SMART SENSOR®

Model：AR854

Digital Sound Level Meter
User's Manual

Version: SZ854-1

Precauction

- Thank you for pruchasing SMART SENSOR® Digital sound level meter.
- This manual provides relative information on how to use the unit and warnings in operation.
- To make the best use of this product's functions, read this manual thoroughly before use. Please keep this manual quick reference.
- Please make some simple test measurement to ensure proper performance of the unit.

Maintenance and warranty

1). Maintenance

➢ Replacement and maintenance of battery:

a.Remove the battery from the unit if it is not required for extended periods of time in order to avoid damage to the battery compartment and the electrode resulting from a leaking battery.

b.After power on, if a symbol appears on the LCD, you need to replace the batteries immediately. Open the battery door, take out the old battery install new batteries, (note the battery polarity), then close the battery door, for details please refer figures and contents on page 10 of this manual.

➢ Cleaning the casing:

Never use alcohol or thinner to clean the unit casing that will especially erode the LCD surface; just clean the unit lightly as needed with little clean water.

2). Warranty

➢ About relative warranties please read provided warranty card.

➢ We disclaim any liability due to: transportation damages; incorrect use or operation; manipulation, alterations or repair attempts; without warranty card, invoice.

Specific Declarations

a. We reserve the rights of the update and amendment of the product design and the manual which are subject to change without further notification.

b. Dispose of battery should in accordance with local laws and regulations.

IntelliSafe CE

ISO 9001 SGS U.K.A.S. QUALITY MANAGEMENT 005

Contents

1. Before use notice

Check-up

Carefully unpack your kit after you purchased this product and ensure that you have the following items. In the event that any item is missing or if you find any mismatch or damage or the manual appearing to lack page, etc. Seriously influencing the reading, promptly contact your dealer.

- Sound level meter 1PCS
- Sponge ball 1PCS
- Computer software disc 1PCS
- USB connection cable 1PCS
- 1.5V battery (AA) 4PCS
- EN user's manual 1PCS
- Warranty card 1PCS
- PP packing box 1PCS

3. Other items

Familiar trouble shooting

The following is a list of actions to be taken if the unit is not working properly:

1). Screen is Blank:
Check the batteries are installed correctly. Open the battery door on rear of the unit. The + and - symbols on the battery should match the corresponding + and - symbols marked in the battery compartment.

2). If the unit can not connect to PC normally, please check if the USB cable is OK, if the cable can not be used formally, please replace it for a new one.

Attentions

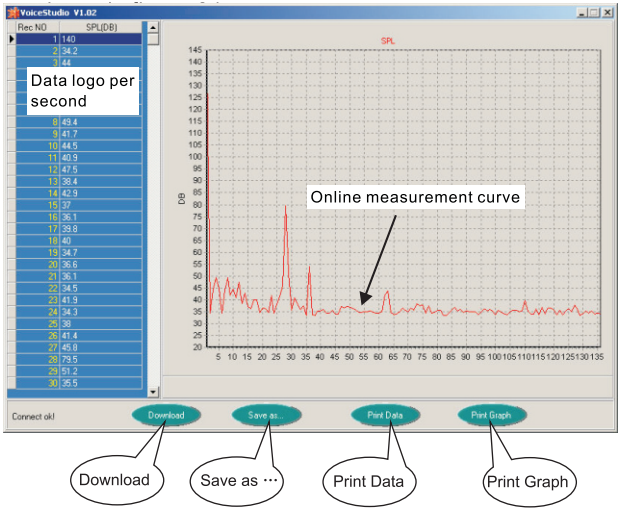
1). Environment conditions on operation:
Indoor use; 2000 meters high below;
Temperature:0~40℃;
Relative humidity: ≤80%RH

2). Do not store or use the unit in following conditions:
a. Splashes of water or high levels of dust.
b. Air with high salt or sulphur content.
c. Air with other gases or chemical materials.
c. High temperature or humidity or direct sunlight.

3). Never impact the unit or used on humidity conditions.

5) On line measurement:

➢ Click Real Time Measure in File menu bar or Real Time Measure button in tool column will enter into the window



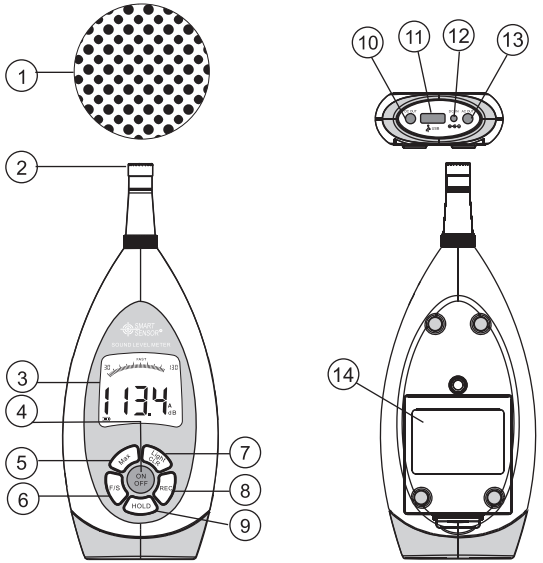
Introduction

This unit has been designed to meet the measurement requirement of noise engineers, noise quality control and health prevention in various environments. Such as noise measurement in factory, office, traffic road, family and all other noise measurement applications.

Features and function

- Designed according to following standard:
  a. GB/T3785-1983
  b. IEC61672-2002 class 2
- Accuracy: ±1.5dB
- Measurement range: 30~130dBA(ref2×10^{-5}Pa)
- Resonse frequency: 20Hz~8kHz
- Reference direction: axial of microphone
- Frequency weighting: A
- Time weighting: FAST, SLOW
- Lmax function
- LCD back-light
- Data HOLD
- Auto power off
- AC, DC signal output
- 10000 data record function
- Connect with PC via USB socket: data record, download, real-time data sampling, printing graph etc.

Diagram of the unit



1. Sponge ball (when outdoor use please put on, prevent wind blowing noise disturbing the unit reading)
2. Prepolarized condenser microphone
3. LCD
4. ON OFF : ON/OFF button
5. Max : Max function button

4) Connection with PC:

➢ Insert one end of USB wire into the USB socket on the unit, as shown in figure 22:

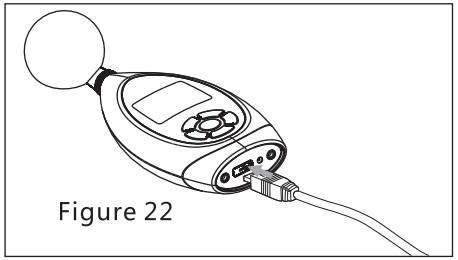
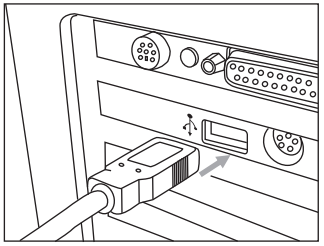


Figure 22

➢ Plug another end of USB wire into the interface port on PC, as shown in figure 23

Figure 23



Note:

➢ Once the connection is done, an USB icon appears on the LCD of the unit indicates a success connection, otherwise, the connection fails.

➢ In connection with PC, the PC could supply the power to the unit directly without 4 *AA batteries .

3) Software instruction

➢ The software window as shown in figure 21:

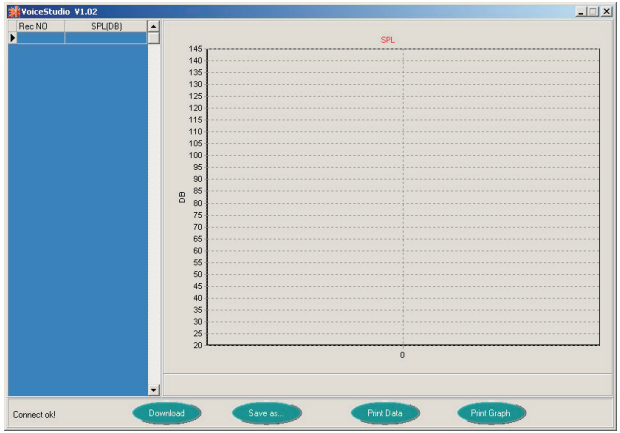


Figure 21

Note:
Check if this unit is connected well with the computer on state column:
Connect OK: Connect successful;
Disconnect: failed to connect.

➢ Tool column instruction as shown in following diagram:

Button	Function
Download	Down load data from sound level meter
Save as...	Save the data in PC
Print Data	Print data via PC printer
Print Graph	Print graph via PC printer

6. F/S : Fast / Slow time weighting switch

7. LIGHT CLR : Black-light and clear stored data button (Press and hold for 2 seconds will clear the stored data)

8. REC : Data store button (10000 storage)

9. HOLD : Data hold button

10. DC OUT : DC signal out(10mv/dB, impedance 500Ω

11. USB : USB socket

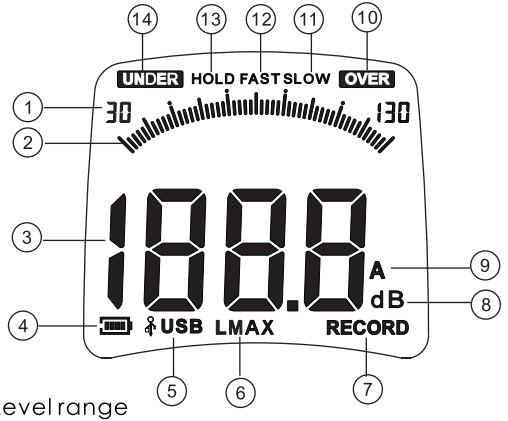
12. DC IN : DC 4.5~9V input jack(outside P, inside N)

13. AC OUT : AC signal out put

14. Battery door

Note:
Above key functions descriptions just are simple introduction, please read operation instructions part in this manual for details.

LCD display



1. Level range
2. Bar graph(2dB/1step)
3. Measuring reading
4. : battery power indication
5. USB : USB connection icon
6. LMAX : Max value icon
7. RECORD : Data store icon
8. dB : sound level unit
9. A : Frequency weighting A
10. OVER : If the sound level is over the maximum range, this symbol will be displayed.
11. SLOW : time weighting slow
12. FAST : time weighting fast
13. HOLD :Data hold
14. UNDER : If the sound level is under the minimum range, this symbol will be displayed.

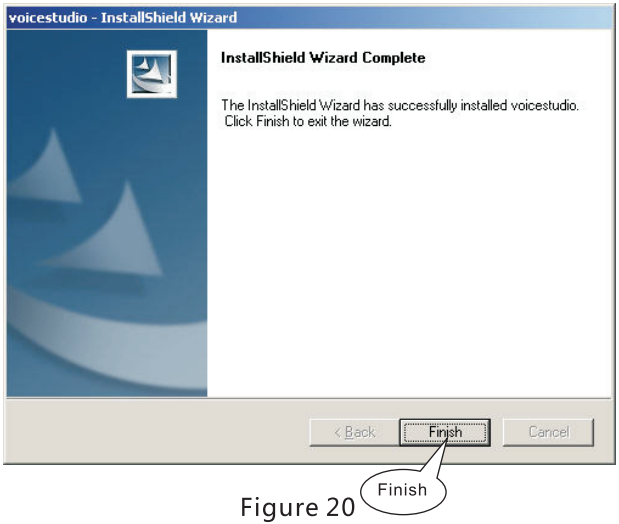


Figure 20

Note:
If you want delete this software, please open the "control panel", then open the "add/delete program" to select VoiceLAB in the list, click the Delete button to remove the software.

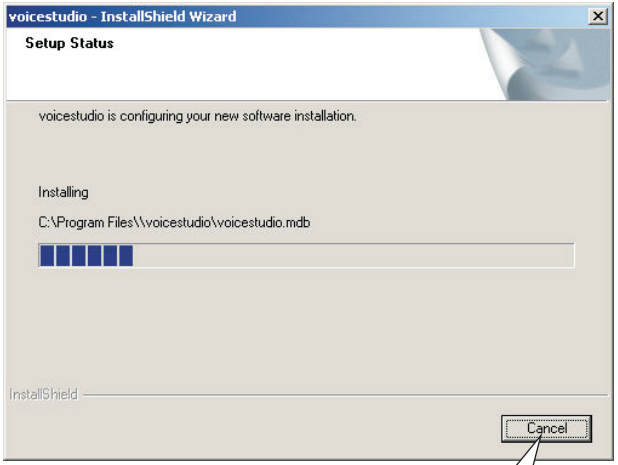


Figure 19

➢ If appears following picture, click Finish, the quick way of starting software will produce automatically on the tabletop, whose name is VoiceLAB, as shown in figure 20:

Specifications

Microphone	AWA14425 prepolarized condenser type
Sensitivity	App. 40mV/Pa
Calibration	94dB@1KHz
Measurement range	30~130dBA
Accuracy	±1.5dB (ref 94dB@1KHz)
Frequency response	20Hz~8KHz
Resolution	0.1dB
Over load indication	"OVER" "UNDER" symbol
Frequency weighting	A
Digital display	3 1 / 2 display
Time weighting	FAST / SLOW
Data store	10000 group
Maxi reading	LMAX
Auto power off	10 minutes with out operation
Power	6V
Dimension	210x72x32mm
Net weight	300G(without battery)
Battery life	10hours(continuous use)

Calibration

Please use 94dB@1KHZ standard calibration instrument

- Setting on sound level meter:
  Frequency weighting is A;
  Time weighting is FAST;

- Insert the microphone head into the standard calibration jack, set the standard source as 94dB@1KHZ, use a small - screwdriver adjusts the calibration knob at the round hole until LCD display93.8, as shown in figure1 :

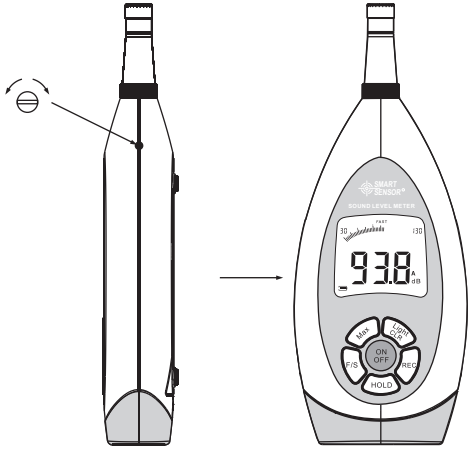


Figure 1

Note:
This unit has been calibrated before leaving factory, one year calibration cycle is recommended.

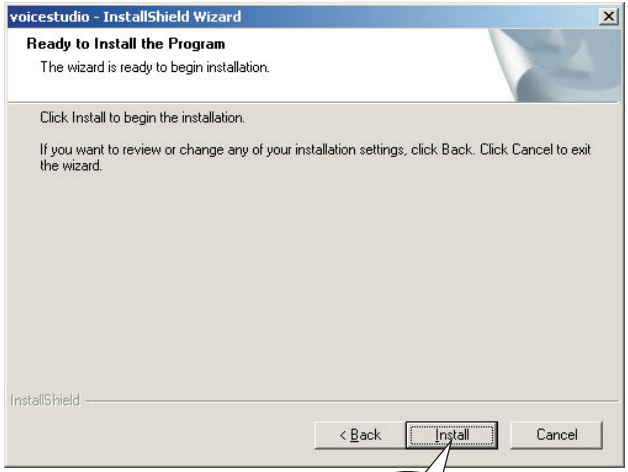


Figure 18

- In program installation process, if want stop it, please click the Cancel button, as shown in figure 19:

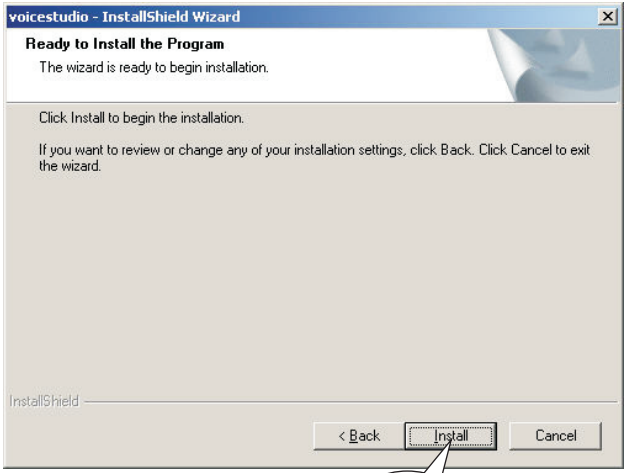


Figure 17

➢ Click the Install button to install the program into your PC, as shown in figure 18:

2. Operation instructions

Battery installment

➢ Open the batter door insert the 4PCS 1.5V batteries into compartment properly, (note the battery polarity), as shown in figure 2:

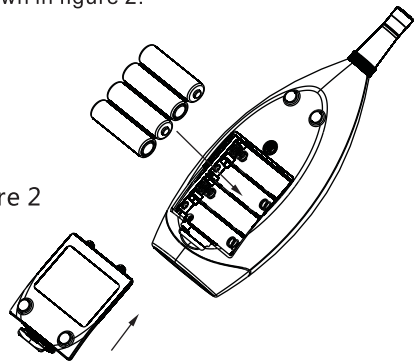


Figure 2

➢Cover the battery door.

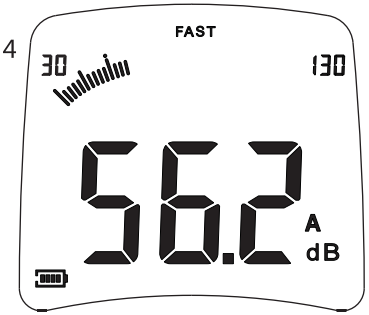
Measure of sound level LP

➢ Press (ON OFF) to turn on, the LCD will show the whole display as follow figure 3:

Figure 3

➢ After 2 second, the meter will enter Lp measuring, LCD will display the reading, the default time weighting is FAST, as figure 4:

Figure 4



➢ Enter the user name and company name, click NEXT to enter Next step, as shown in figure 16:

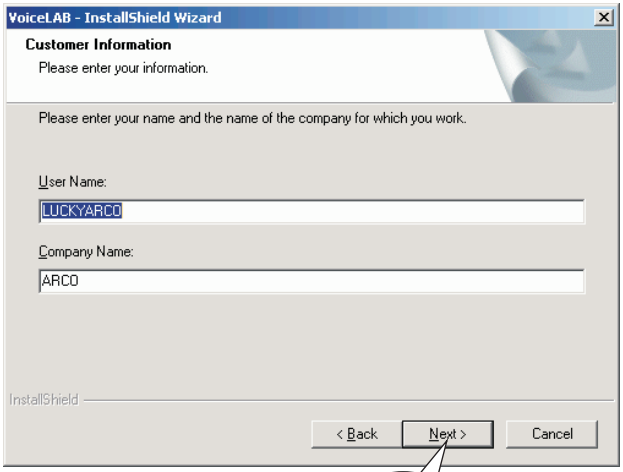


Figure16

➢ Setup type selection, select the defaulted setup (Complete) type, click NEXT to enter Next step, as shown in figure 17:

Connection with PC

1). Requirements of computer configuration:

- CPU: PentiumIII 600MHZ or above;
- One free available USB connecting interface:
- The lowest screen resolution of monitor is 800*600 (or much higher), true color;
- At least 8MB available memory;
- At least 50MB available disk memory;

Operation system: MICROSOFT WINDOWS 98/ME/2000 /XP HOME/XP Professional 32Bit

2). Installing the data collecting software:

Place the software disc in your disc driver, open the disc driver file, double-click the Setup.exe program icon to enter program installation contact interface, click NEXT to enter Next step, as shown in figure 15:

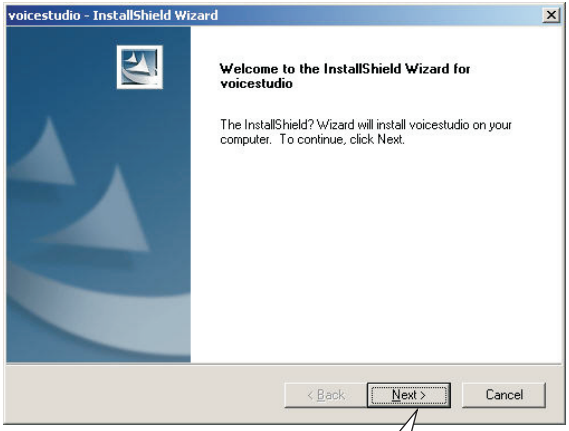
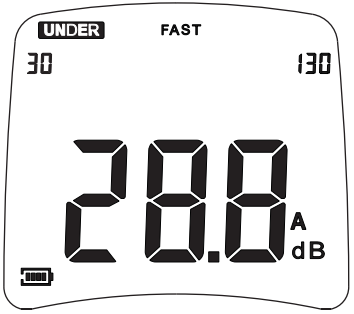


Figure 15

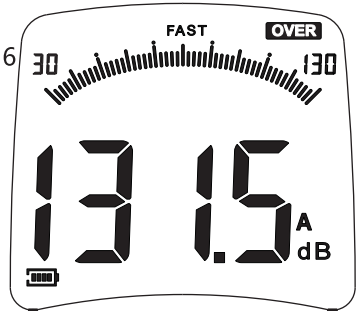
- If the current sound level is under 30dB, the LCD will display UNDER to indicated the current Lp is under measurement range, as figure 5:

Figure 5



- If the current sound level is over 130dB, the LCD will display OVER to indicated the current Lp is over measurement range, as figure 6:

Figure 6



The reading on LCD changes once per second, the Lp is maximum sound level over one second.

Time weighting selection

➢It is defaulted as FAST after power on, the LCD screen displays as in figure 7:

Figure 7

➢Press the F/S key it turns into SLOW , the LCD screen displays as in figure 8

Figure 7

Note:
a.Selecting FAST is to pick up the current reading;
b.Selecting SLOW is to pick up the reading of average within 1 second.

Figure D:
AR854 with a sponge ball in the absence of wind, at free-field response in several incidence direction.

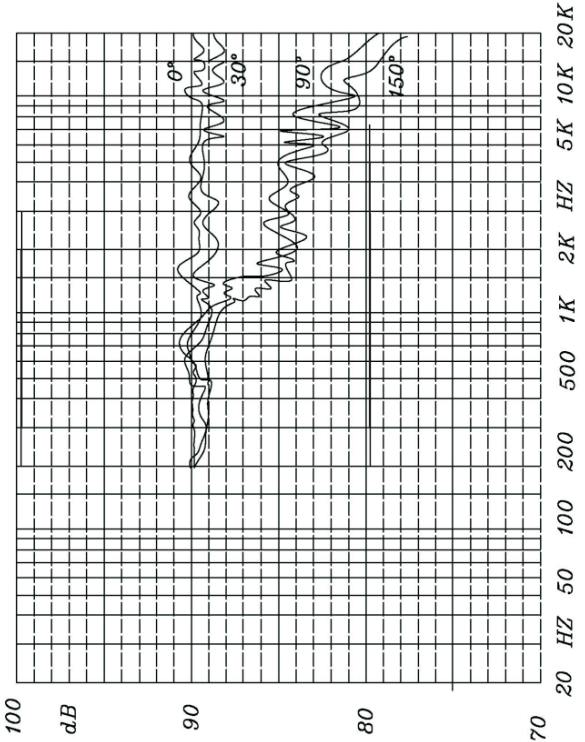
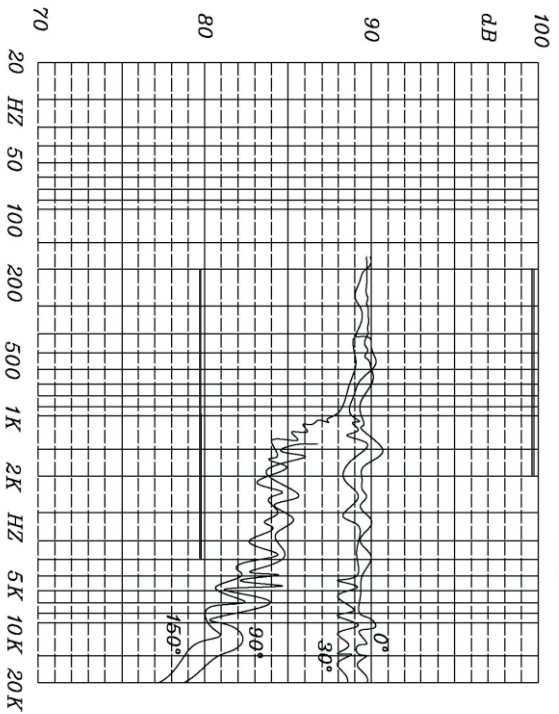


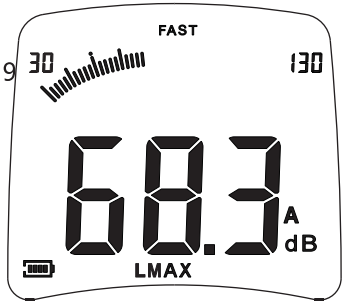
Figure C: A free-field response of AR854 integrating sound level meter in several incidence direction



The maximum value Lmax measurement

➢ During measurement process, press the Max key to lock up the maximum reading, the LCD displays as in figure 9:

Figure 9

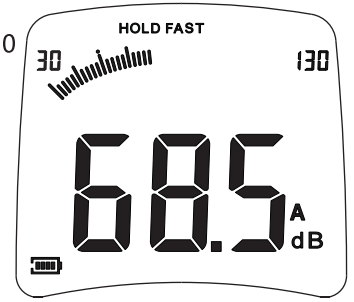


➢ Press it once again to exit the maximum value measurement and return normal measurement mode.

Data hold

➢ Press HOLD , LCD will show HOLD icon and lock the current reading, as figure 10

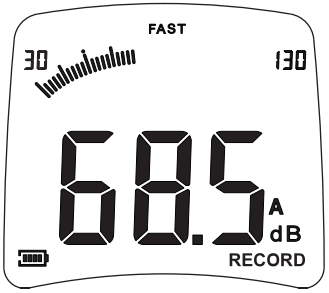
Figure 10



Data storage

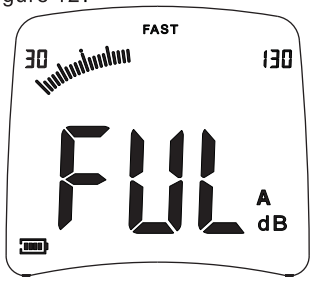
➢ Press  the LCD screen appears the symbol RECORD flashing, indicating that the unit enter into the data storage mode, LCD screen displays as in figure11 :

Figure 11



➢ The memory capacity is 10000, after long period of recording, the LCD screen will appear the symbol FULL, as shown in figure 12:

Figure 12



➢ In data storage process or recording memory is full, press this key again to exit the record mode, the flashing symbol RECORD disappears..

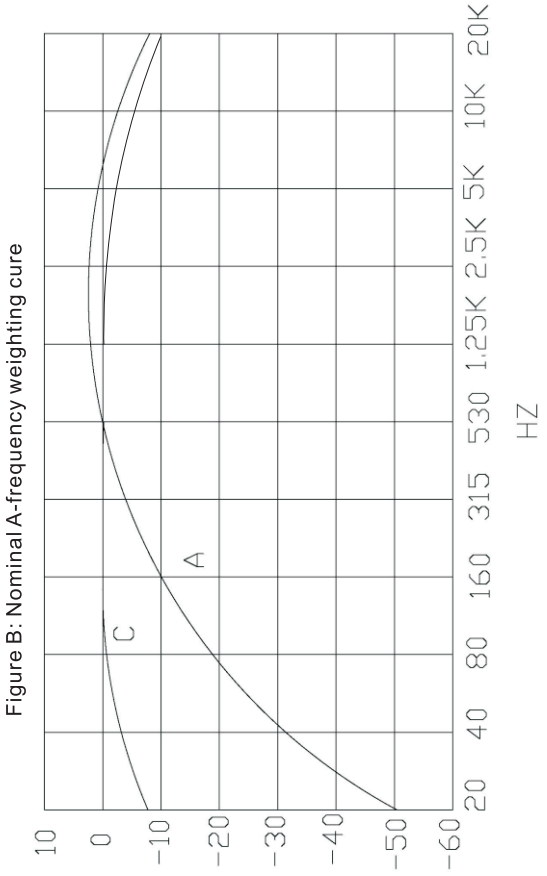
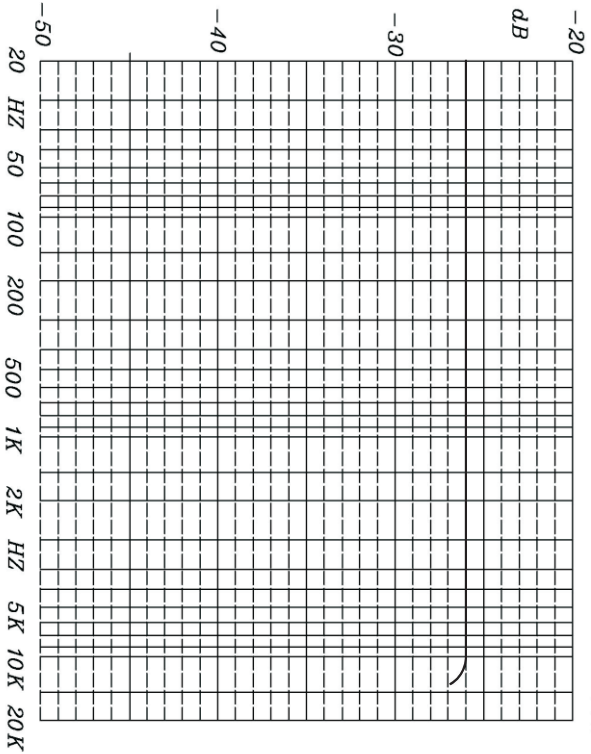


Figure A: Nominal free-field response of AWA14425 microphone in reference incidence direction



Data clearance

➢ Press down the Light CLR key until the LCD screen displays the symbol CLR, then all recorded data will be deleted, LCD displays as in figure 13:

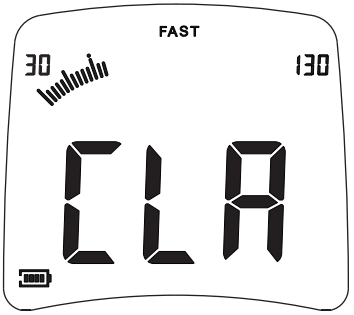


Figure 13

DC adaptor

➢ There is a DC socket for the DC adaptor, when connect with the DC adaptor the meter will auto cut the battery power. The DC power supply range is 4.5V to 9V(outside P, inside N)
When the meter is for long period measurement, please use the DC adaptor power supply.

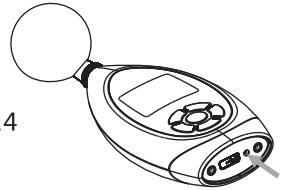


Figure 14

Use of sponge ball

➢ If windy, you may use a sponge ball to reduce the influence of wind noise. There are a standard sponge ball in the packing(reduce noise about 10 to 15dB). See appendix D the influence of free-field response for a meter with sponge ball when there are no wind.

Information for testing

(1) Reference sound pressure: 94dB
(2) Reference incident direction: axial of microphone
(3) Reference point: diaphragm centre of micophone
(4) Adjustment data to obtain a-weighted sound levels equivalent to response to free-field response to plane sinusoidal sound waves incident from the reference direction.

Frequence(Hz)	1k	1.25k	1.6k	2k	2.5k	3.15k
Adjustment(dB)	0.2	0.3	0.4	0.5	0.6	0.8
Frequence(Hz)	4k	5k	6.3k	8k	10k	12.5k
Adjustment(dB)	1.0	1.55	2.1	3.2	4.5	6.2

(5) Nominal free-field response of the meter on reference incident under approximate reference conditions.
(6) Electrical input equipment: 20pF condenser
(7) Highest self-generated noise level:28dB(electrical noise level is not higher than 25dB).
(8) Allow highest sound pressure level on microphone: 132dB
(9) Maximum input peak voltage of electrial input equipment: 4Vp-p
(10)Working voltage range at which the sound level meter confirms to specifications: 4.5V-6.5V
(11)The typical time interval needed to stabilize after changes in environment condition, at least 12 hours to be steady under reference requirement, or at least 19 hours in other ambient conditions.