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HARSHAW BICRON RADIATION MEASUREMENT PRODUCTS

RSO-5™ PORTABLE SURVEY METER

Technical Manual

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Part No. 1020900

ELECTRONIC PRODUCTS
STANDARD WARRANTY

Instruments and options manufactured by Bicron are warranted against defects in materials and workmanship for a period of two years from the date of shipment, unless otherwise agreed upon by Bicron and the customer.

Bicron's obligation with regard to such products shall be limited to repair or replacement, FOB Bicron factory or authorized repair station, at Bicron's option.

The calibration (when applicable) for each instrument is warranted to be within its specified accuracy at the time of shipment. If this initial calibration is determined to be in error, the instrument will be recalibrated at no charge, provided it is returned as described above.

The aforesaid warranty does not cover instruments, options or probes which are subject to excessive physical abuse or are used for purposes other than those intended. In no event shall Bicron be liable for consequential or special damages, transportation, installation, adjustment, work done by customer or other expenses which may arise in connection with such defective product or parts.

EXCLUSION OF LIMITED WARRANTY

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTIBILITY OR FITNESS, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. THIS EXPRESS WARRANTY EXCLUDES COVERAGE OF AND DOES NOT PROVIDE RELIEF FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE, INCLUDING, BUT NOT LIMITED TO LOSS OF USE, LOSS OF SALES OR INCONVENIENCE. THE EXCLUSIVE REMEDY OF THE PURCHASER IS LIMITED TO REPAIR, RECALIBRATION, OR REPLACEMENT OF THE INSTRUMENT AT BICRON'S OPTION.

This warranty specifically excludes the following items which are covered by their original manufacturers' warranties: photomultiplier tubes, GM and proportional tubes, crystal and other solid-state detectors, and batteries.

PROCEDURES AND CAUTIONS

The equipment herein described is designed and manufactured in compliance with all applicable safety standards. Nevertheless, certain hazards are inherent in the use of electronic and radiometric equipment.

Adequate warnings are included in the manual and on the product itself to cover hazards that may be encountered in normal use and servicing of this equipment. No other procedures are warranted by Bicron.

It shall be the owner's or user's responsibility to see to it that the procedures herein are meticulously followed, and especially that the warning and cautionary notes are heeded.

Failure on the part of the user in any way to follow the prescribed procedures shall absolve Bicron and its agents from any resulting liability.

This instrument is intended solely for the detection and measurement of ionizing radiation. It should be used only by persons who have been trained in the proper interpretation of its readings and the appropriate safety procedures to be followed in the presence of radiation.

All instructions and warnings contained in this manual or on the instrument must be read before use and must be strictly followed. Failure to follow these instructions and warnings may result in inaccurate readings and/or user hazard.

Indicated battery and other operational tests must be performed prior to each use to assure that the instrument is functioning properly.

The carrying case contains a radioactive check source (8 microcuries of ^{137}Cs) which is exempt from NRC or agreement state licensing requirements.

This radioactive material is not for human use. Introduction into foods, beverages, cosmetics, drugs or medicinals or into products manufactured for commercial distribution is prohibited.

Wipe tests should be performed if the surface of the source has been damaged. Alcohol may be used for cleaning or wiping the source. Avoid acetone or similar strong solvents.

CAUTIONS

The radioactive material should be handled only by trained individuals in conformance with 10 CFR requirements: Navy Shore RADIAC Calibration Laboratories are the only agents authorized to remove the radioactive sources from this Navy equipment. Tampering with radioactive sources is prohibited.

Failure to conduct periodic performance tests in accordance with ANSI N323-1978, Paragraphs 4.6 and 5.4, and to keep records thereof in accordance with Paragraph 4.5 of the same standard, could result in erroneous reading of potential danger. ANSI N323-1978 becomes, by this reference, a part of this operating procedure.

INSPECTION

Instruments should be examined and tested as soon as received. Claims for transportation damages, if any, should be filed at once with the delivery carrier.

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1.0 GENERAL DESCRIPTION

The Bicron RSO-5™ model is an ergonomically designed survey meter which embodies state-of-the-art electronics and a unique concept in rugged construction.

The instrument features an ion chamber detector, wide-view meter, beta, gamma and X-ray detection, 0-5000 mR/h, and simple ion chamber desiccant maintenance.

1.1 SPECIFICATIONS

RADIATION DETECTED: beta, gamma and X-ray
DETECTOR: Air-filled ionization chamber vented to atmosphere through silica gel desiccant
RANGE: 0-5000 mR/h in 4 linear ranges
ACCURACY: Within +/- 5% of full scale
ENERGY RESPONSE: +/- 20% from 12 keV to 7 MeV
WARMUP TIME: None
RESPONSE TIME: Approx. 5 sec., 0-90% of final reading
TEMPERATURE: Operational from -40°C to +60°C
HUMIDITY: <5% change in reading from 10-95% RH
RF SENSITIVITY: Unaffected by radar fields up to 20 mW/cm^2
BATTERY COMPLEMENT: One, 9-volt MN1604 or equal (the additional battery holder may be used as storage of spare or parallel-wired)
BATTERY LIFE: > 100 hours or > 200 hours with parallel option
COLLECTION POTENTIAL: 12 volts, provided by four permanently installed energy cells (life expectancy > 5 years)
COLLECTION POTENTIAL TEST: Exclusive self-test to verify proper ion chamber collection potential
CONTROLS: Seven-position rotary switch marked off, bat., zero, 5000, 500, 50, 5 mR/h; protected zero adjustment knob; top-mounted calibration pots under removable cover.
DISPLAY: Ruggedized, recessed, high-torque 1 mA meter with 3.35 inch (8.51 cm) scale marked 0-5, 'Bat.ok'. Meter protected by impact-resistant Lexan® polycarbonate window
GEOTROPISM: Within +/- 2% of full scale
SHOCK: 100g per lightweight machine of MIL-STD 202C, method 202B
VIBRATION:5g in each of three mutually orthogonal axes at one or more frequencies from 10-33Hz
CONSTRUCTION: Splash-proof, shockproof, two-piece all-metal case. Scratch-resistant laminated control panel and Bicron Kleen-Krome® trim on case top, durable black polyurethane painted handle and case bottom, chrome-plated steel clips for optional shoulder strap.

Ion chamber volume is approx. 200 cm^3; ion chamber made of 200 mg/cm^2 phenolic.

Window is 7 mg/cm^2 mylar. Positive lock sliding beta shield is 400 mg/cm^2 phenolic.

SIZE: 4.25" X 8" X 8" including handle (10.8 X 20.4 X 20.4 cm)
WEIGHT: 3.1 lbs. (1.4 kg)
OPTION: Over-the-shoulder type carrying strap

2.0 BATTERY INSTALLATION

BATTERY TYPE: 9-volt Mallory MN1604 or equivalent.
PROCEDURE:
1. Turn instrument off.
2. Open pull catches at ends of case and separate case bottom from top.
3. Install battery in clip on bottom circuit board, (clip for spare battery is so marked), observing proper polarity.
4. Replace bottom, orienting rubber pad under battery; close catches.

PARALLEL-WIRED OPTION: Instruments with this option have both battery clips wired into the circuit. Installing a second battery thus provides approximately twice the operational hours of one battery. Only one battery is needed to power the instrument, however.

2.1 BATTERY TEST

Turn control switch to the "bat." position; a meter reading within the "bat. OK" range should be observed.This test allows monitoring of the condition of the battery.

2.2 COLLECTION POTENTIAL TEST

The ion chamber collection potential is also checked when the control switch is in "bat.". The meter needle will oscillate in an obvious manner and not come to rest in the "bat. OK" range if the proper

collection potential is not being supplied to the ion chamber, regardless of the condition of the 9V main battery.

Note: The collection potential energy cells do not normally require replacement or maintenance, due to the relatively insignificant drain imposed by the ion chamber itself. Each can be replaced by the user, however, if rendered unusable for some reason (accidental damage, etc.).

3.0 RADIATION MEASUREMENTS

To make a radiation measurement:

1. Turn the control switch to "zero" and zero the meter using the zero adjustment knob.
2. Turn the control switch to one of the four linear ranges. Due to the sensitivity of the ion chamber to transient switching noise, the meter will normally deflect momentarily when the 5 mR/h range is selected.
3. When surveying for medium to high energy gammas or X-rays, slide the positive-lock beta shield closed to protect the mylar window. Radiation incident on the front, sides and bottom of the case will be detected.
4. When surveying for betas or low energy gammas or X-rays, slide the beta shield open and orient the instrument so that radiation is incident on the exposed window. Note that the end of the shield protrudes beyond the end of the case bottom when fully opened.

*****CAUTION*****

An external source of ionizing radiation of the type the instrument was designed to measure must be used to determine proper operation of this instrument.

3.1 CALIBRATION

The instrument is normally calibrated with ^{137}Cs gamma rays. Recalibration is required after servicing and at regular intervals specified by appropriate regulatory agencies.

The unit is placed in a known radiation field in the appropriate fixed geometry. The center of the ion chamber is indicated by markings on the case bottom to aid in achieving correct orientation.

The calibration controls are located under a splash-proof cover on the top panel. Loosening the single thumbscrew and removing the cover provides access to the controls. The controls themselves are designed to be splash-proof.

A detailed calibration procedure is part of the Q.C. Acceptance Procedure found elsewhere in this manual. Note that the calibration performed provides the instrument with an accuracy well within the +/- 5% of full scale accuracy specification.

4.0 IONIZATION CHAMBER

The ion chamber used in the RSO-5 is essentially a phenolic cylinder with one end sealed with an aluminized mylar film and the other sealed against the housing for the electronic amplifier. The inside of the cylinder is conductive so that it can carry the negative potential. A collector plate is suspended within the cylinder. The chamber is air-filled and vented to the atmosphere through a silica gel desiccant.

This assembly is mounted to the main circuit board and oriented so that the chamber window is aligned with the aluminized mylar window in the case bottom. Note that the case bottom and top can go together only one way because of the alignment.

Total density of the two mylar windows is 7 mg/cm^2. These windows are designed to be easily replaced by the user in the event of accidental damage.

4.1 ELECTRONIC AMPLIFIER

This section of the ion chamber assembly amplifies the current generated in the chamber to provide a meter reading. Due to the amplifier's extreme sensitivity, it can be damaged by electrostatic discharge.

Since such damage is not covered by the warranty on the instrument, it is recommended that the ion chamber amplifier section be serviced (should it require servicing) only by a qualified technician.

4.2 CAM AND ARM ASSEMBLY

This assembly controls operating range selection by positioning the permanent magnet mounted on the arm properly around magnetic reed switches.

Set screws on the cam are user-adjustable, although the factory settings will not normally require adjustment.

4.3 ION CHAMBER DESICCANT SYSTEM

The air-filled ionization chamber is vented to the atomosphere through the amplifier section. Because of the sensitivity of the chamber, leakage currents can be easily set up by small amounts of moisture within the chamber. To keep this moisture to a minimum, the chamber vent is connected to a desiccant system.

The desiccant used is an indicating type of silica gel. At the first sign of pink coloration in the normally blue-colored crystals, remove the crystals, dry them at 200°F for 24 hours, and return them to their container. For immediate use, replace the "used" desiccant with new or previously dried desiccant.

If the desiccant is allowed to become saturated, leakage currents may develop and the instrument may produce erratic readings. The chamber air will then have to be dried by flushing it over fresh desiccant to restore proper operation. This is accomplished by heating the instrument to around 140°F and cooling to room temperature several times after the saturated desiccant has been dried or replaced.

The design of the system is such that removal and replacement of the desiccant is a relatively simple operation. Access to the crystal is gained through a snap-off/snap-on cap. The container is held securely by its clip but can be quickly taken out and put back in. The tube can be separated from and put back on its fittings in simple fashion.

5.0 CORRECTION FACTORS

Since the operation of the ion chamber is affected by air density, correction factors may have to be applied to readings obtained when the instrument is used at temperatures and/or pressures significantly different from those at which the instrument was calibrated. In practice, these factors are significant mainly at the extremes of temperature and pressure.

The correction factors for temperature are found in Table C-2; those for pressure (altitude) are found in Table C-1.

TABLE C-1

CORRECTION FACTORS FOR TEMPERATURE

CALIBRATION TEMPERATURE

OPERATING TEMPERATURE

°C		-40	-34.4	-28.9	-23.3	-17.8	-12.2	-6.7	-1.1	4.4	10	15.6	21.1	26.7	32.2	37.8	43.3	48.9	54.4	60
	°F	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
-40	-40	1.00	.98	.95	.93	.91	.89	.87	.85	.84	.83	.81	.79	.78	.76	.75	.74	.72	.71	.70
-34.4	-30	1.02	1.00	.98	.95	.93	.92	.89	.88	.86	.84	.83	.81	.79	.78	.77	.75	.74	.73	.71
-28.9	-20	1.05	1.02	1.00	.98	.96	.94	.92	.90	.88	.86	.85	.83	.81	.80	.79	.77	.76	.75	.73
-23.3	-10	1.07	1.05	1.02	1.00	.98	.96	.94	.92	.90	.88	.87	.85	.83	.82	.80	.79	.78	.76	.75
-17.8	0	1.10	1.07	1.05	1.02	1.00	.98	.96	.94	.92	.90	.88	.87	.85	.84	.82	.81	.79	.78	.77
-12.2	10	1.12	1.09	1.07	1.04	1.02	1.00	.98	.96	.94	.92	.90	.89	.87	.85	.84	.82	.81	.80	.78
- 6.7	20	1.14	1.12	1.09	1.07	1.04	1.02	1.00	.98	.96	.94	.92	.91	.89	.87	.86	.84	.83	.81	.80
- 1.1	30	1.17	1.14	1.11	1.09	1.07	1.04	1.02	1.00	.98	.96	.94	.92	.91	.89	.87	.86	.85	.83	.82
4.4	40	1.19	1.16	1.14	1.11	1.09	1.06	1.04	1.02	1.00	.98	.96	.94	.93	.91	.89	.87	.86	.85	.83
10	50	1.21	1.19	1.16	1.13	1.11	1.09	1.06	1.04	1.02	1.00	.98	.96	.94	.92	.91	.89	.88	.86	.85
15.6	60	1.24	1.21	1.18	1.16	1.13	1.11	1.08	1.06	1.04	1.02	1.00	.98	.96	.95	.93	.91	.90	.88	.87
21.1	70	1.26	1.23	1.20	1.18	1.15	1.13	1.10	1.08	1.06	1.04	1.02	1.00	.98	.96	.95	.93	.91	.90	.88
26.7	80	1.29	1.26	1.23	1.20	1.17	1.15	1.13	1.10	1.08	1.06	1.04	1.02	1.00	.98	.96	.95	.93	.92	.90
32.2	90	1.31	1.28	1.25	1.22	1.20	1.17	1.15	1.12	1.10	1.08	1.06	1.04	1.02	1.00	.98	.96	.95	.93	.92
37.8	100	1.33	1.30	1.27	1.24	1.22	1.19	1.17	1.14	1.12	1.10	1.08	1.06	1.04	1.02	1.00	.98	.97	.95	.93
43.3	110	1.36	1.33	1.30	1.27	1.24	1.21	1.19	1.16	1.14	1.12	1.10	1.08	1.06	1.04	1.02	1.00	.98	.97	.95
48.9	120	1.38	1.35	1.32	1.29	1.26	1.23	1.21	1.18	1.16	1.14	1.12	1.09	1.07	1.05	1.04	1.02	1.00	.98	.97
54.4	130	1.41	1.37	1.34	1.31	1.28	1.26	1.23	1.20	1.18	1.16	1.13	1.11	1.09	1.07	1.05	1.04	1.02	1.00	.98
60	140	1.43	1.40	1.36	1.33	1.30	1.28	1.25	1.22	1.20	1.18	1.15	1.13	1.11	1.09	1.07	1.05	1.03	1.02	1.00

METER READING X CORRECTION FACTOR = CORRECTED READING

TABLE C-1

CORRECTION FACTORS FOR ALTITUDE (PRESSURE)

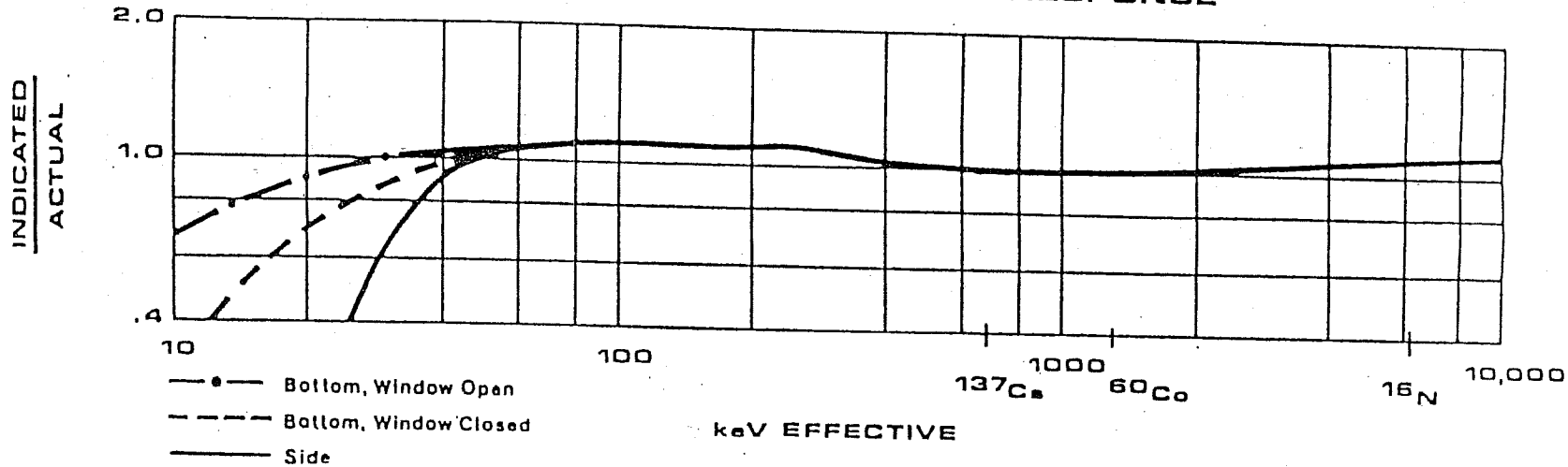
CALIBRATION ALTITUDE

OPERATING ALTITUDE	Sea Level	1000'	2000'	3000'	4000'	5000'	6000'	7000'	8000'
Sea Level	1.00	.96	.93	.90	.86	.83	.80	.76	.73
1000'	1.04	1.00	.96	.93	.90	.86	.83	.80	.76
2000'	1.08	1.04	1.00	.96	.93	.90	.86	.83	.80
3000'	1.12	1.08	1.04	1.00	.96	.93	.90	.86	.83
4000'	1.16	1.12	1.08	1.04	1.00	.96	.93	.90	.86
5000'	1.20	1.16	1.12	1.08	1.04	1.00	.96	.93	.90
6000'	1.25	1.20	1.16	1.12	1.08	1.04	1.00	.96	.93
7000'	1.30	1.25	1.20	1.16	1.16	1.08	1.04	1.00	.96
8000'	1.35	1.30	1.25	1.21	1.21	1.12	1.08	1.04	1.00

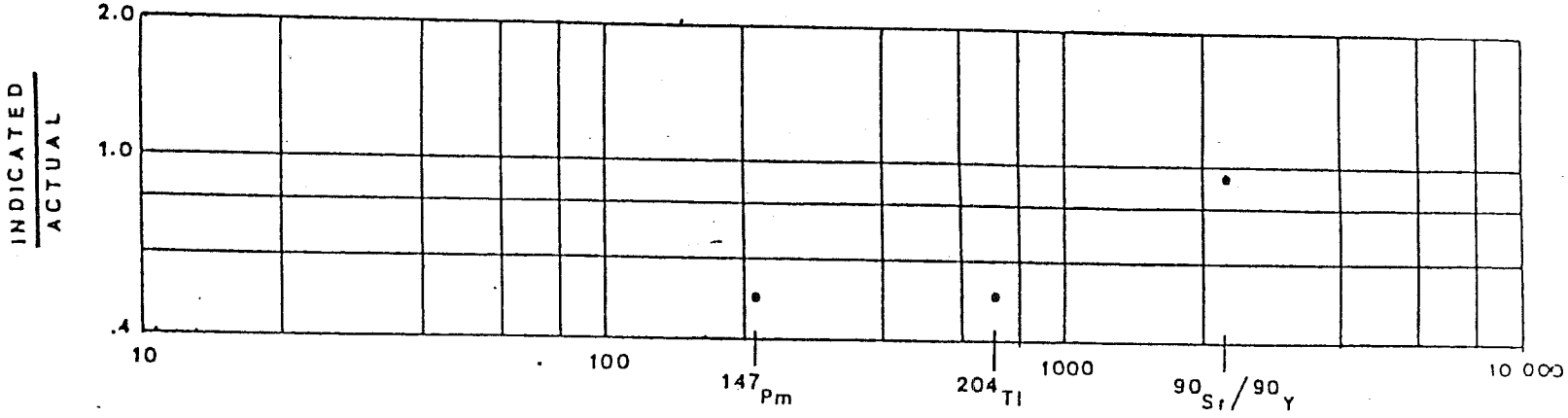
METER READING X CORRECTION FACTOR = CORRECTED READING

NOTE: When both temperature and altitude are different from those at which the instrument was calibrated, Corrected Reading = Meter Reading x Temperature Correction Factor x Altitude Correction Factor.

TYPICAL PHOTON ENERGY RESPONSE



TYPICAL BETA ENERGY RESPONSE



BICRON QC ACCEPTANCE PROCEDURE NUMBER 1020930

MODEL: RSO-5™

1. Perform visual inspection of finished product.

2. Remove all 9V batteries. Connect a power source of 9.30V +/- .05V across the main battery terminals of the battery board. Perform the following tests:

   a. Turn the control switch to "off". Mechanically zero the meter via the rear zero adjustment screw on the meter barrel.

   b. Leave the control switch in "off" position and measure the voltage of each energy cell on the ion chamber mounting board. A minimum voltage of 3.0V should be observed on each cell.

      Note: The RSO-5 contains 4 energy cells.

   c. Leave the control switch in "off" and disconnect the 9-pin "D" connector from the ion chamber. Turn the control switch to the "bat." position. The meter should oscillate at a rate of about 2 to 5 hertz.

   d. Turn the control switch to "off" and reconnect the 9-pin "D" connector to the ion chamber. Turn the control switch to "bat.". The meter should indicate a "bat. ok" condition within +/- 5% of full scale on the meter.

   e. Leave the control switch in "bat." and measure the -V supply between pins 1 and 11 of the 24-pin header. The supply should be -8.0V or greater (more negative).

   f. Turn the control switch to "zero" and check to see that clockwise rotation of the zero control increases the meter reading. Zero the meter with the control.

   g. Check to see that the reed switch magnet arm is functioning properly, as follows:

      1. <u>off, bat., zero positions</u>: arm with magnet should be to the <u>right</u> side of the chamber.

      2. <u>5000 mR/h, 500 mR/h positions</u>: arm with magnet should be to the <u>left</u> side of the chamber.

      3. <u>50 mR/h, 5 mR/h positions</u>: arm with magnet should be in the center of the chamber.

      Adjust the set screws on the cam as required to insure proper reed switch magnet arm action.

3. Perform the following isotopic calibration:

   a. Turn the control switch to "5000 mR/h" and position the unit so that the ion chamber is in the appropriate fixed geometry in a known ^{137}Cs radiation field. (<u>Note</u>: Make sure that the <u>entire</u> chamber is being irradiated.)

   b. Expose the unit to the proper field intensity (listed in Table T-1) required to calibrate the unit at 80% of full scale.

c. Adjust R5 (5000 mR/h calibration pot) until the unit reads 80% of full scale on the meter.

d. To test linearity, expose the unit to the proper field intensity required for 20% of full scale (this value also listed in Table T-1).

e. Note these readings on a Certificate of Calibration.

f. Repeat this procedure for the "500 mR/h" position (using R8, the 500 mR/h calibration pot), the "50 mR/h" position (using R10, the 50 mR/h calibration pot), and the "5 mR/h" position (using R13, the 5 mR/h calibration pot).

TABLE T-1

Isotopic Calibration Table for the RSO-5

Range	Exposure Rate (m/R/h)	Acceptable Meter Reading (mR/h)
5000 mR/h (80%)	4000	3800 - 4200
5000 mR/h (20%)	1000	900 - 1100
500 mR/h (80%)	400	380 - 420
500 mR/h (20%)	100	90 - 110
50 mR/h (80%)	40	38 - 42
50 mR/h (20%)	10	0 - 11
5 mR/h (80%)	4	3.8 - 4.2
5 mR/h (20%)	1	.9 - 1.1

Please note that these calibration values provide an accuracy well within the +/- 5% of full scale accuracy specification for the instrument.

4. Turn the unit off. Install a new +9V alkaline battery (MN1604 or equal) in the main battery holder. (Note: If unit is parallel-wired, battery can be installed in either holder. However, only 1 battery is required for proper operation).

5. Complete, date, and sign a Certificate of Calibration.

SPARE PARTS LIST
BICRON RSO-5

SCHEMATIC SYMBOL	DESCRIPTION			PART NO
	Main PC Board Assembly			1020010
C5, C6	Capacitor,	33 uF,	10 V tan.	9233361
D1, D5, D7-D11	Diode,	1N4148		9600002
Q1	VMOS FET,	VN10KMA		9610003
R4, R20, R21	Resistor,	10 meg,	1/4w, 5%	8110054
R5, R8, R10, R13	Trimpot,	50k		9395032
R6, R9, R11, R14	Resistor,	33.2k,	1/4w, 1%	8533224
R7, R12	Resistor,	1 meg,	1/4w, 1%	8510044
R15	Resistor,	3.3k,	1/4w, 5%	8133014
R16	Resistor,	8.45k,	1/4w, 1%	8584514
RN1	Res. Network,	7 x 220k		8822031
SW3	Switch,	Rotary,	7 pos.	9560006
U2, U3	Int. Ckt.,	CD4016BEX		9650002
U5	Int. Ckt.,	ICL7660CPA		9640005
	Header,	12-pin		9780006
	Header,	24-pin		9780002
	Circuit Board			9410008
	Chamber Mtg. PC Board Assembly			1020020
BT3-BT6	Battery, 3V lithium, BR1225			9750003
C1, C2	Capacitor,	0.1 uF,	Film	9211041
C3	Capacitor,	.047 uF,	Film	9214731
C4	Capacitor,	1.0 uF,	10 V tan.	9231051
D2	Diode,	1N5242		9600005
D3, D4	Diode,	1N4148		9600002
R17	Resistor,	10 meg,	1/4w, 5%	8110054
R18	Resistor,	22 meg,	1/4w, 5%	8122054
R19	Resistor,	1 meg,	1/4w, 5%	8110044
U4	Int. Ckt.,	MC14093BCPDS		9650001
	Connector,	24-pin		9780001
	Connector,	Chamber		9780005
	Pivot Arm Assembly			9100055
	Bracket Assembly			9850006
	Magnet			9100060
	Spring			9470003

	Battery PC Board Assembly	9420003
	Silica Gel Dessicant	9990002
	Dessicant Holder	9100056
	Vent Tube	9100057
	Ion Chamber Assembly	1020060
	Chamber Shell Assembly	9100051
	Angle Bracket (Small)	9850004
	Angle Bracket (Large)	9850005
	Case Top Assembly	1020140
	Handle	9710001
	Meter	9400012
	Meter Window	9400011
	Meter Support Bracket	9850002
	Meter Face	9400022
	Case Bottom Assembly	1020050
	Slide Plate	9100039
	Mylar Window	9100058
	Slide Plate Assembly	9100036
	Miscellaneous	
BT1	Battery, 9V alkaline, MN1604	9750001
R3	Potentiometer, 20k	9382031
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	Knob, Zero	9770004
	Zero Knob Guard	9100034
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	Manual, Operator's	1020900
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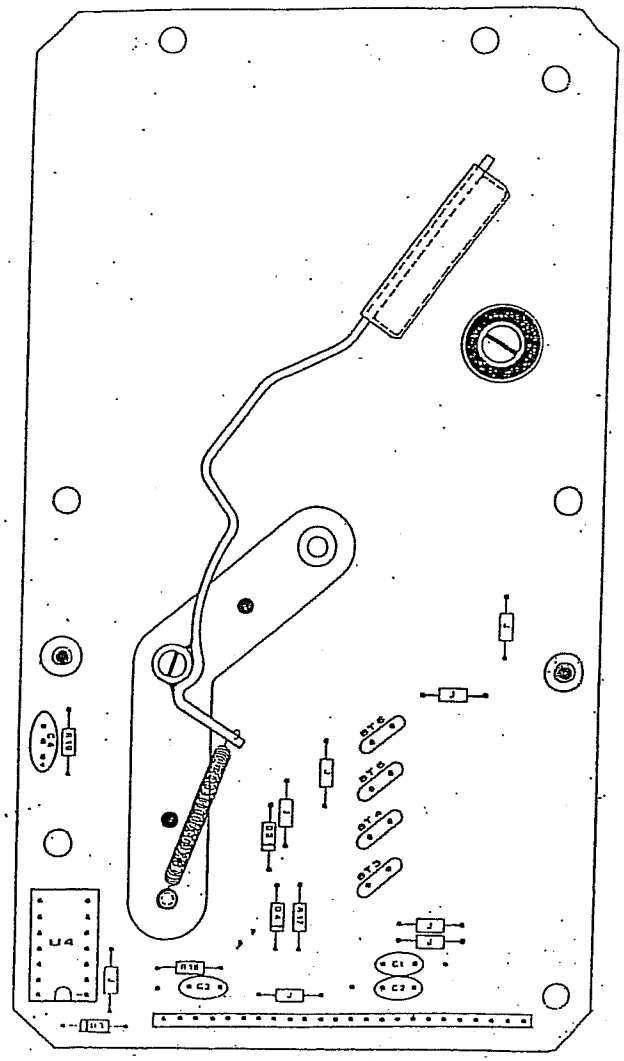
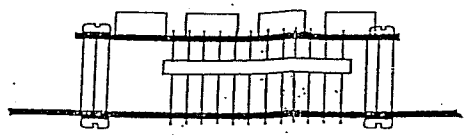
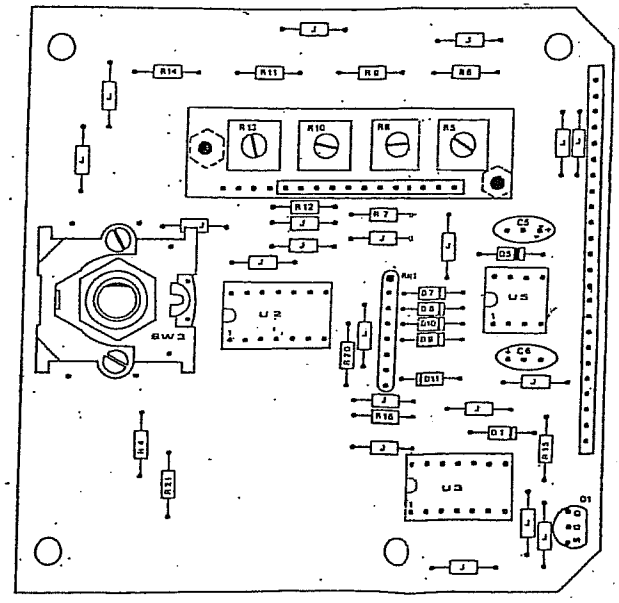
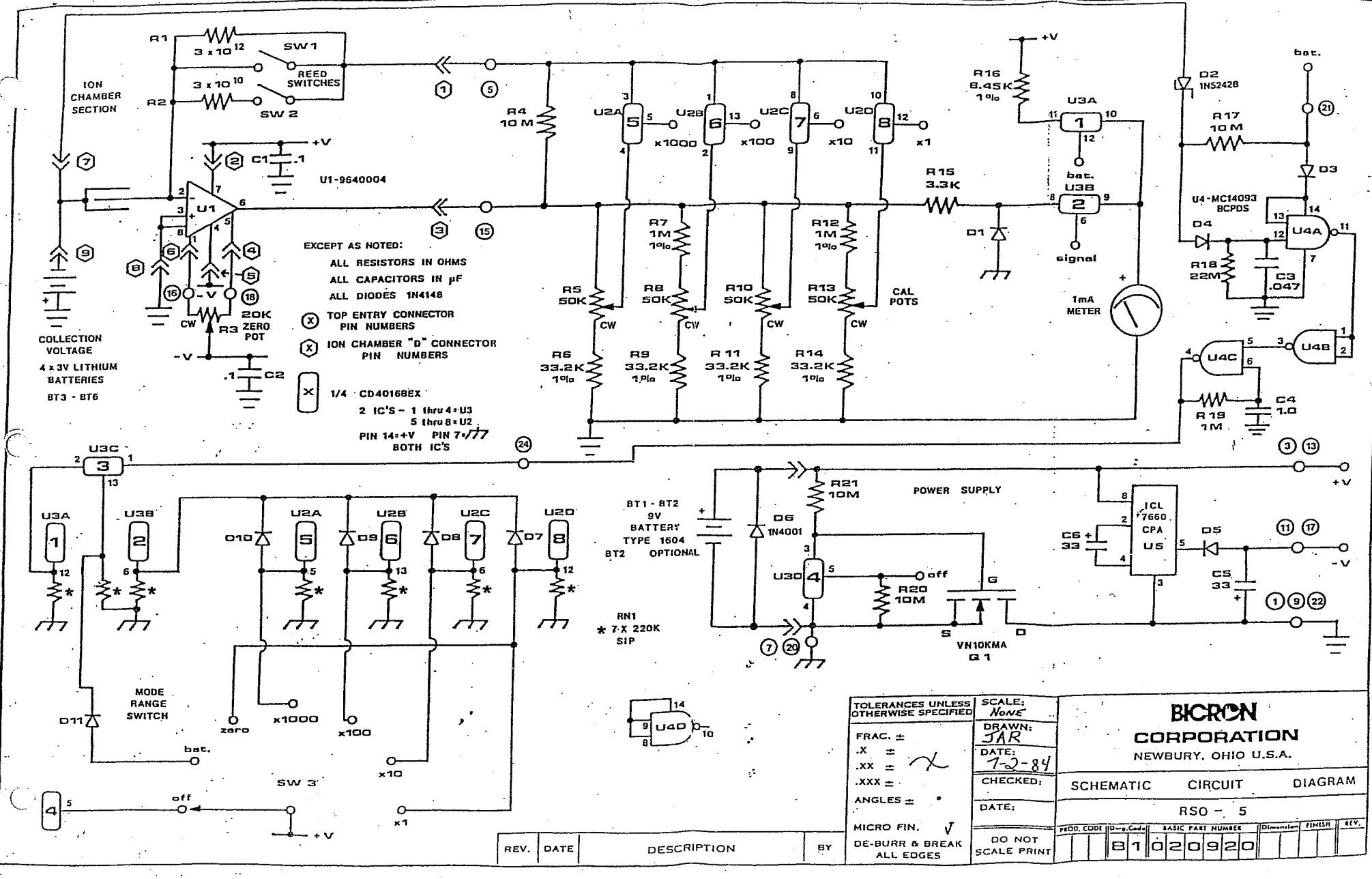


Top View
Component Side



Side View
(Showing Mounting of
Calibration Board)





REV.	DATE	DESCRIPTION	BY

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRAC. ±
.X ±
.XX ±
.XXX ±
ANGLES ±
MICRO FIN. √
DE-BURR & BREAK ALL EDGES

SCALE: None
DRAWN: JAR
DATE: 7-2-84
CHECKED:
DATE:
DO NOT SCALE PRINT

BICRON CORPORATION
NEWBURY, OHIO U.S.A.

SCHEMATIC CIRCUIT DIAGRAM
RSO - 5

PROD. CODE	D-g. Code	BASIC PART NUMBER	Dimension	FINISH	REV.
		B1 0 2 0 9 2 0			