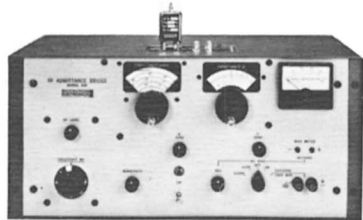


ELECTRONIC INSTRUMENTS FOR LABORATORY AND PRODUCTION

ABRIDGED CATALOG IC-12



IMPEDANCE INSTRUMENTATION



Model
33A/1

RF Admittance Bridge

Measures 2-terminal shunt capacitance and conductance at high frequencies. Specified capacitance resolution obtains with 10 times lower test level than earlier Model 33A with accuracy improved to $\pm 0.5\%$. Inductance, resistance, dissipation factor, and Q may readily be determined. Internal and external dc bias. Major applications in diode, transistor, and IC measurements.

Capacitance Measurement: 0 to 150 pF from 1 MHz to 50 MHz; to 30 pF at 100 MHz; accuracy, $\pm 0.5\%$; resolution, 0.02 pF

Conductance Measurement: 0 to 25,000 μmhos ; accuracy, $\pm 2\%$; resolution, 0.5 μmho

Test Signal: 7 internally supplied crystal controlled frequencies of 1, 5, 10, 20, 30, 50, and 100 MHz; level continuously adjustable from 0.1 V down to as low as 1 mV

DC Bias: Internal, continuously adjustable from -6 to +100 V; external, to ± 250 V

Price: \$2500.00

Model 33B/1

Ultra High Conductance Resolution RF Admittance Bridge

Conductance range, 0 to 5000 μmhos with resolution of 0.1 μmho . Otherwise similar to Model 33A/1

Price: \$3000.00

Model 33C/1

Ultra High Capacitance Resolution RF Admittance Bridge

Capacitance range, 0 to 15 pF with resolution of 0.002 pF; basic accuracy $\pm 1\%$. Otherwise similar to Model 33A/1

Price: \$2650.00

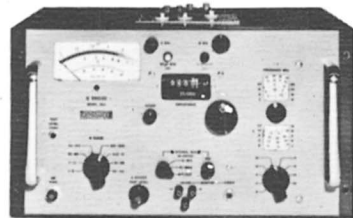
Model 33D/1

Ultra High Capacitance and Conductance Resolution RF Admittance Bridge

Capacitance range 0 to 15 pF with resolution of 0.002 pF. Conductance range 0 to 5000 μmhos with resolution of 0.1 μmho . Basic accuracy $\pm 1\%$. Otherwise similar to Model 33A/1. Price: \$3,150.00

Capacitance Range Extensions

Accessories available for measuring higher values of capacitance at frequencies up to 30 MHz for Model 33A/1 and to 20 MHz for Model 33B/1



Model
33A

Q Bridge—100 KHz to 50 MHz

Dramatically new, non-resonant 3-terminal bridge. Provides direct reading measurements of capacitance up to large values and Q over wide ranges with continuously adjustable test frequency. Low test signal levels. No external work coils. Internal or external dc bias.

Capacitance Measurement: 20 to 1,000 pF (100 KHz to 50 MHz); 2 to 10,000 pF (100 KHz to 10 MHz); indirectly 0.005 to 20 pF; basic accuracy, 0.5%

Q Measurement: 5 to 10,000; basic accuracy, 5% for Q's up to 100, (10 + Q/500)% for Q's 100 to 10,000

Test Signal: Frequency continuously adjustable from 100 KHz to 50 MHz; levels <50 mV; continuously adjustable

Dual External DC Bias: HI to GND and/or LO to GND; differential ± 200 V

Internal DC Bias: HI to LO; 0 to 150V

Price: \$3,000.00



Model
71A

Capacitance/Inductance Meter—1 MHz

Quick, convenient, direct reading, 3-terminal measurements of capacitance or 2-terminal measurements of inductance. Internally supplied 1 MHz test signal. Operates with low test signal level, permitting semi-conductor tests. Linear meter scales. Provision for dc bias. Linear dc output proportional to capacitance or inductance reading for display on dvm, x-y plotter, for data logging, or, with suitable voltage comparator, for go/no go testing.

Capacitance Measurement: 0 to 1000 pF in 7 ranges; accuracy, $\pm 1\%$; resolution, 0.01 pF

Inductance Measurement: 0 to 1000 μH in 7 ranges; accuracy, $\pm 1\%$; resolution, 0.01 μH

Test Signal: Frequency 1 MHz; level, 15 mV rms for capacitance measurements, < 1 mV for inductance measurements

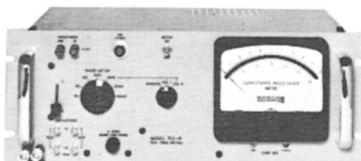
Q Range: Specified accuracies apply for test specimens having Q's of 3 or more; lower with readjustment

DC Bias: Externally supplied up to ± 200 V

DC Analog Output: 0 to 100 mV or 300 mV fs depending on range numerics; also > 1 V fs for loads > 10 M Ω ;

linearity, 0.1% of reading; response time, 10 ms

Price: \$875.00; rack-mounting version with built-in standard, Model 71AR, \$950.00



Model
71CR

Capacitance/Inductance Meter—100 KHz

Quick, convenient, direct reading, 3-terminal measurements of capacitance or 2-terminal measurements of inductance. Internally supplied 100 KHz test signal. Operates with low test signal level, permitting semi-conductor tests. Linear meter scales. Provision for dc bias. Linear dc output proportional to capacitance or inductance reading for display on dvm, x-y plotter, for data logging, or with suitable voltage comparator, for go/no go testing.

Capacitance Measurement: 0 to .01 μF in 7 ranges; accuracy $\pm 1\%$; resolution, 0.1 pF

Inductance Measurement: 0 to 10 mH in 7 ranges; accuracy $\pm 1\%$; resolution 0.1 μH

Test Signal: Frequency, 100 KHz; level, 15 mV for capacitance measurements, <1 mV for inductance measurements

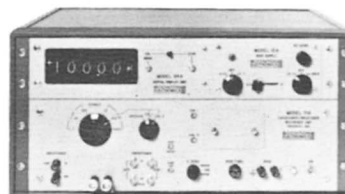
Q Range: Specified accuracies apply for test specimens having Q's of 3 or more; lower with readjustment

DC Bias: Externally supplied up to ± 200 V

DC Analog Output: 0 to 100 mV or 300 mV fs depending on range numerics; also >1 V fs for loads > 10 M Ω ;

linearity, 0.1% of reading; response time, 10 ms

Price: rack-mounting with built-in standard, Model 71CR, \$995.00.



Model
700A

Digital Capacitance/Inductance Meter—1 MHz

Continuous digital readout of 3-terminal capacitance or 2-terminal inductance at 1 MHz. Provisions for remote capacitance measurements and dc bias of capacitance specimen. Internal capacitance standard for both high Q and low Q (Q=3) calibration check. BCD output 1, 2, 4, 8 coded sequence.

Capacitance Measurement: 0 to 1000 pF in 3 ranges; lowest range, 10 pF, fs: 4 digit resolution and over-range (5th digit); basic accuracy, $\pm 0.5\%$

Inductance Measurement: 0 to 100 μH in 3 ranges; lowest range, 1 μH , fs: 4 digit resolution and over-range (5th digit); basic accuracy, $\pm 1\%$

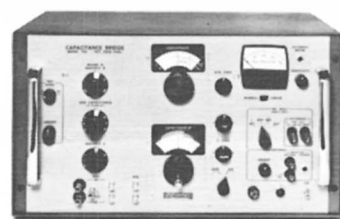
Test Signal: 1 MHz, crystal controlled; level, 15 mV for capacitance, <1 mV for inductance

Q Range: Specified accuracy applies for Q's down to 3; lower with readjustment

DC Bias: Monitored internal and external; ± 100 V internal ± 200 V external.

Response Time: 333 ms

Price: \$2,500.00



Model
74D

Capacitance Bridge—100 KHz

Precision measurements of capacitance and conductance over very broad ranges at 100 KHz. Excellent stability with negligible warm-up drift. Test signal level adjustable to low values for semiconductor testing. 3-terminal arrangement permits use of remote test jig without errors owing to cable capacitance to ground. 2-terminal operation also provided. "Linear" mode for limit operation permits go/no go testing. Provision for differential or comparison measurements. Balancing simple and convenient, with no false or sliding nulls. All zeroing controls vernier driven. Internally supplied or external dc bias.

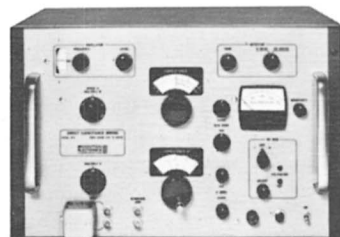
Capacitance Measurement: 0 to 110,000 pF; accuracy, $\pm 0.1\%$; resolution, 0.0002 pF

Conductance Measurement: 0 to 1000 μmhos ; accuracy, $\pm 5\%$; resolution, 0.001 μmho

Test Signal: Internally supplied, 100 KHz; level continuously adjustable from 1 mV to 4 V

DC Bias: Internal, -6 V to +100 V; External, up to ± 400 V

Price: \$1,595.00



Model
75C

Capacitance Bridge—5 KHz to 500 KHz

Versatile 3-terminal bridge with adjustable test frequency. Permits determination of effects of frequency upon test. Includes built-in dc bias supply. Convenient operation; eliminating false and sliding nulls. Completely self-contained including bridge circuit, tunable oscillator and detector.

Capacitance Measurement: 0 to 1000 pF; accuracy, $\pm 0.25\%$; resolution, 0.0002 pF

Conductance Measurement: 0 to 1000 μmhos ; accuracy, $\pm 5\%$; resolution, 0.001 μmho

Test Signal: Internally supplied; continuously adjustable in frequency from 5 KHz to 500 KHz; level adjustable from 1 mV to 3 V

DC Bias: Internal only; continuously adjustable from -5 V to +110 V

Price: \$2200.00



Model
75D

Capacitance Bridge—1 MHz

This new bridge replaces 75A and 75B series. Provides 3-terminal measurements of capacitance and conductance allowing remote connection without errors due to stray capacitance to ground. Makes 2-terminal measurements using Ground Plane Adapter supplied. Inductance is read by conversion from equivalent capacitance measurement. The detector is needle sharp yet shows balance direction from the most extreme off-range setting and an additional differential detector mode allows capacitance or inductance sorting of components. Internal and external dc bias.

Capacitance Measurement: 0 to 1000 pF; accuracy, $\pm 0.25\%$; resolution, 0.00005 pF with phase sensitive detector; 0.0005 pF with amplitude sensitive detector

Conductance Measurement: 0 to 1000 μmhos ; accuracy, $\pm 5\%$; resolution, 0.01 μmho

Inductance Measurement: 25 μH to ∞ ; basic accuracy, $\pm 0.25\%$

Test Signal: 1 MHz, crystal controlled; level adjustable from 1 mV to 300 mV

Dual External DC Bias: HI to GND and/or LO to GND; differential ± 400 V, max.

Internal DC Bias: HI to LO; -6 V to +150 V

Price: \$1,595.00

RF POWER INSTRUMENTATION

Model 41A RF Microwattmeter

Exceptionally stable microwave power meter providing reliable measurements over a 70 dB range with one power detector. Use of full wave diode detector overcomes limitations of stability, sensitivity and overload of the thermal types. No zero balancing except for fractional microwatt measurements. Can be calibrated from low frequency rf source. Stable dc output.

Power Range: 0.01 μ W (-50 dBm) fs to 10 mW (+10 dBm) fs
Power Sensitivity: 0.001 μ W (-60 dBm)
Frequency Range: 0.1 MHz to 7 GHz
Basic Accuracy: ± 0.5 dB
Drift: Less than 0.001 μ W per hour
VSWR: 1.3 to 3 GHz; 1.5 to 7 GHz
Overload Limit: Input of 300 mW cw does not cause damage
Price: 41A; \$750.00; rack mounting Model 41AR, \$775.00



RF VOLTAGE INSTRUMENTATION

Sensitive RF Voltmeters

This Series of RF Voltmeters provide reliable, reproducible voltage measurements from the low radio frequencies to the gigahertz region over a wide range of amplitudes. The versatility of these instruments plus their accuracy and convenience of operation have established them as standards of performance for the industry. The primary differences between the Models 91DA, 91H and 91C are indicated in the specification table below. All three models are characterized by low noise, excellent stability, high input impedance, and low input capacitance.



Model 91DA



Model 91H

	Model 91DA	Model 91H	Model 91C
Voltage Range:	1 mV fs to 3 V fs* *to 300 V with Model 91-7C 100:1 Voltage Divider	1 mV fs to 3 V fs*	3 mV fs to 3 V fs*
Voltage Sensitivity:	300 μ V	100 μ V	1 mV
Power Sensitivity, (50 Ω):	0.0018 μ W	0.0002 μ W	0.02 μ W
Basic Accuracy:	$\pm 2\%$, fs	$\pm 3\%$, fs	$\pm 5\%$, fs
Frequency Range:	20 KHz to 1200 MHz, with uncalibrated response to 4000 MHz		
VSWR:	Less than 1.2 to 1200 MHz for all Models		
Waveform Response:	True rms up to 0.03V (to 3 V with accessory 100:1 Voltage Divider) gradually approaching peak-to-peak (calibrated in rms) above 0.03V		
DC Output	yes	yes	no
dB Range	80 dB	80 dB	70 dB
Price:	\$700.00** \$825.00†	\$650.00** \$775.00†	\$550.00** \$675.00†

**Includes 91-12E RF Probe, 91-13B RF Probe Tip, and 91-8B 50 ohm Adapter

†With complete Accessory Kit, consisting of 91-12E RF Probe, 91-13B RF Probe Tip, 91-6C Underterminated BNC Adapter, 91-7C 100:1 Voltage Divider, 91-8B 50 ohm Adapter, 91-14A Tee Adapter, 91-15A 50 ohm Termination, all in 91-18A Accessory Storage Box.

Model 91K High Impedance RF Millivoltmeter

Model 91K offers exceptionally high input impedance and the very best combination of voltage sensitivity and frequency response. Ideal for in-circuit measurement where high input impedance is more important than the extreme sensitivity and frequency response provided by our standard Sensitive RF Voltmeters. True to the 91 RF Voltmeter series standard of excellence, the 91K also provides highly reproducible voltage measurements over its entire frequency range, low noise, exceptional stability, and low input capacitance. Accessories provided as standard equipment include 91-22A RF Probe, 91-8B 50 ohm Adapter, and 91-13B Probe Tip.

Voltage Range: 10 mV, fs to 30 V, fs (to 300 V with accessory 91-7C 100:1 Voltage Divider)
dBm Range: -40 to +40 dBm (50 Ω)
Input Impedance: Below 25 MHz, $R > 4$ M Ω ;
 above 25 MHz, $R > \frac{100}{f}$ M Ω
Input Capacitance: 2.5 pF (approximately)
Frequency Response: 0.5 MHz to 600 MHz

Basic Accuracy: $\pm 3\%$
Waveform Response: True rms to 300 mV (to 30V with accessory 100:1 Voltage Divider) gradually approaching peak-to-peak (calibrated in rms) above 300 mV
DC Output: Linear dc output voltage; 100 mV and 300 mV for fs
Price: \$680.00

DC INSTRUMENTATION

Model 56A Sensitive DC Null Detector

Electronic galvanometer providing exceptionally high sensitivity and high input impedance. Especially valuable as indicator in conjunction with dc bridges. Zero-center scale. 60 dB scale compression in Hunt Mode virtually eliminates range switching when measuring specimens of unknown value. Provision for remote mode switching. Amplifier output available at front panel terminals. Either floating or grounded operation.

Voltage Sensitivity: 1 μ V to 100 V end scale in 8 ranges
Current Sensitivity: 0.1 pA to 10 μ A, es
Input Resistance: 10 M Ω , all ranges
Operating Modes: Hunt (60 dB meter scale compression); Calibrate (linear meter scale)
Amplifier Output Capability: ± 1 mA into 1000 Ω
Amplifier Gain: -40 to +100 dB
Price: \$495.00 (rack mounted Model 56AR, \$520.00)



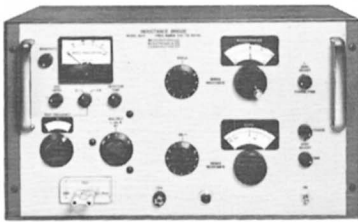
Model 95A Sensitive DC Microvolt/Picoammeter

Unusually broad range of dc voltage and current measurements covered in 42 ranges. Front panel range and function switching uniquely simple and convenient. Zero-center meter. Fast response. Exceptionally stable amplifier output at front panel. Amplifier output gain and reference level adjustable without interaction with meter. Either floating or grounded operation for voltage; floating for current.

Voltage Range: 10 μ V to 1000 V end scale;
Accuracy: $\pm 3\%$; sensitivity, 1 μ V
Current Range: 1 pA to 1 A es; Accuracy, $\pm 4\%$;
 sensitivity, 0.1 pA
Voltmeter Input Resistance: 10 M Ω , all ranges
Amplifier Output: ± 1 V es across 1000 Ω
Amplifier Gain: 100,000 max.
Price: \$600.00 (rack mounted Model 95A-R, \$625.00)



Models
63H,
63L
and
63M



Inductance Bridges

Direct reading measurements of inductance and series resistance. Convenient operation, eliminating false balance and sliding nulls. Exceptional stability. Completely self-contained, with bridge circuit, oscillator, detector, and null indicator in single, compact bench cabinet. Particularly useful for quality assurance or production tests, as well as for laboratory studies.

Model 63H

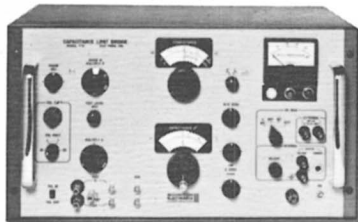
Inductance Measurement: 0 to 110 mH; accuracy, $\pm 0.25\%$; resolution, 0.0002 μ H
Series Resistance Measurement: 0 to 11,000 Ω ; accuracy, $\pm 3\%$; resolution, 0.0002 Ω
Test Signal: Internal oscillator-detector continuously adjustable from 5 KHz to 500 KHz; max. open-circuit level, 3 V

Model 63L

Inductance Measurement: 0 to 11 H; accuracy, $\pm 0.25\%$; resolution, 0.02 μ H
Series Resistance Measurement: 0 to 110,000 Ω ; accuracy, $\pm 3\%$; resolution, 0.005 Ω
Test Signal: Internal oscillator-detector continuously adjustable from 400 Hz to 40 KHz max. open-circuit level 5.5 V

Model 63M

Inductance Measurement: 0 to 1.1 H; accuracy, $\pm 0.25\%$; resolution, 0.002 μ H
Series Resistance Measurement: 0 to 110,000 Ω ; accuracy, $\pm 3\%$; resolution, 0.002 Ω
Test Signal: Internal oscillator-detector continuously adjustable from 1 KHz to 100 KHz; max. open-circuit level 5.5 V
Price: Models 63H, 63L, and 63M, \$2300.00



Model 77B

Capacitance Limit Bridge—1 MHz

Automatic, high-speed, dual or single limit tests, or conventional manual measurements of capacitance or inductance. In automatic mode, test is insensitive to specimen loss. "High," "Low," or "Go" test decisions indicated by front panel lamps as well as by continuity closures for actuation of materials handling equipment. Internally supplied crystal controlled 1 MHz test signal. Operates with low test level. Built-in dc bias supply; provision for external bias. 3-terminal arrangement permits remote measurements.

Capacitance Measurement: Automatic Mode, 0 to 1000 pF with 0.001 pF resolution; Manual, 0 to 1000 pF with 0.0001 pF resolution; basic accuracy $\pm 0.25\%$
Inductance Measurement: Manual or Automatic, 25 μ H to ∞ ; basic accuracy, $\pm 0.25\%$

Conductance Measurement: (Manual only) 0 to 1000 μ mhos; basic accuracy, $\pm 5\%$; resolution, 0.05 μ mho

Tolerance Limits: Programmable at front panel controls from ± 0.0005 pF to ± 200 pF; basic accuracy, $\pm 1\%$ of limit setting

Test Time: Approx. 50 ms

Test Signal: Internally supplied; 1 MHz, crystal controlled; level adjustable from 250 mV to 15 mV for Automatic Mode, to 1 mV for Manual

Decision Output: Green, red, and amber panel lamps indicating "Go," "High," and "Low," respectively; continuity contacts available at rear panel in conformance with test decisions

DC Bias: Internal, continuously adjustable from -6 V to +150 V; external, to ± 400 V
Price: \$2300.00

Model 77B-S1

Capacitance Limit Bridge—100 KHz
 Essentially similar to Model 77B. Has basic capacitance/inductance accuracy of $\pm 0.1\%$. Operates with internally supplied 100 KHz crystal controlled test signal. Capacitance range, automatic or manual, is 0.001 pF to 1000 pF. Inductance range, 2.5 mH to ∞ . Otherwise specifications are as shown for Model 77B.
Price: \$2300.00

All prices are fob Parsippany, New Jersey, and do not include applicable federal, state, or local taxes. Prices and specifications are subject to change without notice.

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Westchester.

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Centre, Huntington, and
Fulton.

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West of (but NOT including)
the above counties.

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AUTOMATION PRODUCTS: In addition to the equipment shown in this catalog, Boonton Electronics Corporation also produces a line of instruments and systems for high-speed, automatic testing and manufacturing process control in electronic component and microcircuit production. This line includes: automatic resistance limit bridges, automatic resistance trimming bridges, automatic capacitance test systems, and resistance and capacitance scanning systems, among many others. Full information on this equipment is provided in our catalog of "Automation Products," available on request.

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Printed in U.S.A. 15M 5/68