

SPECIFICATION

Mains Supply.

200-250 Volts 45-65 cycles Single-phase A.C.

The voltage selector on the Front Panel allows the unit to be adjusted to the nominal voltage of the local supply, in steps of 10 Volts.

Mains Variations

The unit is designed to maintain its full rated performance irrespective of mains voltage variations up to a maximum of $\pm 10\%$ about the nominal voltage for which the selector is set. The output is unaffected by mains frequency within the range 45-65 cycles.

+ve Stabilised D.C.

The unit covers the range 0-500 Volts, in four ranges. The maximum permissible output current is 250mA. With respect to mains voltage variations, the output voltage is stabilised to within $\pm 0.002\%$.

The effective output resistance of the supply is less than 0.02 ohm.

The residual output ripple is less than 1mV R.M.S.

+ve Unstabilised D.C.

Smoothed unstabilised D.C. is available at 320 Volts, 470 Volts or 630 Volts according to the setting of the Voltage Range Switch. The settings are as follows:-

<u>Voltage Range</u>	<u>Nominal Voltage</u>
0 - 150	320
50 - 200	320
200 - 350	470
350 - 500	630

The maximum permissible load is 250mA. on all ranges.

If the current is drawn from the Stabilised and Unstabilised terminals simultaneously, the total of the two currents must not exceed 250mA.

-ve Stabilised D.C.

The negative stabilised supply is required primarily as a voltage reference source for the main +ve stabiliser circuit, but provision is made for small output currents to be drawn for external use.

The fixed 250 Volt output is rated for a maximum load current of 25mA, and the variable 0-250 Volt output for a maximum load current of 1 mA.

The actual voltage available on the negative line is adjusted by the 'Set Range' control, RV2, to a value which permits the +ve Stabiliser to operate over its correct ranges. If the unit is in normal condition the negative voltage will not differ from 250 Volts by a significant amount.

With respect to mains voltage variations, the negative supplies are stabilised to within $\pm 0.002\%$. The effective output resistance at the 250 Volt terminal is less than 0.01 ohm. The 0-250 Volt variable output is derived from a 100,000 ohms potentiometer and this output therefore has a high effective resistance.

-ve Stabilised D.C.
(Contd).

The residual output ripple on the 250 Volt line is less than 1 mV. R.M.S.

Unstabilised A.C.

This supply is nominally 6.3 Volts R.M.S. and the maximum output current is 10 Amps. The unit should not be operated with this supply at a potential more than 500 Volts D.C. with respect to earth.

OPERATION

Before connecting to the mains supply, check that the Voltage Selector on the Front Panel is correctly set for the local mains voltage. Put all three switches on the Front Panel to the OFF position.

Connect the unit to the mains supply by means of the Mains Lead provided, noting that the Red and Black wires are Line and Neutral respectively and that the Green wire is Earth.

Put the MAINS switch on the Front Panel to the ON position and note that the red indicator lamp lights. Allow approximately 30 seconds for the valves to warm up before attempting to use the unit.

Always put the MAINS switch to the OFF position before changing the settings of the mains voltage selectors.

It should be noted that when the REG. switch on the Front Panel is put to the OFF position a resistance of 68 ohms is shunted across the output terminals of the stabilised supply. The purpose of this is to discharge the capacitors across the output and to ensure that the output voltage is virtually zero when the supply is switched off.

TECHNICAL

Metering

The meter on the Front Panel is used to monitor both Voltage and Current in the +ve Stabilised D.C. Supply. The meter is switched by means of the two-position toggle switch.

The mechanical zero of the meter should always be set with the MAINS switch at the OFF position. The zero adjuster on the meter should be set so that the meter pointer reads zero on the Volts scale.

It will be noted that the zero marking on the Current scale is displaced with respect to the true zero of the meter. This is to allow for an internal bleed current of 16 mA. which passes through the meter circuit.

Set Range

The 'Set Range' control, RV2, on the rear of the unit is provided to take account of variations in valves type 85A2 (V12 and V13). This control is set at the factory and should not require re-adjustment unless V12 or V13 is changed.

To check if RV2 is correctly set, put the Voltage Range Switch to the lowest setting and turn the Coarse Voltage Control fully anti-clockwise. Rotation of the Fine Voltage Control should now cause the output voltage to vary from 0 to 15 Volts, with a small overlap at each end of the range. If the unit does not cover this range, or if the overlap is not approximately the same at each end of the range, RV2 should be adjusted slightly.

Hum Level

The Stabilised outputs are arranged as 'floating' supplies and may be operated without an earth connection or with either pole earthed.

If the unit is operated with no pole connected to earth the output ripple may exceed the specification limit. This can be rectified by connecting a capacitor of about 0.1 uF between earth and one of the output terminals.

Voltage Limit

When operated as a 'floating' supply, no output terminal of the Stabilised supplies should be operated at more than 1000 Volts D.C. with respect to Earth.

The Main H.T. Fuse

The Main H.T. Fuse, F3, is fitted in order to protect the series regulator valves and the rectifier circuit in the event of an excessive load on the +ve stabiliser output.

Due to a peculiar secondary emission effect which occurs with some valves type 807, it was necessary to arrange the Fuse F3 and Switch SW3 circuits in a rather unusual way.

Because of this special circuit arrangement it will be noted that if F3 'blows', the output terminal remains connected to the series regulator valve cathodes through the resistor R18. The effect of this is that with a blown fuse F3 the output voltage is approximately 200-220 Volts on open-circuit but falls rapidly if any load current is drawn; under these circumstances there is no stabilising action.

If ever it is noted that the unit is not stabilising correctly, and that it gives an output voltage of about 200-220 volts open-circuit with a high effective output resistance, Fuse F3 should be checked for continuity.

REGULATED POWER SUPPLIESMODELS 501-509TYPICAL INTERNAL ELECTRICAL MEASUREMENTSUNDER CORRECT WORKING CONDITIONS.

		<u>No-Load</u>	<u>Full-Load.</u>
1.	<u>VOLTAGE.</u> H.T. POSITIVE TO COMMON. (Unregulated D.C. voltage across smoothing capacitance.) Range: 0-150v. 50-200v. 200-350v. 350-500v. (Model 505 only) 0-500v.	370 370 540 700 700	300 300 465 615 615
2.	<u>RIPPLE.</u> H.T. POSITIVE TO COMMON. (R.M.S. voltage across smoothing capacitance) - (See Note iv).	0.5	2.0
3.	<u>VOLTAGE.</u> AUXILIARY SUPPLY POSITIVE TO MAIN H.T. POSITIVE LINE (Series Valve Screen Grid D.C. voltage.)	250	228
4.	<u>RIPPLE.</u> AUXILIARY SUPPLY (R.M.S. Voltage across Series Valve Screen Grid smoothing capacitor.)	0.2	0.4
5.	<u>VOLTAGE.</u> NEGATIVE SUPPLY (Unregulated D.C. voltage across negative supply smoothing capacitance.)	445	425
6.	<u>RIPPLE.</u> NEGATIVE SUPPLY (R.M.S. Voltage across negative supply smoothing capacitance.)	0.5	0.8
7.	<u>VOLTAGE.</u> D.C. BIAS (Vgk) ON POSITIVE LINE SERIES VALVES.	34	7.0
8.	<u>VOLTAGE.</u> D.C. BIAS (Vgk) ON NEGATIVE LINE SERIES VALVE.	12	4.5
9.	<u>VOLTAGE.</u> EXTERNAL 6.3v. 10A. OUTPUT. (A.C. Volts).	6.5	6.3
10.	<u>CURRENT.</u> MAINS INPUT (measured with taps correctly set and input of 230v.) Models: 501, 502. 503, 504, 505. 506, 507. 508, 509.	.45A .55A 0.5A 0.7A	1.3A 1.5A 1.4A 1.75A
11.	<u>VOLTAGE.</u> D.C. VOLTAGE ACROSS REFERENCE TUBE (Vak.)	84.5	(± 1.5)v.
12.	<u>VOLTAGE.</u> D.C. VOLTAGE ACROSS FILAMENT OF PREAMPLIFIER VALVE.	0.64	(± .04)v.

NOTES

1. All readings taken at correct nominal supply voltage (frequency 50 cps) on Model 8 AVOMETER or equivalent 20,000 ohms/volt instrument.
- ii) Negative Line readings are not applicable to Models 501, 502, 506, 507.
- iii) PREAMPLIFIER VALVES in high stability models only. 502, 504, 507, 509.
- iv) R.M.S. Ripple Voltage measured on C.R.O. or Avometer Model 8, with 10 MFD blocking capacitor of suitable working voltage.

Cct. Ref.	Description		Remarks
<u>CAPACITORS</u>			
C1	{	0.1uF 1KV. Wkg.	T.C.C. CP48W or Hunts B408K
		.05uF 1KV. Wkg.	T.C.C. CP18W or Hunts B415K
C2		Not required	
C3		100uF 450V. Wkg.	T.C.C. CE53PE
C5		100uF 450V. Wkg.	T.C.C. CE53PE
C6		0.1uF 1KV. Wkg.	T.C.C. CP48W or Hunts B408K
		0.05uF 1KV. Wkg.	T.C.C. CP18W or Hunts B415K
C7		100uF 450V. Wkg.	T.C.C. CE53PE
C8		3.3pF 500V. Wkg.	Erie P100K
C9		0.1uF 350V. Wkg.	T.C.C. CP45N or Hunts B406K
C10	2 x	0.1uF 1KV. Wkg.	T.C.C. CP48W or Hunts B408K
			Parallel connected.
C11		100uF 450V. Wkg.	T.C.C. CE53PE
C12		100uF 450V. Wkg.	T.C.C. CE53PE
C13		100uF 450V. Wkg.	T.C.C. CE53PE
C14		100uF 450V. Wkg.	T.C.C. CE53PE
C15		0.1uF 350V. Wkg.	T.C.C. CP45N or Hunts B406K
C16		3.3uF 500V. Wkg.	Erie P100K
C17		0.1uF 350V. Wkg.	T.C.C. CP45N or Hunts B406K
C18		0.1uF 1KV. Wkg.	T.C.C. CP48W or Hunts B408K
C19		0.1uF 1KV. Wkg.	T.C.C. CP48W or Hunts B408K
C20		Not required	
C21		Not required	
C22		0.1uF 1KV. Wkg.	T.C.C. CP48W or Hunts B408K
C23		0.1uF 350V. Wkg.	T.C.C. CP45N or Hunts B406K
<u>CHOKES</u>			
CH1		10H 350mA.	A.P.T. Pt. No. G.164.
CH2	}	20H 65mA.	A.P.T. Pt. No. G.166.
CH3			
<u>FUSES</u>			
F1	}	5A Cartridge	Belling & Lee L1055/5A
F2		500mA Cartridge	Belling & Lee L1055/500mA
F3			
<u>METER</u>			
M1	}	0-500V	1mA F.S.D. A.P.T. Pt. No. G.292.
		0-250mA	
<u>PILOT LAMP</u>			
PL1		6.3V. 0.115 A. M.E.S. Bulb Osram, OS.76.	
<u>RESISTORS, FIXED</u>			
R1		47 ohm \pm 10%, 1W.	Morganite 'Y'
R2		270K ohm \pm 10%, 1W.	Morganite 'Y'
R3		270K ohm \pm 10%, 1W.	Morganite 'Y'
R4		Not required	} Matched pair \pm 2%.
R5		Not required	
R6		Not required	

Cct. Ref.	Description		Remarks
<u>RESISTORS, FIXED. (Cont'd)</u>			
R7	47 ohm	+ 10%, 1/2W.	Morganite 'S'
R8	47 ohm	+ 10%, 1/2W.	Morganite 'S'
R9	47 ohm	+ 10%, 1/2W.	Morganite 'S'
R10	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R11	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R12	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R13	10K ohm	+ 10%, 1/2W.	Morganite 'S'
R14	100K ohm	+ 10%, 1W.	Morganite 'Y'
R15	470K ohm	+ 5%, 1W.	Morganite 'Y'
R16	10K ohm	+ 10%, 1/2W.	Morganite 'S'
R17	10K ohm	+ 10%, 1/2W.	Morganite 'S'
R18	31K ohm	+ 2%, 1W. W.W.	A.P.T. Pt. No. G.225.
R19	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R20	68K ohm	+ 5%, 1W.	Morganite 'Y'
R21	100K ohm	+ 10%, 1/2W.	Morganite 'S'
R22	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R23	68 ohm	+ 10%, 1W.	Morganite 'Y'
R24	Meter Multiplier Resistor.		
R25	Meter Shunt Resistor.		
R26	220K ohm	+ 10%, 1/2W.	Morganite 'S'
R27	Filament Shunt Resistor.		
R28	3.3M ohm	+ 5%, 1W.	Morganite 'Y'
R29	4.56K ohm	+ 1%, 3W. W.W.	A.P.T. Pt. No. G.316.
R30	1.4K ohm	+ 1%, 3W. W.W.	A.P.T. Pt. No. G.332.
R31	1.4K ohm	+ 1%, 3W. W.W.	A.P.T. Pt. No. G.332.
R32	7.99K ohm	+ 1%, 6W. W.W.	A.P.T. Pt. No. G.328.
R33	270K ohm	+ 10%, 1W.	Morganite 'Y'
R34	270K ohm	+ 10%, 1W.	Morganite 'Y'
R35	270K ohm	+ 10%, 1W.	Morganite 'Y'
R36	270K ohm	+ 10%, 1W.	Morganite 'Y'
R37	350K ohm	+ 2%, 1/2W. H.S.	Radio Resistor H.S.3.
	330K ohm	+ 2%, 1/2W. H.S.	Radio Resistor H.S.3.
R38	4.7K ohm	+ 2%, 1/2W. H.S.	Radio Resistor H.S.3.
R39	680K ohm	+ 2%, 1/2W. H.S.	Radio Resistor H.S.3.
R40	Not required.		
R41	47 ohm	+ 10%, 1/2W.	Morganite 'S'
R42	470K ohm	+ 5%, 1W.	Morganite 'Y'
R43	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R44	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R45	220K ohm	+ 10%, 1/2W.	Morganite 'S'
R46	68K ohm	+ 5%, 1W.	Morganite 'Y'
R47	14K ohm	+ 2%, 3W. W.W.	A.P.T. Pt. No. G.324.
R48	Not required.		
R49	Not required.		
R50	100K ohm	+ 10%, 1/2W.	Morganite 'S'
R51	1K ohm	+ 10%, 1/2W.	Morganite 'S'
R52	20K ohm	+ 1%, 1/2W. H.S.	Radio Resistor H.S.3.
R53	24K ohm	+ 1%, 1/2W. H.S.	Radio Resistor H.S.3.
R54	220K ohm	+ 10%, 1/2W.	Morganite 'S'
R55	126K ohm	+ 1%, 1/2W. H.S.	Radio Resistor H.S.3.
R56	Filament Shunt Resistor.		
R57	3.3M ohm	+ 5%, 1W.	Morganite 'Y'
R58	4.44K ohm	+ 1%, 3W. W.W.	A.P.T. Pt. No. G.326.
R59	1.4K ohm	+ 1%, 3W. W.W.	A.P.T. Pt. No. G.332.
R60	1.4K ohm	+ 1%, 3W. W.W.	A.P.T. Pt. No. G.332.
R61	7.99K ohm	+ 1%, 6W. W.W.	A.P.T. Pt. No. G328.

} Matched Pair
 + 2%
 } Matched Pair
 + 2%
 } Series
 } Connected.

<u>Cct.</u> <u>Ref.</u>	<u>Description</u>	<u>Remarks</u>
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RESISTORS, FIXED. (Cont'd)

R62	9 x 937.5 ohm \pm 1%, 3W. W.W. A.P.T. Pt. No.G314	
R63	(a) 3.125K ohm \pm 1%, 3W. W.W. A.P.T. Pt. No.G312	
	(b) 9.375K ohm \pm 1%, 3W. W.W. A.P.T. Pt. No.G317	
	(c) 9.375K ohm \pm 1%, 3W. W.W. A.P.T. Pt. No.G317	
R64	180K ohm \pm 10%, $\frac{1}{2}$ W. Morganite 'S'	
R65	180K ohm \pm 10%, $\frac{1}{2}$ W. Morganite 'S'	

RESISTORS, VARIABLE

RV1	1.5K ohm \pm 5%, 4W. W.W. Linear. Colvern CLR.5001/13.
RV2	1K ohm \pm 5%, 3W. W.W. Linear. Colvern CLR.901.
RV3	100K ohm \pm 10%, 3W. W.W. Linear. Colvern CLR.4001/13.

RECTIFIERS

MR1	2 x 725V. 300mA.	Westinghouse 14A282
MR2	250V. 70mA.	Westinghouse 15D88
MR3	2 x 500V. 70mA.	Westinghouse 15D83

SWITCHES

SW1	D.P. On-Off 10A. 250V.	Arrow 102P
SW2	S.P. On-Off 10A. 250V.	Arrow 102P
SW3	S.P. C/O 10A. 250V.	Arrow 102PXA
SW4	S.P. C/O 10A. 250V.	Arrow 102PX
SW5	2 Pole 4-way.	A.P.T. Pt. No. G.325.
SW6	S.P. 10-way.	A.P.T. Pt. No. G.405.

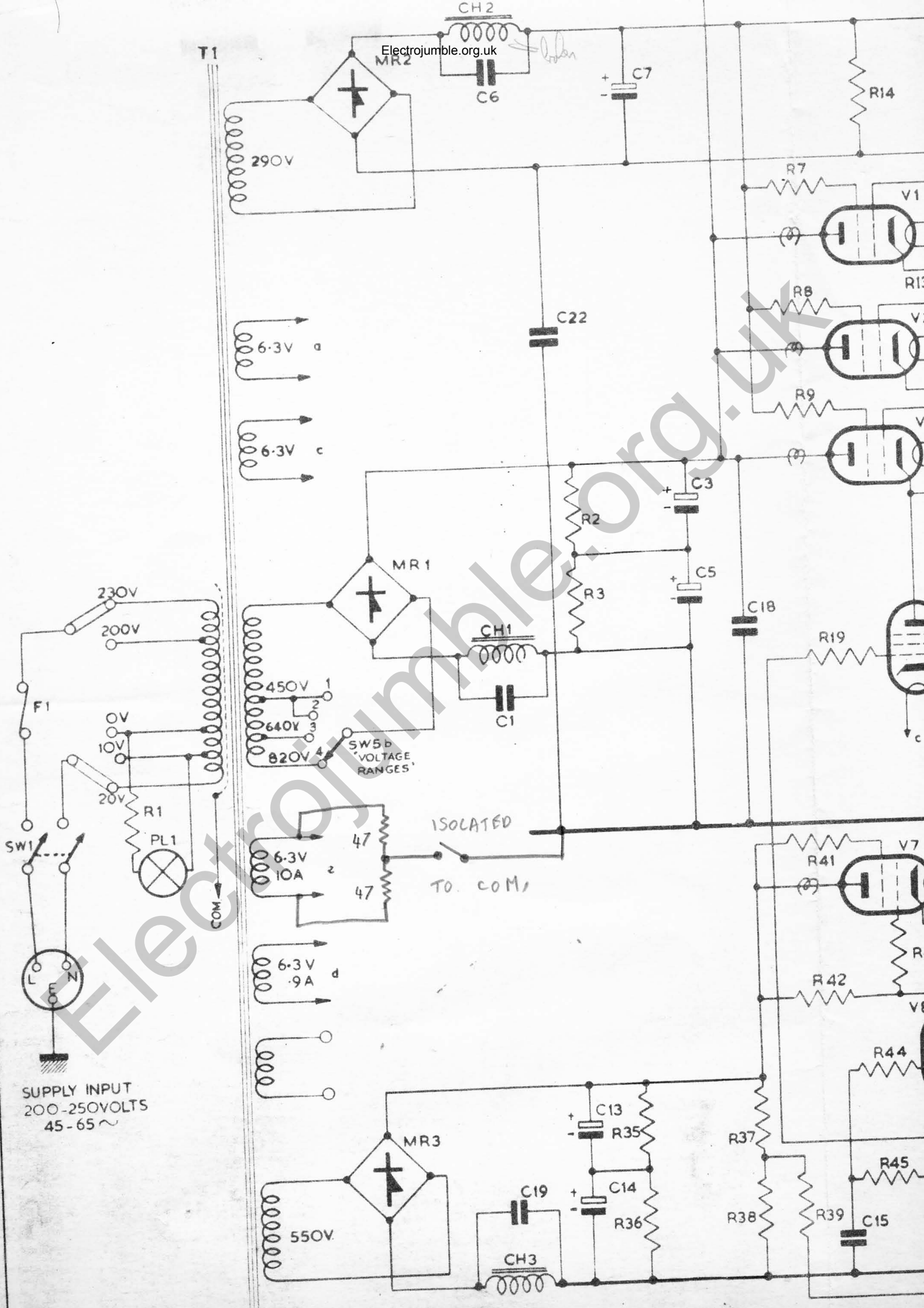
TRANSFORMER

T1	H.T. Screen H.T. Bias and Heaters, A.P.T. Pt. No. G.619.
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VALVES

	<u>Commercial Type</u>	<u>Service Ref.</u>
V1 } V2 } V3 }	807	CV.124
V4 } V5 }	EF.91 (Mullard), Z77 (Osram)	CV.138
V6	XFW40 (Hivac)	CV.2260
V7	807	CV.124
V8 } V9 }	EF.91 (Mullard), Z77 (Osram)	CV.138
V10	85A2 (Mullard)	CV.449.
V11	XFW40 (Hivac)	CV.2260
V12	85A2 (Mullard)	CV.449

T1

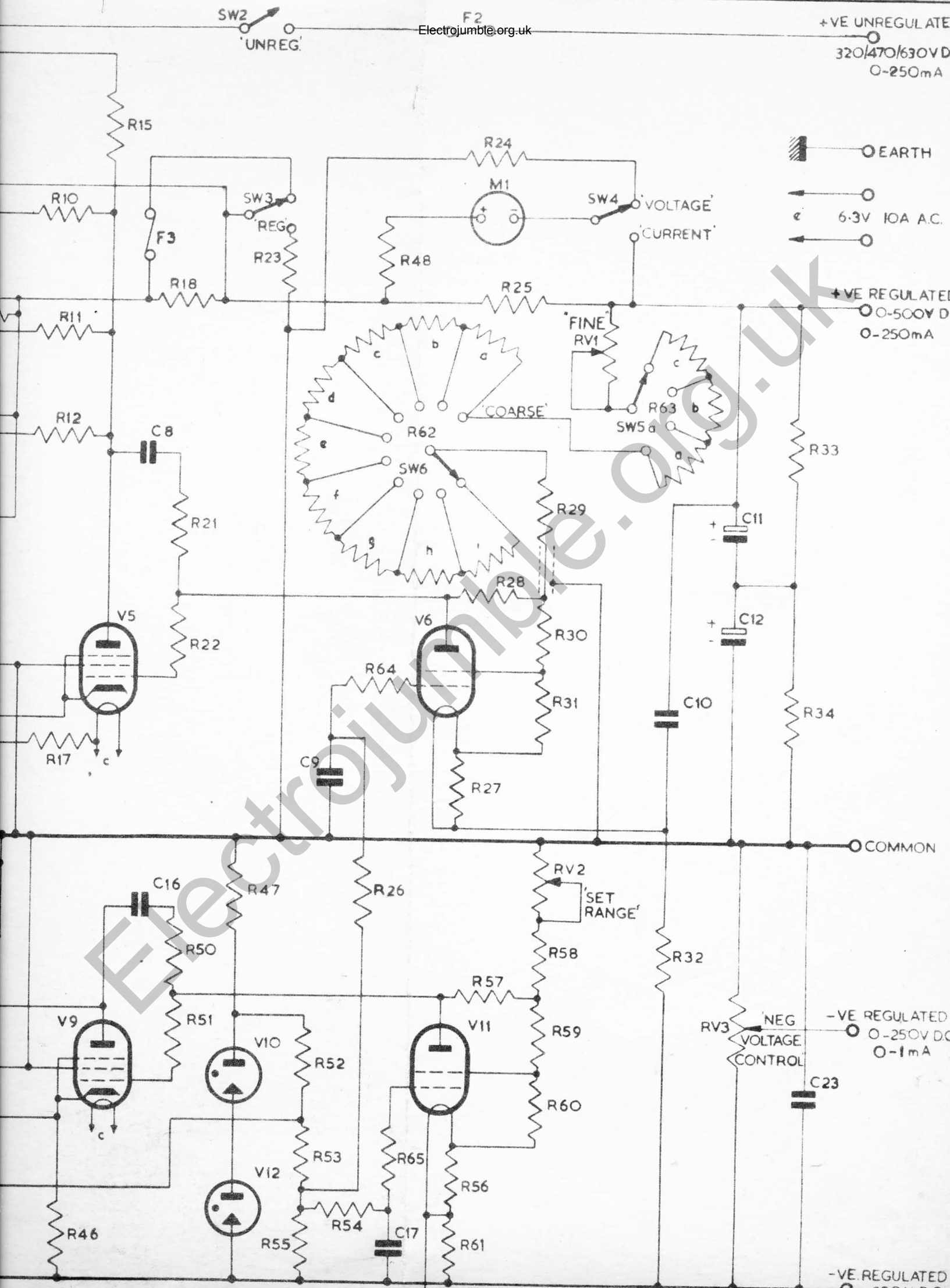


SUPPLY INPUT
200-250VOLTS
45-65~

ISOLATED
TO COM

SW5 b
'VOLTAGE
RANGES'

+VE UNREGULATED
320/470/630V D
0-250mA



⊕ EARTH
6.3V 10A AC
⊖

+VE REGULATED
0-500V D
0-250mA

COMMON

-VE REGULATED
0-250V D
0-1mA

-VE REGULATED

SW2 UNREG.

