4240 Series RF Power Meter

The 4240 series of CW RF power meters provides the high speed measurement capability needed in a production environment, as well as the simplicity of operation required for bench top use. It provides very accurate measurements from -70 dBm to +44 dBm (sensor dependent) and has a rapid display update rate for tuning applications. The easy to read LCD displays both channels simultaneously with numeric and bar graph information.

Five digit resolution, 90 dB dynamic range
The 4240 series has a 5 digit resolution and can display the value in either logarithmic or linear units. The 4242 two channel model allows the simultaneous comparison of multiple inputs during testing and in difference and ratio measurements.

Sensor Compatibility
The 4240 series is compatible with all Boonton CW diode, thermocouple, and waveguide sensors from 10 kHz to 40 GHz. Older sensors can be upgraded with a data adaptor to use the convenient auto calibration feature on the meter eliminating the need for manual calibration data input. Standard IEEE-488 GPIB and RS232 ports allow convenient interface with an ATE system. The SCPI command set, or an available LabVIEW driver allow simple integration with your existing ATE system. The 4240 Series is capable of HP437, HP438, 4220A and 4230A emulation modes for additional compatibility in any ATE system.

Features
- -70 dBm to +44 dBm, depending on sensor
- 90 dB dynamic range, depending on sensor
- 10 kHz to 40 GHz measurement range
- Single or dual-channel display
- >200 measurements per second
- HP437, HP438, and Boonton 4220A/4230A emulation
- Automatically loads sensor data
- Simple software control via SCPI language
- 50 MHz step calibrator
- IEEE-488 and RS-232 interfaces standard

Input Power (dBm)

<table>
<thead>
<tr>
<th>SETTLED</th>
<th>% UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>1.0%</td>
</tr>
<tr>
<td>100</td>
<td>0.1%</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>

The 4240 Series offers a backlit LCD, which provides simultaneous readings of one or both channels, displayed with individually programmable units and resolution.

The instrument can measure gain and output power, and perform sum, difference, ratio and relative measurements. Selectable dual bar graphs assist with gain and peaking adjustments.

Automatic step calibration “AutoCal” function uses built-in 50 MHz sweep calibrator to offer best-in-class power linearity.

Fast-mode Throughput (60 Hz Operation)

![Fast-mode Throughput Graph](image)
Specifications

Frequency Range  10 kHz to 40 GHz
   Sensor dependent
Power Range    -70 dBm to +44 dBm
   Sensor dependent
Number of Channels  One or two
Measurement Speed 1 channel: 200 readings/sec
                   2 channels: 100 readings/sec

Power Sensors
Accepts sensor data adapter with full-calibration data, including high-frequency calibration factors, stored in nonvolatile memory. Sensor menu accesses sensors displaying sensor serial number. Compatible with all Boonton CW power sensors. See Sensor Data Sheet.

Dynamic Range
Up to 90 dB with diode sensors, 50 dB with thermocouple sensors
See Power Sensor Specifications

Inputs
Front panel sensor connectors standard, rear panel inputs optional

Outputs
Front panel CALOUT connector, 0 dBm, 50 MHz, -60 to 20 dBm
Rear panel RECORDER BNC connector, 0 to 10 V into 1 MΩ
Output impedance is 9.09 kΩ. May be operated into 1 kΩ for 1 V fs
Rear panel IEEE-488 and RS-232

Emulation
4220A, 4230A & HP437, 438

Displays
Menu-driven 20 character x 4 line LCD display. Simultaneous display of dual channels with bar graph proportional to data display.

Display Units
Absolute: watts or dBm
Relative: dBr

Display Resolution
5 digits; nW, µW, mW, and W
0.001 dB, dBm, and dBr

Calibration Factors
+3.00 to -3.00 dB, stored in nonvolatile memory. Meter linearly interpolates between entries as required.

Zeroing/AutoCal
Automatic functions to calculate, store, and apply zero corrections and generate linearity calibration data for power sensors.

Ranging
Automatic or manual

Filtering
0.05 to 20.00 seconds

Display Offset
-99.99 to 99.99 dB

Calibration Source

Operating Modes  Off, On CW
Frequency  50.025 MHz ± 0.1%
Level Range  -60 to +20 dBm
Resolution  0.1 dB
RF Connector  Type N (f)
Source VSWR  1.05 (reflection coeff. = 0.024)

Uncertainty
Total accuracy is the sum of the following uncertainties: (errors are ±worst case)
Instrumentation Uncertainty  0.2% at full scale
Calibrator Uncertainty, OC to 20C, NIST traceable
   0 dBm ±0.055 dB (1.27%)
   +20 to -39 dBm ±0.075 dB (1.74%)
   -40 to -60 dBm ±0.105 dB (2.45%)

Other Uncertainties
For sensor, noise, high-frequency calibration uncertainty, consult power sensor specifications.

Other Specifications

AC Power
Rated Voltage  100 to 240 VAC
Voltage Range  90 to 264 VAC
Rated Frequency  50/60 Hz, 400 Hz to max rated voltage of 120 VAC
Frequency Range  47 to 63 Hz, 400 Hz (90 to 135 VAC range only)
Power Consumption  35 VA

This instrument is designed for indoor use only

Operating Temperature  0° to +55 °C
Weight  5 lbs (2.3 kg)

Dimensions
8.26" (21.0 cm) wide
3.48" (8.9 cm) high
13.5" (34.3 cm) deep

IEEE-488 Interface
Complies with IEEE-488 and implements SH1, AH1, T6, L4, SR1, RL1, DC1, and DT1

RS-232 Interface
Complies with RS-232 (9-pin D-sub connector)

Regulatory Compliance
CE compliance with the following European Union directives:
   Low Voltage Directive 2014/35/EU
   Electromagnetic Compatibility Directive (EMC) 2014/30/EU

Construction  Manufactured to the intent of MIL-PRF-28800F, Class 3
Power Sensors

Wide Dynamic Range Diode Sensors

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Frequency Range</th>
<th>Power (dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>51071A</td>
<td>10 MHz to 26.5 GHz</td>
<td>-70 to +20</td>
</tr>
<tr>
<td>51072A</td>
<td>30 MHz to 40.0 GHz</td>
<td>-70 to +20</td>
</tr>
<tr>
<td>51075A</td>
<td>500 kHz to 18.0 GHz</td>
<td>-70 to +20</td>
</tr>
<tr>
<td>51077A</td>
<td>500 kHz to 18.0 GHz</td>
<td>-60 to +30</td>
</tr>
<tr>
<td>51079A</td>
<td>500 kHz to 18.0 GHz</td>
<td>-50 to +40</td>
</tr>
</tbody>
</table>

Thermocouple Sensors

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Frequency Range</th>
<th>Power (dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>51100(9E)</td>
<td>10 MHz to 18.0 GHz</td>
<td>-20 to +20</td>
</tr>
<tr>
<td>51200</td>
<td>10 MHz to 18.0 GHz</td>
<td>0 to +37</td>
</tr>
</tbody>
</table>

Special Purpose Sensors

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Frequency Range</th>
<th>Power (dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>51011 (EMC)</td>
<td>10 kHz to 8.0 GHz</td>
<td>-60 to +20</td>
</tr>
<tr>
<td>51011 (4B)</td>
<td>100 kHz to 12.4 GHz</td>
<td>-60 to +20</td>
</tr>
<tr>
<td>51013 (4E)</td>
<td>100 kHz to 18.0 GHz</td>
<td>-60 to +20</td>
</tr>
<tr>
<td>51015 (5E)</td>
<td>100 kHz to 18.0 GHz</td>
<td>-50 to +30</td>
</tr>
<tr>
<td>51033 (6E)</td>
<td>100 kHz to 18.0 GHz</td>
<td>-40 to +33</td>
</tr>
<tr>
<td>51078</td>
<td>100 kHz to 18.0 GHz</td>
<td>-20 to +37</td>
</tr>
</tbody>
</table>

Diode Average Sensors

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Frequency Range</th>
<th>Power (dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>51085</td>
<td>500 kHz to 18 GHz</td>
<td>-30 to +20</td>
</tr>
</tbody>
</table>

Ordering Information

4241 Single Channel
4242 Dual Channel
-01 Rear sensor inputs
-02 Calibrator, rear panel output
-30 Warranty extended to 3 years

Accessories Required

One or more of the available power sensors.
NOTE: 5ft. sensor cable and data adapter included with instrument based on number of channels ordered.

Accessories Available

41-2A/10 Sensor/Probe Interconnecting Cable (10 ft). A special low-noise cable that connects the power sensor to the power meter.
41-2A/20 Sensor/Probe Interconnecting Cable (20 ft)
41-2A/50 Sensor/Probe Interconnecting Cable (50 ft)
41-2A/100 Sensor/Probe Interconnecting Cable (100 ft)
95004701A F/F Adapter, 41-2A
95004901A Bulkhead Connector F/F
95403001A Rack Mounting Kit, 4240 Series
95109001A Sensor Data Adapter
95006201A Transit case Holds the 4240 series & up to 4 sensors

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