

Mark Products L-4 Seismometer

1.0 Hz and 2.0 Hz Land or Borehole Seismometer



- Stable Natural Frequency
- Lowest Distortion
- Instrument Quality
- Humbuck Construction
- Very High Output
- No Spring Sag
- Shallow surface hole, borehole and horizontal versions



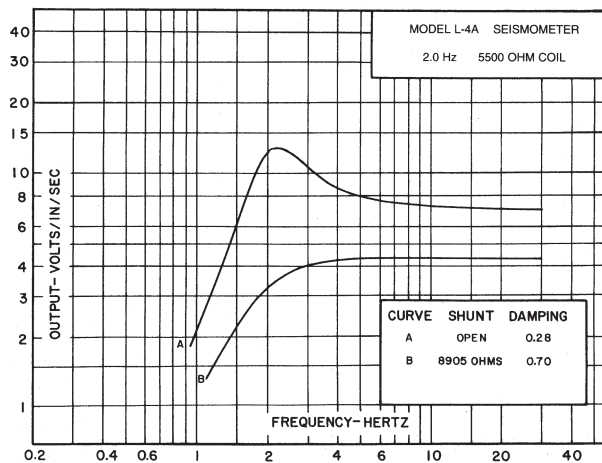
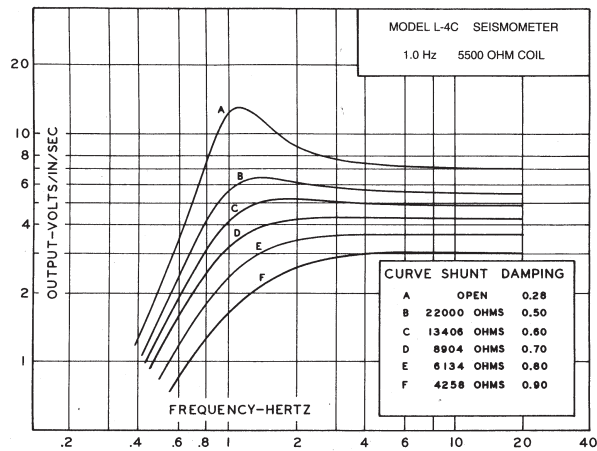
Mark Products L-4 Seismometer

The Mark Products L-4 is an INSTRUMENT QUALITY ONE Hz or TWO Hz multi-purpose seismometer that is small, light, and economical. It is designed to yield the performance needed for scientific studies, yet has the ruggedness required for petroleum exploration work.

The Mark Products L-4 design ELIMINATES the usual causes of failure in VERY LOW FREQUENCY geophones, such as SPRING FATIGUE, OVER-STRESS and INSTABILITY. This seismometer maintains a close frequency tolerance with tilt and temperature and is TRANSPORTED

WITHOUT CLAMPING the moving element.

The Mark Products L-4 is available with or without calibration coils and may be obtained as VERTICAL OR HORIZONTAL elements. A variety of fittings are available for custom application.



Specifications

L-4C 1.0 Hz SEISMOMETER

Type	Moving dual coil, humbuch wound
Frequency	1.0 ± 0.05 Hz measured on 200 pound weight at 0.09 inches/second
Frequency change with tilt	Less than 0.05 Hz at 5° from vertical
Frequency change with excitation	Less than 0.05 Hz from 0 to 0.09 inches/second
Suspended mass	1000 grams
Standard coil resistances	500, 2000, 5500
Leakage to case	100 megohm minimum at 500 V
Transduction power	$0.947 \sqrt{R_c}$
Open circuit damping	$(b_o) = 0.28$ critical
Current damping	$(b_c) = \frac{1.1 R_c}{R_s + R_c}$
Coil inductance	$L_c = 0.0011 R_c$ Lc in henries
Case to coil motion	PP 0.250 inches
Electric analog of capacity	$CC = \frac{73,500}{R_c}$ (microfarads)
Electric analog of inductance	$L_m = 0.345 R_c$ (henries)
Case height	5 ^{1/8} inches - 13 cm
Case diameter	3 inches - 7.6 cm
Total density	3.7 grams/cm ³
Total weight	4 ^{3/4} pounds - 2.15 kilograms
Operating temperature	Range : - 20° to 140°F or -29° to 60°C

COIL RESISTANCE, OHMS	500	2000	5500
Transduction, Volts/in/sec	2.12	4.23	7.02
Coil inductance, henries	0.55	2.20	6.05
Analog capacitance, microfarads	147	36.8	13.4
Analog inductance, henries	173	690	1900
Shunt for 0.70 damping, ohm	810	3238	8905

L-4A 2.0 Hz SEISMOMETER

Type	Moving dual coil, humbuch wound
Frequency	2.0 ± 0.25 Hz measured on 200 pound weight at 0.09 inches/second
Frequency change with tilt	Less than 0.10 Hz at 10° from vertical
Frequency change with excitation	Less than 0.10 Hz from 0 to 0.18 inches/second
Suspended mass	500 grams
Standard coil resistances	500, 2000, 5500
Leakage to case	100 megohm minimum at 500 V
Transduction power	$0.947 \sqrt{R_c}$
Open circuit damping	$(b_o) = 0.28$ critical
Current damping	$(b_c) = \frac{1.1 R_c}{R_s + R_c}$
Coil inductance	$L_c = 0.0011 R_c$ Lc in henries
Case to coil motion	PP 0.250 inches
Electric analog of capacity	$CC = \frac{36,500}{R_c}$ (microfarads)
Electric analog of inductance	$L_m = 0.17 R_c$ (henries)
Case height	5 ^{1/8} inches - 13 cm
Case diameter	3 inches - 7.6 cm
Total density	2.9 grams/cm ³
Total weight	3 ^{3/4} pounds - 1.7 kilograms
Operating temperature	Range : - 20° to 140°F or -29° to 60°C

COIL RESISTANCE, OHMS	500	2000	5500
Transduction, Volts/in/sec	2.12	4.23	7.02
Coil inductance, henries	0.55	2.20	6.05
Analog capacitance, microfarads	73.0	18.3	6.64
Analog inductance, henries	85.0	340	935
Shunt for 0.70 damping, ohm	810	3238	8905

Open Circuit Damping (b_o) = 0.28 Critical

Coil Current Damping (b_c) = $\frac{1.1 R_c}{R_c + R_s}$

Total Damping (b_t) = $b_o + b_c$

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