90 90

MURPHY RADIO SERVICE INSTRUCTIONS

MAINS SUPPLY:	A90:	200-250 volts (50-100 cycles).
	D90:	200-250 volts D.C. or A.C. (25-100 cycles).
WAVE RANGES:		16.7-50 metres. 190-550 metres. 970-2000 metres.
INTERMEDIATE FREQUENCY:		465 kc/s.
VALVES:	A90:	Mazda TH41, VP41, HL41DD, PEN45, UU6.
	D90:	Mazda TH233, VP133, HL133DD, PEN383, U403.
PILOT LAMPS:	A90:	6.2 volt 0.3 amp. globular clear.
	D90:	3.5 volt 0.15 amp. globular clear.
SPEECH COIL IMPEDANCE:		3 ohms.
TOTAL WEIGHT:	A90:	Table 32 lbs. R.G. 64 lbs.
	D90:	Table 26 lbs. R.G. 62 lbs.
CONSUMPTION:	A90:	Table 55 watts.
	D90:	Table 70 watts.
CABINET DIMENSIONS:		Table $17\frac{1}{2}'' \times 16\frac{1}{4}'' \times 9\frac{3}{4}''$ R.G. $36\frac{1}{2}'' \times 22'' \times 15''$.

ISSUED BY
MURPHY RADIO LTD, WELWYN GARDEN CITY
TELEPHONE: WELWYN GARDEN 800

Trimming

ALTHOUGH the trimming of this receiver is critical it should remain very constant in normal use, and unless a fault develops in any of the tuned circuits necessitating the replacement of a component, only very small readjustments need be made from time to time to maintain the optimum performance of the receiver.

APPARATUS REQUIRED

The following equipment is required for carrying out trimming adjustments:

1. *Service Oscillator*, with modulated output; accurately calibrated scales on I.F., L.W., M.W., and S.W. ranges.

2. *Output Meter*. A rectifier type A.C. voltmeter with a range of 0 to 3 or 0 to 5 volts is suitable for this purpose.

3. *Trimming Screwdriver*.

4. *Damping Unit*, for I.F. trimming, consisting of a 0.1 condenser and a 20,000 ohms (¼ watt) resistor wired in series, with a crocodile clip at each end for connecting to the receiver.

THE I.F. CIRCUITS—TUNED TO 465 KC/S.

Unless an oscilloscope is used for the adjustment, it is essential to damp one of each pair of tuned circuits while the other is being adjusted, otherwise an uneven "double humped" resonance curve is likely to be obtained.

The I.F. circuits are tuned by variable inductances, and the following procedure should be adopted for making the adjustment:

1. Connect the oscillator, tuned to 465 Kc/s., between V2 control grid (square 7C test pt. 53) and chassis. Connect the output meter across the L.S. terminals.

2. Connect the damping unit between V2 anode (square 19N test pt. 54) and chassis, and adjust L21 (square 5C) for maximum reading in the output meter.

3. Connect the damping unit between V3 diode anode (square 16N test pt. 62) and chassis, and adjust L19 (square 5B) for maximum reading in the output meter.

4. Connect the service oscillator to V1 control grid (square 9D test pt. 17) and the damping unit between V1 hexode anode (square 23L test pt. 20) and chassis. Adjust L18 (square 9C) for maximum gain.

5. Connect the damping unit between V2 control grid (square 7C test pt. 53) and adjust L17 (square 9B) for maximum gain.

THE I.F. FILTER—TUNE TO 465 KC/S.

This filter is adjusted to give minimum signal at 465 Kc/s. and the adjustment can be judged more accurately by ear than with an output meter.

1. Connect the service oscillator, tuned to 465 Kc/s., to the aerial and earth terminals of the receiver.

2. Reduce the output from the oscillator until the signal is only just audible.

3. Adjust L1 (square 22N) until the signal is at minimum.

R.F. AND OSCILLATOR CIRCUITS

The R.F. and oscillator circuits have trimming condensers in addition to variable inductances. The condensers are trimmed at the low (wavelength) end of the band and the inductances are adjusted to correct any tracking errors at the top end of the band. In practice it will be found that the inductances very rarely require adjustment. The medium-wave band in this receiver must be adjusted first.

M.W. BAND

1. Connect the service oscillator between the aerial and earth terminals, and the output meter to the L.S. terminals. Tune the oscillator and the receiver to 230 metres.

2. Adjust C23 (square 5L) to correct any

calibration errors and C7 (square 10F) for maximum gain.

3. Tune the receiver and the oscillator to 500 metres and adjust L13 (square 6J) and L6 (square 6M) to correct any errors in alignment. If these inductances are varied appreciably it will be necessary to realign the condensers at the bottom end of the band.

L.W. BAND

1. Connect the service oscillator to the aerial and earth terminals, and the output meter to the L.S. terminals. Tune the oscillator and the receiver to exactly 1000 metres. Adjust C26 (square 5K) to correct any calibration errors.

2. Tune the oscillator and the receiver to exactly 1900 metres, and adjust L16 (square 5J) to correct any tracking errors. Adjust L8 (square 5M) for maximum gain. A large adjustment of the coil cores will necessitate a further adjustment of C26.

S.W. BAND

Extreme accuracy is necessary on the short-wave band, and the adjustments are made in the factory with the aid of crystal controlled oscillators. If adjustments are made to the oscillator circuits with the aid of an ordinary service oscillator, the receiver should afterwards be checked under broadcast conditions to see that the waveband coverage is correct.

1. Connect the service oscillator to the aerial and earth terminals, and the output meter to the L.S. terminals. Tune the oscillator and the receiver to exactly 17 metres. Adjust C19 (square 7K) to correct any calibration errors, and C2 (square 7L) for maximum gain.

2. Tune the receiver and the oscillator to exactly 42 metres and adjust L11 (square 7J) and L3 (square 7M) to take up any tracking errors. If these inductances are varied appreciably, readjust the condensers at the bottom end of the band.

Notes

The condenser C12 has been removed from its original position, and is now connected directly between the screen tag (test point 17) on V1 valve holder, and the earth tag on the end of the component rack. This modification is to prevent instability that may occur if the wiring is slightly disarranged, or all of the push-buttons are out.

On the early models only three trimming condensers were fitted to the front panel, and the arrangements were as follows:

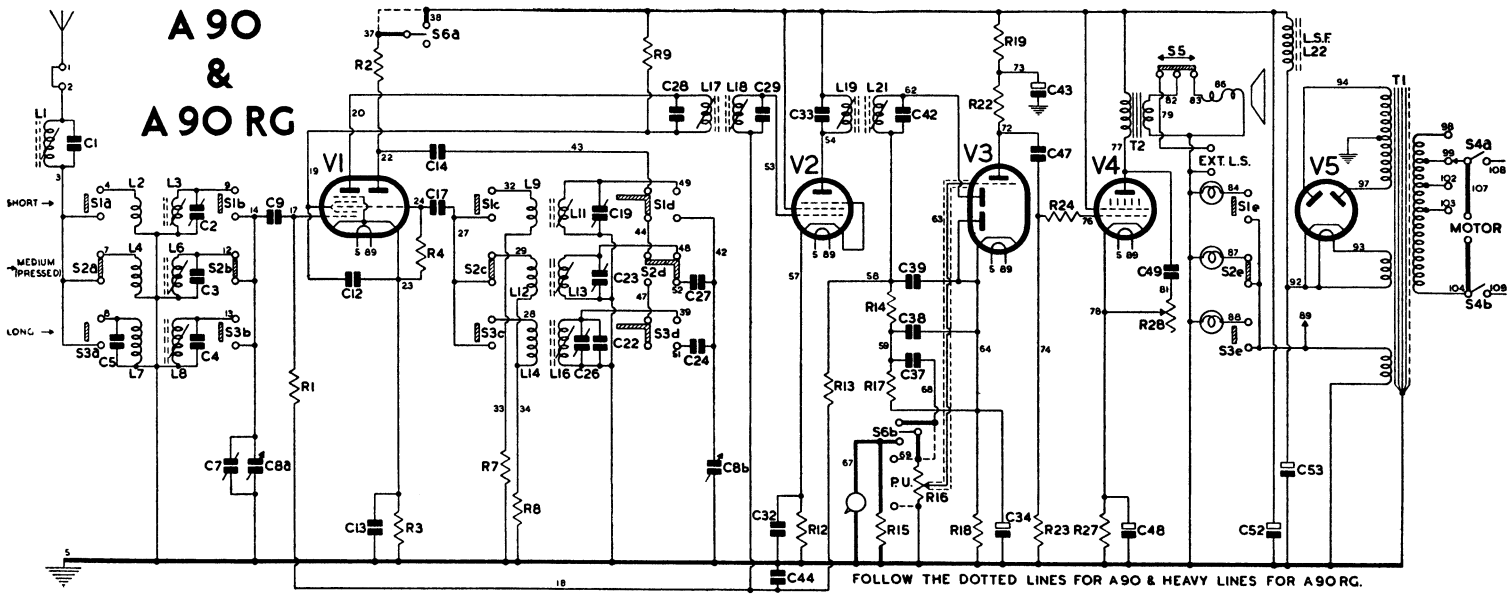
C19 was located on C8b.

C2 was located in the place of C7.

C23 was located in the place of C19.

C7 was located in the place of C2.

On these models, the S.W. Band should be re-aligned first.



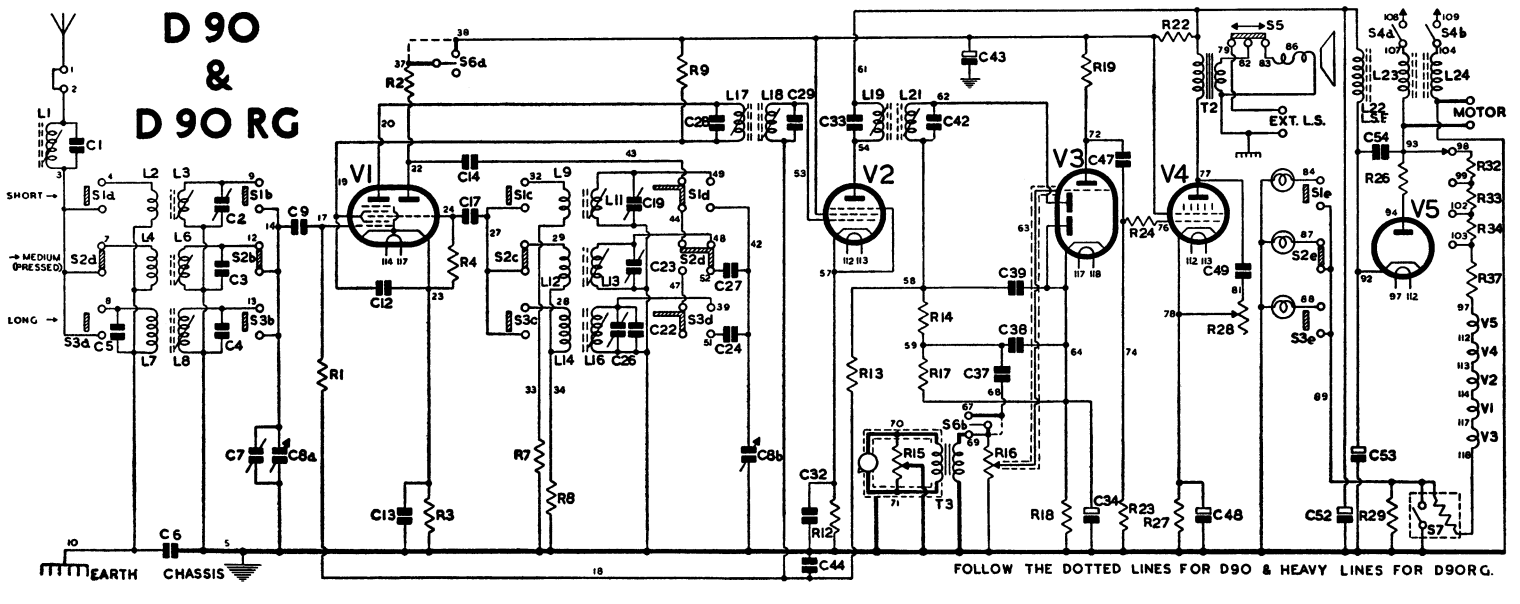
A90 TABLE OF COMPONENTS D90

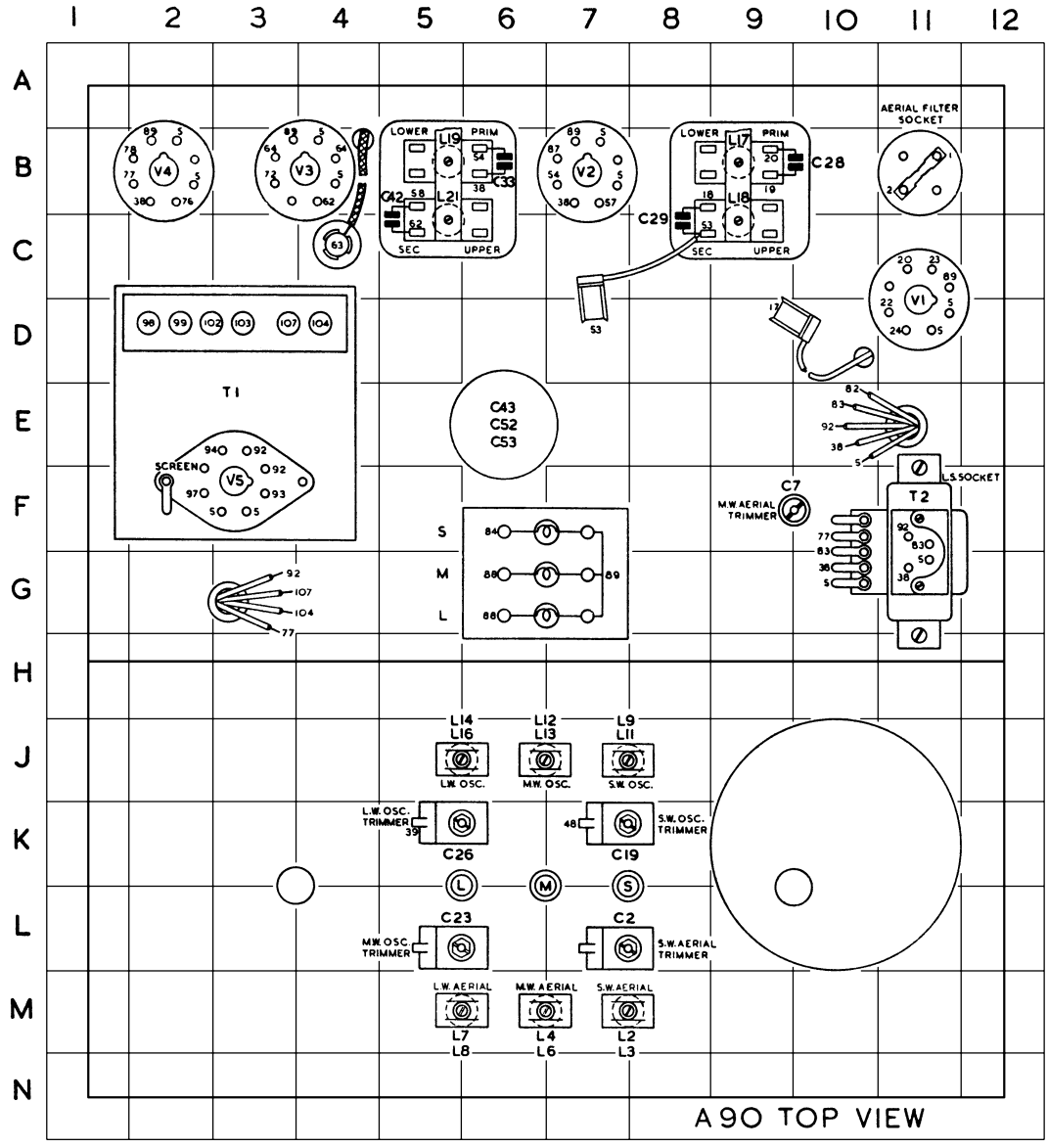
Code	Value	Test	Pts	Square
C1	500 p.f.	2	3	22 P
C2	5–35 p.f.	5	9	7 L
C3	10 p.f.	5	12	19 B
C4	85 p.f.	5	13	17 B
C5	500 p.f.	5	8	17 B
C6	D ·01 Mf.	5	10	23 N
C7	5–35 p.f.	5	14	9 F
C8a	Gang	5	14	22 E
C8b	Gang	5	42	22 D
C9	500 p.f.	14	17	21 L
C12	·05 Mf.	19	23	20 L
C13	·05 Mf.	5	23	21 L
C14	100 p.f.	22	43	22 M
C17	200 p.f.	24	27	23 K
C19	5–35 p.f.	5	48	8 K
C22	260 p.f.	5	39	17 F
C23	5–35 p.f.	5	48	5 L
C24	414 p.f.	42	51	18 D
C26	5–35 p.f.	5	39	6 K
C27	700 p.f.	42	52	19 D
C28	139 p.f.	19	20	9 B
C29	150 p.f.	18	53	8 C
C32	·025 Mf.	5	57	19 L
C33	139 p.f.	38	54	6 B
C34	50 Mf. 12v.	5	64	16 L
C37	·01 Mf.	T 59	69	17 K
		RG 59	68	15 N
C38	100 p.f.	59	64	16 L
C39	100 p.f.	58	64	16 M
C42	150 p.f.	58	62	5 C
C43	A 8 Mf.	73	5	18 J
	D 16 Mf.	38	5	
C44	·05 Mf.	5	18	17 L
C47	·01 Mf.	72	74	15 L
C48	50 Mf. 12v.	5	78	14 L
C49	A ·04 Mf.	77	81	14 L
	D ·1 Mf.	77	81	
C52	A 8 Mf.	5	38	18 J
	D 16 Mf.	5	61	
C53	16 Mf.	5	92	18 K

Code	Value	Test	Pts	Square
R1	1 Meg.	17	18	21 L
R2	A 33,000 1w	22	37	22 K
	D 22,000 1w	22	37	
R3	A 330	5	23	21 K
	D 390	5	23	
R4	22,000	23	24	23 K
R7	47	5	33	20 F
R8	470	5	34	17 F
R9	A 9,100 1w	19	38	20 L
	D 5,100 1w	19	38	
R12	470	5	57	19 L
R13	2·2 MΩ	18	58	17 L
R14	100,000	58	59	16 K
R15	ARG 12,000	5	67	18 N
	DRG 500	70	71	
R16	1 MΩ	5	69	15 D
R17	470,000	59	64	16 K
R18	A 680	5	64	16 K
	D 1,000	5	64	
R19	A 10,000	38	73	15 K
	D 47,000	38	72	
R21	DRG 12,000	5	69	
R22	A 47,000	72	73	15 L
	D 1,000 1w	38	61	
R23	470,000	5	74	14 K
R24	47,000	74	76	14 M
R26	D 47 2w	93	94	
R27	A 200	5	78	14 K
	D 140	5	78	
R28	A 50,000	78	81	14 H
	D 25,000	78	81	
R29	D 23 1w	5	89	
R32	D 75	98	99	
R33	D 100	99	102	
R34	D 75	102	103	
R37	D 336	103	97	

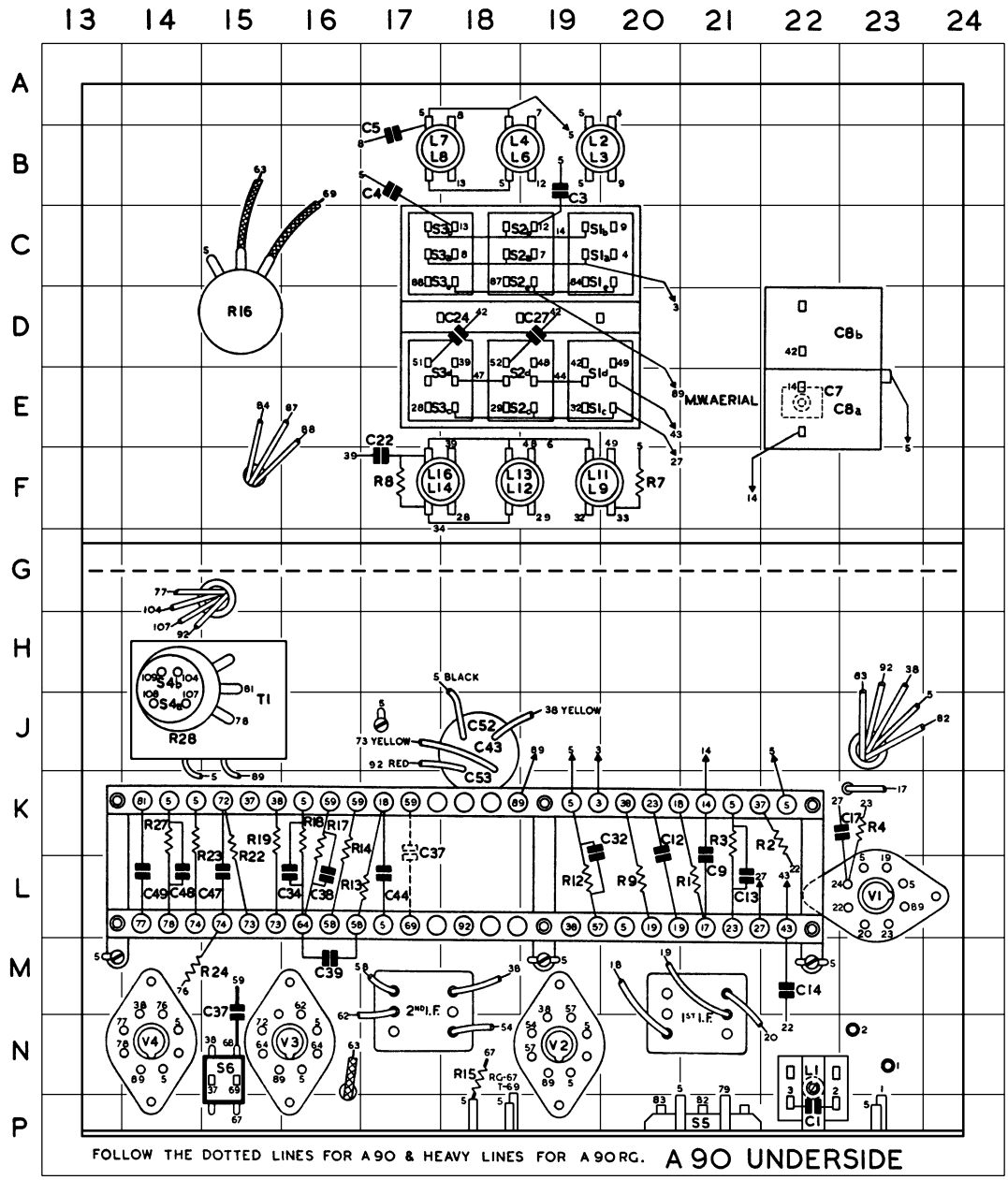
The resistor R21, omitted from the D90 diagram, is connected across the secondary of the pick-up transformer in the Radiogramophone model.

Code	Value	Test	Pts	Square
L1	2·5	2	3	22 N
L2	*	5	4	19 B
L3	*	5	9	19 B
L4	*	5	7	18 B
L6	2·25	5	12	18 B
L7	25	5	8	17 B
L8	15	5	13	17 B
L9	*	33	32	19 F
L11	*	5	49	19 F
L12	*	34	29	18 F
L13	1·25	5	48	18 F
L14	*	34	28	17 F
L16	1·7	5	39	17 F
L17	5·5	19	20	9 B
L18	5·5	18	53	9 C
L19	5·5	38	54	5 B
L21	5·5	58	62	5 C
L22	A 2300	38	92	L.S.F.
	D 900	61	92	
T1 Pri.				
200–205	17	104	103	3 E
210–220	18	104	102	
230–240	20	104	99	
250	22	104	98	
HT Sec.	215	5	94	
	+230	5	97	
T2 Pri.	A 290	77	38	11 F
	D 200	77	61	
Sec.	*	5	82	
T3 Pri.	2	70	71	
Sec.	400	5	69	
P.U.	A 2000			
	D 10			
Th. Delay Switch	D 18	118	89	





Although practical diagrams of the DC chassis have not been included, the majority of components can be located by reference to the AC diagrams on these pages.



A90 TABLE OF VOLTAGES A90

Valve	Type	Electrode	Test Point	Square	Voltage
V1	Mazda TH41	Hexode Anode Hexode Screen Triode Anode Cathode	20 19 22 23	23 L 23 L 23 L 23 L	**116** **116** **65** **4**
V2	Mazda VP41	Anode Screen Cathode	54 38 57	19 N 19 N 19 N	**197** **198** **4**
V3	Mazda HL41DD	Anode Cathode	72 64	15 N 15 N	**85** **1·3**
V4	Mazda PEN45	Anode Screen Cathode	77 38 78	14 N 14 N 14 N	**188** **198** **7**
V5	Mazda UU6	Cathode	92	3 F	**360**

D90 TABLE OF VOLTAGES D90

Valve	Type	Electrode	Test Point	Square	Voltage
V1	Mazda TH233	Hexode Anode Hexode Screen Triode Anode Cathode	20 19 22 23	23 L 23 L 23 L 23 L	**120** **120** **72** **4**
V2	Mazda VP133	Anode Screen Cathode	54 38 57	19 N 19 N 19 N	**185** **160** **3·75**
V3	Mazda HL133DD	Anode Cathode	72 64	15 N 15 N	**72** **1·4**
V4	Mazda PEN383	Anode Screen Cathode	77 38 78	14 N 14 N 14 N	**172** **160** **9**
V5	Mazda U403	Cathode	92	3 F	**255**

All Voltages are taken on A.C. Mains at 240 volts, using a 0–500, 0–50 Voltmeter, 1,000 ohms per volt. All readings are taken from Chassis.

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