RION / Norsonic

# Sound and Vibration

Measuring Instruments General Catalog

NorCloud

RION has recently conlcuded a share transfer agreement on the acquisition of the shares of Norsonic for the purpose of strengthening its business in the European and U.S. markets through the acquisition of new sales channels and the enhancement of product ranges with respect to sound measuring instruments.

We believe that integrating Norsonic's products, related technologies and sales networks and those of the Group is very effective for developing high value added products and increasing market share. By taking advantage of synergies, the Group will focus its efforts on developing products and services that the market has not seen before.

**RION**

RION CO., LTD. was founded in 1944, with the aim of developing commercial products based on scientific work carried out at the Kobayasi Institute of Physical Research. Ever since its founding, RION CO., LTD. has upheld the belief that acoustics is a science of great importance to the well-being and welfare of society. RION has continued to introduce products based on this philosophy, aimed squarely at improving quality of life. A healthy and content society is the vision that guides our activities.

We has three business divisions: "the Medical Instrument Division", "the Environmental Instrument Division", and "the Particle Counter Division". The Medical Instrument Division develops, manufactures, and sells hearing instruments, assistive listening devices, and medical equipment, mainly used in the field of otolaryngology (ear, nose and throat). "The Environmental Instrument Division" develops, manufactures, and sells sound and vibration measuring instruments, including sound level meters, vibration meters and seismometers. "The Particle Counter Division" develops, manufactures, and sells particle counters to measure particles in the air and liquids.

Our products are tailored to the requirements and expectations of its customers. This has helped the company maintain a leading position in the industry. RION wants to use its momentum and forward-looking stance to help create a society that is truly easy to live in. The ultimate aim is to provide a safe and gratifying environment for all members of society.

**Norsonic**

Norsonic, a company headquartered in Norway, has many users operating chiefly in the Norwegian and overseas architectural acoustic product markets, including the environmental measurement market that primarily consists of European or U.S. governmental organizations and universities.

It is one of the world's leading manufacturers, and matches the Company in the development and production of sound measuring instruments such as sound level meters. It enjoys leading market shares in European countries.

Looking at markets associated with sound measurement, environmental monitoring systems, which remotely monitor noises and vibrations generated in a range of places, such as construction sites, factories and roads, and provide customers with data thereof that are stored on the cloud, are becoming mainstay products, especially in Europe and the United States. Norsonic's "NorCloud" environmental monitoring system is a powerful product that responds to these market needs, and it already has a broad range of users in Europe.

# Large colour touchscreen, intuitive menus – easy to use.

Single channel
Sound Analyser
**Nor145**

CE

**4G** LTE

NorCloud

GPS

4,3"

Dual channel
Sound Analyser
**Nor150**

CE

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

**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

## Enviromental Analyser

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

## Building Acoustic Analyser

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.

**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 Wi-Fi 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

## 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.

## 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 Wi-Fi using a web browser to control, download or view the measurement in real time.

## NorConnect Nor1051

NorConnect is a measurement suite and data management program for measurement files downloaded from Nor145 and Nor150.Dependent of your measurement, optimized graphical tools are offered for building acoustic, sound power and environmental/general measurements.

## NorReview Nor1026

The NorReview is a flexible project oriented PC software package for presenting and post processing environmental noise data from our instruments.

# Exploring the possibility of Noise Measurement

Class 1 Sound Level Meter
(With low-frequency sound measurement function)
# NL-63

CE

Class 1 Sound Level Meter
# NL-53

CE

Class 2 Sound Level Meter
# NL-43

CE

▐ **Equipped with LAN terminals to enhance connectivity with other devices.**
▐ **Power can be supplied from portable charger via the USB Type-C connector.**
▐ **A single sound level meter can measure up to four measurement conditions simultaneously. Different frequency weighting and time weighting settings can be specified for each of four measurement conditions.**
▐ **The color touch panel LCD has been designed to offer high visibility both indoors and outdoors, and in the dark.**

| Specifications | | | | Class 1 Sound Level Meter (With low-frequency sound measurement function) **NL-63** | Class 1 Sound Level Meter **NL-53** | Class 2 Sound Level Meter **NL-43** |
|---|---|---|---|---|---|---|
| Applicable standards | | | | IEC 61672-1: 2013 class 1, ISO 7196: 1995, ANSI/ASA S1.4-2014/Part1 class 1, JIS C 1509-1:2017 class 1, JIS C 1516: 2020 class 1 | IEC 61672-1: 2013 class 1, ANSI/ASA S1.4-2014/Part1 class 1, JIS C 1509-1: 2017 class 1, JIS C 1516: 2020 class 1 | IEC 61672-1: 2013 class 2, ANSI/ASA S1.4-2014/Part1 class 2, JIS C 1509-1: 2017 class 2, JIS C 1516: 2020 class 2 |
| | | | | CE marking ■ EMC Directive Directive 2014/30/EU EN 61326-1:2013　　■ RoHS Directive Directive 2011/65/EU EN IEC 63000:2018 ■ Low Voltage Directive Directive 2014/35/EU EN 61010-1:2010/A1:2019, UKCA Marking, China RoHS, KC mark, VCCI Class B | | |
| Measurement function | | | | Simultaneous measurement of up to four conditions (Main channel, Sub1 to Sub3 channels) with selected time weighting and frequency weighting | | |
| | Instantaneous value | | | Time-weighted sound pressure level $L_p$ | | |
| | Calculated value | | | Equivalent continuous sound level: $L_{eq}$, I-time-weighted equivalent continuous sound level: $L_{Ieq}$[2], Moving $L_{eq}$: $L_{eq, mov}$[2], Sound exposure level: $L_E$, Maximum sound level: $L_{max}$, Minimum sound level: $L_{min}$, Percentile sound level: $L_N$, Peak sound level: $L_{peak}$, Takt-max sound level: $L_{tm5}$ | | |
| Measurement frequency range | | | | 1 Hz to 20 kHz | 10 Hz to 20 kHz | 20 Hz to 8 kHz |
| Store | Manual store | | | Data for measurement results are stored manually in single address increments. | | |
| | | Number of data | | Internal memory: max. 1000 sets SD Card: depends on the capacity of the SD Card[1] | | |
| | | Measurement time | | 10 s, 1 , 5 , 10 , 15 , 30 m, 1 , 8 , 24 h, User Setting (1 s to 24 h) | | |
| | Auto store[2] | | | Instantaneous values ($L_p$ store) and processed values ($L_{eq}$ store) are stored continuously on the SD card and automatically at preset intervals. | | |
| | | $L_p$ store interval | | Off, 10 ms, 25 ms, 100 ms, 1 s | | |
| | | $L_{eq}$ calculation interval | | Off, 10 s, 1, 5, 10, 15, 30, 1, 8, 24 h, or User Setting (Min. 1 s to max. 24 h) | | |
| | | Number of data | | SD card: Data can be saved with store names from 0000 to 9999 | | |
| | | Measurement time | | 10 s, 1, 5, 10, 15, 30, 1, 8, 24 h, User Setting (Min. 1 s to max 1000 h), Continue (Perform measurements until the SD card runs out of space[1]) | | |
| Waveform recording *2*3 | File format | | | Uncompressed waveform WAVE file | | |
| | Sampling frequency | | | Select 48 kHz, 24 kHz, 12 kHz, 1200 Hz or 240 kHz | Select 48 kHz, 24 kHz or 12 kHz | |
| Dimensions, Weight | | | | Approx. 265 mm (H) × 83.5 mm (W) × 34.5 mm (D), approx. 400 g (including batteries) | Approx. 258 mm (H) × 83.5 mm (W) × 34.5 mm (D), approx. 400 g (including batteries) | |

∗1 Use Rion fully guaranteed products.　∗2 NX-43EX required for NL-43/NL-53 (sold separately).　∗3 NX-43WR required (sold separately).

## Extended Function Program
## NX-43EX

**Adds a number of functions.**

- Auto store function (instantaneous value, processed value)
- Comparator function
- Continuous data output function
- Trigger function
- LAN function
- Four types of marker functions

**Installation of NX-43EX\* enables addition of NX-43WR / NX-43RT / NX-43FT**
\*The NX-43EX program cannot be uninstalled.

### Waveform Recording Program
### NX-43WR

- This function enables users to record sounds and to process sound levels simultaneously.
- Recorded data can be played on computer and used for frequency analysis. (Uncompressed waveform WAVE file)

**Compatible models**
NL-43/53/63

### Octave, 1/3 Octave Real-time Analysis Program
### NX-43RT/NX-63RT

- Octave band and 1/3 octave band analysis can be performed.

**NX-43RT**
**Compatible models**
NL-43/53

**NX-63RT**
**Compatible models**
NL-63

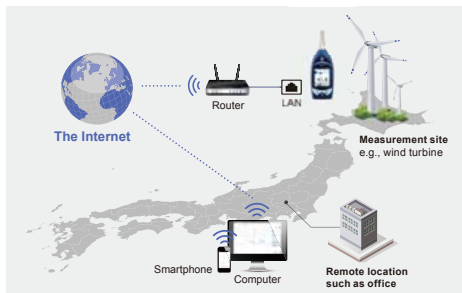### FFT Analysis Program
### NX-43FT

- FFT analysis can be performed.

**Compatible models**
NL-43/53/63

**Case 1**
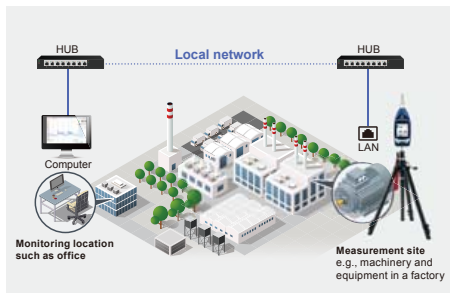**Environmental noise monitoring of remote locations**
The operational status of the sound level meter can be checked remotely from a web browser, reducing the number of site visits. You can also use the meter with a mobile router for wireless communications.

**Case 2**
**Noise monitoring of equipment and machinery at factories and site boundary lines**
Connecting the LAN terminal on the sound level meter and computer with a LAN cable allows noise monitoring from the web browser.
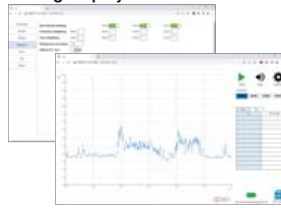
Router | LAN
The Internet
Measurement site e.g., wind turbine
Smartphone | Computer | Remote location such as office

HUB | Local network | HUB
Computer | LAN
Monitoring location such as office
Measurement site e.g., machinery and equipment in a factory

\*NX-43WR is required to listen to the sound during noise measurement on your browser.

**Web browser**
**By connecting to a network, remote connection via web browser of PC or smartphone is established.**

- View and acquire measurement date
- Remote operation of the sound level meter (measurement settings, start and stop of measurement, time adjustment, etc.)
- Real-time audio playback (with optional NX-43WR, Supported by only Google Chrome)
- File download (Downloads are limited to one file at a time.)  Marker function (up to four colors)

**Setting display**

**Marker function**
Sections of characteristic sounds can be color-marked for later examination.

**File download**
Stored data can be retrieved remotely.
\*Downloads are limited to one file at a time.

**Measurement screen**
(Time-Level graph display, calculated value display)

**Ultra compact, Lightweight, High-performance**

Class 2 Sound Level Meter
# NL-27

CE

**Specifications**

| | |
|---|---|
| Applicable standards | IEC 61672-1: 2013 class 2, CE marking, WEEE Directive |
| Measurement functions | $L_p$, $L_{eq}$, $L_E$, $L_{max}$, $L_{Cpeak}$ |
| Measurement level range | A-weighting: 30 dB to 137 dB, C-weighting: 36 dB to 137 dB |

**Build flexible measurement systems for simultaneous measurement of sound and vibrations**

Sound Level Meter Unit
# UN-14

CE   **TEDS compliant**

**Specifications**

| Inputs | 7-pin input connector | For measurement microphone or preamplifier (max. input voltage ±10 V)  (excl. UC-34P connection) Microphone bias voltage +30 V, +60 V, +200 V |
|---|---|---|
| | BNC connector | For CCLD compliant microphone or preamplifier (24 V 4 mA) For TEDS compliant microphone (24 V 4 mA) |
| Measurement level range | | A:  30 dB to 128 dB (using UC-59, NH-17) C:  36 dB to 128 dB (using UC-59, NH-17) Z:  41 dB to 128 dB (using UC-59, NH-17)      (HPF 20 Hz, LPF 20 kHz) |
| Frequency range | | 1 Hz to 80 kHz (20 Hz to 40 kHz ±0.5 dB)  (1 Hz to 80 kHz ±3 dB) |

**All required functions for aircraft noise measurement combined in a single system**

Aircraft Noise Monitoring System

CE

Environmental Noise Monitor
## NA-39A
Compliant with IEC 61672-1: 2013 class 1.
Standard configuration includes one-third octave frequency analysis function.

Noise Arrival Direction Identification Unit
## AN-39D
Elevation angle and direction angle are measured using four microphones, to identify sound source using sound arrival direction of aircraft operation sound and others.

SSR Receiver Unit
## AN-39R
Receives SSR (Secondary Surveillance Radar) information used for air traffic control.

**Workplace noise measurements for industrial safety and health measuring and managing noise exposure for individual workers**

## Noise Dosimeter
# NB-14

CE  WATER RESISTANT

▌ Compact and lightweight, Easy operation, Automatic calibration, USB rechargeable, Simple report generation, Specifications

**Specifications**

| Applicable standards | IEC 61252:1993+AMD1:2000+AMD2:2017,IEC 61672-1:2013 class 2, IEC 62133-2:2017+A1:2021,JIS C 1509-1:2017 class 2,VCCI Class B, Enables measurements in compliance with ISO 9612. |
|---|---|
| | CE Marking •EMC Directive 2014/30/EU IEC 61326-1:2012 IEC 61326-1:2021 • RoHS Directive 2011/65/EU UKCA Marking,WEEE Directive,China RoHS,UN38.3 |
| Measurement function (Measures each calculated value at the same time) | Equivalent continuous A-weighted sound level $L_{Aeq}$ Equivalent continuous C-weighted sound level $L_{Ceq}$ C-weighted peak sound level $L_{Cpeak}$ Percentage of the legal limit of a physical quantity of exposure DOSE |
| Measurement level range | Equivalent continuous A-weighted sound level 58 dB to 143 dB Equivalent continuous C-weighted sound level 58 dB to 143 dB C-weighted peak sound level 75 dB to 146 dB |

### 114 dB/250 Hz calibration sound source
## Pistonphone
# NC-72B  CE

**Specifications**

| Applicable standards | IEC 60942: 2017 class LS/M, class 1/M |
|---|---|
| | ANSI/ASA S1.40-2006 (R2016) class LS/C, class 1/C |
| Compatible microphones | 1 inch, 1/2 inch, 1/4 inch types |
| Nominal sound pressure level | 114 dB |
| Frequency | 250 Hz |

### Compensation for atmospheric pressure not required
## Sound Calibrator
# NC-75  CE

**Specifications**

| Applicable standards | IEC 60942: 2017 class 1, |
|---|---|
| | ANSI/ASA S1.40-2006 class 1 |
| Compatible microphones | 1 inch, 1/2 inch, 1/4 inch types |
| Nominal sound pressure level | 94 dB |
| Nominal frequency | 1 000 Hz |

**Nor1256 is a small battery-operated precision class 1 microphone calibrator conforming to IEC 60942 and ANSI S1.40.**

## Class 1 Sound Calibrator
# Nor1256  CE

• 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

# NorCloud - Noise monitoring made easy!

NorCloud is designed to fit your need for noise monitoring. Even if you are a non expert, NorCloud offers you an easy setup of a project with alarms and triggers.

Assigning your sound level meter or sound monitoring station has never been easier; connect the instrument to Internet, register the sensors id number in your NorCloud project, and you are up and running. Once registered the same sensor can easily be moved between your projects when needed. A powerful report generator integrated in NorCloud offers you to design your own report templates (or you can use one of our standard templates). You can set NorCloud to distribute via e-mail as many measurement reports that you need, as often as you want. Or just select a time window in the graph, and generate a NorCloud report based on the selected time span. Our Noise Monitoring Terminal Nor1531 is a weather proof 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.

## When is NorCloud the preferred solution?

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


NorCloud

• 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 is seamless integrated with NorReview, when further analysis of measurement data is needed. Just select the periode window of interest, download the measurement and open it in NorReview. The NorReview PC software package is one of the most powerful tool available for post processing and presentation of environmental noise data.
NorCloud is available in English, German, French and Spanish.

# Fast, easy to connect your sensor to NorCloud via 4G, Wi-Fi 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.

# Nor850-MF1  $C\epsilon$

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.

**Nor140**    **Nor150**    **Nor145**

# 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 multichannel 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 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 Spectrogram are also available.



## 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.

**Nor850-MF1**
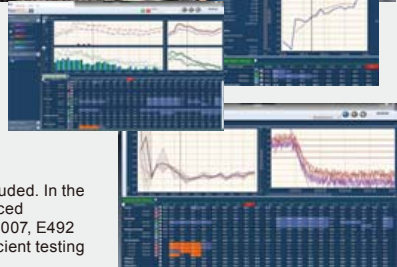
## Sound Power Mode

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.

# Building Acoustics

### Hemi-dodecahedron Loudspeaker
## Nor275
CE

• 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

**Nor275**

### Dodecahedron Loudspeaker
## Nor276
CE

• 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 5 000 Hz via the Nor280 Power Amplifier

**Nor276**

### Power Amplifier
## Nor280
CE

• 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

**Nor280**

### Power Amplifier
## Nor282
CE

• Specially designed for building acoustic and room acoustic measurements.
• Battery operated (90 minutes at full power)
• Graphical user defined equalizer to optimize acoustic output from speaker.
• Wi-Fi for easy connect to Norsonic measuring equipment.
• Compact, 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 loudspeakers types Nor275 or Nor276.
• Wireless Noise on/off hand switch.

**Nor282**

### Tapping Machine
### Light Floor Impact Sound Generator
## FI-01A/Nor277
CE

**Specifications**

| Applicable standards | ISO 10140-5, ISO 16283-2 |
|---|---|
| Hammers Number and Spacing | 5 hammers are arrayed at 100 mmintervals in a straight line |
| Average time between floor impacts of each hammer | 100 ±5 ms |
| Interface | RS-232C |
| Dimensions, Weight | Approx. 230 (H) x 265 (W) x 557 (D) mm, approx. 10 kg |

## Impact Ball
# YI-01

**Specifications**

| | |
|---|---|
| Equivalent mass | 2.5 ±0.1 kg |
| Drop height | 1 m |
| Shape | Hollow sphere with 32 mm thick wall and 178 mm external diameter |
| Rebound coefficient | 0.8 ±0.1 |

## Heavy Floor Impact Source
# FI-02

**For testing the acoustic properties of floor construction**

• Heavy and soft impact source suitable for floor impact sound level
  measurement, simulating events such as children jumping up and down
• Can be used to evaluate mainly the medium and low frequency range
  insulation aspect in the acoustic performance of floor structures

JIS A 1418-2: 2019 Standard Heavy Impact Source (impact force characteristics 1)

## Microphone Boom
# Nor265    C€

• 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 ±90º and ±180º
• 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    C€

**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)
• Fulfils ISO 6926 for reference sound sources in the extended frequency range
  50 Hz – 10 kHz
• Individually calibrated (accredited calibration optional)
• Long-term stability
• Rugged
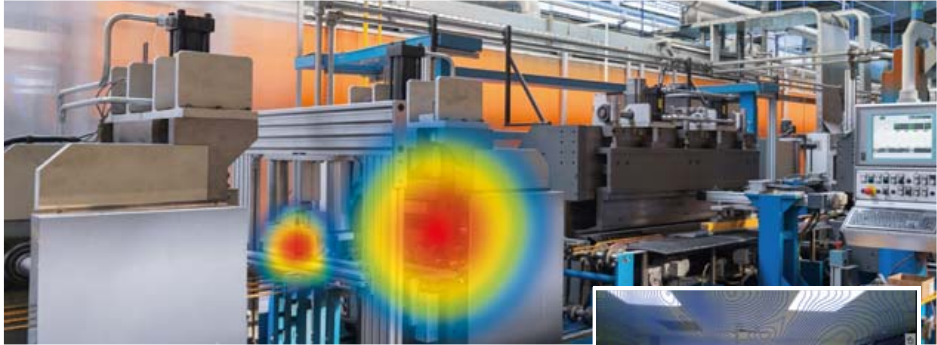
## Achieves high dynamic range using overwhelming number of microphones

## Acoustic Camera
### Hextile/Multitile/Multitile-LF (for low-frequency analysis)

CE

▌ Realtime display of high-resolution color maps generated by high-speed data processing and beamforming
▌ The hexagonal microphone array module offers expandable functionality.
▌ The Multitile-LF for low-frequency analysis can process sound in the 120 Hz–1 kHz frequency range.
▌ Recorded data is stored in MP4 format for subsequent reanalysis.
▌ Available display modes include FFT analysis, octave band analysis, and spectral mapping.
▌ The array of microphones can be connected using USB cables to allow easy settings and power supply.
▌ Camera view lets users experience sounds (virtually) at a specified point simply by selecting a point with the cursor.

USB cable

Computer

**Hextile**   **Multitile**   **Multitile-LF** (for low-frequency analysis)

| Specifications for microphone array | Hextile | Multitile | Multitile-LF (for low-frequency analysis) |
|---|---|---|---|
| Measurement frequency range | 410 Hz to 20 kHz | 220 Hz to 20 kHz | 120 Hz to 1 kHz |
| Number of microphones installed in unit | 128 | 384 | 384 |
| External dimensions | φ48 cm | φ96 cm | φ146 cm |
| Measurement level range (system) | 9 dB to 120 dB | | |
| Minimum measurement distance | 0.5 m | | |
| Frame rate (at camera resolution of 2,592 × 1,944) | 15 FPS | | |
| Operating temperature range | -40 °C to +85 °C | | |
| Water resistance | IP40 | | |
| Computer | MacBook Pro　Intel Core i7、SSD、RAM：8 GB or more | | |
| DC power source | USB 5 V | | |

**Vertical Incidence sound absorption coefficient measuring device using two-microphone method**

# Vertical Incidence Acoustic Measurement System
# Impedance Tube

▎ Within an Impedance tube, the reflected sound or transmitted sound from sound hitting the sound absorbing material or sound insulation material surface vertically is captured to measure the sound absorption coefficient, acoustic impedance, and related values, as well as the sound reduction index of a material.

▎ The results can serve for evaluation and for determining the physical properties of sound absorbing material, sound insulation material and similar materials used for example to achieve weight reduction in automobiles or high-rise buildings.

**Specifications**

| Model | | Model 9301 | Model 9302 | Model 9303 | Model 9305 |
|---|---|---|---|---|---|
| Applicable standards | | JIS A 1405-2, ISO 10534-2 | | JIS A 1405-2, ISO 10534-2, ISO 13472-2 | JIS A 1405-2, ISO 10534-2 |
| Measurement range | Low-frequency tube | 100 Hz to 1 600 Hz | 125 Hz to 1 600 Hz | 125 Hz to 1 600 Hz | — |
| | High-frequency tube | 500 Hz to 6 300 Hz | 500 Hz to 6 300 Hz | — | 1 000 Hz to 10 000 Hz |
| Configuration | Low-frequency tube | Main section, Link section, Calibration section, Measurement section, Sound absorption coefficient measurement section, Diameter 100 mm | Main section, Calibration section, Measurement section, Diameter 100 mm | Main section, Calibration section, Measurement section, Road mounting metal bracket, Reference metal bracket Diameter 100 mm | — |
| | High-frequency tube | Main section, Link section, Calibration section, Measurement section, Sound absorption coefficient measurement section, Diameter 29 mm | Main section, Link section, Measurement section, Diameter 29 mm | — | Main section, Link section, Calibration section, Measurement section, Sound absorption coefficient measurement section, Diameter 16 mm |
| | 1/4-inch microphones | 4 | 2 | 2 | 4 |
| | Amplifier | 1 set | 1 set | 1 set | 1 set |
| | Computer (Option) | 1 | 1 | 1 | 1 |

# Model 9301 Vertical Incidence Sound Absorption Coefficient/ Sound Reduction Index Measurement System

Measures the sound absorption coefficient and acoustic impedance related items of sound absorbing material and the vertical incidence sound reduction index of sound insulation material.
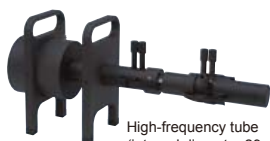
High-frequency tube
(internal diameter 29 mm)

Low-frequency tube
(internal diameter 100 mm)

# Model 9302  Vertical Incidence Sound Absorption Coefficient Measurement System
Measures the sound absorption coefficient and acoustic impedance related items of sound absorbing material.

# Model 9303  Road Surface Sound Absorption Coefficient Measurement System
Designed for on-site measurements of the sound absorption coefficient of road surfaces, used in running vehicle noise tests. Enables similar measurements as the Model 9302.

# Model 9305 Vertical Incidence Sound Absorption Coefficient/ Sound Reduction Index Measurement System for High Frequency Measurement
Measures frequencies up to 10 000 Hz; ideal for measuring acoustic characteristics of sound absorbing and insulating materials for use in electric vehicles and other applications.

# Carefully controlled acoustic properties provide a stable and quiet environment for measurements

## Anechoic Box (Compact Type)

▌ Suitable for use in testing and developing small size precision instruments
▌ Wall reflections are damped for enhanced measurement accuracy
▌ Wedge-shaped absorber layer provides high sound absorption efficiency
▌ Compact dimensions and casters provide mobility
▌ Available as standard Type L, or Type H with higher sound insulation and absorption characteristics

## Anechoic Room

▌ Can be assembled on site in existing buildings, which helps to keep costs low
▌ Enhanced sound insulation performance and additional facilities available as options
▌ Available as standard Type L, or Type H with higher sound insulation and absorption characteristics

## Sound Proof Chamber

▌ Can be assembled on site in a short time
▌ Suitable for many applications, including acoustic measurements of small machinery and equipment, sound-shielded environment configuration, acoustic testing, hearing level testing and more
▌ Enhanced sound insulation performance and additional facilities available as options

# Condenser Microphone UC Series

| Model | UC-27 | UC-34P | UC-35P | UC-30 | UC-31 | UC-33P | UC-52 | UC-59 | UC-57 | UC-29 | UC-54 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Suitable preamplifier | NH-06A | NH-34 supplied | NH-35 supplied | NH-04B/05B/12A | NH-04B/05B/12A | NH-04B/05B/12A | NH-17/17A/22A | NH-17/17A/22A | NH-17/17A/22A | NH-05B (using UA-12) | NH-17/17A/22A (using UA-12) |
| Nominal diameter | 1 inch | | | 1/2 inch | | | | | | 1/4 inch | |
| Frequency response | Sound field | Sound field | Sound field | Sound field | Sound field | Sound pressure | Sound field | Sound field | Sound field | Sound field | Sound field |
| Measurement frequency range (Hz) | 5 to 12 500 | 10 to 12 500 | 10 to 12 500 | 10 to 20 000 | 10 to 35 000 | 10 to 20 000 | 20 to 8 000 | 10 to 20 000 | 10 to 16 000 | *2 20 to 100 000 | *2 20 to 100 000 |
| Bias voltage (V) | 200 | 200 | 0 | 200 | 200 | 200 | 0 | 0 | 0 | 200 | 0 |
| Sensitivity level (dB re 1 V/Pa)*1 | −26.5 | −21/−1 | 0 | −25.5 | −37 | −38 | −33 | −27 | −22 | −47 | −48 |
| Capacitance (pF) | 54 | — | — | 17 | 20 | 20 | 19 | 13 | 14 | 6 | 4 |
| Maximum input sound pressure level (dB) (Linearity tolerance ± 0.3 dB) | 152 | — | 96 | 144 | 160 *4 | 160 | 150 | 148 | 132 *4 | 164 *4 | 164 |
| Inherent noise level (dB) | 12 | 2 | 4 | 20 | 26 | 28 | 24 | 18 | 13 | 42 | 45 |
| Temperature coefficient (dB/°C) | −0.005 | — | — | −0.007 | −0.007 | −0.009 | −0.008 | within ±0.35 dB (at 1 kHz) *3 | within ±0.45 dB (at 250 Hz) *3 | −0.01 | within ±0.7 dB (at 250 Hz) *3 |
| Diaphragm | Titanium alloy | | | | | | | | | Titanium | |
| Dimensions (mm) | dia.23.8 × 21.0 | dia.23.8 × 131 | dia.23.8 × 132.7 | dia.13.2 × 15.0 | dia.13.2 × 13.2 | dia.13.2 × 13.0 | dia.13.2 × 12.0 | dia.13.2 × 14.3 | dia.13.2 × 13.5 | dia.7.0 × 10.0 | dia.7.0 × 10.0 |

*1 Representative value for 1 kHz  *2 UC-29/54 frequency range refers to microphone without grid.  *3 −10 °C to +50 °C referenced to 23 °C  *4 Distortion 3 %
*5 Depend on connected instrument

# Microphone With Preamplifier

▌ TEDS compliant

# Preamplifiers NH Series

▌ Faithful transmission of voltage signal generated by microphone to subsequent amplifier stages
▌ Versatile preamplifier lineup allows choosing the best combination of diameter and microphone type
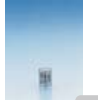
| Model | UC-52T | UC-57T | UC-59T |
|---|---|---|---|
| Microphones | UC-52 | UC-57 | UC-59 |
| Nominal diameter | 1/2 inch | | |
| Frequency response | Sound field | Sound field | Sound field |
| Measurement frequency range (Hz) | 20 to 8 000 | 10 to 16 000 | 10 to 20 000 |
| Drive current | 2 mA to 4 mA | 2 mA to 4 mA | 2 mA to 4 mA |
| A-weighted inherent noise level (dB) | 24 | 13 | 18 |
| Dimensions (mm) | φ13.2×97 | φ13.2×98.5 | φ13.2×99.4 |
| Cable type | EC-90 series (BNC) | EC-90 series (BNC) | EC-90 series (BNC) |

| Model | NH-06A | NH-04B | NH-12A | NH-17 | NH-17A | NH-22A | NH-05B |
|---|---|---|---|---|---|---|---|
| Suitable microphones | UC-27 | UC-30/31/33P | UC-30/31/33P | UC-52/54*1/57/59 | UC-52/54*1/57/59 | UC-52/54*1 (constant current drive) 2 mA to 4 mA | UC-29*1 UC-30/31/33P |
| Nominal diameter | 1 inch | 1/2 inch, 1/4 inch*1 | | | | | 1/2 inch, 1/4 inch |
| Input impedance (GΩ) | 3 | 3 | 3 | 3 | 3 | 6 | 10 |
| Input capacitance (pF) | 0.3 | 0.25 | 0.25 | 0.8 | 0.8 | 0.7 | 0.2 |
| Measurement frequency range (Hz) | 5 to 100 000 | 10 to 100 000 | 10 to 100 000 | 10 to 100 000 | 10 to 100 000 | 10 to 100 000 | 10 to 100 000 |
| Bias voltage (V) | 200 | 200 | 200 | 0 | 0 | 0 | 200 |
| Gain (dB), representative value | −0.1(54 pF) (UC-27) | −0.2 (17 pF) (UC-30) | −0.2 (17 pF) (UC-30) | −0.5 (13 pF) (UC-59) | −0.5 (13 pF) (UC-59) | −0.5 (13 pF) (UC-59) | −0.5 (6 pF) (UC-29)*1 |
| A-weighted inherent noise level (dB) | 12 (UC-27) | 20 (UC-30) | 20 (UC-30) | 18 (UC-59) | 18 (UC-59) | 18 (UC-59) | 42 (UC-29) |
| Output impedance (Ω) | 100 or less | 100 or less | 100 or less | 300 or less | 300 or less | approx. 30 | 100 or less |
| Cable type | EC-04 series (7P) | | 1.5 m integrated (7P) | 5 m integrated (7P) | EC-04 series (7P) | EC-90 series (BNC) | EC-04 series (7P) |

*1 Using UA-12

**TEDS** TEDS (Transducer Electronic Data Sheet) is a format for sensor-specific information defined by the IEEE 1451 series of standards. It includes the data listed below and allows automatic calibration when the sensor is connected to TEDS compliant equipment.
**TEDS data** Manufacturer ID, Model, Serial number, Sensitivity, Calibration date, etc.

Sound
Vibration
Frequency Analyzer
Related Products

## Piezoelectric Accelerometers

| Type | Standard | With built-in amplifier | | |
|---|---|---|---|---|
| External view | **PV-03** CE | **PV-91C** CE | **PV-91CH** CE | **PV-90T** |
| Principle | Compression | Shear | Shear | Shear |
| Weight g | 38 | 1.8 | 3 | 2 |
| Charge sensitivity pC/(m/s²)[*1] | 0.47 | — | — | — |
| Voltage sensitivity mV/(m/s²)[*1] | — | 1 | 11 | 0.5 |
| Vibration frequency range (±1 dB) Hz[*2] | 20 to 1 000 (±1 %) Secondary calibration range. | 1 to 20 000 (±10 %)[*4] | 1 to 15 000 (±10 %)[*5] | 1 to 12 000 (±10 %) |
| Temperature range for use ℃ | −50 to +200 | −50 to +170 | −50 to +170 | −20 to +100 (TEDS: -20 to +85) |

| Type | General-purpose | | Compact / Lightweight | | High-output |
|---|---|---|---|---|---|
| External view | PV-86 has top-mounted connector **PV-85/86** CE | PV-95 has top-mounted connector **PV-94/95** CE | **PV-08A** CE | **PV-90B** CE | **PV-87** CE |
| Principle | Shear | Shear | Shear | Shear | Shear |
| Weight g | 23 | 9 | 0.7 | 1.2 | 115 |
| Charge sensitivity pC/(m/s²)[*1] | 6.42 | 0.714 | 0.102 | 0.18 | 40 |
| Voltage sensitivity mV/(m/s²)[*1] | — | — | — | — | — |
| Vibration frequency range (±1 dB) Hz[*2] | 1 to 7 000 | 1 to 10 000 | 1 to 25 000 | 1 to 25 000 | 1 to 3 000 |
| Temperature range for use ℃ | −50 to +160 | −50 to +160 | −50 to +160 | −50 to +160 | −50 to +160 |

| Type | High-temperature | | | |
|---|---|---|---|---|
| External view | **PV-90H** CE | **PV-44A** CE | **PV-65** CE | **PV-63** CE |
| Principle | Shear | Compression | Shear | Shear |
| Weight g | 2 | 29 | 26 | 28 |
| Charge sensitivity pC/(m/s²)[*1] | 0.29 | 7.65 | 7.14 | 4.59 |
| Voltage sensitivity mV/(m/s²)[*1] | — | — | — | — |
| Vibration frequency range (±1 dB) Hz[*2] | 1 to 20 000 (±10 %) | 1 to 10 000 | 1 to 9 000 | 1 to 8 000 |
| Temperature range for use ℃ | −50 to +250 | −50 to +260 | −50 to +260 | −20 to +300 |

| Type | Waterproof insulation | Triaxial type | | | |
|---|---|---|---|---|---|
| External view | **PV-10B** | **PV-93** CE | **PV-97C** CE | **PV-97** | **PV-97I** |
| Principle | Compression | Shear | Shear | Shear | Shear |
| Weight g | 120 | 30 | 4.7 | 10 | 8 |
| Charge sensitivity pC/(m/s²)[*1] | — | 0.831 | 0.12 | 0.29 | — |
| Voltage sensitivity mV/(m/s²)[*1] | 5.1 | — | — | — | 1.1 |
| Vibration frequency range (±1 dB) Hz[*2] | 3 to 8 000 | 1 to 8 000 (2-axis) 1 to 4 000 (1·3) | 1 to 15 000 (Z) 1 to 10 000 (X·Y) | 1 to 10 000 (Z) 1 to 5 000 (X·Y) (±10 %) | 1 to 7 000 (Z)[*3] 1 to 5 000 (X·Y) (±10 %) |
| Temperature range for use ℃ | −20 to +100 | −50 to +160 | −50 to +160 | −50 to +200 | −20 to +125 |

[*1] Representative value. Actual values are given on calibration sheet supplied with accelerometer.  [*2] Representative value when mounted on flat surface with standard mounting method.
[*3] Max. 100 ℃, max. 1000 m/s²  [*4] 1 Hz to 2 Hz (±15 %) at 150 ℃ to 170 ℃  [*5] 0.6 Hz to 20 kHz (±20 %), 0.5 Hz to 20 kHz (±30 %)
**Note** ● The piezoelectric element in a piezoelectric accelerometer may be damaged by excessive shock. Take care not to drop the accelerometer, and handle it with care when using the magnetic attachment.

## For active control systems sensor applications

### Servo Accelerometer
## LS-40C / 10C





| Specifications | LS-40C | LS-10C |
|---|---|---|
| Voltage sensitivity | 0.5 V/(m/s² ) ±1 % (DC) | 0.3 V/(m/s²) ±1 % (DC) |
| Measurement frequency range | DC to 100 Hz (±10 %) | DC to 100 Hz (±10 %) |
| Power supply voltage | ±15 V DC (±11 V to ±18 V) | ±15 V DC (±11 V to ±18 V) |
| Dimensions, Weight | 37 (H) × 37 (W) × 40 (D) mm, approx. 230 g (including cable) | 37 (H) × 37 (W) × 40 (D) mm, approx. 220 g (including cable) |



## For calibration of accelerometers and vibration meters on-site

### Calibration Exciter
## VE-10

$C\epsilon$

**Specifications**

| | |
|---|---|
| Exciter frequency | 159.2 Hz ±1 % |
| Exciter acceleration | 10 m/s² (rms) ±3 % |
| Exciter velocity | 10 mm/s (rms) ±4 % |
| Exciter displacement | 10 μm (rms) ±5 % |
| Dimensions, Weight | Approx. dia.51×134 (H) mm, approx. 600 g (including batteries) |

**Simultaneous measurement of multiple parameters including PPV and VDV**
**Simultaneous calculation of the measurement quantities defined by DIN 45669-1,**
**ISO 8041 and other international standards**

## Tri-axial Groundborne Vibration Meter
# VM-56

CE  **SD-CARD**

**Specifications**

| | | |
|---|---|---|
| Applicable standards | | DIN 45669-1: 2010-09 (Frequency, Measurement range compliance), SBR Meten en beoordelen van trillingen, Deel A: Schade aan gebouwen 2010, Deel B: Hinder voor personen 2013, ISO 8041: 2005, ISO 8041-1: 2017, CE marking, WEEE directive |
| Measurement range | | Measurement frequency setting is 1 to 80 Hz, defining the following range |
| | Measurement range for VM-56 | Vibration velocity: 0.03 to 100 mm/s |
| | | Weighted vibration amount: 0.02 to 100 mm/s (Reference 16 Hz) |
| | | Maximum absolute waveform value: 0.05 to 100 mm/s (Reference 16 Hz) |
| | | Vibration acceleration: 0.0003 to 10 m/s$^2$ |
| | | Displacement (0-p): 0.01 to 10 mm (0.5 to 4 Hz) |
| | | Measurement range compliant with SBR-Deel B |
| | | Vibration velocity: 0.02 to 100 mm/s (Frequency bandwidth 1 to 80 Hz) |

**Simultaneous measurement in three axes of the instantaneous value for vibration level and vibration acceleration level, as well as the time percentile level, time averaged level, maximum and minimum values**

## Vibration Level Meter
# VM-55

CE

**Specifications**

| | |
|---|---|
| Applicable standards | Weight and Measure Act (Vibration Level Meters) JIS C 1510 : 1995, JIS C 1517 : 2014 |
| Measurement functions | 3-axis simultaneous measurement supported $L_v$, $L_{va}$, Maximum value hold |
| Processing measurement | $L_{eq}$, $L_5$, $L_{10}$, $L_{50}$, $L_{90}$, $L_{95}$, $L_{max}$, $L_{min}$ |
| Measurement frequency range | Vibration level 1 to 80 Hz, Vibration acceleration level 1 to 80 Hz |
| Measurement level range | Vibration level, vertical direction 25 to 129 dB, Vibration level, horizontal direction 30 to 122 dB, Vibration acceleration level 30 to 129 dB |

**Signal outputs for 3 directions allow connection of frequency analyzer and waveform recording on data recorder**

## 3-Axis Vibration Meter
# VM-54

CE

**Specifications**

| | |
|---|---|
| Inputs | 3 channels (with 3-channel vibration input preamplifier) |
| Measurement frequency range | 0.5 Hz to 5 000 Hz |

### Marine Vibration Card
**VX-54WS**
**Specifications**

| | |
|---|---|
| Applicable standards | ISO 6954: 2000 |
| Input | Piezoelectric Accelerometer PV-83CW (triaxial) |
| Measurement frequency range | 1 Hz to 80 Hz (with FLAT characteristics of PV-57A up to 1 kHz) |
| Processing functions | RMS, max (MTVV), min |
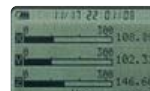
Graphic screen

**PV-83CW**
(supplied)

### Whole Body Vibration Card
**VX-54WB1**
**Specifications**

| | |
|---|---|
| Applicable standards | ISO 2631-1: 1997, ISO 2631-2: 2003, ISO 8041: 2005 |
| Input | Seat Accelerometer PV-62 (triaxial) |
| Measurement frequency range | 0.5 Hz to 80 Hz |
| Processing functions | RMS, MTVV, VDV, Synthesized Value, PEAK, Crest Factor |

Numeric screen

Seat Accelerometer
**PV-62**
(option)

### Hand-Arm Vibration Card
**VX-54WH**
**Specifications**

| | |
|---|---|
| Applicable standards | ISO 5349-1: 2001, ISO 5349-2: 2001, ISO 8041: 2005 |
| Input | Piezoelectric Accelerometer PV-97C/97I (triaxial), etc |
| Measurement frequency range | 8 Hz to 1 000 Hz |
| Processing functions | RMS, MTVV, VDV, Synthesized Value, PEAK, Crest Factor |

FFT screen
(using VX-54FT)

**PV-97C**
(option)

**PV-97I**
(option)

**Flexible unit configuration allows simultaneous sound and vibration measurement**

Vibration Meter Unit

# UV-15  `TEDS compliant`

$C\epsilon$

**Specifications**

| Inputs | Microdot connector | For piezoelectric accelerometer (Maximum input charge 100 000 pC) |
| --- | --- | --- |
| | CCLD (Constant Current Line Drive) | Accelerometer with integrated preamplifier (24 V 4 mA) Accelerometer with TEDS compliant integrated preamplifier (24 V 4 mA) |
| | 7-pin preamp connector (Connector type PRC-03) | For piezoelectric accelerometer connected via preamplifier (VP-26A) (Maximum input voltage ±10 V) |
| Measurement frequency range | | Acceleration (ACC), Velocity (VEL), Displacement (DISP) |
| Dimensions, Weight | | 150 (H) × 36 (W) × 179 (D) mm (not including protruding parts), approx. 500 g |

**Measure machine vibrations in power stations, industrial plants, or engines and motors during product development**

2-Channel Charge Amplifier

# UV-16

$C\epsilon$

**Specifications**

| Inputs | Piezoelectric accelerometer Accelerometer with integrated preamplifier (24 V 4 mA) |
| --- | --- |
| Measurement frequency range | Acceleration (ACC), Velocity (VEL), Displacement (DISP) |
| Dimensions, Weight | 150 (H) × 36 (W) × 179 (D) mm (not including protruding parts), approx. 500 g |

**Dedicated interface unit for UN-14 / UV-15**

Interface Unit

# UV-22

$C\epsilon$

**Specifications**

| Settings control (for UN-14 and UV-15) | Input selection, sensitivity, HPF, LPF, user filter |
| --- | --- |
| Computer interfaces | USB, Ethernet |
| Dimensions, Weight | 150 (H) × 36 (W) × 179 (D) mm, approx. 500 g |

## Simply press against the measurement object

POCKETABLE VIBRATION METER (RIOVIBRO)
# VM-63C

CE

### Specifications

| Measurement range | | |
|---|---|---|
| | Acceleration | 0.1 m/s² to 199.9 m/s² EQ PEAK (RMS × √2) |
| | | 10 Hz to 15 kHz |
| | Velocity | 0.1 mm/s to 199.9 mm/s RMS |
| | | 10 Hz to 1 kHz |
| | Displacement | 0.001 mm to 1.999 mm EQ P-P (RMS × 2 √2) |
| | | 10 Hz to 1 kHz |
| Dimensions, Weight | | Approx. 178 (H) × 64 (W) × 27 (D) mm, |
| | | approx. 200 g |

## Convenient 3-mode measurement for acceleration, velocity, and displacement with storage capacity for up to 1 000 data

General-Purpose Vibration Meter
# VM-82A

CE

### Specifications

| Measurement range | | |
|---|---|---|
| | Acceleration | 0.02 m/s² to 200 m/s²   EQ PEAK  1 Hz to 5 kHz |
| | Velocity | 0.3 mm/s to 1 000 mm/s  RMS  3 Hz to 1 kHz |
| | | 0.1 mm/s to 1 000 mm/s  RMS  10 Hz to 1 kHz |
| | Displacement | 0.02 mm to 100 mm    EQ PEAK   3 Hz to 500 Hz |
| | | 0.001 mm to 100 mm  EQ PEAK   10 Hz to 500 Hz |
| Dimensions, Weight | | Approx. 171.5 (H) × 74 (W) × 25.5 (D) mm, |
| | | approx. 270 g (incruding batteries) |

**Portable vibration analyzer for equipment diagnosis and on-site measurements
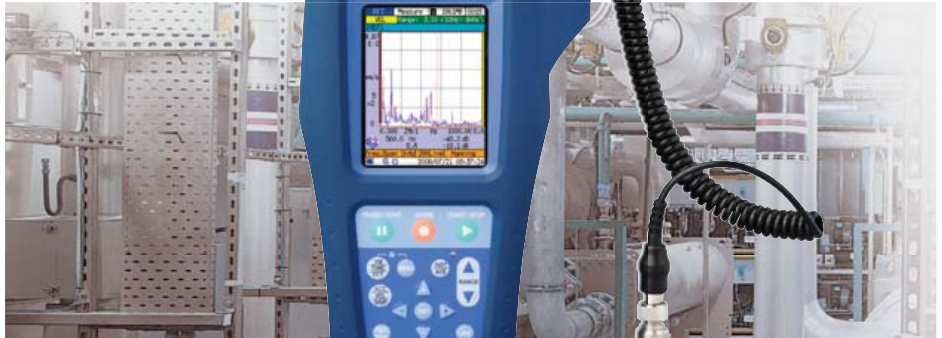Vibration Meter VA-12 with FFT analysis function**

## Vibration Analyzer
# VA-12

CE   **SD-CARD**

Vibration meter mode

### Specifications

| | |
|---|---|
| Applicable standards | CE marking, WEEE Directive, Chinese RoHS (export model for China only) |
| Input range (Vibration meter mode) | Measurement range (using PV-57I, High-pass filter 3 Hz, Low-pass filter 20 kHz) |
| ACC (Acceleration) | 0.02 to 141.4 m/s² (rms) Continuous measurement, 1 Hz to 5 kHz, waveform peak value, crest factor |
| Instantaneous maximum acceleration | 700 m/s² |
| VEL (Velocity) | 0.2 to 141.4 mm/s (rms) at 159.15 Hz |
| DISP (Displacement) | 0.02 to 40.0 mm (EQp-p) at 15.915 Hz |
| FFT mode | Time waveform, spectrum, Acceleration envelope curve |
| Analysis points | 512, 1 024, 2 048, 4 096, 8 192 (3 200 lines) |
| Time window functions | Rectangular, Hanning, Flat-top |
| Processing | Linear average, maximum, exponential averaging, instantaneous value |
| Frequency span | 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz, 20 kHz |
| Memory | |
| Memory media | SD cards (max. 2 GB)* |
| Store files | Sets of measurement values and parameters can be stored on memory card 1 000 data saved as one store name. Max. number of store names: 100 |
| Parameter setting | Up to 5 parameter sets can be stored in unit |
| memory | Parameter settings can be stored on memory card |
| Wave files | Up to 10 seconds per file (frequency range 20 kHz) Vibration waveform recorded during FFT processing available when using a computer. |
| BMP files | Screen capture can be saved as BMP files. |
| Recall function | Measurement data can be read from memory card and redisplayed on screen. |
| Dimensions, Weight | 214 (H) x 105 (W) x 36 (D) mm (without protective cover), approx. 850 g (incl. batteries,with protective cover, PV-57I connected) |

＊Use only RION supplied cards for assured operation          ● Re-analysing is available on the computer.

25

# Multi-Channel Signal Analyzer SA-02 combines FFT Analysis and 1/1, 1/3, 1/12 Octave Band Analysis Capability

## Multi-Channel Signal Analyzer
### SA-02M
4ch 8ch 12ch 16ch
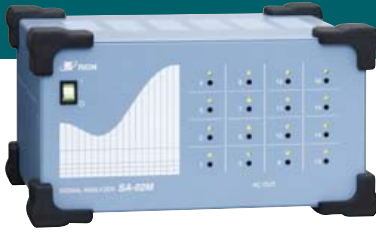
## 4-Channel Signal Analyzer
### SA-02A4
4ch

## Standard Software

Time waveform display / FFT analysis /
Time waveform recording / Power spectrum map, octave map /
Transfer function, coherence function /
Octave band analysis / Recall processing / Overlay display /
Auto-correlation function / Cross-correlation function
Amplitude probability density function
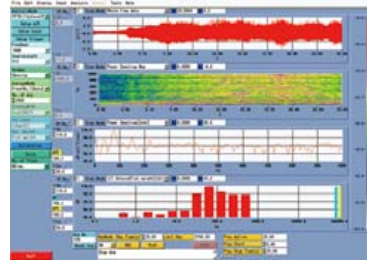
Basic screen layout

### Specifications

| | | |
|---|---|---|
| Applicable standards | | IEC 61260-1:2014 class 1 (Filter), WEEE Directive, RoHS Directive, Chinese RoHS Directive |
| Frequency range | | DC to 40 kHz |
| FFT analyzer section | Analysis frequencies | 100 Hz / 200 Hz / 500 Hz / 1 kHz / 2 kHz / 5 kHz / 10 kHz / 20 kHz / 40 kHz |
| | Number of analysis points | 64 / 128 / 256 / 512 / 1 024 / 2 048 / 4 096 / 8 192 / 16 384 / 32 768 |
| | Time window functions | Rectangular / Hanning / Flat-top / Exponential / Force Exponential |
| | Functions | |
| | Frequency domain | Spectrum, cross-spectrum, transfer function, coherence |
| | Time domain | Autocorrelation, cross-correlation, amplitude probability density, amplitude probability distribution |
| Octave band analyzer section | Analysis mode | 1/1, 1/3, 1/12 |
| Input/output section | | AC output connectors / Trigger input connector / Rotary pulse input connector |
| Dimensions, Weight | SA-02A4 | 58 (H) x 260 (W) x 210 (D) mm (without protruding parts and rubber feet), approx. 2.5 kg |
| | SA-02M | 151 (H) x 290 (W) x 249 (D) mm (without protruding parts and rubber feet), approx. 5.4 kg (4 channels installed) |

## Intensity Probe

## Sound Intensity Probe
### SI-31I

## Triaxial Simultaneous Measurement Intensity Probe
### SI-33I

### Specifications

| | |
|---|---|
| Shape | 12 mm: 200 Hz to 5 kHz, |
| (Effective acoustic distance) | 50 mm: 50 Hz to 1.2 kHz |

### Specifications

| | |
|---|---|
| Shape | 31 mm: 100 Hz to 2 kHz, |
| (Effective acoustic distance) | 50 mm: 50 Hz to 1.2 kHz |

# Dedicated Analysis Software

### Airborne Noise/Floor Impact Noise Insulation Measurement Software
## AS-20PE5
■ Designed for sound insulation measurement of buildings and building materials based on ISO specifications. Measurement and evaluation for the categories of reverberation time, floor impact sound and attenuation, airborne sound, and sound absorption in a reverberation room are possible.
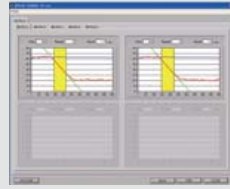


### Sound Power Level Measurement Software for Hemi-anechoic room
## AS-30PA5
■ Allows 1/3 octave band sound power level measurements, according to specifications for sound power level measurements in hemi-anechoic chambers.
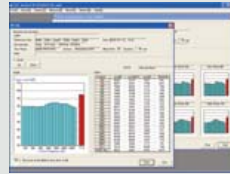


### Loss Factor Measurement Software
## AS-14PA5
■ Using the center excitation method or cantilever method, the frequency response of a strip specimen is measured, and the resonance characteristics are used to determine the loss factor and Young's modulus (or shear coefficient) of the specimen according to the half-power bandwidth method.

### Sound Intensity Measurement Software
## AS-15PA5
■ Calculates sound intensity and performs graphics processing.

### Mode Analysis Software
## ME' Scope VES
■ Allows direct linking of SA-02 and mode analysis software

### Sound Quality Evaluation Software
## CAT-SA02-SQ
■ WAVE data collected with the SA-02 and similar data can be imported into a measurement data file and used to calculate psychoacoustic evaluation quantities.

### Hand-arm Vibration Measurement Software
## CAT-SA02-HT
■ Frequency-weighted acceleration rms values are measured for the X, Y, Z axes simultaneously.
From these values ($a_{hwx}, a_{hwy}, a_{hwz}$), the software determines the triaxial combined value $a_{hv}$.

### Waveform Data Manipulation Software
## CAT-SA32
■ Versatile data manipulation
■ Arithmetic processing
■ Storing manipulated data
■ FFT processing
■ Overlay display
■ Data import function

### Sound Power Level Measurement Software for reverberation room
## AS-31PA5
■ Supports direct and comparative measurement. Also allows reverberation time measurement. Supports multi-channel measurement and microphone rotator use.

### Sound Source Location Software
## AS-16PA5
■ Determines sound incident direction using a 3-axis sound intensity probe, and displays it on screen along with a camera image.

### Tracking Analysis Software
## CAT-SA02-Order
■ Rotation data and sound/vibration data are recorded simultaneously to analyze the rotation order ratio.

### Array Type Visualization Software
## CAT-SA02-AR
■ Sound pressure level fluctuations and changes are made visible using a 32-microphone array.

### Construction Machinery Sound Power Level Measurement System
## CAT-SA02-CPWL
■ Using an Excel macro, the sound power level of construction machinery can be measured.

### Throughput Disk
## CAT-SA02-TH
■ Long-term time waveform recording

### Report Creation Support Tool
## CAT-Report
■ Excel add-on
■ XY graph
■ Ease of operation
■ Cell linking function

■ This software is a product of Vibrant Technology Inc.　　■ This software is a product of Catec Inc.

# Compact design, easy and intuitive operation

## RIONOTE

CE   **SD-CARD**

**RIONOTE is combining the newest technology with the traditional virtues of RION; quality, ease of use and economical sense. The Main Control Unit is easy and intuitive to operate, with the dedicated program of your choice, all on a large color touch screen. RION will continuously develop both programs and hardware for this measuring system of the future.**

## Wireless connections
## Use it anytime anywhere!

＊Selling of Wireless dock (SA-A1WD) differs
 from each country.
 Please contact us for further questions.

RIONOTE enables the use of a wireless dock or wireless sensor amplifiers to avoid the cost and hassle of cables. A plurality of wireless docks and wireless sensor amplifiers can be used simultaneously, up to 16 channels, to store the measured data in the Main Control Unit as well as in the memory of wireless dock or wireless sensor amplifiers.

## RIONOTE Main Control Unit and Amplifier
# SA-A1B4/B2

**Supports direct connection of microphones and piezoelectric accelerometers.**

Sensor amplifier slides into the underside of main unit

**Specifications** (Main control unit and 4ch amplifier)

| | |
|---|---|
| Number of channels | 4, BNC connectors |
| CCLD | 2 mA  24 V (4 mA Factory option) |
| Frequency Range | DC to 20 kHz or 0.25 Hz to 20 kHz |
| Dynamic range | 100 dB or better |
| A/D converter | 24 bit |
| Display | 10.1 inch TFT color LCD |
| Touch panel | Multi-touch |
| SD card | Max. 32 GB |
| Power supply | Li-Ion battery, AC adapter |
| Dimensions, Weight | 188 (H) x 275 (W) x 40 (D) mm |
| | SA-A1: 1 200 g (incl. 280 g battery) |

# RIONOTE Wireless Dock
## SA-A1WD (and Amplifier)
**Separate type wireless dock and amplifier
(2 channel or 4 channel configuration)**

∗ Selling of Wireless dock (SA-A1WD) differs from each country.
Please contact us for further questions.

**Specifications**

| Input | 4 or 2 channels |
| --- | --- |
| | (Amplifier SA-A1B4/B2 needed) |
| Signal transfer to main platform | |
| Wired | Ethernet 100 base-TX |
| Wireless | WLAN (IEEE802.11a/b/g/n) |
| Distance of wireless transfer | about 50 m* |
| Dimensions, Weight | Approx. 42 (H) × 193 (W) × 95 (D) mm, |
| | approx. 500 g (incl. battery) |

∗ Depending on usage conditions

## RIONOTE Program for FFT Analysis
### SX-A1FT

**FFT analysis can be performed.**

| Analysis frequencies | 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz, 20 kHz |
| --- | --- |
| Arithmetic functions | Time waveform for 1 frame, Power spectrum, Cross spectrum, Transfer function, Coherence |
| Window functions | Rectangular, Hanning, Flat-top, Exponential, Force |
| Number of analysis points | 256, 512, 1 024, 2 048, 4 096, 8 192, 16 384 |

## RIONOTE Program for 1/3 Octave Analysis
### SX-A1RT

**Octave band and 1/3 octave band analysis can be performed.**

| Standard compliance | IEC 61260-1: 2014 class1, ANSI/ASA S1.11-1-2014 |
| --- | --- |
| Band filter center frequencies and number of bands | |
| Octave bands | 0.5 to 16 000 Hz, 16 bands Max. 4 channels |
| 1/3 octave bands | 0.4 to 20 000 Hz, 48 bands Max. 3 channels |
| Instantaneous value data (every 100 ms) | $L_P$, $L_{eq}$, $L_{max}$ |
| Processing value data | $L_{eq}$, $L_E$, $L_{max}$, $L_{min}$, $L_N$ |

## RIONOTE Program for Waveform Recording
### SX-A1WR

**It is possible to display and record the time waveform.**

| Frequency range | 100 Hz, 500 Hz, 1 kHz, 5 kHz, 10 kHz, 20 kHz |
| --- | --- |
| Quantization | 16 bit/24 bit |
| Voice memo marker function | Yes |
| Monitor output (playback) | Allows listening to recorded data |
| Recorded data | WAVE format |

● Re-analysing is available on the computer.
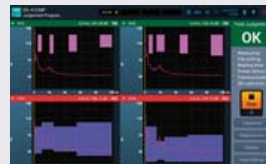
## Vibration Analysis Program
### SX-A1VA

**Adds vibration measurement functions.**

## Judgement Program (Pass/Fail Evaluation)
### SX-A1CMP

**Suitable for pass/fail evaluation of noise, vibrations and other phenomena in production or inspection lines.**

**Capable of recording acoustic / vibration waveforms and various voltage signals in the field**
**Recorded data are saved in WAVE format on SD cards and can be imported into a computer for waveform analysis and other processing tasks**

4 channel Data Recorder
# DA-21

CE  SD-CARD

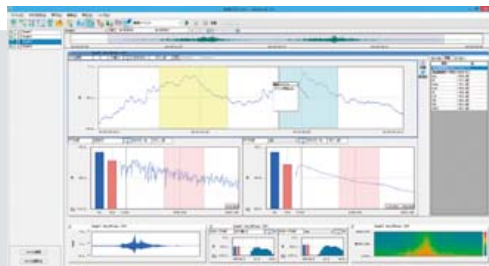### Specifications

| Input section | Signal input | 4ch (BNC) |
|---|---|---|
| | CCLD (Constant Current Line Drive) | 2 mA, 24 V |
| | Frequency response | DC coupling　DC to 1 Hz: ±1.0 dB, 1 Hz to 12.5 kHz: ±0.5 dB, 12.5 kHz to 20 kHz: ±1.0 dB |
| | | AC coupling　1 Hz: ±1.0 dB, 1 Hz to 12.5 kHz: ±0.5 dB, 12.5 kHz to 20 kHz: ±1.0 dB |
| Recording section | Media | SD card [up to 32 GB (FAT16/32)] (Use RION supplied cards for assured operation) |
| Dimensions, Weight | | Approx. 140 (H) x 175 (W) x 45 (D) mm, approx. 450 g (not including batteries), approx. 770 g (including batteries) |

● Re-analysing is available on the computer.

**Provides various display and analysis functions for WAVE file**

Waveform Analysis Software
## AS-70
**Applicable to :**
**RIONOTE, NX-43WR, NX-42WR, NX-28WR, DA-21/20/40, VA-12, VX-55WR, SX-A1VA**



Waveform analysis screen example

### Specifications

| Waveform analysis | Processing | Maximum value, minimum value, average value, effective value, distribution, differentiation and integration, HPF, LPF |
|---|---|---|
| FFT analysis | Number of analysis points | 32 to 65 536 |
| | Data view | Power spectrum, power spectrum density, spectrogram |
| Octave band analysis | Applicable standards | IEC 61260-1: 2014, JIS C 1513-1: 2020 class 1 (Filter) |
| | Frequency range | 1/1 octave band　0.5 Hz to 16 kHz (16 bands) |
| | | 1/3 octave band　0.4 Hz to 20 kHz (48 bands) |

**Perform precise measurements of volume of engine combustion chambers in seconds with no fluid needed**

RION Acoustical Volumeter
(For combustion chamber volume measurement)

$C\epsilon$
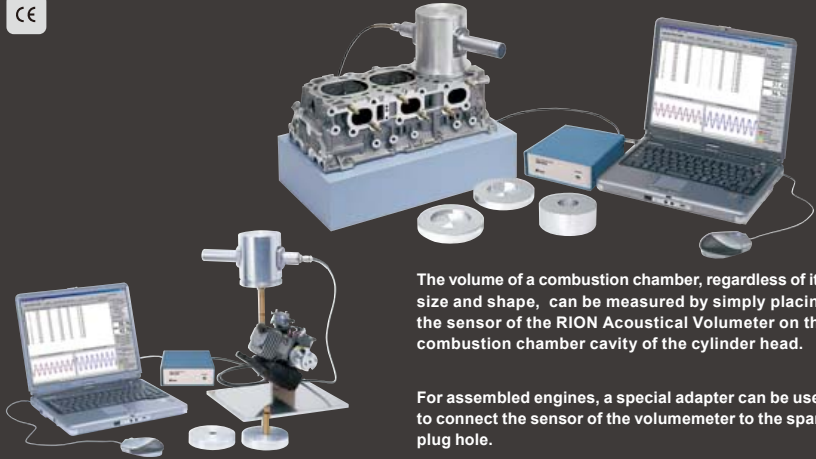
The volume of a combustion chamber, regardless of its size and shape, can be measured by simply placing the sensor of the RION Acoustical Volumeter on the combustion chamber cavity of the cylinder head.

For assembled engines, a special adapter can be used to connect the sensor of the volumemeter to the spark plug hole.

RION Acoustical Volumeter
(For volume of solid object)

$C\epsilon$

Even the volume of objects with complex shape, such as a golf ball, can be measured accurately in about two seconds.

**Allows easy measurement of fluid viscosity**
Viscometer
## VT-06

$C\epsilon$

**Specifications**

| Measurement range | 0.3 dPa.s to 4 000 dPa.s |
|---|---|
| Sample fluid capacity | No.1 or No. 2 rotor |
| | Approx. 300 mL (using JIS compliant 300 mL beaker) |
| | No. 3 rotor |
| | Approx. 170 mL (using No.3 cup) |
| | Lower rotor edge lifted about 15 mm from bottom of cup |
| Measurement accuracy | ±10 % ±1 digit of indicated value, |
| | reproducibility ±5 % |
| Dimensions, Weight | 175 (H) × 77 (W) × 40 (D) mm (not including protruding |
| | parts), approx. 260 g (not including batteries) |

- Joining our strengths -
RION
Norsonic

**RION** / **N** *Norsonic*

＊ Windows is a trademark of Microsoft Corporation.   ＊ Specifications subject to change without notice.

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