entry-level
sound level meters

Instrument Handbook

CR:308 & CR:310
Entry-Level
Sound Level Meters

LAF

45.2 dB

CAL

F/S

A/C

CR:310

Cirrus
Research plc

About this manual

The instructions in this user manual refer to the operation of Cirrus Research plc CR:308 and CR:310 entry-level sound level meters.

The instruments described in this manual are the CR:308 and CR:310.

This manual describes the recommended usage of the CR:308 and CR:310. Any warnings will be indicated by the following symbol:

The additional information required for testing in accordance with IEC 61672 is provided as a supplementary document, 'Optimus Sound Level Meters Technical Data Part B', which is available for download at: www.cirrusresearch.co.uk/library/user-manuals/

It is not possible to change the way that the instrument measures through software or firmware. Any legal metrology aspects of the instrument cannot be affected by any changes made in the instrument.

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Updates

In the interests of continuous product improvement, Cirrus Research plc reserves the right to make changes to product specifications without notice.

To understand the latest updates that have been implemented into this product and to download the most current version of this user manual, visit our website at www.cirrusresearch.com

Revision 2 | August 2021

Contents

1   Introduction

Welcome to your new CR:308/CR:310 entry-level sound level meter.

The CR:308 and CR:310 are general-purpose digital sound level meters designed to IEC 61672 Class 2. The instrument has 'F' (fast) and 'S' (slow) time response and 'A' and 'C' frequency weightings. Additional features include max and min hold for the measurement duration, LCpk, and limit alarm, which you can configure to indicate if your set threshold has been exceeded.

Except for the alarm indication function, the CR:310 includes all the features of the CR:308. In addition, it can display the Leq value and print results directly from the meter to a portable printer.

2   First use

Before using your meter for the first time, please check the contents of your instrument's case, which should include the following:

- •   Sound level meter and Class 2 microphone
- •   Windshield
- •   2 x AA batteries

Optional accessories
- •   Class 2 acoustic calibrator

You may have other accessories, depending on your package.

Before starting a measurement, remove the black microphone protective cap (if fitted) and where necessary, place the windshield carefully over the end of the microphone capsule.

3   Instrument overview

Microphone windshield

(microphone capsule underneath)

Backlit LCD display

Power button

Control keypad

Model number

Serial number label

Tripod mount

Battery compartment

Serial connection for printer
(CR:310 only)

AC/DC out

USB power input

4 Instrument displays

4.1 CR:308 & CR:310 main display

Under-range indicator

Measurement indicator

Overload indicator

Measurement type

Noise level

Battery level

Alarm indicator

(CR:308 only)

30   80   130

L_{AF}

109.2 dB

Lth 99.0dB *
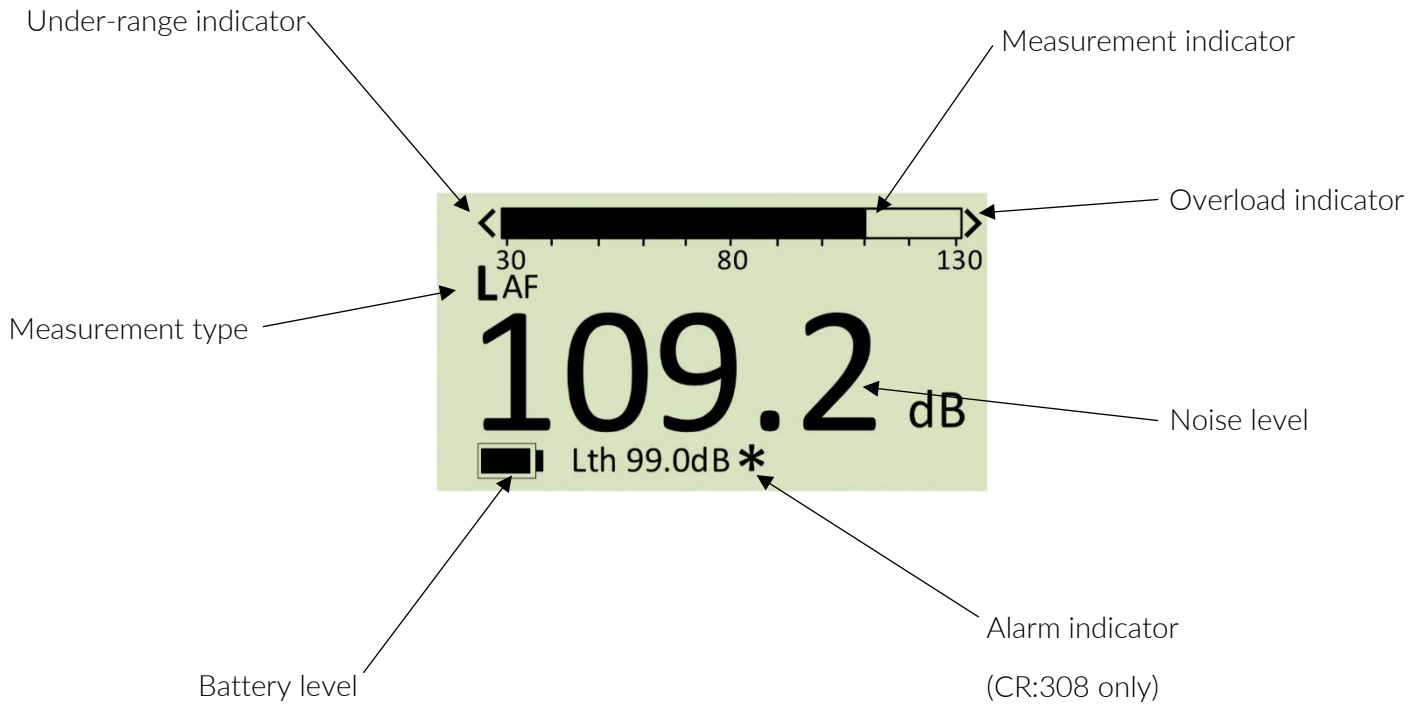
4.2 Calibration display

Press the CAL button.

CAL LEVEL   094.0dB

CORRECT   0.2dB

L_{AF} 93.0dB

CAL   EXIT

Calibrator level

Correction to be applied

Current measurement level
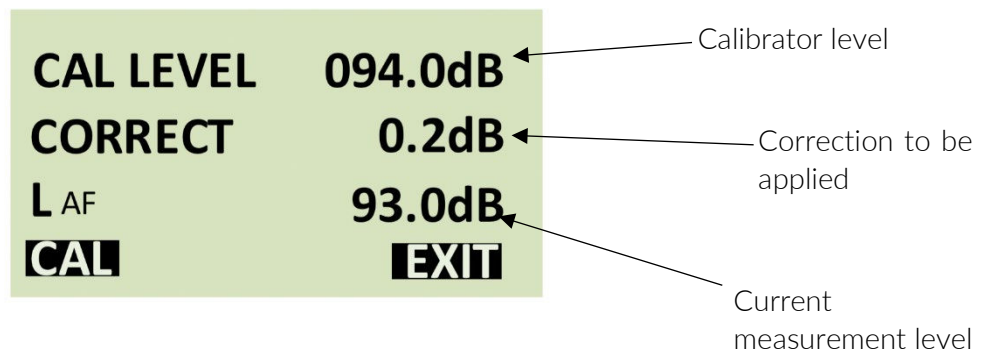
4.3   CR:308 alarm set display

Press (🔔) .

Alarm
enabled/disabled
indicator

LTH 090dB ✓

Threshold level

OK   **EXIT**
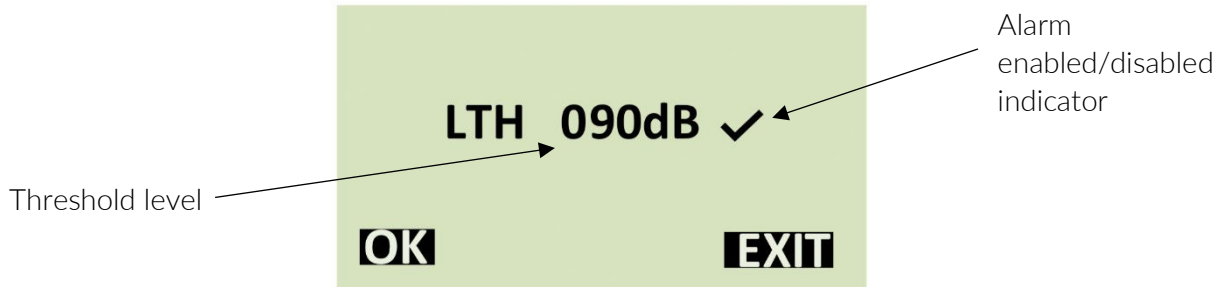
4.4   CR:310 measurement display

Overall
measurement
value

Under-range/
overload indicator

LAeqT	51.7 dB
LAeq1s	50.3 dB
LAF	50.1 dB
LAFmax	74.6 dB
LAFmin	42.5 dB

00:05:13

Measurement duration
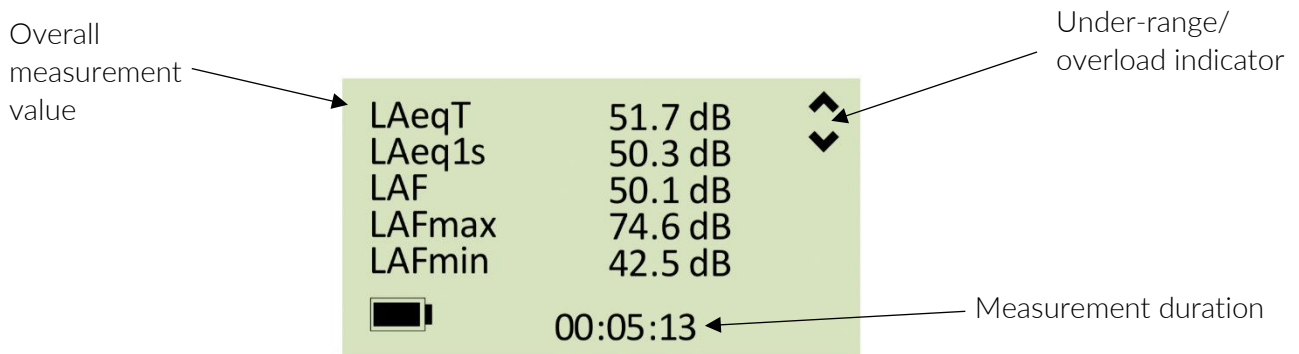
5   Instrument keypads

5.1   CR:308 keypad

Set alarm

Power on/off

Softkey: Exit

Perform calibration

Softkey: CAL/OK

Fast/Slow toggle

Select   measurement view

Reset max/min

A/C weighting toggle

5.2   CR:310 keypad

Start/stop measurement

Power on/off

Softkey: Exit

Perform calibration

Softkey: CAL/Print

Fast/Slow toggle

Select   measurement view

Reset max/min

A/C weighting toggle
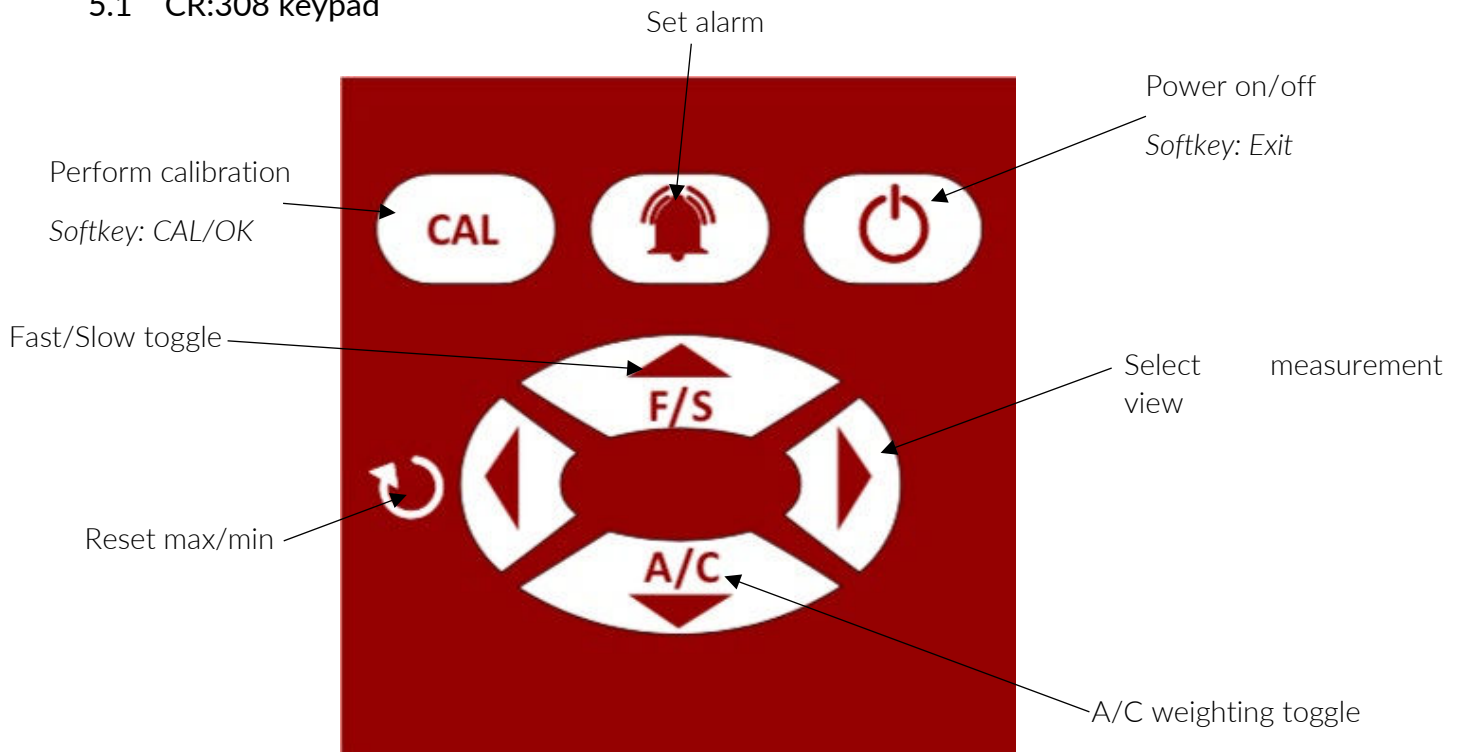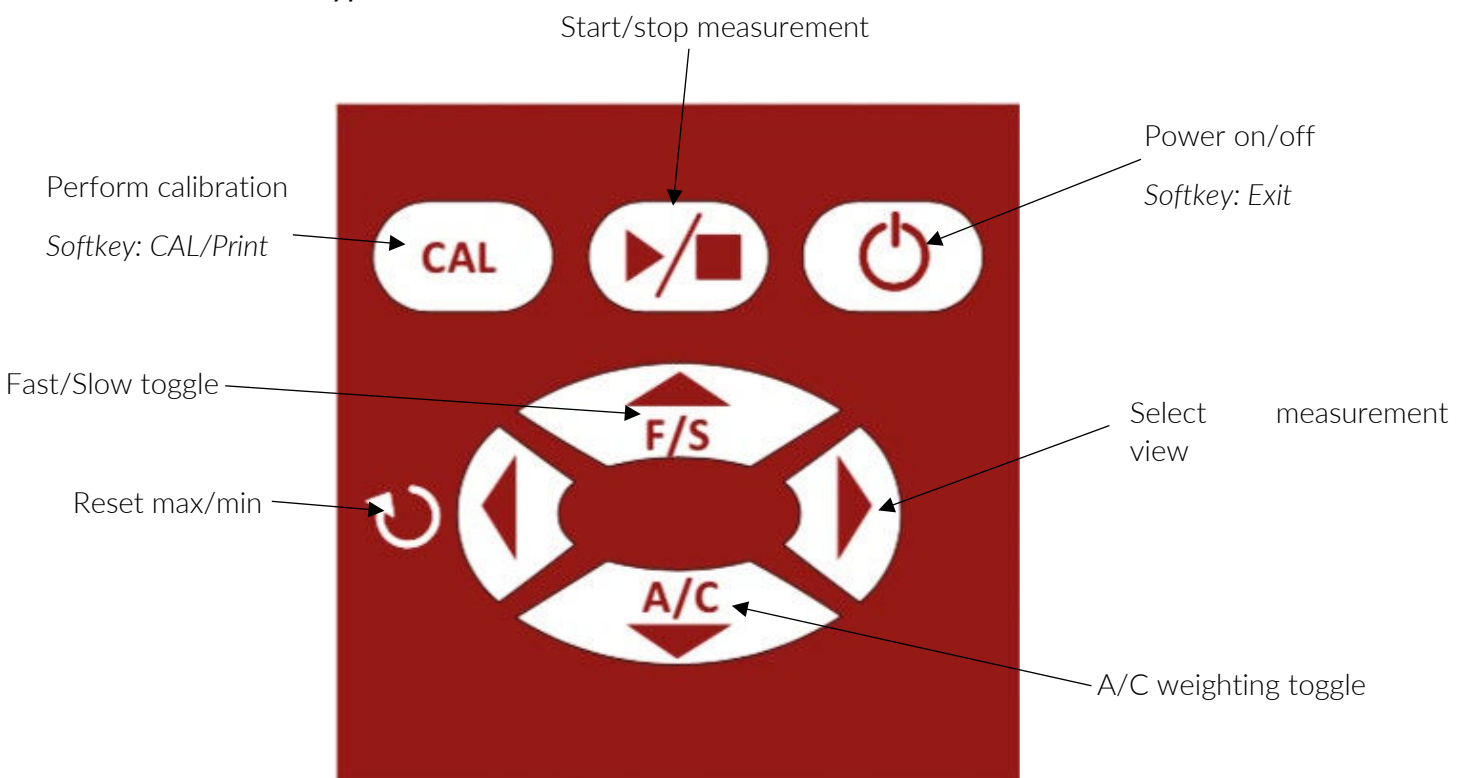
6   Instrument operation

Fit new batteries by sliding the battery cover open and inserting two AA batteries in the correct orientation.

Switch on and allow the instrument to settle for 60 seconds before calibrating.

Before starting a measurement, calibrate the instrument as per the guidance in Section 7 of this user manual.

6.1   Selecting the frequency and time weighting

Select the measurement frequency and time weighting required:

To toggle between A and C weighting, press

To toggle between fast and slow weighting, press

The measurement type is displayed in the main window:

> LAF – A frequency weighting | fast time weighting
> LCF – C frequency weighting | fast time weighting
> LAS – A frequency weighting | slow time weighting
> LCS – C frequency weighting | slow time weighting

To toggle the measurement values, press . This will toggle through the following measurement values if the meter is set to LAF:

> LAF > LAFMax > LAFMin > LCpk > LAF

Integrating averaging measurements Lxeq1s and Lxeq8h are available on the CR:310 instrument.

## 6.2   Maximum, minimum and LCpk values

Maximum, minimum and LCpk values are shown for the duration of time since the meter was switched on or since the reset button was last pressed.

These values can be reset by pressing

6.3   Setting the level alarm (CR:308 only)

The level alarm function can be used to trigger an alert if the noise level exceeds a predetermined value, which is set by you.

To set the alarm level, press 🔔 to enter the alarm setup display.

```
LTH  090dB ✓


OK              EXIT
```
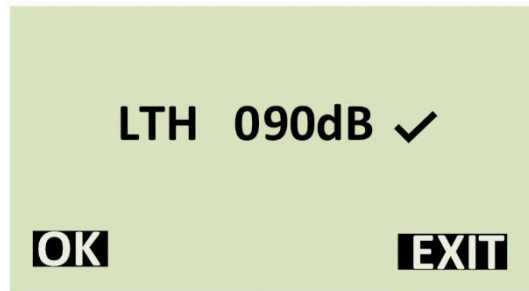
Set the desired level and enabled the alarm by using the arrow buttons. A tick denotes that the alarm is active; a cross denotes that the alarm is disabled. When set, press ⓒ to confirm.

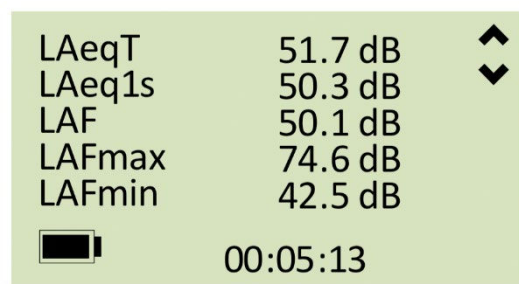*NB: the alarm level should not be set to less than 129dB.*

With the alarm enabled, the main display will indicate that the level has been exceeded by showing an asterisk (*) next to the sound level reading. The triggered threshold value can be reset by pressing ◁

NV: this will also reset the maximum, minimum and LCpk measurement values.

6.4   Performing and printing a measurement (CR:310 only)

Press ▶/■ to start or stop a measurement.

While a measurement is running, the latest values will be displayed on the screen, with the measurement duration shown at the bottom. Alternative measurement parameters can be viewed by pressing the up/down arrow buttons.

```
LAeqT        51.7 dB    ^
LAeq1s       50.3 dB    v
LAF          50.1 dB
LAFmax       74.6 dB
LAFmin       42.5 dB

🔋            00:05:13
```

Overload and under-range are denoted by the ^ and ^V^ indicators in the top right corner of the screen.

After stopping a measurement, the overall measurement values are displayed. Press the up/down arrows to scroll through the overall measurement values.

Tm	00:05:27
LAeq1	51.8dB
LAeq8h	32.3dB
PRINT	**EXIT**

If a printer is attached, the results can be printed by pressing ⬭CAL (Print).
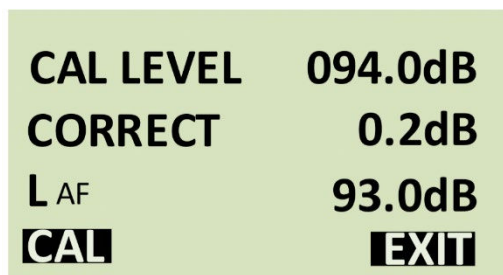
The measurement view can be cancelled by pressing ⏻ (Exit).

7   Instrument calibration

Before each measurement, it is important to calibrate your instrument with an acoustic calibrator, such as the Cirrus Research CR:514 1kHz 94dB calibrator.

To start the process of calibration, ensure the microphone is fitted correctly and place the acoustic calibrator over the microphone.

Press ⬭CAL to enter the calibration menu.

```
CAL LEVEL      094.0dB
CORRECT          0.2dB
L AF             93.0dB
CAL                EXIT
```

Use the arrow keys to set the CAL LEVEL to the acoustic calibration level (94.0dB for the CR:514 calibrator).

Use the arrow keys to set the CORRECT value to 0.2dB, which will make the adjustment for the gap between the calibrator and the microphone (pressure field of the acoustic calibration and the free field of the instrument and microphone (HY:205 microphone).

This will result in the meter reading 93.8dB when a 94dB calibrator is used.

Switch on the acoustic calibrator and insert the microphone capsule into the cavity on the calibrator. Take care to not force the microphone, as this could cause damage to either the instrument or the calibrator.

Press ⬭CAL to automatically calibrate the meter.

Press ⬭⏻ to exit from the calibration display and return to the main display.

8   Specifications and technical information

8.1   Instrument specifications

Applicable standards	IEC 61672-1: 2013 Class 2
Measurement range	30dB(A) – 130dB(A) 40dB(C) – 130dB(C)
Frequency weighting	A and C
Time weighting	Fast (F) and Slow (S)
Display functions	Normal, Maximum, Minimum, CPeak
Measurement functions	LAF, LAS, LCF, LCS, LCPeak
Noise floor	<25dB(A) and 35dB(C)
Display flags	Alarm limit, overload and under-range
Auto calibration range	±4.5dB
Reference point	94dB (1kHz), 92.9dB (8kHz)
Settling time	60s
Display	Backlit 128x64 LCD
Resolution	0.1dB
Electrical input	5V power-in via mini-USB
Power	2 x AA/LR6 1.5V batteries *or* 5V DC via mini-USB input
Battery life	24 hours with alkaline batteries
Microphone	½" pre-polarised electret condenser type HY:205
Operating temperature	0°C to +40°C
Operating humidity	25% – 90%
Atmospheric pressure	65kPa – 108kPa
Storage temperature	-20°C to +60°C
Dimensions	215mm x 68mm x 32mm
Weight (including batteries)	220g
Electrical outputs	AC (tip 3.5mm jack) and DC (middle 3.5mm jack)
DC output	Voltage 15mV/dB, range 450mV – 1950mV
AC output	RMS 2V

8.2   Reference information for periodic testing

Reference level (1kHz)	94dB
Reference level (8kHz)	92.9dB(A)
Linear range 8kHz	30 – 130dB
Linear range 4kHz	30 – 130dB
Linear range 1kHz	30 – 130dB
LCPeak maximum (500Hz, 1kHz, 8kHz)	133dB
Self-generated noise floor	A-weighting = 25dB C-weighting = 35dB
Self-generated noise floor (with mic fitted)	A-weighting = 25dB C-weighting = 35dB
Dummy microphone capacitance	18pf
Recommended dummy microphone	KP:66

8.2.1 Multifrequency acoustic calibrator correction data (set to pressure and test on A-weighting)

| Frequency	Correction
125Hz	0.0
1kHz	0.2
8kHz	2.6

8.2.2 Free field correction for HY205 microphone

Frequency (kHz)	Free field correction (dB)	Frequency (kHz)	Free field correction (dB)
1	0.1	6.3	1.7
1.25	0.1	8	2.6
1.6	0.2	10	4.4
2	0.3	12.5	5.3
2.5	0.5	16	6.5
3.15	0.7	18	7.1
4	1.0	20	7.8
5	1.4	---	---

8.2.3 Case reflection and windshield attenuation data

Frequency (kHz)	Case correction	Windshield correction	Uncertainty
63	0	0	0.27
125	0	0	0.27
250	0.13	0.05	0.27
500	0.18	0.08	0.27
1000	0.09	0.1	0.27
2000	-0.16	0.26	0.27
4000	0.01	0.53	0.32
8000	-0.10	0.26	0.30
16000	-0.17	-0.58	0.29

Add the above data to your measurement to correct.

8.2.4   Directionality plots and case reflection points

1kHz

2kHz

4kHz

8kHz
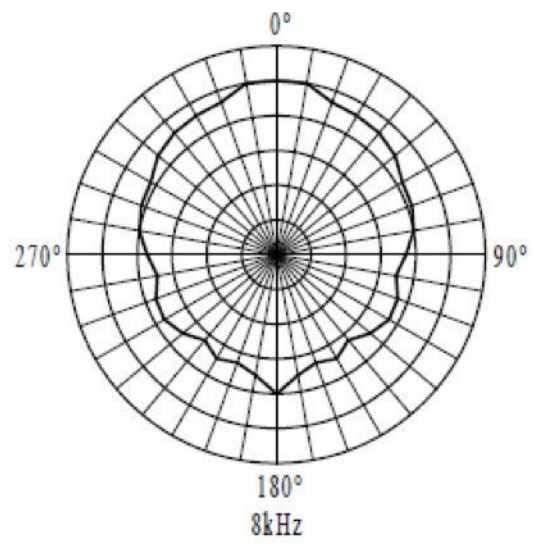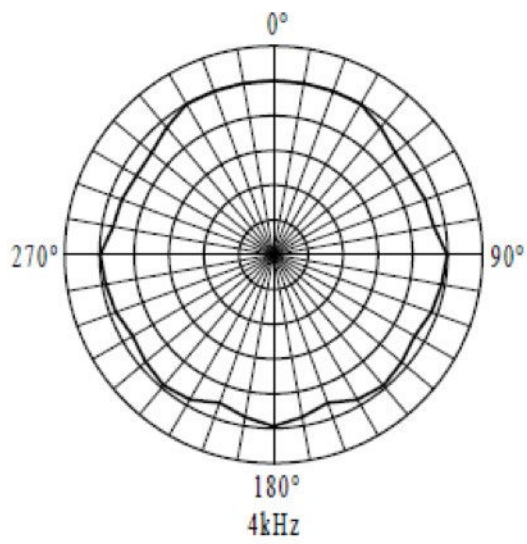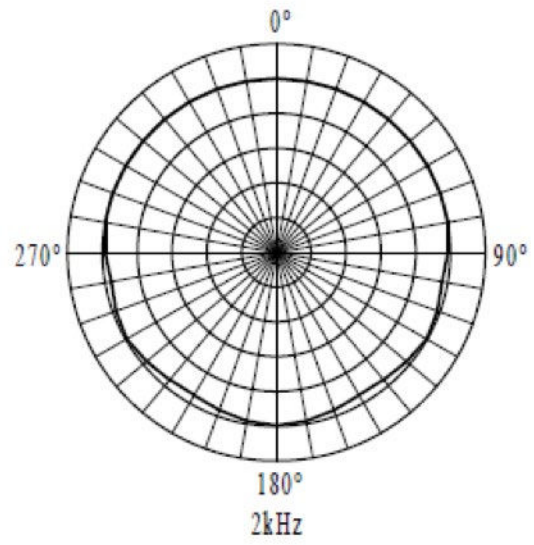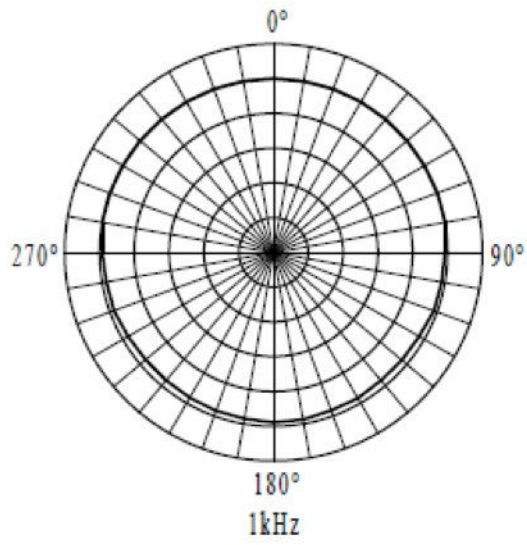
9   Options and accessories

The following table contains information about the model options and accessories available with this sound level meter.

Cirrus Research part number	Descriptions
CR:308	Basic sound level meter with threshold
CR:310	Basic sound level meter with measurement
PR:310	Thermal printer (for use with CR:310 only)
CR:514	Acoustic calibrator
CK:380	Kit case (empty)
CK:381	CR:308 kit including case, meter and calibrator
CK:382	CR:310 kit including case, meter and calibrator
UA:30X	Spare windshield
CP:65	Carrying pouch for sound level meter and calibrator

10 Serial connection

DB9, RS232 communications rate at 9600 Baud.

1 bit start, 8 bits data, 1 bit stop, no parity

11 Declaration of Conformity

Manufacturer: Cirrus Research plc
                  Acoustic House
                  Bridlington Road
                  North Yorkshire
                  YO14 0PH
                  United Kingdom

Telephone: +44 (0)1723 891655

Equipment manufactured after June 2018.

Equipment description

CR:308 sound level meter
CR:310 sound level meter

According to:

EMC Directive 2014/30/EU
Low Voltage Directive 2014/35/EU
RoHS Directive 2011/65/EU

Meet the following standards:

EN 61000-6-3: 2007+A1: 2011
Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments.

EN 61000-6-1: 2007
Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments.

Signed   Friday, 27 August 2021

Martin Williams
Director

12 Product guarantee and extended warranty

1. Every new product is provided with a 12-month warranty. This covers everything we provide against failure, poor workmanship and accidental damage.

NB - European Union law states a product must be fit for purpose for 24 months after purchase. This two-year period covers failure and poor workmanship only.

2. If the product is calibrated by Cirrus Research or an authorised calibration and service centre, then the initial 12-month warranty is extended by a further 12 months, with the same conditions, for up to 15 years in total.

3. If a product has not been calibrated annually by Cirrus Research or an authorised calibration and service centre, then you may buy back into the warranty scheme for £100 plus the cost of calibration. This can only be done once during the life of the product.

4. If a microphone capsule fails under warranty and is physically damaged, we will replace it with a refurbished capsule.

5. If you don't wish to have a refurbished capsule, then you can trade in your damaged capsule for a new one, which will incur a fee of £150.

13 Cirrus Research contact details

In addition to independent sales channels in the UK, Germany and France, Cirrus Research also operates through approved distributors and agents in many countries worldwide. For details of your local representative, please contact Cirrus Research using the information below. Contact details for Cirrus Research authorised distributors and agents are also available from the website at the address shown below.

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