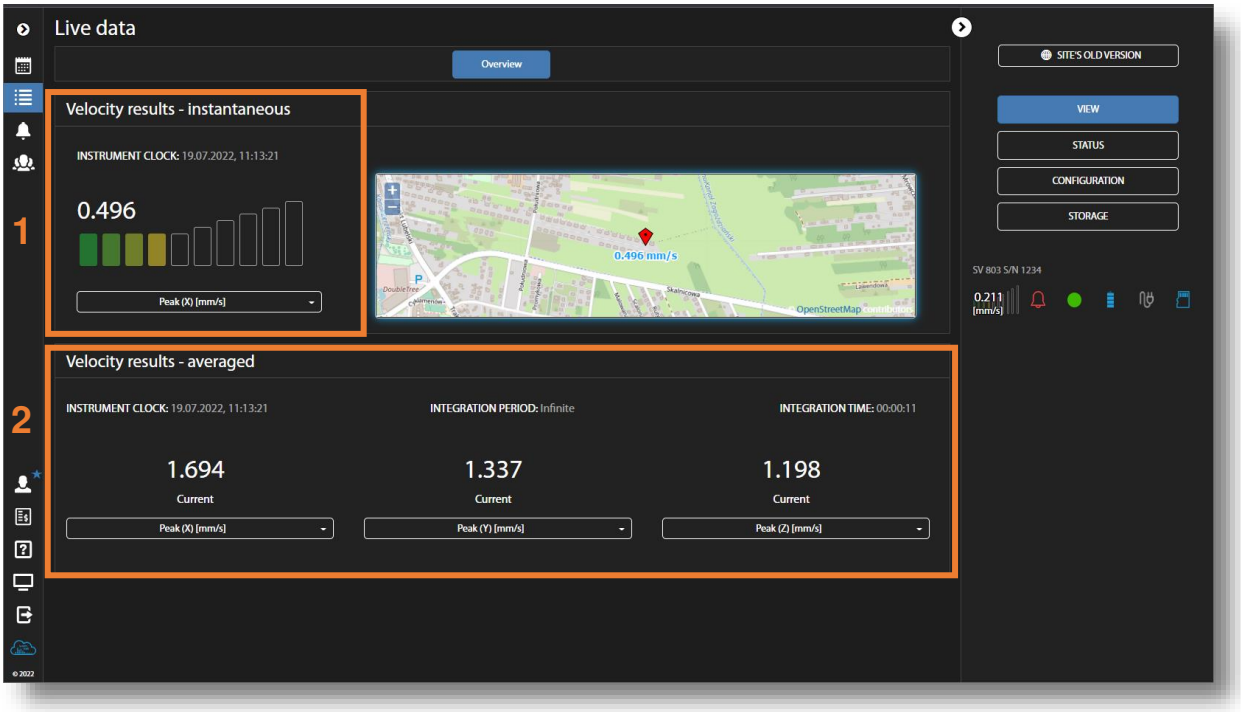
The **STORAGE** button switches to the **Storage** view (see Chapter 5.2.6), where you can download files manually.

***Note**: The contents of the **Configuration** tabs depend on the selected parameters. The aim of this manual is not to present all possible combinations of parameters, but to show the principles of working with SvanNET.*

5.2.4.1 Live data view

Live data view displays the map with the instrument location and results measured in three channels, updated every second:

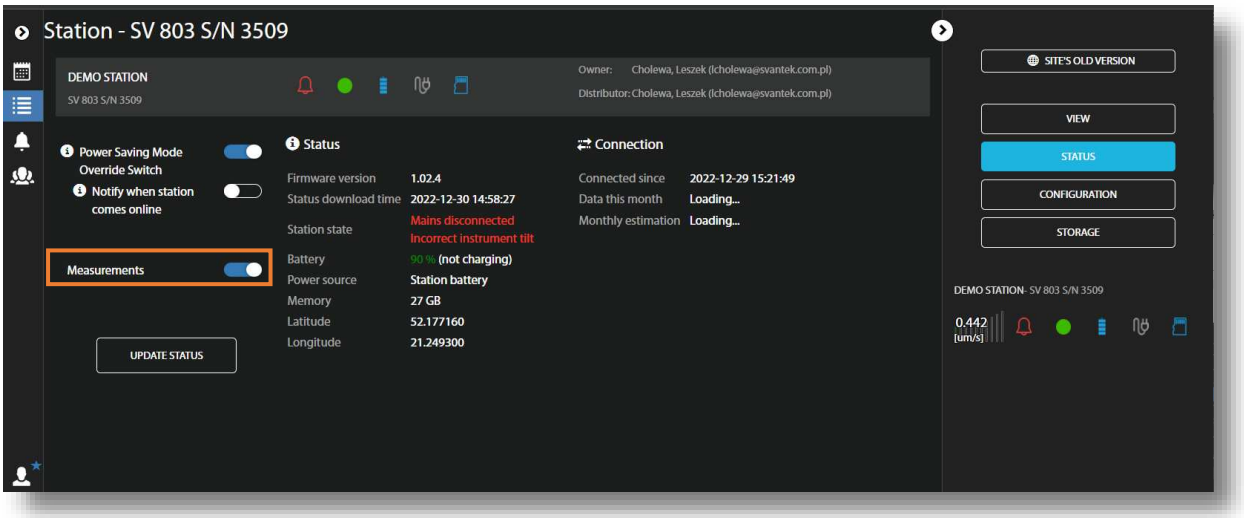
1. **Instantaneous** velocity results measured/averaged over a 1-second period; and
2. **Current averaged** velocity results in the three channels measured/averaged over the INTERGRATION TIME in the range [**1s ÷ Velocity step**]. After the **Velocity step** time has elapsed, the averaging starts from the beginning (INTEGRATION PERIOD).



There are selectors for the results displayed. To change the displayed result, click the selector button for the desired channel and select the result.

5.2.5 STATUS view

The **STATUS** view is similar to that described in Chapter 5.2.1. The difference is that instead of configuring STATUS ALARMS, you can start/stop measurements in this view.



5.2.5.1 Configuration views

The **Configuration** view consists of several sections that allow configuring measurement parameters (**Measurement setup**), measurement results storage (**Storage**), files export in CSV format (**CSV export**), the measured signal recording in WAV format (**Wave recording**), station alarms based on events (**Event trigger**), periodic system check (**Calibration**), auxiliary parameters (**Auxiliary**) and the firmware upgrade (**Firmware upgrade**).

To send a new configuration to the station, click on APPLY SETTINGS.

In the **Measurement setup** section, you can:

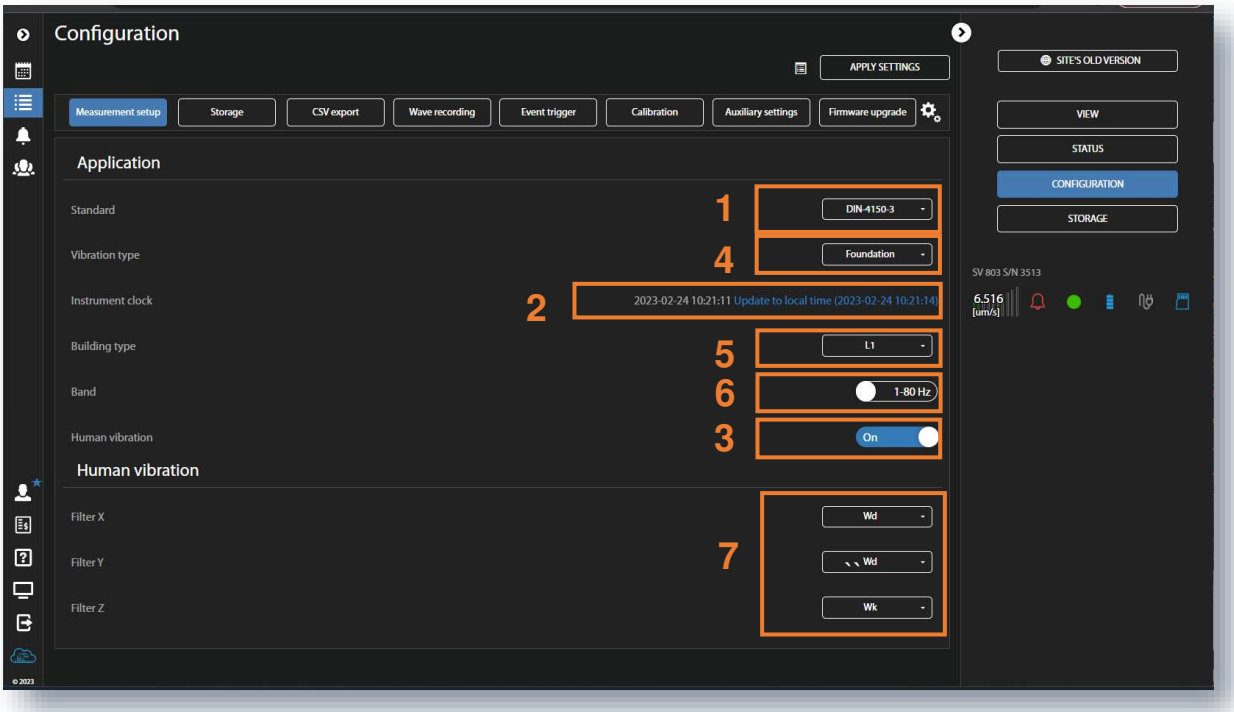
1. select the **Standard**: *PPV*, *BS-7385-2*, *DIN-4150-3*, *KBfmax*, *22/09/1994*, *23/07/1986/1*, *23/07/1986/2*, *IN-1226-A*, *IN-1226-B*, *IN-1226-C*, *IEST VC* or *User*,
2. update the **Instrument clock**,
3. switch on/off the **Human Vibration** measurements

and depending on the standard:

4. select the type of building element (**Vibration type**): *Foundation*, *Top floor*, *Floor slab*, *Underground cavities*, *Buried pipework*, *LT top floor*, *LT floor slab,*
5. select the **Building type** criterion curve for some standards: *L1*, *L2* … or *Workshop*, *Office*, *Residential*, *Theatre*, *VC-A* …,
6. select the measurement **Band**: *1-80 Hz* or *1-315 Hz.*

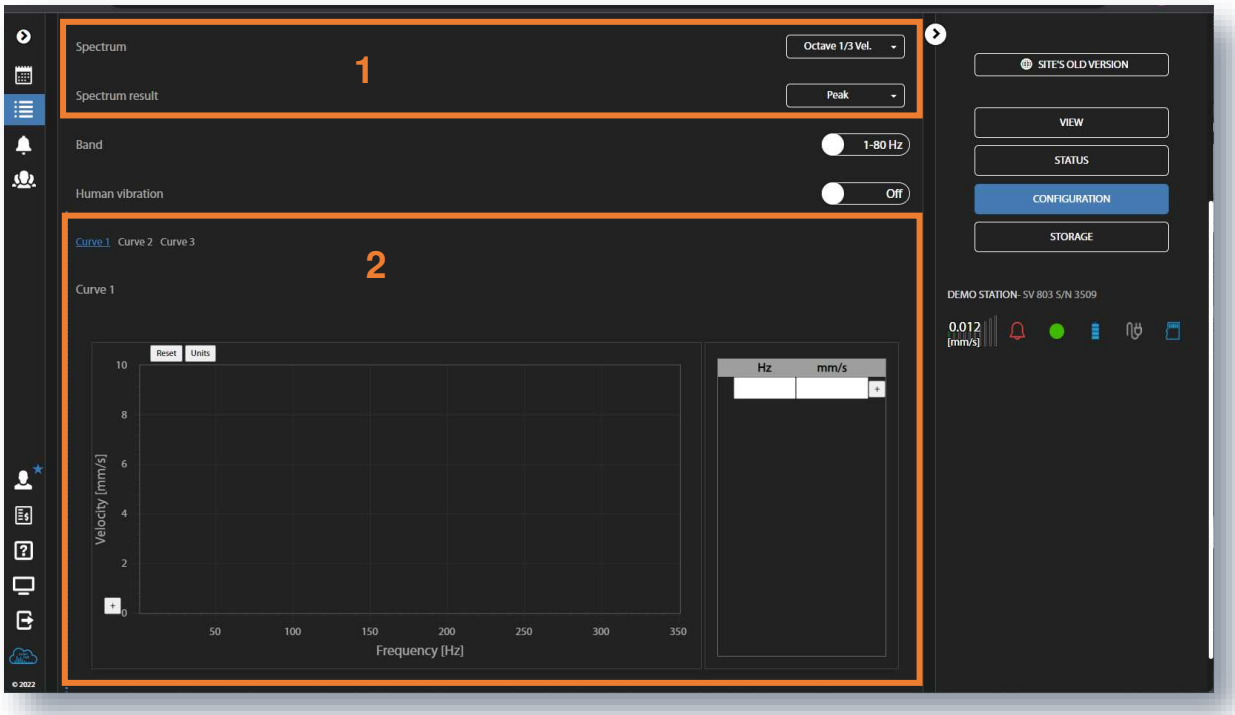
If **Human Vibration** measurements are enabled, you can:

7. set weighting filters for Human Vibration measurements in the channels for the three axes X, Y and Z.



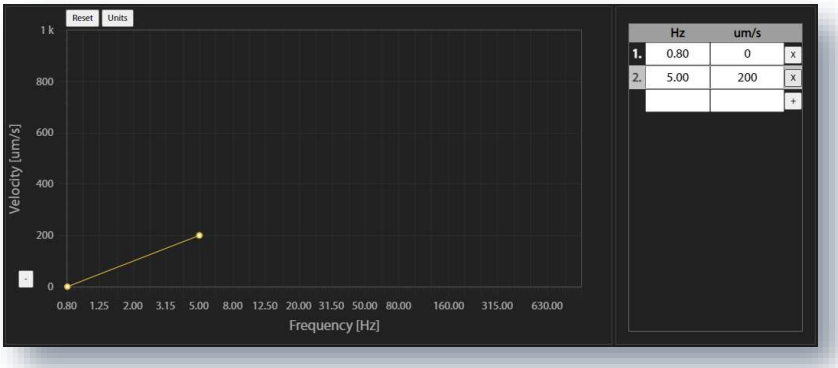
The *User* standard allows you to:

1. Use a specific type of **Spectrum**: *FFT Vel. or Octave 1/3 Vel.* and **Spectrum result** of 1/3 octave band: *Peak*, *Max*, *Min* or *RMS*.
2. Create your own criterion curves.

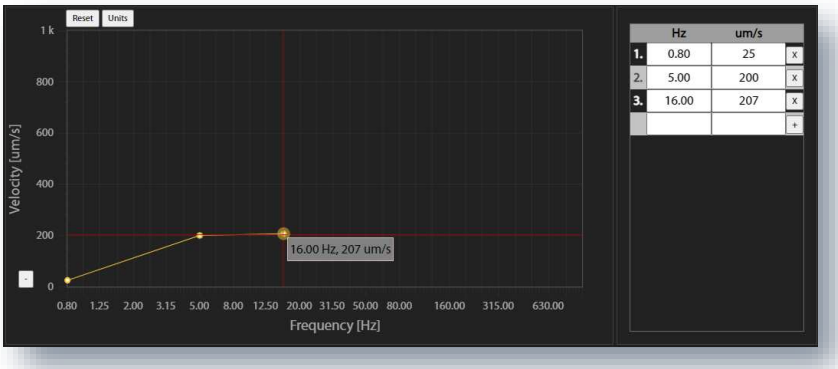


There are two ways to create a curve – using a table or a graph. Both ways complementary. First select the curve you wish to create or modify (**Curve 1**, **Curve 2** or **Curve 3**).

If you want to use a table, enter the coordinates for the new point in the table - values in the **Hz** column and **µm/s** column. The new point will appear on the graph.



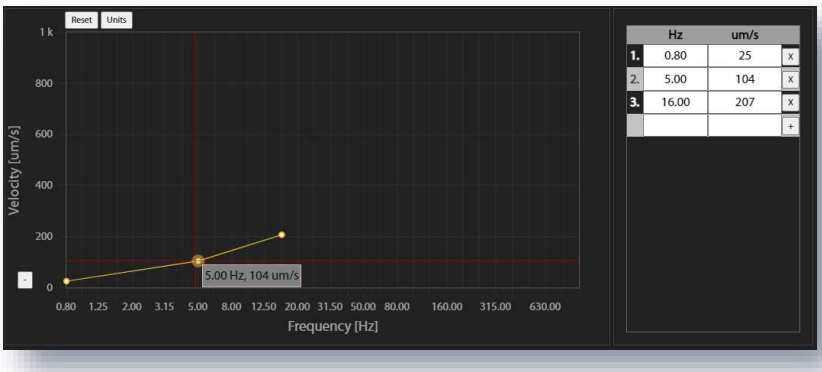
If you want to use a graph, place the cursor on the desired coordinate and click. The new point will be appear on the graph and in the table.



If you want to change the position of the previously created point, you can change its coordinates using either the table or the graph.

You can change the **Velocity** units from **µm/s** to **mm/s** by clicking on the **Units** button.

You can reset the graph by clicking on the **Reset** button.



The instrument performs two types of vibration measurement in three channels – Velocity and Acceleration. Measurement results of both types are stored in the logger file. Velocity signals can optionally be recorded in the wave file.

The logger file can contain three types of records:

1. records of measurement results of velocity vibration from three channels made with **Velocity Step** (so-called time-history - TH),
2. records of measurement results of acceleration vibration from three channels made with **Human Vibration Step** (so-called Summary Results – SR) and
3. records of FFT velocity spectra from three channels made with **Velocity Step**.

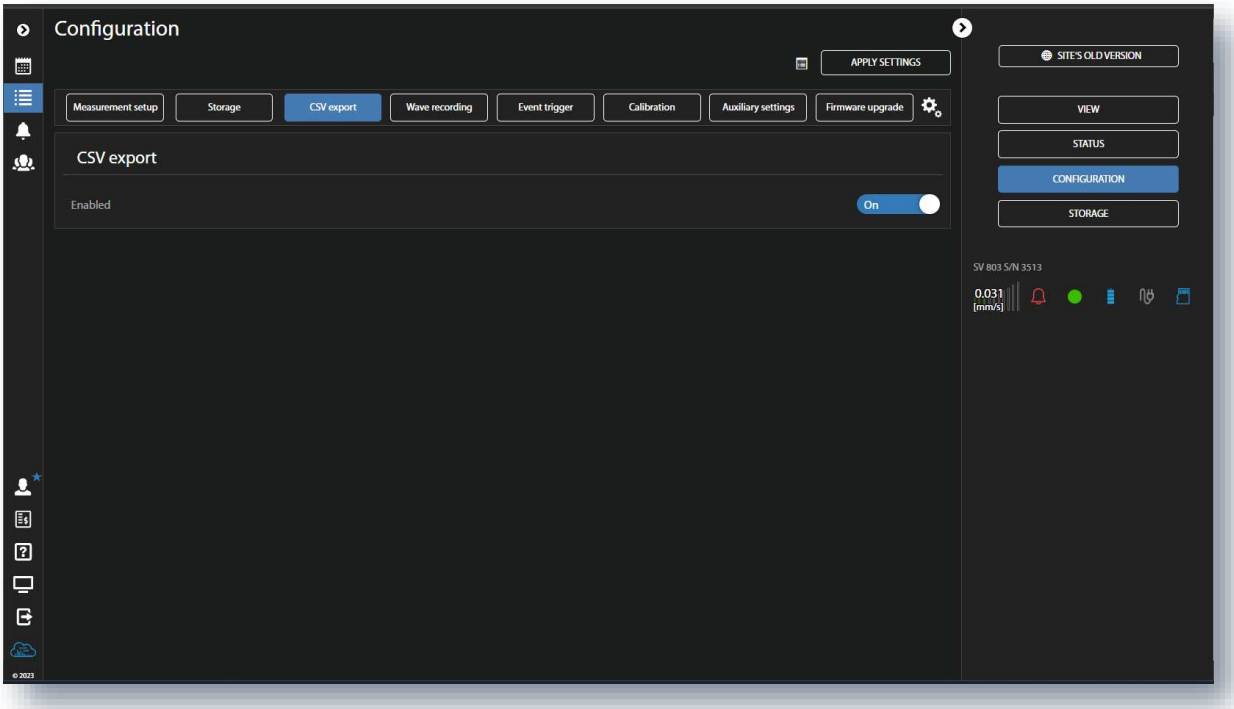
The wave file contains waveform signals for three channels.

In the **Storage** section, you can set:

1. **Logger splitting** period: *Disabled*, *Every 15 m*, *Every 30 m*, *Every 1h* or *Every day,*
2. **Velocity step** for the **Velocity results** registration,
3. **Human vibration step** for the Acceleration results registration,
4. **Spectrum velocity** results recording: switched off (*Off*), continuously during the measurement (*Continuous*) or when the event is registered (*On event*),
5. **Velocity results** to be saved in a file with the **Velocity step**: *PEAK* (PPV), *P-P*, *MAX*, *RMS*, *RRMS* (Rolling RMS), *PEAK VEC* (PPV VEC), *DF* (Dominant Frequency), *OVL* (Overload).

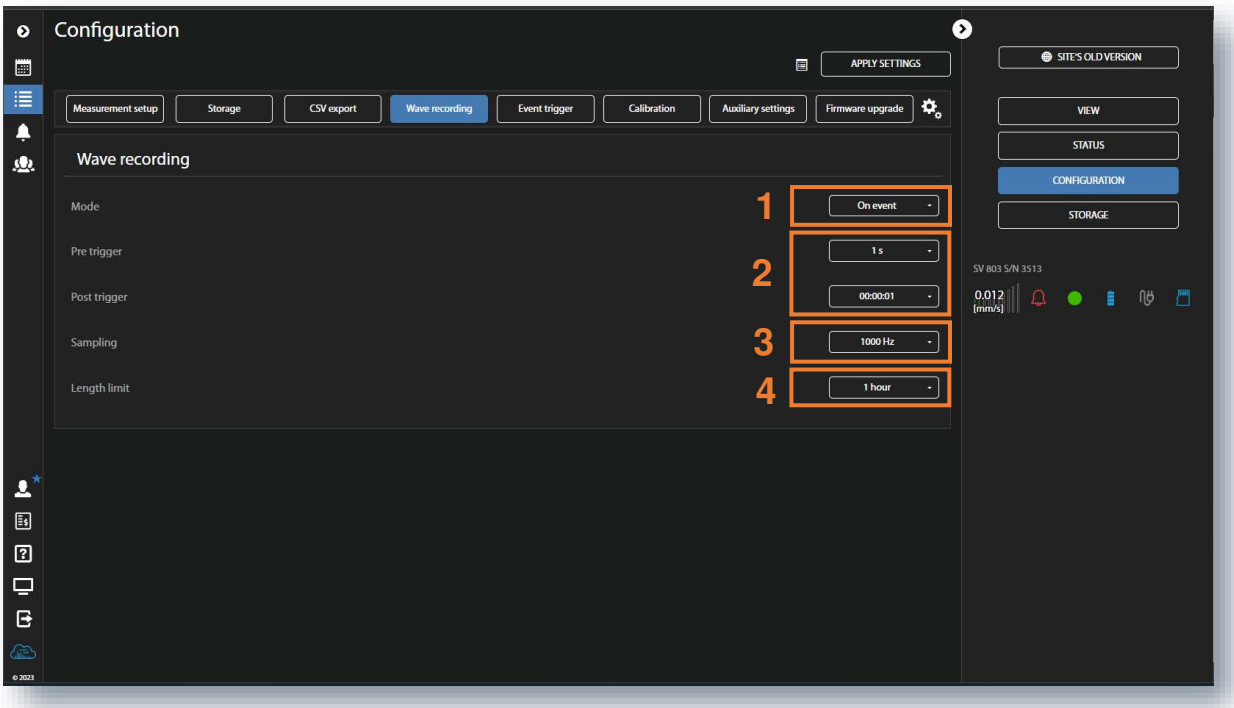
***Note**: All measurement results and waveforms are stored in files with automatically defined names. You can define both file names manually via the Assistant Pro or SvanPC++ interface (see Chapters 4.6.2.1, 4.6.2.2 and 6.3.4).*

The **CSV export** section allows you to export results in the CSV (Comma Separated Values) format.



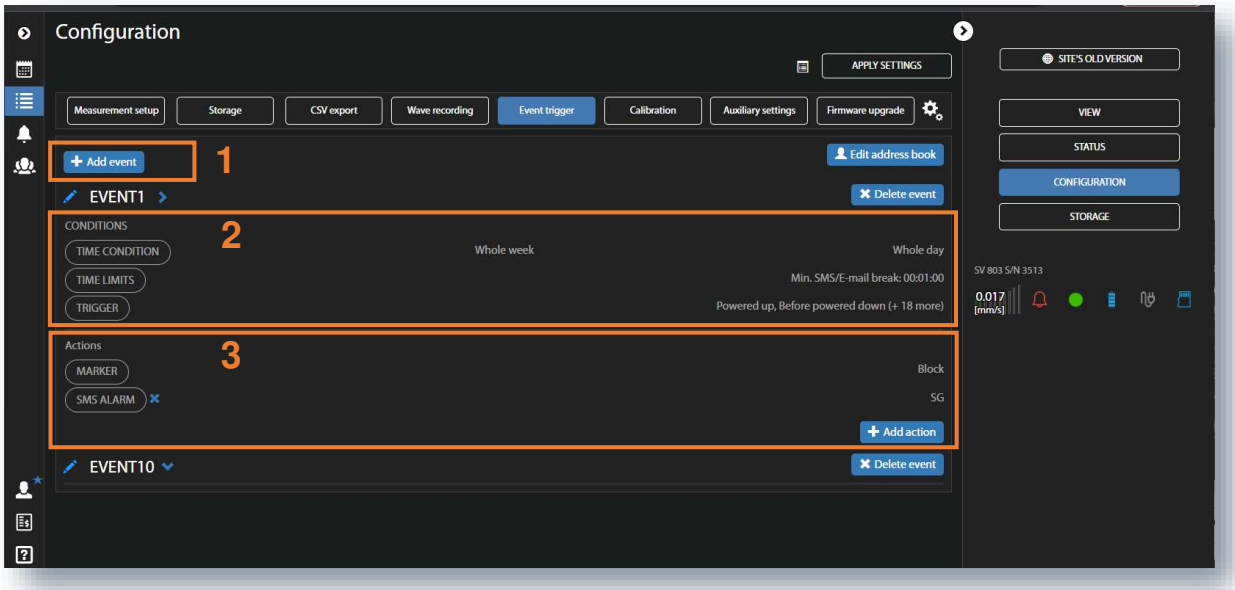
In the **Wave recording** section, you can:

1. set the **Mode** of the recording: *Disable*, *Continuous* (signals are recorded from the measurement start till the measurement end) or *On event* (signals are recorded during the event period),
2. in the case of *On event*, set the recording duration before the event (*Pre trigger*) and after the event (*Post trigger*),
3. set the sampling frequency of the signal recording: *250 Hz*, *500 Hz*, *1000 Hz*,
4. set the time of signal recording after triggering.



In the **Event trigger** section, you can:

1. add new event,
2. configure **CONDITIONS** and
3. define **Actions**.

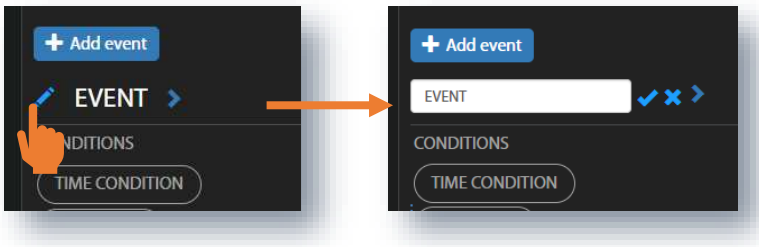


To add a new event, click on **+Add event**. The new **Event** section will appear with the **CONDITIONS** and **Actions** fields.

To edit the event name, click on .

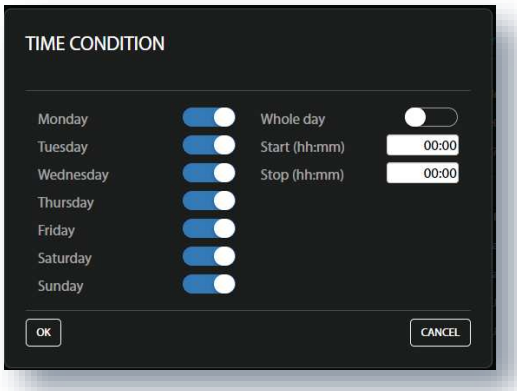
After editing the event name confirm it by clicking on or reject it by clicking on .

To hide the event, click on .



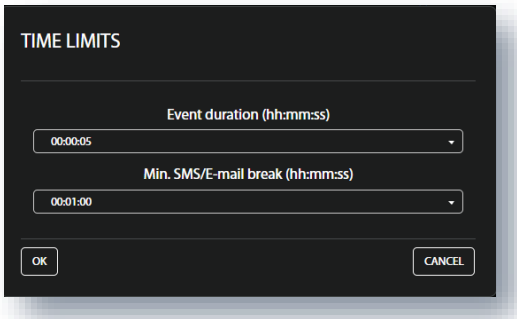
Configuring conditions

Click on **TIME CONDITION** to select days and periods for event registration in the TIME CONDITION configuration box.

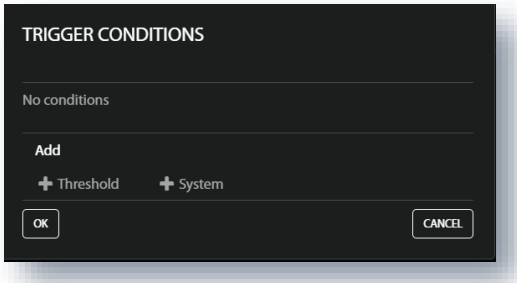


Click on **TIME LIMITS** to set the event (alarm) duration and the minimum interval between consecutive SMS and E-mail notifications in the TIME LIMITS configuration box.

Setting **Min. SMS/E-mail break** period allows you to avoid a barrage of alarms for frequently recurring events.



When you click on **TRIGGER**, the TRIGGER CONDITIONS configuration box appears. In this box you can add the type of condition: **Threshold** or **System**. These conditions are mutually exclusive for the same event.



Threshold trigger condition

The **Threshold** type trigger activates the event when the measured value (**Source**) exceeds above the threshold.

In the **Source** list, select the result to be compared with the threshold: *PPV*, *RMS*, *RRMS* (rolling RMS), *Vector* or *Curve*.

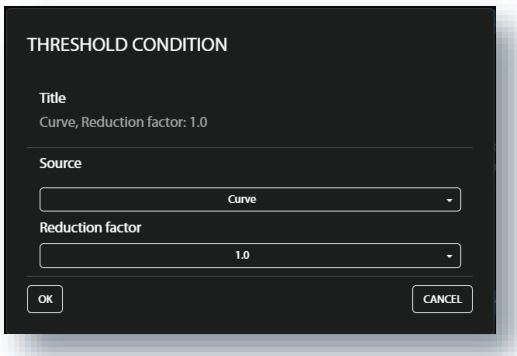
The selected result defines the threshold type – the next parameter in this box.

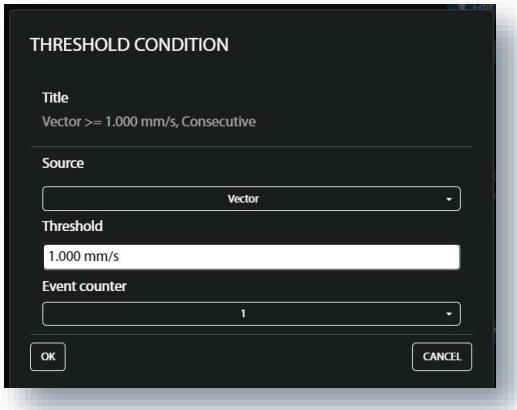
In the case of *Curve*, the **Reduction factor** should be defined from the set: 0.001, 0.01, 0.1 ÷ 1.9.

In the case of *Vector*, the threshold should be defined in the range 1 µm/s ÷ 10.0 m/s.

The threshold can be entered as a value with units or as a value only. If the value is outside the range, the program will adjust it to the nearest limit.

In the case of *PPV*, *RMS* and *RRMS*, it is necessary to define three thresholds for the X, Y and Z axes in the range 1 µm/s ÷ 100 mm/s and to program the **Event counter** logic.





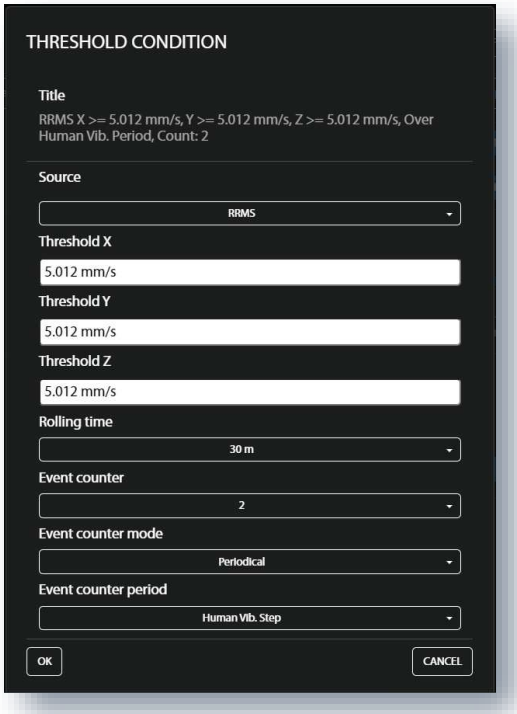
For *RRMS*, the **Rolling time** should also be defined.

In the **Event counter** item, which appears for the specific **Source** (*RMS*, *RRMS*, *PPV* and *Vector*), you can select a number of conditions to be met before the event and alarms are triggered.

If **Event counter > 1**, the **Event counter mode** item appears, allowing you to select the way in which events are counted (*Consecutive* or *Periodical*):

- In the case of *Consecutive*, an event will occur when a trigger condition occurs **Event counter** times in succession.
- In the case of *Periodical*, an event will occur when a trigger condition occurs **Event counter** times in succession periodically with a period (**Event counter period**) equal to *Human Vib. Step* or *Velocity Step*.

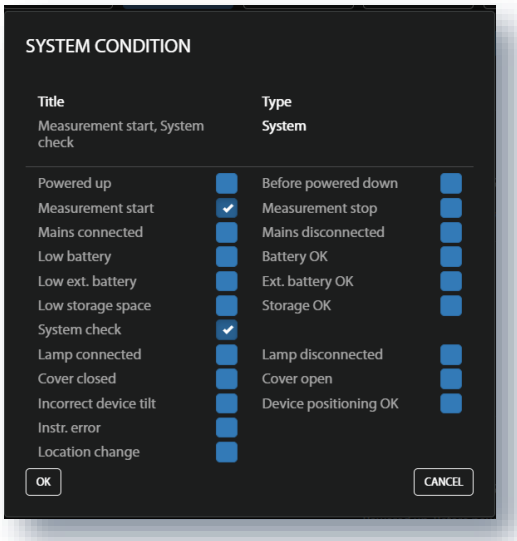
The Event counter is not used for the Curve source.



System trigger condition

The **System** trigger type activates the event when some of the system conditions occur.

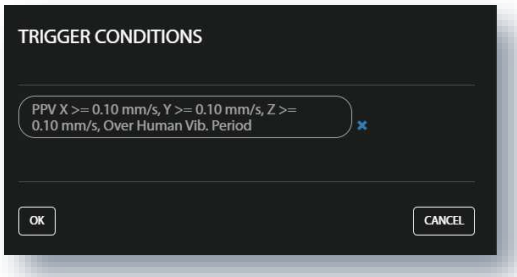
You can select some or all of the conditions presented in the SYSTEM CONDITION configuration box (see description in Chapter 4.6.3.2).



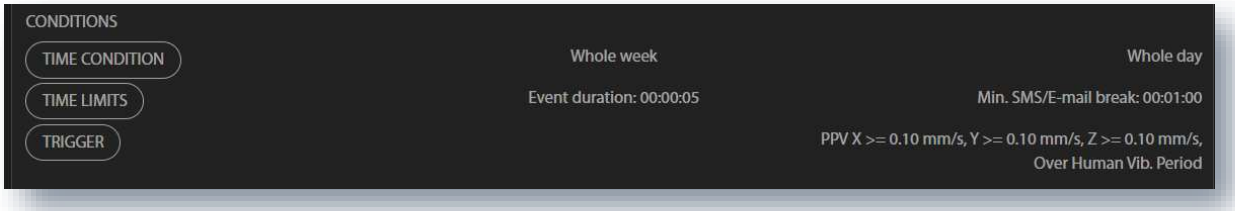
The selected threshold condition is displayed in the TRIGGER CONDITIONS pop-up box.

You can delete this condition by clicking on **×** or confirm the selection by clicking on **OK**.

Once confirmed, the pop-up box closes, and the selection is displayed in the line of the **TRIGGER** button.



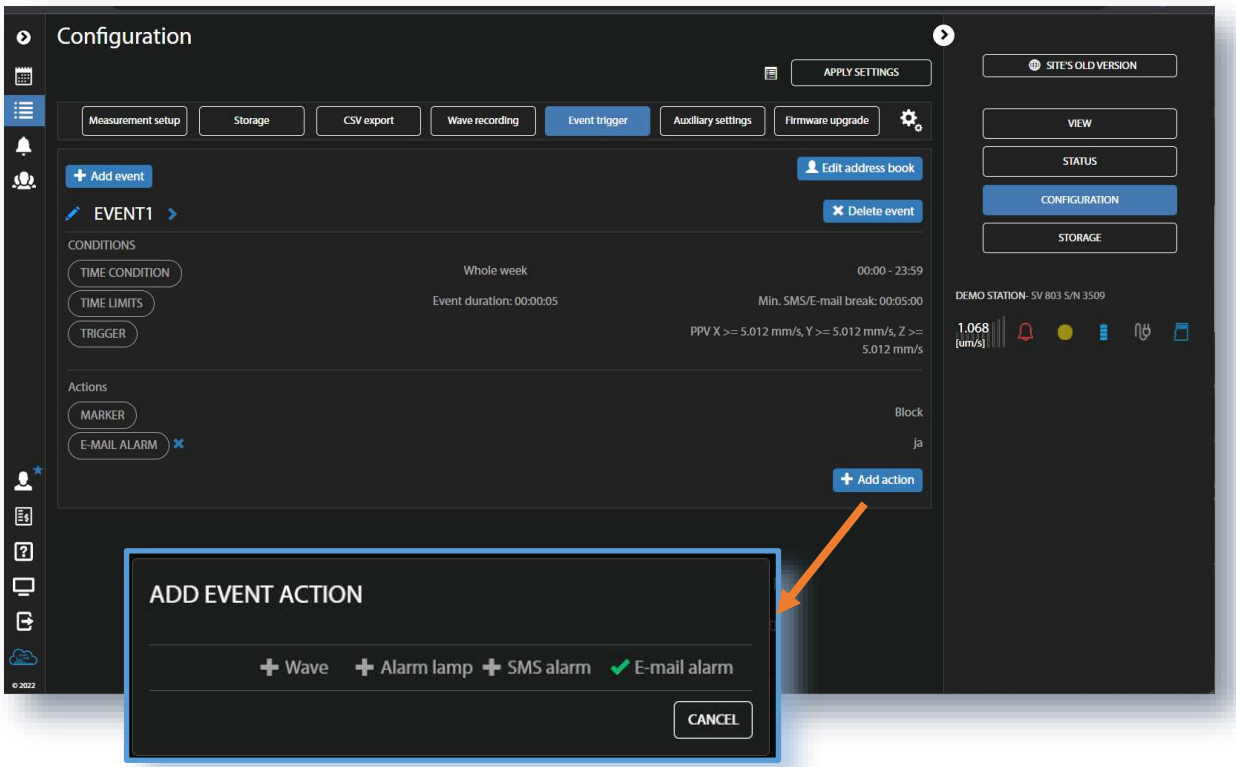
All **CONDITIONS** settings are displayed in the lines of the corresponding buttons.



Defining actions

To create a new action, click on **+Add action** and in the ADD EVENT ACTION pop-up box, click on the action you wish to add and to configure: **Wave**, **Alarm lamp** (both only for the **Threshold** trigger!), **SMS alarm** or **E-mail alarm**.

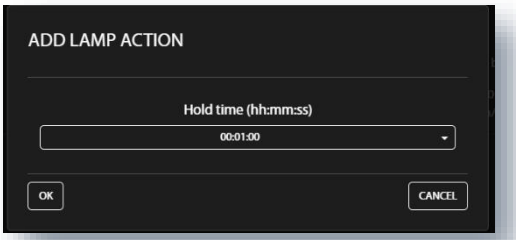
The **MARKER** action, which adds the special block marker of the event duration to the data file, is always enabled.



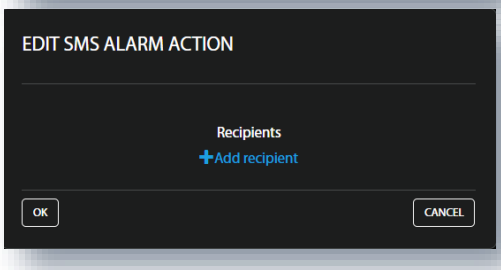
After the event occurs, actions are performed while the event is active, at its start or at its end depending on the action type.

The **Alarm lamp** action triggers an alarm signal on the **EXTERNAL INTERFACE** connector to which an alarm device can be connected (e.g., alarm lamp).

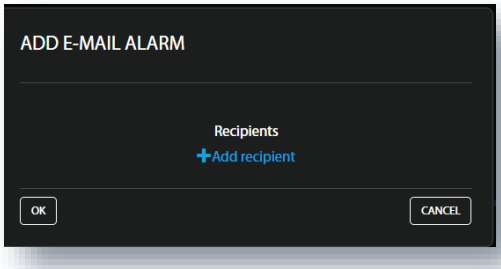
Hold time defines the duration of this alarm after the end of the event.



The **SMS Alarm** action sends the SMS message to the phones of recipients, which can be selected in the **ADDRESS BOOK** opened by clicking on **+Add recipients**.



The **E-mail Alarm** action sends the email messages to the addresses of the recipients, which can be selected in the ADDRESS BOOK opened by clicking on **+Add recipients**.



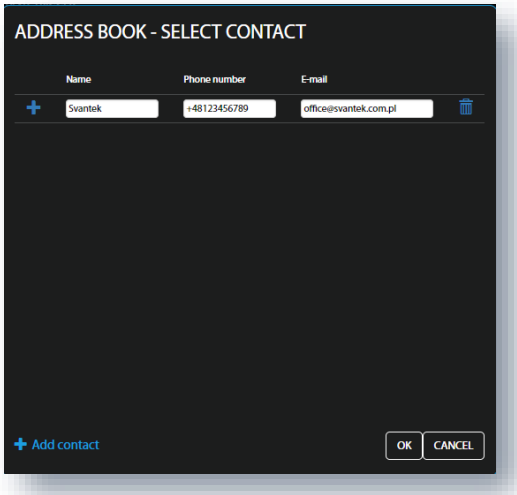
When confirmed (**OK**), the pop-up boxes close, and the selections are displayed in the lines of the corresponding **Actions** buttons.

Address book

The ADDRESS BOOK pop-up box appears in the SMS and E-mail alarm actions pop-up boxes after you click on **+Add recipients**. Select the desired address (**+**) and click on **OK**.

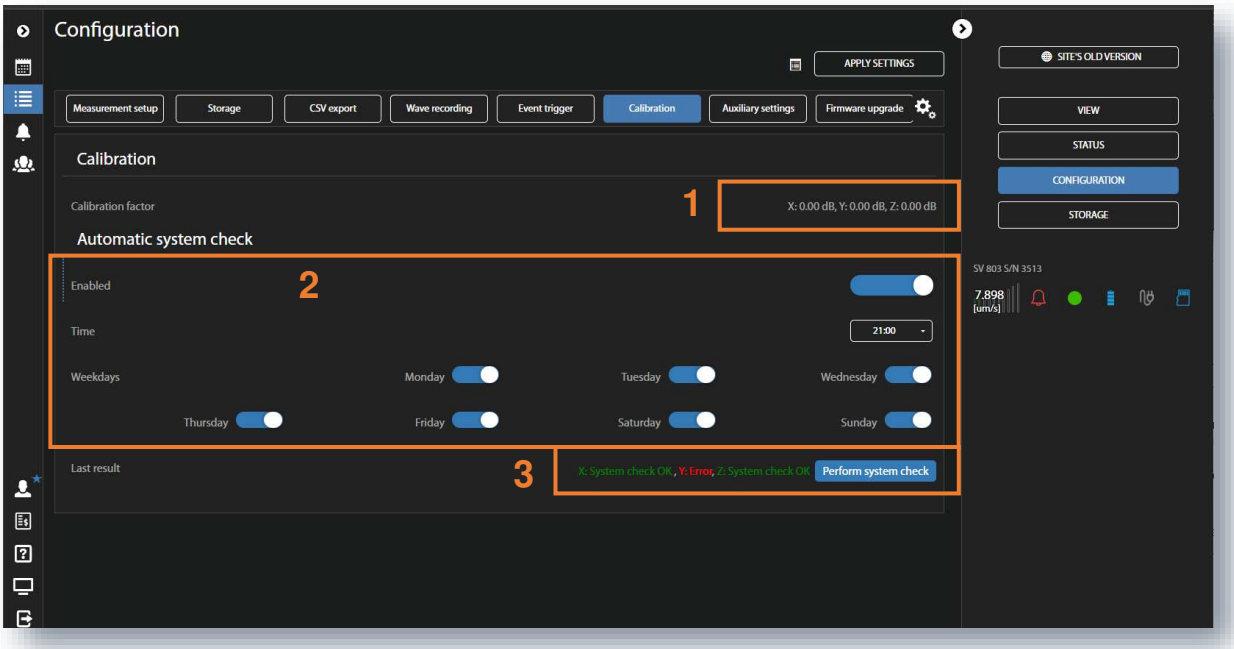
You can add the recipient by clicking on **+Add contact**.

You can also edit the ADDRESS BOOK from the **Configuration** view if you click on **Edit address book**.



In the **Calibration** section, you can:

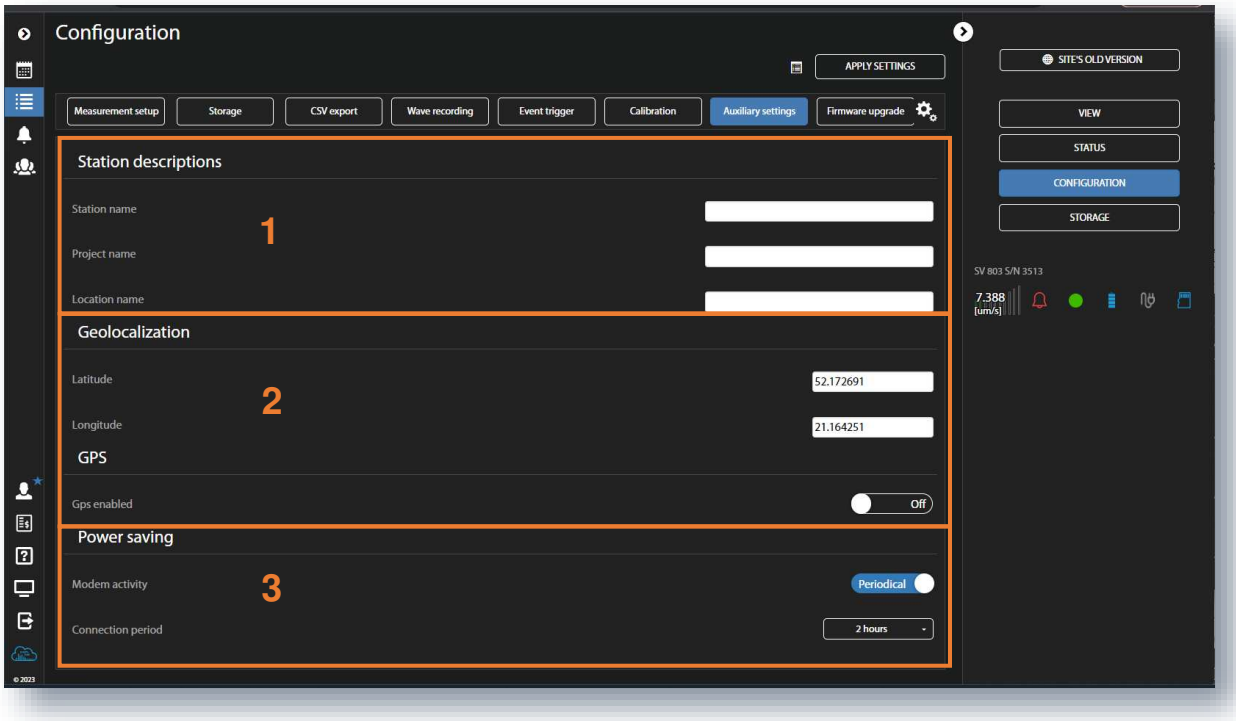
1. Check the calibration factor,
2. Activate and programme the automatic system check and
3. Perform the system check manually.



In the **Auxiliary settings** section, you can:

1. Enter **Station descriptions**: **Station name**, **Project name** and **Location name**.
2. Enter the instrument's **Geolocalization**: **Latitude** and **Longitude**. If the instrument's GPS is enabled Latitude and Longitude will be automatically read out from GPS.
3. Set the **Power saving** mode of the modem - choose **Modem activity** mode (*Continuous* or *Periodical*) and set the **Connection period** from 15 min to 24 h.

In continuous mode, the modem is active all the time. However, this mode is power hungry and if the continuous data transfer is not required, it is recommended to use *Periodical* mode, which ensures low power consumption.

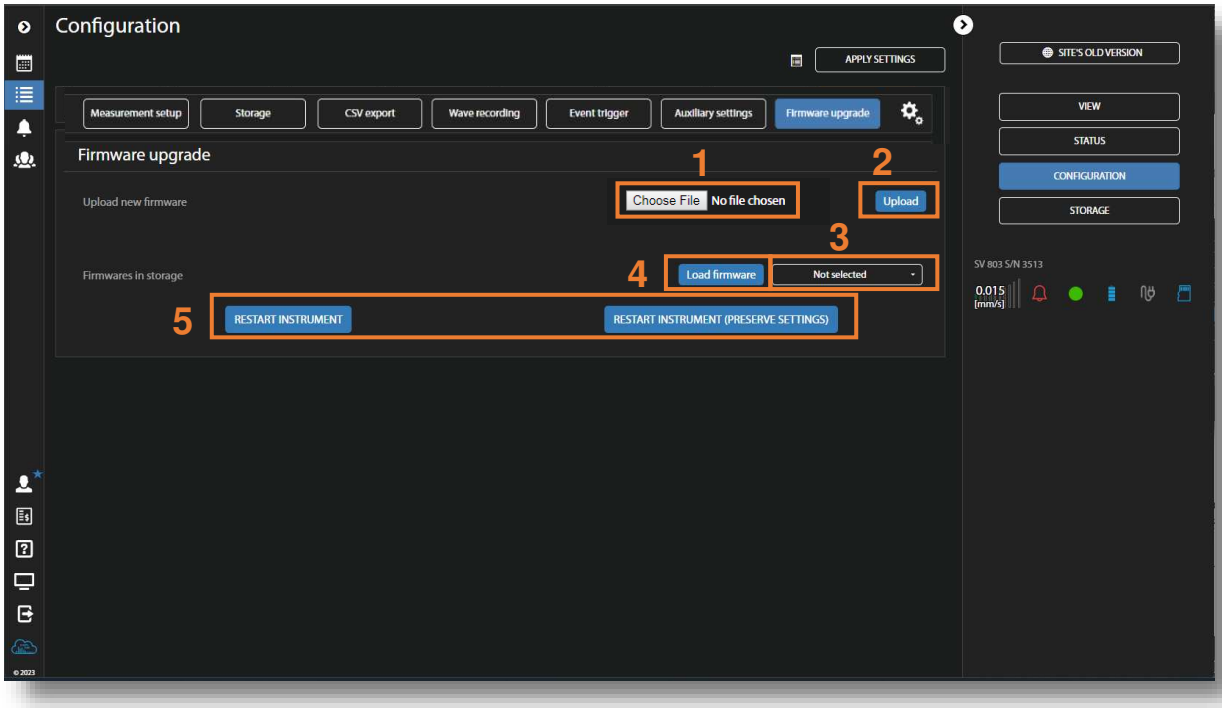


In the **Firmware upgrade** section, you can upload new firmware to the instrument's SD-card and perform the upgrade process remotely.

Before upgrading, it is essential to download the correct firmware file from the SVANTEK website to your PC.

To upgrade the firmware:

1. Click on **Choose file** and locate the firmware *.bin file on your PC.
2. Upload the selected file by clicking on **Upload**.
3. When the upload is complete, select the new firmware package in the firmware selector.
4. Click on **Load firmware**.
5. Click on **RESTART INSTRUMENT** or **RESTART INSTRUMENT (PRESERVE SETTINGS)** button to complete the process and wait 60 seconds for the connection to be re-established. Measurements will start automatically.

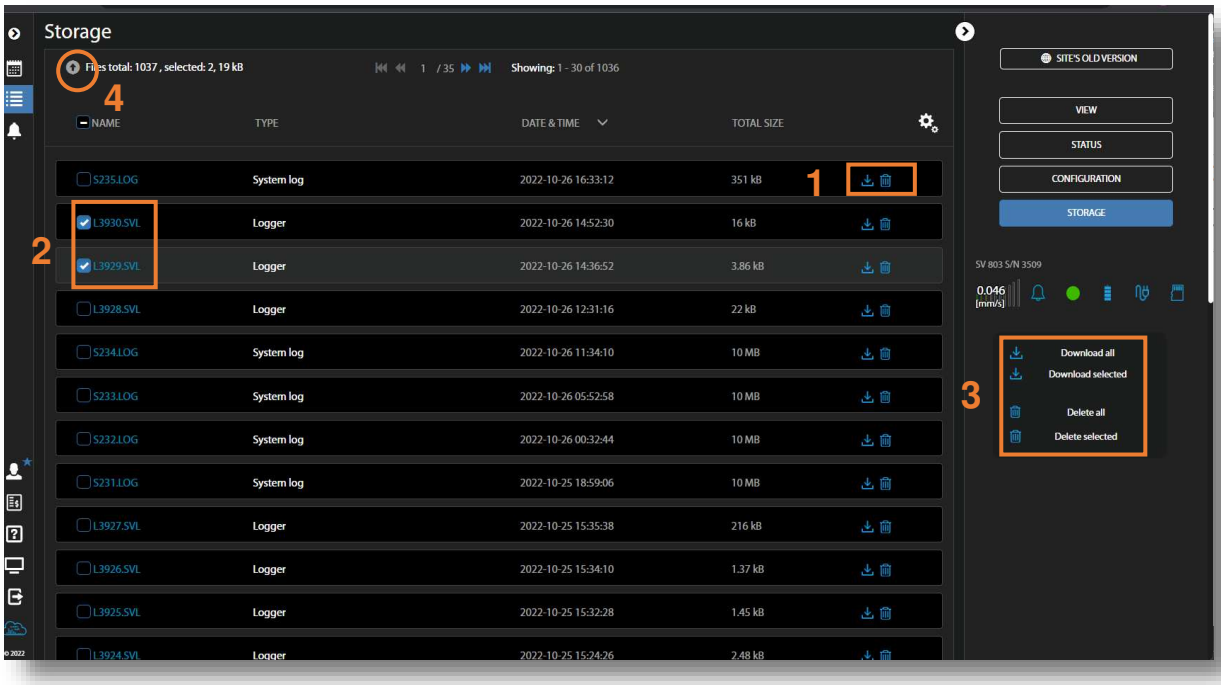


5.2.6 STORAGE view

The **Storage** view presents a list of files stored in the instrument's SD card memory. The list contains only files from a single directory on the memory card and it initially displays the contents of the current working directory.

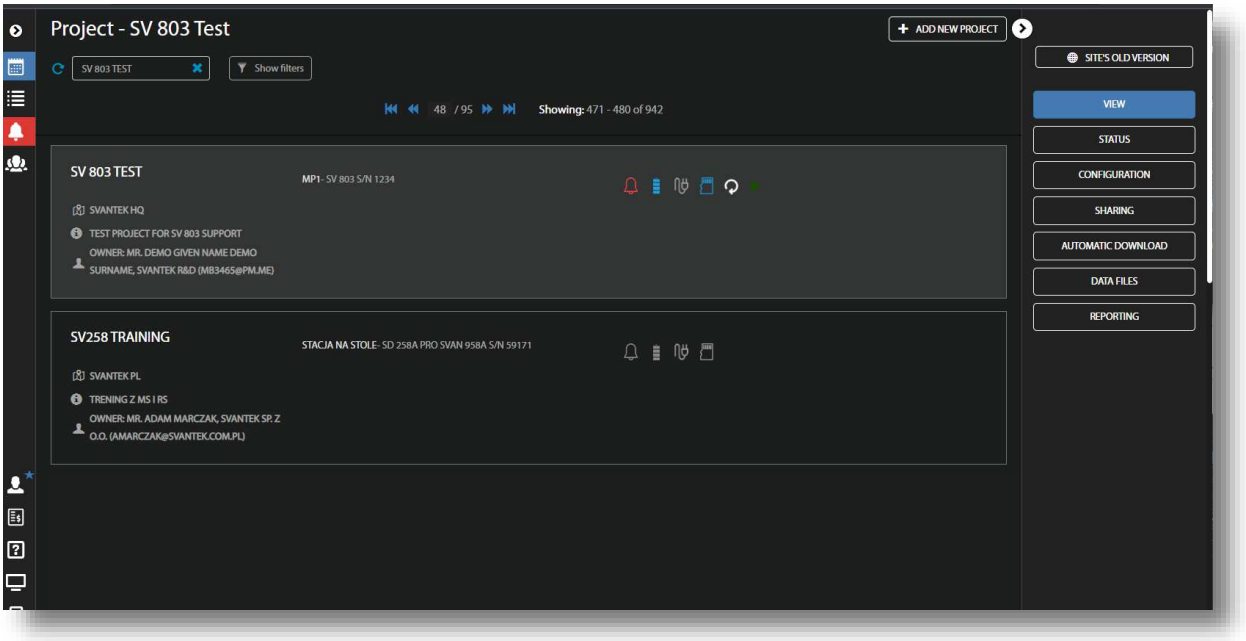
In the **Storage** view, you can:

1. Download or delete individual files by clicking the right icons on the file line.
2. Select several files and download or delete the selected files.
3. Download or delete all files.
4. Navigate through the folder structure by clicking the "folder up" button.



5.3 AUTOMATIC MONITORING SERVICES – PROJECTS

After clicking on the Project list icon, *SvanNET* opens the Project list view, where you can configure projects and view measurement results for all measurement points of the selected project.



A full description of the Project configuration is given in the SvanNET User Manual. This manual only gives a brief description of how to view measurement data in the Automatic Monitoring Services.

To view the project data, click on the **VIEW** button.

Project data can be viewed in several panels: *Project description*, *Configuration Info*, *Live data*, *Map*, *Charts*, *Tables*, *Events*, *Heatmaps*, *Weather/Dust* and *Text*. All panels are customisable so you can create a report based on these customised views using the WYSIWYG (What You See Is What You Get) functionality.

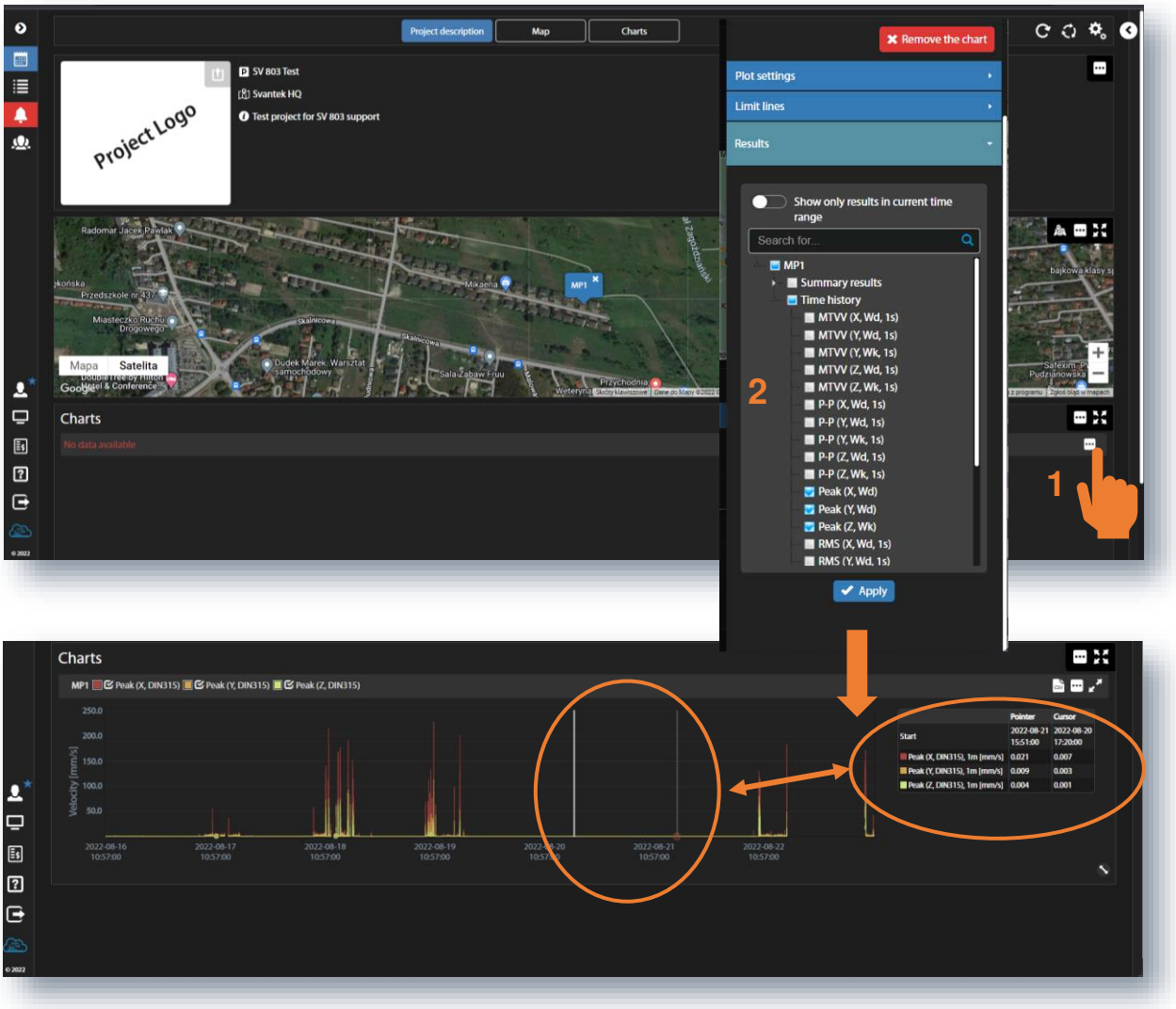
Configuring panels, formatting and creating reports is described in detail in the SvanNET User Manual. This manual only describes parts related to the operation of SV 803.

5.3.1 Viewing time-history of measured results – *Charts* panel

The *Charts* panel presents time-histories of some results.

To view time-history(es):

1. click on the icon in the *Charts* panel and
2. select results from the pop-up box.



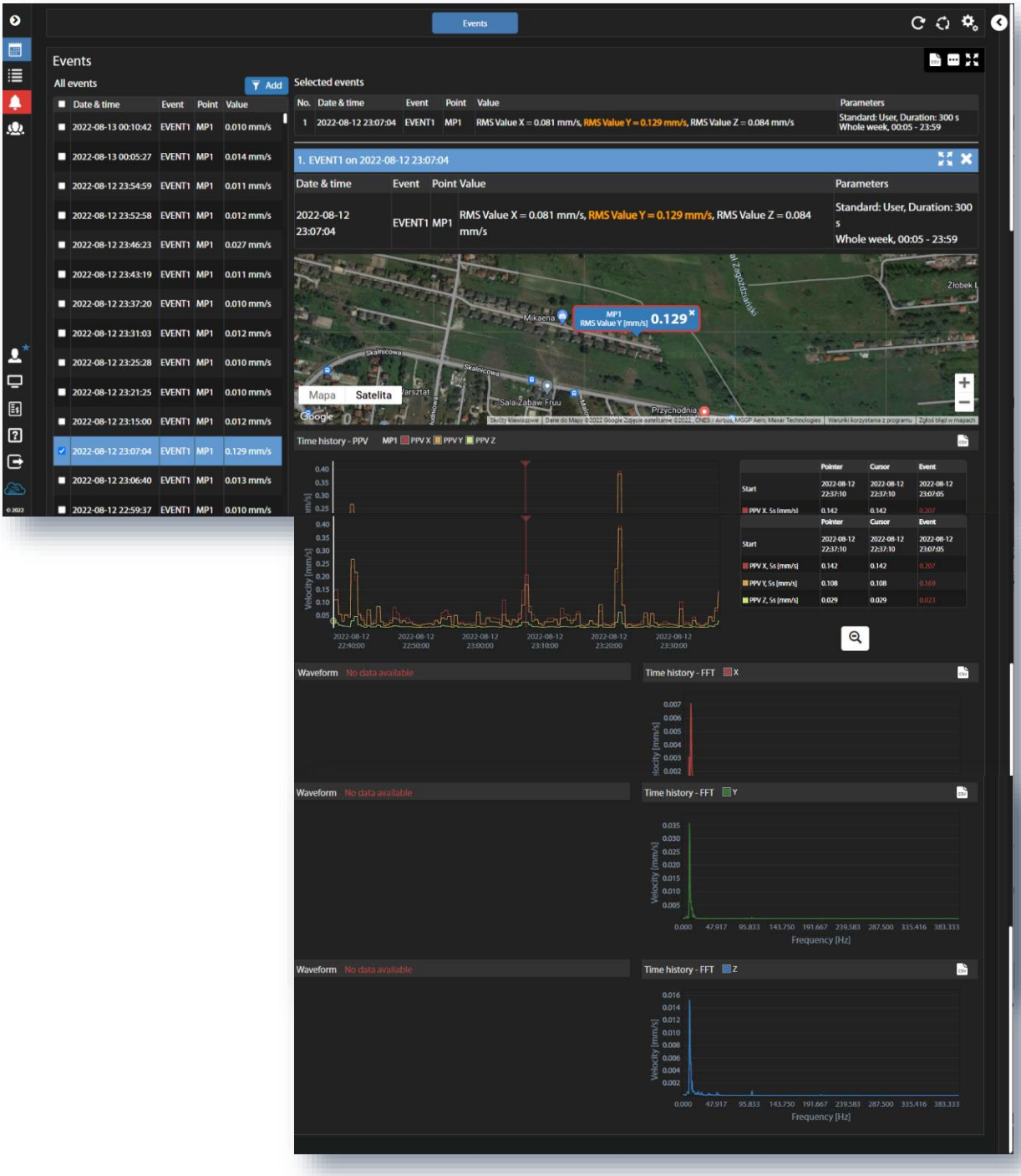
If you point the mouse at the plot, you can read the *Pointer* coordinates in the legend box. Click on the plot and read the *Cursor* coordinates in the legend box.

5.3.2 Viewing events – *Events* panel

The *Events* panel displays the list of events (left pane) and details of selected events (right pane).

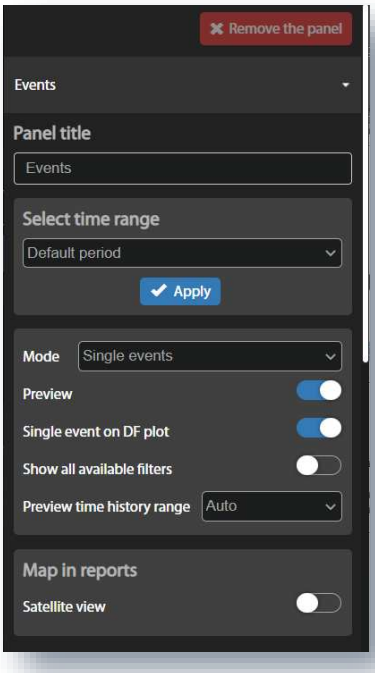
To view event details, highlight the event in the list.

Event details include the measurement point map, PPV time-history curves for three axes with marked events and cursor legend, waveforms and FFT spectra for three axes.


Events
Events
All events
Add
Selected events
Date & time
Event
Point
Value
Parameters
1. EVENT1 on 2022-08-12 23:07:04
RMS Value X = 0.081 mm/s, RMS Value Y = 0.129 mm/s, RMS Value Z = 0.084 mm/s
Standard: User, Duration: 300 s
Whole week, 00:05 - 23:59
Mapa
Satelita
Time history - PPV
Waveform
No data available
Time history - FFT
Frequency [Hz]

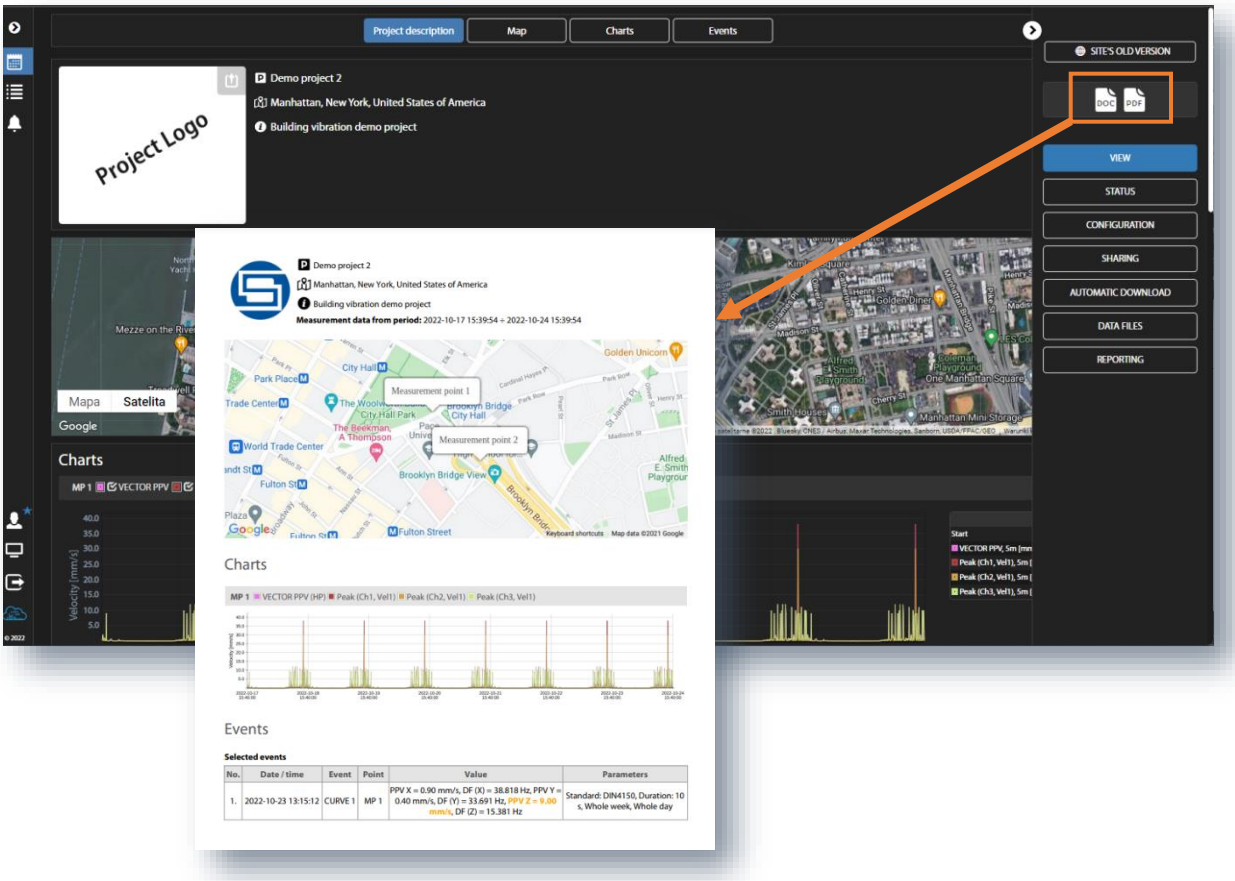
By clicking on the ••• icon in the *Events* panel, you can change the *Panel title* and customise the display of events details:

1. Select the time range for viewing events (*Select time range*): *Default period (Default time range), Last hour, Last day, Last month, Last year, Last x period, Fixed period*. Periods for the last two options are defined after selecting of one of them.
2. Toggle between *Single events* and *Multi-point events*. Multi-point event is an event where at least two single-point events have been superimposed.
3. Toggle *Preview* of event details.
4. Toggle *Single event on DF plot* (Dominant frequency plot).
5. Toggle *Show all available filters*.
6. Select period for time-history plots (*Preview time history range*): *Auto, 5m, 30m, 1h, 2h, 6h, 12h, 24h*.
7. Select the *Map* type *for reports*: *Satellite view* or Road map.



5.3.3 Printing reports

Once you have customised the panels with the results, you can easily generate a report based on this view using functionality of WYSIWYG (What You See Is What You Get). To do this, expand the right tool panel and click on DOC or PDF.



6 DATA POST-PROCESSING – SvanPC++

The *SvanPC++* software for the PC enables configuring instrument settings and provides also wide spectrum of data post-processing and reporting functionalities.

SV 803 needs to be connected to the computer running *SvanPC++* either by the USB cable or the internet. In the last case *SvanPC++* should be supplemented with the *Remote Communication* module.

Although SV 803 is dedicated to wireless remote control it can be also easily configured and controlled via the USB interface. The USB interface mode can be used for the first configuration of the wireless communication. The USB interface can also be used in emergency when the wireless connection was broken or when for some reason wireless communication is not available or in situations when the measurement process doesn't require wireless control of the instrument.

Note: *The current manual describes only most useful and instrument specific functionalities that are available for the USB connection. All other functionalities including functionalities connected with Remote Communication module are well described in SvanPC++ User Manual.*

6.1 SVANPC++ SOFTWARE INSTALLATION AND ACTIVATION

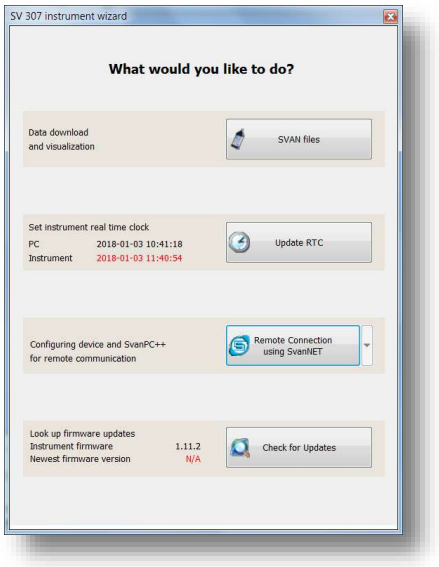
To download and install *SvanPC++* software and Svantek *USB Drivers* go the website: SVANTEK Support and Service - Sound and Vibration.

SvanPC++ requires Windows operating system and minimum system parameters of the PC: 1GHz CPU, 1 GB RAM (2GB RAM for x64 system), 20 GB HDD, 1024x768 display.

6.2 INSTRUMENT VIZARD

After connecting the instrument to the computer running *SvanPC++* by the USB cable the **SV 803 instrument wizard** dialog box appears on the screen. It enables you to:

- download or upload files (**SVAN files** button),
- adjust the instrument real-time clock (**Update RTC** button),
- configure the connection with SvanNET (**Remote Connection using SvanNET** button). Once the connection is configured, the **Remote Communication Center** button will be displayed instead,
- check the firmware version of the instrument with the latest available version (**Check for Updates** button).



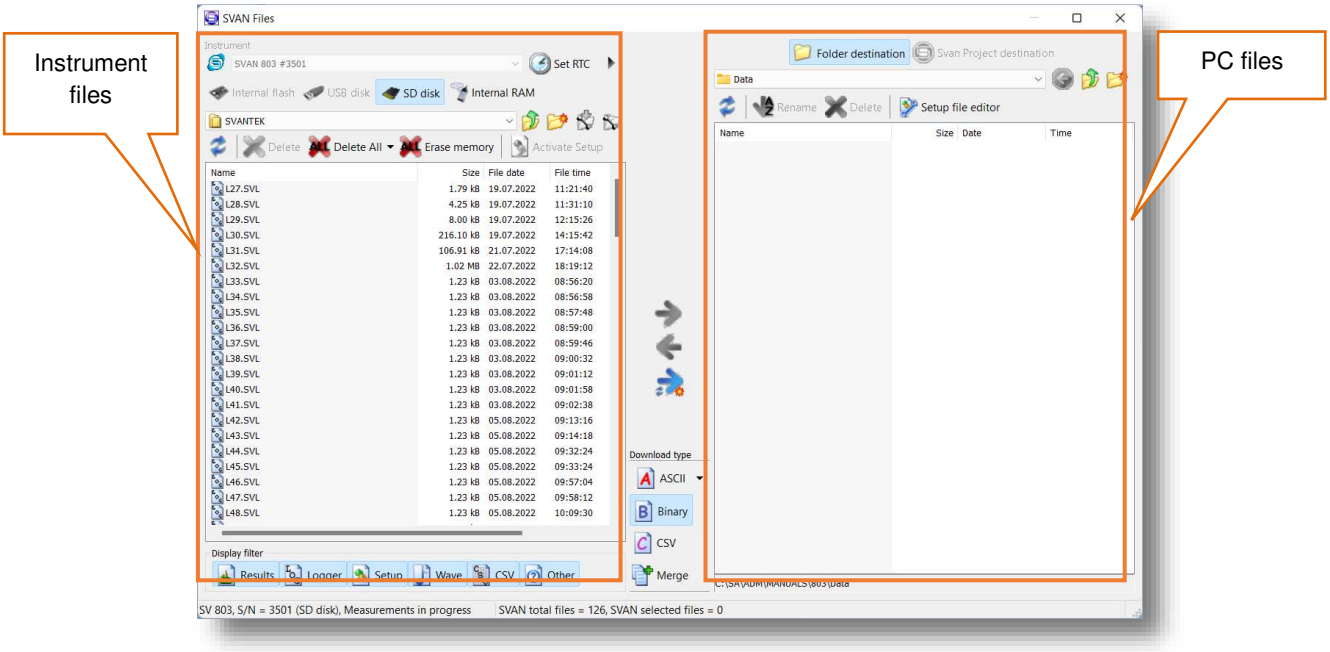
6.3 SVAN FILES

Access to the instrument's files is carried out from the **SVAN Files** dialog box. This dialog box enables managing instrument files, opening data files and configuring settings files.

The **SVAN Files** dialog box consists of two parts: instrument (left) and PC (right). Each part includes tools for files managing (selecting memory, directory and files, deleting files, creating directory, applying filters etc.).

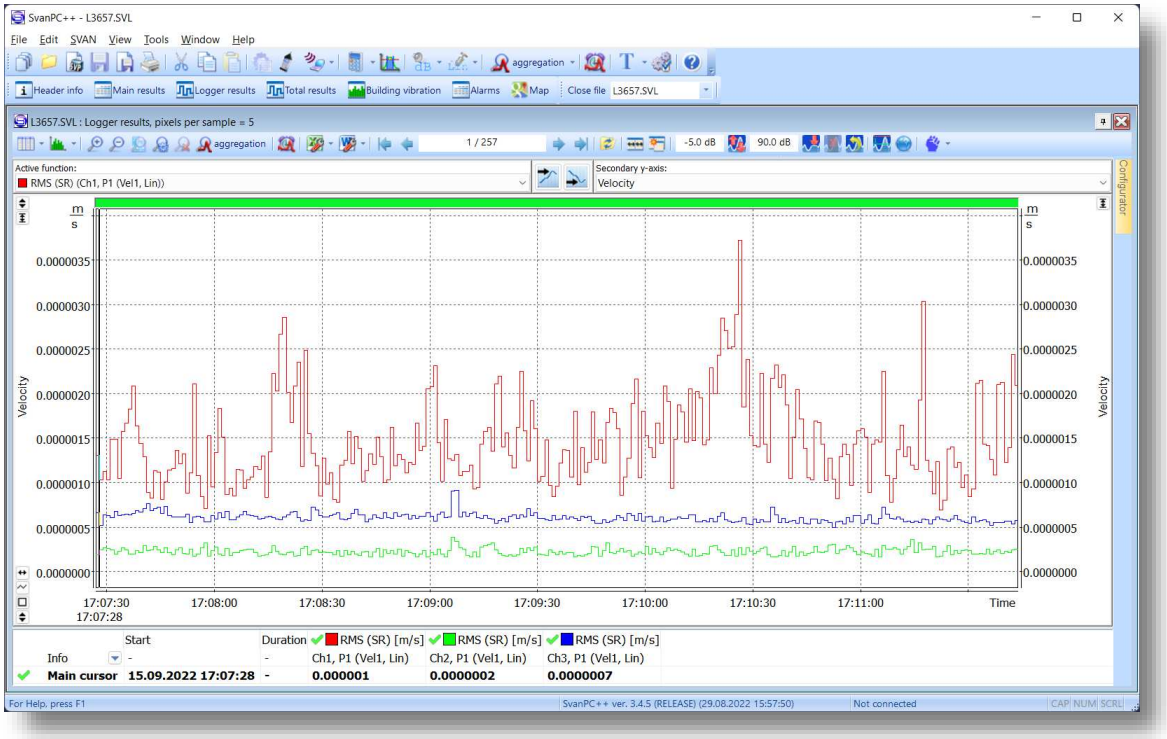
6.3.1 Downloading/uploading files

Arrows in between are used to download files from the instrument to the PC and upload files from the PC to the instrument.



6.3.2 Opening files

Double click the file name to open the **Viewer** module that enables different tools for data viewing. This module is described in detail in the SvanPC++ User Manual.



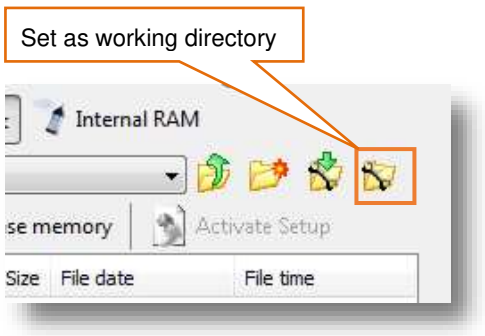
6.3.3 Changing working directory

Working directory is a folder on the SD disc in which all the measurement files are stored. Changing the working directory can be done in the **SVAN Files** dialog box.

For this:

1. Select the desired working directory in the left panel of the **SVAN Files** dialog box.
2. Click the **Set as working directory** button.

From this moment all result files will be stored in the selected directory.

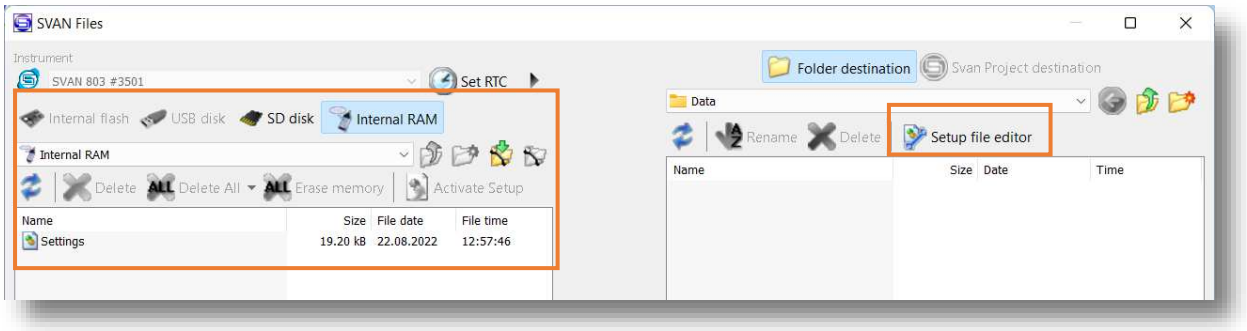


6.3.4 Configuring instrument settings

The instrument settings can be configured with the use of *Setup file editor* opened from the **SVAN Files** dialog box.

In order to edit a setup file (*.svt*), you should either:

- press the **Internal RAM** button, select the *Settings* file and double click it or
- press the **Setup file editor** button, located in the top right corner of the window.



The *Setup file editor* is available in two modes: *Standard* and *Extended*. The settings available in the *Setup file editor* correspond to those available via the SV 803 instrument's interface.

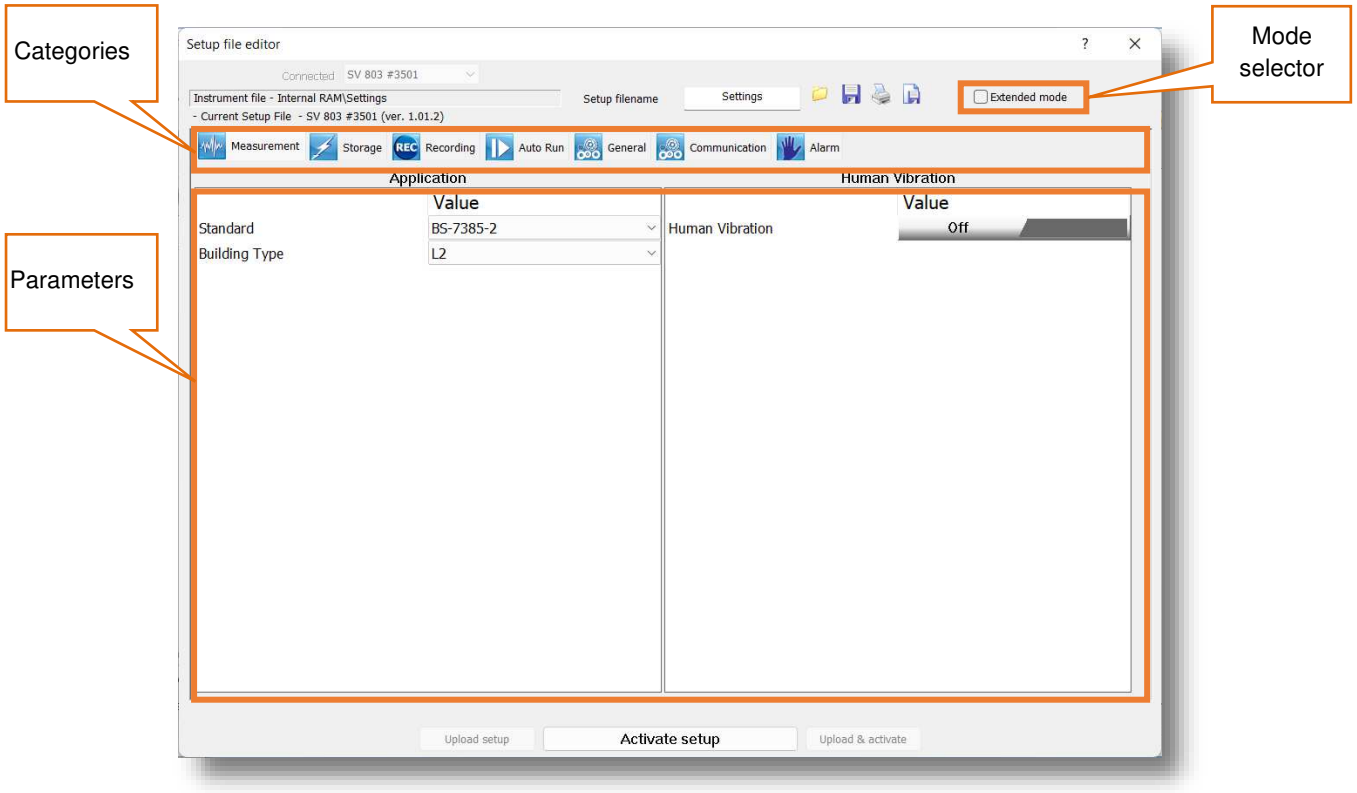
Setup file editor in the *Standard* mode allows for viewing the settings that are most likely to be modified, presented in a simple and intuitive way. Note that not all of the settings available in the connected instrument may be available in the *Standard* mode.

The settings are divided into several categories. You can select a category using the tabs located in the upper part of the *Setup file editor* window.

Settings can be easily edited using the following elements:

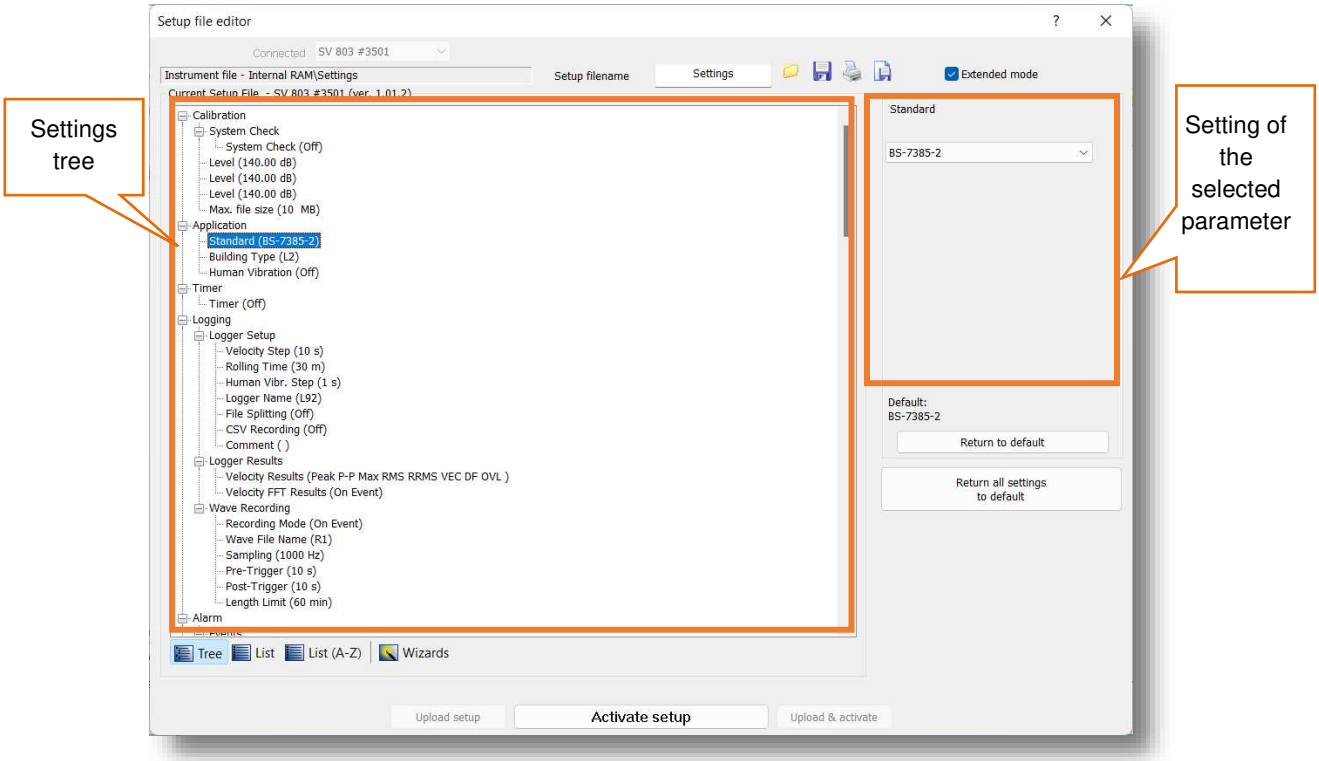
- check boxes – allowing to select some out of several possibilities,
- list boxes – allowing to select one out of several possibilities,
- text fields – allowing to type in a value using keyboard,
- binary buttons – allowing to enable or disable an option.

Standard mode:



In the *Extended* mode, all the settings of SV 803 are visible and available for editing. The list of settings, located at the left-hand side of the window, can be displayed in a tree view or a list view. You can switch the view using the buttons located in the lower part of the window.

Extended mode:



In order to change some particular settings in the *Extended* mode, use the controls that appear in the panel at the top-right corner of the window after selecting parameter from the list.

The default, *Tree View*, offers the settings arranged in a form of a tree, resembling structure of settings in SV 803. The nodes denote menu sections, while the leafs – parameter's settings which can be edited at the top-right corner of the window. The settings are sorted in accordance with menu structure accessible through display panels of the instrument.

Some settings are related to each other. It means that one of them is available for editing only when the other is set to a certain value.

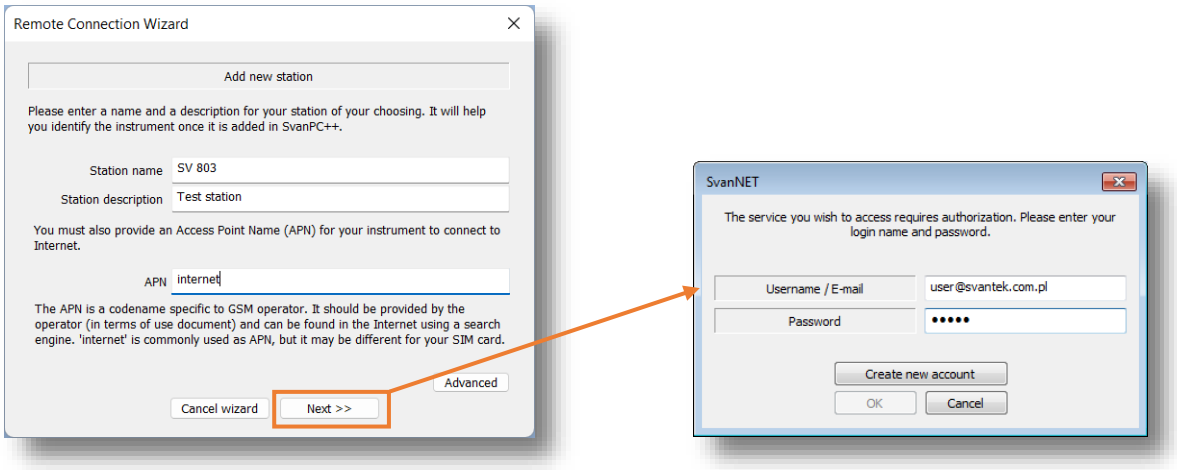
After finishing configuration of settings, press the **Activate setup** button.

At the top of the *Setup file editor* window, next to the Setup filename field, there are several buttons responsible for the file management: opening a setup file stored on the PC, saving the currently edited setup file on the PC, printing currently edited setup file or saving the contents of the currently edited setup file in a simple text format.

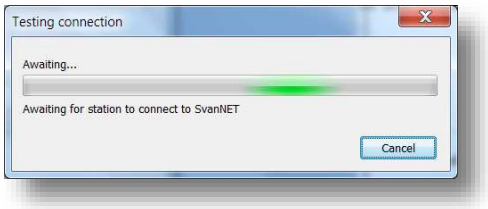
6.4 CONFIGURING WIRELESS CONNECTION

The internet connection can be configured via **SV 803 instrument wizard**. For this:

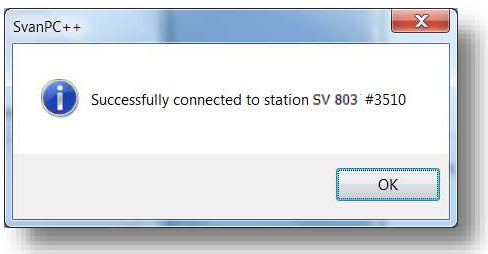
1. In the **SV 803 instrument wizard** dialog box, click the **Remote Connection using SvanNET** button.
2. In the **Remote Connection Wizard** dialog box, type the **Station name**, **Station description** and **APN** of the mobile operator. If necessary, use the **Advanced** button to provide additional parameters required by the mobile operator.
3. After filling in the required fields in the **Remote Connection Wizard**, press the **Next>>** button and enter the login and the password of your registered account.



4. Press **OK** button and SvanPC++ will run connection settings.
5. After entering all the required information SvanPC++ will check connection settings. Wait until process is finished. It may take a few minutes.



6. After successful connection the **Remote Connection using SvanNET** button will change its name to **Remote Communication Center**.



6.5 BUILDING VIBRATION VIEW

SV 803 uses special methods based on Peak Particle Velocity and Dominant Frequency conforming many local standards and also allows measurements of human vibration in buildings. SV 803 generates alarms based on special events which are registered in the data files.

SV 803 uses two approaches for assessment of dominant frequency based on 1/3 octaves or FFT and vibration results associated with that frequency. Different local standards use one or another approach.

SV 803 generates files (group of files) which *SvanPC++* recognizes and presents data in the special *Building vibration* view.

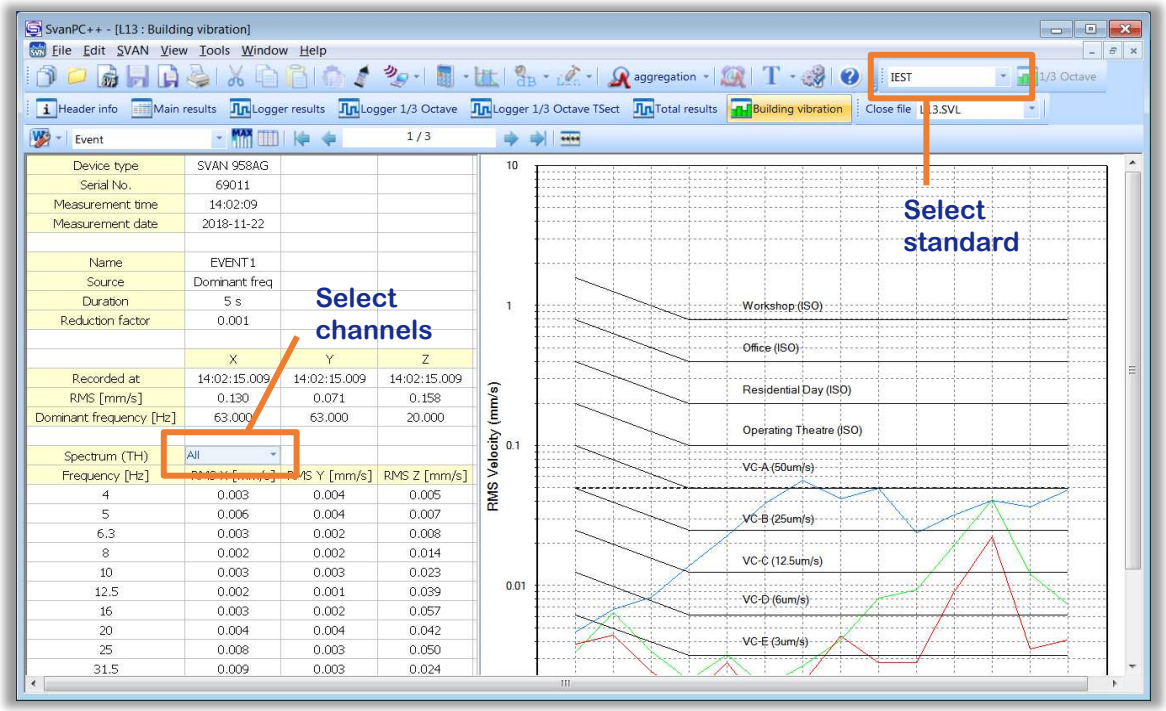
In case of the 1/3-octave approach, the instrument creates the series of logger files with the name **Lxx**, where **xx** is a number, and extension **SVL**.

In case of the FFT approach, the instrument creates **Lxx** files and also wave files that are associated with the logger files with names **Rxx**, where **xx** is a number, and extension **WAV**. One **Rxx** file includes waveform signal recorded for one detected event during the period set in SV 803 as a *PreTrigger + Duration + Post Trigger*.

Note: *While retrieving data from SV 803 remember to retrieve all files created during a measurement.*

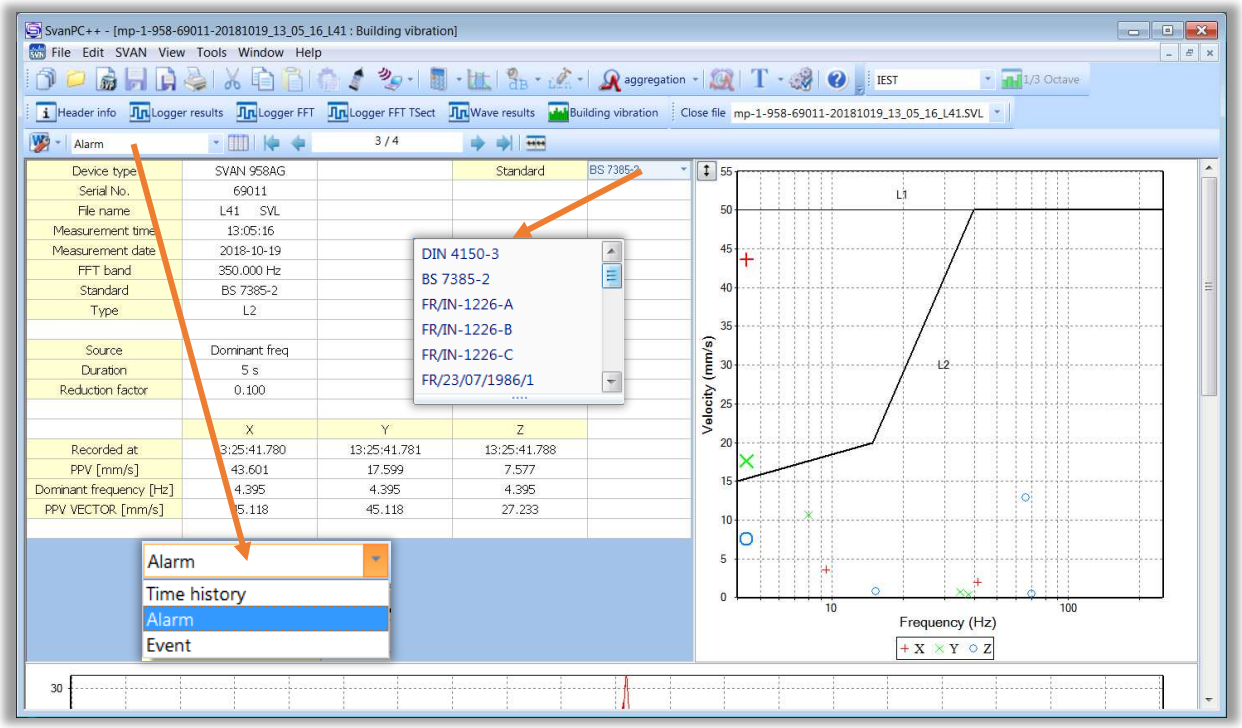
6.5.1 1/3 octave approach

In case of the 1/3 octave approach, the *Building vibration* view presents a table with SV 803 settings and data for the time history, events or alarms and Criterion curves with measurement results for three axes (X, Y, Z) in the way of 1/3-octave spectra.



6.5.2 FFT approach

In case of the FFT approach, the *Building vibration* view presents a table with SV 803 settings and data for the time history, events or alarms and Criterion curves with measurement results for three axes (X, Y, Z) as a points.

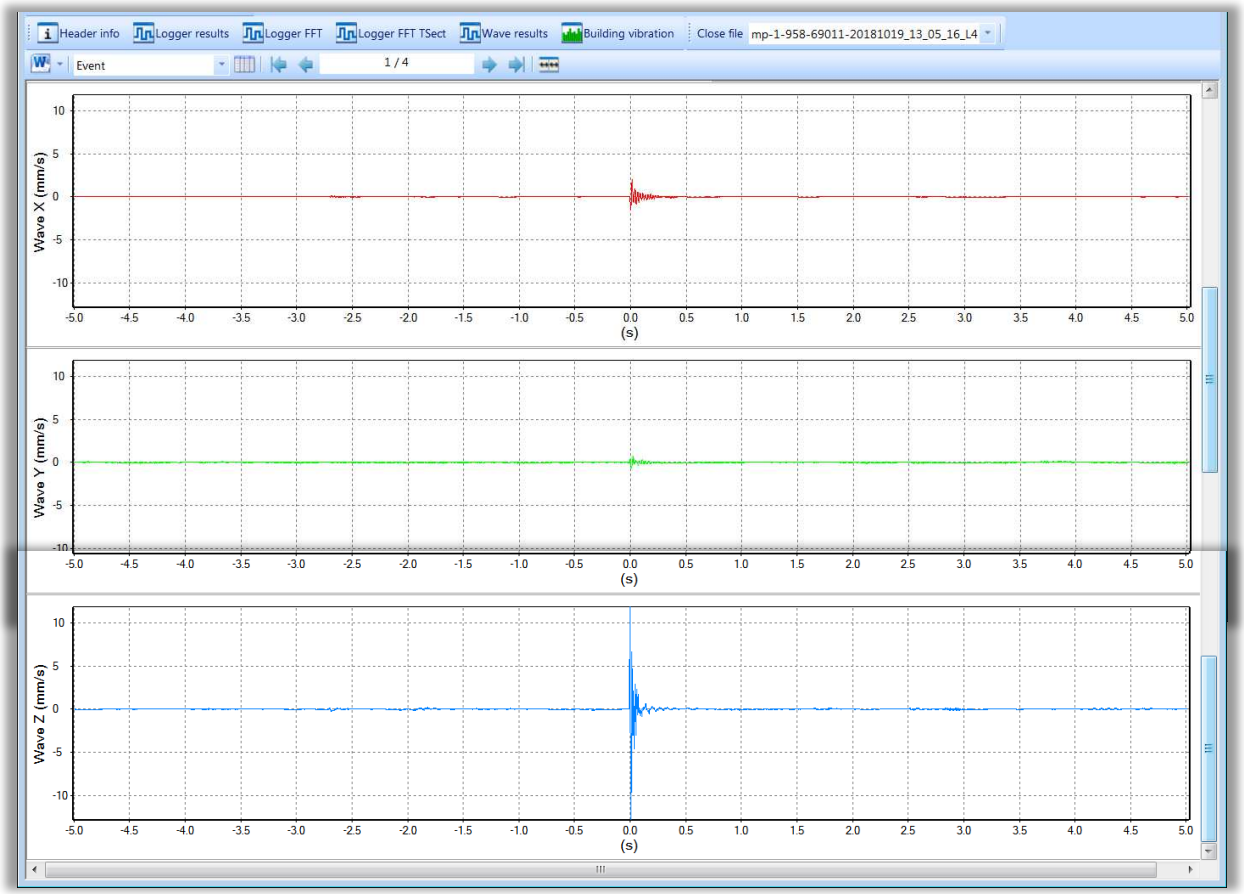


The table content and data presented on the right plot depend on the selections made in the second position of the View toolbar (*Time history*, *Alarm* or *Event*). When you select *Time history*, you can view PPV and Dominant frequency for all measurements performed with the Logger step. When you select *Event* or *Alarm*, you can view PPV and Dominant frequency for events or alarms only. You can scroll through the records with the arrows located on the View toolbar.

Criterion curves depend on the standard selected in the upper right cell of the table (DIN 4150-3, BS 7385-2, FR/IN-1226-A, FR/IN-1226-B, FR/IN-1226-C, FR/23/07/1986/1, FR/23/07/1986/2, FR/22/09/1994, SBR-A).

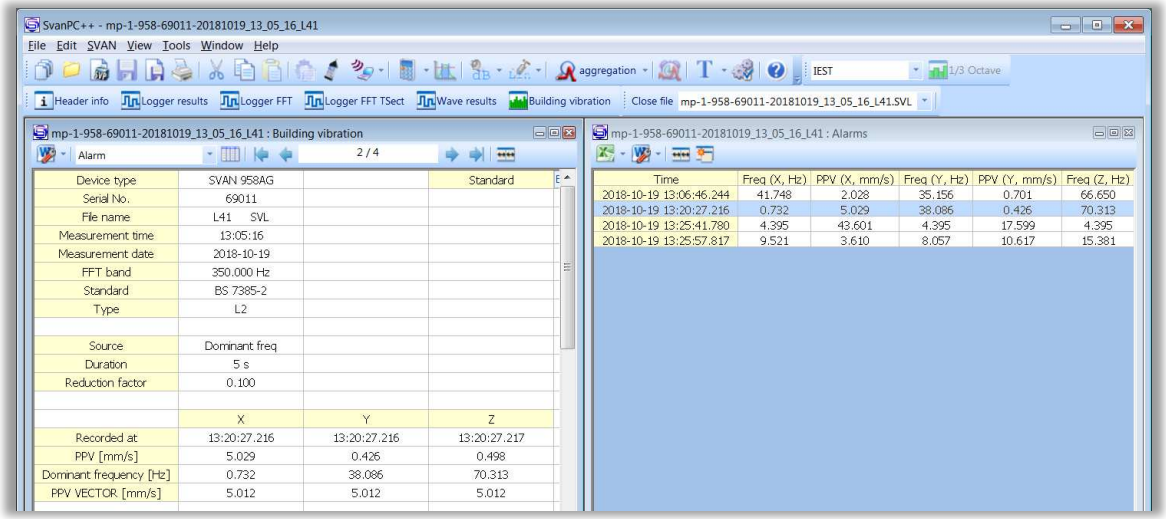
Note: SV 803 calculates PPVs, dominant frequencies, events and alarms based on the selected standard, which is displayed together with other settings in the second column of the table. Selection of the standard in the upper right cell only places another criterion curves, but all measurement results will not be changed.

Scrolling the view down you can examine waveform signals associated with the selected event or alarm registered for three axes.

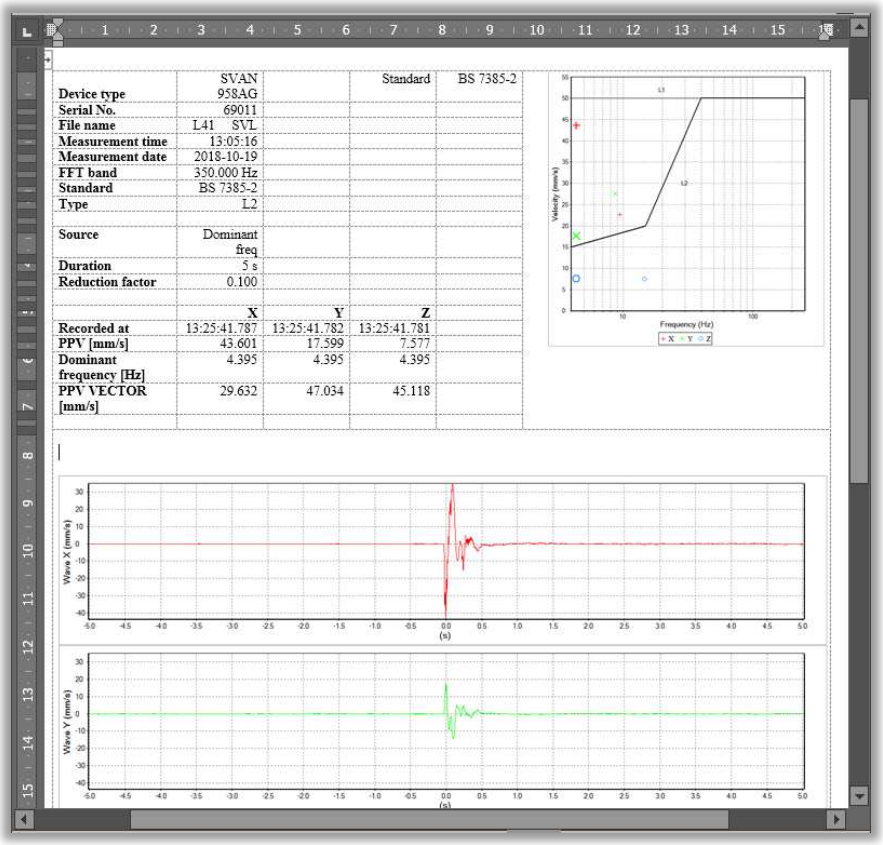


If you press the *Events list* button located next to the Alarm/Event/Time history selector, the new *Alarms* view will appear. This view presents the table with all events detected.

You can display two tables, *Building vibration* and *Alarms* side by side. If you change the row in the *Alarms* table in the right panel, the alarm record will be changed automatically in the left panel and vice versa.



To create a report, press the *Send to MS Word* button at the left side of the view Toolbar .



			Standard	BS 7385-2
Device type	SVAN 958AG			
Serial No.	69011			
File name	L41 SVL			
Measurement time	13:05:16			
Measurement date	2018-10-19			
FFT band	350.000 Hz			
Standard	BS 7385-2			
Type	L2			
Source	Dominant freq			
Duration	5 s			
Reduction factor	0.100			
	X	**Y**	**Z**	
Recorded at	13:25:41.787	13:25:41.782	13:25:41.781	
PPV [mm/s]	43.601	17.599	7.577	
Dominant frequency [Hz]	4.395	4.395	4.395	
PPV VECTOR [mm/s]	29.632	47.034	45.118	

7 MAINTENANCE

7.1 KEEPING DRY INSIDE

Keep SV 803 dry inside If suspicion of any moisture inside the housing, find the cause, dry it out. If sent to repair after damage from moisture, please remove the battery to minimize damage.

7.2 EXCHANGING MEMORY AND SIM CARDS

SV 803 is delivered with 32 GB micro-SD card - Kingston MicroSD HC Class 4 or equivalent.

Note: *The originally supplied Kingston MicroSD HC Class 4 memory card has been tested by SVANTEK and is strongly recommended for use when it is replaced.*

You may exchange it with the higher capacity card (up to 128 GB), but before insertion the card must be formatted as FAT32.

Note: *If you would like to use the card with higher capacity, consult this with the local distributer.*

To exchange the memory or SIM card, follow next steps:

1. Open the lid.
2. Turn off the instrument by long press the button on the inner side of the lid.
3. Extract the memory or SIM card by slidin it from the slot.
4. Insert the new card.
5. Turn on the instrument by long press the button on the inner side of the lid.
6. Close the lid.

7.3 RESETTING THE INSTRUMENT

- **HARDWARE RESET:** internal hardware reset; no user data is changed. Hold down the button on the inside panel of the housing lid (BATTERY EXCHANGE) for 20 seconds, and then release it.

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.*

7.4 FIRMWARE UPGRADE

You can upgrade the firmware either via *SvanNET* (see Chapter 5.2.5.1) or via the USB connection to the PC.

To upgrade the firmware via the USB connection, follow next steps.

1. Turn off the instrument if it is on.
2. Enter the bootstrap mode by pressing any external and then internal key. Keep both keys pressed until the LED inside lights up orange. In the bootstrap mode all LEDs are orange.
3. Connect SV 803 to the PC using SC 816 USB cable.
4. Run the **start.bat** file from the upgrade package on your PC. During loading the new firmware, the internal LED will flash red. A
5. After loading the program, the instrument will start automatically.

7.5 PRESERVATION OF THE INTERNAL BATTERY

- To preserve the life of the internal battery, it is recommended that the instrument is turned off when it is stored.
- When the instrument 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.

***Note**: SV 803 should not be stored for a long time with discharged battery. Storing with the battery in discharged condition may damage it.*

***Note**: If SV 803 is planned to be stored for a long period of time, it is recommended to charge its battery to 60% capacity. The battery should be charged at least once per 6 months.*

7.6 TRANSPORTATION AND STORAGE

For transportation or storage purpose, we recommend using the packaging provided by the manufacturer.

***Note:** For air-transport turn off the instrument.*

7.7 CLEANING

Clean the surface of the instrument with damp soft cloth.

The instrument sockets should be cleaned with the use of compressed air.

***Note:** In cases of larger dirt, such as oil or grease, contact your Local Authorized Distributor or Svantek Service Office.*

7.8 TROUBLESHOOTING

- In the case your instrument does not respond, proceed with hardware reset of the instrument (see Chapter 7.3).
- In the case the reset does not help, call your Local Authorized Distributor or Svantek Service Office.

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

E-mail: support@svantek.com.pl
office@svantek.com.pl

Internet: www.svantek.com

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

8 SV 803 TECHNICAL DATA[1]

Nr	*Parameter*	*Value/ Description*
		Physical data
1	Dimensions	163 x 128 x 115 mm (without accessories)
2	Weight	Approx. 3 kg including battery Approx. 3 kg including battery and mounting plate
4	Leakproof classification	IP 67 according to EN 60529 (1997) + A1 (2000)
5	Working ambient temperature range	-20°C do +50°C (Ambient air temperature, without direct sunlight). *Note: Outside this range the station will automatically switch itself off.* *Note: In charging mode the range of working temperature is from 0°C to +45°C*
6	Storage ambient temperature range	-20°C to +60°C
7	Working relative humidity range	0 – 100 %RH
		Power Supply
1	SB 803 internal battery pack	Li-Ion, 7.2 V, 30.15 Ah, 217 Wh (removable)
2	SV 803 power consumption without charging	Modem and GPS is switched off: ca. 40 mW Mean infrequent short transmissions: ca. 50 mW Continuous transmission: ca. 1.0 W
3	Operating time when powered from the internal battery pack, (20°C, fully charged)	Up to 30 days with continuous modem transmission Up to 180 days in power saving mode *UNLIMITED with SB 803 and solar panel in power saving mode
4	SV 803 power consumption including charging	up to 20 W

[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

5	External DC input	voltage: 5 V to 28 V
6	External DC power supply SB 274	15 V (waterproof)
7	Solar panel (option)	OCV voltage up to 28 V ***Note:*** *Size and power of the panel depend on the climate of the area where the station operates.*
4G modem		
1	modem type and features	The LE910C1-EU is a 4G European module that features Long-Term Evolution LTE connectivity, high-speed HSUPA/HSDPA connectivity while still leveraging backwards compatibility with GSM/GPRS and EDGE networks. Some of the module features are: • GSM bands: B3, B8 (1800/900 MHz) • UMTS/HSPA bands: B1, B3, B8 (2100/1800/900 MHz) • LTE FDD bands: B1, B3, B7, B8, B20, B28A (2100/1800/2600/900/800/700 MHz) • Output power: Class 3 (0.2W, 23dBm), LTE-FDD
2	modem approvals	Approvals of the module: • RED (CE) • RoHS
Bluetooth modem		
1	modem type and features	The instrument contains a wireless transmission module, BGM121 from Silicon Laboratories and supports wireless connection via Bluetooth® 5.2 (Low energy). This connectivity is compatible with mobile and PC devices that support Bluetooth® 5.2. • TX power: up to 8 dBm • Receiver sensitivity: -90 dBm • Range: typically, ≤50m line-of-sight and depending on local RF conditions.
2	modem approvals	Copies of the modules regional approvals certificates may be obtained from Svantek or Silicon Laboratories. • Declaration ID: D033250, Controller Subsystem Qualified Design ID: 88831
GPS module		
1	type and features	The instrument has a built-in GPS module A2235-H produced by Maestro Wireless Solutions Ltd. intended for logging position and time definition. GPS is an antenna module with SiRF Star IV ROM based chip and an on-board integrated antenna.

		• Position Accuracy (horizontal): < 2.5 m CEP (autonomous), • Tracking Sensitivity: -163dBm • Time accuracy: <1µs (directly depends on position deviation)
Measurement characteristics		
1	Standards	DIN 45699-1:2020-06; ISO 4866:2010, Class 1; IEC 61260:2014, Class 1
2	Meter Mode	PPV, DF, RMS, RRMS, VDV, MAX, Peak, Peak-Peak, PPV Vector, aw, OVL
3	Analyser	1/3 octave real-time analysis or FFT analysis, Time domain signal recording to WAV format
4	Filters	DIN 80, DIN 315, VEL 1, KB
5	RMS Detector	Digital true RMS with Peak detection, resolution 0.1 dB
6	Detector Time Constants	Fast 125 ms in accordance with DIN 4150-2
7	Vibration Sensor	Triaxial geophone pack
8	Dynamic Range	1 µm/s RMS ÷ 141 mm/s PEAK
9	Measurement Range	3 µm/s ÷ 100 mm/s RMS (141 mm/s PEAK)
10	Frequency Range	0.8 Hz ÷ 400 Hz (-3 dB)
11	Number of Channels	3
12	Directions of measurement	3 - vertical (Z) and horizontal (X, Y)

APPENDIX D. DEFINITIONS AND FORMULAE OF MEASURED VALUES

D.1 Basic terms and definitions

T current time period of the measurement in seconds.

T_0 reference duration of 28 800 seconds (8 hours)

τ exponential time constant in seconds with the time-weighting **125 ms**.

$v(t)$ instantaneous unweighted velocity signal.

$v_W(t)$ instantaneous frequency-weighted velocity signal with the weighting filter **W**: **Vel1**, **Din80**, **Din315**.

$v_{W\tau}(t)$ instantaneous frequency and time-weighted velocity signal with the weighting filter **W** and time constant τ calculated from the equation:

$$v_{W\tau}(t) = \sqrt{\frac{1}{\tau}\int_{-\infty}^{t} v_W^2(\xi)\; e^{-(t-\xi)\frac{}{\tau}}\, d\xi}\,,$$

where: ξ– integration variable.

$KB(t)$ instantaneous frequency-weighted velocity signal normalized to 1 mm/s

$a(t)$ instantaneous unweighted acceleration signal

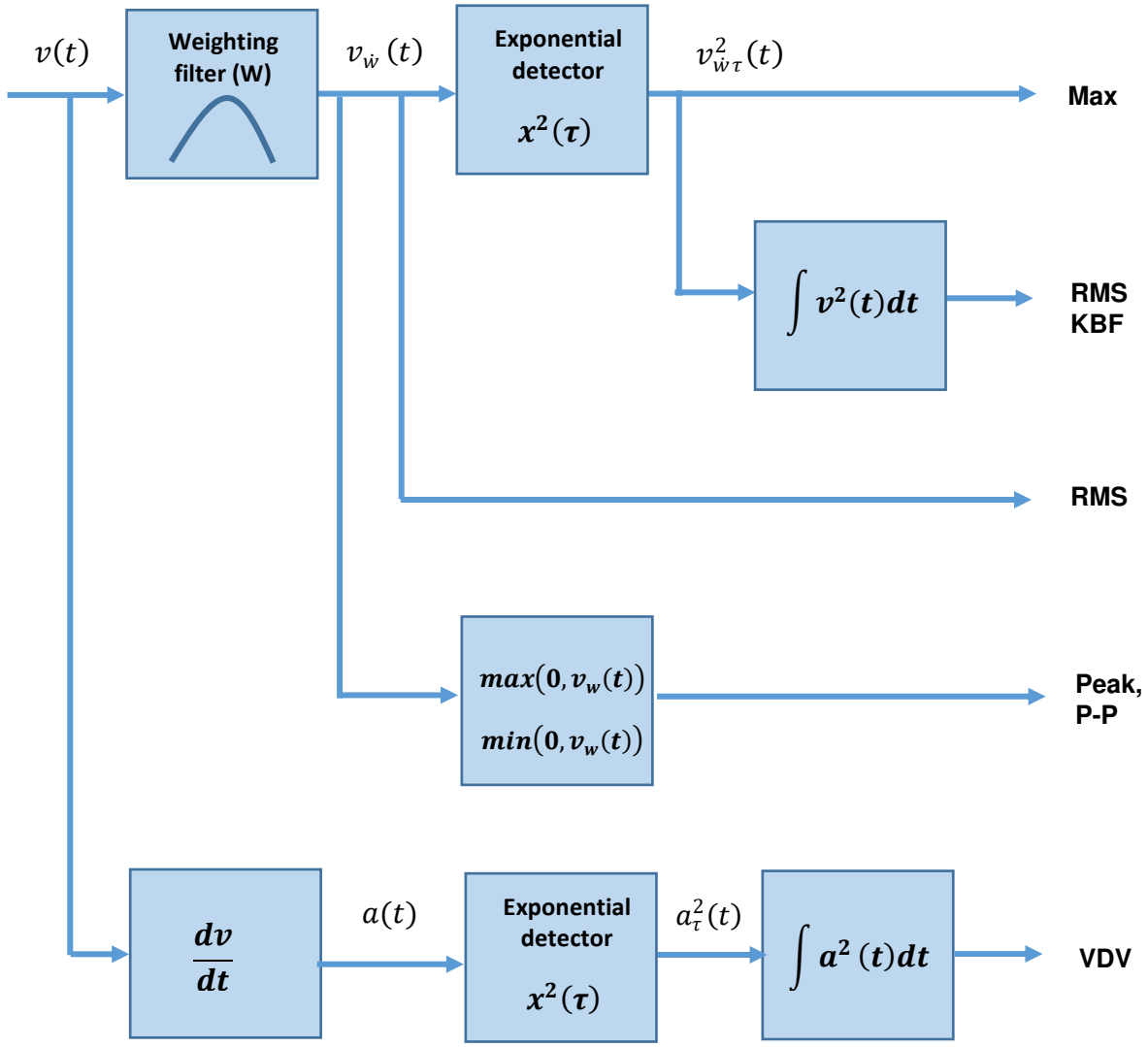
$a_{W\tau}(t)$ instantaneous frequency and time-weighted acceleration signal with the weighting filter **W** and time constant τ calculated from the equation:

$$a_{W\tau}(t) = \sqrt{\frac{1}{\tau}\int_{-\infty}^{t} a_W^2(\xi)\; e^{-(t-\xi)\frac{}{\tau}}\, d\xi}\,,$$

where: ξ– integration variable.

D.2 Definitions and formulas of measuring results

The instrument calculates the vibration measurement results for two profiles, one for the velocity vibration and another for the acceleration vibration. The calculation flow diagram for one profile is presented below:



Peak — Maximum absolute value of the acceleration signal for the axis: X, Y or Z that is frequency-weighted within a stated time interval **T**.

$$Peak = max_T(0, v_W(t))$$

P–P — Peak-to-peak (**P-P**) result is the difference between highest and lowest value of the acceleration signal for the axis X, Y or Z within a stated time interval **T**.

$$P - P = max_T(0, v_W(t)) - min_T(0, v_W(t))$$

Max — Maximal value of the acceleration signal for the axis: X, Y or Z that is frequency- and time-weighted within a stated time interval **T**.

$$Max = max_T(v_{W\tau}(t))$$

RMS — Root mean square result of the acceleration signal for the axis X, Y or Z that is frequency- and time-weighted and averaged for a stated time interval **T**.

$$RMS = \left(\frac{1}{T}\int_0^T v_{W\tau}^2(t)\ dt\right)^{1/2}$$

Roll. RMS — Rolling RMS measured for the axis X, Y or Z in the time window for the last $\mathbf{T_R}$ seconds of the measurement time **T**.

$$Roll.RMS = \sqrt{\frac{1}{T_R}\int_{T-T_R}^{T} v_{W\tau}^2(t)\ dt}$$

PPV — Peak Particle Velocity - maximum absolute value of the unweighted velocity signal for the axis X, Y or Z within a stated time interval **T**.

$$PPV = max_T\left(0, v_W(t)\right)$$

Vector — Vector of the PPV values taken from three axis.

$$PPV_V = max_T\sqrt{v_{Wx}(t)^2 + v_{Wy}(t)^2 + v_{Wz}(t)}$$

KBF — Weighted vibration severity **-** running RMS time average of the KB(t) signal obtained by averaging the time-weighted values of KB(t) for the time $\tau = 0.125$ s.

$$KBF = \sqrt{\frac{1}{\tau}\int_0^{\tau} KB^2(\xi)\ e^{-(\tau-\xi)/\tau}\ d\xi}\ ,$$

where: ξ– integration variable.

KBFTi — Energy-averaged KBf during the time averaging period **Ti**.

$$KBFTi = \sqrt{\frac{1}{Ti}\int_0^{Ti} KBf^2(t)\ dt}\ ,$$

KBFTm — Root-mean-square value of the KB_{FTi} values recorded during the time averaging period $T_m = N \cdot Ti$ where N is the number of cycles each of duration Ti, calculated using the following equation, in which KB_{FTi} values less than or equal to 0,1 ($KB_{FTi} \leq 0{,}1$) are taken to be zero though these cycles contribute to the total number of cycles N

$$KBFTm = \sqrt{\frac{1}{N}\sum_{i=1}^{N} KBFT_i^2}\ ,$$

VDV — Vibration Dose Value – result of the acceleration signal for the axis X, Y or Z that is frequency- and time-weighted averaged for the time **T**.

$$VDV = \left(\int_0^T a_{W\tau}^4(t)\ dt\right)^{1/4}$$