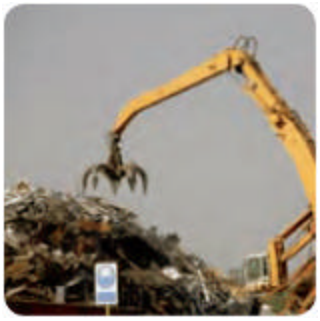
CR800C

Sound Level Meters



CR800C

Key Features

> Ideal for both Occupational and Environmental noise measurements
> Complies with the latest IEC 61672 standard as well as IEC 60651, IEC 60804 and ANSI S1.4
> Available with Class 1 or Class 2 accuracy
> Options of 1:1 and 1:3 Octave Band Filters
> 1:1 Octave Band Filters to help in the selection of hearing protection using the Deaf Defier software
> 1:3 Octave Band Filters for environmental noise measurements and tonal analysis
> Data Logging of up to 1,300 measurements, allowing for example over 12 days of 15 minute measurements, ideal for environmental noise measurements
> USB data download to the Deaf Defier software
> Deaf Defier software supplied as standard to provide measurement reports, analysis and presentation with free online updates.
> AC Output for use with external analysis and recording equipment
> Outdoor measurement kits available for unattended environmental noise monitoring with optional remote access via GSM Modem

The CR800C Series is a range of high performance Sound Level Meters that provide the functions and features demanded by modern measurement standards and guidelines, while being designed specifically for ease of use.

From Noise at Work Risk Assessments to Vehicle Noise Testing to Environmental Noise Measurements, the CR800C Series provides a solution.

Data logging of the measured parameters is standard, and up to 12 days of data can be stored. The Deaf Defier software, which is supplied as standard, allows this measurement data to be downloaded, assessed and measurement reports created.

Available with Class 1 or Class 2 accuracy along with the options of 1:1 & 1:3 Octave Band Filters, there is an instrument to meet your noise measurement needs.

A range of accessories are available to complement the CR800C series including outdoor measurement kits, power supplies, microphone extension cables and software.

The instruments have been designed to be simple to use whilst meeting all of the latest Standards for Sound Level Meters.

Reliable, accurate and affordable, the CR800C Series includes the ideal instruments for your noise measurement applications.

Occupational Noise Measurement



- > Simultaneous measurement of LAF, LAeq, LAFmax and LCpeak
- > Time history of noise levels
- > Risk Assessment of Workplace Noise Levels
- > Ideal for noise measurements in accordance with the Noise at Work Regulations and EU Directive 2003/10/EC
- > Measurements for the selection of hearing protection with CR822C & CR821C using 1:1 Octave Band Filters as well as with the CR832C & CR831C instruments
- > Calculate Noise Exposures and create measurement reports with the Deaf Defier Software

All Noise at Work regulations require the assessment of the potential risk of hearing damage to employees, and the CR800C series provides the essential parameters needed to comply with these measurement standards and guidelines, such as Leq, LEP,d (LEX,8h) and LCPeak.

Where the noise levels are above the limits set by occupational noise regulations such as the Control of Noise at Work Regulations in the UK, the provision of effective noise control measures and hearing protection are often required.

All of the CR800C series, with the exception of the basic CR811C and CR812C units, can provide 1:1 Octave Band measurements, allowing the instrument to be used to determine the frequency content of the noise, and therefore to assist in the provision of a cost-effective solution.

The Deaf Defier3 software includes a database of hearing defender products (PPE) which is used to provide a quick and reliable solution to the selection of appropriate protection.

Environmental Noise Measurement



- > Boundary noise measurements
- > External noise impact assessments
- > Machinery noise testing
- > Motor-sport noise measurements
- > Entertainment noise

For Environmental Noise measurements, the measurements required differ from those for Occupational Noise, and all of the CR800C instruments provide these parameters as standard.

The measurement of Lmax, Lmin, and five Ln values (such as L10, L90 and L95) in addition to the Leq provide the measurement functions needed to comply with measurement standards, regulations and guidelines .

The Time History data stored by the instrument is often vital in the assessment of environmental noise, allowing the CR800C series to be used where a standard Sound Level Meter would not provide sufficient detail of the noise climate. The environmental impact of an operation or location can be assessed using this additional data. Up to 12 days of 1 second Time History data can be stored.

The CR831C and CR832C instruments can also provide 1:1 and 1:3 Octave Band filters, allowing the instruments to be used to identify and control noise sources that include distinct tones, which often cause complaints, even when the overall noise levels are low.

If noise measurements are to be made outdoors, there is a risk that the sound level meter may be affected by rain and wind. The Outdoor noise measurement kits protect the sound level meter and microphone and provide power to the sound level meter thus allowing noise measurements to be made in all weather conditions.

Noise measurement data can also be downloaded remotely if the GSM Cellular Modem option is fitted to the outdoor measurement kit.

Occupational Noise Instrument Selection

	Class 1	Class 2	LAeq	Peak(C)	LEP,d (LEX,8h)	1:1 Octave Band Filters	Software
CR812C		✓	✓	✓	✓		✓
CR811C	✓		✓	✓	✓		✓
CR822C		✓	✓	✓	✓	✓	✓
CR821C	✓		✓	✓	✓	✓	✓
CR832C		✓	✓	✓	✓	✓	✓
CR831C	✓		✓	✓	✓	✓	✓
CR813C	✓		✓				✓

Environmental Noise Instrument Selection

	Class 1	Class 2	LAeq	Lmax	Ln values	Data Logging	Software	Outdoor Kit
CR812C		✓	✓	✓	✓	✓	✓	
CR811C	✓		✓	✓	✓	✓	✓	✓
CR822C		✓	✓	✓	✓	✓	✓	
CR821C	✓		✓	✓	✓	✓	✓	✓
CR832C		✓	✓	✓	✓	✓	✓	
CR831C	✓		✓	✓	✓	✓	✓	✓
CR813C	✓		✓	✓	✓	✓	✓	✓

General Noise Measurements



> R&D noise measurements
> Production line noise testing
> Quality control
> Sound power measurements
> Fire alarm testing

The CR800C series can be used in a wide range of general noise measurement applications.

The provision of Lmax allows the instruments to be used for the measurement of vehicle noise levels.

Optional microphone extension cables enable the microphone and preamplifier to be located away from the Sound Level Meter allowing measurements to be taken in confined areas and in situations where interference from the operator would affect the validity of the data. Product development and testing is an application where this feature is often essential.

All of the CR800C instruments can provide an un-weighted AC output which can be used in conjunction with other noise measurement equipment and recording systems. This allows the units to be used for both general purpose noise measurements as well as more advanced applications.

General Noise Measurement Instrument Selection

	Class 1	Class 2	LAeq	Lmax	Data Logging	Software Support	Microphone Cables
CR812C		✓	✓	✓	✓	✓	
CR811C	✓		✓	✓	✓	✓	✓
CR822C		✓	✓	✓	✓	✓	
CR821C	✓		✓	✓	✓	✓	✓
CR832C		✓	✓	✓	✓	✓	
CR831C	✓		✓	✓	✓	✓	✓
CR813C	✓		✓	✓	✓	✓	✓

Measurements

The CR800C series measure two different types of data, Broadband and Frequency.

The Frequency data can be 1:1 Octave or 1:3 Octave depending upon the configuration of the instrument. In addition to the measured data, the instrument stores calibration records for later download.

Broadband Measurements

The standard parameters stored by all of the CR800C series include Leq , Lmax , Lmin, LCPeak, LE and 5 Ln values. In addition to these standard measurements, the instrument can be configured to store LIeq or LFTeq in place of LE.

The duration of the measurement can be either open-ended, selected from a preset list or defined by the user as required, and the measurements can also be set to automatically repeat a specified number of times.

This function is essential for environmental noise applications where the required measurement duration may be 15 minutes repeating over a 24 hour period.

Time History

When making a Broadband measurement, the instrument automatically stores a noise profile, or Time History, with the measurement. This information is stored as a 1 second Short Leq.

Over 12 days of Time History data can be stored, allowing the CR800C series to be used for logging long periods of data.

This information can be used, for example, to analyse noise events and to identify individual noise sources, such as aircraft. When this data is downloaded into the Deaf Defier software, measurement reports can be created to display both the overall data and the Time History information.

Frequency Analysis

When fitted with the 1:1 or 1:3 Octave Band filters, the CR800C series can provide a sequential sweep through the filter bands, with a minimum duration of 1 minute for the 1:1 Octave Band filters and 3 minutes for the 1:3 Octave Band filters. The sweep can be automatic or manual as required.

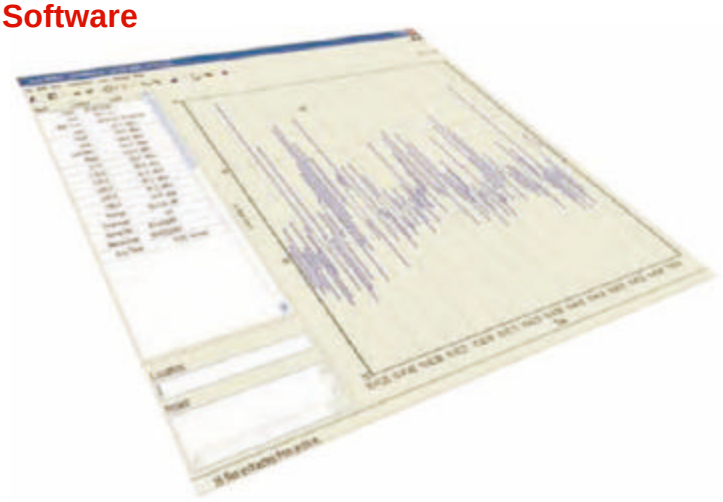
The 1:1 Octave Band filters cover the range of 31Hz to 16kHz, and the 1:3 Octave Band filters cover 25Hz to 16kHz.

The MO800/6 option can be fitted to the 1:3 Octave Band filter to add a 20Hz and 20kHz filter band to the existing 1:3 Filter Bands.



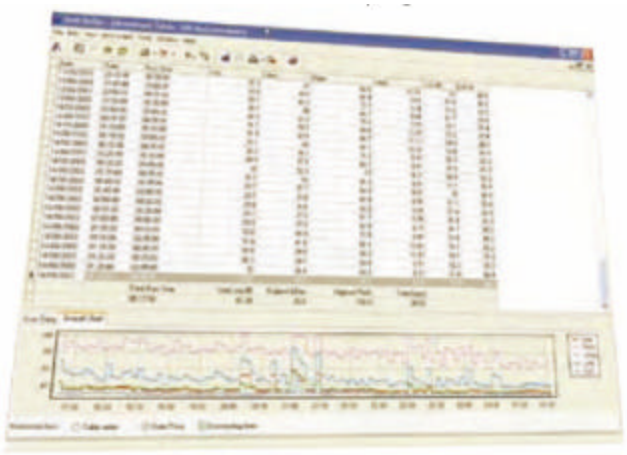



Software



All versions of the CR800C are supplied with the Deaf Defier software program which provides the following functions:

> Download Data from a CR800C series Sound Level Meter
> Store measurements in folders to organise data
> Produce measurement reports and present data
> Enter comments, locations and notes for each measurement
> Display measurements individually or grouped in a tabular format
> Select Hearing Protection (where 1:1 Octave Band measurements are available)
> Calculate NR & NC figures (where 1:1 Octave Band data is available)
> Print and export measurements
> Export measurement data for use in other programs



Broadband Measurements

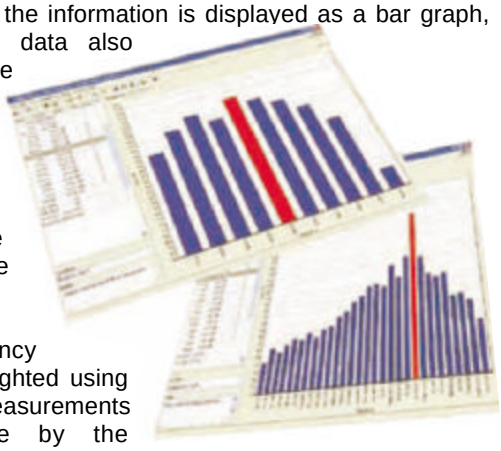
Broadband measurements are displayed in both a tabular and graphical format. The numerical values for the measurement are clearly listed and include the time, date, duration and measurement range along with the Time and Frequency weightings used for each parameter.

Where the data has been downloaded, the Time History graph is also shown. A zoom function is provided to allow sections of the graph to be viewed in more detail. Cursors can be placed on the graph and the software will calculate the Leq between and outside of these markers.

Measurements can be printed or copied to other programs for additional reporting. All data from a Broadband measurement can be exported in a wide range of formats for use in other applications.

Frequency Measurements

For Frequency measurements made using either the 1:1 or 1:3 Octave Band filters, the information is displayed as a bar graph, with the numerical data also shown for reference along with the measurement time, date and duration. Comments and notes can also be entered for future reference.



Individual Frequency bands can be highlighted using the cursor. The measurements are always made by the CR800C series using the Z Frequency Weighting, but if required, the A and C Frequency Weightings can be displayed.

The software can also calculate and display NR and NC values and curves from 1:1 Octave Band data.

Hearing Protector Selector

Where 1:1 Octave Band measurements are available, the Deaf Defier software can calculate the assumed protection from a range of Hearing Protector products such as Ear Plugs and Hearing Defenders.

The calculations are made using the frequency data from the measurement, and the resulting information can be printed or exported for later reference. The results can also be filtered to remove, for example, products that do not reduce the noise level at the ear to below 85dB(A).

The calculation can also include a +4dB “Real World” factor to take account of the loss of protection when PPE is not worn correctly.

Updates for the Deaf Defier program and the Hearing Protector database can be freely downloaded online.

Measurement Reports

The Deaf Defier software contains a number of simple, preformatted measurement reports that can be used to present measurement data.

Information about the measurement, such as the location, time, date and comments, can be entered along with details of the calibration of the sound level meter.

When the report is complete, the information can be printed or exported in a range of formats including PDF, Microsoft Excel or Microsoft Word.

Sound Level Meter Measurement Kits

The CR800C series can be supplied in a measurement kits which include all of the accessories required to operate the instrument.

A measurement kit is the recommended way to purchase a Sound Level Meter as it also contains a suitable Acoustic Calibrator. All noise measurement equipment should be calibrated regularly to ensure that it is operating and measuring correctly.

The standard measurement kit includes the following components:

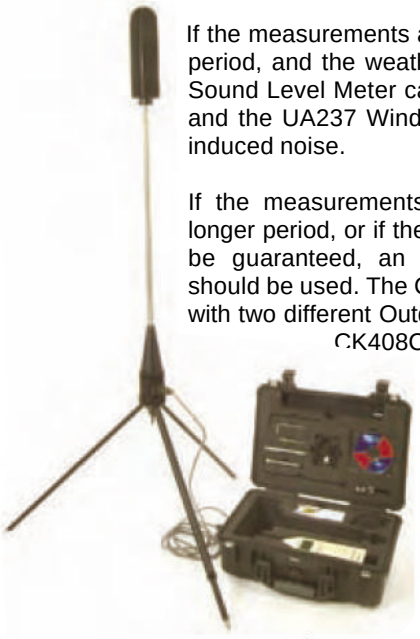
- CR515 or CR514 Acoustic Calibrator
- UA237 Windshield (90mm)
- CK250 Carrying Case
- Deaf Defier Software
- USB Data Cable
- Operating Manuals
- Certificates of Calibration
- Batteries

The measurement kits for the the Class 1 Sound Level Meters (CR811C, CR813C, CR821C & CR831C) are supplied with the Class 1 CR515 Acoustic Calibrator. The Class 2 Sound Level Meters (CR812C, CR822C and CR832C) are supplied with the CR514 Class 2 Acoustic Calibrator.

The CK250 Carrying Case can also hold a microphone extension cable and protects the Sound Level Meter and Acoustic Calibrator from damage during transit and storage.

Weatherproof Outdoor Measurement Kits

Where measurements are to be made outdoors, the Sound Level Meter should be protected from rain and wind.



CK:408C Heavy Duty Outdoor Measurement Kit

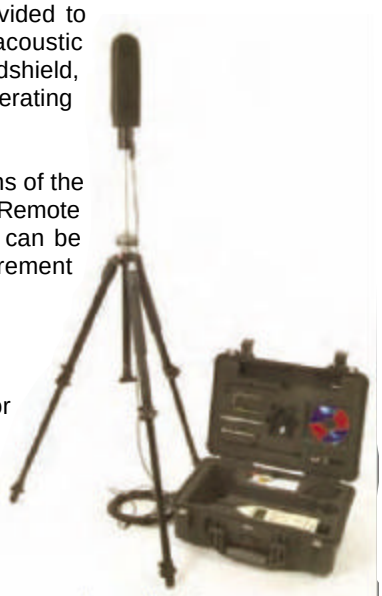
If the measurements are to be made over a short period, and the weather conditions are fine, the Sound Level Meter can be mounted on a tripod, and the UA237 Windshield used to reduce wind induced noise.

If the measurements are to be made over a longer period, or if the weather conditions cannot be guaranteed, an Outdoor Measurement Kit should be used. The CR800C series can be used with two different Outdoor Measurement Kits, the CK408C and CK508C.

Both of these kits provide a secure, weatherproof enclosure for the Sound Level Meter and the microphone as well as a rechargeable battery pack to power the sound level meter.

The CK508C Lightweight Outdoor Kit has been designed to be used for short term measurements, such as overnight, whilst the CK408C Outdoor Kit has been designed for longer term use.

The Weatherproof case used for both of the outdoor measurement kits contains the same accessories included in the standard measurement kit. Space is provided to hold a sound level meter, acoustic calibrator, a standard 90mm windshield, software CD, batteries and operating manuals.



CK:508C Lightweight Outdoor Measurement Kit shown with the optional CT:3 Tripod

Please note that Class 2 versions of the CR800C require the MO800/5 Remote Preamplifier option before they can be used with the Outdoor Measurement Kits.

GSM Cellular Modem Option

In situations where an outdoor measurement kit is used, it is often useful to be able to access the measurement data stored by the instrument from a remote location.

To allow for this, the outdoor measurement kits can be fitted with a GSM Cellular Modem. When this option is fitted, the Deaf Defier software can connect to the sound level meter and download measurement data over a GSM network. External power can be connected to the outdoor kit to allow the instrument to run for longer periods.

Safety Officer's Noise Measurement Kits

The CR800C Sound Level Meters are also available as part of a Safety Officer's Noise Measurement Kit.

These kits provide a complete noise measurement solution and include a sound level meter along with a number of the Cirrus doseBadge Personal Noise Dosemeters.

The sound level meter can be selected from any of the CR800C range to meet the needs of the user. The doseBadge units can be either the standard CR110A instruments or the Intrinsically Safe CR110AIS units.

The unique combination of a CR800C Series sound level meter and the doseBadge personal noise dosemeter allows almost any noise measurement situation to be covered.

Specifications

Applicable Standards
IEC 61672-1:2002 Class 1 or 2 Group X
IEC 60651:2001 Type 1 or Type 2 - IEC 60804:2000 Type 1 or Type 2
ANSI S1.4 with NK70 Random Incidence Adaptor
1:1 & 1:3 Octave Filters to IEC 61260 Class1 (where fitted)

Microphone
Class 1 Instruments MK224 pre-polarized Free-field 1/2" Condenser
Class 2 Instruments MK216 pre-polarized Free-field 1/2" Condenser
Random Incidence to ANSI S1.4 with NK70 Adaptor

Microphone Preamplifier
Class 1 Instruments MV200D Removable Preamplifier
Class 2 Instruments MV200D Integral Preamplifier

Time Weighting
'F' (Fast), 'S' (Slow) & 'I' (Impulse) to IEC61672-1:2002 Class 1 or 2

Frequency Weighting
Channel 1 'A', 'C'or 'Z' - Channel 2 'C' for Peak
Z weighting is a flat frequency response of 8Hz-20kHz ±1.5dB

Measurement Range (Typical)

Broadband	21dB(A) to 140dB(A) Class1
	25dB(A) to 140dB(A) Class2
	143dB© Peak (70 to 140dB Range)
1:1 Octave Band Filters	19dB(Z) to 140dB(Z)
1:3 OctaveBandFilters	14dB(Z) to 140dB(Z)

Noise Floor (Typical)

Broadband	18dB(A) Type1, 20dB(A) Type2
1:1 Octave Band Filters	12dB(Z) @ 1kHz
1:3 Octave Band Filters	7dB(Z) @ 1kHz

Available Measurements
The following metrics can be displayed and stored:

Broadband Mode
L_{Aeq}, L_{Ceq}, or L_{zeq}
L_{CPeak}
L_{AF}, L_{AS}, L_{AI}, L_{CF}, L_{CS}, L_{CI}, L_{ZF}, L_{ZS} or L_{ZI} (not stored)
L_{AFmax}, L_{ASmax}, L_{AImax}, L_{CFmax}, L_{CSmax}, L_{CImax}, L_{ZFmax}, L_{ZSmax} or L_{ZImax}
L_{AFmin}, L_{ASmin}, L_{AImin}, L_{CFmin}, L_{CSmin}, L_{CImin}, L_{ZFmin}, L_{ZSmin}, L_{ZImin}
L_{AE}, L_{CE}, or L_{ZE}, L_{Aleq}, L_{Cleq}, or L_{Zleq}, L_{AFTeq}
$L_{0.1}$ to $L_{99.9}$ (five simultaneous user-selected values available)
Date and time, 1 second Short L_{eq} NoiseProfile (L_{Aeq}, L_{Ceq} or L_{Zeq})

Filter Mode
Filtered L_{ZS}, L_{ZF} or L_{ZI} (not stored)
Filtered L_{Zeq} (stored), L_{Aeq}, L_{Ceq}, or L_{Zeq} (stored)
Date and time

Frequency Bands (Nominal Frequencies)
1:1 Octave Band 31Hz to 16kHz
1:3 Octave Band 25Hz to 16kHz.
20Hz & 20kHz 1:3 Octave Band with MO800/6 Factory Option

Memory
1300 broadband measurements
770 1:1 octave measurements
330 1:3 octave measurements

Eg. 12 days of 15 minute broadband measurements stored.

Noise Profile (LAeq, LCeq or LZeq)
Short Leq (LAeq, LCeq, or LZeq).
Up to 12 days at 1 second acquisition. 2 second factory set option.

Automatic Measurements
The unit can be set to record and store data over fixed times of:

1 minute	5 minutes
10 minutes	15 minutes
30 minutes	1 hour
8 hours	12 hours

or a user defined period
Auto Repeat From 2 to 999 measurements (broadband mode only)
Auto-synchronise to the clock.

Display
Graphical LCD with Quasi-Analogue Display
Selected measurement parameter with level
Warnings for Overload, Under-Range
Battery Level & External Power Indicators
Time & Frequency Weighting
Elapsed measurement time
Real time short Leq (broadband mode)
Graphical 1:1 and 1:3 Octave Band (recall mode only)
Recalled stored measurements
Measurement Range & Instrument settings

Dimensions
340 mm × 75 mm × 25 mm

Weight
450 g

Batteries
2 ×1.5v Alkaline LR6/AA

Battery Life
Broadband Mode Typically > 24 hours

Environmental

Temperature	Operating -10°C to +50°C
	Storage-20°Cto+60°C
Humidity	Up to 95% RH Non-Condensing

External Connections
USB Type B Data Out
Multipin I/O for optional connections

Outputs
Unweighted AC Output via Multipin I/O Connector

External Power
12v-15v DC @ 100mA via Multi I/O Connector
CU800C recommended (Specify UK, EU or US plug type)
Can be powered directly from the USB connection to the PC.

Electromagnetic Performance
IEC 61672-1:2003
IEC 61672-1:2003
Except where modified by EN61000-6-1:2007 & EN61000-6-1:2007

Output Cables

Standard:	ZL100 USB to USB
Optional:	ZL812 AC Output Cable to Phono Connector
	ZL813 RS232 Output Cable

Software Support
Deaf Defier for Windows. (Version v3.3.0 or later)

The Deaf Defier for Windows requires Microsoft Windows 98 SE or later
The Deaf Defier Software is supplied with no licensing restrictions.
Updates can be downloaded from the Internet.

Ordering Information

The CR800C series can be ordered with a variety of features. The table below shows the Sound Level Meter and Measurement Kit reference numbers:

Instrument	Measurement Kit	Description
CR811C	CK811C	CR:811C Class 1 Sound Level Meter
CR812C	CK812C	CR:812C Class 2 Sound Level Meter
CR821C	CK821C	CR:821C Class 1 Sound Level Meter with 1:1 Octave Band Filters
CR822C	CK822C	CR:822C Class 2 Sound Level Meter with 1:1 Octave Band Filters
CR831C	CK831C	CR:831C Class 1 Sound Level Meter with 1:1 & 1:3 Octave Band Filters
CR832C	CK832C	CR:832C Class 2 Sound Level Meter with 1:1 & 1:3 Octave Band Filters
CR813C	CK813C	CR:813C Class 1 Sound Level Meter

Outdoor Measurement Kits

CK408C	Heavy duty Outdoor Measurement Kit for CR811C, CR813C, CR821C & CR831C
CK508C	Lightweight Outdoor Measurement Kit suitable for CR811C, CR813C, CR821C & CR831C
CK408/811	Complete Heavy duty Outdoor Noise Measurement Kit including CR811C & CR515 Acoustic Calibrator
CK508/811	Complete Lightweight Outdoor Noise Measurement Kit including CR811C & CR515 Acoustic Calibrator

Options for the Outdoor Measurement Kits

MM801C	Factory fitted GSM Modem Option for Outdoor Measurement Kits with ZL:810 external 12v power cable
ZL810	External 12v Battery Power Connector for Outdoor Kits

Factory Fitted Upgrades

A range of options are available to enhance the performance of the CR800C series. These options can also be fitted when an instrument is returned for service and recalibration. These options include:

MO800/1	Factory upgrade from Class 2 to Class 1
MO800/2	Factory upgrade from Broadband to include additional 1:1 Octave Band Filters
MO800/3	Factory upgrade from Broadband to include additional 1:1 & 1:3 Octave Band Filters
MO800/4	Factory upgrade from 1:1 to 1:1 & 1:3 Octave Band Filters
MO800/5	Factory upgrade - Remote Preamplifier for Class 2 Instruments
MO800/6	Factory upgrade - Addition of 20Hz & 20kHz 1:3 Octave Band Filters to CR:832C or CR:831C

A range of optional accessories are available for the CR:800C Series.

Microphone Extension Cables

ZL202 2m microphone extension cable
ZL205 5m microphone extension cable
ZL210 10m microphone extension cable
ZL215 15m microphone extension cable
ZL:220 20m microphone extension cable

Output Cables

Standard:	ZL100 USB to USB
Optional:	ZL812 AC Output Cable to Phono Connector
	ZL813 RS232 Output Cable
	ZL814 Multi I/O Interface

Mains Power Supply

CU800C Mains Power Supply. Specify UK, Eu or USA type plug.

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