SVANTEK

USER MANUAL

SV 803

VIBRATION MONITORING TERMINAL

Warsaw, 2024-09-24

Rev. 1.06

Note: *Because of continuous product improvement SVANTEK reserves the right to make changes to product specifications without notice. To download the most up to date User Manual please visit Svantek website at www.svantek.com.*

*This user manual presents the SV 803 firmware revision **1.07**. and the Assistant Pro software revision **1.2.1**.*

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Technical Support Contact Information:

web: www.svantek.com/contact

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

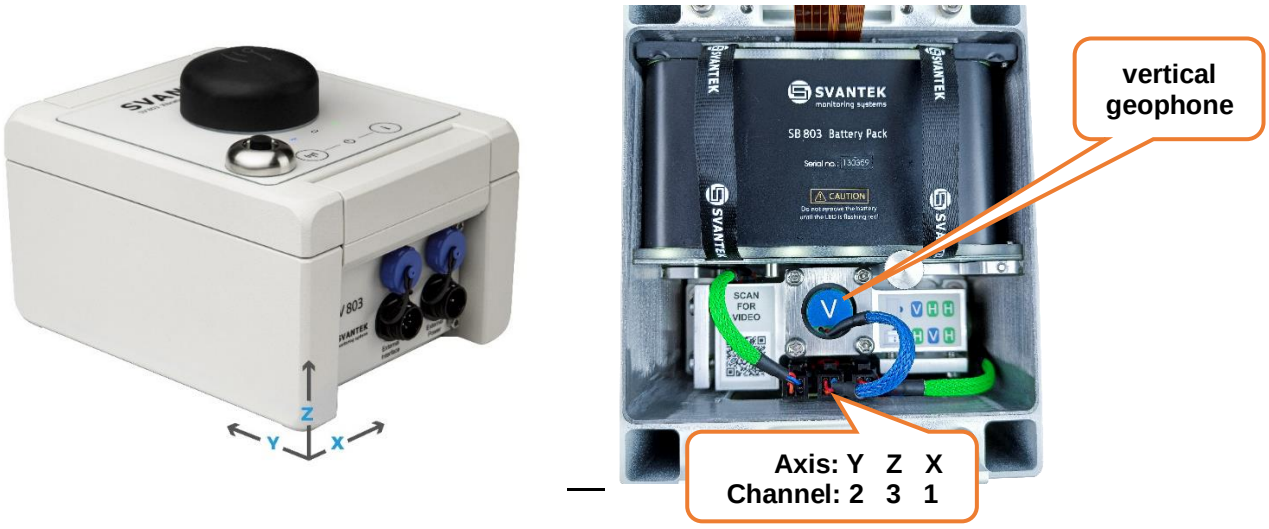
Marking on the Unit	Explanation
UK CA	This product meets UK consumer safety, health or environmental requirements
CE	This product meets EU consumer safety, health or environmental requirements
	Do not throw into standard municipal waste containers. The user is obliged to deliver used equipment to the 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.

Table of Contents:

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 using the 4G modem, via the *Assistant Pro* mobile application using Bluetooth® or via the *SvanPC++* PC software using the USB connection. 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 (20 mm). Other types of spikes are also available (contact your Svantek representative).
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
SB 803	Exchangeable battery pack
SC 270	Mains power supply 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)
SC 816C	Cable USB-C
SC 834	Cable for power SV 803 from external battery
SA 801/C	Very sharp spike
SA 804	External 4G antenna with cable (xx m)
SA 805	Carrying case for SV 803 with accessories
SA 805/3	Carrying case for 3 x SV 803 without accessories
SP 272/803	Alarm lamp and buzzer with cable (5 m)

1.4 OPTIONAL FUNCTIONS

SF 803_FTP	FTP/FTPS push/pull option (SFTP is not supported)

The FTP (File Transfer Protocol) option (**SF 803_FTP**) allows data to be transferred via an FTP server, enabling communication when both SV 803 and a PC have private IP addresses.

Note: *The software optional functions listed above can be purchased at any time as they only require the entry of a special unlock code to activate using Assistant Pro (see Chapter 4.4.4) or SvanPC++ (see Chapter 6.2).*

1.5 COMING OPTIONS

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

1.6 SYSTEM EXTENSIONS

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

SP 876	Weather Station
SP 280	Dust Monitoring

2 SV 803 DESCRIPTION

2.1 KEYPAD AND LEDS

SV 803 has two buttons 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 button will not switch it on. To switch on the modem, use Assistant Pro or SvanNET.*

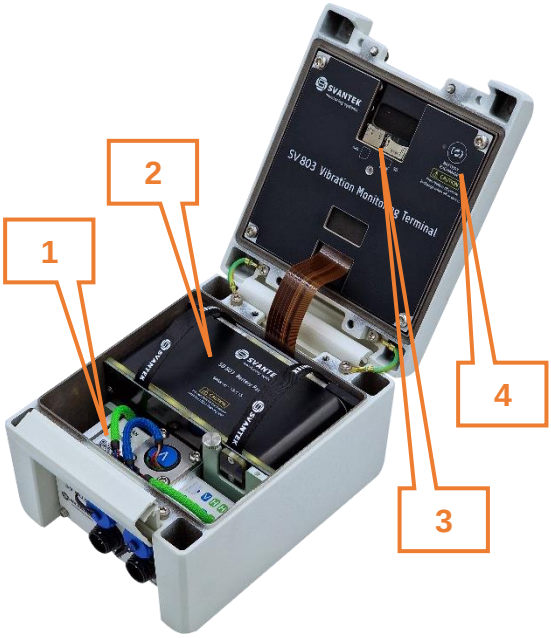
2.2 INSTRUMENT CONTROL

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.



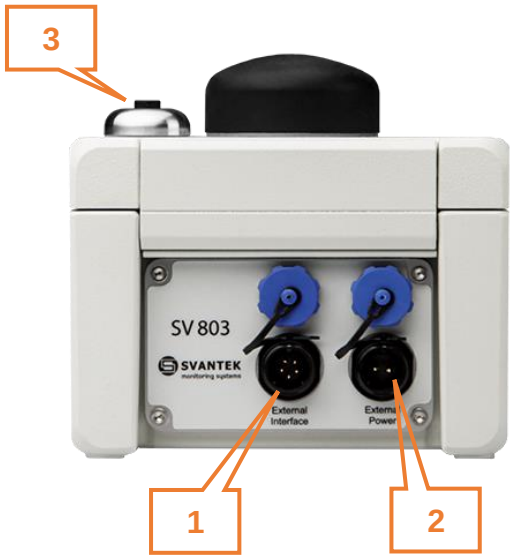
***Note**: SVANTEK does not provide a SIM card for the instrument. It is necessary to purchase the SIM card with the **data plan**. If the instrument is to be used for continuous monitoring, choose a service provider that guarantees good reception at the measurement point.*

***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.*

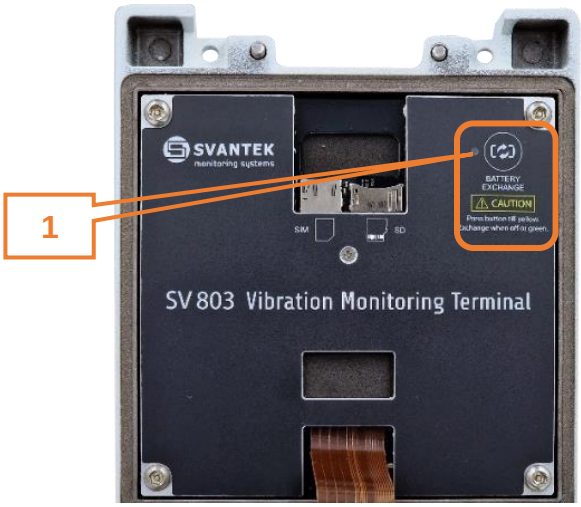
2.4 BATTERY REMOVAL AND CHARGING

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:

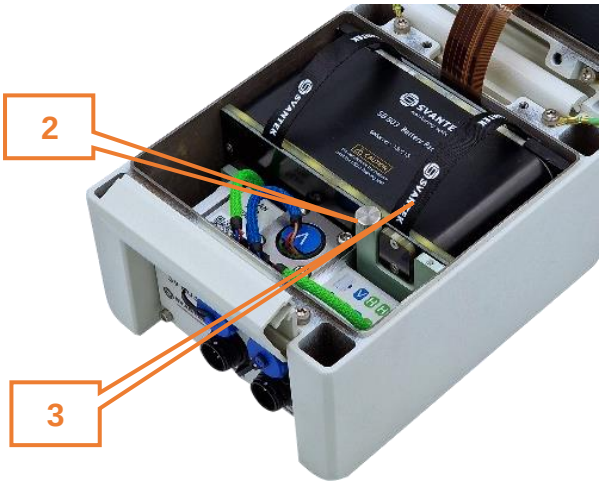
1. Open the lid, press the button on the lid and observe the LED (marked “BATTERY EXCHANGE”); when the LED goes out or turns green (if the WEIPU5 is powered), you can safely remove the battery.



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

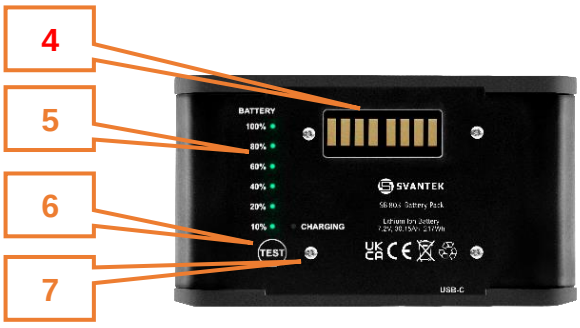
2. Unscrew the screw securing the battery to the housing.
3. Pull out the battery by the straps.

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.

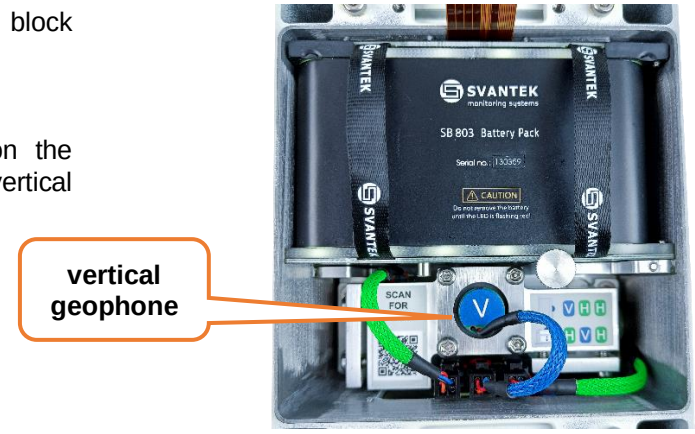
During charging a red LED and a series of green LEDs will light up.

2.5 REPLACING GEOPHONES

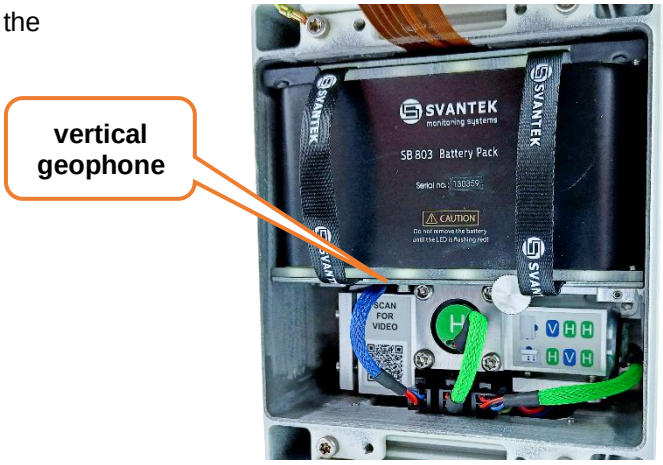
Note: *Before removing the geophones, the SV 803 must be switched off.*

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.

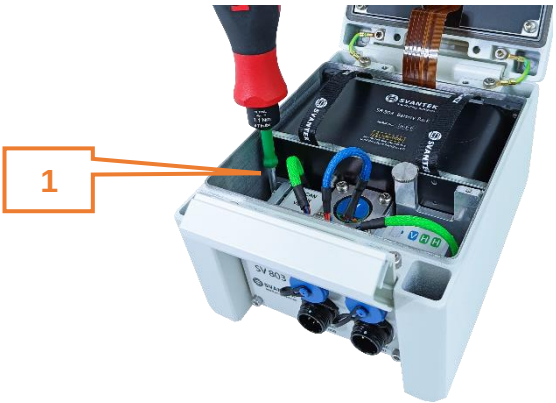
Before removing the geophone block, disconnect all tree cables from the connector panel.

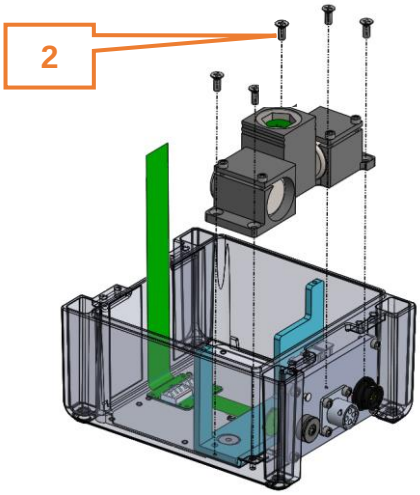
The geophone connectors have special locks that should be pressed when disconnecting. To make this process easier, use the special key (SA 85) to unlock the geophone connectors as shown in the illustration.

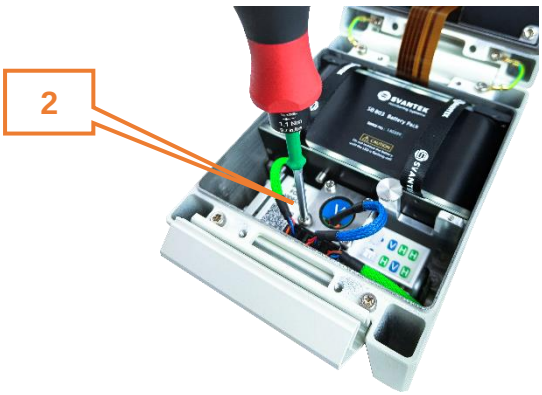
To disconnect the geophone cable, place the key on the connector and lean towards the battery.

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 <u>long screw</u> on the central geophone (2).





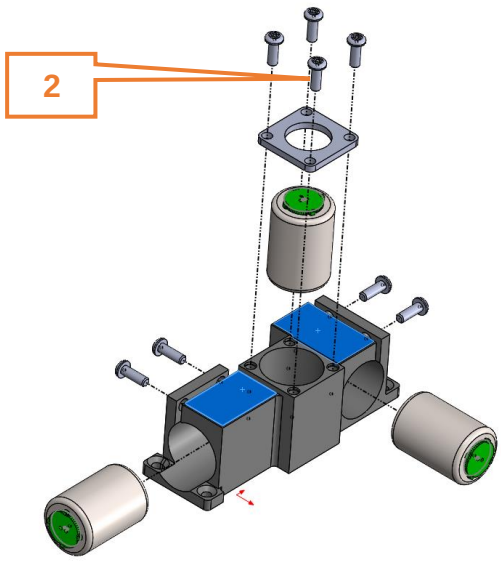


Once the geophone block has been removed, use the torque screwdriver to unscrew the geophone cups and remove the geophone from the box.

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 batteries 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 POWER SAVE MODE

In terms of power consumption, the instrument operates in 2 power consumption modes:

1. Normal power consumption mode, when the **Modem** is set to *Off* or *Continuous* (see Chapter 4.6.6.1). In this mode, each modem (Bluetooth, GPS, 4G) is switched on or off according to the settings.
2. Reduced power consumption mode, when the **Modem** is set to *Periodically active* (see Chapter 4.6.6.1). In this mode, the instrument controls the switching on and off of the modems:
   - the 4G modem is put to sleep and woken up according to the rules described in Chapter 4.6.6.1,
   - the GPS modem is switched on 6 minutes before the 4G modem is to be woken up and is switched off when the 4G modem is in sleep mode,
   - Bluetooth is switched off and does not broadcast any data 10 minutes after switching on the instrument or after the last connection with the *Assistant Pro* application for mobile devices. As long as there is an active connection to the application, Bluetooth is not automatically switched off. Bluetooth turns off 10 minutes after the connection is lost.

When the lid is open, a long press (3 seconds) on any external button wakes up the Bluetooth module. When the lid is closed, pressing the modem button wakes up the LTE modem and Bluetooth for 10 minutes.

Reduced power consumption mode gives a significant increase in operating time. In addition, in this mode, when all the modems are switched off at a given time, the instrument automatically reduces the processor clock, which allows a total of 6 months of operation.

There are several situations where the processor clock cannot be lowered:

- waveform **Recording** enabled with *2000 Hz* or *4000 Hz* **Sampling** (see Chapter 4.6.2.2),
- **Human Vibration** enabled (see Chapter 4.6.1.2),
- less than *10s* **Velocity Step** (see Chapter 4.6.2.1).

3.3 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 button 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.

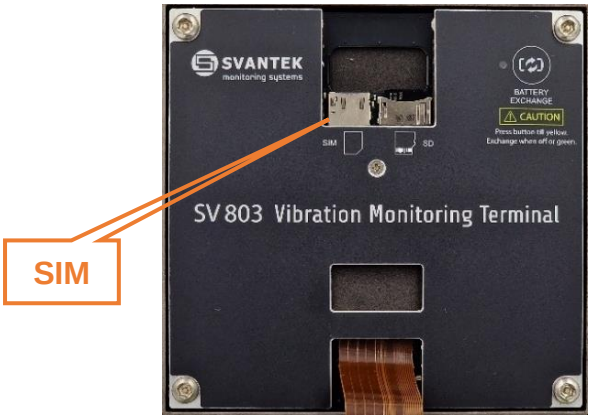
After closing the lid the internal LED switches off automatically.

3.4 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 button 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 6.3.4).

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

3.5 MOUNTING THE INSTRUMENT

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

If measuring on a horizontal surface, attach four spikes to the mounting base and check the level indicator.

The spikes can be sharp or have a round shape.

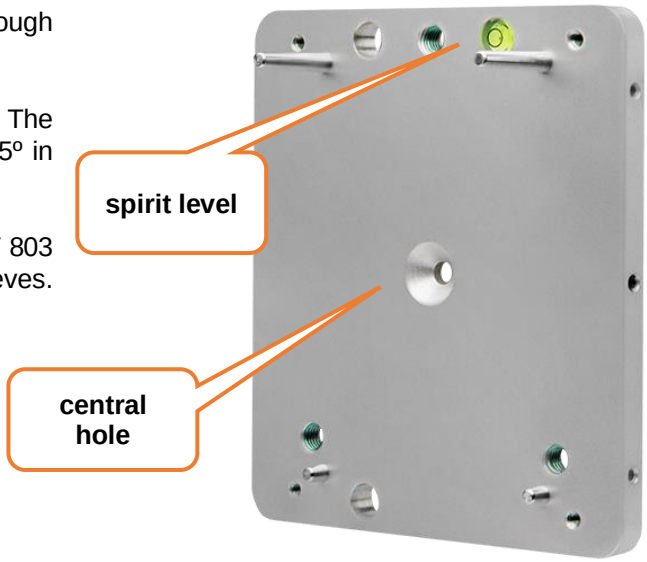
The level indicator is used to check the level when measuring in the horizontal position.

To simplify installation, special bushes and long screws are used to secure the mounting plate to the grooves in the instrument housing.

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.



3.6 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 buttons 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.

3.7 MEASUREMENT RUN AND DATA STORAGE

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

3.7.1 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 4.4.10.

3.7.2 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.

3.7.3 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.

3.7.4 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.

3.8 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.

You can perform the system check manually using the *Assistant Pro* application – see Chapter 4.4.1.

3.9 GEOPHONE IN SITU CHECK

The geophone check can be performed by the user using the SV 110 Handheld Vibration Calibrator and the *Assistant Pro* application, see Chapter 4.4.2.

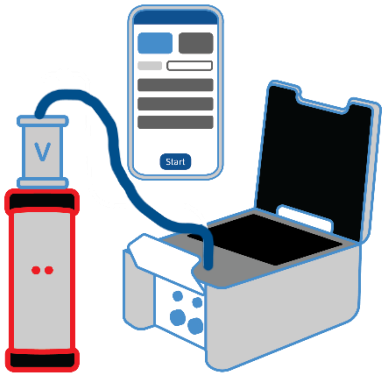
To do this you should:

- extract the tested geophone from the geophone pack, see Chapter 2.5,
- 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, see Chapter 4.4.2.



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

3.10 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.

The *Assistant Pro* application allows you to calibrate the SV 803 or it's geophones after removing them from the SV 803, see Chapter 4.4.2.

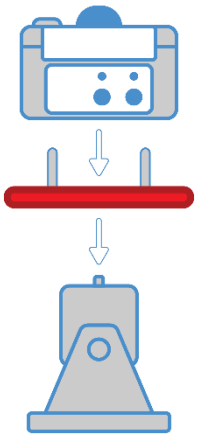
Note: *SV 803 should be calibrated by the authorised laboratory that has the special vibration shaker table.*

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

Note: *The recommended calibration interval is at least once every two years to ensure continued accuracy. Please contact your local Svantek representative for further details.*

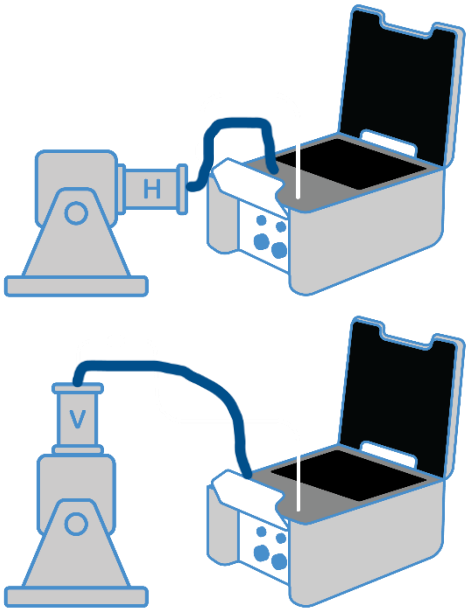
To calibrate the SV 803, proceed as follows:

- mount the SV 803 on the shaker using the mounting plate,
- check the position of the SV 803 with the built-in spirit level,
- set the required amplitude and frequency of the shaker,
- switch on the shaker and the SV 803,
- in the *Assistant Pro* application, select the SV 803 calibration option and press the **Start** button. The SV 803 will automatically detect the geophone that is being calibrated,
- after the calibration measurement apply a new calibration factor if it is within the acceptable range.



To calibrate the geophone, proceed as follows:

- prepare the calibrated geophone using the SA 803 adapter as described in Chapter 3.9,
- mount the adapter with the geophone on the shaker table vertically or horizontally and connect it to the SV 803,
- set the required amplitude and frequency of the shaker,
- switch on the shaker and the SV 803,
- in the *Assistant Pro* application, select the geophone calibration option and press the **Start** button. The SV 803 will automatically detect the geophone that is being calibrated,
- after the calibration measurement, apply a new calibration factor if it is within the acceptable range.



3.11 COMMUNICATION VIA THE 4G MODEM

The 4G modem enables wireless remote control of the instrument, downloading of measurement files, managing the configuration of the instrument, sending alarm emails, etc.

The 4G modem provides the user with a wide range of interface options through the main communication channel, *SvanNET* e-mail functionality and SMS alarm notifications as well as FTP Client service.

You can configure the remote communication via the 4G modem using the *Assistant Pro* mobile application or the *SvanPC++* PC software.

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

***Note**: Make sure that the SIM card has the PIN code deactivated before insertion it into SV 803.*

3.11.1 Main communication channel

The main communication channel is a TCP/IP connection (a lossless data exchange protocol), which can be used to exchange commands according to Appendix A of the SV 803 User Manual. *SvanPC++_RC* ensures this connection and provides data download, configuration, performance validation and measurement start/stop.

The main communication channel of SV 803 can be established by one of two available methods: TCP/IP Client or TCP/IP Server. The SV 803 firmware does not support SSL (Secure Socket Layer) connections.

The **TCP Client** is a mode of the main communication channel in which SV 803 is configured to initiate a connection to a specified address (***remote host***). SV 803 will automatically attempt to establish a TCP/IP connection to a specified address on a specified port (***Data Port***). If the connection is successful, SV 803 can exchange commands with the remote server. If the connection attempt fails or is disconnected by the ***remote host***, SV 803 will attempt to reconnect. In order to prevent the connections from becoming *idle* (a state where the TCP/IP connection appears to be active, but no data can be transferred), the station maintains the connection to the server by sending small packets of data at the keep alive period (which is one minute by default). If the transfer is not properly acknowledged by the other side, the connection is terminated.

***Note:** The **TCP Client** mode is used in the SvanNET web service. SvanPC++_RC supports all of TCP/IP connection modes.*

SV 803 uses the **TCP Client** mode to connect to *SvanNET* (this is the default setting of the station) or another user defined server. The user also connects to *SvanNET* via web browser or *SvanPC++_RC*, and the service creates a "bridge" between the station and the user. In this case there are no restrictions on the SIM card tariff for mobile communication (no public IP address is required) and simple Internet access is sufficient. The essence of *SvanNET* is to simplify the procedures and requirements for connection.

TCP Server is a mode in which SV 803 is configured to act as a server for incoming connections. SV 803 waits for the first connection to be established on a designated port (called *Data Port*; default 8000). Such a connection can come from any application - a TCP/IP connection initiator (e.g., *SvanPC++*) called *remote peer*. For mobile communication, this mode requires a SIM card with a *public address* (called *public IP*).

3.11.1.1 SMS / E-mail alarming

The SMS/E-mail alarm functionality allows SV 803 to inform the user of various events, e.g. exceeded thresholds, low battery, etc., by SMS and/or e-mail notification. SV 803 can send an SMS to a defined number(s) and/or an email to a defined address(es) with the alarm and its details.

SV 803 has an advanced alarm mode. The advanced alarm configuration can be done via *SvanNET*. The e-mail alarm uses the *SvanNET* to send e-mails. The advantages of *SvanNET* e-mails are that the user does not need an e-mail client account on the SMTP server and that the e-mails are SSL encrypted. The content of the message is created automatically.

Note: *SvanNET e-mail service uses SSL connection.*

It should be noted that SMS alarms do not require an Internet connection, and therefore the SIM card does not require a data plan, as the SMS messages are sent entirely over the mobile network. E-mail still requires Internet access.

3.11.2 FTP Client option

The purpose of the FTP (File Transfer Protocol) option is to enable SV 803 to exchange data via an FTP server, allowing communication when both SV 803 and a PC have private IP addresses.

The **FTP Push** feature allows you to download a set of files from the instrument's memory to a user-specified server using FTP. This action is repeated periodically at a set interval so that the new files stored in the instrument’s memory can be uploaded to the FTP server. The FTP Push operation is limited to the working folder and performs the file upload intelligently - it only uploads data that is new compared to the status after the previous FTP Push operation.

The **FTP Pull** feature allows you to upload a setup file from a specified location on an FTP server to the instrument and change the configuration based on the contents of that file. The name of the file is uniquely specified (complete with instrument type and number) and its content is a text string containing configuration parameters.

The FTP server can be accessed from *SvanPC++* using the *Remote Communication Center* (see SvanPC++ User Manual).

Note: *FTP works as stand-alone communication channel or in parallel with TCP communication channel.*

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

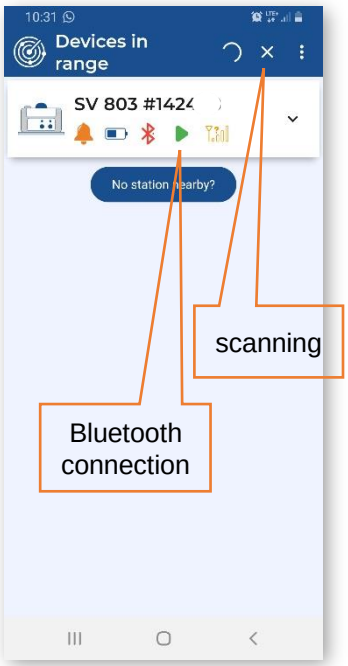
You can also download *Assistant Pro* from the *Play Store*.

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

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

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

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



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.

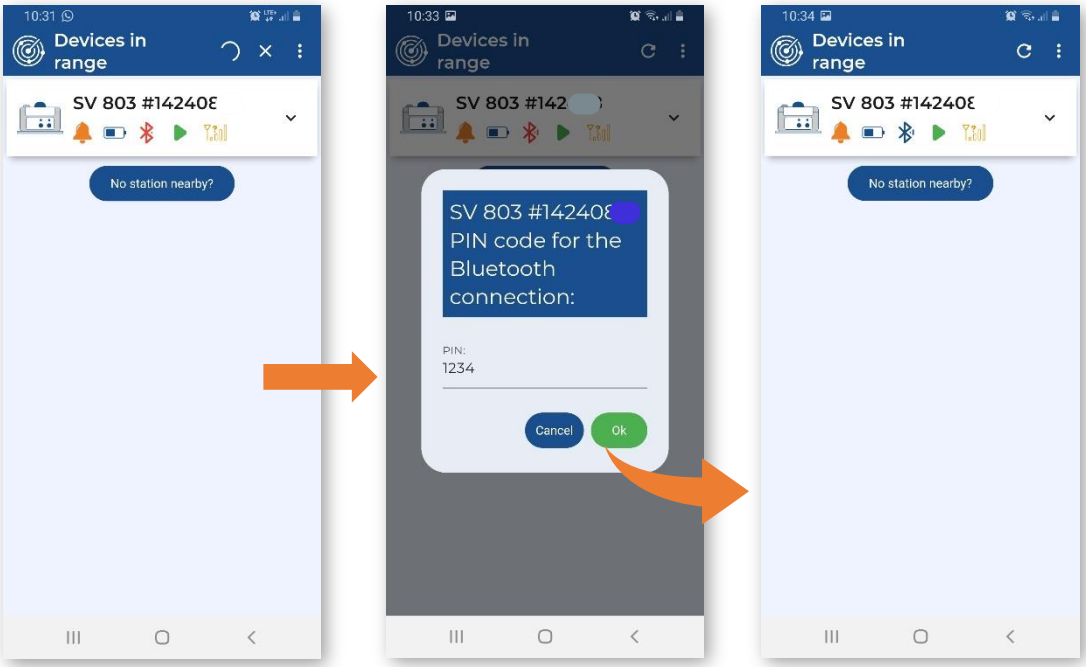
While scanning the instruments, the “scanning” icon is displayed in the upper right corner. You can stop scanning by tapping . When scanning is complete, the “scanning” icon changes to . To start scanning, tap .

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

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:

- Instrument type and position. If the icon flashes, the position of the instrument is incorrect in relation to the geophone axis - see Chapter 2.5.
- Event alarms. If the icon is green there is no current event alarm; if it is orange, there is a current event alarm.
- Battery status. When the battery is low, the icon changes colour to orange.
- Bluetooth – connection being used by another mobile device.
- Bluetooth – not connected.
- Bluetooth – connected.
- The instrument is measuring.
- The instrument is not measuring.
- 4G modem – no signal.
- 4G modem – connected to the Internet.

4G modem – connected to *SvanNET*.

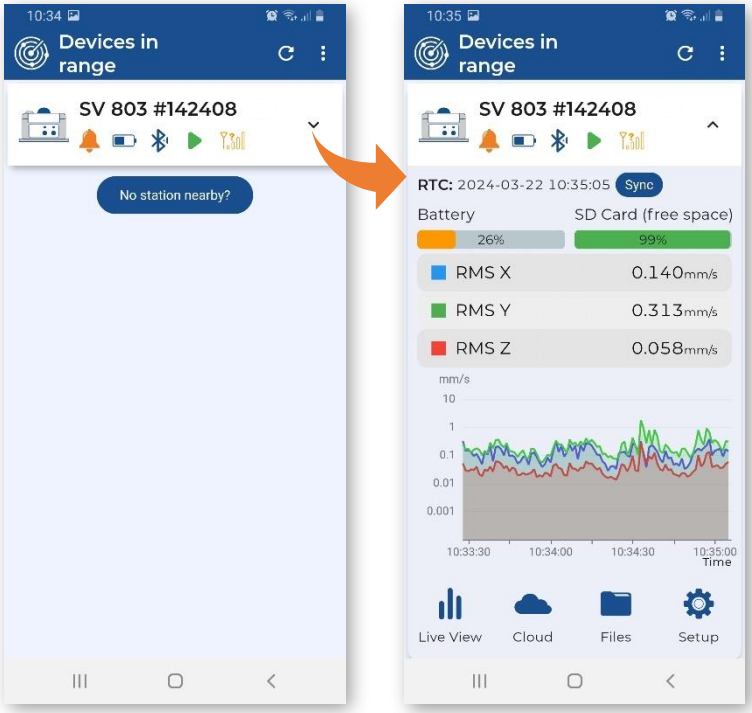
4.4 CONTROLLING THE INSTRUMENT

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

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

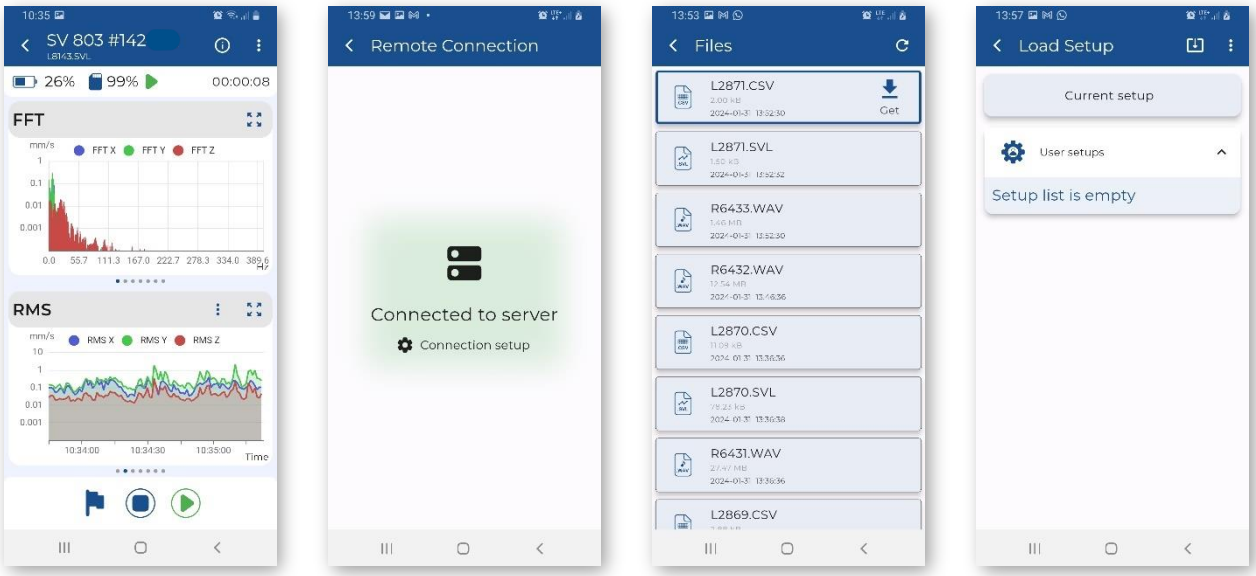
Four icons at the bottom of the panel give you quick access to some functions:

- **Live View** – viewing live results with the possibility to start/stop the measurement,
- **Cloud** – connecting to the *SvanNET* web service (see Chapter 4.4.7),
- **Files** – downloading instrument files (the icon is hidden by default),
- **Setup** – configuring instrument settings.



***Note:** The **Files** icon is hidden by default. To make it visible and to be able to manage instrument files, you should activate it, see Chapter 4.5.*

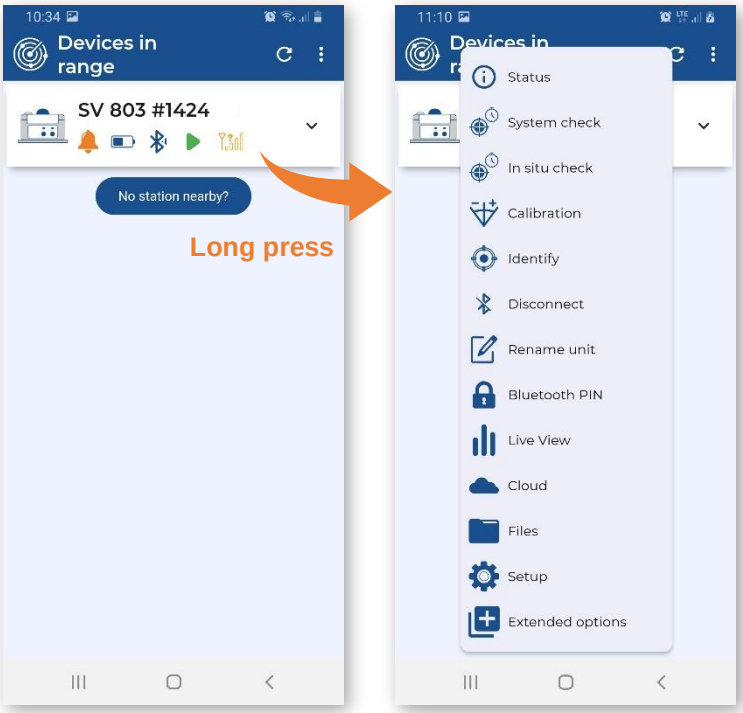
Below are screens after tapping function icons: **Live View**, **Cloud**, **Files** and **Setup**.



You can access these and other functions through the pop-up menu by long tapping on the instrument bar.

The pop-up menu allows you to:

- check the **Status** of the instrument,
- perform the **System check**,
- perform **In situ check** of geophones,
- perform the **Calibration** of the geophones,
- **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 4.4.7),
- open the file list - **Files**; this icon can be hidden, see Chapter 4.5,
- configure instrument settings - **Setup**,
- activate **Extended options**.



4.4.1 System check

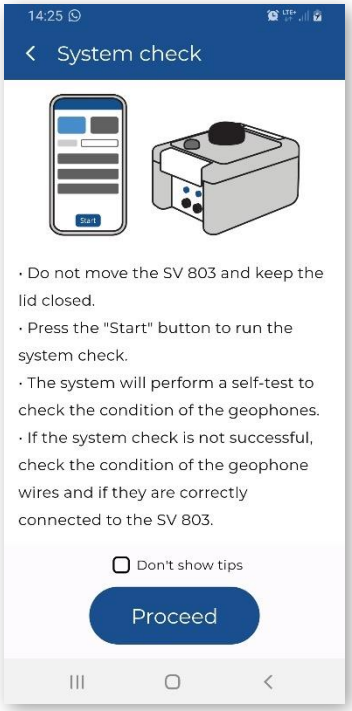
The system check function triggers an electronic pulse and evaluates the response of the sensor signal.

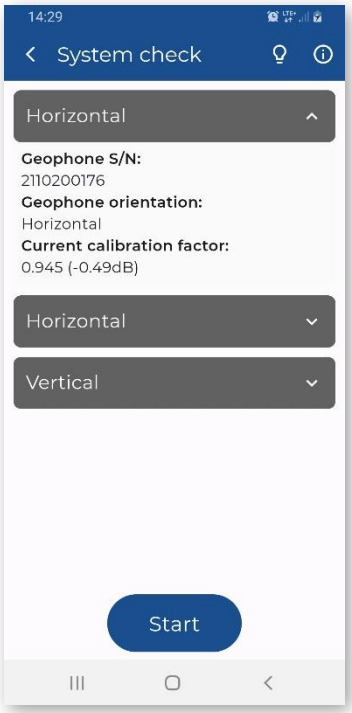
When you select the **System Check**, you will be taken to the Tips page to see how to perform the check.

You can skip the tips if you wish.

The system check should be performed with the closed lid.

Press the **Start** button to run the system check.



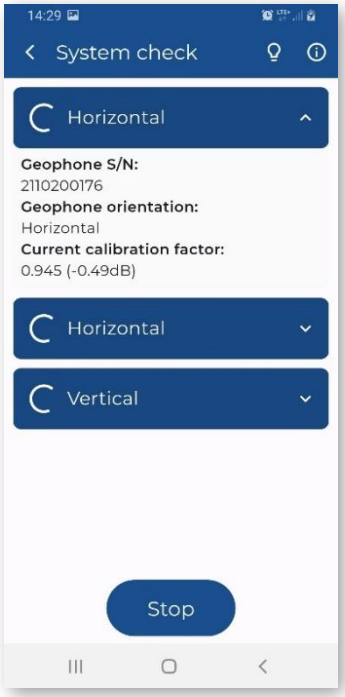


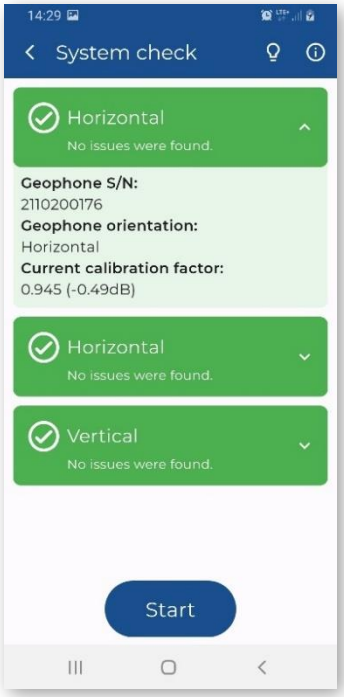
The system check performs a self-test and informs you about the condition of the geophones.

If the system check is not successful, this will be indicated by the geophone bar turning red.

In this case, check that the geophone cable is correctly connected and run the system check again.

If the system check is not successful, take the necessary action: calibrate or replace the geophone.





4.4.2 In situ check

The in-situ check function allows you to check the geophones using the SV 110 hand-held vibration calibrator.

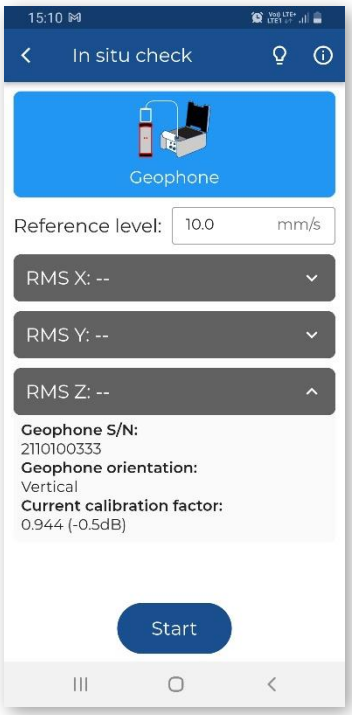
When you select the **In situ check**, you will be taken to the Tips page to see how to perform the in-situ check.

You can skip the tips if you wish.

To perform the in-situ check, follow steps described in Chapter 3.9 and press the **Start** button.

If the system check is not successful, this will be indicated by the geophone bar turning red.

If the system check is not successful, take the necessary action: calibrate or replace the geophone.



4.4.3 Calibration

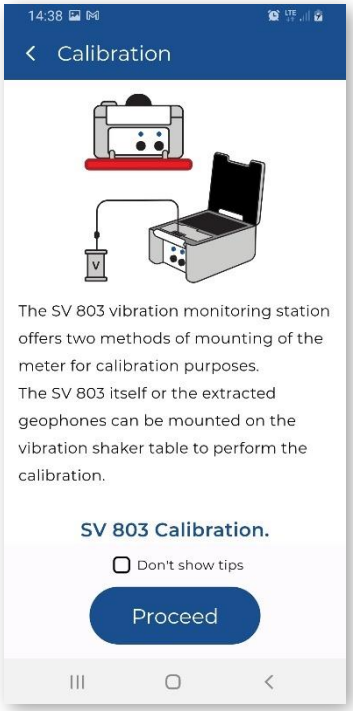
The calibration function allows you to calibrate the SV 803 or the geophones using the vibration shaker table.

When you select the **Calibration**, you will be taken to the Tips page to see how to perform the calibration.

You can skip the tips if you wish.

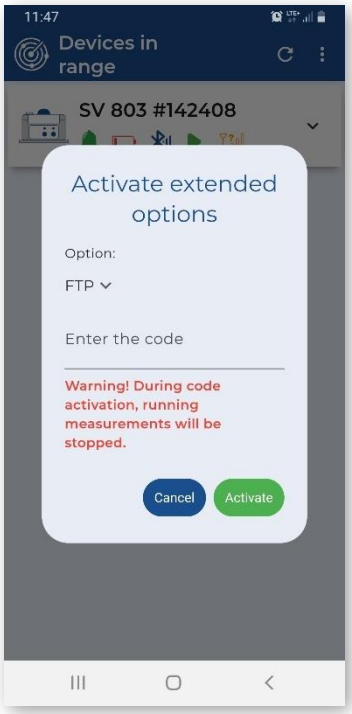
To perform the calibration, choose the device (SV 803 or Geophone), follow steps described in Chapter 3.10 and press the **Start** button.

After the calibration measurement apply a new calibration factor if it is within the acceptable range



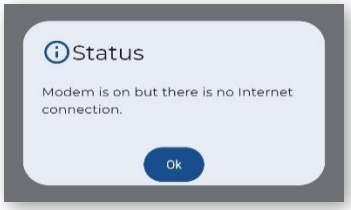
4.4.4 Extended options

The FTP Client option can be enabled if you enter the special code that unlocks this option. Once unlocked, the option is permanently available.



4.4.5 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.

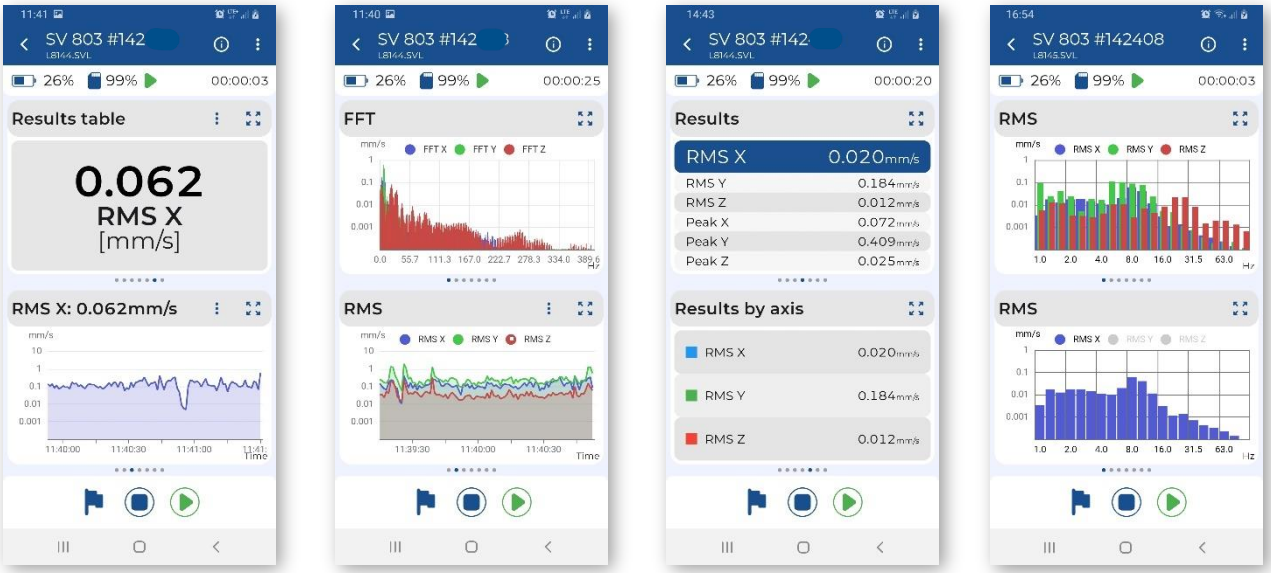
When you tap **Bluetooth PIN**, the dialog appears where you can change the Bluetooth PIN code.

4.4.6 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.

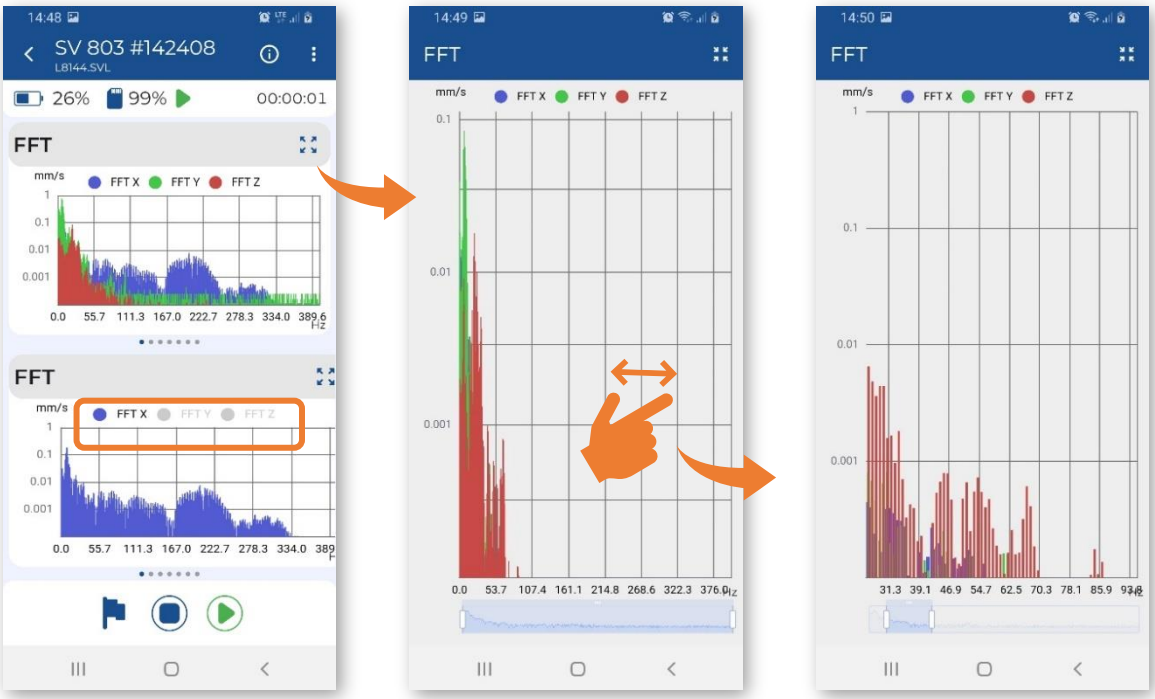


***Note:** The FFT or 1/3 octave spectra views depend on the selected standard – see Chapter [4.6.1.1](). FFT spectra are displayed for most standards based on the PPV and its dominant frequency analysis. 1/3 octave spectra are displayed for the User standard based on the 1/3 octave analysis.*

You can select axis on the time-history or spectrum graph be displayed, by tapping on the round buttons (blue – X, green – Y or red – Z).

The time-history or spectrum graph can be expanded to the full screen.

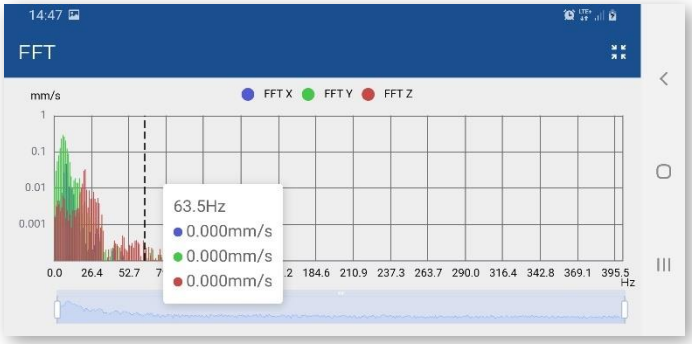
You can zoom in and zoom out the selected time or frequency range using two fingers or the bar below the graph.

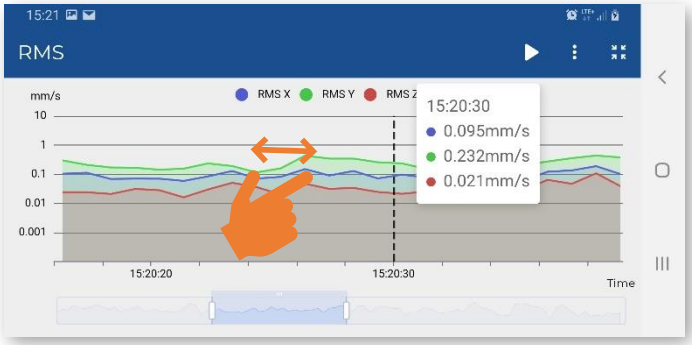


You can rotate the screen to view the graph at a higher resolution.

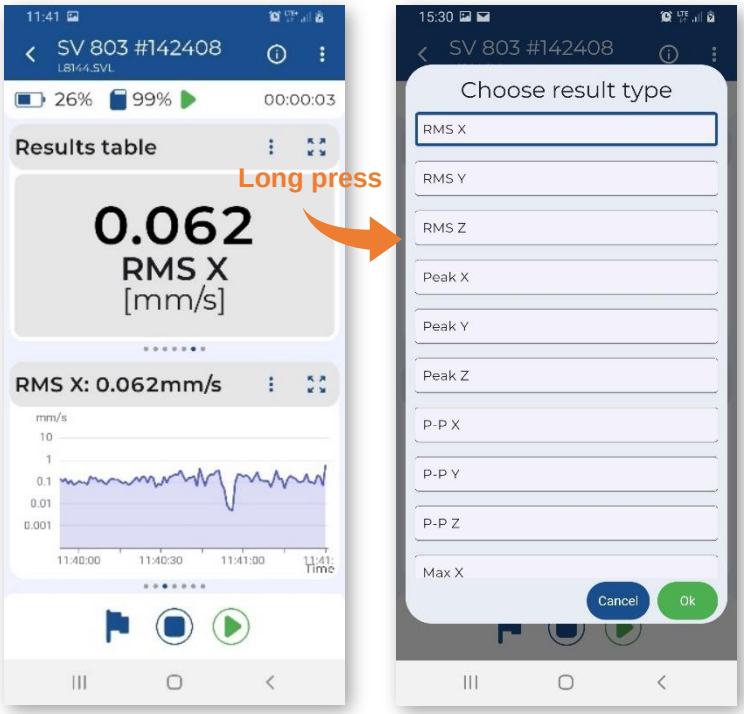
Tap on the graph area to activate the cursor with readings.

To deactivate the cursor, tap outside the graph area.





To select the result to be displayed in the current result value view, long tap on the view.



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.

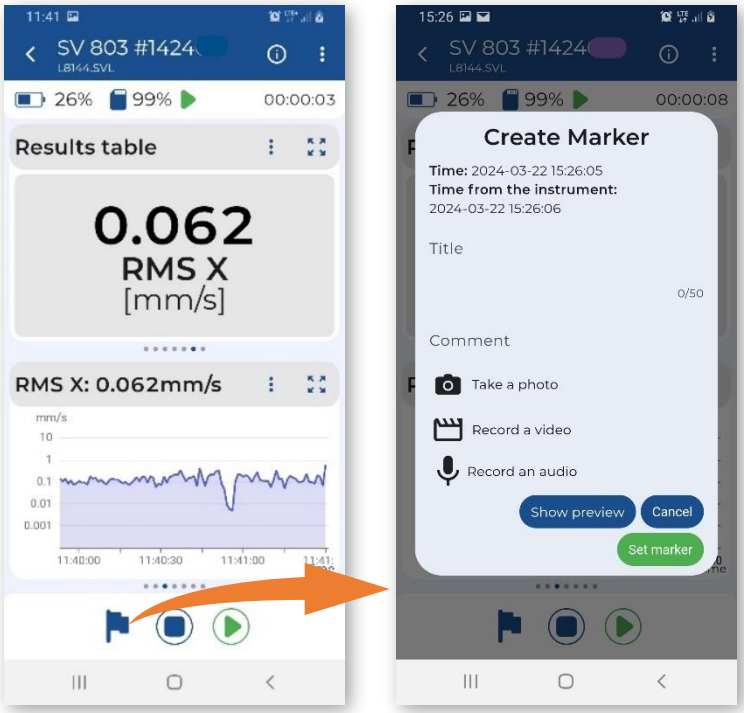
Tap **Comment** to enter the comment text.

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

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

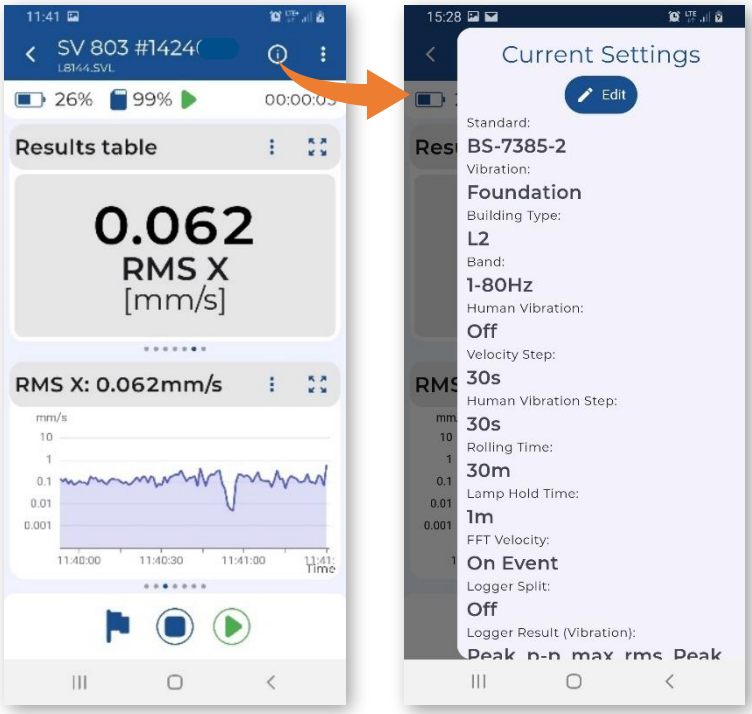
Tap **Record an audio** to add an audio to this marker.

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**,
- see the **User guide**,
- check the **Measurement orientation**,
- **Identify** the instrument, see Chapter 4.4.5,
- perform **Systen check**, **In-situ check** and **Calibration**.

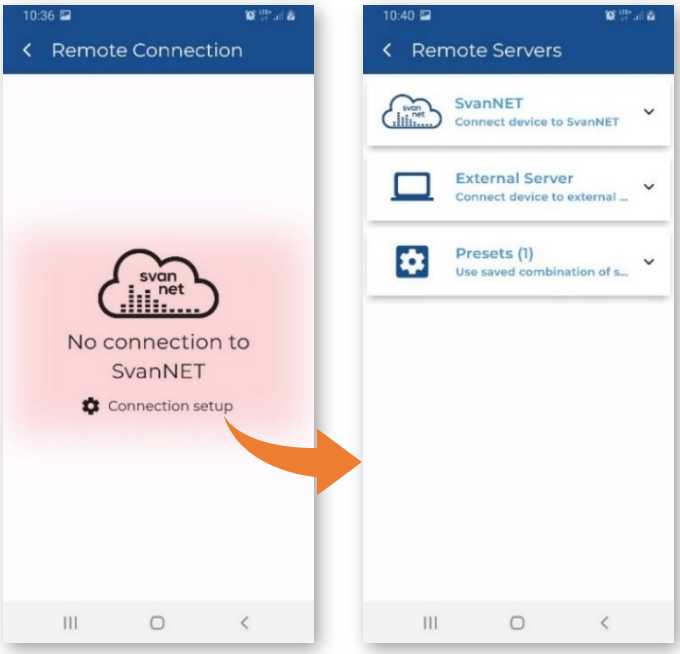
To return to the “Stations in range” screen, tap the  icon.

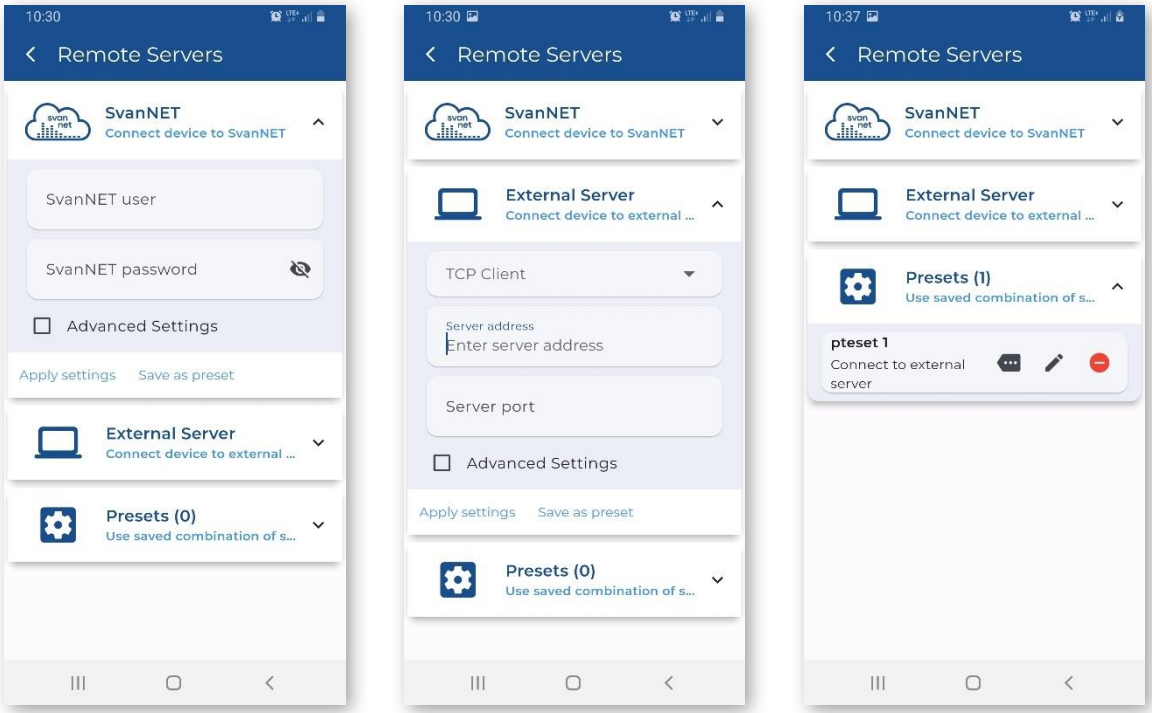
4.4.7 Cloud

When you tap **Cloud** in the expanded instrument panel, the **Remote Connection** screen opens, showing the status of the connection to the *SvanNET* web service.

Tap on **Connection setup** to configure the settings for the remote connection.

You can save presets by taping **Save as preset**. You can use them again later.

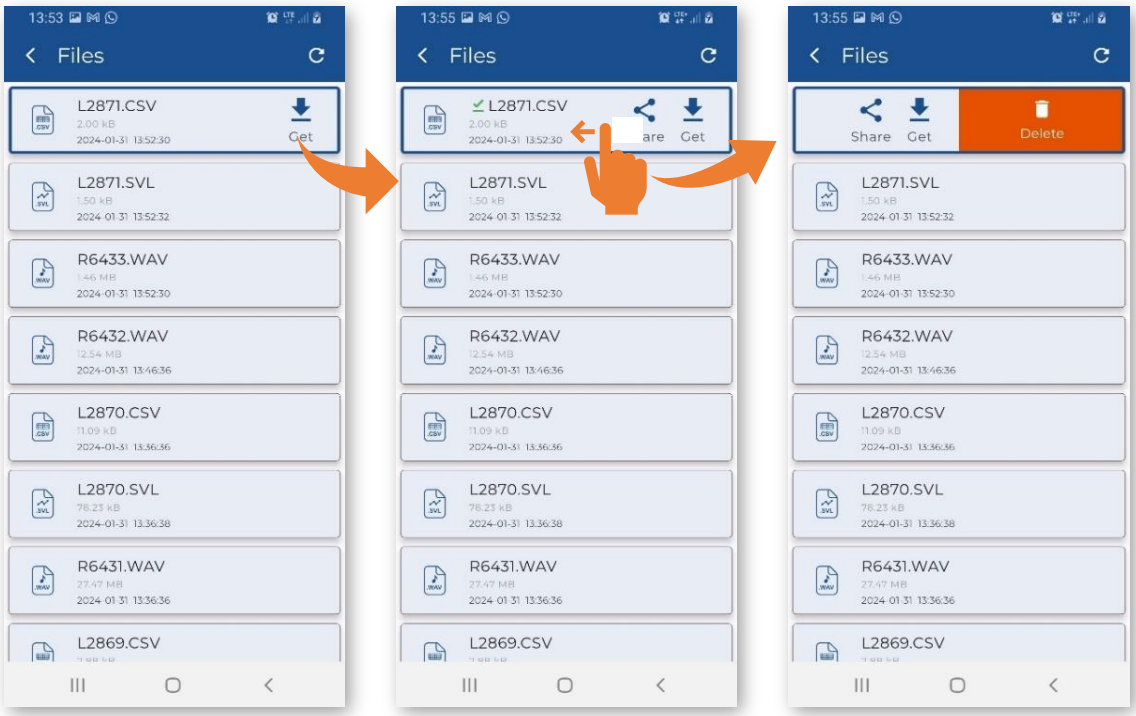




4.4.8 File list

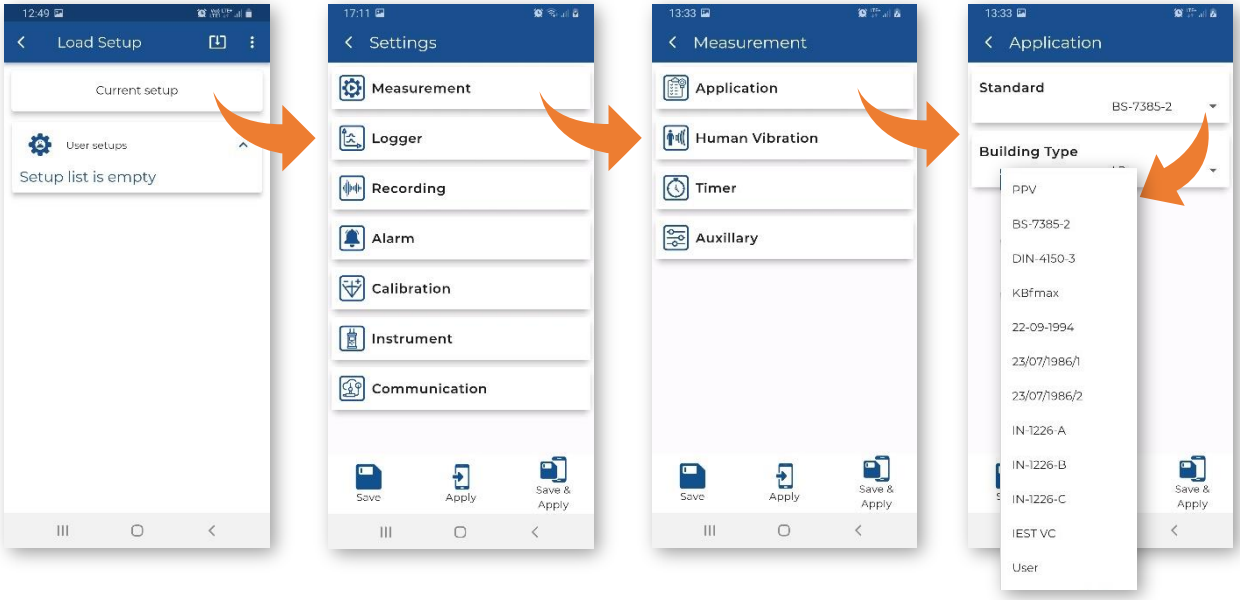
The **Files** section displays the list of files created by the instrument on the instrument's memory card.

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.



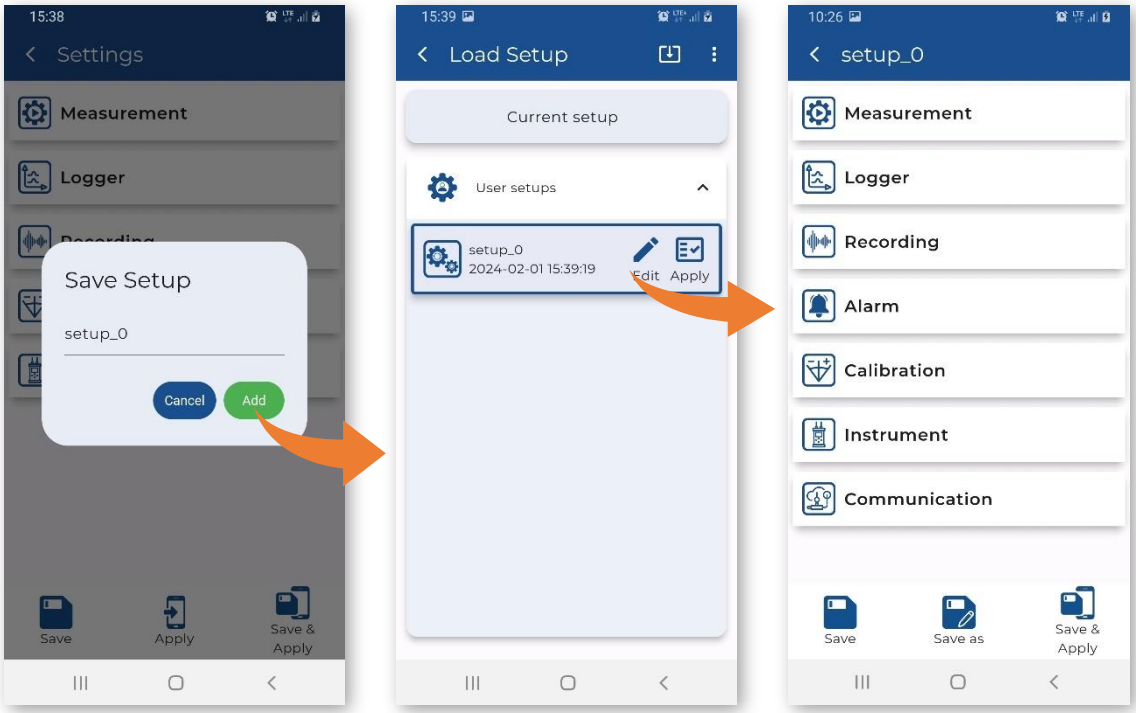
4.4.9 Instrument settings

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**).

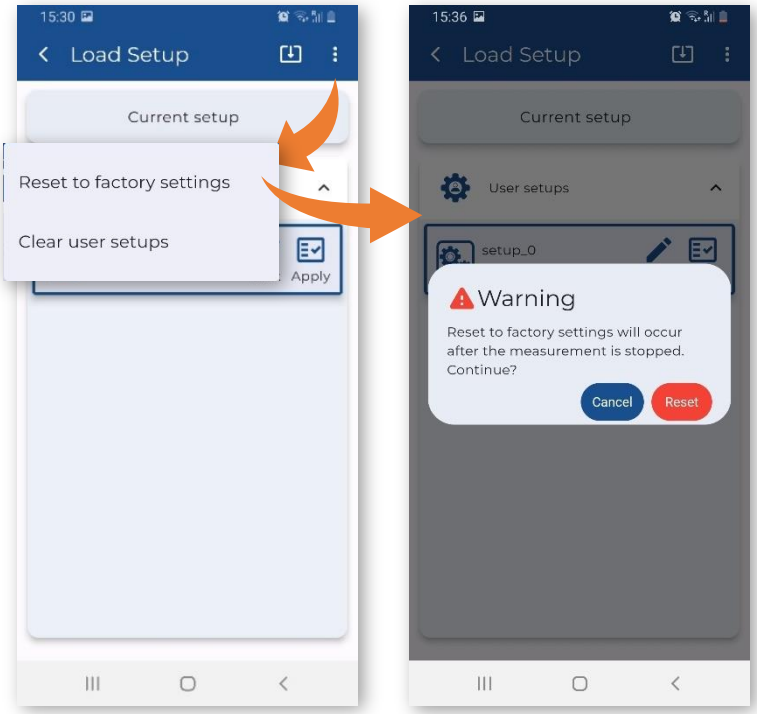
When you save settings, a new setup file is created in the dedicated application's directory on your mobile device, but the current instrument settings are not changed. You can load the settings saved in the file to the instrument. To do this, open the **User Setups** section, select the file with the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



4.4.10 Restoring factory settings

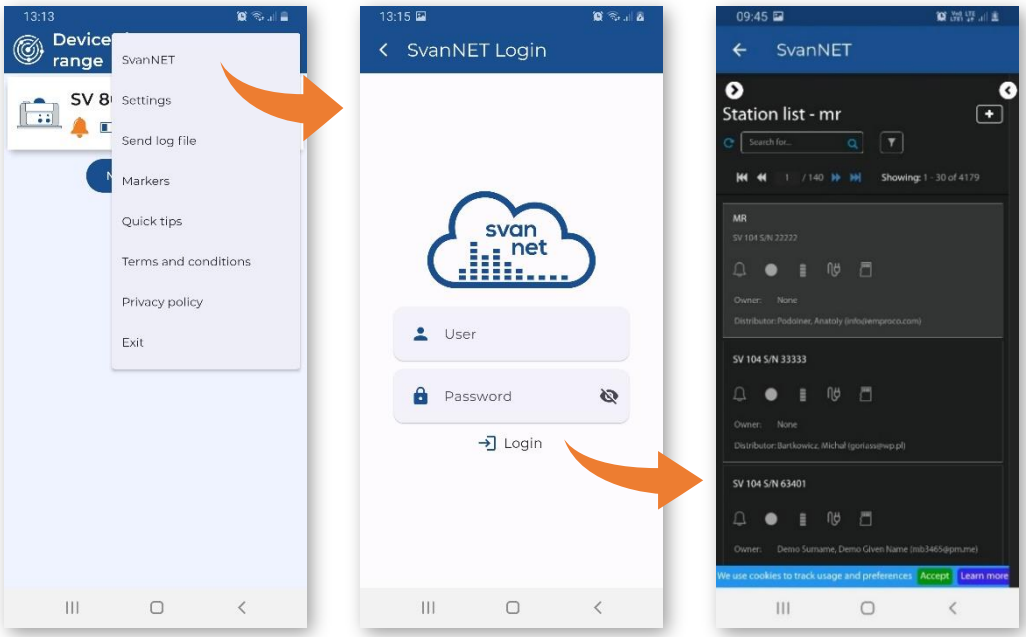
By tapping , you can:

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

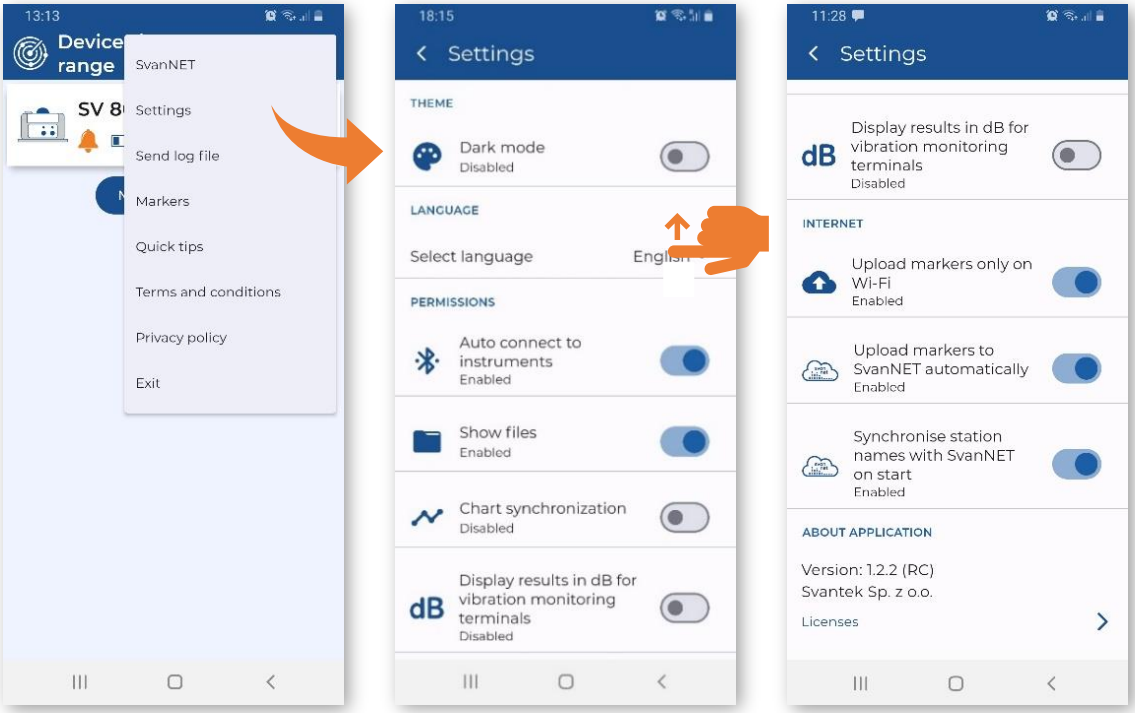


4.5 ASSISTANT PRO AUXILIARY FUNCTIONS AND SETTINGS

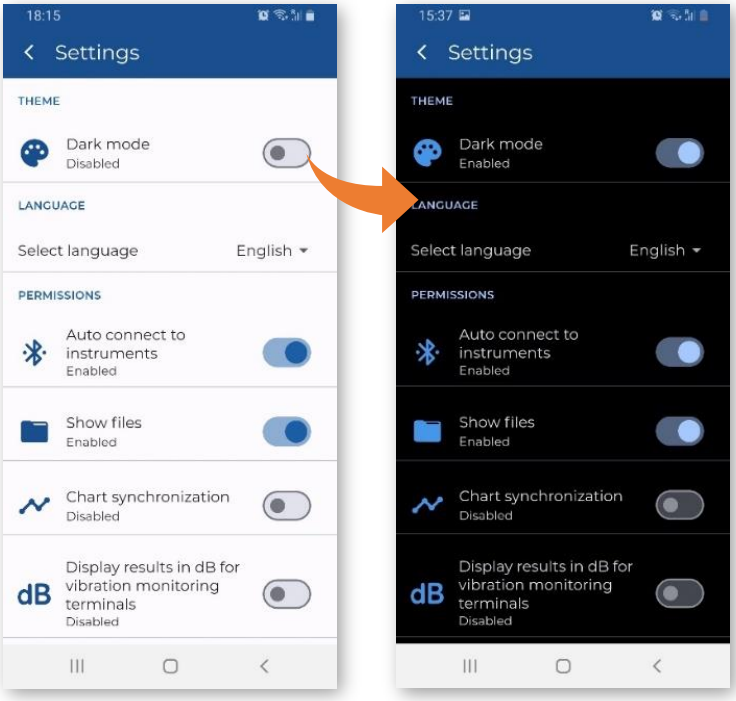
By tapping , you can open *SvanNET* in your mobile device, configure *Assistant Pro* settings, share the log file using Android applications and view, edit and share earlier created markers, get quick tips, get acquainted with terms and conditions and privacy policy and exit the application.



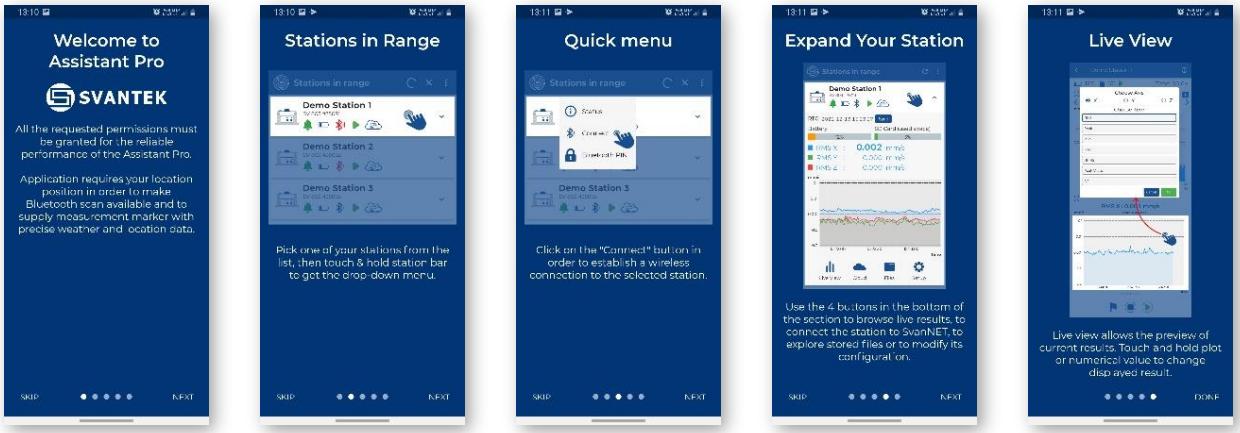
In the *Settings* screen, you can choose the application THEME (enable or disable the **Dark Mode**), choose the application *LANGUAGE*, enable or disable some *PERMISSIONS*: automatic connection with the visible instruments (**Auto connect to instruments**), add/delete the Files item in the pop-up menu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



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



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

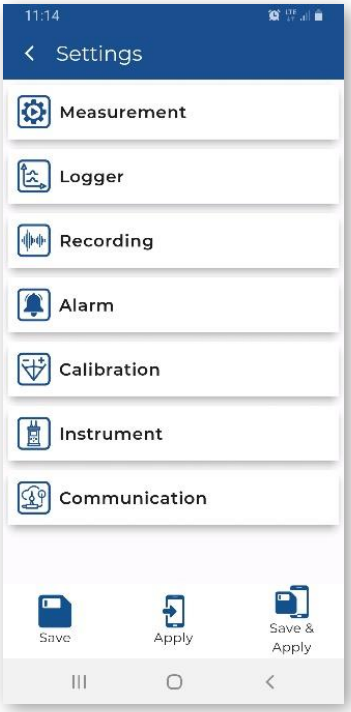


4.6 INSTRUMENT SETTINGS

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.

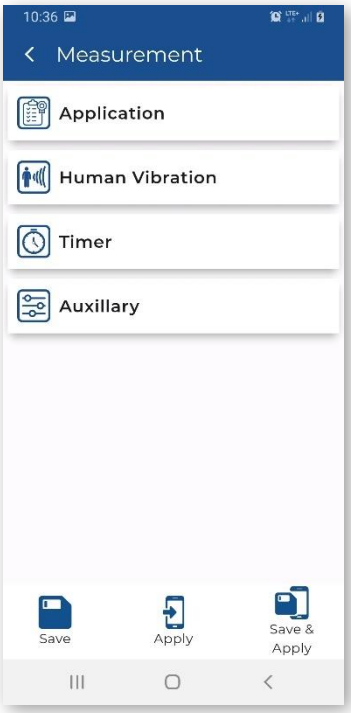
In the case of the *User* standard, three **Curve** sections appear in the main menu, allowing you to define/edit your own criterion curves.



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,
- **Auxillary** – to set some auxiliary settings, like start synchronisation and reference levels.

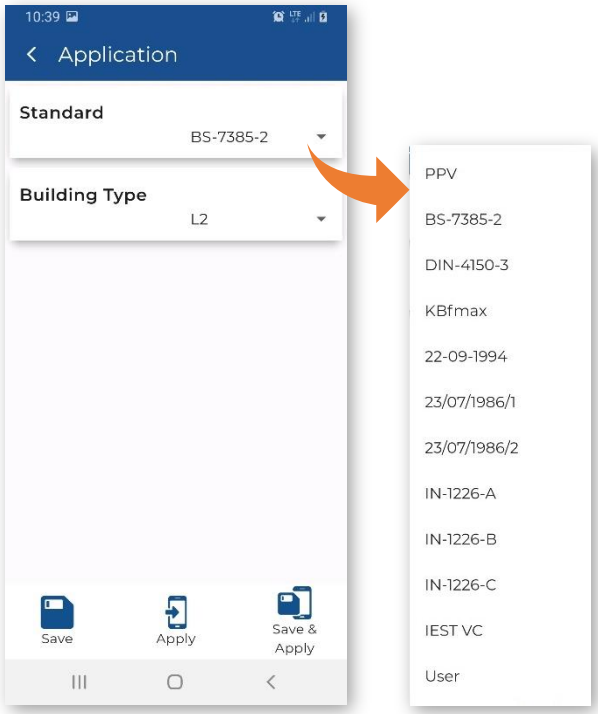


4.6.1.1 Standard settings – Application

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*, *PN-B-02170 (SWD-I)*, *PN-B-02170 (SWD-II)*, *SS4604866:2011*, *SS25211* or *User*.

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

- **Building Type** – for the *BS-7385-2*, *DIN-4150-3*, *22/09/1994*, *23/07/1986/1*, *23/07/1986/2*, *IN-1226-A*, *IN-1226-B*, *IN-1226-C* and *IEST VC* standards,
- **Vibration Type** – for the *DIN-4150-3* standard,
- **Band** – for the PPV, *DIN-4150-3*, *KBfmax* and *User* standards,
- **Spectrum** – for the *User* standard,
- **Curve x** – for the *PN-B-02170 (SWD-I)*, *PN-B-02170 (SWD-II)* standards.



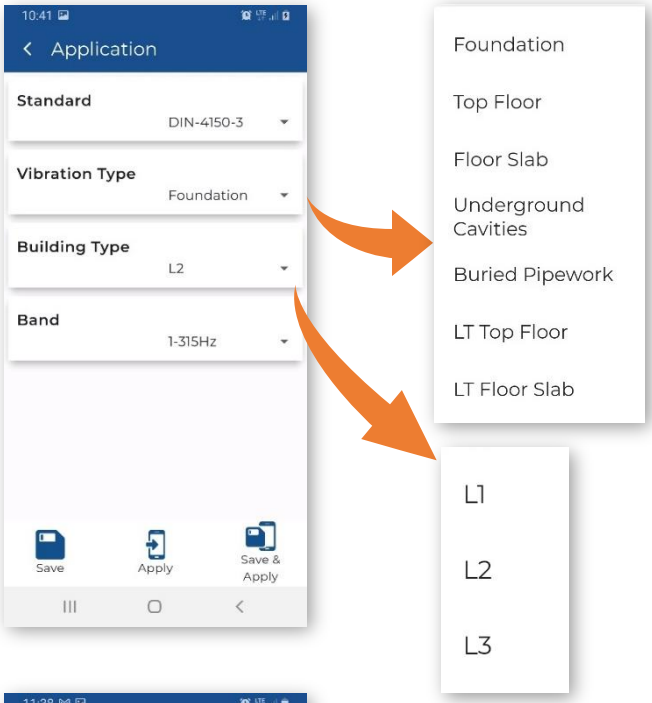
Building Type defines the criterion curve for most standards: **L1**, **L2**, etc.

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*.

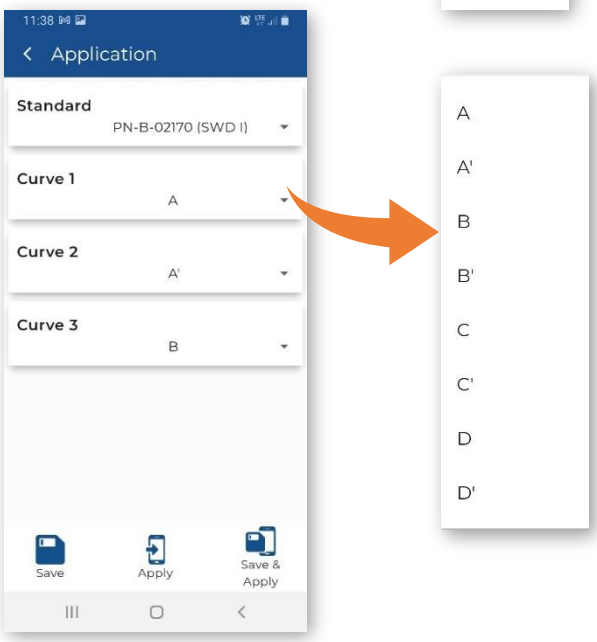
The content of the settings depends on the selected standard.

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*.

The **Band** item allows you to select a band: *1-80Hz* or *1-315Hz*.



The **Curve x** item allows you to select a type of a curve used in the *PN-B-02170 (SWD-I)* and *PN-B-02170 (SWD-II)* standards: *A, A', B, B', C, C', D* or *D'*.



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 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

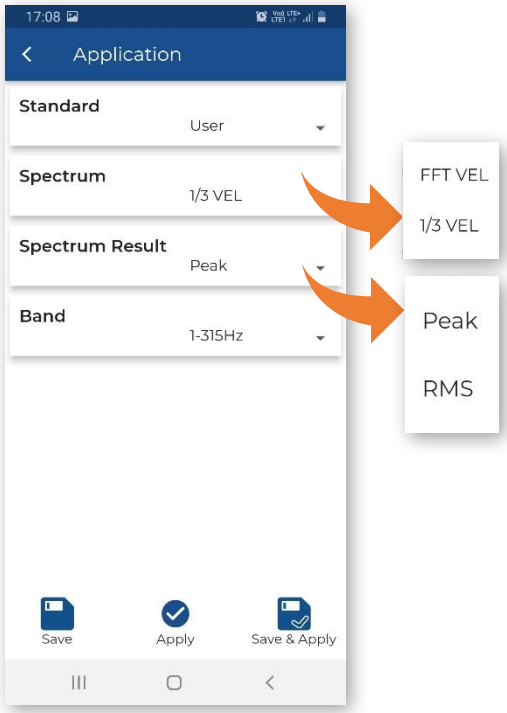
DIN-4150-3	DIN-4150-3 Part 3: Effects of vibration on structures	DIN 80 bandpass DIN 315 bandpass	Measurement of unweighted PPV and its dominant frequency based on FFT analysis in the frequency band 1-100 Hz
KBfmax	DIN 4150-2 Part 2: Human exposure to vibration in buildings	KB Weighting filter	Measurement 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	User defined criteria	VEL 1 DIN 80 DIN 315	User defined method based on PPV and FFT or 1/3 octave velocity spectra
PN-B-02170 (SWD-I)	Polish standard PN-B-02170 “Ocena szkodliwści drgań przekazywanych na podłoże przez budynki, SWD-I”	1/3 octaves	Curves A, A', B, B', C, C', D, D' defined in SWD-I for small buildings
PN-B-02170 (SWD-II)	Polish standard PN-B-02170 “Ocena szkodliwści drgań przekazywanych na podłoże przez budynki, SWD-II”	1/3 octaves	Curves A, A', B, B', C, C', D, D' defined in SWD-I for big buildings
SS4604866: 2011	Swedish standard SS 4604866:2011	VEL 1	FFT based, no alarms for curves
SS25211	Swedish standard SS 25211	VEL 1	FFT based, no alarms for curves

Note: *The exponential RMS detector is used to calculate the Max value (125ms time constant) for all standards for the velocity vibration. The RMS values are calculated directly from the measured signal. For the KBfmax standard, the KBF result is calculated, which is the RMS based result with the exponential detector (125ms time constant). The measured values and the formulas for them are presented in Appendix D.*

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.

To do this, 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*.

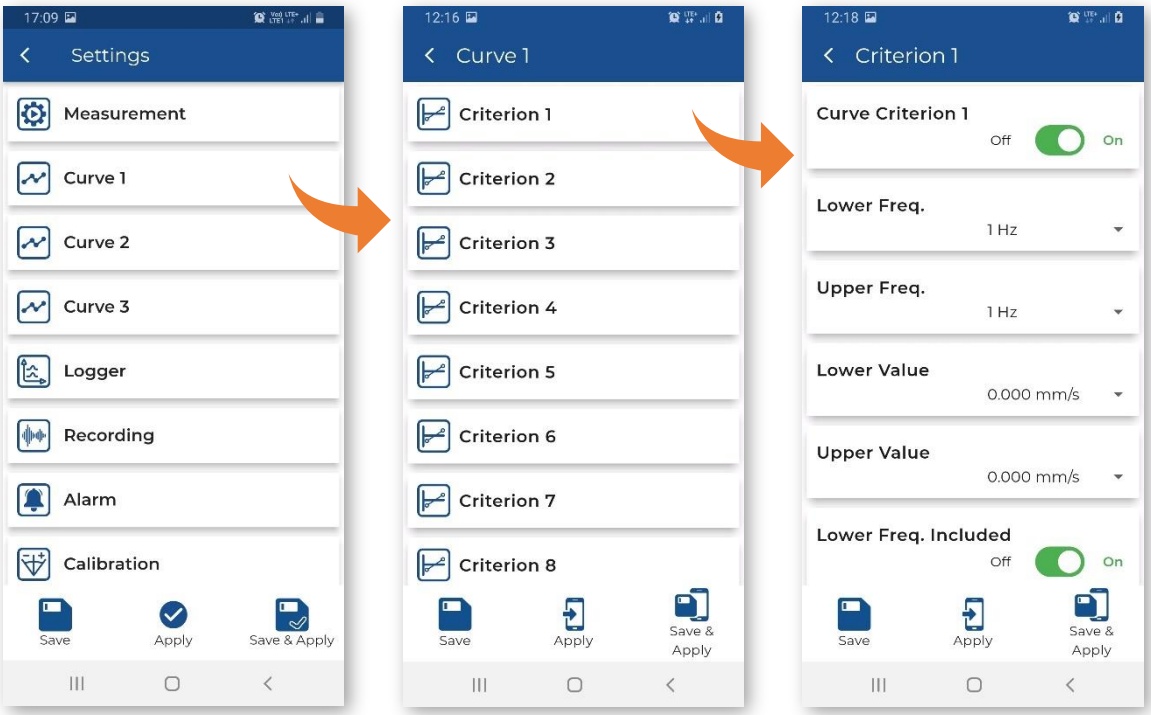


Note: *The FFT spectrum parameters for all methods using FFT analysis are set by default as follows: power spectrum - 411 lines, time window – Hanning.*

In the case of the *User* standard, three **Curve** items appear 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.

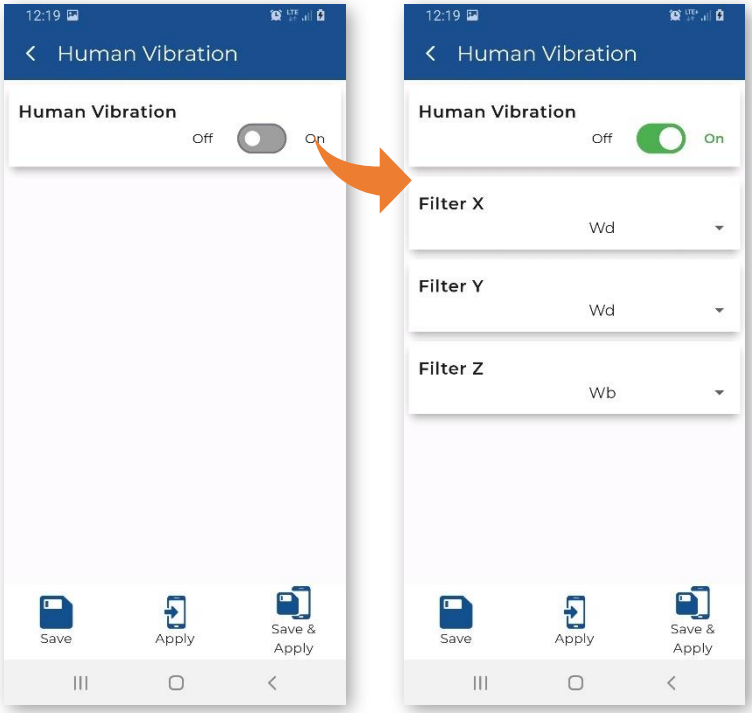


4.6.1.2 Human vibration measurements – Human Vibration

The instrument can measure acceleration vibration in parallel with the velocity vibration, allowing MAX, RMS and VDV results to be measured with different steps. The instrument has built-in weighting filters according to ISO 2631-1 and ISO 2631-2 and BS 6472-1.

The **Human Vibration** section allows you to enable/disable the human vibration measurements (acceleration vibration results).

When the **Human Vibration** option is enabled, you can set the weighting filters for the three channels: X (*Wd* or *Wm*), Y (*Wd* or *Wm*) and Z (*Wb* or *Wm*).



Note: *The exponential RMS detector (1s time constant) is used to calculate the Max values for the acceleration vibration. The RMS values are calculated directly from the measured signal. The measured values and the formulas for them are presented in Appendix D.*

4.6.1.3 Programming instrument internal timer – Timer

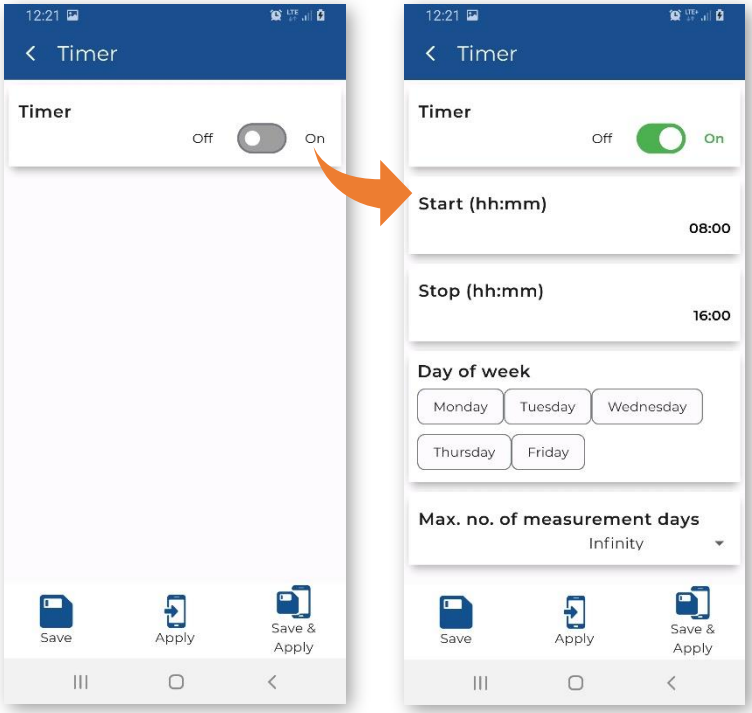
The **Timer** function is used to program the automatic start and stop of the measurement. When the instrument is switched off, the timer switches it on, then starts the measurement and switches it off when the measurement has finished.

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.

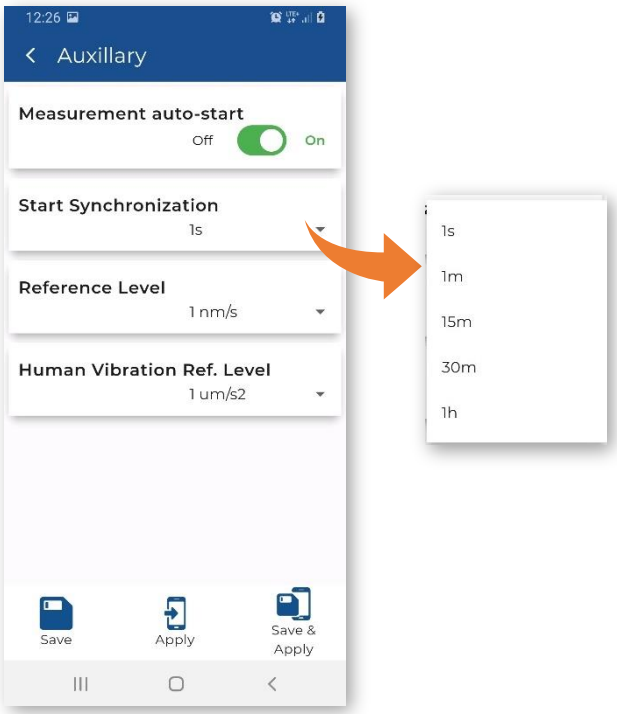


4.6.1.4 Auxiliary settings – Auxiliary

The **Auxiliary** section allows you to:

- switch on the automatic measurement start after turning the instrument on,
- define the points of synchronisation of the measurements with the RTC of the instrument. This parameter can be set to **1s**, **1m**, **15m**, **30m** and **1h**.

  For example, if **1h** is selected, the measurement will start from the beginning of the first second of the next hour after the Start command is sent and will be repeated from the first second of the next hour after the integration period has elapsed if the number of cycles is greater than one.
- check the reference levels for the velocity and acceleration vibration.



4.6.2 Configuring data storage – Logger

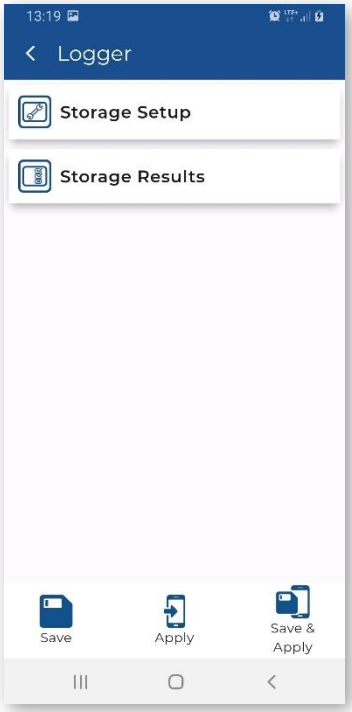
The **Logger** section allows you to configure the way in which the measurement results are stored in files.

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:

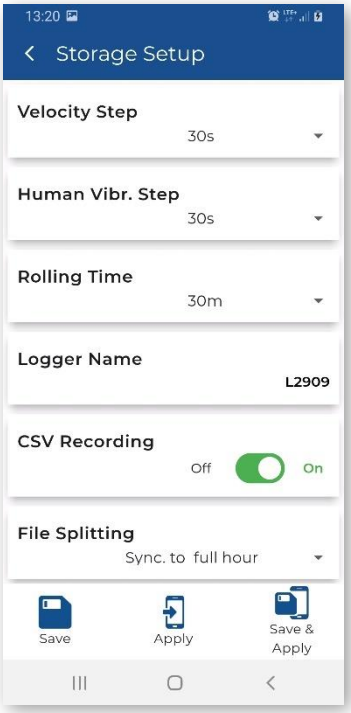
1. velocity vibration results with **Velocity Step**,
2. FFT or 1/3 octave velocity spectra of signals with **Velocity Step**,
3. acceleration vibration results with **Human Vibration Step.**

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:



- step for logging velocity vibration results including FFT or 1/3 octave velocity spectra (**Velocity Step**): *1s..59s, 1m..59m, 1h,*
- step for logging 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 export of results logged to a logger file (except spectra) and alarms in CSV (Comma Separated Values) format (**CSV Recording**),
- write **Comment** that will be visible in *SvanPC++.*

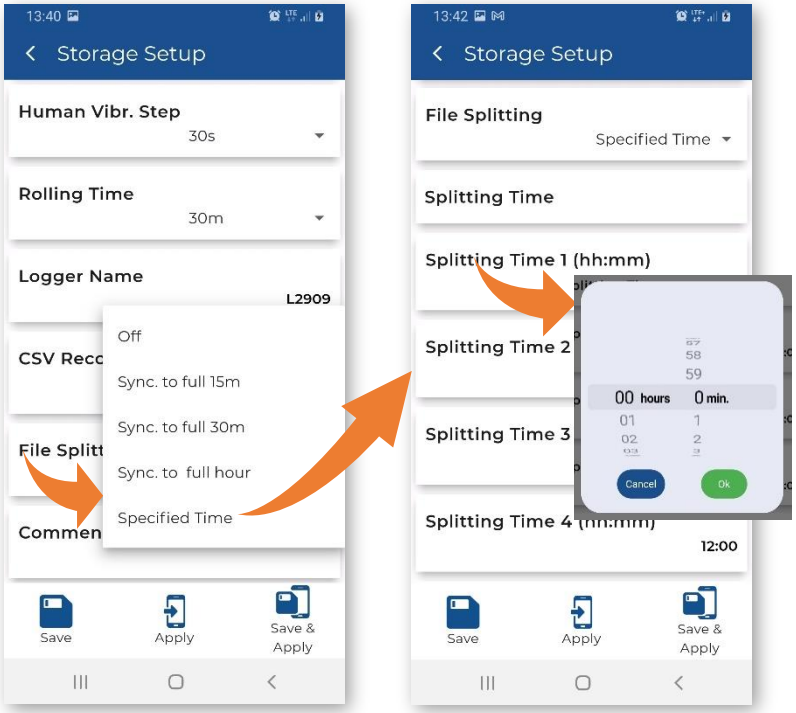
File Splitting allows splitting the logger data registration into separate files.

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*).

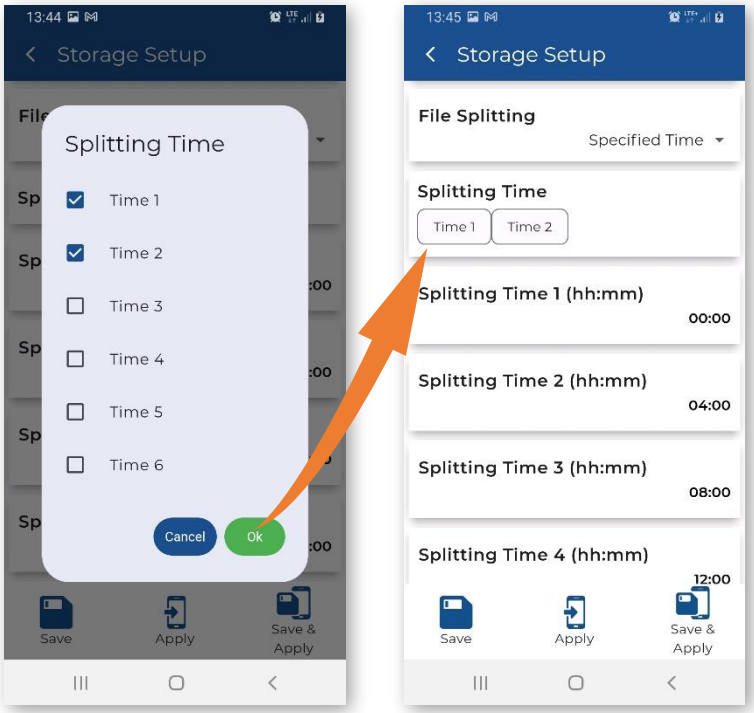
Whenever the split time is reached, the logger file is closed, and a new file is opened with a new number in the file name.

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



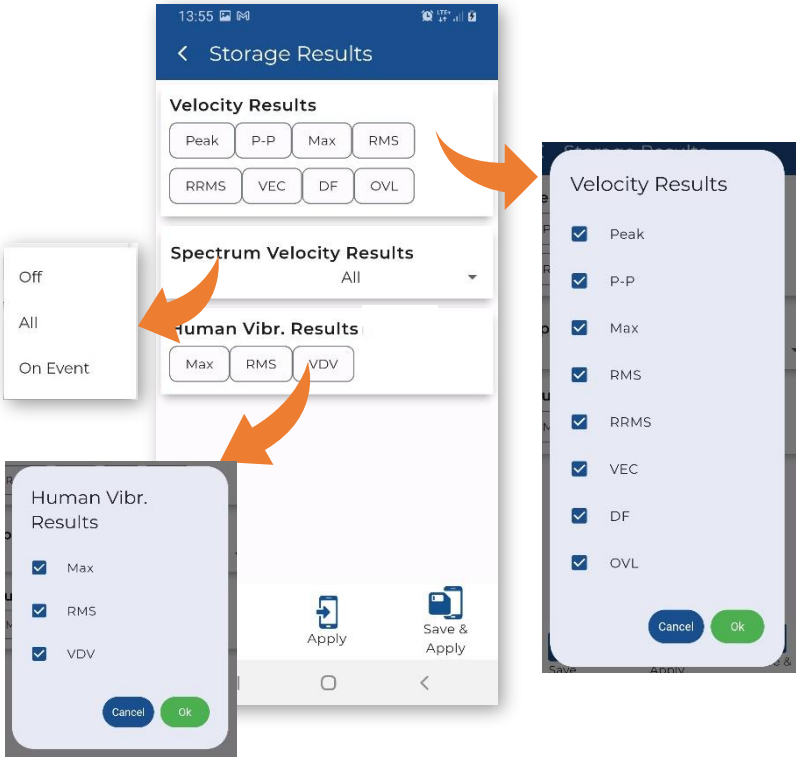
By tapping **Splitting Time**, you can check the splitting times to activate them.

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

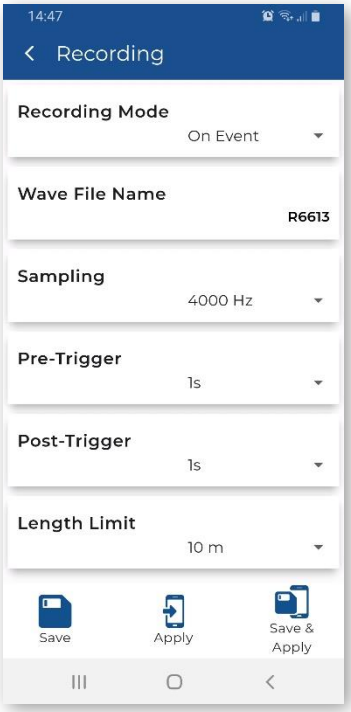


The **Storage Results** section allows you to select the results for logging to the logger file:

- **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.

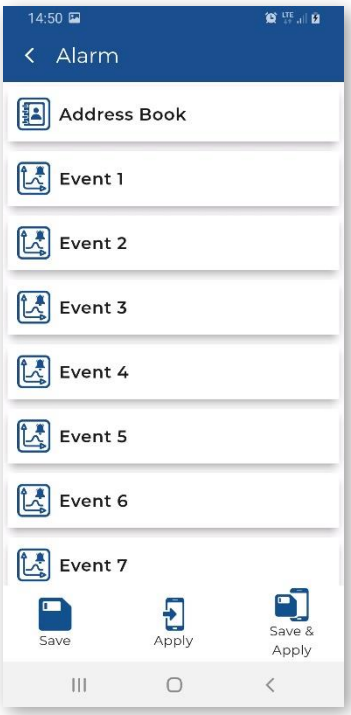
In the case of *On Event*, signals are recorded when an event occurs. The duration of such a recording is calculated as follows: **Pre Trigger** + **Event Duration** + **Post Trigger**, where **Event Duration** is defined in the **Event** list (see Chapter 4.6.3.2). If a new event occurs while recording,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

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

Wave recording settings include:

- **Sampling** frequency: *4000 Hz*, *2000 Hz*, *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.

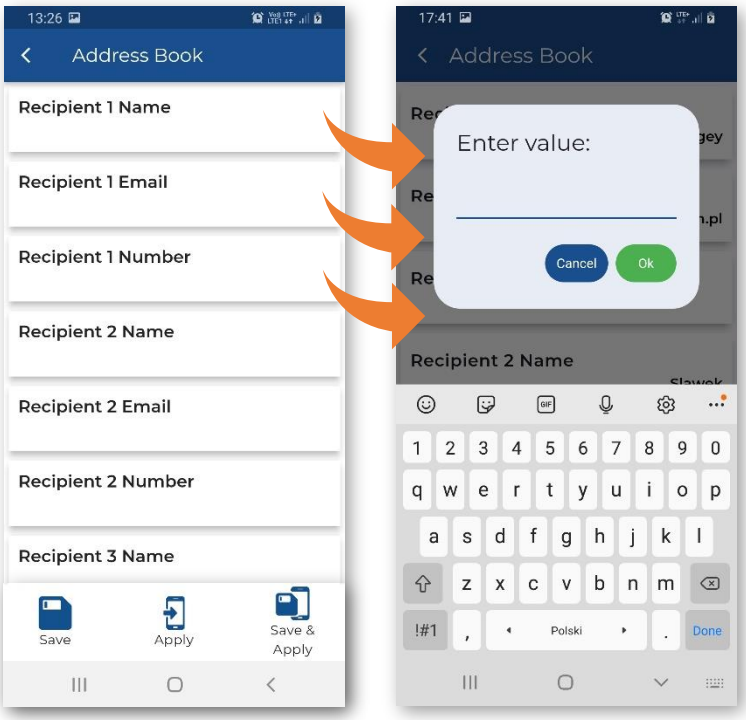
You can configure up to ten independent events associated with alarm conditions that are checked simultaneously. Based on the event alarms the instrument sends SMS and/or e-mail alarm notifications to different recipients.

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.

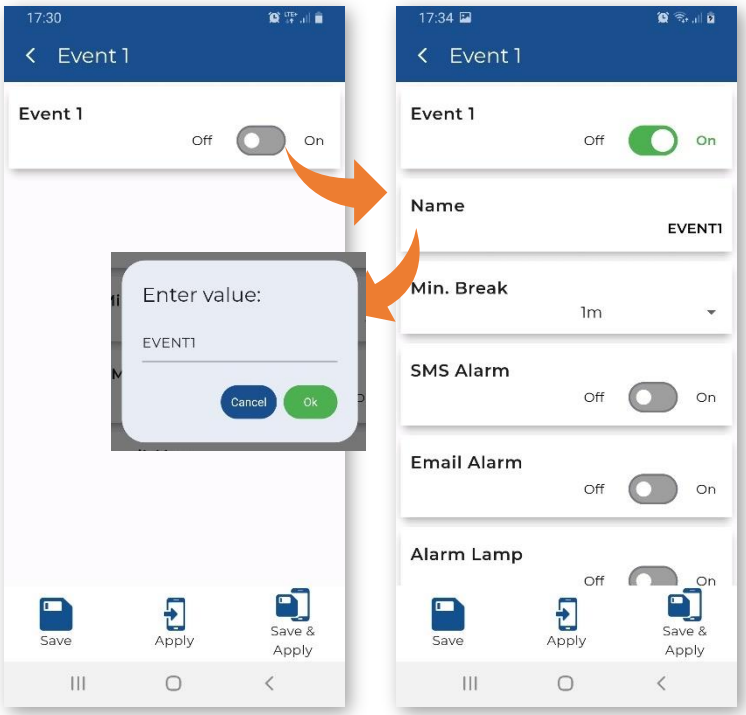
When the event is active (On), you can define its **Name**, enable specific alarms, set the trigger source, threshold level(s) and set time frames for alarms notifications.

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

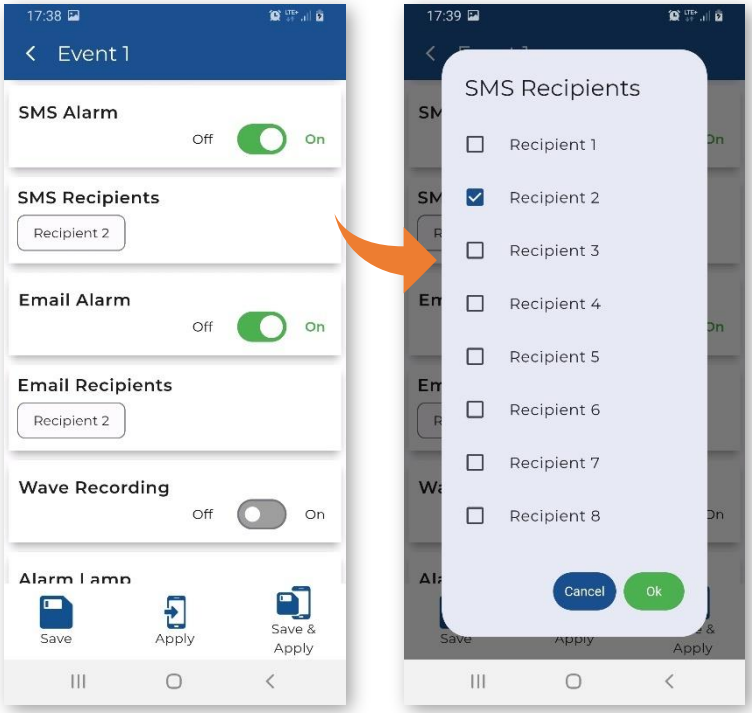
Min. Break defines minimum time between SMS or email messages to limit the repetition of the same alarm messages.

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.

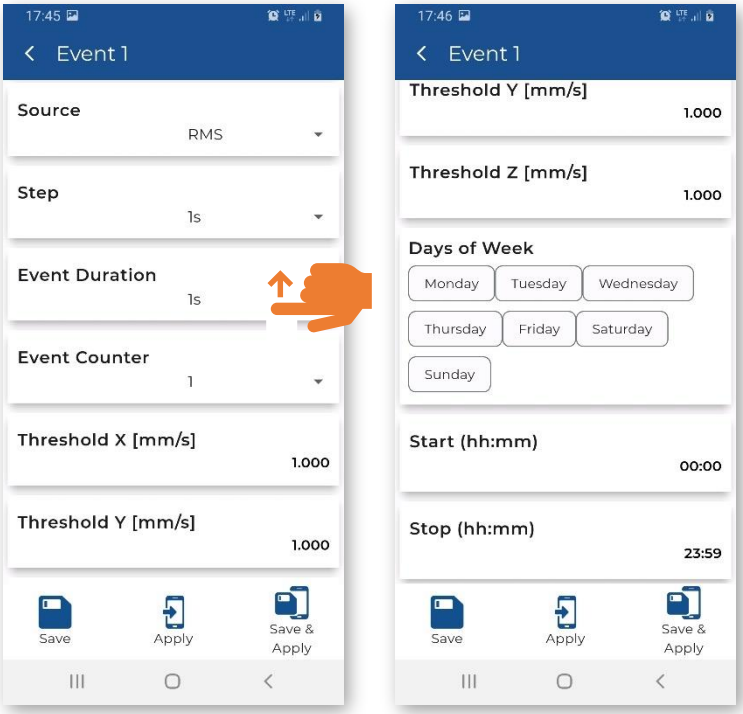
As the **Source** of the event trigger, you can select: *System*, *PPV*, *RMS*, *RRMS* (Rolling RMS), *Vector PPV* which will be compared with the threshold level(s) or select the building type criterion curve (*Curve*) to be checked for exceedance.

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.

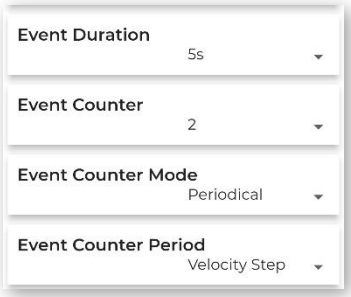


The **Event Duration** item allows you to set the duration of the Event from its start. For this period, the instrument defines the maximum PPV values and the dominant frequencies for the X, Y and Z axes.

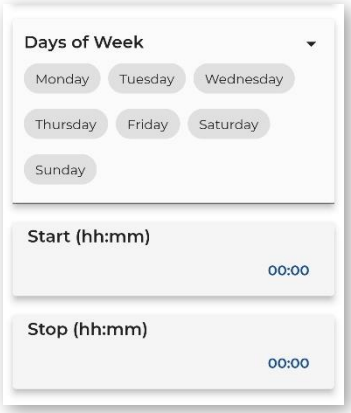
In the **Event Counter** item, which appears for the specified **Source** (RMS, RRMS, PPV, Vector), you can select a number of conditions to be met before the event and alarms are triggered.

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*.

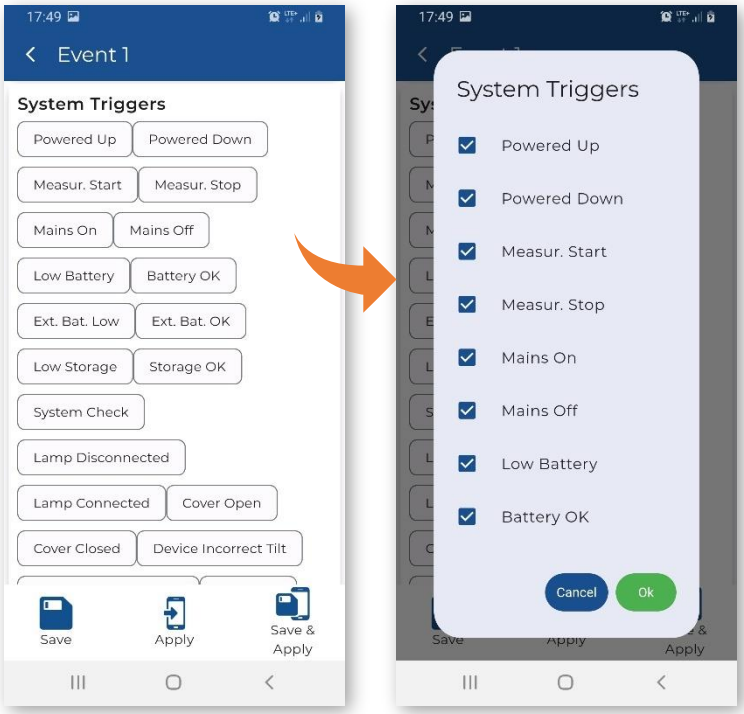


The **Days of Week** item allows you to select the days of the week, and the **Start (hh:mm)** and **Stop (hh:mm)** items allow you to define the time frame in which alarms are generated.



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 a low battery condition is detected 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)
- **FTP Push** / **FTP Pull** – Push or Pull error. An error and alarm is reported if multiple transmission attempts fail.

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

[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.

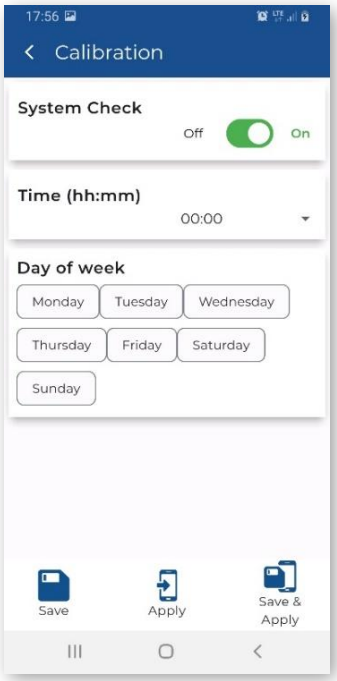
	PPV	always	triggering when 1s PPV in any axis exceeds the threshold level	
	RMS	always	triggering when RMS exceeds the threshold level	RMS
	RRMS	always	triggering when RRMS exceeds the threshold level	RRMS
	Curve 1/2/3	always	triggering when any spectrum line (depending on the **Standard** setting) exceeds the criterion curve considering the reduction factor	
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:

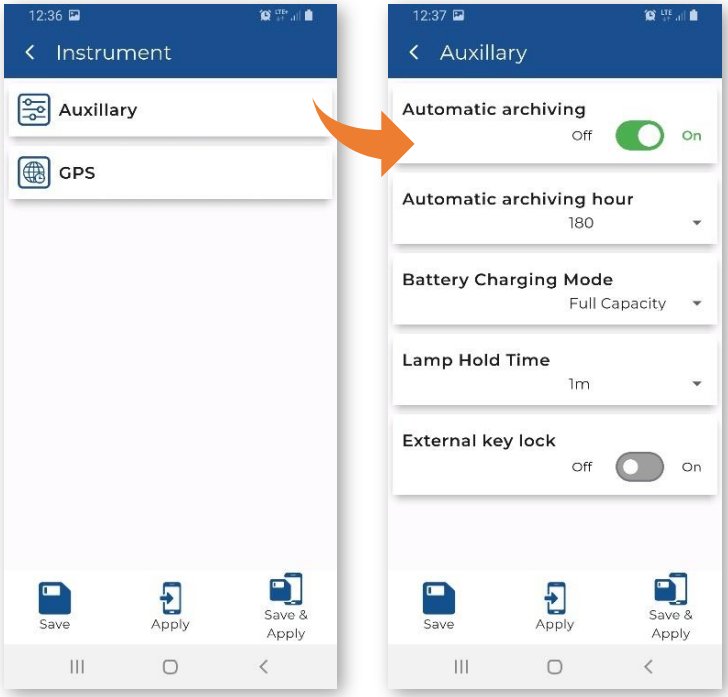
- Activate the **Automatic archiving** mode and set the **Automatic archiving hour**.

  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).
- Switch on/off the **External key lock**.

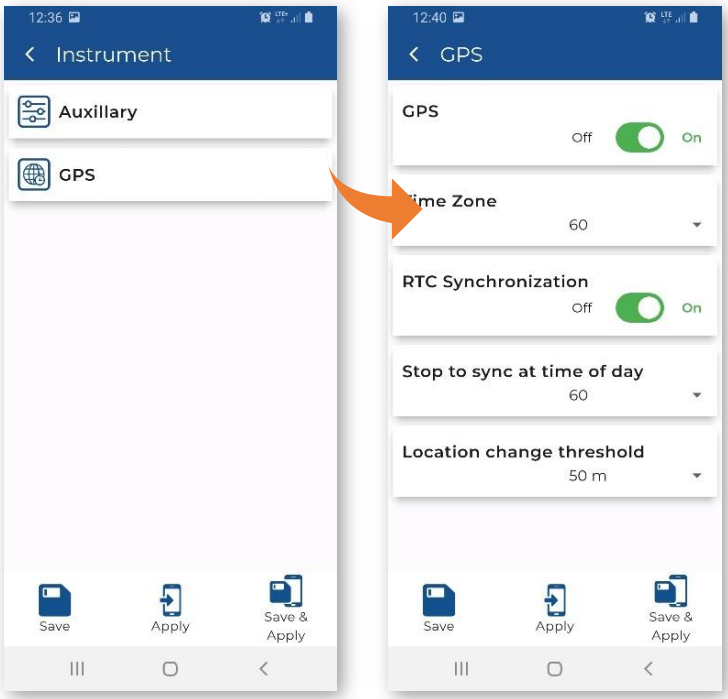


4.6.5.2 Configuring internal GPS – GPS

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.



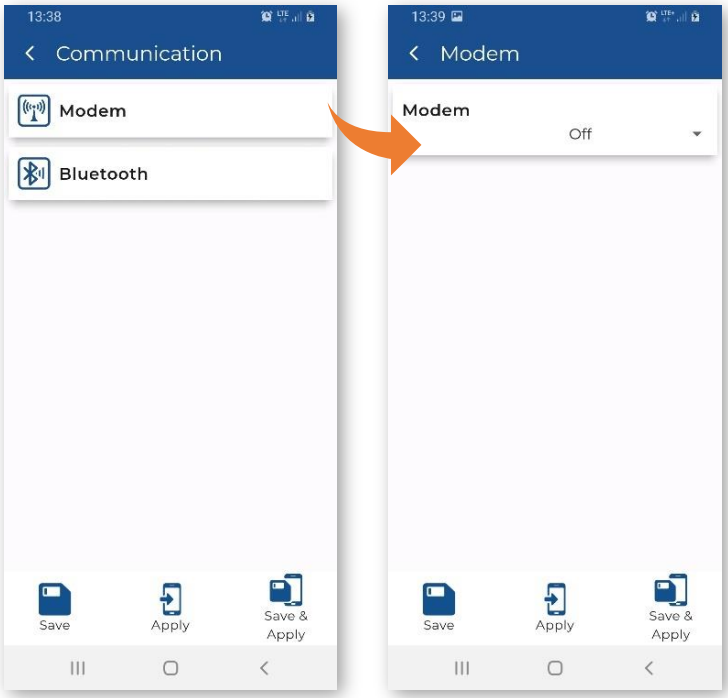
4.6.6 Configuring remote communication – Communication

The **Communication** section allows you to set communication via the 4G modem and Bluetooth.

4.6.6.1 Configuring 4G modem – Modem

In the **Modem** subsection, you can switch *Off* the 4G modem, or select its mode (**Modem**): *Continuous* or *Periodically active*.

When the modem is switched on, you can set the **Connection Type** and **FTP** settings in additional subsections.

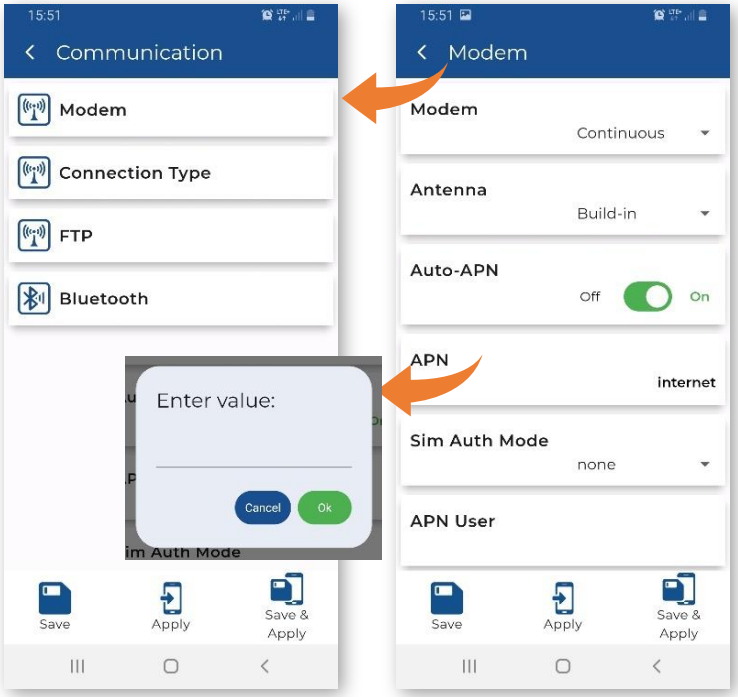


In *Continuous* mode, the modem is active all the time. However, this mode is energy-intensive and if the continuous data transfer is not required, it is recommended to use the *Periodically active* mode, which ensures low energy consumption.

In the *Periodically active* mode, you can set the **Connection Period** during which the 4G modem is in sleep mode.

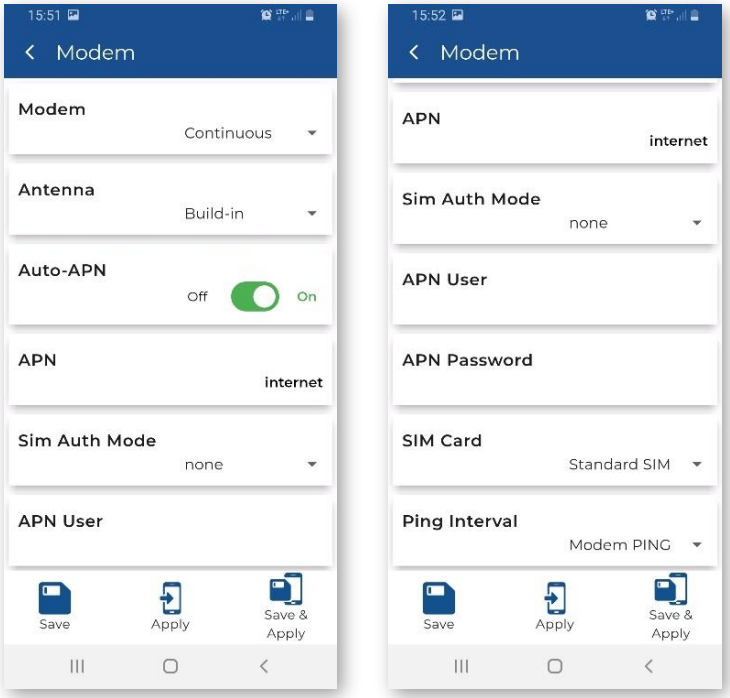
The modem will go into sleep mode immediately after the settings have been applied and will be woken up either when the period expires or when the event occurs.

When the modem wakes up, it automatically connects to *SvanNET* and *SvanNET* takes control of the device, downloads data and finally puts the modem into sleep mode. And so on.



In the **Modem** sub-section, you can:

- select the type of **Antenna** (*Build-In* or *External*),
- switch on/off the automatic APN naming (**Auto-APN**),
- enter the **APN** name of the SIM card,
- select the method of user verification by the SIM card **Sim Auth Mode** (*none* or *PAP*),
- enter **APN User** login,
- enter **APN Password**,
- select the **SIM Card** type (*Standard SIM* or *Data only SIM*),
- select **Ping interval** (*Modem PING Off*, *0, 1m, 2m, 3m, 4m*),
- enter **Ping address** (if Ping interval = *1m, 2m, 3m, 4m*),



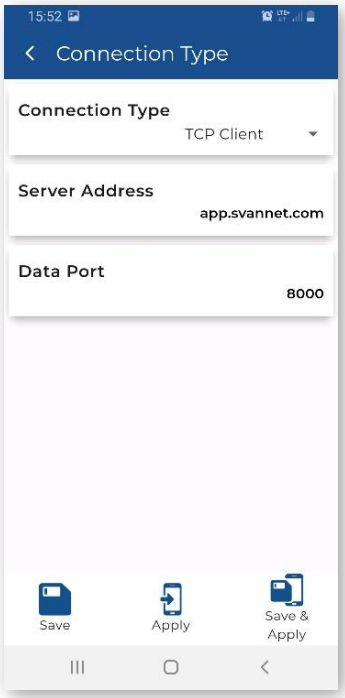
The **Ping interval** item allows you to set the length of time the system waits between ping packets. If **Ping interval** is set to *Off*, pinging will be disabled.

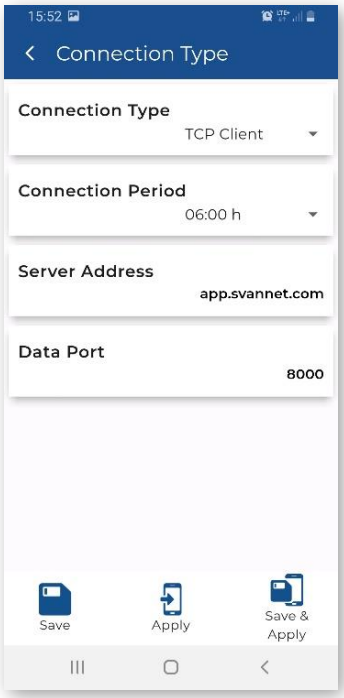
The **Ping address** item allows you to set the address of the ping server to be used first. If this address is not set, the instrument will use the default addresses.

In the **Connection Type** sub-section, you can:

- select the **Connection Type** (*Off, TCP Server, TCP Client – see Chapter 3.11.1*),
- enter TCP/IP **Server Address**, which is *app.svannet.com* by default.
- set the port number (**Data Port**) for data exchange between the remote host and the station.

If the *Periodically active* mode is selected in the **Modem** sub-section, you can set the **Connection Period** during which the 4G modem is in sleep mode.





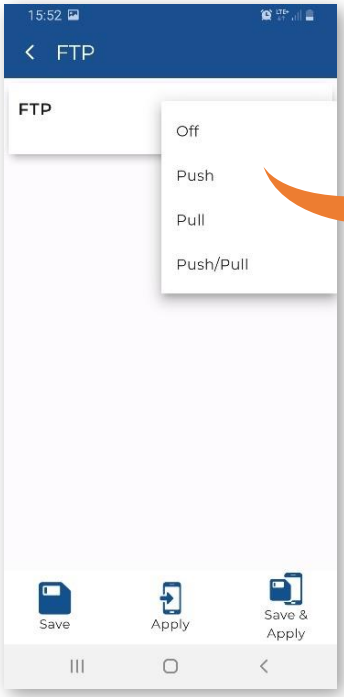
Note: *The FTP function is optional and should be unlocked by entering the activation code (see Chapter 4.4.4).*

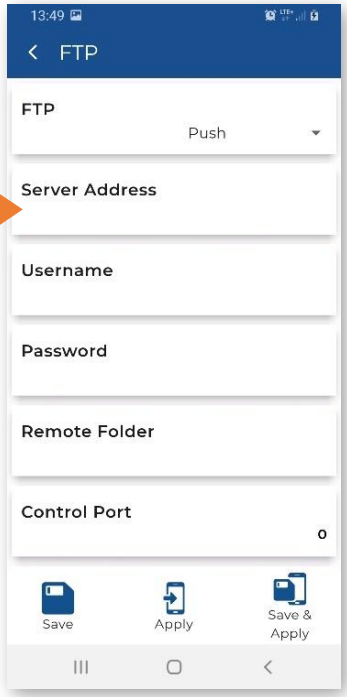
In the **FTP** sub-section, you can:

- switch off (*Off*) or select the **FTP** type (*Push, Pull, Push/Pull), see Chapter 3.11.2*.

If the FTP type is *Push*, you can:

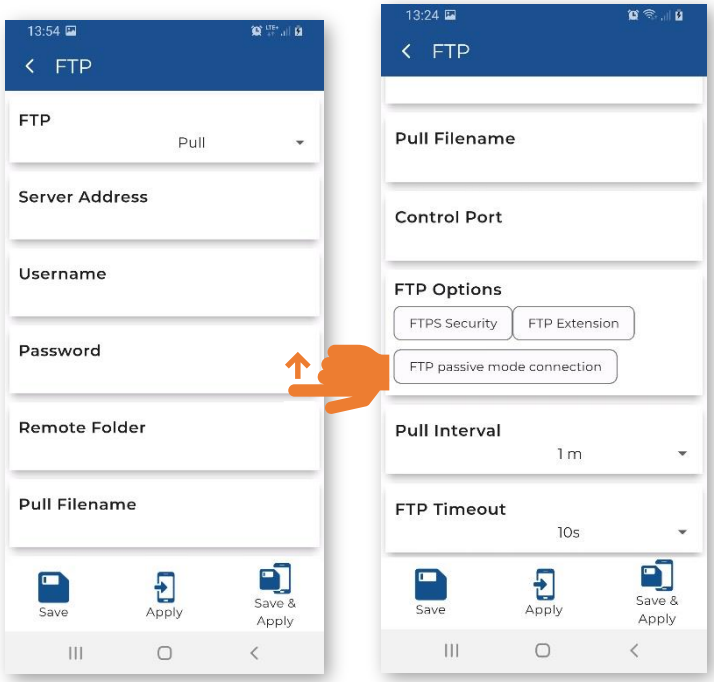
- enter FTP **Server Address**,
- enter **Username**,
- enter **Password**,
- enter **Remote Folder**,
- enter **Control Port**,
- select the **Push Sectors** number (*Auto*, *0 ÷ 124*),
- select the **FTP Options** (*Privat IP ignoring*, *FTPS Security, FTP Extension, FTP passive mode connection*),
- select the **Push Interval** (*At the file size change*, *At logger split, 1m ÷ 24h*),),
- select **Push Files** (*SVL, CSV, WAVE, TXT*),
- select **FTP Timeout** (*10s ÷ 4m*).





If the FTP type is *Pull*, you can:

- enter FTP **Server Address**,
- enter **Username**,
- enter **Password**,
- enter **Remote Folder**,
- enter **Pull Filename**,
- enter **Control Port**,
- switch on/off the **FTP Options** (*FTP passive mode connection, Privat IP ignoring*, *FTPS Security, FTP Extension*),
- select the **Pull Interval** (*After FTP push, 1m ÷ 24:00h*),
- select **FTP Timeout** (*10s ÷ 4m*).



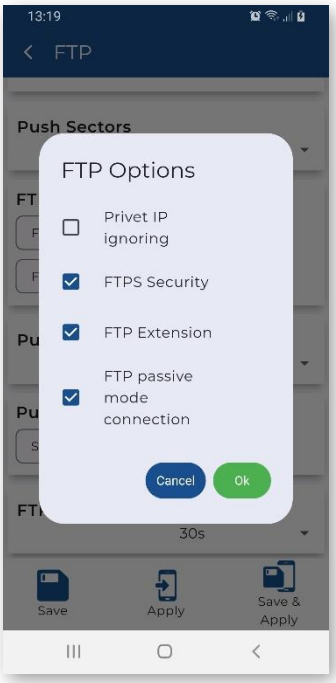
If the FTP type is *Push/Pull*, you can set parameters for both Push and Pull.

Server Address means the location of the FTP server on the network to which you can connect to transfer files.

Push Interval means that files are downloaded to the server from the instrument with the interval from 1 second to 24 hours or when: the file changes its size or the logger splits (see Chapter **Error! Reference source not found.**).

Pull Interval means that files are downloaded from the server to the instrument with the interval from 1 minute to 24 hours or after the FTP push is released.

FTP Options

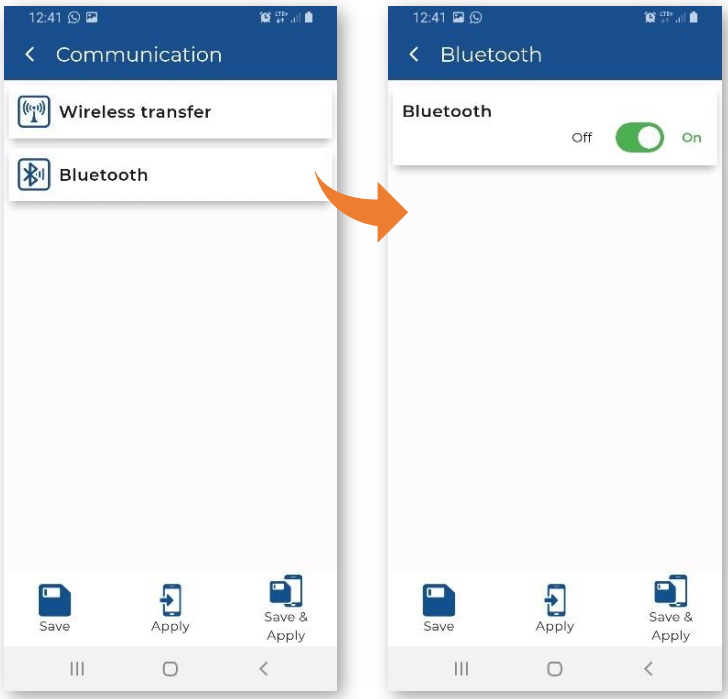


- **FTP passive mode connection**
  - If *Off*, the client establishes the command channel and the server establishes the data channel. Passive FTP provides no security for the FTP server.
  - If *On*, both the command channel and the data channel are established by the client. Active FTP provides security for the FTP server.
- **Private IP ignoring**
  - If *Off*, during a passive FTP mode, the client uses the IP address received from the server, even if it is a private IPV4 address.
  - If *On*, during a passive FTP mode, if the server sends a private IPV4 address, the client will ignore it and connect to the server using the IP address used to establish the FTP command channel.
- **FTPS Security**
  - If *Off*, all FTP commands will make plain FTP connections.
  - If *On*, the FTPS security is enabled.
- **FTP Extension**
  - If *Off*, the EPRT and EPSV commands are always used.
  - If *On*, both module and server IPV4 will use PORT and PASV commands option added to pass-through firewall that is unaware of the extended FTP commands for PUT, LIST, APP, GET.

4.6.6.2 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.



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.

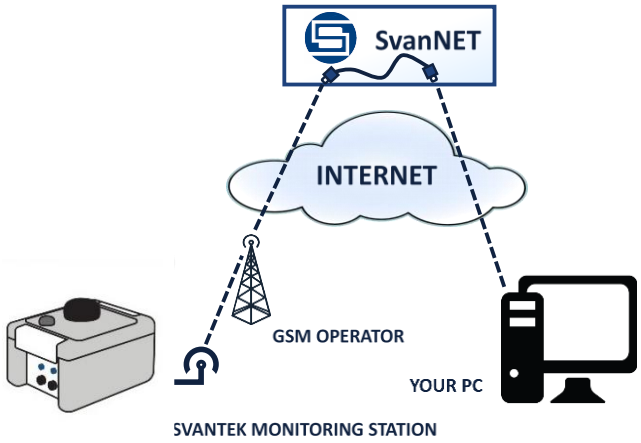
After successful configuration of the 4G modem and connection to the *SvanNET* web service, you can start working with the monitoring station remotely.

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 button on the SV 803 keypad and after a while SV 803 will be connected to *SvanNET* again.

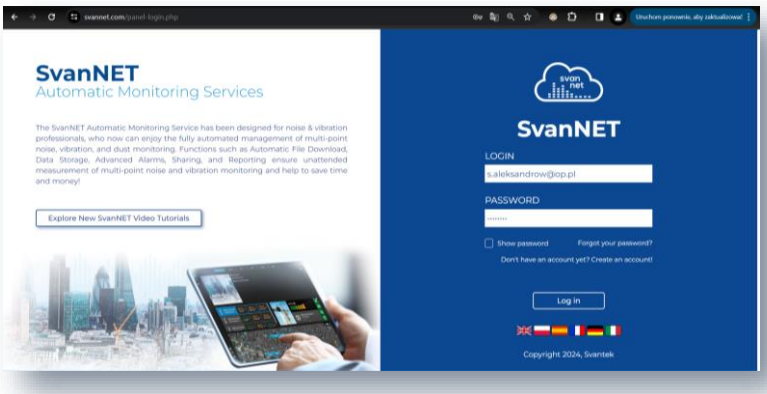
***Note:** If there is a Bluetooth connection, the station will not enter or exit sleep mode.*

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

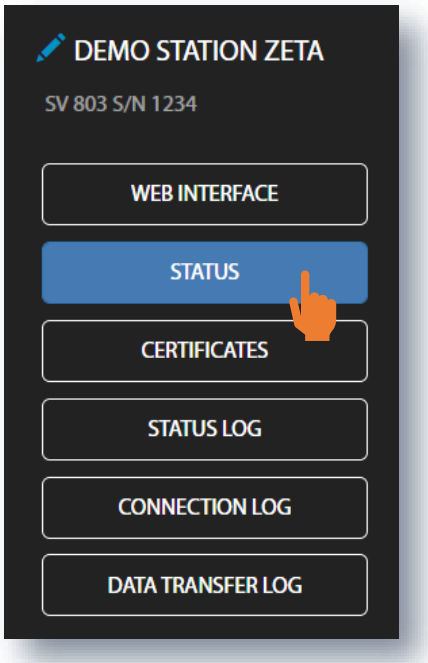
activate licences

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.

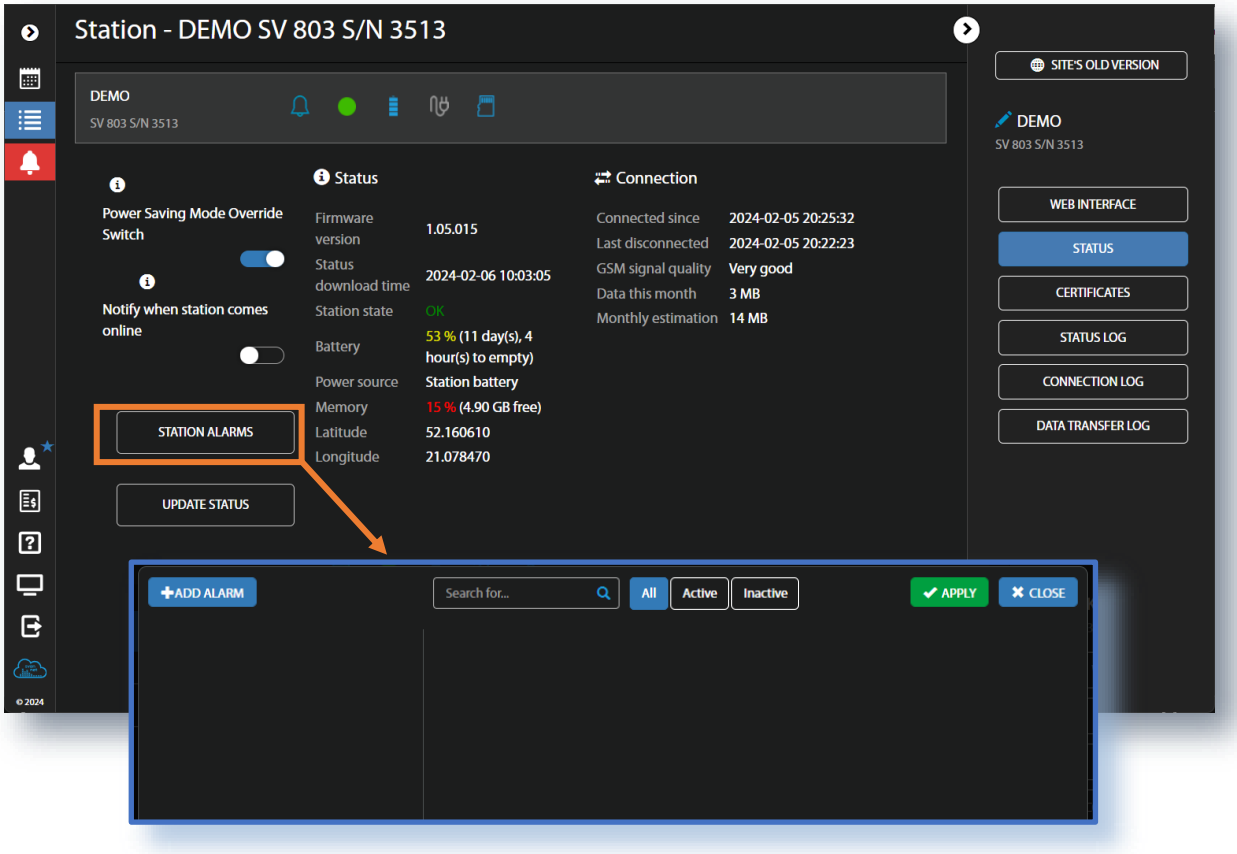
The **DATA TRANSFER LOG** button switches to the Data transfer log view (see Chapter 5.2.3), where you can check the history of data transfers (uploads).

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**).



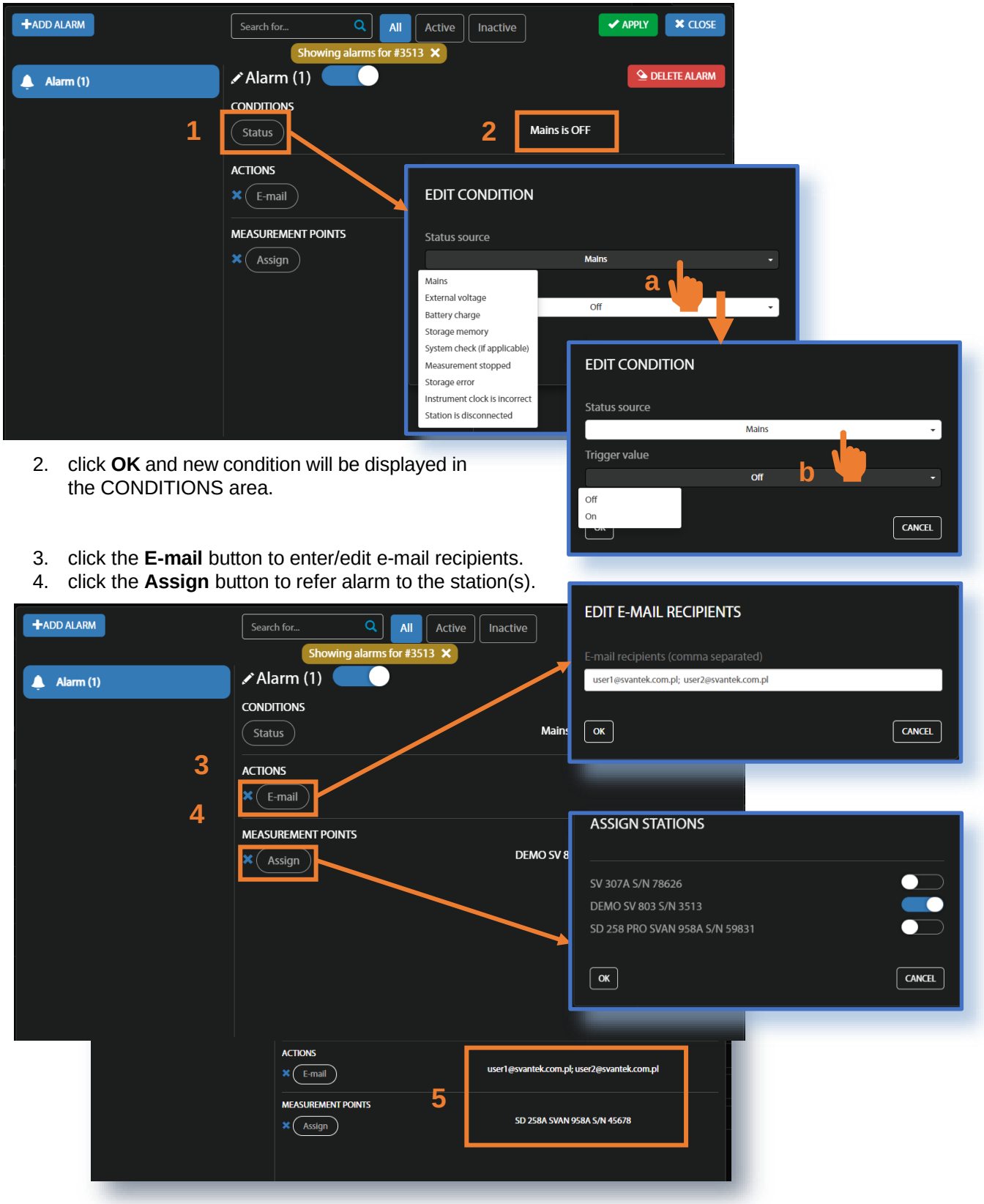
Power Saving Mode Override Switch can be activated to prevent the station from entering into the configured Power Save Mode. The next time the station connects to *SvanNET* (either due to a scheduled connection cycle or due to an event being triggered), the station will remain online with its modem running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

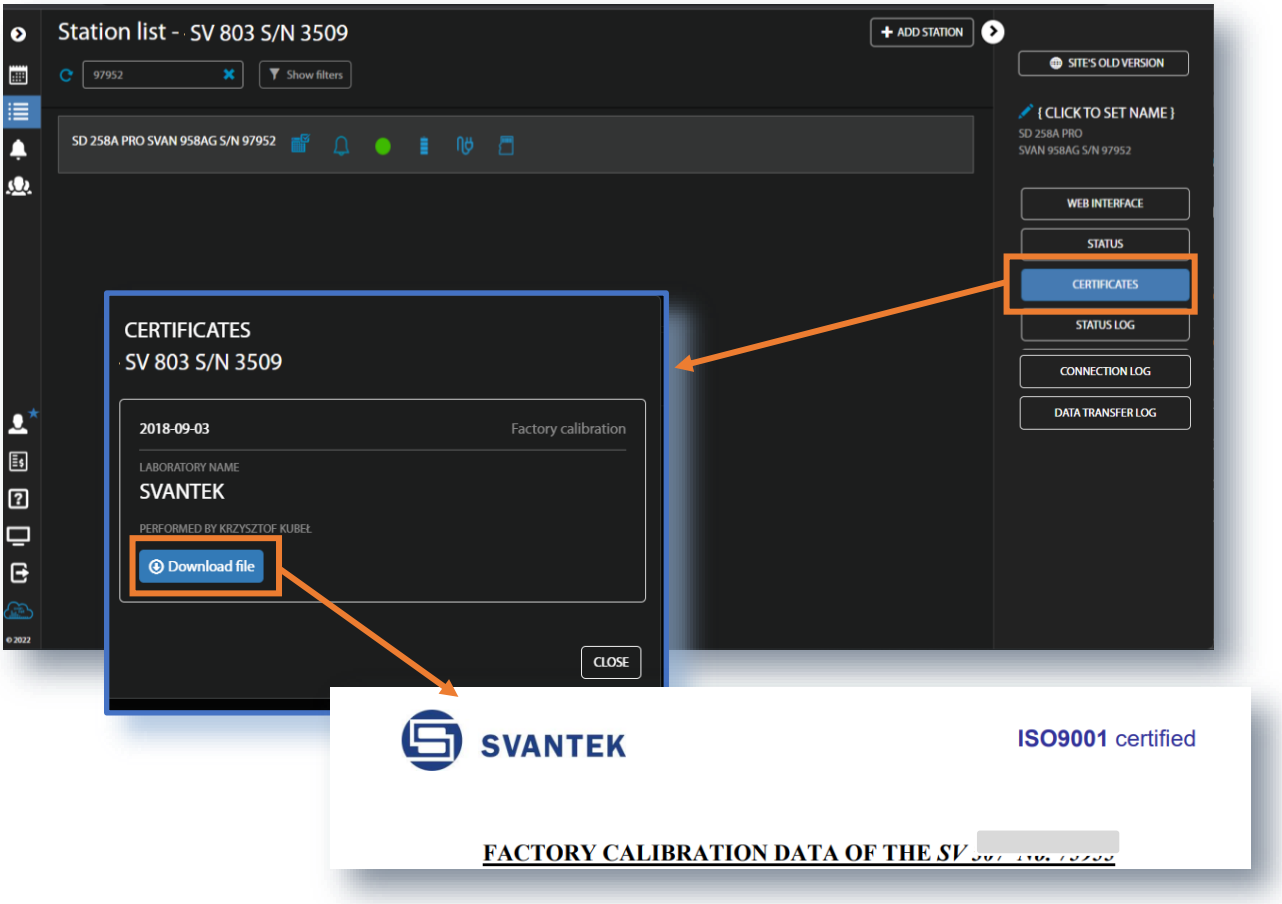
Alarms are reported once after the occurrence of an alarm condition. The occurrence of an alarm condition will generate selected actions (e.g., email) at the moment of status changes compared to the previous check (i.e., if at 8:15 there is power, at 8:30 the power is off, at 8:45 the power is still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

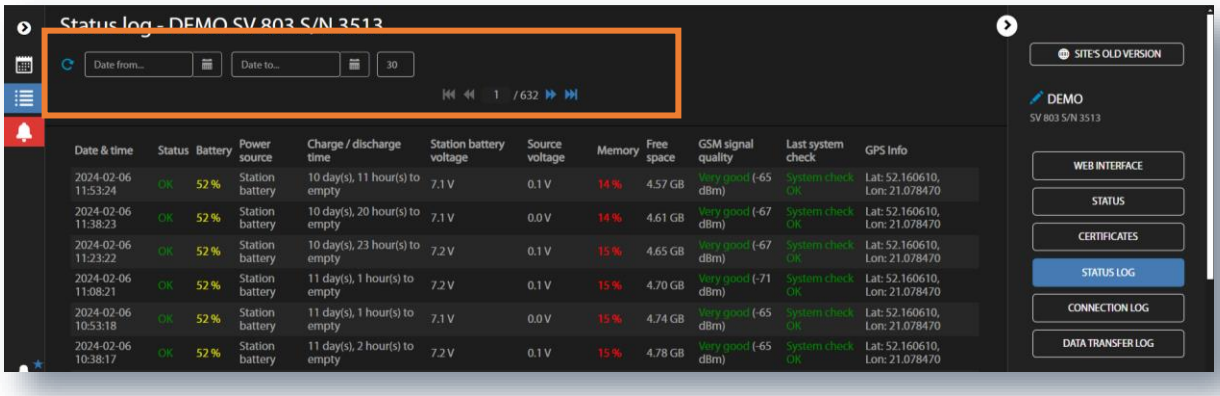


5.2.3 LOG views

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

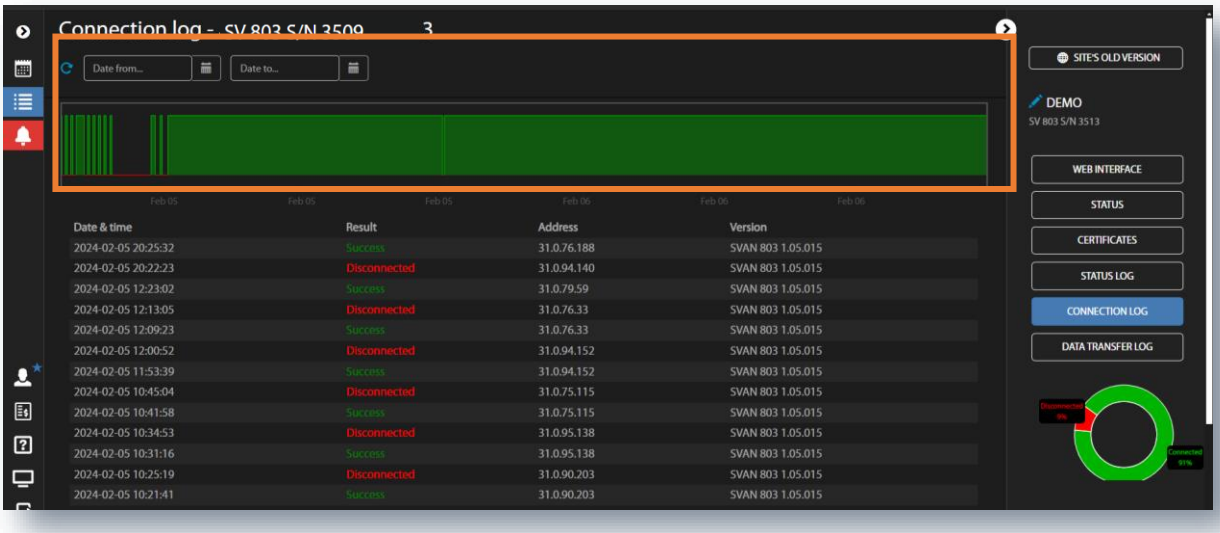
- **Status log** that records the type of power source and charge level, free memory space, GSM signal quality, system check history and GPS information.

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



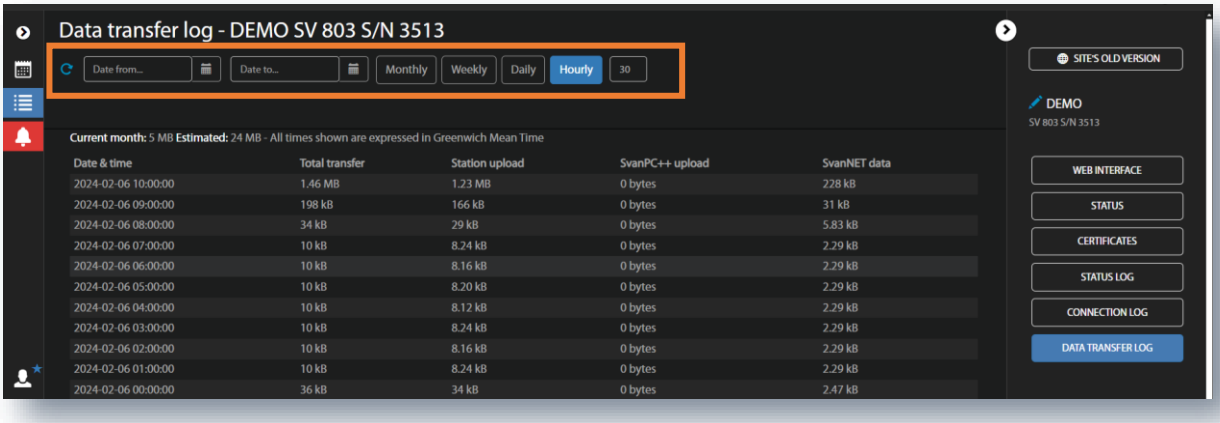
- **Connection log** that registers the history of station connections – result (successful or disconnected), IP address, firmware version and reason for disconnection.

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.



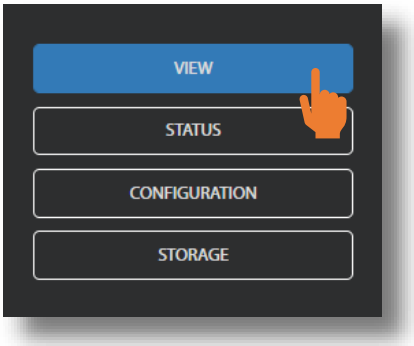
- **Data transfer log** that registers history of data transfers (uploads).

  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.

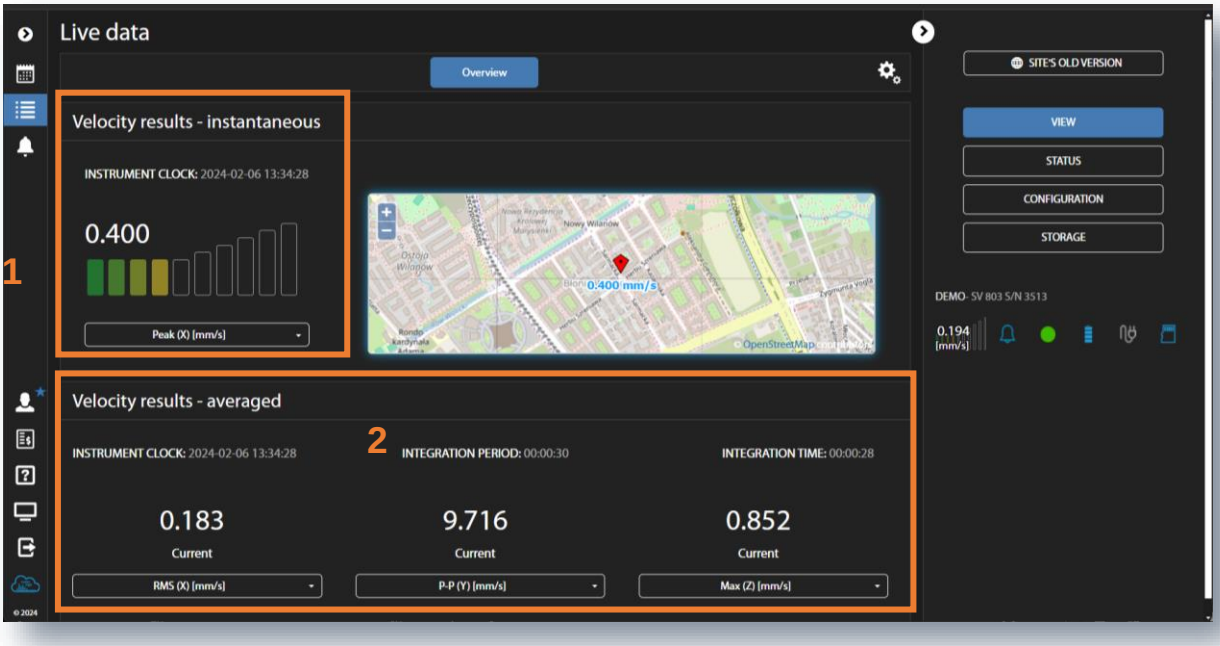
The **STORAGE** button switches to the **Storage** view (see Chapter 5.2.6), where you can download files manually.

***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 shows the map with the instrument location and the results measured in selected channels, updated every second:

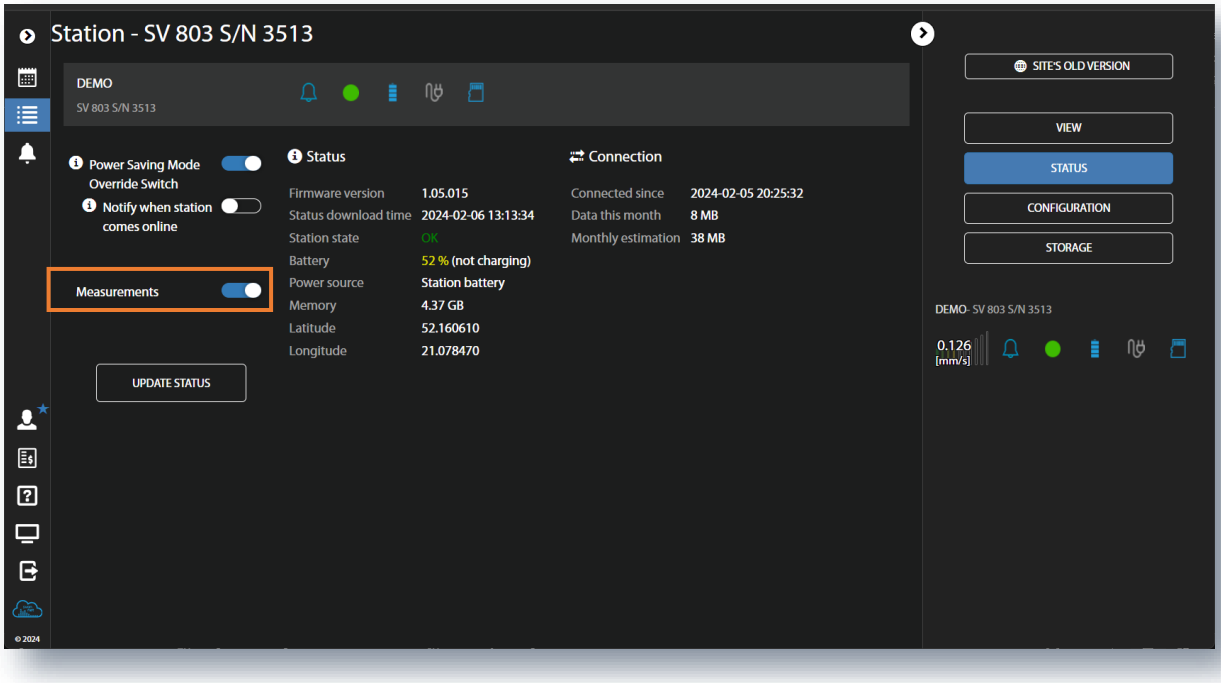
1. **Velocity results - instantaneous** measured/averaged over a 1-second period; and
2. **Velocity results - averaged** over the INTERGRATION TIME in the range [**1s** ÷ INTEGRATION PERIOD]. After the INTEGRATION PERIOD has elapsed, the averaging starts from the beginning.



There are selectors for the results displayed. To change the result displayed, 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**), FTP Client (**FTP data transfer**), auxiliary parameters (**Auxiliary**) and the firmware upgrade (**Firmware upgrade**).

To send a new configuration to the station, click on 

.

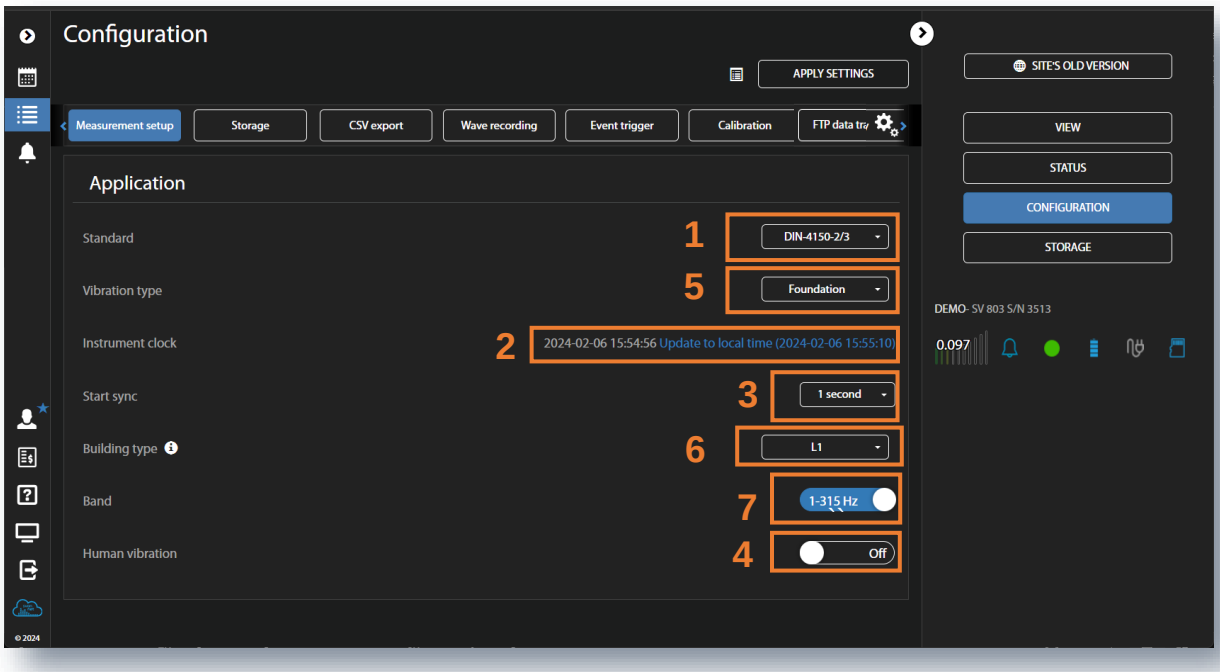
In the **Measurement setup** section, you can:

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*, *PN-B-02170 (SWD-I)*, *PN-B-02170 (SWD-II)*, *SS4604866:2011*, *SS25211* or *User,*
2. update the **Instrument clock**,
3. set the synchronisation of the measurement start with the instrument's RTC to: *1 second*, *1 minute*, *15 minutes*, *30 minutes* or *1 hour*,
4. switch on/off the **Human Vibration** measurements,

and depending on the standard:

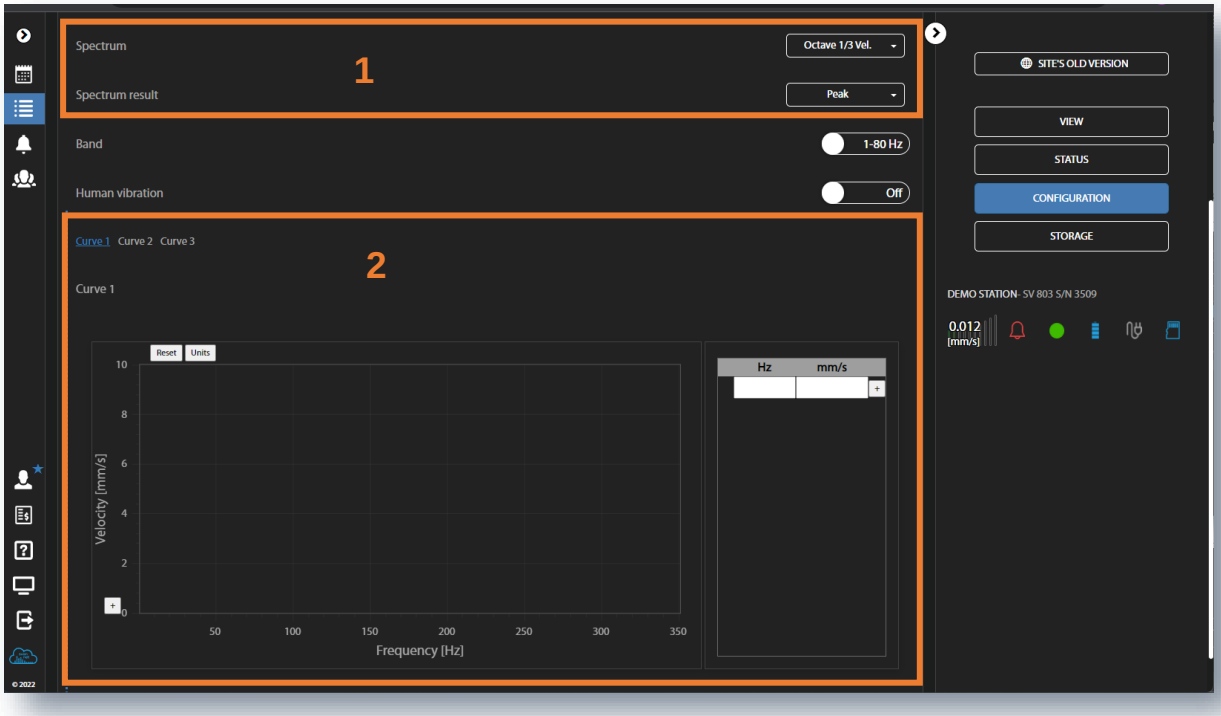
5. select the type of building element (**Vibration type**): *Foundation*, *Top floor*, *Floor slab*, *Underground cavities*, *Buried pipework*, *LT top floor*, *LT floor slab,*
6. select the **Building type** criterion curve for some standards: *L1*, *L2* … or *Workshop*, *Office*, *Residential*, *Theatre*,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

For the *PN-B-02170 (SWD-I)* and *PN-B-02170 (SWD-II)* standards, you can select the type of **SWD Curve 1/2/3**: *A, A', B, B', C, C', D* or *D'*.



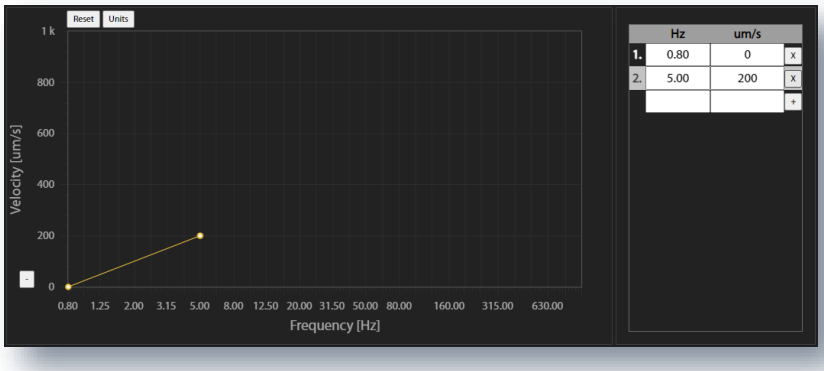
The *User* standard allows you to:

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.

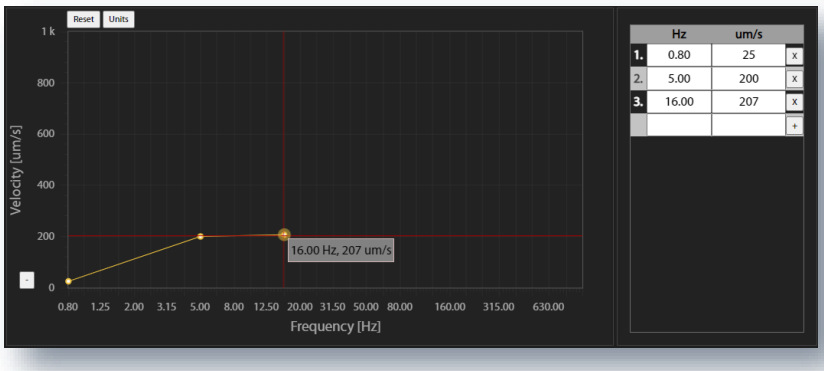


There are two ways to create a curve – using a table or a graph. Both ways complementary. First select the curve you wish to create or modify (**Curve 1**, **Curve 2** or **Curve 3**).

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.



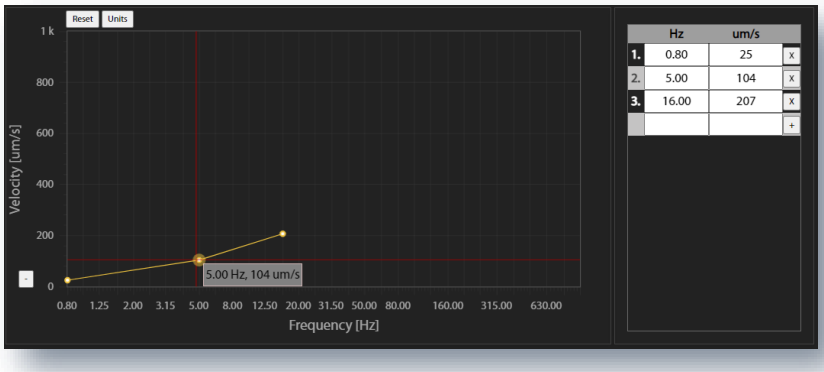
If you want to use a graph, place the cursor on the desired coordinate and click. The new point will be appear on the graph and in the table.



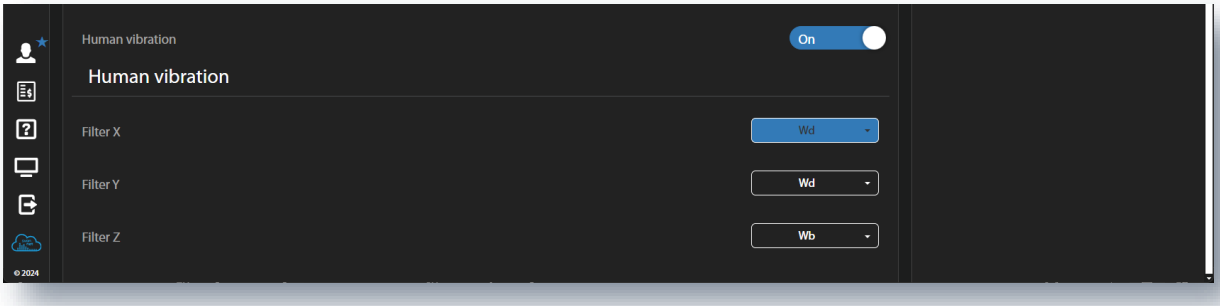
If you want to change the position of the previously created point, you can change its coordinates using either the table or the graph.

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.



When the **Human Vibration** option is enabled, you can set the weighting filters for the three channels: X (*Wd* or *Wm*), Y (*Wd* or *Wm*) and Z (*Wb* or *Wm*).



The instrument performs two types of vibration measurement in three channels – velocity and acceleration vibration. The results of both types of measurements are stored in a logger file. Velocity signals can optionally be recorded in the WAV file.

The logger file may contain three types of records:

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

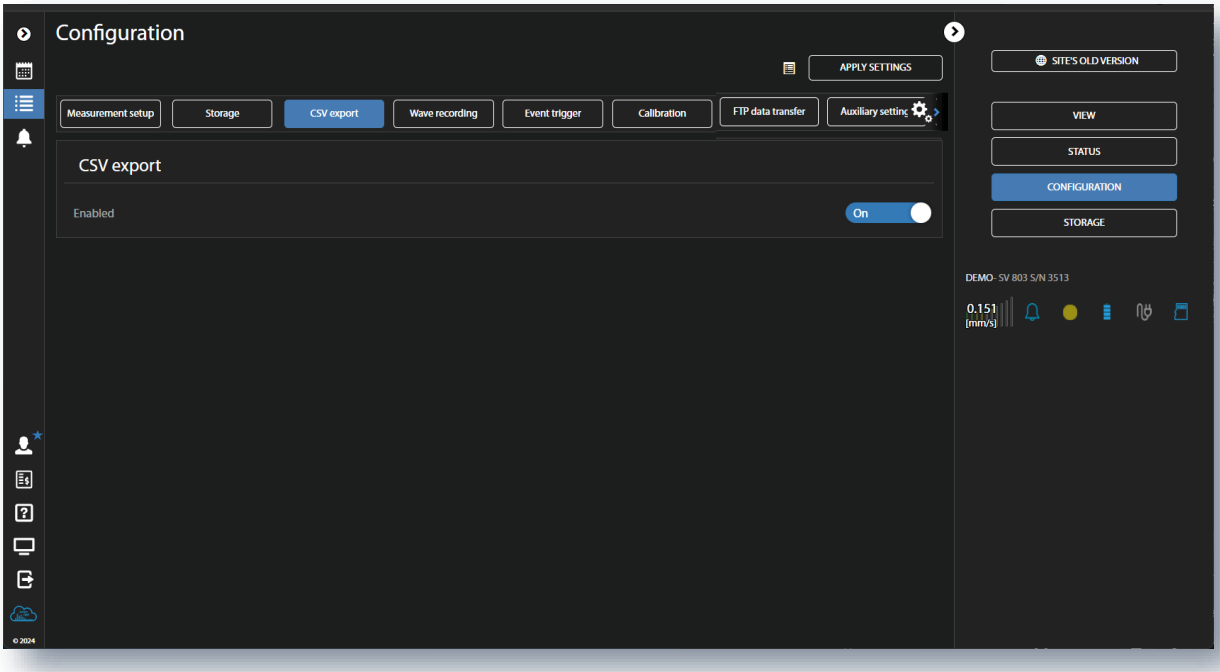
The WAV file contains waveform signals for three channels.

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 registration of the Velocity results,
3. **Human Vib. step** for registration of the Acceleration results,
4. **Spectrum velocity** results recording: switched off (*Off*), continuous during the measurement (*Continuous*) or when the event is registered (*On event*),
5. **Velocity results** to be saved in a logger file with the **Velocity step**: *PEAK* (PPV), *P-P*, *MAX*, *RMS*, *RRMS* (Rolling RMS), *PEAK VEC* (PPV VEC), *DF* (Dominant Frequency) (for some standards), *OVL* (Overload),
6. **Human vibration results** to be saved in a logger file with the **Human Vib. Step**: *MAX*, *RMS*, *VDV*.

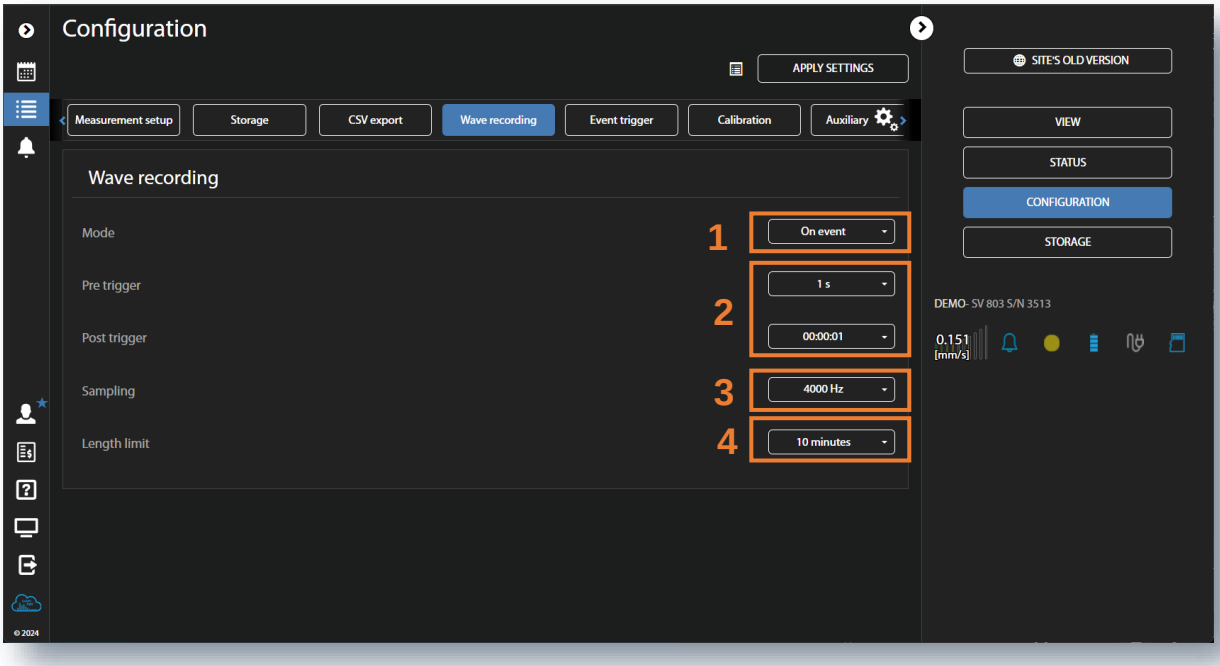
***Note**: All measurement results and waveforms are stored in files with automatically defined names. You can define both file names manually via the Assistant Pro or SvanPC++ interface (see Chapters 4.6.2.1, 4.6.2.2 and 6.3.4).*

The **CSV export** section allows you to export results that are logged to a logger file (except spectra) and alarms in the CSV (Comma Separated Values) format.



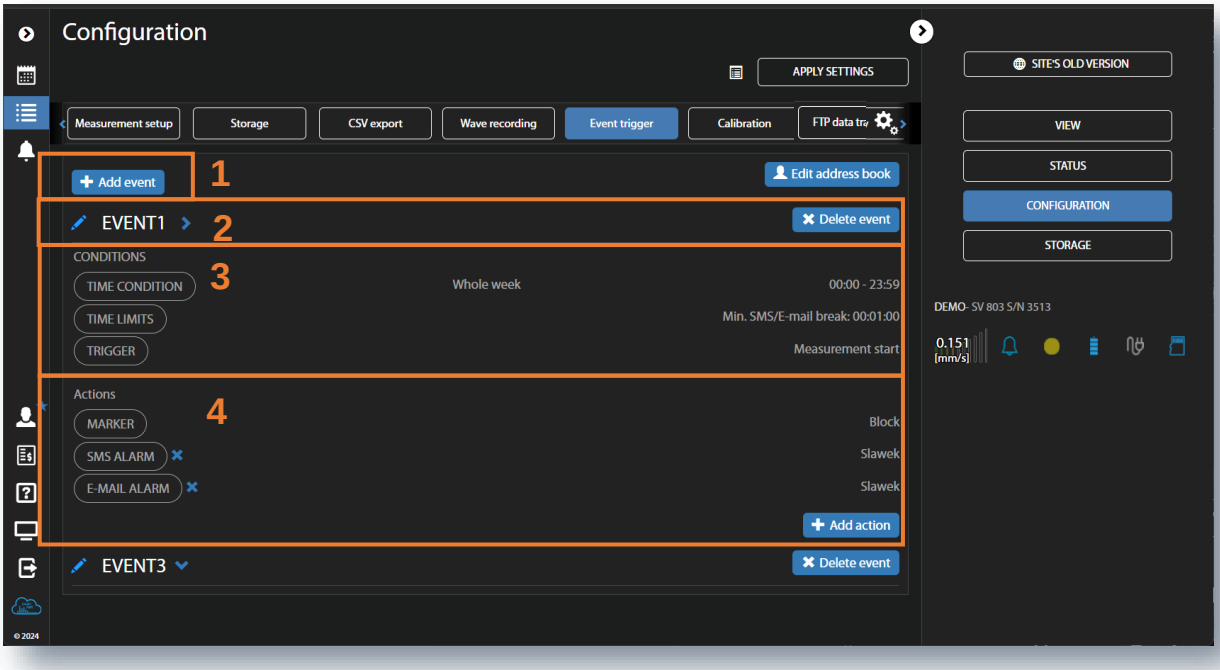
In the **Wave recording** section, you can:

1. set the recording **Mode**: *Disable*, *Continuous* (signals are recorded from the start of the measurement to the end of the measurement) 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 the signal recording after the trigger has occurred.



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

1. add a new event section,
2. name and delete the event,
3. configure conditions to trigger the event and
4. add and define actions that can be performed when the event is triggered.

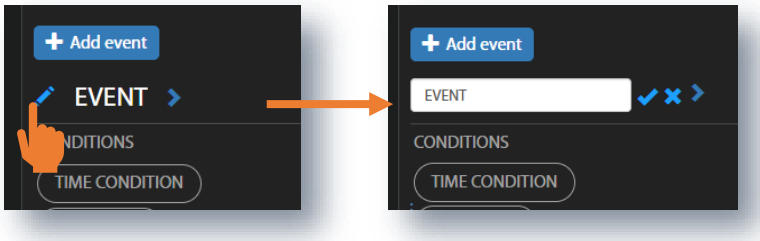


To add a new event, click on **+Add event**. The new **Event** section will appear with the **CONDITIONS** and **Actions** fields.

To edit the event name, click on  .

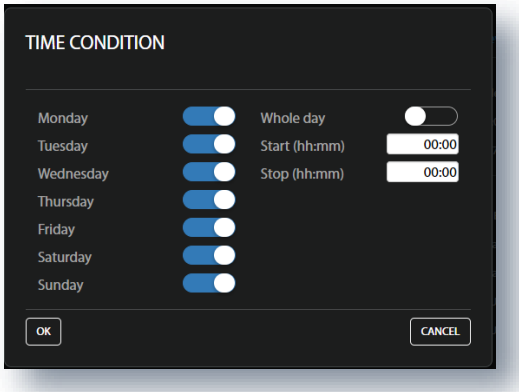
After editing the event name confirm it by clicking on  or reject it by clicking on  .

To hide the event, click on  .



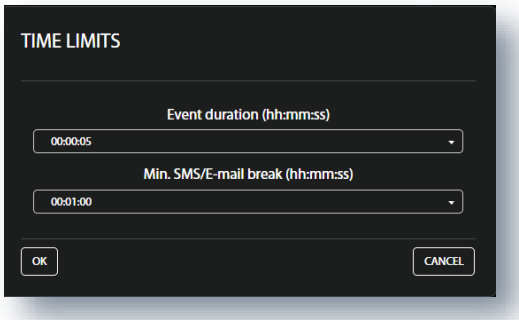
Configuring conditions

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



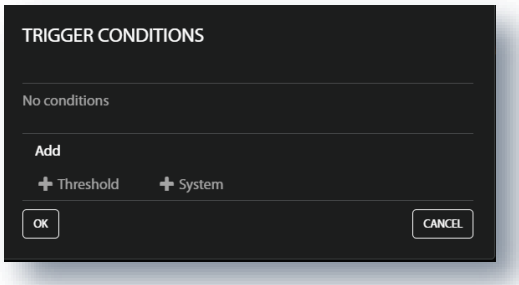
Click on **TIME LIMITS** to set the event (alarm) duration (only for the **Threshold** trigger!) and the minimum interval between consecutive SMS and/or E-mail notifications in the TIME LIMITS configuration box.

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



Click on **TRIGGER** to select the type of condition (**Threshold** or **System**) in the TRIGGER CONDITIONS configuration box. These conditions are mutually exclusive for the same event.

After selection, you can configure the selected trigger.



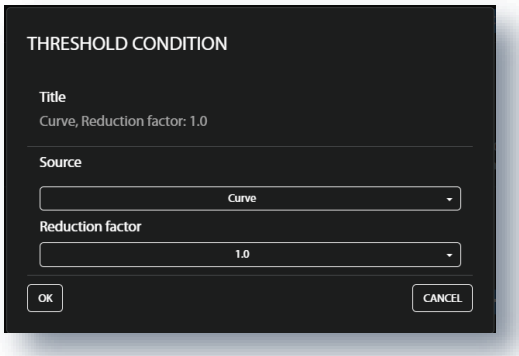
Threshold trigger condition

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

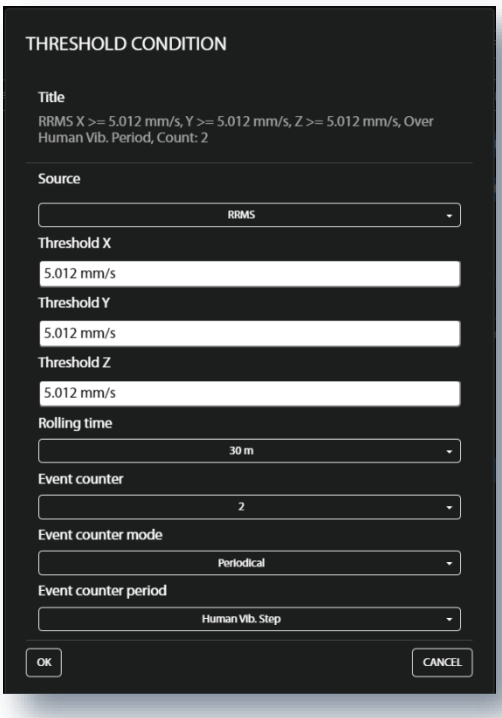


For *RRMS*, the **Rolling time** should also be defined.

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 occurs 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*.

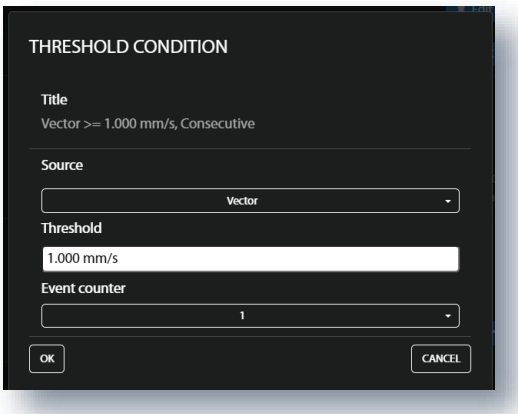


The Event counter is not used for the Curve source.

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.

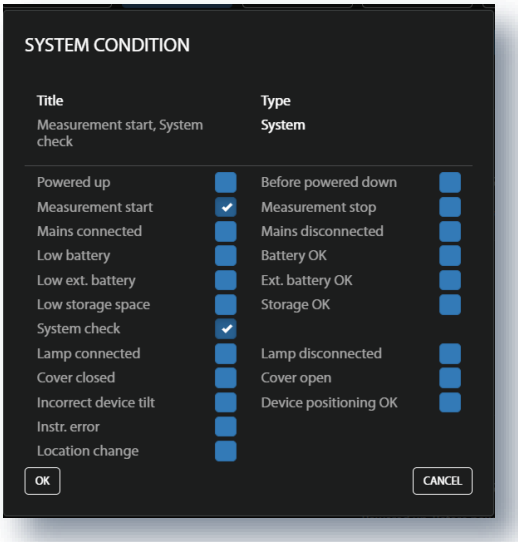
In the case of *PPV*, *RMS* and *RRMS*, it is necessary to define three thresholds for the X, Y and Z axes in the range 1 µm/s ÷ 100 mm/s and to program the **Event counter** logic.



System trigger condition

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

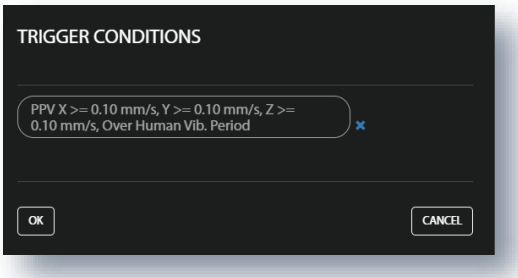
You can select some or all of the conditions presented in the SYSTEM CONDITION configuration box (see description in Chapter 4.6.3.2).



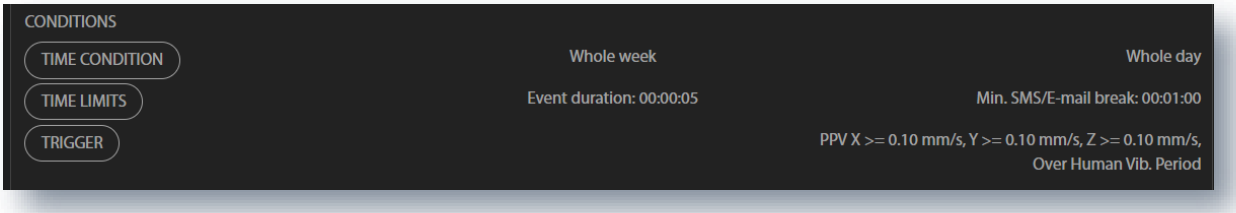
The selected threshold condition is displayed in the TRIGGER CONDITIONS pop-up box.

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.



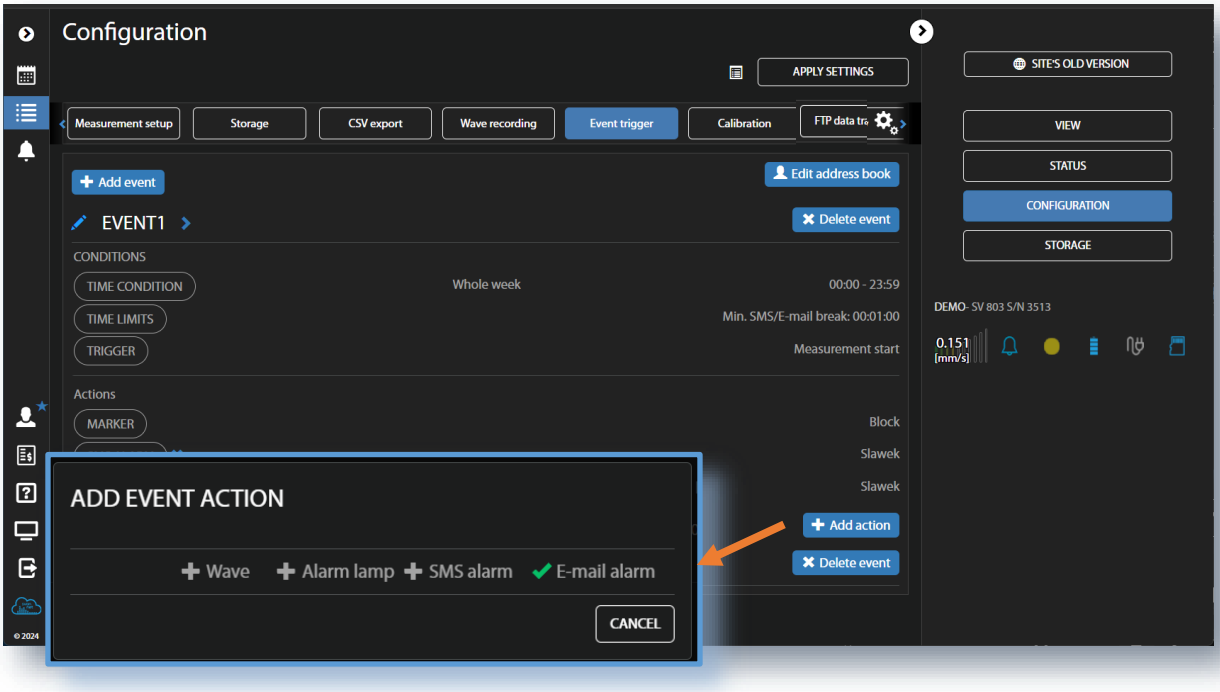
All condition settings are displayed in the lines of the corresponding buttons.



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**.

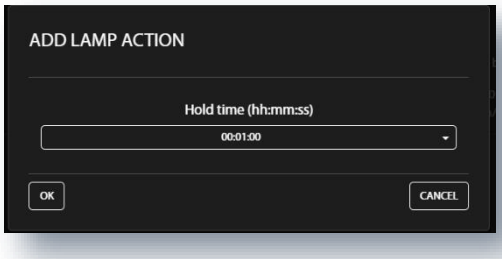
The **MARKER** action, which adds the special block marker of the event duration to the data file, is always enabled.



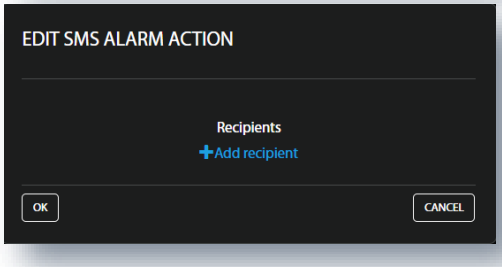
When the event occurs, actions are performed while the event is active, at the start of the event or at its end.

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).

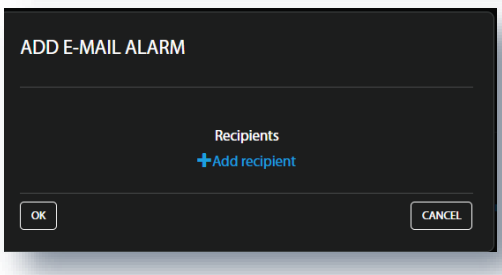
Hold time defines the duration of this alarm after the end of the event.



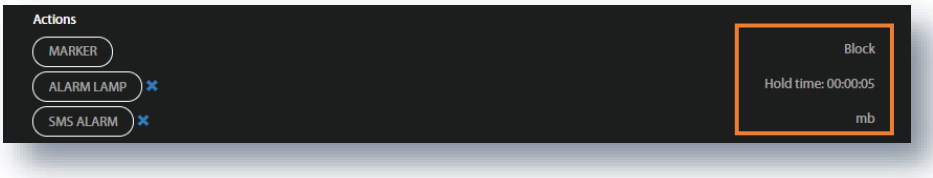
The **SMS Alarm** action sends the SMS message to the phones of recipients, which can be selected in the **ADDRESS BOOK** opened by clicking on **+Add recipients**.



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 box closes, and the selections are displayed in the lines of the corresponding **Actions** buttons.

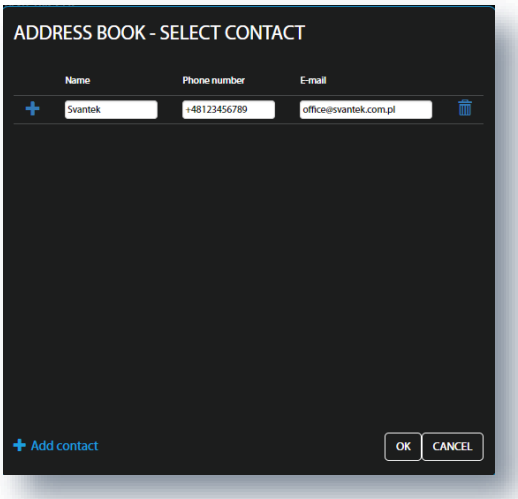


Address book

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**.

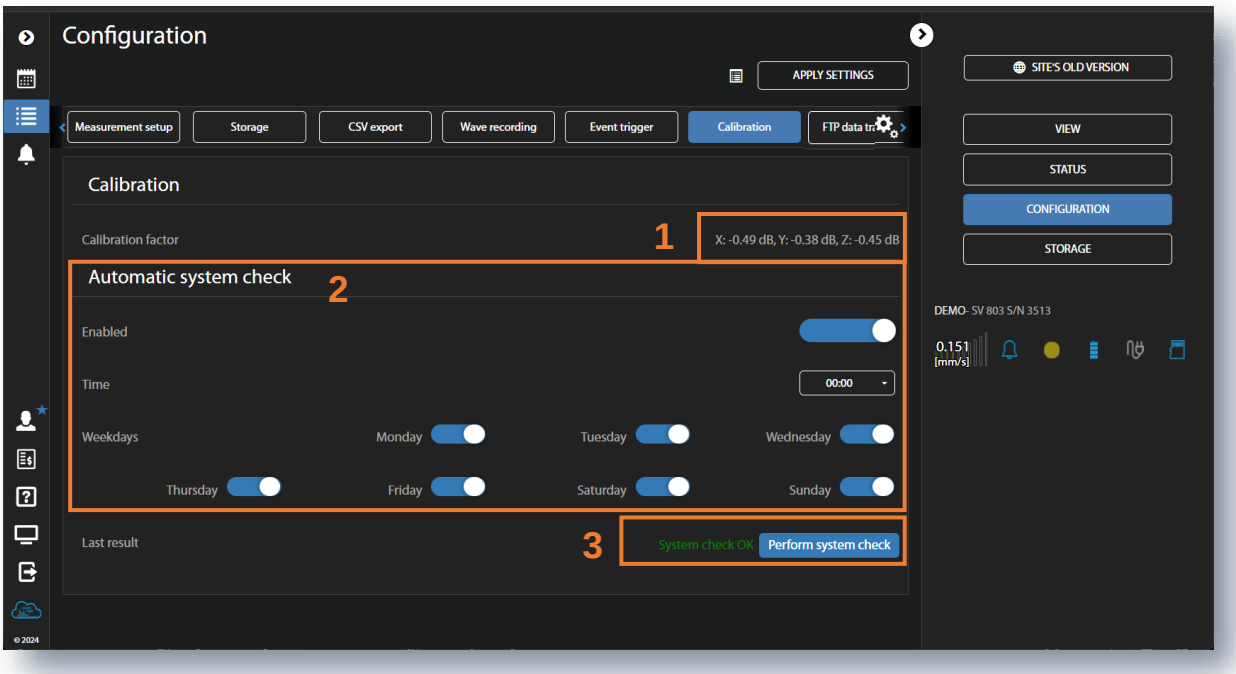
You can add the recipient by clicking on **+Add contact**.

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



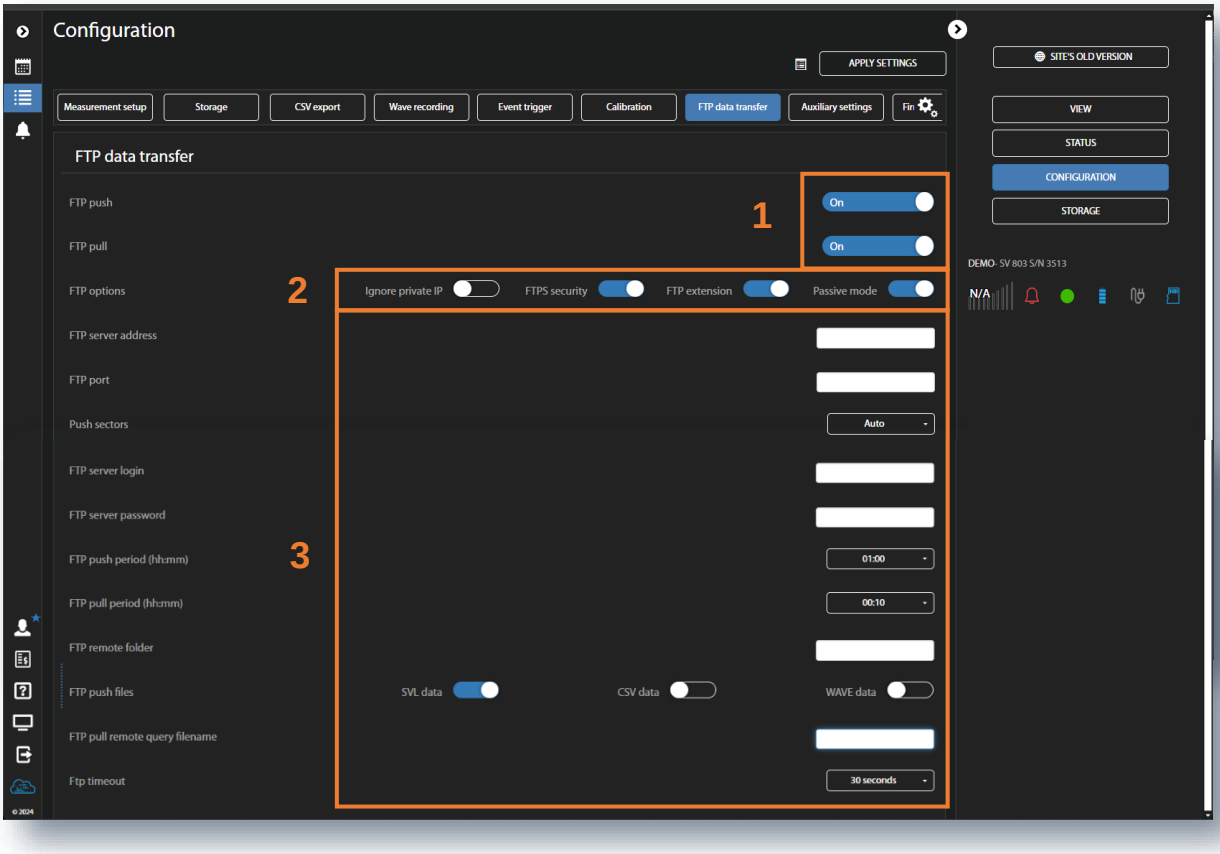
In the **Calibration** section, you can:

1. check the calibration factor,
2. activate and programme the automatic system check and
3. perform the system check manually.



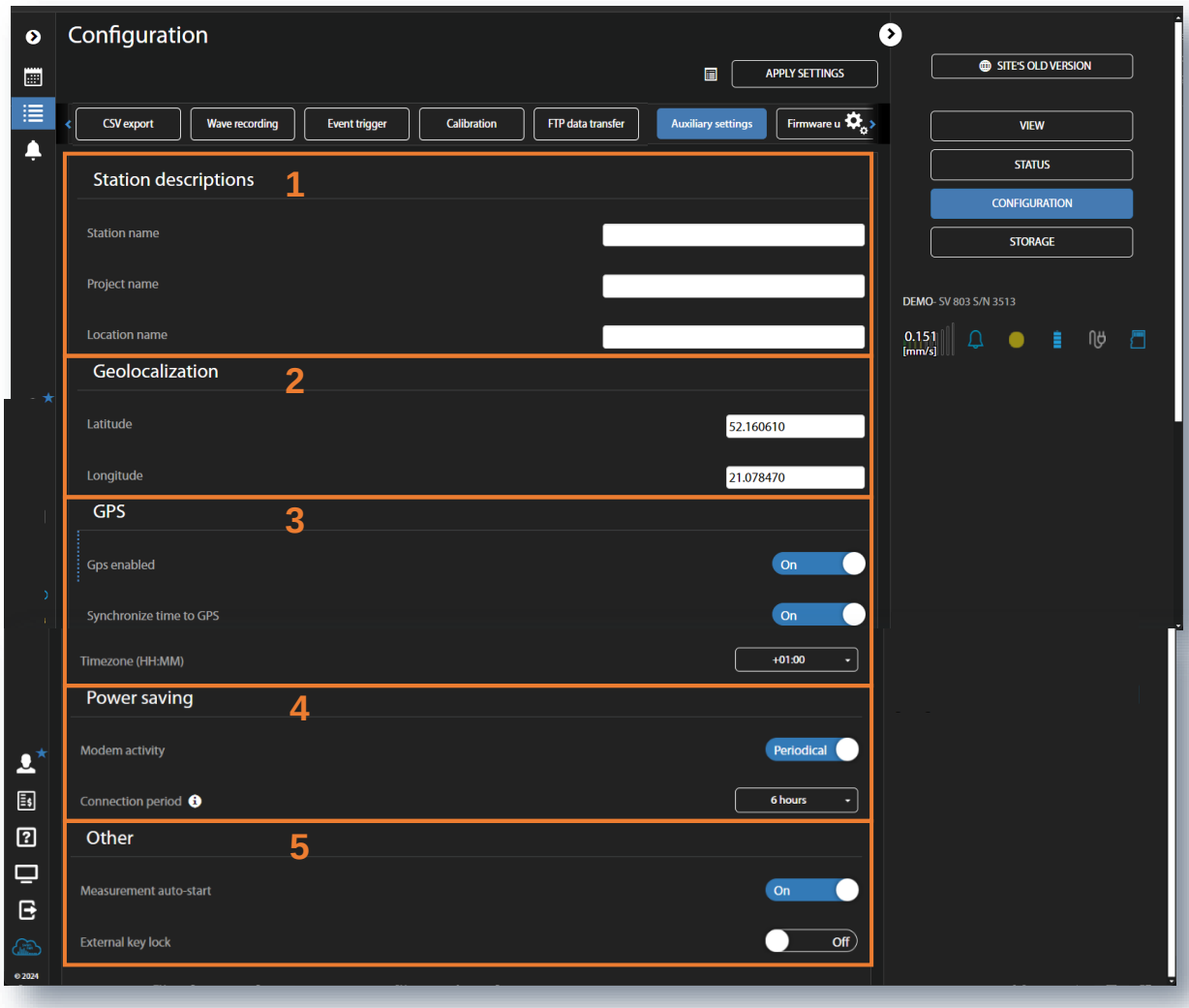
In the **FTP data transfer** section, you can set the FTP option parameters (see Chapter 4.6.6.1):

1. switch on **FTP push / pull** data transfer,
2. select **FTP options**: *Ignore private IP*, *FTPS security*, *FTP extension*, *Passive mode*,
3. set other FTP parameters: server address, port, etc.



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**,
3. enabled GPS, synchronise internal instrument's RTC with the GPS time and set the time zone,
4. set the **Power saving** mode of the modem: **Modem activity** mode (*Continuous* or *Periodical*) and 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,
5. set **Other** settings, like switching on **Measurement auto-start** option and **External key lock** option.

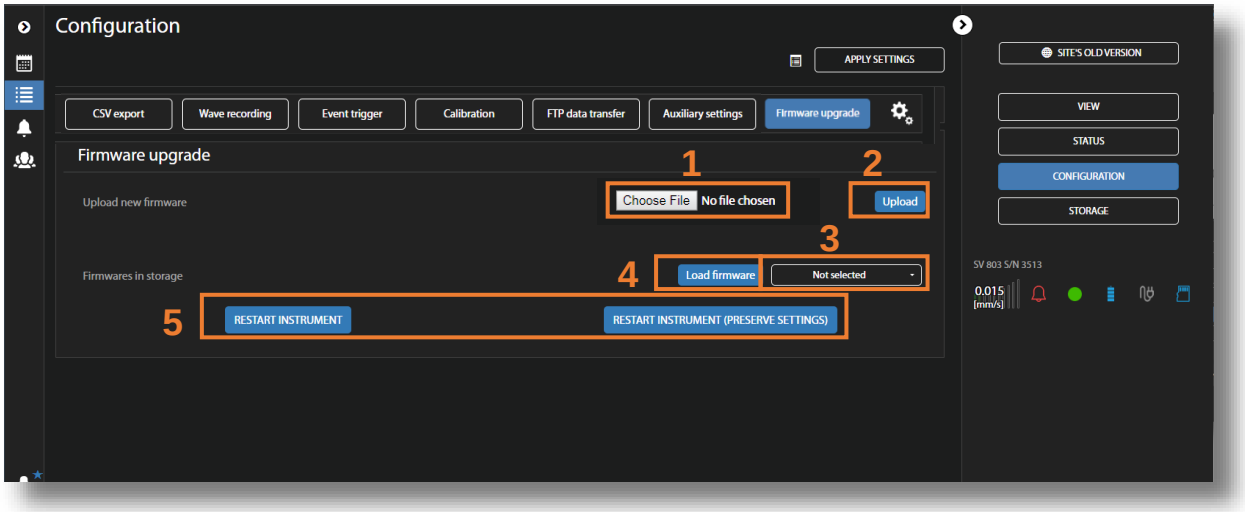


In the **Firmware upgrade** section, you can upload new firmware to the instrument's SD-card and perform the upgrade process remotely.

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.

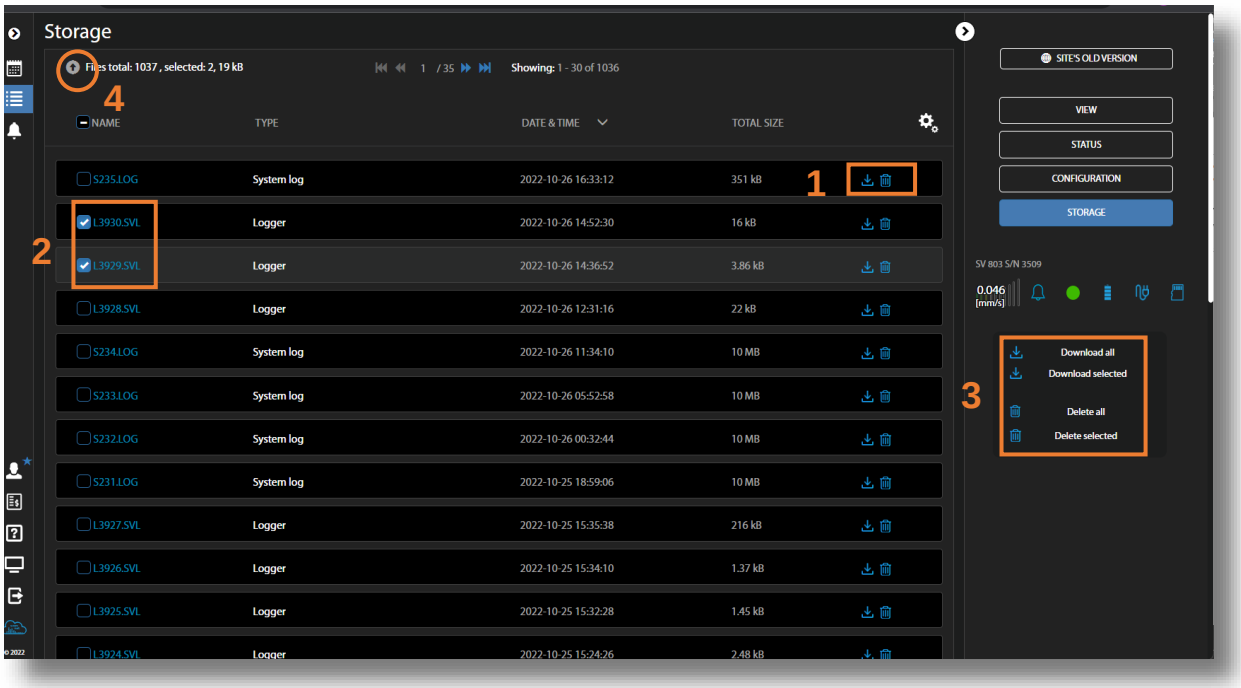


5.2.6 STORAGE view

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.

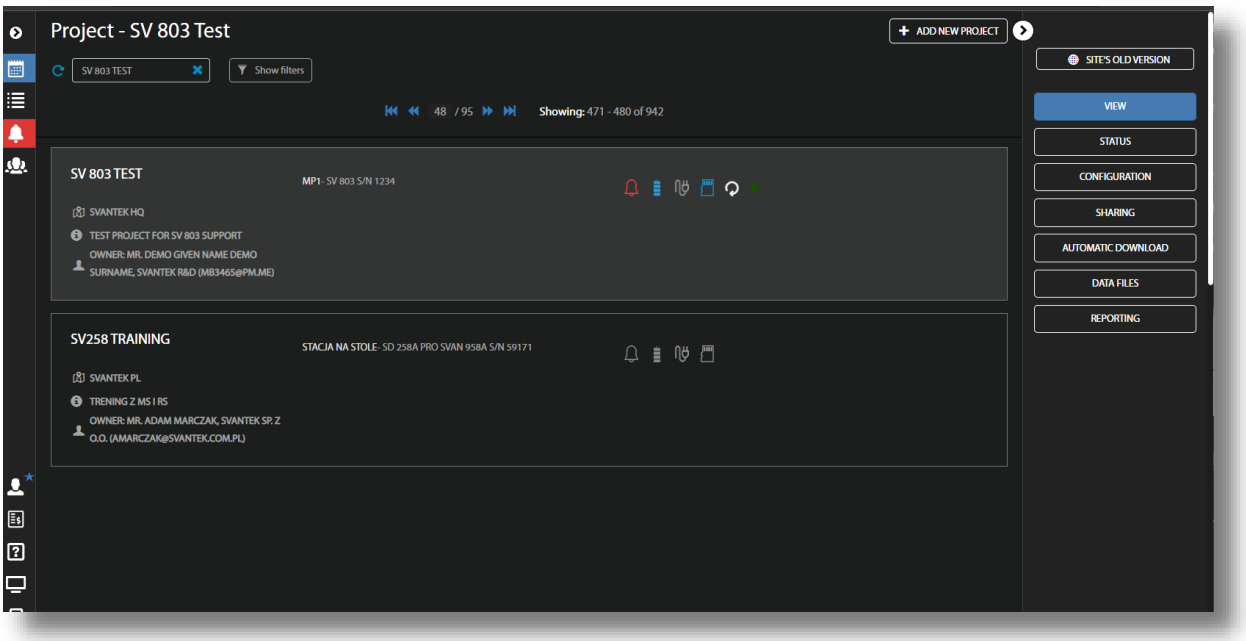
In the **Storage** view, you can:

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.

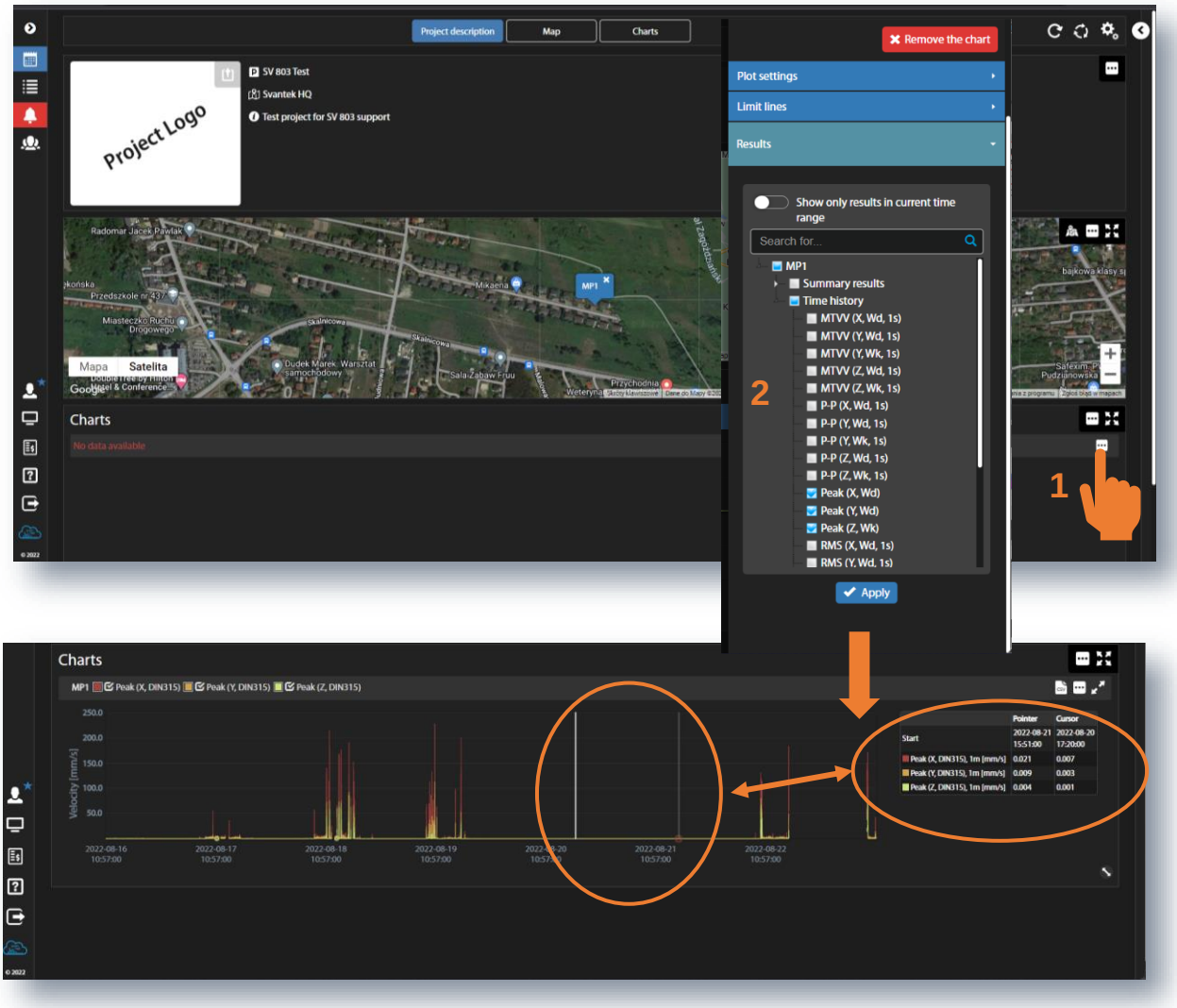
Configuring panels, formatting and creating reports is described in detail in the SvanNET User Manual. This manual only describes parts related to the operation of SV 803.

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.



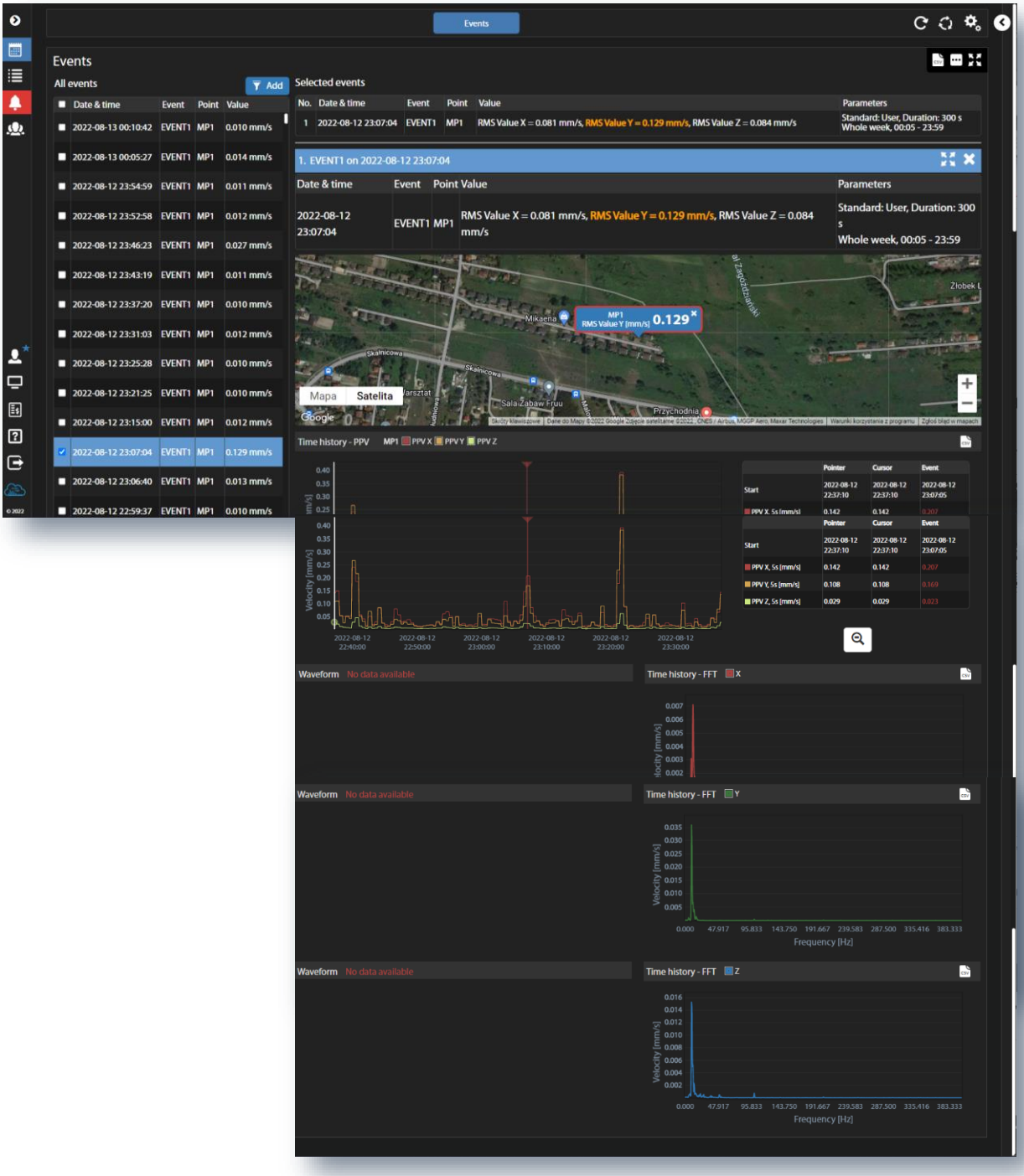
If you point the mouse at the plot, you can read the *Pointer* coordinates in the legend box. Click on the plot and read the *Cursor* coordinates in the legend box.

5.3.2 Viewing events – *Events* panel

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

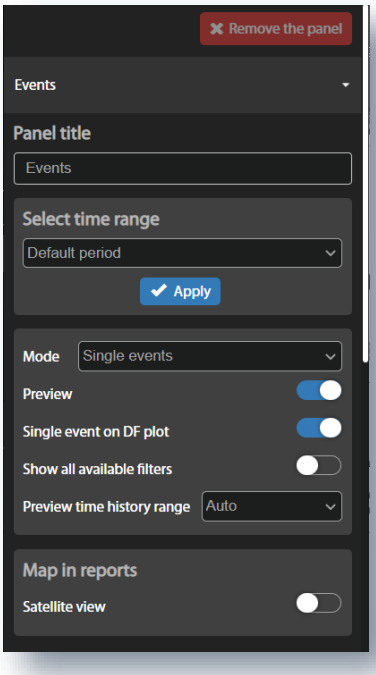
To view event details, highlight the event in the list.

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
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]
Velocity [mm/s]

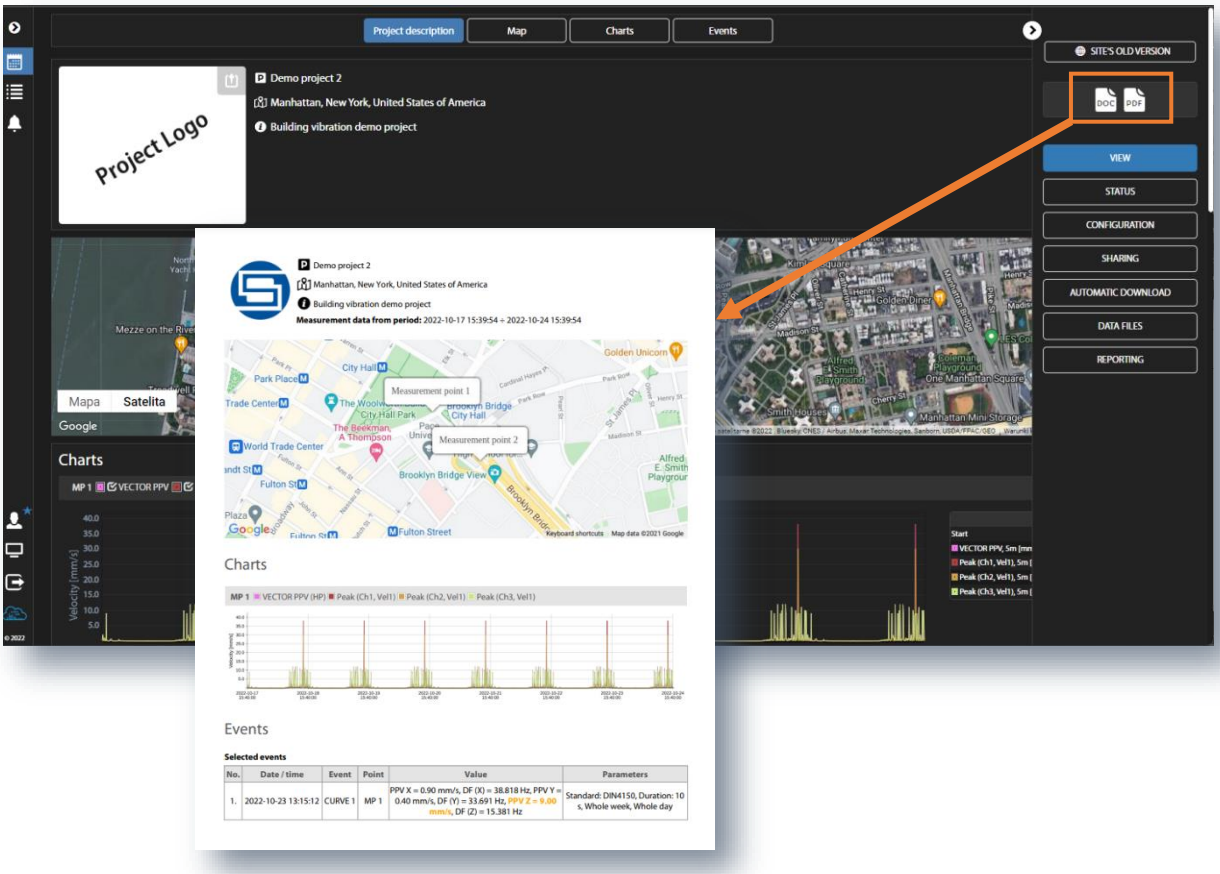
By clicking on the ••• icon in the *Events* panel, you can change the *Panel title* and customise the display of events details:

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 PC SOFTWARE – SvanPC++

The *SvanPC++* software for the PC enables configuration of the instrument settings and provides a wide range of data post-processing and reporting functions.

SV 803 must be connected to a computer running *SvanPC++* either by the USB cable or via the Internet. In the latter case, *SvanPC++* should be supplemented with the *Remote Communication* module.

Although SV 803 is designed for wireless remote control, it can also be easily configured and controlled via the USB interface. The USB interface mode can be used for initial configuration of wireless communication. The USB interface mode can also be used in an emergency, when the wireless connection has been interrupted or when wireless communication is not available for some reason, or in situations where the measurement process doesn't require wireless control of the instrument.

Note: *This manual only describes the most useful and instrument specific functionalities available for the USB connection. All other functionalities, including those related to the Remote Communication module, are well described in SvanPC++ User Manual.*

6.1 SVANPC++ SOFTWARE INSTALLATION AND ACTIVATION

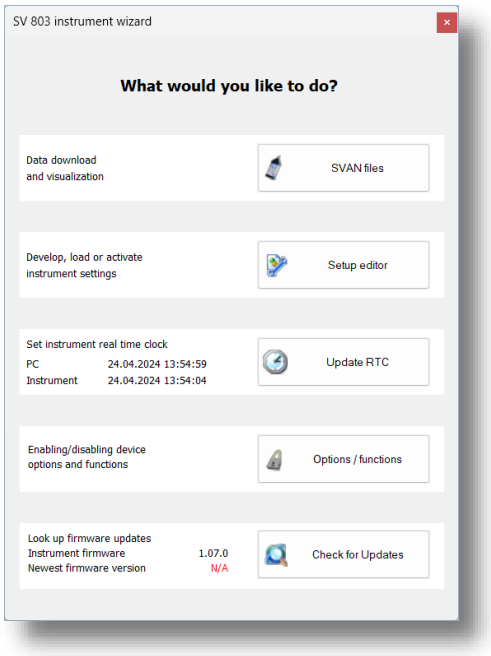
To download and install *SvanPC++* and Svantek *USB Drivers*, please visit the website: SVANTEK Support and Service - Sound and Vibration.

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

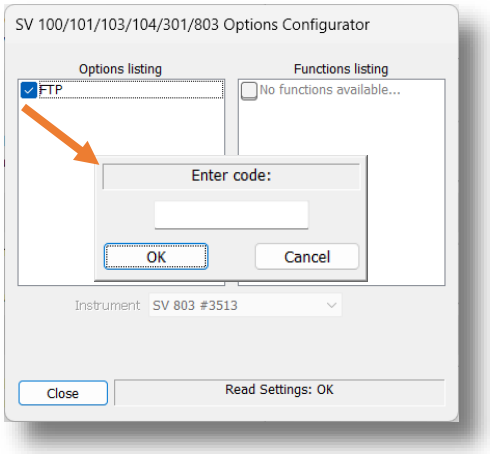
After connecting the instrument to the PC with *SvanPC++* running via the USB cable, the **SV 803 instrument wizard** dialogue box appears on the screen. It allows you to:

- download or upload files (**SVAN files** button),
- edit the instrument settings (**Setup editor** button),
- update the instrument's real time clock (**Update RTC** button),
- unlock the optional functions (**Options / functions**),
- check the firmware version of the instrument with the latest available version (**Check for Updates** button).



If you click functions **Options / functions**, the Options Configurator box will appear in which you can lock/unlock the extended option, e.g. FTP Client.

The FTP Client option can be enabled if you enter the special code that unlocks this option. Once unlocked, the option is permanently available.



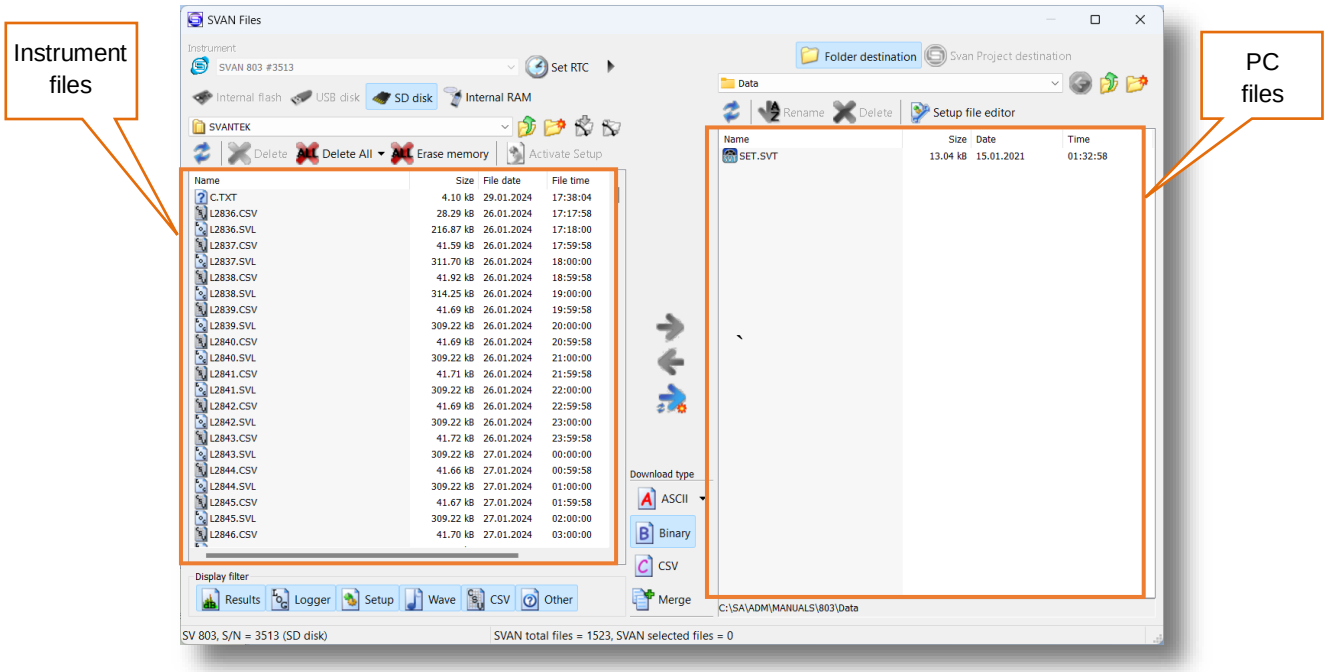
6.3 SVAN FILES

Instrument files are accessed from the **SVAN Files** dialogue box, which allows you to manage instrument files, open data files and configure setup files.

The **SVAN Files** dialogue box consists of two sections: instrument (left) and PC (right). Each section contains tools for managing files (selecting memory, directory and files, deleting files, creating directories, applying filters, etc.).

6.3.1 Downloading/uploading files

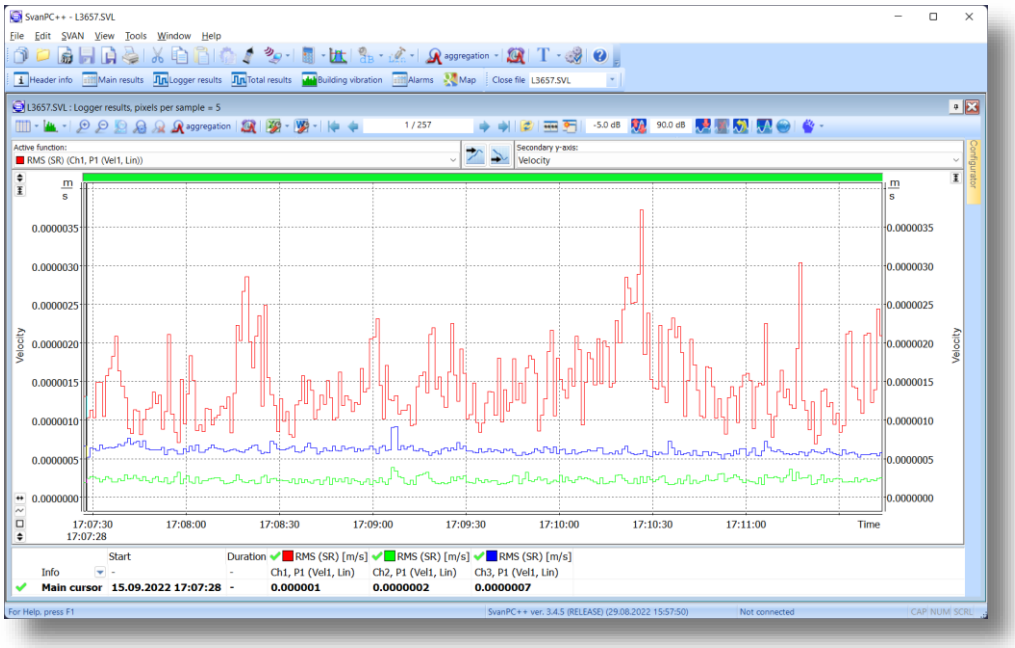
The arrows between the instrument and PC sections are used to download files from the instrument to the PC and upload files from the PC to the instrument.



To download files from the instrument to a PC, select the directory on a PC to download files (right section), select the instruments file to be download (left section) and press the right arrow button (centre section).

6.3.2 Opening files

Double click on the file name to open the **Viewer** module, which provides various tools for viewing the data. This module is described in detail in the SvanPC++ User Manual.

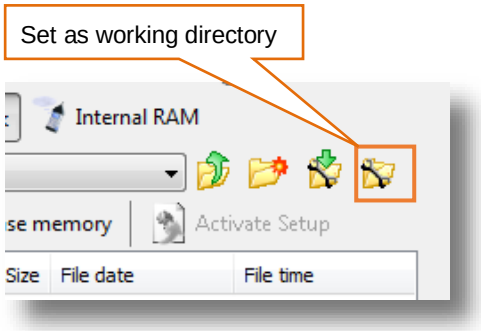


6.3.3 Changing working directory

The working directory is a folder in the instrument's memory where all the measurement files are stored. To change the working directory:

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

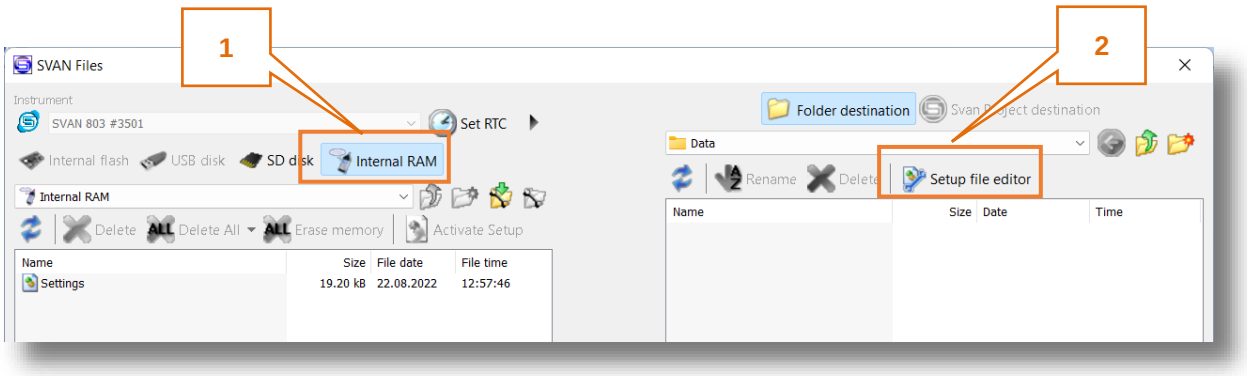
From this point on, all results files will be stored in the selected director.



6.3.4 Configuring instrument settings

The instrument settings can be configured with the use of *Setup file editor*, which can be also opened from the **SVAN Files** dialog box. To do this:

1. press the **Internal RAM** button, select the *Settings* file and double click it, or
2. 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* are the same as those available in the *Assistant Pro* application.

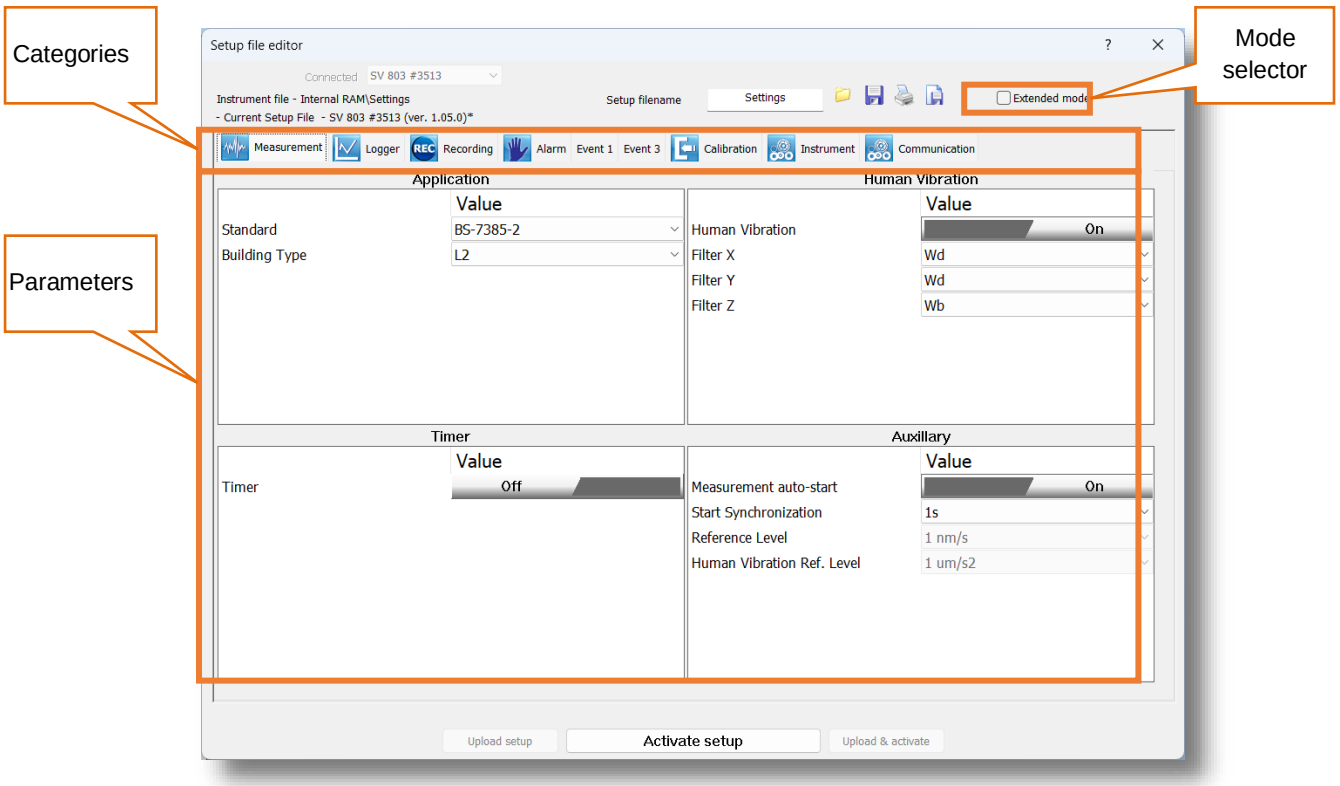
In *Standard* mode the *Setup file editor* allows you to view and edit the settings most likely to be modified, presented in a simple and intuitive way. Note that not all of the settings available in the connected instrument may be available in *Standard* mode.

The settings are divided into a number of categories, which can be selected using the tabs at the top of the *Setup file editor* window.

Settings can be easily edited using the following elements:

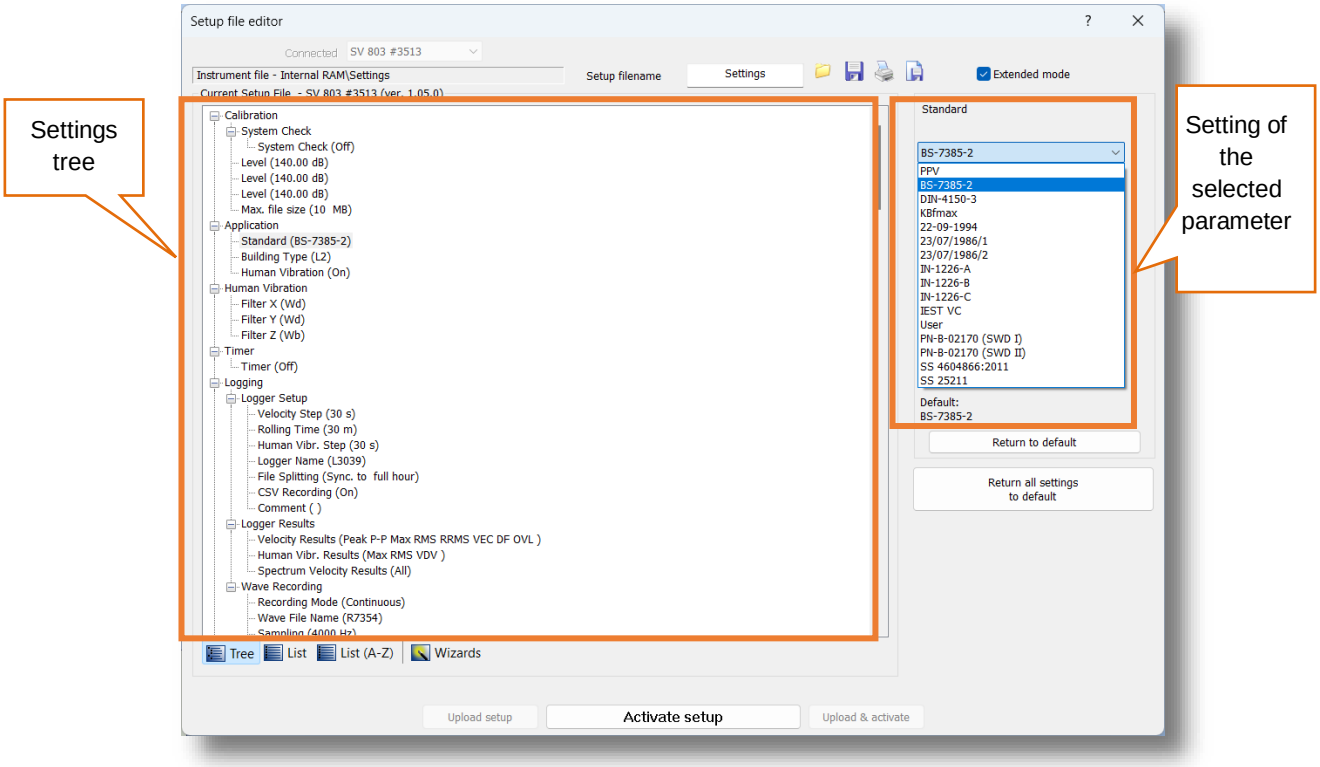
- check boxes – allowing to select some out of several possibilities,
- list boxes – allowing to select one out of several possibilities,
- text fields – allowing to type in a value using keyboard,
- binary buttons – allowing to enable or disable an option.

Standard mode:



In *Extended* mode, all instrument settings are visible and available for editing. The list of settings, located on the left side of the window, can be displayed in a tree view or a list view. You can change the view using the buttons at bottom of the window.

Extended mode:



To change settings in the *Extended* mode, use the controls that appear in the panel at the top right of the window after selecting parameter from the list.

The default, *Tree View*, offers the settings arranged in the form of a tree, similar to the structure of the instrument menu. The nodes represent menu sections, while the leafs represent parameter settings that can be edited in the top right corner of the window. The settings are sorted according to the menu structure accessible via the instrument's display panels.

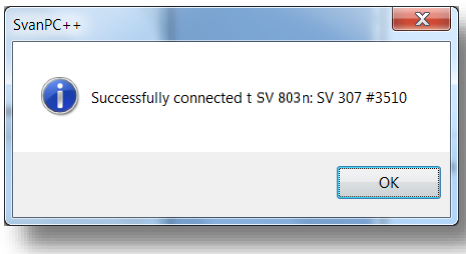
Some of the settings are linked to each other, which means that one of them will only be available for editing if the other one is set to a certain value.

When you have finished configuring the settings, press the **Activate setup** button.

At the top of the *Setup file editor* window, next to the Setup filename field, there are several file management buttons that open a setup file stored on the PC, save the currently edited setup file to the PC, print the currently edited setup file, or save the contents of the currently edited setup file in a simple text format.

In *Extended* mode, you can restore the factory (default) settings by pressing the **Return all settings to default** button.

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



6.4 BUILDING VIBRATION VIEW

SV 803 uses special methods based on Peak Particle Velocity and Dominant Frequency, which comply with many local standards and also allow measurement 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 to assess the dominant frequency based on 1/3 octaves or FFT and the vibration results associated with that frequency. Different local standards use one or the other approach.

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

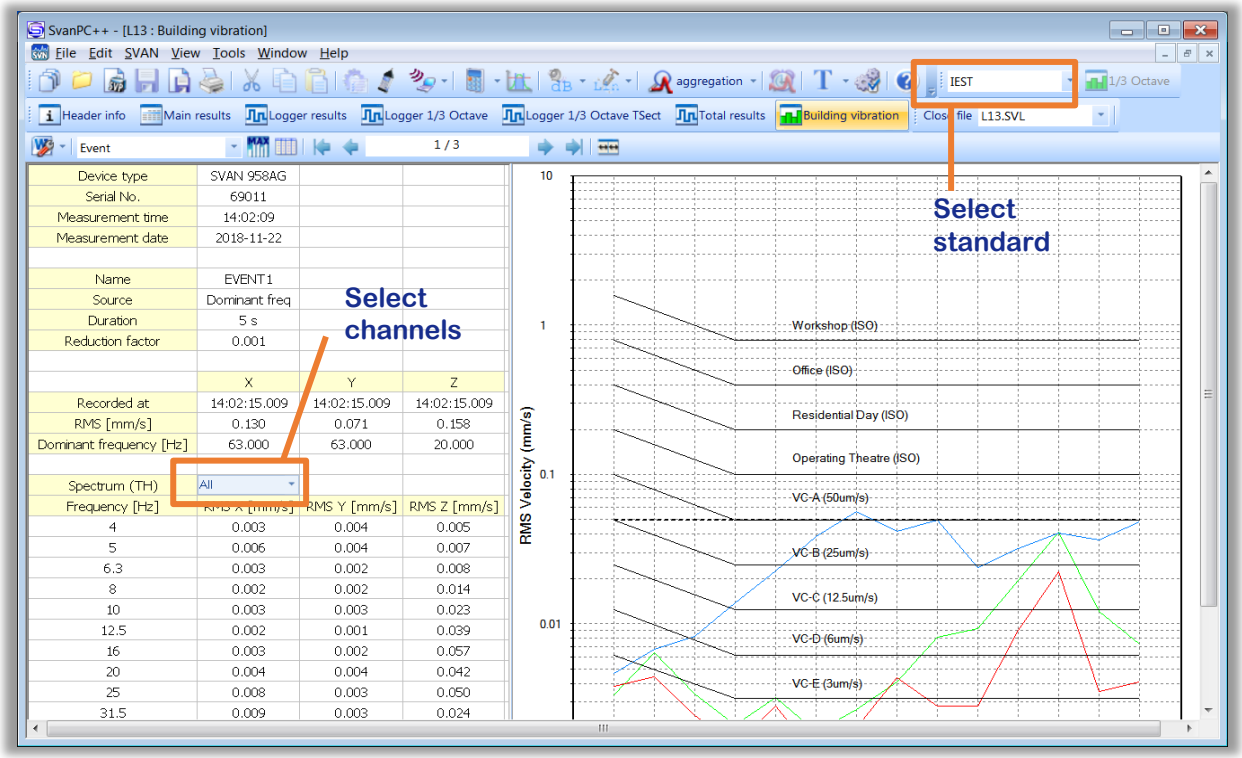
In the case of the 1/3 octave approach, the instrument creates a series of logger files with the name **Lxx**, where **xx** is a number, and the extension **SVL**.

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

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

6.4.1 1/3 octave approach

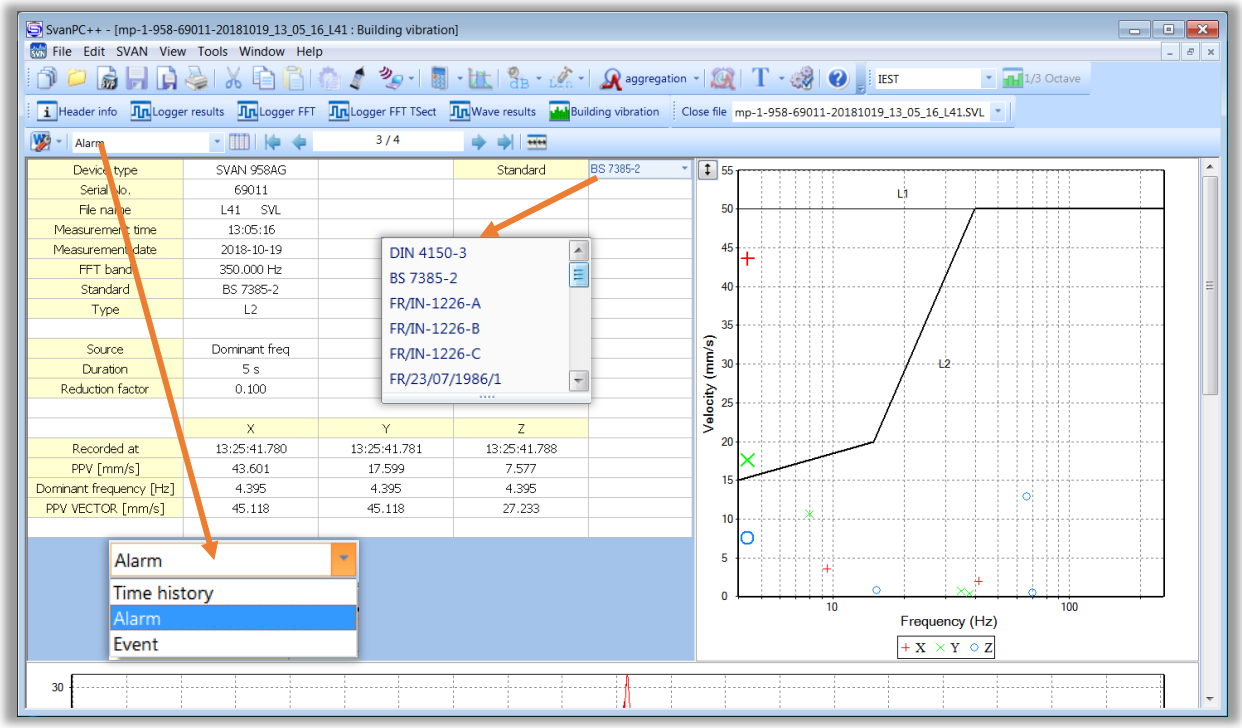
In the case of the 1/3 octave approach, the *Building vibration* view presents a table with SV 803 settings and data for the time history, events or alarms and Criterion curves with measurement results for three axes (X, Y, Z) in the form of 1/3 octave spectra.



Device type	SVAN 958AG		
Serial No.	69011		
Measurement time	14:02:09		
Measurement date	2018-11-22		
Name	EVENT1		
Source	Dominant freq		
Duration	5 s		
Reduction factor	0.001		
	X	Y	Z
Recorded at	14:02:15.009	14:02:15.009	14:02:15.009
RMS [mm/s]	0.130	0.071	0.158
Dominant frequency [Hz]	63.000	63.000	20.000
Spectrum (TH)	All		
Frequency [Hz]	RMS X [mm/s]	RMS Y [mm/s]	RMS Z [mm/s]
4	0.003	0.004	0.005
5	0.006	0.004	0.007
6.3	0.003	0.002	0.008
8	0.002	0.002	0.014
10	0.003	0.003	0.023
12.5	0.002	0.001	0.039
16	0.003	0.002	0.057
20	0.004	0.004	0.042
25	0.008	0.003	0.050
31.5	0.009	0.003	0.024

6.4.2 FFT approach

In the 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.

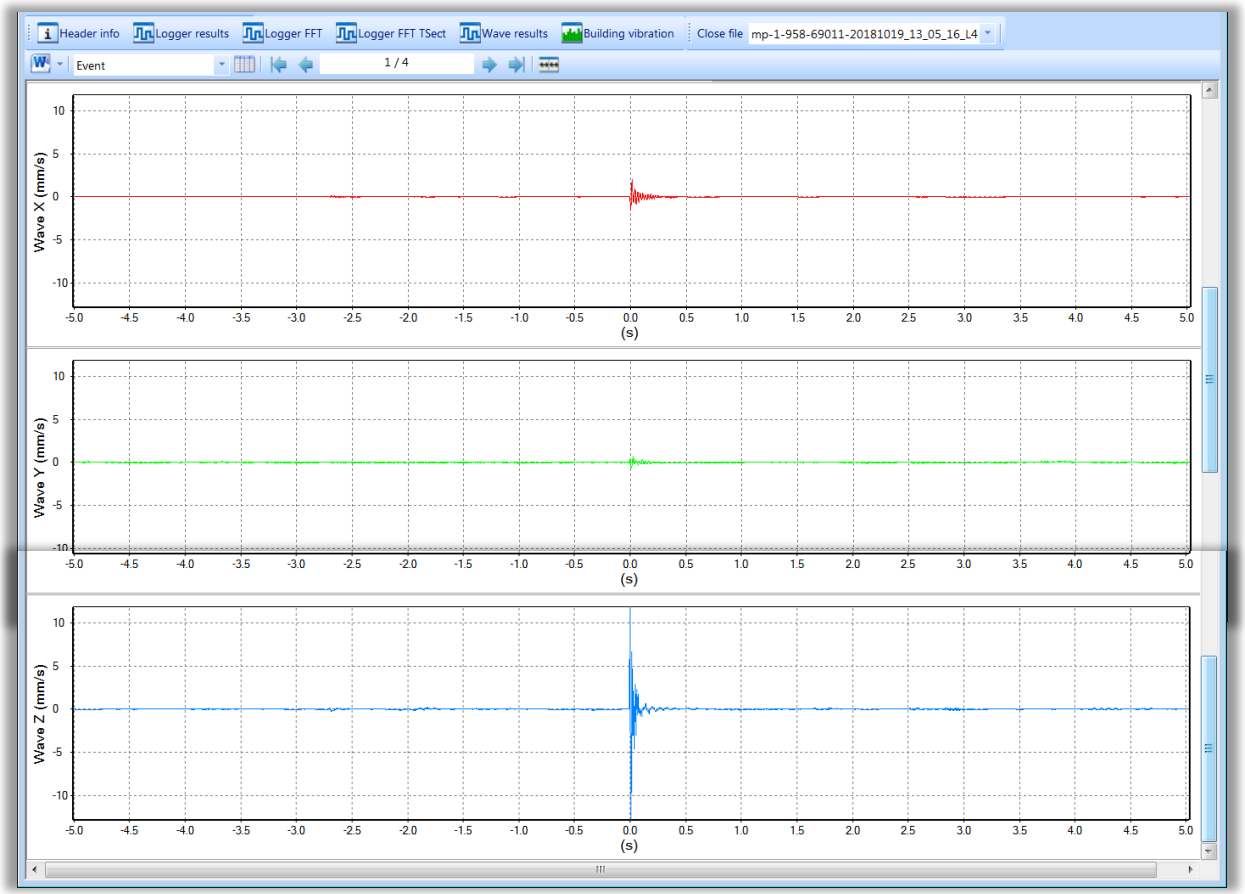


The content of the table and the data presented on the right plot depend on the selections made in the second position of the View toolbar (*Time history*, *Alarm* or *Event*). When you select *Time history*, you can view PPV and Dominant frequency for all measurements performed with the Logger step.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

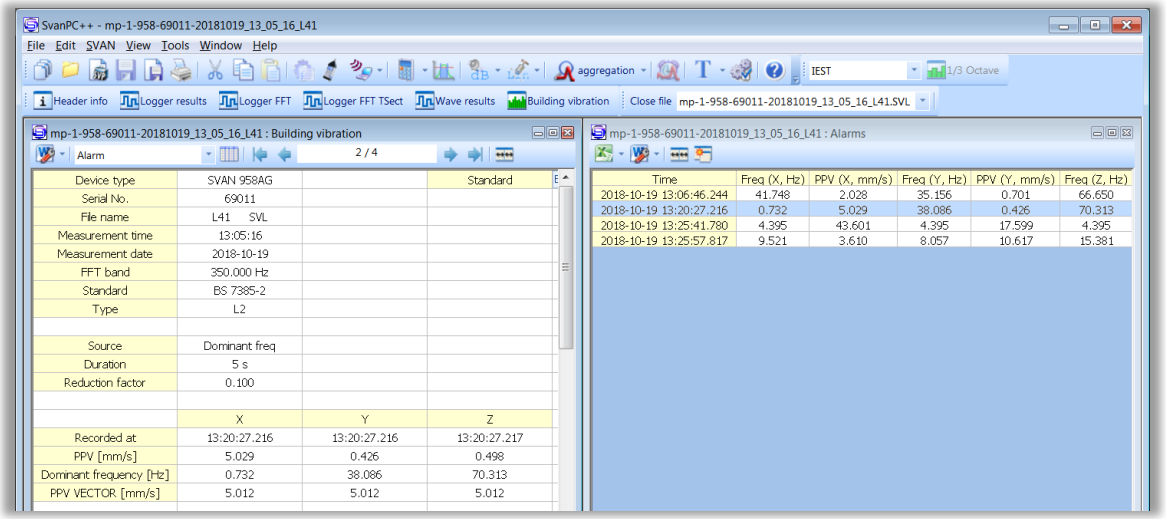
Note: SV 803 calculates PPVs, dominant frequencies, events and alarms based on the selected standard, which is displayed together with other settings in the second column of the table. Selection of the standard in the upper right cell only places another criterion curves, but all measurement results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

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

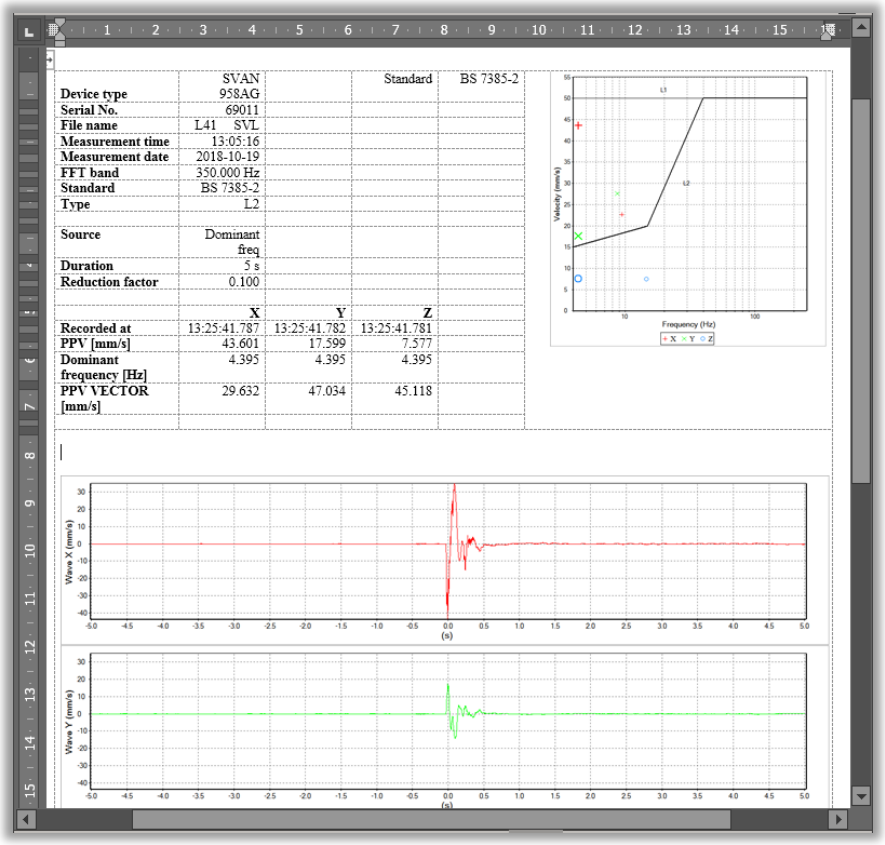


If you press the *Events list* button  located next to the Alarm/Event/Time history selector, the new *Alarms* view will appear. This view presents the table with all events detected.

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  .



Device type	SVAN 958AG		Standard	BS 7385-2
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 button. Keep both buttons 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 **go-usb.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.

Internet: www.svantek.com

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

APPENDIX A. REMOTE CONTROL CODES

USB 2.0 interface (full speed only) is a serial interface working with 12 MHz clock which enables one to control remotely the device. Its speed is relatively high, and it ensures the common usage of USB in all produced nowadays Personal Computers.

Alternatively, all commands described in this appendix are valid for any other kinds of interfaces (if present) like **mobile (3G/4G)** communication, **bluetooth** or **RS232**. Mobile use TCP/IP or UDP communication protocols to exchange data with the instrument. Some of the instruments can also be controlled via SMS.

Functions, which are developed in order to control data flow in the serial interfaces, ensure:
- Bi-directional data transmission,
- Remote control of the instrument.

In order to program the serial interface, the user has to:
1. send a "function code",
2. get a response to the “function code”
3. send/receive a data file (optionally)

A.1 INPUT / OUTPUT TRANSMISSION TYPES

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

Error! Reference source not found.

Error! Reference source not found.

Error! Reference source not found.

Error! Reference source not found.

Error! Reference source not found.

Error! Reference source not found.

Error! Reference source not found.

Error! Reference source not found.

ERROR! REFERENCE SOURCE NOT FOUND.

A.2 FUNCTION #1 – GENERAL CONTROL FUNCTIONS

#1 function enables the user to send the control setting codes to the instrument and read out a file containing the current control state. A list of the control setting codes is given in **Error! Reference source not found.** REF _Ref41388311 \h * MERGEFORMAT **Error! Reference source not found.**. The format of #1 function is defined as follows:

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

or

#1,Xccc,X?,Xccc,(...),X?,Xccc; **(2)**

or

#1,X?,X?,(...),X?; **(3)**

where:

X - group code, **ccc** – new code value,

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

In the first case (1) the instrument does not respond to a command, even if an error occurs.

In the second and third cases (2), (3) the instrument outputs control settings for all requests X? in the following format:

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

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

Note: *Changing settings using #1 functions during measurements running state (#1,S1;) is blocked. Stop the measurements (#1,S0;) before changing the settings.*

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

#1;

In this case the instrument outputs all control settings given in **Error! Reference source not found. Error! Reference source not found.** in the format:

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

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

#1,U803,N1234,W1.01.1,Q0.01:1,Q0.10:2,Q0.30:3,M18,I17:1,I17:2,I16:3,B16,b16,d1s,D1s,K1,L1,Y1,y1,XA0,XD-1:1,XD-1:2,XD-1:3,XD-1:4,XD-1:5,XD-1:6,Xlapp.svannet.com,XJ8000,XNinternet,XOnone,XUnone,XV0.0.0.0,XV0.0.0.0,XV0.0.0.0,XXl1,XXu11,XXz10,XXq60,XXr1800,XXw10,Xk0,Xw0,XF0,XG0,Xo1000,S1,T1,p1,u1,h1,E1;

means that:

- SV 803 is investigated (**U803**); see #7,US; command for unit subtype information;
- its serial number is 1234 (**N1234**);
- software version number is 1.22.1 (**W1.01.1**);
- calibration factor is equal to 0.01 dB in X axis, 0.10 dB in Y axis and 0.30 in Z axis (**Q0.01:1,Q0.10:2,Q0.30:3**);
- **GROUND VIBRATION** is selected as the measurement function (**M18**);
- ... and so on.

See **Error! Reference source not found. Error! Reference source not found.** for more details.

Note: *Control settings presented in the instrument's response and not described in* **Error! Reference source not found. Error! Reference source not found.** *considered as reserved. Do not change these settings!*

A.3 FUNCTION #2 – MEASUREMENT RESULTS READ-OUT IN THE SLM MODE

#2 function enables one to read out the current measurement velocity results from the selected axis.

#2 function has the format defined as follows:

#2 [,<aver>[<flags>]] [,<profile>] [[[,X?] ,X?] ,(...)];

where:

<aver> – type of results:

i – instantaneous results, i.e. results from the current cycle (default),

a – averaged results, i.e. results from the previous cycle,

c – 1 second results, i.e. results integrated for the last 1 second,

<flags> – flags:

s – measurements flags, i.e. measurements running,

<profile>– profile number:

1, 2 or 3 – one of the axes/profiles, i.e. only results from the given axis/profile will be sent;

1 – profile1, X axis,

2 – profile1, Y axis,

3 – profile1, Z axis

X – code of the specified result (see below); if no codes are specified all results will be sent;

In the case of **<profile> = 1, 2 or 3** the instrument sends results in the format defined as follows:

#2 [,<aver>[<flags>f]],<profile>,Xccc,(...);

where **f** is a flags value, e.g. 1 – measurements are running; **ccc** is the value of the result **X** or question mark (**?**) if result **X** is not available;

If no results are available, the instrument returns:

#2,?;

The **X** codes of the results from the **SLM** mode are defined as follows:

v under-range flag (ccc equals to 0 when the overload did not occur, 2 when the under-range took place during the last measurement period but did not occur in the last second of the measurement and 3 when the under-range took place during the last measurement period and it lasted in the last second of the measurement);

V overload flag (ccc equals to 0 or 1);

T time of the measurement (ccc – value in seconds);

x start date of the measurement in format ***dd/mm/yyyy*** (***dd*** – day, ***mm*** – month, ***yyyy*** - year)

t start time of the measurement in format ***hh/mm/ss*** (***hh*** – hour, ***mm*** – minute, ***ss*** - second)

P **Peak** value (ccc – the value in dB);

Q **P-P** value (ccc – the value in dB);

M **Max** value (ccc – the value in dB);

R **RMS** result (ccc – the value in dB).

g **RRMS** result (ccc – the value in dB);

F **CRF** result (ccc – the value in dB);

O **Peak Vector** result (ccc – the value in dB);

d **DF** result (ccc – the value in Hz);

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

#2,1,x06/06/2022,t11:11:05,v0,V0,T45,P61.10,Q54.24,M52.76,R48.43,g?,F12.67,O52.21,d7.15;

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

Example: After sending to the instrument the string:

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

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

#2,1,V0,T34,P60.18,R47.56;

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

A.4 FUNCTION #3 – MEASUREMENT RESULTS READ-OUT IN FFT AND 1/3-OCTAVE

#3 function enables one to read out the current measurement results **FFT** or **1/3 OCTAVE**, depends on ground vibration standard selected.

#3 function format is defined as follows:

#3[,x][,T]; - instantaneous spectrum (in the FFT mode, the spectrum from the last full second)

#3[,x] [,T],A; - averaged spectrum

#3[,x] [,T],I; - instantaneous spectrum (in the FFT mode, the spectrum from the last full second)

#3[,x] [,T],M; - max spectrum

#3[,x] [,T],N; - min spectrum

#3[,x] [,T],P; - peak spectrum

#3[,x] [,T],S; - spectrum for the last full Velocity Step Period

T - include additional parameter in text header data in in the instrument's response

x – send result only for selected channel: 1, 2 or 3

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

#3[<channel>][,x<date>][,t<time>][,r<resolution>][,T<int_time>][,f<firt_frq>];<Status Byte> <LSB of the transmission counter> <MSB of the transmission counter> <data byte> (...) <data byte>

<channel> is the channel number 1, 2 or 3

<date> is the measurement date given in format DD:MM:RRRR

DD – day
MM – month
RRRR – year

<time> is the measurement time given in format HH:MM:SS.mmm

HH – hour
MM – minute
SS – second
mmm – millisecond

<resolution> is the FFT resolution time given in Hz (only in FFT)

<int_time> integration time in seconds (only in 1/3 octave)

<firt_frq> first 1/3 octave frequency (only in 1/3 octave)

e.g.

#3,1,x02/08/2022,t14:25:54.701,r0.52083,2,x02/08/2022,t14:25:52.512,r0.52083,3,x02/08/2022,t14:25:45.422,r0.52083;

The optional text header parameters **[<channel>][,x<date>][,t<time>][,r<resolution>][,T<int_time>][,f<firt_frq>]** are sent only if "T" option is selected.

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

D7	D6	D5	D4	D3	D2	D1	D0

where:

D7 = 0 means that "overload does not happen in channel 3 (Z) ",
= 1 means that “overload appeared in channel 3 (Z)”,

D6 = 0 means that "overload does not happen in channel 2 (Y) ",
= 1 means that “overload appeared in channel 2 (Y)”,

D5 = 0 means that "overload does not happen in channel 2 (X) ",
= 1 means that “overload appeared in channel 1 (X)”,

D4 = 0 the instantaneous current result (RUN State),
= 1 the final result (STOP State),

D3 = 0 **1/3 OCTAVE** results,
= 1 **FFT** results,

D2, D1, D0 type of spectrum:

000 - averaged spectrum
001 - instantaneous spectrum (in the FFT mode, the spectrum from the last full second)
010 - max spectrum
011 - min spectrum
100 - peak spectrum
101 - spectrum for the last full Velocity Step Period

Note: *ASCII part of the response ends with semicolon ";". Status byte, transmission counter and data bytes are coded in binary form.*

Note: *The measurement result is coded in binary form as dB•100 (e.g. 34.5 dB is sent as binary number 3450).*

A.5 FUNCTION #4 – SETUP FILE READ-OUT

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

#4 function formats are defined as follows:

#4,0,\; file containing the catalogue,
#4,0,?; count of the files,
#4,0,index,count; part of the file containing the catalogue,
where:
index - first record,
count - number of records in the catalogue.

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

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

words 8 - 15 reserved.

#4,4; current setup file,
#4,4,?; size of the current setup file,
#4,4,offset,length; part of current setup file,
where:

offset - offset from the beginning of the current setup file,

length - number of bytes to read,

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

All data words are sent **<LSB>** (least significant byte) first.

When an error is detected in the file specification or data, the instrument respond with:

#4,?;

Note: *Current setup file placed in RAM is serviced by this command in the SV 803 only. For data files access see* **Error! Reference source not found. Error! Reference source not found.**.

A.6 FUNCTION #7 – SPECIAL CONTROL FUNCTIONS

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

#7 function format is defined as follows.

To read settings a query should be send to the device:

#7,<code>;

where **<code>** is a two ASCII letter code.

The device responds with a control settings:

#7,<code>,set1[,set2[,set3[,...[,setN]]]];

where **<code>** is the same code sent in the query and **set1, set2,... setN** are settings.

To write settings to the device follow the opposite procedure. Send to the device:

#7,<code>,set1[,set2[,set3[,...[,setN]]]];

In case of success the device responds with:

#7,<code>;

In case of an unknown function or error the device returns:

#7,?;

Codes and settings for #7 function are described in the **Error! Reference source not found. Error! Reference source not found.**.

Note: *#7 function protocol consist of ASCII characters only.*

Note: *Some of the #7 functions are blocked during measurements running state (#1,S1;). Stop the measurements (#1,S0;) before changing these settings.*

A.7 FUNCTION #9 – SETUP FILE WRITE-IN

#9 function enables the user to write a configuration file into the instrument's storage or non-volatile memory. The data file formats are given in Appendix B.

#9 function formats are defined as follows:

#9,<FILE_TYPE>,<FILE_LENGTH>,<DATA>

where:

<FILE_TYPE>	type of the file
	2 - setup file (file is saved on SD card; does not change current setup),
	4 - current setup file,
<FILE_LENGTH>	length of the file in bytes,
<DATA>	binary content of the file.

Note: *Some of the #7 functions are blocked during measurements running state (#1,S1;). Stop the measurements (#1,S0;) before changing these settings.*

A.8 FUNCTION #D – DATA FILES ACCESS

#D functions are used to access data files in the instrument's storage like microSD card or USB Flash Disc with FAT file system. A basic knowledge of FAT file system is necessary to use these functions.

#D functions take the following parameters:

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

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

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

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

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

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

Response:

#D,d; - command was executed

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

4) **#D,r,<disk>,<address>,<offsetB>,<nB>;** the function enables to read a file from the working directory.

Response:

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

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

Response:

#D,w; - command was executed

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

6) **#D,e,<name>;** function enables to delete a file in working directory.

Response:

#D,e; - command was executed

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

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

Response:

#D,e; - command was executed

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

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

Response:

#D,m; - command was executed

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

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

Response:

#D,f; - command was executed

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

10) **#D,j,?;** this function returns parameters of the archive directory in format:

#D,j,<disk>,<address>;

11) **#D,s,?;** this function returns parameters of the setup directory in format:

#D,s,<disk>,<address>;

Note: *Only read functions are available during measurements running state (#1,S1;). Stop the measurements (#1,S0;) to unlock all the functions.*

A.9 FUNCTION #S – DIRECT SETUP ACCESS

#S function enables to read/write instrument's settings in a direct manner. Any settings changed by this command affect current setup, are written into non-volatile memory and are available on the next power up.

#S function format is defined as follows.

To read settings a query should be send to the device:

#S[,<code1>[,<code2>[,code3[,...]]]];

where **<codeN>** is a two to four ASCII letter setting code.

The device responds with a control settings:

#S[,<code1>:<set1>[,<code2>:<set2>[,<code3>:<set3>[,...]]]];

where **<codeN>** is the same settings code sent in the query and <**setN>** is a settings value.

To return all settings available send:

#S;

To write settings to the device follow the opposite procedure. Send to the device:

#S,<code1>:<set1>[,<code2>:<set2>[,<code3>:<set3>[,...]]];

In case of success the device responds with the same ASCII string:

#S,<code1>:<set1>[,<code2>:<set2>[,<code3>:<set3>[,...]]];

In case of an error (e.g. settings code does not exist or parameter value is out of range) the device respond with "?" instead of **<setN>** value:

#S,<codeN>:?;

For example if three parameters are set and <set2> is out of range the device response is:

#S,<code1>:<set1>,<code2>:?,<code3>:<set3>;

Codes and settings for #S function are described in the **Error! Reference source not found. Error! Reference source not found.**.

Note: *#S function protocol consist of ASCII characters only.*

Note: *Some of the #S functions are blocked during measurements running state (#1,S1;). Stop the measurements (#1,S0;) before changing these settings.*

A.10 CONTROL SETTING CODES

The control setting codes used in the SV 307 instrument are given in the below tables.

Table A.1 Unit information

Table A.2 Measurements settings and control

Table A.3 Calibration and geophone settings

Table A.4 Profile settings

Table A.5 Spectrum settings

Notes:

*- function codes marked in green are **read only**!*

*- function codes marked in red are **locked during measurements run state**! Stop measurements before changing these settings.*

*- values in square brackets are **[optional]**!*

- values are written in the form of numbers or in the form of a bit number (prefix 'b') or hexadecimal (prefix '0x') e.g. the b5 is equal to the number 32 = 2^5 or hexadecimal 0x20.

Table A.1 Unit information

Group name	#1 code	#7 code	#S code	Code description
Unit type	U			803
Unit subtype		US		Returns unit subtype. 2 – SV 803
Serial number	N			xxxxxx
Software version	W			a.bb.c – firmware version a.bb.**0**c – beta firmware version
			AA	abbc - firmware version in hex format
Files system version		FS		a.bb - file system version

Group name	#1 code	#7 code	#S code	Code description
PIC version		PI		x.xx - version of auxiliary microcontroller
Hardboot version		VH		x.xx - version of hardboot program
Bootstrap version		VB		x.xx - version of bootstrap program

Table A.2 Measurements settings and control

Group name	#1 code	#7 code	#S code	Code description
Measurement function	M		BB	18 - **GROUND VIBRATION**
Measurement state	S			0 - **STOP** 1 - **START** 2 - **PAUSE** 3 - **System Check** (read only) 4 - **Delay before START** (read only)
Detector type in the **LEQ** function	L		BG	0 - **LINEAR** 1 - **EXPONENTIAL**
Rolling time	XXr		BT	nn- nn time in seconds ∈(1 ÷60) nn- nn time in minutes multiplied by 60 ∈(60 ÷3600)
Auto-Run		AS		#7,AS,<e>,<HH>,<MM>,<hh>,<mm>,<dW>,<mR>; where: <e> - On (e=1), Off (e=0), <HH> - hour of the measurement start, <MM> - minutes of the measurement start, <hh> - hour of the measurement stop, <mm> - minutes of the measurement stop, <dW> - day of week in which the measurement will be done defined as a sum of flags: b0 - Monday b1 - Tuesday b2 - Wednesday b3 - Thursday b4 - Friday b5 - Saturday b6 - Sunday <mR> - maximum number of the measurement days,
			MR	<e> - On (e=1), Off (e=0)
			MJ	<HH> - hour of the measurement start
			MK	<MM> - minutes of the measurement start
			ML	<hh> - hour of the measurement stop
			MM	<mm> - minutes of the measurement stop
			MN	<dW> - day of week

Group name	#1 code	#7 code	#S code	Code description
			MO	<mR> - maximum number of the measurement days

Table A.3 Calibration and geophone settings

Group name	#1 code	#7 code	#S code	Code description
Calibration factor	Q			Qxx.xx:n - calibration factor [dB] represented as real number □(-10.00 □ 10.00) in axis n (1 – X, 2 – Y, 3 – Z)
			AJn	xxxx - calibration factor [dB] multiplied by 100 □□(-1000 □ 1000). in axis n, (0 – X, 1 – Y, 2 – Z)
Last calibration type			AFn	Previously performed calibration type 0 - none 1 - **BY MEASUREMENT** (manual) 2 - **REMOTE** 3 - **FACTORY CALIBRATION** 4 - **AUTOCAL CALIBRATION** n: axis (0 – X axis, 1 – Y axis, 2 – Z axis)
Last calibration date and time		CT		Function returns calibration date and time for all axes in order X, Y, Z, in the format: **#7,CT,DD-MM-YYYY,hh:mm:ss, DD-MM-YYYY,hh:mm:ss, DD-MM-YYYY,hh:mm:ss;** where **hh:mm:ss** denotes the time and **DD/MM/YYYY** gives the date

			AGn	Last calibration date
				d - coded data □(0□□ 65535)
				Date decoding in C language:
				day = (d & 0x1F);
				month = ((d>>5) & 0x0F);
				year = ((d>>9) & 0x7F) + 2000;
				n: axis (0 – X axis, 1 – Y axis, 2 – Z axis)

			AHn	Last calibration time
				t - t coded time □(0□□ 65535)
				Time decoding in C language:
				sec = (t%30);
				min = ((t/30)%60);
				hour = (t/1800);
				Note: time resolution is 2 seconds!
				n: axis (0 – X axis, 1 – Y axis, 2 – Z axis)

Last calibration ref. level			AIn	xxxx - calibration reference level [dB] multiplied by 100 n: axis (0 – X axis, 1 – Y axis, 2 – Z axis)

Group name	#1 code	#7 code	#S code	Code description
Calibration history file version			**AT**	v - version of calibration history file "**C.TXT**"
Calibration history file split size	**XXw**		**AW**	s - a size limit of the calibration history "**C.TXT**" file [MB] □(0□□ 255) *Note: A new file is created after the size limit is reached.*
Geophone TEDs type		**TT**		Returns type of geophone saved in TEDS memory for all axes in order X, Y, Z Where -1 - unknown, 83V - geophone (vertical type) 83H - geophone (horizontal type) 183 - electrical input adapter
Geophone TEDs serial number		**TS**		Returns serial number of geophone saved in TEDS memory for all axes in order X, Y, Z.
Geophone TEDs calibration		**TC**		Returns calibration factor of geophone saved in TEDS memory for all axes in order X, Y, Z.
Geophone TEDs factory calibration		**TF**		Returns factory calibration factor of geophone saved in TEDS memory for all axes in order X, Y, Z.

Table A.4 Channel/profile settings

Group name	#1 code	#7 code	#S code	Code description
Human Vibration Filter type in axis n	**I**			Ik:n - k filter in axis n k: 16 – **Wk**, 17 – **Wd**, 18 – **Wc**, 20 – **Wm**, 23 – **Wb** ***7.8.1.1 n – axis number: 1-X, 2-Y, 3-Z***
			BIn	k - k filter in axis n, n – axis number: 3-X, 4-Y, 5-Z

Table A.5 Spectrum settings

Group name	#1 code	#7 code	#S code	Code description

Table A.6 Ground Vibration settings

Group name	#1 code	#7 code	#S code	Code description
Ground Vibration Standard			CA	Standard for Ground Vibration function 0 - Off 1 - PPV 2 - BS-7385-2 3 - DIN-4150-3 4 - KBfmax 5 - FR/22/09/1994 6 - FR/23/07/1986/1 7 - FR/23/07/1986/2 8 - FR/IN-1226-A 9 - FR/IN-1226-B 10 - FR/IN-1226-C 11 - IEST 12 - User
Ground Vibration Type			CB	In case of **DIN-4150-3** standard 0 - Foundation 1 - Top Floor 2 - Floor Slab 3 - Underground Cavities 4 - Buried Pipework 5 - LT Top Floor 6 - LT Floor Slab
Ground Vibration Spectrum			CC	In case of **User** standard 1 - FFT VEL 3 - 1/3 VEL
Ground Vibration Spectrum Results			CD	In case of **User** standard 0 - Peak 1 - Max 2 - Min 3 - RMS
Ground Vibration Building Type			CE	Building Type 0 - L1 1 - L2 2 - L3 3 - L4 4 - Workshop, 5 - Office,

Group name	#1 code	#7 code	#S code	Code description
				6 - Residential, 7 - Theatre, 8 - VC-A, 9 - VC-B, 10 - VC-C, 11 - VC-D, 12 - VC-E
Ground Vibration Band			**CF**	Frequency Band 0 – (1Hz - 80Hz) 1 – (1Hz - 315Hz)
Human Vibration			**CG**	0 - Off 1 - On
Criterion y^{th} for curve x^{th} x□□(0 □ 2), y□□(0 □ 9)			**FAxy**	In case of **User** standard Curve's Criterion: 0 - Off 1 - On
FFT Lower frequency Criterion y^{th} for curve x^{th} x□□(0 □ 2), y□□(0 □ 9)			**FDxy**	In case of **User** standard FFT Lower frequency in Hz □ (1 □ 512)
1/3 Octave Lower frequency Criterion y^{th} for curve x^{th} x□□(0 □ 2), y□□(0 □ 9)			**FExy**	In case of **User** standard 1/3 Octave Lower frequency: 0 - 0.8 Hz 1 - 1.0 Hz 2 - 1.25 Hz 3 - 1.6 Hz 4 - 2.0 Hz 5 - 2.5 Hz 6 - 3.15 Hz 7 - 4.0 Hz 8 - 5.0 Hz 9 - 6.3 Hz 10 - 8.0Hz 11 - 10.0 Hz 12 - 12.5 Hz 13 - 16.0 Hz 14 - 20.0 Hz 15 - 25.0 Hz

Group name	#1 code	#7 code	#S code	Code description
				16 - 31.5 Hz 17 - 40.0 Hz 18 - 50.0 Hz 19 - 63.0 Hz 20 - 80.0Hz 21 - 100 Hz 22 - 125 Hz 23 - 160 Hz 24 - 200 Hz 25 - 250 Hz 26 - 315 Hz 27 - 400 Hz 28 - 500 Hz 29 - 630 Hz 30 - 800Hz 31 - 1000Hz
FFT Upper frequency Criterion y^{th} for curve x^{th} x□□(0 □ 2), y□□(0 □ 9)			**FHxy**	In case of **User** standard FFT Upper frequency in Hz □ (1 □ 512)
1/3 Octave Upper frequency Criterion y^{th} for curve x^{th} x□□(0 □ 2), y□□(0 □ 9)			**FIxy**	In case of **User** standard 1/3 Octave Upper frequency: 0 - 0.8 Hz 1 - 1.0 Hz 2 - 1.25 Hz 3 - 1.6 Hz 4 - 2.0 Hz 5 - 2.5 Hz 6 - 3.15 Hz 7 - 4.0 Hz 8 - 5.0 Hz 9 - 6.3 Hz 10 - 8.0Hz 11 - 10.0 Hz 12 - 12.5 Hz 13 - 16.0 Hz 14 - 20.0 Hz 15 - 25.0 Hz

Group name	#1 code	#7 code	#S code	Code description
				16 - 31.5 Hz 17 - 40.0 Hz 18 - 50.0 Hz 19 - 63.0 Hz 20 - 80.0Hz 21 - 100 Hz 22 - 125 Hz 23 - 160 Hz 24 - 200 Hz 25 - 250 Hz 26 - 315 Hz 27 - 400 Hz 28 - 500 Hz 29 - 630 Hz 30 - 800Hz 31 - 1000Hz
Lower value Criterion y^{th} for curve x^{th} $x \in (0 \div 2)$, $y \in (0 \div 9)$			**FGxy**	In case of **User** standard Lower value, $\in (0 \div 1000)$
Upper value Criterion y^{th} for curve x^{th} $x \in (0 \div 2)$, $y \in (0 \div 9)$			**FKxy**	In case of **User** standard Upper value, $\in (0 \div 1000)$
Value Unit Criterion y^{th} for curve x^{th} $x \in (0 \div 2)$, $y \in (0 \div 9)$			**FCxy**	In case of **User** standard Value unit: 0 - µm/s 1 - mm/s
Lower frequency included Criterion y^{th} for curve x^{th} $x \in (0 \div 2)$, $y \in (0 \div 9)$			**FFxy**	In case of **User** standard Lower frequency included: 0 - Off 1 - On
Upper frequency included Criterion y^{th} for curve x^{th} $x \in (0 \div 2)$, $y \in (0 \div 9)$			**FJxy**	In case of **User** standard Upper frequency included: 0 - Off 1 - On

Table A.6 Wave settings

Group name	#1 code	#7 code	#S code	Code description
Wave file name			IB	xxxxxxxx – up to 8 characters (permitted characters: 0:9, A:Z, and '_'). Default name "R1"
Last wave file name		LW		a name of a previous wave file
Wave recording mode	XXu		IA	0 - Off 1 - continuous 11 - alarm
Sampling	XXl		IE	1 - 1024 Hz 2 - 512 Hz 3 - 256 Hz
Pre trigger	XXz		IL	x - x pre trigger time [s] (default 10s) ∈ (0 ÷ 60)
Post trigger	XXy		IN	x - x recording time [s]; ∈ (1 ÷ 59), (60 ÷ 3600) with 60s steps and (3600 ÷ 28800) with 3600s steps
Length Limit	XXq		IP	0 - file size limit 4GB x - file size limit in minutes; ∈ (1 ÷ 480)

Table A.7 Logger settings

Group name	#1 code	#7 code	#S code	Code description
Logger file name			DC	xxxxxxxx – up to 8 characters (permitted characters: 0:9, A:Z, and '_'). Default name "L1"
Last logger file name		LB		a name of a previous logger file
Velocity Step (Integration period)	D			0 - infinity (measurement finished by pressing the **Stop** or remotely - by sending S0 control code) nns - nn number in seconds nnm - nn number in minutes nnh - nn number in hours
			BE	0 - infinity (measurement finished by pressing the **Stop** or remotely - by sending S0 control code) nn - time in seconds
Human Vibration Step (Logger step)	d		DB	nn - nn number of seconds ∈ (30 ÷ 3600)

Group name	#1 code	#7 code	#S code	Code description
Human Vibration results			**DR**	x - x – sum of the following flags: b0 - Peak values b1 - P-P values b2 - Max values b3 - RMS values b4 - VDV values b5 - RRMS values
Velocity FFT results			**DS**	0 - Off 1 - Continuous 2 - On Event
Velocity results			**DP**	x - x – sum of the following flags: b0 - Peak values b1 - P-P values b2 - Max values b3 - RMS values b5 - RRMS values b6 - Peak Vector values b7 - DF values b9 - OVL time values
Logger File Splitting Mode	**XA**		**DH**	0 switched off (**OFF**) -1 - file is created for each measurement cycle. 15 - file is created every 15 min, synchronized to RTC. 30 - file is created every 30 min, synchronized to RTC. 60 - file is created every 1 hour, synchronized to RTC. 1440 - file is created on the specified times, see next parameter *Note: for "-1" – integration period must be at least 60s*
Specified Time for Logger File Splitting	**XD**			XDx:n – x = -1 (switched off) x = 0 ÷ 1439 (time in minutes) n = 1 ÷ 6 (specified time number) *Note: valid only if Split Mode is equal to 1440*
			DI	Active split time number x - x – sum of the following flags b0 - split on time number 1 b1 - split on time number 2 b2 - split on time number 3 b3 - split on time number 4 b4 - split on time number 5 b5 - split on time number 6
			DJn	Split hour (0 ÷ 23) for time number n-1, n ∈(0 ÷ 5)

Group name	#1 code	#7 code	#S code	Code description
			DKn	Split minute (0 ÷ 59) for time number n-1, n ∈(0 ÷ 5)
User text			UB	text – to up to 128 characters of user text added each data file. Default text " ". Permitted characters: 0-9, a-z, A-Z, space and the following characters !"#$%&')(*+-./:<=>?@[\]^}_{`|~
Time results		TL		#7,TL,m,d; Get Time velocity results. m – the mask of selected results: b0 - PEAK, channel X, b3 - RMS, channel X, b5 - PEAK, channel Y, b8 - RMS, channel Y, b10 - PEAK, channel Z, b13 - RMS, channel Z, d – fifo buffer pointer: d = 0 - set the fifo pointer to the beginning before sending d = 1 - auto-incrementing of the fifo pointer d = 2 - set the fifo pointer to the last measured result before sending d < 0 - reset the fifo pointer by abs(d) results before to the last measured result Response format: #7,TL,r,mmmm,s,rn,rl,date,time,res1..resN; r – state of the instrument: r0 - RUN state, r1 - STOP state, m – the mask of selected results: b0 - PEAK, channel X, b3 - RMS, channel X, b5 - PEAK, channel Y, b8 - RMS, channel Y, b10 - PEAK, channel Z, b13 - RMS, channel Z, s – integration period in seconds, rn – the number of transmitted records, rl – the number of records in the fifo,

Group name	#1 code	#7 code	#S code	Code description
				date – the date of the first of the transferred records in format DD/MM/YYYY, time – the time of the first of the transferred records in format HH/MM/SS, res1..resN - the results in accordance with the mask (N records). The results of each record contains as many results as there are set bits in the mask

Table A.8 CSV export settings

Group name	#1 code	#7 code	#S code	Code description
CSV file		CV		Reading (response from the instrument): #7,CV,<on>,<err>; Writing: #7,CV,<on>; where <err> - CSV file error; 0 – no error <on> - Writing into CSV: 0 - **Off**, 1 - **On**
			EA	Writing into CSV: 0 - **Off**, 1 - **On**

Table A.9 System check settings

Group name	#1 code	#7 code	#S code	Code description
System check settings		RC		To read/write settings send #7,RC[,<sel>]; where <sel> is settings selector: 0 (or empty) - read system check status 1 - read/write system check settings 2 - start system check 3 - read live check status 4 - read live check status and write to calibration history file Reading status (response from the instrument): #7,RC,0,<active>,<result>,<hh>,<mm>,<ss>,<sm>; where <active> - status of the system check 0 - inactive 1 - active <result> - result of the last system check 0 - OK

Group name	#1 code	#7 code	#S code	Code description
				1 - Failed 2 - Not performed 3 - Speaker failed 4 - Geophone disconnected 5 - Geophone connected 6 - Geophone damaged <hh> - hours left to the next system check <mm> -minutes left to the next system check <ss> - seconds left to the next system check <sm> - geophone service mode 0 - inactive 1 - active Reading/writing settings: #7,RC,1,<mode>[,<time>[,<wday>]]; where <mode> - automatic system check function enable 0 - Off 1 - On <time> - time of a day [min] when system check should be performed 0 - Off 1...1439 –minutes since midnight <wday> - weekday mask; sum of the following flags representing week days b0 - **Monday** b1 - **Tuesday** b2 - **Wednesday** b3 - **Thursday** b4 - **Friday** b5 - **Saturday** b6 - **Sunday** *Notes: the mask value is given in hexadecimal. For example, 1F means working days of a week Monday-Friday.* Response from the #7,RC,3; and #7,RC,4; #7,RC,<x>,<result>,<sm>; <x> - 3 or 4 <result> - result of the live check <sm> - geophone service mode
			AX	<mode> - automatic system check function enable
			AY	<time> - time of a day [min] when system check should be performed
			AZ	<wday> - weekday mask *Notes: the mask value is given in decimal. For example 31 value means working days of a week Monday-Friday.*

Group name	#1 code	#7 code	#S code	Code description

Last system check date			**Aa**	d - coded data ∈(0 ÷ 65535)
				Date decoding in C language:
				day = (d & 0x1F);
				month = ((d>>5) & 0x0F);
				year = ((d>>9) & 0x7F) + 2000;

Last system check time			**Ab**	t - t coded time ∈(0 ÷ 65535)
				Time decoding in C language:
				sec = (t%30);
				min = ((t/30)%60);
				hour = (t/1800);
				Note: time resolution is 2 seconds!

Last system check result			**Ac**	<result> - result of the last system check

Table A.10 Setup settings

Group name	#1 code	#7 code	#S code	Code description
Load setup		**LS**		name - a name of a setup file to be loaded (activated) *Notes:* *- name is given without "svt" extension* *- a setup file must be placed into the SETUP directory of the instrument's SD card prior using this command; see* **Error! Reference source not found.** *or* **Error! Reference source not found.** *on file upload*
Save setup		**SS**		name - a current instrument setup will be saved as a "name.svt" file in the SETUP directory of the instrument's SD card; 8 characters is a maximum name length *Notes:* *- name is given without "svt" extension*
Clear setup		**CS**		This command restores factory defaults of the instrument. To execute command send #7,CS[,<sel>]; where <sel> is settings selector: 0 (or empty) - clear measurements setup (preserve communication settings) 1 - clear all settings 2 - clear all settings and calibration history *Notes: it is not advised to use this function remotely via Internet with <sel>=1 or <sel>=2 since communication with the instrument may be lost!*
Delete setup		**DS**		name - a name of a setup file to be deleted from the SETUP directory of the instrument's SD card *Notes:* *- name is given without "svt" extension*

Table A.11 Alarms settings

Group name	#1 code	#7 code	#S code	Code description
nth address book **name**; nn ∈ (01 ÷ 16)			**QAnn**	Notes: - name has a maximum length of 16 characters
nth address book **email**; nn ∈ (1 ÷ 16)			**QBnn**	Notes: - email has a maximum length of 48 characters
nth address book **phone**; nn ∈ (1 ÷ 16)			**QCnn**	Notes: - phone has a maximum length of 15 characters
nth event **active**; nn ∈ (1 ÷ 10)			**WAnn**	0 - Off 1 - On
nth event **name**; nn ∈ (1 ÷ 10)			**WBnn**	Notes: - name has a maximum length of 16 characters
nth event **source**; n ∈ (1 ÷ 10)			**WCnn**	0 - **System** 1 - **PPV** 2 - **RMS** 3 - **RRMS** 4 - **Curve** 5 - **Curve 1** 6 - **Curve 2** 7 – **Curve 3** 8 – **Vector PPV**
nth event **integration**; nn ∈ (1 ÷ 10)			**WDnn**	0 - **1s** 1 - **SR** (Velocity step) 2 - **TH** (Human Vibration step) Valid only with event source RMS
nth event **X threshold**; nn ∈ (1 ÷ 10)			**WEnn**	x - X axis threshold level in dB ∈ (60 ÷ 160)
nth event **Y threshold**; nn ∈ (1 ÷ 10)			**WZnn**	x - Y axis threshold level in dB ∈ (60 ÷ 160)
nth event **Z threshold**; nn ∈ (1 ÷ 10)			**WXnn**	x - Z axis threshold level in dB ∈ (60 ÷ 160)
nth event **Vec threshold**; nn ∈ (1 ÷ 10)			**WFnn**	x - Vector PPV threshold level in dB ∈ (60 ÷ 160)
nth event **reduction factor**; nn ∈ (1 ÷ 10)			**WGnn**	x - reduction factor in 0.001
nth event **days of week**; nn ∈ (1 ÷ 10)			**WHnn**	x - sum of the following flags flags: b0 - Monday b1 - Tuesday b2 - Wednesday b3 - Thursday b4 - Friday b5 - Saturday b6 - Sunday
nth event **start hour**; nn ∈ (1 ÷ 10)			**WInn**	x - hour ∈ (0 ÷ 23)

Group name	#1 code	#7 code	#S code	Code description
nth event **start minutes**; nn ∈ (1 ÷ 10)			**WJnn**	x - minute ∈ (0 ÷ 59)
nth event **stop hour**; nn ∈ (1 ÷ 10)			**WKnn**	x - hour ∈ (0 ÷ 23)
nth event **stop minutes**; nn ∈ (1 ÷ 10)			**WLnn**	x - minute ∈ (0 ÷ 59)
nth event **duration**; nn ∈ (1 ÷ 10)			**WMnn**	x - duration in s ∈ (1 ÷ 3600)
nth event **counter**; nn ∈ (1 ÷ 10)			**WWnn**	x - counter ∈ (1 ÷ 100)
nth event **counter mode**; nn ∈ (1 ÷ 10)			**WVnn**	counter mode: 0 - Consecutive 1 - Periodical Valid only with **Counter > 1**
nth event **counter period**; nn ∈ (1 ÷ 10)			**TAnn**	counter period: 1 - Velocity step 2 - Human vibration step Valid only with **Event Counter > 1** and **Counter Mode = Periodical**
nth event **min. break**; nn ∈ (1 ÷ 10)			**WNnn**	x - min. break in s ∈ (0 ÷ 3600)
nth event **SMS active**; nn ∈ (1 ÷ 10)			**WOnn**	0 - Off 1 - On
nth event **SMS number mask**; nn ∈ (1 ÷ 10)			**WPnn**	x - sum of the following flags b0 - user number 1 b1 - user number 2 ... B15 - user number 16
nth event **email active**; nn ∈ (1 ÷ 10)			**WQnn**	0 - Off 1 - On
nth event **email recipient mask**; nn ∈ (1 ÷ 10)			**WRnn**	x - sum of the following flags b0 - user number 1 b1 - user number 2 ... B15 - user number 16
nth event **wave recording active**; n ∈ (1 ÷ 10)			**WSnn**	0 - Off 1 - On
nth event **alarm lamp active**; nn ∈ (1 ÷ 10)			**WTnn**	0 - Off 1 - On
nth event **system mask**; nn ∈ (1 ÷ 10)			**WUnn**	b0 - Powered Up b1 - Powered Down b2 - Measurement Start b3 - Measurement Stop b4 - Mains On b5 - Mains Off

Group name	#1 code	#7 code	#S code	Code description
				b6 - Low Battery b7 - Battery OK b8 - Low External Battery b9 - External Battery OK b10 - Low Storage b11 - Storage OK b12 - System Check b13 - Lamp Disconnected b14 - Lamp Connected b15 - Cover Open b16 - Cover Closed b17 - Device Tilt b18 - Device Vertical b19 - Instrument Error b20 - Location

Table A.12 General settings

Group name	#1 code	#7 code	#S code	Code description
UART interface mode	**Xy**		**VL**	0 - none 1 - monitoring station SP 276 2 – External Device 3 – dust monitoring station ES-642
Lamp hold time			**UH**	x - x lamp hold time [s]; ∈ (1 ÷ 59), (60 ÷ 900) with 60s steps
Unit Name		**UN**		Up to 12 characters (permitted characters: 0:9, a:z, A:Z, space, and '_').
Instrument description		**AX**		To read settings send #7,AX;. Response: #7,AX,<station>,<res1>,<res2>; <station> - station name <res1>, <res2> - reserved values To write settings send #7,AX,<sel>,<text>;. where <sel> - value selector 0 - station name <text> - user text up to 128 characters in UNICODE format. Permitted characters: 0-9, a-f, A-F
			LI	<text> - user text for station name
SD card: erase disk		**ED**		Erase all files from SD card.
SD card: version of Fat file system		**FT**		-1 - SD disk not ready 2 – FAT32
SD card: number of sectors		**NS**		n - number of sectors. *Sector is 512 bytes in size*
SD card: number of free sectors		**NF**		n - number of free sectors. *Sector is 512 bytes in size*

Group name	#1 code	#7 code	#S code	Code description
Measurement files number		**BN**		n - number of "*.svl" files in the instrument's working directory
Firmware upgrade		**FU**		To read status of firmware upgrade send #7,FU;. Response: #7,FU,<stat>; To start firmware upgrade send: #7,FU,<name>.<ext>; where <name> - a name of a firmware binary to be used for upgrade; file must reside in the FIRMWARE directory of the instrument's SD card. <ext> - three characters extension of the firmware file; usually it is "BIN" <stat> - status of upgrade; negative value is an error 0 - not upgrading or upgrade finished successfully (if started with #7,FU,<name>.bin;) 1 - start of upgrade 2- checking a firmware image 3 - erasing Flash 4 - writing Flash 5 - checking a firmware after write 6 - finishing After 6 the state always comes to 0.
Firmware list		**FL**		Returns firmware file list in the FIRMWARE directory of the instrument's SD card. Response: #7,FL,<name1>,<len1>[,<name2>,<len2>[...]]; where <namex> - name of the firmware file with extension, e.g. "firmware.bin"; max 8 characters for name and 3 characters for extension <lenx> - length of the firmware filex [B]
RMS on stop		**LL**		Reading (response from the instrument): #7,ll,<L1>,<L2>,<L3>; where <L1> - RMS value from X axis in [dB] <L2> - RMS value from Y axis in [dB] <L3> - RMS value from Z axis in [dB] *Notes: function is not available during measurements.*
Instrument orientation		**OR**		Returns orientation of the device in the format: **#7,OR,x<a.aa>,y<b.bb>,z<c.cc>;** where a.aa - gravitational acceleration in [g] for axis x

Group name	#1 code	#7 code	#S code	Code description
				b.bb - gravitational acceleration in [g] for axis y c.cc - gravitational acceleration in [g] for axis z
Station status		II		This function provides cumulative station status. Reading (response from the instrument): #7,ll,[<rms1>],[<rms2>],[<rms3>],Fx<flags>,B<bat>,D<disk>,ex<err>,wx<war>,Rx<rst>,fx<add>,O<dd:hh:mm:ss>; where <L1> - L value from X axis in [dB] (on STOP only) <L2> - L value from Y axis in [dB] (on STOP only) <L3> - L value from Z axis in [dB] (on STOP only) <flags> - station status flags defined in hexadecimal format as a sum of the following flags: b0 - measurements are running, b1 - pause is active, b2 - reserved, b3 - battery is charging, b4 - reserved, b5 - external power supply is present, b6 - time is synchronized with GPS, b7 - reserved, b8 - reserved, b9 - key pressed, b10 - reserved, b11 - reserved, b12 - reserved, b13 - reserved, b14 - solar panel is connected, b15 - battery charging is finished, b16 - reserved, b17 - battery heater is on, b18 - timer mode is active, <bat> - battery relative state of charge [%] <disk> - SD card occupation [%] <err> - error flags defined in hexadecimal format as a sum of the following flags: b0 - battery pack error, b1 - SD card is not ready, b2 - logger file error, b3 - reserved, b4 - reserved, b5 - reserved, b6 - reserved, b7 - meteo module error, b8 - reserved, b9 - reserved, b10 - reserved, b11 - instrument is not standing correctly, b12 - geophone disconnected, b13 - external battery is low,

Group name	#1 code	#7 code	#S code	Code description
				b14 - logger file name error, b15 - geophone damaged, b16 - communication with battery pack, b17 - battery pack temperatures greater than 60°C, b18 - SIM not detected for more than an hour, <war> - warning flags defined in hexadecimal format as a sum of the following flags: b0 - logging off, b1 - battery pack temperatures greater than 43°C, b2 - battery pack temperatures greater than 55°C, b3 - SIM not detected for more than 5 minutes, <rst> - last instrument power on/off and reset cause b0 - hardware reset, b1 - watchdog reset, b2 - remote reset, b3 - reserved, b4 - reserved, b5 - reserved, b6 - reserved, b7 - reserved, b8 - system was on because of keyboard, b9 - system was on because of external power supply had been connected b10 - system was on because of RTC alarm, b11 - reserved, b12 - system was on because EXT I/O line had triggered, <dd:hh:mm:ss> - system *on* time since last power-up where <dd> - days <hh> - hours <mm> - minutes <ss> - seconds

Table A.13 Power settings

Group name	#1 code	#7 code	#S code	Code description
Battery Charge mode		**SB**	**JY**	0 - Full capacity 1 - Optimized
External Battery mode		**EB**	**JU**	0 - Off 1 - On

Group name	#1 code	#7 code	#S code	Code description
Power status		BS		To read settings send #7,BS;. Response: #7,BS,<bat>,<src>,<time>,<chrg>; where <bat> - battery state of charge [%]; -1 when state of charge cannot be read <src> - power source 0 - internal battery -1 - external power supply, e.g. SB274 -2 - solar panel (battery is charging) -3 - solar panel (battery is not charging) <time> - battery time [h]; either “time to full” if battery is charging or “time to empty” if battery is discharging <chrg> - charging indication 0 - not charging 1 - charging is finished 2 - charging is in progress
Battery voltage		BV		volt - battery voltage [mV] multiplied by 10;
External power voltage		EV		volt - external power supply voltage [mV] multiplied by 10;
Power off		PO		Power off the instrument. *Notes: take care using this command remotely via Internet*
Reset		XR		Hardware reset of the instrument (power off and on). Send #7,XR[,<n>]; n - delay [s] before reset
Battery pack information		BM		To read settings send #7,BM;. Response: #7,BM,<err>,<manuf>,<date>,<sn>,<dev>,<chem>,<chemId>,<designV>,<designC>; where <err> - error reading battery pack 0 - no error, the settings are valid (<manuf>, <date>, etc.) not 0 - error, the settings are not valid; repeat read command <manuf> - manufacture name, “Svantek sp. z o.o.” <date> - manufacture date, “dd.mm.yyyy” <sn> - serial number of packet (production code) <dev> - device name <chem> - chemistry of the battery, “LION” <chemId> - internal chemistry ID <designV> - design voltage [mV] <designC> - design capacity [mAh]
Battery status		BT		To read settings send #7,BT;. Response: #7,BT,<err>,<temp>,<volt>,<curr>,<Merr>,<soc>,<fcc>,<cell1>,<cell2>,<tte>,<ttf>; where <err> - error reading battery pack 0 - no error, the settings are valid (<temp>, <volt>, etc.)

Group name	#1 code	#7 code	#S code	Code description
				not 0 - error, the settings are not valid; repeat read command <temp> - temperature of the battery pack [°C] <volt> - voltage of the battery pack [mV] <curr> - actual current of the battery pack [mA]; negative value means discharging <Merr> - maximum error [%] of the gauging algorithm <soc> - state of charge [%] <fcc> - actual full charge capacity of the battery pack [mAh] <cellx> - voltage of battery pack cellx [mV]; cells connected in serial with cell1 most close to ground <tte> - “time to empty” [min]; value of 65353 means, that battery pack is not discharging <ttf> - “time to full” [min]; value of 65353 means, that battery pack is not charging

Table A.14 System log settings

Group name	#1 code	#7 code	#S code	Code description
System log file		**LG**		To read settings send #7,LG;. Response: #7,LG,<mask>,<time>,<size>,<totSize>,<err>; To write settings send: #7,LG,<mask>,<time>,<size>,<totSize>; where <mask> - events written to a system log file (S.LOG) defined in hex format as a sum of the following flags: 0x0 - **Off** (logs are not saved), 0x0001 – log system events, 0x0002 – log modem communication events, 0x0004 – log modem configuration, 0x0008 – log periodic modem status, 0x0010 – log periodic battery status, 0x0020 – log periodic instrument status, 0x0040 – reserved, 0x0080 – log modem debug (off by default), 0x0100 – log periodic GPS status, 0x0200 – reserved, 0x0400 – log remote commands events, 0x0800 – log advanced alarms events, 0x1000 – reserved, 0x2000 – reserved, 0x4000 – reserved, 0x8000 – reserved

Group name	#1 code	#7 code	#S code	Code description
				<time> - interval [s] for periodic logs, <size> - maximum size [MB] of a single S.LOG file, <sizeTot> - maximum size [MB] of all S.LOG files in the current working directory, <err> - S.LOG file error; 0 – no error. *Notes:* *- it is not advised to switch off the log file! This file is useful in case of support.* *- do not set reserved flags!*
			JL	<mask> - events written to a system log file "Sx.LOG"; see above
			JT	<time> - interval [s] for periodic logs
			JR	<size> - maximum size [MB] of a single "Sx.LOG" file
			JS	<sizeTot> - maximum size [MB] of all "Sx.LOG" files in the current working directory

Table A.15 Position and time settings

Group name	#1 code	#7 code	#S code	Code description
GPS		**GH**	**JN**	0 - **Off** 1 - **On**
Position settings		**GL**		To read settings send #7,GL[,<sel>];. Response: #7,GL, <Latitude>,<Longitude>; To write settings send: #7,GL,<Latitude>,<Longitude>; where <sel> - 0 – automatic read mode. Coordinates are read from GPS if it is active and position is fixed or from the memory otherwise. 1 – coordinates are read from the memory <Latitude> - Latitude in degrees; value has '-' sign for South hemisphere, < Longitude > - Longitude in degrees; value has '-' sign west of Greenwich,
			LA	<LatDeg> - Latitude degrees; value has '-' sign for South hemisphere,
			LB	<LatMin> - Latitude minutes,
			LC	<LatSec> - Latitude seconds,
			LS	<LatmSec> - Latitude milliseconds,
			LE	<LongDeg> - Longitude degrees; value has '-' sign west of Greenwich,
			LF	<LongMin> - Longitude minutes,
			LG	<LongSec> - Longitude seconds,

Group name	#1 code	#7 code	#S code	Code description
			LH	<LongmSec> - Longitude milliseconds,
GPS last data		**GP**		Reading (response from the instrument): #7,GP,<qq>,<YY>,<MM>,<DD>,<hh>,<mm>,<ss>,<LaD>,<LaM>,<LaS>,<LaS10>,<Ladir>,<LoD>,<LoM>,<LoS>,<LoS10>,<Lodir>; Where: <qq> - Fix (qq>0), Not fix (qq=0), <YY> - Year, <MM> - month, <DD> - day, <hh> - hour, <mm> - minute, <ss> - seconds, <LaD> - Latitude degree, <LaM> - Latitude minutes, <LaS> - Latitude seconds, <LaS10> - Latitude fraction of seconds, <Ladir> - Latitude direction (N- north, S- south), <LoD> - Longitude degree, <LoM> - Longitude minutes, <LoS> - Longitude seconds, <LoS10> - Longitude fraction of seconds, <Lodir> - Longitude direction (E- east, W- west)
RTC synchronization with GPS		**GS**	**JO**	0 - **Off** 1 - **On**
Stop measurement to synchronize RTC with GPS			**JZ**	0 - **Off** 1 - **On**
Synchronization time			**JV**	time of a day [min] when synchronization should be performed
Synchronization threshold			**JX**	Minimum time difference between RTC and GPS in seconds to perform synchronization Default: 10s
Real Time Clock (RTC)		**RT**		Current instrument's date/time settings. Reading (response from the instrument): #7,RT,<hour>,<min>,<sec>,<day>,<month>,<year>; Writing: #7,RT,<hour>,<min>,<sec>,<day>,<month>,<year>; where <hour> - hour ∈ (0 ÷ 23) <min> - min ∈ (0 ÷ 59) <sec> - sec ∈ (0 ÷ 59) <day> - day ∈ (1 ÷ 31) <month> - hour ∈ (1 ÷ 12) <year> - hour ∈ (2000 ÷ 2099)
Time zone		**TZ**		x - time zone [min] ∈ (-720 ÷ 840) in 15 minutes step
			JM	x - time zone [min] ∈ (-720 ÷ 840) in 15 minutes step

Group name	#1 code	#7 code	#S code	Code description
On time		RO		Time elapsed since last power up. Reading (response from the instrument): #7,RO,<dd>,<hh>,<mm>,<ss>; where <dd> - days <hh> - hours <mm> -minutes <ss> - seconds

Table A.16 Mobile network settings and status

Group name	#1 code	#7 code	#S code	Code description
Communication Module (3G or LTE) On/Off	Xk		KA	0 - Off 1 - Continuous On 2 - Periodically On
Communication Period			KP	nn - period in minutes □ (15 □ 60) with 15min step and □ (60 □ 1440) with 60 min step; **default is 120 min**
External antenna			KX	Antenna 0 - Internal 1 - External
Access Point Name	XN		KE	Access Point Name is a gateway to the operator's Internet; default "internet" or empty ""; (permitted characters: 0:9, a:z, '.', '-' and '_').
Authentication mode	XF		KB	Authentication mode to be used during Internet connection 0 - Off 1 - PAP
Username	XO		KG	Username to be used during Internet connection
Password	XU		KH	Password to be used during Internet connection
Domain Name Server	XV			Domain Name Server (DNS) address Ipv4 in dot notation
			KI	Domain Name Server (DNS) address written as single number x x=<aa>*2^{24}+<bb>*2^{16}+<cc>*2^{8}+<dd> Where: x - DNS written as single number <aa>.<bb>.<cc>.<dd> - DNS in dot notation (e.g. 192.168.1.1 written as 3232235777 = 192*2^{24}+168*2^{16}+1*2^{8}+1)
Connection type	XB		KL	Connection type 0 - TCP server (listener) mode 1 - TCP client mode (default)
Remote address	XI		KD	Remote address of TCP/UDP connection; default "app.svannet.com"

Group name	#1 code	#7 code	#S code	Code description
				Note: the setting can be a name to be resolved by DNS or Ipv4 address in dot notation, e.g. "192.168.1.1"
Remote port	**XJ**		**KC**	Remote port of TCP/UDP connection □ (0 □ 65535); default 8000 *Note: it is not advised to use ports < 1024!*
SIM mode	**Xw**		**KJ**	0 - data + SMS mode 1 - data only mode
Default settings for LTE			**KU**	0 - user defined settings for LTE 1 - use modem's default settings for LTE
Ping Interval			**KO**	Time interval [s] between consecutive PING commands: 0 - PINGing disabled x - time interval [s]
Ping address			**KN**	The name of the server for PING, e.g: *google.com*
Modem firmware			**KT**	Some LTE modems has selectable firmware for different operators LE910Cx-NF modem supports firmwares: 0 - AT&T Config 1 - Verizon Config 2 - T-Mobile Config LE910Cx-AP modem supports firmwares: 10 - NTT Docomo Config 11 - Telstra Config 12 - KDDI Config 13 - Softbank Config LE910Cx-CN modem supports 20 - China Mobile Config 21 - China Unicom Config 22 - China Telecom Config
Mobile information		**GI**		To read settings send #7,GI,<sel>; where <sel> is a settings selector: 0 - mobile equipment information 1 - mobile network information 2 - mobile connection information Reading mobile equipment information: **#7,GI,0,<manuf>,<model>,<rev>,<id>;** where <manuf> - modem's manufacture name <model> - model of the modem <rev> - modem's firmware revision <id> - modem's IMEI number Reading mobile network information: **#7,GI,1,0x<flags>,<oper>,<simId>,<reg1>,<reg2>,<rssi>,<ber>,<act>;** where <flags> - modem state in hex format defined as a sum of flags:

Group name	#1 code	#7 code	#S code	Code description
				0x00000001 - modem is powered on, 0x00000002 - mode m is initialized, 0x00000004 - modem is connected to the operator's network, 0x00000008 - modem is connected to the Internet, 0x00000010 - modem has established a TCP/IP connection, 0x00000020 - modem is connected to SvanNET, 0x02000000 - modem is requesting a SIM PUK, 0x04000000 - modem is requesting a SIM PIN, 0x08000000 - SIM error, e.g. SIM not inserted, *Notes: all other flags are reserved!* <oper> - ID of the network operator defined as Mobile Country Code (MCC – 3 digits) and Mobile Network Code (MNC – 2 or 3 digits) <simId> - MCC + MNC read from a SIM card <reg1> - GSM network registration indicator; 0 – not registered, 1 – registered <reg2> - GPRS/UMTS/LTE network registration indicator; 0 – not registered, 1 – registered <rssi> - Received Signal Strength Indicator 0 – (-113) dBm or less 1 – (-111) dBm 2..30 – (-109)dBm..(-53)dBm / 2 dBm per step 31 – (-51)dBm or greater 99 – not known or not detectable <ber> - Bit Rate Error [%] (2G) 0 – less than 0.2% 1 – 0.2% to 0.4% 2 – 0.4% to 0.8% 3 – 0.8% to 1.6% 4 – 1.6% to 3.2% 5 – 3.2% to 6.4% 6 – 6.4% to 12.8% 7 – more than 12.8% 99 – not known or not detectable

Group name	#1 code	#7 code	#S code	Code description
				Signal Quality [dBm] (4G) 0: (-4) to (-3) 1: (-6) to (-5) 2: (-8) to (-7) 3: (-10) to (-9) 4: (-13) to (-11) 5: (-15) to (-14) 6: (-17) to (-16) 7: (-19) to (-18) 99 – not known or not detectable <act> - Access Technology 0, 3 – 2G (GSM) 2, 4, 5, 6 – 3G (UMTS) 7, 8, 9 – 4G (LTE) Reading mobile connection information: **#7,GI,2,0x<flags>,<serviceIP>,<trafficUp>,<trafficDown>,<dataUp>,<dataDown>;** where <flags> - modem state in hex format, see <flags> for definition. <serviceIP> - IP address of the remote side in dot notation, e.g. 192.168.0.1 <trafficUp> - amount of raw data [kB] sent out from the instrument to the Internet <trafficDown> - amount of raw data [kB] received by the instrument from the Internet <dataUp> - amount of user data [kB] sent out from the instrument to the Internet <dataDown> - amount of user data [kB] received by the instrument from the Internet *Notes:* *- "user data" means any commands sent to the instrument and any responses received from the instrument, e.g. #7,GI,2; – command sent to the instrument is 8 bytes of <dataDown> #7,GI,2,0x3F,100.101.102.1,229373,26494,11885,1254; - response received from the instrument is 51 bytes of <dataUp>* *- raw data means user data + protocols overhead*
Modem reset		**RM**		Force modem reset. 0 (or empty) - software reset 1 - hardware reset (power off and on)
Signal quality		**SQ**		Modem signal quality, see <rssi>

Table A.20 Bluetooth settings

Group name	#1 code	#7 code	#S code	Code description
Bluetooth		**bt**	**UC**	Bluetooth 0 - Off 1 - On
Bluetooth PIN		**BP**	**UD**	Bluetooth PIN 0 - Off 1...9999 – PIN
Bluetooth software version		**br**		To read settings send #7,br;. Response: #7,br,<a>,<b>,<c>,<d>,<e>; <a>.<b> - software version <c>.<d>.<e> - bootstrap version
Bluetooth status		**bm**		To read settings send #7,bm;. Response: #7,bm,<a>,<b>,<c>,<d>,<e>; <a> - module active <b> - connection active <c> - internal software version <d> - connection interval in ms <e> - package size in bytes

APPENDIX B. DATA FILE STRUCTURES

B.1 GENERAL STRUCTURE OF THE SV 803 FILES

Each file containing data from the **SV 803** (internal file system rev. **1.06**) instrument consists of several groups of words. There are two different types of files containing:

- measuring results data (cf. App. B.2);
- setup data (cf. App. B.3).

Each file has the following elements:

- SvanPC file header (cf. Tab. B.1.1)
- file header (cf. Tab. B.1.2);
- unit and internal software specification (cf. Tab. B.1.3);
- calibration settings (cf. Tab. B.1.4)
- user's text (a header) stored together with the measurement data (cf. Tab. B.1.5);
- Unit text info (cf. Tab. B.1.6);
- parameters and global settings, common for all profiles (cf. Tab. B.1.7);
- parameters for Wave recording (cf. Tab. B.1.10);
- special settings for profiles (cf. Tab. B.1.12);
- header of the logger file (cf. Tab. B.1.15)
- contents of the logger file (cf. Tab. B.1.16)

Other elements of the file structure are not obligatory for each file type stated above. These elements are as follows:

1) Header of the Summary Results Record (saved in Summary Results Record) (cf. Table B.1.17)
2) main results (saved in Summary Results Record) (cf. Tab. B.1.18_SLM)
3) FFT analysis results (saved in Summary Results Record) (cf. Tab. B.1.20)
4) 1/3 OCTAVE analysis results (saved in Summary Results Record) (cf. Tab. B.1.21)
5) settings of the instrument saved in the setup file (cf. Tab. B.1.24);
6) file-end-marker (cf. Tab. B.1.25);

Below, all file structure groups are described separately in Tab. B.1.1 – Tab. B.1.25. The format used in the columns, named **Comment** with the square parenthesis ([xx, yy]), means the contents of the word with; **xx** is the most significant byte (MSB) and **yy** the lowest significant byte (LSB) of the word. The format 0xnnnn means that the nnnn is four-digit number in hexadecimal form.

Table B.1.1. SvanPC file header

Word number	Name	Comment
0..2	"SvanPC"	reserved
3	26	reserved
4	32	reserved
5	71	reserved
6..15	Reserved	reserved
…	…	…

Table B.1.2. File header

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

Table B.1.3. Unit and software specification

Word number	Name	Comment
0	0xnn02	[02, nn=specification's length]
1	UnitNumberL	unit number (LSB word)
2	UnitType	type of the unit: 803 – **SV 803**
3	SoftwareVersion	software version: 106
4	SoftwareIssueDate	software issue date
5	DeviceMode	mode of the instrument
6	UnitSubtype	subtype of the unit: 2 – **SV 803**
7	FileSysVersion	file system version: 106
8	reserved	Reserved
9	SoftwareSubversion	software subversion: 01
10	UnitNumberH	unit number (MSB word)
11	GeoSN_X_L	geophone number (LSB word), X axis
12	GeoSN_X _H	geophone number (MSB word), X axis
13	GeoSN_Y_L	geophone number (LSB word), Y axis
14	GeoSN_Y _H	geophone number (MSB word), Y axis
15	GeoSN_Z_L	geophone number (LSB word), Z axis
16	GeoSN_Z_H	geophone number (MSB word), Z axis
…		…

Table B.1.4. Calibration settings

Word number	Name	Comment
0	0xnn47	[47, nn=header's length]
1	CalibrType X	X axis, type of calibration performed: 0 - none 1 - BY MEASUREMENT (manual) 2 - REMOTE 3 - FACTORY CALIBRATION 4 - AUTOCALIBRATION
2	CalibrDate	X axis, date of calibration performed (cf. App. B.4)
3	CalibrTime	X axis, time of calibration performed (cf. App. B.4)
4	CalibrFactor	X axis, factor (*100 dB) of calibration performed
5	CalibrType X	Y axis, type of calibration performed: 0 - none 1 - BY MEASUREMENT (manual) 2 - REMOTE 3 - FACTORY CALIBRATION 4 - AUTOCALIBRATION
6	CalibrDate	Y axis, date of calibration performed (cf. App. B.4)
7	CalibrTime	Y axis, time of calibration performed (cf. App. B.4)
8	CalibrFactor	Y axis, factor (*100 dB) of calibration performed
9	CalibrType X	Z axis, type of calibration performed: 0 - none 1 - BY MEASUREMENT (manual) 2 - REMOTE 3 - FACTORY CALIBRATION 4 - AUTOCALIBRATION
10	CalibrDate	Z axis, date of calibration performed (cf. App. B.4)
11	CalibrTime	Z axis, time of calibration performed (cf. App. B.4)
12	CalibrFactor	Z axis, factor (*100 dB) of calibration performed
…	…	…

Table B.1.5. USER's text

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

Table B.1.6. Unit text info

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

Table B.1.7. Parameters and global settings

Word number	Name	Comment
0	0xnn04	[04, nn=block's length]
1	MeasureStartDate	measure start date (cf. App. B.4)
2..3	MeasureStartTimeMS	measure start time in ms (cf. App. B.4)
4	DeviceFunction	device function: 18 – **Ground Vibration**
5	Range	measurement range: 2 - **SINGLE**
6	UnitFlags	calibration flags: b0 - if set to 1: X axis, calibration coefficient is used b1 - if set to 1: Y axis, calibration coefficient is used b2 - if set to 1: Z axis, calibration coefficient is used b3 - if set to 1: X axis, overload occurred b4 - if set to 1: Y axis, overload occurred b5 - if set to 1: Z axis, overload occurred b9 -if set to 1: measurement start synchronized with GPS b11 - if set to 1: X axis, underrange occurred b12 - if set to 1: Y axis, underrange occurred b13 - if set to 1: Z axis, underrange occurred
7	RepCycle	repetition cycle: 0 - infinity nnnn - number of repetitions $\in(1 \div 1000)$
8	NofChannel	number of channels (3)
8	NofProf	number of profiles (2) First profile: Velocity Second profile: Human Vibration
10	StartDelay	start delay time
11..12	VelocityStepSec	velocity step in seconds
13	RmsInt	detector's type in the **Rms** function: **0 - LINEAR,** 1 - **EXPONENT.**

14	FilterSpec	Reserved
15	DetSpec	Reserved
16	RollRms1	rolling time (1) in seconds
17	RefLev_A	reference level for acceleration (human vibration profile) given in 0.01dB referenced to 1 um/s2
18	GvStandard	Standard for Ground Vibration function 0 - **Off** 1 - **PPV** 2 - **BS-7385-2** 3 - **DIN-4150-3** 4 - **KBfmax** 5 - **FR/22/09/1994** 6 - **FR/23/07/1986/1** 7 - **FR/23/07/1986/2** 8 - **FR/IN-1226-A** 9 - **FR/IN-1226-B** 10 - **FR/IN-1226-C** 11 - **IEST VC** 12 – **User** 13 – **PN-B-02170 (SWD I)** 14 – **PN-B-02170 (SWD II)** 15 – **SS 4604866:2011** 16 – **SS 25211** 17 – **SS 4604861** 18 – **S 9020**
19	GvVibrType	In case of **DIN-4150-3** standard 0 - **Foundation** 1 - **Top Floor** 2 - **Floor Slab** 3 - **Underground Cavities** 4 - **Buried Pipework** 5 - **LT Top Floor** 6 - **LT Floor Slab**
20	GvSpectrum	1 - **FFT VEL** 3 - **1/3 VEL**
21	GvSpectrumResult	In case of **1/3 VEL** GvSpectrum 0 - **Peak** 1 - **Max** 2 - **Min** 3 – **RMS**

22	GvBuildingType	In the case of **BS-7385-2, DIN-4150-3**, **FR/22/09/1994**, **FR/23/07/1986/1**, **FR/23/07/1986/2**, **FR/IN-1226-A**, **FR/IN-1226-B**, **FR/IN-1226-C** or **IEST VC** standard 0 - **L1** 1 - **L2** 2 - **L3** 3 - **L4** 4 - **Workshop**, 5 - **Office**, 6 - **Residential**, 7 - **Theatre**, 8 - **VC-A**, 9 - **VC-B**, 10 - **VC-C**, 11 - **VC-D**, 12 - **VC-E**
23	GvBand	Band in Hz
24	HumanVibration	Human vibration profile 0 - **Off** 1 - **On**
25	GvSampling	Sampling in Hz
26	RefLev_V	reference level for velocity given in 0.01dB referenced to 1 nm/s
27	VelResults	Velocity results in the 1st profile, all axes saved in the file. Contents defined as a sum of flags: b0 - Peak value (*100 dB) b1 – Peak-Peak value (*100 dB) b2 - maximal value (Max) (*100 dB) b3 – RMS value (*100 dB) b4 – reserved b5 – Rolling RMS (RRMS) value (*100 dB) b6 – Peak Vector value (*100 dB) b7 – Dominant frequency (*1000 Hz) b8 – Meteo / Dust data b9 – OVL time (sec) b10 – Peak sample number b11 – Peak Vector sample number
28	HumanVibrResults	Reserved
29	Spectrum_VelocityResults	Spectrum velocity results in the 1st profile, all axes saved in the file. 0 - Off 1 – All. 2 – On Event
30	StartSync	Synchronization the start of measurement with RTC 0 - switched off. -1 - synchronization to **1 sec**. 1 - synchronization to **1 min**. 15 - synchronization to **15 min**. 30 - synchronization to **30 min**. 60 - synchronization to **1 hour**.
31	GpsTimeZone	GPS Time Zone in 15 min.
32	GpsLastSyncTime	The time between clock synchronization from GPS module and the start of measurement in seconds. 0xffff - no synchronization

33	SplitMode	Logger files splitting mode: 0 - off. -1 - The file is created for each measurement cycle. 15 - The file is created every 15 min synchronized to RTC. 30 - The file is created every 30 min synchronized to RTC. 60 - The file is created every 1 hour synchronized to RTC. 1440 - The file is created on the specified times.
34	SplitTime[1]	Logger files splitting time: -1 - off. 0:1439 - Time in minutes. Valid only if SplitMode is 1440.
35	SplitTime[2]	Logger files splitting time: -1 - off. 0:1439 - Time in minutes. Valid only if SplitMode is 1440.
36	SplitTime[3]	Logger files splitting time: -1 - off. 0:1439 - Time in minutes. Valid only if SplitMode is 1440.
37	SplitTime[4]	Logger files splitting time: -1 - off. 0:1439 - Time in minutes. Valid only if SplitMode is 1440.
38	SplitTime[5]	Logger files splitting time: -1 - off. 0:1439 - Time in minutes. Valid only if SplitMode is 1440.
39	SplitTime[6]	Logger files splitting time: -1 - off. 0:1439 - Time in minutes. Valid only if SplitMode is 1440.
40	AxisOrientation	0 – vertical 1 – horizontal 2 – vertical
41	GeoComp	Geophone compensation 0 - Off 1 - On
42	SWD Curve 1	In case of **SWD I** or **SWD II** standard Curve 1 type: 0 – **A** 1 – **A'** 2 – **B** 3 – **B'** 4 – **C** 5 – **C'** 6 – **D** 7 – **D'**
43	SWD Curve 2	In case of **SWD I** or **SWD II** standard Curve 2 type
44	SWD Curve 3	In case of **SWD I** or **SWD II** standard Curve 3 type

45	SensClass	In case of **S 9020** standard Building sensitivity class $\in(0 \div 4)$
46	Occurance	In case of **S 9020** standard Occurance: 0 – Rare 1 – Repeated 2 – Often
…		

Table B.1.10. Wave-file recording parameters

Word number	Name	Comment
0	0xnn2D	[2D, nn=block's length]
1	TriggerMode	trigger mode: 0 - **OFF**, 1 - recording whole measurement 11 - recording on trigger **ALARM**
2	TriggerPre	pretrigger time given in seconds
3	TriggerPost	postrigger time given in seconds
4	TriggerSampling	sampling frequency given in Hz
5	TriggerStep	trigger period given in 0.1 ms. If zero Step is equal to logger time-step (cf. Tab. B.1.15)
6	TriggerFilter	filter type: 4 – **VEL1**, 15 – **KB**, 16 – **Wk**, 17 – **Wd**, 18 – **Wc**, 20 – **Wm**, 23 – **Wb**, 152 – **DIN80**, 153 – **DIN315**,
7	BitsPerSample	bits/sample: 32
8	RangeX	Full scale signal range in 0.01dB, X axis
9	RangeY	Full scale signal range in 0.01dB, Y axis
10	RangeZ	Full scale signal range in 0.01dB, Z axis
11	Gain	Signal gain in dB. Valid only for bits/sample: 16
12	LengthLimit	Wave file length limit in minutes
…		

Table B.1.12. Special settings for profiles

Word number	Name	Comment
0	0xnn05	[05, nn=block's length]
1	0x0607	[used_profile, profile's mask]
2	0xmm06	[06, mm=sub-block's length]
3	DetectorP[1][1]	detector type in the 1st profile (velocity), X axis: 0 - **100ms** 1 - **125ms** 2 - **200ms** 3 - **500ms** 4 - **1s** 5 - **2s** 6 - **5s** 7 - **10s**
4	FilterP[1][1]	filter type in the 1st profile (velocity), X axis: 4 – **VEL1**, 15 – **KB**, 16 – **Wk**, 17 – **Wd**, 18 – **Wc**, 20 – **Wm**, 23 – **Wb**, 152 – **DIN80**, 153 – **DIN315**,
5	BufferP[1][1]	logger contents in the 1st profile, Y axis, defined as a sum of: 0 - none, 1 – **Peak**, 2 – **P-P**, 4 – **Max**, 8 – **RMS,** 16 – **VDV,** 32 – **RRMS,**
6	Reserved	Reserved
7	Reserved	Reserved
8	0xmm06	[06, mm=sub-block's length]
9	DetectorP[1][2]	detector type in the 1st profile (velocity), Y axis:
10	FilterP[1][2]	filter type in the 1st profile (velocity), Y axis:
11	BufferP[1][2]	logger contents in the 1st profile, Y axis, defined as a sum of:
12	reserved	Reserved
13	reserved	Reserved
14	0xmm06	[06, mm=sub-block's length]
15	DetectorP[1][3]	detector type in the 1st profile (velocity), Z axis:
16	FilterP[1][3]	filter type in the 1st profile (velocity), Z axis:
17	BufferP[1][3]	logger contents in the 1st profile, Z axis, defined as a sum of:
18	reserved	Reserved
19	reserved	Reserved
20	0xmm06	[06, mm=sub-block's length]

21	DetectorP[2][1]	detector type in the 2nd profile (human vibration), X axis:
22	FilterP[2][1]	filter type in the 2nd profile (human vibration), X axis:
23	BufferP[2][1]	logger contents in the 2nd profile, X axis, defined as a sum of:
24	reserved	Reserved
25	reserved	Reserved
26	0xmm06	[06, mm=sub-block's length]
27	DetectorP[2][2]	detector type in the 2nd profile (human vibration), Y axis:
28	FilterP[2][2]	filter type in the 2nd profile (human vibration), Y axis:
29	BufferP[2][2]	logger contents in the 2nd profile, Y axis, defined as a sum of:
30	Reserved	Reserved
31	Reserved	Reserved
32	0xmm06	[06, mm=sub-block's length]
33	DetectorP[2][3]	detector type in the 2nd profile (human vibration), Z axis:
34	FilterP[2][3]	filter type in the 2nd profile (human vibration), Z axis:
35	BufferP[2][3]	logger contents in the 2nd profile, Z axis, defined as a sum of:
36	reserved	Reserved
37	reserved	Reserved
…		

Table B.1.13. FFT spectral analysis settings

Word number	Name	Comment
0	0x0051	[51, 00=block's length in the second word]
1	BlockLength	length of the block
2	0x0307	[used_channel, channel's mask]
3..6	reserved	reserved
7..8	M	frequency resolution: integer mantissa
9	E	frequency resolution: binary exponent. Formula to calculate resolution in Hz: $\Delta F = M \cdot 2^{E}$
10	N	number of FFT spectrum lines
11	T	number of TOTAL values
12	reserved	reserved
13	Window	window function: 0 – **Hanning,** 1 – **Rectangle,** 2 – **Flat Top,** 3 – **Kaiser-Bessel,**
14	WindowFactor	window correction factor in 0.01dB
15	reserved	reserved
16	reserved	reserved
17	Filter	filter type: 4 – **VEL1**,
18	reserved	reserved
…		

Table B.1.14. User curve definition

Word number	Name	Comment
0	0x0075	[75, 00=block's length in the second word]
1	BlockLength	length of the block
2	n_interval	Number of intervals
+[0]	0xnndd	[dd=curveID(1..3), nn=block length]
+[1]	type	type of: 0 - Acceleration, 1 - Velocity, 2 - Displacement,
+[2]	lowerFreq	lower border of the interval: in the case of **1/3 OCTAVE** for GvSpectrum: nn – number of **1/3 OCTAVE** filter ∈(0 ÷ NTer-1) in the case of **FFT** for GvSpectrum nn – freq in Hz
+[3]	lowerIncluded	1 if lowerFreq is included in the interval, 0 - otherwise
+[4..5]	lowerValue	value of the lower border of the interval in um/s
+[6]	upperFreq	upper border of the interval: in the case of **1/3 OCTAVE** for GvSpectrum: nn – number of **1/3 OCTAVE** filter ∈(0 ÷ NTer-1) in the case of **FFT** for GvSpectrum nn – freq in Hz
+[7]	upperIncluded	1 if upperFreq is included in the interval, 0 - otherwise
+[8..9]	upperValue	value of the upper border of the interval in um/s
…		

Table B.1.15. Header of the file from the logger

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

14..15	DustMeteoUnitNumber	serial number of the monitoring station (if the parameter value is equal to 0xFFFFFFFF this parameter is irrelevant)
16	DustMeteoUnitType	type of the monitoring station: - 276 (SP 276) - 642 (ES-642 Dust Monitor) (if the parameter value is equal to 0xFFFF this parameter is irrelevant)
17..18	DustMeteoSoftwareVersion	firmware version number of the monitoring stations (if the parameter value is equal to 0xFFFFFFFF this parameter is irrelevant) Format of version in case of SP276: A.BB.CC where CC = version %100 (two characters) BB = (version / 100)%100 (two characters) A = version / 10000 e.g. 0x00004E2E mean 2.00.14
…	…	…

Note: *The current logger time step in seconds can be obtained from the formulae:*

T = BuffTSec + BuffTMillisec / 1000

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

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

Table B.1.17. Header of the Summary Results Record (saved in Summary Results Record)

Word number	Name	Comment
0	0xnn59	[59, nn=header's length]
1..2	RecNumber	Summary Results Record number: 1..
3..4	MeasureTime	Time of the measurement
5	Flags	Measurement flags. Contents defined as a sum of flags: b0 - if set to 1: X axis, calibration coefficient is used b1 - if set to 1: Y axis, calibration coefficient is used b2 - if set to 1: Z axis, calibration coefficient is used b3 - if set to 1: X axis, overload occurred b4 - if set to 1: Y axis, overload occurred b5 - if set to 1: Z axis, overload occurred b9 -if set to 1: measurement start synchronized with GPS b11 - if set to 1: X axis, underrange occurred b12 - if set to 1: Y axis, underrange occurred b13 - if set to 1: Z axis, underrange occurred

6	MeasureStartDate	measure start date (cf. App. B.4)
7..8	MeasureStartTimeMS	measure start time in ms (cf. App. B.4)
…	…	…

Table B.1.18_VEL. Main velocity results (saved in Summary Results Record),

Word number	Name	Comment
0	0xnn66	[66, nn=block's length]
1st profile results. Axes X. Presence depending on the value of "VelResults" (cf. Tab. B.1.7)		
	Result[1][1]	Peak value in the X axis (*100 dB)
	Result[1][2]	P-P value in the X axis (*100 dB)
	Result[1][3]	Max value in the X axis (*100 dB)
	Result[1][4]	RMS value in the X axis (*100 dB)
	Result[1][5]	RRMS value in the X axis (*100 dB)
	Result[1][6]	DF value in the X axis (*1000 Hz) (results written in 2 words)
	Result [1][7]	Overload time in the X axis (results written in 2 words)
	Result [1][8]	Peak sample number in the X axis (results written in 2 words). Counted relative to the start time of the record. Sampling defined in table B.1.7 (GvSampling).
1st profile results. Axes Y. Presence depending on the value of "VelResults" (cf. Tab. B.1.7)		
	Result[2][1]	Peak value in the Y axis (*100 dB)
	Result[2][2]	P-P value in the Y axis (*100 dB)
	Result[2][3]	Max value in the Y axis (*100 dB)
	Result[2][4]	RMS value in the Y axis (*100 dB)
	Result[2][5]	RRMS value in the Y axis (*100 dB)
	Result[2][6]	DF value in the Y axis (*1000 Hz) (results written in 2 words)
	Result [2][7]	Overload time in the Y axis (results written in 2 words)
	Result [2][8]	Peak sample number in the Y axis (results written in 2 words). Counted relative to the start time of the record. Sampling defined in table B.1.7 (GvSampling).
1st profile results. Axes Z. Presence depending on the value of "VelResults" (cf. Tab. B.1.7)		
	Result[3][1]	Peak value in the Z axis (*100 dB)
	Result[3][2]	P-P value in the Z axis (*100 dB)
	Result[3][3]	Max value in the Z axis (*100 dB)
	Result[3][4]	RMS value in the Z axis (*100 dB)
	Result[3][5]	RRMS value in the Z axis (*100 dB)
	Result[3][6]	DF value in the Z axis (*1000 Hz) (results written in 2 words)
	Result [3][7]	Overload time in the Z axis (results written in 2 words)
	Result [3][8]	Peak sample number in the Z axis (results written in 2 words). Counted relative to the start time of the record. Sampling defined in table B.1.7 (GvSampling).
Common results. Presence depending on the value of "VelResults" (cf. Tab. B.1.7)		
	ResultCommon[1]	Peak Vector value (*100 dB)
	ResultCommon[2]	Peak Vector sample number (results written in 2 words). Counted relative to the start time of the record. Sampling defined in table B.1.7 (GvSampling)
For the S 9020 standard, the Dominant Frequency results are calculated at the moment of calculating the Peak Vector result and for the remaining standards independently for each axis at the moment of calculating the Peak result.		

Table B.1.20. FFT analysis results (saved in Summary Results Record)

Word number	Name	Comment
0	0x0055	[51, 00=block's length in the second word]
1	BlockLength	length of the block
2		[used_channel, channel's mask]
3..6	reserved	reserved
4	NTerTot	number of **TOTAL** values: 0
7	Result[1]	First FFT result (*100 dB);
…	Result[n]	n FFT result (*100 dB);
…	Result[N+T]	Last FFT result (*100 dB);
…	…	…

Table B.1.21. 1/3 OCTAVE analysis results (saved in Summary Results Record)

Word number	Name	Comment
0	0xnn10, 0xnn28, 0xnn29, 0xnn32	[block_id, nn=block_length] 0xnn**10** - averaged spectrum results, 0xnn**28** - min. spectrum results, 0xnn**29** - max. spectrum results 0xnn**32** - peak spectrum results
1	0x0303	[used_axis, axis's mask]
2	LowestFreq	the lowest **1/3 OCTAVE** frequency (*100 Hz)
3	NTer	number of **1/3 OCTAVE** values
4	NTerTot	number of **TOTAL** values: 0
	Tercje[0][i]	1/3 octave[i] value (*100 dB); i=1..NTer+NTerTot (1..10) in X axis
	Tercje[1][i]	1/3 octave[i] value (*100 dB); i=1..NTer+NTerTot (1..10) in Y axis
	Tercje[2][i]	1/3 octave[i] value (*100 dB); i=1..NTer+NTerTot (1..10) in Z axis
…	…	…

Table B.1.23. Meteo Data (saved in Summary Results Record)

Word number	Name	Comment
0	0x002A	[**2A** = id, 00 = block's length in the second word]
1	BlockLength	block length in words
2..3	UnitNumber	serial number of the monitoring station (if the parameter value is equal to 0xFFFFFFFF this parameter is irrelevant)
4	UnitType	type of the monitoring station: - 276 (SP 276) (if the parameter value is equal to 0xFFFF this parameter is irrelevant)
5..6	SoftwareVersion	firmware version number of the monitoring stations (if the parameter value is equal to 0xFFFFFFFF this parameter is irrelevant)

		Format of version in case of SP276: A.BB.CC where CC = version %100 (two characters) BB = (version / 100)%100 (two characters) A = version / 10000 e.g. 0x00004E2E mean 2.00.14
7..8	IntTimeSec	meteorological results averaging time used in the monitoring station
9	Temperature	temperature measurement result in format 0,1°C
10	Pressure	atmospheric pressure measurement result in hectopascals
11	Humidity	relative humidity measurement result in format 0,1%
12	AvgWindSpeed	average wind speed measurement result in the format 0,1 m/s
13	WindDirection	wind direction in degrees for maximum wind speed (if the parameter value is equal to 0FFFFh the direction is undefined)
14	MaxWindSpeed	maximum wind speed measurement result in the format 0,1 m/s
15..16	WindDirTotalPuffs	number of wind measurement samples
17	N	number of directions of wind direction distribution
18..	WindDir[N]	wind direction distribution table - values in the format 0.1%
18+N	M	number of directions of measurement of maximum wind speed
...	WindMax[M]	table of maximum wind speeds - values in 0.1 m / s format
18+N+M	V	number of directions for measuring average wind speeds
...	WindAvg[V]	table of average wind speeds - values in the format 0,1 m/s
16+N+M+V	RainDetection	flag of precipitation: Note: if the flag is zero, the next 5 words of precipitation parameters are not present in this block
+[0]	[RainIntensity]	rainfall intensity in 0.1 mm / h format (It is the sum of the last sixty lots of 1 minute accumulated Rain data. A new sum measurement is generated every minute.)

Table B.1.24. SETUP file

Word number	Name	Comment
0	0x0020	[20, 00=block's length in the second word]
1	BlockLength	length of the block
2..BlockLength-1	SetupTextData	saved setup values

Table B.1.25. File-end-marker

Word number	Name	Comment
0	0xFFFF	file end marker

Table B.1.28. Alarm parameters settings

Word number	Name	Comment
0	0x0060	[**60** = id, 00 = block's length in the second word]
1	BlockLength	block length in words
2	EventCount	
+[0]	0xmm67	[67, mm=sub-block's length]
+[1]	EventId[i]	
+[2]	Active[i]	event active: 0 - switched off, 1 - switched on
+[3..10]	Name[i]	
+[11]	Source[i]	event source: 0 – System 1 – PPV 2 – RMS 3 – RRMS 4 – Curve 5 – Curve 1 6 – Curve 2 7 – Curve 3 8 – Vector PPV 9 – reserved 10 – ISO 2631-1 Curve 11 – Moderate Annoyance Curve 12 – Likely Annoyance Curve 13 – S 9020 Impuls 14 – S 9020 Short 15 – S 9020 Continous
+[12]	Step[i]	event step 0 – 1s, 1 – Velocity step, 2 – Human Vibration step, Valid only with event source RMS
+[13..15]	Threshold1[i] Threshold2[i] Threshold3[i]	in case of **System** event source: Threshold1[i], Threshold2[i] system event mask defined as a sum of: b0 - Powered Up b1 - Powered Down b2 - Measurement Start b3 - Measurement Stop b4 - Mains On b5 - Mains Off b6 - Low Battery b7 - Battery OK b8 - Low External Battery b9 - External Battery OK b10 - Low Storage

		b11 - Storage OK b12 - System Check b13 - Lamp Disconnected b14 - Lamp Connected b15 - Cover Open b16 - Cover Closed b17 - Device Tilt b18 - Device Vertical b19 - Instrument Error b20 - Location Threshold3[i] – reserved in case of **PPV**, **RMS**, **RRMS source**: Threshold1[i] – X axis threshold value in dB Threshold2[i] – Y axis threshold value in dB Threshold3[i] – Z axis threshold value in dB in case of **Curve**, **Curve 1**, **Curve 2**, **Curve 3, ISO 2631-1 Curve, Moderate Annoyance Curve, Likely Annoyance Curve source**: Threshold1[i] – reduction factor in 0.001 Threshold2[i] – reserved Threshold3[i] – reserved in case of Vector **PPV source**: Threshold1[i] – threshold value in dB Threshold2[i] – reserved Threshold3[i] – reserved
+[16]	StartHour[i]	
+[17]	StartMinute[i]	
+[18]	StopHour[i]	
+[19]	StopMinute[i]	
+[20]	Weekday	weekday mask defined as a sum of: b0 – Mo, b1 – Tu, b2 – We, b3 – Th, b4 – Fr, b5 – Sa, b6 – Su,
+[21]	EventDuration[i]	Event duration in seconds
+[22]	EventCounter[i]	Event counter value
+[23]	EventCounterMode[i]	Event counter mode: 0 – Consecutive, 1 – Periodical, Valid only with EventCounter > 1
+[24]	EventCounterPeriod[i]	Event counter period 0 - 1s 1 - Velocity step 2 - Human vibration step Valid only with EventCounter > 1 and EventCounterMode = Periodical

+[25]	MinBreak[i]	min. break between successive events in seconds
+[26]	SMSActive[i]	sms active: 0 - switched off, 1 - switched on
+[27]	SMSRecipMask[i]	
+[28]	Email Active[i]	email active: 0 - switched off, 1 - switched on
+[29]	EmailRecipMask[i]	
+[30]	WaveActive[i]	wave recording active: 0 - switched off, 1 - switched on
+[31]	LampActive[i]	Alarm Lamp active: 0 - switched off, 1 - switched on
…	…	…

B.2 STRUCTURE OF THE FILE CONTAINING RESULTS FROM LOGGER'S FILE

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

File header - cf. Tab. B.1.2.

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

Calibration settings - cf. Tab. B.1.4.

USER'S text - cf. Tab. B.1.5.

Unit text info - cf. Tab. B.1.6.

Parameters and global settings - cf. Tab. B.1.7.

Wave-file recording parameters - cf. Tab. B.1.10.

Special settings for profiles - cf. Tab. B.1.12.

FFT spectral analysis settings – cf. Tab.B.1.13

Header of the statistical analysis - cf. Tab. B.1.14.

Header of the logger file - cf. Tab. B.1.15.

Contents of the logger file - cf. Tab. B.1.16. and the description in B.2.1.

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

The records with the results and the records with the state of the markers as well as the records with the breaks in the results registration are saved in the files in the logger. All results are written in dB*100.

B.2.1.1. Record with the results

The contents of the record with the results depends on the selected measurement function and the value set in the **LOGGER** position of the **PROFILE x** and **SPECTRUM** sub-lists. The following elements can be present (in the given sequence):

(1) flag record (written only if any results is saved)

< flags > :
- b0: X axis, 1- the overload detected, 0 - the overload not detected
- b1: Y axis, 1- the overload detected, 0 - the overload not detected
- b2: Z axis, 1- the overload detected, 0 - the overload not detected

(2) results of the measurement from the first profile (velocity), X axis if the corresponding **LOGGER** position was active *(*cf. Tab. B.1.12); up to seven words are written:

<result1> - **Peak** result, depending on the value of BufferP[1][1] (cf. Tab. B.1.12)
<result2> - **P-P** result, depending on the value of BufferP[1][1] (cf. Tab. B.1.12)
<result3> - **Max** result, depending on the value of BufferP[1][1] (cf. Tab. B.1.12)
<result4> - **RMS** result, depending on the value of BufferP[1][1] (cf. Tab. B.1.12)
<result5> - **VDV** result, depending on the value of BufferP[1][1] (cf. Tab. B.1.12)
<result5> - **RRMS** result, depending on the value of BufferP[1][1] (cf. Tab. B.1.12)
<result6> - **DF** result, depending on the value of BufferP[1][1] (cf. Tab. B.1.12)

(3) results of the measurement from the first profile (velocity), Y axis if the corresponding **LOGGER** position was active *(*cf. Tab. B.1.12); up to seven words are written:

<result1> - **Peak** result, depending on the value of BufferP[1][2] (cf. Tab. B.1.12)
<result2> - **P-P** result, depending on the value of BufferP[1][2] (cf. Tab. B.1.12)
<result3> - **Max** result, depending on the value of BufferP[1][2] (cf. Tab. B.1.12)
<result4> - **RMS** result, depending on the value of BufferP[1][2] (cf. Tab. B.1.12)
<result5> - **VDV** result, depending on the value of BufferP[1][2] (cf. Tab. B.1.12)
<result5> - **RRMS** result, depending on the value of BufferP[1][2] (cf. Tab. B.1.12)
<result6> - **DF** result, depending on the value of BufferP[1][2] (cf. Tab. B.1.12)

(4) results of the measurement from the first profile (velocity), Z axis if the corresponding **LOGGER** position was active *(*cf. Tab. B.1.12); up to seven words are written:

<result1> - **Peak** result, depending on the value of BufferP[1][3] (cf. Tab. B.1.12)
<result2> - **P-P** result, depending on the value of BufferP[1][3] (cf. Tab. B.1.12)
<result3> - **Max** result, depending on the value of BufferP[1][3] (cf. Tab. B.1.12)
<result4> - **RMS** result, depending on the value of BufferP[1][3] (cf. Tab. B.1.12)
<result5> - **VDV** result, depending on the value of BufferP[1][3] (cf. Tab. B.1.12)
<result5> - **RRMS** result, depending on the value of BufferP[1][3] (cf. Tab. B.1.12)
<result6> - **DF** result, depending on the value of BufferP[1][3] (cf. Tab. B.1.12)

(5) results of the measurement from the first profile (human vibration), X axis if the corresponding **LOGGER** position was active *(*cf. Tab. B.1.12); up to seven words are written:

<result1> - **Peak** result, depending on the value of BufferP[2][1] (cf. Tab. B.1.12)
<result2> - **P-P** result, depending on the value of BufferP[2][1] (cf. Tab. B.1.12)
<result3> - **Max** result, depending on the value of BufferP[2][1] (cf. Tab. B.1.12)
<result4> - **RMS** result, depending on the value of BufferP[2][1] (cf. Tab. B.1.12)
<result5> - **VDV** result, depending on the value of BufferP[2][1] (cf. Tab. B.1.12)
<result5> - **RRMS** result, depending on the value of BufferP[2][1] (cf. Tab. B.1.12)
<result6> - **DF** result, depending on the value of BufferP[2][1] (cf. Tab. B.1.12)

(6) results of the measurement from the first profile (human vibration), Y axis if the corresponding **LOGGER** position was active *(*cf. Tab. B.1.12); up to seven words are written:

<result1> - **Peak** result, depending on the value of BufferP[2][2] (cf. Tab. B.1.12)
<result2> - **P-P** result, depending on the value of BufferP[2][2] (cf. Tab. B.1.12)
<result3> - **Max** result, depending on the value of BufferP[2][2] (cf. Tab. B.1.12)
<result4> - **RMS** result, depending on the value of BufferP[2][2] (cf. Tab. B.1.12)
<result5> - **VDV** result, depending on the value of BufferP[2][2] (cf. Tab. B.1.12)
<result5> - **RRMS** result, depending on the value of BufferP[2][2] (cf. Tab. B.1.12)
<result6> - **DF** result, depending on the value of BufferP[2][2] (cf. Tab. B.1.12)

(7) results of the measurement from the first profile (human vibration), Z axis if the corresponding **LOGGER** position was active *(*cf. Tab. B.1.12); up to seven words are written:

<result1> - **Peak** result, depending on the value of BufferP[2][3] (cf. Tab. B.1.12)
<result2> - **P-P** result, depending on the value of BufferP[2][3] (cf. Tab. B.1.12)
<result3> - **Max** result, depending on the value of BufferP[2][3] (cf. Tab. B.1.12)
<result4> - **RMS** result, depending on the value of BufferP[2][3] (cf. Tab. B.1.12)
<result5> - **VDV** result, depending on the value of BufferP[2][3] (cf. Tab. B.1.12)
<result5> - **RRMS** result, depending on the value of BufferP[2][3] (cf. Tab. B.1.12)
<result6> - **DF** result, depending on the value of BufferP[2][3] (cf. Tab. B.1.12)

B.2.1.2. Record with the state of the markers

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

<0x8nnn>

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

b11 = state of #12 marker
b10 = state of #11 marker
...
b1 = state of #2 marker
b0 = state of #1 marker

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

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

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

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

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

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

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

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

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

B.2.1.5. Record with the wave file name

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

<0xC2aa>
<0xccbb>
<0xeedd>
<0xggff>
<0xiihh>
<0xCAaa>

in which:

aa - size of records,

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

B.2.1.6. Record with Summary Results

The format of the data frame is as follows:

HS	L (optional)	D	L (optional)	HE

where:

HS starting header (1 word)
L length of the block (field is optional and occurs only when b7..b0 in header are set to zero)
D Summary Data:
- Main results (cf. Tab. B.1.17_VEL)
- FFT analysis results (optional, cf. Tab. B.1.19)
- 1/3 OCTAVE analysis results (optional, cf. Tab. B.1.20)

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

The HEADER format is as follows:

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

where:

b15 - 1
b14 - 1
b13 - 0
b12 - 0,
b11 - header type:
0 - HS
1 - HE
b10 - 0
b9 - 1
b8 - 1
b15÷b8 – HS (0xC3), HE (0xCB)
b7÷b0 – length of the block (if zero length of the block is saved in additional word L)

B.2.1.7. Record with the comment file name

The format of the data frame is as follows:

HS	D	HE

where:

HS starting header (1 word)

D The full name of the comment file (e.g. “REC62.WAV”).

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

The HEADER format is as follows:

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

where:

b15 - 1
b14 - 1
b13 - 0
b12 - 0,
b11 - header type:
0 - HS
1 - HE
b10 - 1
b9 - 0
b8 - 0
b15÷b8 – HS (0xC4), HE (0xCC)
b7÷b0 – length of the block

B.2.1.8. Record with GPS data

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

Word number	Name	Comment
0	0xC703	record ID (start)
1	Length	length of the block together with IDs, [words]
2	Quality	Signal quality: 0 - GPS_NOT_FIX (no signal) 1 - GPS_FIX 2 - GPS_FIX_DIF
3	Time.Sec	Seconds part of time
4	Time.Min	Minutes part of time
5	Time.Hour	Hours part of time
6	Date.Day	Day
7	Date.Month	Month
8	Date.Year	Year
9	Latitude.Deg	Degree part of latitude
10	Latitude.Min	Minutes part of latitude
11	Latitude.Sec	Seconds part of latitude
12	Latitude.MiliSec	Milliseconds part of latitude

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

B.2.1.9. Block of marker for meteorological data block calculated with the human vibration step

Word number	Name	Comment
0	0xC704	0xC704= block start identifier,
1	0xnnnn	block length in words
2	N_1s	number of averaged 1 second results
3	Temperature	temperature measurement result in format 0,1°C
4	Pressure	atmospheric pressure measurement result in hectopascals
5	Humidity	relative humidity measurement result in format 0,1%
6	WindDirTotalPuffs	number of non-zero wind sample
7	AvgWindSpeed	average wind speed measurement result in the format 0,1 m/s
8	WindDirection	wind direction in degrees for maximum wind speed (if the parameter value is equal to 0FFFFh the direction is undefined)
9	MaxWindSpeed	maximum wind speed measurement result in the format 0,1 m/s
…		Reserved
…	0xnnnn	block length in words
...	0xCF04	0xCF04 = block end identifier,

B.2.1.10. Block of marker for meteorological rainfall calculated with the human vibration step

Word number	Name	Comment
0	0xC705	0C705h= block start identifier,
1	0xnnnn	block length in words
2	RainIntensity	rainfall intensity in 0.1 mm / h format (It is the sum of the last sixty lots of 1 minute accumulated Rain data. A new sum measurement is generated every minute.)
3..4	RainAccumulation	sum of rainfall in 0.01 mm format
5..6	RainDuration	duration of precipitation in seconds
…		Reserved
…	0xnnnn	block length in words
...	0xCF05	0xCF05 = block end identifier

B.2.1.12. Block of marker for alarm and events

Word number	Name	Comment
0	0xC708	0xC708 = block start identifier
1	0xnnnn	block length in words
2	Flags	Alarm/Event flags: b0 - if set to 1: Alarm block b1 - if set to 1: Event Block b2 - if set to 1: Alarm/Event triggered SMS/Email message, lamp, wave recording. b3 - if set to 1: FFT data b4 - if set to 1: 1/3 octave data b5..b15 - reserved
3	Marker	number of marker defined in Tab. B.1.28
4	AlarmDate	Alarm date (cf. App. B.4)
5..6	AlarmTime	Alarm time in ms
7 …	Value[1…]	in case of "System**"** **source** (cf. Tab. B.1.28): Value[1] - LSW of system event defined in SysEventMask Value[2] - MSW of system event defined in SysEventMask Value[3] - Instrument Error (valid only with Instrument Error flag) x - sum of the following flags flags: b0 - RTC error b1 - SD card error b3 - Battery error b4 - Battery temperature too high Value[4] - X axis System Check Value[5] - Y axis System Check Value[6] - Z axis System Check (valid only with System Check flag) 0 - OK 1 - Failed 2 - Not performed 3 - Geophone disconnected 4 - Geophone connected
7 …	Value[1…]	in case of source different then "System**"** and **GvSpectrum** set to **FFT VEL** Value[1] - X axis, Peak value in 0.01dB Value[2] - Peak Vector value in 0.01dB (calculated at X axis Peak time) Value[3..4] - X axis, DF value in 0.001Hz Value[5..6] - X axis, Peak sample number Value[7] - Y axis, Peak value in 0.01dB Value[8] - Peak Vector value in 0.01dB (calculated at Y axis Peak time) Value[9..10] - Y axis, DF value in 0.001Hz Value[11..12] - Y axis, Peak sample number Value[13] - Z axis, Peak value in 0.01dB Value[14] - Peak Vector value in 0.01dB (calculated at Z axis Peak time) Value[15..16] - Z axis, DF value in 0.001Hz

		Value[17..18] - Z axis, Peak sample number Additional in case of **RMS, RRMS** source Value[19] - X axis, RMS triggering value in 0.01dB Value[20] - Y axis, RMS triggering value in 0.01dB Value[21] - Z axis, RMS triggering value in 0.01dB Additional in case of **Peak Vector** source Value[19] - Peak Vector triggering value in 0.01dB Value[20..21] - Peak Vector triggering sample number Value[22] - X axis Peak component of Vector value in 0.01dB Value[23] - Y axis Peak component of Vector value in 0.01dB Value[24] - Z axis Peak component of Vector value in 0.01dB
…	FFT Value[1…]	FFT data in case of source different then "System**"** and **GvSpectrum** set to **FFT VEL** (optional) FFT data blocks for 3 channel in format: Value[1] - FFT block ID (0x0055) Value[2] - block length Value[3] - channel info in format 0xAABB AA - number of channel (number of FFT blocks), BB - channel flag (binary) Value[4] - reserved Value[5] - reserved (data) Value[6..7] - reserved (time in ms) Value[8…] - FFT values in 0.01 dB
7 …	Value[1…]	in case of source different then "System**"** and **GvSpectrum** set to **FFT VEL** Value[1] - X axis, Peak value in 0.01dB Value[2] - Peak Vector value in 0.01dB (calculated at X axis Peak time) Value[3] - X axis, max value of 1/3 octave band in 0.01dB Value[4] - X axis, 1/3 octave band index with max value (0..) Value[5..6] - X axis, Peak sample number Value[7] - Y axis, Peak value in 0.01dB Value[8] - Peak Vector value in 0.01dB (calculated at Y axis Peak time) Value[9] - Y axis, max value of 1/3 octave band in 0.01dB Value[10] - Y axis, 1/3 octave band index with max value (0..) Value[11..12] - Y axis, Peak sample number Value[13] - Z axis, Peak value in 0.01dB Value[14] - Peak Vector value in 0.01dB (calculated at Z axis Peak time) Value[15] - Z axis, max value of 1/3 octave band in 0.01dB Value[16] - Z axis, 1/3 octave band index with max value (0..) Value[17..18] - Z axis, Peak sample number Additional in case of **RMS, RRMS** source Value[19] - X axis, RMS triggering value in 0.01dB Value[20] - Y axis, RMS triggering value in 0.01dB Value[21] - Z axis, RMS triggering value in 0.01dB Additional in case of **Peak Vector** source Value[19] - Peak Vector triggering value in 0.01dB Value[20..21] - Peak Vector triggering sample number Value[22] - X axis Peak component of Vector value in 0.01dB

		Value[23] - Y axis Peak component of Vector value in 0.01dB Value[24] - Z axis Peak component of Vector value in 0.01dB Additional in case of S 9020 source Value[19] - Peak Vector triggering value in 0.01dB Value[20..21] - Peak Vector triggering sample number Value[22] - X axis Peak component of Vector value in 0.01dB Value[23] - Y axis Peak component of Vector value in 0.01dB Value[24] - Z axis Peak component of Vector value in 0.01dB Value[25] - Event duration in seconds Sample number counted relative to the start time of the alarm. Sampling defined in table B.1.7 (GvSampling) For the S 9020 standard, the Dominant Frequency results are calculated at the moment of calculating the Peak Vector result and for the remaining standards independently for each axis at the moment of calculating the Peak result.
…	FFT Value[1…]	FFT data in case of source different then "System**"** and **GvSpectrum** set to **FFT VEL** (optional) FFT data blocks for 3 channel in format: Value[1] - FFT block ID (0x0055) Value[2] - block length Value[3] - channel info in format 0xAABB AA - number of channel (number of FFT blocks), BB - channel flag (binary) Value[4] - reserved Value[5] - reserved (data) Value[6..7] - reserved (time in ms) Value[8…] - FFT values in 0.01 dB
…	1/3 octave Value[1…]	1/3 spectrum data in case of source different then "System**"** and **GvSpectrum** set to **1/3 VEL** (optional) 1/3 spectrum data blocks for 3 channel in format consistent with Table B.1.21
..		
nn-2	0xnnnn	block length in words
nn-1	0xCF08	0xCF08 = block end identifier

B.3 STRUCTURE OF THE SETUP FILE

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

File header - cf. Tab. B.1.2.

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

SETUP DATA - cf. Tab. B.1.23.

File-end-marker - cf. Tab. B.1.24.

B.4 DATE AND TIME

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

```
void ExtractDateTime(int date, unsigned int time, int dt[])
{
      dt[0] = time % 30;                  /* sec */
      dt[1] = (time/30) % 60;             /* min */
      dt[2] = time/1800;                  /* hour */

      dt[3] = date & 0x001F;              /* day */
      dt[4] = (date>>5) & 0x000F;         /* month */
      dt[5] = ((date>>9) & 0x007F) + 2000;      /* year */
}

void ExtractTimeMs(long timeMs, int dt[])
{
      long time = timeMs/1000L;

      dt[0] = time % 60L;                 /* sec */
      dt[1] = (time/60L) % 60L;           /* min */
      dt[2] = time/3600L;                 /* hour */
      dt[3] = timeMs % 1000L;             /* ms */
}
```

B.5 STRUCTURE OF THE CSV FILE

B.5.2. Structure of the CSV file

Section	File contents
File header	// **********
	// CSV file version, 1.20
	// Created, 12/02/2021, 11:20:00
	// Unit, 307, SN, 70825, MicSN, 78322
	// Firmware, 1.21.0, 08/02/2021
	// Corresponding logger file name, L34098.SVL
	// Device function, SLM
	// Integration time, 00:01:00
	// Leq integration, Linear
	// Profile 1, A, Impulse
	// Profile 2, C, Fast
	// Profile 3, Z, Slow
	// CSV save mask, 7FFF, 7FFF, 7FFF, 15
	// **********
Record header	Record, Date, Record End Time, SLM results profile 1, TIME, Lpeak, Lmax, Lmin, L, Leq, LE, Lden, LEPd, Ltm3, LTeq, L(01), L(10), L(20), L(30), L(40), L(50), L(60), L(70), L(80), L(90), LR30m, LR60m, OVL, SLM results profile 2, TIME, Lpeak, Lmax, Lmin, L, Leq, LE, Lden, LEPd, Ltm3, LTeq, L(01), L(10), L(20), L(30), L(40), L(50), L(60), L(70), L(80), L(90), LR30m, LR60m, OVL, SLM results profile 3, TIME, Lpeak, Lmax, Lmin, L, Leq, LE, Lden, LEPd, Ltm3, LTeq, L(01), L(10), L(20), L(30), L(40), L(50), L(60), L(70), L(80), L(90), LR30m, LR60m, OVL
Record data	1, 12/02/2021, 11:21:00, P1, 60, 80.4, 62.5, 41.3, 44.5, 47.1, 64.9, 47.1, 47.1, 53.9, 55.3, 54.8, 50.6, 47.4, 45.8, 44.7, 44.1, 43.6, 43.0, 42.3, 41.5, 46.1, , 0, P2, 60, 80.4, 73.1, 55.6, 57.1, 63.7, 81.4, 63.7, 63.7, 66.7, 67.2, 72.5, 67.6, 64.6, 62.6, 61.5, 60.6, 59.8, 59.0, 58.3, 57.3, 63.9, , 0, P3, 60, 82.5, 72.6, 61.4, 61.5, 66.3, 84.1, 66.3, 66.3, 67.8, 68.0, 74.0, 69.4, 67.6, 66.1, 65.2, 64.4, 63.7, 63.0, 62.1, 61.1, 66.5, , 0
...	

APPENDIX C. 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℃ to +45℃*
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
5	External DC input	voltage: 5 V to 28 V

[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

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
4G modem (SV 803 WW version)		
1	modem type and features	The LE910C1-WWX(D) is an LTE Cat-1 module based on ThreadX intended for global use across EMEA/North America/APAC/LATAM. Some of the module features are: • GSM bands: B2, B3, B5, B8 (850/900/1800/ 1900 MHz) • UMTS/HSPA bands: B1, B2, B4, B5, B6, B8, B19 (800/850/900/1700/ 1900/2100 MHz) • LTE FDD bands: B1, B2, B3, B4, B5, B7, B8, B9, B12, B13, B14, B18, B19, B20, B25, B26, B28 (700/800/850/900/1700/1800/1900/ 2100/2600 MHz) • Output power: Class 3 (0.2W, 23dBm), LTE-FDD
2	modem approvals	Approvals of the module: • EMEA: RED (CE) / UKCA (UK) / TRA (UAE) / ICASA (ZA) • APAC: RCM (AU) / KCC (KR) / IMDA (SG) / NCC (TW) • America: ANATEL (BR) / ISED (CA) / FCC (USA) • 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	A2235-H produced by Maestro Wireless Solutions Ltd.: • Position Accuracy (horizontal): < 2.5 m CEP (autonomous), • Tracking Sensitivity: -163dBm • Time accuracy: <1µs (directly depends on position deviation)
GPS module (SV 803 WW version)		
1	type and features	SAM-M10Q produced by U-blox Holding AG: • Position Accuracy (horizontal): < 1.5 m CEP • Tracking Sensitivity: up to -165dBm • Time accuracy: < 1µs (directly depends in position deviation) • 4 concurrent GNSS reception GPS / QZSS, GLONASS, Galileo, BeiDou • Acquisition Cold / Hot start typ. 23s / 1s • Signal integrity reporting RF interference and jamming detection and • Protection level Real-time position accuracy estimate with 95% confidence
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:

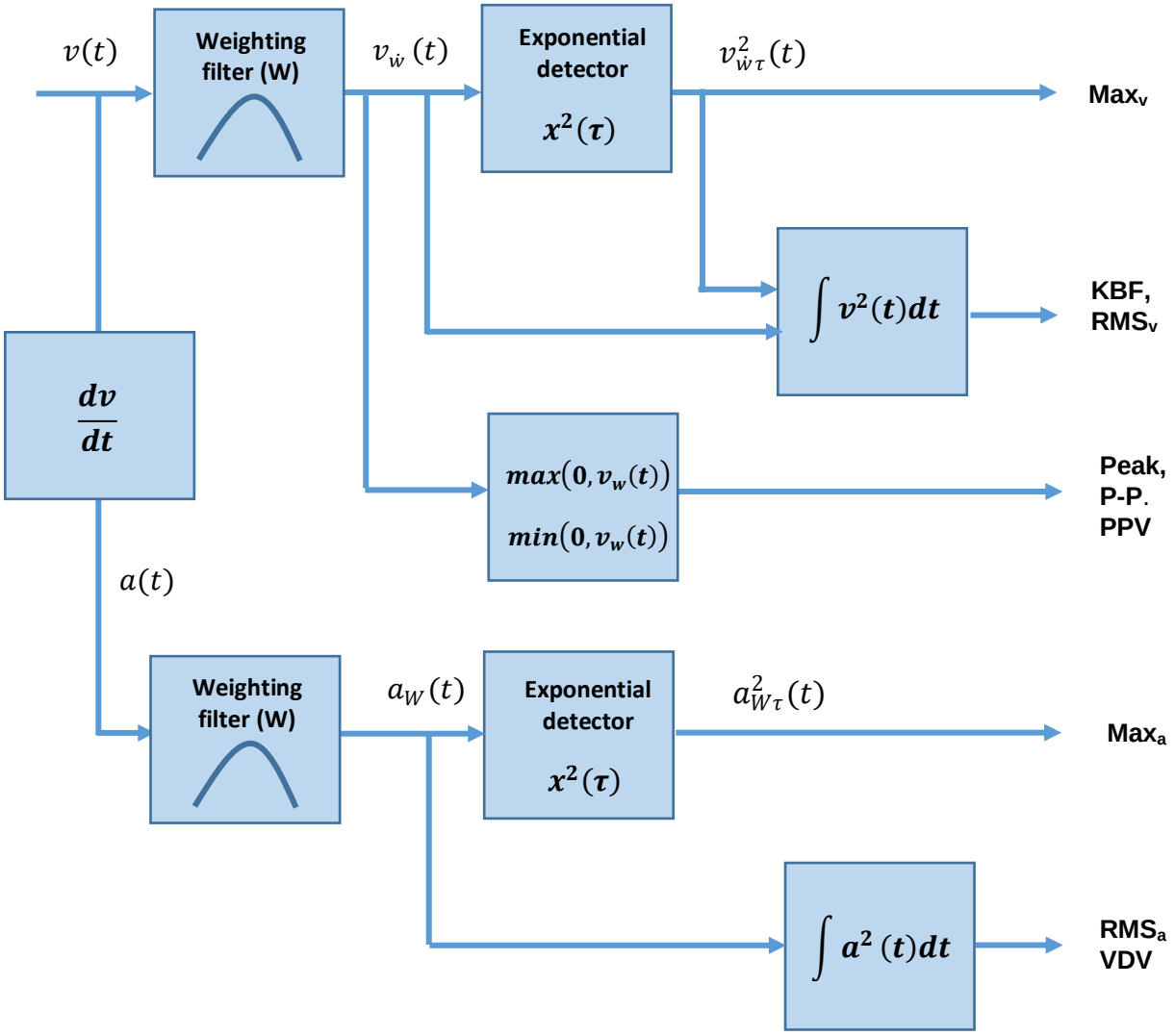
$$a_{W\tau}(t) = \sqrt{\frac{1}{\tau}\int_{-\infty}^{t} a_W^2(\xi)\, e^{-(t-\xi)\frac{}{\tau}}\, d\xi}\,,$$

where: ξ– integration variable.

$a_w(t)$

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

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

Roll. RMS Rolling RMS measured for the axis X, Y or Z in the time window for the last T_R seconds of the measurement time **T**.

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

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.

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

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.

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

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*

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

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

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

Max_a 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**.

$$Max = max_T\left(a_{W\tau}(t)\right)$$

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

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