

ASSEMBLING AND
USING YOUR

Heathkit

A. C. Voltmeter
Model AV-1



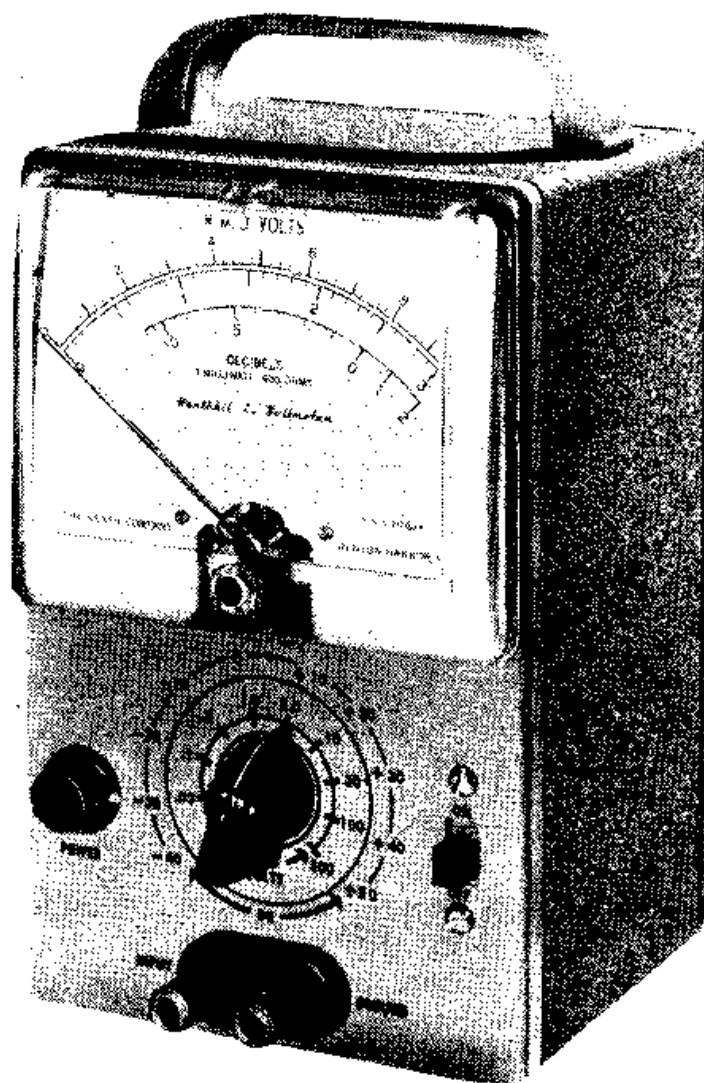
THE HEATH COMPANY
BENTON HARBOR, MICH.

PRICE \$1.00

HEATHKIT

MODEL AV-1

A. C. VOLTMETER



Technical Specifications

Power Requirement:	105-125V AC, 50-60 cycles, 10 Watts
Tube Complement:	1 - 6AU6 1 - 6AT6
Input Impedance:	1 Megohm at 1 KC
Ranges:	.01, .03, .1, .3, 1, 3, 10, 30, 100, 300 V RMS
Decibels:	Total range -52 to +52 db, scale -12 to +2 db. (1 MW - 600 ohm) ten switch selected ranges from -40 to +50 db.
Physical Specifications:	7-3/8" high x 4-11/16" wide x 4-1/8" deep
Net Weight 3½ lbs.	Shipping Weight 5 lbs.

Complex Wave Forms

This instrument, like most AC voltmeters, is calibrated to read the Root Mean Square (RMS) value of a pure sine wave. This is 70.7% of the peak voltage.

As characteristic of most rectifier type instruments, the meter deflection is proportional to the average value of the input wave form. Thus when measuring odd shaped waves (square, saw-tooth, pulse) the meter reading must be given special interpretation. Special reading on this subject will be found in the bibliography.

Circuit Description

The basic circuit consists of two stages of amplification feeding a modified bridge circuit. The meter-bridge circuit returns to the cathode of the voltage amplifier to provide negative feedback.

The AC voltage to be measured is applied across a one megohm voltage divider. This voltage divider provides ten separate meter ranges. The precision resistors used here make it possible for one calibration to serve all ten ranges. Part of the voltage developed across the divider is applied to the grid of the first amplifier stage.

The first stage of amplification uses a hi-gain pentode as a voltage amplifier. The next stage utilizes a hi-mu triode as a current amplifier to feed the meter circuit. Within the modified bridge circuit, the two crystal diodes rectify the output current, providing a unidirectional current flow through the meter movement.

For calibration purposes the meter is placed in parallel with a portion of the calibration control connected to the DC terminals of the bridge. This one calibrating resistance serves for all meter ranges. Once adjusted, the meter deflection is proportional to the voltage across the input terminals.

The feedback loop provides the necessary stability and frequency response. This uses the bridge current to develop negative feedback in the cathode circuit of the voltage amplifier. Extra shielding is provided around the meter to prevent unwanted feedback from the meter to the input circuit.

The power supply is transformer operated. It utilizes a dual selenium rectifier in a half-wave voltage doubler circuit. Two sections of resistance-capacitance filtering are used to provide an adequate hi-voltage supply.

Accuracy

The accuracy of the meter movement is within 2% of full scale. The precision resistors used in the voltage divider are held to within 1%. Some slight error may be introduced by the circuit itself. Final accuracy of the instrument should be within 5% of full scale at the calibrating frequency.

The frequency response of the instrument is ± 1 db from 10 CPS to 50 KC.

In actual practice, inaccuracies do not usually fall in the same direction, consequently some tend to cancel out others. Therefore, it should be expected that the accuracy of the AV-1 will fall well within 5% of full scale.

