

**VIBROMYOGRAPHY SYSTEMS & TRANSDUCERS**

**Complete VMG System** (WSW Windows, WS Mac)

*Everything required to record and analyze VMG Data*

VMG System	with MP150 System	with MP36R System
2-channel	<b>VMG102WSW</b> or <b>WS</b>	<b>VMG36R2WSW</b> or <b>WS</b>
4-channel	<b>VMG104WSW</b> or <b>WS</b>	<b>VMG36R4WSW</b> or <b>WS</b>



**VMG Transducer only**

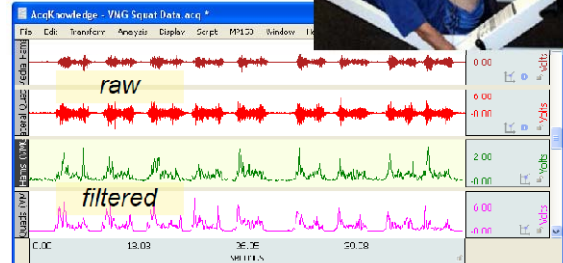
*Stand-alone VMG transducers to extend existing systems*

Large muscle	<b>TSD250</b>
Facial muscle	<b>TSD251</b>

**VMG Transducer & License Pack** (-W Win, -M Mac)

*Add VMG to an existing MP Research System*

For MP150	<b>VMG150PACK-W</b> or <b>-M</b>
For MP36R	<b>VMG36RPACK-W</b> or <b>-M</b>



BIOPAC Vibromyography (VMG) solutions allow researchers to study muscle performance and strength balance using precision microelectromechanical (MEMS) accelerometers, about the size of a quarter, and advanced signal analysis algorithms to monitor muscle vibration. The transducer and software algorithm are optimized for assessing voluntary muscle effort (Type IIB muscle fiber activity).

Transducers are secured over the muscle belly and record the small vibrations that occur when the muscle is activated. The transducer includes band-pass filtering to eliminate most motion artifacts including physiologic tremor. AcqKnowledge software automated VMG Analysis uses wavelet packet analysis to simplify the analysis process and extract the vibrational components that correlate with the effort generated by the muscle being studied.

**VMG Benefits**

- Ability to perform muscle balance assessments
- Improved reproducibility between muscles and individuals
- Convenient setup
- Reduced setup time
- Improved subject comfort
- No electrodes
- No skin preparation

VMG provides extremely reproducible results. The single sensor solution and the lack of skin preparation improve the reliability and reproducibility of muscle effort recordings between muscles and across subjects. One major benefit of being able to compare results between muscles and between subjects is the ability to perform muscle balance assessments.

→ See videos, Application Notes, and Publications at [www.biopac.com/vibromyography-vmg-muscle-activity](http://www.biopac.com/vibromyography-vmg-muscle-activity).

**Vibromyography Transducers**

Vibromyography sensors incorporate a sensitive MEMS accelerometer and are intended for use with a BIOPAC Vibromyography System. Transducers are available as a stand-alone item or to augment an existing VMG system.



- **TSD250** is a larger sensor (3.8 cm dia) for measuring absolute muscle force from substantial muscle groups, such as leg muscles.
- **TSD251** is a smaller sensor (1.8 cm dia) sensor that reliably permits measurement from absolute muscle force from small, superficial muscles, such as facial muscles.

The VMG transducer integrates a low noise accelerometer with low and high pass filtering and pre-amplification. The transducer operates in differential mode in order to achieve superior noise reduction, delivering two channels of vibration data along a three meter cable to a converter unit which both converts the signal to single-ended mode and adapts the VMG signal appropriately for use with the BIOPAC Research platform.

VMG transducers are compatible with both the MP150 and MP36R systems and include dual output connectors to connect to the HLT100C for MP150 Systems or directly to an MP36R System. Up to 16 VMG transducers can be attached per MP150 System and up to four VMG transducers can be connected per MP36R System.

Optimal results are achieved by holding the transducer against the skin with an elastic or athletic wrap using moderate pressure. Either surface of the transducer can be placed against the skin surface; the convex surface may facilitate use on a concave surface. Transducer can be secured with a variety of attachment methods (not included), such as double-sided adhesive, Ace® bandages and Nylatex® wraps (6 cm - 10 cm width suggested).

**Do not use excessive pressure in securing the transducers**—snug enough not to move is adequate.

**VMG Specifications**

**Complete System Components**

Data Acquisition System	Choose MP150 System and HLT100C High Level Transfer Interface or MP36R System (no transducer interface required, direct connection)
VMG Transducers	Choose TSD250 or TSD251 - two for 2-channel, four for 4-channel
VMG License	AcqKnowledge VMG License Key

**VMG Transducer Specifications**

Sensor	TSD250	TSD251
Type:	Sonostics VMG BPS-II	Sonostics VMG BPS-IIIm
Dimensions:	38 mm (dia) x 20 mm (high)	18 mm octagon (dia) x 8.5 mm (high)
Weight:	15 grams	2 grams
Inline-amplifier/converter		
Dimensions (L x W x H):	88 mm x 41 mm x 20 mm	
Weight	35 grams	
Operational Frequency Range:	20-200 Hz	
Output:	MP150: ±10 V	MP36R: ±0.2 V
Gain Constant:	MP150: 50 V/g	MP36R: 1 V/g
Voltage Noise Floor:	MP150: 16 mV (rms)	MP36R: 0.32 mV (rms)
Sensitivity:	0.32 mg (rms)	
Temperature Range:	0 - 50° C	
Maximum Shock:	2000 g	
Cables:	Sensor to conditioning module: 30 cm, flat Conditioning module to BIOPAC platform: 3 m, round, shielded	
Termination (dual connectors):	RJ-25 M (6-pin) to HLT100C and DSUB9 M 9-pin to MP36R	
Interface:	MP150: via HLT100C    MP36R: direct connection to CH analog input	
Minimum sampling rate:	Sample acquisition rate must be set to 2000 Hz for proper operation of the VMG algorithm.	

**VMG License**

AcqKnowledge VMG License Key	<p>VMG functionality is available in AcqKnowledge 4.1.1 or above via License Key Activation. The VMG License must be authorized to access VMG functionality. The VMG License:</p> <ul style="list-style-type: none"> <li>▪ adds “Vibromyography” Calculation channel Preset with required scaling and calibration</li> <li>▪ adds “Vibromyography Filter” option under the Analysis menu</li> <li>▪ includes graph template QuickStart Q45 Vibromyography (.gtl)</li> </ul>
------------------------------	---

**Transducer & License Pack Components**

VMG Transducer (1)	Adds VMG Measurement & Analysis to existing MP Systems TSD250 or TSD251 as specified
AcqKnowledge VMG License Key	VMG License Authorization; requires AcqKnowledge 4.1.1 or above