Sound Level Meter
LA-3570 / 3560 / 3260

SD

Measure, listen, record and check-
all with the same device

Perform more than a sound Level Meter

C E

Class 1	Class 1	Class 2
LA-3570	**LA-3560**	**LA-3260**

ONOSOKKI

Discontinued
(Reference only)

LA-3000 series Sound Level Meter

You can now measure record and check while listening, all with the same device

Overview

The LA-3000 series are cost-effective sound level meters that come standard with a headphone output and an auto memory function. By adding a wide range of options, you can upgrade the models into higher-performance equipment to serve as analyzers, recorders, comparators, and loudness calculators. These sound level meters bring about innovation to field measurements.

Features

- Large easy to see screen
  Direct keys for easy operation
- Linearity range of 110 dB
- Can make measurements from some distance away from a sound source while audibly monitoring it.
- Quad-channel screen (Up to four different calculation results can be displayed simultaneously.)
- Conform to IEC 61672-1 and JIS C1509-1.

Lineup

LA-3570 **Class1** High-sensitivity type
Recommended for measuring faint sounds in an anechoic chamber or similar environment

LA-3560 **Class1** Wide band type
Recommended for making measurements across the entire audible range

LA-3260 **Class2** Standard type
Recommended for measuring and recording noise up to 8 kHz

Standard Specification

Easy operation

The adoption of direct keys makes it easy to change settings with the help of on-screen measurement guidance.
- A, C and Z frequency weightings selectable
- F, S, I and 10-ms time weightings selectable
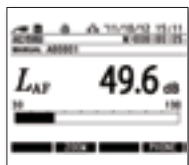- Recalling stored data and conditions
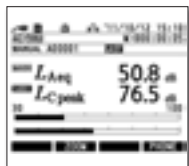
Large screen

Large 3.5-inch screen
Numerical values and waveforms are very easy to see.
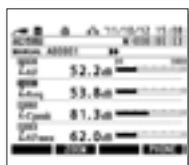
Three measurement screen formats (example)
With varying combinations of frequency weightings (A/C/Z) and time weightings (F/S/I/10 ms), the results of your required calculations can be displayed simultaneously.

Single
(Large display of one calculation)

Dual
(Simultaneous display of two calculation results)

Quad
(Simultaneous display of four calculation results)

Supports SD/SDHC card
Supports high volume memory (up to 32 GB)
*Please contact your nearest distributor for more details about recommended cards.

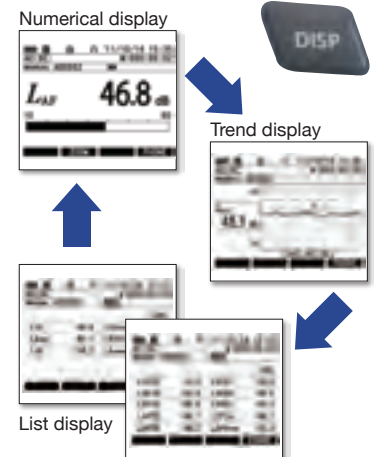**Simultaneous output of A and Z weightings**

Analog output
- Two outputs are possible at a time.
- AC-out (main frequency weighting) fixed
- Selectable from among DC, AC-Z, or Through

One-push selection

Easy display selection

Numerical display

Trend display

List display

Auto memory and manual memory are provided as standard.
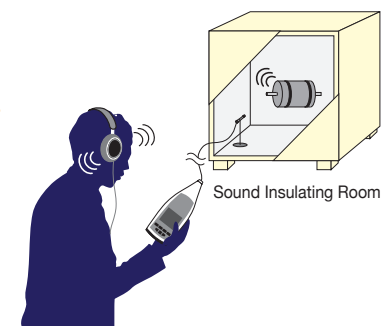In addition to manual memory, auto memory is provided as standard. And by adding a sound recording function (option), you can record live sound.

Remote measurement

Headphone output (Phone output)
You can measure an object placed in an anechoic chamber or a sound insulating box while listening to its sound.

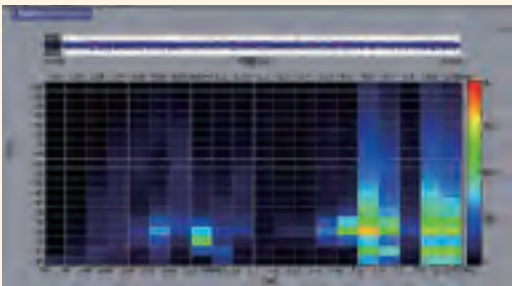*Headphones and extension cable are sold separately.

Sound Insulating Room

ONO SOKKI

the Sound Level Meter evolves into varied products!

Sound Analyzer

By means of real-time octave analysis and FFT analysis, you can determine where a particular distinctive sound occurs along the frequency of a measuring sound. The use of bandpass-filter is effective in a sound source probing.

➡ P.4

Sound Comparator

With the help of instantaneous value and L$_{eq}$*, you can make Pass/Fail judgments on products.
Well-suited for embedding into equipment used on production lines.

*Equivalent Continuous Sound Pressure Level

➡ P.5

Sound Recorder

The Sound Level Meter serves as a sound recorder. Adding playback function allows you to check whether the recording of a measurement sound has been securely made.

(Sampling frequency: 64 kHz, WAVE file)

➡ P.5

Loudness Calculator

In addition to L$_{Aeq}$* display, loudness values more in line with the auditory sensitivity of the human ear can be displayed. This feature is useful in making auditory evaluations.

*Equivalent Continuous A-weighted Sound Pressure Level

➡ P.5

To PC

SD

It is automatically calibrated by exporting data which has been recorded by LA-3000 to the following software.

Without recalibration

For more detailed analysis

Analysis_OS-2000 series

Example of fluctuation sound analysis

○ **Time-series data analysis tool (OS-2500/2600/2700)**
By reading WAVE file, you can display various recorded data and level trend data, can perform checking and editing of recorded sound. By using an IIR filter (OS-0261:option), you can change a filter and emphasize or delete the sound partially while playing back a recorded sound.

○ **1/N Octave analysis software (OS-0264)**
By reading WAVE file and performing octave analysis (1/1, 1/3, 1/12, 1/24), you can confirm the frequency component of recorded sound at a glance.

○ **Sound quality evaluation (OS-2740) & Fluctuation sound analysis (OS-2750)**
Sound quality evaluation software can analyze stationary and non-stationary loudness analyses. It is possible to analyze even more complicated sound quality analysis such as sharpness analysis and roughness analysis. The fluctuation sound analysis can detect a low-level time fluctuating sound (such as a rattling sound), which is difficult to detect by FFT analysis. The two axes of frequency and fluctuation frequency display the time fluctuation component with clarity.
*Supports 16-bit, 24-bit WAVE file of LA-3000 series.

Analysis_DS-3000 series

○ **FFT analysis software (DS-0321, DS-0321L)**
   1/N Octave analysis software (DS-0323, DS-0323L)
   *The model with L: for off-line analysis

By reading in WAVE data derived from the LA-3000 series, FFT analysis, 1/N octave analysis and similar analysis can be performed offline. For example, a non-stationary signal can be analyzed in detail in color map of time-frequency 2-axis. The data of a sound level meter is calibrated automatically.
*Supports 16-bit, WAVE file of LA-3000 series.

1/1 Real-time Octave Analysis Function (Filter 1/1, RTA 1/1 mode) : LA-0351
1/3 Real-time Octave Analysis Function (Filter 1/3, RTA 1/3 mode) : LA-0352

Filter1/1, Filter 1/3 mode (Octave filter analysis mode)

<The use of headphones helps to perform sound probing of a specific sound, such as unusual noise>

In Filter mode, you can make level evaluations in a single frequency band. By focusing solely on a particular frequency band in which a specific unusual noise occurs and measuring the sound pressure level, you can find where the noise is coming from. You can switch the display from level display to trend display.
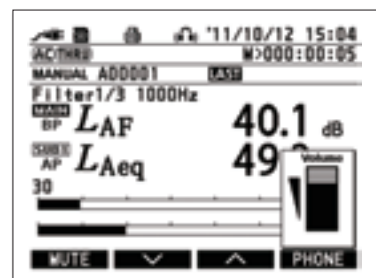
RTA 1/1, RTA1/3 mode
(Real-time octave analysis mode)

<Useful for evaluating frequency components when there is unusual noise>

By dividing a sound in terms of pitch (into frequency bands), this feature helps to analyze at which pitch (frequency band) certain distinctive features occur, as well as for making detailed comparisons.
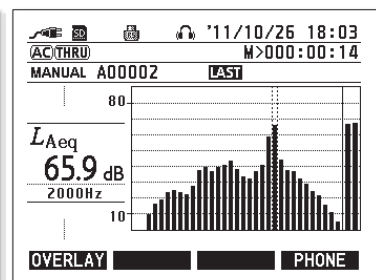
Applicable standards :	IEC 61260: 1995 Class 1, JIS C1513: 2002 Class 1, JIS C1514: 2002 Class 1
Analysis modes :	Octave filter analysis mode, Real-time octave analysis mode
Analysis bands :	16 Hz to 16 kHz in 11 bands (in 1/1 octave) 12.5 Hz to 20 kHz in 33 bands (in 1/3 octave)
Measurement items :	Octave filter analysis mode L_p, L_{eq}, L_E, L_{max}, L_{min} or L_N of a selected band filter and AP Real-time octave analysis mode L_p, L_{eq}, L_E, L_{max}, or L_{min} of each band filter and AP1, AP2 NC values (1/1 octave only)

Frequency weighting and time weighting :	Octave filter analysis mode Applicable to each BP (band-pass) and AP (all-pass) Real-time octave analysis mode Applicable to each frequency band and AP1, AP2
Display format :	Octave filter analysis mode Values (BP, AP), list Real-time octave analysis mode Bar graph (Values for a selected band, AP1 and AP2 included in frequency axis), list
Overwrite display function :	"Stored data" and "measurement-in-progress data" (Real-time octave analysis mode only)

FFT Analysis Function: LA-0353

<Suitable for analyzing impulse sound>

Adding the FFT analysis function makes it possible to perform narrow-band analysis, not only with the magnitude of sound but also with its pitch (frequency). An averaging function is effective for analysis of stationary sound by making waveforms stable. Moreover, the use of a trigger function makes it possible to capture impulse sound. A window function serves as a rectangular window function when a trigger is set, thereby making it easy for the user to make measurements in a user-transparent manner. By virtue of 64 kHz sampling, 25 kHz wide-range analysis is also possible. Pressing the DISP key displays a peak list.
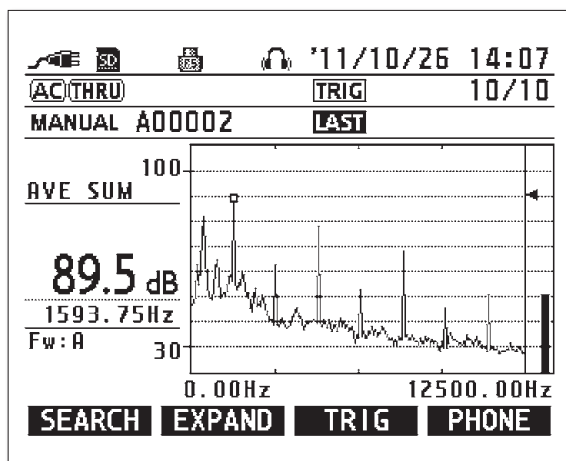
Number of analysis lines :	400 lines
X-axis enlargement function :	x1, x2, x4
Frequency range :	1 kHz, 2.5 kHz, 5 kHz, 12.5 kHz, 25 kHz
Search function :	With high-speed movement search cursor function
Display item :	Instantaneous value, calculation value
Waveform calculation function :	SUM (power summation averaging), MAX Hold, EXP (Power exponential averaging)
Trigger :	Type — Internal trigger (Repeat trigger mode only) Target — L_p values with the following conditions; Frequency weighting…Set on the main screen Time weighting…10ms fixed Position — Fixed 64 pretrigger points
Window function :	Hanning/rectangular (Trigger off : hanning Trigger on : rectangular)
Display (frequency axis) :	Trigger off : Each frequency band, OA (overall), and AP (AVE off:L_p/AVE on*: L_{eq} or L_{max}) *depending on the setting of AVE on mode. Trigger on : Each frequency band, OA, AP (L_p) Peak list — Top 10 points
Memory mode :	Manual

Sound Recording Function: LA-0354

<On-site recording to an SDHC card, on-site checking of those recordings via headphones>

This function enables you to record any unusual sounds that you may hear on site into an SD/SDHC card in WAVE format. And since you can play back those recordings on the sound level meter, you can also check that recordings have been made without fail on site.
You can also save trend data at the same time by allowing the playback of long-duration data recordings. With instantaneous display of this data at the time of reproduction, you can quickly find a distinct sound and start playing back from that point in time.

The OS-2000 series (option) is useful for off-line analysis of recorded sound data.

|		
Stored data	: Noncompressed (WAVE format) audio data	
	Frequency range	AP/specified bands (In octave filter analysis mode)
	File format	WAVE
	Frequency weighting	Z-weighting
	Sampling frequency	64 kHz
	Audio data bit	16-bit / 24-bit
	Reference Lp data	Type ... Lp values of noncompressed audio data
		File format ... CSV
		Sampling ... 1 sec.
Simultaneous saving	: Simultaneous saving is possible with the auto memory function (with some restriction on settings).	
Storage media	: SD/SDHC card ... Up to 32 GB of memory (The maximum file size is 2 GB.)	
	Up to 4 hours of recording with 2 GB in 16-bit format	
	Up to 3 hours of recording with 2 GB in 24-bit format	
	(Notes) OS-2000 series (Data recorded in 16-bit and 24-bit can be used.)	
	DS series (WAVE data recorded in 16-bit can be used.)	
Recording mode	: Start-activated recording: Recording starts/stops in step with measurement. A single file is created for the duration of total measurement time. (Unless otherwise specified, same as measurement time.)	
	Threshold-activated recording: A recording takes place only for a length of time during which a sound level exceeds a threshold. Every time it exceeds a threshold, a single file is newly created.	
Pre-recording function	: Recording begins one second before the start of each recording operation. (This function is operative in level-start or threshold-activated recording mode.)	
Playback function	: Reproduces recorded data from the phone output. Displays trend data updated every second, reproduces the data from specified point.	
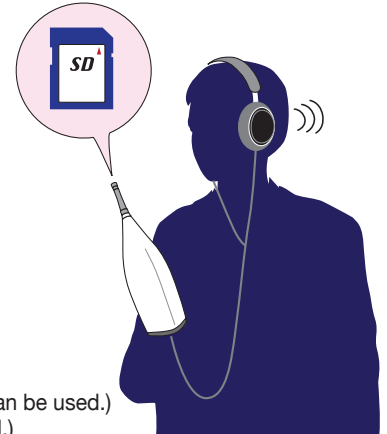
Comparator Function: LA-0355

<Possible to make Pass/Fail judgments on products>

To allow creation of a system with other equipment on a production line, you can make settings for hold time and delay time of output signal.

Available item	: L_p, L_{eq}, L_E, L_{max}, L_{peak}
Judgment hold time	: 0.1 s , 0.2 s , 0.5 s , 1 s , 5 s , 10 s , 30 s , MANUAL
Extended time setting	: OFF , 10 ms , 100 ms , 1 s , 2 s , 3 s , 5 s , 10 s
Output	: Open collector OFF / positive logic / negative logic

Data Logging Function: LA-0356

<Enables to store instantaneous values in CSV format at short time intervals>

Instantaneous values can be stored into an SD/SDHC card in CSV format.

Storing interval	: 10 ms, 100 ms
Available item	: L_p (instantaneous value)
Simultaneous storing	: Enables simultaneous storing with auto memory function (with some restrictions on setting)

Interlocking on/off function with an external power supply: LA-0357

<The Sound Level Meter can be turned on/off in sync with external power>

The power supply on/off of the sound level meter is interlocked with the main power supply of the production lines.
Combined use with the comparator function is useful to build devices for Pass/Fail judgment in production lines.

|	
Function	: When power is supplied from the AC adapter, the main unit starts up automatically. When the power is shut off, the main unit turns off. The power switch on the main unit remains operative.

* When this function is installed, the Sound Level Meter does not operate on battery power.

Loudness Calculation Function : LA-0358

<Allows evaluations based on sound characteristics and auditory sense>

As for noise-level evaluations, there are cases where measurement results are not in tune with the auditory sensitivity of the human ear. In such cases, assessment using loudness values that provide one of the indexes of sound quality evaluation becomes a highly effective tool. Loudness calculation refers to an index used for evaluating the human perception of the magnitude of sound in accordance with DIN45631.
（The LA-0358 loudness calculation function is designed to work on stationary sounds. The OS-2000 series is usable for the Loudness calculation of non-stationary Loudness.）
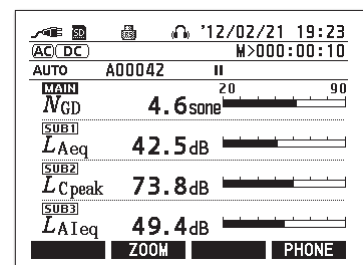
Subject model	: LA-3560, 3570
Measuring lower limit	: LA-3560 (46 dB or less, Lzeq)
	LA-3570 (40 dB or less, Lzeq)

Windscreen
standard

● Windscreen (Φ70 mm)

All-weather Windscreen
LA-0207A
option

*Cannot be used with the LA-3570.

● Windscreen (Φ200 mm)

*The AG-3400 series extension cable for microphone and a tripod (both sold separately) are required.
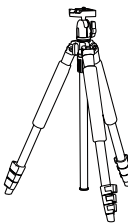
Carrying case
standard

Type AA dry battery x 4 pieces

Instruction manual

Extension cable for microphone
option

AG-3400 series

CE

AG-3401	5 m
AG-3402	10 m
AG-3403	20 m
AG-3404	30 m

*The MI-0301 Microphone holder is provided as standard.

Sound Calibrator
option

SC-3120/2500/2120A

Model name	SC-3120	SC-2500	SC-2120A
Appearance			
Applying standard	JIS C 1515: 2004 Class 1/C	JIS C 1515: 2004 Class 1	JIS C 1515: 2004 Class 2
	IEC 60942:2003 Class 1/C	IEC 60942:2003 Class 1	IEC 60942:2003 Class 2
Applicable sound level meter	LA-3570 LA-3560 LA-3260	LA-3570 LA-3560 LA-3260	LA-3260
Nominal sound pressure level	114 dB	114 dB	94 dB
Nominal frequency	250 Hz	1 000 Hz	1 000 Hz

*Sound calibration for IEC61672 (JIS C 1509) Class1 Sound Level Meter LA-3560/3570: Class 1 or 1/C calibrator

Tripod   LA-0203C
option

This is Ono Sokki's standard tripod for use with our sound level meter.

(SPLINT PRO II made by SLIK Corporation)

Printer   RS-232C Thermal printer DPU-414
option

Interface printer with RS-232C connector. Enables manual printing, auto printing and memory printing.
Connection cable (AX-5042, 2 m) between the LA-3000 series and the printer is provided as standard accessory.

*An AC adapter is sold separately.

AC adapter : PW-C0725-W1-U (100 to 240 VAC)
(Made by Seiko Instruments Inc.)
* Please specify the voltage and plug type of the AC power cable you need.
Recording paper : CX-050B (30 m/roll, 10 rolls/box)

Headphones
option

<Recommended headphones>
· MDR-7506 made by Sony Corporation
· ATH-M50x made by Audio-Technica Corporation

AC adapter PB-7090
CE
standard

Input voltage：100 to 240 VAC 50/60 Hz

*Please specify the voltage and plug type of the AC power cable you need.
*AC adapter：made by Adapter Technology Co., Ltd

Output voltage	:	5.9 VDC
Output connector	:	EIAJ RC-5320A, voltage category 2
Rated output current	:	3.5 A
Total length	:	3.5 m

SD card 1 GB
standard

SDHC card
(up to 32 GB of SDHC card is available, sold separately.)

USB cable
option

<Recommended USB cable>
USB-FSM518：USB (A) male-USB (miniB) male cable made by ELECOM CO., LTD

RS-232C cable 2 m
AX-5022
option

PC side (D-SUB 9-pin)

Signal cable 2 m
AX-501
standard

Φ2.5 sub-mini plug

A cable for AC/DC signal output, comparator output, and external control signal input.

	LA-3570	LA-3560	LA-3260
Applicable standard	IEC 61672-1:2002 Class 1 JIS C 1509-1:2005 Class 1		IEC 61672-1:2002 Class 2 JIS C 1509-1:2005 Class 2
Measurement frequency range	10 Hz to 16 kHz 10 Hz to 15 kHz (±3 dB or less)	10 Hz to 20 kHz (±3 dB or less)	10 Hz to 8 kHz (±3 dB or less)
Measurement level range (IEC, JIS)	A:22 to 130 dB C:28 to 130 dB Z:36 to 130 dB	A:27 to 140 dB C:32 to 140 dB Z:38 to 140 dB	A:26 to 140 dB C:30 to 140 dB Z:36 to 140 dB
Intrinsic noise level	A:14 dB or less C:20 dB or less Z:28 dB or less	A:19 dB or less C:24 dB or less Z:30 dB or less	A:20 dB or less C:24 dB or less Z:30 dB or less
Microphone	MI-1211 -20 dB ±1.5 dB (re.1 V/Pa)	MI-1235 -29 dB ±3 dB (re.1 V/Pa)	MI-1433 -29 dB ±3 dB (re.1 V/Pa)
Microphone preamplifier	MI-3310	MI-3230	
Linearity range	Wide range: 110 dB / normal range : 80 dB		
Level range	20 to 120 dB (wide) / 50 to 120 dB / 40 to 110 dB / 30 to 100 dB / 20 to 90 dB / 10 to 80 dB / 0 to 70 dB	30 to 130 dB (wide) / 60 to 130 dB / 50 to 120 dB / 40 to 110 dB / 30 to 100 dB / 20 to 90 dB / 10 to 80 dB	
Reference range	50 to 120 dB		
Time weighting e.g. LA$_F$	F (fast), S (slow), I (impulse), and 10 ms		
Frequency weighting e.g. LA$_F$	A, C and Z		
Measurement items	L$_p$, L$_{eq}$, L$_E$, L$_{max}$, L$_{min}$, L$_{peak}$, L$_N$ (L$_5$, L$_{10}$, L$_{50}$, L$_{90}$, L$_{95}$, L$_{LO}$, L$_{HI}$, L$_{AV}$, and two more of any L$_N$ data)		
Sampling interval	15.6 µs (L$_p$, L$_{eq}$, L$_E$, L$_{max}$, L$_{min}$, L$_{peak}$), 100 ms (L$_N$)		
Measuring time	e.g. If you want to measure a fixed 10-minute period every hour, and wish to measure this for 24 hours, M.T. shall be 10 min, I.T. shall be 1 h, and T.T. shall be 24 h.		
Measuring time — Measurement time (M.T.)	Manual (0 sec.), user-specified setup: 0.1 to 199 hr. 59 min. 59.9 sec. resolution : 0.1 sec		
Measuring time — Interval time (I.T.)	1 min. to 24 hr. resolution : 1 min		
Measuring time — Total time (T.T.)	0 sec. to 199 hr. 59 min. 59.9 sec. resolution : 0.1 sec		
Start mode	Manual start, timer start, count down start, level start, external control (shunts the external control terminal)		
Display device	3.5" LCD with white backlight		
Display device — Digital display	4-digit / resolution 0.1 dB / updated every 1s		
Display device — Bar indicator	Wide range: 100 dB of display range Normal range: 70 dB of display range		
Display device — Remaining battery level display	4-step display		
Memory function — Memory function	Stored in an SD/SDHC card (SDHC card: up to 32 GB is available.)		
Memory function — Memory mode	MANUAL (CSV file), AUTO (instantaneous value, calculated value, CSV file)......standard function RECORD (WAVE file, 64 kHz sampling)......required for the LA-0354 LOGGING (instantaneous value 10 ms or 100ms, CSV file)......required for the LA-0356		
Memory function — Panel condition memory	Panel Condition (SD/SDHC) power off memory		
Memory function — Basic measurement mode	5 modes (EZ1:L$_{Aeq}$ + L$_{Cpeak}$ / EZ2: Record / EZ3: Logging 100 ms / EZ4: NC / EZ5: Loudness)		
Memory function — Clock function	Built-in (Year / month / day / hour / minute), retention time of content: approx.5 years (charging time: 24 hours from entire discharge state)		
Memory function — Backup function	Stores measurement conditions into the built-in memory		
Calibration — Calibration signal	Electronic calibration by built-in transmitter (1 kHz sine wave) Normal range: -6 dB of full-scale wide range : -16 dB of full-scale		
Calibration — Recommended calibrator	SC-3210, SC-2500		SC-3120, SC-2500, SC-2120A
Output/Input — Phone output (headphone output)	Actual sound or recorded sound (playback sound) *Selected 1 band of actual sound or recorded sound (playback sound) in 1/1 or 1/3 filter mode when the option (LA-0351/0352) is installed. Maximum output: 10 mV (63 Ω at 1 kHz), connector: stereo ϕ3.5		
Output/Input — AC output	Outputs one of A, C, or Z interlocked with the setting selected on the main display, update interval:15.6 µs		
Output/Input — AC output — AC output level	Output level: 0.707 Vrms ± 5 % (normal range), 2.234 Vrms ±5 % (wide range) (When output is open and at full scale.) Output impedance 50 Ω±2 % / load resistance 10 kΩ or more/ offset voltage ±10 mV or less		
Output/Input — AC/DC output	Selectable from DC, AC-Z or Through		
Output/Input — AC/DC output — DC output level	2.5 V ±20 mV (normal range), 2.5 V±10 mV (wide range) (When output is open and at full scale.), scale factor 0.25 V ±10 mV/10 dB		
Output/Input — AC/DC output — AC-Z output level	Output level: 0.707 Vrms (normal range), 2.234 Vrms (wide range) (When output is open and at full scale.) Output impedance 50 Ω±2 %, load resistance 10 kΩ or more, offset voltage ±10 mV or less		
Output/Input — AC/DC output — Through output level	Output level: 0.707 Vrms ±5 % (normal range, wide range) (When output is open and at full scale.) Output impedance 50 Ω±2 %, load resistance 10 kΩ or more, offset voltage ±10 mV or less		
Output/Input — Comparator output	Outputs the status in open collector signal after comparing the setup value with the calculated value / output voltage +3 to +24VDC, maximum sink current 50mA or less. (required for the LA-0355)		
Output/Input — External control input	Operation: Reset and start, control voltage: non-voltage contact input, input pulse width: 200 ms or more, absolute max. input voltage: 24.0 V		
Interface — RS-232C	Baud rate: 9600, 115200 bps, AX-5022 cable (sold separately)		
Interface — USB	Compliant with USB storage class specification ver. 1.1, USB connection cable :USB (A) male-USB(mini-B 5-pin) male (sold separately)		
Interface — External memory	SD/SDHC memory card (up to 32 GB is available.)		

|	LA-3570	LA-3560	LA-3260
Microphone extension *1	103 m (CE marking compliant: up to 30 m)		
Power supply	Type AA battery (alkaline battery cell or Ni-MH secondary battery) x 4 pieces or AC adapter (PB-7090 ... power consumption: approx. 7 VA when using 100 VAC)		
Interlocking on/off function with an external power supply	The main unit is activated automatically when the power is supplied from an AC adapter. (required for the LA-0357) When this function is installed, the LA-3000 series do not operate on battery power.		
Battery life (continuous use)*2	Alkaline battery cell LR6 : approx. 8 hours Ni-MH secondary battery : approx. 8 hours		
Operating (storage) temperature range	-10 to +50 ℃ (-20 to + 60 ℃)		
Operating (storage) humidity range	22 to 90 % RH (10 to 90 %RH) with no condensation		
Outer dimensions	Approx. 379 (H) x 106 (W) x 49.3 (D) mm	Approx. 311 (H) x 106 (W) x 49.3 (D) mm	
Weight	Approx. 680 g (including batteries)	Approx. 630 g (including batteries)	
Accessories	AC adapter (PB-7090), signal cable (AX-501), windscreen (Φ70mm), hand strap, alkaline type AA battery x 4 pieces, carrying case (including shoulder belt), SD memory card (1 GB), instruction manual		

Please use a recommended SD card when you use the SD memory function. For more details about the recommended SD card, please contact your nearest distributor or send an e-mail (overseas@onosokki.co.jp) to us.

*1.The described value is extendable length when the exclusive cable is used.
*2. It depends on the using status such as operation mode, memory mode, and backlight.

◼ Outer Dimensions

(Unit : mm)

LA-3560
LA-3260

LA-3570
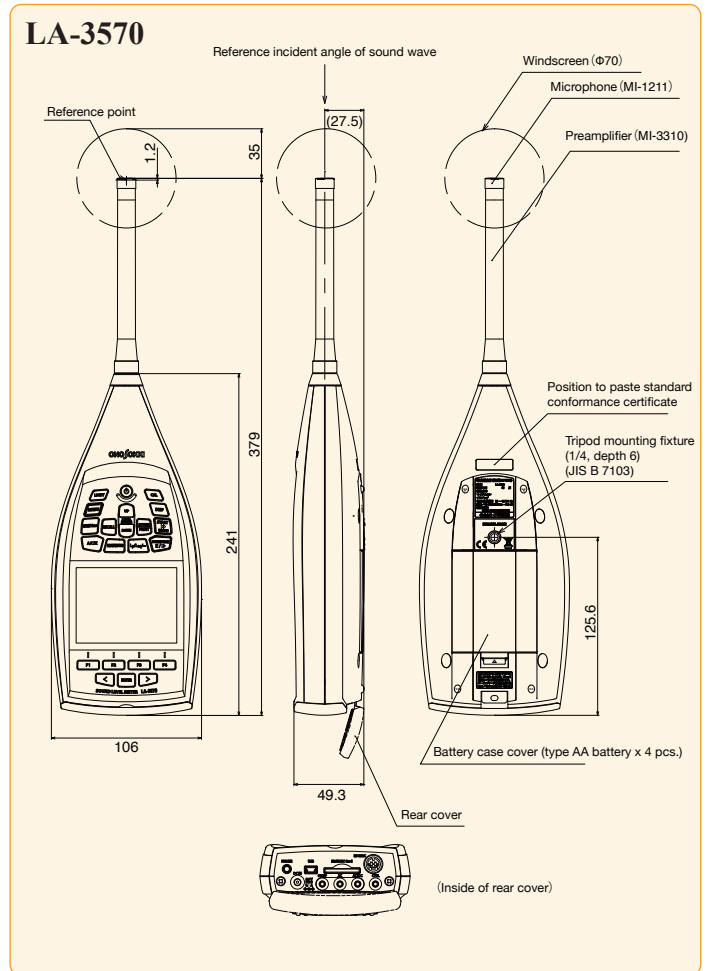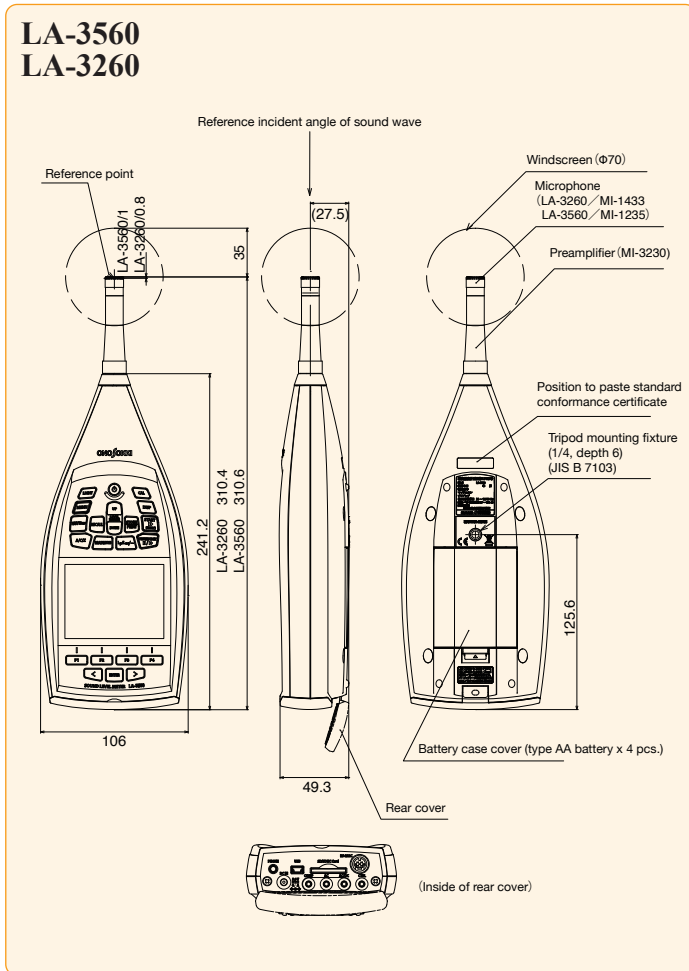
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