

SECTION 5.2

ELECTRONIC CALIBRATION OF RATEMETERS

1.0 Purpose

To describe the procedure for calibration of ratemeters.

2.0 Responsibilities

- The site coordinator is responsible for assuring that this procedure is implemented.
- Survey team personnel are responsible for following this procedure.

3.0 Procedure

3.1 Equipment

✓ Portable ratemeter: Model PRM-6, Eberline Instrument Corporation; Model 12, Ludlum Instrument Corporation, Model 2221, Ludlum Instrument Corporation; or equivalent.

✓ Pulser: Model 500, Ludlum Instrument Co.; or equivalent.

NOTE: The pulsers are calibrated when new and annually thereafter by the manufacturer.

✓ Cable: MHV-C; or other connectors, as applicable.

✓ Record forms.

3.2 Electronic Set-Up

3.2.1 Turn ratemeter on and check batteries; replace if necessary.

PRM-6 and Model 12: Turn the instrument selector switch to BATT. Note condition of batteries on the analog scale. If the reading falls below the acceptable range shown on the meter face, replace the batteries.

2221: Turn the instrument on. Depress battery button. A digital display reading less than 5.6 volts indicates battery power is marginal and batteries should be replaced.

3.2.2 Turn the ratemeter off and connect to the pulser.

- 3.2.3 Turn the pulser on.
- 3.2.4 Set the pulse amplitude to 50 mV and the amplitude adjustment knob to ≥ 10 on the analog scale.
- 3.2.5 Turn the ratemeter onto HV setting. Check instrument voltage reading and pulser voltage reading. (If a difference of 50 V or greater is noted, remove the instrument from service) Record both readings on the Electronic Calibration Record Form (Figure B-2 or equivalent).
- 3.2.6 Set the multiplier knob to the 1K scale.
- 3.2.7 Set pulse rate to 400,000 pulses/min using the multiplier adjustment knobs.
- 3.2.8 Set ratemeter to x 1,000 (1K) scale. Record reading.
- 3.2.9 If necessary, adjust the 1K potentiometer (pot) inside the ratemeter to bring reading to 400,000 cpm. Record adjusted response.
- 3.2.10 Decrease the pulse rate to 40,000 pulses/min by setting the multiplier knob to the 100 scale.
- 3.2.11 Set ratemeter to the x 100 scale. Record reading.
- 3.2.12 If necessary, adjust the x 100 pot inside the ratemeter to bring reading to 40,000 cpm. Record adjusted response.
- 3.2.13 Decrease the pulse rate to 4,000 pulses/min by setting the multiplier knob to the 10 scale.
- 3.2.14 Set the ratemeter to the x 10 scale.
- 3.2.15 If necessary, adjust the x 10 pot inside the ratemeter to bring reading to 4,000 cpm. Record adjusted response.
- 3.2.16 Decrease the pulse rate to 400 pulses/min by setting the multiplier knob to the 1 scale.
- 3.2.17 Set the ratemeter to the x 1 scale. Record reading.
- 3.2.18 If necessary, adjust the x 1 pot inside the ratemeter, to bring reading to 400 cpm. Record adjusted response.
- 3.2.19 Set ratemeter to x 1,000 (1K) scale.

- 3.2.20 Set the multiplier knob to the 1K scale.
- 3.2.21 Set pulse rate to 200,000 pulses/min using the multiplier knobs. Record reading.
- 3.2.22 If necessary, adjust the x 1,000 (1K) pot, inside the ratemeter, to bring readings to 200,000 cpm. Record adjusted response.
- 3.2.23 Repeat steps 3.2.10 thru 3.2.18 for 20,000 pulses/min, 2,000 pulses/min and 200 pulses/min. Decrease the pulse rate scale first, followed by the ratemeter scale.
- 3.2.24 Verify the initial ratemeter readings for 400,000 pulses/min thru 400 pulses/min to insure calibration stability. If stability is not achieved, remove the instrument from service.
- 3.2.25 Turn off ratemeter and pulse generator and disconnect the cables.