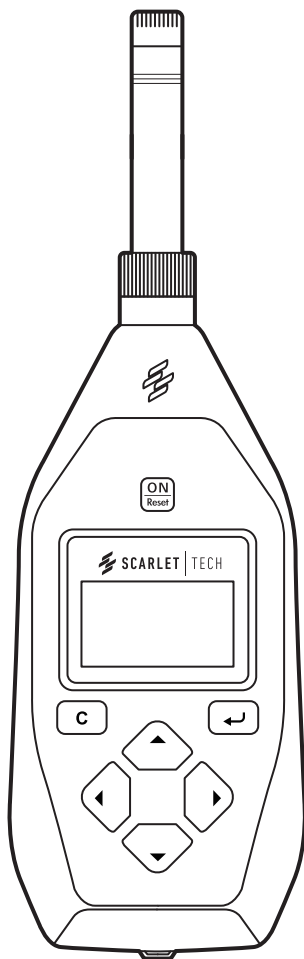




SCARLET | TECH



# ST-11D

Sound Level Meter

User Guide

# Precaution

---

\*Please read the manual carefully before using the meter.

\*Do not touch any parts of the unit only if necessary for operation.

\*Do not disassemble or modify the unit.

\*In case of malfunction, do not attempt to do any repairs.

\*The warranty doesn't apply to damage on the meter diaphragm and other improper use.

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

\*The unit should be protected from shocks and vibration.

\*To avoid damage caused by battery leakage, please take out the battery when not using the meter.

\*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.

# Contents

---

1. General Introduction	1
2. Specification	2
3. Structure features and function	4
4. Operation before measurement	7
4.1 Check list	7
4.2 Use of windscreen	7
4.3 External power supply	7
4.4 Check and change of battery	8
5. Calibration	8
5.1 Acoustic calibration	9
5.2 Calibration setup	9
5.3 Calibration history list	10
6. Operation of ST-11	10
6.1 Main menu	10
6.2 DISP display interface	10
6.3 List display interface	11
6.4 "Setup1" submenu	11
6.4.1 Page 1	11
6.4.2 Page 2	12
6.4.3 Page 3	13
6.4.4 Page 4	13
6.5 "Setup2" submenu	14
6.5.1 Starting setup	14
6.5.2 Auto pause/Restart setup	17
6.5.3 Hardware setup	17
6.5.4 Calendar clock adjustment	18
6.5.5 Logging setup (Optional)	19
6.5.6 Recording setup (Optional)	19
6.6 "Data" submenu	20
6.6.1 Data recall	20
6.6.2 Clear all	22
6.6.3 Turn to U disk mode	22
6.7 Information of instrument	22
Appendix A	24
Appendix B	24
Appendix C	25
Appendix D	26
Appendix E: vocabulary of terms	27
Warranty	28

# General Introduction

Model ST-11D Sound level meter is a digital and multifunction sound level meter with modular design. Its measurement solution is in accordance with IEC 61672: 2013 Class 1 standard and its sensitivity for emission in radio frequency filed is classified as group X. The meter has adopted advanced digital detection technology and has automatic range conversion, reliable and steady performance, wide linear operating range etc. The shell adopts ABS engineering plastic with beautiful shape, light-weight and is easy to carry. The power consumption of it is small. Through the RS-232 digital output interface, users can use a computer remotely to control telemetry, also set a network with computer control and measurements.

It is applied widely in the measurement of noise produced by various machines, vehicle, boat, electro etc. Also can be used to measure environmental noise and industrial noise, e.g. labor protection, industrial hygiene.

## Technical Specification

Model	ST-11	ST-11D
<b>Fulfils Standard</b>	IEC 61672:2013 Class 1	
<b>Normal frequency</b>	10 Hz~20 kHz	
<b>Measurement range</b>	27~140 dB	
<b>Accuracy</b>	±0.7 dB	
<b>Resolution</b>	0.1dB	
<b>Frequency Weighting</b>	A, C, Z, B	
<b>Time Weighting</b>	F, S, I, Peak	
<b>Integrating time</b>	1s~24h	
<b>Dimensions</b>	310×72×32 mm	
<b>Display</b>	128×64 OLED	
<b>Weight</b>	0.4kg	
<b>Main Parameters of Measurement</b>	LFp, LSp, Llp, Leq1, Lpeak, Leq,T, LFmax, LFmin, LSmax, LSmin, LImax, LImin, SEL, Ts, Tm, Volt, E.	LFp, LSp, Llp, Leq,t, Lpeak, Leq,T, LFmax, LFmin, LSmax, LSmin, LImax, LImin< SEL, Lex8h, LAVG, TWA, DOSE, Ln1, Ln2, Ln3, Ln4, Ln5, SD, Ts, Tm, Volt, E.
<b>Datalogging</b>	-	Stores 8000 groups measurement results including Timestamp, %Dose, TWA
<b>Power Supply</b>	4x AAA Batteries or external power supply	
<b>Output Interface</b>	AC, DC, RS-232, USB interface	
<b>Application</b>	Noise Integrating Measurement	Sound Level Meter/ Noise Dosimeter/ Data logging & Precision recording(Optional)
<b>Operation Environment</b>	Air temperature: -15°C~+50 °C Relative humidity: 10 %~90 % Air pressure: 65 kPa~108 kPa	
<b>Package Contents</b>	ST-11/11D Sound Level Meter, Calibration Certificate, Class 1 Field Calibrator (OPTIONAL), 1/2" Prepolarized Condenser Microphone, Windscreen, RS232 Cable, Mini USB Cable (ST-11D only), User Manual, Waterproof Carrying Case.	

# Specification

(1) Microphone:  $\Phi 12.7\text{mm}$  (1/2") pre-polarization condenser microphone. Sensitivity: 30mV/Pa. See the Appendix A.

ST-11/11D can also be equipped with other types of microphones to measure noise which is very low or very high.

Types of microphones

Type	External diameter (mm)	Sensitivity mV/Pa)	Frequency Range (Hz)
AWA14425	$\Phi 12.7$	30	10~16000
AWA14423	$\Phi 12.7$	40	10~20000
AWA14411	$\Phi 23.77$	80	10~16000
AWA14431	$\Phi 6.35$	4	10~20000

(2) Dynamic range

Type	A- Weighting Self-generated Noise	A- Weighting Self-generated Noise	Z- Weighting	Meas. Upper Range
AWA14425	<20dB(A)	<25dB(C)	<30dB	140dB
AWA14423	<18dB(A)	<23dB(C)	<28dB	138dB
AWA14411	<10dB(A)	<15dB(C)	<20dB	132dB
AWA14431	<40dB(A)	<45dB(C)	<50dB	160dB

(3) Frequency Range : 10Hz~16kHz, while using the AWA14423 or AWA14431 Microphone, the Frequency Weighting can get to 10Hz~ 20kHz

(4) Frequency Weighting: A, C, Z and B. For the response in free field, see appendix B.

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

(6) Detectors Characteristics: the true effective value, digital detection, peak factor  $\geq 10$ .

(7) Accuracy: IEC 61672 : 2013 Class 1

(8) Range control: high and low two gears, each gear with 20 dB attenuation, reference level linear range  $\geq 95$  dB.

(9) Display: 128×64 OLED

(10) Output interface: AC, DC, RS-232, USB interface

(11) Calibration: use Model ST-120 sound level calibrator to conform specifications of IEC 60942 for Class 1 for the performance class.

(12) Power:

battery 4×LR 6: work at least 6 hours successively.

Lithium battery: work at least 16 hours successively when it is fully charged.

External power: 5V~9V, 0.2A, working current <120mA

Note 1: test conditions based on normal temperature and pressure, and only turn on the basic functions.

Note 2: when the logging and recording function is open, the consumption of power will add 40mA.

(13) Dim. (H×W×D) mm: 310 mm×72 mm×32 mm

(14) Weight (kg): 0.4

(15) Operation environment:

Air temperature: -15°C~+50 °C

Relative humidity: 10 %~90 %

Air pressure: 65 kPa~108 kPa

(16) Measurement range:

Microphone Type	Measurement range (dB)	Peak factor Ref.10 dB	measurement range (dB)
AWA14425	45~140 27~120	45~123 27~103	70~143 50~123
AWA14423	43~138 25~80	43~121 25~101	70~141 50~121
AWA14411	35~132 15~112	35~115 15~95	60~135 40~115
AWA14431	65~160 45~140	65~143 45~123	90~163 70~143

Above range is the value in the factory, it may change when users tune the calibration value or replace the microphone. The lower limit is determined by the background noise plus 8dB.

(17) Main Parameters of Measurement

ST-11D: LFP, LSp, LIp, Leq,t, Lpeak, Leq,T, LFmax, LFmin, LSmax, LSmin, LImax, LImin, SEL, Lex8h, LAVG, TWA, DOSE, Ln1, Ln2, Ln3, Ln4, Ln5, SD, Ts, Tm, Volt, E.

Note: the n1 to n5 in Ln1-Ln5 can be chosen from 1 to 99.

(18) Memory capacity: 2GB (in ST-11D model)

(19) Logging and recording: optional (in ST-11D model)

(20) Lithium battery (optional): built-in charger module can be charged with 5V external power supply through USB socket. Use high-capacity lithium battery with 2300mAh

# Structure features and function

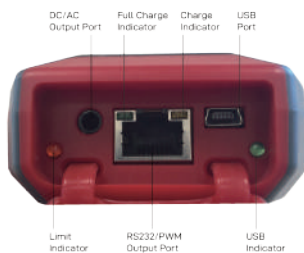
The outline of the Sound Level Meter is shown in figure 1. It consists of microphone, preamplifier and the main unit. During normal operation, the measuring microphone and the preamplifier are installed on the head of the main unit, connected with the main unit through knurled nut. Extension cable can also be used between the main unit and the preamplifier. The function of the connector's pin between preamplifier and the sound level meter is shown in Figure 2. The outline of the sound level meter is sharp to reduce the reflection of the sound wave. The nominal influence caused by the reflection on the shell and the indication features under different incidence direction can be found in Appendix 3. The shell is mold with ABS plastic. The batteries are put in battery box, which is very convenient for users to replace the batteries just by taking off the battery cover plate. All switches are button switches and located at the central of the obverse side. Measuring results are shown on the 128×64 OLED display. Overload indicator light is located on the front top along with external power supply socket and USB port see Figure 3.



Fig 1










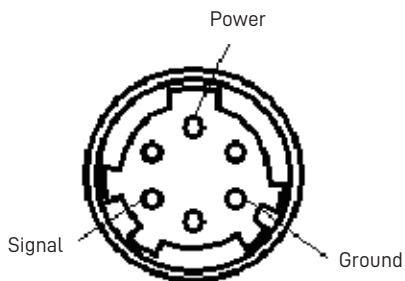
Fig 2



**Fig 3**

Table 1 Keys function

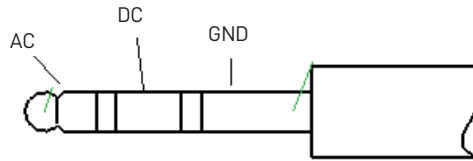
Table 1 Keys function		
	Power on/reset	Power on or reset the meter
	Enter	Enter the next menu or Input the current operation
	Exit	Exit from the current menu or keep pressing for 3s to power off the meter
	Right cursor	Move cursor to next position
	Left cursor	Move cursor to former position
	Parameter up	Parameter data which the cursor points increases
	Parameter down	Parameter data which the cursor points decreases



**Fig.4 x9 socket**

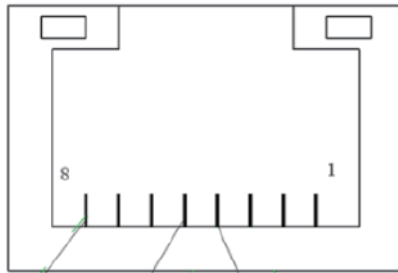


AC/DC output socket, the socket is stereo output socket, when matches with the plug, the definition of each pin plug shown as below:



**Fig 5. AC and DC output**

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











RS232 port serial input, only two serial output signals, the pins are defined as follow:

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 should be hung up, heightening level will be reset °
- 7 · Power control: at ordinary times should be hung up, heightening level will turn on instrument power supply
- 8 · GND

Table 2 Definition of symbol

Symbol	Definition
	Battery level display
	Microphone setup: diffusion field type
	Integrating measurement and statistical analysis are in progress
	Integrating measurement and statistical 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

## Operation before measurement

### 4.1 Check list

- 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.
- ④ The meter should be tested by relative department regularly (such as one year) to ensure its accuracy.

### 4.2 Use of windscreen

If windy, you may use a windscreen to reduce influence of wind noise. There are different types of windscreens to choose. A  $\phi 35 \times 60$  size windscreen can reduce noise about 10dB-15dB, See Appendix D, the influence of free-field responses for a meter with a windscreen when there is 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 continuously for a long time, it is recommended to use an external power supply.

#### 4.4 Check and change of battery

There are two kinds of battery: 4×LR03 batteries or Lithium batteries.


While operating, the meter will check battery power automatically, if it is low, the under-voltage indicator will be lighted up, which reminds users to change batteries. After changing the batteries, the meter will operate normally again. When the lithium batteries are low in power, they should be powered by the external power supply with an USB socket.



Fig 6. LR03 batteries

## Calibration

Normally, the meter doesn't need to be calibrated because it had been calibrated before sale. If it hasn't been used for a long time, or the microphone is changed or overhauled, you should calibrate it again.

Move the cursor on "6.Cali." on the main menu and press  key, then enter submenu of Calibration. See as follows:

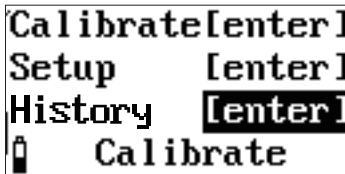



Fig 7. Calibration submenu

First row: Acoustic Calibration. You can use acoustic calibrator to calibrate the sensitivity of the instrument.

Second row: Calibration Setup. You can set the SPL of the acoustic calibrator or the sensitivity of the microphone.

Third row: Calibration History of the instrument.

### 5.1 Acoustic calibration

Move the cursor on the first row and press  key, then you enter the calibration interface. The display shown as follows:

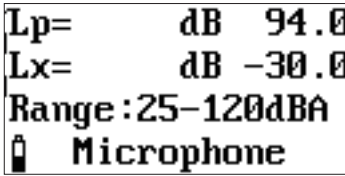





Fig 8. Acoustic calibration of microphone

"Lp= dB 94": The number "94" is the SPL of the calibrator, i.e. the SPL for the instrument to be calibrated. The data after "Lp=" is the SPL which is measured by the instrument during the calibration. "Lx= dB -30.0": The number "-30.0" is the sensitivity level of microphone. The data after "Lx=" is the newly calibrated sensitivity level of the microphone. Range: 25-120 dBA the lower measurement range with the Lx above.

When sound level calibrator is installed on the microphone, turn on the power supply. Press  key to initiate the calibration process. A digit is displaying on the lower right corner of the screen, which change to 9 from 0 and then pauses, press  key and the new microphone sensitivity level is saved.

### 5.2 Calibration setup (Use ST-120 Calibrator)

Move the cursor to the second row on the calibration submenu, press  key and enter calibration setup interface. The following message appears:

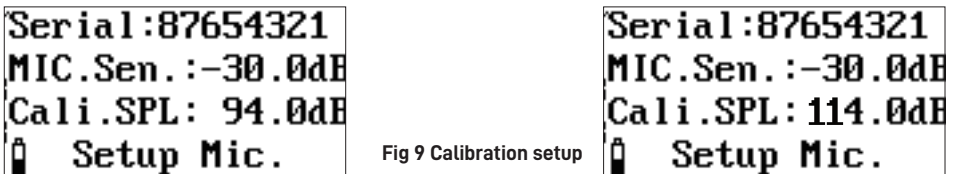









Fig 9 Calibration setup


"Serial.": Serial number of the microphone set by the producer. It cannot be modified.

"MIC.Sen.": Sensitivity level of the microphone. You can adjust the sensitivity level of the microphone by pressing  or  key.

"Cali.SPL": Sound pressure level of the calibrator. If your calibration SPL is not 94.0 dB, press  or  key to make it reach the output SPL of the calibrator. Press  key after the adjustment, the instrument will save the operation and display "OK" on the lower right corner of the screen.

It takes 10 seconds to do the calibration. Then turn the calibrator ST-120 to 114.0 dB. Press  or  key to make it reach the output SPL of the calibrator. Repeat calibration at the level of 114.0dB.

### 5.3 Calibration history list

Move the cursor on the second row on calibration submenu, and press  key to enter the calibration history list. The following message appears:

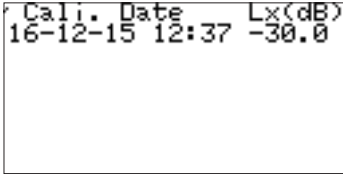







Fig 10 Calibration history list

One line represents one calibration record. One calibration record includes record time and the sensitivity level of the microphone. You can view the calibration history of microphone 1 by pressing   key.

Press  key and the instrument will ask you whether to delete the calibration history. If press  key again, all of the calibration histories will be erased.

## Operation of ST-11

### 6.1 main menu

After pressing  key, the instrument does self-check and shows the Host Number, Microphones Number, Model, and Configuration Number as follows:

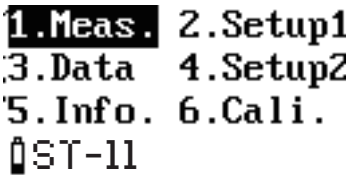


Fig 11. Main menu

### 6.2 DISP display interface

Move the cursor to "1." and press  key, the display will show as follows:

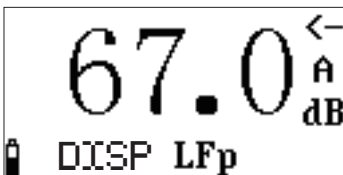





Fig 12. DISP interface

The cursor can be moved between the "DISP", "LFp" and "A", press  or  key can change "DISP" to "List" interface. And "LFp" can be changed between these parameters "LSp", "Llp", "Leq, t", "Lpeak", "Leq, T", "LFmax", "LFmin", "LSmax", "LSmin", "Llmax", "Llmin", "SEL", "Lex8h", "LAVG", "TWA", "DOSE", "L5", "L10", "L50", "L90", "L95" and "SD".

When the meter doesn't do integrating measurement, the "Lpeak", "Leq,T", "LFmax", "LFmin", "LSmax", "LSmin", "Llmax", "Llmin", "SEL", "Lex8h", "LAVG", "TWA", "DOSE", "L5", "L10", "L50", "L90", "L95", "SD" will be displayed as "0.0". The symbol "<--" means the current range is in the low range.

### 6.3 List display interface

When cursor is at "1." in the main menu, press  key, and the instrument will go into the measurement interface, shown as below:

```






Date =10-12-10<-
LFp  = 64.1dB
Leq,t= 54.8dB
 List A LW
  
```

Fig 13. List interface


The first three rows show the measurement results. The cursor can be moved to "List", "C", "LFp", "LSp", "Llp". When cursor is at "C", press  or  key can change the weighting to "Z"; when cursor is at "LFp", "LSp" or "Llp", press  or  key can change to other measurement parameters. such as: LFp, LSp, Llp, Leq,t, Lpeak, Leq,T, LFmax, LFmin, LSmax, LSmin, Llmax, Llmin, SEL, Lex8h, LAVG, TWA, DOSE, L5, L10, L50, L90, L95, SD, Ts, Tm, Volt, Date, Time, and E .

The last row "LW" is the logging and sound recording function open.

*Note: the logging and sound recording function is the optional function in ST-11D.*

### 6.4 "Setup1" submenu

#### 6.4.1 Page 1

Move the cursor to "2.Setup1" on the main menu and press  key, the instrument will enter "2.Setup1" interface and display as follows:

```



Work Mode:----
Auto name:N/A
Name:DATA_0000
 SETUP1  :1
  
```

Fig 14. Page 1 of Step 1

"Work Mode" : To meet different measurement standards and purposes, ST-11 has many parameters for you to choose. You can preset the parameters according to the relevant standards and purposes, divide them into different parameter combinations and make different names. Then you only need to choose the relevant parameter combinations for your measurement requests and do not need to set every parameter. If there are no suitable parameter combinations in the instrument, "----" is displayed behind and new parameters combinations can be made by PC. ST-11 can store at most 32 parameter combinations. See the operation manual in the instruction of relevant instrument management software.

"Auto name": after finishing measurement, it will save and change the group name.

"N/A" means auto name is not available, "yes" means turn on and using this function.

"Name: DATA\_0000": the measurement group name of the results. The former 4 characters will be kept as the former 4 characters of the file name saved in USB flash disk. The instrument can save 128 measurement group names at most. You can write new names by PC.

"P:1": page 1



The cursor can be moved between "P:", "Work Mode", "Auto name", and "Name". Press  or  key and to be back to the main menu.

Table 2 the cursor location and the relevant available options on page1

Cursor position	Available options	Remarks Page turning
P:	2 or 4	Choose other
Work Mode	Next prestore work mode	work mode Whether
Auto Name	N/A, Yes	automatically name or not
Name	Next prestore measurement name	Recall other measurement names

#### 6.4.2 Page 2

Move the cursor on "P:1" and press key, the instrument will enter page 2 and display as follows:

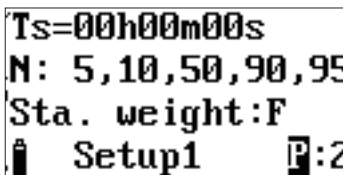


Fig 15 Page 2 of Step 1


Ts=00h00m00s": preset measuring time. It can be set from 1 second to 24 hours. When reaches the preset measuring time, the instrument will stop integrating measurement and statistical analysis, and save the measurement results.

"N : 5, 10, 50, 90, 95": statistical SPL. Statistic sound levels can set the statistic numbers from 1 ~ 99 at random.

"Sta. weighting" : time weighting when making a statistical analysis.

Cursor position	Available options	Remarks
P:	3 or 1	Page turning
h	01h~24h	hour
M	01m~59m	minute
S	01s~59s	second
5, 10, 50, 90 or 95	Numbers from 1 to 99	Set statistic sound level
Sta. weighting	F, S, I	

#### 6.4.3 Page 3

Move the cursor on "P:2" and press  key when under "2.Setup1" interface, the instrument will enter page 3 and display as follows:

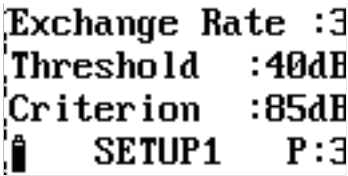



Fig 16. Page 3 of Step 1

"Exchange Rate": exchange rate can be set between 3, 4, 5 and 6.

"Threshold": the threshold value can be set from 40 to 90dB. If time weighted SPL is less than the value, it will not participate in TWA, Dose and LAVG calculations.

"Criterion": the criterion value can be set from 70 to 90dB. Relevant law regulates to input 8 hours criterion value.

#### 6.4.4 Page 4

Move the cursor on "P:3" and press  key when under "2.Setup1" interface, the instrument will enter page 4 and display as follows:

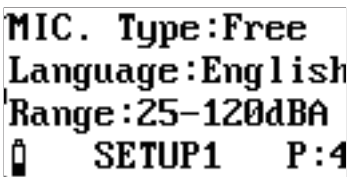


Fig 17. Page 4 of Step 1

"MIC. Type": the mode of microphone. Free and Random mode are optional, means free field type and random incidence type. The ST-11 is equipped with free field microphone by the producer. If random incidence microphone is requested by some countries' standards, change the option to "Random", so the instrument will automatically modify the high frequency to meet the request of frequency response of random incidence microphone.

"Language": Chinese and English

"Range": Range of Linearity level.





## 6.5 "2.Setup2" submenu


Move the cursor on "4.Setup2" and press  key when on the main menu, the instrument will enter page 1 under "4.Setup2" interface and display as follows:



```
Start [enter]
Logging [enter]
Record [enter]
SETUP2 P:1
```



Fig 18. Page 1 of Step 2

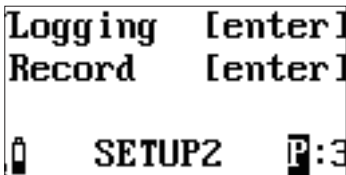
"2.Setup2" is for setting of starting mode, auto-pause, restart, hardware, power supply, clock, logging and recording. Move the cursor on "P:1", then press  or  key and enter page 2. The screen displays as follows:



```
Hardware [enter]
Power [enter]
RTC [enter]
SETUP2 P:2
```

Fig 19. Page 2 of Step 2

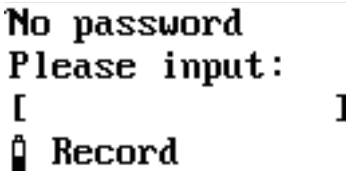
If the user already has authorization of data logging and recording software, move the cursor to "P:2", press  or  key and enter page3. The screen displays as follows:



```
Logging [enter]
Record [enter]
SETUP2 P:3
```

Fig 20. Page 3 of Step 2 with authorization


Otherwise it will remind user to input a 14 bit authorization code.



```
No password
Please input:
[ ]
Record
```

Fig 21. Page 3 of Step 2 without authorization

### 6.5.1 Starting setup

When on page 1 under setup 2 interface, move the cursor to the first row, press  key and enter starting setup interface. The screen displays shown as follows:

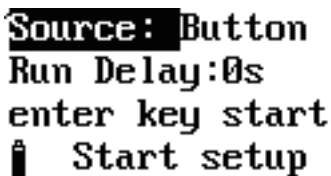




Fig 22. Starting setup

"Source": trigger source, including Clock, Button, Equivalent interval, Limit-surpassing and serial. Applications of each trigger source are listed in the Table 3:

Table 3 Applications of the trigger sources

No	Source	Remarks
1	Clock	Start when reach the specified time
2	Button	Start by pressing the Button
3	Equivalent interval	Start when each time measurement has the equivalent intervals
4	Limit-surpassing	Start when the current value exceeds the specified limit value
5	serial	Continuously measure

### 6.5.1.1 The timing start

When choosing "Clock", "Date" and "Time" are displayed on the screen. You can preset a certain time, and when the preset time is reached, the instrument will automatically start measuring. You can move the cursor on Year, Month, Day, Hour, Minute and Second either, and use  or  key to adjust the time. When a parameter reaches its end, it displays "\*\*\*" which means the parameter does not participate in comparison. The instrument can be triggered once an hour, once a day, or once a month.

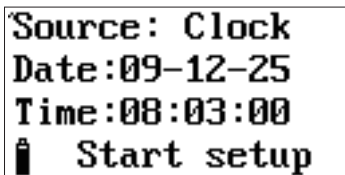


Fig 23. Starting setup of clock

### 6.5.1.2 Button start

When choosing "Button", the screen displays as follows:

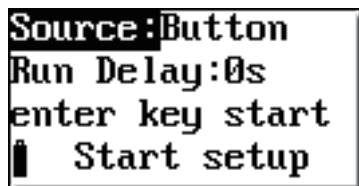




Fig 24. Starting setup of button

"Run Delay": delay time for starting measurement can be set after pressing  key. If 0s is chosen, the measurement will start right away.

Note : Though some certain trigger mode is chosen, you can still start measurement by pressing  key while on "1.Meas" submenu interface.

### 6.5.1.3 Equivalent interval activation

When choose "Equivalent interval", the instrument displays as follows:

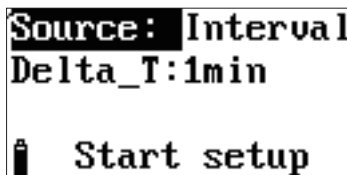


Fig 25. Starting setup of interval

"Delta\_T": interval time for each starting measurement, which can be set between 1min, 5min, 10min, 20min, 30min and 1hour. For example "5 min" means starting at every 5 minutes.

Note: when  $T_s$  is longer than this interval, the actual measurement time is according to  $T_s$  and the starting time will be delayed.

### 6.5.1.4 Limit-surpassing start

When choose "Limit", the instrument displays as follows:

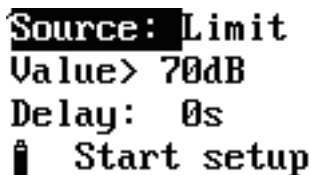


Fig 26. Starting setup of limit

"Value": the preset limit value. If the value is being exceeded, the instrument will start measuring. The value can be set between 40 ~140.

"Delay": the continuous limit-surpassing time. The instrument starts measurement when the time-weighted average index SPL for analysis of channel 0 surpasses the limit. The measurement will continue when the accumulated limit-surpassing time exceeds the "Delay" value, otherwise it will stop. The value can be set from 0 to 999s.

### 6.5.1.5 Serial measurement

When choose "serial", the display shows as follows:

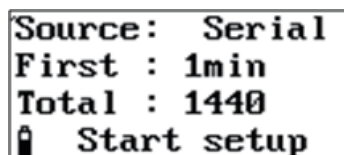



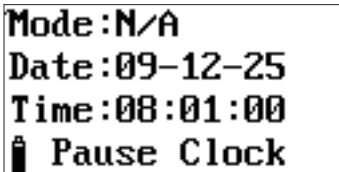
Fig 27. Continuous measurement

"First Ts": the measurement time for each group, the time can be set by user or choose between 1min, 5mim, 10min, 20min, 30min and 1hour.

"Total": the total groups of continuous measurement. The number can be set from 1 to 1440.

### 6.5.2 Auto pause/Restart setup

Move the cursor to the second and third row under "setup 2" interface and press  key, then enter Auto pause / Restart setup interface.



```
Mode: N/A
Date: 09-12-25
Time: 08:01:00
Pause Clock
```



Fig 28. Auto pause/Restart setup

Note : When enter restart interface, "Restart clock" is displayed on the bottom row.


"Mode": working mode of auto pause or restart setup which can be chosen between N/A and Clock. When N/A is chosen, the instrument will not pause or restart. When Clock is chosen, the instrument will auto pause or restart when the internal clock reaches at the fixed time.

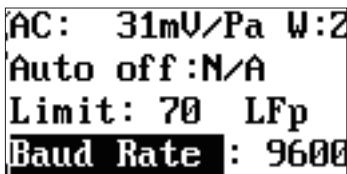
"Date": the fixed date for auto pause/ restart

"Time": the fixed time for auto pause/restart

You can move the cursor on Year, Month, Day, Hour, Minute and Second either, and use  or  key to adjust the time. When a parameter reaches its end, it displays "\*\*\*" which means the parameter does not participate in comparison when auto-on or auto-off. The instrument can switch on or off once an hour, once a day, once a month..... It is suggested to use Auto pause or Restart function together with Timed Activation function to make automatic measurement.

### 6.5.3 Hardware setup

Move the cursor to the "hardware" on page 2 under "setup 2" interface. Press  then it displays as follows:





```
AC: 31mV/Pa W:2
Auto off: N/A
Limit: 70 LFP
Baud Rate: 9600
```

Fig 29. Hardware setup

The first line shows the amplitude of AC output and frequency weighting. The second row shows whether the instrument will turn off automatically for a long time without any operation. The third row shows the indicator lamp light specified threshold. The fourth row shows the baud rate of serial port. The cursor can be moved to "AC", "W", "Auto-off", "Limit" and "Baud rate".

### 6.5.3.1 Adjust the amplitude of AC output



Move the cursor to "AC", press  or  key to set up the amplitude of AC output. There're three gears can be set and each gear differs 10 times. "31mV/Pa" means when microphone gets 1 Pa sound pressure, the pins of AC output will output about 31mV AC signal. When the AC output is set to 316 mV/Pa or 3162mV/Pa, the amplitude of the AC output will increase on the same pressure, but when the sound pressure effects on the microphone is too high, AC output may distort.

Amplitude of AC output	31mV/Pa	316mV/Pa	3162mV/Pa
The upper limit sound pressure when maximum output with no distortion	1Pa	0.1Pa	0.01Pa



### 6.5.3.2 Choice of frequency weighting for AC output

Behind "W", "Z" means do not take frequency weighting, "A" means the AC output signal do A frequency weighting, "C" means the AC output signal do C frequency weighting. Move the cursor to "W", the frequency can be changed.




### 6.5.3.3 Auto-off function

The instrument can be auto-off when there's no operation in a period of time (except "On" Key), it is possible to cancel this function. When the second row shows "10s" behind "Auto-off", means if more than 10s with no operation, the instrument will be auto-off. If it shows "invalid", it means the auto-off function is invalid. Move the cursor to "Auto-off", press  or  key can change "Auto-off" between "invalid" and "10s", "20 s", "30 s", "40 s", "50 s", "60 s", "70s", "80s", "90s".


### 6.5.3.4 Overrun alarm function

The value of "Limit" is limit value on the third row. When the instrument is under the measuring interface, the measured instantaneous sound pressure level is greater than the limit value, "Lamp" light at the bottom of the instrument will be lighted up for at least one second. Move the cursor to "Limit" and press  or  key to adjust the threshold value between 20-140 dB.

### 6.5.3.5 Baud rate

If the user matched serial port, the RS232 output port at the bottom of the instrument can be connected with PC for data transmission, move cursor to "Baud rate of" and press  or  key can change "Baud rate" between "9600", "19200", "57600". Note: After changing the baud rate, please press " " key to save the changed baud rate, otherwise the change will be invalid.

## 6.5.4 Calendar clock adjustment

Move the cursor to the third row on page 2 under "setup 2" interface. Press " " key and enter calendar clock adjustment setup interface. It displays as follows:

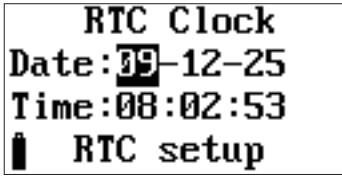


Fig 31. RTC clock setup

You can move the cursor between Year, Month, Day, Hour, Minute and Second, and use or key to adjust the time. After the adjustment, press or and back to page 2 under setup 2 interface.

### 6.5.5 Logging setup (Optional in ST-11D)

Move the cursor to the third row when on page 3 under "setup 2" interface and press key, you can enter the recording setup interface. It displays as follows:

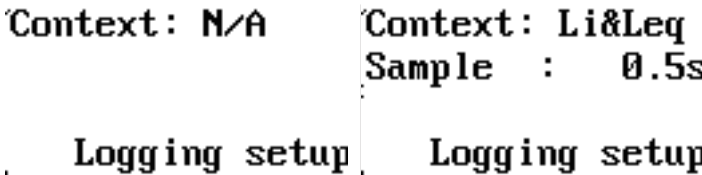


Fig 32. Logging setup

Table 5 Logging content

NO.	type	Logging content
1	N/A	Not logging
2	Linst	Logging the instant SPL
3	Leq,t	Logging the short-time equivalent SPL
4	Li&Leq	Logging the instant SPL and short-time equivalent SPL simultaneously

"content": N/A, Linst, Leq,t and Li&Leq optional. "Sample": Sample interval. You can set the parameter from 0.01s to 6s when Linst is chosen. If "Leq,t" is chosen, you can set the parameter from 0.1s to 60.0s.

### 6.5.6 Recording setup (Optional in ST-11D)

Move the cursor to the third row when on page 1 under "setup 2" interface and press key, you can enter recording setup interface. It displays as follows:

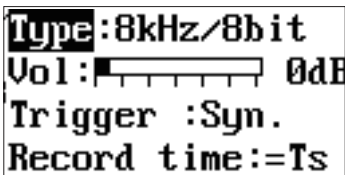


Fig 33 Recorder setup

"Type": recording mode. "N/A", 48kHz, 16bit", "24kHz, 16bit", "12kHz, 8bit" optional.

Table 6 Recording type

No.	Type	Applications
1	N/A	No recording
2	48kHz,16bit	High sample frequency, high accuracy, big capacity files for further analysis.
3	16kHz,16bit	Medium sample frequency, medium capacity files for further analysis.
4	8kHz, 8bit	Low sample frequency, low capacity files only for monitoring

"Vol": Turn up the volume while recording. You can adjust the parameter every 6dB from 0 to 48 dB. If the measuring signals are small, you might choose the higher volume to let the amplitude of recorded waves bigger. If the measuring signals are large, you might choose the lower volume in case the amplitude of the recorded waves are limited. Use "▲" or "▼" key to adjust the volume to let the displayed topmost volume bar stay above 1/2 of the dial and also not occupy the whole dial.

"Trigger": trigger way of recording. You can choose between "Synchrony" and numerical values. "Synchrony" means recording keeps pace with integral measurement, i.e. recording the waves while measurement starts, recording accomplished while measurement finished. "Numerical values" means the instrument starts recording the waves when the average index SPL for analysis of relevant channel surpasses it. The value can be set among 1 ~ 120.

"Record time": Time for limit-surpassing recording activation. 10s, 20s, 30s, 40s, 50s, 60s, 70s, 80s and 90s are optional. If "Synchrony" is chosen on the last page, "=Ts" is displayed and setup cannot be set.

## 6.6 "Data" submenu

Move the cursor on "3.Data" on the main menu and enter submenu of data management. It displays as follows:

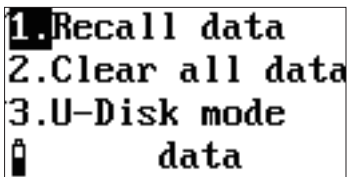



Fig 34. "Data" submenu

"1.Recall data": to recall the data stored in the instrument

"2.Clear all data": to delete the data stored in the instrument

"3.U-Disk mode": change the meter into USB mode

### 6.6.1 Data recall

Move the cursor on the first row under data management interface, and press  key. It displays as follows:

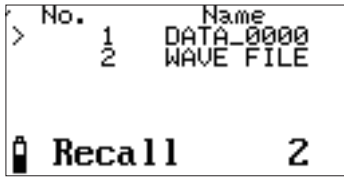


Fig 35. Data recall

First row: the header :

Last row: working status of the instrument, from left to right is "battery voltage, data recall, total groups of the data"

Middle: the serial number and name of each group of data. The ">" on the far left is the cursor.

Note : If the measurement name is "WAVE FILE" , it means the file is recording results of waves and cannot recall data.

The instrument displays group serial number with measurement date or measurement time by pressing "▲" or "▼" key.

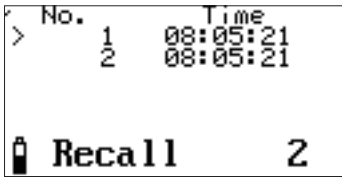


Fig 36. Data recall

Press Cursor key and the cursor can be moved to the next row. When the cursor is moved to the bottom of the screen, the screen will automatically turn the pages; when reach the bottom of the file list, the screen will return to page1.

You can press [Enter] key and view the data that the cursor is pointing at. See the followings:

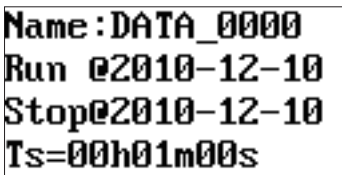


Fig 37. Data recall

Press ▲ or ▼ key to view the previous page or the next page; press ◀ or ▶ key to view the second column; press [Enter] key and it displays as follows:

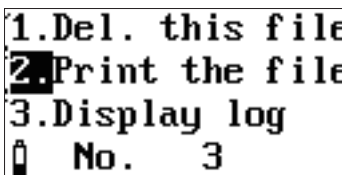




Fig 38 Delete and print current data or display the logging data






"1.Del.this file": Press  key when the cursor stays here, the instrument will delete the data group which is being viewed.


"2.Display log": Press  key when the cursor stays here, the instantaneous SPL will be displayed. If the instantaneous SPL is not logged during integral measuring, "2.Display log" will not be displayed and the instantaneous SPL layout is shown as follows:

Date	Time	LAF	LAS	LAI
YYYY-MM-DD	hh:mm:ss.	dB	dB	dB
2010-12-10	06:41:48.	50.5	54.5	60.3
2010-12-10	06:41:48.	51.2	54.4	60.2
2010-12-10	06:41:48.	54.1	54.6	60.1
2010-12-10	06:41:49.	56.1	54.9	60.0
2010-12-10	06:41:49.	56.4	55.0	60.0
2010-12-10	06:41:49.	55.0	54.9	59.9

Fig 39 Display the logging data

Press  key under this interface and the data of next column will be displayed; press  or  key, the data of next page will be displayed.


### 6.6.2 Clear all

If you press  key when the cursor stays on the second row on data management submenu, the instrument will prompt as follows:


```

1.Recall data
Are you sure?
3.U-Disk mode
data
  
```

Fig 40. Delete all data

If you want to delete all the data in the instrument, press  key; otherwise, press other key to return.

### 6.6.3 Turn to USB disk mode

Press  key while the cursor staying on the second row on data management submenu, the instrument will turn the stored data in FAT32 format to let the data be read correctly when the instrument is connected to PC as a USB disk.

When the instrument works as a USB disk, the filename inside is composed of 3 parts: the former 4 characters of the measurement name, 4 serial numbers and the filename extension. The filename extension includes 3 kinds: AWA for integral analysis data, LOG for logged data, WAV for recording data. ASV and LOG files can be opened by Notepad or Excel program while WAV files can be opened by "windows media player".

### 6.7 Information of instrument


Move the cursor on "5.Info." on the main menu and press  key, instrument information interface is entered. See as follows:



Fig 41 Basic information

"Serial no.123456": The meter serial number is 0123456.



"Version:S\_1.0/H\_1.0": The software version of the instrument is 1.0, the hardware version is 1.0.

"Build: Sep 23 2011": The software of the instrument was written on "Sep 11, 2011".

"File numbers:2": 2 groups of data are stored in the instrument.

"Free Blocks: 8062": 8062 Blocks are available for 8062 groups of data to be saved.

"Made: 2011-11-4": The instrument was manufactured on Nov. 1, 2011.

Press  or  key under this interface, then enter clock display interface. See as follows:

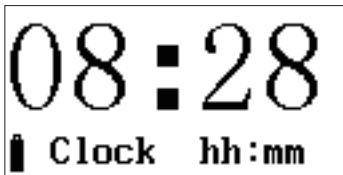




Fig 42. RTC clock setup

Current time is displayed under the interface. If you press Cursor key,  or  key, it will change the display time.

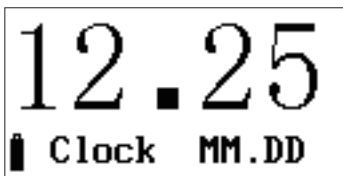


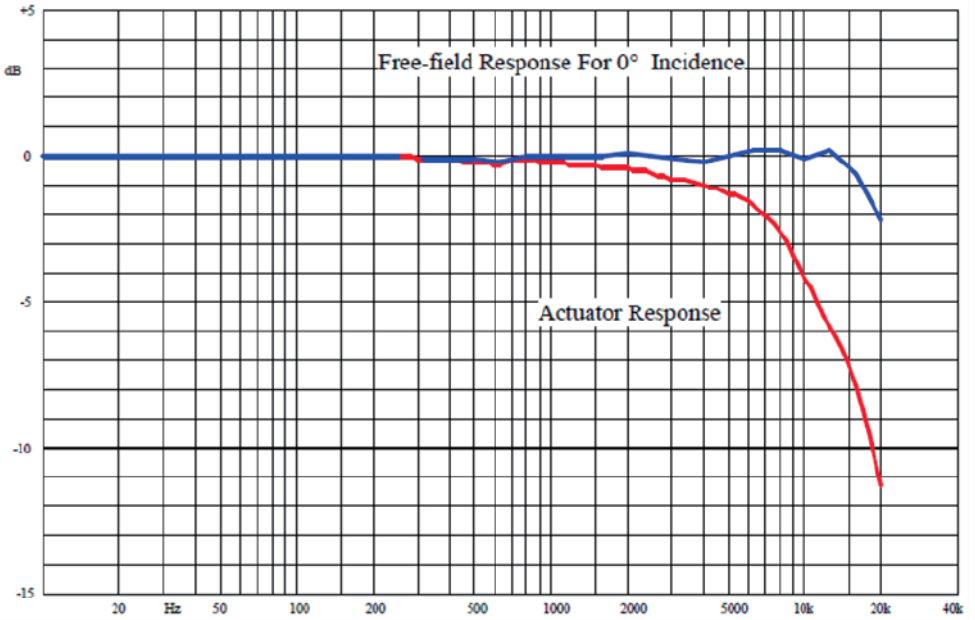


Fig 43. RTC clock setup

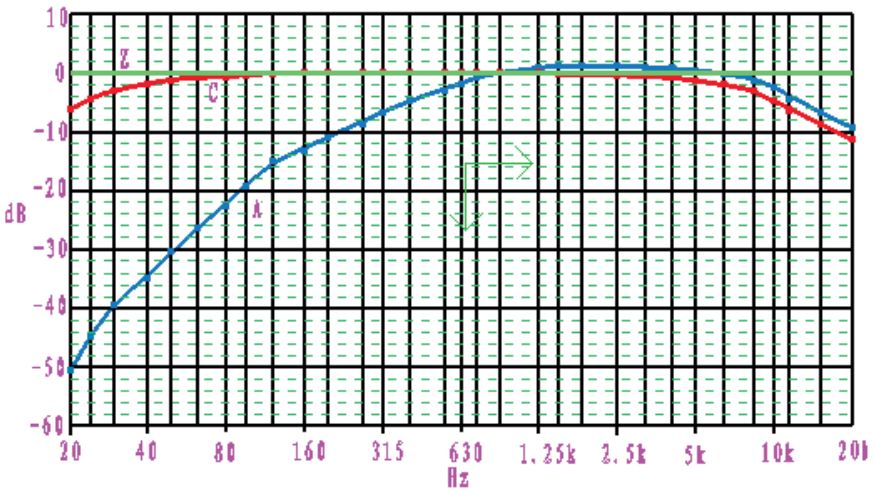
If you press  key at the calendar clock page, the instrument will automatically turn off and go in the standby mode, with power consumption around 4mA. Press  key again and the instrument turns on display again.

**Appendix A: Nominal free field response of AWA14425 type test capacitor microphone in the reference direction**



**Appendix B**

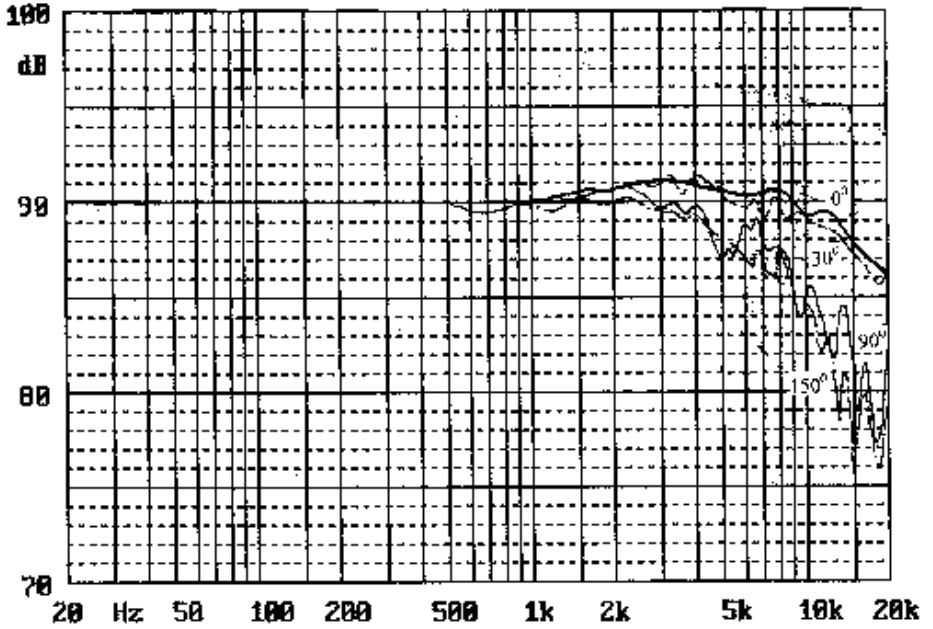
Appendix B: In condition of approximate reference environment the free field frequency response of sound level meter in reference direction.



## Appendix C

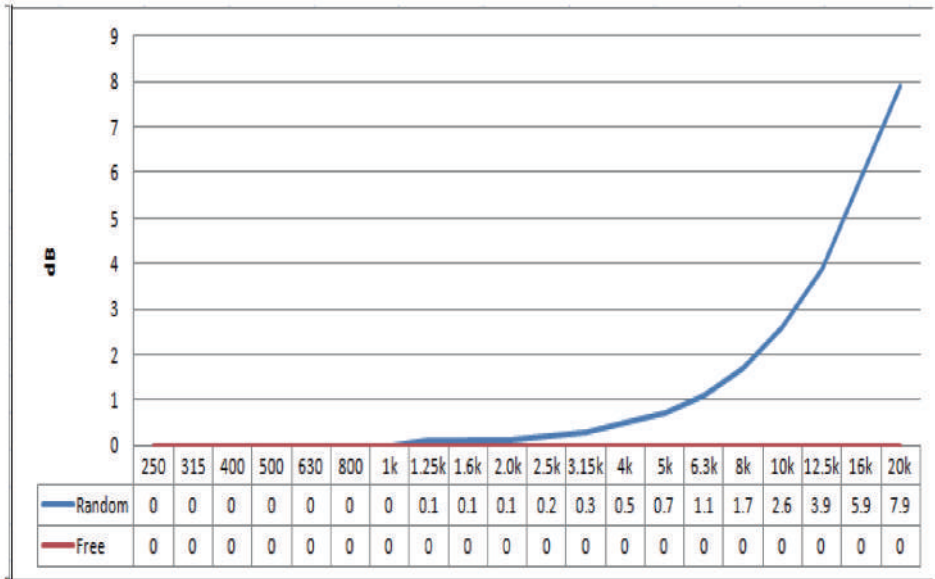
The free field response of sound level meter in different directions under no wind condition and installed with  $\phi 35 \times 60$  windscreen

**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 D

The frequency Response of free-field Type and Random Type microphone when directivity is 90 degrees in the free field



## Appendix E: 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 that this value, the corresponding instructor light will be lighted
LFp	F-weighted maximum SPL (sound pressure level) in 1 second
LSp	I-weighted maximum SPL in 1 second
Llp	Short-time equivalent SPL. t is the average integral time,
Leq,t	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
Llmax	I-weighted maximum SPL
Llmin	I-weighted minimum SPL
SEL	Sound exposure level
E	Personal sound exposure, expressed in Pa <sup>2</sup> h
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

# | Safety, Handling, & Maintenance

---

## Important safety information

**WARNING:** Failure to follow these safety instructions could result in fire, electric shock, or other injuries, or damage to sound level meter or other property. Read all the safety information below before using sound level meter.

**Operate** Avoid using instrument in humid or wet places. Make sure that humidity is within the limits indicated in the next section. Avoid using meter in presence of explosive gas, combustible gas, steam or excessive dust.. Be sure to turn it off after use. If you expect not to use the instrument for a long period remove batteries to avoid leakages of battery liquid which could damage the its inner components.

**Handling** Handle the meter with care. It is made of sensitive electronic components. The meter can be damaged if dropped, burned, punctured, or crushed, or if it comes in contact with liquid. Don't use a damaged meter, such as one with a cracked screen, as it may cause injury.

## Important handling information

**Cleaning** Clean instrument immediately if it comes in contact with anything that may cause stains—

such as dirt, ink, makeup, or lotions. To clean:

- Disconnect all cables and turn instrument off.
- Use a soft, lint-free cloth.
- Avoid getting moisture in openings.
- Don't use cleaning products or compressed air.

**Operating temperature** The instrument is designed to work in ambient temperatures between 5° and 40° C (41° and 104° F) and stored in temperatures between -10° and 60° C (14° and 140° F). The instrument can be damaged and battery life shortened if stored or operated outside of these temperature ranges. Avoid exposing the instrument to direct sunlight even the the air temperature is within the limits.

**Operating humidity** The instrument is designed to work in humidity < 80%rh and stored in dry place where humidity is less than 70%rh.

**Store microphone carefully** Microphone is the key component of the instrument and keep it dry and avoid severe shake or vibration.



Scarlet Tech Co., Ltd.  
© 2015 Scarlet Tech Co., Ltd. All rights reserved.  
4F-3, No. 347, HePing E Rd, 2nd Sec, DaAn District, Taipei City 106, Taiwan  
info@scarlet.com.tw  
www.scarlet-tech.com

version 200803