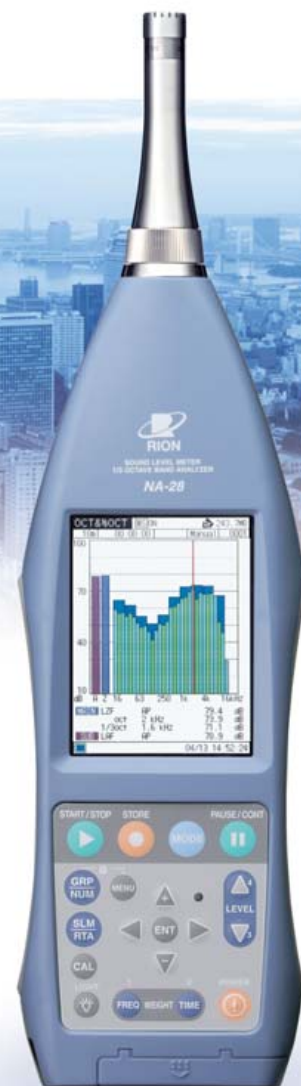# Sound Level Meter

**Simultaneous real-time octave band and 1/3 octave band analysis**
**Simple operation combined with high performance**
**Optimized features for on-site use**

## Sound Level Meter (Class 1) and 1/3 Octave Band Real-time Analyzer
### NA-28 $C\epsilon$

Designated manufacturer of special measurement instrument
Designation number: 341301 (The Japan Measurement Act)
**Type certification number (The Japan Measurement Act): SLF061**

**CF-CARD** **Memory card compatible model** For details, see "Memory Card" on page 14.

▌ Sound level meter and filter functions for octave band and 1/3 octave band analysis, compliant with international standard requirements

▌ Simultaneous real-time octave band and 1/3 octave band analysis capability

▌ Direct storage of measurement result data on CompactFlash (CF) memory card USB port also supports use of unit as removable disk. Optional infrared remote control allows convenient operation from a distance.

## Specifications

| | | |
|---|---|---|
| Applicable standards | | Sound level meter: Sound Level Meter according to the Japan Measurement Act |
| | | JIS C 1509-1: 2005 Class 1, JIS C 1513: 2002 Class 1, JIS C 1514: 2002 Class 1, IEC 61672-1: 2002 Class 1, |
| | | IEC 61260: 1995 Class 1, ANSI S1.4-1983 Type 1, ANSI S1.43-1997 Type 1, ANSI S1.11-2004 Class 1 |
| Measurement functions | | Simultaneous main channel and sub channel measurement, both in sound level meter mode and analyzer mode. |
| | | Frequency weighting and time weighting characteristics can be set separately for main channel and sub channel. |
| | Measurement items | Simultaneous measurement of following items, with selected time weighting and frequency weighting characteristics: $L_p$, $L_{eq}$, $L_E$, $L_{max}$, $L_{min}$, $L_N$, $L_p$ or $L_{eq,\,1sec}$ |
| | | For sub channel in sound level meter mode, one of following items can be selected: $L_{peak}$, $L_{tm5}$ |
| Linearity range (according to JIS, IEC) | | 25 dB to 140 dB |
| Measurement level range | | A weighting: 25 dB to 138 dB, C weighting: 33 dB to 138 dB, Z weighting: 38 dB to 138 dB |
| Measurement frequency range | | 10 Hz to 20 kHz |
| Analysis frequency range | Octave analysis | 16 Hz to 16 kHz (max. 8 kHz during simultaneous octave and 1/3 octave band analysis) |
| | 1/3 octave analysis | 12.5 Hz to 20 kHz (max. 12.5 kHz during simultaneous octave and 1/3 octave band analysis) |
| Correction functions | Windscreen correction | Compensation of frequency characteristics for standard compliance when windscreen is mounted. On/off selection from menu screen. |
| | Diffuse sound field correction | Compensation of frequency characteristics for standard compliance (ANSI S1.4) in diffuse sound fields. On/off selection from menu screen. |
| Storage | | Sound level and processing results are stored by Manual store or Auto store in internal memory or on CF card. Internal memory has 1 block. One of Manual store, Auto store 1, or Auto store 2 can be selected. |
| | Manual store | Manual recording of measurement results per address together with measurement start time |
| | Auto store | Continuous recording of measurement results at selected time intervals. 4 types of markers can be set to identify events that occur while recording. Pause does not function during auto-store. |
| | Auto 1 | Maximum measurement time: 1 000 hours (when using CF card; for internal memory, see below) |
| | | Sound level meter mode: Continuous store of $L_p$, $L_{eq}$, $L_{max}$, $L_{min}$ as 1 set on CF card at 100 ms intervals |
| | | (sub channel results cannot be stored) |
| | | Sampling cycle: 100 ms ($L_p$, $L_{eq}$, $L_{max}$, $L_{min}$) only; internal memory storage capacity: max. 3 hours |
| | | Analyzer mode: Continuous store of band level and all-pass time-weighted sound level $L_p$ on CF card |
| | | Main channel: All-pass value and band level values, Sub channel: All-pass value only |
| | | Sampling cycle: 1 ms to 1 sec, $L_{eq,\,1s}$; internal memory storage capacity: max.10 000 data sets (2.7 hours for 1 sec or $L_{eq,\,1s}$) |
| | Auto 2 | Sound level meter mode: Continuous recording on CF card of Main channel and sub-channel all-pass measurement values, |
| | | together with measurement start time, for each measurement time interval |
| | | Analyzer mode: Continuous recording on CF card of Main channel band levels and all-pass values and sub-channel all-pass values, |
| | | together with measurement start time, for each measurement time interval |
| | | Data capacity: Internal memory max. 1 000 data sets, CF card max. 300 000 data sets |
| Inputs/Outputs | | AC output, DC output, comparator output, external trigger input, USB port, infrared remote control sensor |
| Power | | Four IEC R14P (size C) batteries (16 hours operation with alkaline batteries) or external power supply (AC adapter NC-94B, supplied) |
| Temperature/humidity range for operation | | −10 °C to +50 °C, 10 % to 90 %RH |
| Dimensions, Weight | | 331 (H) × 89 (W) × 51 (D) mm, approx. 730 g (including batteries) |

## Options

| | |
|---|---|
| Remote Control Unit | NA-27RC1 |
| Memory Card (CF card*1) | 128 MB, 256 MB, 2 GB |
| Microphone Extension Cable*2 | EC-04 (2 m and up) |

*1 Use RION supplied cards for assured operation
*2 Max. extension cable length for the Japan Measurement Act compliance is 35 meters.

# Building Acoustic Card
## NX-28BA

▌ Enables use of NA-28 for building acoustics measurements of airborne sound insulation and impact sound insulation (D value, L value etc.) as well as N/NC value measurement and reverberation time measurement
▌ Enables NA-28 to perform JIS and ISO compliant measurement and calculation of evaluation ratings
▌ Result data are stored as text files, and an Excel macro allows evaluation index calculation
▌ Combination with Waveform Recording Card NX-28WR allows simultaneous recording of sound pressure waveform at time of measurement
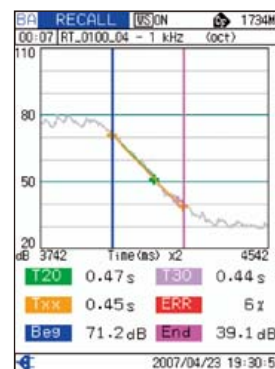
Screen examples
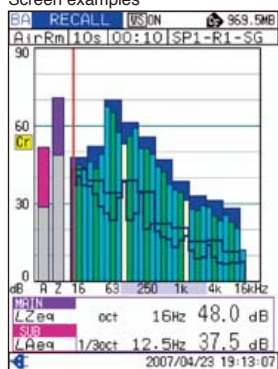


Overlay display of background noise measurement
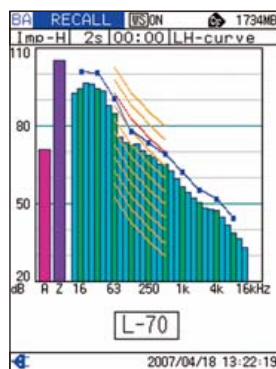


Measurement result for floor impact sound insulation (heavy impact source)



Reverberation time decay curve

Specifications

| Analysis modes | Real-time octave analysis, real-time 1/3 octave analysis |
| --- | --- |
| | Simultaneous real-time octave and 1/3 octave analysis (sound level meter mode not available) |
| Measurement items (depending on measurement mode) | Instantaneous sound pressure level $L_p$, Equivalent continuous sound pressure level $L_{eq}$, maximum of time-weighted sound level $L_{max}$ |
| Measurement types | Airborne sound insulation between rooms, measurement of floor impact sound insulation (standard light impact source), measurement of floor impact sound insulation (standard heavy impact source), room environmental sound level (N value or NC value), reverberation time, airborne sound insulation of facade elements and facades, sound level from service equipment |

# FFT Analysis Card
## NX-28FT

▌ Adds FFT analysis capability to NA-28
▌ Analysis frequency range: 20 kHz (fixed)
▌ Number of analysis lines: 8 000 (fixed) (frame time 400 ms, frequency resolution 2.5 Hz)
▌ Connection of vibration sensor enables vibration level measurement
▌ Pure tone evaluation capability compliant with ISO 1996-2: 2007 - Annex C

Screen examples
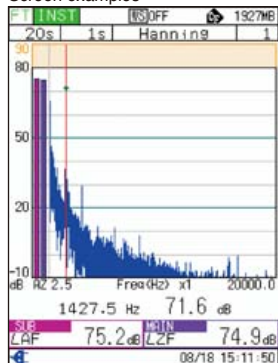


Measurement screen (zoom factor x1)
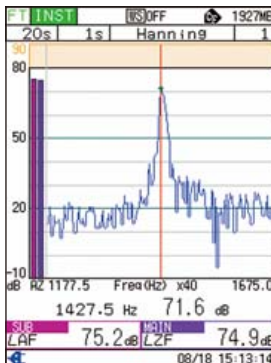


Measurement screen (zoom factor x40)

Specifications

| Measurement mode (FFT mode) | Main channel all-pass value and FFT analysis Sub-channel all-pass value |
| --- | --- |
| Measurement items | Simultaneous measurement of INST and LIN or MAX Measurement time 1 to 999 seconds |
| Dynamic range | 100 dB |
| Analysis frequency range | 20 kHz (fixed) |
| Time window functions | Hanning, Rectangular |
| Number of spectrum lines | 8 000 (fixed) (frame time 400 ms, frequency resolution 2.5 Hz) |
| Sampling frequency | 48 kHz (fixed) |
| Top list screen | List display of frequency and level values for top 20 lines, in descending order |
| Trigger | Controls start of measurement and memory store operation |
| Manual store | Stores measurement results. |

# Waveform Recording Card
## NX-28WR

▌ Adds recording capability to NA-28
▌ Allows simultaneous recording of sound pressure waveform along with sound pressure level while performing frequency analysis with NA-28
▌ Recorded data are in uncompressed WAVE format that can be handled by generic software＊
▌ Use of various waveform analysis applications possible

＊Depending on the sampling frequency, some software applications may not support direct import. For such software, a sampling frequency converter or other suitable tool should be used. For details, contact RION distributors.

**Sampling frequency settings and recording times on CF card**

| | 128 MB | 256 MB | 2 GB |
| --- | --- | --- | --- |
| 48 kHz | 15 m | 30 m | 4 h 40 m |
| 24 kHz | 30 m | 1 h | 9 h 20 m |
| 12 kHz | 1 h | 2 h 10 m | 18 h 50 m |
| 64 kHz | 10 m | 20 m | 3 h 30 m |
| 32 kHz | 20 m | 50 m | 7 h |
| 16 kHz | 50 m | 1 h 40 m | 14 h 10 m |

Actual times may differ slightly depending on the number of files.

Specifications

| Sampling frequencies | |
| --- | --- |
| Simultaneous analysis | 48 kHz, 24 kHz, 12 kHz |
| Sound level meter, octave band analysis, 1/3 octave band analysis | 64 kHz, 32 kHz, 16 kHz |
| Frequency weighting characteristics | Z weighting (flat response, fixed) |
| Recording functions | |
| Event mode | Level recording, interval recording, manual recording |
| Total mode | Total recording |
| Combined use with Building Acoustic Card (NX-28BA) | |
| Insulation and impact sound measurement | Total recording |
| Reverberation time measurement | Total recording with pretrigger (1 sec) |

Playback and reanalysis is done on your PC, not the NA-28.

**Display and analyze data recorded with NX-28WR in various software applications**

## Waveform processing software
### DA-20PA1  For specifications, see page 41

## Waveform analysis software
### CAT-WAVE  For specifications, see page 36

# Sound Level Meter

**Measure Sounds Reliably**
**Extremely User Friendly**
**Provide full support for the measurement process.**

Designated manufacturer of special measurement instrument
Designation number: 341301 (The Japan Measurement Act)

GREEN

**SD-CARD Memory card compatible model**
For details, see "Memory Card" on page 14.

## Sound Level Meter (Class 1)
### NL-52  CE

Type certification number (The Japan Measurement Act): SLF112

## Sound Level Meter (Class 2)
### NL-42  CE

Type certification number (The Japan Measurement Act): SLS111

- 3-inch color screen easy to read anywhere: indoors, outdoors, or in dark locations
- A brief manual and a help function can be easily accessed on the device.
- Guaranteed water-resistant to at least level IP54 (resistant to spraying water).
  Helps reduce failures caused by sudden rain showers.
- In these new models it is possible to use rechargeable batteries which make these meters environmentally-friendly. 24 hour continuous measurement is possible (when using dry alkaline batteries).
- Supports long-term measurements (up to about 1 month) for environment monitoring etc. (using AC adapter)

| Specifications | | Sound Level Meter (Class 1) NL-52 | Sound Level Meter (Class 2) NL-42 |
|---|---|---|---|
| Applicable standards | | IEC 61672-1: 2002 Class 1  ANSI S1.4-1983 Type 1, ANSI S1.4A-1985 Type 1  ANSI S1.43-1997 Type 1, JIS C 1509-1: 2005 Class 1 | IEC 61672-1: 2002 Class 2  ANSI S1.4-1983 Type 2, ANSI S1.4A-1985 Type 2  ANSI S1.43-1997 Type 2, JIS C 1509-1: 2005 Class 2 |
| | | CE Marking (EMC Directive 2004/108/EC, Low Voltage Directive 2006/95/EC), WEEE Directives, Chinese RoHS (export model for China only) | |
| Measurement functions | | Simultaneous measurement of the following items, with selected time weighting and frequency weighting | |
| | Processing (main ch) | Instantaneous sound pressure level: $L_P$, Equivalent continuous sound pressure level: $L_{eq}$, Sound exposure level: $L_E$, Maximum sound pressure level: $L_{max}$, Minimum sound pressure level: $L_{min}$, Percentile sound levels: $L_N$ (0.1 to 99.9 %, 0.1-increment steps, max. 5 values) | |
| | Processing (sub ch) | Instantaneous sound pressure level: $L_P$ | |
| | Additional processing | In addition to main processing items, one of the following can be selected for simultaneous processing: C-weighted equivalent continuous sound level: $L_{Ceq}$, C-weighted peak sound level: $L_{Cpeak}$, Z-weighted peak sound level: $L_{Zpeak}$, I-time-weighted equivalent continuous sound level: $L_{AIeq}$*2, Maximum I-time-weighted equivalent continuous sound level: $L_{AImax}$*2, The power average of the maximum level of each 5 second interval: $L_{Atm5}$, The frequency weighting for the additional processing synchronizes with the frequency weighting of the sub-channel, so when the sub-channel has A-weighting, $L_{Atm5}$ can be selected. When C-weighting (Z-weighting ) is selected, the additional processing $L_{Ceq}$ and $L_{Cpeak}$ ($L_{Zpeak}$) are selectable. | |
| Measurement range | | A-weighting: 25 dB to 138 dB, C-weighting: 33 dB to 138 dB, Z-weighting: 38 dB to 138 dB, C-weighting peak sound level: 55 dB to 141 dB, Z-weighting peak sound level: 60 dB to 141 dB | |
| Frequency range | | 20 Hz to 20 kHz | 20 Hz to 8 kHz |
| Frequency weighting | | A, C, and Z | |
| Time weighting | | F (Fast) and S (Slow) | |
| Correction functions | | Windscreen correction: Compliant with IEC 61672-1 and JIS C 1509-1 standards when the windscreen is installed. | |
| | | Diffuse sound field correction: Correction of frequency characteristics in order to comply with standards (ANSI S1.4) in diffuse sound field. | |
| Store | Manual | Data for measurement results are stored manually in single address increments. Internal memory: max. 1 000 sets, SD Card: depends on the capacity of the SD Card*1 | |
| | Auto*2 | Instantaneous values ($L_P$ mode) and processed values ($L_{eq}$ mode) are stored continuously and automatically at preset intervals. | |
| | $L_P$ sampling cycle | 100 ms, 200 ms, 1 s, $L_{eq\ 1s}$ | |
| | $L_{eq}$ sampling cycle | 10 s, 1, 5, 10, 15, 30 ms, 1, 8, 24 h | |
| | Measurement Time | Max.1 000 h (depends on the capacity of the SD Card)*1 | |
| Waveform recording*3 | | File format: Uncompressed waveform WAVE file, Sampling frequency: Select 48 kHz, 24 kHz or 12 kHz, Data length: Select 24 bit or 16 bit | |
| Outputs | | DC output, AC output, Comparator output*2 | |
| USB | | Allows USB to be connected to a computer and recognized as a removable disk, Allows USB to be controlled via communication commands | |
| RS-232C communication | | Allows for RS-232C communication via use of a dedicated cable | |
| Data continuous output*2 | Type of data | Instantaneous value: $L_P$, Processed value: $L_{eq}$, $L_{max}$, $L_{min}$, $L_{peak}$ | |
| | Output interval | 100 ms | |
| Power requirements | | Four IEC R6 (size AA) batteries (alkaline or rechargeable batteries) or external power supply (option: NC-98C) | |
| | Battery life (23 ℃) | Alkaline battery LR6 (AA): 26 h　Ni-MH secondary battery: 25 h  At the maximum ＊Depends on the setting | |
| Dustproof / water-resistant performance*4 | | IP code: IP54 (except for microphone), See precautions regarding waterproofing | |
| Dimensions, weight | | Approx. 250 (H) x 76 (W) x 33 mm(D), approx. 400 g (with batteries) | |

### Options

| | | | |
|---|---|---|---|
| SD Card 512 MB, 2 GB | SD-512M, SD-2G | Microphone extension cables*5 | EC-04 (2 m and up) |
| AC adapter (100 V to 240 V) | NC-98C | Windscreen for outdoor | WS-15 |

＊1 Use Rion fully guaranteed products.　＊2 NX-42EX required (sold separately).　＊3 NX-42WR required (sold separately).
＊4 Protection against harmful dust and water splashing from any direction.
＊5 Max. extension cable length for the Japan Measurement Act compliance is 105 meters.

**Precautions regarding waterproofing**
Before use, verify that the rubber bottom cover and the battery compartment lid are firmly closed.
To maintain the water and dust proof rating, internal packing replacement is required every two years (at cost).

Sound Level Meter

Vibration Meter

Frequency Analyzer

Recorder

Related Products

Measuring Instrument Combinations

Outline

Knowledge in a Nutshell

Quality Documentation

Company Outline

## Adds a number of programs.
# Extended Function Program
## NX-42EX

▌ When NX-42EX is installed∗ NX-42WR, NX-42RT and NX-42FT can be added.

∗ The NX-42EX program cannot be uninstalled.

The NX-42EX is supplied on the 512 MB SD card. The 512 MB SD card can be used as a memory card after installing the program.

NX-42EX +
NX-42WR →
NX-42RT →
NX-42FT →

| NX-42EX |
| --- |
| Auto store function (instantaneous value, processed value) |
| Comparator function |
| Continuous data output function |

| Additional function / Program type | NX-42WR | NX-42RT | NX-42FT |
| --- | --- | --- | --- |
| Real sound monitor (waveform recording) | ● | | |
| Octave, 1/3 octave band analysis | | ● | |
| Octave, 1/3 octave band filter output | | ● | |
| FFT analysis | | | ● |

# Waveform Recording Program
## NX-42WR

▌ This function enables users to record sounds and processing sound to process sound levels simultaneously.

▌ Recorded data can be played on computer and used for frequency analysis. (Uncompressed waveform WAVE file)

Sampling at 48 kHz, 24 kHz, 12 kHz, Selection of 24 bit or 16 bit

### Maximum recording time (16 bit)

| Sampling frequency / Memory card | 512 MB | 2 GB |
| --- | --- | --- |
| 48 kHz | 1 h | 4 h |
| 24 kHz | 2 h | 8 h |
| 12 kHz | 4 h | 16 h |

The NX-42WR is supplied on the 2 GB SD card. The 2 GB SD card can be used as a memory card after installing the program.

# Octave, 1/3 Octave Real-time Analysis Program
## NX-42RT

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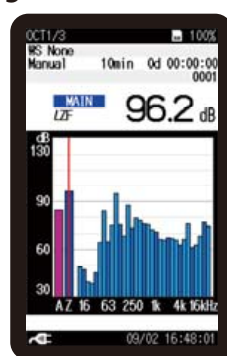

1/3 octave band analysis screen

The NX-42RT is supplied on the 512 MB SD card. The 512 MB SD card can be used as a memory card after installing the program.

# FFT Analysis Program
## NX-42FT

▌ FFT analysis can be performed.


Analysis screen (x1)

The NX-42FT is supplied on the 512 MB SD card. The 512 MB SD card can be used as a memory card after installing the program.

## Complete software for environmental measurements
# Data Management Software For Environmental Measurement
## AS-60

GREEN

Enables measurement data graph display, arithmetic processing, sound exclusion, report creation, file output, and real-sound file playback.

### Supported models
- NL-62∗
- NL-52/42∗
- NL-32/31/22/21∗
- DA-40Viewer

∗Only auto store data are supported.

▌ Easy to use
▌ Reports easy to prepare
▌ Simultaneous display of multiple data items (up to 8 data items)
▌ Data on the data recorder can be loaded (CSV file for DA-40 Viewer)
▌ Data combination


Data management screen

### Recommended computer specifications (Common for AS-60/AS-60RT)

| | |
| --- | --- |
| CPU | Intel CoreTM2 Duo 2.0 GHz or higher |
| RAM | 2 GB or more |
| DISPLAY | XGA (1024 x 768) or more, at least 65 536 colors |
| OS | Microsoft Windows XP Professional 32 bit, Microsoft Windows 7 Professional 32 bit and 64 bit |

● If AS-60/60RT is used on the NL-52/42, the NX-42EX is also needed.

## Adds support for handling octave band analysis data to AS-60
# Data Management Software For Environmental Measurement
(Includes The Octave And 1/3 Octave Data Management Software)
## AS-60RT

GREEN

### Supported models
- NX-62RT∗
- NX-42RT∗
- NA-28∗

∗Only auto store data are supported.
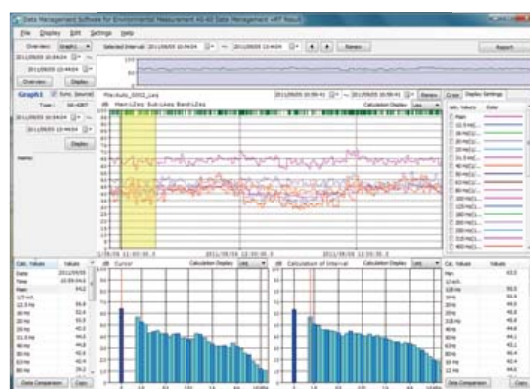

Data management screen

# This software analyzes and stores data files (recorded by the NX-42WR) in the WAVE format.
# Waveform Analysis Software   CAT-WAVE

7

# Sound Level Meter （Sound Level Meter／Sound Level Meter Unit）

## Measure Frequencies from 1 to 20 000 Hz.
## Measure Low-Frequency Sound and Noise with a Single Unit.

Designated manufacturer of special measurement instrument
Designation number: 341301 （The Japan Measurement Act）

GREEN

WATER-RESISTANT

SD-CARD **Memory card compatible model**
For details, see
"Memory Card" on page 14.

## Sound Level Meter (Class 1)
**(With low-frequency sound measurement function)**
### NL-62 CE

**Type certification number
(The Japan Measurement Act): SLF123**

- 3-inch color screen easy to read anywhere: indoors, outdoors, or in dark locations
- A brief manual and a help function can be easily accessed on the device.
- Guaranteed water-resistant to at least level IP54 (resistant to spraying water). Helps reduce failures caused by sudden rain showers.
- In these new models it is possible to use rechargeable batteries which make these meters environmentally-friendly. 16 hour continuous measurement is possible (when using dry alkaline batteries).
- Supports long-term measurements (up to about 1 month) for environment monitoring etc. (using AC adapter)

## Octave, 1/3 Octave Real-time Analysis Program
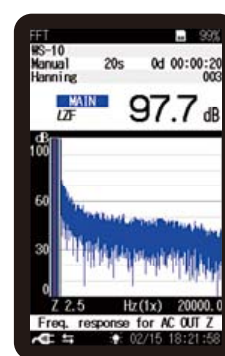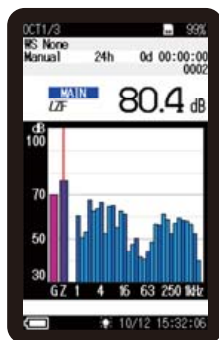### NX-62RT

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

The NX-62RT is supplied on the 512 MB SD card. The 512 MB SD card can be used as a memory card after installing the program.

1/3 octave band analysis screen (low range)

RION
SOUND LEVEL METER
NL-62

## Waveform Recording Program
### NX-42WR

## FFT Analysis Program
### NX-42FT

## Data Management Software For Environmental Measurement
### AS-60
## Data Management Software For Environmental Measurement (Includes the octave and 1/3 octave data management software)
### AS-60RT

## Specifications

| | | |
|---|---|---|
| Applicable standards | | IEC 61672-1: 2002 Class 1, ISO 7196: 1995 |
| | | ANSI S1.4-1983 Type 1, ANSI S1.4A-1985 Type 1, ANSI S1.43-1997 Type 1, JIS C 1509-1: 2005 Class 1 |
| | | CE Marking (EMC Directive 2004/108/EC, Low Voltage Directive 2006/95/EC), WEEE Directives, Chinese RoHS (export model for China only) |
| Measurement functions | | Simultaneous measurement of the following items, with selected time weighting and frequency weighting |
| | Processing (main ch) | Instantaneous sound pressure level: $L_P$, Equivalent continuous sound pressure level: $L_{eq}$, Sound exposure level: $L_E$, Maximum sound pressure level: $L_{max}$, |
| | | Minimum sound pressure level: $L_{min}$, Percentile sound levels: $L_N$ (0.1 to 99.9 %, 0.1-increment steps, max. 5 values) |
| | Processing (sub ch) | Instantaneous sound pressure level: $L_P$ |
| | Additional processing | One of the following can be selected: |
| | | C-weighted equivalent continuous sound level: $L_{Ceq}$, G-weighted average sound level: $L_{Geq}$, C-weighted peak sound level: $L_{Cpeak}$, Z-weighted peak sound level: $L_{Zpeak}$, |
| | | Power average of max. level in time weighted sound level interval $L_{Atm5}$, I-time-weighted average sound level: $L_{AIeq}$, Max. value of I-time-weighted average sound level: $L_{AImax}$ |
| | | ＊Because additional processing frequency characteristics are linked to sub channel frequency characteristics, $L_{Atm5}$, $L_{AIeq}$, $L_{AImax}$ can be selected when A characteristics are selected for sub channel. When C, G, or Z characteristics are selected, $L_{Ceq}$ and $L_{Cpeak}$, $L_{Geq}$, and $L_{Zpeak}$ can be selected for additional processing. |
| Measurement range | | A-weighting: 25 dB to 138 dB, C-weighting: 33 dB to 138 dB, G-weighting: 43 dB to 138 dB, Z-weighting: 50 dB to 138 dB, |
| | | C-weighting peak sound level: 60 dB to 141 dB, Z-weighting peak sound level: 65 dB to 141 dB |
| Frequency range | | 1 Hz to 20 kHz |
| Frequency weighting | | A, C, G and Z |
| Time weighting | | F (Fast) and S (Slow), I (Impulse) and 10 s |
| Correction functions | | Windscreen correction: Compliant with IEC 61672-1 and JIS C 1509-1 standards when the windscreen is installed. |
| | | Diffuse sound field correction: Correction of frequency characteristics in order to comply with standards (ANSI S1.4) in diffuse sound field. |
| Store | Manual | Data for measurement results are stored manually in single address increments. Internal memory: max. 1000 sets, SD Card: depends on the capacity of the SD Card＊1 |
| | Auto | Instantaneous values ($L_P$ mode) and processed values ($L_{eq}$ mode) are stored continuously and automatically at preset intervals. |
| | $L_P$ sampling cycle | 100 ms, 200 ms, 1 s. $L_{eq 1s}$ |
| | $L_{eq}$ sampling cycle | 10 s, 1, 5, 10, 15, 30 ms, 1, 8, 24 h |
| | Measurement Time | Max.1 000 h (depends on the capacity of the SD Card)＊1 |
| Waveform recording＊2 | | File format: Uncompressed waveform WAVE file, Sampling frequency: Select 48 kHz, 24 kHz or 12 kHz, Data length: Select 24 bit or 16 bit |
| Outputs | | DC output, AC output, Comparator output |
| USB | | Allows USB to be connected to a computer and recognized as a removable disk, Allows USB to be controlled via communication commands |
| RS-232C communication | | Allows for RS-232C communication via use of a dedicated cable |
| Data continuous output | Type of data | Instantaneous value: $L_P$, Processed value: $L_{eq}$, $L_{max}$, $L_{min}$, $L_{peak}$ |
| | Output interval | 100 ms |
| Power requirements | | Four IEC R6 (size AA) batteries (alkaline or rechargeable batteries) or external power supply (option: NC-98C) |
| | Battery life (23 ℃) | Alkaline battery LR6 (AA): 16 h    Ni-MH secondary battery: 16 h At the maximum ＊Depends on the setting |
| Dustproof / water-resistant performance＊3 | | IP code: IP54 (except for microphone), See precautions regarding waterproofing |
| Dimensions, weight | | Approx. 255 (H) x 76 (W) x 33 mm(D), approx. 400 g (with batteries) |

＊1 Use Rion fully guaranteed products. ＊2 NX-42WR required (sold separately). 　　＊ Max. extension cable length for the Japan Measurement Act compliance is 105 meters.
＊3 Protection against harmful dust and water splashing from any direction.

## Ultra compact, Lightweight, High-performance

Designated manufacturer of special measurement instrument
Designation number: 341301 (The Japan Measurement Act)

**GREEN**

# Sound Level Meter (Class 2)
## NL-27 $C \epsilon$

**Type certification number
(The Japan Measurement Act):
SLF091**

■ Compliant with Japan Measurement Act, JIS, and IEC requirements
■ Wide 107 dB linearity range allows sound level measurements from 30 to 130 dB without range switching
■ Easy measurement of sound level ($L_p$), equivalent continuous sound level ($L_{eq}$), maximum sound level ($L_{max}$), sound exposure level ($L_E$), and peak sound level ($L_{Cpeak}$)

Specifications

| | |
|---|---|
| Standard compliance | General-Purpose Sound Level Meter according to Japan Measurement Act JIS C 1509-1: 2005 Class 2, IEC 61672-1: 2002 Class 2 CE mark (EMC Directive 2004/108/EC), WEEE Directive |
| Measurement functions Processing functions (normal mode) | Sound level $L_p$, equivalent continuous sound level $L_{eq}$, sound exposure level $L_E$, maximum sound level $L_{max}$, peak sound level $L_{Cpeak}$ (only when peak range was selected) |
| Measurement level range (normal mode) | A-weighting: 30 dB to 130 dB, C-weighting: 36 dB to 130 dB |
| Measurement frequency range | 20 Hz to 8 kHz |
| Power | Two IEC R03 (size AAA) batteries |
| Dimensions, Weight | Approx. 120 mm (H) × 63 (W) × 23.5 mm (D), approx. 105 g (including batteries) |

This product is environment-friendly. It does not include toxic chemicals on our policy.

## For a wide range of high-precision acoustic measurements

# Measuring Amplifier
## NA-42
**(without microphone)**

■ Supports connection of low-noise microphones UC-34P and UC-57 as well as microphones UC-29/54 and others allowing measurement up to 100 kHz

Specifications

| | |
|---|---|
| Measurement functions | Sound pressure level $L_p$, maximum sound level $L_{max}$, peak sound pressure level $L_{peak}$ |
| Measurement frequency range | 1 Hz to 100 kHz (main unit characteristics) |
| Frequency weighting characteristics | A, C, FLAT |
| Time weighting characteristics | F (Fast), S (Slow), I (Impulse) |
| External filter input/output connector | BNC connector |
| Power | Four IEC R14 (size C) batteries, AC adapter (NC-98C, supplied) |
| Dimensions, Weight | 171 (H) × 120 (W) × 236 (D) mm, approx. 1.8 kg (not including batteries) |

Options

| | |
|---|---|
| Microphone Extension Cable* | EC-04 (2 m and up) |
| External Input Adapter | UA-01 |
| Interface Cable | 5WKR4030 |

＊Max. extension cable length for the Japan Measurement Act compliance is 15 meters.

● Allows connection of various microphones and preamplifiers to fit different measurement requirements
● Sound pressure level, sound level maximum, peak sound pressure level measurement modes (selectable)
● Measurement value display to two decimal values or one decimal value (selectable). Parameter information also shown.
● AC and DC output, serial communication function, comparator output function allow flexible configuration of various measurement or monitoring systems

### Management Software NA-42PB1
■ Allows measurement parameter setup and measurement control of NA-42 via commands from a computer, and import of measurement data for display
■ Imported measurement data can be converted and stored as CSV format files
＊Supported operating systems: Microsoft Windows XP Professional/Vista Business

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

# Sound Level Meter Unit
## UN-14  **TEDS compliant**

■ Sound Level Meter Unit UN-14 and Vibration Meter Unit UV-15 can be linked in a measurement system with up to 16 channels
■ Supports connection of measurement microphones and various preamplifiers (with TEDS compliant input etc.)
■ Display shows parameters, measurement value, and bar graph indication
■ Linking with Interface Unit UV-22 allows setup and control from a computer, and transfer of measurement values
■ Backlit LCD and LED warning indicators

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) |
| Frequency weighting characteristics | | A, C, Z (JIS C 1509-1 Class 1, IEC 61672 Class 1 electrical characteristics) |
| 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) |
| Time weighting characteristics | | F, S, 10 ms (JIS C 1509-1 Class 1 electrical characteristics) |
| Power | | 9 V to 15 V DC, suitable AC adapter NC-97 (for up to 10 units), NC-99 (for up to 16 units) Battery Pack Unit BP-17, Cigarette plug adapter CC-82 (option, up to 16 units*) ＊Depending on car battery capacity |
| Dimensions, Weight | | 150 (H) × 36 (W) × 179 (D) mm (not including protruding parts), approx. 500 g |

Options

| | | | | |
|---|---|---|---|---|
| Microphone Extension Cable* | EC-04 (2 m and up) | | AC Adapter | NC-97 (For units up to 10) |
| BNC-BNC Coaxial Cable | EC-90A (2 m and up) | | AC Adapter | NC-99 (For units up to 16) |

Front View          Rear View

# Interface Unit
## UV-22

# Battery Unit
## BP-17

**For specifications, see page 24. 25.**

Vibration Meter

Frequency Analyzer

Recorder

Related Products

Measuring Instrument Combinations

Outline

Knowledge in a Nutshell

Quality Documentation

Company Outline

# Sound Level Meter （Environmental Sound Monitor）

**Designed for Long-term Noise Monitoring Application. Provides the Functionality and Durability Requited for Automated System, and Ease of Maintenance.**

## Environmental Sound Monitor
## NA-37 CE



▌ Multiple interfaces for flexible data collection via LAN, public telecom line, leased analog line, USB memory etc.
▌ High-capacity internal memory provides ample long-term data storage capability (1 month or more)
▌ Optional internal GPS module provides automatic time correction and position information
▌ Internal battery with auto-shutdown and auto restart functions assures operation also during power failure

**Great for environmental noise measurements along highways**

## Environmental Noise Processing Program
## NX-37A

▌ Allows automated measurement of basic data for environmental noise assessment, such as $L_{eq}$ and $L_N$
▌ Choice of interval mode and continuous mode enables automated round-the-clock evaluation.
▌ Sound Discrimination Unit AN-37 (option) can be used to obtain sound arrival direction data, to differentiate between noise originating on site and off site.



Environmental sound measurement screen example

## Environmental Noise Data Processing Software
## AS-40PA1

▌ Collects data measured by NX-37A and allows saving, editing, and report creation.
▌ Multiple measurement locations can be registered, and collected data can be managed in a database for tabulation and report creation.
▌ Real sound data can be played, and tabulated data can be exported as tab separated text files, useful for creating reports.
▌ It is possible to discriminate the direction of the sound arrival.
  ＊Supported operating systems: Microsoft Windows XP Professional/Vista Business
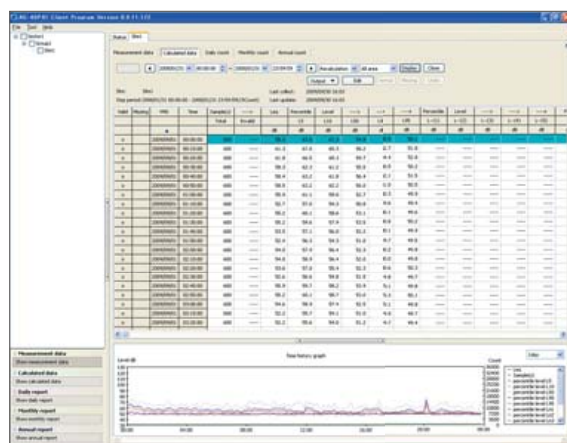


Daily count calculated data screen (example)
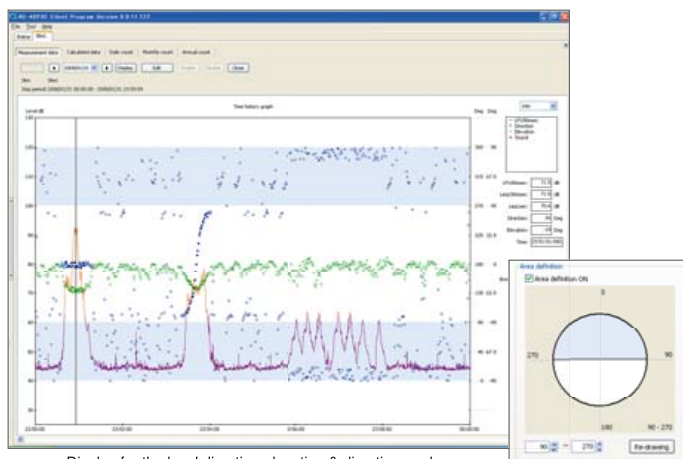


Display for the level direction elevation & direction angles

Aircraft Noise Processing Program NX-37C and Aircraft Noise Data Processing Software AS-50PA2 including support for ground-level sound events* are also available.
＊Ground-level sound event refers to noise produced by aircraft while on the ground, within the airport area. This includes noise from take-off and landing, taxiing, engine trial runs, APU etc.

# NA-37 Related Products

## Sound Level Meter (Class 1)
## NA-83 $C\epsilon$

▌ Wide overall linear operation range enables 28 dB to 138 dB sound level measurement without range switching

## Outdoor microphone
## MS-11
**Supplied with NA-83**

▌ MS-11 has a built-in heater and a built-in sound source for automatic calibration, and is suitable for long-term outdoor use.

## All-Weather Windscreen
## WS-13

▌ Unit complies with requirements of IEC 61672-1 Class 1, JIS C 1509-1: 2005 Class 1 also when using this windscreen
▌ WS-13 has bird spikes to keep birds away.

AN-37/37R

## Noise Discrimination Unit
## AN-37/37R $C\epsilon$

▌ 3-axis microphone system allows determination of incident sound direction
▌ Detection microphone spacing of 25 cm results in compact dimensions and easy installation
▌ Aircraft radar signal reception capability provides additional identification data and enables counting of aircraft numbers (AN-37R)

## Real sound recording Program
## NX-37WR
**(Factory-installed option)**

▌ Selectable Compressed format (for long-term recording) or PCM format (for re-analysis)
▌ Internal memory can hold more than 1 month's worth of files (Compressed format, event duration 5 seconds, 1 000 events per day)

---

**Monitor aircraft noise for compliance with the new Japan environmental regulations** *
(∗Environmental Directive 114, amended December 2007)

## Aircraft Noise Processing Program
## NX-37B

▌ Detects noise events and automatically identifies aircraft noise.
▌ Real sound recording, triggered by noise event (using optional Real Sound Monitor Program NX-37WR)

Evaluation result display (noise other than aircraft)

Evaluation result display (aircraft)

## Aircraft Noise Data Processing Application Software
## AS-50PA1

▌ Compile, tabulate, edit, and view data measured with NX-37B
▌ Locate noise event details for specific events and play real sound data with a few simple steps
▌ Create daily, monthly, and yearly reports
▌ Output tabulated data in CSV format for later report creation (NA-35/36/37)
∗ Supported operating systems: Microsoft Windows XP Professional/Vista Business

Daily report screen

Event compilation screen

Sound Level Meter

Vibration Meter

Frequency Analyzer

Recorder

Related Products

Measuring Instrument Combinations

Outline

Knowledge in a Nutshell

Quality Documentation

Company Outline

# Sound Level Meter （Environmental Sound Monitor）

## System Application Examples

### Aircraft / Environmental noise online monitoring system

▎ Multiple NA-37 units installed at different points are linked via a VPN (Virtual Private Network) or other means.
Measurement data are handled by a central processing system which implements real-time noise level display,
statistical processing, log processing and other tasks.

▎ Information-providing servers can display real-time information on public system terminals.

| Aircraft / Environmental noise monitoring points | Public terminals |
|---|---|

Monitoring point
Monitoring point 2
Monitoring point 1

Public information facility 2
Public information facility 1

**Dedicated network link**

NA-37
Environmental Sound Monitor

Public information access terminal

**Central processing system**
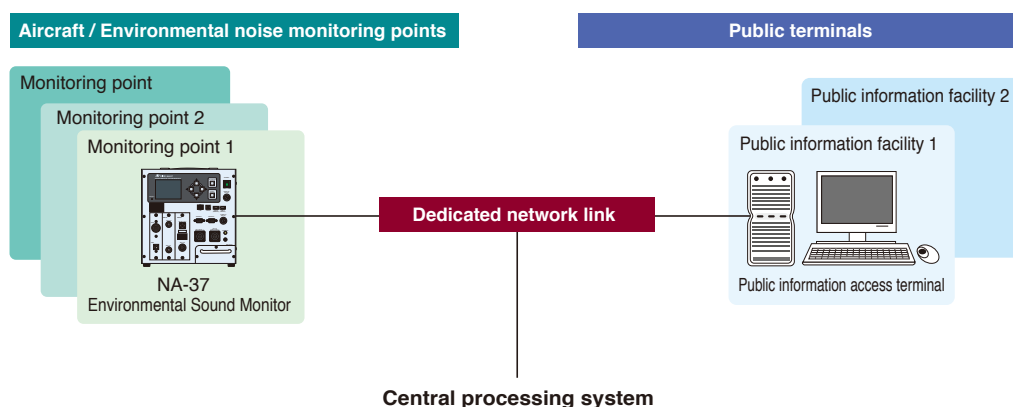
### Mobile measurement point monitoring system

▎ Data can be collected from mobile measurement points also if no network connection is available,
by using one of the following methods:
  • Data transfer using cell phone network with mobile router
  • Data collection using USB memory

▎ GPS unit (option) can provide measurement point position information

**Monitoring system configuration example using temporary connection**

NA-37 Point **A**
NA-37 Point **B**
NA-37 Point **C**

GPS unit  **NA-37**
GPS unit  **NA-37**
GPS unit  **NA-37**

**Computer**
**Router**

LAN
or
Cell phone network
or
commercial line
or
leased line

USB memory    Mobile router
USB memory    Mobile router
USB memory    Mobile router

Sound Level Meter

Vibration Meter

Frequency Analyzer

Recorder

Related Products

Measuring Instrument Combinations

Outline

Knowledge in a Nutshell

Quality Documentation

Company Outline

（**Measurement Microphone／Preamplifier**）

# Condenser Microphones UC Series

- 1 inch type microphones are suitable for measurement also of very low sound pressure levels, but upper measurement frequency is limited to a few over 10 kHz.
- 1/2 inch and 1/4 inch type microphones are suitable for measurement of high frequencies and high sound pressure levels.

| Model | UC-27 | UC-32P | UC-34P | UC-30 | UC-31 | UC-33P | UC-52 | UC-53A | UC-59 | UC-57 | UC-29 | UC-54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Suitable preamplifier | NH-06A | NH-06A | NH-34 supplied | NH-04A/05A/12A | NH-04A/05A/12A | NH-04A/05A/12A | NH-17/17A/22 | NH-17/17A/22 | NH-17/17A/22 | NH-17/17A/22 | NH-05A (using UA-12) | NH-17/17A/22 (using UA-12) |
| Nominal diameter | 1 inch | | | 1/2 inch | | | | | | | 1/4 inch | |
| Frequency response | Sound field | Sound pressure | Sound field | Sound field | Sound field | Sound pressure | Sound field | Sound field | Sound field | Sound field | Sound field | Sound field |
| Measurement frequency range (Hz) | 5 to 12 500 | 5 to 9 000 | 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 20 000 | 10 to 16 000 | 20 to 100 000 [*2] | 20 to 100 000 [*2] |
| Bias voltage (V) | 200 | 200 | 200 | 200 | 200 | 200 | 0 | 0 | 0 | 0 | 200 | 0 |
| Sensitivity level (dB re 1 V/Pa)[*1] | −26.5 | −27 | −21 | −25.5 | −37 | −38 | −33 | −28 | −27 | −22 | −47 | −48 |
| Capacitance (pF) | 54 | 56 | — | 17 | 20 | 20 | 19 | 12 | 13 | 14 | 6 | 4 |
| Maximum input sound pressure level (dB) (Linearity tolerance ± 0.3 dB) | 152 | 154 | — | 144 | 160 [*4] | 160 | 150 | 151 | 148 | 132 [*4] | 164 [*4] | 164 |
| Inherent noise level (dB) | 12 | 13 | 2 | 20 | 26 | 28 | 24 | 20 | 18 | 13 | 42 | 45 |
| Temperature coefficient (dB/ °C) | −0.005 | −0.008 | — | −0.007 | −0.007 | −0.009 | −0.008 | +0.005 | 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 x 21.0 | dia.23.8 x 21.0 | dia.23.8 x 131 | dia.13.2 x 15.0 | dia.13.2 x 13.2 | dia.13.2 x 13.2 | dia.13.2 x 12.0 | dia.13.2 x 12.5 | dia.13.2 x 14.3 | dia.13.2 x 13.5 | dia.7.0 x 10.0 | dia.7.0 x 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 %

# 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 |
| Preamplifier | NH-22T | NH-22T | NH-22T |
| Nominal diameter | 1/2 inch | | |
| Frequency response | Sound field | Sound field | Sound field |
| Measurement frequency range (Hz) | 20～8 000 | 10～16 000 | 10～20 000 |
| Drive current | 2 mA～4 mA | 2 mA～4 mA | 2 mA～4 mA |
| A-weighted inherent noise level (dB) | 24 | 13 | 18 |
| Dimensions (mm) | φ13.2×97.1 | φ13.2×98.6 | φ13.2×99.4 |
| Cable type | EC-90 series (BNC) | EC-90 series (BNC) | EC-90 series (BNC) |

| Model | NH-06A | NH-04A | NH-12A | NH-17 | NH-17A | NH-22 | NH-05A |
|---|---|---|---|---|---|---|---|
| Suitable microphones | UC-27/32P | UC-30/31/33P | UC-30/31/33P | UC-52/53A/54[*1]/57/59 | UC-52/53A/54[*1]/57/59 | UC-52/53A/54[*1]/57/59 (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 | 5 | 10 |
| Input capacitance (pF) | 0.3 | 0.25 | 0.25 | 0.8 | 0.8 | 0.8 | 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) | −0.6 (12 pF)(UC-53A) | −0.6 (12 pF)(UC-53A) | −0.6 (12 pF)(UC-53A) | −0.5 (6 pF)(UC-29)[*1] |
| A-weighted inherent noise level (dB) | 12 (UC-27) | 19 (UC-30) | 19 (UC-30) | 18 (UC-53A) | 18 (UC-53A) | 18 (UC-53A) | 42 (UC-29) |
| Output impedance (Ω) | 100 or less | 100 or less | 100 or less | 300 or less | 300 or less | approx. 120 | 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 Level Meter

## 114 dB/250 Hz calibration sound source

## Pistonphone
### NC-72A ∈

- Suitable for RION microphones including 1 inch, 1/2 inch, and 1/4 inch diameter types and similar-diameter types such as the MR-103
- Unit is powered by alkaline or manganese batteries and rated for 13 hours of continuous use, giving a battery life of about two years if used for 1 to 2 minutes a day

Specifications

| | |
|---|---|
| Applicable standards | JIS C 1515: 2004 (IEC 60942: 2003) Class LS/C |
| | JIS C 1515: 2004 (IEC 60942: 2003) Class 1/C (when using supplied barometer) |
| Nominal sound pressure level | 114 dB, sound pressure level tolerance ±0.15 dB (101.325 kPa) |
| Frequency | 250 Hz ±1 % |
| Distortion | 2.5 % or less |
| Temperature range | −10 °C to +55 °C |
| Humidity range | 10 % to 90 %RH（no condensation） |
| Dimensions, Weight | Approx. 60 (H) × 170 (W) × 40 (D) mm, approx. 740 g (including batteries) |

## Compensation for atmospheric pressure not required

## Sound Calibrator
### NC-74 ∈

- Compact, lightweight, convenient sound calibrator fully suitable for calibration of Sound level meters
- Powered from two size AA alkaline batteries giving more than 30 hours continuous operation at room temperature
- Automatic compensation function for atmospheric pressure changes

Specifications

| | |
|---|---|
| Applicable standards | JIS C 1515: 2004 Class 1, IEC 60942: 2003 Class 1 |
| Compatible microphones | 1 inch, 1/2 inch types |
| Nominal sound pressure level | 94 dB ±0.3 dB |
| Nominal frequency | 1 000 Hz |
| Dimensions, Weight | Approx. 49 (H) × 80 (W) × 74 (D) mm, approx. 200 g (including batteries) |

## Reduce adverse effects of wind noise
## Windscreens
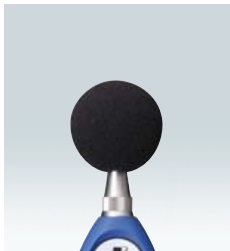
**WS-10**    **WS-15**

| Type | Model |
|---|---|
| Windscreen for 1/2 inch microphones | WS-10 |
| Windscreen for 1 inch microphones | WS-01 |
| Windscreen for 1/4 inch microphones | WS-05 |
| Windscreen for outdoor | WS-15 |
| Windscreen mounting adapter | WS15006 |

## For stationary sound level measurement
## Tripods

**ST-80**    **ST-81**

| Type | Model | Lowest position (mm) | Highest position (mm) | Weight (g) |
|---|---|---|---|---|
| Sound level meter tripod (compatible with extension rod) | ST-80 | 570 | 1 460 | 1 500 |
| Extension rod (for ST-80) | ST-80-100 | 1 170 | 1 960 | 610 |
| All-weather windscreen tripod | ST-81 | 1 350 | 2 150 | 3 200 |
| Compact tripod | 5SLIK | 400 | 1 150 | 580 |

## Memory Card (CompactFlash / SD Card)

Commercially available memory cards (CompactFlash cards) may differ in specifications even among identical models from the same manufacturer.
When using RION equipment designed to handle memory cards, operation is guaranteed only when using memory cards from RION.

CF cards

| Type | Model |
|---|---|
| 128 MB memory card | MC-12CF1 |
| 256 MB memory card | MC-25CF1 |
| 2 GB memory card | MC-20CF2 |

Usage limitations
VM-53A, VA-11 series, SA-78 ....................Max. 256 MB
NA-28, DA-20......................................Max. 2 GB
DA-40 ..................................................Max. 4 GB
(dedicated card, see page 40)

SD cards

| Type | Model |
|---|---|
| 512 MB SD card | SD-512M |
| 2 GB SD card | SD-2G |

## Reduction of wind noise for tunnel experiment

## 1/2 inch Nose Cone
### (For UC-30, UC-31)
### UA-31

**UA-31**

## External power supply for sound level meters and vibration meters

## Battery Pack
### BP-21

- Holds four IEC R20 (size D) batteries
- Provides double battery life of IEC R14 (size C) or four times the battery life of IEC R6 (size AA) batteries

Specifications

| | |
|---|---|
| Dimensions, Weight | 80 (H) × 170 (W) × 50 (D) mm, approx. 1.1 kg |

# Sound Level Meter Selection Examples

## ① Environmental noise

| Application | Models | See page |
|---|---|---|
| General-purpose measurement | NL/NA series | 4, 6 to 8 |
| Sound level recording | NL/NA series + DA-40/20, LR series | 4, 6 to 8, 40 to 42 |
| | NL/NA series (internal memory/memory card) + Management Software | 4, 6 to 8 |
| Frequency analysis 1/1 Octave Band, 1/3 Octave Band Analysis | NA-28, NL-42/52/62 + Program Card | 4, 6, 7 |
| | SA-02 + Software | 32 to 35 |
| | DA-40 + CAT-WAVE, DA-20 + DA-20PA1 | 40, 41 |
| Real sound recording, Data processing | NL-42/52/62 + AS-60 (RT) | 6, 7 |
| Monitoring | NA-37 + WS-13 | 10, 11 |
| Low-frequency measurement | NL-62 + NX-62RT | 9 |

## ② Architectural acoustics

| Application | Models | See page |
|---|---|---|
| A-weighted sound pressure level measurement | NL/NA series | 4, 6 to 8 |
| Frequency analysis | NA-28, NL-42/52/62 + Program Card | 4, 6, 7 |
| Performance testing | SA-02 + Various software | 32 to 35, 38 |

## ③ Acoustic power level measurement

| Application | Models | See page |
|---|---|---|
| Sound pressure level method | SA02 + AS-30PA5, AS-31PA5 | 32, 33 |
| Acoustic intensity method | SA02 + AS-15PA5 | 38 |

## ④ Others

| Application | Models | See page |
|---|---|---|
| Ultrasound, high sound pressure measurement | NA-42 + UC-29/54/31 + NH series | 8, 13 |
| Low sound pressure level measurement | NA-42 + UC-34 + NH-34 | 8, 13 |
| Coupler, diffuse sound field measurement | NA-42 + UC-32P/33P + NH series | 8, 13 |
| Comparator | NL-42/52/62, NA-42 | 6, 7, 8 |
| | SA-02 + CAT-SA02-CMP03 | 32, 37 |
| Acoustic analysis | NL-42/52 + NX-42FT | 6, 7 |
| | SA-02 | 32 |
| | SA-78 | 36 |
| Quality management | NL/NA series | 4, 6 to 8 |
| | SA-02 | 32 |
| Calibration | NC-72A/74 | 14 |
| Anechoic Chamber, Anechoic Box, Anechoic room, Sound-Proof Chamber | RKB series, RKA series, RKC series | 45 |

# Condenser Microphone Selection Examples

## ① Normal measurement

### UC-52/UC-53A/UC-59

UC-52 is a microphone designed for use with Class 2 sound level meters, and UC-53A/59 for use with Class 1 sound level meters. These are electret microphones which do not require a bias voltage.

## ② Measurement of low-level sounds

### UC-27/UC-57

UC-27 is a 1 inch microphone that can measure sound pressure levels down to about 20 dB, and UC-57 is a 1/2 inch type rated for 22 dB. This is suitable for use in quiet environments. UC-27 requires a 200 V bias voltage, but UC-57 is an electret microphone which operates without external bias voltage.

## ③ Measurement of extremely low-level sounds

### UC-34P (with Preamplifier NH-34)

UC-34 is a 1 inch microphone specially designed to make measurements in very quiet environments, with sound pressure levels as low as a few decibels. The dedicated preamplifier NH-34 is required to achieve flat frequency response and to provide the 200 V bias voltage required by the microphone.

## ④ Measurement of high-level sounds

### UC-31/UC-29/UC-54＊

UC-31 is a low-sensitivity 1/2 inch microphone that can handle sound pressure levels in excess of 150 dB. UC-29/UC-54 is similar, but it has a nominal 1/4 inch diameter. UC-31 and UC-29 require a 200 V bias voltage.
＊UC-54: no bias voltage required.

## ⑤ Measurement extending to ultrasonic range

### UC-31/UC-29/UC-54

To make measurements of sounds including high-frequency components above 20 kHz, the same UC-31 (1/2 inch) and UC-29 (1/4 inch) microphones as for high-level measurements can be used.
Response of UC-31 extends to about 35 kHz, while UC-29/UC-54 goes up as high as 100 kHz.

## ⑥ Coupler and random sound field measurements

### UC-32P/UC-33P

UC-32P (1 inch) and UC-33P (1/2 inch) microphones are designed for acoustic measurements with the microphone mounted to a coupler, measurements in diffuse sound fields such as in a reverberation room, and similar applications. The microphones require a 200 V bias voltage.

Sound Level Meter

Vibration Meter

Frequency Analyzer

Recorder

Related Products

Measuring Instrument Combinations

Outline

Knowledge in a Nutshell

Quality Documentation

Company Outline

# Sound Level Meter

## Measurement Microphone Combination Examples

| 1 inch microphones | 1/2 inch microphones | 1/4 inch microphones |
|---|---|---|

### Wind noise prevention/Calibrator

**1 inch microphones**

**Wind noise prevention**
Windscreen
**WS-01**

**Calibrator**
Pistonphone
**NC-72A**

Sound Calibrator
**NC-74**

**1/2 inch microphones**

**Wind noise prevention**
Windscreen
**WS-10**

Suitable for
UC-30
UC-31

1/2 inch Nose Cone
**UA-31**

**Calibrator**
Pistonphone
**NC-72A**

Sound Calibrator
**NC-74**

1/2 inch microphone adapter
**NC-72-S16** (supplied)

1/2 inch microphone adapter
**NC-74-002** (supplied)

**1/4 inch microphones**

**Wind noise prevention**
Windscreen
**WS-05**

**Calibrator**
Pistonphone
**NC-72A**

1/4 inch microphone adapter
**NC-72-S06** (supplied)

### Microphone

**UC-34P**
(with preamplifier NH-34*)

▲ **UC-27**
▲ **UC-32P**

▲ **UC-30**
▲ **UC-31**
**UC-33P**

**UC-52, UC-53A**
**UC-57, UC-59**

**UC-54**

**UC-29**

### Adapter

**UA-10**

**UA-12**

**UA-12**

### Preamplifier

**UC-52T**
**UC-57T**
**UC-59T**

Flexible Rod

**NH-06A**

**NH-04A**

**NH-12A** (1.5 m)

**NH-04A**
**NH-05A**

**NH-12A** (1.5 m)

**NH-17A**

**NH-17** (5 m)

**NH-22**∗

**NH-22T**∗

**NH-05A**

∗Does not apply to all models.

### Extension cable

**EC-04** (2 m)
**EC-04A** (5 m)
**EC-04B** (10 m)

**EC-04C** (30 m, with reel)
**EC-04D** (50 m, with reel)
**EC-04E** (100 m, with reel)

**EC-90A** (2 m)
**EC-90B** (5 m)

**Flexible Rod**

Suitable for
**NH-04A**
**NH-05A**
**NH-12A**
**NH-17**
**NH-17A**
**UA-20** **NH-22**

Measuring Amplifier
**NA-42**

Sound Level Meter Unit
**UN-14**

Multi-Channel Signal Analyzer
**SA-02**

4ch Data Recorder
**DA-20**

8ch Data Recorder
**DA-40**

2-Channel Hand-held FFT Analyzer
**SA-78**

# Sound Level Meter Connection Examples

| AC adapter | Sound level meter | Connection cable | Peripheral equipment |
|---|---|---|---|

**Meter with integrated microphone**

Sound Level Meter **NL-42**
SD-CARD

Sound Level Meter **NL-52**
SD-CARD

Sound Level Meter
( With low-frequency sound measurement function )
**NL-62**
SD-CARD

Sound Level Meter **NA-28**
CF-CARD

AC Adapter **NC-98C**

Battery Pack **BP-21**

AC Adapter **NC-94B**

USB interface Cable — **Computer**

RS-232C Serial I/O Cable **CC-42R** — **Computer**

Printer Cable **CC-42P** — **Printer**

BNC-mini plug Cable **CC-24** — **Peripheral device with BNC connector**

Comparator output Cable **CC-42C** — **External device**

USB interface Cable — **Computer**

BNC-mini plug Cable **CC-24** — **Peripheral device with BNC connector**

**Meter with separate microphone option**
∗For details, see "Condenser Microphone Combination Examples" on page 16.

Measuring Amplifier **NA-42**

Sound Level Meter Unit **UN-14**
Interface Unit **UV-22**

AC Adapter **NC-98C**

AC Adapter **NC-97/99**

Battery Unit **BP-17**

Interface Cable **5WKR4030** — **Computer**

BNC-BNC Cable **NC-39A** — **Peripheral device with BNC connector**

BNC-BNC Coaxial Cable **EC-90A/90B** — **Peripheral device with BNC connector**
∗For information on comparator output connection, contact RION distributors.

USB interface Cable — **Computer**

LAN Cable — **Computer**

## Peripheral equipment

**Computer**

Computer
∗For information on software for various measurements, see the respective sound level meter page.

**Printer**

Printer **DPU-414**

**External device**

Rotating light, alarm etc.

**Peripheral device with BNC connector**

Level Recorder **LR-07**

Data Recorder **DA-20/40**

Multi-Channel Signal Analyzer **SA-02M/02A4**

2-Channel Hand-held FFT Analyzer **SA-78**

---

Sound Level Meter

Vibration Meter

Frequency Analyzer

Recorder

Related Products

Measuring Instrument Combinations

Outline

Knowledge in a Nutshell

Quality Documentation

Company Outline

**17**