INSTRUCTION MANUAL

FOR

MODEL 371
SOUND LEVEL
CALIBRATOR

TRIPLETT

BLUFFTON, OHIO 45817

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CALIBRATOR

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TRIPLETT MODEL 371
SOUND-LEVEL CALIBRATOR
SPECIFICATIONS

ACOUSTIC OUTPUT

FREQUENCIES:	1000Hz, ±3%
SOUND-PRESSURE LEVEL:	114 db, RE: .0002 dyne/cm^2
TEMPERATURE COEFFICIENT:	-.01 db/F°
PRESSURE CORRECTION:	Chart Supplied

GENERAL

OPERATING ENVIRONMENT:	25°F to 125°F, 0 to 99% relative humidity
BATTERY:	NEDA 1611 or 1600
DIMENSIONS:	2" dia. x 4 1/2" L
WEIGHT:	1 lb.

TRIPLETT MODEL 371

SOUND-LEVEL CALIBRATOR

1.0 GENERAL DESCRIPTION

The Model 371 Sound Level Calibrator is a portable and accurate self-contained device for checking the calibration of sound measuring instruments. The model 371 can be used for the field calibration of TRIPLETT Models Sound Level Meter, 380 Sound Level Integrator, and 376 Personal Noise Dosimeter.

The Model 371 may also be used to calibrate any 5/8 inch or 15/16 inch diameter microphone.

1.1 Controls

1.1.1 Push to Operate

A push button switch activates calibrator output and miniature pilot lamp.

1.2 Acoustic Output

The acoustic output from the calibrator is obtained at the end of the instrument opposite from the controls. The correct acoustic output is obtained when a 15/16 inch microphone or smaller diameter microphone in a 15/16 inch adaptor is properly seated in the 15/16 inch recess at the bottom of the calibrator.

2.0 THEORY OF OPERATION

The Model 371 consists of an oscillator, which generates a sinusoidal signal. This signal drives an acoustic transducer that supplies a high-level acoustic calibrating signal to a coupler which fits over the microphone under test.

2.1 Oscillator

The oscillator is a battery operated Wien-Bridge oscillator. An integrated circuit operational amplifier supplies the voltage gain necessary to sustain oscillations and also the power gain to drive the acoustic transducer. A field effect transistor is employed as a variable resistor in the feedback circuit to stabilize the oscillator and reduce distortion.

2.2 Acoustic Output

The oscillator drives a small controlled-reluctance magnetic loudspeaker. The loudspeaker drives one end of the acoustic coupler. The microphone to be calibrated is used to close the coupler.

3.0 OPERATING PROCEDURE

3.1 Battery Check

The battery check mode is incorporated into the pilot lamp circuitry. The battery is in acceptable condition as long as pilot lamp glows when the push to operate button is depressed. The battery must be replaced when the lamp does not glow even if an acoustical output is present.

3.2 Calibration of Sound-Measuring Instruments

The Model 371 Sound-Level Calibrator is adjusted to develop a constant sound-pressure level of 114 db re. .0002 microbar at 1000 Hz, when its acoustic coupler is placed over a high (acoustic) impedance sound-measuring microphone.

This level is established by adjusting the calibrator output to register 114 db sound pressure level on a sound-measuring system using a carefully maintained laboratory standard microphone. Normal variation of temperature and atmospheric pressure

will have negligible effect on the sound-pressure level developed.

The specifications give the value of the temperature coefficient, and the curves in Fig. 1 show the variations of sound-pressure level with atmospheric pressure.

As long as the volume enclosed by the coupler is kept constant, including the effective volume of the microphone to be calibrated, the sound-pressure level developed in the calibrator coupler is constant.

3.2.1 Calibration of the Model 370 Sound-Level Meter

To calibrate the Model 370 Sound Level Meter place the Calibrator over the microphone. Apply the calibration signal and adjust the Cal. Adj. control to give a 114 db indication on the 110 db range.

3.2.2 Calibration of the Model 380 Sound-Level Integrator

To calibrate the Model 380 Sound-Level Integrator place the calibrator over the microphone. Apply the calibration signal to the microphone for exactly 1 minute and note the number of counts accumulated during that interval. Adjust the 380 for an accumulation of exactly 60 counts for 1 minute exposure.

3.2.3 Calibration of the Model 376 Personal Noise Dosimeters

Refer to Paragraph 3.2.2 Calibration of the Model 379 Sound Level Integrator.

3.3 Pressure and Altitude Correction

The Model 371 is subject to altitude and atmospheric pressure changes in relation to its acoustical output. The graph in Fig. 1 shows the change in sound-pressure level with a change in altitude and

atmospheric pressure. The pressures given by the United States Weather Bureau are corrected pressures (pressures referred to sea level). The actual barometric pressure can be requested of your local weather station or you can correct the published barometric reading for your own location. The correction is one inch of mercury per 1000 feet above sea level.

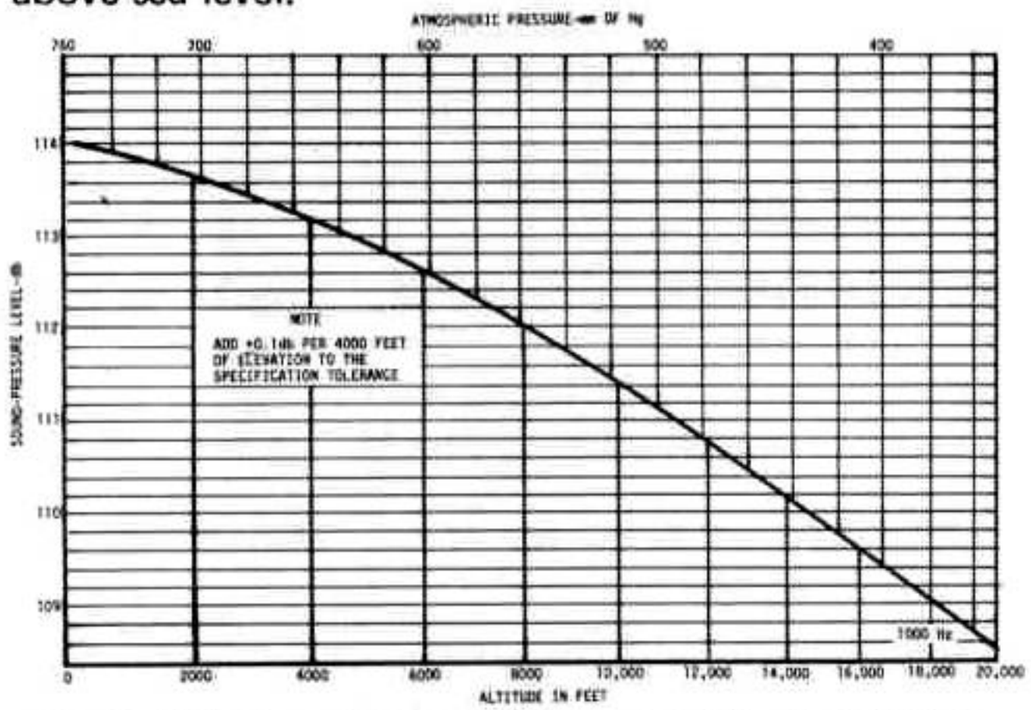

Fig. 1 Variation of Sound-Pressure Level in Relation to Changes in Atmospheric Pressure and Altitude.

When the curve of Fig. 1 is used to determine the acoustical output of the calibrator at high altitude, an additional tolerance of ±.1db per 4000 feet of

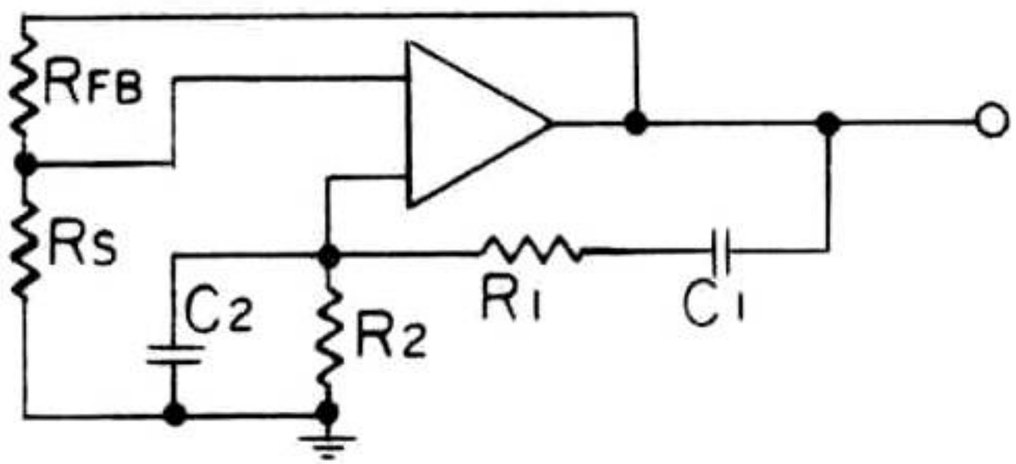

Fig. 2 Functional Diagram of Oscillator of the 371

elevation must be added to the existing specification tolerance.

4.0 PRINCIPLES OF OPERATION

4.1 The Wien-Bridge Oscillator

A functional diagram of the oscillator employed in the Model 371 is shown in Fig. 2.

The networks R_1, C_1 and R_2C_2 determine the frequency at which the oscillator will operate. This network forms a voltage divider, the transfer function of which is equal to 1/3 at the frequency of oscillation.

The loop gain must be +1 for stable operation, therefore, the amplifier gain should be set at +3. The amplifier gain from the noninverting (+) input to the output is determined by expression:

$$\frac{R_{FB}}{R_S} + 1$$

In the Model SPC-10, is a network employing a field effect transistor as a voltage sensitive resistor. The control voltage applied to the FET is proportional to the output of the oscillator, thus forming negative feedback loop which stabilizes the output of the oscillator.

4.2 Battery Check Circuit

The battery check circuit consists of a series circuit made up of a zener diode, a resistor a light emitting diode. The function of the circuit is to test the battery under a loaded condition. The zener diode establishes the minimum acceptable operating voltage. If the battery voltage is below this value no current will flow and the LED will remain dark, if current flows in the circuit the LED will glow indicating the battery is usable.

5.0 SERVICE AND MAINTENANCE

5.1 Battery Replacement

To replace the battery the cylindrical cover must first be removed. This is done by removing the screw located on the polished ring nearest the acoustical output cavity of the calibrator, and sliding the cover back over the rear panel. Install the new battery (NEDA #1600) and check before reinstalling the cover. The battery polarity is indicated by the + sign on the PC board.

5.2 Calibration

The calibration of the Model 371 requires equipment not normally found in standard electronic calibration laboratories. It is recommended the unit be returned to the factory for calibration.

PARTS LIST
MODEL 371

REF. NO.	DESCRIPTION
Resistors	
R1	Composition, 12K ohm, 1/4 w
R2	Composition, 10K ohm, 1/4 w
R3	Composition, 750 ohms, 1/4 w
R4	Composition, 1.5K ohm, 1/4 w
R5	Metal Film, 2.32K ohm, 1/8 w, 1%
R6	Metal Film, 2.32K ohm, 1/8 w, 1%
R7	Composition, 1K ohm, 1/4 w
R8	Composition, 27K ohm, 1/4 w
R9	Composition, 270K ohm, 1/4 w
R10	Composition, 390 ohms, 1/4 w
R11	Composition, 150 ohms, 1/4 w
RV1	Potentiometer, 1K ohm
Capacitors	
C1	Polycarbon, 0.068 mf, 100 volt, ±2%
C2	Polycarbon, 0.068 mf, 100 volt, ±2%
C3	Tantalum, 60 mf, 6 volt
C4	Tantalum, 2.2 mf, 20 volt
C5	Tantalum, 2.2 mf, 20 volt
C6	Tantalum, 2.2 mf, 20 volt
Semiconductors	
CR1	Zener Diode IN754A
CR2	Light emitting diode MV-50
CR3	Silicon Diode IN914
Q1	Field Effect transistor ITE-4868
A1	Integrated circuit
Misc.	
SW1	Switch pushbutton momentary
D1	Microphone cartridge, magnetic

REAR PANEL

SW1

CR2

MV50

R12

10K

CR1

IN754

B1

9V

R3

750Ω

R7

1K

RV-1

1K

C4

2.2mf

20V

R10

390Ω

R11

150Ω

DRIVER

Q1

ITE4868

D

S

G

R4

1.5K

7

2

μA741

6

3

4

C6

2.2mf

20V

CR3

IN914

C1

.068mf

R8

27K

C5

2.2mf

20V

R9

270K

R5

2.32K

1%

C2

.068mf

R6

2.32K

1%

C3

60mf

6V

R1

12K

GRD

CLAIM FOR DAMAGE IN SHIPMENT

The instrument should be tested as soon as it is received. If it fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to us. We will then advise you of the disposition to be made of the equipment and arrange for repair or replacement. Include model number and serial number when referring to this instrument for any reason.

WARRANTY

The Triplett Corporation warrants instruments manufactured by it to be free from defective material or factory workmanship and agrees to repair or replace such instruments which under normal use and service, disclose the defect to be the fault of our manufacturing. Our obligation under this warranty is limited to repairing or replacing any instrument or test equipment which proves to be defective, when returned to us transportation prepaid, within ninety (90) days from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons or service stations in any way so as, in our judgment to injure their stability or reliability or which have been subject to misuse, negligence or accident or which have had the serial number altered, effaced, or removed. Neither does this warranty apply to any of our products, which have been connected, installed, or adjusted otherwise than in accordance with the instructions furnished by us. Accessories including transistors, fuses, cables and batteries not of our manufacture used with this product are not covered by this warranty.

The Triplett Corporation reserves the right to discontinue models at any time, or change specifications, price or design, without notice and without incurring any obligation.

Upon acceptance of this material the purchaser agrees to assume all liability for any damages, and bodily injury which may result from the use or misuse of the material by the purchaser, his employees, or others and that the Triplett Corporation shall incur no liability for direct or consequential damage of any kind.

This warranty and conditions of sale are in lieu of all others expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

IF ANY FAULT DEVELOPS, THE FOLLOWING STEPS SHOULD BE TAKEN:

1. Notify us, giving full details of the difficulty, and include the model number and serial number. On receipt of this information, we will give you service data or shipping instructions.
2. On receipt of shipping instructions, forward the instrument prepaid, to the factory. If requested, an estimate of the charges will be made before the work begins provided the instrument is not covered by the warranty.

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