SIAFA®
Higiene Ocupacional y Medio Ambiente

Sound Level Meters
Nor131 & Nor132

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Norsonic

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The Nor130 Series of Sound Level Meters are designed and manufactured to the latest sound level meter standards and comprises two products.

Nor131

Class 1 Sound Level meter designed for occupational hygiene, general sound level measurements and noise assessments applications. It can be extended with 1/1 and 1/3 octave real time filter bands, level vs. time, statistics, STIPA and reverberation calculation based on impulse excitation. Supplied with detachable IEPE preamplifier allowing use of extension cable.

Nor132

Class 2 Sound Level meter designed for occupational hygiene, general sound level measurements and noise assessments applications. It can be extended with 1/1 and 1/3 octave real time filter bands, level vs. time, statistics, STIPA and reverberation calculation based on impulse excitation. Supplied with fixed IEPE preamplifier.

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Applications

- Noise hazards in the workplace
- Prescription of hearing protection
- Environmental noise investigations
- Product noise testing
- Speech intelligibility - STIPA
- Reverberation time measurement
- General purpose sound level meter

Features

- Single measurement range
- Extremely simple operation
- Parallel L_{Aeq} and L_{Cpeak}
- Large internal memory
- Clock synchronized measurements
- Single measurement range
- USB interface
- Allows use of microphone extension cable (Nor131 only)
- Allows use of Nor1218 outdoor microphone (protection kit) (Nor131 only)
- Large back-lit display
- Complies to IEC and ANSI standard
- 1/1 octave (optional)
- 1/3 octave (optional)
- Statistical analysis (optional)
- Level versus time (optional)
- Speech Transmission Index (STIPA) calculation (optional)
- Reverberation time calculation (optional)

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Easy to use

Just push the START key and measure! No need to worry about gain setting as the instrument covers the entire range from 20-140 dB in one single span. When the measurement stops, the auto-store feature secures your measurement in the non-volatile memory.

There are only three buttons the user needs to operate to complete a measurement, clearly indicated by the orange colour: Power on, Calibration and Start measurement.

The Nor130 Series of SLM's uses the latest available digital technology to give the operator a clear view of the noise climate. The main operations are performed through dedicated front panel keys in order to give instant access to all required functions during the measurement. No need to pre-select required measurement function before starting the investigation. Simply press the NETW-key to swap between the A– and C–weighting networks, and press the FUNC-key to scroll through all the measured functions.

Quatro detector

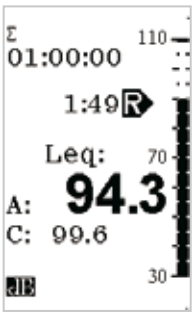
The Quatro detector in the instrument measures both the RMS- and the Peak-levels from two weighting networks simultaneously! Hence, the Nor130 Series offer industrial hygiene specialists the L_{Aeq}, L_{Ceq}, L_{Apeak}, and L_{Cpeak} from one single measurement.

Large memory

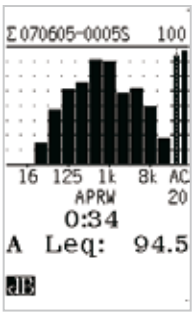
Measurement results may be stored in the (5 MByte) internal non volatile memory. The memory typically holds all measured functions from up to 10,000 individual measurements.

The instrument features four different storage modes, where as all of them have an automatic file numbering system containing a directory each day with today's date and file numbers starting with 1 and up to maximum 9999 each day!

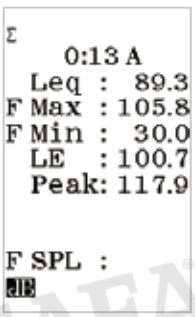
The different storage modes can be set in the memory menu. Manual, Automatic, Repeat and Synchro.



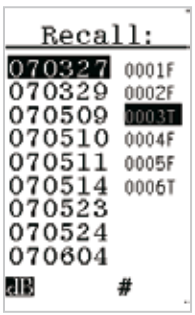
The sound level meter display shows both A– and C-/Z- weighted levels simultaneously



Frequency display (option 1)



The tabular display shows all functions both during and after the measurement.



All measurements are stored using the actual date as current directory name

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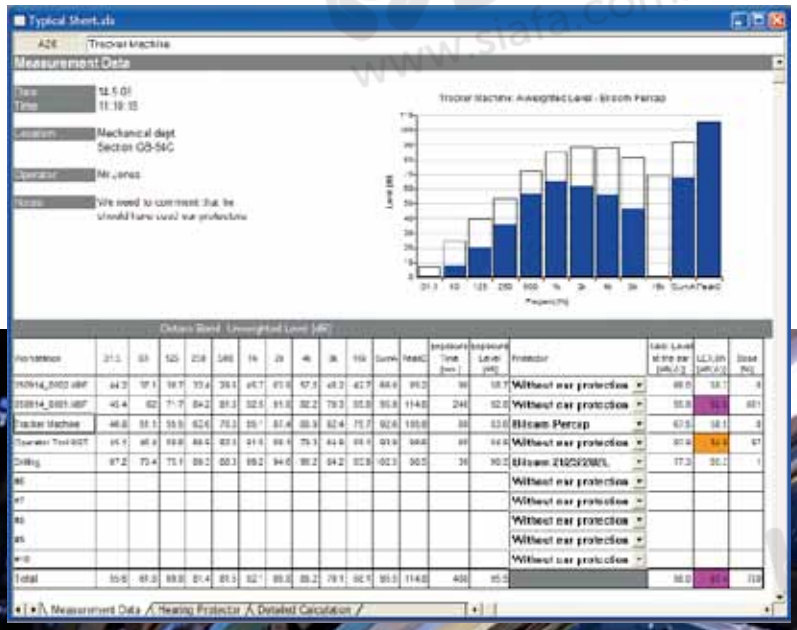
Occupational hygiene

The Nor130 Series is ideal for noise deafness risk assessments under the EU Physical Agents (Noise) Directive. It measures all required functions simultaneously, and presents the results both during and after the measurement period. The L_{Aeq} and L_{Cpeak} values are provided to allow the $L_{EP,d}$ and peak action levels to be determined from quick and simple measurements at each workstation. Where exceedences are detected the L_{Ceq} - L_{Aeq} value is available to allow the HML method of hearing protector to be specified.

For a more detailed analysis, the instruments may be upgraded with 1/1- or 1/3-octave real-time frequency analysis (Option 1 and 4). The resulting frequency spectrum is available at the same time as the initial measurement and gives the information necessary to both specify noise control measures and for the correct prescription of personal hearing protection.

The post processing software NorProtector (Nor1025) for selection of hearing protectors and reporting of noise levels at workers place is a powerful tool for noise deafness risk assessments. The software is included in the Noise at work kit (Nor131/K1 or Nor132/K1) or may be bought separately.



Environmental noise assessments

By adding the statistical L_n function (option 2) the instrument will also provide the dB values in terms of the L5, L10, L50, L90 etc that are required to determine the impact of noise in the community.

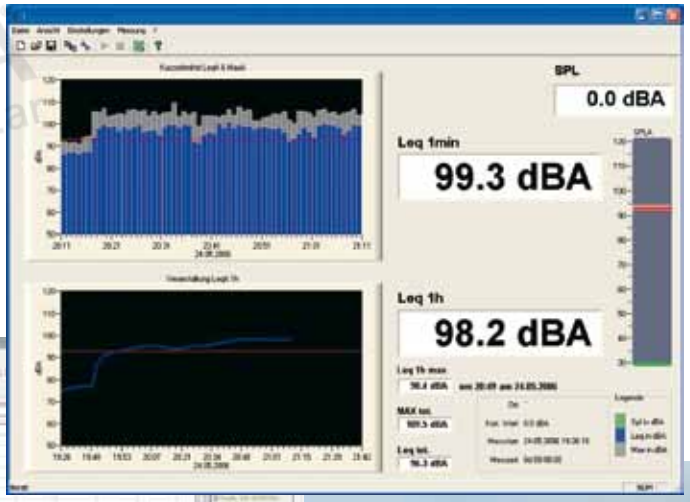
These measurements often require long term noise monitoring. With the clock synchronized automatic storage facility in the Nor130 series, repeated measurements may be performed with the results automatically stored to allow these long term measurements to be made, yet preserving the temporal data on the dispersion of the levels. By taking, for example, 5 minutes measurements on repeat store, the Nor130 instruments will produce 288 measurements per 24 hour period. These measurement files are easily downloaded to a PC using the NorXfer software which will additionally convert all these files into one single Excel-file containing an overview of all the measured data for the entire 24 hour period.

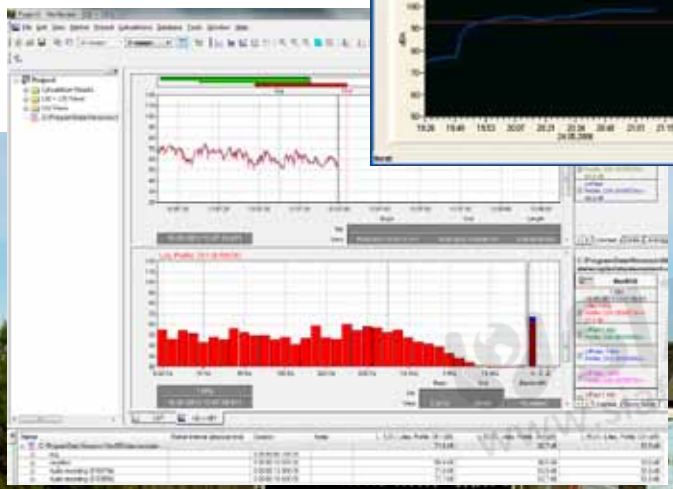
A more detailed analysis may be performed by adding the level vs. time option (option 3). This allows a level vs time resolution of 1 sec (see option 3 later).

The acquired data can be further analysed and a report generated by use of the post processing program NorReview (Nor1026).

The Nor130 series of instrument may also be used as a front end in reporting the sound level in discotheques, concerts and outdoor events using the NorConcertControl monitoring and reporting program

The all weather microphone protection, Nor1218, can be used with the Nor131. Extension cables up to 30 m can be used without any loss in performance. 100 m extension cable can be used for sound pressure levels less than 130 dB and 300 m for levels less than 120 dB.





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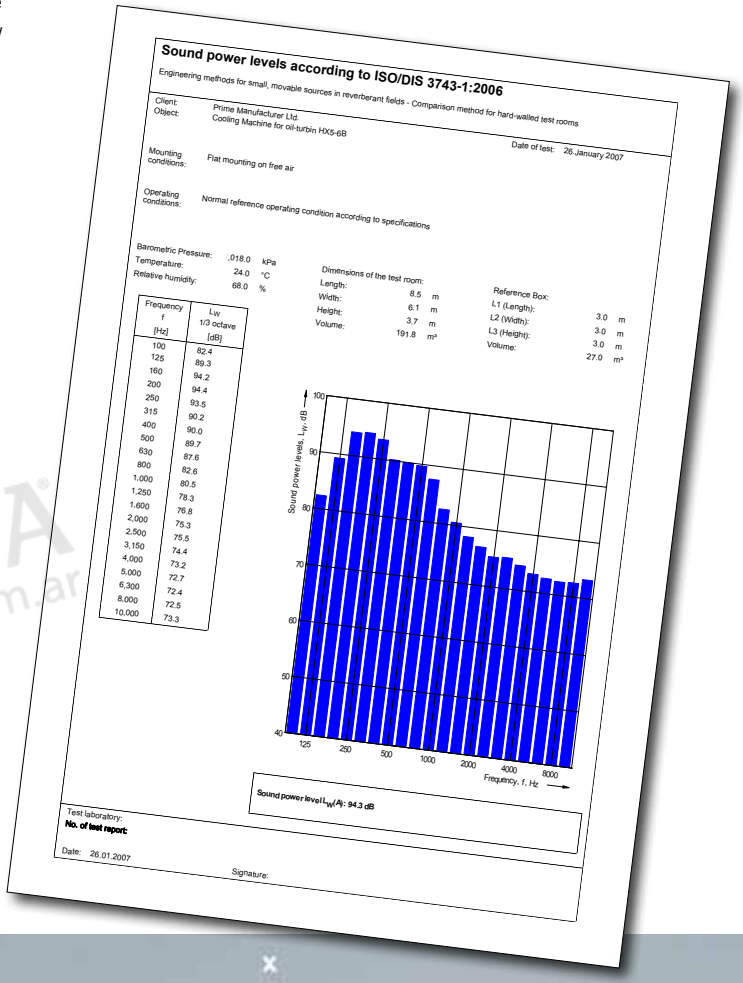
Sound Power measurements

The Nor130 series of instruments together with the Sound Power post processing and reporting program NorPower (Nor1035) is a powerful and budget friendly tool for CE noise labelling a machine according to the EU directive 2000/14/EC and the ISO 3740 series of standards.



Sound power levels according to ISO/DIS 3743-1:2006

Engineering methods for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Client: Prime Manufacturer Ltd.
Object: Cooling Machine for oil-turbin HX5-6B
Date of test: 26.January 2007

Mounting conditions: Flat mounting on free air

Operating conditions: Normal reference operating condition according to specifications

Barometric Pressure: ,018.0 kPa
Temperature: 24.0 °C
Relative humidity: 68.0 %

Dimensions of the test room:
Length: 8.5 m
Width: 6.1 m
Height: 3.7 m
Volume: 191.8 m³

Reference Box:
L1 (Length): 3.0 m
L2 (Width): 3.0 m
L3 (Height): 3.0 m
Volume: 27.0 m³

Frequency f [Hz]	L_W 1/3 octave [dB]
100	82.4
125	89.3
160	94.2
200	94.4
250	93.5
315	90.2
400	90.0
500	89.7
630	87.6
800	82.6
1,000	80.5
1,250	78.3
1,600	76.8
2,000	75.3
2,500	75.5
3,150	74.4
4,000	73.2
5,000	72.7
6,300	72.4
8,000	72.5
10,000	73.3

Sound power level $L_{W(A)}$: 94.3 dB

Test laboratory:
No. of test report:
Date: 26.01.2007
Signature:

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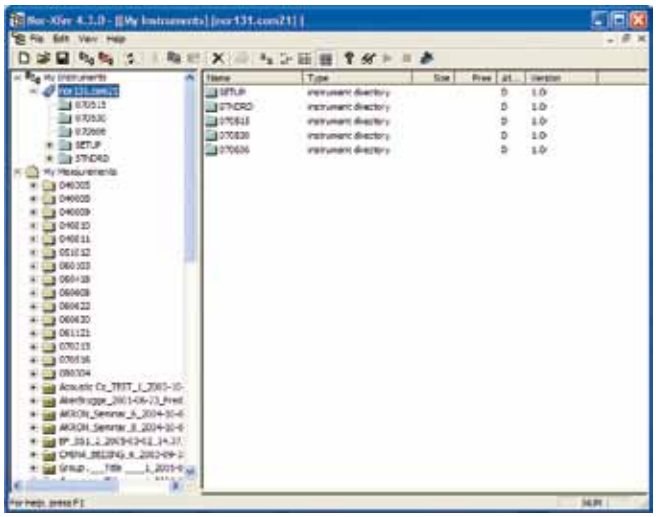
NorXfer

Also supplied with the instrument is the PC data transfer software NorXfer. This program transfers and converts the measurement results from the internal memory or from the SD memory card to the PC. The data can then be seamlessly used by all other Norsonic post processing programs, such as NorReview, NorBuild or NorPower.

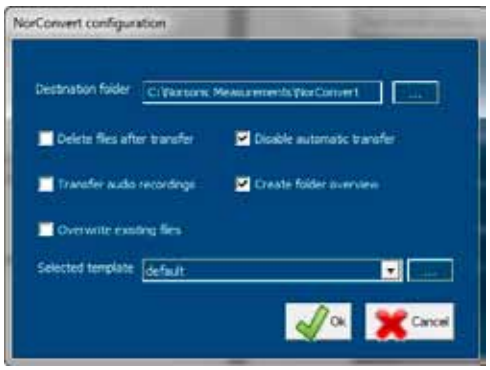


NorReport is an add-in module to the NorXfer. This reporting program enables the user to create Excel templates for calculation and reporting. A vast range of standard templates exist to cover for the local markets need. The measured data can also be directly converted into Excel or text files.

Two optional extensions (not included in standard delivery) can be added to NorXfer. Option 1 is modem control, and option 2 is remote control of all Nor140 functions and setup parameters.

NorConvert

NorConvert is a program for automatic download and convert to Excel of Norsonic measurements on SD card or USB connection (.nbf files) from Nor131 and 132.

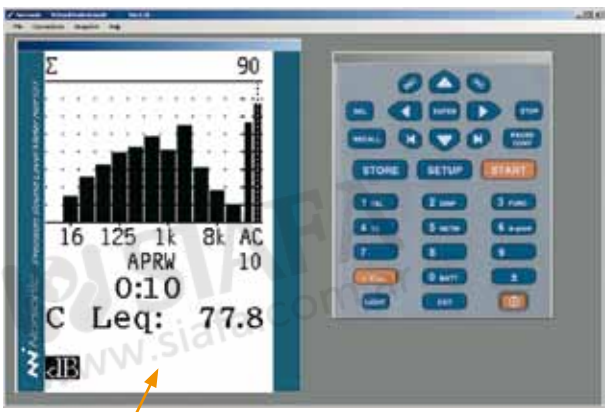


NorConvert will start automatically and transfer and convert all measurements automatically from SD cards and USB ports. In addition you may run the application in manual mode.

The program is part of the NorXfer installation, but the user will not see the NorXfer User Interface running. NorXfer can be used afterwards on the downloaded files as usual, should this be needed.

Virtual Instrument

A virtual sound level meter is included in the delivery of the Nor130 series of instruments. This PC program allows the user to remotely control the sound level meter and simultaneously get a display of the instrument screen on the PC monitor.



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Options

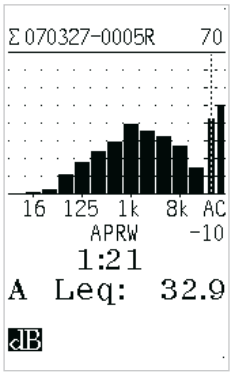
Real Time Frequency analysis (Option 1 and 4)

The spectral weighting network A reports one value for the entire frequency spectrum. It is a sum of the entire noise. The same applies for C and Z networks. If a more detailed analysis is needed for parts of the frequency spectra, such as which frequency is dominating the noise spectrum, or maybe comparing different noise spectra, the frequency analysis option is needed. The Nor130 series of instruments may be extended with 1/1 octave (option 1) or with 1/3 octave (option 4) frequency analysis option. Both options are real time filters analysing all bands in parallel.

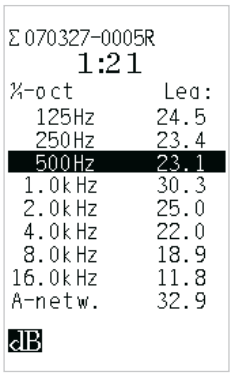
Option 1 1/1 octave analysis, covers the frequency range from 8Hz to 16kHz in 12 frequency bands.

Option 4 1/3 octave analysis covers the frequency band from 6,3Hz to 20kHz in 36 frequency bands.

Within each frequency band the instrument measures SPL, Leq, Lmax, Lmin and Le functions. The frequency bands are measured in parallel to the normal Sound Level Meter functions. Hence, all frequency data are measured and reported simultaneously with the normal Sound Level Meter functions. Additionally, if the option 2 statistical analysis is installed, 8 different L_n-percentiles are calculated within each frequency band in addition to the spectral weighting functions A, C or Z.



The 1/1-octave spectrum may be viewed with a A-preweighting feature



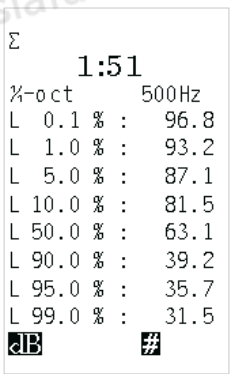
The 1/1-octave table is scrolled up and down for all measured functions

Statistical analysis (Option 2)

For environmental noise evaluation, statistical analysis with the L_n-percentiles are often used. By installing the option 2, the Nor130 instruments offer these functions as well.

The statistical analysis are calculated based on 0.2 dB class widths covering the entire 120 dB dynamic range. 7 fixed L_N-percentiles are calculated ($L_{1\%}$, $L_{5\%}$, $L_{10\%}$, $L_{50\%}$, $L_{90\%}$, $L_{95\%}$, and $L_{99\%}$), plus one user-defined L_n-percentile which may be set to any N-value with 0.1% resolution.

If option 1 or 4, real-time filters are installed, the L_n-percentiles are available for each individual frequency band as well.



The Ln percentage table contains seven fixed and one user-defined percentile

Level versus time measurements (Option 3)

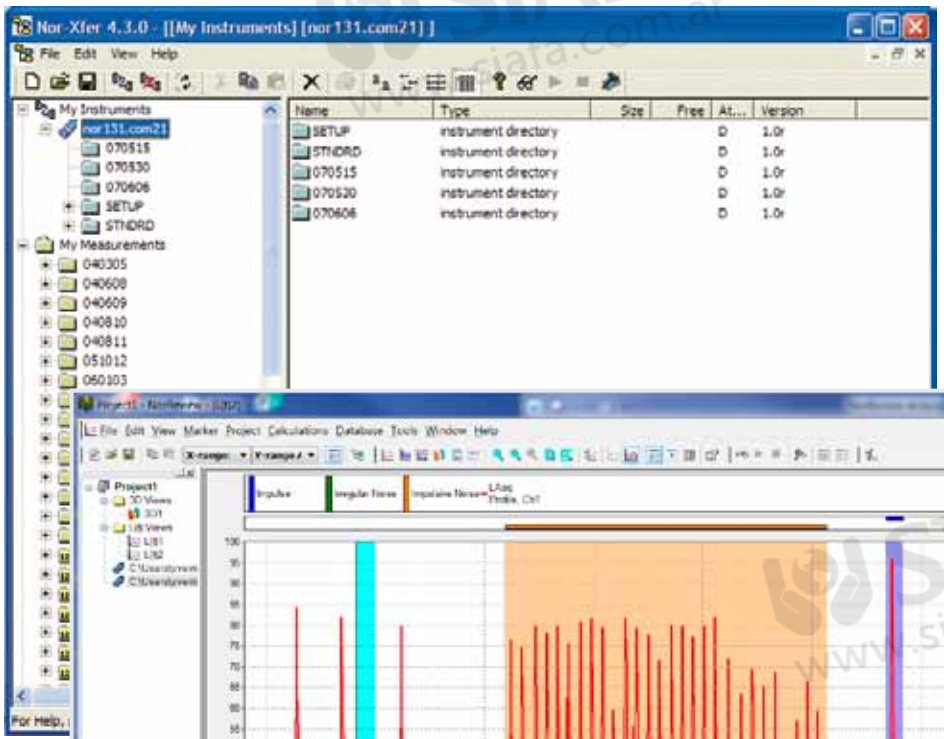
Option 3, level vs. time enables the instrument to log the time profile like the classic level recorders used to do. The time profile is measured by dividing the total measurement into smaller periods of time, all having the same duration. The period length can be set from 1 second and upwards in 1 second steps. The logged parameters are LAeq, LAmax, and LCpeak.

The level vs. time measurement is made in parallel with the basic sound level meter functions for the overall level; the global level for the entire measurement period. If any of the frequency analysis options are installed, the frequency spectrum is reported as a global spectrum in addition to the level vs. time too!

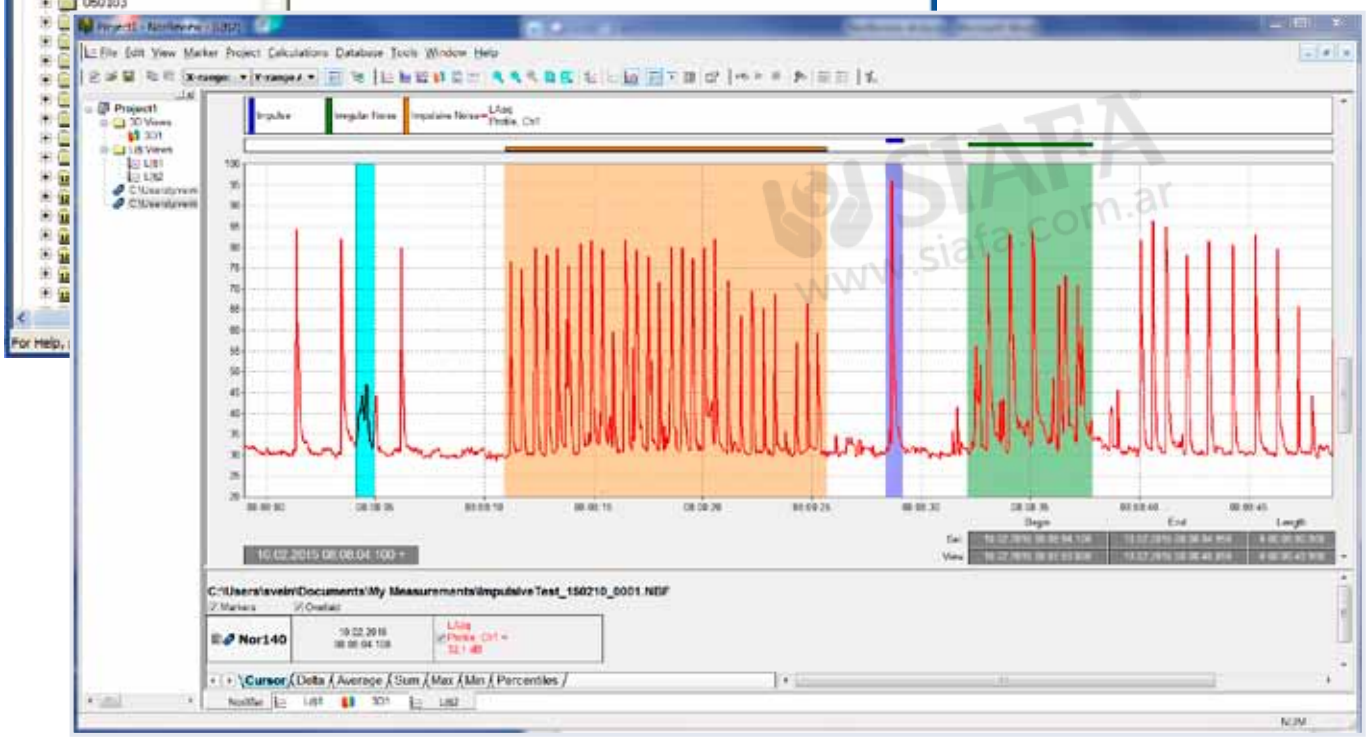
The level vs. time data is not displayed on the instrument but stored in its memory. The data can easily be exported to a PC and automatically converted to Excel format or further analysed in the post processing and reporting program NorReview (Nor1026).

The level vs. time measurements can be combined with the “Repeat” or “Synchro” storage for long term measurements.

NorXfer screenshot



NorReview screenshot



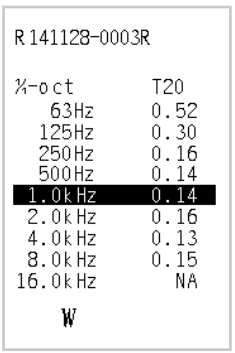
Reverberation time measurement mode (Option 5)

- Reverberation time based on impulse excitation
- Calculates both T20 and T30
- Covers the 63 – 8000 Hz frequency bands for the 1/1-octave filters
- Covers the 50 – 10000 Hz frequency bands for the 1/3-octave filter

Option 5 requires that option 1: 1/1-octave bands is installed!

With the addition of Reverberation time calculations (and STIPA) the Nor131 becomes the obvious sound level meter choice for classroom acoustics measurements!

Very easy to use: from setup through measurement to report using NorXfer (single -or multiple file selection)



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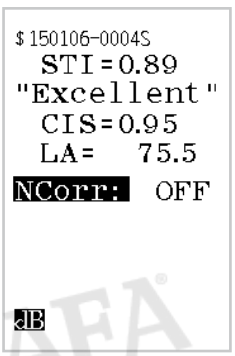
STIPA - Calculates the STIPA speech transmission index (Option 6)

- Fulfils the requirements of the latest IEC 60268-16 (2011-6) Standard for STIPA
- Includes signal (.vaw) for use through separate public address
- Loudspeaker system or portable CD-player can be used for playback of signal
- Background noise correction

It is now possible to use the Nor131 and Nor132 meters for analysing the Speech Transmission quality in public areas using the STIPA method. The method can be used to compare the speech transmission quality at various positions and under various conditions within the same listening space. The calculation follows the latest revision of the standard (2011-6).

A measurement in one listening position takes about 13 sec. Unlike many other STIPA measurement systems, the implementation with the Nor131/132 can also correct the results for the background noise. In addition all calculated indexes are displayed, not only the single STIPA value. This feature is valuable for engineers optimizing the room acoustics in public spaces or other areas where the speech quality is important.



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Specifications (Common for both models unless noted)

The Nor130 series of SLM fulfil the following standards: IEC60651, IEC60804, IEC61672, IEC61260, ANSI S1.4, ANSI S1.11, and ANSI S1.43. The Nor131 instrument meets the Class1 requirements while the Nor132 instrument the Class 2 requirements.

Measured Parameters

Simultaneous measurement of SPL, L_{eq}, L_{Max}, L_{Min}, L_E and LPeak (plus the T_{max5} for Germany only).

Time weighting functions: Fast, Slow and Impulse.

Spectral weighting functions: Simultaneously measurement of A and C or Z-weighting. Additionally the 1/1 octave real time filters covering all bands from 8 Hz to 16K Hz (option 1) or 1/3-octave covering all bands from 6,3Hz to 20kHz (option 4).

Statistical calculations: 7 fixed percentiles L1%, L5%, L10%, L50%, L90%, L95%, and L99% plus one user defined value (f.ex. L0.1%). The statistical calculation is performed in real time within each frequency band if the filter option 1 is installed.

Measurement range

One range covering 120dB without any range adjustments.

Self noise measured with microphone: 17dBA (25dBA for Nor132)

Maximum RMS level: 137dBA

Maximum Peak level: 140dB PeakC

Levels up to 174dB can be measured by use of a suitable 1/4” microphone.

Battery / power consumption

4 IEC LR6 (AA sized). Separate display showing battery voltage and run time on battery since last battery change. Nominal operation time on one set of batteries is >8 hours. Nominal 11-15V external DC voltage. If external supply drops below 9 volt, it switches uninterrupted to internal batteries.

Datastorage Datatransfer

5MB internal memory equals to 2.5 million values which typically holds all measured functions from up to 10,000 individual measurements.

Datatransfer

Data transfer via USB 2.0 interface.

Analogue outputs

AC output, 100mV for full scale deflection.

Size and weight

Depth: 29 mm, Width: 74 mm

Length, excl. microphone/preamplifier: 215 mm,
Length, incl. microphone/preamplifier: 305 mm

Weight incl. batteries: 380 g

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