Model 890-2
Sound Level Calibrator
INSTRUCTION MANUAL

About this Manual
To the best of our knowledge and at the time written, the information contained in this document is technically correct and the procedures accurate and adequate to operate this instrument in compliance with its original advertised specifications.

Notes and Safety Information
This Operator's Manual contains warning headings which alert the user to check for hazardous conditions. These appear throughout this manual where applicable and are defined below. To ensure the safety of operating performance of this instrument, these instructions must be adhered to.


Warning, refer to accompanying documents.


Caution, risk of electric shock.

Technical Assistance
SIMPSON ELECTRIC COMPANY offers assistance Monday through Friday 8:00 am to 4:30 pm Central Time. To receive assistance contact Technical Support or Customer Service at (715) 588-3311.
Internet: **http://www.simpsonelectric.com**

Warranty and Returns
SIMPSON ELECTRIC COMPANY warrants each instrument and other articles manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory or other article of equipment which shall within one (1) year after delivery of such instrument or other article of equipment to the original purchaser be returned intact to it, or to one of its authorized service centers, with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and SIMPSON ELECTRIC COMPANY neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sales of its products.

This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside the SIMPSON ELECTRIC COMPANY factory or authorized service centers, nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by the manufacturer.

This manual represents your meter as manufactured at the time of publication. It assumes standard software. Special versions of software may be fitted, in which case you will be provided with additional details.

The apparatus has been designed and tested in accordance with EN 61010-1, "Safety Requirments for Electrical Equipment for Measurement, Control and Laboratory Use." This operationg guide contains information and warnings that must be followed by the user to ensure safe operation and to maintain the apparatus in a safe condition.

We reserve the right to make changes and improvements to the product without obligation to incorporate these changes and improvements into units previously shipped.

NOTES

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Contents

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1. INTRODUCTION

Never place the operating calibrator tightly against the ear. The high sound level present could be harmful, especially to someone with a hearing deficiency.

1.1 General Description

The Simpson 890-2 Sound Level Calibrator (hereafter referred to as the 890-2, or simply the Instrument) is an accurate, portable sound source designed specifically for convenient field calibration of the Simpson Models 884-2, 886-2, 899 or other compatible Sound Level Meters (SLM). Its compact, rugged construction and battery powered operation permit its use in virtually any location.

When acoustically coupled to a Sound Level Meter the 890-2 provides a constant, calibrated sound pressure level of 114 dB or 94 dB (0 dB reference is 20 µ Pascals) at the microphone of the Sound Level Meter. The sound pressure accuracy is ± 0.5 dB at 23°C and 760 mmHg. The sound frequency is 1,000 Hz. The case of the Instrument is constructed of aluminum and designed to minimize loss when coupling the transducer cavity to the SLM microphone.

1.2 Items and Accessories

All items and accessories required for the operation of the 890-2 are furnished with each instrument and listed in the following table.

Table 1-1. Items and Accessories Furnished With This Instrument.

Quantity	Description	Part Number
1	Screwdriver	5-116470
1	9V battery, NEDA 1604	5-114907*
1	Operator's Manual	06-115335

*Available from local retail stores.

1.3 Technical Data

Table 1-2 lists the technical specifications for the Simpson 890-2 Sound Level Calibrator.

Table 1-2. Technical Data.

1. Acoustic Ouput Frequency:	1000 Hz ± 1%
Sound Pressure Level:	114 dB or 94 dB (switch selectable) (Reference: 0 dB = 20 µ Pascals)
2. Accuracy:	± 0.5 dB at reference conditions
3. Distortion:	2%
4. Temperature Range:	0°to +50°C (operating) -40° to 60°C (storage, battery removed)

5. Ouput Temperature Coefficient:	Less than ± 0.05 dB/°C
6. Operating Relative Humidity:	0 to 90%
7. Power Requirements:	One 9V battery, NEDA 1604
8. Battery Life:	Approximately 35 hours.
9. Reference Conditions:	23°C, 760 mmHg, 30% to 60% Relative Humidity
10. Mechanical Construction:	Aluminum case includes acoustic cavity and provides shielding. Electronic circuits are packaged on a single printed-circuit board.
11. Weight:	13.5 oz. (0.35 kg)
12. Dimensions:	5 1/4" long, 2" diameter (131 mm long, 50 mm diameter)

2. PREPARATION FOR USE

2.1 General

This section contains information and instructions for the packaging and shipping of the 890-2. Included are unpacking and inspection procedures, warranty, shipping and power requirements.

2.2 Unpacking and Inspection

Examine the shipping carton for obvious sign of damage. If shipping carton is in good condition, inspect the Instrument for possible damage. If damaged, notify the carrier and supplier and do not use the Instrument. If Instrument appears to be in good condition, read Operator's Manual in its entirety. Become familiar with the Instrument as instructed in the manual, then proceed to check the electrical performance. Check that all items listed in Table 1-1 are included with the Instrument.

2.3 Warranty

The Simpson Electric warranty policy is printed on the inside front cover of this manual. Read it carefully before requesting a warranty repair. For all assistance, including help with the Instrument under warranty, contact the factory. Give full details of the difficulty and include the Instrument model number, serial number and date of purchase. Service data or shipping instructions will be sent to you promptly. If an estimate of charges for non-warranty or other service work is required, a maximum charge estimate will be quoted. This charge will not be exceeded without your approval.

2.4 Shipping

Pack the Instrument carefully, insure and ship Instrument prepaid to the proper destination.

2.5 Power Requirements

The 890-2 is powered by one 9V battery (supplied). The battery is packaged separately. Refer to Section 4 for installation or replacement instructions.

2.6 Care of the Instrument

1. Immediately clean any spilled materials from the Instrument and wipe dry. If spillage is corrosive, use a suitable cleaner to remove it and to neutralize corrosive action.

2. Remember to turn off the Instrument when not in use.

3. Avoid prolonged exposure or usage in areas subject to temperature and humidity extremes, vibration, mechanical shock, dust, corrosive fumes, and strong electrostatic and electromagnetic interference.

5. Be sure the tranducer cap is firmly in place.

6. If the Instrument has not been used for 30 days, check battery for leakage and replace it if necessary.

7. It is recommended that the Instrument be returned to the factory annually (sooner if required) for a complete overall check, adjustment, and calibration.

8. When the Instrument is not in use, store it in a room free from temperature extremes, dust, corrosive fumes, mechanical vibration or shock. If storage time is expected to exceed 30 days, remove the battery.

3. OPERATION

3.1 General

This section contains the necessary instructions required for operating the 890-2. The 890-2 is designed to calibrate the following Simpson Sound Level Meters: Models 884-2, 886-2, and 899.

3.2 Precautions

When the 890-2 is turned on, a 1000 Hz tone is audible. Under this condition, there is a natural tendency to bring the instrument against the ear. However, **never** place the operating calibrator tightly against the ear. **The high sound level present could be harmful, especially to someone with a hearing deficiency.**

1. Check the calibration of the 890-2 periodically or whenever accuracy is in doubt. For example, inspect the Instrument for evidence that might indicate that it has been subjected to severe mechanical shock or environmental extremes. This check can be compared with another 890-2 Calibrator, or with a reference SLM known to be accurate. If another 890-2 or reference SLM is unavailable, return the Instrument to

the factory for a complete overall check.

2. Be sure the sealing ring in the transducer cap is not damaged and that the leak-to-atmosphere hole is not clogged. (Refer to Table 3-1, item 1.)

3.3 Operational Features and Items

All features and items used to operate the 890-2 calibrator are described in Table 3-1 and illustrated in Figure 3-1.

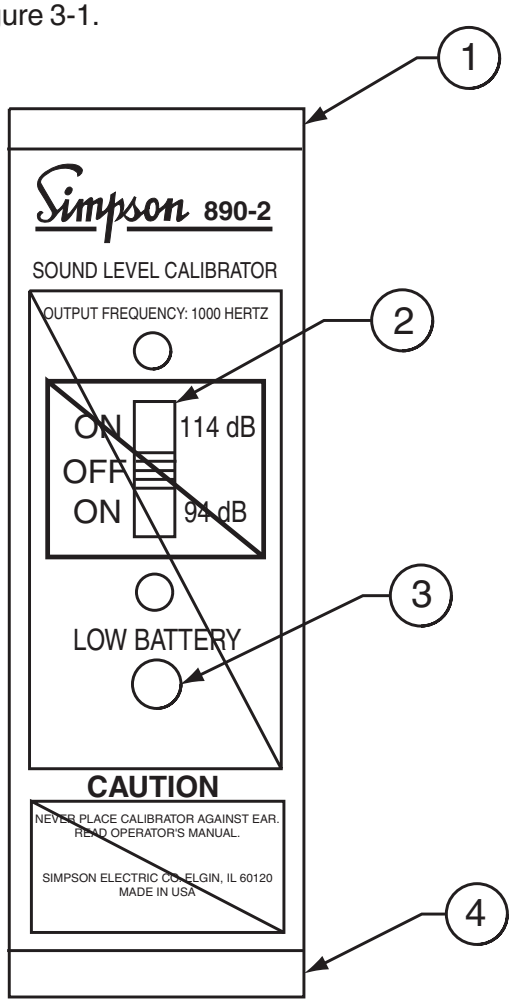

Figure 3-1. Model 890-2

Table 3-1. Operational Features and Items

1. Transducer Cap:
A precisely machined cap which screws into the other end of the housing. The mating of the transducer cap and the microphone of the Sound Level Meter being calibrated constitutes an acoustic coupler. The cap includes a sealing ring to ensure a closed cavity between the cap and Sound Level Meter microphone. A small hole provides a controlled lead to the atmosphere. This cap must be tight when using the calibrator. Calibration may not be accurate if the transducer cap is loose.

2. OFF/ON (94 or 114) dB select switch):
A 3-position slide switch is used to turn the Instrument on and to select either 94 or 114 dB sound pressure output levels.

3. Lo Batt Indicator (LED):
A small light-emitting diode (LED) indicator that will light if the battery needs to be replaced. The Instrument will automatically shutdown if the battery condition is not adequate enough to provide the specified sound level pressure.

4. Battery Cap:
An aluminum cap which screws into one end of the Instrument housing. It provides easy access to the battery compartment and holds the battery firmly in position.

3.4 Effects of Atmospheric Pressure and Temperature

For any one location, the effects of normal variations of atmospheric pressure are usually negligible. The effect of elevation is shown in Figure 3-2. This graph shows the change in Instrument output level compared to that obtained at sea level. For example, if the Instrument is being used at 7500 feet, calibrate the Sound Level Meter for an indication of 113.5.
The effects of temperature are less than ± 0.05 dB/°C (reference is 23°C).

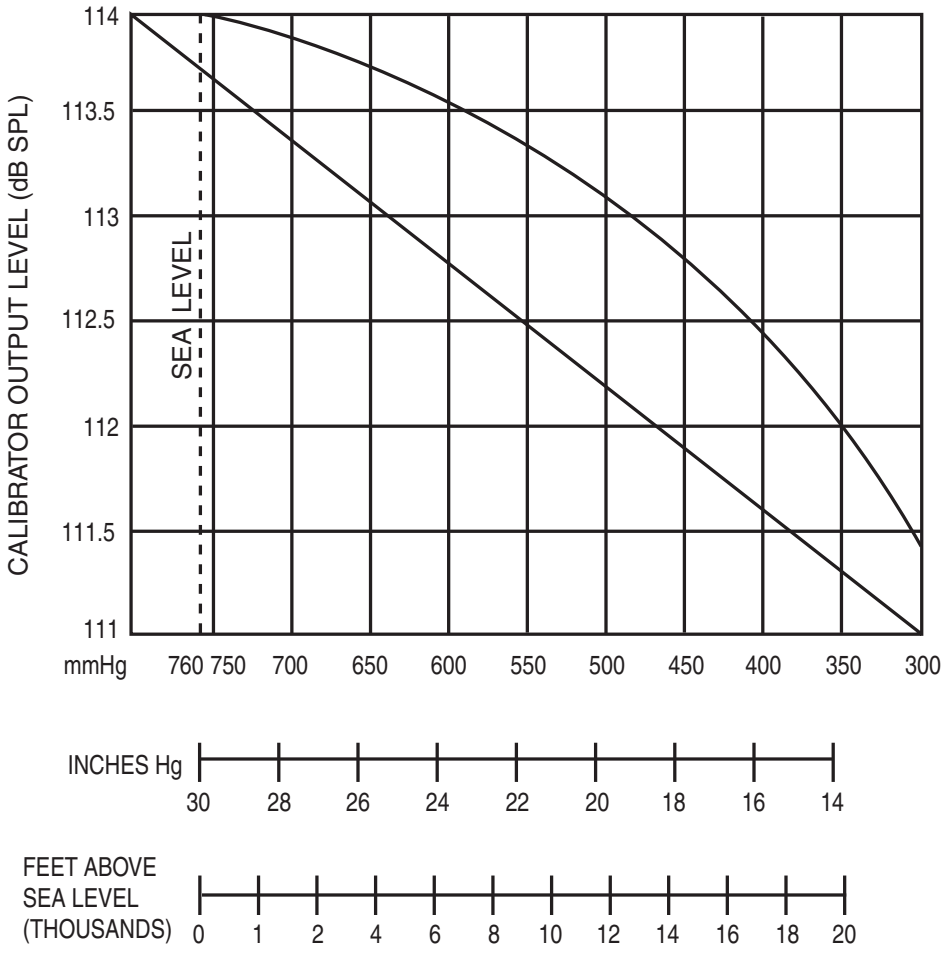

Figure 3-2. Effect of Elevation Upon Calibrator Output

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3.5 Calibration of Simpson Sound Level Meter

1. Set up the sound level meter according to the application as directed below:

   a. Set the range switch to either 110 dB, if the calibration sound pressurelevel is 114 dB; or 90 dB, if the calibration sound pressure level is 94 dB.

   b. The response switch can be set to either the slow, fast, or impulse position. (Impulse is only available on the 899.)

   c. Set the A, B, or C weighting switches required by the application. Note that this feature is available on only the 886-2 and 899, not the 884-2.

2. To calibrate the 884-2, 886-2, or 899 using the 890-2 calibrator:

   a. Remove the windscreen (if used) and carefully insert the microphone fully into the acoustic cavity of the Calibrator.

   b. Turn on the calibrator and select either the 94 or 114 dB output level position.

   NOTE: Normally for the sound pressure takes a second or two to "ramp up" to the correct output level when the Instrument is first switched on. The "Low Battery" indicator may briefly blink during this time. If the Lo-battery indicator remains lit, replace the battery as soon as possible. (Refer to 4.2 and 4.3.)

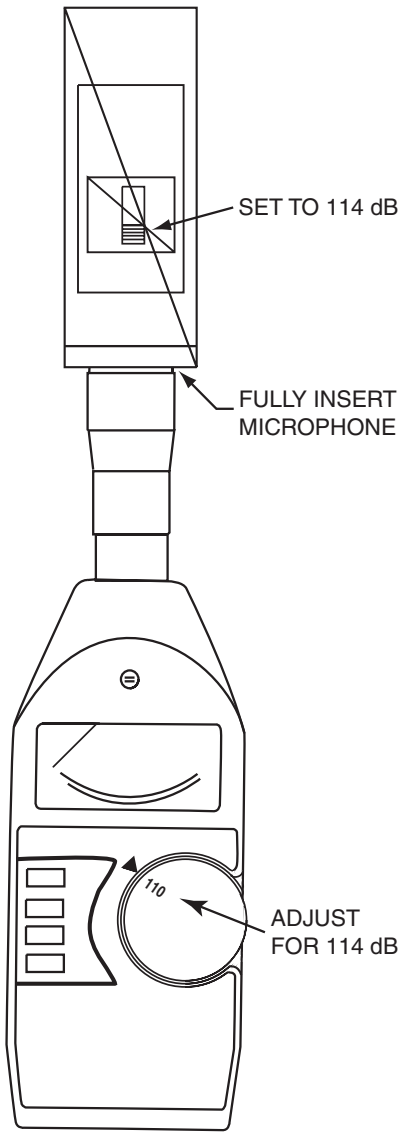

Figure 3-3. Sound Level Meter Calibration.

   c. If the sound level meter reads either 114 dB or 94 dB, depending on the calibrator sound pressure level selected, no calibration adjustment is necessary. If not, remove the small metal cap covering the calibration adjustment of the sound level meter, and using the small screwdriver supplied with the 890-2 calibrator, make the necessary adjustment until it does.

   d. Turn off the calibrator and replace the metal cap covering the calibration adjustment, if it was removed.

4. SERVICING INSTRUCTIONS

4.1 General

The 890-2 contains no operator-serviceable parts, except for the battery. This section contains instructions for replacing the battery. Special training and facilities are required for servicing and calibrating sound level calibrators. When the Instrument does not appear to be functioning properly, send it to the factory.

4.2 Lo-Battery Indication

The Instrument will operate according to specifications for approximately eight hours after the LO-BATTERY indicator initially turns on. After eight hours a “dead battery” detection circuit will automatically shut down the Instrument. The LO-BATTERY indicator will remain on and the battery must be replaced to restore normal operation.

4.3 Battery Installation or Replacement

To replace the battery:

1. Turn off the calibrator.

2. Remove the battery cap (Table 3-1, item 1) by turning it counterclockwise.

3. Pull battery from the compartment and unsnap the connector. (Note routing of the connector cable with respect to the battery.)

4. Snap the battery connector onto the mating terminals of the replacement battery. (The connector is polarized so it only can be connected one way.)

5. Slide the battery into the battery compartment. Turn the battery so the connector is facing outward. Tuck the connector cable neatly under the battery so it will not interfere when the battery cap is replaced.

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