Quest™ Edge 7 Personal Noise Dosimeter

Models EG7, EG7-BT

User Manual

P/N 6017049, Revision F
November 2026

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Manual History

Revision	Date
A	May 2023
B	July 2023
C	March 2024
D	May 2024
E	March 2025
F	June 2025

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Warranty

Part Number 6017049 / Revision F

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Address TSI Incorporated / 500 Cardigan Road / Shoreview, MN 55126 / USA

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Warnings, Safety Markings, & Standard Information

Warnings Concerning Safe Operation

NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by TSI Incorporated could void the users authority to operate the equipment

This device contains license-exempt transmitter(s)/receivers(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device.

WARNING

Repair and battery replacement must be done by authorized service personnel only.

Avertissement

La réparation et le remplacement de la batterie doivent être effectués uniquement par du personnel de service autorisé.

WARNING

Use only EdgeConnect1 or EdgeConnect5 docking stations to charge Edge 7 noise dosimeters.

Avertissement

Utilisez uniquement les stations d'accueil EdgeConnect1 ou EdgeConnect5 pour charger les dosimètres de bruit Edge 7.

Standards

- ANSI S1.25 Personal Noise Dosimeters
- IEC61252 Personal Sound Exposure Meters
- RoHS compliant

TSI® Contact/Service Information

Should your TSI® equipment need to be returned for repair or for recalibration, please contact the service department at the following number or access the online form via tsi.com/service. For technical issues, please contact Technical Support.

Service Department and Technical Support	1-800-680-1220 (USA) or (651) 490-2860
E-mail	technical.services@tsi.com
Internet	www.tsi.com

International Customers

Contact your local, factory-authorized distributor from whom the product was purchased. You can obtain the name and contact information of your local factory-authorized distributor from TSI® Incorporated by using the e-mail or telephone information listed above.

Edge Dosimeter Battery Care Best Practices

The Edge dosimeter incorporates a Lithium Polymer battery as a power source that with proper care should give years of operational service (three years is typical).

Proper Care Includes these Best Practices

- After use, it is best to charge the Edge 7 in an EdgeConnect (Use EdgeDock for models EG3, EG4, EG5) charger prior to storage for a prolonged period. A prolonged period is considered to be two or more months. If the Edge is to be stored for an even longer period, it is best to take the Edge out of storage and recharge the dosimeter every two to three months.
- If the Edge has not been used for a prolonged period or was stored in a low battery condition, charge the Edge in an EdgeConnect before attempting to turn it on.
- It is best not to store the Edge for any period of time in low battery condition.
- If not using the dosimeter, it is best to keep the dosimeter in an EdgeConnect plugged into a power source.

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CHAPTER 1

Introduction

Dosimetry

Measuring noise in the workplace is an important element of hearing conservation programs and noise reduction programs. With a noise dosimeter, you can assess and determine a worker's daily exposure to noise levels. This information can be used to ensure compliance with regulatory bodies or to ensure if hearing conservation programs are needed.

Figure 1-1: Sample measurement display

Overview

To get you started quickly with the Edge, the first chapter is dedicated to introducing basic noise dosimetry terms and information. The subsequent chapters will guide you through setting up the dosimeter, running studies, and assessing your results with easy to follow steps and illustrations.

Noise Dosimeter

What is a noise dosimeter and how does it compute measurements?

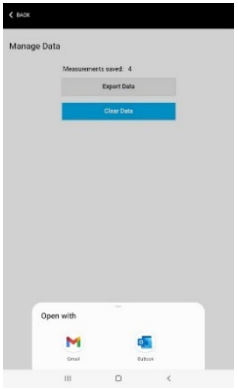
Essentially, a noise dosimeter is composed of the following: a microphone with a preamplifier, a weighted network, fast or slow response time, an internal clock, calculator, and memory to store logged data.

The microphone will, when exposed to a sound pressure, generate an electrical signal. The signal will be increased by a pre-amplifier, and then is regulated to an applicable level by the range control (dB range). The signal then goes through a filter set or weighting system. The next circuit is the response circuit, which controls the dampening of the readout. The response choices are typically Slow or Fast. Finally, the results will display on the dosimeter screen.

For live data view *and* post data analysis, Quest™ Edge dB mobile App and the TSI® Detection Management Software DMS can be used respectively (see Figure 1-2).

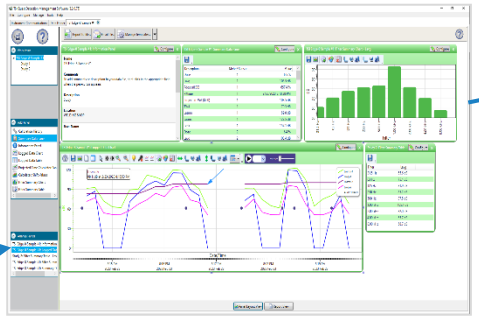
Bluetooth® Unit Visible in the Quest™ Edge dB mobile App.

Live data access in the Quest™ Edge dB App.

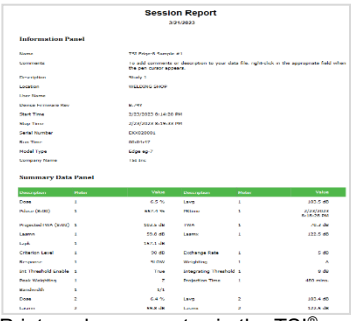


Share measurements from a mobile device.

Quest™ Edge 7 Dosimeter



Data analysis including audio file and octave band chart review via the TSI® Detection Management Software.



Print or share reports via the TSI® Detection Management Software.

Figure 1-2: Illustration of live data view and data analysis

Range of Sound

Sound pressure is measured in decibels, or tenths of a Bel. Sound pressure level is indicated as dB SPL. Since the human ear can detect sounds with an extensive range of amplitude, a decibel scale is used to simplify the measurement results. For example, the ratio between the threshold of hearing and threshold of pain in the human ear if measured in true energy is 10,000,000 times! The same range using the dB scale is 0–140 dB referenced to 20 µPa (Micropascals).

The quietest sound that humans can hear has an amplitude of approximately 0 dB. Prolonged exposure to sound pressure levels exceeding 85 dB can cause permanent damage to the ear. Sound levels in excess of 130 dB are more than the human ear can safely withstand and can result in serious pain and permanent damage.

What do the Standards Say?

Many organizations have studied and analyzed the effects of high sound exposure on hearing. As a result, standards were developed to regulate personal noise exposure. In the United States, the Occupational Safety and Health Administration (OSHA), the Mine Safety and Health Administration (MSHA), and the American Conference of Governmental Industrial Hygienists (ACGIH) have all created regulations and limitations on total permissible noise exposure. International standards are specified by the health and safety regulations such as the European Union (EU) Directive 2003/10/EC. Additionally, the International Electrotechnical Commission (IEC) IEC-61252 has specific guidelines and regulations to monitor noise in the workplace.

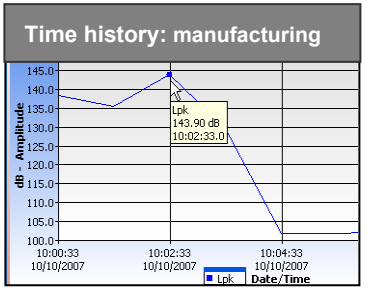
To access these copyrighted standards, please refer to the following:

- OSHA—http://www.osha.gov
- MSHA—http://www.msha.gov
- NIOSH—http://www.cdc.gov/niosh/topics/noise
- ACGIH—http://www.acgih.org/
- IEC—http://www.iec.ch

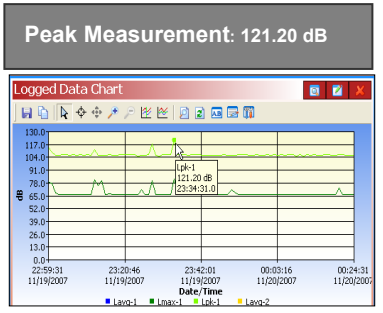
Applications of the Edge

The Edge has a cable-free, mounted microphone that converts sound pressure into an electrical signal. This signal is conditioned, monitored, and integrated over time in order to provide a host of automatically calculated values that can be used in occupational and environmental noise assessments. Programmable parameters permit the Edge to serve many applications. The Edge can be used in the following applications:

- **As a personal noise dosimeter—**used to measure a worker's daily exposure to noise levels. This information can be used to ensure compliance with OSHA, MSHA, ACGIH, IEC, or your own customized parameter settings to determine if your workers are over-exposed to noise.



- **As a time-history monitor—**used to provide a worker's minute-by-minute noise exposure levels. This data can help you identify major contributors to the average daily noise exposure.
- **As a survey monitor**
- **Throughout a plant/facility—**used to oversee noise levels throughout an entire facility. You can identify machines and equipment which produce harmful noise levels.
- **Specific areas in a plant/facility—**used to identify key areas as “noisy” and implement noise control options. Employees may be exposed to unacceptable noise levels if action is not taken in these areas.
- **As a peak dosimeter—**used to detect the highest level of instantaneous sound pressure.



Noise Assessment Steps

1. **Perform a task-based work flow analysis of unacceptable "noisy" areas and list regulations/codes you will follow.**
   - ◎ Observe facility/areas and jot down areas of concern.
   - ◎ Check with standards and noise ordinance regulations in your region/city.
     - ❖ ***See*** ***Chapter 1*** for basic information on dosimetry and standards.

↓

2. **Setting up your dosimeter parameters for your noise studies.**
   - ◎ Customize measurement setup (i.e., criterion level, threshold, weighting, exchange rate, etc.)
     - ❖ ***See*** ***Chapter 2*** for getting started with your dosimeter.
     - ❖ ***See*** ***Chapter 3*** for customizing your setup parameters.
     - ❖ ***See*** ***Chapter 4*** for Noise study scenarios.

↓

3. **Running your studies.**
   - ◎ Calibrate dosimeter.
   - ◎ Attach the dosimeter.
   - ◎ Run, observe, and stop your studies.
   - ◎ Understand display indicators.
     - ❖ ***See*** ***Chapter 4*** "Running and operating".

↓

4. **View your results via TSI Detection Management Software (DMS).**
   - ◎ Working with Charts and Tables.
   - ◎ Organizing and saving your studies.
     - ❖ ***See*** ***Chapter 5*** to view measurements with DMS.

↓

5. **Develop corrective actions.**
   - ◎ Engineering: redesign tools, implement changes in workstation.
   - ◎ Administrative: job sharing/rotations, redefinition of job functions, reduce duration operating tool/equipment, and/or implement medical surveillance.

Overview

The “EG7” model features a user-configurable options of up to four virtual dosimeters with data logging, 1/1 octave band analysis, audio recording, voice notes, run/pause/stop functionality, and many more features. Once the parameters are set and saved in the dosimeter, you can monitor the different dosimeters by pressing the **Enter** button. This will toggle the display between the dosimeters.

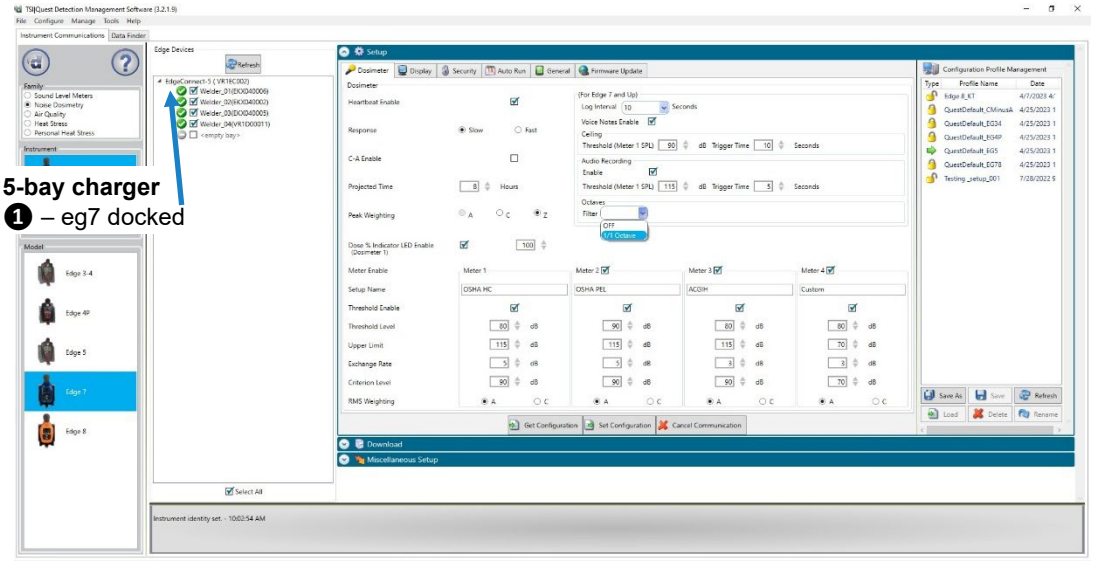


Figure 1-3: Parameter setup screen for EG7

NOTICES
1. **EdgeConnect vs EdgeDock**: The EdgeConnect is only compatible to the EG7 and EG8 models. If you are using older models (EG3, EG4, EG5), you **MUST** use the EdgeDock (see Chapter 2, Getting Started). **Bay chargers**: If you are using a 5-bay charger, you may have various models (EG7 and EG8) docked at once using the EdgeConnect5 as indicated in Figure 1-3. 2. The models selectable in the 5-bay charger section is dependent on if you selected the EG7 or EG8 models. DMS will display a green circle with a checkmark indicating a docked, powered on Edge with the serial name. DMS will also display a checkbox in front of applicable models that are selectable for communicating setup parameters, downloading data, and performing miscellaneous setup. (See “Customizing Setup Parameters in DMS (Chapter 3)” for more details.)

Virtual Dosimeters

You can monitor and log noise studies by enabling different parameter settings in one instrument, also referred to as “virtual dosimeters”. For instance, you may want to set one dosimeter to log using the OSHA HC (Occupational Safety and Health Administration – Hearing Conversation) parameters and also monitor noise with the OSHA PEL (Occupational Safety and Health Administration – Permissible Exposure Level) and in addition the ACGIH (American Conference of Governmental Industrial Hygienists) settings, while still having the option to set your own parameters for a total of four measurements simultaneously.

A few scenarios of virtual dosimeters include:

- Industrial noise control
- Hearing conservation compliance
- Work site assessments
- Personal noise verification
- Military applications

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CHAPTER 2
Getting Started

This chapter is designed to guide you through basic information you will need to begin logging your studies.

Checking the Equipment

If your instrument was sent to you in a storage case, remove all the packaging and become acquainted with the equipment listed in Table 2-1 so you can quickly get started with your noise studies.

NOTICE

Depending on the accessories you selected, the dosimeter may have the following components (see Table 2-1). For the docking stations, you will either have an EdgeConnect1 or an EdgeConnect5. (For more information on parts/accessories, please refer to www.tsi.com.)

(continued on next page)

Table 2-1: Identifying your equipment

Item	Description	Item	Description
	Edge 7 ▪ (MIC-EG7) Microphone and windscreen attached		**EdgeConnect1** (EC1-EG7-EG8)
	▪ **DMS software** (Download from www.tsi.com - not in case) ▪ **Quest™ Edge dB App** (Download from App Store or Google Play - not in case)		**EdgeConnect5** (EC5-EG7-EG8)
	Extra windscreen for microphone (WS-EG7-EG8)		Universal charger adapter (Power supply cord for the docking station, (805102)
	USB cable connects EdgeConnect to the PC (805101)		**AC-300 calibrator**
	Extra clippers (CLP-EG7-EG8)		▪ **Extra Clip** for microphone replacement (6015458) ▪ **3/32 Allen Wrench** for clippers replacement (053-647)

Turning On

To turn on the Edge, press the **On/Off** button. The Edge splash screen (see Figure 2-1) will appear indicating the firmware version and microphone serial number. After the splash screen disappears, the screen will be in the measurement view (see Figure 2-2).

Figure 2-1: Edge 7 powered on with splash screen displayed

LED Indicator

There is a three-color LED indicator on the Edge.

Table 2-2 explains when and why the LED indicator color will appear.

NOTICE
The LED indicator can be disabled via DMS (see “Chapter 3, "Setting up the Edge via DMS".)

Table 2-2: LED indicators explained

LED indicator	Explanation
Red	A flashing red LED indicates the dosimeter 1 dose has exceeded the alarm level.
Amber	A flashing amber LED indicates the dosimeter is stopped and has not exceeded the dosimeter 1 dose alarm level.
Green	A flashing green LED indicates the dosimeter is running and has not exceeded the dosimeter 1 dose alarm level.

Navigating

Once the dosimeter is “Powered-On,” press the **Up/Down** / arrows to navigate through the measurement values and battery run time.

Turning Off

Press and hold the **On/Off** button.

- A “3, 2, and 1” countdown will appear as the dosimeter is powered off.

NOTICE
To halt the power off mode, simply release the **On/Off** button.

Display and Keypad

The keypad is used to run and stop your studies, view your measurement values, and power on and off the dosimeter.

Features

Figure 2-2 explains the features on the display and keypad.

1 Windscreen and microphone

2 LED indicator

- **Red** – indicates dose exceeded the alarm level
- **Amber** – dosimeter stopped
- **Green** – dosimeter measuring

3 Display (measurement view shown)

- View data and various indicators

4 Side Button

- Press once to make voice notes
- Press and hold for 10 seconds to reboot the unit

5 Soft Button(s)

- Used for selecting corresponding on-screen function, ex: pause, run, stop

6 Enter Button

- Used to switch between (toggle) dosimeters one, two, three, four measurements and settings.
- Used to accept or choose a parameter or setting.

7 Up / Down Arrow

- Used to scroll through display/screen views

8 On/Off

- Used to power On/Off the meter.
- Used to exit a menu

Figure 2-2: Edge 7 Powered on with measurement view screen displayed

TSI® Detection Management Software (DMS)

TSI® Detection Management Software (DMS) is a software application designed by TSI® that runs under the Windows® operating system. You can use DMS for a variety of functions related to the Edge dosimeter and with many other TSI® instruments. DMS has the ability to customize your setup parameters, display data, manipulate data, and create reports. For additional information, access the online help manual by clicking on **Help | Content**.

Loading

To load DMS software, follow the Quick Start Guide instructions or download from www.tsi.com.

The software will automatically load the drivers for the EdgeConnect1 and/or EdgeConnect5.

Docking Station Functionality

Depending on the kit you purchased, you may have an EdgeConnect1 and/or an EdgeConnect5 (Use EdgeDock1 or EdgeDock5 for models EG3, EG4, EG5). Both are designed similarly with the same LED indicators. The main difference with the EdgeConnect5 is that it has five bays for docking, charging, and/or managing the dosimeters. TheEdgeConnect5 will charge all docked instruments at one time.

The docking station serves a ***dual-purpose role***. (See Table 2-2 for an explanation of LEDs and components.)

1. It is used to charge the battery on the dosimeter(s).
2. It is used to communicate between the software (DMS) and the dosimeter (i.e., import, export settings and measurement files).

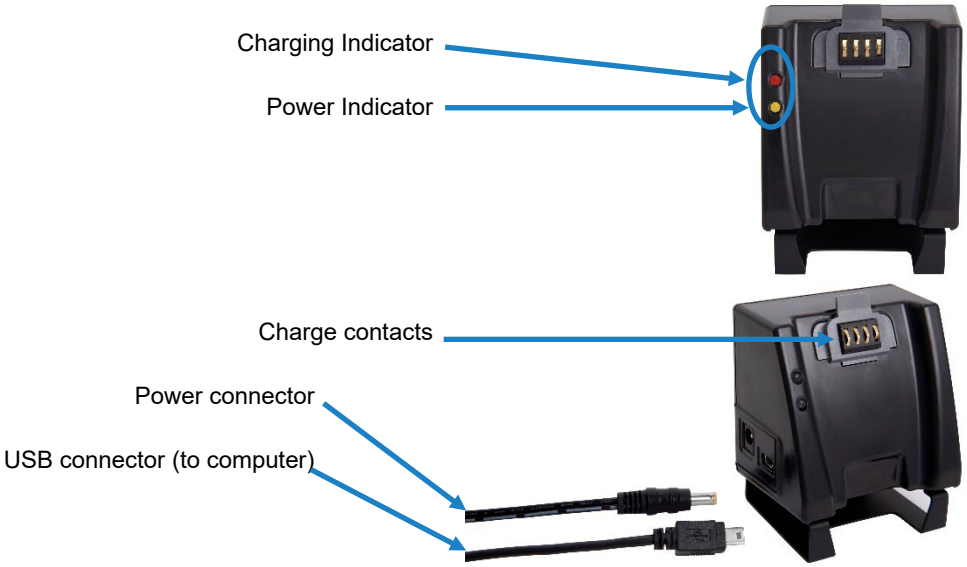

Figure 2-3: EdgeConnect1 (use EdgeDock1 for models EG3, EG4, EG5)

Docking Station Components

Table 2-3 below explains the EdgeConnect1 or EdgeConnect5 (Use EdgeDock1 or EdgeDock5 for Edge models EG3, EG4 and EG5) LED indicators, power connector, USB connector, and contact pins.

Table 2-3: EdgeConnect1 and EdgeConnect5 components

Docking Station Components	Explanation
Charging indicator	Identifies if the dosimeter is “charging” or “fully charged”. A **red blinking** LED indicates the dosimeter is charging. A **solid green** LED equates to a fully-charged dosimeter.
Power indicator	An **amber** LED indicates the docking station is powered on.
Power connector	Attach the power connector cable to the docking station in order to charge the dosimeter(s).
USB connector	Attach the USB connector to communicate via your computer to the dosimeter(s).
Charge Contacts	Placing the dosimeter(s) onto the charge contacts allows charging and communication.

EdgeConnect1 or EdgeConnect5

The EdgeConnect1 and EdgeConnect5 are powered by a 12-volt charger adapter with international plug adapters. The backside of the Edge slides into the hook of the EdgeConnect1 or EdgeConnect5 with the mounting clasps rotating to a 90-degree angle (which will rest on a table/work area).

Power/Electrical Characteristics of EdgeConnect1 and EdgeConnect5

Power Requirements	AC Adapter – **Input**: 100-240Vac, 50/60 Hz. **Output** : 12 Vdc, 3A, 36 W.
Operating temperature	0ºC - 40ºC

Physical Attributes of EdgeConnect1 and EdgeConnect5

LED amber indicator	Indicates EdgeConnect1 or EdgeConnect5 is “powered on” (lower of the two shown LEDs).
LED red indicator and **LED green indicator**	Signifies status of charging. Flashing red indicates charging. Solid green indicates charging is complete.
Size of EdgeConnect1	2.87” x 2.32” x 3.54” (7.29 cm x 5.98 cm x 9.0 cm)
Size of EdgeConnect5	12.81” x 3.1” x 3.54” (32.54 cm x 7.87 cm x 9.0 cm)

Figure 2-4 illustrates the assembly of the charger adapter and the plug adapter. It slides into place by guiding it down the back cavity (opening) of the power supply.

NOTICE
The example is a typical adapter which may be different than the one you are using. Mechanically, it will function similarly.

Figure 2-4: Attaching the charger adapter with the plug adapter

Powering EdgeConnect1 or EdgeConnect5

1. Assemble the charger adapter and plug adapter as illustrated in Figure 2-5. (It will be the same process for an EdgeConnect5.)
2. Plug the charger adapter directly into the wall (electrical wall plate).
3. Plug the opposite end into the power connector (or jack) of the EdgeConnect1.

NOTICE
An amber, solid light will appear indicating power to the charger.

Figure 2-5: Attaching charger adapter to EdgeConnect1
(use EdgeDock1 for models EG3, EG4, EG5)

Charging your Dosimeter

The number of hours you have used your dosimeter from your last charge will impact your total charge time.

NOTICE
To charge a fully discharged battery, it would take approximately 7 hours.

How to Charge

1. Plug in the power adapter to the EdgeConnect (see power adapter in Figure 2-7 below).
   - The EdgeConnect's lower LED will appear solid when powered on.

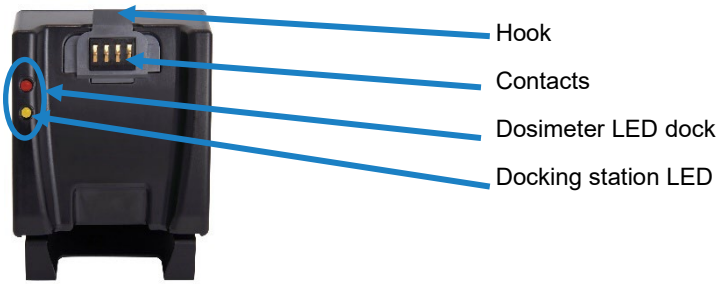

Figure 2-6: EdgeConnect

2. Slide the Edge (see ❶) downward onto the **Hook** of the EdgeConnect until it clicks. It will be fully seated (see ❷ in Figure 2-7 below).

NOTICE
The top LED will appear as red flashing when charging or solid green when fully charged.

❶ **Backside of Edge:**
The open cavity and contacts slide into the “Hook” of EdgeConnect. The contacts will align to each other.

❷ **Example of the Edge Charging**

Dosimeter charge status (upper LED)
- **Flashing Red** LED when charging
- **Solid Green** LED when fully charged

Power adapter

EdgeConnect station status (lower LED)
- **Amber** LED indicates dock is powered on

Figure 2-7: Docking the Edge on the EdgeConnect

Mounting the Docking Station to a Wall

The docking station is equipped with two single screw slots for mounting the docking station to the wall. It is recommended to use #6 round headed screws for mounting the dock to a wall. Figure 2-8 below displays the backside of the single bay dock.

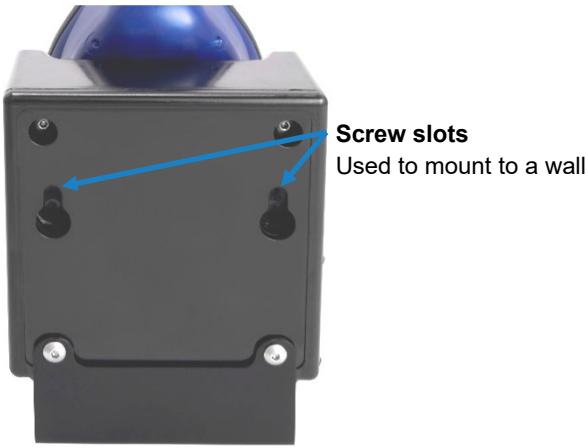

Figure 2-8: Backside of EdgeConnect

Storing the Dosimeter

To preserve the life of the battery, turn the dosimeter off when you are storing the dosimeter.

Additionally, if the dosimeter is docked and stored on the docking station when the dosimeter is powered off, it will still draw a small amount of battery power from the dosimeter. Thus, it is recommended to store the dosimeter(s) separately from the docking station.

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CHAPTER 3

Setting up the Edge 7 via DMS

Noise Studies

The EG7 model comes equipped with four (4) customizable user setups. You have the option to customize the parameters for threshold values, exchange rate values, filtering, an upper limit value, and a criterion level. In addition, the EG7 model also has the 1/1 octave capability that can be enabled via DMS.

This chapter explains data storage, the preset views on the dosimeter, and how to customize the parameters and display of your Edge via DMS. It concludes with an explanation of downloading data from the dosimeter to the software.

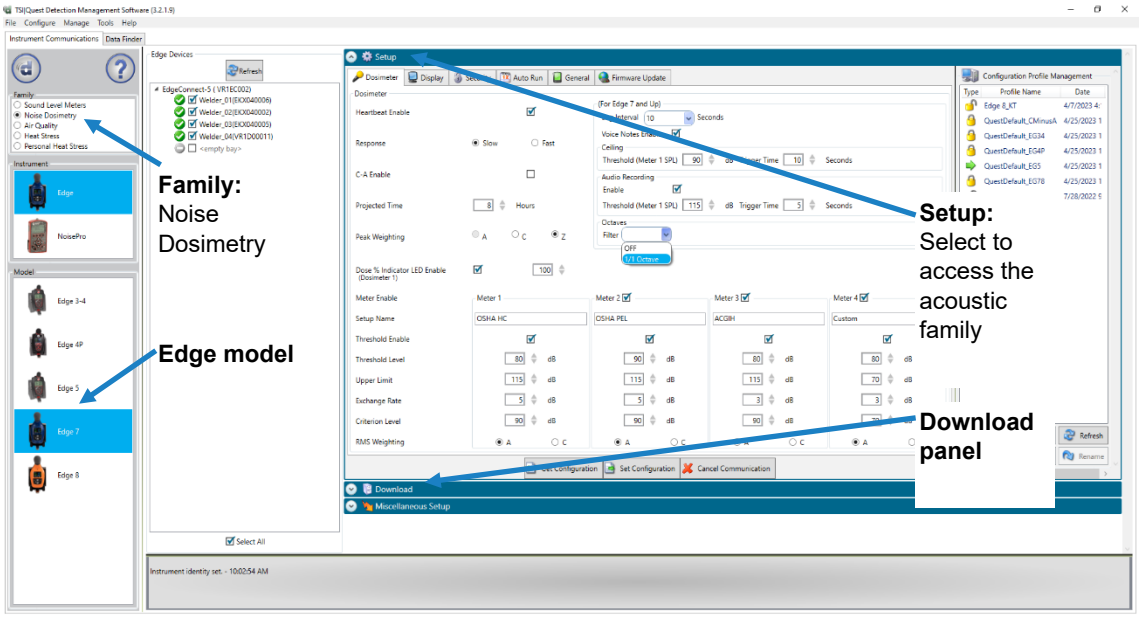


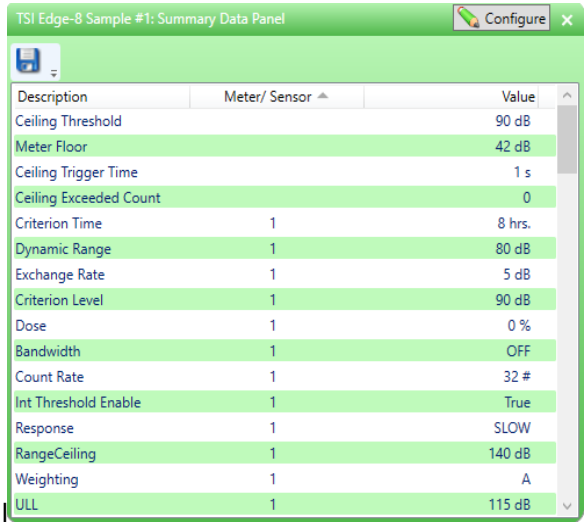
Figure 3-1: Edge Setup and Download options in DMS

Understanding what Data is Stored

When you are running noise dosimetry studies, there are two types of data stored on the dosimeter which include the summary data and time history (or Logged) data.

Summary Data

Summary data represents values that occurred over the entire run of the study. For an average value, such as Lavg, it represents the average decibel value over the entire run time. Peak and Max values are the highest measurements that occurred throughout the run time.



Description	Meter/ Sensor	Value
Ceiling Threshold		90 dB
Meter Floor		42 dB
Ceiling Trigger Time		1 s
Ceiling Exceeded Count		0
Criterion Time	1	8 hrs.
Dynamic Range	1	80 dB
Exchange Rate	1	5 dB
Criterion Level	1	90 dB
Dose	1	0 %
Bandwidth	1	OFF
Count Rate	1	32 #
Int Threshold Enable	1	True
Response	1	SLOW
RangeCeiling	1	140 dB
Weighting	1	A
ULL	1	115 dB

Figure 3-2: Sample summary data from DMS reporting

Time History

Time history data is also referred to as “logged data” which plots measurement values at a configurable time interval.

Time History data represents values that occurred over the most recent time period, which is the logging interval. For example, if the log interval is 10 seconds, then the Peak value is the highest Peak value for that 10 seconds, and the Lavg value is the average dB value for that 10 seconds.

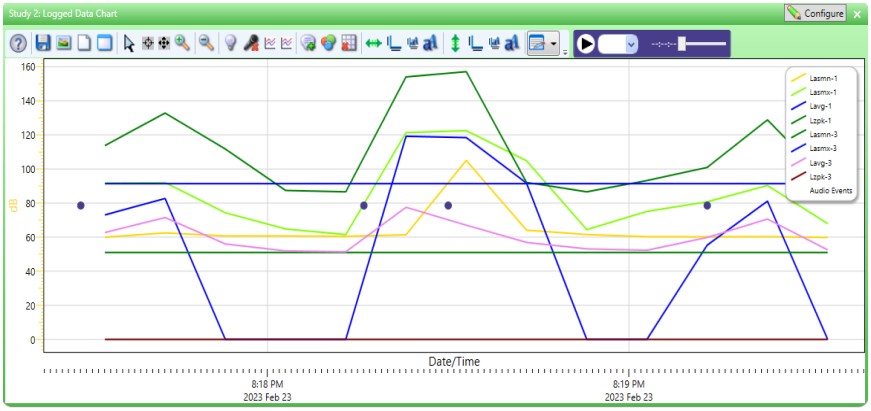


Figure 3-3: Sample time history data (or logged data) chart

Logging

The EG7 model logs at a selectable interval up to 60 seconds (1,5,10,15,30,60) and includes the following measurements:

Lavg, Leq, Lmax, Lmin and Lpk, for all meters

In DMS, you can customize the logged data chart results by checking Lavg/Leq, Lpk, and/or Lmax/Lmin measurement values.

Views on the Edge

The Edge is a user-friendly and customizable dosimeter. With a simple click of a checkbox in DMS, you can select the appropriate measurement values or views to appear or not appear on the display of your dosimeter. The following table briefly identifies the displayed data values and views with a brief definition. (See Appendix B. Glossary of Terms for additional information of these terms.)

Definitions of Data Log Values and Views

To set up the Edge and work with noise level data, you will want to have a good understanding of the terms listed in Table 3-1.

NOTICE

The following table is based on A-weighted, slow measurements. Thus, if you choose A or C-weighted with Fast or Slow response the measurement values will change on the display (i.e., you selected sound pressure level with C-weighting with Fast response, it will display as Lcf.) For further details, please see Table 3-1.

Table 3-1: Dosimeter views and definitions

Views on the EDGE	Explanation
L_{xx}	***Sound pressure level***—is the basic measure of noise loudness, expressed in decibels. (In DMS this is noted as "SPL"). It is expressed with a particular response setting (Slow or Fast) and weighting (A or C).
L_{xxMX}	***Maximum sound level***—is the highest sound level recorded during a measurement interval with a particular response setting (Slow or Fast) and weighting (A or C). Lmax is the highest value that is included in Lavg or dose calculations. ▪ Under OSHA regulations, unprotected workers may not be exposed to maximum sound levels greater than 115 dB, measured with a Slow response rate.
Lxpk	***Peak Level***—is the highest instantaneous sound pressure level recorded during a measurement interval. Unlike the maximum level, the peak is detected independently of dosimeter settings for response rate or weighting. It is expressed with a particular weighting (C or Z). ▪ Under OSHA regulations, unprotected workers may not be exposed to peak sound levels greater than 140 dB.
L_{xxMN}	***Minimum sound level***—the lowest sampled sound level during the measurement interval allowing for the unit's Response Time setting (Fast or Slow). It is expressed with a particular weighting (A or C).

Table 3-1: Dosimeter views and definitions *(continued)*

Views on the EDGE	Explanation
Lavg	***Average sound level***—(in dB) computed for a chosen time duration, based on a 4, 5, or 6 dB exchange rate. Lavg with a 3 dB exchange rate is referred to as Leq (equivalent sound level). All sound levels at or above the threshold level are averaged into the calculations relating to noise exposure. Lavg is typically calculated with no threshold, with a threshold of 80 dB or with a threshold of 90 dB.
L_{TWA}	***Time-weighted average***—is the sound level (in dB) that is accumulated for any time period but with its average level computed over an 8-hour period. TWA is usually measured with A-weighting, Slow response, and a 5 dB exchange rate. ▪ All sound levels at or above the threshold level (cutoff level) are averaged into the calculations relating to noise exposure. TWA is calculated with no cutoff, with cutoff 1 (typically 80 dB), or with cutoff 2 (typically 90 dB). ▪ If the time period is less than 8 hours, the TWA will be less than the Lavg. If the time period is more than 8 hours, the TWA will be more than the Lavg.
L_{xE}	***Sound Exposure Level (SEL)***—the sound exposure level averages the sampled sound over a one second period. Assuming the sampled run time to be greater than one second, SEL is the equivalent one-second noise that would be equal in energy to the noise that was sampled. SEL is typically measured using a 3 dB exchange rate without a threshold (L_{xE} is not used by OSHA). It is expressed with a particular weighting (A or C).
Dose	***Dose***—related to the Criterion Level, a dose reading of 100% is the maximum allowable exposure to accumulated noise. For OSHA, 100% dose occurs for an average sound level of 90 dB over an 8-hour period (or any equivalent exposure). (Please see Glossary of Terms for more details).
Projected Dose (P_{dose})	***Projected Dose***—this is similar to Dose. However, instead of an 8-hour period, a specific hour is entered. (See dose for more information.)
UL	***Upper Limit***—is the amount of time that the sound level exceeds a preset level (the Upper Limit).
Ceiling Count (Cx)	**Ceiling Count** – is the number of times the sound level measured by meter 1 has exceeded the ceiling threshold settings. For example: $Cx_{90,10}$ means that the ceiling threshold is 90 dB and the trigger time is 10 seconds.
Time Response (Fast, Slow)	Typically, noise is not constant. Using a response of Slow or Fast simply smooths the noise fluctuation and makes the sound level easier to work with. ▪ **Slow** – 1 second (1,000 milliseconds) ▪ **Fast** – 0.125 second (125 milliseconds)

Table 3-1: Dosimeter views and definitions *(continued)*

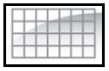
Views on the EDGE	Explanation
RT	**Run Time -** The overall time of your noise study.
Weighting (A, C)	A and C weighting are types of frequency filters that cover the frequency range of human hearing (20 Hz to 20 kHz). ▪ **"A" weighting**—the "A" weighted filter attempts to make the dosimeter respond closer to the way the human ear hears. It attenuates the frequencies below several hundred hertz as well as the high frequencies above six thousand hertz. "A" weighted measurements are often reported as dBA. ▪ **"C" weighting**—provides a fairly flat frequency response with only slight attenuation of the very high and very low frequencies. "C" weighting is intended to represent how the ear perceives sound at high decibel levels and is often used as a "flat" response when LINEAR is not available. "C" weighted measurements are often reported as dBC.
	Memory storage symbol displays the total memory storage remaining in percentage (%). For example, if it displays 99%, this means that 99% of its internal memory is available.
	***Calendar symbol***—the calendar symbol and calendar field displays the current date in a preselected format of day-month-year or month-day-year. **NOTICE** It is important that your instrument displays the correct date. Refer to page 3-21 to learn about setting the appropriate date.
	Battery power clock symbol—the battery power clock symbol identifies the number of hours and minutes of battery time remaining on the dosimeter. For example, if it displays the symbol 24:50 this represents 24 hours and 50 minutes of battery life remaining on the dosimeter. **NOTICE** Refer to page iii to view battery care and best practices.
	The Current Time Clock symbol displays the current dosimeter time (24 hours format) in hour-minute-second. **NOTICE** It is important that your instrument displays the correct time. Refer to page 3-21 to learn about setting the appropriate time.

Table 3-1: Dosimeter views and definitions *(continued)*

Views on the EDGE	Explanation
	The Octave Band Graphical and Numeric display symbols apply to meter 1 only. It displays the SPL (Sound Pressure Level) and Lavg or Lmax values/graph for each frequency band in a given audio spectrum. **NOTICE** Refer to page 3-13 for more information on this feature. D1 refers to the meter 1. These symbols are only available when octave band display is enabled via DMS.
	The Session Review symbol allows reviewing of the last 5 sessions stored on the device. It will display the Start time, Run time, Lavg and Dose for those sessions.

Docking

Communicating and Downloading Data

By using your docking station, USB cable, software, and your dosimeter, you can quickly communicate between the software and the dosimeter. There are two methods for communicating which are:

- **Send setup data**: Enables you to configure your setup parameters in Detection Management Software (DMS) and download these parameters to the Edge.
- **Retrieve data**: You have the capability to retrieve the data from the dosimeter into DMS in order to view and analyze your studies in DMS's charts, tables, and reporting functionality.

How to connect your dosimeter to the computer

1. Dock the dosimeter on the EdgeConnect1 (or EdgeConnect5) and turn on the dosimeter by pressing the **On/Off** button.

NOTICE

See Charging your Dosimeter for more information.

2. Plug the USB cable into the computer (see ❶ in Figure 3-4).
3. Plug the opposite end into the docking station (see ❷) and plug the **EdgeConnect's AC power supply** into the **docking station** (see ❸).

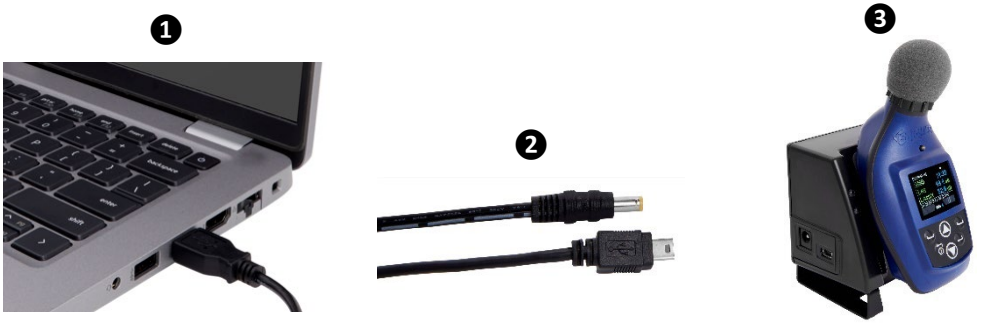


Figure 3-4: Communicating—connecting a docked Edge to a PC

4. For first time use of a docking station, **Welcome to the Found New Hardware Wizard** will appear (see Figure 3-5). Select **No** and press **Next** through the remaining wizard. At the end of the wizard, press **Finish**.
   - This will install the hardware components associated with your EdgeConnect1 and/or EdgeConnect5.

NOTICE
If you have more than one EdgeConnect1 or EdgeConnect5, this wizard will appear for each new dock which is connected to your PC.

Figure 3-5: New Hardware wizard for Edge Dock

Customizing Setup Parameters in DMS

Customizing and saving setups are performed via DMS. The following sections discuss each of the setup screens and explain how to save and send the parameters to the dosimeter(s).

NOTICE

The following DMS settings apply to the Edge 7 (EG7) model. If you are also using EG8 models and have them docked in a 5-bay EdgeConnect5 charger, they will appear in the "Edge Bay Charger" tree section, but will not be selectable in the **Edge Devices** section unless you first select the Edge 8 in the **Model Section**. Use the checkbox to denote which instruments are affected when setup changes are applied and the "send setup to instruments" or "set identity" buttons are selected.

Dosimeter Setting

The Dosimeter tab settings are used to set up the instrument with basic parameters. The EG7 model features four "virtual dosimeters" in one with four customized, user-defined settings. Please refer to the General Edge parameters table below for details.

1. Click on the Dosimeter tab from the Edge's Instrument Configuration panel (see ❶). To change the settings, follow one (or all) of the selection options below.
   - Click on the arrow and select an option.
   - Click on the arrows and select a numeric value or type in a value.
   - Click in the print settings checkbox to activate/enable the print settings feature.
2. To set the general features, save and send to the Edge (for more details see "Saving and Sending Configurations (Chapter 3)***"***.

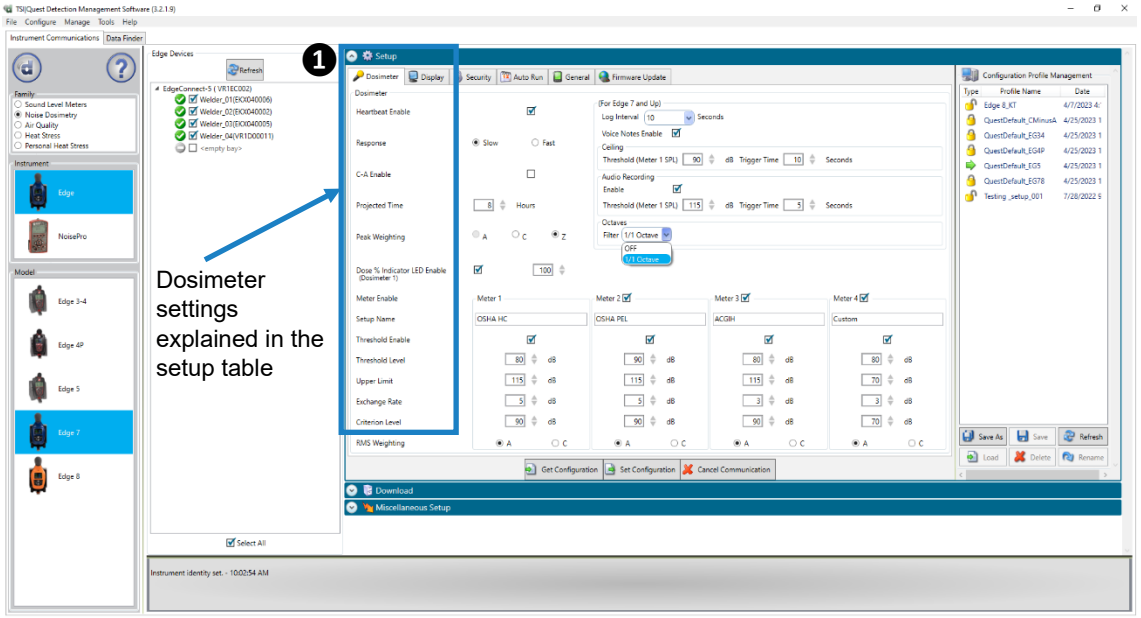


Figure 3-6: Detection Management Software (DMS): Dosimeter setup screen

General Edge Parameters

Table 3-2: Dosimeter fields explained for the Edge

Dosimeter Setting	Description NOTE: Refer to Glossary for more detailed information.
Heartbeat Enable	When enabled (or checked), the LED will flash green while running and flash amber when stopped.
Response	Either Slow Time Response or Fast Time Response is applied to the measurements. (Typically, Slow time response is used in the US market while Fast is used in the EU communities.)
Projected Time	A time parameter selectable via the up/down arrows or type in a value. The projected time value is used to make projected dose calculation for the dose measurement. The factory default value is 8 hours.
Peak Weighting	Select either **C** or **Z** for the peak frequency weighting.
Dose % Indicator LED (Dosimeter 1)	When enabled (or checked), the LED will flash red when the dosimeter 1 dose value exceeds the designated entered value.

Table 3-2: Dosimeter fields explained for the Edge *(continued)*

Dosimeter Setting	Description NOTE: Refer to Glossary for more detailed information.
Meter Enable	When the checkbox is selected, that meter is active while in run mode recording data that can be shown in Data View panels. If not selected, that meter does not record data and will not be shown in the Data View panels. **NOTICE** For Edge 7 and 8, **Meter Enable** is configurable for meters 2 through 4.
Setup Name	(*Optional field*) A setup name may be entered into the field for each meter. When set, it appears on the top of Edge's display (example setup names: OSHA, MSHA, EU directive).
Threshold Level	Select a Threshold Level via the up/down arrow or by typing in a value. The range is 70 dB to 90 dB in 1 dB steps.
Upper Limit	Select an Upper Limit dB level for a meter by clicking the up/down arrows or by typing in a value. **NOTICE** The upper limit (UL) is a measurement setting in which the user selects a specific decibel level. The UL value records the amount of time that the Sound level is at or greater than the entered level.
Exchange Rate	Enter in (or select with up/down arrows) a value of 3, 4, or 5 dB for a meter. ER refers to how sound energy is averaged over time. (OSHA uses a 5 dB doubling rate while most of the world uses 3 dB.)
Criterion Level	Select a Criterion level via the up/down arrow or by typing in a value. The range is 70 dB to 90 dB in 1 dB steps. **NOTICE** Criterion level is the average SPL that will result in 100% dose over the criterion time and is typically set by a regulatory agency such as OSHA, EU directive, etc.
RMS Weighting	Select either **A** or **C** RMS Weighting for a meter. **NOTICE** The RMS (root mean square) are the results from the Edge with the response time and weighting settings considered.
Log Interval	Configure the data logging interval by clicking on the drop-down box and selecting either 1, 5, 10, 15, 30, or 60 seconds.

Table 3-2: Dosimeter fields explained for the Edge *(continued)*

Voice Notes Enable	When enabled (checked) in DMS, the user can, by the press of a button on the Edge, make 14 second verbal notes about, for example, location, description, or noise events. These recorded audio events can be viewed and played on the Logged Data Chart panel (see ❹ Figure 3-7).
Ceiling	The Ceiling function, which is always enabled on the Edge, will increment a counter whenever the sound level measured by meter 1 has exceeded the specified threshold level for the specified trigger time. This recorded counter value can be displayed on the Summary Data panel by enabling the Ceiling Exceeded Count measurement (see ❸ Figure 3-7).
Audio Recording	When enabled (checked) in DMS, this function will automatically record 14 seconds of an audio noise event whenever the sound level measured by meter 1 exceeds the entered threshold level for the entered trigger time. The resulting audio events can be viewed and played on the Logged Data Chart panel (see ❷ Figure 3-7).
Octaves Filtering	Octaves Filtering applies to meter 1 only. The resulting data can be view in the Summary Data and Filter Summary Chart/Table panels. It displays the SPL (Sound Pressure Level), Lavg, and Lmax values/graph, among others, for each frequency band in a given audio spectrum. There are two Edge Octaves Filter settings: ▪ OFF – No filtering (for broadband measurements only) ▪ 1/1 Octave – Full octave band analysis (31.5 Hz to 8 kHz) (see ❶ Figure 3-7).

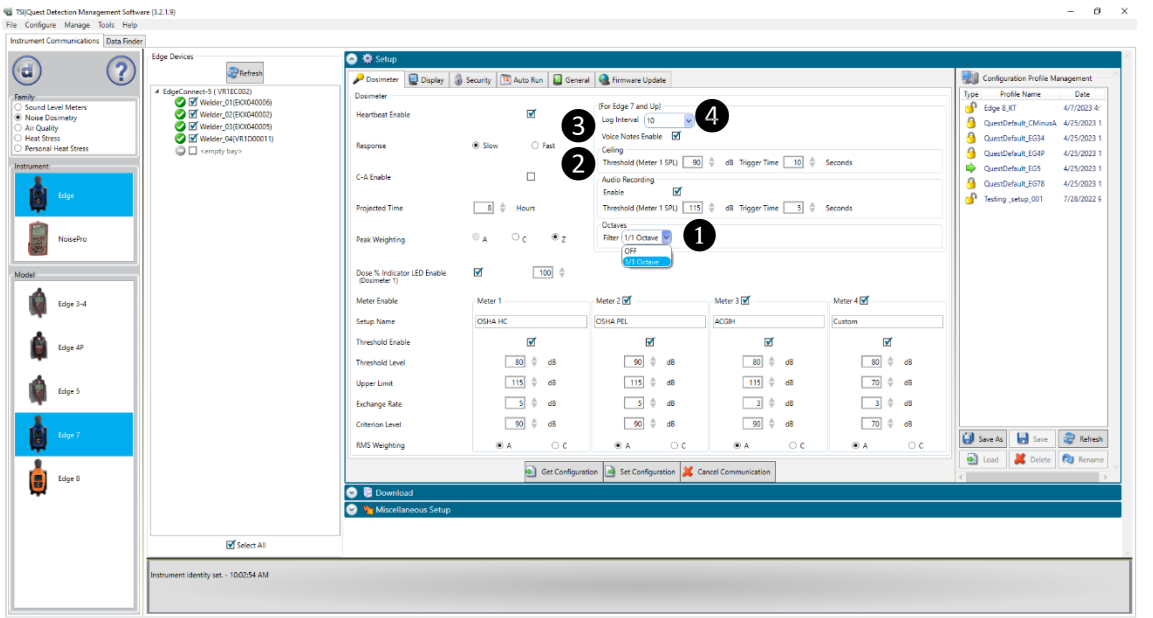


Figure 3-7: DMS Edge dosimeter parameter setting screen

Octave Band Filter Settings

The EG7 model comes equipped with an octave band filter that can be enabled via DMS. The Octave Band function is only available for Meter 1 (see Figure 3-7).

Voice Notes Settings

The EG7 is equipped with a voice note capability (see Figure 3-7). To start a recording, press the side button of the EG7 once. A recording screen will appear with 15 seconds countdown (see Figure 3-8). After the countdown, the screen goes back to its original display. This action can be repeated at needed. The recording is automatically saved on the instrument but can only be listened to or visualized in DMS (the study must be downloaded to read the audio file), with the appropriate time stamps. The maximum number of voice notes is 10. If this number is reached, the memory full or voice notes full symbol will appear. The current session remains uninterrupted while the recording is in progress.

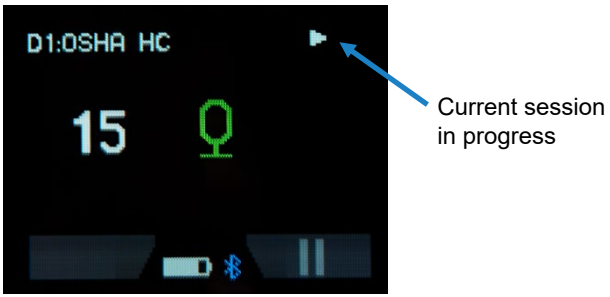


Figure 3-8: Voice note recording screen

NOTICE
Factory Default settings have Voice Notes disabled. The voice note function must be pre-enabled in DMS, then the voice note can only be triggered with the physical push of the side button. Voice notes can only be taken when the unit is in the Run state. If Disabled in DMS and the configuration is sent to the docked dosimeter, the Voice Notes button on the dosimeter will not trigger any recording.

Audio Recording Settings

The EG7 can automatically record audio of noise event above a preset dB level. The recorded audio is saved on the instrument and can only be listened to or visualized via DMS (the study must be downloaded to read the audio file). The current session remains uninterrupted while the recording is in progress (see Figure 3-9). A custom trigger time can be set to enable recording only when said noise level lasts over a given time period (see Figure 3-7). This feature is especially useful for quick diagnostics and allows for time savings in noise data analysis. Each recording lasts 15 seconds, and the maximum number of audio recording is 10. If this number is reached, the memory full or audio recording is full symbol will appear.

NOTICE
Factory Default settings have Audio Recording Disabled. The Audio Recording settings must be pre-enabled in DMS. The Audio Recording can only be triggered on the dosimeter if it is enabled in DMS and sent to the dosimeter when docked. If Disabled in DMS and the configuration is sent to the docked dosimeter, Audio Recording by the dosimeter will not be triggered at any dB/time combination threshold.

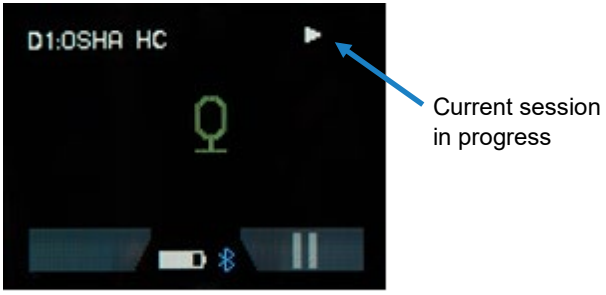


Figure 3-9: Automatic Audio recording screen

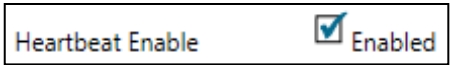
Dose % Indicator LED

The Edge is equipped with a multifunction LED indicator. Aside from its communication-related functions while in the dock station, it can be used as a Heartbeat to indicate the dosimeter run state. In addition, while the dosimeter is running, it can also be used to provide an alarm for when the user's dose % has exceeded a designated value (as measured by dosimeter 1). Some users may prefer to disable one or both of these LED functions.

To configure the Indicator LED, begin by opening DMS, select setup button from start screen, and then select **Edge** and the appropriate model (ensuring it is set up to communicate).

- **Alarm enable**: To enable the flashing **red** LED when the dosimeter 1 dose % exceeds the designated value during run mode, select (check) the **Enabled** checkbox. Then use the arrows to select a numeric value or type in a value for the dose % alarm level. To disable this feature, clear the **Enabled** checkbox.

- **Heartbeat enable**: To enable the flashing **green** LED when the dosimeter is in run mode, select (check) the **Enabled** checkbox. To disable this feature, clear the **Enabled** checkbox.



Press **Set Configuration** to send the changes to the selected instrument.

Display Setting

The display screen is used to customize the parameters which will appear on your Edge. It is organized by two columns, the "Display position" and the "Item to Display" and includes a "Set selected Items" selection/drop-down box. The display position indicates the order of the parameter (or item) which will appear on the display, while the "Item to display" designates the measurement or parameter. The example/figure below displays the SPL, Max, Min, Lavg, TWA, Dose, UL, RT, and battery time remaining parameters to appear on the display.

NOTICE
There are up to 24 selectable parameters.

1. Click on the **Display** tab from the Edge's Instrument Configuration panel (see ❶). To customize the display, click on either the **Display position** (see ❶) or the **Item to Display** field (see ❷). The field will be shaded in blue when selected.
2. Click on the drop down box of the **Set Selected Item** (see ❸) and select a parameter.
3. Repeat these steps as needed to select each position.

NOTICE
"**OFF**" indicates that no item/parameter is selected.

4. To set the display features, save and send to the Edge (for more details see "*Saving and Sending Configurations (Chapter 3)*").

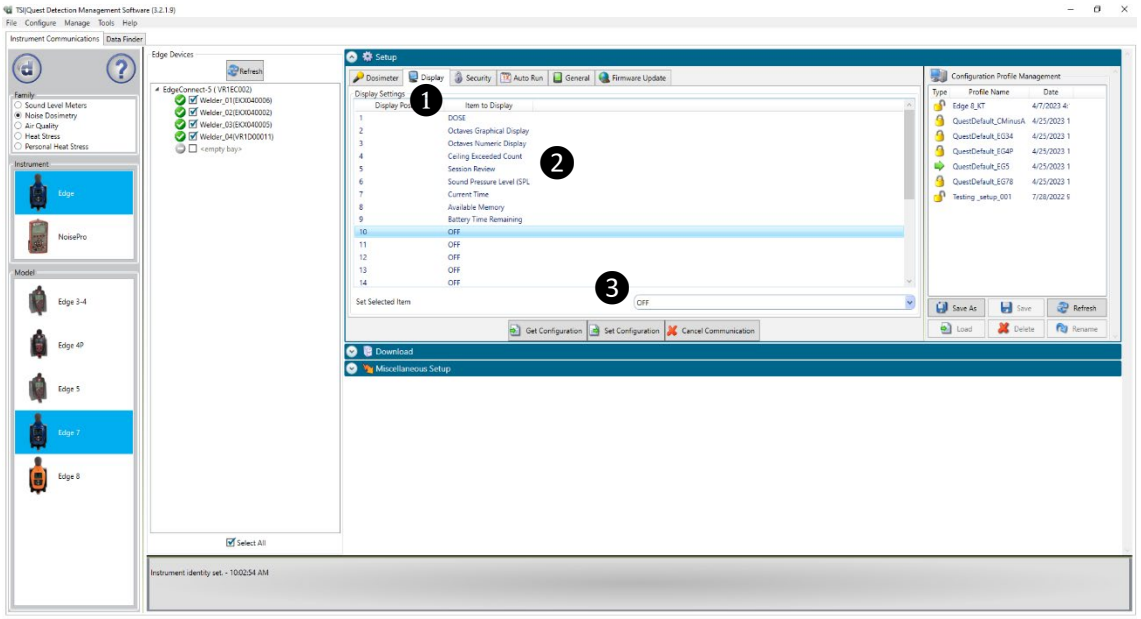


Figure 3-10: DMS Edge display screen

Security Setting

The security setting is a type of “locking” feature (or secure run feature) that enables you to password protect the instrument to prevent users from inadvertently terminating a study. Initially, this feature is set through the software and turned on once in run mode by quickly pressing the left soft key button three consecutive times. (To unlock, quickly press the left soft key three consecutive times and then press **Enter**). To set this feature, please follow the steps below.

1. Click on the **Security** tab from the Edge’s Instrument Configuration panel (see ❶). To enable, click on the **Enabled** check box. (Ensure the specific Edge is selected and communicating to the software.
2. Next, select either **Not Displayed** (see ❷) or **Displayed** (see ❸). Press **Set Configuration** to send the changes to the selected instrument.
3. To set the security settings, save and send to the Edge (for more details see “*Saving and Sending Configurations (Chapter 3)*”.)

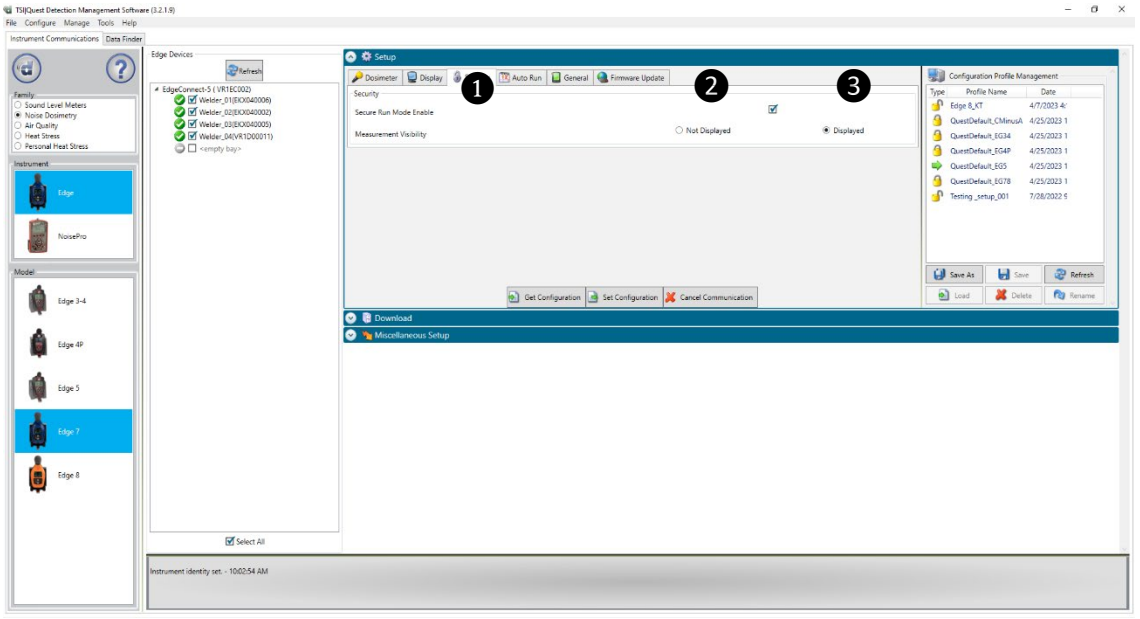


Figure 3-11: DMS Edge security setting

Auto Run Setting

With the Edge auto-run mode, you can program up to two *auto start* and *auto stop* configurations when start date and duration parameters are enabled. This is useful if you want to pre-set the instruments to run and stop for a specific time period, such as a week-long study. See steps below to enable.

IMPORTANT NOTICE
The instrument's date and time must be accurate for the auto run feature to work properly. See Miscellaneous Setup on page 3-21, to learn about setting the correct date and time. If the dosimeter will not be docked to charge between Auto-Run periods, also consider the battery life of the instrument between charges when setting Auto Run periods.

1. Click on the **Auto-Run** tab from the Edge's Instrument Communications panel (see ❶) and click in the **Enable** checkbox (see ❷).
2. To program **Date 1**, click in the **Enabled** checkbox (see ❸) and select a **Start Date** (by using the calendar icon or type in a date). Select the **Duration**, by either typing in the time (designated in hours, minutes, and seconds) or using the up/down arrows (see ❹). (Repeat this step to set up a second Auto run mode, see ❺ and ❻.)
3. To set **Auto-Run** setting, save and send to the Edge (for more details see "*Saving and Sending Configurations (Chapter 3)*").

NOTICE
The unit must be turned Off for the Auto Run to occur.

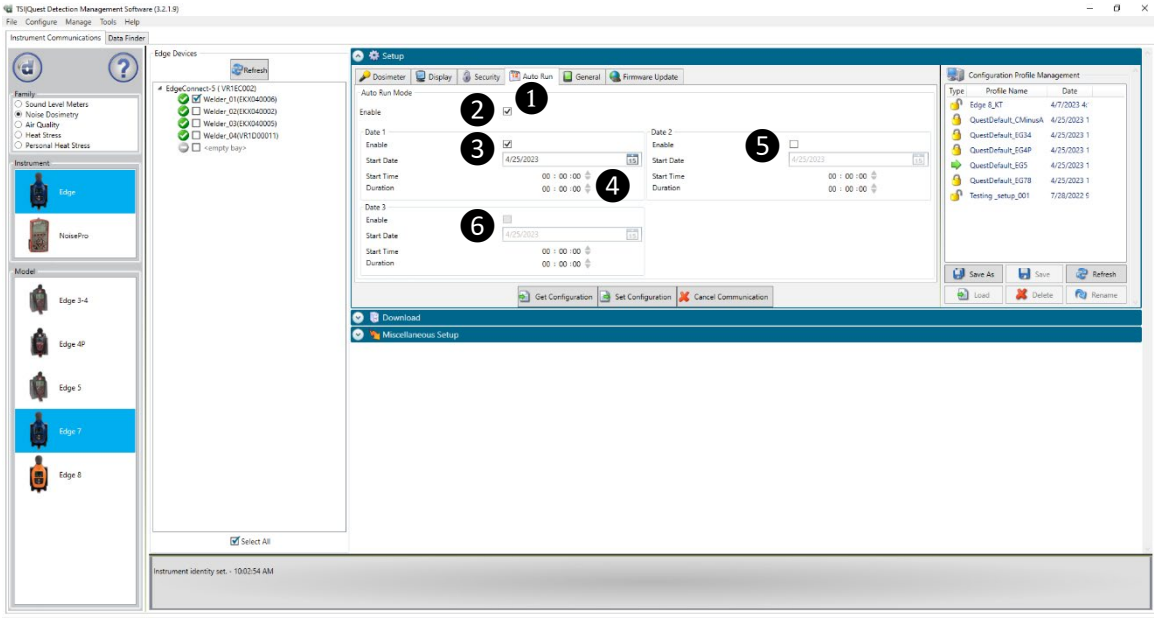


Figure 3-12: DMS Edge auto run screen

General

The General tab (see ❶) contains the Bluetooth® Enable/Disable setting (see ❷), as well as the Display Timeout and Inactivity Timeout setting. The Bluetooth® Setting is applicable to “BT” units and allows Bluetooth® to be turned off. The Display Timeout (see ❸) is a configurable timeout to turn off the display when the unit is not being interacted with to save battery life. Just the display is turned off and any sessions that are currently running will continue to run. The Inactivity Timeout (see ❹) is applicable only when the unit is in the Stopped state and will turn off the unit when not interacted with.

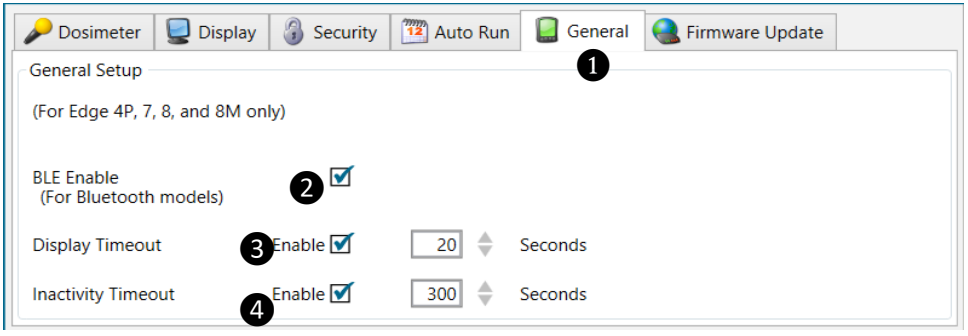


Figure 3-13: DMS Edge general tab screen

Firmware Update

Edge firmware updates are performed in DMS when the instruments are docked, communicating, and the update key is selected. Please follow the steps below prior to updating your Edge(s).

NOTICE
This feature enables you to update all of your docked Edges (when powered on and not in run mode).

1. Click on the **Firmware** tab from the Instrument Communications panel (see ❶) and ensure to dock the Edge(s).
   - Press Refresh button to refresh the docked instruments (if necessary).
2. Press the Update button.
   - The instrument display should turn off and the instrument LED should turn solid green.
   - **DO NOT** remove the instrument from the dock while the firmware update process in taking place. The process can take as long as 10 minutes.
3. Wait until DMS states that the firmware update is **Done** (example of the message:).
   - The meter should reboot with the latest version of firmware.

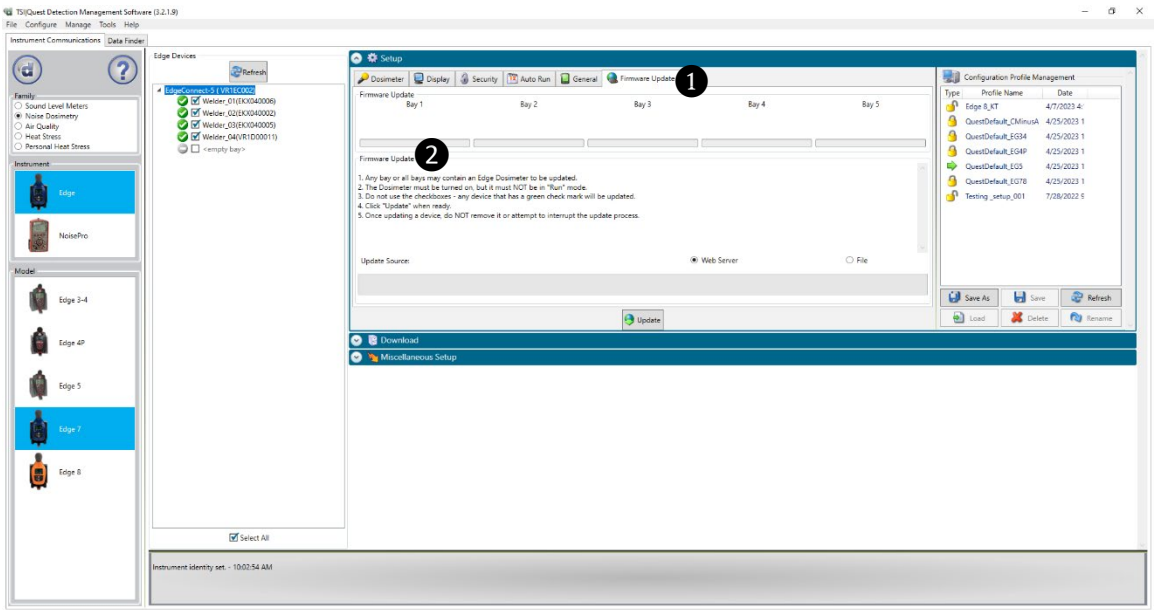


Figure 3-14: DMS Edge firmware update screen

NOTICE
DO NOT remove the Edge from the dock while the firmware update is in progress.

NOTICE
If the firmware update process fails and the Edge meter has a blinking red LED, follow these steps to recover the meter: ▪ Close DMS. ▪ Unplug the dock USB cable and power cable. ▪ Plug USB and power cable back into the dock. ▪ Wait for at least 1 minute and then install the Edge back onto the dock. ▪ Open DMS. **DO NOT** hit the “Refresh” button. ▪ Wait for DMS to show the meter as “Unknown.” ▪ Navigate to the firmware update screen and press “**Update**.” ▪ The update process should begin again. Wait for the firmware update process to finish and the meter to boot up.

Edge: Miscellaneous Setup

The Edge miscellaneous setup screens can be used to set/get the Date Time of the instrument and set/get its identity string.

Setting/Getting the Date Time

Set the date time of the instrument on the **Date-Time** tab of the **Miscellaneous setup** screen. Choose either the **Current System Time** or **Specific Time** radio button. Current system time is the time that the windows computer displays in the lower right-hand corner of the screen. When you set time to “current system time,” you are setting the time in the dosimeter to match the time of the computer that is running DMS.

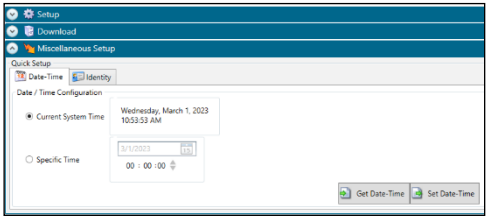


Figure 3-15: Set/Get Date-Time screen

For **Specific Time**, enter the date using the calendar or manual entry. Set the time with the arrows and select a numeric value or type in a value. Send the date time to the instrument by clicking the **Set Date Time** button. You can retrieve the instrument’s current time value by clicking the **Get Date Time** button.

Setting/Getting the Identity

Set the identity string of the instrument on the **Identity** tab of the **Miscellaneous setup** screen. Enter an identity value in the **Identity string** text box. Send the identity to the instrument by clicking the **Set Identity** button. You can retrieve the instrument's current identity value by clicking the **Get Identity** button.

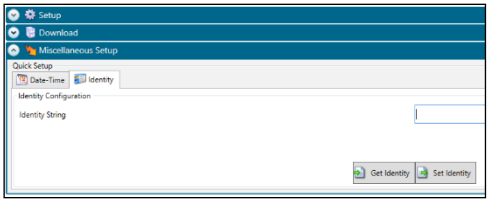


Figure 3-16: Set/Get Identity screen

Saving and Sending Configurations

With the Edge, there are saved setup profiles used to quickly access and apply to The Edge(s). The steps below explain how to save the configuration settings in DMS and how to send to the instrument. There is also a Get Configuration feature which is used to pull the setup from the instrument into the software.

NOTICE
To only send the setup or get the setup, skip to step 3 or 4. Please refer to this section as you set up your instrument.

1. To save the Edge configuration in the software, click on a name in the **Configuration Profile Management** panel (see ❶).

NOTICE
The name will be shaded a light gray when selected.

   - To create a new profile name, click Save As and type in a profile name. Click **Save**. (It will save under the configuration profile management panel).

2. Click on the Save button (see ❷) and type in a Name. Click **OK**.

NOTICE
This saves the configuration file in the software.

   - Or click Save As button and rename the setting by typing in a name. Click **OK**.

3. To send to the instrument, select the Set Configuration button (see ❸).

4. To get the setup from the instrument, click on the Get Configuration button (*optional*: To save the setup as a configuration follow steps 1–2 above.)

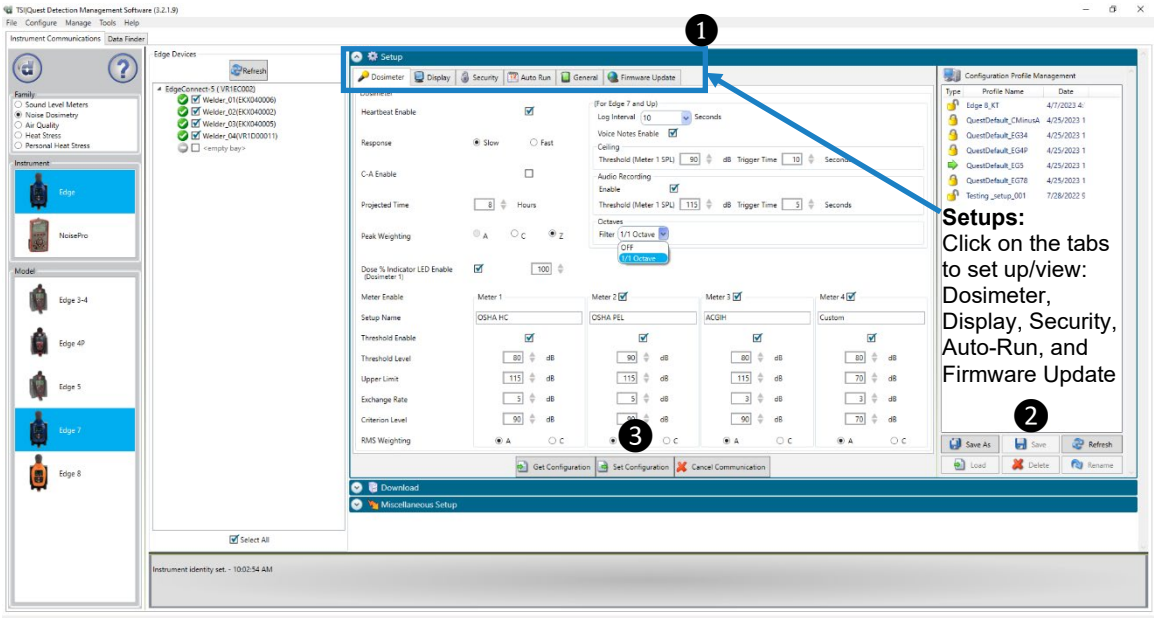


Figure 3-17: Saving and sending Edge setups

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CHAPTER 4

Running and Operating

As explained in Chapter 3, the view of your display is customizable via DMS.

NOTICE

The subsequent sections show examples of views which you may have disabled on your dosimeter. (Please refer to Chapter 3, "Setting up the Edge via DMS".)

Overview of Running a Study

On the Edge 7, with the introduction of the Pause functionality, the time between Run and Stop is considered a session. If you do a Run, Pause, Run, Pause, Stop, the data in DMS will show two studies within a Session. The downloaded file in DMS will show a + symbol on the left. Clicking on the + symbol will drop down a "Study 1" and "Study 2" options.

The list below is a brief overview of the steps for running a study.

Quick Help List: Typical Dosimetry Session

1. Turn the dosimeter on and check your battery power.
2. Reset the dosimeter.
   - This will clear out all of the data history before your study begins to ensure you have sufficient memory space on the Edge.
3. Set up your study parameters via DMS.
4. Calibrate the dosimeter.
5. Attach the dosimeter for your personal noise study.
6. Press the **Run** soft key button to start a session.
7. Press the **Pause** soft key button when you are ready to pause a session. The recorded data is now classified as a study.
8. Press the **Stop** soft key button to stop a session.
9. Review your results either on the meter, or via the Quest™ Edge dB APP (on Bluetooth®-enabled devices) or download to DMS for further analysis (graphs/charts, saving and printing).

Figure 4-1: Quick help list for running a study

Positioning the Edge on your Shirt

How to Attach the Dosimeter

Clip the dosimeter on your shirt and ensure the microphone is positioned as high on your shoulder as possible and away from your neck.

a. If the noise seems to come from one direction, place it on the shoulder closest to the noise source.

b. During monitoring, keep clothing from coming into contact with the windscreen to avoid contaminating your results.

Figure 4-2: Attaching the Edge on your shoulder

Checking Battery Power

Typically, the life of the battery is up to 30 hours nominal with 20 seconds timeout display (see Appendix A for specific specifications). It is recommended to perform a daily download of the measured data while simultaneously charging the battery for maximum efficiency. A quick recharge with the EdgeConnect takes up to four (4) hours when half of the battery power is expended.

NOTICE
Refer to page ix to view battery care and best practices.

There are two battery identifiers on the dosimeter which are the battery indicator icon and the battery power clock (see Figure 4-3).

Checking Battery Power

1. The **battery indicator icon** (located at the bottom of your screen) gives an approximation of battery life and is always present.
   - If low battery appears, less than 8 hours of run time is available.
2. Additionally, there is a **battery time remaining measurement** which identifies the number of hours and minutes remaining on the dosimeter.
3. To view, press the **Up/Down** arrows /. This will navigate you through the views of the dosimeter.

NOTICE
The battery time remaining measurement can be disabled from the view of the meter. See Chapter 3 for explanation on changing the display.

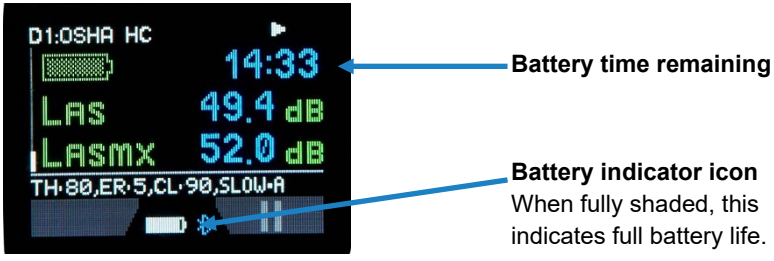


Figure 4-3: Battery indicators

Calibrating

It is recommended to calibrate your dosimeter before you run your study(ies) and after your study(ies) to ensure highly accurate measurement results. The steps below address how to calibrate for either a pre or post calibration.

Calibrating the Dosimeter

1. Remove the windscreen from the dosimeter by twisting and pulling the black collar ring (do not pull on the foam). (See Figure 6-1 for an illustration.)
2. Ensure the Edge is turned on and in the stop mode. (See "Turning On" and "Turning Off" in Chapter 2.)
3. Slide the Edge into the mouth of the calibrator.

NOTICE
Ensure the adapter ring is inserted into the mouth of the calibrator before you slide the Edge into the cavity.

4. Turn on the calibrator and ensure parameters are set to 114 dB and 1000 Hz (*see calibration manual for operation details).*

Figure 4-4: Calibrating

5. "**CAL**" will flash on the display when detected.
6. Press the **Enter** button to trigger the calibration display.

7. To match the values on the calibration display, press repeatedly the **Up** or **Down** arrow /▼ in order to select the exact output on the calibrator (i.e., 114 dB).
8. When you have selected the appropriate dB level, press the **Enter** ↵ button.
9. A shaded bar will appear loading your calibration information. Then a summary calibration screen will appear indicating the dB level with date and time displayed.
10. To return to the measurement view screen, press the **On/Off** ⏻ button.
11. To end the calibration steps, turn off the calibrator. Detach the dosimeter from the calibrator.

NOTICE
A manual calibration can be started by simultaneously pressing the **Up/Down** arrow ▲/▼ keys.

Resetting the Dosimeter

The Edge can be reset through the dosimeter keypad or via DMS. This will clear out all of the data history to ensure you have sufficient memory space on the Edge for new studies. The steps below outline how to reset your dosimeter.

Reset

1. Ensure the meter is **Off**.
2. Turn the meter on by pressing the power (**On/Off**) ⏻ button.
3. When the splash screen appears, press and hold the **On/Off** ⏻ and the **Enter** ↵ buttons until the splash screen disappears.

Figure 4-5: Splash screen

NOTICE
Setup menu is used to reset the dosimeter, change the contrast, and return to the main view.

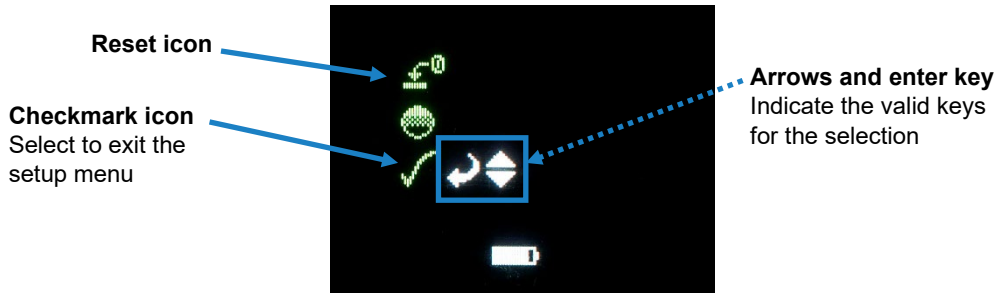


Figure 4-6: Reset Screen

4. Press and hold the **Enter** button.
5. A 3, 2, 1 countdown will appear and then a shaded bar will appear indicating the dosimeter is being reset.
6. To return to the measurement view screen, press the down arrow until the checkmark (exit) icon is selected and press the **Exit** button.

Contrast

1. Ensure the meter is **Off**.
2. Turn the meter on by pressing the **Power** (**On/Off**) button.
3. When the splash screen appears, press and **hold** the **Power** (**On/Off**) and the **Enter** buttons until the splash screen disappears (see Figure 4-5 for splash screen.)
4. The Setup menu appears on the Edge. Press the **Up** or **Down** arrow key to select the **Contrast** icon (the arrows and enter key icons will appear to its side).

NOTICE
Setup menu is used to reset the dosimeter, change the contrast, and return to the main view.

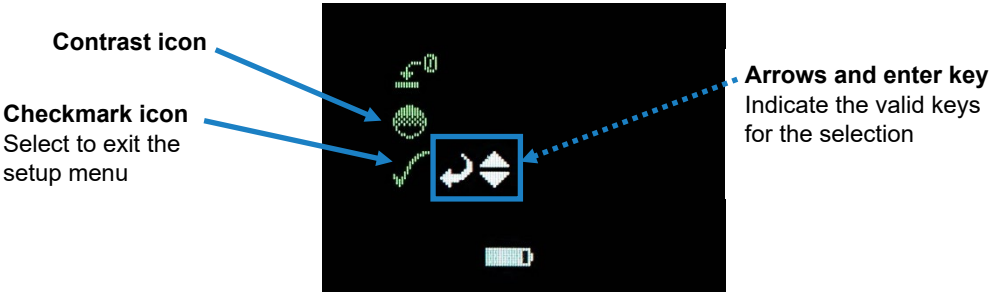


Figure 4-7: Changing the contrast from the keypad

5. Next press the **Enter** button.
6. A number will appear on your display (i.e., 50). Press the **Up** or **Down** arrow to increase or decrease the contrast of the Edge.
7. Press **Enter** button to accept the new contrast value.
8. To return to the measurement view screen, press the down arrow until the checkmark (exit) icon is selected and press the **Exit** button.

Hardware Reboot

To reboot the Dosimeter, press and hold the voice notes button for 10 seconds.

Running Studies

With a couple pushes on the keypad buttons, you will be running and viewing your sessions. After you are done recording sessions, you can load the session data into DMS to analyze, save, and create reports. (See Chapter 5 for viewing your logged data in DMS).

Starting a Run

How to Run a Noise Study

1. If your dosimeter is turned off, press the **On/Off** button to power on.
2. Press and hold the **Run** soft key button.
   - A 3, 2, 1 countdown will appear.
3. When running, the following will appear:
   - A run indicator will appear on the top-right side.
   - The LED indicator will flash green (unless you disabled this in DMS).

Figure 4-8: Display screen while running

Stopping a Study

While the dosimeter is running, you can pause the session by pressing and holding the pause soft key button then end the session by pressing and holding the stop button.

How to Pause a Noise Study

While running, press the **Pause** soft key.

1. A 3, 2, 1 countdown will appear.
2. The pause indicator ❚❚ will be shown in the display.

NOTICE
When viewing the session in DMS, a pause occurrence will be shown by a break in the line of data in the chart.

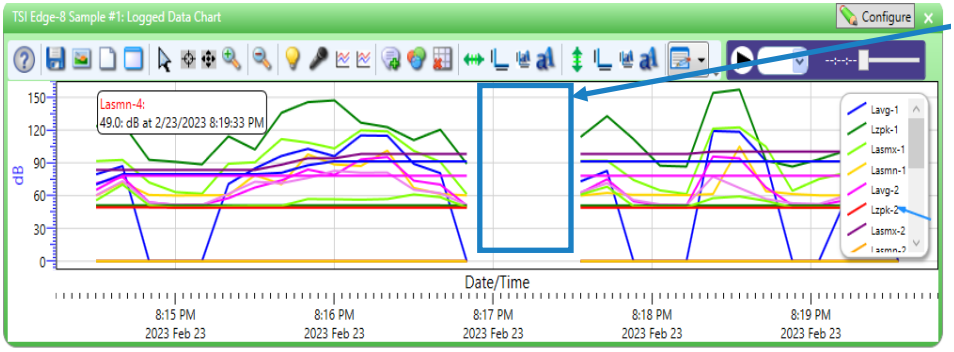


Figure 4-9: Pause noise study

How to Stop a Noise Session

While on pause, press and hold the **Stop** soft key button.

1. A 3, 2, 1 countdown will appear.
2. The stop indicator ■ will be shown in the display.

Indicators/Icons on the Display

The Edge is equipped to notify you of operational/status updates. These indicators (or alert notices) are located on the top right-hand side of the screen. Table 4-1 explains the function of each indicator.

Table 4-1: Indicators (i.e., run, stop, battery, and OL)

Indicator Icon	Explanation
■	***Stop***—indicates the dosimeter is currently in the stop status(opposed to run).This indicates a session
❚❚	**Pause**—Indicates the dosimeter is currently in the pause status. The recorded data is referred to as a study.
▶	***Run***—indicates the dosimeter is currently logging a study.
	Battery charge status—when completely shaded in black, this indicates full battery power
OL	***Overload***—will appear whenever the input signal exceeds the range of the dosimeter.

Viewing Measurements on the Display

The up/down ▲/▼ arrows on the keypad of the dosimeter enable you to move through the various measurements. Use the enter ↵ button to switch the display between (toggle) dosimeters one, two, three and four measurements and settings. For specific information on the views of the Edge, please see “Views on the Edge (Chapter 3)”.)

Viewing Measurements

Press the **Up/Down** ▲/▼ arrow. This will move you through the views on the display.

NOTICE
If you enabled only one measurement to appear on the display, when you press the up/down ▲/▼ arrows it will not show any other measurement values.

Locking or Securing your Dosimeter During Run

As explained previously under DMS setup parameters, the security or lock feature is designed to lock the meter during run to ensure the study will not be stopped unless the lock feature is disabled. (Setting this feature is programmed via DMS. See "Locking or Securing (below)" for more details.)

Locking or Securing

How to Lock or Secure

1. Turn the dosimeter on and press the **Run** soft key to begin logging your study.
2. To enable the lock, press the **Left** soft button three consecutive times within one second intervals.
   - The Lock screen will appear.

Key indicator
Indicates dosimeter is locked while running.

Padlock icon
Secure all

Figure 4-10: Locking/Securing run

NOTICE
If lock/secure run does not activate, please check that locking is set up on your dosimeter.

Unlocking

How to Unlock

1. To unlock, press the left soft button three consecutive times, within one second intervals, and then press the **Enter** button.
   a. If the padlock icon and the key indicator were on the screen, these will vanish and the measurement view will appear along with the run indicator.
   b. If you enabled the lock feature (with the key indicator showing and the measurement view showing) then the key indicator will disappear.
2. To stop your study, press the soft key and the 3, 2, 1 will display as it ends the study.
3. To download and view your results in DMS, please see Chapter 5.)

CHAPTER 5

Viewing your Sessions in DMS

The focus of this chapter is to discuss how to view your sessions via Detection Management Software (DMS). The first section explains how to retrieve your sessions from the dosimeter, and the subsequent sections will then walk you through viewing, organizing, and customizing your studies.

NOTICE
You have the option of multiple different languages in DMS including: English, Spanish, Portuguese, German, French, Italian, and Korean.

Downloading Data

Loading your sessions entails communicating, downloading the sessions/studies (files), and viewing the files in the data finder page, charts and tables, or report views.

Downloading

1. Ensure DMS is installed.
    - Install the software from the USB flash drive or visit our website at TSI Software and Firmware Wizard | TSI. To find the latest DMS software applicable for your dosimeter(s), type your dosimeter model in the search bar and select from the pull-down menu.

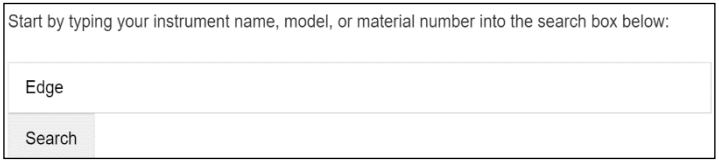


Figure 5-1: Communicating between your PC and the Edge

2. Dock the dosimeter and connect it to your PC using the USB cable (see, “Communicating and Downloading Data”).

Figure 5-2: Communicating between your PC and the Edge

3. Power on the Edge by pressing the button.

4. In DMS’ start screen, choose Download.

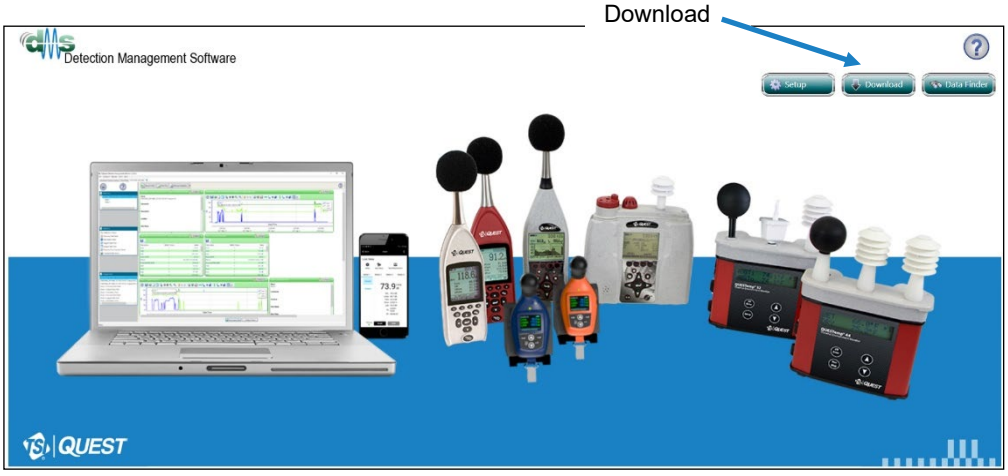
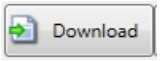


Figure 5-3: DMS start screen

5. Select **Noise Dosimetry** (see ❶), **Edge** (see ❷), and **Edge 7** (see ❸). Select the docked Edge(s) to download (see ❹).

6. Click 

button.
   - In the status field, it will state download is successful.
   - Then, a clear the instrument memory prompt will appear. Click **yes** to clear the memory or click **no** if you want to save the data on the dosimeter.
7. The sessions (files) will load and post to the Data Finder page under Family: Noise Dosimetry heading.

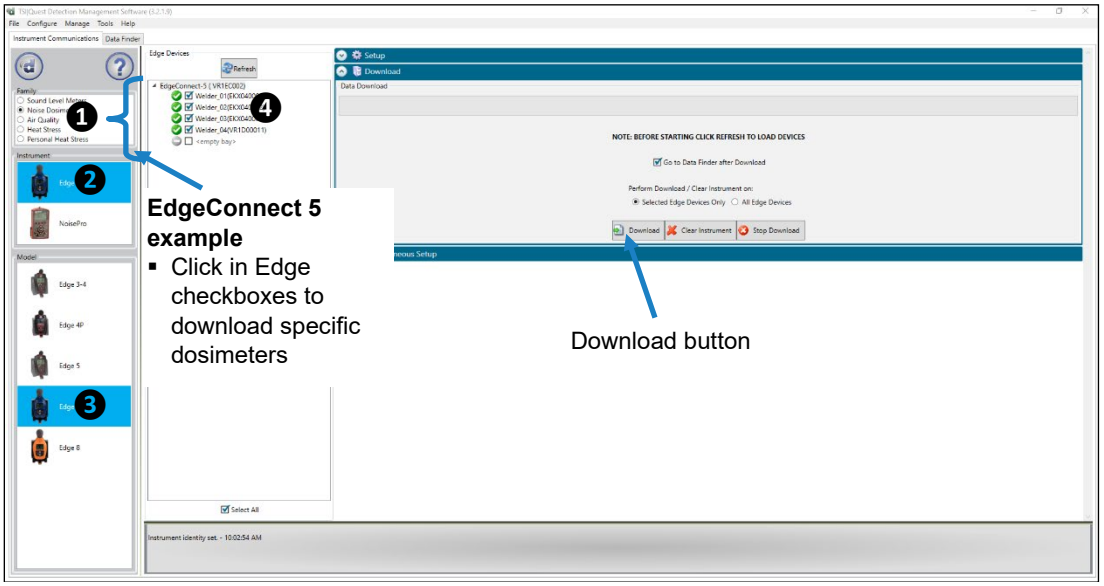


Figure 5-4: Downloading in DMS with the Edge

Viewing Data and Data Finder Page

When you download the data via the the download feature, the data is stored and viewable via the data finder page with advanced charting, tables, and reporting capability. The information is viewable in customizable graphs and/or with measurements/parameters displayed on the top navigational bar.

Selecting and Viewing Data

1. In the **Data Finder** page (see ❶), select the **Noise Dosimetry** family data Each row in the dataset represents a session. Double click on the appropriate row to open a session file. If a session includes multiple studies, a + symbol will show on the left of the row (see ❷). Clicking on the + symbol will drop down a “Study 1” and “Study 2” options.

NOTICE
You may need to expand to see the study data.

2. **Optional**: To reorganize the data displayed in the data finder columns, click drag and drop the titles of the columns in different positions. To shrink/expand the columns, click and drag the black column divider(s).

NOTICE
These methods are similar to positioning/expanding in other spreadsheet programs.

NOTICE
After upgrading DMS, you should right-click in the whitespace of the Data Finder's Browse tree and select the "**Refresh All**" menu option. This will add the new Model Name column to the Data Finder tables and the new Edge 7 and 8 sample data sessions to the TSI Sample Data\Noise browse folder.

3. To view in **Charts** and **Tables**, click on Analyze or Report View buttons.

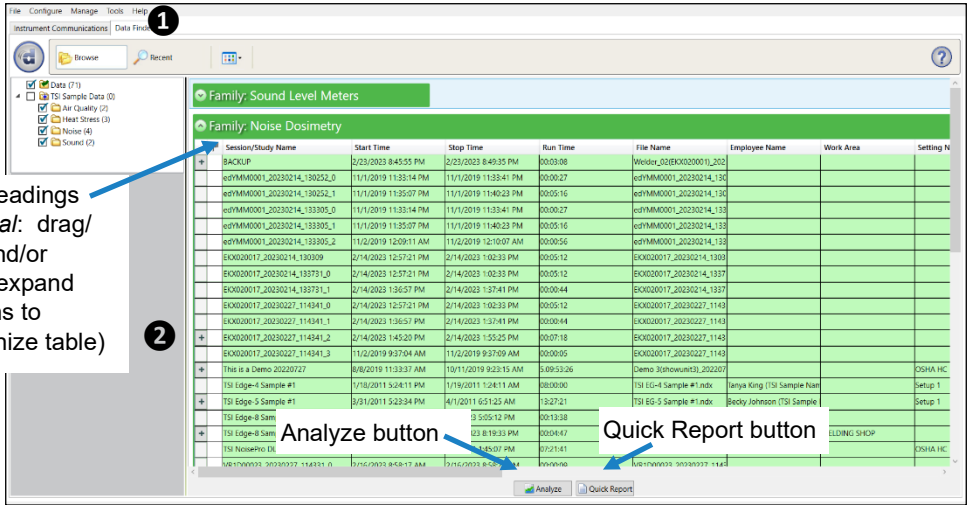


Figure 5-5: Data Finder page with the downloaded data

Report View

The Report View button provides a quick link to view/print the Edge data. To customize the data, refer to the next session, panel view page.

- Click to print the report.

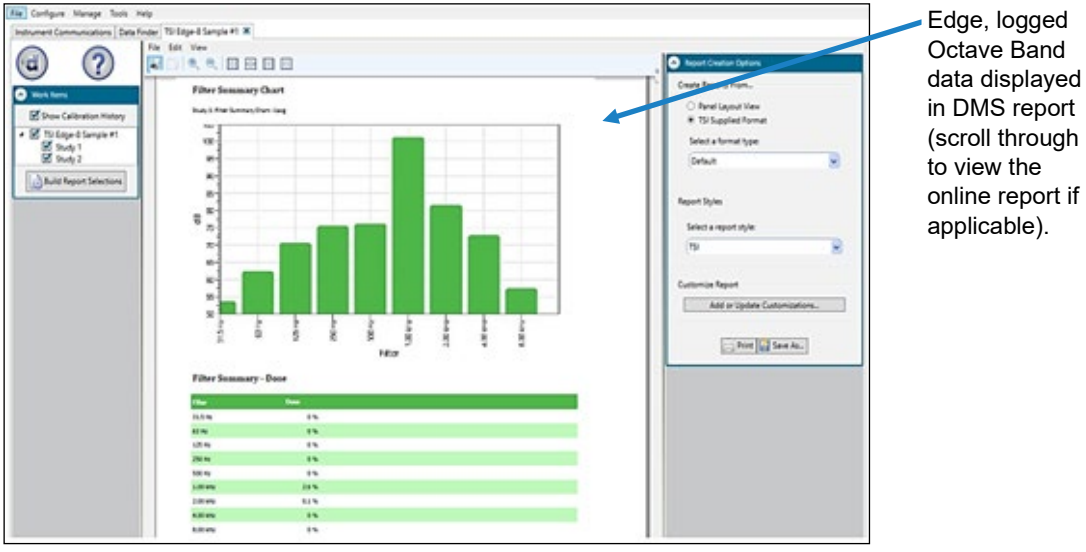
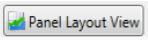


Figure 5-6: Sample data report in DMS

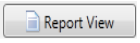
Panel Layout View (charts/tables) 

When you are in the data finder page (see above), select either the **Analyze** button or double-click on a session/study to view the data in charts and tables as displayed in Figure 5-7. The measurements and parameters will be displayed in charts and tables which may be customized for analysis and/or reporting purposes.

1. Panel Layout View is divided into **Work Items** (see ❶), **Add Panel** (see ❷), and **Arrange Panels** (see ❸) palettes, as well as data panels (see ❹).

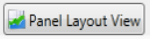
Work items ❶	Select either the session or study (in order to view appropriate measurement/parameter data).
Add panel ❷	Double-click on a chart/table type and it will appear as a panel on your screen.
Arrange panels ❸	Displays the order of the charts/tables which appear in the panel layout. Also, when a chart/table is selected in the arrange panels palette, the associated data panel is selected. The resize handles are applied and the panel is brought into view. (This is very useful when several panels are displayed.) To delete a panel, click on a chart/table and press **Delete** from your keyboard.
Data Panels ❹	Used to view your measurement and/or parameters from your study.

NOTICE
Use the toolbar bar icons and/or configure button to customize parameters.

2. To view the data as a report, click the 

button.

NOTICE
The panels will print in the order in which they are displayed in the panel layout view.

3. To toggle/switch back to panel layout view, click the 

button.

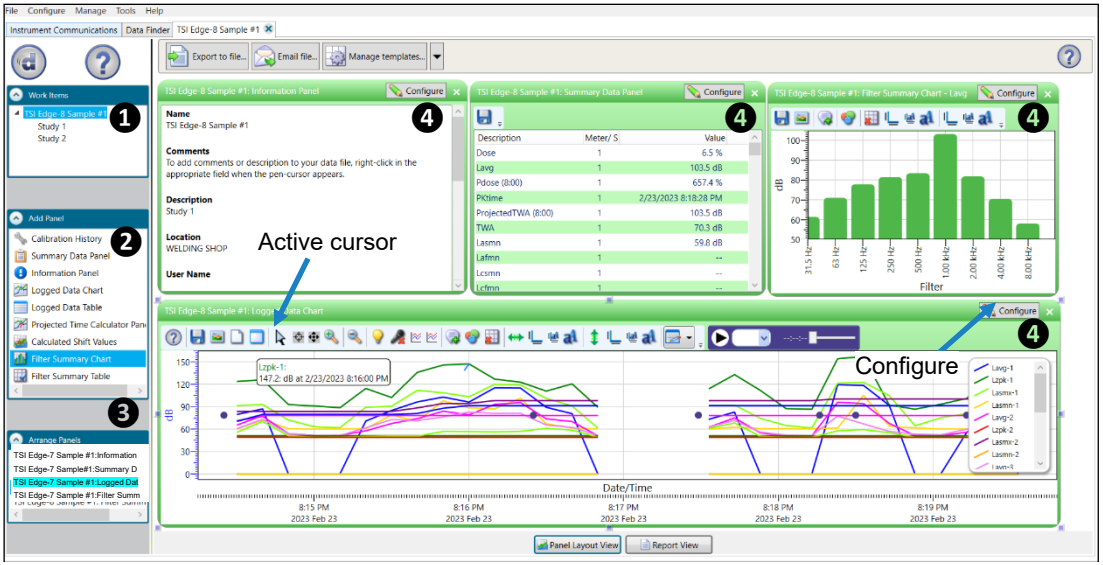
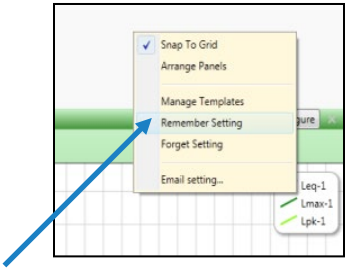


Figure 5-7: Panel layout view (viewing the data in charts and tables)

Table 5-1: Quick Tips with Panels (charts/tables)

Tip	Description
To stretch the panel	Click on one of the grips along the panel's edges and drag the mouse. The panel will expand or shrink when resizing.
To move the panel	Click on the panel's header and drag and drop to the appropriate panel position. **NOTICE** By default, the panels will snap into place on an invisible grid. Right-click outside the panel area and click **Snap to Grid** to clear the checkbox and allow free panel placement.
To change ranges	When clicking on either the *x*-axis or *y*-axis, click and drag the mouse until the appropriate range is selected. **NOTICE** It will span the numbers up or down depending on how you drag the mouse.
To add labels	Click on the add labels icon. Right-click and select edit text to add note/label on the chart. Type in text and press the **Enter** key (on your keyboard). To move the label, left-click and hold to drag to appropriate location on chart.

Tip	Description
To customize chart colors	Click on the icon and using the properties box, select different colors as needed.
To customize *x* or *y* axis font type	Click on these or icons.
To export data to .xls file	Click on the export icon.
To save a layout	Right-click outside the panel area as displayed below.  Click **Remember Setting**.

CHAPTER 6

Maintenance

Replacing Microphone and Windscreen

CAUTION

Microphones are susceptible to electro-static dissipation (ESD). To avoid damage, **DO NOT** replace the windscreen or handle the microphone when the Edge meter is installed on the dock.

Attaching/Detaching

The Edge features a field replaceable microphone and a Click-on, twist-off removable windscreen.

NOTICE

If you ordered an Edge kit, extra windscreen(s) will be included in your case.

Before you start, turn off the dosimeter by pressing and holding the On/Off button.

1. Remove the windscreen by twisting and pulling on the black ring. (**DO NOT** pull on the foam).
2. If you are replacing the windscreen, snap on a new windscreen by gently pushing it until it fits firmly.
3. To remove the microphone, first carefully remove the clip around the collar of the microphone (see Figure 6-1 below).
4. To remove the clip, insert the provided spare clip into the pin holes located on the opposite side, and push the existing clip half way. Then remove both clips one at the time (see Figure 6-1 below).
5. Make sure both clips are removed completely. Then gently remove the microphone from its socket.
6. To attach a new microphone, gently connect the microphone into the connector located in the socket until it fits firmly. Then, carefully push one clip back into its place. A properly installed microphone should only have one clip located in the back of the dosimeter.

CAUTION
When placing the microphone, position it correctly to fit the connector. Risk of bending the connector wire may occur if this action is not conducted properly.

The following diagram illustrates how to remove and replace the microphone.

Figure 6-1: Microphone and windscreen assembly

CHAPTER 7

Technical Support/ Customer Service

Contact/Service Information

This section gives directions for contacting TSI® Incorporated for technical information and directions for returning the Edge 7 Personal Noise Dosimeter for service.

Technical Support Contacts

If you have any difficulty setting or operating the instrument, or if you have technical or application questions about this system, contact TSI® Incorporated's Technical Support.

North America and Asia Pacific	Europe, Middle East, and Africa
Telephone: 1-800-680-1220 (USA); +1 651-490-2860 (outside USA)	**Telephone**: +49 241-52303-0
Fax: +1 651-490-3824	**E-mail:** tsigmbh@tsi.com
E-mail: technical.services@tsi.com	

Service Contact Information

If your instrument does not operate properly, or if you are returning the instrument for service, visit our website at tsi.com/service for a Service Request form, or contact Customer Service.

North America and Asia Pacific	Europe, Middle East, and Africa
TSI Incorporated Attn: Service Dept 5200 Dickey John Rd Auburn, IL 62615 USA	**TSI Instruments Ltd.** Stirling Road Cressex Business Park High Wycombe, Bucks HP12 3ST United Kingdom
Telephone: 1-800-680-1220 (USA); +1 651-490-2860 (outside USA)	**Telephone:** +44 (0) 149 4 459200
E-mail: technical.services@tsi.com	**E-mail:** tsiuk@tsi.com

Returning for Service

Visit our website at tsi.com/service and complete the on-line “Service Request” form or call TSI® at 1-800-680-1220 (USA) or (651) 490-2860, or 001 651 490-2860 (International) for specific return instructions.

Customer Service will need the following information:

- The instrument model number
- The instrument serial number
- A purchase order number (unless under warranty)
- A billing address
- A shipping address

Use the original packing material to return the instrument to TSI®. If you no longer have the original packing material, seal off any ports to prevent debris from entering the instrument and ensure that the display and the connectors on the instrument front and back panels are protected. This instrument must be packed in a manner appropriate for a precision instrument.

APPENDIX A

Specifications*

*All specifications are subject to change without notice.

ANSI S1.25 Class Designation

Acoustic Dosimeter: 2AS-V/V-5 with frequency weighting C, Time constant F, and exchange rates 3 and 4 also available. A criterion level of 90 dB and a threshold level of 80 dB are used for measurements to OSHA requirements.

IEC 61260 Class Designation

The Eg7, Eg7-BT personal sound exposure meters conform to 1/1 band filters, class 2, IEC 61260-1:2014.

Mechanical Characteristics

Housing	Plastic case with black, gray background and white outlined buttons.
Size	4.62” long x 2.39” wide x 1.91” thick (without windscreen but including microphone) (117 mm long x 61 mm wide x 48 mm thick)
Weight	4 oz. (113 g), less mounting device
Ingress Protection....	IP65

Power/Electrical Characteristics

Battery Life.....	Up to **30** hours of continuous operation at normal operation under reference to environmental conditions when full capacity batteries are installed. It is recommended to charge the battery frequently for maximum efficiency.
Type	Lithium Polymer (Flat cell)
Memory capacity	Up to 100 days of data logging of standard noise data, without voice notes, audio recording or 1/1 Octave Band data enabled with a 1 minute sampling rate.
Power Supply (P/N 805103)	Input Voltage Range: 100 ~ 240 VAC, 50 ~ 60 Hz Output Voltage: 12V at 3.0 A

Environmental Effects

Stabilization Time.....	The typical time interval needed to stabilize after changes in environmental conditions is 5 minutes for each 10°C change.
Operating Temperature.....	+14°F to + 122°F (-10°C to + 50°C)
Charging Temperature.....	On EdgeConnect, (dry) “office” conditions 41°F to 104°F (5°C to 40°C)
Storage Temperature .	-13°F to + 140°F (-25°C to + 60°C)
Humidity Range.....	5% to 95% Non-Condensing
Pollution Degree	II
Overvoltage Category	II
Altitude	2,000m
Location	Indoor or Outdoor
Operating Barometric Pressure Range.....	65 kPa to 108 kPa (19 to 32 inches of Hg) Approximate 3500 m to -600 m elevation relative to sea-level (11500 ft. to -2000 ft.). Field calibration should be performed near intended operating elevation.

Vibration Effects.....	Applied Vibration of 0.1 g (10 Hz to 500 Hz) can produce a level of 71 dBA @ 500 Hz (force perpendicular to diaphragm) **NOTICE** This is 1 dB above the RMS Linear operating lower limit of 70 dB.
Magnetic Field Effects	The threshold level (min 70 dB) was not reached with a 4000 A/m magnetic field applied. The sound exposure, after 1 hour in a 60 Hz 80 A/m magnetic field, with an electrically equivalent microphone impedance device is 0.0001 Pa^2 h, with no cables used or needed. The reference orientation or direction of maximum response to an 80 A/m magnetic field is when the field is perpendicular to the plane of the personal sound level meter display/keypad.
EMC & ESD Immunity	The sound level at which the personal sound level meter conforms to the Electromagnetic and electrostatic compatibility requirements and test procedures is 85 dBA, with no cables used or needed. No degradation of performance following applications of ESD per IEC 61000-6-2 industrial levels. No limitations due to ESD are known. No degradation of performance during application of RF per IEC 61000-6-2 industrial levels for all applicable configurations. The personal sound exposure meter was set to run mode, Bluetooth® enabled, octaves enabled, display timeout disabled during emissions and immunity testing.

User Interface

Display

Size: 128 x 64 color OLED

Keypad

Six (6) keys: up arrow, down arrow, enter, 2 soft keys, on/off.

EdgeConnect1 and EdgeConnect5

EdgeConnect1 and EdgeConnect5 are powered by a 12-volt charger adapter with international plug adapters. The backside of the Edge slides into the hook of the EdgeConnect1 or EdgeConnect5 with the mounting clasps rotating to a 90-degree angle (which will rest on a table/work area).

Physical Attributes of EdgeConnect1 and EdgeConnect5

LED amber indicator	Indicates EdgeConnect1 or EdgeConnect5 is “powered on” (lower of the two shown LEDs).
LED red indicator and **LED green indicator**	Signifies status of charging. Flashing red indicates charging. Solid green indicates charging is complete.
Size of EdgeConnect1	2.87” x 2.32” x 3.54” (7.29 cm x 5.98 cm x 9.0 cm)
Size of EdgeConnect5	12.81” x 3.1” x 3.54” (32.54 cm x 7.87 cm x 9.0 cm)

Measurements

Types

Displayed Data and status indicators.....	SPL, Average value (Lavg or Leq), Maximum value (Lmx), Minimum value (Lmn), Peak Value (Lcpk), Exposure, Run Time, TWA, UL Time 1/1 Octave band, Ceiling Exceedance Count

Measurement Parameters and Specs

Measurement Parameters and Specs	
Dosimeters.....	Four (4) dosimeters at once (EG7 and EG8 models), each with its own assignable profile (via DMS only).
RMS Range	RMS Linear operating range of each filter band is 70 to 140 dB
RMS Weighting.....	A or C weighting
RMS Time Response ..	Fast or Slow
Frequency Range and tolerance(s)	20 Hz to 12.5 kHz 20, 25, 31.5 ±3 dB 40, 50 ±2 dB ≥ 8 kHz +5/-∞ dB
Exchange Rate (ER) ...	3 dB, 4 dB, or 5 dB
Peak Range.....	110 dB to 143 dB
Peak Weighting	C or Z weighting
Pulse Range @ Tolerance	1 ms 4 kHz tone-burst: 53 dB @ ±1.5 dB 10 ms 4 kHz tone-burst: 53 dB @ ±0.7 dB 100 ms 4 kHz tone-burst: 53 dB @ ±0.7 dB The shortest tone-burst is 1 ms, tone-bursts are applied with continuous 70 dBA @ 1 kHz
Criterion Levels (Lc) ..	70 to 90 dB in 1 dB increments
Criterion Duration (Tc) (Reference integration time).....	8 Hours
Threshold Level (Lt)....	70 to 90 dB in 1 dB increments

Measurement Parameters and Specs	
Holding Upper Limit.....	The upper Limit is triggered at 141 dB. The delay time is less than or equal to 1 second.
Holding Upper Limit Trigger (minimum time).	1/32 sec, plus delay of time response (F/S).
Integration time duration Limits	At sound level (L) of 70 to 140 dB the Integration period (t) is 1 sec. to over 10 Hours (@140 dB). This spec is about size and resolution of internal math functions to meet measurement standards and does not limit runtime to 10 hours.
Reference range.....	Not Applicable, unit is auto-ranging.
Reference Sound exposure	1 $Pa^2 \cdot h$
Reference Filter Attenuation	0 dB
Sound Exposure range	0.01 to 9999.9 $Pa^2 \cdot h$
Sound Exposure Impulse Tolerance	The typical percentage deviations from the sound exposure indicated, in response to positive-going unipolar pulses and to negative-going unipolar pulses is 0.63 %.
Noise Floor	≤ 58 dBA
Microphone input tests (input signal)	0.22 V_{RMS} MAX
Microphone Reference Direction.....	The reference sound-wave direction is perpendicular to the microphone face or 0 degrees incidence angle.
Acoustic test method ..	To determine the relative frequency response the sound exposure meter was suspended from the ceiling using strings with the microphone face perpendicular to the sound source.
Warmup time	The warmup time for the dosimeter is 1 minute.
Mid-band Octave Frequencies.....	The nominal mid-band 1/1 octave filter frequencies in Hertz are 16, 31.4, 63, 125, 250, 500, 1K, 2K, 4K, 8K, 16K.
Reference input level...	A nominal open circuit sensitivity -65.4 dB re:1V/Pa microphone will produce 0.5356 mV_{RMS} with a 94 dB re:20 µPa 1 kHz acoustic signal applied.

Microphone Specifications

The Maximum safe SPL for the microphone is 152 dB.

Eg7/8 Microphone MIC-EG7 Frequency Response			
1/3 Octave Center Frequency (Hz)	Nominal 0º Incidence Angle Frequency Response (dB)	Nominal 90º Incidence Angle Frequency Response (dB)	Nominal random Incidence Angle Frequency Response (dB)
20	-0.7	-0.7	-0.7
25	-0.4	-0.4	-0.4
31.5	-0.3	-0.3	-0.3
40	-0.1	-0.1	-0.1
50	0.0	0.0	0.0
63	0.1	0.1	0.1
80	0.1	0.1	0.1
100	0.2	0.2	0.2
125	0.2	0.2	0.2
160	0.2	0.2	0.2
200	0.0	0.0	0.2
250	0.1	0.1	0.3
315	0.1	0.1	0.3
400	0.1	0.2	0.3
500	0.3	0.3	0.3
630	0.1	0.2	0.2
800	-0.1	0.0	0.0
1000	0.0	0.0	0.0
1250	0.0	-0.1	-0.1
1600	0.0	-0.2	-0.2
2000	0.0	-0.3	-0.2
2500	0.2	-0.3	-0.2
3150	0.2	-0.4	-0.3
4000	0.6	-0.4	-0.2
5000	1.3	-1.1	-0.5
6300	1.1	-0.7	-0.7
8000	1.1	-1.7	-0.9
10000	1.9	-2.1	-1.2
12500	1.9	-3.1	-1.3

Eg7/8 Pressure Field Frequency Response	
1/1 Octave Frequency (Hz)	Nominal Pressure Field Frequency Response (dBA)
31.5	-40.4
63	-26.7
125	-16.2
250	-8.6
500	-3.1
1000	0.0
2000	0.9
4000	0.3
8000	-2.7
12500	-6.6

Microphone Input Tests

The Edge supports microphone input testing using Input Adapter 805104. The maximum input signal level is 0.22 V_{RMS}. Internal filters are digital with a reference attenuation of 0dB. To perform microphone input tests:

- Remove the microphone retaining clip and microphone from the dosimeter.
- Power on the dosimeter meter with no microphone installed.
- Simultaneously Press/hold the two soft keys to show z-weighted readings.
- Ensure signal generator is set for high impedance output (Hi-Z).

NOTICE
It is important to power on the dosimeter with **no microphone attached** when running microphone input tests.

(Field) Calibration

Pre-calibration	When performed, valid prior to the start of the study.
Post-calibration	When performed, valid for the previous study.
Storage	Calibrations for a study are stored in the related study file.
Calibrator requirement.	Calibrations should be performed at 114 dB at 1 kHz.
Pressure to Free field .	The pressure field to free field correction at 1 kHz is zero.
Calibration Interval.....	Annual laboratory recalibration is recommended.

Communications

The Edge communicates via the EdgeConnect1 and/or the EdgeConnect5. Communications is supported via USB cable from the docking station to the PC.

Special Functions

Security	Key sequence protection through the keypad when running.
Auto-Run	May be programmed via DMS.
Logging	Data logging which includes Lavg/Leq, Lmx, Lcpk.
Voice Notes.....	Make verbal notes about location description or noise events, which will display in the time-stamped data set.
Audio Recording ...	Automatically record audio of a noise event above a configurable dB level.
Projected Dose	P_{Dose} predicts the end of a working day (8 hours) Dose, from the currently accumulated Dose value.
Pause Study.....	Pause the current session and resume it later without impacting the quality of the measurements. The pause period can be reviewed in the downloaded data set.

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APPENDIX B

Glossary of Terms

Background Noise, effects of

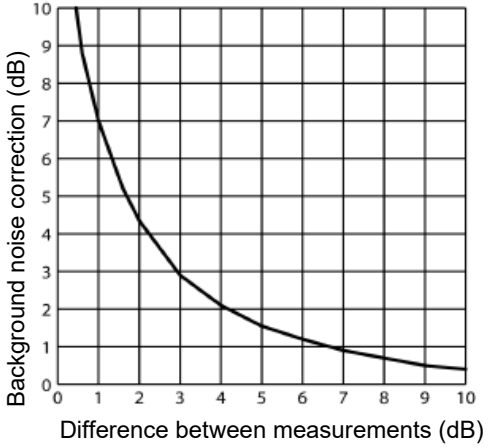
Background noise can cause considerable error in measurement when its level is high relative to the level of a noise source of interest. If you can make measurements both with and without the contribution of a noise source of interest, you can mathematically subtract the background noise from the combined measurement, yielding the level of the noise source of interest alone. The accuracy of this determination improves as the difference between the two measurements increases.

To remove background noise:

1. Obtain a measurement that includes the contribution of the noise source of interest (the combined measurement).
2. Make a second measurement under exactly the same conditions as in Step 1 but without the presence of the noise source of interest (the background noise measurement).
3. Determine the decibel difference between these two measurements.
4. Find that difference on the *x*-axis of the figure below.
5. Find the point on the curve directly above this difference.
6. Read the corresponding value on the *y*-axis for that point (the correction value).
7. Subtract the correction value from the combined measurement.

Example

Measurements with and without the noise source of interest are 91 dB and 90 dB, respectively. For a difference of 1 dB, the background noise correction value is 7 dB. Therefore, the level for the noise source of interest without the noisy background is 84 dB.



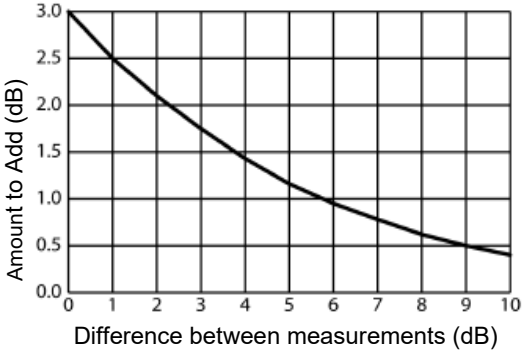
Combining Noise sources

Because sound levels are measured in decibels they cannot be simply added together. A sound level of 90 dB plus 90 dB does not yield 180 dB but rather 93 dB. The procedure for mathematically determining a combined level of sound from independent measurements made for two noise sources is given below.

1. Make independent measurements for both noise sources, where each exists without the presence of the other.
2. Determine the decibel difference between these two measurements.
3. Find that difference on the *x*-axis of the figure below.
4. Find the point on the curve directly above this difference.
5. Read the corresponding value on the *y*-axis for that point (the Amount to Add).
6. Add this value to the larger of the two measurements.

Example

Independent measurements for the two noise sources yielded levels of 90 dB and 91 dB. For a difference of 1 dB, the correction factor taken from the curve below is 2.5 dB. Therefore, the combined level when these two sound sources are present in the measurement area at the same time 93.5 dB.



Crest Factor

Crest Factor is the ratio of the instantaneous peak value of a wave to its RMS value. This is a performance specification of a meter's ability to process signals that have peaks that are substantially higher than their RMS averages.

Criterion Level (CL)

Criterion level is the average SPL that will result in a 100% dose over the Criterion time, usually 8 hours. The Criterion Level is typically set by a regulating agency, such as OSHA, and is not usually applicable for community noise monitoring. Examples: OSHA mandates the Criterion Level (maximum allowable accumulated noise exposure) to be 90 dB for 8 hours. For an 8-hour sample, an average level (Lavg) of 90 dB will result in 100% dose. For the OSHA HEARING CONSERVATION AMENDMENT, the "action level" is 85 dB for 8 hours. This would result in a 50% dose reading. Note that the Criterion Level has not changed. (If the Criterion Level were changed to 85 dB then an 8-hour average of 85 dB would result in 100% dose.)

Criterion Time

The time over which the Criterion Level is established, generally 8 hours.

Decibel (dB)

Sound Level Meters use the decibel as the unit of measure known as Sound Pressure Level (SPL). SPL uses the ratio between a reference level of 20 microPascals (.00002 Pascals) and the level being measured. SPL = 20 log (measured level/reference level). Example: the SPL for 1 Pascal is 20 log (1 Pascal/.00002 Pascal) = 94 dB 20 microPascals (.00002 Pascals) is considered the average threshold of hearing. A whisper is about 20 dB. A normal conversation is typically from 60 to 70 dB, and a noisy factory from 90 to 100 dB. Loud thunder is approximately 110 dB, and 120 dB borders on the threshold of pain.

Dose

Related to the Criterion Level, a dose reading of 100% is the maximum allowable exposure to accumulated noise. For OSHA, 100% dose occurs for an average sound level of 90 dB over an 8-hour period (or any equivalent exposure). By using a TWA reading rather than the average sound level, the time period is no longer explicitly needed. A TWA of 90 dB is the equivalent of 100% dose. The dose will double (halve) every time the TWA increases (decreases) by the Exchange Rate. Example: OSHA uses an Exchange Rate of 5 dB. Suppose the TWA is 100 dB. The dose would double for each 5 dB increase over the Criterion Level of 90 dB. The resulting dose is therefore 400%. If the TWA was instead equal to 80 dB then the dose would halve for each 5 dB below the Criterion Level. The resulting dose would be 25%. When taking noise samples less that the full workday, dose is an easy number to work with because it is linear with respect to time. Example: If a 0.5-hour sample results in 9% dose and the workday is 7.5 hours long, then the dose for the full workday would be a 135% dose (7.5 / 0.5 x 9%). This is computed making the assumption that the sampled noise will continue at the same levels for the full 7.5-hour workday.

Exchange Rate (ER – also known as the Doubling Rate)

Exchange rate refers to how the sound energy is averaged over time. (Also, referred to as Doubling Rate.) Using the decibel scale, every time the sound energy doubles, the measured level increases by 3 dB. This is the 3 dB exchange rate that most of the world uses. For every increase of 3 dB in the time weighted average, the measured DOSE would double. Some organizations such as OSHA in the U.S. have argued that the human ear self-compensates for changing noise levels and they felt that the 3 dB exchange rate should be changed to more closely match the response of the human ear. OSHA currently uses a 5 dB exchange rate, which would mean that the reported DOSE would double with every 5 dB increase in the time weighted average. The exchange rate affects the integrated reading Lavg, DOSE, and TWA but does not affect the instantaneous sound level.

Field Calibration (vs. Factory Calibration), pre-calibration, post-calibration

To be sure the dosimeter is functioning within specified tolerance limits, it should be returned to the factory annually for a factory recalibration. To verify that the dosimeter is measuring properly during normal use, field calibrations should be performed. Pre-calibration is performed prior to any data being recorded by the dosimeter. During a pre-calibration, the dosimeter level may be adjusted to match the calibrator output level. Post-calibration is a simple verification that the instrument has remained in calibration throughout the measurement period.

Free field setting (microphone)

Measurements made in an area without sound reflections, diffractions and absorptions caused by nearby objects (including the operator). Sound waves are free to spread out continuously, like ripples on a pond, without reflection. When making free field measurements with a dosimeter set up for use as a sound level meter, the microphone is typically pointed directly at the sound source.

Hearing Conservation (HC)

The Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration (MSHA) provide regulatory standards for hearing conservation programs. In addition, the American Conference of Governmental Industrial Hygienists (ACGIH) provides industrial standards for hearing conservation programs. http://www.osha.gov/ , http://www.msha.gov/ , http://www.acgih.org/home.htm.

Hertz (Hz)

Unit of vibration frequency in cycles per second.

Lavg (Average Level)

Lavg is the average sound level measured over the run time. This becomes a bit confusing when thresholds are used. Any sound below the threshold is not included in this average. Remember that sound is measured in the logarithmic scale of decibels therefore the average cannot be computed by simply adding the levels and dividing by the number of samples. When averaging decibels, short durations of high levels can significantly contribute to the average level. Example: Assume the threshold is set to 80 dB and the Exchange Rate is 5 dB (the settings of OSHA's Hearing Conservation Amendment). Consider taking a one-hour noise measurement in an office where the **A**-weighted sound level was typically between 50 dB and 70 dB. If the sound level never exceeded the 80 dB threshold during the one hour period, then the Lavg would not indicate any reading at all. If 80 dB was exceeded for only a few seconds due to a telephone ringing near the instrument, then only those seconds will contribute to the Lavg resulting in a level perhaps around 40 dB (notably lower than the actual levels in the environment).

$L_{EP,D}$

Daily personal noise exposure level.

Leq (Equivalent Level)

The true equivalent sound level measured over the run time. The term Leq is functionally the same as Lavg except that it is only used when the Exchange Rate is set to 3 dB and the threshold is set to none.

Logging

(Also called Data Logging.) Certain measurements, such as average level (Lavg) and maximum level (max), can be recorded by the dosimeter at regular intervals. For example: A dosimeter is set to log Lavg and max at one minute logging intervals. If the dosimeter runs for one hour, then it would log 60 Lavg results and 60 max levels. You would be able to see the average and maximum levels for each minute of the one hour run time.

Maximum Level (Lmax)

The highest sampled sound level during the instrument's run time allowing for the unit's Response Time setting (Fast or Slow).

Measurement Range

The decibel range within which the unit's measurements are valid.

Minimum Level (Lmin)

The lowest sampled sound level during the instrument's run time allowing for the unit's Response Time setting (Fast or Slow).

Noise Floor

In a "Perfectly Quiet" room, the electrical noise produced by the microphone is approximately 35 dB on A-weighting and 45 dB on **C**-weighting. These levels are known as the Noise Floor of the instrument. The Noise Floor can cause inaccurate measurements at low measurement levels. Measurements must always be at least 5 dB above the Noise Floor to be valid. Therefore, the lowest valid measurements of the dosimeter are approximately 40 dB on **A**-Weighting and 50 dB on **C**-Weighting.

Peak Level

Peak is the highest instantaneous sound level that the microphone detects. Unlike the Max Level, the peak is detected independently of the unit's Response Time setting (Fast or Slow). Example: The peak circuitry is very sensitive. Test this by simply blowing across the microphone. You will notice that the peak reading may be 120 dB or greater. When taking a long-term noise sample (such as a typical 8-hour workday sample for OSHA compliance), the peak level is often very high. Because brushing the microphone over a shirt collar or accidentally bumping it can cause such a high reading, the user must be careful of placing too much emphasis on the reading.

PEL (Permissible Exposure Level)

The **A**-weighted sound level at which exposure for a Criterion Time, typically eight hours, accumulates a 100% noise dose.

Projected Time

The variable amount of time used to make a projected dose calculation from an actual dose measurement.

Random incidence (microphone)

This only applies to Class/Type 1 microphones. Measurements made in an area where sound waves are coming from all directions, including reflections and diffractions. When the dosimeter is being used as a sound level meter in an area where reflections and diffractions from nearby objects are present, use the Random Incidence Corrector with the microphone, and angle the microphone at approximately 70 degrees. Most personal noise dosimetry applications do not require the random incidence corrector, since they are not measured with a Class/Type 1 microphone.

Response Time

The response determines how quickly the unit responds to fluctuating noise. Fast has a time constant of 125 milliseconds. Slow has a time constant of 1 second. Example: Typically, noise is not constant. If you were to try to read the sound level without a response time, the readings would fluctuate so much that determining the actual level would be extremely difficult. Using a response of slow or fast simply smooths the noise fluctuation and makes the sound level easier to work with. While the terms slow and fast have very specific meanings (time constraints), they work very much as you would expect. The fast response would result in a more fluctuating sound level reading than would the slow response. The OSHA regulations require the slow response.

RMS (Root Mean Square)

The RMS voltage of a signal is computed by squaring the instantaneous voltage, integrating over the desired time, and taking the square root. Simply put, the RMS values are the results from the dosimeter with the response time and weighting settings taken into account.

SEL/Lxe (Sound Exposure Level)

The sound exposure level averages the sampled sound over a one second period. Assuming the sampled run time to be greater than one second, SEL is the equivalent one-second noise that would be equal in energy to the noise that was sampled. SEL is typically measured using a 3 dB exchange rate without a threshold. SEL is not used by OSHA. Example: Suppose you wanted to measure in a location next to railroad tracks, which also happened to be in the takeoff path of an airport. A train passes by taking 10 minutes with an average sound level of 82 dB. A jet passes overhead taking 45 seconds with an average level of 96 dB. Which of these events results in more sound energy? You can answer the question by comparing their SEL readings, which compress each event into an equivalent one-second occurrence. SEL for the train = 109.7 dB, SEL for the jet = 112.5 dB.

Threshold

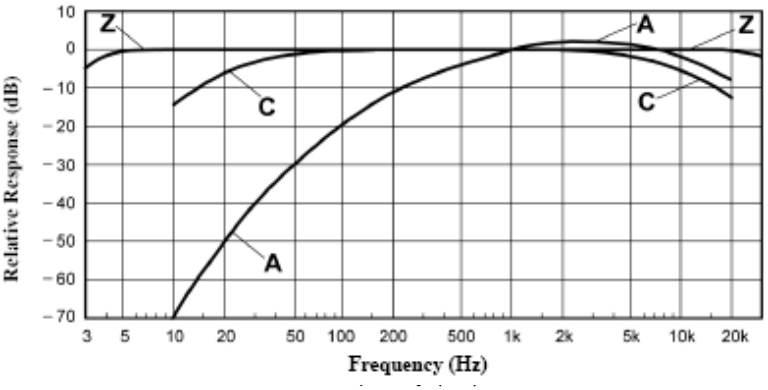
The threshold affects the Lavg, TWA, and Dose measurements. All sound below the threshold is considered nonexistent noise for the averaging and integrating functions. The threshold does not affect measurements in the sound level mode. OSHA uses two different thresholds. The original Occupational Noise Exposure Standard (1971) used a 90 dB threshold and called for engineering controls to reduce the noise levels if the eight-hour TWA was greater than 90 dB. The Hearing Conservation Amendment (1983) uses an 80 dB threshold and calls for a hearing conservation program to be put in place if the eight-hour TWA exceeds 85 dB (50% dose). The Hearing Conservation Amendment is the more stringent of the two rulings and is what most US industrial users are concerned with. Example: With an 80 dB threshold, suppose you placed a 79 dB calibrator on the unit for a period of time. Because all of the noise is below the threshold, there would be no average (you can think of it as an average of 0 dB). If the calibrator were 80 dB instead, then the average would be 80 dB. On histogram printouts, typically 1 minute (or other specified increment) averages are printed. Because real noise fluctuates, it is quite possible to have an average level below the threshold. This also applies for the overall Lavg.

TWA (Time Weighted Average)

The time weighted average always averages the sampled sound over an 8-hour period. TWA starts at zero and grows. The TWA is less than the Lavg for a duration of less than eight hours, exactly equal to the Lavg at eight hours, and grows higher than Lavg after eight hours. TWA represents a constant sound level lasting eight hours that would result in the equivalent sound energy as the noise that was sampled. Example: Think of TWA as having a large 8-hour container that stores sound energy. If you run a dosimeter for 2 hours, your Lavg is the average level for those 2 hours - consider this a smaller 2-hour container filled with sound energy. For TWA, take the smaller 2-hour container and pour that energy into the larger 8-hour TWA container. The TWA level will be lower. Again, TWA is ALWAYS based on the 8-hour container. When measuring using OSHA’s guidelines, TWA is the proper number to report provided that the full work shift was measured. Example: If the work shift is 6.5 hours long, then measure for the entire 6.5 hours. TWA is the correct level to report to OSHA. It does not have to be modified.

Weighting (A, C, Z, etc.)

"**A**", "**B**", "**C**", "**Z**" and LINEAR are the standard weighting networks available. These are frequency filters that cover the frequency range of human hearing (20 Hz to 20 kHz). "**A**" weighting is the most commonly used filter in both industrial noise applications (OSHA) and community noise regulations. "**A**" weighted measurements are often reported as dBA. The "**A**" weighted filter attempts to make the dosimeter respond closer to the way the human ear hears. It attenuates the frequencies below several hundred hertz as well as the high frequencies above six thousand hertz. "**B**" weighting is similar to "**A**" weighting but with less attenuation. The "**B**" weighting is very seldom, if ever, used. The "**C**" weighting provides a fairly flat frequency response with only slight attenuation of the very high and very low frequencies. "**C**" weighting is intended to represent how the ear perceives sound at high decibel levels and is often used as a "flat" response when LINEAR is not available. "**C**" weighted measurements are often reported as dBC. "**Z**" is zero weighting, with no weighting across the frequency range of human hearing. LINEAR is thought of as having a flat frequency response curve over the entire measurement frequency range. LINEAR is most commonly found on upper model sound level meters and is typically used when performing octave band filter analysis.



Upper Limit (UL)

A type of measurement parameter setting in which the user selects a certain decibel level. The dosimeter will then record the amount of time that the sound level was at or greater than the preset level. This time is then recorded as "UL Time"

Windscreen

A windscreen is a covering for the microphone that reduces disturbances caused by wind and direct contact with other surfaces. The windscreen is placed over the microphone when taking measurements to help prevent false high readings due to wind blowing across the microphone or objects (hair, clothing, etc.) brushing against the microphone. The windscreen will also help protect the microphone from dust and debris.

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APPENDIX C

Measurement Equations

$$DOSE = \frac{100}{TC}\left[\int_{0}^{RTIME} 2^{(LS-CL)/(ER)}\,dt\right]\%$$

$$PrD_{8\ hours} = DOSE \times \frac{TC}{RTIME}\ \%$$

$$PrD_{x\ hours} = DOSE \times \frac{Prt}{RTIME}\ \%$$

$$L_{AVG} = ER\left[log_2 \int_{0}^{RTIME} 2^{LS/ER}\,dt - log_2\,(RTIME)\right] dB$$

$$L_{EQ} = 3.01\left[log_2 \int_{0}^{RTIME} 2^{LS/3.01}\,dt - log_2\,(RTIME)\right] dB$$

$$SEL = ER\left[log_2 \int_{0}^{RTIME} 2^{LS/ER}\,dt\right] dB$$

$$TWA = ER\left[\log_2 \int_0^{RTIME} 2^{LS/ER}\, dt - \log_2(TC)\right] dB$$

$$TWA_{x\ hours} = L_{AVG} + ER\left[\log_2\left(\frac{Prt}{TC}\right)\right] dB$$

$$EXP_{HRS} = [2^{(L_{EQ}-94)/3.01}]\frac{RTIME}{3600}\ Pa^2H$$

$$LHIST = ER\left[\log_2 \int_0^{HTIME} 2^{LS/ER}\, dt - \log_2(HTIME)\right] dB$$

$$TIME\ STAT\ DIST = 100 \times \frac{SC}{TS}\ \%$$

Table C-1: Variables used in equations

Variables	Explanations
LS	Sound level, in decibels, that exceeds the Threshold Level. The response time is indicated by the second letter (Slow or Fast).
TC	8-Hour Criterion Time (28800 seconds).
RTIME	Run Time (seconds).
ER	Exchange Rate (3, 4, 5 or 6 dB).
CL	Criterion Level (40 to 140 dB).
LHIST	Integrated level stored either in 1 second, 10 second, or 1 minute periods based on the programmed logging setup.
HTIME	Time used to computer Time History (1 second, 10 seconds, or 1 minute).
SC	Sample Counts. The number of samples occurring at the same decibel level.
TS	Total Samples. The total number of samples during the Run Time.
Prt	Projection Time (seconds).

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