



Data Sheet

4300 Series RF Power Meter



Taking performance to a new peak

4300 Series RF Power Meter

The Model 4300 Power Meter can be configured to meet many RF/Microwave power measurement requirements. Each field installable channel module is a complete measurement system with its own microprocessor and non-volatile memory. This allows up to six simultaneous, independent power measurements.

Sensitivity and Frequency Range

As with all Boonton power meters, the Model 4300 channel modules can operate with many Boonton power sensors. Instrument frequency range extends from 10 kHz to 100 GHz and power ranges from -70 to +44 dBm. Optional accessory cables allow power sensors to be located as far as 100 feet from the instrument.

Measurement Accuracy

The Model 4300 can be configured with a 30 MHz programmable calibrator module (Model 4321/4322). This calibrator significantly enhances basic measurement accuracy. Rather than rely on nominal sensor linearity data, the programmable calibrator, together with a firmware calibration routine, significantly reduces linearity uncertainty.

In systems where 50 MHz traceability is required, the Model 4300 can be configured with a 50 MHz, 0 dBm calibrator (Model 4323/ 4324). Both calibrators can be installed in a single instrument.

Automatic Test

The model 4300 is designed for use with automatic test systems. Up to 6 independent channels and standard GPIB allow fast parallel power measurements. All front panel functions can be programmed from the bus controller, with the Model 4300 returning power measurement in 20 milliseconds plus 5 milliseconds per channel, e.g. 25 milliseconds for one channel and 50 milliseconds for six channels.



- Instrument frequency Range: 10 kHz to 100 GHz
- Power Range: -70 dBm to +44 dBm
- One to Six Channel Capability
- Up to 90 dB Dynamic Range with Single Sensor
- Complete Series of Coaxial Sensors

Specifications

Frequency Range	10 kHz to 100 GHz, sensor dependent, see Sensor Data Sheet
Power Range	-70 dBm to +44 dBm Sensor dependent
Power sensors	Compatible with all Boonton diode and thermocouple sensors Refer to the Power Meter Sensor Chart
Dynamic Range	90 dB with diode sensors, 50 dB with thermocouple sensors Refer to the Power Meter Sensor Chart
Inputs	Front and rear panel inputs standard for each channel module installed. Each channel is an independent measuring unit. One to six channels, refer to ordering information.

Rear Panel Outputs

The rear panel output connectors are BNC female. There is one connector for each installed channel module. The outputs are linear in watts or logarithmic in dB from 0 to 10 V and are selected via the front panel or by remote commands. High/low limit or zero status can be selected.

Measurement Modes

Single channel, summation channel (ratio), multiple channel
(All channels displayed simultaneously)

Display Units

Absolute	Watts, dBm
Ratio (summation)	dB or % (Channel 1 +/-Channel 2 +/-Channel 3 +/-Channel N)
Relative	dBr
Display	Alphanumeric backlit LCD 2 lines of 40 characters each
Resolution	4 1/2 digits, watts mode 0.01 dB, dB modes

Uncertainty

The total measurement uncertainty is the sum of the instrumentation uncertainty (instrument less sensor), noise (see sensor table), reference frequency/ calibrator uncertainty (see sensor tables for the reference frequency uncertainty for waveguide sensors), power linearity uncertainty (see sensor table), and sensor Cal. Factor uncertainty (see Sensor Data Sheet). When making multichannel ratio measurements, the total measurement uncertainty is the sum of the individual channels.

Instrument Uncertainty

Uncertainty	RSS	Worst Case
Single Channel Mode ⁽¹⁾	0.12% (0.005 dB)	0.3% (0.013 dB)
Zeroing	0.03% (0.002 dB)	0.25% of fs
Shaping ⁽²⁾	0.15% (0.007 dB)	0.12% (0.005 dB)
Total Uncertainty	0.14% (0.006 dB)	0.42% +0.25% of fs

⁽¹⁾ Accuracy of Summation (ratio) mode is n x single channel when n = number of channels.

⁽²⁾ When using the 50 MHz fixed calibrator, or waveguide sensors, add 1% to the stated shaping error. Add 2% for the top 10 dB of the coaxial sensors.

Power Reference/Calibrator

50 MHz (0 dBm) Power Reference

Internal 50 MHz source with type N female connector. Set to 0.7% (0.03 dB) at 0 dBm. Front or rear panel. (0-55°C). SWR < 1.05. The worst case uncertainty for one year is 1.2%, RSS 0.9%(0.04 dB).

See ordering information.

30 MHz Programmable Calibrator

Internal 30 MHz source with programmable level between -60 dBm and +20 dBm, 1 dB steps. Front or rear panel (20-30°C). At 0-20°C and 30-55°C add 0.35% (0.15 dB) (See ordering information).

SWR <1.05.

Level	RSS	Worst Case
@0 dBm	0.6 (0.025 dB)	0.3% (0.04 dB)
+20 dBm to -39 dBm	0.7% (0.03 dB)	1.4% (0.06 dB)
-40 dBm to -60 dBm	0.9% (.04 dB)	2.1% (0.09 dB)

Calibration Factors

3.0 dB to -3.0 dB range in 0.01 dB steps. These stored calibration factors are interpolated linearly and applied automatically to readings when the frequency is entered through front panel keys; up to 80 individual calibration factors for up to 20 power sensors can be stored in non-volatile memory.

Ranging

Auto-ranging, set-ranging and hold on range; each channel operating independently. 10% headroom hold on range has 25 dB dynamic range on each range (0.2 dB resolution at -25 dB point).

Settling time

0-99%, 10 dB power step, hold range, filter set to 20 ms. Readout over the IEEE bus.

Diode Sensors <200 ms

Thermocouple Sensors <450 ms

Filtering

Filtering is selected by entering the filter time in ms, between 20 ms and 20 s. Filtering is accomplished in 20 ms increments, e.g., selecting 2000 ms selects 100 point, pipe line averaging.

Zeroing

Each range is independently zeroed upon selecting the 'ZERO' function either via the front panel or over the bus.

Limits

Front panel or bus selectable between + 100 dB and -100 dB
Independently for each channel

Other Specifications

Power Consumption 40 VA; 100, 120,220 and 240 V
+/-10%,50 to 400 Hz

Operating Temperature 0° to 55°C

Storage Temperature -55° to +75°C

Environmental Characteristics Complies with MIL-STD 28800C
Type II, Class 5, Style E and F
equipment

Weight 21 lbs (9.5 kg) with 6 channels
and programmable calibrator

Dimensions 17.24 in (43.8 cm) wide
3.485 in (8.8 cm) high
17.75 in (45.0 cm) deep

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



Accessories Available

41-2A/10	Sensor Probe Interconnecting Cable (10ft) (M/M)
41-2A/20	Sensor Probe Interconnecting Cable (20 ft) (M/M)
41-2A/50	Sensor Probe Interconnecting Cable (50 ft) (M/M)
41-2A/100	Sensor Probe Interconnecting Cable (100 ft) (M/M)
9S004901A	Bulkhead connector F/F, 41-2A

Ordering Information

The Model 4300 RF Power Meter has a chassis that contains six module slots for installation of the Model 4300 input modules, and a seventh calibrator slot. The Model 4300 may be configured as follows:

4300	Chassis
4311	Universal Channel Module
4321	30 MHz Programmable Calibrator Module (front output)
4322	30 MHz Programmable Calibrator Module (rear output)
4323	50 MHz (0 dBm) Power Reference Module (front output)
4324	50 MHz (0 dBm) Power Reference Module (rear output)
4300	Sensor, application dependent (See Sensor Data Sheet)

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