

A.P.67921 VOLTMETER, VALVE, CT. 54

(Joint-Services Designation, Balanced Valve Voltmeter, Portable, CT. 54)

SUMMARY OF DATA

PURPOSE

Used for measuring D.C. voltages 0 to 2,400V and A.C. voltages 0 to 480V R.M.S. (over frequency-range 20 c/s to 200 Mc/s) and resistance 0 to 10 megohms. The voltmeter imposes a negligible load on the voltage source to which it is connected; this source may therefore possess high resistance or high impedance. Provision is made for the instrument to function as a centre-zero meter on the D.C. voltage range.

DESCRIPTION

The instrument consists essentially of a meter in a bridge circuit containing a valve operating as a triode. When measuring D.C. voltages, the input voltage is applied to a resistor chain from which a tapping is taken to the grid of the triode; a special high-voltage range (0 to 2,400V) is obtained with the aid of an external Multiplier consisting of a resistor-chain which reduces the input voltage to one-thousandth of its value. For A.C. measurements, the A.C. is first rectified by a diode valve; for R.F. voltages measurements, a probe unit is provided, this containing a separate diode valve. For resistance measurements, a 1.5V battery passes a current through the unknown resistance and a selected reference resistor in the instrument; the voltage developed across the reference resistor is then measured as in D.C. voltage measurement.



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PERFORMANCE

Measurement	Range	Remarks	Accuracy
DC volts	0-2.4V or 1.2-0-1.2V	Input resistance 20 megohms	Errors do not exceed $\pm 3\%$ of full-scale reading on range in use.
	0-4.8V or 2.4-0-2.4V		
	0-24V or 12-0-12V		
	0-48V or 24-0-24V		
DC volts	0-240V or 120-0-120V	Input resistance 40 megohms	
	0-480V or 240-0-240V		
	0-2,400V or 1,200-0-1,200V		
		Input resistance approximately 20 megohms. External multiplier is required for these ranges.	
AC volts	0-2.4V RMS	AC HIGH terminal may be used for frequencies of 20 c/s to 20 Mc/s; PROBE is preferable for RF measurements, and may be used over the frequency range 10 kc/s to 200 Mc/s.	At audio frequencies errors do not exceed $\pm 3\%$ of full-scale readings on range in use.
	0-4.8V RMS		
	0-24V RMS		
	0-48V RMS		
	0-240V RMS		
	0-480V RMS		
Resistance	0-1K 40 ohms mid-scale	The test voltage for resistance measurements is 1.5V	Accuracy cannot be expressed simply, because of reciprocal scale. Accuracy is better than $\pm 3\%$ but this depends on accuracy of zero adjustment.
	0-10K 400 ohms mid-scale		
	0-100K 4,000 ohms mid-scale		
	0-1M 40,000 ohms mid-scale		
	0-10M 400,000 ohms mid-scale		

POWER REQUIREMENTS AND CONSUMPTION

When the instrument is battery-operated, a dry battery of 75V (tapped at 15V) is used in conjunction with two dry batteries of 1.5V. The A.C. mains unit (A.P.67922 Rectifier Unit CTA2) is insertable in instrument, if battery block is removed; it operates off the following A.C. mains voltages; 45, 180, 200, 210, 220, 230, 240, 250V, a selector being provided. The 180V tapping is intended for 400 - 500 c/s and the others for 50/60 c/s.

Consumption: 15 watts (approx.).

PHYSICAL DATA

Height: 13 in.
Width: 10½ in.
Depth: 5 in.
Weight: 17 lb (approx.)

ACCESSORIES

Probe Unit, Design 3. (Patt. 61418) - permanently attached to instrument.
Three test leads two black, one red with interchangeable prod/crocodile clips.
Rectifier Unit CTA2, in stowage box. (Patt. 67922)
D.C. Multiplier CTA25. (Patt. 61417)
Box, for batteries, dry, CTA24. A.P.61833
Cell, dry, 1.5V. A.P.21060 (two)
Battery, dry, 75V. A.P.14221
Test probes (1 pair) AP 64159

REMARKS

Replaces Valve Voltmeter A.P.54706 and Electrostatic Voltmeter 0 - 3 kV A.P.W5078.

HANDBOOK

B.R.1771(5)

ESTABLISHMENT LIST

E.1015 Testing Outfits TKA/D/E/F/G.

PRODUCTION SPECIFICATION

13684R

OTHER SERVICE AND COMMERCIAL DESIGNATIONS

JOINT-SERVICES: Balanced Valve Voltmeter, portable, CT.54.

AIR MINISTRY: AM Ref. 10S/16373.

COMMERCIAL: ELECTRONIC INSTRUMENTS LTD. MICOVAC M22A.