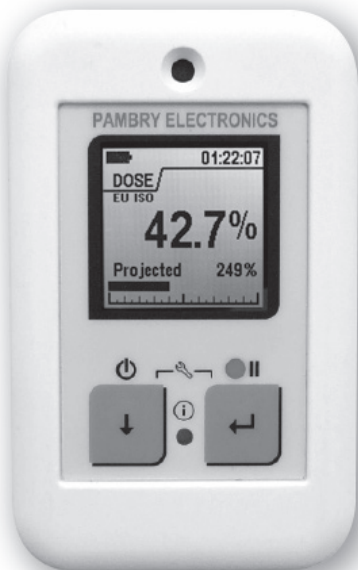




Listen Ear™ Personal Noise Dose Meter



User Manual

SOFTWARE REVISION

The User Manual supplied with the Listen Ear™ reflects the firmware installed at the time of manufacture. Updating the firmware may add or change product features.

SAFETY INFORMATION

For safe practice only operate in accordance with the instructions in this manual.



WARNING

To avoid personal injury, follow the guidelines below:

- Do not remove cover.
- Use the Listen Ear™ only as specified in this manual.
- Do not use around explosive gas or vapour.



- It is your responsibility to contribute to a clean and healthy environment by using the appropriate local return and collection systems.
- The symbol shown on the left indicates that separate collection systems must be used for any discarded equipment or batteries marked with the WEEE Symbol.



PAMBRY DISCLAIMER

Pambry Electronics reserve the right to change specifications or update this user manual at any time without prior notice.

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1.0 INTRODUCTION

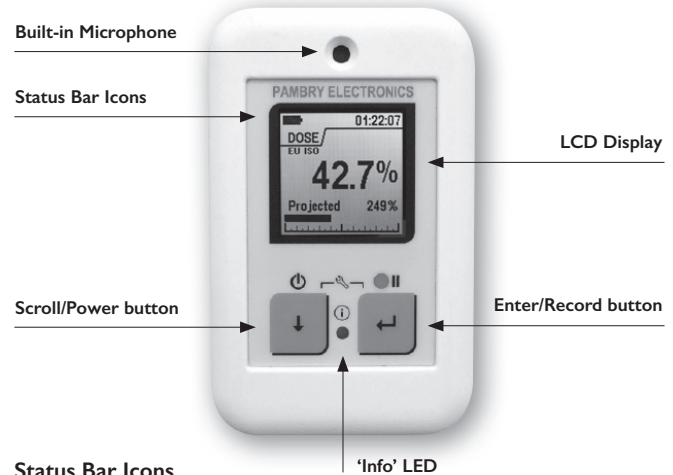
Welcome to your new purchase of your Listen Ear™ Noise Dose Meter and thank you for choosing Pambry Electronics Ltd, a dedicated UK manufacturer of audio products sold worldwide.

This professionally made and calibrated instrument is by far the best value for money device of its type in the world. It will assist you to monitor your hearing health and Noise Induced Hearing Loss (NIHL). As one of the smallest and lightest units made, its ease of use belies the hidden complexity inside. The theory behind NIHL is provided in Chapter 11 of this manual.







2.0 FEATURES

- Compact and light design to clip on during the working day
- View current noise level and total exposure of the day on back lit LCD display
- Knock and Vibration Cancelling Technology - patent applied (1611153.6)
- Revolutionary design to simulate the effect of wearing ear defenders
- Use Mobile Phone to control and view data
- Battery life up to 160 hours / 4 working weeks
- Charged using USB
- Pre-set and custom Dose criteria settings including: ISO, OSHA, ACGIH, NIOSH
- Up to two simultaneous Dose analysers, each using different criteria
- Comply to the 'Control of Noise at Work Regulations 2005 (UK)'
- Complies to international standards: IEC 61672-1, IEC 61252
- Produce a daily report and statistics of the work environment by downloading data
- Default 8-hour day
- Tamper proof facility
- Bright LED for dose alarm warning
- Contains A, C and Z-weighting filters to mimic the frequencies heard by the human ear
- Built in Internal or optional External Microphone
- Calibrated during manufacture
- Data logging - Noise Dose / Sound Level / Temperature / Humidity / Movement
- No USB Drivers required to download data
- Class 2 sound level meter
- Includes movement and orientation monitor
- Records Temperature and Relative Humidity

3.0 DESCRIPTION



Status Bar Icons

-  Battery level Indicator
-  Wireless connectivity enabled
-  Mobile phone app. connected
-  Report enabled
-  Wearing Ear Defender
-  External Microphone Connected
- 00:00:00** Noise dose record duration - HH:MM:SS
- OL** Acoustic Overload recorded.
Recorded dose may not be accurate

Supplied with your Listen Ear™

- Quick Start Guide
- User Manual
- Micro USB 2.0 Cable 1.5m

Optional Accessories

- Sound Calibration Unit (SCU)
- External Microphone
- Wall bracket

3.1 Charging Before Use

Before use ensure the unit is fully charged by connecting it into a suitable charger or computer USB port.

Charging is indicated by an "Info" LED and/or display icon. A red light indicates "charging in progress", a green light means that the battery is "fully charged". Charging may take up to 5 hours, depending on where the device is connected. Battery life between charges is up to 160hours (4 working weeks), depending on the activated options.

The 'Info LED' blinks RED once every 3 seconds when the battery level is below 10%.

3.2 Connecting to a PC

The method of accessing the stored files in your Listen Ear™ is by using your computer's file explorer application, where the stored files can be downloaded and manipulated as required.

Connect your Listen Ear™ device to your PC using the USB Cable supplied. Microsoft® Windows® shall install the drivers automatically. Windows® explorer will be activated granting you access to stored files located on your device.

3.3 Switch ON

On initial power up or if the battery has been discharged you will be prompted to the time/date menu.

To switch ON your Listen Ear™ press the "Scroll/Power" button. The Pambry 'splash' screen will appear followed by the recently used 'page'. There are a number of different 'pages' each one representing a specific measurement or function. Each 'page' is obtained by pressing the "Scroll/Power" button. Each press scrolls to the next 'page' then returns where you started. The unit wakes on power up in the first 'page' DOSE and the default set of measurement 'pages' are Dose and Level.

There are a further 5 screen pages which can be accessed via the MENU screen (see CLOCK settings below) and scrolling to PAGES.

3.4 Switch OFF

Depressing the "Scroll/Power" button for 1 second will turn the unit OFF.

Note that if a Noise Dose recording is in progress this will stop and reset.

Unit cannot be switched off in MENU OPTIONS Page as SCROLL MODE is activated.

If needed, Listen Ear™ can be manually "rebooted" by holding the "Scroll/Power" button for 8 seconds. Current recording will be aborted, and settings will be set to factory defaults. Report and History files will not be affected.

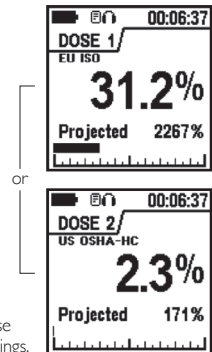
4.0 PAGES

There are 5 'pages' so called because each represents a specific measurement or function.

Each "Scroll/Power" button press turns to the next 'page' and eventually back to the first one. Section 5.1 describes way of enabling/disabling required 'pages'.

Dose

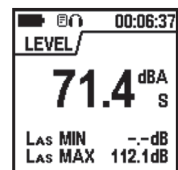
- Name of the Dose standard
- Current Noise Dose percentage
- Projected Noise Dose percentage (at the end of the 8h shift)
- Graphic representation of the Current Noise Dose (0-100%)



Depending on the Dose standard set in the settings.

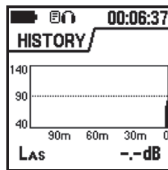
Level

- Current Sound Pressure Level
- Maximum Sound Pressure Level (current session)



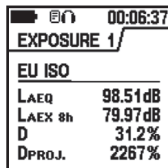
History

- Last 90 minutes of Sound Pressure Level
- Current Sound Pressure Level

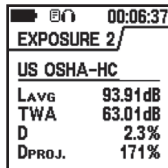


Exposure (current session)

- L_{EQ} - equivalent continuous noise level
- L_{EX8h} - noise exposure level averaged over 8h
- Current Dose percentage
- Projected Dose percentage at 8Hr point



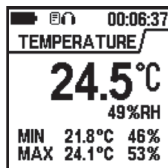
or



By toggling the Enter/Record key (if two analysers are selected). See Ch 5.2 Menu/Settings.

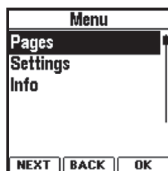
Temperature

- Current temperature
- Current humidity
- Minimum temperature and humidity (current session)
- Maximum temperature and humidity (current session)



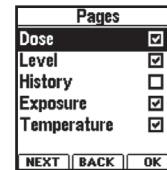
5.0 MENU

To enter or exit from Menu press and release both buttons simultaneously. Button functions depend on the current Menu location and are displayed at the bottom of the screen.



5.1 Menu / Pages

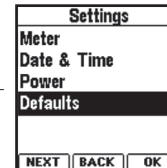
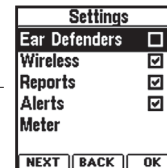
The 'Pages' menu allows to enable/disable required pages. At least one page must be enabled. Only parameters from enabled pages are recorded in the report and history files (if enabled).



5.2 Menu / Settings

Your Listen Ear™ has a number of adjustable settings which can be modified, enabled & disabled if desired in the Settings pages.

Or scrolling down to find more.



Menu / Settings / Ear defender

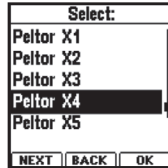
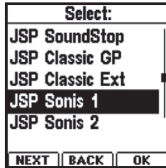
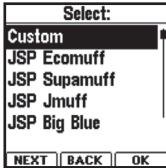
Under the EU/UK Control of Noise at Work Regulations 2005, noise levels above 85dBA require the use of hearing protection. If you wish to use your Listen Ear™ whilst wearing hearing protection, then this is possible by inputting the SNR (see page 20) attenuation figure from the specification of your hearing defender or ear plug into the SETUP page screen. The Listen Ear™ will take note of the new setting and give exposure readings as if measuring at your ear inside the Hearing Defender earmuff and not outside in the external environment.

The 'Ear defender' menu displays 3 lines of information regarding the current settings.

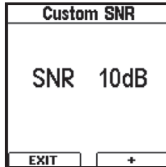
- Line 1 - Enable or disable Ear Defender correction
- Line 2 - Current Ear defender model from the pre-set list.
- Line 3 - Current SNR value



A range of preprogrammed Ear Defenders with SNR ratings can be selected by entering the 'Line 2'. If you are wearing an ear defender contained in the list (currently 16 in all), scroll to the ear defender being used and press OK. The SNR value will be used for the Noise Dose and Sound Level calculation.



Alternatively, if your particular Ear defender is not displayed in the list, Scroll to the SNR, press OK and enter SNR value between 5 and 45dB for the Ear defender worn. This value should be obtained from the Ear Defender manufacturer.



See section 11.2 for information regarding ear protection.

Menu / Settings / Wireless

Enable / disable Wireless connectivity.

For more details please refer to Listen Ear™ APP user guide.

Menu / Settings / Reports

In addition to the 'easy to understand' Noise Dose presented as a single number; Listen Ear™ can produce and save Daily Report Files.

First menu line **enables / disables** report and history saving.

The method for accessing the stored files in your Listen Ear™ is by using your computer's file explorer application, where the stored files can be downloaded and manipulated as required.

Two types of files are stored (depending on settings):

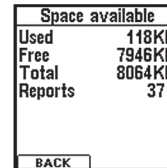
- Report files, named *rep_0001.txt* (in folder */REPORTS*), containing recording session details. These can be opened by any text editor, i.e. Notepad in Windows based PC's
- Time history files, named *hst_0001.csv* (in folder */HISTORY*), containing periodically saved levels measured. Data is stored in the csv (comma separated values) format and can be opened by any text editor; i.e. Notepad or Microsoft Excel in Windows based PC's and used to post process recorded data, i.e. to plot a Time History graph.

The **Time history** sets how often data is recorded in the history file.

Longer data recording periods decrease the history file size, allowing to store more files.

The **Memory Manager** allows you to check available storage space, content and format memory if necessary.

CAUTION - memory formatting will delete all your existing report and history files!



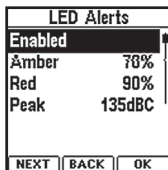
Menu / Settings / Alerts

This page refers to the settings for the **Info LED** warning indicator. If enabled, the 'Info LED' will indicate two different alerts:

- Amber or Red for Noise Dose
- Blue for Sound Level Noise peak

The 'Info LED' will start blinking Amber or Red when the Noise Dose will exceed set levels in Dose Analyser 1. If an alert has been triggered, press any button to stop the LED from blinking.

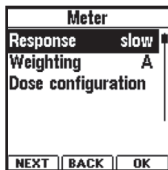
Should you be in very high noise environments the 'Info LED' will flash blue to indicate a peak level exceeded.



Menu / Settings / Meter

It is not recommended to alter the Meter Settings if you are unfamiliar with the use and understanding of noise measurements.

See chapter 11.0 Theory behind the Listen Ear™



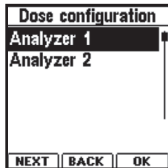
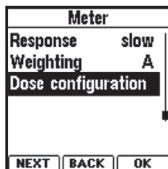
Choose between **Fast & Slow** Time weighting.
Choose between **A, C & Z** Frequency Weightings

Menu / Settings / Meter /Dose Configuration /Analyzer

Select Dose Configuration and choose either Analyser 1 or 2.

Analyser 1 can be set to one of 5 fixed preset references, or a Custom preset.

Analyser 2 can also be set as Analyser 1 but can also be disabled so as not to appear in the Page Menus if not required. Analyser 1 is always present and cannot be disabled.



Preset Dose Standards: -

Standard Ref.	EU ISO	US OSHA-HC	US OSHA-PEL	US ACGIH	US NIOSH	CUSTOM
Ex rate dB	3	5	5	3	3	As Req.
Cr level dB	85	90	90	90	85	As Req
Cr threshold dB	-	80	90	-	80	As Req
Cr time Hrs	8	8	8	8	8	As Req
Cr response	-	slow	slow	slow	slow	As Req.

In the CUSTOM setting, you may choose the Exchange rate to be from 3 to 6dB, Criterion Level from 75 to 90dB. Criterion threshold can be set to Disable, 80dB or 90dB

Criterion Time is set fixed to 8 hours in accordance with Noise at Work Regulations. Criterion Response time is either slow or off.

Menu / Settings / Time-Date

Set current Time and Date.

Press NEXT to select item to be adjusted, press +/-OK to adjust selected item.

Select SAVE and press +/-OK to save new settings. Otherwise select Cancel or EXIT from menu.



Menu / Settings / Defaults

To restore back to default factory settings, SCROLL down to Defaults and press ENTER. Confirm in the next step.

Report and history files will not be affected.



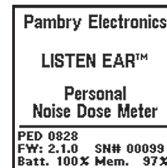
5.3 Menu / Info

Information about your Listen Ear™ can be found in the Info Page.

- Listen Ear Model & Serial Number
- Firmware Version
- Battery Remaining (%)
- Memory Storage Remaining (%)

Info Page is a **READ ONLY** Page.

To exit the Info Page press both buttons simultaneously.

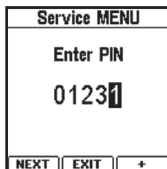


6.0 CALIBRATION

In accordance with Noise at Work Regulations - Each time a device is used it should be calibrated using an acoustic calibrator. This will ensure the instrument is measuring correctly and that you are complying with the requirements of any standards.

Calibration should be done using a Sound Calibrator and appropriate Internal or External Microphone Calibration Fixture, available as an option.

The Calibration menu can be accessed by going to the "Info" screen, and holding both buttons until "Pin Entry" screen appears. Use **01231** pin to access the calibration menu.



6.1 Calibration procedure

Int. refers to the built-in microphone

Ext. refers to the optional external microphone that can be used via the micro USB port.

Pressing NEXT (both buttons) will step through the calibration menu from **Int.** to **Ext.** Microphones and returning to the Meter page.

Ensure Listen Ear™ is situated on a stable flat surface throughout the calibration process.

Place Sound Calibration Unit (SCU) provided over the internal or external microphone.

1. Switch ON SCU. A continuous SPL of 94dB @ 1KHz shall be applied to the Internal/External microphone.
2. **Ls** should read 94dBA +/- 0.2dBA. If required adjust SPL Value using +/- buttons.
3. To store the new calibration value, press and hold both buttons simultaneously until confirmation is shown.
4. Remove and switch OFF SCU.
5. The Listen Ear™ is now calibrated.

The "Info LED" will change colour to green if Ls read 94dBA ±0.2dBA, or blue/amber if value is below/above limit.




7.0 ATTACHING YOUR Listen Ear™

Mount the Listen Ear™ as close to your ear as possible. Attach the Listen Ear™ to your clothing using the integrated clip.

7.1 Mounting Listen Ear™ with external microphone attached

Your Listen Ear device can be supplied with an external microphone which provides added flexibility for positioning.

Plug the **External** microphone provided into the Micro USB Socket. The microphone LED shall illuminate momentarily.

The  Icon shall appear on the status bar indicating that the **External** microphone has been correctly paired and activated ready for use.

Relevant calibration data has been applied automatically.

The **Internal** microphone will be disabled while the **External** microphone is connected.

The Anti-Knock & Vibration System is not active when **External** microphone is connected

Only microphones supplied by Pambry Electronics will be recognised (paired) by the Listen Ear™

Attach **Ext.** microphone to your shoulder or helmet as close to the ear as possible using the mounting clip provided.

8.0 SPECIAL FEATURES

8.1 Anti-Knock & Vibration System

A major problem encountered with personal noise dosimeters is distinguishing between true audio impulse noise and extraneous mechanical 'tapping' on the personal noise dosimeter casing. The introduction of a Patented Anti-Knock & Vibration System to the Listen Ear™ provides an additional level of accuracy to the final result. The Listen Ear™ can detect and eliminate the mechanical tapping noise, therefore the noise exposure measured and recorded is an actual representation of that environment. Number of detected 'knocks' is recorded and stored in the report file. The Anti-Knock & Vibration System is not active when the **External** microphone is connected.

8.2 Motion Detection System

This feature monitors the Listen Ear™ motion status. It will detect if the unit is not worn during the recording session. The 'non motion' event will be detected if the unit is stationary for at least 10 seconds. Number of events and summary of 'no motion' time is recorded in the report file.

8.3 Auto Power OFF

To save the battery life, the Listen Ear™ will switch itself OFF after 1 hour if no motion is detected and no record is taking place.

9.0 MEASUREMENTS

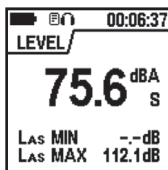
Your Listen Ear™ is a sound level meter with the capacity to record and calculate the complex requirements for safe levels of noise dose. The traditional working day of 8 hours is used and set as a default in your Listen Ear™.

This can be altered as can the various audio thresholds, but it is NOT recommended you do or need to until you are entirely familiar with the subject of NIHL.

9.1 Use as a Sound Level Meter

Scroll your Listen Ear™ to the page labelled 'Level'. This function provides you with a live sound level (the large digits in the screen centre) and the reading will change with the level of sounds heard in your environment.

These can be modified under the settings menu. The smaller digits and icons at the top and bottom of the screen relate to the unit's use as a Noise Dosimeter.

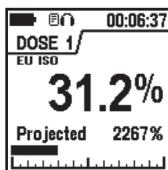


9.2 Use as a Noise Dosimeter

Scroll your Listen Ear™ to the screen labelled 'Dose'. The percentage value gives you the amount of Noise Dosage you have used up over your working 8hr day. The Projected Noise Dose represents the calculated dose at the end of an 8hr shift, assuming that the noise level will stay at the current level.

Start Measurement


Press and hold the Record button. The 'Info' LED shall illuminate GREEN momentarily and "Record started" message shall also appear momentarily. The real-time counter is now activated which indicates that your Noise Dosimeter is calculating and recording data.

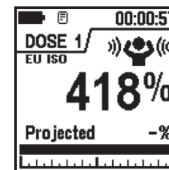


Stop Measurement

Press and hold the Record button. The 'Info' LED shall illuminate RED momentarily.

At the end of the 8 hour work shift if you are working safely, the dose value will display less than 100%.

Should you exceed the Alert dose threshold levels (see page 11 / 12) the  icon will be displayed.



It is advised that you should remove yourself to a quiet environment to allow your hearing to recover if the dose recorded is greater than 100%. You may also consider using the Ear Defenders.

Menu and Settings cannot be accessed while recording is in progress.

10.0 FIRMWARE UPDATE

Firmware is the software that is inside the Listen Ear™. Occasionally, Pambrly Electronics may release new versions of the firmware that add enhanced functions or fix software bugs.

To update the firmware, you need a USB connection from your computer to your Listen Ear™. You must also have a copy of the firmware file, obtained from Pambrly Electronics website or Customer Service.

1. Turn on and connect your Listen Ear™ to your PC.
2. Copy the Firmware update file to your Listen Ear™ memory.
3. Disconnect Listen Ear™ from your PC.
4. Press and hold Power button until 'Info LED' starts blinking blue. Release buttons.
5. Your Listen Ear™ will start in the 'Bootloader' mode and will ask you to confirm firmware update. Press 'Yes', the 'Info LED' will start blinking green, and finally your Listen Ear™ will restart with new Firmware.

Firmware update process may take up to 1 minute. Do not press any buttons whilst update is in progress.

11.0 THEORY BEHIND THE Listen Ear™

11.1 Reference Information - NIHL

Noise-induced hearing loss (NIHL) is hearing impairment or loss resulting from exposure to loud sound. As a consequence, you may have a loss of perception of a narrow range of frequencies, impaired cognitive perception of sound, or other impairment, including sensitivity to sound or even ringing in the ears.

Hearing may deteriorate gradually from chronic and repeated noise exposure, such as loud music or background noise, OR suddenly, from a short high intensity impulse noise such as a gunshot or air horn.

In both types of noise, the loud sound over stimulates delicate hearing cells, leading to the permanent injury or death of these cells. Once lost, your hearing cannot be restored. When exposure to hazards such as noise occur at work and is associated with hearing loss, it is referred to as occupational hearing loss.

Listen Ear™ has the capability of monitoring both types of noise. There are various standards to which noise measurements adhere to, but the main ones are the US and EU/UK ISO references.

The more stringent of these standards is the ISO type and this is the default setting for your Listen Ear™. Your Listen Ear™ units can be modified via the Settings pages. The various standards types are available as presets or you can set a customized one should it be necessary.

It is important to realise that once you have been subjected to a significant amount of excessive noise and your hearing loss is confirmed, it is too late! So, what will your Listen Ear™ do. The device is primarily designed to measure the noise levels in your environment. Wherever you are, if you are wearing it, the LEVEL display screen will indicate the actual noise level in dB in real time. The DOSE display screen takes these level measurements and integrates them over an 8-hour time slot to give you a percentage noise dose figure. As you work or play in a noisy environment, the dose meter will register and record the amount of noise and present it as a percentage of the safe allowable level. Once you reach 100% you should remove yourself from the noisy environment and recover for 24 hours. **This is what Listen Ear™ does - it tells you when you have received enough noise on a daily (8hr) basis and will help to save your hearing.**

11.1.1 Preset Standards

ISO - International Organization for Standardization, Europe

OSHA - Occupational Safety and Health Administration, USA

ACHIH - American Conference of Governmental Industrial Hygienists, USA

NIOSH – National Institute for Occupational Health and Safety, USA

Below is a table of typical noise levels for your information.

dB Levels		
Possible physical damage	160	Pistol shot
	150	Fireworks display, Rock concert peak
Acoustic trauma	140	Shotgun blast
	130	Jet engine (50m distance), motor racing
Painful	120	Rock concert, thunder
	110	Car horn, snow blower, pneumatic hammer
Extremely loud	100	Blow dryer, helicopter cabin, chainsaw
	90	Motorcycle, lawnmower,
Ear protection required	85	
	80	Factory, noisy restaurant, vacuum cleaner
Factory Noise Action Level.Very loud	70	Car cabin, alarm clock, city traffic
	60	Conversation, dishwasher
Loud	50	Moderate
	40	Faint Refrigerator
Moderate	30	Quiet Whisper
	20	Ticking watch

11.2 Ear Protection

Ear defenders or ear muffs are PPE (personal protective equipment) designed to protect the wearer from extreme noises. The head-band and outer covering is usually made from a hard thermoplastic or metal. The protection usually comes from the earcup mass/stiffness, the earseal compliance and the internal acoustic foam thus reducing the amplitude of the sound waves within the earcups of the ear defender. Earplugs work on the different principle of simply blocking sound waves from entering the ear canal.

What is SNR and NNR?

SNR stands for **Single Number Rating** whilst **NNR** stands for **Noise Reduction Rating**. These two systems are slightly different in their test method but basically provide a number value that can be used to compare the level of noise attenuation offered by different hearing protectors. To determine acoustic pressure on your ears, you subtract the SNR or NNR value from the average noise level measured.

For example if the noise level measures an average of 99dBA and you are wearing ear protection with an SNR of 19, the acoustic pressure at your ears is on average $99 - 19 = 80$ dBA.

The higher the SNR or NNR, the higher the level of noise attenuation provided by the hearing protection. For the same ear defender, the NNR value will generally be a few dB higher than the SNR value, and as such the SNR method is preferred in Europe.

In the case of dual noise protection i.e. the use of ear plugs under a hearing defender, the SNR values sadly cannot be added together as other issues such as body conduction come into play and the Noise Dose result will not be safe.

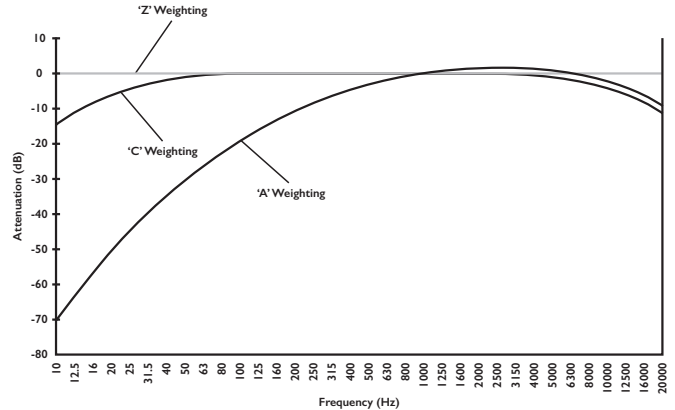
11.3 A, C & Z Filter Weighting

Our Human hearing has a specific performance over a certain frequency. Weighting Filters represent our hearing performance at specific sound levels with respect to frequency.

- A - Filter: emulating the human hearing @ lower levels
- C - Filter: emulating the human hearing @ higher levels
- Z - No weighting, i.e. what the system is actually producing.

Figure 1 opposite illustrates frequency response curves for A, C & Z Filter Weighting.

Figure 1 - Frequency Weighting Curves



11.4 Fast & Slow Time Weighting

Time weightings are used to represent the behaviour of sound pressure levels.

When sound level meters were first developed, analogue meters were used. The needle would move corresponding to the sound pressure level. The needle size/weight would vary depending on manufacture leading to ambiguous results.

Standards were introduced to ensure sound level meters from different manufacturers would display the same readings.

These are known as time weightings

F - Fast Weighting time constant = 125ms - decay 34,7 dB/sec. it is only a glimpse of the very last Sound pressure that has happened during our recording.

S - Slow Weighting time constant = 1 sec - decay 4,3 dB/sec

This smoother level history can give you a better indication of the noise level in an environment which is constantly changing.

Keep in mind that Leq is the most relevant long-term measurement that would correspond to our human perception.

12.0 REPORT AND HISTORY FILES

The report and history files are stored in the memory only 'report' function is enabled in Menu/Setting/Reports (see page 11). Both file names are numbered i.e. rep_0007.txt and hst_0007.csv for the report number 4. Files are stored in folder /Reports and /History respectively.

12.1 Report file example

```

Daily Noise Dose Report #0007
Record duration      08:00:00
Record started      18:17:57 19/11/18
Record completed    02:17:57 20/11/18
Las min            ---          00:30:33 20/11/18
Las max           126.9dB        00:39:37 20/11/18
Lpk max           137dB
Peak events        3
Overloads          0

Exposure
Analyzer #1 configuration  EU ISO
Dose recorded         123.68%
Leq                  0.00dB
Lex8h                85.92dB
Exchange Rate        3dB
Criterion level      85dB
Threshold            none

Analyzer #2 configuration  US OSHA-PEL
Dose recorded         4.31%
Lavg                 0.00dB
TWA                  67.33dB
Exchange Rate        5dB
Criterion level      90dB
Threshold            90dB

Environment data
Temperature min      14.5 °C          20:06:54 19/11/18
Temperature max     24.2 °C          18:19:29 19/11/18
Humidity min        37.0%RH          19:32:04 19/11/18
Humidity max        79.1%RH          00:39:39 20/11/18
No motion events (>10s)  10          Duration 00:53:30
Knock events        245

System
Manufacturer        Pamby Electronics
Model               PED 0828
Firmware Version    2.0.1
Serial number       00095
Calibration time    Internal Mic.    14:33:00 15/11/18
Report file         rep_0007.txt
Time history file   hst_0007.csv

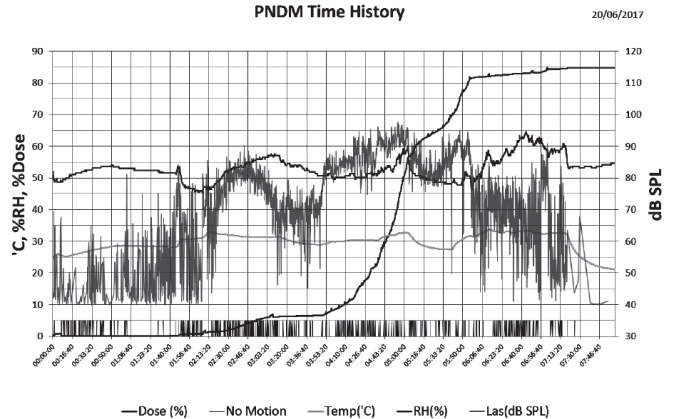
End of Report
    
```

12.2 History file example (2 minutes part only)

Start date,	Duration,	Interv. (s),	Records		
03/07/17,	08:00:00,	10,	2880		
T(h:m:s),	Las(dB),	Dose(%) ,	No motion,	Temp(°C),	Hum(%RH)
09:26:12,	,	0.0,	,	21.2,	63.4
09:26:22,	,	0.0,	,	21.2,	63.4
09:26:32,	42.7,	0.0,	,	21.2,	63.9
09:26:42,	,	0.0,	,	21.2,	63.9
09:26:52,	59.9,	0.0,	,	21.2,	63.4
09:27:02,	,	0.0,	,	21.3,	63.4
09:27:12,	44.5,	0.0,	,	21.3,	63.4
09:27:22,	51.6,	0.0,	,	21.3,	63.4
09:27:32,	62.3,	0.21,	1,	21.3,	63.4
09:27:42,	70.6,	0.21,	1,	21.3,	63.4

NOTE: Spaces are inserted in above sample for clarity.

12.3 Example plot generated from the history file, using Microsoft Excel software



13.0 SPECIFICATION

Certificates and standards

IEC 61672: 1993	Class 2 Sound Level Meter
IEC 61252: 1993	Personal Sound Exposure Meter
CE Mark	Complies with the Directive on low voltage 73/23/CEE and Directive CEM 89/336/CEE modified by 93/68/CEE.

Sound measurement

L _A	70dB to 140dB
L _{CPK}	140dB
Over Load detector flag	140.1dB
Resolution	0.1dB
Frequency weighting	A, C
Time weighting	Slow (1s), Fast (1/8s)

Exposure measurement

Dose range	0% to 9999%
Exchange Rate	3dB, 4dB, 5dB, 6dB
Criterion Level for 100% Dose	75 to 90dBA (in 5 dB Increments)
Criterion Threshold	none, 80db, 90dB
Simultaneous analysers	up to 2
Ear defender SNR range	5dB to 45dB
Results	SPL, L _{EQ} , L _{EX8h} , L _{AVG} , TWA, L _{MIN} , L _{MAX} , Dose (%), Projected Dose (%8h)

Environmental measurement

Temperature range	-40°C to +80°C
Temperature resolution	0.1°C
Humidity	0% - 100% RH
Humidity resolution	1% RH
Motion	3 axis, 10s detection time

Memory

8Mbytes. Accessible by micro USB cable using PC - no drivers required.

Microphones

Internal	Pre-polarised condenser microphone
External	as above + proprietary USB interface

Data logging

Summary results for the measurement time	
File type	reports: *.txt, history: *.csv
Time history at intervals	10s, 30s, 1m, 5m, 10m
Temperature and humidity	
Motion status	number of events, summary time

User interface

Display	LCD, 128x128, backlit for 6s after keypress
Keypad	two multifunction buttons
Other	multicolour 'info LED'

Battery

Non removable Lithium-Polymer	3.7V / 550mAh
Power consumption	2mA (avg), 20mA (max)
Auto power-off	1h (no motion, not recording)
Charging	micro USB, up to 200mA
Operating time	up to 160 hours / 4 working weeks (depending on features enabled)

Dimensions, weight, appearance

Size (H x W x D) including clip	83mm x 52mm x 19mm
Weight	52g
Available colours	white, grey, black

Environmental

Operating temperature	0°C to +50°C
Operating Humidity	up to 90% RH, non-condensing
Storage temperature	-10°C to +60°C
Storage Humidity	up to 90% RH, non-condensing

NOTE: All values are typical unless otherwise stated.

Continuous product development and innovation are the policy of our company. Therefore, we reserve the right to change the specifications without prior notice.



EC Declaration of Conformity

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Sales: sales@pambry.co.uk
Web: www.pambry.co.uk

Pambry Electronics Ltd. declare under our sole responsibility that the product:

PED 0828 Pambry Personal Noise Dose Meter.

Complies with the applicable EU CE Directives.

Applicable EU Directives: 2014/53/EU Radio Equipment Directive
 2011/65/EU RoHS Directive
 2012/19/EU WEEE Directive

Quality Assurance: Pambry Electronics Ltd. Operates a Quality Management System in accordance with ISO9001:2008.

Date: May 2017

Signed:

.....
John Webb
Manager of Quality Assurance

PRO93 - A



Pambry Electronics Ltd

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