PRODUCT SHEET

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VIBROMYOGRAPHY SYSTEMS & TRANSDUCERS

Complete VMG System (WSW Windows, WS Mac)
Everything required to record and analyze VMG Data
VMG System with MP160/150 System with MP36R System

| | 2-channel | **VMG102WSW** or **WS** | **VMG36R2WSW** or **WS** |
| | 4-channel | **VMG104WSW** or **WS** | **VMG36R4WSW** or **WS** |

VMG Transducer only
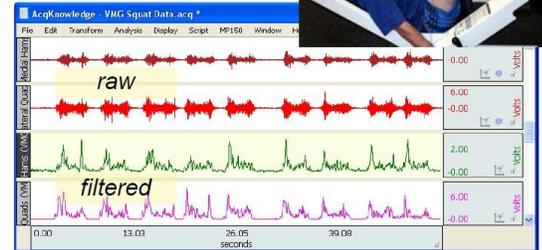*Stand-alone VMG transducers to extend existing systems*
Large muscle   **TSD250A**

VMG Transducer & License Pack (-W Win, -M Mac)
Add VMG to an existing MP Research System
For MP160/150   **VMG150PACK-W** or **-M**
For MP36R   **VMG36RPACK-W** or **-M**

BIOPAC Vibromygraphy (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. Acq*Knowledge* 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.

TSD250A Vibromyography Transducer

The TSD250A is a sensitive acceleromoter (32.64 mm diameter) that uses advanced signal analysis algorithms to monitor small muscle vibrations that occur when a muscle is activated. This transducer is optimized for assessing voluntary muscle effort and includes band-pass filtering for eliminating most motion artifacts including physiologic tremor.

- **TSD250A** is used for for measuring absolute muscle force from substantial muscle groups, such as leg muscles.

This 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.

TSD250A is compatible with both the MP160/150 and MP36R systems and includes dual output connectors to connect via an adjusted DA100C (5 V excitation voltage) amplifier-to-TCI114 interface for MP160/150 Systems, or directly to an MP36R System.

NOTE: TheTSD250A sensor is a replacement for the discontinued TSD250. When comparing multiple subjects identical transducers should be used. Results recorded with a TSD250A may not be directly comparable to TSD250 or TSD251 data. (The TSD251 facial muscle transducer has also been discontinued.)

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Up to 16 VMG transducers can be attached per MP160/150 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 transducersô snug enough not to move is adequate.

VMG Specifications

Complete System Components

Data Acquisition System	Choose MP160 System and DA100C-to-TCI114 Interface or MP36R System (no transducer interface required, direct connection)
VMG Transducers	Choose TSD250A - two for 2-channel, four for 4-channel
VMG License	*AcqKnowledge* VMG License Key

VMG Transducer Specifications

Sensor	TSD250A
Type:	Accelerometer
Dimensions: (W x H)	32.64 mm (octagonal) x 9.14 mm (sidewall) to 12.57 mm (dome)
Weight:	10 grams
Operational Frequency Range:	20-200 Hz
Output:	*MP160/150*: ±10 V *MP36R*: ±0.2 V
Gain Constant:	*MP160/150*: 50 V/g *MP36R*: 1 V/g
Voltage Noise Floor:	*MP160/150*: 16 mV (rms) *MP36R*: 0.32 mV (rms)
Sensitivity:	0.32 mg (rms)
Temperature Range:	0 - 50° C
Maximum Shock:	2000 g
Termination:	TCI114 to DA100C and DSUB9 M 9-pin to MP36R
Interface:	*MP160/150*: via DA100C, *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	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:

- adds ‰ibromyography+Calculation channel Preset with required scaling and calibration
- adds ‰ibromyography Filter+option under the Analysis menu
- includes graph template QuickStart Q45 Vibromyography (.gtl)

Transducer & License Pack Components   *Adds VMG Measurement & Analysis to existing MP Systems*

VMG Transducer (1)	TSD250A
AcqKnowledge VMG License Key	VMG License Authorization; requires *AcqKnowledge* 4.1.1 or above