

## Personal Noise Dose Meter Type 4448

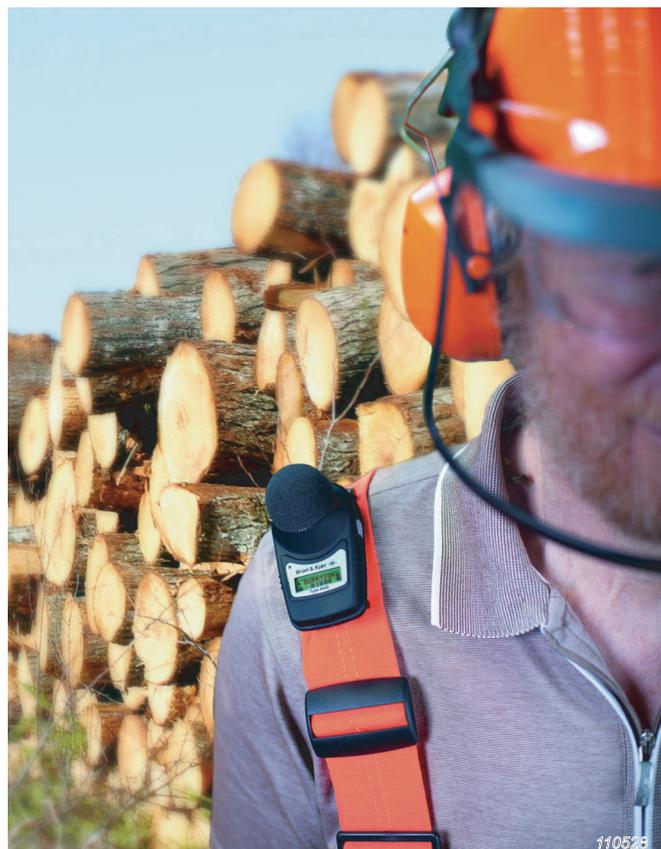
Type 4448 is a shoulder-mounted, cable-free personal noise dose meter. This unit accompanies workers throughout their workday, measuring and registering all relevant data about their noise exposure, even in hazardous environments with the intrinsically safe model.

Two-button operation, the informative LCD display and the auto-calibration function make it easy to master the noise dose meter in just a few minutes. The built-in rechargeable battery and memory provide capacity for several workdays' worth of measurement.

Type 4448 includes  $L_{Ceq}$  measurement for hearing protection selection using the noise reduction rating (NRR), single number rating (SNR) or high, middle, low (HML) rating method.

Kits containing up to ten dose meters are available. Each kit comes with a carrying case that has enough room for all the included and optional accessories for noise dose assessment with Type 4448.

Wireless communication using an infrared interface with your PC enables you to download data and configure the dose meter using Work Noise Partner PC software. In addition to archiving, reviewing and reporting measurement data, this software allows calculation of workday noise doses according to a variety of national and international standards. Measurement data from Type 4448 and B&K 2245 Sound Level Meter can be combined in a single Work Noise Partner project.



### Uses and Features

#### Uses

- Occupational noise assessment and management
- Selecting hearing protection based on measurements

#### Features

- Lightweight and cable-free
- Easy to mount according to standards
- Multiple mounting options
- Robust, compact design suited for use in various environments
- Simultaneous measurement of all data relevant to standards (ISO and OSHA)
- Simultaneous measurement of A- and C-weighted levels
- Logging profile with 1 minute interval
- Peak counting (135, 137 and 140 dB level exceedance)
- Preset measurement time capability
- Auto-calibration
- Rechargeable battery, 90-minute maximum recharge time
- Up to 28 hours of operating time
- Linkable charging stations, charge up to 12 units at a time
- 180-hour memory capacity
- Simple two-button operation
- Button and display lock
- Highly visible LED level exceedance alarms
- LCD screen displays status and measurement data
- Six languages: English, French, German, Italian, Portuguese and Spanish
- Wireless connection for downloading data (infrared)
- Intrinsically safe model available

Noise-induced hearing loss is one of the most prevailing occupational health problems. Repeated exposure to high noise levels puts millions of workers at risk. Once the damage is done, social and psychological handicaps can lead to potentially massive expenses due to the loss of skilled labour, early retirement and worker compensation.

**Fig. 1**  
*To go all the places that it might need to go, Type 4448 was designed to be compact and robust with no cables to get in the way*



Compared to those expenses, prevention is cheap. It is important to assess and monitor noisy work environments before the damage is done and, if necessary, reduce noise exposure to a safe level by reducing machine noise, improving room acoustics, adjusting work days and/or providing appropriate hearing protection.

The benefit of using noise dose meters for measurements is that they move with the worker within the actual work environment, thereby monitoring noise exposure related to the individual's work pattern and behaviour.

### Powerful and Flexible

Powered by a digital signal processor (DSP), Type 4448 can measure all relevant noise parameters simultaneously, making setup unnecessary. DSP technology also allows the easy addition of new features through software updates, ensuring the longevity of your investment.

**Fig. 2**  
*Always know the status of the battery and memory capacity*



### Quick and Easy to Operate

Two-button operation, auto-calibration, LCD display and a user interface with six languages (English, French, German, Italian, Spanish or Portuguese) ensure that you can fully master Type 4448 in just a few minutes.

### Real-time Estimation

While in stand-by mode, Type 4448 provides a real-time display of  $L_{AF}$  (ISO display mode) or  $L_{AS}$  (OSHA display mode). This feature provides a quick and easy estimate of the sound pressure level in a particular area.

### Avoid Accidental Tampering

The buttons and display can be locked to avoid accidental adjustments to the units. The unit will still display elapsed measurement time and the remaining battery capacity, which will provided confidence that all is as it should be.

**Fig. 3**  
Type 4448  
simultaneously  
measures  $L_{Aeq}$  and  
 $L_{Ceq}$  and displays  
 $L_{Ceq}-L_{Aeq}$



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### Select Hearing Protection from Measurements

Noise dose meter Type 4448 simultaneously measures  $L_{Aeq}$  and  $L_{Ceq}$ , so by using NRR, SNR or the HML rating method, appropriate hearing protection can be selected based directly on the measured data.

### Ready to Measure when You Are

Type 4448 provides up to 28 hours of operation between charges, has enough memory to log all data for 180 hours at 1 minute intervals and starts up in just a few seconds. Type 4448 can be ready when you are and log data for several shifts without having to recharge or download data.

### Smart Charging

Type 4448 is charged with intelligent drop-in chargers. They control each Type 4448 individually; so you can drop-in and remove individual units as required and regardless of the units' current charge status. As soon as a unit is fully charged, the charger will switch to trickle charge mode for that device, maintaining the charge while avoiding damage to the battery from overcharging. You can also link up to four chargers, charging up to 12 noise dose meters simultaneously – with only one power supply.

**Fig. 4**  
Using a single  
power supply with  
two 3-way chargers



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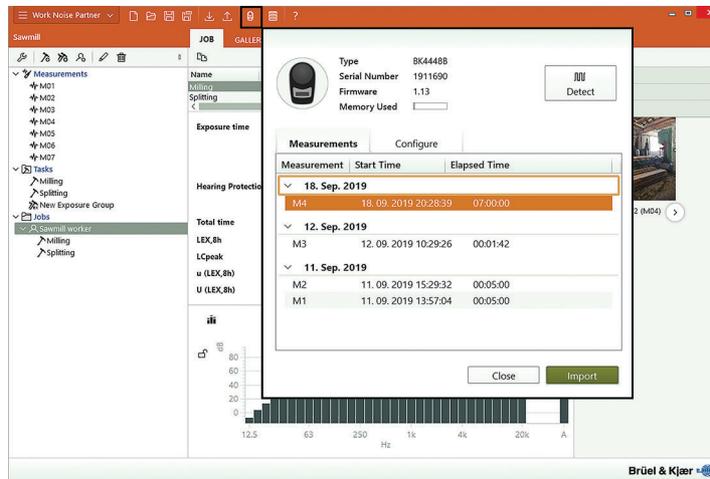
### Intrinsically Safe Models

Type 4448 is available as an intrinsically safe model, meeting the requirements of ATEX EEx ia I M1, EEx ia IIC T2 II 1 G, certificate number 07ATEX2032X. North American and Canadian FM/CSA approvals are to Class 1, Division 1, Groups A, B C, D, temperature classification T2.

This means that the noise dose meters are suitable for usage in hazardous areas such as mines, printing works, petrochemical plants and other areas that require intrinsically safe monitoring instruments.

## Measurement Is Just the Beginning

**Fig. 5**  
Add measurements  
and configure the  
noise dose meter  
using Work Noise  
Partner



A Work Noise Partner project makes it easy to model the noise exposure for any number of workers using task, job or whole-day measurement strategies. The software provides all the tools to archive, review and report measurements made with Type 4448 and the B&K 2245 Sound Level Meter. In addition, it allows easy calculations of workday noise dose according to a range of national and international standards.

## And All in a One Case

**Fig. 6**  
Kit containing five  
units

Also showing the  
optional  
Sound Calibrator  
Type 4231  
and an additional  
3-way Charger  
ZG-0860



Multiple-unit kits make it easy to assess noise exposures for many workers. A kit case has space for up to 10 dose meters, 2 chargers, 1 power supply, 1 calibrator and other accessories that might be needed – lightweight and convenient. Starter kits are available with 1, 3, 5 or 10 units. They include the case, one power supply, a 3-way charger (kits with 10 units contain 2), one infrared-to-USB cable, a screwdriver and the field guide.

Kits can be completed with single units or using the expansion kits (containing 3 or 5 units).

All components are also available as individual accessories.

## Compliance with Standards

   	<p>The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives</p> <p>RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME</p> <p>China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China</p> <p>WEEE mark indicates compliance with the EU WEEE Directive</p>
<b>Safety</b>	<p>ATEX Directive 94/9/EC and the following intrinsic safety standards: EN 60079–0: 2009, EN 60079–11: 2007 and EN 60079–26: 2006.</p> <p>EN 60950: Safety of IT Equipment.</p> <p>EN 60335–2–29: Safety of Electrical Appliances.</p>
<b>EMC Emission</b>	IEC 61000–4–3/6–3: Test techniques and requirements for Radiated Electromagnetic compatibility (EMC) field tests.
<b>EMC Immunity</b>	<p>IEC 61000–4–6/6–2: Test techniques and requirements for Immunity to Electromagnetic compatibility (EMC) – disturbances induced by radio frequency fields. Tested at 10 V/m or greater.</p> <p>IEC 61000–4–2: Test techniques and requirements for Electrostatic discharge immunity tests.</p>
<b>Product Specific Standards</b>	<p>IEC 61252: 2002: Electro-acoustics – Specifications for Personal Sound Exposure Meters.</p> <p>ANSI S1.25: 1991: Specifications for Personal Noise Dosimeters.</p>
<b>Temperature</b>	Ambient Operating Temperature: 0 to +40 °C (32 to 104 °F)
<b>Humidity</b>	IEC 61252: 2002: section 12.4 (Operating): The indicated sound exposure remains within –11 to +12% over 30 to 90% RH relative to a reference point of 65% RH at 40 °C.
<b>Atmospheric Pressure</b>	EN 61252: section 12.2: The indicated sound exposure remains within –11 to +12% relative to reference conditions for an ambient pressure of 1013 ± 10%
<b>Mechanical</b>	<p>Non-operating:</p> <p>IEC 60068–2–6: Vibration: 0.3 mm, 20 m/s<sup>2</sup>, 10–500 Hz</p> <p>IEC 60068–2–27: Shock: 1000 m/s<sup>2</sup></p> <p>IEC 60068–2–29: Bump: 1000 bumps at 250 m/s<sup>2</sup></p>

## STANDARDS

All types conform to:

- IEC 61252:2002
- ANSI S1.25:1991

Intrinsically safe model also conforms to:

- ATEX EEx ia I M1, EEx ia IIC T2 II 1 G, certificate number 07ATEX2032X
- FM/CSA approvals are to Class 1, Division 1, Groups A, B, C, D, temperature classification T2

## SUPPLIED MICROPHONE

1/2" condenser microphone mounted on instrument body

## FREQUENCY WEIGHTINGS

**L<sub>eq</sub> and RMS Detector:** A (and simultaneously C)

**Peak Detector:** A, C and Z (Linear)

## TIME WEIGHTINGS

Slow, Fast and Impulse

## MEASUREMENT PARAMETERS

**Equivalent Continuous Sound Level:** L<sub>Aeq</sub>, L<sub>Ceq</sub>, L<sub>Ceq</sub>-L<sub>Aeq</sub>

**Average Sound Level:** L<sub>av</sub>

**Impulse Weighted Average Sound Level:** L<sub>Aleq</sub>

**Maximum Peak Level:** L<sub>Cpeak</sub>, L<sub>Apeak</sub>, L<sub>Zpeak</sub>

**Time Weighted Average (TWA):** Using Q=5

**Maximum Sound Pressure Level:** L<sub>AFmax</sub>, L<sub>ASmax</sub>, L<sub>Almax</sub>

**Minimum Sound Pressure Level:** L<sub>AFmin</sub>, L<sub>ASmin</sub>, L<sub>Almin</sub>

**Sound Exposure Level:** L<sub>AEPd</sub>, L<sub>EX,8h</sub>, L<sub>AE</sub>

**Sound Exposure:** Pa<sup>2</sup>hr, Pa<sup>2</sup>sec

**Dose percentage:** Dose %

**8 hour projected dose percentage:** Projected dose %

Peak Count: 135, 137 and 140 dB exceedance

## MEASURING RANGE

Sound Level Range: 65.0 – 140.3 dB (L<sub>Aeq</sub>; L<sub>Ceq</sub>)

Peak Range: 95.0 – 143.3 dB(C)

## LOGGING

Up to 180 hours with 1 minute logging interval

L<sub>Aeq</sub>, L<sub>av</sub> (Q=5), L<sub>Zpeak</sub>, L<sub>Cpeak</sub>

## STABILIZATION TIME

3 seconds after start

## EXCHANGE RATE

Q=3 dB and Q=5 dB

## UNDERRANGE

1 dB below measurement range

## OVERLOAD INDICATION

RMS: at 140.4 dB (0.1 dB above measurement range)

Peak: at 143.4 dB linear (0.1 dB above peak range)

Indicated in display during measurement and on PC in downloaded data

## THRESHOLD AND CRITERION LEVELS

Type 4448 displays OSHA data for 80 and/or 90 dB thresholds and a 90 dB criterion level. After download to PC, data can be recalculated with the following levels:

- Threshold Levels: 70 – 90 dB in 1 dB steps
- Criterion Level: 70 – 90 dB in 1 dB steps

## CALIBRATION

Using Sound Calibrator Type 4231 (optional)

Target calibration level can be user defined – default 94 dB

Units automatically detect calibration; press accept to store calibration  
Calibration history stores dates, times and levels. Last calibration before and first calibration after assigned to/stored with measurement

## USER INTERFACE

**Operation:** Two buttons: on/off, configuration/measurement control

**Display:** LCD 100 × 32 pixels

**Languages:** English, German, French, Spanish, Portuguese and Italian

**Status During Measurement:** Display alternates between status (remaining battery and memory capacity) and measurement information (elapsed time and instantaneous level, L<sub>AF</sub> (ISO mode) or L<sub>AS</sub> (OSHA mode)), respectively

ISO or OSHA mode can be chosen to select the data subset displayed on the instrument (does not change measured data)

**Stand-by mode:** Alternating display status and selected set of data for most recent measurement, respectively

**Locked mode:** Only battery status and elapsed time

## SETUP

**Measurement:** All parameters are always measured simultaneously

**On Instrument:**

- Contrast (6 steps)
- Language (see above)
- Auto  (Auto-lock buttons Yes/No)
- Display mode (ISO/OSHA), Pro. Mode (Yes/No)
- Alarms (Activate/Deactivate LED dB Alarm function)
- Preset time (No or up to 12 hours in 30 m steps)
- Clear Memory

**Using PC:** Language, display mode, contrast, start-up text, alarms, calibration level, time and date, preset measurement time (1-minute steps), auto-lock

Pro-mode: Threshold and criteria levels

## PRESET MEASUREMENT TIME

**Set up using PC:** Any period from 1 minute to 12 hours

**Set up on instrument:** 30 min. steps from 30 min. to 12 hours

Preset time = 0 corresponds to no preset time chosen; that is, manual measurement control (start and stop measurements manually)

## MEMORY/DATA STORAGE

180 hours of time history with 1 minute logging period

Non-volatile, 10 years of storage

Maximum number of measurements: 180

## CLOCK

Real-time clock with calendar

Accuracy: better than 1 min per month (ca. 2 s per day)

## DOWNLOAD

Data is downloaded to the PC using infrared- to-USB cable (AO-1492)

## BATTERY

**Internal Rechargeable NiMH Cells:** recharge using charger (ZG-0860)

**Battery Operating Time:** 28 hr

**Battery Status Indication:** Symbol and estimated remaining time (hr)

**Time to Fully Charge:** 90 min max.

**Battery Replacement:** Requires authorised service

## MEASUREMENT CONTROL

**Manual Control Mode:** Use buttons for Start/Stop

**Preset Measurement Time Activated:** Measurement started manually.

Unit will automatically stop measurement and turn off at preset time

## ENVIRONMENTAL CONDITIONS

**Operating temperature:** 0 to +40 °C (32 to 104 °F)

**Storage temperature:** –10 to +50 °C (14 to 122 °F)

**Storage humidity:** 30 to 95% RH (non-condensing)

## INTRINSICALLY SAFE MODEL

The Noise Dose Meter shall not be used in areas where a layer of coal dust may be deposited on the enclosure

The microphone shall not be removed in the hazardous area

The unit is not to be charged within a hazardous area. Battery charging is only permitted using the approved charger

## DIMENSIONS AND WEIGHT

**Dimensions:** 80 × 47 × 52 mm (3.1 × 1.8 × 2.0 in) including windshield

**Weight:** 71 g (2.5 oz)

## Ordering Information

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Type 4448-001*	Personal Noise Dose Meter with HML parameters
Type 4448-002*	Personal Noise Dose Meter with HML parameters, Intrinsically Safe Model

### Starter Kits

All Starter Kits include the following accessories:

- ZG-0860: 3-way charger
- ZG-0864: Power supply for ZG-0860
- QA-0232: Screwdriver
- KE-0461: Carrying case
- AO-1492: Infrared-to-USB cable
- DS-1174: Spare windshields for Type 4448 (5 pack)
- BR-2212: Multilanguage field guide for Type 4448

**NOTE:** Starter kits with 10 units include an additional charger, the cable to connect chargers and an extra pack of spare windshields.

#### TYPE 4448-001 STARTER KITS (STANDARD MODEL)

Type 4448-101	1-unit Starter Kit
Type 4448-103	3-unit Starter Kit
Type 4448-105	5-unit Starter Kit
Type 4448-110	10-unit Starter Kit

#### Type 4448-001 Starter Kits with Sound Calibrator Type 4231

Type 4448-C-101	1-unit Starter Kit with 1 × Type 4231
Type 4448-C-103	3-unit Starter Kit with 1 × Type 4231
Type 4448-C-105	5-unit Starter Kit with 1 × Type 4231
Type 4448-C-110	10-unit Starter Kit with 1 × Type 4231

#### TYPE 4448-002 STARTER KITS (INTRINSICALLY SAFE MODEL)

Type 4448-201	1-unit Starter Kit
Type 4448-203	3-unit Starter Kit
Type 4448-205	5-unit Starter Kit
Type 4448-210	10-unit Starter Kit

#### Type 4448-002 Starter Kits with Sound Calibrator Type 4231

Type 4448-C-201	1-unit Starter Kit with 1 × Type 4231
Type 4448-C-203	3-unit Starter Kit with 1 × Type 4231
Type 4448-C-205	5-unit Starter Kit with 1 × Type 4231
Type 4448-C-210	10-unit Starter Kit with 1 × Type 4231

### Optional Accessories

Type 4231	Sound Calibrator
DV-0216	Crocodile Clip Mounting Kit (5 pack)
DV-0217	Pin Mounting Kit (5 pack)
DV-0218	Harness Mounting Kit (5 pack)
DV-0220	Hard-Hat Mounting Kit (1 pack)
DV-0221	3-Point Harness (1 pack)
DS-1174	Spare Windshield for Type 4448 (5 pack)
Type 2245-W-S	B&K 2245 Sound Level Meter with Work Noise Partner Software

### Service and Support Products

#### ACCREDITED CALIBRATION

DOSE-CAI	Accredited Initial Calibration of Type 4448
DOSE-CAF	Accredited Calibration of Type 4448

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\* Each Type 4448 comes with one set of crocodile mounting clips and one set of safety pin mounts.

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**Brüel & Kjær Sound & Vibration Measurement A/S**  
DK-2850 Nærum · Denmark · Telephone: +45 77 41 20 00 · Fax: +45 45 80 14 05  
www.bksv.com · info@bksv.com  
Local representatives and service organizations worldwide

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