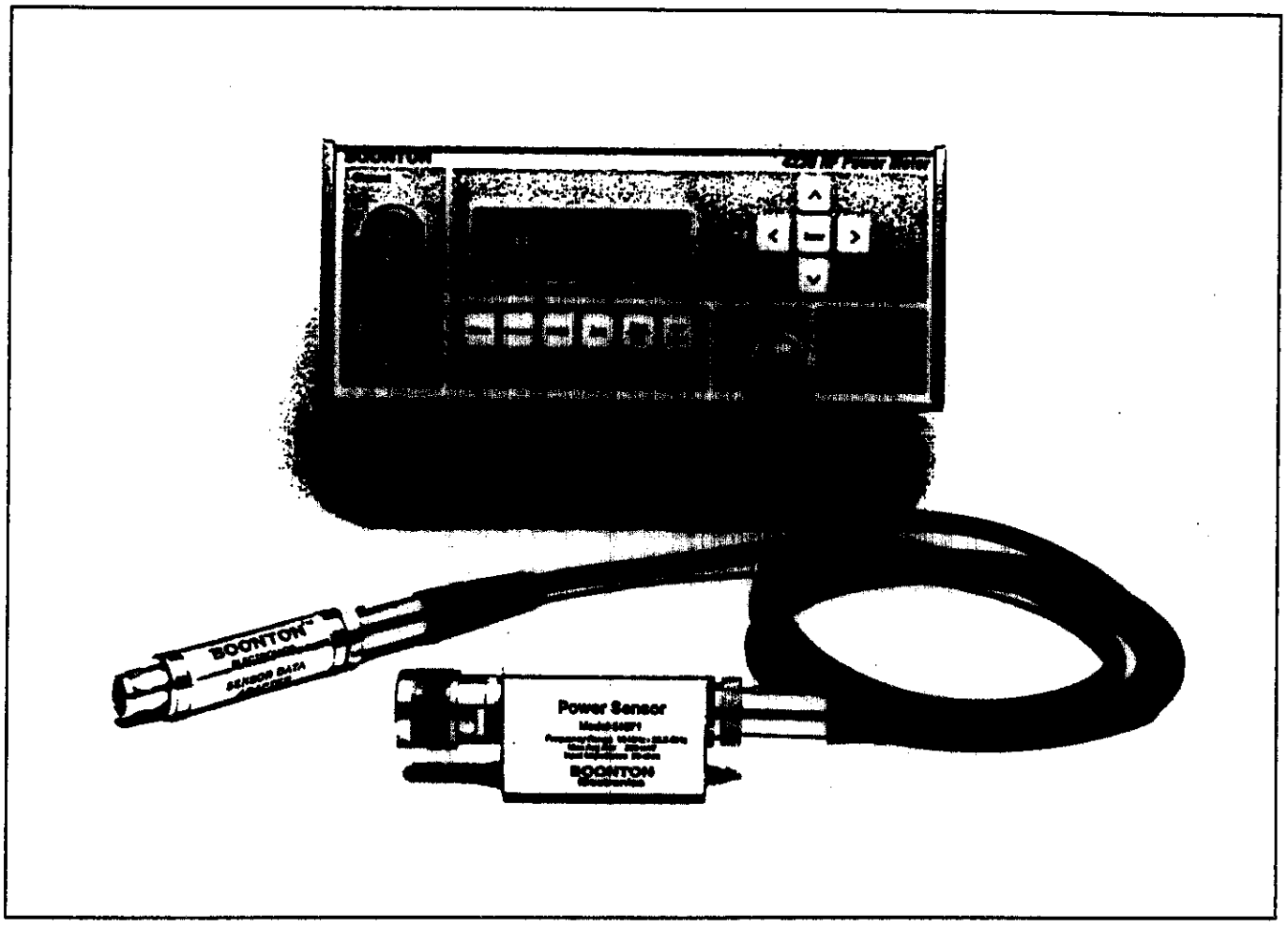

Figure 1-1. Model 4230 RF Powermeter

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This instruction manual provides general information, installation and operating instructions, and application notes for the Model 4230 RF Power Meter. See Figures 1-1 and 1-2.

1-3. DESCRIPTION.

1-4. The Model 4230 is a digital signal processor based, single or dual channel, solid state RF power meter. It is capable of measuring RF power levels from -70 dBm to +44 dBm. The frequency range and power level are sensor dependent. Boonton 51000 series sensors provide measurement capabilities for frequencies from 10 kHz to 100 GHz.

1-5. FEATURES.

1-6. Power Sensors. A wide range of diode and thermocouple power sensors for both coaxial and waveguide applications are available for use with the Model 4230. Sensor data adapters are supplied with the Model 4230, however, the power sensor must be ordered separately.

1-7. Diode sensors measure the voltage across a precision resistor, using specially selected diodes. Detection is square law (true RMS) over approximately the lower two-thirds of the sensor's dynamic range, and peak detecting over the upper portion. Because the instrument is calibrated for sine waves over the entire range, measurements at the top one-third of the sensor's dynamic range are valid only for non-modulated signals. In the RMS region, linearity is excellent, and any signal type can be measured. The diode range has been extended into the peak detecting region with the use of real time shaping for the diode curve. When coupled with the high sensitivity of the diode, such shaping allows a dynamic range of 90 dB. Diode sensors are rugged and have an overload headroom of more than 5 dB for continuous signals. The dynamic range in the RMS region can be extended further through use of an external attenuator.

1-8. Thermal sensors measure the voltage developed across a dissimilar metal junction caused by the thermal gradient generated by the RF power being measured. Because these sensors are heat detecting, they provide true RMS response over their entire range. Very high peak powers (15 to 30 watts) can be accommodated for very short duty cycles and still provide valid results. The dynamic range is 50 dB. Thermal sensors are not as sensitive as diode sensors.

1-9. The sensor data adapter contains non-volatile memory for storage of the calibration data. In addition, calibration data for up to four sensors can be stored in the instrument's non-volatile memory. The user can enter both the linearity and high frequency sensor calibration correction data which are supplied with each sensor. For sensors ordered with the Model 4230, the calibration data is loaded into the sensor data adapter prior to shipment. When the frequency of the RF signal to be measured by one of these sensors is entered, the instrument looks up the appropriate calibration factors, interpolates as necessary, and automatically applies the correction to the measured value. Calibration factors for sensors ordered with the instrument are stored in the plastic pouch attached to the inside of the instrument's top cover.

1-10. Simple Instrument Setup and Operation. In the operating mode the functions: Frequency, Averaging Time, Reference Level, Zeroing/Calibration are selected with a single keystroke. Values for these parameters are displayed and can be adjusted by using the arrow and enter keys. Additional operating parameters can be modified through the menu driven structure accessible via the <Menu> and <Sensor> keys.

1-11. Alphanumeric Display. The alphanumeric LCD provides clear, unambiguous readouts of the instrument's setup and measurement values. Simultaneous display of both channels is available in dual channel mode. A bar graph provides a display of the channel's measured value for nulling and peaking applications.

1-12. Selectable Ranging. Any of seven measurement ranges, or autoranging, can be selected during instrument setup. The selection will be held until it is changed, or until the instrument is turned off. When measuring signals with levels that fall within a narrow range, selecting one specific instrument range may reduce measurement time. Autoranging is useful if the RF signal level is unknown, or if RF signals with widely varying levels are to be measured.

1-13. Selectable Filtering. Measurement speed and display stability can be optimized through the use of selectable filtering. Filter times can be adjusted up to 20 seconds maximum in 50 millisecond increments.

1-14. Zeroing. Automatic zeroing (nulling of offsets for the sensor and input channel) is done independently on each range to eliminate zero carryovers.

1-15. Built-In Precision Calibrator. A built-in 50 MHz calibrator provides an accurate, stable, and convenient power source for calibration of the instrument to specified tolerances. The calibrator may be toggled on or off from the Setup menu. The connector is normally mounted for front panel access, however option-02 changes this to rear panel access.

1-16. Chart Recorder Output. A 0 to 10 volt dc output, proportional to the measurement values, is available for application to a chart recorder.

1-17. Optional Interface. A RS-232 option enables full service remote control of the Model 4230. All instrument controls and values, except power on and off, are accessible to a bus controller in the remote operating mode.

1-18. ACCESSORIES.

1-19. A sensor data adapter for each channel installed along with the AC power cord is supplied with the instrument. One or more Boonton 51000 series power sensors are required. The power sensors are not supplied as part of the instrument, but must be ordered separately. A five-foot power sensor cable, Model 41-2A, is supplied with each sensor ordered. Additional available accessories include the following:

a. Model 41-2A/10 Sensor/Probe Interconnecting Cable (10 ft)

b. Model 41-2A/20 Sensor/Probe Interconnecting Cable (20 ft)

c. Model 41-2A/50 Sensor/Probe Interconnecting Cable (50 ft)

d. Model 41-2A/100 Sensor/Probe Interconnecting Cable (100 ft)

e. Model 950047 F/F Adapter, 41-2A (for connecting Model 41-2A cables end to end)

f. Model 950049 Bulkhead Connector F/F, 41-2A (for connecting Model 41-2A cables end to end)

g. Model 954015 Rack Mounting Kit

h. Model 951090 Additional Sensor Data Adapters

1-20. OPTIONS.

1-21. Option-01, 1 Channel Front. The instrument can be configured as a single channel unit.

1-22. Option-02, 2 Channels Rear. Two power sensor connectors are installed on the rear panel.

1-23. Option-03, 1 Channel Rear. A single power sensor connector is installed on the rear panel.

1-24. Option-04, Rear Calibrator. Option -04 brings the 0 dBm, 50 MHz calibrator connector out the rear instead of the front panel.

1-25. Option-05, RS-232 Interface. An RS-232 serial interface is available for remote operation. Selectable baud rates, data, stop and parity bits are programmable.

1-26. SPECIFICATIONS. Performance specifications of the Model 4230 are listed in Table 1-1.

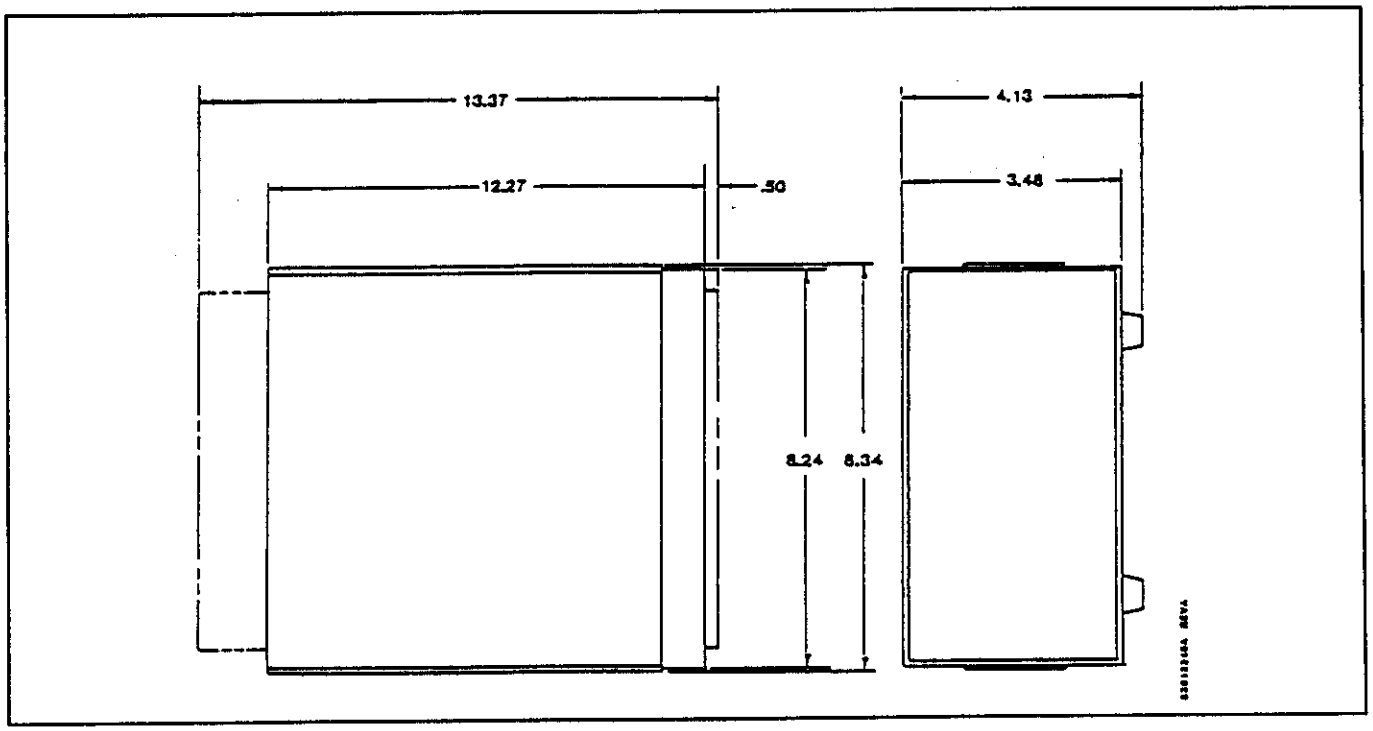

Figure 1-2. Outline Dimensions.