THE 700 SERIES
Sound Level Meters/Dosimeters

Some outstanding common functions are:
- 110 dB Dynamic Range
- Accurate Measurement of Gunfire
- Analysis of Peak Data
- Data Report directly to Printer
- Built in Data Logging
- GSA Contract / 2 yr. Warranty

710

Designed for routine applications. Custom formatted reports. Two doses, TWA’s, Projected Doses. Single Key operation. Type II or Type I Accuracy Available.

700

Designed for sophisticated applications. Complete data analysis. Two way computer interface, data storage plus A, C weighting, multiple exchange rates, all possible doses & TWA’s. Full statistical analysis.

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P.O. Box 8060
Provo, UT 84601 U.S.A.
801-375-1777 Telex 705560
FAX 801-375-0182
Model 710
Integrating Sound Level Meter
Noise Dosimeter

The Model 710 Dosimeter/Integrating Sound Level Meter from LARSON•DAVIS Laboratories introduces a new era of simplicity in noise measurement, without sacrificing features or operating accuracy. Designed for routine applications, the 710 provides two values of Dose, Projected Dose, and Time-Weighted Average (TWA) simultaneously. A third TWA is available with the LEQ function. The convenience of more than one Dose at the push of a key allows the user to verify both of OSHA's requirements (Dose with an 80 dB threshold and Dose with a 90 dB threshold) with one measurement.

Seventeen Different Measurements

**Measurements for Dose 1:**
- Dose 1
- Projected Dose 1
- Time Weighted Avg 1

**Measurements for Dose 2:**
- Dose 2
- Projected Dose 2
- Time Weighted Avg 2

**Measurements for LEQ:**
- Integrated Sound Level (LEQ)
- Sound Exposure Level (SEL)

**General measurements:**
- Instantaneous Sound Pressure Level (SPL)
- Maximum RMS Level (LMAX)
- Minimum RMS Level (LMIN)
- Peak Level-Unweighted
- Total Measurement Time
- Time over 115 dBA RMS
- Time over 140 dBL PEAK
- Number of Overloads
- Battery Life in Percent

**Annotated Display**

LARSON•DAVIS designed a mistake-proof display for data readouts which shows the function key pressed along with the parameter value and proper units. Errors due to pushing the wrong button and misunderstanding what the display represents are virtually eliminated.

**Rugged Design**

The Model 710 is built to be a survivor. With its sealed keyboard and rugged case design, it can perform well in harsh environments. Tested at very high and low temperatures and humidity, the 710 is certified to hold its superb accuracy in extreme conditions.

All electronic circuits are completely enclosed with noise-reducing copper shields, enabling the 710 to measure sound pressure levels much lower than competitive instruments. The copper shields also minimize EMI and RF radiation influences allowing its use in power plants and other high radiation areas. UL and BASEEFA intrinsic safety certifications are available for the Model 710.

Measured values are stored in virtual memory for several months or until the operator performs an intentional reset. Data will even survive low batteries and battery changes.

**Measuring Accuracy**

Ambient noise levels in the work place can range from very small to very large SPLs over short intervals of time. Noise impulses (caused by pneumatic tools, punch presses, steam valves, explosions, etc.) can instantaneously raise ambient noise levels to very high SPLs.

The dynamic range of a sound level meter is defined as a measure of the dB ratio between the largest and smallest measurable signal.
within a single range setting. Dynamic range is a key indication of the ability of an instrument to accurately respond to any changes in noise levels, regardless how impulsive the noise.

Competitive sound level meters often offer a smaller dynamic range than the 710 and employ either range switches or autoranging circuits in attempting to span the typical range of sound level measurements. However, autoranging circuits are not adequate to accurately measure many types of noise impulses.

The 710 provides a full 110 dB dynamic range, which eliminates the need for range switches and prevents the loss of inaccurate measurement of data due to overload, under-range, or autorange errors.

The dynamic impulse response is so advanced that the energy of a single 1 mscc pulse can be accurately captured.

In addition to the integrating rms detector, a separate Linear Peak Detetor circuit with 40 dB dynamic range (nominally 113 to 153 dB) is provided, to make detailed analysis of impulse exposure possible.

Because these features free the user from instrument accuracy concerns, more attention can be given to the meaning of the data acquired. There is no need to settle for instruments with limitations when the Model 710 guarantees superb measurement accuracy for any type of noise.

**Printer/Computer Interface**

The 710 has an RS-232 port which allows downloading to a serial printer for a neatly formatted one-page report or to a computer for data filing and customized reporting.

**Customized Features**

Embedded in the memory of each meter is the company name, the meter serial number, calibration offset, and the software revision level. These are printed on all reports to identify product ownership and to deter theft or product misuse. Additional custom features are available including change of standard parameter settings at time of purchase. See the parameter selection sheet for more information.

**Data Security**

The 710 keyboard can be locked by pushing the LOCK key and entering 4 numbers. The keyboard will be inoperative until these same few numbers are again entered.

**Selection Of Dose 1 And Dose 2 Parameters**

The exchange rate, criteria level, and threshold values for Dose, TWA, and Threshold are given default settings at the factory. However, these settings can be changed from the 710 keyboard or from a computer.

**Time History**

The Model 710 has the capability to store and print several thousand time history samples. Dual histogram tables showing distributed rms energy and distributed peak energy (impulses) above 120 dB are standard.

Report compression features allow the user to compress the data history to 15, 30, 60 or 480 sample time intervals. One special print mode allows the 710 to compress the time history data, regardless of the number of samples, to a single page report.

**Model 810 Type 1 SLK**

The Model 810 is a precision, Type 1, integrating sound level meter and noise dosimeter. It retains all the functions of the Model 710 but has a Type 1 frequency response. The standard configuration includes a 5 inch preamplifier (Model 827), and a 1/2 inch precision air condenser microphone. Optional high sensitivity or dosimeter versions are available.
# Model 710 Specifications

## Acoustical and Electrical

**Dynamic Range**
- 110 dB min., 35 to 145 dBA (typical) in one range

**Crest Factor**
- 40 dB (based on 1 sec rms integration)

**Pulse Range**
- 80 dB min. using 1 msec burst of 4 kHz

**Single Pulse Response**
- less than 1.5 dB error for a single cycle of 1 kHz at 140 dB

**Noise Floors**
- 35 dB max. A-weight slow
- 105 to 114 dB unweighted peak

**Frequency Response**
- A-weight meets ANSI S1.4 1983

**Unweighted Peak Detector**
- 11 Hz to 10 kHz

**Detector Accuracy**
- True rms, less than 0.4 dB error from 40 to 140 dB

**Display**
- Custom 16 element LCD
- 0.1 dB, 0.1% resolution

**Power Supply**
- 9 V Alkaline Battery Duracell MN1604 or equivalent
- External Supply: 7 to 16 Vdc at 16 mA max.

## Operating Time
- 40 hr continuous, 3 mo. memory retention

## Standards Met
- ANSI S1.25 1978 Type 2
- ANSI S1.4 1983 Type 2
- IEC 651 Type 2
- IEC 804 Type 2

## Environmental

### Effect of Humidity
- Less than 0.5 dB error with 90% humidity at 25°C (72°F)

### Effect of Temperature
- Less than 0.5 dB error from -20° to 50° C

### Storage Temperature Range
- -30° to 60° C

### Effect of Magnetic Fields
- 47 dB (A or C weight)
- 80 A/M (1 Oersted) and 67 dBA
- 800 A/M (10 Oersted)

## Memory Saturation

<table>
<thead>
<tr>
<th>Elapsed Time</th>
<th>19.4 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose</td>
<td>19999%</td>
</tr>
<tr>
<td>TWA</td>
<td>limited to 19.4 days</td>
</tr>
<tr>
<td>Projected Dose</td>
<td>9999%</td>
</tr>
<tr>
<td>Number of Overloads</td>
<td>255</td>
</tr>
<tr>
<td>Number of Stops</td>
<td>255</td>
</tr>
<tr>
<td>Overload Level</td>
<td>145 dB min.</td>
</tr>
<tr>
<td>SPL</td>
<td>140 dB min.</td>
</tr>
<tr>
<td>Peak</td>
<td>145 dB min.</td>
</tr>
</tbody>
</table>

## Physical

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width: 7.5 cm (3 in)</td>
</tr>
<tr>
<td>Length: 15.0 cm (6 in)</td>
</tr>
<tr>
<td>Depth: 2.5 cm (1 in)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>326 g (11.5 oz.)</td>
</tr>
</tbody>
</table>
Model 810 Specifications

### Acoustical and Electrical

**Dynamic Range**

- 110 dB min, 20 to 130 dBA (typical) in one range

**Crest Factor**

- 40 dB (based on 1 sec rms integration)

**Pulse Range**

- 80 dB min, using 1 msec burst of 4 kHz

**Single Pulse Response**

- less than 1.5 dB error for a single cycle of 1 kHz at 140 dB

**Noise Floors**

- 35 dB max, A-weight slow
- 105 to 114 dB unweighted peak

**Frequency Response**

- A-weight meets ANSI S1.4 1983

**Unweighted Peak Detector**

- 11 Hz to 10 kHz

**Detector Accuracy**

- True rms, less than 0.4 dB error from 40 to 140 dB

**Display**

- Custom 16 element LCD
- 0.1 dB, 0.1% resolution

**Power Supply**

- 9 V Alkaline Battery Duracell MN1604 or equivalent
- External Supply: 7 to 16 Vdc at 18 mA max.

### Operating Time

- 40 hr continuous, 3 mo. memory retention

### Environmental

**Effect of Humidity**

- Less than 0.5 dB error with 90% humidity at 25°C (72°F)

**Effect of Temperature**

- Less than 0.5 dB error from -20° to 50°C

**Storage Temperature Range**

- -30° to 60°C

**Effect of Magnetic Fields**

- 47 dB [A or C weight]
- 80 A/M (1 Oersted) and 67 dBA
- 800 A/M (10 Oersted)

### Standards Met

- ANSI S1.25 1978 Type 1
- ANSI S1.4 1983 Type 1
- IEC 651 Type 1
- IEC 804 Type 1

### Environmental

**Effect of Humidity**

- Less than 0.5 dB error with 90% humidity at 25°C (72°F)

**Effect of Temperature**

- Less than 0.5 dB error from -20° to 50°C

### Environmental

**Storage Temperature Range**

- -30° to 60°C

**Effect of Magnetic Fields**

- 47 dB [A or C weight]
- 80 A/M (1 Oersted) and 67 dBA
- 800 A/M (10 Oersted)

### Memory Saturation

**Elapsed Time**

- 19.4 days

**Dose**

- 19999%

**TWA**

- limited to 19.4 days

**Projected Dose**

- 9999%

**Number of Overloads**

- 255

**Number of Stops**

- 255

**Overload Level**

- 145 dB min.

**SPL**

- 140 dB min.

**Peak**

- 145 dB min.

### Physical

**Dimensions**

- Width: 7.5 cm (3 in)
- Length: 32.4 cm (13 in)
- Depth: 2.5 cm (1 in)

**Weight**

- 454 g (16 oz.)
Examples of the highly descriptive data displays of the model 710
Model 710/810 Customer Specified Parameters

Certain parameters of the 710 must be specified at time of purchase. They are resident in EPROMs and will be retained in case of MEMORY LOSS, such as when the meter is left overnight without a battery. Please complete this form and return it to Larson/Devil Laboratories with your order.

P.O. Number: ___________ LDL Order Number: ___________

Name: ___________________ Company: ________________________

Address: _________________________________________________________

City: ___________________ State/Province, Country _______________________

Customer Name (Maximum of 10 Characters including spaces, will appear on printout)

1. Peak Saved in Time History\(^1\) Yes (default) _____ No _____

2. Peak Distribution\(^2\) Ten entries/sec (default) _____ One entry/sec _____

3. Data Reset in\(^3\) 1 second _____ 2 seconds (default) _____

Dose and other Parameters

Defaults are for U.S.A. OSHA doses and minute by minute Leq time history.

DOSE 1

<table>
<thead>
<tr>
<th></th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Exchange Rate #1 (3,4,5,6)</td>
</tr>
<tr>
<td>B</td>
<td>Threshold #1</td>
</tr>
<tr>
<td>C</td>
<td>Criterion #1</td>
</tr>
</tbody>
</table>

DOSE 2

<table>
<thead>
<tr>
<th></th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Exchange Rate #2 (3,4,5,6)</td>
</tr>
<tr>
<td>E</td>
<td>Threshold #2</td>
</tr>
<tr>
<td>F</td>
<td>Criterion #2</td>
</tr>
<tr>
<td>G</td>
<td>Leq Exchange Rate</td>
</tr>
<tr>
<td>H</td>
<td>Leq Threshold</td>
</tr>
<tr>
<td>I</td>
<td>Leq Criterion (not used)</td>
</tr>
<tr>
<td>J</td>
<td>RMS Exceedance Level</td>
</tr>
<tr>
<td>K</td>
<td>Peak Exceedance Level</td>
</tr>
<tr>
<td>L</td>
<td>Exceedance Hysteresis (0-7)</td>
</tr>
<tr>
<td>M</td>
<td>History Period (n x 10 sec., n=1 to 255)</td>
</tr>
<tr>
<td>N</td>
<td>History Exchange Rate (3,4,5,6)</td>
</tr>
<tr>
<td>O</td>
<td>History Threshold</td>
</tr>
</tbody>
</table>

All values must be whole numbers. Parameters A-F and J-L can be modified from the keypad.

\(^1\) If yes, the highest peak value for each history period is also stored with the time history point.

\(^2\) This specifies the sampling rate of the peak hold detector used for the peak level histogram.

\(^3\) Time required to reset the memory by holding 2 keys simultaneously.
The powerful measurement capabilities of the Larson-Davis Model 710C can now be exploited to their fullest extent with a simple software package which lends itself to casual use as well as to software development.

With the 700-C10C interface cable, the memory and set-up registers of the sound level meter are accessible from a PC compatible at a rate of 1200 baud. The Larson-Davis 710DUMP Program will extract the data out of the Model 710 with very little difficulty, eliminating the task of programming communication routines. Some of the features of the software are:

- Direct print of usual 710C reports to file
- Data dump of histogram or time history to files which can be imported into spreadsheets.
- Commands may be called from batch files with no screen echo.
- Parameters for dose, time history duration, etc may be changed from the PC.

This last feature lets the user modify the history $L_{eq}$ period anywhere from 1 second to $n$ times 10 seconds ($n=1$ to 255). This turns the 710 into a limited environmental noise monitor, with variable interval $L_{eq}$ up to more than 40 minutes and overall histogram.

This program does not analyze or display the data graphically. The Larson-Davis Laboratories 710-SW1 Software allows such manipulation. Contact Larson-Davis for more information.

Sample graph created with FOXGRAPH (TM) using 710DUMP of RMS histogram data for different types of music.
INSTRUCTIONS

These instructions can be viewed by entering TYPE 710DUMP.DOC MORE at a DOS prompt. Other sample files with the extension *.DOC may be viewed.

Before starting the program, connect the 710C to your computer's COM1 RS-232 port with a Model 700-C10C interface cable. RS-232 communication requires much battery power from the 710C. We suggest the use of the external power jack and AC\DC-1 or 2 adapter on the interface cable. This will also power the 710C externally and minimizes battery drain.

710DUMP is activated by typing (at the DOS prompt) the command: 710DUMP
The computer screen will clear and then show the following:

---

Larson Davis Model 710 Data to File Transfer Program

---

Command line options are:

- P1 for User 1 Report...
- P20 to P29 for User 2 Reports...
- P2 for RMS Histogram Data File...
- P3 for Peak Histogram Data File...
- P4 for Time History Data File...
- P5 for all 'R' & 'Q' values File...
- A for All unformatted files i.e. P2-P5
- Q will quiet any output to the screen
- E to Enter new parameters into 710

Any combination of P2 to P5 may be issued for multiple files at one time. For example: '710DUMP P4 P5 Q' will read the overall and history data without printing anything to the screen.

Command line:
(c) Copyright 1989 Larson-Davis

Note: This program utilizes the colors of a CGA monitor or equivalent; on a Monochrome Monitor the program may not operate properly.

The commands for the 710DUMP program may also be included on the command line. This allows 710DUMP to operate from a DOS BATCH command file. The following line is an example of a command line that will extract the USER 2 report 0 from the 710:

710DUMP P20 Q

The report will be extracted from the 710 and placed in a file called 710USER2.DAT and the "Q" command will keep the 710DUMP from changing the screen mode or printing anything to the CRT (this will work with MONOCHROME MONITORS).