GUIDE

FIELD CALIBRATION

Watch[MC] and Pro[MC] Series

Revision 05



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GUIDE OVERVIEW



This guide outlines the steps to calibrate Soft dB's microphones for the Watch[MC] and Pro[MC] Series monitoring stations.

The proposed methodology is based on recognized best practices in the field.

Before performing a calibration, verification of the regulatory and normative requirements applicable to the project is recommended.

During manual calibrations in the field, Smart Acoustic Sensor (SAS) microphones can also be calibrated in accordance with the method presented in this document.

SCOPE OF THE GUIDE

This guide focuses on the field calibration of acoustic sensors for Soft dB monitoring stations.

Unlike laboratory calibration, field calibration is a simple and quick procedure that should preferably be done periodically to check and verify the sensitivity of the acoustic sensor according to the environmental conditions present in the field.

This calibration ensures the reliability of the measured acoustic levels. Note that field calibration is in no way a substitute for more detailed laboratory calibration, which should ideally be performed annually or in accordance with local regulations or specific project requirements.

The measurement stations covered in this guide are:

- Watch Series ™
- Pro Series MC

The distinction between the two types of stations can be made by referring to the identification label on the environmental housing. Note, however, that the shape of the housing and the acoustic sensor, including its environmental protection, may vary from one version to another.

The guide presents two different calibration methods that can be used:

- **Automatic Calibration mode** using the calibration wizard. This method is primarily recommended by Soft dB. In addition to facilitating calibration through a wizard, when the monitoring station is online, the calibration data is recorded in a database, eliminating the need for the user to record the various parameters.
- **Manual calibration mode** for each type of station, is another method described in this guide.

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REQUIRED EQUIPMENT

The equipment required to perform calibration differs depending on the type of monitoring station.

Watch Series

- Reference source or calibrator (1000 Hz, 94 dB (exact value to be validated according to the reference source))
- Computer with micro-USB cable
- Latest version of Watch Utility software installed on the computer: https://www.softdb.com/software.php?watch

Pro Series

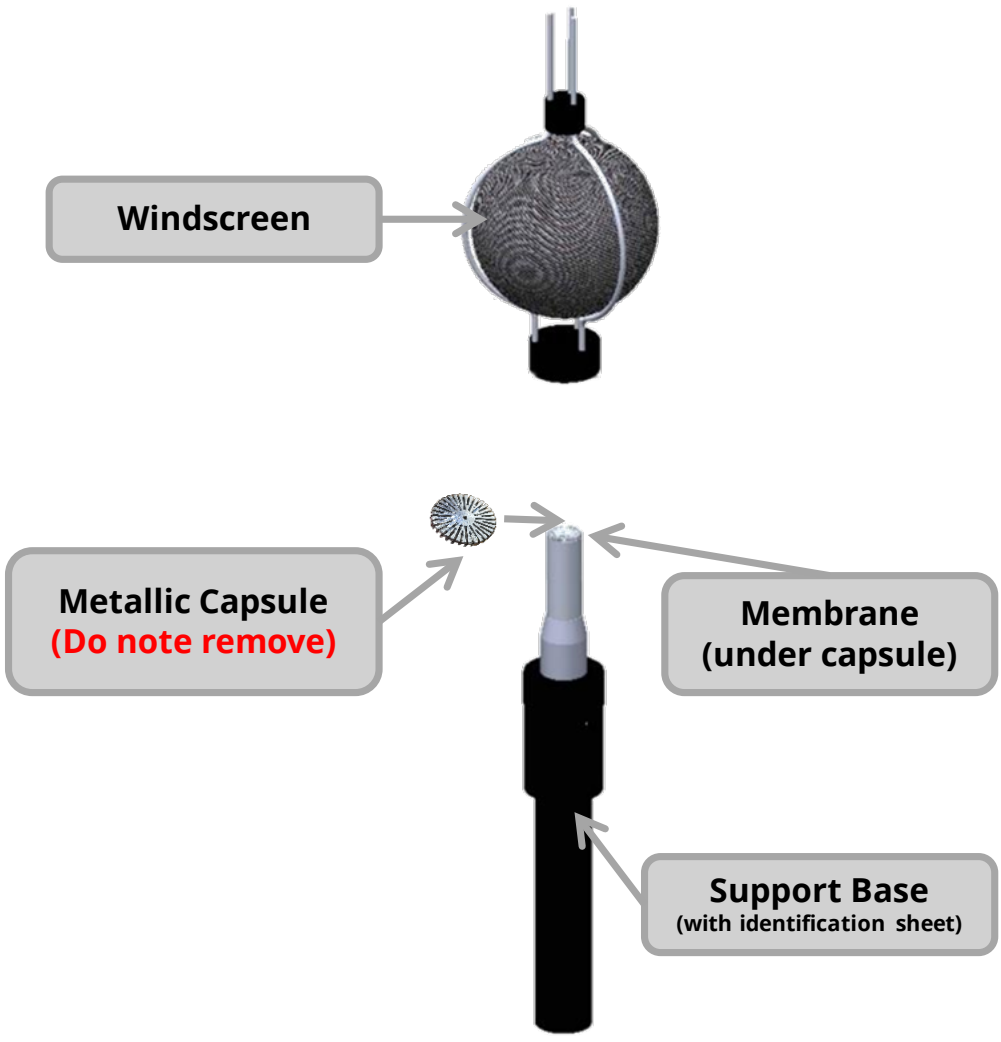
- Reference Source (1000 Hz, 94 dB or 114 dB (exact value to be validated according to the reference source))
- Compatible USB touchscreen

COMPONENTS OF THE ACOUSTIC SENSOR

Before calibrating the Soft dB monitoring station's acoustic sensor, it is important to have all the necessary equipment on hand. Pay particular attention to the instrument components. The "**Calibration Steps**" section will refer to these specific components in the instruction details.

Here are the different components of an acoustic sensor and its mounting. Note that some microphones have environmental protections that may differ from the images shown in this guide.

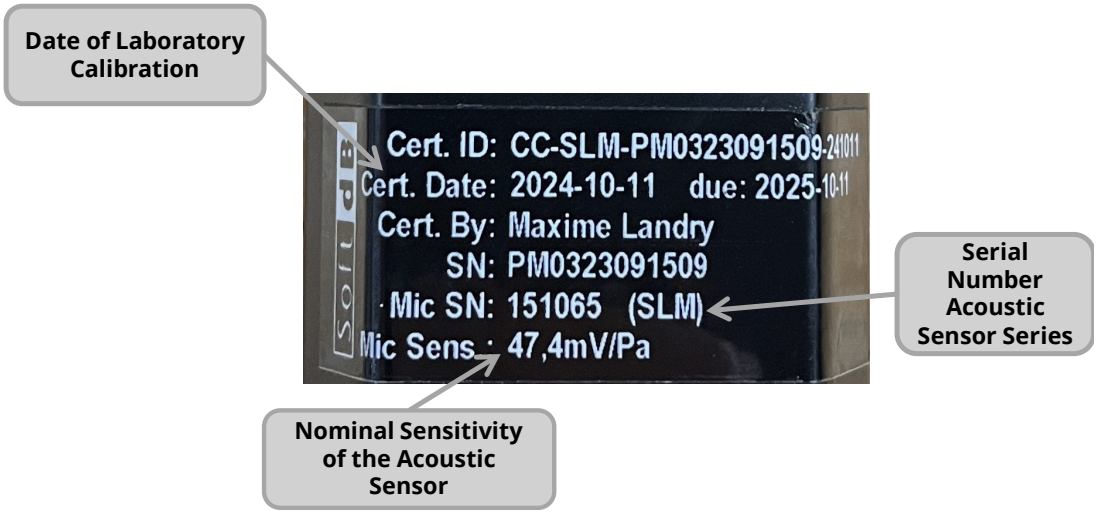
Figure A



ACOUSTIC SENSOR IDENTIFICATION

Identification information is located on the acoustic sensor's mounting bracket. Additionally, this information is also available on the microphone's environmental protection panel.

Figure B

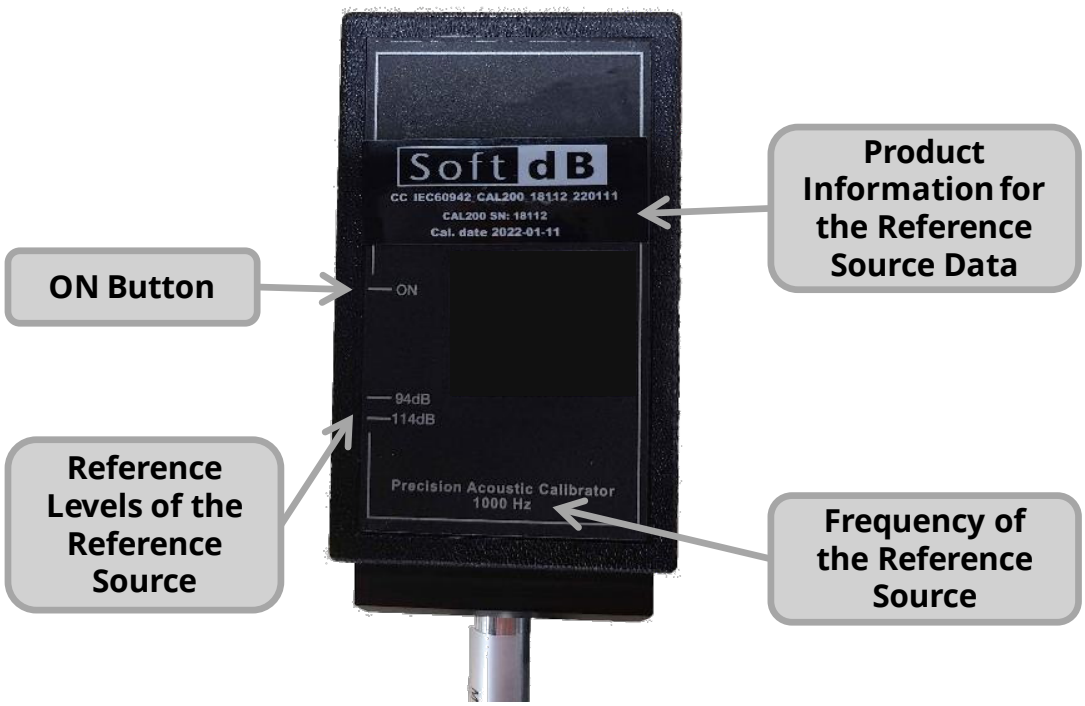


DESCRIPTION OF THE REFERENCE SOURCE

It is highly recommended to use the same reference source (calibrator) during calibrations. In the event that a different source is used, it would be important to note the serial number of the reference source used, during each calibration.

The reference source (calibrator) displays useful information, such as product information, frequency, reference levels and the ON indicator.

Figure C



RECOMMENDATIONS

This procedure is provided as a general reference tool. Ensure that you always comply with the current standards and regulations according to the specific requirements of your project.

Calibration allows you to verify the quality of the measured levels between two calibrations, which can be compromised if there is a significant deviation in microphone sensitivity. It is essential to ensure that your measurements are accurate.

For optimal calibration conditions, it is recommended to perform monthly calibrations when **certain weather conditions** are met:

- Wind speed less is than 20 km/h;
- Humidity levels are below 90%;
- Dry conditions, with no precipitation;
- The ambient temperature remains within the tolerance limits specified by the manufacturer of the measuring equipment (acoustic sensor and reference source);
- The ambient noise around the microphone is stable. If the noise is too high, it will affect the calibration and could skew the results. If the ambient noise is high, an acoustic calibration at a higher level (for example, 114 dBA) should be performed, if the microphone is capable of measuring such levels.

It is the client's responsibility to complete the calibration register (p. 35) during each calibration, particularly the manual mode calibrations. This log is generally required when analysis of the data measured by the stations is necessary. This document will serve as a record of the measured noise levels and sensitivities. To ensure data accuracy, it is recommended to calibrate the acoustic sensors at least once a month. Additionally, it is advised to avoid handling the measuring instruments on rainy or windy days, as weathering of the microphone can affect the quality of the calibrations and the accuracy of the measurements.

It should be noted that due to general operating range, performing calibrations in temperatures below -10 degrees Celsius is not recommended. If calibration at temperatures below -10 is required, ensure that the specifications of the calibrator being used has been approved for operation for these temperatures.

When should I contact Soft dB?

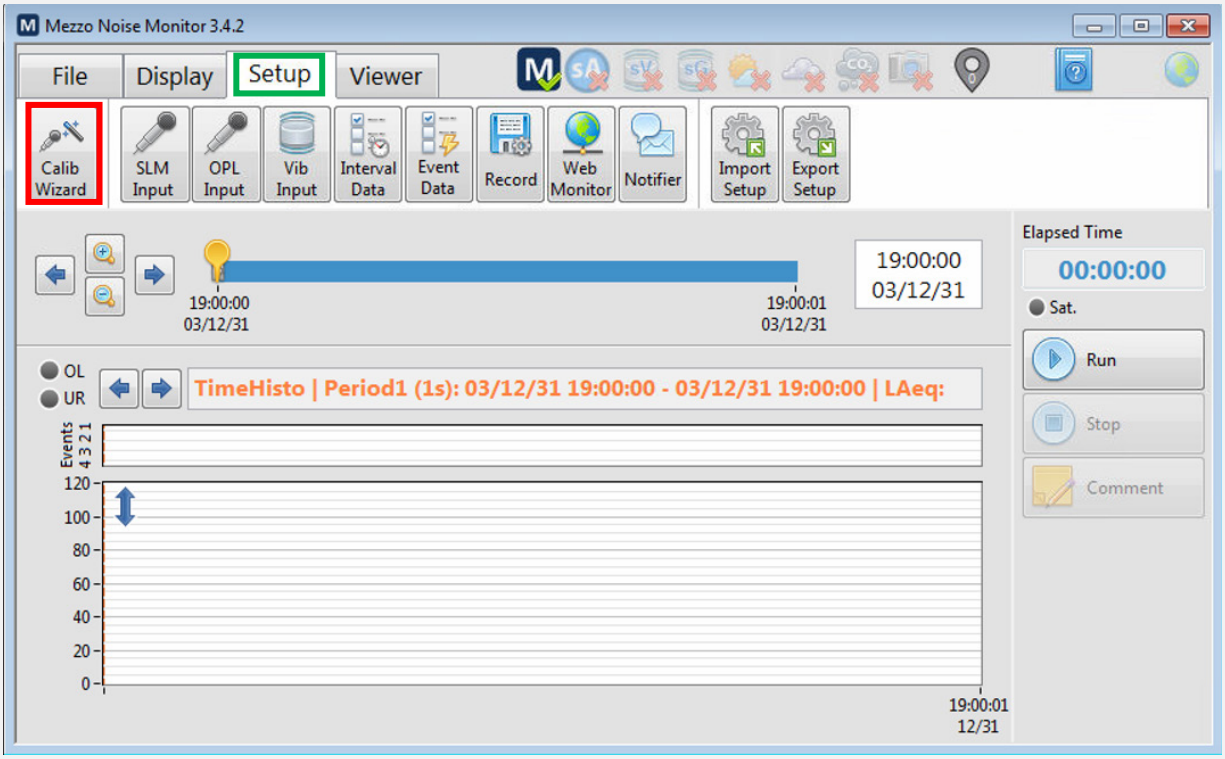
If **the difference between the reference level and the measured level** exceeds 1.0 dB, the calibration process should be restarted. Should there be a significant discrepancy after two iterations, please contact the Soft dB Team for further support.

CALIBRATION WIZARD – SUMMARY OF STEPS

	STEPS	WATCH SERIES	PRO SERIES
☐	Connect a tablet or computer to the station and open the *Watch Utility* (Station Watch) or *Mezzo Noise Monitor* (Pro Station) software	Step 1 (See page 22- Watch[M])	Step 1 (See page 22- Pro[M])
☐	Enter in the calibration register: • The calibrator's model and serial number This step is only required in the case where a different calibrator is used for each calibration.	See Calibration Register	
☐	Start the calibration wizard and follow the instructions described, in order, as shown on the screen.	Calibration Wizard (Watch Series™), Page 17	Calibration Wizard (Pro Station™ Series), Page 12

CALIBRATION WIZARD (PRO STATION^{MC} SERIES)

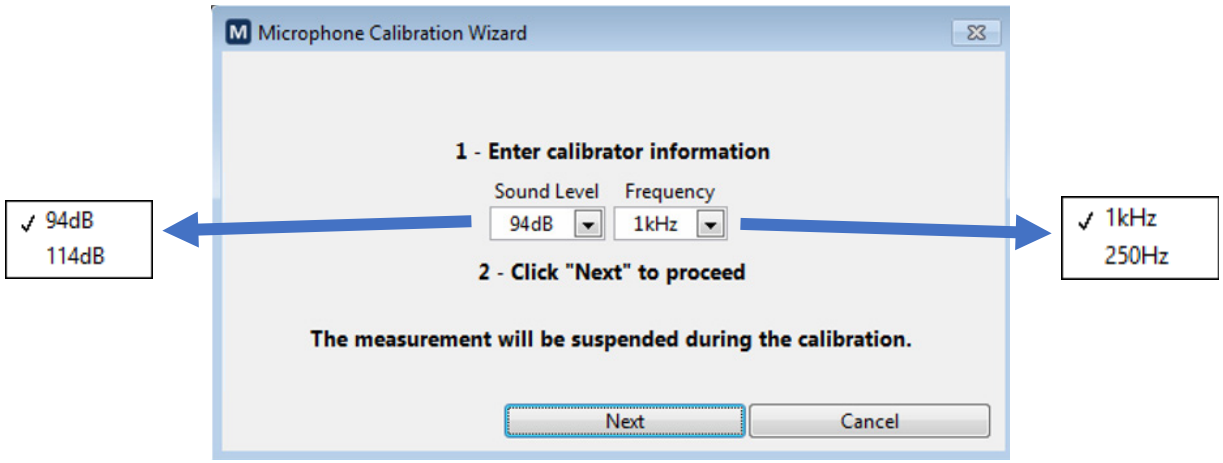
1 With the touch screen connected to the station, access the Mezzo Noise Monitor software on the measuring station.



In the Setup tab, select the 

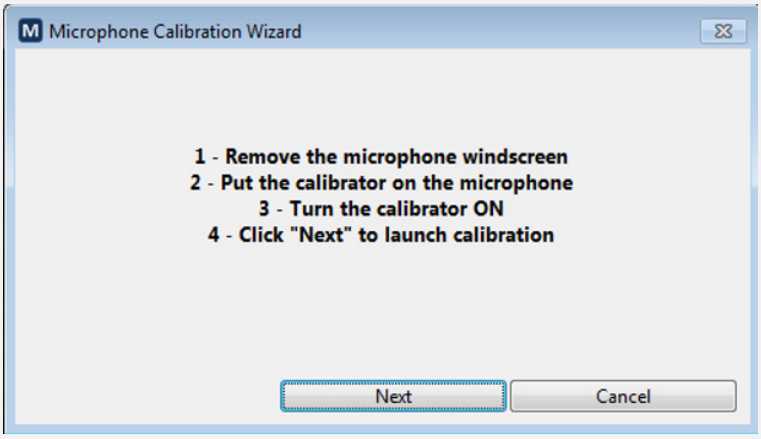
to open the Calibration Wizard (red box).

2 Verify that the *Sound level* and *Frequency* parameters are set to the levels indicated on the calibrator, and that the calibrator is activated.



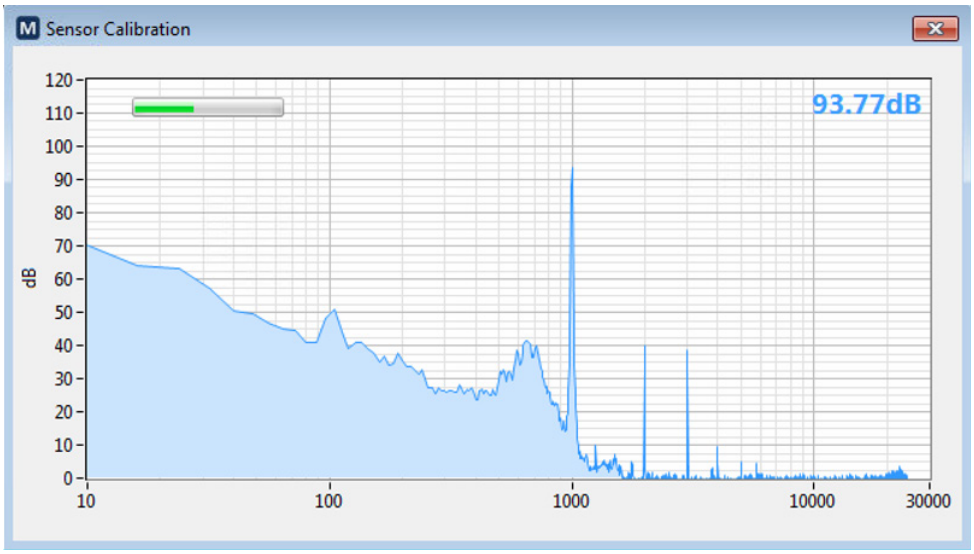
Once complete, select Next.

3 Follow the on-screen instructions (remove the wind ball from the microphone, install the calibrator, and start the calibrator by pressing the ON button).

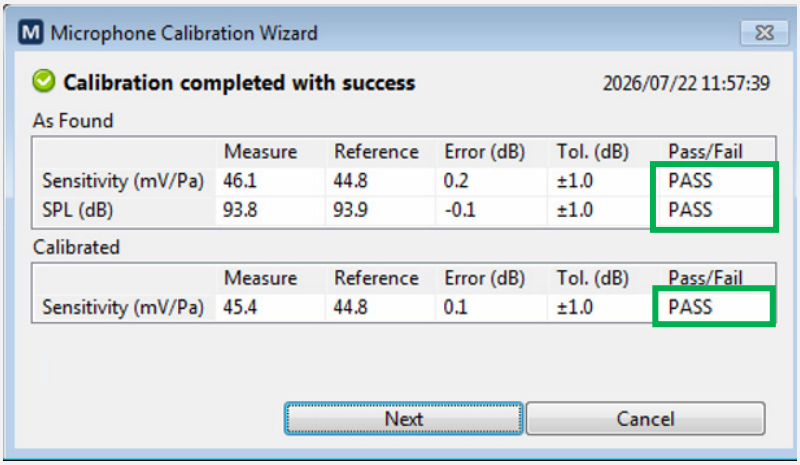


Once complete, select Next.

4 A spike in the calibration frequency (in this case, 1000 Hz) should be visible, indicating that the calibrator is functional. Wait a few moments for the calibration to be carried out.



5 The calibration has been completed successfully when all indicators show a "PASS".



When the calibration results with a "FAIL" reading, it is important to understand the parameters considered.

Parameter	Unit	Definition
Reference Sensitivity	mV/Pa	Microphone reference sensitivity as shown on the microphone calibration certificate. This is the level considered to be the reference value.
As-Found Sensitivity — Sensitivity before calibration	mV/Pa	Microphone sensitivity recorded in the sound level meter prior to field calibration. It represents the sensitivity setting used by the instrument at the time the check is performed.
As-Found SPL — Level measured before calibration	dB SPL	The sound pressure level displayed by the sound level meter when the acoustic calibrator is installed on the microphone, before any adjustment. This value allows the initial sound level meter reading to be compared to the reference level produced by the calibrator before proceeding with the calibration.
Calibrated Sensitivity — Sensitivity after calibration	mV/Pa	New sensitivity value calculated and stored in the sound level meter so that the measured level corresponds to the reference level of the acoustic calibrator. This value is then used for field measurements. The calibrated SPL is not shown since it will be equivalent to the reference SPL after calibration.

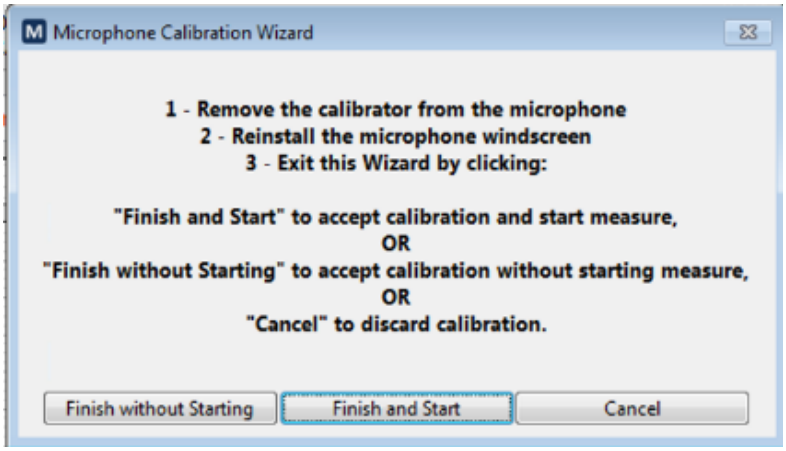
If the A*s-Found* parameters fail testing, it may indicate a problem with the previous calibration or with the microphone's communication chain (e.g., a cut cable, physical contamination, a calibrator turned off, etc.).

If *calibrated sensitivity* fails, it is important to check that the calibrator and microphone are working properly (e.g., cables, connectors, etc.). If no apparent problems are observed, contact Soft dB. The acoustic sensor and/or calibrator may

need to be returned to Soft dB for inspection, potential repair, and/or recertification, if applicable.

If the calibration is successful, select Next.

6 Follow the on-screen instructions (remove the calibrator and reinstall the wind ball).

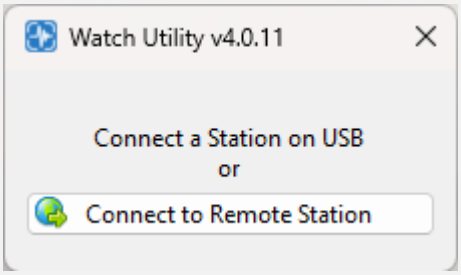


To complete the process,

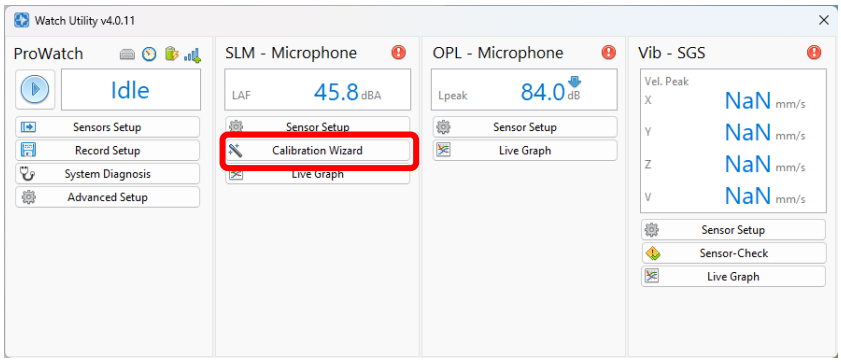
- Select Finish and Start so that the measurement resumes automatically.
- Select Finish without Starting so that the calibration process can be completed without the measurement being taken automatically.
- Select Cancel in order to cancel the calibration process (in the event of a handling error, for example).

CALIBRATION WIZARD (WATCH^{MC} SERIES)

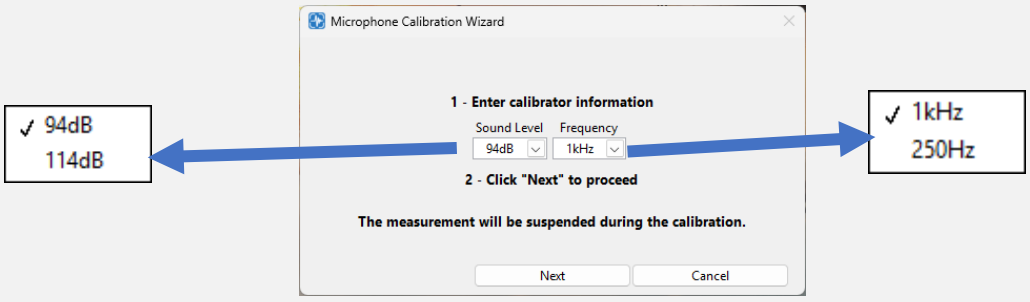
1 Using a computer or tablet with Windows, access the Watch Utility software and connect the computer to the measuring station.



2 Select Calibration Wizard to open the Calibration Wizard (red box) in the acoustic sensor section.

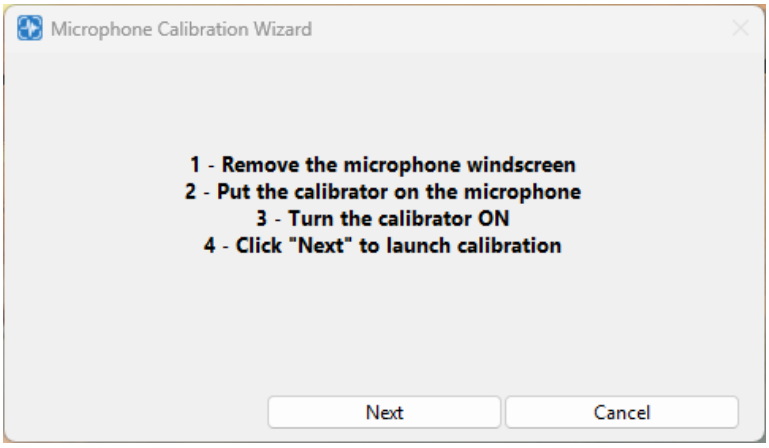


3 Verify that the *Sound level* and *Frequency* parameters are set to the levels indicated on the calibrator, and that the calibrator is activated.



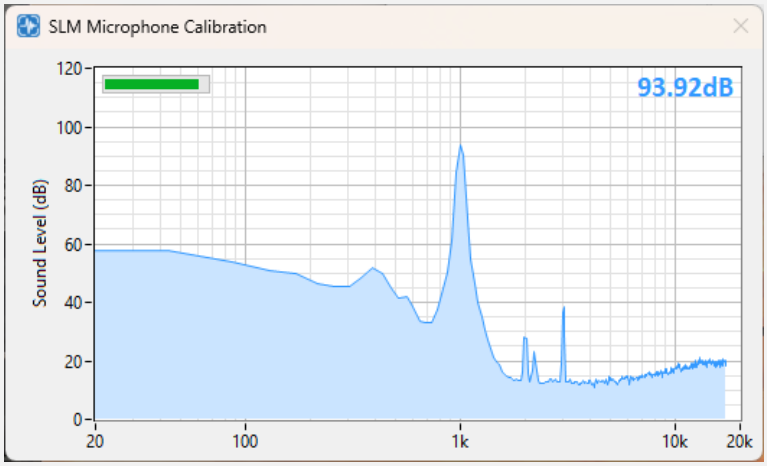
Once complete, select Next.

4 Follow the on-screen instructions (remove the wind ball from the microphone, install the calibrator, and start the calibrator by pressing the ON button).

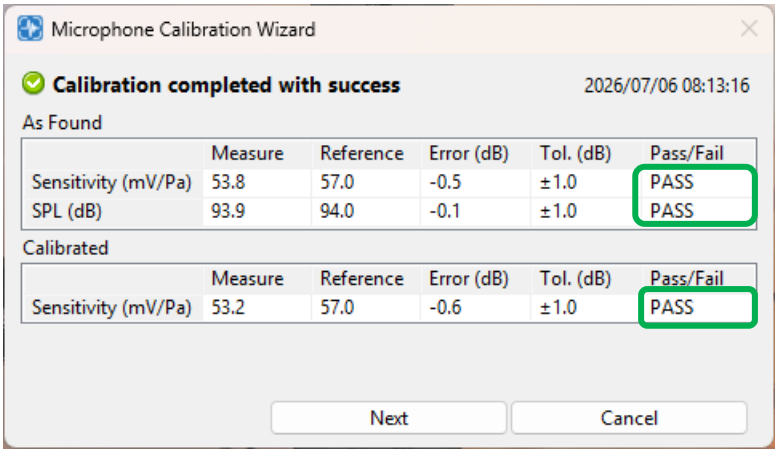


Once complete, select Next.

5 A spike in the calibration frequency (in this case, 1000 Hz) should be visible, indicating that the calibrator is functional. Wait a few moments for the calibration to be carried out.



6 The calibration has been completed successfully when all indicators read "PASS".



When the calibration results with a "FAIL" reading, it is important to understand the parameters considered.

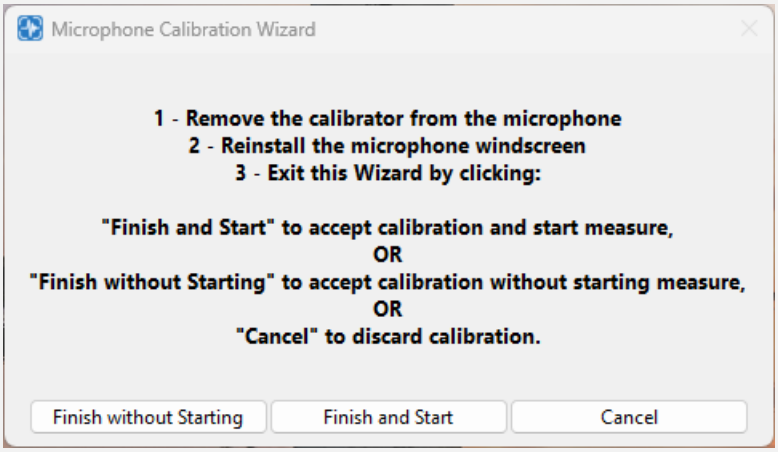
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If the *"As-Found"* parameters fail testing, it may indicate a problem with the previous calibration or with the microphone's communication chain (e.g., a cut cable, physical contamination, a calibrator turned off, etc.).

If *calibrated sensitivity* fails, it is important to check that the calibrator and microphone is working properly (e.g., cables, connectors, etc.). If no apparent problems are observed, contact Soft dB. The acoustic sensor and/or calibrator may need to be returned to Soft dB for inspection, potential repair, and recertification, if applicable.

If the calibration is successful, select Next.

7 Follow the on-screen instructions (remove the calibrator and reinstall the wind ball).



To complete the process,

- Select Finish and Start so that the measurement resumes automatically.
- Select Finish without Starting so that the calibration process can be completed without the measurement being automatically resumed.
- Select Cancel in order to cancel the calibration process (in the event of a handling error, for example).

MANUAL CALIBRATION - SUMMARY OF STEPS

	STEPS	WATCH SERIES	PRO SERIES
☐	Stop measurement	Step 1	
☐	Information to enter in the calibration register: The model and serial number of the calibrator The serial number of the sound level meter The nominal sensitivity written on the microphone The calibrators reference level	See the calibration register and Step 2	
☐	Install and start the calibrator	Steps 3, 4 and 5	
☐	Note the sensitivity of the microphone registered in the software	Step 7.2	Steps 6.1-6.3
☐	Check the measured level and record it in the logbook* Compare the measured level to the calibrator's reference level*	Step 7.3	Step 6.4
☐	Restore Nominal Microphone Sensitivity	Step 7.4	Step 6.5
☐	Distribute the calibrator, note the measured level in the register. Compare the measured level to the calibrator's reference level.	Step 7.5	Step 6.6
☐	Calibrate the microphone	Step 7.6	Step 6.7
☐	Note the new sensitivity in the calibration register	See the calibration register	
☐	Finalize the calibration and distribute the measurement	Step 8-11	

** These steps are only required during periodic calibration.*

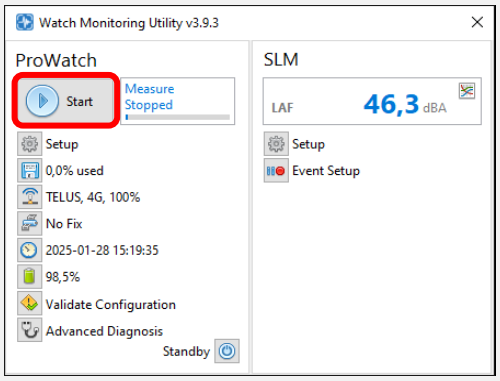
MANUAL CALIBRATION - PREPARATION

During the calibration process, the data obtained can be recorded in the "Calibration Register (p. 35)" available at the end of this guide.

1 Using the monitoring software provided, stop/discontinue measurements.

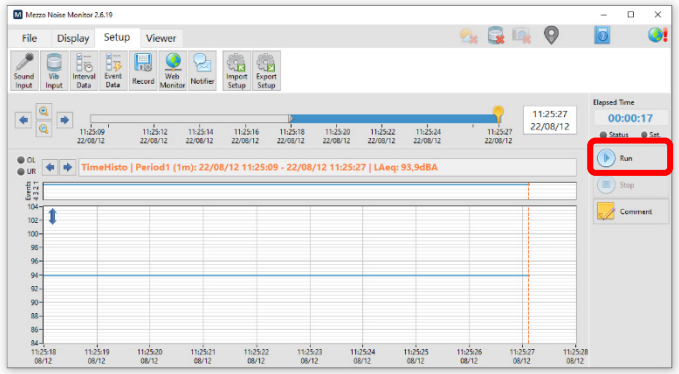
Watch MC

- *Windows* computer or tablet to the station's USB port
- Open the Watch Utility software and press the Stop button



Pro Station MC

- Connect the touchscreen to one of the station's USB ports.
- Use the Noise Monitor software. This software should already be open on the station's computer. Press the Stop button.



2 Verify that the date of the last laboratory calibration, located at the base of the microphone (Figure B), is less than 1 year old. Perform the same check for the reference source.

Notes:

- If the last laboratory calibration was performed over one year, laboratory calibration is recommended. Contact Soft dB to make further arrangements.
- If the label is not present, check the calibration date on the microphone calibration certificate supplied with the station or within the Watch Utility software (SLM tab / setup button).

3 Remove the windscreen (foam ball) on the microphone base by carefully unscrewing it counterclockwise. Be careful not to squeeze the screen during removal.



Notes:

- It is important to ensure that the metallic capsule, which protects the microphone membrane, remains securely in place.
- If the surface of the windscreen is damp or weathered, replace it with a dry or new windscreen.
- If the windscreen appears damaged and/or does not stay securely on the microphone, replace it with a new one.

Soft dB cannot be held responsible for damage caused by improper handling of instruments during calibration.

4 Install the standard source at the end of the microphone until the microphone is locked. This can be done by pushing the microphone into the receiver base of the standard source and rotating slightly clockwise.



Record the calibrator's serial number and note it in the Calibration Log.

It is best to always use the same calibrator.

Record the reference level of the calibrator and record it in the Calibration Log.

5 Wait 90 seconds after installing the reference source. Next, start the device by pressing the *Start button* (this may vary depending on model; see the example in the red box*)*.



Remarks:

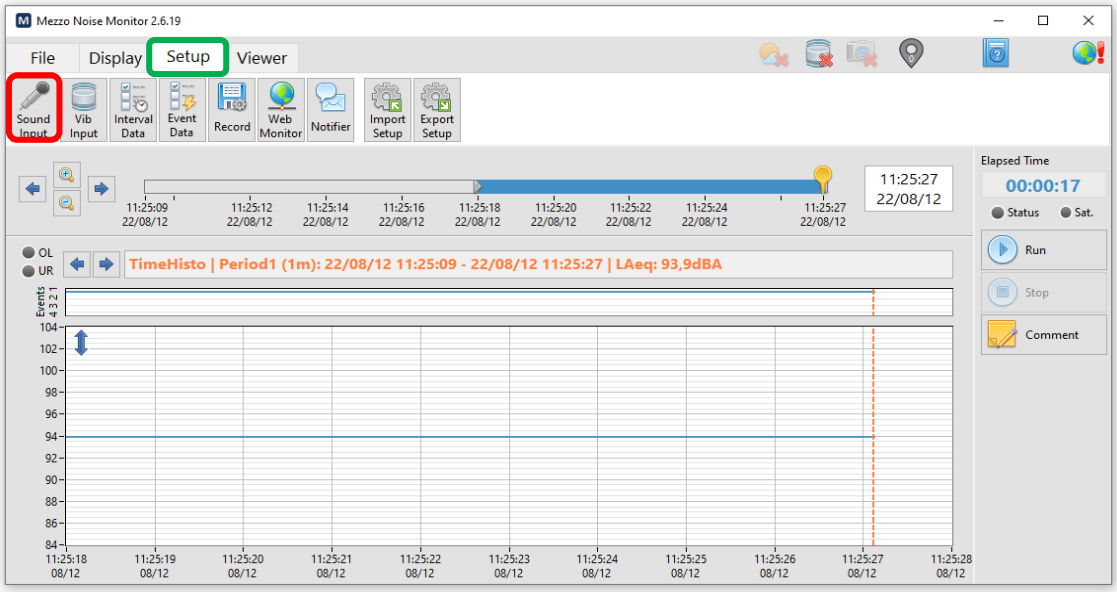
- The waiting time is important because it allows for the pressure to be balanced between the reference source and the microphone.

For Pro [MC] Series Stations: Continue to Step 7

For Watch [MC] Series Stations: Continue to Step 8

MANUAL CALIBRATION (PRO MC SERIES)

6.1 With the touch screen connected to the station, access the Mezzo Noise Monitor software on the measuring station and stop the measurement (orange box).



Select the Setup tab (green box).

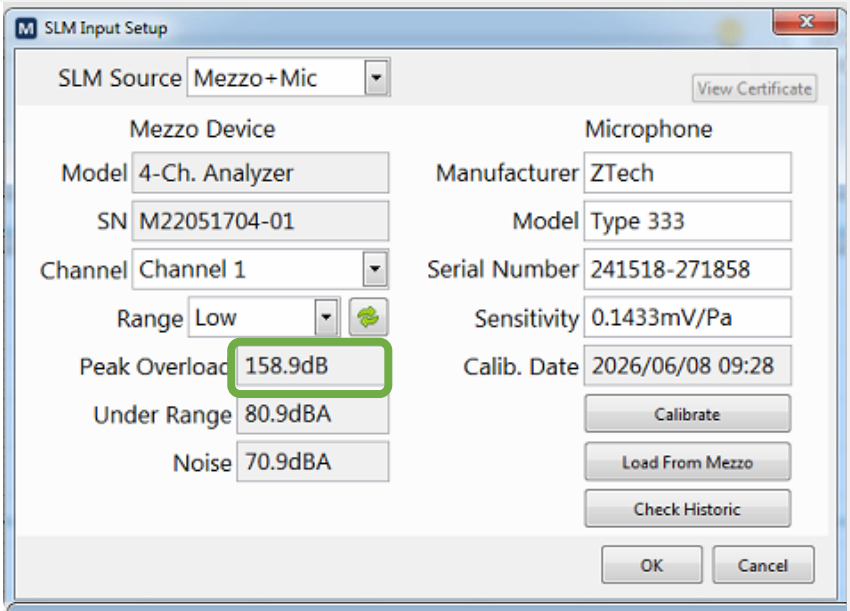
In the Setup tab, select 

or 

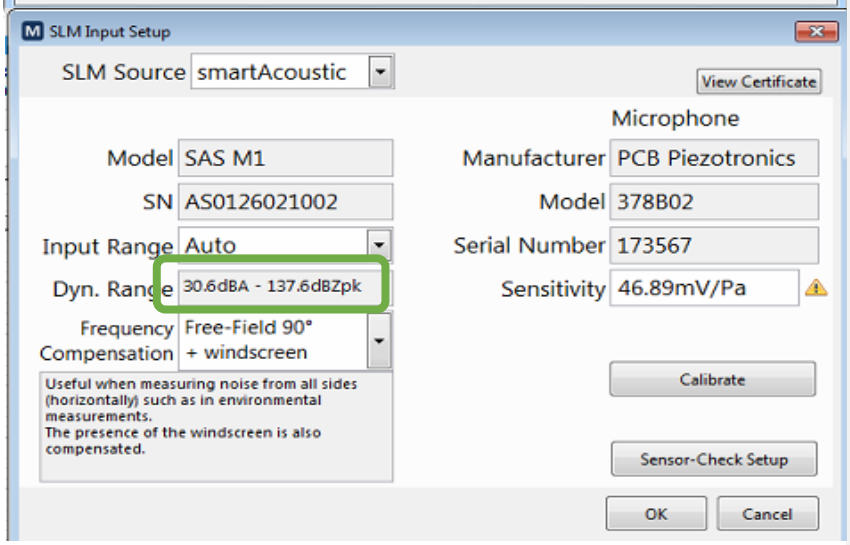
to access the interface for the type of microphone installed.

6.2

Regular Microphone



SAS Microphone



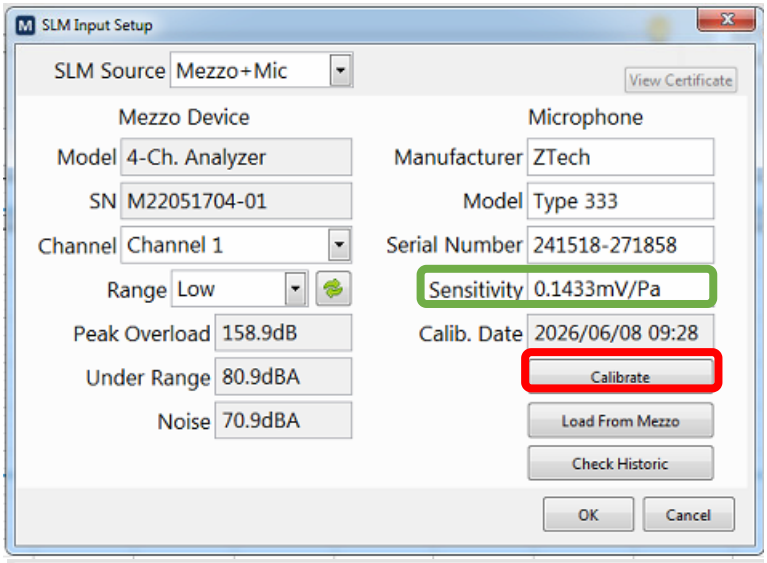
Check that the sound level generated by the standard source is lower than the saturation sound level (overload) of the acoustic sensor (green box).

Notes:

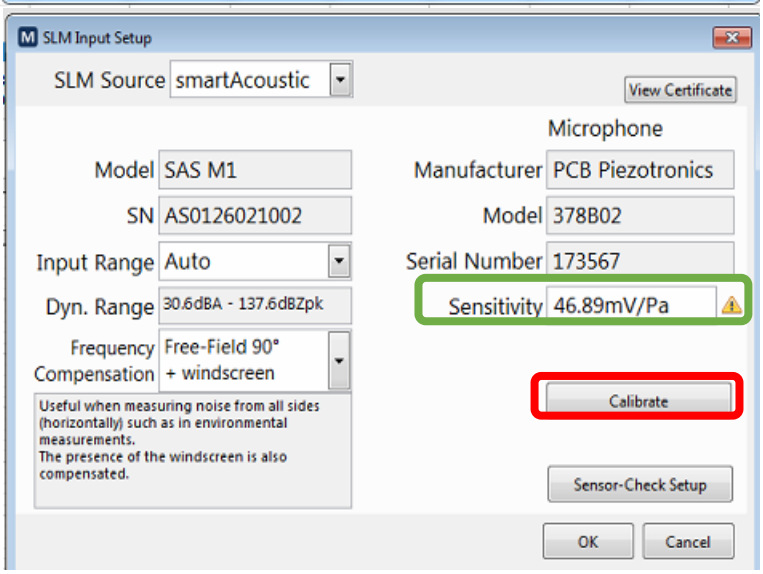
- If the reference level selected on the calibrator is higher than the saturation level (overload) of the acoustic sensor (red box), do not perform calibration or modify the level generated by the standard source when possible.

6.3

Regular Microphone



SAS Microphone



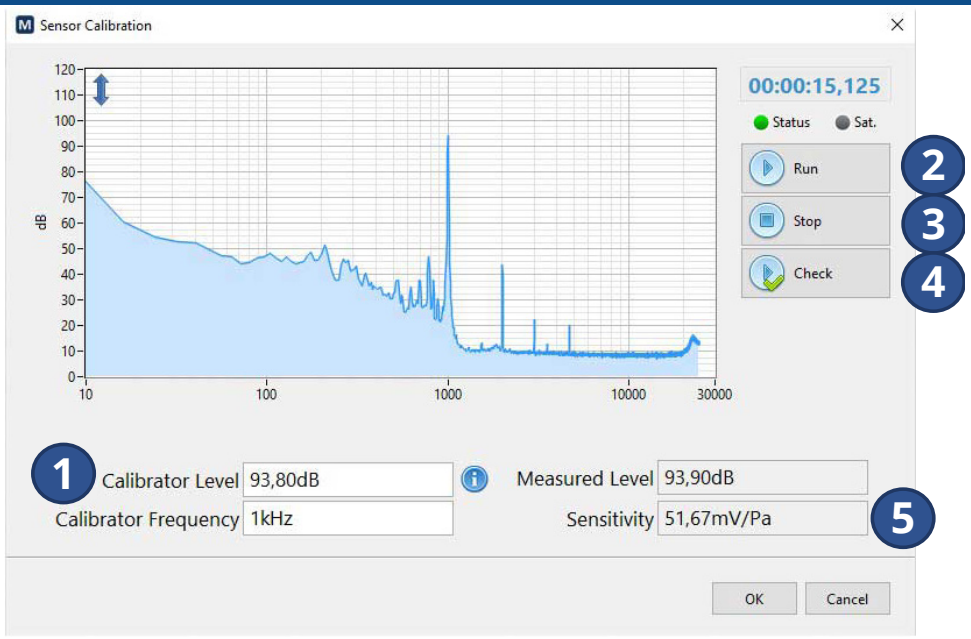
Verify that the microphone's serial number, manufacturer's name, and microphone model number are correct. This information is available on the MSDS at the base of the microphone.

If this is the first time the acoustic sensor has been calibrated (after installation), reset to the nominal sensitivity by pressing the button Load From Mezzo. This will also automatically enter microphone information into the interface.

Note the sensitivity in the green box in the calibration register (before the calibration) and enter this information in the Sensitivity - Before column.

Select Calibrate to access the calibration and level check interface (red box).

6.4

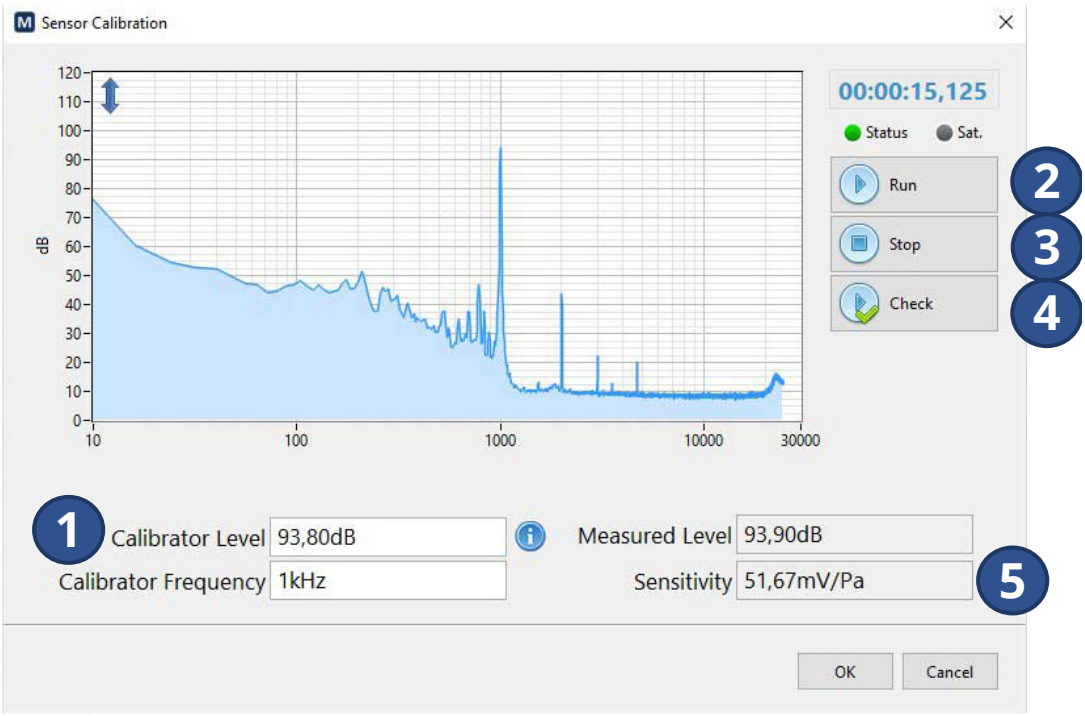


1. Depending on the type of calibration source, the *Calibrator* level may sometimes need to be adjusted (see the icon for details ℹ). It is strongly recommended that the reference level be verified in the technical specifications of the reference source and the microphone.
2. Verify that the reference source is activated by ensuring that a peak is visible at the nominal frequency of the source (1000 Hz).
3. *Calibrator Level* and *Calibrator Frequency* (**point 1**) are identical to the reference data written on the calibrator (**Figure C**).
4. Click *Check* and note the measured level *Measured Level* value in the Calibration Register. Click *Stop* after 5 seconds or more;
5. Check the difference between the *Calibrator Level* and the *Measured Level*.
   - If the observed deviation is less than ±1.0dB, the procedure can be continued;
   - If the observed deviation is greater than or equal to ±1.0 dB, It is important to check that the calibrator and microphone is working properly (e.g., cables, connectors, etc.). If no apparent problems are observed, contact Soft dB. The acoustic sensor and/or calibrator may need to be returned to Soft dB for inspection, potential repair, and/or recertification, if applicable.

6.5

1. Return to the Sound Input Setup page by pressing OK. Use Load From Mezzo to reset to nominal sensitivity. Note it in the calibration register.
2. Select Calibrate to access the calibration and level check interface (red box).

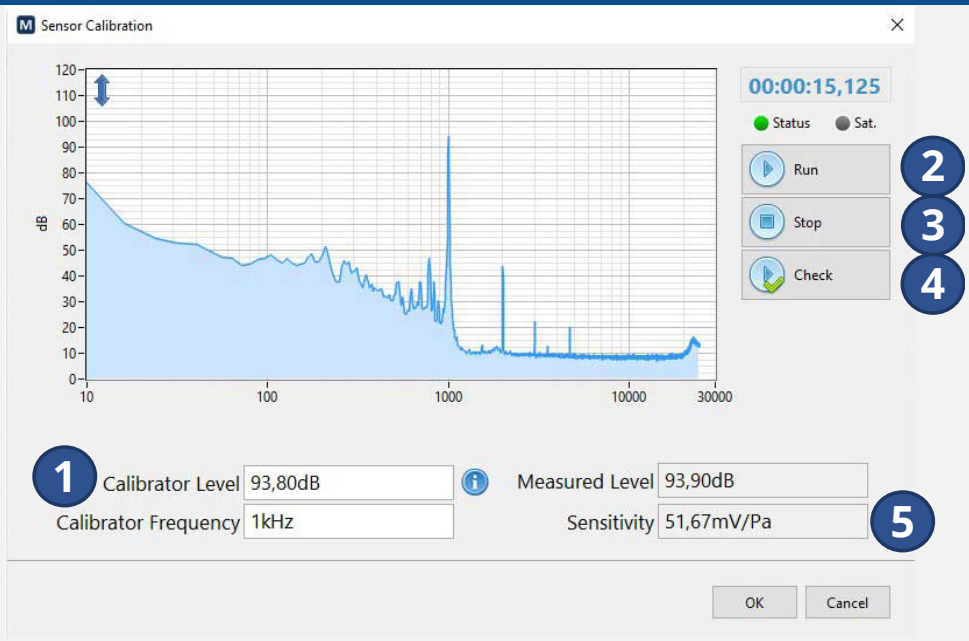
6.6



1. Make sure the calibrator is in operation
2. Click on *Check* to check the calibration (point 4).
3. After 5 seconds or more, press the STOP button (point 3).
4. Check the measured level in the *Measured Level* box. Enter this information in the calibration register.
5. Repeat the checks presented in sub-step 5 of task 6.4.

If the data is within tolerances, proceed to the next step.

6.7



1. Make sure the calibrator is in operation.
2. Click *Run* to start calibration (**point 2**).
3. After 5 seconds or more, press the *Stop* button (**point 3**).
4. Check the measured level in the *Measured Level* box. Note this information in the calibration register.
5. Repeat the checks presented in sub-step 5 of task 6.4.

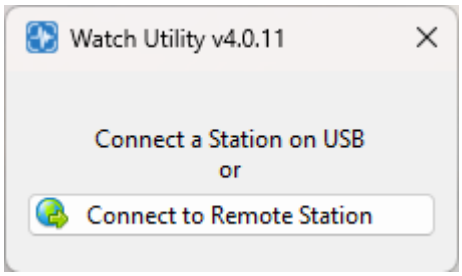
If the data is within tolerances, click OK to save this calibration.

6.8

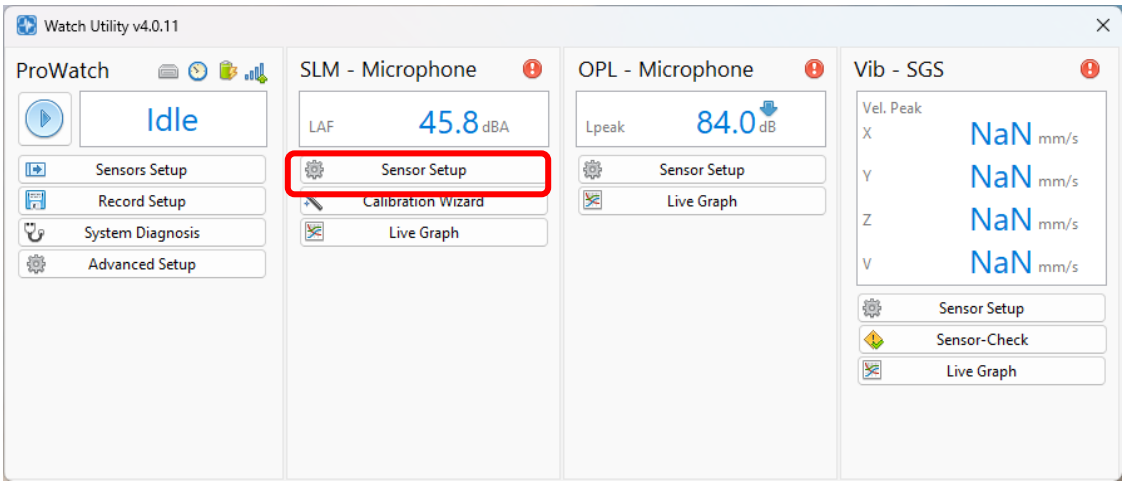
Proceed to the calibration finalization step (step 8)

MANUAL CALIBRATION (WATCH MC SERIES)

7.1 Using a computer or tablet with Windows, access the Watch Monitoring Utility software and connect the computer to the measurement station.

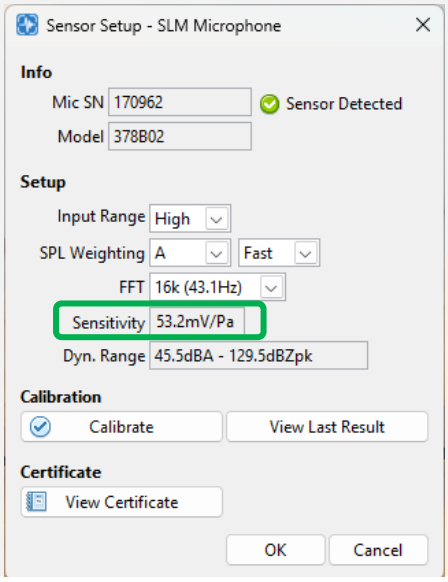


Select Sensor Setup in the 2nd column of the screen (red box) to access the Sensor Setup menu.



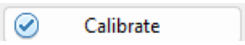
7.2

Enter the sensitivity of the microphone (green box) in the calibration log.

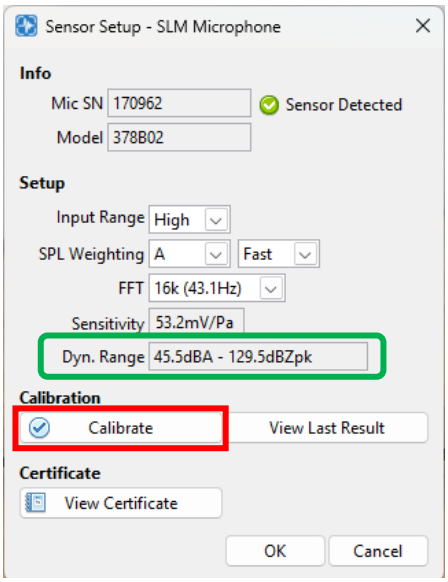


7.3

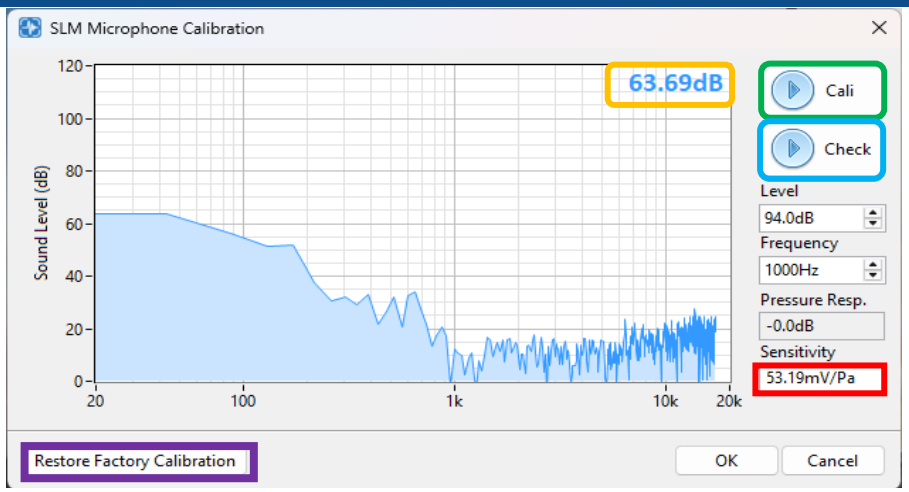
Check that the "*Dynamic Range*" *(circled green)* is higher than the standard source level.

Select 

to open the calibration interface (red box).



7.4



1. Verify that the *Level* and *Frequency* parameters are set to the levels indicated on the calibrator, and that the calibrator is enabled.
2. Start the calibrator.
3. Select "*Check*" (blue box), a peak of 1000 Hz should be observed.
4. After more than 5 seconds, take note of the measured level (orange box).
5. Record the measured level in the calibration register.
6. Check the deviation between the Calibrator Level and the measured level.
    a. If the observed deviation is less than ±1.0dB, continue the procedure;
    b. If the observed deviation is greater than ±1.0dB, it is important to check that the calibrator and microphone are working properly (e.g., cables, connectors, etc.). If no apparent problems are observed, contact Soft dB. The acoustic sensor and/or calibrator may need to be returned to Soft dB for inspection, potential repair, and recertification, if applicable.
7. Select "*Restore Factory Calibration*" (purple box).

7.5

1. Start the calibrator.
2. Select "*Check*" (blue box).
3. After more than 5 seconds, take note of the measured level (orange box).
4. Record the measured level in the calibration register.
5. Check the deviation between the Calibrator Level and the measured level.
    a. If the observed deviation is less than ±1.0dB, continue the procedure;
    b. If the observed deviation is greater than ±1.0dB, it is important to check that the calibrator and microphone are working properly (e.g., cables, connectors, etc.). If no apparent problems are observed, contact Soft dB. The acoustic sensor and/or calibrator may need to be returned to Soft dB for inspection, potential repair, and recertification, if applicable.

7.6

1. Start the calibrator.
2. Select "Cali" (green box). Wait 5 seconds for the calibration to be completed.
3. After more than 5 seconds, record the level measured (orange box).
4. Record the measured level in the calibration register.
6. Check the deviation between the Calibrator Level and the measured level.
    a. If the observed deviation is less than ±1.0dB, continue the procedure;
    b. If the observed deviation is greater than ±1.0dB, it is important to check that the calibrator and microphone are working properly (e.g., cables, connectors, etc.). If no apparent problems are observed, contact Soft dB. The acoustic sensor and/or calibrator may need to be returned to Soft dB for inspection, potential repair, and recertification, if applicable.
7. Select OK to save the sensitivity. Do not close with the X or "cancel," otherwise the up-to-date sensitivity will not be saved.

7.7

Proceed to the calibration finalization step (step 8)

MANUAL CALIBRATION - FINALIZATION

Once the boxes in the Calibration Register are filled, it is now time to finalize the calibration of the acoustic sensor.

8 Remove the reference source (calibrator) by rotating it slightly clockwise. Careful not to unscrew the microphone membrane.



9 Reinstall the windscreen (foam ball) by rotating clockwise onto the membrane.

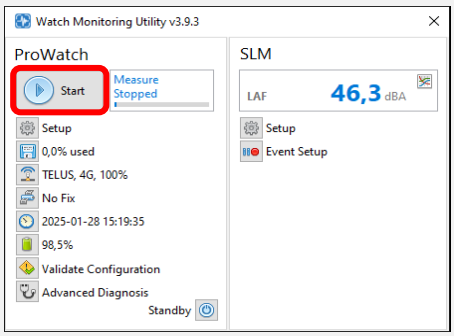
Ensure that the windscreen is dry and that it fully covers the microphone.



10 Using the monitoring software, restart the measurements.

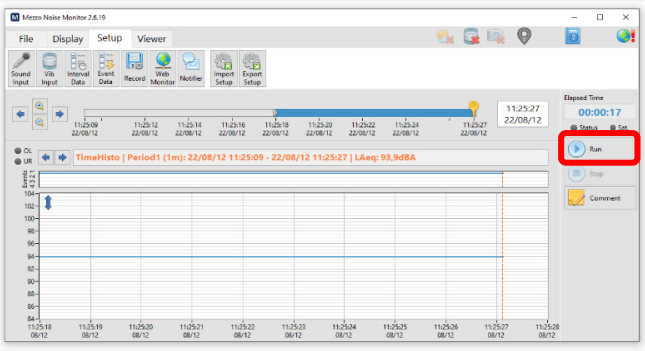
Watch [MC]

- *Windows* computer or tablet to the station's USB port
- Open the Watch Utility software and press the *Start* button (red box).



Pro Station [MC]

- Connect the touchscreen to one of the station's USB ports.
- Use the Noise Monitor software. This software should already be open on the station's computer. Select the *Run* button.



CALIBRATION REGISTER

S/N of Watch Series:_____ S/N of Microphone Series:_____ Certification Date:_____ Sensitivity Certificate:_____

Date	Hour	Calibrated By:	Calibrator Serial Number	Reference Level (dBA)	Sensitivity (mV/Pa)	Measured Level (dBA)	Difference Between the Reference Level and the Measured Level			Sensitivity (mV/Pa)	Weather		Comments	General Condition of the Station/Visible Damage?	Measuremer Distributior After Calibration?
					Before	Before	Less than ± 1 dBA	Between ± 1 dBA and ± 1,5 dBA	Greater than ± 1,5 dBA	After	Wind Speed (km/h)	Humidity (%)			
										-					
										-					
										-					
										-					
										-					
										-					



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