THE "AVO" ELECTRONIC TESTMETER Mk. IV

Instructions for Setting the Coarse Zero and A.C. Zero Controls

The preset controls for the adjustment of A.C. Zero and Coarse Zero are easily accessible from the outside of the instrument by the removal of "press-in" covers from the side of the instrument. The disposition of the controls are shown in the illustration (Fig. 8).

NOTE—The third preset control is a trimming adjustment for full scale deflection of the millivoltmeter circuit and should not be touched.

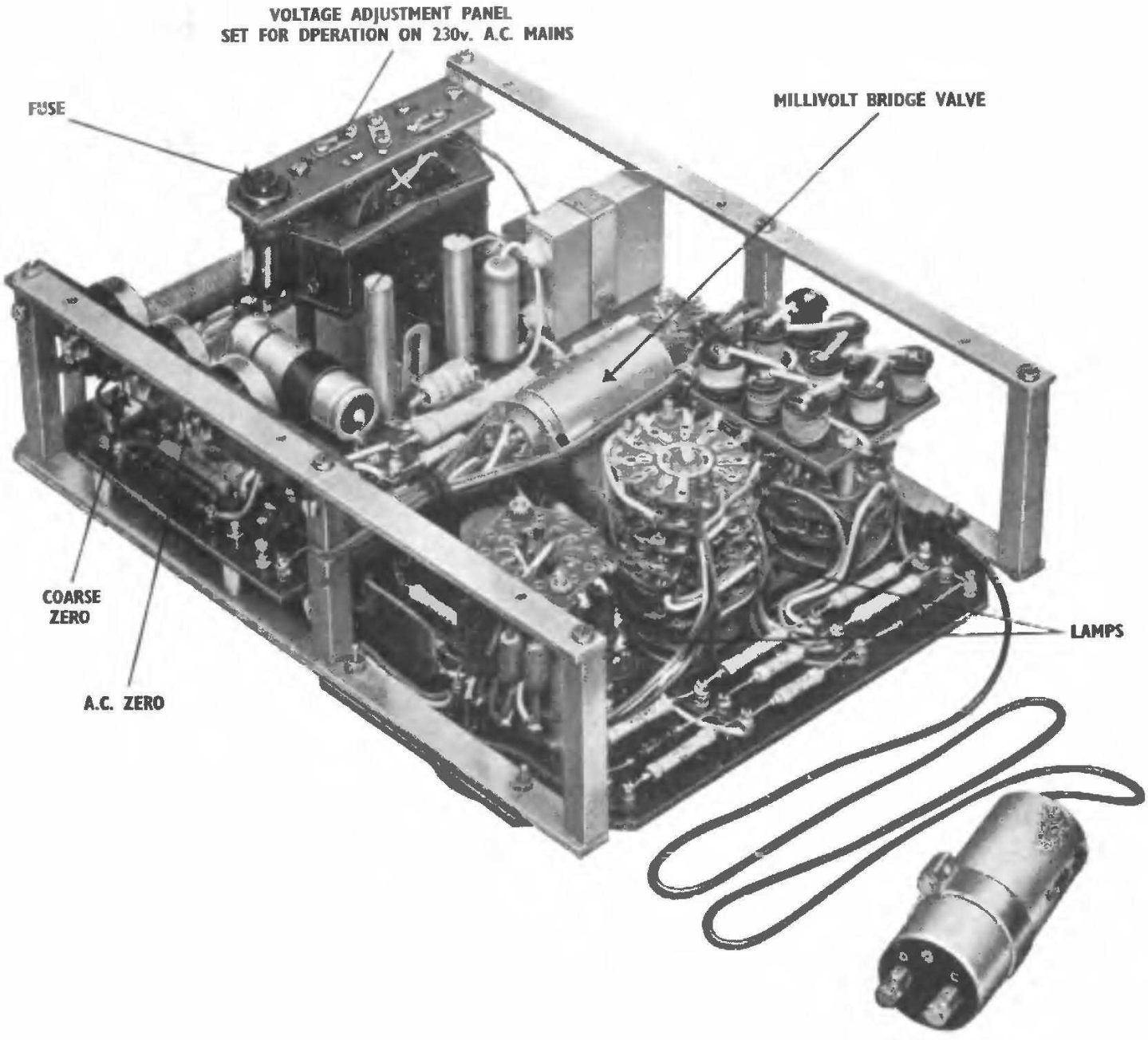


Fig. 8.

Setting the Coarse Zero Control

(1) Set the testmeter to "amps. D.C."

(2) Adjust the "Set Zero Instrument Control" on the front of the instrument half-way round its traverse.

(3) Adjust the "Coarse Zero Control" on the side of the instrument until the movement pointer is at zero.

Adjustment of A.C. Zero

(1) With the probe internal place finger on H.P. terminal with instrument set to 1V A.C. range and note that the meter reverse switch is positioned to produce a forward deflection of the movement, as the terminal is touched.

(2) With the probe internal and the L.P. and H.P. terminals shorted or with the probe external and the probe terminal marked "C" shorted to the probe case terminal, set the instrument to its 1V D.C. range.

(3) Set movement needle to zero by means of "Set Zero Instrument" Control.

(4) Change to 1V A.C. range and set movement needle to 0·07V (3·5 divisions) by means of "A.C. Zero" control, with H.P. and L.P. terminals shorted.

Adjustment of Instrument for Operation upon Various Power Supplies

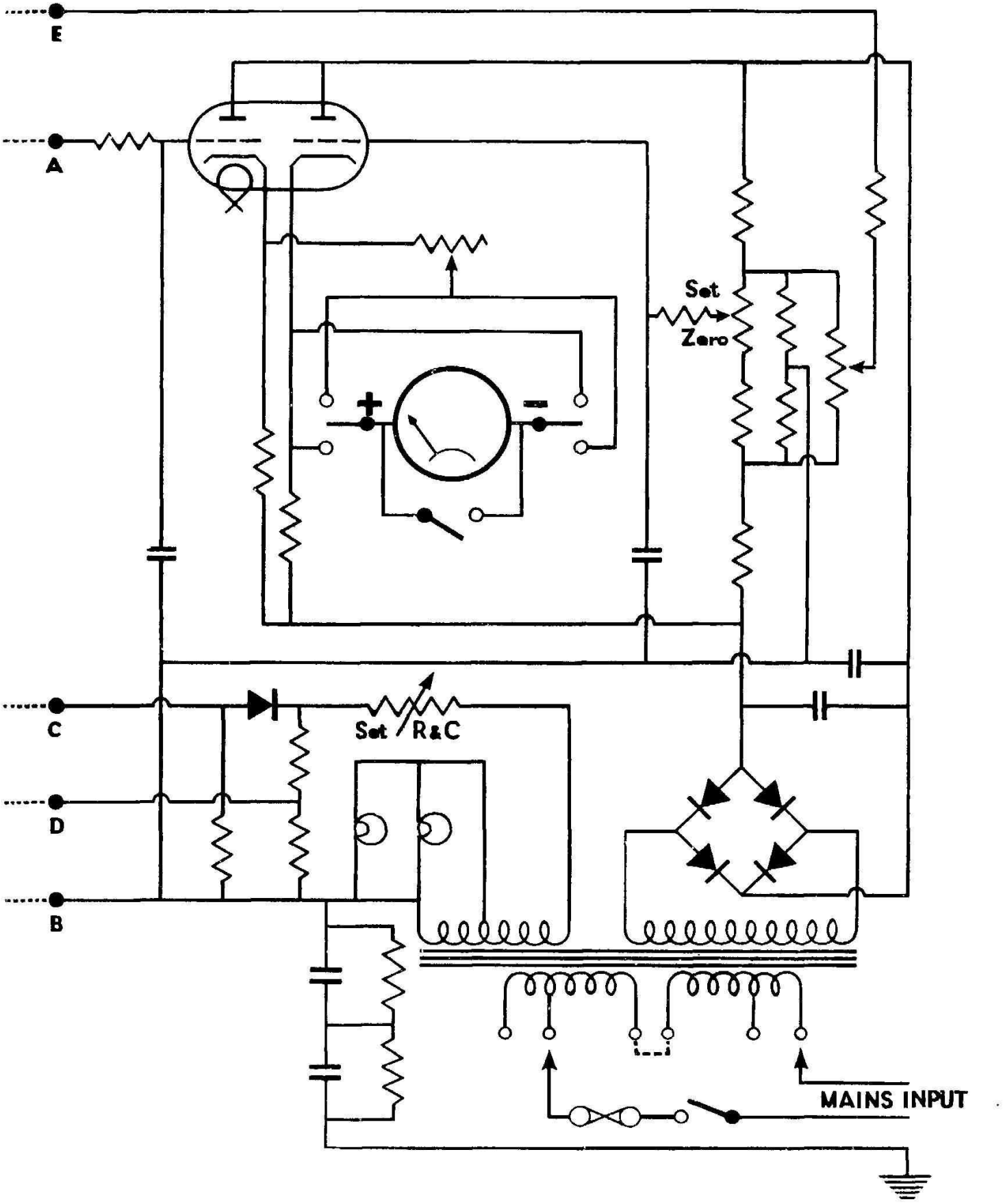
The instrument is suitable for connection to A.C. mains voltages between 100-130 volts 50-60 c/s and 200-260 volts 50-60 c/s. Should it be necessary to alter the mains voltage tapping from the normal 220-240 volt mains for which the instrument is initially adjusted, remove the small inspection plate from the rear of the instrument, thus exposing to view the tap changing board and fuse. The mains voltage connections for different values of voltage are then made as in the table below.

Operating Voltage.	Connect H to	Connect G to	Link
100/110V	B & D	C & E	—
110/130V	A & D	C & F	—
200/220V	B	E	C & D
220/240V	A	E	C & D
240/260V	A	F	C & D

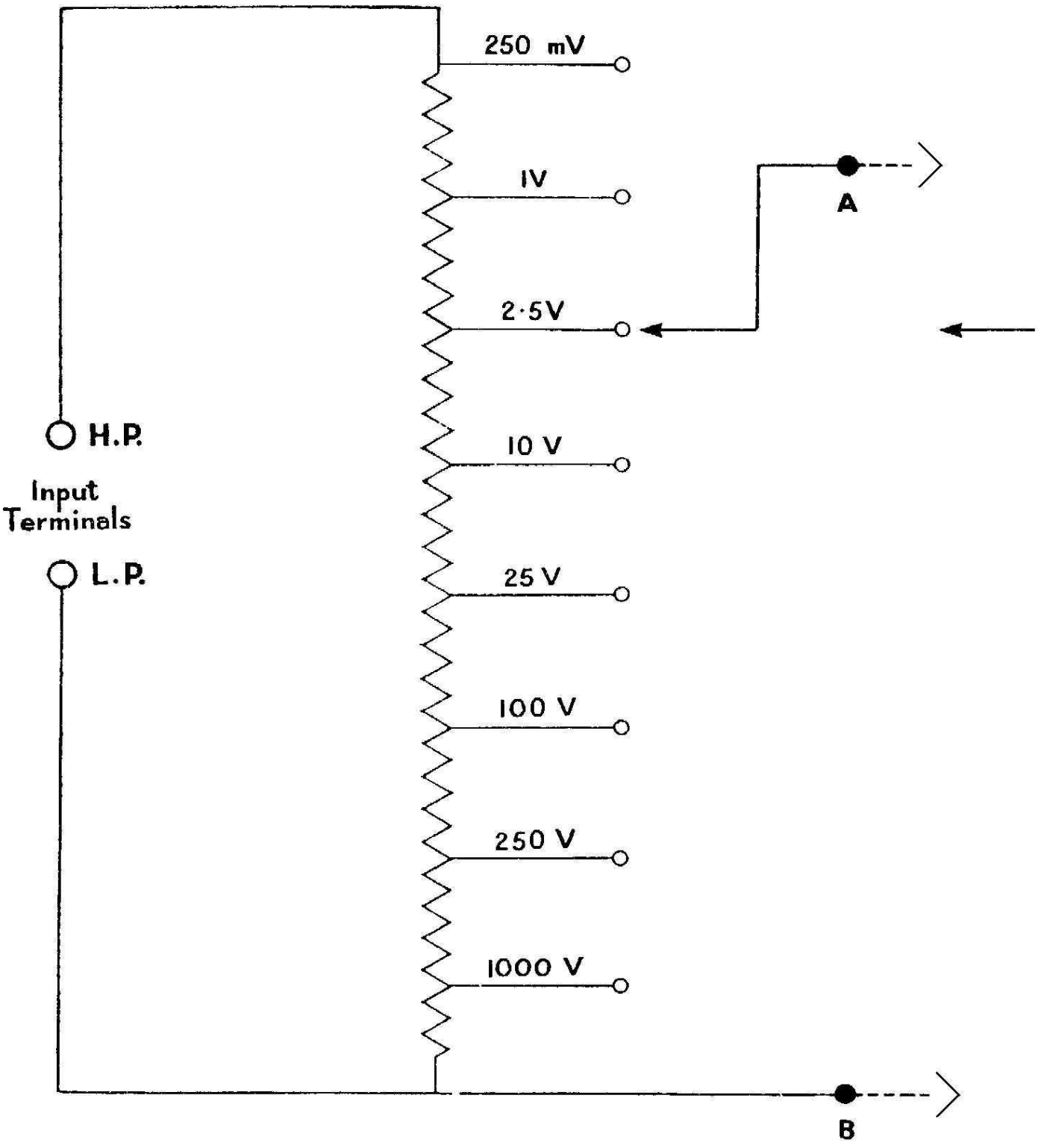
TABLE OF RANGES

Type of Measurement to be made.	Scale Reading.	Multiplier Switch Setting.	Range Switch Setting.	Load Switch Setting.
D.C. Volts. Using H.P. and L.P. Terminals (Input Resistance 11MΩ)	250·0mV full scale	250·0mV D.C.	Volts D.C.	
	1·0V ,, ,,	1·0V	,,	
	2·5V ,, ,,	2·5V	,, ,,	
	10·0V ,, ,,	10·0V	,, ,,	
	25·0V ,, ,,	25·0V	,, ,,	
	100·0V ,, ,,	100·0V	,, ,,	
	250·0V ,, ,,	250·0V	,, ,,	
	1000·0V ,, ,,	1000·0V D.C.	,, ,,	
D.C. Volts Using L.P. Terminal with External Multiplier plugged into X10 Socket (Input Resistance 110MΩ)	2·5V full scale	250·0mV D.C.	Volts D.C.	
	10·0V ,, ,,	1·0V	,, ,,	
	25·0V ,, ,,	2·5V	,, ,,	
	100·0V ,, ,,	10·0V	,, ,,	
	250·0V ,, ,,	25·0V	,, ,,	
	1000·0V ,, ,,	100·0V	,, ,,	
	2500·0V ,, ,,	250·0V	,, ,,	
	10,000·0V ,, ,,	1000·0V D.C.	,, ,,	
A.C. Volts Using L.P. and H.P. Terminals with Probe Internal	1·0V R.M.S. full scale	1·0V	Volts A.C.	
	2·5V ,, ,, ,,	2·5V	,, ,,	
	10·0V ,, ,, ,,	10·0V	,, ,,	
	25·0V ,, ,, ,,	25·0V	,, ,,	
	100·0V ,, ,, ,,	100·0V	,, ,,	
	250·0V ,, ,, ,,	250·0V	,, ,,	
Measuring between Probe Terminal marked "C" and Earth Clip with Probe External (See page 10 for notes on Voltage Limitation at High Frequencies.)	1·0V R.M.S. full scale	1·0V	Volts A.C.	
	2·5V ,, ,, ,,	2·5V	,, ,,	
	10·0V ,, ,, ,,	10·0V	,, ,,	
	25·0V ,, ,, ,,	25.0V	,, ,,	
	100·0V ,, ,, ,,	100·0V	,, ,,	
	250·0V ,, ,, ,,	250·0V	,, ,,	
A.C. Volts Using L.P. Terminal with Probe Internal and High Potential Lead Plugged into X10 Socket	10·0V R.M.S. full scale	1·0V	Volts A.C.	
	25·0V ,, ,, ,,	2·5V	,, ,,	
	100·0V ,, ,, ,,	10·0V	,, ,,	
	250·0V ,, ,, ,,	25·0V	,, ,,	
	1000·0V ,, ,, ,,	100·0V	,, ,,	
	2500·0V ,, ,, ,,	250·0V	,, ,,	

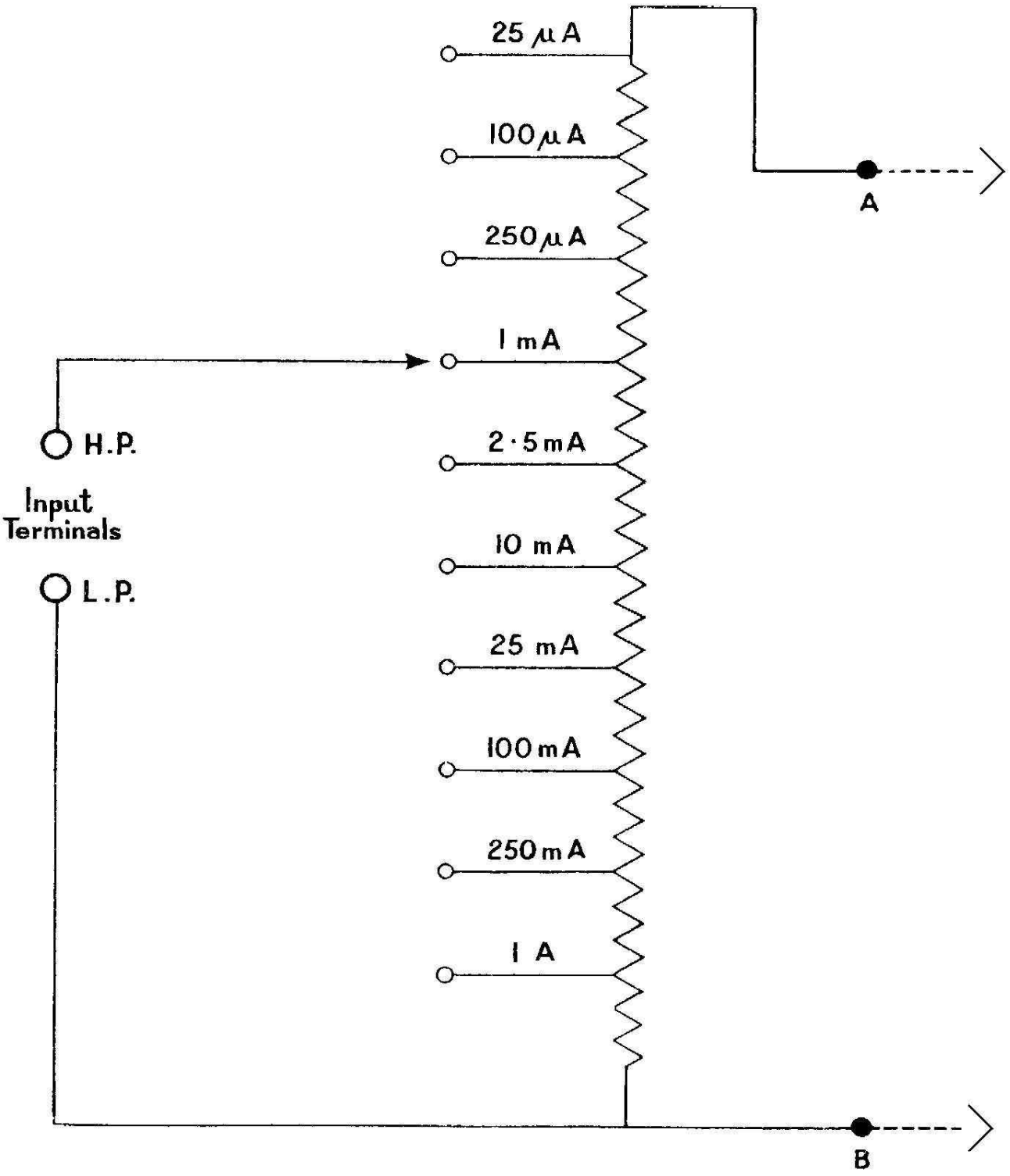
Type of Measurement to be made.	Scale Reading.	Multiplier Switch Setting.	Range Switch Setting.	Load Switch Setting.
D.C. Current 250mV Drop at Full Scale on all Ranges. Using L.P. and H.P. Terminals	25μA full scale 100μA ,, ,, 250μA ,, ,, 1mA ,, ,, 10mA ,, ,, 25mA ,, ,, 100mA ,, ,, 250mA ,, ,, 1A ,, ,,	25μA 100μA 250μA 1mA 10mA 25mA 100mA 250mA 1A	Amps. D.C. ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,,	
Decibels (Reference level of 50mW)	−10 to +10db add 10db to scale reading	—	50mW 5 Watts	5Ω 600Ω 10Ω 2000Ω 25Ω 5000Ω Select any load above as required
A.C. Power Output	500mV full scale 5·0W ,, ,,	—	500mW 5 Watts	5Ω 600Ω 10Ω 2000Ω 25Ω 5000Ω Select any load above as required
Capacitance —	·0001μF—0·5μF ·01μF— 50μF	—	μF μF × 100	
Resistance —	0·2Ω—1000Ω 20Ω—100,000Ω 2000Ω—10MΩ	—	Ω ÷ 100 Ω Ω × 100	
Insulation —	0·1MΩ—1000MΩ	—	MΩ	See notes on p. 13, *re* test voltage



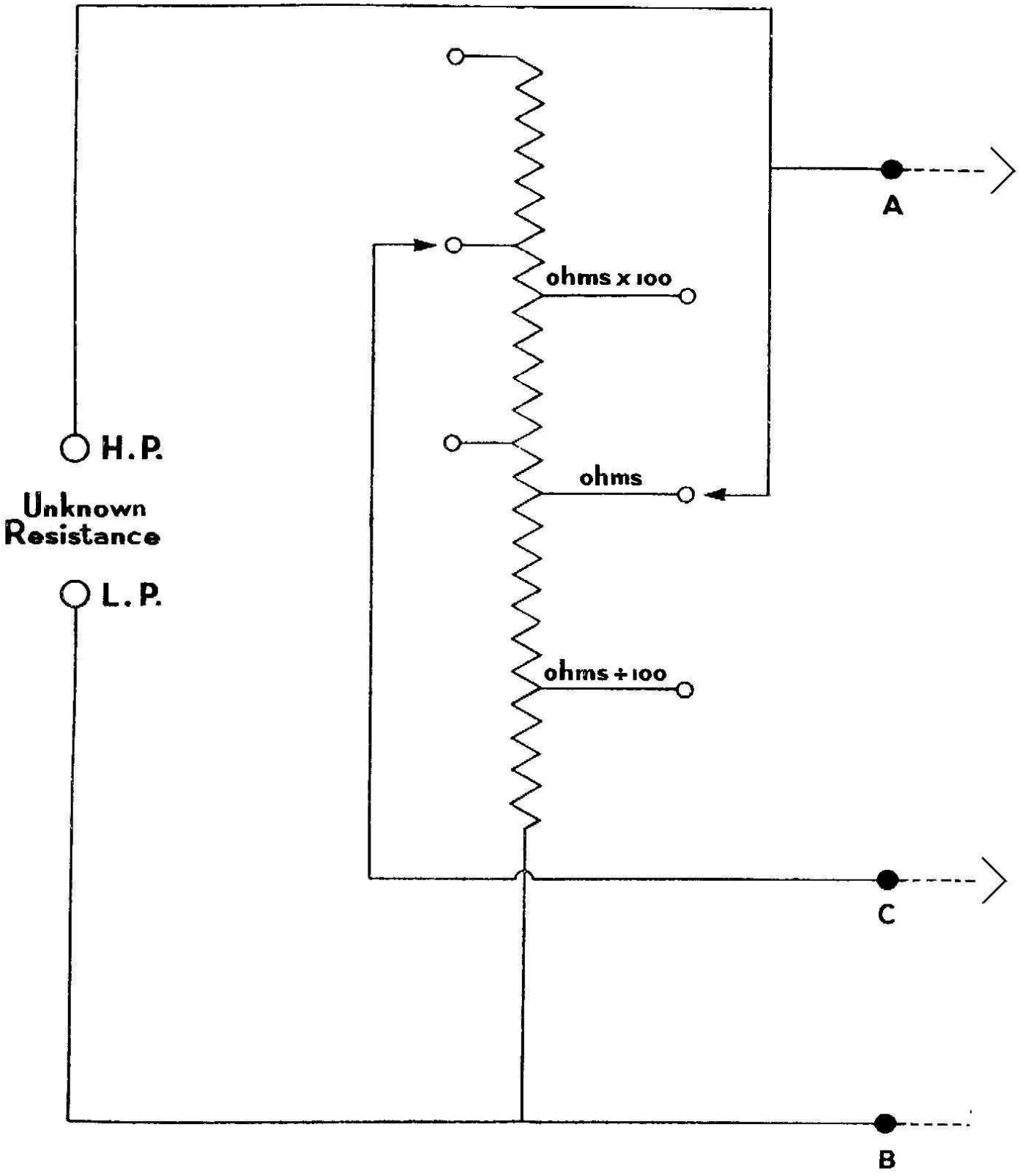
BASIC D.C. MILLIVOLTMETER DIAGRAM



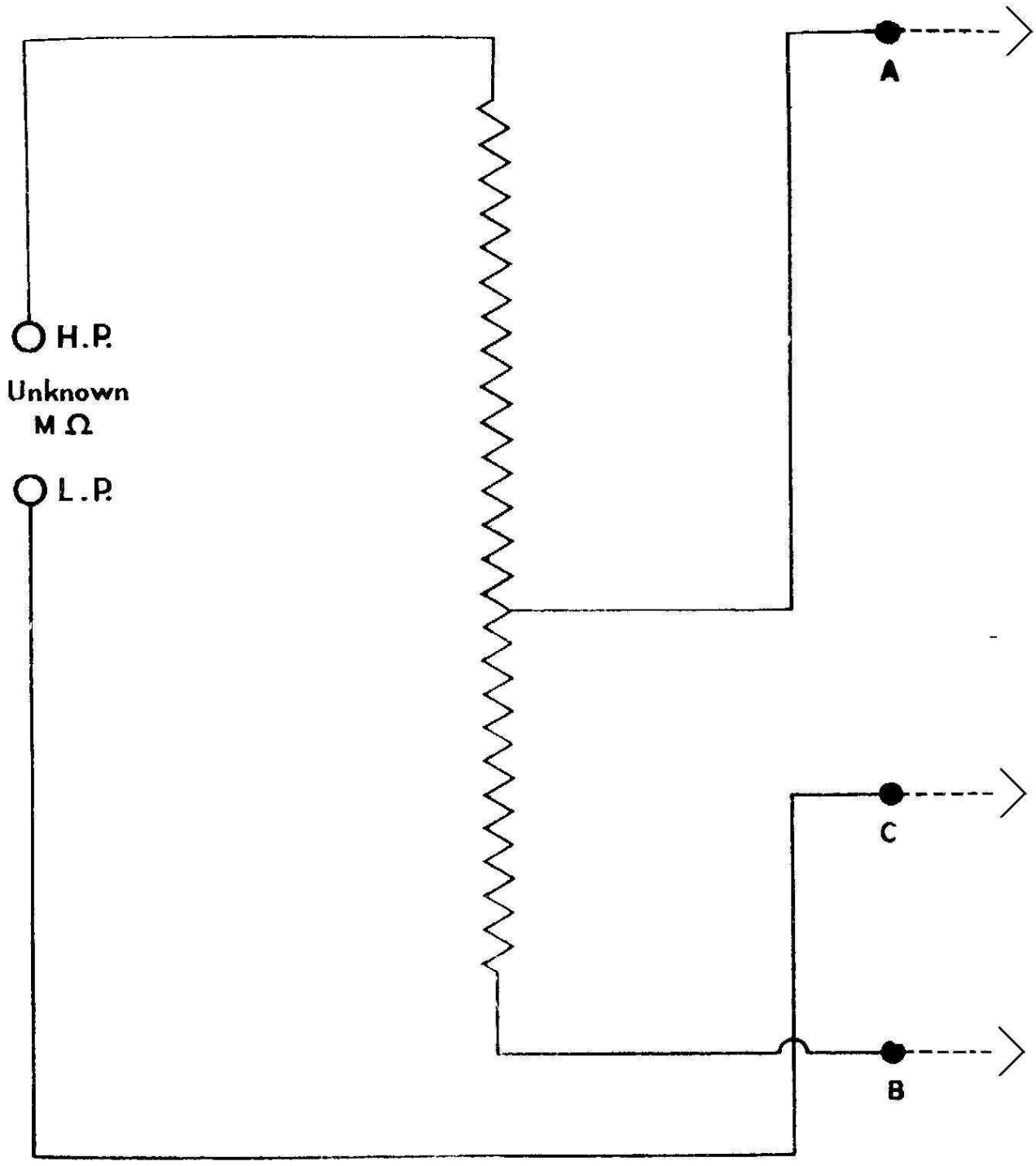
D.C. VOLTS MEASURING CIRCUIT ING



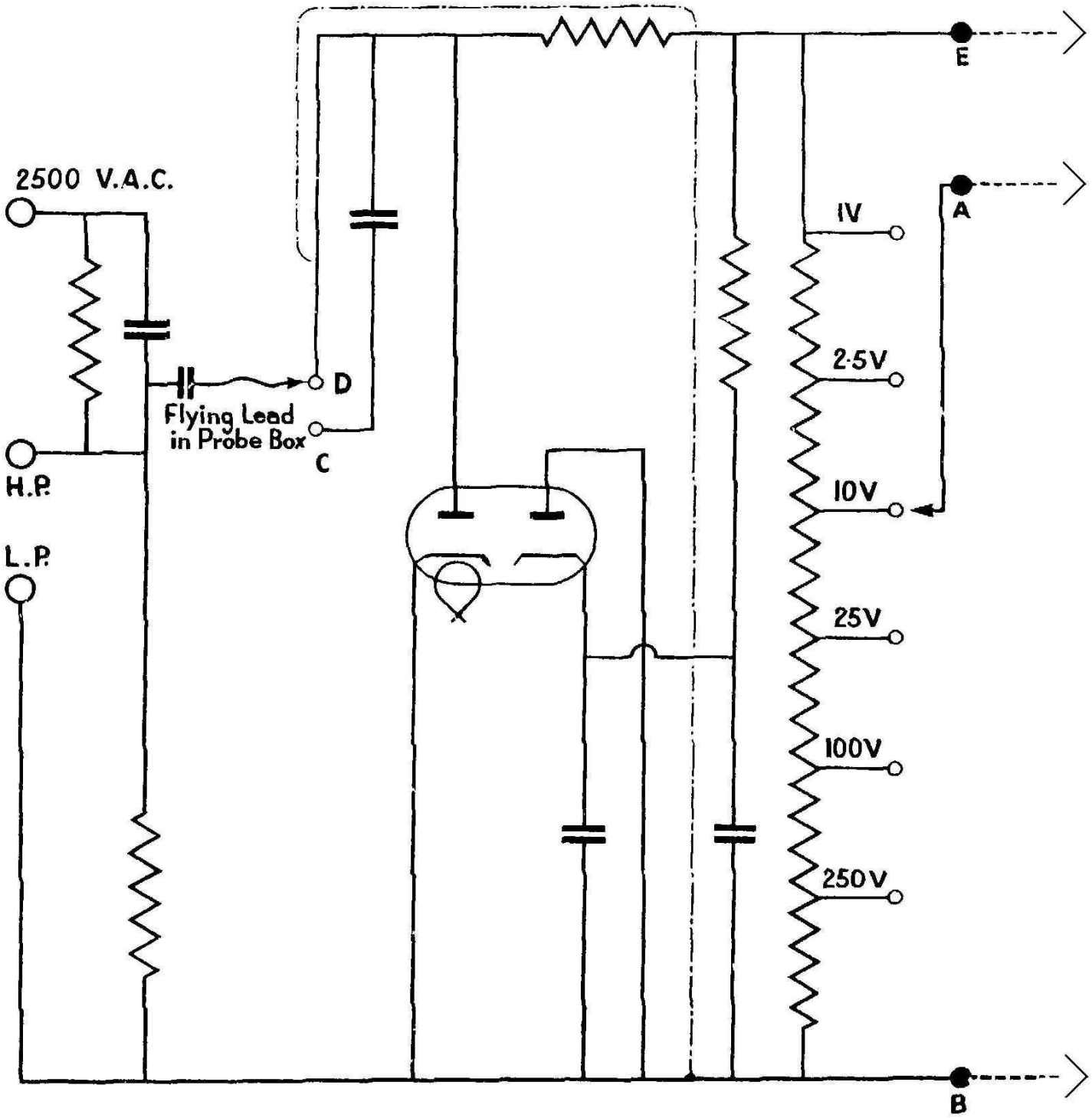
D.C. CURRENT MEASURING CIRCUIT CIRCUIT



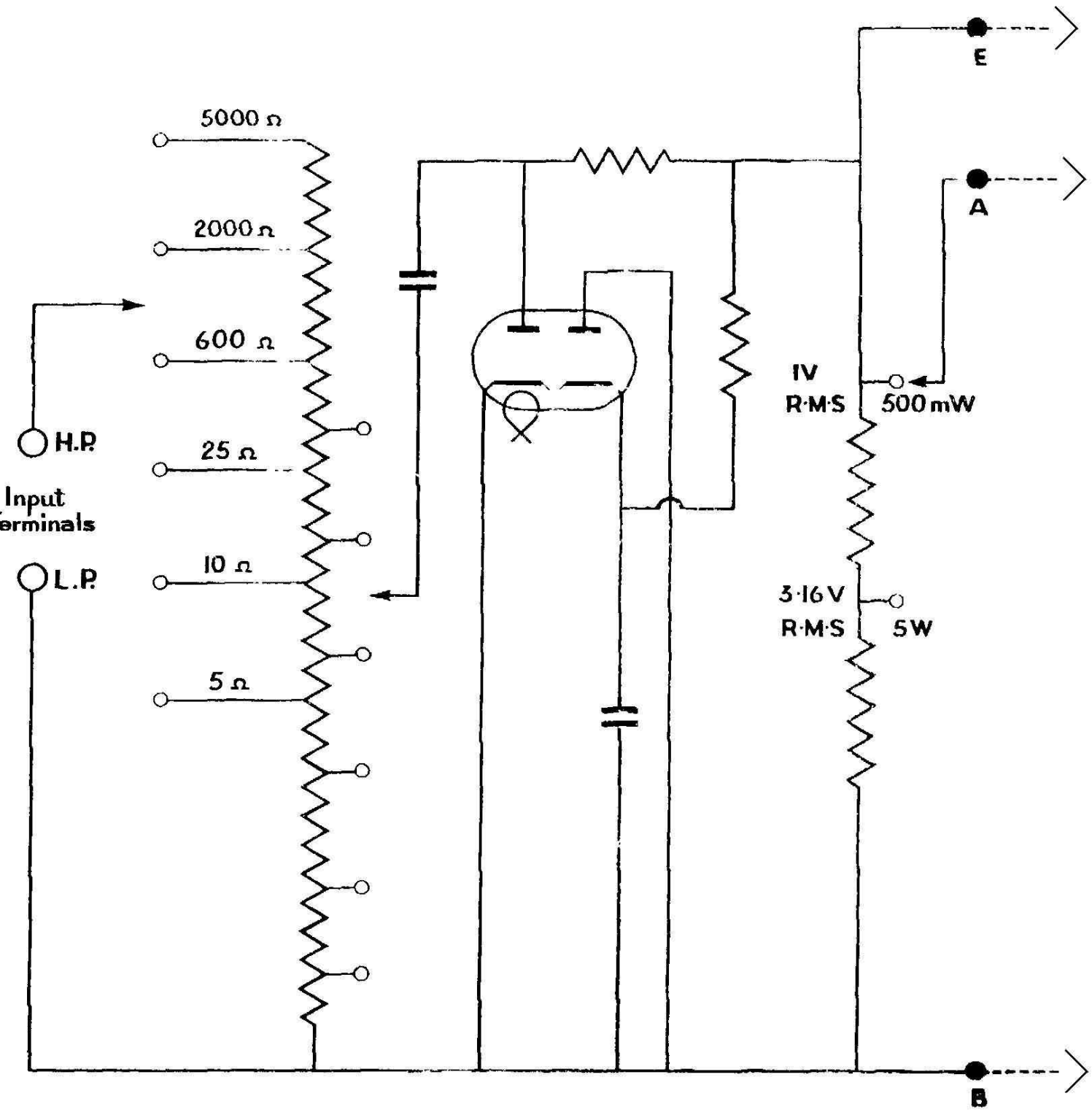
OHMS MEASURING CIRCUIT



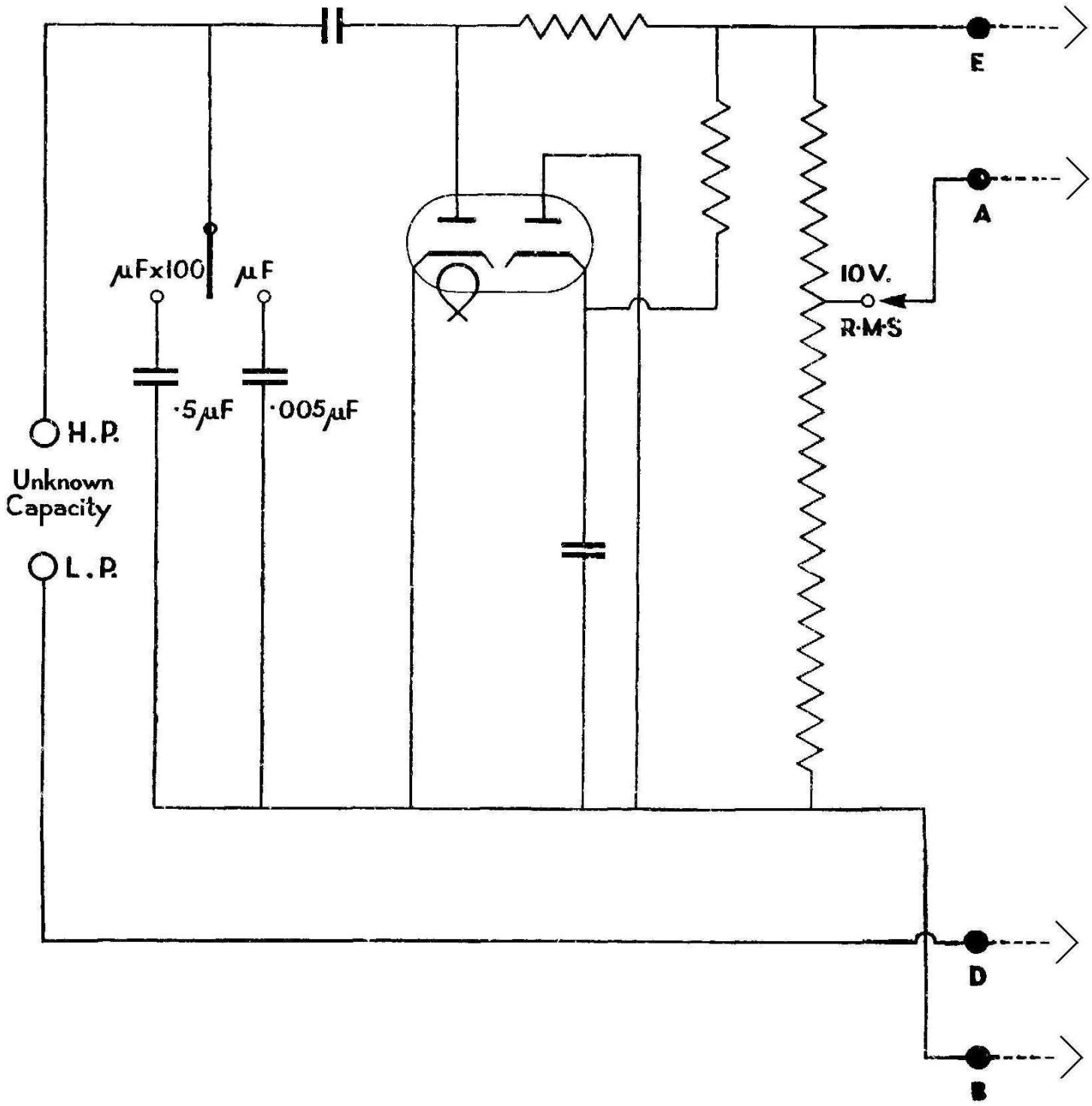
MEGOHMS MEASURING CIRCUIT



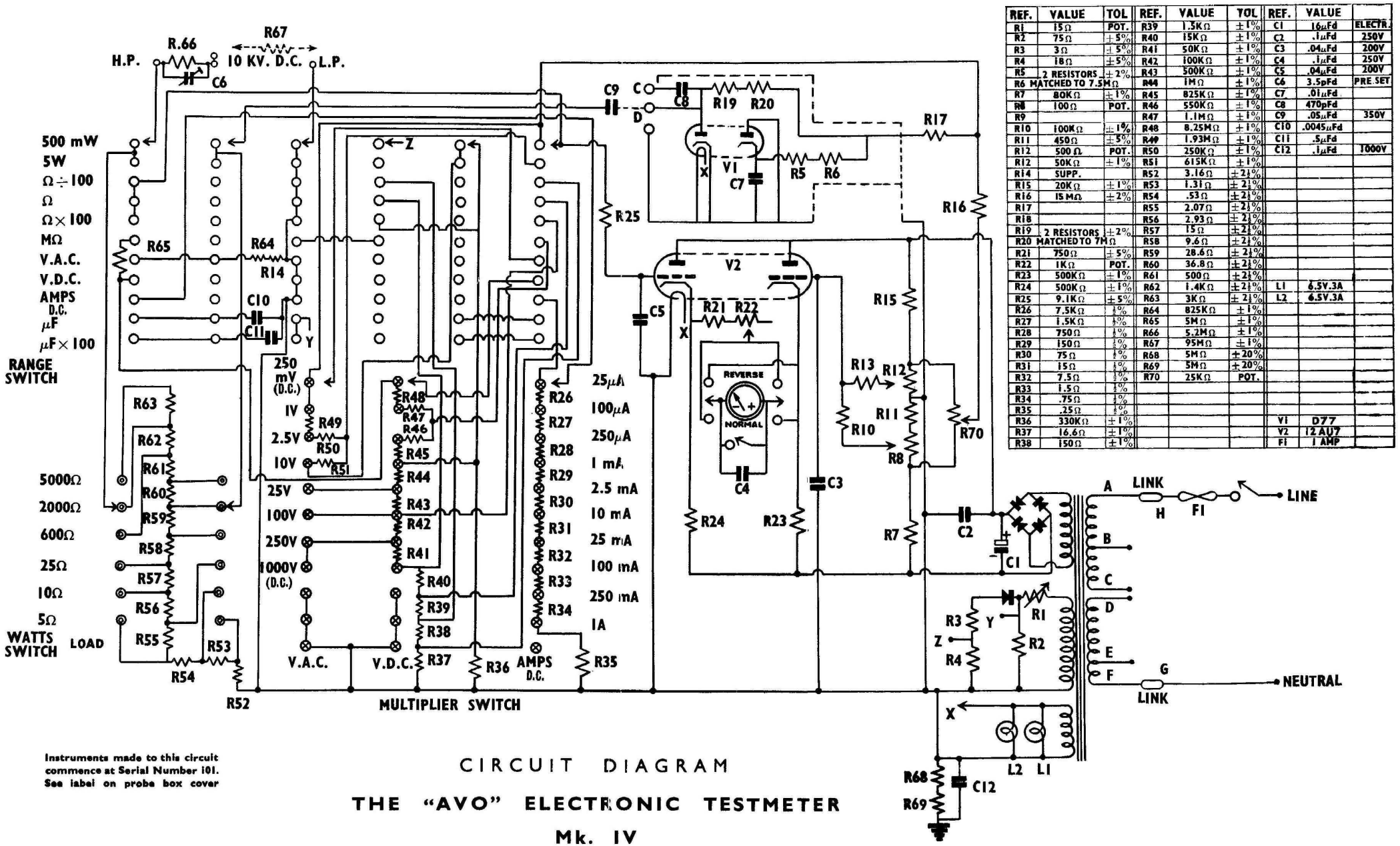
A.C. VOLTS MEASURING CIRCUIT



WATTS MEASURING CIRCUIT



CAPACITY MEASURING CIRCUIT



REF.	VALUE	TOL	REF.	VALUE	TOL	REF.	VALUE	
R1	15Ω	POT.	R39	1.5KΩ	±1%	C1	16μFd	ELECTR.
R2	75Ω	±5%	R40	15KΩ	±1%	C2	.1μFd	250V
R3	3Ω	±5%	R41	50KΩ	±1%	C3	.04μFd	200V
R4	18Ω	±5%	R42	100KΩ	±1%	C4	.1μFd	250V
R5	2 RESISTORS	±2%	R43	500KΩ	±1%	C5	.04μFd	200V
R6	MATCHED TO 7.5MΩ		R44	1MΩ	±1%	C6	3.5pFd	PRE SET
R7	80KΩ	±1%	R45	825KΩ	±1%	C7	.01μFd	
R8	100Ω	POT.	R46	550KΩ	±1%	C8	470pFd	
R9			R47	1.1MΩ	±1%	C9	.05μFd	350V
R10	100KΩ	±1%	R48	8.25MΩ	±1%	C10	.0045μFd	
R11	450Ω	±5%	R49	1.93MΩ	±1%	C11	.5μFd	
R12	500Ω	POT.	R50	250KΩ	±1%	C12	.1μFd	1000V
R12	50KΩ	±1%	R51	615KΩ	±1%			
R14	SUPP.		R52	3.16Ω	±2½%			
R15	20KΩ	±1%	R53	1.31Ω	±2½%			
R16	15MΩ	±2%	R54	.53Ω	±2½%			
R17			R55	2.07Ω	±2½%			
R18			R56	2.93Ω	±2½%			
R19	2 RESISTORS	±2%	R57	15Ω	±2½%			
R20	MATCHED TO 7MΩ		R58	9.6Ω	±2½%			
R21	750Ω	±5%	R59	28.6Ω	±2½%			
R22	1KΩ	POT.	R60	36.8Ω	±2½%			
R23	500KΩ	±1%	R61	500Ω	±2½%			
R24	500KΩ	±1%	R62	1.4KΩ	±2½%	L1	6.5V.3A	
R25	9.1KΩ	±5%	R63	3KΩ	±2½%	L2	6.5V.3A	
R26	7.5KΩ	½%	R64	825KΩ	±1%			
R27	1.5KΩ	½%	R65	5MΩ	±1%			
R28	750Ω	½%	R66	5.2MΩ	±1%			
R29	150Ω	½%	R67	95MΩ	±1%			
R30	75Ω	½%	R68	5MΩ	±20%			
R31	15Ω	½%	R69	5MΩ	±20%			
R32	7.5Ω	½%	R70	25KΩ	POT.			
R33	1.5Ω	½%						
R34	.75Ω	½%						
R35	.25Ω	½%						
R36	330KΩ	±1%				V1	D77	
R37	16.6Ω	±1%				V2	12AU7	
R38	150Ω	±1%				F1	1 AMP	

Instruments made to this circuit commence at Serial Number 101. See label on probe box cover

CIRCUIT DIAGRAM

THE "AVO" ELECTRONIC TESTMETER

Mk. IV