

SV106

Human Vibration Analyser



INSTRUMENTATION FOR SOUND & VIBRATION MEASUREMENTS

Whole-Body Vibration Applications



The SV106 fully complies to requirements of ISO 2631-1 and Vibration EU Directive providing the A(8) vibration exposure value referring to health and overall vibration total value (VECTOR) for the evaluation of comfort. Two inputs allow connection of 2 tri-axial whole-body vibration sensors simultaneously.

The A(8) vibration exposure value is calculated in real time and results from both sensors are displayed simultaneously in VDV and RMS units or points. In addition to exposure values, the SV 106 calculates time left to limits suggesting the safe working time for the user.

ISO 2631-1 and Directive 2002/44/EC



The ISO 2631-1 specifies different weighting filters and indicators for evaluation of effect of vibration on human health, comfort and perception. In accordance with ISO 2631-1 and European Directive the A(8) vibration exposure value is calculated as the highest value of frequency weighted RMS determined in 3 axes including the weighting factor of 1.4 in the X and Y axes.

ISO 2621-1 also suggest to use VDV instead of RMS if the signal is impulsive which is recognized by the ratio of PEAK to RMS being higher than 9 (so called crest factor). Therefore vibration exposure limits are specified as action values and limit values both for RMS and VDV.

ISO 2631-5*



To meet the requirements of ISO 2631-5 the SV106 offers a possibility of recording the raw time domain signal to the WAV format. The mentioned standard describes the dose calculation from the time domain signal in case of multiple shocks.

Vehicle seat vibration



The methods of evaluation of vehicle seat vibration are described in ISO 10326. Following this standard SEAT values are the ratio of the vibration exposure at the seat to that at the floor, where a complete rigid seat would have a value of 1.0. For this application the SV106 is using two sensors the SV38V and SV151.

Motion sickness



Vibrations with frequencies below 0.5 Hz cause so called motion sickness, primarily in the standing and sitting postures. This type of vibrations are typical for ships and other sea vessels. The most recognized symptoms of motion sickness are dizziness and vomiting. The SV 106 with a SV 38V MEMS sensor is capable to measure vibration frequencies from 0.1 Hz which makes it suitable for motion sickness measurements in accordance to ISO 2631-1. The low frequency vibrations are measured in vertical axis with Wf weighting filter.

ISO 2631-2 and DIN 4150-2*

The second parts of ISO 2631 and DIN 4150 refer to human vibration in buildings. Both standards provide different indicators and frequency weighting for the same type of measurement. All required parameters are available in the SV106 so it can be configured to the requirements of the selected standard. For this application SV106 is using the SV207B metal mounting base with the SV84 accelerometer which is placed in the middle of the workplace floor.



SV 207B

ISO 8041 in-situ check*

In-situ checks require usage of the SV111 vibration calibrator and are intended for check of the instrument's basic calibration and functionality in the field. During the check procedure the SV38V seat-pad accelerometer or SV84 ground vibration accelerometer is mounted on the shaker which produces vibration level of 1 m/s² at 16 Hz. Shaker can be loaded with large weight up to 1 kilogram. Any improper object fixing is automatically detected and indicated by LEDs on the calibrator's panel giving the information about direction which should be corrected.



SV 111

*Function requires optional software or hardware accessories. For more information contact Svantek distributor or check ordering information on svantek.com website.

Hand-Arm Vibration Applications



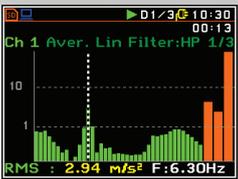
The SV106 is a unique instrument that enables measurement of hand-arm vibration on both hands simultaneously. Features such as big OLED display, microSD card, 16 hours operating time and powerful measurement capabilities made the SV106 the number one choice for hand-arm vibration measurements. The SV106 provides tools for simple vibration exposure assessment as well as for sophisticated studies such as 1/3 octave analysis* or time domain signal recording*. The SV106 is using the intelligent MEMS accelerometers with a TEDS memory containing the information about sensitivity and accelerometer type. The information about sensitivity enables the automatic calibration whilst the model type information is used for automatic adjustment of settings such as weighting filter.

ISO 5349-2 and EU Directive 2002/44/EC



The ISO 5349-2 measurement technique requires simultaneous assessment of frequency weighted RMS values in 3 axes and combining them as a vibration total value. The vibration total value result is a basis for calculation of the A(8) vibration exposure which has a daily limit of 5 m/s² in accordance with the Vibration Directive or 400 points in accordance with the UK regulations. Depending on the working activity, the measurement may require assessment of A(8) on one or both hands.

Frequency analysis*



ISO 5349-1 implies to be desirable to report (unweighted) one-third-octave band root-mean-square acceleration magnitudes over the frequency range of the measurement system. Frequency analysis such as 1/3 octave provides information on dominant frequencies and harmonics, which may help engineers to identify effective vibration control measure as well as detection of artifacts.

Hand-Arm Vibration Accelerometers*

Vibration measurements in accordance with ISO 5349-1 should be located at or near the surface of the hand (or hands) where the vibration enters the body. Preferably, the accelerometer should be located at the middle of the gripping. Two types of sensor mounting are used: fixed on the tool or on hand. Usage of molded adapters mounted on a hand allows measurement to be done exactly at the point where the vibration enters the body.

Fixing on a tool is done usually with metal clamps or plastic straps on a tool handles. If only fingers have contact with the vibrating surface it is recommended to use glue or epoxy resin type cement in order to attach the sensor to the object. The use of soft setting glues or wax is not recommended because of the poor coupling through such adhesives, which often result in a poor frequency response.

The great advantage of SVANTEK accelerometers is the MEMS technology which is free from DC-shift effect. The DC-shift distortion occurs in the piezoelectric accelerometers due to excitation of transients which are too large for the transducer, overloading the piezoelectric system. Any measurements showing signs of DC-shift should be disregarded.



SV 150



SV 105A / SV 105AF



ISO 8041 in-situ check*

In-situ checks require the use of a vibration calibrator such as the SV110 and are intended for checking the instrument's basic calibration and functionality in the field. During the check procedure, the SV105A accelerometer is mounted on the shaker with the SA105A adapter and is calibrated at vibration level of 10 m/s² at 80 Hz. The check procedure lasts 30 s for each axis.



SV 110

*Function requires optional software or hardware accessories. For more information contact Svantek distributor or check ordering information on svantek.com website.

SV106 Technical Specifications

Vibration Level Meter & Analyser

Standards	ISO 8041:2005; ISO 2631-1:1997; ISO 2631-2:2003; ISO 2631-5:2004; ISO 5349-1:2001; ISO 5349-2:2001
Meter Mode	ahw (RMS HAND-ARM), ahv (VECTOR HAND-ARM), aw (RMS WHOLE-BODY), awmax (RMS MAX WHOLE-BODY), VDV, MaxVDV, awv (VECTOR WHOLE-BODY), A(8) Daily Exposure, ELV Time (TIME LEFT TO LIMIT), EAV Time (TIME LEFT TO ACTION) MTVV, Max, Peak, Peak-Peak
Filters in Profile (1)	Wd, Wk, Wm, Wb, Wc, Wj, Wg, Wf (ISO 2631), Wh (ISO 5349)
Filters in Profile (2)	HP, KB, Vel3 (for PPV measurement), Band Limiting Filters according to ISO 8041:2005
RMS & RMQ Detectors	Digital true RMS & RMQ detectors with Peak detection, resolution 0.1 dB
Measurement Range	Transducer dependent: 0.01 ms ⁻² RMS ÷ 50 ms ⁻² Peak (with SV 38V and Wd filter) 0.1 ms ⁻² RMS ÷ 2000 ms ⁻² Peak (with SV 105A and Wh filter)
Frequency Range	0.1 Hz ÷ 2 kHz (transducer dependent)
Data Logger	Time-history data including meter mode results and spectra
Time-Domain Recording ¹	Simultaneous x, y, z time-domain signal recording, sampling frequency 6 kHz (optional)
Analyser ¹	1/1 octave real-time analysis with centre frequencies from 0.5 Hz to 2000 Hz (optional) 1/3 octave real-time analysis with centre frequencies from 0.4 Hz to 2500 Hz (optional)
Accelerometer (optional)	SV 38V integrated tri-axial accelerometer for Whole-Body measurements SV 105A integrated tri-axial accelerometer including hand straps SV 105AF integrated tri-axial accelerometer with force sensors including hand straps SV 150 integrated tri-axial accelerometer with adapter for direct attaching to hand-held power tools SV 151 integrated tri-axial accelerometer for SEAT transmissibility measurements SV 84 tri-axial IEPE accelerometer for ground / building vibration measurements



General Information

Input	2 x LEMO 5-pin: six channels Direct or IEPE type and 2 channels for force transducers
Dynamic Range	90 dB
Force Range	0.2 N ÷ 200 N (dedicated channels for force transducers)
Sampling Rate	6 kHz
Memory	Internal 16 MB non-volatile memory 8 GB Micro SD card included (micro SD flash card slot supports cards up to 16 GB)
Display	Super contrast (10000:1) OLED 2.4" colour display (320 x 240 pixels)
Interfaces	USB 1.1 Client, Extended I/O - AC output (1 V Peak) or Digital Input/Output (Trigger - Pulse)
Power Supply	Four AA batteries (alkaline) operation time > 12 h (6.0 V / 1.6 Ah) ² Four AA rechargeable batteries operation time > 16 h (4.8 V / 2.6 Ah) ² (not included) USB interface 500 mA HUB
Environmental Conditions	Temperature from -10 °C to 50 °C Humidity up to 90 % RH, non-condensed
Dimensions	140 x 83 x 33 mm (without accelerometer)
Weight	Approx. 390 grams including batteries (without accelerometer)

¹function operates together with vibration level meter
²with one SV 38V tri-axial accelerometer in meter mode



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.

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