



## optimus red

# Sound Level Meters for Noise at Work & Occupational Noise Measurements



The **optimus red** sound level meters use the very latest digital technology and industrial design to give you the ideal instrument for Occupational and Industrial Hygiene noise measurements.

### Applications

- Occupational & Industrial Hygiene Noise Evaluations
- Noise at Work Surveys & Noise Exposure Calculations
- Hearing Protector Selection using HML or Octave Band Methods
- Machinery Noise Tests
- Noise Ordinance & Community Noise Assessments
- General Noise Measurements

### Key Features

- Simple operation with an ergonomic design
- Simultaneous measurement of all workplace noise parameters with additional two "virtual" noise meters
- VoiceTag™ note recording
- AuditStore™ measurement verification
- Latest digital technology with a high resolution colour OLED display and back-lit keypad
- Measure up to 140dB(A) and 143dB(C) Peak with a single measurement range
- Real-time 1:1 Octave Band Filters
- NR & NC values & curves on screen
- Pause & Back Erase as standard
- Very large 4GB memory which can store over 10,000 measurements
- Long battery life
- Measure up to 170dB with the optional MV:200EH microphone system

For Occupational Noise and Industrial Hygiene, measuring the noise exposure of employees quickly and reliably is essential. The optimus red sound level meters are the ideal instrument for these applications with a clear, high resolution OLED colour screen, a wide 120dB measurement span (up to 140dB(A) and 143dB(C) Peak) and simultaneous measurement of all available parameters.

There's no setup or complicated configuration needed. Just switch on, calibrate and press start.

It's that simple.

### VoiceTag audio recording

Before each measurement is made, you can record a VoiceTag by simply speaking into the microphone.

You can record notes about the measurement location, describe what is being measured or simply store information that may be useful at a later date.

### The ideal instrument for any application

With two additional "virtual" noise meters running at the same time, you can meet any noise regulation, guideline or standard.

Whether you need to meet the UK and EU Regulations, measure to OSHA HC & PEL, MSHA, ACGIH or any other regulation, an **optimus red** is the ideal instrument.

**AuditStore™**  
Data verification for your noise measurements

**VoiceTag™**  
Audio note recording

## Simple operation with advanced technology

The **optimus** sound level meters have been designed with ease of use as the most important feature which lets you get on with measuring and controlling the noise.

The instruments use the very latest in digital technology and industrial design techniques to make everything as clear and simple as possible.

The high resolution colour OLED screen can be seen in any conditions, and the keypad illuminates automatically in low light.

The case is robust and covered with a tactile finish so it can be used even if

you're wearing gloves.

The measurement data is displayed in a clear and simple format along with a real-time noise chart so that you can see how the noise varies with time.

All of the functions of the instrument are measured simultaneously, and with a wide 120dB measurement span you don't need to worry about choosing the right range. An **optimus** can measure up to 140dB(A) and 143dB(C) Peak in this single range.

Just switch on, calibrate and you are ready to go.

## The ideal solution for occupational noise

The **optimus red** sound level meters are the ideal sound instruments for occupational noise and industrial hygiene measurements, as well as for basic noise surveys, and will give you all of the information you need, right at your finger tips.

### UK & EU Noise at Work Regulations

If you are working to the UK Control of Noise at Work Regulations or the EU Physical Agents (Noise) Directive, the Leq View gives you the information that you need.

The  $L_{Aeq}$  and  $L_{CPeak}$  values are measured at the same time which allow the  $L_{EP,d}$  ( $L_{EX,8h}$ ) and the Peak Action Levels to be determined.

The  $L_{Ceq}-L_{Aeq}$  (C-A) value is also measured which can be used to select PPE using the HML method.  $L_{AE}$  is also measured along with  $L_{ZPeak}$  for regulations that use this rather than  $L_{CPeak}$ .

### OSHA,MSHA & other regulations

If you need to meet regulations such as OSHA HC & NC, MSHA HC or ACGIH, the two "virtual" noise meters in the Dose View can be quickly configured to provide you with this information.

The Quick Setup gives access to a number of preset functions including OSHA HC & NC, OSHA HC & ACGIH and MSHA HC & EC.

The custom settings can be used to choose any other setup or configuration that you may need.

Once you've chosen the setup needed it will be stored so each time you use the meter you will have the information you need.

For the two "virtual" noise meters, the  $L_{AVG}$ , TWA, % Dose and Estimated % Dose are displayed.

### Octave Band Filters for Noise Control & Selecting Hearing Protection

The CR:162C and CR:161C instruments also feature real-time octave band filters which will measure the noise in 10 different frequency bands.

The octave band measurement is made at the same time as the other measurements and includes the overall level in each band along with a time history of the bands across the measurement period.

### NR & NC values & curves on screen

The D variants add NR & NC values and curves to the 1:1 octave band measurements.

This information can be useful in checking the performance of HVAC systems and noise levels in rooms.

### Basic noise level measurements

The **optimus red** instruments can also be used for basic noise measurements where the Sound Level is required, such as community and noise ordinance enforcement and testing of fire and emergency alarms.



### Class 1 & Class 2 performance

Where precision measurements are needed, Class/Type 1 instruments are available as well as the General Purpose Class/Type 2 instruments.

### Data logging & PC download

If there is a need to record and download measurements to a PC, data logging is available with the B, C & D version instruments.

These units are supplied with the NoiseTools software and a USB data cable to allow the measurement information to be downloaded.

# NoiseTools Software

The NoiseTools software package gives you a quick and simple way to download, analyse and report your noise measurement information.

The initial summary screen shows you the most commonly used information and, through simple icons, gives you access to the detailed measurement data. You can simply print the summary screen to get a quick measurement report.

For advanced users, each and every function measured by the instrument is available for review and analysis and the data can be exported for further use.

VoiceTag audio recordings can be played back for reference and are automatically stored with the measurement data. Where Octave Band data is available, this information can be used by the program to calculate the level of protection from a range of hearing defenders and ear plugs.

To help you keep your noise measurement data organised and easy to find, NoiseTools allows each measurement to be allocated to people, places and projects.



# Instrument Range & Measurement Kits

The **optimus red** comprises the A, B, C and D variants, each of which can be specified as either Class 1 or Class 2. All of the instruments can measure Sound Level functions plus Lmax and Lmin with all frequency and time weightings.

The A versions measure the Integrated noise levels such as Leq and LAE, C-A, Peak Sound Pressure and the virtual noise meters for OSHA/MSHA/ACGIH.

The B versions provide the same functions as above but with the addition of **Data Logging** so that measurements can be downloaded to the NoiseTools software. The VoiceTag audio recording is available on the B versions.

The C versions add **Real Time Octave Band Filters** to the functions of the B versions which can be used for the selection of hearing protection.

The D variants add NR & NC values and curves directly on the instrument display.

Specifications and a selection chart are available on the following page.



Measurements can be sorted or grouped by any parameter, person, place or project and measurement reports created quickly and easily.

NoiseTools is supplied free from any licensing restrictions or limits allowing you to install the program on as many PC's as needed at no additional cost.

# AuditStore data verification

AuditStore™ is a new technology that helps you to ensure that your noise measurement data is valid and trustworthy. AuditStore allows the user to verify measurements that have been downloaded to the NoiseTools software against a secure data store within the instrument.

Each time you make a measurement with your optimus, a selection of the overall data is stored into a separate, secure memory that is independent of the main memory card.

This data contains essential information about the measurement such as the time, date and duration, the  $L_{Aeq}$ , Peak(C) and  $L_{AFmax}$ ,  $L_{A10}$  &  $L_{A90}$  (where available) and the overload indication.

In addition to the noise measurement data, information about the last calibration is also stored.



The AuditStore data can be downloaded from the instrument when required and then the measurements can be checked against the AuditStore.

The NoiseTools software will check that the measurement information held in the main database and displayed on the screen matches the values within the AuditStore secure memory.

NoiseTools will display verification symbols if the information matches, a unique feature which will be useful in any legal proceedings.

Complete measurement kits are available for the **optimus** instruments which contain the instrument, an acoustic calibrator, windshield, cables, batteries and accessories. The measurement kits contain all of the accessories needed to carry out a noise survey.



# Specifications

<p><b>Applicable Standards</b> IEC 61672-1:2002 Class 1 or Class 2 Group X IEC 60651:2001 Type 1 I or Type 2 I IEC 60804:2000 Type 1 or Type 2 IEC 61252:1993 Personal Sound Exposure Meters ANSI S1.4 - 1983 (R2006), ANSI S1.43 - 1997 (R2007) ANSI S1.25:1991 1:1 Octave Band Filters to IEC 61260 &amp; ANSI S1.11-2004 (C &amp; D variants)</p> <p><b>Microphone</b> Class 1 MK:224 pre-polarized, Class 2 MK:216 pre-polarized</p> <p><b>Microphone Preamplifier</b> MV200 Removable Preamplifier</p> <p><b>Total Measurement Range:</b> 20dB to 140dB RMS Single Range Noise Floor: &lt;18dB(A) Class 1, &lt;21dB(A) Class 2</p> <p><b>Frequency Weightings</b> RMS &amp; Peak: A, C, &amp; Z Measured Simultaneously Frequency Bands: 10 Octave Bands (31.5Hz to 16kHz, C &amp; D variants)</p> <p><b>Time Weightings</b> Fast, Slow &amp; Impulse Measured Simultaneously</p> <p><b>Display</b> High resolution OLED display. Ambient light sensor &amp; illuminated keypad</p> <p><b>Memory</b> 4GB (B, C &amp; D Versions), 32GB factory fit option</p> <p><b>Audit Store</b> Measurement verification data stored in secure memory</p> <p><b>Time History Data Rates (Global settings)</b> 10ms, 62.5ms, 125ms, 250ms, 1/2 sec, 1 sec, 2 sec (User selectable)</p> <p><b>Voice Tag Audio Recording (B, C &amp; D Versions)</b> Up to 30 seconds of audio notes with each measurement</p> <p><b>Integrators</b> Three simultaneous "virtual" noise meters. Integrator 1 is preset to Q3 for Leq functions. Integrators 2 &amp; 3 can be configured with the following: Exchange Rate: 3, 4 or 5 dB Threshold: 70dB to 120dB (1 dB steps) Time Weighting: None or Slow Criterion Level: 70dB to 120dB (1 dB steps) Criterion Time: 1 to 12 hours in 1 hour steps</p> <p><b>Integrator Quick settings</b> EU, OSHAHC &amp; OSHANC, OSHAHC &amp; ACGIH, MSHAHC &amp; MSHAEC, Custom 1 &amp; Custom 2</p>	<p><b>Measurement control</b> Pause &amp; Back Erase with user selectable duration</p> <p><b>Dimensions</b> Size: 283mm x 65mm x 30mm Weight: 300gms/10oz</p> <p><b>Batteries</b> 4 x AA Alkaline</p> <p><b>Battery life</b> Typically 12 hours with Alkaline AA Typically 20 hours with Lithium AA Non-Rechargeable Battery life is dependent upon the battery type and quality &amp; screen brightness</p> <p><b>Connections</b> USB Type B to PC AC &amp; DC Output via ZL:174 (2 x Phono, 1m) Multi-pin I/O for external power via ZL:171 cable (2.1mm socket) External Power: 5v-15v via Multi I/O socket via ZL:171 cable (2.1mm socket)</p> <p><b>Tripod Mount</b> 1/4" Whitworth socket</p> <p><b>Case</b> Material: High Impact ABS-PC with soft touch back &amp; keypad</p> <p><b>Environmental</b> Temperature: -10°C to +50°C, Storage -20°C to +60°C Humidity: to 95% RH Non Condensing</p> <p><b>Electromagnetic performance</b> IEC 61672-1:2002 &amp; IEC 61672-2:2003 Except where modified by EN 61000-6-1:2007 &amp; EN 61000-6-1:2007</p> <p><b>Language options</b> English, French, German, Spanish. Other language options may be available</p> <p><b>Software Support</b> NoiseTools Download, Configuration &amp; Analysis software supplied as standard. Compatible with Microsoft Windows XP, Vista &amp; 7 (32bit &amp; 64bit)</p> <p><b>Measurement Functions</b> CR:162A &amp; CR:161A Displayed Functions <math>L_{xy}</math>, <math>L_{XYMax}</math>, <math>L_{XYMin}</math>, <math>L_{Xeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{Ceq}</math>, <math>L_{Aeq}</math>, <math>L_{XE}</math> Graph of Short <math>L_{Aeq}</math>, <math>L_{CPeak}</math> Integrators 2 &amp; 3: TWA, Dose%, Est Dose% Measurement Run Time</p> <p><b>CR:162B &amp; CR:161B</b> Displayed Functions <math>L_{xy}</math>, <math>L_{XYMax}</math>, <math>L_{XYMin}</math>, <math>L_{Xeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{Ceq}</math>, <math>L_{Aeq}</math>, <math>L_{YE}</math>, <math>L_{Aeq}</math> Graph of Short <math>L_{Aeq}</math>, <math>L_{CPeak}</math></p>	<p><b>Measurement Run Time</b> Integrators 2 &amp; 3: TWA, Dose%, Est Dose%</p> <p><b>Stored Functions</b> <math>L_{XYMax}</math> &amp; Time History of <math>L_{XYMax}</math> <math>L_{Aeq}</math>, <math>L_{Ceq}</math>, <math>L_{Zeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{APeak}</math> Time History of <math>L_{Aeq}</math>, <math>L_{Ceq}</math>, <math>L_{Zeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{APeak}</math>, <math>L_{Aeq}</math> Integrators 2 &amp; 3: <math>L_{AVG}</math>, TWA, %Dose Time History of <math>L_{AVG}</math></p> <p><b>CR:162C &amp; CR:161C</b> Displayed Functions <math>L_{xy}</math>, <math>L_{XYMax}</math>, <math>L_{XYMin}</math>, <math>L_{Xeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{Ceq}</math>, <math>L_{Aeq}</math>, <math>L_{XE}</math>, <math>L_{Aeq}</math> Graph of Short <math>L_{Aeq}</math>, <math>L_{CPeak}</math> Measurement Run Time Integrators 2 &amp; 3: TWA, Dose%, Est Dose% Real-Time Octave Band Filters</p> <p><b>Stored Functions</b> <math>L_{XYMax}</math> &amp; Time History of <math>L_{XYMax}</math> <math>L_{Aeq}</math>, <math>L_{Ceq}</math>, <math>L_{Zeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{APeak}</math> Time History of <math>L_{Aeq}</math>, <math>L_{Ceq}</math>, <math>L_{Zeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{APeak}</math>, <math>L_{Aeq}</math> Integrators 2 &amp; 3: <math>L_{AVG}</math>, TWA, %Dose Time History of <math>L_{AVG}</math> Octave Bands: Overall <math>L_{eq}</math> &amp; <math>L_{eq}</math> Time History for each band Measurement Run Time Time &amp; Date of Measurement Start</p> <p><b>CR:162D &amp; CR:161D</b> Displayed Functions <math>L_{xy}</math>, <math>L_{XYMax}</math>, <math>L_{XYMin}</math>, <math>L_{Xeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{Ceq}</math>, <math>L_{Aeq}</math>, <math>L_{YE}</math>, <math>L_{Aeq}</math> Graph of Short <math>L_{Aeq}</math>, <math>L_{CPeak}</math> Measurement Run Time Integrators 2 &amp; 3: TWA, Dose%, Est Dose% Real-Time Octave Band Filters NR &amp; NC values &amp; curves</p> <p><b>Stored Functions</b> <math>L_{XYMax}</math> &amp; Time History of <math>L_{XYMax}</math> <math>L_{Aeq}</math>, <math>L_{Ceq}</math>, <math>L_{Zeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{APeak}</math> Time History of <math>L_{Aeq}</math>, <math>L_{Ceq}</math>, <math>L_{Zeq}</math>, <math>L_{CPeak}</math>, <math>L_{ZPeak}</math>, <math>L_{APeak}</math>, <math>L_{Aeq}</math> Integrators 2 &amp; 3: <math>L_{AVG}</math>, TWA, %Dose Time History of <math>L_{AVG}</math> Octave Bands: Overall <math>L_{eq}</math> &amp; <math>L_{eq}</math> Time History for each band NR &amp; NC values &amp; curves Measurement Run Time Time &amp; Date of Measurement Start</p> <p>where x=A, C, Z; y=F, S, I Other functions may be calculated by the NoiseTools software and displayed on download.</p> <p><b>Notes</b> 1. For details of the displayed and stored parameters, please refer to the optimum user manual. All specifications, features and values are typical and are subject to change without notice.</p>
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# Instrument Selection

Function/Instrument	Class 1	Class 2	Sound Level Functions	Leq/Peak Functions	TWA/Dose Functions	Data Logging	Pause & Back Erase	Audit Store	Voice Tag Note Recording	1:1 Octave Band Filters	NR & NC Curves on screen	Software Support	Measurement Kit
CR:162A		✓	✓	✓	✓	✓	✓						CK:162A
CR:161A	✓		✓	✓	✓	✓	✓						CK:161A
CR:162B		✓	✓	✓	✓	✓	✓	✓	✓			✓	CK:162B
CR:161B	✓		✓	✓	✓	✓	✓	✓	✓			✓	CK:161B
CR:162C		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	CK:162C
CR:161C	✓		✓	✓	✓	✓	✓	✓	✓			✓	CK:161C
CR:162D		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	CK:162D
CR:161D	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	CK:161D

**Standard Accessories**  
The optimum sound level meters are supplied, as standard, with the following accessories:  
User Manual  
Certificate of Calibration  
USB Data/Power Cable  
Windshield  
NoiseTools Software CD (Requires B, C or D Version to download measurements)

**Measurement Kits**  
The optimum sound level meters are available as a complete measurement kit with the following accessories:  
optimum Sound Level Meter  
CR:514 Class 2 or CR:515 Class 1 Acoustic Calibrator  
UA:237 90mm Windshield  
CK:300 Carrying Case  
User Manual & Certificates of Calibration  
USB Data/Power Cable & NoiseTools Software CD (Requires B or C Version to download measurements)



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cr16x/05/12/r4EN



ISO 14001:2004  
EMS 552104

ISO 9001:2008  
FM 531001

