

GA109 and GA206
Industrial Range of
Sound Level Meters



Thank you for buying a Castle product, I am sure you will find both the goods and the service to be of the highest quality but if not, then please feel free to write to me personally and I will ensure that your needs are dealt with immediately.

This manual is designed to show you the operation of the goods you have purchased and a very brief insight into acoustics itself. If you would like to become a competent person in the eyes of the law, then you may like to know more about our Competent persons training course for the Noise at Work Regulations.

It is my intention for Castle Group Ltd to provide a complete range of Noise and Vibration products and Services of the highest standard. If you would like to know more about any of our other products and services then please complete the reply paid card in this manual and return it to us for prompt action or telephone on +44(0)1723 584250.

Simon Bull

A handwritten signature in black ink, consisting of several loops and a horizontal line at the end, representing the name Simon Bull.

Sales and Marketing Director

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Introduction

This manual contains complete operating instructions for models **GA206** and **GA109**. The instruments have 'A' and 'C' frequency weighting with 'SLOW', 'FAST' and 'PEAK' meter responses. There is also a maximum hold 'MAX' provision to hold the maximum level during a transient noise event. Both instruments conform to :
BS EN 60651, and ANSI S1.4 standards.

GA206

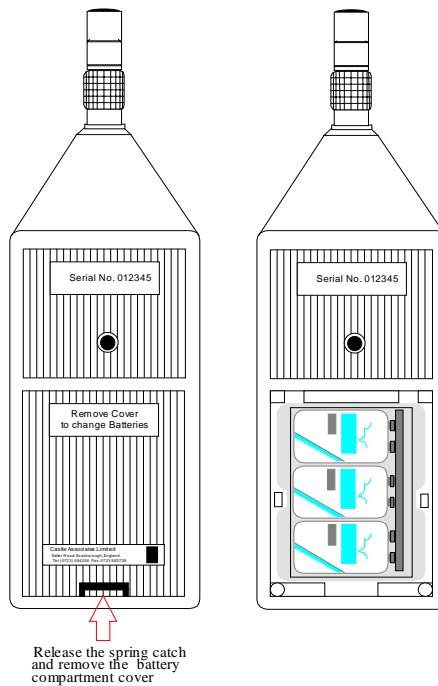
The Castle GA206 is an Industrial Sound Level Meter conforming to the British and International standards for a type 2 instrument. Its special features include a noise exposure scale, pushbutton range selection with LED range indication and max hold facility.

GA109

The Castle GA109 is a type 1 meter designed for general purpose applications in Industry and the Environment etc. where the best accuracy is required at an economic cost. A combination of an excellent electret microphone, high grade circuitry and a mirrored 40dB linear scaled meter movement ensures a high degree of accuracy. An AC and DC output socket is also provided.

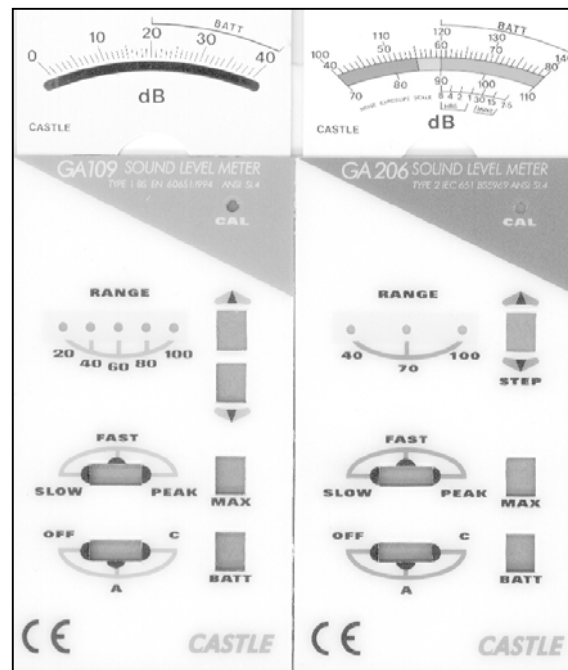
Battery Installation

Use 3 high-capacity 9V batteries, Type 6LR61. The instrument will function with one or two batteries, but with a reduced running time. Do not use rechargeable batteries. When BATTERY LOW appears upon test, replace all batteries as soon as possible, otherwise the instrument's specification cannot be guaranteed.



Press clip, remove cover, attach batteries to connector, replace cover firmly and close clip.

Controls



GA109

GA206

Power and Weighting Switch

A three position slide switch with the following functions:-

- 'OFF' All power to the instrument is removed.
- 'A' (ON) The instrument is switched on and set to measure sound level with 'A' weighting.
- 'C' (ON) The instrument is switched on and set to measure sound level with 'C' weighting.

BATT

A pushbutton battery check is provided with direct readout on the meter scale.

Response

A three position slide switch with the following functions:

- 'SLOW'** The instrument is set for measurements with the standardised 'SLOW' meter response, a time constant of 1000ms.
- 'FAST'** The instrument is set for measurements with the standardised 'FAST' meter response, a time constant of 125ms.
- 'PEAK'** The instrument is set for measurements with 'PEAK' meter response and a time constant of 50micro-seconds. This is most useful when used with the 'MAX' button as the peak level of fast transient events can be captured and displayed.

MAX

A pushbutton switch is fitted which when depressed and held will capture and display the maximum rms levels. Releasing the button restores normal operation.

Range Indication

The LED's indicate the range of measurement selected. On the GA109 the range indicated must be added to the meter reading i.e. with a selected range of 80 and a meter indication of +16dB the resultant noise reading would be 96dB(A) or (C) as selected. On the GA206 each range is printed on the meter scale giving direct readings.

Range Changing

- GA109** This instrument is provided with both up and down ranging pushbuttons.
- GA206** When first switched on the instrument will select the highest range. To change the range the 'STEP' button is depressed once to step down one range. When the 40dB range is selected further operation of the 'STEP' button will scroll the range back to 100dB.

CAL

A screwdriver adjusted control which changes to input sensitivity of the instrument normally used for calibration purposes in conjunction with an acoustic calibrator.

Meter Movement

- GA109** The meter movement is calibrated on a linear scale over a range of 0 to 40dB relative to the range setting. The sound level is read by adding the range offset to the meter reading.
- GA206** The meter movement is calibrated in three linear scales: 40-80dB, 70-110dB and 100-140dB relative to the range setting.

Calibration

The instrument should always be calibrated before use with either a Castle GA601 or GA602 acoustic calibrator.

Procedure:-

1. Check that the battery condition of the instrument is adequate using the '**BATT**' button. If the batteries are low then they must be replaced prior to calibrating.
2. Set the controls of the instrument to '**A**' weighting with '**FAST**' response. Then set the range to '**60**' on a GA109 or '**70**' on a GA206.
3. Carefully insert the microphone into the calibrator cavity (on base of calibrator) ensuring that it is a tight fit.
4. Turn on the calibrator to 94dB and check that the batteries are adequate.
5. Check the reading on the instrument and if required alter the '**CAL**' screw so the meter displays exactly 94dB.
6. If using a GA602 it is also possible to cross-check the meter linearity and inter-range accuracy by taking a second reading at 104dB (readings should be within 0.4dB) on the appropriate range.

Measuring Sound Levels

Use as a normal Sound Level Meter

1. Check the battery voltage and calibration of the instrument as previously described.
2. Switch on the instrument and select the highest range. Then select either 'A' or 'C' depending on which one you want.
3. Point the instrument towards the source of the noise to be measured.
4. Progressively reduce the RANGE setting with the 'STEP' button until the meter needle is within the upper half of the scale.
5. If it proves difficult to read the meter because of excessive needle movement then try switching the RESPONSE switch to 'SLOW'. Record the measurement, either directly if using a GA206, or adding the RANGE setting to the meter reading if using a GA109.
6. If required you can at this stage take a maximum noise level by depressing and holding down the 'MAX' button. This will automatically take the maximum reading and stay there as long as the button is held.

Use as a Noise Exposure Meter (GA206 only)

The special meter scale of the GA206 enables it to be used in conjunction with the recommendations of the Noise at Work Regulations and equivalent edicts throughout the world. For steady noise levels, the supplementary scale provides the recommended maximum daily exposure to the noise. The meter may be read directly in terms of the maximum daily exposure to the noise in hours or minutes. It is extremely important that it is realised that this scale **only** applies for measurements with the 70dB range selected. See table on next page.

NOISE EXPOSURE TABLE

DURATION PER DAY FOR 100% DOSE	3dB DOUBLING		5dB DOUBLING	
	THRESHOLD		THRESHOLD	
	85	90	85	90
HOURS				
8	85	90	85	90
4	88	93	90	95
2	91	96	95	100
1	94	99	100	105
MINUTES				
30	97	102	105	110
15	100	105	110	115
7.5	103	108	115	120
3.35	106	111	120	125
SECONDS				
112	109	114	125	130
56	112	117	130	135
28	115	120	135	
14	118	123		
7	121	126		
3.5	124	129		
1.75	127	132		

Output Socket

The GA109 instrument is equipped with a three pin lemo connector on the right hand side of the instrument to provide AC and DC signals. The AC output is designed to deliver a 120mV RMS signal F.S.D. into a 10K Ω load. The DC output is designed to deliver a 2.0V signal F.S.D. into a 10K Ω load.

The lemo connector required is type No: FGG0B303CLAD52Z with the connections as follows:-

View from inside plug with red spot to top (12 o'clock)

The pin at the top (12 o'clock) is earth

The pin to the right (4 o'clock) is AC

The pin to the left (8 o'clock) is DC.

Technical Specification

Standards

GA109 BS EN 60651 Type 1
ANSI S1.4 Type 1

GA206 BS EN 60651 Type 2
ANSI S1.4 Type 2

Measuring Range

GA109

<u>Range</u>	<u>Measuring Range</u>	<u>Max Peak Level</u>
20	20-60 dB	73 dB
40	40-80 dB	93 dB
60	60-100 dB	113 dB
80	80-120 dB	133 dB
100	100-140 dB	153 dB

GA206

<u>Range</u>	<u>Measuring Range</u>	<u>Max Peak Level</u>
40	40-80 dB	93 dB
70	70-110 dB	123 dB
100	100-140 dB	153 dB

Frequency weighting

GA109 'A' and 'C' to BS EN 60651 Type 1

GA206 'A' and 'C' to BS EN 60651 Type 2

Time weighting

Slow, Fast and Peak to IEC651

Peak onset time < 50 micro seconds

Detector

Characteristics: True RMS

Signal to noise: >5dB at bottom scale

Crest factor capability: >13dB at FSD.

Display

Type: Analogue moving coil meter

GA109: 40dB linear scale with mirror

GA206: 40dB linear scale with Noise Exposure Scaling

Both have Battery Indicator

Output Socket (GA109 only)

AC output : 120mV RMS for FSD

Output impedance approx 600Ω

Load impedance $10K\Omega$ or more

Short circuit protected

DC output : 2.0V for FSD 50mV/dB

Output impedance approx 600Ω

Load impedance $10K\Omega$ or more

Connector : Lemo type - FGG0B303CLAD52Z

Microphone Preamp

Pre-polarised $\frac{1}{2}$ inch(12.7mm) condenser

Sensitivity: 12mV/Pa

Preamp output impedance: 500 Ω

Calibration

Acoustic using a Castle GA601 or GA602 at 94dB

re 20 micro-Pascals at 1KHz

Batteries

Type: 3 x 6LR61 (alkaline)

Life: High energy type approx 50hrs

Temperature

Operating range: -15C to +50C

Storage range: -20C to +70C (without batteries)

Temperature effect: < 0.5dB from -10C to +50C

Humidity

Operating range: 30% RH to 90% RH

Humidity effect: < 0.5dB

Electromagnetic Compatability

Fulfills: FCC class B
EN 550 22

Dimensions & Weight

GA109 & GA206: 275x75x58mm
GA109 & GA206: 800g (with batteries)

Warranty and After Sales Service

Castle Group design and manufacture precision instruments, which if treated with reasonable care and attention should provide many years of trouble free service.

In the event of a fault occurring, during the warranty period, the instrument should be returned to Castle Group Ltd, in its original packaging, or to an authorised agent. Please enclose a clear description of the fault or symptom.

Details of the warranty cover are available from Castle Group Ltd or an authorised agent.

All instruments are designed to meet rigid British and International Standards. An annual calibration is recommended to ensure that these high standards are maintained. This is particularly important for cases in which instrument readings are to be used in litigation or compliance work.

For warranty and service return to:

The Service Department
Castle Group Ltd
Salter Road
Cayton Low Road Industrial Estate
Scarborough
North Yorkshire
YO11 3UZ

Telephone	UK:	(01723) 584250
	INT:	44 1723 584250
Fax	UK:	(01723) 583728
	INT:	44 1723 583728

Any misuse or unauthorised repairs will invalidate the warranty.

Damage caused by faulty or leaking batteries is not covered by the warranty.

Notes

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