HUMAN VIBRATION METER

LARSON DAVIS
A PCB DIVISION

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HVM200 HUMAN VIBRATION METER

FEATURES

- Control and view data from a mobile app (Android™ or Apple iOS)
- Removable micro SD memory card
- USB 2.0 and Wi-Fi
- Replaceable lithium battery
- ISO 8041:2021 compliant filters
- Three measurement channels

APPLICATIONS

- Hand-arm vibration measurement to ISO 5349
- Whole body measurement to ISO 2631
- General vibration measurement

WORKER SAFETY & PRODUCT TESTING

The HVM200 is a small, rugged, 3-channel vibration meter with built in Wi-Fi that can be used to measure hand-arm, whole body and general vibration. It includes the metrics and frequency weightings needed to measure human vibration. The measurement filters meet the requirements of ISO 8041:2021 and are designed to measure per ISO 2631-1, 2 & 5 and ISO 5349 in support of the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and the directive 2002/44/EC. This makes the HVM200 an ideal choice for an instrument used to demonstrate compliance with human vibration requirements and regulations worldwide.

WIRELESS MOBILE INTERFACE

Leverage the power of wireless portable electronics to make measuring human vibration easy. Our free app available on Google Play™ and the Apple App Store can be used to improve the way measurements are made by using portable electronics to control the measurement and view data.

1/1 AND 1/3 OCTAVE FILTERS (OPTIONAL)

Determine the frequency content of measured vibration levels by configuring the HVM200 with the optional IEC 61260 class 1 compliant 1/1 and 1/3 octave filters (0.5 Hz to 2000 Hz and 0.4 Hz to 2500 Hz respectively). Data can then be transferred for reporting or further analysis using USB, Wi-Fi or a removable micro SD memory card.

RECORD SAMPLED TIME DOMAIN DATA (OPTIONAL)

Because the HVM200 supports a large removable micro SD memory (up to 32 GB), it is now possible to store and archive the sampled time data for all three channels. Data is stored in a 24-bit format and files can be read with tools such as Matlab® or GNU Octave for additional processing.

INCLUDED ACCESSORIES	
PSA035	Universal AC to USB power supply with USB cable (CBL218) and plug adaptors
BAT018	User replaceable 2250 mAh rechargeable battery that will power the HVM200 continuously for 8 to 12 hours
CBL217-01	One foot (30 cm) cable for connecting sensors
SD Card	8 GB removable memory micro SD flash memory card for data storage

SOFTWARE SOLUTIONS

APP BASED CONNECTIVITY

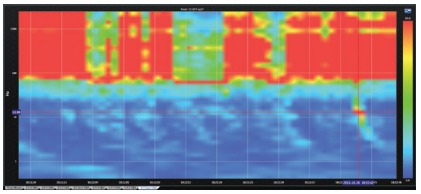
Your smartphone or other portable electronic device can now become the keypad and display for the HVM200 using our app for smartphones and tablets to control and view data. By default the HVM200 is configured to provide its own network through a hotspot to ensure that you always have a network, you can communicate with the HVM200 by connecting your phone to the HVM200 hotspot.

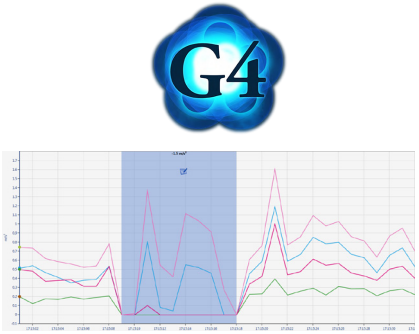
Alternatively, the HVM200 can be configured to be part of an existing Wi-Fi network and it will automatically find and connect to configured networks. After connecting your mobile device to the same network, the app will automatically find all HVM200 devices on the local network and allow them to be controlled and results viewed. Download the LD Atlas™ app for free – available on Google Play™ and the Apple App Store®.

- Manage instrument setups
- Run and stop measurements
- View data except 1/1 and 1/3 octave data
- Manage Wi-Fi connections
- Calibrate and check calibration
- View files
- Schedule measurements

LD G4 UTILITY: REPORTING & ANALYSIS SOFTWARE

The LD G4 Utility Model SWW-G4-HVM for PC supports the HVM200 allowing you to connect, control, download, and view data from multiple devices simultaneously. View your data graphically and in spreadsheet format, generate reports, and easily export in Excel® format for further data analysis. Using LD G4 with the HVM option enabled, you can graphically modify data and the software will automatically recalculate metrics based upon your inputs to deliver a "What If" analysis.





- Instrument setup and control
- Data download (HVM100 or HVM200)
- View time history in tabular or graphical formats
- Perform "what-if" analysis by editing data and recalculating results
- Print reports with resulting metrics
- Export data and archives

SOFTWARE DEVELOPMENT KIT

When you need to write your own software or integrate the HVM200 into existing software, we offer a software development kit, SDK, to facilitate the development. The HVM200 API is based upon http, html and JSON so command and responses are plain text and highly portable; which makes software development much easier. A DLL with a C-sharp API is also provided with the SDK in order to access data in files.

HVM200 APPLICATIONS

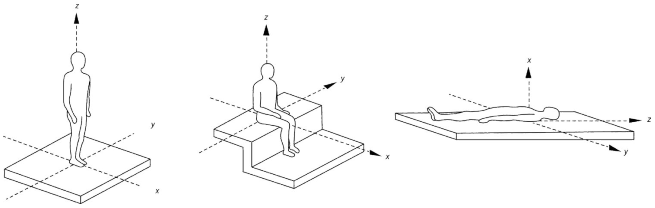
MEASURING HUMAN VIBRATION

Both whole body and hand-arm vibration can be a significant source of injury risk in the workplace. Effects of human vibration range from Hand-Arm Vibration Syndrome to lower back, neck, and shoulder issues. Vibration experienced in workplaces such as dental offices, mining operations, construction sites, industrial plants, and more should be taken seriously. When an employer suspects workers are being harmed by vibration, the best way to ensure safety is to measure the vibration to which the worker is exposed throughout a typical work day.

Tool and equipment manufacturers may publish vibration values, but in practice the vibration experienced by the user can vary widely depending on the condition of the tool, tool accessories (such as drill bits), the type of work surface, the worker's posture or technique, or other factors. The best way to determine if a particular tool is safe for a given user in a given situation is to measure the vibration with a human vibration meter.

HAND-ARM VIBRATION

Compliance with hand-arm vibration requirements in directive 2002/44/EC and other national standards can be measured according to the method specified in ISO 5349-1 and 5349-2 using the HVM200. The HVM200 can also be used to determine tool specific vibration levels using methods specified in ISO 28927 and ISO 20643. Hand-arm vibration is always measured using the Wh weighting which is automatically set by the HVM200 when selecting hand-arm measurement mode.



WHOLE-BODY VIBRATION

Use the HVM200 with the SEN027 seat pad to measure whole body vibration as specified in the ISO 2631 series of standards. User definable weighting factors (default is 1.4, 1.4 and 1.0) are used to compute A(8) and VDV. ISO compliant frequency weightings for various whole body measurement situations are built in as seen in the weightings table below.

HVM200 WHOLE-BODY WEIGHTINGS

Weighting	Description	Definition
W_b	Z-axis vertical vibration	ISO 8041, ISO 2631-4
W_c	X-axis, seat back	ISO 8041, ISO 2631-1
W_d	X-axis & y-axis, seat surface	ISO 8041, ISO 2631-1
W_e	Rotational seat surface	ISO 8041, ISO 2631-1
W_f	Motion sickness (vertical)	ISO 8041, ISO 2631-1
W_j	Vertical recumbent	ISO 8041, ISO 2631-1
W_k	Z-axis, seat surface	ISO 8041, ISO 2631-1
W_m	Vibration in buildings	ISO 8041, ISO 2631-2

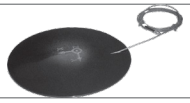
GENERAL VIBRATION

Couple the HVM200 with a USB power supply and general purpose accelerometer to create a small and portable vibration data logger. This capability can be used for product testing and production line quality assessments. The HVM200 can also be used to make ISO 4866 measurement of structure vibration and ISO 6954 measurement of ship vibration levels.

CHOOSE YOUR CONFIGURATION

SENSOR SELECTION GUIDE

It is important to select an accelerometer that provides the measurement range needed for the vibration environment being tested. An adapter should also be chosen that allows for the measurement of vibration as close as possible to the location where vibration is transferred to the body. For applications where there is a need to measure lower vibration levels, the higher sensitivity SEN041F, 1 mV/(m/s^2), can be used. The guide below shows recommend sensor and adapter combinations for a variety of common measurement applications.

	HAND-ARM VIBRATION				WHOLE-BODY VIBRATION	GENERAL VIBRATION
Adapter Type	Handle Adapter	"T" Adapter	Clamp Adapter	Palm Adapter	Seat Adapter	
Cable						
	CBL217-01(incl)	CBL217-01(incl)	CBL217-05	CBL216	Included with SEN027	CBL217-05
Sensor						
	SEN040F	SEN040F	SEN040F	SEN026	SEN027	SEN020
	S = 0.1 mV/(m/s^2)	S = 0.1 mV/(m/s^2)	S = 0.1 mV/(m/s^2)	S = 1 mV/(m/s^2)	S = 10 mV/(m/s^2)	S = 0.1 mV/(m/s^2)
	1.0* to 49k m/s^2	1.0* to 49k m/s^2	1.0* to 49k m/s^2	0.1* to 49k m/s^2	0.02* to 98 m/s^2	0.1* to 14.7k m/s^2
Adapter					Included	Included stud mount
	ADP081A	ADP080A	ADP082A	ADP063		
Typical Use	Accelerometer held to the side of the hand	Accelerometer held between fingers	Clamp to handle of a machine	Measure at the palm under a glove	Measure from a sitting or standing position	General purpose

*When using Wh frequency weighting

ADAPTORS

"T" Adapter Model ADP080A

Palm Adapter Model ADP063

Clamp Adapter Model ADP082A

Handle Adapter Model ADP081A

OPTIONAL ACCESSORIES

Arm Band
Model CCS048-L & CCS048-S
The CCS048 arm band allows the HVM200 to be attached to the forearm of a worker when making hand-arm vibration measurements. With the delayed start feature measurements can be made by a single person. Available in small and large sizes.

Hard Shell Case Model CCS047
Provides storage and transport protection for HVM200 with sensors and accessories. Case measures 15 x 19 x 7 inches (38 x 48 x 18 cm) and has a durable, hard shell designed for long term, industrial usage.

Hand-held Shaker Model 394C06
The 394C06 shaker will output 1 g (9.81 m/s^2) at 159.2 Hz. Supporting sensors up to 7.4 oz (210 gm) the 394C06 is an excellent choice for field verification of system setup and functionality.

Portable Vibration Calibrator Model 9210D
Meet not only the "in-situ" requirements of ISO 8041 "Human response to vibration – measuring instrumentation" but also achieve mechanical "verification testing" requirements.

MORE INDUSTRIAL HYGIENE SOLUTIONS

SPARTAN™ NOISE DOSIMETER

MODEL 730

The Spartan Noise Dosimeter Model 730 is designed to make worker noise dose measurements easy and fast. With Spartan, control test setup and measurements directly from the Larson Davis Atlas™ mobile app. All essential tasks can be completed from your iOS™ or Android™ device.

LD Atlas offers interference-free monitoring using low-energy Bluetooth, ensuring that you get the valuable data you need the first time. When a test is complete, Spartan communicates with LD Atlas to download the data which is viewable directly from a phone or tablet. Generate reports, including the full data file, from the mobile interface before sharing via email. Spartan Noise Dosimeters are available in 1-, 3-, 5-, and 10-packs.

- Truly wireless – with wireless charging and Bluetooth communication
- Options to connect via USB
- Full control and live monitoring via LD Atlas app
- Download and view measurements, generate and share pdf reports on-the-go from the app
- Automatically connect and download data via G4 LD Utility software
- Built-in bump and motion detection
- Optional Event Sound Recording (730-ESR)
- Optional 1/1 Octave filters (730-OB1)

SPARTAN SOUND LEVEL METERS FOR WORKPLACE NOISE

SERIES 821IH AND 721IH

The Spartan Series of Sound Level Meters 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, measurement 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.

- Easy-to-navigate, responsive touch display
- Long battery life
- Wireless charging
- Automatic data transfer
- Built-in noise dose metrics

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 3 000 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	
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/s^2, cm/s^2, ft/s^2, in/s^2, g, dB
Time History (Logging)	
Storage Interval	1, 2, 5, 10, 20, 30 s; 1, 2, 5, 10, 20, 30 min; 1hr
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
Weighting	Unweighted
Measured Values	RMS, Max
Compliance	IEC 61260-1:2014 Class 1
Power Supply	
Internal Battery	Rechargeable Li-ion, user replaceable
Charge Time	3.5 hours using PSA035
Battery Run Time	Up to 9 hours (12 hours for WiFi disabled or disconnected)
Communication Interface	
Communication	USB and 802.11 b/g WiFi
Physical	
Dimensions	4.6 x 2.6 x 0.7 in. (118 x 67 x 18 mm)
Weight (Including Battery)	4.6 oz. (130 gm)
Environmental	
Operating Temperature	14 °F to 122 °F (-10 °C to 50 °C)
Operating Humidity	0 to 90% relative humidity, non-condensing

GENERAL SPECIFICATIONS (CONTINUED)
Compliance
ISO 8041:2021 Human response to vibration - Measuring Instrumentation (See manual for scope of compliance)
IEC 61010-1 (2010) Safety
IEC 61326-1:2013 EMC
IEC 61325-2-3:2013 EMC safety
ISO 2631-1:1997 Whole-body vibration – General requirements
ISO 2631-2:2003 Whole-body vibration – Vibration in buildings
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
ISO 5349-2:2001 Hand-transmitted vibration – Practical guidance
EN 1032:2003 Mechanical vibration – Testing of mobile machinery
ANSI S2.70

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-arm 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	G4 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 4-pin mini connector for SEN026
CBL217	¼ – 28 4-pin to ¼ – 28 4-pin, 5 ft (1.5 m) cable
CBL237	¼ – 28 4-pin to three 10-32 plugs for SEN033 cable. Available in 5, 10 & 20 ft (1.5, 3 & 6 m)
SEN033	Single axis seismic accelerometer, 1000 mV/g, ICP, 50 gm, 0.06 to 450 Hz, 10-32 top connector with TEDS. Use with CBL237
SEN034	Triaxial accelerometer for seismic, 1000 mV/g, ICP, 0.5 to 3000 Hz, ¼ – 28 4-pin connector with TEDS. Use with CBL217
SEN041F	Triaxial accelerometer, 1 mV/(m/s^2), for ADP080A, 81A and 82A
CCS047	Hard shell case for HVM200 and accessories
CCS048-S	Small arm band for HVM200, fits arm circumference of 8 in to 12.5 in (20 to 32 cm)
CCS048-L	Large arm band for HVM200, fits arm circumference of 10.5 in to 16.5 in (27 to 42 cm)
394C06	Hand-held shaker, 9.81 m/s^2 at 159.2 Hz
CER-HVM200	Factory calibration of HVM200, does not include sensor

LARSON DAVIS
A PCB DIVISION

3425 Walden Avenue, Depew, NY 14043 USA

larsondavis.com | sales@larsondavis.com | 888 258 3222 | +1 716 926 8243

MD-0394 revB [0224]