

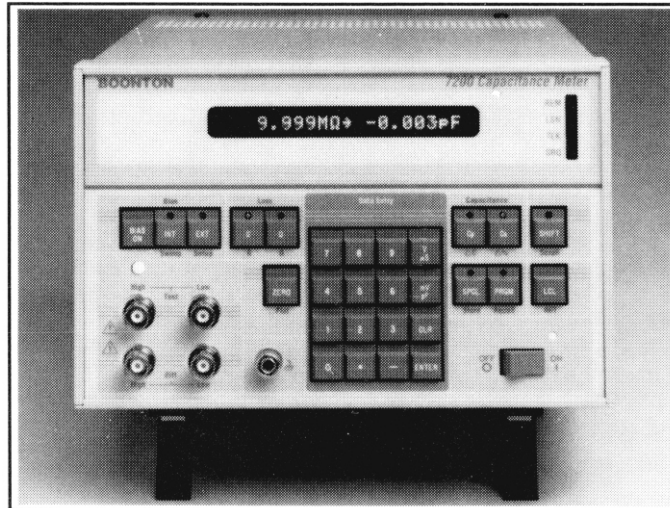
BOONTON

IMPEDANCE MEASURING INSTRUMENTS

Capacitance Meter Model 7200



- Capacitance range, 0 to 2000 pF
- Conductance range, 0 to 2000 μ S
- Test frequency, 1 MHz crystal-controlled
- Test level, selectable 15, 30, 50, and 100 mV
- External bias \pm 200 V
- Standard programmable internal bias \pm 100 V
- Analog outputs proportional to both C and G and bias
- GPIB standard



Description

The Model 7200 is the latest of a long line of impedance measuring instruments. Two phase-sensitive detectors are used to extract and display both the parallel capacitance and conductance of the device under test. From the measured parameters the 7200 can calculate and display the equivalent parallel and series resistance, series capacitance, dissipation factor, and quality factor Q. Capacitance can also be displayed as a deviation from a selectable reference standard in % or pF units. The 7200 uses a software filter technique which averages consecutive measurements to achieve a stable display value. Test levels are programmable from 15 to 100 mV, making the 7200 suitable for a wide variety of semiconductor measurements. Up to 99 complete front panel setups can be stored and recalled in internal non-volatile memory.

Bias Voltage

The 7200 accepts, measures and displays external bias voltage over a range of \pm 200 volts. An internal bias supply is also included and is programmable over a \pm 100 volt range. This bias capability, along with fast responding analog C, G and V outputs, makes the 7200 ideal for C-V and G-V semiconductor plots, as well as DLTS material studies.

Automatic Zeroing

One key stroke zeros the 7200 for stray capacitance and loss. The 7200 is capable of zeroing up to 2000 pF. As a result, the maximum range of the instrument can be effectively increased to 4000 pF by first zeroing the 7200 with a 2000 pF specimen connected to the input.

Special Functions

A variety of special functions are provided to extend the operation of the 7200 to meet specific requirements. For example, the instrument can be forced to hold a particular measurement or bias range. The averaging filter length can be selected from no averaging up to 500 measurements. Special functions can also be used, in conjunction with external standards, to calibrate the instrument from the front panel or over the IEEE-488 interface.

Bus Operation

The 7200 is equipped with a full function IEEE-488 interface bus. The following can be remotely programmed: all panel functions, including special functions; store and recall panel setups; and zero and bias controls. For rapid data transfer, C, G and V information is available simultaneously. Front panel setups can be stored and recalled by program location.

IMPEDANCE MEASURING INSTRUMENTS

Capacitance Meter Model 7200 (continued)



Specifications

Capacitance Display

Capacitance Range: 0 to 2000 pF

Full Scale Ranges: 2, 20, 200, 2000 pF

Accuracy: 0.25% of reading + 0.2% of full scale +0.005 pF

Resolution: 0.001 pF from 0 to 2 pF; 0.01 pF from 2 to 20 pF; 0.1 pF from 20 to 200 pF; 1 pF above 200 pF

Conductance Display

Conductance Range: 0 to 2000 μ S

Full Scale Ranges: 2, 20, 200, 2000 μ S

Accuracy: 2.5% of reading + 2.0% of full scale +0.05 μ S + 2 (ω C)², where C is the parallel capacitance in Farads

Residual Series Resistance: 2 Ω maximum

Resolution: 0.01 μ S from 0 to 2 μ S, 0.1 μ S from 20 to 20 μ S; 1 μ S from 20 to 200 μ S; 10 μ S above 200 μ S

Computed Parameters:

Series Capacitance: 0.000 to \pm 9999 pF

Series Resistance: 0.00 Ω to \pm 9.999 M Ω

Parallel Resistance: \pm 488.5 Ω to \pm 9.999 M Ω

Dissipation: 0.000 to \pm 999.9

Quality Factor: 0.000 to \pm 999.9

Δ C: 0.000 to \pm 4047 pF

Δ %: 0.00 to \pm 99.99%

Temperature Influences

Operating Temperature: 10°C to 40°C

Amplitude Error: $<\pm$ 0.017%/°C

Phase Error: $<\pm$ 0.2%/°C

Warmup Time: 2 Hours

Test Signal

Frequency: 1.0 MHz, crystal-controlled

Level: programmable, 15, 30, 50 and 100 millivolts

External Bias

Voltage Range: \pm 200 volts

Maximum current: 30 milliamps, fused

External Bias Display

Voltage Range: \pm 200 V

Resolution: 0.1 V

Accuracy: 0.25% of rdg + 4 counts

Internal Bias

Voltage Range: \pm 100 volts, programmable from the front panel.

Accuracy: 0.5% of setting + 10 counts

Resolution: 1 millivolt for voltages less than or equal to 20 volts; 10 millivolts for voltages above 20 volts.

Maximum Current: 5 milliamperes

Rear Panel Connectors

Analog Out, C: 2 volts full scale, source resistance 1000 ohms. Linearity 0.1% of reading + 0.05% of full scale.

Analog Out, G: 2 volts full scale, source resistance 1000 ohms. Linearity 0.1% of reading + 0.05% of full scale.

Analog Out, Bias: 2 volts full scale, source resistance 1000 ohms.

IEEE-488: Complies with IEEE-488-1978. Implements AH1, SH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C0 and E1.

External Bias In: \pm 200 volts max., 1/16 A fuse protected.

Front Panel Controls and Displays

Controls: Keyswitches enable data entry and selection of major functions.

Displays: Vacuum Fluorescent, 20-digit display of BIAS LEVEL, TEST LEVEL, CAPACITANCE, LOSS, ADRS AND SPCL.

Weight: 12 lbs. (5.4 kg)

Power Requirements: 100, 120, 220, 240 V AC, 50-60 Hz, 35 VA.

Accessories Available:

Capacitance standard, P/N 76-2A series

Conductance standard, P/N 76-4A series

Rack mtg. kit, single, P/N 950002

Rack mtg. kit, dual, P/N 950001

Rack mtg. kit, to mount w/older $\frac{1}{2}$ -rack inst. P/N 950002

Transit case, P/N 950029

CE Mark: Declares Conformity to European Community (EC) Council Directives: 89/336/EEC//93/68/EEC, 73/23/EEC//93/68/EEC & Standards: EN55011, EN50082-1, EN61010-1.