

# PRODUCT DATA

## Type 2240 — Integrating-averaging Sound Level Meter

Type 2240 is a very simple to use sound level meter, which complies with all the latest sound level meter standards. As an integrating-averaging sound level meter, it measures the equivalent, or average, sound pressure level  $L_{eq}$ . In addition, it measures the instantaneous, maximum and peak sound pressure levels at the same time.

Type 2240 is designed to make life easy. Operation of the instrument cannot be simpler – just point and measure. All parameters are measured simultaneously, there is no setup necessary. If any doubt should arise, a quick guide is readily available under the instrument's sliding cover.

This simplicity is supplemented with precision. Type 2240 fulfils the rigid Class 1 (previously Type 1) tolerances of the latest sound level meter standards.

### USES

- Assessment of environmental noise levels
- Measurement of noise in the workplace
- General purpose sound pressure level measurements, for example, to check PA systems or household installations

### BENEFITS

- $L_{Aeq}$ ,  $L_{AFmax}$ ,  $L_{Cpeak}$  and  $L_{AF}$  measured simultaneously
- Class 1 precision
- Complies with IEC and ANSI standards
- No setup necessary
- Extremely simple operation
- Robust and easy-to-use



### Measurement Parameters

Assessing noise levels is not always a simple matter, regardless of whether it is environmental or workplace noise you must measure. Fortunately, well-established standards and practices have determined common criteria for nearly all kinds of noise assessment making it easier to measure, report and evaluate sound pressure levels. For example, nearly all measurements must apply the 'A' frequency-weighting and, in most cases where time-weighting (or time constant) is relevant, the 'F' time-weighting is used. In workplace situations, it is also often required to use the 'C' frequency-weighting to measure peak sound pressure levels for assessing hearing damage risks. Type 2240 provides all of these measurement parameters in one easy-to-use package.

The instrument measures these four parameters simultaneously:

- $L_{AF}$  – the instantaneous ‘A’ frequency-weighted and ‘F’ time-weighted sound pressure level
- $L_{AFmax}$  – the maximum ‘A’ frequency-weighted and ‘F’ time-weighted sound pressure level detected during a measurement
- $L_{Aeq}$  – the ‘A’ frequency-weighted equivalent continuous sound pressure level, that is, the average level representing the same energy as the measured fluctuating levels
- $L_{Cpeak}$  – the maximum ‘C’ frequency-weighted sound pressure level detected during a measurement

Switch on the instrument, press the start key and the instrument is ready to measure using any or all of the above parameters. In doing so, you will find that Type 2240’s measurement parameters cover the most common noise check requirements and standards. While complex analyses such 1/3-octave or statistical analyses require a more complex instrument, Type 2240 can and will provide you with hassle-free operation and quick, on-the-spot noise level checks.

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## User Interface

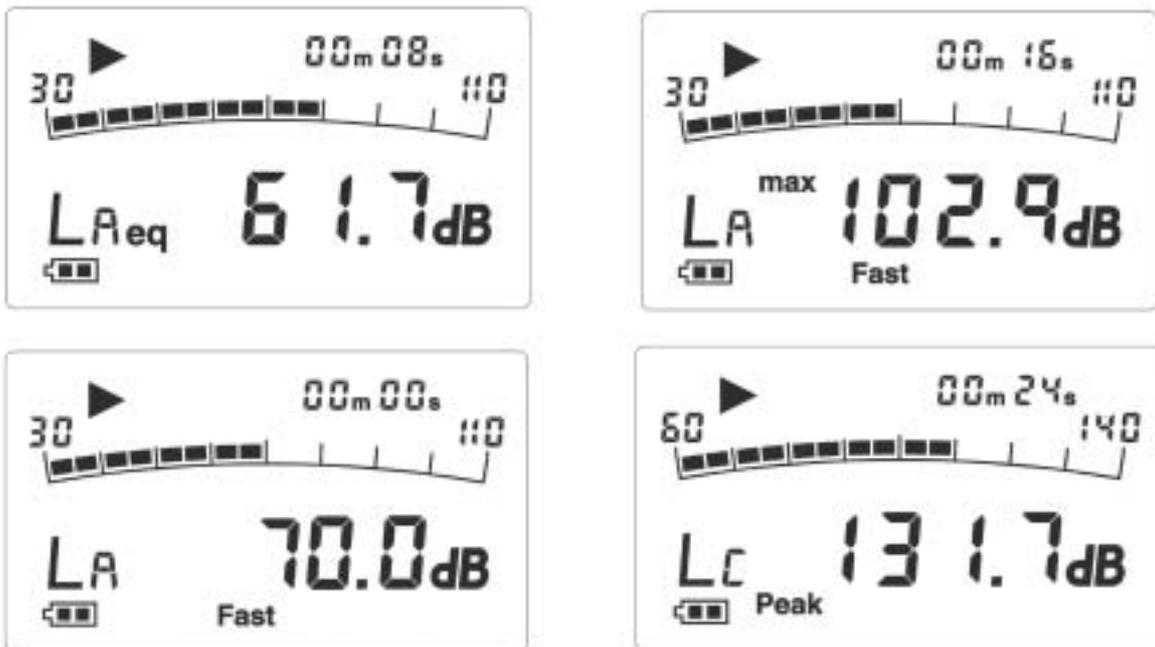
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The streamlined design of Type 2240 means that the only controls you need to use are a power switch and three push keys:

- **Start/Stop key** – for starting and stopping measurements
- **Parameter key** – for selecting which parameter to display
- **Range key** – for selecting the measurement range, either 30–110 dB or 60–140 dB

Integrated in the instrument casing is an illustrated quick guide for immediate help in using the push keys. The large LCD display shows the parameter and range you have chosen, and the relevant current measurement reading. Fig. 1 gives examples of the display options.

**Fig. 1** Examples of measurement options (in actual display size)



## 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
<b>Safety</b>	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
<b>EMC Emission</b>	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
<b>EMC Immunity</b>	EN/IEC 61000-6-1: Generic standards – Immunity for residential, commercial and light industrial environments EN/IEC 61000-6-2: Generic standards – Immunity for industrial environments EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements FCC Rules, Part 15: Complies with the limits for a Class B digital device

## Specifications – Type 2240 Integrating-averaging Sound Level Meter

### STANDARDS

Conforms with the following:

- IEC 61672 – 1:2002 Class 1
- IEC 60651 Type 1 (1979) with amendments 1 and 2
- IEC 60804 Type 1 (2000)
- ANSI S1.4 – 1983 Type S1
- ANSI S1.43 – 1997 Type 1

### PARAMETERS

Four parameters are measured simultaneously:

- $L_{AF}$ , instantaneous sound pressure level, frequency weighting 'A' and time weighting 'F'
- $L_{AFmax}$ , maximum sound pressure level, frequency weighting 'A' and time weighting 'F'
- $L_{Aeq}$ , equivalent continuous sound pressure level, frequency weighting 'A'
- $L_{Cpeak}$ , maximum peak sound pressure level, frequency weighting 'C'

**Resolution:** 0.1 dB for all four parameters

### MEASUREMENT CONTROL

Measurements are manually controlled  
 Measurement times between 1 s and 60 min

### MEASURING RANGES

**RMS:** Total range: 30 – 140 dB  
 Two manually selected ranges: 30 – 110 dB and 60 – 140 dB  
**Peak:** 60 – 143 dB

### NOISE FLOOR

Below measurement range, < 22 dB

### DETECTORS

Simultaneous RMS and Peak with independent frequency weightings  
**Linear Operating Range:** 80 dB

### FREQUENCY RANGE

20 Hz to 16 kHz

### FREQUENCY WEIGHTINGS

A-weighting (RMS)  
 C-weighting (Peak)

### TIME WEIGHTING

'F' (Fast)

### OVERLOAD AND UNDER-RANGE INDICATORS

Overload is indicated at full-scale +0.3 dB

An overload detected during a timed measurement latches and is displayed with the relevant parameters until these are cleared  
 Under-range is indicated at scale lower limit –0.5 dB

### MICROPHONE

Type 4188 Prepolarized Free-field 1/2" Condenser Microphone  
**Sensitivity:** –30 dB re 1 V/Pa  $\pm$  2 dB (corresponding to 31.6 mV/Pa)  
**Frequency Range:** 8 Hz to 16 kHz  $\pm$  2 dB

### DISPLAY

#### LCD showing:

- Input signal level – indicated with a quasi-analogue bar
- Selected parameters with level
- Warnings for: low battery, measurement in progress, overload and under-range
- Measuring range
- Frequency and time weighting
- Elapsed measurement time

**Update Cycle:** 1 s (numeric), 0.1 s (bar graph)

**Elapsed Time Display:** from 00 min 00 s up to 60 min 00 s

### SETTLING TIME

Less than 5 s

### REFERENCE CONDITIONS

**Reference Frequency:** 1000 Hz  
**Reference Sound Pressure Level:** 94 dB  
**Reference Temperature:** 20 °C (68 °F)  
**Reference RH:** 65%  
**Reference Range:** 30 – 110 dB  
**Reference Direction of Incidence:** Frontal

### ENVIRONMENTAL EFFECTS

**Storage Temperature:** –25 to 60 °C (–13 to 140 °F)  
**Operating Temperature:** –10 to 50 °C (14 to 122 °F)  
**Effect of Magnetic Field:** 80 A/m (1 oersted) at 50 Hz gives less than 30 dB (A-weighted)

### BATTERIES

Two 1.5 V LR 6/AA-size alkaline batteries  
**Power Consumption During Normal Operation:** Less than 300 mW  
**Lifetime (at room temperature):** Approximately 16 h

### PHYSICAL CHARACTERISTICS

**Dimensions:** 230 × 78 × 31 mm including microphone  
**Weight:** 245 g (8.64 oz) including batteries

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## Ordering Information

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**Type 2240** Integrating-averaging Sound Level Meter  
**Type 2240 A** Integrating-averaging Sound Level Meter with Type  
4231 Sound Level Calibrator

**Includes the following accessories:**

Type 4188 Prepolarized Free-field 1/2" Condensor Microphone  
DZ9566 Random-incidence Corrector  
KE 0443 Pouch

UA 1236 Protective Cover  
UA 0229 Screwdriver  
Two alkaline batteries

**Optional Accessories**

Type 4231 Sound Level Calibrator (included with Type 2240 A)

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

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