

915 and
2450 MHz

ELECTROMAGNETIC LEAKAGE MONITOR

"SURVEYOR" T.M.

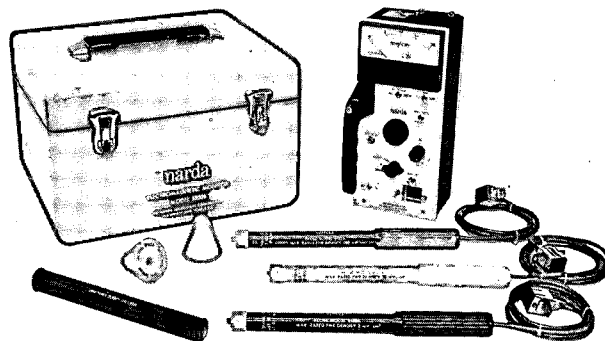
915 and
2450 MHz

Model
8100B

WITH MAXIMUM HOLD AND AUTOMATIC ZERO

FEATURES:

- Dual mode of operation:
Maximum Hold or Normal
- Automatic zero
- Accuracy ± 0.75 dB at two frequencies: 915 and 2450 MHz
- Completely portable, lightweight
- Adjustable alarm sounds when meter exceeds preset level
- Automatic malfunction and fail-safe indicator
- Interchangeable probes enable readings from $10 \mu\text{W}/\text{cm}^2$ to $200 \text{ mW}/\text{cm}^2$



Narda Model 8100B, Electromagnetic Leakage Monitor fully complies with the requirements specified for test equipment in the performance standards published by the Department of Health, Education and Welfare in the Federal Register, Volume 35, dated October 1970.

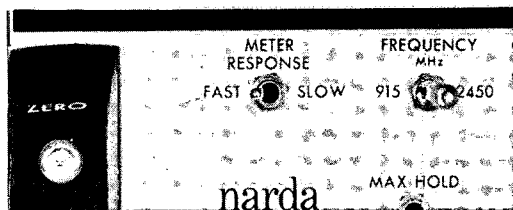
DESIGN

A completely portable detector, the Model 8100B Electromagnetic Leakage Monitor has been specifically designed to fill the need for a reliable device to make microwave oven measurements at close range with good accuracy. It detects and measures hazardous radiation leakage from microwave ovens, heaters, dryers, and medical equipment which operate at 915 MHz and at 2450 MHz, the two most common frequencies in use. Calibrations at other frequencies are available upon special request.

Three different hand-held probes, each having a dynamic range of 23 dB, can be used with the Leakage Monitor. Advanced state-of-the-art design of the probes minimizes the perturbations of the electromagnetic field during test. This feature enables the probe to measure radiation emanating through cracks and joints, and to determine the power density at varying distances from the radiation source.

METER DESCRIPTION

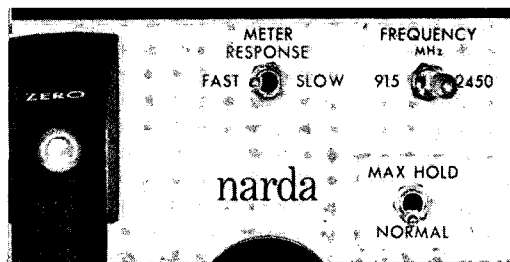
Two special features of the Model 8100B are Auto Zero and Maximum Hold. The Auto Zero feature simplifies zeroing of the meter by conveniently providing a push-button in the handle of the instrument. This allows the operator to quickly zero the instrument by pressing the pushbutton while holding the instrument with the same hand.



Electronic zeroing effectively eliminates any possibility of error which may be introduced by accidentally turning a manual type zero control.

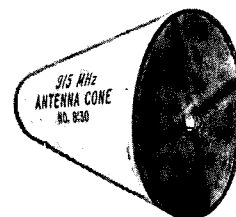
Maximum Hold allows the operator to survey an oven or a surface for a maximum level. When operated in this mode, the instrument will memorize the maximum reading encountered during the survey. The maximum reading is displayed on the meter thus relieving the user of having to remember what the highest level encountered was and allowing him to concentrate on the area being surveyed to see exactly where the maximum occurred.

The instrument may be switched back to the normal position at any time to indicate the varying leakage level as it occurs.



PROBE DESCRIPTION

During measurement, the axis of the probe is positioned parallel to the direction of propagation of the radiated wave. Thus, the body of the probe is essentially invisible to the field. This provides greater accuracy of readings as compared to other types of Leakage Monitors.



PRECISION MICROWAVE AND RF TEST EQUIPMENT

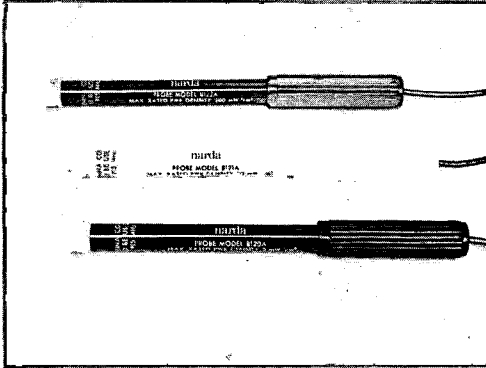
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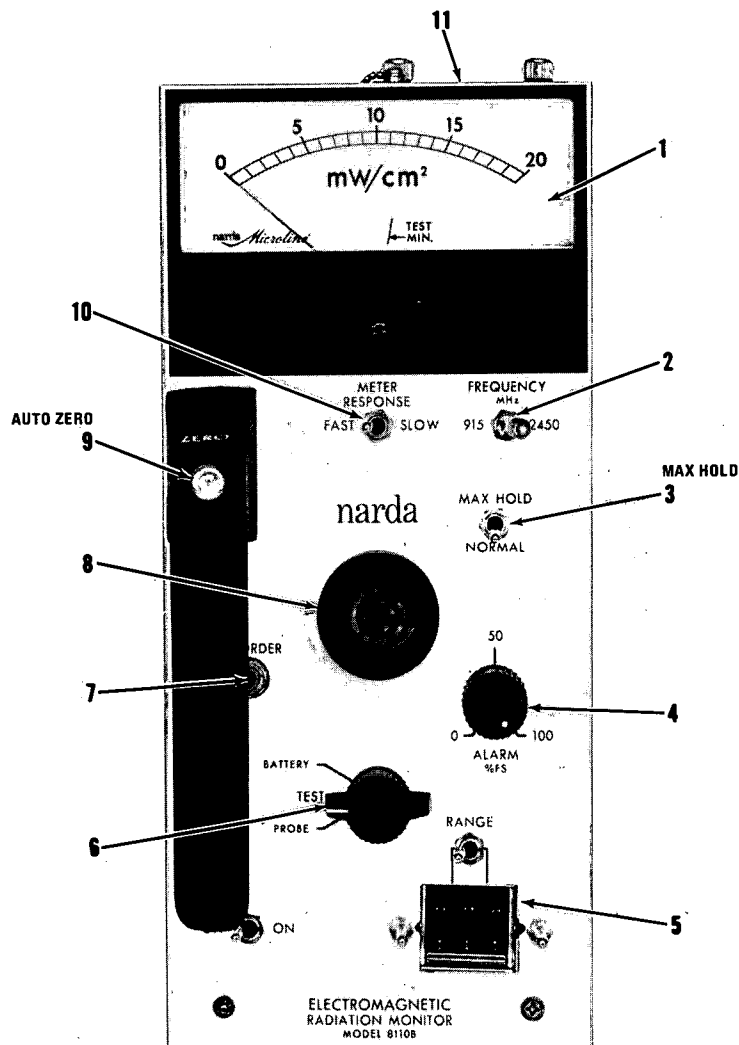
Each probe is 11" (279.4 mm) long and 3/4" (19 mm) in diameter. Choice of probe is based upon the sensitivity of measurement desired by the operator. Sensitivity of each probe is in the range of 10:1 over the next most sensitive probe, enabling the operator to read the meter to the maximum level of accuracy. The instrument automatically selects the range appropriate to the probe being used.



Three interchangeable probes are available to provide full-scale power density indications from 200 $\mu\text{W}/\text{cm}^2$ to 200 mW/cm^2 . Readings can be made as low as 10 $\mu\text{W}/\text{cm}^2$. Each hand-held probe is non-polarized and does not require orientation in the radiation field to obtain an accurate indication of field density. Each probe combines the antenna and detector in a single, composite unit.

Probes used for 2450 Hz measurement can be placed as close as 1/2" (1.3 cm) from the radiation source without significantly disturbing the field. To ensure reliable measurement, probes can be fitted with a 2" (5 cm) long, polystyrene foam spacer. The spacer is placed on the tip of the probe so that the new specified distance is maintained for every measurement.

The probe used for 915 MHz measurement is fitted with a 2" (5 cm) long antenna cone to increase the gain of the instrument. The cone also ensures that a fixed distance (5 cm) is maintained between the probe tip and the radiation source.



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PRECISION MICROWAVE AND RF TEST EQUIPMENT

THE NARDA MICROWAVE CORPORATION, Plainview, New York 11803

**915 and
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ELECTROMAGNETIC LEAKAGE MONITOR

"SURVEYOR"™ T.M.

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1. Meter

The direct reading meter has a scale which covers a 13 dB range. The scale is linear, thus permitting measurements over wide dynamic ranges with excellent linearity through use of a built-in DC operational amplifier.

2. Calibration

A frequency selector switch on the monitor provides for switching the meter from readings at one calibrated center frequency to the other calibrated center frequency. Accuracy of probe calibration at these frequencies is ± 0.75 dB.

3. Max Hold

A mode switch is provided to select either the NORMAL or MAX HOLD mode of operation. In the max hold mode, the meter will display the highest level measured during the survey. This allows the operator to concentrate on the area being surveyed without memorizing the highest leakage levels measured.

4. Audible Alarm

A panel control allows an audible alarm to be set at any percentage of full scale value of the particular probe. When this threshold is exceeded, an alarm is sounded to alert the operator of the existence of power density greater than his preset level. A panel switch enables the user to determine if the probe is operating properly, thus eliminating a possible source of danger to the tester.

5. Range Selection

Each probe has a 200:1 dynamic range. A range switch permits selection of either of two 10 dB ranges. The range switching capability permits use of a single probe for full dynamic range readings on both scales.

6. Battery/Probe Test

A two position Battery/Probe Test Switch is provided to verify proper operation of both items. When momentarily held in either the BATTERY or the PROBE position, a reading at or above the TEST MIN level indicates acceptable performance. If a reading below the TEST MIN level is obtained, either the battery must be recharged or the probe must be replaced.

7. Recorder

The recorder jack is provided to connect an external recorder or metering device.

8. Automatic Fail Safe

An audio alarm will sound to notify the operator if an element or antenna probe is inoperative or if a probe is not connected. This feature protects the operator in case of equipment malfunction.

9. Automatic Zero

The zero pushbutton mounted in the handle allows fast and accurate automatic zeroing of the meter.

10. Meter Response Time

A two position switch allows selection of either fast or slow meter response times. When set to the SLOW position, the unit will automatically integrate peak power readings and indicate the average power level being radiated with a response time of 3 seconds. In the FAST position the meter will indicate each peak value with a response time of 1 second.

11. AC Operation

Although specifically designed as a portable unit, Model 8100B can also be operated using 115 or 230 V, 50-60 Hz AC. A receptacle for connection of an AC line cord and a 115/230 Selector Switch are located beneath a removable plate on the top of the instrument. The AC mode of operation is also used to charge the battery. Charging automatically takes place when power is applied and the unit is operational.

NOTE

Ensure that meter and line cord are completely out of microwave radiation field when using AC to power the instrument.

Leakage Suppression

All RF probes and the monitor are designed for electromagnetic compatibility. This ensures that the unit is completely insensitive to extraneous electromagnetic radiation under normal battery operating conditions.

Configuration

Model 8100B is completely portable; monitor, probes and AC power cable are easily carried in a convenient carrying case. The complete unit weighs only 12-1/2 pounds (5.7 Kg). Standard power is supplied by a 15 V rechargeable nickel-cadmium battery with a 2:1 use/charge ratio. Minimum use period between charges is 20 hours.

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Calibration Frequencies (MHz)	915 and 2450 (other frequencies available on special order)		
Power Reading Ranges: Probe Model 8120A Probe Model 8121A Probe Model 8122A	Full Scale (two ranges) 200 μ W/cm ² and 2 mW/cm ² 2 mW/cm ² and 20 mW/cm ² 20 mW/cm ² and 200 mW/cm ²	Range of Measurement 10 μ W/cm ² to 2 mW/cm ² 100 μ W/cm ² to 20 mW/cm ² 1 mW/cm ² to 200 mW/cm ²	
Accuracy of Probe Calibration	± 0.75 dB		
Probe Time Constants	0.035 second for Model 8120A 0.5 second for Models 8121A and 8122A		
Time constants to audible alarm and recorder output in "FAST" meter response position (excluding meter)	0.35 second with Model 8120A 0.5 second with Models 8121A and 8122A		
Response Time Including Meter The time it takes for the meter indicator to reach 90% of its final steady state reading when subjected to a stepped input signal	Probe 8120A 8121A 8122A	Fast (nominal) 0.5 second 0.75 second 1 second	Slow (maximum) 3 seconds 3 seconds 3 seconds
Auto Zero	Provides fast and accurate electronic zeroing of meter		
Effective Area	5.25 cm ² at 915 MHz; 0.54 cm ² at 2450 MHz		
Accuracy of Instrumentation	$\pm 3\%$ of full scale		
Sensitivity Ranges	Selected automatically when probe is connected		
Probe Overload Rating: Probe Model 8120A Probe Model 8121A Probe Model 8122A	6 mW/cm ² 40 mW/cm ² 600 mW/cm ²		
Meter Scale	Linear scale, marked 0 to 20		
Battery Data: Battery Charging Time Between Charging Use-to-charge Ratio	15-volt nickel-cadmium rechargeable Self-contained 20 hours use time 2:1		
Recorder Output	3V full scale into a minimum resistance of 1 K ohm		
Power Density Safety Alarm	An adjustable, audible alarm, preset by operator for a percentage of full scale		
Max-hold Drift	0.3% per minute (nominal)		
Size: Probes Meter Cable	11" (28cm) long x $\frac{3}{4}$ " (1.9cm) diameter each 10" x 4 $\frac{1}{4}$ " x 4" (25.4cm x 10.8cm x 10.1cm) (not including handle) 5' (1.5 meters) long (including probe)		
Weight: Meter (max.) Complete with Case	Pounds Kilograms Pounds Kilograms	4.5 2.0 12.5 5.7	
U.S Price: Model 8100B** Complete unit includes meter, carrying case, battery, recharging line cord, one probe - selected by customer, antenna cone and 2-inch (5cm) spacer \$1075.			
Optional additional probes and accessories:			
Probe (Model 8120A, 8121A, or 8122A)			165. each
915 MHz Antenna Cone (Model 8130)			50. each
2450 MHz 2-inch Spacer (Model 8140B) (4-pack)			60. each/pack
Zero Power Density Simulator (Model 8150) (protects probe from stray radiation when not in use)			40. each

**If a complete unit is ordered, including all three probes and Power Density Simulator, the total price is \$1445.00
U.S. Patent Nos. 3,641,439, 3,789,299, DES 221, 587, DES 221, 588, DES 223, 293.

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