

COMPACT MOLECULAR-ELECTRONIC SEISMIC SENSORS

Molecular-electronic seismic velocity sensors are designed for measuring the seismic vibration of the ground surface, buildings and engineering structures in one or three directions and give the analog output signal proportional to the velocity of the input seismic signal.

The instruments' sensing elements are self-centering and thus don't require any external mass centering or mass position controls. Sensing elements of all compact sensors except the MTSS-1003 stay fully functional in any orientation with respect to the vertical axis. Meanwhile the MTSS-1003 stays functional within installation tilts of up to 15°.

The main features and advantages of the molecular-electronic sensors:

- the high-sensitive molecular-electronic transducer and liquid inertial mass;
- low noise level;
- wide dynamic range;
- wide frequency range;
- very rugged, no moving mechanical parts to break or wear out;
- no parasitic mechanical resonances;
- no maintenance, mass locking and centering required;
- low power consumption.

The R-sensors' compact velocimeters range includes the following models:

MTSS-2003 – The 3-component high-sensitivity velocimeter designed for strong motion seismic measurements, industrial vibration monitoring and analysis. The output function of a device is formed by a feedback configuration.

MTSS-2003WB version is optimized for operation at lower frequencies which could be useful in passive seismic exploration, monitoring of huge structures having very low natural frequencies, estimation of local earthquakes parameters.

MTSS-1003 – The 3-component low-power compact velocimeter designed for strong motion seismic measurements, industrial vibration monitoring and analysis. Able to work within 15° tilt relative to vertical axis.

MTSS-1001 – The 1-component version of **MTSS-2003**. Small in size, mounted in plastic case, equipped with a screw tail pin for ground installation. It also can be used in a group of three sensors installed orthogonally with use of specially-designed mounting.

MTSS-1011 – The 1-component ultra-compact high frequency velocimeter based on strong motion sensing elements. Small in size, mounted in aluminum case, equipped with a



screw tail pin for ground installation. This sensors features 50mm/sec input motion clip level @ 100 Hz.

MTSS-2003 LOW-NOISE VELOCIMETER



The compact MTSS-2003 velocity sensor combines low-noise, small weight and high gain. The electrodynamic feedback results in very flat response over wide frequency range, high dynamic range and high time and temperature stability of the instrument parameters.

The wide dynamic range, high temperature stability and competitive price make it ideal and cost-effective solution for various applications such as earthquake measurements, structure monitoring, and object state control.

The output function of a device is formed by a feedback configuration.

Configuration	Triaxial velocimeter, orthogonal axes
Sensitivity	250 V·sec/m or customized
Maximum input signal	± 30 mm/sec
Frequency bandwidth	1 – 250 Hz or customized
Maximum output swing	±7.5V, single-ended
Output impedance	500 Ohms
Integral noise in the pass band	100 nm/sec
Dynamic range	110 dB
Cross-axis sensitivity	-60 dB
Non-linearity at the edge of the dynamic range	less than 1%
Temperature range	-40°C - +55°C (-40°F - 131°F)
Supply voltage	10.5 - 16Vdc, single supply or ±9.5 .. ±15 Vdc dual supply (option)
Supply current	35mA @ 12 Vdc single supply or ±12mA @ ± 12 Vdc dual supply
Installation tilt	ANY
Cable type	Geophysical 1.5 meter (4.92 ft) 8 wires, open-ended or customized length and type
Housing material	Aluminum
Case accessories*	Mounting base, leveling feet
Weight (without accessories)	0.9 kg (1,98 lbs)
Dimensions	120 x 120 x 60mm (4.724" x 4.724" x 2.362")

*- Accessories are sold separately.

MTSS-2003WB LOW-FREQUENCY COMPACT VELOCIMETER



Some applications requires wider operating frequency range compare to standard MTSS-2003 velocity sensors. Among them are passive seismic, structural monitoring, estimation of the low-frequency parameters of local earthquakes etc.

MTSS-2003WB sensor offers wider low frequency band with moderate self-noise at very small weight and size. The electrodynamic feedback results in very flat response over specified frequency range, high dynamic range and high time and temperature stability of the instrument parameters.

The output function of a device is formed by a special low-frequency feedback design.

Configuration	Triaxial velocimeter, orthogonal axes
Sensitivity	250 V·sec/m or customized
Maximum input signal	± 30 mm/sec
Frequency bandwidth	0.2 – 20 Hz or 0.2 – 50 Hz option
Maximum output swing	±7.5V, single-ended
Output impedance	500 Ohms
Integral noise in the pass band	700 nm/sec
Dynamic range	93 dB
Cross-axis sensitivity	-60 dB
Non-linearity at the edge of the dynamic range	less than 1%
Temperature range	-40°C - +55°C (-40°F - 131°F)
Supply voltage	10.5 - 16Vdc, single supply or ±9.5 .. ±15 Vdc dual supply (option)
Supply current	35mA @ 12 Vdc single supply or ±12mA @ ± 12 Vdc dual supply
Installation tilt	ANY
Cable type	Geophysical 1.5 meter (4.92 ft) 8 wires, open-ended or customized length and type
Housing material	Aluminum
Case accessories*	Mounting base, leveling feet
Weight (without accessories)	0.9 kg (1,98 lbs)
Dimensions	120 x 120 x 60mm (4.724" x 4.724" x 2.362")

*- Accessories are sold separately.

MTSS-1003 LOW-POWER VELOCIMETER



The MTSS-1003 is a low-power three component sensor featuring the low-noise molecular-electronic sensing element.

The wide dynamic range, high temperature stability and competitive price make it ideal and cost-effective solution for various applications such as earthquake measurements, structure monitoring, and object state control.

The MTSS-1003 has 3 installation legs included; for installation with screws on flat surfaces the sensors can be supplied with the eyes setting fixture.

Configuration	Triaxial velocimeter, orthogonal axes
Sensitivity	250 V·sec/m or customized
Maximum input signal	± 30 mm/sec
Frequency bandwidth	1 – 250 Hz or customized
Maximum output swing	±7.5V, single-ended
Output impedance	500 Ohms
Integral noise in the pass band	100 nm/sec
Dynamic range	110 dB
Cross-axis sensitivity	-60 dB
Non-linearity at the edge of the dynamic range	less than 1%
Temperature range	-40°C - +55°C (-40°F - 131°F)
Supply voltage	10.5 - 16Vdc, single supply
Supply current	15mA @ 12 Vdc single supply
Installation tilt	± 15°
Cable type	UTP Cat 5E 1.5 meter (4.92 ft) 4 wires, open-ended or customized length and type
Housing material	Aluminum
Case accessories	3 feet
Weight (without accessories)	0.8 kg (1,76 lbs)
Dimensions (diameter * height)	70 x 93 mm (2.76" x 3.66")

MTSS-1001 VELOCIMETER OVERVIEW



One-component version of the MTSS-2003 velocimeter. While small in size and light, these sensors features high level of accuracy and stability of parameters.

The wide dynamic range, low distortion, high temperature stability and competitive price make it ideal and cost-effective solution for various applications such as earthquake measurements or structure monitoring.

Configuration	Uniaxial velocimeter
Sensitivity	250 V·sec/m or customized
Maximum input signal	± 30 mm/sec
Frequency bandwidth	1 – 250 Hz or customized
Maximum output swing	±7.5V, single-ended
Output impedance	500 Ohms
Integral noise in the pass band	100 nm/sec
Dynamic range	110 dB
Non-linearity at the edge of the dynamic range	less than 1%
Supply voltage	10.5 - 16Vdc, single supply or ±9.5 .. ±15 Vdc dual supply (option)
Supply current	17mA @ 12 Vdc single supply or ±6mA @ ± 12 Vdc dual supply
Installation tilt	ANY
Cable type	UTP Cat 5E 1.5 meter (4.92 ft) 4 wires, open-ended or customized length and type
Housing material	Plastic case, aluminum bottom
Case accessories	Screw tail pin, Orthogonal mounting base*
Weight (without accesories)	0.38 kg (0,84 lbs)
Dimensions (diameter * height)	45 x 105 mm (1.77” x 4.134”)

*- This item is sold separately.



Three MTSS-1001 sensors installed on a mounting base.

MTSS-1011 COMPACT VELOCIMETER OVERVIEW

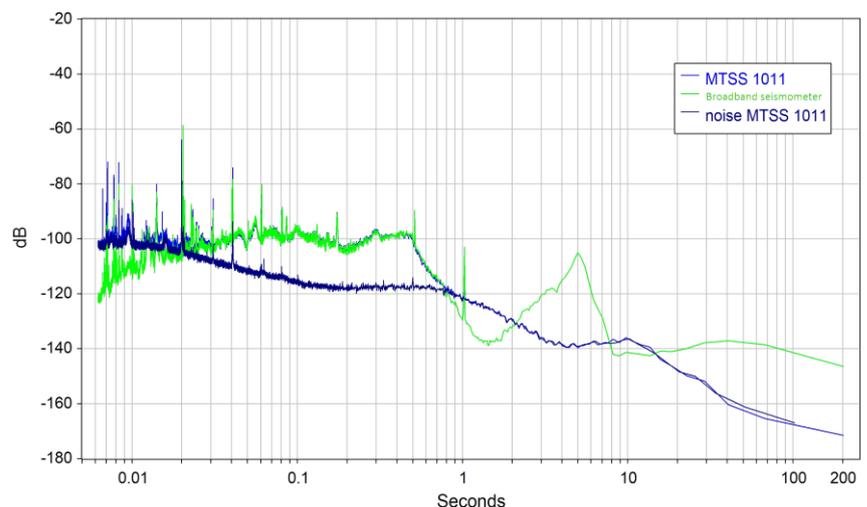


One-component velocimeter made with a special strong motion sensing element. While small in size and light, these sensors feature high level of accuracy and stability of parameters.

The wide dynamic range, low distortion, high temperature stability and competitive price make it ideal and cost-effective solution for various applications like structure monitoring, vibration analysis or earthquake alarm.

Configuration	Uniaxial velocimeter
Sensitivity	95 V·sec/m or customized
Maximum input signal	± 50 mm/sec at 100Hz
Frequency bandwidth	1 – 630 Hz or customized
Maximum output swing	±6.0V, single-ended
Output impedance	500 Ohms
Supply voltage	±9.5 .. ±15 Vdc dual supply
Supply current	±10mA @ ± 12 Vdc dual supply
Installation tilt	ANY
Cable type	UTP Cat 5E 1.5 meter (4.92 ft) 4 wires, open-ended or customized length and type
Housing material	Aluminum
Case accessories	Screw tail pin, Orthogonal mounting base*
Weight (without accesories)	0.27 kg (0,6 lbs)
Dimensions (diameter * height)	45 x 60 mm (1.77" x 2.362")

*- This item is sold separately.



**Noise performance of MTSS-1011 comparing
to a conventional broadband seismometer**