RION

Clean and simple design, intuitive operation, wide range of applications

The NL Series Lineup

NL-32 NL-22 NL-31 NL-21 NL-20

Sound Level Meter < Class 1 >

NL-32/31

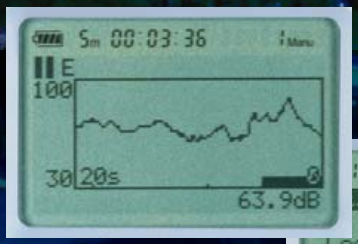
Sound Level Meter < Class 2 >

NL-22/21/20

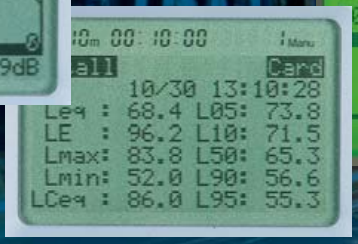
CE

Wide 100 dB dynamic range eliminates need for level range switching

Powerful functions for diverse measurements. Easy-to-read display and stable long-term operation. A new generation of sound level meters.



Level/time measurement screen



Simultaneous processing result display screen

Sound level display screen (with backlight)

Real sound monitor function

NL-32/22

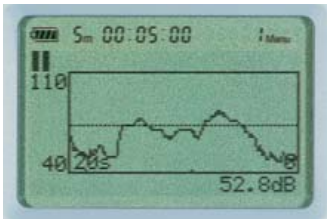
The real sound monitor card NX-22J integrates a sound monitor function in the sound level meter. This allows event recording (above a certain threshold) or interval recording (at preset intervals) during sound level measurement.
By using the NL-22PB1 management software, you can perform various data processing functions while listening to the actual recorded sound.

Real sound monitor display

Comparator function

NL-32/22/31/21

An open collector output linked to the comparator function can be used for various purposes. The comparator level can be set from 30 to 130 dB in 1-dB steps. (Maximum applied voltage: 24 V DC, maximum current: 60 mA DC)



Comparator level display

Compatible with CompactFlash cards

NL-32/22/31/21

Data can be recorded directly on high-capacity memory cards. 64 MB CF card can be supplied as option. This will hold 99,999 sets of processed values such as L_{eq}, or 5.2 days worth of continuous data with sound level measurement performed every 100 ms. By selecting a suitable card, you can easily match the storage capacity to the intended measurement.

Timer function

NL-32/22/31/21

The unit can be set to start and stop measurement at specified times. In the standby condition, the unit consumes only a small amount of power. In combination with the interval function, this enables problem-free long-term measurement.

Power backup capability

When the unit is powered from an external source (AC adapter), the inserted batteries will automatically take over if the external power is interrupted for any reason.

- **Simultaneous measurement of equivalent continuous sound level, percentile sound level, and maximum level**
- **Graphic indication of sound level fluctuations, back-erase function for excluding recent data**
- **Easy-to-read backlit LCD display**
- **Filter cards provide expanded settings for various filter functions** NL-32/22/31/21
- **USB interface** (with optional connection cable) NL-32/22

Main unit functions (data recording/output)

Card slot

NL-32/22/31/21

A CompactFlash card slot is integrated in the unit Inserting a card here enables auto store operation. Optional program cards can also be inserted, to load various expansion functions.

Card slot

I/O connectors (RS-232C/USB) USB compatible

NL-32/22

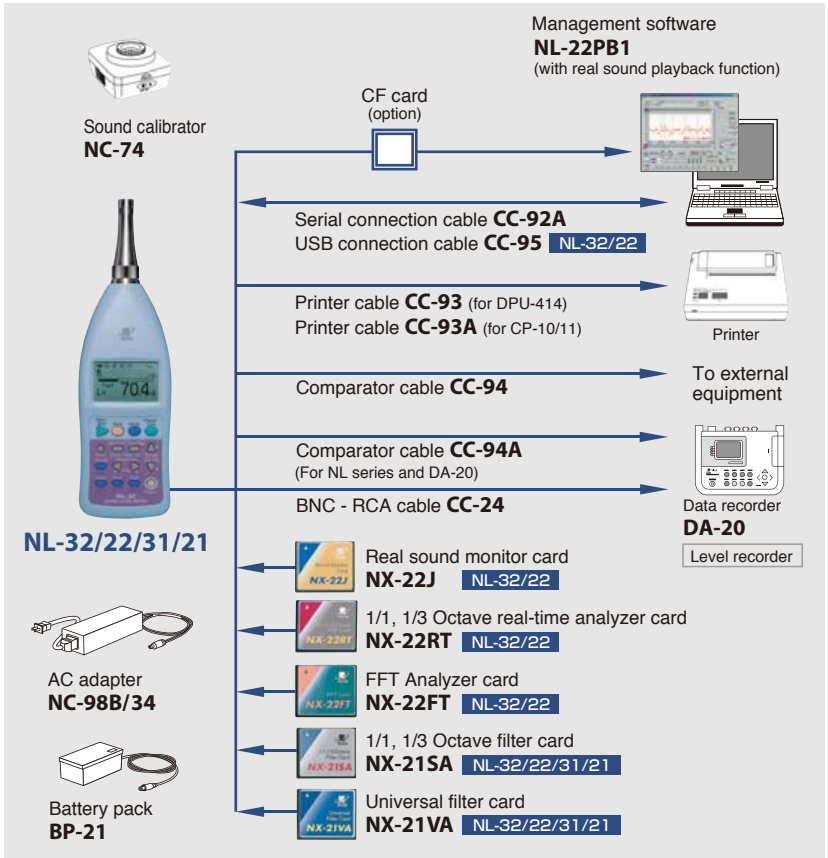
The I/O connector allows sound level measurement control from a computer, data output to a computer, data output to a printer (optional DPU-414/CP-11/CP-10), and comparator output (dedicated cable required). In addition, an AC/DC output connector and AC adapter connection jack are also provided.


Connectors on bottom of unit

NL series is compliant with the current Measurement Law, JIS and IEC regulations. An attractive lineup of optional program cards is provided. These CompactFlash (CF) cards contain programs for adding useful functions such as sound monitoring, 1/1 and 1/3 octave real-time analysis, and FFT analysis.
(Depending on the sound level meter model, some restrictions may exist as to which program cards can be used.)
Automated measurements for environmental evaluation and noise control purposes are made easy by various convenient features of these sound level meters, such as power-saving design, and optional real sound monitoring capability. Results of automatic measurement can be stored directly on CF card, making it easy to transfer such data to a computer for further processing.

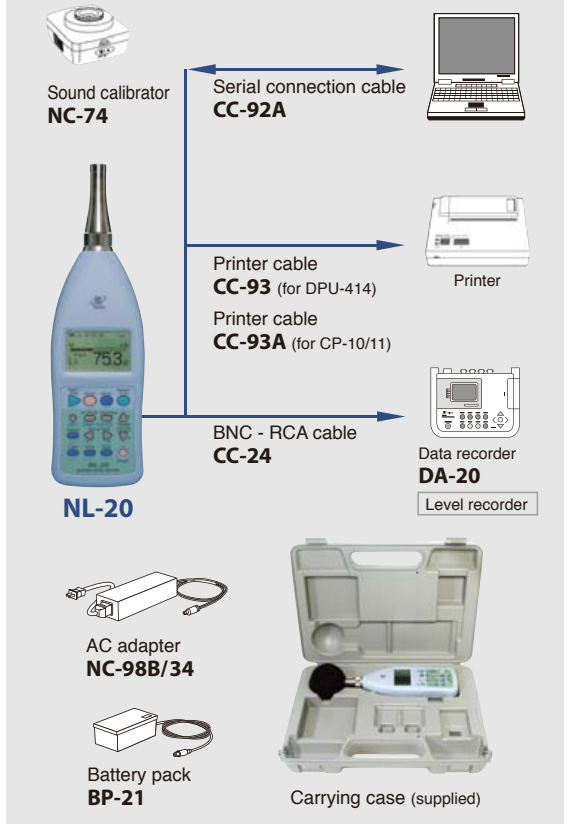
System diagram NL-32/22/31/21

(Equipment other than sound level meter is optional)



NL-20

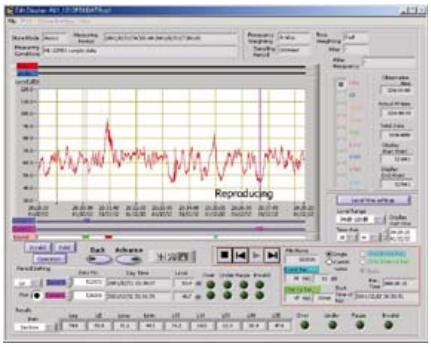
(Equipment other than sound level meter is optional)



Management software

NL-32/22 ● Supported OS: Windows 98/98SE/ME/2000/XP ● Not compatible with manualy stored data

Management software
NL-22PB1
(with real sound playback function)



Edit display screen

When using the real sound monitor card NX-22J, recorded live sound can be played back. Data erase and recalculation are also possible.

Daily report display screen

By reading in auto store data from memory card, processing functions such as measurement data display, editing, creation of daily and weekly reports, text file export, and printing become possible.

Memory card recording times	
Memory card capacity	Recording time
128 MB	Approx. 5 hours
256 MB	Approx. 11 hours

Program cards (CF card)

NL-32/22/31/21

Program card compatibility chart

		NL-32/22	NL-31/21	NL-20
Real sound monitor card	NX-22J	YES	NO	NO
1/1, 1/3 Octave real-time analyzer card	NX-22RT	YES	NO	NO
FFT Analyzer card	NX-22FT	YES	NO	NO
1/1, 1/3 Octave filter card	NX-21SA	YES	YES	NO
Universal filter card	NX-21VA	YES	YES	NO

Real sound monitor card
NX-22J

Adds sound monitor function to sound level meter.

This allows event recording (above a certain threshold) or interval recording (at preset intervals) during sound level measurement. By using the NL-22PB1 management software, you can perform various data processing functions while listening to the recorded sound.

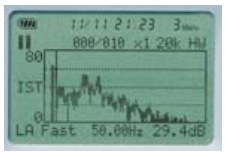
＊ The recorded sounds are not useful for the aim of frequency analysis.

1/1, 1/3 Octave real-time analyzer card
NX-22RT

Adds 1/1, 1/3 octave real-time analyzer function to sound level meter.

- ●Supported standards: IEC 61260: 1995 Class 1, JIS C 1514: 2002 Class 1
- ●Measurement modes: L_p, L_{eq}, L_E, L_{max} (select one processing function)
- ●Frequency analyzer bands: 1/1 octave filter: 16 Hz to 8 kHz
  1/3 octave filter: 12.5 Hz to 16 kHz
- ●Memory: Max. 100 data per file, Number of files: max. 100
- ●AC/DC output: Voltage always corresponds to L_p value, regardless of selected measurement type (full-scale –10 dB: 2.5 V, 0.25 V/10 dB)

FFT Analyzer card
NX-22FT



Adds FFT analyzer function to sound level meter.

- ●Frequency span: 2 kHz, 5 kHz, 10 kHz, 20 kHz
- ●Window types: Regular, Hanning
- ●Number of analysis lines: 400
- ●Zoom ratio: ×1, ×2, ×4
- ●Processing: Instantaneous, linear average, maximum value
- ●Memory: Max. 100 data per file, Number of files: max. 50

1/1, 1/3 Octave filter card
NX-21SA

Adds frequency band switching analyzer function to sound level meter.

- ●Supported standards: IEC 61260: 1995 Class 1, JIS C 1514: 2002 Class 1
- ●Frequency analyzer bands: 1/1 octave filter: 16 Hz to 8 kHz
  1/3 octave filter: 12.5 Hz to 16 kHz
  (NL-21 to 10 kHz)
- ●AC/DC output: For selected frequency band

Universal filter card
NX-21VA
(1/3 octave steps)

Adds high-pass filter and low-pass filter function to sound level meter.

- ●3rd order high-pass filter: 10 Hz to 12.5 kHz (NL-21 to 8 kHz)
- ●3rd order low-pass filter: 10 Hz to 12.5 kHz (NL-21 to 8 kHz)
- ●AC/DC output: For selected frequency band

Sound calibrator
NC-74

Ideal for calibration of high-precision sound level meters

This device conforms to IEC 60942: 1997 Class 1 and JIS C 1515: 1991. Its performance and functions are eminently suitable for high-precision sound level meters.

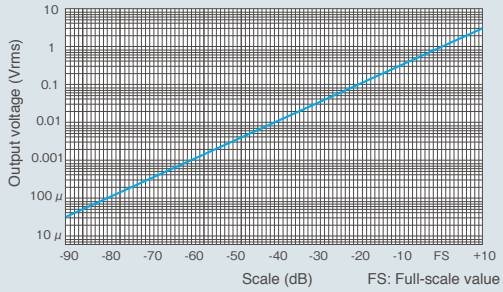
- ●Sound level: 94 dB
- ●Frequency: 1 kHz

Sound level meter characteristics and sound level measurement

Output connector

■AC Output

Supplies an AC signal after frequency weighting. When a filter card (NX-21SA, NX-21VA) is inserted, the AC signal is output after filter processing. The relationship between display reading and output voltage is as shown below.

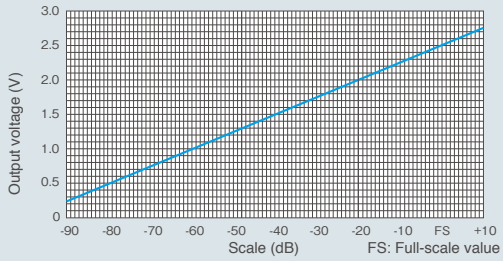


- Output voltage: 1 Vrms ±50 mVrms (scale upper limit)
- Output impedance: approx. 600 Ω
- Load impedance: 10 kΩ or more
- Suitable cable: BNC - RCA cable CC-24 (option)

Output signal in calibration mode (scale upper limit –6 dB, 1000 Hz sine wave) is 0.5 Vrms.

■DC Output

Supplies a level-converted DC signal after frequency weighting, rms detection, and logarithmic compression. The selected frequency weighting and time weighting characteristics are active. The relationship between display reading and output voltage is as shown below.

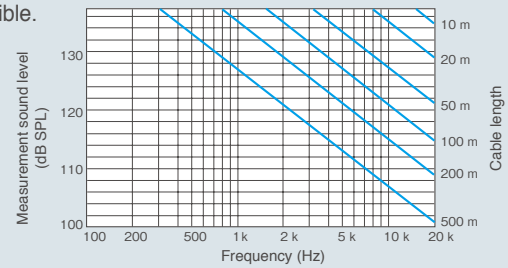


- Output voltage: 2.5 V ±50 mV (scale upper limit), 0.25 V/10 dB
- Output impedance: approx. 50 Ω
- Load impedance: 10 kΩ or more
- Suitable cable: BNC - RCA cable CC-24 (option)

Output signal in calibration mode (scale upper limit –6 dB) is 2.35 V.

Influence of microphone extension cable

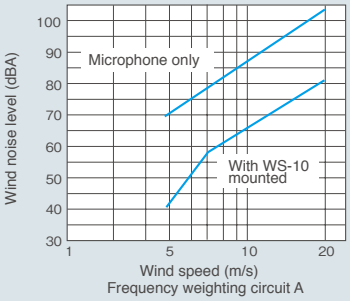
When the output of the microphone/preamplifier is routed through an extension cable, certain limitations regarding measurable sound level and frequency range will apply. This is due to the influence of the cable capacitance. The longer the cable, the lower the measurable sound level and the lower the frequency limit. The diagram below shows the relationship between cable length, measurable sound level, and frequency. If for example a sound level of 123 dB is to be measured up to 8 kHz, an extension cable length of up to about 100 meters is possible.



Effect of windscreen

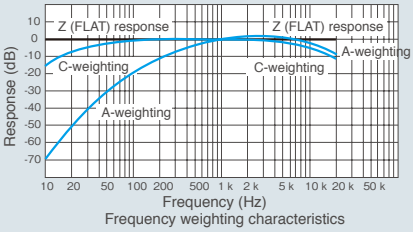
When making outdoor measurements in windy weather or when measuring air conditioning equipment or similar, wind noise at the microphone can cause measurement errors. To prevent this, the supplied windscreen WS-10 can be attached to the microphone. The windscreen characteristics are shown below. The windscreen will reduce wind noise by about 25 dB during noise level measurement (with A-weighting), and by about 15 dB during sound level measurement.

WS-10



Frequency weighting characteristics

The major types of frequency weighting used by sound level meters are A, C, and Flat. The respective weighting curves are shown below. The subjective impression of how loud a sound is depends not only on the sound level. Low-frequency sounds and high-frequency sounds are perceived differently, even if they have the same level. Using the A-weighting curve when measuring sound produces results that are fairly similar to the subjective impression gained by the human hearing. Therefore A-weighting is normally used, both in Japan and internationally, for noise evaluation and similar tasks. Flat characteristics are suitable for example when the actual sound level is to be measured or when the output of the sound level meter will be used for frequency analysis. C-weighting produces results that are close to flat response characteristics, but the influence of sounds below 31.5 Hz and above 8 kHz is reduced. This setting is useful for sound pressure measurements where unwanted low-frequency components are to be excluded or where a high degree of high-frequency components exist.



Frequency weighting characteristics

All-weather windscreen WS-03

This sturdy, durable product is designed for prolonged outdoor use. It not only reduces wind noise but also provides protection against rain and dew. The product consists of a 20-cm diameter open cell type polyurethane foam structure for reducing wind noise and a ball-shaped nylon non-woven cloth for water proofing.

WS-03 (option)

- Specifications:
  Wind noise reduction: approx. 28 dB (A-weighting), approx. 19 dB (C-weighting)
  Effect on frequency response: 20 Hz to 8 kHz +0.8, –1.5 dB (with water droplets)
  Compatible microphones: 1/2 inch, 1 inch diameter
  Shape and weight: 200 mm dia. ball shape, approx. 2.5 kg
- Material: Open cell type polyurethane foam and nylon non-woven cloth

Specifications

	NL-32	NL-31	NL-22	NL-21	NL-20
Applicable standards	High-Precision Sound Level Meter according to the following standards		General-Purpose Sound Level Meter according to the following standards		
	IEC 61672-1 : 2002 Class 1		IEC 61672-1 : 2002 Class 2		
	JIS C 1509-1 Class 1		JIS C 1509-1 Class 2		
Measurement functions (main processing)	Simultaneous measurement of all items, with selected time weighting and frequency weighting: Sound level L_p, equivalent continuous sound level L_{eq}, sound exposure level L_E, maximum sound level L_{max}, minimum sound level L_{min}, percentile sound level L_N (5 freely selectable values)				
Measurement functions (sub processing)	In addition to main processing items, one of the following can be selected for simultaneous processing: Peak sound level L_{peak}, C-weighted peak sound level L_{Cpeak}, C-weighted equivalent continuous sound level L_{Ceq}, power average of maximum sound level in a given interval L_{Atm5}, impulse sound level L_{AI}, impulse equivalent continuous sound level L_{AIeq} ∗L_{Atm5}, L_{AI}, and L_{AIeq} can only be chosen when A-weighting is selected for main processing. ∗L_{Ceq} can only be chosen when A-weighting and flat characteristics are selected for main processing.				———
Measurement time	10 seconds, 1, 5, 10, 15, 30 minutes, 1, 8, 24 hours, and manual (maximum 200 hours)				
Measurement level range	A-weighting: 28 to 138 dB, C-weighting: 33 to 138 dB, FLAT: 38 to 138 dB				
	C-weighted peak sound level: 55 to 141 dB, FLAT characteristics peak sound level: 60 to 141 dB				———
Inherent noise	A-weighting: 20 dB or less (Typ.17 dB), C-weighting: 25 dB or less, FLAT: 30 dB or less		A-weighting: 22 dB or less (Typ.19 dB), C-weighting: 27 dB or less, FLAT: 32 dB or less		
Linearity range	100 dB				
Level range selection	20 to 80 dB, 20 to 90 dB, 20 to 100 dB, 20 to 110 dB, 30 to 120 dB, 40 to 130 dB (6 ranges in 10-dB steps)				
Frequency range (including microphone)	20 Hz to 20 kHz		20 Hz to 8 kHz		
Electrical circuit (AC output)	10 Hz to 20 kHz				
Electrical circuit characteristics(detector)	10 Hz to 20 kHz			10 Hz to 14 kHz	
Frequency weighting characteristics	A-weighting, C-weighting, Flat				
rms detection	Performed with digital processing				
Time weighting characteristics (dynamic characteristics)	Fast, Slow, Impulse (Impulse selectable only as auxiliary processing function)				Fast, Slow
Acoustic calibration	Using sound level calibrator NC-74				
Back-erase function	Data for 5-second interval before pressing Pause button can be excluded				
Processing	Digital				
Sampling frequency	20.8 μs (L_{eq}, L_{max}, L_{min}, L_E), 100 ms (L_N)			30.3 μs (L_{eq}, L_{max}, L_{min}, L_E), 100 ms (L_N)	
Data store functions	Manual store in internal memory or on memory card (selectable), auto store when memory card is inserted				Store in internal memory only
Manual store	Store sound level, processed values, store time, processing start time in internal memory or on memory card (max. 100 data sets)				Manual store only
Auto store 1	Continuously store sound level (every 100 msec, 200 msec, 1 sec) or L_{Aeq} (every 1 sec) on memory card, with timer function				
Auto store 2	Continuously store main and sub processing values and processing start time information at preset measurement intervals on memory card, with timer function				
Microphone	1/2 inch electret condenser microphone				
Model (sensitivity level)	UC-53A (–28 dB)		UC-52 (–33 dB)		
Preamplifier	NH-21				
Display	LCD with LED backlight (128 × 64 dots + 121 icons), display contents: numeric and bar graph indication of sound level Combined display of all processed values, L-T screen (real-time level recording with 20-second horizontal axis) Menu screen display for operation				
Outputs	AC/DC jack (menu selectable), AC output: 1 Vrms (full scale), DC output: 2.5 V (full scale), 0.25 V/10 dB				
I/O connector	RS-232C, USB	RS-232C	RS-232C, USB	RS-232C	RS-232C
	Sound level measurement control from a computer, output of data to computer or printer (optional DPU-414/CP-11/CP-10)				
Comparator output	Activated when preset threshold level (30 to 130 dB in 1-dB steps) is exceeded (comparator output)				———
Power requirements	Four IEC R6P (size AA) batteries (LR6 or R6PU), AC adapter (Option: NC-34, NC-98B)				
Battery life	Backlight off (battery life is reduced to about 1/2 when backlight is on), main processing on, sub processing off, options not used				
LR6 (alkaline batteries)	Approx. 24 hours	Approx. 29 hours	Approx. 30 hours	Approx. 32 hours	Approx. 34 hours
R6PU (manganese batteries)	Approx. 10 hours	Approx. 10 hours	Approx. 11 hours	Approx. 12 hours	Approx. 14 hours
Ambient temperature for use	–10 to +50 °C, 10 to 90 % RH (no condensation)				
Dimensions, weight	Approx. 260 × 76 × 33 mm, approx. 400 g (including batteries)				
Supplied accessories	Windscreen WS-10 × 1, carrying case, IEC R6P (size AA) R6PU battery (manganese) × 4, hand strap, connector cover				

Options

Name	Model
Real sound monitor card	NX-22J
1/1, 1/3 Octave real-time analyzer card	NX-22RT
FFT Analyzer card	NX-22FT
1/1, 1/3 Octave filter card	NX-21SA
Universal filter card	NX-21VA
Management software	NL-22PB1
128 MB CompactFlash memory card	MC-12CF1
256 MB CompactFlash memory card	MC-25CF1

Name	Model
Microphone extension cable	EC-04 (2 m and up)
BNC - RCA cable	CC-24
Serial connection cable	CC-92A
Printer cable	CC-93 (for DPU-414)
Printer cable	CC-93A (for CP-10/11)
Comparator cable	CC-94
Comparator cable(for NL series)	CC-94A

Name	Model
USB connection cable	CC-95
Sound calibrator	NC-74
Pistonphone	NC-72A
All-Weather windscreen set	WS-03E
Printer	DPU-414
AC adapter	NC-34 series
AC adapter (100 to 240 V AC)	NC-98B

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