User Manual for NoisePen Dosemeter

Model 26

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No liability is accepted for any inaccuracies or omissions in this manual, although due care has been taken to ensure that it is complete and as accurate as possible.

Accessories supplied by Pulsar Instruments plc. have been designed for use with the instrumentation manufactured by Pulsar Instruments Plc. No responsibility is accepted for damage caused by the use of any other parts or accessories.

The NoisePen is designed and manufactured in the United Kingdom by:

Pulsar Instruments plc, The Evron Centre, John Street, Filey North Yorkshire, YO14 9DW, United Kingdom.

Version 6 June 2016

About this manual

- The instructions in this user manual refer to the operation of Pulsar Instruments plc NoisePen personal noise dosemeter.

- The NoisePen configuration will be set at the factory depending on customer or geographical requirements, therefore some options or views shown in this manual may not be applicable.

- This manual describes the recommended usage of the NoisePen. Any warnings will be indicated by the following warning symbol:

Preface

Thank you for purchasing the NoisePen personal dosemeter system from Pulsar Instruments plc.

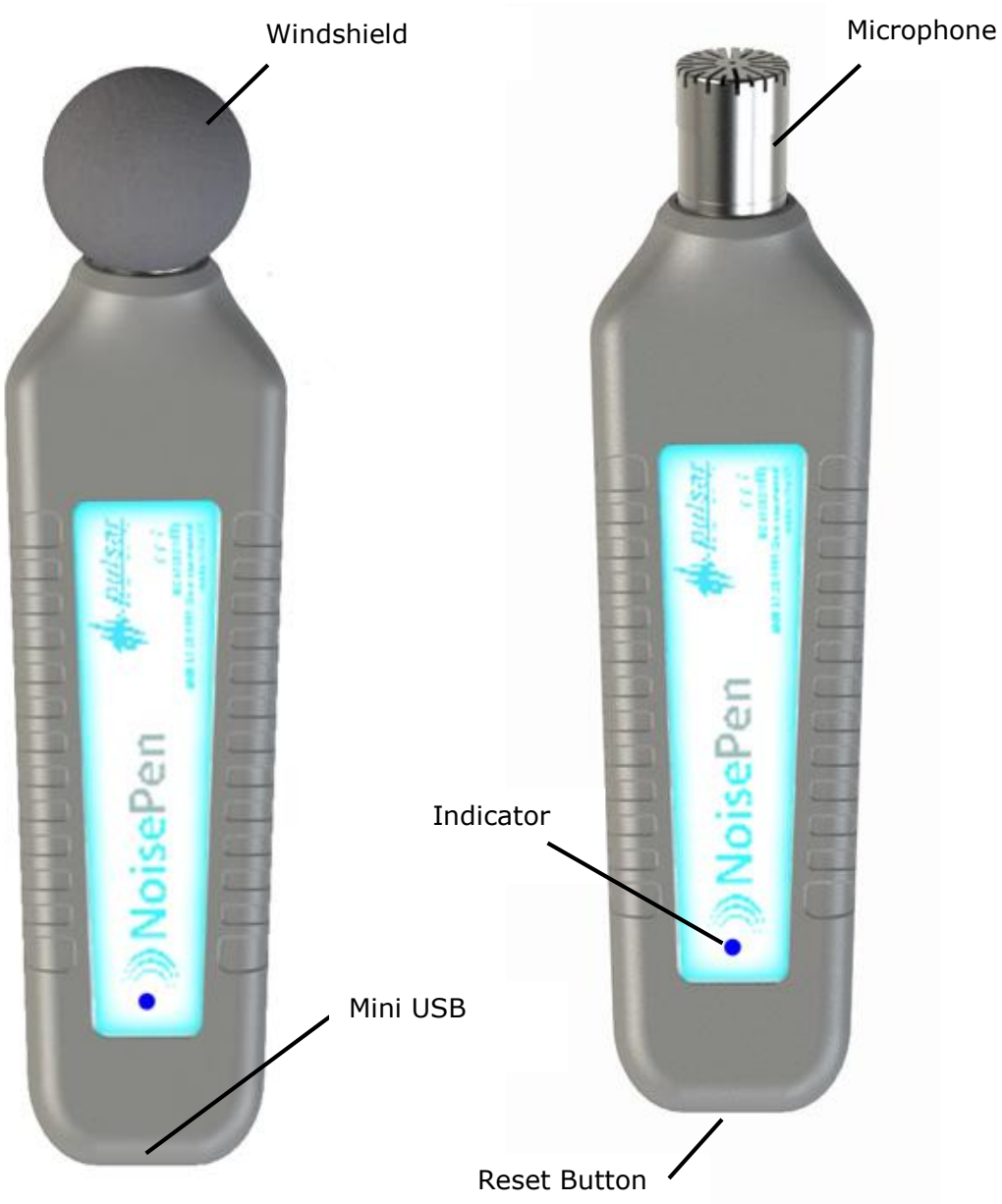
The Pulsar NoisePen is a powerful two channel instrument providing simple operation for a wide range of customer and geographical regulatory requirements. Channel one monitors RMS noise level, whilst channel two monitors the Peak level.

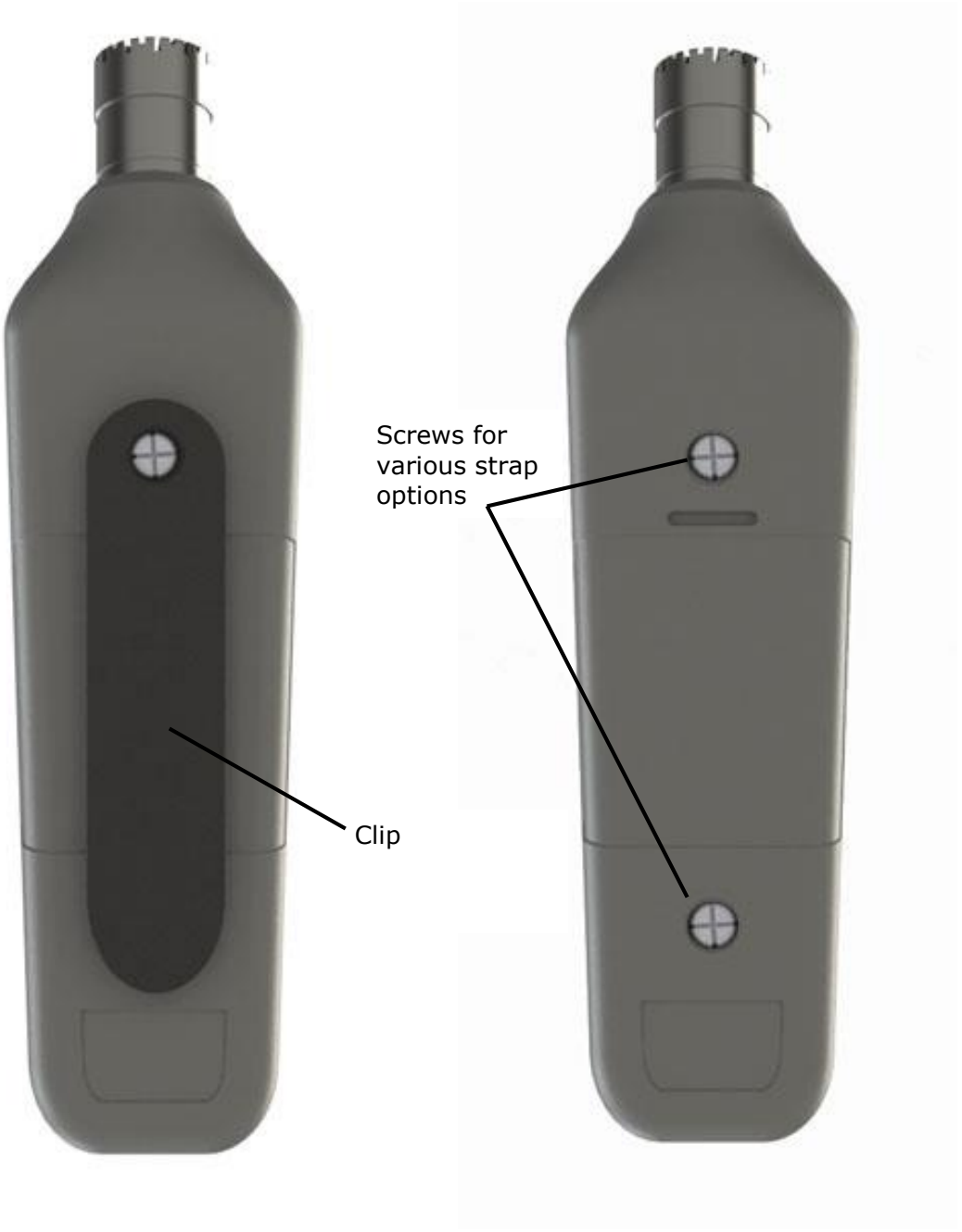
Pulsar Instruments will guide the user through the regulatory requirements of the users' industry and country and pre-configure the NoisePen at the factory prior to shipping. This enables the user to receive and start using the NoisePen with little or no additional setup, avoiding the risk of incorrect measurements being made.

This manual describes the procedure that should be followed to operate the NoisePen dosemeter, as well as comprehensive technical information, using optional accessories and troubleshooting.

This manual also contains an introduction to what a personal noise dosemeter is, and how it works.

Instrument Overview





Key Features of the NoisePen

- Microphone – PM2 ½" Pre-polarised Free-field Condenser Microphone
- Windshield – foam windshield
- USB – Mini USB socket
- LED Indicator
- Pocket Clip
- Strap fastening screws
- Reset button

Introduction

The new Pulsar NoisePen has no controls or cables, which means that it can be used in situations where the wearer is working in confined spaces or where a cable could present a risk of being caught in machinery.

*The NoisePen setup is pre-configured prior to shipping to provide the simplest operation for the User, whilst still providing useful functionality including scheduled measurements to aid the user.

All user setup and measurement downloads are through the USB connector to a PC using the simple to use AnalyzerPlus software. This provides a simple single point for managing all NoisePens and all data.

A personal noise dosemeter measures, stores and calculates parameters required to comply with Occupational Noise regulations. The NoisePen is a small device that can be worn by a user which will measure the noise over a set duration, typically an 8hr period of time, and provide an indication of whether the user was subjected to a noise dose in excess of the recommended levels. If this occurs or the level approaches this level then appropriate action is required, possibly moving away from noisy equipment, working for shorter durations in that location or wearing hearing defenders.

The key parameters relating to noise dosemeters are:

Parameter	Configuration Options*
Exchange Rate	3dB or 5dB
Threshold	70-90dBA (1 dB steps) or None
Criterion Level	70-90dBA (1 dB steps)
Criterion Time	8, 10, 12, 16 or 18h
Time Weighting	Fast, Slow, None
Frequency Weighting	Channel 1 – 'A' Channel 2 (Peak) – 'C', 'Z'

* These parameters are pre-configured before shipping to the customer. Pulsar will discuss your requirements with you prior to shipping to ensure that you have the correct configuration for your needs.

The main channel used for estimating dose is derived from an 'A' weighted signal which is averaged (integrated) and accumulated only if the signal exceeds the Threshold. If the accumulated level reaches the Criterion Level before the Criterion Time a dose exceedance has occurred.

The exchange is the increase in noise level that corresponds to a doubling of the noise level, typically 3dB exchange rate is used and applied to LAeq, whilst the US applies 5dB exchange rate which applies to TWA.

Requirements for applicable configuration options are dependent upon the industry or country the NoisePen will be used in, as a guide the table below lists these.

Regulation Body or Country	Threshold (dB)	Criterion Level (dB)	Time Weighting	Frequency Weighting	Criterion Time (Hrs)	Exchange Rate (dB)
EU & UK	None	85	None	A, C Peak	8	3
OSHA HC	80	85	Slow	A, C Peak (115dB(A) Max)	8	5
OSHA PEL	90	90	Slow	A, C Peak (115dB(A) Max)	8	5
MSHA HC	80	85	Slow	A	8	5
MSHA NC	90	90	Slow	A	8	5
NIOSH	80	85	Slow	A, C Peak	8	3
ACGIH	80	85	Slow	A, C Peak	8	3
DOD USAF	80	85	Slow	A	8	3
Korea	80	85	Slow	A	8	5
New Zealand	None	85	None	A, Lin Peak	8	3
Brazil	80	85	Slow	A	8	5

Getting Started

Quick Start

There are different ways to use the NoisePen.

- Programme measurement – start time and duration of measurement.
- Manual start and stop by plugging into AnalyzerPlus.

The following instructions summarise the recommended steps that should be followed to perform a manual measurement:

- Plug the NoisePen into PC with AnalyzerPlus installed
- Ensure the NoisePen has been fully charged
- Perform acoustic calibration
- Start measurement
- Unplug NoisePen from USB
- Attach NoisePen to user
- Leave running for duration or work shift
- Remove NoisePen from user
- Plug the NoisePen into PC with AnalyzerPlus installed
- Stop measurement
- Perform acoustic calibration
- Download measurement
- Generate Report

Acoustic calibration before and after a measurement is highly recommended and may be mandatory in certain circumstances to ensure accuracy of the NoisePen throughout the measurement.

Unpacking the instrument for the first time

Carefully remove all components of the NoisePen system from the shipping container or carrying case and inspect for possible damage or missing items. If there appears to be damage or something missing contact Pulsar Instruments immediately.

Charging the NoisePen

In order to maintain accurate battery level indication it is recommended that the NoisePen is fully charged before first use or if it has gone flat.

Upon receiving your NoisePen, please fully charge it before use. The NoisePen has an internal battery pack which is charged when plugged into USB.

Plug the NoisePen into a USB power source (either a PC or 5V USB Power Supply). The LED on the NoisePen will turn RED to indicate it is charging. When fully charged the LED indicator will turn BLUE.

The actual time to fully charge a NoisePen will depend on the current capability of the USB source, but will typically be less than four hours for a fully discharged NoisePen.

A fully charged NoisePen is capable of 24hrs of measurements.

When unplugged from the USB and not measuring the NoisePen will go to sleep after 15 seconds. Whilst in sleep mode it will draw minimum power to retain battery power. Typical shelf life whilst in sleep mode is 30 days, but it should be recharged before making any measurements if left on the shelf for a while.

For correct charging and power use indication the USB should be capable of supplying greater than 200mA. Some USB hubs of PC Tablets may not be able to supply this.

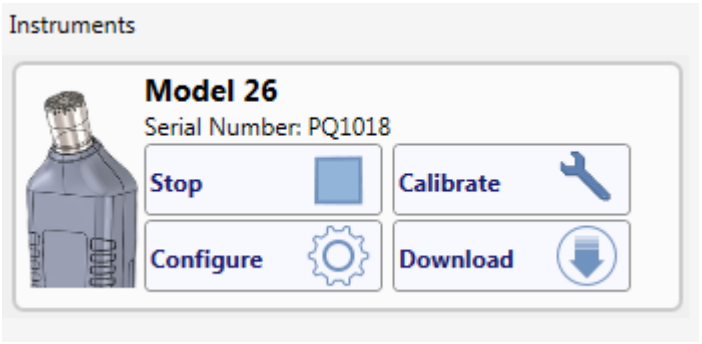
NoisePen Indicator

The NoisePen indicator will indicate the following states of operation:

- RED solid – plugged into USB and charging
- BLUE solid – plugged into USB and fully charged
- BLUE flashing – unplugged from USB and measuring
- OFF – unplugged from USB and not measuring
- RED flashing – Battery low or Memory Full
- RED/ BLUE alternate flash – dose exceedance measured
- RED/BLUE Solid – Boot loader mode ready for firmware upgrade

Connecting to AnalyzerPlus

Most User Interface with the NoisePen is through the AnalyzerPlus software. Install and run AnalyzerPlus and plug the NoisePen into the PC with the supplied USB cable. A NoisePen Model 26 instrument window will pop up in the bottom left.

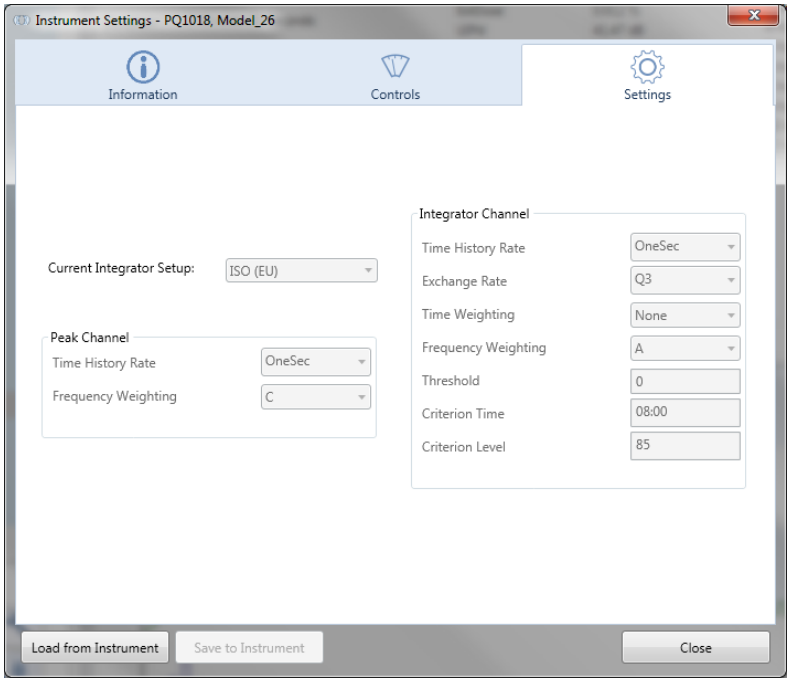


This provides access to NoisePen controls.

The NoisePen is designed to work with USB2.0 and USB3.0 on operating systems supporting these.
In the event of USB issues, please contact Pulsar Instruments with details of USB type, hardware used and operating system details.

Checking the Configuration

To review the configuration of the NoisePen, connect to AnalyzerPlus. When the instrument has appeared in the bottom left window, select '**Configure**' and then the 'Settings' tab. This tab will display how the NoisePen has been configured. Check the configuration is as requested.



User Settings

The user can set the following:

- Date and clock
- Categories – Person, Place and Project
- Schedules

The time and date are automatically synchronised to the PC when plugged in with AnalyzerPlus running.

Categories can be set to aid searching for measurements after downloading. Three fields can be entered, Person, Place and Project.

Connect the NoisePen to AnalyzerPlus, when the instrument window appears in the bottom left, select '**Configure**'. In the information tab, type in the Person, Place, Project fields as required, press '**Save to Instrument'**.

See the scheduled measurement section for details on setting a scheduled measurement.

Performing a Calibration

It is recommended that regular calibration checks are performed on the NoisePen, typically before and after a measurement, because the microphone is susceptible to minor damage from even small knocks.

The calibration applies corrections (if needed) to ensure that your measurements are as accurate as possible.

To perform a calibration of the NoisePen, connect to AnalyzerPlus. When the instrument has appeared in the bottom left window remove any windshield and place an acoustic calibrator on the microphone.

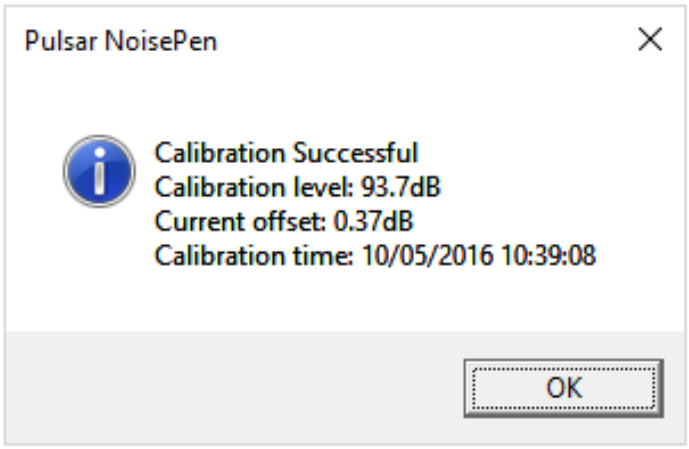
Ensure that the small pressure equalisation hole next to the microphone cavity on the calibrator is not blocked, as this could cause damage to the microphone.

The calibrator should be the correct level for the configuration of the NoisePen, typically 94 or 114dB. Switch the calibrator on and press '**Calibrate**' in AnalyzerPlus. The result of the calibration will be reported, along with the present offset from the last factory calibration.

Replace the windshield.

Note there is a -0.3dB correction between pressure and free field for the microphone used on the NoisePen.

Calibration is only possible if it is within +/-2dB of the last factory calibration and is within +/-0.075dB for 5 consecutive seconds.



Only a Pulsar Instruments calibrator should be used with the NoisePen, as these have the appropriate correction factor for the difference between the free field and pressure responses of the microphone.

Manual Measurement (starting and stopping a measurement)

A manual measurement can be started and stopped by connecting to AnalyzerPlus.

To start a manual measurement connect the NoisePen to AnalyzerPlus, perform a calibration per the section above. Remove the Calibrator and replace the windshield, press '**Start**' in the instrument window in the bottom left.

The measurement should be started within an hour of the last calibration for a pre-measurement calibration to be registered.

Unplug the NoisePen and attach it to the User for the duration of the measurement.

To stop a measurement remove the NoisePen from the user and connect it to AnalyzerPlus. Press '**Stop**' when the bottom left instrument window appears.

Repeat the calibration as described above.

The measurement can now be downloaded.

Downloading a Measurement

Connect the NoisePen to AnalyzerPlus, when the instrument window appears in the bottom left, select '**Download**'.

If there are measurements in the instrument a window will open listing the measurements available for download. Measurements can be organised into categories as desired.

Tick the 'Open after download' button if desired.

Either select a group of measurements to download and select '**Download**' or double click on a single measurement to download.

Measurements are downloaded to the PC.

Clearing the Memory

Clearing the memory will remove all the measurements from the NoisePen.

Connect the NoisePen to AnalyzerPlus. When the instrument window appears in the bottom left, select '**Configure**'. Select the Controls tab and then select '**Clear Memory'**. A confirmation window will appear, confirm as required.

Viewing Measurement Data

Measurements can be selected in the top left window of AnalyzerPlus, they can be searched by selecting Instrument, Person, Place or Project.

Double click on a measurement to view. The data can now be reviewed and a report created as required. Calibration data can be viewed by selecting the '**Calibration Information**' button.

Any overload (signal exceeding 140dB) will be displayed as a red 'Overload' at the top of the measurement.

Right click on the measurement gives Export, Delete or Create a Group options.

To close a measurement, either click the small cross on the right of the measurement tab, or centre press the measurement tab.

Setting Scheduled Measurements

Scheduled measurements can be created to delay a single measurement or create a repeat measurement to start at the same time for selected days over the next seven days.

Up to 12 schedules can be set up to 28 days into the future.

To set schedules, connect the NoisePen to AnalyzerPlus, when the instrument window appears in the bottom left, select '**Configure'**. Select the Controls tab and select '**Enable Schedules**' and '**New Schedule'**. Configure the schedules as desired and select '**Save to Instrument**'.

Remove the USB and the NoisePen will start measuring at the scheduled time.

Schedules can be disabled, enabled and cleared in the same window.

Windshield

The windshield WP26 provides a degree of dust protection for dusty work environments, wind noise reduction and a degree of noise reduction in the event of the microphone being knocked.

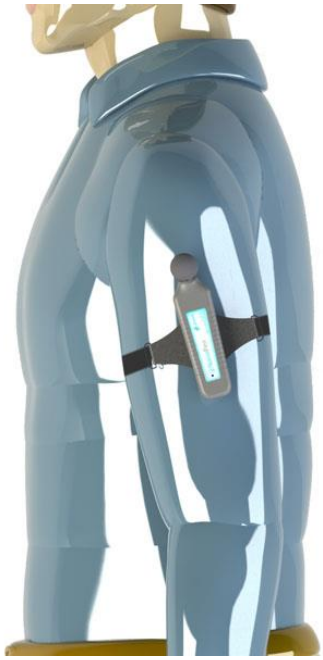
The windshield is simply fitted to the microphone by pushing over the top of the microphone when not making a recording. No correction is required to acoustic results for the windshield.

Mounting and Wearing the NoisePen

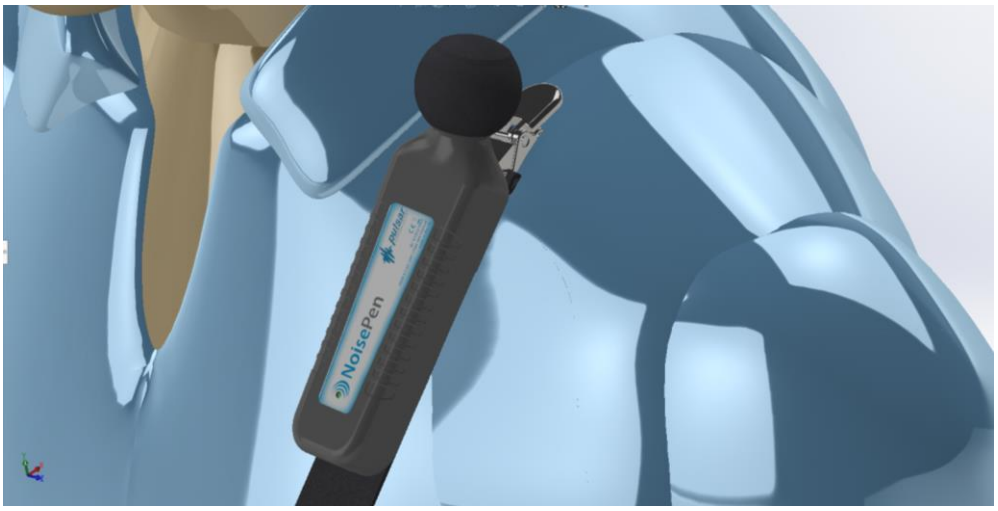
The NoisePen is supplied with a pocket clip to allow it to be clipped to an item of clothing for ease of use.

Pulsar recommend that the NoisePen is mounted on the shoulder within 10cm of the ear to provide best possible measurements. A suitable strap can be ordered from Pulsar, part number NP2.

An alternative option is NP3, which includes a 50cm velcro strip suitable for mounting on the arm.



NP4 is an adjustable, vertical, elastic mount option with a crocodile fixing clip.



Care should be taken with any mounting option selected to ensure the NoisePen is secure and will not fall.

Care should be taken with mounting the NoisePen to avoid any extenuous noise sources, for example the microphone rubbing against clothing.

Accessories

The Noisepen is supplied as standard with:

- Model 26 – NoisePen
- NP1 – Pocket clip
- WS26 - NoisePen Windshield

The following accessories are available for use with the NoisePen:

- NP2 – Leather mounting strap for shoulder
- NP3 – Metal clip Velcro strap for arm
- NP4 – Vertical strap for shoulder
- K6 – Small packing case for 2 pens
- K7 – Small packing case for 5 pens
- K8 – Safety Professional Kit Case
- PS26 – 5V USB power supply
- DC26 – USB cable for NoisePen
- Model 106 – Class 2 94dB calibrator
- Model 108 – Class 2 114dB calibrator

Troubleshooting

This section contains information which may solve simple operational problems you may encounter. If you are unable to solve the problem or experience any problems with the assembly or operation of the instrument contact Pulsar Instruments Plc or your local representative for further assistance.

Basic Operation

Symptom	Possible Cause	Possible Remedy
The Unit does not power on when plugged into USB	USB source is not supplying 5V	Use another USB source or USB power supply
	The instrument has become corrupted	Reset the unit by placing a sharp object, such as a paper clip, through the reset hole. LED should then flash
Unit will not start	If no measurement or unplugged from USB the unit will go to sleep after 15 seconds	Normal operation
Unit does not appear in AnalyzerPlus	Running an old version of AnalyzerPlus prior to NoisePen integration	Install latest version of AnalyzerPlus
	Driver not correctly installed	Contact Pulsar Instruments or your local representative for assistance
Battery level indication non valid value	The NoisePen needs to be fully charged before the level is set	Recharge the battery until the LED turns Blue

Calibration

Symptom	Possible Cause	Possible Remedy
The calibration fails: Too Low	The Acoustic Calibrator is not switched on	Switch on the Acoustic Calibrator and retry
	The Acoustic Calibrator is not fitted correctly	Check that the Acoustic Calibrator is fitted according to the instructions supplied
	The microphone capsule is loose or not fitted	Check that the microphone capsule is tight and fitted correctly
	The Acoustic Calibrator is set to a lower level than the expected level	Set the Acoustic Calibrator to the correct level if it has more than one setting

	The Microphone may be damaged	Contact Pulsar Instruments or your local representative for assistance
The calibration fails: Too High	The Acoustic Calibrator is set to a higher level than the expected level	Set the Acoustic Calibrator to the correct level if it has more than one setting
The calibration fails: Unstable	The background noise level is within 15dB of the calibration level	Move to a location where the background noise level is more than 15dB below the calibration level
	The Microphone may be damaged	Contact your local distributor or Pulsar Instruments Plc

Measurements & Settings

Symptom	**Possible Cause**	**Possible Remedy**
Reported that the measurement stopped due to low battery warning	Battery ran flat during one of the measurements on the NoisePen	Download all measurements and clear memory to reset this message
No calibration before result in a measurement	Calibration was not performed within 1 hr of starting a manual measurement	Perform calibration just prior to starting a measurement
	Measurement for a scheduled measurement	Perform manual measurement with calibration just prior to starting measurement
Unable to save schedules	Maximum number of schedules has already been set	A maximum of 12 schedules can be set
Schedule did not run	Flat battery	Check battery level
	Memory full	Check memory level

Additional Information

Additional technical information on the NoisePen can be found on the Pulsar Instruments website.

Please visit http://www.pulsarinstruments.com/product/pulsar-noisepen-sound-exposure-meter for the latest tips, hints, help and videos.

CE Certificate of Conformity

Pulsar Instruments plc Filey UK

Manufacturer:

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United Kingdom

Tel: +44 1723 518011

Equipment Description

The following equipment manufactured after 1st January 2016:

Model 26 NoisePen

Along with their standard accessories

According to EMC Directive 93/68/EEC meet the following standards:

IEC 61000-6-1:2007
EMC : Generic standards – Immunity standard for residential, commercial and light-industrial environments.

IEC 61000-6-3:2007
EMC : Generic standards – Emission standard for residential, commercial and light-industrial environments.

Sarah Brack
Managing Director Dated 28th April 2016

Appendix A – Specifications

The NoisePen Personal Noise Dosemeter has been designed to meet the requirements of IEC 61252:1993 Personal Sound Exposure Meters and the ANSI S1.25:1991 Personal Noise Dosemeters.

Applicable Standards

Model 26 NoisePen

IEC 61252:1993 Personal Sound Exposure Meters
ANSI S1.25:1991 Personal Noise Dosemeters Class Designation 2AS-90/80-5

Measurement Range (Typical)

70dB(A) to 140dB(A) RMS (linear range – starting at 94dB)
90dB(C) to 143dB(C) Peak

Measurement Functions:

The NoisePen supports Dual Channel measurements.

Channel 1 measures RMS, whilst Channel 2 measures Peak. Time and frequency weightings for each channel are pre-configured to customer requirements prior to shipping.

Overall Measurement Data

Overall measurement parameters displayed will depend on configuration of the individual NoisePen. The following is a guide:

NoisePen Configuration
NoisePen Serial Number, Model Number, Name*, Person*, Place* and Project*
Calibration Before and After (if performed)
Start Date and Time
Measurement Duration
Channel 1 average RMS level
Channel 2 Highest Peak(C) Sound Level
Dose Measurement
Projected or estimated Exposure
115dB(A) Maximum Sound Level Exceedance
Time History of both channels

* Text fields which can be configured by the user.

Channel 1 Measurement Data (Integrator)

For 3dB Exchange Rate:

L_{Aeq}, L_{EPd}, L_{AE}, % Dose, Exposure (Pa^2h)
Estimated % Dose, Estimated Exposure (Pa^2h), Projected Exposure

For 5dB Exchange Rate:

L_{AVG}, TWA, % Dose, Estimated % Dose

Channel 2 Measurement Data

LC(peak) or LZ(peak)

Time History

Time History of:

L_{Aeq}

LC_{peak} or LZ_{peak}

Time history can be configured at the factory and selectable between:
1s and 60s.

Memory

The Noisepen can store the following measurement data:
20 x 8 hour shifts at storage of 1 second for both peak and integrator (160 hours at 1 second storage rate)

Weightings

Frequency:
'A' for all Sound Level measurements. 'C' or 'Z' for Peak Sound Pressure – settable at the factory

Time:
None or Slow – settable at the factory

Exchange Rate

3dB or 5dB – settable at the factory

NoisePen User Configuration

Name, Person, Place and Project text fields.

Date and Time settable to PC time unit is connected to.

NoisePen Factory Configuration

	Channel 1 (Integrator channel)	Channel 2 (Peak Channel)
Frequency Weighting	'A'	'C', 'Z'
Exchange Rate	3dB, 5dB	N/A
Threshold	70-90dBA (1dB steps), None	N/A
Criterion Level	70-90dBA (1dB steps)	N/A
Criterion Time	8, 10, 12, 16 or 18h	N/A
Time Weighting	Fast, Slow, None	N/A
Storage Rate	1 second, 60 seconds	1 second, 60 seconds

Calibration level:
Selectable between 94 or 114dB.

Power
Internal 2xAAA nickel metal hydride battery pack suitable for greater than 500 recharge cycles.

Rechargeable via USB 5V approx 300mA, less than 4 hrs for full charge.

Output

Mini USB. USB cable supplied to connect to PC or power supply.

Drivers

USB driver is part of the AnalyzerPlus installation.

Dimensions

124 (long) x 34 (wide) x 28 (high) mm excluding windshield or mounting clips/strap.

Environmental

Temperature	-10°C to +50°C Operating -20°C to +60°C Storage
Humidity	Up to 99% RH Non-Condensing

Weight

Model 26	82gms (2.9oz)

Software

AnalyzerPlus software for Windows 7 and above.

Warranty

1. This document is a short summary of the full warranty document and is in ordinary English; it is not a legal document.
2. The warranty covers any new acoustic measuring instrument manufactured by Pulsar Instruments plc after 21st October 2011.
3. The warranty covers all faults, including parts and labour, on the instrument resulting from manufacturing defects or accidental damage (except to the microphone capsule) for the period given in paragraph (5) below,
4. The warranty does exclude damage to an instrument caused by the use of any accessories or components not specified or recommended by Pulsar Instruments plc.
5. The initial period of the warranty is 2 (two) years or 104 weeks from the date of purchase as a new instrument from Pulsar Instruments plc or their formally approved distributors OR 126 weeks from the date the instrument passed its final manufacturing inspection at Pulsar Instruments plc - whichever is the shorter.
6. Any rechargeable battery only has the battery manufacturer's warranty (usually one year) however there will be a reduced charge for replacing rechargeable batteries during the annual "Routine Verification" process.
7. On completion of each routine verification by Pulsar Instruments plc, the instrument will automatically be given an additional free 12 month warranty. It follows that should the instrument be routinely verified by Pulsar Instruments plc every year, the warranty is effectively continuous to a maximum of 7 (seven) years from the date of purchase.
8. There will be a charge for routine verification and the price is published in the Service Price List.
9. The customer is responsible for all shipping, duty and other charges relating to the routine servicing and calibration of the instruments, except where the instrument is deemed to be faulty due to manufacturing defects, when Pulsar Instruments plc will cover the shipping, duty and other charges relating to the repair of the instrument. Pulsar Instruments plc reserves the right to decline an instrument under the warranty where there is clear evidence of tampering or where no fault is found. In these cases, the customer will be liable for any shipping, duties or charges.
10. Pulsar Instruments endeavours to ensure stocks of service components for a full fifteen year period but of course cannot guarantee parts availability as certain components become obsolete or are discontinued.
11. If a sub-component becomes obsolete and/or stocks are depleted then Pulsar Instruments will endeavour to facilitate a repair but may not be able offer the same length of guarantee.
12. In the event of any dispute on the terms of the warranty Pulsar Instruments plc will accept pendulum arbitration by the United Kingdom Institute of Acoustics Ltd.
13. The warranty does not in any way reduce any legal right of the buyer or user of the sound level meter; it is in addition to all legal rights determined by the European Union.
14. Pulsar Instruments plc reserves the right to amend or update these terms and conditions without prior notice.

Guarantee

Pulsar Instruments plc. also offer a 7-year guarantee on all their units manufactured after 21st October 2011, providing that the instrument has undergone annual "Routine Verification" as described in the relevant IEC standard. The guarantee covers all parts and labour excepting only damage caused by the user.

Because of the unique fragility of microphones, only internal short or open circuits are accepted as faults and not accident damage.

The guarantee requires the user to return the unit to their nearest authorised Pulsar Instruments Plc. distributor/agent. This guarantee is in addition to any statutory rights in your country.

Pulsar Instruments Contact

Pulsar Instruments Plc. also have approved distributors and agents in many countries worldwide. For details of your local representative, please contact Pulsar Instruments Plc. at the address below. Contact details for Pulsar's authorised distributors and agents are also available from the website at the address shown below.

Registered Office, factory & commercial and customer contact

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Spanish Language www.pulsarinstruments.com.es

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