HUMAN VIBRATION METER

for Worker Safety & Product Testing

HVM 200

HUMAN VIBRATION METER

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

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 8041:2005 compliant
- Three measurement channels

Applications:

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

The HVM200 is a small rugged 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. This 3 channel meter meets the requirements of ISO 8041:2005 and it is 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.
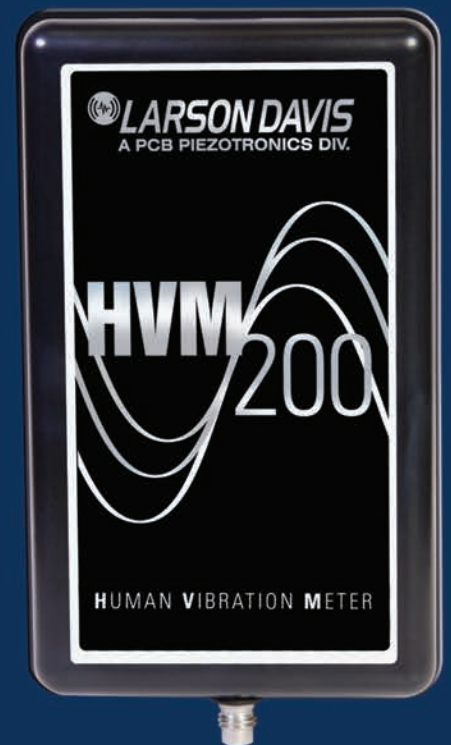
App for Mobile Platforms

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 HVM200 app for free available on Google Play and the Apple App Store. To find the app, search for HVM200 in the online store.

The HVM200 app provides functionality to
- 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

# G4 Reporting and Analysis Software for PC's

HVM Option (SWW-G4-HVM)

Functionality includes:

- 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

Free Evaluation

The G4 HVM Module can be downloaded from www.larsondavis.com. It will fully support the HVM200 for 30 days, after 30 days, a licenses must be purchased to activate the HVM200 support.
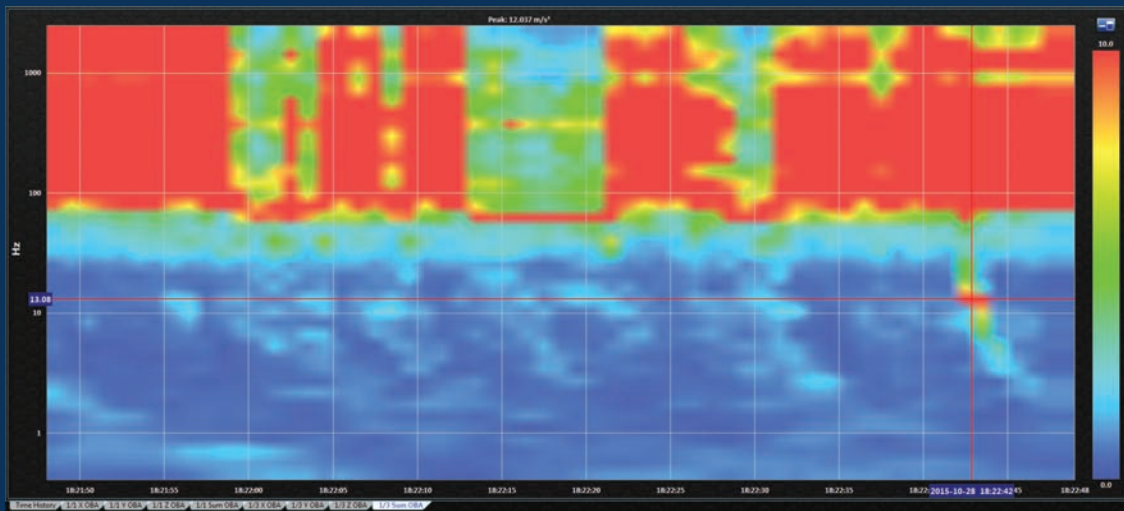
"What if" Analysis

Using G4 with the HVM option, you can graphically modify data and G4 will automatically recalculate metrics based upon the given inputs and display the results.

Original Data				"What if" Analysis	Results			

Original Data

2015-Oct-14 17:14:46
00:01:00

x	y	z	Sum
0.8717	0.3277	0.6346	1.1270
2.0435	0.7935	1.3495	2.5357
6.4087	2.6205	4.1421	7.7881
0.1989	0.0946	0.1893	0.2905
0.1125	0.0423	0.0819	0.1455
0.0796	0.0299	0.0579	0.1029
0.0563	0.0212	0.0410	0.0727
0.0398	0.0150	0.0290	0.0514
>24	>24	>24	>24
>24	>24	>24	>24

Results

2015-Oct-14 17:14:46
00:01:00

x	y	z	Sum
0.5880	0.2302	0.4459	0.8164
2.0435	0.7935	1.3495	2.5357
4.9087	1.2576	3.1941	6.2881
0.0000	0.0000	0.0000	0.0000
0.0759	0.0297	0.0576	0.1054
0.0537	0.0210	0.0407	0.0745
0.0380	0.0149	0.0288	0.0527
0.0268	0.0105	0.0204	0.0373
>24 Hours	>24 Hours	>24 Hours	>24 Hours
>24 Hours	>24 Hours	>24 Hours	>24 Hours

Software Development Kit (SWW-G4-SDK)

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.

Applications

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
Wb	Z-axis vertical vibration	ISO 8041, ISO 2631-4
Wc	X-axis, seat back	ISO 8041, ISO 2631-1
Wd	X-axis & y-axis, seat surface	ISO 8041, ISO 2631-1
We	Rotational seat surface	ISO 8041, ISO 2631-1
Wf	Motion sickness (vertical)	ISO 8041, ISO 2631-1
Wj	Vertical recumbent	ISO 8041, ISO 2631-1
Wk	Z-axis, seat surface	ISO 8041, ISO 2631-1
Wm	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.
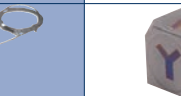
Sensor Selection Guide

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[1] to 49k m/s^2	1.0[1] to 49k m/s^2	1.0[1] to 49k m/s^2	0.1[1] to 4.9k m/s^2	0.02 to 98 m/s^2	0.1[1] to 14.7k m/s^2
Adapter	ADP081A	ADP080A	ADP082A	ADP063	Included	Includes stud mount
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

[1] When using Wh frequency weighting

Optional Accessories

"T" Adapter

Palm Adapter

Clamp Adapter

Handle Adapter

Hard Shell Case (CCS047)

Provides storage and transport protection for an HVM200 with sensors and accessories. The 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.

Arm Band (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.

Hand-held Shaker (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.

Included Accessories

USB Power Supply (PSA035)

Universal AC to USB power supply with USB cable (CBL218) and plug adapters.

Sensor Cable (CBL217-01)

One foot (30 cm) cable for connecting sensors

Rechargeable Li-ion Battery (BAT018)

User replaceable 2250 mAh rechargeable battery that will power the HVM200 continuously for 8 to 12 hours.

8 GB Removable Memory

Micro SD flash memory card for data storage.

Specifications

Input

Input Type	ICP® , IEPE or CCP
Excitation Current	2 mA
Input Connector	¼-28 4-pin male

Input Linear Range
  (Fc weighting)
  (Wh weighting)
	0.2 mV to 5.0 V at 80 Hz
	0.09 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

Measurement Modes	Hand-arm, Whole-body, Vibration
Metrics by mode: Vibration Hand-arm Whole-body	 RMS, Peak, Min, Max (x, y, z & Σ) RMS, Peak, Min, MTVV, A(1), A(2), A(4), A(8) (x, y, z & Σ) RMS, Peak, Min, MTVV, A(8), A(8)Exp, EP, VDV (x, y, z & Σ)
Frequency Weightings: Vibration Hand-arm Whole-body	 Fa (0.4 Hz to 100 Hz), Fb (0.4 Hz to 1250 Hz), Fc (6.3 Hz to 1250 Hz) Wh 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)

Store 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
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
  Access Point (AP)
	
	12 hours
	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

Run Modes

Manual	Run/stop from button or using app
Timed	Start at preset 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 °F to 122 °F (- 10 °C to 50 °C)
Operating Humidity	0 to 90% relative humidity, non-condensing

Included Accessories

PSA035	100 – 240 VAC to 5 V 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

Compliance

ISO 8041:2005 Human response to vibration - Measuring instrumentation
IEC 61010-1 (2001) 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

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
SEN020	Triaxial accelerometer, 0.1 $mV/(m/s^2)$, 10-32 fem thread
SEN026	Triaxial accelerometer, 1 $mV/(m/s^2)$, for ADP063
SEN027	Seat pad with triaxial accelerometer, 10 $mV/(m/s^2)$
SEN040F	Triaxial accelerometer, 0.1 $mV/(m/s^2)$, for ADP080A, 81A and 82A
SEN041F	Triaxial accelerometer, 1 $mV/(m/s^2)$, for ADP080A, 81A and 82A
ADP063	Palm adapter for use with SEN026
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/s^2 @ 159.2 Hz
CER-HVM200	Factory calibration of HVM200, does not include sensor

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-OB3	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
SWW-G4-SDK	Software Development Kit

Model HVM200 **Human Vibration Meter**

Hand-arm

Whole Body

General Vibration
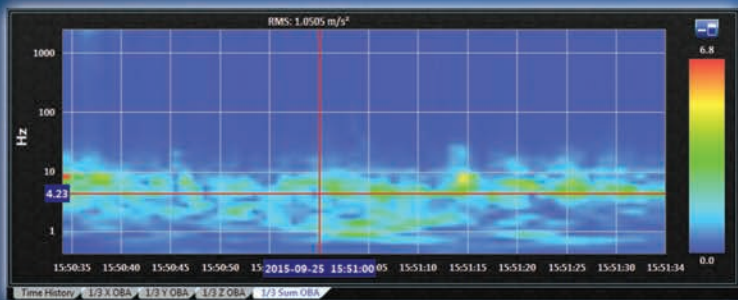
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Larson Davis provides complete solutions for noise and vibration measurement and analysis. From stand-alone, simple-to-use instruments to complete systems including sensors, data acquisition, and software, Larson Davis has what you need.

As a division of PCB Piezotronics, Inc., Larson Davis guarantees Total Customer Satisfaction through our outstanding limited warranty; no-charge 24 hours toll-free technical support; global distribution; and worldwide customer service.

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