B&K 2245

with Work Noise Partner

User Guide

for Version 1.5

BN 2377–17

210812.0.4

TABLE OF CONTENTS

OVERVIEW

Your instrument works with applications:

- **Noise Partner** for general-purpose, basic sound level measurements
- **Enviro Noise Partner** for measuring and analysing sound levels in the world around us
- **Work Noise Partner** for determining sound exposure levels in the workplace
- **Product Noise Partner** for testing noise emission levels of products

There is a mobile version and a PC version of each application.

Work Noise Partner performs noise exposure calculations according to standards. The mobile app connects to the instrument to act as a remote control and enables you to create a project, fill it with tasks and exposure groups which are used to define jobs, and to add measurements and annotations. The PC application connects to the instrument and allows you to import projects and measurements for processing and creating reports. The PC application also has facilities for applying hearing protection and using a dosimeter.

Licences

B&K 2245 is a type-approved sound level meter (SLM). However, this basic functionality can be extended with optional licences; it can perform frequency analysis, log broadband and spectral data, perform statistical analysis and make audio recordings.

Licences for the instrument control the functionality of the instrument and to which applications it can connect.

BZ-7300: Noise Partner

This licence enables you to make simple, broadband measurements, to make general-purpose sound pressure level measurements, and to make basic occupational, product and environmental measurements.

- Measure broadband parameters.
- Connect to Noise Partner mobile app and PC application.

BZ-7301: Enviro Noise Partner

This licence enables you to measure and report on environmental noise concerns.

- Measure broadband parameters.
- Perform spectrum analysis (1/1- and 1/3-octave).
- Perform statistical analysis of measured broadband parameters.
- Average and log intervals of broadband and/or spectral data (logging mode).
- Record audio.
- Connect to Enviro Noise Partner mobile app and PC application.

BZ-7302: Work Noise Partner

This licence enables you to measure occupational noise-related concerns, such as noise exposure surveys and risk mitigation for noise-induced hearing loss.

- Measure broadband parameters.
- Perform spectrum analysis (1/1- and 1/3-octave).
- Average and log intervals of broadband and/or spectral data (logging mode).
- Record audio.
- Connect to Work Noise Partner mobile app and PC application.

BZ-7303: Product Noise Partner

This licence enables you to determine the sound power level of a device under test (DUT) according to standards.

- Measure broadband parameters.
- Perform spectrum analysis (1/1- and 1/3-octave).
- Perform statistical analysis of measured broadband parameters.
- Record audio.
- Connect to Product Noise Partner mobile app and PC application.

BZ-7304: Exhaust Noise Partner

This licence enables you to measure exhaust noise.

- Measure broadband parameters.
- Connect to Noise Partner mobile app and PC application.

About the instrument

The instrument measures **sound level meter** parameters (Leq, LE, Lav, Lpeak, Lmax, Lmin, L(SPL), L) with up to two simultaneous frequency weightings (A, B, C, Z) and up to three simultaneous time weightings (F, S, I) for the exponential averaging.

The instrument performs **frequency analysis** of either 1/1- or 1/3-octave spectra (Leq, Lmax, Lmin) with one of the available frequency weightings (A, B, C, Z) and time weightings (F, S).

The instrument takes **single measurements**. In other words, the instrument calculates a single value for each measured parameter for the total measurement time.

The instrument takes logged measurements. In other words, it has a **logging mode** that can average and log intervals of broadband and/or spectral data to obtain a profile of the total measurement with logging intervals between 1 s and 1 min.

The instrument takes **audio recordings**.

Standards

Go to: **Menu** > **About** > **Metrology** > **Standards**.

Here you will see the complete list of standards to which the instrument conforms.

About the mobile app

The mobile app interfaces with the instrument, making remote measurements possible and making it easier to change settings and interact with the data. It is recommended that you use the mobile app whenever possible.

Functionality of the mobile version of Work Noise Partner:

- Add tasks, exposure groups and jobs.
- Control the instrument remotely (make measurements).
- Annotate measurements (add photos, videos, notes and commentary).
- See the status of the instrument and access instrument settings.
- Add past measurements to tasks and exposure groups.
- Display GUI in dark mode (set at the system level).

About the PC application

Functionality of the PC version of Work Noise Partner:

- Import projects created with the mobile app from the instrument.
- Create projects from measurements stored on the instrument.
- Add measurements stored on the instrument to an existing project.
- View measurements, annotations, calculations and results.
- Create, view and edit tasks, exposure groups and jobs.

- Use a dosimeter:
    - Connect to a dosimeter.
    - Add dosimeter measurements to a project.
    - Configure a dosimeter's settings.
- Apply hearing protection.
- Export projects for use with OMEGA products (Germany).
- Export projects to another file format (for sharing or reporting).
- Play back recorded audio (digitally gained).

System requirements

The mobile app

- iOS-based phone or tablet

    See supported iOS versions for current app version in the App Store®, under **Work Noise Partner** > **Information** > **Compatibility**.

The PC application

System Requirements:

- Windows® 8.1 or 10 (64-bit) operating system
- Microsoft® .NET 4.7.2 framework

Recommended PC:

- Intel® Core™ i5 or better
- Sound card
- Solid State Drive (SSD)
- 8 GB of memory
- At least one available USB port
- Microsoft Office 2016 or later

Data storage

The instrument

Data storage: Approximately 12 GB

The instrument has 16 GB of built-in storage, of which approximately 12 GB is available for data storage. All measurement data and annotations are stored on the instrument.

Measurements and annotations are imported to the PC application from the instrument. They can then be saved to your computer or to a location on a network.

Useful settings

- **Menu** > **Data explorer**: View past measurements or move them to trash.
- **Menu** > **Status**: See remaining storage space.
- **Menu** > **System settings** > **Data management**: Edit settings for data backup and retention.

Mobile app

Neither measurement data nor annotations are stored on your mobile device, everything is uploaded to and stored on the instrument.

Service and support

The instrument comes with the standard product warranty for Brüel & Kjær products.

Visit www.bksv.com/Service to request a quote for or find information about services.

- Hardware maintenance and repair
- Calibration
- Extended warranty contracts for hardware

Firmware updates

Update firmware over the Internet.

1. Connect the instrument to a network with access to the Internet.

   See **Local connections on page 24** for more information.

2. Press ⬚ briefly to open the menu.
3. Go to: **System settings** > **Advanced settings**.
4. Set **Service mode** to *Enabled*.
5. Go to: Check for updates.
6. Follow the prompts.

✎ **Note:**

- When you return your instrument for service, the firmware will be updated to the latest version.
- For type-approved firmware versions, you may need to return the instrument to a certified service centre to update the firmware. Check with your type-approving authority before updating the firmware.

Application updates

Updates are handled via the application.

Contact information

For service and support, contact your nearest Brüel & Kjær Customer Care support team.

Headquarters: info@bksv.com, +45 7741 2000

China (Beijing): +86 21 6113 3674

France: service.fr@bksv.com, +33 1 69 90 71 02

Germany: bkservice.de@bksv.com, +49 421 17 87 0

Italy: it.info@bksv.com, +39 02 5768061

Japan: info_jp@bksv.com, +81 3 6810 3500

North & South America: bkservice@bksv.com, +1 770 209 6907

Spain: servicio.tecnico@bksv.com, +34 91 659 08 20

UK & **Ireland**: ukservice@bksv.com, +44 1223 389800

Go to www.bksv.com/contact for contact information to our other global offices.

Additional documentation

Product data
- B&K 2245 with Noise Partner: BP 0029
- B&K 2245 with Enviro Noise Partner: BP 0030
- B&K 2245 with Work Noise Partner: BP 0031
- B&K 2245 with Exhaust Noise Partner: BP 0032
- B&K 2245 with Product Noise Partner: BP 2643
- Microphone Type 4966: BP 2536

Manuals and guides
- Getting Started Guide: BR 1812
- Instruction Manual for B&K 2245 with Microphone Type 4966: BE 1910
- Phone / Tripod Holder UA-2237 Guide: BR 8071
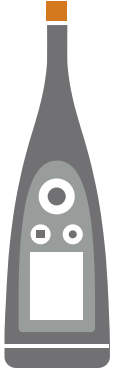- Windscreen UA-1650 Guide: BR 0011

Help

Help for B&K 2245 with Work Noise Partner is also available in HTML format.

Resources
- Environmental Noise: BR 1626
- Measuring Sound Primer: BR 0047

THE INSTRUMENT
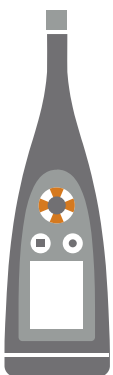
Hardware interface

The **microphone** is at the top of the instrument.

is the **power/menu/reboot** button.

Press and hold the button to power the instrument on or off. When the instrument is on, press the button briefly to open the menu. If the instrument becomes unresponsive, press and hold the button for approximately 40 seconds (remove cables first).

The arrow buttons **scroll** through measurement displays, **auto-zoom** graphs, **move** cursors and **navigate** the menu.

Press ▲ and ▼ briefly to scroll through measurement displays.

Press ◀ and ▶ briefly to scroll through the parameters for each display.

Press and hold ◀ or ▶ to move the cursor on the Spectrum and Profile displays.

Press and hold ▲ to auto-zoom the Y-axis on the Spectrum and Profile displays.

■ is the **stop/reset** button.

Press the button once to stop a measurement. At this point, averaged measurement parameters will stop updating and you can review the results. Press the button again to clear the results and reset the instrument for the next measurement. Data is saved automatically.
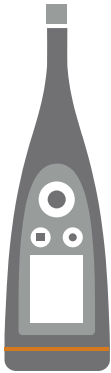
◉ is the **start/pause** button.

Press the button once to start a measurement, press it again to pause the measurement, press it a third time to resume the measurement.

The **screen** displays sound levels and the menu.

The **light ring** is colour-coded to reflect the status of the instrument.

The light ring is solid **green** while measuring.

The light ring flashes **yellow** slowly while idle or quickly while paused (measuring).

The light ring flashes **red** quickly for intermittent overloads.

The light ring is solid **purple** for latched overloads.

The light ring flashes **white** slowly when switched off and charging the battery.

The light ring flashes **blue** while pairing a mobile device with the instrument.

On the base of the instrument is a **threaded hole** for mounting the instrument on a tripod and a **USB-C™ socket**. Use the USB socket as a connector or as signal output.
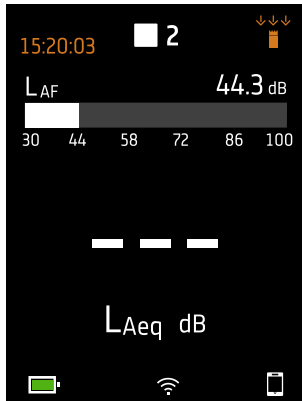
Instrument GUI
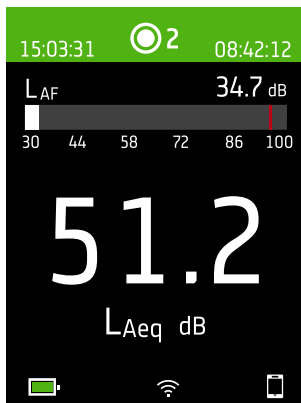
This is an example of the instrument graphical user interface (GUI) in dark colour scheme while measuring and connected to the mobile app.

💡 **Hint:** You can view the GUI in a web browser via the instrument's IP address. See

for more information.
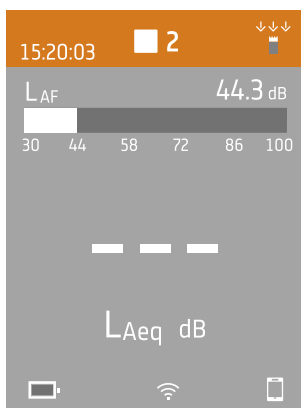
The top region shows measurement information and instrument status.

When idle, the instrument displays the current time (to the left) and input settings (to the right).

⌚ : Indicates the clock is controlled from a network time protocol (NTP) server on the Internet. Precision of the time is within 10 ms.

📡 : Indicates that clock is controlled from a satellite. Precision of the time is within 1 ms.

⚠️ : Indicates that the clock is estimated to be more than 2 s wrong.

↓↓↓ : Indicates that Sound field is set to Free-field and there is not a windscreen.

↓↓↓ : Indicates that Sound field is set to Free-field and there is a windscreen.

→ ← : Indicates that Sound field is set to Diffuse-field and there is not a windscreen.

→ ← : Indicates that Sound field is set to Diffuse-field and there is a windscreen.
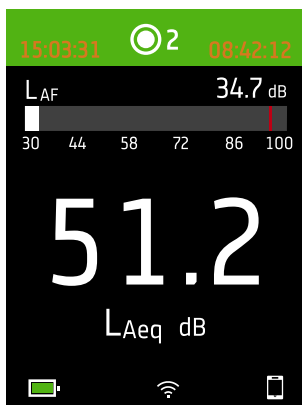
During a measurement, the instrument displays the start time (to the left) and the elapsed time (to the right).
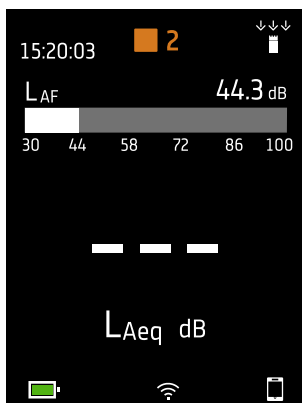
The number in the centre is the measurement number. The first measurement of every day is number 1. The number increments with each new measurement.

The background colour of the top region and the centre symbol change to indicate the state of the instrument.

⬜ : Indicates that the instrument is ready to measure.

◎ : Indicates that the instrument is measuring.

⏸ : Indicates that the instrument is paused.

◻ : Indicates that the instrument is stopped and displaying results from the measurement.
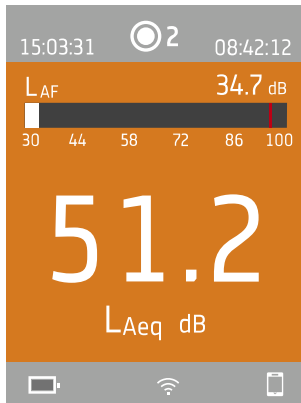
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Press ▲ and ▼ briefly to scroll through measurement displays. Press ◄ and ►
briefly to scroll through the parameters for each display.

SLM view (left) and List view (right) are the main displays
for single measurements. SLM view shows a bar graph
and one broadband parameter. List view shows a bar
graph and a list of broadband parameters.
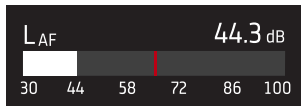
The bar graph shows the instantaneous sound level (L) with frequency and time
weightings. This display is sometimes called the fast bar or fast display.

▌: Indicates the maximum instantaneous sound level during a measurement.

✎ **Note:** The bar graphs in SLM view and List view are unique, that is they can each be set to show a different parameter.

- Go to **Menu** > **Display settings** > **SLM view** > **Graph parameter** to set the parameter for the bar graph when displaying one broadband parameter.
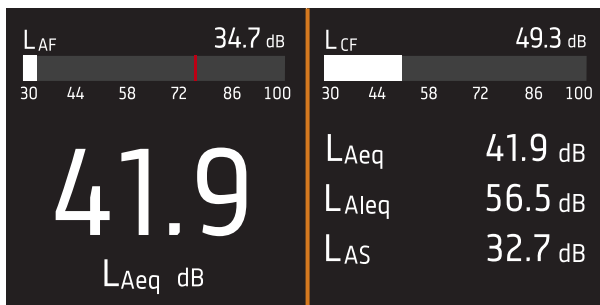- Go to **Menu** > **Display settings** > **List view** > **Graph parameter** to set the parameter for the bar graph when displaying a list of broadband parameters.

Profile view is the main display for logged measurements because it shows the profile of logged broadband and/or spectrum parameters.

Press and hold ◄ or ► to move the cursor in the display. The readout above the
graph shows the location of the cursor and its decibel level. Press and hold ▲ to
auto-scale the Y-axis to fit the data.

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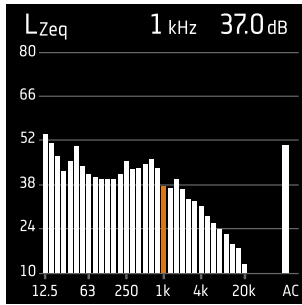
Spectrum view displays the frequency analysis of spectrum parameters, shown as decibel (dB) levels by Hertz (Hz).

Press and hold ◄ or ► to move the cursor in the display. The readout above the graph shows the location of the cursor and its decibel level. Press and hold ▲ to auto-scale the Y-axis to fit the data.

For very low or very high sound levels, you will see indicators.

▼ : Indicates a signal that is under the measurement range.

Overload occurs when the signal is over the measurement range. There are two types of overload indicators: latched and instantaneous. The latched-overload indicator is triggered at the first instance of overload and persists until the instrument is reset. The instantaneous-overload indicator is triggered every time the signal is over the measurement range.

▲ : Indicates instantaneous overload.

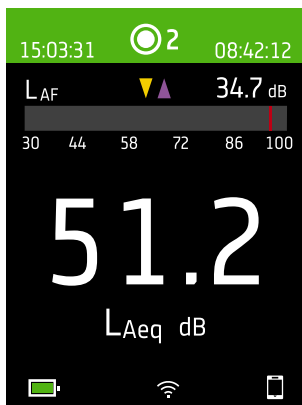▲ : Indicates latched overload.
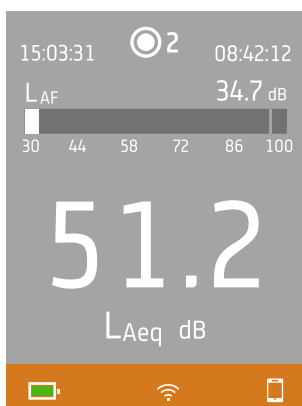
The bottom region provides information about the system: battery, network, and connectivity status.

The battery icons show the status of the battery. For example, 🔋 (charging) or 🔋 (full).

The network icons show the current network settings and its status. For example, 📶 (connected to a wireless network), (ᴪ) (acting as a hotspot), ⛁ (Ethernet connection) or ✈ (aeroplane mode).

The connectivity icons show you to which application the instrument is connected: 📱 (mobile) or 🖥 (PC).

☁ indicates that a backup is in progress.

The menu

Use the buttons on the instrument to interact with the menu.

⊜ : Open / close the menu; open a response dialog; confirm a setting in a response dialog; enable / disable parameter selection boxes.

▲ : Navigate up a list; increment a value in a response dialog.

▼ : Navigate down a list; decrement a value in a response dialog.

◀ : Navigate down a level in the menu; exit a response dialog (without confirming a setting).

▶ : Navigate up a level in the menu; enter a response dialog.

Web server display

You can display the instrument GUI in a web browser.

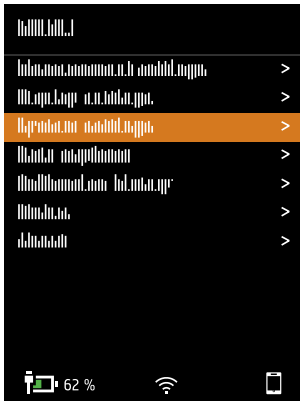You will need:

- Your instrument
- A computer or mobile device with Wi-Fi® and a web browser installed

Procedure:

1. Go to: **System settings** > **Network settings** > **Web server display**.
2. Select **Enabled**.
3. Network your devices.

   This is one way to network your devices:

   a. On the instrument, go to: **System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**.

   b. Select **Act as hotspot**.

   c. Make note of the hotspot name (example: BK2245-000000) and password.

   d. Connect your device to the hotspot as per the manufacturer's instructions.
4. On your mobile device or computer, open a web browser.
5. Type <*IP address*/**display**> in the address bar of the browser.

   When acting as a hotspot, the IP address of the instrument is 10.42.0.1, so you will type <**10.42.0.1/display**>.

✎ **Note:** You can find the instrument's IP address here: **System settings** > **Network settings**. Look under Wi-Fi settings or Ethernet settings depending on your connection.

Charge the battery

The instrument has an internal Lithium-ion rechargeable battery.

Procedure

1. Connect the instrument to a power source.

    🔋 indicates that the battery is charging with a readout of the percentage charged.

2. Disconnect the power source to stop charging.

Approved power sources

- Mains
- Base station (the base station is powered via mains)
- Computer
- Power bank

Status

Go to **Menu** > **Status** to see the status of the battery.

- **Status**: Either *Full*, *Charging*, or *Discharging*
- **Time remaining**: The approximate time left on the charge
- **Charged**: The percentage to which the battery is currently charged

Power consumption

Settings for the screen and wireless configuration can have a noticeable effect on the instrument's power consumption. The type of measurement you perform will not have a large effect on battery consumption.

To manage power consumption, you can modify these settings:

- **System settings** > **Power management**
- **System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**
- **Display settings** > **Screen brightness**
- **System settings** > **Network settings** > **Web server display**

Battery calibration

To improve the accuracy of battery readings, it is recommended to calibrate the battery regularly.

1. Press ⊜ briefly to open the menu.
2. Go to: **System settings** > **Advanced settings** > **Service mode**.
3. Select **Enabled**.
4. Go to: **Calibrate battery**.

Follow the prompts to calibrate your battery.

Fix an unresponsive instrument

If your instrument freezes, try rebooting the instrument.

1. Remove all external connections, including the charger.

2. Press and hold ⏻ until the instrument reboots.

    This should take approximately 40 seconds.

Drying the instrument

IP rating

The enclosure for the instrument has an IP (ingress protection) rating of 55 as defined in IEC 60529. The double-digit rating number is actually two separate ratings. The first number is the rating of protection against the entry (ingress) of solids, such as dust. The second number is the rating of protection against the entry of liquids, such as water.

*   **Protection against solids**: A rating of five means that the ingress of dust is not entirely prevented, but that it does not enter in quantities sufficient to interfere with the operation of the instrument.

*   **Protection against liquids**: A rating of five means that the ingress of water from a low-pressure jet (6.3 mm (0.25 in)) from any direction has no harmful effect on the instrument. A rating of five means that the instrument is not watertight.

Where can water get in?

It is possible for water to enter the space between the microphone cartridge and the microphone preamplifier when, for example, the instrument is exposed to heavy rain. Also, water may enter the instrument body if, for example, the instrument is submerged in water.
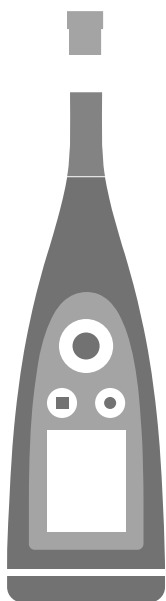
On B&K 2245, the **microphone cartridge** attaches to (and detaches from) the microphone preamplifier, which is an integral part of the instrument body.

The **instrument body** includes the microphone preamplifier and houses the signal processor. Of course, the instrument body also provides the user interface (control buttons, a display screen and a light ring) which allows you to interact with the instrument.

✎ **Note:** The microphone preamplifier cannot be removed from the instrument.

What will happen?

Water ingress between the microphone cartridge and the microphone preamplifier will not permanently damage the instrument, but measurement operation will be disturbed until everything is dry. This is because the contacts between the microphone cartridge and microphone preamplifier are very sensitive to contamination, such as water, which disrupts the ability of the signal to travel from the microphone cartridge to the microphone preamplifier.

✎ **Note:** Water that enters the instrument body will cause permanent damage.

How to dry the instrument

1. Turn the microphone cartridge anticlockwise to remove the microphone from the instrument body.
2. Let the microphone cartridge and instrument body dry by evaporation.
3. Reattach the microphone cartridge to the instrument body.

DOWNLOAD THE APPS

Download the mobile app

You will need:

- iOS-based phone or tablet

  See supported iOS versions for current app version in the App Store®, under **Work Noise Partner** > **Information** > **Compatibility**.

Procedure:

1. Go to the App Store.
2. Search for and install Work Noise Partner.

Updates

You will be informed of updates via the App Store.

Download the PC application

You will need:

- A computer with access to the Internet and a web browser

System Requirements:

- Windows® 8.1 or 10 (64-bit) operating system
- Microsoft® .NET 4.7.2 framework

Recommended PC:

- Intel® Core™ i5 or better
- Sound card
- Solid State Drive (SSD)
- 8 GB of memory
- At least one available USB port
- Microsoft Office 2016 or later

Procedure:

1. Go to: www.bksv.com/downloads.
2. From the list of available downloads, expand **B&K 2245 Software, firmware and manuals**.
3. Click **B&K 2245 Software downloads**.
4. Scroll down to the application.
5. Click **Install Work Noise Partner Software** to start the download.
6. Once the download is complete, double-click the file (Setup.exe) to start installation.

   ✎ **Note:** The file will be placed in a location that is defined by the settings in your web browser.

The PC application will start immediately after installation.

Updates

You will be informed of updates via the application.

CONNECT DEVICES

Communication between the instrument and the devices running the applications is an essential part of using the instrument. Once you understand the ways in which the devices can communicate, you will be able to change connections to suit your circumstances.

There are basically two ways to connect the mobile app or the PC application to the instrument: locally or remotely. The difference between the two types is that remote connections enable you to connect to the instrument when you are not near it. For most people, a local connection is all you will need.

Local connections

A local connection is a connection to a local area network (LAN). It is the simplest way to connect the applications to the instrument. Typically, the network will be your office or home network, but you can also use the instrument to create a hotspot to which you can connect devices while you are out in the field.

Once the instrument and the device running the application are using the same network, they can communicate. You will use Wi-Fi®, Bluetooth® and Ethernet in varying combinations to enable communication between devices.

✒ **Note:** The mobile app and PC application do not connect to one another, the applications only connect to the instrument.

Join your local network

Connect all devices (instrument, mobile device and PC) to your local network so that they can communicate with one another. Connect the mobile device and PC as per the manufacturer's instructions. Connect the instrument using one of the following options:

- Use an Ethernet connection:
    - Use a USB-C to USB-A cable to connect the instrument to your PC.
    - Use a USB-C to Ethernet adaptor to connect an Ethernet cable directly to the instrument.
    - Place the instrument on the desktop base station (an optional accessory that provides power and a network connection to the instrument).
- Use a wireless connection:
    a. Press ⊜ briefly to open the menu.
    b. Go to: **System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**.
    c. Select **Connect to network**.
    d. Go to: **Wi-Fi name**.
    e. Select the network you wish to join.
    f. Enter the password at the prompt.

        Use ▲ and ▼ to scroll through the character menu.

        Use ◄ and ► to move left or right.

        Press ⊜ to advance to the options: OK or Cancel.

Use the instrument as a hotspot

Connect your mobile device and / or PC to the instrument's hotspot so that the devices can communicate.

1. On the instrument, go to: **System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**.

2. Select **Act as hotspot**.

3. Make note of the hotspot name (example: BK2245-000000) and password.

4. Connect the mobile device and / or PC to the hotspot as per the manufacturer's instructions.

Change the hotspot password

If you wish to change the default password for the instrument hotspot:

1. Go to: **System settings** > **Network settings** > **Wi-Fi settings**.

2. Ensure that Wi-Fi mode is set to Act as hotspot.

3. Select **Password**.

4. Use ▲ and ▼ to scroll through the character menu.

5. Press ⏚ to confirm the changes.

✏ **Note:** Restart the instrument to apply the new password.

Remote connections

It is possible to connect to an instrument remotely, that is, connect to an instrument on a network from a different network or the Internet. Establishing a remote connection is a little more complicated than creating a local connection, but it can be helpful if you want to be able to access your instrument from remote locations. The following includes information about your instrument, general guidelines for the configuration of your router to enable remote connection, and how to test the connection.

✏ **Note:**

- Remote connection is optional. In other words, you do not need to be able to connect to your instrument remotely in order to use it with the mobile app or the PC application.
- Please refer to the manufacturer of your router or to your Internet service provider (ISP) for information specific to your network.
- The instrument must be on and connected to the network in order to access it remotely using the mobile app or the PC application.

Before you begin, you will need some information about your Internet service:

- Is your IP address IPv4 or IPv6 or both?

  The instrument supports both. The difference is that IPv4 requires port forwarding while IPv6 does not.

- If you have an IPv4 address, is it static or dynamic?

  You can use either static or dynamic addresses. However, dynamic IPv4 addresses change, which requires you to enter a new IP address in the mobile app or PC application every time the address changes.

- If you have a dynamic IPv4 address, can you get a static IP address or set up a DynDNS (dynamic domain name system)?

  You can use a static IP address or set up DynDNS, which works by assigning a persistent host name to the instrument, to overcome the problem of changing IPv4 addresses.

- Is your ISP blocking any instrument ports?

  ✒ **Note:** The instrument uses ports 80, 443 and 8700 to 8720. It is not possible to change these ports. Therefore, remote connection is not possible if your ISP blocks any of those ports.

What you will need:

- An instrument that is connected to the network (either by Wi-Fi® or Ethernet)
- Access to the settings interface of your network router

How to connect remotely via an IPv4 address

Use the NAT (network address translation) capabilities of your router to forward the ports of your instrument so that you can connect to it remotely.

A general procedure is as follows:

✒ **Note:** This procedure applies to static IPv4 addresses and dynamic IPv4 address using DynDNS.

1. Look for the port forwarding option on your router.

   If you do not find it right away, look for advanced options.

2. Create port-forwarding rules.

   Port-forwarding rules link the IP address of the instrument to ports that it uses so that when you send a request to the instrument's network from another network, the router knows to which device to direct the request.

   You can find the IPv4 address of the instrument on the instrument or on the router.

   - On the instrument, go to: **Menu** > **Network settings** > **Wi-Fi settings** or **Ethernet settings** > **IP address**.
   - On the router, see the list of the connected devices.

   The instrument uses the following ports:

   - Port 80: The common port assigned to HTTP (hypertext transfer protocol)
   - Port 443: The common port assigned to HTTPS (hypertext transfer protocol secure)
   - Ports 8700 to 8720: Open ports

   ✒ **Note:** All ports use TCP (transmission control protocol).

3. From another network, such as a mobile network, test the setup.

   ✒ **Note:** Turn off Wi-Fi on your mobile device to make sure that you are not connected to the same network as the instrument.

   a. Open the mobile app.
   b. Tap **Connect instrument**.
   c. From the instrument list, tap **Connect manually**.

   ✒ **Note:** If the mobile app is connected to an instrument, disconnect from it to access the list.

d. Enter the IP address or host name, and if used, the password.

- For IPv4 addresses, enter your network's public WAN IP address.

  You can find your WAN IP address on your router or through an Internet search of 'my IP'.

- For DynDNS, enter the host name given by the DynDNS.

e. Tap **Connect**.

✎ **Note:** You can also test the setup using the PC application. Click ⤓ to open the import dialog then click ☰ and select **Add instrument from IP address**.

How to connect remotely via an IPv6 address

You do not have to set up port forwarding when using an IPv6 address.

To test the remote connection, try to connect to the instrument from a different network. The easiest way to check is to use a mobile device that has a mobile network and the mobile app installed.

✎ **Note:** Turn off Wi-Fi on your mobile device to make sure that you are not connected to the same network as the instrument.

1. Open the mobile app.

2. Tap **Connect instrument**.

3. From the instrument list, tap **Connect manually**.

   ✎ **Note:** If the mobile app is connected to an instrument, disconnect from it to access the list.

4. Enter the IPv6 address of your instrument.

   To find the IPv6 address, go to: **Menu** > **Network settings** > **Wi-Fi settings** or **Ethernet settings** > **IPv6 address**.

   ✎ **Note:** Enter the address in brackets, for example: [2701:db8:424d:d15::1a2f::].

5. Tap **Connect**.

✎ **Note:**

- If you are unable to connect, try adjusting the firewall settings on your router.

- You can also test the setup using the PC application. Click ⤓ to open the import dialog then click ☰ and select **Add instrument from IP address**.

Connect the mobile app to the instrument

The mobile app connects to the instrument via Wi-Fi® and Bluetooth®.

What you will need:

- The instrument

- An iOS-based mobile device (phone or tablet) with the mobile app installed

  ✎ **Note:** You will need to enable Wi-Fi and Bluetooth on your mobile device.

How to connect

1. Turn on the instrument.

2. Open the mobile app.

3. Tap **Connect instrument**.

    ✎ **Note:** After successfully connecting to your instrument this button will change to Configure instrument.

4. Tap on your instrument to connect.

    💡 **Hint:** Give the instrument a nickname (**System settings** > **Network settings** > **Nickname**). A nickname can make it easier to find your instrument in a list. Also, nicknames are fun!

5. The mobile app will prompt you to connect the mobile device and the instrument to the same local network.

    You have two options:

    - *Connect to network*: The instrument and the mobile device connect to the Wi-Fi access point of your personal or work network.
    - *Act as hotspot*: This enables the instrument's hotspot and your mobile device connects to it.

6. After choosing, the mobile app prompts you for the permissions and information required to connect to the desired network.

That's it! The instrument shows ⬜ when it is connected to the mobile app.

Once the mobile app has connected to an instrument, the app will remember the instrument and re-establish a connection automatically after separation.

How to add the instrument manually

If you want to find an instrument that is not showing up in the list of discovered instruments, such as an instrument on another network, you can manually add the instrument to the list using its IP address.

✎ **Note:** Use this functionality to connect to your instrument remotely.

1. On the mobile app, tap **Connect manually**.

2. Enter the IP address or host name, and if used, the password.

    For local connections, you can find the IP address of the instrument here: **Menu** > **System settings** > **Network settings** > **Wi-Fi settings** or **Ethernet settings**.

    For remote connections, the IP address or host name will depend on your setup. Refer to **Remote connections on page 25** for information about which IP address or host name to use.

3. Tap **Connect**.

How to disconnect devices

Disconnect the instrument from the mobile app if you wish to connect the mobile app to another instrument. When you disconnect the instrument, the mobile app will not connect to the instrument automatically.

1. From the home screen of the mobile app, tap **Configure instrument** to open the instrument menu.

2. Tap the disconnect button next the instrument.

3. Tap **Disconnect**.

✎ **Note:** If you disconnect the instrument from the mobile app, the app will still discover the instrument.

Troubleshooting connection problems

- Check that the instrument is set to act as a hotspot (**System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**).

- Check that the instrument is generating a hotspot, it will show (((ᴊ))).

- Check that Wi-Fi is enabled on the mobile device.

- Make sure that the two devices are within range.

- Try turning Wi-Fi off and on again on the mobile device.

- Try re-entering the network password on the mobile device. You may have to forget the network first.

- If you get an invalid password error message on the mobile device when trying to connect to the instrument hotspot, try rebooting the instrument.

CONFIGURE YOUR INSTRUMENT

You can edit instrument settings using the instrument or using the mobile app.

The functionality of the mobile app enhances the usability of the instrument. For example, it is easier to use the keypad on your mobile device to enter passwords than it is to scroll through characters on the instrument. It is recommended to use the mobile app to set up the instrument wherever possible.

✎ **Note:**

- Work Noise Partner will automatically set up your instrument to measure the correct parameters for determining noise exposure levels according to standards. That being said, it is possible to modify the instrument's settings. If the instrument is not set up correctly, the mobile app will prompt you for permission to make the necessary changes before making measurements.

- You cannot access all of the instrument settings from the mobile app. If you cannot find a setting in the mobile app, check the instrument.

Access instrument settings on the instrument

Press ⬙ briefly to open the menu.

Use the arrow buttons to navigate through the menu and the power button to make selections.

💡 **Hint:**

- The menu is hierarchical. Your current location in the menu is shown in the header.

- The menu opens at the location from which it was closed.

- An arrow (>) on the far right indicates that there is a sub-menu, press ▶ to access it.

- Navigate to the ✖ and press ⬙ to exit parameter menus.

- You can also use the mobile app to edit some of the instrument settings.

Access instrument settings on the mobile app

1. Open the mobile app.

2. Connect the mobile app to the instrument.

   See for more information.

3. Tap **Configure instrument**.

Input settings

Input settings ensure that you are collecting accurate data. The instrument optimizes the frequency response based on the selected microphone and makes corrections based on the selected sound field and windscreen.

Go to: **Measurement settings** > **Input**.

Microphone

Use this setting to tell the instrument which microphone is attached.

The instrument is designed for use with Microphone Cartridge Type 4966. Type 4966 is prepolarized, so it can be used with battery-operated equipment such as B&K 2245, and is optimized for use in free-field environments. By default, the instrument is set up to use the attached Type 4966 microphone cartridge.

Microphone list

The microphone list populates the options available when you specify which microphone is connected to the instrument. Therefore, the list of microphones allows you to set up the instrument for use with a different microphone cartridge. The microphone list initially contains Type 4966 only. You can edit the microphone list, but only on the instrument.

The type and serial number, sensitivity and sound field for each microphone are stored in the list.

Add a microphone to the list

1. Press ⊜ briefly to open the menu.
2. Go to: **System settings** > **Advanced settings**.
3. Enable **Service mode**.
4. Go to: **Microphones**.
5. Select any microphone and choose **Create new**. A new microphone Type 4966 will be created and added to the list.
6. Select the new microphone and choose **Edit**.
7. Choose the type of microphone: *4966* or *Unknown*.
8. Enter the microphone's serial number.
9. Enter the microphone's sensitivity from the calibration chart.
10. If **Type** is set to *Unknown*, enter the nominal sensitivity (from the calibration chart) and if the microphone is for free sound fields.

Delete a microphone from the list

1. In the microphone list, select a microphone.
2. Choose **Delete**.
3. Confirm that you want to delete the microphone.

✐ **Note:** You cannot delete the default microphone from the list, that is, the microphone that came with the instrument.

Sound field

It is important that the instrument knows the type of sound field in which you are measuring so it can apply the appropriate correction to your measurements. These corrections will enhance the overall frequency response of the system regardless of whether or not the microphone you are using is designed for the sound field in which you are measuring.

- Choose **Free-field** if you are in an environment with no (or very few) objects or surfaces that will reflect sound. Free-field sounds generally come from the sound source.
- Choose **Diffuse-field** if you are in an environment with a lot of objects or surfaces that reflect sound. Diffuse-field sounds come randomly from all angles (random incidence) due to reflection off surfaces within the environment.

✎ **Note:** Generally, ISO requires free-field conditions and ANSI requires diffuse-field conditions. Be sure to check your local standards for the setting you require.

Windscreen

Windscreens are used to reduce the amount of wind-induced noise in measurements. Therefore, windscreens are generally used for outdoor measurements, but they can be used any time you want to protect measurements from unwanted noise caused by air movement.

Windscreen detect is the setting that enables or disables automatic detection of Windscreen UA-1650.

- *Enabled*: The instrument detects the windscreen and applies the appropriate correction.
- *Disabled*: Specify the windscreen manually under **Windscreen type**.

Measurement control

Measurement control settings specify how your measurements will run.

Go to: **Measurement settings** > **Measurement control**.

Logging mode

Logging measures and saves data periodically on the internal disk and thus creates a profile of measurement data. Measurements are restarted for each interval. This is done in addition to measuring sound levels for the total measurement time.

The instrument can log broadband parameters as well as spectrum parameters.

- *Disabled*: Turn off Logging mode.
- *Enabled*: Turn on Logging mode.

Logging interval

This setting controls the length of the interval at which measurements are logged when **Logging mode** is set to *Enabled*.
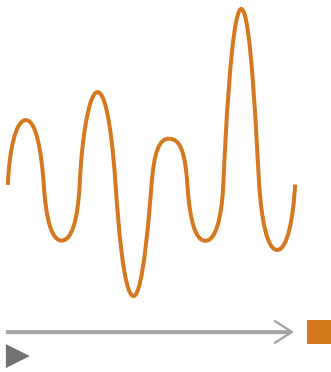
Measurement time

This setting controls how the measurement stops: automatically or manually.

- *Preset*: The instrument will measure for the time specified in **Preset time**, then stop and save automatically.
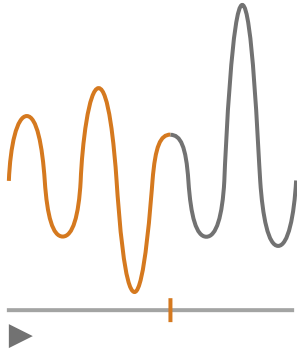
- *Free*: You control the measurement manually.

Preset time

This setting controls the amount of time for which the instrument will measure when **Measurement time** is set to *Preset*.
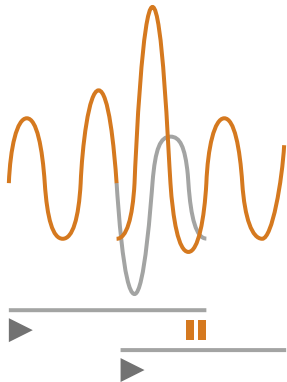
Back-erase mode

This setting determines what happens when you resume a paused measurement.
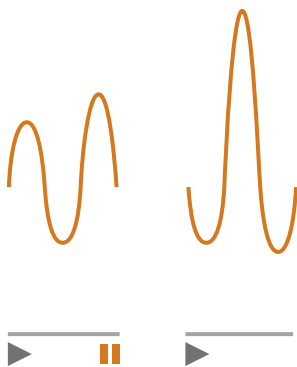
💡 **Hint:** You can change these settings while a measurement is paused.

✎ **Note:** Back-erase will not be applied to logged data. To enable Back-erase mode, **Logging mode** must be set to *Disabled*.

- *Enabled*: Overwrite measurement data for the **Back-erase time**.

- *Disabled*: Resume the measurement without overwriting earlier data.

Back-erase time

This setting controls the number of seconds that will be erased when the measurement is resumed. This setting is enabled when **Back-erase mode** is set to *Enabled*.

Broadband parameters

The instrument measures broadband sound level parameters with frequency weightings that mimic how humans hear sounds and time weightings that define the averaging of sound levels over time. The different parameters that you can measure are combinations of the parameters (Leq, LE, Lav, Lpeak, Lmax, Lmin, L(SPL) and L) with frequency weightings (A, B, C or Z) and time weightings (F, S or I).

You can make measurements with up to two frequency weightings simultaneously.

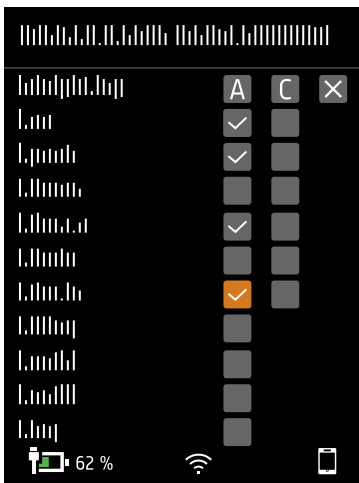Go to: **Measurement settings** > **Broadband parameters**.

How to set up broadband parameters using the instrument

1. Enable a frequency weighting.
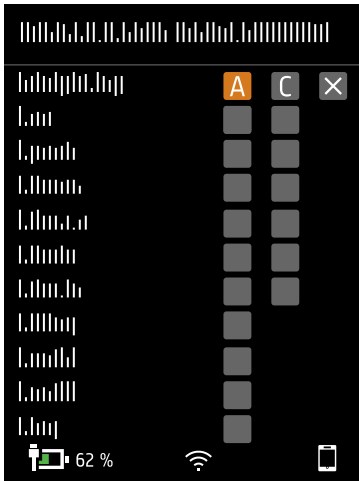
   a. Press ◀ to navigate to a weighting box.

   b. Press ≣ to scroll through the frequency weightings.

2. Enable measurement parameters.

   a. Press ▼ to navigate to a parameter.

   b. Press ≣ to enable / disable parameters.

3. Navigate to ☒.

4. Press ≣ to close the parameter selection menu.

How to set up broadband parameters using the mobile app

1. Tap **1** to enable parameters for the first frequency weighting.

    The instrument measures broadband parameters with up to two frequency weightings simultaneously, you will enable parameters for each frequency weighting separately.

2. Select the frequency weighting.

    a. Tap **Weighting**.

    b. Select the desired frequency weighting.

    > ✎ **Note:** The options are the unused frequency weightings.
    >
    > See **Broadband parameters on page 34** for more information.

    c. Tap **Back**.

3. Enable measurement parameters.

    a. Tap a parameter.

    b. Tap **On** to enable or **Off** to disable the parameter.

    > See **Broadband parameters on page 34** and **Broadband parameters on page 34** for more information.

    c. Tap **Back**.

4. Repeat the process for the second frequency weighting.

5. Tap **Done** to return to the project menu or tap **Back** to return to the instrument settings menu.

About parameters

Time-averaged levels

The instrument can average levels of the sound source over time.

*   **Leq** = equivalent continuous sound level

    This parameter calculates a constant level of noise with the same energy content as the varying acoustic noise signal being measured.

*   **LE** = sound exposure level

    This parameter takes the sound levels for a period of time and calculates the constant sound level that would produce the same total sound energy in one second. Sound level exposure is sometimes called single event level (SEL).

*   **Lav** = average sound level

    This parameter is used to assess the noise exposure of a person over a period of time. Lav uses a time weighting, generally S, and an exchange rate. Here, exchange rate is the increase in noise level that corresponds to a doubling of the noise level. This is a widely used occupational health noise parameter in the USA, corresponding to the LAeq used otherwise.

    > ✎ **Note:** LAeq is always based on Exchange Rate = 3.

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Peak levels

- **Lpeak** = peak sound level

  This parameter gives the highest value of the frequency-weighted acoustic signal.

  Lpeak is usually used with C frequency weighting in occupational noise measurements where loud bangs are present, or it is used for assessing possible damages to human hearing caused by very high short-duration noise levels.

  Lpeak,1s is the peak sound level during the latest second.

Exponentially averaged levels

Exponentially averaged sound levels provide easy-to-read values. A number of parameters are derived from exponential averaging:

- **Lmax** = maximum sound level

  This parameter gives you the highest time-weighted sound level that occurs during the measurement time.

  Lmax is often used in conjunction with another noise parameter (for example, Leq) to ensure a single noise event does not exceed a limit.

- **Lmin** = minimum sound level

  This parameter gives you the lowest time-weighted sound level that occurs during the measurement time.

- **L** = instantaneous sound level

  This parameter shows the instantaneous time-weighted sound level as measured by the instrument.

- **L(SPL)** = sound pressure level

  This parameter calculates the maximum time-weighted sound level during the latest second.

✎ **Note:** Lpeak,1s, L and L(SPL) are instantaneous values, as such they are for display only and are not saved with the measurement.

About time weightings

The instrument uses three standard-defined time weightings: F, S and I. Time weightings define the exponential averaging in the root-mean-square (RMS) measurement to average the fluctuations in sound levels and create useful readings.

Time weightings use time constants. Time constants define the time it takes for the instrument to respond to a change in sound levels.

- **F** = 125 ms time constant, decay of 34.7 dB/s

  The fast rise and decay of this time weighting means it will show a lot of the variations in the acoustic signal. You can use this weighting to measure sounds that fade rapidly, such as a dog bark.

  ✎ **Note:** F time weighting can be used for most measurements.

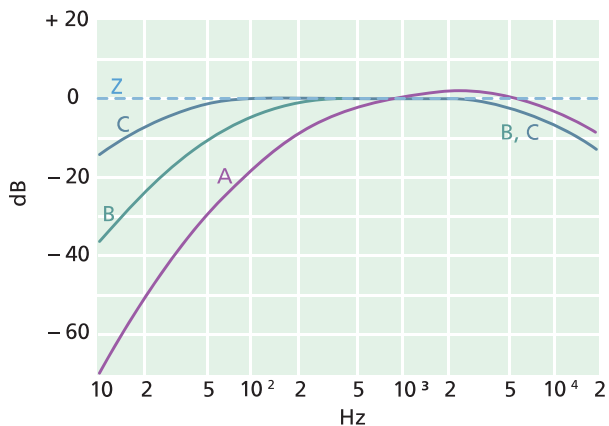- **S** = 1 s time constant, decay of 4.3 dB/s

  The relatively slow rise and decay of this time weighting means it will smooth the variations in the acoustic signal. You can use this weighting to measure sounds that fade slowly, such as a bell toll.

- **I** = 35 ms time constant, decay of 2.9 dB/s

When choosing a time weighting to use, ask yourself if you want to track or smooth the variations in sound levels over time.

About frequency weightings

Frequency weightings mimic how humans hear sound.

A-weighting

- Represents the human ear's response at low to medium sound levels
- Equal loudness curve: 40 dB
- The most commonly applied frequency weighting
- Can be used for all sound levels

B-weighting

- Represents the human ear's response at medium sound levels
- Equal loudness curve: 70 dB

C-weighting

- Represents the human ear's response at fairly high sound levels
- Equal loudness curve: 100 dB
- Mainly used to assess peak values of high sound pressure levels (LCpeak)

Z-weighting

- No frequency weighting
- Used to collect unweighted data

✏ **Note:** An **equal loudness curve** is a frequency response curve. Equal loudness curves are the experimental results of presenting pure tones and levels at different frequencies to young people with no hearing impairment. Along a contour line the young, average, normal listener will judge tones presented with different combinations of frequency and dB to be equally loud.

Table of parameters

This table gives an overview of all the possible parameter/frequency weighting combinations.

✎ **Note:** The parameters are listed as they appear in the Broadband parameters menu.

	A	B	C	Z
Leq	LAeq	LBeq	LCeq	LZeq
Lpeak	LApeak	LBpeak	LCpeak	LZpeak
LFmax	LAFmax	LBFmax	LCFmax	LZFmax
LSmax	LASmax	LBSmax	LCSmax	LZSmax
LFmin	LAFmin	LBFmin	LCFmin	LZFmin
LSmin	LASmin	LBSmin	LCSmin	LZSmin
LavS4	LavAS4			
LavS5	LavAS5			
LIeq	LAIeq			
LImax	LAImax			
Lpeak,1s	LApeak,1s	LBpeak,1s	LCpeak,1s	LZpeak,1s
LE	LAE	LBE	LCE	LZE
LF	LAF	LBF	LCF	LZF
LS	LAS	LBS	LCS	LZS
LF(SPL)	LAF(SPL)	LBF(SPL)	LCF(SPL)	LZF(SPL)
LS(SPL)	LAS(SPL)	LBS(SPL)	LCS(SPL)	LZS(SPL)

Spectrum parameters

Spectrum parameters are the parameters upon which you can perform spectral analysis.

Spectral analysis has many uses. For example, it can be used to see the sound levels at low, medium and high frequencies, to see where the sound energy is in the frequency spectrum, or to assess sounds with distinct tones.

Measure spectrum parameters (Leq, Lmax and Lmin) with frequency weightings (A, B, C, or Z) and time weightings (F and S).

Go to: **Measurement settings** > **Spectrum parameters**.

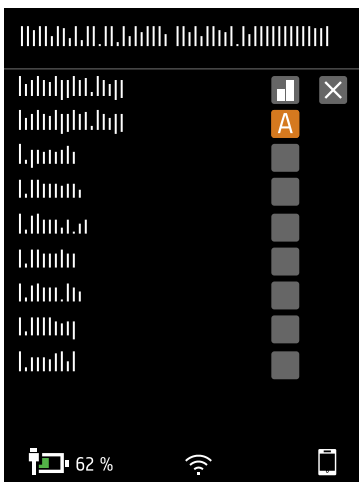## Set up spectrum parameters using the instrument

1. Press ◀ to navigate to the bandwidth box.
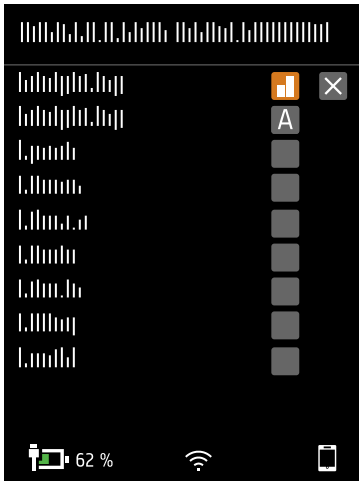
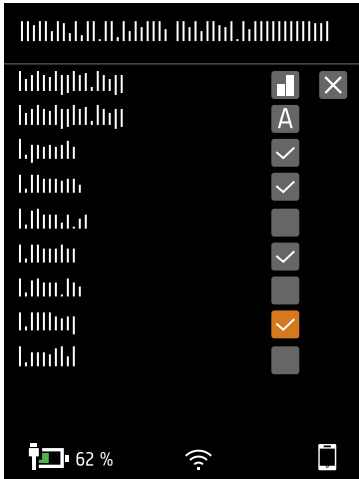2. Press ≡ to toggle between bandwidths.

   - ▪ = 1/1-octave

   - ▪ = 1/3-octave

3. Enable a frequency weighting.

   a. Press ▼ to navigate to the weighting box.

   b. Press ≡ to scroll through the frequency weightings.

4. Enable measurement parameters.

    a. Press ▼ to navigate to a parameter.

    b. Press ⬌ to enable / disable parameters.

5. Navigate to ✕.

6. Press ⬌ to close the parameter selection menu.

Set up spectrum parameters using the mobile app

1. Select the bandwidth of frequency analysis.

    a. Tap **Bandwidth**.

    b. Select a bandwidth: *1/3-octave* or *1/1-octave*.

       See **Spectrum parameters on page 39** for more information.

    c. Tap **Back**.

2. Select the frequency weighting.

    a. Tap **Weighting**.

    b. Select the desired frequency weighting.

       See **Spectrum parameters on page 39** for more information.

    c. Tap **Back**.

3. Enable measurement parameters.

    a. Tap a parameter.

    b. Tap **On** to enable or **Off** to disable the parameter.

   See **Spectrum parameters on page 39** and **Spectrum parameters on page 39** for more information.

4. Tap **Done** to return to the project menu or tap **Back** to return to the instrument settings menu.

About bandwidth

The bandwidth of the frequency analysis. You can choose 1/3-octave (third-octave) or 1/1-octave (full-octave). 1/3-octave will give you a finer analysis of the frequency than 1/1-octave.

The range of the centre frequencies are:

- 1/3-octave: 12.5 Hz to 16 kHz
- 1/1-octave: 16 Hz to 8 kHz

About parameters

- **Leq** = equivalent continuous sound level

  This parameter calculates a constant level of noise spectrum with the same energy content as the varying acoustic noise signal being measured.

- **L** = instantaneous sound level

  This parameter shows the instantaneous time-weighted sound level spectrum as measured by the instrument.

✎ **Note:** L is an instantaneous spectrum, as such it is for display only and is not saved with the measurement.

About time weightings

The instrument uses three standard-defined time weightings: F, S and I. Time weightings define the exponential averaging in the root-mean-square (RMS) measurement to average the fluctuations in sound levels and create useful readings.

Time weightings use time constants. Time constants define the time it takes for the instrument to respond to a change in sound levels.

- **F** = 125 ms time constant, decay of 34.7 dB/s

  The fast rise and decay of this time weighting means it will show a lot of the variations in the acoustic signal. You can use this weighting to measure sounds that fade rapidly, such as a dog bark.

  ✎ **Note:** F time weighting can be used for most measurements.

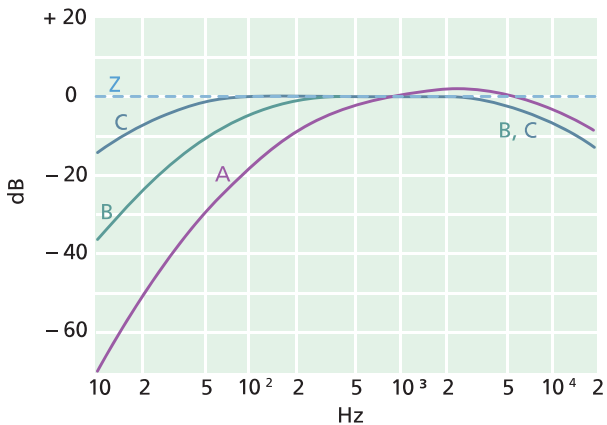- **S** = 1 s time constant, decay of 4.3 dB/s

  The relatively slow rise and decay of this time weighting means it will smooth the variations in the acoustic signal. You can use this weighting to measure sounds that fade slowly, such as a bell toll.

- **I** = 35 ms time constant, decay of 2.9 dB/s

When choosing a time weighting to use, ask yourself if you want to track or smooth the variations in sound levels over time.

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- Mainly used to assess peak values of high sound pressure levels (LCpeak)

Z-weighting

- No frequency weighting
- Used to collect unweighted data

✎ **Note:** An **equal loudness curve** is a frequency response curve. Equal loudness curves are the experimental results of presenting pure tones and levels at different frequencies to young people with no hearing impairment. Along a contour line the young, average, normal listener will judge tones presented with different combinations of frequency and dB to be equally loud.

Table of parameters

This table gives an overview of all the possible parameter / frequency weighting combinations.

✏ **Note:** The parameters are listed as they appear in the Spectrum parameters menu.

	A	**C**	**Z**	**B**
Leq	LAeq	LCeq	LZeq	LBeq
LF	LAF	LCF	LZF	LBF
LS	LAS	LCS	LZS	LBS

Audio recording

Audio signal can be recorded and stored as listen-quality MP3 files (compressed to 3 % of original signal). When enabled, the audio will record for the duration of the measurement time.

You can listen to audio recordings in the PC application, which has controls for playback, digital gain settings, and playback speed options.

Record audio

1. Go to: **Measurement settings** > **Audio recording**.
2. Set **Listen quality** to *Enabled* to record audio for listening purposes (as opposed to analysing purposes).

Listen to audio

Playback in the PC application

When post-processing projects in the PC application, the Measurement window contains the controls for playing back audio recordings.

1. Open a project.

   See **Work with a project** for more information.
2. Select a measurement.
3. Open the Measurement window.
4. Use the controls at the bottom of the window to play back the recording.

Display settings

Display settings control how the instrument screen looks (brightness, colour scheme), the brightness of the light ring, and the data that is displayed.

Go to: **Display settings**.

Screen brightness

Screen brightness controls how bright the screen on the instrument is. You can choose from six levels of brightness.

Light ring brightness

Light ring brightness controls the brightness of the light ring on the instrument. Choose from four settings: *Off*, *Low*, *Normal* or *High*.

Colour scheme

This setting controls the colour of the screen and text.

- *Light* is a light background with dark text.
- *Dark* is a dark background with light text.

Display views

SLM view

Set up the instantaneous display (bar graph) and the readout for one broadband parameter (single measurement).

List view

Set up the instantaneous display (bar graph) and readouts for multiple broadband parameters (single measurement). You can display three parameters on the instrument and five parameters on the mobile app.

Spectrum view

Set up the display of frequency analysis spectra.

Profile view

Set up the display of logged measurement parameters, also called the logging profile, on the instrument.

About data view

Display information about the instrument and the data.

Display view settings

The following list contains information about the settings for the different views.

- **Graph parameter** (SLM view, List view)

  Choose the parameter for the bar graph; that is, the instantaneous (or fast) display of instantaneous sound levels.

- **Parameter** (Spectrum view)

  Choose the parameter for the spectrum display; that is, the display of the sound level for each frequency band.

- **Parameter** (Profile view)

  Choose the parameter for the profile display; that is, the display of logged sound levels by time.

- **Graph max level**, **Graph min level** (SLM view, List view, Spectrum view, Profile view)

  Define the range (maximum and minimum levels) for the bar graph in dB.

  The range that you define should match the dynamics of the signal you are measuring. In other words, it should include all the sound levels that are present.

- **Parameter** (SLM view)

  Choose the parameter to display in the area below the bar graph.

- **Parameter 1**, **2** and **3** (List view)

  Choose the parameters to display as a list below the bar graph. You do not have to define all three, choose *None* to leave a list item blank.

- **Display**

  Enable or disable the display.

About data view

About data view displays information about the instrument with which you are measuring. It can also include the location of the instrument (latitude and longitude) using GPS (global positioning system).

To enable latitude and longitude coordinates in About data view:

1. Enable Service mode on the instrument.

   a. Press ⬚ briefly to open the menu.

   b. Go to: **System settings** > **Advanced settings** > **Service mode**.

   c. Select **Enabled**.

2. Using the instrument or the mobile app, go to: **System settings** > **Advanced settings** > **GPS location**.

3. Select **Enabled**.

✎ **Note:** To use the mobile app to enable latitude and longitude coordinates in About data view, Service mode must be enabled on the instrument. You cannot use the mobile app to enable Service mode.

Regional settings

Regional settings allow you to choose the language, date and time settings of the instrument.

Go to: **System settings** > **Regional settings**.

Language

Choose the language of the user interface of the instrument.

✎ **Note:** From the home screen, go to About > Preferences > Language.

Time zone

Set the time zone in which you are measuring.

✎ **Note:** It is very important that the instrument, mobile device and PC are all set to the same time zone. Otherwise, you may not be able to import measurements from the instrument to the PC application.

Date format

Choose the order of day, month, year (in numerical format).

Time format

Display time as a 24- or 12-hour clock.

Date separator

Choose the symbol that separates the day, month and year.

Decimal point

Choose the decimal separator: decimal comma or decimal point.

Decimal places

Choose the number of decimal places to display: *1* or *2*.

Power management

Use the Power management settings to switch off the screen or instrument after periods of inactivity. These settings can be helpful if you want to maximise battery life for long, unattended measurements.

Go to: **System settings** > **Power management**.

Switch screen off after

Use this setting to switch off the screen on the instrument automatically after a period of inactivity (that is, when you are not pushing its buttons). The instrument will stay on and continue to measure even if the screen is off.

- *Never*: The screen will not switch off.
- *2, 5 or 10 minutes*: After 2, 5 or 10 minutes, the screen switches off.

Shut down after

Use this setting to shut down the instrument automatically after a period of inactivity (that is, when you are not pushing its buttons).

- *Never*: The instrument will not turn off.

- *2, 5 or 10 minutes*: After 2, 5 or 10 minutes, the instrument turns off.

✎ **Note:** If the instrument is measuring, it will not shut off. If the instrument is charging, it will shut off.

Data management

Data management settings include settings for storing a backup and for data retention.

Go to: **System settings** > **Data management**.

Backup settings

You can set up your instrument to store backups of your data to a USB stick or network storage (either a network attached storage (NAS) device or a shared folder). Data transfers automatically when the storage device is available. An icon on the instrument indicates the status of the backup.

Store a backup on network storage

You will need:

- Network storage
- Your instrument

✎ **Note:** If you are using NAS, you will need to set it up according to the manufacturer's instructions first.

Procedure:

1. Go to: **Backup settings** > **Backup**.
2. Select **Disabled**.
3. Enter the host name or IP address of the device or network (so the instrument can find it).
4. Enter the user name and password (so the instrument can access the device or network).
5. Specify the path (so the instrument knows where to upload the data.)
6. Specify the domain if the network belongs to a domain.
7. Set **Backup** to *Network storage*.

Store a backup on a USB stick

You will need:

- A USB-C™ (or USB-A with an adaptor) memory stick with at least 16 GByte formatted as FAT32 or exFAT
- Your instrument

Procedure:

1. Go to: **Backup settings** > **Backup**.

2. Select **USB stick**.

3. Connect the USB stick. The transfer will start automatically.

Data retention

Data retention is set to *Manual* by default. This means that you will need to manually move data to Trash.

To set the instrument to remove data automatically:

1. Set **Data retention** to *Automatic*.

2. Use the **Retention period** setting to specify how long to keep the data.

After the specified time, data will be moved to Trash.

✏ **Note:** Data that is in the Trash folder is deleted only when you empty the folder or if space is needed.

Network settings

Network settings enable you to control your local (or remote) network connections. There are also settings to give the instrument a nickname, to protect it with a password and to view the instrument GUI in a web broswer.

See [Local connections on page 24](#) and [Remote connections on page 25](#) for more information.

Go to: **System settings** > **Network settings**.

Nickname

A nickname can make your instrument easier to identify if you have multiple instruments. This is because the default name of an instrument is based on its type and serial number, so they all look very similar.

Add a nickname using the mobile app

1. Tap **Nickname**.

2. Use the keypad to enter a nickname.

3. Tap **Done**.

💡 **Hint:** You can also use emojis!

Add a nickname using the instrument

1. Select **Nickname**.

2. Use the arrow keys to enter a name.

3. Press ⊜ to exit the dialog.

💡 **Hint:** Use the mobile app, it is much easier.

Tips for nicknames

- Make the nickname short.
- Make the nickname unique.
- Use a naming pattern such as the phonetic alphabet.
- Use the location of the instrument.

Password

This setting allows you to password protect your instrument. The password will be required to connect to the instrument through Wi-Fi or Ethernet.

You can add or change the password using either the instrument or the mobile app.

Add a password using the instrument

1. Go to: **System settings** > **Network settings**
2. Select **Password**.

   ✎ **Note:** If the instrument is already password protected, you will need to confirm that you want to enter a new password.
3. Use the arrow keys to enter a password.
4. Press ⊜.

💡 **Hint:** Use the mobile app, it is much easier.

Add a password using the mobile app

1. Tap **Password**.
2. Use the keypad to enter a password.
3. Tap **Done**.

Web server display

Web server display is a setting that allows you to view the instrument GUI on a web browser that is connected to the same network as the instrument. This can be useful if more than one person wants to be able to monitor a measurement from a distance.

✎ **Note:** The display is not interactive, it is for viewing purposes only.

The setting can be accessed from either the instrument or the mobile app. See **Web server display on page 18** for more information.

Wi-Fi settings

Wi-Fi settings control the wireless connections of the instrument.

Wi-Fi mode: Airplane mode

Use this setting to switch off Wi-Fi and Bluetooth on the instrument.

Wi-Fi mode: Connect to network

Use this setting to connect your instrument to your local wireless network, such as your work or home network. The instrument will be able to communicate with the other devices on the network, that is your iOS device or PC.

1. Set **Wi-Fi mode** to *Connect to network*.

2. If you are using the instrument, select **Wi-Fi name**.

   If you are using the mobile app, the iOS device will search for the available networks.

3. Select your network from the list of available networks.

4. Enter the network password.

Wi-Fi mode: Act as hotspot

Use this setting to enable the instrument's hotspot to which you can connect your iOS device or PC so they can communicate.

1. Set **Wi-Fi mode** to *Act as hotspot*.

2. Connect your iOS device or PC to the hotspot as per the manufacturer's instructions. If you are using the mobile app, follow the prompts to connect your iOS device to the hotspot.

Change the hotspot password on the instrument

1. Select **Password**.

2. Use ▲ and ▼ to scroll through the character menu.

3. Press ⊜ to confirm the changes.

✎ **Note:** Restart the instrument to apply the new password.

Change the hotspot password using the mobile app

✎ **Note:** To edit the hotspot password on the mobile app, the mobile device must be connected to the instrument's hotspot.

1. Tap the text box for Password.

2. Use the keypad to enter a new password.

3. Tap **Done**.

   ✎ **Note:** There are two instances of Done while the keypad is open, be sure to tap the upper instance or your changes will not be saved.

4. Tap the back arrow.

   This will cause the mobile device to lose connection to the hotspot.

The instrument and mobile app will reconnect automatically.

Reset network settings

You can reset the network settings so that the instrument will forget all networks to which it has connected. This will not affect any settings that have been saved on your iOS device.

This setting can only be accessed from the instrument.

How to reset network settings

1. Select **Reset network settings**.

2. Select **Yes**.

Voltage output

This setting allows you to output an anologue signal. The USB-C™ socket on the bottom of the instrument is also an output channel. To use the socket as an output channel requires an output cable such as AO-0846, which has a stereo-mini plug for connecting headphones.

Go to: **System settings** > **Voltage output**.

Source

Input X-weighted: Output the frequency-weighted input signal for listening purposes.

LXF: Output the frequency-weighted instantaneous sound level with time weighting F as 10 mV/dB.

X = the frequency weighting.

✎ **Note:** The frequency weightings available correspond to the parameters that the instrument is set to measure.

Lock the settings

After you have finished setting up the instrument, you can lock the measurement, display and system settings to prevent changes.

✎ **Note:** This setting is only accessible on the instrument.

1. Go to: **System settings** > **Advanced settings** > **Service mode**.

2. Select **Enabled**.

3. Go to: **Lock settings**.

4. Select **Enabled**.

CALIBRATION CHECK

It is a best practice to check the accuracy of your instrument before and after a measurement by performing a calibration check. A calibration check is not a calibration. **Calibration** includes an adjustment of the instrument's sensitivity. A **calibration check** compares the current sensitivity of the instrument with the sensitivity from its initial calibration, checking that it has not changed too much.

When you place a sound calibrator on the microphone, the instrument detects the tone and automatically checks the deviation of the sensitivity of the instrument from its initial calibration.

How to perform a calibration check

You will need:

- The instrument
- A sound calibrator such as Type 4231

  A sound calibrator generates a known sound level, against which the measured level can be checked. Type 4231 generates a tone at 1 kHz with levels at 94 dB or 114 dB.

  ✒ **Note:** Be sure to add the calibrator's serial number in the calibration settings of the instrument. Go to: **Menu** > **System settings** > **Advanced settings** > **Calibration** > **Type 4231 no.**

Procedure:

1. Turn on the instrument.

   ✒ **Note:** Ensure that the **instrument is not measuring** and that the **menu is not open**.

2. Gently seat the calibrator on the microphone.
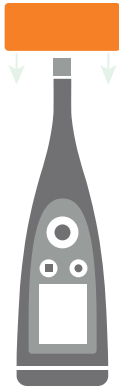
3. Turn on the sound calibrator.
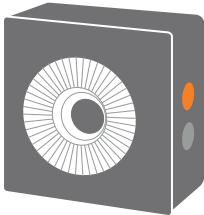
4. After a short period the instrument will initiate a calibration check, choose **Yes**.

5. The calibration check will have one of two results:

   - *Pass*: The measured sound level is within tolerance. The instrument is ready for use.
   - *Fail*: The measured sound level is greater than the acceptable tolerance. The instrument should be recalibrated or serviced.

6. Exit the calibration check.

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Calibration history

Go to: **Menu** > **Calibration history**.

Here you can view an instrument's history of calibrations and calibration checks.

Calibration settings

Go to: **Menu** > **System settings** > **Advanced settings** > **Calibration**.

Automatic calibration check

The instrument is set to perform a calibration check automatically by default.

To change this setting, set **Automatic check** to *Disabled*.

Calibration reminder

The instrument is set to remind you when it is time to calibrate by default.

To change the settings:

1. Enable Service mode.
2. Go to: **Calibration**.
3. Edit the settings for **Calibration reminder** and **Calibration interval** as desired.

Custom calibration

The instrument is set to use Sound Calibrator Type 4231 by default.

To use a different calibrator and set a custom calibration level:

1. Go to: **Calibrator**.
2. Select **Custom**.
3. Select **Custom calibrator no.** to add the calibrator's serial number.
4. Select **Custom level** to specify the sound level in dB.

PROJECTS (MOBILE)

A project is a collection of jobs, tasks, exposure groups, measurements and annotations for testing workplace noise according to a specific standard for a nominal workday.

A job is the overall occupational activity of the worker. A job includes all the tasks that a worker performs throughout their workday. Tasks and exposure groups (and their measurements) are added to jobs to calculate exposure levels for a nominal workday.

A task is a distinct activity performed by a worker or a group of workers. Tasks are defined by the content and duration of the activity. Tasks (and their measured sound levels) are added to jobs to calculate exposure levels for a nominal workday.

An exposure group is a group of workers who have similar roles and exposure levels. Exposure groups (and their measurements) are added to jobs to calculate exposure levels for a nominal workday.

✎ **Note:** The OSHA standard does not use exposure groups for evaluating workplace noise, TWA (time-weighted average) is calculated based on tasks.

Projects are stored on the instrument and transferred to the PC application for post-processing (analysis and report generation).

Create a new project using the mobile app

Before you can create a project using the mobile app, you must first connect to the instrument. See **Connect the mobile app to the instrument on page 27** for more information.

1. Tap **Home**.
2. Tap **Create Project**.
3. Tap **Add Photo** if you want to add a photo from your mobile device.

    ✎ **Note:**
    - The first time you do this, you will be prompted to give Work Noise Partner access.
    - The project's picture will not show on small screens.

4. Tap the project name at the top of the screen to edit the project name.
5. Enter project information:
    - Project Name is required, the default is *New Project*.
    - Organization, Description and Contact are optional.
6. Select the standard to which you are testing: *ISO 9612:2009*, *Slovene regulation*, *OSHA*, *Czech* or *Western Australian*.
7. Edit the settings related to each standard as necessary.
8. Tap **Save**.

Once you create a project, you can add **Tasks on page 57**, **Exposure groups on page 58** and **Jobs on page 59** as needed.

About settings for the standards

Uncertainty (ISO 9612:2009, Slovene regulation, Czech, Western Australian)

Estimate the uncertainty of your measurements.

- *1.65 (p=95%)*: Coverage factor of 1.65 and a confidence interval of 95%. In other words, you expect one out of every twenty measurements to fail.
- *2.23 (p=99%)*: Coverage factor of 2.23 and a confidence interval of 99%. In other words, you expect one out of every one hundred measurements to fail.

Limits (Slovene regulation, Czech)

Values (in dB) for daily exposure limits. If needed, tap to edit the default values.

Exchange rate (OSHA)

The amount of increase that corresponds to a doubling of the noise dose. Choose between *3 dB*, *4 dB* and *5 dB*.

Criterion level (OSHA)

The maximum equivalent sound pressure level (A-weighted) over an 8-hour workday that must not be exceeded. Also referred to as the exposure limit. Choose either *85 dB* or *90 dB*.

Threshold (OSHA)

Any sound levels below the threshold level do not contribute to the noise dose measurement data. For example, if you set the threshold level to 80, sound levels below 80 dB are not used to calculate doses and time-weighted averages.

Value in dB.

Workplace (Czech)

Choose the type of work environment.

How to edit a project

You can edit the project in two ways:

- In the list of projects, swipe left on a project and select ⬚.
- In a project, tap **Edit**.

After editing, tap **Save** to save the changes.

How to delete a project

In the list of projects, swipe left and tap 🗑.

Tasks

A task is a distinct activity performed by a worker or a group of workers. Tasks are defined by the content and duration of the activity. Tasks (and their measured sound levels) are added to jobs to calculate exposure levels for a nominal workday.

On the bottom of the project screen, tap **Tasks** to open the list of all tasks and exposure groups which have been created for the project. The list is empty at first.

Create a task

1. Tap **+ New Task**.

2. At the prompt, enter a name.

3. Tap **Done**.

Edit or delete tasks

Swipe left on a task. (It has to be collapsed. If it is not collapsed, tap it to collapse it.)

- Tap ☑ to edit.

- Tap 🗑 to delete.

Add measurements to a task

In the list of tasks and exposure groups, tap on an item to expand it.

- Tap **Add from the list** to add a measurement stored on the instrument. See **Measurements (mobile) on page 62** for more information.

- Tap **Measure** to open the measurement screen. See **Measurements (mobile) on page 62** for more information.

Filters

At the top of the list of tasks and exposure groups are three buttons: All, Done and Not done. These buttons will filter the tasks and exposure groups in the project so you can quickly see the status of the project or check that all measurements have been made.

Exposure groups

An exposure group is a group of workers who have similar roles and exposure levels. Exposure groups (and their measurements) are added to jobs to calculate exposure levels for a nominal workday.

On the bottom of the project screen, tap **Tasks** to open the list of all tasks and exposure groups which have been created for the project. The list is empty at first.

✎ **Note:** The OSHA standard does not use exposure groups for evaluating workplace noise, TWA (time-weighted average) is calculated based on tasks.

Create an exposure group

1. Tap **+ New Exposure Group**.

2. Enter a name.

3. Set the number of workers in the exposure group.

   Use left and right arrows or tap on the text box to use the keypad.

4. Tap **Done**.

Edit or delete exposure groups

Swipe left on an exposure group. (It has to be collapsed. If it is not collapsed, tap it to collapse it.)

- Tap ⬚ to edit.

- Tap 🗑 to delete.

Add measurements to an exposure group

In the list of tasks and exposure groups, tap on an item to expand it.

- Tap **Add from the list** to add a measurement stored on the instrument. See **Measurements (mobile) on page 62** for more information.

- Tap **Measure** to open the measurement screen. See **Measurements (mobile) on page 62** for more information.

Filters

At the top of the list of tasks and exposure groups are three buttons: All, Done and Not done. These buttons will filter the tasks and exposure groups in the project so you can quickly see the status of the project or check that all measurements have been made.

Jobs

A job is the overall occupational activity of the worker. A job includes all the tasks that a worker performs throughout their workday. Tasks and exposure groups (and their measurements) are added to jobs to calculate exposure levels for a nominal workday.

On the bottom of the project screen, tap **Jobs** to open the list of all jobs which have been created for the project. The list is empty at first.

Create jobs

1. Tap **+ New Job**.

2. At the prompt, enter a job name.

3. Tap **Done**.

Add tasks and exposure groups to a job

A job consists of the tasks and/or exposure groups that add up to a nominal workday, which is defined as an 8 hour working day. A working day includes working times and positions, the number and duration of breaks, and the work pattern.

1. Tap on a job to expand it.

2. Tap **+ Add task or exposure group**. The list of tasks and exposure groups opens.

3. Allocate time for a task or exposure group to add it to a job.

   Use the left and right arrows to allocate time. (You can also tap on the box to use your keypad to enter a time.)

   If you do not allocate time for a task or exposure group, it is not added to a job.

4. Tap **Save**.

For testing according to the ISO, Western Australian, Slovene, or Czech standards or regulations, LEX,8h (daily personal noise dose) is calculated and displayed based on the time allocated to the tasks and exposure groups added to the job. For testing according to the OSHA standard, TWA (time-weighted average) is calculated and displayed based on the time allocated to the tasks added to the job.

Edit time allocation on a job

1. From the job list, tap on a job to expand it.

2. Tap **+ Add task or exposure group**.

3. Edit time allocation.

4. Tap **Save**.

Edit or delete a job

Swipe left on a job. (It has to be collapsed. If it is not collapsed, tap it to collapse it.)

- Tap ⬚ to edit.

- Tap 🗑 to delete.

Filters

At the top of the list of tasks and exposure groups are three buttons: All, Exceeded and Not exceeded. These buttons will filter the jobs in the project.

MEASUREMENTS

The exact steps of a measurement will vary depending on the settings you use in Measurement control.

A basic overview is as follows:

1. Press ⊙ to start a measurement.
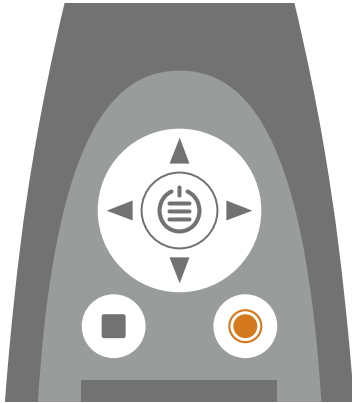
2. If necessary, press ⊙ to pause.
3. Press ⊙ to resume.
4. Press ■ to stop the measurement.

At this point, you can review the results of the measurement.

5. Press ■ again to clear the data from the last measurement and return the instrument to its ready state.

✎ **Note:**

- You will not need to stop the measurement if it has a preset time. Go to **Menu** > **Measurement settings** > **Measurement control** to enable or disable preset measurement times.
- Data is stored automatically when the measurement stops.
- If you are using the instrument with the mobile app, annotations will be synced with the measurement and saved on the instrument.

Data explorer

Go to: **Menu** > **Data explorer**.

Browse the measurements stored on the instrument, with the option to open or delete measurements.

1. Navigate to the desired folder.

2. Press ▶.

3. Choose **Open** to view the measurement on the instrument.

   ✏ **Note:**

   - Press ⬛ to close the measurement.

   - Opening a measurement changes the current settings of the instrument to the settings of the measurement.

   Or choose **Move to Trash** to move the measurement to Trash.

To open the trash folder, go to: **Data** > **Show Trash**. Once you empty the trash, measurements will be permanently deleted.

Measurements (mobile)

When you connect the instrument and the mobile app, the mobile app can be used to control the instrument. This is useful if you want to be able to start or stop a measurement from a distance (so that you do not introduce noise to the measurement). The mobile app and the instrument show the status of the instrument regardless of whether you use the instrument or the mobile app to start, stop or pause the measurement.

The exact steps of a measurement will vary depending on the settings you use in Measurement control. See **Measurement control on page 32** for more information.

Measurement controls

Tap ◯ to start a measurement.

To pause, slide ⏸ to the left.

Tap ◯ to resume.

Slide ⬜ to the right to stop the measurement.

✏ **Note:**

- It will not be necessary to stop the measurement if you specified a measurement time in Measurement control.

- Measurement data is only stored on the instrument.

- You can switch between tasks and exposure groups from the measurement screen, even while you are measuring. The measurement will be attached to the task or exposure group on the measurement screen at the time the measurement stops.

- After making and attaching at least three measurements to a task or exposure group, the mobile app calculates the LAeq and the task or exposure group is marked as done.

Add measurements to a project

Measurements made while a project is open are added automatically to the project.

Make a measurement

1. Open an existing project, or create a new one.

2. Tap **Tasks**.

   This opens the list of tasks and exposure groups that have been added to a job. See **Tasks on page 57** or **Exposure groups on page 58** for more information about adding tasks and exposure groups to a project.

3. In the Tasks list, tap a task or exposure group to expand it.

4. Tap **Measure**.

Add past measurements

You can add measurements that are stored on the instrument to your project.

1. Open an existing project, or create a new one.

2. In the Tasks list, tap a task or exposure group to expand it.

3. Tap **Add from the list**.

4. Tap to select one or more measurements.

5. Repeat as needed.

Delete measurements

Swipe left on a measurement to delete it from a project.

✎ **Note:** The measurement is only removed from the project, it is not deleted from the instrument.

ANNOTATIONS

Use the mobile app to annotate your measurement. Annotations are comments you can attach to a measurement. There are four types of annotations: photo, video, note, and commentary. Every measurement can have multiple annotations of different types.

You can attach annotations to the measurements on the measurement screen or later once the measurement is attached to a task or exposure group.

It is always a good idea to add annotations to your measurements. For example, they can help you and your colleagues identify measurements at a later date and provide valuable information about the context of a measurement.

How to make annotations

1. From the measurement screen, tap ✎.

2. Choose the kind of annotation you want to add:

   - 📷 : Photos

     You can use either front-facing or rear-facing camera to take a photo.

   - 🎥 : Videos

     You can use either front-facing or rear-facing camera to record video.

   - ✏ : Notes
   - 🎤 : Commentary

3. Snap a photo, make a recording or write a note.

4. Photos: Tap **Retake** to take a different photo or **Use Photo** to use it.

   Videos: Tap **Retake** to take a different video, tap the play button to view the video, or tap **Use Video** to use it.

   Notes: Tap **Done** to save the note or **Cancel** to discard it.

   Commentary: Tap the play button to listen to the recording. Tap **Delete recording** if you want to record a different commentary, tap **Done** to save the commentary, tap **Cancel** to discard the commentary.

5. Repeat as needed.

View annotations in the mobile app

1. From the home screen, tap **Projects**.

2. Tap on a project in the list to open it.

3. Tap on a task or exposure group.

   This will display the list of measurements attached to the task or exposure group.

4. Swipe left on a measurement.

5. Tap ✎ to open the annotations attached to the measurement.

6. Tap on an annotation to expand it.

✏️ **Note:**

- Only one annotation at a time can be expanded.
- To view a video annotation or listen to an audio annotation tap the play button.
- You can also navigate through video / audio by using the slider at the bottom.

Edit annotations

1. Swipe left on an annotation.
2. Tap the edit button to edit the annotation's name.

   When editing notes, you have two options: *Edit note* or *Rename note*.
3. Tap **Done** to save the changes.

Delete annotations

1. Swipe left on an annotation.
2. Tap 🗑️.

POST-PROCESS USING THE PC APP

PC application GUI

This is the Work Noise Partner PC application with a project open.
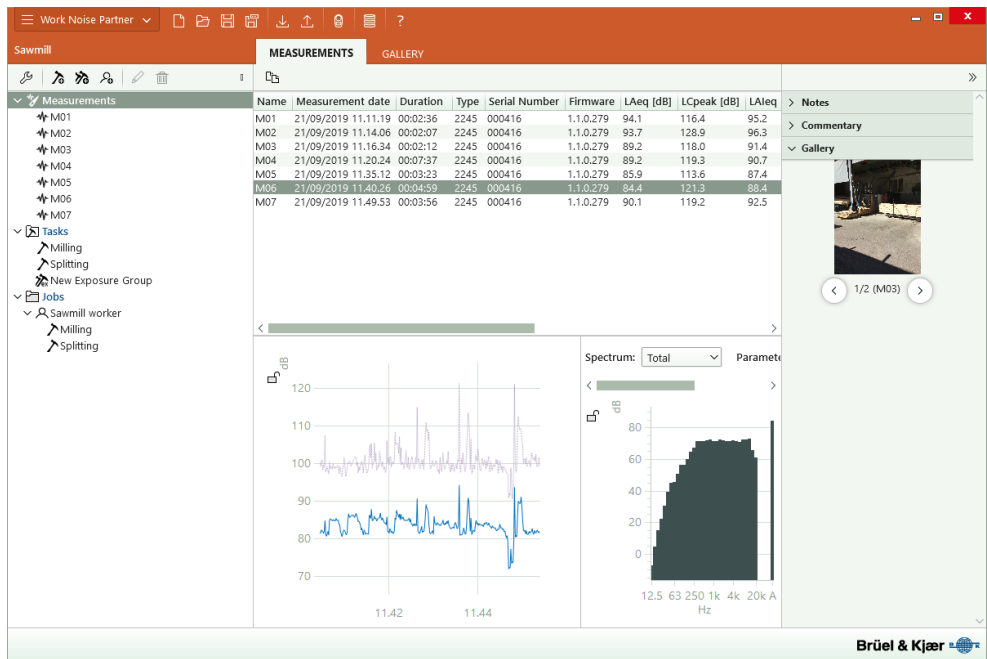
The application tab opens / closes the **application menu** where you will find tools for the project and the application.
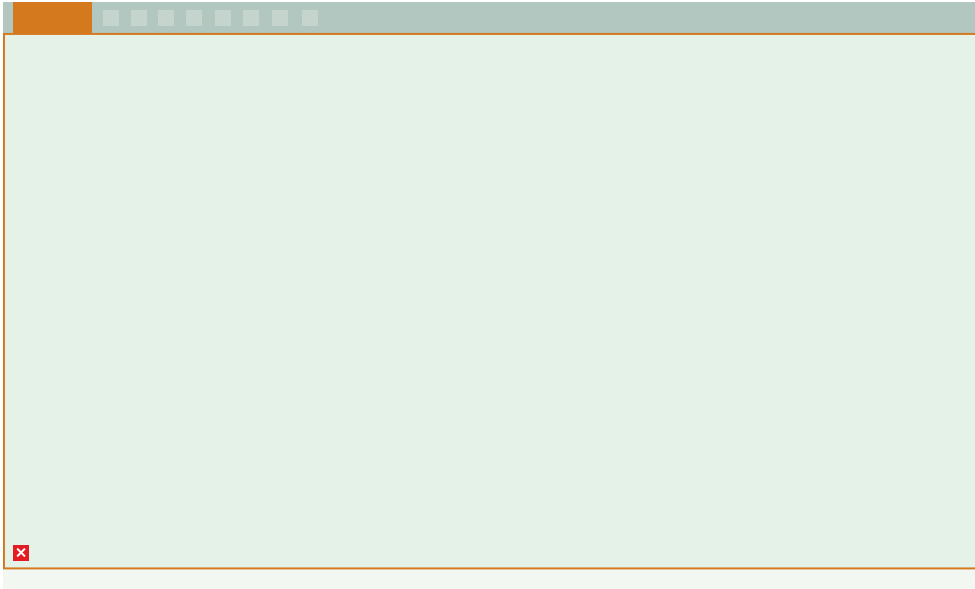
⚙ **Options**: Change the language of the GUI.

ⓘ **About**: Information about the application.

❌ **Exit**: Close the application.

These are the **tools** that control the operation of the application.
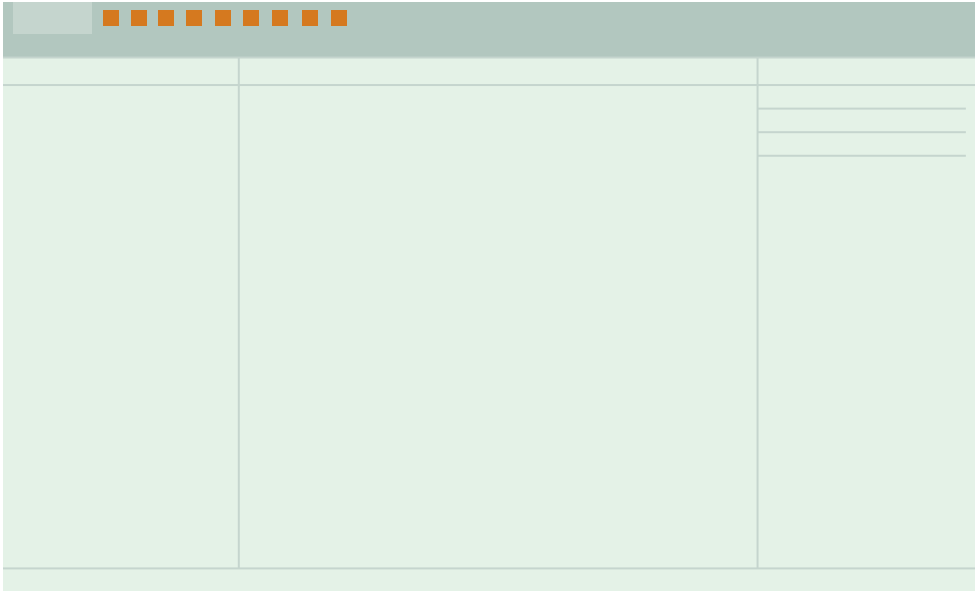
⬜ : Create a new project.

📂 : Open an existing project.

💾 : Save the current project.

🗄 : Save the current project under a new name or in another location.

⬇ : Import data from the instrument or network storage.

⬭ : Open the Dosimeter dialog.

⬆ : Create a report, export data to Microsoft® Excel®.

🗄 : Open the Hearing Protection Database dialog.

? : Open the help.

When you open a project or import data, you will see the individual measurements in the **project browser** window. Select measurements to view them.
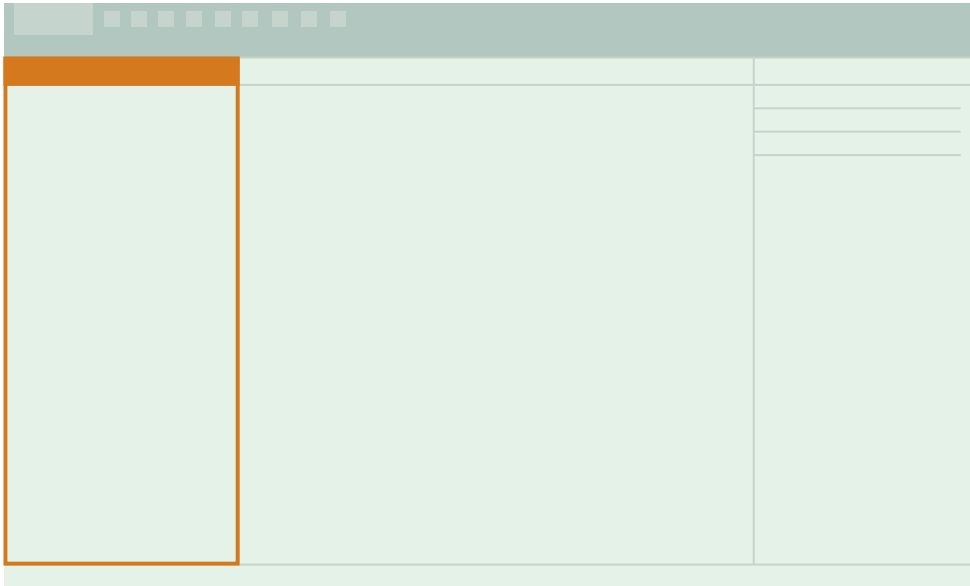
🔧 : Open the Edit project properties dialog.

⚒ : Add a task.

⚒ : Add an exposure group.

🔍 : Add a job.

✏ : Edit the name of a measurement, task, exposure group or job.

🗑 : Remove a measurement, task, exposure group or job from the project.

These tabs are for switching between the **Measurement**, **Tasks** or **Jobs** window and the **Gallery** window.
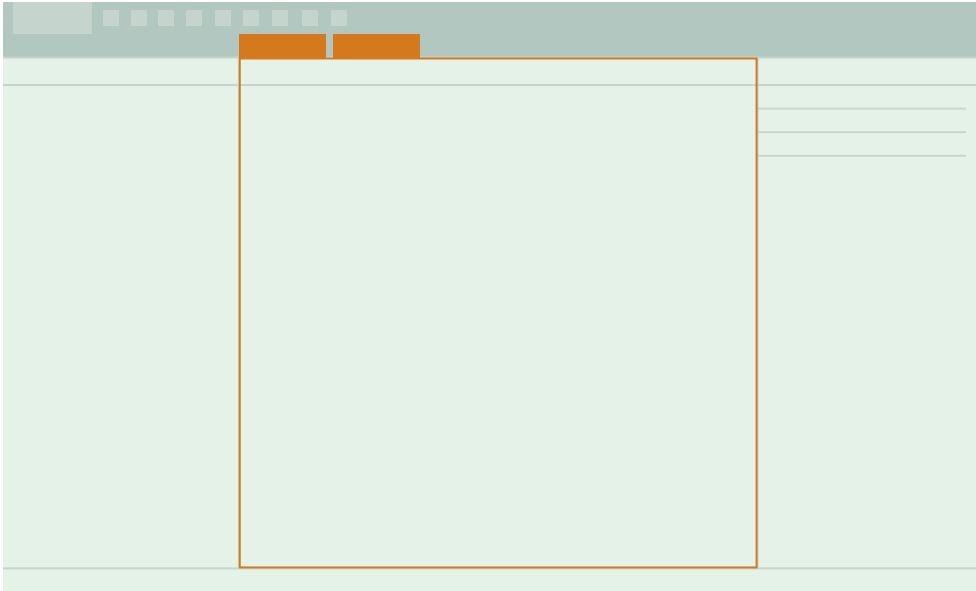
In this panel, you will find collapsible windows for viewing annotations.

Gallery: View photos and videos attached to the measurement.

Notes: Read the notes attached to the measurement.

Commentary: Listen to voice memos attached to the measurement.

Import a project

Projects that are made using the mobile app are stored on the instrument. You can import the entire project to the PC application from the instrument.

✏ **Note:** If you have set up the instrument to store a backup of its data on network storage or USB stick, you can import projects from the storage location.

You will need:

- Your instrument
- A project
- A PC installed with the PC application
- A USB cable

How to import a project
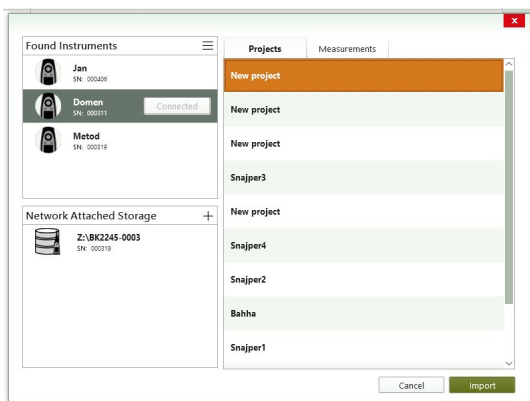
1. Open the PC application.

2. Connect the instrument to the computer using the cable.
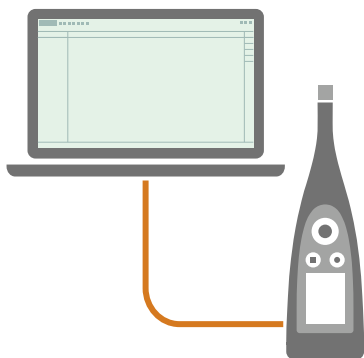
💡 **Hint:** Instead of using a cable, connect the two devices to the same network using Wi-Fi®.

3. In the PC application, click ⭳ .

4. Find your instrument in the import dialog and select it.
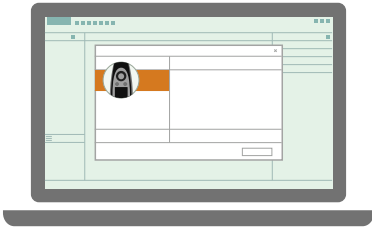
✎ **Note:** To import from a backup, click on one of the locations under Network Attached Storage.

5. Click **Connect**.

A progress bar will indicate that the software is connecting to the instrument.

6. Click **Projects**.

7. Select the project you want to import.

✎ **Note:** You can only import one project at a time.

8. Click **Import**.
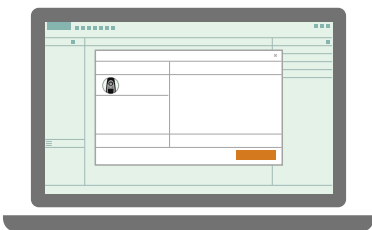
A progress bar will indicate that the project is importing.

Import from a backup

The first time you import from a backup, you will need to tell the PC application where the backup is stored.

You will need:

- An instrument that is set up to store a backup of its data

  See **Data management on page 48** for more information.

- Data in the backup

Procedure:

1. In the import dialog, click ＋ .

2. Click **Add network location**.

3. Browse to the location of the backup.

   ✏ **Note:** Your computer will need to be able to access this location.

4. Select the folder with the matching serial number of your instrument.

5. Click **Select Folder**.

Add an instrument using its IP address

If you want to find an instrument that is not showing up in the list of discovered instruments, such as an instrument on another network, you can manually add the instrument to the list using its IP address.

✏ **Note:** Use this functionality to connect to your instrument remotely.

1. In the import dialog, click ＝ .

2. Click **Add instrument from IP address**.

3. Enter the IP address or host name, and if used, the password.

   For local connections, you can find the IP address of the instrument here: **Menu** > **System settings** > **Network settings** > **Wi-Fi settings** or **Ethernet settings**.

   For remote connections, the IP address or host name will depend on your setup. Refer to **Remote connections on page 25** for information about which IP address or host name to use.

4. Click **Connect**.

Create a project using the PC application

You can create a project in the PC application then add measurements, tasks, exposure groups and jobs as needed.

How to create a project

1. Open the PC application.

2. Click ▯ .

3. In the Organization tab of the Create Project dialog, enter project properties:

- Click **Add Photo** to add a photo.
- Project Name is required, the default is *New Project*.
- Organization, Description and Contact are optional.

4. In the Calculation tab of the dialog, use the drop-down to select a standard.

5. If needed, edit the settings related to the selected standard.

6. Click **Create**.

7. Click ▭ .

8. Give the file a name and click **Save**.

   The defaults are:

   - Name: No default name, enter a name to save
   - Location: *C:\Users\USER\Documents\Work Noise Partner*

You are now ready to add tasks and jobs to your project.

About settings for the standards

Uncertainty (ISO 9612:2009, Slovene regulation, Czech, Western Australian)

Estimate the uncertainty of your measurements.

- *1.65 (p=95%)*: Coverage factor of 1.65 and a confidence interval of 95%. In other words, you expect one out of every twenty measurements to fail.
- *2.23 (p=99%)*: Coverage factor of 2.23 and a confidence interval of 99%. In other words, you expect one out of every one hundred measurements to fail.

Limits (Slovene regulation, Czech)

Values (in dB) for daily exposure limits. If needed, tap to edit the default values.

Exchange rate (OSHA)

The amount of increase that corresponds to a doubling of the noise dose. Choose between *3 dB*, *4 dB* and *5 dB*.

Criterion level (OSHA)

The maximum equivalent sound pressure level (A-weighted) over an 8-hour workday that must not be exceeded. Also referred to as the exposure limit. Choose either *85 dB* or *90 dB*.

Threshold (OSHA)

Any sound levels below the threshold level do not contribute to the noise dose measurement data. For example, if you set the threshold level to 80, sound levels below 80 dB are not used to calculate doses and time-weighted averages.

Value in dB.

Workplace (Czech)

Choose the type of work environment.

Edit project properties

Click 🔧 to edit the properties.

Import measurements

Import measurements to add them to a project. You can add measurements to empty projects or to projects that already contain measurements.

You will need:

- A project open in the PC application
- One or more measurements

How to import measurements

1. Connect the instrument to the computer using the cable.
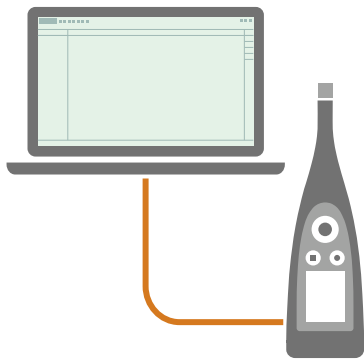
💡 **Hint:** Instead of using a cable, connect the two devices to the same network using Wi-Fi®.

2. In the PC application, click ⤓ .

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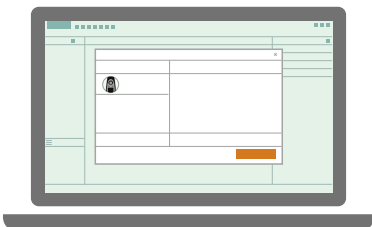3. Find your instrument in the import dialog and select it.
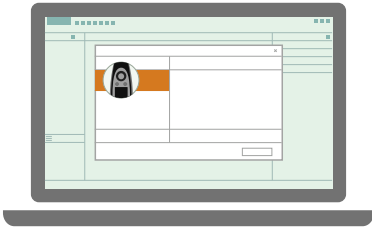
4. Click **Connect**.
5. Click **Measurements**.
6. Select the data you want to transfer.
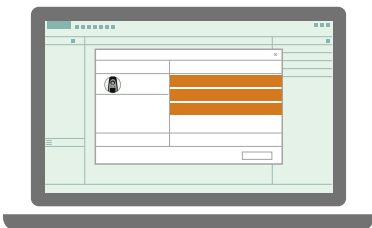
💡 **Hint:** Use <Ctrl> or <Shift> to select multiple measurements or annotations.

7. Click **Import**.

Import from a backup

The first time you import from a backup, you will need to tell the PC application where the backup is stored.

You will need:

- An instrument that is set up to store a backup of its data

  See **Data management on page 48** for more information.
- Data in the backup

Procedure:

1. In the import dialog, click ┿ .

2. Click **Add network location**.

3. Browse to the location of the backup.

   ✎ **Note:** Your computer will need to be able to access this location.

4. Select the folder with the matching serial number of your instrument.

5. Click **Select Folder**.

Add an instrument using its IP address

If you want to find an instrument that is not showing up in the list of discovered instruments, such as an instrument on another network, you can manually add the instrument to the list using its IP address.

✎ **Note:** Use this functionality to connect to your instrument remotely.

1. In the import dialog, click ☰ .

2. Click **Add instrument from IP address**.

3. Enter the IP address or host name, and if used, the password.

   For local connections, you can find the IP address of the instrument here: **Menu** > **System settings** > **Network settings** > **Wi-Fi settings** or **Ethernet settings**.

   For remote connections, the IP address or host name will depend on your setup. Refer to **Remote connections on page 25** for information about which IP address or host name to use.

4. Click **Connect**.

Dosimeter

You can use Personal Noise Dose Meter Type 4448 with Work Noise Partner.

Connect to a dosimeter

Infrared (IR) communication establishes the short-range connection between a dosimeter and a PC.

1. Connect the infrared download adaptor (AO-1492) to your PC.

2. Turn on Type 4448.

   ✎ **Note:** Make sure the dosimeter is sufficiently charged.

3. Place the infrared sensor on the dosimeter near to and facing the infrared adaptor.

4. Start Work Noise Partner.

5. Click ⊖ to open the dosimeter dialog.

6. In the dialog, click **Detect**.

Once a dosimeter and PC are connected, you will see information about the dosimeter and be able to access its measurements and configuration.

Import dosimeter measurements

Import dosimeter measurements to add them to a project. Dosimeter measurements will be added to the open project, or a new project will be created if one is not open.

Measurements that are stored on the dosimeter are listed in the **Measurements** tab and are grouped by date and ordered from newest to oldest.
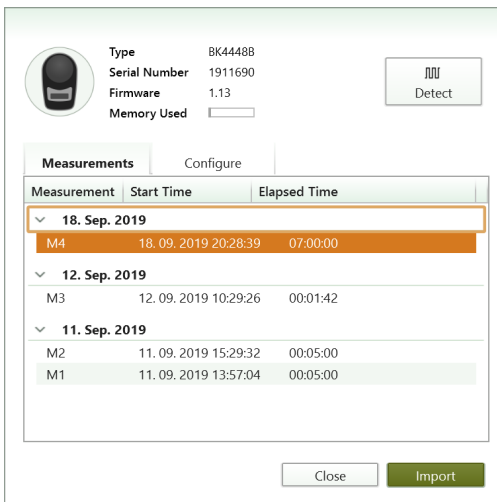
1. Click to select the desired measurements.

2. Click **Import**.

Configure a dosimeter

1. Click the **Configure** tab.

2. Edit the desired settings.

3. Click one of the following:

   - **Apply** to send the settings to the dosimeter.

   - **Close** to cancel the changes.

About the settings

Language: Controls the display language. Choose between *English*, *French*, *German*, *Spanish*, *Italian* and *Portuguese*.

Display mode: Controls the parameters that show when the measurement stops. Choose *ISO* if you are testing according to ISO standards. Choose *OSHA* if you are testing according to OSHA standards.

LCD contrast: Controls the contrast of the dosimeter screen. Choose a level from one to six.

Startup text: Controls the text to display upon start of dosimeter. You can enter a maximum of 12 characters for each line.

The **Alarms** settings control alarms:

- Enable or disable alarms.

- Set different alarm levels for ISO and OSHA standards.

The **Time and calibration** settings control measurements and calibration:

- Set the calibration level.

- Enable or disable auto-lock. If enabled, the dosimeter enters locked mode when a measurement starts.

- Set the preset measurement time. Set a time from one minute to 12 hours. Set the time to zero to disable preset measurement times.

Memory clearing: Delete all measurements from the dosimeter.

✎ **Note:** This action permanently removes all measurements from the dosimeter, but does not affect the configuration settings.
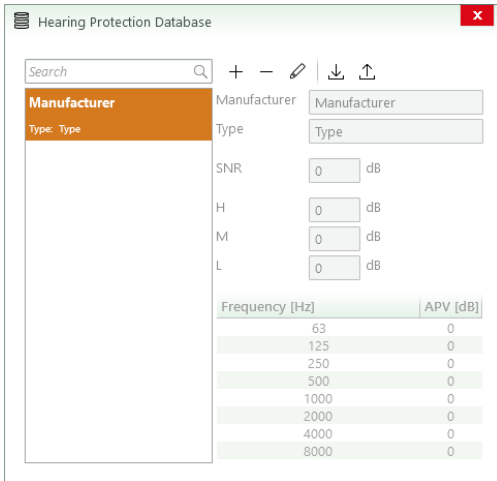
Hearing protection database

You can account for the use of hearing protection in Work Noise Partner. Create a database for different types of hearing protection so that you can apply hearing protection to jobs in your project.

The database file is created and stored locally upon installation of the application.

Open the Hearing Protection Database dialog

In the upper toolbar, click 🗄.

Add items to the database

1. In the dialog, click ➕.

2. Click in a field to enter text:

   - Manufacturer: Maker of the hearing protection

   - Type: Kind of hearing protection

   - SNR: Single number rating

   - NRR: Noise reduction rating

   - H, M and L: High, middle and low ratings

   - APV: Assumed protection value

     Click a row in the table to add values to the APV column.

3. Click ➕ to add another item.

✎ **Note:**

- This example shows the SNR, HML and APV of the hearing protection.

Model	Frequency [2]	125	250	500	1000	2000	4000	8000	**H**	**M**	**L**	SNR
H515FB 190 g	Mean att. [3]	10.9	17.2	26.6	28.3	33.5	37.8	37.9				
	Stand. dev. [4]	3.2	2.5	2.2	2.7	2.6	2.0	2.6	32 dB	24 dB	15 dB	27 dB
	APV [5]	7.7	14.8	24.4	25.6	30.9	35.7	35.3				

- All changes are saved automatically.

Delete items from the database

1. Select an item.
2. Click ▬.
3. Confirm or cancel the action.

Edit items in the database

1. Select an item.
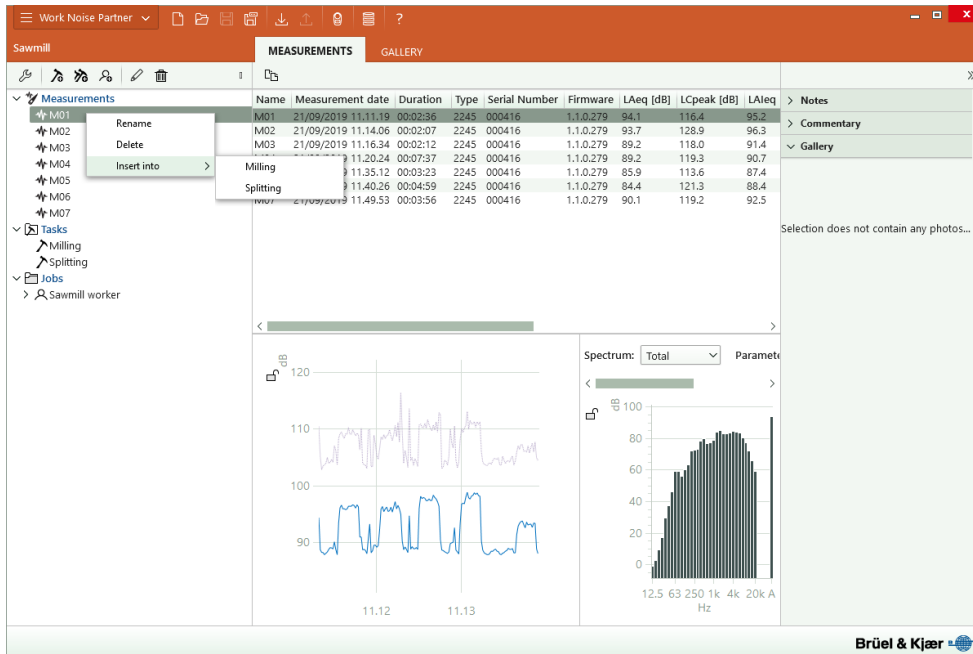2. Click ✏.

Import a database

1. Click ↓.
2. Browse to the location of the file you wish to import.
3. Click **Open**.

✎ **Note:** Import will not remove or modify any existing hearing protection items.

Export the database

1. Click ↑.
2. Browse to the location to which you would like to export the file.
3. Click **Save**.

Measurements

View a measurement

Click on a measurement in the project browser on the left to open the Measurement tab.

Add measurements

Click ⤓ to import measurements from the instrument or from a backup. See **Import measurements on page 75** for details.

Add part of a measurement

Use the graph to add part of a measurement to a task or exposure group.

1. Click on a measurement to select it.
2. In the graph of the measurement, click and drag to select a range.
3. Right-click in the selected area.
4. Hover over **Insert into**.
5. Select the desired task or exposure group.

Context-sensitive menu

Right-click on a measurement in the project browser to open the context-sensitive menu.

Rename: Give the measurement a different name.

Delete: Remove the measurement from the project.

Insert into: Add the measurement to a task or exposure group.

Tasks

A task is a distinct activity performed by a worker or a group of workers. Tasks are defined by the content and duration of the activity. Tasks (and their measured sound levels) are added to jobs to calculate exposure levels for a nominal workday.
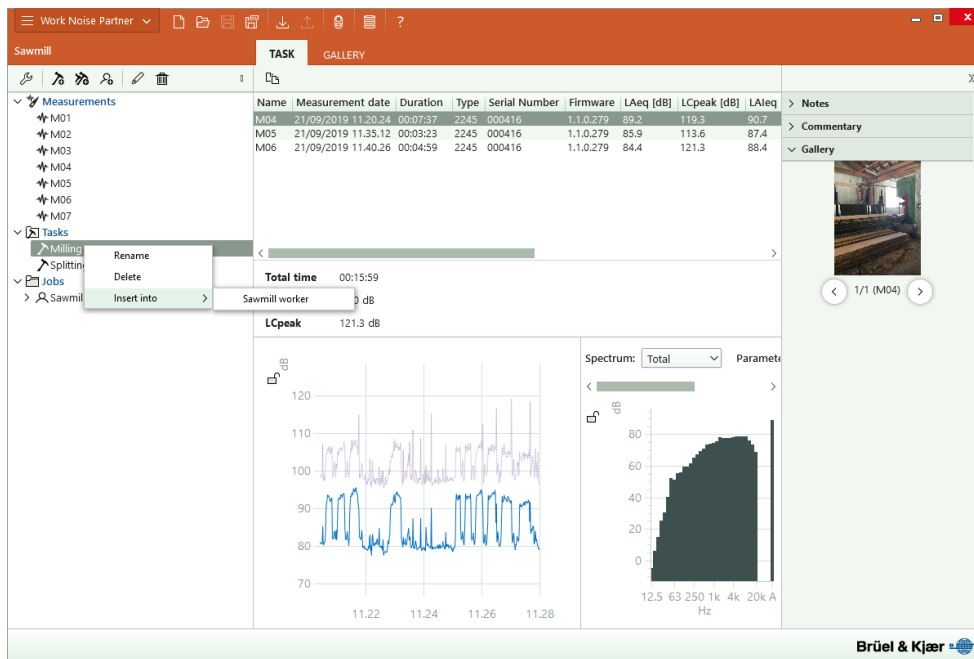
Add a task

Click ![icon] in the project browser toolbar to add a task to your project.

View a task

Click on a task in the project browser on the left to open the Task tab.

Add measurements to a task

1. Right-click on a measurement.

2. Hover over **Insert into**.

3. Select the task from the list.

💡 **Hint:** You can also drag and drop measurements into tasks and exposure groups.

Context-sensitive menu

Right-click on a task in the project browser to open the context-sensitive menu.

Rename: Give the task a different name.

Delete: Remove the task from the project.

Insert into: Add the task to a job.

Exposure groups

An exposure group is a group of workers who have similar roles and exposure levels. Exposure groups (and their measurements) are added to jobs to calculate exposure levels for a nominal workday.

✏️ **Note:** The OSHA standard does not use exposure groups for evaluating workplace noise, TWA (time-weighted average) is calculated based on tasks.
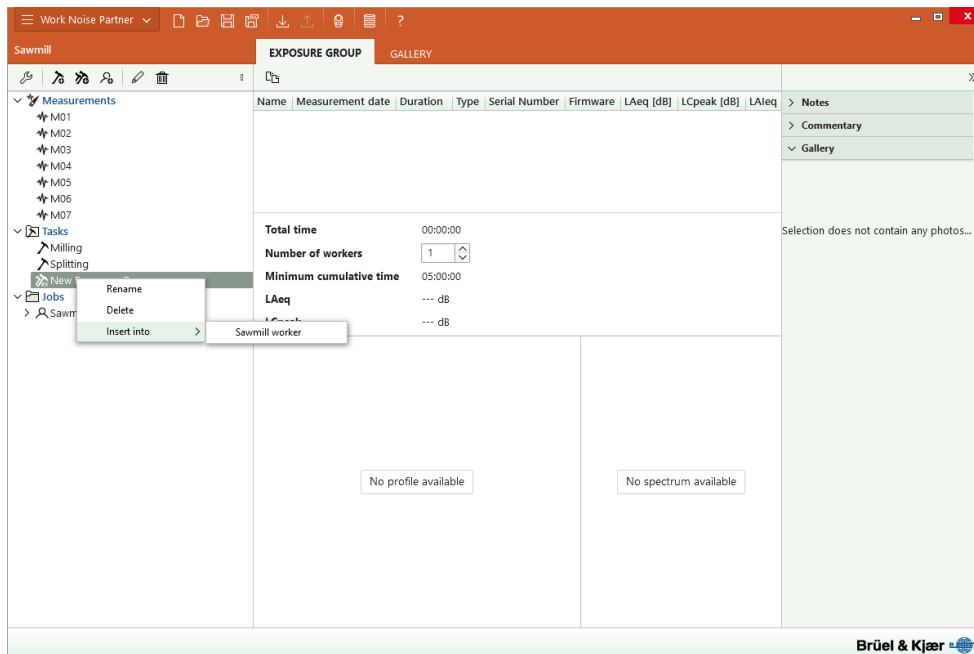
Add an exposure group

Click ⚒ in the project browser toolbar to add an exposure group to your project.

✏ **Note:** The new exposure group will be added to the Tasks folder of the project.

View an exposure group

Click on an exposure group in the project browser on the left to open the Exposure Group tab.

Add measurements to an exposure group

1. Right-click on a measurement.
2. Hover over **Insert into**.
3. Select the exposure group from the list.

💡 **Hint:** You can also drag and drop measurements into tasks and exposure groups.

Edit the number of workers in an exposure group

1. In the project browser, click on an exposure group.
2. In the Exposure group tab, use the arrows to set the number of workers in the exposure group.

✏ **Note:** Minimum cumulative time is updated automatically when you change Number of workers.

Context-sensitive menu

Right-click on an exposure group in the project browser to open the context-sensitive menu.

Rename: Give the exposure group a different name.

Delete: Remove the exposure group from the project.

Insert into: Add the exposure group to a job.

Jobs

A job is the overall occupational activity of the worker. A job includes all the tasks that a worker performs throughout their workday. Tasks and exposure groups (and their measurements) are added to jobs to calculate exposure levels for a nominal workday.

✏ **Note:** The OSHA standard does not use exposure groups for evaluating workplace noise, TWA (time-weighted average) is calculated based on tasks.
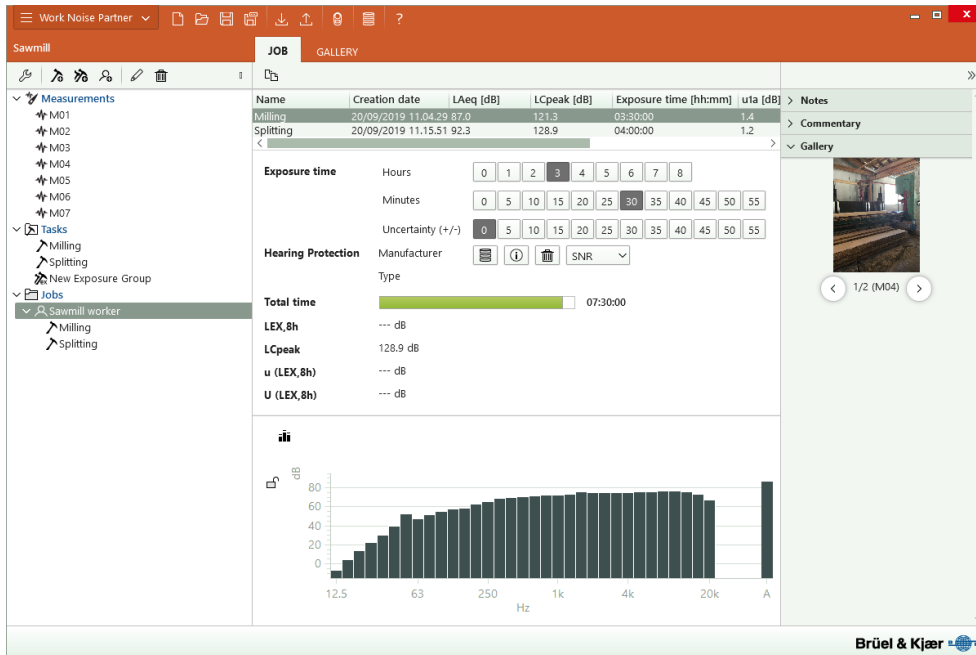
Add a job

Click in the project browser toolbar to add a job to your project.

View a job

Click on a job in the project browser on the left to open the Job tab.

Add tasks or exposure groups to a job

Work Noise Partner calculates noise exposure levels based on the exposure time of each task and exposure group (if used) that has been added to the job.

✎ **Note:** Work Noise Partner supports multiple standards. The application calculates and displays the total time as well as LEX,8h or TWA and LCpeak or LZpeak, depending on the standard you are using.

1. In the project browser, right-click on the task or exposure group you would like to add to a job.

2. Hover over **Insert into**.

3. Select the desired job from the list.

4. Set the exposure time.

   a. In the Job tab, click on a task or exposure group in the list at the top of the tab.

   b. Use the buttons below the list to set the exposure time.

      Add an uncertainty to define the exposure time as a range. For example, 4 h ± 30 min is the same as 3 h 30 min ≥ exposure time ≥ 4 h 30 min.

✎ **Note:** Calculations update automatically when you add or remove tasks and exposure groups or when you edit exposure times.

💡 **Hint:** You can also drag and drop tasks and exposure groups into jobs.

Add hearing protection to the job

1. Add hearing protection to the job.

    a. Click ▤ in the Job tab.

    b. In the dialog, select the desired hearing protection from the list on the left.

    c. Click **Select Hearing Protection**.

2. Select the method for calculating the effect of the hearing protection from the drop-down menu.

    - SNR: Single number rating

    - NRR: Noise reduction rating

    - HML: High, medium, low

    - APV: Assumed protection value

        The APV option is the octave band method (which uses APV).

About the methods

ISO 9612 requires the effect of personal protective equipment to be calculated according to standard ISO 4869-2. There are three methods you can use: octave band, HML and SNR.

In the USA, NIOSH recommends the use of NRR values.

Warning: The recommended OSHA method gives different results than the recommended NIOSH method.

Definitions

$$LAeq\prime = LAeq - PNR$$

Where:

- LAeq' is the effective A-weighted equivalent continuous noise level at the ear.

- LAeq is the measured A-weighted equivalent continuous noise level.

- PNR: Predicted noise level reduction

SNR

Use SNR if the noise is not tonal or dominated by low frequencies.

$$LAeq\prime = LCeq - SNR$$

NRR

There are different methods for calculating the effect of NRR. Work Noise Partner uses the NIOSH method:

$$TWA\prime = TWA - (NRR - 7)$$

You can also apply NRR even if your project doesn't use the OSHA standard. In that case, the effect of NRR is calculated like this:

$$LAeq\prime = LAeq - (NRR - 7)$$

HML

Use HML if the noise is tonal or dominated by low frequencies.

$$LAeq\prime = LAeq - PNR$$

PNR is calculated like this:

If	$LCeq - LAeq \leq 2$	then	$PNR = M - \frac{H-M}{4}(LCeq - LAeq - 2)$
	$LCeq - LAeq > 2$		$PNR = M - \frac{M-L}{8}(LCeq - LAeq - 2)$

Octave band

The octave band method (which uses APV) is the most accurate method. Use the octave band method if the noise is tonal. It is important to know which frequencies are most prominent in the noise environment. This helps us to select the most appropriate earplugs or earmuffs because different hearing protectors attenuate, or block, noise at different frequencies.

APV is given for each octave band.

$$LAeq\prime_i = LAeq_i - APV_i$$

$$LAeq_i = Leq_i + A_i$$

Where A_i is the A-weighting for each octave band.

View hearing protection

Click ⓘ to see hearing protection details or add the hearing protection to the database.

Delete hearing protection

Click 🗑 to remove the hearing protection from the job.

Context-sensitive menu

Right-click on a job in the project browser to open the context-sensitive menu.

Rename: Give the job a different name.

Delete: Remove the job from the project.

# Review annotations in the PC application

If you created annotations using the mobile app, you can review them in the PC application.

It is always a good idea to add annotations to your measurements. For example, they can help you and your colleagues identify measurements at a later date and provide valuable information about the context of a measurement.

Check out the gallery

You will find any photos or video that have been attached to the measurements in the project in the Gallery windows. There are two Gallery windows, one in the centre panel and one in the side panel. Both windows have similar functionality, but there are slight differences.

✎ **Note:** Videos will be identifiable by a play button

1. Select measurements in the project browser.

2. In the centre panel, click on the **Gallery** tab.

    - Tap (↺) or (↻) to rotate the file.
    - Tap ⊕, ⊖ or ⟐ to zoom.
    - Use the arrows to browse.
    - Right-click on the image to open the context sensitive menu to save a copy of the file.
    - Click on the video to play it.

3. In the side panel, click on **Gallery** to expand the window.

    - Use the arrows to browse.
    - Right-click on the image to open the context sensitive menu to save a copy of the file.
    - Click on a video to play it.

Listen to commentary

You will find any voice memos that have been attached to the measurements in the project in the Commentaries window.

1. Select measurements in the project browser.

2. Open the **Commentary** window.

3. Press the play button.

4. Use the slider to move forward or backward in the recording.

5. Click ◁ to open the volume slider.

Read notes
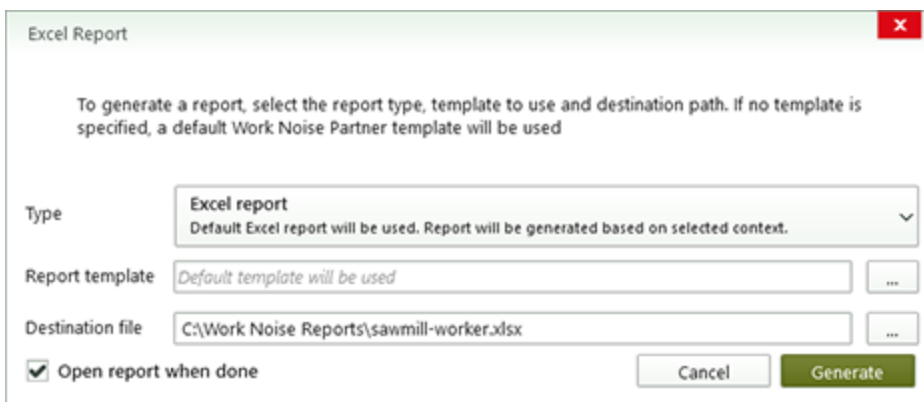
You will find any notes that have been attached to the measurements in the project in the Notes window.

1. Select measurements in the project browser.
2. Open the **Notes** window.

Export a report

A report is data that has been exported from the project to a Microsoft® Excel® workbook.

1. In the project browser, click on the job you want to export.
2. Click ⊡ to open the Excel Report dialog.

3. Choose the type of report:

   - Excel report: This is the default type of report. Data is exported to the default (or a user-defined) template.

     ✐ **Note:** Use this type of report unless you want to use your data with OMEGA.

   - OMEGA: This type of report exports data to a workbook template that is configured for use with OMEGA.

4. Edit the **Report template** field if you want to use a template other than the default template.
5. Specify the name and location of the report in the **Destination file** field.
6. Enable or disable the option to open the report when the export is done.
7. Click **Generate**.

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TERMINOLOGY

A-weighting filter	Frequency weighting corresponding approximately to the 40 dB equal loudness curve, that is to say, the human ear's response at low to medium sound levels. It is by far the most commonly applied frequency weighting and is used for all levels of sound.
B-weighting filter	Frequency weighting corresponding approximately to the 70 dB equal loudness curve, that is to say, the human ear's response at medium sound levels.
C-weighting filter	Frequency weighting corresponding to the 100 dB equal loudness curve, that is to say, the human ear's response at fairly high sound levels. Mainly used when assessing peak values of high sound pressure levels.
Decibel (dB)	The measurement unit for expressing the relative intensity of sound. A direct application of linear scales (in Pa) to the measurement of sound pressure leads to large and unwieldy numbers. As the ear responds logarithmically rather than linearly to stimuli, it is more practical to express acoustic parameters as a logarithmic ratio of the measured value to a reference value. This logarithmic ratio is called a decibel or dB. The advantage of using dB can be clearly seen in the below illustration. Here, the linear scale with its large numbers is converted into a manageable scale from 0 dB at the threshold of hearing (20 µPa) to 130 dB at the threshold of pain (~100 Pa). Our hearing covers a surprisingly wide range of sound pressures - a ratio of over a million to one. The dB scale makes the numbers manageable.
E	Sound Exposure is the energy of the A-weighted sound calculated over the measurement time. The unit is Pa^2h.
Exchange Rate	Exchange Rate is the increase in noise level that corresponds to a doubling of the noise level. ✎ **Note:** LAeq is always based on an Exchange Rate = 3.
Exposure Time	Exposure Time is the actual time that a person is exposed to noise during a workday.
Fast Max	Maximum time-weighted acceleration, velocity, displacement or voltage level measured with Linear frequency weighting and Fast time weighting. It is the highest level occurring during the measurement time.
Fast Min	Minimum time-weighted acceleration, velocity, displacement or voltage level measured with Linear frequency weighting and Fast time weighting. It is the lowest level occurring during the measurement time.
'F', 'S' or 'I' time weighting	A time weighting (sometimes called a 'time constant') defines how the exponential averaging in root-mean-square (RMS) measurement is done. It defines how heavily fluctuating sound pressure variations are smoothed or averaged to allow useful readings. The standards define three time weightings: F (Fast), S (Slow) and I (Impulse). Most measurements are carried out using the F time weighting, which uses a 125 ms time constant.

Frequency	The number of pressure variations per second. Frequency is measured in hertz (Hz). The normal hearing for a healthy young person ranges from approximately 20 Hz to 20000 Hz (20 kHz).
Frequency weighting	Our hearing is less sensitive at very low and very high frequencies. In order to account for this, weighting filters can be applied when measuring sound. The most commonly used weighting is the 'A-weighting', which approximates the human ear's response to low - medium noise levels. A 'C-weighting' curve is also used, particularly when evaluating very loud or low-frequency sounds.
LAE	Sound Exposure Level - sometimes abbreviated SEL and sometimes called Single Event Level, is the Sound Exposure expressed as a level. The letter 'A' denotes that the A-weighting has been included.
LAeq	A widely used noise parameter that calculates a constant level of noise with the same energy content as the varying acoustic noise signal being measured. The letter 'A' denotes that the A-weighting has been included and 'eq' indicates that an equivalent level has been calculated. Hence, LAeq is the A-weighted equivalent continuous noise level.
LAF	The instantaneous time-weighted sound level, Lp, is available at any time. 'A' denotes that the A-frequency weighting is used. 'F' denotes that the Fast time-weighting is used.
LAFmax	Maximum time-weighted sound level measured with A-frequency weighting and Fast time weighting. It is the highest level of environmental noise occurring during the measurement time. It is often used in conjunction with another noise parameter (for example LAeq) to ensure a single noise event does not exceed a limit.
LAFmin	Minimum time-weighted sound level measured with A-frequency weighting and Fast time weighting. It is the lowest level of environmental noise occurring during the measurement time (time resolution is 1 s).
LA90.0	The noise level exceeded for 90% of the measurement period with A-frequency weighting. The level is based on statistical analysis of LAeq sampled at 1 s intervals into 0.2 dB wide classes. The percentage is user-definable.
LAF(SPL)	The Sound pressure Level (maximum time-weighted sound level during the latest second) is available at any time. 'A' denotes that the A frequency weighting is used. 'F' denotes that the Fast time-weighting is used.
LCpeak	Maximum peak sound level during a measurement. 'C' denotes that the C frequency weighting is used. Used for assessing possible damages to human hearing caused by very high short-duration noise levels.
LCpeak,1s	Maximum peak sound level during the latest second - is available at any time. 'C' denotes that the C frequency weighting is used. Used for monitoring the peak levels.
Linear Weighting	'Linear' frequency weighting is without any frequency weighting, that is, equivalent to LIN, Z or FLAT.

Linear	Time-averaged (RMS) weighted acceleration (or voltage) value, averaged over the entire measurement period with frequency weighting Linear.
Loudness	Loudness is the subjective judgement of intensity of a sound by humans. Loudness depends upon the sound pressure and frequency of the stimulus and whether the sound field is diffuse- or free-field. The unit is the sone. The Zwicker method of calculation of stationary loudness based on 1/3-octave measurements is described in ISO 532 - 1975, Method B.
Loudness Level	Loudness Level = 10*log2(Loudness) + 40. The unit is the phon.
Overload	When the broadband sound level is above the measuring range of the instrument. The light ring will flash red quickly for intermittent overloads and will be solid purple for latched overloads.
Peak	Maximum peak of the acceleration, velocity, displacement signal or voltage input with frequency weighting Linear.
Peak-peak	The real peak-to-peak value (difference between the most positive value of the signal and the most negative value of the signal). Available for Displacement only.
Sound	Any pressure variation that the human ear can detect. Just like dominoes, a wave motion is set off when an element sets the nearest particle of air into motion. This motion gradually spreads to adjacent air particles further away from the source. Depending on the medium, sound extends and affects a greater area (propagates) at different speeds. In air, sound propagates at a speed of approximately 340 m/s. In liquids and solids, the propagation velocity is greater - 1500 m/s in water and 5000 m/s in steel.
Sound level or sound pressure level	The level in decibels of the pressure variation of a sound. See also decibel.
TCpeak	The time when the peak sound level occurred. 'C' denotes that the C frequency weighting is used.
Threshold Level	Any sound levels below the threshold level do not contribute to the Dose measurement data. For example, if you set the threshold level to 80, any sound levels below 80 dB are not taking into consideration by the analyzer, when it calculates doses and time weighted averages.
TWA	The Time Weighted Average is the average A-weighted sound level for a nominal 8-hour working day with Time Weighting S and Exchange Rate 5. TWA is calculated from the measured LavS5 (taking Threshold Level into account) and a Reference time of 8 h. Mainly used in the USA for assessing the noise exposure for a worker during a working day.
Underrange	When the broadband sound level is below the measuring range of the instrument. Underrange is only indicated on the screen; no underrange information is saved with the final result of the measurement.
Z-weighting	'Zero' frequency weighting is without any frequency weighting, that is, equivalent to Linear, LIN or FLAT.