

IP1

ELECTRONIC CALIBRATION OF BICRON ANALYST RATEMETERS

1.0 PURPOSE

To describe the procedure for calibration of BICRON ratemeters to be used in screening samples for laboratory contamination control.

2.0 RESPONSIBILITIES

- The Laboratory Manager or designee is responsible for assuring that this procedure is implemented.
- Health Physics personnel are responsible for electronic calibration of the instrument.

3.0 EQUIPMENT

- Portable ratemeter-scaler: Model Analyst, Bicron Corporation; or equivalent
- Pulse generator: Model 500, Ludlum Instrument Co.; or equivalent
- Cable: MHV-C
- Record forms

4.0 PROCEDURE

- 4.1 Turn ratemeter on and check batteries; replace if necessary.
- 4.2 Turn analyzer switch to out.
- 4.3 Turn the ratemeter off and connect to the pulse generator.
- 4.4 Adjust multiplier to 1 on Pulser.
- 4.5 Set the pulse amplitude to 500 mV and the amplitude adjustment knob to 0 on the analog scale.
- 4.6 Turn the pulse generator on.

- 4.7 Turn the ratemeter onto HV setting. Check instrument voltage reading and pulser voltage reading. Set the HV to the voltage required by the detector with which it is matched, i.e., 900 V for a GM tube.

Note: (If a difference of 50 V or greater is noted, remove the instrument from service. Tag the instrument and note the problem or put it in the instrument repair area.)

- 4.8 Record both readings.
- 4.9 Adjust the pulse rate to 400 pulses/min.
- 4.10 Turn on ratemeter speaker.
- 4.11 Adjust switch to x1 scale on ratemeter - adjust fine amplitude knob slowly up until audio response is received on Bicorn speaker.

Note: The point where audio response is received on the Bicorn is called the starting point.

- 4.12 Adjust the fine amplitude knob 100 mV above the starting point. The ratemeter should read 400 pulses/min Record reading.
- 4.13 Turn ratemeter speaker off.
- 4.14 If necessary, adjust the x1 potentiometer (pot) inside the ratemeter to bring reading to 400 cpm. Record reading.
- 4.15 Set the ratemeter to the x10 scale.
- 4.16 Increase the pulse rate to 4,000 pulses/min by setting the multiplier knob to the 10 scale. Record reading.
- 4.17 If necessary, adjust the x10 (pot) inside the ratemeter to bring reading to 4,000 cpm. Record reading.
- 4.18 Set ratemeter to the x100 scale.
- 4.19 Increase the pulse rate to 40,000 pulses/min by setting the multiplier knob to the 100 scale. Record reading.
- 4.20 If necessary, adjust the x100 (pot) inside the ratemeter to bring reading to 40,000 cpm. Record reading.

- 4.21 Set ratemeter to x1,000 (1K) scale.
- 4.22 Set pulse rate to 400,000 pulses/min using the multiplier adjustment knobs. Record reading.
- 4.23 If necessary, adjust the 1K (pot) inside the ratemeter to bring reading to 400,000 cpm. Record reading.
- 4.24 Set pulse rate to 200,000 pulses/min using the multiplier knobs. Record reading.
- 4.25 Repeat steps for 20,000 pulses/min, 2,000 pulses/min and 200 pulses/min. Decrease the pulse rate scale first, followed by the ratemeter scale.
- 4.26 Verify the initial ratemeter readings for 400,000 pulses/min through 400 pulses/min to insure calibration stability. If stability is not achieved, remove the instrument from service.
- 4.27 Turn off the ratemeter and pulse generator and disconnect the cables.
- 4.28 The record is filed in the Health Physics instrument calibration room in the calibration file cabinet.