REED

# Model C-322

## Datalogging Sound Level Meter

# Instruction Manual



Tripod sold separately (Model BS-6)

www.reedinstruments.com

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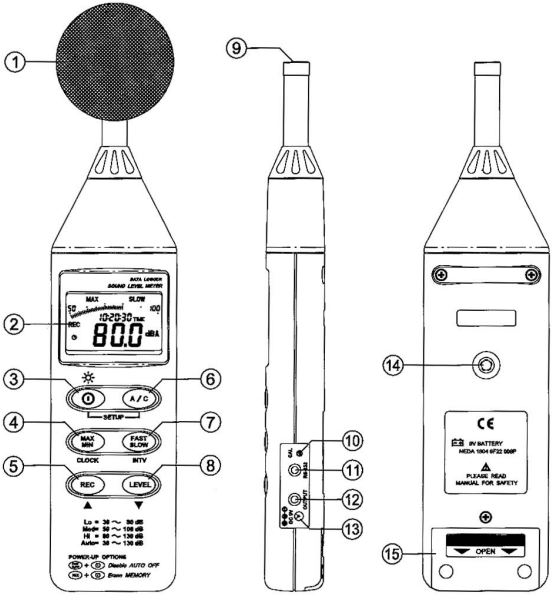
## Features

- IEC651 Type II
- Auto-ranging from 30 to 130 dB
- Dynamic range of 50 dB
- 32,000 record datalogger
- User selectable sampling intervals
- Real-time clock logs each data point with time and date
- 4-digit backlit LCD display with analog bar graph
- AC and DC output
- Max/Min function
- Auto power off

## Specifications

| | |
|---|---|
| Measuring Range: | 32 to 80 dB, 50 to 100 dB, 80 to 130 dB |
| Resolution: | 0.1 dB (1dB analog) |
| Accuracy: | ±1.5 dB @ 94 dB |
| Frequency Range: | 31.5 Hz to 8 kHz |
| Microphone: | 1/2” electret condenser microphone |
| Operating Conditions: | 0 to 40°C ( 32 to 104°F), 10 to 90%RH |
| Storage Conditions: | -10 to 60°C (14 to 140°F), 10 to 75%RH |
| Power Supply: | 1 x 9V alkaline battery |
| Dimensions: | 275 × 64 × 30mm (10.8 × 2.5 × 1.2”) |
| Weight: | 285g (0.55lb) |
| Includes: | Calibration screwdriver, windshield ball, RS232 cable, Windows datalogging software, carrying case, and battery |
| Optional Accessories: | Sound Calibrator (R8090), USB Cable (USB-300), Tripod (BS-6), AC Adapter (CFD00120V-09V10) |

## Instrument Description




1. Windshield ball
2. LCD display
3. Power & backlight button
4. MAX/MIN hold button
5. Record button
6. Frequency weighting button
7. Time weighting button
8. Level range control button
9. Microphone
10. CAL potentiometer
11. RS232 interface
12. Signal output terminal
13. External power supply terminal
14. Tripod mounting screw
15. Battery cover

*Display Description*


| Symbol | Function |
|---|---|
| UNDER | Under range |
| MAX | Maximum indication |
| MIN | Minimum indication |
| FAST | Fast response |
| SLOW | Slow response |
| OVER | Over range |
| 88-180 | Range indication |
| REC | Recording datalogger |
| FULL | Memory is full |
| | Auto Power OFF is active |
| | Low battery |
| AUTO | Auto level range selective |
| dBA | A-Weighting |
| dBC | C-Weighting |
| -LO- | Under range 20dB |

## Operating Instructions

Wind noise in the microphone can cause measurement errors. Use the windshield ball to reduce any wind effect on your measurement.

*Power and Backlight*

Press the Power button to turn the meter on. When the meter is turned on, the LCD will show how much memory is currently available. Press and hold the Power button to turn the meter off. While the meter is on, press the Power button to turn the backlight on and off.

*Frequency and Time Weighting Selection*

Selecting the proper Frequency and Time Weighting is essential in obtaining accurate measurements.

Press the A/C button to switch between A and C Frequency Weighting.

- **A Frequency:** General sound level measurement
- **C Frequency:** Low-frequency sound level measurement

Press the Fast/Slow button to switch between fast and slow Time Weighting measurements.

- **Fast:** Normal measurements (125mS)
- **Slow:** Checking average level of fluctuating noise (1s)

*Level Range*

Press the LEVEL button to select the appropriate measuring range.

- **LO:** 30 - 80dB
- **MED:** 50 - 100dB
- **HI:** 80 - 130dB
- **AUTO:** 30 - 130dB

*Taking a Measurement*

1. Turn the power on and select the desired Frequency, Time, and Level
2. Point the microphone at the noise source to be measured
3. The sound level will be displayed on the LCD screen

*MAX/MIN Hold*

Select the proper level range before using **MAX/MIN** mode to ensure that the reading value will not exceed the measurement range. Press the **MAX/MIN** button to enter the maximum and minimum recording mode. Press the button once to select MAX value. Press it again to select MIN value, and press it once again to select current value with **MAX MIN** symbol blinking. Press the **MAX/MIN** button and hold it down for 2 seconds to exit the MAX/MIN mode.

Note: If the sound level range or change A-C weight are changed, the MAX/MIN mode will be cleared.

*Auto Power Off*

By default, the meter is in auto power off mode. The meter will power itself off after 30 minutes without operation (button operation, RS232 communication and no recording operation). To disable the auto power off, press and hold the **FAST/SLOW** button and turn the meter on. The symbol will NOT appear. This indicates that the auto power off has been disabled.

## Datalogging

When the **REC** button is pressed, the meter will start recording. Pressing the **REC** button again will stop recording.

*Clock Setup*

1. With the meter off, press and hold the **A/C** button
2. Turn on the meter
3. Press the **MAX/MIN** button
4. Press **REC** to increase or **LEVEL** to decrease the number
5. Press the **MAX/MIN** button to adjust next item. The adjusting order is Year ➔ month ➔ day ➔ hour ➔ minute
6. Press the **MAX/MIN** button to finish the setup
7. If you want cancel setup at any time, press power button

*Recording Interval Setup*

1. With the meter off, press and hold the **A/C** button and turn the meter on
2. Press the **FAST/SLOW** button
3. Press **REC** to increase or **LEVEL** to decrease the number
4. Press the **FAST/SLOW** button to adjust next item
5. Press the **FAST/SLOW** to finish the setup
6. If you want cancel setup at any time, press power button

*Erasing the Memory*

1. Turn off the meter
2. Press and hold **REC** button
3. Press power button and hold for at least 5 seconds
4. The LCD will then show “CLR” and “SURE” to clear the memory

## Calibration Procedures

Calibrate the instrument before operation if the instrument was not in use for a long time or it was operated in a bad environment

1. Make the following switch settings:
   Display: dBA
   Time weighting: FAST
   Measurement mode: MAX MIN Mode function disabled
   Level range: 50 to 100dB
2. Insert the microphone housing carefully into the insertion hole of the calibrator.
3. Turn on the switch of calibrator and adjust the CAL potentiometer of the unit. The level display will indicate the desired level.
4. This meter was calibrated before shipment. In order to ensure the accuracy of the sound level meter for a long period of time it should be calibrated once a year.

## Setup TestLink RS232 Interface Software

System Requirements: Windows 98/NT 4.0/NT2000/XP/VISTA

Minimum Hardware Requirements: PC or NoteBook with Pentium 90MHz or higher, 32 MB RAM. At least 5 MB hard drive space available to install TestLink. The recommended resolution is 800 x 600.

*Installing TestLink*

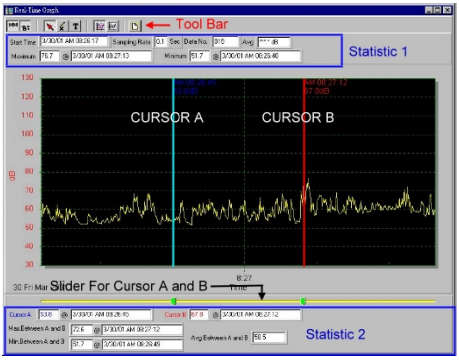
1. Close all other applications before installing TestLink
2. Insert setup CD into the CD drive.
3. Choose the Start button on the Taskbar and then select Run
4. Type E:\SETUP and click OK, then it will copy SE322.exe (executable file) as well as the help file to your hard drive (default is c:\program files\TestLink\SE322)
5. For other operation instruction details, refer to the online help while executing SE322

*Main Menu*

| | |
|---|---|
| File/Open | Retrieves files from the disk |
| Save | Saves the active window (when the caption bar is highlighted) data to the hard drive |
| Print | Prints the data of the active window (graph or list) |
| Printer Setup | Selects printer |
| File/Exit | Terminates TestLink program |
| View/Control Panel | By opening the Panel Window, the user can control meter via the button in this window |
| View/Real-Time Graph | Opens Real-Time Graph display to a graph of the present data |
| Real Time Data/Run | Starts collecting real time data |
| Stop | Stops collecting real time data |
| DataLogger | By opening the DataLogger Window, the user can load recorded data of meter to PC in this window |
| Output To Graph | Graphing tabular data |

The Underlines indicate the keyboard shortcuts to get to this actions. Simply use the Control key on your keyboard with the Underlined caracter. IE: The keyboard shortcut to Save is Control S.

*Graph*




You can choose a rectangle area on the graph to zoom in for detail. There are two vertical lines (Cursor A and Cursor B) in the graph. Time and value are displayed on the top and right side of each cursor.

You can move the mouse cursor over Cursor A or B and click to select and drag the mouse cursor to move these cursors left or right. Right below Cursor A and B is a slider. You can also click and drag slider to move Cursor A or B.

At the top of this screen are the statistics/values for the Start Time, Sampling Rate, Data Number, Maximum and Minimum values of the graph. At the bottom of the screen are the statistics/values for the maximum and minimum average between Cursor A and B. This data will update automatically when Cursor A or B are moved.

You can double click the graph to call up the option dialog. In the option dialog, you can customize your graph style.

You can also right click the graph (real time graph is not allowed) to call up the popup menu.

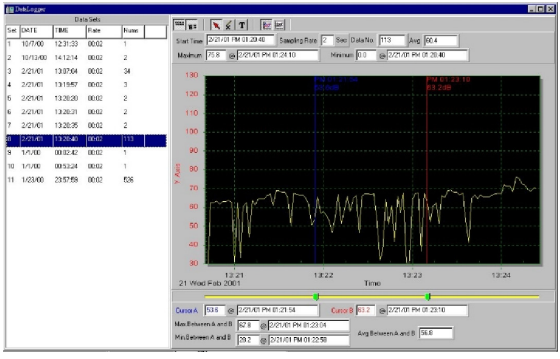
To Zoom into this graph using the mouse, Left click (click the left mouse button) and drag the cursor to select the new extents and release the mouse button.

To Undo the Zoom, Right click on the graph, you will see a pop-up menu, select Undo Zoom.

*Tool Bar*

| | |
|---|---|
|  | Display or hide Statistic 1 |
|  | Display or hide Statistic 2 |
|  | Normal cursor |
|  | When selected, the mouse cursor will become a cross sign when moving to the graph, click on the graph to mark a cross sign on the graph. |
|  | When selected, the mouse cursor will become a “I” sign when moving to the graph, click on the graph to annotate. |
|  | Color graph |
|  | Monochrome graph |

*DataLogger*




Once the meter is connected to the PC, either select “DataLogger” from the main menu or click on  in the tool bar. This will load the data from the meter, the progress indicator will display the loading progress. If an error occus, simply click on “DataLogger” again.

*continued ...*

After the data has been loaded, the left hand side of the computer screen will show how many data sets were loaded as well as the detail information for each data set: Start Date, Start Time, Recording Rate and Record Numbers. Here is an example:

Data Sets

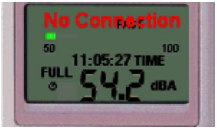
| Set | DATE | TIME | Rate | Nums |
|---|---|---|---|---|
| 1 | 1999/7/25 | PM 01:24:52 | 00:02 | 10 |
| 2 | 1999/7/25 | PM 01:25:38 | 00:02 | 5142 |
| 3 | 1999/7/25 | PM 09:29:08 | 00:02 | 21 |
| 4 | 1999/7/25 | PM 09:32:04 | 00:02 | 3 |
| 5 | 1999/7/25 | PM 09:32:09 | 00:02 | 1 |
| 6 | 1999/7/25 | PM 09:32:14 | 00:02 | 9 |
| 7 | 1999/7/25 | PM 10:03:43 | 00:02 | 1896 |
| 8 | 1999/7/25 | PM 11:06:57 | 00:02 | 3 |
| 9 | 1999/7/25 | PM 11:49:47 | 00:02 | 9086 |

The data set will be transfered to the graph on the right hand side of the screen, each time after you load your recorded data from the meter. The waveform graph and statistics on the right hand side of the screen displays the information of the data set you have chosen. Therefore, you can click any data sets to the change the data set displayed in the graph.

## Tutorial - Quick Start to Use SE322 TestLink

*Recording real time data in waveform*

1. First turn the meter on and connect it to a PC RS232 serial port using the cable (SE-300) provided.
2. Start SE322 program.
3. If the connection is successful the panel will display the same value as the Sound Level Meter. If the connection between the meter and the PC has failed, it will display “No Connection” in the panel window in TestLink SE322.

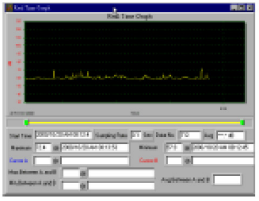



4. When the connection is successful, click ▶ to start recording real time data and there will be a waveform on the Real Time Graph Window.
5. Click ■ to stop recording.

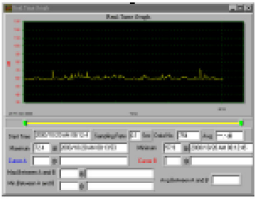
*How to save the recorded real time data to a file?*

1. Click the graph window you want to save and the graph window will become active, then choose File/Save from main menu or click  from the tool bar.

an active window



a non active window



2. In the save dialog window, choose the file name and file type you wish to save. Your choices are: Binary file (*.ghf), Text file (*.txt) and Microsoft Excel file (*.csv). The Binary format (*.ghf) will create a much smaller file size however, it can only be used in TestLink SE322. The Text format (*.txt) can be opened by TestLink SE322 and any other word processor program such as Microsoft Word, Notepad etc. The Microsolt Excel format (*.csv) can be opened by TestLink SE322 and Microsoft Excel.

*How to load the recorded data from the memory of the meter and save it to a file?*

1. Turn the meter on
2. Press the "**REC**" button of the meter to start recording data
3. After a while, press "**REC**" button again to stop recording data
4. Connect the meter to a PC
5. Start the SE322 program
6. Choose Data Logger from the main menu or click  from tool bar

## Frequently Asked Questions

**Question:** I connected the meter to a PC serial port and turned meter on, but it still shows "NO CONNECTION".
**Answer:** It could be that all serial port you're using is occupied by another application, close all other applications. If it still don't work. Restart your computer and run TestLink SE322 again.

**Question:** How can I save the graph to a file which can be used in Microsoft Excel?
**Answer:** When you save a graph to a file, the default file format is *.ghf and you can also select *.csv. CSV is an Microsoft Excel file format. You can then open it using Microsoft Excel.

**Question:** How do I uninstall TestLink SE322?
**Answer:** Launch the Add/Remove Programs applet out of the Control Panel, highlighting the SE322, and clicking on the Add/Remove button. This will remove the SE322 folder and files from your computer.

**Question:** Why would loading data fail?
**Answer:** This might be caused by the slow response from some of the PC.

**Question:** How do I zoom into the graph?
**Answer:** Left click (click the left mouse button) and drag the cursor to select the new extents and release the mouse button.

**Question:** When I setup the real time sampling with a fast rate (eg. 0.1 sec), some of the sampling data might be lost.
**Answer:** This might be caused by the slow response from some of the PC.

## Battery Replacement

When the battery voltage drops below the operating voltage, this symbol will appear  . Remove the battery cover on the back and insert a new 9V Battery. Verify that the polarity is correct.

## Notes