

INSTRUCTION MANUAL

SOUND LEVEL METER

MODEL AWA5636-1

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PRECAUTION

*Use the unit only as described in this manual.

*Don't touch any parts of the unit other than necessary for operation.

*Don't disassemble or not modify the unit.

*In case of malfunction, don't attempt any repairs.

*Note the condition of the unit clearly and contact the supplier.

*The unit should be protected from shocks and vibration.

*Load the batteries with correct polarity. If the unit is not to be used for an extended period of time, be sure to remove the batteries in order to avoid possible damage to the unit from electrolyte leakage.

*For storing or operating the unit. Avoid locations which:

1. May be subject to adverse influences such as from high temperature or high humidity, air with high salt or corrosive content, or gases from chemicals.

2. May be subject to splashes of water or direct sunlight, excessive dust or dirt accumulation.

*When use the unit in the condition of high temperature or in direct sunlight, protect it from heat with suitable methods.

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1.General Introduction:

Model AWA5636 Sound level meter is digital and modular sound level meter with multifunction meeting IEC 61672-1:2002 class 2, and the sensitivity to radio frequency fields belongs to group X.

The meter adopts advanced digital detection technology and has advantages of reliable and steady performance, wide automatic range, and on need of range conversion etc. It is applied widely in measuring noise produced from various machines, vehicle, boat, electro etc. Also it can used to measure environmental noises and industrial noise, e.g. labor protection, industrial hygiene.

2.Specification

- (1) Microphone: Model AWA14421 pre-polarization condenser microphone. Outer diameter: 12.7mm (1/2"). Nominal Sensitivity: 30mV/Pa. Frequency range: 20Hz - 12.5 kHz. See nominal free sound field response at the reference incidence direction in the appendix A.
- (2) Measurement Range: 30dB~130 dB (A) (ref. 20 μ Pa).
- (3) Frequency Range: 20 Hz~12.5 kHz.

(4) Frequency Weighting: A, C, Z. See the response in free sound field in the appendix B

Note: AWA5636-0 doesn't have A or Z weighting

(5) Time Weighting: F, S, I.

Note: AWA5636-0, AWA5636-1 and AWA5636-2 don't have I weighting

(6) Reference Direction: axial of condenser microphone

(7) Accuracy: meets IEC 61672 : 2002 class 2

(8) Display screen: 128×64 OLED

(9) Output interface: PWM output, AC, DC, RS-232, USB interface

Note: Some configurations don't have RS232, USB interface.

(10) Calibration: use model AWA6221B sound level calibrator meeting IEC 60942 class 2. Also we can use model AWA 6221 (class 1) and B&K model 4221 (class 1).

(11) Power supply: 4 LR7 batteries which can work at least 10 hours successively. Optional Lithium battery which work at least 20 hours successively after full charged. External power: 4.5V-9V, consumption is less than 90mA.

Note: When Lithium battery is chosen, the instrument only works with the Lithium battery.

(12) Dim. (H×W×D): 310× 72× 32 mm

(13) Weight: 0.24 kg

(14) Operation environment:

Air temperature: -20℃ ~ +50 ℃

Relative humidity: 25 %~90 %

Air pressure: 65 kPa~108 kPa

Correlation table of AWA5636-1

Frequency Weighting	Time Weighting	Main Submenu	Output Interface
A, C, Z	F, S	Measure Setup Information	AC(Three gears can be adjusted) DC
Integrating Function	Statistic Analysis	Calendar Clock	Main Measurement Index
Yes	No	No	Lp, Leq,T, Lmax, Lmin, SEL, E, Tm
USB Interface	Storage Function	Watchdog	
No	No	No	

Optional function for AWA5636-1

RS232 Interface	USB Interface	Statistical Function
Yes	Optional	Optional
1/1 OCT	1/3 OCT	Record and recording function
Invalid	Invalid	Invalid

Optional function introduction

RS232 interface: the instrument can be connected to PC through RS232 interface. Users can view measurement results and set the frequency and time weighting by computer. The AWA5636-2 also allows to print measurement results through RS232 interface when measurement is finished. The RS232 interface of AWA 5636-1 only support 9600 baud rate.

Statistical analysis function: can measure these indexes such as L10 L5, L50 L90, L95 and SD.

Logging and recording function: log time-weighted SPL, make curve that short-term equivalent sound level changes with time, and record the sound file in the form of WAV.

3. Structure features and function

The outline of the Sound Level Meter is shown in figure 1. It consists of

microphone, preamplifier and main unit. During normal operation, the microphone and the preamplifier are installed on head of the main unit which can be taken off from the main unit through knurled nut. Extension cable can also be used between the main unit and the preamplifier. The function of the socket' pins between preamplifier and the sound level meter are shown in figure 2. The outline of the sound level meter is sharp to reduce the reflection of the sound wave. The nominal influence of the reflection caused by the shell of sound level meter and the indication features of the sound level meter at different incidence directions are mentioned in Annex.C. The shell is mould with ABS plastic, the batteries are put in battery box, and it is very convenient to replace the batteries through turning down the battery cover plate. All switches are button switches which are located in the central of the obverse side. Sensitivity adjustment is on the lower left side of the instrument. Overload indicator light is located on front top, external power supply socket is located on the right side of the bottom, and on the bottom is a 8 core socket and a 2 core stereo socket, the definition and function of pins is shown in figure 2, 3 and 4.

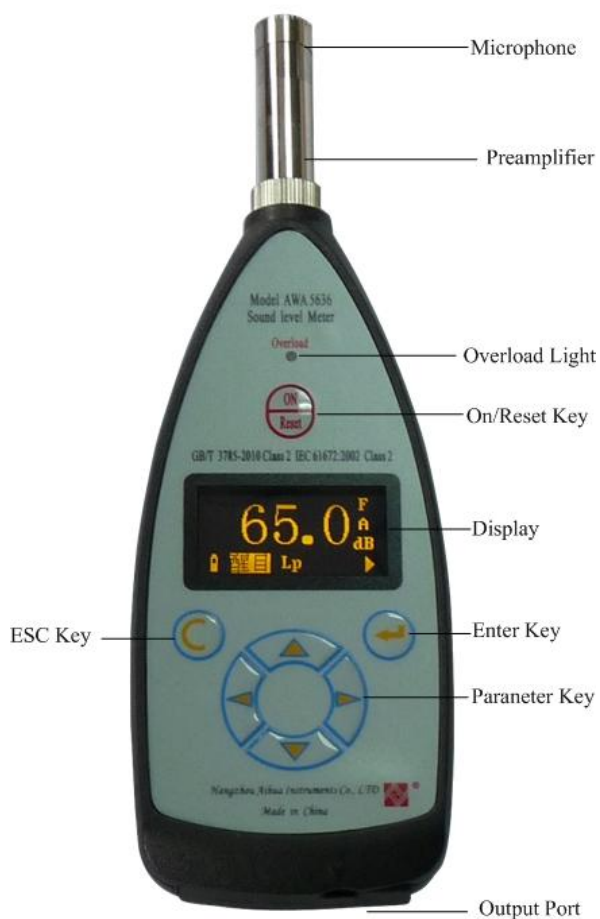


Figure 1

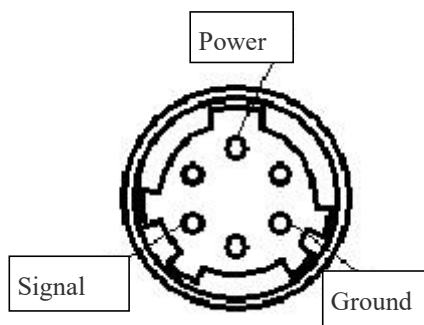


Figure 2

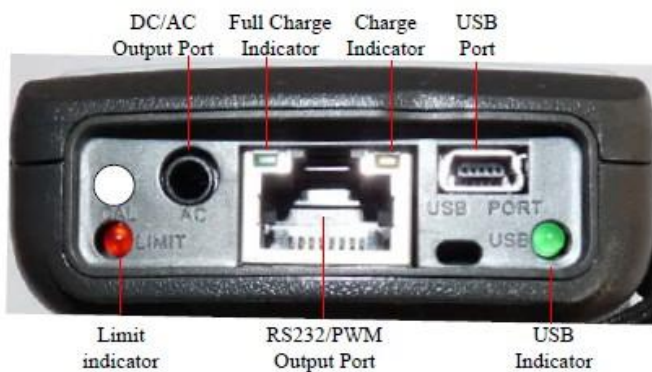


Figure3

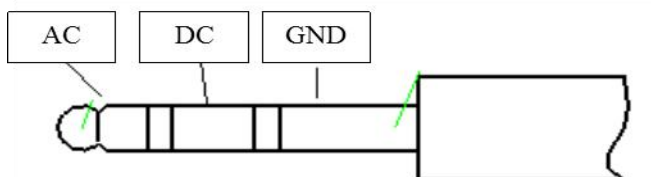
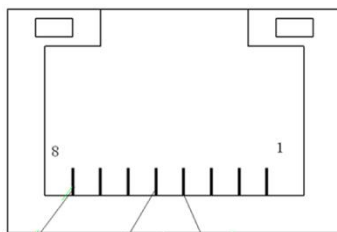


Figure 4

RS232 output socket, the socket type USES the RJ45 socket, pins are defined as shown below:



RS232 port serial input, only two serial output signal, the pins are defined as follows. The pins are defined as follows:

1	2	3	4	5	6	7	8
Power	Empty	PWM	RXD	TXD	Reset	Power control	GND

1. External power : input+4.5V~9V/output batteries voltage
2. Empty
3. PWM output
4. RXD
5. TXD
6. Reset: at ordinary times, it should be hung up, instrument would be reset when level is higher.
7. Power control: at ordinary times, it should be hung up, power supply of instrument would be turned on when level is higher.
8. GND

Keys function		
	Power on/rese	Power on or reset the meter
	Enter	Enter the next menu or Input the current operation
	Exit	Exit from the current menu or keep pressing for 3s to power off the meter
	Right cursor	Move cursor to next position
	Left cursor	Move cursor to last position
	Parameter up	Parameter data increase which the cursor is pointed
	Parameter down	Parameter data decrease which the cursor is pointed

Definition of symbol

Symbol	Definition
	Battery level display
	Microphone setup: diffusion field model
	Integrating measurement and statistic analysis are in progress
	Integrating measurement and statistic analysis are paused
	Logging the varying waves of SPL with time
	Recording
	The measured signal surpasses the upper limit of measurement range
	The measured signal under the lower limit of measurement range

4. Operation:

4.1 Preparation before using.

- ① Check whether the microphone has been installed correctly.
- ② Check whether battery has been put in.
- ③ If necessary, calibrate it with a sound calibrator. Regulate method is in chapter 5.
- ④ The meter should be tested by relative department fixedly (such as one year), so as to ensure its accuracy.

4.2 Use of windscreen

If windy, you may use a windscreen to reduce the influence of wind noise. There are different models for you to choose. Windscreen of $\phi 35 \times 60$ size can reduce noise about 10-15dB. See appendix D the influence of free-field responses for a meter with a windscreen when there are no wind.

4.3 External power supply

The Sound Level Meter can be connected with external power through

the $\phi 1.1$ external power socket at the lower right of the instrument. At this time, the inner battery will be cut-off automatically. The voltage range of the external power supply is 4.5V~9V. The shell of plug is the cathode and the core of plug is the anode. When the Sound Level Meter is used for long time continuously, it is recommended to use external power supply.

4.4 Check and change of battery

While operating, the meter will check battery power automatically, if it is low, the undervoltage indicator on will be lighted, which reminds to change battery. After you change the battery, the meter will operate normal again.

4.5 Power saving function

The AWA5636-1 sound level meter has power saving function, it will be turned off automatically when no pressing keys over 900 seconds. If you want to cancel this function can keep holding the left key, at the same time open the instrument power supply or press the reset button, while the instrument shows normal level again then release your hand.

5. Calibration

Usually, the meter needn't be calibrated because it had been calibrated before sale. But if it hasn't been used for a long time, or microphone is changed or overhauled, you'd calibrate it again.

May be use Model AWA 6221 (class 1) or Model AWA 6221B (class 2) or B&K 4221(class 1) Sound Calibrator for calibrate sound level meter. Match the sound calibrator with a 1/2 inch adapter into microphone, open the meter power and let it on "F", "Lp" state. Preheat for 30 seconds and press the power button of sound calibrator, the meter should indicate 93.8 dB. If not so, adjust the "calibration potentiometer" on right side with a little screwdriver.

If the sound pressure level of the calibrator is not 94 dB, deduct 0.2 dB from the normal sound pressure level of the calibrator as calibrating sound pressure level.

6. Information for testing

- (1) Reference sound pressure level: 94dB
- (2) Reference incident direction: Axial of microphone
- (3) Reference point: Diaphragm center of microphone

(4) Adjustment data to obtain A-weighting sound levels equivalent to response to free-field response to plane sinusoidal sound waves incident from the reference direction.

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

(5) Nominal free-field response of the meter on reference incidence under approximate reference conditions. See appendix B

(6) Electrical input equipment: 20pF condenser, insulation resistance is more than 1 G Ω

(7) Highest self-generated noise level: 25dB (electrical noise level is not higher than 23dB) .

(8) Allowed highest sound pressure level on microphone: 135dB

(9) Maximum input peak voltage of electrical input equipment: 2Vp-p

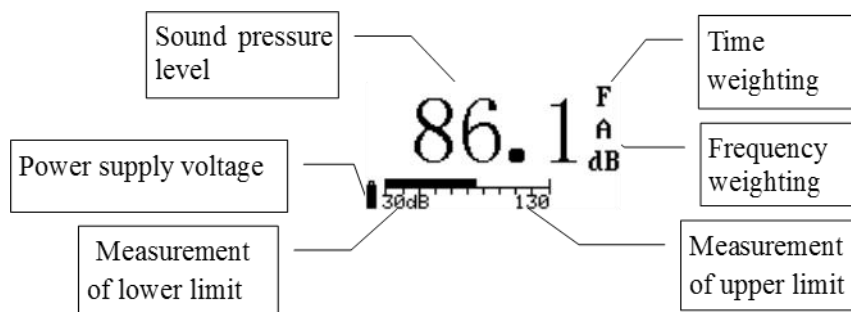
(10) Working voltage range at which the sound level meter conforms to specifications: 4.5~9V

(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.

7. The operation of AWA5636-1

7.1 The interface of operation

Press “On” key for a second and release it, the LCD will display as following:



The value of measurement results are displayed in larger size, the frequency and time weighting are on its right, the last line displays the power supply voltage, dynamic bar chart, measurement upper limit and lower limit from left to right.

There will be A- weighting and F time weighting after restarting every time.

7.2 Measurement of A-weighting sound level

Make the microphones directed sound sources and try to make sound waves come from reference to the incident direction to the microphones. To

reduce the effects of the human body on the measurement, should make people away from instrument as far away as possible, if it is necessary can add extension cable, it can reduce the effects of human body and the measurement shell. Open the power supply, after the instrument stable for several seconds, the display showing is A –weighting sound level.

7.3 Measure of C frequency weighing sound level

When the cursor is moved to “A”, press the “Up” or “Down” keys to change it to “C”, after several seconds, the meter will display C frequency weighting sound level.

7.4 Choose of time-weighting

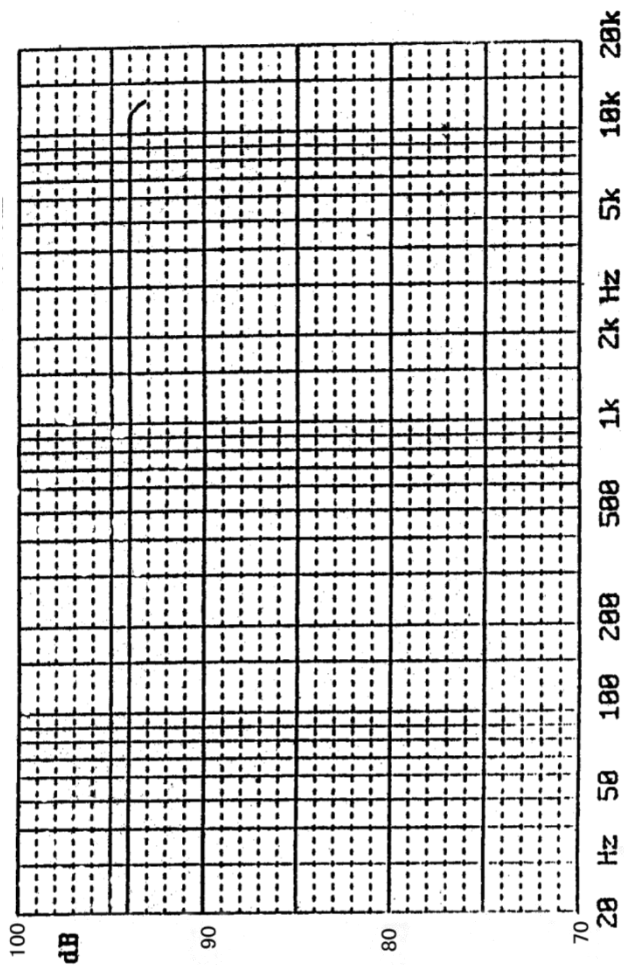
Usually we choose F frequency, if the reading changes greatly, we could choose S frequency. When the cursor is moved to “F”, press the “Up” or “Down” keys to change it to “S”, the time weighting is S.

7.5 Measure of maximum sound level (Lmax) and cancel

Press “enter” key, the low right of display will show “MAX.” Only when the SPL becomes higher, the “MAX” will refresh. Press “enter” again, the “MAX” will disappear and the value will be changed according to noise outside.

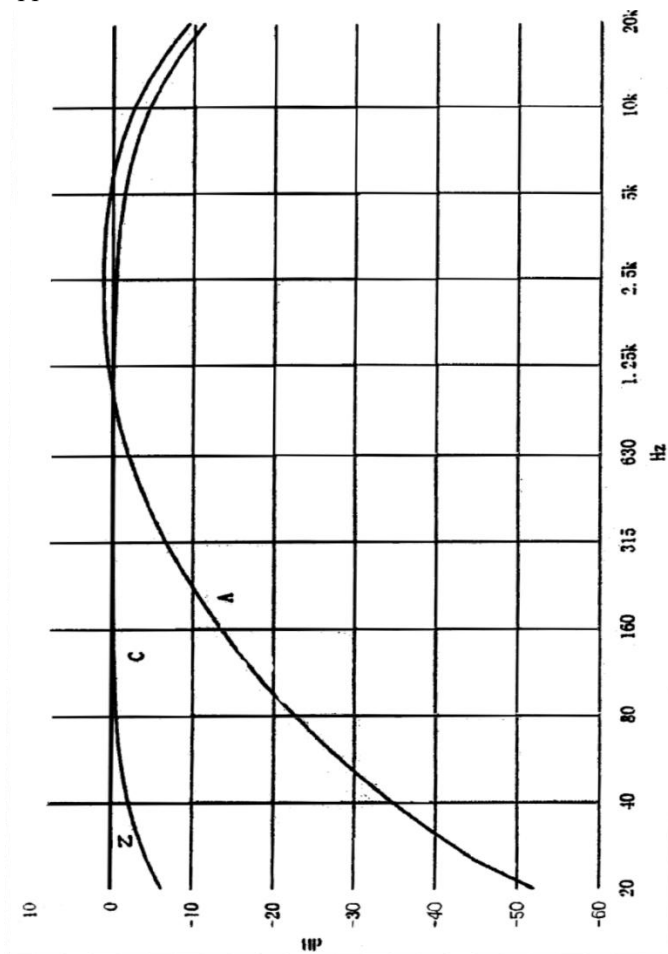
Appendix A

The reference direction of nominal free respond of test electret capacitor microphone model AWA14421.



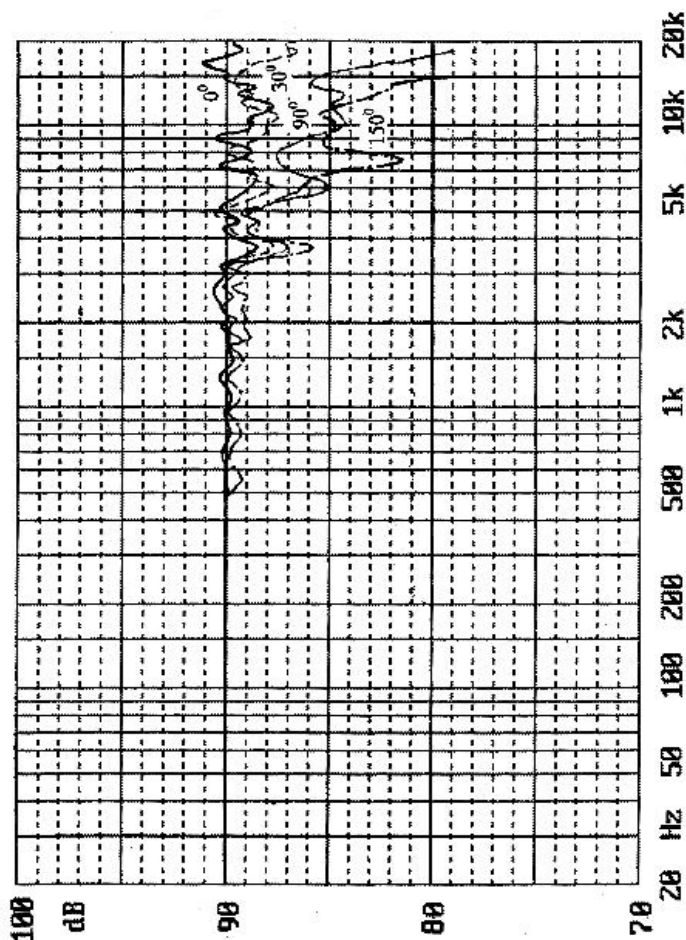
Appendix B

On the reference direction of nominal free response of sound level meter in approximate reference environment



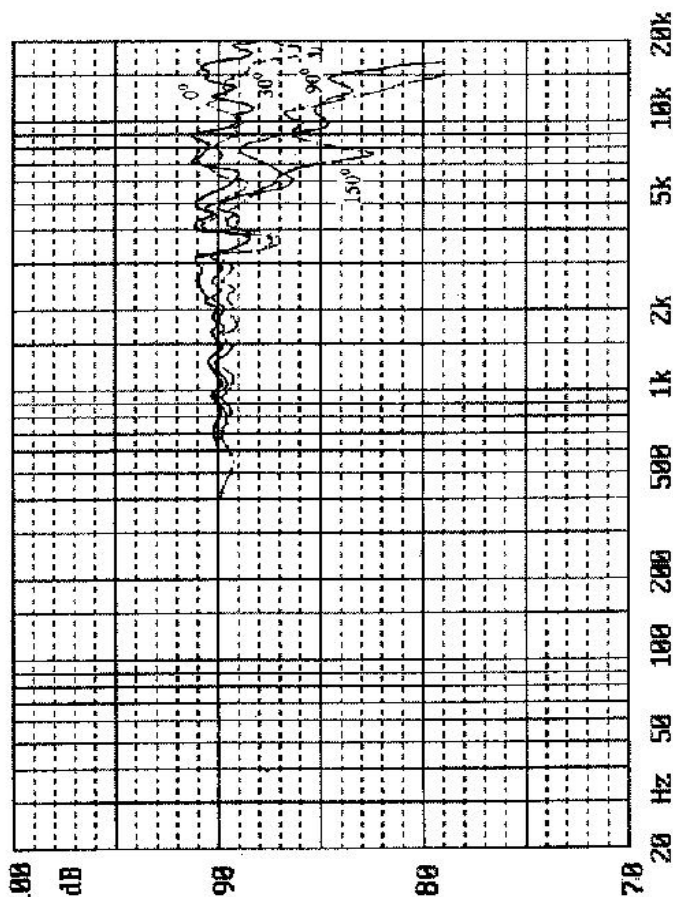
Appendix C

Directional response



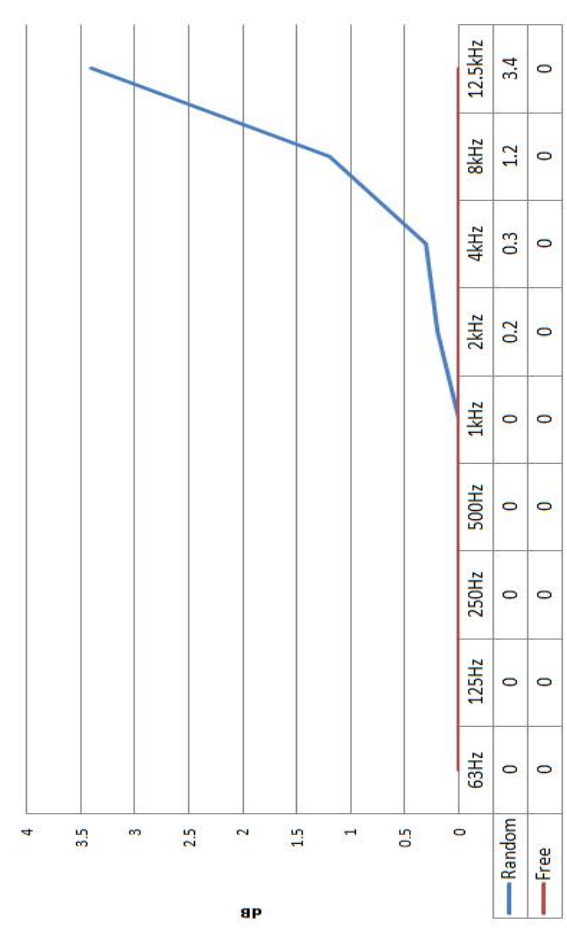
Appendix D

The free field response of sound level meter in different directions under no wind condition and intalled $\phi 35 \times 60$ windscreen



Appendix E

The frequency response of free-field type and random type microphone when directivity angle is 90 degree in the free field.



Appendix F: vocabulary of terms

The instrument shows common symbols and terms

Exchange rate	When noise dose doubled, the added value of time weighting average SPL
Threshold	If time weighted SPL less than the value, it will not participate in TWA, LAVG calculations
Criterion	When noise dose is more than this value, the corresponding instructor light will be lighted
LFp	F-weighted maximum SPL(sound pressure level) in 1 second
LSp	F-weighted maximum SPL in 1 second
LIp	I-weighted maximum SPL in 1 second
Leq,t	Short-time equivalent SPL. t is the average integral time, which is determined by the set sampling interval. t is generally less than 10s.
Leq,T	Equivalent-continuous SPL. T is the average integral time which can be set casually from 1 second to 24 hours
Lpeak	Peak SPL
LFmax	maximum sound pressure level, F-weighted
LFmin	minimum sound pressure level, F-weighted
LSmax	maximum sound pressure level, slow detector
LSmin	minimum sound pressure level, slow detector
LImax	I-weighted maximum SPL
LImin	I-weighted minimum SPL
SEL	Sound exposure level

E	Personal sound exposure, expressed in Pa2h
Lex,8h	equivalent SPL of 8 hours
LAVG	Average SPL
TWA	Time-weighted average SPL
DOSE	Noise dose, which is the percentage of time that a person is exposed to noise that is potentially damaging to hearing. 100% represents the noise exposure has exceeded the standard.
LN	Statistic SPL. N is an integer ranges from 1 ~ 99 and can be casually chosen by the user
Linst	The instant value of time-weighted SPL

Packing list

Items	Host	Wind screen SR35×60	Φ2 Clock batch	Alkaline cell
Quantity	1	1	1	4
Items	Aluminum alloy case	CD	RS-232 transmission cable	Mini USB cable
Quantity	1	optional	optional	optional
Items	instruction manual	verification certificate	Product qualification certificate	Certificate of authority
Quantity	1	1	1	0