

THE MEASURABLE DIFFERENCE.



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# OXYGEN TRAINING > SOUND LEVEL





*OXYGEN's sound level option can be used for determining the time dependent sound pressure level according to IEC 61672 and IEC 651.*

## Features:

- > Frequency weighting: A-, B-, C-, D- or Z weighting
- > Time weighting: fast (125 ms), slow (1000 ms) or impulse (35 ms / 1500 ms)
- > Reference level  $p_0$  available for airborne sound (20  $\mu\text{Pa}$ ) or water (1  $\mu\text{Pa}$ )
- > Energy equivalent sound pressure level  $L(A)_{\text{eq}}$
- > Time dependent sound pressure level
- > Minimum and maximum occurring sound pressure level
- > Statistical (percentile) sound pressure Levels
- > Above mentioned values can be determined for the entire measurement or block-wise per definable time interval
- > Raw frequency weighted sound pressure in original unit [Pa]
- > Noise exposure level  $L(A)_{\text{Ex,8h}}$  and Noise Dose D

## Benefits:

- > Statistical sound pressure level analysis
- > (Long term) sound monitoring
- > Sensor sensitivity can be entered manually or determined with calibrator
- > Sound pressure level determination for airborne sound and water
- > Interval-wise logged sound pressure levels

## Applications:

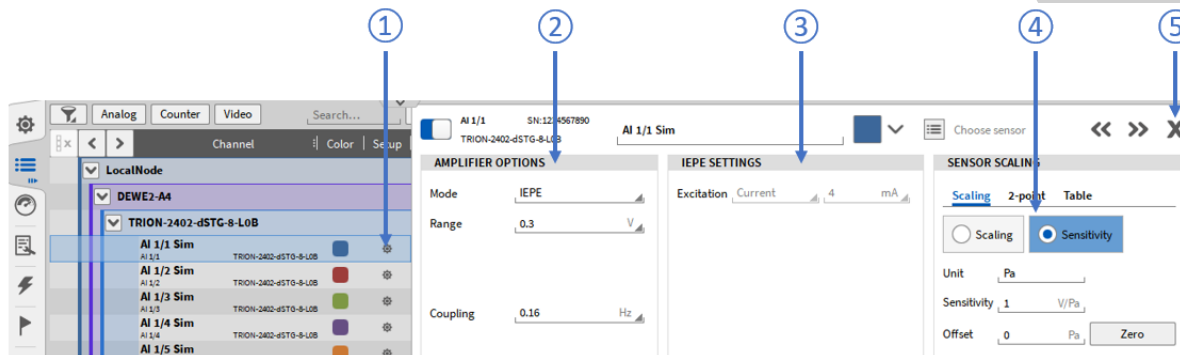
- > Analyzing the acoustical emission of machines
- > Determining the spatial and statistical sound pressure level distribution in buildings
- > Long term noise monitoring



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# CHANNEL SETUP

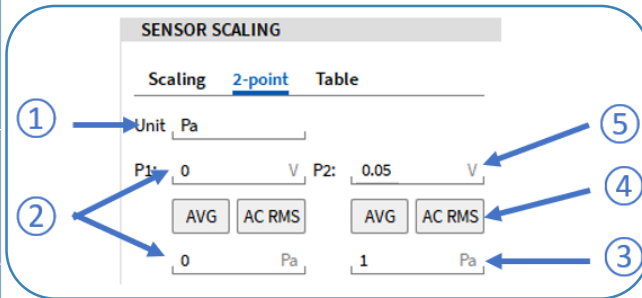
- 1 Connect the microphones to the hardware and open the channel setup
- 2 Select the proper amplifier options for your sensor (typically IEPE mode)
- 3 Set up the correct excitation current
- 4 To enter the sensitivity of the sensor, select Sensitivity, enter the correct unit [Pa] and enter the correct sensitivity
- 5 Close the Channel Setup when finished





# CALIBRATION

- 1 If a calibrator is used for sensitivity determination, go to the 2-point sensor scaling tab and enter the unit [Pa]
- 2 Let the settings 0 V and 0 Pa untouched. This means that 0 V measurement signal equals 0 Pa.
- 3 Enter the reference RMS-sound pressure of the calibrator. This is 1 Pa<sub>RMS</sub> for a 94 dB calibrator and 10 Pa<sub>RMS</sub> for a 114 dB calibrator
- 4 When the calibrator signal is stable, press the AC RMS button. The AC RMS level of the calibrator will be averaged for the last 1 second
- 5 The sensitivity will be calculated automatically

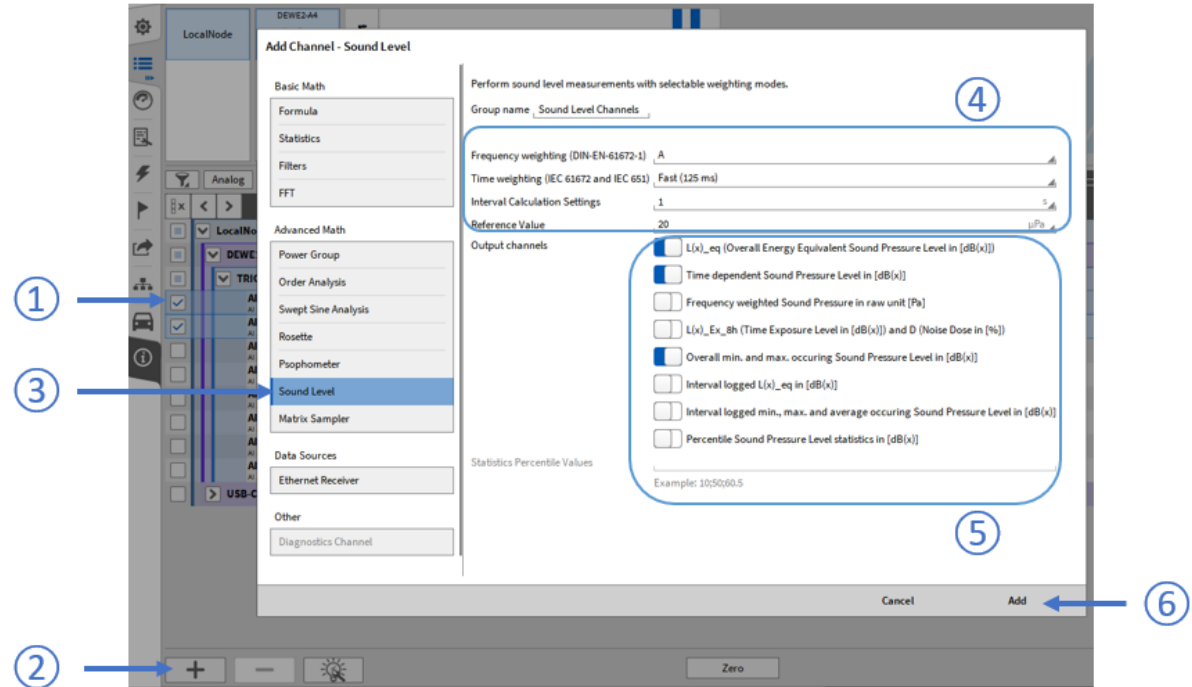


# CREATING A SOUND LEVEL DETERMINATION



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- 1 Select the input channels for which a sound level shall be determined by selecting their checkboxes in the Channel List
- 2 Press the + button
- 3 Select the *Sound Level* section
- 4 Perform the required settings
- 5 Select the desired output channels
- 6 Press the *Add* button



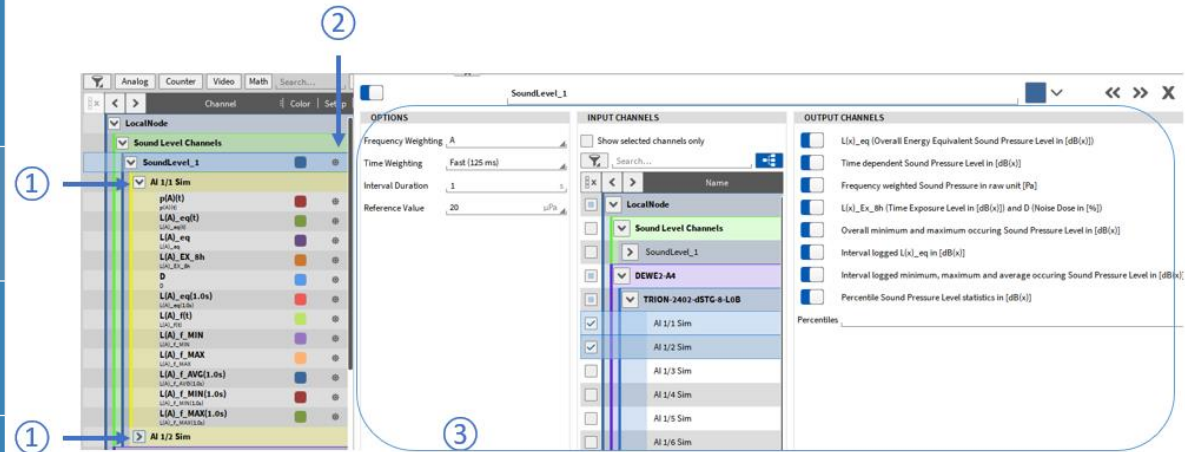
# CREATING A SOUND LEVEL DETERMINATION



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- 1 A new sound level determination will be added to the Channel List. A separate section with output channels per input channel will be created and can be expanded by pressing the Arrow button
- 2 The settings can be edited by pressing the Gear button of the Sound Level group
- 3 The options, input channels and output channels can be edited afterwards if required



- Frequency: A-weighting, B-, C-, D and Z-weighting according to IEC 61672 can be selected for the sound level determination.
- Time weighting: Fast (125 ms), slow (1000 ms) and impulse (rising 35 ms / falling 1500 ms) can be selected for the sound level determination. Fast and slow time weighting are compliant with IEC 61672 and impulse weighting complies with IEC 651.
- It is possible to update certain output signals interval wise. The time interval can be selected from 0.1 s to 10 s.
- It is possible to select the reference sound pressure level  $p_0$  for airborne sound which is 20  $\mu\text{Pa}$  or the reference sound pressure level  $p_0$  for water which is 1  $\mu\text{Pa}$ .



# AVAILABLE OUTPUT CHANNELS

- ① Outputs the energy equivalent sound pressure level  $L(x)_{eq}$  for the entire measurement
- ② Outputs the time dependent frequency and time weighted sound pressure level  $L(x)_\tau$
- ③ Outputs the frequency weighted raw signal  $p(x)(t)$
- ④ Outputs the daily noise exposure level  $L(x)_{EX,8h}$  for and the equivalent noise dose  $D$  for a reference level of 85 dB
- ⑤ Outputs the minimum  $L(x)_{\tau,MIN}$  and maximum  $L(x)_{\tau,MAX}$  occurring sound pressure level during the measurement as single value
- ⑥ Outputs the  $L(x)_{eq}$  calculated for the specified time interval
- ⑦ Outputs the  $L(x)_{\tau,MIN}$  and  $L(x)_{\tau,MAX}$  and  $L(x)_{\tau,AVG}$  calculated for time the specified time interval
- ⑧ Outputs the sound pressure level(s) that are exceeded for a certain percentage of the measurement time

## OUTPUT CHANNELS

- ①   $L(x)_{eq}$  (Overall Energy Equivalent Sound Pressure Level in [dB(x)])
- ②  Time dependent Sound Pressure Level in [dB(x)]
- ③  Frequency weighted Sound Pressure in raw unit [Pa]
- ④   $L(x)_{EX,8h}$  (Time Exposure Level in [dB(x)]) and  $D$  (Noise Dose in [%])
- ⑤  Overall minimum and maximum occurring Sound Pressure Level in [dB(x)]
- ⑥  Interval logged  $L(x)_{eq}$  in [dB(x)]
- ⑦  Interval logged minimum, maximum and average occurring Sound Pressure Level in [dB(x)]
- ⑧  Percentile Sound Pressure Level statistics in [dB(x)]

Percentiles 10.0;33.3;95.0

Channel	Value	Unit
p(A)(t)	0.000353	AVG
L(A)eq(t)	89.885873	AVG
L(A)eq	89.885873	AVG
L(A)EX_8h	76.763421	AVG
D	14.911256	AVG
L(A)eq(1.0s)	89.885870	AVG
L(A)f(t)	89.885829	AVG
L(A)f_MIN	61.650387	AVG
L(A)f_MAX	89.913489	AVG
L(A)f_10.0	89.911622	AVG
L(A)f_33.3	89.900166	AVG
L(A)f_95.0	76.527740	AVG
L(A)f_AVG(1.0s)	89.885851	AVG
L(A)f_MIN(1.0s)	89.858067	AVG
L(A)f_MAX(1.0s)	89.913488	AVG

$X$  denotes the selected frequency weighting (A, B, C, D, Z)

$\tau$  denotes the selected time weighting (fast, slow, impulse)



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# AUDIO REPLAY

- ① It's possible to replay channels via the default PC sound card by using the Audio Player Instrument
- ② Possibility to Mute channels
- ③ Possibility to set the volume
- ④ Possibility to change the left-right Balance

*Maximum number of replay channels per instrument is 2.*

*Recommended sample rate of replay channels is from 1 kHz to 200 kHz*

*Replay is available in LIVE, REC and PLAY mode.*

*In LIVE and REC mode, the actual data is replayed.*

*In PLAY mode, replay is snapped to Orange cursor (⑤).*

