

CEL-400 SERIES CLASSIC SOUND LEVEL METERS

The CEL-400 series sound level meters are an ergonomic, modular interpretation of the classic integrating instrument. They are available in several combinations of functionality complying with IEC and ANSI standards, Type 1 and Type 2 accuracy grades, with choice of up to three bandwidths and two types of data collection.

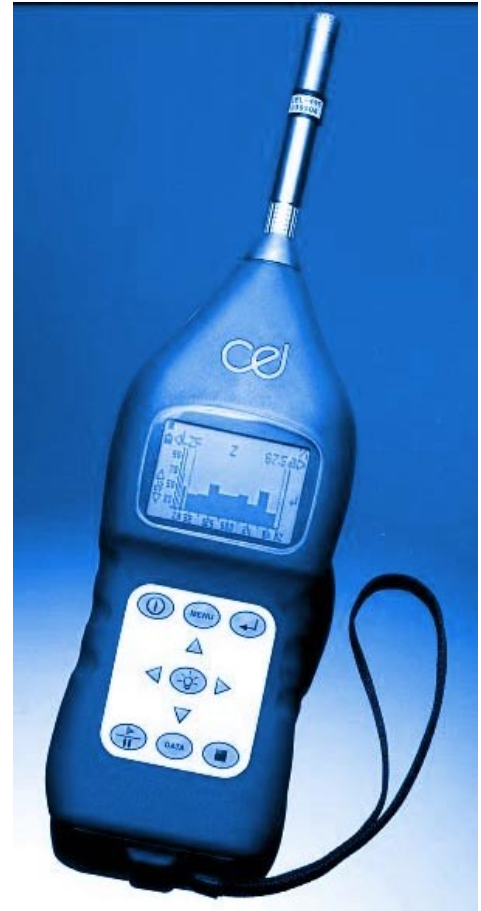
The system consists of two versions that differ in the way that results are captured. The CEL-440 provides traditional manual operation and storage of results at the end of each run while the CEL-480 is a more versatile instrument that utilises a built-in calendar clock to automate data collection for both long and short term measurements.

Main benefits

- Advanced modular technology to provide a choice of models and a clear upgrade path for future proof operation
- Choice of broad band and frequency analysis models to offer solutions for a wide range of noise problems
- Manual or automatic operation (depending on model)
- Intuitive user control with icon based keypad and graphics screen
- Multi-lingual operation
- On-board data memory to eliminate the need for hand written reports
- Download capability to printers and computers

Applications

- Product noise assessments
- Transportation noise studies
- Noise control analysis
- Noise nuisance measurements
- Industrial site boundary noise level measurements
- Sound power assessments
- Environmental surveys and audits
- Noise dose/exposure measurements



Navigation Through the Menu Screens

Operation of the instrument is accomplished using menus through which the user can move by means of navigational cursor keys. An intuitive menu structure allows the meter to be set up prior to recording. Alternatively, a pre-stored set-up can be loaded for use from memory. The chosen set-up and results can

be clearly seen on a large backlit where screen prompts guide users through the different menu screens. Measurements are stored as Runs in a large non-volatile memory in the instrument, and this data can be later recalled to the screen for review or can be directly printed or downloaded to a PC.

Set-up and Measurement Capabilities

The CEL-440 and CEL-480 instruments feature a 70 dB dynamic range, adjustable in 10 dB steps that cover a 20 to 140 dB measurement range.

They can be pre-configured with a user defined measurement set-up recalled from memory and 4 separate User Setups are available for each operating mode.

The last used set-up is available for use at the end of the start up sequence.

Each instrument is supplied complete with operational firmware in English, French, German, Italian and Spanish menu text.

All instruments measure instantaneous sound levels with Fast, Slow and Impulse time weightings, Peak, A-, C- and Z-frequency weighted levels, time-averaged levels with selectable integration coefficients Q, impulse

weighted time-averaged levels, and run time maximum and minimum sound levels. The sound exposure level L_{AE} can be measured and applied to events such as aircraft take-off or vehicle drive-by.

Up to five user-selectable statistical parameters from 0.1 to 99.9% allow both instruments to collect noise data according to many environmental standards.

Short interval profiles can be stored in the CEL-480, which also allows for the collection of $L_{EP,d}$ and TWA results based on a user selectable working day, making it ideally suited to Workplace noise applications.

A fixed run timer is also available which allows a run to be started at any time and be continued and saved after the preset time finishes. The stored data distribution is

then used to calculate statistical values and time-history data. Up to 999 separate runs can be stored in the CEL-480, each of which can contain up to 9999 records or periods of data. Over 200,000 profiles points can be stored in the CEL-480 for digital level recording applications.

Soundtrack Software for MS Windows™ 3.1, 95, 98, NT

Two software packages are available to download stored data to the computer. The standard dB21 software is provided with every CEL-440 model and the enhanced dB22 software with full graphing and recalculation capabilities is provided as standard with every CEL-480 model.

Quick Edit Features

The Quick Edit feature enables the frequency and time weightings to be easily changed without having to go into the menu structure.

	Manual Operation	Automatic Operation
Operational mode by measurement bandwidth	Cumulative run results	Cumulative run results, period run results & profiles
Broadband only	CEL-440.A	CEL-480.A
Broadband plus octaves	CEL-440.B	CEL-480.B
Broadband plus oct and 1/3 oct	CEL-440.C	CEL-480.C

Output Capabilities

Once stored in the instrument, data can be output in a variety of formats. For example, data can be sent to DAT tape recorders for long-term storage or further manipulation, or it can be output via a Centronics printer interface to give hard copy. In addition, a Windows® software package (dB21&22) are available as standard with the CEL-440 and CEL-480 for downloading completed runs to a PC where the results can be exported as an ASCII format file to a spreadsheet or word processing package.

Choosing the Right Model for Your Application

CEL sound level meter model number	Key benefits of model variant	Typical applications for this CEL sound level meter variant
CEL-480.C1	Full specification instrument including LAeq, 1/3 octave and octave band analysis, profile logging, LEP,d and TWA	Occupational hygiene surveys, environmental impact surveys, checking conformance to local ordinances (ISO 1996)
CEL-480.B1	Precision measurement of LAeq plus octave band analysis (ISO 374X)	Sound power measurement of steady noise sources
CEL-480.A1	Precision instrument with cumulative, period and profile storage of noise data	Construction site noise surveys (UK BS 5228) Transportation noise studies (US 24 hour surveys)
CEL-480.C2	Identification of tonal content of noise to allow engineering solutions	Product noise assessments
CEL-480.B2	LAeq, Lav, Lpk, Lmx plus octave band analysis	General purpose noise limit enforcement surveys
CEL-480.A2	LAeq, Lmx, LN% and Lpk measurements with profiles for time history recording	Factory site boundary surveys
CEL-440.C1	Precision LAeq measurements with 1/3 octave and octave band analysis	Product noise certification
CEL-440.B1	Precision LAeq measurements with octave band analysis	Prescribing the correct hearing protection against high levels of industrial noise
CEL-440.A1	Precision measurements of maximum sound level Lmx	Vehicle noise drive-by tests, Policing the Machinery Noise Directive/CE
CEL-440.C2	Storage of 1/3 octave and octave band spectra of Lmx and LAeq	Product noise investigation
CEL-440.B2	Lmx, Lmn, octave band analysis	General noise control, heating and ventilation surveys
CEL-440.A2	LAeq, Lav, Lmx and Lpk measurement	Front line industrial health and safety (OSHA 1910.95, ISO 1999 Noise at Work)

TECHNICAL SPECIFICATIONS

Electro-Acoustic

Applicable standards	IEC 1672 199X class 1 and 2, ANSI S1.4, DIN45657 IEC 1260 class 1
Time weightings	Slow, Fast and Impulse
Frequency weightings (RMS and peak)	A & C for rms, C & Z (lin) for peak
Amplitude weighting (Q)	3, plus one from 4, 5 6 or none
Overall measurement range	10-140 dB
Measurement ranges	70-140, 60-130, 50-120, 40-110, 30-100, 20-90, 10-80 dB
Noise floor	20 dB(A) type 1 25 dB(A) type 2 <35 dB(Z)
Broad band mode measurements	L, LAeq, LAleq, Lav, LAE, Lmx, Lmn, LTM3, LTM5, LN%, LEP,d, TWA, LZpx
Octave bands	9 bands 31.5 Hz to 8 kHz, LAeq, Lmx measured in each band
1/3 octave bands	28 bands 25 Hz to 12.5 kHz, LAeq, Lmx measured in each band
Statistical parameters	5 x LN% values, user selectable 0.1 – 99.9%

Memory Functions

Stored data	512 kB memory for 999 cumulative runs or spectral frequency scans (CEL-480, plus 9999 periods)
Fixed measurement times (CEL-480)	1, 5, 10, 15, 20, 30 mins 1, 2, 4, 8, 12, 24 hours
Interval times (CEL-480)	1, 5, 10, 15, 20, 30 secs 1, 5, 10, 15, 20, 30, 60 mins
Delay timers (CEL-480)	7 pairs of user selectable start and stop times to the nearest minute up to
Profiles (CEL-480)	31 days 23 hours 59 mins in advance Optional storage of 1 or 2 parameters of at least 200,000 samples
Profile intervals	1, 10, 60 sec profiles of Lmx, Lmn, Lpk, LAeq, Lav, LN%, LTM3, LTM5

Physical Characteristics

Display area	2100 mm ² (3.3 in ²)
Dimensions & weight	13.5 x 4 x 1.5 in / 17 oz
Battery type	4 x AA alkaline cells
Battery life	25 hours in broadband mode
External power	12 V DC at 150 mA
Tripod mounting	¼ in Whitworth camera tripod thread

ORDERING INFORMATION

Sound Level Meter Type 1	Standard CEL-440.A1 CEL-440.B1 CEL-440.C1	Datalogging CEL-480.A1 CEL-480.B1 CEL-480.C1
Sound Level Meter Type2	CEL-440.A2 CEL-440.B2 CEL-440.C2	CEL-480.A2 CEL-480.B2 CEL-480.C2

Standard kits are available that include a sound level meter with wrist strap, the matching acoustic calibrator, a foam windshield and the attaché style kit case.

Example kit for “workplace noise” measurements: Standard kit based on the CEL-440 instrument with octave band filters; specify the CEL-440.B2/K1. Kit meets all national and international specifications for type 2 accuracy sound level meters.