

# PRODUCT DATA

## Integrating Sound Level Meter — Type 2239 A

*Type 2239 A is a Class 1 sound level meter that is designed to be quick and easy to use when making environmental noise and occupational-health related measurements. A large LCD screen displays measurements and includes a quasi-analog bar showing the current sound pressure level. The instrument has two parallel, independently weighted detectors that enable it to display RMS and Peak readings simultaneously.*

### USES

- Control of noise levels in the workplace
- Environmental noise surveys
- Complaint investigation
- Sound power measurements

### FEATURES

- Conforms with IEC 61672 – 1 Class 1, IEC 60651 and 60804 Type 1
- Conforms with ANSI S1. – 41983 and S1.43 – 1997 Type 1
- Simultaneous RMS and Peak measurements (with independent frequency weightings)
- Measures  $L_{eq}$ , Peak, MaxP, MaxL, MinL, SPL, and Inst
- 40 records of stored results
- Back-lit display
- Five built-in languages: English, German, French, Spanish and Italian



030100

### Description

Type 2239 A is a Class 1 sound level meter. It is designed to be quick and easy to use when taking environmental noise and occupational-health related measurements.

Measurements are displayed on a large LCD screen, which includes a quasi-analog bar that shows the current sound pressure level.

The instrument features two parallel, independently weighted detectors. This enables it to display both RMS and Peak readings simultaneously.

### Intuitive User-interface

The clearly marked arrows and symbols on the front panel, combined with the large LCD screen (with back light), make it very easy to learn to use the sound level meter. The display is clear and concise. Clear instructions and warnings guide you through your measurement.

### Real-time Clock

Type 2239 A has a real-time clock and calendar which mark each measurement with date and time.

### Data Storage and Processing

The instrument is capable of storing up to 40 records of measurement results. Each record stores the date, measurement time,  $L_{eq}$ , MaxP, MaxL, MinL and overload status. These results can be transferred to a PC using standard communications software. Measurement results can also be output to a portable printer as you take them.

### Fast and Easy Calibration

To calibrate Type 2239 A, simply fit a calibrator to the sound level meter and press a button. The sound level meter calculates the required correction factor and calibrates itself automatically.

### AC Output


The linearly-weighted AC output enables you to make a direct calibrated recording (on Digital Audio Tape, for example), which can be used later for complete acoustical analysis. It also enables monitoring by headphone.

### Post-processing of Data

All data from Type 2239 A can be read and post-processed by Brüel & Kjær's environmental software packages. Noise Explorer software Type 7815 allows you to store, manage and inspect data from all Brüel & Kjær sound level meters; data can be exported to spreadsheets and pasted into reports. Type 7825 Protector™ is unique software for occupational health work; measurements made with Type 2239 A at working points can, for example, be used to calculate noise doses for all personnel working at that point. Evaluator™ Type 7820/21 is dedicated to handling environmental-noise measurements and calculations of rating levels.

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## Compliance with Standards

	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive. C-Tick mark indicates compliance with the EMC requirements of Australia and New Zealand
Safety	EN 61010-1 and IEC 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use. UL 3111-1: Standard for Safety – Electrical measuring and test equipment
EMC Emission	EN/IEC 61000-6-3: Generic emission standard for residential, commercial and light-industrial environments. EN/IEC 61000-6-4: Generic emission standard for industrial environments. CISPR 22: Radio disturbance characteristics of information technology equipment. Class B Limits. FCC Rules, Part 15: Complies with the limits for a Class B digital device.
EMC Immunity	EN/IEC 61000-6-1: Generic standards – immunity for residential, commercial and light-industrial environments. RF immunity implies that sound level indications of 45 dB or greater will be affected by no more than 0.5 dB. EN/IEC 61000-6-2: Generic standards – immunity for industrial environments. RF immunity implies that sound level indications of 60 dB or greater will be affected by no more than 0.5 dB. <b>Note:</b> The above conformance is guaranteed only when using accessories listed in this Product Data sheet.

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## Specifications – Integrating Sound Level Meter Type 2239 A

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### STANDARDS

Conforms with the following:

- IEC/EN 61672 (2002) Class 1
- IEC 60651 Type 1 (1979) and amendment 1 (1993) and Amendment 2 (2000)
- IEC 60804 Type 1 (2000)
- EN 60651 Type 1 and Amendment 1 (2000)
- EN 60804 Type 1 and Amendment 1 (2000)
- ANSI S1.4–1983 Type S1
- ANSI S1.43–1997 Type 1

### MEASURING RANGES

Range (dB)	Max. Peak Level	Upper Limit (RMS) for Signals with Crest Factor 10 (20 dB)
30 – 100	103	83
50 – 120	123	103
70 – 140	143	123

### NOISE FLOOR

Below measurement range – less than 30 dB

### DETECTORS

Simultaneous RMS and Peak with independent frequency weightings

**Linearity Range:** 70 dB

**Pulse Range:** 73 dB

**Non-linear Distortion:** insignificant

**Peak Detector Rise Time:** Typically 50  $\mu$ s (< 100  $\mu$ s)

### FREQUENCY WEIGHTINGS

**RMS:** A or C

**Peak:** C

### MICROPHONE

Type 4188 Prepolarized Free-field 1/2" Condenser Microphone

**Sensitivity:** –30 dB re 1 V/Pa  $\pm$  2 dB

**Frequency Range:** 8 Hz to 16 kHz  $\pm$  2 dB

**Capacitance:** 12 pF

### TIME WEIGHTINGS

F, S, I (Fast, Slow, and Impulse)

### PARAMETERS

**Types:**  $L_{eq}$ , MaxP, MaxL, MinL, Peak, SPL, Inst.

**Resolution:** 0.1 dB

**Updated:** Once per second

### EXCHANGE RATE

3 dB

### MEMORY

40 Records of Measurement Results

### CLOCK

Real-time (calendar) and measurement duration

### VIBRATION SENSITIVITY

< 80 dB at 1 m/s<sup>2</sup> horizontally

< 85 dB at 1 m/s<sup>2</sup> vertically

### AC OUTPUT

Short-circuit protected LEMO series 00 socket

**Max. Output:** 0.5 V RMS

**Output Resistance:** 100  $\Omega$

**Output:** Linear

### DISPLAY

4 line back-lit LCD showing:

- Input signal level – indicated with a quasi-analog bar (updated 15 times per second)
- Selected parameter with level
- Warnings for overload and low battery power
- Measuring range
- Time and frequency weighting
- Elapsed measurement time
- Menus for displaying and editing settings
- Stored measurement results can be recalled

### BATTERIES

Four 1.5V LR6/AA size alkaline cells

**Lifetime (at room temperature):** Typically >12 h

### EFFECT OF MAGNETIC FIELD

80 A/m (1  $\text{\AA}$ rsted) at 50 Hz gives < 34 dB

### SERIAL INTERFACE

Compatible with:

- EIA–574
- EIA–232–E with 25-pole adaptor

**Baud Rate:** 9600

**Data Bits:** 8

**Stop Bit:** 1

**Parity:** None

**Handshake:** XON/XOFF

### ENVIRONMENTAL EFFECTS

**Storage Temp.:** –25 to +60°C (–13 to +140°F)

**Operating Temp.:** –10 to +50°C (14 to 122°F)

**Temperature Effect:** <0.5 dB (–10 to +50°C)

**Humidity Effect:** <0.5 dB for 30%<RH<90% (at 40°C, 1 kHz)

### PHYSICAL CHARACTERISTICS

**Size:** 257×97×41 mm (10.1"×3.8"×1.6")

**Weight:** 460 g (1.01 lb)(including batteries)

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## Ordering Information

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Type 2239 A Integrating Sound Level Meter

**Includes the following accessories**

Type 4188 Prepolarized Free-field 1/2" Microphone

KE 0323 Shoulder Bag

UA 1236 Protective Cover

4 × QB 0013 1.5 V LR6/AA Alkaline Cells

### OPTIONAL ACCESSORIES

Type 4231 Sound Level Calibrator

Type 4226 Multifunction Acoustic Calibrator

Type 2322 Portable Printer

Type 7815 Noise Explorer Software

Type 7820 Evaluator Software

Type 7821 Evaluator Light Software

Type 7825 Protector Software

UA 1251 Tripod

UA 0801 Tripod

UA 0459 Windscreen ( $\varnothing$  65 mm)

AO 0403 LEMO to BNC Cable

AO 1442 9-pole Cable with 25-pole Adaptor (for serial interface to computer)

KE 0325 Carrying Case with Insert for Sound Level Meter, Sound Level Calibrator Type 4231 and Tripod UA 1251 and Printer Type 2322

#### TRADEMARKS

Evaluator and Protector are trademarks of Brüel & Kjær Sound & Vibration Measurement A/S

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Brüel & Kjær reserves the right to change specifications and accessories without notice.

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