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Operator's Manual
Electronic Stethoscope STV91

Application

The Electronic Stethoscope STV91 makes it possible to convert smallest vibration signals into audible sound over a wide frequency range.
This may be useful in such fields as for example:

- To make vibrations audible for noise reduction in vehicles and machines
- To tap the sound resulting from vibrations transmitted by pipes, walls, doors, etc., for example in connection with police investigations.

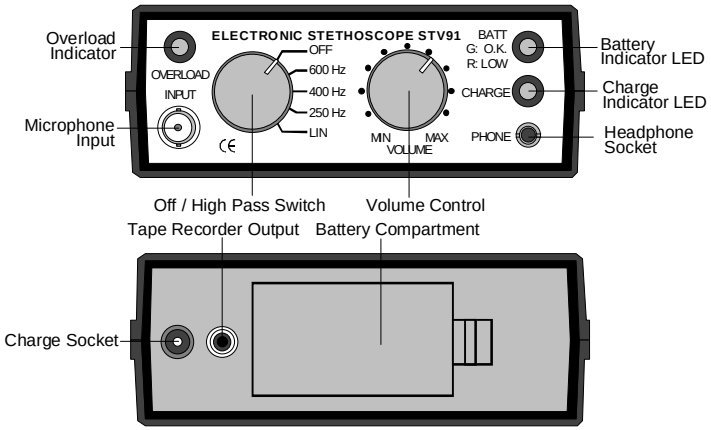
Function

As microphone of the Electronic Stethoscope STV91 acts a piezoelectric vibration transducer. This type of microphone combines highest sensitivity with lowest noise floor. The STV91 is a battery operated instrument, and therefore well suited for field operation. It comprises the following functions:

- Preamplifier with volume control
- Output stage for headphone connection
- Switchable high pass filter
- Low pass filter
- Overload indication
- Circuit for battery charge of an internal accumulator with indication of charging and battery condition.

Operation

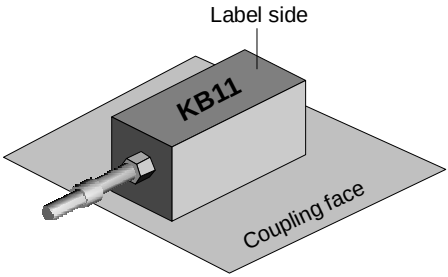
The following illustration shows the controls and connectors of the STV91.



Power Supply: Type STV91 works with an internal 9V block battery type IEC 6F22. The battery has to be inserted into the battery compartment at the back of the instrument. It may be operated by a primary battery (that means not chargeable) or a chargeable accumulator (type Ni-Cd or Ni–MH).
The LED "BATT" indicates the condition of the battery. It glows green, if the battery voltage is sufficient. If the battery voltage drops below the limit of 6.5 V it glows orange. In this case the battery has to be changed or the accumulator has to be charged.
For operation with an accumulator the STV91 has an internal high-quality battery charge monitor with currentless delta-U sensing. This circuit combines a short charging time and a long life of the accumulator.
When charging the accumulator, the STV91 should be switched off ("OFF"-position of the switch). For charging the delivered mains plug adapter or another DC voltage source (12 V .. 18 V/ 100 mA) has to be connected to the charging connector at the back of the STV91. The LED "CHARGE" glows red, as soon as the charging process starts. The charging time for a totally discharged accumulator with a capacity of 120 mAh amounts to about 2 hours. When the accumulator is fully charged, the LED "CHARGE" starts to flash. This is the signal that the internal circuit for battery charge has switched over to trickle charge. This way it is impossible to overcharge the accumulator even if the charging voltage remains connected.

☞ **Important:** The internal circuit for battery charge may be used with inserted chargeable batteries only! Using a not chargeable battery, it is not allowed to connect a voltage to the charging connector at the back of the instrument! Ignoring this, the consequence could be a damage of the battery with secondary defects of the instrument.

Connection of the Microphone: The cable of the microphone has to be connected to the BNC connector "INPUT". Pay attention to the connection of the cable at the microphone side, too. Now you can fix the microphone at the measuring point.
You reach the maximum sensitivity by attaching the microphone with its mounting side (with two mounting holes) against the measuring point, so that the label side of the microphone shows upwards. At the simplest case you can press the microphone by hand to the measuring point.



Suitable fixing materials are double adhesive tape, adhesive pads or plastic bonding substances. The softer the adhesive film, the poorer the transmission, especially at high frequencies.

☞ **Important:** Fix at first the microphone, then switch on the instrument. Otherwise it may happen that the instrument will be overloaded heavily, and you may suffer a hearing damage, when using headphones this moment.

Operation with headphones: The volume control "VOLUME" of the STV91 has to be turned to the left stop, before switching on the instrument. It is switched on with the left control knob. This switch is coupled with a variable high pass filter. The high pass frequen-

cies are 600 Hz, 400 Hz, 250 Hz, and 50 Hz in the position “LIN”. The high pass filter can improve the audibility in case of disturbing low frequency noise.
With the volume control “VOLUME” the amplification of the signal may be adjusted as necessary. At the left stop the amplification is 1 (0 dB). That means, the signal of the microphone will be transmitted to the output without amplification. At the right stop the amplification reaches 1000 (60 dB). Too much amplification may provoke an oscillation squeal as the result of an acoustical feed back between the microphone and the headphone. To minimize this disturbing side-effect, it is advisable to use closed headphones only.
At extremely high modulation the signal will be distorted by the output stage. This state will be indicated by the LED “OVERLOAD”. It starts glowing at a peak value of the output voltage of 2 V. In this moment the signal is still undistorted.

Connection of a Tape Recorder: The output signal may be taken from the Cinch connector at the back of the instrument. The output level amounts, like at the output for headphones, to a peak value of 2 V. It depends on the position of the volume control.

Technical Specification

Input:	for piezoelectric contact microphone recommended model: KB11
Input impedance:	> 4 MΩ
Outputs:	3.5 mm stereo jack socket Cinch connector $\hat{u}_{amax}$ = 2 V peak value
Gain:	0 to 60 dB, adjustable
High pass filter:	50 Hz (linear), 10 dB / octave attenuation 250 Hz, 20 dB/ octave attenuation 400 Hz, 20 dB/ octave attenuation 600 Hz, 20 dB/octave attenuation
Upper frequency limit:	6 kHz, 12 dB/octave
Headphones:	stereo, closed, impedance > 20 Ω, 3.5 mm stereo jack
Overload indication:	LED, at output voltage U_{amax} > 2 V peak value
Battery:	9V block type IEC 6F22
Battery life:	Alkaline (approx. 500 mAh): approx. 25 hours Ni-Cd accumulator (approx. 120 mAh): approx. 6 hours
Battery indicator:	LED, threshold voltage approx. 6.5 V
Charging current:	100 mA at 12 V charging voltage, DIN 45323 connector
Charging time:	approx. 2 hours for accumulator type Ni-Cd- or Ni-MH
Accessories:	230 VAC / 12 VDC / 0.5 A mains plug adapter for charging

Limited Warranty

Metra warrants during a period of
24 months
that its products will be free from defects in material or workmanship and shall conform to the specifications current at the time of shipment.

The warranty period starts with the date of invoice.
Customer has to provide the dated bill of sale as evidence.
The warranty period ends after 24 months. Repairs do not extend the warranty period.

This limited warranty covers only defects which arise as a result from normal use according to the instruction manual. Metra's responsibility under this warranty does not apply to any improper or inadequate maintenance or modification and operation outside the product's specifications.

Shipment to Metra has to be paid by the customer.
The repaired or replaced product will be sent back at Metra's expense.

CE

Declaration of Conformity

Product: Electronic Stethoscope

Models: STV91

Hereby is certified that the above mentioned products

comply with the demands of the following standards:

- EN 50081-1
- EN 50082-1

Responsible for this declaration is the producer

Metra Mess- und Frequenztechnik

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Declared by
Manfred Weber
Radebeul, 28th of June, 1999

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