

# UNIVERSAL LOGARITHMIC AC VOLTMETERS SERIES 303



**VOLTAGE RANGES: 300 $\mu$ V to 1000V**  
**FREQUENCY RANGES: 2Hz to 6MHz**  
**AVERAGE RESPONDING, CALIBRATED**  
**IN RMS OF SINEWAVE.**

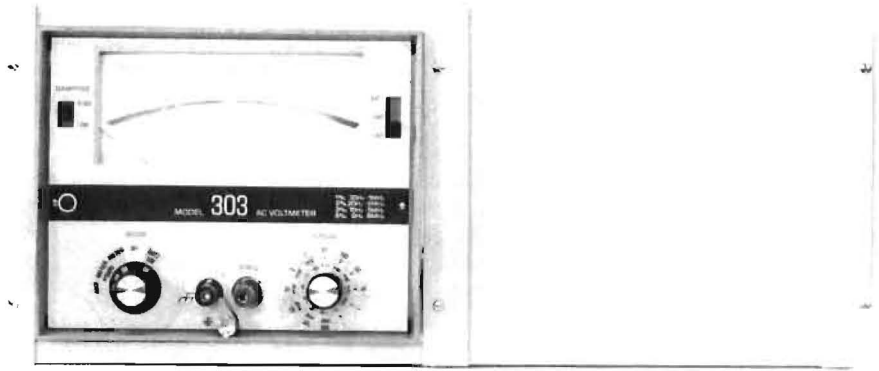
- Highest Readability — Logarithmic Scales for Consistently High Resolution. Linear dB Scale, 12" Scale Length.
- True Portability — Line/Rechargeable Battery Operation.
- Greatest Versatility in their Class — 2Hz to 6MHz, 100 $\mu$ V to 1 or 10kV (with probe), 1% basic range accuracy.
- Overload Protection on All Ranges; Signal Ground Isolated from Case Ground.
- Ideal for Communications Work, Video AC Calibration, General Purpose AC Measurements.



**BALLANTINE LABORATORIES, INC.**

*FOUR DECADES OF INNOVATION IN ELECTRONIC INSTRUMENTATION*

## LOGARITHMIC AC VOLTMETER/AMPLIFIERS



Series 303 instruments not only provide high-accuracy, broadband AC measurements (average-responding, RMS calibrated), but also function as precise-gain broadband AC amplifiers of excellent linearity and stability. Despite their moderate price, they provide performance that is unsurpassed in this class of analog AC instruments. The unique Ballantine mirror-backed logarithmic voltage display insures uniform accuracy and highest usable resolution over the entire extent of every voltage range. Effective scale length exceeds 12".

These solid-state instruments have a voltage range of 100 microvolts to 350 Volts, which may be extended to 1000 or 10,000 Volts with optional probes. They have a frequency range from 2Hz to 6MHz and are usable to beyond 12MHz with reduced accuracy. The midband accuracy, from 30Hz to 1MHz is  $\pm 1\%$  of reading, with broader tolerances above and below that band.

The METER +10dB mode of the Series 303 may be used for increased sensitivity — 100 microvolts over a 10Hz to 1MHz frequency range.

Input overvoltage protection allows applying a maximum of 350 Volts RMS at frequencies up to 2kHz on any range without damage. Even at 6MHz, voltages as high as 35V RMS can be applied on the four most sensitive ranges. On ranges from 100mV and up, maximum continuous input of 350 Volts RMS is allowable.

The amplifier mode provides 40dB of gain adjustable in 10dB steps, over 2Hz to 6MHz, with a linearity of better than  $\pm 0.5$ dB up to 100 millivolts output.

The Models 303-50 and 303-51 are supplied with a 20dB Probe (Model 1303) for measurements up to 1000 Volts. Optionally, a 10 kilovolt probe (Model 1301) may be used with any of the series. Models 303 and 303-50 have built-in rechargeable batteries; Models 303-01 and 303-51 operate from line only.

The 303 Series may be used as high gain AC amplifiers, and the 303-09 additionally incorporates a DC output proportional to the average of the input signal which is usable for driving chart and trend recorders as well as digital indicators.

A rack-mounting kit permits mounting one, or two, Series 303 meters in a 19-inch rack.

The thousands of Series 303 instruments in service in leading electronics fields all over the world, give proof of their great value, performance, and reliability.

MODELS	303, 303-01, 303-09, without Probe	303-50 and 303-51 with Model 1303 20dB Probe																		
Voltage Range	300 $\mu$ V–350V (12 ranges, 1mV FS to 350V)	3mV–1000V (11 ranges, 10mV FS to 1kV)																		
Lowest indication in "Meter +10dB" Mode	100 $\mu$ V (10Hz–1MHz)	1mV (100 $\mu$ V without Probe) (10Hz–1MHz)																		
Decibel Range	–78dBm to +52dBm; 0dBm = 1mW/600 $\Omega$	–58dBm to +62dBm; 0dBm = 1mW/600 $\Omega$																		
Frequency Range	2Hz–6MHz 1Hz–10MHz (3dB bandwidth) Except 303-09 (see note 1)																			
Accuracy (% of reading) (see note 2)	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">± 1%, 30Hz – 1MHz</td> <td style="width: 33%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">± 2%, 20Hz – 2MHz</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">± 3%, 10Hz – 3MHz</td> <td></td> </tr> <tr> <td style="text-align: center;">Without Probe</td> <td style="text-align: center;">± 5% 2Hz – 10Hz</td> <td style="text-align: center;">With Probe</td> </tr> <tr> <td style="text-align: center;">to 35V,</td> <td style="text-align: center;">± 5%, 3MHz– 6MHz</td> <td style="text-align: center;">to 350V</td> </tr> <tr> <td style="text-align: center;">35–350V</td> <td style="text-align: center;">±10%, 3MHz– 6MHz</td> <td style="text-align: center;">350–1000V</td> </tr> </table>			± 1%, 30Hz – 1MHz			± 2%, 20Hz – 2MHz			± 3%, 10Hz – 3MHz		Without Probe	± 5% 2Hz – 10Hz	With Probe	to 35V,	± 5%, 3MHz– 6MHz	to 350V	35–350V	±10%, 3MHz– 6MHz	350–1000V
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Response	Average, calibrated in RMS of a sine wave.																			
Scales	Logarithmic voltage scales, 0.9 to 3.5 and 2.8 to 11. Linear decibel scale, –8.4 to +2.4dBm;																			
Input Impedance	10 M $\Omega$    15–25pF	10 M $\Omega$    7.5pF (25pF without probe)																		
Amplifier Mode	Gain 40dB $\pm$ 0.5dB, 2Hz–6MHz. Full scale output 0.1V RMS. AC coupled. Source resistance 150 $\Omega$ . Input noise < 30 $\mu$ V. Model 303-09 has DC as well as AC output.																			
Power Requirements	120/240V, 50–420Hz, 3W, or rechargeable nickel cadmium battery. (Models 303-01 and 303-51, line power supply only).																			
Dimensions	6.1" high x 7.8" wide x 10.2" deep. (15.5 cm x 19.8 cm x 25.9 cm.)																			
Weight	303 and 303-50: 8 lbs. (3.6 kg) net, 12 lbs. (5.4 kg) shipping. 303-01 and 303-51: 7 lbs. (3.2 kg) net, 11 lbs. (5.0 kg) shipping.																			
Rack Mounting	Model 800 Rack Mounting Kit accommodates one or two Series 303 instruments in 19" x 7" Rack.																			
Prices	303: \$395    303-09: \$425 303-01: 335	303-50: \$445 303-51: 385																		

Note 1: Model 303-09 is an environmentalized, 4MHz version of 303-01, 100  $\mu$ V to 350 Volts (1mV FS to 350V FS).  
Linear voltage scale.

Note 2: Accuracy in "Meter + 10dB" Mode is  $\pm$ 1% f.s. 100Hz–100kHz,  $\pm$ 2% f.s. 50Hz–200kHz,  $\pm$ 3% f.s. 20Hz–500kHz,  
 $\pm$ 5% f.s. 10Hz–1MHz.

## ACCESSORIES

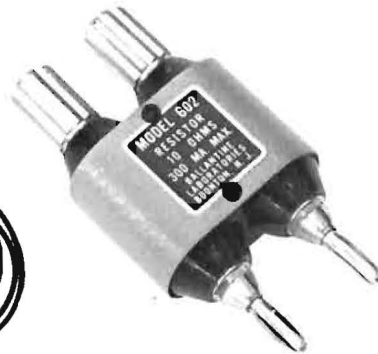


**Model 1303 Probe**  
Low capacitance, 20dB attenuator probe. For measurements to 1000 Volts. \$75. (Supplied with Models 303-50/51).

**Model 618 Adapter**  
to convert BNC female to single binding post (one supplied). \$6.50.

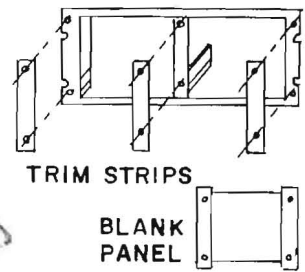


**Model 1301 High Voltage 80dB Attenuator Probe** for measurements to 10,000 Volts at frequencies up to 1MHz. Input impedance is greater than 10,000 megohms shunted by less than 4.5 picofarads. Shielded dual banana plug termination. \$90.



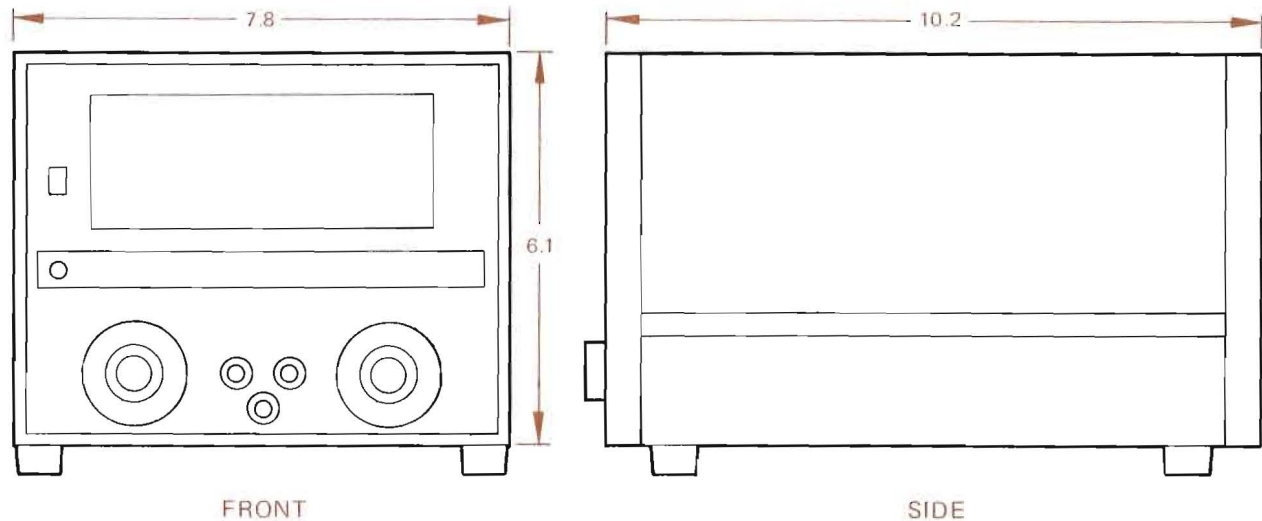
**Model 600 Shunt Resistor**  
Assemblies plug into input of Series 303 for measurement of current over a range of 0.1 microamperes to 10 amperes. Resistor values are in six decade steps from 0.01 ohm to 1000 ohms, thus making it possible to read current from the voltage scales.

Models 601 to 604 (1, 10, 100, & 1000  $\Omega$ ), \$30 each.  
Model 605 (0.1  $\Omega$ ), \$50.  
Model 606 (0.01  $\Omega$ ), \$65.



**Model 800**  
Rack Mounting Kit for adapting one (or two) Series 303 voltmeters to a 7" x 19" rack, without modification of the voltmeters. \$50.

## DIMENSIONS



## BALLANTINE LABORATORIES, INC.

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*Four Decades of Innovation in Electronic Instrumentation*