SM-6 Geophone

- Long travel version of the SM-4 (8-Hz, 10-Hz, & 14-Hz) geophone; also available in 4.5-Hz natural frequency
- Special orientations upon request beyond the normal vertical and horizontal options
- Widely used in industrial vibration-monitoring systems
- Rugged construction with precious-metal, rotating-coil contacts
- 2-year limited warranty

The SM-6 geophone is a long coil travel version of the time-proven SM-4 geophone. The extra coil travel offers an advantage for higher tilt requirements and where larger amplitude signals may be encountered, for example, in industrial vibration monitoring. A range of natural frequencies is available from 4.5 Hz to 14 Hz, providing choice of the correct geophone for a wide variety of applications.

The SM-6 can be supplied for vertical and horizontal orientation. Other specialized versions are available upon request, for example, Galperin (54.7°), 45°.

The SM-6 is an ideal choice for the shear-wave horizontal elements, partnering an SM-4 vertical geophone in a 3-component package.

A variety of I/O Sensor land cases can accommodate the SM-6 geophone elements, making them suitable for an extensive range of field applications.
### Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>SM-6/U-B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td></td>
</tr>
<tr>
<td>Natural frequency ( (f_n) )</td>
<td>8 Hz</td>
</tr>
<tr>
<td>Tolerance</td>
<td>±0.5 Hz</td>
</tr>
<tr>
<td>Maximum tilt angle for specified ( f_n )</td>
<td>20°</td>
</tr>
<tr>
<td>Typical spurious frequency</td>
<td>150 Hz</td>
</tr>
<tr>
<td><strong>Distortion</strong></td>
<td></td>
</tr>
<tr>
<td>Distortion with 0.7 in/s p.p coil-to-case velocity</td>
<td>&lt;0.2%</td>
</tr>
<tr>
<td>Distortion measurement frequency</td>
<td>12 Hz</td>
</tr>
<tr>
<td>Maximum tilt angle for distortion specification</td>
<td>15°</td>
</tr>
<tr>
<td><strong>Damping</strong></td>
<td></td>
</tr>
<tr>
<td>Open-circuit damping</td>
<td>0.315</td>
</tr>
<tr>
<td>Damping calibration-shunt resistance</td>
<td>2,257 Ω</td>
</tr>
<tr>
<td>Damping with shunt</td>
<td>0.6</td>
</tr>
<tr>
<td>Tolerance with shunt</td>
<td>±5%</td>
</tr>
<tr>
<td><strong>Resistance</strong></td>
<td></td>
</tr>
<tr>
<td>Standard coil resistance</td>
<td>375 Ω</td>
</tr>
<tr>
<td>Tolerance</td>
<td>±5%</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
</tr>
<tr>
<td>Open-circuit sensitivity</td>
<td>28.8 V/m/s</td>
</tr>
<tr>
<td>Tolerance</td>
<td>±5%</td>
</tr>
<tr>
<td>( R_B c f_n )</td>
<td>6,000 ΩHz</td>
</tr>
<tr>
<td>Moving mass</td>
<td>11.1 g</td>
</tr>
<tr>
<td>Maximum coil excursion p.p.</td>
<td>4 mm</td>
</tr>
<tr>
<td><strong>Physical Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>25.4 mm</td>
</tr>
<tr>
<td>Height</td>
<td>36 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>81 g</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>−40°C to +100°C, −40°C to +100°C, −40°C to +100°C (−40°F to +212°F)</td>
</tr>
<tr>
<td><strong>Limited Warranty Period</strong></td>
<td>2 years</td>
</tr>
<tr>
<td><strong>All parameters are specified at +20°C in the vertical position unless otherwise stated.</strong></td>
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## Specifications (cont.)

<table>
<thead>
<tr>
<th></th>
<th>A-Coil</th>
<th>B-Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
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<td></td>
</tr>
<tr>
<td>Natural frequency (f_n)</td>
<td>4.5 Hz</td>
<td>4.5 Hz</td>
</tr>
<tr>
<td>Tolerance</td>
<td>±0.5 Hz</td>
<td>±0.5 Hz</td>
</tr>
<tr>
<td>Maximum tilt angle for specified (f_n)</td>
<td>0°</td>
<td>0°</td>
</tr>
<tr>
<td>Typical spurious frequency</td>
<td>140 Hz</td>
<td>140 Hz</td>
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<tr>
<td><strong>Distortion</strong></td>
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<td></td>
</tr>
<tr>
<td>Distortion with 0.7 ips p.p. coil-to-case velocity</td>
<td>&lt;0.3%</td>
<td>&lt;0.3%</td>
</tr>
<tr>
<td>Distortion measurement frequency</td>
<td>12 Hz</td>
<td>12 Hz</td>
</tr>
<tr>
<td>Maximum tilt angle for distortion specification</td>
<td>0°</td>
<td>0°</td>
</tr>
<tr>
<td><strong>Damping</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-circuit damping</td>
<td>0.265</td>
<td>0.56</td>
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<tr>
<td>Open-circuit damping tolerance</td>
<td>±5%</td>
<td>±5%</td>
</tr>
<tr>
<td><strong>Resistance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard coil resistance</td>
<td>375 Ω</td>
<td>375 Ω</td>
</tr>
<tr>
<td>Tolerance</td>
<td>±5%</td>
<td>±5%</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-circuit sensitivity</td>
<td>28.0 V/m/s (0.71 V/in/s)</td>
<td>28.8 V/m/s (0.73 V/in/s)</td>
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<tr>
<td>Tolerance</td>
<td>±5%</td>
<td>±5%</td>
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<tr>
<td>(R_B f_n)</td>
<td>3,875 Ω Hz</td>
<td>6,000 Ω Hz</td>
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<tr>
<td>Moving mass</td>
<td>16.1 g (0.57 oz)</td>
<td>11.1 g (0.39 oz)</td>
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<tr>
<td>Maximum coil excursion p.p.</td>
<td>4 mm (0.16 in)</td>
<td>4 mm (0.16 in)</td>
</tr>
<tr>
<td><strong>Physical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>25.4 mm (1 in)</td>
<td>25.4 mm (1 in)</td>
</tr>
<tr>
<td>Height</td>
<td>36 mm (1.42 in)</td>
<td>36 mm (1.42 in)</td>
</tr>
<tr>
<td>Weight</td>
<td>81 g (2.85 oz)</td>
<td>81 g (2.85 oz)</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>−40°C to +100°C (-40°F to +212°F)</td>
<td>−40°C to +100°C (-40°F to +212°F)</td>
</tr>
<tr>
<td><strong>Limited Warranty Period</strong>*</td>
<td>1 year</td>
<td>1 year</td>
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</table>

* Warranty excludes damage caused by high-voltage and physical damage to the element case.

All parameters are specified at +20°C in the vertical position unless otherwise stated.

## Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Description</th>
<th>P/N</th>
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<tbody>
<tr>
<td>SM-6</td>
<td>4.5 Hz</td>
<td>SM-6/U-A</td>
<td>P/N 1006050</td>
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<tr>
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<td>SM-6/H-A</td>
<td>P/N 1006090</td>
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<td>SM-6/U-B</td>
<td>P/N 1006060</td>
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<td></td>
<td>SM-6/H-B</td>
<td>P/N 1006100</td>
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<td>SM-6</td>
<td>8 Hz</td>
<td>SM-6/U-B</td>
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<td></td>
<td>SM-6/H-B</td>
<td>P/N 1006300</td>
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<td>SM-6</td>
<td>10 Hz</td>
<td>SM-6/U-B</td>
<td>P/N 1006330</td>
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<td></td>
<td>SM-6/H-B</td>
<td>P/N 1006350</td>
</tr>
<tr>
<td>SM-6</td>
<td>14 Hz</td>
<td>SM-6/U-B</td>
<td>P/N 1006400</td>
</tr>
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<td></td>
<td></td>
<td>SM-6/H-B</td>
<td>P/N 1006420</td>
</tr>
</tbody>
</table>
Geophone Response Curve and Phase Lag