



Sound Level Meter **NL-21/31**

Ideal for a wide range of sound measurements
Expandable Functionality Using Program Cards



ISO 14001
JQA-EM0488

ISO 9001
JQA-Q0334

The Sound Level Meter NL-21 (Class 2) and NL-31 (Class 1) not only comply with the existing IEC standards, they also conform to the new IEC/CDV 61672-1 standard for sound level meters. These instruments are equipped with features such as equivalent continuous sound pressure measurement and a number of the other measurement function. The NL-21 and NL-31 also use a wide dynamic range of 100 dB, making them ideal for continuous measurement since there is no need to switch measurement ranges. The measured data can be stored either in the internal memory or on the memory card provided. CompactFlash cards enables you to store continuous measurements. You can also upload programs from the optional filter cards to provide additional functions such as octave and third-octave band analysis, or third order Butterworth high/low-pass filter analysis in third-octave steps. You can also upload recorded data to your PC via the memory card.

- Complies with existing IEC standards and the new IEC/CDV 61672-1 standard
- No range switching required due to the 100 dB wide dynamic range.
- Simultaneous measurement of equivalent continuous sound pressure level (L_{eq}), percentile levels (L_N), maximum levels (L_{max}), etc.
- Graph display for sound level fluctuations and back erase function
- Backlit LCD screen for high-visibility display
- One 16 MB CompactFlash card provides up to 1.3 days of L_p readings taken every 100 ms.
- Timer function for automatic measurement over extended periods
- Dual-measurement function for L_{Aeq} , L_{Cpeak} , L_{peak} , L_{A5m}
- Comparator output function allows setting level determination
- Expansion features, including a range of filter settings, are provided by filter cards
- Power failure back-up function when the AC adapter is used



Back-lit screen



Terminals in bottom of the unit

I/O Terminals

Equipped with a port for sound level meter control from a PC, data output and for comparator output (using optional cable), an AC/DC output terminal and AC adapter socket.



Card slot

Card slot

The unit is equipped with a card slot for CompactFlash cards. You can use the Auto Store function by installing a memory card. You can also extend the meter's filter functions by installing a filter card (optional) and loading the software.

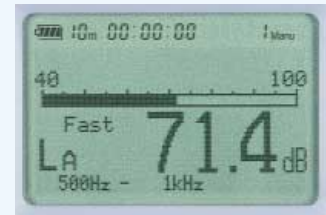
Sound Level Meter **NL-21/31**



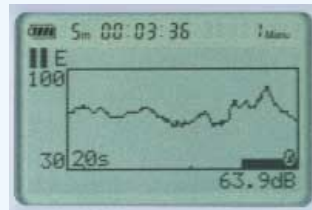
Sound Level Meter NL-21



Octave filter display screen.



Universal filter display screen.



Data retrieval display screen.



List display screen.

• Comparator function

A comparator output function is available using open collector output. The function can be set to values between 30 and 130 dB in 1-dB increments.

• Power failure compensation function

If the power supply is interrupted while you are using an external power source (AC adapter), the internal batteries ensure that measurements continue.

• Dual measurement

Dual measurement is possible for the following measurement items

L_{Aeq} and L_{Ceq} , L_{Aeq} and L_{Atm5} , L_{Aeq} and L_{Cpeak} , L_{Aeq} and L_{Aeq}

• Filter Card NX-21SA/21VA

Filter functions are offered as programs. Octave, third-octave and universal filter functions can be added by installing programs from filter cards.

• Back Erase Function

Can be set to erase data from preceding 5 seconds

• Support for CompactFlash cards (option)

Data is logged directly onto a CompactFlash memory card. Using a 16 MB card, you can store up to 1.3 days of sound level data recorded at 100-millisecond intervals. You can use the optimum card capacity for your purpose of measurement.

Data Downloading Software

This program downloads data stored manually in the internal memory of the instrument via the RS-232-C interface to a PC and converts the data to CSV files.

The program includes a function to convert the CSV files to text files enabling the user to set the decimal sign and the data separation sign. CSV files created by this program can be also converted to the format used for the data stored on the Compact Flash cards.

■ System configuration



CF card



Computer

CC-92 Serial I/O cable

CC-93 Printer cable



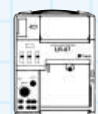
Printer

CC-94 Comparator output cable

CC-24 BNC to RCA cable



Data Recorder



Level Recorder

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

NX-21VA Universal filter card

Sound calibrator NC-74 (optional)

- An acoustic calibrator that complies with the IEC 60942: 1997 Class 1 and JIS C 1515:1991 Class 1 standards with all the functionality required for calibrating precision sound level meters
- Sound pressure level: 94 dB, 1 kHz



Specifications

Applicable standards

Sound Level Meter NL-21	Sound Level Meter NL-31
IEC 60651: 1979 Type 2	IEC 60651: 1979 Type 1
IEC 60804: 1985 Type 2	IEC 60804: 1985 Type 1
IEC 61672-1 Class 2	IEC 61672-1 Class 1
JIS C1502: 1990	JIS C1505: 1988

Measurement functions

Main processing functions

Simultaneous measurement of all items according to 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 selectable settings)

Auxiliary processing functions

One selectable for simultaneous processing with main measurement processing functions

- 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 5 s intervals 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 or FLAT is selected for main processing.

Measurement time

10 seconds, 1, 5, 10, 15, 30 minutes, 1, 8, 24 hours, and manual (maximum 200 hours)

Measurement range

A weighting: 28 to 138 dB
C weighting: 33 to 138 dB
Flat: 38 to 138 dB
Peak sound level: 141 dB

Inherent noise

NL-21	NL-31
A weighting: 20 dB or less	18 dB or less
C weighting: 27 dB or less	25 dB or less
Flat: 32 dB or less	30 dB or less

Linearity range: 100 dB

Reference sound pressure level: 94 dB

Reference level range: 30 to 120 dB

Level range selection

6 ranges in 10-dB steps

(7 ranges when optional 1/1, 1/3 Octave Filter Program Card NX-21S or optional Universal Filter Program Card NX-21V is in use)

Frequency range

Overall characteristics including microphone:

NL-21: 20 to 8000 Hz NL-31: 20 to 12500 Hz

Frequency weighting: A, C, FLAT

RMS detection: Digital processor

Time weighting Characteristics: Fast, Slow, Impulse

(Impulse is selectable only for auxiliary processing functions)

Back-erase function

Sampling interval

NL-21: 30.3 μ s (L_{eq} , L_{max} , L_{min} , L_E) NL-31: 20.8 μ s (L_{eq} , L_{max} , L_{min} , L_E)
100 ms (L_N) 100 ms (L_N)

Data store functions

Manual store: Internal memory: Up to 100 data sets

With optional CF card: Multiple blocks of up to 100 data sets each.

Auto store (only available using optional CF card)

Auto store 1: L_p data with 100 ms, 200 ms or 1 s sampling interval or L_{eq} , 1 s data.

Selectable start and stop time. Store capacity 16 MB card: 864000 data.

Maximum time 200 hours.

Auto store 2: Time history of main and auxiliary results processed over a preset

measurement period. Selectable start and stop time and selectable stand

by/measurement interval to reduce power consumption. Maximum store capacity:

99999 periods (56700 periods on 8 MB card)

Microphone and preamplifier

1/2-inch prepolarized condenser type

NL-21	NL-31
Model: UC-52	UC-53A
Sensitivity: -33 dB	-29 dB
Preamplifier NH-21	

Display: Backlit LCD (128 \times 64 dots + 121 icons)

Outputs

AC/DC output Key-selectable AC or DC output

I/O connector

Sound level meter control from and data output to a computer

Data output to printer DPU-414/CP-11/CP-10

Comparator output

Power requirements

Four IEC R6P (size "AA") batteries

Battery life (20 °C)

NL-21: Approx. 32 h (alkaline batteries), 12 h (manganese batteries)	NL-31: Approx. 27 h (alkaline batteries), 10 h (manganese batteries)
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With backlighting, battery life is reduced by about 50 %.

When auxiliary processing functions are enabled, battery life is reduced by about 20 %.

When the optional filter is enabled, battery life is reduced by about 15 %.

AC adapter (option)

NC-34: 100 V AC

NC-34A: 120 V AC

NC-34B: 220 V AC

NC-98: 100 to 240 V (CE-marked)

Current rating

NC-21: Approx. 55 mA

NL-31: Approx. 65 mA

Current consumption in standby mode: 3 mA

Internal backup battery retains clock for about 1.5 months without external power

Ambient conditions: -10 °C to +50 °C, 10 % to 90 % RH

Dimensions: Approx. 260 \times 76 \times 33 mm

Weight (excluding batteries): Approx. 300 g

Supplied accessories

Windscreen	WS-10	1
Carrying case	NL-21-031	1
Connector cover (mounted on unit)	NL-21-005	1
Hand strap	VM-63-017	1
Batteries	IEC R6P	4
Instruction manuals		1 set

(Instruction Manual, Technical Notes, Serial Interface Manual, 1 each)

Optional equipment

1/1, 1/3 Octave Filter Program Card	NX-21SA
Universal Filter Program Card	NX-21VA
CompactFlash card	MC-16CF
AC adapter	NC-34 series
AC adapter with CE mark	NC-98 (100 to 240V)
BNC-to-RCA cable	CC-24
Microphone extension cable	EC-04 series
Serial I/O cable	CC-92
Printer cable	CC-93
Printer	DPU-414
Sound calibrator	NC-74 (Class 1)
Pistonphone	NC-72 (Class 0L)
Comparator output cable	CC-94
Level recorder	LR-06/LR-07

Optional program card specifications

The program card is a CompactFlash card which contains program data. After these program data have been read off the card by the sound level meter during the software installation process, the new function can be used.

The data on the program card are protected, to ensure that the card cannot be used for several sound level meters simultaneously.

Only one function can be selected for installation in the sound level meter.

1/1, 1/3 Octave Filter Program Card: NX-21SA

Linearity range during filter operation is 65 dB.

Applicable standard: IEC 61260 : 1995 Class 1

1/1 octave filters

Installed in NL-21: 16 Hz to 8 kHz Installed in NL-31: 16 Hz to 8 kHz

1/3 octave filters

Installed in NL-21: 12.5 Hz to 10 kHz Installed in NL-31: 12.5 Hz to 16 kHz

Universal Filter Program Card: NX-21VA

3rd-order Butterworth high-pass filter and 3rd-order Butterworth low-pass filter with

freely selectable frequency in 1/3 octave steps

Linearity range during filter operation is 65 dB.

HPF cutoff frequencies (-3 dB)

Installed in NL-21: 10 Hz to 8 kHz Installed in NL-31: 10 Hz to 12.5 kHz

LPF cutoff frequencies (-3 dB)

Installed in NL-21: 10 Hz to 8 kHz Installed in NL-31: 10 Hz to 12.5 kHz

Specifications are subject to change without notice. Windows is registered trademark of Microsoft Corporation.



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