

CEL-450 Real time octave and third octave band analyzer

Introduction

The **CEL-450** is a new concept in sound level meters offering the power of digital signal processing (DSP) technology in a small lightweight unit. The instrument provides all the features of a broadband meter while simultaneously offering the ability to measure noise levels in whole or third octave bands across a wide range of frequencies that cover the whole audible range. There are 6 models in the family covering the requirements of ANSI standards in the type 1 and type 2 categories. Datalogging is provided as standard and download and control software completes the popular kits.



CEL-450 real time analyzer

Key benefits

- ❑ Single 140dB ultra-wide dynamic range
- ❑ Real time measurements in octaves from 16 Hz to 16 kHz
- ❑ Real time measurements in third octaves from 12.5 Hz to 20 kHz
- ❑ Simultaneous measurements of A, C and Z (linear) levels
- ❑ Max, min, average, peak measurements
- ❑ Q = 3, 4, 5 or 6 exchange rates available
- ❑ Data logging intervals as fast as every 10 msec per spectrum
- ❑ 999 separate runs
- ❑ Over 800,000 data points

Applications

- ❑ simple noise surveys
- ❑ industrial hygiene
- ❑ measurements for OSHA compliance
- ❑ machinery measurements
- ❑ product noise reduction
- ❑ transient event analysis
- ❑ transmission loss
- ❑ barrier investigations
- ❑ selection of correct hearing protection devices

The major benefit of the **CEL-450** is the ease with which it can make full range noise measurements in difficult situations such as those encountered with transient sources. These can include impacts, pass-by testing of vehicles, flyover tests for aircraft, shooting ranges and other similar difficult to measure noise sources. The ultra wide dynamic

range of 140 dB means that it is not necessary to worry about selecting the right range as the meter is always on the right range. Noise parameters such as the max, min, average, peak etc. can be enabled or disabled depending upon the exact requirements of the task in hand. Data log the results from 10 msec to 30 minutes to collect time history of the level changes.

Operation and use

The new **CEL-450** could not be any easier to use. It allows the operator to configure the measurements according to the most used settings and it will remember them in a non-volatile memory ready for the next time. Simply choose the appropriate frequency and time weightings and data logging interval and save them in one of four User Setup stores. A factory default Setup comes as standard with



3 broadband plus 11 full octaves shown simultaneously on screen

the most often used settings already saved. Calibrate the input using an acoustic device and the meter is ready to go. Up to 999 separate measurements can be stored and recalled or downloaded to the included dB23 software. 11 full octaves or 33 third octave spectra can be captured in real time ensuring that none of the signal is missed compared to sound level meters with switching filters.

Product Information		
Broadband measured parameters	Instantaneous level L_{xy} , maximum level L_{xymx} , minimum level L_{xymn} , average level L_{xeq} , exposure level L_{xE} , peak level L_{xpk} , average level L_{avg} , TWA, L_{Ceq} - L_{Aeq} , $L_{EP,D}$, takmaximal levels L_{tm3} & L_{tm5}	
Octave and third octave band measured parameters	Instantaneous level L_{xy} , maximum level L_{xymx} , minimum level L_{xymn} , average level L_{xeq} , peak level L_{xpk}	
Acoustic accuracy	ANSI S1.4 (R1997) type 1 and type 2, IEC 61672:2002, IEC 60651 : 1994, IEC 60804 : 2000, IEC 61260 : Class 0	
Microphone details	CEL-250 precision electret capsule for type 1 models, CEL-485 combined electret microphone and preamplifier for type 2 models	
Broadband frequency weightings	'A', 'C' and 'Z' (linear, un-weighted, all-pass level)	
Frequency response (Hz)	6.3 Hz to 30 kHz for -3 dB down points	
Octave band center frequencies	11 simultaneous bands with center frequencies 16 Hz to 16 kHz	
Third octave band frequencies	33 simultaneous bands with center frequencies 12.5 Hz to 20 kHz	
Time weightings (response)	Slow, Fast and Impulse for rms.	
Peak frequency weighting	'A', 'C' or 'Z' separate from rms. weighting	
Dynamic range for calculations	140 dB	
Noise floor (dB)	16.5 'A' weighted, 19.7 'C' weighted, 23.4 'Z' weighted	
Maximum noise level (dB)	140 dB rms., 143 dB peak (with standard 50 mV/Pa CEL-250 mic)	
Resolution (dB)	0.1 dB across whole range	
DSP sampling rate (Hz)	67,200 Hz sampling with true rms. values calculated digitally	
Histogram classwidth (dB)	143 x cells at 1 dB steps for full 140 dB range plus over-range and under-range cells (user selectable for broadband measurements)	
Memory storage capability	2 Mbytes (over 800,000 data points) 25,000 full octave spectra,	
Sampling intervals, up to 4 broadband time history profiles (user selected)	18 times from 10, 20, 50, 100, 250, 500 msec 1, 5, 10, 15, 20, 30 sec 1, 5, 10, 15, 20, 30 min	
Fixed duration for measurement	12 durations from 1, 5, 10, 15, 20, 30 min 1, 2, 4, 8, 12, 24 hour	
Calibration method	Manual or automatic set to user entered dB level, last 4 calibration details saved for review and verification of stability	
Configurations saved in memory	1 factory default plus 4 user setups saved per bandwidth	
Analog outputs	AC signal 0.5 V rms. at 94 or 114 dB FSD (plus optional log DC output 0 to 2 V for 0 to 140 dB at 14.28 mV/dB)	
Digital output	Download or remote control of operations of meter via dB23 software	
Baud rate for digital transfer	8 settings from 9600 to 115200 baud	
Screen languages	English, French, German, Italian, Spanish menu selectable	
LCD screen display	128 x 64 pixel monochrome backlit display with icon indicators	
Size	13.4 x 4 x 1.5 in (340 x 100 x 40 mm)	
Weight	19.3 oz (550 gm)	
Tripod socket	Standard camera thread (1/4 inch)	
Internal power supply	4 off AA alkaline cells (15 hours typical max battery life for broadband, 12 hours typical for narrow band measurements)	
External power supply	12 V dc at 150 mA nominal via 2.1 mm power connector	
Models available	ANSI Type 1 accuracy	ANSI Type 2 accuracy
Broadband model	CEL-450.A1	CEL-450.A2
Octave band model	CEL-450.B1	CEL-450.B2
Third octave band model	CEL-450.C1	CEL-450.C2
Measurement Kits	Specify a standard CEL-450 kit by adding /K1 after meter part #	