Simpson

Model 896 Multi/Level Calibrator
OPERATOR'S 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 symbols 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.

This instrument is designed to prevent accidental shock to the operator when properly used. However, no engineering design can render safe an instrument which is used carelessly. Therefore, this manual must be read carefully and completely before making any measurements. Failure to follow directions can result in a serious or fatal accident.

Technical Assistance

SIMPSON ELECTRIC COMPANY offers assistance Monday through Friday 7:30 am to 5:00 pm Central Time. To receive assistance contact Technical Support or Customer Service at (847) 697-2260.
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.

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1. INTRODUCTION

The Simpson 896 Multi-Frequency/Level Calibrator (hereafter referred to as the 896, or the Instrument) is an accurate sound source designed for convenient field calibration of the Simpson 884-2, 886-2 or 899 Sound Level Meters. The 896 is compact, durably constructed, lightweight, and battery-powered for portable use.

The 896 has two sound pressure levels (114 dB or 94 dB) and five output frequencies (125, 250, 500, 1000 and 2000 Hz). This allows versatility of checking the A, B or C weighted frequency response characteristics of the Sound Level Meter. The Instrument's housing shields the electronic circuitry and provides efficient acoustic coupling between the calibrator transducer and the Sound Level Meter microphone.

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

1.1 Technical Data

Table 1-1 lists the technical specifications for the 896 Multi-Frequency/Level Calibrator.

Table 1-1. Technical Data

Acoustic Outputs	
Frequencies:	125, 250, 500, 1000 or 2000 Hz.
Sound Pressure Levels:	114 dB SPL or 94 dB SPL (Ref: 0 dB = 20 mPascals).
Accuracies:	SPL: ±0.5 dB all frequencies at reference conditions.
Frequencies:	±2% all frequencies.
Distortion:	Less than 5%.
Temp. Range:	0°C to 50°C.
Output Temperature Coefficient:	Less than minus 0.02 dB/°C.
Operating Relative Humidity:	0 to 90%.
Power Requirements:	One 9 V (NEDA 1604) battery.
Battery Life:	Approx. 120 hours (2 hours per day operation). Nominal Current Drain: 3 mA. (Refer to appropriate Manufacturer's data for temperature effects on battery life.)
Reference Conditions:	23°C, 760 mm Hg and 30% to 60% Relative Humidity.
Weight:	15 oz. (0.426 kg).
Dimensions:	2" wide x 5-7/8" long.
Construction:	Aluminum housing with all electronic circuitry on a single printed circuit board.

1.2 Items And Accessories

All items and accessories required to operate the 896 are furnished with the Instrument and listed in Table 1-2.

Table 1-2. Items and Accessories Furnished With the Instrument

Quantity	Description	Part Number
1	Screwdriver	5-116470
1	9 V Battery, NEDA	1604*
1	Operator's Manual	6-110689

*Available from local retail stores (transistor radio type).

2. CARE OF INSTRUMENT

This section contains unpacking and inspection procedures, warranty, shipping, care, and battery installation.

2.1 Unpacking And Inspection

Examine the shipping carton for signs of damage before unpacking. If shipping carton is in good condition, unpack and inspect the Instrument for possible damage incurred during shipment. If damaged, notify the carrier and supplier. Do not attempt to use the Instrument.

If the Instrument appears to be in good condition, read the Operator's Manual in its entirety. Become familiar with the Instrument as instructed in the manual, then check the electrical performance as soon as possible. Check that all items are included with the Instrument (see Table 1-2). Save the shipping carton and packing materials for storing or future shipping of the Instrument.

2.2 Warranty

The Simpson Electric Company warranty policy is printed on the inside front cover of this manual. Read it carefully before requesting a warranty repair. For all assistance, contact the factory directly. Give full details of any problems along with the model number, serial number, and date of purchase.

2.3 Shipping

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

2.4 Care

1. Immediately clean any spilled material from the Instrument and wipe dry. If spillage is corrosive, use a suitable cleaner to remove spillage and to neutralize corrosive action.
2. When Instrument is not in use, set the Rotary Switch to the OFF position.

3. Avoid prolonged exposure or usage in areas subject to temperature and humidity extremes, vibration, mechanical shock, dust, corrosive fumes, and strong electrical and electromagnetic interferences.
4. Be sure the transducer cap is firmly in place. (Removal of the Transducer cap may invalidate calibration.)
5. If the Instrument has not been used for 30 days, check battery for leakage and replace if necessary.
6. It is recommended that the Instrument be returned to the factory annually (sooner if required) for a complete overall check, adjustment, and calibration.
7. When not in use, store instrument 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.

2.5 Battery Installation Or Replacement

1. Set the Rotary Switch of the 896 to the OFF position.
2. Remove the battery cap (Table 3-1, item 1) by turning it counterclockwise.
3. If replacing the battery, remove the old battery.
4. Snap the battery connector onto the mating terminals of the replacement battery. The connector is polarized to allow it to be connected only one way.
5. Tuck the connector cable neatly under the battery so it will not interfere when the battery cap is replaced, and slide the battery into the battery compartment. Replace the battery cap.

3. OPERATION

This section contains information required to operate the Instrument in a safe and proper manner. Follow the instructions herein and in the Operator's Manual for the Sound Level Meter.

3.1 Precautions

Do not place the operating Calibrator tightly against the ear. The high sound levels could be harmful, especially to someone with a hearing deficiency.

Check the calibration of the 896 periodically or whenever accuracy is in doubt. Do this by comparing Instrument with another 896 Calibrator or a reference Sound Level Meter known to be accurate. If another 896 or reference Sound Level Meter is unavailable, return the Instrument to the factory for a complete overall check.

Be sure the Sealing Ring in the Transducer Cap is not damaged and that the leak-to-atmosphere opening is not blocked. (Table 3-1, item 5.)

3.2 Operating Items And Features

All items or features used to operate the calibrator are described in Table 3-1. Become familiar with each before operating the Instrument for the first time.

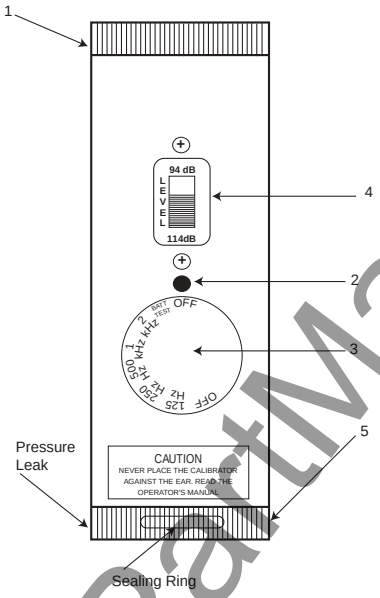

Figure 3-1. Model 896

Table 3-1. Operational Items or Features

1. **Battery Cap:** This aluminum cap provides easy access to the Battery Compartment and holds the battery firmly in position.

2. **BATT TEST Indicator:** When set to BATT TEST position, a Light-Emitting Diode (LED) indicator will light if the battery is strong enough to provide specified Sound Pressure Levels of 114 or 94 dB SPL.

NOTE: If the LED does not light, replace the battery and retest. DO NOT use the calibrator if it does not pass the battery test. The results will not be accurate.

3. **OFF/Batt Test/Frequency Select Switch:** This 8-position rotary switch is used to turn calibrator on/off, to test the battery or to select one of the five output frequencies .

4. **114 dB/94 dB Level Select Switch:** This 2-position slide switch selects either the 114 or 94 dB calibration levels.

5. **Transducer Cap:** This cap forms an acoustic coupler between the calibrator and the Sound Level Meter microphone. A small hole in the side of the cap provides a controlled pressure leak to the atmosphere.

3.3 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.) The graph shows the change in Instrument output level compared to that obtained at sea level. For example, if the Instrument is being used at 5000 feet, calibrate the Sound Level Meter for an indication of 114.58 dB for the frequency of 1000 Hz.

The effects of temperature are less than -0.02 dB/°C (Reference is 23°C).

3.4 Battery Check

Check battery condition by setting the Rotary Switch to the BATT TEST position. The LED will light, indicating that the battery is adequate. If it does not light, replace the battery.

(An audible output may be obtained with a weak battery, however, any calibration made with the Calibrator will be invalid.)

3.5 Sound Level Meter Setting

1. Set the Rotary Switch to the 110-120 dB range.
2. Set the Response Switch to the SLOW or FAST position.
3. Set the A, B, or C weighting switches to weighting specified for application. If no weighting is specified, use C weighting (A weighting only for 884).

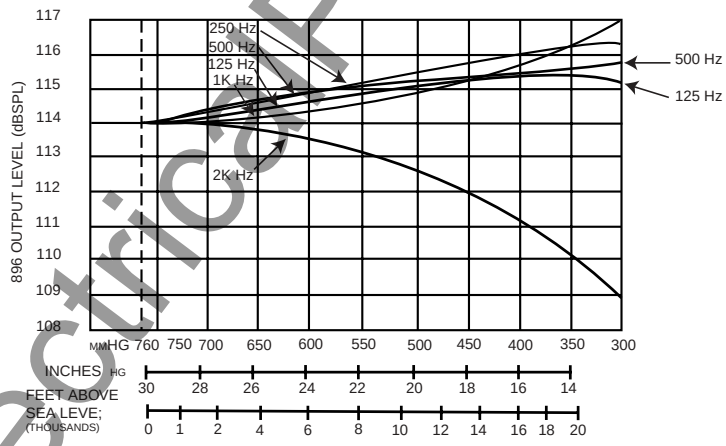

Figure 3-2. Effect of Elevation Upon Calibrator Output

3.6 Calibration of 884-2, 886-2 and 899 Sound Level Meters

The Simpson 884-2, 886-2 and 899 Sound Level Meters have a condenser microphone and electronic weighting networks in order to obtain random incidence response characteristics as specified in ANSI S1.4-1983. To correlate these random incidence response characteristics to those readings ob-

tained on the Sound Level Meter when coupled to an 896 Calibrator, correction factors relating the Sound Level Meter random incidence frequency response to its pressure frequency response (obtained in an acoustic coupler) must be known. These correction factors take into consideration the condenser microphone random incidence versus pressure frequency response differences and the A, B, or C frequency weighting versus flat frequency response differences. The former differences are negligible for the frequencies involved when using the 896. The latter differences are listed in Table 3-2.

	Frequency				
Weighting	125	250	500	1K	2K
A	-16.1	-8.6	-3.2	0	+1.2
B	-4.2	-1.3	-0.3	0	-0.1
C	-0.2	0	0	0	-0.2

Table 3-2. Nominal Differences between A, B, or C Frequency Weighting Responses and Flat Frequency Response (dB)

Calibration at 1kHz:

1. Pull off the small metal cap covering the calibration adjustment of the Sound Level Meter.
2. If using the windscreen, remove and carefully insert the microphone fully into the acoustic cavity of the calibrator.
3. With one hand, hold the 896 and the Sound Level Meter against the body, while holding the Sound Level Meter in a horizontal plane. (See Figure 3-3.)
4. Set the Rotary Switch of the 896 to the 1 kHz position.

Calibrating an 884-2, 886-2 and 899 SLM

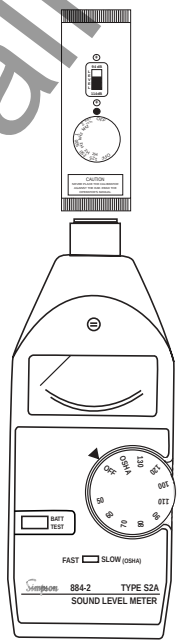

Figure 3-3

5. Set Slide Switch to the 114 dB position.
6. Observe the meter indicator on the Instrument. It should read 114 dB 60.5 dB (when atmospheric and temperature effects are negligible). If it does not, make the necessary adjustment using screwdriver provided with the calibrator.

NOTE: The factors of atmospheric pressure and ambient temperature must be taken into consideration when observing the meter reading and before performing any adjustment (see paragraph 3.4).

7. Set the Rotary Switch of the 896 to the OFF position.
8. Set the Range Switch of the Sound Level Meter to the OFF position.
9. Replace the cap covering the calibration adjustment of the Sound Level Meter.

The 884-2, 886-2 or 899 can also be calibrated at 2000, 500, 250, or 125 Hz in a manner similar to the 1000 Hz calibration; however, the weighting effects must be taken into consideration. (Refer to Table 3-2.) For example, if calibration at 250 Hz in the A weighting is desired, the actual Sound Level Meter indication would be 114 - 8.6 = 105.4 dB SPL. Set the Sound Level Meter to the 100 dB range and the 896 to the 250 Hz and 114 dB SPL and calibrate the Sound Level Meter for 105.4 dB SPL.

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