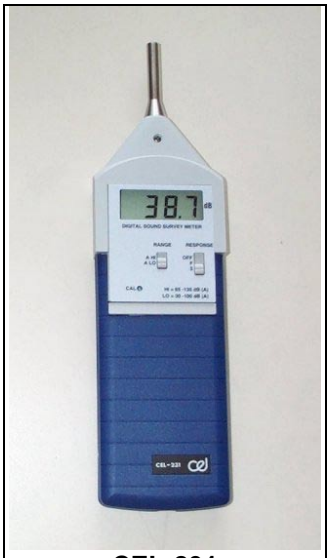
CEL 200 Series

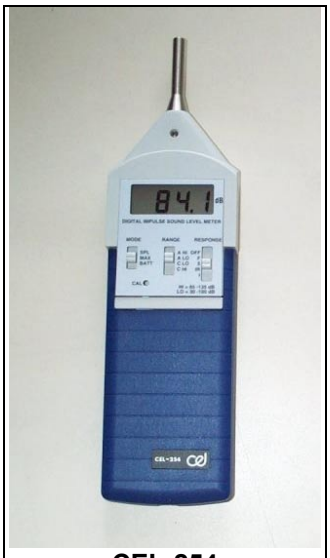
Simple Sound Level Meters

Frequently Asked Questions

Casella USA is proud to announce the CEL-200 Series of sound level meters. These FAQ's help to give an overview of the current models, answer some of the more typical questions that arise and describe how they fit into the overall CEL product portfolio of noise measurement instruments.



CEL-231



CEL-254

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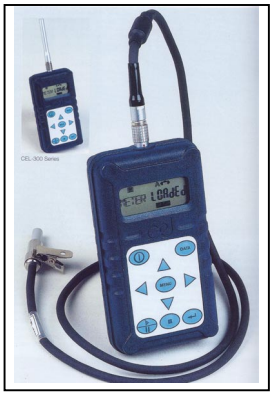
FAQ's: INTRODUCTION

How do the instruments fit into the CEL product range?

CEL-200 Series

The simplest meters remain the CEL-200 series including the CEL-231 and 254 models featuring ANSI type 2 accuracy sound level meters with Sound Pressure Level (SPL), Maximum Noise Level (Max) and Impulse response (CEL-254 only) measurement capabilities.

CEL-300 Series



The intermediate range of convertible personal noise dosimeters or logging sound level meters is in the form of the **CEL-320** or **CEL-360**. Simply swap out the microphone inputs to convert the dosimeter into the sound level meter or vice versa. Both models feature ANSI type 2 accuracy for the overall measurements.

CEL-400 Series

The mid range sound level meters are the CEL-440 and 480 providing recording of level against time or level against frequency. The instruments are fitted with sequential frequency analysis capability in either full octave or third octave bands. Both type 1 and type 2 / datalogging or non-datalogging models are available for the CEL-400 sound level meter range.

CEL-500 Series

The top of the range meters are the CEL-553, 573 and 593 real time analyzers which feature parallel capture of level against time and frequency. A range of versatile upgrade options for such specific tasks as Rapid Data Storage, Building Acoustics, Sound Quality and Long Term Logging measurements are also available. Both type 1 and type 2 models are available.

FAQ's: COMPARISON OF MODELS

What models are there in the range?
Two main variants are available – the **CEL-231** and the **CEL-254**. Both are designed using the same basic casing and internal hardware. The differences between them are in the functionality provided.

What is the main difference between the CEL-231 and 360?
The main difference is the addition of the maximum hold feature in the **CEL-254** models. This makes the **CEL-254** model more useful in circumstances where the noise levels are fluctuating

FAQ's: OPERATION

How long will a standard Alkaline battery last in a CEL-231 or 254?
A set of 4 AAA alkaline cells can power a **CEL-231** or **CEL-360** for up to **20 hours** continuous operation at normal room temperature. Lower temperatures will reduce useful battery life. Alkaline batteries are recommended for longest running time.

Can rechargeable batteries be used in a CEL-231 or 254?
A set of 4 AAA NiCad rechargeable batteries can be used instead of alkaline batteries but battery life will only last for about 10 hours at normal room temperature. The rechargeable batteries will operate successfully down to lower temperatures than an alkaline battery. NiCad batteries may be recharged and used repeatedly in these instruments. When NiCad batteries are run down they can be recharged overnight and used again up to the number of recharge cycles recommended by the battery manufacturer.

How can the instrument be powered from a mains source?
The **CEL-231** and **CEL-254** are not designed to be powered from an external supply since there is no provision of a power connector on the instruments. However, in specific circumstances a meter may be connected to a regulated mains transformer for long-term measurements in a fixed setup that is only intended to be used indoors. (Contact Casella CEL Technical Department for these specific details).

Can the microphone of a CEL-231 or 254 be removed?
The microphone unit of a **CEL-231** and **254** is not removable therefore remote operation is not normally possible. In special circumstances it may be possible to fit a length of plastic tubing of ¼" internal diameter over the end of the microphone in order to place the open end near to a machine noise source that would be dangerous to approach so closely.

Can the CEL-231 or 254 be used for outdoor measurements?
The **CEL-231 and 254** are not designed for extended use outdoors since they are not sealed against the likely wind and rain that would spoil such measurements.

How quickly does the digital display update during measurements?
The digital display shows samples of the continuous rms sound pressure level every 1/3 of a second. This is a compromise between updating the display too quickly making it too difficult to see the

readings and being too slow for the update routine in which case the display would appear very sluggish. In a non-integrating instrument tests have shown 3 times a second to be about the optimum rate that the brain can interpret without missing valuable information.

What outputs are available from the CEL-231 and 254?

The three-pole jack socket on the bottom of the case of the CEL-231 and 254 provide both the ac and dc signals to external equipment. The ac output signal is used for connection to an audio tape recorder or spectrum analyser. The dc output is used to provide a signal to a data logger or paper chart recorder.

What are the characteristics of the ac output?

The ac signal is a conditioned signal that has been passed through the selected frequency weighting. This means that it will give either an 'A' or 'C' response signal that represents the pressure waveform at the microphone. The 'C' setting is recommended for making audio recordings since it has a better (wider and flatter) frequency response than the 'A' weighting. The signal is available on the tip and sleeve of the 3.5 mm stereo jack socket at a level of up to 7.25 V rms for full scale deflection. This means that for a sound level of 100 dB measured on the Lo range of the meter the output would be 7.25 V rms. A signal at half the range FSD would output a voltage of 3.625 V rms and so on. A signal may still be present below the minimum scale deflection but may not still be linear at such low levels.

What are the characteristics of the dc signal?

The dc signal is a more slowly varying voltage after the time weighting network in the meter. Therefore, it will represent the same signal as seen on the display. It will have the selected 'A' or 'C' frequency and either the Slow, Fast or Impulse time weighting. The signal is available on the ring and sleeve of the 3.5 mm stereo jack socket at a level of up to 6 V rms maximum starting at between 4 and 5 volts. It increases at a rate of nominally 25mV/dB for each range. A noise level of 100 dB on the Lo range would produce an output of 6 V rms while the same noise level but measured on the Lo range would produce an output of 5.125 V rms.

FAQ's: INSTRUMENT FUNCTION

What measurement ranges do the CEL-231 and 254 cover?
Both meters are equipped with two measurement ranges each covering a 70 dB dynamic span. These ranges cover the overall levels from 30 to 100 dB on the low (Lo) range setting, and levels from 65 to 135 on the high (Hi) range setting.

What results can be measured?
The **CEL-231** will measure the following parameters during the measurement run:

- The **instantaneous sound pressure level** during the run,

The **CEL-254** will measure the following parameters during the measurement run:

- The **instantaneous sound pressure level** during the run,
- The maximum RMS level or **Lmax**,
- The battery voltage **V** at any time in the run

What rms frequency weightings are available in the CEL-231 and 254?
One broadband frequency weighting is provided in the **CEL-231** for the collection of the rms noise levels – the 'A' weighting response. Two broadband frequency weightings are provided in the **CEL-254** for the collection of the rms noise levels – the 'A' and 'C' weightings according to the international standards defined in IEC-651 and ANSI S1.4. Tolerances for these weightings are as specified in the type 2 classifications of these documents. This allows the **CEL-254** to be used for measuring the NRR rating method for choosing hearing protectors against excessively high workplace noise exposure.

What time weightings are available in the CEL-231 and 254?
Both instruments are equipped with the Slow and Fast time weightings to suit all requirements for general-purpose noise measurements. In addition the **CEL-254** is equipped with the Impulse time weighting for specialized measurements that call for that response to be used. Use the Slow time response to "dampen" the readings to make it easier to see what is happening. Use the Fast response to more accurately follow the changing noise levels as they rise and fall. Use the Impulse response only when the regulations require it.

What exchange rates or Q values are available in the CEL-231 and 254?
There is no specific exchange rate available in the meters since this function is only associated with instruments that can measure the time average noise levels. Noise levels must be visually averaged by watching the digital display for the collection of noise dose results to satisfy the US Noise at Work regulations as specified in the OSHA, MSHA or DoD relevant documents.

FAQ's: ACCURACY & RESULTS

What accuracy are the instruments designed to fulfil?

The **CEL-231** and **CEL-254** instruments comply with the international standards in the type 2 classifications that classify them as general-purpose instruments. This specifies an overall expected accuracy of +/- 2 dB under normal measurement conditions. Use of the instruments as dosimeters by visually averaging fluctuating noise levels may produce wider tolerances than this depending on how well the "on time" of a notional average level is measured.

Are any results saved when using the SLM mode?

Results are not saved in either of the instruments when the SLM mode is used. This mode is intended to allow the instruments to be used as a simple sound level meter for quick hand held surveys.

FAQ's: APPLICATIONS

What markets are the instruments designed for?

There are three main markets for the **CEL-231** and **CEL-254**.

- a simple meter for monitoring noise exposure in the workplace
- a general purpose sound level meter for many environmental sources
- a short term noise meter for quick measurements on specific noise sources

How are these markets covered by the CEL-231 and 254?

When noise levels are relatively steady either meter may be successfully used to measure the sound. When more rapidly variable noise levels are encountered the **CEL-254** meter is the preferred instrument because it has the maximum hold feature that will lock on to the highest reading that occurs. The **CEL-231** is suitable for the measurement of noises from fans, pumps, compressors and other similar sources. The **CEL-254** should be used where there is a requirement to capture the worst-case situation or when compliance with a noise limit is being tested.

For more details on the **CEL-200** series, or any of the other Casella USA products, please contact us:

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