RION

Class 1 Sound Level Meter

(with low-frequency sound measurement function)

NL-63

Instruction Manual

Operation Guide

Organization of the NL-63 Instruction Manual

There are four types of instruction manuals for Class 1 Sound Level Meter (with low-frequency sound measurement function) NL-63.

Quick Start Guide

This manual describes the basic handling of Sound Level Meter NL-63.

Operation Guide (This Document)

This manual describes how to use Sound Level Meter NL-63, how to connect and use peripheral devices such as sound level recorders and printers, and what to do when using an SD card.

Communication Guide

This manual describes communication between a computer and Sound Level Meter NL-63 via a serial interface. It describes such topics as the communication protocol, commands for controlling the sound level meter, and data output from the sound level meter.

Technical Guide

This manual is a technical guide to the sound level meter and noise measurements, including the performance of Sound Level Meter NL-63, microphone structure and characteristics, and how extension cables and windscreens affect measurements.

You can download the Instruction Manuals from our website:

https://rion-sv.com/nl-43_53_63/manual/

Organization of This Manual

This manual describes the functions and operation method of the Class 1 Sound Level Meter (with low-frequency sound measurement function) NL-63. When the measuring system is configured with other equipment, make sure to read the instruction manual of the equipment for how to operate the other equipment.
In addition, safety precautions are described on Page 5 onwards. Please be sure to read them.

The manual consists of the chapters listed below.

- Overview of This Product
  Describes the basic information on this device.
- Terminology and Notation
  Explains notation such as quantifiers and their names.
- Name and Function of Each Part
  Briefly describes the name and function of each key and port.
- Turning on the Power
  Describes how to turn on the power.
- Reading the Display
  Explains the symbols displayed on the screen.
- Setting Menu
  Describes how to configure the settings of the device.
- Store Operation
  Describes how to store the measurement data.
- Connection with Peripheral Devices
  Describes how to connect peripheral devices.
- Calibration
  Describes how to calibrate the device.
- Measurement
  Provides the basic explanation of measurement.
- Optional Programs
  Describes optional programs.
- Specifications
  Lists the technical specifications.

Safety Precautions / Precautions for Use

Safety precautions

The precautions shown here are intended to help you use the product safely and correctly, and to prevent harm and damage to you and other people. Incidents that could occur as a result of incorrect handling are divided into two categories: “WARNING” and “CAUTION”. Make sure to follow the contents of all these categories because they are serious matters related to safety.

Examples of pictorial indications

Specific prohibitions may be displayed in the illustrations.

	Prohibitions		Instructions

Display	Meaning
⚠ WARNING	Indicates a possibility of death or serious injury due to incorrect handling.
⚠ CAUTION	Indicates a possibility of personal injury or property damage due to incorrect handling.
Important	Failure to observe the precautions indicated by this may result in damage to the device.
Note	Denotes special information that is helpful in utilizing the capabilities of the device but that is not directly related to safety.

- **Handling of the batteries**

⚠WARNING

If electrolyte leaking from the batteries gets into your eyes, rinse with water without rubbing and immediately seek medical attention.
Failing to do so may result in blindness.

If electrolyte leaking from the batteries gets on your skin or clothes, wash it off immediately with water.

- **Handling of this product**

⚠WARNING


Do Not Disassemble

Never disassemble, repair, or modify the product.
Doing so may cause a fire, electric shock, or an accident.


No Wet Hands

Do not connect the power cable or remove the main unit with wet hands.
Doing so may cause electric shock or injury.


Keep Dry

Do not immerse the main unit in water or splash water on it.
The microphone is not waterproof. Immersing it in water or splashing it with water may cause electric shock or malfunction.
The water resistance of the main unit only mitigates potential damage caused by a small amount of rainfall, etc. If the main unit is exposed to more than a small amount of rainfall, etc., it may cause electric shock or malfunction.

Do not use the device for purposes other than for what it is originally intended.

Keep the product away from heat sources such as fire and stoves.
Failure to do so may cause a fire, electric shock, or malfunction.

Do not use the device if any abnormality such as damage is discovered.
Continuing to use the device regardless of an abnormality may cause electric shock or fire. In such circumstances, please contact your dealer.

Do not use the device if there is something wrong with it, such as it becomes abnormally hot.
Doing so may result in a malfunction or fire.

Do not use or connect to the power supply in a humid place such as a bathroom or in a place where it may get wet.
Doing so may cause electric shock or malfunction.

Do not use, store, or leave the product in a hot place such as in a place exposed to fire, direct sunlight, or inside a car on a hot day.
Doing so may cause fire, battery breakage, or overheating.

When disposing of the product, do not set it alight.
Doing so may cause a fire or the batteries to explode. When disposing of the product, follow the regulations of your country or local municipality.

Do not use the power cable connected to the optional AC adapter with a voltage other than 100 V AC.
The power cable connected to the AC adapter is a 100 V AC compatible cable that conforms to electrical safety standards. We cannot guarantee the safety of the device if it is used with a voltage other than 100 V AC. Use the power cable that complies with the laws and regulations of your area.

If there is dust on the external power supply port, wipe it off before connecting the AC adapter.
Failure to do so may result in electric shock, short circuit, or fire.

Wipe off any water on the main unit and the external power supply port before connecting to the power supply.
Failure to do so may result in electric shock, short circuit, or fire.

If there is a problem with the device during use, turn off the power and disconnect the AC adapter and remove the batteries.
In such circumstances, please contact your dealer.

Always turn off the power after use.
Turn off the power and remove the batteries if you intend to store the product for a long time without using it. Leaving the batteries may cause the electrolyte to leak. Remove the AC adapter.

Make sure to hold the plug or connector when disconnecting a cord or cable.
Do not apply excessive force, such as holding the cord or cable and pulling them out.

⚠CAUTION

Do not use or store the product within the reach of children or pets.
Doing so may result in electric shock, injury, or accidental ingestion.

Do not store the device in places in which it will be subject to water, dust, high temperatures, high humidity, or in direct sunlight. Do not use or store the device in places where it may be adversely affected by salt, sulfur, chemicals, gases, etc.
The operating temperature for this device is -10°C to +50°C and the humidity range is 10% to 90% RH.

* In the event of a product defect caused by RION, RION will repair or replace the device.

Precautions for use

- Avoid using and storing the product in places with high temperatures and humidity, or in places exposed to direct sunlight for long periods of time.
- If there is a drastic change in the surrounding temperature, the product may malfunction due to internal condensation.
- As the main unit is a precision electronic device, avoid using or storing it in locations subject to shock or vibration.
- If you do not intend to use the device for a long time, remove the batteries, and store it.
- Do not insert wires, metal pieces, conductive plastics, etc. through any holes or gaps in the product. Doing so may result in a malfunction.
- Do not replace the microphone or preamplifier with those with numbers different from those specified on the serial number label.
- Do not use the preamplifier of this device with other sound level meters. Doing so may damage the preamplifier.
- If you are using the device outdoors and it starts raining, stop taking measurements and keep the device dry. If the device gets wet, wipe it off with a dry cloth and dry it in a well-ventilated environment.
- Make sure the microphone and microphone grid are installed securely before using or storing the device. If there is any looseness, turn off the power, retighten the microphone and microphone grid before using or storing the device.
- Store the device in an appropriate position in the included carrying case.
- Two device units can be stored in the carrying case. If storing a device in an empty space in the case, wrap the device with bubble wrap to protect it. Note that we assume no responsibility for any damage or malfunction of the device if it is stored in an empty space.
- The touch panel surface is easily damaged, so do not poke or hit it with an object such as a pen, pencil, or screwdriver.
- To maintain the accuracy of measurements, inspect the device regularly. When using the device for transactions or certification activities, the device needs to be subject to an authorized inspection according to the rules and regulations of the relevant country.
- Be aware that removing the sticker will cause the device to be no longer subject to the dustproof and waterproof performance warranty.
- Note the following points to maintain the dustproof and waterproof performance of the device:
  - Make sure that the battery compartment cover and bottom cover are closed securely.
  - Do not open the battery compartment cover or bottom cover while the device is wet.
  - Do not leave the device in a wet state. Wipe off any water droplets and dry the device.
  - To check the dustproof and waterproof performance of the device, send it for regular inspection and calibration.
  - We recommend regularly having the packing inside the case and the bottom cover replaced (for a fee). For replacement of the packing and the bottom cover, please contact your dealer.
- The rechargeable backup battery for the clock of this device is a consumable item. We recommend regularly having the battery replaced (for a fee). For replacement of the rechargeable battery, please contact your dealer.
- Be sure to turn off the power before inserting or removing the SD card.
- Never format the optional program card such as NX-43WR with SD card formatting software (such as SD Formatter). Otherwise, the program data on the card will be erased and the respective functions can no longer be used. Restoration of the erased program is not guaranteed.

[Disclaimer]

- RION shall not be held accountable for the following damages:
  Any damage caused by earthquakes, lightning, wind and floods, fires for which RION is not responsible, actions or accidents by a third party, intentional or negligent misuse by the customer, or use under other abnormal conditions.
- RION shall not be held accountable for the following incidental damages arising from the use or inability to use this product:
  Alteration or loss of recorded content, loss of business profits, or the interruption of business, etc.
- RION shall not be held accountable for any damage caused by not following the contents of this document.

[Cleaning the product]

- To clean the device, use a dry, soft cloth or a cloth wrung out with lukewarm water. Do not use organic solvents such as benzene or alcohol.

[What to do when disposing of the product]

- When disposing of this product or batteries, make sure to consult with your local municipality.

Contents

1

Overview of This Product

- Class 1 Sound Level Meter (with low-frequency sound measurement function) NL-63 is a class 1 sound level meter that complies with the following laws and regulations related to sound level meters: the Measurement Act, IEC, JIS, and ANSI/ASA. The measurable frequency range is 1 Hz to 20 kHz.
- This device consists of a 1/2 inch microphone, preamplifier, and main unit, and the microphone and preamplifier can be removed from the main unit and used at a distance. The main unit is equipped with operation keys and a 3.5 inch backlit color LCD display. The high visibility of the screen thanks to a large color LCD, selectable display languages, and the intuitive and simple user interface that combines key operations and touch panel operations enables the desired measurements to be taken without incorrectly configuring the necessary settings.
- The main unit's input/output functions include an alternating current (AC) / direct current (DC) port, an RS-232C port, a USB port and, a LAN port for improving connections with communication devices.
- The main unit has IP54 dustproof and waterproof performance. By installing the optional Windscreen WS-15 or the WS-16 to the microphone, it is possible to mitigate damage caused by a small amount of rain according to IPX3 water-resistant specifications.
- As for the measurement functions, as well as sound level, equivalent continuous sound level, maximum and minimum sound levels, the device has a simultaneous measurement function for the likes of hourly sound levels and sound exposure level. The results of these measurements can be recorded on the internal memory or an SD card.
- The device has a wide linearity range of up to 113 dB, eliminating the need for switching ranges while taking measurements.
- The communication function makes it possible to control devices using commands as well as transfer and print measurement data.
- By connecting the device to a network via the LAN port, the device can be controlled and the sound listened to via a web browser on your computer or smartphone, allowing the operator to monitor and control sound levels and so on remotely (NX-43WR must be installed for audio recording).
- The device can be powered by alkaline AA batteries or Ni-MH rechargeable AA batteries, and can operate continuously for approximately 12 hours. In addition to supplying power using AC Adapter NE-21P or Battery Pack BP-21A as an external power supply, power can also be supplied using a commercially available USB charger. Batteries and an external power supply can be used together, enabling measurements over long time durations.
- The device is equipped with measurement functions such as the Auto store mode, comparator, time-weighted I (impulse), and triggered measurement. The installation of optional programs enables the addition of a waveform recording function, octave band and 1/3 octave band real-time analysis function, and/or an FFT analysis function.

Measurement function

Class 1 Sound Level Meter (with low-frequency sound measurement function) NL-63 enables simultaneous measurement of up to four channels (Main channel, Sub1 to Sub3 channels) with selected time weighting and frequency weighting.

	Name		Frequency weighting	Time weighting
Instantaneous value	Time-weighted sound pressure level	L_p	✓	✓
Calculated value	Equivalent continuous sound level	L_{eq}	✓	–
	I-time-weighted equivalent continuous sound level	L_{Ieq}	✓	✓
	Moving L_{eq}	$L_{eq,\ mov}$	✓	–
	Sound exposure level	L_E	✓	–
	Maximum sound level	L_{max}	✓	✓
	Minimum sound level	L_{min}	✓	✓
	Percentile sound level	L_N L_{N1}, L_{N2}, L_{N3}, L_{N4}, L_{N5} (0.1 to 99.9, 0.1-increment steps)	✓	✓
	Peak sound level	L_{peak}	✓	–
	Takt-max sound level	L_{tm5}	✓	✓

Device usage environment

Place of use	Indoors or outdoors
Altitude	Up to 2,000 m
Ambient temperature	-10°C to 50°C
Relative humidity	10% to less than 90% RH (no condensation)
Fluctuations in mains voltage	(100 V to 240 V) ±10%
Overvoltage category	Category II (AC adapter)
Use in damp locations	Not recommended
Pollution degree of surrounding environment	Pollution degree 2
Dustproof and waterproof performance	IP54 (excluding microphone)
Impact resistance	Not applicable

2

Terminology and Notation

Quantifiers and their names with Sound Level Meter NL-63

Depending on whether the device has frequency weighting, there is no distinction between sound level and sound pressure level, with them both treated as the sound level.

Notation and name with NL-63	Frequency weighting	Measurement value	Time weighting			
			F-weighting	S-weighting	10 s	I-weighting
L_p Sound pressure level	A-weighting	A-weighted sound pressure level	L_{AF}	L_{AS}	L_{A10s}	L_{AI}
	C-weighting	C-weighted sound pressure level	L_{CF}	L_{CS}	L_{C10s}	(L_{CI})
	Z-weighting	Z-weighted sound pressure level	L_{ZF}	L_{ZS}	L_{Z10s}	(L_{ZI})
	G-weighting	G-weighted sound pressure level	L_{GF}	L_{GS}	L_{G10s}	(L_{GI})
L_{eq} Equivalent continuous sound level	A-weighting	Equivalent continuous A-weighted sound level	L_{Aeq}			–
		I-time-weighted equivalent continuous sound level	–			L_{AIeq}
	C-weighting	Equivalent continuous C-weighted sound level	L_{Ceq}			–
	Z-weighting	Equivalent continuous Z-weighted sound level	L_{Zeq}			–
	G-weighting	Equivalent continuous G-weighted sound level	L_{Geq}			–
L_E Sound exposure level	A-weighting	A-weighted sound exposure level	L_{AE}			–
	C-weighting	C-weighted sound exposure level	L_{CE}			–
	Z-weighting	Z-weighted sound exposure level	L_{ZE}			–
	G-weighting	G-weighted sound exposure level	L_{GE}			–
L_{max} Maximum sound level (Same for L_{min})	A-weighting	Maximum A-weighted sound level	L_{AFmax}	L_{ASmax}	$L_{A10smax}$	L_{AImax}
	C-weighting	Maximum C-weighted sound level	L_{CFmax}	L_{CSmax}	$L_{C10smax}$	(L_{CImax})
	Z-weighting	Maximum Z-weighted sound level	L_{ZFmax}	L_{ZSmax}	$L_{Z10smax}$	(L_{ZImax})
	G-weighting	Maximum G-weighted sound level	L_{GFmax}	L_{GSmax}	$L_{G10smax}$	(L_{GImax})
L_N Percentile sound level	A-weighting	Percentile A-weighted sound level	L_{AFN}	L_{ASN}	L_{A10sN}	(L_{AIN})
	C-weighting	Percentile C-weighted sound level	L_{CFN}	L_{CSN}	L_{C10sN}	(L_{CIN})
	Z-weighting	Percentile Z-weighted sound level	L_{ZFN}	L_{ZSN}	L_{Z10sN}	(L_{ZIN})
	G-weighting	Percentile G-weighted sound level	L_{GFN}	L_{GSN}	L_{G10sN}	(L_{GIN})
L_{peak} Peak sound level	A-weighting	A-weighted peak sound level	(L_{Apeak})			–
	C-weighting	C-weighted peak sound level	L_{Cpeak}			–
	Z-weighting	Z-weighted peak sound level	L_{Zpeak}			–
	G-weighting	G-weighted peak sound level	(L_{Gpeak})			–

Notation and name with NL-63	Frequency weighting	Measurement value	Time weighting			
			F-weighting	S-weighting	10 s	I-weighting
$L_{eq,\ mov}$ Moving L_{eq}	A-weighting	A-weighted moving Leq	$L_{Aeq,mov}$			–
	C-weighting	C-weighted moving Leq	$L_{Ceq,mov}$			–
	Z-weighting	Z-weighted moving Leq	$L_{Zeq,mov}$			–
	G-weighting	G-weighted moving Leq	$L_{Geq,mov}$			–
L_{tm5} Takt-max sound level	A-weighting	Takt-max A-weighted sound level	L_{Atm5}	–	–	–
	C-weighting	Takt-max C-weighted sound level	–			–
	Z-weighting	Takt-max Z-weighted sound level	–			–
	G-weighting	Takt-max G-weighted sound level	–			–

Note

- There is no combination of Peak sound level / Sound exposure level / moving L_{eq} and I-weighting.
- Measured quantities in parentheses are not commonly used.
- Although the indication on the device is τ, it is written here as 10 s.

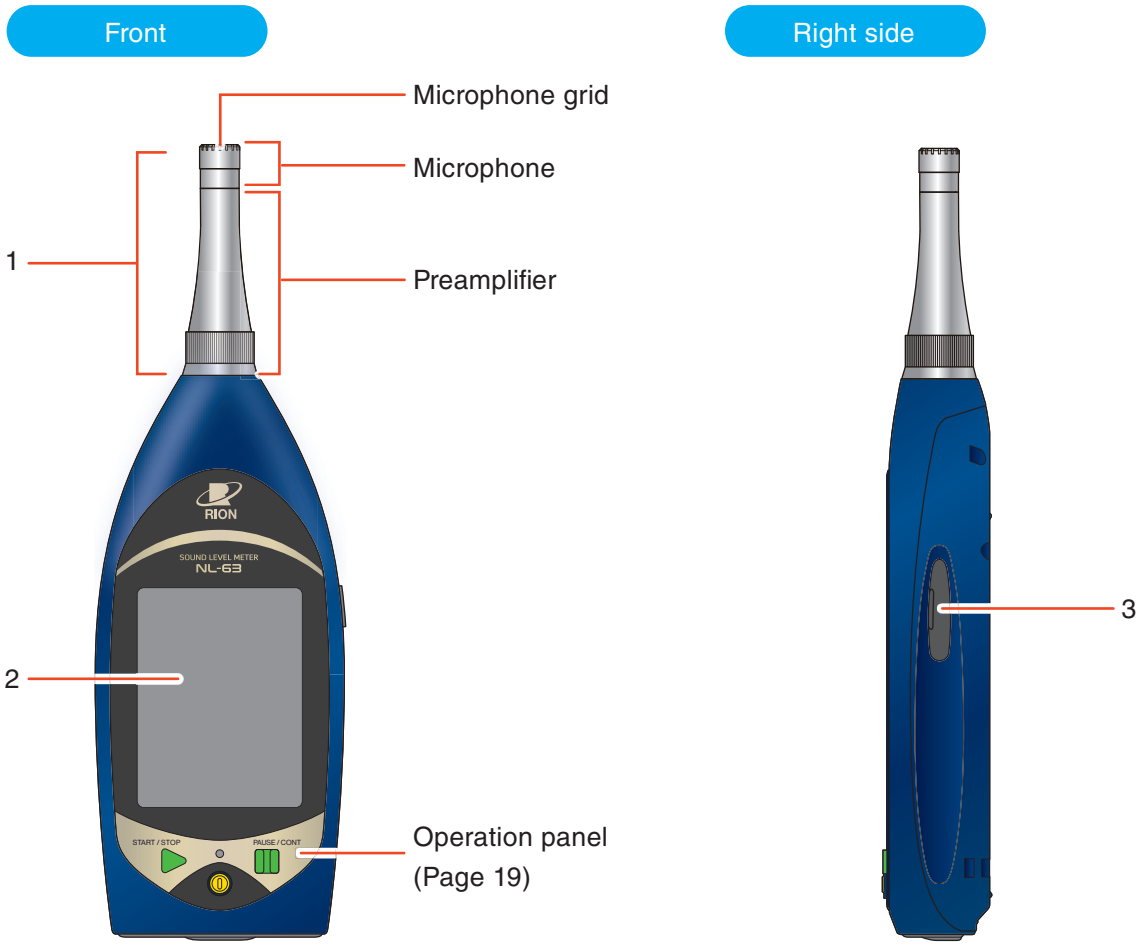
The notation of quantifiers in international standards and JIS with Sound Level Meter NL-63

Quantifiers are taken from ISO 1996, IEC 61672-1, JIS C 1509-1 and JIS Z 8731.

Notation and name with NL-63	Frequency weighting	ISO 1996 notation	JIS C 1509-1 (IEC 61672-1) notation	JIS Z 8731 notation
L_A A-weighted sound level	A-weighting	L_{pA}	–	L_{pA}
L_C C-weighted sound level	C-weighting	–	–	–
L_Z Sound level	Z-weighting	L_p	–	L_p
L_{Aeq} Equivalent continuous A-weighted sound level	A-weighting	$L_{Aeq,T}$	$L_{Aeq,T}$	$L_{Aeq,T}$
L_{Ceq} Equivalent continuous C-weighted sound level	C-weighting	–	–	–
L_{Zeq} Equivalent continuous sound level	Z-weighting	–	–	–
L_{AE} A-weighted Sound exposure level	A-weighting	L_{EA}	$L_{AE,T}$	L_{EA}
L_{CE} C-weighted Sound exposure level	C-weighting	–	–	–
L_{ZE} Z-weighted Sound exposure level	Z-weighting	–	–	–
L_{AN} L_{A5} 5% Percentile A-weighted sound level	A-weighting	$L_{AN,T}$ $L_{A5,T}$	–	$L_{AN,T}$ $L_{A5,T}$
L_{AN} L_{A10} 10% Percentile A-weighted sound level	A-weighting	$L_{AN,T}$ $L_{A10,T}$	–	$L_{AN,T}$ $L_{A10,T}$
L_{AN} L_{A50} 50% Percentile A-weighted sound level	A-weighting	$L_{AN,T}$ $L_{A50,T}$	–	$L_{AN,T}$ $L_{A50,T}$
L_{AN} L_{A90} 90% Percentile A-weighted sound level	A-weighting	$L_{AN,T}$ $L_{A90,T}$	–	$L_{AN,T}$ $L_{A90,T}$
L_{AN} L_{A95} 95% Percentile A-weighted sound level	A-weighting	$L_{AN,T}$ $L_{A95,T}$	–	$L_{AN,T}$ $L_{A95,T}$
L_{Amax} Maximum A-weighted sound level	A-weighting	$L_{pA,max}$	L_{Amax}	$L_{pA,max}$
L_{Amin} Minimum A-weighted sound level	A-weighting	–	–	–
L_{Cpeak} C-weighted peak sound level	C-weighting	–	L_{Cpeak}	–

3

Name and Function of Each Part

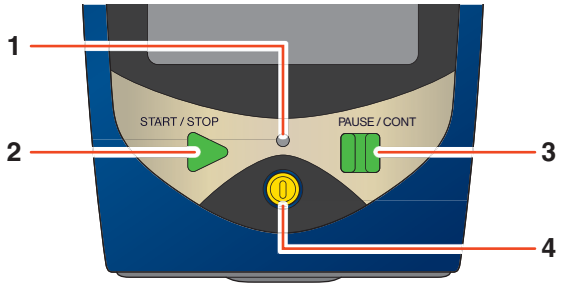


No.	Name	Description
1	Microphone and preamplifier	The microphone and preamplifier can be separated from the main unit. They can be installed at a distance from the main unit using an extension cable (optional).
2	Touch panel	LCD display with backlight. The sound level is displayed numerically and as a bar graph. Also displayed are the operating status of the device, set measurement conditions, warnings, and other information. The display can be operated by touch.
3	Card slot (SD)	A slot for inserting an SD card.

Note

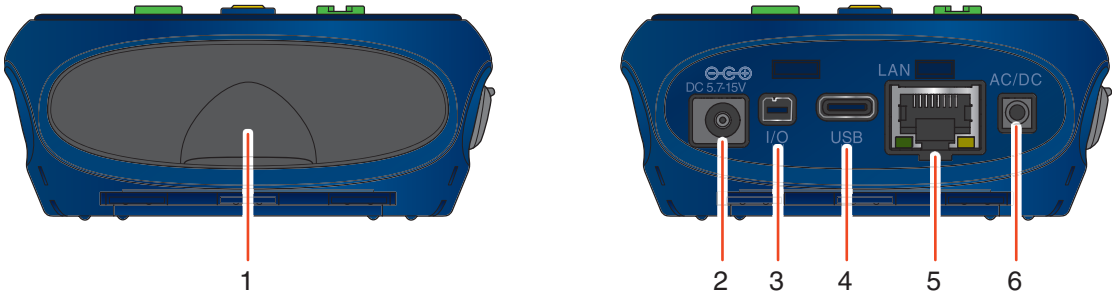
- Do not use a microphone and preamplifier other than those indicated on the serial number label on the back of the device.
- Make sure the microphone and microphone grid are installed securely before using or storing the device.
  If there is any looseness, retighten the microphone and microphone grid before using or storing the device.

Operation panel



No.	Name	Description
1	Indicator LED	Lights or flashes red or blue depending on the operation and status of the device.
2	START/STOP key	Used when starting or ending measurement. Press the START/STOP key from the current state (sound level display) to enter the measurement state. Press again to end the measurement. Returns to the measurement screen if pressed while operating the menu.
3	PAUSE/CONT key	Used to pause the screen display. Also, when pressed during measurement in Manual mode, measurement can be paused. Press again to resume. During PAUSE in Manual mode, the indicator LED flashes blue. *When back erase is set, you can omit from the calculation the measured values from the time of pressing up to several seconds before (1, 3, or 5 seconds can be selected). Returns to the previous screen if pressed while operating the menu.
4	POWER key	Press and hold for several seconds to turn the power on or off. To forcibly turn the power off when the key lock is enabled, press and hold for 10 seconds or longer.

Bottom

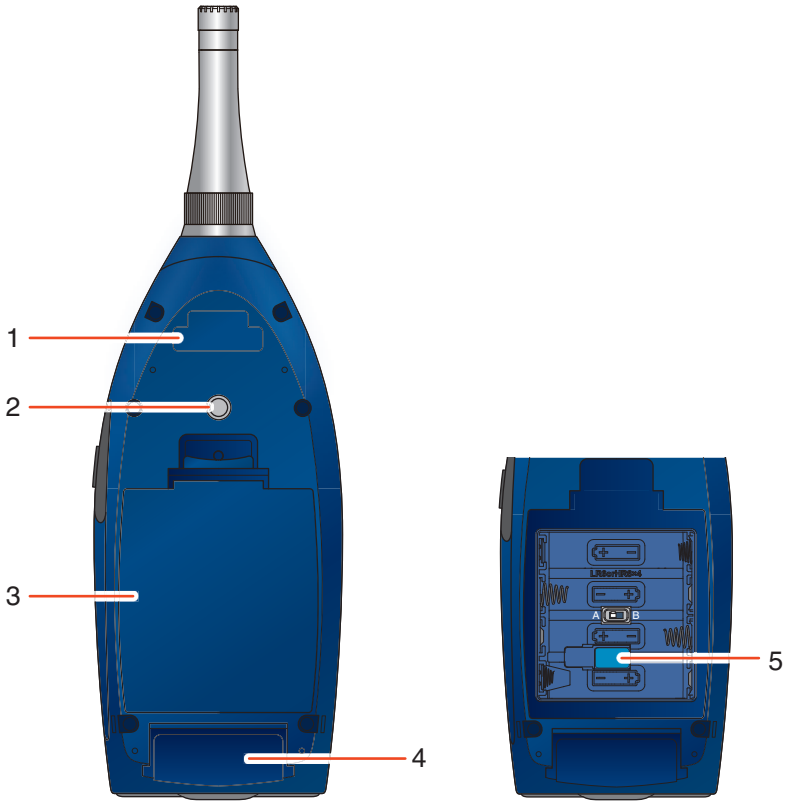


No.	Name	Description
1	Bottom cover	A cover to protect the ports. Ports can be accessed by opening the bottom cover.
2	External power supply port (DC IN)	This is the port for connecting AC Adapter NE-21P (optional) (input voltage of 100 V to 240 V, 50/60 Hz). You can also use DC Polarity Converter CC-43J (optional) by connecting it to the NC-98 series dedicated AC adapter for sound level meters NL-42A/52A/62A and NL-42/52/62. The Battery Pack BP-21A (optional) can also be used by connecting CC-43J (Page 25).
3	I/O port	An RS-232C port for connecting a computer or printer.
4	USB port (Type-C)	A port for connecting a computer. It is also possible to connect a commercially available USB charger such as a mobile battery to supply power via USB.
5	LAN port	A port for connecting a computer or router.
6	AC/DC port	This port outputs AC signals corresponding to the sound pressure waveform after frequency weighting, and DC signals corresponding to the sound level after frequency weighting and time weighting.

Important

- To maintain the dustproof and waterproof performance, close the bottom cover securely when using the device.
- Do not use AC adapters or battery packs other than the specified ones. Doing so may result in a malfunction.
- The AC/DC port can output simultaneously using the AC/DC Output Splitter Cable CC-43S (optional).
- When using the AC adapter NC-98 series to operate the device, be sure to use the DC Polarity Converter CC-43J (optional).

Back



No.	Name	Description
1	Serial number label	The serial numbers of the microphone, preamplifier, and sound level meter are listed here.
2	Tripod mounting screw	This screw can be used to mount the device to a camera tripod.
3	Battery compartment	Install four AA batteries to use the device. There is a power-on mode switch in the battery compartment (Page 28).
4	Nameplate	It shows necessary information such as the model, date of manufacture, and applicable standards of the device.
5	Sticker	The sticker guarantees the dustproof and waterproof performance of the unit.

Important

- Do not remove the sticker on the rear of the unit. If the sticker is removed, the “water and dust resistant performance” of the unit is no longer guaranteed.

4

Turning on the Power

The device can be operated with four AA batteries (alkaline batteries, Ni-MH rechargeable batteries), or, as an external power supply, AC Adapter NE-21P, Battery Pack BP-21A, or a USB power supply. The operating voltage is 5.7 V to 15 V (rated voltage 12 V).

⚠ WARNING

- If you notice any abnormalities such as excessive heat, smoke, or a burning odor while using the device, immediately remove the batteries, unplug the AC adapter plug from the outlet, and contact your dealer.
- If you do not intend to use the device for a long time, remove the batteries. Failing to do so may result in battery leakage.

Note

- Make sure to set the date and time before measuring.
- When the batteries are installed and the AC adapter is connected to the device, power is supplied from the AC adapter. (The AC adapter takes priority in terms of power supplies. However, when power is supplied from the USB port, the USB takes the top priority.)
  When power is no longer supplied from the AC adapter due to a power outage, etc., the device automatically switches to being powered by the batteries.
- When operating the device with just an external power supply, if the device is turned off when the external power supply turns off, the auto-file-closing and auto-shutdown operations will not be performed, and so we recommend installing new batteries in the main unit. However, make sure to set the power-on mode switch to the A side (Page 28).
- When using the specified AC adapter, the instrument can withstand momentary power failures of the commercial power supply for up to approximately 50 ms.

4.1 Inserting the batteries

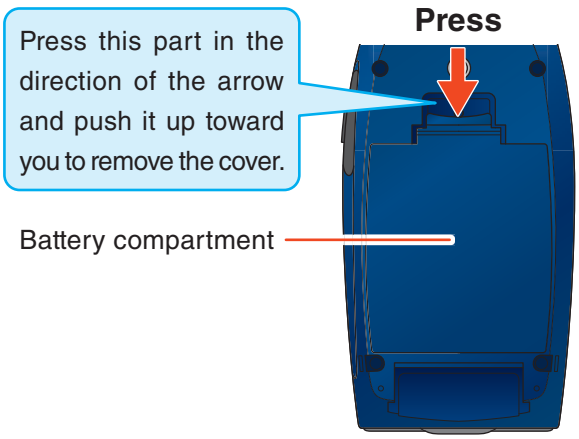
⚠ WARNING

- Make sure to correctly insert the batteries with the polarities of the batteries “+” and “-” matching the marks. If the polarities are incorrect, the batteries may explode or leak. If you do not intend to use the device, remove the batteries to prevent leakage. If electrolyte leaking from the batteries gets on your skin or clothes, wash it off immediately with water.
- Be careful not to get your hands pinched or cut when installing the battery compartment cover.

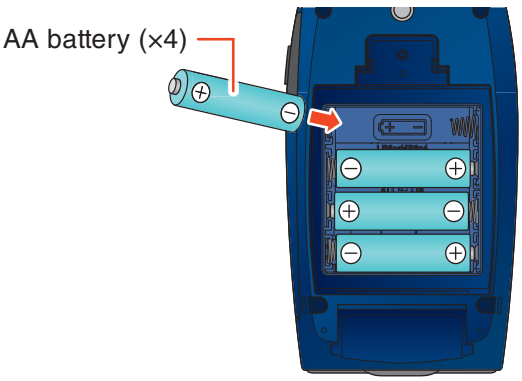
Important

- Insert four new batteries of the same type. Using different types of batteries or mixing old and new batteries may cause a failure.

1 **Remove the battery compartment cover.**



2 **Insert four AA batteries, ensuring that the orientation matches the “+” and “-” marks.**



3 **Reinstall the cover.**

Important

- To maintain the dustproof and waterproof performance, make sure that the battery compartment cover is closed securely.

Continuous operating time with battery

The continuous operating time with batteries will vary depending on the battery manufacturer and type (model), the usage environment of the NL-63, and the measurement conditions.
For example, the operating time is approximately as follows for continuous measurement in Auto store mode (Page 93 to 105) when set to Eco (the I/O setting is turned off, communication is turned off, Backlight Auto Off is set, etc. (Page 42)).

Battery type	Continuous operating time with battery (at 23°C)
Alkaline battery	Approx. 12 h
Ni-MH rechargeable battery	Approx. 12 h

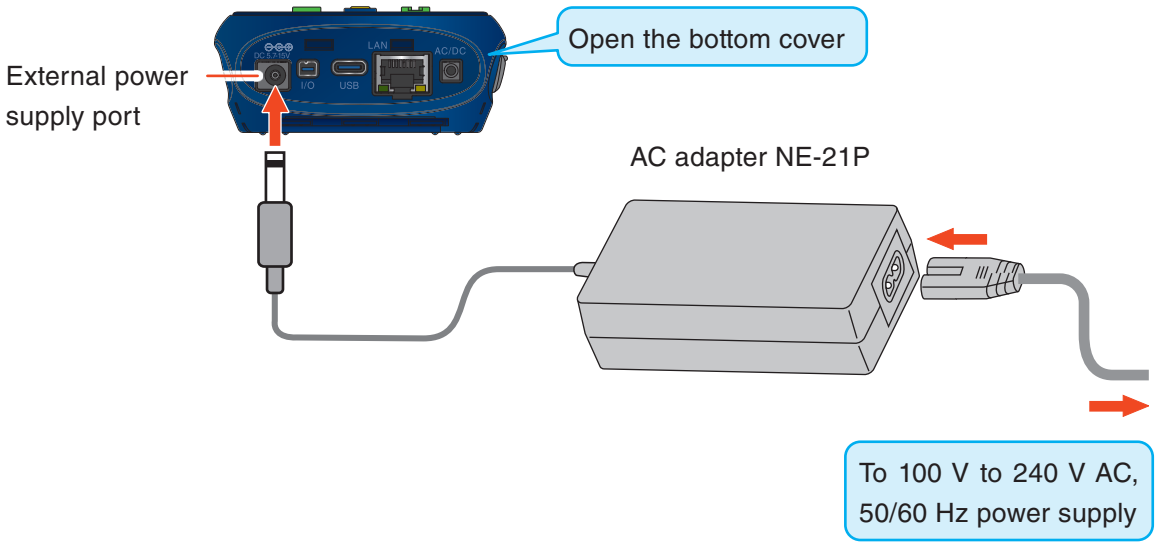
Note

- Select [System] - [Power] from the [Menu] screen according to the battery type, and set the [Battery Type] correctly.
- The continuous operating time of Ni-MH rechargeable batteries varies depending on the charging state.
- If you want to extend the continuous operating time with batteries as much as possible, we recommend applying the Eco setting (Page 42).

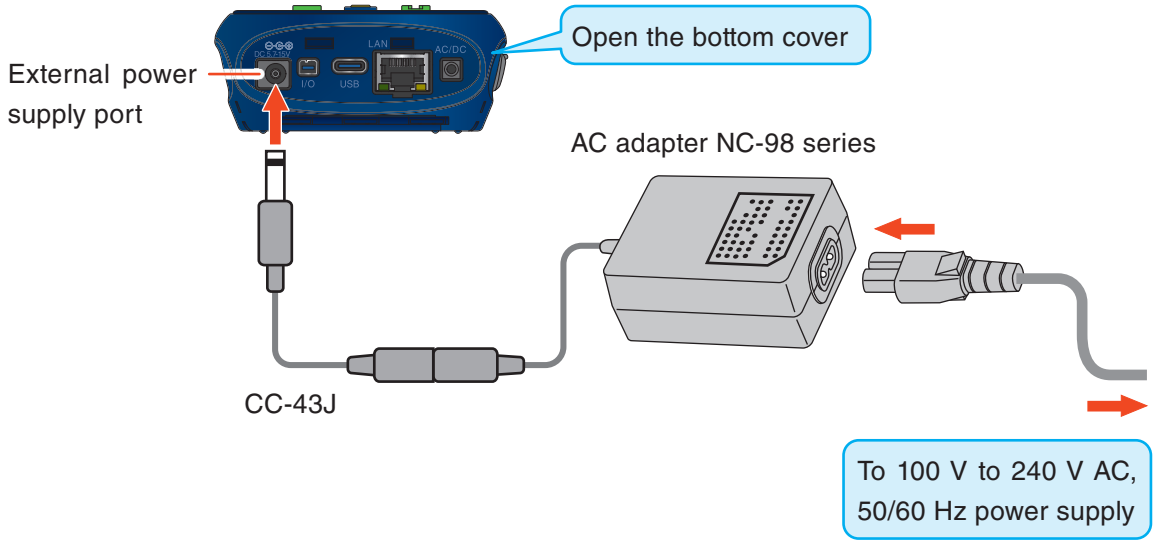
4.2 Connecting an external power supply

The following connection methods are possible for operation using an external power supply.

NE-21P



NC-98 series + CC-43J

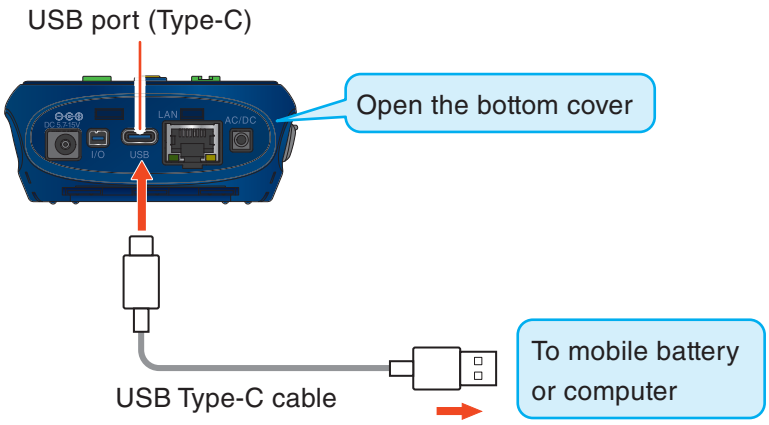


Note

- Be sure to use the DC Polarity Converter CC-43J (optional) even when using the Battery Pack BP-21A (optional) to operate the device.
- When using a battery pack, use new alkaline batteries or fully charged Ni-MH batteries.
- The measured value may fluctuate momentarily due to sudden fluctuations in the power supply voltage.

USB power supply (from mobile battery, computer, etc.)

To power the device via USB, connect the USB Type-C cable to the USB port of the computer or USB charger.



Note

- For the external power supply, the dedicated AC adapter NE-21P is recommended. USB power supply may cause a drop in measurement performance depending on the quality of the commercially available computer power supply and USB charger.
- Power may not be supplied depending on the type of connected cable and battery used.

4.3 Backup battery

This device is equipped with a backup battery (rechargeable battery) for the clock.
The rechargeable battery is charged when the power supply of the main unit is turned on. Even when the power is turned off, the battery will be charged if an external power supply is connected.
The relationship between charging time and the duration of time the battery typically lasts is as follows.
It takes 24 hours to be fully charged.

Charging time	Approximate battery power duration
1 hour	1 week
12 hours	3 months
24 hours	6 months

- Use the AC adapter when connecting an external power supply for charging the battery while the power is turned off.
- The backup battery has a limited service life. Check the battery during inspection and calibration, and replace it if necessary (please contact your dealer).

Note

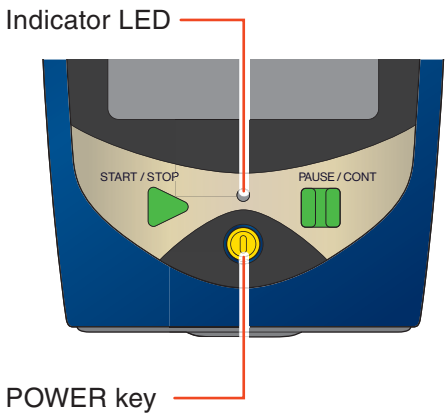
- The charging time, battery power duration, and battery service life vary according to the usage environment.
- If you use an old rechargeable battery, the battery power duration will be shorter.

4.4 Turning on/off the power

When turning on the power

Press and hold the POWER key for several seconds.

Release your finger from the POWER key when the startup screen appears.
After the startup screen appears, the measurement screen appears.
During startup, the indicator LED flashes red, blue, and pink in cycles.



When turning off the power

Press and hold the POWER key for several seconds.

Release your finger from the POWER key when the power-off screen appears.

⚠ WARNING

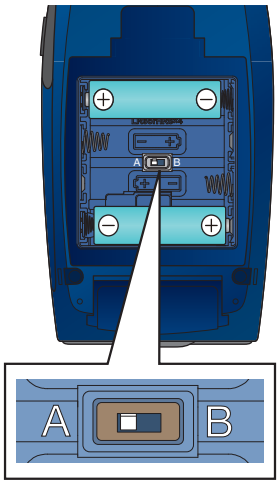
- If the device is to be stored for a long time with the power turned off, remove the batteries. Leaving the batteries inside the device may cause electrolyte to leak. Remove the AC adapter, battery pack, and USB charger as well.

Note

- Wait at least 10 seconds after turning off the power of the device before turning it on again.
- When the key lock is turned on, the POWER key does not respond even when touched. To forcibly turn the power off, press and hold for 10 seconds or longer. For details on the key lock, see “Reading the Display” (Page 33).

When switching the power-on mode

Removing the battery compartment gives access to the power-on mode switch labeled “A-B”. Normally, the A side is used, however, if this switch is set to the B side, you can control whether the power supplied to the device with the external power supply port or USB port is turned on/off. In this situation, the POWER key on the operation panel cannot be operated.



Power-on mode switch

Important

- If you use the device with the switch set to the B side, do not insert the batteries. If batteries are installed, even if the external power supply or USB power is turned off, the device will continue to run on the batteries, so it will not respond to being turned on/off externally.
- When using the device with the switch set to the B side, the settings may not be reflected if the power is turned off immediately after changing the settings of the device. Wait 10 seconds after changing the settings before turning off the power.

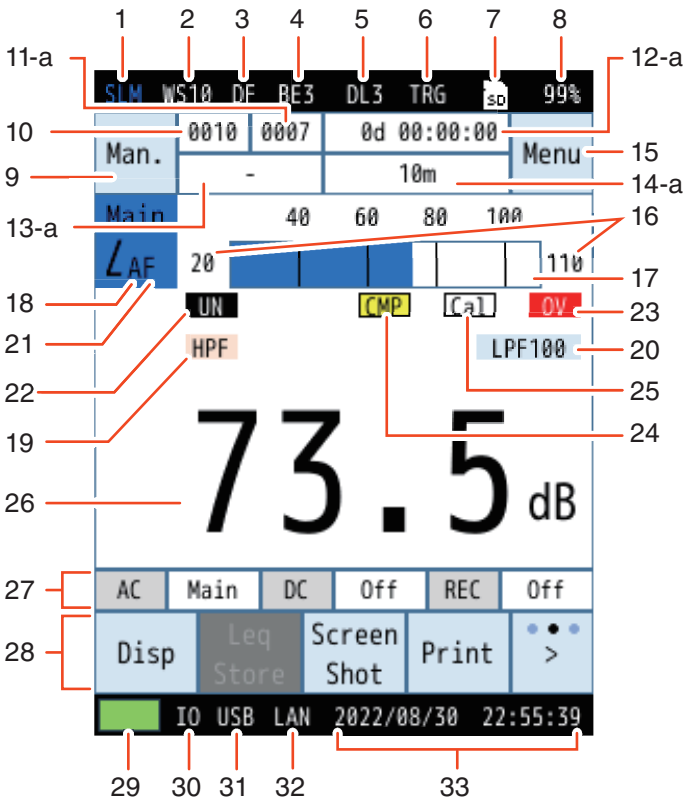
5 Reading the Display

5.1 Sound level screen (main channel display)

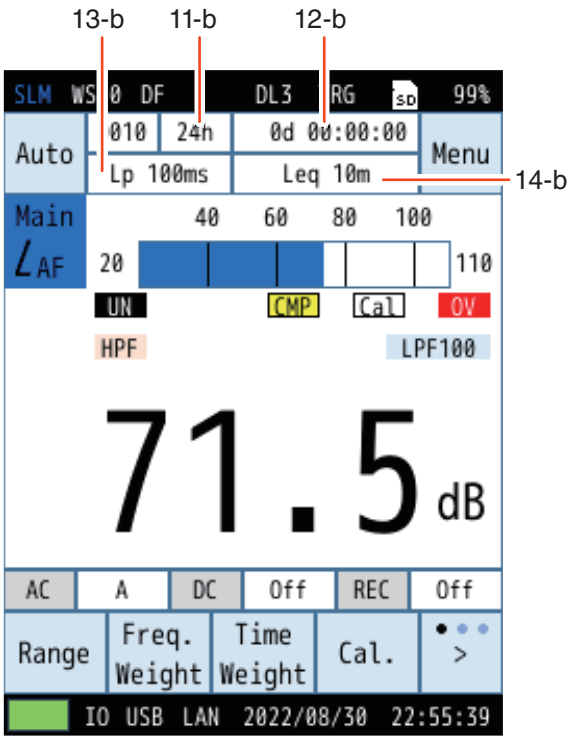
Note

- While the actual display may not look exactly like those in the figures below, the explanation is based on the assumption that the same text will be displayed.

Manual



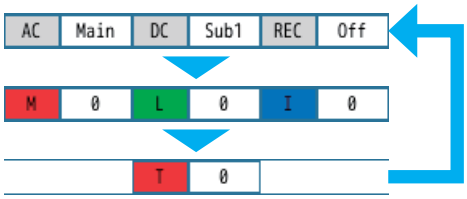
Auto or Timer Auto

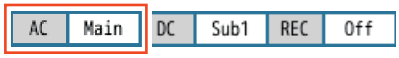


No.	Name	Description
1	Measurement mode	Displays the measurement mode.
2	Windscreen correction	Displays the windscreen model set with the windscreen correction function (Page 113).
3	Diffuse sound field correction	Appears when diffuse sound field correction is set to [On] (Page 116).
4	Back erase function (Manual)	Appears when the back erase function is set to 1s, 3s, or 5s (Page 55).
5	Delay measurement function	Displays the time (seconds) set with the delay measurement (Page 55).
6	Trigger mode	Appears when the measurement start trigger is set (Page 56).
7	SD card	Appears when an SD card is installed (Page 18).

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>8</td><td>SD card remaining capacity</td><td>Displays the remaining capacity of the installed SD card.</td></tr>
<tr><td>9</td><td>Store mode</td><td>Displays the store mode when saving to memory.
There are three store modes: Manual, Auto, and Timer Auto (Page 53).</td></tr>
<tr><td>10</td><td>Store name</td><td>Displays the store name (Page 53).</td></tr>
<tr><td>11-a</td><td>Address
(Manual)</td><td>Displays the memory address. If there is already data at that address, this will be displayed in red (Page 53).</td></tr>
<tr><td>11-b</td><td>Total measurement time
(Auto)</td><td>In the Auto store mode, displays the total measurement time (Page 57).
Not displayed in Timer Auto mode.</td></tr>
<tr><td>12-a</td><td>Calculation / measurement elapsed time
(Manual)</td><td>Displays the elapsed time since starting measurement in hours, minutes, and seconds.</td></tr>
<tr><td>12-b</td><td>Measurement elapsed time
(Auto, Timer Auto)</td><td>Displays the elapsed time since starting measurement in days, hours, minutes, and seconds.</td></tr>
<tr><td>13-a</td><td>----</td><td>Not displayed in Manual Store mode.</td></tr>
<tr><td>13-b</td><td>L_p store interval
(Auto, Timer Auto)</td><td>When the store mode is set to Auto or Timer Auto, the set L_p store interval is displayed (Page 57).</td></tr>
<tr><td>14-a</td><td>Calculation / measurement time
(Manual)</td><td>Displays the total measurement time set in the store settings.</td></tr>
<tr><td>14-b</td><td>L_{eq} calculation interval
(Auto, Timer Auto)</td><td>When the store mode is set to Auto or Timer Auto, the set L_{eq} calculation interval is displayed (Page 58).</td></tr>
<tr><td>15</td><td>Menu / Pause / Measurement status</td><td>Touch to display the [Menu] screen.
<table>
<tr><td>▶</td><td>Flashes during measurement.
In addition, the indicator LED flashes red.</td></tr>
<tr><td>■</td><td>Flashes during measurement standby in Timer Auto mode.
In addition, the indicator LED flashes blue.</td></tr>
<tr><td>II</td><td>When set to Manual store mode, if the PAUSE/CONT key is pressed while measuring, measuring will pause and this will flash.
In addition, the indicator LED flashes blue.</td></tr>
<tr><td>II</td><td>If the PAUSE/CONT key is pressed in the current state, measuring will pause and this will appear.</td></tr>
<tr><td>Lock</td><td>Flashes when the operation is locked.
Touching the key lock on the menu ring locks all setting values. Operations other than turning off the screen and unlocking the key lock will not provoke a response. To turn the power off, disable the key lock and then press the POWER key.</td></tr>
</table>
* The [Menu] screen is also displayed when you touch [Man.] in the upper left of the screen.</td></tr>
<tr><td>16</td><td>Bar graph range</td><td>Displays the values from the lower limit to the upper limit of the bar graph. The range can be changed via [Display] in the [Menu] screen (Page 45).</td></tr>
<tr><td>17</td><td>Bar graph</td><td>Displays the sound level as a bar graph (updated every 0.1 s).</td></tr>
</table>

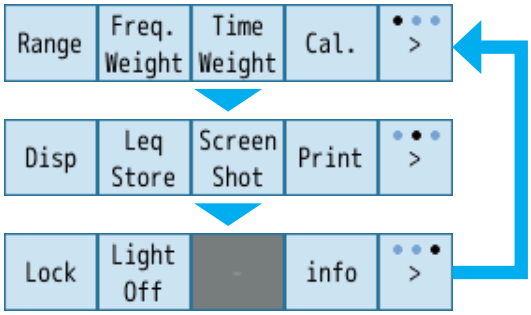
<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>18
19
20</td><td>Frequency weighting</td><td>Displays the frequency weighting set for each channel.
<table>
<tr><td>A</td><td>A-weighting</td></tr>
<tr><td>C</td><td>C-weighting</td></tr>
<tr><td>Z</td><td>Z-weighting</td></tr>
<tr><td>G</td><td>G-weighting</td></tr>
<tr><td>Z(HPF)</td><td>High-pass filter with Z-weighting</td></tr>
<tr><td>Z(LPF100Hz)</td><td>Low-pass filter with Z-weighting (cutoff frequency 100 Hz)</td></tr>
<tr><td>Z(LPF500Hz)</td><td>Low-pass filter with Z-weighting (cutoff frequency 500 Hz)</td></tr>
</table></td></tr>
<tr><td>21</td><td>Time weighting</td><td>Displays the time weighting set for each channel.
<table>
<tr><td>F</td><td>Fast</td></tr>
<tr><td>S</td><td>Slow</td></tr>
<tr><td>I</td><td>Impulse</td></tr>
<tr><td>τ=10s</td><td>10 s</td></tr>
</table></td></tr>
<tr><td>22</td><td>Under-range indication</td><td>
<table>
<tr><td>UN
(White on black)</td><td>When a sound level under-range condition is detected, the indication is shown for at least 1 second.</td></tr>
<tr><td>UN</td><td>If the calculation contains signal under-range data, the indication is shown. This indication remains on the calculation result screen until the next calculation measurement is started.</td></tr>
</table></td></tr>
<tr><td>23</td><td>Overload indication</td><td>
<table>
<tr><td>OV
(White on red)</td><td>When a sound level overload condition is detected, the indication is shown for at least 1 second.</td></tr>
<tr><td>OV</td><td>If the calculation contains signal overload data, the indication is shown. This indication remains on the calculation result screen until the next calculation measurement is started.</td></tr>
</table></td></tr>
<tr><td>24</td><td>Comparator</td><td>
<table>
<tr><td>CMP</td><td>Displayed when a comparator signal (open collector signal for controlling external devices) is set.</td></tr>
</table></td></tr>
<tr><td>25</td><td>Reference signal output</td><td>
<table>
<tr><td>Cal</td><td>Displayed when [Ref. Signal Output] is turned on the [I/O] screen (Page 63).</td></tr>
</table></td></tr>
<tr><td>26</td><td>L_p value display</td><td>Displays the sound level for each channel (updated every second).</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>27</td><td>Information display bar</td><td>
Each time you touch the [info] on the menu ring, the displayed information will switch. [info] is displayed by touching [>] on the far right of the menu ring. See the description of the menu ring (Page 33).


<table>
<tr><td>AC Main</td><td>


Displays the frequency weighting of the AC output set in [Signal Output] - [AC OUT] (Page 64) on the [I/O] screen.
[Main] will be displayed if linked with Main, and [A] if A-weighting is selected.
The character color changes depending on the setting of [Output Level Range] (Page 63).
• The output level range is linked to the graph upper limit or set to [Off]: Black text Main
• The output level range is set to 70 dB to 130 dB: Red text Main
If the sound level exceeds the value set in [Signal Output] - [Output Level Range] (Page 63) on the [I/O] screen, the background color of letters AC turns red AC and is shown for at least 1 second. In this case, set [Output Level Range] to a larger value.
</td></tr>
<tr><td>DC Sub1</td><td>


Displays the target channel of the DC output set in [Signal Output] - [DC OUT] (Page 64) on the [I/O] screen. If it is linked with Main, [Main] will be displayed.
The character color changes depending on the setting of [Output Level Range] (Page 63).
• The output level range is linked to the graph upper limit or set to [Off]: Black text Main
• The output level range is set to 70 dB to 130 dB: Red text Main
If the sound level exceeds the value set in [Signal Output] - [Output Level Range] (Page 63) on the [I/O] screen, the background color of letters DC turns red DC and is shown for at least 1 second. In this case, set [Output Level Range] to a larger value.
</td></tr>
<tr><td>REC Off
M 0
L 0
I 0
T 0</td><td>
Displays the recording mode of the waveform recording function and the number of files recorded in each recording mode (M: Manual, L: Level, I: Interval, T: Total).
* Even if the optional program NX-43WR is not installed, this information is displayed but waveform recording cannot be selected.
</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>28</td><td>Menu ring</td><td>
Each time you touch [>] on the far right of the menu ring, the displayed menu switches.


<table>
<tr><td>Range</td><td>Sets the upper and lower limits of the bar graph.</td></tr>
<tr><td>Freq. Weight</td><td>Sets the frequency weighting for each channel (Page 48).</td></tr>
<tr><td>Time Weight</td><td>Sets the time weighting for each channel (Page 49).</td></tr>
<tr><td>Cal.</td><td>Displays the calibration screen (Page 146).</td></tr>
<tr><td>Disp</td><td>Switches the screen display.</td></tr>
<tr><td>Leq Store
Lp Store
(Manual)</td><td>Displayed when in Manual mode (Page 81).
Even if you select [Cancel] to save data after measurement, you can save the data again. “Leq Store” appears in the menu ring. Touch it to save the L_{eq} store data (L_{eq}, L_E, L_{max}, etc.).
When paused, [Lq Store] appears. Touch it to save the L_p store data.</td></tr>
<tr><td>Screen Shot</td><td>Saves a screenshot of the displayed screen (Page 110).</td></tr>
<tr><td>Print</td><td>Prints a screenshot of the displayed screen (Page 122).</td></tr>
<tr><td>Lock</td><td>Turns on/off the key lock function.
Operations other than turning off the screen and unlocking the key lock will not provoke a response.
To turn the power off, disable the key lock and then press the POWER key (Page 28).</td></tr>
<tr><td>Light Off</td><td>Turns off the backlight (Page 166).</td></tr>
<tr><td>info</td><td>Switches the display of the information display bar.</td></tr>
</table>
</td></tr>
</table>

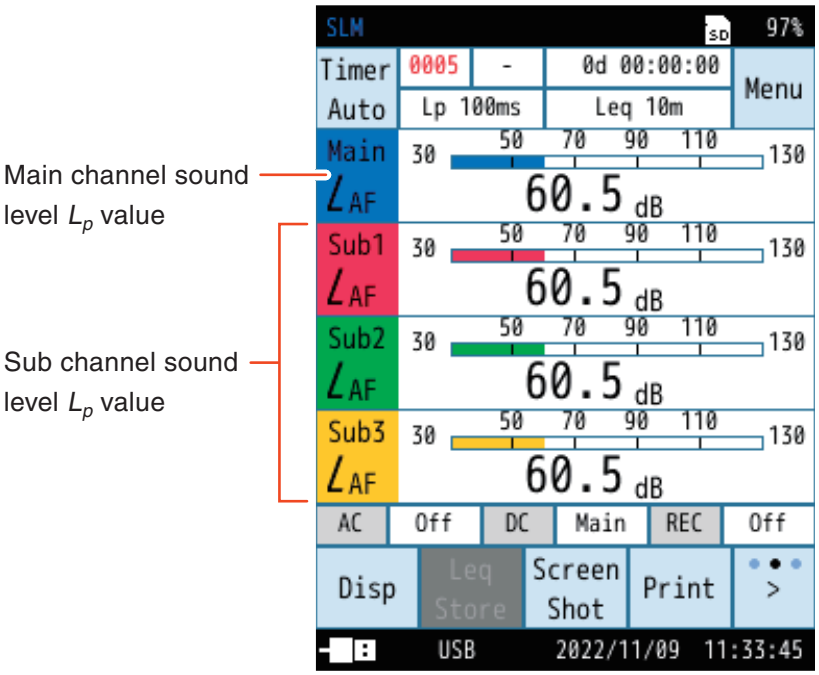
<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>29</td><td>Battery level / Power status</td><td>Displays the power status.
Check this indicator when using the device on batteries. As the batteries are used, the remaining level decreases.
<table>
<tr><td>  </td><td>Full</td></tr>
<tr><td>  </td><td>Low</td></tr>
<tr><td>  </td><td>In this state, the backlight dims regardless of the brightness setting.
Replace the batteries.
Measurements cannot be taken when the display starts flashing (the battery will run out soon, so do not perform measurement operations).
Replace the batteries immediately.</td></tr>
<tr><td>  </td><td>Appears when using the AC adapter or battery pack.</td></tr>
<tr><td>  </td><td>Appears when USB power is being supplied from a USB charger.</td></tr>
</table></td></tr>
<tr><td>30</td><td>I/O communication</td><td>Appears when [I/O Port] is set on the [I/O] screen (Page 62).</td></tr>
<tr><td>31</td><td>USB communication</td><td>Appears when USB is set on the [I/O] screen (Page 62).</td></tr>
<tr><td>32</td><td>LAN communication</td><td>Appears when LAN is set on the [I/O] screen.</td></tr>
<tr><td>33</td><td>Date / Current time</td><td>Displays the current date and time.</td></tr>
</table>

Note

- When operating the device with just an external power supply, if the device is turned off when the external power supply turns off, the auto-, file-closing and auto-shutdown operations will not be performed, and so we recommend installing new batteries in the main unit. However, make sure to set the power-on mode switch to the A side (Page 28).

5.2 Sound level screen (sub channel display)

If you set one of the sub channels to [On] on the measurement screen, the sound level L_p value of the sub channels will be displayed on the measurement screen (Page 48).



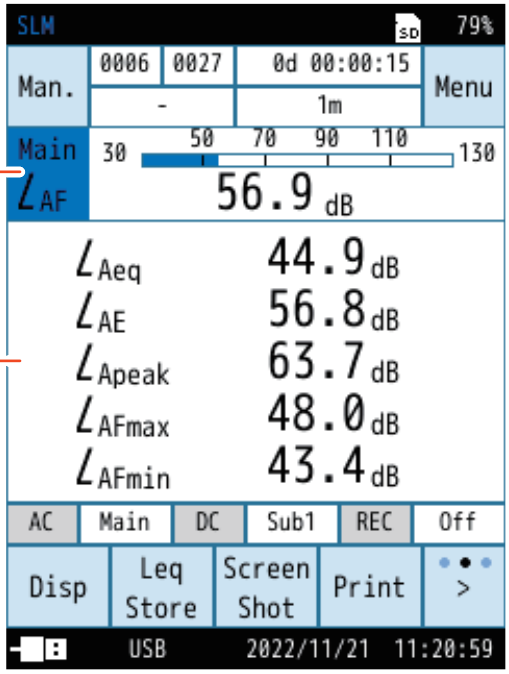
5.3 Calculated value screen

The measurement amount set to [On] under [Leq Calc.] on the [Display] screen can be displayed on the calculated values screen (Page 46).
Each time you touch [Disp] on the menu ring, the display switches in the order of the sound levels screen » calculated values screen*1 » time-level screen*2 » sound levels screen.

*1 Not displayed when all the calculated value settings of [Leq Calc.] under [Display] of [Menu] are set to [Off].
*2 Not displayed when [Time-Level] under [Display] of [Menu] is set to [Off].

Touch to switch the channel when one of the sub channels is [On].

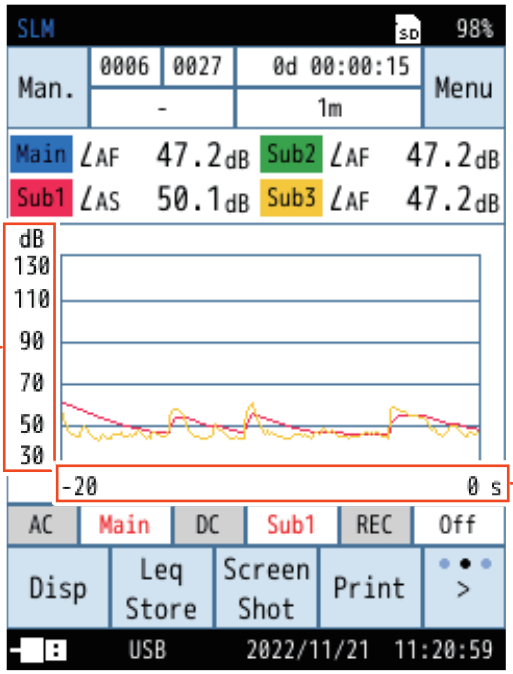
Calculated values
The calculated values set to [On] in [Leq Calc.] are displayed.



5.4 Time-Level screen

The time-level screen can be displayed by setting [Time-Level] on the [Display] screen to a setting other than [Off] (Page 46).
Each time you touch [Disp] on the menu ring, the display switches in the order of the sound levels screen » calculated values screen*1 » time-level screen*2 » sound levels screen.

*1 Not displayed when all the calculated value settings of [Leq Calc.] under [Display] of [Menu] are set to [Off].
*2 Not displayed when [Time-Level] under [Display] of [Menu] is set to [Off].

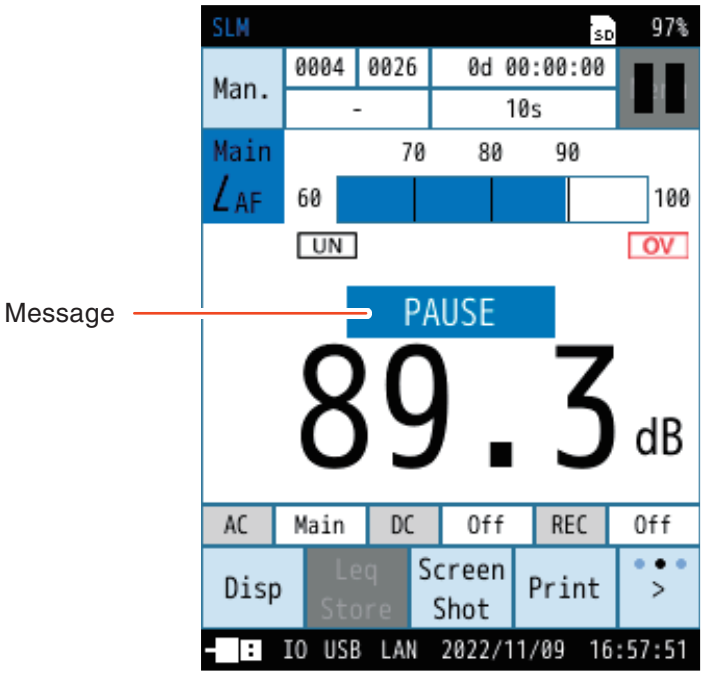


Level
The level fluctuation of the sound level is displayed. The scale of the level axis is linked to the bar graph (Page 45).

Time
The sound level is displayed retroactively on the time axis scale (20s, 1m, 2m) set in [Time-Level].

5.5 Message display

When you press the START/STOP key or PAUSE/CONT key, one of the following messages will be displayed for about 1 second.



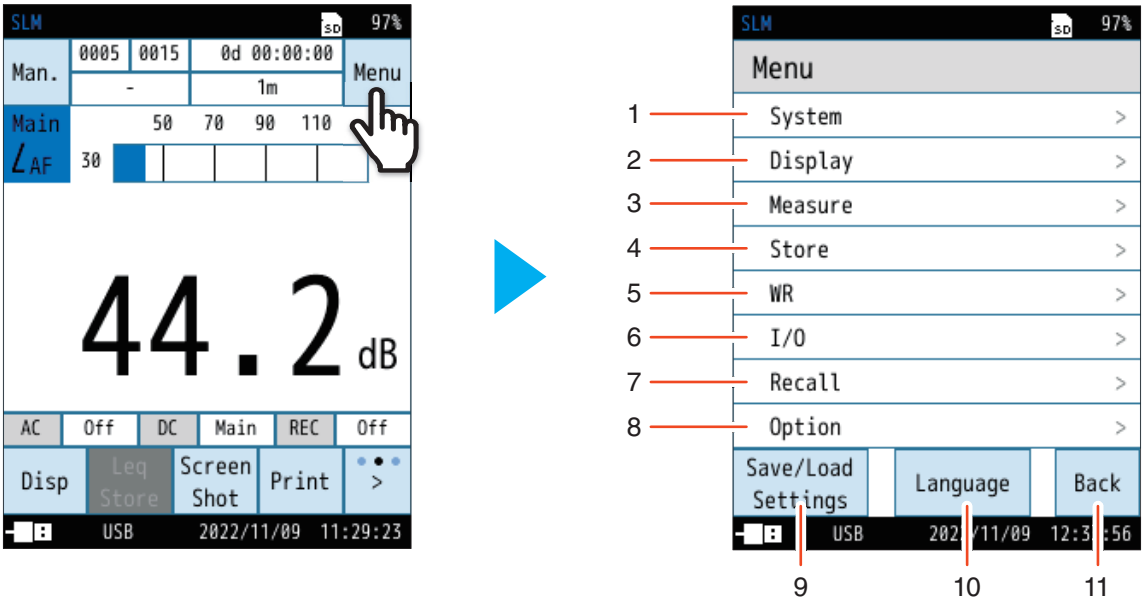
Display	Description
START	Appears when the START/STOP key is pressed, and the measurement starts.
STOP	Appears when the START/STOP key is pressed and measuring is finished.
PAUSE	Appears when the PAUSE/CONT key is pressed and display or measuring is paused. II (Manual): The device will be paused in the measurement state, and this symbol will flash in the upper right corner. II: The device will be paused in the current state, and this symbol will be displayed in the upper right corner.
BACK ERASE	Appears when the PAUSE/CONT key is pressed while measuring when back erase is set (Page 55).
CONTINUE	Appears when the PAUSE/CONT key is pressed to resume display or measuring.

6

Setting Menu

6.1 [Menu] screen

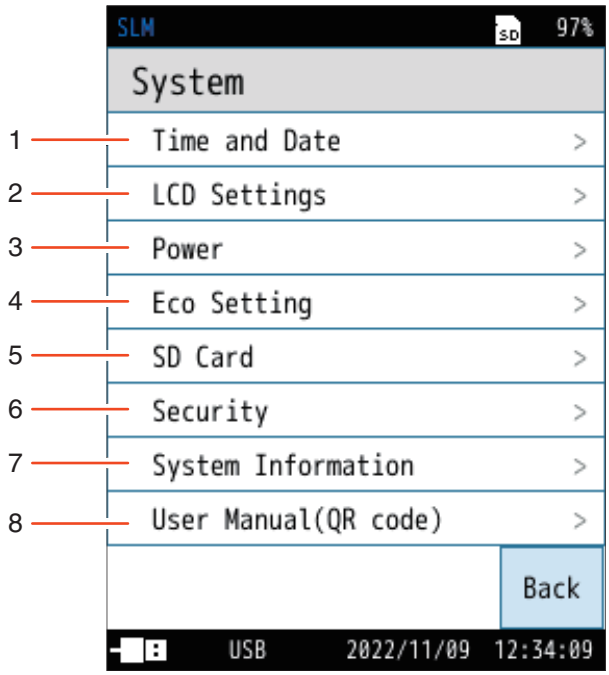
Touch [Menu] on the measurement screen to display the [Menu] screen.



No.	Name	Description
1	System	Displays the screen for setting items related to the system of the device (Page 40).
2	Display	Displays the screen for setting the calculated values and other items to be displayed on the measurement screen (Page 45).
3	Measure	Displays the screen for setting the number of measurement channels, correction and other items (Page 47).
4	Store	Displays the setting screen for calculating and saving measurement results (Page 51).
5	WR	Select this to record the waveform. It cannot be selected unless option program NX-43WR is installed. For details, refer to the instruction manual of Waveform Recording Program NX-43WR.
6	I/O	Displays the screen for setting the type and method of I/O signals, communication control and other items (Page 62).
7	Recall	Displays the screen for loading the data saved on the internal memory or SD card.
8	Option	Displays the screen for switching the function of the device to each program if optional programs are installed. You can also install optional programs from here.
9	Save/Load Settings	Displays a screen for saving the measurement settings or reading the settings and applying them to the device (Page 69).
10	Language	Displays the screen for setting the display language (Page 76).
11	Back	Returns to the previous screen.

6.2 System

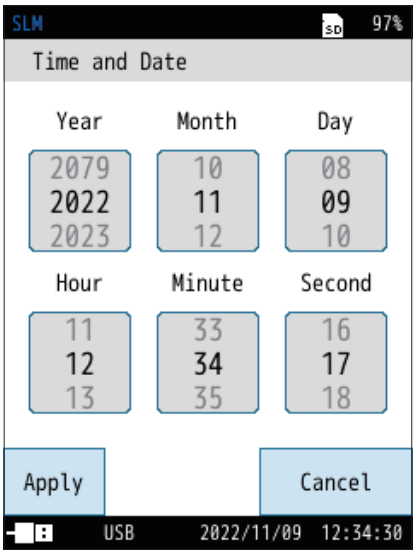
Configures the settings related to the system.



No.	Name	Description
1	Time and Date	Sets the year, month, day, hour, minute, and second of the built-in clock (Page 41).
2	LCD Settings	Sets the brightness of the backlight, backlight auto-off time, and LCD auto-off time (Page 41).
3	Power	Sets the type of batteries used in the device (Page 42).
4	Eco Setting	Applies the Eco setting to reduce power consumption (Page 42).
5	SD Card	Checks the capacity and free space of the SD card inserted in the device, and formats the SD card. This can be selected only when an SD card is inserted (Page 43).
6	Security	Sets the user name, password, and key lock (Page 43).
7	System Information	Sets the device model, serial number, index, and program version (Page 44).
8	User Manual (QR code)	Displays the QR code to RION website for Instruction Manuals (Page 44).

6.2.1 Time and Date

Sets the year, month, day, hour, minute, and second of the built-in clock.
Touch [Apply] to apply the settings.



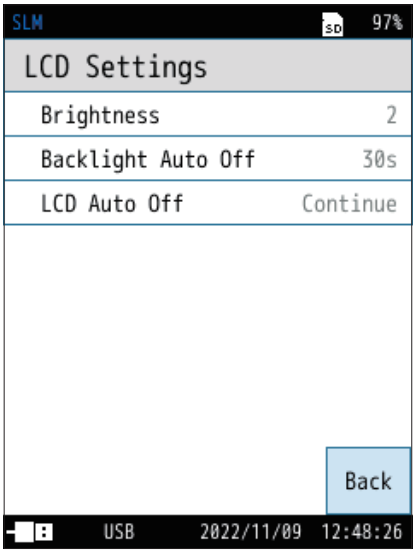
Note

- Make sure to set the time before taking measurements.

6.2.2 LCD Settings

Sets the brightness of the backlight, backlight auto-off time, and LCD auto-off time.

Item	Description
Brightness	Select the brightness of the backlight from 1 to 4. *Setting it to “4”, continuous operation time on batteries is shortened by about 50%, and setting it to “1”, by about 30% compared to automatic brightness change or the “screen off” operation.
Backlight Auto Off	30s: If no operation is performed for the selected time, the backlight will be darker than brightness level “1” and will be in the same state as the “screen off” state. 3m: (same as 30s) Continue: The backlight stays on.
LCD Auto Off (Auto, Timer Auto)	The continuous operating time with batteries is about 30% longer under this setting compared to when set to change to automatic brightness. 30s / 1m / 2m / 5m: When taking measurements, if no operation is performed within the selected time, the backlight will turn off completely. Continue: The backlight stays on.

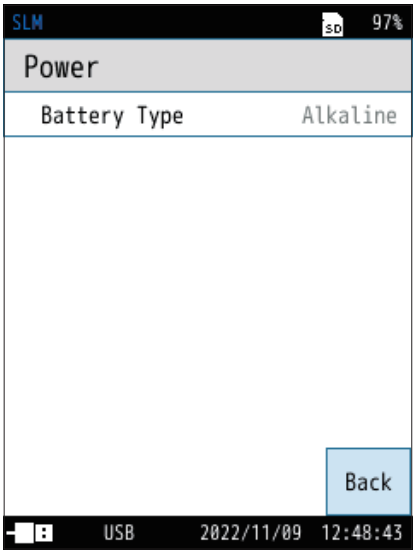


(s = seconds, m = minutes)

6.2.3 Power

Sets the type of batteries used in the device.
Incorrect settings may shorten the continuous operation time on batteries.

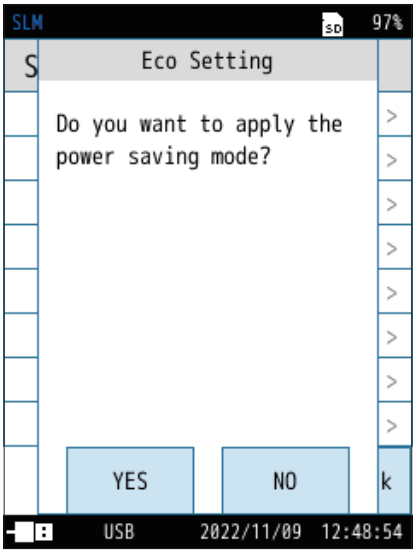
Item	Description	
Battery Type	Alkaline	Select this when using alkaline batteries.
	Nickel	Select this when using Ni-MH rechargeable batteries.



6.2.4 Eco Setting

Switches on/off the Eco setting, which reduces power consumption.
Executing the Eco setting (power saving) automatically changes the settings of the device as follows.

Item	Settings in power saving mode
Sub Channel Settings	Off
Backlight Auto Off	30s
LCD Auto Off	30s
Brightness	1
AC OUT	Off
DC OUT	Off
TCP (IO/USB/LAN)	Off
LCD auto off time during auto store	1m
Comparator	Off



Note

- [LCD Auto Off] is not displayed in Manual mode.

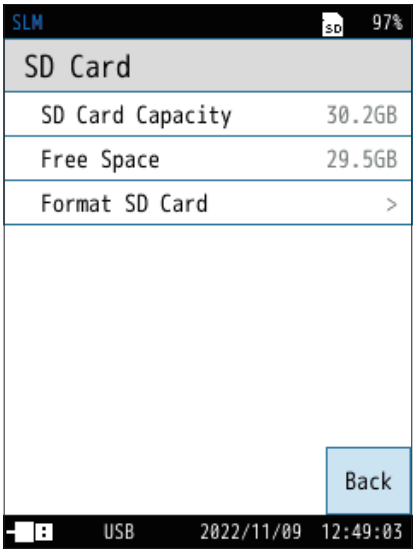
6.2.5 SD Card

Checks the capacity and free space of the SD card inserted in the device, and formats the SD card.
This can be selected only when an SD card is inserted.

Item	Description
SD Card Capacity	Displays the capacity of the SD card.
Free Space	Displays the free space of the SD card.
Format SD Card	Formats the SD card.

Note

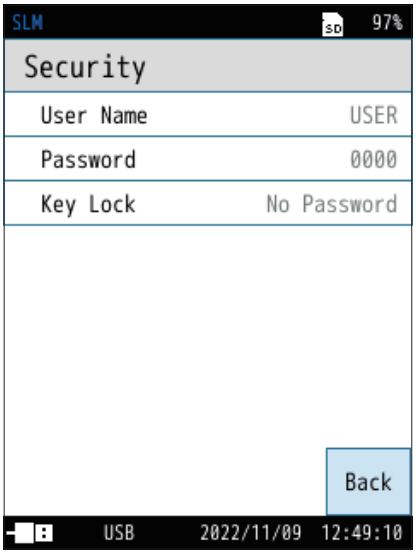
- For the card capacity and store time when performing Auto store, see “Card capacity and store time” (Page 168).



6.2.6 Security

Sets the user name, password, and key lock. User Name and Password are also used for security during LAN communication.

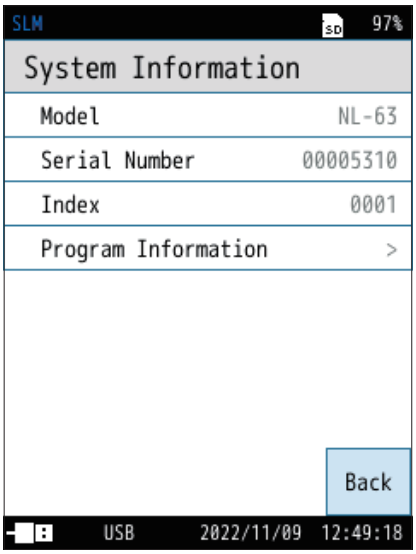
Item	Description
User Name	Sets the user name (1 to 12 characters). It is also used as the User Name for LAN communication.
Password	Sets the password for the key lock (4 characters). It is also used as a Password for LAN communication.
Key Lock	Sets whether to use a password for canceling the key lock.



6.2.7 System Information

Sets the device model, serial number, index, and program version.
Data cannot be recalled if the index at the time of recording is different from the set index.

Item	Description
Model	Displays the model number of the device.
Serial Number	Displays the serial number of the device.
Index	Displays the index of the device. Touch to change the number.
Program Information	Enables you to check the version of the program installed on the device.



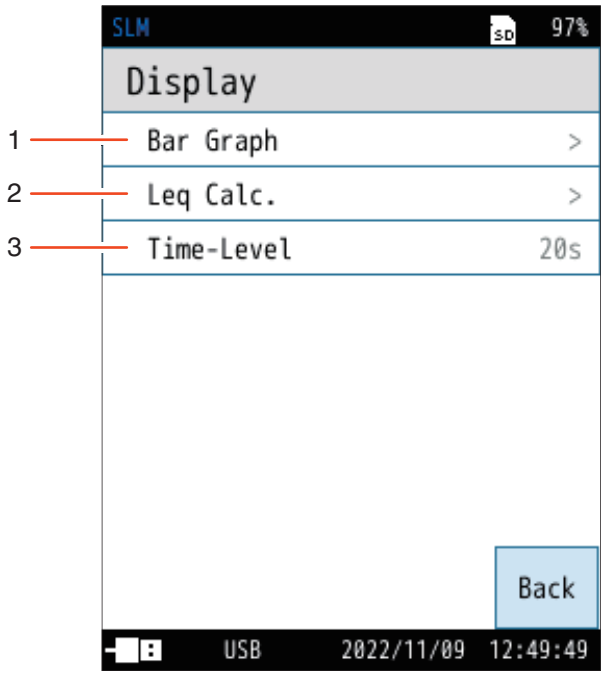
6.2.8 User Manual (QR code)

Displays the QR code to RION website for Instruction Manuals.
If you load it on your smartphone, etc., you will be taken to the website.

*The above QR code is an image.
It is different from the actual link.

6.3 Display

Sets the measurement amount and other items displayed on the measurement screen.

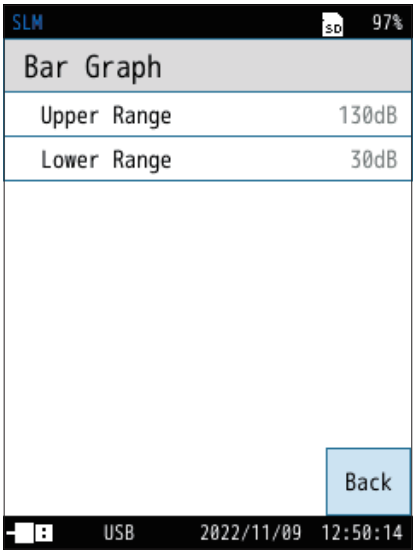


No.	Name	Description
1	Bar Graph	Sets the upper and lower limits of the bar graph (Page 45).
2	Leq Calc.	Sets the measurement amount to be displayed on the [Calculated value] screen (Page 46).
3	Time-Level	Sets whether to display Time-Level screen (Page 46).

6.3.1 Bar Graph

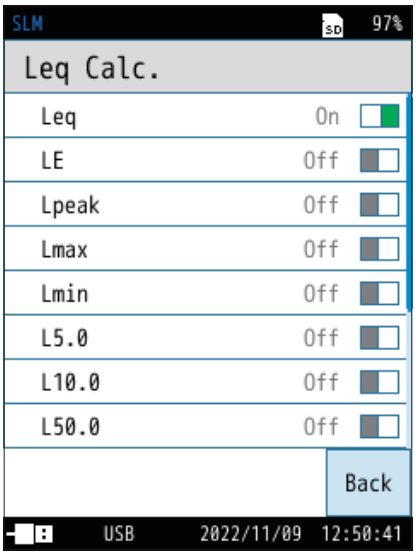
Sets the upper and lower limits of the bar graph.

Item	Description
Upper Range	Select the upper limit (dB) of the bar graph. The value that can be set is 70 dB to 130 dB in 10 dB increments.
Lower Range	Select the lower limit (dB) of the bar graph. The value that can be set is 20 dB to 60 dB in 10 dB increments.



6.3.2 Leq Calc.

Sets the measurement amount to be displayed on the measurement screen.
The setting switches between turning on/off each time you touch.
L_{eq} calculation (statistical calculation for a certain interval such as L_{eq}, L_E, L_{max}, L_{min}, L_{peak}, L_N, L_{leq}, $L_{eq,mov}$ and L_{tm5}) is measured at the same time. Turn on the calculated value you want to display.



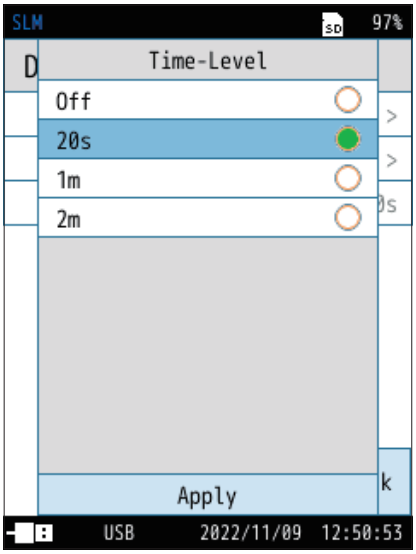
Item	Description
On	Displays the calculated value of the target on the measurement screen.
Off	Does not display the calculated value of the target on the measurement screen.

Note

- Calculated values which is selected [Off] in this setting are measured and saved.
- L_{tm5} calculation and back erase function cannot be set at the same time.

6.3.3 Time-Level

Sets whether to display Time-Level.

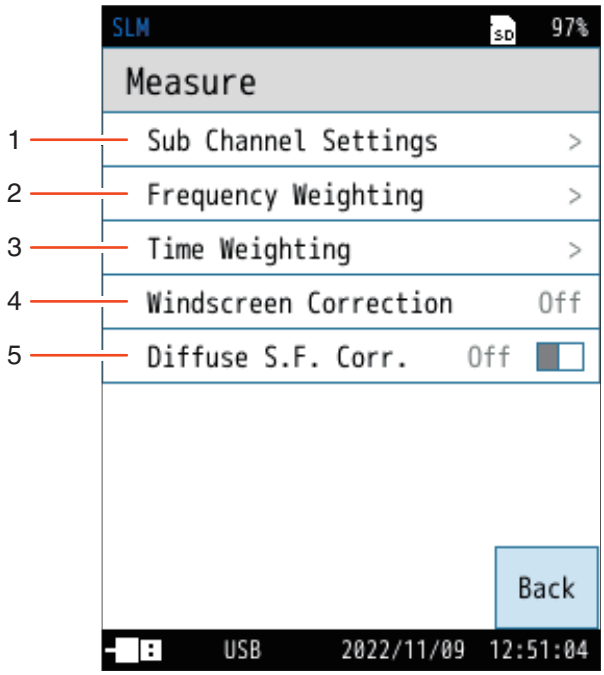


(s = seconds, m = minutes)

Item	Description
Off	Does not display the [Time-Level] screen.
20s	Displays the [Time-Level] screen. Select the screen horizontal axis (time).
1m	
2m	

6.4 Measure

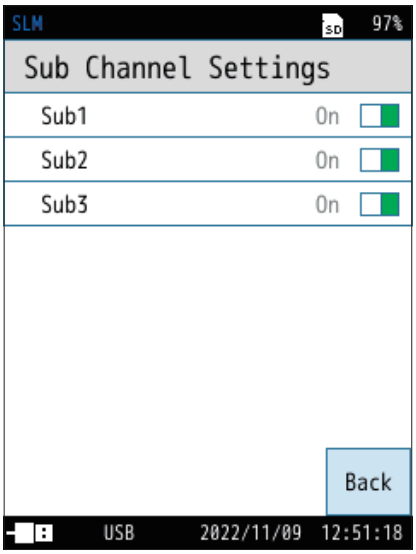
Sets the number of measurement channels, correction and other items.



No.	Name	Description
1	Sub Channel Settings	Sets On/Off for sub channel (Sub1 to Sub3) display (Page 48).
2	Frequency Weighting	Sets the frequency weighting for each channel (Page 48).
3	Time Weighting	Sets the time weighting for each channel (Page 49).
4	Windscreen Correction	Compensates for variations in sensitivity and frequency response due to attachment of the windscreen. Set to [On] when a windscreen is mounted to the device (Page 49).
5	Diffuse S. F. Corr.	Compensates for variations in sensitivity and frequency response in diffuse sound fields for free fields. Set to [On] when measuring in a diffuse sound field (Page 50).

6.4.1 Sub Channel Settings

When set to [On], the sub channel sound level L_p is displayed on the measurement screen at the same time as the main channel.
The calculated values are also displayed for each channel.

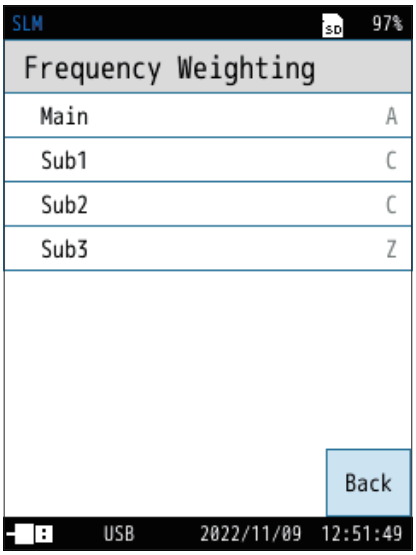


Note

- Sub channel sound level data are also saved at the same time as the main channel and can be viewed on the [Recall] screen (Page 85).

6.4.2 Frequency Weighting

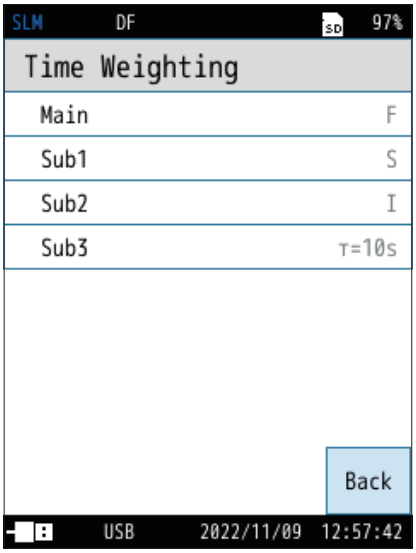
Sets the frequency weighting for each channel.



Item	Description
A	Sets A-weighting. A frequency filter that accounts for the relative loudness perceived by the human ear, and is selected when measuring general environmental noise.
C	Sets C-weighting. A frequency filter is applied that attenuates low-frequency range equal to or below 31.5 Hz and the high-frequency range equal to or above 8 kHz. In general, C-weighting may be used to reduce background noise such as wind noise for frequency analysis, or to measure loud sounds.
Z	Sets Z-weighting. A flat frequency filter is applied over the specified measurement frequency range. Select when measuring sound levels (physical quantity) over a wide band, or when performing frequency analysis of the measured sound.
G	Sets G-weighting. A frequency filter is applied that accounts for the relative loudness perceived by the human ear by infrasound. Select when evaluating the psychological and physiological effects of infrasound from 1 Hz to 20 Hz.
Z (HPF)	Sets Z-weighting and high-pass filter.
Z (LPF100Hz)	Sets Z-weighting and low-pass filter (cutoff frequency 100 Hz).
Z (LPF500Hz)	Sets Z-weighting and low-pass filter (cutoff frequency 500 Hz).

6.4.3 Time Weighting

Sets the time weighting for each channel.



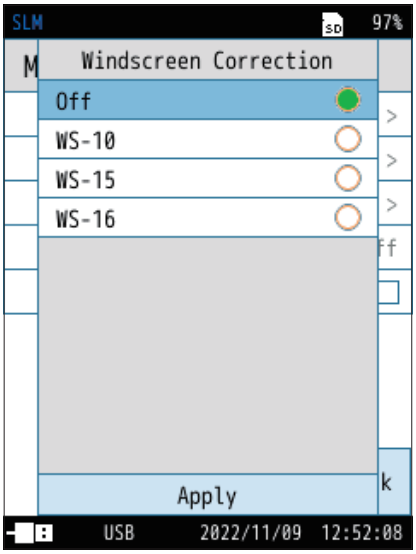
Item	Description
F	Sets F (Fast). Select this when measuring general noise, especially fluctuating sound. This is usually used for measuring noise levels and sound levels.
S	Sets S (Slow). Select this to pick up sounds with little fluctuation or the average values of fluctuating sounds. This is used for measuring noise such as express trains and regular railway sounds, etc. It is also commonly used to measure low frequency sounds.
I	Sets I (Impulse). This responds to short, continuous sounds more quickly than F (fast) in the onset.
τ=10s	Sets 10s. S (Slow) is usually used to measure low frequency sound, but this setting with a larger time constant τ may be used in order to accurately capture the magnitude of infrasound of about 1 Hz. However, care must be taken because it becomes difficult to capture sounds that fluctuate in a short period of time.

Note

- The device uses high-speed sampling (20.8 μs) data for the sound pressure waveforms for L_{eq} and L_E calculation, and so it is not affected by time weighting.

6.4.4 Windscreen Correction

Compensates for variations in sensitivity and frequency response due to attachment of the windscreen.
Set to [On] when a windscreen is mounted to the device.
Refer to the “Technical Guide” for details on windscreen correction.



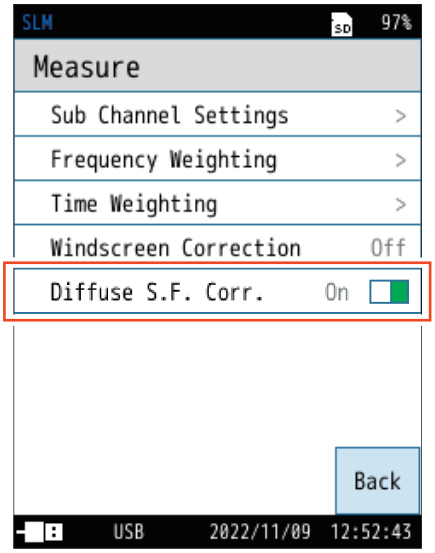
Item	Description
Off	Does not use windscreen correction.
WS-10	Compensates for variations in sensitivity and frequency response due to attachment of Windscreen WS-10. Select this when attaching WS-10.
WS-15	Compensates for variations in sensitivity and frequency response due to attachment of All-Weather Windscreen WS-15. Select this when attaching WS-15.
WS-16	Compensates for variations in sensitivity and frequency response due to attachment of Rain-protection Windscreen WS-16. Select this when attaching WS-16.

6.4.5 Diffuse S.F. Corr.

Compensates for variations in sensitivity and frequency response in diffuse sound fields for free fields.
Set to [On] when measuring in a diffuse sound field.
For details, refer to the “Technical Guide”.

Item	Description
On	Uses diffuse sound field correction
Off	Does not use diffuse sound field correction

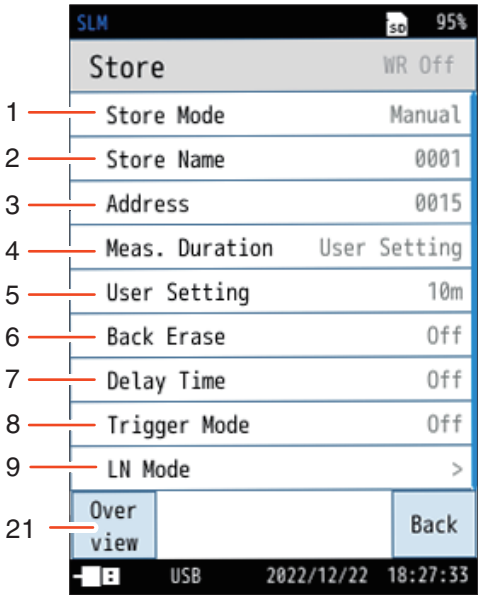
When [On] is selected, [DF] is displayed at the top of the screen.



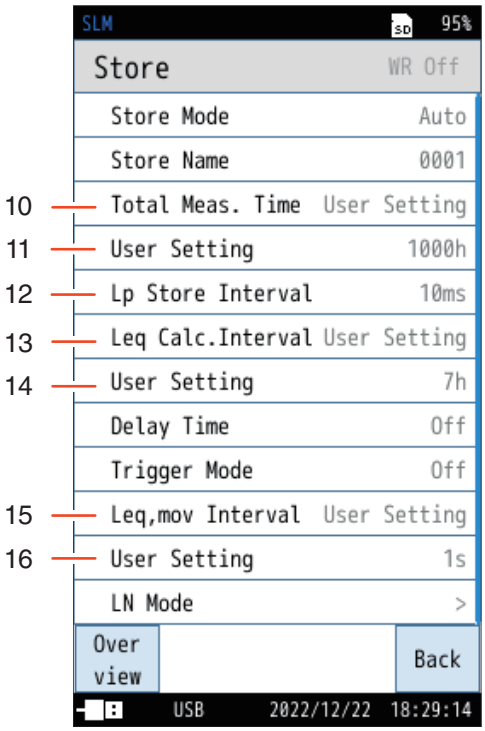
6.5 Store

Sets the store conditions, etc. for saving calculation results.

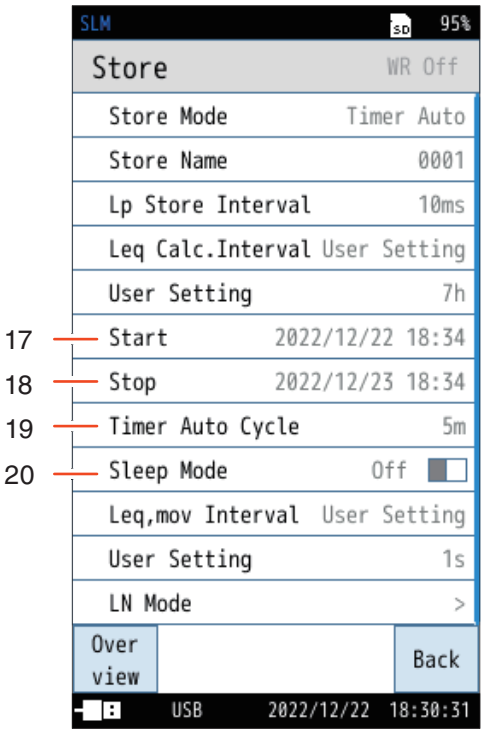
Manual mode



Auto mode



Timer Auto mode



No.	Name	Description
1	Store Mode	Sets the store mode of store operations. You can select from [Manual], [Auto], and [Timer Auto] (Page 53).
2	Store Name (the same for each mode)	Sets the identification number of the store data (0000 to 9999) (Page 53).
3	Address (Manual)	Sets the identification number of the store address (0001 to 1000) (Page 53).
4	Meas. Duration (Manual)	Select a measurement time (Page 54).
5	User Setting (Manual)	In [Meas. Duration], if you select [User Setting], it will be displayed on the store screen, and you can set the measurement time to a time of your choice. The maximum time that can be set is 24 hours (Page 54).
6	Back Erase (Manual)	Sets the function to omit data immediately before the interruption in the calculation when the measurement is interrupted (Page 55). L_{tm5} is not calculated when back erase function is set.
7	Delay Time (Manual, Auto)	Sets the delay time from when the measurement start operation is performed to when measuring actually starts (Page 55). This can be selected only when [Trigger Mode] is set to [Off].
8	Trigger Mode (Manual, Auto)	For the trigger for starting measurement, you can select from a level or an external trigger (Page 56).
9	LN Mode (the same for each mode)	Sets the sampling date and changes the L1 to L99 value for LN1 to LN5 (Page 56).
10	Total Meas. Time (Auto)	Sets the total measurement time in Auto mode (Page 57).
11	User Setting (Auto)	In [Total Meas. Time], if you select [User Setting], you can set the total measurement time to a time of your choice. In Auto mode, the maximum time that can be set is 1,000 hours (Page 57).
12	Lp Store Interval (Auto, Timer Auto)	Sets the L_p (sound level) store interval in Auto mode and Timer Auto mode (Page 57).
13	Leq Calc.Interval (Auto, Timer Auto)	Sets the calculation interval of L_{eq} calculation (L_{eq}, $L_{eq,mov}$, L_E, L_{max}, L_{min}, L_{peak}, L_N, L_{tm5} and L_{leq}) in Auto mode and Timer Auto mode (Page 58).
14	User Setting (Auto, Timer Auto)	If you select [User Setting] in [Leq Calc.Interval], it will be displayed on the [Store] screen, and you can set a L_{eq} calculation interval of your choice. The maximum time that can be set is 24 hours (Page 58).
15	Leq,mov Interval (Auto, Timer Auto)	Sets the calculation interval of $L_{eq,mov}$ calculation in Auto mode and Timer Auto mode (Page 58).
16	User Setting (Auto, Timer Auto)	If you select [User Setting] in [Leq,mov Interval], it will be displayed on the [Store] screen, and you can set a $L_{eq,\ mov}$ interval of your choice. The maximum time that can be set is 1 hour (Page 58).
17	Start (Timer Auto)	Sets the measurement start time in Timer Auto mode (Page 60).
18	Stop (Timer Auto)	Sets the measurement stop time in Timer Auto mode (Page 60).
19	Timer Auto Cycle (Timer Auto)	Sets the timer auto cycle time in Timer Auto mode (Page 60).
20	Sleep Mode (Timer Auto)	Sets whether to use sleep mode while measuring in Timer Auto mode (Page 61).
21	Overview (the same for each mode)	Displays an overview of the store settings (Page 61).

6.5.1 Store Mode

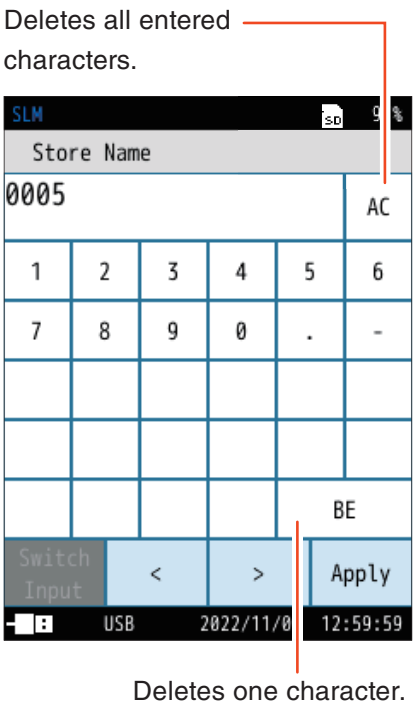
Sets the store mode.
You can select from [Manual], [Auto], and [Timer Auto].
For details, refer to “Store Operations” (Page 80).

6.5.2 Store Name (the same for each mode)

Sets the identification number of the store data.
Enter the store name using four digits (0000-9999).

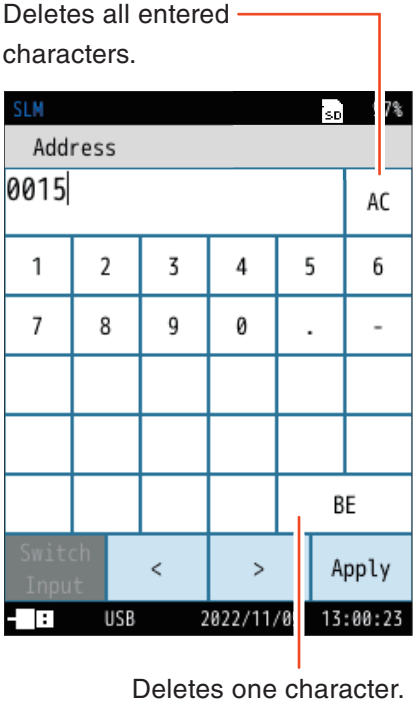
Note

- An SD card is required to set the store name.
- This cannot be set when saving data to the internal memory.



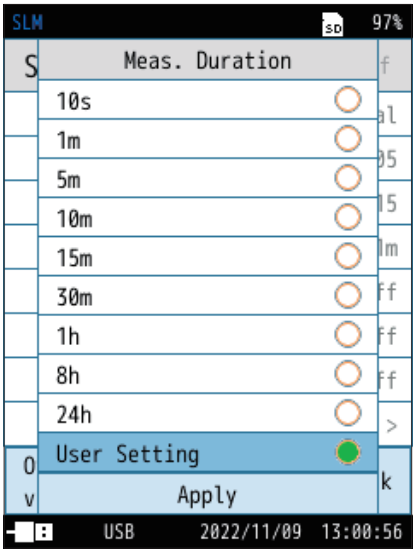
6.5.3 Address (Manual mode)

Sets the identification number of the store address in Manual mode.
Enter the store address using four digits (0001-1000).



6.5.4 Meas. Duration (Manual mode)

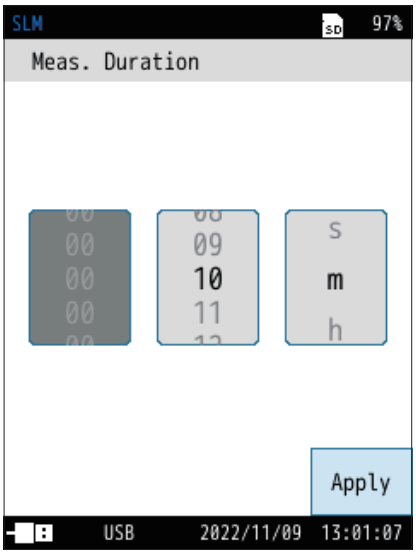
Select the measurement time in Manual mode.
If you select [User Setting], you can set the measurement time to a time of your choice.



(s = seconds, m = minutes, h = hours)

6.5.5 User Setting (Manual mode)

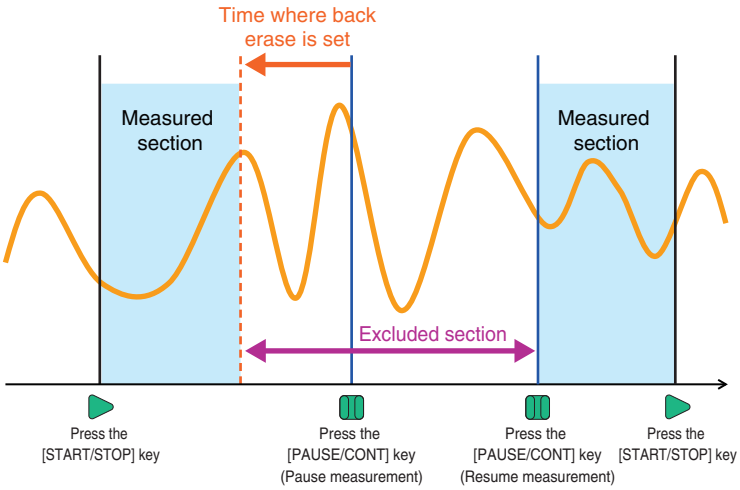
In [Meas. Duration] in Manual mode, if you select [User Setting], you can set the measurement time to a time of your choice.
The time that can be set is from 1 second to 24 hours.

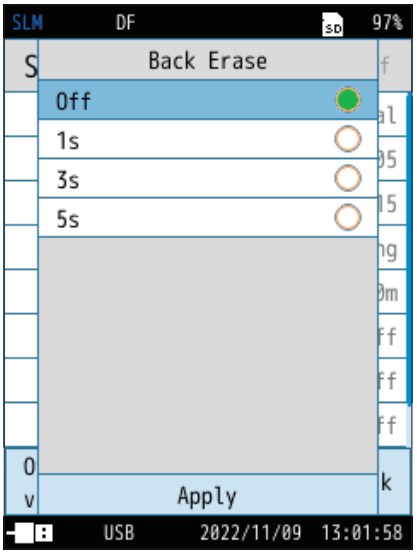


(s = seconds, m = minutes, h = hours)

6.5.6 Back Erase (Manual mode)

Sets the function to omit data immediately before the interruption in the calculation when the measurement is interrupted in Manual mode.
Once this is set, the setting value is displayed at the top of the screen.





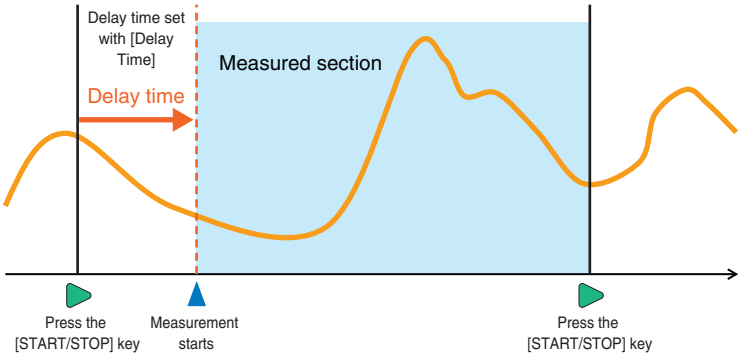
(s = seconds)

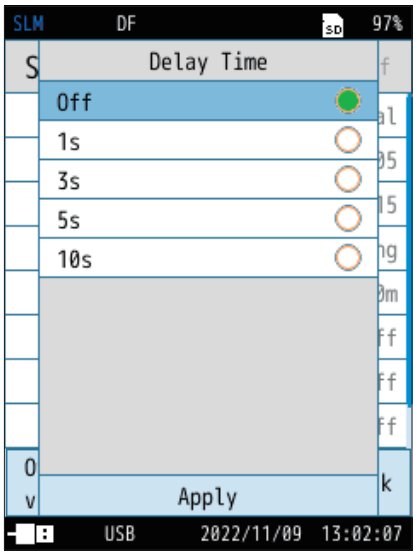
Note

- When [Wave Rec. Mode] of waveform recording is [On], the back erase function is disabled.

6.5.7 Delay Time (Manual mode, Auto mode)

Sets the delay time from when the measurement start operation is performed in Manual mode and Auto mode, to when measuring actually starts.
Once this is set, the setting value is displayed at the top of the screen.
This can be selected only when [Trigger Mode] is set to [Off].

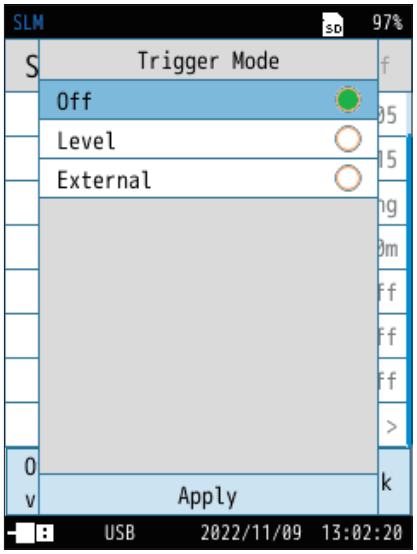




(s = seconds)

6.5.8 Trigger Mode (Manual mode, Auto mode)

For the trigger for starting measurement in Manual mode and Auto mode, you can select from level or an external trigger.
For details about level and external triggers, see “When [Comparator] is selected” (Page 66).

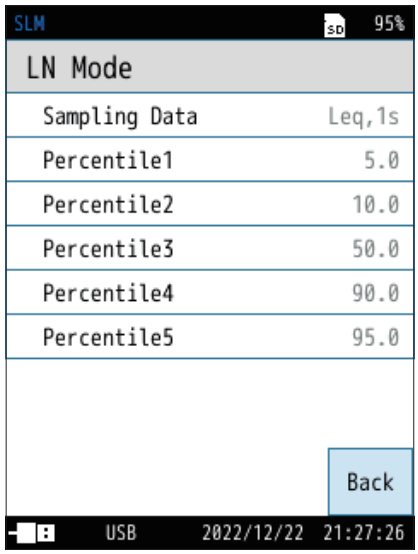


Note

- Level trigger: Measurement starts when the specified channel exceeds the specified level.
- External trigger: Measurement starts when the Comparator Output / Trigger Input Cable (CC-43CT) connected to the I/O port are shorted.
- Trigger Mode cannot be used together with the following functions.
  - Delay Time
  - Level recording (when the Waveform Recording Program NX-43WR is installed)
  - I/O port functions

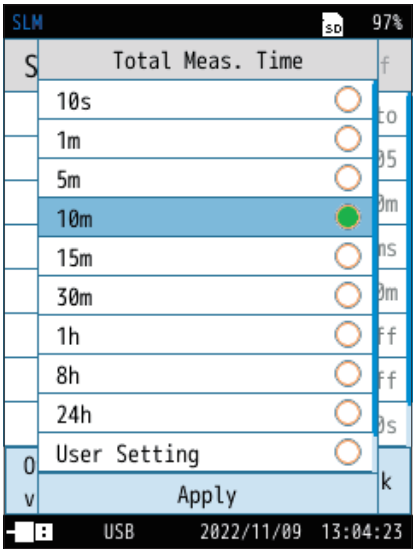
6.5.9 LN Mode (the same for each mode)

Sets the Sampling Data which would be used for calculation L_N and changes the Percentile 1 to 5 value for LN Mode (the value of Percentile 1 to 5 can be set from L0.1 to L99.9, 0.1 incremental steps).



6.5.10 Total Meas. Time (Auto mode)

Sets the total measurement time in Auto mode.
If you select [User Setting], you can set the measurement time to a time of your choice.
When [Continue] is selected, the measurement will continue until the SD card runs out of space.



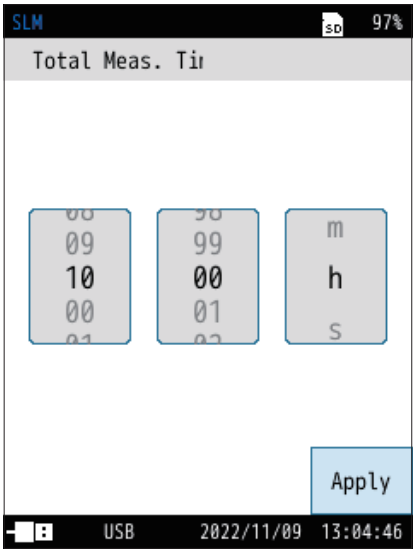
(s = seconds, m = minutes, h = hours)

6.5.11 User Setting (Auto mode)

In [Total Meas. Time] in Auto mode, if you select [User Setting], you can set the total measurement time to a time of your choice.
The time that can be set is from 1 second to 1000 hours.

Note

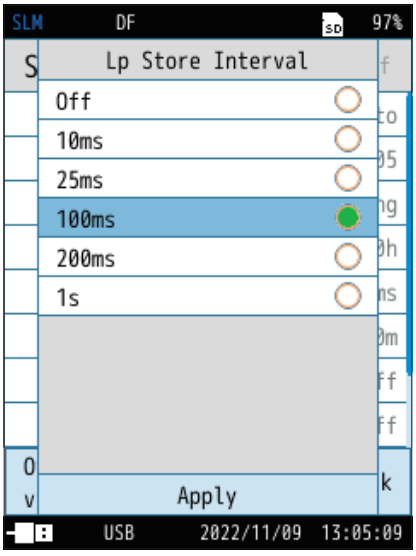
- Set the [Total Meas. Time] to [Continue] when measuring over 1000 hours.



(s = seconds, m = minutes, h = hours)

6.5.12 Lp Store Interval (Auto mode, Timer Auto mode)

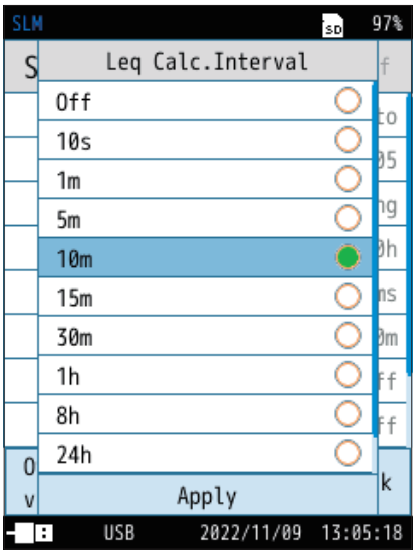
Sets the L_p (sound level) store interval in Auto mode and Timer Auto mode.



(ms = milliseconds, s = seconds)

6.5.13 Leq Calc.Interval (Auto mode, Timer Auto mode)

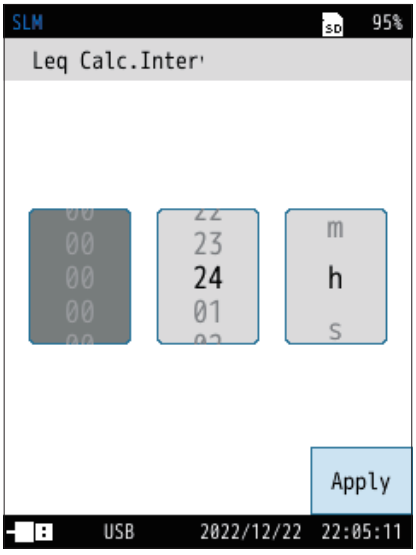
Sets the calculation interval of L_{eq} calculation (L_{eq}, $L_{eq,mov}$, L_E, L_{max}, L_{min}, L_{peak}, L_N, L_{tm5} and L_{leq}) in Auto mode and Timer Auto mode.
If you select [User Setting], you can set the value of your choice.



(s = seconds, m = minutes, h = hours)

6.5.14 User Setting (Auto mode, Timer Auto mode)

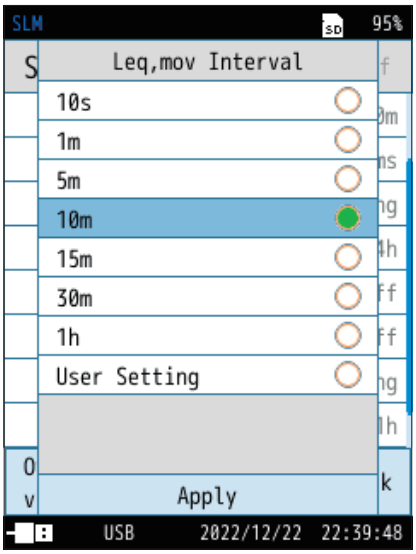
If you select [User Setting] in [Leq Calc. Interval], you can set the L_{eq} calculation interval of your choice.
The time that can be set is from 1 second to 24 hours.



(s = seconds, m = minutes, h = hours)

6.5.15 Leq,mov Interval (Auto mode, Timer Auto mode)

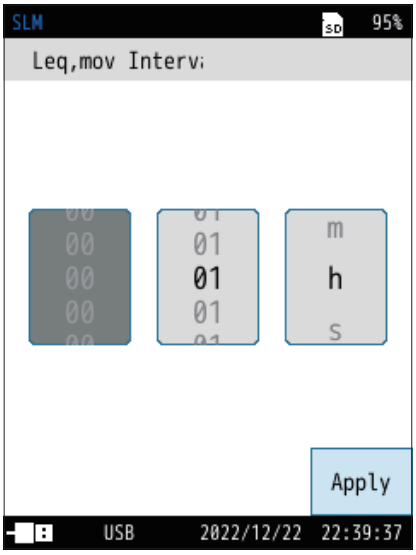
Sets the calculation interval of Moving L_{eq} ($L_{eq,mov}$) calculation in Auto mode and Timer Auto mode.
If you select [User Setting], you can set the value of your choice.



(s = seconds, m = minutes, h = hours)

6.5.16 User Setting (Auto mode, Timer Auto mode)

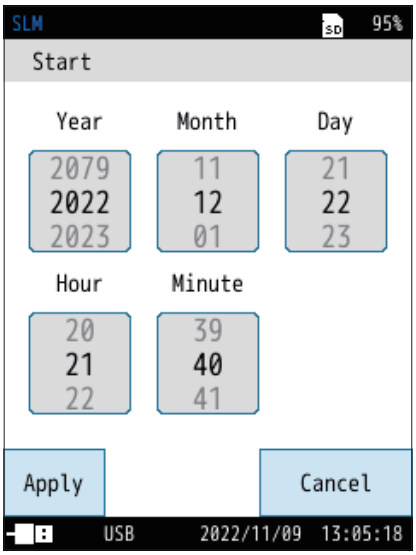
If you select [User Setting] in [Leq,mov Interval], it will be displayed on the [Store] screen, and you can set a Leq, mov interval of your choice.
The maximum time that can be set is 1 hour.



(m = minutes, h = hours)

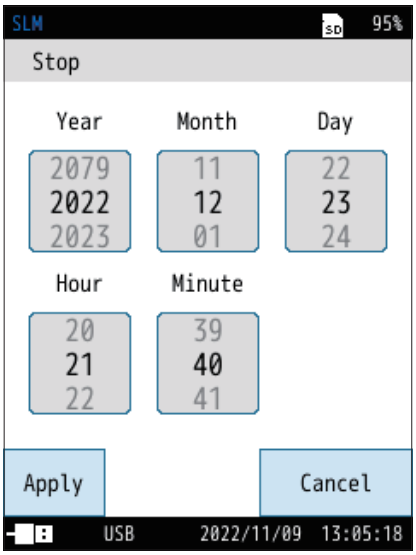
6.5.17 Start (Timer Auto mode)

Sets the measurement start time in Timer Auto mode.
When you open the setting screen for the first time, the time five minutes from the current time is displayed.



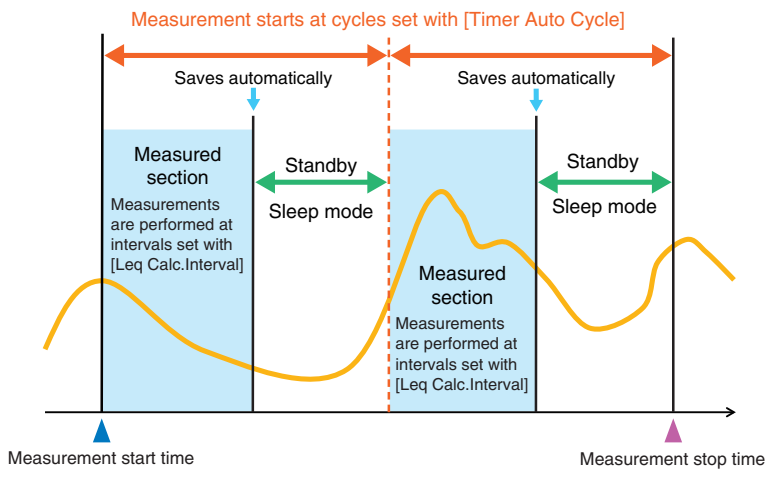
6.5.18 Stop (Timer Auto mode)

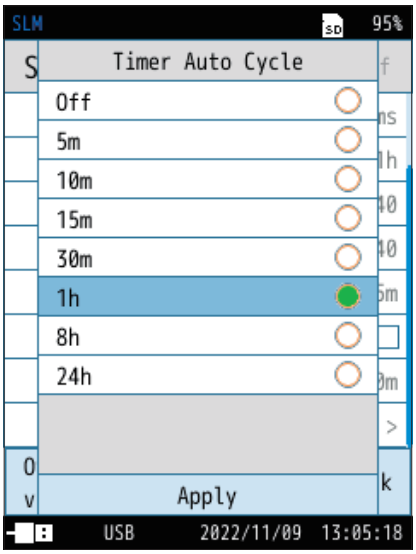
Sets the measurement stop time in Timer Auto mode.
When you open the settings screen for the first time, the time 24 hours from the start time is displayed.



6.5.19 Timer Auto Cycle (Timer Auto mode)

Sets the timer auto cycle time in Timer Auto mode.

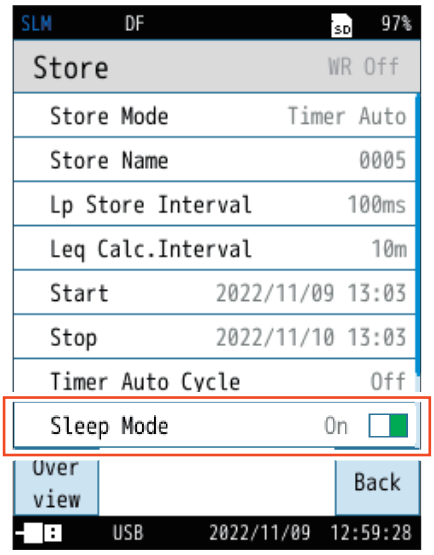




6.5.20 Sleep Mode (Timer Auto mode)

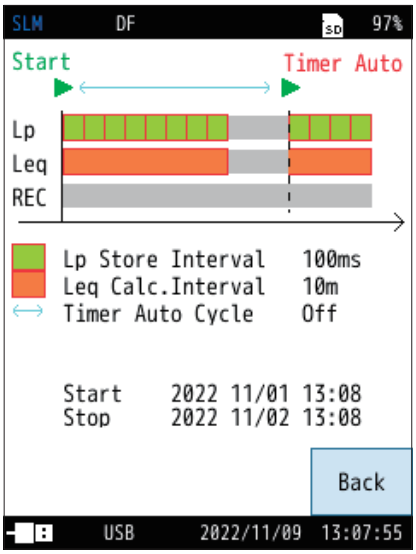
Sets whether to use sleep mode while measuring in Timer Auto mode.
When the sleep mode is [On], after about 30 seconds have passed after pressing the START/STOP key and measuring goes into standby, the device will enter its low-power mode.
In the low-power mode, the power consumption is about 1/20 compared to Auto store (LCD turned off) when Eco is set. The device remains in the low-power mode even while in standby between measurements.

- During the low power consumption state, the LCD turns off and the indicator LED flashes blue every 5 seconds.
- About 90 seconds before starting measurements, the device wakes from its low-power mode and goes into stand-by until starting measuring.
- Press and hold the POWER key to wake up, and the measurement settings will be displayed during standby. If no operation is made, the device will reenter the low-power mode (the device will not respond to other keys).
- In addition to turning off the LCD display during sleep mode, the AC/DC output, USB, comparator, and RS-232C functions are also turned off. If you need to use the functions above, turn off the sleep mode setting.



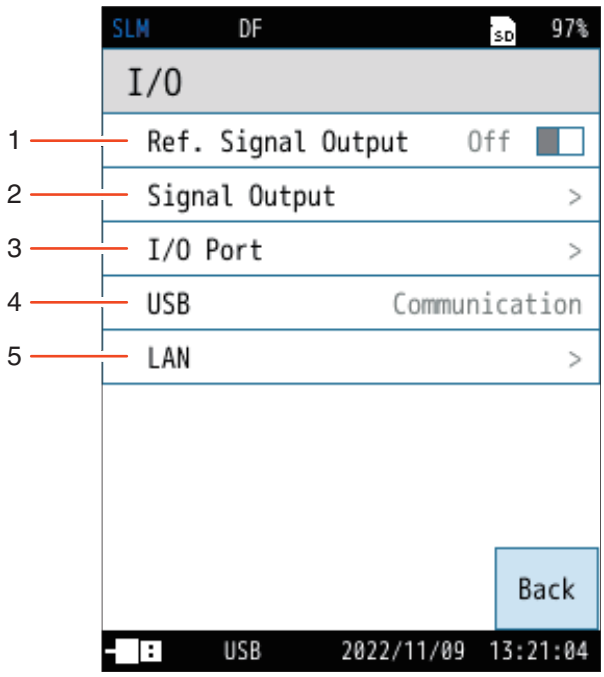
6.5.21 Overview

Displays an overview of the store settings.
The stored values are displayed with the horizontal axis as the measurement time.



6.6 I/O

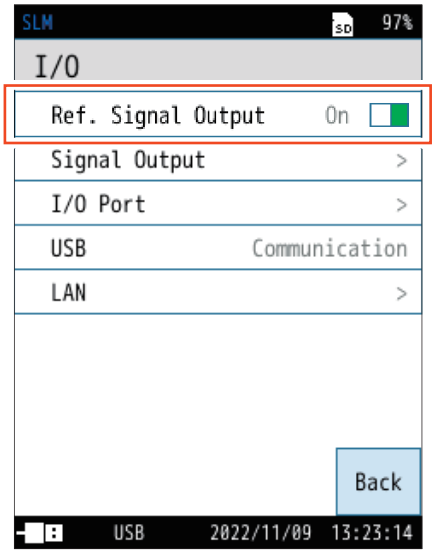
This screen is used to set the types of signals to be input and output externally.



No.	Name	Description
1	Ref. Signal Output	Outputs the reference signal (Page 63).
2	Signal Output	Sets the AC and DC output (Page 63).
3	I/O Port	Sets the I/O port on the bottom of the device (Page 65).
4	USB	Sets the USB port on the bottom of the device (Page 68).
5	LAN	Sets the LAN port on the bottom of the device (Page 68).

6.6.1 Ref. Signal Output

When set to [On], a reference signal is output from inside the main unit and used for calibrating external devices and wave recording data.
Cal is displayed on the screen at this time.
Frequency : 1 kHz
Output Level : Bar graph range upper limit – 6 dB



Note

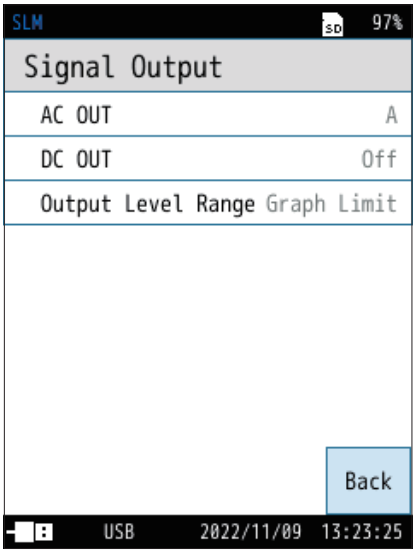
When the [Ref. Signal Output] is set to [On], the following settings are automatically changed (the settings will not return to as they were even if [Ref. Signal Output] is set to [Off]).

- Sub channel : OFF
- Windscreen Correction : OFF
- Diffuse S.F. Corr. : OFF
- Time Weighting : F
- Frequency Weighting (Main channel, Waveform Recording, AC OUT)
  When G-weighting is set, it will change to C-weighting
  When Z-weighting (LPF100 Hz) is set, it will change to Z-weighting
  When Z-weighting (LPF500 Hz) is set, it will change to Z-weighting

6.6.2 Signal Output

Sets the AC and DC output.

Item	Description
AC OUT	Sets the AC signal output from the AC/DC port on the bottom of the device (Page 131).
DC OUT	Sets the DC signal output from the AC/DC port on the bottom of the device (Page 135).
Output Level Range	Sets the upper limit of the output level range.



Important

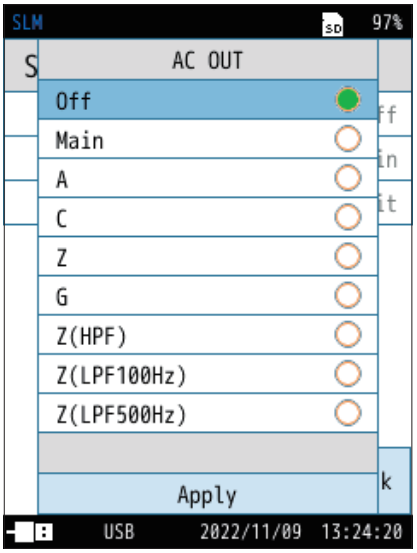
- Make sure that the dedicated cable and AC/DC Output Splitter Cable CC-43S are connected. Connecting with the wrong cable and adapter may damage the main unit.

Note

- Simultaneous output of AC output and DC output is possible. To output either AC output or DC output, use CC-24. To output them simultaneously, use CC-43S.
- If either the AC output or DC output is turned ON while the CC-43S stereo output cable is connected, the output will be from channel 1.
  When both are ON, AC output is output from channel 1.
  If either AC or DC is turned ON with the stereo output cable connected, the output will always be from channel 1.
  If both are turned ON, AC output will be output from channel 1 and DC output will be output from channel 2.

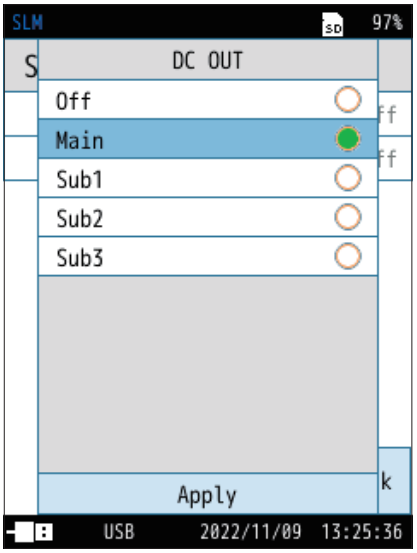
AC OUT

Item	Description
Off	No AC signal is output.
Main	Outputs an AC signal corresponding to the sound pressure waveform after frequency weighting. Applies the frequency weighting set in the selected channel.
Sub1	
Sub2	
Sub3	
A	Outputs an AC signal corresponding to the sound pressure waveform after frequency weighting. Applies the selected frequency weighting.
C	
Z	
G	
Z(HPF)	
Z(LPF100Hz)	
Z(LPF500Hz)	



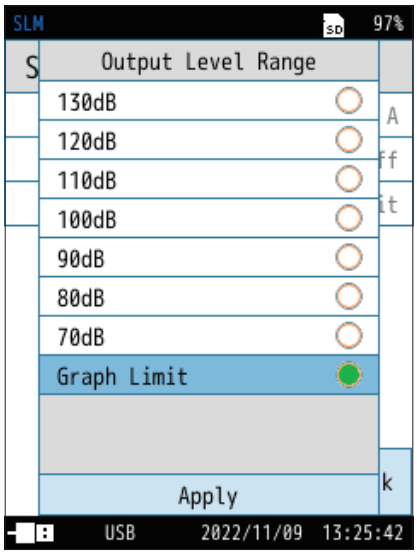
DC OUT

Item	Description
Off	No DC signal is output.
Main	Outputs a DC signal corresponding to the sound level (L_p) after frequency weighting and time weighting. Applies the frequency weighting and time weighting set for the selected channel.
Sub1	
Sub2	
Sub3	



Output Level Range

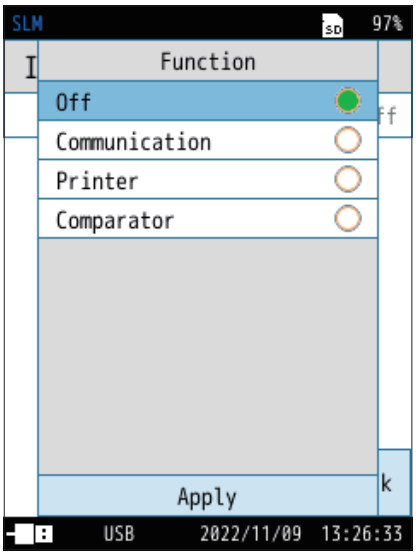
Item	Description
130dB	Sets the upper range of AC output and DC output. When set to 70 dB to 130 dB, the displayed text color changes (Page 32).
120dB	
110dB	
100dB	
90dB	
80dB	
70dB	
Graph Limit	Sets it to the same upper limit as the bar graph.



6.6.3 I/O Port

Sets the I/O port on the bottom of the device.

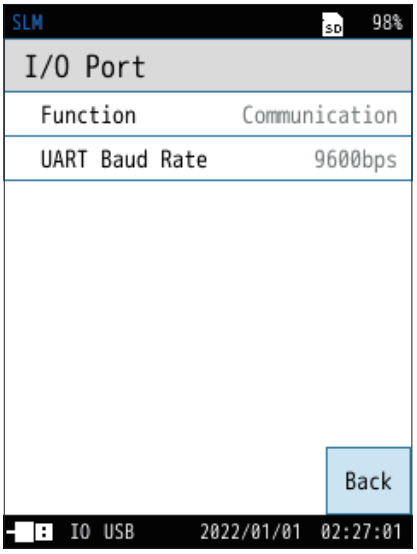
Item	Description
Off	Turns off the I/O setting of the I/O port.
Communication	Measurement values can be acquired and settings can be changed by using communication commands.
Printer	The contents on the screen can be printed using the dedicated printer DPU-414 or BL2-58. * DPU-414 and BL2-58 are no longer manufactured and sold.
Comparator	Sets the comparator signal (open collector signal for external device control).



When [Communication] is selected

Measurement values can be acquired and the baud rate can be changed by using communication commands.

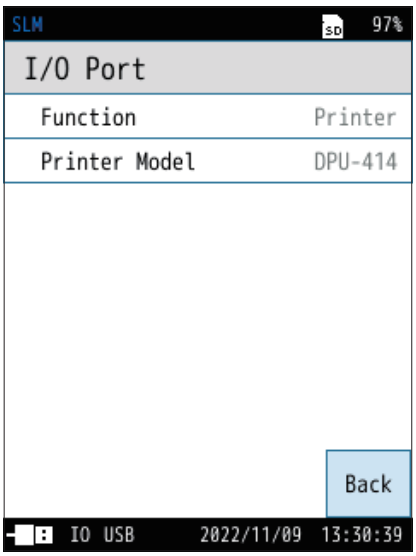
Item	Description
UART Baud Rate	The baud rate can be selected from 9600 bps, 19200 bps, 38400 bps, 57600 bps, and 115200 bps.



When [Printer] is selected

The contents on the screen can be printed using the dedicated printer DPU-414 or BL2-58.

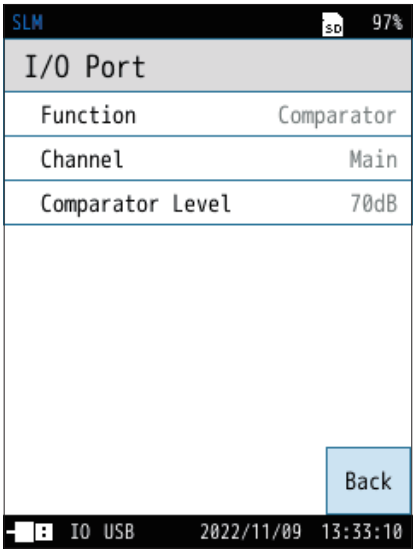
Item	Description
DPU-414	Select the printer to use from DPU-414 and BL2-58.
BL2-58	



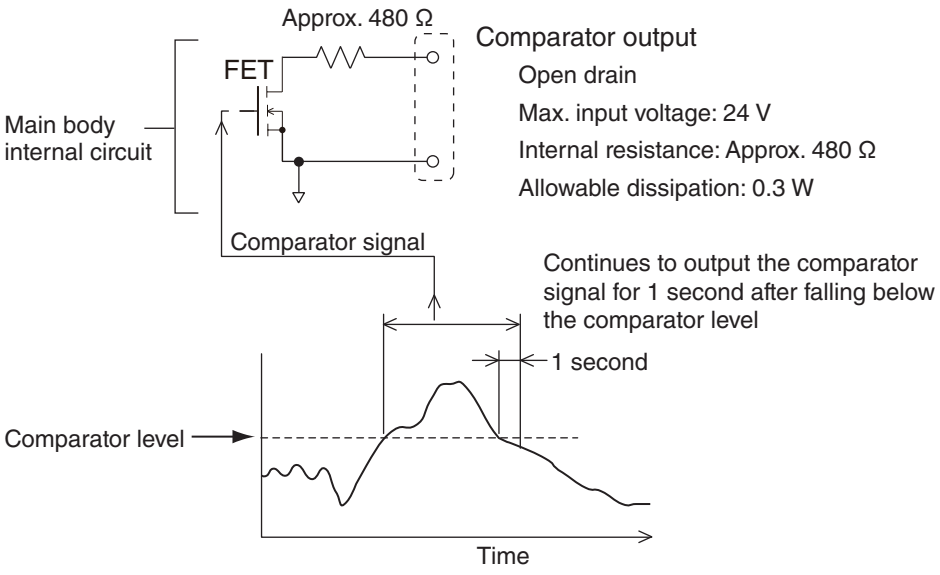
When [Comparator] is selected

The comparator output turns on when the specified channel exceeds the set level.

Item	Description
Channel	Select the channel to be subject to the comparator's judgment.
Comparator Level	Sets the level for which the comparator output is turned on.

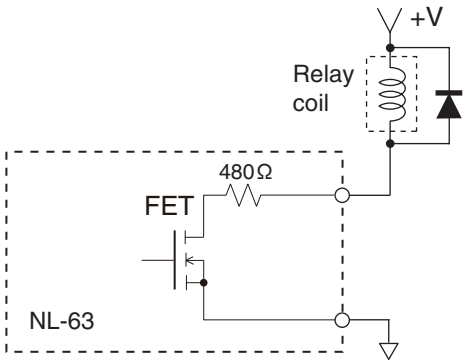


- **Comparator output**



• Example of comparator output circuit

An example of a circuit for controlling a relay by the comparator output of NL-63 is shown below.

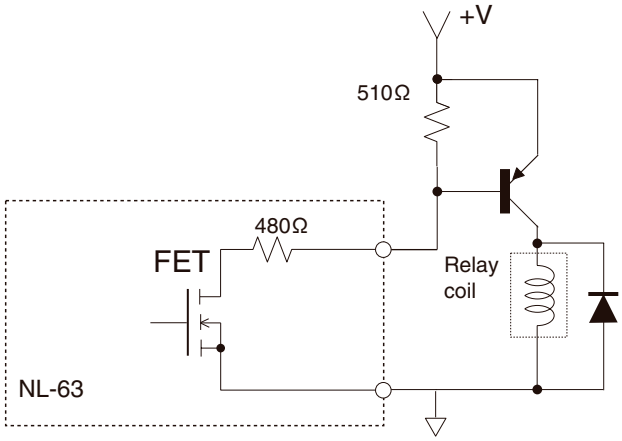


The voltage applied to the relay when the comparator is turned on is per the following formula.

$$Vr = (Rr / (Rr + 480)) \times V$$

Vr : voltage (V) applied to the relay
Rr : relay coil resistance (Ω)
V : power supply voltage (V) of the circuit used

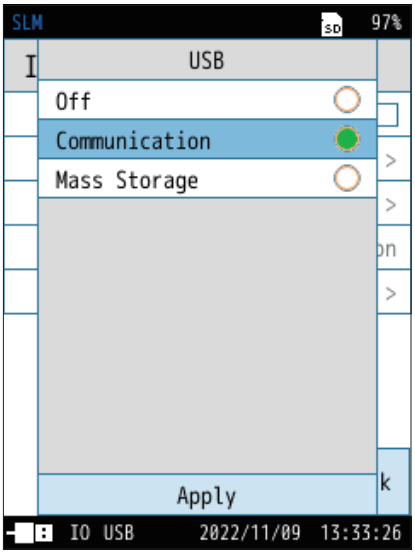
If the coil resistance of the relay used is large enough compared to the internal resistance of 480 Ω in the NL-63, most of the power supply voltage will be applied to the relay.
If the coil resistance is not large enough, the voltage applied to the relay will be divided between the internal resistors within the NL-63. As a result, if the operating voltage of the relay is not achieved, the following electrical circuit should be used to eliminate the effects of the internal resistance within the NL-63.



6.6.4 USB

Sets the USB port on the bottom of the device.

Item	Description
Off	Turns off the I/O setting of the USB port.
Communication	Measurement values can be acquired and settings can be changed by using communication commands.
Mass Storage	Enables the transferring of data by making the computer recognize the SD card as a removable disk.



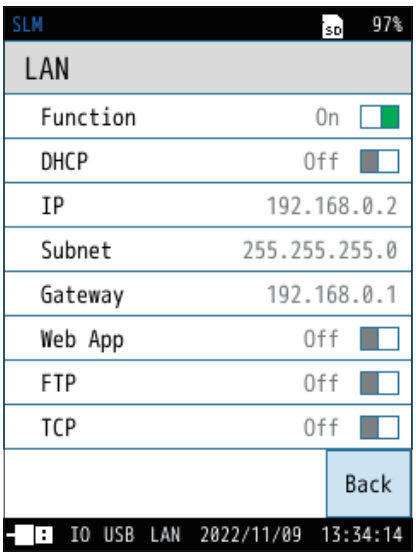
Note

- The USB port can be used for both [Communication] and [Mass Storage]. For details, refer to the “Communication Guide”.

6.6.5 LAN

Sets the LAN port on the bottom of the device.
The LAN port communicates with the IP address specified by the user or automatically obtained from the router, and it can be controlled by commands, acquire data, and display a web browser. For details, refer to the “Communication Guide”.

Item	Description
Function	Sets On/Off for the LAN function.
DHCP	Automatically sets the IP address of the sound level meter.
IP	Sets the IP address of the Sound Level Meter and displays the current settings.
Subnet	Sets the subnet mask and acquires the current setting.
Gateway	Sets the default gateway and acquires the current setting.
Web App	Turns On/Off the web app. To use the web app, set it to [On]. * It is recommended to use the web browser Google Chrome on a computer. The sound will not play on other web browsers.
FTP	Sets On/Off for file transfer.
TCP	Turns on/off the communication control.



The IP address on the screen is an example.

6.7 Save/Load Settings

By using a settings file, you can do the following:

- By loading a prepared settings file on the internal memory or SD card, you can configure settings accurately and efficiently.
- Even if settings are changed accidentally, the settings can be restored by loading a settings file on the internal memory or SD card.
  This device can save five settings in Memory (internal), one in Startup (internal), one in Memory (SD), and one in Startup (SD).

Resume function

The device memorizes the settings when the power is turned off and starts measuring with the same settings when the power is turned on the next time.

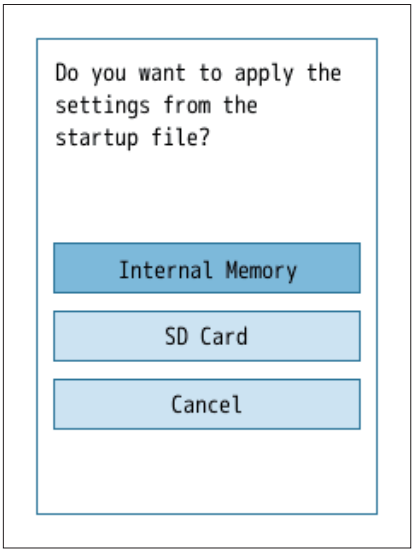
Note

- If the device is started up with a startup file on its internal memory and the SD card, select whether to load the settings of the resume function or those of the startup loading function.

Startup file loading function

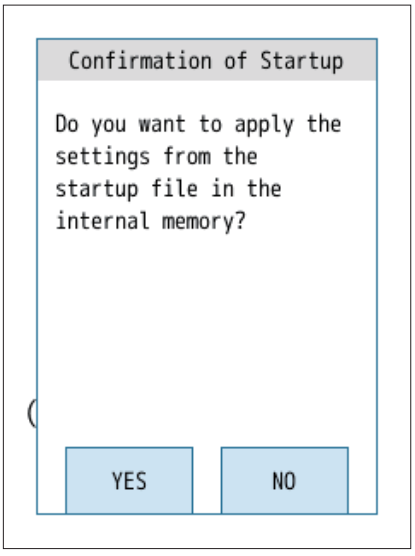
If there are settings files on both the internal memory of the device and the SD card, a selection screen like the one on the right will appear when the device is turned on.

Item	Description
Internal Memory	Loads the settings from the startup file in the internal memory.
SD Card	Loads the settings from the startup file on the SD card.
Cancel	The resume function loads the settings from the last time the power was turned off.



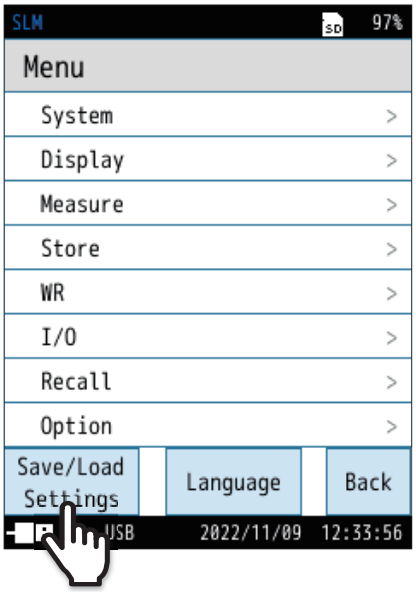
If there is a startup file in the internal memory or on the SD card, a selection screen like the one on the right will appear (the screenshot here is of when the startup file is in the internal memory).

Item	Description
YES	Loads the settings from the startup file in the internal memory or on the SD card.
NO	The resume function loads the settings from the last time the power was turned off.



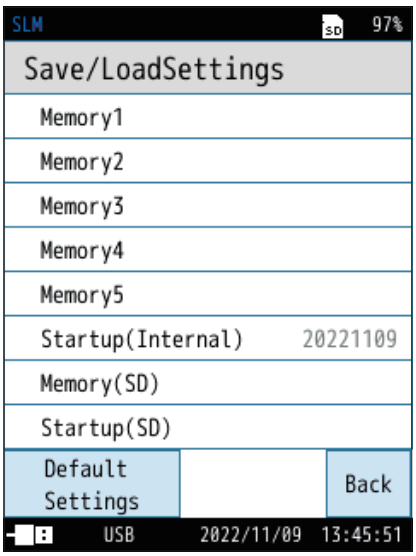
6.7.1 Saving settings

1 **Touch [Save/Load Settings] on the [Menu] screen.**



2 **Select where to save the setting file.**

Item	Description
Memory 1-5	Saves the current settings to the internal memory.
Startup (Internal)	Saves the current settings to the internal memory as a startup.
Memory (SD)	Saves the current settings to the SD card.
Startup (SD)	Saves the current settings to an SD card as a startup.

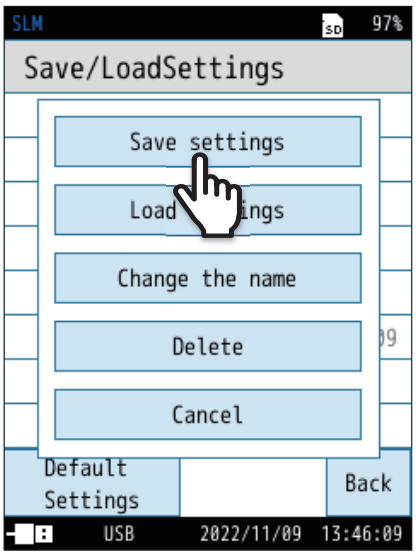


3 **Touch [Save settings].**

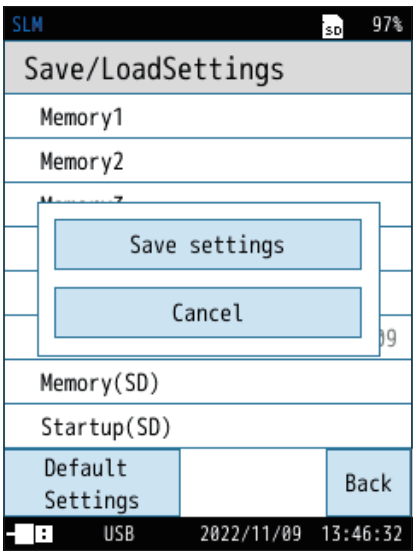
The current settings are saved to the selected destination.

Note

- To overwrite the data, select [OK] on the confirmation screen.
- When the settings are saved, the date is displayed as the settings file name next to the item. The file name can be changed by touching [Change the name].

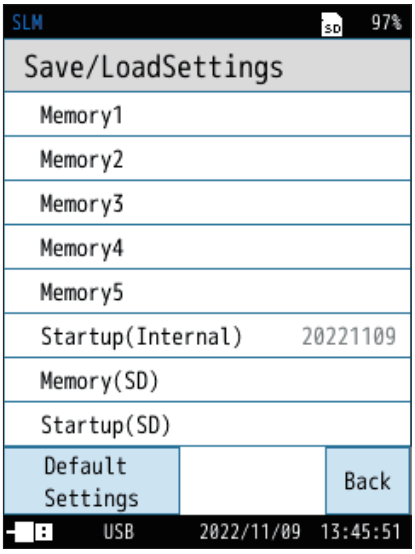


When saving new settings, the screen shown on the right appears.



6.7.2 Loading settings

1 Select the setting file you want to load.

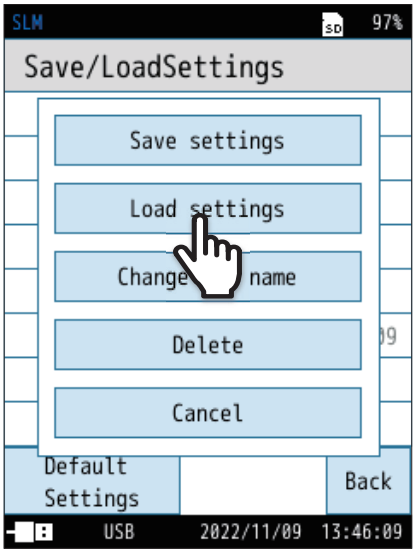


Note

- Loading a settings file overwrites the current settings.
- Before loading the settings file, we recommend saving the current settings if necessary.

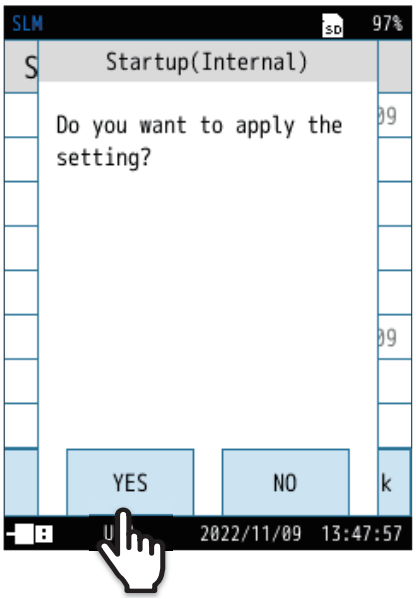
2 Touch [Load settings].

The confirmation screen appears.



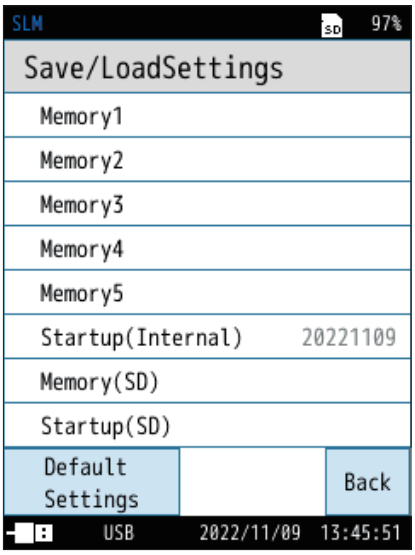
3 Touch [YES] on the confirmation screen.

The contents of the selected settings file are reflected in the settings of the device.



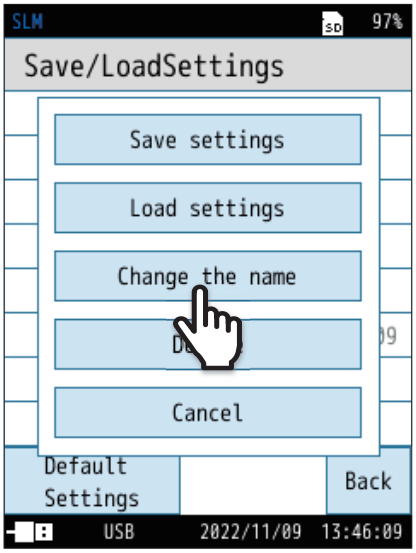
6.7.3 Renaming the settings file

1 **Select the setting file you want to rename.**



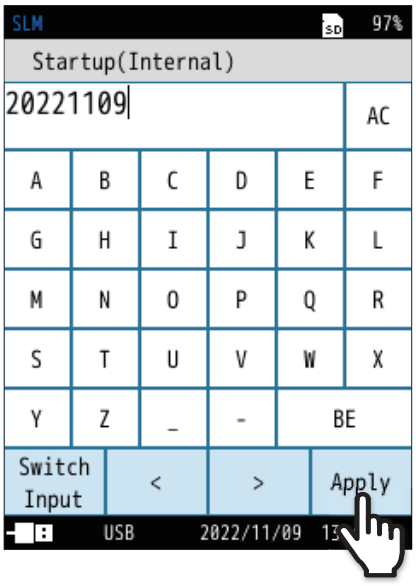
2 **Touch [Change the name].**

The [Change the name] screen appears.



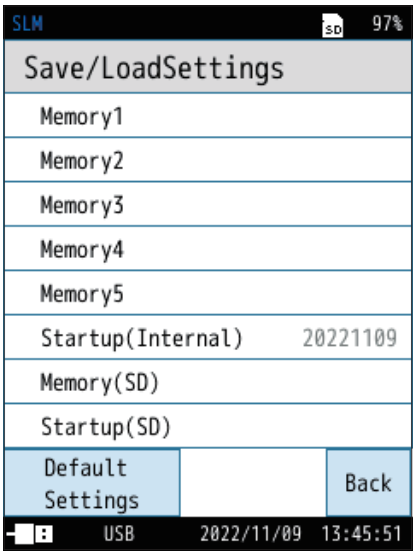
3 **Enter the name on the [Change the name] screen, and touch [Apply].**

(Character limit: 1 to 8 characters)



6.7.4 Deleting the settings

1 **Select the setting file you want to delete.**

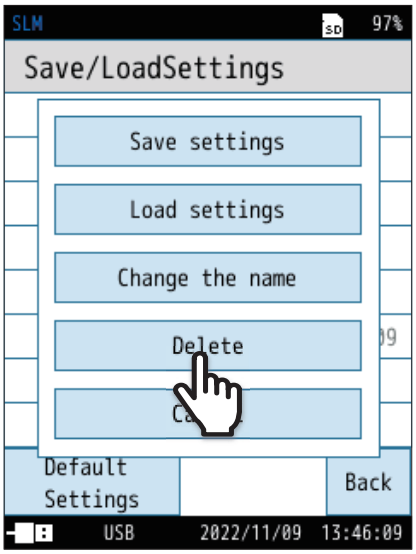


2 **Touch [Delete].**

The confirmation screen appears.

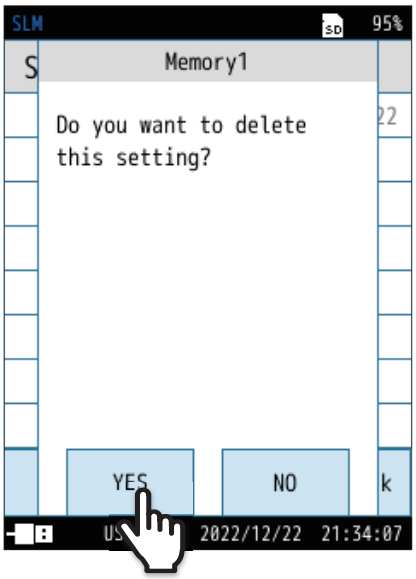
Note

- Touch [Cancel] to return to the [Save/Load Settings] screen.



3 **Touch [YES] on the confirmation screen.**

The selected setting file is deleted.

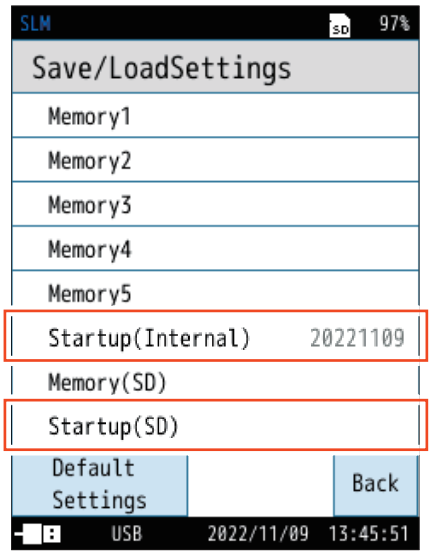


6.7.5 Startup settings

If you save the settings in Startup, you can specify to start up the device with those settings.

1 Select either [Startup (Internal)] or [Startup (SD)].

Item	Description
Startup (Internal)	Saves the current settings to the internal memory as a startup.
Startup (SD)	Saves the current settings to an SD card as a startup.

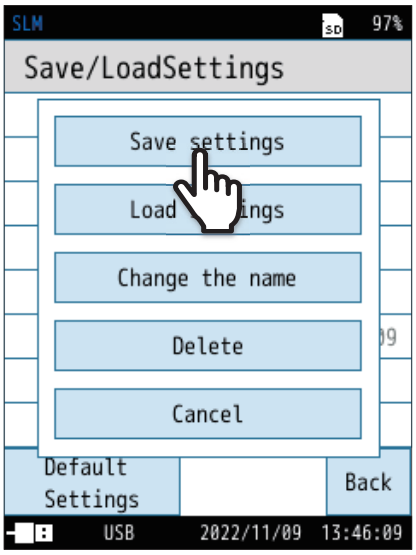


2 Touch [Save settings].

The current settings are saved as a startup.

Note

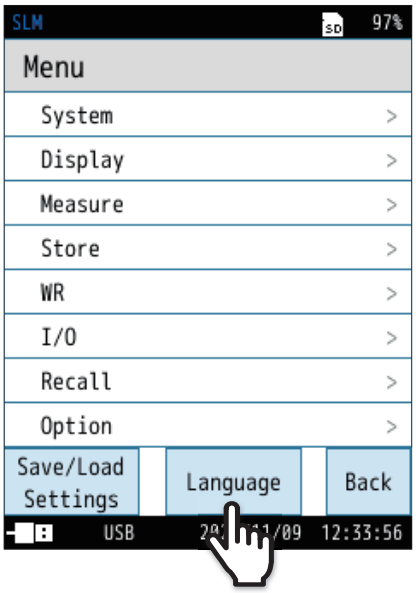
- To overwrite the data, select [OK] on the confirmation screen.



6.8 Changing the language

The language used on this device can be set.

1 Touch [Language] at the bottom of the [Menu] screen.

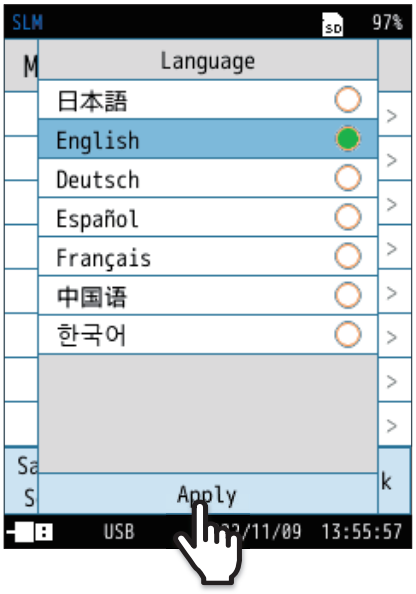


2 Select a language, and touch [Apply].

The language setting is memorized, and so the message will be displayed in the set language even if the device is turned on and off again.

Note

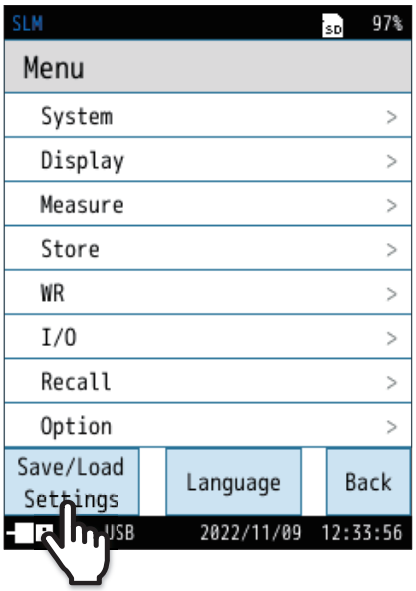
- This manual describes how to operate the device when the language is set to [English].



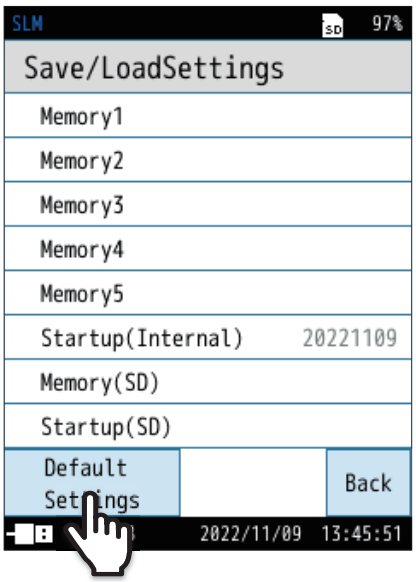
6.9 Restoring factory default settings

To return the settings to the default values, follow the procedure below.

1 **Touch [Save/Load Settings] at the bottom of the [Menu] screen.**



2 **Touch [Default Settings].**

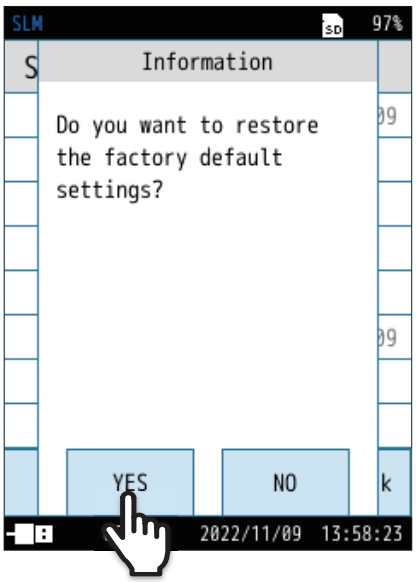


3 **Touch [YES] on the confirmation screen.**

The setting returns to the default values (Page 78).

Note

- The time, language and store data are not initialized.



Default settings

The factory default settings for the main setting items are listed below.
For information on how to restore the default values, refer to "Restoring factory default settings" (Page 77).

Item			Default settings
System	LCD	Brightness	2
		Backlight Auto Off	30s
		LCD Auto Off	Continue
	Power	Battery Type	Alkaline
	Security	User Name	USER
		Password	0000
		Key Lock	No Password
	System Information	Index	0001
Display	Bar Graph	Upper Range	130dB
		Lower Range	30dB
	Leq Calc.	Leq	On
		LE	Off
		Lpeak	Off
		Lmax	On
		Lmin	Off
		L5.0	Off
		L10.0	Off
		L50.0	On
		L90.0	Off
		L95.0	Off
		LIeq	Off
		Leq, mov	Off
		Ltm5	Off
	Time-Level		20s

Item			Default settings
Measure	Sub Channel Settings	Sub1	Off
		Sub2	Off
		Sub3	Off
	Frequency Weighting	Main	A
		Sub1	A
		Sub2	A
		Sub3	A
	Time Weighting	Main	F
		Sub1	F
		Sub2	F
		Sub3	F
	Windscreen Correction		Off
	Diffuse S.F. Corr.		Off
Store	Store Mode		Manual
	Store Name		0000
	Address		0001
	Meas. Duration		10m
	Back Erase		Off
	Delay Time		Off
	Trigger Mode		Off
I/O	Ref. Signal Output		Off
	Signal Output	AC OUT	Off
		DC OUT	Off
	I/O Port		N/A
	USB		N/A
	LAN		N/A

7 Store Operation

This device can save measurement data (calculated values such as sound levels and equivalent continuous sound levels, measurement conditions such as frequency weighting and time weighting) to the internal memory or SD card. This section describes saving to and loading from the internal memory.
There are three store modes: Manual, Auto, and Timer Auto.

Important

- Use SD cards that are genuine and provided by RION. The performance of other cards is not guaranteed (Page 106).
- Do not turn off the power or remove the SD card while in the middle of storing. Doing so may corrupt the data.
- Saving to the internal memory is not possible when an SD card is inserted in the card slot.

Note

- Prior to measurement, first format the SD card for storing data with this device.

Precautions when using the environmental measurement data management software AS-60

- When processing the measurement data with AS-60, measure with the device set to store in Auto and Timer Auto mode because AS-60 cannot read data stored in Manual mode.
- When L_p store is performed with the device set to an L_p store interval of 200 ms and 1 s, the median value L_{eq}, maximum value Lmax, and minimum value L_{min} of the sound level within the time interval is calculated with the AS-60 based on the L_p stored with the interval of 200 ms or 1 s. To obtain accurate L_{eq}, L_{max}, and L_{min} values, store L_p at a store interval of 100 ms. This setting stores L_p, which is stored at 100 ms intervals for sound levels with a sampling interval of 20.8 µs (sampling frequency of 48 kHz), and L_{eq}, L_{max}, and L_{min}, which are calculated at intervals of 100 ms based on the sound level.

About store mode

Store mode	Description
Manual	All calculated values except sound level L_p are considered as a single data set, and the measurer manually saves each data. When the person taking measurements performs the store operation after measuring, the calculated value that was measured and measurement conditions are saved together with the measurement start time. If the SD card is not installed, data is automatically saved to the internal memory of the main unit. If the SD card is installed, data is automatically saved to the SD card.
Auto	The device continuously records the sound level (L_p) of the set L_p store interval and the result calculated during the set L_{eq} calculation interval. This mode can be used by installing an SD card. When one of the following conditions occurs, the store is stopped and data is saved. • When the total measurement time reaches the set value • When the L_{eq} store reaches 1,000 sets • When the capacity of the SD card becomes insufficient
Timer Auto	You can set the start time and stop time and perform auto store. This mode can be used by installing an SD card. By setting the measurement cycle, you can limit L_p store and L_{eq} calculation to be performed only during the period when store is required. When one of the following conditions occurs, the store is stopped and data is saved. • When the total measurement time reaches the set value • When the L_{eq} store reaches 1,000 sets • When the capacity of the SD card becomes insufficient

7.1 Store operation in Manual mode

7.1.1 Saving to internal memory

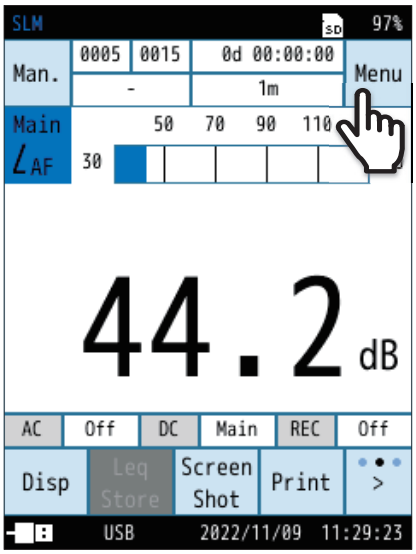
Each calculated value is saved when the store operation is performed on the confirmation screen at the end of calculation.

Note

- If an SD card is not inserted, the data will be saved to the internal memory.
- If an SD card is inserted, the data will be saved to the SD card.

1 **Touch [Menu] on the measurement screen.**

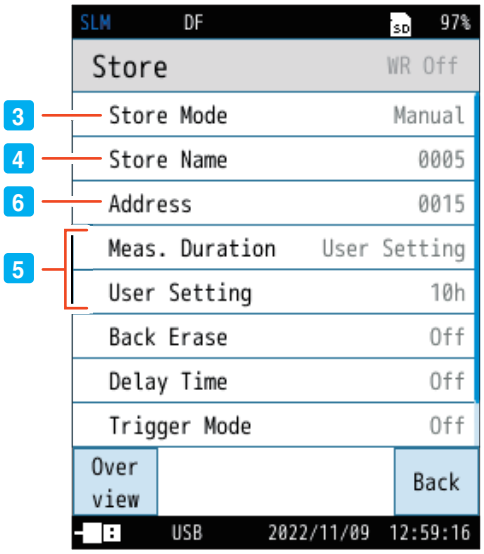
The [Menu] screen appears.



2 **Touch [Store] on the [Menu] screen.**

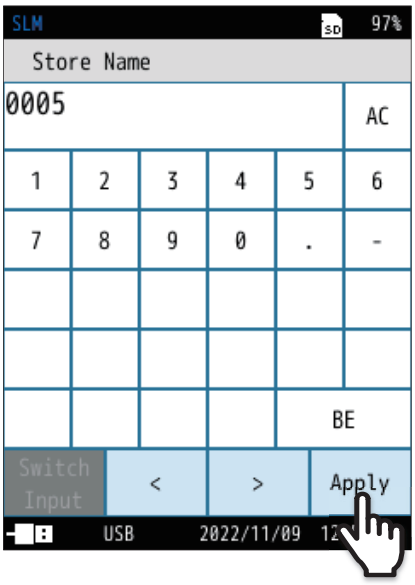
The [Store] screen appears.

3 On the [Store] screen, touch [Store Mode] and select [Manual].



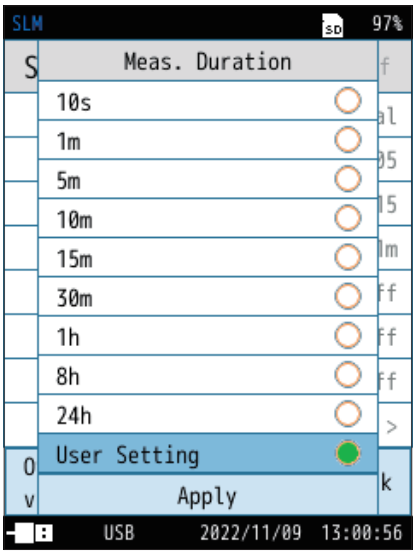
4 Set the store name (only when an SD card is inserted).

1. **On the [Store] screen, touch [Store Name].**
   The input screen for the store name appears.
2. **Enter the store name (4-digit number).**
   The setting range is from 0000 to 9999.
   (BE: Deletes one character. AC: Deletes all entered characters.)
3. **Touch [Apply].**



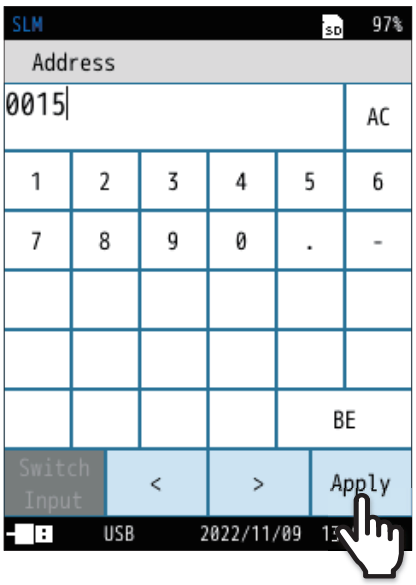
5 Select a measurement time.

1. **On the [Store] screen, touch [Meas. Duration].**
   Select a measurement time, and touch [Apply].
2. **If you select [User Setting], you can set the measurement time to a time of your choice.**
   The maximum time that can be set is 24 hours.

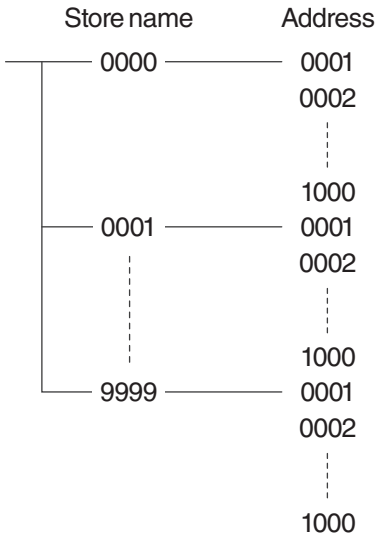


(s = seconds, m = minutes, h = hours)

6 Set the store address

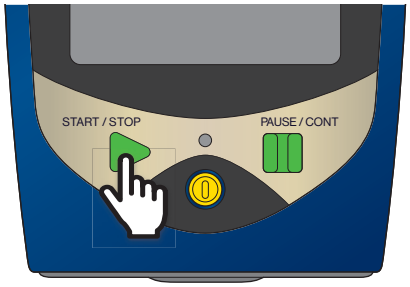


1. **On the [Store] screen, touch [Address].**
   The input screen for the store address appears.
2. **Enter the store address (4-digit number).**
   The initial setting is 0001. If there is no problem, no change is required. Enter a store address when you want to set an address other than 0001 or when you want to avoid the address where data is saved.
   The setting range is from 0001 to 1000.
   (BE: Deletes one character. AC: Deletes all entered characters.)
3. **Touch [Apply].**



- The address is displayed on the measurement screen. When an address is displayed in red, it indicates that there is data saved to this address.
- If measurement data has already been saved, a confirmation screen will appear when starting measuring. If you select [Overwrite and measure], the data will be overwritten (the saved data will be deleted and the current data will remain).
- For whether the data is already saved, see “Loading the saved data” (Page 85).

7 Touch [Back] or press the START/STOP key to return to the measurement screen.



8 Press the START/STOP key on the measurement screen to start measurement.

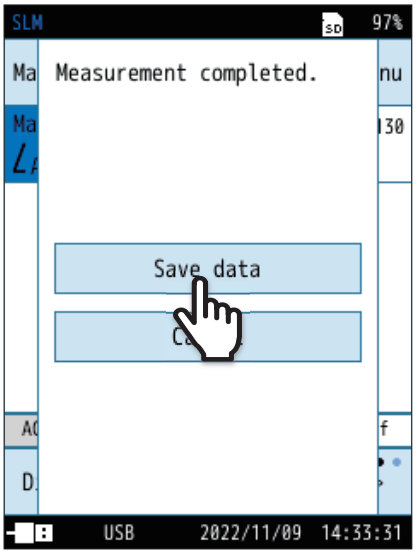
9 Press the START/STOP key again to end the measurement.

After the measurement is completed, the confirmation screen appears.

10 Touch [Save data].

The calculation result is saved.

- It takes about one second to save to the memory. After saving, the address will be increased by 1.
- The saved information includes conditions such as measurement start date and time, measurement time, frequency weighting, time weighting, the outcomes of their calculation, and OVER and UNDER information.
- The [Time-Level] screen will not be saved.
- If canceled, data can be saved from [Lp Store/Leq Store] on the menu ring (Page 33).



Important

- Performing the store operation saves the measurement data to the displayed address.
- Addresses displayed in red already contain saved measurement data. Be careful not to accidentally overwrite this data.

Note

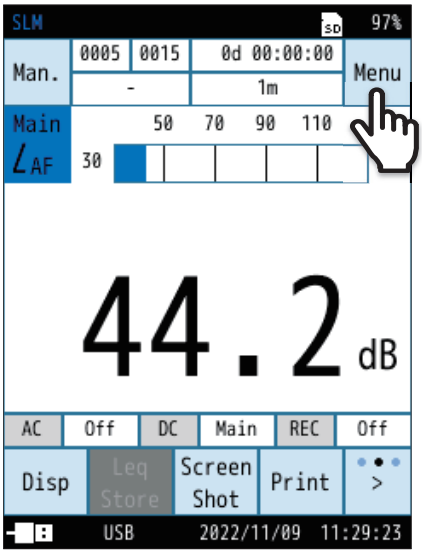
- If the number of addresses with saved data is 1,000, the number of addresses will not increase anymore and 1,000 will be displayed in red.
  If you want to continue measuring and saving data, change the store name (Page 82).

7.1.2 Loading the saved data

Load the data saved to the internal memory in Manual mode.

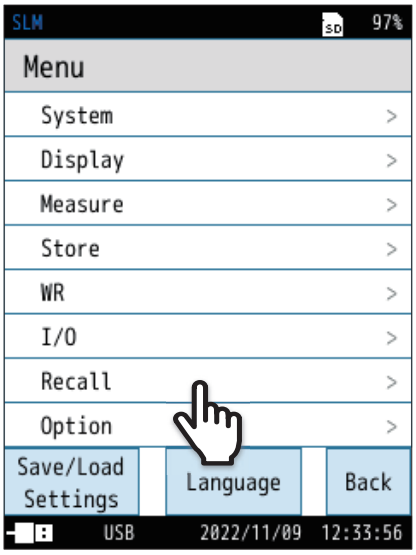
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



2 Touch [Recall] on the [Menu] screen.

The [Recall] screen appears.

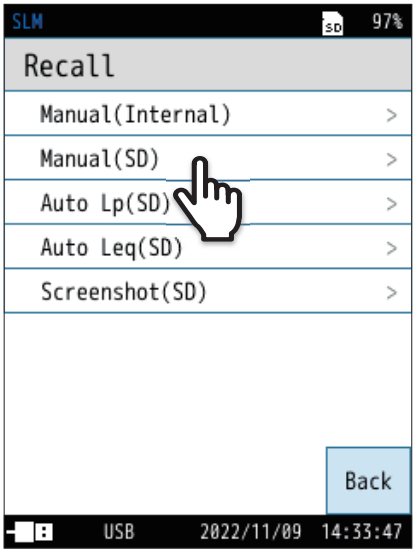


3 Select the location to which to save data from the [Recall] screen.

A list of saved data is displayed.

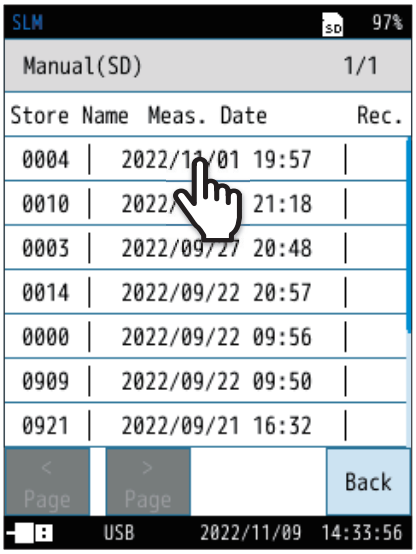
Note

- If no SD card is inserted, you can only select [Manual (Internal)].



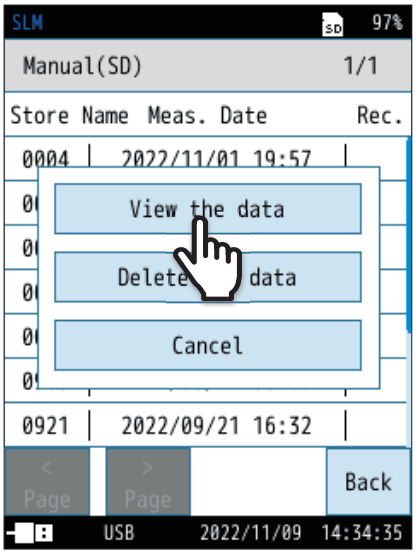
4 Touch the data to read.

- The data is listed by store name.
- [Meas. Date] is the date and time the measuring was started for the first address measured with the same store name.
- [Meas. Date] will not change even if the number of store addresses increases.

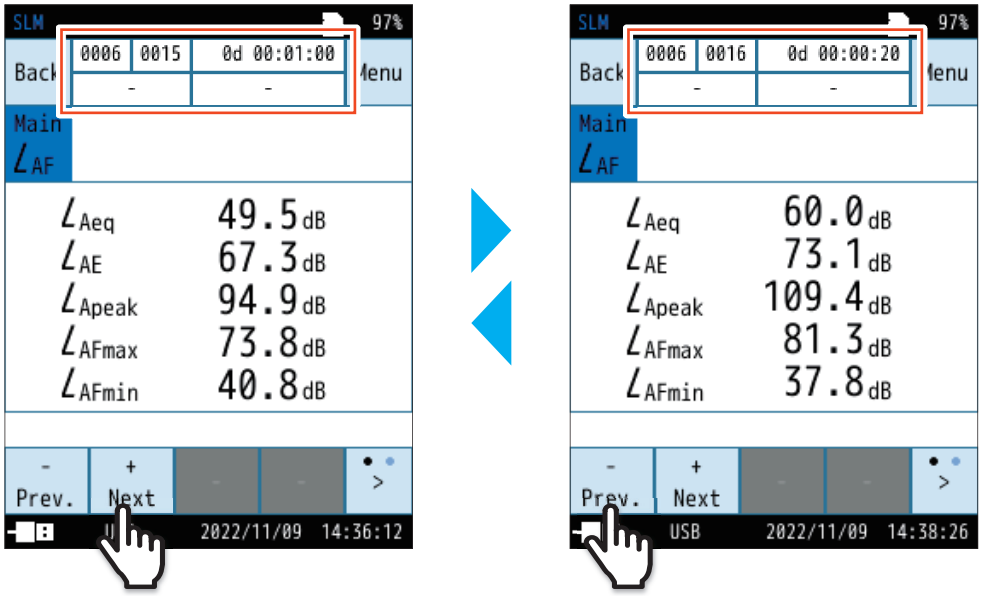


5 Touch [View the data].

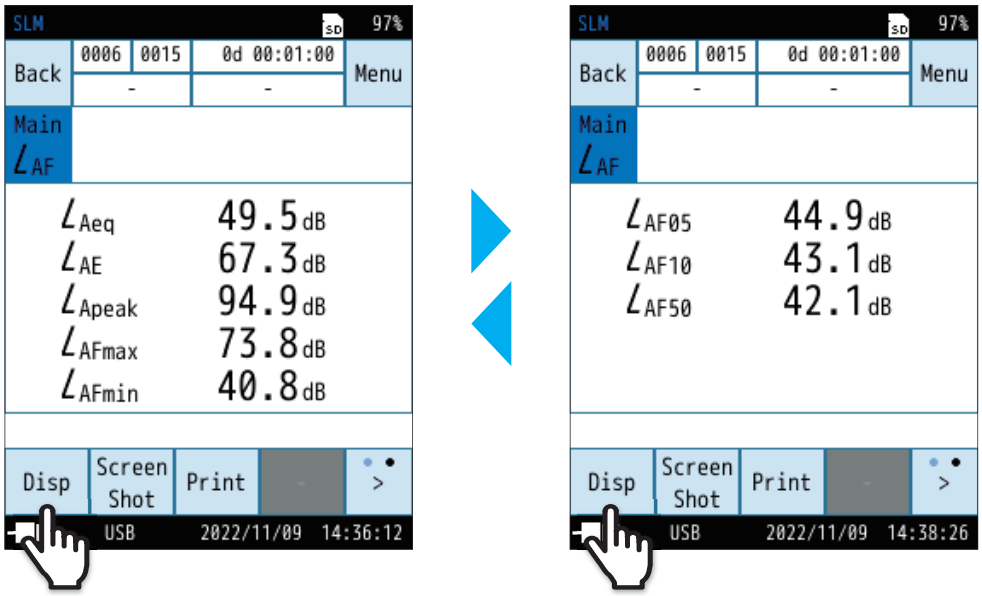
The data appears.



Each calculated value of the store address is displayed.
You can change the address with [- Prev.] or [+ Next] on the menu ring.



If there are six or more calculated values, on the menu ring, touch [>] and then touch [Disp] to switch to the next screen after the calculated values screen.



- Touch [Menu] to check the measurement and store settings.
- You can save a screenshot or print from the menu ring.

7.1.3 Deleting the saved data

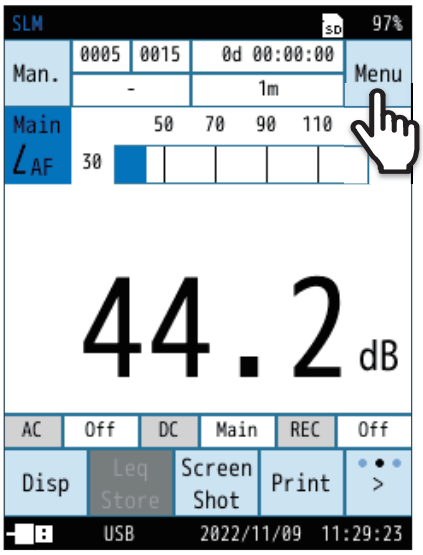
Delete the data saved to the internal memory in Manual mode.

Note

- When deleting data, it is deleted on a store name basis. You cannot delete data for each address.

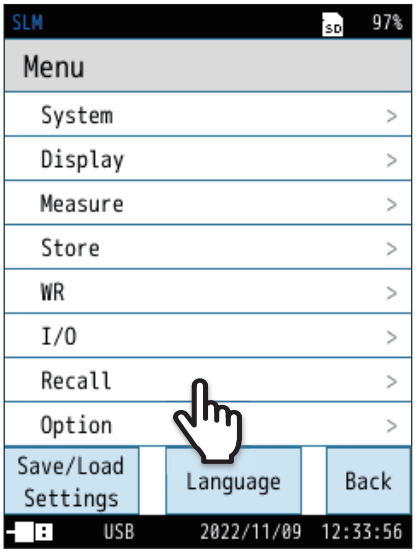
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



2 Touch [Recall] on the [Menu] screen.

The [Recall] screen appears.

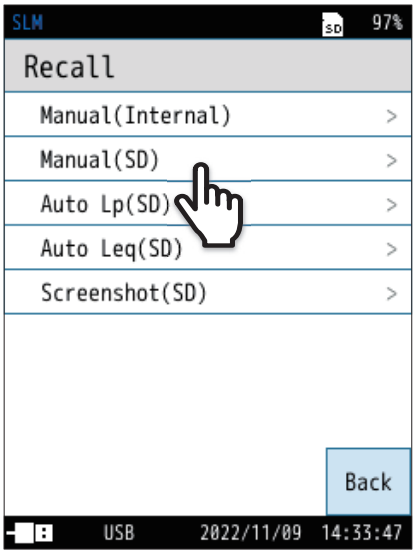


3 Select the location to which to save data from the [Recall] screen.

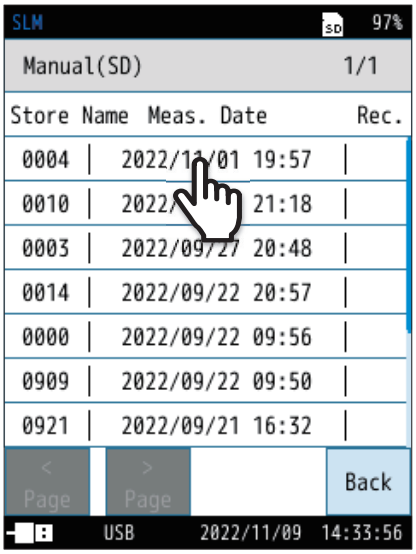
A list of saved data is displayed.

Note

- If no SD card is inserted, you can only select [Manual (Internal)].

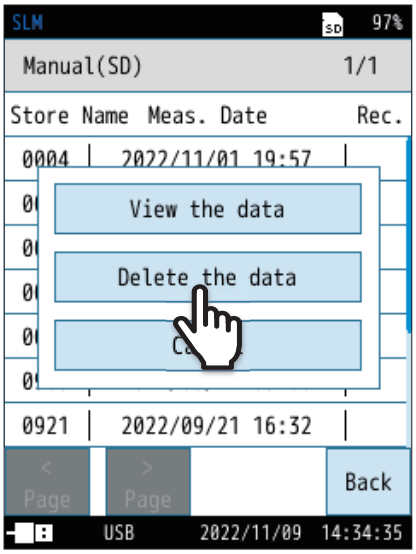


4 Touch the data to delete.



5 Touch [Delete the data].

The data will be deleted.

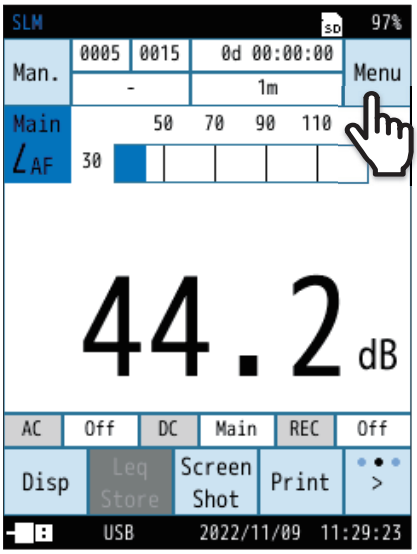


7.1.4 Copying data from the internal memory to the SD card

Copy the data saved on the internal memory to the SD card.

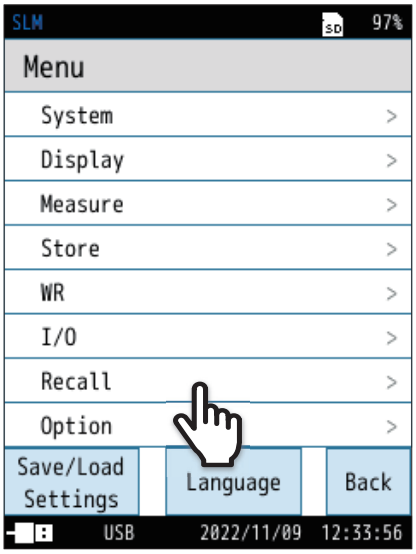
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



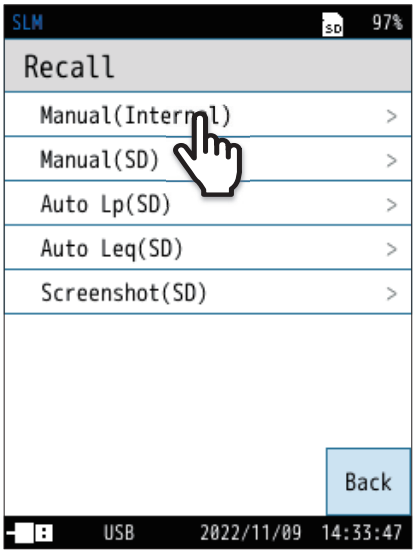
2 Touch [Recall] on the [Menu] screen.

The [Recall] screen appears.

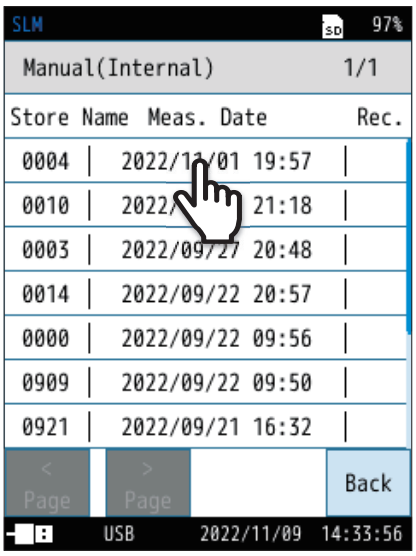


3 Touch [Manual (Internal)].

A list of saved data is displayed.

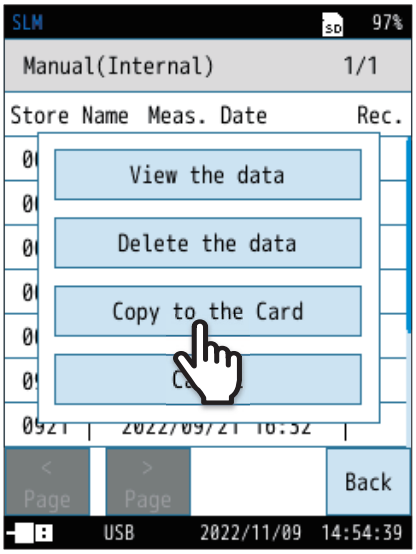


4 Touch the data to copy.



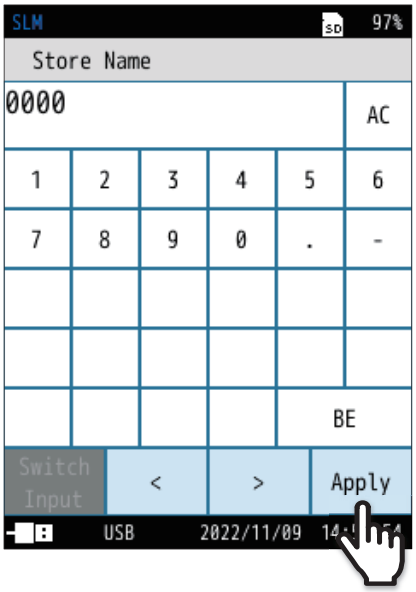
5 Touch [Copy to the Card].

The store name entry screen for the copy destination appears.

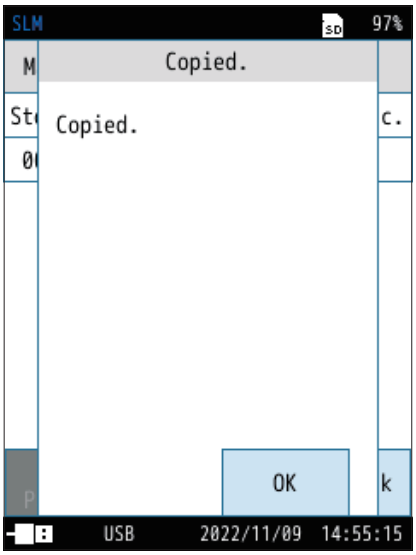


6 On the store name entry screen for the copy destination, enter the store name (4-digit number), and touch [Apply].

The setting range is from 0000 to 9999.
(BE: Deletes one character. AC: Deletes all entered characters.)



Data is copied from the internal memory to the SD card.



7.2 Store operation in Auto mode

The device continuously records the sound level (L_p) of the set L_p store interval and the result calculated during the L_{eq} calculation interval. This mode can be used by installing an SD card.
When one of the following conditions occurs, the store is stopped and data is saved.

- When the total measurement time reaches the set value
- When the L_{eq} store reaches 1,000 sets
- When the capacity of the SD card becomes insufficient

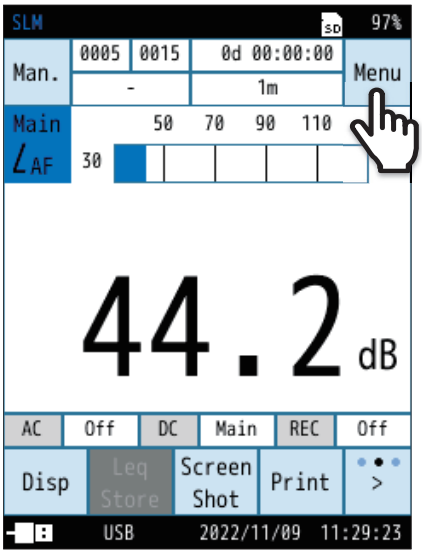
Item	Description
L_p store	Continuously auto-saves the sound level L_p. This store function is useful when recording sound level fluctuations. For the store interval, you can select from Off, 10ms, 25ms, 100ms, 200ms, and 1s.
L_{eq} Store	All calculated values except sound level L_p are considered as a single data set, and up to 1,000 data sets can be stored continuously and automatically. This is optimal for measurements taken over a fixed long time duration. For the calculation interval, you can select from Off, 10s, 1m, 5m, 10m, 15m, 30m, 1h, 8h, 24h, and User Setting (up to 24 hours).

7.2.1 Saving to memory

An SD card must be inserted.
In Auto mode, L_p store and L_{eq} store are performed simultaneously (they can also be performed separately).

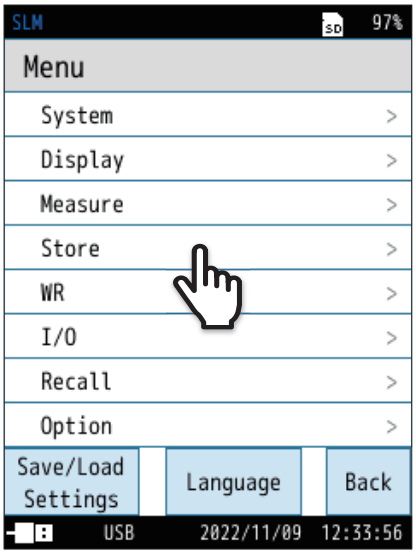
1 **Touch [Menu] on the measurement screen.**

The [Menu] screen appears.

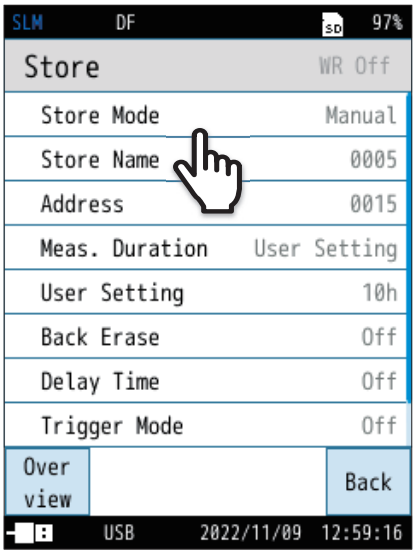


2 Touch [Store] on the [Menu] screen.

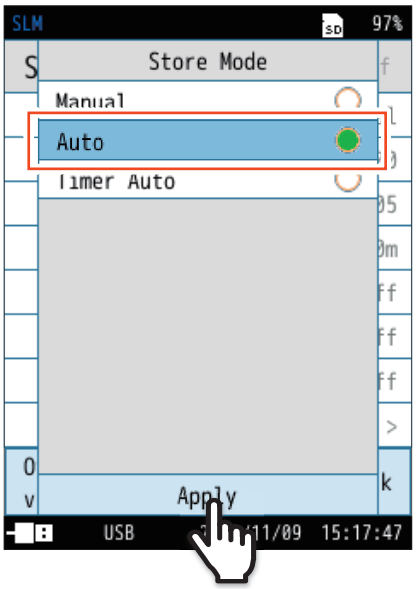
The [Store] screen appears.



3 On the [Store] screen, touch [Store Mode].

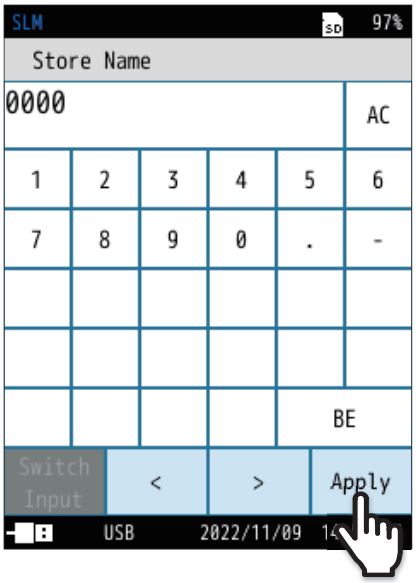


4 Select [Auto], and touch [Apply].



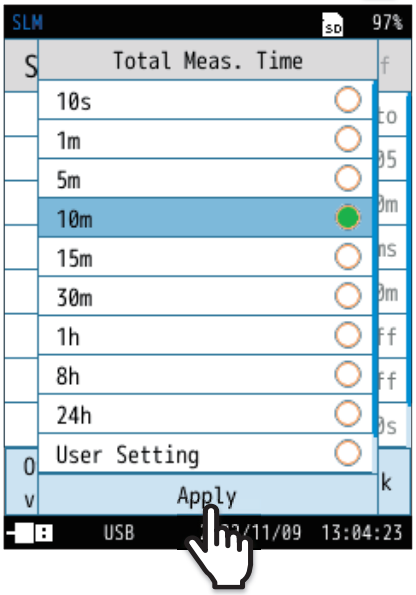
5 Set the store name (only when an SD card is inserted).

1. **On the [Store] screen, touch [Store Name].**
   The input screen for the store name appears.
2. **Enter the store name (4-digit number).**
   The setting range is from 0000 to 9999.
   (BE: Deletes one character. AC: Deletes all entered characters.)
3. **Touch [Apply].**



6 Set the total measurement time.

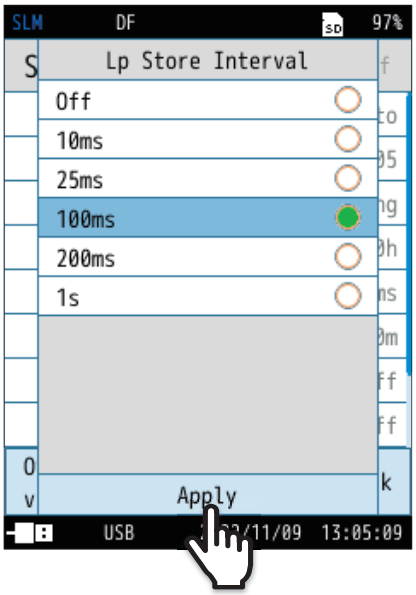
1. **On the [Store] screen, touch [Total Meas. Time].**
2. **Select a total measurement time, and touch [Apply].**
   - If you select [User Setting], you can set the total measurement time to a time of your choice. The maximum time that can be set is 1000 hours.
   - When [Continue] is selected, the measurement will continue until the SD card runs out of space.



(s = seconds, m = minutes, h = hours)

7 Set the Lp store Interval.

1. **On the [Store] screen, touch [L_p Store Interval].**
2. **Select a store interval, and touch [Apply].**
   - If this setting is set to [Off], L_p store will not be performed.
   - If this setting is set to [100ms], L_p, L_{eq}, L_{max}, and L_{min} will be stored at a 100 ms interval. L_{eq}, L_{max}, and L_{min} are not displayed when recalling on the main unit. They can only be viewed on a computer. Select anything other than [100ms], only L_p will be stored.



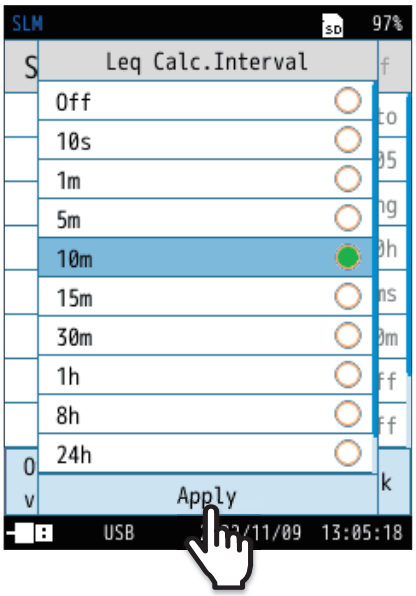
(ms = milliseconds, s = seconds)

8 Set the L_{eq} Calc.Interval.

1. **Touch [L_{eq} Calc.Interval] on the [Store] screen.**
2. **Select a calculation interval.**
   - If this setting is set to [Off], L_{eq} store will not be performed.
   - If you select [User Setting], you can set the calculation interval of your choice. The maximum time that can be set is 24 hours.

Note

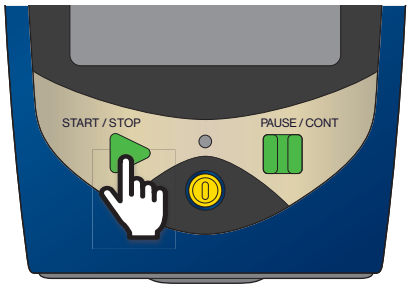
- You cannot set both the L_p store interval and L_{eq} calculation interval to [Off].



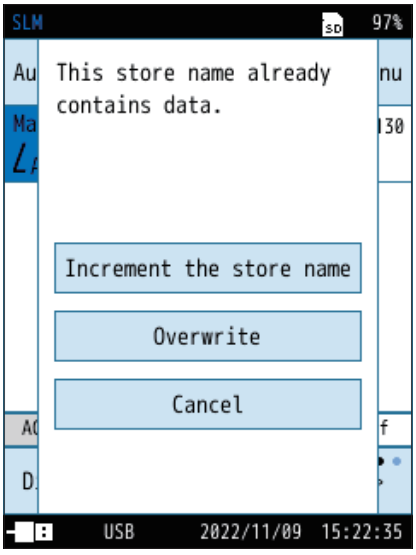
9 Touch [Back] or press the START/STOP key to return to the measurement screen.

10 Press the START/STOP key on the measurement screen to start measurement.

- Each time the set Lp store interval and Leq calculation interval elapse, the measurement amount is automatically saved.
- After saving this data to the memory, the store name turns red.
- The measurement stops when the specified total measurement time has elapsed. To finish in the middle of measuring, press the START/STOP key.
- If the L_p store interval is set in Auto mode, you can mark the data if necessary (Page 104).



11 When measuring again, press the START/STOP key and select from [Increment the store name], [Overwrite], and [Cancel].



Note

- The relationship between the elapsed measurement time and data quantity
  If the L_p store interval is set to 100 msec in Auto mode, 10 data items are saved per second, so if the elapsed measurement time is 10 seconds, the number of data items that will be saved is 100.
  If the L_p store interval is set to 1 sec, 10 data items will be saved.
- The pause function cannot be used while in Auto mode.
- In Auto mode, the L_{eq} calculation results are displayed as saved numbers. This is not displayed when the L_{eq} calculation interval is set to [Off].

7.2.2 Loading the saved data

For the operation method, refer to “Loading the saved data” (Page 85).

7.2.3 Deleting the saved data

For the operation method, refer to “Deleting the saved data” (Page 88).

7.3 Store operation in Timer Auto mode

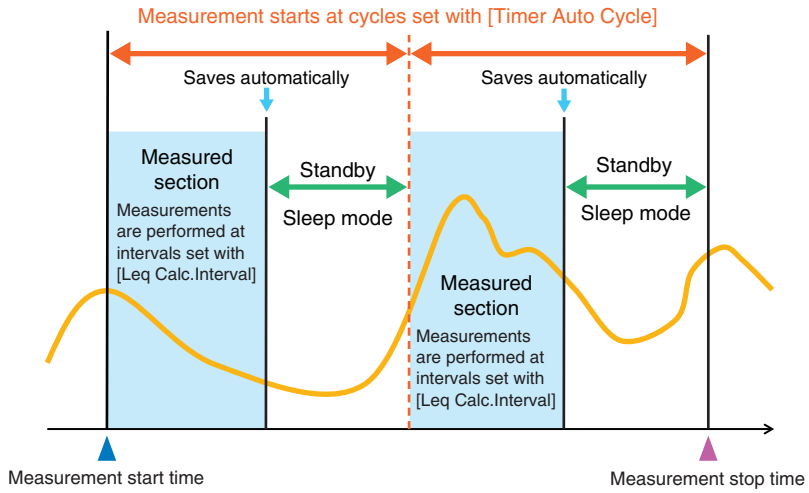
Continuously record the results calculated at the set start time and timer auto cycle. This mode can be used by installing an SD card.
When one of the following conditions occurs, the store is stopped and data is saved.

- When the L_{eq} store reaches 1,000 sets
- When the capacity of the SD card becomes insufficient

Note

- The time at which the calculation is started is used for the measurement date and time of the measurement and calculation data. For example, if the calculation time is 1 minute for L_{eq} store, and the measurement date and time of the data is 00:01:02, it is the value for 1 minute from 00:01:02.

Timer Auto measurement interval (if Timer Auto Cycle is set)

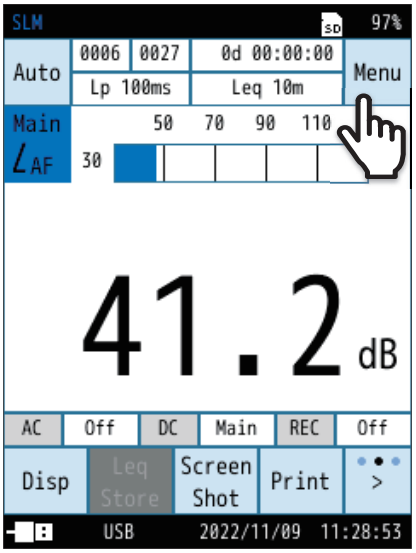


7.3.1 Saving to memory

An SD card must be inserted.
In Timer Auto mode, L_p store and L_{eq} store are performed simultaneously (can also be performed separately).

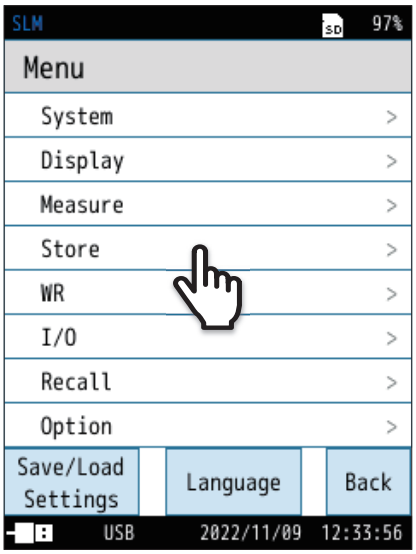
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.

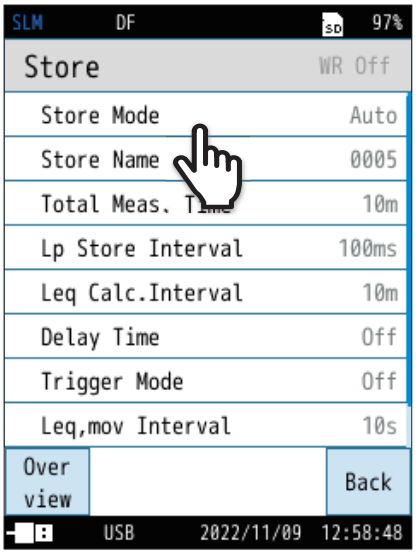


2 Touch [Store] on the [Menu] screen.

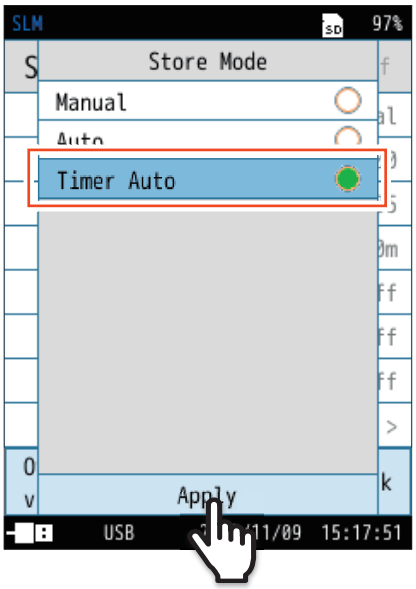
The [Store] screen appears.



3 On the [Store] screen, touch [Store Mode].

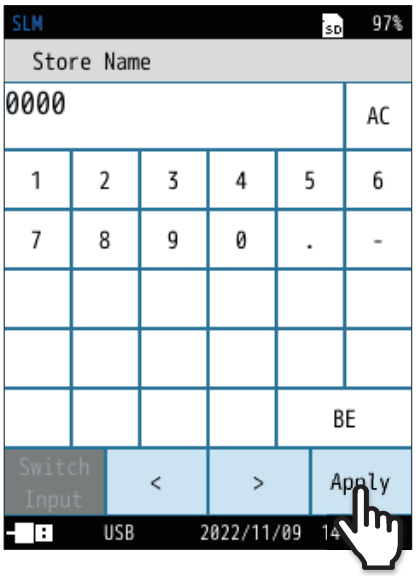


4 Select [Timer Auto], and touch [Apply].



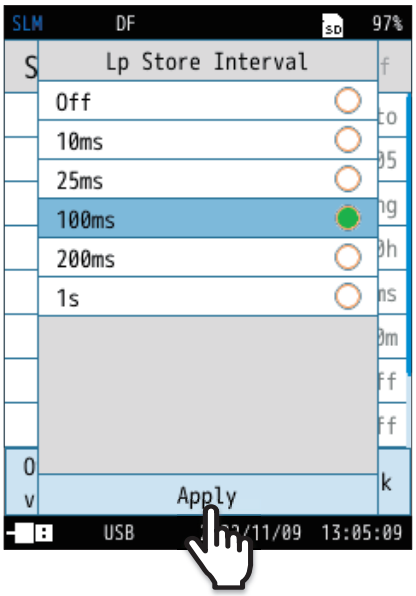
5 Set the store name (only when an SD card is inserted).

1. **On the [Store] screen, touch [Store Name].**
   The input screen for the store name appears.
2. **Enter the store name (4-digit number).**
   The setting range is from 0000 to 9999.
   (BE: Deletes one character. AC: Deletes all entered characters.)
3. **Touch [Apply].**



6 Set the L_p store interval.

1. **On the [Store] screen, touch [Lp Store Interval].**
2. **Select a store interval, and touch [Apply].**
   - If this setting is set to [Off], L_p store will not be performed.
   - If this setting is set to [100ms], L_p, L_{eq}, L_{max}, and L_{min} will be stored at a 100 ms interval. L_{eq}, L_{max}, and L_{min} are not displayed when recalling on the main unit. They can be viewed on a computer. In all other cases, only L_p will be saved.



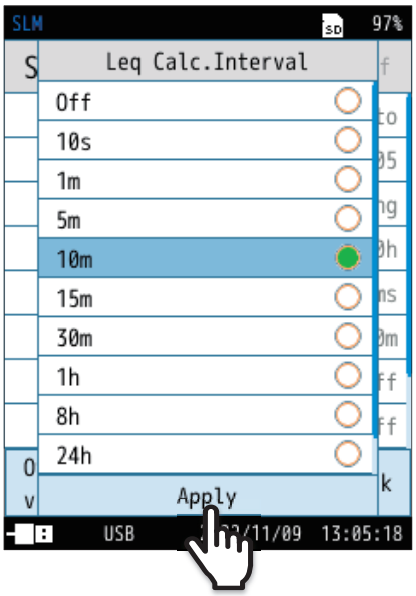
(ms = milliseconds, s = seconds)

7 Set the L_{eq} store calculation interval.

1. **Touch [Leq Calc.Interval] on the [Store] screen.**
2. **Select a calculation interval, and touch [Apply].**
   - If this setting is set to [Off], Leq store will not be performed.
   - If you select [User Setting], you can set the calculation interval of your choice. The maximum time that can be set is 24 hours.

Note

- You cannot set both the L_p store interval and L_{eq} calculation interval to [Off].



(s = seconds, m = minutes, h = hours)

8 Set a start time.

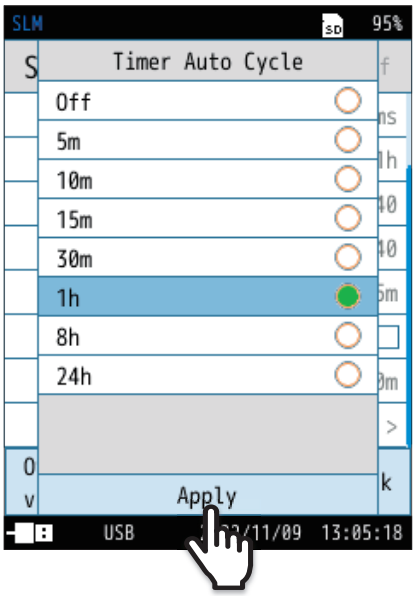
1. **On the [Store] screen, touch [Start].**
2. **Set a start time, and touch [Apply].**

9 Set a stop time.

1. On the [Store] screen, touch [Stop].
2. Set a stop time, and touch [Apply].

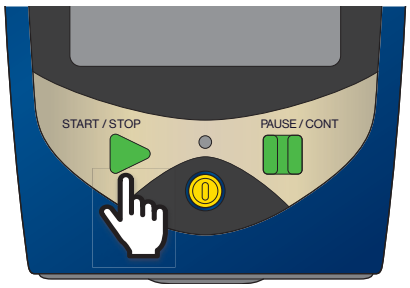
10 Set the timer auto cycle.

1. On the [Store] screen, touch [Timer Auto Cycle].
2. Select a timer auto cycle, and touch [Apply].



(m = minutes, h = hours)

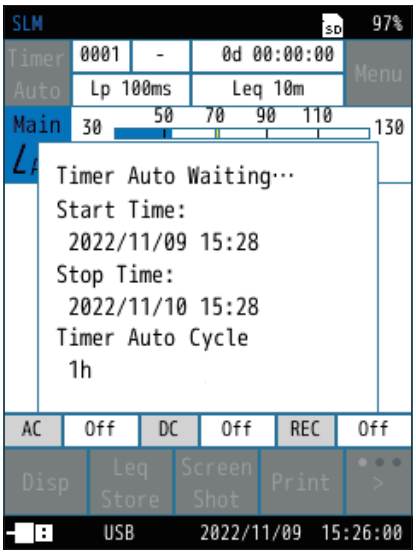
11 Touch [Back] or press the START/STOP key to return to the measurement screen.



12 **Press the START/STOP key on the measurement screen to start measurement.**

The measurement starts at the set start time.

- Each time the set Lp store interval and Leq calculation interval elapse, the measurement amount is automatically saved.
- After saving this data to the memory, the store name turns red.
- The measurement stops at the set stop time. To finish in the middle of measuring, press the START/STOP key.
- If the L_p Store Interval is set in Timer Auto mode, you can mark the data if necessary (Page 104).



Note

- The relationship between the elapsed measurement time and data quantity
  If the L_p store interval is set to 100 msec in Timer Auto mode, 10 data items are saved per second, so if the elapsed measurement time is 10 seconds, the number of data items that will be saved is 100.
  If the L_p store interval is set to 1 sec, 10 data items will be saved.
- The pause function cannot be used while in Timer Auto mode.

7.3.2 Loading the saved data

For the operation method, refer to “Loading the saved data” (Page 85).

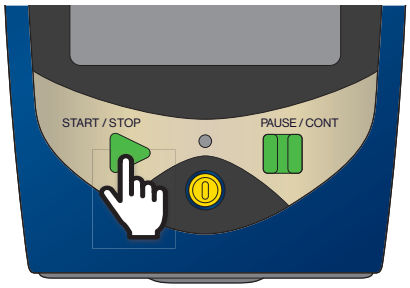
7.3.3 Deleting the saved data

For the operation method, refer to “Deleting the saved data” (Page 88).

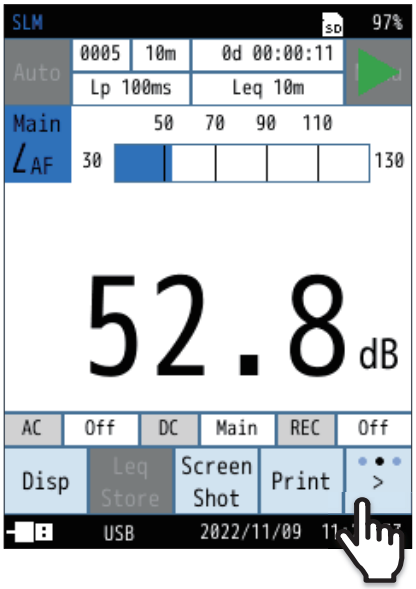
7.4 Markers

When the store mode is Auto or Timer Auto and the L_p Store Interval is set, you can mark the data.

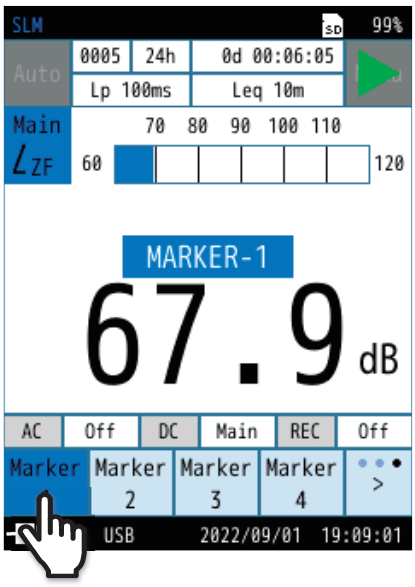
1 **Press the START/STOP key on the measurement screen to start measurement.**



2 **On the menu ring, touch [>] during measuring to display [Marker 1], [Marker 2], [Marker 3], and [Marker 4].**

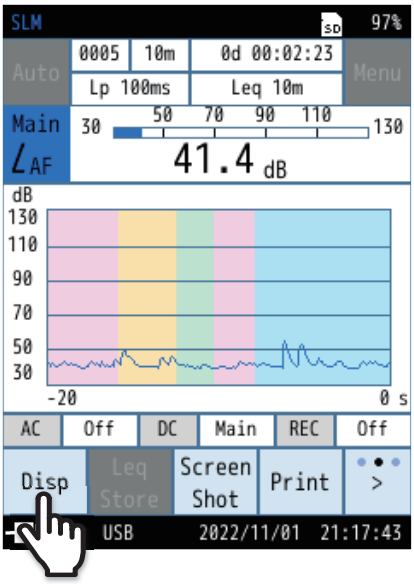


Touch [Marker 1], [Marker 2], [Marker 3], or [Marker 4] to mark with the corresponding color.
To delete a marker, touch the corresponding marker in the menu ring.



3 **When you touch [Disp] on the menu ring, the [Time-Level] screen with markers appears.**

It does not appear if there is no marker.



4 **The measurement stops when the set end time is elapsed, or the START/STOP key is pressed.**

7.5 SD card

- We ask that you use an SD card purchased from RION for this device. SD cards other than those purchased from RION may not work correctly with this device.
- The SD card inserted in the device is recognized as a removable disk by connecting the device to a computer with a USB Type-C cable. On the [I/O] screen, set [USB] to [Mass Storage].
- If you do not use the communication function, leave [USB] on the [I/O] screen set to [Off].
- If you want to transfer the data saved on the SD card to your computer, under [USB] on the [I/O] screen, select [Mass Storage].

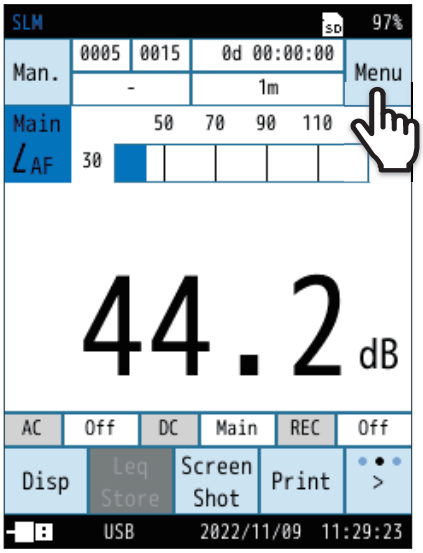
7.5.1 Formatting the SD card

Important

In the following cases, make sure to format the SD card before measuring.
- When using an SD card for the first time with the device
- When you want to delete all data saved on the SD card

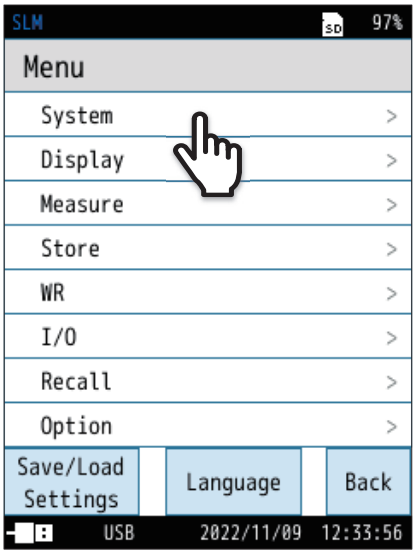
1 **Touch [Menu] on the measurement screen.**

The [Menu] screen appears.



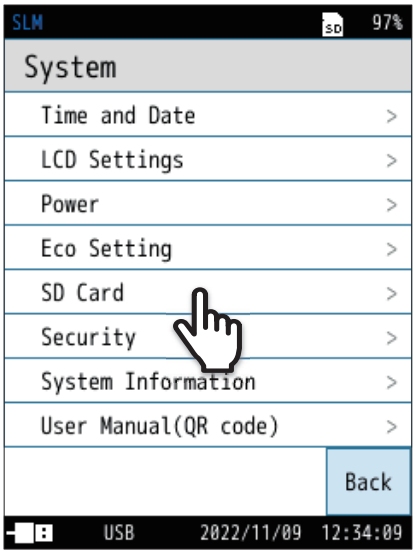
2 **Touch [System] on the [Menu] screen.**

The [System] screen appears.



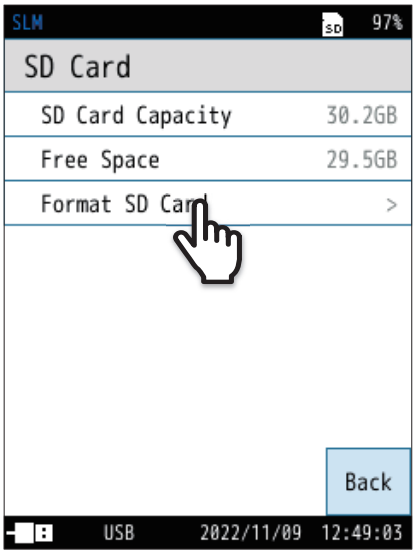
3 Touch [SD Card] on the [System] screen.

The [SD Card] screen appears.



4 Touch [Format SD Card] on the [SD Card] screen.

The confirmation screen appears.

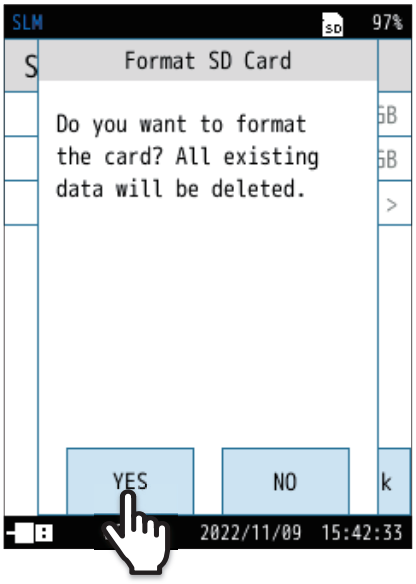


5 Touch [YES].

The SD card will be formatted.

Note

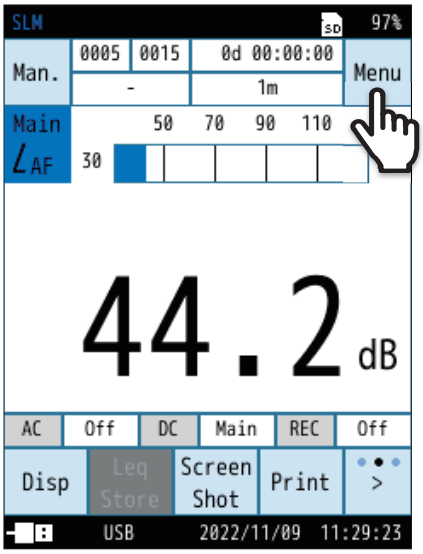
- When formatting the SD card on a computer, under [File system], select [FAT] or [FAT32].



7.5.2 Transferring the data saved on the SD card to a computer

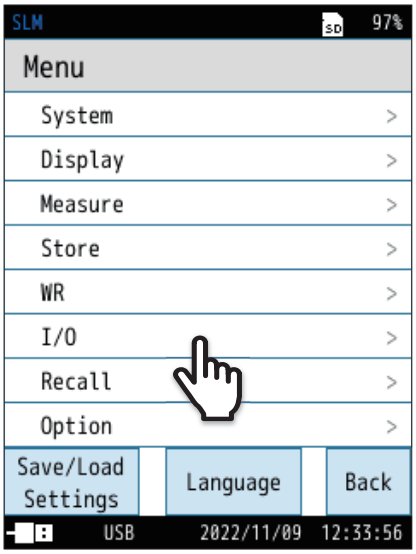
1 **Touch [Menu] on the measurement screen.**

The [Menu] screen appears.



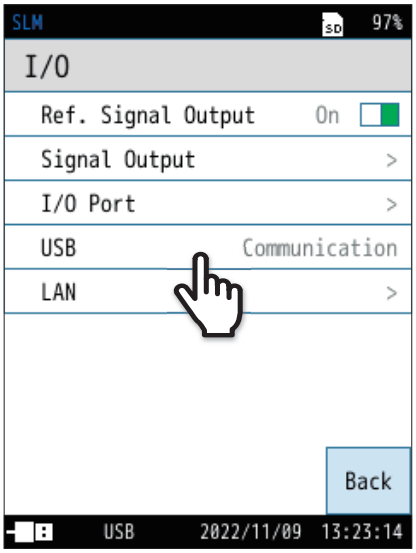
2 **Touch [I/O] on the [Menu] screen.**

The [I/O] screen appears.

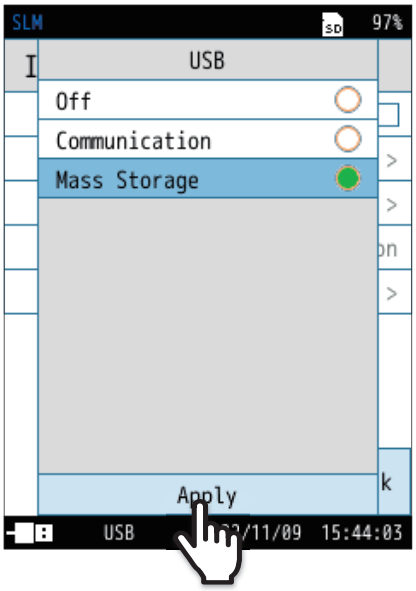


3 **Touch [USB] on the [I/O] screen.**

The USB screen appears.



4 Touch [Mass Storage] on the [USB] screen, and touch [Apply].



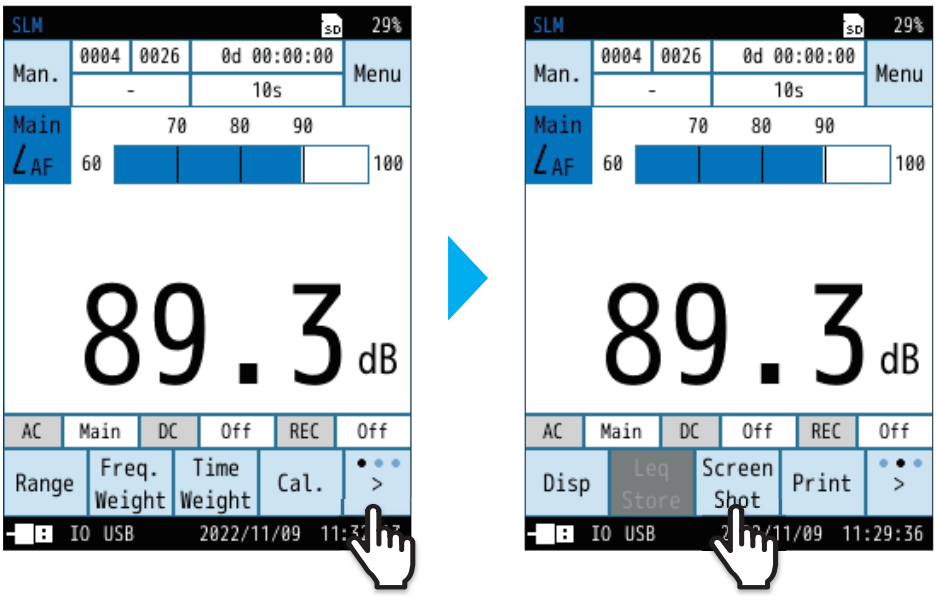
5 Connect the main unit and the computer with a USB Type-C cable.

Once recognized as a removable disk, measurement data, screenshots, setting conditions, calibration history data, etc. saved on the device can be displayed and checked in the USB drive folder.
For details, refer to “File organization” (Page 169).

6 To remove the main unit, touch [Remove Device] displayed on the screen of the main unit.

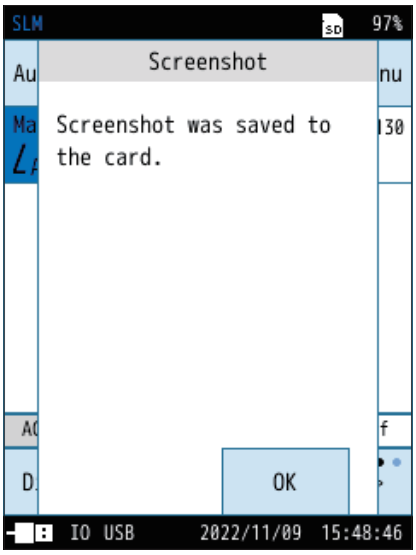
7.6 Saving the screen

Touch [>] on the menu ring, and touch [Screen Shot].



The message "Screenshot was saved to the card." appears, and a screenshot of the displayed screen is saved to the SD card as bitmap data.
For details, refer to “File organization” (Page 169).

Storage folder	¥Screenshot¥
File name	XXXX_yyyyMMdd_hhmmss.bmp (Index)_(Date saved)_(Time saved).bmp
Extension	.bmp
Data capacity	Approx. 300 KB per file

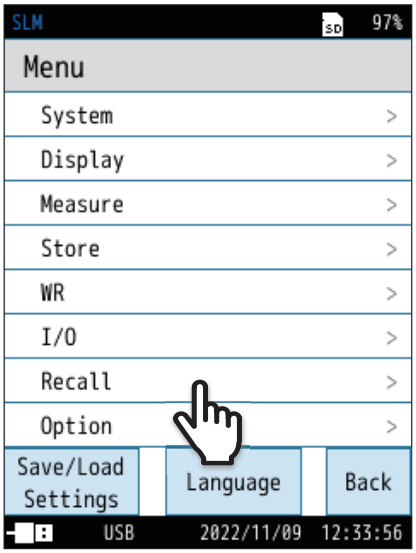


Checking the saved screens

Check the screen data saved on the SD card.

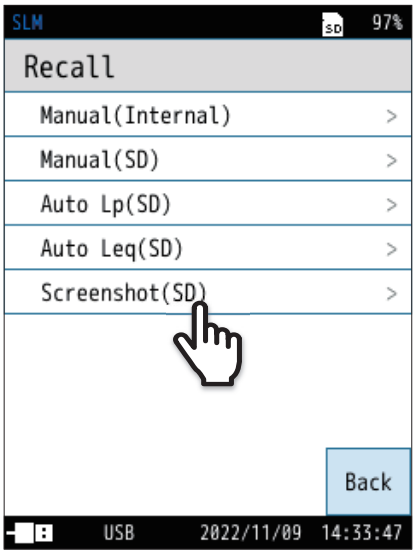
1 Touch [Recall] on the [Menu] screen.

The [Recall] screen appears.

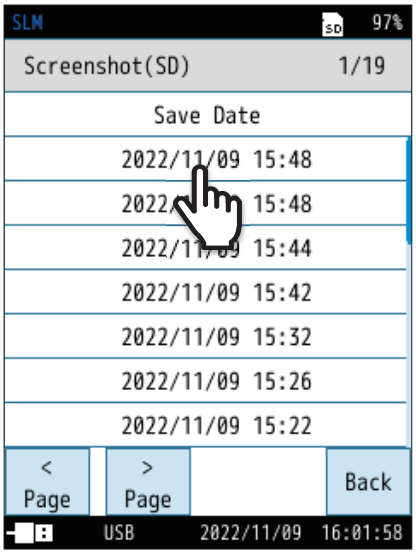


2 On [Recall] screen, touch [Screenshot (SD)].

A list of saved screen data is displayed.

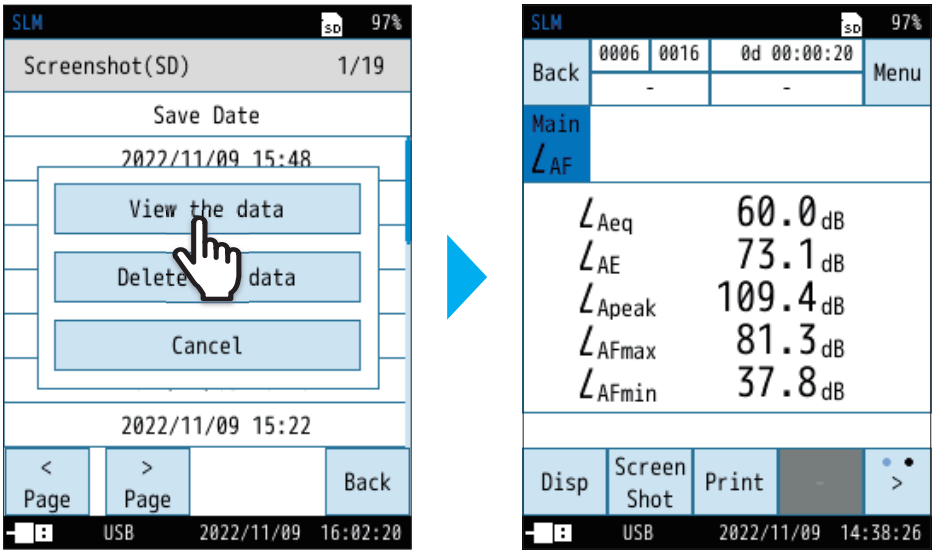


3 Touch the data to read.



4 Touch [View the data].

The saved screen appears. Touch the screen to return to 3.



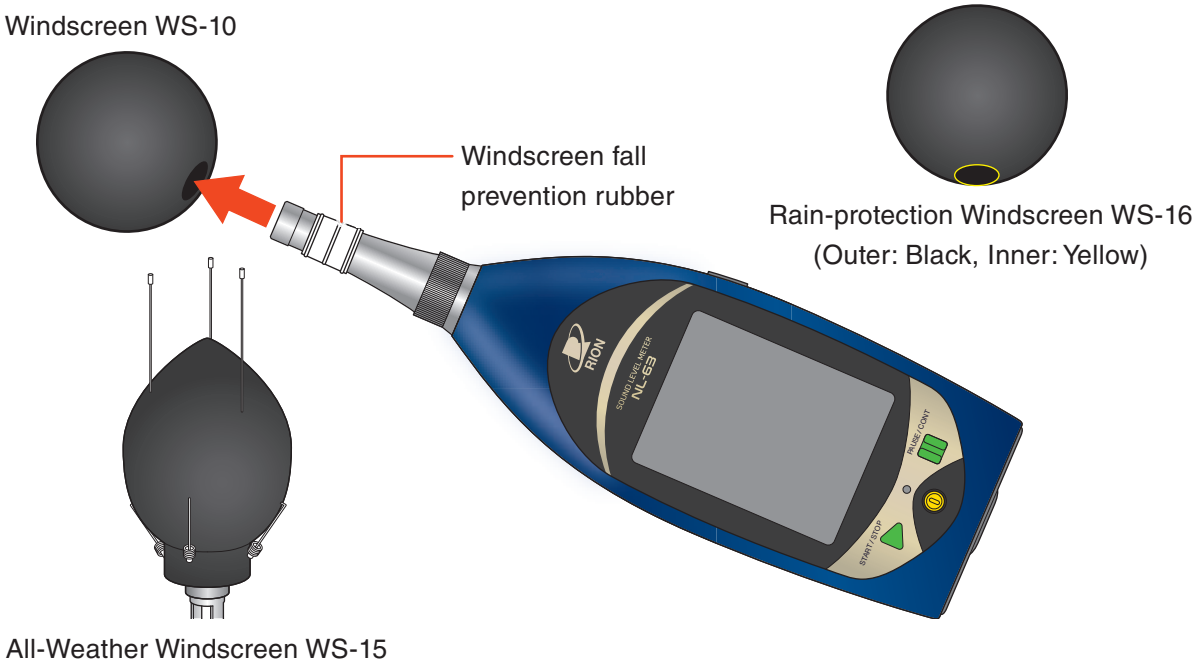
8

Connection with Peripheral Devices

8.1 Attaching the windscreen

When measuring noise outdoors in a windy environment or with a ventilation system present, the wind or air can come into contact with the microphone and generate wind noise, which can affect the measurement results. In such cases, wind/air noise can be reduced by installing the supplied Windscreen WS-10 to the microphone. The optional All-Weather Windscreen WS-15 or Rain-protection Windscreen WS-16 not only suppresses wind noise but also protects the microphone from light rain.
The sensitivity and frequency response change, when the windscreen is attached to the microphone. When using a windscreen, correction can be made by following the procedure below.
This correction ensures the device complies with the standard even with a windscreen installed.
For details on the windscreen characteristics, refer to the “Technical Guide”.

1 Attach the windscreen to the microphone.

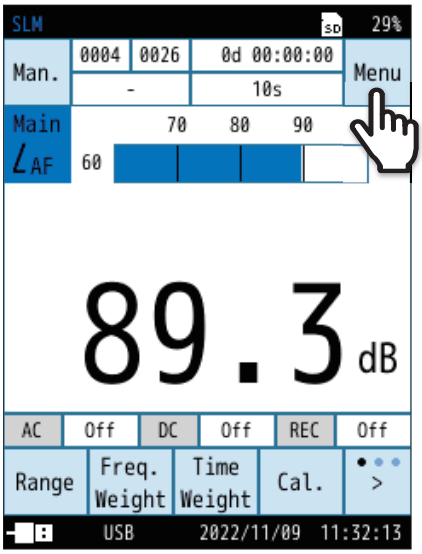


Important

- When using the All-Weather Windscreen WS-15, remove the fall prevention rubber. Otherwise, WS-15 cannot be installed.

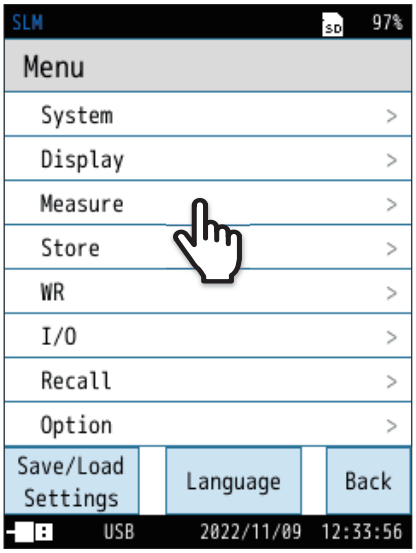
2 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



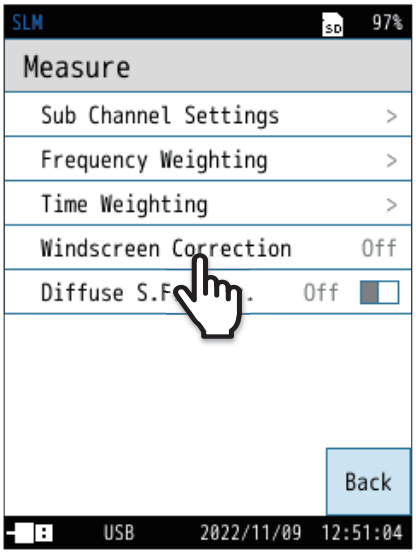
3 Touch [Measure] on the [Menu] screen.

The [Measure] screen appears.

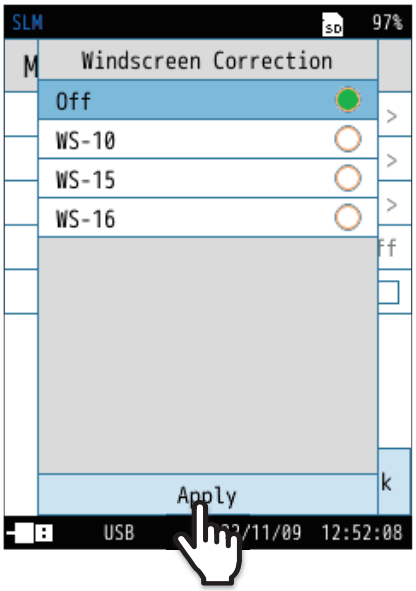


4 Touch [Windscreen Correction] on the [Measure] screen.

The windscreen selection screen appears.



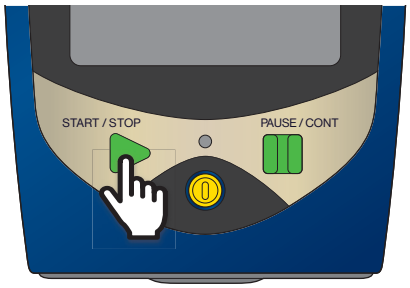
5 Select the windscreen to use, and touch [Apply].



The name of the selected windscreen is displayed at the top of the screen.

Item	Description
Off	Does not use windscreen correction
WS-10	Compensates for variations in sensitivity and frequency response due to attachment of Windscreen WS-10. Select this when attaching WS-10.
WS-15	Compensates for variations in sensitivity and frequency response due to attachment of All-Weather Windscreen WS-15. Select this when attaching WS-15.
WS-16	Compensates for variations in sensitivity and frequency response due to attachment of Rain-protection Windscreen WS-16. Select this when attaching WS-16.

6 Touch [Back] or press the START/STOP key to return to the measurement screen.

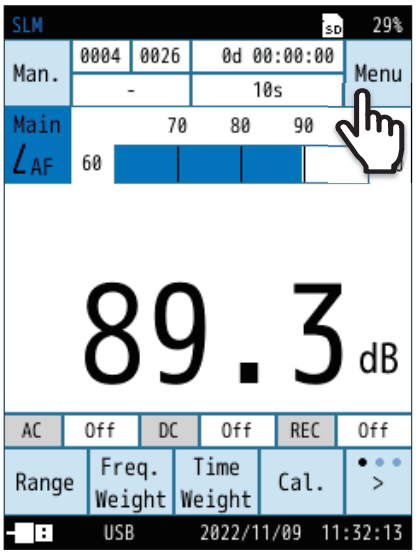


8.2 Diffuse sound field correction settings

If using the device in a diffuse sound field, set this setting to [On].
This compensates for variations in sensitivity and frequency response in diffuse sound fields for free fields.
For details, refer to the “Technical Guide”.

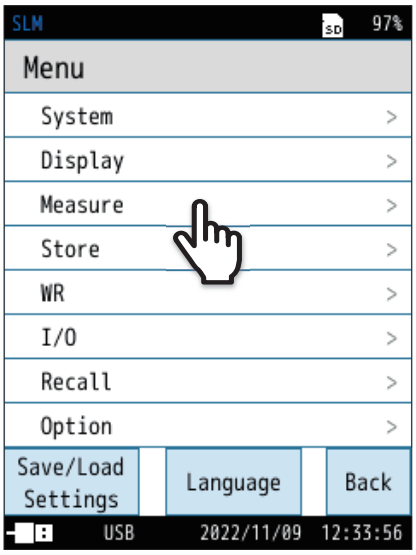
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



2 Touch [Measure] on the [Menu] screen.

The [Measure] screen appears.

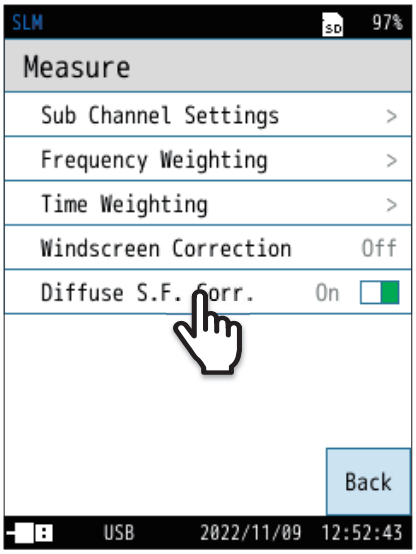


3 Touch [Diffuse S.F. Corr.] on the [Measure] screen.

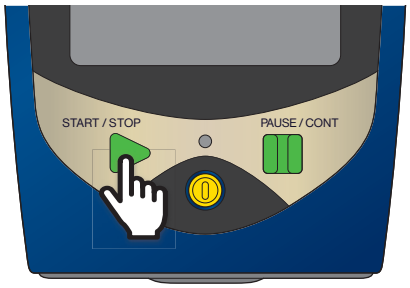
The setting switches between turning on/off each time you touch.

Item	Description
On	Uses diffuse sound field correction
Off	Does not use diffuse sound field correction

When [On] is selected, [DF] is displayed at the top of the screen.



4 Touch [Back] or press the START/STOP key to return to the measurement screen.



8.3 Setting the SD card and program card

Measurement data can be recorded on an SD card, and the results can be processed on a computer.
You can take various measurements by installing program cards (optional), such as NX-43WR.

Important

- Be sure to turn off the power before inserting or removing the card.
- If you remove the SD card while writing out or loading data, the data on the SD card may become corrupted.
- Use SD cards that are genuine and provided by RION. The performance of other cards is not guaranteed.
- Note that we assume no responsibility for any damage or loss of stored measurement data.

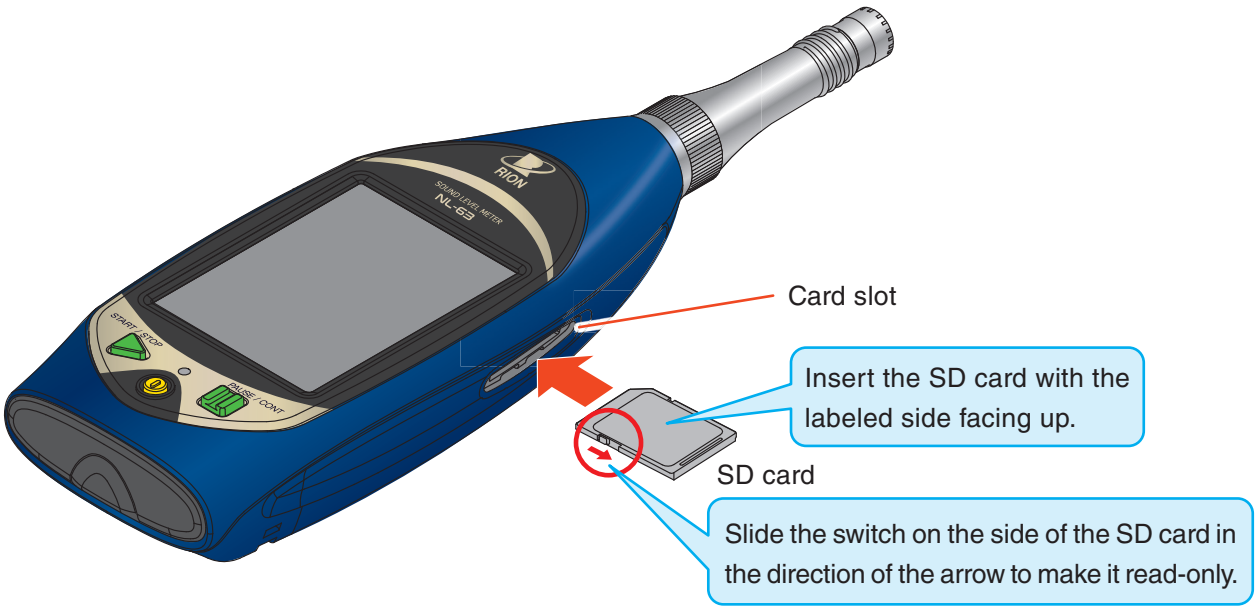
Note

- Prior to measurement, first format the SD card for storing data with this device.

1 Open the card slot cover on the right side of the device.

2 Insert the SD card.

With the label on the SD card facing up, insert it into the card slot on the right side of the device until a clicking sound is made.



3 Install the program card software.

Refer to the instruction manual for the program card (optional) to install it.

Note

- This step is not necessary for SD cards used for saving data.

4 To remove the SD card, push it in until it makes a clicking sound.

The SD card will pop out, so take it out.

8.4 Mounting on a tripod

When taking measurements at a fixed point for a long time, mount the device to a camera tripod.

⚠ CAUTION

- Be careful not to drop the device when mounting it on a tripod. Also, ensure that the tripod does not fall over.
- When using a tripod, make sure the tripod is stable with the device mounted.
- Do not move the device while it is mounted to the tripod. Doing so may cause an injury due to it falling over or hitting someone.

Important

- When mounting the device to a tripod, use the tripod screw to directly fix the device in place.
- Be careful not to tilt the screw when mounting or removing the device from the tripod. Turning with excessive force may damage the screw of the device.

8.5 Connecting the microphone extension cable

By using the microphone extension cable EC-04 series, the microphone can be installed in a location away from the device.
Diffraction from the device and unwanted audio from the person taking measurements are reduced, enabling more precise measurements.
The following types of microphone extension cables are available.

Microphone extension cable EC-04 series

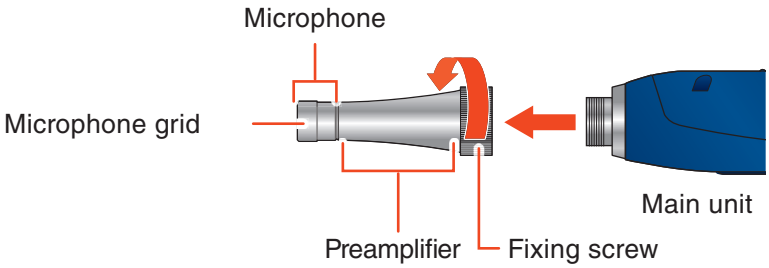
Model	Length
EC-04	2 m
EC-04A	5 m
EC-04B	10 m
EC-04C	30 m (reel part) + 5 m (relay cable)
EC-04D	50 m (reel part) + 5 m (relay cable)
EC-04E	100 m (reel part) + 5 m (relay cable)

- You can also use multiple cables to extend the distance of the microphone.
- Extension cables up to 105 meters are subject to verification under the Measurement Act.
- An extension cable is required to install All-Weather Windscreen WS-15.

Important

- Make sure to turn off the device before connecting or disconnecting a microphone extension cable.
- As the length of the cable increases, the capacitance of the cable limits the maximum measurement frequency and measurement level.
  For details, refer to the “Technical Guide”.

1 Loosen the preamplifier fixing screw.



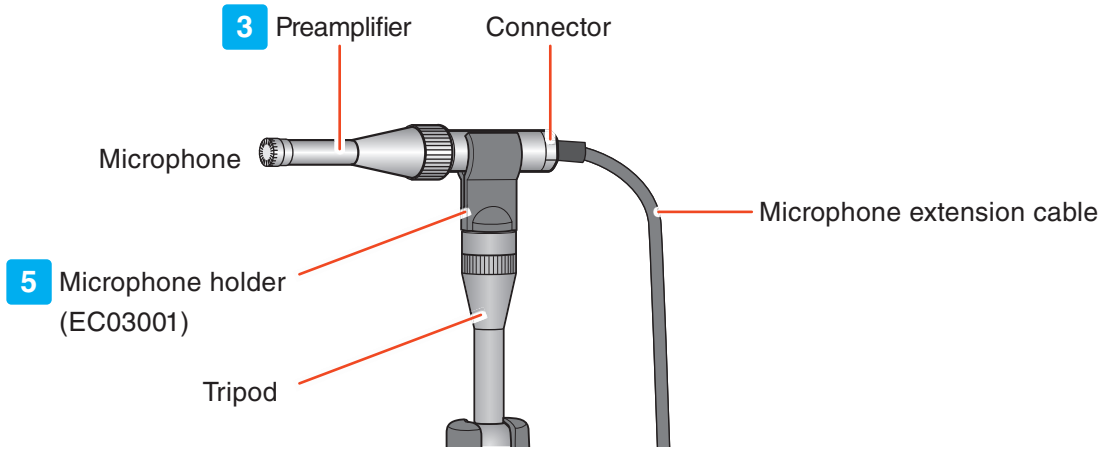
2 Remove the microphone and preamplifier from the main unit.

Important

- Never separate the microphone and preamplifier. Doing so may result in a malfunction.
- Make sure the microphone and microphone grid are installed securely before using or storing the device.
  If there is any looseness, retighten the microphone and microphone grid before using or storing the device.
- Never remove the microphone grid. Doing so may damage the microphone.
- For windscreen assembly, refer to the instruction manual of windscreen WS-15.

3 Connect the extension cable to the preamplifier.

Tighten with the fixing screw.



4 Connect the other end of the extension cable to the main unit.

Tighten with the fixing screw.

5 Use the microphone holder when mounting the microphone on a tripod.

1. **Secure the microphone holder (supplied with the microphone extension cable) to the tripod.**
2. **Insert the connector of the extension cable into the microphone holder.**

8.6 Connecting to a printer

By connecting a printer to the device, you can print hard copies of measurement screenshots and data saved to the internal memory or SD card.
* The printer, recording paper, and printer cable CC-42P are optional.

Connecting the device and printer with a printer cable

Use a printer cable (optional) to connect the device and printer as follows:

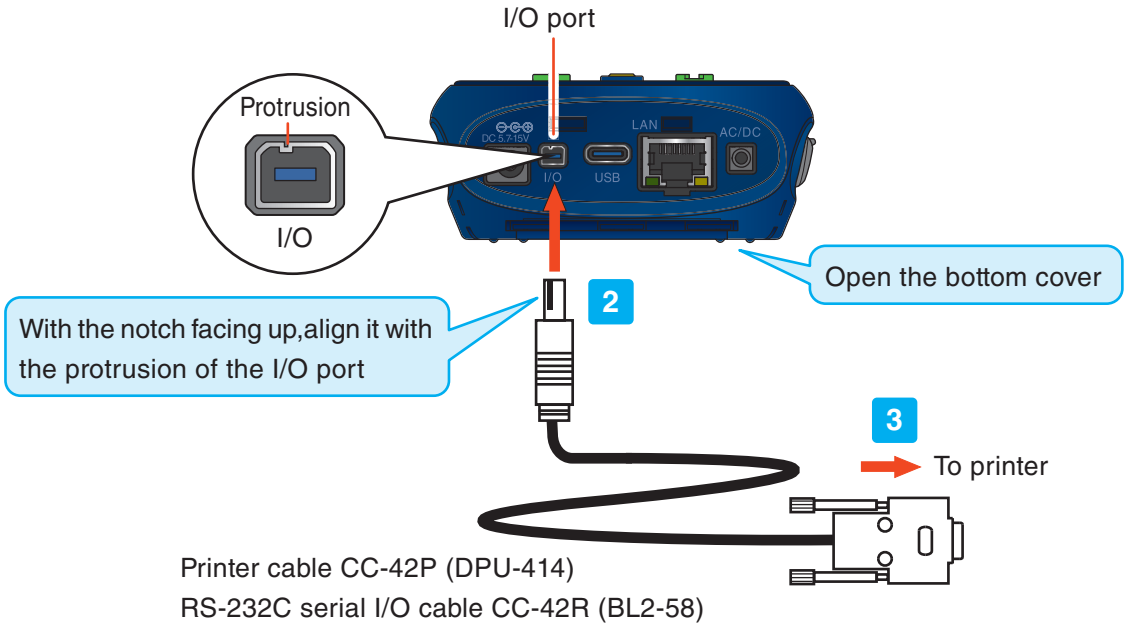
Important

- Note that the cable to be used differs depending on the printer.
- Make sure the orientation is correct when inserting the cable into the I/O port.

1 **Open the bottom cover of the device.**

2 **Insert the connector of the printer cable into the I/O port of the device.**

3 **Plug the other end of the printer cable into the input port on the printer.**



Note

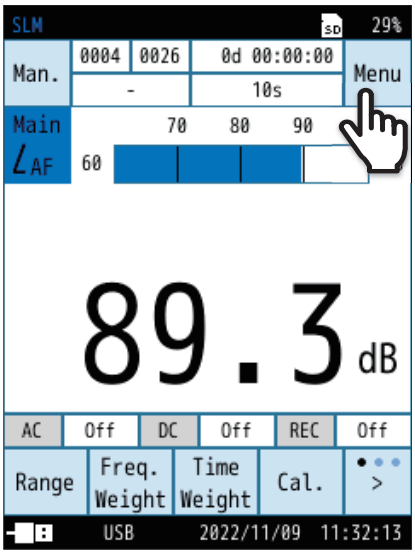
- For details, refer to the instruction manual of the printer.

Setting the I/O port of the device

When using a printer (DPU-414/BL2-58), set the I/O ports of the device according to the following procedure.

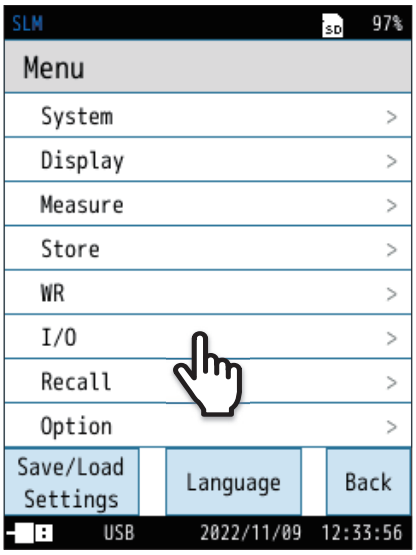
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



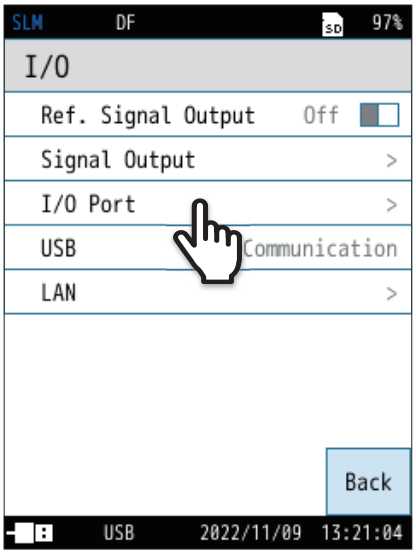
2 Touch [I/O] on the [Menu] screen.

The [I/O] screen appears.

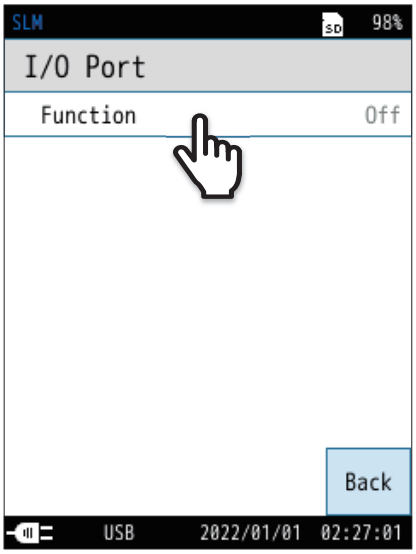


3 Touch [I/O Port] on the [I/O] screen.

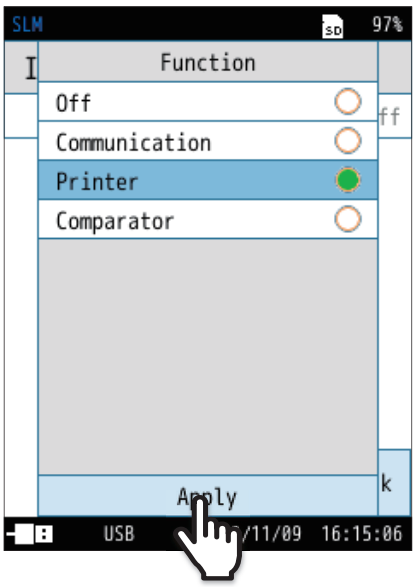
The [I/O Port] screen appears.



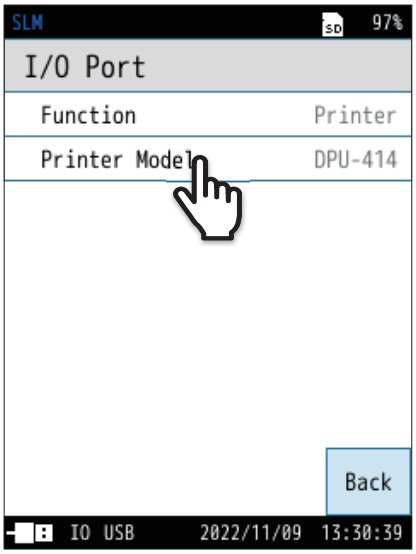
4 Touch [Function] on the [I/O Port] screen.



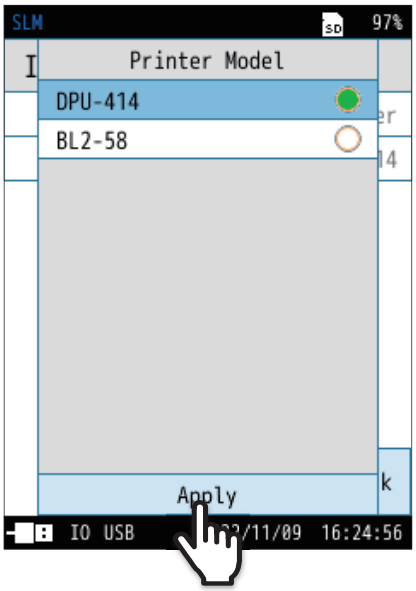
5 Select [Printer], and touch [Apply].



6 Touch [Printer Model].



7 Select the applicable model, and touch [Apply].



DPU-414 printer setting example

If you turn on the power while holding down the ONLINE key of the printer, the printer status will be printed.
The following is an example of what printing looks like when the soft DIP switches are set for the device (the actual printing font will be different).

[DIP SW setting mode]
Dip SW-1
1(OFF) : Input = Serial
2 (ON) : Printing Speed = High
3 (ON) : Auto Loading = ON
4 (OFF) : Auto LF = OFF
5 (ON) : Setting Command = Enable
6 (OFF) : Printing
7 (ON) : Density
8 (ON) : =100%
Dip SW-2
1 (OFF) : Printing Columns = 80
2 (ON) : User Font Back-up = ON
3 (ON) : Character Select = Normal
4 (ON) : Zero = Normal
5 (ON) : International
6 (ON) : Character
7 (ON) : Set
8 (ON) : =Japan
Dip SW-3
1 (ON) : Data Length = 8 bits
2 (ON) : Parity Setting = No
3 (OFF) : Parity Condition = Even
4 (OFF) : Busy Control = XON/XOFF
5 (OFF) : Baud
6 (ON) : Rate
7 (ON) : Select
8 (OFF) : = 19200 bps

Note

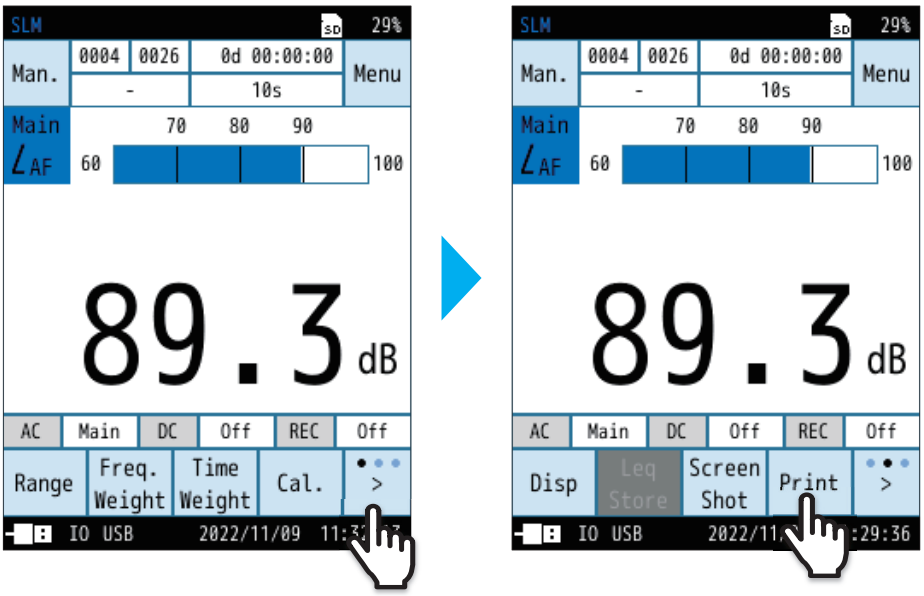
- For details, refer to the instruction manual of the printer.

Printing the measurement screen

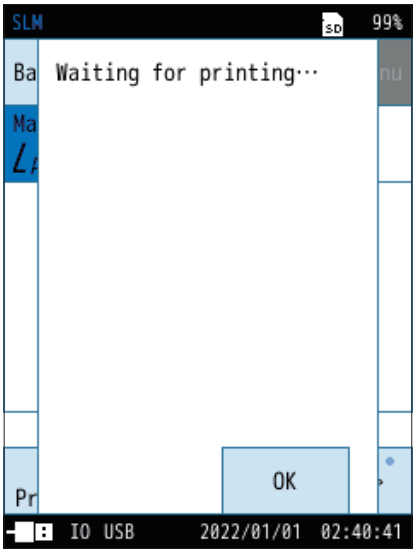
1 **Turn on the power to the device and the printer.**

2 **Connect the device and the printer (Page 122).**

3 **Touch [>] on the menu ring, and touch [Print].**



The [Print] screen appears, and the measurement screen is printed.

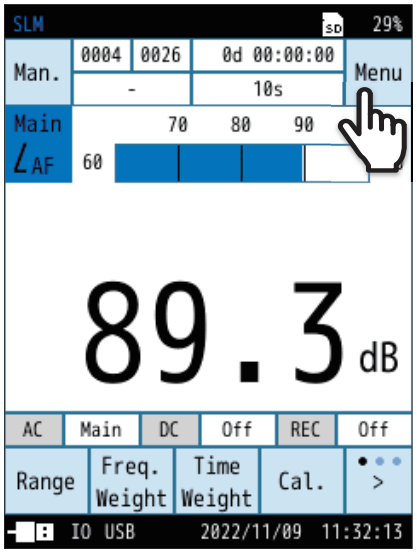


Printing the saved data

Print the data saved on the internal memory or SD card.

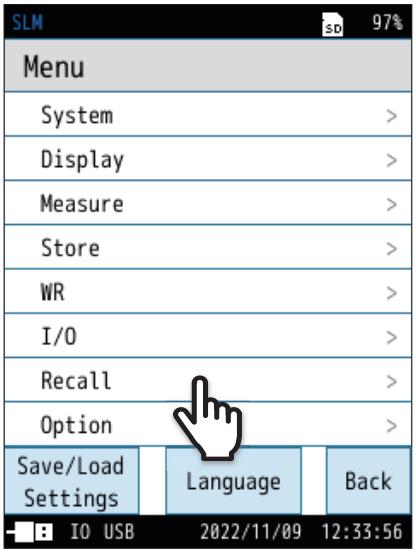
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



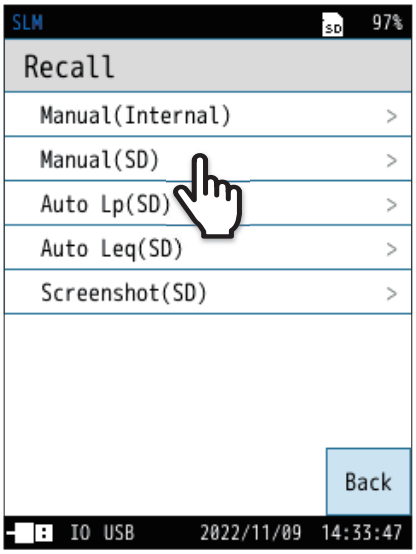
2 Touch [Recall] on the [Menu] screen.

The [Recall] screen appears.

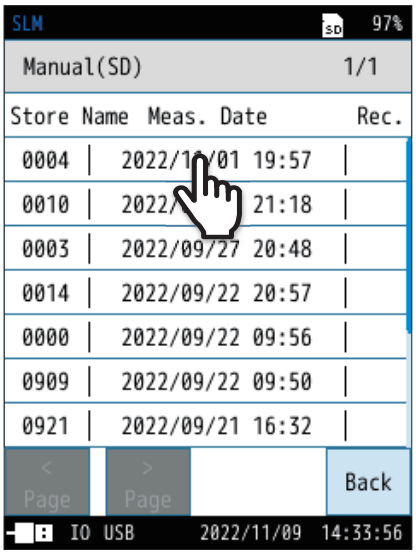


3 On the [Recall] screen, select the data you want to print.

1. **Select the location where the data you want to print is stored.**
   (Example: When printing Manual (SD) data)
   The data selection screen appears.

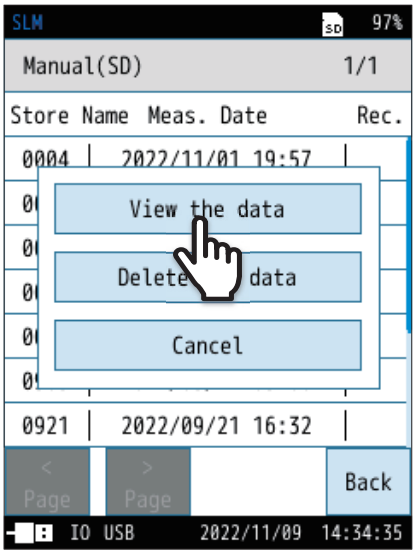


2. **Select the data you want to print.**

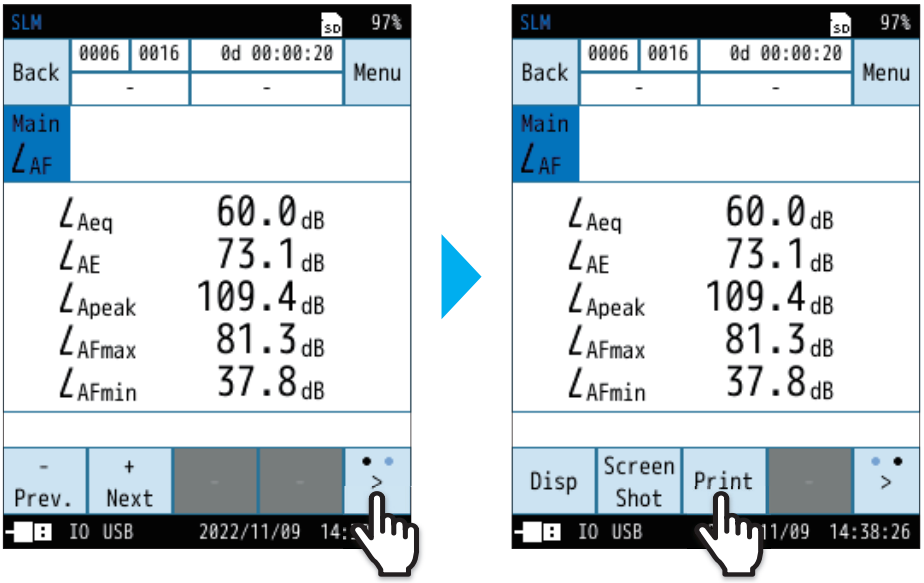


4 Touch [View the data].

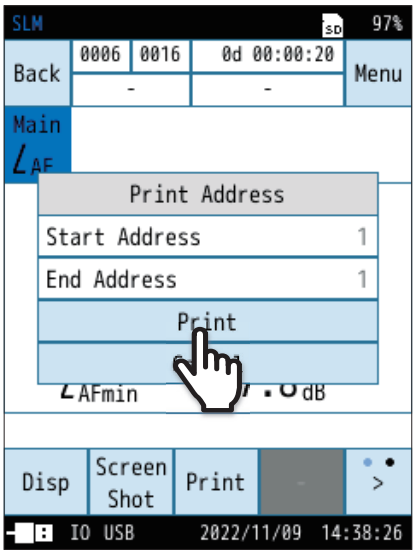
The saved data are displayed.



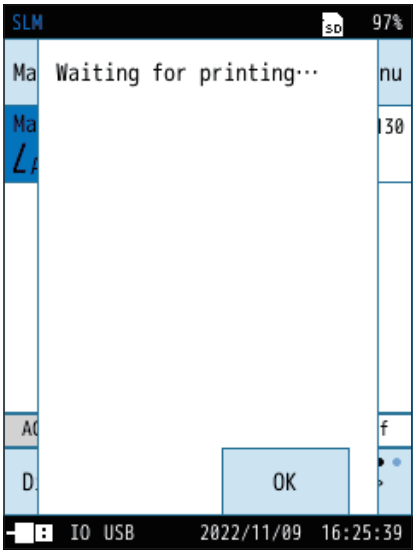
5 Touch [>] on the menu ring, and touch [Print].



6 Enter the [Start Address] and [End Address], and touch [Print].



The [Print] screen appears, and the saved data is printed.



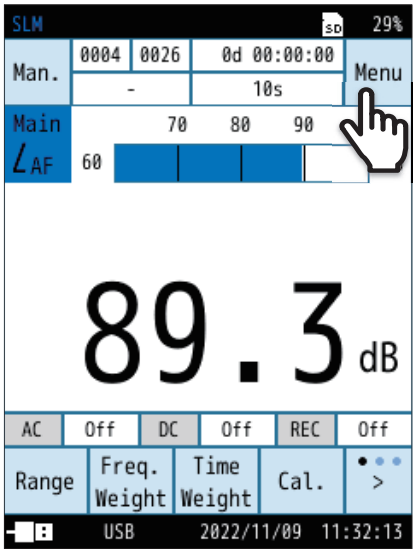
8.7 Connecting the AC/DC output ports

8.7.1 AC OUT (AC output)

Set the channel for the frequency weighting and time weighting applied to the AC signal output from the AC/DC port on the bottom of the device.

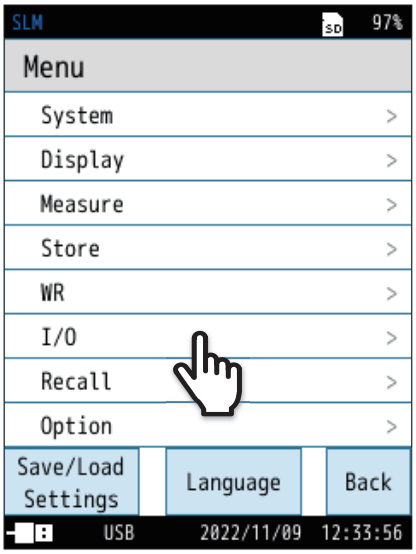
1 **Touch [Menu] on the measurement screen.**

The [Menu] screen appears.



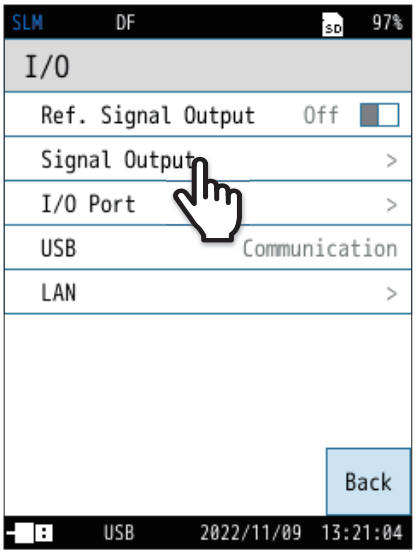
2 **Touch [I/O] on the [Menu] screen.**

The [I/O] screen appears.



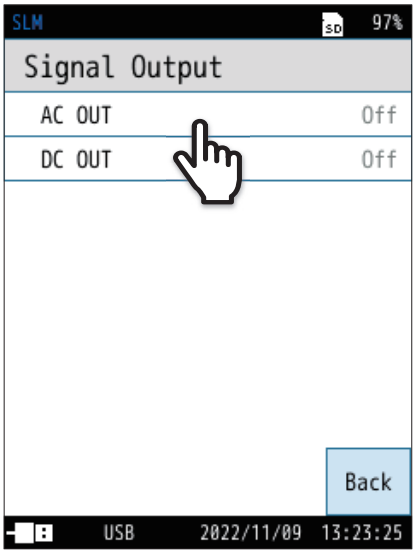
3 Touch [Signal Output] on the [I/O] screen.

The [Signal Output] screen appears.



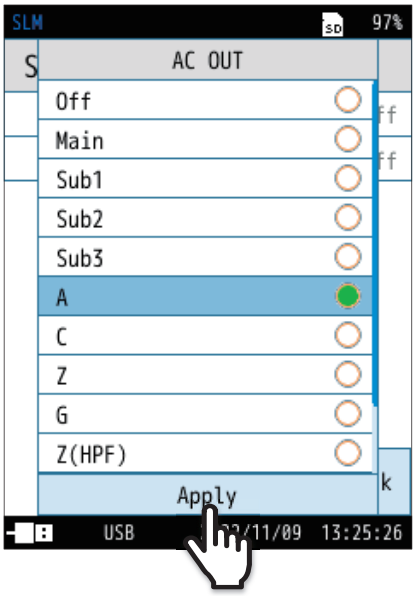
4 Touch [AC OUT].

The [AC OUT] screen appears.



5 Select the frequency weighting of the output AC signal.

Item	Description
Off	No AC signal is output.
Main	Outputs an AC signal corresponding to the sound pressure waveform after frequency weighting. Applies the frequency weighting set in the selected channel.
Sub1	
Sub2	
Sub3	
A	Outputs an AC signal corresponding to the sound pressure waveform after frequency weighting. Applies the selected frequency weighting.
C	
Z	
G	
Z(HPF)	
Z(LPF100Hz)	
Z(LPF500Hz)	



6 Touch [Apply].

Important

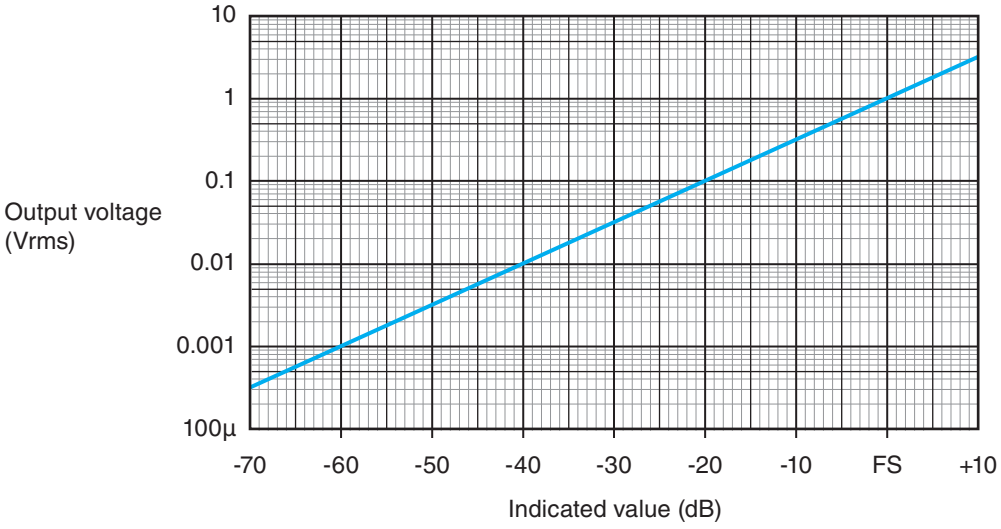
- The continuous operating time on batteries will be shortened by approximately 30% when this function is used compared to when the setting is off.
- If both [AC OUT] and [DC OUT] are turned on, make sure that the AC/DC Output Splitter Cable CC-43S (optional) of a cable that supports simultaneous output of AC/DC OUT is connected. Connecting with the wrong adapter may damage the main unit.

AC output specifications

Output voltage	1 Vrms at the output level range Example: 1 Vrms at 120 dB input when the output level range setting is 120 dB
Output resistance	50 Ω
Load impedance	10 kΩ or more
Connection cable	BNC pin output cable CC-24/CC-24S (BNC-miniplug) AC/DC Output Splitter Cable CC-43S * Operation with other cables is not guaranteed.

Ideal indicated values and AC output voltage

The relationship between the indicated values (sound level L_p) of the device and the AC output voltage is shown in the figure below.



FS: Full scale value (output level range)

- For example, when the output level range is set to 120 dB, the output signal will be 0.5 Vrms at an indicated value of 114 dB (output level range – 6 dB).
- The actual range of output linearity is from the output level range to -60 dB.
  However, if the output linearity range (60 dB) falls below the lower limit of the measurement level specification range of the Sound Level Meter, the linearity of 60 dB cannot always be maintained.

Time delay

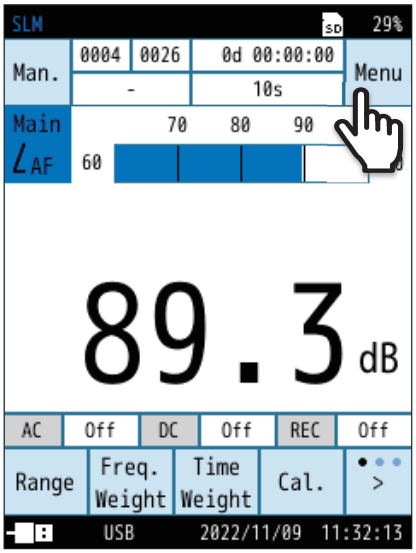
This device converts the analog input signal from the microphone to a digital signal, performs digital signal processing with the digital signal processor (DSP), converts it back to an analog signal, and outputs the AC output signal. Depending on the frequency, a time delay of approximately 1.3 ms occurs in the case of AC output in relation to the input signal from the microphone (Frequency weighting: Z, at 1 kHz sine wave output). However, the time delay varies with frequency.

8.7.2 DC OUT (DC output)

Set the channel for the frequency weighting and time weighting applied to the DC signal output from the AC/DC port on the bottom of the device.

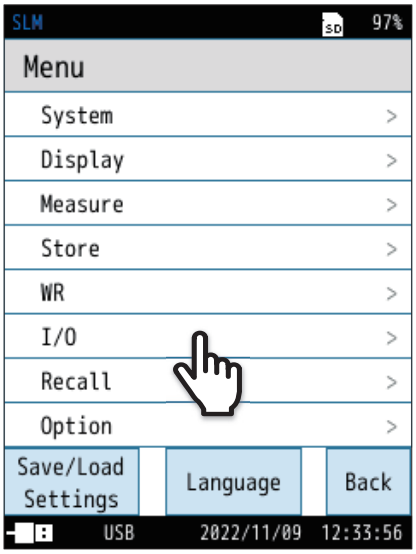
1 **Touch [Menu] on the measurement screen.**

The [Menu] screen appears.



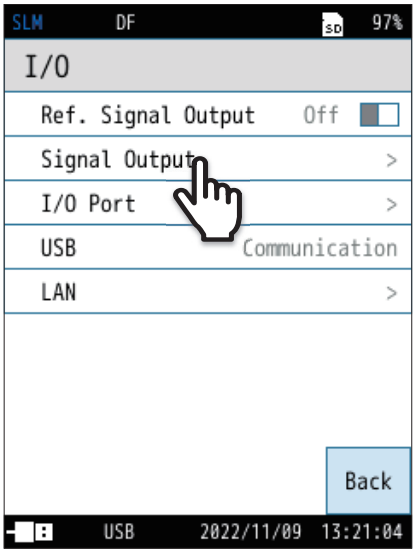
2 **Touch [I/O] on the [Menu] screen.**

The [I/O] screen appears.



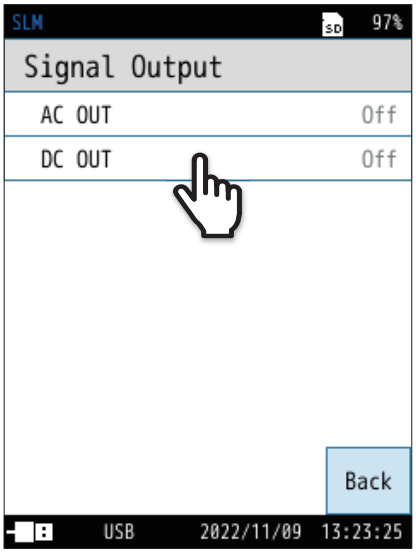
3 **Touch [Signal Output] on the [I/O] screen.**

The [Signal Output] screen appears.



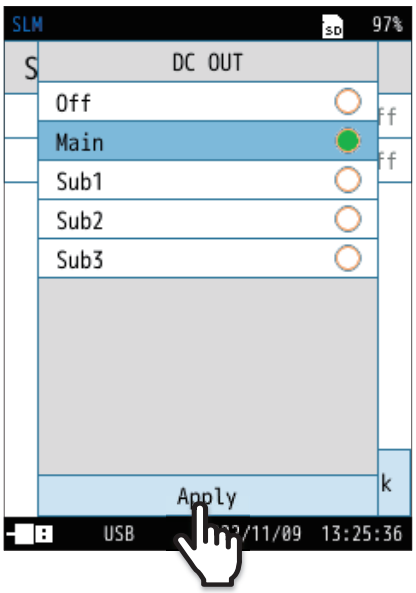
4 Touch [DC OUT].

The [DC OUT] screen appears.



5 Select the channel that outputs the DC signal, and touch [Apply].

Item	Description
Off	No DC signal is output.
Main	Outputs a DC signal corresponding to the sound pressure waveform after frequency weighting. Applies the frequency weighting set in the selected channel.
Sub1	
Sub2	
Sub3	



Important

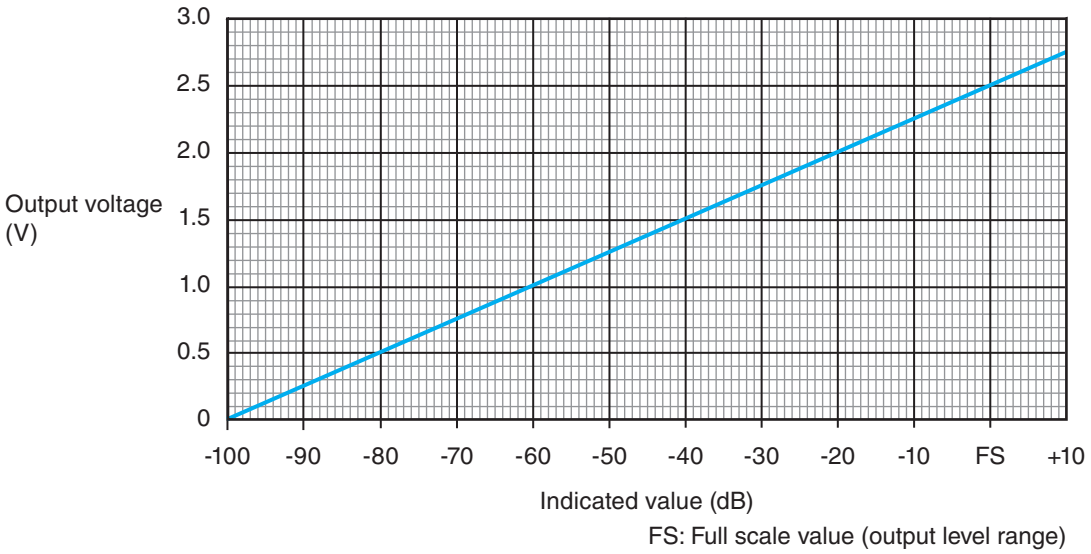
- The continuous operating time on batteries will be shortened by approximately 30% when this function is used compared to when the setting is off.
- If both [AC OUT] and [DC OUT] are turned on, make sure that the AC/DC Output Splitter Cable CC-43S (optional) of a cable that supports simultaneous output of AC/DC OUT is connected. Connecting with the wrong adapter may damage the main unit.

DC output specifications

Output voltage	2.5 V, 25 mV/dB at the output level range Example: Outputs 2.5 V at 120 dB input when the output level range is set to 120 dB
Output resistance	50 Ω
Load impedance	10 kΩ or more
Applicable cable	BNC pin output cable CC-24 (BNC-miniplug) AC/DC Output Splitter Cable CC-43S * Operation with other cables is not guaranteed.

Ideal indicated values and DC output voltage

The relationship between the indicated values (sound level L_p) of the device and the DC output voltage is shown in the figure below.



- For example, when the output level range is set to 120 dB, the output signal will be 2.35 V at an indicated value of 114 dB (output level range – 6 dB).
- The actual range of output linearity is from the output level range to -60 dB.
  However, if the output linearity range (60 dB) falls below the lower limit of the measurement level specification range of the Sound Level Meter, the linearity of 60 dB cannot always be maintained.

8.8 Connection with level recorder or data recorder

Changes in sound levels over time can be recorded by connecting a level recorder to the device.
Waveforms can also be recorded by connecting a data recorder to the device.
Connect a level recorder (LR-07/LR-20A) or data recorder (DA-21/DA-20/DA-40) and the device with BNC pin output cable CC-24/CC-24S (optional) as follows.
The level recorder uses analog recording by way of a pen and rolled paper, and the data recorder uses digital recording.

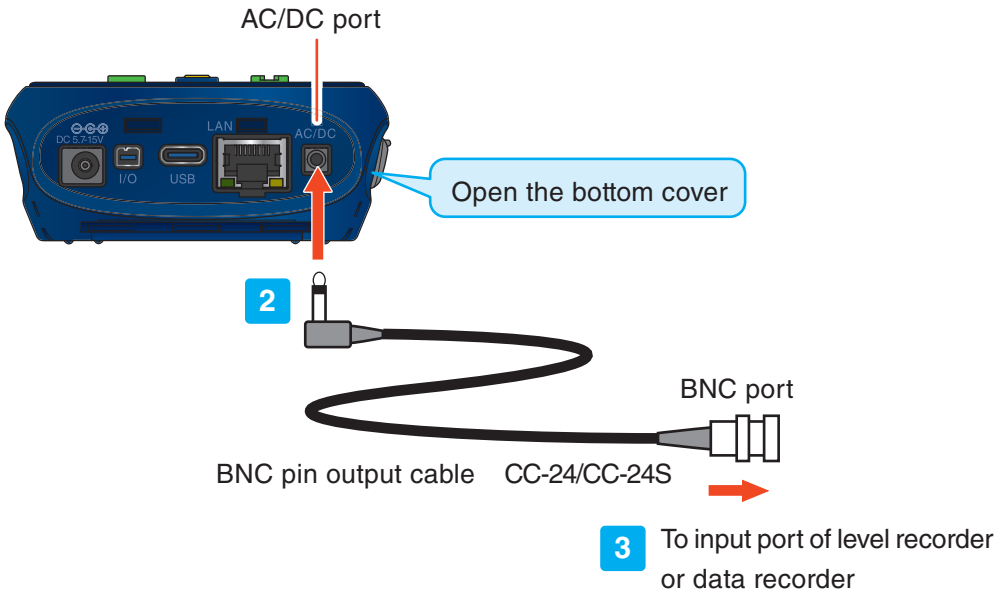
Important

- Operation is not guaranteed with BNC pin output cables other than CC-24 or CC-24S.

1 **Open the bottom cover of the device.**

2 **Insert the connector of the BNC pin output cable into the AC/DC port of the device.**

3 **Plug the BNC port of the BNC pin output cable into the input port of the level recorder or data recorder.**



Sound level recording

Record changes in the sound level over time as follows.

1 Turn on the power to the device and the level recorder or data recorder.

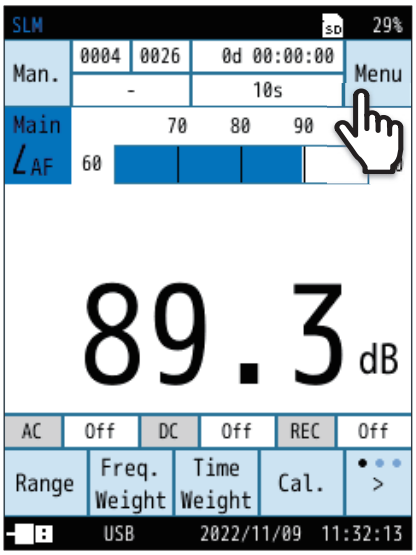
Note

- For how to handle the level recorder and data recorder, refer to the instruction manual of each device.

2 Connect the device to the level recorder or data recorder (Page 138).

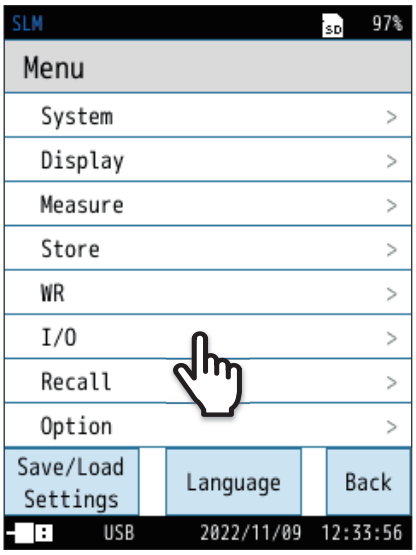
3 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



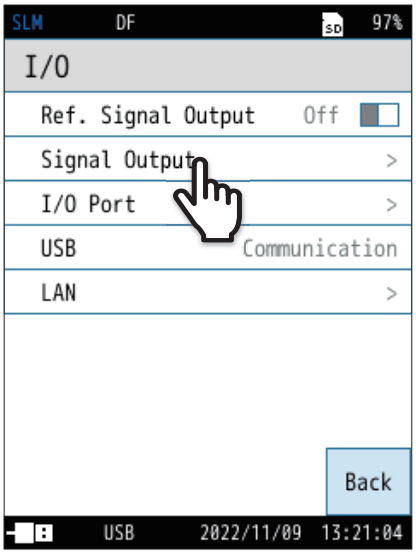
4 Touch [I/O] on the [Menu] screen.

The [I/O] screen appears.



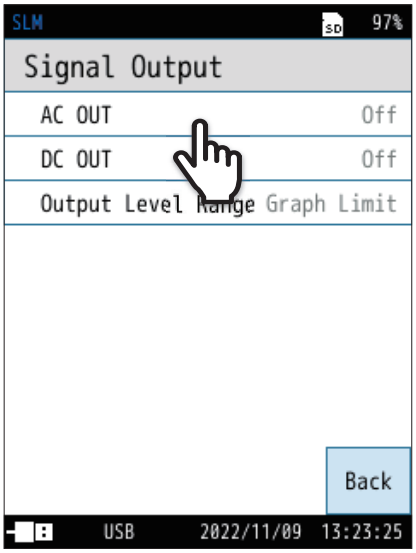
5 Touch [Signal Output] on the [I/O] screen.

The [Signal Output] screen appears.

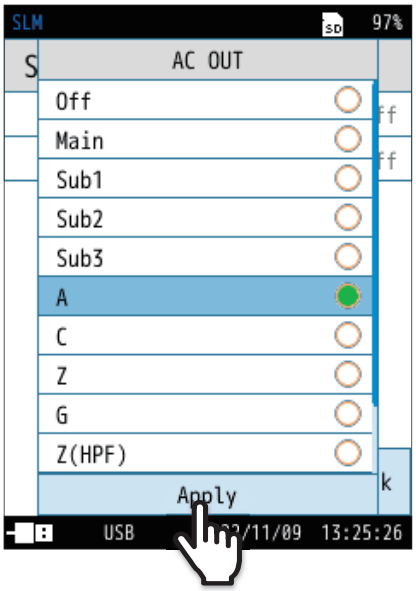


6 Touch [AC OUT].

The [AC OUT] screen appears.



7 Select the frequency weighting of the AC signal output to the level recorder or data recorder, and touch [Apply].



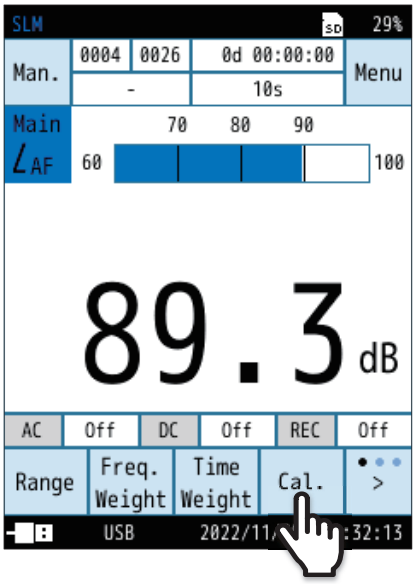
Item	Description
Off	No AC signal is output.
Main	Outputs an AC signal corresponding to the sound pressure waveform after frequency weighting. Applies the frequency weighting set in the selected channel.
Sub1	
Sub2	
Sub3	
A	Outputs an AC signal corresponding to the sound pressure waveform after frequency weighting. Applies the selected frequency weighting.
C	
Z	
G	
Z(HPF)	
Z(LPF100Hz)	
Z(LPF500Hz)	

Important

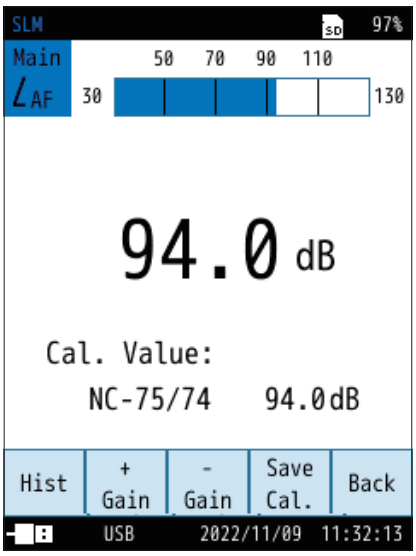
- The continuous operating time on batteries will be shortened by approximately 30% when this function is used.

8 Touch [Back] or press the START/STOP key to return to the measurement screen.

9 Touch [Cal.] on the measurement screen.

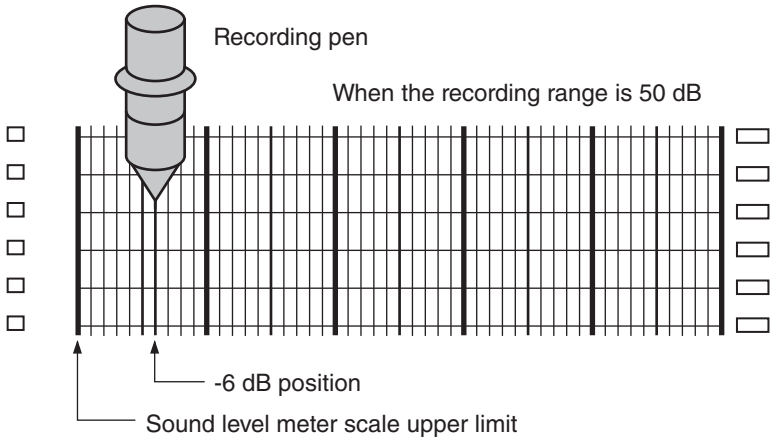


To calibrate an external device (level recorder or data recorder) a calibrator (Page 146) or reference signal is output (Page 63).



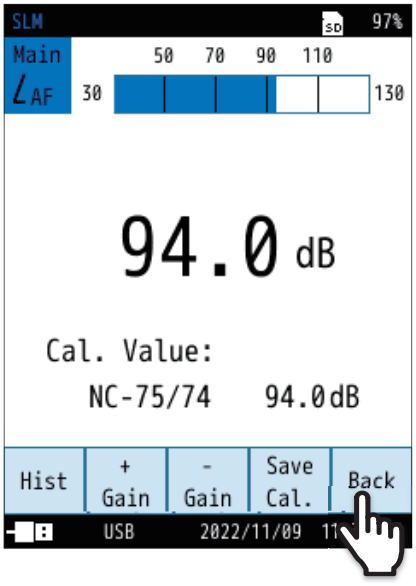
10 Adjust the pen to record the position corresponding to the calibration value.

- For example, if the calibration value is 94 dB, adjust the pen to record at -6 dB from the upper limit of the scale.
- If a level recorder is connected, record the calibration signal. For details, refer to the instruction manual of the data recorder.



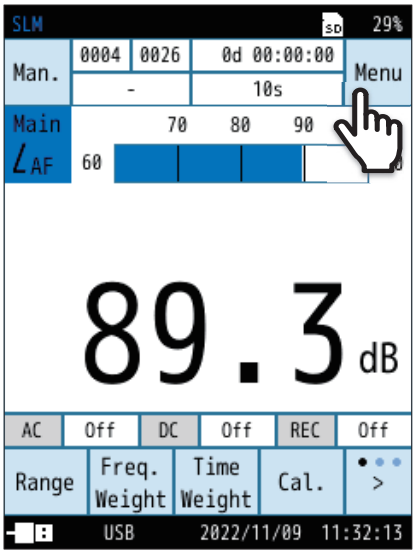
11 Touch [Back] or press the START/STOP key.

The device enters measurement mode.

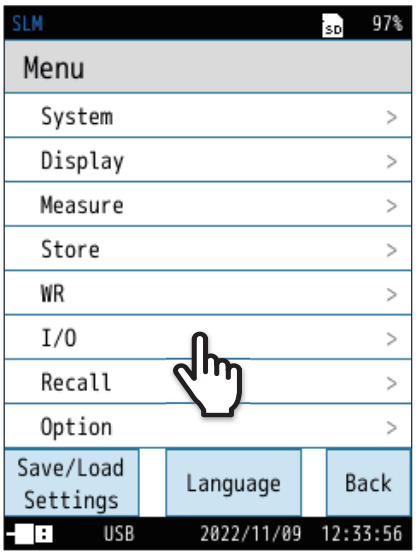


12 Set the output level range on the device.

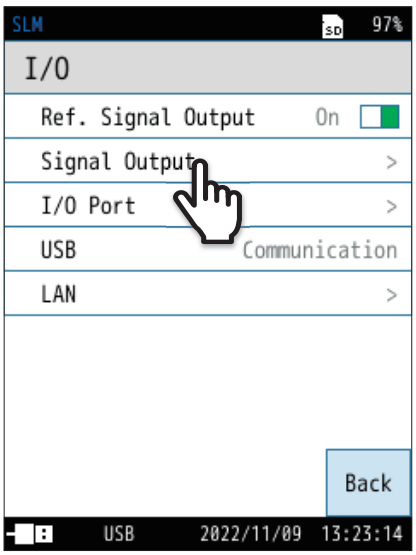
1. **Touch [Menu] on the measurement screen.**
   The [Menu] screen appears.



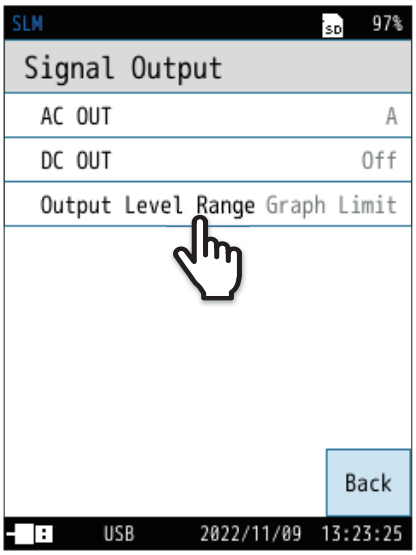
2. **Touch [I/O] on the [Menu] screen.**
   The [I/O] screen appears.



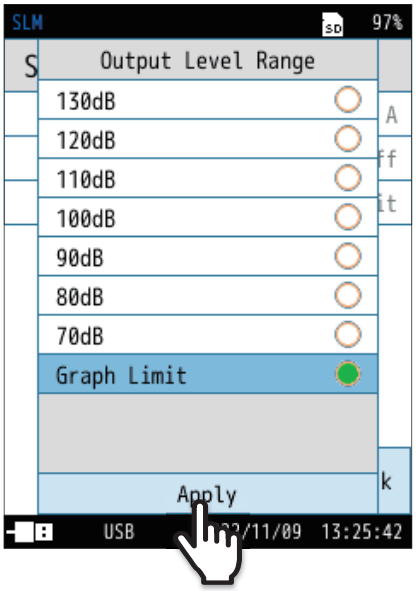
3. **Touch [Signal Output] on the [I/O] screen.**
   The [Signal Output] screen appears.



4. **Touch [Output Level Range] on the [Signal Output] screen.**
   The [Output Level Range] screen appears.



5. **Select the output level range, and touch [Apply].**



13 Touch [Back] or press the START/STOP key to return to the measurement screen.

Measure and record according to the instruction manual of the level recorder or data recorder.

8.9 Computer connection

Connect a computer and the device with a commercially available USB Type-C cable as follows.

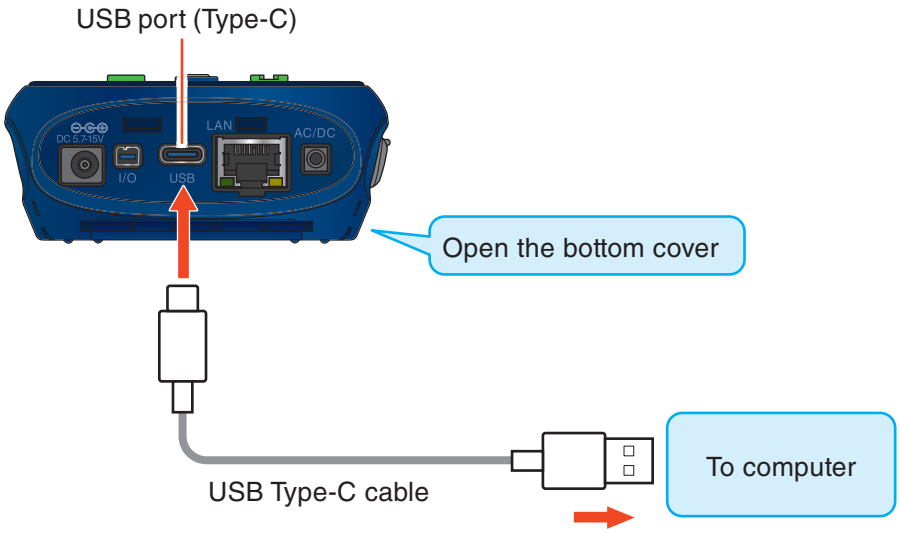
Note

- When using the communication function to control the operation of the sound level meter with commands, on the [I/O] screen, set [USB] to [TCP].
- To use the communication function, refer to the “Communication Guide”.

1 Open the bottom cover of the device.

2 Insert the Type-C connector of the USB cable into the USB ports of the device and computer.

The SD card inserted into the device is recognized as a removable disk. On the [I/O] screen, set [USB] to [Mass Storage].



9 Calibration

Before starting the measurement, calibrate the sound by inserting the microphone of the device into a sound calibrator (NC-75/74) or a pistonphone (NC-72B/72A).
Adjust it so that the sound level L_p (indicated value) display of the device is equal to the sound level in the coupler of the calibrator.

Note

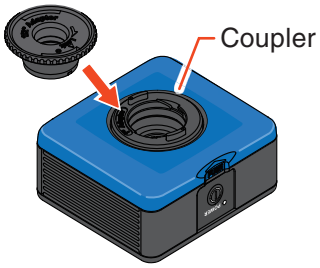
- When using a pistonphone (NC-72B/72A), perform sound calibration with the frequency weighting of the main channel set to Z or C.
- We recommend regularly calibrating the sound calibrator and pistonphone.
- You do not need to change the bar graph's upper and lower limits on the device to match the sound pressure level of the calibrator.
- For details on how to calibrate using a sound calibrator or pistonphone, refer to the respective instruction manuals.
- Perform sound calibration with the microphone of this device horizontally inserted all the way into the sound calibrator or pistonphone.

1 Check that the power switch on the sound calibrator or pistonphone is turned off.

2 Attach the 1/2 inch adapter to the sound calibrator or pistonphone coupler.

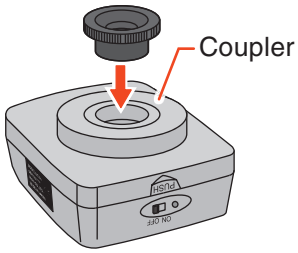
Sound calibrator NC-75

1/2 inch adapter for NC-75

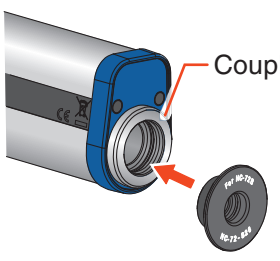


Sound calibrator NC-74

1/2 inch adapter for NC-74

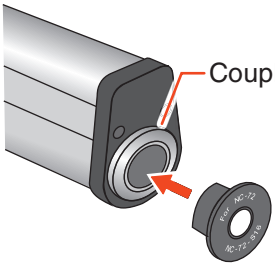


Pistonphone NC-72B



1/2 inch adapter for NC-72B

Pistonphone NC-72A



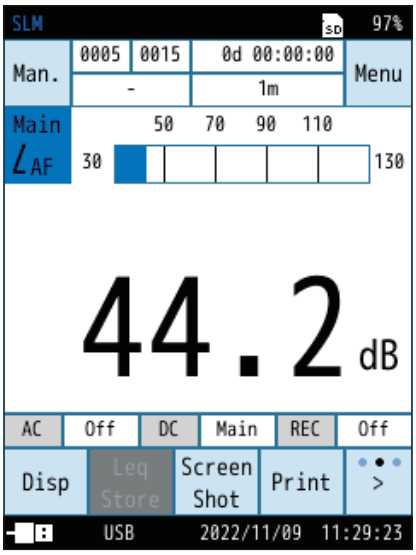
1/2 inch adapter for NC-72A

3 Gently and slowly push the microphone of the device until it hits the back of the coupler.

Important

- Attach the sound calibrator or pistonphone to the microphone gently and slowly.
- If it is pushed in or pulled out suddenly, the air pressure inside the coupler will change significantly, which may damage the diaphragm of the microphone.
- When attaching or detaching the calibrator, do not rotate the device or the calibrator. Rotating the device or calibrator may loosen or dislodge the microphone grid and damage the microphone diaphragm.

4 After inserting the microphone, wait a short while and then read the indicated value on the device.



Note

- Accurate calibration cannot be performed immediately after the microphone is inserted because the air pressure inside the calibrator and microphone has changed. It takes about 90 seconds for the air pressure to stabilize and the microphone performance of the device to stabilize. As for the time required for the inside of the calibrator to stabilize, see the instruction manual of each sound calibrator.

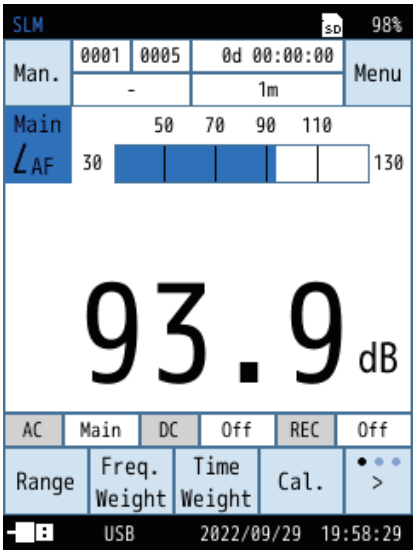
5 Turn on the power switch of the sound calibrator or pistonphone.

6 Wait until the indicated value on the device settles before reading it.

Check that the sound calibrator (NC-75/74) exceeds the value read in step 4 by 20 dB or more and that the pistonphone (NC-72B/72A) exceeds the read value by 30 dB or more.

Note

- If this difference is less than 20 dB for the sound calibrator (NC-75/74) and less than 30 dB for the pistonphone (NC-72B/72A), the surrounding environment noise will affect the calibration, and you will be unable to calibrate accurately.



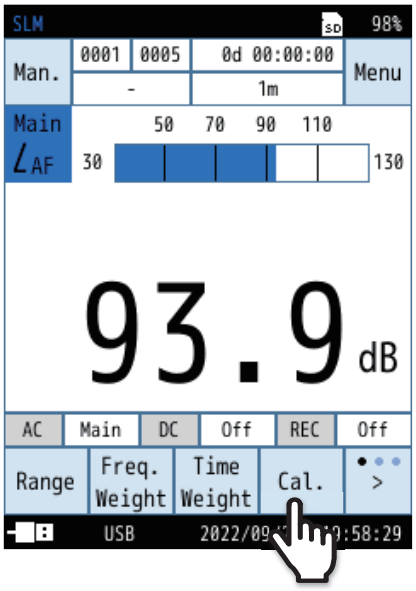
7 To adjust the indicated value, touch [Cal.].

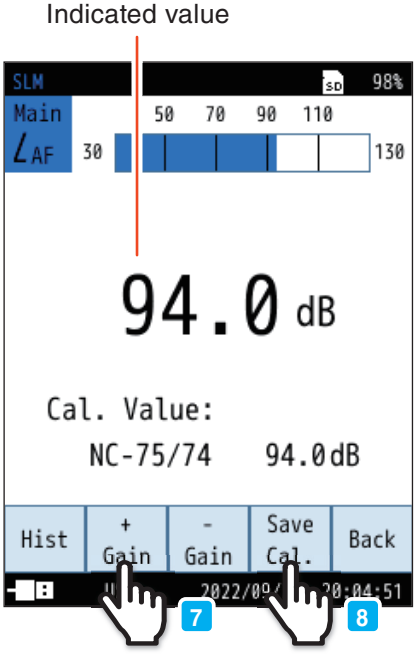
- If there is no difference between the indicated value and the calibrated value, or if you do not adjust the indicated value, the calibration procedure concludes here.
- Touch [+Gain] and [-Gain] so that the indicated values become the following calibration values.

Model	Calibration value
NC-75/74	94.0 dB
NC-72B/72A	Refer to the respective instruction manuals

Note

- Calculate the generated sound pressure level by substituting the following into the formula described in the NC-72B/72A instruction manual.
  - Specified sound pressure level on the calibration chart that comes with the NC-72B/72A (nominal value is 114 dB)
  - Compensation value for effective load volume of the microphone (-0.07 dB)
  - Static pressure at time of use

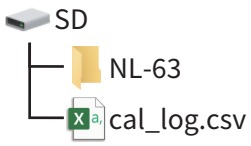


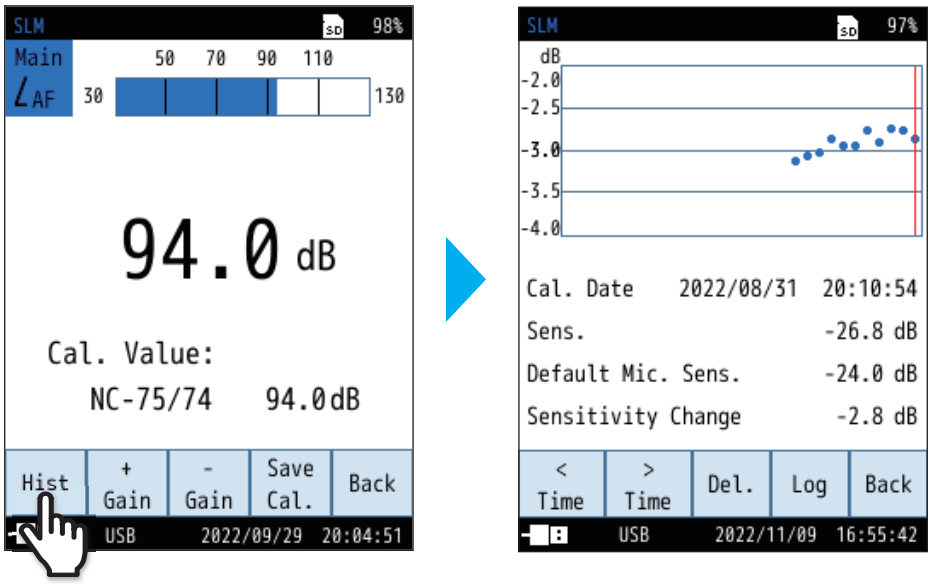


8 Touch [Save Cal.].The calibration value is saved.

Hist

- Touch [Hist] to check up to 30 past calibration data items.
  - Touch [< Time] or [> Time] on the menu ring to display the calibration value for the date and time you want to check.
  - If you touch [Output History] on the menu ring, you can save the history to the SD card.
- History data is saved in CSV format to the following location on the SD card.





9 **Touch [Back] or press the START/STOP key to return to the measurement screen.**

10 **Turn off the sound calibrator or pistonphone.**

11 **Gently pull the microphone of the device out of the coupler.**

10 Measurement

When measuring with the device, all the measurement functions (L_p, L_{eq}, L_E, L_{peak}, L_{max}, L_{min}, L_N) of the device are performed at the same time. However, sub channels are measured only when sub channels are set to [On] in [Measure] on the [Menu] screen.

Important

- Format the SD card before measuring.

Note

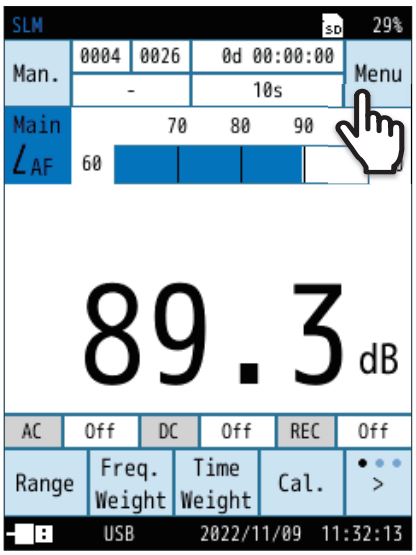
- Make sure to set the date and time before measuring. Finish connecting with peripheral devices and calibration.

10.1 Setting the date and time

This device has a built-in clock. The date and time of measurements can be saved to the memory along with the measurement data.
Follow the steps below to set the date and time.

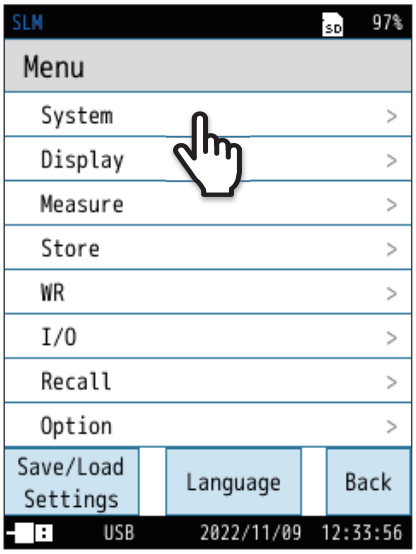
1 **Touch [Menu] on the measurement screen.**

The [Menu] screen appears.



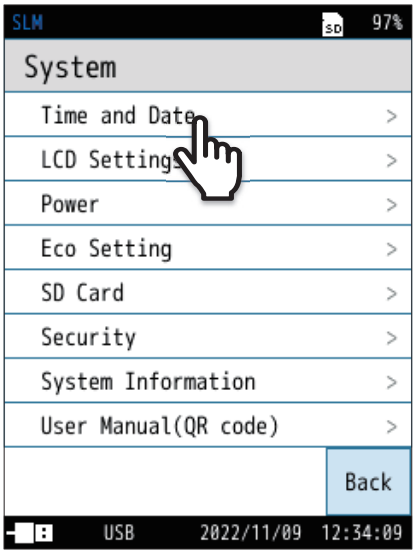
2 Touch [System] on the [Menu] screen.

The [System] screen appears.

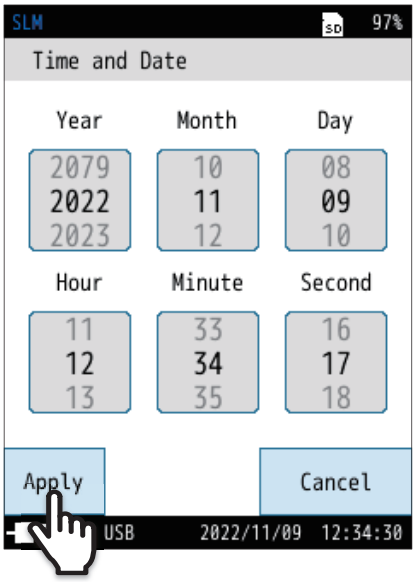


3 Touch [Time and Date] on the [System] screen.

The [Time and Date] screen appears.



4 Set the year, month, day, hour, minute, and second, and touch [Apply].

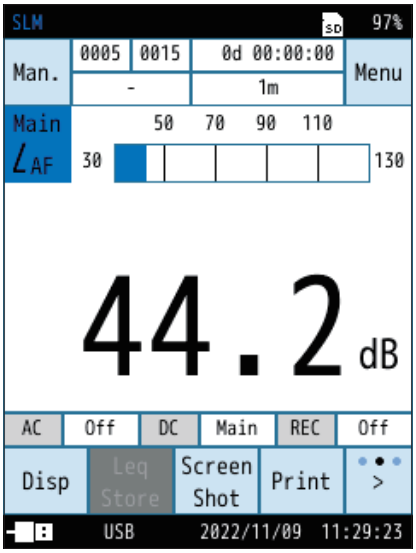


Note

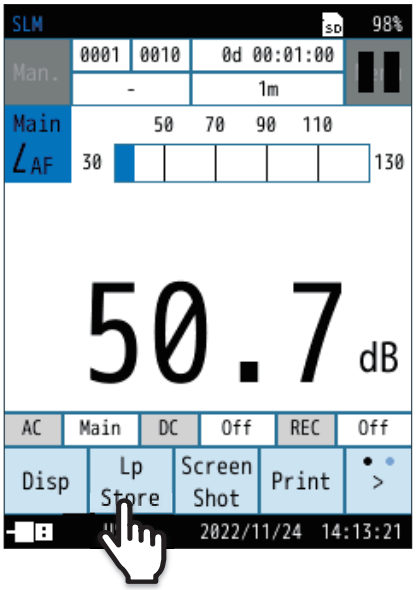
- This device has a calculation error of up to about 1 minute per month. Make sure to set the time before measuring.
- The clock of this device is retained by the built-in backup rechargeable battery when the power is turned off.
  The retention period of the clock depends on the charging time of the backup rechargeable battery (Page 27). It takes about 24 hours to fully charge the device.

10.2 Checking the sound level (L_p) (current state)

- The sound level (L_p) is displayed on the screen to show the current state, the bar graph is updated every 100 ms, and the level is updated every second.



- Press the PAUSE/CONT key to pause the level display. [II] will be displayed in the upper right of the screen.
  When paused, [Lq Store] appears on the menu ring. Touch it to save the L_p store data.

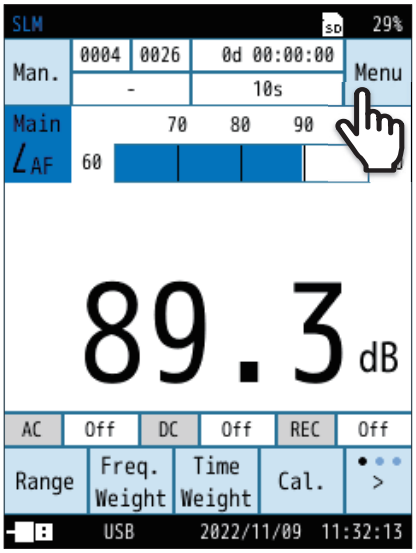


10.3 Measuring the sound level (L_p) (measurement state)

Measure the sound level.

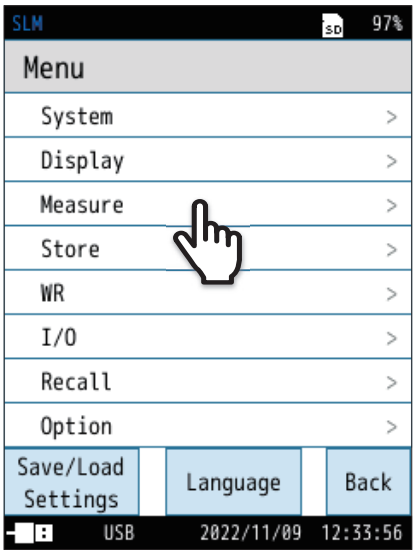
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



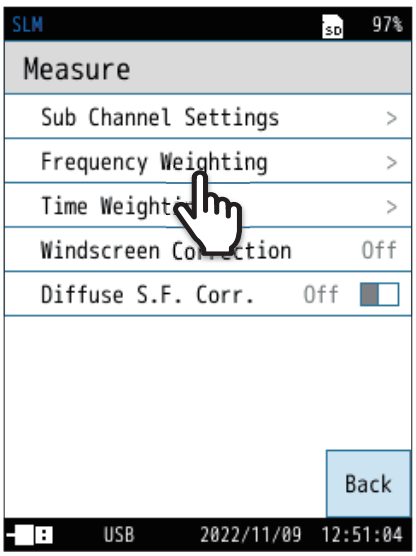
2 Touch [Measure] on the [Menu] screen.

The [Measure] screen appears.



3 Touch [Frequency Weighting] on the [Measure] screen.

The [Frequency Weighting] screen appears.



Note

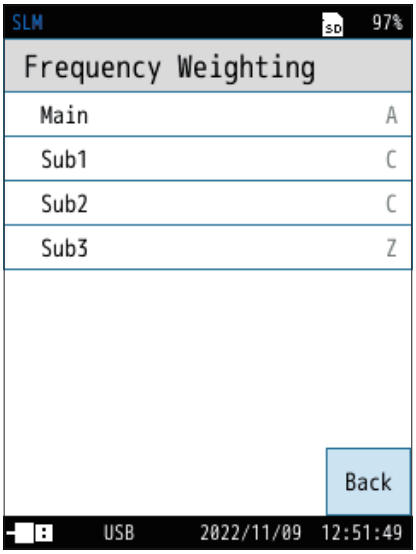
- The [Frequency Weighting] screen can also be displayed by touching [Freq. Weight] on the menu ring.

4 Touch the channel to use, and select the frequency weighting.

When measuring according to a standard such as JIS, set the time weighting according to the corresponding standard.

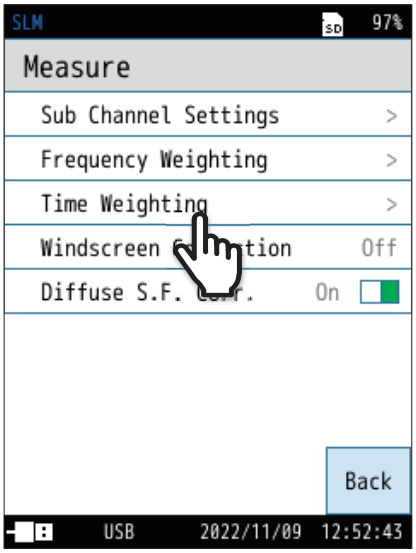
Item	Description
A	Sets A-weighting.
C	Sets C-weighting.
Z	Sets Z-weighting.
G	Sets G-weighting.
Z (HPF)	Sets Z-weighting and high-pass filter.
Z (LPF100Hz)	Sets Z-weighting and low-pass filter.
Z (LPF100Hz)	Sets Z-weighting and low-pass filter.

For details on each item, see “Frequency Weighting” (Page 48).



5 Return to the [Measure] screen, and touch [Time Weighting].

The [Time Weighting] screen appears.



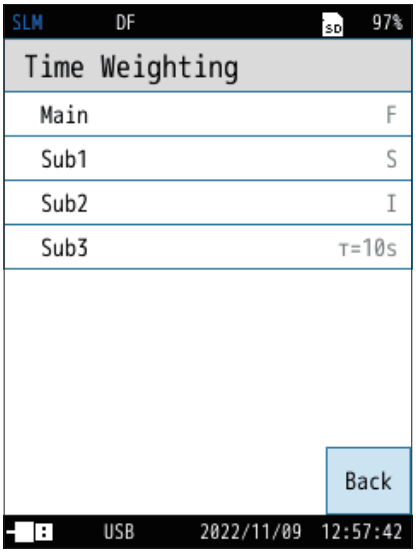
6 Touch the channel to use, and select the time weighting.

When measuring according to a standard such as JIS, set the time weighting according to the corresponding standard.

Item	Description
F	Sets F (fast).
S	Sets S (slow).
I	Sets I (impulse).
τ=10s	Sets 10s.

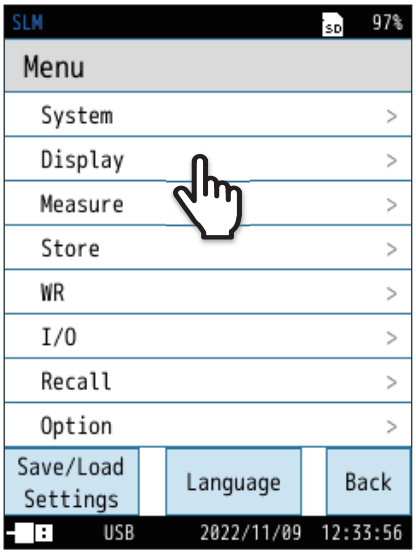
Note

- The device uses high-speed sampling (20.8 μs) data for the sound pressure waveforms of L_{eq} and L_E calculation, and so it is not affected by time weighting.



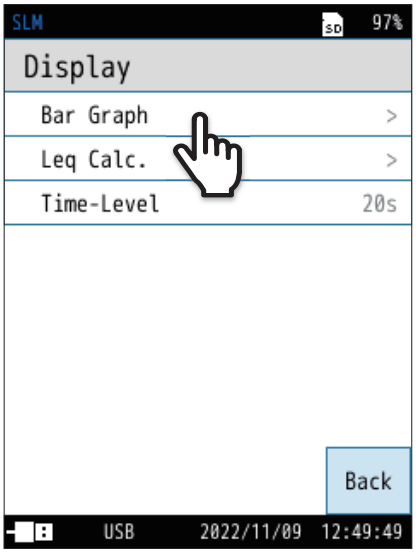
7 Return to the [Menu] screen, and touch [Display].

The [Display] screen appears.



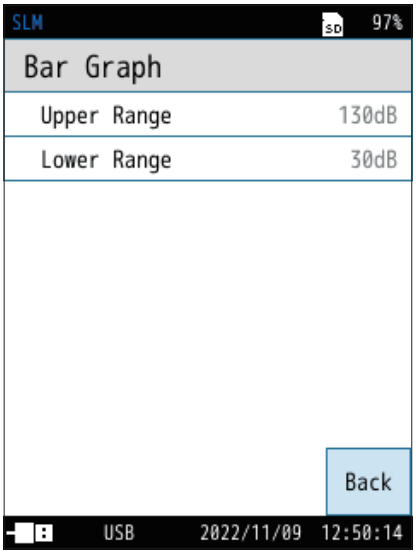
8 Touch [Bar Graph] on the [Display] screen.

The [Bar Graph] screen appears.



9 Set the upper and lower limits of the bar graph.

Item	Description
Upper Range	Select the upper limit (dB) of the bar graph. The value that can be set is 70 dB to 130 dB in 10 dB increments.
Lower Range	Select the lower limit (dB) of the bar graph. The value that can be set is 20 dB to 60 dB in 10 dB increments.



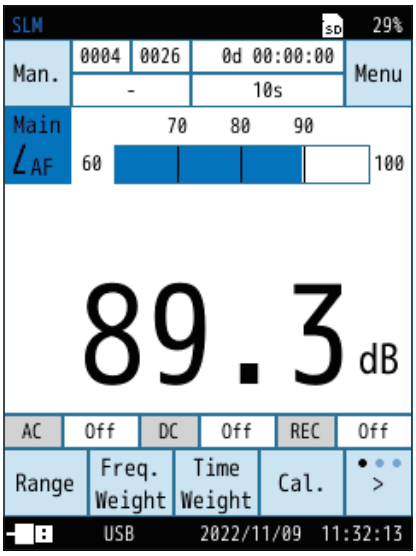
Note

- The [Bar Graph] screen can also be displayed by touching [Range] on the menu ring.
- The default setting of 30 to 130 dB will suffice if neither AC output, DC output, nor waveform recording function (when NX-43WR is installed) is used.
- To make the bar graph display easier to see, set the upper and lower limits of the bar graph so that the measured sound pressure level comes near the center of the graph.

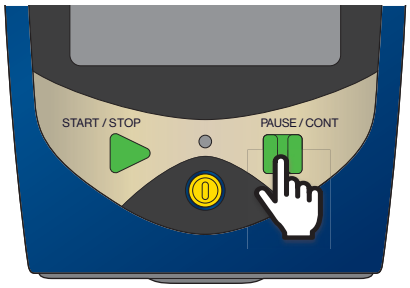
10 Touch [Back] or press the START/STOP key to return to the measurement screen.

11 Press the START/STOP key to start the measurement.

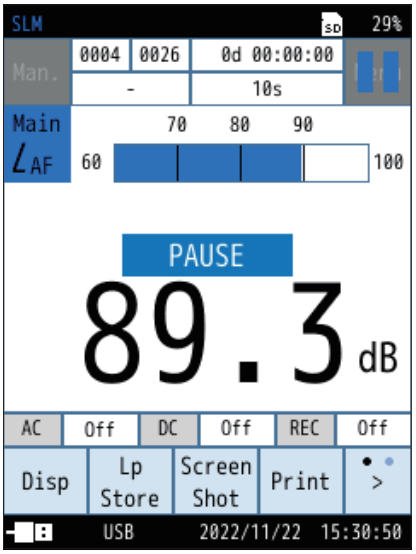
- The sound level (L_p) is displayed, and the bar graph and level are updated every second.



- The display can be paused and resumed by pressing the PAUSE/CONT key.



- When paused, [PAUSE] and "II" will flash on the screen.
- The indicator LED flashes blue while paused.
- The bar graph display is updated even when paused.
- Touch [Lp store] on the menu ring to save the sound level (L_p).



12 Press the START/STOP key to end the measurement.

To store the measurement data, refer to "Store Operations" (Page 80).

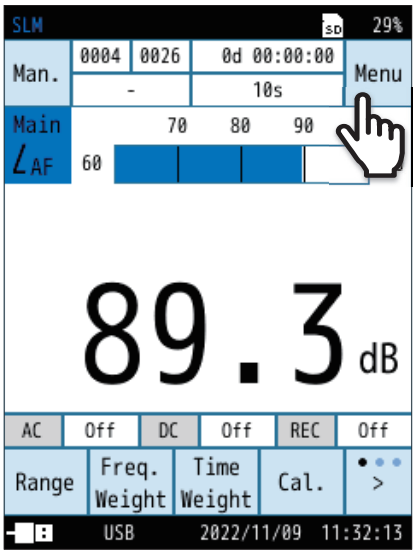
10.4 L_{eq} calculation

Measure L_{eq}, L_E, L_{peak}, L_{max}, L_{min}, L_5, L_{10} L_{50}, L_{90}, L_{95}, L_{tm5}, and L_{leq}.

Measuring the equivalent continuous sound level (L_{eq})

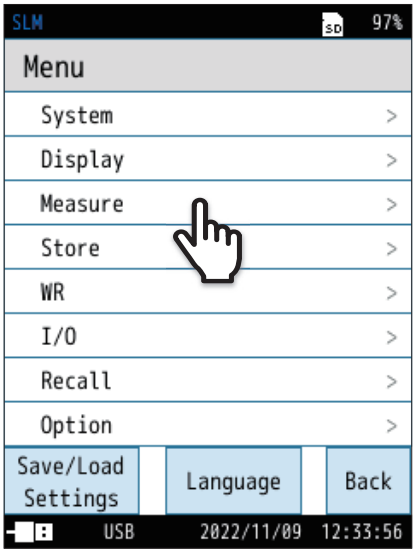
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



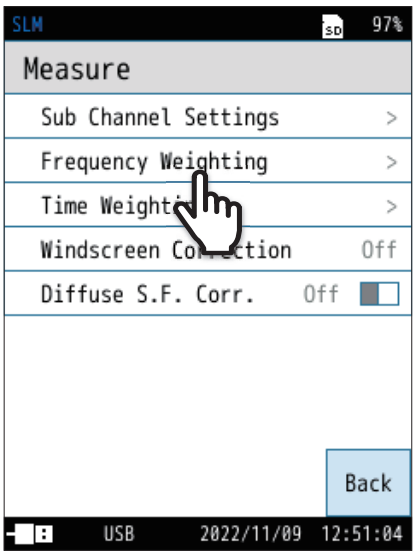
2 Touch [Measure] on the [Menu] screen.

The [Measure] screen appears.



3 Touch [Frequency Weighting] on the [Measure] screen.

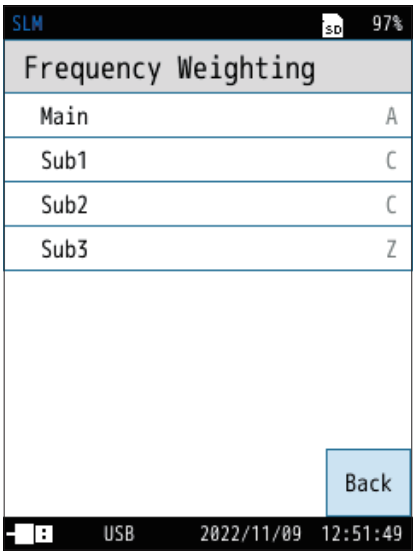
The [Frequency Weighting] screen appears.



Note

- The [Frequency Weighting] screen can also be displayed by touching [Freq. Weight] on the menu ring.

4 Touch the channel to use, and select the frequency weighting.

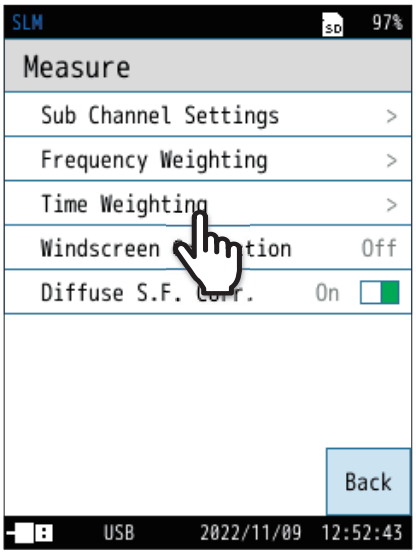


Item	Description
A	Sets A-weighting.
C	Sets C-weighting.
Z	Sets Z-weighting.
G	Sets G-weighting.
Z (HPF)	Sets Z-weighting and high-pass filter.
Z (LPF100Hz)	Sets Z-weighting and low-pass filter.
Z (LPF500Hz)	Sets Z-weighting and low-pass filter.

For details on each item, see “Frequency Weighting” (Page 48).

5 Return to the [Measure] screen, and touch [Time Weighting].

The [Time Weighting] screen appears.



Note

- The [Time Weighting] screen can also be displayed by touching [Time Weight] on the menu ring.

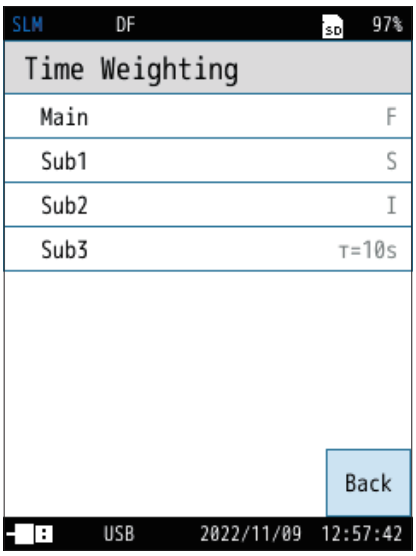
6 Touch the channel to use, and select the time weighting.

Item	Description
F	Sets F (fast).
S	Sets S (slow).
I	Sets I (impulse).
τ=10s	Sets 10s.

For details on each item, see “Frequency Weighting” (Page 48).

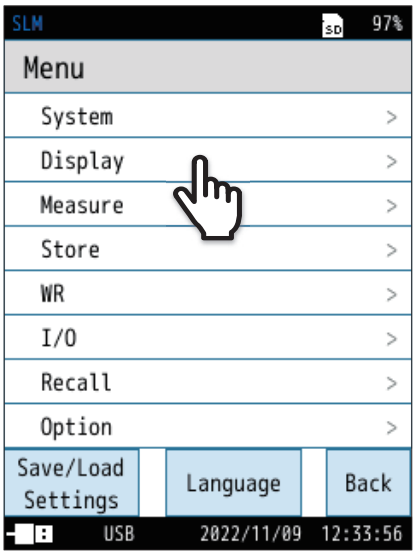
Note

- The device uses high-speed sampling (20.8 µs) data for the sound pressure waveforms for L_{eq} and L_E calculation, and so it is not affected by time weighting.



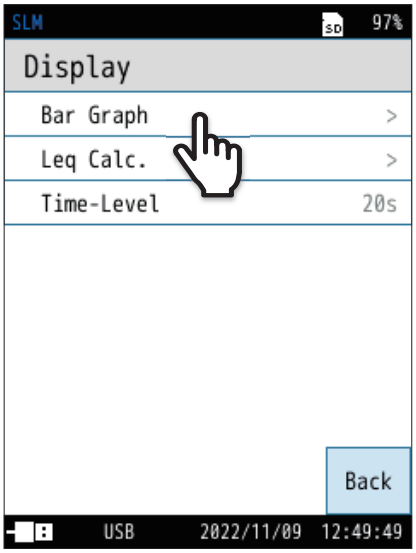
7 Return to the [Menu] screen, and touch [Display].

The [Display] screen appears.

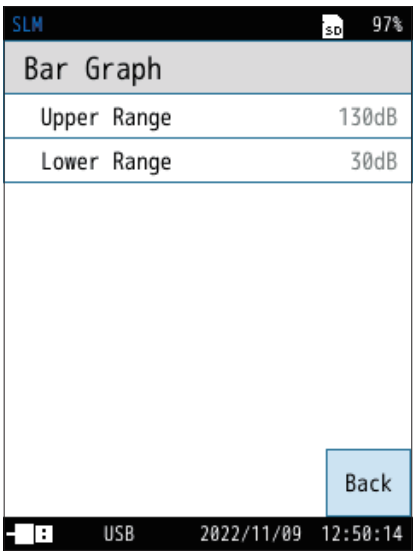


8 Touch [Bar Graph] on the [Display] screen.

The [Bar Graph] screen appears.



9 Touch [Upper Range] or [Lower Range], and then select a value.



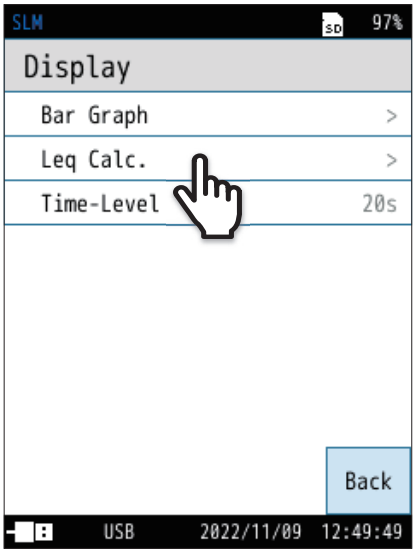
Item	Description
Upper Range	Select the upper limit (dB) of the bar graph. The value that can be set is 70 dB to 130 dB in 10 dB increments.
Lower Range	Select the lower limit (dB) of the bar graph. The value that can be set is 20 dB to 60 dB in 10 dB increments.

Note

- The [Bar Graph] screen can also be displayed by touching [Range] on the menu ring.
- The default setting of 30 to 130 dB will suffice if neither AC output, DC output, nor waveform recording function (when NX-43WR is installed) is used.
- To make the bar graph display easier to see, set the upper and lower limits of the bar graph so that the measured sound pressure level comes near the center of the graph.

10 Return to the [Display] screen, and touch [Leq Calc.].

The [Leq Calc.] screen appears.



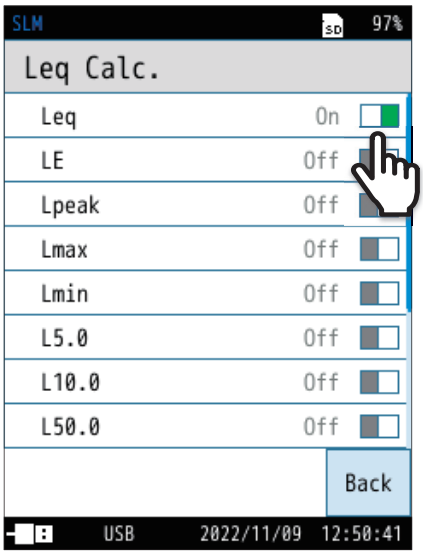
11 On the [Leq Calc.] screen, set the amount of calculation displayed on the measurement screen to [On].

The setting switches between turning on/off each time you touch.

Item	Description
On	Displays the calculated value of the target on the measurement screen.
Off	Does not display the calculated value of the target on the measurement screen.

Note

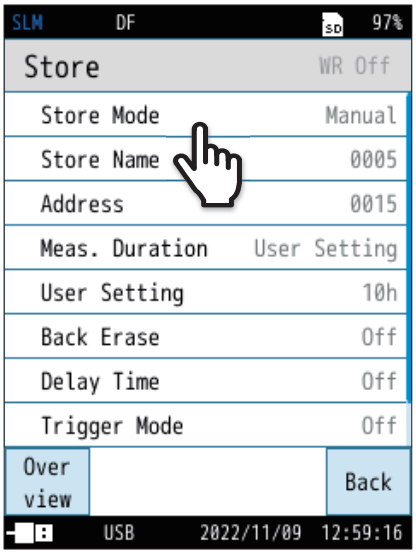
- L_{eq} calculation (L_{eq}, $L_{eq,mov}$, L_E, L_{max}, L_{min}, L_{peak}, L_N, L_{tm5} and L_{leq} statistical calculation for a certain interval, etc.) is measured at the same time. This setting sets the calculated values you want to display.



12 Return to the [Menu] screen, and touch [Store].

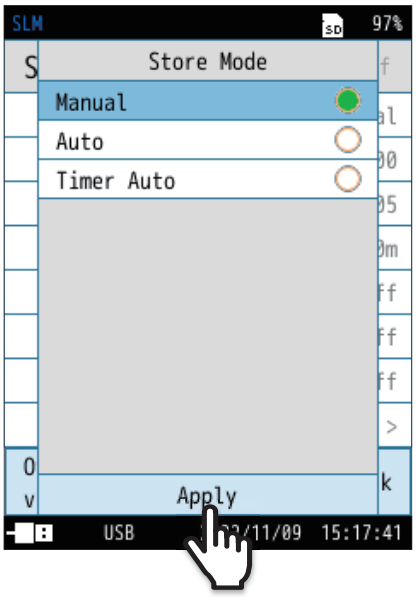
The [Store] screen appears.

13 On the [Store] screen, touch [Store Mode].



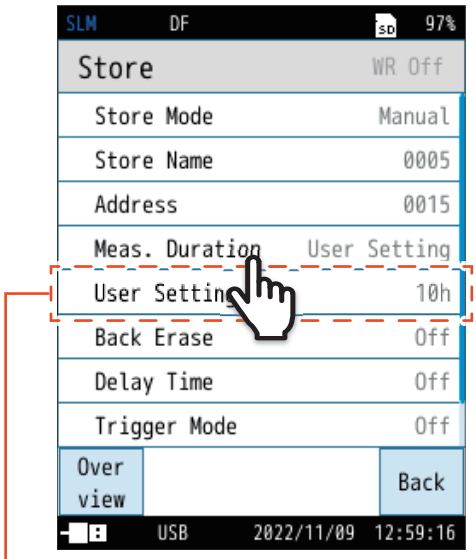
14 Select the store mode from [Manual], [Auto], [Timer Auto] and touch [Apply].

For details, refer to “Store Operations” (Page 80).



15 On the [Store] screen, touch [Meas. Duration].

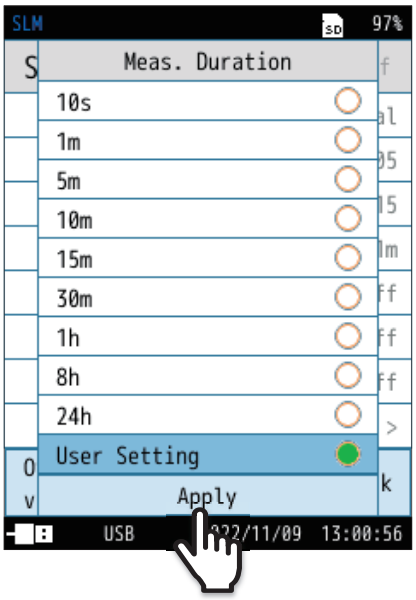
Item	Description
10s	Select a measurement time.
1m	
5m	
10m	
15m	
30m	
1h	
8h	
24h	
User Setting	In [Meas. Duration], if you select [User Setting], [User Setting] appears on the [Store] screen, and you can set the measurement time to a time of your choice. In Manual mode, the maximum time that can be set is 24 hours.



(s = seconds, m = minutes, h = hours)

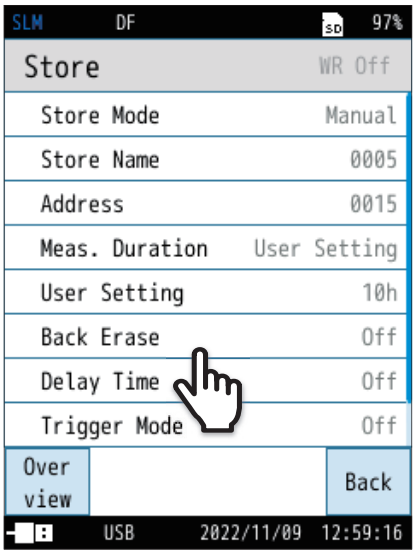
Displayed when [User Setting] is selected in [Meas. Duration].

16 Select a measurement time, and touch [Apply].



17 Set [Back Erase] as necessary.

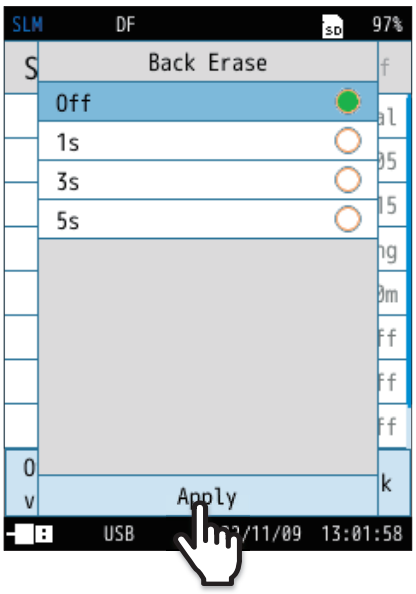
1. **On the [Store] screen, touch [Back Erase].**
   The [Back Erase] screen appears.



2. Select the back erase time from Off, 1s, 3s, and 5s, and touch [Apply].

The set time is displayed at the top of the screen.

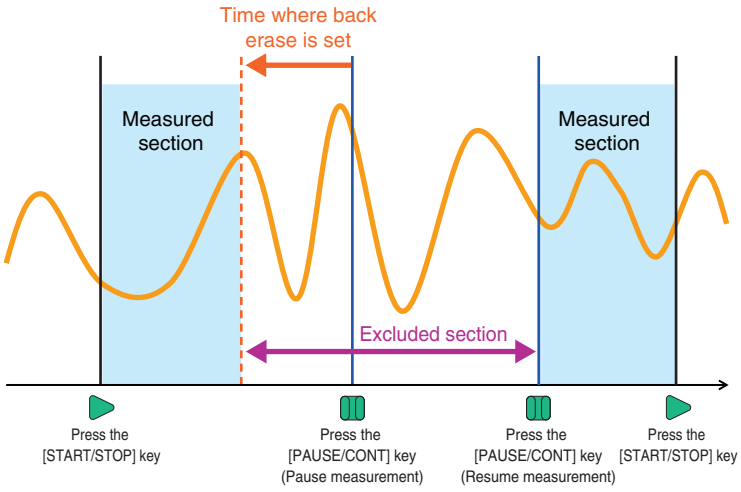
Item	Description
Back Erase	Sets the function to omit data immediately before the interruption in the calculation when the measurement is interrupted.



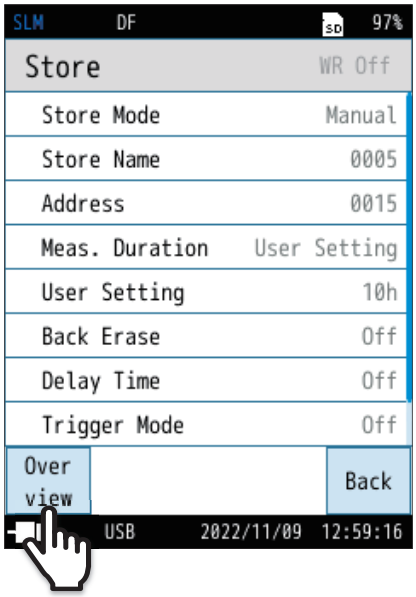
Note

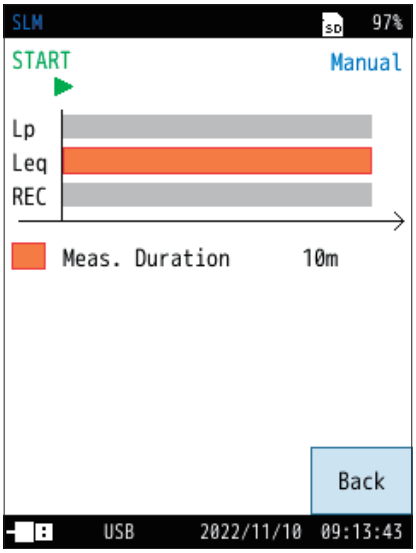
- When [Wave Rec. Mode] of waveform recording is [On], the back erase function is disabled (when NX-43WR is installed).

Overview of the back erase function

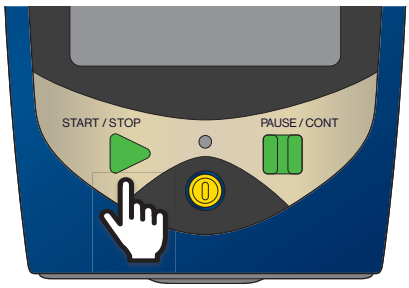


18 If necessary, touch [Overview] to see an overview of the store.





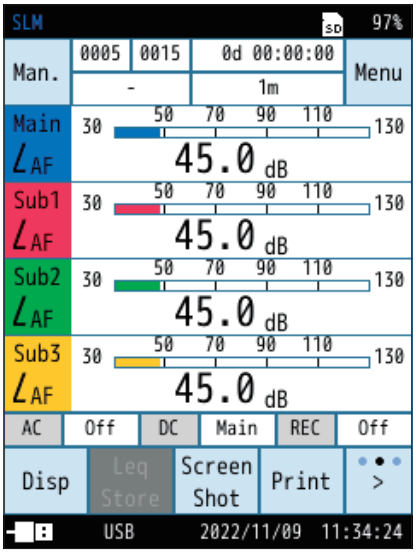
19 Touch [Back] or press the START/STOP key to return to the measurement screen.



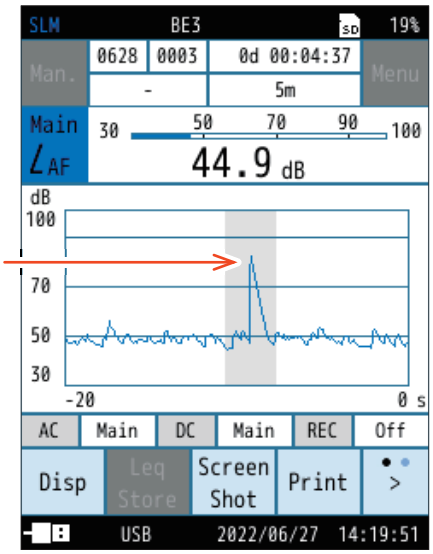
20 Press the START/STOP key to start the measurement.

At this point, previous measurement values are cleared.

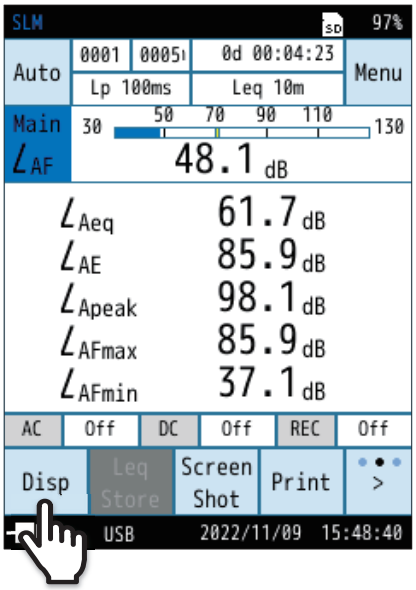
- The ▶ symbol flashes during measurement, and the elapsed time is displayed. In addition, the indicator LED flashes red.
- The measurement stops automatically when the measurement time specified in 16 has elapsed.
- To terminate the measurement before the set measurement time, press the START/STOP key.
- If an overload signal or under-range signal occurs once or more while measuring, [OV] or [UN] is displayed on the screen. This indicates that the sound level data used in the calculation contains an overload signal or an under-range signal (Page 29).
- Press the PAUSE/CONT key during measurement to interrupt the measurement. Press the PAUSE/CONT key again to resume measurement.
- When measuring is paused, [II] is displayed on the screen (the time during which the pause and back erase functions are activated is not included in the measuring time).
- If you set the back erase function, you can check the data to be erased on the [Time-Level] screen.



Data erased with back erase turned on (3s)



21 Touch [Switch display] on the menu ring to switch the display.



The value labeled Leq is the equivalent continuous sound level.

- If Leq is not displayed, make sure that the Leq display setting is set to [On] (Page 160).
- When [OV] is displayed, this indicates that the sound level used for the calculation contained overload signal data.
- When [UN] is displayed, this indicates that the sound level used for the calculation contained under-range signal data.

Note

- If you touch [Disp] while measuring, you can read the equivalent continuous sound level during the calculation (only level numerical values are displayed, and the bar graph is of the sound level L_p).
- If you change the settings such as frequency weighting (A/C/Z/G/Z(HPF)/Z(LPF100Hz)/Z(LPF500Hz)) or time weighting (F/S/I/τ=10s) after taking measurements, the measurement values will be discarded.

Note

- Moving L_{eq} ($L_{eq,mov}$), sound exposure level (L_E), peak sound level (L_{peak}), maximum sound level (L_{max}), minimum sound level (L_{min}), percentile sound level (L_N) , and takt-max sound level (L_{tm5}) are all measured at the same time as the equivalent continuous sound level (L_{eq}).

10.5 When taking measurements in a dark place

When you touch the screen or press a key during automatic brightness change or “screen off” operation, the backlight of the LCD screen turns on, making it easier to see the display in dark environments.
If you want to turn off the backlight while it is on, touch [Light Off] on the menu ring.

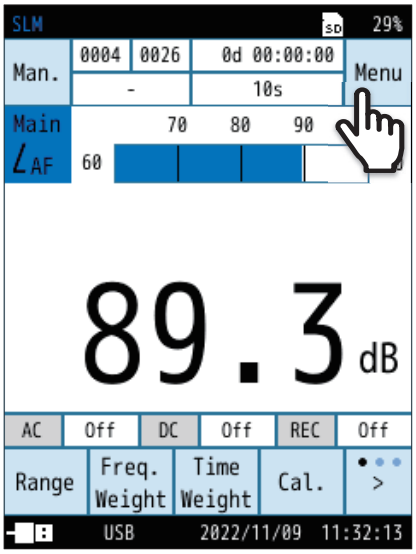
Note

- The backlight of the LCD screen does not turn on when the remaining battery level indicator is red.

Set the brightness and lighting time of the backlight as follows.

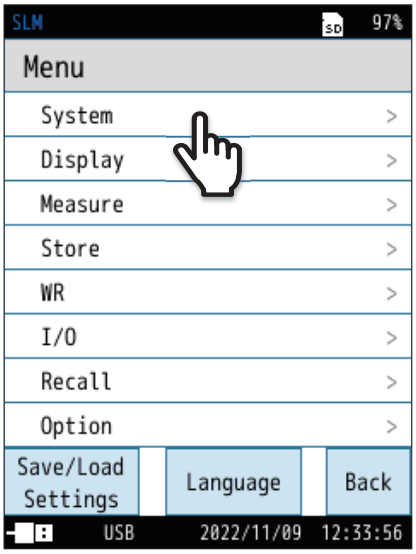
1 Touch [Menu] on the measurement screen.

The [Menu] screen appears.



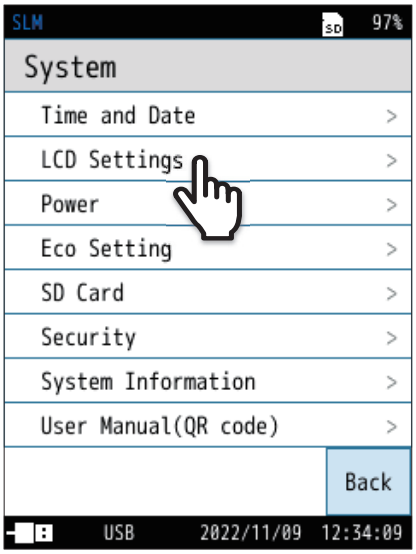
2 Touch [System] on the [Menu] screen.

The [System] screen appears.



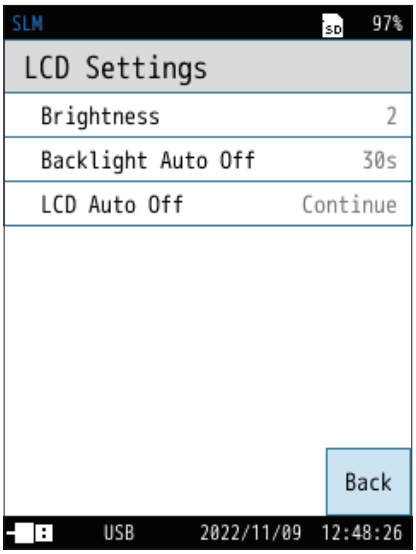
3 Touch [LCD Settings] on the [System] screen.

The [LCD Settings] screen appears.



4 Set the brightness and lighting time of the backlight.

Item	Description
Brightness	Select the brightness of the backlight from 1 to 4. *Setting it to “4”, continuous operation time on batteries is shortened by about 50%, and setting it to “1”, by about 30% compared to automatic brightness change or the “screen off” operation.
Backlight Auto Off	30s: If no operation is performed for the selected time, the backlight will be darker than brightness level “1” and will be in the same state as the “screen off” state. 3m: If no operation is performed for the selected time, the backlight will be darker than brightness level “1” and will be in the same state as the “screen off” state. Continue: The backlight stays on.
LCD Auto Off	The continuous operating time with batteries is about 30% longer under this setting compared to when set to change to automatic brightness. 30s: When taking measurements in Auto store or Timer Auto store mode, if no operation is performed within the selected time, the backlight will turn off completely. 1m: When taking measurements in Auto store or Timer Auto store mode, if no operation is performed within the selected time, the backlight will turn off completely. 2m: When taking measurements in Auto store or Timer Auto store mode, if no operation is performed within the selected time, the backlight will turn off completely. 5m: When taking measurements in Auto store or Timer Auto store mode, if no operation is performed within the selected time, the backlight will turn off completely. Continue: The backlight stays on.



(s = seconds, m = minutes)

10.6 Card capacity and store time

L_p Store Interval setting only

Lp store time	SD card capacity		
	512 MB	2 GB	32 GB
100 ms	56 hours	243 hours	3,540 hours
200 ms	116 hours	468 hours	7,040 hours
1 s	579 hours	2,260 hours	34,490 hours

L_{eq} Store Interval setting only

	SD card capacity		
	512 MB	2 GB	32 GB
Data sets	1,260,000 sets	5,100,000 sets	77,880,000 sets

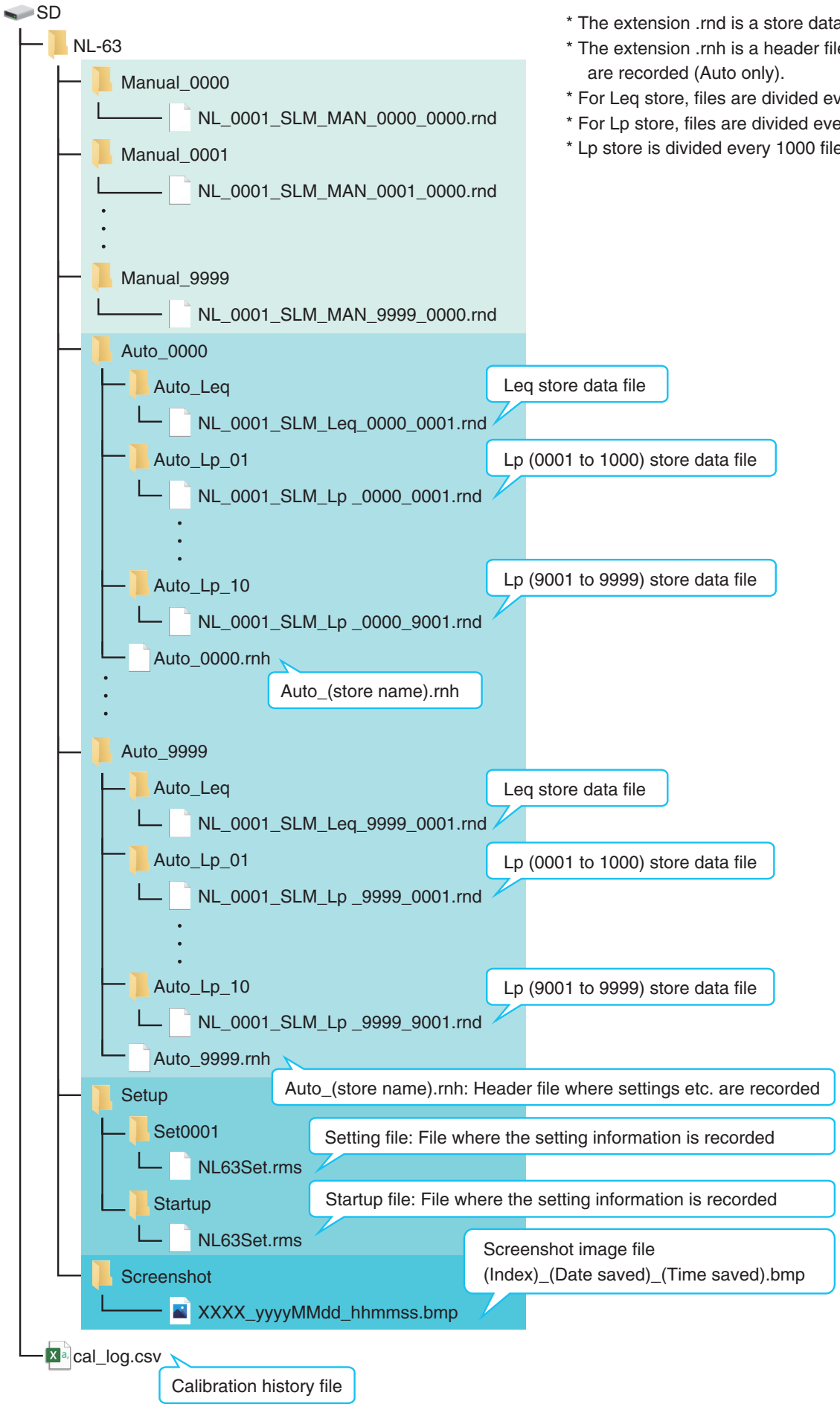
Number of bytes per header file

Approx. 1,555 Byte per file

The measurement time/number of data sets increases as the number of measurement channels decreases.

Number of channel(s)	Measurement time compared to measuring with 4 channels
1	Approx. 2.4 times as long
2	Approx. 1.6 times as long
3	Approx. 1.2 times as long

10.7 File organization



* The extension .rnd is a store data file.
* The extension .rnh is a header file where settings etc. are recorded (Auto only).
* For Leq store, files are divided every 60,000 stores.
* For Lp store, files are divided every hour.
* Lp store is divided every 1000 files.

10.8 How to import the data into a computer

The stored data can be imported to a computer as a CSV file and opened with Microsoft Excel, etc.
(Displaying Auto store data with Environmental Measurement Data Management Software AS-60 is very convenient.)

1 Connect the SD card containing the stored data or the device to a computer (Page 145).

It will be recognized as a removable disk.

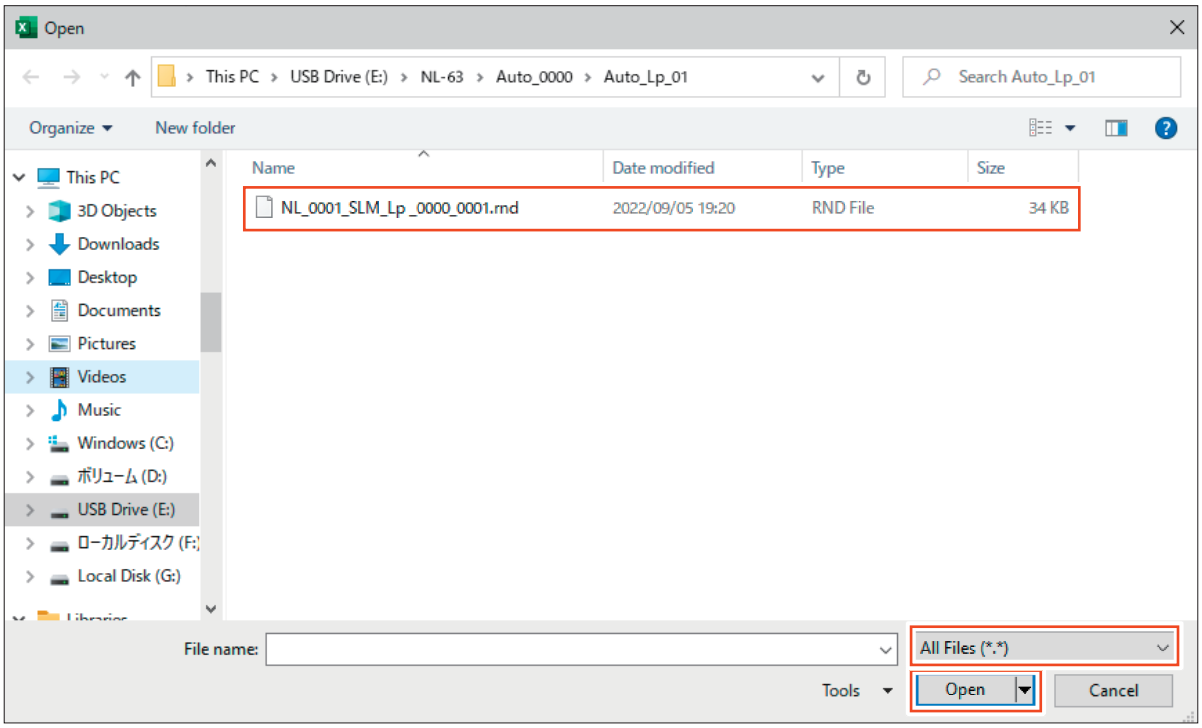
- To import data from an SD card, install the SD card into a commercially available SD card reader to connect it to your computer.
  For information about the data on the SD card, see “File Structure” (Page 169).
- To import data from the device, connect it to a computer by using a USB Type-C cable.
  On the [I/O] screen, set [USB] to [Mass Storage].

Note

- We recommend that the store data be copied onto the hard disk drive of your computer.

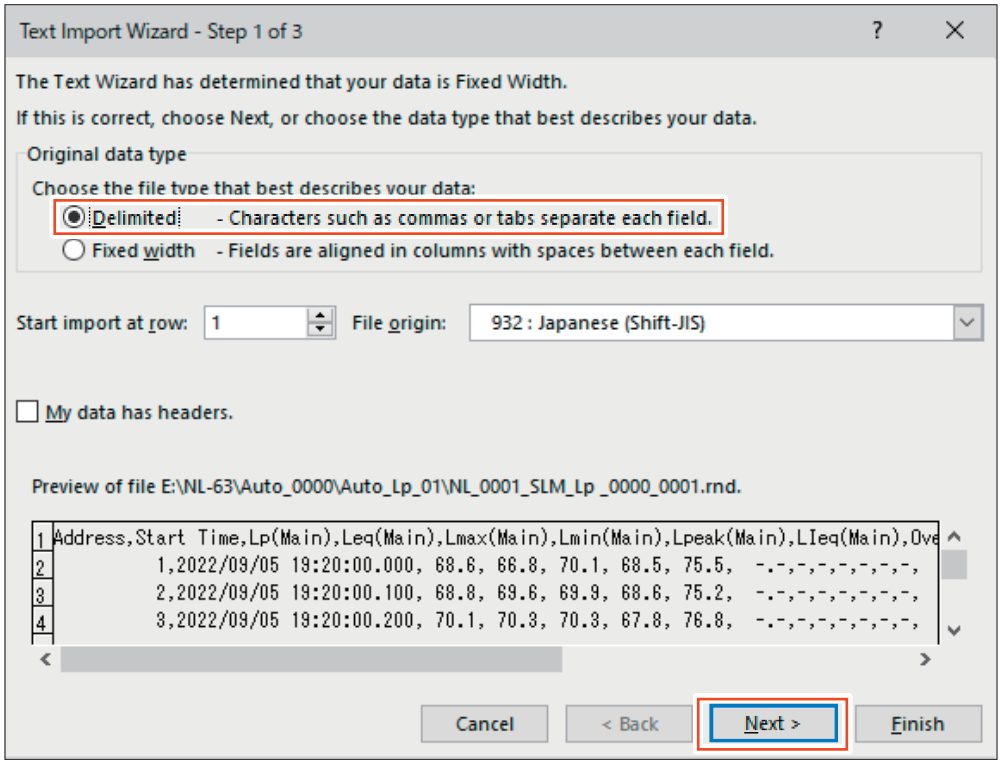
2 Launch Excel, and then open the store data file.

1. **Click the [File] tab, and then click [Open].**
2. **Open the folder that contains the file you want to open, and then select [All Files].**
3. **The file will be displayed, so select it and then click [Open].**
   The [Text Import Wizard] screen appears.

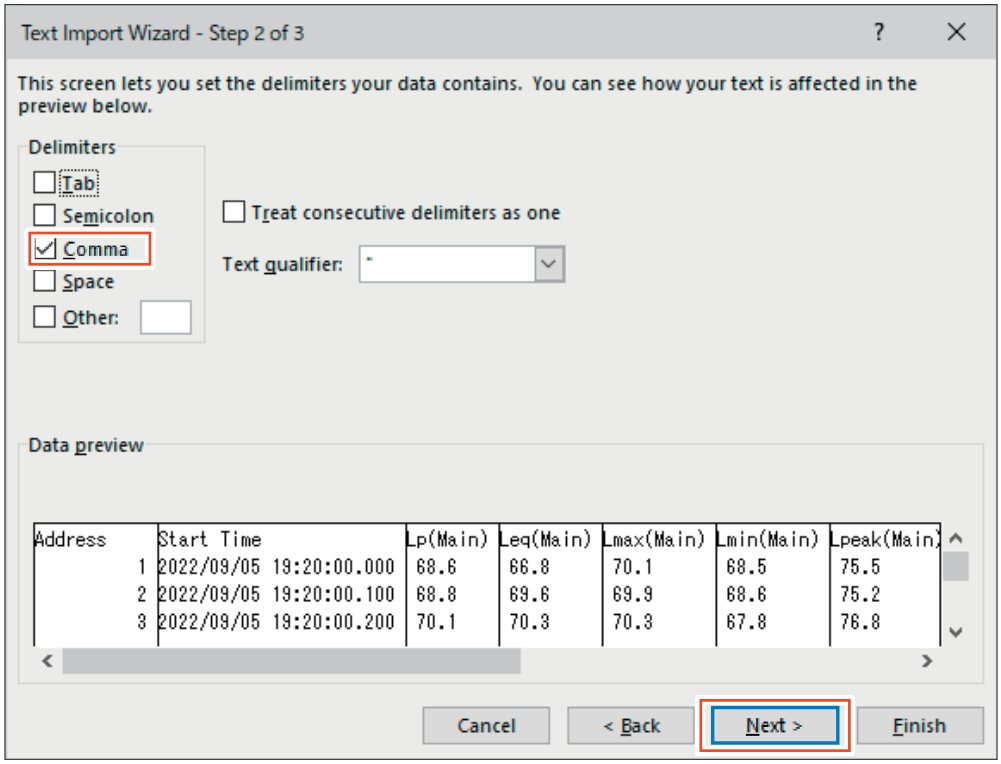


3 Specify the data format and open the file.

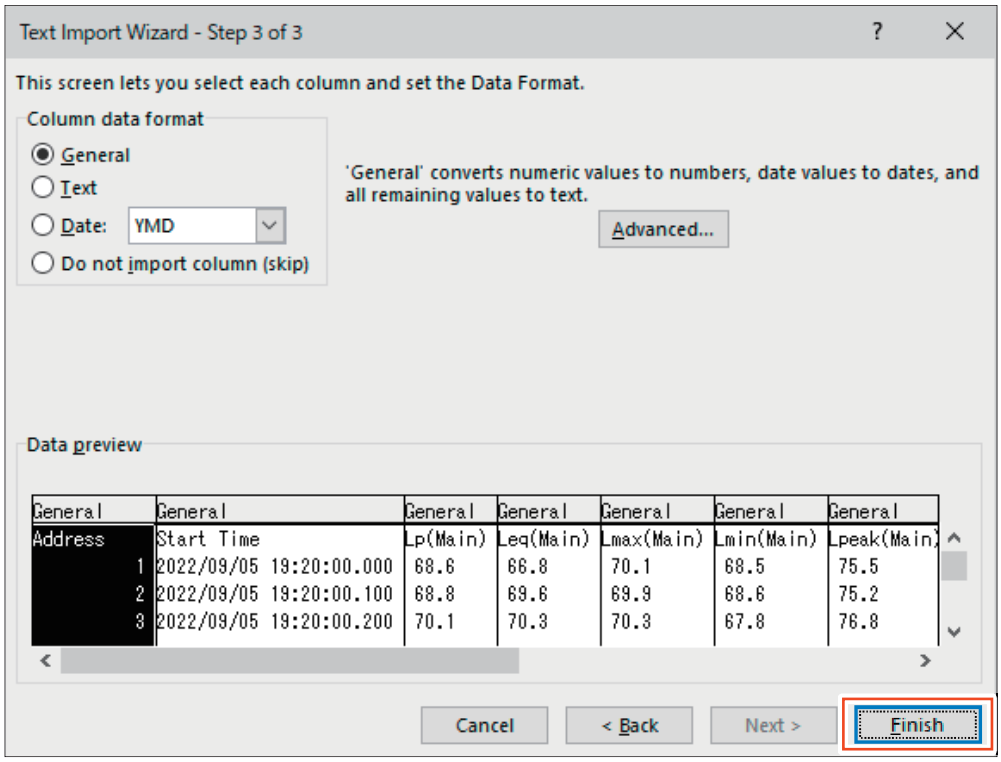
1. **Select [Delimited - Characters such as commas or tabs separate each field.], and then click [Next].**



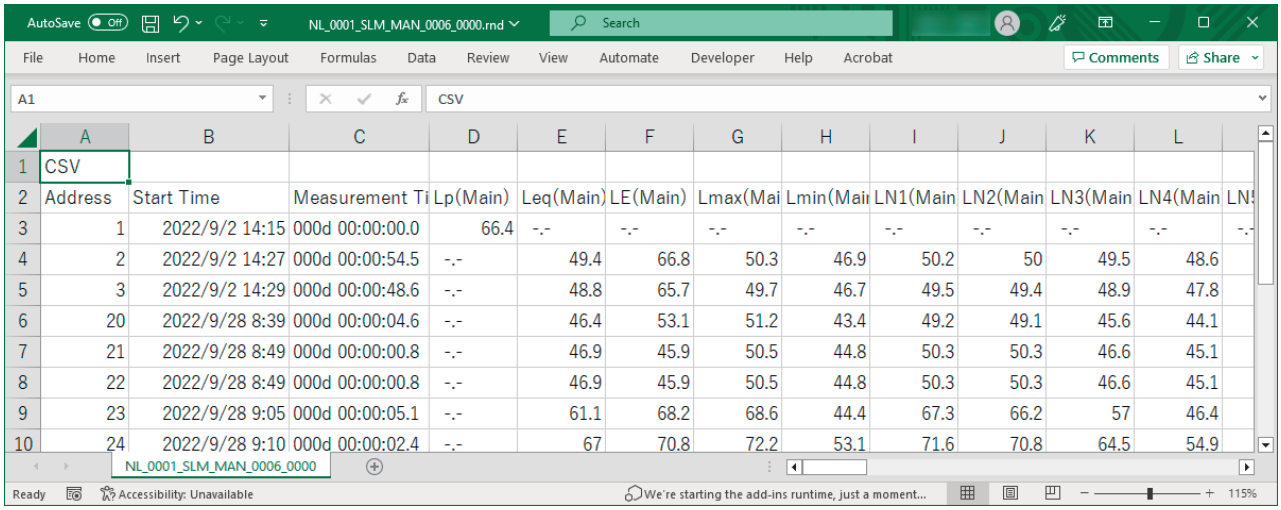
2. **Under [Delimiters], check the [Comma] checkbox, and then click [Next].**



3. Click [Finish] to open the store data file.

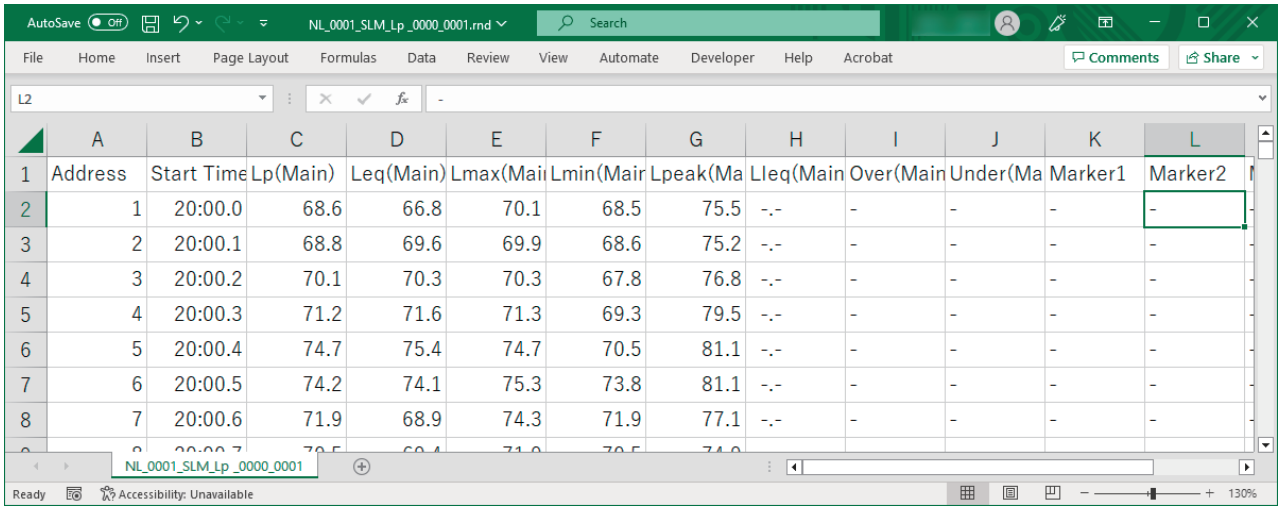


- **Screenshot example of Manual store data**



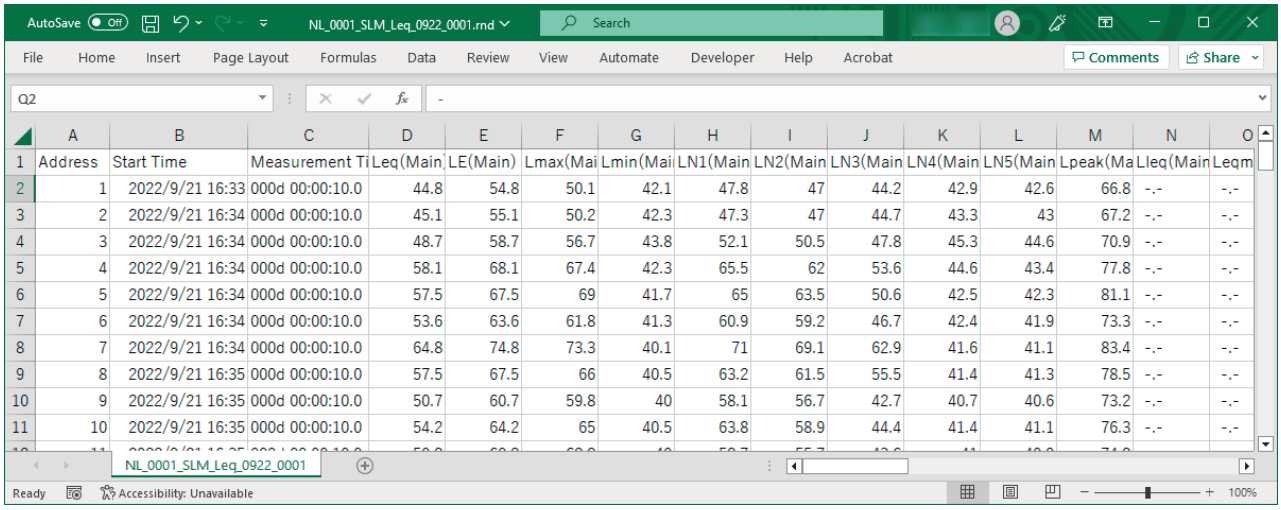
	A	B	C	D	E	F	G	H	I	J	K	L
1	CSV											
2	Address	Start Time	Measurement Ti	Lp(Main)	Leq(Main)	LE(Main)	Lmax(Mai	Lmin(Mai	LN1(Main	LN2(Main	LN3(Main	LN4(Main
3	1	2022/9/2 14:15	000d 00:00:00.0	66.4	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-
4	2	2022/9/2 14:27	000d 00:00:54.5	-.-	49.4	66.8	50.3	46.9	50.2	50	49.5	48.6
5	3	2022/9/2 14:29	000d 00:00:48.6	-.-	48.8	65.7	49.7	46.7	49.5	49.4	48.9	47.8
6	20	2022/9/28 8:39	000d 00:00:04.6	-.-	46.4	53.1	51.2	43.4	49.2	49.1	45.6	44.1
7	21	2022/9/28 8:49	000d 00:00:00.8	-.-	46.9	45.9	50.5	44.8	50.3	50.3	46.6	45.1
8	22	2022/9/28 8:49	000d 00:00:00.8	-.-	46.9	45.9	50.5	44.8	50.3	50.3	46.6	45.1
9	23	2022/9/28 9:05	000d 00:00:05.1	-.-	61.1	68.2	68.6	44.4	67.3	66.2	57	46.4
10	24	2022/9/28 9:10	000d 00:00:02.4	-.-	67	70.8	72.2	53.1	71.6	70.8	64.5	54.9

- **Screenshot example of Auto store for L_p store data**



	A	B	C	D	E	F	G	H	I	J	K	L
1	Address	Start Time	Lp(Main)	Leq(Main)	Lmax(Mai	Lmin(Mair	Lpeak(Ma	LIeq(Main	Over(Main	Under(Ma	Marker1	Marker2
2	1	20:00.0	68.6	66.8	70.1	68.5	75.5	-.-	-	-	-	-
3	2	20:00.1	68.8	69.6	69.9	68.6	75.2	-.-	-	-	-	-
4	3	20:00.2	70.1	70.3	70.3	67.8	76.8	-.-	-	-	-	-
5	4	20:00.3	71.2	71.6	71.3	69.3	79.5	-.-	-	-	-	-
6	5	20:00.4	74.7	75.4	74.7	70.5	81.1	-.-	-	-	-	-
7	6	20:00.5	74.2	74.1	75.3	73.8	81.1	-.-	-	-	-	-
8	7	20:00.6	71.9	68.9	74.3	71.9	77.1	-.-	-	-	-	-

- **Screenshot example of Auto store for L_{eq} store data**



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Address	Start Time	Measurement Ti	Leq(Main	LE(Main)	Lmax(Mai	Lmin(Mai	LN1(Main	LN2(Main	LN3(Main	LN4(Main	LN5(Main	Lpeak(Ma	LIeq(Main	Leqm
2	1	2022/9/21 16:33	000d 00:00:10.0	44.8	54.8	50.1	42.1	47.8	47	44.2	42.9	42.6	66.8	-.-	-.-
3	2	2022/9/21 16:34	000d 00:00:10.0	45.1	55.1	50.2	42.3	47.3	47	44.7	43.3	43	67.2	-.-	-.-
4	3	2022/9/21 16:34	000d 00:00:10.0	48.7	58.7	56.7	43.8	52.1	50.5	47.8	45.3	44.6	70.9	-.-	-.-
5	4	2022/9/21 16:34	000d 00:00:10.0	58.1	68.1	67.4	42.3	65.5	62	53.6	44.6	43.4	77.8	-.-	-.-
6	5	2022/9/21 16:34	000d 00:00:10.0	57.5	67.5	69	41.7	65	63.5	50.6	42.5	42.3	81.1	-.-	-.-
7	6	2022/9/21 16:34	000d 00:00:10.0	53.6	63.6	61.8	41.3	60.9	59.2	46.7	42.4	41.9	73.3	-.-	-.-
8	7	2022/9/21 16:34	000d 00:00:10.0	64.8	74.8	73.3	40.1	71	69.1	62.9	41.6	41.1	83.4	-.-	-.-
9	8	2022/9/21 16:35	000d 00:00:10.0	57.5	67.5	66	40.5	63.2	61.5	55.5	41.4	41.3	78.5	-.-	-.-
10	9	2022/9/21 16:35	000d 00:00:10.0	50.7	60.7	59.8	40	58.1	56.7	42.7	40.7	40.6	73.2	-.-	-.-
11	10	2022/9/21 16:35	000d 00:00:10.0	54.2	64.2	65	40.5	63.8	58.9	44.4	41.4	41.1	76.3	-.-	-.-

11

Optional Programs

This device supports various optional programs.
Refer to the instruction manual of each optional program for how to use it.

Waveform recording program NX-43WR	Enables users to record sounds while processing sound levels.
Octave·1/3 Octave Real-time Analysis Program NX-63RT	Octave band·1/3 octave band real-time analysis becomes possible.
FFT analysis program NX-43FT	Enables FFT analysis.

12

Specifications

Applicable standards

IEC 61672-1:2013 class 1
ISO 7196:1995
ANSI/ASA S1.4-2014/Part 1 class 1
JIS C 1509-1:2017 class 1
JIS C 1516:2020 class 1
CE Marking
• EMC Directive Directive 2014/30/EU EN 61326-1:2013
• RoHS Directive Directive 2011/65/EU EN IEC 63000:2018
• Low Voltage Directive Directive 2014/35/EU EN 61010-1:2010/A1:2019
UKCA Marking, China RoHS, KC mark, VCCI Class B

Measurement function

Simultaneous measurement of up to four channels (Main channel, Sub1 to Sub3 channels) with selected time weighting and frequency weighting

Instantaneous value	Time-weighted sound pressure level	L_p
Calculated value	Equivalent continuous sound level	L_{eq}
	I-time-weighted equivalent continuous sound level	L_{Ieq}
	Moving L_{eq}	$L_{eq,\ mov}$
	Sound exposure level	L_E
	Maximum sound level	L_{max}
	Minimum sound level	L_{min}
	Percentile sound level	L_N
	Peak sound level	L_{peak}
	Takt-max sound level	L_{tm5}

Measurement time

Manual store	10 s, 1 m, 5 m, 10 m, 15 m, 30 m, 1 h, 8 h, 24 h, User Setting (1 s to 24 h)
Auto store	10 s, 1 m, 5 m, 10 m, 15 m, 30 m, 1 h, 8 h, 24 h, User Setting (Min. 1 s to max 1000 h), Continue (Perform measurements until the SD card runs out of space)

Microphone and preamplifier

Microphone	UC-59L
Sensitivity level (representative value)	-27 dB (re. 1V/Pa at 1kHz)
Preamplifier	NH-26

Measurement level range

A-weighting	25 dB to 138 dB
C-weighting	33 dB to 138 dB
Z-weighting	50 dB to 138 dB (1 Hz to 20 kHz)
G-weighting	43 dB to 138 dB
C-weighted peak sound level	60 dB to 141 dB
Z-weighted peak sound level	65 dB to 141 dB

Self-generated noise

A-weighting	17 dB or less (Typical 15 dB)
C-weighting	25 dB or less (Typical 23 dB)
Z-weighting	42 dB or less (Typical 40 dB)
G-weighting	35 dB or less (Typical 33 dB)

Entire linear operating range	25 dB to 138 dB
Linear operating range	113 dB
Measurement frequency range	1 Hz to 20 kHz
Standard frequency	1 kHz
Reference sound pressure level	94 dB
Frequency weighting	A-weighting, C-weighting, G-weighting, and Z-weighting
Filter	Digital processing High-pass filter: Limit the lower limit of the measurement frequency range to 10 Hz or more Low-pass filter: Limits the measurement frequency lower limit to 100 Hz or 500 Hz Cutoff frequency: 100 Hz, 500 Hz
Time weighting	F (Fast), S (Slow), I (Impulse), and 10s
Input range	Automatic switching
Bar graph display	Upper range: 70 dB to 130 dB can be set in 10 dB increments Lower range: 20 dB to 60 dB can be set in 10 dB increments
Sampling interval	L_p, L_{eq}, L_E, L_{max}, L_{min}, L_{peak}, L_{leq}: 20.8 µs (sampling frequency 48 kHz) L_N: L_p : 100 ms, L_{eq} : 1 s $L_{eq, mov}$: L_{eq} : 1 s L_{tm5}: L_{max} : 5 s
Calibration	A reference signal is input using sound calibrator NC-75/NC-74 or pistonphone NC-72B/NC-72A, and the signal input sensitivity is adjusted. Up to 30 calibrations can be managed in the calibration history, and saved to an SD card Nominal frequency: NC-75/NC-74: 1 kHz; NC-72B/NC-72A: 250 Hz Nominal sound level: NC-75/NC-74: 94 dB; NC-72B/NC-72A: Refer to the instruction manuals of NC-72B/72A respectively
Reference signal output to external devices	Frequency: 1 kHz Output level: Bar graph upper limit – 6 dB
Correction function	Windscreen correction function (WS-10, WS-15, WS-16): Corrects the influence on the frequency response when the windscreen is installed. Diffuse sound field correction function: Corrects the influence on the frequency response when used in a diffuse sound field.
Delay time	After the operation to start measuring, the device starts measuring after the specified time elapses Setting time: Off, 1s, 3s, 5s, 10s

<table>
<tr><td>Back erase function</td><td>Excludes, from the calculation, data from the specified time before using this function<table><tr><td>Setting time</td><td>Off, 1s, 3s, 5s</td></tr></table></td></tr>
<tr><td>Display</td><td><table><tr><td>Device</td><td>3.5 inch TFT-LCD (with touch panel functionality)</td></tr><tr><td>Touch panel</td><td>Resistive film method (pressure-sensitive)</td></tr><tr><td>Screen size</td><td>QVGA (320 x 240)</td></tr><tr><td>Backlight</td><td>Light Off, Brightness can be set 1-4</td></tr><tr><td>Time-Level graph/
bar graph update cycle</td><td>100 ms</td></tr><tr><td>Numeric value update cycle</td><td>1 s</td></tr></table></td></tr>
<tr><td>Key lock</td><td>Touch panel and key input can be locked to prevent operation
User name (up to 12 characters) and password (4 digits) can be set to unlock the device</td></tr>
<tr><td>Languages</td><td>Japanese, English, German, Spanish, French, Chinese, Korean</td></tr>
<tr><td>Overload indication / Under-range indication</td><td>Notifies under the following conditions for each measurement channel:
• OVER is displayed for a signal input that is larger than the upper measurement limit
• UNDER is displayed for a signal input that is smaller than the lower measurement limit
• OUTPUT OVER is displayed for a signal output that is larger than the output level range</td></tr>
<tr><td>Manual store</td><td>Data per address is saved to internal memory or SD card
• Calculated values L_{eq}, L_E, L_{max}, L_{min}, L_{peak}, L_N, L_{tm5} and L_{leq} are saved
• L_p data can also be saved when the device is paused.<table><tr><td>Data storage capacity</td><td>Internal memory: Data of up to 1,000 addresses can be stored
SD card: Data an be saved with store names from 0000 to 9999
(up to 1,000 addresses for each store)</td></tr></table></td></tr>
<tr><td>Auto store (L_p store)</td><td>L_p data is continuously saved to the SD card at the interval set in Lp Store Interval. Calculated values L_{eq}, L_{max}, L_{min}, L_{peak} and L_{leq} are also calculated at the same time and saved continuously on the SD card.<table><tr><td>Lp store interval</td><td>Off, 10 ms, 25 ms, 100 ms, 200 ms, 1 s</td></tr><tr><td>File splitting interval</td><td>1 hour</td></tr><tr><td>Data storage capacity</td><td>SD card: Data can be saved with store names from 0000 to 9999</td></tr></table></td></tr>
<tr><td>Auto store (L_{eq} store)</td><td>Simultaneously calculate L_{eq}, $L_{eq,mov}$, L_E, L_{max}, L_{min}, L_{peak}, L_N, L_{tm5} and L_{leq} at the interval specified in [Leq Calc.Interval] before recording the results continuously on the SD card.<table><tr><td>Leq calculation interval</td><td>Off, 10 s, 1 m, 5 m, 10 m, 15 m, 30 m, 1 h, 8 h, 24 h, or User Setting
(Min. 1 s to max. 24 h)</td></tr><tr><td>File splitting interval</td><td>60,000 stores</td></tr><tr><td>Data storage capacity</td><td>SD card: Data can be saved with store names from 0001 to 1000</td></tr></table></td></tr>
<tr><td>Data format</td><td>CSV file (a text file in which information is separated by commas)</td></tr>
<tr><td>Screenshot</td><td>Saving screen display contents in BMP format</td></tr>
<tr><td>Data recall</td><td>Browses stored data and screenshot images</td></tr>
<tr><td>Memorizing and recalling settings</td><td>Setting information can be saved to the internal memory or SD card and recalled at startup or at a specified time</td></tr>
<tr><td>SD card formatting</td><td>Initializes the contents of the SD card to free up space so that you can use it</td></tr>
</table>

<table>
<tr><td>Output</td><td>
<table>
<tr><td>AC output</td><td>Output voltage: 1 Vrms at the output level range
Output resistance: 50 Ω
Load impedance: 10 kΩ or more</td></tr>
<tr><td>DC output</td><td>Output voltage: 2.5 V, 25 mV/dB at the output level range
Output resistance: 50 Ω
Load impedance: 10 kΩ or more</td></tr>
<tr><td>DC/AC simultaneous output</td><td>Enables simultaneous output of DC output and AC output</td></tr>
</table>
</td></tr>
<tr><td>Output range</td><td>Can be linked to the bar graph upper limit, or set from 70 dB to 130 dB in 10 dB increments</td></tr>
<tr><td>Comparator</td><td>The comparator output turns on when the specified channel exceeds the set level</td></tr>
<tr><td>Communication/
RS-232C</td><td>
<table>
<tr><td>Communication</td><td>Measurement values can be acquired and settings can be changed by using communication commands</td></tr>
<tr><td>Print</td><td>Printing is possible using the dedicated printer DPU-414 or BL2-58.
Prints the measurement screen or saved data screen</td></tr>
<tr><td>Baud rate</td><td>9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps</td></tr>
</table>
</td></tr>
<tr><td>USB</td><td>
<table>
<tr><td>Communication</td><td>Measurement values can be acquired and settings can be changed by using communication commands</td></tr>
<tr><td>Data transfer</td><td>Enables the transferring of data by making the computer recognize the SD card as a removable disk</td></tr>
</table>
</td></tr>
<tr><td>LAN</td><td>
<table>
<tr><td>Communication</td><td>Measurement values can be acquired and settings can be changed by using communication commands</td></tr>
<tr><td>Data transfer</td><td>Data on an SD card can be transferred to a computer</td></tr>
<tr><td>Web browser display</td><td>Via a web browser, settings can be changed and measured values displayed. Via Google Chrome on PC, audio can be played.</td></tr>
</table>
</td></tr>
<tr><td>Power supply</td><td>4 × AA batteries, power supply to DC jack and USB port
<table>
<tr><td>Operating time
(at 23°C, ECO setting)</td><td>Alkaline battery LR6: Approx. 12 hours
Ni-MH rechargeable battery HR6: Approx. 12 hours
Mobile battery: Approx. 20 hours of power at 5000 mAh
* The operating time varies depending on the device settings and the battery manufacturer</td></tr>
<tr><td>AC adapter</td><td>NE-21P
(Input: 100 V to 240 V AC, 50/60 Hz, Output: 12 V DC)</td></tr>
<tr><td>External power supply voltage</td><td>5.7 V to 15 V (rated voltage 12 V)
USB port: 5 V</td></tr>
<tr><td>Primary side (100 V side) power consumption</td><td>Approx. 3 W</td></tr>
</table>
</td></tr>
<tr><td>Operating temperature and humidity range</td><td>
<table>
<tr><td>Temperature</td><td>-10°C to 50°C</td></tr>
<tr><td>Humidity</td><td>10% to 90% RH (no condensation)</td></tr>
</table>
</td></tr>
<tr><td>Dustproof and waterproof performance</td><td>
<table>
<tr><td>IP rating</td><td>IP54 (excluding microphone)</td></tr>
</table>
</td></tr>
<tr><td>Dimensions, weight</td><td>Approx. 265 mm (H) x 83.5 mm (W) x 34.5 mm (D), approx. 400 g (including batteries)</td></tr>
</table>

Accessories	Carrying case	×1
	Model name label (For attaching the carrying case)	×2
	Windscreen WS-10	×1
	Windscreen fall prevention rubber	×1
	Hand strap	×1
	Size AA alkaline batteries	×4
	512MB SD Card	×1
	Instruction Manual: Quick Start Guide	×1
	Supplied Accessories & Inspection Certificate	×1
Optional accessories	Optional programs	
	Waveform Recording Program	NX-43WR
	Octave·1/3 Real-time Analysis Program	NX-63RT
	FFT Analysis Program	NX-43FT
	512MB SD Card	MC-51SD1
	2GB SD Card	MC-20SD2
	32GB SD Card	MC-32SP3
	AC adapter (100 V to 240 V AC)	NE-21P
	Battery pack (Using four D alkaline batteries)	BP-21A
	Microphone extension cable	EC-04 series
	All-Weather Windscreen	WS-15
	Rain-protection Windscreen	WS-16
	BNC pin output cable	CC-24/CC-24S
	Printer cable	CC-42P
	RS-232C serial I/O cable	CC-42R
	Comparator Output / Trigger Input Cable	CC-43CT
	AC/DC Output Splitter Cable	CC-43S
	DC Polarity Converter	CC-43J
	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
	Waveform Analysis Software	AS-70
	Sound calibrator	NC-75
	Pistonphone	NC-72B
	Tripod for sound level meter	ST-80
	Tripod for All-Weather Windscreen	ST-91
	4 channel Data Recorder	DA-21
	Level recorder	LR-07
	Dedicated soft case	
	Rubber cover for external power use	

Trademarks

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