NOISE & VIBRATION
INDUSTRIAL HYGIENE
SOLUTIONS

NOISE DOSIMETERS, HUMAN VIBRATION METERS, AND
SOUND LEVEL METERS
Industrial Hygienists, EHS Consultants, and Safety Managers know that complying with noise exposure limits protects workers from permanent hearing loss. Understanding actual noise levels experienced by individuals in the workplace is key to complying with guidelines established by OSHA, ISO, and other global directives. The best way to determine whether an individual’s noise dose is within the acceptable limits is to measure personal noise exposure with a noise dosimeter that meets IEC and ANSI noise dosimetry standards and provides exposure levels in an easy-to-understand format. It is vital to understand whether the worker’s daily noise dose is below or within established action and limit levels. This is critical knowledge in mitigation of worker hearing loss risk, deployment of hearing conservation programs, engineering noise controls, and even mandatory programs for periodic audiological examinations.

**SPARTAN™ NOISE DOSIMETER**

**MODEL 730**

With Spartan 730, control test setup, timers, and measurements for up to four virtual dosimeters on a single device wirelessly via the easy-to-read display and on-device navigation. For greater efficiency, perform these tasks wirelessly via low-energy Bluetooth from a PC or via the exclusive mobile app, LD Atlas™. Spartan facilitates faster, simpler, consistent operation designed to save time and money.

With LD Atlas, all essential tasks, including viewing real-time exposure data, exceedances, battery life, and measurement metrics, can be completed directly from your iOS or Android device. Monitor devices free from the worry of interfering with the work routine of the person being measured. When a test is complete, Spartan communicates with LD Atlas, offering to download data. Generate reports, including the full data file, from the mobile interface before sharing via email. Spartan Noise Dosimeters are configured with built-in wireless chargers in a robust travel case and available in 1-, 3-, 5-, and 10-packs.

- Truly wireless using Bluetooth communication
- Programmable (on/off) LED alarm for exceedances or actions
- Built-in bump detection and motion detection
- Multiple timer modes
- Voice-to-text notations with LD Atlas app
- Robust and rigorously drop tested design
- Optional Event Sound Recording (730-ESR)
- Optional 1/1 Octave Band filters (730-OB1)
Excessive exposure to vibration, whether through the whole body or confined to the hand and arm, has wide-ranging, harmful effects. For Industrial Hygienists, measuring a worker’s exposure to vibration is key to avoiding vibration-related injury and illness. If measured vibration values are higher than action values specified in national and international standards, workers may be at a significant risk of injury. Low back and neck pain, vestibular issues, and hand-arm vibration syndrome are all serious consequences of human body vibration exposure. Human vibration measurement tools with built-in metrics linked to standards assist safety professionals in understanding risk and making smart decisions about exposure risks and actions or deployment of administrative or engineering controls.

**HUMAN VIBRATION METER**  
**MODEL HVM200**

The HVM200 is a small, rugged human vibration meter with built-in Wi-Fi, designed to measure hand-arm, whole body, and general vibration. It includes the metrics and frequency weightings needed to measure human vibration. This three-channel meter meets the requirements of ISO 8041:2005 and measures per ISO 2631-1, -2, & -5 and ISO 5349 in support of the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Vibration at Work Regulations 2005, and the directive 2002/44/EC. This makes the HVM200 an ideal choice to demonstrate compliance with human vibration requirements and regulations worldwide.

- Designed for hand-arm, whole body, and general vibration measurements
- Control and view data from LD Atlas mobile app
- Meets ISO criteria and EU directives
- Ergonomically designed mounting adaptors and application optimized ICP® accelerometers
- USB 2.0 and Wi-Fi
- Removable Micro SD Memory Card
- Replaceable Lithium Battery

**LD ATLAS™ MOBILE APP**  
**FOR SPARTAN & HVM200**

Install LD Atlas on your phone or tablet – available for both iOS and Android – and connect to your Spartan Noise Dosimeter Model 730 and Human Vibration Meter Model HVM200. Use LD Atlas to easily check on the status of your meter, make setup changes for a new measurement, analyze data, listen to recorded audio files, and even create and share PDF reports with your own company logo.
Industrial Hygienists and safety professionals responsible for protecting workers from dangerous levels of noise in the workplace often need to map sound levels in key parts of an industrial environment or throughout an entire plant. Sound maps – (often called sound surveys, noise surveys, or occupational noise surveys) – give health and safety professionals important information to begin the process of reducing worker noise exposure.

Task-based or job-based noise measurements are another component of industrial acoustics – the noise to which a worker is exposed in a given task is measured, and then a formula is used to calculate the overall noise exposure for the workday. An accurate, easy-to-use, IEC and ANSI compliant sound level meter is key to compiling useful sound level information. Octave bands provide information that can help identify noise source, and the ability to annotate results allows users to organize data efficiently.

WORKPLACE SOUND LEVEL METER
MODEL SOUNDTRACK LxT®

The SoundTrack LxT Sound Level Meter was developed to meet the unique needs of those involved in workplace noise exposure assessment and plant noise surveys. It is fully compliant with IEC and ANSI standards for Class 1 or Class 2 sound level meters. In addition, LxT files are fully compatible with the ISO 9612:2009 measurement strategies for task or job-based measurements. Organize your sampling methodology and annotate noise survey data to save time and provide better results.

- Extremely rugged – compact and lightweight
- 30 hours operation using AA lithium batteries
- Large, bright, high-contrast LCD Screen
- Simple one-handed operation
- Real-time octave bands (optional)
- Real-time 1/3-octave bands (optional)
- Digital voice annotation (optional)
- Compatible with utility software for data analysis and reporting
## SPECIFICATIONS

### SPARTAN NOISE DOSIMETER MODEL 730

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Performance</th>
<th>ANSI S1.25-1991 (R2017), IEC 61252 Ed. 1.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Operating Range</td>
<td>52 – 140 dB rms A-weighted</td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>94 dB</td>
</tr>
<tr>
<td>Peak Range</td>
<td>78 – 143 dB Peak, C-weighted</td>
</tr>
<tr>
<td>Peak Weightings</td>
<td>A, C, Z</td>
</tr>
<tr>
<td>RMS Weightings</td>
<td>A, C, Z</td>
</tr>
<tr>
<td>Time Weightings</td>
<td>Slow, Fast, Impulse</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>20 Hz to 10 kHz</td>
</tr>
<tr>
<td>Data Logging</td>
<td>1 second samples</td>
</tr>
<tr>
<td>Logged data</td>
<td>$L_{Aeq}$, $L_{Ceq}$, $L_{Apeak}$, $L_{Cpeak}$, $L_{ASmax}$, $L_{AFmax}$, TWAS, TWA5, Motion</td>
</tr>
<tr>
<td>Memory</td>
<td>8 GB internal</td>
</tr>
<tr>
<td>Communications</td>
<td>Bluetooth Low Energy 4.1</td>
</tr>
<tr>
<td>Battery</td>
<td>Rechargeable Lithium Ion</td>
</tr>
<tr>
<td>Run Time</td>
<td>40 hours typical</td>
</tr>
<tr>
<td>Charge Time</td>
<td>3 hours from full discharge</td>
</tr>
<tr>
<td>Charger</td>
<td>Qi-compliant wireless or USB</td>
</tr>
<tr>
<td>Compliance</td>
<td>CE, ROHS, WEEE</td>
</tr>
<tr>
<td>Motion</td>
<td>Overall motion percentage and bump</td>
</tr>
<tr>
<td>Languages</td>
<td>English, Spanish, Italian, French, Portuguese, German</td>
</tr>
</tbody>
</table>

#### Virtual Dosimeter

- 4 independent with configurable LED indication
- Exchange Rate: 3, 4, 5, 6
- Criterion Level: 70.0 to 100.0 dB
- Threshold: 70.0 to 100.0 dB
- Shift Time: 1 to 24 hours
- Alarms: 2 independent with configurable indication
- Measurement Results: Dose, ProjDose, L_{Aeq}, L_{Ceq}, TWA5, TWAS, Motion, Motion

#### Summary Measured Values (Common to all virtual dosimeters)

$\omega$ = A, C, or Z frequency weighting
$T$ = F, S, or I time weighting

- $L_{Aeq}$, $L_{Ceq}$, $L_{Apeak}$, $L_{Cpeak}$, $L_{ASmax}$, $L_{AFmax}$
- $L_{C-A}$ Exposure (Pa$^2$s & Pa$^2$h), Motion
- $L_{C-A}$, Exceedance count and time for 2 rms and 3 peak thresholds
- Overload count, duration, and percentage

#### Mechanical

- Display: Color LCD 176 x 176 pixels, always on with low light sensor and front light
- Ingress Protection: IP65
- Keys: Four buttons
- Weight: 112 g (4.2 oz.) including clips and windscreen

#### 1/1 Octave Filters (optional)

- Standards: ANSI/ASA S1.11-2014; IEC 61260-1:2014 Class 1
- Filters: 31.5 Hz to 8 kHz
- Linear Operating Range: 42 to 140 dB @ 1 kHz
- Measured Results: $L_{Aeq}$, $L_{Ceq}$, $L_{Apeak}$, $L_{Cpeak}$, $L_{ASmax}$, $L_{AFmax}$, $TWA5$ (Lmin)

#### Event Audio Recording (optional)

- Format: 16-bit .wav
- Sample Rate: 8 kHz
- Recording Time: Fixed: 2 s pre-trigger and 10 s post-trigger
- Trigger Source: $L_{Aeq,1s}$, $L_{Ceq,1s}$
- Trigger Level: 40 – 140 dB, selectable

#### Ordering Information

- 730: Spartan 730 noise dosimeter with one windscreen and two clips. Includes calibration certificate
- 730-PKxx-EU: Complete Spartan 730 noise dosimeter kit that includes quantity ‘xx’ dosimeters and one USB to Bluetooth dongle. Each dosimeter includes one windscreen, two clips, and a calibration certificate.
- 730-ESR: Spartan 730 option to add event sound recording
- 730-OB1: Spartan 730 option to add 1/1 octave filters

#### Accessories

- CAL150: Class 2 calibrator, with user-selectable output 94 or 114 dB at 1 kHz, ½ in. opening with ¼ in. adaptor (ADP109) and calibration certificate included
- WS012-XX: Replacement windscreen for Spartan 730. Available in 1, 3, 5, 10, or 25 packs where XX is the number of windscreens
- 730-CLIPS: Replacement clip for Spartan 730, quantity 2
- CER-730: ISO 17025 factory calibration and certification of Spartan 730
- ADP109: Calibrator adaptor for ½ in. to ¼ in. opening. Used with Spartan 730
- DIVX016: USB to Bluetooth dongle used with Spartan 730
# Human Vibration Meter Model HVM200

## General Specifications

### Input
- **Input**: ICP®, IEPE or CCP
- **Excitation Current**: 2 mA
- **Input Connector**: ¼-28 4-pin male
- **Input Linear Range**:
  - **Fc weighting**: 0.2 mV to 5.0 V at 80 Hz
  - **Wh weighting**: 0.9 mV to 5.0 V at 16 Hz
- **Bandwidth**: 0.4 Hz to 3000 Hz
- **Range**: Single range
- **Calibration**: TEDS or manual entry
- **Overload Indicator**: LED on HVM200 and icon in app

### Sample Rate
- **7161.458 Hz**

### Measured Values (General)
- **Measurement Modes**: Hand-arm, Whole-body, Vibration
- **Metrics by mode**:
  - **Vibration**: RMS, Peak, Min, Max (x, y, z & Σ)
  - **Hand-arm**: RMS, Peak, Min, MTVV, A(1), A(2), A(4), A(8) (x, y, z & Σ)
  - **Whole-body**: RMS, Peak, Min, MTVV, A(8), A(8)Exp, EP, VDV (x, y, z & Σ)
- **Frequency Weightings**:
  - **Vibration**: Fa (0.4 Hz to 100 Hz), Fb (0.4 Hz to 1250 Hz), Fc (6.3 Hz to 1250 Hz)
  - **Hand-arm**: Wh
  - **Whole-body**: Wb, Wc, Wd, We, Wf, Wj, Wk, Wm
- **Measurement Units**: m/s², cm/s², ft/s², in/s², g, dB
- **Time History (Logging)**:
  - **Store Interval**: 1, 2, 5, 10, 20, 30 s; 1, 2, 5, 10, 20, 30 min; 1 hr
- **Stored Values**: RMS and peak for x, y, z & Σ

### 1/1 and 1/3 Octave Filters (Optional)
- **1/1 Octave Filters**: 0.5 Hz to 2000 Hz
- **1/3 Octave Filters**: 0.4 Hz to 2500 Hz
- **Filter Selection**: None, 1/1, 1/3 or 1/1 and 1/3
- **Weighting**: Unweighted
- **Measured Values**: RMS, Max
- **Compliance**: IEC 61260-1:2014 Class 1, ANSI S1.11-2014 Part 1, Class 1

### Time Data Recording (Optional)
- **Data Format**: Binary – see HVM200 manual

### Power Supply
- **Internal Battery**: Rechargeable Li-ion, user replaceable
- **External Power**: USB (PSA035)
- **Charge Time**: 3.5 hours using PSA035
- **Battery Run Time**:
  - **Connect to Wi-Fi**: 12 hours
  - **Access Point (AP)**: 9 hours
- **USB Power**: 180 mA with battery charged
- **Communication Interface**:
  - **USB**: USB 2.0 hi-speed (micro USB type B connector)
  - **Wi-Fi**: 802.11 b/g with WPA and WPA2

## Ordering Information

- **HVM200**: 3-channel vibration meter for general and human vibration. Includes CBL217-01. Sensors not included
- **HVM200-HA-40F**: Kit for hand-arm vibration includes HVM200, CCS047, CCS048-L, ADP081A, SEN040F & SWW-G4-HVM
- **HVM200-WB**: Kit for whole body vibration includes HVM200, CCS047, SEN027 & SWW-G4-HVM
- **HVM200-ALL-40F**: Kit for hand and whole body vibration includes HVM200, CCS047, CCS048-L, ADP081A, SEN040F, SEN027 & SWW-G4-HVM
- **HVM200-0B3**: Option for 1/1 and 1/3 octave filters. Includes SWW-G4-HVM
- **HVM200-RAW**: Option to record sampled waveforms for all three channels
- **SWW-G4-HVM**: 4G license to add support for HVM100 and HVM200 that can be installed concurrently on up to five computers
- **SWW-G4-SDK**: Software Development Kit

## Optional Accessories
- **CBL216**: ¼-28 4-pin to ¼-28 4-pin, 5 ft. (1.5 m) cable
- **CBL217**: ¼-28 4-pin to ¼-28 4-pin, 5 ft. (1.5 m) cable
- **SEN020**: Triaxial accelerometer, 0.1 mV/(m/s²), 10-32 fem therm
- **SEN026**: Triaxial accelerometer, 1 mV/(m/s²), for ADP063
- **SEN027**: Seat pad with triaxial accelerometer, 10 mV/(m/s²)

## Compliance
- ISO 8041:2005 Human response to vibration - Measuring instrumentation
- IEC 61326-1:2013 EMC
- IEC 61325-2-3:2013 EMC safety
- ISO 2631-1:1997 Whole-body vibration – General requirements
- ISO 2631-4:2001 Whole-body vibration – Rotational motion
- ISO 2631-5:2004 Whole-body vibration – Vibration containing shocks
- ISO 5349-1:2001 Hand-transmitted vibration – General requirements
- EN 1032:2003 Mechanical vibration - Testing of mobile machinery
- ANSI S2.70

## Run Modes
- **Manual**: Run/stop from button or using app
- **Timed**: Start at present time
- **Delayed**: Start after 5, 10, 20, 30 or 60 second delay

## Physical
- **Height**: 4.6 in. (11.8 cm)
- **Width**: 2.6 in. (6.7 cm)
- **Depth**: 0.7 in. (1.8 cm)
- **Weight (including battery)**: 4.6 oz. (130 gm)

## Environmental
- **Operating Temperature**: 14 ºF to 122 ºF (-10 ºC to 50 ºC)
- **Operating Humidity**: 0 to 90% relative humidity, non-condensing

## Included Accessories
- **PSA035**: 100 – 240 VAC to 5V USB power supply with adapters
- **CBL217-01**: ¼-28 4-pin to ¼-28 4-pin, 1 ft. (30 cm) cable
- **BAT018**: Internal rechargeable lithium battery

## Accessories
- **CBL216**: ¼-28 4-pin to 4-pin mini connector for SEN026
- **CBL217**: ¼-28 4-pin to ¼-28 4-pin, 5 ft. cable
- **SEN020**: Triaxial accelerometer, 0.1 mV/(m/s²), 10-32 fem therm
- **SEN026**: Triaxial accelerometer, 1 mV/(m/s²), for ADP063
- **SEN027**: Seat pad with triaxial accelerometer, 10 mV/(m/s²)
**ORDERING INFORMATION (CONTINUED)**

SEN040F  
Triaxial accelerometer, 0.1 mV/(m/s), for ADP080A, 81A and 82A

SEN041F  
Triaxial accelerometer, 1 mV/(m/s), for ADP080A, 81A and 82A

ADP063  
Palm adapter for use with SEN040F or SEN041F

ADP080A  
"T" adapter for use with SEN040F or SEN041F

ADP081A  
Handle adapter for use with SEN040F or SEN041F

ADP082A  
Circle clamp adapter for use with SEN040F or SEN041F

ADP084A  
Kit including ADP080A, ADP081A, ADP082A and ADP063

CCS047  
Hard shell case for HVM200 and accessories

CCS048-S  
Small arm band for HVM200, fits arm circumference of 8 to 12.5 in. (20 to 32 cm)

CCS048-L  
Large arm band for HVM200, fits arm circumference of 10.5 to 16.5 in. (27 to 42 cm)

394C06  
Hand-held shaker, 9.81 m/s² at 159.2 Hz

CER-HVM200  
Factory calibration of HVM200, does not include sensor

**GENERAL SPECIFICATIONS (CONTINUED)**

- **Humidity:** up to 95% non-condensing
- **International Protection Rating:** IP 54
- **Standard Compliance:**
  - **ANSI:** S1.4-2014, S1.25-1991 (R 2007), S1.11-2004
  - **CE:** Directive 2004/108/EC, IEC 61326-1:2005

**ORDERING INFORMATION**

- **LXT1**  
  Class 1 SoundTrack LxT with preamplifier and free field microphone
- **LXT1L**  
  Class 1 SoundTrack LxT with low range option, preamplifier and free field microphone
- **LXT1-RI**  
  Class 1 SoundTrack LxT with preamplifier and random or diffuse field microphone
- **LXT1L-RI**  
  Class 1 SoundTrack LxT with low range options, preamplifier and random or diffuse field microphone
- **LXT1B**  
  Class 1 SoundTrack LxT meter only. Does not include preamplifier or microphone
- **LXT1-GPR**  
  Class 1 SoundTrack LxT configured with ¼ in. microphone for measuring high level sound (> 160 dB)
- **LXT1-NFR-PK1**  
  Class 1 N’Forcer kit – includes SoundTrack LxT, CAL200 calibrator, portable printer, preamplifier, free field microphone, windscreen and padded carrying case
- **LXT2**  
  Class 2 SoundTrack LxT with preamplifier and free field microphone
- **LXT2L**  
  Class 2 SoundTrack LxT with low range option, preamplifier and free field microphone
- **LXT2B**  
  Class 2 SoundTrack LxT meter only. Does not include preamplifier or microphone
- **LXT2-NFR-PK1**  
  Class 2 N’Forcer kit – includes SoundTrack LxT, CAL150 calibrator, portable printer, preamplifier, free field microphone, windscreen and padded carrying case

**Firmware Options**

- **LXT-LOG**  
  Time History Data Logging
- **LXT-HSLOG**  
  High Speed Logging Option (to 100ms)
- **LXT-ENV**  
  Measurement History (intervals)
- **LXT-CN**  
  Community Noise, Ldn & Lden
- **LXT-DVA**  
  Digital Voice Annotation
- **LXT-OB1**  
  1/1 Octave Real Time Filters
- **LXT-OB3**  
  1/1 and 1/3 Octave Real Time Filters

**Accessories**

- **LXT-ACC**  
  Type 1 Accessory Kit - hard shell case, CAL200 calibrator, USB cable, AC adapter, windscreen and Utility Software
- **LXT-ACC1**  
  Type 2 Accessory Kit - Hard shell case, CAL150 calibrator, USB cable, AC adapter, windscreen and G4 Utility software
- **LXT-CCS**  
  Hand Shell Carrying Case
- **CAL150**  
  Type 2 Microphone Calibrator
- **CAL200**  
  Type 1 Microphone Calibrator
- **SWW-DNA**  
  Advanced Analysis Software
- **SWW-DNA-LXT**  
  DNA Instrument Driver for Model LxT
- **LXT-RPT**  
  Full test report for new LxT

**SOUNDTRACK LxT®**

### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>SPL (dB SPL)</th>
<th>SPL (dB SPL)</th>
<th>SPL (dB SPL)</th>
<th>SPL (dB SPL)</th>
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</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>39 to 140 dB</td>
<td>37 to 139 dB</td>
<td>27 to 118 dB</td>
<td>31 to 125 dB</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>39 to 140 dB</td>
<td>37 to 139 dB</td>
<td>29 to 118 dB</td>
<td>35 to 125 dB</td>
</tr>
<tr>
<td><strong>Z</strong></td>
<td>44 to 140 dB</td>
<td>42 to 139 dB</td>
<td>34 to 118 dB</td>
<td>42 to 125 dB</td>
</tr>
</tbody>
</table>

- **SPL maximum level:** 140 dB SPL, 139 dB SPL, 118 dB SPL, 125 dB SPL
- **Peak level:** 143 dB, 142 dB, 121 dB, 128 dB

- **Operating temperature:** 14 to 122 °F (-10 to 50 °C)
- **Storage temperature:** -22 to 140 °F (-30 to 60 °C)

- **Environmental:**
  - **Battery life:** Approximately 22 hours (alkaline cells), 30 Hours (lithium cells), depending on usage
  - **Dimensions:** 8.8” L x 2.8” W x 1.6” D (22.4 cm x 7.1 cm x 4.1 cm), 11.5” L (29.2 cm) with preamplifier and microphone
  - **Weight:** 1.0 lbs (471 g), 1.1 lbs (513 g) with preamplifier and microphone

- **Data Storage / Communication:**
  - **Flash Data Storage:** 2GB standard
  - **Communication to PC via USB**

- **Power:**
  - Internal: 4 AA cells, 1.5 Volts each; Alkaline, NiMH, or Lithium
  - External: 5.0 VDC ±5%, USB powered

- **Physical Characteristics:**
  - **Dimensions:** 8.8” L x 2.8” W x 1.6” D (22.4 cm x 7.1 cm x 4.1 cm), 11.5” L (29.2 cm) with preamplifier and microphone
  - **Weight:** 1.0 lbs (471 g), 1.1 lbs (513 g) with preamplifier and microphone

- **Display / Keypad:**
  - Display: High contrast, monochrome, black on white, 1/8th VGA 160 x 240 dot graphics, 4 level grey-scale, bright white LED backlighting
  - Keypad: Silicone elastomer “quiet touch” with tactile feedback, 4 dedicated function keys, 3 context soft-keys, and 5 navigation keys

- **Environmental:**
  - **Operating temperature:** 14 to 122 °F (-10 to 50 °C)
  - **Storage temperature:** -22 to 140 °F (-30 to 60 °C)
Larson Davis offers a full line of noise and vibration measurement instrumentation such as Class 1 and 2 sound level meters, outdoor noise monitoring systems, personal noise dosimeters, human vibration meters, audiometric calibration systems, microphones and preamplifiers, and data analysis software. Instrumentation is used in community and environmental noise monitoring, measurement of building acoustics, managing worker exposure to noise and vibration, and various automotive, aerospace, and industrial applications. Larson Davis is a division of PCB Piezotronics, Inc., a wholly owned subsidiary of MTS Systems Corporations.