Sound Level Meters

Nor131 & Nor132

Applications

- Noise hazards in the workplace
- Prescription of hearing protection
- Environmental noise investigations
- Product noise testing
- Noise labeling

Features

- Single measurement range
- Parallel L_{Aeq} and L_{Cpeak}
- Real-time frequency analysis
- Both 1/1- and 1/3-octave bands
- Large internal memory
- Clock synchronized measurements

Norsonic

Norsonic AS, the high quality manufacturer of advanced sound analysers for more than 40 years, is proud to present a new range of sound level meters. We have taken parts of the unique technology from our more advanced analysers into a new simple sound level meter - to give the users a reliable low cost SLM with the well-known Norsonic quality. Thereby, our complete range of sound level meters is expanded to cover any need from simple dB(A) measurement to advanced sound analysis.

To give our customers the highest degree of measurement accuracy and to follow our quality philosophy, the Norsonic series of sound level meters are type approved by several national homologation laboratories, such as PTB, Germany.

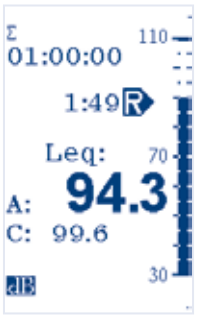
Nor130 Series of SLM's

The Nor130 Series of Sound Level Meters are designed and manufactured to the latest sound level meter standards and comprises two products. The Nor131 is a Class 1 (precision) instrument whilst the Nor132 is designed in accordance with the less accurate Class 2 requirements. Both meters offer the same features with exception of the detachable preamplifier which is only available on the Nor131 version.

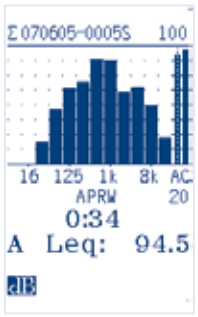
Easy to use

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

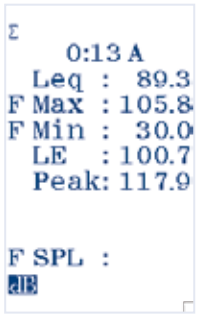


Frequency display (option 1)

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.

Legible display with backlight

The high resolution backlit graphical display presents all results clearly. The sound level meter graphical display contains a bargraph with the instantaneous SPL level plus the numerical value of the selected functions for both weighting networks. Date, time and the instrument status are displayed as well. The DISP button toggles between the sound level meter graphical display and the real time 1/1 or 1/3 octave level vs. frequency display (optional extension)



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

A push on the TBL-key presents all results in a tabular view.

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 10000 each day!

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

The different storage modes can be set in the memory menu.

Manual Requires that the operator manually stores the acquired data before the next measurement is made. The instrument prompts the user to store before a new measurement begins, or before switching off the unit.

Automatic The data is stored automatically each time a measurement is finished.

Repeat Automatically storage of data and restart of next measurement using the same setup and duration. There will be a short time delay between each measurement due to internal memory housekeeping.

Synchro Same as Repeat, but the instrument automatically reduces the duration of the first measurement period in order to synchronize the measurement series with the first full hour. Minimum measurement duration for this function is 30 sec per individual measurement

USB interface

Remote control of the instrument is possible via the USB 2.0 interface. All features may be controlled, and all measured results may be read-out.

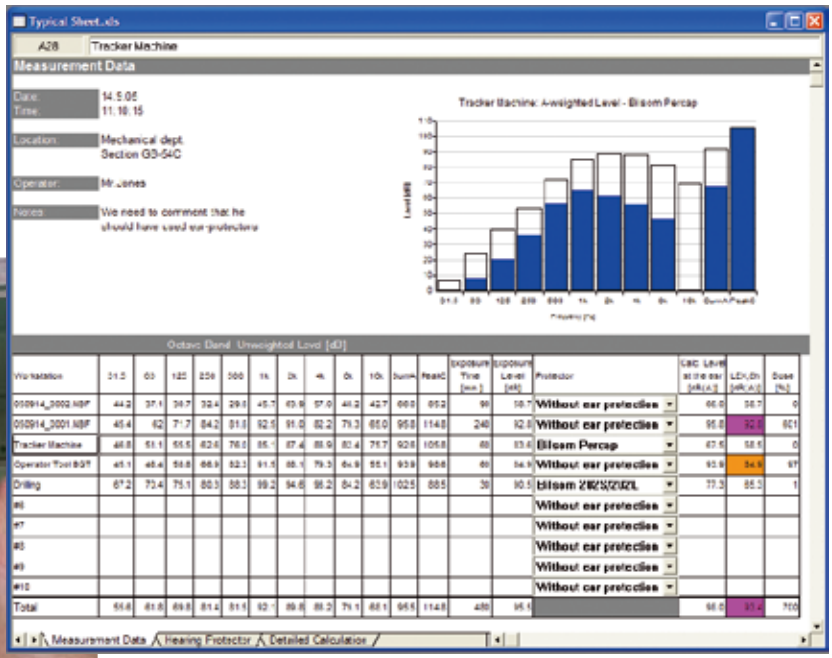
By use of the Norsonic NorXfer software (included in the delivery), data downloading is completed in a few keystrokes in a Windows Explorer environment.

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.



NorProtector screenshot

Environmental noise assessments

By adding the statistical L_N function (option 2) the instrument will also provide the dB values in terms of the L_5, L_{10}, L_{50}, L_{90} 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, Nor1212, 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.

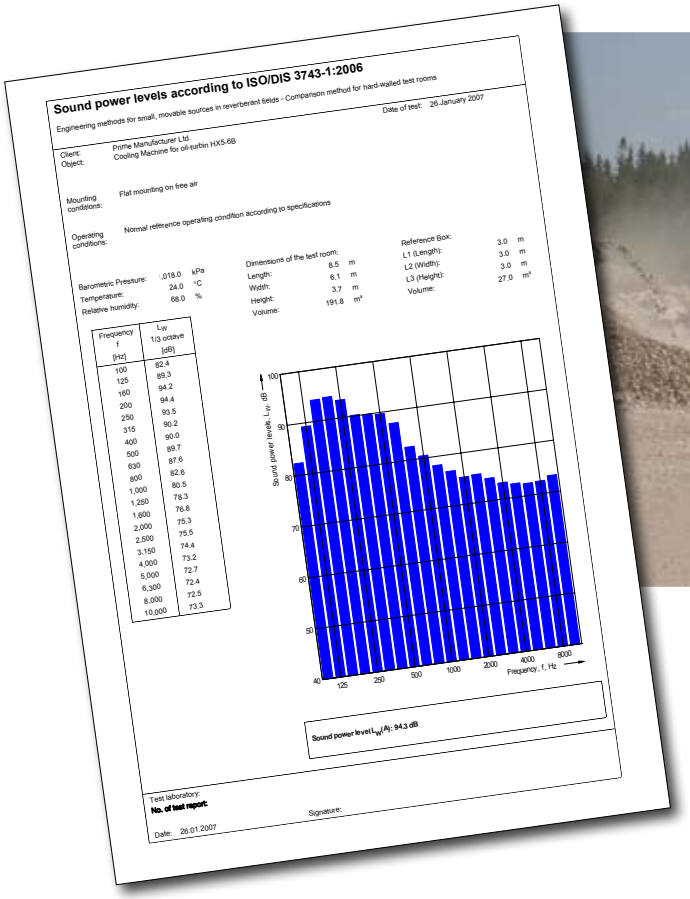
Nor1212

NorConcertControl screenshot

Photo © Heitere Openair Zofingen

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: 1018.0 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

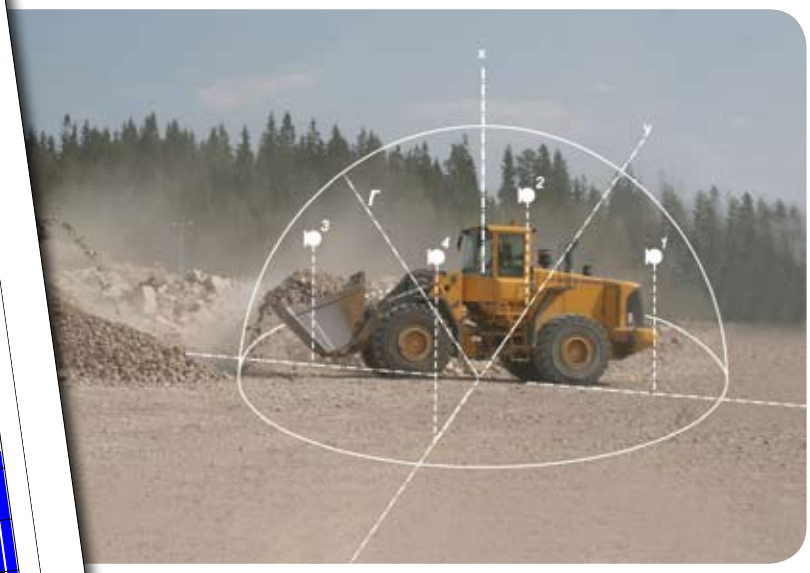
Reference Box:
L1 (Length): 3.0 m
L2 (Width): 3.0 m
L3 (Height): 3.0 m
Volume: 27.0 m³

Frequency f [Hz]	Lw 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, dB
Frequency, f, Hz

Sound power level L_{WA}: 94.3 dB

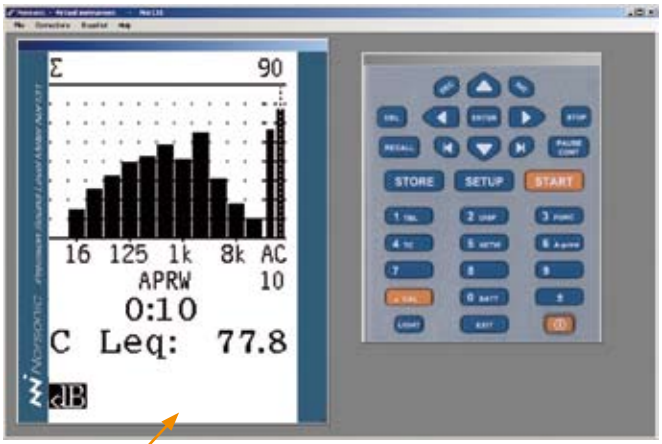
Test laboratory:
No. of test report:
Date: 26.01.2007
Signature:



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.

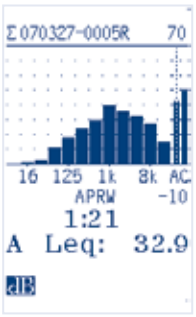
Also included in the delivery is the PC data transfer program NorXfer. This program transfers data from the instruments internal memory via the USB interface to the PC. It can also automatically convert the data into a Microsoft Excel workbook or normal text files (.txt).



NorVirtual

Real Time Frequency analysis (Option 1 and 4)

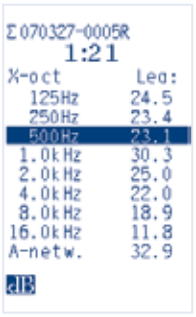
The spectral weighting network A reports one value for the entire frequency spectrum. It is a sum of the entire noise. The same applies for C and Z networks. If a more detailed analysis is needed for parts of the frequency spectra, such as which frequency is domination the noise spectrum, or maybe comparing 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, unlike most other sound level meters in this price category, which analyse only one filter band at the time.



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

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.



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

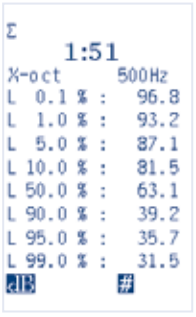
Within each frequency band the instrument measures SPL, Leq, Lmax, Lmin and Le functions. The frequency bands are measured in parallel to the normal Sound Level Meter functions. Hence, all frequency data are measured and reported simultaneously with the normal Sound Level Meter functions. Additionally, 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.

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.



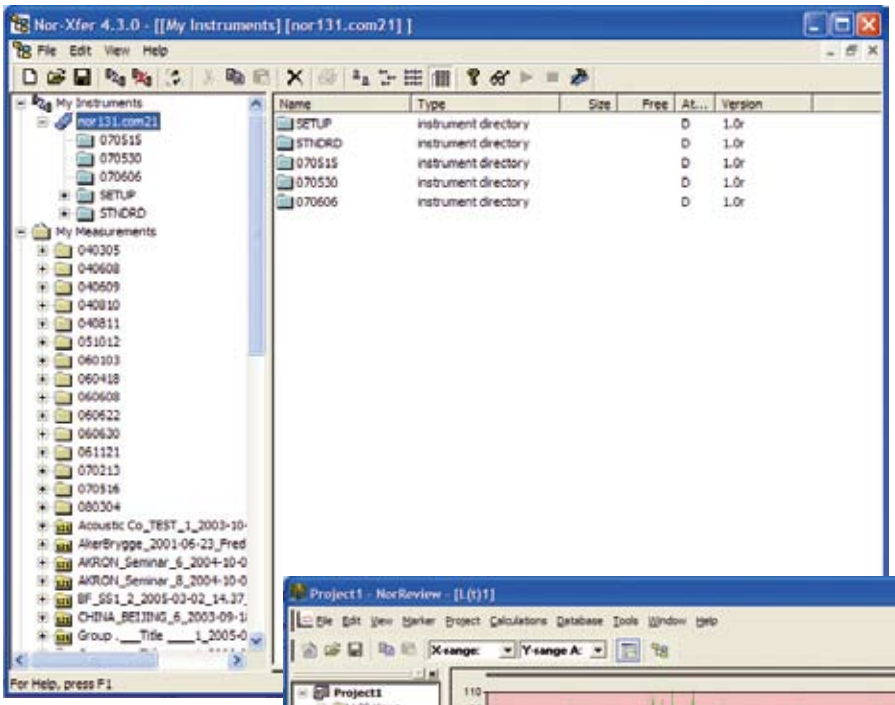
The LN percentage table contains seven fixed and one user-defined percentile

Level versus time measurements (Option 3)

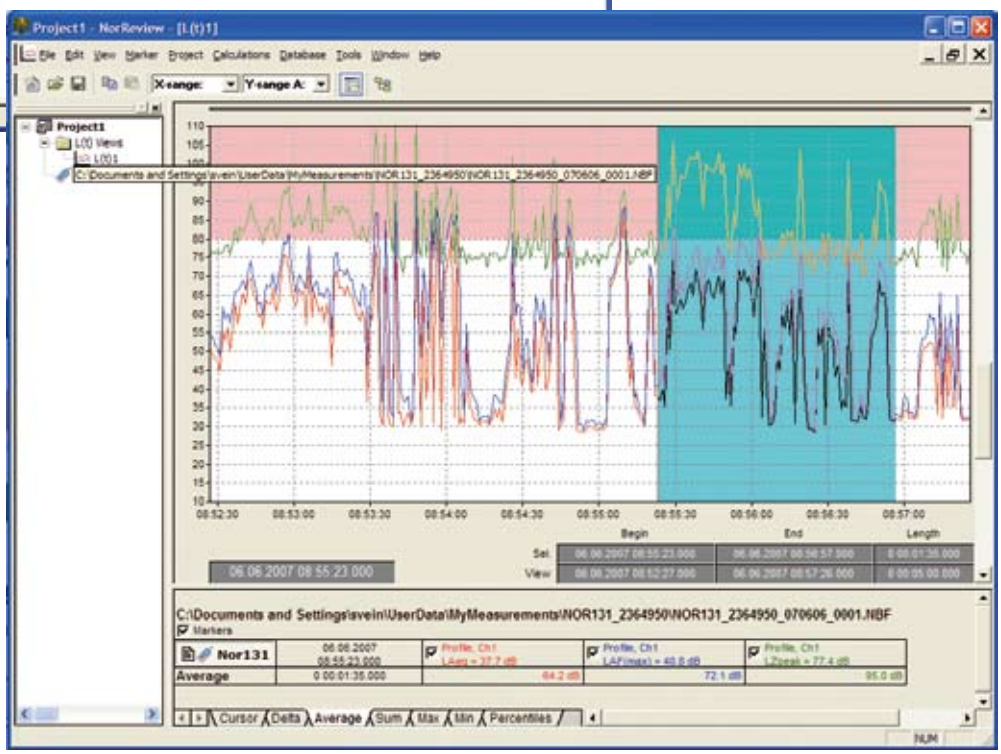
Option 3, level vs. time enables the instrument to log the time profile like the classic level recorders used to do. The time profile is measured by dividing the total measurement into smaller periods of time, all having the same duration. The period length can be set from 1 second and upwards in 1 second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

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).



NorXfer screenshot



NorReview screenshot

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 is to the Class 2 requirements.

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

Time weighting functions:
Fast, Slow or 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 (option 2)
7 fixed percentiles $L_{1\%}$, $L_{5\%}$, $L_{10\%}$, $L_{50\%}$, $L_{90\%}$, $L_{95\%}$, and $L_{99\%}$ plus one user defined value (f.ex. $L_{0.1\%}$). 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:
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.

Microphone and preamplifier:
Detachable ICP preamplifier on Nor131 which allows up to 30 meter of extension cable to be used without loss of performance. 100 m for SPL level less than 130 dB and 300 m for SPL level less than 120 dB. Nor132 has a fixed ICP preamplifier. The microphones are free field electret types. A build in random incidence correction network can be selected. A built in optional correction network for the windscreen can also be selected.

Analogue output:
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

Specifications subject to changes without notice.

Norsonic
P.O.Box 24, N-3421 Lierskogen, Norway
Tel.: +47 3285 8900 Fax.: +47 3285 2208
info@norsonic.com www.norsonic.com

Distributor: