

PRODUCT DATA

Personal Noise Dose Meter — Type 4448

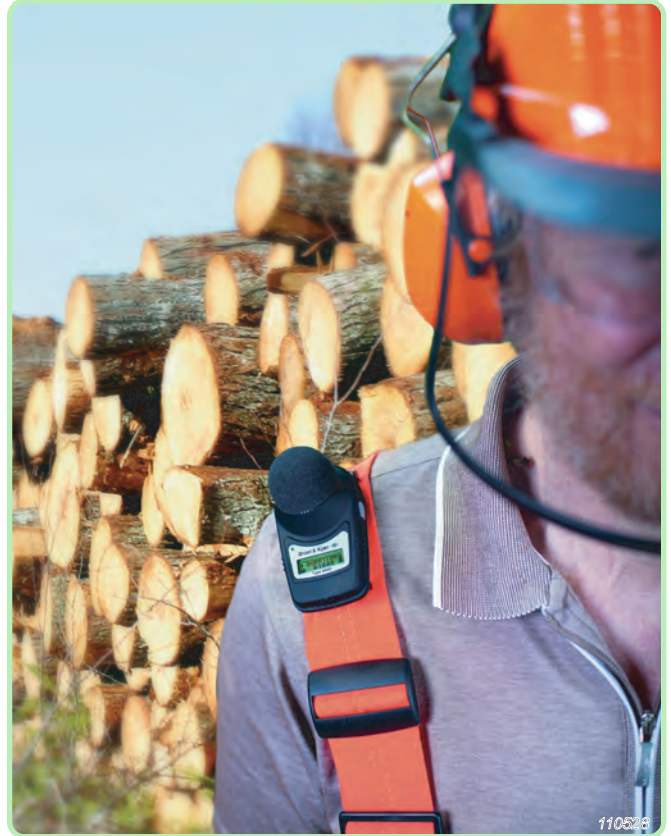
Type 4448 is a shoulder-mounted, cable-free personal noise dose meter. This unit accompanies workers throughout their workday, measuring and registering all relevant data about their noise exposure.

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.

The instrument is available in two configurations: Type 4448-A and -B. Type 4448-B provides all features of Type 4448-A and adds L_{Ceq} measurement for hearing protection selection using the Noise Reduction Rating (NRR), Single Number Rating (SNR) or High, Middle, Low (HML) rating method. Both are also available as intrinsically safe models for use in hazardous environments.

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

Data download and instrument configuration are done wirelessly using the infrared-to-USB cable and require Protector – Software for Calculation of Personal Noise Exposure Type 7825 (not included with Type 4448 or in kit). In addition to archiving, reviewing and reporting features, this software also allows "What if" analysis to reveal ways for reducing noise exposure.



Uses and Features

Uses

- Occupational noise assessment and management
- Provide data for selecting the appropriate hearing protection

Features

- Lightweight and cable-free
- Easy to mount with compliance to standards
- Robust, compact design for measurements in a wide variety of environments
- Simultaneous measurement of all relevant data (for ISO and OSHA)
- Simultaneous measurement of A- and C-weighted levels (Type 4448-B only) for hearing protection analysis
- Logging profile with 1 min interval
- Peak counting (135, 137 and 140 dB level exceedance)
- Preset measurement time capability
- Auto-calibration
- Rechargeable battery with up to 28 hours of operating time – 90-minute maximum recharge time
- 180-hour memory capacity
- Simple two-button operation
- Key and display lock
- Highly visible LED level exceedance alarms
- LCD display: Battery and memory status and selected measurement data
- Six languages: English, French, German, Italian, Portuguese and Spanish
- Linkable charging stations can charge up to 12 units at a time
- Wireless connection for downloading data (infrared)
- Multiple mounting options
- Intrinsically safe models available

Noise-induced Hearing Loss Is Expensive – Preventing It Is Cheap

Noise-induced hearing loss is one of the most prevailing occupational health problems. Millions of workers are at risk – repeatedly exposed to high noise levels. 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 pushbuttons 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 provide confidence that all is as it should be.

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



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Select Hearing Protection from Measurements

The advanced noise dose meter Type 4448-B 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 Ex

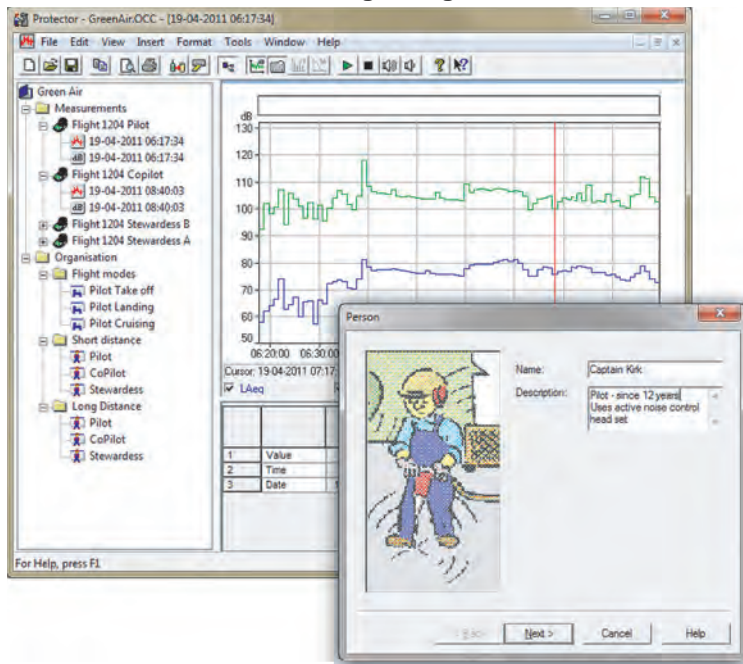
Both Type 4448-A and Type 4448-B are available as intrinsically safe models, meeting the requirements of ATEX EEx ia I M1, EEx ia IIC T2 II 1 G, certificate number 07ATEX2032X. North American and Canadian FM/CSA approvals are to Class 1, Division 1, Groups A, B C, D, temperature classification T2.

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

A Protector Type 7825 project is the complete collection of personal noise exposure data belonging to one organization and makes modelling each individual's exposure easy and comprehensive



Data download and instrument configuration are done wirelessly, via an infrared-to-USB connection and require Protector Type 7825 (not included with Type 4448 or kits). The software provides all the tools to archive, review and report measurements made with any Brüel & Kjær sound level meter or noise dose meter. In addition, it allows comprehensive “what if” analysis, making it easy to identify and plan risk mitigation and noise exposure reduction.

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

 	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	ATEX Directive 94/9/EC and the following intrinsic safety standards: EN 60079–0: 2009, EN 60079–11: 2007 and EN 60079–26: 2006. EN 60950: Safety of IT Equipment. EN 60335–2–29: Safety of Electrical Appliances.
EMC Emission	IEC 61000–4–3/6–3: Test techniques and requirements for Radiated Electromagnetic compatibility (EMC) field tests.
EMC Immunity	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. IEC 61000–4–2: Test techniques and requirements for Electrostatic discharge immunity tests.
Product Specific Standards	IEC 61252: 2002: Electro-acoustics – Specifications for Personal Sound Exposure Meters. ANSI S1.25: 1991: Specifications for Personal Noise Dosimeters.
Temperature	Ambient Operating Temperature: 0 to +40°C (32 to 104°F)
Humidity	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.
Atmospheric Pressure	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%
Mechanical	Non-operating: IEC 60068–2–6: Vibration: 0.3 mm, 20 m/s ² , 10–500 Hz IEC 60068–2–27: Shock: 1000 m/s ² IEC 60068–2–29: Bump: 1000 bumps at 250 m/s ²

Specifications – Personal Noise Dose Meter Type 4448

Specifications apply to all types unless otherwise stated.

STANDARDS

All types conform with the following National and International Standards:

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

Intrinsically safe versions also conform 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

Type: 1/2" Condenser Microphone mounted on instrument body

FREQUENCY WEIGHTINGS

L_{eq} and RMS Detector: A (and simultaneously C on Type 4448-B)

Peak Detector: A, C and Z (Linear)

TIME WEIGHTINGS

Slow, Fast and Impulse

MEASUREMENT PARAMETERS

Equivalent Continuous Sound Level: L_{Aeq}, L_{Ceq}^{*}, L_{Ceq}–L_{Aeq}^{*}

Average Sound Level: L_{av}

Impulse Weighted Average Sound Level: L_{Aleq}

Maximum Peak Level: L_{Cpeak}, L_{Apeak}, L_{Zpeak}

Time Weighted Average (TWA): Using Q=5

Maximum Sound Pressure Level: L_{AFmax}, L_{ASmax}, L_{Almax}

Minimum Sound Pressure Level: L_{AFmin}, L_{ASmin}, L_{Almin}

Sound Exposure Level: L_{AEPd}, L_{EX,8h}, L_{AE}

Sound Exposure: Pa²hr, Pa²sec

Dose percentage: Dose %

8 hour projected dose percentage: Projected dose %

* Type 4448-B only

Peak Count: 135, 137 and 140 dB exceedance

MEASURING RANGE

Sound Level Range:

65.0–140.3 dB (L_{Aeq}, L_{Ceq}^{*})

Peak Range:

95.0–143.3 dB(C)

LOGGING

Up to 180 hours with 1 minute logging period

L_{Aeq}, L_{av} (Q=5), L_{Zpeak}, L_{Cpeak}

STABILISATION TIME

3 seconds after start

EXCHANGE RATE

Q=3 dB and Q=5 dB

UNDERRANGE

1 dB below measurement range

OVERLOAD INDICATION

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

Peak: at 143.4dB linear (0.1dB 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

USER INTERFACE

Operation: Two pushbuttons: on/off, configuration/measurement control.

Display: LCD 100 x 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_{AF} (ISO mode) or L_{AS} (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

All parameters are always measured simultaneously

On Instrument:

Contrast (6 steps)

Language (see above)

Auto  (Auto-lock pushbuttons 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 min steps)

Clear Memory

Using PC: Language, welcome screen text, display mode, LED Alarms, Calibration target 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 no preset time chosen; i.e., manual measurement control (must be manually started and stopped)

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 are 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 pushbuttons 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 VERSIONS

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 x 47 x 52 mm (3.1 x 1.8 x 2.0 in.) including windshield

Weight: 71 g (2.5 oz.)

Ordering Information

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

STARTER KITS

Basic Noise Dose Meter Type 4448-A-001 Kits:

Type 4448-A-101 Starter kit with 1 Type 4448-A-001 unit
Type 4448-A-103 Starter kit with 3 Type 4448-A-001 units
Type 4448-A-105 Starter kit with 5 Type 4448-A-001 units
Type 4448-A-110 Starter kit with 10 Type 4448-A-001 units

I.S. Basic Noise Dose Meter Type 4448-A-002 Kits:

Type 4448-A-201 Starter kit with 1 Type 4448-A-002 unit
Type 4448-A-203 Starter kit with 3 Type 4448-A-002 units
Type 4448-A-205 Starter kit with 5 Type 4448-A-002 units
Type 4448-A-210 Starter kit with 10 Type 4448-A-002 units

HML Noise Dose Meter Type 4448-B-001 Kits:

Type 4448-B-101 Starter kit with 1 Type 4448-B-001 unit
Type 4448-B-103 Starter kit with 3 Type 4448-B-001 units
Type 4448-B-105 Starter kit with 5 Type 4448-B-001 units
Type 4448-B-110 Starter kit with 10 Type 4448-B-001 units

I.S. HML Noise Dose Meter Type 4448-B-002 Kits:

Type 4448-B-201 Starter kit with 1 Type 4448-B-002 unit
Type 4448-B-203 Starter kit with 3 Type 4448-B-002 units
Type 4448-B-205 Starter kit with 5 Type 4448-B-002 units
Type 4448-B-210 Starter kit with 10 Type 4448-B-002 units

All Starter Kits include the following accessories:

- ZG-0860: 3-way charger
 - QA-0232: Screwdriver
 - KE-0461: Kit case
 - ZG-0864: Power supply for ZG-0860
 - AO-1492: Infrared to USB cable
 - DS-1174: Spare windshields for Type 4448 (5 pack)
 - BR-2212: Multilanguage field guide for Type 4448
 - BZ-5298: Environmental Software DVD (license not included)
- Starter kits with 10 units include additional:**
- ZG-0865: 3-way charger (ZG-0860) and extension cable (AO-1943)
 - DS-1174: Spare windshields for Type 4448 (5 pack)

EXPANSION KITS

Basic Noise Dose Meter Type 4448-A-001 Expansion Kits:

Type 4448-A-303 Expansion kit with three Type 4448-A-001 units
Type 4448-A-305 Expansion kit with five Type 4448-A-001 units

I.S. Basic Noise Dose Meter Type 4448-A-002 Kits:

Type 4448-A-403 Expansion kit with three Type 4448-A-002 units
Type 4448-A-405 Expansion kit with five Type 4448-A-002 units

HML Noise Dose Meter Type 4448-B-001 Kits:

Type 4448-B-303 Expansion kit with three Type 4448-B-001 units
Type 4448-B-305 Expansion kit with five Type 4448-B-001 units

I.S. HML Noise Dose Meter Type 4448-B-002 Kits:

Type 4448-B-403 Expansion kit with three Type 4448-B-002 units
Type 4448-B-405 Expansion kit with five Type 4448-B-002 units

All Expansion Kits include the following accessory:

- ZG-0865: 3-way charger (ZG-0860) and extension cable (AO-1943)

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

OPTIONAL ACCESSORIES

Type 4231	Sound Calibrator
DV-0216	Crocodile 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 7825	Protector PC Software for Calculation of Personal Noise Exposure
Type 7825-X-100	Upgrade to latest version of Protector PC Software for Calculation of Personal Noise Exposure

Service and Support Products**ACCREDITED CALIBRATION**

4448-CAI	Accredited Initial Calibration of Type 4448
4448-CAF	Accredited Calibration of Type 4448
4448-TCF	Conformance Test of Type 4448, with certificate

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