HBK HOTTINGER BRÜEL & KJÆR



B&K 2245 and HBK 2255 with Noise Partner

User Guide

for Version 1.8.1

BN 2376–21

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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
- **Building Acoustics Partner** for testing sound insulation in buildings

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



The mobile app connects with the instrument to act as a remote control, and it enables you to document the measurement with photos, videos, notes and commentaries using the functionality of your mobile device. Once you have made a measurement, you will use the PC application to view and process data, and report your findings.

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 (ISO 3744, ISO 3746 and EN 71-1).

- 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

B&K 2245

The instrument measures **sound level meter** parameters (Leq, 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.

✎ **Note:** Licence BZ-7304 (Exhaust Noise Partner) enables basic parameters (Lmax and Lmin) with one frequency weighting (A) and time weightings (F, S or I).

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

HBK 2255

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

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

Standards

Menu location: **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, which enables you to control the instrument as though you have it in your hand. The mobile app allows you to start, stop and pause measurements from a distance, to avoid measuring unwanted sounds. The mobile app also makes it easier to change settings and interact with the measurement data. Last, the mobile app enables you to fully document your measurements with photos, video, written notes and commentary. It is recommended that you use the mobile app whenever possible.

Functionality of the mobile version of Noise Partner:

- See the status of the instrument and access instrument settings.
- Set up the instrument for measuring.
- Control the instrument remotely (make measurements).
- View measurements.
- Annotate measurements (add photos, videos, notes and commentary).
- Add location and time to annotations (via the iOS mobile device).
- Share measurements via the cloud.
- Recall past data stored on the instrument.

✎ **Note:** If you have additional licences installed (and enabled) on your instrument, Noise Partner is able to reflect certain functionality of the other licences. However, the help for Noise Partner only includes information for licence BZ-7300 (Noise Partner).

About the PC application

Functionality of the PC version of Noise Partner:

- View measurements and annotations.
- Create projects from measurements stored on the instrument.
- Add measurements stored on the instrument to an existing project.
- Share projects via the cloud.
- Export projects to another file format (for sharing or reporting).
- View measurement and annotation locations on a map.
- Preview and create reports.

System requirements

The mobile app

- iOS-based phone or tablet

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

The PC application

System Requirements:

- Windows® 10 or 11 (64-bit) operating system
- Microsoft® .NET 6 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

Standard warranty

B&K 2245 has a two-year warranty that is valid from the delivery of the product.

HBK 2255 has a two-year warranty that is valid from the delivery of the product.

Updates

Instrument

Update firmware and install new licences over the Internet.

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

   See Join your local network 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.
- Any new languages are installed with the update of the firmware.

Applications

Updates are handled via the application.

Services

Visit www.hbkworld.com/en/services-support for information about available services.

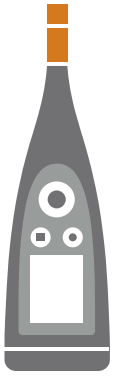
- Extended warranty contracts for hardware
- Hardware maintenance and repair
- Support and calibration services

Contact information

Visit www.hbkworld.com/en/contact-us for links to find your local HBM, BKSV (Brüel & Kjær), nCode or ReliaSoft office.

THE INSTRUMENT

Hardware interface



The **microphone** and **preamplifier** are at the top of the instrument.

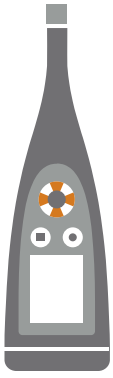
B&K 2245 has a removable microphone cartridge and a built-in microphone preamplifier.

HBK 2255 has a removable microphone preamplifier and supports TEDS (transducer electronic data sheet).



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 / parameters and **navigate** the menu.

Press ▲ and ▼ briefly to scroll through measurement displays.

Press ◄ and ► briefly to scroll through the parameters for each display.



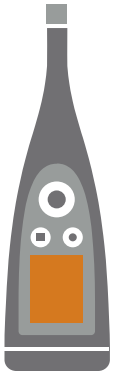
■ is the **stop/reset** button.

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.

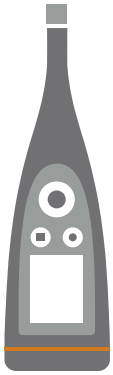


◉ is the **start/pause** button.

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.

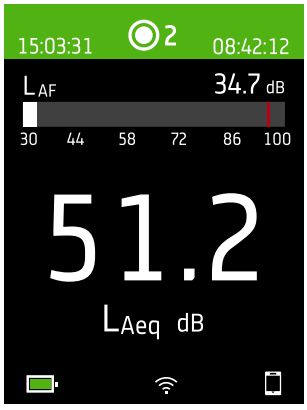
The light ring flashes **white** slowly when switched off and charging the battery.

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



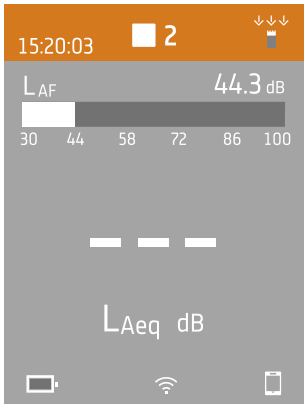
On the base of the instrument is a **threaded hole** for mounting the instrument on a tripod and a **USB-C™ socket**. Use the USB socket as a connector or as signal output.

Instrument GUI

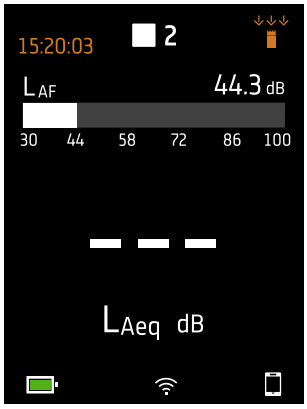


This is an example of the instrument graphical user interface (GUI) in dark colour scheme while measuring and connected to the mobile app.

Hint: You can view the GUI in a web browser via the instrument's IP address. See Web server display 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).

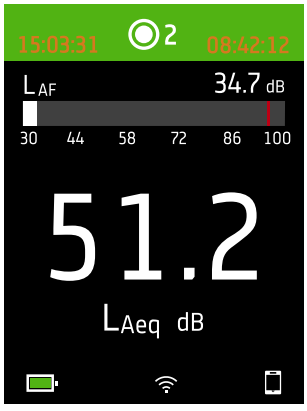
: Indicates that the clock is estimated to be more than 2 s wrong.

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

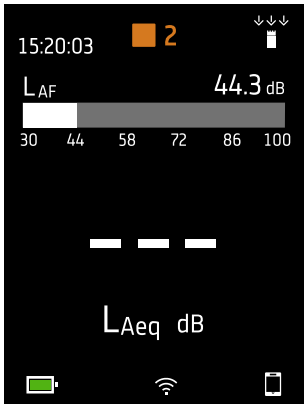
: Indicates that Sound field is set to Free-field and there is a windscreen.

: 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.

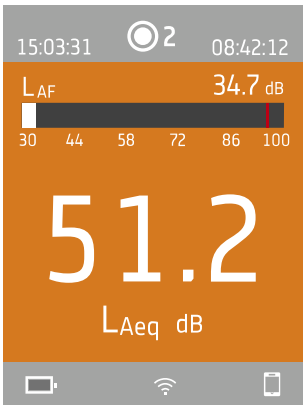
The background colour of the top region and the centre symbol change to indicate the state of the instrument.

: Indicates that the instrument is ready to measure.

: Indicates that the instrument is measuring.

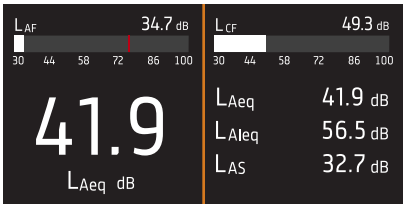
: Indicates that the instrument is paused.

: Indicates that the instrument is stopped and displaying results from the measurement.

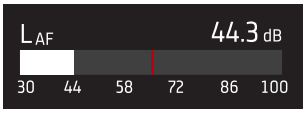


In the middle is the measurement display. There are views for broadband parameters (SLM view and List view) and a view for information about your data (About data view).

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.

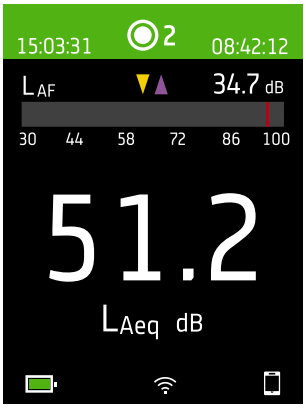


The bar graph shows the instantaneous sound level (L) with frequency and time weightings. This display is sometimes called the fast bar or fast display.

| : 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.



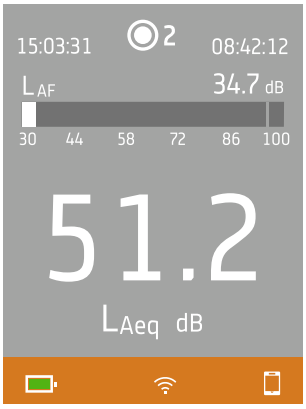
For very low or very high sound levels, you will see indicators.

▼ : 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.

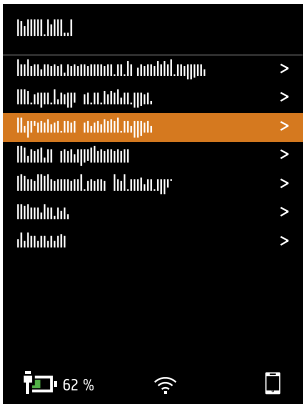
The battery icons show the status of the battery. For example, (charging) or (full).

The network icons show the current network settings and its status. For example, (connected to a wireless network), (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 or BK2255-000000) 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.

Water ingress

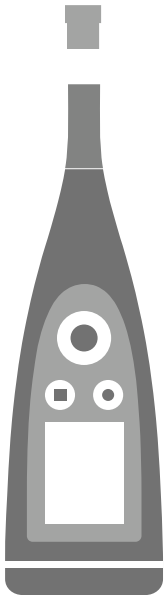
IP rating

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 **Noise Partner** > **Information** > **Compatibility**.

Procedure:

1. Go to the App Store.
2. Search for and install 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® 10 or 11 (64-bit) operating system
- Microsoft® .NET 6 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 and HBK 2255 Software, Manuals and Compliance Information**.
3. Click **B&K 2245 and HBK 2255 Software Downloads**.
4. Scroll down to the application.
5. Click **Install 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 or BK2255-000000) and password.
4. Connect your device 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. From the instrument list, tap +.

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

   c. Enter the IP address or host name.

      - 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.

   d. Tap **Done**.

   e. Tap the instrument listing to 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. From the instrument list, tap .

   Note: If the mobile app is connected to an instrument, disconnect from it to access the list.
3. 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::].
4. Tap **Done**.
5. Tap the instrument listing to 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 via HTTP

If you are unable to connect to instruments remotely, there is a setting in the application menu which allows you to connect to instruments via HTTP instead of HTTPS. HTTP does not have the certificate requirements of HTTPS, which can cause problems with security features like firewalls. See Application menu for information about where to find the setting.

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.

   A list of detected instruments sorted by nickname, type and serial number opens.
3. 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!
4. 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.
5. 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.

Note: Remember that measurement data is stored on the instrument. If measurement data is no longer being displayed after separation, tap on the mobile app to open the list of past measurements and recall the desired measurement.

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 .
2. Enter the IP address or host name.

   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 for information about which IP address or host name to use.
3. Tap **Done**.

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. In the mobile app, tap to open the instrument menu.
2. Tap the instrument.



3. Tap **Disconnect**.

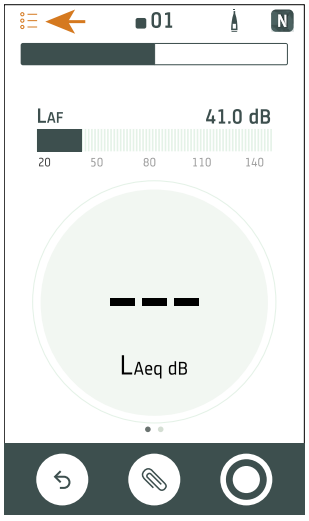
Note: If you disconnect the instrument from the mobile app, the app will still discover the instrument.

Troubleshooting connection problems

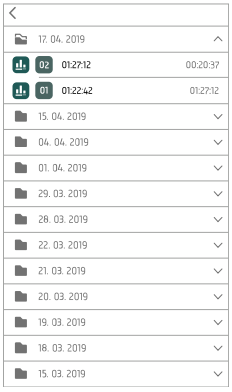
- Check that the instrument is set to act as a hotspot (**System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**).
- Check that the instrument is generating a hotspot, it will show .
- Check that Wi-Fi is enabled on the mobile device.
- Make sure that the two devices are within 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.

Mobile app GUI

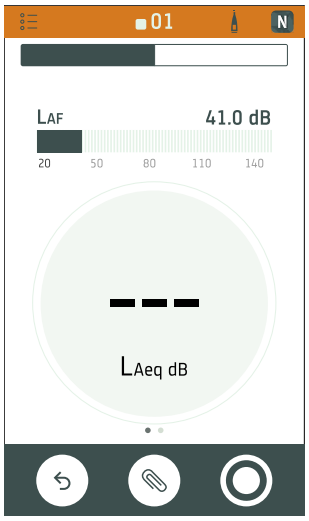
Note: If the mobile app and the instrument are not set to display the same language, text in the graphical user interface (GUI) of the mobile app will be in two languages.



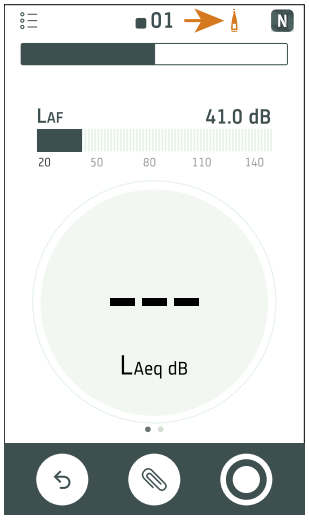
Tap to view a list of the measurements stored on the instrument.



The folders are organized by date, and each folder contains the measurements taken that day. Tap on a folder to expand its contents then tap on a measurement to open it.

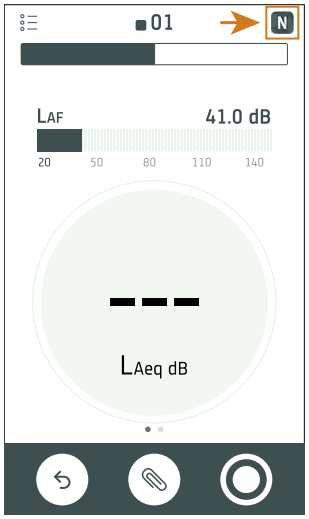


The mobile app displays the same colour, status icon and measurement number as the instrument.

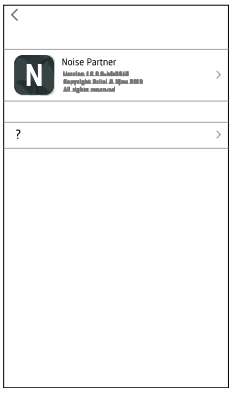


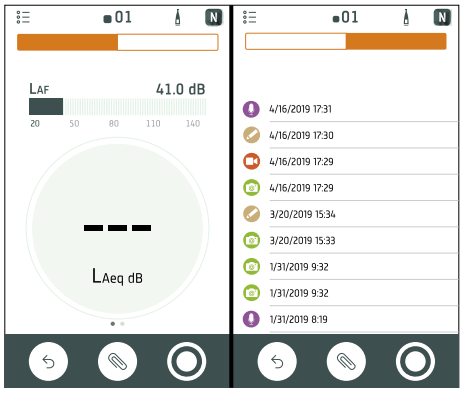
Tap to open the Setup screen. Open the Setup screen to access instrument settings and view status information about the instrument. You can edit many of the instrument settings using the mobile app.

The icon also gives status information. means there is no connection between the instrument and the mobile app. means that the wireless signal is weak. means data is being uploaded to the instrument.

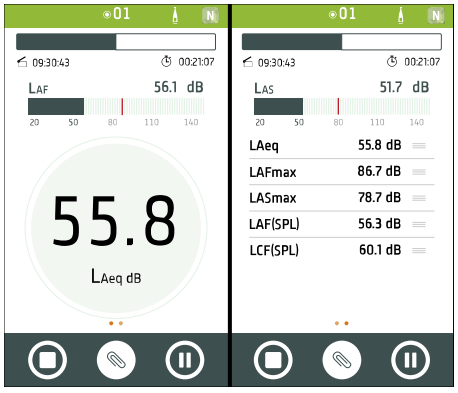


Tap N to access information about the mobile app and help.



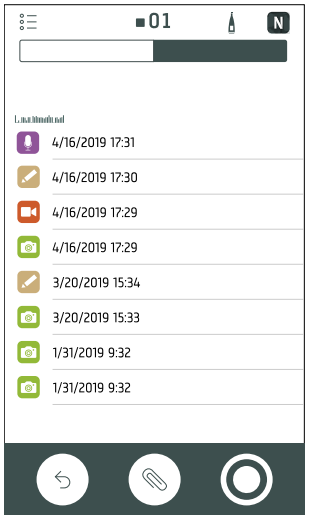


Use the navigation bar to change between **Total** (left) and **Annotations** (right).



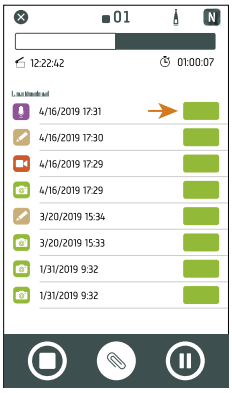
Total displays instantaneous parameters and parameters that are calculated for the total measurement time. It is the main display for single measurements. SLM view (left) shows an instantaneous broadband parameter (bar graph) and one calculated broadband parameter. List view (right) shows an instantaneous broadband parameter (bar graph) and a list of calculated broadband parameters. Each view contains a unique bar graph.

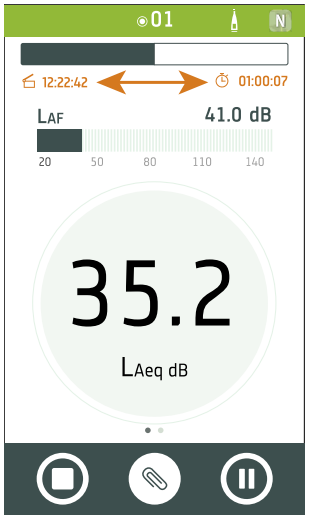
Swipe left or right to switch between views. Tap on a parameter to change the parameter being displayed. Tap and drag ≡ to move items in the list.



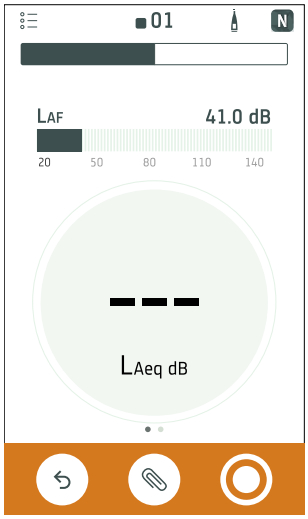
Annotations is the list of annotations.

Tap an annotation to review it. Swipe left on an annotation to delete it. While measuring or reviewing a measurement, tap **Attach** to add an unattached annotation to the measurement.





During a measurement, the mobile app shows the measurement start time (🖋) and the measurement duration time (⏱).



Tap to reset the instrument for the next measurement.

Tap to open the annotation menu.



Tap to start a measurement.

During a measurement, slide to the right to stop or slide to the left to pause.

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:

- 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 How to connect for more information.
3. Tap .

Setup mode

HBK 2255 can be used for very different purposes: general sound level measurements, environmental measurements, building acoustics measurements and calculations, and measurements at very low frequencies. To handle such different applications and to make it easier to set up and use the instrument, HBK 2255 has different setup modes. The Setup mode setting filters the instrument settings to provide a dedicated user interface for the different types of applications. It is important to check that the setup mode of the instrument matches the type of measurement you will preform.

Note:

- The Setup mode setting is not available on B&K 2245 because it only handles basic sound level meter applications.
- The functionality of your instrument will depend on the licences installed and enabled on your instrument, which affects the setup modes available on your instrument.
- In some cases, you may be prompted to change the setup mode when connecting to the mobile app.

Menu location: **Measurement settings** > **Setup mode**

About the setup modes

Below is a short description of all the Setup mode options for HBK 2255.

SLM

The SLM setup mode is used for most measurements within the normal human range of hearing in both level and frequency..

Infrasound

The Infrasound setting is for measurements at very low frequencies using Microphone Type 4964. In this mode, 1/3-octave frequency analysis is extended down to the 0.8 Hz band (1 Hz for 1/1-octave analysis) and the G frequency weighting is selectable. Infrasound functionality requires the BZ-7452 licence to be installed and enabled on your instrument.

Building acoustics

The Building acoustics setting is for testing sound insulation: measurements of sound pressure levels in the source and receiving rooms as well as the measurement, calculation and display of reverberation time in the receiving room. The building acoustics functionality requires the BZ-7350 licence to be installed and enabled on your 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

The Microphone setting tells the instrument which microphone is attached. The microphones in the microphone database populate the options for the Microphone setting. See Microphone database for more information about the database.

B&K 2245 has a built-in preamplifier and 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. If you change the microphone cartridge, you will need to change the Microphone setting.

HBK 2255 is designed to be used with different combinations of microphone cartridges and microphone preamplifiers, which enables the instrument to perform a variety of applications. HBK 2255 uses TEDS (transducer electronic data

sheet) to set the attached microphone cartridge/preamplifier pair automatically. If you change the microphone cartridge/preamplifier pair, the instrument will change the Microphone setting according to the TEDS information of the new pair. See TEDS, Microphones and HBK 2255 for more information about TEDS, supported microphone cartridges and preamplifiers, and how it works with HBK 2255.

✎ **Note:** If you are using a single microphone preamplifier with multiple microphone cartridges, check that the Microphone setting is correct. By default, the instrument selects the first microphone cartridge/preamplifier pair with the correct preamplifier for the Microphone setting.

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**.

Frequency range

HBK 2255 has a few options for extending the lower limit of the frequency range of your measurements. The options available will vary according to the licences installed and enabled on your instrument.

	Normal	Extended	Very low
1/3-octave	12.5 Hz to 20 kHz	6.3 Hz to 20 kHz	0.8 Hz to 20 kHz
1/1-octave	16 Hz to 16 kHz	8 Hz to 16 kHz	1 Hz to 16 kHz

✎ **Note:** The usable lower frequency will be limited by the specifications of the attached microphone.

TEDS, Microphones and HBK 2255

TEDS

HBK 2255 uses TEDS (transducer electronic data sheet) to detect the attached microphone (microphone cartridge/preamplifier pair), add new microphones to the microphone database and set the attached microphone as the input. If the TEDS information changes (that is, if you change the microphone), the instrument changes its configuration accordingly. The instrument performs all of these tasks automatically, which makes it very easy to change microphones on HBK 2255.

TEDS scenarios

For preamplifiers with a built-in TEDS chip, the chip contains information about the microphone preamplifier, and in some cases, the microphone cartridge as well. The instrument supports three TEDS scenarios using three different templates. The templates are standardized in compliance with IEEE 1454.4.

- **Microphone preamplifier**: TEDS describes the preamplifier (serial number and some characteristics).
- **Microphone with integrated preamplifier**: TEDS describes the microphone preamplifier and microphone cartridge as one unit, with one serial number and one sensitivity.
- **Combined microphone cartridge and preamplifier**: TEDS describes a microphone preamplifier with one serial number and a microphone cartridge with another serial number, but a single sensitivity (the sensitivity of the system).

The information the instrument enters in the microphone database depends on the TEDS scenario of the attached microphone (microphone cartridge/preamplifier pair). See Microphone database for more information about the database.

Microphones supported by HBK 2255

Below is a list of all Brüel & Kjær microphone cartridges, microphone preamplifiers, and microphone cartridge/preamplifier combinations which can be used with HBK 2255.

Microphone preamplifiers	• 1/2-inch Microphone Preamplifier Type 2669 • 1/4-inch Microphone Preamplifier Type 2670 • 1/2-inch Microphone Preamplifier ZC-0043 (with 1/2-inch to 1/4-inch adapter for use with 1/4-inch Microphone Types 4954 and 4944)
Microphone with integrated preamplifier	• Outdoor Microphone Type 4952 (integrated preamplifier)

Combined microphone cartridge and preamplifier	Standard combinations for HBK 2255 using Preamplifier ZC-0043: • Type 4966-Z-041: 1/2-inch Microphone Cartridge Type 4966 + ZC-0043 • Type 4964-Z-041: 1/2-inch Microphone Cartridge Type 4964 + ZC-0043 • Type 4954-Z-047: 1/4-inch Microphone Cartridge Type 4954 + Adapter UA-0056 + ZC-0043 • Type 4944-Z-047: 1/4-inch Microphone Cartridge Type 4944 + Adapter UA-0056 + ZC-0043 ✎ **Note:** The microphone cartridge, preamplifier and adapter (if used) are sealed with tape. Calibration is void if the seal is broken.
Microphone cartridges Microphone cartridges do not have built-in TEDS. Microphone cartridges may be used with one of the supported (known) preamplifiers or an unknown preamplifier.	Microphone cartridges treated as known: • 1/2-inch Microphone Cartridge Type 4966 • 1/2-inch Microphone Cartridge Type 4964 • 1/4-inch Microphone Cartridge Type 4954 • 1/4-inch Microphone Cartridge Type 4944 Microphone cartridges treated as unknown: • 1/2-inch Microphone Cartridge Type 4188 • 1/2-inch Microphone Cartridge Type 4189 • 1/2-inch Microphone Cartridge Type 4942 • Outdoor Microphone Type 4198 (includes Preamplifier Type 2669-C)

Microphone usage scenarios

Using a standard combination

Standard microphone combinations are set up for use with the instrument prior to delivery. When you detach and reattach the combination, the instrument reads the TEDS information and recognizes the attached microphone as a microphone in the microphone database. The instrument sets the attached microphone as the input, and you are ready to measure.

Using Type 4952

The instrument comes with a standard microphone. In addition, you purchase Type 4952 for use with the instrument. The first time you attach Type 4952 to the instrument, the instrument reads the TEDS information but does not recognize the attached microphone because it is not in the microphone database. The instrument adds a new microphone to the database using TEDS. The instrument sets the attached microphone as the input, and you are ready to measure.

Using a new preamplifier with TEDS

You attach a microphone preamplifier that has not been connected to the instrument before. The instrument reads the TEDS information in the preamplifier and adds a new microphone cartridge/preamplifier pair to the microphone database. The new microphone consists of an unknown microphone cartridge with serial number 0 together with the preamplifier and its serial number. You can manually edit the microphone cartridge in the database as needed. See Microphone database for more information about editing the database.

Using one microphone preamplifier with multiple cartridges

Each microphone cartridge/preamplifier pair must be set up in the microphone database. When you attach a microphone to the instrument, the preamplifier will be recognized in more than one microphone cartridge/preamplifier pair. By default, the instrument selects the first microphone cartridge/preamplifier pair with the correct preamplifier for the Microphone setting. You will need to manually change the Microphone setting if the default selection is not correct.

Microphone database

The microphone database populates the list of options in the dialog box of the Microphone setting. Initially, the database only contains the microphone supplied with the instrument.

You can only access the microphone database on the instrument: **Menu** > **System settings** > **Advanced settings**.

B&K 2245 has a built-in microphone preamplifier, but you can use different microphone cartridges with the instrument. To use a different microphone cartridge with the instrument, you will first need to add the microphone cartridge to the microphone database. The microphone database stores the type and serial number, sensitivity and sound field for individual microphone cartridges.

HBK 2255 has a detachable microphone preamplifier. The instrument can be used with different combinations of microphone cartridges and microphone preamplifiers. The instrument uses TEDS to detect the attached microphone and add new microphones to the microphone database. The microphone database stores the type and serial number, sensitivity and sound field for each microphone cartridge along with the type and serial number of its associated microphone preamplifier to create a microphone cartridge/preamplifier pair. If TEDS only contains information about the microphone preamplifier, you can edit the information about the microphone cartridge in the microphone database. If TEDS contains information about the microphone cartridge/preamplifier pair, it is not possible to edit information about the microphone cartridge or preamplifier in the microphone database.

For more information about TEDS and HBK 2255, see TEDS, Microphones and HBK 2255.

Known vs unknown microphones

Known microphone cartridges and preamplifiers are microphone cartridges and preamplifiers that the instrument recognizes.

B&K 2245 recognizes 1/2-inch Microphone Cartridge Type 4966.

HBK 2255 recognizes all microphone cartridges and preamplifiers listed in the table below.

Standard microphone combinations for HBK 2255	• Type 4966-Z-041: 1/2-inch Microphone Cartridge Type 4966 + Preamplifier ZC-0043 • Type 4964-Z-041: 1/2-inch Microphone Cartridge Type 4964 + Preamplifier ZC-0043 • Type 4954-Z-047: 1/4-inch Microphone Cartridge Type 4954 + Adapter UA-0056 + Preamplifier ZC-0043 • Type 4944-Z-047: 1/4-inch Microphone Cartridge Type 4944 + Adapter UA-0056 + Preamplifier ZC-0043
Microphone (with integrated preamplifier)	• Outdoor Microphone Type 4952
Microphone preamplifiers	• 1/2-inch Microphone Preamplifier Type 2669 • 1/4-inch Microphone Preamplifier Type 2670 • 1/2-inch Microphone Preamplifier ZC-0043 (with 1/2-inch to 1/4-inch adapter for use with 1/4-inch Microphone Types 4954 and 4944)

All microphone cartridges and preamplifiers that the instrument does not recognise are unknown.

While it is possible to use unknown microphones with the instrument, known microphones enhance the functionality of the instrument. For example, the instrument will not apply any filter corrections for unknown microphones.

How to edit the microphone database

1. Press briefly to open the menu.
2. Go to: **System settings** > **Advanced settings**.
3. Enable **Service mode**.
4. Go to: **Microphones**.
5. Select a microphone in the list and choose an action:
   - *Edit*: Opens the microphone in the database so you can make changes to its type, serial number, sensitivity and sound field.
   - *Delete*: Deletes the microphone from the database.
   - *Create new*: Creates a copy of the selected microphone which you can edit as needed.
   - *Select*: Sets the microphone as the microphone attached to the instrument.

Note:

- You cannot delete the microphone that the instrument is currently set to use.
- For HBK 2255, the ability to edit or delete microphones in the database depends on the TEDS scenario which applies to the attached microphone/preamplifier pair. If TEDS only contains information about the microphone preamplifier, it is possible to edit information about the microphone cartridge and/or delete the microphone. If TEDS contains information about the microphone cartridge/preamplifier pair, it is not possible to edit or delete the microphone. See TEDS, Microphones and HBK 2255 for more information about TEDS scenarios.

Measurement control

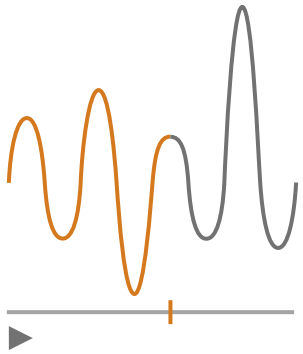
Measurement control settings specify how your measurements will run.

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

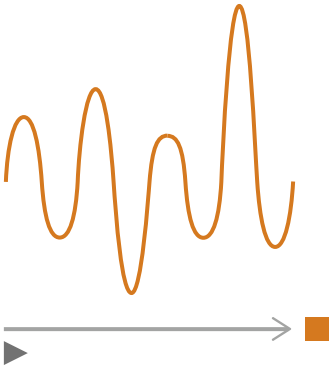
Measurement time

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

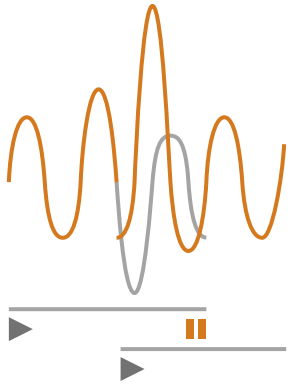
This setting controls the amount of time for which the instrument will measure when **Measurement time** is set to *Preset*.

Back-erase mode

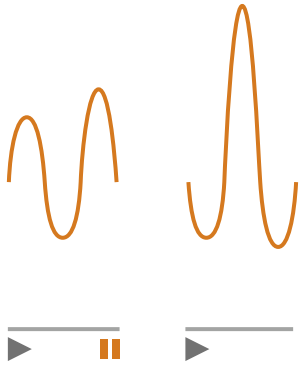
This setting determines what happens when you resume a paused measurement.

Hint: You can change these settings while a measurement is paused.

- *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, Lmax, Lmin, etc.) with frequency weightings and time weightings (F, S or I).

B&K 2245 has frequency weightings A, B, C and Z. The instrument can make measurements with up to two frequency weightings simultaneously.

HBK 2255 has frequency weightings A, B, C, and Z. The instrument can make measurements with up to three frequency weightings simultaneously. If the BZ-7452 licence is installed and enabled on HBK 2255, the instrument will also have frequency weighting G.

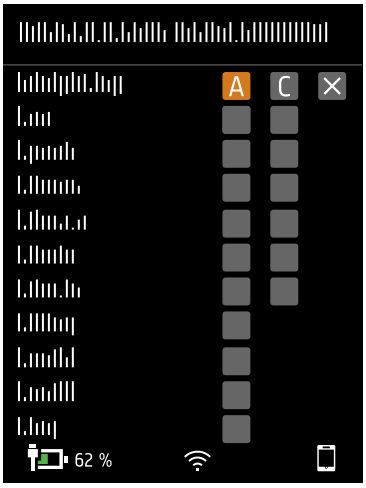
✎ **Note:** HBK 2255 filters the number of frequency weightings and the available frequency weightings according to theSetup mode setting.

✎ **Note:** Licence BZ-7304 (Exhaust Noise Partner) enables basic parameters (Lmax and Lmin) with one frequency weighting (A) and time weightings (F, S or I).

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

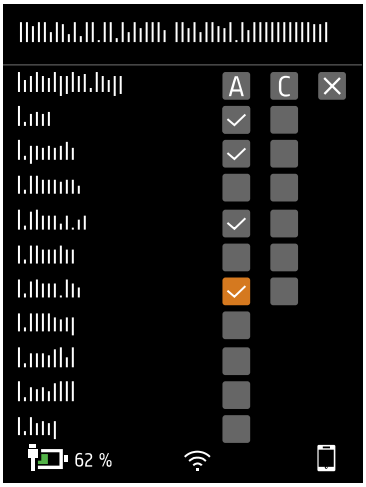
How to set up broadband parameters using the instrument

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 can measure broadband parameters with multiple simultaneous frequency weightings, 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 About frequency weightings 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 About parameters and About time weightings for more information.

   c. Tap **Back**.
4. Repeat the process for each frequency weighting.
5. Tap **Done** to return to the measurement screen 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.

Peak levels

- **Lpeak** = peak sound level

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

  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.

✎ **Note:** If you are measuring to a standard, check if the standard defines which time weighting to use.

- **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, or to measure sounds that have a lot of transients (changes).

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

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

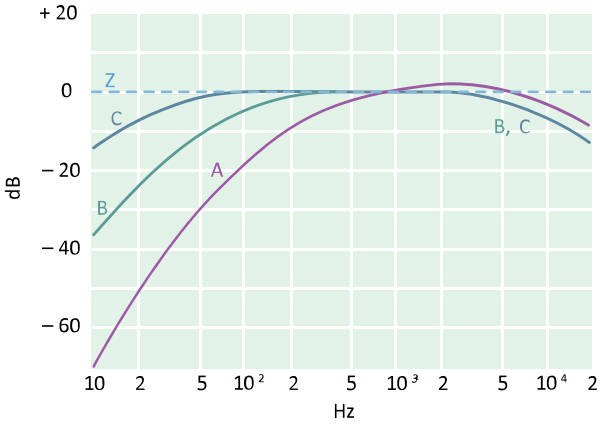
  The relatively slow rise and decay of this time weighting means it will smooth the variations in the acoustic signal. You can use this weighting to measure sounds that fade slowly, such as a bell toll, or to measure sounds that are fairly constant.

- **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	L**A**eq	L**B**eq	L**C**eq	L**Z**eq
Lpeak	L**A**peak	L**B**peak	L**C**peak	L**Z**peak
LFmax	L**A**Fmax	L**B**Fmax	L**C**Fmax	L**Z**Fmax
LSmax	L**A**Smax	L**B**Smax	L**C**Smax	L**Z**Smax
LFmin	L**A**Fmin	L**B**Fmin	L**C**Fmin	L**Z**Fmin
LSmin	L**A**Smin	L**B**Smin	L**C**Smin	L**Z**Smin
LIeq	L**A**Ieq			
LImax	L**A**Imax			
Lpeak,1s	L**A**peak,1s	L**B**peak,1s	L**C**peak,1s	L**Z**peak,1s
LF	L**A**F	L**B**F	L**C**F	L**Z**F
LS	L**A**S	L**B**S	L**C**S	L**Z**S
LF(SPL)	L**A**F(SPL)	L**B**F(SPL)	L**C**F(SPL)	L**Z**F(SPL)
LS(SPL)	L**A**S(SPL)	L**B**S(SPL)	L**C**S(SPL)	L**Z**S(SPL)

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).

The SLM view displays the readout of a single broadband parameter level in a large font so it is easy to see. Use the display when you only want to view a single parameter.

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.

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)

  The Graph parameter setting defines the parameter for the bar graph; that is, the instantaneous (or fast) display of instantaneous sound levels.

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

  Together, the Graph max level and Graph min level settings 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)

  The Parameter setting defines the parameter to display in the area below the bar graph.

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

  The Parameter settings define the parameters to display as a list below the bar graph. The instrument can display up to three parameters. Choose *None* to leave a list item blank.

- **Display**

  The Display setting allows you to enable or disable each type of 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

The Regional settings group controls settings that often vary by your geographical location: language, date, time, numerical formats and measurement units.

Menu location: **System settings** > **Regional settings**.

Language

Choose the language of the user interface of the instrument.

✎ **Note:**

- If the mobile app and the instrument are not set to display the same language, text in the graphical user interface (GUI) of the mobile app will be in two languages.
- Access the settings on your mobile device to set your language preference for the device, or to set your language preference for the app.

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 and places

Choose the decimal separator: decimal comma or decimal point.

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

Measurement units: Wind speed, temperature and dimensions

HBK 2255 works with weather station kits MM-0316-A and MM-0256-A, which are based on Vaisala weather stations.

The measurement unit settings allow you to choose your preferred measurement unit for wind speed, temperature and dimensions.

- SI = metric system
- US/UK = imperial system

Note: Wind speed and temperature data requires a weather station. See External devices for more information.

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.

Menu location: **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 and Remote connections 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 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 **Password**.
2. Use the keypad to enter a new password.
3. Tap **Done**.

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**.

External devices

For HBK 2255, the External devices setting includes settings that allow you to output the analog signal and to connect the instrument to a weather station.

See Voltage output for information about how to output the analog signal.

Menu location: **System settings** > **External devices**

Weather station

The atmospheric conditions, such as humidity and wind speed, in which measurements are made are an essential part of environmental measurements.

HBK 2255 works with weather station kits MM-0316-A and MM-0256-A, which are based on Vaisala weather stations.

- MM-0316-A measures wind speed and wind direction.
- MM-0256-A measures wind speed, wind direction, ambient temperature, ambient pressure, relative humidity and rainfall.

MM-0316-A and MM-0256-A connect to the instrument using either a wired or a wireless connection.

- Wired: USB Adapter ZH-0698 and a USB-C to USB-A female adapter
- Wireless: via Bluetooth®

Set **Weather station** = *Vaisala* if you have connected a weather station to the instrument.

The measured weather parameters are saved with data and displayed together with the broadband parameters.

See Regional settings for information about how to set the measurement unit for wind speed, temperature and dimensions.

Voltage output

The Voltage output setting allows you to output the analog signal through the USB-C™ socket on the bottom of the instrument. To output the signal requires an output cable. One option is the AO-0846 cable, which has a stereo-mini plug for connecting headphones.

How to output the analog signal

1. Select the analog signal to output.

   For B&K 2245, go to **Menu** > **System settings** > **Voltage output** > **Source**.

   For HBK 2255, go to **Menu** > **System settings** > **External devices** > **Voltage output**.

   - *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.

   Note:

   - *X* = the frequency weighting.
   - The frequency weightings available correspond to the parameters that the instrument is set to measure.
2. Attach the output cable to the instrument.
3. Start a measurement.

Metadata

Metadata is information which describes data in the context of the measurement process and helps you to make sense of your data. The instrument automatically stores information about the data it collects, such as the date and time of each measurement, the measurement number, the microphone used, and the GPS coordinates (if enabled).

For HBK 2255, the Metadata setting allows you to create custom metadata. Custom metadata is stored with the measurement and supported in the Enviro Noise Partner and Building Acoustics Partner PC applications. If you export your measurement data from the PC application, the export file includes the custom metadata.

Menu location: **Metadata**

How to create custom metadata

To use custom metadata on your measurements, you will need to create metadata before you start to measure. There are 9 metadata on the instrument, numbered from 1 to 9.

1. Enable metadata collectively (as a whole).
    a. Go to: **Metadata** > **Metadata**.
    b. Select *Enabled*.
2. Enable metadata individually (one by one).
    a. For example, go to **Metadata 1** > **Metadata 1**.
    b. Select *Enabled*.

    Once a metadata is enabled, you will be able to edit it.
3. Use the **Name** setting to name the metadata.

    This is the name you will see when prompted to edit/confirm metadata before saving each measurement.
4. Use the **Type** setting to define the format of the metadata.
    - Choose *Text* for metadata which consists of letters, numbers, symbols and spaces.
    - Choose *Number* for metadata which consists of numbers only. Values can be from 000 to 999.
    - Choose *Picklist* to create a list from which you can pick a value.
5. If **Type** = *Picklist*, you will also need to create entries to populate the list. Entries can consist of letters, numbers, symbols and spaces. You can create up to 11 entries.
6. Enter a default value for the metadata.

    Only the setting that corresponds to the type of metadata will be enabled: Text value, Number value or Picklist value.

How metadata works

To add metadata to your measurements, you will need to enable metadata collectively. Each individual metadata (Metadata 1 through Metadata 9) that is enabled will be added to each measurement you make.

Before a measurement is saved, you will be prompted to confirm the metadata. At this point, you can edit the values before you confirm.

✎ **Note:** Number metadata do not automatically increment with each measurement.

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 most recent and initial calibrations, 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.**

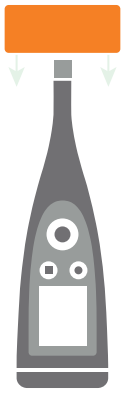
Procedure:

1. Turn on the instrument.

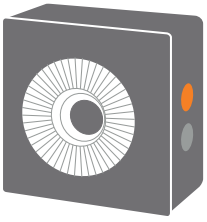


Note: Ensure that the **instrument is not measuring** and that the **menu is not open**.

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**.

Hint: You can respond to the calibration dialog using the mobile app if you are using B&K 2245 with firmware versions greater than 1.1.3.1653 or HBK 2255 with firmware versions greater than 1.2.1325.

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.



Calibration history

To view the history of calibrations and calibration checks, go to: **Menu** > **Calibration history**.

Calibration settings

Menu location: **Menu** > **System settings** > **Advanced settings** > **Calibration**.

Automatic calibration check

By default, the instrument is set to perform a calibration check automatically when it detects the constant sound level produced by the calibrator. Use the Automatic check setting to disable automatic calibration checks.

If you disable automatic calibration checks, you can still initiate a calibration check.

1. Go to: **Menu** > **System settings** > **Advanced settings**.
2. Enable the **Service mode** setting.
3. Go to: **Calibration** > **Calibrate**.
4. Follow the prompts on the instrument.

Calibration reminder

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

To change the settings:

1. Go to: **Menu** > **System settings** > **Advanced settings**.
2. Enable the **Service mode** setting.
3. Go to: **Calibration**.
4. Edit the **Calibration reminder** and **Calibration interval** settings 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: **Menu** > **System settings** > **Advanced settings**.
2. Enable the **Service mode** setting.
3. Go to: **Calibration**.
4. Go to: **Calibrator**.
5. Select **Custom**.
6. Use **Custom calibrator no.** to add the calibrator's serial number.
7. Select **Custom level** to specify the sound level in dB.

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

Menu location: **Menu** > **Data explorer**

Folder structure

There are two top-level folders in the data explorer: Data and Trash. Within the two folders are subfolders, named by date. Within each date folder are all measurements made that day.

Data folder	Trash folder
Date folders	Date folders
Measurement folders	Measurement folders

Navigate the folders

Each time you open the Data explorer, you will start in the Data folder. With each folder you select, there will be different options depending on your location in the folder structure.

Options for the Data folder	Options for the Trash folder
• Show Trash: Opens the Trash folder. • Move Data to Trash: Moves all data to the Trash folder.	• Show Data: Opens the Data folder. • Empty Trash: Deletes all data in the Trash folder permanently.

Options for date folders	
In the Data folder	In the Trash folder
• Open: Opens the folder. • Move to Trash: Moves the folder to the Trash folder.	• Recover: Sends the folder and its contents to the Data folder. • Open: Opens the folder. • Delete: Permanently deletes the folder.

Options for measurement folders	
In the Data folder	In the Trash folder
• Open: Opens the measurement. • Move to Trash: Moves the measurement to the Trash folder.	• Recover: Sends the measurement to the Data folder. • Delete: Deletes the measurement permanently.

Delete data

There are two stages to remove data from the instrument forever. The first stage is to send the data to the Trash folder and the second stage is to delete data from the Trash folder. By default, you will need to move data to the Trash folder manually.

To learn how to set up the instrument to move data to the Trash folder automatically, see Data management.

Hint: Move data with which you are not currently working to the Trash folder. This will keep the Data folder tidy so you can use the Data folder as you would a working folder. Data in the Trash folder can be returned to the Data folder at any time.

Review measurements

When you open a measurement, you will be able to view and interact with the measurement data in the instrument display.

How to open a past measurement

1. Go to: **Menu** > **Data explorer**.
2. Navigate to the desired date folder.
3. Press ► and select **Open**.
4. Navigate to the desired measurement folder.
5. Press ► and select **Open**.

Note:

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

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.

Note: Measurement data is only stored on the instrument.

Make a measurement

1. Connect the mobile app to the instrument.

   See Connect the mobile app to the instrument for more information.
2. Use the controls at the bottom of the screen to start a measurement.

How to control measurements

Use the controls at the bottom of the screen to start, stop and pause measurements.

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

Controls

Tap to start a measurement.

To pause, slide to the left.

Tap to resume.

Slide to the right to stop the measurement.

Tap to reset the analyzers for the next measurement.

Note:

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

List of measurements

You can access the list of measurements stored on an instrument from the mobile app. From the list of measurements, you can open, rename or delete measurements.

Tap to open the list of measurements.

Open past measurements

Tap a measurement to open it.

Delete measurements

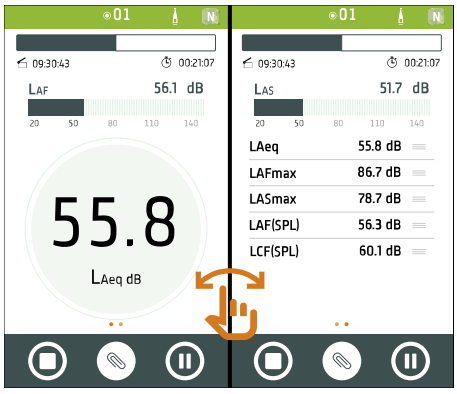
Swipe left on a measurement for the option to delete it.

Measurement views (mobile)

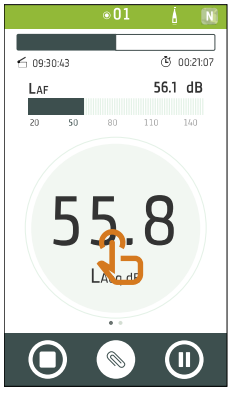
You can change the display of the mobile app before or during a measurement, or while reviewing a completed measurement.

Note: Changes in the mobile app display will not change the instrument settings.

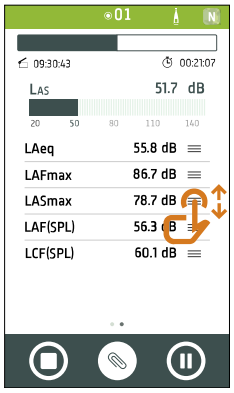
Swipe left or right to switch between views.



Tap on a readout to change the parameter being displayed.

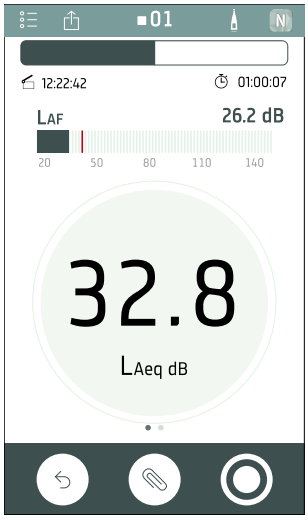


Touch and hold ≡ to move items in the list



Review measurements (mobile app)

After you stop a measurement, the measurement stays open to review.



You can open past measurements to review in the mobile app. See Measurements (mobile) for information about how to open a past measurement.

You can change the measurement views as during a measurement. See Measurement views (mobile) for more information.

Tap to close the measurement.

Tap to open the list of measurements.

Tap to share the measurement. The measurement is encrypted and uploaded to the Brüel & Kjær cloud, then an email with a download link is generated.

Tap to open the Setup screen for the instrument.

Tap N to access information about the app, app settings and help.

Tap to reset the instrument or tap to start a new recording. This will cause the measurement to close.

Tap to add annotations to the measurement. See Annotations for information about adding annotations to a measurement.

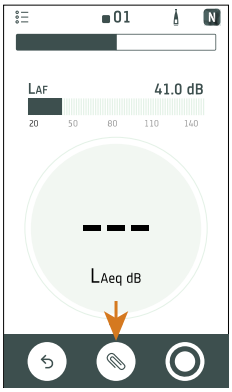
ANNOTATIONS

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.

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
   - 🎥 : Videos
   - 📝 : Notes
   - 🎙 : Commentary
3. Snap a photo, make a recording or write a note.
4. Repeat as needed.

Note:

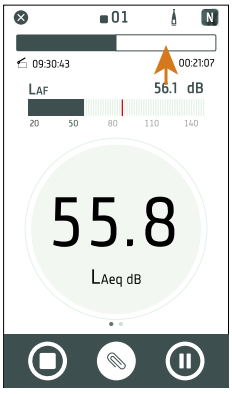
- Long press the photo or video button to use files from the gallery on your mobile device.
- To delete an annotation: Go to **Annotations**, swipe left on the unwanted annotation and tap **Delete**.
- If the mobile app has permission to use the location services of your mobile device, your annotations will have location data and you will be able to see them on the map in the PC application. Go to the mobile device's settings to view/edit the permissions of the mobile app.

You can make annotations before, during and after measurements. Annotations made during a measurement upload to the instrument automatically and are stored with the measurement data to which they belong. Annotations made before and after measurements will be stored on the instrument as unattached annotations, you can attach them to a measurement in the mobile app or the PC application.

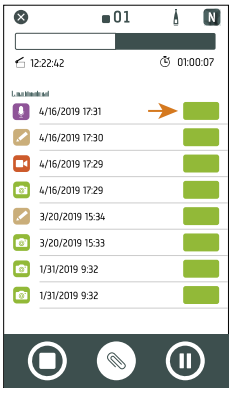
How to attach unattached annotations

To attach an annotation to a measurement, a measurement must be open or in progress.

1. Navigate to **Annotations**.



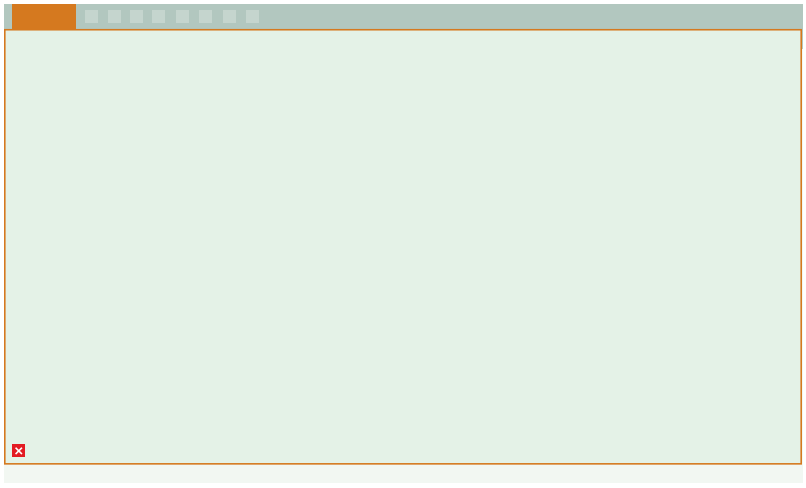
2. Tap **Attach** at the desired annotations (or tap 📎 if you want to create more annotations).



POST-PROCESS USING THE PC APP

PC application GUI

The application tab opens / closes the **application menu** where you will find information about the application and its options.

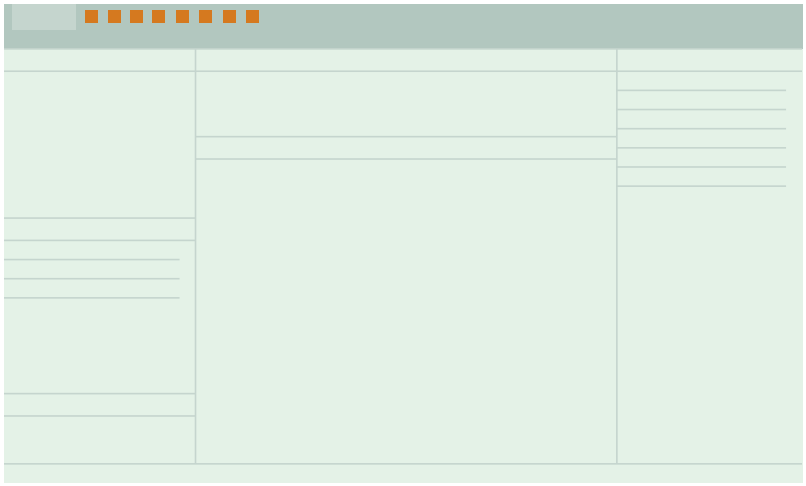


Options: Change the language of the GUI.

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.

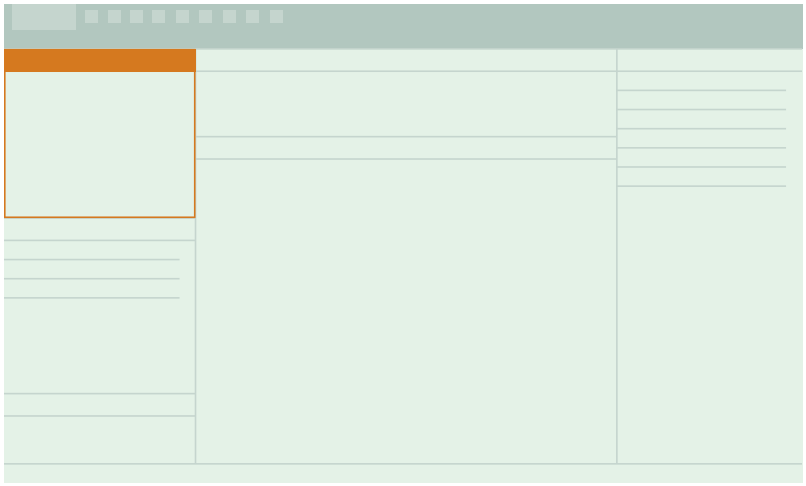
: Export project contents into another format.

: Create a report.

: Upload project to the cloud and share via email.

: Open the help.

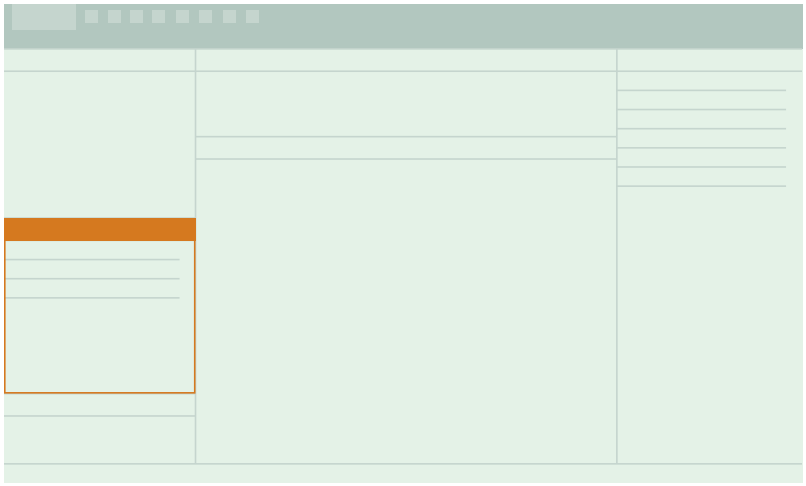
When you open a project or import data, you will see the individual measurements in the **project browser** window. Select measurements to view them.



Project Name: Unnamed projects appear as *Untitled* in the toolbar.

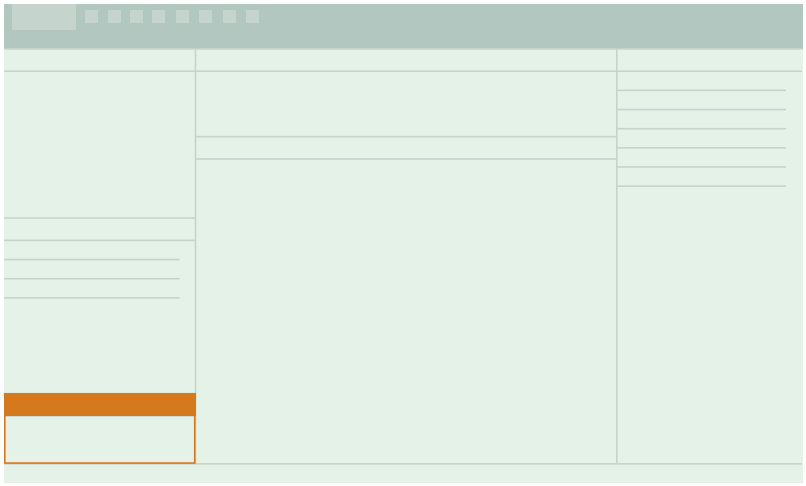
: Select all measurements in the project browser.

Unattached annotations displays annotations that are not linked to a measurement.

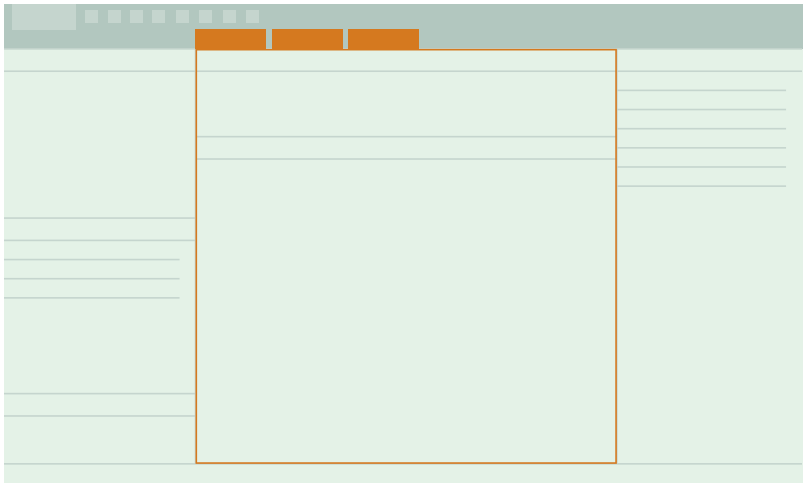


Unattached annotations are organized by type: **Gallery** (photos and videos), **Commentaries** and **Notes**.

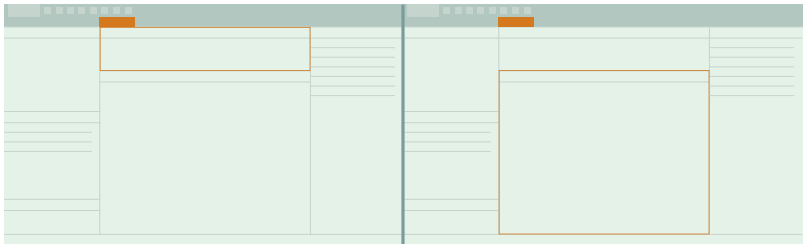
Tasks, such as importing data or exporting a project, are displayed in this window.



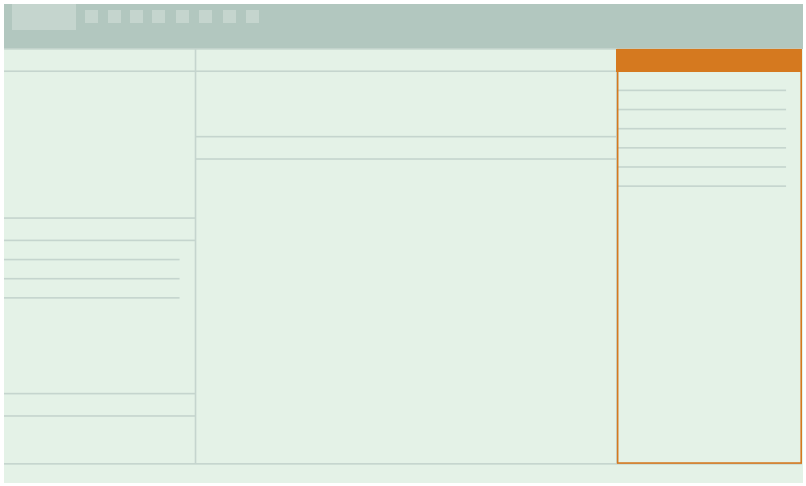
These tabs are for switching between the **Measurement**, **Gallery**, **Map** and **Report period** windows.



Within the Measurement window, there are two areas. The upper section is an **overview** of the selected measurements in a project. It will help keep you oriented while you investigate the graph and table views in the section below.



In this panel, you will find collapsible windows for viewing annotations.



Annotations:

- (Map): View locations of annotations and measurements on a map.
- (Gallery): View photos and videos attached to the measurement.
- (Commentaries): Listen to voice memos attached to the measurement.
- (Notes): Read the notes attached to the measurement.

Application menu

The application menu in the PC application gives you access to select project tools, as well as options for and information about the application.

Open the application menu

Click on the Noise Partner tab in the upper left corner to open the application menu. Click the tab again to close the menu.

Project tools

Access tools to create a new project, open a project or save a project, and learn their keyboard shortcuts.

Hint: Open a project from the application menu to choose from a list of recent projects.

Application options

The Options tab opens settings specific to the application.

Language

Use the drop-down menu to set the language of the user interface.

Connecting to an instrument

If it is not possible to connect to instruments remotely via HTTPS, enable the setting to connect via HTTP. HTTP does not have the certificate requirements of HTTPS, which can cause problems with security features like firewalls. See Remote connections for more information about connecting to an instrument remotely.

About the application

The About section is where you will find open source licences, the EULA (end user licence agreement), release notes and version numbers.

Open a project

Use the Open dialog to open projects that have been saved to a location on your PC or your local area network (LAN). You can open a project using the button in the toolbar or from the application menu.

Crash recovery

If the application crashes, there is a crash recovery feature. When you open the application, there will be a list of crashed projects. Open one to recover the project from the point you were at without losing any data.

Create a project using the PC application

A project is a collection of one or more measurements plus any associated annotation files. The scope of the project is up to you to define; it can span a single measurement on a single day, or multiple measurements made on one or more days. Create a project then import measurements as needed. See Import measurements for information about importing measurements.

How to create a project

1. Open the PC application.
2. Click .
3. Give the file a name and click **Save**.

   The defaults are:

   - Name: *Untitled*
   - Location: *C:\Users\USER\Documents\Noise Partner*

You are now ready to add measurements to your project.

Open a project

Use the Open dialog to open projects that have been saved to a location on your PC or your local area network (LAN). You can open a project using the button in the toolbar or from the application menu.

Import data

The Import dialog allows you to import data to the PC app. You can use the PC app to analyse data, generate reports or to export data into another format.

Once data is imported, it is available in tabular and graphical formats.

Basic import instructions

1. In the PC application, click , to open the Import dialog.
2. On the left, select the source for the import.

   You can import from an instrument or a backup storage device, such as a network attached storage (NAS) device or a USB stick.
3. On the right, select the data to import.

   You can import measurements and annotations.
4. Click **Import**.

Import measurements

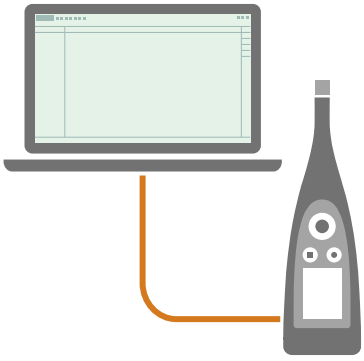
Import measurements to add them to a project. You can add measurements to empty projects or to projects that already contain measurements.

You will need:

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

How to import measurements

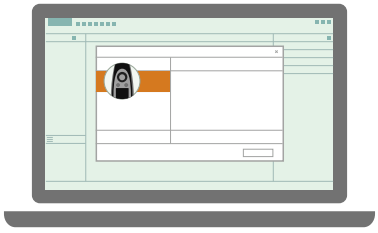
1. Connect the instrument to the computer using the cable.



Hint: Connect the two devices to the same network using Wi-Fi®.

2. In the PC application, click , to open the Import dialog.

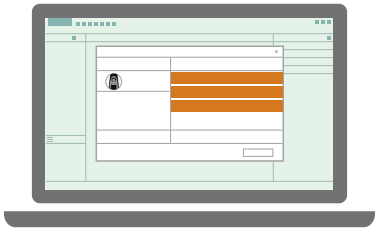
3. Find your instrument in the dialog and select it.



Note: To import from a backup, click on the storage location.

4. Select the data you want to transfer.

   You can import measurements and annotations.



Hint: Use <Ctrl> or <Shift> to select multiple items.

5. Click **Import**.



Measurement icons

Measurement icons indicate the type of measurement.

: General sound level measurement

Import from an 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 PC application, click to open the Import dialog.
2. In the import dialog, click .
3. Click **Add instrument from IP address**.
4. Enter the IP address or host name.

   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 for information about which IP address or host name to use.
5. Click **OK**.
6. After you connect to the instrument, select the data to import.

   You can import measurements and annotations. See Import measurements for more information.
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 for more information.
- Data in the backup

Procedure:

1. In the PC application, click to open the Import dialog.
2. In the import dialog, click .
3. Click **Add NAS or USB stick**.
4. Browse to the location of the backup.

   Note: Your computer will need to be able to access this location.
5. Select the folder with the matching serial number of your instrument.
6. Click **Select Folder**.

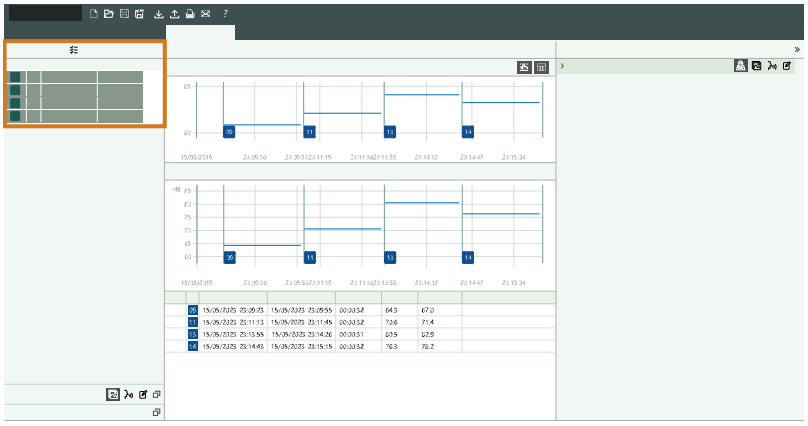
7. After you connect to the storage location, select the data to import.

   You can import measurements and annotations. See Import measurements for more information.

8. Click **Import**.

Project browser

The project browser (in the panel on the left) gives an overview of your project (its name and the data it contains) and allows you to select the items to view.



Basic controls

The project browser controls what is displayed in the application. The application displays measurement data, annotations and settings for the item or items selected in the project browser.

- Click an item to select it.
- Right-click a measurement for options to delete, copy, paste and export.
- Right-click a column header to customise the contents of the table.
- Double-click the name to edit it. In the PC app, the default name is the model and serial number of the instrument plus the measurement ID. The name is preserved if you copy data from one instance of the PC app to another instance of the PC app.
- <**Ctrl**> + click to select non-adjacent items.
- <**Shift**> + click to select a range of items.
- Click a header to sort items.

Tools

: Select/deselect all measurements in the project browser.

Attach annotations

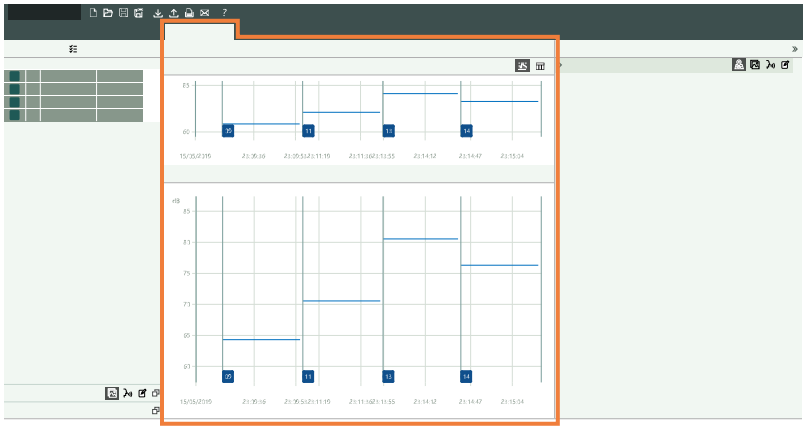
Drag and drop an annotation file on a measurement in the project browser to attach the annotation to the measurement. Files can be a part of the project (as attached or unattached annotations) or stored on your PC.

See Review annotations in the PC application for more information about annotations.

Measurement window

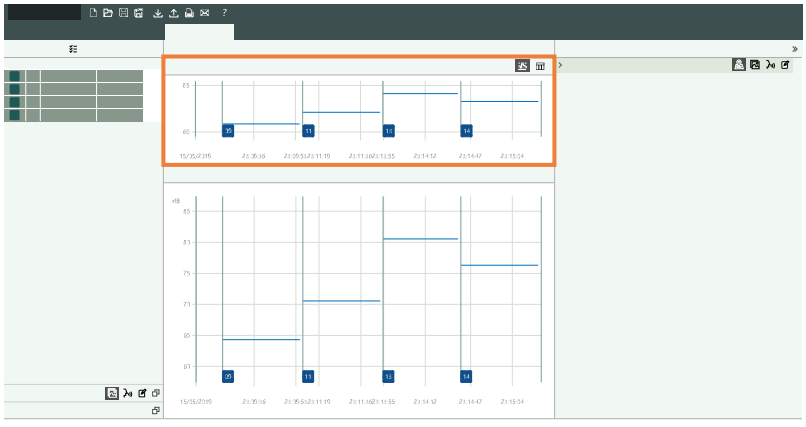
The Measurement window displays single measurements. You can view the data in both graphical and tabular formats.

Select one or more measurements in the Project browser to display measurement data.



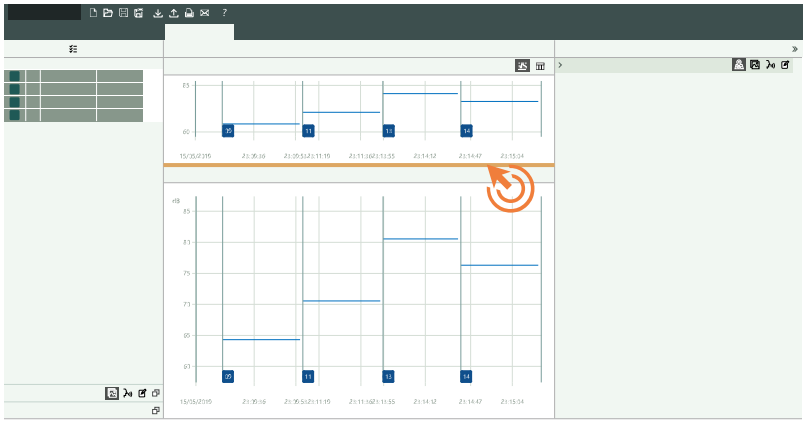
Overview

The uppermost section is the measurement overview, it helps keep you oriented when you, for example, switch to table a table view or zoom in on a section of the measurement.



Adjust the window size

Mouse over a vertical or horizontal boundary. When the cursor changes and the line is highlighted, click and drag to resize the area.

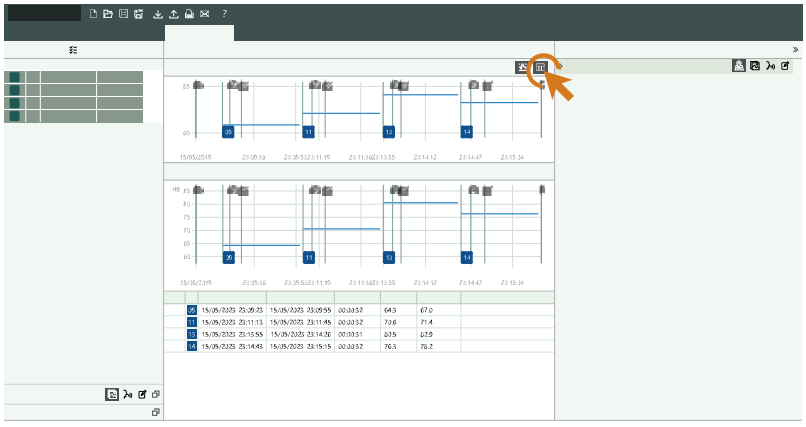


Customise the display

Click  to show or hide the profile view.

Click  to show or hide the table view.

The overview is always visible, but you can resize its area as needed.



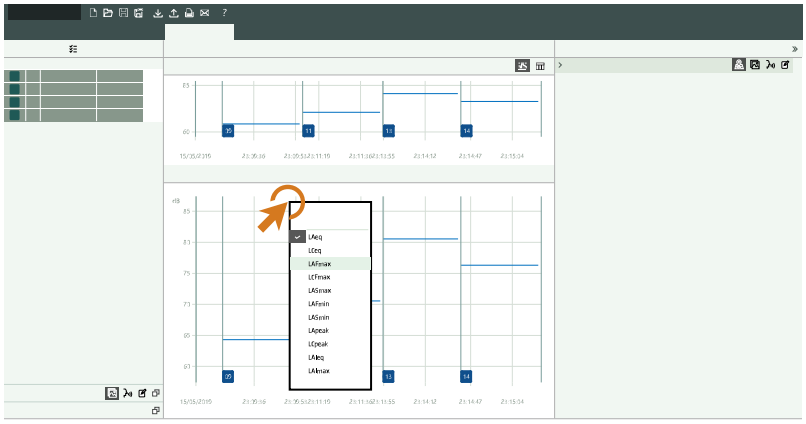
Profile graphs

For single measurements, each parameter is a single, calculated dB level for the total measurement time. This means that their graphs will be flat, horizontal lines. You can use this display to easily see the differences in the calculated values for each measured parameter.

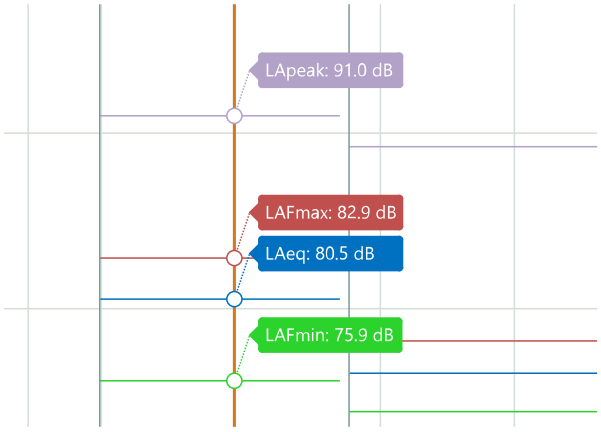
Hide or show parameters

Right-click in the profile to select which parameters to view.

Note: The right-click menu only shows measured parameters.

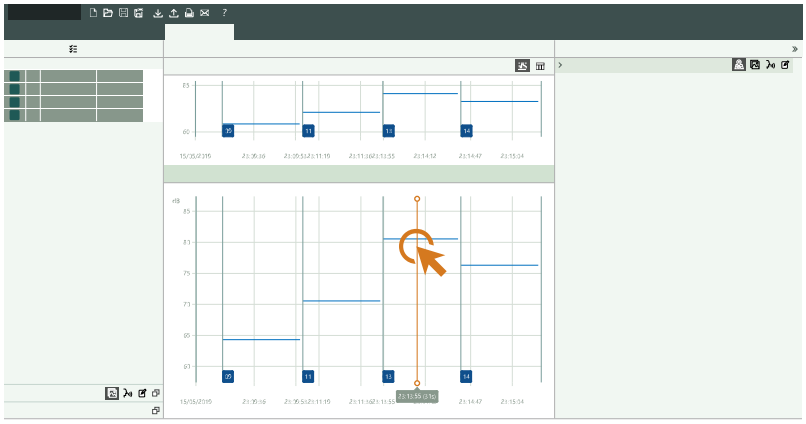


Parameters are colour coded.



The cursor

Click on the overview or the profile to place the cursor.



The cursor has two readouts: one at the bottom which shows the time and duration (in parentheses), and one in the graph which shows the level at that point.

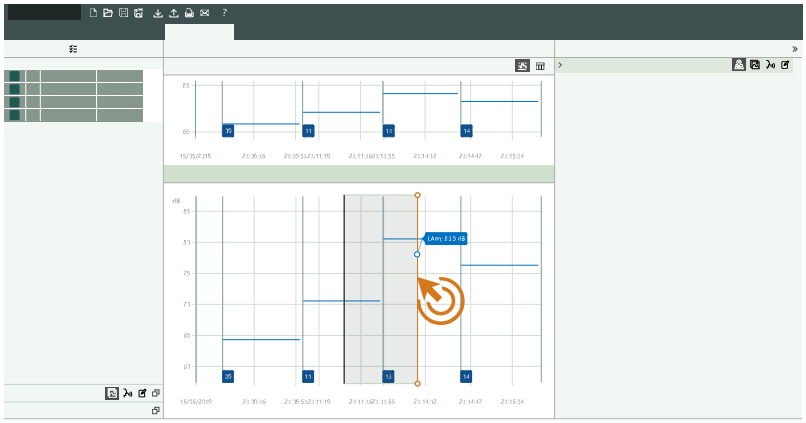
Hint: You can use the left and right arrow keys on your keyboard to move the cursor or click on the time readout to enter a specific time.

Selections

In the overview or the profile, click and drag to select a range.

When you select a range in the overview, the selection acts as a magnifying glass. Click and drag the range to move it.

When you select a range in the profile, you can adjust the boundaries of the selection and play with the functionality of the application.



To adjust the selection, click and drag the left or right cursor. Alternatively, use the left and right arrow keys to move a cursor or the entire selection in steps. Click the cursor you want to move to select it, or in the middle of the section to select the entire selection. The cursor readouts show the times for the start and end of the selection. Click on a time readout to enter a specific time.

Right-click the selection for the option to zoom in on the selected range.

Zoom

There are many ways to get a closer look at your data:

- Click on a measurement number to zoom in on the measurement.
- Select a range, then right-click and select **Zoom**. Select **Unzoom** to zoom out.
- Select a range in the upper graph to view it in the lower graph.
- Double-click the Y-axis to scale the graph to the shown levels.
- Hover over the Y-axis and use the mouse wheel to scale the graph vertically.
- Hover over the graph and use the mouse wheel to zoom in or out horizontally from the position of the mouse.

Hint: When you zoom in, you can use the upper graph to keep track of where you are in the project. Double-click on the X-axis of the upper graph to zoom out.

Copy the data

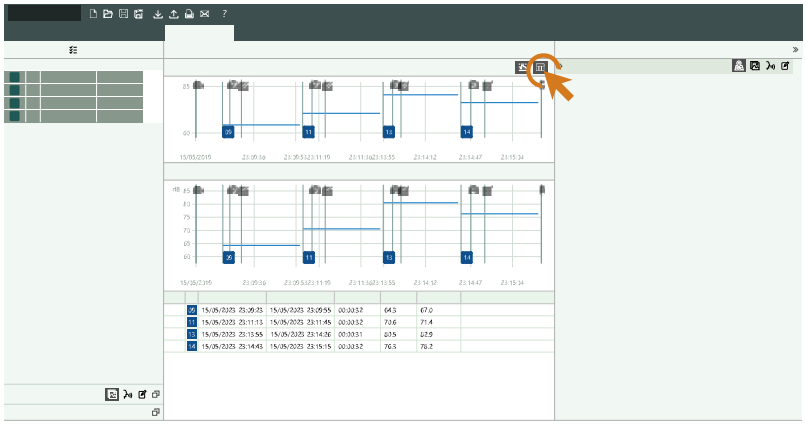
Right-click on the graph to copy it to your clipboard. Paste the image into Microsoft® applications such as Excel®, Word or Powerpoint®. If the application supports vector graphics, the graphs paste as SVGs. Otherwise the graphs paste as bitmaps (PNG).

Tables

Data is available in both graphical and tabular formats. Tabular formats allow you to copy data points to spreadsheet editors to perform your own calculations, for example.

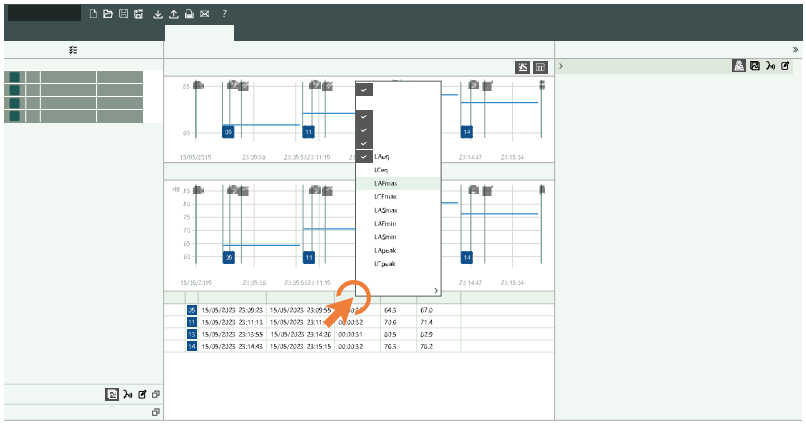
Show table view

Click to show or hide the table view.



Customise the contents

Right-click a column header in the measurement table to select which columns to show or hide.



Cursor levels

The measurement table updates automatically if you move the cursor in the overview.

Copy the table

Right-click on the table and select **Copy table** to copy its contents to your clipboard in CSV format. Paste the data into Microsoft® applications such as Excel®, Word or Powerpoint®.

Review annotations in the PC application

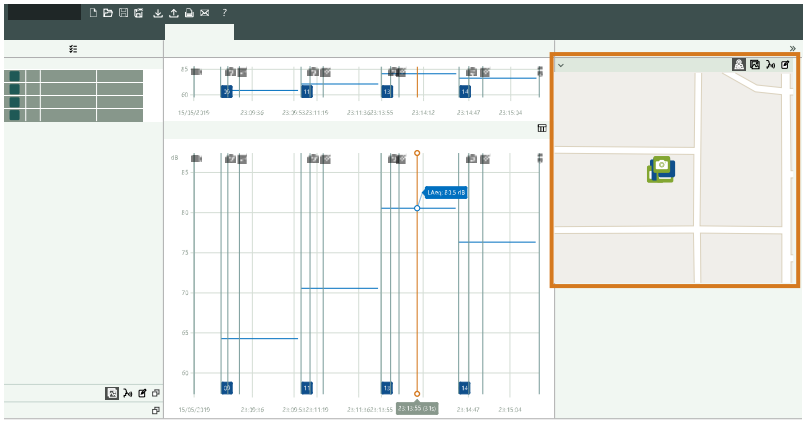
If you created annotations using the mobile app, you can review them in the PC application.

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.

How to view annotations

Select an item in the project browser to view attached annotations. See Project browser for more information.

When the Measurement tab is open, there is an Annotations window in the panel on the right which allows you to view and edit the attached annotations while viewing measurement data.



The Gallery and Map tabs are dedicated annotation views. When either the Gallery or Map tab is open, the panel on the right shows only annotation options.

The Unattached annotations window in the panel on the left shows imported annotations that are not attached to a measurement.

Annotation symbols:

- Map:
- Gallery:
- Commentaries:
- Notes:

See where annotations were made

The Map windows show the location of measurements and annotations. Use the context-sensitive menu to toggle on or off the different annotation types.

Note: The map only shows annotations that have location data. To enable location data, the mobile app needs access to the location services of the mobile device. You can view/edit the permissions for the mobile app in the settings menu for the mobile device. See View locations for more information about measurements and annotations with location data.

Check out the gallery

The Gallery windows show photograph and video annotations.

- Tap or to rotate the file.
- Tap to zoom.
- Use the arrows to browse.
- Use the context-sensitive menu to cut, copy or paste.
- Click on a video to play it.

Listen to commentary

The Commentaries windows show voice recordings.

- Press the play button to listen to the recording.
- Use the slider to move forward or backward in the recording.
- Click to open the volume slider.
- Use the context-sensitive menu to cut, copy, paste and delete.

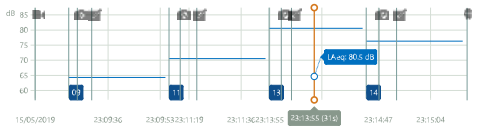
Read notes

The Notes windows show text notes.

Each note is stamped with the date and time. Click on a note to edit the text. The context-sensitive menu has options to cut, copy, paste and delete.

See when annotations were made

Open the **Measurement** window to see when annotations were made during a measurement. Annotation icons overlaid on the measurement graphs show when an annotation was made. Click on an annotation icon to open the annotation in its window.



- : Photos
- : Videos
- : Notes
- : Commentary

How to attach or detach annotations

Sometimes you need to move an annotation. In the PC application, it is easy to, for example, attach an unattached annotation to a measurement, or move an attached annotation from one measurement to another, or detach an unwanted annotation from a measurement.

1. Find an annotation that you want to move.
2. Do one of the following:
    - Click and drag the annotation where you want it.
    - Right-click on the annotation and select **Cut** or **Copy** then paste it where you want it.

Use files stored on your PC

To add annotation files stored on your PC, drag and drop items from Windows Explorer into the application interface. You can add photo, video, text and audio files.

- To add a file as an unattached annotation, drop the file in the Unattached annotations window.
- To add a file as an attached annotation, drop the file on a measurement in the project browser or select a measurement in the project browser then drop the file in the Annotations window.

View locations

You can view measurements and annotations on the map in the PC application. Being able to see where measurements and annotations were made on a map can make it much easier to identify a specific measurement in the future, both for you and for your colleagues.

✎ **Note:** To see measurements in the map, enable GPS location on the instrument. To see annotation on the map, allow the mobile app to access location services in the settings for the mobile device. There is more information below.

Map window

The location of each measurement and annotation in a project is marked by icons on the map. There are two Map windows, one in the centre panel and one in the side panel. Both windows have similar functionality, but there are slight differences between the two.

Controls

- Switch between Road (a graphical representation of the map) and Aerial (a photographic representation of the map) views.
- Mouse over the map and scroll up or down to zoom in or out.
- Double-click to zoom in.
- Click and drag to move the map.
- Click on an annotation icon to open the annotation in its window.
- Right-click to open the context-sensitive menu where you can turn on and off the display of annotation icons.

How to enable GPS location on the instrument

1. Press briefly to open the menu.
2. Go to: **System settings** > **Advanced settings** > **Service mode**.
3. Select **Enabled**.
4. Go to: **GPS location**.
5. Select **Enabled**.

Note: You will be able to view the GPS coordinates on the instrument if About data view is enabled. See Display settings for more information.

How to add location data to annotations

Annotations use the functionality of the mobile device on which the app is running, for example, its camera is used to take photos and record video. To add location data to an annotation, the mobile app will need permission to access the location services of the mobile device. The first time you start the mobile app it will ask for permission to access location services. If you ever want to change the permissions for the mobile app, this is done in the settings menu for the mobile device.

Export data

The Export dialog allows you to export data and annotations. Export data to use it in other applications or to perform your own calculations. You can export data to a Microsoft® Excel® workbook or a text file.

How to export

1. In the project browser, highlight the measurements you want to export.
2. Click .
3. Specify the name and location of the export file in the **Destination file** field.
4. Choose the format into which you want to export the measurement data:
   - *Excel Workbook (*.xlsx)*

     File extension *.xlsx is compatible with Microsoft Excel 2007 and newer.
   - *Tab separated values (*.txt)*
5. If you are exporting to a workbook, you have the option to use a master file.

   When you export a measurement to a workbook, master files tell the PC application what to do with the data. You can create custom master files.

6. If you are exporting to a workbook, the export method sets how the data is written to the workbook.
    - *Auto*: The application chooses the best option; this is the default setting.
    - *Open XML (DOM)*: A memory-based method for writing to a workbook, which can tie up processing resources.

      Note: The DOM method cannot be used for big exports.
    - *Open XML (xmlWriter)*: A sequentially-based method for writing to a workbook, which can be time-consuming for large quantities of data.
    - *COM Interop (requires Excel)*: A faster method than the xmlWriter method, if it works. Issues with Microsoft Office installations (this method requires Microsoft Exel to be installed on your PC) and security settings can prevent this method from working.
7. Enable or disable:
    - **Launch Excel after export**: When exporting to an .xlsx file, open the exported Excel file.
    - **Open in file explorer**: When exporting to a .txt file, open the location of the exported file in the file explorer.
    - **Use invariant export language**: Export parameters in a consistent language.

      It is recommended that you enable this setting if a program (or macro) is going to interpret the parameters. This setting will output parameters in English and the names of the parameters will be kept over time from version to version of the program. This is not guaranteed for other languages, where the parameter names might change over time.
    - **Export raw statistical data**: Include statistical data in the export.
    - **Export annotations and signal recordings**: Include annotations and signal recordings in the export. If the project includes annotations: photographs export as .jpg files, notes as .txt files, and commentary and video as .mp3 files. If the project includes audio recordings (signal recordings): listen-quality recordings export as .mp3 files, and analysis-quality recordings export as .flac files.
8. Click **OK**.

How to create master files

You can create your own (custom) Microsoft Excel files that define the data you wish to export. This can be used to filter your measurement data in the exported file, to perform custom calculations or to create graphs automatically.

1. In the Export dialog, set a destination and use the following settings:
    - **Export formats**: *Excel Workbook*
    - **Master file**: *None*
    - **Launch Excel after export**
2. Click **OK**.
3. In the Excel file:
    a. Delete the unwanted data columns (data columns correspond to measurement parameters).
    b. Arrange the columns as desired.
    c. Add sheets for calculations and graphs, for example.
    d. Select all rows with contents, except for the first row (the header row).

e. Right-click and select **Clear Contents**.

4. Use the Save as... option to name and save your new master file.

Note:

- To export to a master file, set the Master file field in the Export dialog to your master file.
- When you export to your master file, it will contain only the sheets and parameters included in that master file.
- Master files work best when exporting measurement data that is similar. The reason is because parameters must be in both the data set and the master file to be included in the exported file. Luckily, you can create multiple master files for use with different types of measurement data.

Report

You can preview and create reports directly from the PC application. The ability to preview the report allows you to ensure the report includes the correct data before you create it.

Reports include relevant information about the instrument as well as the current measurement display (both in graphical and tabular formats).

Create a report

1. Set up the display in the Measurement window.

   See Measurement window for more information.

2. Open the Report preview window to preview the report.

   Hint: Report preview is an active window, it updates automatically when you make changes to a display.

3. Select a preview format from the drop-down menu: HTML (default) or PDF.

   Note:

   - The HTML preview is faster but less accurate than the PDF preview.
   - The choice of preview format does not affect the final report when using the button to generate a report.
   - The HTML preview is platform independent, which is helpful if you do not have Microsoft® Word installed on your PC. The PDF preview requires Microsoft Word.

4. Once you are happy with the preview, do one of the following:

   - In the application toolbar, click to generate a report in .docx, which is the native Word format. Afterwards, you can apply your own custom styles, formats and layouts to the report.
   - In the PDF preview, use the toolbar in the Report preview window to create a PDF of the report or to print out the report.

Share a project

An easy way to transfer projects between colleagues and stakeholders is to use the project sharing feature in the PC application. The project sharing feature encrypts the project, uploads the project to the Brüel & Kjær cloud and generates an email with a download link. The PC app is free to download and use, so anyone with whom you share the link will be able to open the project and work with the data.

Note: To use the sharing feature, the device from which you are sharing must be set up with your email account.

How to share a project

1. Click to open the project sharing dialog, which immediately prompts you to enter a password to protect the project.
    - A password is recommended but not required. Leave the field blank if you do not wish to protect the project.
    - If used, the recipient will be prompted to enter the password to open the project but not to download the project.
2. Click OK to start the upload.

    The entire project, including measurements and annotations, is uploaded.
3. Add recipients to the automatically generated email.

Share from the mobile app

You can also share projects and measurements using the mobile app. The feature works the same on the mobile app as it does on the PC app, but with the ability to share individual measurements as well as projects.

Use the button to share. The button is context-sensitive, so what you share depends on what is open when you tap the button: a measurement or a project.

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.
'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.
G-weighting	Frequency weighting used for infrasound measurements.
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).
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.
LGeq	The G-weighted equivalent continuous noise level - used to assess infrasound.
LGpeak	Maximum peak sound level with G-weighting.
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.
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.
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.