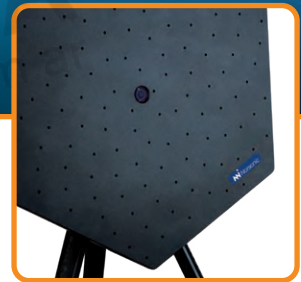


# Product Range Catalogue





# Innovative sound instrumentation

Norsonic is a leading manufacturer of precision measurement instruments for sound and vibration applications. Since 1967, the specifications for our instruments have been based on international requirements and regional requirements found in the EU, North American and other industrialised countries.

By careful attention to the user's requirements at the design stage, it has been possible to increase the complexity of the instrument yet preserve a user interface that is convenient and easy to understand. Our products have been developed in close consultation with our customers worldwide.

It is by listening to our customers' needs that keep Norsonic at the forefront of the world market for sound and vibration instrumentation. Our vision is to supply our customers with the most innovative sound instrumentation of the highest quality.

Norsonic offer 3 years warranty. Our quality philosophy permeates the whole lifecycle of a product. It starts with the design, continues with internal design tests, and ends with pattern evaluation for legal metrology at international laboratories such as the PTB in Germany.

Our products have for decades been type approved in order to secure that the produced measurement results are accurate and within the given specifications. All our sub-contractors are carefully selected and frequent quality audits assure that they keep a high quality standard.

Full test and calibration in accordance with relevant international standards, such as IEC 61672, are carried out before the products leave the factory.

Norsonic Calibration Laboratory (NCL) is an international accredited laboratory. Products producing absolute levels, such as acoustical calibrators, tapping machines and reference sound sources are supplied with accredited calibration certificates as a part of the delivery.

Norsonic uses a minimum of 20% of its turnover in research and development. A great portion of this amount is used to design new features in existing products, to ensure that you as a Norsonic customer can keep your products up to date for many years after your initial purchase. We are active member of the international standardisation work.

Our R/D department has close cooperation with collaborating partners in order to take advantage of special technology not offered by internal resources.

At Norsonic, we are proud to serve our customers and listen to their needs. All our products are developed in close cooperation with customers by listening to their needs and wishes.

For more detailed information visit us at [www.norsonic.com](http://www.norsonic.com)



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## Sound Level Meters

Norsonic offers a complete range of sound level meters. Whatever measurement application you have, Norsonic has the right tool. Not only the sound level meters and accessories, but a range of controlling, post processing and reporting programs help you to evaluate, compute and create reports - easy and intuitive.

All the sound level meters are based on the same design philosophy; intuitive, easy to use, durable and sophisticated, packed in a rugged, yet small, instrument case.

A Norsonic instrument is kept up to date for years after the date of purchase. New program versions are issued frequently with new features and support for new standards.

Our sound level meters are type approved by PTB, LNE and other national laboratories.

All products are individually calibrated and covered by a 3 years warranty.

## Sound Level Meter Nor103

Being both light weighted and ultra-compact makes this instrument very portable as it will fit in your pocket. Yet, it ensures you the same reliability and precision as other class 1 sound level meters on the market.

It features an easy interface with only 3 function keys, and a clean graphical screen displaying large fonts and a big graphical dB speedometer. The instrument will operate for up to 9 hours on just two AAA alkaline batteries. Delivered with a protective silicone cover and fitted with a tripod mounting thread.

### Applications

- Noise hazards in workplace
- Environmental noise survey testing
- Product noise testing
- General purpose noise level meter





# Sound Level Meters Nor131 & Nor132

Class 1 and class 2 Sound Level meters 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, STIPA and reverberation time calculation based on impulse excitation. Huge internal memory and USB interface for easy data dump to a PC. The Nor131 is supplied with detachable IEPE preamplifier allowing use of extension cable. Nor132 comes with a fixed preamplifier.

## Applications

- Noise hazards in the workplace
- Prescription of hearing protection
- Environmental noise logger
- Product noise testing
- Speech intelligibility - STIPA
- Reverberation time measurement
- General purpose sound level meter
- HVAC noise with, NC, NR, RC rating

The Nor131 and Nor132 are easy to use – just push the start key and measure. There are only three buttons you need to operate to complete a measurement, clearly indicated by the orange colour; Power on, Calibration and Start measurement. The other buttons are just short keys for quick access to the most important settings.



# Environmental Meter Nor139

Class 1 Sound Level meter mainly designed for advanced noise assessments and noise logging, featuring event triggered sound recording and manual marker setting. May optionally be fitted with 1/1- and 1/3-octave filters with multispectra resolution down to 100 ms time resolution. Huge internal memory, USB interface and SD-card makes it easy to import measurement data to a PC for further post-processing and reporting.

## Applications

- Environmental noise assessments with sound recording and markers
- Environmental noise logger
- Noise hazards in the workplace
- Product noise testing
- Noise nuisance recorder
- General purpose sound level meter
- HVAC noise with, NC, NR, RC rating

The Nor139 is easy to use – just push the start key and measure. There are only three buttons you need to operate to complete a measurement, clearly indicated by the orange colour; Power on, Calibration and Start measurement. The other buttons are just short keys for quick access to the most important settings.





# Sound Analyser Nor140

Class 1 Sound Analyser covering all the features of the Nor13x series of sound level meters plus building acoustics and a large vast of other applications. This is the perfect tool for acoustic consultants, R/D engineers and other highly professional users that need a sound level meter covering literally all applications a single channel sound level meter can measure. Huge internal memory, USB interface and SD-card makes it easy to import measurement data to a PC for further post processing and reporting.

The Nor140 is seamless integrated with Nor850 multichannel system. It can be used as a frontend in a Nor850 system or only the Nor850 post processing and reporting tools that are available for building acoustics and sound power.

Control your Nor140 from a smartphone. The Nor140 in combination with a noise terminal and NorRemote give you a unique freedom to take control of your Nor140 from any place in the world.

## Applications

- Environmental noise assessments with markers and sound recording
- Environmental monitoring
- Building acoustics
- Noise hazards in the workplace
- Product development
- Product noise testing
- Quality control
- Noise mapping
- Sound power
- Speech intelligibility - STIPA
- Vibration measurements
- Noise nuisance recorder
- Front end for Nor850
- HVAC noise with, NC, NR, RC rating

The Nor140 is easy to use – just push the start key and measure. There are only three buttons you need to operate to complete a measurement, clearly indicated by the orange colour; Power on, Calibration and Start measurement. The other buttons are just short keys for quick access to the most important settings.



# Single channel Sound Analyser Nor145

## Dual channel Sound Analyser Nor150

The Nor145 and Nor150 sound analysers sets new standards in user-friendliness and sophistication not yet found in any other sound level meter on the market today. Featuring a large 4.3" true colour touch-screen sharing the same user philosophy as a smartphone.

The Nor145 and Nor150 are based on the same hardware and software platform and are in its basic configuration equal. Different emphasis has been made to optimise the use of the two models.

The Nor145 is a single channel unit optimised for easy wireless connectivity featuring a built in 3G/4G/LTE and WLAN modem. It is smaller and lighter than Nor150.

The Nor150 is a dual channel instrument suitable for all dual channel applications such as Sound intensity measurements and dual channel building acoustics. The Nor150 cannot be fitted with a built in 4G/LTE and WLAN modem, but can be easy interfaced to use external devices for this purpose.

Further features include; two measurement channels, built in web server, GPS and advanced voice and text notes bringing the sophistications normally found in laboratory instrumentation out in the field. Connect your smartphone, pad or PC and take full control of the instrument. Add photos and voice notes obtained on your smartphone or pad seamless integrated with markers to your noise data.



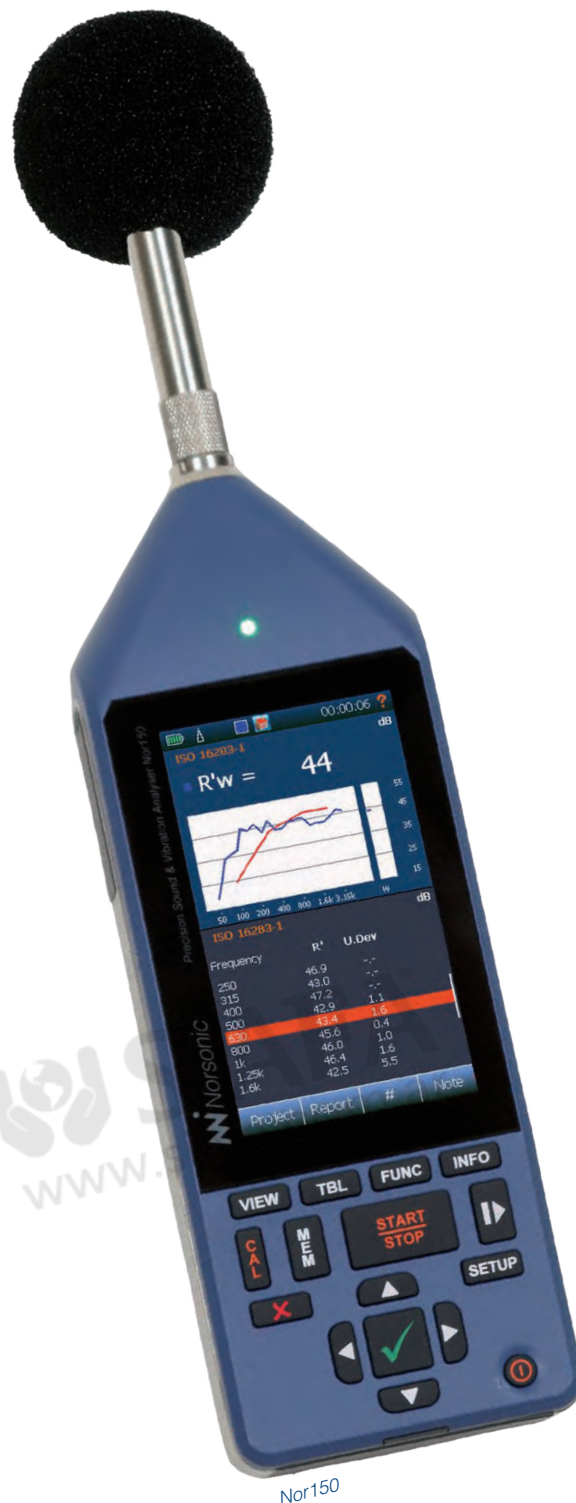
Nor145

## Applications

- Environmental noise
- Environmental noise assessments
- Building acoustics
- Sound intensity (Nor 150 only)
- Noise monitoring
- Product noise testing
- Vibration measurements
- Noise in the workplace
- Infrasound
- Noise nuisance recorder
- Front end for Nor850

## Features

- Precision sound level meter and frequency analyser according to class 1
- Easy connectivity via built in WLAN and 3G/4G LTE modem (Nor145)
- Dual channel (Nor150 only)
- Large colour touch-screen (4.3")
- Real push keys for quick operation in challenging environments
- Intuitive user interface with graphical icons for selection of measurement mode and custom-made user setups
- Built-in webserver
- Voice, text notes and built-in GPS for documentation of the measurements
- Wide frequency range (0,4 Hz – 20 kHz in 1/3 octave band)
- Parallel 1/3 octaves and FFT analysis
- 120 dB measurement range
- Extensive trigger system for reports, audio recording and camera
- Seamless integration with Nor850 software
- Easy management of measurement files in NorConnect Nor1051
- Multi-language support
- Extensive on-board help system



Nor150



## Environmental Analyser

Both units are ideal for all type of environmental noise measurements, attended or unattended, single or dual channel measurements. The Nor145 with its built in 4G/LTE modem features an easy connectivity to NorCloud and are for most environmental applications a preferred choice due to its built-in modem.

- Twin time profiles with resolution from 5 ms and additional Moving report with trigger possibility
- Extensive trigger system for reports, audio recording, camera and digital output lines
- Voice, text and picture notes
- 5 independent event triggers (LDEN support)
- Advanced marker management
- Full remote-control support via NorRemote app for smartphone, PC or pads
- Seamless connection to NorCloud for unattended monitoring and reporting
- 0-20 sec graphical back erase / pause function
- 0-120 sec Audio pre-trigger
- Seamless integration to post-processing programs and Excel

Measurements with markers, audio recordings and event triggered pictures are easily made. The large 4.3" display gives you all the necessary information. Up to 60 measurement parameters may be logged simultaneously.

For attended measurements a sophisticated marker management system with up to 10 user defined markers eases the post processing and reporting task. The event triggered audio recording and pictures further enhanced the use for unattended measurements. An advanced trigger system offering different trigger levels for Day, Evening and Night. The dual channel option in the Nor150 further expands the use of the system. The built in GPS function is useful for tagging the measurement position and for clock synchronisation when several units are in use for blast monitoring or similar applications.

The NorRemote smart phone app connects seamless to the instrument and gives the user full remote access to the instrument. Pictures and voice notes taken on the smartphone is automatically transferred to the instrument and bundled with the measurement data. The camera on your smartphone or any IP camera may be controlled by the instruments event trigger.

Both instruments are easy connected to NorCloud, our noise monitoring control and reporting software. Easy to use for both short- or long-term unattended monitoring.







## Building Acoustic Analyser

Norsonic continue its long-time tradition for creating the state-of-the-art building acoustic analysers. The Nor145 and Nor150 is no exception in this respect! It can be used as a manually operated single or dual channel (Nor150) building acoustic analyser, or as a remotely controlled advanced building acoustic frontend for the Nor850 multichannel system. The Building Acoustics mode is designed to cover any in-situ sound insulation measurement tasks. You may choose to measure airborne, façade or impact sound insulation.

- Reverberation time measurements with parallel calculation of T15, T20, T30, Tmax and EDT
- Ensemble averaging of reverberation decays
- Backward integration of reverberation decays based on impulse excitation
- User adjustment of individual RT decay lines
- Signal generator with white, pink or bandpass filtered noise
- Supports multiple microphone and loudspeaker positions with corresponding on-board energetic or arithmetic averaging
- Project overview with information about all individual measurement details and project progress
- Seamless integration with Nor850 reporting software
- Wireless single or dual channel measurements using one or two Nor145 controlled from Nor850

Both instruments offer a built-in signal generator for excitation of the source room level measurements or for excitation of the reverberation time measurements. The results are measured in accordance with the ISO 16283 Standard requirements. With additional background level measurement results, an on-board calculation of the final airborne sound insulation indices DnT and Rw in accordance with ISO 717 is performed. Of course, the similar possibility is available for impact sound insulation index Ln,w using a tapping machine such as the Nor277.

The reverberation time excitation may alternatively be based on an impulsive source. In any case, results for T15, T20 and T30 are calculated in parallel. The analysers are seamless integrated with the Nor850 software, either as a remote frontend to the Nor850 Measurement System, or as a manual measurement tool for exporting measurement files to the post processing Nor850 Reporting System. Complete calculation of airborne, façade and impact sound insulation indices in accordance with international and national Standards

### Supported Standards

- ISO 16283-1, -2 and -3. ISO 140-4, -5 and -7, ISO 717-1 and -2, ISO 10052
- ASTM E336 and E413, ASTM E1007 and E989
- DIN 4109-4 and -11
- BS-ISO 140-4 and -7
- SS-EN-ISO 25267
- SIA 181





## Sound Intensity Analyser Nor150

The Nor150 fitted with sound intensity option and the sound intensity probe kit Nor1290 is a powerful tool for all kind of sound intensity measurements. It is designed for easy use in all type of measurement conditions.

The remote-control handle using a Smartphone as a measurement control and displaying device forms a light weighted and easy to use system, allowing the user to perform all measurements with a single hand operation. The Smartphone communicates via WiFi with the internal web server running in the Nor150. The system may also be used with the sound intensity probe directly attached to the Nor150.

### Applications

- Sound Power measurements in accordance with
  - ISO 9614
  - ANSI S12.12
  - ECMA 160
- Noise Mapping
- Noise Source locations

### Features

- Compliant to IEC 61043 Class 1
- Full on-board support for ISO 9614
- Unique phase correction allows measuring 25 Hz to 10 kHz with 12 mm spacer
- Intuitive warning indicators
- Measurement-based suggestions for improving results
- Automatic measurement sequence
- Pause and back-erase with graphical display
- Full measurement edit support (segment exclusion, resize, retake)
- Add segment support
- Export to Nor850 mapping and reporting software
- Photo, text and voice annotation
- NorRemote app for smartphone remote control







## Noise at Work Analyser

The Nor145 is the right tool for the noise at work experts. It covers all the use in one unit.

The wide frequency range covers additional applications such as infra sound and single axis vibration measurements. The analyser allows you to create your own measurement setups that pop up on the start-up screen. The pause and graphical back erase function help you to remove unwanted events from the measurement in situ. You may add markers to the measurement to separate different work sequences within a measurement. Easy and intuitive.

The built-in camera, text and voice annotation, ensures fast and easy documentation of the various measurement locations. Creating a report is easy using NorReport and templates tailored to various national regulations.



### Future proof, expandable and 3-year warranty

The Nor145 and 150 Analysers are designed to be expanded and upgradeable to give you a complete measurement tool for years to come. Norsonic's retrofit policy ensures regular software updates with new features and new options. There are more to come such as STIPA and ultra sound.

| Sound Level Meter selection chart                              | Nor103      | Nor131/132     | Nor139      | Nor140      | Nor145      | Nor150      |
|--|-------------|----------------|-------------|-------------|-------------|-------------|
| <b>General Sound Level Meter</b>                               | √           | √              | √           | √           | √           | √           |
| Number of measurement channels                                 | 1           | 1              | 1           | 1           | 1           | 1 & 2       |
| 1/1 & 1/3 octave band  |             | 6,3Hz - 20k    | 6,3Hz - 20k | 0,4Hz - 20k | 0,4Hz - 20k | 0,4Hz - 20k |
| +10 dB extended measurement range                              |             |                |             | √           | √           | √           |
| Reference spectrum   |             |                |             | √           | √           | √           |
| Statistical calculations                                       |             | √              | √           | √           | √           | √           |
| Parallel Time constants (F/S/I)                                |             | √              | √           | √           | √           | √           |
| Weighting networks   | A/C         | A/C/Z          | A/C/Z       | A/C/Z       | A/C/Z       | A/C/Z       |
| One measurement range - no gain setting                        | √           | √              | √           | √           | √           | √           |
| Dynamic range (RMS) (dBA)                                      | 30 - 137 dB | 17/25 - 137 dB | 17 - 137 dB | 17 - 137 dB | 17 - 137 dB | 17 - 137 dB |
| Dynamic range Peak C   | 55 - 140 dB | 45 - 140 dB    | 45 - 140 dB | 45 - 140 dB | 45 - 140 dB | 45 - 140 dB |
| <b>Occupational &amp; Industrial hygiene</b>                   | √           | √              | √           | √           | √           | √           |
| LAEq in parallel with PeakC                                    | √           | √              | √           | √           | √           | √           |
| LAEq - LCEq  |             | √              | √           | √           | √           | √           |
| Reverberation table based on impulse excitation                |             | √              | √           | √           | √           | √           |
| <b>Environmental Noise Assessments</b>                         |             | √              | √           | √           | √           | √           |
| Level vs time resolution incl. multispectra                    |             | ≥ 1 sec        | ≥ 100ms     | ≥ 5ms       | ≥ 5ms       | ≥ 5ms       |
| Graphical L/t curve  |             |                | √           | √           | √           | √           |
| 1/1 & 1/3 octave band multispectrum                            |             |                | √           | √           | √           | √           |
| Audio recording  |             |                | √           | √           | √           | √           |
| Support for SYSCHECK of microphones                            |             |                |             | √           | √           | √           |
| Support for heating of Nor1216 microphone                      |             |                |             | √           | √           | √           |
| Compatible with NorReview                                      |             | √              | √           | √           | √           | √           |
| Compatible with NorCloud                                       |             |                |             |             | √           | √           |
| Noise Nuisance Recorder with remote trigger                    |             |                | √           | √           | √           | √           |
| <b>Building Acoustics</b>                                      |             |                |             | √           | √           | √           |
| Noise and impulse based RT with graphical curve                |             |                |             | √           | √           | √           |
| Noise generator  |             |                |             | √           | √           | √           |
| Swept sine   |             |                |             | √           | √           | √           |
| Calculation of rating curves                                   |             |                |             | √           | √           | √           |
| Dual channel in addition to single channel                     |             |                |             |             |             | √           |
| <b>Sound Intensity</b>   |             |                |             |             |             | √           |
| <b>Audiometer calibration</b>                                  |             |                |             | √           |             |             |
| <b>FFT</b>   |             |                |             | √           | √           | √           |
| <b>STIPA</b>   |             | √              |             | √           |             |             |
| <b>Survey Sound Power measurements according to ISO 3746</b>   |             |                |             | √           |             |             |
| <b>Compatible with Nor850 software</b>                         |             |                |             | √           | √           | √           |
| <b>GPS and internal or external camera</b>                     |             |                |             |             | √           | √           |
| <b>LAN interface</b>   |             |                |             |             | √           | √           |
| <b>Built in WLAN (Nor145) / Dongle (Nor150)</b>                |             |                |             |             | √           | √           |
| <b>USB interface</b>   | via adapter | √              | √           | √           | √           | √           |
| <b>Built in 3G/4G modem</b>                                    |             |                |             |             | √           |             |
| <b>High speed RS 232 interface</b>                             |             |                | √           | √           | √           | √           |
| <b>SD-card for storage of measurement and audio recordings</b> |             |                | √           | √           | √           | √           |
| <b>Internal memory storing measurements</b>                    | √           | √              | √           | √           |             |             |

## Generating reports

Measuring sound is often more than just reporting a dBA value. Most measurements are made in accordance to a standardized method requiring a report generated on a standard format, but sometimes you may need a customized report or calculations made in Excel. Whatever need you have, we offer a broad range of programs that helps you to evaluate the data and generate proper measurement reports.

## NorConvert & NorXfer

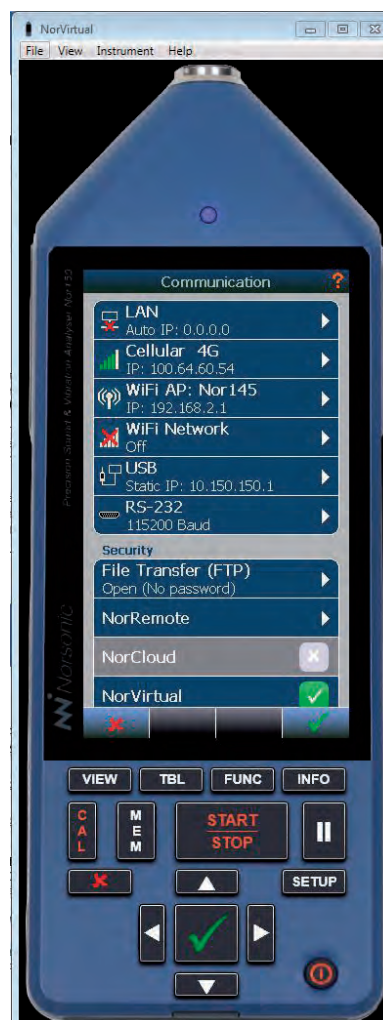
The NorXfer and NorConvert are programs for downloading data from the Nor13x and Nor140 range of sound level meters. NorConvert is automatically downloading and converting measurement files to Excel. NorXfer is a program for downloading and converting to Excel too, but unlike the NorConvert you have a browser feature for full freedom of selecting the measurement files to transfer. Freeware.

## NorVirtual

A program for emulating the Nor13x, Nor140, Nor145 and Nor150 on a PC. Whatever view the sound level meter has (graphs, menus, tables etc.), the same view is visible on the PC screen. The mouse can be used to operate the virtual keyboard. NorVirtual for Nor145/Nor150 supports all communication channels. Hence, you may connect to a Nor145/Nor150 via modem, WLAN, LAN etc and use the program as a simple remote control. In combination with NorConnect you have a simple and intuitive solution for remote control and download measurements. Freeware.

## NorReport

A program for automatic generating customized Excel reports based on templates. The program is freeware and acts as a plug in module and works seamlessly with NorConnect, NorXfer and NorConvert. Several templates are available for various applications adapted to local national standards. You may add your own templates or just modify an existing one to optimize it for your application.



NorVirtual Nor145



# NorRemote Nor1050

The Nor145/Nor150's built in web server opens up new possibilities of remote communication and acquisition of data from a Sound level meter. Simply connect to your instrument via LAN, GPRS or WiFi using a web browser to control, download or view the measurement in real time.

The program covers all applications from downloading files to full control of your analyser, add markers, start a recording or just check the battery status. Connect your smartphone, pad or PC to the Nor145 or Nor150. Photos and voice notes obtained on your smartphone or pad are seamless integrated with markers into your noise data with markers in the time profile.

NorRemote is part of option 11 in Nor145 and Nor150.



NorRemote

# NorConnect Nor1051

NorConnect is a measurement suite and data management program for measurement files downloaded from Nor145 and Nor150. Nor145/Nor150s meta tag features makes it easy to sort and search across projects to find measurements with equality. The program also offers a graphical and numerical viewer function of your measurements. Dependent of your measurement, optimized graphical tools are offered for building acoustic, sound power and environmental/general measurements.

You may scan through your measurements and listen to audio recordings and generate reports using predefined or your customized report templates. The program is seamless integrated to Nor850 and NorReview if a more detailed analysis is required. It also offers easy integration to Excel.

The program supports all communication environments offered by Nor145/Nor150 and enables you to connect to the instrument remotely via modem, WLAN or LAN.

Freeware and part of the Nor145/Nor150 delivery.



L/t view with audio recording

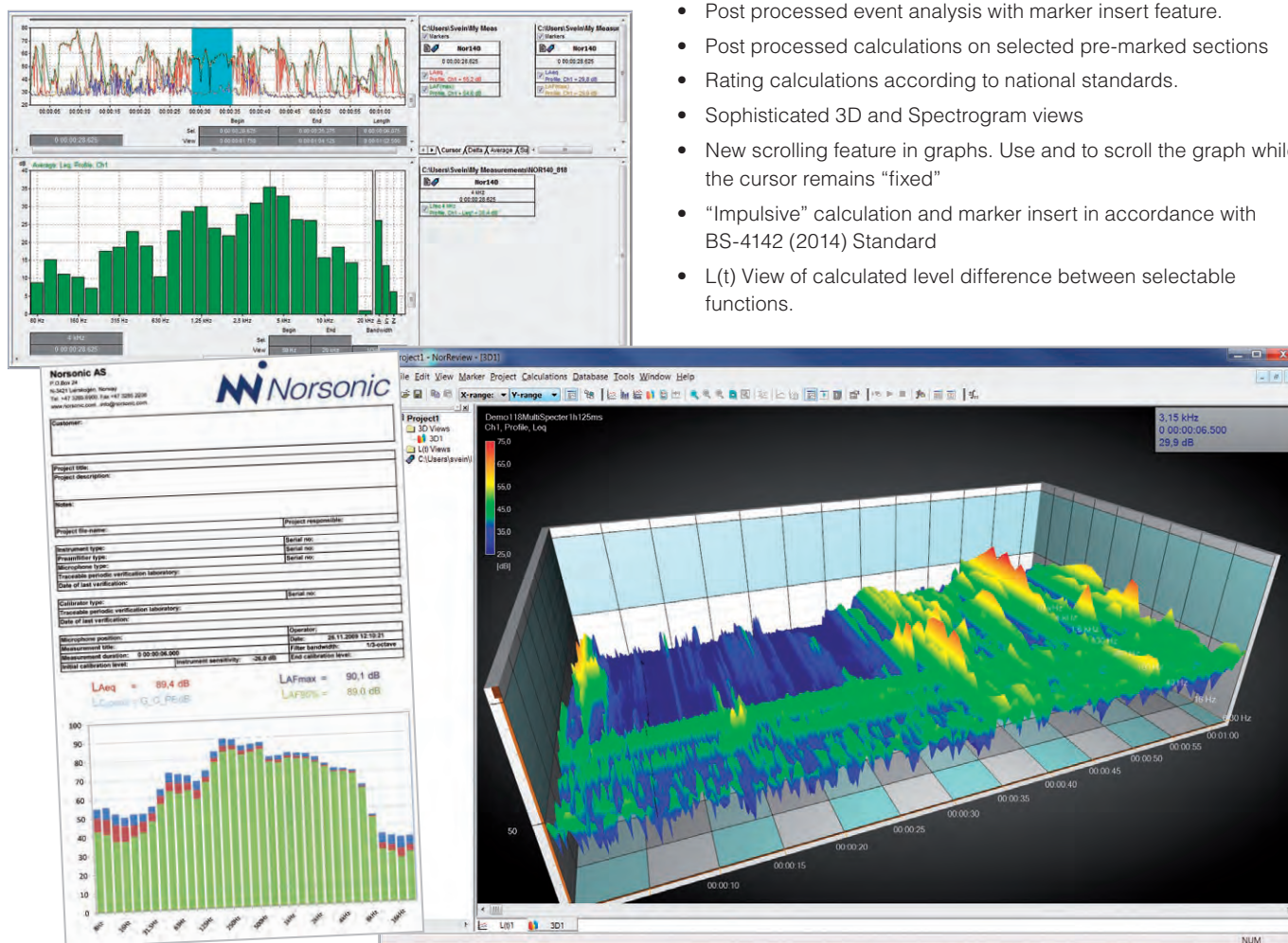
Building Acoustic view

# NorReview Nor1026

The NorReview is a flexible project oriented PC software package for presenting and post processing environmental noise data from our instruments. Each project may contain all kind of raw and post processed noise and weather data, audio recordings, voice notes, Microsoft® Word or Excel reports and other files such as digital photos and pdf-text files. It can quickly generate a single report or make advanced evaluations and complex project reports.

## Features

- Flexible and versatile user-interface
- Evaluation of industrial noise
- Evaluation of rail and road traffic noise
- Evaluation of residential noise
- Evaluation of multiple measurement files simultaneously
- Direct import or file read-in from Norsonic instruments
- Displays frequency, time-profile, FFT and AC views of the measurement data
- Insert and edit markers to recognize noise sources
- Replay of audio recordings with dynamic cursor and marker insert features.
- Post processed event analysis with marker insert feature.
- Post processed calculations on selected pre-marked sections
- Rating calculations according to national standards.
- Sophisticated 3D and Spectrogram views
- New scrolling feature in graphs. Use and to scroll the graph while the cursor remains "fixed"
- "Impulsive" calculation and marker insert in accordance with BS-4142 (2014) Standard
- L(t) View of calculated level difference between selectable functions.



# Nor850 Reporting System



Building Acoustics



Sound Intensity



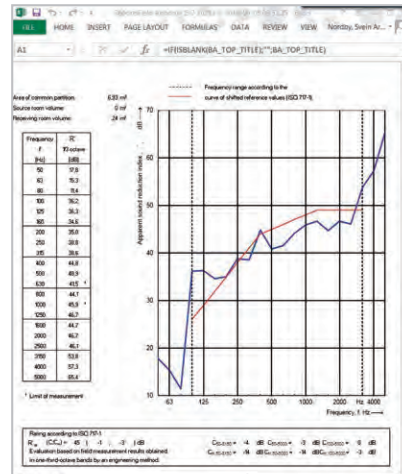
Sound Power

The user-friendly and innovative calculation and reporting features in the Nor850 may be used as individual post-processing modules. This feature is available for the building acoustics and sound power modes. In addition, a dedicated reporting module for sound intensity measurement is available.

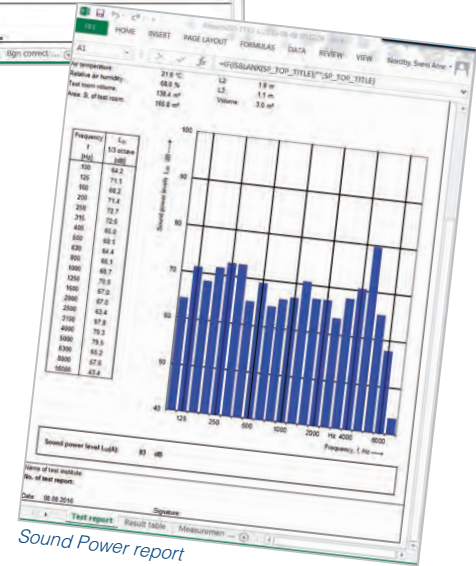
Measurements taken manually by use of the Norsonic sound level meters Nor140, Nor145 or Nor150 are imported easily into the reporting modules. Level, reverberation or background measurement files are included into the respective table folders by simple drag&drop technique. Even complete building acoustics files containing all data in one file may be imported.

The full range of Standards for building acoustics such as the in-situ ISO 16283, laboratory ISO 10140 and the national version such as American ASTM Standards, are selectable. The sound power module support ISO 3740. Calculation properties as well as informative text for the excel reports are inserted and edited for the final calculation of the sound insulation indices or sound power value. The sound intensity module support ISO 9614 1-2.

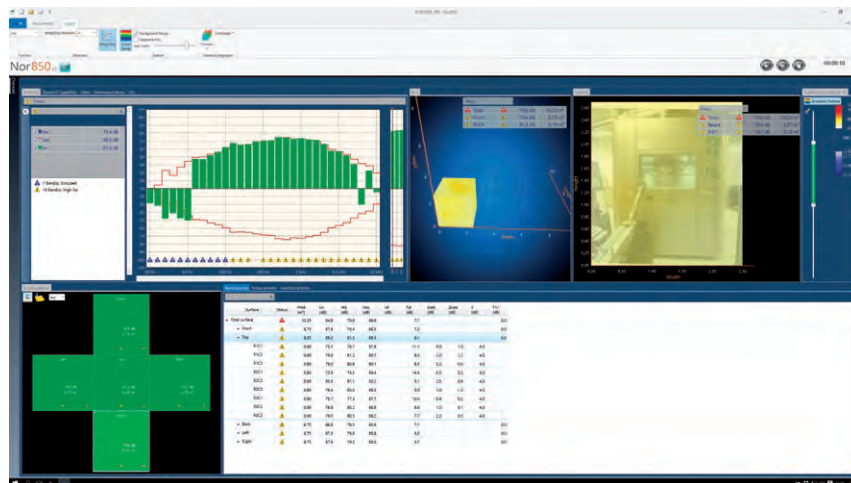
The Nor850 Reporting system can be upgraded to a complete Nor850 Measurement system at any time.



Building Acoustic report



Sound Power report



Sound Intensity measurement analysis



# Measurement System Nor850

The Nor850 measurement system is the state-of-the-art acoustical analyser from Norsonic. Using the experiences and accumulated knowhow from the previous generations of analysers such as Nor811, Nor823, Nor830 and Nor840, Norsonic is offering a unique multi-channel system.

The software Nor850 Suite is connecting a variable number of individual measuring units to create the optimal system that suits any measurement task. Dedicated user-friendly offer the following application packages:



General Analyser



Building Acoustic



Sound Power



Appliance Noise



## General Analyser Mode

The General Mode allows the user to make multispecter measurements in all channels simultaneously with various settings for frequency range and level profiles. The profiles have user-defined period lengths from a few msec to several minutes. The results are presented in user-defined setups with both level vs. frequency and level vs. time views as well as tables. Special views for 3D or Spectro-gram are also available.

Quality control measurements are easily made using the two reference spectra possibilities. Each reference spectre may be used as a lower or upper boundary with a Go/NoGo output to the operator.

The Nor850 Suite offers an environmental software extension that enables the user to make audio recordings in selected channels and to insert event markers along the timeline during the measurement sequence.

## Nor850-MF1

The Nor850-MF1 rack is designed to contain up to 10 measurement channels. Each channel module has the same features and specifications as the Nor140, but can only be remotely controlled from the Nor850 Suite via LAN interface. For wireless connection, a router is attached to the LAN connector. The rack is powered by 115/230 Vac or by 12Vdc.

The Nor850-MF1 rack is delivered with a selectable number of measurement channels, and may be upgraded with additional channels as the needs grow. Multiple racks may be used in the same system alternatively in a mix with Nor140, Nor145 or Nor150 Sound Level Meters as additional frontends. Optionally, selected channels may be fitted with signal generator outputs.

Example of configuration



Nor140 Nor150 Nor145



Nor850-MF1



## Building Acoustic Mode

The basic Building Acoustics application package includes all required features for performing sound insulation tests in the field. Both the traditional ISO 140 Standards as well as ISO 16283 Standards are included, plus national varieties of these. The ASTM Standards E336, E90 as well as the E413 are also included.

In the extended Building Acoustics package the more advanced laboratory test such as ISO 10140 as well as ASTM E1007, E492 and E989 are included together with absorption coefficient testing in accordance with ISO 354 and ASTM C423.

The signal generator offers white, pink or bandpass filtered noise even with user defined pre-excitation of the measurement chambers. The Nor850 Suite additionally offer features for automatic control of Rotating Microphone Booms, Tapping Machines as well as control of moving loudspeaker systems.

Calculation of sound insulation indices with predefined printed reports as well as parameter input in both metric and US formats. Enhanced features for multichannel calibration procedures are available using remote displays and acoustic loudspeaker feedback.

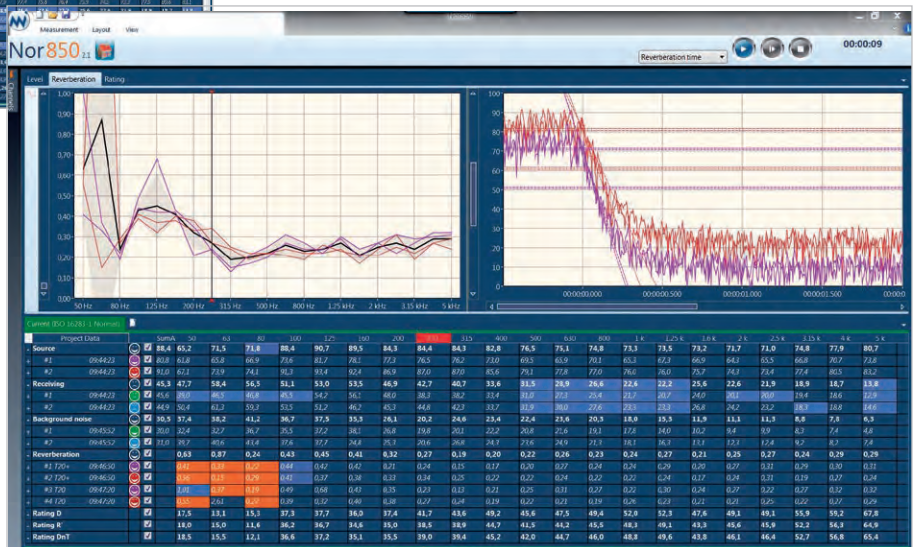
Old measurement project from previous Norsonic analysers may be imported and compared with new measurements using the multi-project feature. Measurement results are re-used in new projects by easy drag&drop functionality.



Building Acoustic level measurement view



Building Acoustics rating view



Building Acoustics reverberating measurement view



## Sound Power Mode

The basic Sound Power application package includes all features required for making sound power test in accordance with the various Standards in the ISO 3740 series.

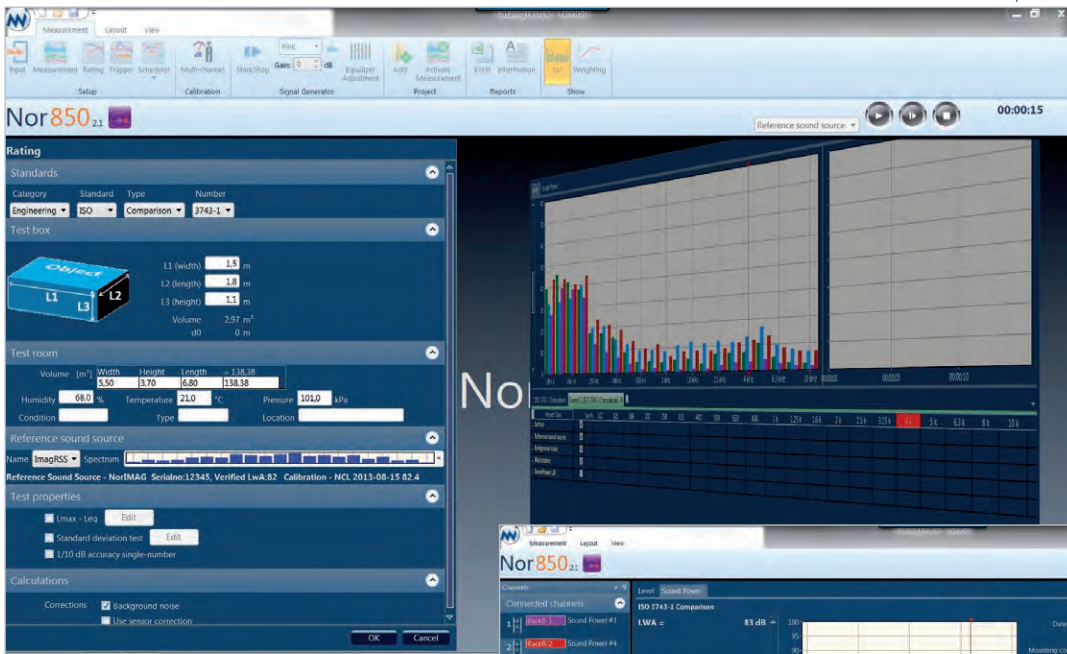
The extended Sound Power application package contains required features for making more special tests such as dual-chamber testing of heat-pumps, dynamic testing of earth moving machinery, and similar. The entire test procedure may be controlled by a user defined Scheduler for easy test repetitions.



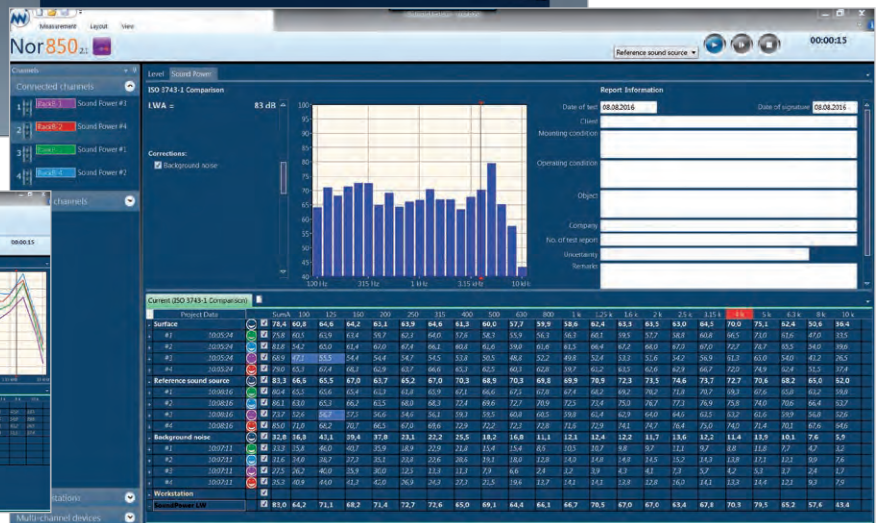
## Appliance Noise Mode

The Appliance Noise application package includes the requires features to perform a full laboratory test of the ISO 3822 Noise emission from appliances and equipment used in water supply installations.

Sound Power setup menu



Sound Power measurement view



Sound Power resulting view



## Available features for all modes

In the heart of the Nor850 Suite there is a sensor database containing all possible information about each user complete list of measurement transducers (microphones, preamplifiers, accelerometers, etc.) including serial numbers, product name, producer, calibration history, verification laboratories, the date of next verification, correction data, and more. The data base may also include similar data for calibrators and reference sound sources.

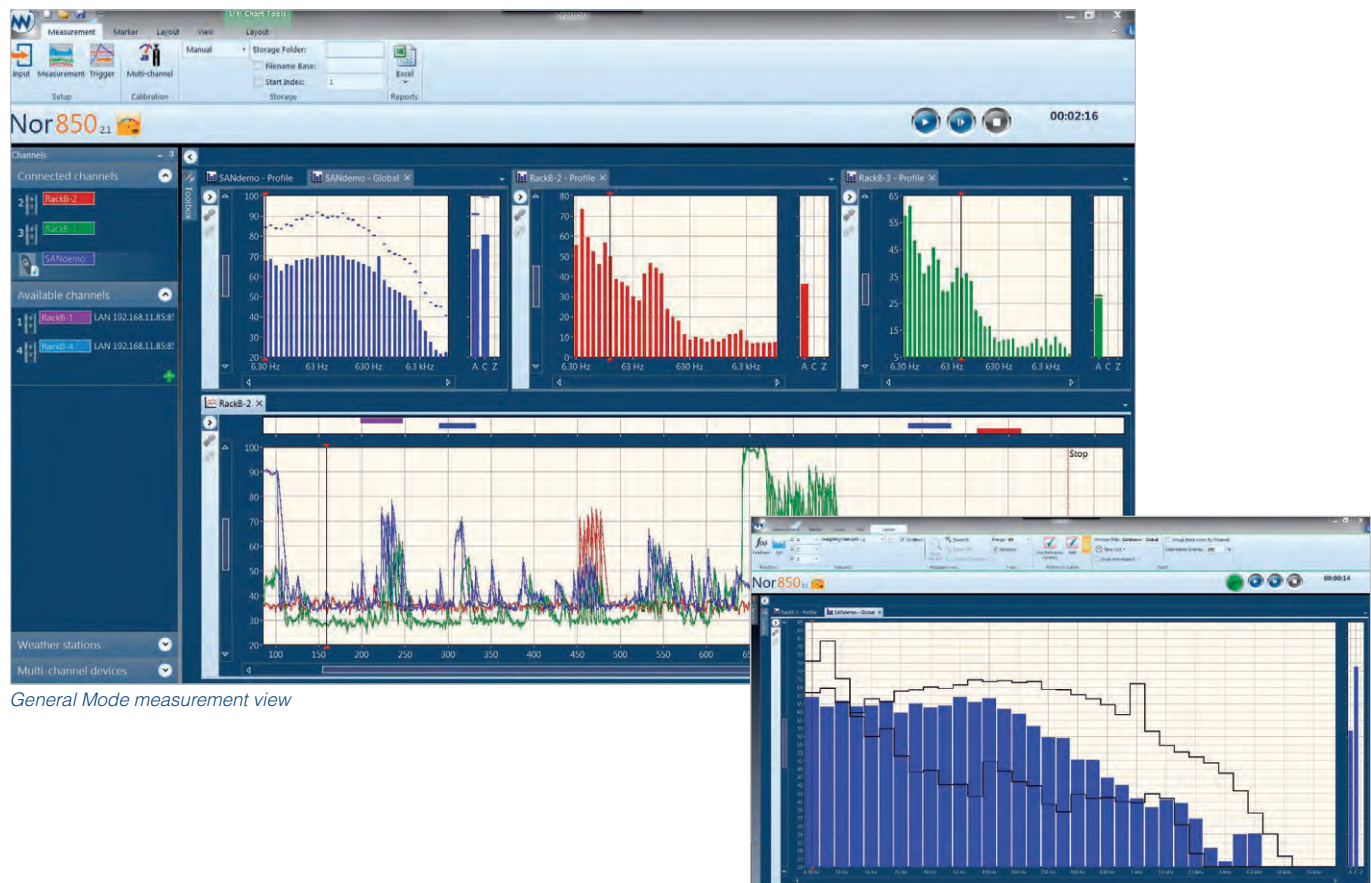
Logging of DC-voltage levels in parallel with the acoustic measurements is available, as well as direct read-in of temperature, humidity and pressure from external sensors.

Individual units for each measuring channel offer a very high degree of operating flexibility. It allows the user to operate a multichannel system one day – or many individual measuring units another day!

The multichannel system Nor850 is expanding as the needs grow. Start with the new Nor145 or Nor150, or a unit of the standardised Nor140, and increase step-by-step by adding additional units – or mix with Nor850-MF1 Racks containing 1-10 measuring channels.

By connecting a number of individual measuring units through various communication channels – including both LAN and USB – the user may create the optimal multichannel system for any task. Wireless communication through Bluetooth or WLAN is also available.

Each individual measuring unit may be homologated by independent verification laboratories that means even the entire multichannel system may be homologated!



General Mode measurement view

QC view with reference curves

# Noise Sources

## Hemi-dodecahedron Loudspeaker Nor275

- Hemi-dodecahedron noise source for field applications
- Portable noise source with omnidirectional characteristics
- Fulfils the directional characteristics required by the ISO 16283 Standard when mounted on a hard reflecting plane
- Delivers 120 dB sound power level in conjunction with the Nor280 Power Amplifier over the frequency range 50 to 5 000 Hz
- Dimensions: 332 (d) × 195 (h) mm (13 x 7,6")  
Weight 5,7 kg (12,6 lb)

## Dodecahedron Loudspeaker Nor276

- Dodecahedron loudspeaker
- High power loudspeaker with omnidirectional characteristics
- Fulfils the directional characteristics required by the ISO 10140 and ISO 16283 Standards
- Supplied with individual omni directional calibration certificate
- Fulfils ISO 3382-2
- Delivers a continuous sound power level of 120 dB when driven with pink noise over the frequency range 50 to 5000 Hz via the Nor280 Power Amplifier
- Dimensions: 332 mm (13") diameter. Weight 9,3 kg (20,5 lb)

## Power Amplifier Nor280

- A portable power amplifier with internal noise generator for use with the Nor275, Nor276 or other suitable loudspeakers
- Specially designed for building acoustics measurements
- Lightweight and rugged construction
- Self contained noise generator
- Emits 120 dB sound power level in the 50 - 5000 Hz frequency range when used with Norsonic dodecahedron loudspeakers Nor275 or Nor276
- Wireless remote control of noise generator (optional)
- Equalization network to optimise acoustic output from speaker
- Balanced signal input for low noise and limited, cross talk problems
- Dimension: 275 x 110 x 246 mm (10,8 x 4,3 x 9,7"), Weight 3,5 kg (7,9 lb)



Supplied with individual accredited calibration certificate!



## Tapping Machine Nor277

- Tapping Machine for making footfall noise transmission measurements in buildings as set out in International and National Standards
- Impact sound transmission testing according to ISO 16283-2, ISO 10140, ASTM E-492 and ASTM E-1007
- Determination of single number quantity index  $L_{n,w}$ , in accordance with ISO 717-2 and ASTM E-989
- Remote operation from hand switch or PC
- Mains or battery operation
- Powered from 85-264 volt AC main supply. Built in Lithium Ion rechargeable batteries
- Low weight 10 kg (22 lb) incl. battery and wireless remote option
- Supplied with accredited calibration certificate
- Tapping sequence of 10 impacts per second, rpm controlled via servo feedback loop
- Built in self check of hammer fall speed, and tapping sequence
- Retractable feet
- Dimensions: 265 x 230 x 495 mm (10,4 x 9,1 x 19,5")

## Impact Ball Nor279

### Applications

- To be used as the "Rubber Ball " alternative to the Tapping Machine excitation method in accordance with the ISO 16283-2 Appendix A.2 and the ISO 10140-5 Appendix F.2
- Fulfill the requirements for a "standard heavy impact source" as given in the Japanese JIS A 1418-2:2000 Standard for impact sound insulation

### Features

- Hollow sphere ball
- Outside diameter 178 mm and thickness 32 mm
- Silicone rubber material
- Equivalent mass 2,5 kg (+/- 0,1 kg)
- Coefficient of restitution at 0,8 (+/- 0,1)
- Rubber hardness 40° (+/- 5°)
- Individual calibrated







## Microphone Boom Nor265

- Oscillating microphone boom for spatial averaging in building acoustics or sound power measurements
- Building acoustics measurements in accordance with ISO 10140 and ISO 16283
- Reverberation time measurements in accordance with ISO 354
- Sound Power measurements in accordance with ISO 3740 series.
- Directional response measurements of loudspeakers and microphones
- Accurate positioning
- Sweep of  $\pm 90^\circ$  and  $\pm 180^\circ$
- Direct control or remote control from a PC
- User defined sweeps. Selectable sweep times
- Boom length adjustable from 0,8

Optionally, the Nor265 may be equipped with a turntable and RS-232 remote control.

## Reference Sound Source Nor278

### Applications

- Substitution and juxtaposition methods for determination of sound power of noise sources according to ISO 3747
- Comparison method for determination of sound power of noise sources according to ISO 3741, ISO 3743-1, ISO 3744 and 3747

### Features

- A-weighted Sound power output : 93 dB re 1 pW (50Hz line frequency)
- Sound power 50 Hz – 20 kHz: 94 dB re 1 pW (50 Hz line frequency)
- Fulfills ISO 6926 for reference sound sources in the extended frequency range 50 Hz – 10 kHz
- Individually calibrated (accredited calibration optional)
- Long-term stability
- Weight 18,6 kg
- Rugged



# Environmental Noise Monitoring

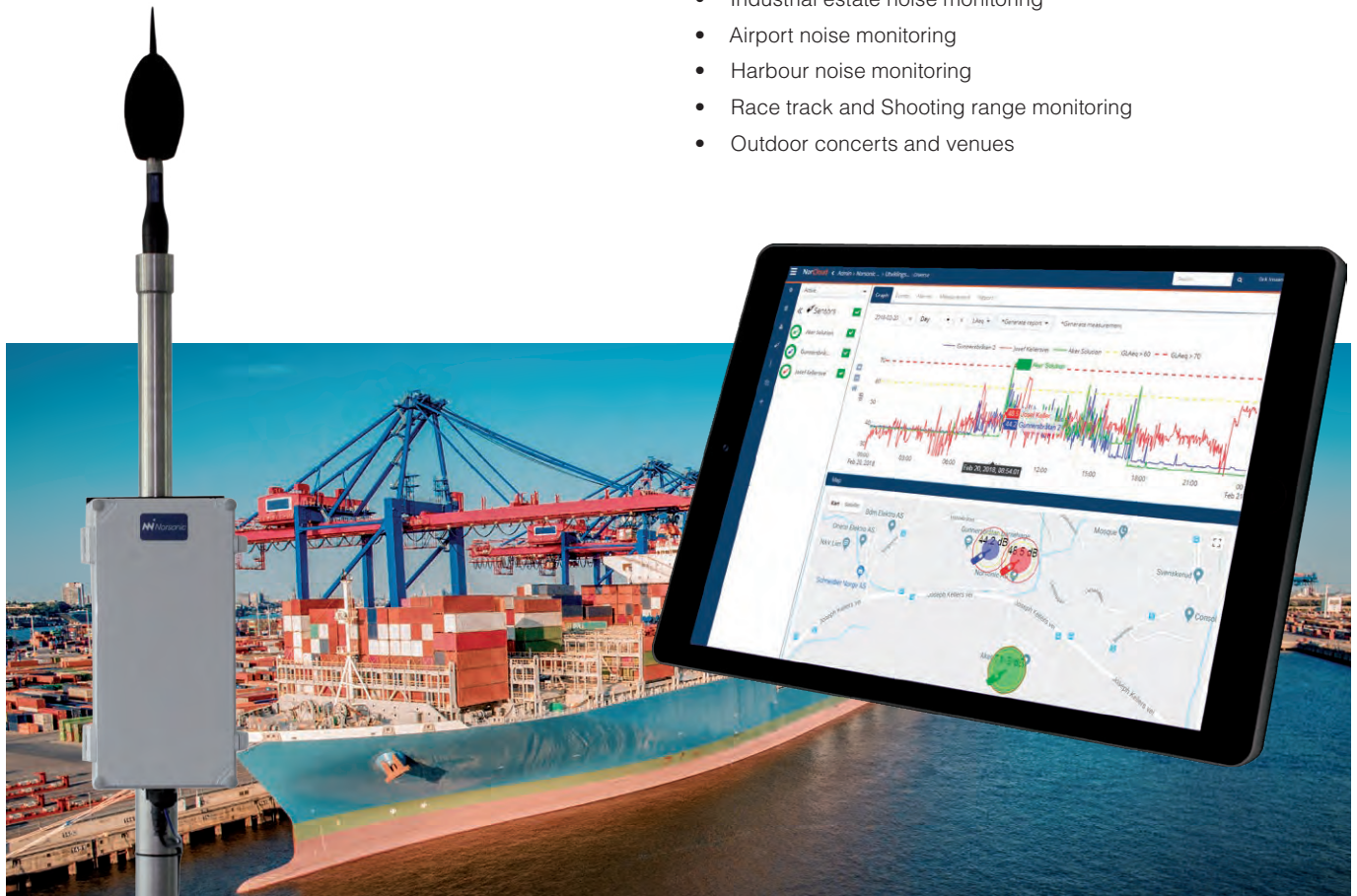
Norsonic offers a wide range of solutions for Environmental Noise Monitoring; from stand-alone Noise Monitoring Terminals (NMT) with local or remote access, to large scaled hosted systems with several NMTs fully automated which deliver daily reports with noise data and meteorological data to the customer.

Throughout the world on every continent we have delivered solutions for Environmental Noise monitoring. We have systems at harbours, construction sites, traffic noise monitoring, wind energy plants, race tracks, production plants, shooting ranges and airports. Some systems are run by the customer itself.

We have several Noise Monitoring Terminal versions tailored for your needs. E.g. NoiseMonitoringTerminalNor1531-a weatherproof cabinet supplied as a ready to go unit, including a IEC 61672 class 1 compliant instrument, our famous all weather outdoor microphone Nor1216, battery for shorter disruptions in power supply and a 4G modem.

Whenever and wherever you need to monitor and collect noise data on a permanent or a longer time span as in:

- Construction noise monitoring
- Transport noise monitoring
- City noise monitoring
- Industrial estate noise monitoring
- Airport noise monitoring
- Harbour noise monitoring
- Race track and Shooting range monitoring
- Outdoor concerts and venues



# NorCloud - Noise monitoring made easy!

Connecting a sound level meter (Nor145/Nor150) or a sound monitoring station to a professional web-based cloud service has never been easier. Get your instrument connected internet via 4G, WIFI or LAN, register the sensor id in a Project you have created in your NorCloud account, and you are up and running. NorCloud allows you to install an unlimited numbers of measurement channels within the same project. A NorCloud instrument is easily moved between NorCloud Projects, or just disconnected to be used as a standalone SLM.

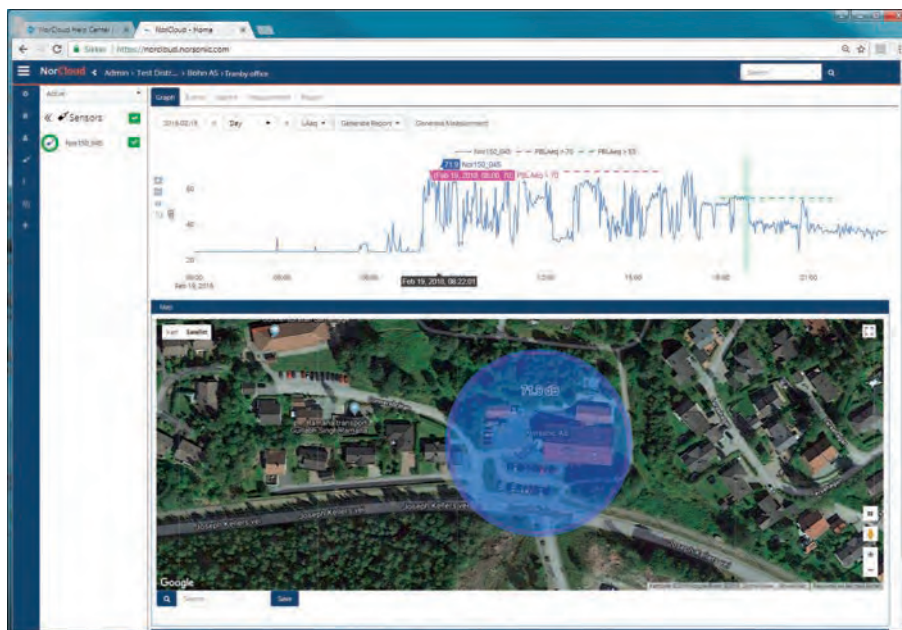
Access and visualise Live and Historical data on your PC or Pad. Define and change the measurement setup or Lden values on the fly. Create triggered event markers, set up to receive alarms via e-mail or SMS. Integrated in NorCloud you find a powerful Report generator. Here you can design your own report templates and use them to generate periodic measurement reports that can be automatically distributed via e-mail directly from NorCloud. Need for more information? With NorCloud you can collect data from an IP web camera and integrate weather station for meteorological data. As data is stored on a SD card in the instrument as well as in the cloud, you have an automatic data backup service.

NorCloud is seamless integrated with NorReview when further analysis of measurement data is needed.

Just select the period of interest, download the measurement and open it in NorReview. The NorReview PC software package is one of the most powerful tools available for post processing and presentation of environmental noise data.

## Why NorCloud?

- Fast, easy to connect your sensor to NorCloud via 4G, WIFI or LAN.
- No software installation required.
- All data automatically uploaded to NorCloud.
- Access all your data with any web browser on any device. The site is smart phone compatible.
- Project management with measurement, trigger and alert setups, in addition to user access control.
- Powerful report designer and generator integrated.
- View live data or download time specific measurements on the go.
- Seamless integrated with NorReview.
- Real time SMS and e-mail alerts sent directly from instrument.
- Protect your data. Redundant storage of data locally on the unit and in NorCloud.
- Norsonic reliability.



# Outdoor microphones

Norsonic offers a broad range of microphone solutions for permanent and semi-permanent installations.

## Nor1210 for permanent installations

- Permanent outdoor microphone for community (Model C) and aircraft noise (Model A)
- Built-in electrostatic actuator calibration
- Fulfils IEC 60651, IEC 61672 class 1 and ANSI S1.4 type 1
- Type approved by PTB, Germany
- Low self noise – typically below 20 dB, A-weighted

## Nor1216 for permanent installations

- Outdoor microphone for community and aircraft noise
- Fulfils IEC 60651, IEC 61672 class 1 and ANSI S1.4 type 1 (frequency correction applied)
- Protection class IP 55 (dust and water)
- Easy to calibrate with a normal 1/2" sound calibrator
- Microphone verification by SysCheck facility
- Low self noise – typically below 17 dB, A-weighted
- Delivered with individually calibration certification.
- Built-in heating for enhanced weather protection
- Directly powered and supported by Nor140 or Nor150 (built-in selectable frequency correction networks, heater supply and SysCheck signal generator)
- Type approved by PTB, Germany



Nor1210

Nor1216





Nor1217

Nor1218

## Nor1217 for temporary installations

- Outdoor microphone for community and aircraft noise
- Directly powered and supported by Nor140, Nor145 or Nor150 (built-in selectable frequency correction networks, SysCheck signal generator)
- Fulfils IEC 60651, IEC 61672 class 1 and ANSI S1.4 type 1 (frequency correction applied).
- Protection class IP 55 (dust and water)
- Easy to calibrate with a normal ½" sound calibrator
- Microphone verification by SysCheck facility
- Low self noise – typically below 17 dB, A-weighted
- Low cost - uses microphone and preamplifier supplied with Nor140, Nor145 or Nor150
- Type approved by PTB, Germany

## Nor1218 for temporary installations

- Outdoor microphone for community and aircraft noise
- Directly powered and supported by Nor131/Nor139 (built-in selectable frequency correction networks)
- Fulfils IEC 60651, IEC 61672 class 1 and ANSI S1.4 type 1 (frequency correction applied)
- Protection class IP 55 (dust and water)
- Easy to calibrate with a normal ½" sound calibrator
- Low self noise – typically below 17 dB, A-weighted
- Low cost - uses microphone and preamplifier supplied with Nor131/Nor139

| Outdoor microphone selection chart                 | Nor1210A | Nor1210C | Nor1216 | Nor1217 | Nor1218 |
|--|----------|----------|---------|---------|---------|
| Permanent  | √        | √        | √       |         |         |
| Semi-permanent                                     |          |          |         | √       | √       |
| Actuator verification                              | √        | √        |         |         |         |
| SysCheck verification                              |          |          | √       | √       |         |
| Designed for Nor131/Nor139                         |          |          |         |         | √       |
| Designed for Nor140/Nor145/Nor150                  |          |          | √       | √       | √       |
| IEC 61672 class 1 horizontal incidence (Community) |          | √        | √       | √       | √       |
| IEC 61672 class 1 vertical incidence (Airport)     | √        |          | √       | √       | √       |

# Acoustic Camera

## Applications

- Sound source identifications
- Sound leakage
- Automotive
- Industry
- Environmental noise
- Building acoustics



## A new modular design concept for acoustic arrays

The Norsonic Hextile shaped acoustic camera is a module-based design that gives the user both portability and great resolution for a wide range of measurement situations. The microphone array's hexagon shape gives the ability to combine several tiles into larger arrays.

With a single Hextile, the user has a small, lightweight and therefore very portable acoustic camera suitable for many surveys within the frequency range 410 Hz to 20 KHz. A USB cable between the MacBook and the acoustic camera is all you need - no additional power supply is required. The Hextile is made from robust and lightweight aluminium, has 128 MEMS microphones, and is less than 3 kg in weight while having a maximum diameter of 46 cm.

For users that require a better resolution overall and particularly at the lower frequencies, three single Hextiles can be combined to a larger Multitile system. With 384 microphones and a maximum diameter of 96 cm, this setup makes you measure frequencies down to 220 Hz from 20K Hz in one shoot.

For special low frequency applications, it is also possible to utilise the Multitile in the Low Frequency configuration called Multitile-LF. By placing the individual Hextiles further away from each other, the diameter of the array is increased to 1.46 m. This configuration is ideal for low frequency measurements below 1 kHz, with lowest frequency limit of 120 Hz. This solution is supplied with a powered USB hub. Using an optical USB cable, the MacBook can be placed more than 10 meters away from the Multitile array.





## Features

Nor848 system is quick and easy to set up in the field with its rugged customized tripods. The Hextile is ready as soon as the USB is plugged and the application is launched. The Multitile, with its three Hextiles and a bigger tripod, is set-up and ready to measure in less than five minutes.

The sound signal from every microphone as well as the video from the integrated optical camera are recorded and stored in the computer. Both live intensity plots as well as post-processed analysis are available with the user-friendly software package that runs on MacBook Pro. The list of features are in continuous development.

Ask us for a demonstration, as you need to see it to believe it!

# Calibrators

## Class 1 Sound Calibrator Nor1255

Nor1255 is a small battery-operated precision class 1 microphone calibrator generating 114dB @ 1kHz conforming to IEC60942 and ANSI S1.40. The all-digital design with a quartz-controlled signal generator ensuring a frequency stability not yet seen on any calibrator on the market today. The reference microphone and accompanying control circuit maintain a constant sound pressure level inside the calibration coupler and automatically adjusts for changes in load volume, temperature, humidity and barometric pressure.

- Conforms to IEC 60942 : 2017 Class 1 and ANSI/ASA S1.40-2006 (R2016) Class 1
- Ultra-stabile silicone reference microphone
- All-digital quartz-controlled signal generator
- Fully compensated for static pressure, humidity and temperature
- Sound pressure independent of microphone equivalent volume
- Robust, compact and battery operated
- 114dB @ 1000 Hz
- Supplied with accredited calibration certificate

## Class 1 Sound Calibrator Nor1256

Nor1256 is a small battery-operated precision class 1 microphone calibrator conforming to IEC 60942 and ANSI S1.40. The combination of two different levels and two different frequencies allow both level linearity and frequency linearity to be verified. In addition, the sound calibrator measures the environmental conditions: air pressure, temperature and humidity. The all-digital design with a quartz controlled signal generator ensuring a frequency stability not yet seen on any calibrator on the market today. The reference microphone and control circuit together maintain a constant sound pressure level inside the calibration coupler and automatically adjust for changes in load volume, temperature, humidity, and barometric pressure. The selected level and frequency is clearly indicated on the OLED display.

- Conforms to IEC 60942 : 2017 Class 1 and ANSI/ASA S1.40-2006 (R2016) Class 1
- Ultra-stabile silicone reference microphone
- All-digital quartz controlled signal generator
- Fully compensated for static pressure, humidity and temperature
- Sound pressure independent of microphone equivalent volume
- Robust, compact and battery operated.
- 114 and 94 dB @ 1000 and 250 Hz
- Built in display
- Measurement of humidity, temperature and static pressure
- Supplied with accredited calibration certificate





# Nor133 & Nor136 Vibration meter

## Applications and features

- Designed in accordance with ISO 8041
- Whole body vibration to ISO 2631
- Hand Arm vibration to ISO 5349
- Building Vibration measurement
- Ship cabin vibration measurements
- Graphical and numerical display of all channels simultaneously
- Huge memory capacity with SD memory card
- Records the raw data signal for analysis in NorVibraTest
- Complete range of accelerometers for HA and WB measurements
- Support for use of passive geophone Nor1292



## Nor1038 NorVibraTest

### Features

- Post-processing software
- Calculation of all weighted features for multi-file measurements
- Displays weighted and un-weighted time signal, frequency spectrum, power density
- Handles up to 6 measured vibration channels and one noise channel



Nor1286 - Triaxial seat pad accelerometer

Nor1287 - Triaxial miniature accelerometer

Nor1270 - General purpose single axis accelerometer

Nor1288 - Triaxial accelerometer



Nor1292 - Triaxial velocity sensor (Geophone)

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