FAQ Model 831- Low level noise measurements

How to use the Model 831 with the 378A04 microphone & preamplifier to measure low level noise.

The Model 831 sound level meter can be used with the 378A04 low noise microphone & preamplifier to measure noise levels as low as 6.5 dB A-weighted. This FAQ describes the necessary equipment and procedure for setting up the Model 831 to make these measurements.

Required Items

A complete kit with all these items except the CAL200 can be ordered using part number **831-LOWN** and an existing 831 can be upgraded using part number **831-LOWN-UPG.**

Item	Photo	831-LOWN	831-LOWN-UPG	Description
831		Included		Model 831 sound level meter
831-4mA		Included	Included	Option to modify the Model 831 to output 4 mA ICP current when used with ADP074
831-ACC		Included		Accessory kit for Model 831 that includes hard shell case, batteries, A/C power supply, USB cable and 3.5 inch windscreen (Additional accessories not shown)
ADP074		Included	Included	Adapter for Model 831 that plugs into the preamplifier connector on the top and provides an ICP® output on a BNC connector
378A04		Included	Included	Low noise, ICP microphone and preamplifier. 6.5 dB A-weighted
012A10		Included	Included	BNC male-male cable, 10 ft (3 m). (other lengths can be used)
BNC M-M		Included	Included	Used to rigidly connect the 378A04 to ADP074
ADP032		Included	Included	Used to mount 378A04 to a tripod with ¼-20 threads (camera tripod)
CAL200		Optional	Optional	Acoustic calibrator. Other models can be used but the calibrator must be able to output 94 dB re 20 µPa.

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Fully assembled, the 831-LOWN system looks like the systems shown below depending upon whether the flexible BNC cable is used or the rigid connector.

How to Calibrate using the CAL200

Step	Description	
Step 1	**Set the CAL200 output level to 94 dB** ***Warning***: Using a 114 dB calibration level will cause the 378A04 to overload during calibration and result in an incorrect calibration.	

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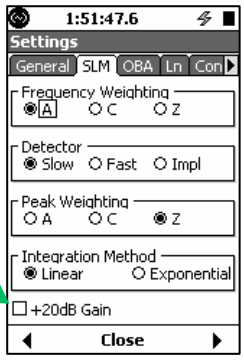
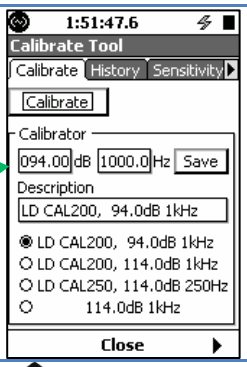
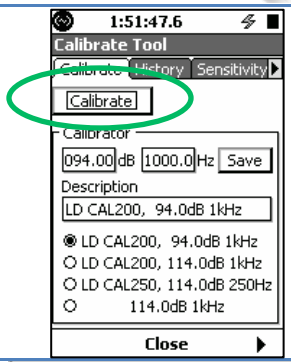
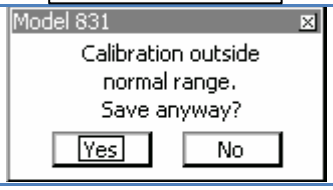
Step 2	Verify that the input gain in the Model 831 is set to 0 dB by pressing Menu > Settings and making sure the +20 dB is unchecked on the SLM tab. If needed, uncheck the 20 dB gain and select Close to save the changes ***Warning***: If the 20 dB is enabled it will cause the 831 to overload during calibration.	
Step 2	On the Model 831, press TOOLS then select Calibrate. Make sure the CAL200 with 94 dB is selected	
Step 3	Insert the microphone into the CAL200 making sure it is firmly seated. Turn on the CAL200 by pressing the button on the side.	
Step 4	On the Model 831 Calibrate tab, highlight the Calibrate button and press enter to calibrate the Model 831.	
Step 5	The 831 may display a message that the calibration is outside normal range. Select **Yes** to save anyway	

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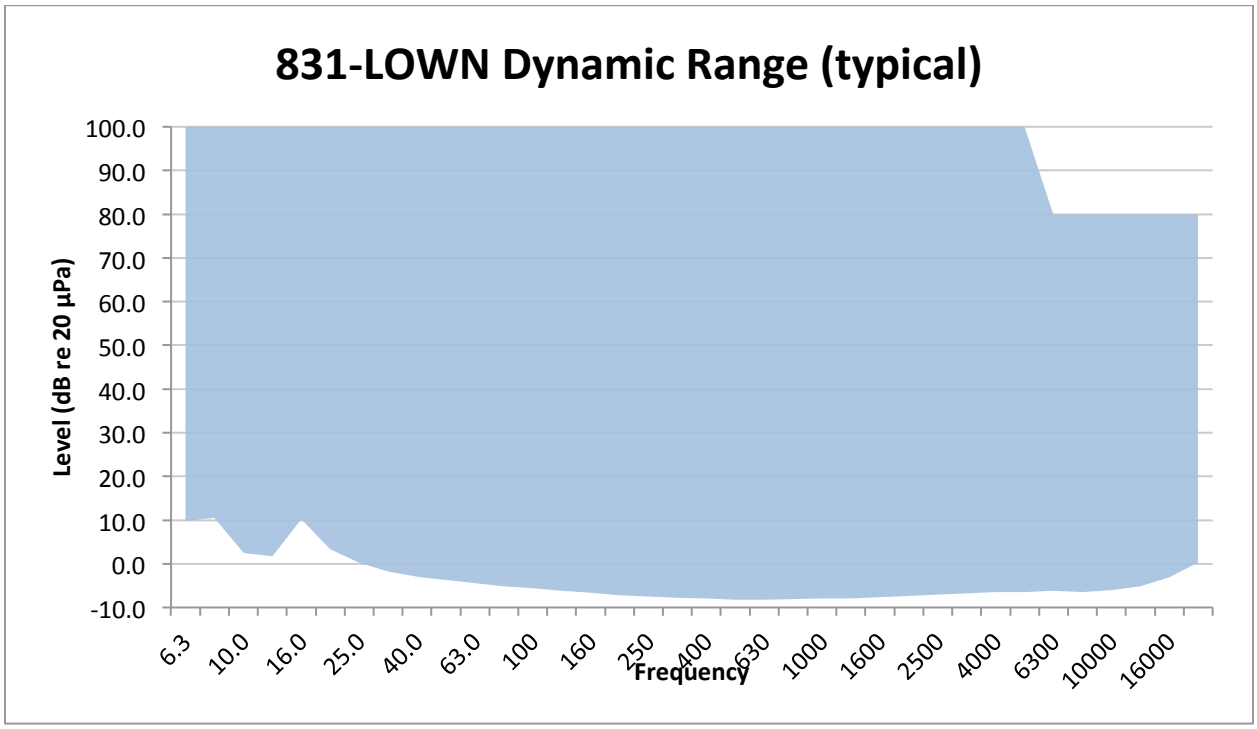
Important Information

When using the 378A04 with the Model 831, the overload indication will not work properly because the 378A04 has less dynamic range than the Model 831. Measured levels above the Upper Limit documented below should be considered as overloaded. The table below documents the acceptable measurement range.

	Gain	A-weighted	C-weighted	Z-weighted (20 – 20 kHz)
Upper Limit[1]	0 dB	80 dB (100 below 5 kHz)[2]	80 dB (100 below 5 kHz)[2]	80 dB (100 below 5 kHz)[2]
	20 dB	60 dB (80 below 5 kHz)[3]	60 dB (80 below 5 kHz)[3]	60 dB (80 below 5 kHz)[3]
Lower Limit Linearity[1]	0 dB	16 dB	21 dB	32 dB
	20 dB	16 dB	20 dB	30 dB
Noise Floor[1]	0 dB	6 dB	11 dB	22 dB
	20 dB	5.5 dB	10 dB	20 dB

The typical dynamic range for an 831 with 378A04 is shown below



[1] Typical values
[2] The frequency dependent 3 % distortion limit is 80 dB for the entire frequency range and 100 dB from 10 Hz to 5 kHz.
[3] The frequency dependent 3 % distortion limit is 60 dB for the entire frequency range and 80 dB from 10 Hz to 5 kHz.

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Spectral Statistics – The Model 831 records statistical distribution data (LN) between 200 and 0.2 dB. Statistics for levels less than 0.2 dB are not computed. This does not impact the broadband statistics but has potential to be seen in spectra statistics.

Power and Battery – Using the 378A04 with the Model 831 will decrease the battery run time by approximately 15%.

Standards compliance – The Model 831 sound level meter when used with the 378A04 low noise microphone has not been tested for compliance with IEC 61672-1 or ANSI S1.4. Larson Davis does not guarantee compliance with all the requirements of IEC 61672-1 or ANSI S1.4 when using the Model 831 with a 378A04 microphone.

Factory Calibration or Certification

Because of the technology used to build the 378A04 it is not possible to perform an annual certification of the 378A04 using an electrostatic actuator, which is commonly used by calibration facilities. For this reason, annual calibrations should be performed at the factory in an anechoic environment. Contact Larson Davis for price and lead time information.