SVANTEK

USER MANUAL

SV 35

ACOUSTIC CALIBRATOR

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Contents

1.Introduction

One of the fundamental questions that are most frequently asked while taking a measurement is whether its result is accurate. Proceeding with a measurement without having a positive answer to this question may result in obtaining data of no practical use and wasting our time. However, we may easily obtain the answer by performing a calibration of the sound level meter together with the microphone and its preamplifier. Calibration of the measurement device may be done in two ways: by comparing the calibrated device with a reference device of known parameters; or using a template of the measured quantity to perform a reference measurement. Acoustic devices are usually calibrated in the latter fashion with so-called, acoustic calibrators. Acoustic calibrator is a device, which produces acoustic pressure of defined level and frequency. In other words, such calibrator is a reference of acoustic pressure. With help of such a reference we can check the accuracy of the measurements performed with the sound level meter and/or calibrate it if the error occurs.

2. Acoustic calibrator SV 35

2.1. General description

The SV 35 acoustic calibrator is a small, portable dual-range Class 1 device (sound source), see Picture 1. Powered by two LR03/AAA batteries, it contains a loudspeaker producing acoustic pressure, reference microphone for monitoring generated level, pressure and temperature sensors for measurements of atmospheric conditions and a microprocessor system controlling the operation of the calibrator. Sinusoidal waveform of 1 kHz frequency is digitally generated and feeds the loudspeaker. Sampled signal from the reference microphone indicates the level of currently generated signal in a feedback loop. On the basis of information about the level of the signal, actual values of pressure and temperature, microprocessor adjusts amplification of the loudspeaker signal in order to produce appropriate sound pressure level in the calibrator's chamber.

Due to the feedback regulation loop the SV 35 calibrator does not require adjusting and operates in a wide range of temperatures and humidity (see SV 35 Datasheet).

Picture 1. Acoustic calibrator SV 35

The SV 35 is designed for calibration of sound level meters with ½" and ¼" microphones. Picture 2 shows the calibration of Class 1 sound level meter SVAN 971 with a ½" microphone.

Picture 2. Calibration of the SVAN 971 sound level meter with a ½" measurement microphone

Notice: *For calibration of a meter with a ¼" microphone the SA 30 reduction adapter must be applied.*

2.2. Use of the calibrator

2.2.1. Automatic calibration

The SV 35 calibrator is equipped with an optical system which detects the presence of a microphone in the calibrator's chamber. That allows the calibrator to be switched on automatically, when it is placed on the microphone and to be switched off when it is dismounted. For this reason, usage of the SV 35 calibrator is as simple as putting it on the microphone, performing the calibration and taking it off the microphone.

Notice: *The SV 35 calibrator will always switch on in the range set at the moment of switching it off.*

Notice: *The automatic switching on will not work when the SA30 calibration adapter is inserted into the calibrators chamber.*

Notice: *Default range after replacing the battery is 114 dB.*

2.2.2. Button functions

The SV 35 calibrator is equipped with a multifunctional button for controlling operation of the device. The functions of the button depend on the state of the calibrator (ON/OFF) and on the time of its pressing (see Table 2).

When the calibrator is OFF, pressing the button turns it on immediately. Range is automatically set to that one in which the calibrator was switched off. If the calibrator is not put on the microphone within 3-5 seconds from turning on, it will switch off automatically.

When the calibrator is ON, short pressing of the button (less than 3-5 sec.) will cause switching the range from 94 dB to 114 dB or the other way round. Button pressed longer (over 3-5 sec.) will switch the calibrator off, either when the device is put on the microphone or not.

Either when the SV 35 is ON or OFF pressing the button over 10 seconds and releasing it will cause full reset of the system. Normally this function is not necessary. It has been implemented in the case of inappropriate operation of the calibrator caused by external (EM radiation, subnormal atmospheric conditions, etc) or internal (inappropriate system reset as a result of battery replacement) factors.

The operation time of the calibrator with a microphone put inside its chamber is limited to 3-5 minutes. This functionality was added in order to save the battery, e.g. when the calibrator is accidentally left with the microphone inside.

Notice: *Leaving the SA 30 reduction adapter in the chamber of the calibrator is equivalent with the state of the microphone being left inside. Hence, the calibrator will switch off automatically after 3-5 minutes from the moment the adapter is put inside the calibrator.*

Table 1. Functional description of the calibrator's button.

Calibrator turned OFF	
Button press	Function description
Short, less than 3 sec.	Turn on the device
Over 10 sec.	Full reset of the system

Calibrator turned ON	
Button press	Function description
Short, less than 3 sec.	Change the range of the device
Over 3-5 sec. and below 10 sec.	Turn off the device
Over 10 sec.	Full reset of the system

2.2.3. Range diodes

In normal mode of operation, the calibrator's diodes act as range indicators. In this mode diode of the chosen range is lighting with continuous light, indicating that the device is ready for to start the calibration procedure (see Picture 4).

After the calibrator is put on the microphone, switched on or the range is changed, acoustic pressure inside the calibrator's chamber is adjusted to the desired level. During that process appropriate range diode blinks with a frequency of 2 Hz.

Notice: *Calibration should not be performed until the range diode is lighting with continuous light.*

Picture 4. The top view of the SV 35 calibrator with one diode on

The diodes blinking alternately indicate the low voltage of the battery. It is recommended to not use the SV 35 calibrator in this state as the generated level may differ from the declared values.

Notice: *Replace the batteries, when diodes blink alternately.*

2.3. Replacing the battery

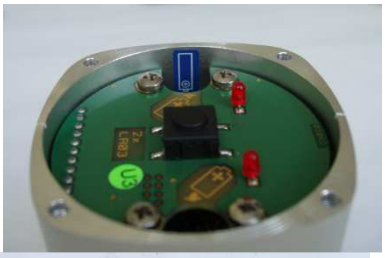
The battery should be replaced as follows:

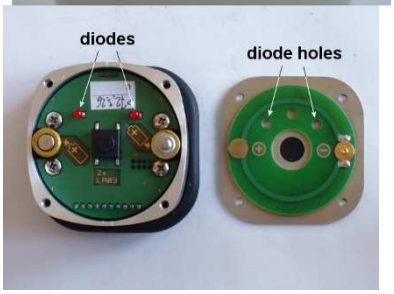
a) remove the rubber cover on the button and diodes' side

b) holding the cover unscrew four fixing screws with your fingers

c) take off the cover and remove discharged batteries

d) put new batteries in place of the discharged ones with polarization as indicated on the printed board and calibrator's case





e) put on the cover so that the diodes fit the corresponding holes in it

f) holding the cover with one hand fasten the fixing screws

g) put on the rubber cover

3. SV 35 Technical specifications

Output signal

Sound Pressure Level (SPL):	94 dB and 114 dB, with respect to 20 μPa in reference conditions
Accuracy:	IEC 60942: 2003 standard, Class 1
SPL Accuracy:	±0.3 dB
Frequency accuracy:	±0.2 %
Total Distortion	< 0.25 % for 94 dB range and < 0.75 % for 114 dB range

Reference conditions

Temperature:	23 °C
Atmospheric pressure:	101.3 kPa
Humidity:	30-80 % RH
Effective microphone load volume**:**	250 mm^3, microphone type: 4134, SN: 1591010

General data

Effective load volume sensitivity:	0.00027 dB / mm^3
Level stabilization time:	typical 10 sec., max. 25 sec.
Microphone dimensions:	½” and ¼” with reduction adapter SA 30
Storage temperature range:	-25 °C do + 70 °C
CE classification:	EN 61010-1: 2010 EN 61326-1:2006 EN 55022:2010 EN 60942:2003

Working conditions

Temperature range:	from –10 °C to +50 °C
Atmospheric pressure range:	from 65 kPa to 108 kPa
Humidity range:	from 25 % to 90 % RH

Environmental conditions influence (typical)

Temperature coefficient:	$\pm 5 \cdot 10^{-3}$ dB/°C
Pressure coefficient:	$\pm 1 \cdot 10^{-4}$ dB/hPa
Humidity coefficient:	$\pm 1.25 \cdot 10^{-3}$ dB/%

Power supply

Battery type:	two LR03 (IEC)/AAA (ANSI) alkaline batteries
Continuous operation time:	40 hours in 94 dB range and 30 hours in 114 dB range
Standby mode: approx.	2 years
Minimal working voltage:	2.1 V

Dimensions and weight

Weight:	305 g with batteries
Dimensions:	65 x 65 x 70 mm