Integrating Sound Level Meter

LA-4440 (Class 1)
LA-1410 (Class 2) /LA-1440 (Class 2)

ONO SOKKI

Focusing on field measurement with versatile functions, New LA

LA-1400 / 4400 series integrating sound level meters conform to the requirements by the latest standard of IEC / JIS. And also they are designed to focus on field measurement in pursuing of easy operation and cost-effectiveness. All models can measure 14 items simultaneously including L_{eq}, which is popularly used in sound measurement, and have a wide linearity range of 100dB. Setting can be made with easy-to-follow menu. From measurement of work environment to machine and product noise analyses, you can choose suitable model which meets your needs and applications.

LA-4440 Precision Integrating Sound Level Meter (Class 1)
LA-1440 Integrating Sound Level Meter (Class 2)
LA-1410 Integrating Sound Level Meter (Class 2)

1 All models with Equivalent Continuous Sound Pressure Level (L_{eq}) measurement function

All models of LA-1400 / 4400 series can measure 14 measurement items including Equivalent Continuous Sound Pressure Level (L_{eq}), which is widely used as an indicator at present sound measurement.

2 Multiple simultaneous measurements

LA-1400 / 4400 series can calculate all of 14 measurement items simultaneously. No need for selecting measurement item to calculate before measurement, no error for miss-setting. Only one pressing of START button in order to start measurement is required. All results of measurement items can be checked with several pressings of DISP (abbreviation of DISPLAY) button after measurement.

- 14 measurement items: L_p, L_{eq}, L_E, L_{max}, L_{min}, L_{peak}, L_{HI}, L5, L10, L50, L90, L95, L_{LO}, L_{AVE}
  The all items can be calculated simultaneously and saved as needed.

3 Wide linearity of 100dB without adjusting level range

Re-measurement is not necessary for over / under-range. LA-1400 / 4400 series feature a wide linearity range of 100dB and can measure the sound pressure level from 30 to 130dB at one range*. It works effectively in the measurement of unpredictable or large fluctuation in sound level.

*Sound pressure level from 30 to 130dB can be measured at the range of 40 to 120dB.

4 Easy-to-follow setting menu without referring to the manual

Each model of LA-1400 / 4400 series can be operated with easy-to-follow setting menu. Operator can setup with just [+] and [ENTER] keys. Simply classified hierarchic structure leads to complete each setting by selecting menu items. Detailed settings including measurement conditions and selection of output signals can be made even though you do not have manual with you.

00/01/02 21:57
MENU
STT-MODE >
MEASURE >
DISPLAY
M-RECALL >
MEMORY >
LpLeq ON >
DISP ON >
>
>
>

Series accomplishes your needs effectively with high-performance.

What is Equivalent Continuous Sound Pressure Level (L_{eq})?

There are diverse array of sound source to be measuring object; environmental noises of road and construction site, noise of working environment at production site in factory, mechanical noise from products such as car, office equipment, and home appliance. The sound level of those generally fluctuates with time. The L_{eq} measurement, which is an average of sound level in specified periods, is an important index for sound evaluation as a representing value of sound level such as mechanical noise generated at a particular measurement environment.
Different from the alternative statistical averaging method (Percentile Sound Pressure Level), the averaging method of L_{eq} is based on an acoustic energy and a fundamental evaluation amount to meet various requirements with clear physical meaning. Recent years, evaluation of sound level by obtaining L_{eq} is a mainstream in JIS which is applicable for latest requirement of ISO. The related standard also defines L_{eq} terms as follows.

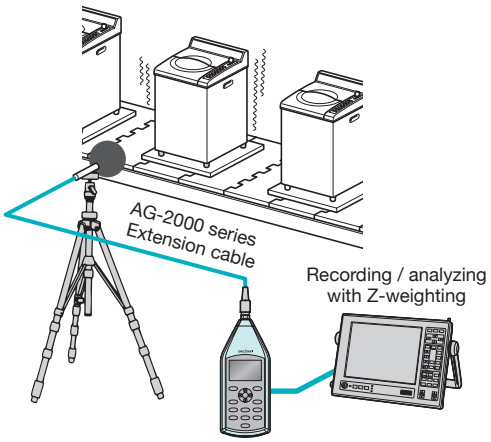
Description and measurement of environmental noise (JIS Z 8731)	**Equivalent Continuous Sound Pressure Level**
Determination of sound power levels of noise sources using sound pressure (JIS Z 8732 / 8733)	**Time-averaged Sound Pressure Level**
Noise emitted by machinery and equipment–Measurement of emission sound pressure levels at a work station and at other specified positions (JIS Z 8737 series)	**Time-averaged Emission Sound Pressure Level**

5 Microphone can be used away from main unit of sound level meter up to 305m by connecting several coaxial extension cables. (LA-4440: up to 105m)

Exclusive coaxial cable, which has been achieved popularity with previous model LA-1350 / 4350, is selected as an extension cable between microphone and main unit of LA-1400 / 4440 series. Using coaxial cable enables measurement of extension and moving the measurement place easier with small-type code reel. Even 100m extension measurement can be performed without annoyance of heavy multicore cable.

6 Displaying sound pressure level with A-weighting, AC output with Z-weighting

Not only the measurement of sound level in the field, but also recording data (time waveform) is required in order to analyze noise and sound in details.
In the past sound level measurement, it needs troublesome procedure to measure the A-weighted sound pressure level and record the Z-weighted sound pressure level at the same time. Sound level must be measured by sound level meter without frequency weighting, and then calculated and recorded at the same time by analyzer. This way has been required expensive instruments.
This new LA-1400 / 4440 series enable to output signal with flat Z-weighting from analog output connector during displaying and measuring sound level with A-weighting in main unit.



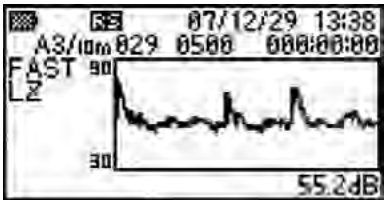
Measuring with A-weighting

Measuring the noise at L_{Aeq} by sound level meter and recording with flat Z-weighting by FFT analyzer.

7 L_p memory function to store L_p (Time Weighted Sound Level) at 1ms interval

The LA-1440 / 4440 can store the sound pressure level with time weighting (L_p) at 1ms interval. This function enables to check the fluctuation of sound level in short time.

- Storing interval can be selected from 1ms, 2ms, 5ms and 10ms. Maximum of 200 seconds can be stored at 1ms interval.



Ex) Displays level on vertical axis, time on horizontal axis

8 Resume function to activate with same settings used at previous power OFF

Same as existing LA series, measurement conditions just before being powered OFF are automatically saved. Measurement can be started again quickly with previous measurement conditions even though the power has been turned off in order to move the measurement place (resume function). The LA-1400 / 4440 series also have 9 condition memories and able to store each measurement condition as required by circumstances. Presetting the measurement conditions not only makes it smooth to restart measurement but also prevents from setting error in the field.

9 Can be operated main unit of sound level meter by remotely and transferred measurement result to a PC. (required software: user preparation)

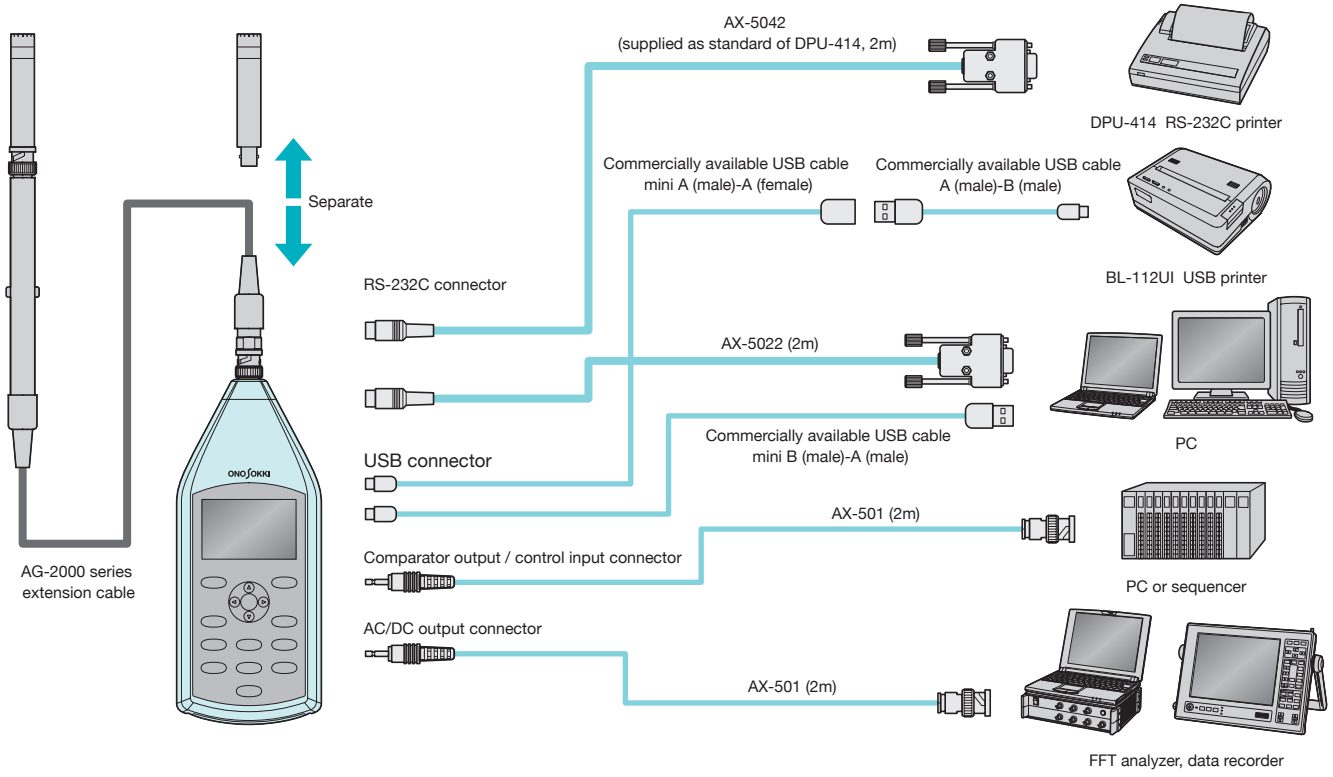
Communications via RS-232C and USB enable to transfer the measurement result to a PC and remote controll of LA-1440 / 4440 main unit with software (user preparation).

●Sound Level Meter Functions Chart

		LA-1410	LA-1440	LA-4440
Linearity range		100dB		
Frequency range		10Hz to 8kHz (IEC, JIS)		10Hz to 20kHz (IEC, JIS)
Measurement range		20 to 90dB, 30 to 90dB, 40 to 100dB, 50 to 110dB, 60 to 120dB, 70 to 130dB, 40 to 120dB (Measurement of 30 to 130dB can be performed at the range of 40 to 120dB.)		
Frequency weighting		A, C, Z		
Time weighting	FAST / SLOW	●	●	●
	IMPULSE	×	×	●
	10ms	×	×	●
Measurement items		L_p, L_{eq}, L_E, L_N (L5, L10, L50, L90, L95, Hi, Low, Ave), L_{max}, L_{min}, L_{peak}		
Measurement time		Manual, arbitrary setup (199h59m59s max.)		
Total measurement time		×	Arbitrary setup (199h59m59s max.)	
Display	Measurement value (displayed for each item, ON / OFF selectable)	●	●	●
	Measurement value list display	●	●	●
	Trend graph display	●	●	●
	Trend list display	×	●	●
Memory function	Manual memory	● Total calculated values: 100 addresses		
	Auto memory	×	● Total calculated values: 100 addresses X 200 blocks L_{eq}: 1000 addresses X 200 blocks	
	L_p record	×	●	●
Auto measurement function	Timer measurement function	×	●	●
	Trigger measurement function	×	●	●
	Trigger delay function	×	●	●
Measurement condition memory function (panel condition)		●(9 kinds)	●(9 kinds)	●(9 kinds)
	Resume function	●	●	●
Analog output: select one from AC, AC-Z, DC		●	●	●
External control input		×	●	●
Comparator function with delay and hold function*		×	○	○
Interface: RS-232C and USB connection		×	●	●
Microphone extension		305m max.	305m max.	105m max.
LCD backlight		●	●	●
Print function	Applicable printer model	×	DPU-414/BL-112UI (sold separately)	
	Print mode	×	Measurement value / image data displayed on LCD	

●: Equipped as standard ○: Option X: Not provided
* Refer to "Comparator output function (LA-0141)"

●System Configurations



●Option

Comparator output function LA-0141

An optional software LA-0141 can output comparison result when the measured value exceeds the setting value. It makes use of determination of sound level under measurement.

Set comparison value	40.0 to 130.0dB (in increment of 0.1dB)
Comparison item	L_{max} or L_{peak}
Delay time	0ms, 100ms, 1s, 5s *It can be used for the determination only when the measured value keeps exceeding against the setting value. Error-determination caused from single-shot sound can be avoided. When [MANUAL] is set from hold time condition (HOLD TIME), setting to delay conditions (DELAY) is automatically deactivated.
HOLD time	100ms, 1s, 5s, manual *It is time period to hold output signal even though measured value goes below the setting value. When the operating mode is manual, output signal is held until next measurement starts.
Output logic	Negative or positive logic
Output signal specification	Open collector (output withstand voltage: +3 to + 24VDC, current: 50mA or less)

AC adapter PB-7080

Input voltage	100 to 240VAC
Output voltage	6VDC
Output connector	EIAJ RC-5320A Voltage category2
Rated output current	2A

*Please specify the input voltage of the adapter with your order; 100 to 120VAC or 220 to 240VAC.

Signal output cable AX-501

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

Extension cable AG-2000 series (coaxial type)

AG-2010	10m
AG-2030	30m
AG-2050	50m with code reel
AG-2100	100m with code reel

* MI-0301 Microphone holder is a standard accessory of each extension cable.
* Conjunction cable (5m) for connecting to main unit of sound level meter is attached with extension cable with code reel.
* Microphone can be used away from main unit of sound level meter up to 305m by connecting several extension cables. (LA-4440: up to 105m)

●Peripherals

Sound Calibrator SC-3100A / 2120A

The SC-3100A / 2120A are sound calibrators conforming to JIS C1515: 2004, indispensable for determining the reference measurement for a sound level meter. The SC-3100A is Class1/C piston phone-type, outputs sound pressure at 250Hz and 124dB, and recommended sound calibrator for LA-1410 / 1440 / 4440.
The SC-2120A is Class2 speaker-type sound calibrator used for 1kHz and 94dB output.

All-weather Windscreen LA-0206

In measurement where the microphone is exposed to the wind, the windscreen must be used for protection.
This screen reduces noise caused by the wind in performing sound level measurement outdoors, and prevents the microphone from being damaged by rain or snow.

Screen diameter: ø200mm

Sound Level Meter Tripod LA-0203C

This tripod is Ono Sokki's standard tripod for use with our sound level meter. The maximum height is 161.5cm and minimum height can be reduced to less than 10cm by reversing the tripod and attaching the center pole to the sound level meter.

Printer

• Thermal Printer with RS-232C connector DPU-414

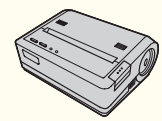
Interface printer with RS-232C connector. By connecting the printer to a sound level meter, manual printing, auto printing, and memory printing are possible. Hard copy of display screen can be performed by connecting with LA-1440 / 4440. Connection cable (AX-5042) between LA-1440 / 4440 and DPU-414 is supplied as standard accessory.

AC adapter: PW-4007J (100-120VAC) or PW-4007E (220-240VAC) (sold separately)
Recording paper: CX-050B (30m/roll, 10 rolls/box, sold separately)

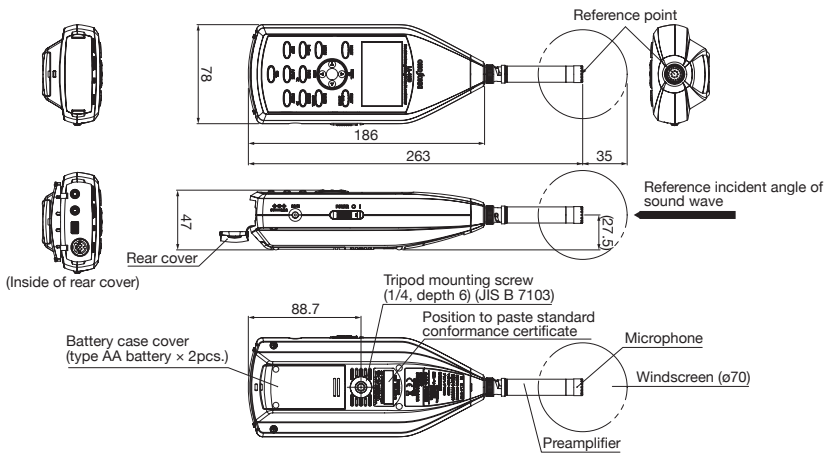
• Recommended Thermal Printer with USB connector BL-112UI (from SANEI Electric Inc.)

Interface printer with USB connector. By connecting the printer to a sound level meter, manual printing, auto printing, and memory printing are possible. Hard copy of display screen can be performed by connecting with LA-1440 / 4440.

Recommended cable for USB (manufactured by ELECOM CO., LTD)
USB-MAEA03 : mini A (male) =A (female)
USB-FS3 : A (male) = B (male)



●Outer dimension (unit: mm)



●Basic Specifications

		LA-1410	LA-1440	LA-4440
Applying standards		JIS C 1509-1:2005 Class 2 IEC 61672-1 :2002 Class 2		JIS C 1509-1:2005 Class 1 IEC 61672-1 :2002 Class 1
Microphone		1/2-inch back electret-type condenser type MI-1432 Nominal sensitivity level: –29dB		1/2-inch back electret-type condenser type MI-1234 Nominal sensitivity level: –29dB
Preamplifier		MI-3111		
Linearity range		100dB		
Frequency range		10Hz to 8kHz (JIS, IEC)		10Hz to 20kHz (JIS, IEC)
Measurement range		A : 26 to 137dB (JIS, IEC) C : 31 to 137dB (JIS, IEC) Z : 36 to 137dB (JIS, IEC)		A : 27 to 137dB (JIS, IEC) C : 30 to 137dB (JIS, IEC) Z : 35 to 137dB (JIS, IEC)
Frequency weighting		A, C, Z		
Intrinsic noise		A: 20dB or less, C: 25dB or less, Z: 30dB or less		A: 19dB or less, C: 22dB or less, Z: 27dB or less
Level range		20 to 90dB, 30 to 90dB, 40 to 100dB, 50 to 110dB, 60 to 120dB, 70 to 130dB, 40 to 120dB (Measurement of 30 to 130dB can be performed at the range of 40 to 120dB.)		
Time weighting		Fast, Slow		Fast, Slow, Impulse, 10ms
Measurement items		L_p, L_{eq}, L_E, L_N (L5, L10, L50, L90, L95, Hi, Low, Ave), L_{max}, L_{min}, L_{peak}		
Sampling interval		31.25μs (other than L_N), 100ms (L_N)		20.8μs (other than L_N), 100ms (L_N)
Measurement time		Manual, arbitrary setup (199h59m59s max.)		
Total measurement time		—	Arbitrary setup (199h59m59s max.)	
Start mode		Manual, Timer (time setting: in increment of 1 second) Trigger (can be started after a lapse of specified time (0 to 10 seconds, in increment of 1 second) after trigger detection: Trigger delay function)		
Calibration		Electrical calibration by internal calibration signal (1kHz sine wave), calibration by external sound calibrator		
Recommended sound calibrator		SC-3100A		
Display device		LCD with LED backlight semitransparent (124 x 64-dot), measurement value display by numeric and bar indicator. List display and trend graph display for various kinds of calculated values, displays of day, time, measurement time and conditions of various kinds of instruments.		
Displayed update time		Numeric: 1s, bar indicator : 0.1s, trend graph: 0.2s		
Memory function	Manual memory	Total calculated values: 100 addresses		
	Auto memory	—	Total calculated values: 100 addresses x 200 blocks L_{eq}: 1000 addresses x 200 blocks	
	L_p record	—	Sound pressure level with time weighting (L_p) is automatically stored at the specified interval. : 1000 addresses x 200 blocks Storing interval: select one from 1ms, 2ms, 5ms, and 10ms.	
Measurement condition memory function		Condition memory: 9 kinds		
	Resume	Settings activated at power ON can be selected from three; Settings used at previous power OFF, factory settings, any condition memory number which is set from menu		
Analog output		Select one from three; AC output with selected frequency weighting, AC output with Z-weighting, DC output with selected frequency weighting and time weighting		
	Rated AC output	0.707Vrms / F.S. (normal range), 2.238Vrms / F.S. (wide range)		
	Rated DC output	2.5V / F.S., 0.25V / 10dB		
	Electrical specification	Output impedance: 50Ω, load resistance: 10kΩ or more, applicable cable: AX-501 (sold separately)		
External control input		—	Operation: Calculation can be started or placed in pause with toggle operation (negative logic). Voltage level: Low 0.0 to 0.5V, Hi 3.0 to 5.0V Pulse width: 100ms or more Absolute maximum rated input voltage: 5.0V	
Comparator function (option: LA-0141)		—	Comparison level: Set to 40.0 to 130.0dB in increment of 0.1dB Comparison measurement item: L_{max} or L_{peak} Delay time: 0ms,100ms,1s, 5s Hold time: 100ms, 1s, 5s, manual Output logic: Negative or positive logic Output signal specification: Open collector (withstand voltage: +3 to +24VDC, current: 50mA or less)	
Clock function		Current calendar year / month / day / hour and minute can be displayed and set / with leap year adjustment		
RS-232C		—	Control of main unit and data output, output to exclusive printer (DPU-414) Baud rate: 9,600 / 115,200 bps	
USB		—	Control of main unit and data output, output to exclusive printer (BL-112U) USB2.0 FULL SPEED (connect to virtual COM port)	
Microphone extension*1		305m max.		105m max.
Print function		—	Menu: Measurement value, start / stop time of measurement, actual measurement time, frequency weighting, time weighting Mode: Normal (alpha-numeral) or image data displyed on LCD Applicable printer: DPU-414 / BL-112UI (sold separately)	
Power supply		Type AA battery x 2pcs. or AC adapter (PB-7080, sold separately)		
Battery life		Approx. 8 hours (LR-6 alkaline batteries in used)		
Operating temperature / humidity range		-10 to 50°C / 25 to 90%RH (with no condensation)		
Storage temperature / humidity range		-20 to 60°C / 10 to 90%RH (with no condensation)		
Outer dimensions		Approx. 78(W) x 263(H) x 47(D)mm		
Weight		Approx. 375g (including batteries)		
Accessories		Windscreen (ø70mm) x 1, carrying case x 1, hand strap x 1, battery x 2pcs., manual: 1 copy for each (Basic Operation, Interface (LA-1440 / 4440), Technical Guidance, Simple Operation Guide)		

*1. The cable length given here is the length when each of the exclusive cable sold by Ono Sokki is used.

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*Outer appearance and specifications are subject to change without prior notice.

URL: http://www.onosokki.co.jp/English/english.htm

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