



## VIBRATION MONITORS & REAL-TIME VIBRATION ANALYZERS

### *HAVPro Features:*

- Up to Three Simultaneous Measurement Channels
- Basic Monitor Provides Fast, Simple Operation
- Comprehensive Summary and Time History Data
- Serves Hand-Arm, Whole-Body and Machine Vibration Applications
- Large 100 Test Memory Capacity
- Fully Integrated with QuestSuite® Professional II "The System Solution" Software Application
- RS-232 Interface, Optional USB Adapter



### *VI-400Pro Features:*

- Up to Four Simultaneous Measurement Channels
- 1/1 & 1/3 Octave Real-Time Frequency Analysis
- Comprehensive Summary and Time History Data
- Serves Hand-Arm, Whole-Body & Machine Vibration Applications
- 32MB Internal Memory Logs More Than 2 Weeks of 1-second Results
- Fully Integrated with QuestSuite® Professional II "The System Solution" Software Application
- USB 1.1 Interface
  - Rugged Handheld Case
  - Optional Sound Measurements
  - Optional FFT Analysis



## *The Issue*

Growing awareness of human vibration hazards in the workplace and the promulgation of new exposure standards like the EU Vibration Directive are driving a growing need to quantify and qualify hand-arm and whole-body vibration exposures from power hand tools, transportation and other equipment. First priority is to screen for the presence and magnitude of vibration in as simplistic a way as possible. Once results are obtained, more detailed monitoring and analysis may be in order. Many situations also exist where broadband measurements of hand-arm, whole-body or machine vibration levels do not provide adequate information to the user. For instance, in some regions of the world human vibration exposures are required by law to be quantified by frequency in octave bands. Elsewhere, while broadband measurements of vibration are a prudent first step, attempting to apply engineering controls to resolve excessive vibration levels requires an understanding of the frequency content of the vibration that is occurring. The lack of a pre-engineered system of sensors, monitors and software for this full range of applications leaves employers and vibrating equipment manufacturers with the overwhelming task of selecting and integrating all these components on their own. Cost can run high, time required can be excessive and desired results may never be achieved.

## *The Solution*

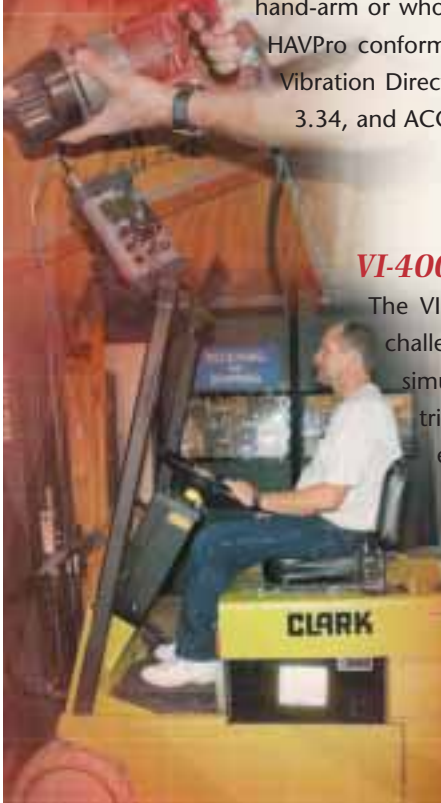
Quest Technologies has created a simplified and fully integrated solution for the complete range of application requirements described above. The heart of this solution is QuestSuite Professional II, "The System Solution" software application from Quest. QuestSuite Professional II supports both the Quest model HAVPro Basic Vibration Monitor and the Quest model VI-400Pro Advanced Real-Time Vibration Analyzer. You may now confidently monitor exposures associated with human vibration and manage the data needed to develop both administrative and engineering control solutions to prevent injury. Users configure the HAVPro or VI-400Pro to their application quickly with pre-defined and user-defined setups contained in QuestSuite Professional II. Collected data are recalled at the instrument or quickly and easily uploaded to QuestSuite Professional II for further analysis and viewing. This powerful system makes it simple to chart, report, annotate, archive and electronically distribute exposure data. Post-processing of data in QuestSuite Professional II includes the ability to combine multiple exposure profiles to obtain total exposure values for multiple tasks or evaluate the impact of control measures on exposures prior to any real purchases or implementations. Multiple scenarios can also be used to help optimize return on investment from a range of exposure control considerations.

## *HAVPro Description*

The HAVPro is a compact, lightweight, fully integrated 3-channel instrument for obtaining tri-axial vibration measurements. This basic monitor is the ideal screening tool for quickly and simply determining the presence and magnitude of hazardous hand-arm or whole-body vibration levels. Time history data also allows insight into exposure variations over time. The HAVPro conforms to the requirements of the latest human vibration measurement standards including the new EU Vibration Directive 2002/44/EC dated June 2002, ISO 5349-2001, ISO 2631, ISO 8041 Type 1, ANSI S3.18, ANSI S3.34, and ACGIH 2005 WBV & HAV Threshold Limit Values.

## *VI-400Pro Description*

The VI-400Pro is a rugged, powerful, lightweight, hand-held device ideal for field use even in the most challenging environments. The VI-400Pro is an advanced analyzer monitoring up to four input channels simultaneously, each including 1/1 or 1/3 real-time octave band data. Three channels are typically used for tri-axial vibration measurements. As a bonus, the fourth channel may be used to simultaneously analyze either sound or an additional single axis of vibration by attaching additional optional transducers to the instrument. The VI-400Pro meets all Class 1/Type 1 requirements of ISO 8041, IEC 60651, IEC60804 and Class 1 requirements of IEC 61672-1, plus the latest human vibration standards including the new EU Vibration Directive 2002/44/EC dated June 2002, ISO 5349-2001, ISO 2631, ANSI S3.18, ANSI S3.34 and ACGIH 2005 WBV & HAV Threshold Limit Values.



## ***How it Works***

Powerful QuestSuite Professional II software works with both your basic HAVPro monitor and the advanced VI-400Pro, providing a fully integrated system solution.

### ***Fast & Simple Setup***

Ease of use is achieved through both pre-defined and user-defined application setups that are loaded into the HAVPro or VI-400Pro with a single mouse click.



### ***Exposure Calculator***

An integrated calculator computes and displays time to reach Exposure Action and Limit Values like those defined in EU Physical Agents Directive on hand-arm and whole-body vibration. Other standards around the world can also be handled by the calculator.

### ***Thorough & Informative Data Presentation***

Selectable "Data Panels" are used to present only those data sets of interest to the user. An extensive library of data panels exists and is constantly being enhanced.



### ***Reporting & Exporting is a Snap***

What you see is what you get (WYSIWYG) reporting is made possible by a design that allows users to select data panels to be reported and define their sequence as well. Data exporting is as simple as right-clicking on the data panel of interest and choosing the export format.

### ***Powerful What-If Analysis***

Users can combine the results of multiple tests to build virtual exposure scenarios from representative samples. This reduces field test time, minimizes disruptions to operations being monitored and creates the opportunity to test and see the impact of administrative controls or equipment substitutions prior to implementation.



## ORDERING INFORMATION

### HAVPro Basic Vibration System

PART NUMBER	DESCRIPTION
<b>Vibration Kits</b>	
072-001	<b>HAVPro Personal Human Vibration Monitor Less Sensors</b> – Includes HAVPro Personal Human Vibration Monitor, 072-006 Computer Interface Cable, 2008-8050 Soft Sided Protective Case and 072-008 Storage Case.
HAVPRO-HA	<b>HAVPro Hand-Arm Vibration Kit</b> – Includes 072-001 HAVPro Personal Human Vibration Monitor, 072-010 3-Axis Voltage Mode Accelerometer, 072-007 Sensor Cable and 072-005 Clamp Style Mounting Adapter.
HAVPRO-WB	<b>HAVPro Whole-Body Vibration Kit</b> – Includes 072-001 HAVPro Personal Human Vibration Monitor, 072-011 3-Axis Seat Pad Accelerometer and 072-007 Sensor Cable.
HAVPRO-HAWB	<b>HAVPro Hand-Arm &amp; Whole Body Vibration Kit</b> – Includes 072-001 HAVPro Personal Human Vibration Monitor, 072-010 3-Axis Voltage Mode Accelerometer, 072-007 Sensor Cable, 072-005 Clamp Style Mounting Adapter and 072-011 3-Axis Seat Pad Accelerometer.
<b>Optional Accessories</b>	
072-010	<b>Hand-Arm Triax Accelerometer</b>
072-011	<b>Whole-Body Triax Accelerometer with cable</b>

### VI-400Pro Real-Time Vibration Analyzer

PART NUMBER	DESCRIPTION
<b>Analyzer Kits</b>	
VI400PRO	<b>VI-400Pro Real-Time Vibration Analyzer Less Sensors</b> – Includes VI-400Pro Real-Time Vibration Analyzer with USB Computer Interface Cable and 072-008 Storage Case.
VI400PRO-HA	<b>VI-400Pro Real-Time Hand-Arm Vibration Analyzer Kit</b> – Includes VI-400Pro Real-Time Vibration Analyzer with USB computer interface cable, 072-026 Tri-Axial HAV Sensor, 072-022 Sensor Cable, 072-005 HAV Sensor Mounting Block and Clamp Assembly and 072-008 Molded Storage Case.
VI400PRO-WB	<b>VI-400Pro Real-Time Whole-Body Vibration Analyzer Kit</b> – Includes VI-400Pro Real-Time Vibration Analyzer with USB computer interface cable, 072-029 Tri-Axial WBV Seat-Pad Sensor and 072-008 Molded Storage Case.
VI400PRO-HAWB	<b>VI-400Pro Real-Time Hand-Arm &amp; Whole-Body Vibration Analyzer Kit</b> – Includes VI-400Pro Real-Time Vibration Analyzer with USB computer interface cable, 072-026 Tri-Axial HAV Sensor, 072-022 Sensor Cable, 072-005 HAV Sensor Mounting Block and Clamp Assembly, 072-029 Tri-Axial WBV Seat-Pad Sensor, and 072-008 Molded Storage Case.
<b>Optional Accessories</b>	
072-026	<b>Sub-Miniature Tri-Axial HAV Sensor</b>
072-029	<b>VI-400Pro Tri-Axial WBV Sensor with Cable</b>
072-028	<b>Microphone Pre-Amplifier</b> – For connecting 59-523 microphone to 4th input channel of VI-400Pro. Microphone purchased separately.
59-523	<b>BK4936 1/2" Class 1 Pre-Polarized Microphone</b> - Pre-amplifier, calibrator adapter and windscreen sold separately.
072-031	<b>3 Meter Extension Cable</b> – For connection between VI-400Pro and 072-028 microphone pre-amplifier.
56-990	<b>Calibrator Adapter</b> – For 1/2" diameter microphone to "QC" series calibrators.
QC-20	<b>Acoustical Calibrator</b> w/Selectable Output 114dB or 94dB at 1000Hz or 250 Hz. Microphone to Calibrator adapter purchased separately.

### Common Accessories for Both Models

PART NUMBER	DESCRIPTION
<b>Accessories</b>	
072-005	<b>Hand-Arm Block &amp; Clamp Mount</b>
072-018	<b>Handheld Vibration Calibrator/Shaker</b>
072-032	<b>T-Handle Adapter for Hand-Arm Vibration Measurements</b>
<b>Support Software</b>	
QSP-PROII	<b>QuestSuite Professional II Single-User License</b> – Includes one CD and one user authorization code for installation of QuestSuite Professional II to support one office and one portable PC installation within the same company site.
QSP-PROII-MUL	<b>QuestSuite Professional II Multi-User Site License</b> – Includes one CD and (1) user authorization code for installation of QuestSuite Professional II to support a total of (10) concurrent network users or (10) stand alone users or any combination of the two within the same company site.
QSP-PROII-UNL	<b>QuestSuite Professional II Unlimited-User Site License</b> – Includes one CD and (1) user authorization code for installation of QuestSuite Professional II to support an unlimited number of concurrent network users or stand-alone users or any combination of the two within the same company site.

# TECHNICAL SPECIFICATIONS

## HAVPro & VI-400Pro

SPECIFICATIONS	HAVPro	VI-400Pro
Input Types:	(3) Input channels accept (1) tri-axial accelerometer	(4) Input channels. Each can be configured for sound or vibration
<b>STANDARD SENSOR</b>		
Hand-Arm Sensor:	Part No. 072-010 voltage mode tri-axial accelerometer, 10mV/g sensitivity	Part No. 072-026 voltage mode tri-axial accelerometer, 10mV/g sensitivity
H-A RMS Range:	0.01 m/s <sup>2</sup> to 5,000 m/s <sup>2</sup> , dependent upon gain setting and accelerometer	.001-596 m/s <sup>2</sup> depending on selected filter
H-A Peak Range:	0.2 m/s <sup>2</sup> to 7,000 m/s <sup>2</sup> , dependent upon gain setting	0.003m/s <sup>2</sup> - 798 m/s <sup>2</sup> depending on selected filter
Whole Body Sensor:	Part No. 072-011 voltage mode tri-axial seat pad accelerometer, 100mV/g sensitivity	Part No. 072-029 voltage mode tri-axial seat pad accelerometer, 100mV/g sensitivity
W-B RMS Range:	0.001 m/s <sup>2</sup> to 500 m/s <sup>2</sup> , dependent upon gain setting	.001-596 m/s <sup>2</sup> depending on selected filter
W-B Peak Range:	0.2 m/s <sup>2</sup> to 700 m/s <sup>2</sup> , dependent upon gain setting	0.003m/s <sup>2</sup> - 798 m/s <sup>2</sup> depending on selected filter
<b>MEASUREMENTS</b>		
Units:	English, Metric, dB	English, Metric, dB
Vibration Modes:	Acceleration, Velocity, Displacement	Acceleration, Velocity, Displacement
Machine Vibration:	Arms, Amin, Amax, Aeq, Amp, PEAK, Time History	RMS, Peak, Peak-Peak, MTVV, Min, Max, Aeq, Time History
Hand-Arm Vibration:	Arms, Amin, Amax, Aeq, Amp, PEAK, A(1), A(2), A(4), A(8)	RMS, VDV, Peak, Peak-Peak, Min, Max (MTVV), Vector Sum, A(8), EAV Time, ELV Time, Time History
Whole-Body Vibration:	Arms, Amin, Amax, Aeq, Amp, PEAK, CFmp, CF, VDV, Time History	RMS, VDV, Peak, Peak-Peak, Min, Max (MTVV), Vector Sum, A(8), EAV Time, ELV Time, Time History
Sound Level:	Not Applicable	SPL, Leq,/Lavg, SEL, Ldn, Ltm3, Ltm5, L1 to L99, Lmax, Lmin, Lpeak, Time History
Dynamic Range:	60dB	100dB
Frequency Range:	0.5 – 3000 Hz +/- 5%    0.3 – 5000 Hz +/- 10%	0.5 to 20kHz (input transducer dependent & filters)
Sampling Rate:	14,400 Hz	51.2 kHz
Analyzer:	Not Applicable	Real-Time 1/1 & 1/3 Octave Analysis, Optional FFT
<b>FREQUENCY WEIGHTINGS</b>		
Vibration:	Ws (Severity), Fa (0.4 – 100 Hz), Fb (0.4 – 1250 Hz), Fc (6.3 – 1250 Hz)	HP1, HP3, HP10, Vel1, Vel3, Vel10, VelMF, Dil1, Dil3, Dil10
Sound:	Not Applicable	A, C, Lin
Hand-Arm:	Wh	Wh
Whole-Body:	Wb, Wc, Wd, We, Wg, Wj, Wk, WB	Wc, Wd, Wj, Wk, Wm, KB
<b>MEMORY STORAGE</b>		
Setups:	Up to 10 User-defined setup files	No specific limit
Data Files:	Up to 100 data files	No specific limit
Time History:	Interval lengths of 1, 2, 5, 10, 20, 30 or 60 seconds. Up to 120 intervals per data file with Arms and PEAK/interval. Up to 240 intervals per data file with Arms or PEAK/interval	More than two weeks of one second RMS/MAX/MIN/Peak results
Size:	512K	32MB non-volatile (flash-type)

## TECHNICAL SPECIFICATIONS (CONT'D)

### HAVPro & VI-400Pro (Cont'd)

SPECIFICATIONS	HAVPro	VI-400Pro
<b>COMMUNICATION</b>		
Interface:	RS-232 Serial Interface on 8-pin DIN, up to 115 kbps	USB 1.1
Direct Printout:	Custom 3-line header, data & time history.	Not Applicable.
Channel Outputs:	AC-Weighted or Band-Limited, DC-rms, min, max, peak, sum rms, sum max, sum min, sum peak	AC Output, External Trigger Input or Trigger Output
<b>STANDARDS</b>		
EMI/RFI:	CE Compliant	CE Compliant
Performance:	ISO 8041:1990 and 1:1999, 2631, 5349, ANSI S3.34, ANSI 3.18, European Vibration Directive 2002/44/EC	ISO 8041-1, 2631, 5349, 10816, IEC 60651, IEC 60804, IEC 61672-1, ANSI S1.1:1986 Type 1, ANSI S3.34, ANSI 3.18, IEC 1260:1994, European Vibration Directive 2002/44/EC
<b>ENVIRONMENTAL</b>		
	-20 to 60C (-4 to 140F) Up to 90RH, non-condensed	-10 to 50c (14 to 122 F). Up to 90RH, non-condensed
<b>MECHANICAL &amp; POWER</b>		
Battery:	(2) "AA" (IEC Type LR6), 12 hours with Charge/Direct modes, 4 hours with voltage mode	(4) "AA" Disposable Alkaline Batteries provide >8 hours operation. External power supply rated at 6 to 24 VDEC/250mA. USB interface rate at 5V at 300mA
Size:	6.0" x 3.3" x 1.1" (152.4mm x 83.8mm x 27.9mm)	5.31" x 3.23" x 1.65" (135mm x 82mm x 42mm)
Weight:	10 oz. (279g)	16.08 oz. (0.5 kg)
<b>LANGUAGES</b>		
	English, Spanish, German, Italian	English, Russian

Specifications subject to change without notice. For the most current specifications and additional information about Quest Technologies visit our web site at [www.Quest-Technologies.com](http://www.Quest-Technologies.com)



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