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
- \( L_{\text{AFmax}} \) – 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
- \( L_{\text{Cpeak}} \) – 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.

**User Interface**

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)*
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’
- $L_{AF_{max}}$, maximum sound pressure level, frequency weighting ‘A’ and time weighting ‘F’
- $L_{Aeq}$, equivalent continuous sound pressure level, frequency weighting ‘A’
- $L_{C_{peak}}$, 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 ±2 dB (corresponding to 31.6 mV/Pa)
Frequency Range: 8 Hz to 16 kHz ±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 LR6/AA-size alkaline batteries
Power Consumption During Normal Operation: Less than 300 mW
Lifetime (at room temperature): Approximately 16 h

PHYSICAL CHARACTERISTICS
Dimensions: 230 x 78 x 31 mm including microphone
Weight: 245 g (8.64 oz) including batteries

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
EN61010–1 and IEC 61010–1: Safety requirements for electrical equipment for measurement, control and laboratory use.
UL3111–1: 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
CISPR22: 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
EN/IEC 61000–6–2: Generic standards – Immunity for industrial environments
EN/IEC61326: Electrical equipment for measurement, control and laboratory use – EMC requirements
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### Ordering Information

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>2240</td>
<td>Integrating-averaging Sound Level Meter</td>
</tr>
<tr>
<td>2240 A</td>
<td>Integrating-averaging Sound Level Meter with Type 4231 Sound Level Calibrator</td>
</tr>
</tbody>
</table>

Includes the following accessories:
- Type 4188: Prepolarized Free-field 1/2” Condensor Microphone
- DZ9566: Random-incidence Corrector
- KE0443: Pouch
- UA1236: Protective Cover
- UA0229: Screwdriver
- Two alkaline batteries
- Type 4231: Sound Level Calibrator (included with Type 2240 A)

### Optional Accessories

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