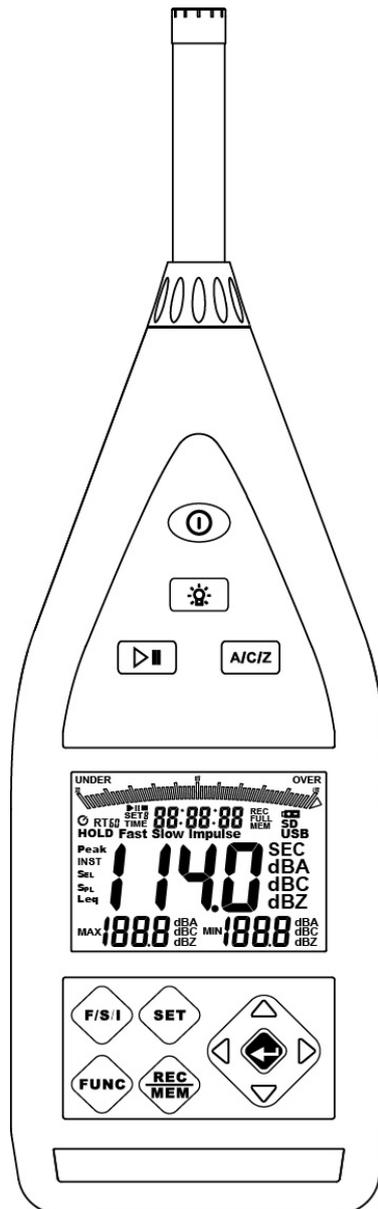


TENMARS

ST-109R Integrating Sound Level Meter User's Manual



HB2ST109R003

Contents

1	Introduction	1
2	Accessories	1
3	Safety Precaution.....	1
4	Instrument Description.....	2
5	Operation	3
5.1	Backlight Button	4
5.2	Start/Pause Measuring	4
5.3	Data Hold:	4
5.4	Single Record/ Datalogger Reading.....	4
5.5	Product Setup	5
5.6	Integrating Time Setup	5
5.7	Auto Power Off.....	5
5.8	Analog/Communication Output Interface.....	6
5.9	Record Data Delete/Back-up.....	6
5.10	94dB Calibrate.....	7
5.11	Microphone Connection Inter-face.....	7
5.12	Microphone Extension Test	7
5.13	Equivalent Free-Field.....	8
6	Software Installation	9
7	General Specifications	10
8	Electrical specification	11
9	Maintenance or Repair.....	12
10	Battery Replacement	12
11	Product Disposal.....	12

1 Introduction

This Integrating Sound Level Meter (ISLM) is IEC61672-1:2002 Class 1 compliant.

2 Accessories

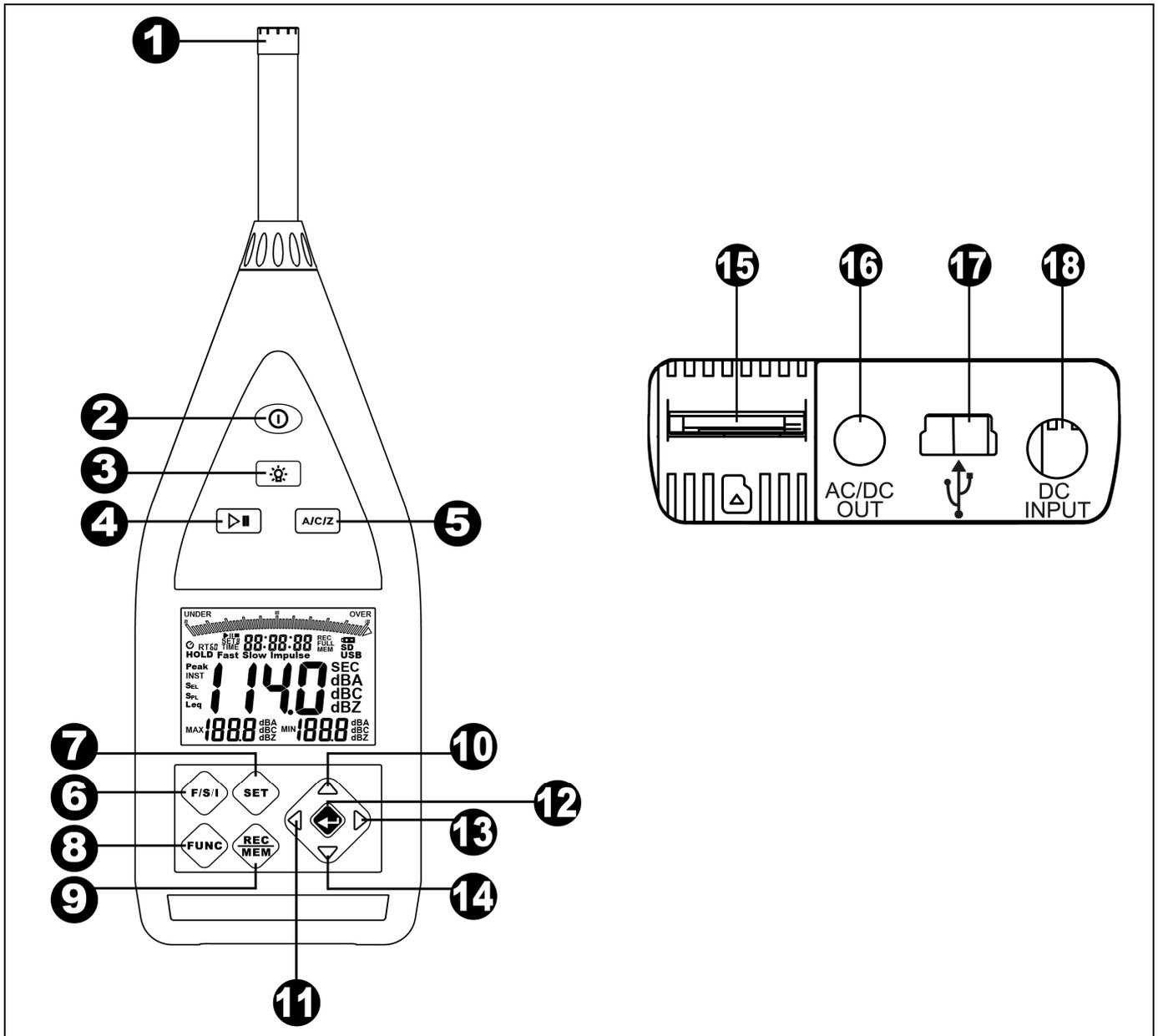
- 1 Meter
- 1 User's Manual
- 1 AC to DC adaptor
- 1 Windscreen ball
- 1 Installation disk
- 1 USB cable (Mini B type)
- 1 AC adapter (9~12V/500mA)
- 4 1.5V AA-LR6-AM3 alkaline battery

3 Safety Precaution

	Caution! Please refer to this manual. Improper use may damage the meter and its components.
	Complies with European Directive.

- Do not operate in environments with flammable gas or humid environments.
- Operating altitude: up to 2000M.
- Operating environment: Indoor use; Pollution degree 2.
- Clean with soft cloth when dirty, such as glasses cloth. Do not clean with chemicals and other solvents.
- EMC: EN61326-1:CISPR 11:Group 1, Class B
- ✧ **Class B** – Equipment for use in all establishments other than domestic.
- ✧ **Group1** – RF energy generated is needed for internal functioning.

4 Instrument Description



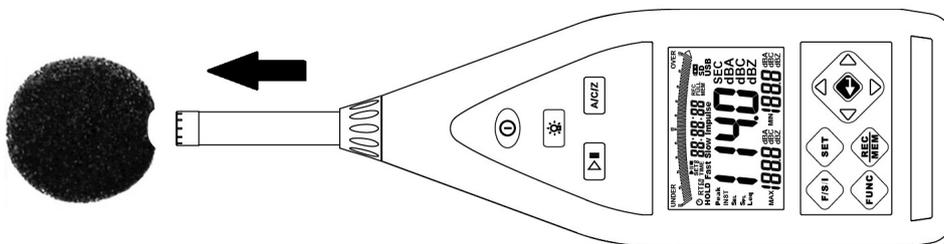
- 1. Microphone
- 2. Power Button
- 3. Backlight Button
- 4. Start or Pause Test Button
- 5. Frequency Weighting Select Button
- 6. Time Weighting Select Button
- 7. Set Button
- 8. Test function select button
- 9. Record data / Reading Record data button
- 10. Data Hold/ up arrow button.

- 11. Clock switch/left arrow button
- 12. OK button
- 13. Clock switch/right arrow button
- 14. Shift switch/end measurement/down arrow button
- 15. MICRO SD card slot
- 16. Analog/RS232 professional output
- 17. USB
- 18. DC voltage input (6V~12V)

5 Operation

1. Press  button to power on or off your product.
 2. Press  button to selection measurement mode.
 - Sound pressure level (SPL)
 - Equivalent Energy Sound Level (Leq)
 - Sound exposure level (SEL)
 - Peak sound pressure (PeakMAX)
 3. Press  button to switch time weight.
 4. Press  button to switch frequency weight.
 5. Press  button to switch shift, end integrating measurement during integrating.
 6. Press  button to start integrating measuring (SPL exclusive) and revoke auto off function.
 7. Display measurement readings on LCD.
- * Peak sound pressure (PeakMAX) does not support time and frequency weighting.

CAUTION	
	Please mount windscreen to microphone as shown in figure below to reduce wind noise when ambient wind speed is greater than 10m/sec.



5.1 Backlight Button

In standby mode , Press  button to turn on backlight, press  button again to turn it off immediately.

* Backlight will turn off in 15 seconds automatically.

5.2 Start/Pause Measuring

Press  button to start integrating Leq/SEL/PeakMAX and MAX/MIN lock-up function with the maximum and minimum values displayed at the lower row of LCD and measurement interval upper row of LCD. Press  button to pause measurement and  button to abort measurement.

* The longest time that the SPL mode, SEL, and peak sound pressure mode can last is 99 hours, 59 minutes and 59 seconds.

5.3 Data Hold:

Press  button to the on/off data HOLD. If the integrating is started, this function is invalid.

5.4 Single Record/ Datalogger Reading

Each press the  button once to display REC message, increment record count by 1 and log one measurement record.

Press and hold  button for 1 second to enter record reading mode, press  button to reading records, press  button to toggle switch time display between hh:mm:ss and yyyy/mm/dd, press and hold  button for 1 second to exit reading function.

5.5 Product Setup

Press  button to enter set-up mode of this product for the following:

Press the button to cycle through the following options:

Clock → Auto record → Auto power off → Communication interface →
Delete one record → Delete all record → Copy SD card → 94dB calibrate →
Back to measurement mode

 Select settings

 Select place settings

 Select value up/down

 Enter data delete/copy

 Enter setup and exit setup page

* Please get your SD card installed before enabling SD card copy function.
Please refer to section 5.9 for details.

5.6 Integrating Time Setup

In Leg mode the record and integrating time settings are the same:

Press  button to enter Integrating time selection page, the LCD display
REC with the following options for selection:

10 seconds → 1 minute → 5 minute → 10 minute → 30 minute → 1 hour →
8 hour → 16 hour → 1 day → Custom. Press  button to point cursors, 
 button to change values, with the maximum settings at 23 hours, 59
minutes and 59 seconds.

 Enter setup and exit setup page.

5.7 Auto Power Off

The longest auto power off time is 99 minutes; set this to zero to disable the
auto off function.

The auto power off will be disabled accordingly in the USB connection
mode.

5.8 Analog/Communication Output Interface

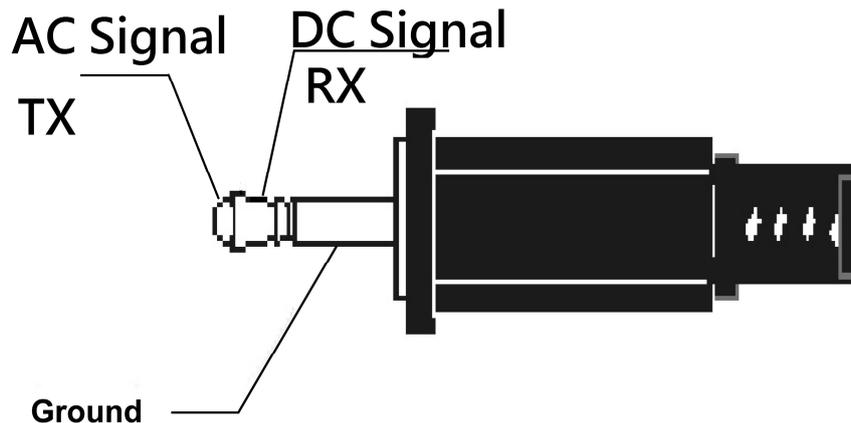
This product features to computer communication inter-face: USB and RS-232.

The RS-232 (TTL) and analog output inter-face shares.

You may select USB or RS232 inter-face in the set-up mode. The default value is USB.

AC signal output: MAX: 5VP-P/130dB, output impedance around 600Ω

DC signal output: 10mV/10dB, output impedance around 100Ω



5.9 Record Data Delete/Back-up

You may define the file name with a desktop program: file extension is ".IAR", file name may contain up to 8 characters including capital letter A~F and number 0~9.

The auto backup function copies data from this product to micro SD card and delete them afterwards.

Please connect to external power source for micro SD card write-in operation to prevent it from failed due to power outage.

You may manually delete records in the mode of a single record or all records.

The single record delete function erases the latest one first and move to the earlies one.

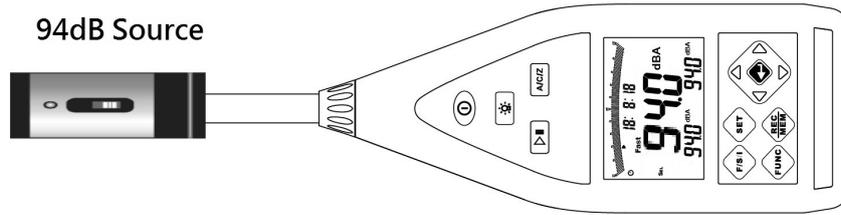
See section 5.5 for the functions of individual buttons.

* ID of this product is "FFFFFFFF" by default.

* This product supports a micro SD card in the FAT16/FAT32 format.

* The maximum space supported in SD/SDHC mode is 32GB.

5.10 94dB Calibrate



Input 94dB@1KHZ signal.

Last calibration records are displayed at the lower right corner of LCD.

Current measurement value is displayed at the lower left corner of LCD.

Time weight value is Fast by default.

Calibration range: 91dB~97dB.

Press button to the selection frequency weight.

Press button to select shift.

Press button to select full calibration.

Press button to select next setup mode.

Press button to save calibration value and exit set-up mode.

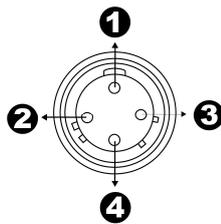
5.11 Microphone Connection Inter-face

Pin 1: signal input

Pin 2: ground

Pin 3: power supply

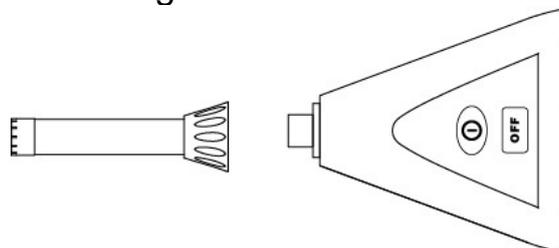
Pin 4: X



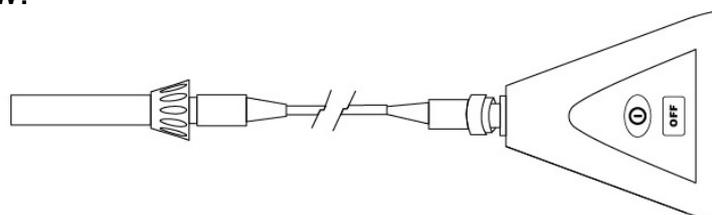
5.12 Microphone Extension Test

To avoid measurement deviation due to the reflection effect and invalid operations you may measure integrating sound levels by extending the microphone with an extension cord.

- Press button to power off this product.
- Turn the pre-amplifier and microphone counterclockwise to remove them from the body as shown in figure below:



- Connect extension cord to the pre-amplifier and microphone as shown in the figure below:



5.13 Equivalent Free-Field

Frequency	Deviation pressure
20-400	0
500	0
630	0
800	0
1000	0.2
1250	0.3
1600	0.4
2000	0.5
2500	0.6
3150	0.7
4000	0.9
5000	1.5
6300	2.3
8000	3.5
10000	5
12500	6.5
16000	8.7
20000	10.3

* Microphone specification: ST-109

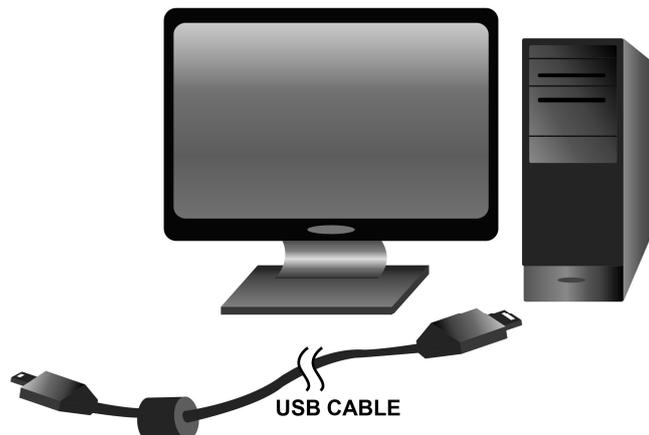
6 Software Installation

Operating system support: Windows XP/Windows7 /Windows 8.1/Windows 10

- Insert the DVD ROM included with this product in the DVD drive of the computer connected to this product, click to execute the Installer program.



- Remove the DVD once the desktop program is installed successfully.
- Connect this product to a computer with included USB cable.



- To execute desktop program: double click the Integrating Sound Level Meter program icon to start it.



- See Software Installation Guide for details on software operation.

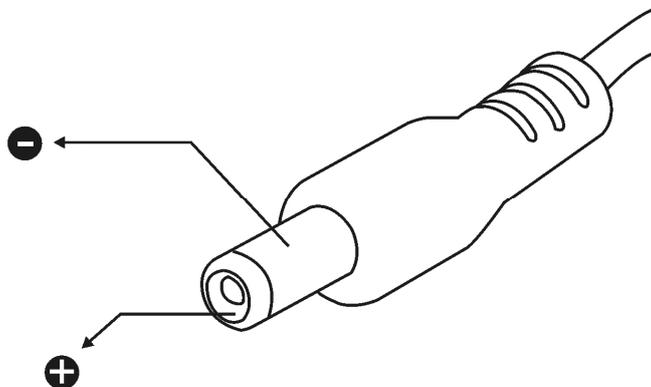
7 General Specifications

- **Readings display:** two rows with maximum value at 1999.
- Lower power detection, backlight function, data lock function (HOLD)
- Auto power On/Off function
- **Overload display:** "OVER" or "UNDER"
- **Storage interval:** 1 second~ 24 hours; up to 35,000 records.
- **Battery:** 1.5V*4(LR6 – AA – AM3 – MN 1500)
- **Battery life:** Approximately 30 hours
- **Power consumption at standby mode:** 10uW
- **Power consumption at operation mode:** 250mW
- **Operation temperature and humidity:** 5°C~40°C with relative humidity up to 80%
- **Storage temperature and humidity:** -10°C~60°C with relative humidity up to 70%
- **Weight:** Approximately 500 grams
- **Dimensions:** 285(L)x90(W)x39(H) mm
- **Adapter specification:**

Convert external AC 100~240V power to DC 9V/0.5A

Specification: Voltage at DC9V/0.5A

Plug: O.D.: 5.5mm; I.D.: 2.1mm



8Electrical specification

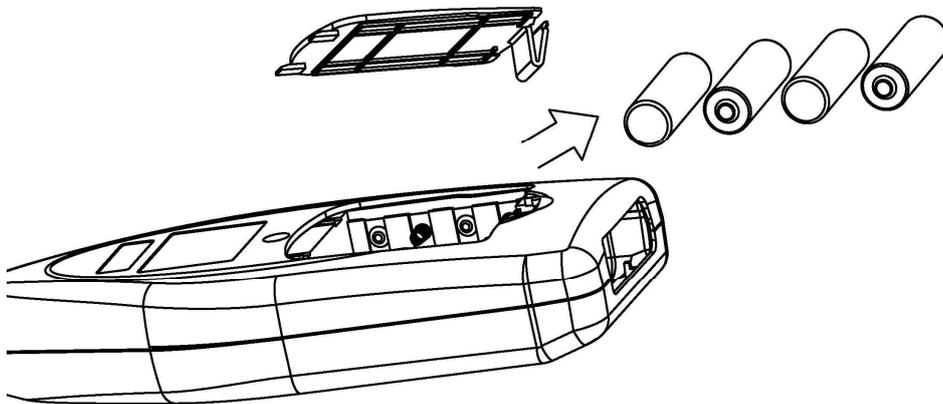
Display Refresh Rate	One time per second
Major Applicable Standards	IEC 61672-1 : 2002 Class1 IEC60651:1979 TYPE 1 IEC60804:2000 TYPE 1
Microphone	High sensitivity, 1/2" pre-polarized capacitor microphone 50 mV/Pa
Measurement Items	Lxyp,Lxmax,Lxmin,Lxeq,LAE,Lcpeak
Measurement Range	30dB ~ 130dB (A) 35dB ~ 130dB (C) 40dB ~ 130dB (Z)
Dynamic range	60 dB
Measurement shift	30dB ~ 90dB (L) 50dB ~ 110dB (M) 70dB ~ 130dB (H)
Integrate Time Setup	Manual, 10s, 1m, 5m, 10m , 30m, 1h, 8h, 16h, 24h
Micro SD Card	The max support capacity of micro SD card is 32GB ; 37,000 data about story space 300KB
Peak value measurement range	70~133 dBC
Time Weighting	Fast, Slow, Impulse, Peak
Frequency Weighting	A/C/Z
Frequency Range	20Hz~16KHz
DC Output	10mV/1dB
AC Output	1Vrms(±10%)/130dB each range
Starting Time	< 10 Second
Thermal noise	≤ 28dBA

9 Maintenance or Repair

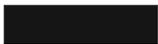
1. When the  symbol is displayed on the LCD, it means that there is insufficient power; please change the battery immediately in order to ensure its accuracy.
2. Do not place the meter in locations that have high temperature, humidity or that are exposed to direct sunlight.
3. Remember to turn off the power after usage; remove the battery if not used for a long period of time in order to prevent battery leakage and causing damages to internal components.

10 Battery Replacement

1. Turn off the power.
2. Open the battery cover at the back of the meter, remove the batteries.
3. Insert four batteries in the correct positive-negative polarity.
4. Put the battery cover back in place.



11 Product Disposal



Note: This symbol indicates that the meter and its accessories must be separated and processed properly.

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