INSTRUCTION MANUAL

Nor103 is a small and versatile IEC Class 1 sound level meter. The combination of a big graphical display and only three function buttons makes this sound level meter easy to operate, even by non-acousticians. It displays the current sound pressure level and calculates both sound exposure level and the equivalent continuous sound level. After the measurement you it gives you also the Fmax or Cpeak reported and stored. These are basic acoustic figures that are widely used for general noise measurements and reporting.

nor**103**

SOUND LEVEL METER

Norsonic

Nor103 User Guide – January 2018

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If you wish to communicate with us, please feel welcome.

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Finding the information you need

Thank you for choosing Norsonic! The sound level meter Nor103 have been designed to give you many years of safe, reliable operation.

The User Guide has been divided into 7 chapters.

Depending on your requirements and your familiarity with sound measurements as such, you may find that you use some parts of this manual often and others not at all.

The very first chapter acquaints you with the Nor103 and describes its features and possibilities.

The next section provides a closer look at the instrument with a presentation of all major parts and the keys of the keyboard.

Calibration is a vital point ensuring that your measurements are sufficiently correct for the purpose. Therefore, a separate chapter has been devoted to this.

How to measure with the sound level meter is described in the following and outlines the use of the instrument as a proper sound level meter.

Detailed specifications about the instrument is found in the chapter covering Technical specifications.

Note that the instruction manual describes a fully equipped instrument. Your Nor103 may not have the additional cables and hence information related to this is not relevant.

Our objective with this manual has been to address your goals and needs. Please let us know how well we succeeded!

Overview

Precautions

- Operate the unit only as described in this manual.
- Do not drop the unit. Protect it from shocks and vibration.
- The permissible environmental temperature range for operation of the unit is -10 to +50°C. Relative humidity must be between 10% and 90%.
- Do not use or store the unit in locations which may be subject to water, direct sunlight, high temperatures or humidity. Also protect the unit from air with high salt or sulphur content, gases or the influence of chemicals.
- Do not forget to turn the unit off after use. Remove the batteries if the unit is not to be used for some time.
- When disconnecting cables, always hold the plug and do not pull the cable.
- To clean the unit, use only a dry cloth or a cloth lightly moistened with water. Do not use chemical cleaning cloths, solvents or alcohol-based cleaners to prevent the possibility of deformation and discoloring.
- Do not insert any objects such as pins, metal scraps, conducting plastic etc. into any opening on the unit.
- Do not disassemble the unit or attempt internal alterations.
- In case of malfunction, do not attempt any repairs. Note the condition of the unit clearly and contact the supplier.
- When disposing of the unit or the batteries, follow national and local regulations regarding waste disposal.

Safety

In this manual, important safety instructions are specially marked as shown below. To prevent the risk of death or injury to persons and severe damage to the unit or peripheral equipment, make sure that all instructions are fully understood and observed.

Important! Disregarding instructions printed here incurs the risk of damage to the product.

NOTE! Mentioned about the tips to use this unit properly.
(This messages do not have to do with safety.)

This product can be used in any non hazardous areas within the environmental conditions given in the technical specification.

To conform to the EU requirement of the Directive on Waste Electrical and Electronic Equipment, the symbol mark on the right is shown on the instrument.

Contents

Introducing the sound level meter Nor103

The sound level meter Nor103 is a class 1 sound level meter and complies with IEC61672-1 and is able to measure a number of acoustic parameters. The microphone is a 1/2-inch electret condenser microphone. It has a wide 107 dB linearity range, measuring sound levels between 30 and 137 dB, with no need to select the range. The unit has an LCD panel and 4 operation keys. Optional AC output and DC output connector is available on request.

It measures the following values:>

- SPL The Instantaneous Sound Pressure Level
- L_{MAX} The Maximum Sound Pressure Level
- L_{eq} The Integrated Equivalent SPL
- L_{E} The Sound Exposure Level
- L_{CPEAK} The Maximum Peak Level (Peak range only)

The time-weighting can be Fast or Slow. While the measurement is running the instantaneous SPL is available for inspection, but as soon as the measurement is terminated the SPL becomes meaningless and therefore not listed in the result tables.

This unit has the following two level ranges.

Wide range: This measures the range between 30 and 137 dB and allows simultaneous measurement of Lp, Leq, Lmax, and LE.

Peak range: Along with the processing results for wide range, this range also measures LCpeak, but the lower limit for measurement becomes 65 dB.

No range setting. Only one level range with a dynamic range of 107 dB makes the setup easy and ensures reliable measurements in all situations – especially useful for unattended measurements. With its normal microphone this means a measurement range covering levels from the self-noise of the microphone (typically less than 30 dB A-weighted) to sound with peak values up to 137 dB.

Storing and retrieving of results. The results from a measurement is automatically stored in the non-volatile memory of the instrument. The information may later be displayed on the instrument screen or transferred to a PC via an optional special cable and a software.

The main unit and preamplifier is one single unit so it is not possible to extend the microphone.

Battery operation. The instrument is powered from two size AAA internal batteries which typically last for eight hours.

Setting up is easy to do. After you've defined wide or peak range, the time constant and duration of the measurement, you are ready to press the start key. The selection last used is automatically selected when you power the instrument up again. During the measurement you have instant access to all measurement values.

With the Nor103 you are able to do all basic noise measurements – community noise, industrial hygiene, product control and more.

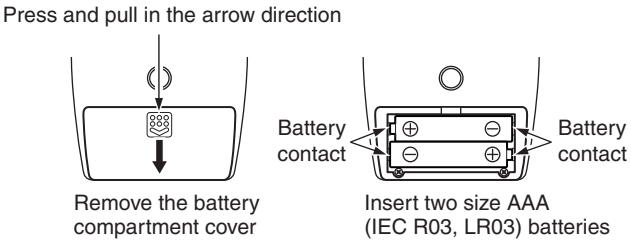
The Norsonic product range contains a wide range of equipment and accessories for use with acoustic measurements and noise monitoring. We supply enclosures for permanent monitoring installations, environmental cases for semi-permanent installations, microphones for applications in tough environments, cables, modems, weather stations and post-processing software. A detailed presentation of this is available on the Norsonic home page: www.norsonic.com.

Taking a closer look at the instrument

The Nor103 is delivered assembled and ready. We recommend that the microphone is always mounted on the preamplifier as this will prevent dust and dirt to enter the insulator around the sensitive signal terminal on the microphone.

Always keep the instrument turned off if you are required to unscrew or screw the cartridge on the preamplifier. Screw only finger tight!

The instrument is powered from two AAA size batteries which are inserted as shown on the figure.



Use of batteries

The sound level meter comes with two AAA batteries.
Battery lifetime is typically 8 hours (depends on use and brand of batteries).
The use of alkaline or lithium batteries is strongly recommended to avoid leakage.
Rechargeable batteries may also be used, but with reduced operating time.

If the instrument is stored for a prolonged period of time, we recommend removing the batteries to avoid damage from leaky batteries.

Data are stored in a non-volatile memory and will retain its content independent of the batteries.

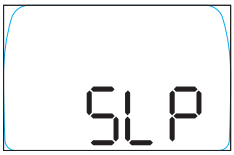
Switch on and off the instrument

Press the **POWER** key in the lower right corner of the instrument to turn the power on. A second operation, hold for 0,5 seconds or more, will switch the instrument off.

Sleep mode

If powered and left unattended and unoperated with the measurement screen being shown and no key is pressed for 10 minutes, the unit enters sleep mode and the sleep mode screen appears. Power consumption is 30% of normal in sleep mode.
The unit will not enter sleep mode in the following situations, even if no key is pressed for 10 minutes;

- If the processing screen, calibration screen, recall screen, or menu screen is displayed.
- If a cable is connected to the external connector (any of the three types).



By pressing any key when instrument is in sleep mode will wake the unit up and return to the measurement screen.

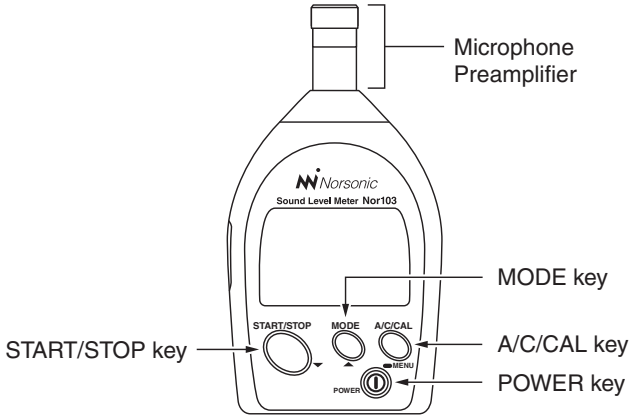
Front panel overview

Microphone/preamplifier

Microphone and preamplifier are integrated in a single enclosure. An extension cable cannot be used.

START/STOP key

Press to start or stop processing. Also used to change setting values in the calibration screen menu screen, and recall screen.



Important! Do not unscrew the microphone from the preamlifier.

MODE key

Changes the processing result display in the measurement screen and processing screen. Also used to change setting values in the calibration screen, menu screen, and recall screen.

A/C/CAl key

This key selects the frequency weighting characteristics, calibration screens and recall screen. Pressing and holding this key in the measurement screen activates the menu screen.

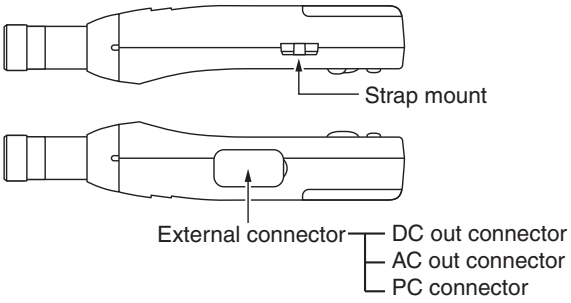
POWER key

Turns the unit on and off.

Side view

External connector

This connector is composed of a DC out connector, an AC out connector, and a PC connector for calibration purpose and download of measurements. (The connector can only be used for one purpose at a time.)



DC out connector

A DC signal corresponding to the sound level can be output from here. The signal after frequency weighting, time weighting, and logarithmic compression is output here (constant output when a DC output cable is connected). Connect the unit with the optional DC output cable to external equipment.

AC out connector

An AC signal weighted with frequency weighting characteristic Z is output here (constant output when an AC out cable is connected). Connect the unit with the optional AC out cable to external equipment.

When 110 dB is displayed, output is 1 Vrms. (The upper limit of the output voltage is 1.8 Vrms)

+600 mVrms

- 400 mVrms

PC connector

Connect the unit with the optional PC adapter cable to computer and download stored data in the instrument. Operation requires installation of software.

Note! All cables are optional and must be ordered separately.

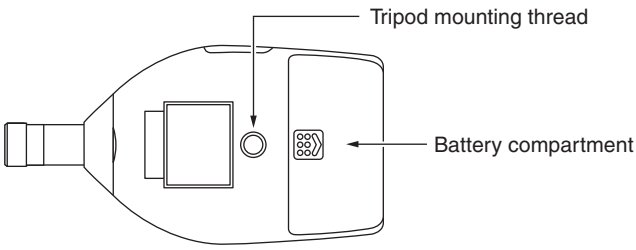
Strap mount

Attach the hand strap here. Pass your wrist through this strap when holding the unit when measuring.

Rear view

Tripod mounting thread

Mount the unit on a camera tripod with this thread.

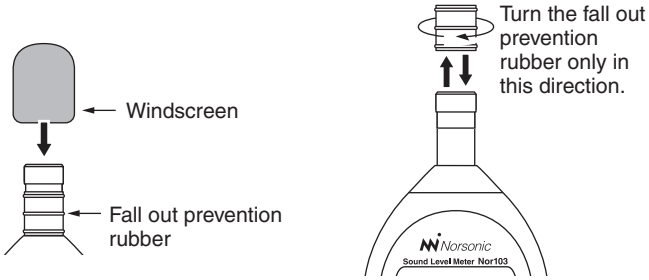


Attachments

Windscreen

We recommend using the windscreen to reduce wind noise and to protect the microphone from dust.

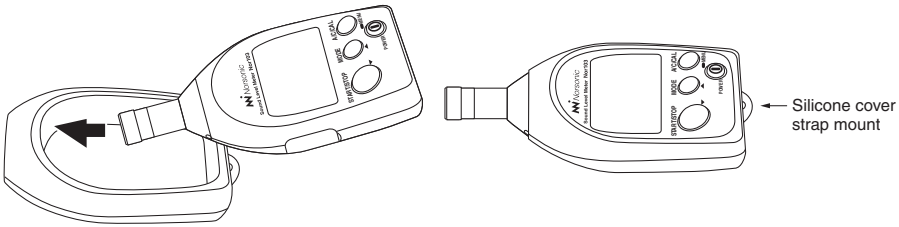
Windscreen fall out prevention rubber prevents the windscreen from dropping off the microphone.



IMPORTANT! The windscreen can easily drop off the unit, so we recommend attaching the fall out pre- vention rubber. Be sure to follow the instructions in the following diagram when attaching or detaching the fall out prevention rubber. Turning it in the opposite direction may loosen the microphone and cause it to fall off.

Silicone cover

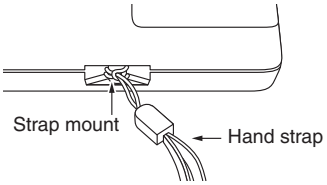
The silicone cover protects the unit from shocks and also makes it easier to grip when held. Fit the cover to the unit with the windscreen removed, as shown in the following illustrations.



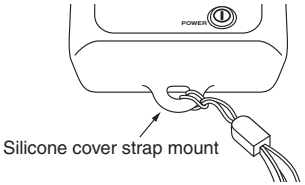
NOTE! You cannot use external connector when the silicone cover is fitted. You can attach the hand strap to the silicone cover strap mount.

Hand strap

To help prevent dropping of the unit, pass your wrist through this strap when holding the unit for measuring. Attach the hand strap as shown below.



When you have not fitted the silicone cover

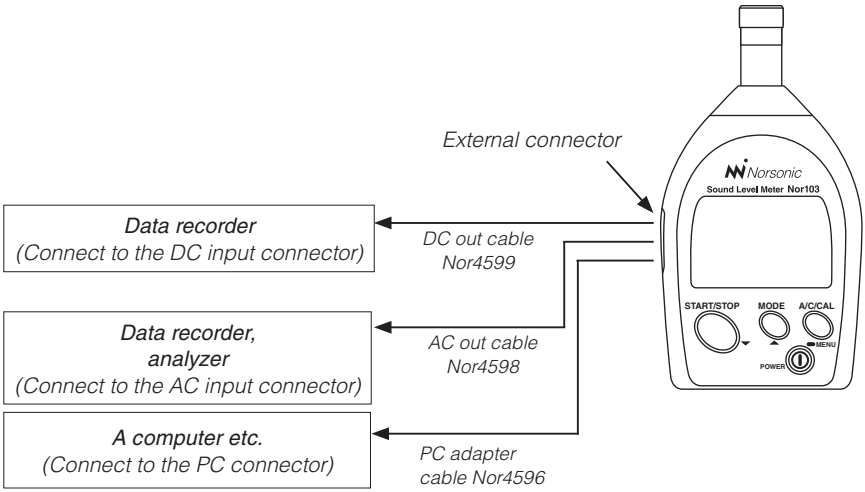


When you have fitted the silicone cover

Connecting external equipment

You can connect external equipment, such as a data recorder, level recorder, or computer, to the external connector.

Connect as shown in the following diagram.



NOTE! The connector has the ability to act as a DC out connector, an AC out connector, or a USB connector, but it can perform only one of these functions at a time.

Calibrating the instrument

Calibration is the normal way of ensuring that the sound level meter measures the level with sufficient accuracy. For a proper calibration, you need a sound calibrator.

One may say that a sound calibrator is just as much a verification of proper operation as it is a device of adjusting the sensitivity of sound measuring instruments.

Measuring microphones are very delicate devices designed to fulfil very rigid specifications. This makes them vulnerable and subject to damage unless proper care is taken.

When to calibrate

Calibration of the sound level meter should preferably take place before and after a measurement session is commenced, or whenever required by applicable standards. Furthermore, since the sound level meter automatically enters C-weighted mode, you won't have to bother with the calibrator frequency either if your calibrator apply a frequency between 250 Hz and 1 kHz.

Carrying out the calibration

According to IEC 61672-1, a class 1 sound calibrator shall be used, such as the Norsonic sound calibrator Nor1255 or Nor1256. (Class 1 sound calibrator as defined by the International standard for sound calibrators: IEC 60942.)

Do as follows:

1. **Access calibration mode.** Press the **A/C/CAL** key until the acoustic calibration screen is shown. "Aco" and "Cal" appear on the display. The frequency weighting characteristic is fixed to C and the time weighting characteristic is fixed to F. The display will look as shown on the figure.

NOTE! Do not calibrate the instrument before three minutes after switching the instrument (SLM) on.

2. **Mount the calibrator.** Mount the sound calibrator onto the microphone. Switch on the sound calibrator and wait until the level has stabilized, according to manufacturer's product manual or at least for a minimum of 30 seconds.
3. **Adjust the dB value**. Press the **START/STOP** key (Down) or **MODE** key (Up) to adjust the display volume to 94 dB if calibrator output is 94 dB or 114 dB if calibrator output is 114 dB.

Know the output level of your sound calibrator.

Some sound calibrators have an output level of 94 dB, while others have an output level of 114 dB. Norsonics Nor1256 will be able to give both signals.

Unless you know the output level of your sound calibrator you won't be able to know what level the measuring instrument is supposed to show. The output level is normally stated on the sound calibrator or in its accompanying user documentation or calibration certificate.

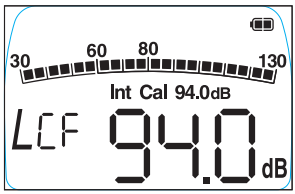
NOTE! Be aware of the fact that instruments using free-field Microphones, like Nor103, shall sometimes be adjusted to a value slightly lower than the output level of the sound calibrator. For this half-inch cartridge this will typically amount to 0.2 dB lower for calibrators producing a 1000 Hz calibration signal (e.g. the sound level meter should then be set to 113.8 dB when using a 114 dB @ 1000 Hz sound calibrator).

The internal calibration (calibration with an electronic signal) can be chosen. Such calibration is not according to standard IEC 61672-1, but to be considered a performance check or self-test.

For adjusting the instrument with the built-in oscillator (1 kHz, sinusoidal wave), you press the **A/C/CAL** key to switch to the internal calibration screen. "Int", "Cal", and "94.0dB" will appear on the display.

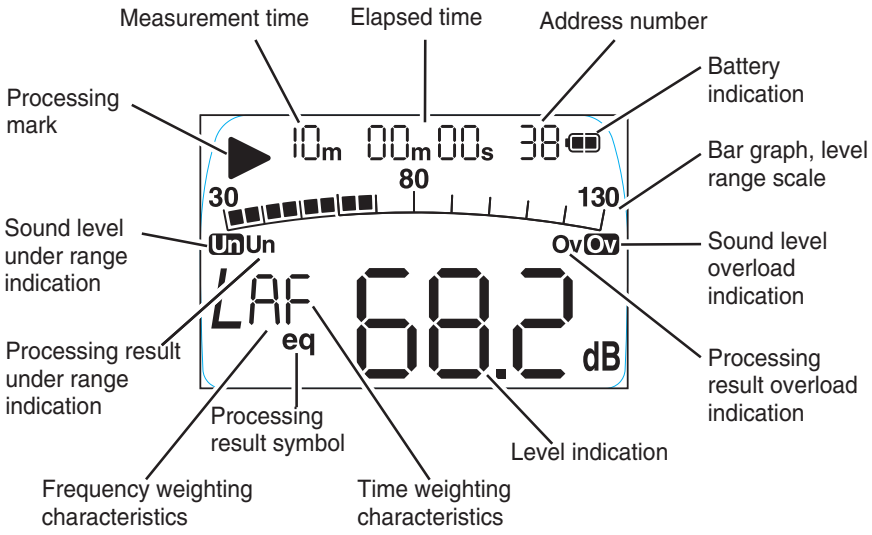
The frequency weighting characteristic is fixed to C and the time weighting characteristic is fixed to F. The display will look as shown on the figure.

Then just press the **START/STOP** key (Down) or **MODE** key (Up) to adjust the volume to 94.0 dB.



Making a measurement

Measurement and processing screen



Measurement time

The measurement time set in the menu screen.

Elapsed time

The amount of time elapsed since processing started.

Address number

The address where the processing result is stored.

Battery indication

Indicates battery charge.

Bar graph, level range scale

Shows the sound level in a bar graph.

Sound level overload indication

Shows that the sound level has exceeded the measurement range.

Processing result overload indication

Appears during processing when the sound level exceeds the measurement range, and remains until the next process starts. Appears also when recalling a measurement.

Level indication

Shows the sound level (Lp) and each processing result (L_{eq}, L_{max}, L_E, and L_{Cpeak}) as digits. Switch the display with the **MODE** key. L_{Cpeak} is processed and shown only when peak range is selected.

Time weighting characteristics

Shows the time weighting characteristics selected in the menu screen.

Processing result symbol

Shows the relevant symbol for the displayed processing result (L_{eq}, L_{max}, L_E, or L_{Cpeak}).

Frequency weighting characteristics

Shows the weighting charateristics selected. Change with the **A/C/CAL** key.

Processing result under range indication

If the sound level falls below the measurable limit (-0.6 dB) during processing, this appears until the next process starts (when a processing result is shown).

Sound level under range indication

Appears when the sound level falls below the measurable limit (-0.6 dB).

Processing mark

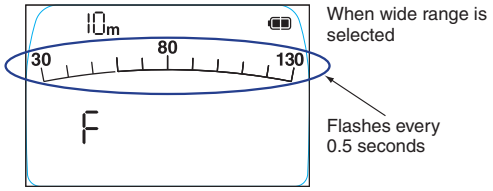
Flashes during processing.

Measurement settings

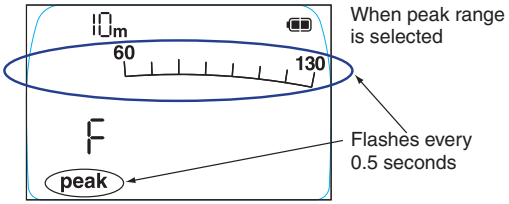
In the measurement screen, press and hold for 2 seconds the **A/C/CAL** key to switch to the menu screen/settings (not available during processing).

Range setting

Press the **START/STOP** key or the **MODE** key to select the following range settings.
Wide: Measurement range: 30 to 130 dB, L_{Cpeak} will NOT be processed.



Peak: Measurement range: 65 to 130 dB, L_{Cpeak} will be processed



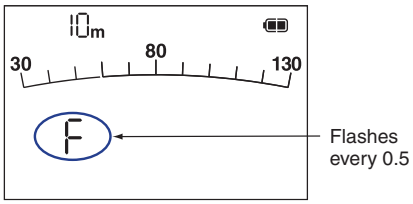
NOTE! Even if the frequency weighting characteristic is A, LCpeak is processed as C.

At all time you can press the **A/C/CAL** key to proceed in the settings menu, or press and hold the **A/C/CAL** key to exit and return to the measurement screen.

Setting time weighting characteristics

Press the **A/C/CAL** key to proceed in the settings menu

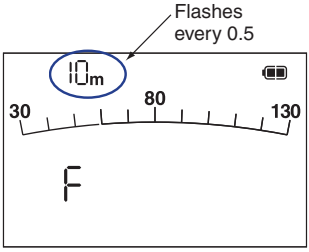
Press the **START/STOP** key or the **MODE** key to select the following settings.
F (fast), S (slow)



Setting measurement time

Press the **A/C/CAL** key to proceed in the settings menu

Press the **START/STOP** key or the **MODE** key to select the following settings.
1 m (1 minute), 5 m (5 minutes), 10 m (10 minutes), 1 h (1 hour).



Starting the Measurement

Defining frequency weighting characteristics

In the measurement screen, press the **A/C/CAL** key to select either frequency weighting characteristic A or C.

Processing (measurement)

Press the **START/STOP** key to start the processing.

The processing mark flashes during processing. Additionally, pressing the **MODE** key switches the display to show processing results (Lp, L_{eq}, L_{max}, L_E, or L_{Cpeak}) made up to that point. Processing stops when the measurement time elapses or you press the **START/STOP** key.

Storing processing data

When processing stops, the L_{eq}, L_{max}, L_E, or L_{Cpeak} processing results are automatically stored, and the address number increases by one ready for a new measurement.

Resume function

When the instrument is turned on, the following parameters maintain the same settings they had before you turned the unit off:

- Measurement time
- Time weighting characteristics
- Level range
- Address indication

The following items have predefined settings upon startup.

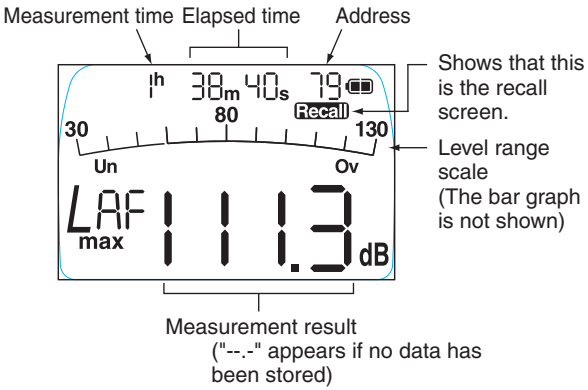
- Frequency weighting characteristic A
- Display processing value type Lp

Memory handling

Recalling stored data

Press the **A/C/CAL** key until the recall screen appears. The most recent processing result is shown.

The display will look similar as shown on the figure, with Recall written in the upper right corner.



Press the **START/STOP** key or the **MODE** key to change the displayed data as follows (LCpeak appears only when peak range is selected).

Address n-1 $L_{eq} \Leftrightarrow L_{max} \Leftrightarrow L_e (\Leftrightarrow L_{Cpeak}) \Leftrightarrow$

Address n $L_{eq} \Leftrightarrow L_{max} \Leftrightarrow L_e (\Leftrightarrow L_{Cpeak}k) \Leftrightarrow$

Address n+1 $L_{eq} \Leftrightarrow L_{max} \Leftrightarrow L_e (\Leftrightarrow L_{Cpeak}) \Leftrightarrow$

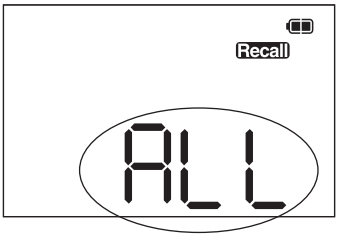
Press and hold the **START/STOP** or the **MODE** key to move through the addresses faster.

--- Address n-1 ⇔ Address n ⇔ Address n+1 ---

Press the **A/C/CAL** key to return to the measurement screen

Clearing stored data

Press the **A/C/CAL** key for 3 or more seconds while the recall screen is shown and a screen asking you to confirm clearing of the data appears.



ALL and CLr flash alternately on the screen every 0.5 seconds.

Press the **START/STOP** key and all stored data is cleared, then the recall screen appears again.

Press the **A/C/CAL** key to cancel the operation and return to the recall screen.

NOTE! It is not possible to undo the cancellation of the memory. When pressing **START/STOP** you will not be asked to confirm the cancellation, all data will be permanently lost.

Initializing

Power the unit on while pressing the **START/STOP** key and the settings in the instrument are initialized; meaning address counter is set to 1 and settings are reset to fabrication default settings. Memory is not formatted /cleared, but new measurements will now overwrite stored data.

Initial setting values

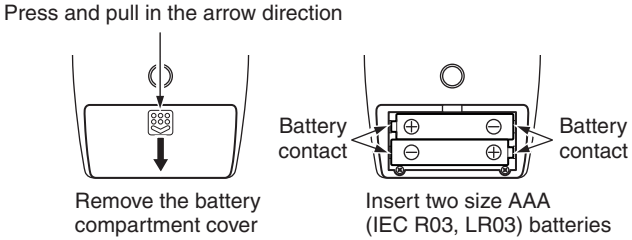
Measurement time	10 m (10 minutes)
Time weighting characteristics	F (Fast)
Level range	Wide
Address	1

Batteries

Inserting or changing batteries

Important! Make sure the unit is turn off before removing old batteries.

1. Remove the battery compartment cover on the rear of the unit. Press and pull in the arrow direction.
2. Take out eventual old batteries an insert two new, size AAA (IEC R03, LR03) batteries into the battery compartment. Insert correctly as indicated in the compartment.



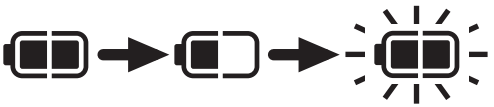
3. Re-mount the battery compartment cover.

Important!
Take care not to reverse the (+) and (-) polarity when inserting the batteries. If batteries are inserted with wrong polarity, the unit will not operate.
Always use two identical batteries, and replace batteries only as a set. Mixing battery types or old and new batteries can lead to damage.
Remove the batteries from the unit when it is not in use for more than a week.
Do not subject the battery connectors to strong force or stress. Damaged springs can lead to loss of proper battery contact.

Battery life (at 23°C, using wide range)

Manganese batteries: approx. 3 hours
Alkaline batteries: approx. 9 hours

Battery life will be reduced by 20% when a DC output cable is connected.



Full charge

Indicator flashing
(replace the batteries)

Battery indication

Indicates battery charge.

When the indicator starts to flash, starting a new measurement is no longer possible. Replace the batteries with new ones.

Important! If the indicator starts flashing during processing, processing will end at that point.

Technical specifications

Applicable legislation

IEC 61672-1 class 1
JIS C 1509-1 class 1
JIS C 1516 class 1
CE marking WEEE Directive

Measurement functions

Processing type

Sound level L_p
Equivalent continuous sound level L_{eq}
Sound exposure level L_E
Maximum Sound level L_{max}
C weighting peak sound level L_{Cpeak} (when peak range is selected)

Measurement times

1 minute, 5 minutes, 10 minutes, or 1hour

Microphone

1/2-inch electret condenser microphone Model: UC-59
Sensitivity: -33 dB±3 dB (re.1 V/Pa)

Measurement level range

Wide range:	A weighting: 30 dB to 137 dB
	C weighting: 36 dB to 137 dB
Peak range:	A weighting: 65 dB to 137 dB
	C weighting: 65 dB to 137 dB

Total range

30 dB to 137 dB (A weighting, 1 kHz)

Peak sound level measurement range

65 dB to 140 dB

Inherent noise level

Wide range: A weighting: 21 dB or less
C weighting: 29 dB or less
Peak range: A weighting: 54 dB or less
C weighting: 54 dB or less

Measurement frequency range

10 Hz to 20 kHz

Reference frequency

1 kHz

Reference sound pressure level

94 dB

Frequency weighting characteristics

A and C

Time weighting characteristics

F (fast) and S (slow)

Level range

Wide range: 30 to 130 dB
Peak range*: 60 to 130 dB
* Peak range is used when measuring peak sound level.

RMS detecting circuit

Digital processing

Processing

Digital
Sampling interval: 25 µs
(L_p, L_{eq}, L_{max}, L_E, L_{Cpeak})

Calibration acc IEC, JIS:

Acoustic calibration using Nor1255 or similar
Calibration frequency: 1 kHz
Calibration sound pressure level: 114 dB

Electronic verification using an internal electronic signal

Windscreen

Conforms to IEC 61672-1 Class 1 even when the windscreen is attached

Display

TN positive display, reflective type
Numeric display 0.1 dB resolution

Bar graph

Scale range 100 dB
Resolution 5 dB
Display update cycle 0.1 s

Warning indications

Over (overload): appears at 137.4 dB (at 1 kHz)
Under (under range): appears at measurement lower limit -0.1 dB

Battery indication

Remaining battery capasity is indicated in 3 stages

Storing processing results

Processing results stored in the internal memory when processing ends.
Storing capacity: 199 measurements
Stored data can be viewed in the recall screen.
The stored data can also be sent to a computer through an optional PC adapter cable.

DC out connector

DC output: 3 V (full scale), 25 mV/dB
Output impedance: 50 Ω
Load impedance: 10 kΩ or more

AC out connector

AC output:

1 Vrms	+600 mVrms -400 mVrms	(at 110 dB)
	(Upper limit: 1.8 Vrms)	

Overload: +2 dB
Output impedance: 600 Ω
Load impedance: 10 kΩ or more
Frequency weighting characteristics: Z weighting

PC cable

Use an optional adapter cable to send stored data to a computer.

Power requirements

2 size AAA (IEC R03, LR03) batteries
Power consumption:
Approx. 80 mA (when operating at 3 V) (Approx. 30% in sleep mode)
Battery life (at normal temperature):
Wide range
Approx. 7 hours (using alkaline batteries)
Peak range
Approx. 5 hours (using alkaline batteries)
Battery life is reduced by 20% when a DC or AC output cable is connected.
Power consumption increases by approximately 20% during calibration.

Environmental conditions for operation

-10°C to 50°C, 10% to 90% RH (No condensation)

Dimensions

Approx. 130 mm(H)×63 mm(W)×23.5 mm(D)

Weight

Approx. 105 g (incl. batteries)

Supplied accessories

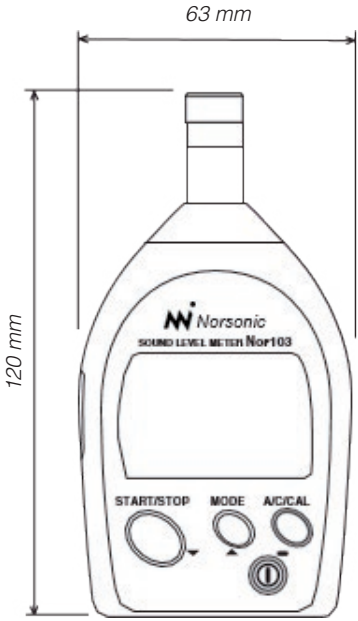
Windscreen:	1 off Nor4617
Hand strap:	1 off
Windscreen fall out prevention rubber:	1 off Nor4618
Silicone cover:	1 off Nor4619
Size AAA alkaline batteries:	2 off
Instruction Manual:	1 off
Inspection certificate:	1 off

Optional equipment

Sound calibrator:	Nor1255
AC out cable:	Nor4598
DC out cable:	Nor4599
PC adapter cable:	Nor4596

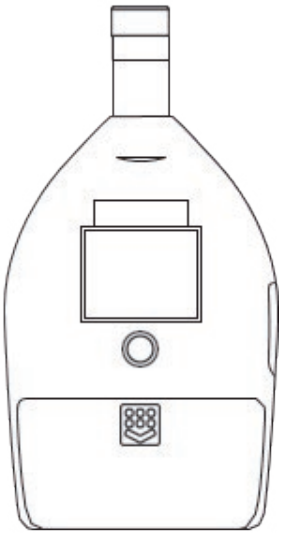
Dimensional drawings

Left side view



Front view

Right side View



Rear view

IEC 61672-1 compliance table

Standard paragraph	Description	See aslo	Remark
5	Performance specifications		
5.1	General		
5.1.4	Configuration & normal mode of operation	9.2.1 b)	Configuration • Nor103 • Nor4617 • Windscreen fall out prevention rubber • Silicone cover (Attachments) Normal mode of operation Power on and off Unit powered
5.1.6	Models of microphone Appropriate procedures for use the sound level meter	9.2.1 c) 9.2.5 b)	UC-59 Power on and off, Measurement, Calibration
5.1.7	Mounting of microphone	9.2.1 b)	Attachments
5.1.8	Identification of computer software		N/A
5.1.10	Description of frequency weightings that are provided	9.2.2 c)	A, C
5.1.12	Description of level ranges (@ A-weighted SPL @ 1 kHz) Instruction manual of the level range controls and function. Recommendation for selecting the optimum level range.	9.2.2 h) 9.2.5 c)	30 dB to 137 dB Menu settings Menu settings
5.1.13	Reference SPL reference level range, Reference orientation, reference position of microphone.	9.2.5 a), 9.3 a), b), c)	94.0 dB Wide range Fig. 1 Reference incidence direction and reference point position
5.1.14	Operating of the hold facility and the means for clearing a display that is held.		Measurement: Maximum timeweighted sound level Lmax, C weighted peak sound level
5.1.15	Dummy microphone: Designgoal and tolerance	9.3 g)	Capacitance of dummy microphone: 19 pF Tolerance: ±3 pF
5.1.16	Highest SPL and Peak-Peak input voltage without causing-damage.	9.3 i)	150 dB 28 Vp-p
5.1.17	Characteristics of each independent channel to be described		N/A

5.1.18	Initial time interval after switching on power	9.2.5 e)	Less than 30 seconds.
5.2	Adjustment to indicated levels		
5.2.1	Model of sound calibrator(s)	9.2.4 a)	Nor1251, Nor1255 or Nor1256
5.2.3	Procedure for calibration & adjustment with sound calibrator	9.2.4 c)	→ Calibration: Acoustic calibration with Sound Calibrator @1000 Hz, 114 dB
5.2.4 5.2.5	Data for correction - with and without windscreen - for : Deviation of average frequency response to uniform frequency response. Case refl ection and microphone diffraction Including values for expanded uncertainties. In 1/3 octave frequencies for 63 Hz to 1 kHz and 1/12 octave frequencies for 1 kHz to 16 kHz	9.2.4 d) 9.2.5 b)	Fig. 2 Frequency response of the microphone UC-59 (including the case reflection) Fig. 4 Influence of Nor4617 on acoustic performance of Nor103
5.2.7	Adjustment data for sound calibrator or electrostatic actuator (for A-weighted sound levels)	9.3 d)	Tab. 2 Adjustment data for sound calibrator
5.4	Frequency weightings		
5.4.12	Frequency response & tolerances of optional frequency responses	9.2.2 c)	N/A
5.5	Level linearity		
5.5.9	A, C and Z weighted levels for the lower and upper limit of the linear operating range.	9.3 e)	Tab. 3 The lower and upper limits of the linear operating range
5.5.10	Starting point for the level linearity error	9.3 f)	Tab. 3 The lower and upper limits of the linear operating range
5.5.11	How to test level linearity if display range < linearity range	9.3 k)	N/A
5.6	Self generated noise		
5.6.1	Self-noise at the more sensitive ranges (including microphone)	9.2.5 o) 9.3 h)	Maximum value A: <21 dB C: <29 dB
5.6.3	Self-noise at the more sensitive ranges with dummy microphone	9.3 h)	Dummy microphone (19 pF) Maximum value Equal to 5.6.1 Typical value A: 19 dB C: 24 dB

5.7	Time weighting F and S		
5.7.1	Description of time weightings that are provided	9.2.2 d)	F, S
5.10- 5.11	Overload and Under-range indication		
5.10.1	Operation & interpretation of overload indicators	9.2.5 k)	Measurement screen and processing screen
5.11.1	Operation & interpretation of under-range indicators		Measurement screen and processing screen
5.12	Peak C sound level		
5.12.1	Nominal range of LCpeak at for each level range	9.2.2 i)	Specifications
5.14	Thresholds		
5.14	Operation of user-selectable thresholds	9.2.5 l)	N/A
5.15	Display		
5.15.2	Description of the indication of displayed quantities	9.2.2 g)	Measurement screen and processing screen
5.15.3	Description of the display	9.2.2 g	Measurement screen and processing screen
5.15.4	Description of the displayed quantities	9.2.2 a)	N/A
5.15.5	Statement of the display update rate	9.2.2 g)	1 second
5.15.6	Time interval for completion of the integration	9.2.5 f)	N/A
5.15.7	Description of method for transferring data to PC	9.2.5 m)	Attachments
5.16	Analogue and digital outputs		
5.16.1	Electric output connector (AC output)	9.2.5 p)	Frequency weighting: Z 1 Vrms +600 mVrms -400 mVrms (at 110 dB) Output range: 1.8 Vrms or less Output impedance: 600 Ω Load impedance: >10 kΩ

	Electric output connector (DC output)		Frequency weighting: A, C Output voltage: 3.0 V (at 130 dB), 25 mV/dB Output range: 0.5 to 3.2 V Output impedance: 50 Ω Load impedance: >10 kΩ
5.17	Timing facilities		
5.17.1	Procedure to preset the integration time & time of the day	9.2.5 g)	N/A
5.17.2	Statement of the minimum & maximum integration time	9.2.5 h)	N/A
5.18	RF emissions and power supply disturbance		
5.18.1	Length & type of interface cable and characteristics of connected devices	9.2.5 n)	AC output cable Nor4598 (2 m) DC output cable Nor4599 (2 m) PC adapter cable Nor4596 (2.5 m) All cables shielded 31 Description for IEC 5.18.2 Operating mode or highest radio frequency emissions 9.3 n) Operat ion mode
5.18.2	Operating mode or highest radio frequency emissions	9.3 n)	Operat ion mode: normal operation Connection pattern: PC adapter cable Nor4596 (with ferrite cores)
5.20	Power supply		
5.20.2	Maximum and minimum power supply voltage	9.3 j	Maximum: 3.6 V Minimum: 1.8 V
5.20.3	Battery types & battery life	9.2.3 a)	Batteries
5.20.4	Operation from an external power supply	9.2.3 c)	N/A
5.20.5	Public power supply voltage	9.2.3 d)	N/A
6	Environmental, electrostatic and radio frequency criteria		
6.1.2	Time interval for needed to stabilize after environmental changes	9.3 l)	Temperature change: < 1 hour Humidity change: < 1 hour Staticpressure change: < 5 minutes

6.2.2 (Note)	Measurement when static pressure is < 85 kPa		Calibration and measurement performed in this environment using Sound Calibrator Nor1255 6.5.2 Degradation of functions by electrostatic discharge 9.2.7 b) Measurement value
6.5.2	Degradation of functions by electrostatic discharge	9.2.7 b)	Measurement value affected temporarily by electrostatic discharge
6.6.1	Operating mode with least immunity to AC power frequency fields and RF fields	9.3 o)	Fig. 5 Operation mode: normal operation Connection pattern: PC adapter cable Nor4596 (with ferrite cores)
6.6.4 (Note)	Field strength for conforming (in case > 10 V/m)	9.3 m)	N/A
7	Provisions for use with auxiliary devices		
7.1	Correction for use of microphone cable	9.2.6 b)	N/A
7.2	Effect of optional accessories (windscreen)	9.2.6 a)	Fig. 4 Influence of Nor4617 on acoustic performance of Nor103
7.3	Statement of conformance with optional accessories (windscreen)		Compliant with IEC 61672-1, with Windscreen Nor4617 mounted
7.4	Operation of 1/1 - 1/3 octave band filters	9.2.6 c)	N/A
7.5	Details about connection & effects of auxiliary devices	9.2.6 d)	Attachments
9	Instruction manual		
9.2.1	General		
9.2.1 a)	Description of type, classifi cation (X, Y, Z) and class		Group X, Class 1
9.2.1 b)	Overall confi guration, Normal operation confi guration (including windscreen)	5.1.4 5.1.7	Refer to 5.1.4 Refer to 5.1.7
9.2.1 c)	Models of microphones	5.1.6	Refer to 5.1.6
9.2.1 d)	Required microphone cable to conform		N/A
9.2.1 e)	Characteristics & operation each channel		N/A
9.2.2	Design features		

9.2.2 a)	Description of quantities which can be measured	5.15.4	time-weighted sound level, equivalent continuous sound level, maximum value of time-weighted sound level, sound exposure level, peak sound level
9.2.2 b)	Relative free-fi eld response as function of incidence angle and frequency (detailed tabular description)		Directional Characteristics with Horizontal Direction (Fig. 6), Vertical Direction (Fig. 7)
9.2.2 c)	Description of the frequency weightings	5.1.10 5.4.12	Refer to 5.1.10 Refer to 5.4.12
9.2.2 d)	Description of the time weightings	5.7.1	Refer to 5.7.1
9.2.2 e)	Identifi cation of the level ranges (A-weighted @ 1 kHz)	5.1.12	Refer to 5.1.12
9.2.2 f)	Operation of the level range control	5.1.12	Refer to 5.1.12
9.2.2 g)	Description of the display and update rates	5.15.2-3-4-5	Refer to 5.15.2-3-4-5
9.2.2 h)	Total range of A- weighted SPL (@ 1 kHz)	5.1.12	Refer to 5.1.12
9.2.2 i)	Nominal range of LCpeak at for each level range	5.12.1	Refer to 5.12.1
9.2.2 j)	Computer software to operate the SLM	5.1.8	Refer to 5.1.8
9.2.2 k)	Design goals and tolerances for quantities which are not in the standard (T-weight 10 ms, LAIeq)		N/A
9.2.3	Power supply		
9.2.3 a)	Battery types & battery life	5.20.3	Refer to 5.20.3
9.2.3 b)	Description of the function of battery check		Batteries: Display
9.2.3 c)	Operation from an external power supply	5.20.4	Refer to 5.20.4
9.2.3 d)	Public power supply voltage	5.20.5	Refer to 5.20.5
9.2.4	Adjustment to indicated levels		
9.2.4 a)	Model of sound calibrator(s)	5.2.1	Refer to 5.2.1
9.2.4 b)	Calibration check frequency		1 kHz
9.2.4 c)	Procedure for calibration & adjust-ment with sound calibrator	5.2.3	Refer to 5.2.3

9.2.4 d)	Data for correction - with and without windscreen - for : Deviation of average frequency response to uniform frequency response. Case reflection and microphone diffraction Including values for expanded uncertainties. In 1/3 octave frequencies for 63 Hz to 1 kHz and 1/12 octave frequencies for 1 kHz to 16 kHz	5.2.4 - 5.2.5	Refer to 5.2.4 - 5.2.5
9.2.5	Operating the sound level meter		
9.2.5 a)	Reference direction	5.1.13	Refer to 5.1.13
9.2.5 b)	Procedure to measure sound, Influence of the instrument case and operator.	5.1.6 5.2.4 5.2.5	Refer to 5.1.6 Refer to 5.2.4 Refer to 5.2.5
9.2.5 c)	Recommendation for selecting optimum level range	5.1.12	Refer to 5.1.12
9.2.5 e)	Initial time interval after switching on power	5.1.18	Refer to 5.1.18
9.2.5 f)	Time interval for completion of the integration	5.15.6	Refer to 5.15.6
9.2.5 g)	Procedure to preset the integration time & time of the day	5.17.1	Refer to 5.17.1
9.2.5 h)	Statement of the minimum & maximum integration time	5.17.2	Refer to 5.17.2
9.2.5 i)	Operation of the “Hold” function		Measurement: Measurement of maximum timeweighted sound level
9.2.5 j)	Operation of the reset function or L_{eq}, L_E, L_{peak} and overload		Measurement results (measurement values, overload indication, under-range indication) are reset when a new measurement is started. Time required for measurement initialization: < 1 second
9.2.5.k)	Operation & interpretation of overload indicators	5.10.1	Refer to 5.10.1
9.2.5 l)	Operation of user-selectable thresholds	5.14	Refer to 5.14
9.2.5 m)	Description of method for transferring data to PC	5.15.7	Refer to 5.15.7

9.2.5 n)	Length & type of interface cable and characteristics of connected devices	5.18.1	Refer to 5.18.1
9.2.5 o)	Self-noise at the more sensitive ranges (including microphone). Averaging time ≥ 30 s.	5.6.1	Refer to 5.6.1
9.2.5 p)	Characteristics of AC and DC output	5.16.1	Refer to 5.16.1
9.2.6	Accessories		
9.2.6 a)	Effect of windscreen (directional response and frequency weighting)	7.2	Refer to 7.2
9.2.6 b)	Corrections for microphone cable	7.1	Refer to 7.1
9.2.6 c)	Use of bandpass filters	7.4	Refer to 7.4
9.2.6 d)	Connection of auxiliary devices	7.5	Refer to 7.5
9.2.7	Influence of environmental conditions		
9.2.7 a)	Components intended for operation in controlled environment		None
9.2.7 b)	Degradation of functions by electrostatic discharge	6.5.2	Refer to 6.5.2
9.2.7 c)	Statement for conformance to AC power frequency fi elds and RF fields		Statement of conforming to the basic statement (Tab. 1)
9.3	Information for testing		
9.3 a)	Reference sound pressure level	5.1.13	Refer to 5.1.13
9.3 b)	Reference level range	5.1.13	Refer to 5.1.13
9.3 c)	Microphone reference point	5.1.13	Refer to 5.1.13
9.3 d)	For A-weighted sound levels: Adjustment data for multi-frequency sound calibrator and/or electrostatic actuator	5.2.7	Refer to 5.2.7
9.3 e)	Nominal A-weighted sound levels at the upper and lower limits of the linear operating range on each level range. For frequencies 31.5 Hz, 1, 4, 8 and 12.5 kHz	5.5.9	Refer to 5.5.9

9.3 f)	Starting point for the level linearity error For frequencies 31.5 Hz, 1, 4, 8 and 12.5 kHz At the reference level range	5.5.10	Refer to 5.5.10
9.3 g)	Dummy microphone: Design goal and tolerance	5.1.15	Refer to 5.1.15
9.3 h)	Self-noise at the more sensitive ranges with microphone and with dummy microphone	5.6.1 / 5.6.3	Refer to 5.6.1 / 5.6.3
9.3 i)	Highest SPL and Peak-Peak input voltage to accommodate	5.1.16	Refer to 5.1.16
9.3 j)	Maximum and minimum power supply voltage	5.20.2	Refer to 5.20.2
9.3 k)	How to test level linearity if display range < linearity range	5.5.11	Refer to 5.5.11
9.3 l)	Time interval for needed to stabilize after environmental changes	6.1.2	Refer to 6.1.2
9.3 m)	Field strength for conforming (in case > 10 V/m)	6.6.4	Refer to 6.6.4
9.3 n)	Operating mode or highest radio frequency emissions	5.18.2	Refer to 5.18.2
9.3 o)	Operating mode with least immunity to AC power frequency fi elds and RF fi elds	6.6.1	Refer to 6.6.1

Nor103 - IEC61672-1 Frequency Response

Nominal frequency Hz	Exact frequency Hz	UC-59 Frequency Response (dB)	Frequency Response (dB) case reflection	Electrical response (dB)	Total Response (dB)	Windscree Correction (dB)	Total Expanded Uncertanty (dB)
63	63,1	0,1	-0,1	0,0	0,0	0,0	0,0
80	79,4	0,1	0,2	0,0	0,3	0,0	0,3
100	100,0	0,1	-0,1	0,0	0,0	0,0	0,0
125	125,9	0,1	0,0	0,0	0,1	0,0	0,1
160	158,5	0,1	-0,0	0,0	0,1	0,0	0,1
200	199,5	0,1	-0,0	0,0	0,1	0,0	0,1
250	251,2	0,1	-0,1	0,0	0,0	0,0	0,0
315	316,2	0,0	-0,0	0,0	0,0	0,0	0,0
400	398,1	0,0	-0,1	0,0	-0,1	0,0	-0,1
500	501,2	0,0	0,0	0,0	0,0	0,0	0,0
630	631,0	0,0	0,0	0,0	0,0	0,0	0,0
800	794,3	-0,1	0,1	0,0	0,0	0,0	0,0
1000	1 000	0,0	0,1	0,0	0,1	-0,1	0,0
1250	1 259	0,0	0,3	0,0	0,3	-0,1	0,2
1600	1 585	0,0	0,1	0,0	0,1	0,0	0,1
2000	1 995	0,0	-0,2	0,0	-0,2	0,1	-0,1
2500	2 512	0,0	-0,3	0,0	-0,3	0,2	-0,1
3150	3 162	0,1	-0,4	0,0	-0,3	0,2	-0,1
4000	3 981	0,1	0,1	0,0	0,2	0,4	0,6
5000	5 012	0,1	0,2	0,0	0,3	0,4	0,7
6300	6 310	0,1	0,0	0,0	0,1	0,5	0,6
8000	7 943	0,0	-0,4	0,0	-0,4	0,2	-0,2
10000	10 000	-0,1	-0,1	0,0	-0,2	0,7	0,5
12500	12 589	-0,3	-0,1	-0,5	-0,9	0,5	-0,4
16000	15 849	-0,8	-0,1	-3,1	-4,0	-0,2	-4,2
20000	19 953	-2,1	-0,0	-45,3	-47,4	-0,6	-48,0

Reference incidence direction and reference point position

Reference point position Center of diaphragm plane

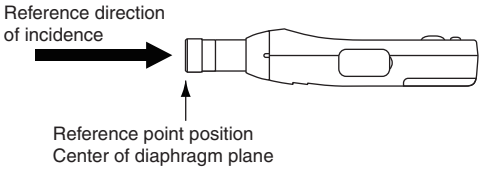


Fig. 1 Reference incidence direction and reference point position

Frequency Response

The frequency response of a sound field microphone is expressed as the frequency response in the reference direction of incidence (0°).
The diagram below shows an example for the frequency response of the microphone UC-59.

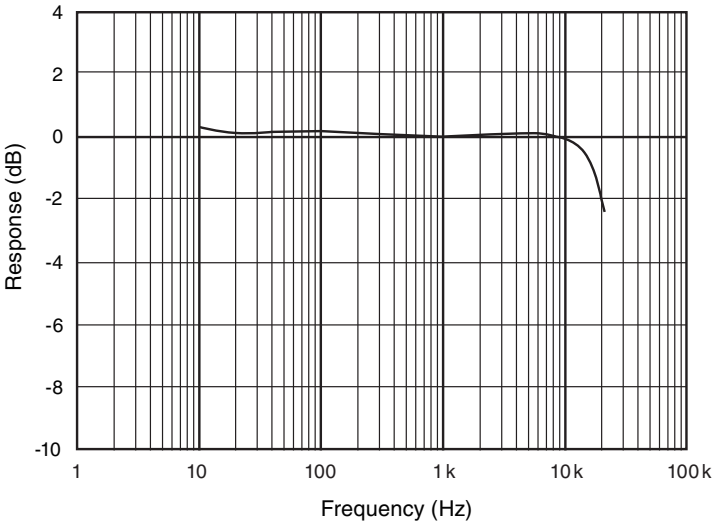
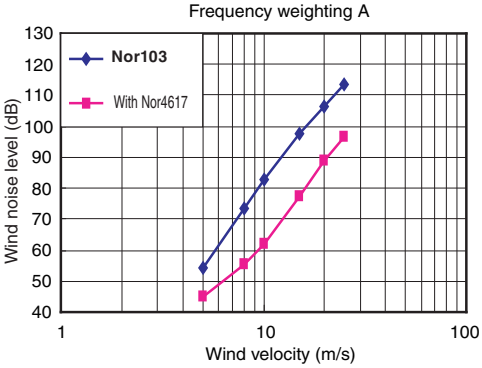


Figure 2: Frequency response for mic UC-59

Effect of Windscreen Nor4617

The windscreen Nor4617 reduces measurement errors due to wind noise.
The Nor4617 characteristics are shown below.



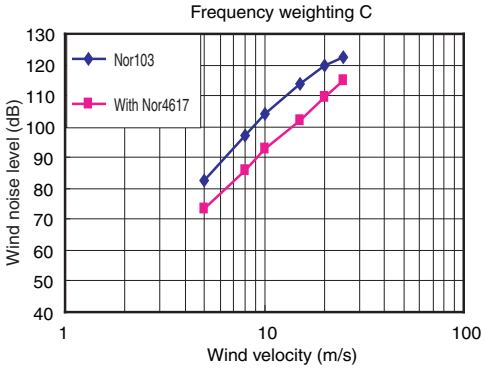


Fig. 3 Wind noise reduction effect

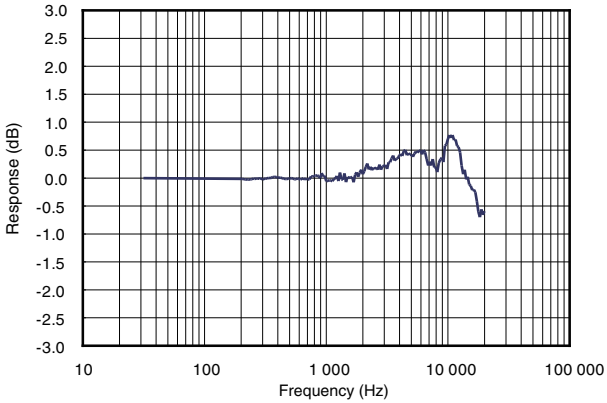
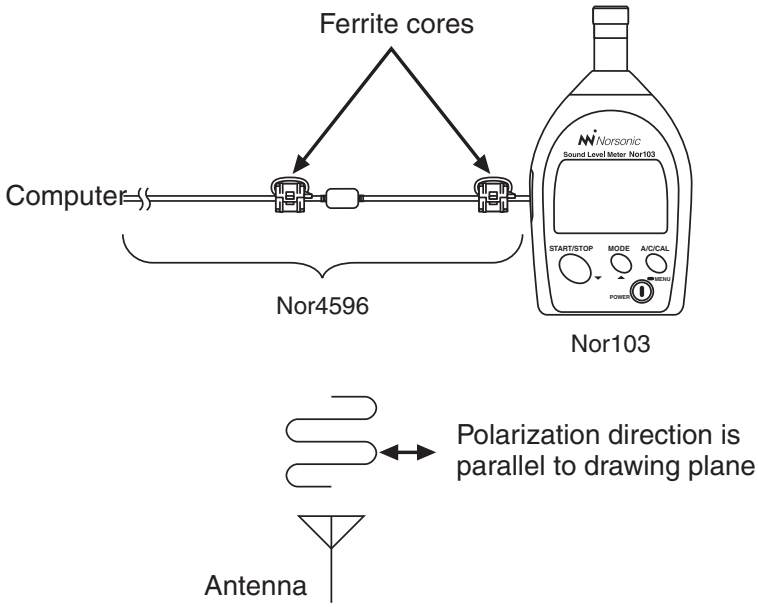


Fig. 4 Influence of windscreen Nor4617 on acoustic performance of Nor103 (Referenced to Nor103 characteristics)

The greatest susceptibility configuration for radio frequency fields



Operation mode: normal operation

Connection pattern
- PC adapter cable (with ferrite cores) Nor4596 2.5 m

Fig. 5 The greatest susceptibility configuration for radio frequency fields

Statement of conforming to the basic statement

Tab. 1 Statement of conforming to the basic statement

Immunity to AC power frequency fields	The specification of IEC 61672-1 Class 1 is satisfied
Immunity to RF fields	The specification of IEC 61672-1 Class 1 is satisfied
Emissions	The specification of IEC 61672-1 Class 1 is satisfied

The lower and upper limits of the linear operating range

Tab. 2 The lower and upper limits of the linear operating range

A-weighting

	Sound level (dB)				
Frequency (Hz)	31.5	1 k	4 k	8 k	12.5 K
Upper	97.0	137.0	136.0	133.0	130.0
Start	94.0	94.0	94.0	94.0	94.0
Lower	30.0	30.0	30.0	30.0	30.0

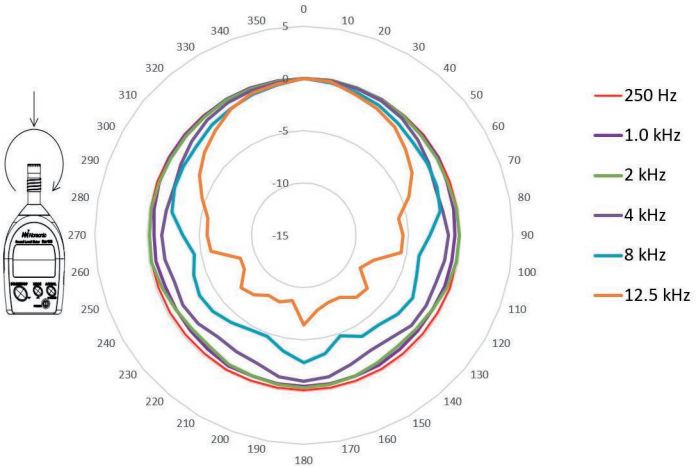
C-weighting

	Sound level (dB)				
Frequency (Hz)	31.5	1 k	4 k	8 k	12.5 K
Upper	134.0	137.0	136.0	133.0	130.0
Start	94.0	94.0	94.0	94.0	94.0
Lower	36.0	36.0	36.0	36.0	36.0

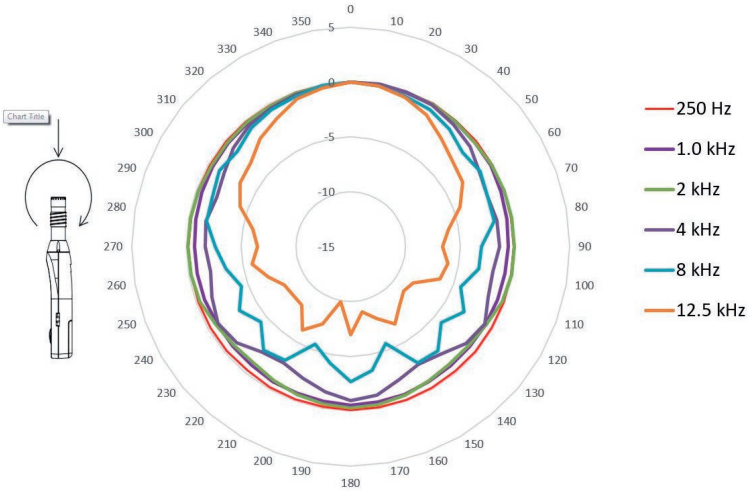
Directional Characteristics

The directional characteristics of Nor103 is a measure of its differing sensitivity sound waves arriving from various angles. Since the electret condenser microphone used in the Nor103 is a pressure-sensitive type, it should be equally sensitive in all directions. However, refraction and cavity effects cause a certain microphone directional response at high frequencies.

Directional Characteristics with Horizontal Direction Graf



Directional Characteristics with Vertical Direction



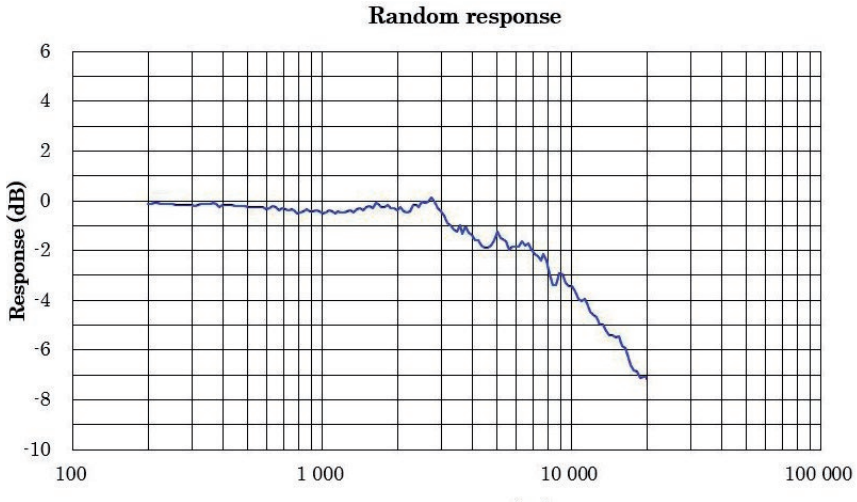
Directional Characteristics with Horizontal Direction

Angle	Frequency [Hz]					
	501	1000	1995	3981	7499	15849
0º	0	0	0	0	0	0
10º	-0,03	0,03	0,03	-0,01	0,02	-0,22
20º	-0,03	-0,04	-0,03	-0,1	-0,12	-0,72
30º	-0,07	-0,05	-0,07	-0,16	-0,47	-1,33
40º	-0,08	-0,11	-0,17	-0,4	-0,89	-1,95
50º	-0,16	-0,16	-0,27	-0,77	-1,26	-3,02
60º	-0,15	-0,15	-0,27	-1,21	-1,14	-4,6
70º	-0,24	-0,36	-0,3	-1,66	-1,46	-5,3
80º	-0,27	-0,46	-0,21	-1,52	-2,08	-6,37
90º	-0,29	-0,52	-0,13	-1,17	-3,06	-8,78
100º	-0,3	-0,61	-0,2	-1,31	-4,12	-8,88
110º	-0,3	-0,68	-0,42	-1,55	-3,7	-8,65
120º	-0,33	-0,78	-0,76	-1,49	-3,45	-10,97
130º	-0,31	-0,75	-0,99	-1,58	-3,72	-10,48
140º	-0,31	-0,74	-1,03	-2,1	-4,46	-9,71
150º	-0,29	-0,63	-0,88	-2,25	-4,42	-10,22
160º	-0,32	-0,64	-0,64	-1,83	-4,57	-11,24
170º	-0,24	-0,55	-0,48	-1,25	-3,84	-10,5
180º	-0,26	-0,56	-0,44	-1,02	-2,87	-9,21
190º	-0,25	-0,53	-0,47	-1,26	-3,96	-11,53
200º	-0,27	-0,63	-0,66	-1,92	-5,42	-11,38
210º	-0,24	-0,57	-0,7	-2,1	-4,4	-10,87
220º	-0,31	-0,74	-1,03	-2,27	-4,46	-9,64
230º	-0,31	-0,83	-1,03	-1,8	-4,08	-10,69
240º	-0,31	-0,83	-0,83	-1,66	-3,84	-11,78
250º	-0,35	-0,83	-0,52	-1,84	-3,96	-8,9
260º	-0,35	-0,64	-0,19	-1,48	-4,24	-8,74
270º	-0,35	-0,64	-0,23	-1,38	-3,93	-8,87
280º	-0,31	-0,44	-0,21	-1,61	-2,34	-6,68
290º	-0,2	-0,25	-0,25	-1,76	-1,3	-5,49
300º	-0,2	-0,18	-0,27	-1,42	-1,04	-4,57
310º	-0,2	-0,17	-0,29	-1,01	-1,19	-3,4
320º	-0,16	-0,12	-0,23	-0,61	-1,04	-2,23
330º	-0,12	-0,01	-0,1	-0,37	-0,49	-1,39
340º	-0,12	-0,03	-0,06	-0,25	-0,17	-0,71
350º	-0,12	-0,04	-0,11	-0,19	-0,17	-0,36

Directional Characteristics with Vertical Direction

Angle	Frequency [Hz]					
	501	1000	1995	3981	7499	15849
0º	0	0	0	0	0	0
10º	-0,01	0	-0,04	0,05	0,01	-0,19
20º	-0,04	-0,05	-0,03	-0,05	0,03	-0,67
30º	-0,03	-0,07	-0,04	-0,12	-0,23	-0,99
40º	-0,1	-0,11	-0,16	-0,43	-0,94	-2,32
50º	-0,16	-0,21	-0,22	-0,8	-0,9	-3,09
60º	-0,14	-0,23	-0,12	-1,41	-0,89	-4,35
70º	-0,16	-0,37	-0,08	-1,66	-1,42	-6,31
80º	-0,19	-0,47	-0,04	-1,41	-1,72	-6,84
90º	-0,25	-0,57	-0,03	-1,42	-2,98	-8,34
100º	-0,25	-0,68	-0,06	-1,8	-3,5	-9,49
110º	-0,25	-0,73	-0,26	-1,62	-4,35	-9,69
120º	-0,26	-0,81	-0,71	-0,88	-3,28	-10,31
130º	-0,27	-0,82	-0,94	-1,23	-4,31	-11,2
140º	-0,28	-0,84	-0,97	-2,21	-2,22	-9,69
150º	-0,25	-0,74	-0,81	-2,61	-3,12	-12,31
160º	-0,24	-0,67	-0,56	-2,05	-5,76	-8,66
170º	-0,23	-0,62	-0,34	-1,23	-3,92	-13,98
180º	-0,19	-0,55	-0,26	-0,97	-2,71	-9,91
190º	-0,3	-0,69	-0,44	-1,52	-4,48	-14,25
200º	-0,3	-0,74	-0,66	-2,22	-5,83	-8,57
210º	-0,31	-0,8	-0,89	-2,73	-3,64	-11,74
220º	-0,4	-0,93	-1,15	-2,46	-2,53	-10,48
230º	-0,35	-0,91	-1,03	-1,38	-4,35	-11,31
240º	-0,35	-0,93	-0,76	-0,99	-3,56	-10,28
250º	-0,32	-0,82	-0,37	-1,53	-4,5	-9,22
260º	-0,35	-0,78	-0,18	-2,03	-3,95	-9,12
270º	-0,35	-0,71	-0,12	-1,7	-3,18	-8,53
280º	-0,33	-0,62	-0,12	-1,59	-1,9	-7,11
290º	-0,28	-0,52	-0,21	-1,96	-1,81	-6,35
300º	-0,28	-0,44	-0,27	-1,6	-1,09	-4,74
310º	-0,22	-0,38	-0,28	-1,02	-1,24	-3,61
320º	-0,21	-0,29	-0,25	-0,57	-1,29	-2,41
330º	-0,24	-0,33	-0,25	-0,43	-0,82	-1,57
340º	-0,15	-0,22	-0,17	-0,3	-0,26	-1,06
350º	-0,15	-0,24	-0,14	-0,19	-0,27	-0,51

Random incidence response



Norsonic

Declaration of Conformity

We, Norsonic AS, Gunnersbråtan 2, N-3409 Tranby, Norway, declare under our sole responsibility that the product:

Sound Level Meter Nor103

to which this declaration relates, is in conformity with the following standards or other normative documents:

Performance complying with:

IEC 61672-1:2013 class 1

This Declaration of Conformity does not affect our warranty obligations.

Tranby, December 2017

Stig Lodberg-Holm
Quality Manager

The declaration of conformity is given according to EN 45014 and ISO/IEC Guide 22.

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Norsonic AS supplies a complete range of instrumentation for acoustics – from sound calibrators, microphones and preamplifiers; via small handheld sound level meters to advanced, yet portable, real time analysers, but also spectrum shapers, building acoustics analysers and complete community, industry and airport noise monitoring systems. Contact your local representative or the factory for information on our complete range of instrumentation.