

## *Ranger Seismometer*



### *General Description*

The SS-1 Ranger Seismometer is a “moving coil” style (velocity) transducer. The coil is stationary, however, while the strong permanent magnet serves as the seismic inertial mass. The mass is supported and constrained by annular springs at the top and bottom of the moving magnet.

The basic natural period of 0.35 seconds is extended to one second or more by means of small rod magnets that surround the periphery of the mass, interacting with its magnetic field. The separate calibration coil in the base provides a simple and accurate means of field-calibrating the SS-1, using only a known-voltage battery and a fixed precision resistor. In a vertical position, the unit is 5.5 inches in diameter and 12 inches high (305 mm x 140 mm), including the inertial mass centering extension.

It weighs 10.9 lbs. (or 5.0 kg). For transportation, a protective clamp for the moving mass is incorporated into the base of the seismometer. Available as options for the SS-1 are adjustable leveling feet and bulls-eye levels.

The SS-1 Ranger Seismometer, widely recognized as an excellent short-period field seismometer, is the terrestrial version of the “lunar seismometer” designed for the Ranger lunar program. The current SS-1 retains the original features of small size, high sensitivity, adjustable natural period and rugged watertight construction.

An important feature of the Ranger Seismometer is that it can be adapted as either a vertical or horizontal seismometer by simple adjustment of the mass centering spring.

The Ranger has been used extensively for years as a field seismometer by major seismological observatories. As a structural dynamics instrument, the SS-1 Ranger pioneered in the determination of multi-modes of vibration under low-level excitation; structures studied under this application have included dams, high-rise buildings and nuclear power plants.

### *Specifications*

Natural period:	1 second nominal
Weight of mass:	1.45 kg
Calibration coil:	Standard
Mass travel:	$\pm 1$ mm
External resistance for 70% of critical damping:	Approx. equal to coil resistance
Calibration coil motor Constant:	0.4 newtons per ampere nominal
Calibration coil resistance:	100 ohm
Transducer Coil:	5000 ohms nominal
Approximate Generator Constant:	345 V(m/s)
Approximate CDR at 1 second:	6530

### *Ordering information*

- If desired natural period is greater than one second, specify for vertical or horizontal operation.
- Specify desired transducer coil resistance, if other than 5000 ohms.
- Specify options desired; bulls-eye levels and/or leveling feet.

### *Physical Characteristics*

Housing:	Watertight case
Operating Temperature:	-40° to 70° (-40° to 160°F)
Size:	305 mm x 140 mm diameter (12" x 5.5")
Weight:	5.0 kg (10.9 lbs.)