1.C.1.

MAZDA

1.C.1.

PENTAGRID FREQUENCY CHANGER

Directly heated – for battery operation

TENTATIVE

RATING

Filament Voltage (volts)	V_f	1.4
Filament Current (amps)	I_f	.05
Maximum Anode Voltage (volts)	$V_{a(max)}$	90
Maximum Screen Voltage (volts)	$V_{g2\ \&\ 4(max)}$	67.5
Maximum Screen Supply Voltage (volts)	$V_{g2\ \&\ 4(b)max}$	90.0
Maximum Mean Cathode Current (mA)	$I_{k(av)max}$	5.5

INTER-ELECTRODE CAPACITANCES *	†	‖
Grid 3/all (μμF) (R.F. Input)	7.0	8.1
Anode/all (μμF) (I.F. Output)	7.5	8.6
Grid 1/all (μμF) (Osc. Input)	3.8	4.9
Grid 3/Anode (μμF) (max)	0.4	0.4
Grid 3/Grid 1 (μμF) (max)	0.2	0.23
Grid 1/Anode (μμF) (max)	0.1	0.13

* With no external shield

† Inter-electrode capacitances with holder capacitance balanced out.

‖ Total capacitance including a Benjamin B7G holder type 75/663R.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19.0
Maximum Seated Height (mm)	47.6
Approximate Nett Weight (ozs)	0.25
Approximate Packed Weight (ozs)	0.5

MOUNTING POSITION - Unrestricted.

MAZDA

1.C.1.

PENTAGRID FREQUENCY CHANGER

Directly heated – for battery operation

TENTATIVE

TYPICAL OPERATION

Anode Voltage (volts)	V_a	45	67.5	90	90
Screen Voltage (volts)	$V_{g2 \& 4}$	45	67.5	45	67.5
Grid 3 Voltage	V_{g3}	0	0	0	0
Grid 1 Resistance (megohms)	R_{g1}	0.1	0.1	0.1	0.1
Anode Impedance (megohms) (approximately)	r_a	0.6	0.5	0.8	0.6
Conversion Conductance (μmhos)	g_c	235	280	250	300
Grid 3 Bias for Conversion Conductance of approximately 5 μmhos		-9	-14	-9	-14
Anode Current (mA)	I_a	0.7	1.4	0.8	1.6
Screen Current (mA)	$I_{g2 \& 4}$	1.9	3.2	1.9	3.2
Grid 1 Current (mA)	I_{g1}	0.15	0.25	0.15	0.25
Total Cathode Current (mA)	I_k	2.75	5.0	2.75	5.0

BULB Clear

BASE B7G.

Viewed from free end of pins.

CONNEXIONS

Pin 1	Filament - ve	f-
Pin 2	Anode	a
Pin 3	Grids 2 & 4(Osc. Anode & Screen)	g2 & 4
Pin 4	Grid 1 (Oscillator)	g1
Pin 5	Filament - ve & Grid 5	f- & g5
Pin 6	Grid 3 (Signal)	g3
Pin 7	Filament +ve	f+

MAZDA

I.D.13

BATTERY R.F. DIODE

Indirectly heated

RATING		
Heater Voltage (volts)	V_h	1.4
Heater Current (amps)	I_h	0.15
Maximum Anode Voltage (RMS).	$V_{a(max)}$	130
Maximum Peak Inverse Voltage (volts)	P.I.V.(max)	365
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	5.0
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	0.5
Maximum Potential Heater/Cathode (volts D.C.)	$V_{h-k(max)}$	100

INTER-ELECTRODE CAPACITANCES *		
Anode/Cathode ($\mu\mu$F)	C_{a-k}	0.6
Anode/Heater ($\mu\mu$F)	C_{a-h}	1.05
Heater/Cathode ($\mu\mu$F)	C_{k-h}	0.7

* With no external shield.

DIMENSIONS	
Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19

MOUNTING POSITION - Unrestricted.

NOTE The Resonant frequency of this valve is approximately 1,000 Mc/s. with no external shield.

MAZDA

I.D.13

BATTERY R.F. DIODE

Indirectly heated

TYPICAL OPERATION (with Condenser Input Filter)

Anode Voltage (volts R.M.S)	117
Filter Input Condenser (μF)	2.0
Minimum Total Effective Anode/Supply Impedance (ohms)	0

BULB Clear

BASE B.7.G.

Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Cathode	k
Pin 4	-	-
Pin 5	Internal Connexion •	1.c
Pin 6	Anode	a
Pin 7	Heater	h

• This pin must be left free.

I.D.13

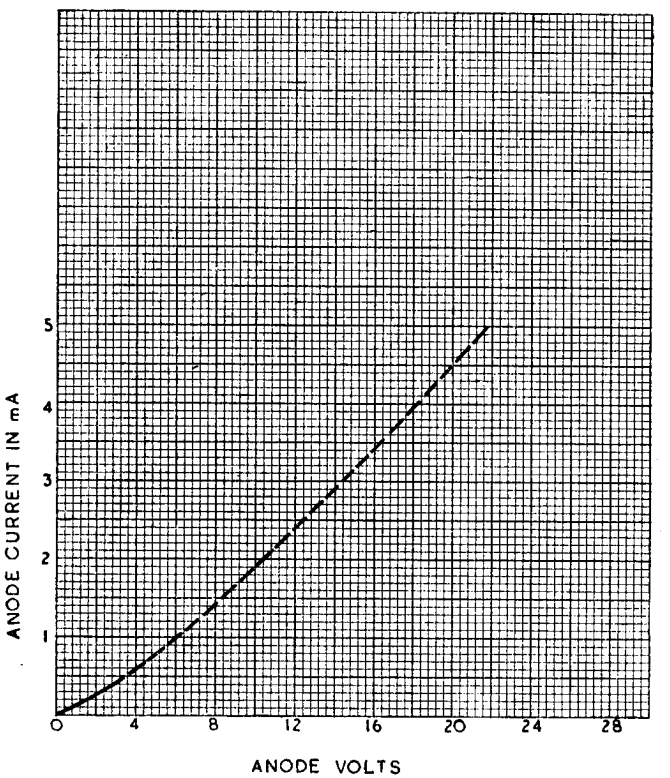
MAZDA

I.D.13

BATTERY R.F. DIODE

Indirectly heated

AVERAGE CHARACTERISTIC CURVE



October 1948 *RADIO DIVISION* Issue 1/6

THE EDISON SWAN ELECTRIC COMPANY LTD.

1.F.3.

MAZDA

1.F.3.

VARIABLE – Mu R. F. PENTODE

Directly heated – for battery operation

TENTATIVE

RATING

Filament Voltage (volts)	V_f	1.4
Filament Current (amps)	I_f	.05
Maximum Anode Voltage (volts)	$V_{a(max)}$	90
Maximum Screen Voltage (volts)	$V_{g2(max)}$	67.5
Maximum Screen Supply Voltage (volts)	$V_{g2(b)}$	90
Maximum Mean Cathode Current (mA)	$I_{k(av)max}$	5.5

INTER-ELECTRODE CAPACITANCES

		§	‡
Grid/Anode (μμF) (max)	$C_{a,g1}$	0.01	0.012
Grid/Earth (μμF)	C_{in}	4.1	5.2
Anode/Earth (μμF)	C_{out}	7.5	8.6

§ Measured with Benjamin cylindrical screen type 75/832, but holder capacitance balanced out.

‡ Total capacitance including a Benjamin B7G holder type 75/833 and screen type 75/832.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19.0
Maximum Seated Height (mm)	47.6
Approximate Nett Weight (ozs)	0.25
Approximate Packed Weight (ozs)	0.5

MOUNTING POSITION - Unrestricted.

1.F.3.

MAZDA

1.F.3.

VARIABLE – Mu R. F. PENTODE

Directly heated – for battery operation

TENTATIVE

TYPICAL OPERATION

Anode Voltage (volts)	Va	45	67.5	90	90
Screen Voltage (volts)	Vg2	45	67.5	45	67.5
Control Grid Bias (volts)	Vg1	0	0	0	0
Anode Current (mA)	Ia	1.6	3.3	1.7	3.4
Screen Current (mA)	Ig2	0.7	1.5	0.65	1.4
Anode Impedance (megohms)	ra	0.35	0.25	0.8	0.5
Mutual Conductance (mA/V)	Gm	0.65	0.95	0.7	0.97
Grid Bias for mutual conductance = 10μA/v	Vg1	-8.5	-14	-8.5	-14

BULB Clear

BASE B.7.G.

Viewed from free end of base.

CONNEXIONS

Pin 1	Filament -ve	f-
Pin 2	Anode	a
Pin 3	Screen Grid	g2
Pin 4	No Connection	-NC
Pin 5	Filament -ve and Grid 3	f-
Pin 6	Control Grid	g1
Pin 7	Filament +ve	f+

1.FD.9

MAZDA

1.FD.9

DIODE – R. F. PENTODE

Directly heated – for battery operation

TENTATIVE

RATING

Filament Voltage (volts)	V_f	1.4
Filament Current (amps)	I_f	.05
Maximum Anode Voltage (volts)	$V_{a(max)}$	90
Maximum Screen Voltage (volts)	$V_{g2(max)}$	90
Maximum Control Grid Voltage (volts positive)	$V_{g1(max)}$	0
Maximum Cathode Current (mA)	$I_{k(av)max}$	3.0
Maximum Mean Diode Current (μA)	$I_{a(d)(av)max}$	200
Inner Mμ ••	μ_{g1g2}	12.0

•• at V_a = 67.5; V_{g2} = 67.5; V_{g1} = 0.

INTER-ELECTRODE CAPACITANCES		‖	¶
Grid/Anode (μμF)	$C_{a,g1}$	0.4	0.67
Grid/Earth (μμF)	C_{in}	2.2	3.3
Anode/Earth (μμF)	C_{out}	3.3	4.4

• With no external shield.

‖ Inter-electrode capacitances with holder capacitance balanced out.

¶ Total capacitance including a Benjamin B7G Holder Type 75/663R.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19.0
Maximum Seated Height (mm)	47.6
Approximate Nett Weight (ozs)	0.25
Approximate Packed Weight (ozs)	0.5

MAZDA

1.F.D.9

DIODE – R. F. PENTODE

Directly heated – for battery operation

TENTATIVE

TYPICAL OPERATION

Anode Voltage (volts)	V_a	67.5
Screen Voltage (volts)	V_{g2}	67.5
Grid Bias Voltage (volts)	V_{g1}	0
Anode Impedance (megohms)	r_a	0.6
Mutual Conductance (mA/V)	g_m	0.625
Anode Current (mA)	I_a	1.6
Screen Current (mA)	I_{g2}	0.4

As R.C.C. Amplifier

Anode Supply Voltage (volts)	$V_{a(b)}$	45	45	90	135
Grid Bias Voltage (volts)	V_{g1}	0	0	0	0
Anode Load Resistance (megohms)	R_a	0.22	0.47	0.47	0.47
Screen Resistance (megohms)	R_{g2}	0.39	1.2	1.8	1.8
Grid Resistance of following valve (megohms)	R_g	0.47	2.2	2.2	2.2
Screen Bypass Condenser (μF)	$C_{g2,E}$	.035	0.02	0.03	0.035
Coupling Condenser to following valve (μF)	C	.006	0.002	0.002	0.002
Voltage Gain @ 5v. R.M.S. Output		24	38	57	70

BULB Clear

BASE B7G

Viewed from free end of pins.

CONNEXIONS

Pin 1	Filament (–). grid 3	f–,g3
Pin 2	No connection	NC
Pin 3	Diode	ad
Pin 4	Screen Grid	g2
Pin 5	Anode	a
Pin 6	Control Grid	g1
Pin 7	Filament (+)	f+

1.P.10

MAZDA

1.P.10

OUTPUT PENTODE

Directly heated – for battery operation

TENTATIVE

GENERAL

The 1.P.10 has a 2.8 volt 50 mA filament with a centre tap. For normal operation from a 1.4 volt dry cell the two sections so formed are connected in parallel.

In some applications, such as AC/DC/battery receivers, it may be desirable to connect all the valve filaments in series; in which case the two filament sections of the 1.P.10 would be run in series. With this arrangement a shunting resistance must be placed across the 1.4 Volt section of the 1.P.10 nearest the negative end of the chain, in order to by-pass the cathode current in excess of the rated maximum per section. If the cathode current of the other valves contributes to the filament current of the 1.P.10, it may be necessary to by-pass both filament sections.

RATING		¶		]
Filament Voltage (volts)	V_f	2.8		1.4
Filament Current (amps)	I_f	.05		0.1
Maximum Anode Voltage (volts)	$V_{a(max)}$		90	
Maximum Screen Voltage (volts)	$V_{g2(max)}$		67.5	
Maximum Mean Cathode Current (mA) with Input swing	$I_{k(av)max}$	5.5 •		11.0
Maximum Quiescent Cathode Current (mA)	$I_{k(o)max}$	4.5 •		9.0

¶ Series Filament Arrangement

] Parallel Filament Arrangement

• For each 1.4v. Filament Section.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19.0
Maximum Seated Height (mm)	47.6
Approximate Nett Weight (ozs)	0.25
Approximate Packed Weight (ozs)	0.5

MOUNTING POSITION - Unrestricted.

MAZDA

1.P.10

OUTPUT PENTODE

Directly heated – for battery operation

TENTATIVE

TYPICAL OPERATION AS CLASS 'A' AMPLIFIER		§		‡	
Anode Voltage (volts)	V_a	67.5	90	67.5	90
Screen Voltage (volts)	V_{g2}	67.5	67.5	67.5	67.5
Control Grid Bias (volts) †	V_{g1}	-7	-7	-7	-7
Quiescent Anode Current (mA)	$I_{a(o)}$	6.0	6.1	7.2	7.4
Quiescent Screen Current (mA)	$I_{g2(o)}$	1.2	1.1	1.5	1.4
Mutual Conductance (mA/V)	g_m	1.4	1.43	1.55	1.58
Anode Impedance (megohms)	r_a	0.1	0.1	0.1	0.1
Anode Load (ohms)	Z_a	5,000	8,000	5,000	8,000
Input Swing (volts RMS)	$V_{rms(sig)}$	5	5	5	5
Power Output (mW)	P_{out}	160	235	180	270
Percentage Total harmonic Distortion (%)	D	12	13	10	12

§ Series Filament Arrangement.

‡ Parallel Filament Arrangement.

† Referred to negative end of the filament.

BULB Clear

BASE B.7.G.

Viewed from free end of pins.

CONNEXIONS

Pin 1	Filament	f
Pin 2	Anode	a
Pin 3	Control Grid	g1
Pin 4	Screen Grid	g2
Pin 5	Filament C.T. Grid 3	f(tap)g3
Pin 6	Anode	a
Pin 7	Filament	f

For Parallel filament operation Pin 5 should be connected to L.T. negative.

For Series filament operation Pin 1 is normally connected to L.T. negative.

MAZDA

2 E 30

2 E 30

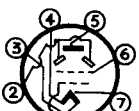
TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

Cathode à chauffage direct.

Tension filament	6 (5,4 à 6,6) Volts CC ou CA	
Courant filament	0,65 Ampère	
Temps de chauffage (1)	2 sec. env.	
Coefficient d'amplification écran/grille de contrôle	7	
Capacités inter-électrodes:	*avec blindage*	*sans blindage*
capacité d'entrée	9,6	9,5 pF
capacité de sortie	14	6,6 pF
capacité anode-grille	0,18	0,2 pF max.
Hauteur maximum	67 mm	
Diamètre maximum	19 mm	
Encombrement	V. 17-B. 1	
Base	MB7	
Brochage	7. B-DG	
Position de montage	Verticale	

Broches:

N° 1 – Grille de contrôle (G_1).
N° 2 – Ecrans déflecteurs (2).
N° 3 – Filament.
N° 4 – Filament.



Broches de la base, face à l'observateur (3).

Broches:

N° 5 – Anode.
N° 6 – Ecran (G_2).
N° 7 – Point milieu du filament.

Notice sommaire
concernant l'utilisation du tube 2 E 30

Le tube **2 E 30** du fait de sa faible tension d'anode, est spécialement adapté aux appareils mobiles et portatifs. Il peut être utilisé dans tous les étages H.F. et B.F. d'un émetteur de faible puissance; le chauffage rapide du filament permet de couper celui-ci pendant les périodes d'attente. D'autre part, utilisé en B.F. ce tube a une grande réserve de puissance. Enfin il est tout désigné pour l'emploi en H.F. et ne nécessite pas de neutrodynage jusqu'à 165 mégacycles, d'où son utilisation à plein régime pour cette fréquence.

(1) Dans toutes les applications, la tension anode doit être coupée avant (ou simultanément avec) la tension filament. Lorsque le 2 E 30 commande un tube de puissance à filament thorié, prendre toute précaution pour ne pas appliquer les tensions anode et écran tant que le filament du 2 E 30 n'est pas à sa température de fonctionnement.

(2) Les écrans déflecteurs (broche n° 2) doivent être reliés soit directement à la terre, soit à la prise médiane du filament. Dans les circuits H.F., le point milieu du filament, doit être relié soit à la masse, soit à un point commun afin de réduire l'impédance du filament.

(3) Le trou central du socket ne doit pas être obstrué, car les tubes pourraient éventuellement, comporter un queusot entre les broches.

REPRODUCTION INTERDITE

2E30

MAZDA

2 E 30

TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

AMPLIFICATEUR BASSE FREQUENCE ET MODULATEUR - CLASSE A I

Limites des conditions d'utilisation.

Tension d'anode	250 Volts max.
Tension d'écran (grille n°2)	250 Volts max.
Dissipation d'anode	10 Watts max.
Dissipation d'écran (grille n°2)	2,5 Watts max.

Exemples typiques d'utilisation

Tension filament	6 V CC	6 V CC	6 V CA	6 V CA	
Tension d'anode	180	250	180	250	Volts
Tension d'écran (grille n°2)	180	250	180	250	Volts
Tension de grille n°1	−10	−16,5	−13	−20	Volts
Résistance insérée en circuit cathode	−	−	400	450	Ohms
Tension de crête de grille n°1	9	14	11	14	Volts
Courant d'anode (signal nul)	30	40	30	40	mA
Courant d'anode (signal max.)	32	44	32	44	mA
Courant d'écran (signal nul)	2,5	3,3	2,5	3,3	mA
Courant d'écran (signal max.)	4,3	7,4	5,2	7,4	mA
Résistance interne	59	63	59	63	k Ω
Pente	3,45	3,7	3,45	3,7	mA/V
Impédance de charge	4,5	4,5	4,5	4,5	k Ω
Puissance utile (signal max.)	1,8	4,5	2,25	4,5	W
Distorsion totale	6,5	8	8	8	%

AMPLIFICATEUR BASSE FREQUENCE ET MODULATEUR - CLASSE AB I

Limites des conditions d'utilisation

Tension d'anode	250 Volts max.
Tension d'écran (grille n°2)	250 Volts max.
Dissipation d'anode	10 Watts max.
Dissipation d'écran (grille n°2)	2,5 Watts max.

REPRODUCTION INTERDITE

MAZDA

2 E 30

2E30

TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

AMPLIFICATEUR BASSE FREQUENCE & MODULATEUR

CLASSE A 1
Exemples typiques d'utilisation en PUSH-PULL
(Valeurs pour 2 tubes)

	6 V CC	6 V CC	6 V CA	6 V C.A.	
Tension filament	180	250	180	250	Volts
Tension anode	180	250	180	250	Volts
Tension d'écran (grille n° 2)	-10	-16,5	-13	-20	Volts
Tension de grille n° 1					
Résistance insérée en circuit cathode	-	-	200	225	Ohms
Tension de crête de grille à grille	18	28	22	28	Volts
Courant d'anode (signal nul)	60	80	60	80	mA
Courant d'anode (signal max.)	64	88	64	88	mA
Courant d'écran (signal nul)	5	6,6	5	6,6	mA
Courant d'écran (signal max.)	8,6	14,8	10,4	14,8	mA
Impédance de charge (entre anodes)	9	9	9	9	k Ω
Puissance utile (signal max.)	3,6	9	4,5	9	W
Distorsion totale	5	6	6	6	%

CLASSE AB 1

Exemples typiques d'utilisation
(Valeurs pour 2 tubes)

	6	6	6 Volts CA(1)	
Tension filament				
Tension d'anode	180	250	250	Volts
Tension d'écran (grille n° 2)	180	250	250	Volts
Tension de grille n° 1 (1)	-17,5	-25	-25	Volts
Tension de crête de grille à grille	31	45	45	Volts
Courant d'anode (signal nul)	38	48	48	mA
Courant d'anode (signal max.)	54	80	82	mA
Courant d'écran (signal nul)	2	3	3	mA
Courant d'écran (signal max.)	7,6	13,5	10	mA
Impédance de charge (entre anodes)	7	8	6	k Ω
Puissance utile (signal max.)	5	12,5	10	W
Distorsion totale	4,5	7,5	3,6	%

(1) Lorsque le filament est alimenté en continu, la tension de grille n°1 doit être réduite d'environ 9,5 V et le retour de grille se faire sur l'extrémité négative du filament.

REPRODUCTION INTERDITE

2E30

MAZDA

2 E 30

TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

AMPLIFICATEUR BASSE FREQUENCE & MODULATEUR

CLASSE AB 2

Limites des conditions d'utilisation

Tension d'anode	275 Volts max.
Tension d'écran (grille n°2)	275 Volts max.
Tension de crête positive de grille	20 Volts max.
Courant d'anode (signal max.) (1)	60 mA max.
Puissance d'alimentation de l'anode (signal max.) (1)	15 Watts max.
Dissipation d'écran (grille n°2) (1)	2,5 Watts max.
Dissipation d'anode (1)	10 Watts max.

Exemples typiques d'utilisation
(Valeurs pour 2 tubes)

Tension filament	6	6 Volts CA (2)	
Tension d'anode	180	250	Volts
Tension d'écran (grille n°2)	180	250	Volts
Tension de grille n°1 (2)	-22,5	-30	Volts
Courant d'anode (signal nul)	16	40	mA
Courant d'anode (signal max.)	100	120	mA
Courant d'écran (signal nul)	1	4	mA
Courant d'écran (signal max.)	16	20	mA
Courant grille n°1 (signal max.)	3	2,3	mA
Impédance de charge (entre anodes)	2,5	3,8	k Ω
Puissance de commande de grille	0,23	0,2	W
Puissance utile (signal max.)	7,4	17	W
Distorsion totale	3	4	%

(1) Valeur moyenne pour un signal B.F. sinusoïdal.

(2) Lorsque le filament est alimenté en continu, la tension de grille n°1 doit être réduite d'environ 3,5 V et le retour de grille se faire sur l'extrémité négative du filament.

REPRODUCTION INTERDITE

MAZDA

2 E 30

2E30

TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

AMPLIFICATEUR HAUTE FREQUENCE & OSCILLATEUR CLASSE C - TELEGRAPHIE

MODULATION DE FREQUENCE

Régime avec la clé abaissée, sans modulation de fréquence.

Limites des conditions d'utilisation (pour un tube)

Tension d'anode	250 Volts max.
Tension d'écran (grille n° 2)	250 Volts max.
Tension de grille n° 1	-150 Volts max.
Résistance à insérer dans la grille n° 1	0,1 M Ω max.
Courant d'anode	60 mA max.
Courant de grille n° 1	3 mA max.
Tension H.F. de crête sur la grille n° 1	30 Volts max.
Puissance d'alimentation de l'anode	15 Watts max.
Puissance d'alimentation de l'écran (grille n° 2)	2,5 Watts max.
Dissipation d'anode	10 Watts max.

Exemples typiques d'utilisation (pour un tube)

Tension d'anode	200	250	Volts
Tension d'écran (grille n° 2)	200	200	Volts
Tension de grille n° 1	-46	-50	Volts
Résistance à insérer dans le circuit de la grille n° 1	20	20	k Ω
Résistance à insérer dans le circuit cathode	850	850	Ω
Tension H.F. de crête sur la grille n° 1	66	72	Volts
Courant d'anode	45	50	mA
Courant d'écran (grille n° 2)	10	10	mA
Courant de grille n° 1	2,3	2,5	mA
Puissance de commande sur grille n° 1	0,15	0,2	Watt approx.
Puissance utile	5	7,5	Watts approx.

Exemples d'utilisation en doubleur de fréquence de 82,5 à 165 Mcy/sec.

Tension d'anode	250	250	Volts
Tension d'écran	220	200	Volts
Tension grille n° 1	-110	-70	Volts
Résistance à insérer dans le circuit de la grille n° 1	70	30	k Ω
Résistance à insérer dans le circuit cathode	1.750	1.250	Ω
Tension H.F. de crête sur la grille n° 1	120	100	Volts
Courant d'anode	50	50	mA
Courant d'écran (grille n° 2)	7	5	mA
Courant de grille n° 1	1,4	2,3	mA
Puissance de commande sur grille n° 1	0,2	0,5	Watt approx.
Puissance utilisable (1)	5	4	Watts approx.
Puissance utile courante	4	3	Watts approx.

(1) La puissance utilisable comprend les pertes dans les circuits et le rayonnement H.F. aussi bien que la puissance utilisée dans la charge.

REPRODUCTION INTERDITE

2E30

MAZDA

2 E 30

TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

AMPLIFICATEUR HAUTE FREQUENCE - CLASSE C
TELEPHONIE
MODULATION SUR L'ANODE & L'ECRAN

Conditions de la porteuse pour une modulation max. de 100 %

Limites des conditions d'utilisation

Tension d'anode	200	Volts max.
Tension d'écran (grille n°2)	200	Volts max.
Tension de grille n°1	−150	Volts max.
Résistance à insérer dans la grille n°1	0,1	M Ω max.
Courant d'anode	60	mA max.
Courant de grille n°1	2,5	mA max.
Puissance d'alimentation de l'anode (1)	12	Watts max.
Puissance d'alimentation de l'écran (grille n°2) (1)	2,5	Watts max.
Dissipation anode (1)	6,6	Watts max.

Exemple typique d'utilisation

Tension d'anode	200	Volts
Tension d'écran (grille n°2)	200	Volts
Tension de grille n°1	−46	Volts
Résistance à insérer dans le circuit de la grille n°1	20	k Ω
Résistance à insérer dans le circuit cathode	850	Ω
Tension H.F. de crête sur la grille n°1	66	Volts
Courant d'anode	45	mA
Courant d'écran (grille n°2)	10	mA
Courant de grille n°1	2,3	mA
Puissance de commande sur grille n°1	0,15	Watt approx.
Puissance utilisable	5	Watts approx.

(voir schémas d'utilisation pages 2550-7 et 8)

(1) Lorsque le tube est modulé à 100% par un courant sinusoïdal, la puissance moyenne augmente de 50%. Avec un courant de forme complexe, comme ceux produits par la parole ou la musique, la puissance moyenne augmente approximativement de 20 à 25 %.

REPRODUCTION INTERDITE

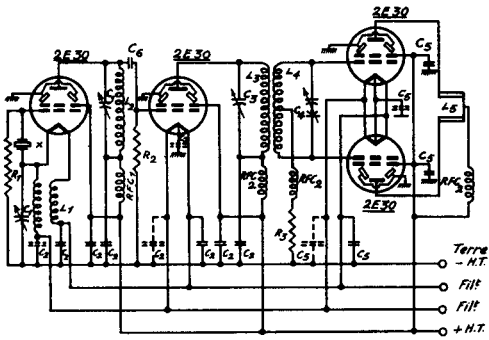
MAZDA

2 E 30

2E30

TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

EMETTEUR OU ETAGE D'ATTAQUE 144-148 MCy



X - Quartz (12 - 12,33 mégacycles)

R_1 - 100 K Ω	C_2 - 0,001μ F	C_5 - 500 μμF
R_2 - 50 K Ω	C_3 - 15 μF	C_6 - 50 μμF
R_3 - 25 K Ω	C_4 - 10 μμF	RFC_1 - 2,5 mhy
C_1 - 35 μμ F		RFC_2 - Self de choc

L_1 - Bobines imbriquées, 10 tours chacune à spires jointives, fil émaillé 1 m/m de diamètre, diamètre de la bobine 12,7.

L_2 - 7 spires espacées, fil nu ou étamé 16/10 m/m diamètre 19,05.

L_3-L_4 - Epingle à cheveux 50,8 de long, 25,4 de large, en fil de 16/10 nu ou étamé.

L_5 - Circuit à ligne 215,9 m/m de long, espacement 19,05 d'axe en axe. Tube de cuivre diamètre 6,35 m/m avec barre de court-circuit coulissante.

Quand les filaments sont alimentés en alternatif, les condensateurs portés en pointillés doivent être branchés entre une extrémité du filament et la masse. Ceux notés en pointillés entre le point milieu et la masse sont alors supprimés.
Quand les filaments sont alimentés en continu, les condensateurs figurés en pointillés doivent être branchés entre le point milieu du filament et la masse. Toutes les connexions des condensateurs de découplage doivent être aussi courtes que possible et dans l'étage final tous les découplages doivent faire retour sur un point commun.

Les informations et schémas que nous communiquons ne sauraient engager notre responsabilité. Ils sont fournis sans garantie quant à leur protection éventuelle par des tiers

REPRODUCTION INTERDITE

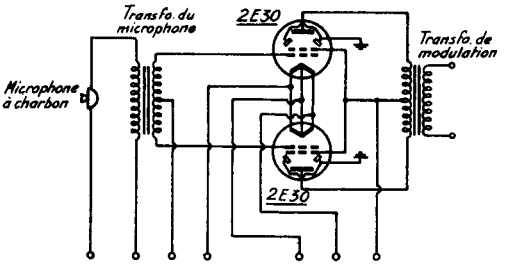
2E30

MAZDA

2 E 30

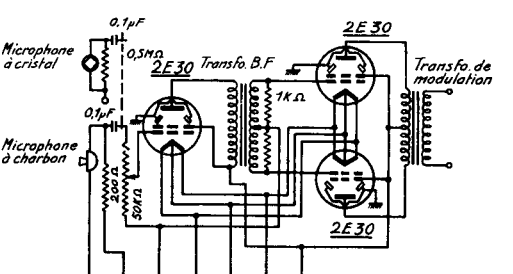
TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR DE PUISSANCE - MODULATEUR
(TYPE MINIATURE)

AMPLIFICATEUR DE MODULATION 10 WATTS_CLASSE AB1



Terre	Batterie — Polar.	Fil.	Terre +Pol.	Fil.	+H.T.	Courant alternatif
Terre	Batterie — Polar.	Terre -Fil. -H.T. +Polar.	Non Branché	+Fil.	+H.T.	Courant continu

AMPLIFICATEUR DE MODULATION 17 WATTS_CLASSE AB2



Terre	Batterie — Polar.	Fil.	Terre +Polar.	Fil.	+H.T.	Courant alternatif
Terre	Batterie — Polar.	Terre -Fil. -H.T. +Polar.	Non Branché	+Fil.	+H.T.	Courant continu

Les informations et schémas que nous communiquons ne sauraient engager notre responsabilité. Ils sont fournis sans garantie quant à leur protection éventuelle par des tiers

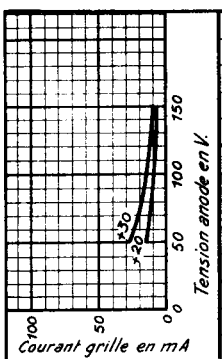
REPRODUCTION INTERDITE

MAZDA

2 E 30

2E30

COURBES DES COURANTS D'ANODE DE GRILLE N° 1 ET DE GRILLE N° 2 EN FONCTION DE LA TENSION D'ANODE (TENSION DE GRILLE N° 2 - 150 VOLTS)



TENSION ANODE EN VOLTS

600
500
400
300
200
100
0

Vg=+30
+25
+20
+15
+10
+5
0
-5
-10
-20
Ia
Ig
+30
+20
0

400
300
200
100
0

COURANT D'ANODE ET DE GRILLE N°2 EN mA

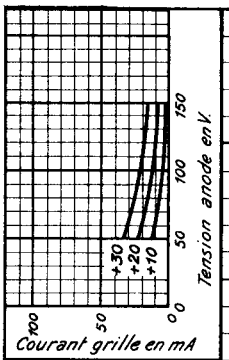
REPRODUCTION INTERDITE

2 E 30

MAZDA

2 E 30

COURBES DES COURANTS D'ANODE DE GRILLE N° 1 ET DE GRILLE N° 2 EN FONCTION DE LA TENSION D'ANODE (TENSION DE GRILLE N° 2 - 200 VOLTS)



TENSION ANODE EN VOLTS

600
500
400
300
200
100
0

Vg = +30
+25
+20
+15
+10
+5
0
-5
-10
-20
-30
Ia
+30
+20
+10
0
-2

400
300
200
100
0

COURANT D'ANODE ET DE GRILLE N°2 EN mA

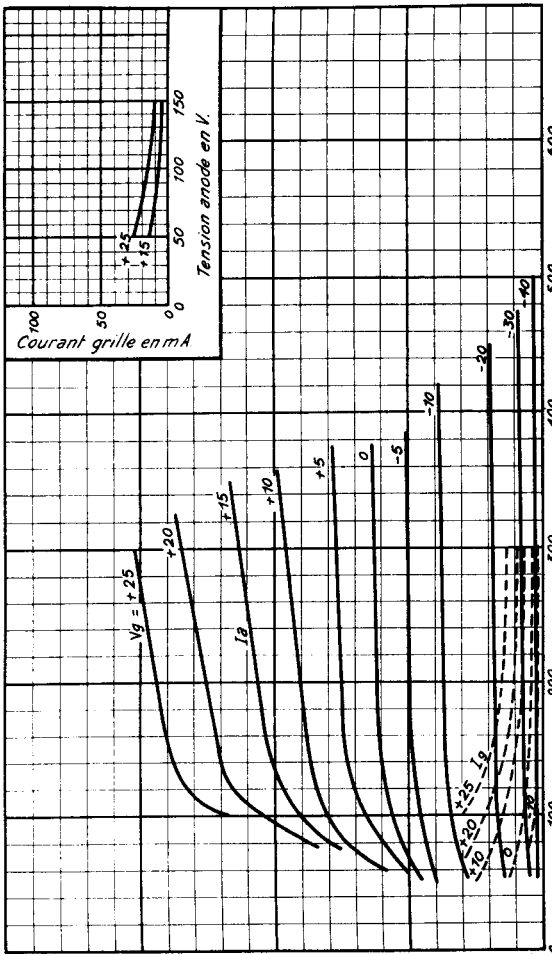
REPRODUCTION INTERDITE

MAZDA

2 E 30

2E30

COURBES DES COURANTS D'ANODE DE GRILLE N° 1 ET DE GRILLE N° 2 EN FONCTION DE LA TENSION D'ANODE (TENSION DE GRILLE N° 2 - 250 VOLTS)



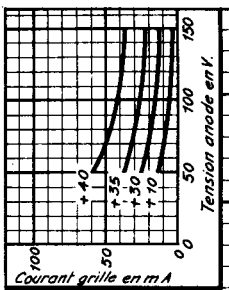
REPRODUCTION INTERDITE

2 E 30

MAZDA

2 E 30

COURBES DU COURANT D'ANODE ET DU COURANT DE GRILLE EN FONCTION DE LA TENSION D'ANODE CONNEXION TRIODE (ANODE ET GRILLE N° 2 RÉUNIES)



TENSION ANODE EN VOLTS

600
500
400
300
200
100
0

-50
-40
-30
-20
-10
0
+10
+20
+30
VG= +40

500
400
300
200
100
0

COURANT D'ANODE EN mA

REPRODUCTION INTERDITE

MAZDA

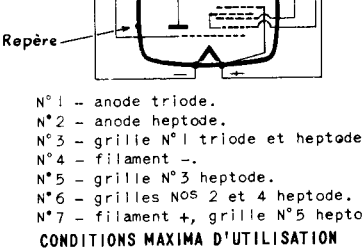
2G21

2 G 21

TRIODE HEPTODE
CHANGEUR DE FRÉQUENCE
SUBMINIATURE A CHAUFFAGE DIRECT

Filament à oxydes	
Tension filament	1,25 Volt
Intensité filament	0,050 Ampère
Capacités interélectrodes :	
Capacité grille N°3 - anode heptode	0,065 pF
Capacité grille N°3 - anode triode	0,022 pF
Capacité grille N°3 - grille N°1	0,14 pF
Capacité grille N°1 - anode triode	1,3 pF
Capacité d'entrée	3,5 pF
Capacité de sortie de l'oscillateur	3,8 pF
Capacité d'entrée de l'oscillateur	3,7 pF
Capacité de sortie du changeur de fréquence	3,6 pF
Encombrement	T.22-S.1
Longueur (sorties non comprises)	38,1 mm max.
Section	9,8 × 7,3 mm max.
Brochage	7.S-RA
Position de montage	indifférente
Connexions	fils souples

Connexions (1) de la base, face à l'Observateur.



N°1 - anode triode.
N°2 - anode heptode.
N°3 - grille N°1 triode et heptode.
N°4 - filament -.
N°5 - grille N°3 heptode.
N°6 - grilles Nos 2 et 4 heptode.
N°7 - filament +, grille N°5 heptode.

CONDITIONS MAXIMA D'UTILISATION

Tension d'anode triode	45 Volts
Tension d'anode heptode	45 Volts
Tension de grilles N°2 et N°4	45 Volts
Tension de grille N°3	Jamais positive
Courant de cathode	2,2 mA

(1) - Les sorties sont numérotées à partir du repère (point rouge).

REPRODUCTION INTERDITE

2G21

MAZDA

2 G 21

TRIODE HEPTODE
CHANGEUR DE FRÉQUENCE
SUBMINIATURE A CHAUFFAGE DIRECT

EXEMPLE D'UTILISATION EN CHANGEUR DE FREQUENCE

Tension d'anode heptode	22,5	Volts
Tension de grilles N^{OS} 2 et 4 heptode	22,5	Volts
Tension d'anode triode	22,5	Volts
Tension de grille N°3 heptode	0	Volt
Impédance de charge sur G_3 heptode	5	M Ω
Impédance de charge sur G_1 (oscillateur)	50	K Ω
Courant d'anode heptode	0,2	mA
Courant de grilles N^{OS} 2 et 4	0,3	mA
Courant d'anode triode	1	mA
Courant de grille N°1 (oscillateur)	30	μ A
Pente de conversion	60	μ A/V
Tension de grille N°3 pour une pente de conversion de 2 μA/V	-3,5	Volts approx.
Résistance interne	0,5	M Ω approx.

REPRODUCTION INTERDITE

MAZDA

2 XM 400

TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE

2 XM 400

Cathode à oxydes à chauffage direct.	
Tension filament (CA ou CC)	4 Volts
Intensité filament	2,35 Amp.
Hauteur maximum	145 mm
Diamètre maximum	50 mm
Ampoule	V 71
Culot	N° 6207

Position de montage : Verticale, culot en bas. Jamais horizontale.

Broches :

N° 1 Non connectée.
N° 2 Filament.

Broches :

N° 3 Non connectée.
N° 4 Filament.
L'anode est reliée à la corne du sommet.

Broches du culot face à l'observateur

Conditions maxima

Fréquence d'alimentation	150 cycles/sec. max.
Tempér. du mercure condensé (1)	25-70° C.
Tension inverse de crête	4.000 Volts max.
Courant anode de pointe	1,6 Amp. max.
Courant anode moyen	0,4 Amp. max.
Chute de tension interne	15 Volts approx.

Le filament du 2 XM 400 doit être porté à sa température de fonctionnement avant d'appliquer la tension d'anode. Dans des conditions moyennes, le délai d'application est de l'ordre de 30 secondes.

Les blindages et les circuits de filtre H.F. doivent être isolés autant que possible de l'émetteur, afin d'éviter les effets pernicieux des champs magnétiques et électrostatiques. Ces champs tendent à produire des décharges dans la vapeur de mercure, compromettent la vie du tube et rendent le filtrage difficile. Un blindage externe doit être utilisé quand les tubes se trouvent placés à proximité de ces champs. Des filtres H.F. doivent être employés quand le fonctionnement de ces tubes peut être troublé par les tensions H.F. Si l'on utilise des blindages, une ventilation suffisante doit être assurée pour maintenir la température normale du mercure condensé.

(1) Fonctionnement à 40° + 5° C recommandé.

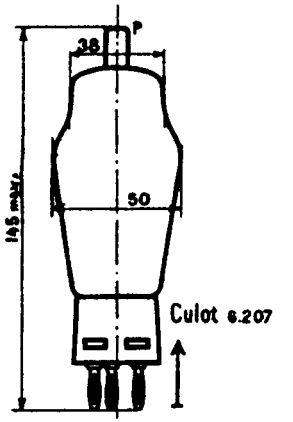
REPRODUCTION INTERDITE.

2 XM 400

MAZDA

2 XM 400

TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE



VUE EN PLAN SUIVANT FLECHE

REPRODUCTION INTERDITE

MAZDA

2 XM 400

2 XM 400

CIRCUITS D'UTILISATION

REPRODUCTION INTERDITE

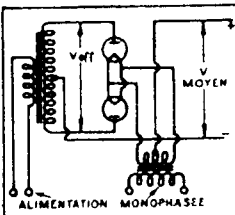


FIG.1

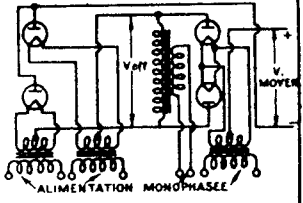


FIG.2

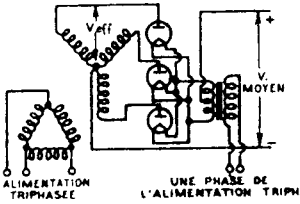


FIG.3

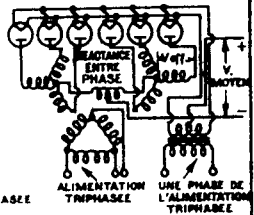


FIG.4

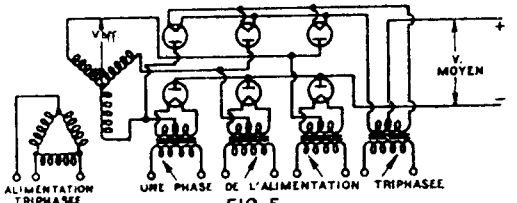


FIG.5

Fig.	Circuits	V. moyen	V. inverse	I. moyen
1	Monoph. - Redress. 2 altern. 2 tubes	0,318 V. max. 0,450 V. eff.	3,14 V.moy.	0,636 I.max
2	Monoph. - Redress. 2 altern. 4 tubes	0,636 V. max. 0,900 V. eff.	1,57 V.moy.	0,636 I.max
3	Triphasé - Redressement 1 altern.	0,827 V. max. 1,170 V. eff.	2,09 V.moy.	0,827 I.max
4	Triphasé - Double étoile en parall.	0,827 V. max. 1,170 V. eff.	2,09 V.moy.	1,91 I.max
5	Triphasé - Redressement 3 altern.	1,65 V. max. 2,34 V. eff.	1,045 V. m.	0,955 I.max

Conditions présumées

1. Source d'alimentation sinusoïdale. - 2. Tensions équilibrées sur chaque phase. - 3. Charge de tension alterne nulle dans les tubes. - 4. Résistance de charge purement ohmique. - 5. Sans filtre.

MAZDA
2 XM 600 A
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE

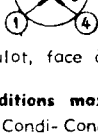
2 XM 600 A

Cathode à oxydes à chauffage direct.

Tension filament (CA ou CC)	2,5 Volts
Intensité filament	5 Amp.
Hauteur maximum	168 mm
Diamètre maximum	61 mm
Ampoule	V 81
Culot	N° 6173 à ergot

Position de montage : Verticale, culot en bas. Jamais horizontale.

Broches :
N° 1 Filament.
N° 2 Non connectée.



Broches :
N° 3 Non connectée.
N° 4 Filament.
L'anode est reliée à la corne du sommet.

Broches du culot, face à l'observateur

Conditions maxima

	Condition I	Condition II	Condition III	
Fréquence d'alimentation	150	150	1.000	Cycles/sec.
Température du mercure condensé (1)	25-60	25-70	25-70	° C.
Tension inverse de crête	10.000	2.000	5.000	Volts max.
Courant anode de pointe	1	2	1	Amp. max.
Courant anode moyen	0,25	0 5	0,25	Amp. max.
Chute de tension interne	15	15	15	Volts approx.

Le filament du 2 XM 600 A est partiellement protégé de l'anode par des écrans, ce qui permet de l'alimenter par une source dont la fréquence peut atteindre 1.000 cycles/seconde. Le filament doit être porté à sa température de fonctionnement avant d'appliquer la tension d'anode. Dans des conditions moyennes, le délai d'application est de l'ordre de 30 secondes.

Les blindages et les circuits de filtre H.F. doivent être isolés autant que possible de l'émetteur, afin d'éviter l'effet pernicieux des champs magnétiques et électrostatiques. Ces champs tendent à produire des décharges dans la vapeur de mercure, compromettant la vie du tube et rendent le filtrage difficile. Un blindage externe doit être utilisé quand les tubes se trouvent placés à proximité de ces champs. Des filtres H.F. doivent être employés quand le fonctionnement de ces tubes peut être troublé par les tensions H.F. Si l'on utilise des blindages, une ventilation suffisante doit être assurée pour maintenir la température normale du mercure condensé.

(Suite au verso.)

(1) Fonctionnement à 40° + 5° C. recommandé.

REPRODUCTION INTERDITE

2 XM 600 A

MAZDA

2 XM 600 A

TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE

Notes sur les conditions I et III

Le tableau de la page suivante indique les valeurs expérimentales de l'inductance de choc (L) et de la capacité (C) pour les filtres à entrée par inductance qui maintiendront la pointe du courant anode au-dessous du maximum recommandé, à condition que le courant continu de charge n'excède pas la valeur maximum du courant moyen indiquée.

Les valeurs de (L) et de (C) sont basées sur une alimentation alternative à la fréquence de 50 cycles/seconde.

La capacité (C) est suffisamment faible pour éviter toute pointe excessive lorsque la puissance est appliquée au circuit pour la première fois et cependant assez élevée pour procurer un filtrage adéquat. Si l'on augmente l'inductance (L), il est possible d'augmenter la capacité (C) dans la même proportion. Dans un filtre à deux sections ayant deux inductances de valeurs inégales, la plus forte inductance doit être placée du côté des tubes redresseurs. Dans le cas d'une telle disposition, la valeur maximum de chaque capacité doit être déterminée d'après la valeur de l'inductance qui la précède.

Les circuits des fig. 1, 2 et 3 procurent une tension ondulée à moins de 5 % lorsqu'on utilise un filtre à deux sections ayant le minimum d'inductance et la capacité maximum correspondante. Les circuits des fig. 4 et 5 procurent une tension ondulée à moins de 1 %. Pour chacun de ces circuits, un meilleur filtrage peut être obtenu à l'aide d'inductances de valeurs plus élevées que la valeur minimum indiquée au tableau. Dans le cas de ces valeurs supérieures, les capacités correspondantes peuvent être augmentées dans le même rapport afin d'obtenir encore de meilleurs résultats.

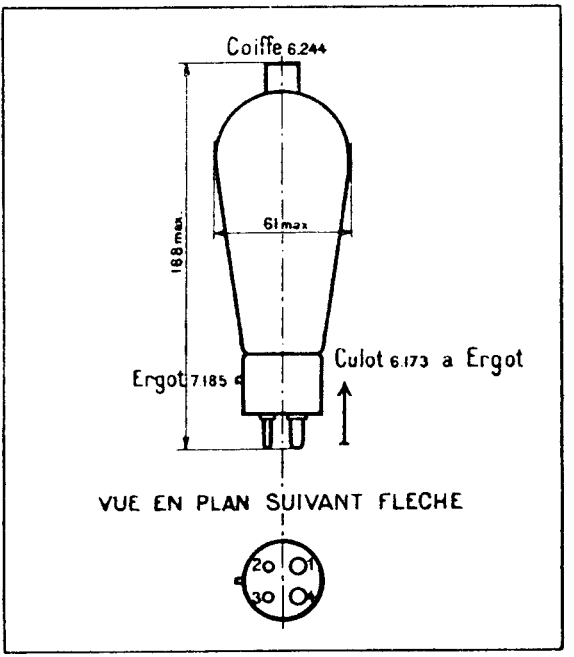
REPRODUCTION INTERDITE.

MAZDA

2 XM 600 A

TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE

2 XM 600 A



REPRODUCTION INTERDITE

MAZDA
2 XM 600 A

TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE

2 XM 600 A

Circuits et Types de redressement	Tension alternative efficace appliquée (1) en Volts	Tension max. CC à l'entrée du filtre	Inductance de choc pour un filtre à une section		Maximum du courant continu de charge en Ampère
			Min. de L en Hy	Max. de C en μF	
Monophasé 2 alternances (2 tubes) Fig. 1	3.535 par tube	3.180	8,0	1,25	0,5
	3.000 —	2.700	6,8	1,5	0,5
	2.000 —	1.800	4,5	2,1	0,5
	1.500 —	1.350	3,4	2,8	0,5
Monophasé 2 alternances (4 tubes) Fig. 2	7.070 total	6.360	16,0	0,6	0,5
	6.000 —	5.400	13,5	0,7	0,5
	5.000 —	4.500	11,0	0,9	0,5
	4.000 —	3.600	8,9	1,1	0,5
Triphasé 1 alternance Fig. 3	4.080 par phase	4.780	3,2	1,4	0,75
	3.000 —	3.510	2,2	2,0	0,75
	2.000 —	2.340	1,4	3,0	0,75
	1.500 —	1.750	1,1	4,0	0,75

Septembre 1947 **Compagnie des Lampes** N° 4201-4 A

REPRODUCTION INTERDITE.

REPRODUCTION INTERDITE.

MAZDA

2 XM 600 A

TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE

Circuits et Types de redressement	Tension alternative efficace appliquée (1) en Volts	Tension max. CC à l'entrée du filtre	Inductance de choc pour un filtre à une section		Maximum du courant continu de charge en Ampère
			Min. de L en Hy	Max. de C en μF	
Triphasé, double étoile en parallèle Fig. 4	4.080 par phase	4.780	2,0	0 5	1,5
	3.000 —	3.510	1.5	0,7	1,5
	2.000 —	2.340	1,0	1,1	1,5
	1.500 —	1.750	0,7	1,5	1,5
Triphasé 2 alternances Fig. 5	4.080 par phase	9.570	1,8	0,5	0,75
	3.000 —	7.020	1,4	0,7	0,75
	2.000 —	4.680	0,9	1,2	0,75
	1.500 —	3.510	0,7	1,5	0,75
Monophasé 2 alternances (2 tubes) (2) Fig. 1	3.535 par tube	3.950	—	—	0,25
	3.000 —	3.390	—	—	0,25
	2.000 —	2.260	—	—	0,25
	1.500 —	1.700	—	—	0,25

(1) Dans le cas d'une tension inverse de crête max. de 10.000 Volts, Si le 2 XM 600 A est utilisé dans des conditions de fréquence ou de température, telles que la tension inverse soit limitée à 5.000 Volts, la valeur de la tension alternative appliquée et celle de la tension continue de sortie figurant dans le tableau doivent être multipliées par le facteur 0,5 pour obtenir les nouvelles valeurs de fonctionnement sous 5.000 Volts.

(2) Avec un condensateur à l'entrée du filtre.

Septembre 1947 Compagnie des Lampes N° 4201-5 A

2 XM 600 A

2 XM 600 A

MAZDA

2 XM 600 A

CIRCUITS D'UTILISATION

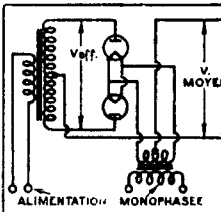


FIG.1

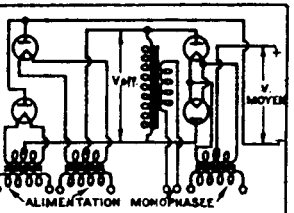


FIG.2

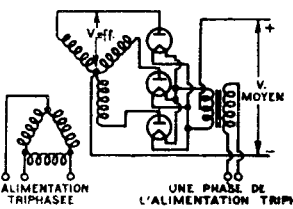


FIG.3

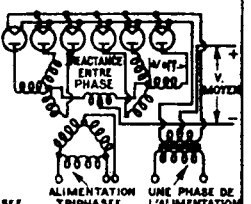


FIG.4

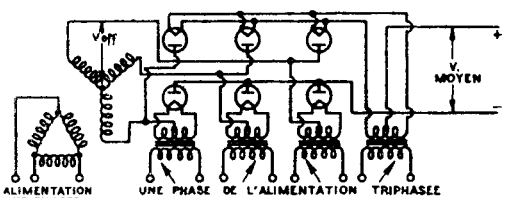


FIG.5

Fig.	Circuits	V. moyen	V. inverse	I. moyen
1	Monoph. - Redress. 2 altern. 2 tubes	0,318 V. max. 0,450 V. eff.	3,14 V.moy.	0,636 I.max
2	Monoph. - Redress. 2 altern. 4 tubes	0,636 V. max. 0,900 V. eff.	1,57 V.moy.	0,636 I.max
3	Triphasé - Redressement 1 altern.	0,827 V. max. 1,170 V. eff.	2,09 V.moy.	0,827 I.max
4	Triphasé - Double étoile en parall.	0,827 V. max. 1,170 V. eff.	2,09 V.moy.	1,91 I.max
5	Triphasé - Redressement 2 altern.	1,65 V. max. 2,34 V. eff.	1,045 V. m.	0,955 I.max

Conditions présumées

1. Source d'alimentation sinusoïdale. - 2. Tensions équilibrées sur chaque phase. - 3. Chute de tension interne nulle dans les tubes. - 4. Résistance de charge purement ohmique. - 5. Sans filtre.

REPRODUCTION INTERDITE.

MAZDA

3 T 20

TRIODE OSCILLATEUR
AMPLIFICATEUR DE PUISSANCE HF
AMPLIFICATEUR DE PUISSANCE B F
M O D U L A T E U R

3 T 20

Filament: Tungstène thorié.	
Tension CA ou CC	7,5 Volts
Intensité	1,25 Amp.
Coefficient d'amplification	8
Capacités inter-électrodes:	
Capacité grille-anode	6,0 pF
Capacité grille-filament	4,3 pF
Capacité filament-anode	1,5 pF
Encombrement	V.71 – A.2
Culot	CL 112
Brochage	4.A-BA

AMPLIFICATION DE PUISSANCE B.F. ET MODULATION CLASSE A

CONDITIONS MAXIMA D'UTILISATION

Tension d'anode CC	600 Volts max.
Dissipation sur l'anode	20 Watts max.

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode CC	425	500	600 Volts
Tension grille CC (1)	-40	-45	-55 Volts
Tens.de crête B.F.sur grille	35	40	50 Volts
Courant d'anode CC	18	24	30 mA
Résistance interne	5.000	4.600	4.300 Ohms
Pente	1,6	1,725	1,840 mA/V
Impédance de charge	10.200	8.000	7.800 Ohms
Puiss. de sortie non modulée (5 % de second harmonique)	1,6	2,3	3,8 Watts

AMPLIFICATION DE PUISSANCE B.F. ET MODULATION CLASSE B

CONDITIONS MAXIMA D'UTILISATION

Tension d'anode CC	600 Volts max.
Courant d'anode CC signal max.	70 mA max.
Puissance appliquée à l'anode signal max.	42 Watts max.
Dissipation sur l'anode	20 Watts max.

EXEMPLE TYPIQUE D'UTILISATION

Les valeurs indiquées se rapportent à deux tubes à moins de mention contraire

Tension d'anode CC	400	500	600 Volts
Tension grille CC	-50	-60	-75 Volts
Tension de crête B.F.entre grilles	270	290	320 Volts
Cour.d'anode CC signal nul	8	8	8 mA
Cour.d'anode CC signal max.	130	130	130 mA
Impédance de charge (par tube)	1.500	2.000	2.500 Ohms

(Suite au verso.)

Reproduction interdite

3 T 20

MAZDA

3 T 20

TRIODE OSCILLATEUR
AMPLIFICATEUR DE PUISSANCE HF
AMPLIFICATEUR DE PUISSANCE B F
M O D U L A T E U R

(Suite de la page précédente)

Impédance de charge effective (entre anodes)	6.000	8.000	10.000 Ohms
Puissance d'excitation signal max. (approx.)	3	3	3 Watts
Puissance de sortie signal max. (approx.)	27	36	45 Watts

AMPLIFICATION DE PUISSANCE H.F.
TELEPHONIE - CLASSE B

Régime de porteuse pour l'utilisation d'une modulation maximum de 100 %.

CONDITIONS MAXIMUM D'UTILISATION

Tension d'anode CC	600 Volts max.
Courant d'anode CC	50 mA max.
Puissance appliquée à l'anode	30 Watts max.
Dissipation sur l'anode	20 Watts max.

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode CC	500	600	Volts
Tension grille CC	-60	-75	Volts
Tension de crête H.F. sur la grille	85	90	Volts
Courant d'anode CC	45	45	mA
Courant grille CC (approx.) (2)	0,2	0,2	mA
Puiss. d'excitation (approx.) (2)(3)	2,2	2,3	Watts
Puissance de sortie (approx.)	6	7,5	Watts

AMPLIFICATION DE PUISSANCE H.F.
MODULATION PAR ANODE
TELEPHONIE - CLASSE C

Régime de porteuse pour une modulation maximum de 100 %.

CONDITIONS MAXIMA D'UTILISATION

Tension d'anode CC	500 Volts max.
Tension grille CC	-200 Volts max.
Courant d'anode CC	60 mA max.
Courant grille CC	15 mA max.
Puissance appliquée à l'anode	30 Watts max.
Dissipation sur l'anode	13,5 Watts max.

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode CC	400	500	Volts
Tension grille CC	-150	-190	Volts
Résistance	10.000	12.700	Ohms
Tens. de crête H.F. sur la grille	260	300	Volts
Courant d'anode CC	55	55	mA
Courant grille CC (approx.) (2)	15	15	mA
Puiss. d'excitation (approx.) (2)	4	4,5	Watts
Puissance de sortie (approx.)	14	18	Watts

Reproduction interdite

MAZDA

3 T 20

3 T 20

TRIODE OSCILLATEUR
AMPLIFICATEUR DE PUISSANCE HF
AMPLIFICATEUR DE PUISSANCE BF
M O D U L A T E U R

AMPLIFICATION DE PUISSANCE H.F. ET AUTO-OSCILLATION
TELEGRAPHIE - CLASSE C

Régime clé abaissée sans modulation

CONDITIONS MAXIMA D'UTILISATION

Tension d'anode CC	600 Volts max.
Tension grille CC	-200 Volts max.
Courant d'anode CC	70 mA max.
Courant grille CC	15 mA max.
Puissance appliquée à l'anode	42 Watts max.
Dissipation sur l'anode	20 Watts max.

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode CC	500	600 Volts
Tension grille CC	-125	-150 Volts
Résistance	8.300	10.000 Ohms
Tens. de crête H.F. sur la grille	235	260 Volts
Courant d'anode CC	65	65 mA
Courant grille CC (approx.) (2)	15	15 mA
Puiss. d'excitation (approx.) (2)	3,5	4 Watts
Puissance de sortie (approx.)	20	25 Watts

(1) la résistance CC dans le circuit de grille ne doit pas dépasser 0,5 mégohm avec polarisation de la cathode ou 0,1 megohm avec polarisation fixe.

(2) valeur sujette à de grandes variations.

(3) en crête de BF avec 100 % de modulation.

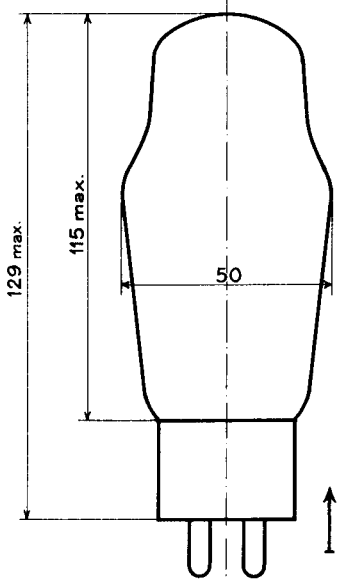
Reproduction interdite.

3 T 20

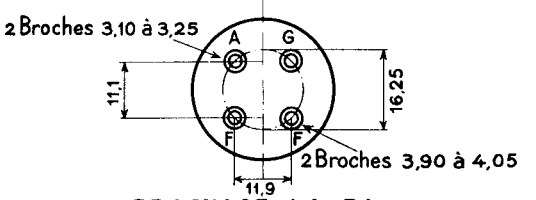
MAZDA

3 T 20

ENCOMBREMENT V.71 _ A.2



VUE EN PLAN SUIVANT FLECHE



BROCHAGE 4.A – BA

REPRODUCTION INTERDITE

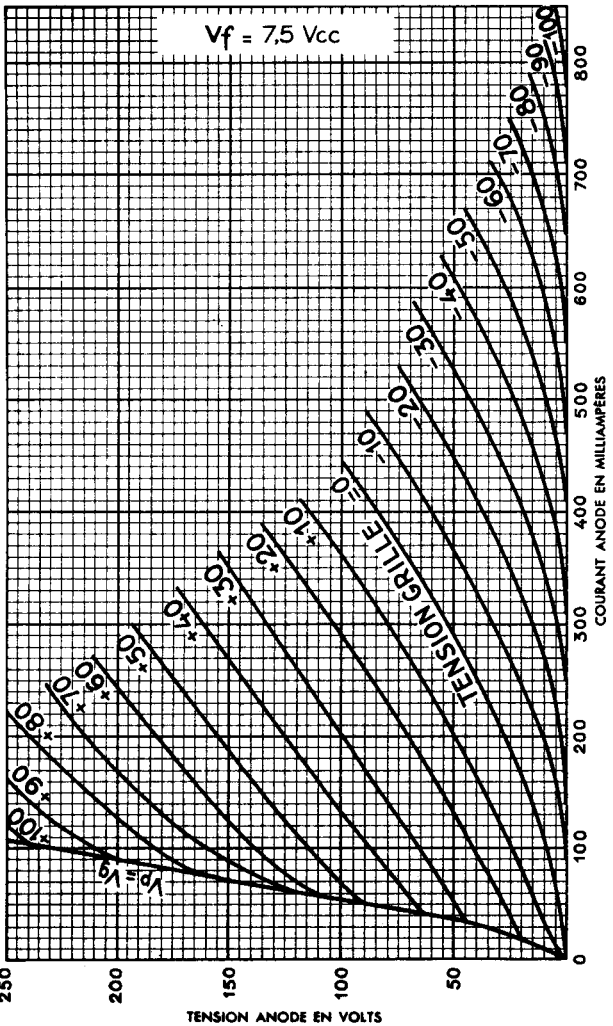
MAZDA

3 T 20

3 T 20

COURBES DU COURANT ANODE

en fonction de la tension anode



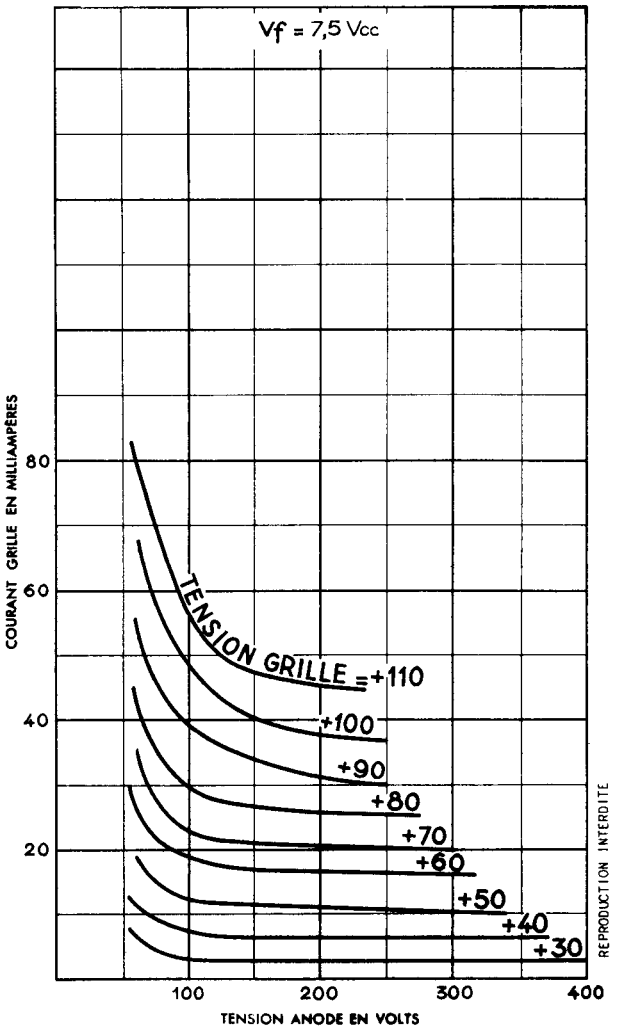
REPRODUCTION INTERDITE

3 T 20

MAZDA

3 T 20

COURBES DU COURANT GRILLE
en fonction de la tension grille

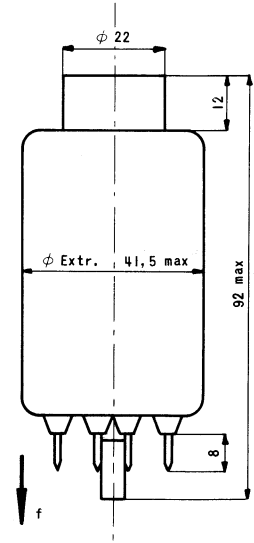


REPRODUCTION INTERDITE

MAZDA
3T50 A1G

3T50 A1G

TRIODE D'EMISSION - Anode en graphite
AMPLIFICATEUR H.F.
Série A



NATURE DU FILAMENT
TUNGSTENE THORIE

Tension ..... 6,3 V
Intensité ..... 4,25 A

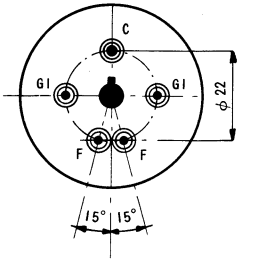
CAPACITES ENTRE ELECTRODES

Capacité grille-plaque 3,3 pF
" filament-grille 3,5 pF
" " plaque 0,6 pF

CARACTERISTIQUES

Pente mesurée au 1/10e de Is 3,5mA/v
Coefficient d'amplification 16
Fréquence limite d'utilisation pour laquelle on peut obtenir la puissance utile nominale avec un rendement de 66% ..... 200 Mhz

Vue suivant flèche f



LIMITES D'UTILISATION

Tension anodique max .. 1200 v
Dissipation anodique max ..... 35 w

SUPPORTS A UTILISER

MAZDA S.25/50 E

REPRODUCTION INTERDITE

3T50 A1G

MAZDA
3T50 A1G

TRIODE D'EMISSION - Anode en graphite
AMPLIFICATEUR H.F.
Série A

AMPLIFICATION H.F. OU AUTO-EXCITATION
Classe C Télégraphie

CONDITIONS MAXIMA D'UTILISATION

Tension anodique	900 V max
Courant moyen anodique	140 mA max
Puissance appliquée	125 W max
Puissance dissipée	35 W max
Polarisation de grille de commande	−150 V max
Courant de grille de commande	55 mA

EXEMPLE D'UTILISATION

Tension anodique	600	700	750	800	900 V
Courant moyen anodique	92,5	110	115	125	138 mA
Polarisation de grille de commande	−88	−110	−120	−130	−150 V
Tension de crête de grille de commande	175	208	225	240	280 V
Courant moyen de grille de commande	19	23	25	23	32 mA
Puissance utile	39	54,5	68,5	72	91 W
Puissance de commande de grille	3,3	4,8	5,6	5,5	9 W

AMPLIFICATION H.F.
Classe C Téléphonie - Modulation par l'anode

CONDITIONS MAXIMA D'UTILISATION

Tension anodique	900 V max
Courant moyen anodique	100 mA max
Puissance appliquée	90 W max
Puissance dissipée	25 W max
Polarisation de grille de commande	−150 V max
Courant de grille de commande	30 mA max

EXEMPLE D'UTILISATION

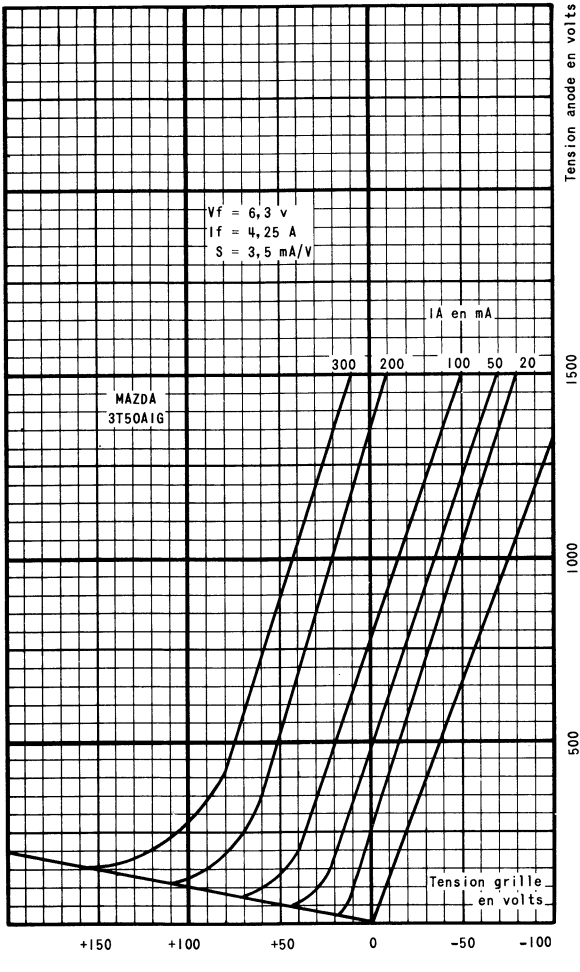
Tension anodique	700	800	900 V
Courant moyen anodique	82	89	98 mA
Polarisation de grille de cde	−82	−90	−132 V
Tension de crête de grille de cde	150	180	220 V
Courant moyen de grille de cde	17	20	26 mA
Puissance utile	40	50	64 W
Puissance de commande de grille	2,6	3,6	5,7 W

REPRODUCTION INTERDITE

MAZDA
3T50 A1G

3T50 A1G

CARACTERISTIQUES A COURANT CONSTANT

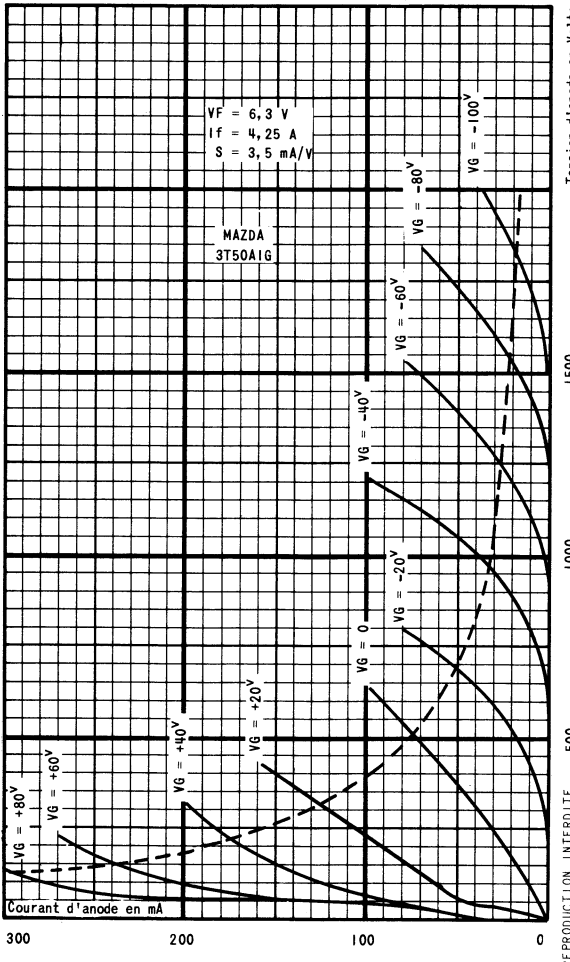


REPRODUCTION INTERDITE

3T50 A1G

MAZDA
3T50 A1G

COURBES DU COURANT D'ANODE EN FONCTION
DE LA TENSION D'ANODE

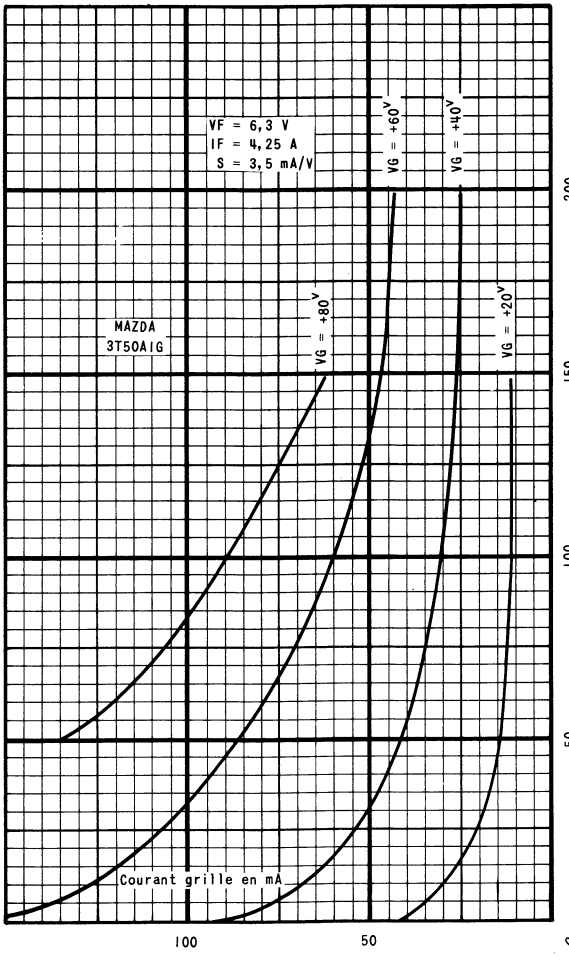


REPRODUCTION INTERDITE

MAZDA
3T50 A1G

3T50 A1G

COURBES DU COURANT DE GRILLE EN FONCTION
DE LA TENSION D'ANODE



REPRODUCTION INTERDITE

MAZDA

3 T 100 A 1

TRIODE AMPLIFICATRICE ET OSCILLATRICE H. F.

3T100A1

Nature du filament	Tungstène thorié.
Tension filament	7,5 Volts CA ou CC
Intensité filament	4,25 Amp.
Pente (mesurée au 1/10e du courant de saturation)	4 mA/V
Coefficient d'amplification	18
Capacités inter-électrodes:	
Capacité grille-anode	3,3 pF
Capacité grille-filament	4 pF
Capacité anode-filament	0,2 pF
Hauteur maximum	111 mm
Diamètre maximum	50 mm
Encombrement	C.50 - FC.1
Pied	Voir dessin page 4318-3
Coiffe	

SUPPORTS MAZDA A UTILISER

Montage en oscillateur ordinaire	S 100 D
Montage en oscillateur à ligne support à pastille	S 100 E SP 100 E
Montage symétrique: Accord grille	S 100 F
Montage symétrique: Accord cathode	S 100 G

LIMITES D'UTILISATION

Tension anode maximum	1.500 Volts max.
Dissipation anode maximum	50 Watts max.
Pour une fréquence maximum de	150 Mc/s
Fréquence pour laquelle la tension normale d'anode et la puissance appliquée sont réduites de 50 %	250 Mc/s

AMPLIFICATION H.F. DE PUISSANCE TELEPHONIE - CLASSE C MODULATION PAR L'ANODE

Régime de la porteuse pour l'utilisation d'une modulation maximum de 100 %.

CONDITIONS MAXIMA

Tension anode CC	1.500 Volts max.
Tension grille CC	-500 Volts max.
Courant anode CC	150 mA max.
Courant grille CC	40 mA max.
Puissance appliquée à l'anode	200 Watts max.
Dissipation anode	40 Watts max.

(Suite au verso).

Reproduction interdite

3T100A1

MAZDA

3 T 100 A 1

TRIODE AMPLIFICATRICE ET OSCILLATRICE H. F.

EXEMPLES TYPIQUES D'UTILISATION

Tension anode CC	800	1.000	1.250	1.500 Volts
Tension grille CC	−200	−265	−380	−400 Volts
Tension grille H.F. de crête	330	420	560	600 Volts
Courant anode CC	90	110	130	150 mA
Courant grille CC (ap.)	13	17	23	25 mA
Puissance d'excitation (approx.)	4,3	7,1	12,8	15 Watts
Puissance de sortie (approx.)	52	84	130	190 Watts
Rendement	72	76	80	84 %

AMPLIFICATION H.F. DE PUISSANCE OU AUTO-OSCILLATION TELEGRAPHIE – CLASSE C

Régime clé abaissée, sans modulation.

CONDITIONS MAXIMA

Tension anode CC	1.500 Volts max.
Tension grille CC	−500 Volts max.
Courant anode CC	175 mA max.
Courant grille CC	40 mA max.
Puissance appliquée à l'anode	260 Watts max.
Dissipation anode	60 Watts max.

EXEMPLES TYPIQUES D'UTILISATION

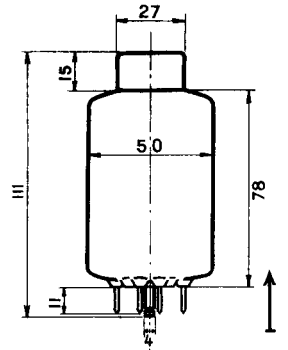
Tension anode CC	800	1.000	1.100	1.250	1.500 Volts
Tension grille CC	−65	−90	−100	−115	−120 Volts
Tension grille H.F. de crête	180	230	250	275	300 Volts
Courant anode CC	115	135	140	155	175 mA
Courant grille CC (approx.)	20	23	26	29	30 mA
Puissance d'excitation (approx)	3,6	5,3	6,5	7,9	9 Watts
Puissance de sortie (approx.)	67	93	113	148	200 Watts
Rendement	67	71	73	76	76 %

Reproduction interdite

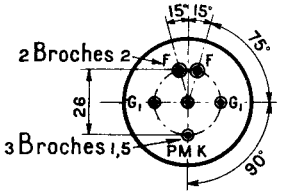
MAZDA

3 T 100 A 1

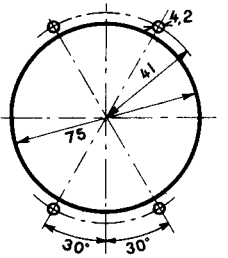
3T100A1



VUE EN PLAN SUIVANT FLECHE



COTE DE PERÇAGE DU SUPPORT



REPRODUCTION INTERDITE

3T100A1

MAZDA

3 T 100 A 1

CARACTÉRISTIQUE

à courant anode constant

V_f = 7,5 V

T_f = 4,25 A

S = 4 mA/V

k = 18

500 mA

2 mA

500 450 400 350 300 250 200 150 100 50 20 2

0 500 1000 1500 2000

TENSION ANODE EN VOLTS

150 100 50 0 50 100

TENSION GRILLE EN VOLTS

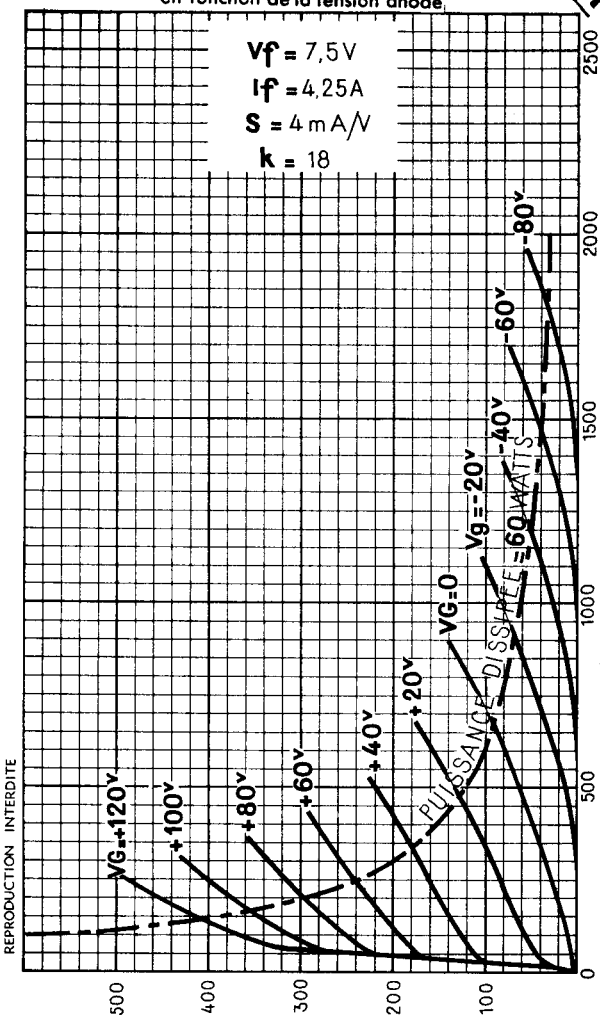
REPRODUCTION INTERDITE

MAZDA

3 T 100 A 1

3T100A1

COURBES DU COURANT ANODE
en fonction de la tension anode



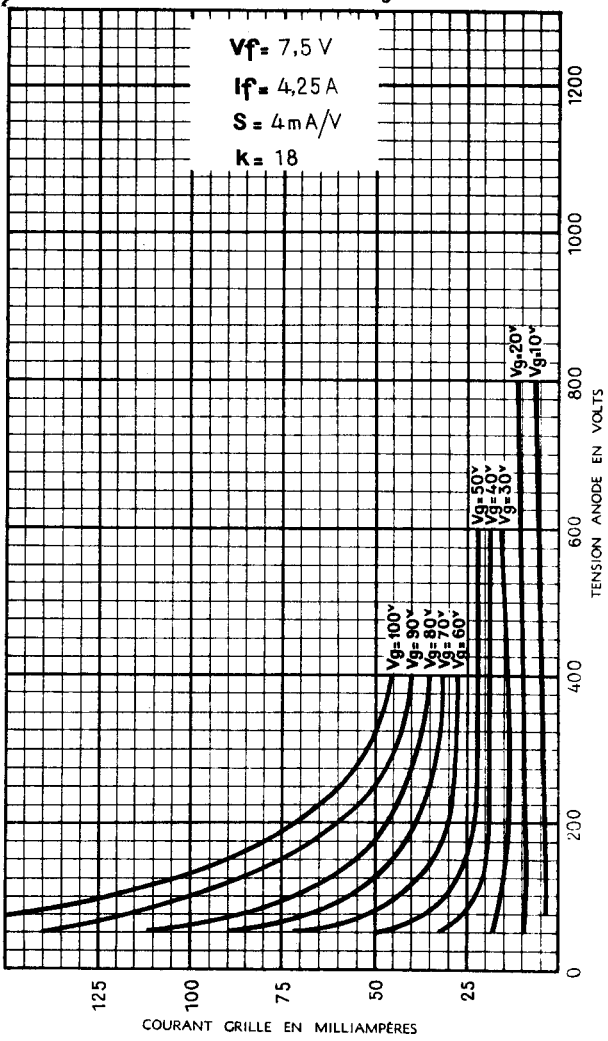
REPRODUCTION INTERDITE

3T100A1

MAZDA

3 T 100 A 1

COURBES DU COURANT GRILLE
en fonction de la tension grille



REPRODUCTION INTERDITE

MAZDA

3 T 100 A 1 G

3T100A1G

TRIODE AMPLIFICATRICE ET OSCILLATRICE H. F.
A ANODE EN GRAPHITE

Nature du filament	Tungstène thorié.
Tension filament	7,5 Volts CA ou CC
Intensité filament	4,25 Amp.
Pente (mesurée au 1/10e du courant de saturation)	4 mA/V
Coefficient d'amplification	18
Capacités inter-électrodes :	
Capacité grille-anode	3,3 pF
Capacité grille-filament	4 pF
Capacité anode-filament	0,2 pF
Hauteur maximum	111 mm
Diamètre maximum	50 mm
Ampoule Pied Coiffe	Voir dessin page 3

Support Mazda à utiliser SP100E

Limites d'utilisation

Tension anode maximum	1.500 Volts max.
Dissipation anode maximum	60 Watts max.
Pour une fréquence maximum de	150 MHz
Fréquence pour laquelle la tension normale d'anode et la puissance appliquée sont réduites de 50 %	250 MHz

Amplification H.F. de puissance
Téléphonie - Classe C
Modulation par l'anode

Régime de la porteuse pour l'utilisation d'une modulation maximum de 100 %.

Conditions maxima

Tension anode CC	1.500 Volts max.
Tension grille CC	- 500 Volts max.
Courant anode CC	150 mA max.
Courant grille CC	40 mA max.
Puissance appliquée à l'anode	200 Watts max.
Dissipation anode	40 Watts max.

Exemples typiques d'utilisation

Tension anode CC	800	1.000	1.250	1.500 Volts
Tension grille CC	- 200	- 265	- 380	- 400 Volts
Tension grille H.F. de crête	330	420	560	600 Volts

REPRODUCTION INTERDITE

3 T 100 A I G

MAZDA

3 T 100 A I G

TRIODE AMPLIFICATRICE ET OSCILLATRICE H. F.
A ANODE EN GRAPHITE

Exemples typiques d'utilisation *(suite)*

Courant anode CC	90	110	130	150	mA
Courant grille CC (approx.)	13	17	23	25	mA
Puissance d'excitation (approx.)	4,3	7,1	12,8	15	Watts
Puissance de sortie (approx.)	52	84	130	190	Watts
Rendement	72	76	80	84	%

Amplification H.F. de puissance ou auto-oscillation
Télégraphie - Classe C

Régime clé abaissée, sans modulation.

Conditions maxima

Tension anode CC	1.500 Volts max.
Tension grille CC	- 500 Volts max.
Courant anode CC	175 mA max.
Courant grille CC	40 mA max.
Puissance appliquée à l'anode	260 Watts max.
Dissipation anode	60 Watts max.

Exemples typiques d'utilisation

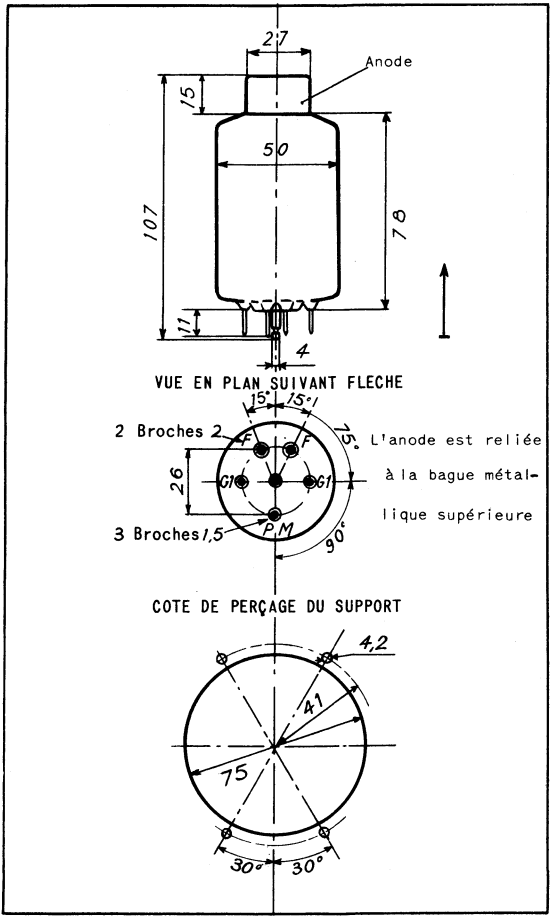
Tension anode CC	800	1.000	1.100	1.250	1.500 Volts
Tension grille CC	- 65	- 90	- 100	- 115	- 120 Volts
Tension grille H.F. de crête	180	230	250	275	300 Volts
Courant d'anode CC	115	135	140	155	175 mA
Courant grille CC (approx.)	20	23	26	29	30 mA
Puissance d'excitation (approx.)	3,6	5,3	6,5	7,9	9 Watts
Puissance de sortie (approx.)	67	93	113	148	200 Watts
Rendement	67	71	73	76	76 %

REPRODUCTION INTERDITE

MAZDA

3T100A1G

3T100A1G



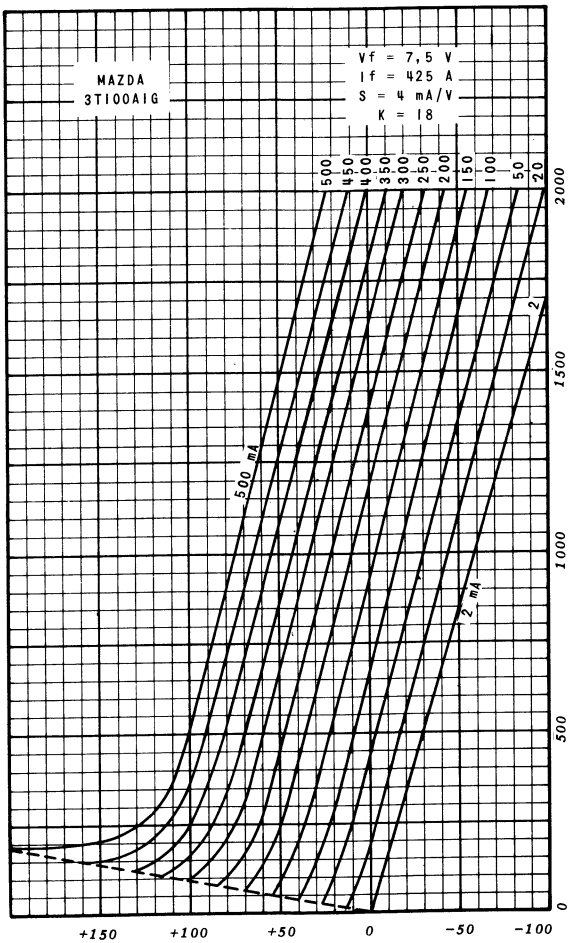
REPRODUCTION INTERDITE

3T100A1G

MAZDA

3T100A1G

CARACTÉRISTIQUE
A COURANT ANODE CONSTANT



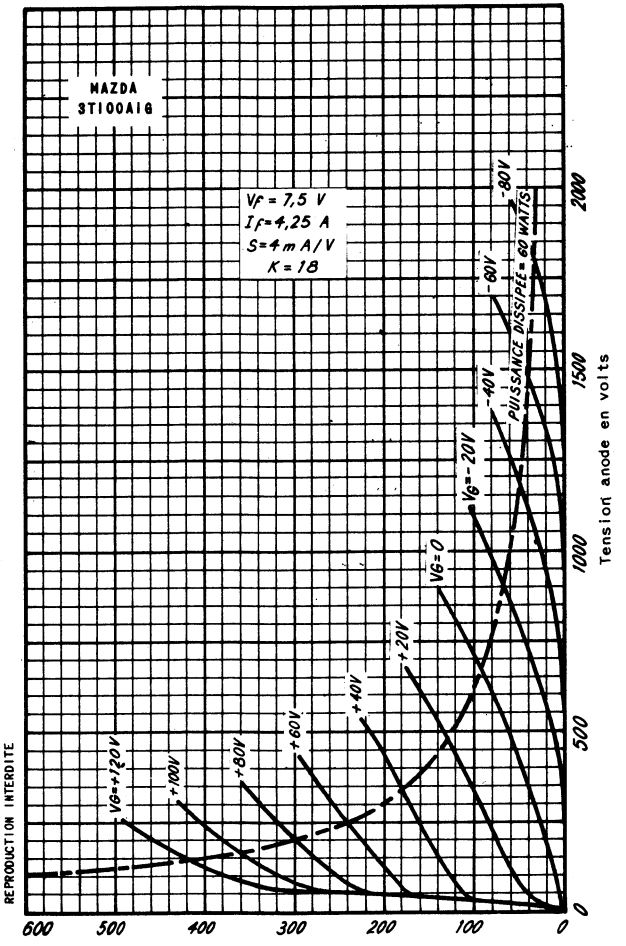
REPRODUCTION INTERDITE

MAZDA

3T100A1G

3T100A1G

COURBES DU COURANT ANODE
EN FONCTION DE LA TENSION ANODE



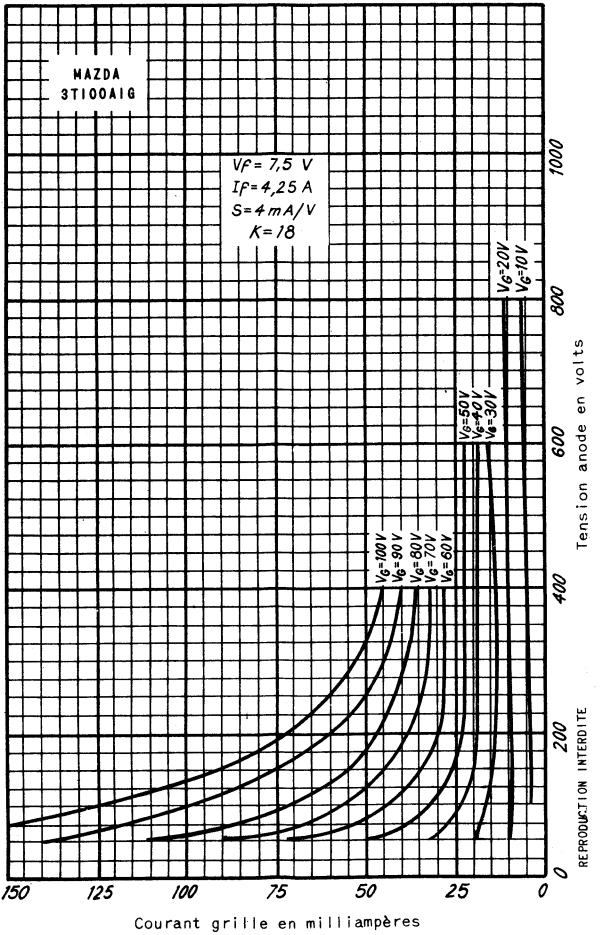
REPRODUCTION INTERDITE

3 T 100 A I G

MAZDA

3 T 100 A I G

COURBES DU COURANT GRILLE
EN FONCTION DE LA TENSION GRILLE



REPRODUCTION INTERDITE

MAZDA

3T100A2

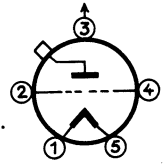
3T100A2

TRIODE D'ÉMISSION
AMPLIFICATEUR H. F.
SÉRIE "A"

Nature du filament :	Tungstène thorié
Tension filament	6,3 Volts
Intensité filament	4 Ampères
Pente (mesurée au 1/10ème de la saturation)	8 mA/V
Coefficient d'amplification	160
Fréquence limite d'utilisation pour laquelle on peut obtenir la puissance utile nominale avec un rendement de 66 %	150 MH_Z
Capacités interélectrodes :	
capacité grille-anode	5 pF approx.
capacité grille-filament	5,5 pF approx.
capacité anode-filament	0,6 pF approx.
Hauteur maximum	120,5 mm
Diamètre maximum	50 mm
Encombrement	C.50-FC.2
Brochage	5.F-BF
Support Mazda à utiliser	S.P.100 E

Broches :

N° 1 - Filament.
N° 2 - Grille.
N° 3 - Non connectée (à ne pas utiliser comme relais).



Broches :

N° 4 - Grille.
N° 5 - Filament.
L'anode est reliée à la couronne métallique.

Broches de la base, face à l'observateur.

LIMITES D'UTILISATION

Tension d'anode maximum CC	1.250 Volts max.
Dissipation d'anode maximum	60 Watts max.
Puissance utile	115 Watts max.

AMPLIFICATEUR H.F ou AUTO-EXCITATION
CLASSE C - TELEGRAPHIE
Conditions maxima (T.C.C) (1)

Tension d'anode CC	1.250 Volts max.
Courant moyen d'anode CC	150 mA max.
Puissance appliquée à l'anode	160 Watts max.
Dissipation anode	45 Watts max.
Tension de grille CC	-200 Volts max.
Courant de grille CC	50 mA max.

(1) - Trafic commercial continu.

REPRODUCTION INTERDITE

3TI00A2

MAZDA

3TI00A2

TRIODE D'ÉMISSION
AMPLIFICATEUR H. F.
SÉRIE "A"

EXEMPLES TYPIQUES D'UTILISATION

Tension d'anode CC	1.000	1.250	Volts
Courant moyen d'anode CC	105	120	mA
Tension de grille CC	- 80	- 100	Volts
Tension de crête H.F grille	175	210	Volts
Courant moyen de grille CC (ap.)	28	35	mA
Puissance d'excitation (approx.)	4,9	8	Watts
Puissance utile (approx.)	80	113	Watts

AMPLIFICATEUR H.F - CLASSE C - TELEPHONIE

Modulation par l'anode. Conditions maxima (T.C.C) (1)

Tension d'anode CC	1.000	Volts max.
Courant moyen d'anode CC	125	mA max.
Puissance appliquée à l'anode	125	Watts max.
Dissipation anode	27	Watts max.
Tension de grille CC	- 200	Volts max.
Courant de grille CC	50	mA max.

EXEMPLES TYPIQUES D'UTILISATION

Tension d'anode CC	800	1.000	Volts
Courant moyen d'anode CC	90	102	mA
Tension de grille CC	- 90	- 110	Volts
Tension de crête H.F grille	182	220	Volts
Courant moyen de grille CC (approx.)	31	39	mA
Puissance d'excitation (approx)	5,7	8,5	Watts
Puissance utile (approx.)	57	84	Watts

AMPLIFICATEUR B.F et MODULATEUR CLASSE B

Conditions maxima (T.C.C) (1)

Tension d'anode CC	1.250	Volts max.
Courant moyen d'anode CC	150	mA max.
Puissance appliquée à l'anode	180	Watts max.
Dissipation anode	60	Watts max.

EXEMPLE D'UTILISATION

VALEURS POUR 2 TUBES EN PUSH-PULL

Tension d'anode CC	1.250	Volts
Tension de grille CC	0	Volt
Tension de crête H.F grille	135	Volts
Courant d'anode CC (signal nul)	55	mA
Courant d'anode CC (signal max)	265	mA
Impédance de charge (entre anodes)	14,5	K Ω
Puissance de sortie (signal max)	205	Watts approx.
Puissance d'excitation (signal max.)	3	Watts approx.

(1) - Trafic commercial continu.

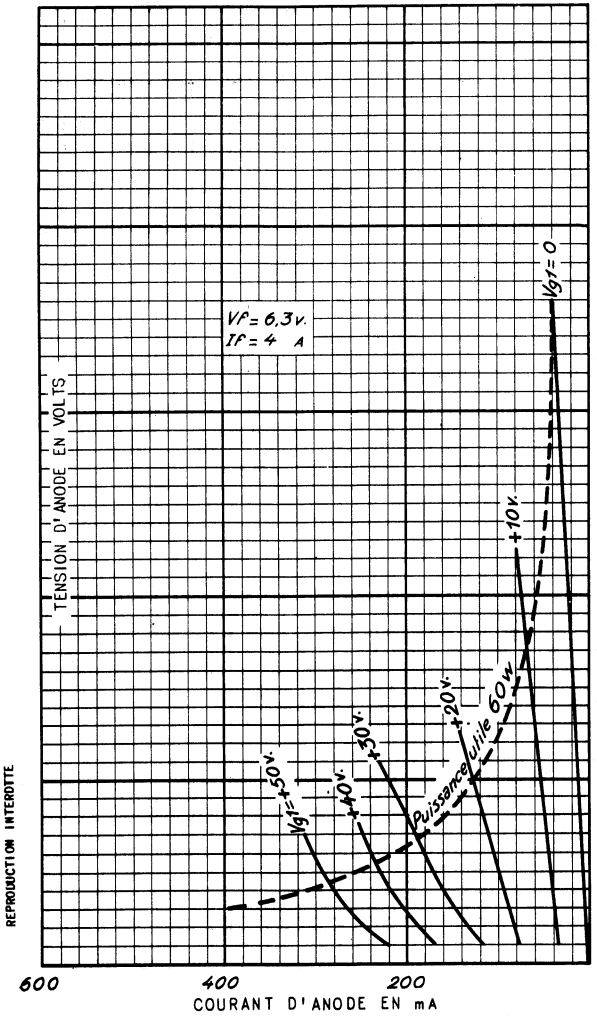
REPRODUCTION INTERDITE

MAZDA

3T100A2

3T100A2

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



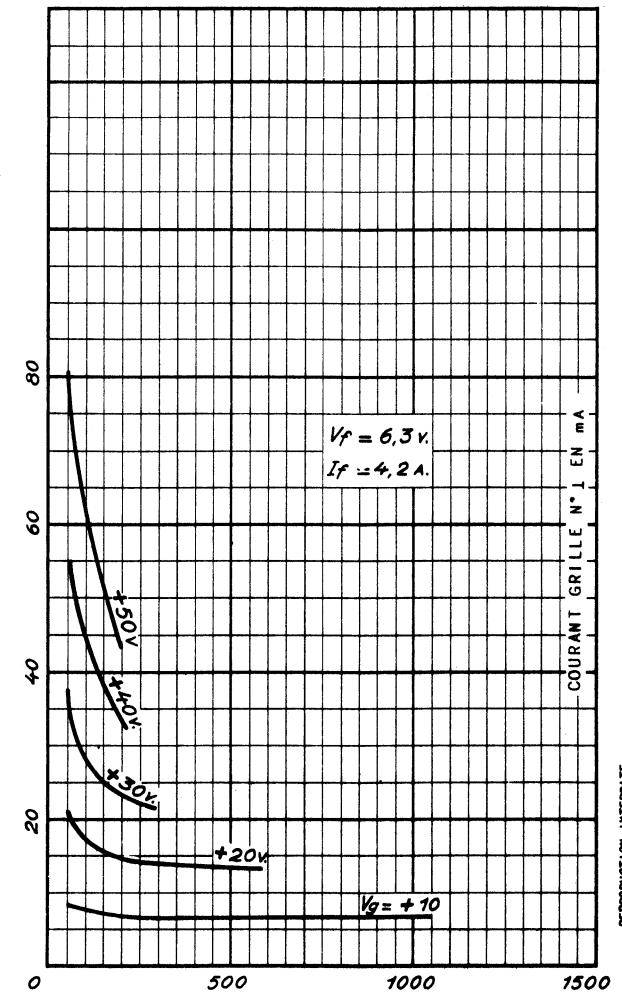
REPRODUCTION INTERDITE

3T100A2

MAZDA

3TI00A2

COURBES DE LA TENSION D'ANODE EN FONCTION DE LA TENSION GRILLE N° I



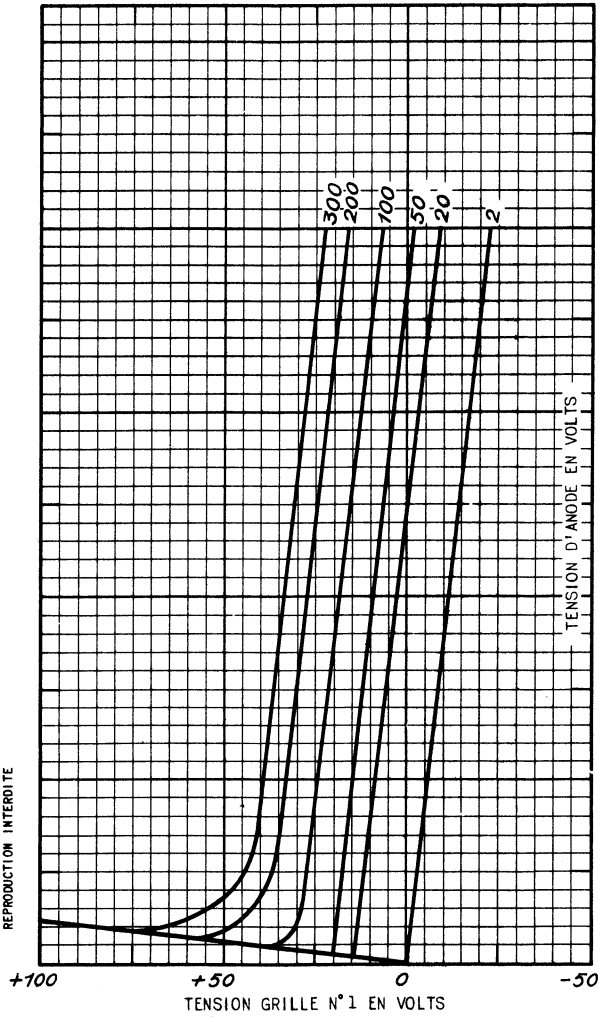
REPRODUCTION INTERDITE

MAZDA

3T100A2

3T100A2

COURBES DU COURANT GRILLE N° 1 EN FONCTION DE LA TENSION D'ANODE



REPRODUCTION INTERDITE

MAZDA

3T100R

3T100R

TRIODE À CHAUFFAGE DIRECT
CATHODE THORIÉE
TRIODE DE PUISSANCE
POUR FONCTIONNEMENT EN RÉGULATEUR SÉRIE

CARACTERISTIQUES GENERALES

Electriques

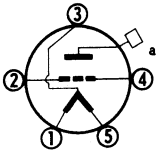
Cathode à chauffage direct

Tension filament	10 V
Courant filament	7 A

Mécaniques

Hauteur maximale hors tout	145 mm max.
Hauteur maximale de l'ampoule	115 mm max.
Diamètre maximal	82 mm
Embase	5 C 31 (1)
Coiffe	C 14 - 1

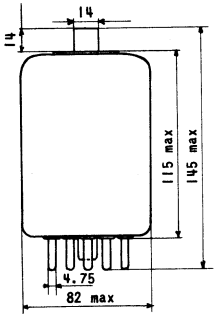
Brochage



Broche N°1 - Filament
Broche N°2 - Grille
Broche N°3 - Point milieu filament
Broche N°4 - Grille
Broche N°5 - Filament

Vue face à l'observateur

Encombrement



Il existe, à la Société "NATIONAL" une prise d'anode spéciale portant la référence PA 14.

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(1) Référence U.T.E (norme C95-111-additif 1, feuille 19.1 et 19.2.)

REPRODUCTION INTERDITE

3T100R

MAZDA

3T100R

TRIODE À CHAUFFAGE DIRECT
CATHODE THORIÉE
TRIODE DE PUISSANCE
POUR FONCTIONNEMENT EN RÉGULATEUR SÉRIE

LIMITES MAXIMALES D'UTILISATION

Système des limites absolues

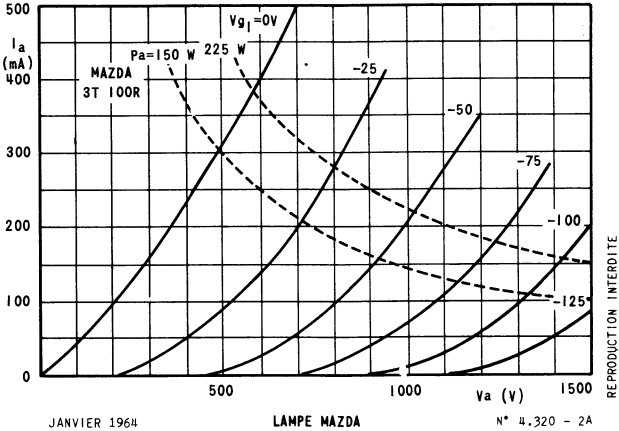
Tension filament	10,5	V max.
	9,5	V min.
Tension de crête instantanée d'anode	3000	V max.
Tension de crête instantanée négative de grille	1200	V max.
Courant moyen de cathode	750	mA max.
Dissipation d'anode		
– refroidissement naturel	150	W max.
– avec ventilation (1)	225	W max.
Dissipation de grille	30	W max.
Courant moyen de grille	150	mA max.

CARACTERISTIQUES NOMINALES

Pente pour un courant d'anode de 350 mA	10 mA/V
Coefficient d'amplification	11

(1) La température de l'ampoule, au point le plus chaud, ne doit pas dépasser 220° C.

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



REPRODUCTION INTERDITE

MAZDA

4 Y 25

4 Y 25

TÉTRODE AMPLIFICATRICE A FAISCEAUX ELECTRONIQUES DIRIGÉS

Cathode à chauffage indirect (1)	
Tension filament	6,3 Volts CC ou CA
Intensité filament	0,9 Amp.
Pente (pour un courant d'anode de 72 mA)	6 mA/V approx.
Coefficient d'amplification grille-écran	8
Capacités inter-électrodes:	
Grille anode (avec blindage extérieur)	0,2 pF max.
Capacité d'entrée	11 pF max.
Capacité de sortie	7 pF max.
Hauteur maximum	146 mm.
Diamètre maximum	50 mm.
Ampoule	V 71
Coiffe	6.177
Culot	6.236

AMPLIFICATION B.F. DE PUISSANCE ET MODULATION CLASSE AB2 (2)

Conditions maxima d'utilisation

Tension anode CC	600 Volts max.
Tension écran (grille N°2) CC	300 Volts max.
Courant anode CC pour signal max. (3)	120 mA max.
Puissance appliquée à l'anode par signal max. (3)	60 Watts max.
Puissance appliquée à l'écran (3)	3,5 Watts max.
Dissipation anode (3)	25 Watts max.

Exemples typiques d'utilisation

Sauf mention contraire, les valeurs indiquées se rapportent à 2 tubes.

Tension anode CC	400	500	600	Volts
Tension écran CC	300	300	300	Volts
Tension grille N°1 CC (polarisation fixe)	-25	-25	-30	Volts
Tension BF de crête de grille à grille	78	78	78	Volts
Courant anode CC pour signal maximum	240	240	200	mA
Courant anode CC pour signal nul	100	100	60	mA
Courant écran CC pour signal maximum	10	10	10	mA
Courant écran CC pour signal nul	5	5	5	mA
Résistance de charge (par tube)	800	1.060	1.600	Ohms.

(1) Dans les circuits où la cathode n'est pas reliée directement au filament, la différence de potentiel entre cathode et filament ne doit pas dépasser 100 Volts. Dans le cas de dissipation maximum de l'anode et de l'écran, la tension du filament ne doit pas subir de fluctuations l'élevant au-dessus de 7 Volts.

(2) L'indice 2 indique qu'il existe un courant grille pendant une partie du cycle.

(3) Moyenne établie sur tout cycle B.F. de forme sinusoïdale.

(Voir page suivante)

Reproduction interdite

MAZDA

4 Y 25

4 Y 25

TÉTRODE AMPLIFICATRICE A FAISCEAUX ELECTRONIQUES DIRIGÉS

Résistance de charge effective (d'anode à anode)	3.200	4.240	6.400	Ohms
Puissance max.d'entrée dans la grille (4)	0,2	0,2	0,1	Watt approx.
Puissance max. de sortie (5)	55	75	80	Watts approx.

AMPLIFICATION H.F. DE PUISSANCE TELEPHONIE CLASSE B

Régime de l'onde porteuse par tube pour l'utilisation avec un taux de modulation maximum de 100 %

Tension anode CC	600	Volts max.
Tension écran (grille N°2) CC	300	Volts max.
Courant anode CC	80	mA max.
Puissance appliquée à l'anode	37,5	Watts max.
Puissance appliquée à l'écran	2,5	Watts max.
Dissipation anode	25	Watts max.

Exemples typiques d'utilisation

Tension anode CC	400	500	600	Volts
Tension écran (grille N°2) CC	250	250	250	Volts
Tension grille N°1 CC (6)	-25	-25	-25	Volts
Tension H.F. de crête dans la grille	30	30	20	Volts
Courant anode CC	75	75	62,5	mA
Courant écran CC	4	4	3	mA
Courant grille CC (approx.)	0	0	0	mA
Puissance d'attaque (approx.) (7)	0,25	0,25	0,2	Watt
Puissance de sortie (approx.)	9	12,5	12,5	Watts

AMPLIFICATION H.F. DE PUISSANCE AVEC MODULATION PLAQUE TELEPHONIE CLASSE C

Régime de l'onde porteuse par tube pour l'utilisation avec un taux de modulation maximum de 100 %

Tension anode CC	475	Volts max.
Tension écran (grille N°2) CC	300	Volts max.
Tension grille (grille N°1) CC	- 200	Volts max.
Courant anode CC	83	mA max.
Courant grille (grille N°1) CC	5	mA max.
Puissance appliquée à l'anode	40	Watts max.
Puissance appliquée à l'écran (grille N°2)	2,5	Watts max.
Dissipation anode	16,5	Watts max.

(4) L'étage de commande doit être capable d'alimenter les grilles de l'étage classe AB2 aux valeurs maxima indiquées avec un faible taux de distorsion. La résistance effective par circuit grille de l'étage classe AB2 doit être maintenue inférieure à 500 Ohms et l'impédance effective à la plus haute fréquence de réponse désirée ne doit pas dépasser 700 Ohms.

(5) Avec un étage de commande d'impédance nulle et un filtrage parfait, la distorsion dans l'anode ne dépasse pas 2 %. Pratiquement les taux de régulation de tension anode, de tension écran et de tension grille ne doivent pas dépasser respectivement 5% et 3 %.

(6) La résistance totale effective du courant grille ne doit pas dépasser 25.000 Ohms.

(7) Au maximum d'un cycle B.F. avec un taux de modulation de 100 %.

(Voir page suivante)

Reproduction interdite

MAZDA

4 Y 25

4 Y 25

TÉTRODE AMPLIFICATRICE A FAISCEAUX ELECTRONIQUES DIRIGÉS

Exemples typiques d'utilisation

Tension anode CC	325	400	475	Volts
Tension écran CC(8)	225	225	225	Volts
Résistance d'écran	20.000	30.000	50.000	Ohms
Tension grille CC(6) (9)	-75	-80	-85	Volts
Résistance de grille	25.000	22.800	21.300	Ohms
Tension H.F. de crête sur la grille	90	95	110	Volts
Courant anode CC	80	30	83	mA
Courant écran CC	5	5,75	5	mA
Courant grille CC (approx.)	3	3,5	4	mA
Puissance d'attaque (appr.)	0,25	0,3	0,4	Watt
Puissance de sortie (appr.)	17,5	22,5	27,5	Watts

AMPLIFICATION H.F. DE PUISSANCE ET AUTO-OSCILLATION TELEGRAPHIE CLASSE C

Régime par tube, clé abaissée, sans modulation(10)	
Tension anode CC	600 Volts max.
Tension écran (grille N°2) CC	300 Volts max.
Tension grille (grille N°1) CC	-200 Volts max.
Courant anode CC	100 mA max.
Courant grille CC	5 mA max.
Puissance appliquée à l'anode	60 Watts max.
Puissance appliquée à l'écran	3,5 Watts max.
Dissipation anode	25 Watts max.

Exemples typiques d'utilisation

Tension anode CC	400	500	600	Volts
Tension écran CC(11)	250	250	250	Volts
Résistance série	20.000	42.000	50.000	Ohms
Tension grille CC(6) (12)	-45	-45	-45	Volts
Résistance de grille	12.800	12.300	12.800	Ohms
Résistance de cathode	410	410	410	Ohms
Tension H.F. de crête sur la grille	65	65	65	Volts
Courant anode CC	100	100	100	mA
Courant écran CC	7,5	6	7	mA
Courant grille CC (approx.)	3,5	3,5	3,5	mA
Puissance d'attaque (appr.)	0,2	0,2	0,2	Watt
Puissance de sortie (appr.)	25	30	40	Watts

(8) Obtenue de préférence à partir d'une alimentation fixe *modulée* ou à partir de l'alimentation anode *modulée* au travers de la résistance dont la valeur est indiquée.

(9) Peut être obtenue à l'aide d'une résistance de grille (valeurs indiquées), quoiqu'une combinaison soit de résistance de grille et de résistance de cathode, soit de résistance de grille et d'alimentation fixe soit recommandée.

(10) On peut utiliser une modulation essentiellement négative si la crête positive de l'enveloppe B.F. ne dépasse pas 115 % des conditions de la porteuse.

(11) Obtenue à partir, soit d'une source séparée, soit d'un pont de résistances, soit de l'alimentation d'anode au travers d'une résistance-série de la valeur indiquée.

(12) Obtenue soit à partir d'une source fixe, soit par une résistance de grille (12.800), soit par une résistance de cathode (410), soit par une combinaison de ces méthodes.

Reproduction interdite

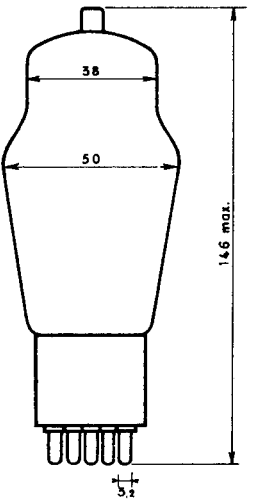
MAZDA

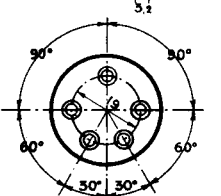
4 Y 25

4 Y 25

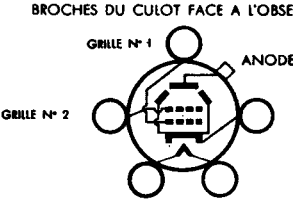
TÉTRODE AMPLIFICATRICE

A FAISCEAUX ELECTRONIQUES DIRIGÉS





BROCHES DU CULOT FACE A L'OBSERVATEUR



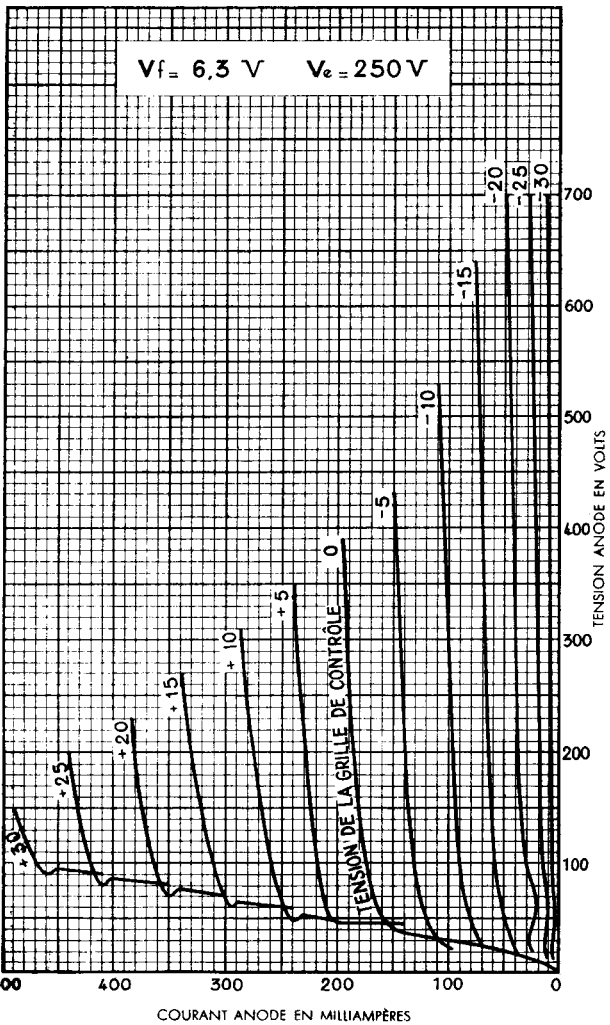
REPRODUCTION INTERDITE

MAZDA

4 Y 25

4Y25

CARACTÉRISTIQUES MOYENNES DE PLAQUE



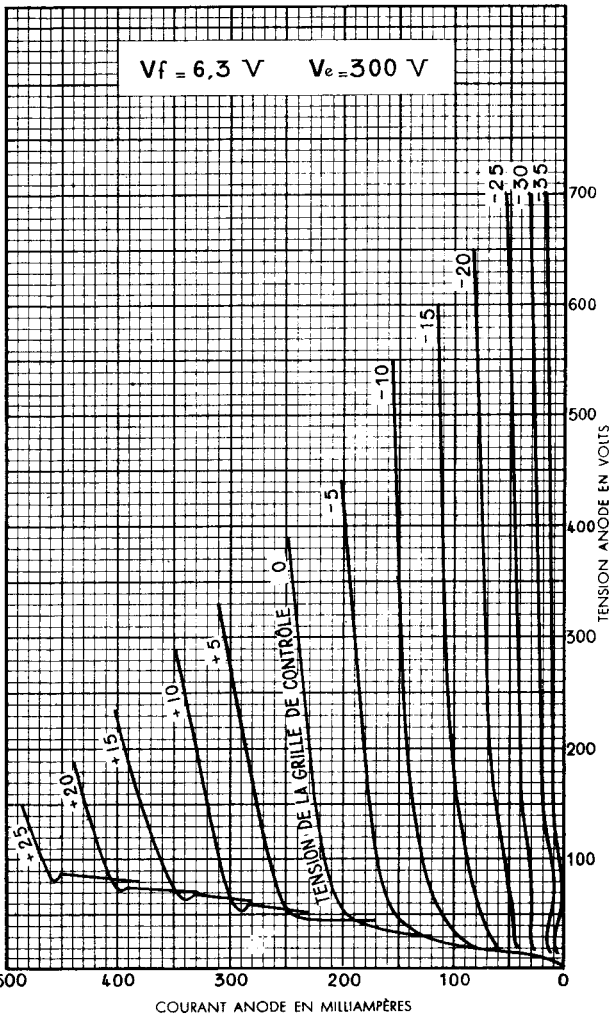
REPRODUCTION INTERDITE

4 Y 25

MAZDA

4 Y 25

CARACTÉRISTIQUES MOYENNES DE PLAQUE



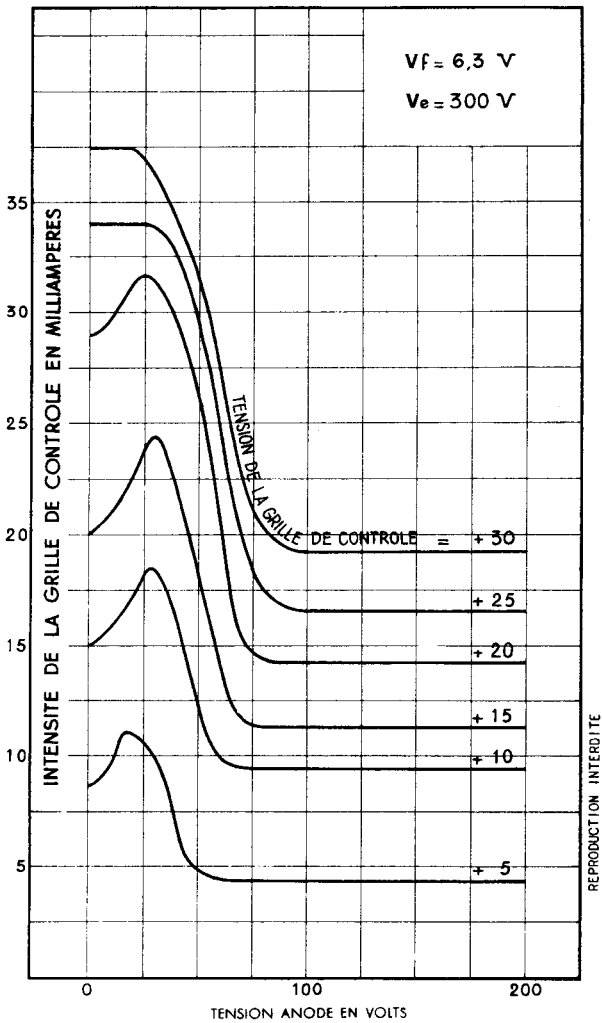
REPRODUCTION INTERDITE

MAZDA

4 Y 25

4Y25

CARACTÉRISTIQUES TYPIQUES D'UTILISATION



REPRODUCTION INTERDITE

MAZDA

4Y50AI

4Y50AI

TÉTRODE D'ÉMISSION A FAISCEAUX ÉLECTRONIQUES DIRIGÉS AMPLIFICATEUR H. F. SÉRIE "A"

Cathode à chauffage indirect (1)		
Tension filament	6,3	Volts
Intensité filament	1,45	Ampère
Pente (mesurée au 1/10ème de la saturation)	10	mA/V
Capacités interélectrodes :		
Capacité d'entrée	18	pF
Capacité de sortie	8	pF
Capacité grille-anode	0,1	pF
Hauteur maximum	99	mm
Diamètre maximum	41	mm
Encombrement		C.48-FC. 3
Brochage		9.F-CB
Support Mazda à utiliser		S.25-50A

Broches :

N° 1 - Filament.
N° 2 - Déflecteur.
N° 3 - Grille N° 1.
N° 4 - Grille N° 2.
N° 5 - Cathode.

Broches :

N° 6 - Grille N° 2.
N° 7 - Grille N° 1.
N° 8 - Déflecteur.
N° 9 - Filament.
L'anode est reliée à la couronne métallique

Broches de la base, face à l'Observateur.

LIMITES D'UTILISATION

Tension d'anode maximum CC	600	Volts max.
Tension de grille N°2 maximum CC	275	Volts max.
Dissipation d'anode maximum	35	Watts max.
Dissipation de grille N°2 maximum	7	Watts max.
Fréquence limite pour laquelle on obtient la puissance nominale avec un rendement de 66 %	220	MH_Z

AMPLIFICATEUR H.F ou AUTO-EXCITATION CLASSE C - TELEGRAPHIE

Conditions maxima

Tension d'anode CC	800	Volts max.
Courant moyen d'anode CC	150	mA max.
Tension de grille N°2 CC	250	Volts max.
Courant de grille N°2 CC	35	mA max.
Puissance appliquée à l'anode	120	Watts max.
Dissipation anode	30	Watts max.
Tension de grille N° 1 CC	- 60	Volts max.
Courant de grille N° 1 CC	15	mA max.

(Voir Note au Verso)

REPRODUCTION INTERDITE

4Y50AI

MAZDA

4Y50AI

TÉTRODE D'ÉMISSION A FAISCEAUX ÉLECTRONIQUES DIRIGÉS AMPLIFICATEUR H. F. SÉRIE "A"

EXEMPLES TYPIQUES D'UTILISATION

Tension d'anode CC	600	750	Volts
Courant moyen d'anode CC	92	110	mA
Tension de grille N°2 CC	200	225	Volts
Courant de grille N°2 CC	19	26	mA
Tension de grille N°1 CC	- 33	- 42	Volts
Tension de crête H.F grille N°1	50	55	Volts
Courant moyen de grille N°1 CC (approx.)	8	10	mA
Puissance d'excitation (approx.)	0,4	0,55	Watt
Puissance utile (approx.)	43	63	Watts

AMPLIFICATEUR H.F - CLASSE C - TELEPHONIE MODULATION PAR L'ANODE ET LA GRILLE N°2

Conditions maxima

Tension d'anode CC	700	Volts max.
Courant moyen de cathode	180	mA max.
Tension de grille N°2 CC	250	Volts max.
Courant de grille N°2 CC	35	mA max.
Puissance appliquée à l'anode	125	Watts max.
Dissipation anode	30	Watts max.
Tension de grille N°1 CC	- 60	Volts max.
Courant de grille N°1 CC	15	mA max.

EXEMPLES TYPIQUES D'UTILISATION

Tension d'anode CC	500	600	Volts
Courant moyen de cathode	125	150	mA
Résistance à insérer dans le circuit G_2	10	10	K Ω
Tension de grille N°1 CC	- 42	- 42	Volts
Tension de crête H.F grille N°1	58	58	Volts
Courant moyen de grille N°1 CC (approx.)	10	10	mA
Puissance d'excitation (approx.)	0,58	0,58	Watt
Puissance utile (approx.)	34	47	Watts

(1) Dans les circuits où la cathode n'est pas directement reliée au filament, la différence de potentiel entre filament et cathode doit être inférieure ou au plus égale à 100 volts.

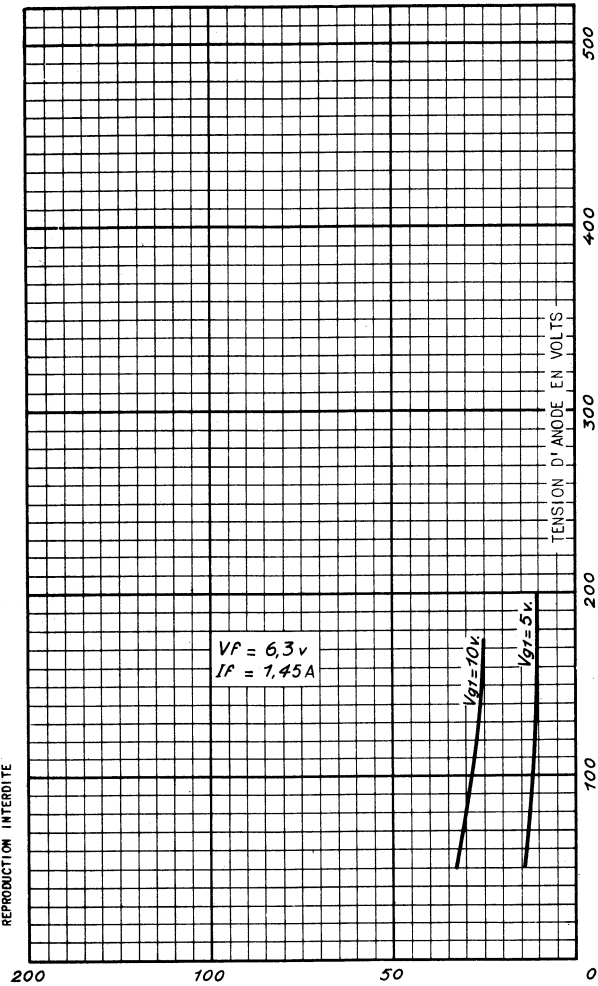
REPRODUCTION INTERDITE

MAZDA

4Y50AI

4Y50AI

COURBES DU COURANT GRILLE N° 1 EN FONCTION DE LA TENSION D'ANODE



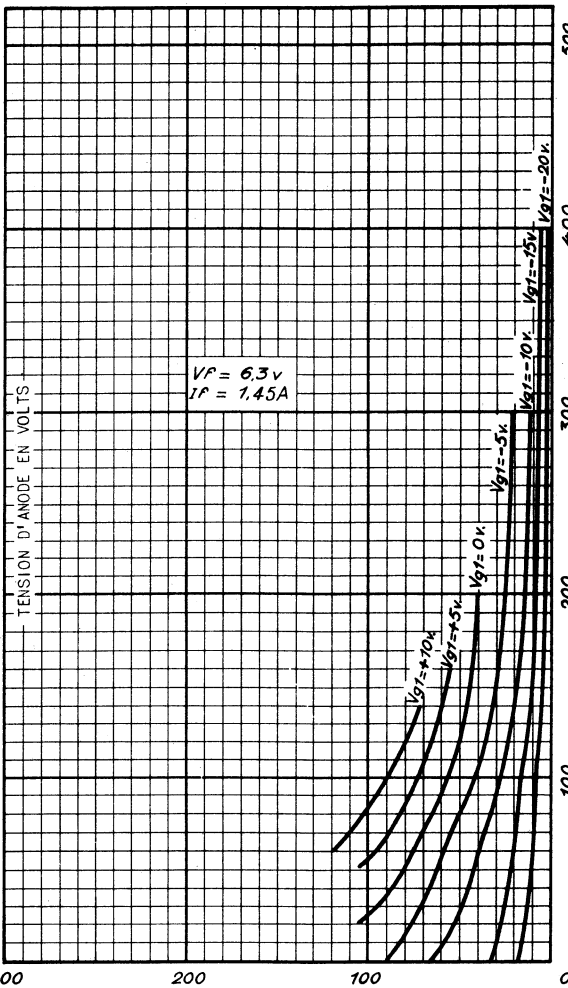
REPRODUCTION INTERDITE

4Y50AI

MAZDA

4Y50AI

COURBES DU COURANT DE GRILLE N° 2 EN FONCTION DE LA TENSION D'ANODE



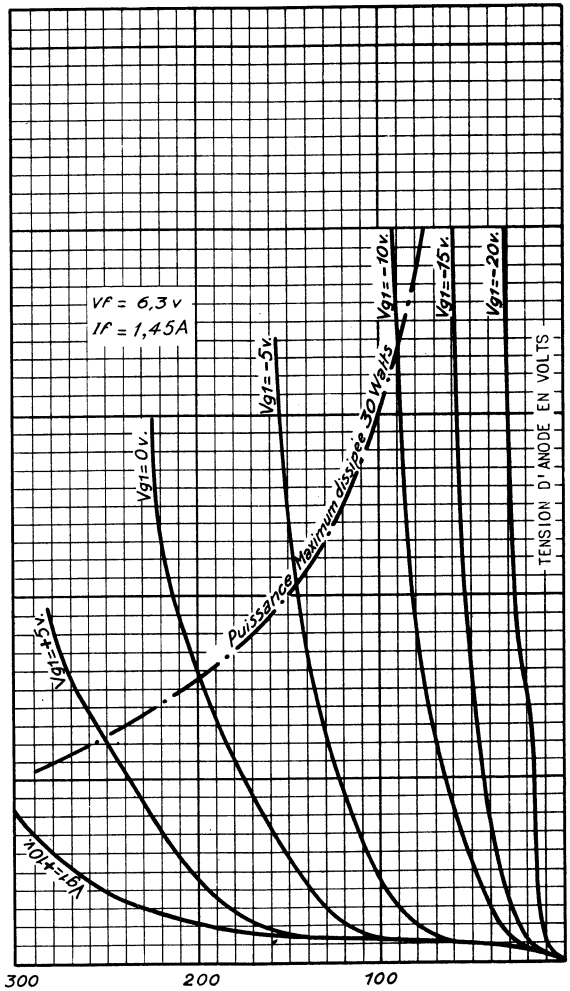
REPRODUCTION INTERDITE

MAZDA

4Y50A

4Y50A1

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



REPRODUCTION INTERDITE

DOUBLE TETRODE D'EMISSION A FAISCEAUX ELECTRONIQUES DIRIGES AMPLIFICATEUR ET OSCILLATEUR H. F.

4 Y 50 D

Le tube 4Y50D est une double tétrode d'émission dont les caractéristiques de fonctionnement sont comparables en tout point à celles du 829B.

Par suite de précautions spéciales et du renforcement de la structure, il a été possible d'augmenter les dissipations admissibles sur les grilles. De ce fait, le fonctionnement du 4Y50D est stable quand on utilise le tube à pleine puissance.

CARACTERISTIQUES GENERALES

Electriques

Branchement du filament	en parallèle	en série
Tension filament	6,3 V	12,6 V
Intensité filament	3,2 A	1,6 A

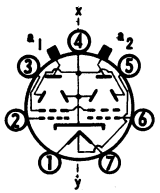
Capacités interélectrodes : pour chaque élément

Capacité anode-grille	0,12 pF
Capacité d'entrée	16,4 pF
Capacité de sortie	7,6 pF
Hauteur maximale (broches comprises)	112 mm max.
Diamètre maximal	53 mm max.
Brochage	7.E-UA

Le plan des électrodes de chaque élément est parallèle à celui dont la trace passe par l'axe de la broche 4 et par le milieu de l'intervalle séparant les broches nos 1 et 7 (trace figurée sur le schéma de brochage par l'axe xy).

REPRODUCTION INTERDITE

BROCHAGE



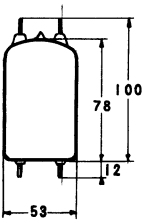
Broches face à l'observateur

REPARTITION DES BROCHES :

- No 1 - filament
- No 2 - grille no 1 (élément no 2)
- No 3 - grille no 2
- No 4 - cathode et grille no 3 (ou déflecteurs)
- No 5 - point milieu filament
- No 6 - grille no 1 (élément no 1)
- No 7 - filament

Chaque anode est réunie à une des sorties du sommet

ENCOMBREMENT



Cotes maximales en millimètres

DIAMETRE DES BROCHES

nos 1-2-3-5-6-7 ϕ = 1,5 mm

nos 4 ϕ = 3,2 mm

a_1 - anode élément no 1

a_2 - anode élément no 2

MAZDA
4 Y 75 R

4Y 75R

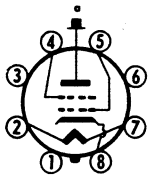
TÉTRODE DE PUISSANCE
AMPLIFICATEUR A.F. - RÉGULATEUR SÉRIE
Série : OCTAL

Le tube 4 Y 75 R est une tétrode de puissance conçue pour l'amplification A.F. et la régulation série des alimentations stabilisées.
L'anode du 4Y75R est en graphite et admet, de ce fait, une dissipation élevée sans inconvénient pour le bon fonctionnement du tube.
L'utilisation du 4Y75R en régulateur série est prévue en montage triode avec la grille n°2 reliée à l'anode.

Caractéristiques générales

Cathode à chauffage indirect	
Tension filament	6,3 V
Courant filament	1,65 A
Hauteur maximale	130 mm
Diamètre maximal	55 mm
Culot	octal

BROCHES
N° 1–Connexion interne
N° 2–Filament
N° 3–Connexion interne
N° 4–Grille n° 2

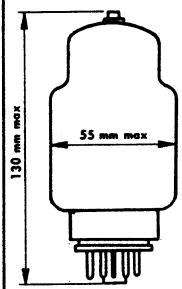


BROCHES
N° 5–Grille n° 1
N° 6–Connexion interne
N° 7–Filament
N° 8–Cathode coiffe–anode

Broches de la base, face à l'observateur

LIMITES MAXIMALES D'UTILISATION

Système des limites absolues
Sauf indication contraire, les tensions sont indiquées par rapport à la cathode



Tension d'anode	800 V max.
Tension de grille n°2	400 V max.
Tension négative de grille n° 1	150 V max.
Tension entre la grille n° 1 et la grille n°2	500 V max.
Dissipation d'anode	35 W max.
Dissipation de grille n°2	4,5 W max.
Courant moyen de cathode	200 mA max.

CARACTERISTIQUES NOMINALES

Tension d'anode	250 V
Tension de grille n°2	150 V
Tension de grille n° 1	−17,5 V
Courant d'anode	140 mA
Courant de grille n°2	4 mA
Pente	10 mA/V

CARACTERISTIQUES NOMINALES EN CONNEXION TRIODE

La grille n°2 reliée à l'anode

Tension d'anode	150 V
Tension de grille n° 1	−12 V
Courant d'anode	200 mA
Pente	12,5 mA/V
Coefficient d'amplification	4,5

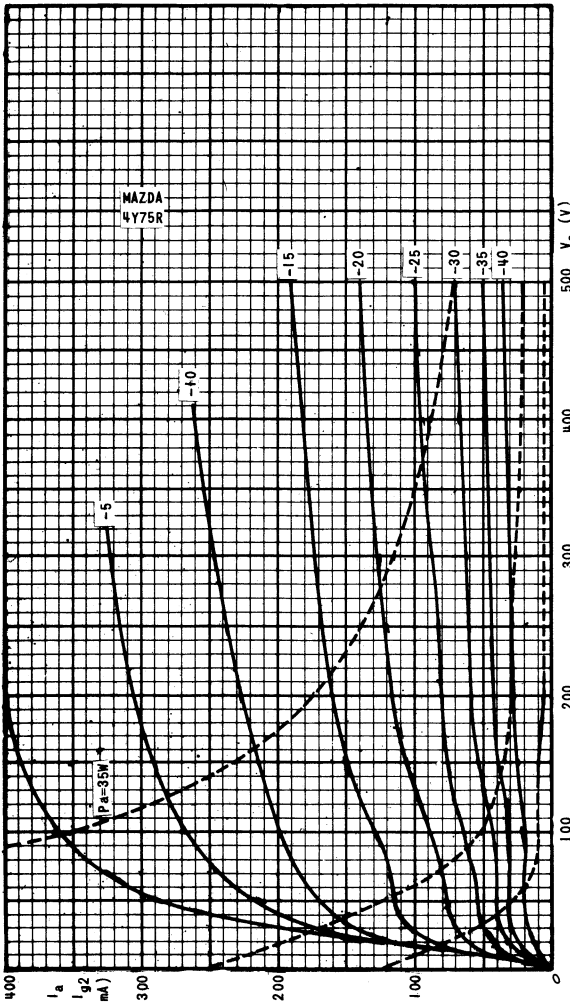
REPRODUCTION INTERDITE

4Y 75 R

MAZDA

4Y 75R

COURBES DES COURANTS D'ANODE ET DE GRILLE N°2
EN FONCTION DE LA TENSION D'ANODE

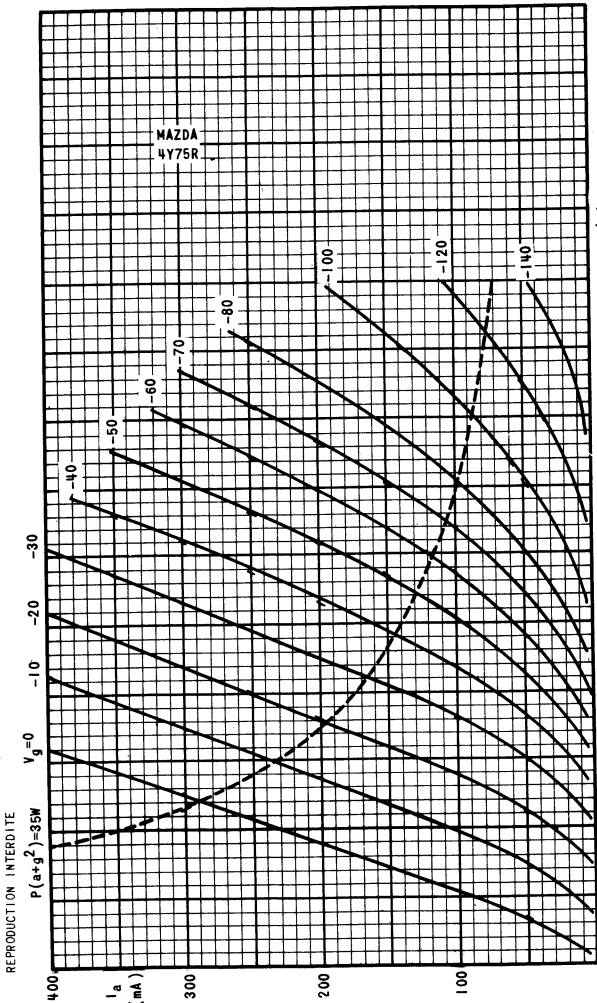


MAZDA

4Y75R

4Y75R

COURBES DU COURANT D'ANODE EN FONCTION
DE LA TENSION D'ANODE
CONNEXION TRIODE (g_2 réunie à l'anode)



MAZDA

4 Y 100 A 1 N

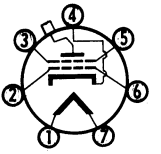
4 Y 100 A 1 N

TÉTRODE A FAISCEAUX DIRIGÉS
AMPLIFICATEUR M. F.
EMBASE : SEPTAR - SUPPORT UTILISÉ : SEPTAR 7 C 26

Cathode à chauffage indirect		
Tension filament	6,3	Volts
Intensité filament	3,75	Amp.
Hauteur broches comprises	120	mm max.
Diamètre	53	mm max.
Support à utiliser		SEPTAR 7C26
Culot		SEPTAR

BROCHES :

N° 1 – Filament
N° 2 – Grille n° 1
N° 3 – Grille n° 2
N° 4 – Cathode



BROCHES :

N° 5 – Grille n° 2
N° 6 – Grille n° 1
N° 7 – Filament
L'anode est reliée à la coiffe du sommet.

Broches de la base, face à l'observateur

LIMITES D'UTILISATION

Tension d'anode	750 V max.
Tension de grille n° 2	325 V max.
Dissipation d'anode	50 W max.
Dissipation de grille n° 2	10 W max.

REPRODUCTION INTERDITE

MAZDA
4Y100AIS

4Y100AIS

TETRODE D'EMISSION A FAISCEAUX
ELECTRONIQUES DIRIGES
AMPLIFICATEUR H. F. SERIE "A"

Cathode à chauffage indirect (1)	
Tension filament	6,3 Volts
Intensité filament	3,75 Ampères
Capacités interélectrodes :	
Capacité d'entrée	28 pF
Capacité de sortie	13 pF
Capacité grille-anode	0,27 pF
Hauteur maximum	118 mm
Diamètre maximum	50 mm
Encombrement	C.50-FC.3
Brochage	9.F-CB
Support Mazda à utiliser	SP.100A

Broches :

N° 1 - Filament.
N° 2 - Déflecteur.
N° 3 - Grille N° 1.
N° 4 - Grille N° 2.
N° 5 - Cathode.

Broches :

N° 6 - Grille N° 2.
N° 7 - Grille N° 1.
N° 8 - Déflecteur.
N° 9 - Filament.
L'anode est reliée à la couronne métallique.

Broches de la base face à l'Observateur.

LIMITES D'UTILISATION

Tension d'anode maximum CC	750 Volts max.
Tension de grille N° 2 maximum CC	350 Volts max.
Dissipation d'anode maximum	50 Watts max.
Dissipation de grille N° 2 maximum	14 Watts max.
Fréquence maximum	60 MHz max.

AMPLIFICATEUR H.F ou AUTO-EXCITATION
CLASSE C - TELEGRAPHIE

Conditions maxima

Tension d'anode CC	800 Volts max.
Courant moyen d'anode CC	250 mA max.
Tension de grille N° 2 CC	350 Volts max.
Courant de grille N° 2 CC	45 mA max.
Puissance appliquée à l'anode	200 Watts max.
Dissipation anode	60 Watts max.
Tension de grille N° 1 CC	-250 Volts max.
Courant de grille N° 1 CC	10 mA max.

(1) Dans les circuits où la cathode n'est pas directement reliée au filament, la différence de potentiel entre filament et cathode doit être inférieure ou au plus égale à 100 volts.

REPRODUCTION INTERDITE

4Y100AIS

MAZDA
4Y100AIS

TETRODE D'EMISSION A FAISCEAUX
ELECTRONIQUES DIRIGES
AMPLIFICATEUR H. F. SERIE " A"

EXEMPLES TYPIQUES D'UTILISATION

Tension d'anode CC	600	750	Volts
Courant moyen d'anode CC	170	195	mA
Tension de grille N° 2 CC	300	300	Volts
Courant de grille N° 2 CC	36	35	mA
Tension de grille N° 1 CC	- 100	- 100	Volts
Tension de crête H.F grille N° 1	110	110	Volts
Courant moyen de grille N° 1 CC (approx.)	4	6,4	mA
Puissance d'excitation (approx.)	0,45	0,7	Watt
Puissance utile (approx.)	79	110	Watts

AMPLIFICATEUR H.F. - CLASSE C - TELEPHONIE
MODULATION PAR L'ANODE & LA GRILLE N° 2
Conditions maxima

Tension d'anode CC	750	Volts
Courant moyen d'anode CC	250	mA
Tension de grille N° 2 CC	300	Volts
Courant de grille N° 2 CC	45	mA
Puissance appliquée à l'anode	190	Watts
Dissipation anode	60 W	Watts
Tension de grille N° 1 CC	- 250	Volts
Courant de grille N° 1 CC	10	mA

EXEMPLES TYPIQUES D'UTILISATION

Tension d'anode CC	550	600	Volts
Courant moyen de cathode CC	145	148	mA
Résistance à insérer en Circuit G_2	10	10	KΩ
Tension de grille N° 1 CC	- 90	- 100	Volts
Tension de crête H.F. grille N° 1	100	105	Volts
Courant moyen de grille N° 1 (approx.)	5,4	4,5	mA
Puissance d'excitation (Approx.)	0,54	0,47	Watt
Puissance utile (Approx.)	55	75	Watts

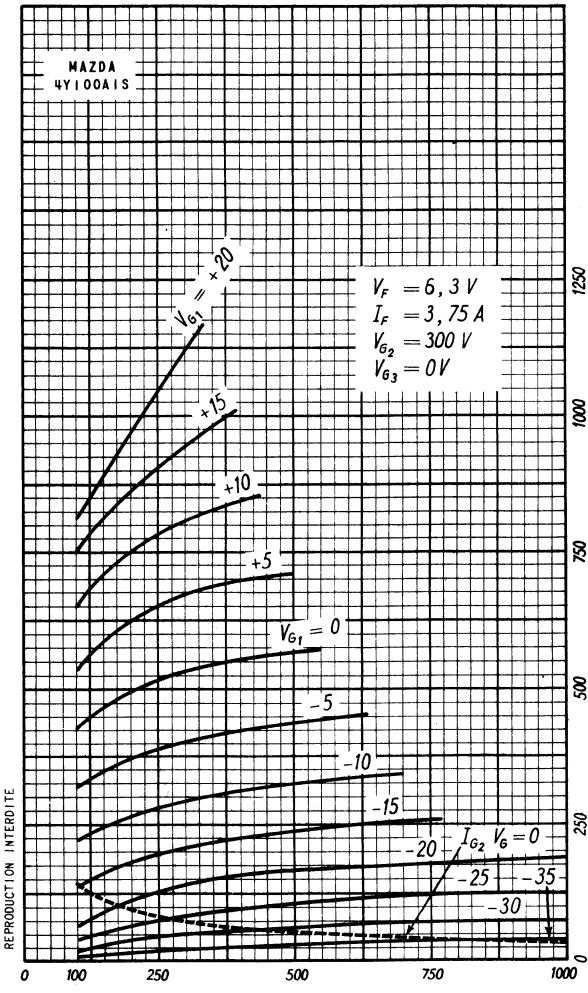
REPRODUCTION INTERDITE

MAZDA

4Y100A1S

4Y100A1S

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



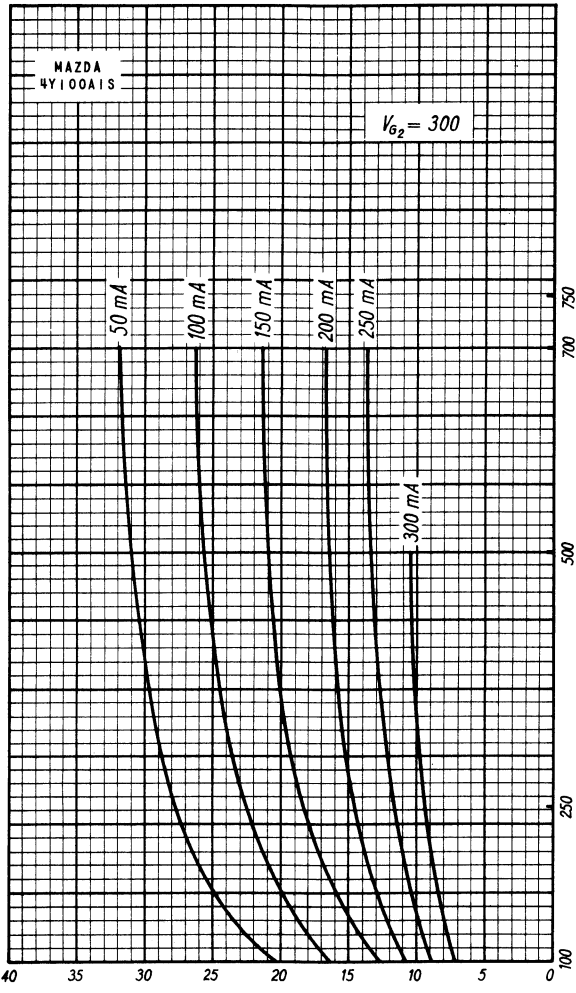
REPRODUCTION INTERDITE

4Y100A1S

MAZDA

4Y100A1S

COURBES DE LA TENSION D'ANODE
EN FONCTION DE LA TENSION DE GRILLE N° 1
A COURANT D'ANODE CONSTANT



REPRODUCTION INTERDITE

MAZDA

7745 / 4 Y 100 D

7745 / 4Y100D

DOUBLE TÉTRODE D'ÉMISSION A FAISCEAUX ÉLECTRONIQUES DIRIGÉS AMPLIFICATEUR H. F.

Le tube 7 745/4Y100D est un double tétrode d'émission constituée de deux éléments de 4Y100AI réunis dans la même ampoule.

Ce tube double permet :

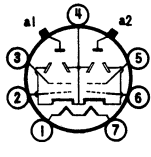
- de remplacer deux tubes 4Y100AI par un seul, dans le fonctionnement en push-pull,
- d'obtenir, avec les deux éléments en parallèle, une puissance de plus de 200W avec un tube unique et pour des tensions d'anode et d'écran de 750V et 300V respectivement,
- d'obtenir, avec les deux éléments en parallèle, une puissance de sortie de 100W avec une tension anodique ne dépassant pas 600V, ce qui conduit à une simplification notable des alimentations qui peuvent être réalisées avec du matériel standard.

CARACTERISTIQUES GENERALES

ELECTRIQUES		
Tension filament	12,6	V
Intensité filament	3,6	A
CAPACITE INTERELECTRODES		
Capacité anode-grille	0,5	pF
Capacité d'entrée	26	pF
Capacité de sortie	19	pF
Hauteur maximale (broches comprises)	135	mm max.
Diamètre maximal	71	mm max.
Brochage		7.E-UA

Le plan des électrodes de chaque élément est parallèle à celui dont la trace passe par l'axe de la broche 4 et par le milieu de l'intervalle séparant les broches n° 1 et 7 (trace figurée sur le schéma de brochage par l'axe xy).

BROCHAGE



Broches face à l'observateur

DIAMETRE DES BROCHES

n°s 1-2-3-5-6-7: Ø = 1,5mm

n° 4: Ø = 3,2mm

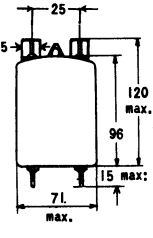
REPARTITION DES BROCHES :

N° 1-filament
N° 2-grille n° 1 (élément n° 1)
N° 3-grille n° 2 (élément n° 1)
N° 4-Cathode et grille n° 3 (ou déflecteurs).
N° 5-grille n° 2 (élément n° 2)
N° 6-grille n° 1 (élément n° 2)
N° 7-filament

Chaque anode est réunie à une des sorties du sommet

a_1-anode élément n° 1
a_2-anode élément n° 2

ENCOMBREMENT



Cotes maximales en millimètres

REPRODUCTION INTERDITE

7745
4Y100D

MAZDA

7745 / 4 Y 100 D

DOUBLE TÉTRODE D'ÉMISSION A FAISCEAUX
ÉLECTRONIQUES DIRIGÉS
AMPLIFICATEUR H. F.

AMPLIFICATEUR H.F. CLASSE C TELEGRAPHIE
Limites maximales d'utilisation

Tension continue d'anode	800	V max.
Tension continue de grille n°2	350	V max.
Tension continue de grille n°1	−300	V max.
Dissipation d'anode	60	W max. par élément
Dissipation de grille n°2	15	W max. "
Dissipation de grille n°1	2	W max. ".
Fréquence	80	MHz max.

CONDITIONS NORMALES D'UTILISATION
les deux éléments en parallèle

Tension d'anode	600	600	750	V
Tension de grille n°2	250	300	300	V
Tension de grille n°1	−85	−100	−100	V
Tension de crête de grille n°1	95	110	110	V
Courant moyen d'anode	250	340	390	mA
Courant moyen de grille n°2	60	72	70	mA
Courant moyen de grille n°1	11	8	13	mA
Puissance appliquée	150	204	293	W
Puissance de sortie	105	160	220	W env.
Puissance de commande	1	0,9	1,4	W

AMPLIFICATEUR H.F. CLASSE C TELEPHONIE
MODULATION PAR L'ANODE ET LA GRILLE-ECRAN
Limites maximales d'utilisation

Tension d'anode	750	V max.
Tension de grille n°2	300	V max.
Tension de grille n°1	−300	V max.
Dissipation d'anode	60	W max. par élément
Dissipation de grille n°2	15	W max. par élément
Dissipation de grille n°1	2	W max.

CONDITIONS NORMALES D'UTILISATION
les deux éléments en parallèle

Tension d'anode	550	600		V
Résistance du circuit de grille n°2	5	5		kΩ
Tension de grille n°1	−90	−100		V
Tension de crête de grille n°1	100	105	V	environ
Courant moyen de grille n°1	11	9	mA	"
Courant moyen de cathode	290	300	mA	"
Puissance appliquée	160	180	W	"
Puissance de sortie	110	150	W	"
Puissance de commande	1,1	1	W	"

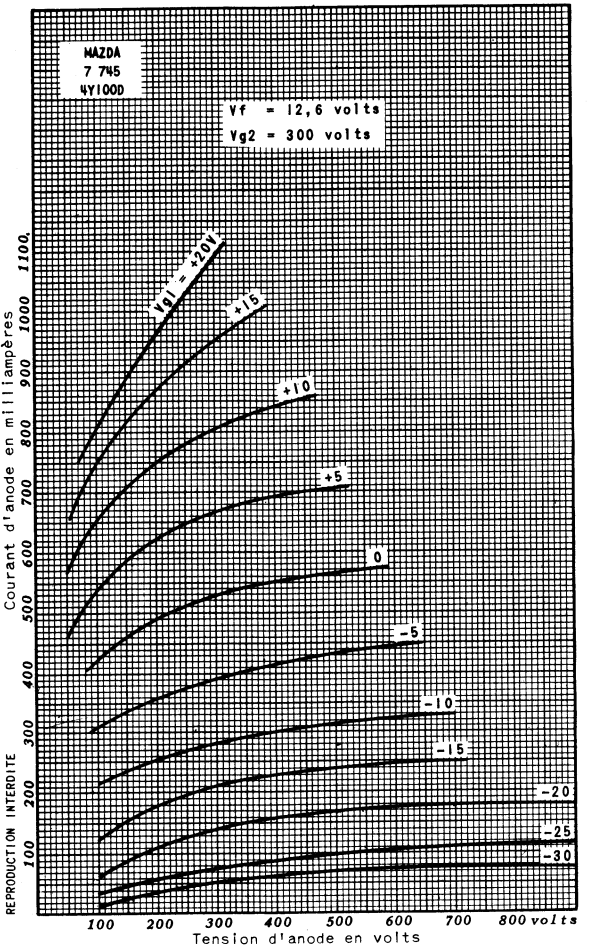
REPRODUCTION INTERDITE

MAZDA

7745 / 4 Y 100 D

7745 / 4Y100D

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



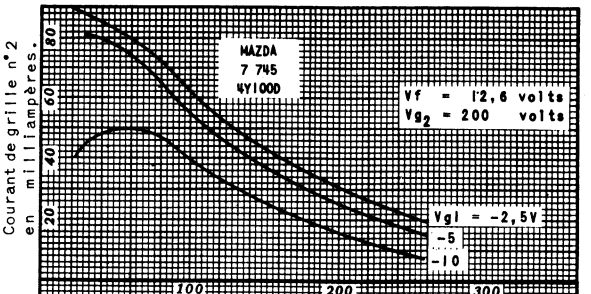
REPRODUCTION INTERDITE

7745
4Y100D

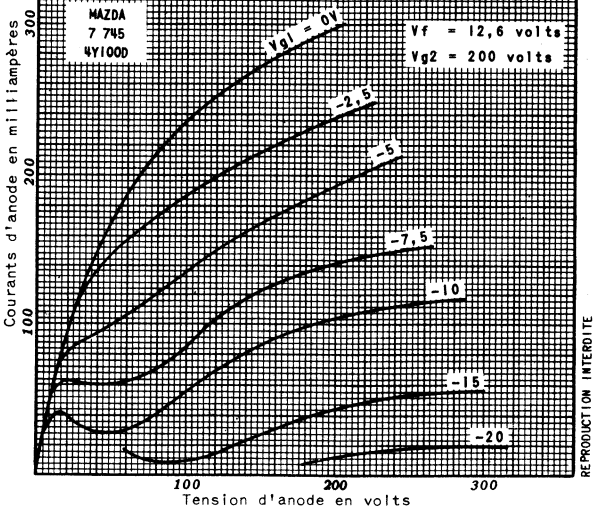
MAZDA

7745 / 4 Y 100 D

COURBES DU COURANT DE GRILLE Nº 2
EN FONCTION DE LA TENSION D'ANODE



COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



REPRODUCTION INTERDITE

MAZDA

4 Y 100 R

4 Y 100 R

DOUBLE TÉTRODE A FAISCEAUX DIRIGÉS
RÉGULATION SÉRIE DES ALIMENTATIONS STABILISÉES
EMBASE : SEPTAR
SUPPORT UTILISÉ : SEPTAR 7 C 26

Le type 4Y100R est une double tétrode spécialement conçue pour la régulation série des alimentations stabilisées.
Les anodes en graphite admettent une dissipation élevée sans inconvénient pour le bon fonctionnement du tube.
L'utilisation du 4Y100R en régulateur série est prévu en montage triode, la grille n° 2 étant reliée à l'anode.
La valeur limite de la dissipation totale d'anode et de grille n° 2 des deux sections du 4Y100R est de 100 watts.

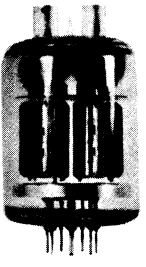
CARACTERISTIQUES GENERALES

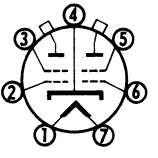
ELECTRIQUES

Cathode à chauffage indirect	
Tension filament	12,6 V ± 10 %
Courant filament	3,5 A

MECANIQUES

Diamètre	71 mm max.
Hauteur, sans les broches	120 mm max.
Embase	Septar
Support à utiliser	Septar 7C26





Broches de la base, face à l'observateur

N° 1 - Filament
N° 2 - Grille n° 1 - Elément n° 1
N° 3 - Grille n° 2 - Elément n° 1
N° 4 - Cathode
N° 5 - Grille n° 2 - Elément n° 2
N° 6 - Grille n° 1 - Elément n° 2
N° 7 - Filament
Coiffes - Anodes

CAPACITES INTERELECTRODES

Pour chaque section

Capacité d'entrée	25 pF
Capacité de sortie	22 pF
Capacité anode-grille n° 1	0,5 pF

Entre sections

Capacité entre grilles n° 1	0,020 pF
Capacité entre anodes	5 pF

REPRODUCTION INTERDITE

4Y100R

MAZDA

4 Y 100 R

DOUBLE TÉTRODE A FAISCEAUX DIRIGÉS
RÉGULATION SÉRIE DES ALIMENTATIONS STABILISÉES
EMBASE : SEPTAR
SUPPORT UTILISÉ : SEPTAR 7 C 26

LIMITES MAXIMALES D'UTILISATION
Système des Limites absolues

Pour chaque section

Tension filament	11,3 V	min.
	13,8 V	max.
Tension d'anode	800 V	max.
Courant d'anode	350 mA	max.
Dissipation d'anode (1)	50 W	max.
Dissipation de grille n°2 (1)	7,5 W	max.
Tension entre le filament et la cathode		
– filament positif par rapport à la cathode	200 V	max.
– filament positif par rapport à la cathode	100 V	max.
Résistance du circuit de grille n°1		
– en polarisation fixe	0,1 MΩ	max.
– en polarisation cathodique	0,5 MΩ	max.
– en polarisation mixte	0,5 MΩ	max.
Température de l'ampoule au point le plus chaud	250°C	max.

CARACTERISTIQUES NOMINALES
Montage triode

Pour chaque section

Tension continue d'anode	250	V
Tension continue de grille n°1	−10	V
Courant d'anode	200	mA
Pente	20	mA/V
Coefficient d'amplification	11	
Résistance interne	550	Ω

(1) La dissipation totale d'anode et de grille n°2 des deux sections du tube ne doit pas dépasser 100 W.

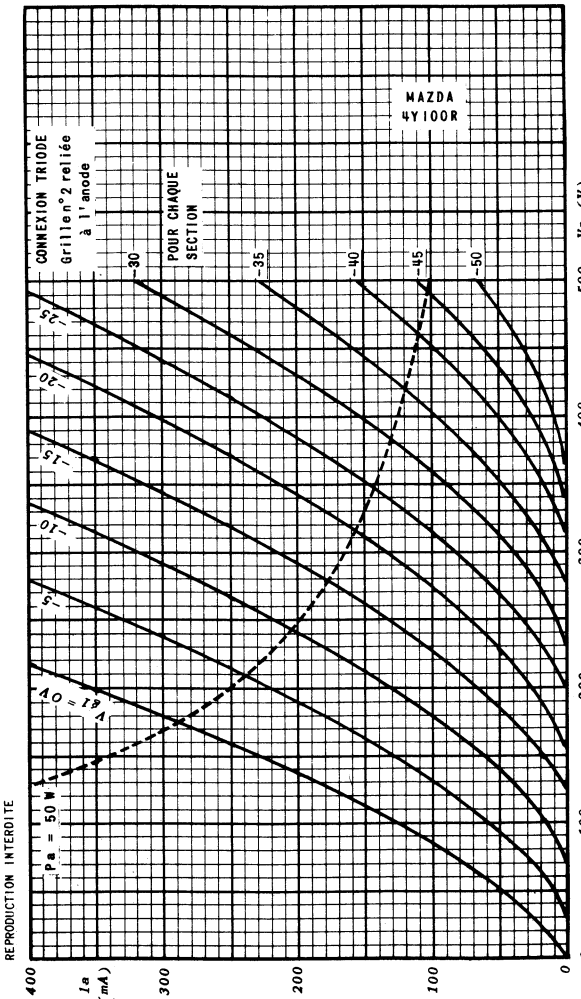
REPRODUCTION INTERDITE

MAZDA

4 Y 100 R

4Y100R

COURBES DU COURANT PLAQUE
EN FONCTION DE SA TENSION



REPRODUCTION INTERDITE

MAZDA

5 Y 35

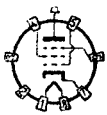
PENTODE AMPLIFICATRICE H.F. DE PUISSANCE

5Y35

Cathode à chauffage indirect.	
Tension Filament	24 Volts CA ou CC
Intensité Filament	0,45 Amp.
Pente pour un courant anode de 32,5 mA	1,6 mA/V
Coefficient d'amplification de grille-écran	3,9
Capacités inter-électrodes.	
Capacités grille N° 1 — anode	0,1 pF
Capacité d'entrée	15 pF
Capacités de sortie	12 pF
Hauteur maximum	156 mm
Diamètre maximum	50 mm
Ampoule / Coiffe	Voir dessin page 4950-3

Broches :

N° 1 - Filament.
N° 2 - Non connectée.
N° 3 - Non connectée.
N° 4 - Grille N° 2 (écran)



Broches :

N° 5 - Grille N° 1.
N° 6 - Grille N° 3 (suppresseur).
N° 7 - Cathode.
N° 8 - Filament.
L'anode est reliée à la coiffe du sommet.

Broches du culot, face à l'observateur.

Conditions maxima

Tension anode	1.000 Volts max.
Tension Grille-Ecran	500 Volts max.
Dissipation anode	35 Watts max.
Dissipation écran	6 Watts max.
Pour une fréquence maximum de	20 Mc/S
Fréquence atteinte avec une tension d'anode de 625 volts	60 Mc/S

AMPLIFICATION H.F. DE PUISSANCE

TÉLÉPHONIE — CLASSE B

Tension anode CC	1.000 Volts
Tension écran CC	350 Volts
Tension grille N° 1	-80 Volts
Tension grille N° 3	0 Volt
Tension grille N° 1 H.F. de crête	45 Volts
Courant anode CC (appr.)	50 mA
Courant écran CC (appr.)	5 mA
Courant grille N° 1 CC (appr.)	11 mA
Puissance d'excitation (appr.)	0,1 Watt
Dissipation d'anode	35 Watts
Dissipation écran	1,8 Watt
Puissance de sortie	15 Watts

REPRODUCTION INTERDITE.

5Y35

MAZDA

5 Y 35

PENTODE AMPLIFICATRICE H.F. DE PUISSANCE

AMPLIFICATION H.F. DE PUISSANCE
TÉLÉPHONIE. CLASSE C
Modulation par la grille N° 3

Tension anode CC	1.000 Volts
Tension écran CC	300 Volts
Tension grille N° 1 CC	-170 Volts
Tension grille N° 3 CC	-120 Volts
Tension de grille N° 1 H.F. de crête (approx.)	190 Volts
Tension de grille N° 3 B.F. de crête (approx.)	120 Volts
Courant anode CC	41 mA
Courant écran CC	20 mA
Courant grille N° 1 CC (approx.)	2,5 mA
Courant grille N° 3 (approx.)	0
Puissance d'excitation (approx.)	0,5 Watt
Puissance de modulation (approx.)	0
Dissipation anode	30 Watts
Dissipation grille N° 2	6 Watts
Puissance de sortie	11 Watts

AMPLIFICATION H.F. DE PUISSANCE
TÉLÉGRAPHIE. CLASSE C
Modulation par la Grille N° 2

Tension anode CC	1.000 Volts
Tension écran CC	250 Volts
Tension grille N° 1 CC	-170 Volts
Tension grille N° 3	0
Tension de grille N° 1 H.F. de crête (approx.	250 Volts
Courant anode CC (approx.)	55 mA
Courant écran CC (approx.)	2 mA
Courant grille N° 1 CC (approx.)	1,5 mA
Puissance d'excitation (approx.)	0,3 Watt
Puissance dans l'écran (approx.)	0,5 Watt
Puissance de modulation (approx.)	5 Watts
Dissipation anode	34 Watts
Puissance de sortie	21 Watts

AMPLIFICATION H.F. DE PUISSANCE
TÉLÉPHONIE. CLASSE C

Tension anode CC	1.000 Volts
Tension écran CC	350 Volts
Tension grille N° 1 CC	-170 Volts
Tension grille N° 3	0
Tension grille H.F. de crête	215 Volts
Courant anode CC (approx.)	120 mA
Courant écran CC (approx.)	15 mA
Courant grille N° 1 CC (approx.)	9,2 mA
Puissance d'excitation (approx.)	2 Watts
Dissipation anode	30 Watts
Dissipation écran	5,3 Watts
Puissance de sortie	90 Watts

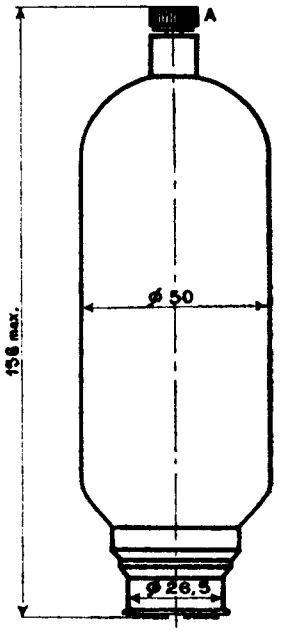
REPRODUCTION INTERDITE

MAZDA

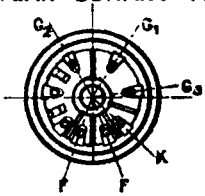
5 Y 35

PENTODE AMPLIFICATRICE H.F. DE PUISSANCE

5Y35



VUE EN PLAN SUIVANT FLECHE



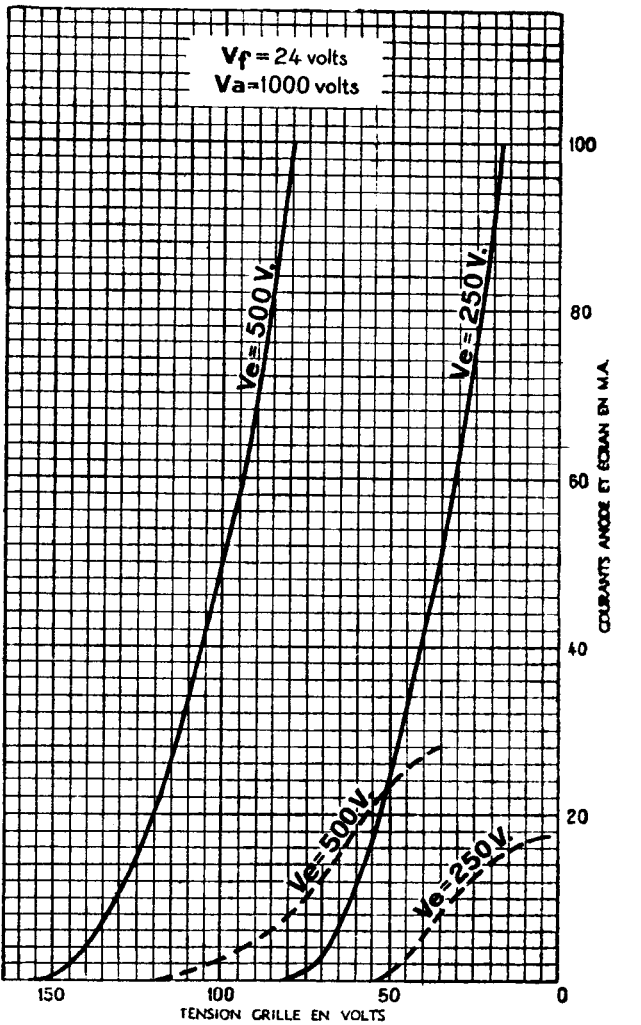
REPRODUCTION INTERDITE

5 Y 35

MADZA

5 Y 35

Courbes des courants anode et écran en fonction de la tension grille N° 1



REPRODUCTION INTERDITE

MAZDA

6C10

6C10

TRIODE HEXODE FREQUENCY CHANGER

Indirectly heated—for parallel operation

RATING

Heater Voltage (volts)	V_h	6.3	
Heater Current (amps)	I_h	0.23	
		Triode	Hexode
Maximum Anode Voltage (volts)	$V_{a(max)}$	175	250
Maximum Screen Voltage (volts)	V_{g2}		250
Maximum Mean Cathode Current (mA)		6	7
Maximum Anode Watts	P_a	0.8	1.5
Maximum Screen Watts	P_{g2}		0.3
Mutual Conductance (mA/V)	g_m	• 2.8	
Amplification Factor	μ	• 22	
Maximum Potential Heater/ Cathode (volts D.C.)		50	

• Taken at $V_{a(t)} = 100$; $V_{g(t)} = 0$.

INTER-ELECTRODE CAPACITANCES

(TRIODE SECTION)			
Anode/earth	(μμF)	$C_{out(t)}$	2.3
Anode/grid	(μμF)	$C_{a(t),\ g(t)}$	1.2
Grid/earth	(μμF)	$C_{in(t)}$	5.5
(HEXODE SECTION)			
Anode/earth	(μμF)	$C_{a(h),\ earth}$	9.2
Anode/grid 1	(μμF)	$C_{a(h),\ gl(h)}$	0.1
Grid 1/earth	(μμF)	$C_{gl(h),\ earth}$	4.0
Hexode grid/ triode grid	(μμF)	$C_{gl(h),\ g(t)}$	0.35

Earth denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shield joined to cathode.

DIMENSIONS

Maximum Overall Length	(mm)	60
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	53

MOUNTING POSITION - Unrestricted.

6C10

MAZDA

6C10

TRIODE HEXODE FREQUENCY CHANGER

Indirectly heated—for parallel operation

TYPICAL OPERATION

(TRIODE SECTION)		
Anode Voltage (volts)	$V_{a(t)}$	90
Approximate Anode Current (mA)	$I_{a(t)}$	4.8
(HEXODE SECTION)		
Anode Voltage (volts)	$V_{a(h)}$	250
Initial Screen Voltage (volts)	$V_{g2(h)}$	85
Grid Bias (volts - negative)	$V_{g1(h)}$	-2
Conversion Conductance (μA/V)	g_c	750
Approximate Anode Current (mA)	$I_{a(h)}$	3
Approximate Screen Current (mA)	$I_{g2(h)}$	3

BULB - Clear

BASE - B8A

Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Hexode anode	a_h
Pin 3	Triode anode	a_t
Pin 4	Triode grid and hexode grid 3	$g_{1(t)}, g_{3(h)}$
Pin 5	Hexode grid 2 and grid 4	$g_{2(h)}, g_{4(h)}$
Pin 6	Hexode grid 1	$g_{1(h)}$
Pin 7	Cathode and shield	k & s
Pin 8	Heater	h

6.C.31

MAZDA

6.C.31

TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

RATING		Triode	Heptode
Heater Voltage (volts)	V_h	6.3	
Heater Current (amps)	I_h	0.83	
Maximum Anode Voltage (volts)	$V_{a(max)}$	150	250
Maximum Screen Voltage (volts)	V_{g2}		250
Mutual Conductance (mA/V)	g_m	• 5.3	: 3.1
Amplification Factor	μ	• 16	
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	15	
Maximum Potential Heater/Cathode (volts DC)	$V_{h,k}$	150	

: Taken at V_a = 250v; V_{g2} = 100v; V_{g3} = 0; V_{g1} = -2v.

• Taken at V_{at} = 100v; V_{gt} = 0v.

INTER-ELECTRODE CAPACITANCES

Heptode Section

Anode/Earth (μμF)	$C_{a(h),E}$	13.0
Anode/Grid (μμF)	$C_{a(h),g1(h)}$	0.0012
Grid 1/Earth (μμF)	$C_{g1(h),E}$	9.5
Heptode Grid/Triode Grid (μμF)	$C_{g1(h),g(t)}$	0.09

Triode Section

Anode/Earth (μμF)	$C_{out(t)}$	4.4
Anode/Grid (μμF)	$C_{a(t),g(t)}$	3.0
Grid/Earth (μμF)	$C_{in(t)}$	11.5

DIMENSIONS

Maximum Overall Length (mm)	103
Maximum Diameter (mm)	32
Maximum Seated Height (mm)	90
Approximate Nett Weight (ozs)	1¾
Approximate Packed Weight (ozs)	2¼

MOUNTING POSITION - Unrestricted.

MAZDA

6.C.31

TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

TYPICAL OPERATION

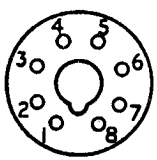
Heptode Section			
Anode Voltage (volts)	$V_{a(h)}$	250	250
Screen Voltage (volts)	$V_{g2(h)}$	100	100
Grid Bias (volts - ve)	$V_{g1(h)}$	-3.0	-2.5
Peak Heterodyne Voltage (volts)	$V_{(pk)het}$	9.0	9.0
Conversion Conductance (mA/volt)	g_c	750	870
Anode Current (mA)	$I_{a(h)}$	3.0	3.8
Screen Current (mA)	$I_{g2(h)}$	6.05	7.5
Anode Impedance (megohms)	$r_{a(w)}$	1.6	1.2
Input Capacitance Workings (Hot) (μμF)	$C_{in(w)}$	12.5	13.0
Conversion Conductance at V_g = -43v; V_{g2} = 250v(μA/V) (approx.)		3	
Input signal handling capacity (Peak carrier volts)			• 10

• For 5% Total Audio Harmonic Distortion at 60% Modulation.

Triode Section		
Anode Voltage (volts)	80	
Anode Current (mA) (average)	5	

BULB Metallised

BASE International octal (I08)



Viewed from free end of pins.

CONNEXIONS

Pin 1	Metallising	M
Pin 2	Heater	h
Pin 3	Heptode Anode	ah
Pin 4	Grid 2, Grid 4	g2,g4
Pin 5	Grid 3, Triode Grid	g3,gt
Pin 6	Triode Anode	at
Pin 7	Heater	h
Pin 8	Cathode	k
Top Cap	Grid	gl

NOTE
The 6.C.31 is identical to the TH.41 with the exception of heater characteristics, basing and inter-electrode capacitance.

6.C.31

MAZDA

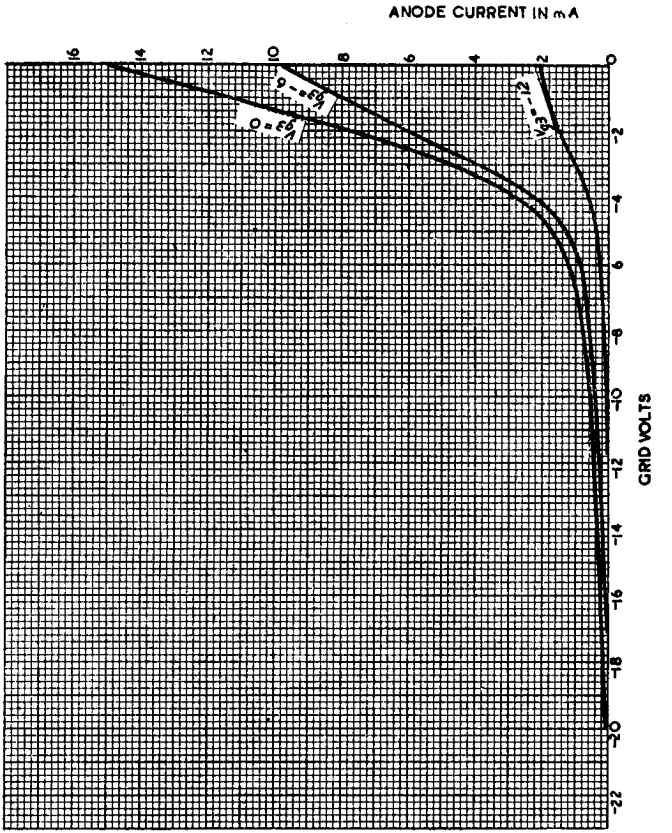
6.C.31

TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES

Curves of heptode section taken at V_b=250, V_{g2}=100



MAZDA

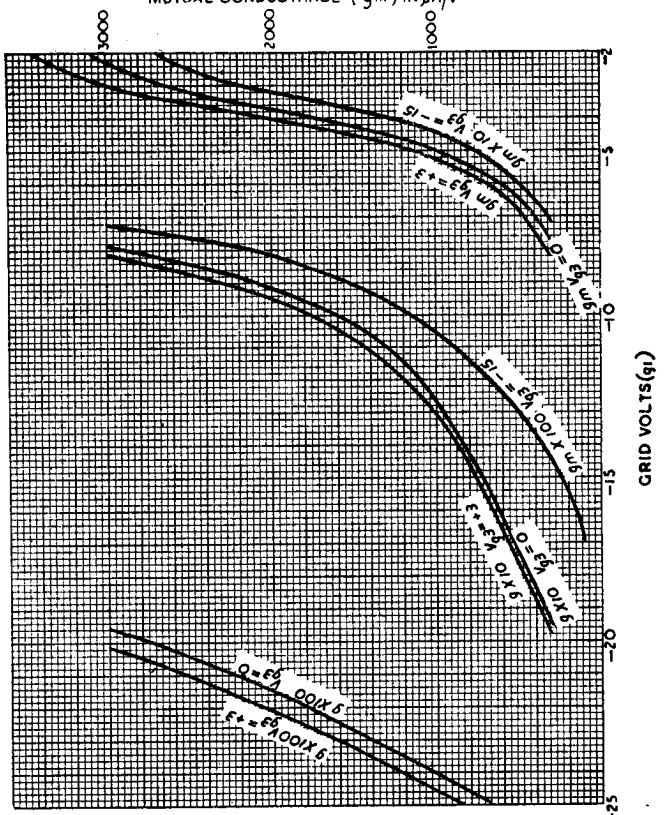
6.C.31

TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES

Curves of heptode section taken at V_b=250, V_{g2}=100



THE EDISON SWAN ELECTRIC COMPANY LTD.

6.C.31

MAZDA

6.C.31

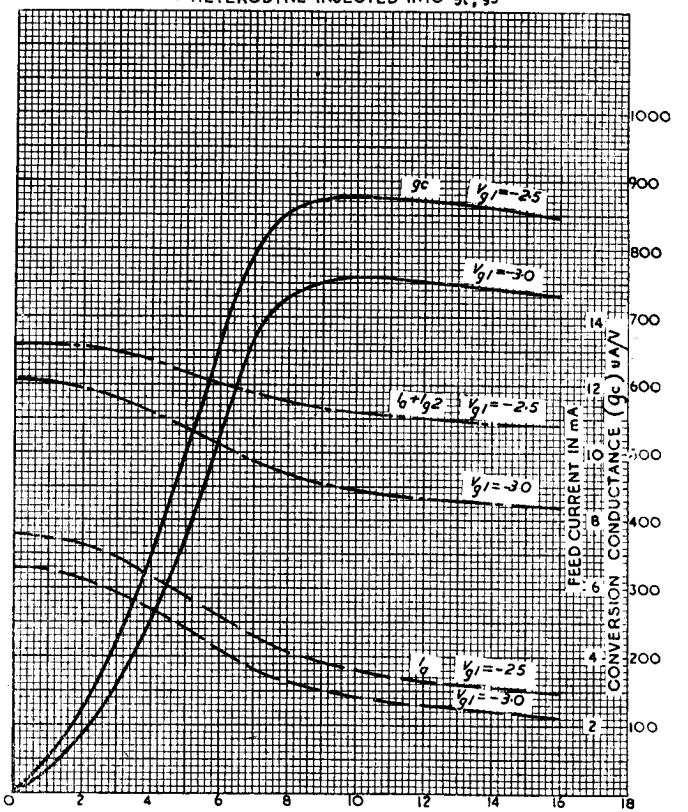
TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES

V_a	V_{g2}	V_{g3}	R_{g3}	V_{g1}	V_{sig}
250	100	Grid current bias	50,000Ω	-2·5 -3·0	0·5v Peak

HETERODYNE INJECTED INTO g_1, g_3



HETERODYNE PEAK VOLTS

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MAZDA

6.C.31

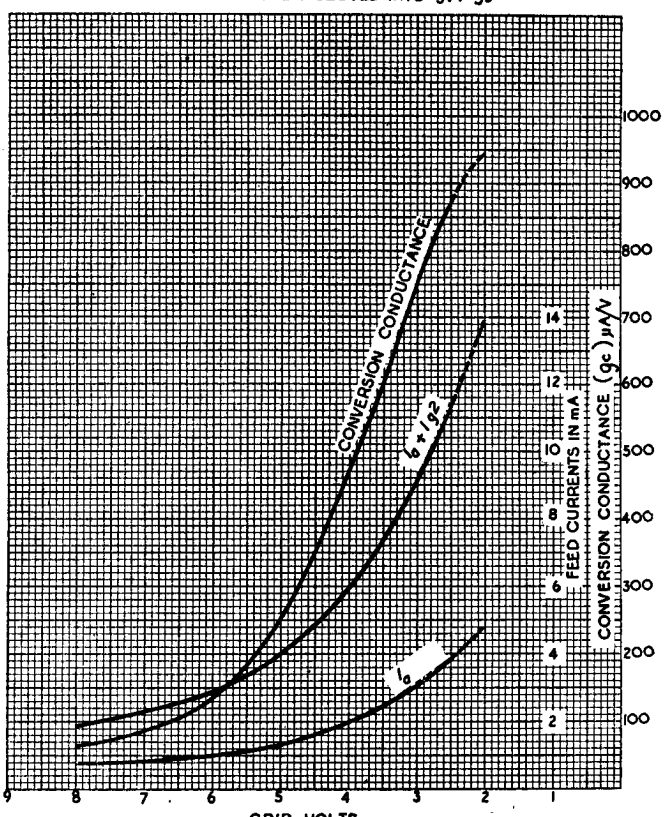
TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES

V_b	V_{g2}	V_{g3}	R_{g3}	V het	V sig
250	100	self bias	50,000 Ω	9·0 Peak	0·5V Peak

HETERODYNE INJECTED INTO g_1 , g_3



THE EDISON SWAN ELECTRIC COMPANY LTD.

6.C.31

MAZDA

6.C.31

TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

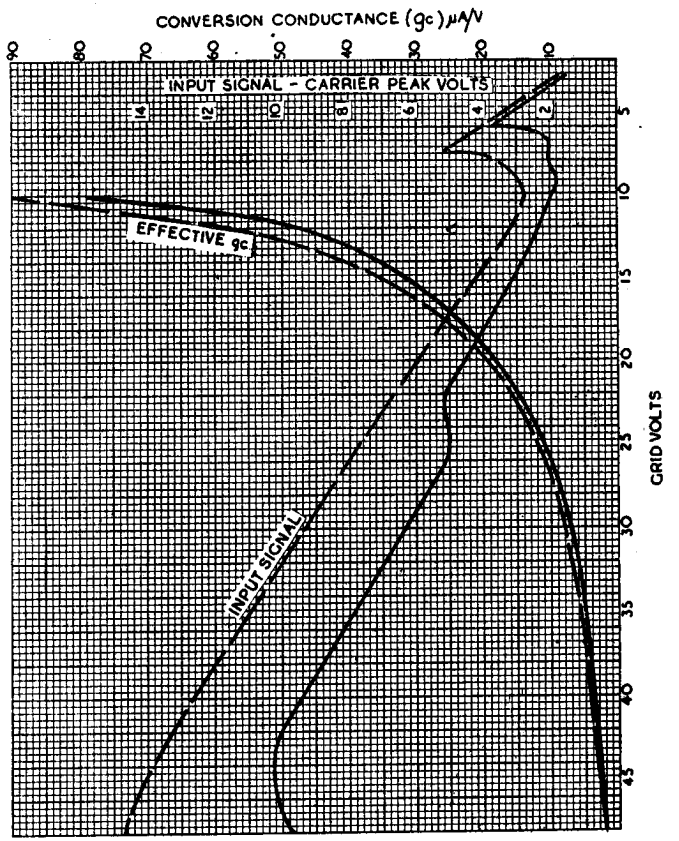
AVERAGE CHARACTERISTIC CURVES

V_b	V_{g2}	R_{g2}	V_{gt}	$R_{gt,k}$	V_{het}	Modulation
250	100 @ V_{g1} = -3 Rising	24·8kΩ	self bias	50	9·0 Peak	60%

——— 5% Total audio harmonic distortion

— — 10% Total audio harmonic distortion

Heterodyne injected in g_1, g_3



THE EDISON SWAN ELECTRIC COMPANY LTD.

6.C.9

MAZDA

6.C.9

TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated – for parallel operation

TENTATIVE

RATING		Triode	Heptode
Heater Voltage (volts)	V_h		6.3
Heater Current (amps)	I_h		0.45
Maximum Anode Voltage (volts)	$V_{a(max)}$	150	250
Maximum Screen Voltage (volts)	V_{g2}		250
Maximum Mean Cathode Current-Heptode (mA)	$I_{k(h)av(max)}$		10
Maximum Mean Cathode Current-Triode (mA)	$I_{k(t)av(max)}$	6	
Mutual Conductance (mA/V)	g_m		‡ 2.5
Amplification Factor	μ		
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$		150

‡ Taken at V_a = 250v; $V_{g2(h)}$ = 100v; $V_{g(h)}$ = -2.5v.

INTER-ELECTRODE CAPACITANCES

		¶	§
(Triode Section)			
Anode/Earth (μμF)	$C_{out(t)}$	1.7	3.0
Anode/Grid 1 (μμF)	$C_{a(t),g(t)}$	1.8	2.0
Grid 1/Earth (μμF)	$C_{in(t)}$	7.7	9.0
(Heptode Section)			
Anode/All (μμF)	$C_{a(h),all}$	3.0	4.5
Anode/Grid 1 (μμF)	$C_{a(h),g1(h)}$	.003	.0045
Grid 1/All (μμF)	$C_{g1(h),all}$	8.3	9.8
Heptode Grid/Triode Grid (μμF)	$C_{g1(h),g(t)}$	.12	.13
Heptode Grid/Triode Anode (μμF)	$C_{g1(h),a(t)}$	.013	.014

¶ Inter-electrode capacitances with holder capacitance balanced out

§ These capacitances include a Benjamin B8A holder measured at a frequency of 1 Mc/s.

"Earth" denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to Cathode.

DIMENSIONS

Maximum Overall Length (mm)	67
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	54
Radius Over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	$\frac{3}{4}$
Approximate Packed Weight (ozs)	1

MOUNTING POSITION – Unrestricted.

MAZDA

6.C.9

TRIODE HEPTODE FREQUENCY CHANGER

Indirectly heated—for parallel operation. **TENTATIVE**

TYPICAL OPERATION

Triode Section

Anode Voltage (volts)	Va(t)	80
Approximate Anode Current (mA)	Ia(t)	4 to 6

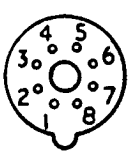
Heptode Section

Anode Voltage (volts)	Va(h)	250
Initial Screen Voltage (volts)	Vg2(h)	100
Grid Bias (volts-ve)	Vg1(h)	-2.5
Peak Heterodyne Voltage (volts)	V(pk)het	9.0
Conversion Conductance (μA/Volt)	gc	650
Approximate Anode Current (mA)	Ia(h)	3.0
Approximate Screen Current (mA)	Ig2(h)	6.0
Approximate Anode Impedance (megohms)	ra(w)	3.0
Input Loss at 45 Mc/s	rg1,k(w)	5,500
Input Capacitance Working (Hot) (μμF)	Cin(w)	‖ 9.7
Change in input capacitance produced by biassing valve to cut-off (μμF)	△Cin(w)	1.3
Equivalent grid noise resistance (ohms)	req	60,000

Inter-electrode capacitance with holder capacitance balanced out.

BULB Clear

BASE B.8.A.



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Heptode Anode	ah
Pin 3	Triode Anode	at
Pin 4	Triode Grid 1 and Heptode Grid 3	g1(t) g3(h)
Pin 5	Heptode Grid 2 and Grid 4	g2(h) g4(h)
Pin 6	Heptode Grid 1	g1(h)
Pin 7	Cathode & Shield	k & s
Pin 8	Heater	h

MAZDA

6.D.1

TELEVISION SINGLE DIODE

Indirectly heated – for parallel operation

RATING		
Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.15
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	5
Maximum Peak Anode Current (mA)	$i_{a(pk)max}$	50
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	350
Maximum Potential Heater/ Cathode (volts DC)	$V_{h-k(max)}$	150

INTER-ELECTRODE CAPACITANCES		
Anode/Cathode (μμF)	c_{a-k}	1.6
Anode/Heater (μμF)	c_{a-h}	0.45
Cathode/Heater (μμF)	c_{k-h}	3.0

The hot Anode/Cathode capacitance increases by 0.1 μμF.

The hot Cathode/Heater capacitance increases by 0.2 μμF.

DIMENSIONS	
Maximum Overall Length (mm)	51
Maximum Diameter (mm)	11
Maximum Seated Height (mm)	44.5
Approximate Nett Weight (ozs)	¼
Approximate Packed Weight (ozs)	½

MOUNTING POSITION – Unrestricted

6.D.1

MAZDA

6.D.1

TELEVISION SINGLE DIODE

Indirectly heated – for parallel operation

TYPICAL OPERATION

Vision Signal Detector-Half Wave

Using a shunt peaking circuit with 2 Mc/s pass-band followed by Video Stage.

Total Load (R) (ohms)	4800
Compensating Inductance (L) (μH)	180
Total Capacitance across Load (C) (μμF)	20

With recommended RC = 95,000 (ohms x μμF)

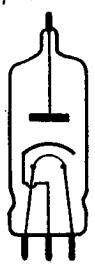
and $\frac{L}{CR^2} = 0.4 \times 10^{-6}$

D.C. Restoring in Cathode Ray Tube

Load Resistance (megohms)	0.5
Coupling Condenser (μF)	0.01

BULB Clear

BASE B.3.G.



MAZDA

6.D.2

DOUBLE DIODE (Separate Cathodes)
Indirectly heated – for parallel operation

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.3
Maximum Mean Anode Current per Anode (mA)	$I_{a(av)max}$	9
Maximum Peak Anode Current per Anode (mA)	$I_{a(pk)max}$	50
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	500
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	250

INTER-ELECTRODE CAPACITANCES *

		†	¶
Anode 1/All other electrodes (μμF)	$c_{a'-all}$	3.4	4.6
Anode 1/Anode 2 (μμF)	$c_{a'-a''}$	0.023	0.026
Anode 1/Cathode 1 (μμF)	$c_{a'-k'}$	1.75	1.75
Anode 2/All other electrodes (μμF)	$c_{a''-all}$	3.4	4.6
Anode 2/Cathode 2 (μμF)	$c_{a''-k''}$	1.75	1.75
Cathode 1/All other electrodes (μμF)	$c_{k'-all}$	4.1	5.3
Cathode 1/Cathode 2 (μμF)	$c_{k'-k''}$	0.009	0.011
Cathode 2/All other electrodes (μμF)	$c_{k''-all}$	4.0	5.2

* Measured with a closely fitting metal can connected to earth.

† Inter-electrode capacitance with holder capacitance balanced out.

¶ Total capacitance including a B.7.G. ceramic holder.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19
Maximum Seated Height (mm)	47.5
Approximate Nett Weight (ozs)	¼
Approximate Packed Weight (ozs)	⅓

MOUNTING POSITION – Unrestricted

6.D.2

MAZDA

6.D.2

DOUBLE DIODE (Separate Cathodes)
Indirectly heated – for parallel operation

BULB Clear

BASE B.7.G.

Viewed from free end of pins.

CONNEXIONS

Pin 1	Cathode 2	k"
Pin 2	Anode 1	a'
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Cathode 1	k'
Pin 6	Internal Shield	s
Pin 7	Anode 2	a"

EDISWAN
MAZDA

6FI

HIGH SLOPE SCREENED R.F. PENTODE
Indirectly heated—for parallel operation
REPLACEMENT TYPE ←

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.35
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Mutual Conductance (mA/V)	g_m	9.0§
Maximum Anode Dissipation (watts)	$P_{a(max)}$	3.5†
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	1.0†
Maximum Potential Heater/Cathode (volts DC)	$V_{(h-k)max}$	150

§ Taken at $V_a = V_{g2} = 200V$; $V_{g1} = -1.8V$.

† With grid cathode resistance not exceeding 10,000 ohms.

INTER-ELECTRODE CAPACITANCES (pF)

		*	¶	‡
Anode/Earth	c_{out}	4.6	6.1	—
Anode/Control Grid	c_{a-g1}	—	.0077	.0068
Control Grid/Earth	c_{in}	9.0	10.5	—

* Inter-Electrode capacitances with holder capacitance balanced out.

¶ Total capacitances including Benjamin B8A moulded holder measured at 1 Mc/s.

‡ Total capacitances including Benjamin B8A moulded holder measured at 1 Mc/s but with extra perpendicular shield.

DIMENSIONS

Maximum Overall Length	(mm)	67
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	54
Radius over Location Key	(mm)	12.25

Indicates a change ←

EDISWAN
MAZDA

6F1
HIGH SLOPE SCREENED R.F. PENTODE
Indirectly heated—for parallel operation
REPLACEMENT TYPE ←

MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION—As Amplifier

Anode Voltage (volts)	V_a	—	200	190	208
Screen Voltage (volts)	V_{g2}	240*	200	190	208
Grid Bias Voltage (volts-ve)	V_{g1}	1.45	1.8	1.55	1.9
Anode Current (mA)	I_a	20.3*	10.0	10.3	10.15
Screen Current (mA)	I_{g2}	5.6*	2.60	2.7	2.65
Mutual Conductance (mA/V)	g_m	—	9.0	9.25	8.95
Input Capacity, Working (pF)	‡§$C_{in(w)}$	—	12.1	12.25	12.1
Change in input capacity produced by biassing valve to 1μA/V (pF)	‡$\Delta C_{in(w)}$	—	2.75	2.9	2.7
Self Bias Resistance (ohms)	R_{k-E}	56	—	120	150
Input Loss at 45 Mc/s (ohms)	$\phi r_{g1-k(w)}$	—	14000	12500	14000
Equivalent Grid Noise Resistance (ohms)	r_{eq}	—	780	750	790

* Maximum permissible rating D.C. connected as Video Output Valve. (no signal)

§ Inter-Electrode capacitance with holder capacitance balanced out.

‡ Hot capacity measurements taken at a frequency of 0.5 Mc/s.

ϕ Measured with grid circuit decoupled to cathode pin 7. Screen and Anode circuits and shield returned to cathode pin 5.

Indicates a change ←

EDISWAN

MAZDA

6FI

6FI

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

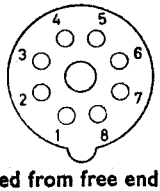
REPLACEMENT TYPE ←

TYPICAL OPERATION—As Frequency Changer

Control Grid or Cathode Injection.		
Anode Voltage (volts)	V_a	250
Screen Supply Voltage (volts)	V_{g2}	250
Screen Dropping Resistor (ohms)	R_{g2}	100,000
Grid 1 Resistor for grid current bias (ohms)	R_{g1}	100,000
Heterodyne Peak Voltage (volts)	$V_{(het)pk}$	2.0
Anode Current (mA)	I_a	5.2
Screen Current (mA)	I_{g2}	1.3
Grid 1 Current (μA)	I_{g1}	18
Conversion Conductance (mA/V)	g_c	3.3

BULB—Clear.

BASE—B8A.



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Internal Shield & Suppressor	g3,s
Pin 4	Screen Grid	g2
Pin 5	Cathode	k
Pin 6	Control Grid	g1
Pin 7	Cathode	k
Pin 8	Heater	h

Indicates a change ←

EDISWAN

MAZDA

6FI

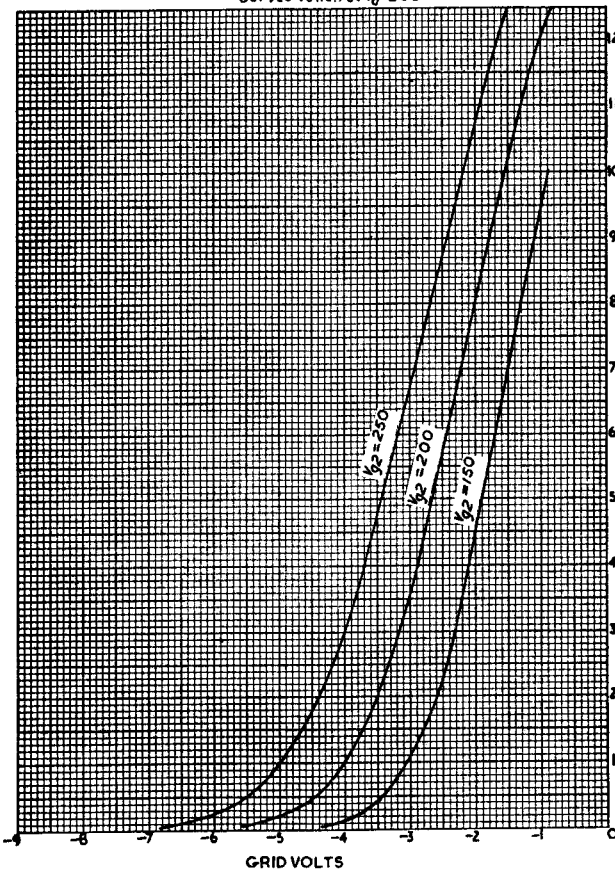
HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES

Curves taken at V_g=250



Indicates a change ←

EDISWAN

MAZDA

6F1

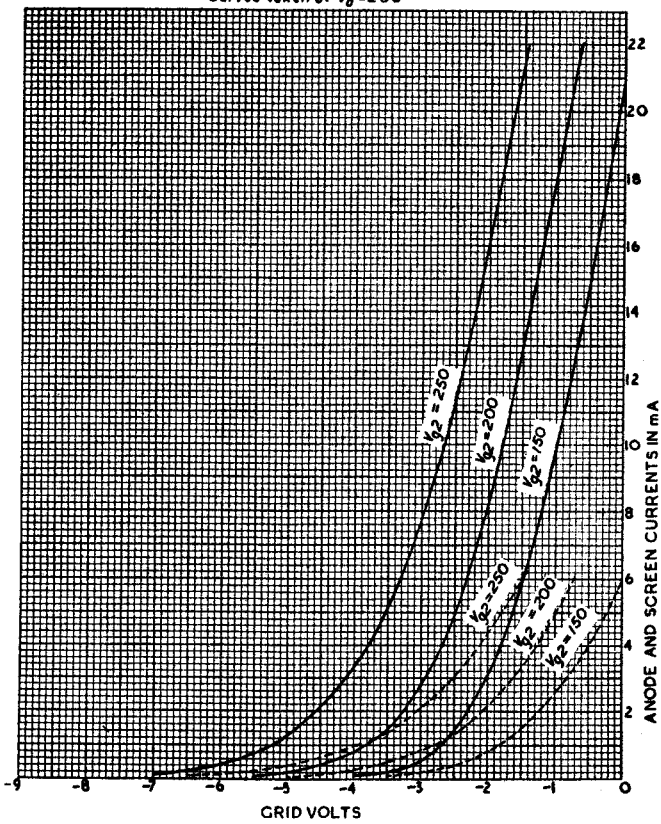
HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES

Curves taken at V_o = 250



Indicates a change ←

6F1

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MAZDA

6F1

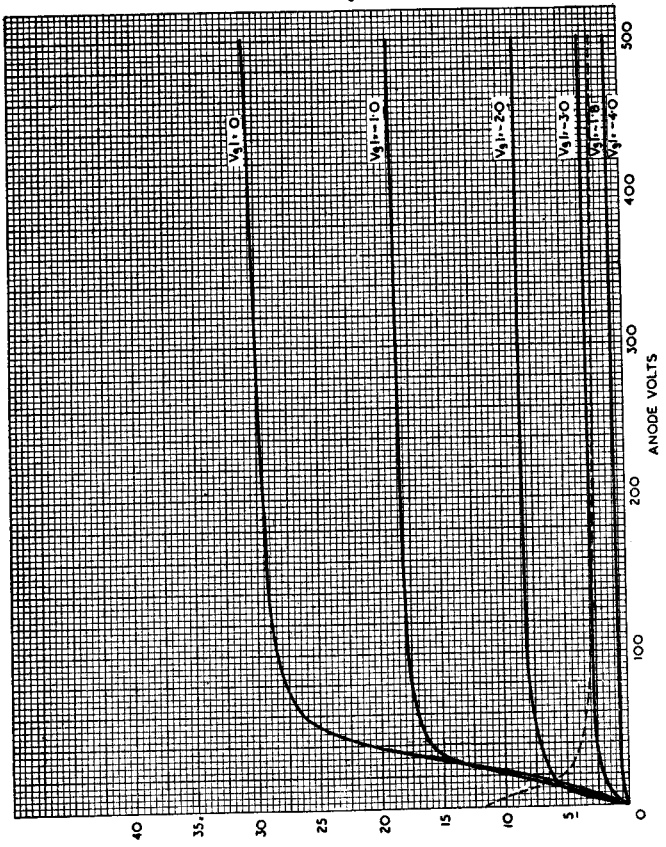
HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES

CURVES TAKEN AT V_{g2}=200



ANODE AND SCREEN CURRENT (MILLIAMPS)

Indicates a change ←

MAZDA

6.F.11

6.F.11

SCREENED R.F. PENTODE

Indirectly heated — for parallel operation

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.2
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	150
Maximum Cathode Current (mA)	$I_{k(av)max}$	10
Mutual Conductance (mA/V)	g_m *	2.2
Anode Impedance (megohms)	r_a *	2.8
Inner μ	μ_{g1-g2} *	26
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

* Taken at V_a = 250v; V_{g2} = 100v; V_{g1} = 1.8v.

INTER-ELECTRODE CAPACITANCES

		†	¶
Anode/Earth (μμF)	c_{out}	6.7	8.2
Anode/Grid (μμF)	c_{a-g1}	.0039	.004
Grid/Earth (μμF)	c_{in}	5.3	6.8

† Inter-electrode capacitances with holder capacitance balanced out.

¶ Including a Benjamin B.8.A. holder at a frequency of 1 Mc/s with vertical screen fitted to holder between pins 3-4 and 7-8.

"Earth" denotes the remaining earthy potential electrodes, shields and heater joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	67
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	54
Radius Over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	⅞
Approximate Packed Weight (ozs)	1

MOUNTING POSITION - Unrestricted

June 1948 Issue 1/2

RADIO DIVISION

THE EDISON SWAN ELECTRIC COMPANY LTD.

6.F.11

MAZDA

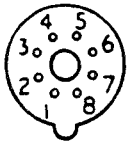
6.F.11

SCREENED R.F. PENTODE

Indirectly heated — for parallel operation

BULB Clear

BASE B.8.A.



Viewed from free end of pins

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Internal Shield	s
Pin 4	Suppressor Grid	g_3
Pin 5	Screen Grid	g_2
Pin 6	Control Grid	g_1
Pin 7	Cathode	k
Pin 8	Heater	h

NOTE: Pin 8 should preferably be connected to "earth" potential.

In use pins 3 and 4 should be joined and earthed.

June 1948 Issue 1/2

RADIO DIVISION

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

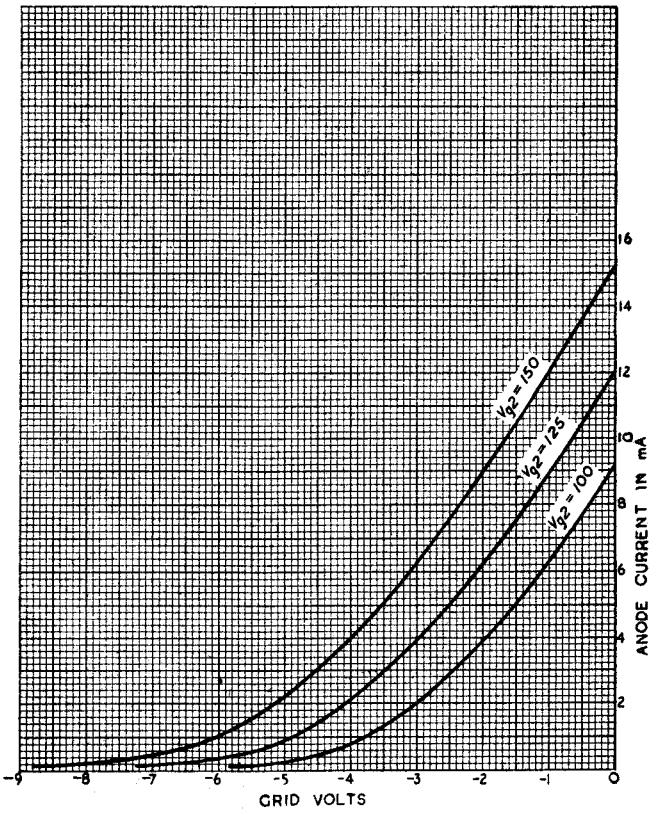
6.F.11

SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES

Curves taken at V_a=250



August 1948 Issue 1/2

RADIO DIVISION

THE EDISON SWAN ELECTRIC COMPANY LTD.

6.F.11

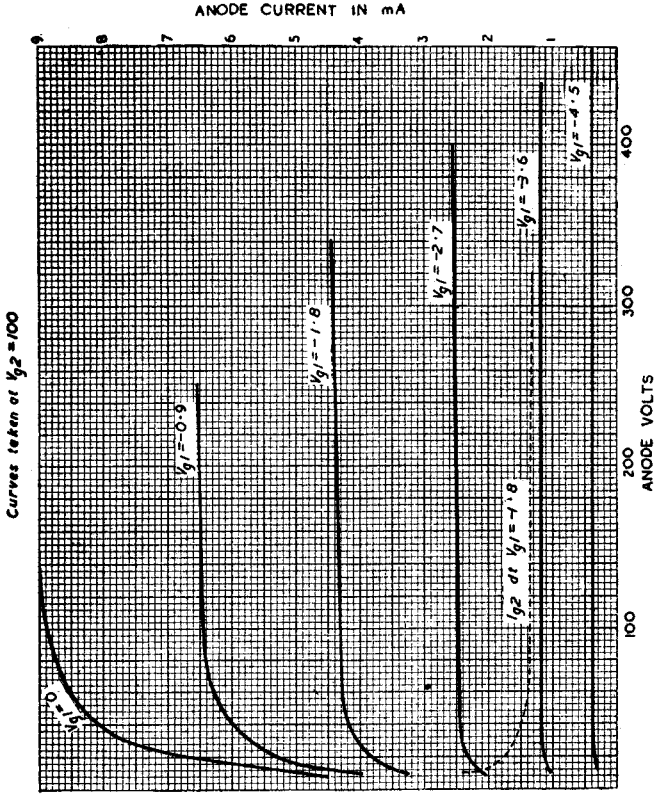
MAZDA

6.F.11

SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES



August 1948

Issue 1/2

RADIO DIVISION

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

6.F.12

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated - for parallel operation

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.3
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Mutual Conductance (mA/V)	S_m	* 7.5
Anode Impedance (megohm)	r_a	* 0.9
Inner μ q	μ_{g1g2}	* 74
Maximum Anode Dissipation (watts)	$W_{a(max)}$	† 2.5
Maximum Screen Dissipation (watts)	$W_{g2(max)}$	† 0.8
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

* Taken at $V_a = V_{g2} = 250$ v; $V_{g1} = -2$ v; $I_a = 10$ mA

q i.e. $\frac{\delta V_{g2}}{\delta V_{g1}}$ with I_a constant

† If used in a can at maximum rating the can must be matt black both internally and externally.

INTER-ELECTRODE CAPACITANCES

		§	]	‡
Anode/Earth ($\mu\mu$F)	C_{out}	3.2	4.4	4.6
Anode/Control Grid ($\mu\mu$F)	C_{a-g1}	.0045	.006	.005
Control Grid/Earth ($\mu\mu$F)	C_{in}	7.6	8.8	9.0

§ Measured with Benjamin B7G valveholder and cylindrical screen type 75/832, but with holder capacitance balanced out.

] Including capacitance of Benjamin B7G valveholder type 75/833 and cylindrical screen type 75/832.

‡ As] but with additional perpendicular shield fitted between pins 2-3 and 6-7.

"Earth" denotes the remaining earthy electrodes, shields and heater joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19
Maximum Seated Height (mm)	47.5
Approximate Nett Weight (ozs)	1
Approximate Packed Weight (ozs)	2

MOUNTING POSITION - Unrestricted

6.F.12

MAZDA

6.F.12

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

TYPICAL OPERATION

Anode Voltage (volts)	V_a	250	200
Screen Voltage (volts)	V_{g2}	250	200
Grid Bias Voltage (volts -ve)	V_{g1}	2.0	1.5
Anode Current (mA)	I_a	10.0	8.3
Screen Current (mA)	I_{g2}	2.5	2.1
Mutual Conductance (mA/V)	g_m	7.5	7.2
Input Working Capacity (μμF)	$c_{in(w)}$	9.9	10.1
Change in Input Capacity (μμF) produced by biassing valve to 1 μA/V	$\triangle c_{in(w)}$	2.2	2.3
Self Bias Resistance (ohms)	R_k	160	145
Input Loss Resistance at 45 Mc/s (ohms)		8,900	8,200
Equivalent noise resistance required (ohms)	R_{eq}	1,100	1,000

Bulb Clear

BASE B.7.G.

Viewed from free ends of pins

CONNEXIONS

Pin 1	Control Grid	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode	a
Pin 6	Suppressor Grid	g3
Pin 7	Screen Grid	g2

MAZDA

6.F.12

HIGH SLOPE SCREENED R.F. PENTODE

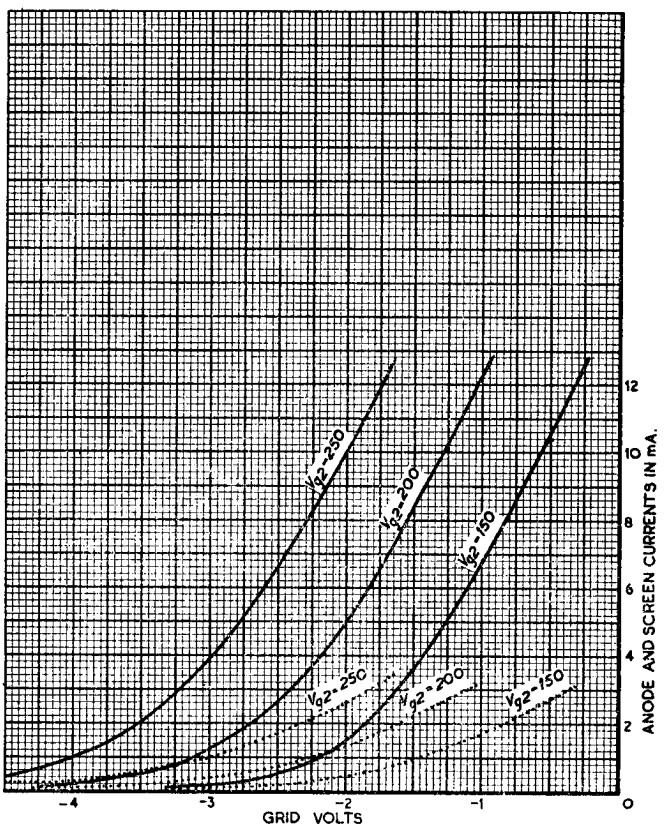
Indirectly heated – for parallel operation

CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE 6F12

Curves taken at V_a=250V.

Key { —— Anode Current ····· Screen Current



6.F.12

MAZDA

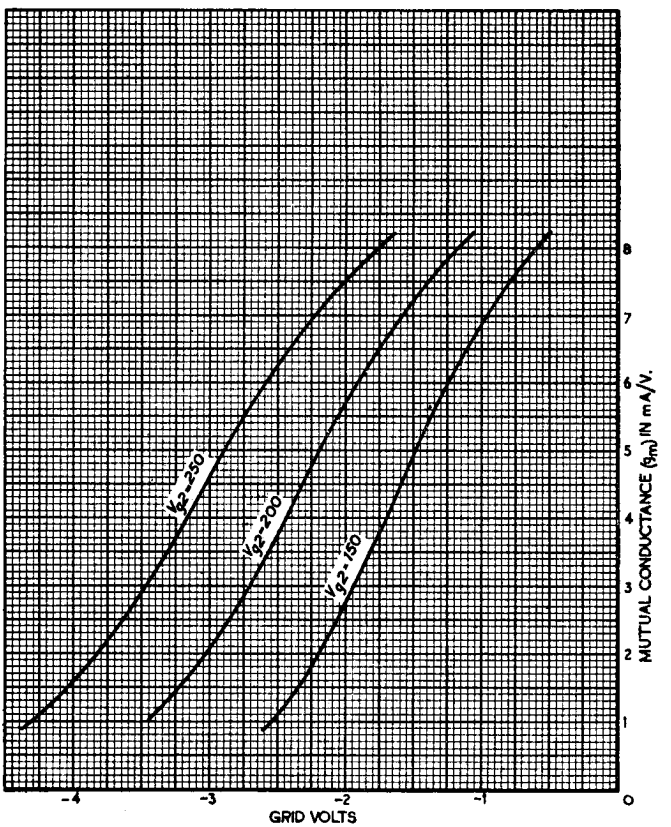
6.F.12

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE 6F12



May 1948 RADIO DIVISION Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

6.F.12

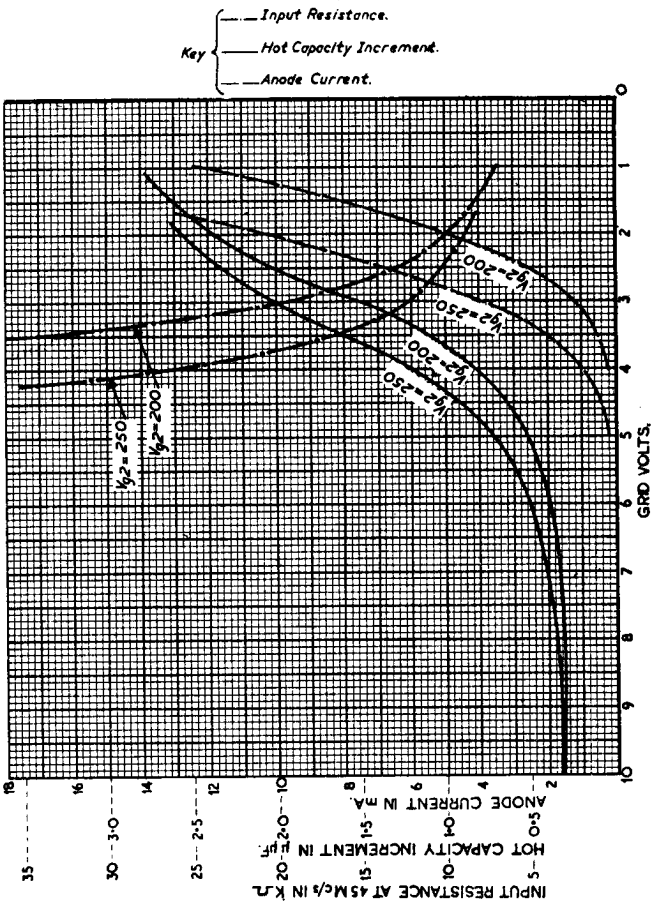
HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE 6F12

Curves taken at V_a=250V, V_{g3}=0V, f=45Mc/s.



THE EDISON SWAN ELECTRIC COMPANY LTD.

6.F.12

MAZDA

6.F.12

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

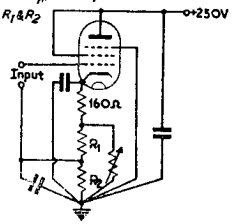
CHARACTERISTIC CURVES OF AVERAGE

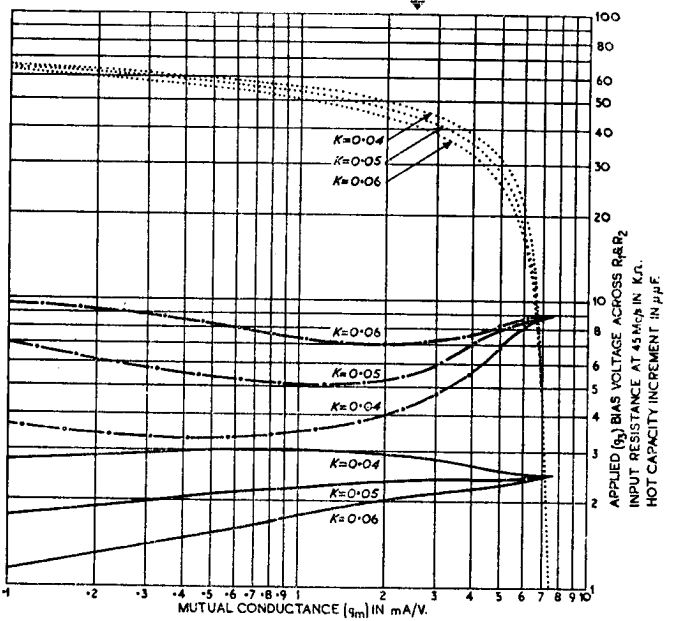
MAZDA VALVE 6F12

Curves taken at I_a=10mA (initial), f=45Mc/s.

Key
- ····· Applied (g_3) Bias Voltage across R_1&R_2
- —— Input Resistance.
- —— Hot Capacity Increment.

Note: $K=\frac{R_1}{R_1+R_2}$





May 1948 RADIO DIVISION Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

6.F.12

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

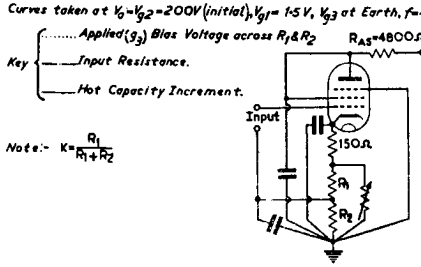
CHARACTERISTIC CURVES OF AVERAGE

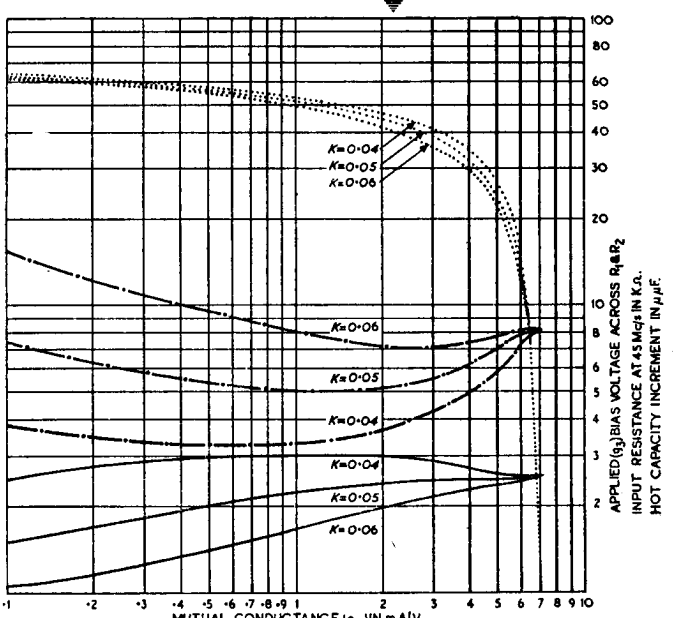
MAZDA VALVE 6F12

Curves taken at $V_a = V_{g2} = 200V$ (initial), $V_{g1} = 1.5V$, V_{g3} at Earth, f = 4.5Mc/s.

Key
- ..... Applied (g_3) Bias Voltage across R_1 & R_2
- ——— Input Resistance.
- — — Hot Capacity Increment.

Note:- $K = \frac{R_1}{R_1 + R_2}$





6.F.13

MAZDA

6.F.13

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

RATING		
Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.35
Maximum Anode Voltage (volts)	V_a	250
Maximum Screen Voltage (volts)	V_{g2}	250
Mutual Conductance (mA/V)	g_m	$ 9.0
Maximum Anode Dissipation (watts)	P_a	† 3.5
Maximum Screen Dissipation (watts)	P_{g2}	† 1.0
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

$ Taken at $V_a = V_{g2} = 200v$; $V_{g1} = -1.8v$.

† With grid cathode resistance not exceeding 10,000 ohms.

INTER-ELECTRODE CAPACITANCES		¶	+	[
Anode/Earth (μμF)	C_{out}	4.4	5.9	-
Anode/Control Grid (μμF)	$C_{a,g}$	-	.007	.006
Control Grid/Earth (μμF)	C_{in}	9.5	11.0	-

¶ Inter-Electrode capacitances with holder capacitance balanced out.

\+ Total capacitances including Benjamin B8A moulded holder measured at 1 Mc/s.

[Total capacitances including Benjamin B8A moulded holder measured at 1 Mc/s but with extra perpendicular shield.

DIMENSIONS	
Maximum Overall Length (mm)	67
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	54
Radius over Location Key (mm)	12.25

MOUNTING POSITION - Unrestricted.

MAZDA

6.F.13

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

TYPICAL OPERATION

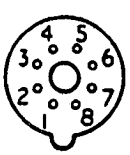
Anode Voltage (volts)	V_a	-	200	190	208
Screen Voltage (volts)	V_{g2}	220 ‡	200	190	208
Grid Bias Voltage (volts -ve)	V_{g1}	1.45	1.8	1.55	1.9
Anode Current (mA)	I_a	17.0 ‡	10.0	10.3	10.15
Screen Current (mA)	I_{g2}	4.5 ‡	2.60	2.7	2.65
Mutual Conductance (mA/V)	g_m		9.0	9.25	8.95
Input Capacity Working (μμF)	* $c_{in(w)}$		12.6	12.75	12.6
Change in input capacity produced by biassing valve to 1μA/V (μμF)	△ $c_{in(w)}$	-	2.75	2.9	2.7
Self Bias Resistance (ohms)	$R_{K,E}$	68	-	120	150
Input Loss at 45 Mc/s (ohms)	$r_{g1,k(w)}$	-	4800	4500	4900
Equivalent grid noise resistance (ohms)	r_{eq}		780	750	790

‡ Maximum permissable rating D.C. connected as Video Output Valve.

* Inter-Electrode capacitance with holder capacitance balanced out.

BULB Clear

BASE B8A



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Internal Screen	s
Pin 4	Suppressor Grid	g3
Pin 5	Screen Grid	g2
Pin 6	Control Grid	g1
Pin 7	Cathode	k
Pin 8	Heater	h

6.F.13

MAZDA

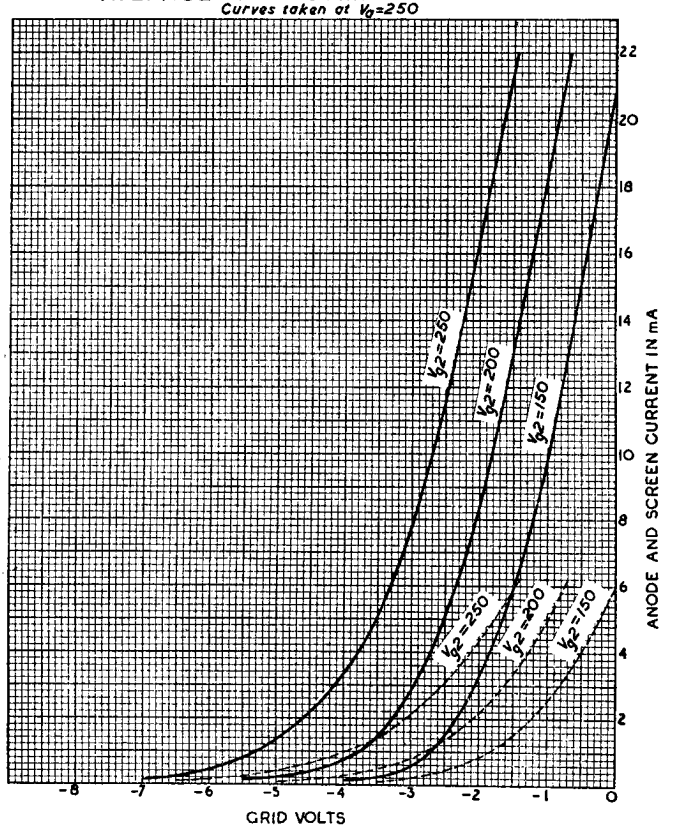
6.F.13

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES

Curves taken at V_{g2}=250



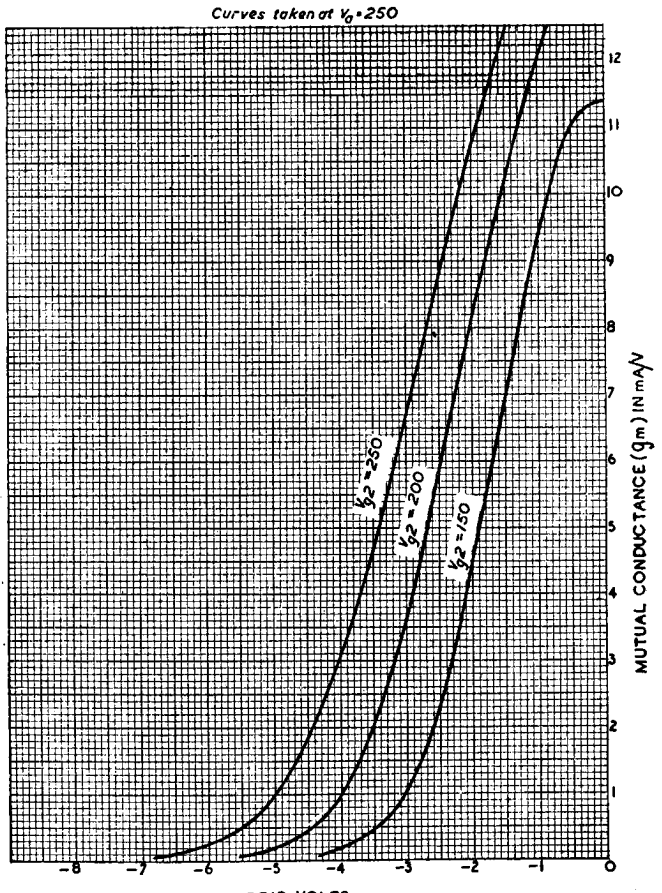
MAZDA

6.F.13

HIGH SLOPE SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES



6.F.14

MAZDA

6.F.14

TELEVISION SCREENED PENTODE

TENTATIVE

RATING

Heater Voltage (volts)	V_h		6.3
Heater Current (amps)	I_h		0.35
Maximum Anode Voltage (volts)	$V_{a(max)}$		250
Maximum Screen Voltage (volts)	$V_{g2(max)}$		250
Mutual Conductance (mA/V)	g_m	*	10.6
Anode Impedance (megohms)	r_a	*	0.125
Inner Mu	$\mu_{g1,g2}$	*	33
Maximum Anode Dissipation (watts)	$W_{a(max)}$		4.0
Maximum Screen Dissipation (watts)	$W_{g2(max)}$		1.0
Maximum Potential Heater/Cathode (volts D.C.)	$V_{h-k(max)}$		150

* Taken at $V_a = V_{g2} = 140v$; $V_{g1} = -1.25v$.

INTER-ELECTRODE CAPACITANCES

		§	[
Anode/Earth (μμF)	C_{out}	3.8	5.3
Anode/Control Grid (μμF)	C_{a-g1}	.02	.021
Control Grid/Earth (μμF)	C_{in}	9.3	10.8

§ Inter-electrode Capacitances with holder capicitance balanced out.

[Total capacitance including a Benjamin B8A moulded holder at a frequency of 1 Mc/s.

DIMENSIONS

Maximum Overall Length (mm)	67
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	54
Radius over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	¾
Approximate Packed Weight (ozs)	1

MOUNTING POSITION - Unrestricted.

6.F.14

MAZDA

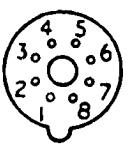
6.F.14

TELEVISION SCREENED PENTODE

TENTATIVE

BULB Clear

BASE B8A



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Internal Shield •	s
Pin 4	Suppressor Grid	g_3
Pin 5	Screen Grid	g_2
Pin 6	Control Grid	g_1
Pin 7	Cathode	k
Pin 8	Heater	h

This valve is not fitted with an internal cylindrical shield around the electrode structure.

6.F.15

MAZDA

6.F.15

VARIABLE MU R. F. PENTODE

Indirectly heated – for parallel operation

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.2
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Maximum Cathode Current (mA)	$I_{k(av)max}$	10
Mutual Conductance (mA/V)	g_m	[2.3
Anode Impedance (megohm)	r_a	[1.7
Inner μ	$\mu_{g1,g2}$	16.5
Maximum Potential Heater/Cathode (volts D.C.)	$V_{h,k(max)}$	150

[Taken at V_a = 250v; V_{g2} = 100v; V_{g1} = -2.5v.

INTER-ELECTRODE CAPACITANCES

		¶	‖
Anode/Earth (μμF)	C_{out}	6.8	8.3
Anode/Grid (μμF)	$C_{a,g1}$	.0034	.0035
Grid/Earth (μμF)	C_{in}	5.1	6.6

¶ Inter-electrode capacitances with holder capacitance balanced out.

‖ Including a Benjamin B8A holder at a frequency of 1 Mc/s with vertical screen fitted to holder between pins 3-4 and 7-8.

"Earth" denotes the remaining earthy potential electrodes, shields and heater joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	67
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	54
Radius Over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	¾
Approximate Packed Weight (ozs)	1

MOUNTING POSITION Unrestricted.

MAZDA

6.F.15

VARIABLE MU R. F. PENTODE

Indirectly heated – for parallel operation

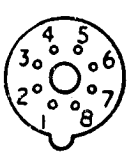
TYPICAL OPERATION

Anode Voltage (volts)	V_a	250	250
Screen Voltage (volts)	V_{g2}	100	250
Grid Bias Voltage (volts-ve)	V_{g1}	2.5	
Anode Current (mA)	I_a	7.0	
Screen Current (mA)	I_{g2}	2.0	
Mutual Conductance (mA/V)	g_m	2.3	
Anode Impedance (megohms)	r_a	1.7	
Input Loss at 45 Mc/s (ohms)	$r_{g1,k(w)}$	24,000	
Input Capacitance Working (Hot) (μμF)	$C_{in(w)}$	* 6.1	
Change in input capacitance produced by biassing valve to cut-off (μμF) △	$C_{in(w)}$	0.9	
Bias to give mutual conductance of 100 μA/V.	V_{g1}		27
Bias to give mutual conductance of 23 μA/V.	V_{g1}	13.3	34
Equivalent grid noise resistance (ohms)	r_{eq}	6,000	

* Inter-electrode capacitance with holder capacitance balanced out.

BULB Clear

BASE B8A



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Internal Shield	s
Pin 4	Suppressor Grid	g3
Pin 5	Screen Grid	g2
Pin 6	Control Grid	g1
Pin 7	Cathode	k
Pin 8	Heater	h

NOTE

In use pins 3 and 4 should be joined and earthed.

6.F.15

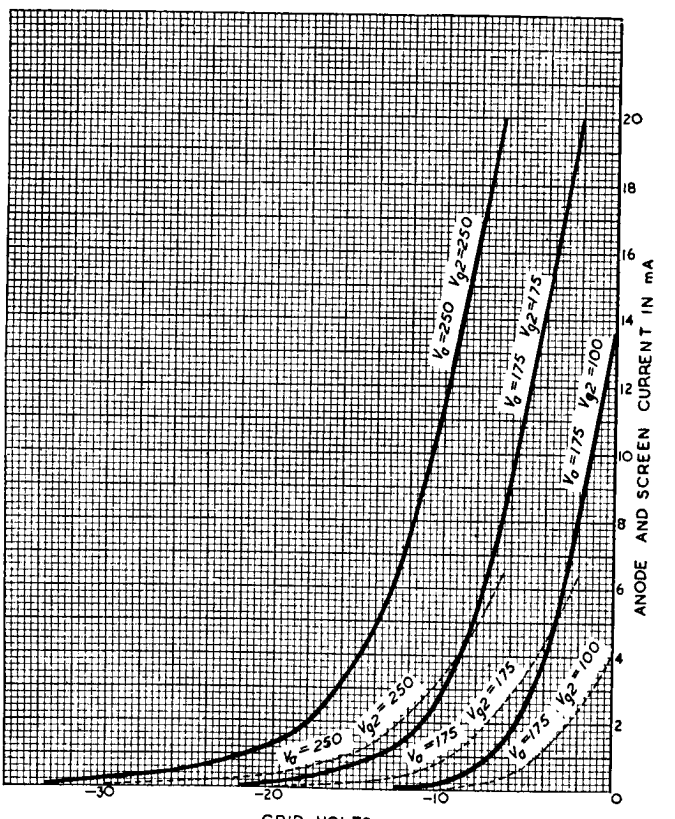
MAZDA

6.F.15

VARIABLE MU R. F. PENTODE

Indirectly heated – for parallel operation

TENTATIVE CHARACTERISTIC CURVES



October 1948 *RADIO DIVISION* Issue 1/2

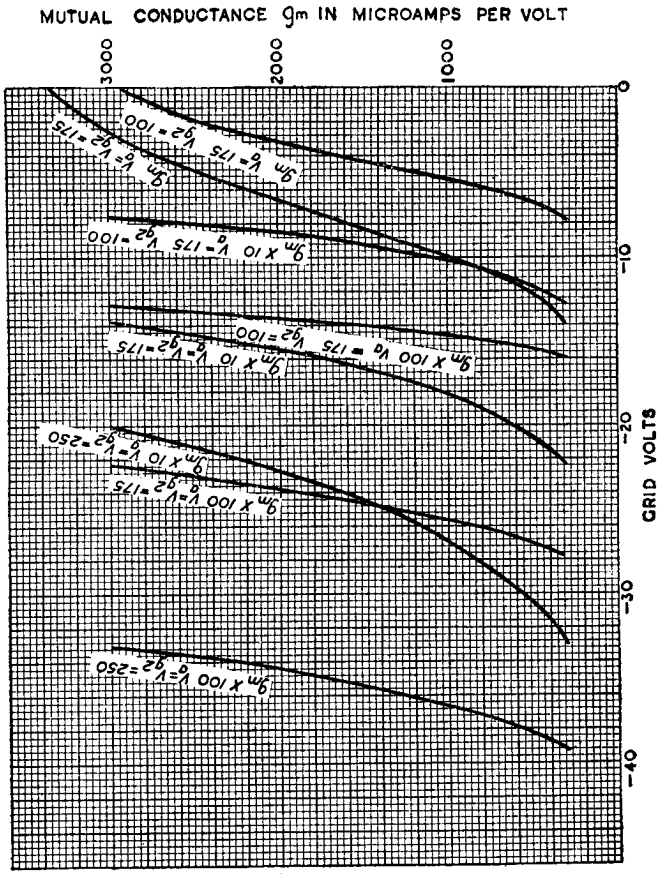
THE EDISON SWAN ELECTRIC COMPANY LTD

MAZDA

6.F.15

VARIABLE MU R. F. PENTODE

Indirectly heated – for parallel operation



MAZDA

6F17

MINIATURE PULSE & R.F. BEAM TETRODE

Indirectly heated—for parallel operation

RATING

Heater Voltage (volts)	Vh	6.3
Heater Current (amps)	Ih	0.3
Maximum Anode Voltage (volts)	Va(max)	600
Maximum Screen Voltage (volts)	Vg2(max)	600
Mutual Conductance (mA/V)	gm	• 8.3
Maximum Anode Dissipation (watts)	Pa	‡ 3.5
Maximum Screen Dissipation (watts)	Pg2	0.7

• Tested under pulse conditions and taken at Va = Vg2 = 250v; Vg1 = -6.25v; Ia = 64mA.

‡ If used in a can at maximum rating the can must be matt black both internally and externally.

INTER-ELECTRODE CAPACITANCES		‖	¶	⌈
Anode/Control Grid (μμF)	Ca-g1	.03	.033	.05
Anode/Earth (μμF)	Cout	6.0	7.1	5.9
Control Grid/Earth (μμF)	Cin	6.6	7.6	7.5

‖ Inter-electrode capacitance with holder capacitance balanced out, but with cylindrical screen.

¶ Total capacitance including Benjamin B7G holder type 75/828 and cylindrical screen type 75/832.

⌈ Total capacitance including Benjamin B7G holder type 75/663R without cylindrical screen.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19
Maximum Seated Height (mm)	47.5
Approximate Nett Weight (ozs)	1
Approximate Packed Weight (ozs)	2

MOUNTING POSITION - Unrestricted.

6F17

MAZDA

6F17

MINIATURE PULSE & R.F. BEAM TETRODE

Indirectly heated—for parallel operation

BULB Clear

BASE B7G

Viewed from free end of pins

CONNEXIONS

Pin 1	Control Grid	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode	a
Pin 6	Beam Plates	
Pin 7	Screen Grid	g2

MAZDA

6F17

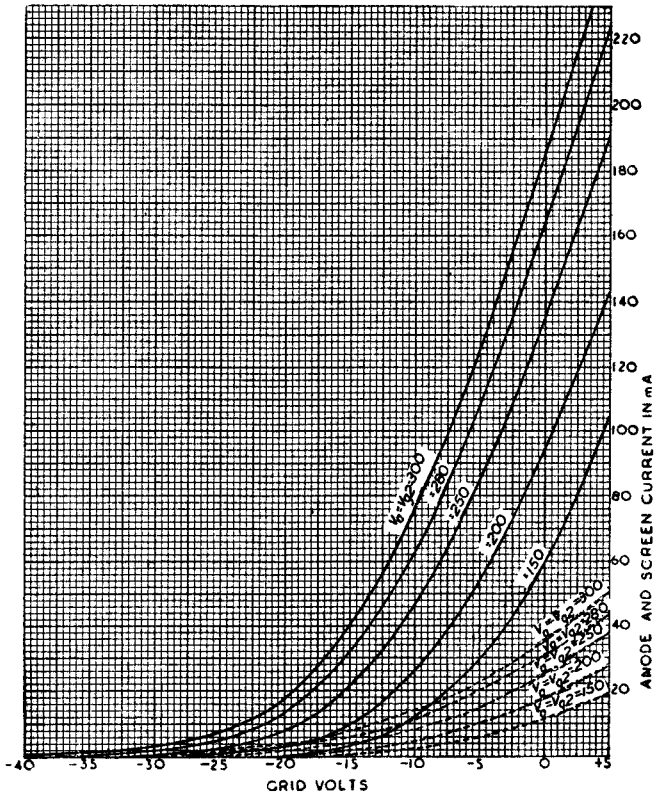
6F17

MINIATURE PULSE & R.F. BEAM TETRODE

Indirectly heated—for parallel operation

AVERAGE CHARACTERISTIC CURVES

These curves were taken with a short duration pulse having a 400:1 off to on period



MAZDA

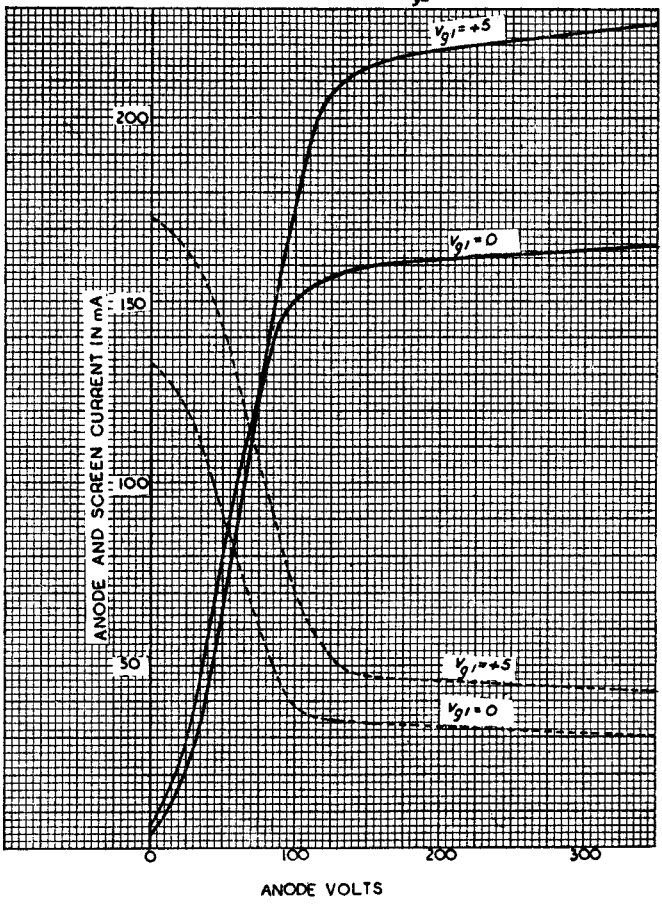
6F17

MINIATURE PULSE & R.F. BEAM TETRODE

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES

These curves were taken with a short duration pulse having a 400:1 off to on period at V_{g2} = 280



EDISWAN

MAZDA

6F18

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE

GENERAL

The 6F18 is a variable-mu HF. Pentode intended for use in AM/FM Receivers having parallel connected heater chains, and is suitable for use on A.C. Mains.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.2
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Maximum Anode Dissipation (watts)	P_a	2.25
Maximum Screen Dissipation (watts)	P_{g2}	0.5
Maximum Heater to Cathode Voltage (Volts D.C.)	$V_{h\text{-}k(max)}$	150

INTER-ELECTRODE CAPACITANCES (pF)

Control Grid/Earth	c_{in}	5.2*	6.5**
Anode/Earth	c_{out}	5.0	6.3
Control Grid/Anode	$c_{a\text{-}g1}$	0.0017	0.0021

" Earth " denotes the remaining earthy potential electrodes, heater and shields connected to cathode.

* Inter-electrode capacity with holder capacity balanced out but with cylindrical screen can.

** Total capacity including Carr Fastener holder type 76/840E/T with radial shield and cylindrical screen. The ca-g1 holder Capacity can be reduced to 0.00004 pF by the insertion of a shield between pins 4 and 5, 9 and 1. If an unscreened holder is used (without can or skirt) the total a to g1 capacity with holder becomes 0.0025 pF.

6F18

EDISWAN

MAZDA

6F18

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE

DIMENSIONS

Maximum Overall length	(mm)	56.0
Maximum Diameter	(mm)	22.2
Maximum Seated Height	(mm)	49.0
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

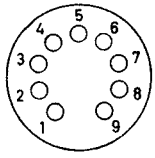
MOUNTING POSITION Unrestricted

TYPICAL OPERATION

Anode Voltage (volts)	V_a	175	175
Screen Voltage (volts)	V_{g2}	100	175
Grid Bias Voltage (volts)	V_{g1}	−1.3	
Anode Current (mA)	I_a	12.0	
Screen Current (mA)	I_{g2}	3.5	
Mutual Conductance (mA/V)	g_m	4.4	
Anode Impedance (kΩ)	r_a	220	
Bias to give mutual conductance of 100 μA/V (volts)			−19.5
Input Capacity working (Hot) (pF)	c_{in}	7.1	
Input Capacity change at cut-off (pF)	Δc	1.7	
Input Loss at 38 Mc/s, cathode pins strapped (kΩ)		16	

BULB Clear

BASE Noval (B.9.A.)



View from free end of Pins

EDISWAN

MAZDA

6F18

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE

CONNECTIONS

Pin 1	Cathode	k
Pin 2	Control Grid	g1
Pin 3	Cathode	k
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Internal Shield	s
Pin 7	Anode	a
Pin 8	Screen Grid	g2
Pin 9	Suppressor Grid	g3

NOTES

If only one cathode pin is required it is recommended that Pin 3 be used.

6F18

EDISWAN

MAZDA

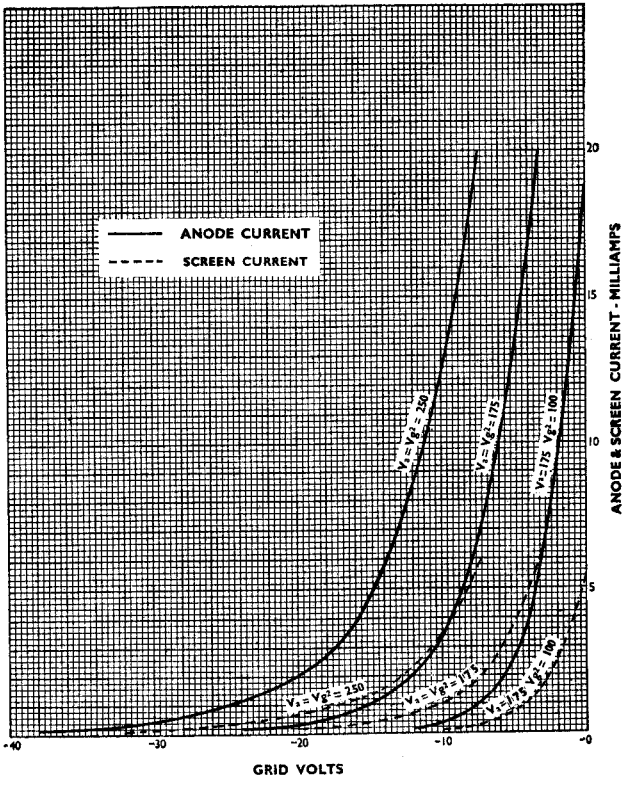
6F18

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE

CHARACTERISTIC CURVES



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SIEMENS EDISON SWAN LIMITED

EDISWAN

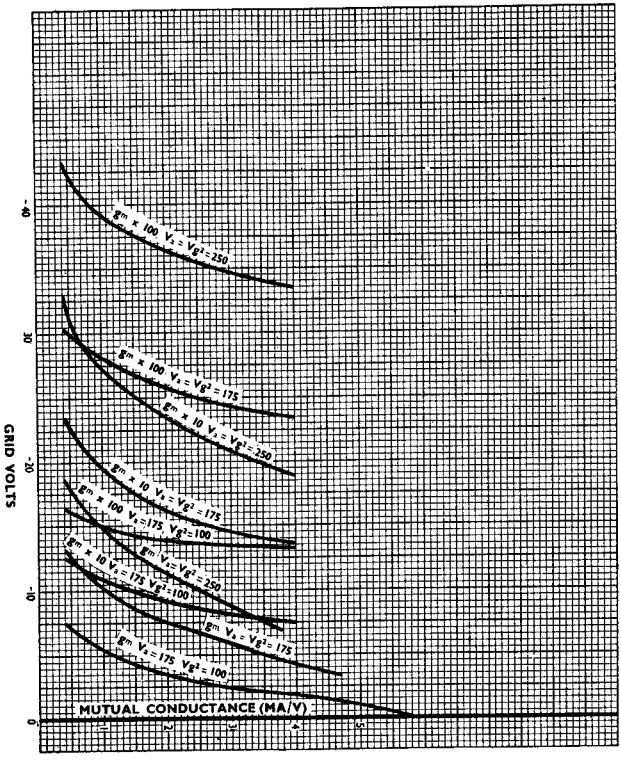
MAZDA

6F18

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE



EDISWAN

6F21

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation.

GENERAL

The 6F21 is a miniature based indirectly heated variable mu H.F. Pentode. It is intended for use in H.F. or L.F. Amplifiers having parallel connected heaters.

RATING

Heater Voltage (volts)	V_h	6·3
Heater Current (amps)	I_h	0·2
Maximum Anode Voltage (volts)	$V_{a(max)}$	300
Maximum Screen Voltage (volts)	$V_{g2(max)}$	300
Maximum Anode Voltage (volts)	$V_{a(max)}$	500*
Maximum Screen Voltage (volts)	$V_{g2(max)}$	300*
Mutual Conductance (mA/V)	g_m	2·5††
Inner μ	$\mu_{g1,g2}$	30††
Maximum Potential Heater/Cathode (volts DC)	$V_{h,k(max)}$	150
Maximum Anode Dissipation (watts)	$P_{a(max)}$	3·0
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	0·7

* With 5,000 ohms in series with the anode, and 20,000 ohms in series with the screen, $I_a = 0$.

†† $V_a = 250$ v ; $V_{g2} = 200$ v ; $V_{g1} = -2{\cdot}5$ v.

INTER-ELECTRODE CAPACITANCES (pF)

		§	‡	‡‡
Anode/Earth	c_{out}	7·0	8·1	
Gride 1/Earth	c_{in}	4·7	5·8	
Anode/Grid 1	$c_{a\text{-}g1}$	0·0078	0·0098	0·0083

6F21

EDISWAN

6F21

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation.

§ Inter-electrode capacity with holder capacity balanced out.

‡ Total capacity with a Benjamin B7G holder type 75/787R.

‡‡ Total capacity with a Benjamin type 75/787R holder and a perpendicular shield between pins 2, 3 and 6, 7.

"Earth" denotes the remaining earthy potential electrodes, heater and shields connected to cathode.

DIMENSIONS

Maximum Overall Length	(mm)	54·5
Maximum Diameter	(mm)	19
Maximum Seated Height	(mm)	47·5
Approximate Nett Weight	(ozs)	¼
Approximate Packed Weight	(ozs)	½

MOUNTING POSITION

Unrestricted.

TYPICAL OPERATION

Anode Voltage (volts)	V_a	250	250
Screen Voltage (volts)	V_{g2}	100	200
Grid Bias (volts)	V_{g1}	−0·5	−2·5
Anode Current (mA)	I_a	4·9	7·8
Screen Current (mA)	I_{g2}	1·25	2·0
Mutual Conductance (mA/V)	g_m	2·5	2·5
Grid Bias for Mutual Conductance of 10 μA/V (volts)			−34
Equivalent Grid Noise Resistance (KΩ)	R_{eq}		7·5
Anode Impedance (MΩ)	r_a		1·2

EDISWAN

6F21

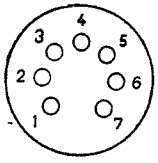
6F21

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation

BULB—Clear.

BASE—B7G.



Viewed from free end of pins

CONNECTIONS

Pin 1	Control Grid	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode	a
Pin 6	Suppressor Grid and Shield	g3,s
Pin 7	Screen Grid	g2

September 1959 *INDUSTRIAL VALVE & CRT DIVISION* Issue 2/7

SIEMENS EDISON SWAN LIMITED

6F21

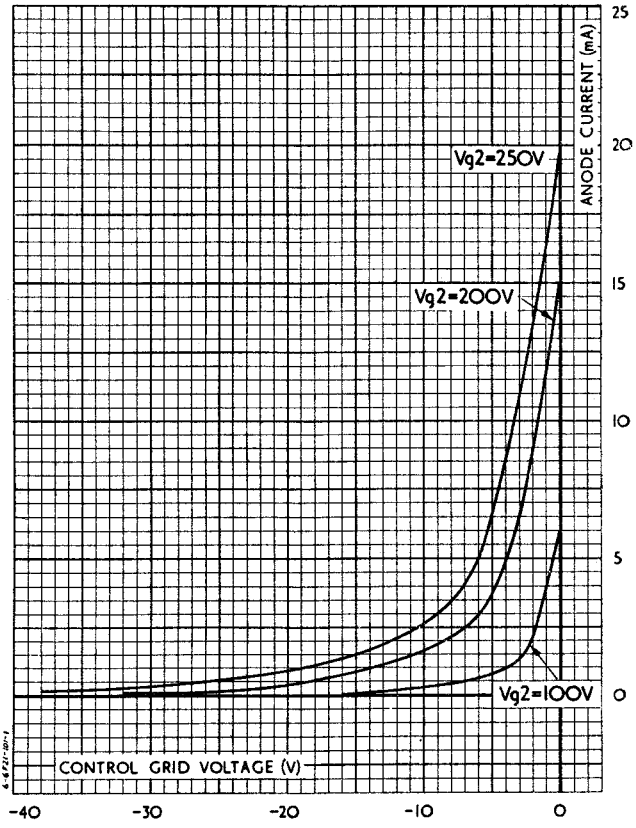
EDISWAN

6F21

VARIABLE MU H.F. PENTODE

Indirectly heated—for parallel operation

AVERAGE CHARACTERISTIC CURVES:
I_a/V_{g1} Curves taken at $V_a = 250V$



INDUSTRIAL
September 1959 *VALVE & CRT DIVISION* Issue 2/7

SIEMENS EDISON SWAN LIMITED

EDISWAN
MAZDA

6F23

HIGH SLOPE SCREENED H.F. PENTODE

TENTATIVE

GENERAL

The 6F23 is intended for use as a straight television pentode and is suitable for AC or AC/DC operation.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.3
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Maximum Anode Dissipation (watts)	$P_{a(max)}$	3§
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	1§
Maximum Heater to Cathode Voltage (volts) (r.m.s.)	$V_{h\text{-}k(max)}$	200†
Maximum Resistance Control Grid to Cathode (kΩ)	$R_{g\text{-}k(max)}$	600‡
Mutual Conductance (mA/V)	g_m	9.2*
Inner Amplification Factor	$\mu_{g1\text{-}g2}$	64*

* At $V_a = V_{g2} = 170$ volts; $I_a = 10$ mA.

§ With a grid-cathode resistance not exceeding 10,000 ohms.

† From Cathode to higher potential heater pin.

‡ With maximum anode dissipation 2 watts, maximum screen dissipation 0.5 watts and assuming a common anode and screen decoupling resistance of not less than 2,200 ohms ±10%.

INTER-ELECTRODE CAPACITANCES (pF)

		‡	§	**
Grid/Earth	c_{in}	9.0	10.0	9.0
Anode/Earth	c_{out}	4.0	5.0	3.7
Anode/Grid	$c_{g1\text{-}a}$	0.008	0.009	0.007

Inter-electrode Capacitances (*continued overleaf*)

6F23

EDISWAN
MAZDA

6F23
HIGH SLOPE SCREENED H.F. PENTODE
TENTATIVE

"Earth" denotes the remaining earthy potential electrodes, shields and heater joined to cathode.

‡ Inter-electrode capacitances with holder capacitance balanced out.

§ Total inter-electrode capacity including B9A ceramic holder without skirt or radial shield (Plessey holder type CP180014/1).

** Capacity in fully shielded jig, without can.

DIMENSIONS

Maximum Overall Length	(mm)	67.5
Maximum Diameter	(mm)	22.2
Maximum Seated Height	(mm)	60.5
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION

Anode Voltage (volts)	V_a	170
Screen Voltage (volts)	V_{g2}	170
Grid Bias Voltage (volts)	V_{g1}	—1.9
Cathode Bias Resistance (ohms)	R_k	150
Anode Current (mA)	I_a	10
Screen Current (mA)	I_{g2}	2.6
Mutual Conductance (mA/V)	g_m	9.2
Input Loss at 38 Mc/s (ohms)	$r_{g1\text{-}k(w)}$	8,500*
Equivalent grid noise resistance (ohms)	R_{eq}	670
Input Capacity Working (pF)	$c_{in(w)}$	12.1‡
Change in Input Capacity produced by biassing valve to cut off (pF)	$\Delta c_{in(w)}$	2.45‡

* With the two cathodes strapped and returned directly to earth.

‡ Hot Capacity at 38 Mc/s.

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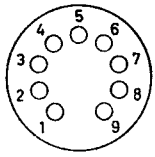
MAZDA

6F23

HIGH SLOPE SCREENED H.F. PENTODE

TENTATIVE

BASE—Noval (B9A)



Viewed from Free End of Pins

CONNECTIONS

Pin 1	Cathode	k
Pin 2	Control Grid	g1
Pin 3	Cathode	k
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Shield	s
Pin 7	Anode	a
Pin 8	Screen Grid	g2
Pin 9	Suppressor Grid	g3

EDISWAN

MAZDA

6F25

SCREENED VARIABLE MU H.F. PENTODE

Indirectly heated—for series or parallel operation

TENTATIVE

GENERAL

The 6F25 is an indirectly heated Screened Variable-μ-H.F. Pentode of Frame Grid construction. It is capable of handling large input signals without cross-modulation occurring, therefore it is very suitable for use as the common I.F. amplifier in AC or AC/DC television receivers.

RATING

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·3	A
Maximum Anode Voltage	$V_{a(max)}$	250	V
Maximum Screen Voltage	$V_{g2(max)}$	250	V
Maximum Anode Dissipation	$P_{a(max)}$	2·5	W
Maximum Screen Dissipation	$P_{g2(max)}$	0·5	W
Mutual Conductance	g_m	12·5*	mA/V
Inner Amplification Factor	$\mu_{g1\text{-}g2}$	35*	
Maximum Heater/Cathode Voltage r.m.s.	$V_{h\text{-}k(rms)max}$	150†	V
Maximum Control Grid/ Cathode Resistance	$r_{g\text{-}k}$	1	MΩ

* At V_a=170V, V_{g2}=90V, I_a=11·5mA.

† From cathode to higher potential heater pin.

INTER-ELECTRODE CAPACITANCES (pF)††

Grid 1/Earth	c_{in}	8·5
Anode/Earth	c_{out}	2·7
Anode/Grid 1	$c_{a\text{-}g1}$	0·006
Grid 1/Grid 3	$c_{g1\text{-}g3}$	0·1
Grid 1/Grid 2	$c_{g1\text{-}g2}$	1·8
Grid 1/Cathode	$c_{g1\text{-}k}$	6·0
Anode/Grid 2	$c_{a\text{-}g2}$	0·19
Anode/Grid 3	$c_{a\text{-}g3}$	0·45

†† With fully shielded socket, without can.

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

6F25

EDISWAN

MAZDA

6F25

SCREENED VARIABLE MU H.F. PENTODE

Indirectly heated—for series or parallel operation

TENTATIVE

DIMENSIONS

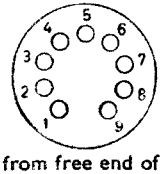
Maximum Overall Length	56	mm
Maximum Diameter	22·2	mm
Maximum Seated Height	49	mm

MOUNTING POSITION—Unrestricted

TYPICAL OPERATION

Supply Voltage	$V_{a(b)}$	200	V
Anode Voltage	V_a	170	V
Screen Voltage (Initial)	V_{g2}	90	V
Grid Bias Voltage (approx)	V_{g1}	—1·5	V
Anode Current	I_a	11·5	mA
Screen Current	I_{g2}	2·8	mA
Mutual Conductance	g_m	12·5	mA/V
Screen Resistance	R_{g2}	39	kΩ
Self Bias Resistance	R_k	100	Ω
Grid Voltage for Mutual Conductance Reduction 10 : 1	V_{g1}	—5·5	V

BASE—Noval (B9A)



Viewed from free end of pins

CONNECTIONS

Pin 1	Cathode	k
Pin 2	Control Grid	g1
Pin 3	Cathode	k
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Internal Shield	s
Pin 7	Anode	a
Pin 8	Screen Grid	g2
Pin 9	Suppressor Grid	g3

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
MAZDA

6F26

6F26

VARIABLE MU H.F. PENTODE

Indirectly heated—for series or parallel operation

GENERAL

The 6F26 is a miniature based, indirectly heated, variable mu H.F. Pentode. It is intended for use in television receivers having series or parallel connected heater chains.

RATING

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·3	A
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Screen Voltage	$V_{g2(max)}$	300	V
Maximum Cathode Current	$I_{k(max)}$	15	mA
Mutual Conductance	g_m	6*	mA/V
Inner Amplification Factor	μ_{g1-g2}	25*	
Maximum Heater/Cathode Potential (DC)	$V_{h-k(max)}$	150†	V
Maximum Anode Dissipation	$P_{a(max)}$	2·5	W
Maximum Screen Dissipation	$P_{g2(max)}$	0·65	W
Maximum Grid 1/Cathode Resistance	$R_{g1-k(max)}$	3	MΩ
Maximum Heater/Cathode Resistance	$R_{h-k(max)}$	20	kΩ

* At V_a=250V; V_{g2}=100V; V_{g1}=2.0V.

† From Cathode to higher potential heater pin.

INTER-ELECTRODE CAPACITANCES (pF)††

Grid/Earth	c_{in}	7·2
Anode/Earth	c_{out}	3·7
Anode/Control Grid	c_{a-g1}	<0·007

†† Interelectrode capacities with fully shielded socket, without can.

DIMENSIONS

Maximum Overall Length	67·5	mm
Maximum Diameter	22·2	mm
Maximum Seated Height	60·5	mm

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

6F26

EDISWAN
MAZDA

6F26

VARIABLE MU H.F. PENTODE

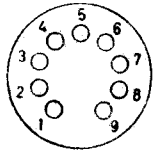
Indirectly heated—for series or parallel operation

MOUNTING POSITION—Unrestricted

TYPICAL OPERATION

Anode Voltage	V_a	250	250	V
Screen Voltage	V_{g2}	100	250	V
Grid Bias Voltage	V_{g1}	—2	·	V
Anode Current	I_a	10	·	mA
Screen Current	I_{g2}	2·5	·	mA
Mutual Conductance	g_m	6	·	mA/V
Anode Resistance	r_a	0·5	·	MΩ
Equivalent Grid Noise Resistance	R_{eq}	1·5	·	kΩ
Grid Bias to give Mutual Conductance of 60 μA/V	V_{g1}		—35	V

BASE—Noval (B9A)



CONNECTIONS

Pin 1	Cathode	k
Pin 2	Control Grid	g_1
Pin 3	Cathode	k
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Internal Shield	s
Pin 7	Anode	a
Pin 8	Screen Grid	g_2
Pin 9	Suppressor Grid	g_3

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

MAZDA

6 F 32

6F32

SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

GENERAL

The 6 F 32 has a short cut off Suppressor Grid characteristic which makes it particularly suitable for use in Modulator, Variable Reactance and Timing Circuits.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.63
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	200
Mutual Conductance (mA/V)	g_m	* 3.35
Inner μ ¶	$\mu_{g1}-\mu_{g2}$	* 38
Maximum Anode Dissipation (watts)	$P_{a(max)}$	† 4.5
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	1.5
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

* Taken at $V_a = V_{g2} = 200v$; $V_{g1} = -4v$; $V_{g3} = 0v$.

¶ i.e. $\frac{\delta V_{g2}}{\delta V_{g1}}$ with I_a constant

† Low grid resistance should be employed, particularly when running at maximum dissipation.

INTER-ELECTRODE CAPACITANCES

Anode/Earth (μμF)	C_{out}	5.7
Anode/Control Grid (μμF)	C_{a-g1}	<0.0005
Control Grid/Earth (μμF)	C_{in}	10.5

"Earth" denotes the remaining earthy potential electrodes, heater and metallising joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	96
Maximum Diameter (mm)	32
Maximum Seated Height (mm)	83.5
Approximate Nett Weight (ozs)	1¼
Approximate Packed Weight (ozs)	1¾

MOUNTING POSITION - Unrestricted

Indicates a change ←

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THE EDISON SWAN ELECTRIC COMPANY LTD.

6F32

MAZDA

6F32

SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

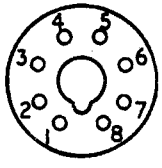
REPLACEMENT TYPE

TYPICAL OPERATION

Anode Voltage (volts)	V_a	200	200
Screen Voltage (volts)	V_{g2}	200	200
Control Grid Bias Voltage (volts)	V_{g1}	-4.5	-4.5
Suppressor Grid Bias Voltage (volts)	V_{g3}	0	-3.3
Anode Current (mA)	I_a	5.1	2.5
Screen Current (mA)	I_{g2}	3.45	5.5
Mutual Conductance (mA/V	g_m	3.0	1.4
Approximate Suppressor Grid Bias (volts) for 50 μA/V with V_{g1} = -4.5v.		-8.0	-8.0

BULB Metallised

BASE B.O.7



Viewed from free ends of pins

CAP B.V.A. Standard

CONNECTIONS

Pin 1	Heater	h
Pin 2	Cathode	k
Pin 3	Anode	a
Pin 4	Screen Grid	g2
Pin 5	Suppressor Grid	g3
Pin 6	Metallising	M
Pin 7	Omitted	-
Pin 8	Heater	h
Top Cap	Control Grid	g1

Indicates a change ←

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THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

MAZDA

6F32

6F32

SCREENED R.F. PENTODE

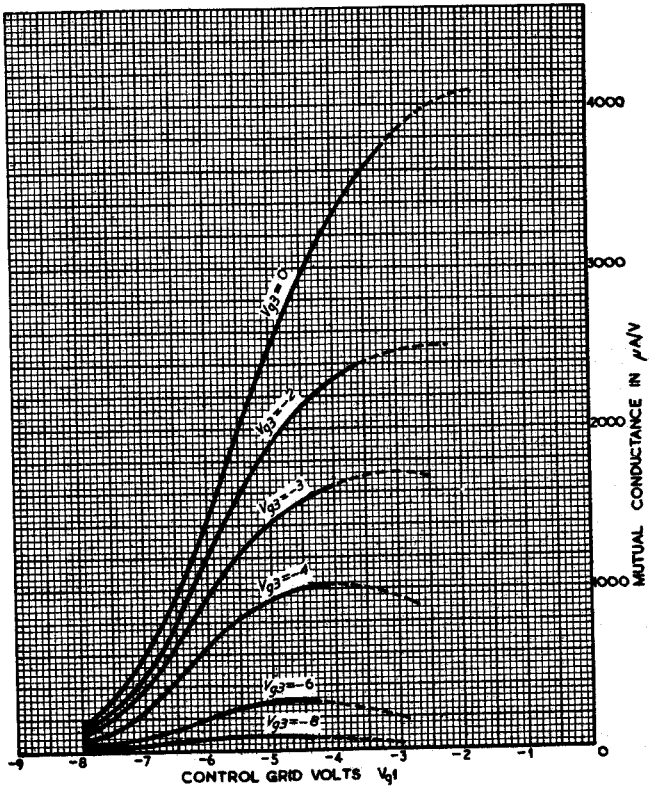
Indirectly heated—for parallel operation

Replacement Type ←

AVERAGE CHARACTERISTIC CURVES

Curves taken at $V_b = V_{g2} = 200V$.

Where the curve is broken a dissipation limit is exceeded.



Indicates a change ←

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SIEMENS EDISON SWAN LIMITED

6F32

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MAZDA

6F32

SCREENED R.F. PENTODE

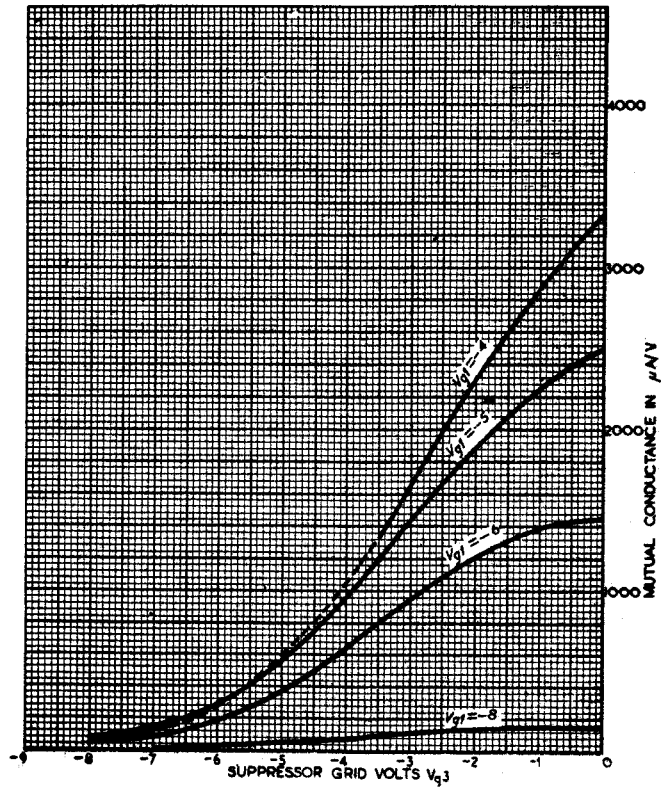
Indirectly heated—for parallel operation

Replacement Type ←

AVERAGE CHARACTERISTIC CURVES

Curves taken at $V_b = V_{g2} = 200V$

Where the curve is broken a dissipation limit is exceeded.



Indicates a change ←

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SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

6 F 32

SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

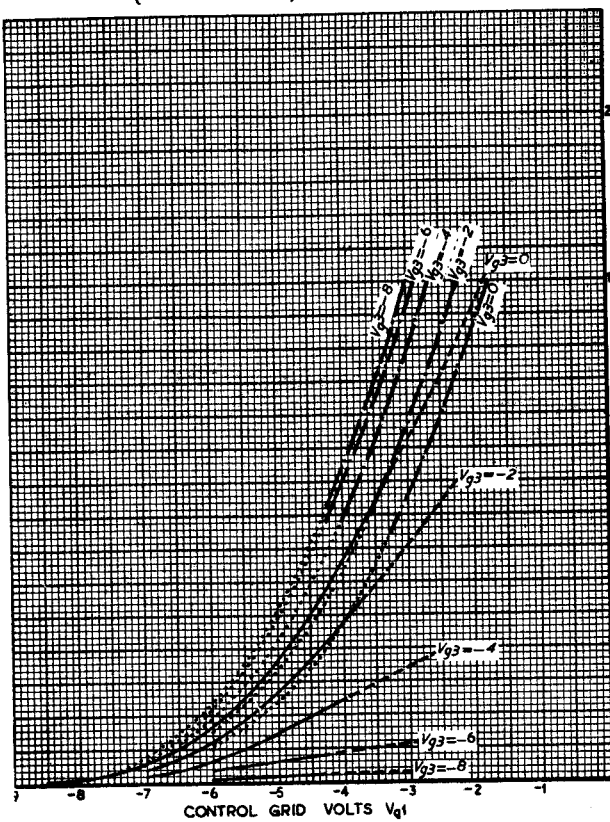
Replacement Type

AVERAGE CHARACTERISTIC CURVES

Curves taken at $V_a = V_{g2} = 200V$

Key
- Anode Current
- Screen Current
- Anode Current
- Screen Current

In these regions a dissipation limit is exceeded



Indicates a change ←

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SIEMENS EDISON SWAN LIMITED

6F32

EDISWAN

MAZDA

6F32

SCREENED R.F. PENTODE

Indirectly heated—for parallel operation

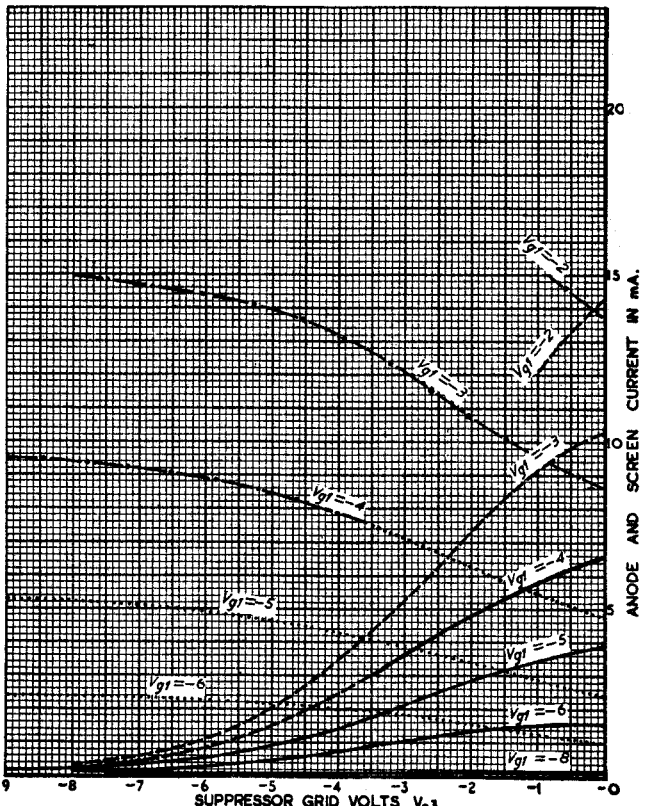
Replacement Type

AVERAGE CHARACTERISTIC CURVES

Curves taken at $V_b = V_{g2} = 200V$

Key
- Anode Current
- Screen Current
- Anode Current
- Screen Current

} In these regions a dissipation limit is exceeded.



Indicates a change

November 1956 VALVE & CRT DIVISION Issue 2/2

SIEMENS EDISON SWAN LIMITED

MAZDA

6F33

SCREENED R.F. PENTODE

Indirectly heated

6F33

GENERAL

The 6.F.33 has a short cut-off Suppressor Grid characteristic which makes it particularly suitable for use in Modulator, Variable Reactance and Timing Circuits. A diode has been tied to the suppressor in order to prevent "blocking" when this grid is driven positive. ←

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.35
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Mutual Conductance (mA/V)	g_m	• 4.35
Inner μ //	$\mu_{g1\ g2}$	• 38
Maximum Anode Dissipation (watts)	$P_{a(max)}$	2.5
Maximum Screen Dissipation (watts)	P_{g2}	0.8
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	100

• Taken at V_a = 200v; V_{g2} = 100v; V_{g1} = -1.5v; V_{g3} = 0v.

// i.e. $\frac{\delta V_{g2}}{\delta V_{g1}}$ with I_a constant.

INTER-ELECTRODE CAPACITANCES

			♣	$	
Anode/Earth	($\mu\mu$F)	c_{out}	4.5	5.6	←
Anode/Control Grid	($\mu\mu$F)	c_{a-g1}	0.01	0.012	
Control Grid/Earth	($\mu\mu$F)	c_{in}	7.3	8.4	←
Suppressor Grid/Earth	($\mu\mu$F)	c_{g3-E}	10.0	11.1	←

♣ Measured with Benjamin cylindrical screen type 75/832, but holder capacity balanced out.

$ Including capacity of Benjamin B7G holder type 75/833 and screen type 75/832.

DIMENSIONS

Maximum Overall Length	(mm)	54
Maximum Diameter	(mm)	19
Maximum Seated Height	(mm)	48.6
Approximate Nett Weight	(ozs)	‡
Approximate Packed Weight	(ozs)	‡

MOUNTING POSITION - Unrestricted.

Indicates a change ←

6F33

MAZDA

6F33

SCREENED R.F. PENTODE

Indirectly heated

BULB Clear

BASE B.7.G

Viewed from free end of pins

CONNECTIONS

Pin 1	Control Grid	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode	a
Pin 6	Suppressor Grid	g3
Pin 7	Screen Grid	g2

6F33

EDISWAN
MAZDA
6F33

SCREENED R.F. PENTODE

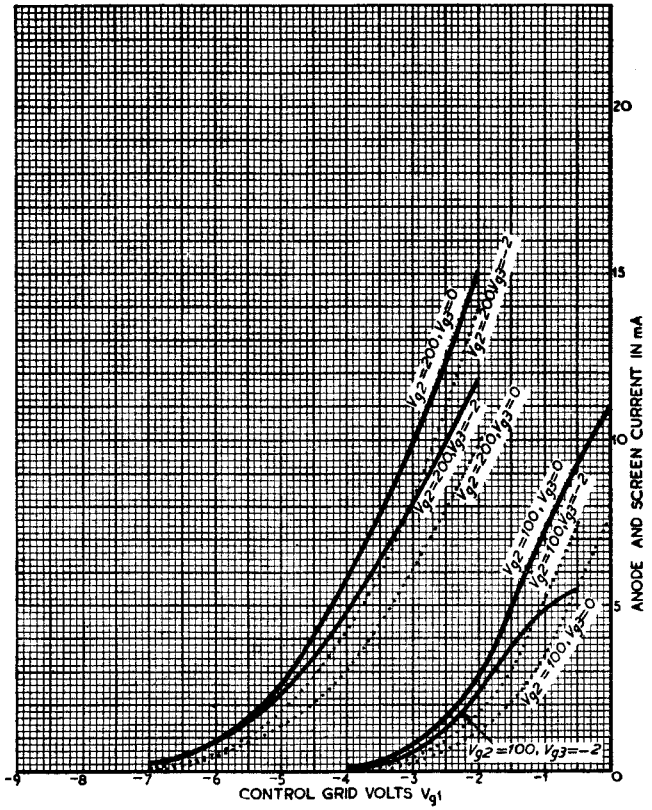
Indirectly heated

CHARACTERISTIC CURVES OF AVERAGE

EDISWAN VALVE 6F33

Curves taken at $V_a = 200V$.

Key { ——— *Anode Current*
{ ····· *Screen Current*



May 1948 *VALVE & CRT DIVISION* Issue 1/6

SIEMENS EDISON SWAN LIMITED

6F33

EDISWAN

MAZDA

6F33

SCREENED R.F. PENTODE

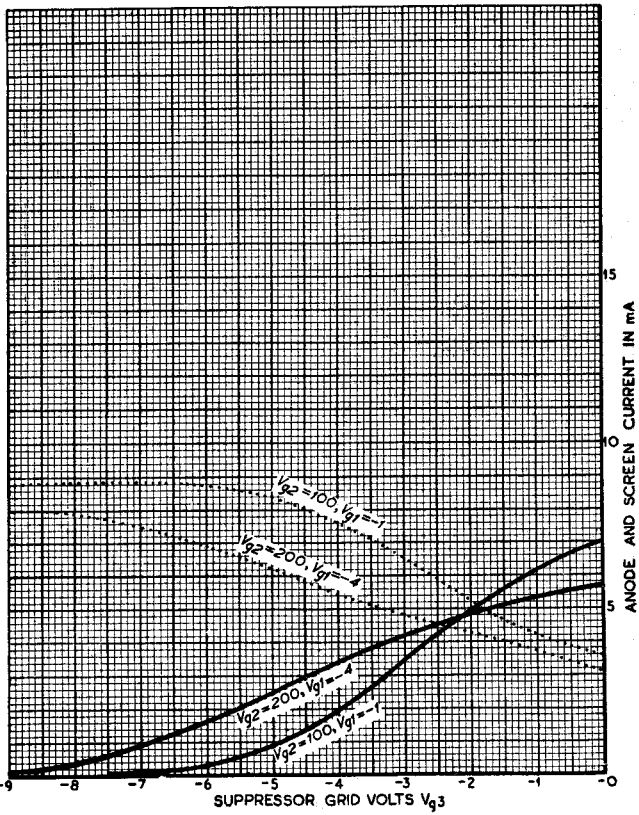
Indirectly heated

CHARACTERISTIC CURVES OF AVERAGE

EDISWAN VALVE 6F33

Curves taken at $V_b = 200V$.

Key { ——— Anode Current
····· Screen Current



May 1948 VALVE & CRT DIVISION Issue 1/6

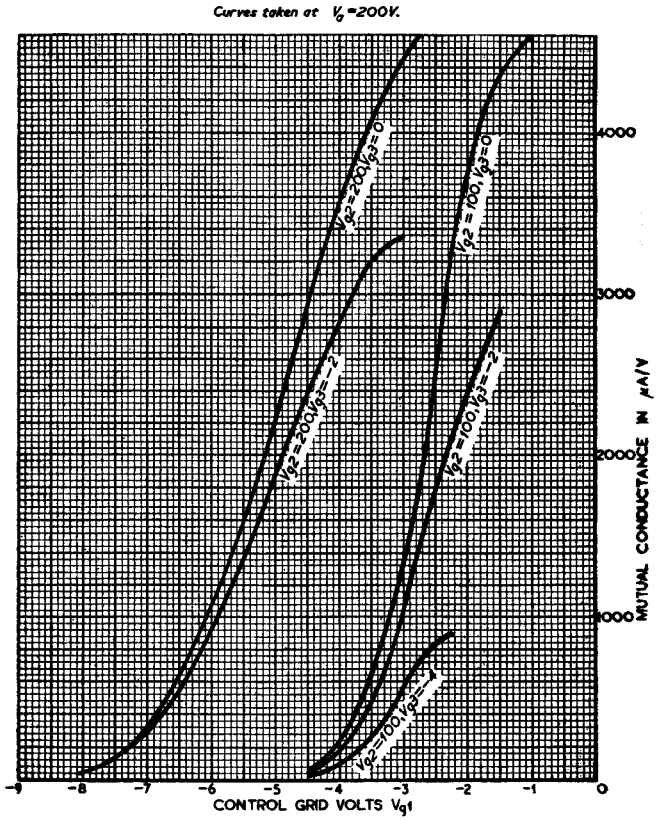
SIEMENS EDISON SWAN LIMITED

EDISWAN
MAZDA
6F33

6F33

SCREENED R.F. PENTODE
Indirectly heated

CHARACTERISTIC CURVES OF AVERAGE
EDISWAN VALVE 6F33



May 1948 *VALVE & CRT DIVISION* Issue 1/6
SIEMENS EDISON SWAN LIMITED

6F33

EDISWAN

MAZDA

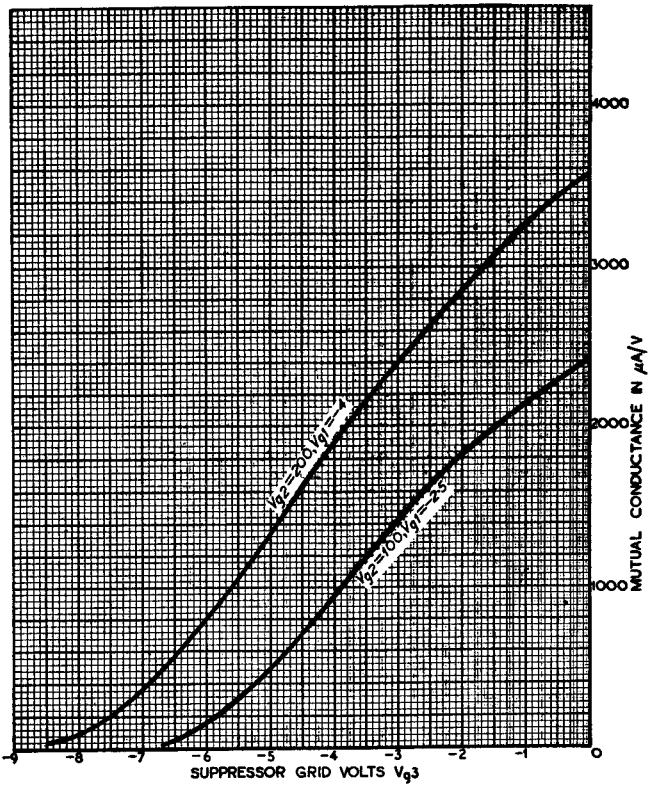
6F33

SCREENED R.F. PENTODE

Indirectly heated

CHARACTERISTIC CURVES OF AVERAGE

EDISWAN VALVE 6F33



May 1956 *VALVE & CRT DIVISION* Issue 1/6

SIEMENS EDISON SWAN LIMITED

EDISWAN

6H1

HEXODE

Indirectly heated—for parallel operation

←

GENERAL

The 6H1 is a miniature based hexode intended for use as a frequency changer with a separate triode oscillator, and will operate up to a frequency of 20 Mc/s. It is also suitable for use as a gated amplifier, and may be used in equipment having AC or DC powered parallel connected heater chains.

RATING

Heater Voltage	(volts)	V_h	6·3
Heater Current	(amps)	I_h	0·2
Maximum Anode Voltage	(volts)	$V_{a(b)max}$	550†
Maximum Operating Anode Voltage	(volts)	$V_{a(max)}$	300
Maximum Screen Voltage	(volts)	$V_{g2,4(b)max}$	400†
Maximum Operating Screen Voltage	(volts)	$V_{g2,4(max)}$	300
Maximum Anode Dissipation	(watts)	$P_{a(max)}$	1·0
Maximum Screen Dissipation	(watts)	$P_{g2+4(max)}$	0·7
Mutual Conductance	(mA/V)	g_m	2·1*

* Measured at $V_a = 250$ V ; $V_{g2+g4} = 100$ V ; $V_{g1} = -1{\cdot}8$V.

† $I_a = 0$.

All Maximum Values quoted are absolute.

INTER-ELECTRODE CAPACITANCES (pF)

Anode/Grid 1	$c_{a\text{-}g1}$	0·06
Anode/Earth	$c_{a\text{-}E}$	9·25
Grid 1/Earth	$c_{g1\text{-}E}$	4·3
Grid 3/All	$c_{g3\text{-}all}$	4·9

"Earth" denotes all earth potential electrodes, shields and heater connected to the cathode.

These capacities are measured cold with a metal screening can fitted to the valve.

EDISWAN

6H1

HEXODE

Indirectly heated—for parallel operation

←

DIMENSIONS

Maximum Overall Length	(mm)	54·5 ←
Maximum Diameter	(mm)	19·0
Maximum Seated Height	(mm)	47·5 ←
Approximate Nett Weight	(ozs)	¼
Approximate Packed Weight	(ozs)	½

MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION—Frequency Changer

Anode Voltage	(volts)	V_a	250
Screen Voltage	(volts)	V_{g2+4}	100
Grid 1 Bias Voltage	(volts)	V_{g1}	−2·2 ←
Anode Current (approx)	(mA)	I_a	2·3* ←
Screen Current (approx)	(mA)	I_{g2+4}	2·7* ←
Conversion Conductance	(μA/V)	g_c	560† ←
Valve Anode Resistance ($\delta v_a/\delta i_a$)	(MΩ)	r_a	1·0 ←
Peak Heterodyne Voltage	(volts)	$V_{het(pk)}$	12 ←
Grid 3 Resistor	(kΩ)	R_{g3}	47*

* Grid 3 connected in parallel with the grid of the oscillator valve and biased by grid current through the Grid 3 resistor.

† Measured with an anode circuit of low dynamic impedance.

Indicates a change ←

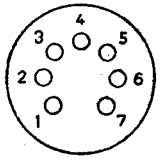
EDISWAN

6HI

HEXODE

Indirectly heated—for parallel operation

BASE—B7G



Viewed from free end of pins

VALVE HOLDER—Ediswan Clix VH337/7, VH437/7 and VH17/7 series.

CONNECTIONS

Pin 1	Grid 1	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode	a
Pin 6	Grid 3	g3
Pin 7	Grid 2 and Grid 4	g2+g4

EDISWAN

6H1

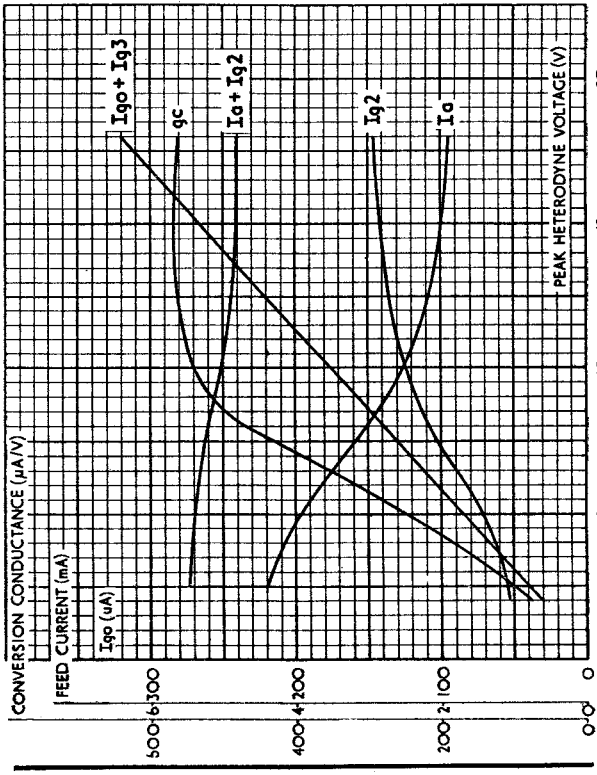
HEXODE

Indirectly heated—for parallel operation

AVERAGE CHARACTERISTIC CURVES:
$g_c, I_a, I_{g2}, I_{g3}, I_{g0}/V_{het(pk)}$
Heterodyne injected into g3

V_a = 250V	V_{g2} = 100V	V_{g3} = Self Bias
V_{g1} = —2.2V	Z_L = 49kΩ	R_{g3} = 47kΩ

Note: g3 is connected in parallel with the grid of an external oscillator and is biased by grid current.



MAZDA

6H8G

6 H 8 G

DOUBLE DIODE - PENTODE

Cathode à chauffage indirect		
Tension Filament	6,3	CC ou CA Volts
Intensité Filament	0,3	Amp.
Hauteur maximum		115 m/m
Diamètre maximum		38 m/m
Ampoule		V 51
Culot		Octal. 6218

Broches :

N° 1 Métallisation extérieure.
N° 2 Filament.
N° 3 Plaque Pentode.
N° 4 Plaque Diode n° 2.
N° 5 Plaque Diode n° 1.

Broches :

N° 6 Grille n° 2.
N° 7 Filament.
N° 8 Cathode et Grille n° 3.

La Grille n° 1 est reliée au culot du sommet.

Broches du culot, face à l'observateur

Utilisation de la Pentode en amplificatrice, Classe A

Tens. Filament (1)	6,3	6,3	6,3	6,3 Volts
Tens. Plaque	100	200	250	250 max. Volt
Tens. Grille n° 2.	100	100	100	125 max. Volt
Tens. Grille n° 1.	− 2	− 2	− 2	− 3 Volts
Coeffic. d'amplific.	800	1.900	2.300	1.550
Résistance interne.	0,400	0,900	1,1	0,650 Mégohm
Pente	2	2,1	2,1	2,4 mA/V
Courant Plaque ..	5,5	5,7	5,7	8,5 mA
Courant Grille n° 2	1,9	1,8	1,8	2,6 mA
Cut-Off pour Ip < 50 µA...	− 26	− 26	− 26	− 35 Volts

Utilisation en Double Diode

Les deux diodes ont avec la pentode une cathode commune. Chaque diode est connectée à sa propre broche du culot.

L'action redresseuse ou détectrice peut être utilisée, soit avec une alternance, soit avec deux, pour obtenir la tension de signal à l'entrée de la pentode, et (ou) pour obtenir la tension de régulation du gain des étages amplificateurs H.F. ou M.F., de manière à maintenir constante la tension de l'onde porteuse appliquée à la grille de la détectrice B.F.

Le circuit redresseur d'une seule alternance permet d'obtenir une tension environ deux fois supérieure à celle obtenue avec un circuit redressant les deux alternances.

La régulation du gain d'un amplificateur au moyen d'une tension redressée peut se faire de différentes manières. La tension de régulation peut être appliquée aux grilles de contrôle des tubes amplificateurs, ou, dans le cas des pentodes haute fréquence, elle peut être appliquée aux grilles « suppressors » aux plaques et (ou) aux écrans.

(1) Dans les circuits où la cathode n'est pas directement connectée au filament, la différence de potentiel entre filament et cathode devra être aussi faible que possible

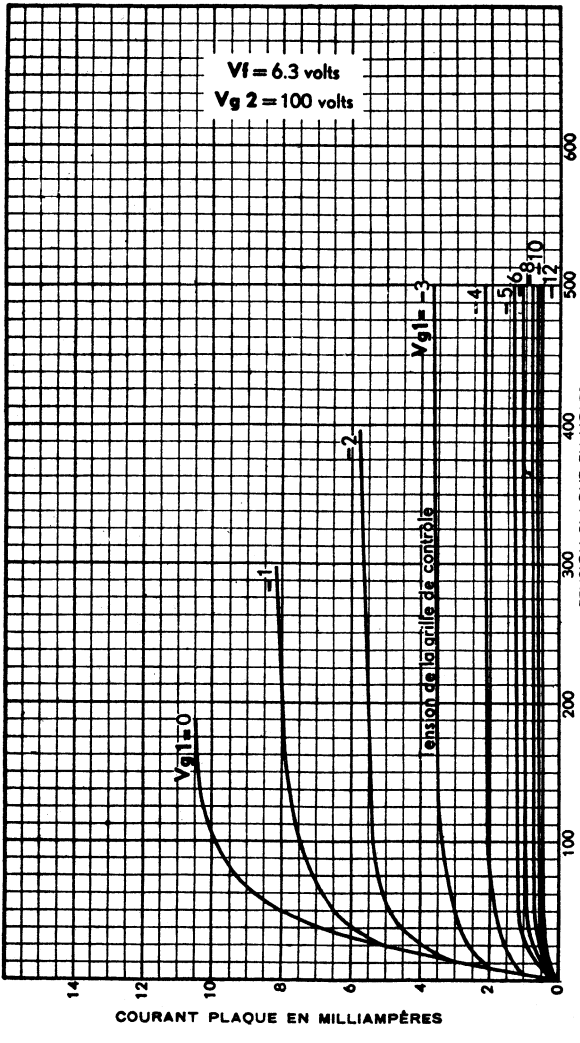
REPRODUCTION INTERDITE

6H8G

MAZDA

6 H 8 G

COURBE DU COURANT PLAQUE EN FONCTION DE SA TENSION



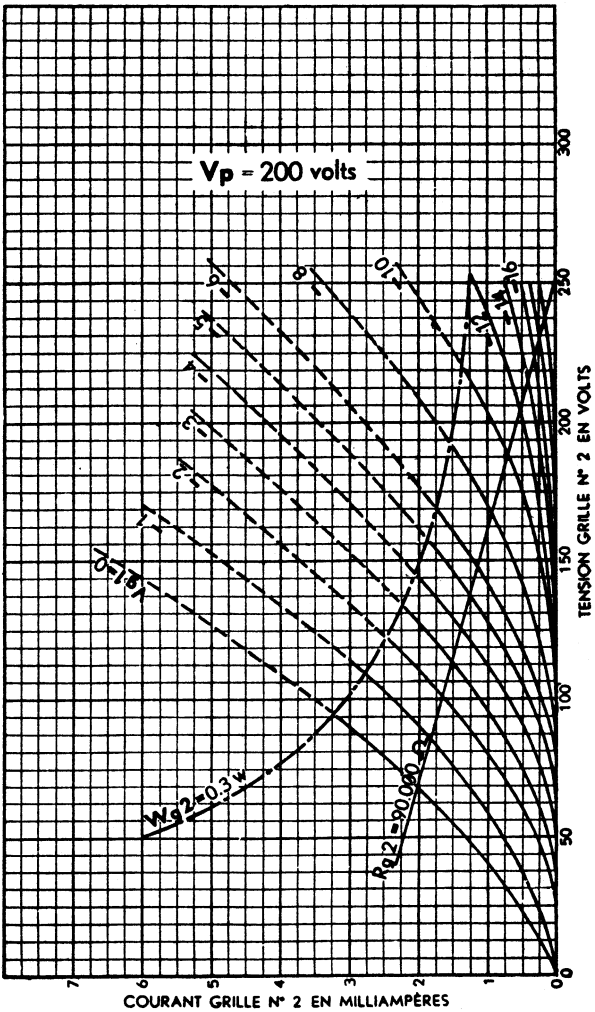
REPRODUCTION INTERDITE

MAZDA

6H8G

6 H 8 G

COURBES DU COURANT GRILLE N° 2 EN FONCTION DE LA TENSION GRILLE N° 2



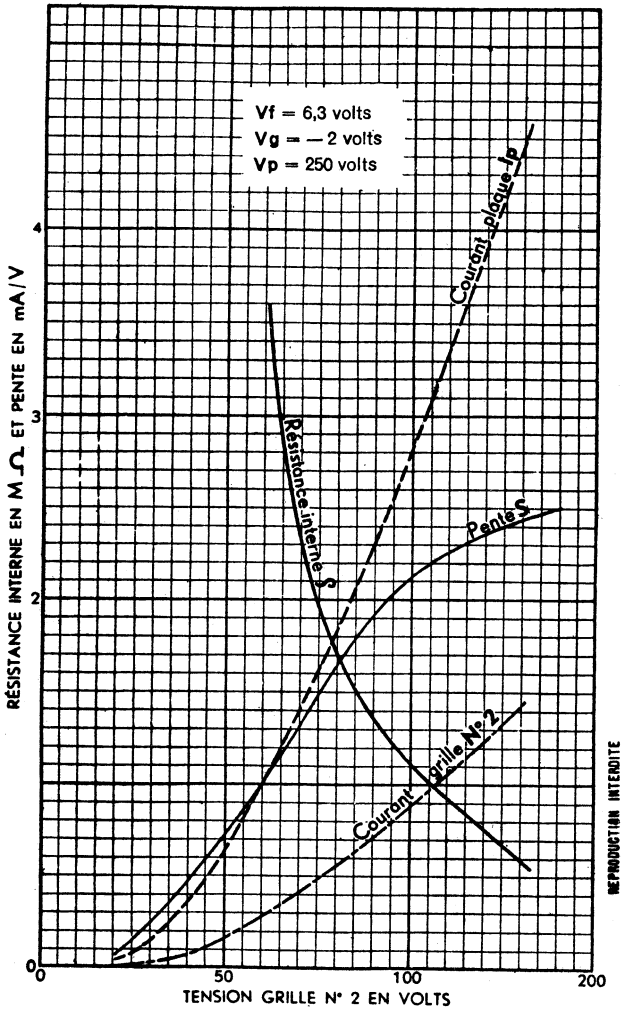
REPRODUCTION INTERDITE

6H8G

MAZDA

6H8G

Courbes de la pente, de la résistance interne, du courant plaque et du courant grille n° 2 en fonction de la tension grille n° 2.



REPRODUCTION INTERDITE

MAZDA

6K8

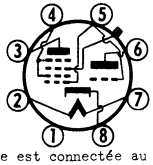
6K8

TRIODE HEXODE
CHANGEUR DE FREQUENCE ET OSCILLATEUR
CULOT OCTAL

Tension filament	6,3	V
Intensité filament	0,3	A
Hauteur maximale	79,3	mm
Diamètre maximal	33,3	mm
Tension d'anode hexode	250	V
Courant d'anode hexode	2,5	mA
Pente hexode	0,35	mA/V
Tension d'anode triode	100	V
Courant d'anode triode	3,8	mA
Résistance grille triode	50	kΩ

Brochage :

N° 1 – Connexion interne
N° 2 – Filament
N° 3 – Anode hexode
N° 4 – Grilles n°s 2 et 4 hexode



Brochage :

N° 5 – Grille triode et grille n° 1 hexode
N° 6 – Anode triode
N° 7 – Filament
N° 8 – Cathode

La grille n° 3 hexode est connectée au chapeau du sommet.

Broches de la base, face à l'observateur.

REPRODUCTION INTERDITE

EDISWAN

MAZDA

6LI

TELEVISION TWIN TRIODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.4
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Mutual Conductance (mA/V)	g_m	2.8*
Amplification Factor	μ	16*
Maximum Anode Dissipation (watts) (either section)	$P_{a(max)}$	3.0†
Maximum Total Anode Dissipation (watts)	$P_{a(tot)max}$	4.0†

* Taken at V_a=200 volts ; I_a=10mA.

† The permissible anode dissipation rating is a function of the grid cathode resistance and the circuit employed.

INTER-ELECTRODE CAPACITANCES (pF)

		‡	§
Grid 1/Anode 1	$c_{g'-a'}$	2.7	2.9
Grid 2/Anode 2	$c_{g''-a''}$	2.6	2.8
Grid 1/Earth	$c_{g'-E}$	2.8	4.1
Grid 2/Earth	$c_{g''-E}$	2.8	4.1
Anode 1/Earth	$c_{a'-E}$	2.4	3.7
Anode 2/Earth	$c_{a''-E}$	2.2	3.5
Anode 1/Anode 2	$c_{a'-a''}$	0.62	0.62
Grid 1/Grid 2	$c_{g'-g''}$	0.016	0.017
Grid 1/Anode 2	$c_{g'-a''}$	0.033	0.034
Grid 2/Anode 1	$c_{g''-a'}$	0.09	0.1

‡ Inter-electrodes capacitances with holder capacitance balanced out.

§ Total capacitances including a Benjamin B8A moulded holder measured at a frequency of 1 Mc/s.

EDISWAN

MAZDA

6L1

TELEVISION TWIN TRIODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

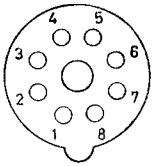
DIMENSIONS

Maximum Overall Length	(mm)	67
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	54
Radius over Location Key	(mm)	12.25

MOUNTING POSITION—Unrestricted.

BULB—Clear.

BASE—B8A



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Anode 2	a″
Pin 3	Grid 2	g″
Pin 4	Cathode 2	k″
Pin 5	Anode 1	a′
Pin 6	Grid 1	g′
Pin 7	Cathode 1	k′
Pin 8	Heater	h

Indicates a change ←

EDISWAN

MAZDA

6L1

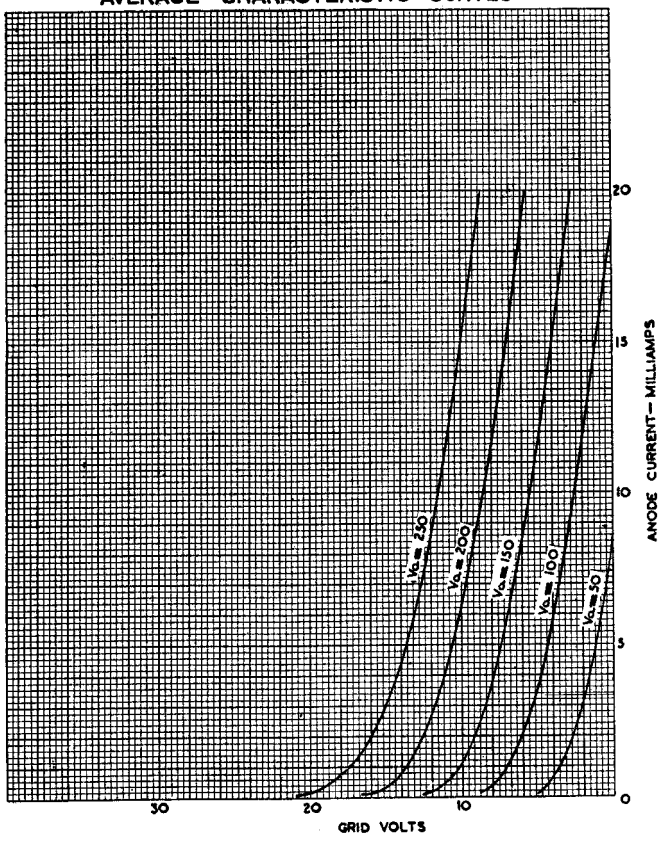
TELEVISION TWIN TRIODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

6L1

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

EDISWAN

MAZDA

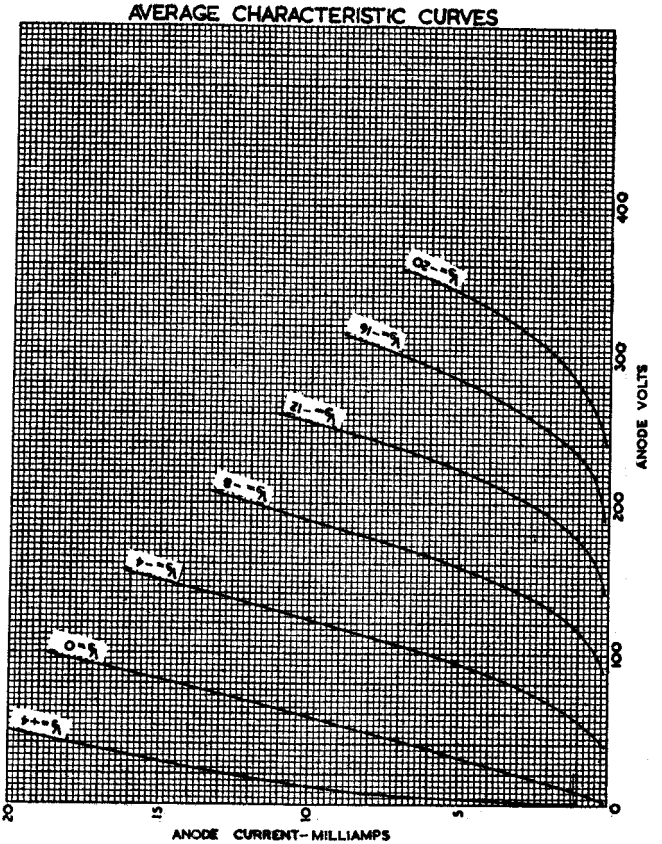
6L1

TELEVISION TWIN TRIODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

EDISWAN

MAZDA

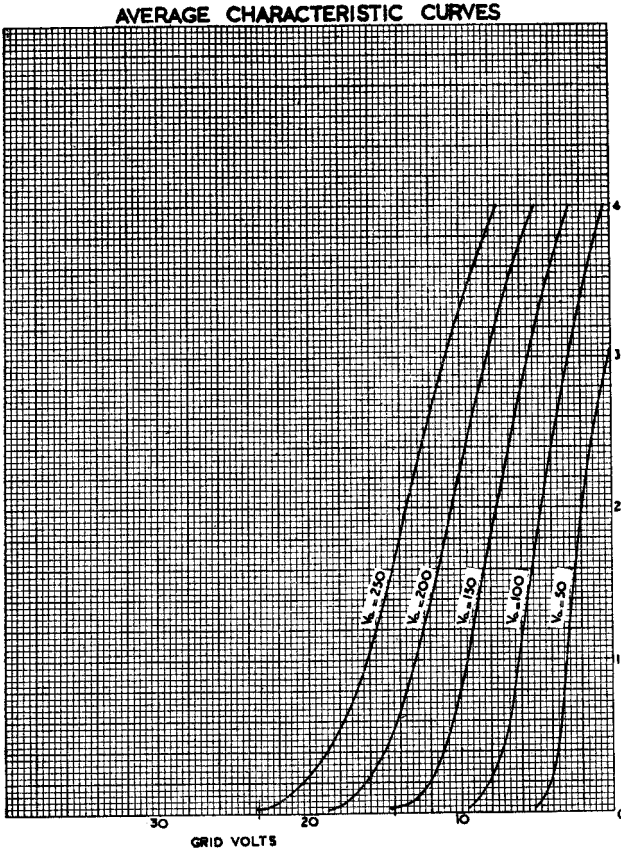
6L1

TELEVISION TWIN TRIODE

Indirectly heated—for parallel operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

6.L.18

MAZDA

6.L.18

TRIODE OSCILLATOR

Indirectly heated – for parallel operation

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.3
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Mutual Conductance (mA/V)	g_m *	7.6
Anode Impedance (ohms)	r_a *	2250
Amplification Factor	μ *	17
Maximum Anode Dissipation (watts)	$W_{a(max)}$	5.0
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

* Taken at V_a = 150 v; I_a = 25 mA.

INTER-ELECTRODE CAPACITANCES

		♭	†
Anode/Earth (μμF)	C_{out}	6.0	9.1
Anode/Grid (μμF)	C_{a-g1}	2.6	2.8
Grid/Earth (μμF)	C_{in}	4.6	5.9

♭ Inter-electrode capacitances with holder capacitance balanced out.

† Total capacitances including Benjamin B.8.A. moulded holder measured at 1 Mc/s.

"Earth" denotes the remaining earthy potential electrodes, shields and heater joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	67
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	54
Radius Over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	⅞
Approximate Packed Weight (ozs)	1

MOUNTING POSITION - Unrestricted.

6.L.18

MAZDA

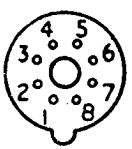
6.L.18

TRIODE OSCILLATOR

Indirectly heated – for parallel operation

BULB Clear

BASE B.8.A.



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Internal Connexion §	
Pin 4	Internal Shield	s
Pin 5	Internal Connexion §	
Pin 6	Grid	gl
Pin 7	Cathode	k
Pin 8	Heater	h

§ "Internal Connexion" indicates that the pin is connected to an electrode for the purpose of improving mechanical rigidity. The connexion may not always be made to the same electrode on a given valve type, and it is essential that the corresponding valve holder socket be left unconnected.

6.L.18

MAZDA

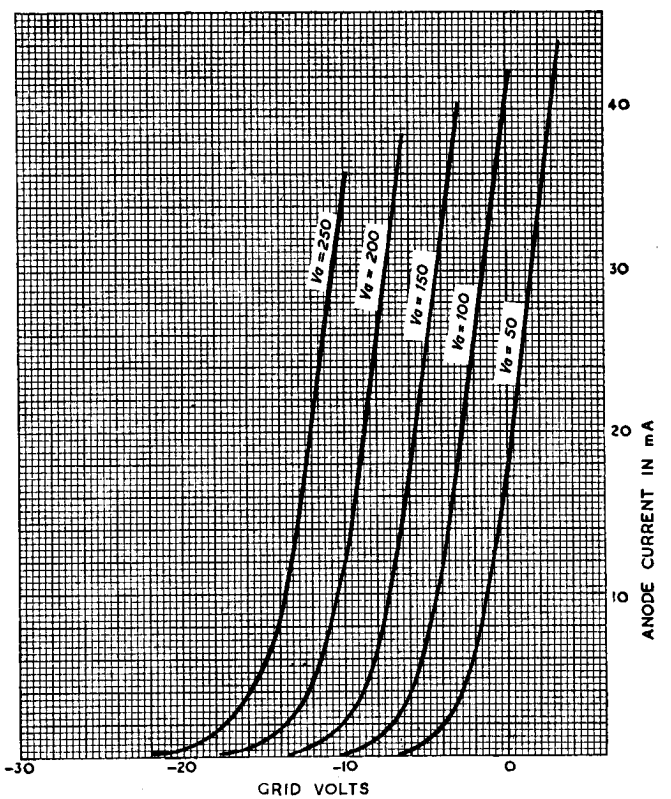
6.L.18

TRIODE OSCILLATOR

Indirectly heated – for parallel operation

CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE 6L18



June 1948 *RADIO DIVISION* Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA
6.LD.20

DOUBLE DIODE TRIODE
Indirectly heated – for parallel operation

TENTATIVE

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.25
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Cathode Current (mA)	$I_{k(av)max}$	5
Mutual Conductance (mA/V)	g_m	¶ 3.4
Anode Impedance (ohms)	r_a	¶ 9,300
Amplification Factor	μ	¶ 31.5
Maximum Mean Diode Current per diode (mA)	$I_{a(d)av(max)}$	0.1
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

¶ Taken at V_a = 100v; V_g = 0v.

INTER-ELECTRODE CAPACITANCES

		†	§
Anode/Earth (μμF)	$C_{out(t)}$	3.7	5.0
Anode/Grid (μμF)	C_{ag}	1.5	1.7
Grid/Earth (μμF)	$C_{in(t)}$	3.6	4.9
Grid/Diode 1 (μμF)	$C_{g,a'(d)}$	.0017	.003
Grid/Diode 2 (μμF)	$C_{g,a"(d)}$	.005	.015
Diode 1/Earth (μμF)	$C_{in(a'd)}$	2.1	3.4
Diode 1/Diode 2 (μμF)	$C_{a'(d)a"(d)}$	0.45	0.65
Diode 2/Earth (μμF)	$C_{in(a"d)}$	2.0	3.3
Anode/Diode 1 (μμF)	$C_{a,a'(d)}$	.0017	.0027
Anode/Diode 2 (μμF)	$C_{a,a"(d)}$	.0019	.0031

† Inter-electrode capacitances with holder capacitance balanced out.

§ These capacitances include a Benjamin B8A holder measured at a frequency of 1 Mc/s.

"Earth" denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	67
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	54
Radius Over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	¾
Approximate Packed Weight (ozs)	1

MOUNTING POSITION - Unrestricted.

6.LD.20

MAZDA

6.LD.20

DOUBLE DIODE TRIODE

Indirectly heated – for parallel operation

TENTATIVE

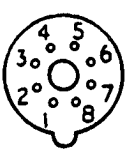
TYPICAL OPERATION

H.T. Applied Voltage (volts)	V_b	260	260
Decoupling Resistance (ohms)	Ω	22,000	22,000
Anode Load (ohms)	Z_a	47,000	100,000
Cathode Self-Bias Resistance (ohms)	R_k	1,500	2,200
Anode Current (mA)	I_a	2.0	1.3
Voltage Amplification :		19.5	21.5
Output Voltage (R.M.S.) for 2% Second Harmonic :		16.5	20.0

: When feeding an output valve having a 470,000 ohm grid resistor.

BULB Clear

BASE B.8.A.



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater]	h
Pin 2	Anode	a
Pin 3	Control Grid	g_1
Pin 4	Internal Shield	s
Pin 5	Diode 2 ¶	a"d
Pin 6	Diode 1	a'd
Pin 7	Cathode	k
Pin 8	Heater	h

] Pin 1 should preferably be connected to "earth" potential.

¶ It is recommended that Diode 2 should be used for detection.

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

6.M.2

DUAL SENSITIVITY TUNING INDICATOR

Indirectly heated—for parallel operation

GENERAL

The 6M2 is a cathode ray tuning indicator of the dual sensitivity type, giving a fluorescent image in the form of a Maltese Cross. One pair of angles are of low sensitivity, whilst the other pair are of high sensitivity, the cut-off voltages being - 20 and - 4 volts respectively, (with an anode supply voltage of 250 volts).

RATING

Heater Voltage (volts)	Vh	6.3
Heater Current (amps)	Ih	0.2
Maximum Anode Voltage (volts)	Va(max)	300
Maximum Anode Dissipation (watts) (either section)	Pa(max)	0.5
Maximum Target Voltage (volts)	Vt(max)	250
Minimum Target Voltage (volts)	Vt(min)	90
Maximum Cathode Current (mA)	Ik(max)	5
Maximum Heater/Cathode Voltage (DC) (volts)	Vh-k(max)	100
Maximum Grid to Cathode Resistance (Megohms)	Rg-k(max)	3

DIMENSIONS

Maximum Overall Length	(mm)	90
Maximum Diameter	(mm)	28
Maximum Seated Height	(mm)	76

MOUNTING POSITION - Unrestricted

TYPICAL OPERATION

H.T. Supply Voltage (volts)	200		250	
Target Voltage (volts)	200		250	
Target Current at Vg1 = 0 (mA)	0.3		0.46	
1st Section (a' - for strong signals)				
Anode load resistance (megohms)	1		1	
Grid Voltage (volts)	0	-20	0	-20
Anode Current (mA)	0.2	0.06	0.25	0.08
Shadow Angle (degrees)	82	4	83	6
2nd Section (a" - for weak signals)				
Anode load resistance (megohms)	2		2	
Grid Voltage (volts)	0	-3	0	-4
Anode Current (mA)	0.1	0.06	0.12	0.07
Shadow Angle (degrees)	75	18	75	15

THE EDISON SWAN ELECTRIC COMPANY LTD.

6.M.2

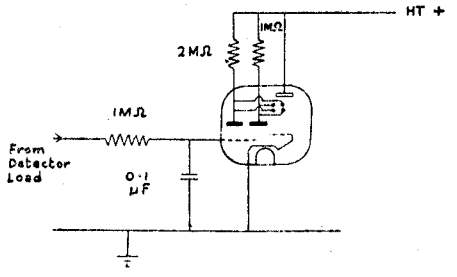
MAZDA

6.M.2

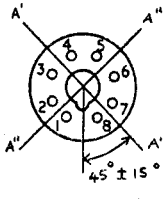
DUAL SENSITIVITY TUNING INDICATOR

Indirectly heated—for parallel operation

TYPICAL CIRCUIT



BASE - International Octal (I.O.8)



VIEWED FROM FREE END OF PINS

POSITION OF SHADOW

A' - A' Centre Line of a' shadow.

A" - A" Centre Line of a" shadow.

CONNECTIONS

Pin 1	Internal Connection	I.C.
Pin 2	Heater	h
Pin 3	Anode 2	a"
Pin 4	Grid	g
Pin 5	Target	t
Pin 6	Anode 1	a'
Pin 7	Heater	h
Pin 8	Cathode	k

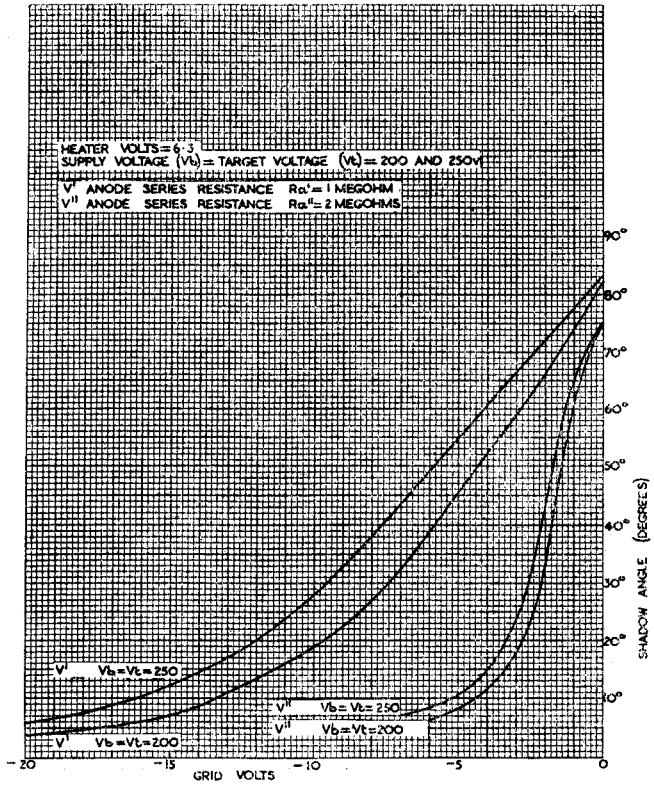
MAZDA

6.M.2

6.M.2

DUAL SENSITIVITY TUNING INDICATOR

Indirectly heated—for parallel operation



November 1956 *RADIO DIVISION* Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD.

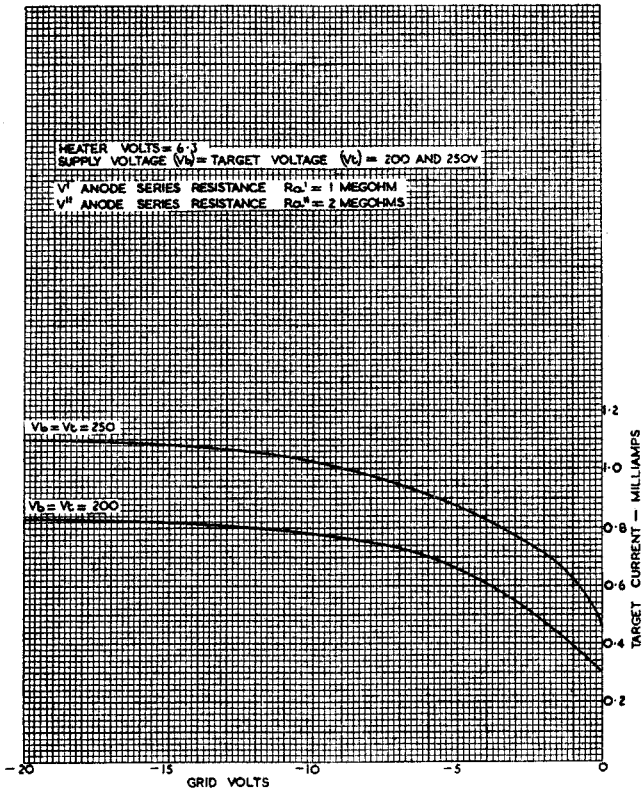
6.M.2

MAZDA

6.M.2

DUAL SENSITIVITY TUNING INDICATOR

Indirectly heated—for parallel operation



THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

6.P.25

BEAM POWER AMPLIFIER

Indirectly heated – for parallel operation

RATING

Maximum Heater Voltage (volts)	V_f	6.3
Maximum Heater Current (amps)	I_f	1.1
Maximum Anode Voltage (volts)	V_a	250
Maximum Anode Dissipation (watts)	W_a(max)	10
Maximum Screen Voltage (volts)	V_{g2}	250
Maximum Screen Dissipation (watts)	W_{g2}(max)	2.5
Mutual Conductance (mA/V)	g_m	* 9.0
Inner Mu	μ_{g1-g2}	*17.6
Maximum Potential Heater/Cathode (volts DC)	V_{h-k}(max)	150

*Taken at $V_a = V_{g2} = 100v$; $V_{g1} = 0v$.

INTER-ELECTRODE CAPACITANCES

Anode/Earth (μμF)	C_{out}	12
Anode/Grid (μμF)	C_{a-g1}	0.85
Grid/Earth (μμF)	C_{in}	23

"Earth" denotes the remaining earthy potential electrodes, heater and metallizing joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	123
Maximum Diameter (mm)	45
Maximum Seated Height (mm)	109
Approximate Nett Weight (ozs)	2
Approximate Packed Weight (ozs)	3

Apart from the heater characteristics and basing, the characteristics of the 6.P.25 are identical with the Pen.45.

MOUNTING POSITION - Unrestricted.

6.P.25

MAZDA

6.P.25

BEAM POWER AMPLIFIER

Indirectly heated – for parallel operation

TYPICAL OPERATION

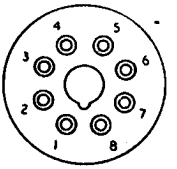
Anode Voltage (volts)	V_a		250	
Screen Voltage (volts)	V_{g2}		250	
Grid Bias Voltage (volts -ve)	V_{g1}		8.5	
Quiescent Anode Current (mA)	$I_{a(o)}$		40	
Quiescent Screen Current (mA)	$I_{g2(o)}$		8.0	
Power Output (watts)	W_{out}	¶ 4.5		† 5.4
Anode Load (ohms)	Z_a	¶ 5000		† 4700
Input Swing R.M.S.	$V_{g1(rms)}$	¶ 4.3		† 5.1
Anode Current (mA) (with Input Swing)	$I_{a(av)}$	¶ 42		† 43
Input Swing (volts RMS) for 50 mW	$V_{g1(rms)}$	0.41		0.42
Input Swing (volts RMS) for 250 mW	$V_{g1(rms)}$	0.93		0.94
Self Bias Resistance (ohms)	R_k		180	

¶ For 5% Third Harmonic and Second Harmonic not exceeding 5%.

† For 7% Third Harmonic and Second Harmonic not exceeding 7%.

BULB Partly metallized

BASE A.0.7



Viewed from free end of pins.

CONNEXIONS

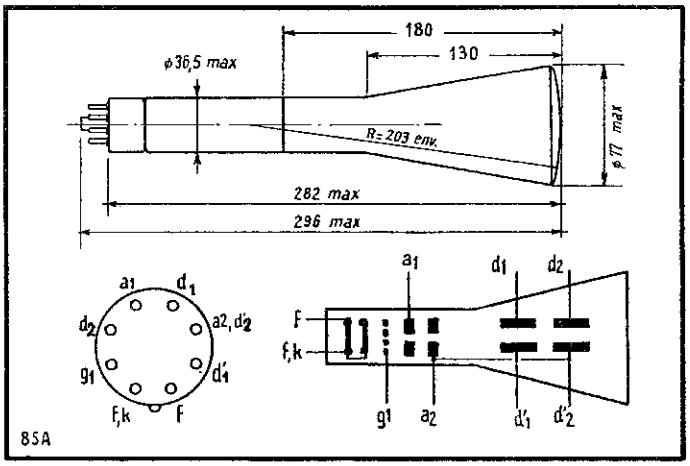
Pin 1	Metallizing	M
Pin 2	Heater	h
Pin 3	Anode	a
Pin 4	Grid 2	g2
Pin 5	Grid 1	g1
Pin 6	Omitted.	
Pin 7	Heater	h
Pin 8	Cathode	k

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

8 SA 1 8 SA 2
8 SA 4 8 SA 5

TUBES ÉLECTROSTATIQUES DE 8 cm POUR OSCILLOGRAPHIE



CULOT	CHAUFFAGE
Octal 8 broches	6,3 V 0,6 A

CAPACITES

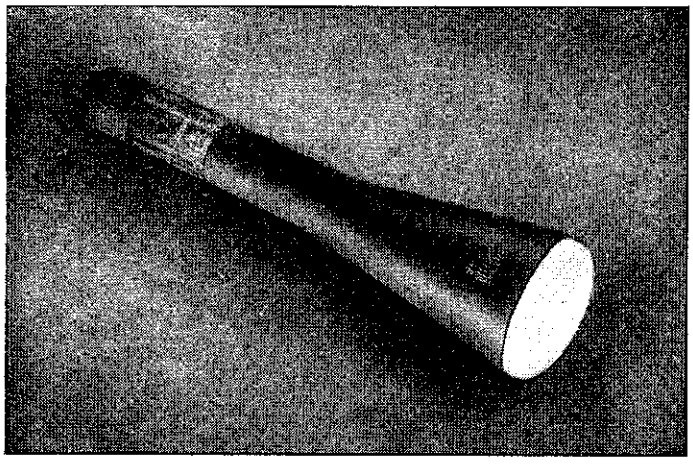
Grille 1	10 pF
Plaque d_1 à plaque d'_1	3 pF
Plaque d_2 à plaque d'_2	4 pF

NOTES

La tension de grille correspondant à l'extinction est de —35 V pour 1 200 V sur l'anode 2.

La plaque d'_2 est réunie intérieurement à l'anode 2.

Les tubes de la série 8 S A sont des versions améliorées de ceux de la série C 75 S. Les caractéristiques électriques sont communes aux deux séries, sauf l'intensité de chauffage : 0,6 A pour les 8SA et 0,8 A pour les C 75 S ; d'autre part, les C 75 S ont une longueur légèrement supérieure (312 mm hors-tout).



CARACTERISTIQUES D'UTILISATION

Premier exemple :

Tension d'anode 2	600 V
Tension d'anode 1	170 V
Sensibilité plaques 1	0,58 mm/V
Sensibilité plaques 2	0,55 mm/V

Deuxième exemple :

Tension d'anode 2	800 V
Tension d'anode 1	230 V
Sensibilité plaques 1	0,44 mm/V
Sensibilité plaques 2	0,41 mm/V

Troisième exemple :

Tension d'anode 2	1 000 V
Tension d'anode 1	285 V
Sensibilité plaques 1	0,35 mm/V
Sensibilité plaques 2	0,33 mm/V

Quatrième exemple :

Tension d'anode 2	1 200 V
Tension d'anode 1	345 V
Sensibilité plaques 1	0,29 mm/V
Sensibilité plaques 2	0,27 mm/V

CARACTERISTIQUES LIMITES

Tension maximum d'anode 2	1 200 V
Tension maximum d'anode 1	400 V
Tension minimum de grille	0 V
Tension maximum de grille	—35 V
Tension maximum entre anode 2 et une plaque quelconque de déviation	600 V
Résistance maximum dans la grille	1,5 MΩ
Dissipation maximum de l'écran	10 mW/cm²

EDISWAN

MAZDA

10C2

TELEVISION TRIODE PENTODE

Indirectly heated—for series operation

RATING			Triode	Pentode
Heater Current	(amps)	I_h	0.1	
Heater Voltage	(volts)	V_h	28.0	
Maximum Anode Voltage	(volts)	$V_{a(max)}$	150	250
Maximum Screen Voltage	(volts)	$V_{g2(max)}$		250
Maximum Anode Dissipation	(watts)	$P_{a(max)}$		1.0
Maximum Screen Dissipation	(watts)	$P_{g2(max)}$		0.5
Mutual Conductance	(mA/V)	g_m	4.0*	
Amplification Factor		μ	17	
Maximum Heater to Cathode Voltage	(volts) r.m.s.	V_{h-k} (r.m.s.)	200**	

* Measured at V_a=100v ; V_g=0.

** Measured with respect to the higher potential heater pin.

INTER-ELECTRODE CAPACITANCES (pF)

Triode Section		†	‡
Anode/Earth	$c_{out(t)}$	1.6	2.9
Anode/Grid	$c_{a(t),g(t)}$	1.7	1.9
Grid/Earth	$c_{in(t)}$	4.1	5.4
Pentode Section			
Anode/Earth	$c_{out(p)}$	2.6	4.1
Anode/Grid 1	$c_{a(p),g1(p)}$	0.012	0.0135
Grid 1/Earth	$c_{in(p)}$	7.5	9.0
Pentode Grid/Triode Grid	$c_{g1(p),g(t)}$	0.55	0.56
Pentode Grid/Triode Anode	$c_{g1(p),a(t)}$	0.030	0.031
Pentode Anode/Triode Anode	$c_{a(p),a(t)}$	0.12	0.32

Inter-Electrode Capacitances continued overleaf.

10C2

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10C2

TELEVISION TRIODE PENTODE

Indirectly heated—for series operation

† Inter-electrode capacitances with holder capacity balanced out.

‡ These capacitances include a Benjamin B8A holder, measured at a frequency of 1 Mc/s.

" Earth " denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

DIMENSIONS

Maximum Overall Length	(mm)	67
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	54
Radius over Location Key	(mm)	12.25
Approximate Nett Weight	(ozs)	$\frac{3}{4}$
Approximate Packed Weight	(ozs)	1

MOUNTING POSITION

Unrestricted.

TYPICAL OPERATION

As a frequency changer with oscillator volts applied to Grid 1.

Pentode Section

Anode Voltage	(volts)	$V_{a(p)}$	135	150
Screen Voltage	(volts)	$V_{g2(p)}$	135	150
Grid Circuit Resistance for Grid Current Bias	(kΩ)	R_{g1}	15	68
Grid Current	(μA)	I_{g1}	180	45
Conversion Conductance	(mA/V)	g_c	2	2.1
Peak Heterodyne Voltage	(volts)	$V_{(pk)het}$	3.25	3.25
Approximate Anode Current	(mA)	$I_{a(p)}$	5.0	4.7
Approximate Screen Current	(mA)	$I_{g2(p)}$	1.5	1.3
Equivalent Grid Noise Resistance	(kΩ)	r_{eq}	5.8	5.3 ←

Triode Section

Anode Voltage	(volts)	$V_{a(t)}$	80
Average Anode Current	(mA)	$I_{a(t)}$	5

Indicates a change ←

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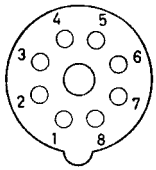
10C2

TELEVISION TRIODE PENTODE

Indirectly heated—for series operation

BULB Clear.

BASE B8A.



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Pentode Anode	a_p
Pin 3	Triode Anode	a_t
Pin 4	Triode Grid	g_t
Pin 5	Pentode Screen Grid	$g_{2(p)}$
Pin 6	Pentode Grid	$g_{1(p)}$
Pin 7	Cathode and Shield	k,s
Pin 8	Heater	h

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MAZDA
10D2

10D2

DOUBLE DIODE (Separate Cathodes)
Indirectly heated—for series operation

RATING

Heater Voltage (volts)	V_h	19
Heater Current (amps)	I_h	0.1
Maximum Mean Anode Current per Anode (mA)	$I_{a(av)max}$	9
Maximum Peak Anode Current per Anode (mA)	$I_{a(pk)max}$	50
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	300
Maximum Potential Heater/Cathode (D.C. + A.C. peak with heater -ve)	$V_{h-k(max)}$	150

INTER-ELECTRODE CAPACITANCES *

		§	†
Anode 1/All other Electrodes (μμF)	$C_{a'-all}$	3.4	4.5
Anode 1/Anode 2 (μμF)	$C_{a'-a''}$	0.018	0.021
Anode 1/Cathode 1 (μμF)	$C_{a'-k'}$	1.65	1.68
Anode 2/All other Electrodes (μμF)	$C_{a''-all}$	3.4	4.5
Anode 2/Cathode 2 (μμF)	$C_{a''-k''}$	1.65	1.65
Cathode 1/All other Electrodes (μμF)	$C_{k'-all}$	4.0	5.1
Cathode 1/Cathode 2 (μμF)	$C_{k'-k''}$	0.009	0.011
Cathode 2/All other Electrodes (μμF)	$C_{k''-all}$	4.1	5.2
Cathode 2/Heater (μμF)	$C_{k''-h}$	2.5	2.8
Cathode 1/Heater (μμF)	$C_{k'-h}$	2.27	2.3

* Measured with a closely fitting metal can connected to earth.

§ Inter-electrode capacitance with holder capacitance balanced out.

† Total capacitance including a Benjamin B.7.G. ceramic holder Type 75/833 and cylindrical screen Type 75/832. This holder has a radial Shield between pins 1 and 7.

DIMENSIONS

Maximum Overall Length (mm)	54
Maximum Diameter (mm)	19
Maximum Seated Height (mm)	47.5
Approximate Nett Weight(ozs)	¼
Approximate Packed Weight (ozs)	⅜

MOUNTING POSITION - Unrestricted.

10D2

EDISWAN
MAZDA
10D2

DOUBLE DIODE (Separate Cathodes)
Indirectly heated—for series operation

BULB - Clear

BASE - B.7.G.

Viewed from free end of pins

CONNECTIONS

Pin 1	Cathode 1	k'
Pin 2	Anode 2	a"
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Cathode 2	k"
Pin 6	Internal Shield	s
Pin 7	Anode 1	a'

MAZDA

10F3

10F3

SCREENED H.F. PENTODE

Indirectly heated—for series operation

For replacement purposes only

RATING

Heater Current (amps)	I_h	0.1
Heater Voltage (volts)	V_h	22
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Mutual Conductance (mA/V)	g_m	• 6.5
Maximum Anode Watts	P_a	1.5
Maximum Screen Watts	P_{g2}	0.4

• Taken at $V_a = V_{g2} = 200$; $V_{g1} = -2.35$; $I_a = 6$ mA

INTER-ELECTRODE CAPACITANCES

			†	¶	‡
Grid/earth	(μμF)	C_{in}	9.5	11.0	-
Anode/earth	(μμF)	C_{out}	4.4	5.9	-
Grid/anode	(μμF)	C_{ga}	-	.006	.005

† Inter-electrode capacitances with holder capacity balanced out.

¶ Total capacities including Benjamin B8A moulded holder measured at 1 Mc/s.

‡ Total capacities including Benjamin B8A moulded holder measured at 1 Mc/s with extra perpendicular shield.

DIMENSIONS

Maximum Overall Length	(mm)	67
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	54
Radius Over Location Key	(mm)	12.25
Approximate Nett Weight	(ozs)	¾
Approximate Packed Weight	(ozs)	1

10F3

MAZDA

10F3

SCREENED H.F. PENTODE

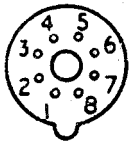
Indirectly heated—for series operation

For replacement purposes only

MOUNTING POSITION - Unrestricted

BULB - Clear

BASE - B8A



Viewed from free end of pins

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Shield	s
Pin 4	Suppressor grid	g_3
Pin 5	Screen grid	g_2
Pin 6	Control grid	g_1
Pin 7	Cathode	k
Pin 8	Heater	h

EDISWAN
MAZDA

10F18

VARIABLE MU H. F. PENTODE
Indirectly heated—for series operation

GENERAL

The 10F18 is a variable mu H.F. Pentode intended for use in AM/FM Receivers having series fed heaters and is suitable for use on AC/DC Mains.

RATING

Heater Voltage	(volts)	V_h	13·0
Heater Current	(amps)	I_h	0·1
Maximum Anode Voltage	(volts)	$V_{a(max)}$	250
Maximum Screen Voltage	(volts)	$V_{g2(max)}$	250
Maximum Anode Dissipation	(watts)	$P_{a(max)}$	2·25
Maximum Screen Dissipation	(watts)	$P_{g2(max)}$	0.5
Maximum Heater to Cathode Voltage	(volts r.m.s.)	$V_{h\text{-}k(max)}$	150

INTER-ELECTRODE CAPACITANCES (pF)

		*	**
Control Grid to Earth	c_{in}	5·2	6·5
Anode to Earth	c_{out}	5·0	6·3
Control Grid to Anode	$c_{a\text{-}g1}$	0·0017	0·0021

Earth denotes the remaining earthy potential electrodes, heater and shields connected to cathode.

* Inter-electrode capacity with holder capacity balanced out but with cylindrical screen can.

** Total capacity including Carr Fastener holder type 76/804E/T with radial shield and cylindrical screen. The Cg-a holder capacity can be reduced to 0·00004 pF by the insertion of a shield between pins 4 and 5, 9 and 1. If an unscreened holder is used (without can or skirt) the total g1 to a capacity with holder becomes 0·0025 pF.

10F18

EDISWAN

MAZDA

10F18

VARIABLE MU H. F. PENTODE

Indirectly heated—for series operation

DIMENSIONS

Maximum Overall Length	(mm)	56·0
Maximum Diameter	(mm)	22·2
Maximum Seated Height	(mm)	49·0
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

MOUNTING POSITION—Unrestricted

TYPICAL OPERATION

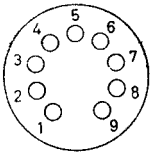
Anode Voltage (volts)	V_a	175	175
Screen Voltage (volts)	V_{g2}	100	175
Grid Bias Voltage (volts)	V_{g1}	−1·3	
Anode Current (mA)	I_a	12·0	
Screen Current (mA)	I_{g2}	3·5	
Mutual Conductance (mA/V)	g_m	4·4	
Bias to give mutual conductance of 100 μA/V			−19·5
Anode Impedance (kΩ)	r_a	220	
Input Capacity Working (Hot) (pF)	c_{in}	7·1	
Input Capacity Change at cut-off (pF)	Δc	1·7	
Input Loss at 38 Mc/s, cathode pins strapped (kΩ)		16	

BULB—Clear

EDISWAN
MAZDA
10F18

VARIABLE MU H. F. PENTODE
Indirectly heated—for series operation

BASE—Noval (B9A)



Viewed from free end of pins

CONNECTIONS

Pin 1	Cathode	k
Pin 2	Control Grid	g1
Pin 3	Cathode	k
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Internal Shield	s
Pin 7	Anode	a
Pin 8	Screen Grid	g2
Pin 9	Suppressor Grid	g3

NOTE.—If only one cathode pin is required it is recommended that pin 3 be used.

MAZDA

10.LD.3

DOUBLE DIODE TRIODE

Indirectly heated—for series operation

RATING

Heater Current (amps)	I_h	0.1
Heater Voltage (volts)	V_h	14
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Cathode Current (mA)	$I_{k(av)max}$	5
Mutual Conductance (mA/V)	g_m •	1.4
Anode Impedance (ohms)	r_a •	50,000
Amplification Factor	u •	70
Maximum Mean Diode Current per Diode (mA)	$I_{a(d)av(max)}$	0.8
Maximum Potential Heater/ Cathode (volts RMS)	$V_{h-k(max)}$ ••	150
Maximum Anode Dissipation (watts)	$P_{a(max)}$	1.0

• Taken at V_a = 100v; V_g = -1

••Measured with respect to the higher potential heater pin.

INTER-ELECTRODE CAPACITANCES

			à	$
Anode/Earth	(μμF)	$c_{out(t)}$	1.9	3.2
Anode/Grid	(μμF)	c_{ag}	1.3	1.5
Grid/Earth	(μμF)	$c_{in(t)}$	3.0	4.3
Grid/Diode 1	(μμF)	$c_{g,a'(d)}$	< 0.007	< 0.009
Grid/Diode 2	(μμF)	$c_{g,a''(d)}$	< 0.03	< 0.04
Diode 1/Earth	(μμF)	$c_{in(a'd)}$	1.2	2.5
Diode 1/Diode 2	(μμF)	$c_{a'(d),a''(d)}$	< 0.3	< 0.5
Diode 2/Earth	(μμF)	$c_{in(a''d)}$	1.1	2.4
Anode/Diode 1	(μμF)	$c_{a,a'(d)}$	< 0.01	< 0.011
Anode/Diode 2	(μμF)	$c_{a,a''(d)}$	< 0.01	< 0.011

à Inter-electrode capacitances with holder capacitance balanced out.

$ These capacitances include a Benjamin B.8.A. holder measured at a frequency of 1 Mc/s.

"Earth" denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

DIMENSIONS

Maximum Overall Length	(mm)	60
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	53
Radius Over Location Key	(mm)	12.25
Approximate Nett Weight	(ozs)	¼
Approximate Packed Weight	(ozs)	1

MOUNTING POSITION - Unrestricted.

10.LD.3

MAZDA

10.LD.3

DOUBLE DIODE TRIODE

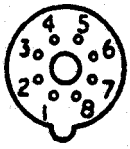
Indirectly heated—for series operation

TYPICAL OPERATION

H.T. Voltage after de-coupling (volts)	$V_{a(b)}$	150	150
Anode Load (ohms)	R_a	220,000	100,000
Anode Current (mA)	I_a	0.32	0.5
Cathode Self Bias Resistance (ohms)	R_k	3,900	2,200
Grid Resistance of following valve (ohms)	R_g	680,000	330,000
Voltage Amplification		44	40
Output Voltage (RMS) for 5% Second Harmonic		16.5	12

BULB Clear

BASE B.8.A



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater ‖	h
Pin 2	Anode	a
Pin 3	Control Grid	G1
Pin 4	Internal Shield	s
Pin 5	Diode 2 ‡	a"d
Pin 6	Diode 1	a'd
Pin 7	Cathode	k
Pin 8	Heater ‖	h

‖ Pin 1 should be connected to the earthy end of the heater chain.

‡ It is recommended that Diode 2 should be used for detection.

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN
MAZDA

10M2/UM35

DUAL SENSITIVITY TUNING INDICATOR

Indirectly heated—for series operation

GENERAL

The 10M2/UM35 is a cathode ray tuning indicator of the dual sensitivity type giving a fluorescent image in the form of a Maltese Cross. One pair of angles are of low sensitivity whilst the other pair are of high sensitivity, the cut-off voltages being —20 and —3 respectively, with an anode supply voltage of 200 volts.

RATING

Heater Current (amps)	I_h	0·1
Heater Voltage (volts)	V_h	12·6
Maximum Anode Voltage (volts)	$V_{a(max)}$	300
Maximum Anode Dissipation (either section) (watts)	$P_{a(max)}$	0·5
Maximum Target Voltage (volts)	$V_{t(max)}$	250
Minimum Target Voltage (volts)	$V_{t(min)}$	90
Maximum Cathode Current (mA)	$I_{k(max)}$	5
Maximum Heater/Cathode Voltage (R.M.S.) (volts)	$V_{h\text{-}k(max)}$	200
Maximum Grid to Cathode Resistance (megohms)	$R_{g\text{-}k(max)}$	3

DIMENSIONS

Maximum Overall Length	(mm)	90
Maximum Diameter	(mm)	28
Maximum Seated Height	(mm)	76
Approx. Nett Weight	(ozs)	1
Approx. Packed Weight	(ozs)	$1\frac{1}{2}$

MOUNTING POSITION—Unrestricted.

November 1958 *VALVE & CRT DIVISION* Issue 1/2

SIEMENS EDISON SWAN LIMITED

EDISWAN
MAZDA
10M2/UM35
DUAL SENSITIVITY TUNING INDICATOR
Indirectly heated—for series operation

TYPICAL OPERATION						
H.T. Supply Voltage (volts)	100			200		
Target Voltage (volts)	100			200		
Target Current at Vg1. = 0 (mA)	0·1			0·4		
1st Section						
(a′—for weak signals)						
Anode Load Resistance (megohms)	2	2	2	2		
Grid Voltage (volts)	0	−2	0	−3		
Anode Current (mA)	0·05	0·03	0·1	0·06		
Shadow Angle (degrees)	77	15	78	25		
2nd Section						
(a″—for strong signals)						
Anode Load Resistance (megohms)	1	1	1	1		
Grid Voltage (volts)	0	−10	0	−20		
Anode Current (mA)	0·1	0·04	0·19	0·08		
Shadow Angle (degrees)	77	5	75	10		

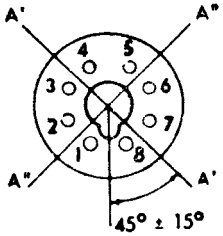
EDISWAN
MAZDA

10M2/UM35

DUAL SENSITIVITY TUNING INDICATOR

Indirectly heated—for series operation

BASE—International Octal (I08).



Viewed from free end of pins

POSITION OF SHADOW

A'—A' Centre line of a' shadow.
A"—A" Centre line of a" shadow.

CONNECTIONS

Pin 1	Heater	h
Pin 2	Internal Connection	IC
Pin 3	Anode 2	a"
Pin 4	Target	t
Pin 5	Grid	g
Pin 6	Anode 1	a'
Pin 7	Cathode	k
Pin 8	Heater	h

10M2/UM35

EDISWAN

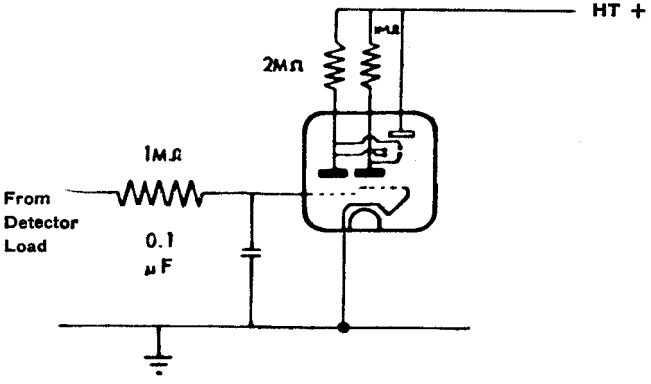
MAZDA

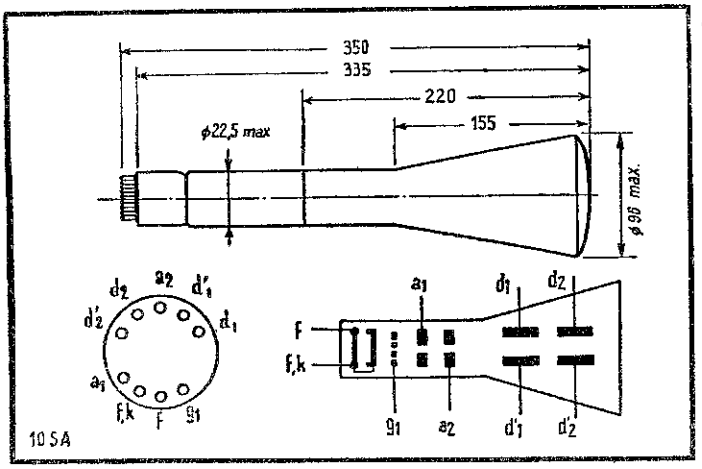
10M2/UM35

DUAL SENSITIVITY TUNING INDICATOR

Indirectly heated—for series operation

TYPICAL CIRCUIT





MAZDA

10 SA 1 10 SA 2 10 SA 4 10 SA 5

TUBES ÉLECTROSTATIQUES DE 10 cm POUR OSCILLOGRAPHIE

CULOT	CHAUFFAGE
Spécial à 9 broches	6,3 V 0,6 A

CAPACITES

Grille 1	12 pF
Plaque d_1 à plaque d'_1	2 pF
Plaque d_2 à plaque d'_2	3 pF

CARACTERISTIQUES D'UTILISATION

Premier exemple :

Tension d'anode 2	800 V
Tension d'anode 1	200 V
Sensibilité plaques 1	0,62 mm/V
Sensibilité plaques 2	0,6 mm/V

Deuxième exemple :

Tension d'anode 2	1 000 V
Tension d'anode 1	240 V
Sensibilité plaques 1	0,5 mm/V
Sensibilité plaques 2	0,48 mm/V

Troisième exemple :

Tension d'anode 2	1 200 V
Tension d'anode 1	280 V
Sensibilité plaques 1	0,42 mm/V
Sensibilité plaques 2	0,4 mm/V

Quatrième exemple :

Tension d'anode 2	1 400 V
Tension d'anode 1	320 V
Sensibilité plaques 1	0,37 mm/V
Sensibilité plaques 2	0,35 mm/V

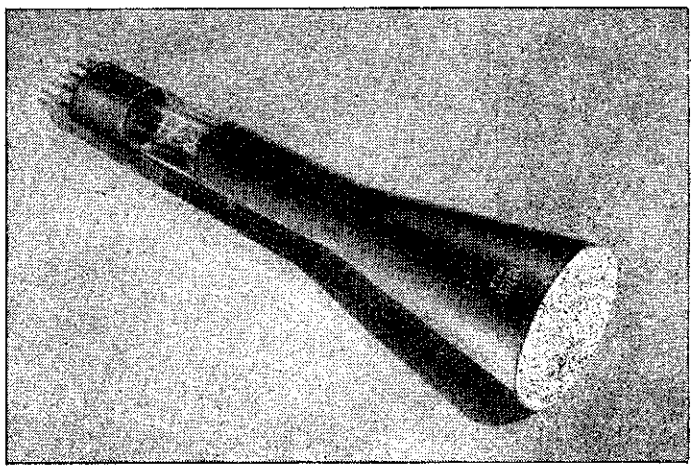
CARACTERISTIQUES LIMITES

Tension maximum d'anode 2	1 500 V
Tension maximum d'anode 1	450 V
Tension minimum de grille	0 V
Tension maximum de grille	—55 V
Tension maximum entre anode 2 et une plaque quelconque de déviation	600 V
Résistance maximum dans la grille	1,5 MΩ
Dissipation maximum de l'écran	10 mW/cm²

NOTES

La tension de grille correspondant à l'extinction est de —55 V pour 450 V sur l'anode 1.

Les tubes de la série 10 S A sont des versions améliorées de ceux de la série C 95 S. Les caractéristiques électriques sont communes aux deux séries, sauf l'intensité de chauffage : 0,6 A pour les 10 S A et 0,8 A pour les C 95 S ; ces derniers sont d'autre part légèrement plus longs : 355 mm hors-tout.



EDISWAN

11A1

LOW MU TRIODE

Indirectly heated

GENERAL

The 11A1 is a miniature based triode intended for use as a series stabiliser valve. It has a maximum cathode current of 120mA and a maximum anode dissipation of 15 watts. These valves are suitable for operation in parallel.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.95
Maximum Anode Voltage (volts)	$V_{a(max)}$	300
Maximum Anode Dissipation (watts)	$P_{a(max)}$	15
Maximum Cathode Current (mA)	$I_{k(max)}$	120
Maximum Heater/Cathode Voltage (volts)	$V_{h\text{-}k(max)}$	250
Mutual Conductance (mA/V)	g_m	12*
Amplification Factor	μ	4.5*
Anode Impedance (ohms)	r_a	375*

* Measured at $V_a = 150V$; $I_a = 100mA$

INTER-ELECTRODE CAPACITANCES (pF)†

Anode/Grid	$c_{a\text{-}g}$	9.0
Anode/Cathode	$c_{a\text{-}k}$	4.5
Grid/Cathode	$c_{g\text{-}k}$	8.5

† Measured without external shield

DIMENSIONS

Maximum Overall Length	(mm)	65
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	58
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

September 1959 — *INDUSTRIAL VALVE & CRT DIVISION* — Issue 1/7

SIEMENS EDISON SWAN LIMITED

IIAI

EDISWAN

IIAI

LOW MU TRIODE

Indirectly heated

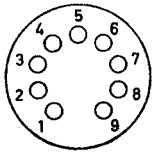
MOUNTING POSITION—Unrestricted

TYPICAL OPERATION—Series Regulator (Two valves in parallel)

Input Voltage (volts)	V_{in}	360
Output Voltage (volts)	V_{out}	210
Output Current (total) (mA)	$I_{out\ (tot)}$	200
Stabilisation for $\pm$ 7% input (%)		0.2

Small resistors should be inserted in the anode and cathode leads of each valve for balancing purposes.

BASE—Noval (B9A)



Viewed from free end of pins.

CONNECTIONS

Pin 1	Internal Connection	IC
Pin 2	Cathode	k
Pin 3	Internal Connection	IC
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Grid	g
Pin 7	Internal Connection	IC
Pin 8	Internal Connection	IC
Pin 9	Anode	a

September 1959 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

MAZDA

11.E.2

BEAM POWER AMPLIFIER

Indirectly heated – for Pulse Amplification

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.9
Maximum Peak Anode Voltage - Pulse Rating (volts)	$V_{a(pk)max}$	12,500
Maximum Screen Voltage (volts)	$V_{g2(max)}$	550
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	1.0
Inner Mu	$\mu_{g1,g2}$	* 9.0
Maximum Anode Dissipation (watts)	$W_{a(max)}$	5.0
Maximum Screen Dissipation (watts)	$W_{g2(max)}$	1.0
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

* Taken at V_a = 200v; V_{g2} = 200v; I_a = 25mA.

INTER-ELECTRODE CAPACITANCES

Anode/Earth (μμF)	$C_{a,all}$	7.5
Anode/Control Grid (μμF)	$C_{a,g1}$	0.2
Control Grid/Earth (μμF)	$C_{g1,all}$	15.5

"Earth" denotes the remaining earthy potential electrodes, heater joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	86
Maximum Diameter (mm)	32
Maximum Radius over Side Cap (mm)	25
Maximum Seated Height (mm)	73
Approximate Nett Weight (ozs)	1¼
Approximate Packed Weight (ozs)	4

MOUNTING POSITION - Vertical

NOTE

This valve is intended for use in break modulators but it can be employed in a series modulation with a standoff voltage of 3,000 volts.

11.E.2

MAZDA

11.E.2

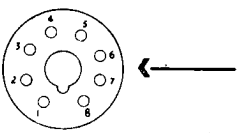
BEAM POWER AMPLIFIER

Indirectly heated – for Pulse Amplification

CAP American Miniature

BULB Clear

BASE I.O.8.



Viewed from free end of pins.

⟵ Indicates position of side cap.

CONNEXIONS

Pin 1	Blank	-
Pin 2	Heater	h
Pin 3	Blank	-
Pin 4	Screen Grid	g2
Pin 5	Control Grid	g1
Pin 6	Blank	-
Pin 7	Heater	h
Pin 8	Cathode	k
Side Cap	Anode	a

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THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

11.E.3

BEAM POWER AMPLIFIER

Indirectly heated – for Pulse Amplification

RATING

Heater Voltage (volts)	V_h	4.2
Heater Current (amps)	I_h	2.5
Maximum Anode Voltage as Series Modulator (volts DC)	$V_{a(max)}$	3,500
Maximum Peak Anode Voltage as Break Modulator (volts)	$V_{a(pk)max}$	12,500
Maximum Screen Voltage (volts)	$V_{g2(max)}$	700
Maximum Control Grid Negative Bias (volts-ve)	$V_{g1(max)}$	-700
Maximum Peak Cathode Current (amps)	$I_{k(pk)max}$	† 3.5
Inner μ	μ_{g1-g2}	‡ 9.0
Maximum Anode Dissipation (watts)	$W_{a(max)}$	10.0
Maximum Screen Dissipation as Series Modulator (watts)	$W_{g2(max)Series}$	0.9
Maximum Screen Dissipation as Break Modulator (watts)	$W_{g2(max)Break}$	2.0
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

† Taken under Pulse Conditions of approximately 10 micro-seconds duration and 400:1 minimum off-on ratio.

‡ Taken at V_a = 200; V_{g2} = 200; I_a = 40 mA.

INTER-ELECTRODE CAPACITANCES

Anode/Earth ($\mu\mu$F)	C_{out}	7.5
Anode/Control Grid ($\mu\mu$F)	C_{a-g1}	0.26
Control Grid/Earth ($\mu\mu$F)	C_{in}	20

"Earth" denotes the remaining earthy potential electrodes and heater joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	140
Maximum Diameter (mm)	54
Maximum Seated Height (mm)	125
Approximate Nett Weight (ozs)	2¼
Approximate Packed Weight (ozs)	7

MOUNTING POSITION - Vertical

NOTE

This valve is intended for use as a break or series modulator with a short duration pulse input signal. When the equipment may be subjected to reduced atmospheric pressures the peak voltage between the control grid and Screen grid should not exceed 1,200 volts.

11.E.3

MAZDA

11.E.3

BEAM POWER AMPLIFIER

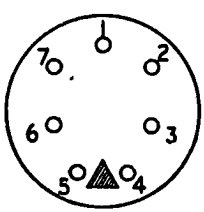
Indirectly heated – for Pulse Amplification

TYPICAL OPERATION		Series Modulator	Break Modulator
Quiescent Anode Voltage (volts)	$V_{a(o)}$	3,500	500
Screen Voltage (volts)·	V_{g2}	500	500
Signal Voltage Positive (volts)		50	25
Peak Anode Current (amps)	$I_{a(pk)}$	2	1
Approximate Knee Voltage (volts)		200	
Peak Anode Output Voltage (volts)		3,300	10,000
Approximate Peak Grid Current (amps)	$I_{g1(pk)}$	0.12	0.05

CAP BVA Standard

BULB Clear

BASE British 7 Pin.



Viewed from free end of pins.

CONNEXIONS

Pin 1	Blank	-
Pin 2	Control Grid	g1
Pin 3	Blank	-
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Cathode	k
Pin 7	Screen Grid	g2
Top Cap	Anode	a

MAZDA

12.E.1

BEAM TETRODE

Indirectly heated – for parallel operation

TENTATIVE

GENERAL

The 12.E.1 is intended for use as a series or shunt control valve in stabilised power packs.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	1.6
Maximum Anode Voltage (volts)	$V_{a(max)}$	800
Maximum Screen Voltage (volts)	$V_{g2(max)}$	300
Maximum Control Grid Voltage	$V_{g1(max)}$	100
Maximum Voltage between g1 and g2 (volts)	V_{g1-g2}	400
Mutual Conductance (mA/V)	g_m	• 14
Maximum Anode Dissipation (watts)	p_a	35
Maximum Screen Dissipation (watts)	p_{g2}	5.0
Maximum Cathode Current (mA)	$I_{k(max)}$	300
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$ t [	300

• Taken at $V_a = V_{g2} = 150$ V $I_a = 200$ mA.

[Provided the cathode is positive.

INTER-ELECTRODE CAPACITANCES

Grid/Earth (μμF)	c_{in}	23.0
Anode/Earth (μμF)	c_{out}	8.3
Anode/Grid (μμF)	$c_{a,g1}$	1.3

"Earth" denotes the remaining earthy potential electrodes and heater joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	150
Maximum Diameter (mm)	54
Maximum Seated Height (mm)	136
Approximate Nett Weight (ozs)	2½
Approximate Packed Weight (ozs)	7

MOUNTING POSITION - Vertical

If run horizontally then the axis AB must be on a horizontal plane.

12.E.1

MAZDA

12.E.1

BEAM TETRODE

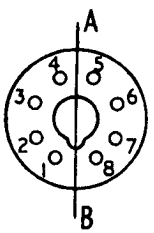
Indirectly heated – for parallel operation

TENTATIVE

BULB Clear

TOP CAP American miniature

BASE International Octal (I08)



Viewed from free end of pins.

CONNEXIONS

Pin 1	-	-
Pin 2	Heater	h
Pin 3	-	-
Pin 4	Screen Grid	g2
Pin 5	Control Grid	g1
Pin 6	-	-
Pin 7	Heater	h
Pin 8	Cathode	k
Top Cap	Anode	a

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THE EDISON SWAN ELECTRIC COMPANY LTD

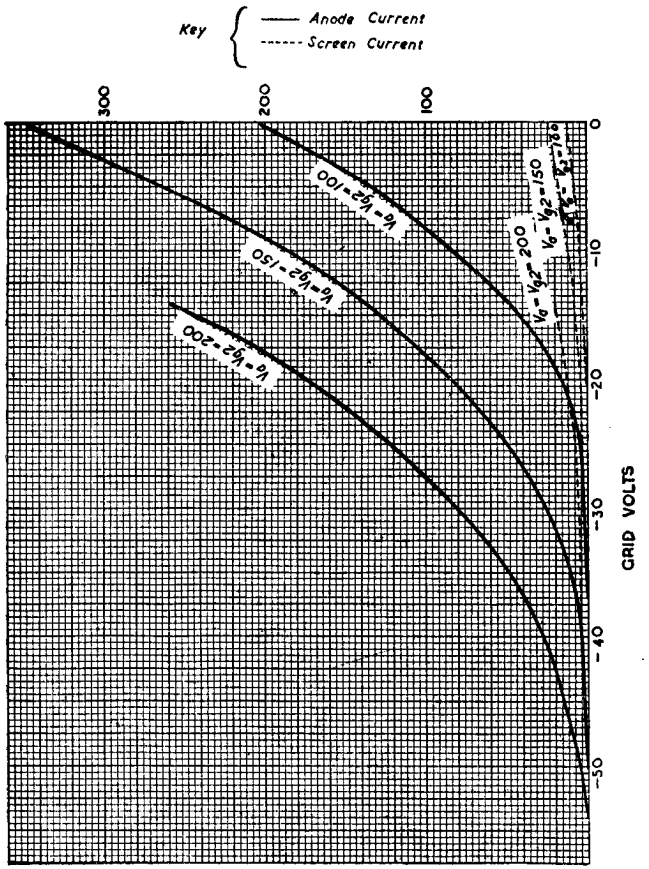
MAZDA

12.E.1

BEAM TETRODE

Indirectly heated – for parallel operation

TENTATIVE
AVERAGE CHARACTERISTIC CURVES



ANODE AND SCREEN CURRENTS IN mA

MAZDA

12.E.1

BEAM TETRODE

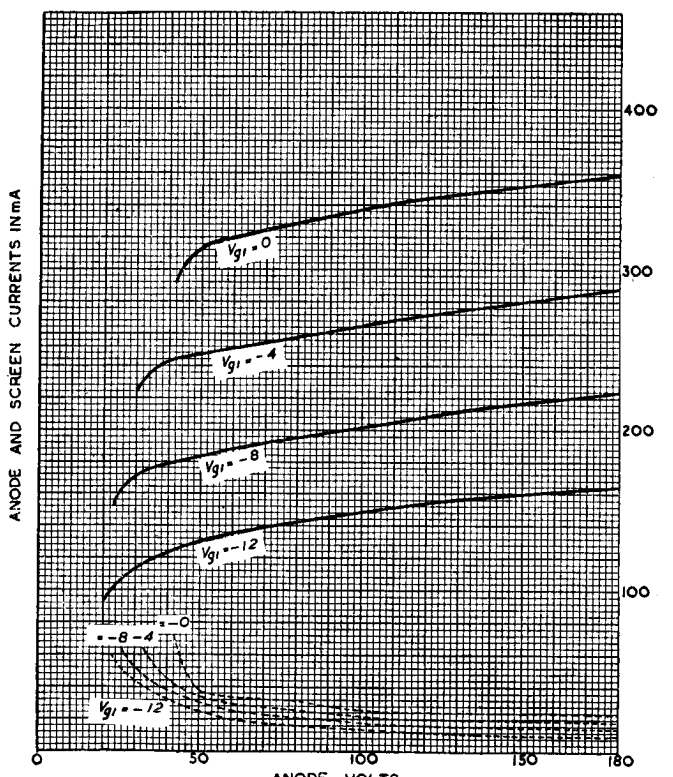
Indirectly heated – for parallel operation

TENTATIVE

AVERAGE CHARACTERISTIC CURVES

Curves taken at V_{g2} = 150v.

Key — *Anode Current*
---- *Screen Current*



THE EDISON SWAN ELECTRIC COMPANY LTD

EDISWAN

12E12

PULSE MODULATOR TETRODE

TENTATIVE

GENERAL

The 12E12 is a Pulse Modulator Tetrode, having a maximum anode dissipation of 60 watts, and a maximum peak anode current of 15 amps. It has an indirectly heated cathode, and is intended for use in Radar equipment.

RATING

Heater Voltage	(volts)	V_h	26
Heater Current	(amps)	I_h	1.6
Maximum Anode Voltage	(kV)	$V_{a(max)}$	11.0
Maximum Screen Grid Operating Voltage	(kV)	$V_{g2(max)}$	1.25
Maximum Screen Grid Voltage ($I_a = 0$)	(kV)	$V_{g2(max)}$	1.35
Maximum Control Grid Voltage (Negative)	(volts)	$-V_{g1(max)}$	−1,000
Maximum Control Grid Voltage (Positive Peak)	(volts)	$+V_{g1(pk)max.}$	300
Maximum Anode Dissipation	(watts)	$P_{a(max)}$	60
Maximum Screen Dissipation	(watts)	$P_{g2(max)}$	8
Maximum Grid 1 Dissipation	(watts)	$P_{g1(max)}$	3
Maximum Peak Anode Current	(amps)	$I_{a(pk)max.}$	15†
Maximum Grid 1 Series Resistance	(kΩ)	R_{g1}	100
Minimum Screen Grid Series Resistance	(kΩ)	R_{g2}	20*

* The Screen Grid should be decoupled to earth with a condenser.

† For a duty cycle not greater than 0.001. With peak currents in excess of 5 amps the product of peak current in amps and pulse duration in microseconds should not exceed 30.

Rating (Continued Overleaf)

EDISWAN

12E12

PULSE MODULATOR TETRODE

TENTATIVE

The current-time product limit still applies for currents less than 5 amps, the maximum duty cycle then being limited by the anode dissipation.
The valve should not operate for longer than 5 μs in any 100 μs period.
A minimum cathode heating time of three minutes should elapse before any cathode current is drawn.
All Maximum Ratings are Absolute values not Design Centres.

INTER-ELECTRODE CAPACITANCES (pF)

Anode/Grid 1 (max)	$c_{a\text{-}g1}$	2.0
Cathode/Grid 1	$c_{g\text{-}k}$	37
Anode/Cathode	$c_{a\text{-}k}$	7.5

DIMENSIONS

Maximum Overall Length	(mm)	150
Maximum Diameter	(mm)	65
Maximum Seated Height	(mm)	142
Approximate Nett Weight	(ozs)	$5\frac{3}{4}$
Approximate Packed Weight	(ozs)	24

MOUNTING POSITION—Vertical preferred, but if horizontal the grid plane should be vertical.

TYPICAL OPERATION—As Series Modulator.

Anode Voltage Supply	(kV)	$V_{a(b)}$	9.5
Screen Voltage	(kV)	V_{g2}	1.2
Grid No. 1 Bias	(volts)	$-V_{g1}$	—800
Grid No. 1 Pulse	(volts)	$+V_{g1}$	1,020
Anode Current Pulse	(amps)	$I_{a(pk)}$	10
Anode Load	(ohms)	R_a	800
Peak Pulse Power Input	(kW)	$P_{in(pk)}$	100
Peak Pulse Power Output	(kW)	$P_{out(pk)}$	80
Output Voltage	(kV)	V_{out}	8
Pulse Duration	(μ secs)	t_p	2
Pulse Repetition Frequency	(p/s)	P.R.F.	500

EDISWAN

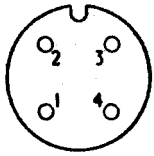
12E12

PULSE MODULATOR TETRODE

TENTATIVE

TOP CAP—CT3

BASE—B4A



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Screen Grid	g2
Pin 3	Control Grid	g1
Pin 4	Heater, Cathode	h,k
Top Cap	Anode	a

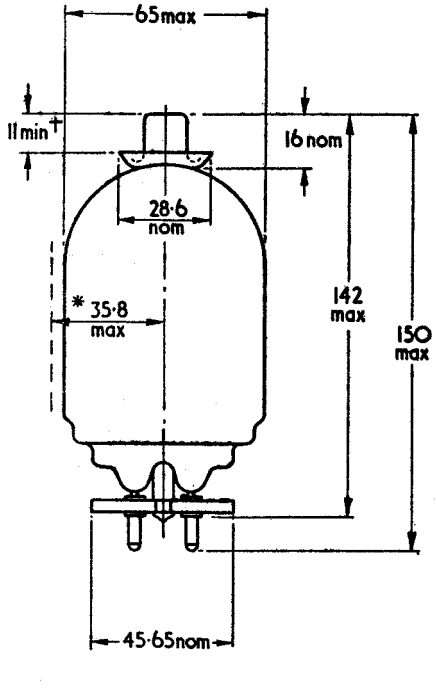
12E12

EDISWAN

12E12

PULSE MODULATOR TETRODE

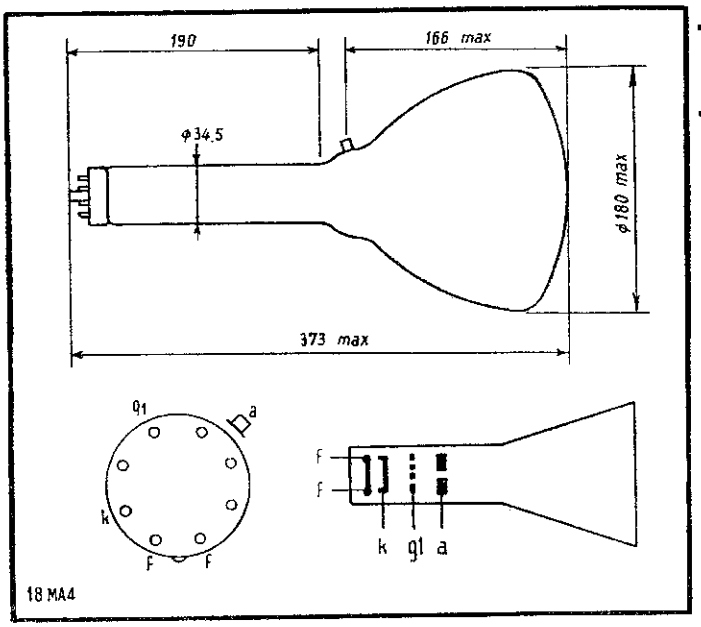
TENTATIVE



All Dimensions in mm.

* Eccentricity with respect to centre line of base.

† Straight side of top cap.



MAZDA

18 MA 4

TUBE ÉLECTROMAGNÉTIQUE DE 18 cm POUR TÉLÉVISION

NOTES

Le 18 MA 4 est un tube à concentration et déviation électromagnétiques à structure triode et écran blanc.

La valeur indiquée comme tension d'anode doit être considérée comme une valeur minimum et devra être augmentée si on désire une plus forte brillance. On n'oubliera cependant pas que, dans cette catégorie de tubes cathodiques, la puissance à mettre en jeu pour le balayage croît proportionnellement à la tension d'anode ; de toute façon, on évitera de dépasser pour cette dernière la valeur de 4,5 kV.

Une résistance de protection de 25 kΩ environ devra être prévue entre alimentation T.H.T. et anode du tube. D'autre part, il faudra ménager un enroulement séparé et bien isolé pour le chauffage du tube, et relier une extrémité du filament à la cathode.

Pour un réglage de la concentration tel que les lignes de l'image soient invisibles à une distance d'observation égale à 6 fois la hauteur de l'image, la concentration exige environ 450 ampères-tours.

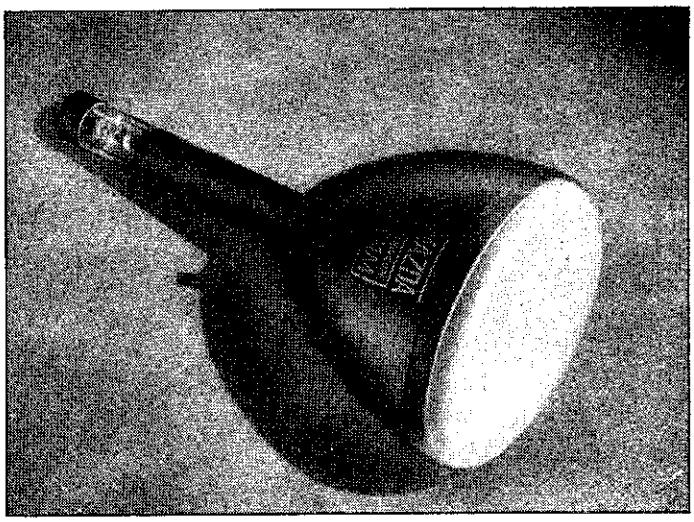
CULOT	CHAUFFAGE
Octal 8 broches	6,3 V 0,6 A

CAPACITES

Grille	5 pF
Cathode	5 pF

CARACTERISTIQUES D'UTILISATION

Tension d'anode	3,5 kV
Tension de grille correspondant à l'extinction de l'image	—21,5 à —42 V
Tension de commande moyenne (valeur de crête) pour un courant de faisceau variant de 0 à 100 µA	18 V
Tension de commande moyenne (valeur de crête) pour un courant de faisceau variant de 0 à 150 µA	21 V
Tension de commande maximum (valeur de crête) pour un courant de faisceau variant de 0 100 µA	21 V
Tension de commande maximum (valeur de crête) pour un courant de faisceau variant de 0 à 150 µA	24,5 V
Dimensions de l'image	105 × 140 mm



MAZDA

19G3

19G3

HIGH VACUUM HALF-WAVE RECTIFIER

Indirectly heated

RATING ¶		1,500 c.p.s	50 c.p.s.
Heater Voltage (volts)	V_h	* 4.0	* 4.0
Heater Current (amps)	I_h	1.4	1.4
Maximum Peak Inverse Voltage-No Load (volts)	P.I.V.(max)$_o$	7,500	7,000
Maximum Peak Inverse Voltage-On Load (volts)	P.I.V.(max)	6,500	6,300
Maximum Mean Current (mA)	I_{av}	75	50
Maximum Peak Current (mA)	I_{pk}	375	375
Minimum Surge Limiting Resistance (ohms)		[1,800	[1,900

* The Heater must be switched on for 15 seconds before the Anode Voltage is applied.

[This resistance may be obtained in the distributed resistance of the transformer.

¶ All Maximum Ratings are absolute values not design centres.

DIMENSIONS

Maximum Overall Length (mm)	100
Maximum Diameter (mm)	32
Maximum Bulb Diameter (mm)	29
Maximum Seated Height (mm)	87
Approximate Nett Weight (ozs)	$1\frac{3}{4}$
Approximate Packed Weight (ozs)	$2\frac{1}{2}$

MOUNTING POSITION - Unrestricted

19G3

MAZDA

19G3

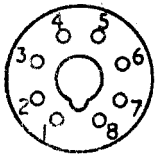
HIGH VACUUM HALF-WAVE RECTIFIER

Indirectly heated

CAP Miniature

BULB Clear

BASE International Octal (I08)



Viewed from free end of pins.

CONNEXIONS

Pin 1	Blank *	
Pin 2	Heater/Cathode	hk
Pin 3	Blank *	
Pin 4	Blank *	
Pin 5	Blank *	
Pin 6	Blank *	
Pin 7	Heater	h
Pin 8	Blank *	
Top Cap	Anode	a

* Blank pins in Socket must be left free.

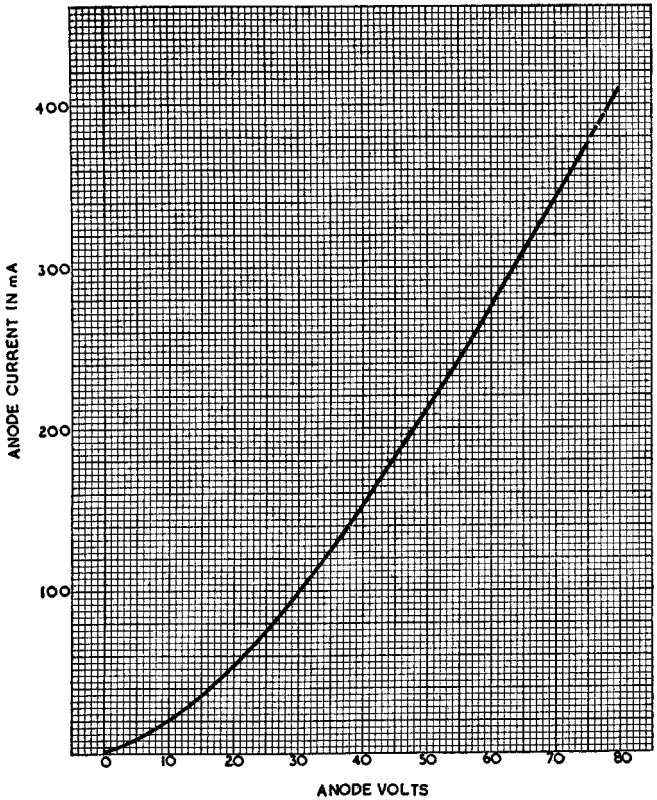
MAZDA

19G3

HIGH VACUUM HALF-WAVE RECTIFIER

Indirectly heated

AVERAGE CHARACTERISTIC CURVE



October 1948 *VALVE & CRT DIVISION* Issue 1/6

SIEMENS EDISON SWAN LIMITED

MAZDA

19G6

19G6

HIGH VACUUM HALF WAVE RECTIFIER

Indirectly heated—for High Voltage Power Supplies

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.5
Maximum Peak Inverse Anode Volts (Wkg)(kv)	P.I.Vmax (w)	6.0
Maximum Peak Inverse Anode Volts (no-load)(kv)	P.I.Vmax	7.0
Maximum Anode Volts (R.M.S.) (kv)	V_a(R.M.S.)	2.5
Maximum Mean Anode Current (mA)	I_a(av)	30.0
Maximum Peak Anode Current (mA)	I_a(pk)	180.0
Minimum Surge Limiting Resistance (ohms) •		5,400
Maximum Reservoir Condenser Capacitance (μF)		1.0

• This resistance can be obtained in the distributed resistance of the transformer winding.

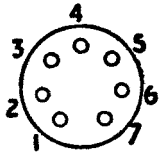
INTER-ELECTRODE CAPACITANCES

Anode to all. (μμF)	C_a-all	2.8

DIMENSIONS

Overall Length Maximum (mm)	60
Diameter Maximum (mm)	19
Approximate Nett Weight (ozs)	‡
Approximate Packed Weight (ozs)	‡

BASE - Miniature Button. 7. Pin. B7G.



Viewed from free end of pins.

BASE CONNECTIONS

Pin.1. - to Pin 2.
Pin.2. - Cathode.
Pin.3. - Heater.
Pin.4. - Heater.
Pin.5. - Pin.2.
Pin.6. - Pin.2.
Pin.7. - Pin.2.
Cap. - Anode.

NOTES

Cathode & Heater should normally be tied externally. If left free, the heater to cathode voltage must never exceed 10 volts Peak.

The heater must be switched on for 20. seconds before the anode voltage is applied.

All Maximum Ratings are absolute values not design centres.

19.H.1

MAZDA

19.H.1

HIGH VOLTAGE HALF-WAVE RECTIFIER

Directly heated

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	2.0
Maximum D.C. Output Current (mA)	$I_{a(av)max}$	75
Maximum Working Peak Inverse Voltage (kV)	P.I.V.(max)	15.0
Maximum No Load Peak Inverse Voltage (kV) ‡	P.I.V.(max)	17.5
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	600
Maximum Value of Reservoir Capacitor	μF	0.5
Minimum Value of Limiting Resistor (ohms)	Ω	2,500
H.T. Switching Delay Period (Seconds)		10

‡ The maximum value of RMS working anode voltage will depend on the regulation of the transformer, and must be such that the maximum P.I.V. on no load is not exceeded.

All Maximum Ratings are absolute values, not design centres.

DIMENSIONS

Maximum Overall Length (mm)	210
Maximum Diameter (mm)	51
Maximum Seated Height (mm)	195
Approximate Nett Weight (ozs)	5
Approximate Packed Weight (ozs)	14

MOUNTING POSITION - Vertical

MAZDA

19.H.1

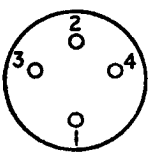
HIGH VOLTAGE HALF-WAVE RECTIFIER

Directly heated

BULB Clear

CAP B.V.A. Standard

BASE 4 pin



Viewed from free end of pins.

CONNEXIONS

Pin 1	-
Pin 2	-
Pin 3	Filament f
Pin 4	Filament f
Top Cap	Anode A

MAZDA

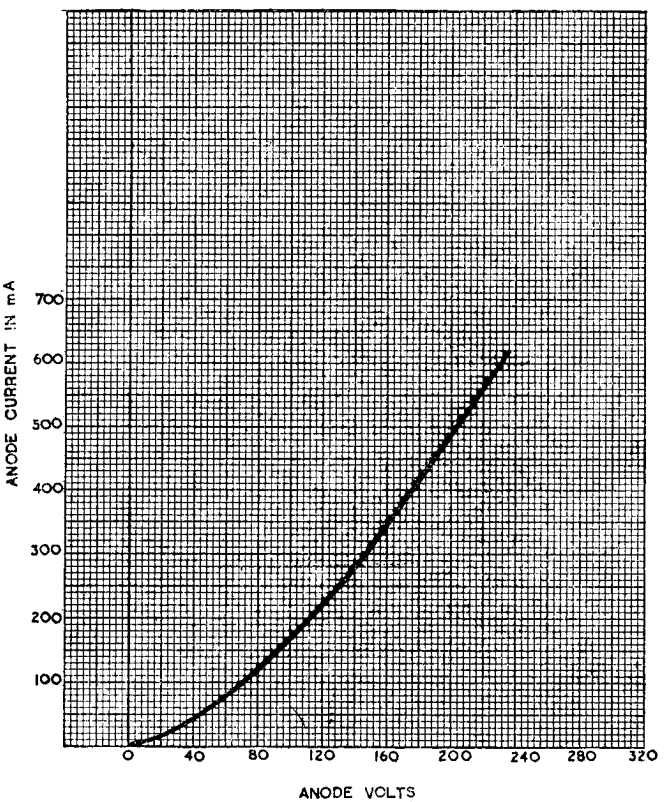
19.H.1

HIGH VOLTAGE HALF-WAVE RECTIFIER

Directly heated

AVERAGE CHARACTERISTIC CURVE

Curve taken with a short duration pulse



THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

19.H.4

HIGH VACUUM DIODE

Directly heated – for High Voltage Power Rectification

RATING ¶

Heater Voltage (volts)	V_h	§ 2.5
Heater Current (amps)	I_h	3.3
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	25.0
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	150
Maximum Peak Inverse Voltage - No Load (KV)	$P.I.V._{o.}(max)$	23.0
Maximum Peak Inverse Voltage - On Load (KV)	$P.I.V._{w.}(max)$	20.0
Minimum Surge Limiting Resistance (ohms)	Ω	23,000

§ The Heater must be switched on for 10 seconds before the Anode Voltage is applied.

¶ All Maximum Ratings are absolute values, not design centres.

DIMENSIONS

Maximum Overall Length (mm)	129
Maximum Diameter (mm)	40
Maximum Seated Height (mm)	116
Approximate Nett Weight (ozs)	2½
Approximate Packed Weight (ozs)	3½

MOUNTING POSITION - Unrestricted.

19.H.4

MAZDA

19.H.4

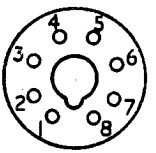
HIGH VACUUM DIODE

Directly heated – for High Voltage Power Rectification

CAP American Miniature Type

BULB Clear

BASE International Octal (I08)



Viewed from free end of pins.

CONNEXIONS

Pin 1	–	–
Pin 2	Heater	h
Pin 3	–	–
Pin 4	–	–
Pin 5	–	–
Pin 6	–	–
Pin 7	Heater	h
Pin 8	–	–
Top Cap	Anode	a

NOTE

All pins with the exception of No. 2 should be connected to pin No. 7 on the holder, and pin No. 7 connected to the reservoir condenser.

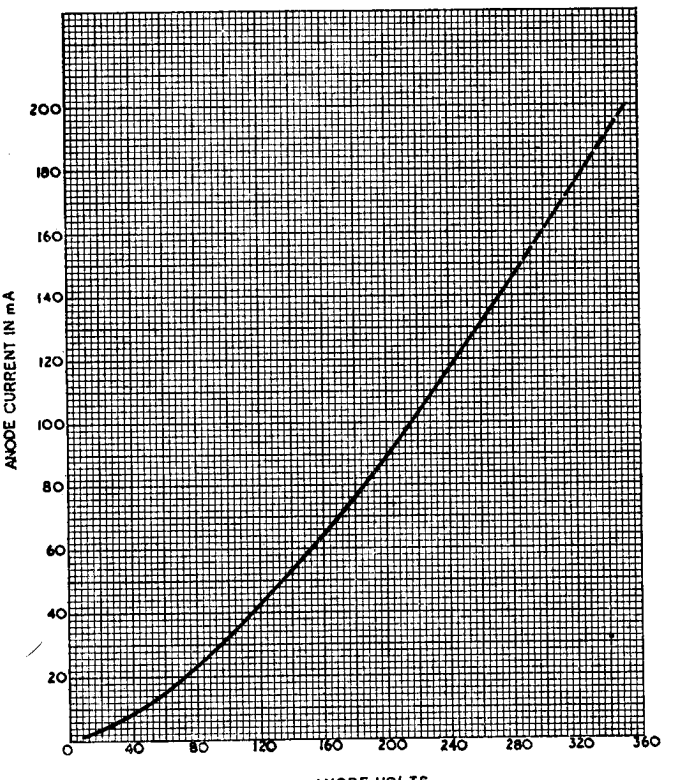
MAZDA

19.H.4

HIGH VACUUM DIODE

Directly heated – for High Voltage Power Rectification

AVERAGE CHARACTERISTIC CURVE



October 1948 RADIO DIVISION Issue 1/6

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN
MAZDA
19.H.5
HIGH VACUUM DIODE
Indirectly heated—for Voltage Damping and Power Rectification

19H5

RATING ϕ

Heater Voltage (volts)	V_h ‡	4.0
Heater Current (amps)	I_h	4.0
Maximum Anode Dissipation (watts)	$P_{a(max)}$	32

As damping Diode

Maximum Anode Current pulsing - 2 microseconds maximum (amps)	$I_{a(max)pulse}$	10
Maximum Peak Inverse Voltage short pulse rating or transients (kV)	P.I.V. (max)	27
Maximum Peak Inverse Voltage short pulse rating or transients (Fault Condition) (kV)		$ 35
Approximate Impedance at 8 amps Peak (ohms)	r_a	100

As power Rectifier or Delay line Charging Diode

Maximum Mean Anode Current - at 4:1 Peak/Mean (choke filter) (mA)	$I_{a(max)av}$	180
Maximum Mean Anode Current - at 8:1 Peak/Mean (capacity filter) (mA)	$I_{a(max)av}$ ⁄	125
Maximum R.M.S. Anode Current (mA)	$I_{a(max)r.m.s.}$	350
Maximum Peak Inverse Voltage - No load (kV)	P.I.V.(max)o	20
Maximum Peak Inverse Voltage - On load (kV)	P.I.V.(max)	18
Maximum Peak Inverse Voltage (Fault Condition) 5 seconds duration (kV)	P.I.V.(max) Fault	30

This valve is a very low impedance diode intended for use as a charging and damping diode in radar applications. It can also be used as a Power Rectifier at mains frequencies.

‡ The Heater must be switched on for 30 seconds before the Anode Voltage is applied.

$ For a maximum period of 50 milliseconds.

ϕ All Maximum ratings are absolute values not design centres.

⁄ When used with a capacity input filter, the effective resistance in the anode circuit should not be less than 1600 ohms. ←

DIMENSIONS

Maximum Overall Length (mm)	240 ←
Maximum Diameter (mm)	57 ←
Approximate Nett Weight (ozs)	7
Approximate Packed Weight (ozs)	18

MOUNTING POSITION - Unrestricted

Indicates a change ←

February 1954 *VALVE & CRT DIVISION* Issue 2/6
SIEMENS EDISON SWAN LIMITED

19H5

EDISWAN

MAZDA

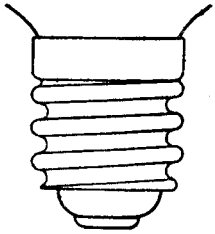
19.H.5

HIGH VACUUM DIODE

Indirectly heated—for Voltage Damping and Power Rectification

BULB Clear

BASE Goliath Ediswan Screw Cap



CONNEXIONS

Contact 1	Heater	h
Contact 2	Heater	h
Top Cap	Anode	a

NOTE

The Heater is connected internally to cathode

MAZDA

20A2

GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

RATING

Heater Voltage (volts)	V_h	6.3	
Heater Current (amps)	I_h	1.0	
Approximate Voltage Drop (volts)		9.0	
Maximum Peak Forward Anode Voltage	$V_{a\ (max)}$	600	
Maximum Peak Inverse Anode Voltage	$PIV_{\ (max)}$	1,300	
Maximum Shield Grid Voltage (volts)	$V_{g_2\ (max)}$	—100	←
Maximum Control Grid Voltage (volts)	$V_{g_1\ (max)}$	—100	←
Maximum Peak Cathode Current (mA)	$I_{k(pk)\ max}$	1,250	
Maximum Mean Cathode Current (mA)	$I_{k(av)\ max}$	250	
Control Grid Series Resistance (megohms)		0.01 to 1.0	

NOTE

Cathode and heater should normally be tied externally. If left free, the heater to cathode voltage must never exceed 25 volts peak. The heater must be switched on for 15 seconds before anode voltage is applied.

All maximum ratings are absolute values, not design centres.

DIMENSIONS

Maximum Overall Length (mm)	110
Maximum Diameter (mm)	40
Maximum Seated Height (mm)	97
Approximate Nett Weight (ozs)	$1\frac{1}{2}$
Approximate Packed Weight (ozs)	2

Indicates a change ←

Industrial
March 1957 *VALVE & CRT DIVISION* Issue 2/6
SIEMENS EDISON SWAN LIMITED

20A2

MAZDA

20A2

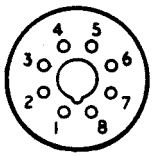
GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

MOUNTING POSITION—Unrestricted

BULB—Clear

BASE—International Octal (I08)



Viewed from free end of pins

CONNECTIONS

Pin 1	No connection	NC
Pin 2	Heater	h
Pin 3	Anode	a
Pin 4	No connection	NC
Pin 5	Control Grid	g_1
Pin 6	Shield Grid	g_2
Pin 7	Heater	h
Pin 8	Cathode	k

March 1957 *Industrial VALVE & CRT DIVISION* Issue 2/6

SIEMENS EDISON SWAN LIMITED

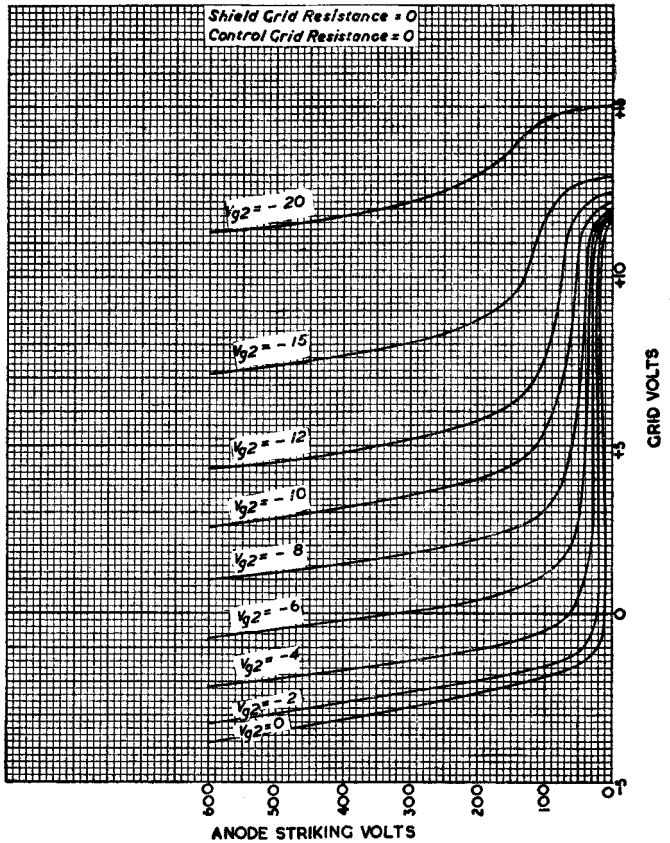
MAZDA

20.A.2

GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

AVERAGE CHARACTERISTIC CURVES



MAZDA

20.A.3

20.A.3

THYRATRON GAS TETRODE

Indirectly heated for use as Gas Relay

RATING		
Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.6
Arc Voltage Drop (volts)		8
Maximum Forward Anode Volts	V_a	650
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	1300
Maximum Shield Grid Voltage (volts)	V_{g2}(max)	-100
Maximum Control Grid Volts	V_{g1}(max)	-100
Maximum Peak Cathode Current (mA)	I_k(pk)max	500
Maximum Average Cathode Current (mA)	I_k(av)max	100
Control Grid Circuit Res. (Megohms)	R_{g1}	0.01-10.0
Control Ratio G1		250 *
Control Ratio G2		1000 †

* V_{g2} = 0 R_{g1} = 0

† V_{g1} = 0 R_{g1} = 0 R_{g2} = 0

IMPORTANT

1) Heater to cathode voltage must never exceed 25 volts peak.

11) The heater must be switched on for 10.sec min before anode voltage is applied.

111) All maximum ratings are absolute values, not design centres.

DIMENSIONS	
Overall Length Maximum (mm)	54
Maximum Diameter (mm)	19
Maximum Seated Height (mm)	47.5
Approximate Nett Weight (ozs)	¼
Approximate Packed Weight (ozs)	½

MOUNTING POSITION - Unrestricted.

20.A.3

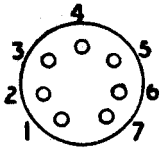
MAZDA

20.A.3

THYRATRON GAS TETRODE

Indirectly heated for use as Gas Relay

BASE - Miniature Button 7. pin B7G.



Viewed from free end of pins.

CONNEXIONS

Pin 1	Grid 1	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Grid 2	g2
Pin 6	Anode	a
Pin 7	Grid 2	g2

EDISWAN

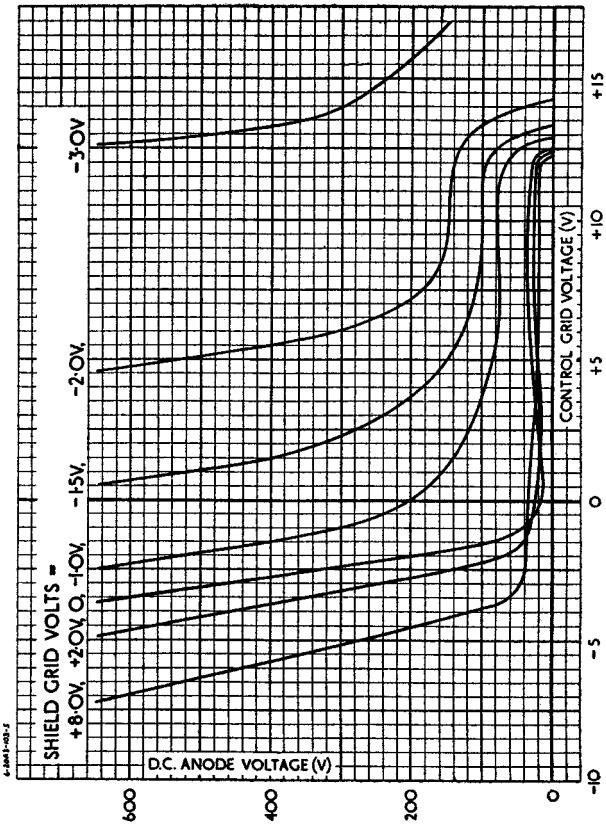
20A3

THYRATRON GAS TETRODE

Indirectly heated for use as Gas Relay

AVERAGE CHARACTERISTIC CURVES: V_a/V_g

$R_{g1}=0$ $R_{g2}=0$



INDUSTRIAL
VALVE & CRT DIVISION
September 1959 Issue 1/7
SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

20D1

DOUBLE DIODE (Separate Cathodes)
Indirectly heated—for series operation

REPLACEMENT TYPE ←

RATING

Heater Voltage (volts)	V_h	9.5
Heater Current (amps)	I_h	0.2
Maximum Mean Anode Current per Anode (mA)	$I_{a(av)max}$	9
Maximum Peak Anode Current per Anode (mA)	$I_{a(pk)max}$	50
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	500
Maximum Potential Heater/Cathode (D.C.+A.C. peak with heater—ve) (volts)	$V_{h\text{-}k(max)}$	300

INTER-ELECTRODE CAPACITANCES (pF)*

		§	†
Anode 1/All other Electrodes	$c_{a'\text{-}all}$	3.4	4.5
Anode 1/Anode 2	$c_{a'\text{-}a''}$	0.018	0.021
Anode 1/Cathode 1	$c_{a'\text{-}k'}$	1.65	1.68
Anode 2/All other Electrodes	$c_{a''\text{-}all}$	3.4	4.5
Anode/2 Cathode 2	$c_{a''\text{-}k''}$	1.65	1.65
Cathode 1/All other Electrodes	$c_{k'\text{-}all}$	4.0	5.1
Cathode 1/Cathode 2	$c_{k'\text{-}k''}$	0.009	0.011
Cathode 2/All other Electrodes	$c_{k''\text{-}all}$	4.1	5.2
Cathode 2/Heater	$c_{k''\text{-}h}$	2.15	2.45
Cathode 1/Heater	$c_{k'\text{-}h}$	1.95	1.98

* Measured with a closely fitting metal can connected to earth.

§ Inter-electrode capacitance with holder capacitance balanced out.

† Total capacitance including a Benjamin B7G ceramic holder Type 75/833 and cylindrical screen Type 75/832. This holder has a radial shield between pins 1 and 7.

20D1

EDISWAN

MAZDA

20D1

DOUBLE DIODE (Separate Cathodes)
Indirectly heated—for series operation

REPLACEMENT TYPE ←

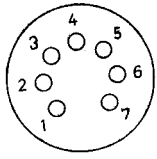
DIMENSIONS

Maximum Overall Length	(mm)	54
Maximum Diameter	(mm)	19
Maximum Seated Height	(mm)	47.5
Approximate Nett Weight	(ozs)	$\frac{1}{4}$
Approximate Packed Weight	(ozs)	$\frac{1}{2}$

MOUNTING POSITION—Unrestricted.

BULB—Clear

BASE—B7G



Viewed from free end of pins.

CONNECTIONS

Pin 1	Cathode 1	k′
Pin 2	Anode 2	a″
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Cathode 2	k″
Pin 6	Internal Shield	s
Pin 7	Anode 1	a′

Indicates a change ←

EDISWAN

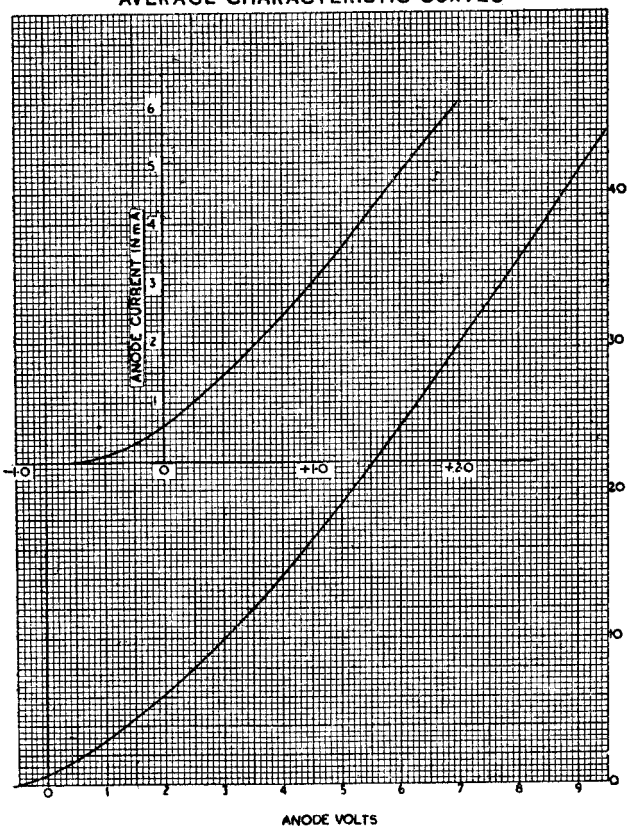
MAZDA

20D1

DOUBLE DIODE (Separate Cathodes)
Indirectly heated—for series operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

October 1958 *VALVE & CRT DIVISION* Issue 2/2A

SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

20F2

20F2

TELEVISION SCREENED PENTODE

Indirectly heated—for series operation

REPLACEMENT TYPE ←

RATING

Heater Current (amps)	I_h	0.2
Heater Voltage (volts)	V_h	11.0
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Mutual Conductance (mA/V)	g_m	10.6*
Anode Impedance (megohms)	r_a	0.125*
Inner Mμ	$\mu_{g1\text{-}g2}$	33*
Maximum Anode Dissipation (watts)	$P_{a(max)}$	4·0
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	1.0
Maximum Potential Heater/Cathode (volts A.C.)	$V_{h\text{-}k(max)}$	250‡

* Taken at $V_a = V_{g2} = 140v$; $V_{g1} = -1.25v$.

‡ Measured with respect to the higher potential heater pin.

INTER-ELECTRODE CAPACITANCES (pF)

		§	†
Anode/Earth	c_{out}	4.6	6.1
Anode/Control Grid	$c_{a\text{-}g1}$	.007	.008
Control Grid/Earth	c_{in}	8.8	10.3

§ Inter-electrode capacitances with holder capacitance balanced out.

† Total capacitance including a Benjamin B8A moulded holder at a frequency of 1 Mc/s.

DIMENSIONS

Maximum Overall Length	(mm)	67
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	54
Radius over Location Key	(mm)	12.25
Approximate Nett Weight	(ozs)	$\frac{3}{4}$
Approximate Packed Weight	(ozs)	1

Indicates a change ←

EDISWAN

MAZDA

20F2

TELEVISION SCREENED PENTODE

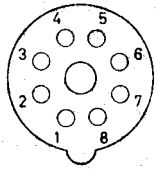
Indirectly heated—for series operation

REPLACEMENT TYPE ←

MOUNTING POSITION—Unrestricted.

BULB—Clear

BASE—B8A



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Internal Shield	s
Pin 4	Suppressor Grid	g_3
Pin 5	Screen Grid	g_2
Pin 6	Control Grid	g_1
Pin 7	Cathode	k
Pin 8	Heater	h

Indicates a change ←

EDISWAN
MAZDA
20L1
TELEVISION TWIN TRIODE
Indirectly heated—for series operation
REPLACEMENT TYPE ←

RATING

Heater Current (amps)	I_h	0.2
Heater Voltage (volts)	V_h	12.6
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Mutual Conductance (mA/V)	g_m	2.8*
Amplification Factor	μ	16*
Maximum Anode Dissipation (watts) (either section)	$P_{a(max)}$	3.0†
Maximum Total Anode Dissipation (watts)	$P_{a(tot)\ max}$	4.0†
Maximum Heater/Cathode Voltage (volts r.m.s.)	$V_{h\text{-}k(max)}$	250‡

* Taken at V_a=200 volts ; I_a=10mA.

† The permissible anode dissipation rating is a function of the grid cathode resistance and the circuit employed.

‡ Measured with respect ot the higher potential heater pin.

INTER-ELECTRODE CAPACITANCES (pF)

		§	‖
Grid 1/Anode 1	$c_{g'\text{-}a'}$	2.7	2.9
Grid 2/Anode 2	$c_{g''\text{-}a''}$	2.6	2.8
Grid 1/Earth	$c_{g'\text{-}E}$	2.8	4.1
Grid 2/Earth	$c_{g''\text{-}E}$	2.8	4.1
Anode 1/Earth	$c_{a'\text{-}E}$	2.4	3.7
Anode 2/Earth	$c_{a''\text{-}E}$	2.2	3.5
Anode 1/Anode 2	$c_{a'\text{-}a''}$	0.62	0.62
Grid 1/Grid 2	$c_{g'\text{-}g''}$	0.016	0.017
Grid 1/Anode 2	$c_{g'\text{-}a''}$	0.033	0.034
Grid 2/Anode 1	$c_{g''\text{-}a'}$	0.09	0.10

§ Inter-electrode capacitances with holder capacitance balanced out.

‖ Total capacitances including a Benjamin B8A moulded holder measured at a frequency of 1Mc/s.

Indicates a change ←

20L1

EDISWAN

MAZDA

20L1

TELEVISION TWIN TRIODE

Indirectly heated—for series operation

REPLACEMENT TYPE ←

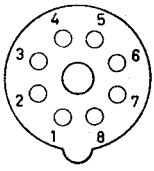
DIMENSIONS

Maximum Overall Length	(mm)	67
Maximum Diameter	(mm)	22
Maximum Seated Height	(mm)	54
Radius over Location Key	(mm)	12.25
Approximate Net Weight	(ozs)	$\frac{3}{4}$
Approximate Packed Weight	(ozs)	1

MOUNTING POSITION—Unrestricted.

BULB—Clear

BASE—B8A.



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Anode 2	a″
Pin 3	Grid 2	g″
Pin 4	Cathode 2	k″
Pin 5	Anode 1	a′
Pin 6	Grid 1	g′
Pin 7	Cathode 1	k′
Pin 8	Heater	h

Indicates a change ←

EDISWAN

MAZDA

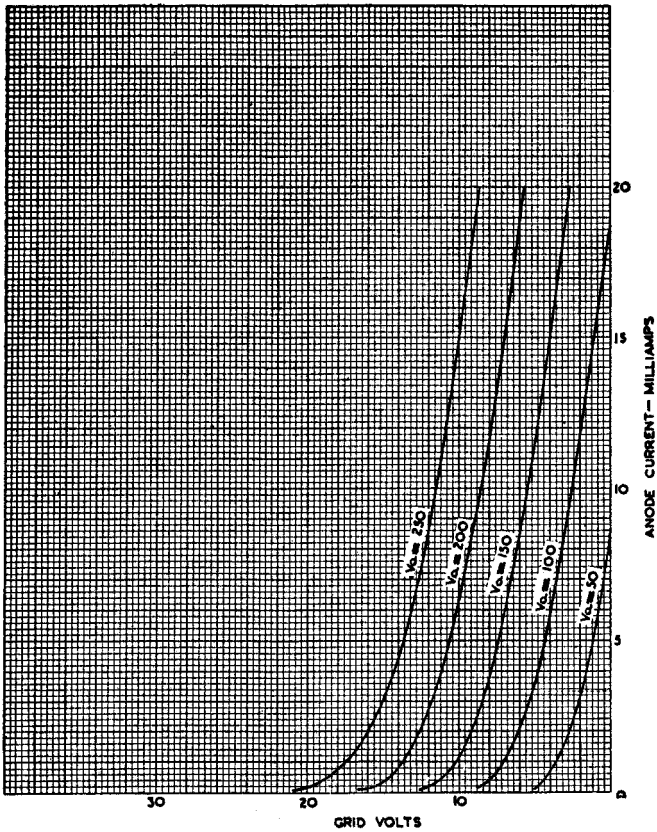
20L1

TELEVISION TWIN TRIODE

Indirectly heated—for series operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

20L1

EDISWAN

MAZDA

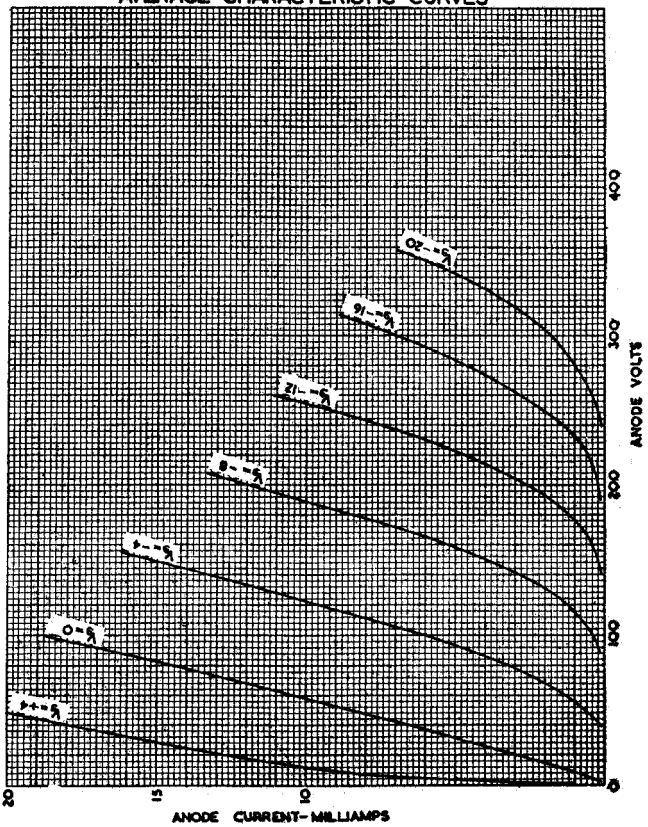
20L1

TELEVISION TWIN TRIODE

Indirectly heated—for series operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

October 1958 *VALVE & CRT DIVISION* Issue 2/2A

SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

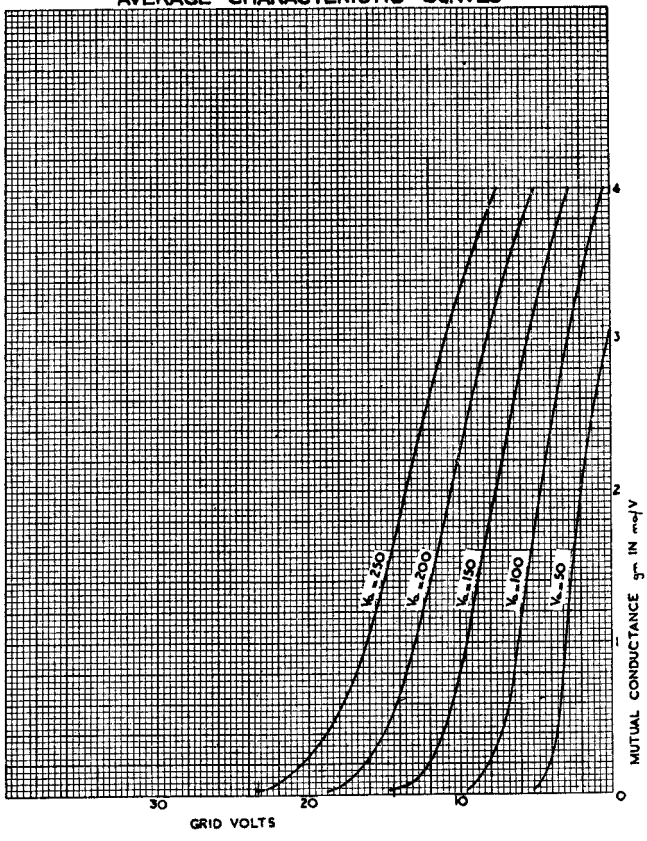
20L1

TELEVISION TWIN TRIODE

Indirectly heated—for series operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

SIEMENS EDISON SWAN LIMITED

MAZDA

20.P.2

TELEVISION BEAM POWER AMPLIFIER

Indirectly heated — for series operation

RATING		
Heater Current (amps)	I_h	0.2
Heater Voltage (volts)	V_h	38
Maximum Anode Voltage (volts)	$V_{a(max)}$	400
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Mutual Conductance (mA/V)	g_m	* 13.5
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	5
Maximum Anode Dissipation (watts)	$P_{a(max)}$	20
Maximum Peak Anode Voltage (volts) (pulse)	$V_{a(pk)max}$	5,000

* At $V_a = 220$; $V_{g2} = 220$; $V_{g1} = -7.5$;

INTER-ELECTRODE CAPACITANCES		
Grid/Earth (μμF)	C_{in}	27.0
Anode/Earth (μμF)	C_{out}	5.3
Anode/Grid (μμF)	C_{ga}	0.56

DIMENSIONS	
Maximum Overall Length (mm)	142
Maximum Diameter (mm)	54
Maximum Seated Height (mm)	128

MOUNTING POSITION - Unrestricted.

20.P.2

MAZDA

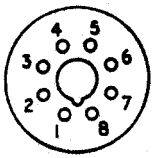
20.P.2

TELEVISION BEAM POWER AMPLIFIER

Indirectly heated – for series operation

BULB - Clear

BASE - International Octal (107)



Viewed from free end of pins.

CONNECTIONS.

Pin 1	-	-
Pin 2	Heater	h
Pin 3	-	-
Pin 4	Screen Grid	g_2
Pin 5	Control Grid	g_1
Pin 6	Omitted	-
Pin 7	Heater	h
Pin 8	Cathode	k
Top Cap	Anode	a

August 1950 *RADIO DIVISION* Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD

EDISWAN
MAZDA
20P4
TELEVISION BEAM POWER AMPLIFIER
Indirectly heated—for series operation
REPLACEMENT TYPE ←

GENERAL

The 20P4 has been designed for use in the output stage of a time base for magnetic scanning. The valve has been designed to stand the high peak anode voltages required by this class of service.

RATING

Heater Current (amps)	I_h	0·2
Heater Voltage (volts)	V_h	38·0
Maximum Anode Voltage (volts)	$V_{a(max)}$	400*
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250
Maximum Peak Anode Voltage (volts) (pulse positive)	$V_{a(pk)\ max}$	6,000
Maximum Peak Screen Voltage (volts) (pulse negative)	$V_{g2(pk)\ max}$	1,500
Maximum Anode Dissipation (watts)	$p_{a(max)}$	10·0
Maximum Screen Dissipation (watts)	$p_{g2(max)}$	4
Maximum Heater/Cathode Voltage (volts r.m.s.)	$V_{h\text{-}k(max)}$	250†
Maximum Cathode Current (mA)	$I_{k(max)}$	150
Maximum Grid/Cathode Circuit Resistance (MΩ)	R_{g1}	1·0

* V_a may be increased to 550 where a " recovered voltage " of >200 is available.

† Measured with respect to the higher potential heater pin.

INTER-ELECTRODE CAPACITANCES (pF)

Anode/Earth	c_{out}	10·0
Anode/Control Grid	$c_{a\text{-}g1}$	0·3
Grid/Earth	c_{in}	20·0

Indicates a change ←

20P4

EDISWAN

MAZDA

20P4

TELEVISION BEAM POWER AMPLIFIER

Indirectly heated—for series operation

REPLACEMENT TYPE ←

DIMENSIONS

Maximum Overall Length	(mm)	108
Maximum Diameter	(mm)	32
Maximum Seated Height	(mm)	94
Approximate Nett Weight	(ozs)	$2\frac{1}{2}$
Approximate Packed Weight	(ozs)	7

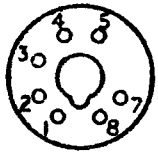
MOUNTING POSITION—Unrestricted

If mounted horizontally it is recommended that pins 2 and 6 should be in a vertical plane.

BULB—Clear

CAP—American Miniature (CT1)

BASE—International Octal (I07)



Viewed from free end of pins.

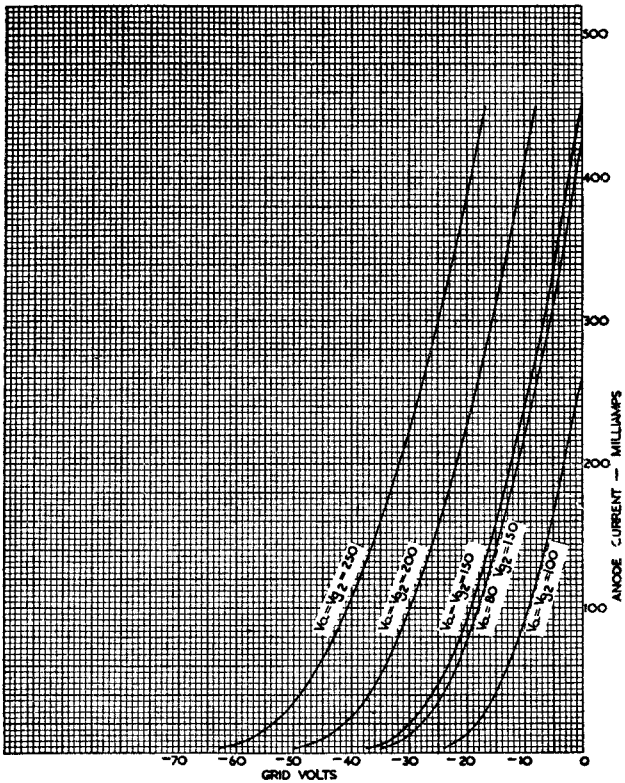
CONNECTIONS

Pin 1	No connection	NC
Pin 2	Heater	h
Pin 3	No connection	NC
Pin 4	Screen Grid	g2
Pin 5	Control Grid	g1
Pin 6	No Pin	NP
Pin 7	Heater	h
Pin 8	Cathode	k
Top Cap	Anode	a

Indicates a change ←

EDISWAN
MAZDA
20P4
TELEVISION BEAM POWER AMPLIFIER
Indirectly heated—for series operation
REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

20P4

EDISWAN

MAZDA

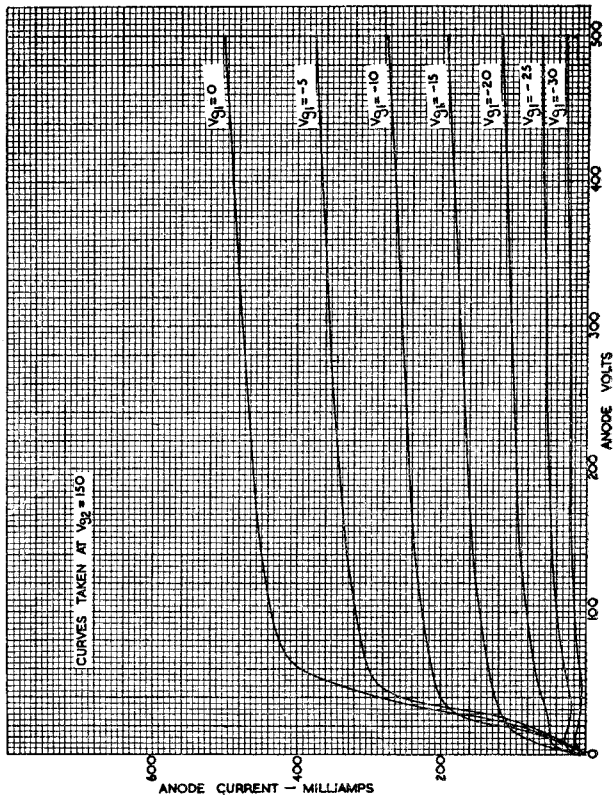
20P4

TELEVISION BEAM POWER AMPLIFIER

Indirectly heated—for series operation

REPLACEMENT TYPE ←

AVERAGE CHARACTERISTIC CURVES



Indicates a change ←

February 1959 *VALVE & CRT DIVISION* Issue 2/2A

SIEMENS EDISON SWAN LIMITED

EDISWAN

21A1

GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

GENERAL

The 21A1 is a Gas Filled Tetrode intended for use as a Half Wave Grid Controlled Rectifier at altitudes up to 55,000 feet.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.95
Arc Voltage Drop (volts)		9.0
Maximum Peak Forward Anode Voltage (volts)	V_a (max)	600*
Maximum Peak Inverse Anode Voltage (volts)	PIV (max)	1,300*‡
Maximum Shield Grid Voltage (Before Anode Conduction) (volts)	V_{g2} (max)	—100‖
Maximum Control Grid Voltage (Before Anode Conduction) (volts)	V_{g1} (max)	—100‖
Maximum Peak Cathode Current (mA)	$I_{k(pk)}$ max	1,250
Maximum Mean Cathode Current (mA)	$I_{k(av)}$ max	250†
Maximum Mean Positive Control Grid Current (mA)	$I_{g1(av)}$ max	5†§
Control Grid Series Resistance (megohms)	R_{g1}	0.01 to 10
Maximum Peak Heater to Cathode Voltage (Heater Positive) (volts)	$V_{h\text{-}k(max)}$	25
Maximum Peak Heater to Cathode Voltage (Heater Negative) (volts)	$V_{h\text{-}k(max)}$	100
Ambient Temperature Range (C°)		—50 to +90

NOTES—See overleaf

April 1960 Issue 1/7

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

2IAI

EDISWAN

2IAI

GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

NOTES

The heater must be switched on for 15 seconds minimum before the application of anode voltage.

* Maximum ratings are Absolute Values not Design Centres and apply at air pressure corresponding to an altitude of 55,000 feet and up to a maximum supply frequency of 1·6kc/s.

‡ Under transient switching conditions and note (*) the Maximum Surge Peak Inverse Voltage is 2000V.

|| Maximum Negative Voltage during Conduction is 10V.

† Maximum averaging time, 15 seconds.

§ Currents of this order may not be drawn when the anode is more negative than —10 volts.

DIMENSIONS

Maximum Overall Length	(mm)	85
Maximum Diameter	(mm)	33
Maximum Seated Height	(mm)	71
Approximate Nett Weight	(ozs)	1¼
Approximate Packed Weight	(ozs)	2

MOUNTING POSITION—Unrestricted

April 1960 Issue 1/7

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

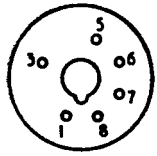
EDISWAN

21A1

GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

BASE—International Octal (6 Pin)



Viewed from free end of pins.

CONNECTIONS

Pin 1	Heater	h
Pin 2	No Pin	NP
Pin 3	Anode	a
Pin 4	No Pin	NP
Pin 5	Control Grid	g1
Pin 6	Shield Grid	g2
Pin 7	Heater	h
Pin 8	Cathode	k

April 1960 Issue 1/7

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

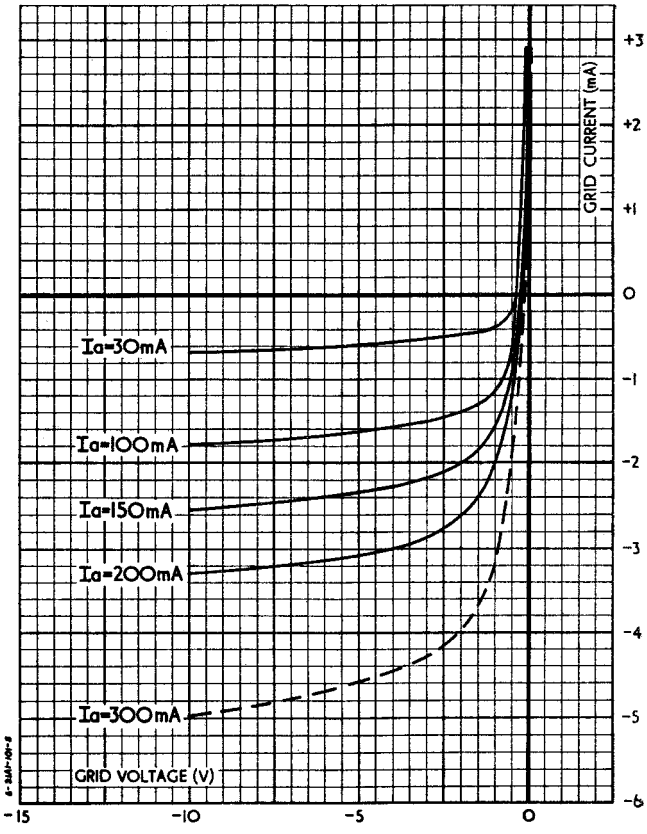
EDISWAN

21A1

GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

AVERAGE CHARACTERISTIC CURVES : I_{g1}/V_{g1}



April 1960 Issue 1/7

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

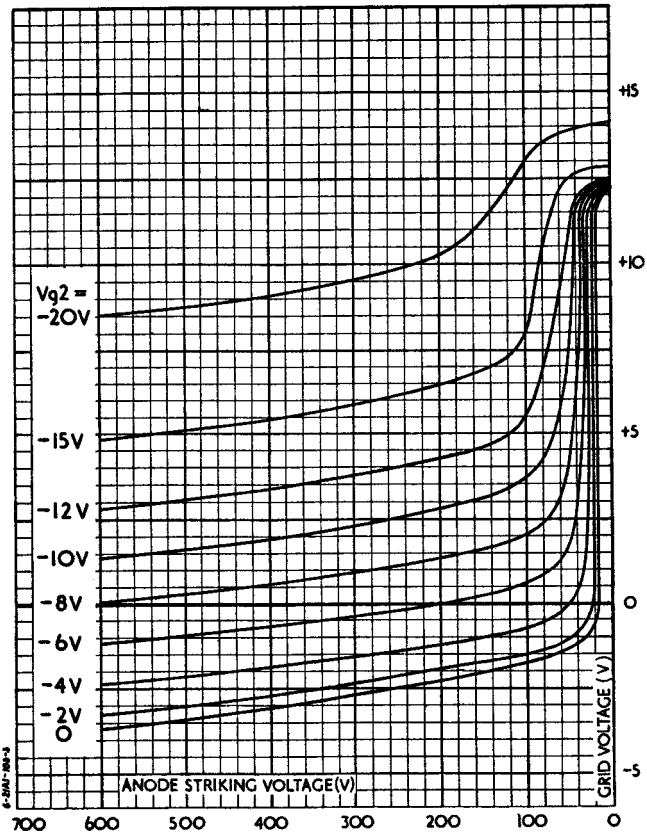
21A1

GAS FILLED TETRODE

Indirectly heated—for use as a Grid Controlled Rectifier

AVERAGE CHARACTERISTIC CURVES : $V_{a(ign)}/V_{g1}$

$R_{g1}=0\Omega$ $R_{g2}=0\Omega$



April 1960 Issue 1/7

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

21B12

INERT GAS FILLED THYRATRON

Directly heated

TENTATIVE

GENERAL

The 21B12 is an Inert Gas Filled Thyratron suitable for welding or motor control.
It has a directly heated oxide coated cathode.

RATING

Filament Voltage	V_f	2·5 V
Filament Current	I_f	9·0 A
Maximum Peak Forward Anode Voltage		1·0 kV
Maximum Peak Inverse Anode Voltage		1·25kV
Maximum Mean Cathode Current	$I_{k(av)max}$	2·5 A
Maximum Peak Cathode Current	$i_{k(max)}$	30 A
Maximum Grid Voltage (before Conduction)	$V_{g(max)}$	300 V
Maximum Grid Voltage (after Conduction)	$V_{g(max)}$	10 V
Control Ratio		200 : 1
Maximum Striking Voltage for Conduction		70 V
Voltage Drop		12 V
Ambient Temperature Range		—55° to +75° C

DIMENSIONS

Maximum Overall Length	158 mm
Maximum Diameter	40 mm

MOUNTING POSITION—Unrestricted.

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

21B12

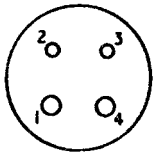
INERT GAS FILLED THYRATRON

Directly heated

TENTATIVE

CAP—CT3.

BASE—UX4 (E.I.A. No. A4—10).



Viewed from free end of pins

CONNECTIONS

Pin 1	Filament	f
Pin 2	Filament Centre Tap	fct
Pin 3	Grid	g
Pin 4	Filament	f
Cap	Anode	a

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
21N12
MERCURY VAPOUR THYRATRON
Indirectly heated
TENTATIVE

GENERAL

The 21N12 is a convection cooled Mercury Vapour Thyratron. It has an indirectly heated oxide coated cathode and it is intended for use in power supplies and welding equipment, etc.

RATING—Absolute Values

Heater Voltage	V_h	5·0±5%	V
Heater Current (nominal)	I_h	5·0	A†
Maxiumum Peak Forward Anode Voltage		10	kV
Maximum Peak Inverse Anode Voltage	P.I.V.(max)	10	kV
Maximum Anode Voltage Drop		18	V
Maximum Mean Cathode Current (max averaging 15 secs)	$I_{k(av)max}$	3	A
Maximum Peak Cathode Current	$i_{k(pk)max}$	25	A
Maximum Surge Cathode Current (0·1 sec)		250	A
Maximum Grid Resistance	$R_{g(max)}$	100	kΩ
Maximum Supply Frequency		150	c/s
Condensed Mercury Temperature Limits	T_{Hg}	35 to 70	°C

† The heater must be switched on for a minimum of three minutes before the anode voltage is applied.

DIMENSIONS

Maximum Overall Length	248	mm
Maximum Diameter	59	mm
Maximum Seated Height	240	mm

December, 1960 Advance Data

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

2IN12

EDISWAN

2IN12

MERCURY VAPOUR THYRATRON

Indirectly heated

TENTATIVE

MOUNTING POSITION—Vertical, base down.

CHARACTERISTICS

Critical Grid Current (at V_a=6kV)		<10	μA
Control Ratio (nominal)		100 : 1	
Ionization Time (approx)	t_i	10	μs
De-ionization Time (approx)	t_d	1,000	μs

TOP CAP—CT3

BASE—B4F

CONNECTIONS

Pin 1	Grid	g
Pin 2	Heater	h
Pin 3	No Connection	NC
Pin 4	Heater, Cathode	h, k
Cap	Anode	a

December, 1960 Advance Data

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

2IN15

MERCURY VAPOUR THYRATRON

Indirectly heated

GENERAL

The 21N15 is a Mercury Vapour Thyratron suitable for welding and motor control. It has an indirectly heated oxide coated cathode.

RATING

Heater Voltage	V_h	5·0	V
Heater Current	I_h	5·0	A
Maximum Peak Forward Anode Voltage		1·5	kV
Maximum Peak Inverse Anode Voltage	P.I.V.(max)	1·25	kV
Maximum Negative Grid Voltage (before Conduction)		500	V
Maximum Negative Grid Voltage (during Conduction)		10	V
Maximum Mean Cathode Current (maximum averaging 15 seconds)	$I_{k(av)max}$	3·0	A
Maximum Peak Cathode Current (25c/s and above)	$i_{k(pk)max}$	20	A
Maximum Surge Cathode Current (Fault protection maximum duration 0·1 seconds)		200	A
Maximum Critical Grid Current (at $V_a = 1·0kV$)		<10	μA
Maximum Power Supply Frequency		150	c/s
Condensed Mercury Temperature Limits	T_{Hg}	40 to 75	°C
Control Ratio		150:1	
De-ionisation Time (approx)		1,000	μs
Ionisation Time (approx)		10	μs
Anode Voltage Drop		16	V
Maximum Grid Resistance	$R_{g(max)}$	100	kΩ
Recommended Minimum Grid Resistance	$R_{g(min)}$	10	kΩ

May, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

2IN15

EDISWAN

2IN15

MERCURY VAPOUR THYRATRON

Indirectly heated

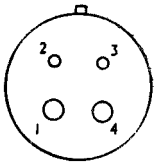
DIMENSIONS

Maximum Overall Length	199 mm
Maximum Diameter	57 mm
Maximum Seated Height	184 mm

MOUNTING POSITION—Vertical, Base down

CAP—CT3

BASE—UX4 (E.I.A. No. A4-10)



Viewed from free end of pins.

CONNECTIONS

Pin 1	Heater	h
Pin 2	Heater, Cathode	h, k
Pin 3	Grid	g
Pin 4	Heater, Cathode	h, k
Cap	Anode	a

May, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

22M1

GLOW MODULATOR

GENERAL

The 22M1 is a Glow Modulator with a cold cathode. It is intended for use as a modulated light source in facsimile equipment.

RATING

Maximum Striking Voltage		225	V
Maximum Peak Current	$i_{pk(max)}$	75	mA
Maximum Mean Current	$I_{av(max)}$	35	mA
Maximum Voltage Drop at 30mA		150	V

DIMENSIONS

Maximum Overall Length	78	mm
Maximum Diameter (base)	34	mm
Maximum Seated Height	64	mm

MOUNTING POSITION—Unrestricted

CHARACTERISTICS

Approximate light output at 30mA	0·13 cd
Luminance	60 cd/sq. in.
Average diameter of light area on screen normal to valve axis and 20mm from end of bulb	25 mm
Diameter of light source (approx.)	1·3 mm

April, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

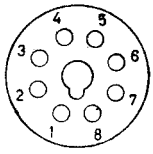
22MI

EDISWAN

22MI

GLOW MODULATOR

BASE—International Octal (102)



Viewed from free end of pins.

CONNECTIONS

Pin 1	No Pin	NP
Pin 2	No Pin	NP
Pin 3	Cathode	k
Pin 4	No Pin	NP
Pin 5	No Pin	NP
Pin 6	No Pin	NP
Pin 7	Anode	a
Pin 8	No Pin	NP

April, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

MAZDA

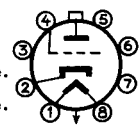
23MA4

23MA4

CATHOSCOPE

Cathode à chauffage indirect	
Tension filament (CA ou CC)	6,3 Volts
Intensité filament	0,6 Amp.
Concentration: Magnétique.	
Déflexion: Magnétique.	
Nature de l'écran: produit n°4, à fluorescence blanche, pour reproduction des images de Télévision.	
Encombrement	R.46-0C.1
Hauteur totale	385 mm
Diamètre écran	230 mm
Culot	N° CL 221
Brochage	4.0-BA
Capacités inter-électrodes:	
Wehnelt, par rapport aux autres électrodes	8 pF max.
Cathode, par rapport aux autres électrodes	8 pF max.
Demi-angle d'ouverture du faisceau 30 à 31 degrés	

Broches:
N° 1- Filament.
N° 2- Cathode.
N° 3- Non connectée.
N° 4- Wehnelt.
N° 5- Non connectée.



Broches:
N° 6- Non connectée.
N° 7- Non connectée.
N° 8- Filament.
L'anode d'accélération est reliée à la corne du ballon.

Broches du culot, face à l'observateur.

Conditions normales d'utilisation

Tension maximum d'anode	7.000 Volts max.
Tension normale d'anode	5.000 Volts
Tension de Wehnelt pour extinction de l'image	-28 à -62 Volts
Tension de crête du Wehnelt pour une modulation complète du tube (1)	26 Volts approx.
Tension entre filament et cathode	± 100 Volts max.
Dimensions de l'image normale	145 x 195 mm
Bobine de concentration	400 Amp./Tours
Résolution maximum	550 Lignes

Utilisation

Le cathoscope MAZDA 23 MA4, à concentration et déflexion magnétiques, est pourvu d'un écran donnant des images de télévision en blanc et noir.

Il est recommandé d'utiliser le tube avec une tension d'anode d'au moins 5.000 volts. La tension choisie dépend largement de la brillance d'image désirée et de la puissance de balayage disponible.

La puissance de balayage nécessaire est directement proportionnelle à la tension d'anode du tube. En tous cas, pour obtenir une couleur d'écran agréable à l'oeil, il est recommandé de ne pas adopter une tension d'anode inférieure à 4.500 volts.

(Suite au verso)

REPRODUCTION INTERDITE

23MA4

MAZDA

23MA4

CATHOSCOPE

Une résistance de protection d'environ 25.000 ohms doit être placée entre l'anode du tube et l'alimentation H.T.

Les éléments du récepteur de télévision, particulièrement les transformateurs, doivent être blindés ou convenablement placés afin que les champs de fuite soient sans influence sur le faisceau électronique.

La position de la bobine de concentration dépend de la dimension du spot désirée. Cette dimension est choisie de telle sorte que les lignes de l'image ne puissent pas être discernées à la distance normale de vue de l'écran. Pour une distance égale à environ six fois la hauteur de l'image et pour une tension d'anode de 5.000 volts, l'écartement entre le diaphragme du Wehnelt et le milieu de l'entrefer de la bobine doit être de l'ordre de 40 mm. Ceci s'applique à des bobines de concentration ayant des entrefers de l'ordre de 6 mm. Dans ces conditions, 400 Ampères-tours environ sont nécessaires pour la concentration.

Le fait de déplacer la bobine de concentration vers le diaphragme du Wehnelt accroît la dimension du spot et le nombre d'ampères-tours requis et, inversement, le fait de l'éloigner réduit la dimension du spot et le nombre d'ampères-tours.

Les bobines de déflexion doivent être montées aussi près que possible de l'épaulement du col.

Nota.-

1. La tension élevée qui est appliquée au tube 23 MA4 est très dangereuse. De grandes précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension; par exemple, des disjoncteurs doivent couper le circuit primaire de l'alimentation H.T. et la décharge du condensateur doit être assurée automatiquement dès l'ouverture du panneau de protection de l'appareil.

2. Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous chocs ou contraintes brusques, car l'"implosion" du tube peut provoquer des accidents graves. Dans les appareils de télévision ou autres montages utilisant le 23 MA4, une glace de protection épaisse doit être placée en permanence devant l'écran du tube.

---

(1) La modulation complète correspond à un courant de faisceau nul pour les noirs de l'image et à un courant de 150 µA pour les blancs.

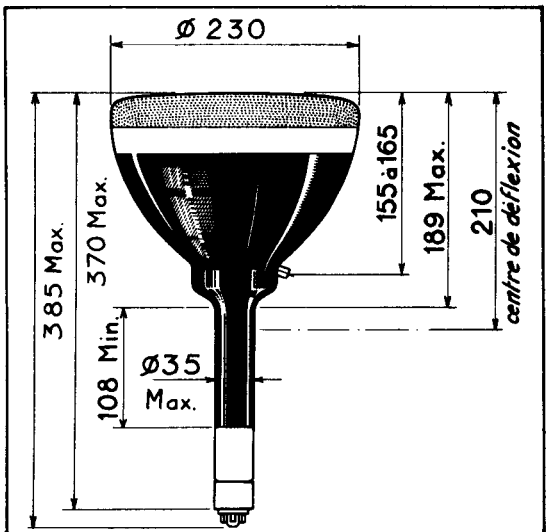
REPRODUCTION INTERDITE

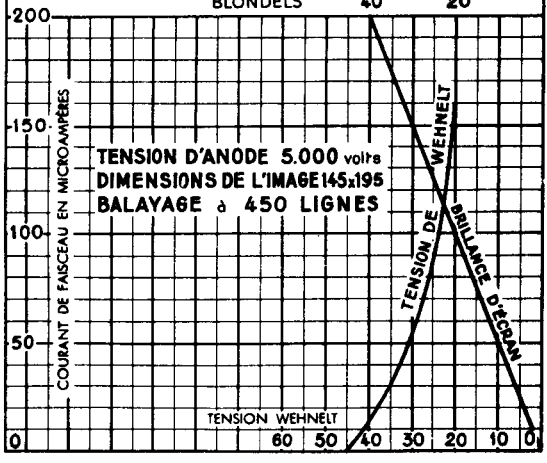
MAZDA

23MA4

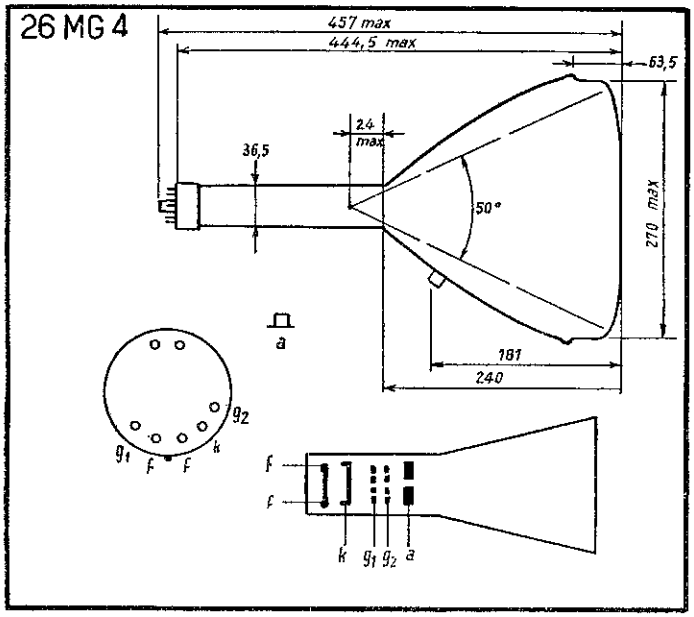
23MA4

CATHOSCOPE
DIMENSIONS ET COURBE
CARACTÉRISTIQUE





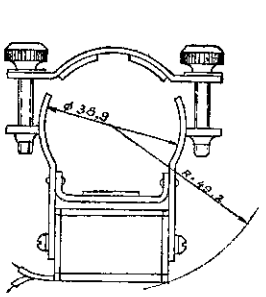
REPRODUCTION INTERDITE

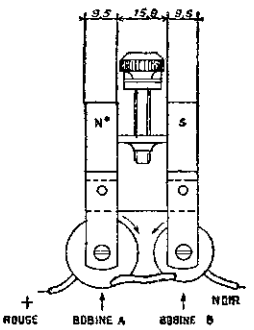


MAZDA

26 MG 4

TUBE ÉLECTROMAGNÉTIQUE DE 26 cm MUNI D'UN PIÈGE A IONS, POUR TÉLÉVISION





Piège à ions normalisé du type électromagnétique.

CULOT	CHAUFFAGE
Duodécal 7 broches	6,3 V 0,6 A

CAPACITES

Grille 1	6,5 pF
Cathode	5 pF
Anode à revêtement ext.	500 à 2 500 pF

CARACTERISTIQUES D'UTILISATION

Tension d'anode	9 kV
Tension de grille 2	250 V
Tension de grille 1 correspondant à l'extinction de l'image	—27 à —63 V
Dimensions de l'image	152 × 203 mm

CARACTERISTIQUES LIMITES

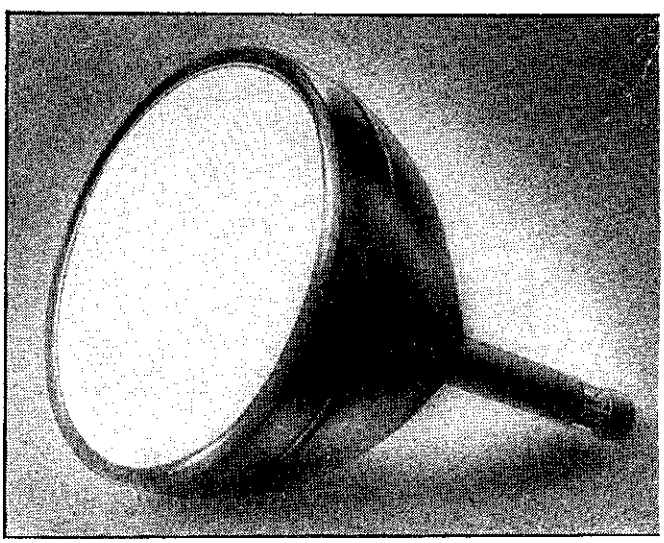
Tension minimum d'anode	8 kV
Tension maximum d'anode	10 kV
Tension maximum de grille 2	410 V
Tension de grille :	
Tension positive de crête	+2 V
Polarisation	0 à —125 V
Tension maximum filament-cathode	125 V
Au moment de la mise sous tension, pour moins de 15 secondes et si le filament est négatif par rapport à la cathode	410 V
Résistance maximum dans la grille 1	1,5 MΩ

PIEGE A IONS ELECTROMAGNETIQUE

Bobine A : 2 000 tours ; 33 Ω environ ;
Bobine B : 306 tours ; 3,1 Ω environ ;
Courant maximum ..... 200 mA

★ Le courant circulant dans le sens indiqué, la pièce polaire N doit attirer le pôle sud d'une boussole.

Les tubes Mazda de 26 et 31 cm sont livrés avec un piège à ions à aimant permanent.



MAZDA

27MI

NINE STAGE PHOTO-ELECTRIC MULTIPLIER

27MI

RATING

Maximum Supply Voltage Secondary Cathode K.10 to Cathode K.1 (D.C. or Peak A.C.) (Volts)	950
Maximum Potential Anode/Secondary Cathode K.10 (Volts)	150
Maximum Anode Current (mA)	1.0
Cathode kl sensitivity (μA/lumen)	† 20 ←

(Vk1 = 0, all secondary cathodes joined at 100 volts)

† The sensitivity is on the basis of a lamp colour temperature of 2700°K and a light area of 5mm. x 20mm.

Note: It is recommended that the bleeder current in the potentiometer providing the secondary cathode voltages should be of the order of 10 times the maximum working current output of the tube.

GENERAL

The 27.M.1 is a high vacuum photo-cell with high response in the visible region. The photo electric current produced at the Cathode is multiplied many times by secondary emission occuring at successive cathodes within the valve.

It is capable of multiplying very small currents produced under weak illumination by an average value of one million times, when operated at 100 volts per stage.

The resultant output current is a linear function of the exciting illumination, under normal operating conditions. Since secondary emission occurs simultaneously, the frequency response is flat up to the frequencies at which transit time becomes a limiting factor.

Because of its great sensitivity, low noise level low dark current and freedom from distortion the 27.M.1 may be used for light operated relays, for film scanning, fascimile transmission and in scientific research involving low light levels; and in many applications its small size is an advantage.

It should be appreciated that with photo-electric multipliers, large variations in overall sensitivity may be present between individual valves.

27MI

MAZDA

27MI

NINE STAGE PHOTO-ELECTRIC MULTIPLIER

TYPICAL OPERATION

Voltage between anode and secondary cathode k10 (volts)	50
Voltage difference per stage (volts)	100
Anode dark current (max)(μA)	¶ 0.25
Luminous sensitivity (amps/lumen)	‡ 20 ←
Current amplification	§‡ 10^6

‡ The sensitivity is on the basis of a lamp colour temperature of 2700°K and a light area of 5mm x 20mm. ←

§ Ratio of anode sensitivity/cathode sensitivity.

¶ With 100 volts between anode and secondary cathode k10.

INTER-ELECTRODE CAPACITANCES.

Anode to all other electrodes (μμF)	6.7
Anode to cathode k10 (μμf)	4.1

DIMENSIONS.

Maximum Overall Length (mm)	94.0
Maximum Bulb diameter (mm)	28.5
Maximum Base diameter (mm)	33.4
Light centre from seat (mm)	49.2 ± 2.4
Cathode Length (mm)	24
Cathode Width (mm)	8

BASING. - Special 11 pin Sub Magnal

CONNECTIONS.

Pin 1	Cathode 2
Pin 2	Cathode 3
Pin 3	Cathode 4
Pin 4	Cathode 5
Pin 5	Cathode 6
Pin 6	Cathode 7
Pin 7	Cathode 8
Pin 8	Cathode 9
Pin 9	Cathode 10
Pin 10	Anode
Pin 11	Cathode 1

↑ Direction of light.

Viewed from free end of pins.

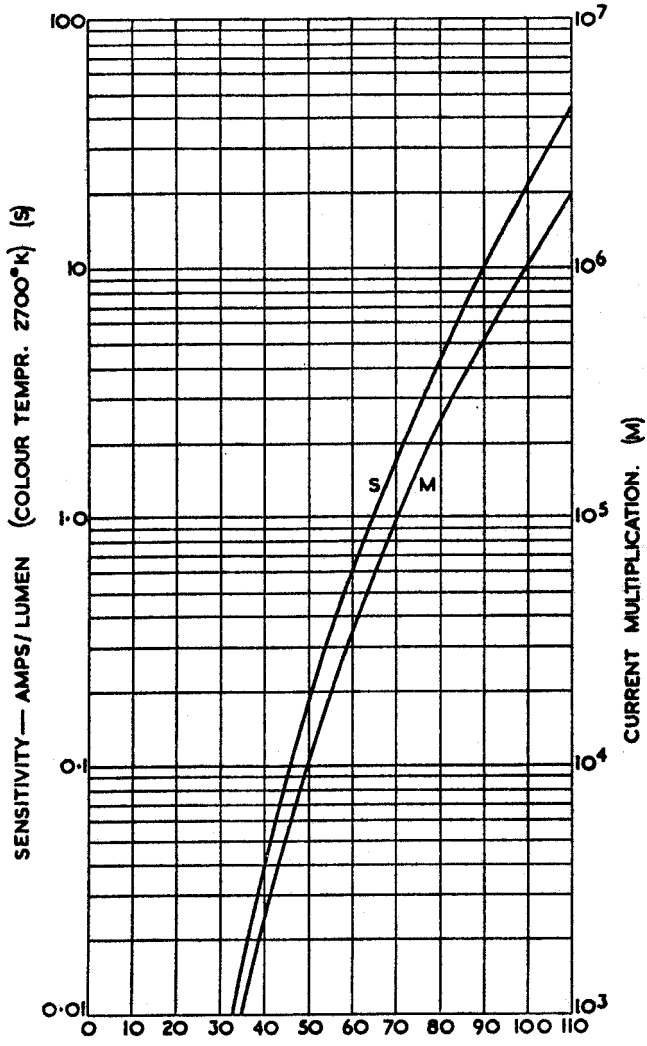
Note: Pin 1 is taken as the first pin to the left of the keyway. Similarly pin 11 which is connected to the photo emitting cathode k1 is taken as the first pin to the right of the keyway.

Indicates a change ←

EDISWAN

27M1

NINE STAGE PHOTO-ELECTRIC MULTIPLIER
AVERAGE CHARACTERISTIC CURVES (D.C. Operation)



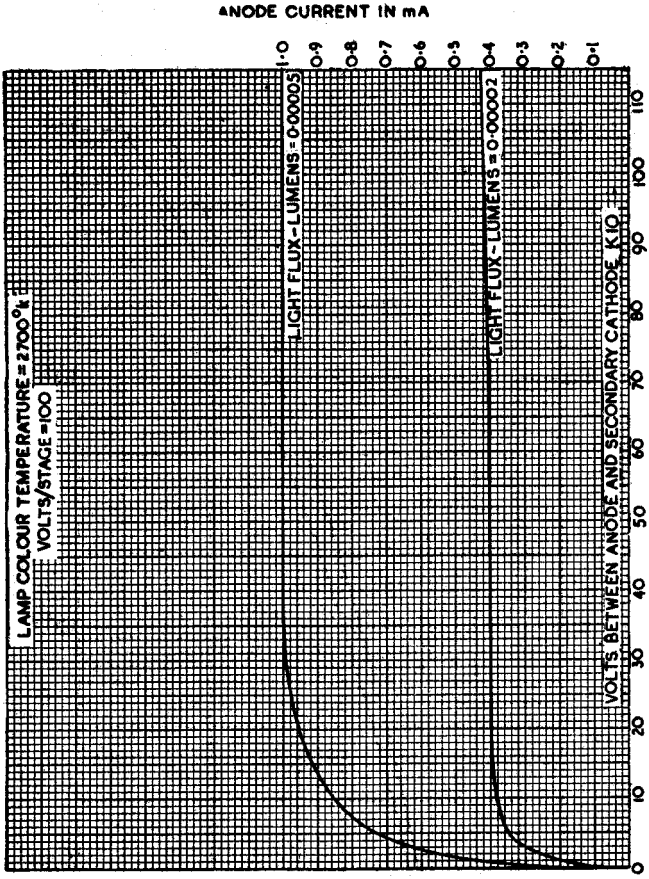
27M1

EDISWAN

27M1

NINE STAGE PHOTO-ELECTRIC MULTIPLIER

AVERAGE CHARACTERISTIC CURVES



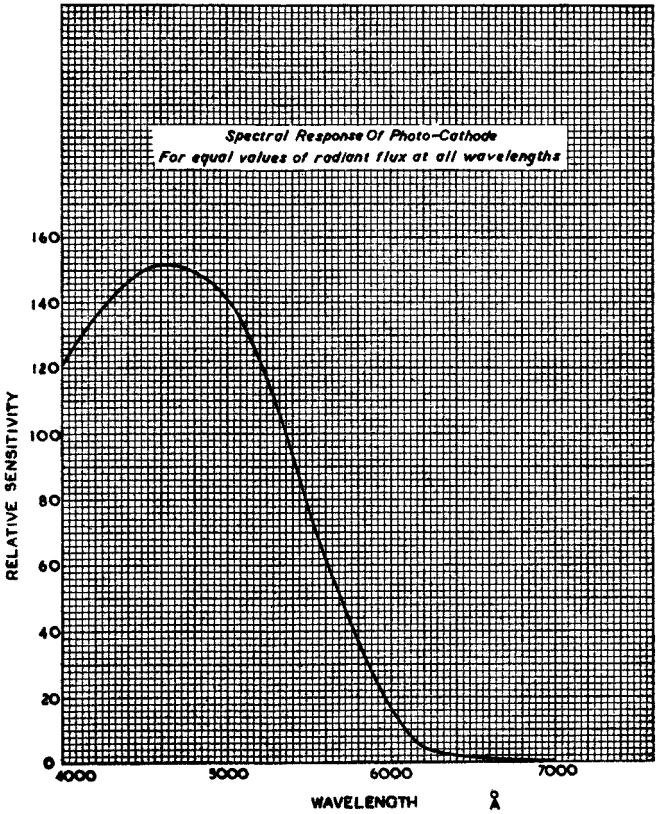
EDISWAN

27MI

NINE STAGE PHOTO-ELECTRIC MULTIPLIER

27MI

AVERAGE CHARACTERISTIC CURVES



March 1956 VALVE & CRT DIVISION Issue 2/6

SIEMENS EDISON SWAN LIMITED

MAZDA

29C1

29C1

HIGH VACUUM CONTROL DIODE

Directly heated tungsten filament—for use as the controlling element in stabiliser circuits

RATING

Approximate Filament Voltage (volts)	V_f	4.0
Approximate Filament Current (amps)	I_f	0.8
Maximum Anode Current (mA)	$I_{a(max)}$	3.0
Maximum Anode Voltage (volts)	$V_{a(max)}$	100

DIMENSIONS

Maximum Overall Length (mm)	80
Maximum Diameter (mm)	32
Maximum Seated Height (mm)	67
Approximate Nett Weight (ozs)	1¼
Approximate Packed Weight (ozs)	2¼

MOUNTING POSITION - Unrestricted.

December 1948 *VALVE & CRT DIVISION* Issue 1/6

THE EDISON SWAN ELECTRIC COMPANY LTD.

29C1

MAZDA

29C1

HIGH VACUUM CONTROL DIODE

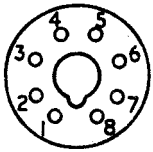
Directly heated tungsten filament—for use as the controlling element in stabiliser circuits

TYPICAL OPERATION

Saturated Anode Current (mA)	I_a	2.0
Minimum Anode Voltage (volts)	$V_{a(min)}$	20
Approximate Filament voltage (volts)	V_f	4.0
Approximate Filament current (amps)	I_f	0.8

BULB Clear

BASE International Octal (IO8)



Viewed from free end of pins.

CONNEXIONS

Pins 1, 2, 4	Filament	f
Pin 3	Blank	-
Pin 5	Anode	a
Pins 6, 7, 8	Filament	f

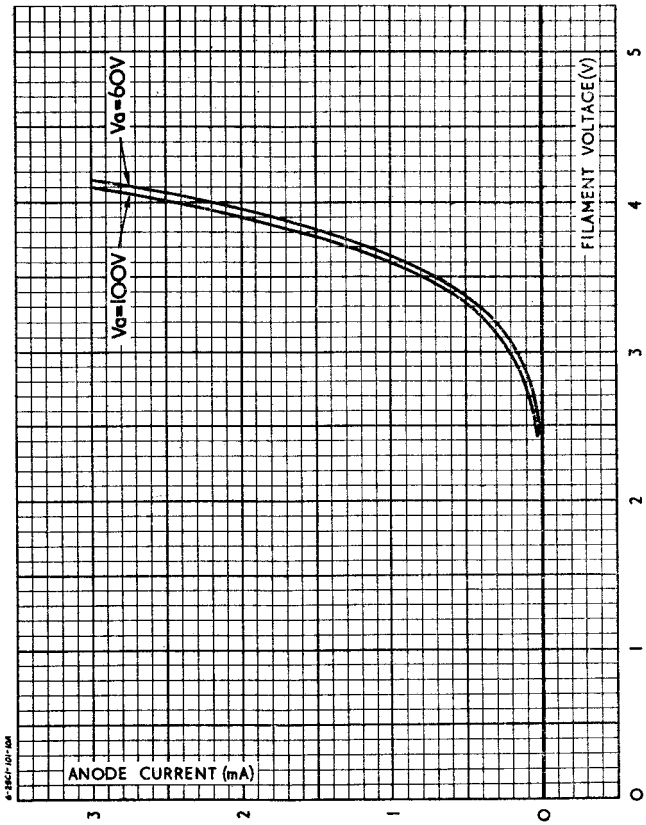
EDISWAN

29C1

HIGH VACUUM CONTROL DIODE

Directly heated tungsten filament—for use as the controlling element in stabiliser circuits

AVERAGE CHARACTERISTIC CURVES: I_a/V_f



September 1959 INDUSTRIAL VALVE & CRT DIVISION Issue 1/7

SIEMENS EDISON SWAN LIMITED

29C1

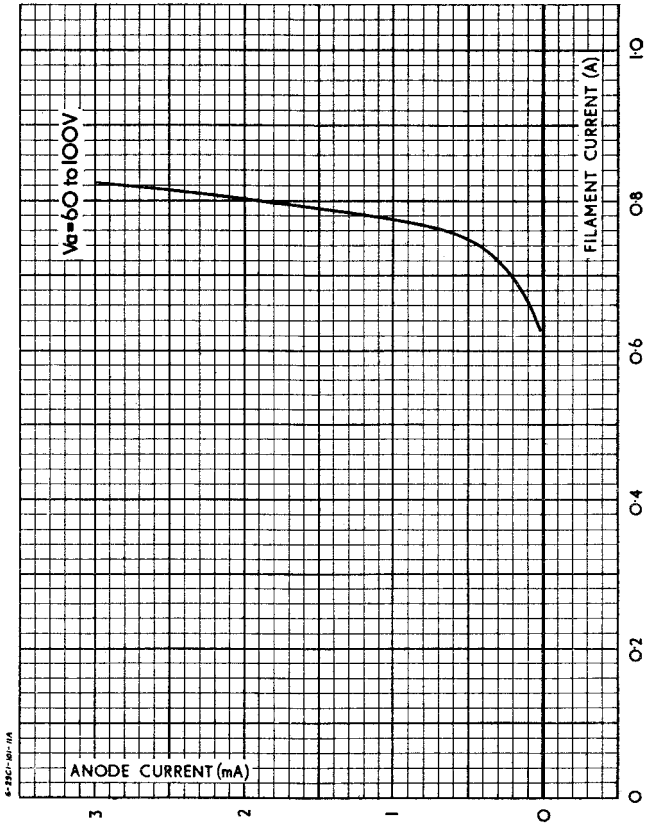
EDISWAN

29C1

HIGH VACUUM CONTROL DIODE

Directly heated tungsten filament—for use as the controlling element in stabiliser circuits

AVERAGE CHARACTERISTIC CURVES: I_a/I_f



INDUSTRIAL
September 1959 *VALVE & CRT DIVISION* Issue 1/7
SIEMENS EDISON SWAN LIMITED

29.D.2

MAZDA

29.D.2

IONISATION GAUGE

Directly heated filament

RATING

Filament Voltage (volts)	V_f	6.0
Filament Current (amps)	I_f	1.3
Collector Voltage (volts negative) ‡		-25
Internal Wire Electrode Voltage §		185
Internal Wire Electrode Current (mA)		1.0
Collector Current μA/micron pressure		20

‡ It is advisable to include a 100,000 ohm fixed resistance in series with this electrode.

§ It is advisable to include a 500 ohm fixed resistance in series with this electrode.

WEIGHT

Approximate Nett Weight (ozs)	3½
Approximate Packed Weight (ozs)	14½

MOUNTING POSITION Unrestricted.

MAZDA

29.D.2

IONISATION GAUGE

Directly heated filament

TYPICAL OPERATION

De-gas electrodes before use, using normal High Vacuum Technique.

Collector is of nickel. It can be bombarded up to approximately 40w at 150 mA max.

Internal wire electrode is of molybdenum and can be bombarded at 20-25w with 60-100 mA.

Glass is C9 (Boro Silicate Type) and can be baked to 450°C.

BULB Clear

BASE Wire ends and stem.

EDISWAN
MAZDA

30B1

CATHODE RAY TUBE—ALL ELECTROSTATIC 3½" Dia.

Indirectly heated high grade precision measurement cathode ray tube with a polished flat face.

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.72
Maximum 1st Anode Voltage (volts)	$V_{a1(max)}$	2,500
Maximum 2nd Anode Voltage (volts)	$V_{a2(max)}$	1,000
Maximum 3rd Anode Voltage (volts)	$V_{a3(max)}$	6,000
Average Sensitivity of "X" Plates (mm/V)		• 360/V
Average Sensitivity of "Y" Plates (mm/V)		• 800/V

Where "V" denotes the voltage on the 3rd Anode and bulb coating.

INTER-ELECTRODE CAPACITANCES

X1 Deflecting Plate/All other electrodes (μμF)	$C_{x1,all}$	15.0
X2 Deflecting Plate/All other electrodes (μμF)	$C_{x2,all}$	15.0
Y1 Deflecting Plate/All other electrodes (μμF)	$C_{y1,all}$	14.5
Y2 Deflecting Plate/All other electrodes (μμF)	$C_{y2,all}$	14.5
X1 Deflecting Plate/Y1 Deflecting Plate (μμF)	$C_{x1,y1}$	1.5
X1 Deflecting Plate/Y2 Deflecting Plate (μμF)	$C_{x1,y2}$	1.0
X2 Deflecting Plate/Y1 Deflecting Plate (μμF)	$C_{x2,y1}$	1.0
X2 Deflecting Plate/Y2 Deflecting Plate (μμF)	$C_{x2,y2}$	1.25
Control Grid (Wehnelt)/All other electrodes (μμF)	$C_{g,all}$	9.5

DIMENSIONS

Maximum Overall Length (mm)	340
Maximum Diameter (mm)	90
Nominal Screen Diameter (inches)	3½
Approximate Nett Weight (ozs)	21
Approximate Packed Weight (lbs)	10¼

NOTES

For general measurement work the 30.B.1/P1 is recommended. This has a screen with a medium persistence green phosphor. For special applications, however, the tube may be supplied with any of the standard phosphors described on the Introductory Page to this Section.

Final Anode and Bulb coating are brought out separately in order to enable a finer spot or a higher writing speed to be obtained by increasing the Final Anode voltage above the limit set for the 1st Anode Voltage.

In use the 3rd Anode and bulb coating are normally joined.

30B1

EDISWAN
MAZDA

30B1

CATHODE RAY TUBE—ALL ELECTROSTATIC 3½" Dia.

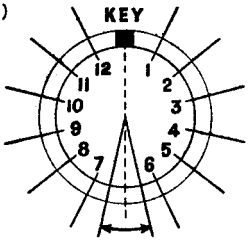
Indirectly heated high grade precision measurement cathode ray tube with a polished flat face.

TYPICAL OPERATION

3rd Anode Voltage (volts)	V_{a3}	2,000	5,000
2nd Anode Voltage - approximate, for focus (volts)	V_{a2}	440	800
1st Anode Voltage (volts)	V_{a1}	2,000	2,000
Average Bias on Control Grid for Cut-off of Beam Current (volts)	V_g	-60	-60
Average Working Bias for 20μA Beam (volts)		-33	-33
Approximate Sensitivity of "X" Plates (mm/V)		0.20	0.08
Approximate Sensitivity of "Y" Plates (mm/V)		0.30	0.12

BASE 12 Contact Key Base (BS.448)

VIEW OF FREE END



PERMISSIBLE ANGULAR VARIATION OF MOUNTS ± 10°

CONNEXIONS

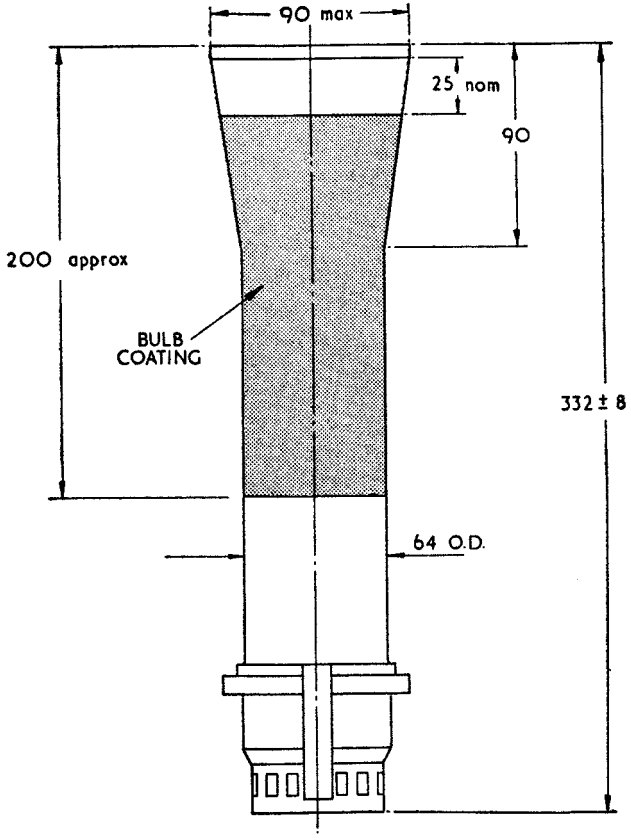
Pin 1	Control Grid	g
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode 1	a1
Pin 6	Anode 2	a2
Pin 7	Internal Coating	m
Pin 8	Deflecting Plate Y2	y2
Pin 9	Deflecting Plate X2	x2
Pin 10	Anode 3	a3
Pin 11	Deflecting Plate X1	x1
Pin 12	Deflecting Plate Y1	y1

EDISWAN

30B1

CATHODE RAY TUBE—ALL ELECTROSTATIC 3½" Dia.

Indirectly heated high grade precision measurement cathode ray tube with a polished flat face



All dimensions in mm.

August 1958 | INDUSTRIAL VALVE & CRT DIVISION | Issue 1/8

SIEMENS EDISON SWAN LIMITED

MAZDA

30C3

CATHODE RAY TUBE—ALL ELECTROSTATIC 5½" Dia.

Indirectly heated high grade precision measurement cathode ray tube with a polished flat face.

RATING

Heater Voltage (Volts)	V_h	4.0
Heater Current (amps)	I_h	0.72
Maximum 1st Anode Voltage (volts)	$V_{a1(max)}$	2,500
Maximum 2nd Anode Voltage (volts)	$V_{a2(max)}$	1,000
Maximum 3rd Anode Voltage (volts)	$V_{a3(max)}$	6,000
Average Sensitivity of "X" Plates(mm/V)	+	600/V
Average Sensitivity of "Y" Plates (mm/V)	+	1,100/V

+ Where "V" denotes the voltage on the 3rd Anode and Bulb Boating

INTER-ELECTRODE CAPACITANCES

X1 Deflecting Plate/all other electrodes (μμF)	$C_{x1,all}$	6.0
X2 Deflecting Plate/all other electrodes (μμF)	$C_{x2,all}$	6.0
Y1 Deflecting Plate/all other electrodes (μμF)	$C_{y1,all}$	8.6
Y2 Deflecting Plate/all other electrodes (μμF)	$C_{y2,all}$	8.6
X1 Deflecting Plate/Y1 Deflecting Plate (μμF)	$C_{x1,y1}$	0.25
X1 Deflecting Plate/Y2 Deflecting Plate (μμF)	$C_{x1,y2}$	0.25
X2 Deflecting Plate/Y1 Deflecting Plate (μμF)	$C_{x2,y1}$	0.25
X2 Deflecting Plate/Y2 Deflecting Plate (μμF)	$C_{x2,y2}$	0.25
Control Grid (Wehnelt)/all other electrodes (μμF)	$C_{g,all}$	8.2
X1 Deflecting Plate/X2 Deflecting Plate (μμF)	$C_{x1,x2}$	2.5
Y1 Deflecting Plate/Y2 Deflecting Plate (μμF)	$C_{y1,y2}$	3.2

DIMENSIONS

Maximum Overall Length (mm)	430
Maximum Diamater (mm)	142 ←
Nominal Screen Diameter (inches)	5½
Approximate Nett Weight (ozs)	30
Approximate Packed Weight (lbs)	11½

NOTES

The connections to the deflector plates are brought out to side contacts on the neck of the tube in order to reduce the inductance and capacitance of the leads, and the coupling between the X and Y plates. It is intended, particularly, for H.F. and pulse measurements.

For general measurement work the 30.C.3/P1 is recommended. This has a screen with a medium persistence green phosphor. For special applications, however, the tube may be supplied with any of the standard phosphors described on the Introductory Page to this section.

Final Anode and Bulb coating are brought out separately in order to enable a finer spot or a higher writing speed to be obtained by increasing the Final Anode voltage above the limit set for the 1st Anode Voltage.

In use the 3rd Anode and Bulb coating are normally joined.

All maximum ratings are absolute values not design centres.

← *Indicates a change*

30C3

MAZDA

30C3

CATHODE RAY TUBE—ALL ELECTROSTATIC 5½" Dia.

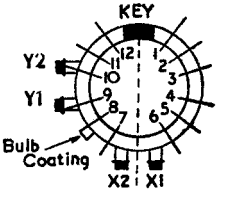
Indirectly heated high grade precision measurement cathode ray tube with a polished flat face.

TYPICAL OPERATION

3rd Anode Voltage (volts)	V_{a3}	2,000	6,000
2nd Anode Voltage - approximate for focus (volts)	V_{a2}	440	960
1st Anode Voltage (volts)	V_{a1}	2,000	2,000
Average Bias on Control Grid for Cut-off of Beam Current (volts)	V_g	-60	-60
Average Working Bias for 20μA Beam (volts)		-33	-33
Approximate Sensitivity of "X" Plates (mm/V)		0.30	0.1
Approximate Sensitivity of "Y" Plates (mm/V)		0.57	0.19

BASE 12 Contact Key Base BS.448.

Permissible angular variation of mounts ±10°



CONNECTIONS

Pin 1	Control Grid	g
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode 1	a1
Pin 6	Anode 2	a2
Pin 7	-	-
Pin 8	-	-
Pin 9	-	-
Pin 10	Anode 3	a3
Pin 11	-	-
Pin 12	-	-

← *Indicates a change*

EDISWAN

30C4

5½" MAGNETIC CATHODE RAY TUBE
for Film Scanning

GENERAL

The 30C4 is a magnetically focussed and deflected cathode ray tube for Film Scanning. The tube is aluminised, has a polished flat face, and is available with either a T3 or T5 short persistence screen.

RATING

Heater Voltage (volts)	V_h	2.0
Heater Current (amps)	I_h	1.3 ←
Maximum Anode Voltage (volts)	$V_{a(max)}$	10,000

All maximum ratings are Absolute values not Design Centres.

INTER-ELECTRODE CAPACITANCES (pF)*

Grid 1/All other electrodes	$C_{g\text{-all}}$	5.0
Cathode/All other electrodes	$C_{k\text{-all}}$	5.0

* These capacitances include a Benjamin Type Wafer Octal Holder.

SCANNING ANGLE—40°

DIMENSIONS

Maximum Overall length	(mm)	373
Maximum Overall Diameter	(mm)	142 ←
Maximum Neck Diameter	(mm)	35
Approximate Nett Weight	(lbs)	1½
Approximate Packed Weight	(lbs)	15

Indicates a change ←

April 1960
Issue 2/8

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

30C4

EDISWAN

30C4

$5\frac{1}{2}$" MAGNETIC CATHODE RAY TUBE for Film Scanning

TYPICAL OPERATION

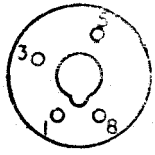
Anode Voltage	(volts)	V_a	9000
Grid Voltage for cut-off of raster	(volts)	$-V_{g1}$	45-98
Average Peak to Peak Modulating voltage for modulation up to 150μA	(volts)		30
Maximum Peak to Peak modulating voltage for Limit Tube	(volts)		35

FOCUS

At an Anode voltage of 10kV, a focussing field equivalent to 900 Ampere-Turns is required, the centre of the air gap of the coil being sited 33mm in front of the grid plane.

ANODE CAP—Cavity (CT8)

BASE—Mazda Octal (BO4)



Viewed from free end of pins.

April 1960 Issue 2/8

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

30C4

5½″ MAGNETIC CATHODE RAY TUBE
for Film Scanning

CONNECTIONS

Pin 1	Heater	h
Pin 2	No Pin	NP
Pin 3	Cathode	k
Pin 4	No Pin	NP
Pin 5	Control Grid	g
Pin 6	No Pin	NP
Pin 7	No Pin	NP
Pin 8	Heater	h
Cap	Anode	a

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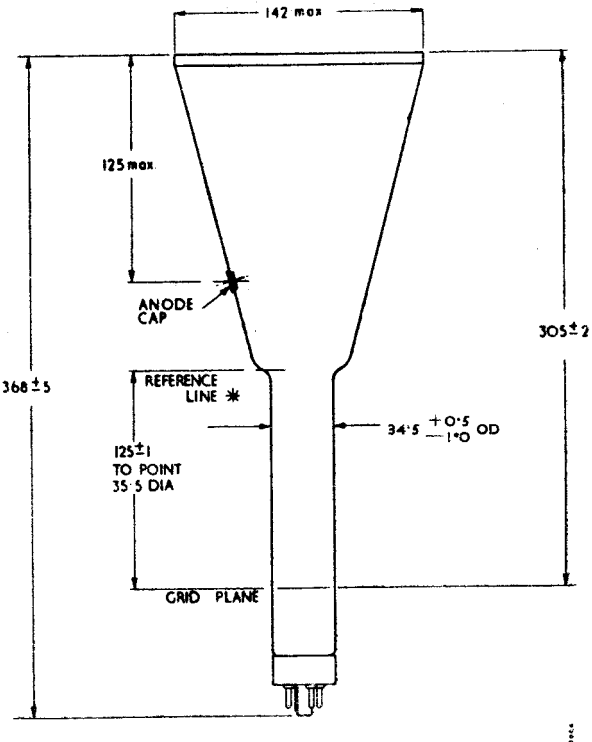
ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

30C4

EDISWAN

30C4

5½" MAGNETIC CATHODE RAY TUBE
for Film Scanning



All Dimensions in mm.

*Determined by Reference Line Gauge No. 6. (See Section 3.)

April 1960 Issue 2/8

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

MAZDA

30C8

CATHODE RAY TUBE–ALL ELECTROSTATIC 7" Dia.

Indirectly heated–for Radio D.F. Compass

RATING

Heater Voltage (volts)	Vh	4.0
Heater Current (amps)	Ih	0.72
Maximum 1st Anode Voltage (volts)	Va1(max)	500
Maximum 2nd Anode Voltage (volts)	Va2(max)	1,000
Maximum 3rd Anode Voltage (volts)	Va3(max)	4,000
Average Sensitivity of "X" Plates (mm/V)		†520/V
Average Sensitivity of "Y" Plates (mm/V)		†520/V

† Where "V" denotes the voltage on the 3rd Anode.

INTER-ELECTRODE CAPACITANCES

XE Deflecting Plate/All other electrodes (μμF)	Cxe,all	14.6
XW Deflecting Plate/All other electrodes (μμF)	Cxw,all	14.0
YN Deflecting Plate/All other electrodes (μμF)	Cyn,all	14.9
YS Deflecting Plate/All other electrodes (μμF)	Cys,all	13.8
XE Deflecting Plate/XW Deflecting Plate (μμF)	Cxe,xw	4.5
YN Deflecting Plate/YS Deflecting Plate (μμF)	Cyn,ys	4.4
XE+XW Deflecting Plates/YN+YS Deflecting Plates (μμF)	C(xe+xw) -(yn+ys)	2.7
Control Grid (Wehnelt)/All other electrodes (μμF)	Cg,all	8.6

DIMENSIONS

Maximum Overall Length (mm)	495
Maximum Diameter (mm)	175
Nominal Screen Diameter (inches)	7
Approximate Nett Weight (lbs)	2¼
Approximate Packed Weight (lbs)	11¼

NOTES

This is a Cathode Ray Tube with a compass scale affixed externally to the face of the screen. It is a precision contructed and calibrated instrument which provides bearings with an error not exceeding 1% at any point on the scale while the four cardinal bearings, N, S, E, W, are accurate to ±0.25°. ←

Normally the tube is supplied with a green phosphor (P1) having medium persistence characteristics. Other phosphors (see Introductory Page 1. to this section) and scale arrangements can be supplied by special arrangement.

The gun system is capable of providing the high beam currents required for "Pulse D.F."

All maximum ratings are absolute values not design centres. ←

Indicates a change ←

MAZDA

30.C.9

CATHODE RAY TUBE - ALL ELECTROSTATIC 7" Dia.

Indirectly heated—for measurements

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.72
Maximum 1st Anode Voltage (volts)	$V_{a1(max)}$	500
Maximum 2nd Anode Voltage (volts)	$V_{a2(max)}$	1,000
Maximum 3rd Anode Voltage (volts)	$V_{a3(max)}$	4,000
Average Sensitivity of "X" plates (mm/V)		*520/V
Average Sensitivity of "Y" plates (mm/V)		*520/V

* Where "V" denotes the voltage on the 3rd Anode.

All Maximum Ratings are Absolute values not Design Centres.

INTER-ELECTRODE CAPACITANCES

X1 Deflecting Plate/all other electrodes (μμF)	$C_{x1,all}$	14.6
X2 Deflecting Plate/all other electrodes (μμF)	$C_{x2,all}$	14.0
Y1 Deflecting Plate/all other electrodes (μμF)	$C_{y1,all}$	14.9
Y2 Deflecting Plate/all other electrodes (μμF)	$C_{y2,all}$	13.8
X1 Deflecting Plate/X2 Deflecting Plate (μμF)	$C_{x1,x2}$	4.5
Y1 Deflecting Plate/Y2 Deflecting Plate (μμF)	$C_{y1,y2}$	4.4
X1+X2 Deflecting Plates/Y1+Y2 Deflecting Plates (μμF)	$C_{(X1+X2)(Y1+Y2)}$	2.7
Control Grid (Wehnelt)/All other electrodes (μμF)	$C_{g,all}$	8.6

DIMENSIONS

Maximum Overall Length (mm)	495
Maximum Diameter (mm)	175
Nominal Screen Diameter (inches)	7
Approximate Nett Weight (lbs)	2¼
Approximate Packed Weight (lbs)	11¾

NOTES

The 30.C.9 is a precision contructed instrument for applications where the accuracy of the gun contruction employed in compass tubes is required without the provision of scales.

The gun system is capable of providing the high beam currents when pulse modulation of the grid is required.

For general measurement work the 30.C.9/P1 is recommended. This has a screen with a medium persistence green phosphor. For special applications, however, the tube may be supplied with any of the standard phosphors described on the introductory page in this section.

30.C.9

MAZDA

30.C.9

CATHODE RAY TUBE - ALL ELECTROSTATIC. 7" Dia
Indirectly heated—for measurements

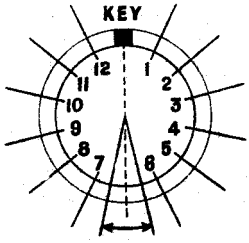
TYPICAL OPERATION

3rd Anode Voltage (volts)	V_{a3}	2,200
2nd Anode Voltage-approximate for focus (volts) *	V_{a2}	440
1st Anode Voltage (volts)	V_{a1}	450
Negative Bias on Control Grid for cut-off of Beam Current (volts)	V_g	30-90

* The voltage required on the 2nd Anode for focus decreases with an increase of beam current and the above figure gives the voltage required at low current.

BASE 12 contact Key Base
(BS.448)

VIEW OF FREE END



PERMISSIBLE ANGULAR VARIATION OF MOUNTS ± 10°

CONNECTIONS

Pin 1	Control Grid	g
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode 1	a1
Pin 6	Anode 2	a2
Pin 7	-	-
Pin 8	Deflecting Plate Y2	Y2
Pin 9	Deflecting Plate Y1	Y1
Pin 10	Anode 3	a3
Pin 11	Deflecting Plate X1	X1
Pin 12	Deflecting Plate X2	X2

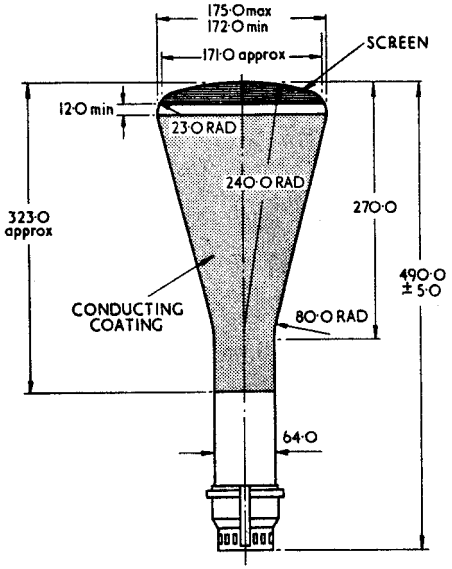
THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

30C9

CATHODE RAY TUBE–ALL ELECTROSTATIC 7" Dia.

Indirectly heated—for measurements



All dimensions in mm.

June 1959 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/8

SIEMENS EDISON SWAN LIMITED

MAZDA

30C12

CATHODE RAY TUBE—ALL ELECTROSTATIC

Indirectly heated—for Radio D.F. Compass

GENERAL

The 30C12 is a precision constructed instrument which provides bearings with an error not exceeding ± 1° at any point. No degree scale is attached but a centre cross and mark are provided, in line with the axis of the Y Plates, accurate to ± 0.25°. The tube is suitable for use in "Pulse D.F." systems and may be supplied with any of the standard phosphor screens described on the Introductory Page to this Section.

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.72
Maximum 1st Anode Voltage (volts)	$V_{a1(max)}$	500
Maximum 2nd Anode Voltage (volts)	$V_{a2(max)}$	1,000
Maximum 3rd Anode Voltage (volts)	$V_{a3(max)}$	4,000
Average sensitivity of X Plates (mm/V)		520/V*
Average sensitivity of Y Plates (mm/V)		520/V*

* V denotes the voltage on the 3rd Anode.

30C12

MAZDA

30C12

CATHODE RAY TUBE—ALL ELECTROSTATIC

Indirectly heated—for Radio D.F. Compass

INTER-ELECTRODE CAPACITANCES (pF)

X_1 Deflecting Plate/X_2 Deflecting Plate	$C_{x1,x2}$	4.5
X_1 Deflecting Plate/All other Electrodes	$C_{x1,all}$	14.0
X_2 Deflecting Plate/All other Electrodes	$C_{x2,all}$	14.6
Y_1 Deflecting Plate/Y_2 Deflecting Plate	$C_{y1,y2}$	4.4
Y_2 Deflecting Plate/All other Electrodes	$C_{y2,all}$	13.8
Y_1 Deflecting Plate/All other Electrodes	$C_{y1,all}$	14.9
X_1, X_2 Deflecting Plates/Y_1, Y_2 Deflecting Plates	$C_{x1,x2/y1,y2}$	2.7
Grid/All other Electrodes	$C_{g/all}$	8.6

DIMENSIONS

Maximum Overall Length (mm)	495
Maximum Bulb Diameter (mm)	175
Maximum Neck Diameter (mm)	65
Approximate Nett Weight (lbs)	$2\frac{1}{4}$
Approximate Packed Weight (lbs)	$16\frac{1}{4}$

TYPICAL OPERATION

3rd Anode Voltage (volts)	2,200
2nd Anode Voltage (volts)	440$
1st Anode Voltage (volts)	450
Negative bias on Control Grid for cut-off of Beam Current (volts)	30–90

$ 2nd Anode Voltage for focus decreases with increase of beam current and the above figure is the voltage required at low currents.

October, 1957 *Industrial* *VALVE & CRT DIVISION* Issue 1/3

SIEMENS EDISON SWAN LIMITED

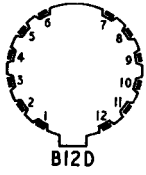
MAZDA

30C12

CATHODE RAY TUBE—ALL ELECTROSTATIC

Indirectly heated—for Radio D.F. Compass

BASE—B12D



B12D

Viewed from free end of Pins

Permissible angular variation of mount $\pm 10°$.

CONNECTIONS

Pin 1	Grid	g
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode 1	a1
Pin 6	Anode 2	a2
Pin 7	No Internal Connection	NC
Pin 8	Deflecting Plate Y_2	Y_2
Pin 9	Deflecting Plate Y_1	Y_1
Pin 10	Anode 3	a3
Pin 11	Deflecting Plate X_2	X_2
Pin 12	Deflecting Plate X_1	X_1

October, 1957 *Industrial* *VALVE & CRT DIVISION* Issue 1/3

SIEMENS EDISON SWAN LIMITED

MAZDA

30C13

TRIODE PENTODE V.H.F. CHANGER

Indirectly heated—for series operation

TENTATIVE

GENERAL

The 30C13 is a miniature based indirectly heated Triode Pentode Frequency Changer. The base connections are arranged for maximum suitability in Printed Circuit applications, and give the pentode cathode lead a minimum of inductance. It is intended for use in V.H.F. Printed Circuits in AC or DC powered Television Receivers having series connected heater chains.

RATING

			Triode	Pentode
Heater Current	(amps)	I_h	0.3	
Heater Voltage	(volts)	V_h	9.0	
Maximum Anode Voltage	(volts)	$V_{a(max)}$	250	250
Maximum Screen Voltage	(volts)	$V_{g2(max)}$		175
Maximum Cathode Current	(mA)	$I_{k(max)}$	14	14
Maximum Anode Dissipation	(watts)	$P_{a(max)}$	1.5	1.7
Maximum Screen Dissipation	(watts)	$P_{g2(max)}$		0.5
Mutual Conductance	(mA/V)	g_m	5.0*	6.2†
Amplification Factor		μ	20	
Maximum Heater/Cathode Voltage	(volts)	$V_{h,k(max)}$	200	

* Measured at $V_a = 100$ V. $I_a = 14$ mA.

† Measured at $V_a = 170$ V. $V_{g2} = 170$ V. $I_a = 10$ mA.

INTER-ELECTRODE CAPACITANCES (pF)

		§	†
Grid 1/All	$c_{g1\text{-}all}$	6.3	7.4
Anode Pentode/All	$c_{ap\text{-}all}$	5.2	6.35
Grid 1/Anode Pentode	$c_{g1\text{-}ap}$	0.016	0.019
Grid Triode/All	$c_{gt\text{-}all}$	3.5	4.3
Anode Triode/All	$c_{at\text{-}all}$	3.3	4.1
Grid Triode/Anode Triode	$c_{gt\text{-}at}$	1.7	2.0
Grid Triode/Anode Pentode	$c_{gt\text{-}ap}$	0.004	0.006
Grid 1/Anode Triode	$c_{g1\text{-}at}$	0.009	0.016
Anode Pentode/Anode Triode	$c_{ap\text{-}at}$	0.019	0.026
Grid 1/Grid 2	$c_{g1\text{-}g2}$	2.25	2.25
Grid 1/Grid Triode	$c_{g1\text{-}gt}$	0.027	0.059

§ Capacities with holder capacity balanced out but with a cylindrical screening can.

† Total capacity including a B9A Nylon Phenolic Printed Circuit holder with a cylindrical screen (Ediswan Clix VH9/1).

30C13

MAZDA

30C13

TRIODE PENTODE V.H.F. CHANGER

Indirectly heated—for series operation

TENTATIVE

DIMENSIONS

Maximum Overall Length	(mm)	56
Maximum Diameter	(mm)	22.2
Maximum Seated Height	(mm)	49

MOUNTING POSITION — Unrestricted

TYPICAL OPERATION — As Frequency Changer with Oscillator Volts applied to Grid 1.

Pentode				
Supply Voltage	(volts)	$V_{a(b)}$	200	200
Anode Voltage (Decoupling Resistance 4.7 kΩ)	(volts)	V_a	170	170
Screen Voltage (R_{g2} 27 kΩ)	(volts)	V_{g2}	145	150
Grid 1 Resistance for Grid Current Bias	(kΩ)	R_{g1}	33	100
Grid 1 Current	(μA)	I_{g1}	130	42
Conversion Conductance	(μA/V)	g_c	2000	2150
Heterodyne Volts Peak		$V_{het(pk)}$	5.0	4.5
Anode Current (approx)	(mA)	I_a	6.8	6.3
Screen Current (approx)	(mA)	I_{g2}	2.0	1.9
Triode				
Anode Voltage	(volts)	V_a	120	120
Anode Current (mean)	(mA)	I_a	6.0	6.0

MAZDA

30C13

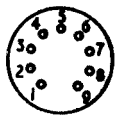
TRIODE PENTODE V.H.F. CHANGER

Indirectly heated—for series operation

TENTATIVE

BULB—Clear

BASE—NOVAL (B9A)



Viewed from Free End of Pins

VALVE HOLDER

Ediswan Clix : Printed Circuit Type : VH9/1
" " Standard Circuit Types : VH499/9 and VH599/9 series.

CONNECTIONS

Pin 1	Pentode Cathode and Pin 8	k_p and Pin 8
Pin 2	Pentode Grid 2	g_{2p}
Pin 3	Pentode Anode	a_p
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Triode Anode	a_t
Pin 7	Triode Grid	g_{1t}
Pin 8	Triode Cathode, Shield, Pentode Cathode and Grid 3	k_t, g_{3p}, s, k_p
Pin 9	Pentode Grid 1	g_{1p}

The basing has been specially arranged to minimise pentode cathode lead inductance effects.

EDISWAN
MAZDA
30C15

V.H.F. TRIODE PENTODE FREQUENCY CHANGER
Indirectly heated—for series operation

TENTATIVE

GENERAL

The 30C15 is an indirectly heated triode pentode frequency changer on a B9A base, the triode being identical to that in the 30C1. By careful selection of base connections and internal design to minimise pentode cathode lead inductance effects, the valve is made particularly suitable for printed circuits and can be used with advantage in wired circuits. It is intended for use in AC or DC powered V.H.F. Television Receivers having series connected heaters.

RATING

			Triode	Pentode
Heater Current	(amps)	I_h	0.3	
Heater Voltage	(volts)	V_h	9.0	
Maximum Anode Voltage	(volts)	$V_{a(max)}$	250	250
Maximum Screen Voltage	(volts)	$V_{g2(max)}$		175
Maximum Cathode Current	(mA)	$I_{k(max)}$	14	14
Maximum Anode Dissipation	(watts)	$P_{a(max)}$	1.5	1.7
Maximum Screen Dissipation	(watts)	$P_{g2(max)}$		0.5
Mutual Conductance	(mA/V)	g_m	5.0*	8.5†
Amplification Factor		μ	20	
Maximum Heater/Cathode Voltage	(volts r.m.s.)	$V_{h\text{-}k(max)}$	200	

* Measured at $V_a = 100$ V. $I_a = 14$ mA.
† Measured at $V_a = 170$ V. $V_{g2} = 170$ V. $I_a = 10$ mA.

INTER-ELECTRODE CAPACITANCES (pF)

		§	†
Grid 1/All	$c_{g1\text{-}all}$	6.7	7.6
Anode Pentode/All	$c_{ap\text{-}all}$	5.0	6.0
Grid 1/Anode Pentode	$c_{g1\text{-}ap}$	0.014	0.017
Grid Triode/Earth	$c_{gt\text{-}E}$	3.2	4.0
Anode Triode/Earth	$c_{at\text{-}E}$	3.2	4.0
Grid Triode/Anode Triode	$c_{gt\text{-}at}$	1.6	1.8

§ Capacities with holder capacity balanced out but with a cylindrical screening can.
† Total capacity including a B9A Ceramic holder with a cylindrical screen (Plessey CP 180024/3).

"Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

30C15

EDISWAN

MAZDA

30C15

V.H.F. TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

TENTATIVE

DIMENSIONS

Maximum Overall Length	(mm)	56
Maximum Diameter	(mm)	22.2
Maximum Seated Height	(mm)	49
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

MOUNTING POSITION — Unrestricted

TYPICAL OPERATION — As Frequency Changer with Oscillator Volts applied to Grid 1.

Pentode

Supply Voltage	(volts)	$V_{a(b)}$	200
Anode Voltage (Decoupling Resistance 4.7 kΩ)	(volts)	V_a	164
Screen Voltage (R_{g2} = 27 kΩ)	(volts)	V_{g2}	138
Grid 1 Resistance for Grid Current Bias	(kΩ)	R_{g1}	100
Grid 1 Current	(μA)	I_{g1}	31
Conversion Conductance	(μA/V)	g_c	3450
Heterodyne Volts Peak		$V_{het(pk)}$	3.7
Anode Current (approx)	(mA)	I_a	7.7
Screen Current (approx)	(mA)	I_{g2}	2.3

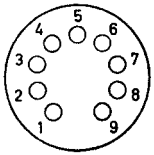
Triode

Anode Voltage	(volts)	V_a	120
Anode Current (mean)	(mA)	I_a	6.0

EDISWAN
MAZDA
30C15
V.H.F. TRIODE PENTODE FREQUENCY CHANGER
Indirectly heated—for series operation
TENTATIVE

BULB—Clear

BASE—Noval (B9A)



Viewed from Free End of Pins

CONNECTIONS

Pin 1	Pentode Cathode and Pin 8	k_p and Pin 8
Pin 2	Pentode Grid 2	g_{2p}
Pin 3	Pentode Anode	a_p
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Triode Anode	a_t
Pin 7	Triode Grid	g_{1t}
Pin 8	Triode Cathode, Shield, Pentode Cathode and Grid 3	k_t, g_{3p}, s, k_p
Pin 9	Pentode Grid 1	g_{1p}

The basing has been specially arranged to minimise pentode cathode lead inductance effects.

EDISWAN
MAZDA

30C17

V.H.F. TRIODE PENTODE FREQUENCY CHANGER
Indirectly heated—for series operation

TENTATIVE

GENERAL

The 30C17 is an indirectly heated, Triode Pentode Frequency Changer of Frame Grid construction. It is intended for use in television tuners, in which the gain of the frequency changer is controlled from the A.G.C. line. The pentode section has a variable-μ-characteristic. As the basing of the 30C17 is identical to that of 30C15, it can be used in place of the 30C15 in existing tuners, in which case the gain increase on Bands I and III will be 3.5 to 4.0 dB.

RATING		Triode	Pentode	
Heater Current	I_h	0·3		A
Heater Voltage	V_h	7·4		V
Maximum Anode Voltage	$V_{a(max)}$	250	250	V
Maximum Screen Voltage	$V_{g2(max)}$	·	230	V
Maximum Cathode Current	$I_{k(max)}$	18	18	mA
Maximum Heater/ Cathode Voltage	$V_{h\text{-}k(rms)max}$	·	200	V
Mutual Conductance	g_m	8·5*	·	mA/V
Amplification Factor	μ	20	·	
Maximum Anode Dissipation	$P_{a(max)}$	2	1·7	W
Maximum Screen Dissipation	$P_{g2(max)}$	·	0·5	W

*Measured at V_a=100V. I_a=15mA.

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

30C17

EDISWAN

MAZDA

30C17

V.H.F. TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

TENTATIVE

INTER-ELECTRODE CAPACITANCES (pF)†

Grid 1/All other electrodes	$c_{g1\text{-}all}$	6·6
Anode Pentode/All other electrodes	$c_{ap\text{-}all}$	3·1
Grid1/Anode Pentode	$c_{g1\text{-}ap}$	0·008
Anode Triode/Earth	$c_{at\text{-}E}$	2·6
Grid Triode/Earth	$c_{gt\text{-}E}$	3·5
Anode Pentode/Grid Triode	$c_{ap\text{-}gt}$	0·002
Grid Triode/Anode Triode	$c_{gt\text{-}at}$	1·8
Anode Pentode/Anode Triode	$c_{ap\text{-}at}$	0·01
Grid 1/Grid Triode	$c_{g1\text{-}gt}$	0·01
Grid 1/Anode Triode	$c_{g1\text{-}at}$	0·005

† With fully shielded socket, and can.

DIMENSIONS

Maximum Overall Length	56 mm
Maximum Diameter	22·2mm
Maximum Seated Height	49 mm

MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION—Frequency Changer at 200 Mc/s, Oscillator Voltage applied to Grid 1.

Pentode

Supply Voltage	$V_{a(b)}$	200 V
Anode Voltage (Decoupling Resistance, $R_a = 4{\cdot}7k\Omega$)	V_a	170 V
Screen Voltage ($R_{g2} = 22K\Omega$)	V_{g2}	155 V
Cathode Bias Resistance	R_k	100 Ω
Grid 1 Resistance	R_{g1}	4·7MΩ
Grid 1 Current	I_{g1}	0·6mA
Anode Current (approx)	I_a	6·4 μA
Screen Current (approx)	I_{g2}	2·0mA
Grid Voltage for Conversion Conductance Reduction 10 : 1	V_{g1}	−6·7 V

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
MAZDA

30C17

V.H.F. TRIODE PENTODE FREQUENCY CHANGER
Indirectly heated—for series operation

TENTATIVE

Triode

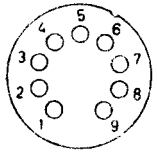
Anode Voltage	V_a	100 V
Anode Current	I_a	5·0mA

NOTES

Conversion Conductance at 1 Mc/s (V_b, R_a, R_{g1}, R_{g2} as above) = 4·9 mA/V. Shield completely surrounds pentode.

Basing arranged to minimise pentode cathode lead inductance effects.

BASE—Noval (B9A)



CONNECTIONS

Pin 1	Pentode Cathode and Pin 8	k_p, Pin 8
Pin 2	Screen Grid	g_2
Pin 3	Pentode Anode	a_p
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Triode Anode	a_t
Pin 7	Triode Control Grid	g_t
Pin 8	Triode Cathode, Suppressor Grid, Shield, Pentode Cathode	k_t, g_3, s, k_p
Pin 9	Pentode Control Grid	g_1

Associated Electrical Industries Limited
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
MAZDA
30D5
CATHODE RAY TUBE—LONG AFTERGLOW 9" Dia.
Indirectly heated—for Marine Radar

RATING

Heater Voltage (volts)	Vh	4.0
Heater Current (amps)	Ih	0.75
Maximum 1st Anode Voltage (volts)	Va1(max)	1,700
Maximum 2nd Anode Voltage (volts)	Va2(max)	1,700
Maximum 3rd Anode Voltage (volts)	Va3(max)	9,000

DIMENSIONS

Maximum Overall Length (mm)	462
Maximum Diameter (mm)	228
Nominal Screen Diameter (inches)	9

NOTES

The 30.D.5 is a 9" cathode ray tube, having a special long-afterglow screen, suitable for P.P.I display. A double layer type screen is employed which gives a blue flash with a yellow afterglow. The focussing is electrostatic and the deflection magnetic.

The 1st anode must always be at least 50 volts positive with respect to the 2nd anode.

All maximum ratings are Absolute values not Design Centres.

30D5

EDISWAN

MAZDA

30D5

CATHODE RAY TUBE—LONG AFTERGLOW 9″ Dia.

Indirectly heated—for Marine Radar

TYPICAL OPERATION

3rd Anode Voltage (volts)	Va3	8,000
2nd Anode Voltage-approximate for focus (volts)	Va2	1,300
1st Anode Voltage (volts)	Va1	1,350
Negative Bias on Control Grid for cut-off of Beam Current (volts)	Vg	-70

BASE. International Octal (I.O.8)

VIEWED FROM FREE END OF PINS

CONNECTIONS		
Pin 1	Blank	
Pin 2	Anode 1	a1
Pin 3	Anode 2	a2
Pin 4	Blank	-
Pin 5	Control Grid	g
Pin 6	Cathode	k
Pin 7	Heater	h
Pin 8	Heater	h
Top Cap	Anode 3	a 3

MAZDA

30.E.6

CATHODE RAY TUBE–ALL ELECTROSTATIC 12" Dia.

For measurement purposes

RATING

Heater Voltage (volts)	Vh	4.0
Heater Current (amps)	Ih	0.72
Maximum 1st Anode Voltage (volts)	Va1(max)	500
Maximum 2nd Anode Voltage (volts)	Va2(max)	1,200
Maximum 3rd Anode Voltage (volts)	Va3(max)	6,000
Average Sensitivity of "X" Plates (mm/V)		*900/V
Average Sensitivity of "Y" Plates (mm/V)		*900/V

* Where "V" denotes the voltage on the 3rd Anode.

DIMENSIONS

Maximum Overall Length (mm)	640
Maximum Diameter (mm)	312
Nominal Screen Diameter (inches)	12
Approximate Nett Weight (lbs)	7½
Approximate Packed Weight (lbs)	40

NOTES

For general measurement work the 30E6/P1 is recommended. This has a screen with a medium persistence green phosphor. For special applications, however, the tube may be supplied with any of the standard phosphors described in the Introductory page to this Section.

All Maximum Ratings are Absolute values not Design Centres.

30.E.6

MAZDA

30.E.6

CATHODE RAY TUBE–ALL ELECTROSTATIC 12" Dia.

For measurement purposes

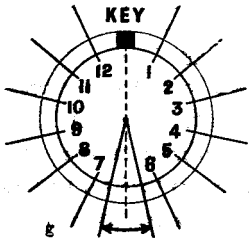
TYPICAL OPERATION

3rd Anode Voltage (volts)	Va3	5,000	6,000
*2nd Anode Voltage - approximate for focus (volts)	Va2	1,000	1,200
1st Anode Voltage (volts)	Va1	400	400
Negative Bias on Control Grid for Cut-off of beam Current (volts)	Vg	30-60	30-60

* The voltage required on the 2nd Anode for focus decreases with an increase of beam current and the above figure gives the voltage required at low currents.

BASE 12 Contact Key Base (BS448)

VIEW OF FREE END



PERMISSIBLE ANGULAR VARIATION OF MOUNTS ±10°

CONNECTIONS

Pin 1	Control Grid	g
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode 1	a1
Pin 6	Anode 2	a2
Pin 7	Internal Coating	m
Pin 8	Deflecting Plate Y2	y2
Pin 9	Deflecting Plate X2	x2
Pin 10	Anode 3	a3
Pin 11	Deflecting Plate X2	.x1
Pin 12	Deflecting Plate Y1	y1

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

30E8

CATHODE RAY TUBE - ALL ELECTROSTATIC 12" Dia.

Indirectly heated—for Radio D.F. Compass

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.72
Maximum 1st Anode Voltage (volts)	$V_{a1(max)}$	500
Maximum 2nd Anode Voltage (volts)	$V_{a2(max)}$	1,000
Maximum 3rd Anode Voltage (volts)	$V_{a3(max)}$	4,000
Average Sensitivity of "X" Plates (mm/V)		* 800/V
Average Sensitivity of "Y" Plates (mm/V)		* 800/V

* Where "V" denotes the voltage on the 3rd Anode.

All Maximum Ratings are Absolute values not Design Centres.

INTER-ELECTRODE CAPACITANCES.

X1 Deflecting Plate/all other electrodes (μμF)	$C_{x1,all}$	15.2
X2 Deflecting Plate/all other electrodes (μμF)	$C_{x2,all}$	15.6
Y1 Deflecting Plate/all other electrodes (μμF)	$C_{y1,all}$	14.9
Y2 Deflecting Plate/all other electrodes (μμF)	$C_{y2,all}$	15.6
X1 Deflecting Plate/X2 Deflecting Plate (μμF)	$C_{x1,x2}$	5.1
Y1 Deflecting Plate/Y2 Deflecting Plate (μμF)	$C_{y1,y2}$	4.8
X1+X2 Deflecting Plates/Y1+Y2 Deflecting Plates (μμF)	$C_{(X1+X2),-(Y1+Y2)}$	2.9
Control Grid (Wehnelt)/all other electrodes (μμF)	$C_{g,all}$	9.8

DIMENSIONS

Maximum Overall Length (mm)	640
Maximum Diameter (mm)	312
Nominal Screen Diameter (inches)	12
Approximate Nett Weight (lbs)	7½
Approximate Packed Weight (lbs)	53

NOTES

This is a Cathode Ray Tube with a compass scale affixed to the screen. It is a precision contructed and calibrated instrument which provides bearings with an error not exceeding $\pm 1^{\circ}$ at any point on the scale, while the four major bearings N.S.E.W. are accurate to $\pm 0.25^{\circ}$. The scale is graduated to correct for octantal error.

The 30.E.8 is identical to the 30.E.7 except that the N.S.E.W. markings are omitted.

The tube is normally supplied with a green (P1) phosphor having medium persistence characteristics. Other phosphors (see introductory page to this section) and scale arrangements can be supplied by special arrangement.

30E8

MAZDA

30E8

CATHODE RAY TUBE - ALL ELECTROSTATIC 12″ Dia.

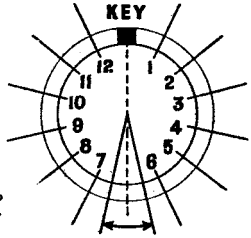
Indirectly heated—for Radio D.F. Compass

TYPICAL OPERATION

3rd Anode Voltage (volts)	V_{a3}	2,200
2nd Anode Voltage - approximate for focus (volts) *	V_{a2}	450
1st Anode Voltage (volts)	V_{a1}	450
Negative Bias on Control Grid for cut-off of Beam Current (volts)	V_g	30-90

* The voltage required on the 2nd Anode for focus decreases with an increase of beam current and the above figures give the voltage required at low current.

BASE 12 contact Key Base (BS. 448)



VIEW OF FREE END

PERMISSIBLE ANGULAR VARIATION OF MOUNTS ± 10°

CONNECTIONS

Pin 1	Control Grid	g
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode 1	a1
Pin 6	Anode 2	a2
Pin 7	-	-
Pin 8	Deflecting Plate Y2	Y2
Pin 9	Deflecting Plate Y1	Y1
Pin 10	Anode 3	a3
Pin 11	Deflecting Plate X1	X1
Pin 12	Deflecting Plate X2	X2

EDISWAN
MAZDA

30E10

CATHODE RAY TUBE—ALL ELECTROSTATIC 12" Dia.

Indirectly heated—
for measurement purposes or Radio D.F. Compass

NOTES

The 30E10 is a precision contructed instrument which provides bearings with an error not exceeding $\pm 1^0$ at any point.

The tube is normally supplied with a green phosphor (P1) having medium persistence characteristics. For special applications, however, the tube may be supplied with any of the standard phosphors described on the Introductory page to this Section.

RATING

Heater Voltage (volts)	Vh	4.0
Heater Current (amps)	Ih	0.72
Maximum 1st Anode Voltage (volts)	Va1(max)	500
Maximum 2nd Anode Voltage (volts)	Va2(max)	1,000
Maximum 3rd Anode Voltage (volts)	Va3(max)	4,000
Average Sensitivity of "X" Plates (mm/V)		* 800/V
Average Sensitivity of "Y" Plates (mm/V)		* 800/V

* There "V" denotes the voltage on the 3rd Anode.

INTER-ELECTRODE CAPACITANCES.

X1 Deflecting Plate/All other electrodes (μμF)	Cx1,all	15.2
X2 Deflecting Plate/All other electrodes (μμF)	Cx2,all	15.6
Y1 Deflecting Plate/All other electrodes (μμF)	Cy1,all	14.9
Y2 Deflecting Plate/All other electrodes (μμF)	Cy2,all	15.6
X1 Deflecting Plate/X2 Deflecting Plate (μμF)	Cx1,x2	5.1
Y1 Deflecting Plate/Y2 Deflecting Plate (μμF)	Cy1,y2	4.8
X1, X2 Deflecting Plates/Y1,Y2, Deflecting Plates (μμF)	C(x1+x2) -(y1+y2)	2.9
Control Grid (Wehnelt)/All other electrodes (μμF)	cg,all	9.8

DIMENSIONS

Maximum Overall Length (mm)	640
Maximum Diameter (mm)	312
Nominal Screen Diameter (inches)	12
Approximate Nett Weight (lbs)	7½
Approximate Packed Weight (lbs)	40

30E10

EDISWAN
MAZDA

30E10

CATHODE RAY TUBE—ALL ELECTROSTATIC 12" Dia. Indirectly heated— for measurement purposes or Radio D.F. Compass

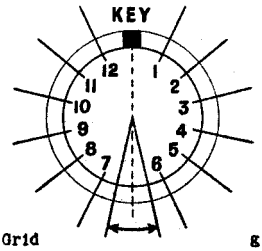
TYPICAL OPERATION

3rd Anode Voltage (volts)	Va3	2,200
2nd Anode Voltage - approximate for focus (volts) ‡	Va2	450
1st Anode Voltage (volts)	Va1	450
Negative Bias on control grid for cut-off of Beam Current (volts)	Vg	30-90

‡ The voltage required on the 2nd Anode for focus decreases with an increase of beam current and the above figure gives the voltage required at low currents.

BASE 12 Contact Key Base (BS.448)

VIEW OF FREE END



PERMISSIBLE ANGULAR VARIATION OF MOUNTS ±10°

CONNECTIONS

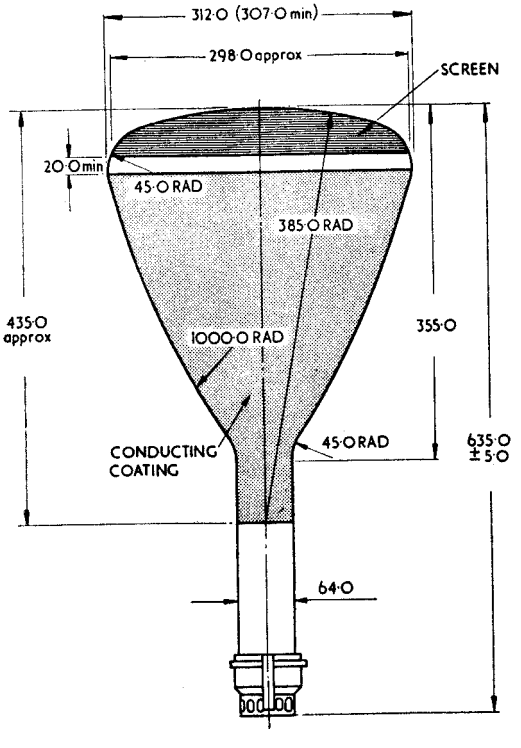
Pin 1	Control Grid	g
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode 1	a1
Pin 6	Anode 2	a2
Pin 7	Blank	-
Pin 8	Deflecting Plate Y2	y2
Pin 9	Deflecting Plate Y1	y1
Pin 10	Anode 3	a3
Pin 11	Deflecting Plate X1	x1
Pin 12	Deflecting Plate X2	x2

EDISWAN

30E10

CATHODE RAY TUBE–ALL ELECTROSTATIC 12″ Dia.

Indirectly heated–
for measurement purposes or Radio D.F. Compass



All dimensions in mm.

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SIEMENS EDISON SWAN LIMITED

EDISWAN

30E11

30E11

CATHODE RAY TUBE—LONG AFTERGLOW
12 inch Diameter
Indirectly heated—for Marine Radar

GENERAL

The 30E11 is a 12" aluminised cathode ray tube, having a special long-afterglow screen, suitable for P.P.I. display. A double layer type screen is employed which gives a blue flash with a yellow afterglow. The focusing is electrostatic and the deflection magnetic.

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.75
Maximum 1st Anode Voltage (volts)	$V_{a1(max)}$	1,700
Maximum 2nd Anode Voltage (volts)	$V_{a2(max)}$	1,700
Maximum 3rd Anode Voltage (volts)	$V_{a3(max)}$	*10,000

* The maximum rating of 10kV is a design centre rating. The absolute maximum of 12,000 volts must not be exceeded.

NOTE. The 1st Anode must always be at least 50 volts positive with respect to the second Anode.

DIMENSIONS

Maximum Overall Length (mm)	540
Maximum Bulb Diameter (mm)	312
Maximum Neck Diameter (mm)	35
Minimum Neck Diameter (mm)	33.5
Screen Face to 35.5 m/r dia. Swing Gauge (mm)	284 ± 3
Nominal Screen Diameter (ins.)	12
Approximate Nett Weight (lbs)	6
Approximate Packed Weight (lbs)	35

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SIEMENS EDISON SWAN LIMITED

30E11

EDISWAN

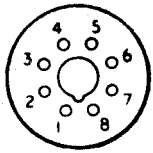
30E11

CATHODE RAY TUBE—LONG AFTERGLOW
12 inch Diameter
Indirectly heated—for Marine Radar

TYPICAL OPERATION

3rd Anode Voltage (volts)	10,000
2nd Anode Voltage (Focusing) volts (approx)	1,500
1st Anode Voltage (volts)	1,550
Average Negative Bias on Control Grid for cut-off of Beam Current (volts)	80

BASE—International Octal (108)



Viewed from free end of pins

CAP—CT2

VALVE HOLDER— Ediswan Clix VH 232/8, VH 238/8.

CONNECTIONS

Pin 1	No Internal Connection	NC
Pin 2	Anode 1	a_1
Pin 3	Anode 2	a_2
Pin 4	No internal connection	NC
Pin 5	Grid	g
Pin 6	Cathode	k
Pin 7	Heater	h
Pin 8	Heater	h
CAP	Anode 3	a_3

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SIEMENS EDISON SWAN LIMITED

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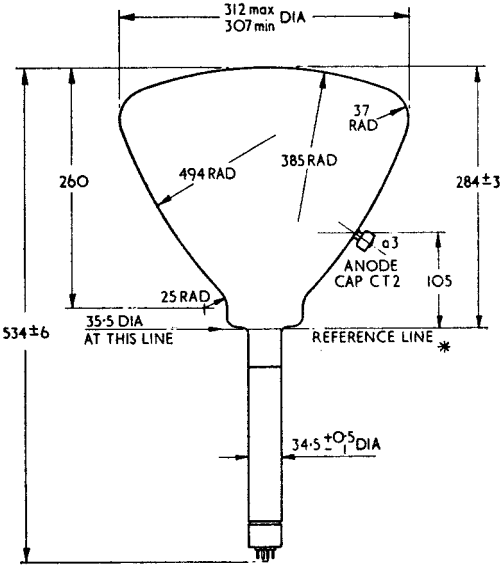
30E11

CATHODE RAY TUBE—LONG AFTERGLOW

12 inch Diameter

Indirectly heated—for Marine Radar



4-30E11-0-2A

All dimensions in mm.

Anode Cap in line with keyway on base.

* Determined by Reference Line Gauge No. 6. See Section 3.

MAZDA
30F5

HIGH SLOPE SCREENED H.F. PENTODE
Indirectly heated—for series operation

GENERAL

The 30F5 is intended for use as a straight television pentode and is suitable for AC/DC series operation.

RATING

Heater Current (amps)	I_h	0·3
Heater Voltage (volts)	V_h	7·3
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g_2(max)}$	250
Maximum Anode Dissipation (watts)	$P_{a(max)}$	3§
Maximum Screen Dissipation (watts)	$P_{g_2(max)}$	1§
Maximum Heater to Cathode Voltage (volts) (r.m.s.)	$V_{h-k(max)}$	200†
Maximum Resistance Control Crid to Cathode (kΩ)	$R_{g-k(max)}$	600‡
Mutual Conductance (mA/V)	g_m	8.8*
Inner Amplification Factor	μ_{g_1,g_2}	55*

* At $V_a = V_{g_2} = 170$ volts. $V_{g_1} = -1{\cdot}85$

§ With a grid cathode resistance not exceeding 10,000 ohms

† From Cathode to higher potential heater pin

‡ With maximum anode dissipation 2 watts, maximum screen dissipation 0·5 watts and assuming a common anode and screen decoupling resistance of not less than 2,200 ohms ±10%

INTER-ELECTRODE CAPACITANCES (pF)

		‡	§
Grid/Earth	c_{in}	9·0	10·3
Anode/Earth	c_{out}	4·4	5·7
Anode/Grid	c_{g_1-a}	0·0073	0·0077

Inter-electrode Capacitances (*continued overleaf*)

MAZDA

30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

" Earth " denotes the remaining earthy potential electrodes, shields and heater joined to cathode.

‡ Inter-electrode capacitances with holder capacitance balanced out.

§ Total inter-electrode capacity including B9A ceramic holder without skirt or radial shield (Carr Fastener holder type 77/076).

DIMENSIONS

Maximum Overall Length (mm)	67.5
Maximum Diameter (mm)	22.2
Maximum Seated Height (mm)	6.5
Approximate Nett Weight (ozs)	$\frac{1}{2}$
Approximate Packed Weight (ozs)	1

MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION

Anode Voltage (volts)	V_a	170
Screen Voltage (volts)	V_{g_2}	170
Grid Bias Voltage (volts)	V_{g_1}	—1·85
Anode Current (mA)	I_a	10
Screen Current (mA)	I_{g_2}	2·6
Mutual Conductance (mA/V)	g_m	8·8
Input Loss at 45 Mc/s (ohms)	$r_{g_1-k(w)}$	16,000*
Equivalent grid noise resistance (ohms)	R_{eq}	750

* With grid circuit ONLY returned to pin 3

EDISWAN

MAZDA

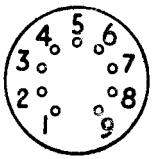
30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

BULB—Clear

BASE—Noval (B9A)



Viewed from Free End of Pins

CONNECTIONS

Pin 1	Cathode	k
Pin 2	Control Grid	g1
Pin 3	Cathode	k
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Shield	s
Pin 7	Anode	a
Pin 8	Screen Grid	g2
Pin 9	Suppressor Grid	g3

EDISWAN

MAZDA

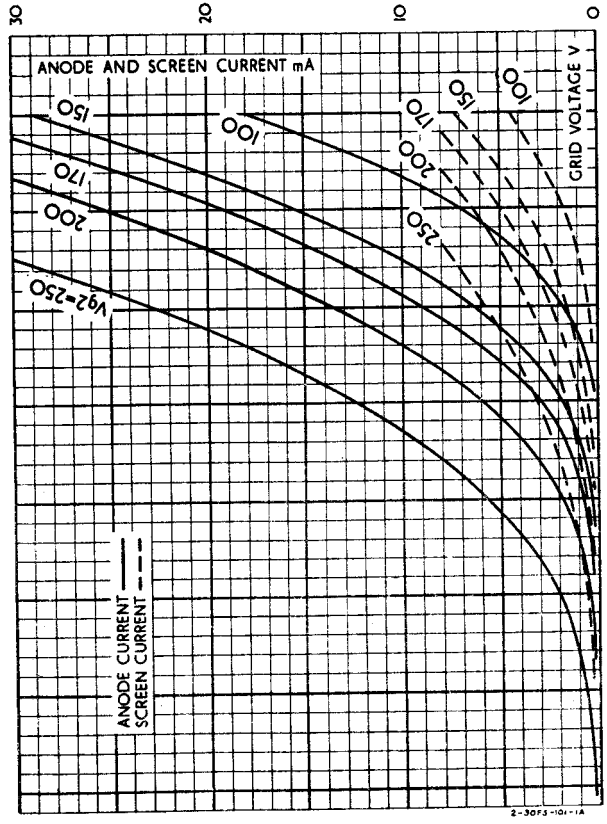
30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES: Ia, Ig2/Vg

Va=250V.



EDISWAN

MAZDA

30F5

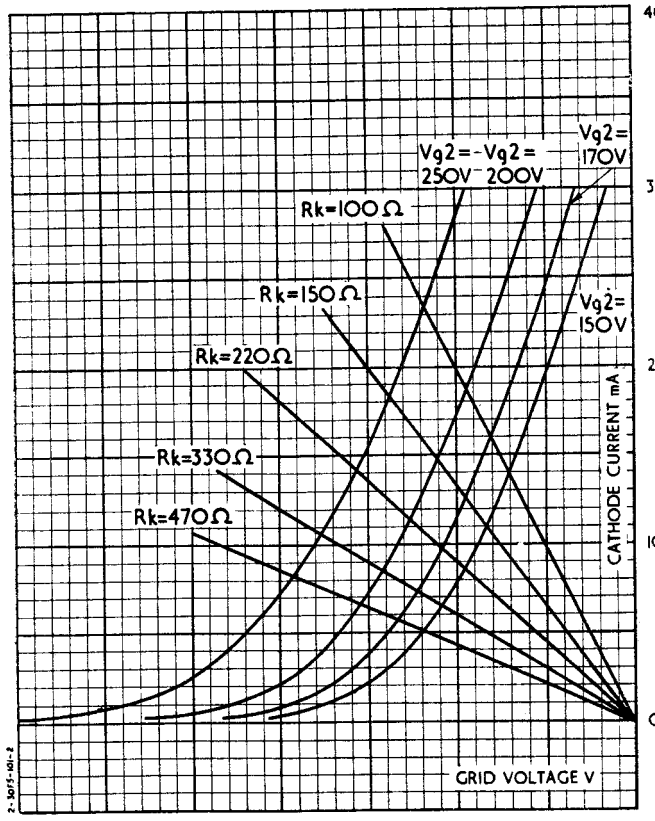
HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES: I_k/V_g

Va=250V.

Screen to Anode Current Ratio=26% (approx.)



30F5

EDISWAN

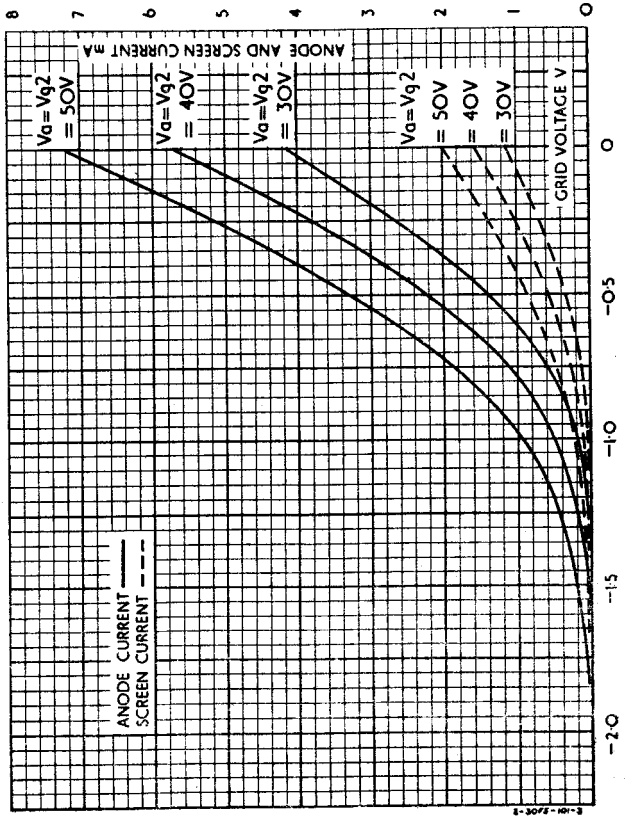
MAZDA

30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES: Ia, Ig2/Vg



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SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

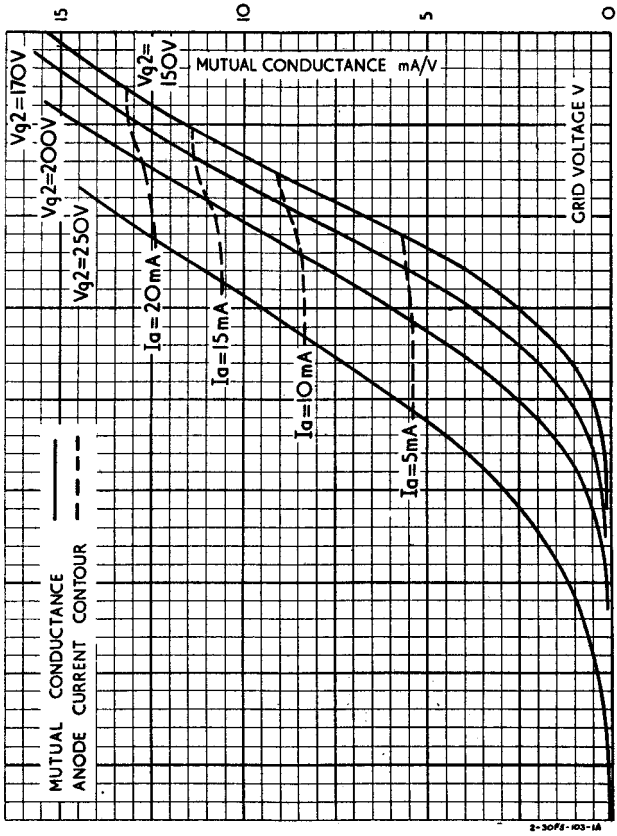
30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES: gm/Vg

Va=250V.



SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

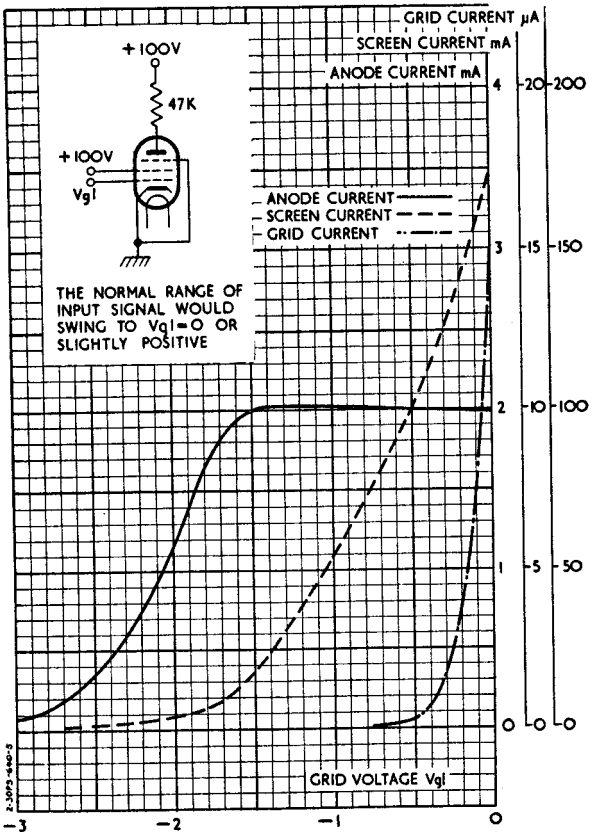
30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES: Ia, Ig2, Ig1/Vg

Used as a limiter in a synchronising separator circuit.



SIEMENS EDISON SWAN LIMITED

EDISWAN

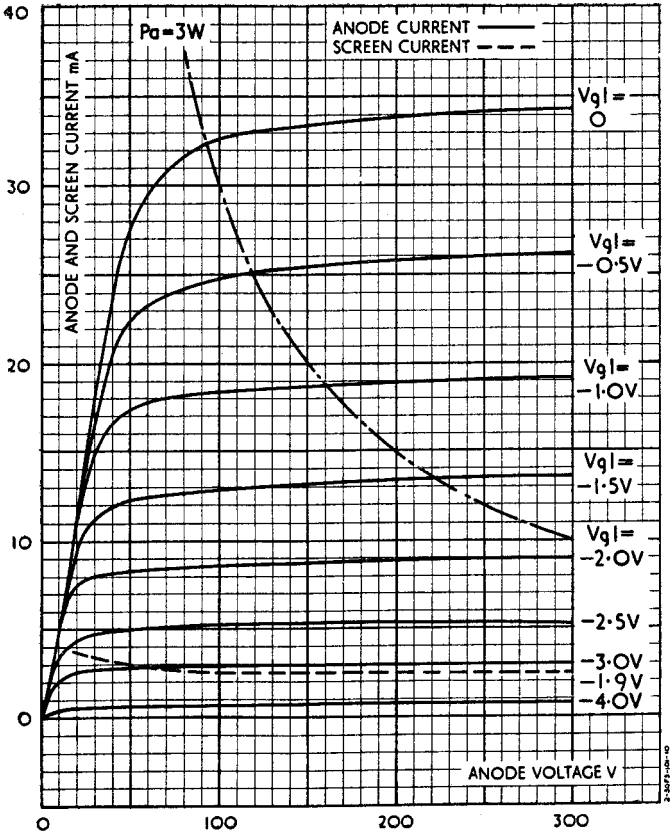
MAZDA

30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES: Ia, Ig2/Va
Vg2=170V.



SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

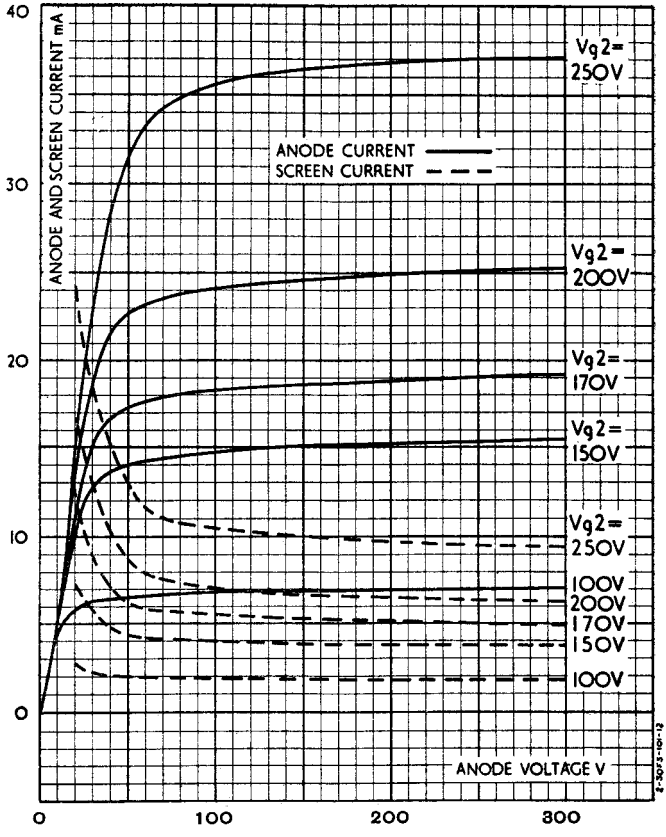
30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

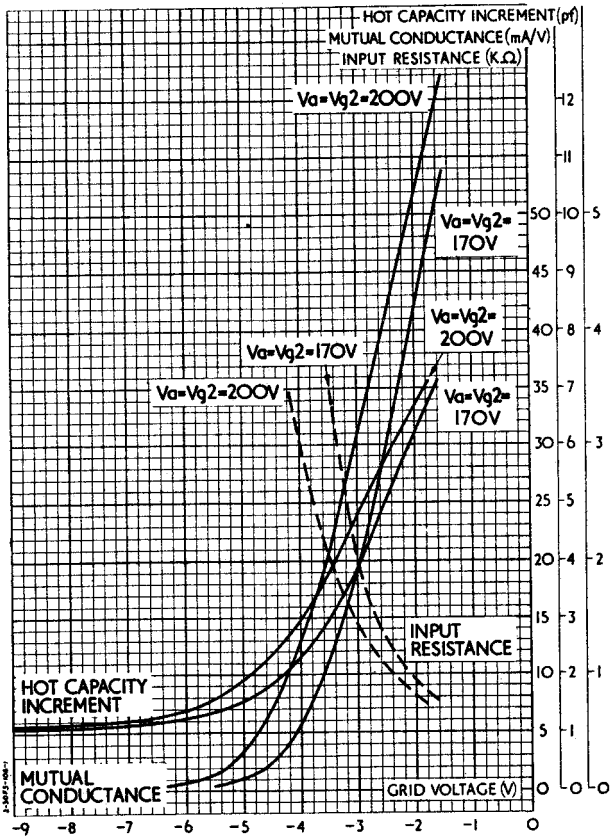
AVERAGE CHARACTERISTIC CURVES: Ia, Ig2/Va

$V_{g1} = -1{\cdot}0V.$



EDISWAN
MAZDA
30F5
HIGH SLOPE SCREENED H.F. PENTODE
Indirectly heated—for series operation

Average Characteristic Curves : r_{in}, g_m $\delta c/V_g$
f = 38 Mc/s
See also "Test Circuit" overleaf.



SIEMENS EDISON SWAN LIMITED

EDISWAN

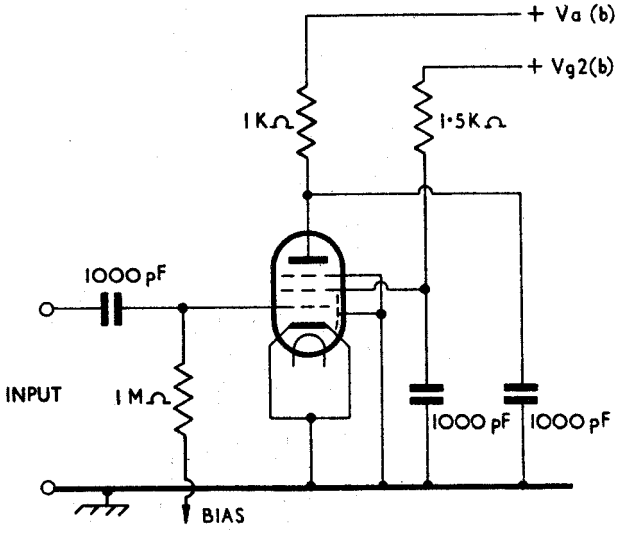
MAZDA

30F5

HIGH SLOPE SCREENED H.F. PENTODE

Indirectly heated—for series operation

TEST CIRCUIT
for
Average Characteristics r_{in}, g_m $\delta c/V_g$
f = 38 Mc/s.



SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

30F27

30F27

SCREENED V.H.F. TETRODE

Indirectly heated—for series operation

TENTATIVE

GENERAL

The 30F27 is an indirectly heated V.H.F. Tetrode, with variable μ characteristics for reducing cross modulation effects at higher signal levels. It is of Frame Grid construction and is intended for use in Television Turret Tuners.

RATING

Heater Current	I_h	0·3	A
Heater Voltage	V_h	3·7	V
Maximum Anode Voltage	$V_{a(max)}$	250	V
Maximum Screen Voltage	$V_{g2(max)}$	230	V
Maximum Anode Dissipation	$p_{a(max)}$	2·5	W
Maximum Screen Dissipation	$p_{g2(max)}$	0·4	W
Maximum Heater/Cathode Voltage (r.m.s.)	$V_{h-k(rms)max}$	90‡	
Maximum Cathode Current	$I_{k(max)}$	18	mA
Mutual Conductance	g_m	15*	mA/V
Inner Amplification Factor	μ_{g1-g2}	60*	

* At V_a=170V, V_{g2}=140V, I_a=13·5mA.

‡ From Cathode to higher potential heater pin.

INTER-ELECTRODE CAPACITANCES (pF)

		*	**	***
Grid 1/Earth	c_{in}	6·3	6·6	7·6
Anode/Earth	c_{out}	1·8	2·1	3·1
Anode/Grid 1	c_{a-g1}	0·027	0·029	0·031
Grid 1/Grid 2	c_{g1-g2}	2·0	2·0	2·0
Grid 1/Cathode	c_{g1-k}	4·0	4·1	4·5

* With fully shielded socket, without can.

** With holder capacity balanced out.

*** Total interelectrode capacities including B9A ceramic holder without skirt or radial shield (Plessey Holder type CP180014/1).

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

30F27

EDISWAN

MAZDA

30F27

SCREENED V.H.F. TETRODE

Indirectly heated—for series operation

TENTATIVE

DIMENSIONS

Maximum Overall Length	56 mm
Maximum Diameter	22·2mm
Maximum Seated Height	49 mm

MOUNTING POSITION—Unrestricted

TYPICAL OPERATION

		†	††	
Anode Voltage	V_a	170	150	V
Screen Voltage (Initial)	V_{g2}	140	105	V
Self Bias Resistance	R_k	82	·	Ω
Grid Current Bias Resistance	R_{g1}	·	330	kΩ
Grid Bias Voltage (approx)	V_{g1}	—1·25	·	V
Anode Current	I_a	13·5	14	mA
Screen Current	I_{g2}	1·7	1·4	mA
Equivalent Grid Noise Resistance	R_{eq}	450		Ω
Mutual Conductance	g_m	15	15·5	mA/V
Input loss at 50 Mc/s		6·8§		kΩ
Input Capacity Working	$c_{in(w)}$	10·3§**		pF
Change in Input Capacity produced by biasing valve to cut-off	Δc_{in}	2·9§		pF

† Cathode self bias circuit

†† Grid Current bias circuit.

§ Measured at 50Mc/s with the three Cathodes strapped and taken directly to earth.

** With holder capacity balanced out.

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

MAZDA

30F27

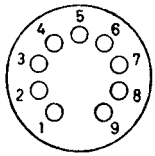
SCREENED V.H.F. TETRODE

Indirectly heated—for series operation

TENTATIVE

30F27

BASE—Noval (B9A)



Viewed from free end of pins

CONNECTIONS

Pin 1	Cathode	k
Pin 2	Control Grid	g_1
Pin 3	Cathode, input	k_{in}
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Shield	s
Pin 7	Anode	a
Pin 8	Screen Grid	g_2
Pin 9	Cathode	k

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

MAZDA

30FL1

30FL1

TRIODE BEAM TETRODE

Indirectly heated—for series operation

TENTATIVE

GENERAL

This triode beam tetrode valve combination has a medium mu triode and a high slope beam tetrode and is intended for use in the Video Output or Sync Separator stages of AC/DC Mains Television receivers having series connected heaters.

RATING

		Tetrode	Triode	
Heater Voltage (volts)	V_h	9.4		
Heater Current (amps)	I_h	0.3		
Maximum Anode Voltage (volts)	$V_{a(max)}$	250	250	
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250		
Mutual Conductance (mA/V)	g_m	7.5†	3.4*	
Amplification Factor	μ		18*	
Maximum Anode Dissipation (watts)	$P_{a(max)}$	3	2	←
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	1·0		←
Maximum Heater to Cathode Voltage (volts r.m.s.)	$V_{h-k\ (max)}$	‡150		

Notes

* V_a=200 volts. I_a=10mA.

† V_a 170 volts. V_{g2}=170 volts. I_a=10mA. V_{g1}=−2·1 volts.

‡ Measured with respect to the higher potential heater pin.

Indicates a change ←

30FL1

EDISWAN

MAZDA

30FL1

TRIODE BEAM TETRODE

Indirectly heated—for series operation

TENTATIVE

INTER-ELECTRODE CAPACITANCES (pF)

		‖	¶
Grid 1/Earth	$c_{g1\text{-}E}$	7.9	9.2
Anode q/Earth	$c_{aq\text{-}E}$	3.2	4.5
Grid 1/Anode q	$c_{g1\text{-}aq}$	0.03	0.048
Grid t/Earth	$c_{gt\text{-}E}$	3.6	4.6
Anode t/Earth	$c_{at\text{-}E}$	2.6	3.6
Grid t/Anode t	$c_{gt\text{-}a}$	2.7	3.0
Grid t/Anode q	$c_{gt\text{-}aq}$	0.0068	0.0074
Grid 1/Anode t	$c_{g1\text{-}at}$	0.0083	0.010
Anode q/Anode t	$c_{aq\text{-}at}$	0.037	0.0374

‖ Measured with holder capacity balanced out.

¶ Measured to include capacity of Carr-Fastener ceramic holder without screen or skirt. If a skirted holder is used the total $c_{g1\text{-}aq}$ is 0.035 pF.

DIMENSIONS

Maximum Overall Length (mm)	56.0
Maximum Diameter (mm)	22.2
Maximum Seated Height (mm)	49.0
Approximate Nett Weight (ozs)	$\frac{1}{2}$
Approximate Packed Weight (ozs)	$\frac{3}{4}$

MAZDA

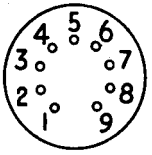
30FL1

TRIODE BEAM TETRODE

Indirectly heated—for series operation

MOUNTING POSITION—Unrestricted

BASE—Noval (B9A)



Viewed from Free End of pins

CONNECTIONS

Pin 1	Triode Anode	a_t
Pin 2	Triode Grid	g_t
Pin 3	Triode Cathode	k_t
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Tetrode Anode	a_q
Pin 7	Tetrode, Screen Grid	g_2
Pin 8	Tetrode Control Grid	g_1
Pin 9	Tetrode Cathode, Beam Plates Shield	$k_{q,bp,s}$

30FLI

MAZDA

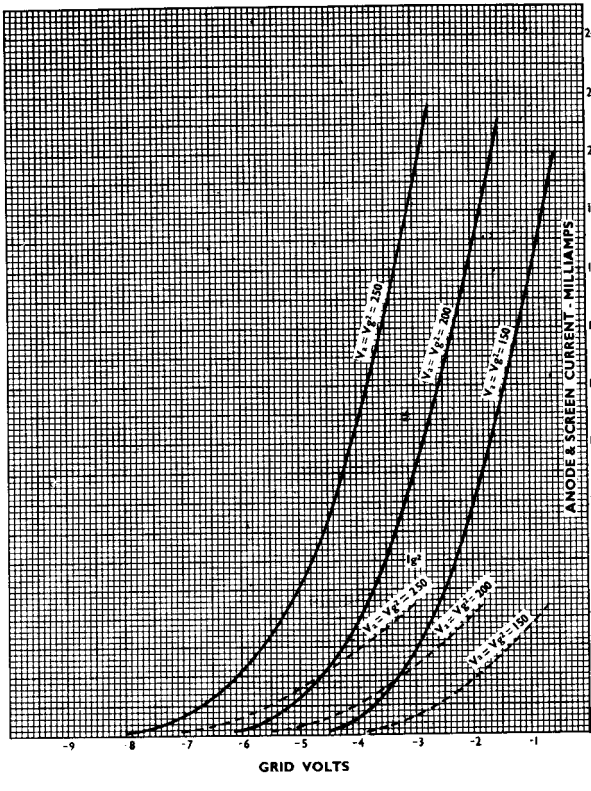
30FLI

TRIODE BEAM TETRODE

Indirectly heated—for series operation

TENTATIVE

AVERAGE CHARACTERISTIC CURVES



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SIEMENS EDISON SWAN LIMITED

MAZDA

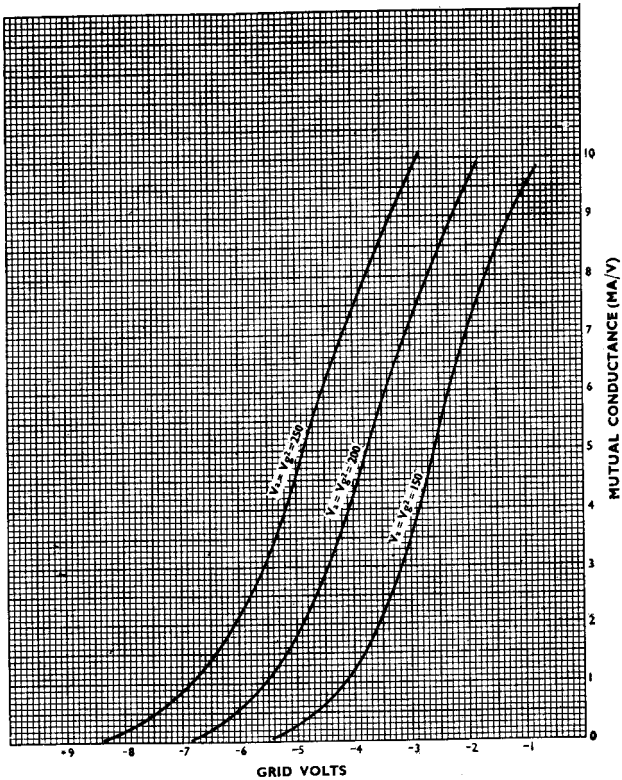
30FL1

TRIODE BEAM TETRODE

Indirectly heated—for series operation

TENTATIVE

AVERAGE CHARACTERISTIC CURVES



EDISWAN
MAZDA

30L15
CASCODE RF DOUBLE TRIODE
Indirectly heated—for series operation

TENTATIVE

GENERAL

The 30L15 is a miniature based RF Double Triode having separate cathodes and shielded sections for use as a Cascode RF Amplifier in television receivers with AC/DC powered series connected heater chains.

RATING

Heater Current	(amps)	I_h	0.3
Heater Voltage	(volts)	V_h	7.0
Maximum Anode Voltage	(volts)	$V_{a(max)}$	250
Maximum Anode Dissipation (either section)	(watts)	$P_{a(max)}$	2.0
Maximum Cathode Current (each section)	(mA)	$I_{k(max)}$	16
Maximum Grid Voltage (negative)	(volts)	$-V_{g1(max}$	−50
Maximum Grid to Cathode Resistance (Section 1)	(kΩ)	$R_{g'-k'(max)}$	500
Maximum Grid to Cathode Resistance (Section 2)	(kΩ)	$R_{g''-k''(max)}$	22*
Maximum Effective Grid to Earth Resistance (Section 2)	(kΩ)	$R_{g''-E(max)}$	150†
Mutual Conductance	(mA/V)	g_m	9.0‡
Amplification Factor		μ	26‡

* With Grid Current Bias.

† With Potentiometer Bias from the HT line.

‡ Measured at V_a=90 V ; I_a = 15 mA ; V_{g1} = —1.2 V.

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

30L15

EDISWAN
MAZDA
30L15
CASCODE RF DOUBLE TRIODE
Indirectly heated—for series operation
TENTATIVE

INTER-ELECTRODE CAPACITANCES (pF)

		§	§§
Grid '/Cathode', Heater, Shield	$c_{g'-k',h,s}$	3.1	4.1
Anode''/Cathode', Heater, Shield	$c_{a''-k',h,s}$	3.6	4.5
Anode'/Cathode', Heater, Shield	$c_{a'-k',h,s}$	1.9	2.8
Cathode''/Cathode', Heater, Shield	$c_{k''-k',h,s}$	5.4	6.3
Anode'/Grid'	$c_{a'-g'}$	1.5	1.5
Anode''/Cathode''	$c_{a''-k''}$	0.19	0.21
Anode'/Anode''	$c_{a'-a''}$	0.011	0.013
Grid'/Anode''	$c_{g'-a''}$	0.0058	0.0096

§ With holder capacity balanced out but with screening can.

§§ With screening can and ceramic holder. Plessey type CP/180024/3.

DIMENSIONS

Maximum Overall Length	(mm)	56
Maximum Diameter	(mm)	22.2
Maximum Seated Height	(mm)	49
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

MOUNTING POSITION—Unrestricted

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ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
MAZDA

30L15
CASCODE RF DOUBLE TRIODE
Indirectly heated—for series operation
TENTATIVE

TYPICAL OPERATION

			Circuit 1†	Circuit 2‡
H.T. Supply Voltage	(volts)	$V_{a(b)}$	200	200
Anode Decoupling Resistor, Section 2	(ohms)		2200	3300
Anode Current	(mA)	I_a	15.3	14.8
Grid Bias Voltage, Section 1 (cathode resistor)	(volts)	V_g	—1.53	—1.2
Self Bias Resistor, Section 1	(ohms)	R_k	100	82
Combined Mutual Conductance ($\Delta Ia/\Delta Vg1$)	(mA/V)	gm	8.5	8.6
Approx. A.G.C. Voltage to give Mutual Conductance of 100μA/V	(volts)		—7.0	—12.0
Input Capacitance (working)	(pF)	$C_{in(w)}$	6.0*	6.0*
Change in Input Capacitance by biassing to cut-off	(pF)	$\Delta C_{in(w)}$	1.2	1.2

* Inter-electrode capacity with holder capacity balanced out but with cylindrical screen can.

† With Potentiometer bias from the HT line for Valve Section 2.

‡ With Grid Current bias for Valve Section 2.

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

30L15

EDISWAN

MAZDA

30L15

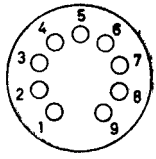
CASCODE RF DOUBLE TRIODE

Indirectly heated—for series operation

TENTATIVE

BASE—Noval (B9A)

Viewed from free end of pins



CONNECTIONS

Pin 1	Cathode 2	k″
Pin 2	Grid 2, Shield	g″,s
Pin 3	Anode 2	a″
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Grid 1	g′
Pin 7	Cathode 1 Input	k′in
Pin 8	Cathode 1 Output	k′out
Pin 9	Anode 1	a′

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ASSOCIATED ELECTRICAL INDUSTRIES LTD.

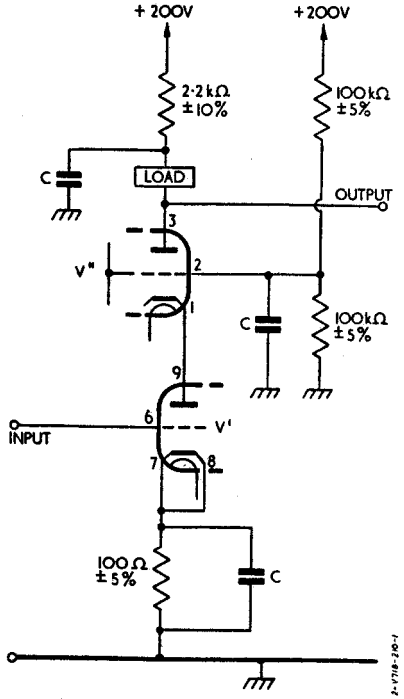
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
MAZDA
30L15
CASCODE RF DOUBLE TRIODE
Indirectly heated—for series operation
TENTATIVE

TYPICAL 30L15 CASCODE BIAS CIRCUITS

Circuit 1

Valve section 2, Potentiometer Bias arrangement.



C = DECOUPLING CONDENSERS

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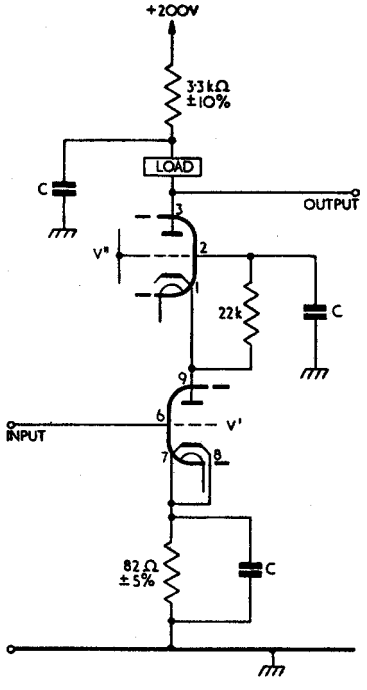
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
MAZDA
30L15
CASCODE RF DOUBLE TRIODE
Indirectly heated—for series operation
TENTATIVE

Circuit 2

Valve section 2, Grid Current Bias arrangement.



C=DECOUPLING CONDENSERS

NOTE : Application of bias to section 1 in the Potentiometer Bias arrangement effectively controls both triodes giving this combination a shorter grid base than the Grid Current Bias arrangement.

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

MAZDA

30L15

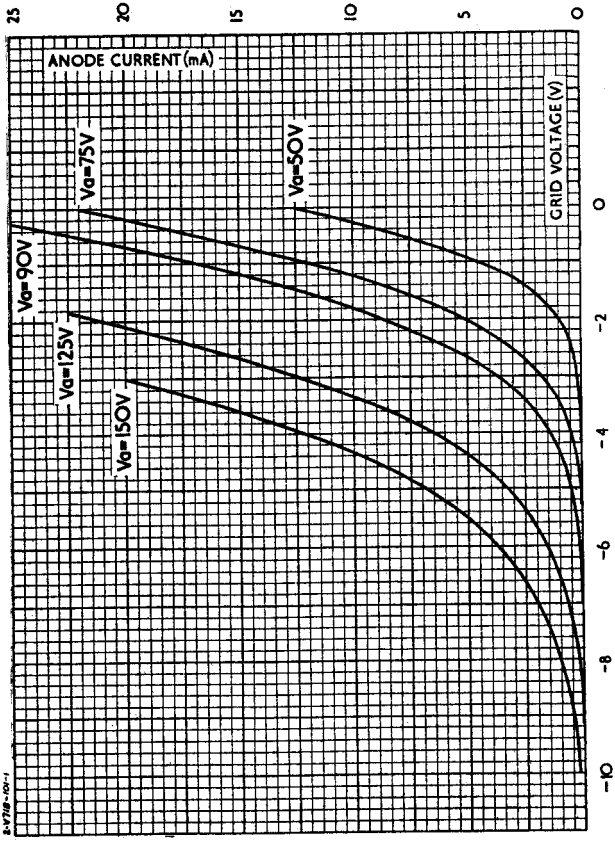
CASCODE RF DOUBLE TRIODE

Indirectly heated—for series operation

TENTATIVE

CHARACTERISTIC CURVES: I_a/V_g

Each Section



April 1960 Issue 1/2

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

30L15

EDISWAN

MAZDA

30L15

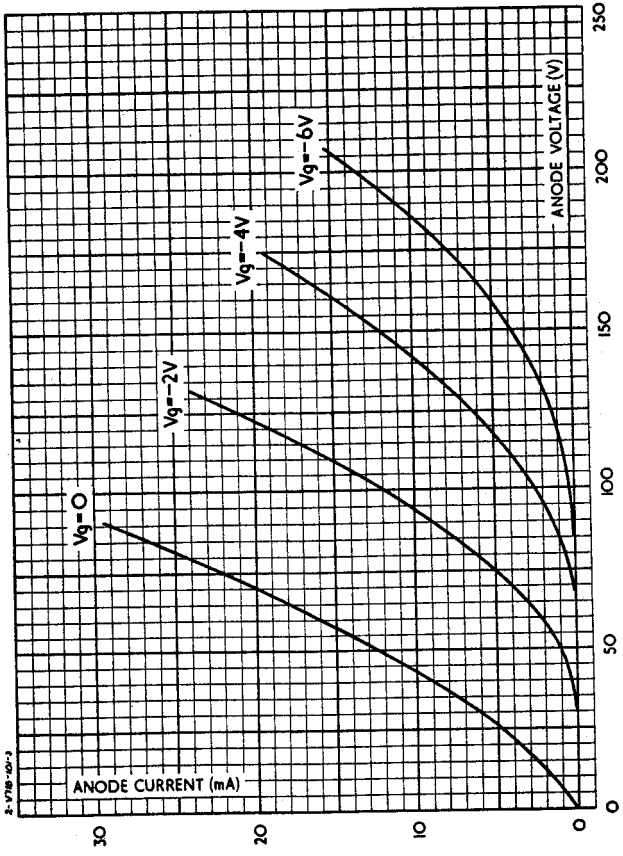
CASCODE RF DOUBLE TRIODE

Indirectly heated—for series operation

TENTATIVE

CHARACTERISTIC CURVES: I_a/V_a

Each Section



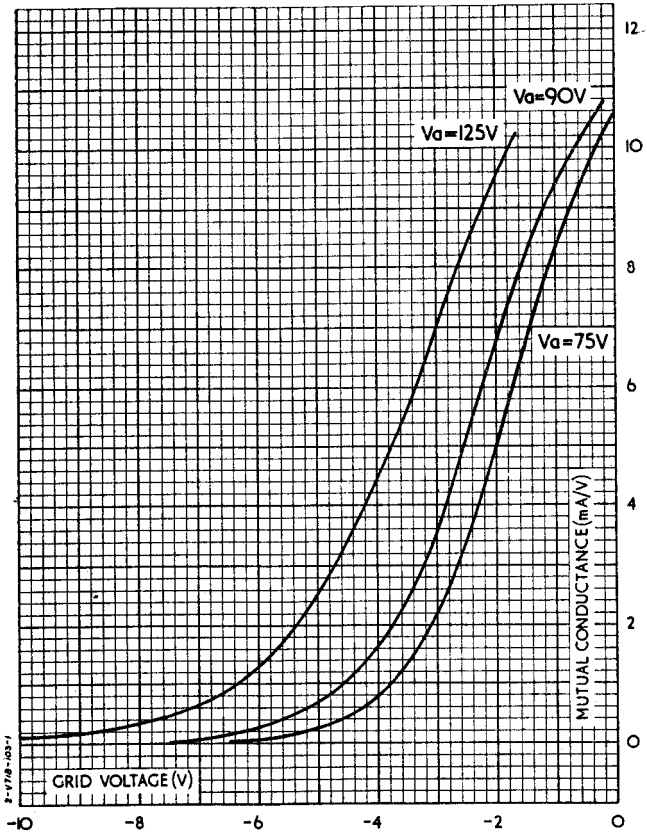
April 1960 **Issue 1/2**

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN
MAZDA
30L15
CASCODE RF DOUBLE TRIODE
Indirectly heated—for series operation
TENTATIVE

CHARACTERISTIC CURVES: g_m/V_g
Each Section



April 1960 Issue 1/2

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

MAZDA

30P4

TELEVISION BEAM POWER AMPLIFIER

Indirectly heated—for AC/DC series operation

GENERAL

The 30P4 is primarily intended for use in the Magnetic Scanning Line Output Stage of A.C./D.C. Television Receivers with series connected heaters.

RATING

			Note
Heater Current (amps)	I_h	0·3	
Heater Voltage (volts)	V_h	25	
Maximum Anode Voltage (volts)	$V_{a(max)}$	400	(a)
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250	
Maximum Cathode Current (mA)	$I_{k(max)}$	160	
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	4·0	
Maximum Anode Dissipation (watts)	$P_{a\ (max)}$	10·0	
Maximum Peak Anode Voltage (Pulse positive) (volts)	$V_{a\ (pk)\ max}$	6,000	(c)
Maximum Heater to Cathode (volts) (R.M.S.)	$V_{h-k\ (max)}$	200	(b)
Maximum Grid to Cathode Circuit Resistance (Megohms)	$R_{g1-k\ (max)}$	1·0	
Maximum Peak Screen Voltage (Pulse negative) (volts)	$V_{g2\ (pk)\ max}$	2,000	

Rating (*continued overleaf*)

MAZDA

30P4

TELEVISION BEAM POWER AMPLIFIER

Indirectly heated—for AC/DC series operation

NOTES

(a) V_a may be increased to 550v. where a "recovered Voltage" of more than 200 volts is available.

(b) Heater Cathode voltage is measured with respect to the higher potential heater pin.

(c) Rated for Television Line Scan where the duty cycle does not exceed 15% and the pulse duration does not exceed 15 microseconds.

The maximum rating of 6 kV is a design centre rating. The absolute rating of 7·5 kV maximum must not be exceeded.

INTER-ELECTRODE CAPACITANCES (pF)

Control Grid to Earth	c_{in}	20·0
Anode to Earth	c_{out}	10·0
Anode to Control Grid	c_{a-g1}	0·3

"Earth" denotes the remaining earthy potential electrodes, heater and shields connected to cathode.

DIMENSIONS

Maximum Overall Length (mm)	113
Maximum Diameter (mm)	32
Maximum Seated Height (mm)	99
Approximate Nett Weight (ozs)	1½
Approximate Packed Weight (ozs)	4

MOUNTING POSITION

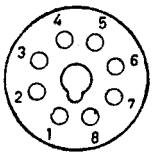
If mounted horizontally it is recommended that pins 4 and 8 should be in a vertical plane.

EDISWAN
MAZDA
30P4
TELEVISION BEAM POWER AMPLIFIER
Indirectly heated—for AC/DC series operation

BULB—Clear

TOP CAP—CT1

BASE—International Octal (IO7)



Viewed from Free End of Pins

CONNECTIONS

Pin 1	No connection	NC
Pin 2	Heater	h
Pin 3	Internal Connection†	IC
Pin 4	Screen Grid	g2
Pin 5	Control Grid	g1
Pin 6	No Pin	NP
Pin 7	Heater	h
Pin 8	Cathode	k
Top Cap	Anode	a

† " Internal connection " indicates that the pin is connected internally to an electrode for the purpose of improving mechanical rigidity of the valve. The connection may not always be made to the same electrode on a given valve type and it is essential that the corresponding valve holder socket be left unconnected.

EDISWAN

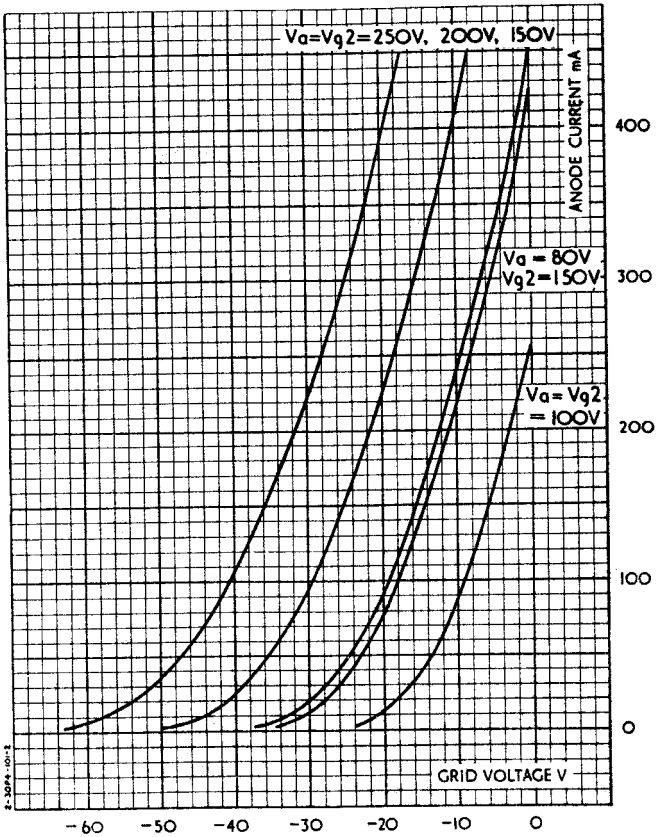
MAZDA

30P4

TELEVISION BEAM POWER AMPLIFIER

Indirectly heated—for AC/DC series operation

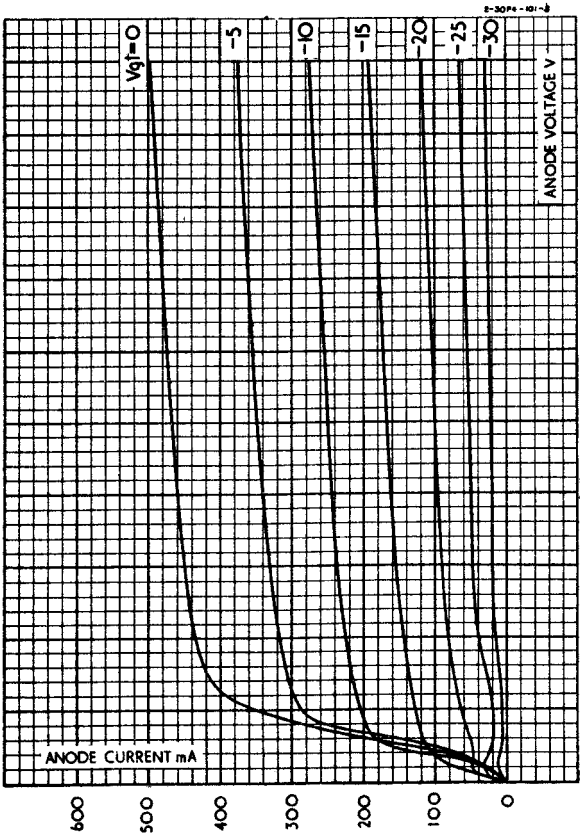
AVERAGE CHARACTERISTIC CURVES: I_a/V_g



SIEMENS EDISON SWAN LIMITED

EDISWAN
MAZDA
30P4
TELEVISION BEAM POWER AMPLIFIER
Indirectly heated—for AC/DC series operation

AVERAGE CHARACTERISTIC CURVES: I_a/V_a
$V_{g2}=150V$



SIEMENS EDISON SWAN LIMITED

MAZDA

30P12

OUTPUT TETRODE

Indirectly heated—for series or parallel operation

TENTATIVE

GENERAL

The 30P12 has been designed for use in the output stage of Audio Amplifiers or Frame Time Bases, and is suitable for AC or AC/DC operation.

RATING

Heater Current (amps)	I_h	0·3
Heater Voltage (volts)	V_h	12·6
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g_2(max)}$	250
Maximum Anode Dissipation (watts)	$P_{a\ (max)}$	6·0
Maximum Screen Dissipation (continuous) (watts)	$P_{g_2(max)}$	1·8
Maximum Screen Dissipation (Speech and Music) (watts)	$P_{g_2(max)}$	2·7
Maximum Cathode Current (mA)	$I_{k(max)}$	50
Maximum Heater to Cathode Voltage (volts) (r.m.s.)	$V_{h-k\ (max)}$	150*
Mutual Conductance (mA/V)	g_m	8.3†

† Measured with respect to the higher potential heater pin.

* Taken at $V_a = 170v$; $V_{g_2} = 180$; $V_{g_1} = -9{\cdot}4v$; $I_a = 35mA$

DIMENSIONS

Maximum Overall Length (mm)	78·5
Maximum Diameter (mm)	22·2
Maximum Seated Height (mm)	71·5
Approximate Nett Weight (ozs)	$\frac{1}{2}$
Approximate Packed Weight (ozs)	$1\frac{1}{4}$

MOUNTING POSITION—Unrestricted

30P12

MAZDA

30P12

OUTPUT TETRODE

Indirectly heated—for series or parallel operation

TENTATIVE

TYPICAL OPERATION—Class A Audio Output

Anode Supply Voltage (volts)	$V_{a(b)}$	170
Screen Supply Voltage (volts)	$V_{g_2(b)}$	180
Grid Bias Voltage (volts)	V_{g_1}	—10.3
Anode Current (quiescent) (mA)	$I_{a(o)}$	31
Screen Current (quiescent) (mA)	$I_{g_2(o)}$	7·2
Anode Load (ohms)	R_a	5,000‡
Power Output (watts)	P_{out}	2·25‡
Input Swing (volts) (r.m.s.)	$V_{in(r.m.s.)}$	3·9‡

The above operating conditions were taken with fixed DC potentials.

The grid to cathode circuit resistance must not exceed 0·5 megohms with cathode self-bias.

‡ For 5% Third Harmonic and Second Harmonic not exceeding 5%.

TYPICAL OPERATION—Frame Time-Base

The frame output stage should be designed to allow for valve spread and deterioration during life in addition to component variation. Values of total tetrode peak-anode current available for a new average valve and at the assumed end of life point on any valve are as follows :

	V_a	V_{g_2}	V_{g_1}	$I_{a(mA)}$
Average New Valve	50	180	−1	110
Assumed End of Life Condition	50	180	−1	72

EDISWAN

MAZDA

30P12

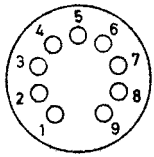
OUTPUT TETRODE

Indirectly heated—for series or parallel operation

TENTATIVE

BULB—Clear

BASE—Noval (B9A)



Viewed from Free End of Pins

CONNECTIONS

Pin 1	Internal Connection†	IC
Pin 2	Control Grid	g1
Pin 3	Cathode	k
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Internal Connection†	IC
Pin 7	Anode	a
Pin 8	Internal Connection†	IC
Pin 9	Screen Grid	g2

† " Internal connection " indicates that the pin is connected internally to an electrode for the purpose of improving mechanical rigidity of the valve. The connection may not always be made to the same electrode on a given valve type and it is essential that the corresponding valve holder socket be left unconnected.

30P12

EDISWAN

MAZDA

30P12

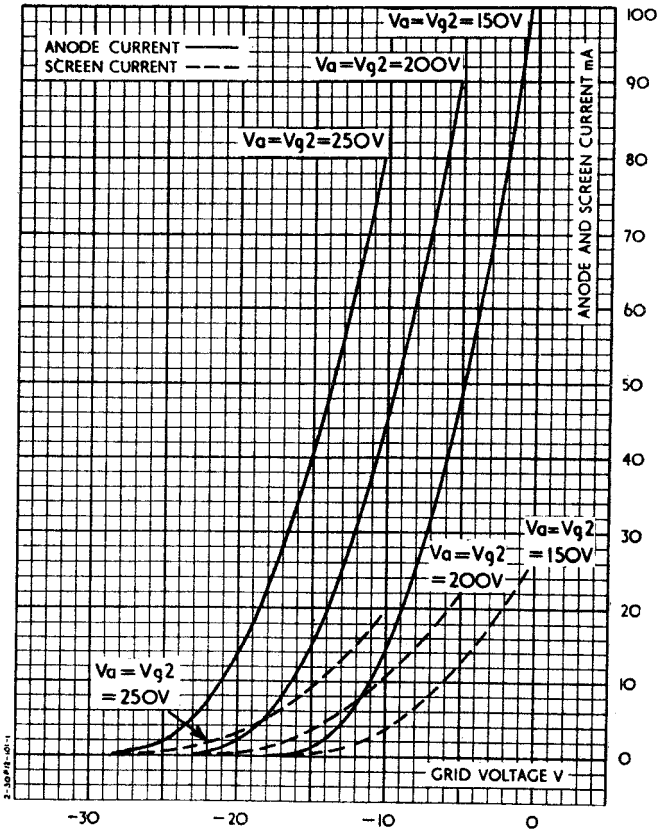
OUTPUT TETRODE

Indirectly heated—for series or parallel operation

TENTATIVE

CHARACTERISTIC CURVES: I_a, I_{g2}/V_g

Heater Current = 0·3 amps.



July 1958 VALVE & CRT DIVISION Issue 2/2

SIEMENS EDISON SWAN LIMITED

30PL1

MAZDA

30PL1

TRIODE—OUTPUT BEAM TETRODE
Indirectly heated—for series operation

TENTATIVE

GENERAL

This valve is a dual type, consisting of a Triode and an Output Beam Tetrode in the same envelope, each section having its own cathode. It is suitable for use in the Audio Amplifier or Frame Time-Base stages of television receivers designed for AC/DC mains operation and having series connected heater chains.

RATING

		Tetrode	*Triode*
Heater Current (amps)	I_h	0·3	
Heater Voltage (volts)	V_h	13·0	
Maximum Anode Voltage (volts)	$V_{a(max)}$	250	250
Maximum Screen Voltage (volts)	$V_{g_2(max)}$	250	
Maximum Anode Dissipation (watts)	$P_{a(max)}$	5·5†	2·0†
Maximum Screen Dissipation (Continuous) (watts)	$P_{g_2(max)}$	1·5†	
Maximum Screen Dissipation (Speech and Music) (watts)	P_{g_2}	2·2	
Mutual Conductance (mA/V)	g_m	6·5§	3·4*
Amplification Factor	μ		18*
Anode Impedance (ohms)	r_a		5,300*
Maximum Heater to Cathode Voltage (volts) (r.m.s.)	$V_{h-k(max)}$	150‡	

* Measured at V_a = 200v. I_a = 10mA.

§ Measured with V_a = 170v. V_{g_2} = 180v. I_a = 32mA.

† The total anode dissipation of both sections not to exceed 6 watts.

‡ Measured with respect to the higher potential heater pin.

The characteristics for the triode section of the 30PL1 are the same as for the 6/30L2 triode.

30PLI

MAZDA

30PLI

TRIODE—OUTPUT BEAM TETRODE
Indirectly heated—for series operation

TENTATIVE

INTER-ELECTRODE CAPACITANCES (pF)

		†	‡
Triode Section			
Grid/Earth	$c_{in(t)}$	2·6	3·7
Anode/Earth	$c_{out(t)}$	2·0	3·0
Anode/Grid	$c_{a(t),g(t)}$	2·4	2·7
Tetrode Section			
Grid 1/Earth	$c_{in(q)}$	9·8	11·0
Anode/Earth	$c_{out(q)}$	7·3	8·6
Anode/Grid 1	$c_{a(q)\text{-}g1(q)}$	0·21	0·21
Tetrode Anode/Triode Anode	$c_{a(q)\text{-}a(t)}$	1·0	1·0
Tetrode Grid 1/Triode Grid	$c_{g1(q)\text{-}g(t)}$	0·014	0·016
Tetrode Anode/Triode Grid	$c_{a(q)\text{-}g(t)}$	0·093	0·093
Tetrode Grid 1/Triode Anode	$c_{g1(q)\text{-}a(t)}$	0·1	0·18

"Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

† Inter-electrode capacitances with holder capacitance balanced out.

‡ Total capacity including ceramic B9A unskirted holder without radial shield. Carr Fastener holder type 77/076.

DIMENSIONS

Maximum Overall Length	(mm)	67·5
Maximum Diameter	(mm)	22·2
Maximum Seated Height	(mm)	60·5
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

EDISWAN
MAZDA
30PL1
TRIODE—OUTPUT BEAM TETRODE
Indirectly heated—for series operation
TENTATIVE

MOUNTING POSITION—Unrestricted

TYPICAL OPERATION—Class A Audio Output ←

Tetrode Section

		Fixed Bias		*Self Bias*	
Anode Voltage (anode to earth) (volts)	V_a	170		180	
Screen Voltage (screen to earth) (volts)	V_{g2}	180		190	
Anode Current (Quiescent) (mA)	$I_{a(o)}$	28		28	
Screen Current (Quiescent) (mA)	$I_{g2(o)}$	6.5		6.5	
Grid Bias Applied (volts)	V_{g1}	−9.6		—	
Cathode Bias Resistance (ohms)	R_k	—		270	
Anode Load (ohms)	R_a	6000 §	5300†	7000 §	6200†
Power Output (watts)	P_{out}	2.0 §	2.35†	1.85 §	2.2†
Input Swing (volts r.m.s.)	$V_{in(rms)}$	3.3 §	3.9†	3.1 §	3.8†

The above operating conditions are taken with constant anode and screen supply voltages.

§ For 5% Third Harmonic and Second Harmonic not exceeding 5%.

† For 7% Third Harmonic and Second Harmonic not exceeding 7%.

The grid to cathode circuit resistance of the tetrode must not exceed 0·5 megohms with cathode self-bias when used at the maximum wattage rating.

Indicates a change ←

30PL1

EDISWAN

MAZDA

30PL1

TRIODE—OUTPUT BEAM TETRODE

Indirectly heated—for series operation

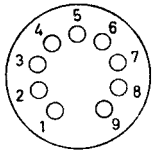
TENTATIVE

TYPICAL OPERATION—Frame Time-Base ←

The frame output stage should be designed to allow for valve spread and deterioration during life in addition to component variation. Values of total tetrode peak anode current available for a new average valve and at the assumed end of life point on any valve are as follows :

	V_a (volts)	V_{g2} (volts)	V_{g1} (volts)	I_a (mA)
Average New Valve	50	170	—1	88
Assumed End of Life Condition	50	170	—1	57
Average New Valve	50	180	—1	96
Assumed End of Life Condition	50	180	—1	62
Average New Valve	55	190	—1	104
Assumed End of Life Condition	55	190	—1	67

BASE—Noval (B9A)



Viewed from free end of pins

CONNECTIONS

Pin 1	Triode Anode	a_t
Pin 2	Triode Grid	g_t
Pin 3	Triode Cathode	k_t
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Tetrode Anode	a_q
Pin 7	Tetrode Cathode, Beam Plates	$k_{q,bp}$
Pin 8	Tetrode Screen Grid	g_2
Pin 9	Tetrode Control Grid	g_1

Indicates a change ←

EDISWAN

MAZDA

30PL13

TRIODE OUTPUT BEAM TETRODE

TENTATIVE

GENERAL

The 30PL13 is a Triode Output Beam Tetrode, each section having its own cathode. It is suitable for use in 110° Frame Time Base stages of AC/DC powered television receivers having series connected heater chains.

RATING		Tetrode	Triode
Heater Current (amps)	I_h	0.3	
Heater Voltage (volts)	V_h	16.0	
Maximum Anode Voltage (volts)	$V_{a(max)}$	250*	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	250	
Maximum Anode Dissipation (watts)	$P_{a(max)}$	7.0	1.0
Maximum Screen Dissipation (watts)	$P_{g2(max)}$	2.4	
Maximum Mean Cathode Current (mA)	$I_{a(av)max}$	75	
Mutual Conductance (mA/V)	g_m		3.4‡
Amplification Factor	μ		18‡
Maximum Heater/Cathode Voltage (volts r.m.s.)	$V_{h\text{-}k\ (max)}$	150†	150†
Maximum Grid 1/Cathode Resistance (Self Bias) (megohms)	$R_{g1\text{-}k(max)}$	2§	

* Maximum Peak Positive Anode Voltage (pulse) 2.0kV

Maximum Peak Negative Anode Voltage (pulse) 500V

Maximum pulse duration 4% of one cycle and not more than 800μs.

‡ Measured at $V_a = 200V$, $I_a = 10mA$.

† Measured with respect to the higher potential heater pin.

§ Maximum Tetrode Grid1/Cathode resistance, fixed bias, 1 megohm.

The characteristics for the triode section of the 30PL13 are the same as for the 6/30L2 triode.

March 1960 Issue 1/2

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

30PL13

EDISWAN

MAZDA

30PL13

TRIODE OUTPUT BEAM TETRODE

TENTATIVE

DIMENSIONS

Maximum Overall Length	(mm)	78.5
Maximum Diameter	(mm)	22.2
Maximum Seated Height	(mm)	71.5
Approximate Nett Weight	(ozs)	$\frac{1}{2}$
Approximate Packed Weight	(ozs)	$\frac{3}{4}$

MOUNTING POSITION—Unrestricted

TYPICAL OPERATION—Frame Time-Base.

The frame output stage should be designed to allow for valve spread and deterioration during life in addition to component variation. Values of total tetrode peak anode current available from a new average valve and at the assumed end of life point on any valve are as follows :

	V_a	V_{g2}	V_{g1}	$I_{a(mA)}$
Average New Valve	55	170	—1	175
Assumed End of Life Condition	50	170	—1	110

March 1960 Issue 1/2

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

MAZDA

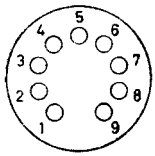
30PL13

TRIODE OUTPUT BEAM TETRODE

TENTATIVE

30PL13

BASE—Noval (B9A)



Viewed from free end of pins.

CONNECTIONS

Pin 1	Triode Grid	g_t
Pin 2	Tetrode Cathode, Beam Plates, Shield	$k_q, b_{p,s}$
Pin 3	Tetrode Control Grid	g_1
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Tetrode Anode	aq
Pin 7	Tetrode Screen Grid	g_2
Pin 8	Triode Cathode	k_t
Pin 9	Triode Anode	a_t

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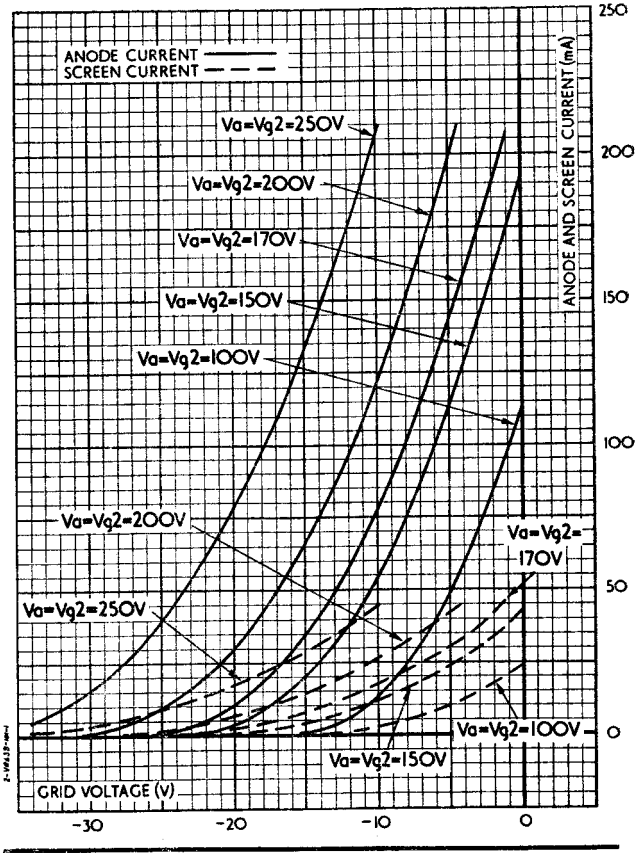
ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

30PL13

EDISWAN
MAZDA
30PL13
TRIODE OUTPUT BEAM TETRODE
TENTATIVE

CHARACTERISTIC CURVES : $I_a, I_{g2}/V_g$
Tetrode Section



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ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

MAZDA

30PL13

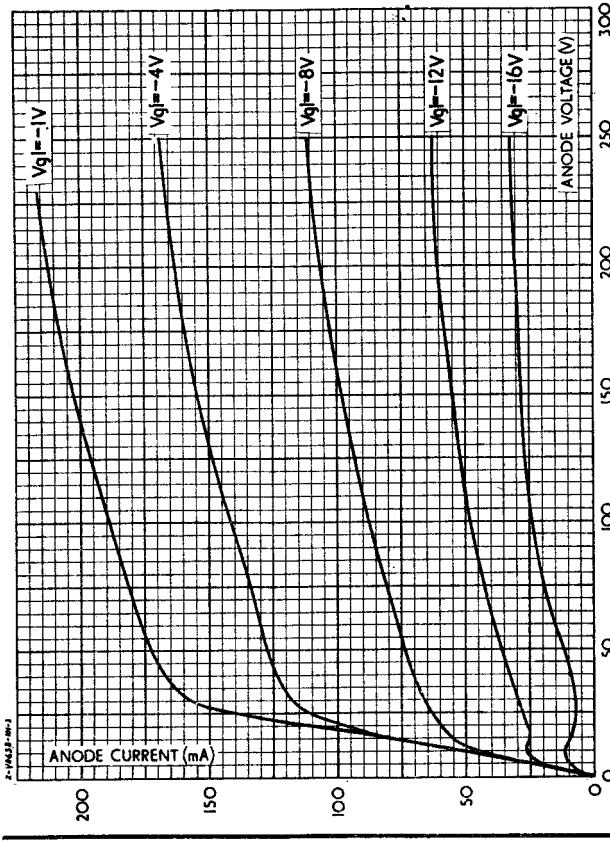
TRIODE OUTPUT BEAM TETRODE

TENTATIVE

CHARACTERISTIC CURVES: I_a/V_a

Tetrode Section

$V_{g2}=170V.$



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ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

MAZDA

30PL14

TRIODE OUTPUT BEAM TETRODE

Indirectly heated—for series operation

TENTATIVE

GENERAL

The 30PL14 is a High Power Triode Beam Tetrode, designed principally for the Frame Time Base circuit of television receivers using 110° and 114° cathode ray tubes.

Each section has its own cathode.

The characteristics for the triode section are the same as for the 6/30L2 triode.

RATINGS

		Tetrode	Triode	
Heater Voltage	V_h	16		V
Heater Current	I_h	0·3		A
Maximum Anode Voltage	$V_{a(max)}$	250*	250	V
Maximum Screen Voltage	$V_{g2(max)}$	250	·	V
Maximum Anode Dissipation	$p_{a(max)}$	8	1	W
Maximum Screen Dissipation	$p_{g2(max)}$	2	·	W
Mutual Conductance	g_m	·	3·4†	mA/V
Amplification Factor	μ	·	18†	
Maximum Mean Cathode Current	$I_{k(av)max}$	75	·	mA
Maximum Heater/Cathode Voltage (r.m.s.)	$V_{h\text{-}k(max)}$	150**	150**	V
Maximum Resistance Grid 1/Cathode (Self Bias)		2	·	MΩ
Maximum Resistance Grid 1/Cathode (Fixed Bias)		1	·	MΩ

* Maximum peak anode voltage (pulse positive) 2·0kV.
Maximum peak anode voltage (pulse negative) 500V.
Maximum pulse duration 5% of one cycle with a maximum of 1 msec.

** Measured with respect to the higher potential heater pin.

† $V_a = 200V$, $I_a = 10mA$.

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

30PL14

EDISWAN

MAZDA

30PL14

TRIODE OUTPUT BEAM TETRODE

Indirectly heated—for series operation

TENTATIVE

DIMENSIONS

Maximum Overall Length	78·5 (mm)
Maximum Diameter	22·2 (mm)
Maximum Seated Height	71·5 (mm)

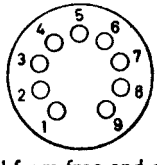
MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION—Frame Time Base

The output stage should be designed to allow for valve spread and deterioration during life in addition to component variation. Values of total peak anode current available for a new average valve and at assumed end of life point for any valve are as follows :—

	V_a	V_{g2}	V_{g1}	I_a
Average New Valve	55V	170V	−1V	210mA
Average New Valve	55V	185V	−1V	235mA
Assumed End of Life Condition	50V	170V	−1V	135mA
Assumed End of Life Condition	50V	185V	−1V	151mA

BASE—Noval (B9A)



Viewed from free end of pins

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

MAZDA

30PL14

TRIODE OUTPUT BEAM TETRODE

Indirectly heated—for series operation

TENTATIVE

CONNECTIONS

Pin 1	Triode Grid	g_t
Pin 2	Tetrode Cathode, Beam Plates, Screen	k_q, b_p, S
Pin 3	Tetrode Control Grid	g_1
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Tetrode Anode	a_q
Pin 7	Tetrode Screen Grid	g_2
Pin 8	Triode Cathode	k_t
Pin 9	Triode Anode	a_t

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31B81

CATHODE RAY TUBE—ALL ELECTROSTATIC 3½" DIA.
Post Deflection Acceleration
For High Precision Instruments

GENERAL

The 31B81 is a flat screen Cathode Ray Tube with post-deflection acceleration. It is suitable for high precision instruments.

RATING

Heater Voltage	V_h	6·3 V
Heater Current	I_h	0·5 A
Maximum Final Anode Voltage	$V_{a4(max)}$	8 kV
Minimum Final Anode Voltage	$V_{a4(min)}$	2 kV
Maximum Third Anode Voltage	$V_{a3(max)}$	4 kV
Minimum Third Anode Voltage	$V_{a3(min)}$	1 kV
Maximum Second Anode Voltage	$V_{a2(max)}$	2 kV
Maximum First Anode Voltage	$V_{a1(max)}$	2·5kV
Minimum First Anode Voltage	$V_{a1(min)}$	1 kV
Maximum Negative Grid Voltage	$V_{g(max)}$	−200 V
Minimum Negative Grid Voltage (cathode hot)	$V_{g(min)}$	0* V
Maximum Positive Grid Voltage (cathode cold)	$V_{g(max)}$	200 V
Maximum X1 Plate/X2 Plate Voltage	$V_{x1\text{-}x2(max)}$	1 kV
Maximum Y1 Plate/Y2 Plate Voltage	$V_{y1\text{-}y2(max)}$	1 kV
Maximum Heater/Cathode Voltage	$V_{h\text{-}k(max)}$	150 V
Maximum X Plate/Third Anode Resistance	$R_{x\text{-}a3(max)}$	5 MΩ
Maximum Y Plate/Third Anode Resistance	$R_{y\text{-}a3(max)}$	5 MΩ
Maximum Grid/Cathode Resistance	$R_{g\text{-}k(max)}$	2 MΩ
Minimum Heater/Cathode Resistance	$r_{h\text{-}k(min)}$	2† MΩ
Minimum Grid/Cathode Resistance	$r_{g\text{-}k(min)}$	10 MΩ

* The Grid must not become positive with respect to cathode.
† Heater 100V negative to cathode.

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31B81

CATHODE RAY TUBE—ALL ELECTROSTATIC 3½" DIA.
Post Deflection Acceleration
For High Precision Instruments

INTER-ELECTRODE CAPACITANCES (pF)

Cathode/All other electrodes	$c_{k\text{-all}}$	8
Grid/All other electrodes	$c_{g\text{-all}}$	17
X1 Deflecting Plate/X2 Deflecting Plate	$c_{x1\text{-}x2}$	2·5
Y1 Deflecting Plate/Y2 Deflecting Plate	$c_{y1\text{-}y2}$	3
X1 Deflecting Plate/All other electrodes except X2	$c_{x1\text{-all, less x2}}$	8
X2 Deflecting Plate/All other electrodes except X1	$c_{x2\text{-all, less x1}}$	8
Y1 Deflecting Plate/All other electrodes except Y2	$c_{y1\text{-all, less y2}}$	7·5
Y2 Deflecting Plate/All other electrodes except Y1	$c_{y2\text{-all, less y1}}$	7·5
Y1 Deflecting Plate/X1 or X2 Deflecting Plate (approx.)	$c_{y1\text{-x1 or x2}}$	0·1
Y2 Deflecting Plate/X1 or X2 Deflecting Plate (approx.)	$c_{y2\text{-x1 or x2}}$	0·2

CHARACTERISTICS

Second Anode Voltage (focus anode)	V_{a2}	350	V
Grid Bias Voltage for cut off at			
$V_{a1} = 1kV$	V_g	–35	V
$V_{a1} = 2kV$	V_g	–70	V
$V_{a1} = 2{\cdot}5kV$	V_g	–87	V
X Plate Sensitivity ($V_{a4} = V_{a3}$)	S_x	$\frac{800}{V_{a3}}$	mm/V
Y Plate Sensitivity ($V_{a4} = V_{a3}$)	S_y	$\frac{520}{V_{a3}}$	mm/V
X Plate Sensitivity ($V_{a4} = 2V_{a3}$)	S_x	$\frac{620}{V_{a3}}$	mm/V
Y Plate Sensitivity ($V_{a4} = 2V_{a3}$)	S_y	$\frac{400}{V_{a3}}$	mm/V
Grid Voltage (Drive) at $I_{a4} = 25\mu A$, $V_{a1} = 2kV$	V_g	<32	V

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31B81

CATHODE RAY TUBE—ALL ELECTROSTATIC $3\frac{1}{2}$" DIA.
Post Deflection Acceleration
For High Precision Instruments

The undeflected spot will fall within a circle of 5 mm radius from the centre of the tube face.

The Plate sensitivity for a deflection of less than 75% of the useful scan will not differ from that for 25% by more than 2%.

The edges of a raster with mean dimensions which are 75% of the useful scan will not deviate from the mean rectangle by more than $2\frac{1}{2}$%.

The minimum useful screen area is a circle of 3·7 cm radius.

Orthogonality of deflection axes is $\pm 1\%$.

DEFLECTION DISTORTION

In any Cathode Ray Tube using a simple post-deflection accelerator, the application of the accelerating potential results in deflection distortion, which becomes more pronounced as the ratio of V_{a4}/V_{a3} is increased.

It is recommended that for work involving the measurement of relative deflection amplitudes directly on the tube face this ratio should not exceed 2 : 1.

ORIENTATION

Looking at the screen with the spigot key upward, a positive potential applied to X1 will deflect the spot to the left and a positive potential applied to Y1 will deflect the spot upward.

MAGNETIC SHIELDING

The magnetic shield should be of high permeability material, of a thickness determined by the magnetic field at the tube position. The shield should be earthed. To obtain optimum results equipment containing Cathode Ray Tubes should always be designed to minimise the magnetic field around the tubes, as magnetic shielding can never be completely effective. In addition to the more obvious deflection effects of alternating fields, steady magnetic fields from smoothing chokes, magnetised steel components, etc., can produce spot distortion or low gun efficiency.

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

31B81

EDISWAN

31B81

CATHODE RAY TUBE—ALL ELECTROSTATIC $3\frac{1}{2}$" DIA.
Post Deflection Acceleration
For High Precision Instruments

DIMENSIONS

Maximum Overall Length	360mm
Maximum Screen Diameter	92mm
Maximum Neck Diameter	52mm

MOUNTING

The tube should not be supported by the base alone, but should preferably be held in a rubber-lined clamping ring at the screen end together with a similar clamp round the magnetic screen close to the base.

The socket should have sufficient freedom of movement to accommodate the tube overall length tolerance and a small amount of lateral float to ensure good pin contact without straining the base.

SCREEN PHOSPHORS

Type	*Colour*	*Persistence*	*Application*
T1	Green	Medium	Visual
T3	Blue Actinic	Short	Photographic
T4	White	Medium Short	Visual/ Photographic
T6	Yellow Afterglow	Long	Visual
T7	Orange Afterglow	Very Long	Visual

TYPICAL OPERATION

Final Anode Voltage	V_{a4}	4 kV
Third Anode Voltage	V_{a3}	2 kV
Second Anode Voltage	V_{a2}	350 V
First Anode Voltage	V_{a1}	2 kV
Grid Voltage	V_g	–60 V
Third Anode Current	I_{a3}	1 μA
Final Anode Current (=I screen)	I_{a4}	2 μA

The Line width at $I_{screen} = 0{\cdot}5\mu A$ is 0·3mm measured on a circle 50mm diameter.

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

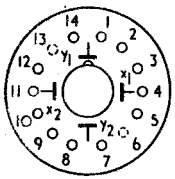
EDISWAN

31B81

CATHODE RAY TUBE—ALL ELECTROSTATIC 3½" DIA.
Post Deflection Acceleration
For High Precision Instruments

SIDE CONTACT—CT8

BASE—B14A (Diheptal)



Viewed from free end of pins.

CONNECTIONS

Pin 1	Heater	h
Pin 2	Cathode	k
Pin 3	Grid	g
Pin 4	First Anode	a1
Pin 5	Second Anode	a2
Pin 6	No pin	NP
Pin 7	Deflector Plate Y1	Y1
Pin 8	Deflector Plate Y2	Y2
Pin 9	Third Anode	a3
Pin 10	Deflector Plate X2	x2
Pin 11	Deflector Plate X1	x1
Pin 12	No Connection	NC
Pin 13	No Pin	NP
Pin 14	Heater	h
Cap	Final Anode	a4

January, 1961 ADVANCE DATA

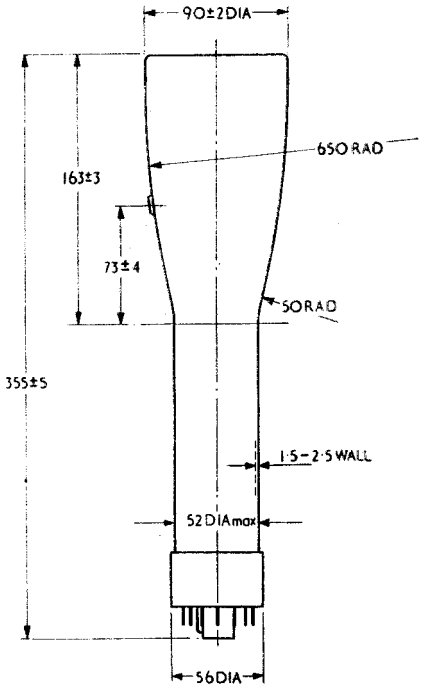
Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31B8I

CATHODE RAY TUBE—ALL ELECTROSTATIC $3\frac{1}{2}$" DIA.
Post Deflection Acceleration
For High Precision Instruments



All Dimensions in mm.

April, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31B82

CATHODE RAY TUBE—ALL ELECTROSTATIC 5″ DIA.
Helical Post Deflection Acceleration
For High Performance Oscillography

GENERAL

The 31B82 is a precision Cathode Ray Tube designed for high performance oscillography. It has high deflection sensitivity and a helical post-deflection accelerator which allows the application of high p.d.a. ratios. The screen is aluminised and the deflector plates are brought out to side arms.

RATING

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·6	A
Maximum Final Anode Voltage	$V_{a4(max)}$	12	kV
Maximum Second Anode Voltage	$V_{a2(max)}$	800	V
Maximum First and Third Anode Voltage	$V_{a1,a3(max)}$	2	kV
Maximum Negative Grid Voltage	$V_{g(max)}$	–200	V
Maximum Positive Grid Voltage	$V_{g(max)}$	0*	V
Maximum Third Anode Peak Voltage to X or Y plates	$V_{a3(pk)max}$	500	V
Maximum Heater/Cathode Voltage	$V_{h-k(max)}$	180	V
Maximum Isolating Shield Voltage	$V_{is(max)}$	2·1	kV
Maximum Deflector Plate Shield Voltage	$V_{def(max)}$	2·1	kV

* The grid must not become positive with respect to cathode.

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

31B82

EDISWAN

31B82

CATHODE RAY TUBE—ALL ELECTROSTATIC 5″ DIA.
Helical Post Deflection Acceleration
For High Performance Oscillography

INTER-ELECTRODE CAPACITANCES (pF)†

Cathode/All other electrodes	$C_{k\text{-}all}$	4·6
Grid/All other electrodes	$C_{g\text{-}all}$	6·4
X1 Deflecting Plate/X2 Deflecting Plate	$C_{x1\text{-}x2}$	1·9
Y1 Deflecting Plate/Y2 Deflecting Plate	$C_{y1\text{-}y2}$	1·5
X1 Deflecting Plate/All other electrodes	$C_{x1\text{-}all}$	3·5
X2 Deflecting Plate/All other electrodes	$C_{x2\text{-}all}$	3·5
Y1 Deflecting Plate/All other electrodes	$C_{y1\text{-}all}$	2·8
Y2 Deflecting Plate/All other electrodes	$C_{y2\text{-}all}$	2·8

† With holder balanced out.

POST DEFLECTION ACCELERATOR—Helical

Resistance	R_{pda}	200–600	MΩ

ORIENTATION

Looking at the screen with the p.d.a. contact to the left, a positive potential applied to X1 will deflect the spot to the left and a positive potential applied to Y1 will deflect the spot upward.

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31B82

CATHODE RAY TUBE—ALL ELECTROSTATIC 5" DIA.
Helical Post Deflection Acceleration
For High Performance Oscillography

DIMENSIONS

Maximum Overall Length	469 mm
Maximum Screen Diameter	135·4 mm
Maximum Neck Diameter	52·55mm

MOUNTING

The tube should not be supported by the base alone, but should preferably be held in a rubber-lined clamping ring at the screen end together with a similar clamp round the magnetic screen close to the base.
The socket should have sufficient freedom of movement to accommodate the tube overall length tolerance and a small amount of lateral float to ensure good pin contact without straining the base.

SCREEN PHOSPHORS

Type	*Colour*	*Persistence*	*Application*
T1	Green	Medium	Visual
T3	Blue Actinic	Short	Photographic
T4	White	Medium Short	Visual/ Photographic
T6	Yellow Afterglow	Long	Visual
T7	Orange Afterglow	Very Long	Visual
T8	Yellow Afterglow	Medium Long	Visual

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

31B82

EDISWAN

31B82

CATHODE RAY TUBE—ALL ELECTROSTATIC 5″ DIA.
Helical Post Deflection Acceleration
For High Performance Oscillography

TYPICAL OPERATION

Final Anode Voltage	V_{a4}	10 kV
Second Anode Voltage	V_{a2}	180 to 590 V
First and Third Anode Voltage	$V_{a1,a3}$	1·67kV
Grid Bias Voltage for cut-off	V_g	–50 to –80 V
Isolation Shield Voltage	V_{is}	1·57 to 1·7*kV
Deflector Plate Shield Voltage	V_{def}	1·57 to 1·7‡kV

* The inner end of the helix and the isolation shield are connected together inside the tube. With the correct potential on these electrodes, barrel and pin-cushion effects are minimised.

‡ Adjustment of the deflection plate shield potential controls the linearity of the Y deflection by variation of the edge effect of the Y deflection plates.

For many purposes the deflection plate shield (pin 12) may be connected externally to the isolation shield.

DEFLECTION CHARACTERISTICS—Under above conditions

Sensitivity of X Plates	S_x	$\frac{560}{V_{a3}}$ mm/V
Sensitivity of Y Plates	S_y	$\frac{2800}{V_{a3}}$ mm/V
Useful X Plate Scan		10 cm
Useful Y Plate Scan		4 cm

The undeflected spot will fall within a circle of 5 mm radius from the centre of the tube face.

Orthogonality of deflection axes : $\pm$ 1%

The edges of a raster the size of the useful scan will not deviate from the mean rectangle by more than 1·5%.

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

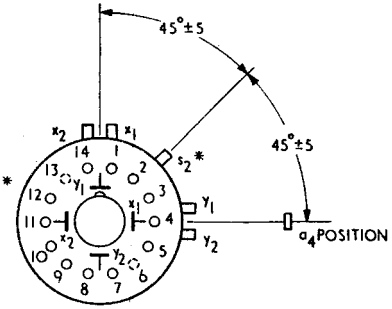
EDISWAN

31B82

CATHODE RAY TUBE—ALL ELECTROSTATIC 5" DIA.
Helical Post Deflection Acceleration
For High Performance Oscillography

SIDE CONTACT—CT8

BASE—B14A (Diheptal)



Viewed from free end of pins.

CONNECTIONS

Pin 1	Heater	h
Pin 2	Cathode	k
Pin 3	Grid	g
Pin 4	No Connection	NC
Pin 5	Second Anode	a2
Pin 6	No Pin	NP
Pin 7	No Connection	NC
Pin 8	No Connection	NC
Pin 9	First and Third Anode	a1, a3
Pin 10	No Connection	NC
Pin 11	No Connection	NC
Pin 12*	Deflector Plate Shield	S1
Pin 13	No Pin	NP
Pin 14	Heater	h
Cap	Final Anode	a4
*	Isolation Shield	S2

January, 1961 ADVANCE DATA

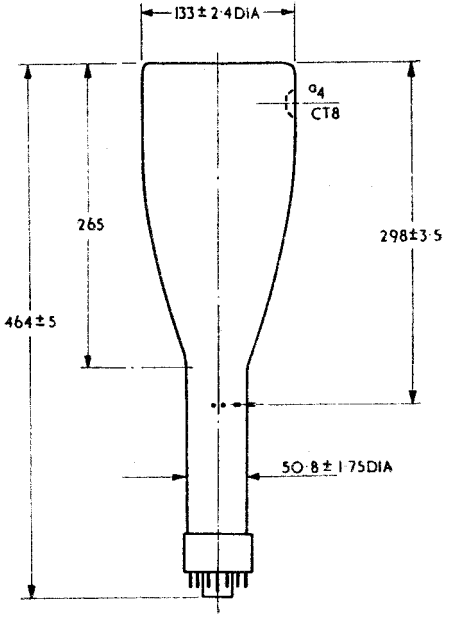
Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31B82

CATHODE RAY TUBE—ALL ELECTROSTATIC 5" DIA.
Helical Post Deflection Acceleration
For High Performance Oscillography



All Dimensions in mm.

April, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

MAZDA

31C1

6" MAGNETIC ALUMINISED CATHODE RAY TUBE

Indirectly heated—for Radio D.F. Compass
(High Brightness Level)

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.72
Maximum Anode Voltage (volts)	$V_{a\ (max)}$	10,000*
Minimum Anode Voltage (volts)	$V_{a\ (min)}$	7,500

* The maximum rating of 10kV is a Design Centre rating. The absolute rating of 12.5kV maximum must not be exceeded.

INTER-ELECTRODE CAPACITANCES (pF)§

Grid 1/all other electrodes	$c_{g,all}$	4.7
Cathode/all other electrodes	$c_{k,all}$	5.3

§ These capacitances include a "Cinch" wafer duodecal holder.

DIMENSIONS

Maximum Overall Length (mm)	468
Maximum Face Diameter (mm)	160
Maximum Neck Diameter (mm)	35
Approximate Nett Weight (lbs)	2¼
Approximate Packed Weight (lbs)	16¼

NOTES

The 31C1 Cathode Ray Tube has a concave face treated to reduce specular reflection and has an internal compass scale graduated with octantal correction. The 31C1 and 31C2 differ only in the manner of scale graduation.

TYPICAL OPERATION

Anode Voltage (volts)	V_a	9,500
Negative Grid Bias for cut-off of 140 mm focused line (volts)	V_g	43–93
Average Peak to Peak modulating Voltage for modulation up to 150 μA (volts)		30
Maximum Peak to Peak modulating Voltage for modulation of Limit C.R. Tube up to 150 μA (volts)		35

Typical Operation (*continued overleaf*)

MAZDA

3IC1

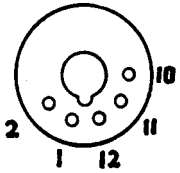
6" MAGNETIC ALUMINISED CATHODE RAY TUBE

Indirectly heated—for Radio D.F. Compass
(High Brightness Level)

The heater and cathode should be connected at the same DC potential. In the case of cathode modulation it is recommended that a resistance not exceeding 100,000 ohms should be inserted between heater and cathode.

A resistance should be inserted in the anode circuit in order to limit the discharge current to 100mA max., in the event of a flash over inside the tube.

BASE—(B12A) 5 pin



Viewed from Free End of Pins

ANODE CAP—Cavity (CT8)

CONNECTIONS

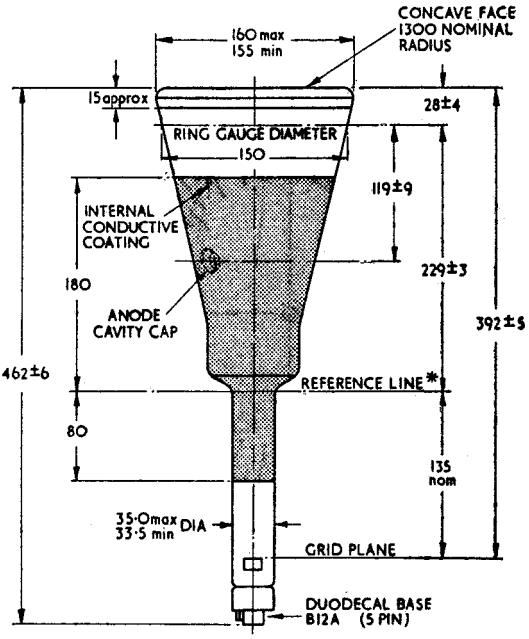
Pin 1	Heater	h
Pin 2	Grid	g
Pin 3	No Pin	NP
Pin 4	No Pin	NP
Pin 5	No Pin	NP
Pin 6	No Pin	NP
Pin 7	No Pin	NP
Pin 8	No Pin	NP
Pin 9	No Pin	NP
Pin 10	No Internal Connection	NC
Pin 11	Cathode	k
Pin 12	Heater	h
Cap	Anode	a

EDISWAN

3IC1

6" MAGNETIC ALUMINISED CATHODE RAY TUBE

Indirectly heated—for Radio D.F. Compass (High Brightness Level)



All dimensions in mm.

Anode Cap in line (±15°) with keyway on base.

*Determined by Reference Line Gauge No. 6. (See Section 3)

3ICI

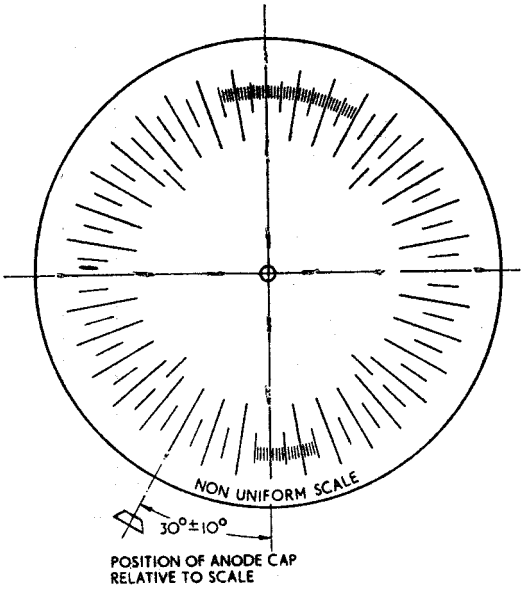
EDISWAN

3ICI

6" MAGNETIC ALUMINISED CATHODE RAY TUBE

Indirectly heated—for Radio D.F. Compass
(High Brightness Level)

SCALE ARRANGEMENT.



July 1959 — INDUSTRIAL VALVE & CRT DIVISION — Issue 1/8

SIEMENS EDISON SWAN LIMITED

MAZDA

31C2

6" MAGNETIC ALUMINISED CATHODE RAY TUBE

Indirectly heated—for Radio D.F. Compass
(High Brightness Level)

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.72
Maximum Anode Voltage (volts)	$V_{a(max)}$	10,000*
Minimum Anode Voltage (volts)	$V_{a(min)}$	7,500

*The maximum rating of 10kV is a design centre rating. The absolute rating of 12.5 kV maximum must not be exceeded.

INTER-ELECTRODE CAPACITANCES (pF)§

Grid 1/all other electrodes	$c_{g,all}$	4.7
Cathode/all other electrodes	$c_{k,all}$	5.3

§These capacitances include a "Cinch" wafer type duodecal holder.

DIMENSIONS

Maximum Overall Length (mm)	468
Maximum Face Diameter (mm)	160
Maximum Neck Diameter (mm)	35
Approximate Nett Weight (lbs)	$2\frac{1}{4}$
Approximate Packed Weight (lbs)	$16\frac{1}{4}$

NOTES

The 31C2 Cathode Ray Tube has a concave face treated to reduce specular reflection and has an internal compass scale uniformly graduated. The 31C1 and 31C2 differ only in the manner of scale graduation.

MAZDA

31C2

6" MAGNETIC ALUMINISED CATHODE RAY TUBE

Indirectly heated—for Radio D.F. Compass
(High Brightness Level)

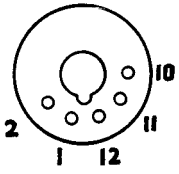
TYPICAL OPERATION

Anode Voltage (volts)	V_a	9,500
Negative Grid Bias for cut-off of 140mm focused line (volts)	V_g	43–93
Average peak to peak modulating voltage for modulation up up to 150μA (volts)		30
Maximum peak to peak modulating voltage for modulation up to 150 μA (volts)		35

The heater and cathode should be connected at the same DC potential. In the case of cathode modulation it is recommended that a resistance not exceeding 100,000 ohms should be inserted between heater and cathode.

The anode circuit should include a resistance which will limit the discharge current to 100 mA max. in the event of a flash-over inside the tube.

BASE—B12A



Viewed from free end of pins.

CAP. Cavity C,T, 8.

MAZDA

31C2

6" MAGNETIC ALUMINISED CATHODE RAY TUBE

Indirectly heated—for Radio D.F. Compass
(High Brightness Level)

VALVE HOLDER—Ediswan Clix VH93/5, VH92/7, VH92/12

CONNECTIONS

Pin 1	Heater	h
Pin 2	Control Grid	g
Pin 3	No Pin	NP
Pin 4	No Pin	NP
Pin 5	No Pin	NP
Pin 6	No Pin	NP
Pin 7	No Pin	NP
Pin 8	No Pin	NP
Pin 9	No Pin	NP
Pin 10	No Internal Connection	N.C.
Pin 11	Cathode	k
Pin 12	Heater	h
CAP	Anode	a

October, 1957 *Industrial* *VALVE & CRT DIVISION* Issue 1/3

SIEMENS EDISON SWAN LIMITED

EDISWAN

31C81

CATHODE RAY TUBE–ALL ELECTROSTATIC 6″ DIA.
Post Deflection Acceleration
For High Precision Instruments

GENERAL

The 31C81 is a flat screen Cathode Ray Tube with post-deflection acceleration. It is suitable for high precision instruments.

RATING

Heater Voltage	V_h	6·3	V
Heater Current (approx)	I_h	0·5	A
Maximum Final Anode Voltage	$V_{a4(max)}$	8	kV
Minimum Final Anode Voltage	$V_{a4(min)}$	2	kV
Maximum Third Anode Voltage	$V_{a3(max)}$	4	kV
Minimum Third Anode Voltage	$V_{a3(min)}$	1	kV
Maximum Second Anode Voltage	$V_{a2(max)}$	2	kV
Maximum First Anode Voltage	$V_{a1(max)}$	2·5	kV
Minimum First Anode Voltage	$V_{a1(min)}$	1	kV
Maximum Negative Grid Voltage	$V_{g(max)}$	–200	V
Minimum Negative Grid Voltage (Cathode Hot)	$V_{g(min)}$	0*	V
Maximum Positive Grid Voltage (Cathode Cold)	$V_{g(max)}$	200	V
Maximum X1 Plate/X2 Plate Voltage	$V_{x1\text{-}x2(max)}$	1	kV
Maximum Y1 Plate/Y2 Plate Voltage	$V_{y1\text{-}y2(max)}$	1	kV
Maximum Heater/Cathode Voltage	$V_{h\text{-}k(max)}$	150	V
Maximum X Plate/Third Anode Resistance	$R_{x\text{-}a3(max)}$	5	MΩ
Maximum Y Plate/Third Anode Resistance	$R_{y\text{-}a3(max)}$	5	MΩ
Maximum Grid/Cathode Resistance	$R_{g\text{-}k(max)}$	2	MΩ
Minimum Heater/Cathode Resistance	$r_{h\text{-}k(min)}$	2†	MΩ
Minimum Grid/Cathode Resistance	$r_{g\text{-}k(min)}$	10	MΩ

* The Grid must not become positive with respect to cathode.

† Heater 100V Negative with respect to cathode.

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31C81

CATHODE RAY TUBE–ALL ELECTROSTATIC 6″ DIA.
Post Deflection Acceleration
For High Precision Instruments

INTER-ELECTRODE CAPACITANCES (pF)

Cathode/All other electrodes	$C_{k\text{-all}}$	8
Grid/All other electrodes	$C_{g\text{-all}}$	17
X1 Deflecting Plate/X2 Deflecting Plate	$C_{x1\text{-}x2}$	2·5
Y1 Deflecting Plate/Y2 Deflecting Plate	$C_{y1\text{-}y2}$	3
X1 Deflecting Plate/All other electrodes except X2	$C_{x1\text{-all,less X2}}$	8
X2 Deflecting Plate/All other electrodes except X1	$C_{x2\text{-all,less X1}}$	8
Y1 Deflecting Plate/All other electrodes except Y2	$C_{y1\text{-all,less Y2}}$	7·5
Y2 Deflecting Plate/All other electrodes except Y1	$C_{y2\text{-all,less Y1}}$	7·5
Y1 Deflecting Plate/X1 or X2 Deflecting Plate (approx.)	$C_{y1\text{-x1 or x2}}$	0·1
Y2 Deflecting Plate/X1 or X2 Deflecting Plate (approx.)	$C_{y2\text{-x1 or x2}}$	0·2

DEFLECTION DISTORTION

In any Cathode Ray Tube using a simple post-deflection accelerator, the application of the accelerating potential results in deflection distortion, which becomes more pronounced as the ratio of the V_{a4}/V_{a3} is increased. It is recommended that for work involving the measurement of relative deflection amplitudes directly on the tube face this ratio should not exceed 2 : 1.

ORIENTATION

Looking at the screen with the spigot key upward, a positive potential applied to X1 will deflect the spot to the left and a positive potential applied to Y1 will deflect the spot upward.

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RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31C81

CATHODE RAY TUBE–ALL ELECTROSTATIC 6" DIA.
Post Deflection Acceleration
For High Precision Instruments

MAGNETIC SHIELDING

The magnetic shield should be of high permeability material, of a thickness determined by the magnetic field at the tube position. The shield should be earthed. To obtain optimum results, equipment containing Cathode Ray Tubes should always be designed to minimise the magnetic field around the tubes, as magnetic shielding can never be completely effective. In addition to the more obvious deflection effects of alternating fields, steady magnetic fields from smoothing chokes, magnetised steel components, etc., can produce spot distortion or low gun efficiency.

DIMENSIONS

Maximum Overall Length	500mm
Maximum Screen Diameter	163mm
Maximum Neck Diameter	52mm

MOUNTING

The tube should not be supported by the base alone, but should preferably be held in a rubber-lined clamping ring at the screen end together with a similar clamp round the magnetic screen close to the base. The socket should have sufficient freedom of movement to accommodate the tube overall length tolerance and a small amount of lateral float to ensure good pin contact without straining the base.

SCREEN PHOSPHORS

Type	*Colour*	*Persistence*	*Application*
T1	Green	Medium	Visual
T3	Blue Actinic	Short	Photographic
T4	White	Medium Short	Visual/ Photographic
T6	Yellow Afterglow	Long	Visual
T7	Orange Afterglow	Very Long	Visual

January, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

3IC81

CATHODE RAY TUBE–ALL ELECTROSTATIC 6″ DIA.
Post Deflection Acceleration
For High Precision Instruments

TYPICAL OPERATION

Final Anode Voltage	V_{a4}	4 kV
Third Anode Voltage	V_{a3}	2 kV
Second Anode Voltage	V_{a2}	350 V
First Anode Voltage	V_{a1}	2 kV
Grid Voltage	V_g	−60 V
Third Anode Current	I_{a3}	1 μA
Final Anode Current (=Screen Current)	I_{a4}	2 μA

The line width at $I_{screen} = 0{\cdot}5\mu A$ is 0·5 mm. measured on a circle of 50 mm. diameter.

CHARACTERISTICS

Second Anode Voltage (focus anode)	V_{a2}	350	V
Grid Bias Voltage for cut-off			
at $V_{a1} = 1kV$	V_g	−35	V
$V_{a1} = 2kV$	V_g	−70	V
$V_{a1} = 2{\cdot}5kV$	V_g	−87	V
X Plate Sensitivity ($V_{a4} = V_{a3}$)	S_x	$\frac{1170}{V_{a3}}$	mm/V
Y Plate Sensitivity ($V_{a4} = V_{a3}$)	S_y	$\frac{860}{V_{a3}}$	mm/V
X Plate Sensitivity ($V_{a4} = 2V_{a3}$)	S_x	$\frac{940}{V_{a3}}$	mm/V
Y Plate Sensitivity ($V_{a4} = 2V_{a3}$)	S_y	$\frac{710}{V_{a3}}$	mm/V
Grid Voltage (drive) at $I_{a4} = 25\mu A$, $V_{a1} = 2kV$	V_g	<32	V

The Plate sensitivity for a deflection of less than 75% of the useful scan will not differ from that for 25% by more than 2%.

The undeflected spot will fall within a circle of 7 mm radius from the centre of the tube face.

The minimum useful screen area is a circle of 7 cm radius.

Orthogonality of deflection axes is $\pm$ 1°.

The edges of a raster with mean dimensions which are 75% of the useful scan will not deviate from the mean rectangle by more than $2\frac{1}{2}$%.

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Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31C81

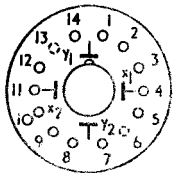
CATHODE RAY TUBE–ALL ELECTROSTATIC 6" DIA.

Post Deflection Acceleration

For High Precision Instruments

SIDE CONTACT—CT8

BASE—B14A (Diheptal)



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Cathode	k
Pin 3	Grid	g
Pin 4	First Anode	a1
Pin 5	Second Anode	a2
Pin 6	No Pin	NP
Pin 7	Deflector Plate Y1	Y1
Pin 8	Deflector Plate Y2	Y2
Pin 9	Third Anode	a3
Pin 10	Deflector Plate X2	X2
Pin 11	Deflector Plate X1	X1
Pin 12	No Connection	NC
Pin 13	No Pin	NP
Pin 14	Heater	h
Cap	Final Anode	a4

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Associated Electrical Industries Limited

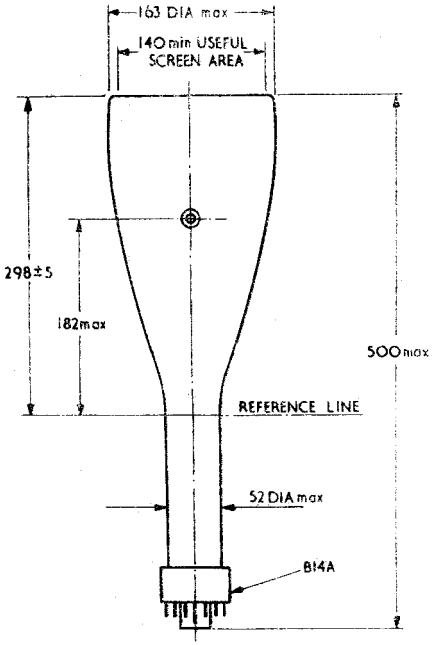
RADIO & ELECTRONIC COMPONENTS DIVISION

31C81

EDISWAN

31C81

CATHODE RAY TUBE–ALL ELECTROSTATIC 6" DIA.
Post Deflection Acceleration
For High Precision Instruments



All Dimensions in mm.

April, 1961 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31E12

12″ RADAR CATHODE RAY TUBE

Electrostatic Focus—Magnetic Deflection

GENERAL

The 31E12 is a 12″ aluminised cathode ray tube having a long afterglow T6 or T7 aluminised screen suitable for radar PPI display. The tube has a substantially flat face.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.6
Maximum Final Anode Voltage (kV)	$V_{a2+4(max)}$	12*
Minimum Final Anode Voltage (kV)	$V_{a2+4(min)}$	8
Maximum First Anode Voltage (volts)	$V_{a1(max)}$	400
Maximum Heater/Cathode Voltage (Heater Negative) (D.C.) (volts)	$V_{h\text{-}k(max)}$	150

* The maximum rating of 12kV is a Design Centre Rating. The Absolute Maximum of 14kV must not be exceeded.

INTER-ELECTRODE CAPACITANCES (pF)

Grid/Earth	$C_{g\text{-}E}$	9
Cathode/Earth	$C_{k\text{-}E}$	7
Second and Fourth Anode/External Conductive Coating	$C_{a2+4\text{-}M}$	1500

These Capacities include an Ediswan Clix holder CRT 92/7.

DIMENSIONS

Maximum Overall Length	(mm)	485
Maximum Diameter	(mm)	307
Maximum Neck Diameter	(mm)	35.5
Approximate Nett Weight	(lbs)	$11\frac{3}{4}$
Approximate Packed Weight	(lbs)	$23\frac{1}{4}$

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ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

31E12

12" RADAR CATHODE RAY TUBE

Electrostatic Focus—Magnetic Deflection

TYPICAL OPERATION

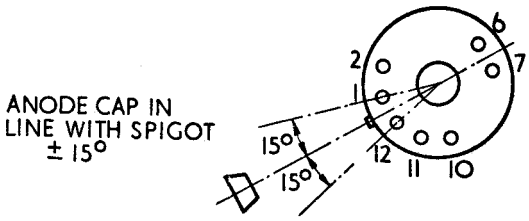
Final Anode Voltage (kV)	V_{a2+4}	12
First Anode Voltage (volts)	V_{a1}	300
Third Anode Voltage for focus (mean) (volts)	V_{a3}	0
Grid Bias for cut-off of 250mm focussed line (volts)	V_g	33—77
Average peak to peak modulating voltage for modulation up to 150 μA*		24
Persistence T6 Screen (secs)		50†
Persistence T7 Screen (secs)		175†

† Persistence is defined as the time taken from the cessation of continuous excitation for the luminance to decay from 1 Foot-Lambert to approximately 1% of that value.

* The T7 screen is liable to burn if a stationary or slowly moving spot is used even with low values of mean current.

The 31E12 is available with either a T6 Long Yellow Afterglow Screen or a T7 Very Long Orange Afterglow Screen.

BASE—Duodecal (B12A)



Viewed from free end of pins.

CAP—Cavity (CT8)

ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

3IE12

12" RADAR CATHODE RAY TUBE

Electrostatic Focus—Magnetic Deflection

CONNECTIONS

Pin 1	Heater	h
Pin 2	Grid	g
Pin 3	No Pin	NP
Pin 4	No Pin	NP
Pin 5	No Pin	NP
Pin 6	Third Anode	a3
Pin 7	Internal Connection	IC
Pin 8	No Pin	NP
Pin 9	No Pin	NP
Pin 10	First Anode	a1
Pin 11	Cathode	k
Pin 12	Heater	h
Cap	Second and Fourth Anode	a_2+4

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ASSOCIATED ELECTRICAL INDUSTRIES LTD.

RADIO & ELECTRONIC COMPONENTS DIVISION

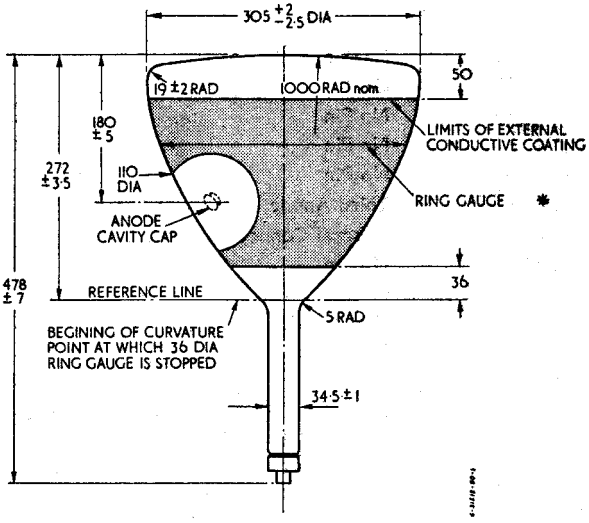
3IE12

EDISWAN

3IE12

12" RADAR CATHODE RAY TUBE

Electrostatic Focus—Magnetic Deflection



* Ring Gauge (mm)	Distance from centre of Screen (mm)
280	93 ± 10
230	150 ± 9
180	191 ± 8
130	222 ± 7
80	249 ± 6
36	272 ± 3.5

All dimensions in mm

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ASSOCIATED ELECTRICAL INDUSTRIES LTD.
RADIO & ELECTRONIC COMPONENTS DIVISION

MAZDA

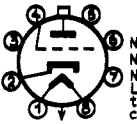
3IMA4

3IMA4

CATHOSCOPE

Cathode à chauffage indirect
Tension filament (CA ou CC) 6,3 Volts
Intensité filament 0,6 Amp.
Concentration: Magnétique.
Déflexion: Magnétique.
Nature de l'écran: Produit N°4, à fluorescence blanche pour reproduction des images de Télévision.
Encombrement R.5I-OC.1
Hauteur totale 490 mm
Diamètre écran 310 mm
Culot N° CL 221
Brochage 4.0-BA
Capacités inter-électrodes :
Wehnelt, par rapport aux autres électrodes 8 pF max.
Cathode, par rapport aux autres électrodes 8 pF max.
Demi-angle d'ouverture du faisceau 26 à 27 degrés.

Broches:
N°1- Filament.
N°2- Cathode.
N°3- Non connectée.
N°4- Wehnelt.
N°5- Non connectée.



Broches:
N°6- Non connectée.
N°7- Non connectée.
N°8- Filament. L'anode d'accélération est reliée à la corne du ballon.

Broches du culot, face à l'observateur.

Conditions normales d'utilisation

Tension maximum d'anode	7.000 Volts max.
Tension normale d'anode	5.500 Volts
Tension de Wehnelt pour extinction de l'image	-28 à -62 Volts
Tension de crête du Wehnelt pour une modulation complète du tube(1)	26 Volts approx.
Tension entre filament et cathode	± 100 Volts max.
Dimensions de l'image normale	190 x 253 mm.
Bobine de concentration	450 Amp./Tours
Résolution maximum	819 Lignes.

Utilisation

Le cathoscope MAZDA 3I MA4, à concentration et déflexion magnétiques, est pourvu d'un écran donnant des images de télévision en blanc et noir.

Il est recommandé d'utiliser le tube avec une tension d'anode d'au moins 5.500 volts. Cette tension dépend largement de la brillance d'image désirée et de la puissance de balayage disponible.

La puissance de balayage nécessaire est directement proportionnelle à la tension d'anode du tube. En tous cas, pour obtenir une couleur d'écran agréable à l'oeil, il est recommandé de ne pas adopter une tension d'anode inférieure à 5.000 volts.

(Suite au Verso)

REPRODUCTION INTERDITE

3IMA4

MAZDA

3IMA4

CATHOSCOPE

Une résistance de protection d'environ 25.000 ohms doit être placée entre l'anode du tube et l'alimentation H.T.

Les éléments du récepteur de télévision, particulièrement les transformateurs, doivent être blindés ou convenablement placés afin que les champs de fuite soient sans influence sur le faisceau électronique.

La position de la bobine de concentration dépend de la dimension du spot désirée. Cette dimension est choisie de telle sorte que les lignes de l'image ne puissent pas être discernées à la distance normale de vue, de l'écran. Pour une distance égale à environ six fois la hauteur de l'image et pour une tension d'anode de 5.500 volts, l'écartement entre le diaphragme du Wehnelt et le milieu de l'entrefer de la bobine doit être de l'ordre de 40 mm. Ceci s'applique à des bobines de concentration ayant des entrefers de l'ordre de 6 mm. Dans ces conditions 450 Ampères-tours environ sont nécessaires pour la concentration.

Le fait de déplacer la bobine de concentration vers le diaphragme du Wehnelt accroît la dimension, du spot et le nombre d'ampères-tours requis et, inversement, le fait de l'éloigner réduit la dimension du spot et le nombre d'ampères-tours.

Les bobines de déflexion doivent être montées aussi près que possible de l'épaulement du col.

Nota.-

1. La tension élevée qui est appliquée au tube 3I MA4 est très dangereuse. De grandes précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension; par exemple, des disjoncteurs doivent couper le circuit primaire de l'alimentation H.T. et la décharge du condensateur doit être assurée automatiquement dès l'ouverture du panneau de protection de l'appareil.

2. Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous chocs ou contraintes brusques, car l'"implosion" du tube peut provoquer des accidents graves. Dans les appareils de télévision ou autres montages utilisant le 3I MA4, une glace de protection épaisse doit être placée en permanence devant l'écran du tube.

(1) La modulation complète correspond à un courant de faisceau nul pour les noirs de l'image et à un courant de 150 µA pour les blancs.

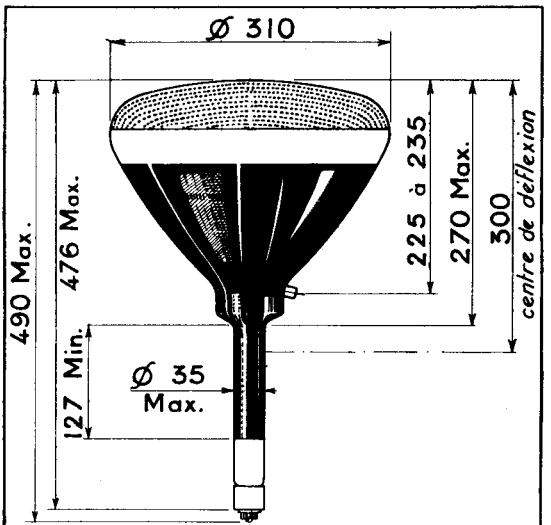
REPRODUCTION INTERDITE

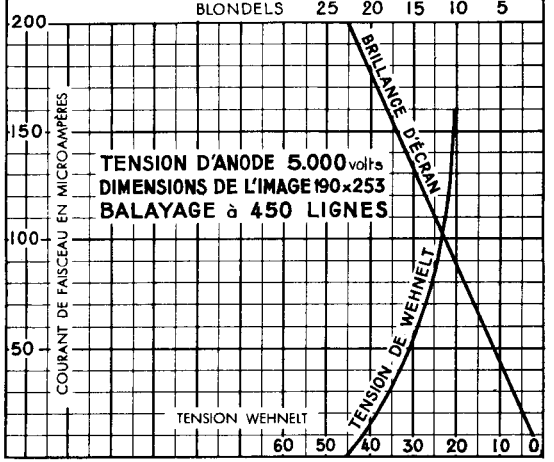
MAZDA

3IMA4

3IMA4

CATHOSCOPE
DIMENSIONS ET COURBE
CARACTÉRISTIQUE





REPRODUCTION INTERDITE

MAZDA

31MC4

TUBE ÉLECTROMAGNÉTIQUE DE 31 cm MUNI D'UN PIÈGE A IONS, POUR TÉLÉVISION

31MR4

TUBE ÉLECTROMAGNÉTIQUE DE 31 cm A ÉCRAN ALUMINISÉ ET PIÈGE A IONS, POUR TÉLÉVISION

31MG4

TUBE ÉLECTROMAGNÉTIQUE DE 31 cm A FOND PLAT ET PIÈGE A IONS, POUR TÉLÉVISION

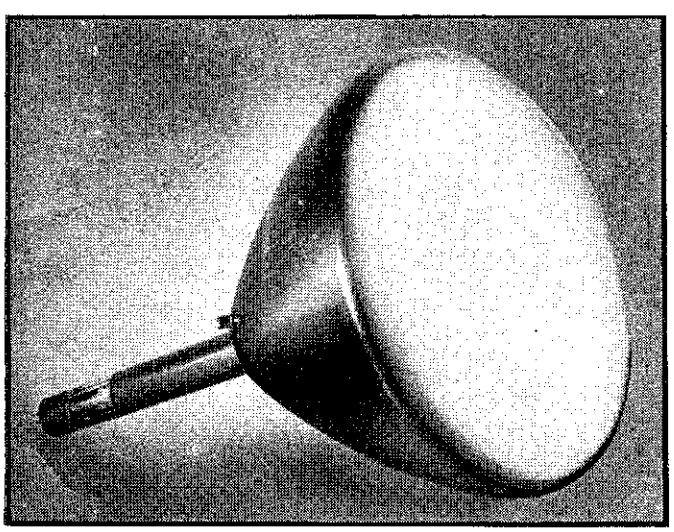
31MS4

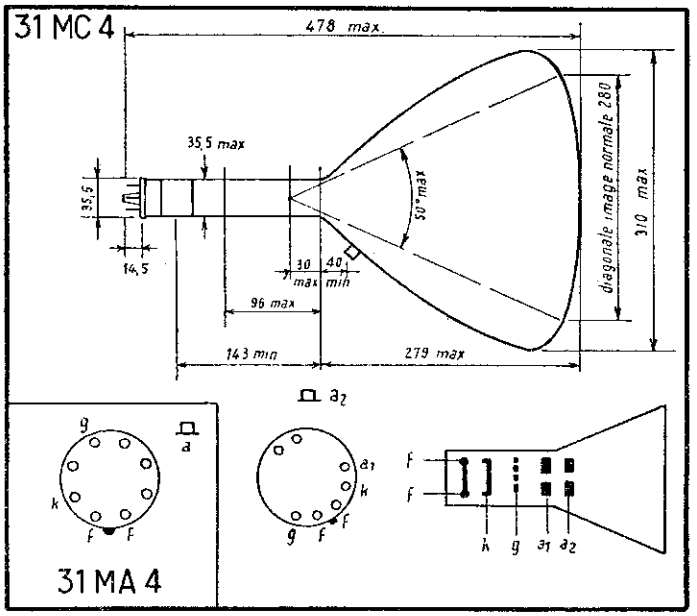
TUBE ÉLECTROMAGNÉTIQUE DE 31 cm A FOND PLAT, ÉCRAN ALUMINISÉ ET PIÈGE A IONS, POUR TÉLÉVISION

CULOT	CHAUFFAGE
Duodécal 7 broches	6,3 V 0,6 A

CAPACITES

Grille	6,5 pF
Cathode	5 pF
Anode 2 à revêtement ext. max.	2.500 pF





CARACTERISTIQUES D'UTILISATION

Tension d'anode 2	9 kV
Tension d'anode 1	250 V
Tension de modulation (crête)	12 V
Tension de grille 1 pour extinction de l'image	—30 à —70 V
Courant dans le piège (1)	100 mA
Bobine de concentration	450 A/t.

(1) Pour un piège à ions tel que celui présenté page 16. D'autres caractéristiques sont possibles, à condition que soit maintenu le nombre des ampères-tours pour chaque bobine.

CARACTERISTIQUES LIMITES

Tension minimum d'anode 2	6 kV
Tension maximum d'anode 2	11 kV
Tension maximum d'anode 1	400 V
Tension minimum de grille 1	0 V
Tension maximum de grille 1	—200 V
Tension maximum filament-cathode	150 V
Résolution maximum	850 lignes

31MA4

(C 310 MW 1)

TUBE TRIODE DE REMPLACEMENT

Culot	voir dessin ci-dessus
Filament	6,3 V 0,6 A
Tension normale d'anode	5,5 kV
Tension maximum d'anode	7 kV

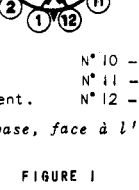
MAZDA

36 MG 4

36 MG 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

Cathode à chauffage indirect	
Tension filament	6,3 Volts
Intensité filament	0,6 Ampère
Concentration et déflexion	Magnétiques
Piège à ions	Magnétique
Nature de l'écran : produit N°4 à fluorescence blanche.	
Encombrement *(voir figure 1)*	R.70-DC1
Hauteur totale	435 mm max.
Diagonale de l'écran *(voir figure 2)*	350 mm
Dimensions de l'image normale	207 x 276 mm
Culot	Duo Décal
Brochage *(voir figure 1)*	5.D-CC
Capacités inter-électrodes :	
Wehnelt, par rapport aux autres électrodes	6 pF
Cathode, par rapport aux autres électrodes	5 pF
Capacité entre recouvrement extérieur et anode N°2	1500 pF max.
Angles d'ouverture du faisceau :	
Diagonale	70 degrés
Horizontale	65 degrés
Verticale	50 degrés



N° 1 – Filament.
N° 2 – Wehnelt.
N° 3 à N°9 – manquent.
N° 10 – Anode N° 1.
N° 11 – Cathode.
N° 12 – Filament.

Broches de la base, face à l'Observateur.

FIGURE 1

L'anode N° 2 est reliée à un bouton placé sur le ballon qui se trouve dans le plan méridien passant par les broches 6 et 12 (à ± 15° près) et du côté de la broche 6 *(voir figure 2)*

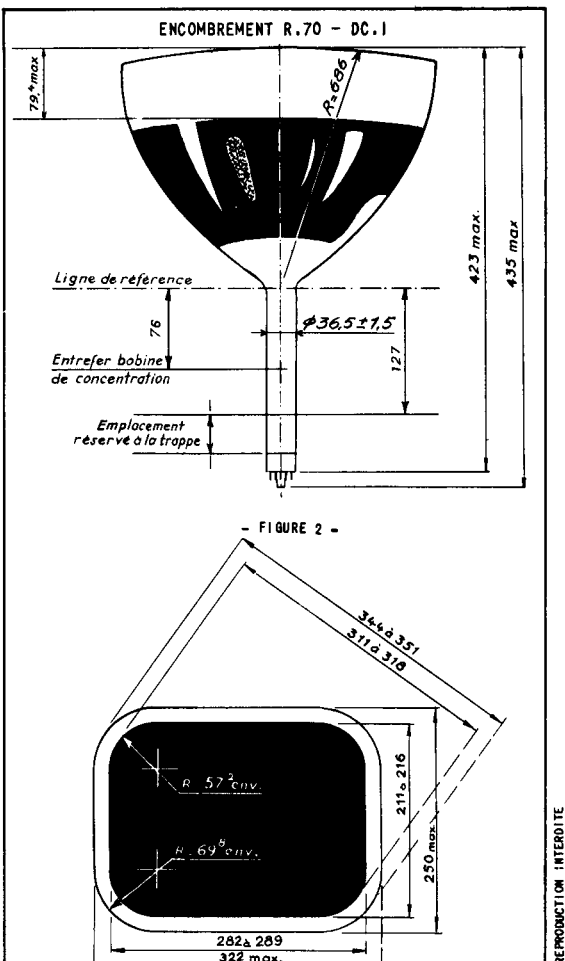
REPRODUCTION INTERDITE

36 MG 4

MAZDA

36 MG 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS



REPRODUCTION INTERDITE

MAZDA

43 MG 4

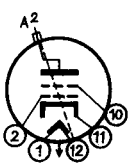
43 MG 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

Le Cathoscope 43MG4 est un tube à rayons cathodiques pour télévision, à concentration et déflexion magnétiques. Il est muni d'un piège à ions éliminant tout risque d'apparition de tache ionique.

La face sphérique de l'écran est à grand rayon de courbure. Sa forme rectangulaire correspondant aux dimensions relatives des images de télévision (4×3).

Cathode à Chauffage Indirect	
Tension filament	6,3 Volts
Intensité filament	0,6 Ampère
Concentration et déflexion	Magnétiques
Piège à ions	Magnétique
Nature de l'écran : produit N°4 à fluorescence blanche.	
Encombrement *(voir figure 2)*	R.74-DC.1
Hauteur totale	490 mm. ± 10mm
Diagonale de l'écran *(voir figure 2)*	425 mm.
Dimensions de l'image normale	275 x 365 mm. env.
Culot	Duo Décal
Brochage *(voir figure 1)*	5.D - CC
Capacités inter-électrodes :	
Wehnelt, par rapport aux autres électrodes	6 pF
Cathode, par rapport aux autres électrodes	5 pF
Capacité entre recouvrement extérieur et anode n° 2	1500 pF max.
Angles d'ouverture du faisceau :	
Diagonale	70 degrés
Horizontale	65 degrés



5.D - CC

Broches de la base, face à l'observateur.

N° 1 - FILAMENT.
N° 2 - WEHNELT.
N° 3 à N° 9 - MANQUENT.
N° 10 - ANODE N° 1.
N° 11 - CATHODE.
N° 12 - FILAMENT.

- FIGURE 1 -

L'anode N° 2 est reliée à un bouton, placé sur le ballon, qui se trouve dans le plan méridien passant par les broches 6 et 12 (à ±30° près) et du côté de la broche 6 (voir figure 2).

REPRODUCTION INTERDITE.

MAZDA

43 MG 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

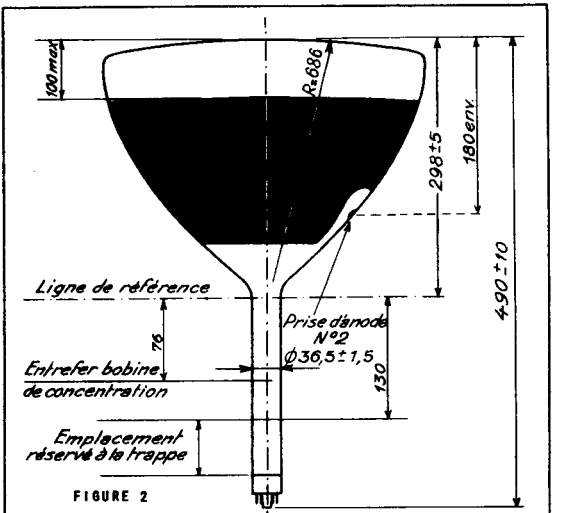
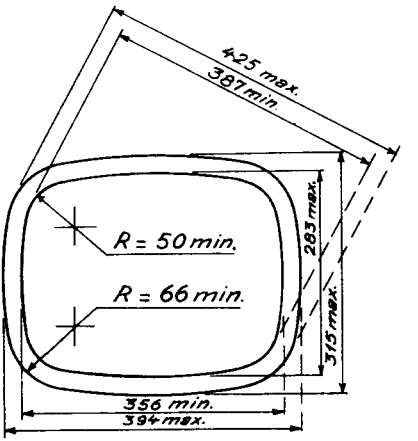


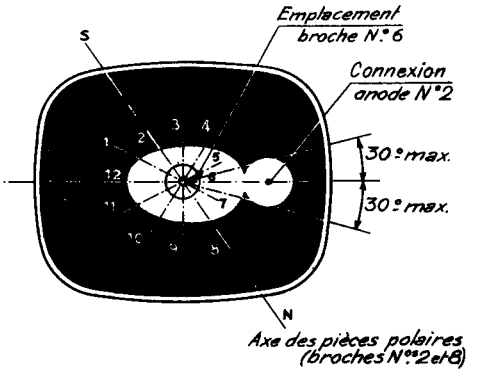
FIGURE 2

ENCOMBREMENT R.74 - DC.1



REPRODUCTION INTERDITE

CATHOSCOPE
TÉTRODE A PIÈGE A IONS



- FIGURE 2 -

NOTA

A - La tension élevée qui est appliquée au tube 43MG4 est dangereuse. Des précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension.
La norme U.T.E. n°C.92-210 du 8 Avril 1954, précise les règles de sécurité applicables.

B - Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous chocs ou contraintes brusques car, l'implosion du tube peut provoquer des accidents graves.
La norme U.T.E. n°C.92-210 du 8 Avril 1954, précise les règles de sécurité applicables.

REPRODUCTION INTERDITE.

43 MG 4

MAZDA

43 MG 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

CONDITIONS MAXIMA D'UTILISATION

Tension maximum d'anode N° 2	16.000 V max.
Tension maximum d'anode N° 1	410 V max.
Tension de Wehnelt maximum	0 V max.
Tension de Wehnelt minimum	−125 V max.
Tension de crête entre filament et cathode pendant la période de chauffage (filament négatif par rapport à la cathode) 15 sec. max.	410 V max.
Tension maximum entre filament et cathode en fonctionnement	± 150 V max.
Résolution maximum	850 lignes

CONDITIONS NORMALES D'UTILISATION

Tension d'anode N° 2 (1)	14.000 Volts
Tension d'anode N° 1	300 Volts
Tension de Wehnelt pour l'extinction de l'image	−33 à −77 Volts
Bobine de concentration (2)	670 ± 10 % Amp./tours
Champ de la trappe à ions	35 gauss env.

MISE EN PLACE ET REGLAGE DU PIEGE A IONS
(et réalisation d'un piège électromagnétique)

REMARQUE IMPORTANTE - Une trappe à ions mal réglée sur un canon sous tension risque de projeter la totalité du faisceau électronique sur un point limité, de la paroi d'anode, entraînant pour celle-ci une dissipation excessive pouvant aller à la longue, (quelques minutes) jusqu'à la perforation.
Il est donc indispensable que, durant le réglage du piège à ions, l'opérateur ne soit troublé par aucune inquiétude concernant le comportement électrique du reste de l'appareillage lequel doit par conséquent avoir été soigneusement vérifié et essayé avant la mise sous tension des deux anodes du cathoscope.

---

(1) La brillance et la définition décroissent avec la tension anode. En général, on n'utilise pas une tension inférieure à 10.000 Volts.

(2) Avec bobine de concentration normale dont l'entrefer est à environ 76 mm. de la ligne de référence et les tensions de polarisation et de vidéo ajustées pour obtenir une brillance de 350 blondels sur une image couvrant tout l'écran.

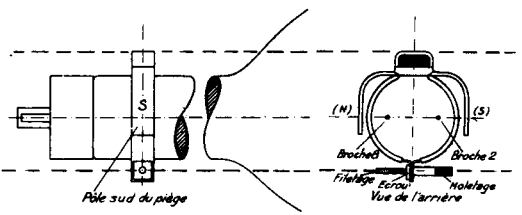
REPRODUCTION INTERDITE.

43 MG 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

I - PIEGE A AIMANT PERMANENT

Placer le piège sur le col du tube conformément aux vues de la *figure 3*



- FIGURE 3 -

Régler en définitive le piège ainsi monté :
a) en faisant glisser l'ensemble lentement sur le col du tube sans en changer l'orientation.
b) le cas échéant en tournant légèrement l'ensemble en le maintenant dans son plan.
Le réglage est obtenu lorsque l'on observe un maximum de brillance de l'image.
Un dérégiage du piège se manifeste, s'il est faible par une perte de brillance et s'il est plus important par une ombre sur un coin ou sur un bord de l'image.

II - PIEGE ELECTROMAGNETIQUE.

A - REALISATION

Les pièces polaires des électro-aimants ne sont formées que par les demi-bagues qui doivent être faites en *fer doux*. Par contre, le ou les pontets supérieurs, la visserie, ou d'une manière générale, toutes les pièces destinées au serrage sur le col du cathoscope doivent être exécutées en métal non magnétique (bronze, laiton, aluminium).

Dans ce dernier ordre d'idées de nombreuses variantes sont permises jusqu'à la suppression pure et simple du ou des pontets, le serrage se faisant uniquement par les demi-bagues formant ressorts.

Dans tous les cas, des garnitures de feutre ou de caoutchouc sont indispensables pour éviter de dangereuses rayures du col au cours des manipulations du réglage.

REPRODUCTION INTERDITE.

MAZDA

43 MG 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

B - MISE EN PLACE ET REGLAGE

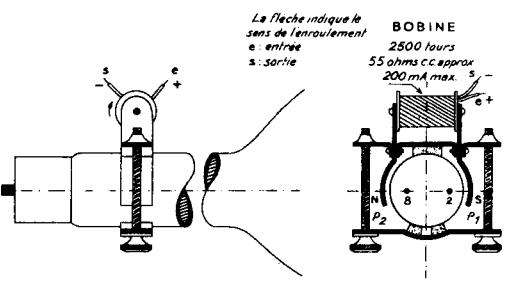
S'assurer d'abord que la polarité et le sens d'enroulement indiqués sur la vue de gauche de la *figure 4* sont bien respectés.

- placer ensuite le piège sur le col du tube et conformément à la même vue.

Régler ce piège ainsi monté :
a) en agissant sur le courant traversant la bobine,
b) le cas échéant, en tournant légèrement l'ensemble en le maintenant dans son plan.

Le règlage est obtenu, lorsque l'on observe un maximum de brillance de l'image.

Un déréglage du piège se manifeste, s'il est faible par une perte de brillance et s'il est plus important par une ombre sur un coin ou sur un bord de l'image.



- FIGURE 4 -

La tension étant appliquée dans le sens indiqué, la pièce polaire P_2 marquée (N) doit attirer le pôle sud d'une boussole.

REPRODUCTION INTERDITE.

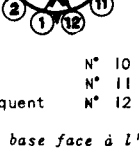
MAZDA

43 MH 4

43 MH 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

Cathode à chauffage indirect	
Tension filament	6,3 Volts
Intensité filament	0,6 Ampère
Concentration et déflexion	Magnétiques
Piège à ions	Magnétique
Nature de l'écran: produit N°4 à fluorescence blanche	
Encombrement *(voir figure 2)*	R.73-DC1
Hauteur totale	499 mm. max.
Diagonale de l'écran	425 mm.
Dimensions de l'image normale	275 x 365 mm
Culot	Duo Décal
Brochage	5.D - CC
Capacités inter-électrodes :	
Wehnelt, par rapport aux autres électrodes	6 pF
Cathode, par rapport aux autres électrodes	5 pF
Capacité entre recouvrement extérieur et anode N°2	1.500 pF max.
Angles d'ouverture du faisceau:	
Diagonale	70 degrés
Horizontale	65 degrés



N° 1 - Filament.	N° 10 - Anode N° 1.
N° 2 - Wehnelt.	N° 11 - Cathode.
N° 3 à N° 9 - manquent	N° 12 - Filament.

Broches de la base face à l'Observateur

FIGURE 1

L'anode N°2 est reliée à un bouton placé sur le ballon qui se trouve dans le plan méridien passant par les broches 6 et 12 (à ± 15° près) et du côté de la broche 6. *(Voir Figure 4).*

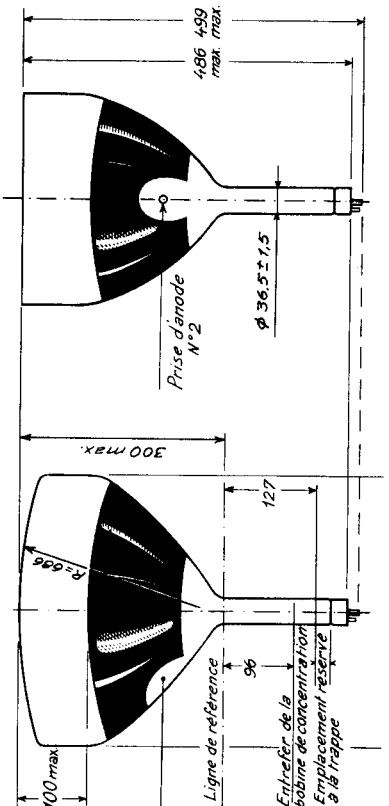
REPRODUCTION INTERDITE

MAZDA

43 MH 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

ENCOMBREMENT R.73 - DC.I



- FIGURE 2 -

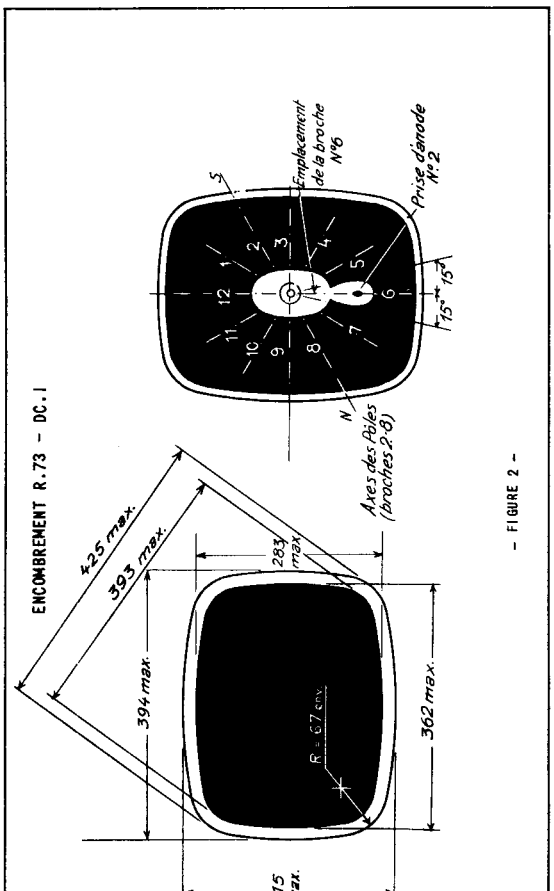
REPRODUCTION INTERDITE

MAZDA

43 MH 4

43 MH 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS



- FIGURE 2 -

REPRODUCTION INTERDITE

43 MH 4

MAZDA

43 MH 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS

CONDITIONS MAXIMA D'UTILISATION

Tension maximum d'anode N° 2	16.000 V max.
Tension maximum d'anode N° 1	410 V max.
Tension de Wehnelt maximum	0 V max.
Tension de Wehnelt minimum	- 125 V max.
Tension de crête entre filament et cathode pendant la période de chauffage (filament négatif par rapport à la cathode) 15 sec. max.	410 V max.
Tension maximum entre filament et cathode en fonctionnement	± 150 V max.
Résolution maximum	850 lignes

CONDITIONS NORMALES D'UTILISATION

Tension d'anode N° 2 (1)	14.000 Volts
Tension d'anode N° 1	300 Volts
Tension de Wehnelt pour l'extinction de l'image	-33 à -77 Volts
Bobine de concentration (2)	415 Ampères/Tours
Champ de la trappe à ions	35 gauss env.

NOTA

A - La tension élevée qui est appliquée au tube 43MH4 est très dangereuse. De grandes précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension par exemple, des disjoncteurs doivent couper le circuit primaire de l'alimentation haute tension et la décharge du condensateur doit être assurée automatiquement dès l'ouverture du panneau de protection de l'appareil.

B - Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous les chocs ou contraintes brusques car l'implosion du tube peut provoquer des accidents graves. Dans les appareils de télévision ou autres montages utilisant le 43 MH4 une glace de protection épaisse doit être placée en permanence devant l'écran du tube.

(1) La brillance et la définition décroissent avec la tension anode. En général, on n'utilise pas une tension inférieure à 10.000 Volts.

(2) Avec bobine de concentration normale dont l'entrefer est à environ 78mm. de la ligne de référence et les tensions de polarisation et de vidéo ajustées pour obtenir une brillance de 350 blondels sur une image couvrant tout l'écran.

REPRODUCTION INTERDITE

MAZDA

43 MR4

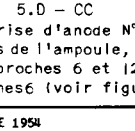
43 MR4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

Le cathoscope **43MR4** est un tube à rayons cathodiques pour télévision, à concentration et déflexion magnétiques. Il est muni d'un piège à ions éliminant tout risque d'apparition de tache ionique.

La face sphérique de l'écran est à grand rayon de courbure. Sa forme rectangulaire correspond aux dimensions relatives des images de télévision (4×3). Réalisé en verre neutre, il est métallisé intérieurement.

Cathode à chauffage indirect	
Tension filament	6,3 Volts
Intensité filament	0,6 + 10% Ampère
Concentration et déflexion	Magnétiques
Piège à ions	Magnétique
Nature de l'écran : produit N°4 à fluorescence blanche. Persistance moyenne	
Encombrement *(voir figure 2)*	R.74-DC.1
Longueur totale	490 ± 10 mm
Diagonale de l'écran *(voir figure 2)*	425 mm max.
Dimensions de l'image normale	275 × 365 mm env.
Culot	Duo Décal 5 broches.
Brochage *(voir figure 1)*	5.D - CC
Capacités inter-électrodes :	
Wehnelt par rapport aux autres électrodes	6 pF
Cathode par rapport aux autres électrodes	5 pF
Capacité entre recouvrement extérieur et anode n° 2 :	2000 pF env.
Angles d'ouverture du faisceau :	
Diagonale	70 degrès
Horizontale	65 degrès



Broches de la base, face à l'observateur.

N° 1 – FILAMENT.
N° 2 – WEHNELT.
N° 3 à N° 9 – MANQUENT.
N°10 – ANODE N° 1.
N°11 – CATHODE.
N°12 – FILAMENT.

5.D – CC

- FIGURE 1 -

La prise d'anode N°2 est située sur une des petites faces de l'ampoule, dans le plan méridien passant par les broches 6 et 12 (à ± 30° près) et du côté de la broche6 (voir figure 2).

REPRODUCTION INTERDITE.

43 MR 4

MAZDA

43 MR4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

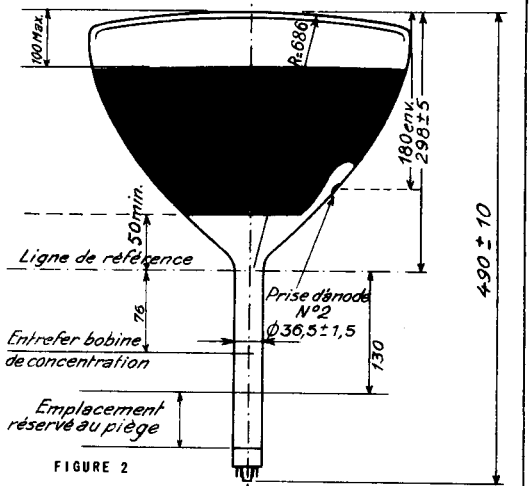
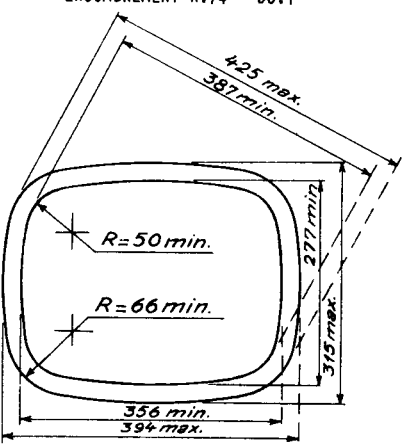


FIGURE 2

ENCOMBREMENT R.74 - DC.1



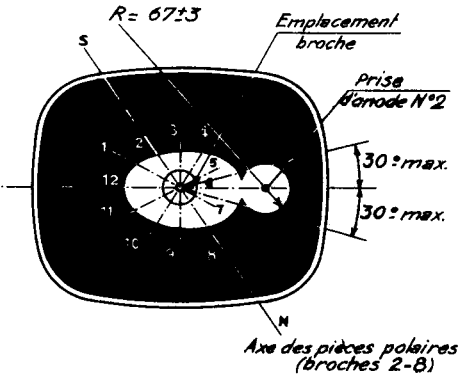
REPRODUCTION INTERDITE.

MAZDA

43MR4

43 MR 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ



- FIGURE 2 -

NOTA

A - La tension élevée qui est appliquée au tube 43MR4 est dangereuse. Des précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension.
La norme U.T.E. n°C.92-210 du 8 Avril 1954, précise les règles de sécurité applicables.

B - Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous chocs ou contraintes brusques car, l'implosion du tube peut provoquer des accidents graves.
La norme U.T.E. n°C.92-210 du 8 Avril 1954, précise les règles de sécurité applicables.

REPRODUCTION INTERDITE.

43 M R 4

MAZDA

43 M R 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

CONDITIONS MAXIMA D'UTILISATION

Tension maximum d'anode N° 2	16.000 V max.
Tension maximum d'anode N° 1	410 V max.
Tension de polarisation Wehnelt	
positive	0 V max.
négative	125 V max.
Tension de crête positive de Wehnelt	2 V max.
Tension de crête entre filament et cathode pendant la période de chauffage (15 sec. max. et filament négatif par rapport à la cathode)	410 V max.
Tension maximum entre filament et cathode en fonctionnement	± 150 V max.
Résolution maximum	850 lignes

CONDITIONS NORMALES D'UTILISATION

Tension d'anode N° 2	14.000	Volts
Tension d'anode N° 1	300	Volts
Tension de Wehnelt pour l'extinction de l'image	-33 à -77	Volts
Bobine de concentration (1)	670 ± 10 %	Amp./tours
Champ de la trappe à ions	35	gauss env.

MISE EN PLACE ET REGLAGE DU PIEGE A IONS
(et réalisation d'un piège électromagnétique)

REMARQUE IMPORTANTE - Un piège à ions mal réglé sur un canon sous tension risque de projeter la totalité du faisceau électronique sur un point limité de la paroi d'anode, entraînant pour celle-ci une dissipation excessive pouvant aller à la longue (quelques minutes) jusqu'à la perforation.
Il est donc indispensable que, durant le réglage du piège à ions, l'opérateur ne soit troublé par aucune inquiétude concernant le comportement électrique du reste de l'appareillage qui doit par conséquent avoir été soigneusement vérifié et essayé avant la mise sous tension des deux anodes du cathoscope.

(1) Avec bobine de concentration dont l'entrefer est à environ 76 mm, de la ligne de référence et les tensions de polarisation et de vidéo, ajustées pour obtenir une brillance de 350 blondels sur une image, couvrant tout l'écran.

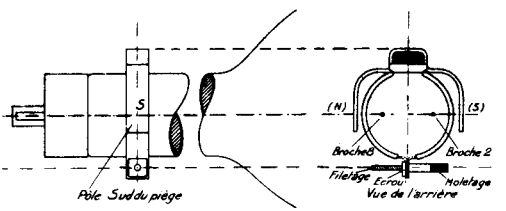
REPRODUCTION INTERDITE.

43 MR4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

I - PIEGE A AIMANT PERMANENT

Placer le piège sur le col du tube conformément aux vues de la *figure 3*



- FIGURE 3 -

Régler en définitive le piège ainsi monté :
a) en faisant glisser l'ensemble lentement sur le col du tube sans en changer l'orientation.
b) le cas échéant en tournant légèrement l'ensemble en le maintenant dans son plan.
Le réglage est obtenu lorsque l'on observe un maximum, de brillance de l'image.
Un déréglage du piège se manifeste, s'il est faible par une perte de brillance et s'il est plus important par une ombre sur un coin ou sur un bord de l'image.

II - PIEGE ELECTROMAGNETIQUE.

A - REALISATION

Les pièces polaires des électro-aimants ne sont formées que par les demi-bagues qui doivent être faites en ***fer doux***. Par contre, le ou les pontets supérieurs, la visserie, ou d'une manière générale, toutes les pièces destinées au serrage sur le col du cathoscope doivent être exécutées en métal non magnétique (bronze, laiton, aluminium).

Dans ce dernier ordre d'idées de nombreuses variantes sont permises jusqu'à la suppression pure et simple du ou des pontets, le serrage se faisant uniquement par les demi-bagues formant ressorts.

Dans tous les cas, des garnitures de feutre ou de caoutchouc sont indispensables pour éviter de dangereuses rayures du col au cours des manipulations du réglage.

REPRODUCTION INTERDITE.

MAZDA

43 MR4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

B - MISE EN PLACE ET REGLAGE

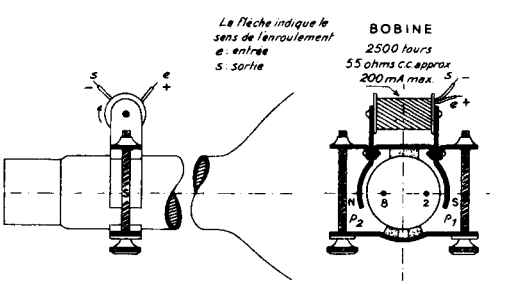
S'assurer d'abord que la polarité et le sens d'enroulement indiqués sur la vue de gauche de la *figure 4* sont bien respectés.

- placer ensuite le piège sur le col du tube et conformément à la même vue.

Régler ce piège ainsi monté :
a) en agissant sur le courant traversant la bobine,
b) le cas échéant, en tournant légèrement l'ensemble en le maintenant dans son plan.

Le règlage est obtenu, lorsque l'on observe un maximum de brillance de l'image.

Un déréglage du piège se manifeste, s'il est faible par une perte de brillance et s'il est plus important par une ombre sur un coin ou sur un bord de l'image.



- FIGURE 4 -

La tension étant appliquée dans le sens indiqué, la pièce polaire P_2 marquée (N) doit attirer le pôle sud d'une boussole.

REPRODUCTION INTERDITE.

MAZDA

54MS4

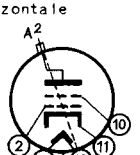
54 MS 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN METALLISÉ

Le cathoscope **54MS4** est un tube à rayons cathodiques pour télévision, à concentration et déflexion magnétiques. Il est muni d'un piège à ions éliminant tout risque d'apparition de tache ionique.

La face sphérique de l'écran est à grand rayon de courbure. Sa forme rectangulaire correspond aux dimensions relatives des images de télévision (4×3). Réalisé en verre neutre, il est métallisé intérieurement.

Cathode à chauffage indirect	
Tension filament	6,3 Volts
Intensité filament	0,6 + 10% Ampère
Concentration et déflexion	Magnétiques
Piège à ions	Magnétique
Nature de l'écran : produit N°4 à fluorescence blanche. Persistance moyenne	
Encombrement *(voir figure 2)*	R.75-DC.1
Longueur totale	594 max.
Diagonale de l'écran *(voir figure 2)*	542 mm max.
Dimensions de l'image normale	365 x 486 mm env.
Culot	Duc Décal 5 broches.
Brochage *(voir figure 1)*	5.D - CC
Capacités inter-électrodes :	
Wehnelt par rapport aux autres électrodes	6 pF
Cathode par rapport aux autres électrodes	5 pF
Capacité entre recouvrement extérieur et anode n° 2 :	750 pF env.
Angles d'ouverture du faisceau :	
Diagonale	70 degrés
Horizontale	67 degrés



Broches de la base.
face à l'observateur.

N° 1 – FILAMENT.
N° 2 – WEHNELT.
N° 3 à N° 9 – MANQUENT.
N°10 – ANODE N° 1.
N°11 – CATHODE.
N°12 – FILAMENT.

5.D – CC **– FIGURE 1 –**

La prise d'anode N°2 est située sur une des petites faces de l'ampoule, dans le plan méridien passant par les broches 6 et 12 (à ± 30° près) et du côté de la broche 6 (voir figure 2).

REPRODUCTION INTERDITE.

54MS4

MAZDA

54 MS 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

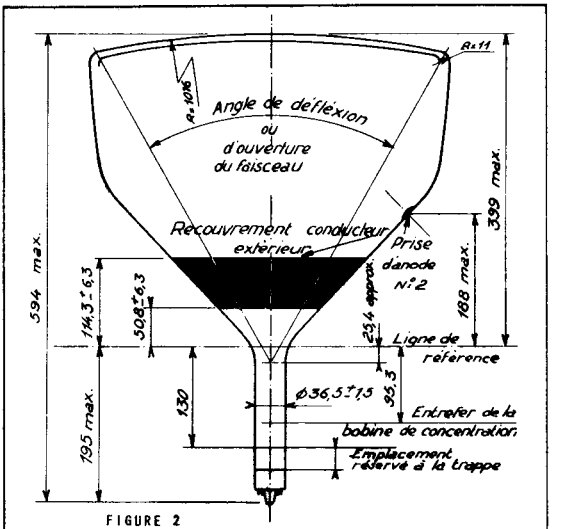
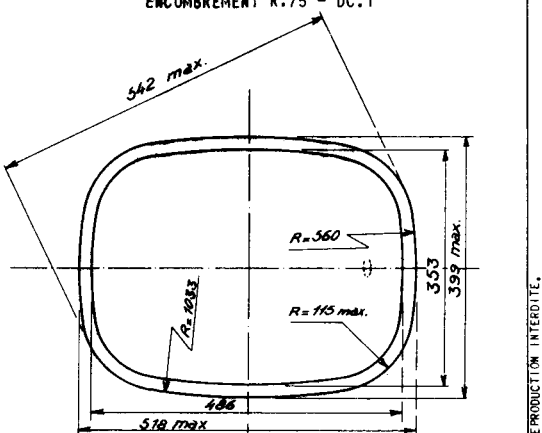


FIGURE 2

ENCOMBREMENT R.75 - DC.1



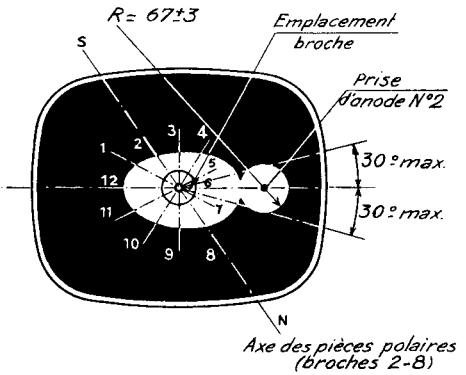
REPRODUCTION INTERDITE.

MAZDA

54MS4

54 MS 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISE



- FIGURE 2 -

NOTA

A - La tension élevée qui est appliquée à ces tubes est dangereuse. Des précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension.

La norme U.T.E. n° C.92.210 du 8 avril 1954 précise les règles de sécurité applicables.

B - Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous chocs ou contraintes brusques car, l'implosion du tube peut provoquer des accidents graves.

REPRODUCTION INTERDITE.

54MS4

MAZDA

54 MS 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

CONDITIONS MAXIMA D'UTILISATION

Tension maximum d'anode N° 2	18.000 V max.
Tension maximum d'anode N° 1	500 V max.
Tension de polarisation Wehnelt	
positive	0 V max.
négative	125 V max.
Tension de crête positive de Wehnelt	2 V max.
Tension de crête entre filament et cathode pendant la période de chauffage (15 sec. max. et filament négatif par rapport à la cathode)	410 V max.
Tension maximum entre filament et cathode en fonctionnement	± 180 V max.
Résolution maximum	850 lignes

CONDITIONS NORMALES D'UTILISATION

Tension d'anode N° 2	16.000 Volts
Tension d'anode N° 1	300 Volts
Tension de Wehnelt pour l'extinction de l'image	-33 à -77 Volts
Bobine de concentration (1)	710 ± 10 % Amp./tours
Champ de la trappe à ions	40 gauss env.

MISE EN PLACE ET REGLAGE DU PIEGE A IONS
(et réalisation d'un piège électromagnétique)

REMARQUE IMPORTANTE - Un piège à ions mal réglé sur un canon sous tension risque de projeter la totalité du faisceau électronique sur un point limité de la parci d'anode, entraînant pour celle-ci une dissipation excessive pouvant aller à la longue (quelques minutes) jusqu'à la perforation.
Il est donc indispensable que, durant le réglage du piège à ions, l'opérateur ne soit troublé par aucune inquiétude concernant le comportement électrique du reste de l'appareillage qui doit par conséquent avoir été soigneusement vérifié et essayé avant la mise sous tension des deux anodes du cathoscope.

(1) Avec bobine de concentration dont l'entrefer est à environ 76 mm. de la ligne de référence et les tensions de polarisation et de vidéo, ajustées pour obtenir une brillance de 350 blondels sur une image, couvrant tout l'écran.

REPRODUCTION INTERDITE.

MAZDA

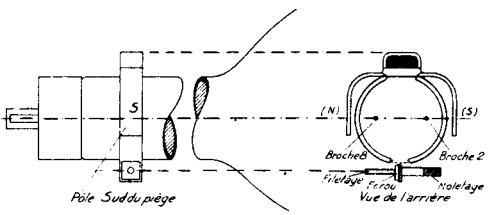
54MS4

54 MS 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

I - PIEGE A AIMANT PERMANENT

Placer le piège sur le col du tube conformément aux vues de la *figure* 3



- FIGURE 3 -

Régler en définitive le piège ainsi monté :
a) en faisant glisser l'ensemble lentement sur le col du tube sans en changer l'orientation.
b) le cas échéant en tournant légèrement l'ensemble en le maintenant dans son plan.
Le réglage est obtenu lorsque l'on observe un maximum, de brillance de l'image.
Un déréglage du piège se manifeste, s'il est faible par une perte de brillance et s'il est plus important par une ombre sur un coin ou sur un bord de l'image.

II - PIEGE ELECTROMAGNETIQUE.

A - REALISATION

Les pièces polaires des électro-aimants ne sont formées que par les demi-bagues qui doivent être faites en *fer doux*. Par contre, le ou les pontets supérieurs, la visserie, ou d'une manière générale, toutes les pièces destinées au serrage sur le col du cathoscope doivent être exécutées en métal non magnétique (bronze, laiton, aluminium).

Dans ce dernier ordre d'idées de nombreuses variantes sont permises jusqu'à la suppression pure et simple du ou des pontets, le serrage se faisant uniquement par les demi-bagues formant ressorts.

Dans tous les cas, des garnitures de feutre ou de caoutchouc sont indispensables pour éviter de dangereuses rayures du col au cours des manipulations du réglage.

REPRODUCTION INTERDITE.

54MS4

MAZDA

54 MS 4

CATHOSCOPE
TÉTRODE A PIÈGE A IONS
ET ÉCRAN MÉTALLISÉ

B - MISE EN PLACE ET REGLAGE

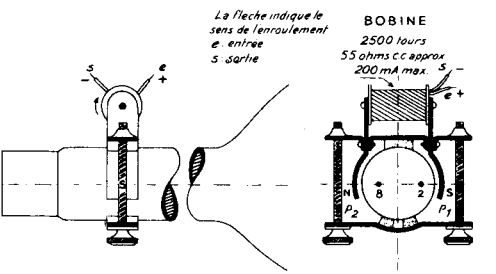
S'assurer d'abord que la polarité et le sens d'enroulement indiqués sur la vue de gauche de la *figure 4* sont bien respectés.

- placer ensuite le piège sur le col du tube et conformément à la même vue.

Régler ce piège ainsi monté :
a) en agissant sur le courant traversant la bobine,
b) le cas échéant, en tournant légèrement l'ensemble en le maintenant dans son plan.

Le règlage est obtenu, lorsque l'on observe un maximum de brillance de l'image.

Un déréglage du piège se manifeste, s'il est faible par une perte de brillance et s'il est plus important par une ombre sur un coin ou sur un bord de l'image.



- FIGURE 4 -

La tension étant appliquée dans le sens indiqué, la pièce polaire P_2 marquée (N) doit attirer le pôle sud d'une boussole.

REPRODUCTION INTERDITE.

MAZDA
78A

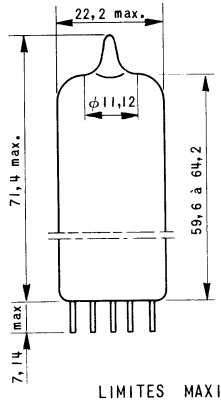
78A

DIODE SPECIALE POUR L'ENSEIGNEMENT

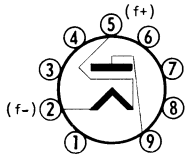
Le type 78A est une diode spéciale destinée à l'Enseignement, pour les manipulations des élèves. Sa particularité réside dans le fait que l'on peut mettre en évidence l'effet de saturation du courant d'anode sans risque de détérioration de la cathode.

CARACTERISTIQUES GENERALES

Cathode à chauffage direct
Ampoule ..... A22 - 4
Embase ..... noval



Broche n° 1 ..... connexion interne
Broche n° 2 ..... filament (-)
Broche n° 3 ..... connexion interne
Broche n° 4 ..... connexion interne
Broche n° 5 ..... filament (+)
Broche n° 6 ..... connexion interne
Broche n° 7 ..... connexion interne
Broche n° 8 ..... connexion interne
Broche n° 9 ..... anode



Broches de la base face à l'observateur.

LIMITES MAXIMALES D'UTILISATION

Courant de filament ..... 900 mA
Tension d'anode ..... 110 V

CARACTERISTIQUES DE COURANT D'ANODE

Le réseau de courbes de la page 2A correspond à un tube moyen. Les valeurs du courant d'anode peuvent varier d'un tube à un autre ou bien en fonction du temps, pour un même tube. Mais le relevé expérimental de la caractéristique Ia = f (va) permettra toujours d'atteindre le courant de saturation.

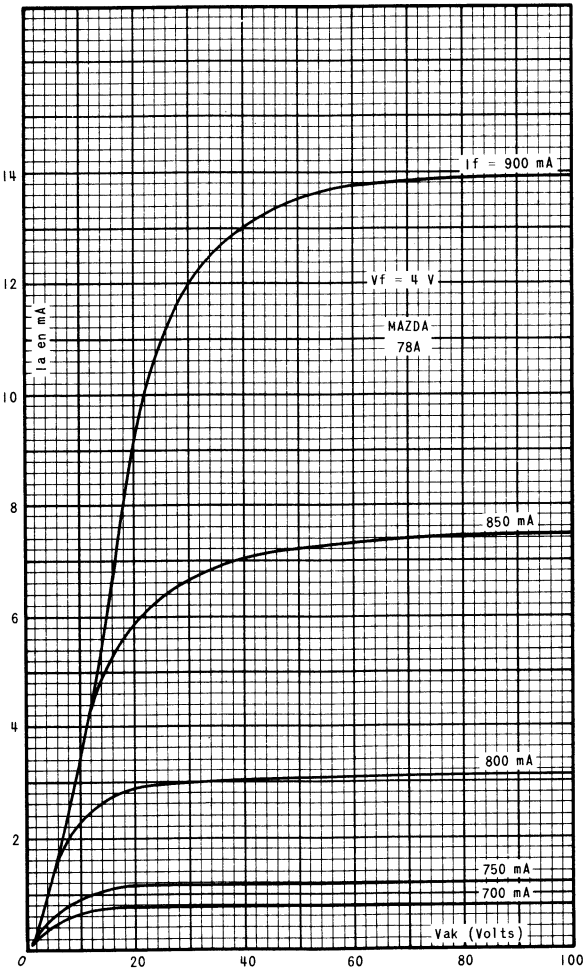
Le courant de filament a une valeur élevée. Il importe de tenir compte, lors de la manipulation, du montage utilisé pour les appareils de mesures (montage amont ou montage aval).

REPRODUCTION INTERDITE

78A

MAZDA
78A

COURBES DE FONCTIONNEMENT



REPRODUCTION INTERDITE

MAZDA
6/30L2

TELEVISION TWIN TRIODE
Indirectly heated—for series or parallel operation

TENTATIVE

GENERAL

This General Purpose Twin Triode is intended for use in television receivers and is suitable for A.C./D.C. or A.C. operation.

RATING		Notes
Heater Voltage (volts)	V_h	6·3
Heater Current (amps)	I_h	0·3
Mutual Conductance (mA/V)	g_m	3·4 (a)
Amplification Factor	μ	18 (a)
Maximum Anode Voltage (volts)	V_a (max)	250
Maximum Anode Dissipation (watts) (either section)	P_a (max)	2·0 (b)
Maximum Total Anode Dissipation (watts)	P_a (tot) max	2·5 (b)
Maximum Heater to Cathode Voltage (volts) (RMS)	$V_{h\text{-}k}$ (max)	150 (c)

Notes

(a) $V_a = 200$ volts. $I_a = 10$ mA.

(b) The permissible anode dissipation rating is dependent on the grid-cathode resistance, and the circuit employed. For the values quoted, the grid-cathode resistance should not exceed 0·25 megohms with cathode self bias.

(c) Measured with respect to the higher potential heater pin.

The potential of the internal shield must not be positive to that of either cathode.

6/30L2

MAZDA

6/30L2

TELEVISION TWIN TRIODE

Indirectly heated—for series or parallel operation

TENTATIVE

INTER-ELECTRODE CAPACITANCES (pF)

		†	‡
Grid 1/Earth	$c_{g',E}$	2·5	3·5
Grid 2/Earth	$c_{g'',E}$	2·4	3·5
Anode 1/Earth	$c_{a',E}$	2·1	3·2
Anode 2/Earth	$c_{a'',E}$	2·0	2·9
Grid 1/Anode 1	$c_{g',a,}$	2·5	2·8
Grid 2/Anode 2	$c_{g'',a''}$	2·5	2·8
Grid 1/Grid 2	$c_{g',g''}$	0·006	0·0064
Anode 1/Anode 2	$c_{a',a''}$	0·038	0·038
Grid 1/Anode 2	$c_{g',a''}$	0·014	0·015
Anode 1/Grid 2	$c_{a',g''}$	0·012	0·012

† Inter electrode capacity with holder capacity balanced out.

‡ Total inter electrode capacity including B9A ceramic holder (Carr Fastener holder type 77/076).

"Earth" denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	(mm)	56
Maximum Diameter (mm)	(mm)	22·2
Maximum Seated Height (mm)	(mm)	49
Approximate Nett Weight (ozs)	(ozs)	$\frac{1}{2}$
Approximate Packed Weight (ozs)	(ozs)	$\frac{3}{4}$

January, 1958 *VALVE & CRT DIVISION* Issue 1/2

SIEMENS EDISON SWAN LIMITED

MAZDA

6/30L2

TELEVISION TWIN TRIODE

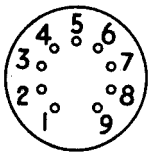
Indirectly heated—for series or parallel operation

TENTATIVE

MOUNTING POSITION—Unrestricted

BULB—Clear

BASE—NOVAL (B9A)



Viewed from Free End of Pins

CONNECTIONS

Pin 1	Anode 2	a″
Pin 2	Grid 2	g″
Pin 3	Cathode 2	k″
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Anode 1	a′
Pin 7	Grid 1	g′
Pin 8	Cathode 1	k′
Pin 9	Shield	s

6/30L2

MAZDA

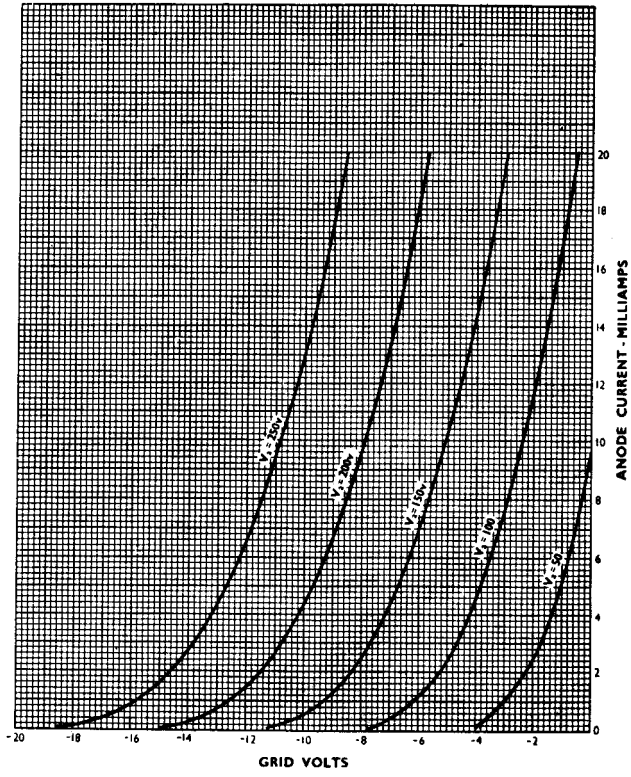
6/30L2

TELEVISION TWIN TRIODE

Indirectly heated—for series or parallel operation

TENTATIVE

AVERAGE CHARACTERISTIC CURVES



January, 1958 *VALVE & CRT DIVISION* Issue 1/2

SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

6/30L2

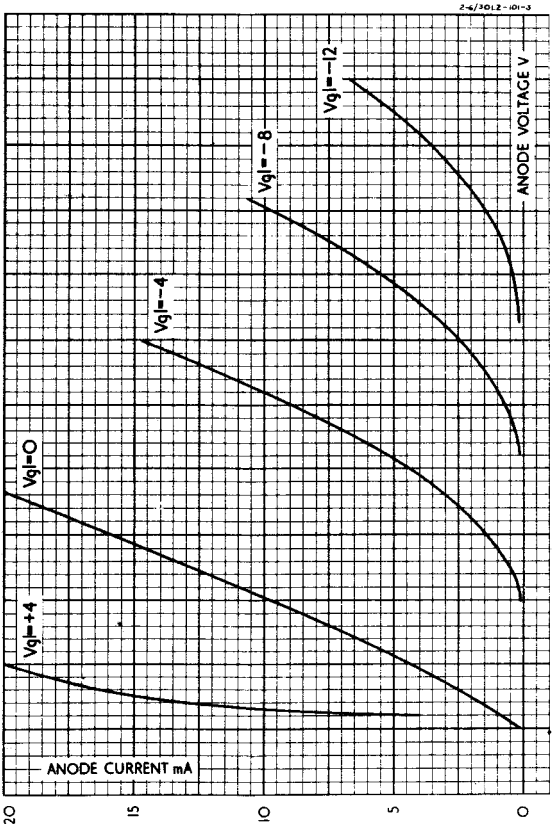
TELEVISION TWIN TRIODE

Indirectly heated—for series or parallel operation

TENTATIVE

CHARACTERISTIC CURVES : I_a/V_a

Each Section



6/30L2

EDISWAN

MAZDA

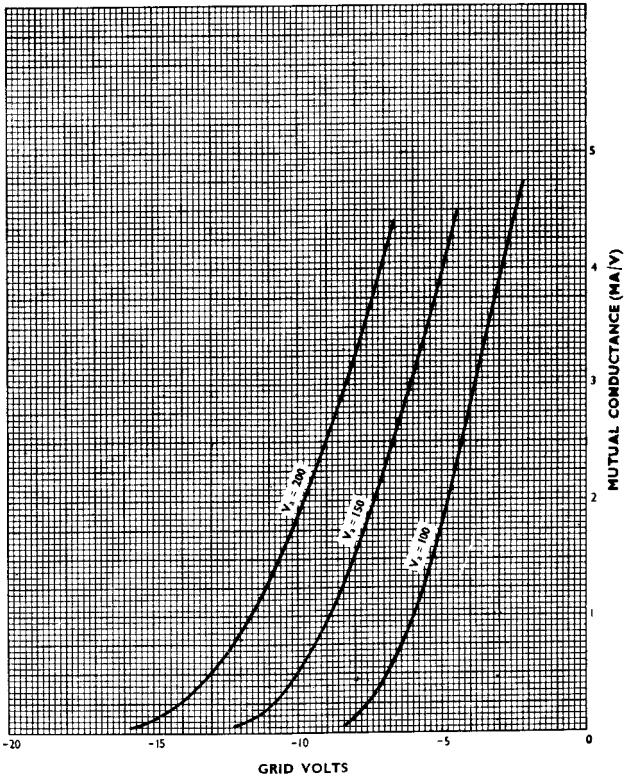
6/30L2

TELEVISION TWIN TRIODE

Indirectly heated—for series or parallel operation

TENTATIVE

CHARACTERISTIC CURVES : g_m/V_g



July, 1958 *VALVE & CRT DIVISION* Issue 2/2

SIEMENS EDISON SWAN LIMITED

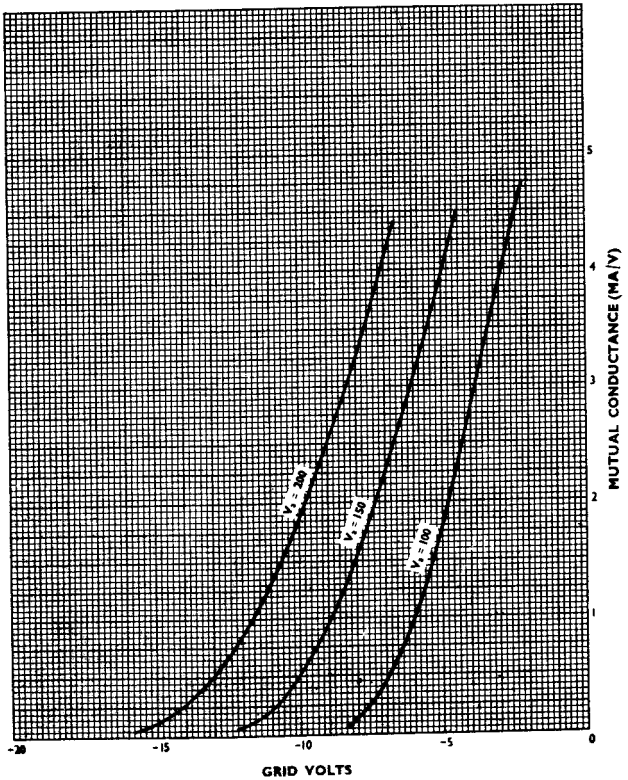
MAZDA
6/30L2

TELEVISION TWIN TRIODE

Indirectly heated—for series or parallel operation

TENTATIVE

AVERAGE CHARACTERISTIC CURVES



MAZDA

829 B

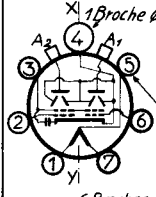
829-B

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUEES CONCERNENT LES DEUX ELEMENTS.

Cathode à chauffage indirect			
Dispositions du filament :	*Série*	*Parallèle*	
Tension filament	12,6 ± 10 %	6,3 ± 10 %	Volts CC ou CA
Intensité filament	1,125	2,25	Ampères
Pente de chaque élément, mesurée pour une tension d'anode de 250 VCC, une tension de grille n°2 de 175VCC et un courant d'anode de 60 mA		8,5	mA/V approx.
Coefficient d'amplification G_2/G_1 de chaque élément mesuré pour une tension d'anode et de grille n°2 de 225VCC et un courant d'anode de 60 mA		9	
Capacités interélectrodes (par élément) :			
Capacité grille n°1 anode (1)		0,12	pF max.
Capacité d'entrée		14,5	pF
Capacité de sortie		7	pF
Capacité grille n°2 - Cathode (2)		65	pF appr.
Encombrement		CC.1 - A.1	
Hauteur maximum (broches comprises)			105 mm max.
Diamètre maximum			60,5 mm max.
Brochage		7.E - UA	
Position de montage		verticale, pied en bas ou en haut, ou horizontale à condition que le plan de chaque anode soit vertical.	

Le plan des électrodes de chaque élément est parallèle à celui dont la trace est figurée ci-dessous en xy

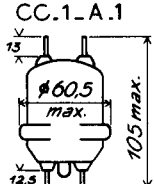


BROCHES :

N° 1-Filament.
N° 2-Grille n° 1 (élément n° 2).
N° 3-Grille n° 2.
N° 4-Cathode, déflecteurs.
N° 5-Point milieu du filament.
N° 6-Grille n° 1 (élément n° 1).
N° 7-Filament.
Chaque anode est réunie à une des sorties du sommet.
A_1 anode (élément n° 1); A_2 anode (élément n° 2).

Broches de la base, face à l'observateur.

CC.1-A.1



(1) - Avec un blindage externe situé au-dessus de l'anneau de scellement.

(2) - La valeur indiquée comprend celle du condensateur de découplage inséré à l'intérieur du tube dans le circuit grille n°2 - cathode.

REPRODUCTION INTERDITE.

829-B

MAZDA

829 B

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS
AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUEES CONCERNENT LES DEUX ELEMENTS.

AMPLIFICATEUR DE PUISSANCE B.F. et MODULATEUR
Classe AB_1 (3)
Refroidissement naturel
LIMITES DES CONDITIONS D'UTILISATION
EN FONCTIONNEMENT T.C.C. (4)

Tension d'anode C.C.	600	volts max.
Tension de grille n°2 (écran) C.C.	225	volts max.
Courant d'anode C.C. pour une tension de signal max. (5)	250	mA max.
Puissance d'alimentation sur l'anode pour une tension de signal max. (5)	100	watts max.
Puissance d'alimentation sur la grille n°2 (écran) pour une tension de signal max. (5)	7	watts max.
Dissipation sur l'anode (5)	30	watts max.
Pointe de tension filament-cathode	± 100	volts max.
Température de l'ampoule	235 °C	max.

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode C.C.	600	volts.
Tension de grille n°2 (écran) C.C. (6)	200	volts.
Tension de grille n°1 C.C. (7)	-18	volts.
Tension de pointe BF de grille n°1 à grille n°1	36	volts.
Courant d'anode C.C. pour une tension de signal nulle	40	mA.
Courant d'anode C.C. pour une tension de signal max.	100	mA.
Courant de grille n°2 C.C. pour une tension de signal nulle		mA.
Courant de grille n°2 C.C. pour une tension de signal max.	18	mA.
Résistance de charge effective (Anode à anode)	13,75	kΩ.
Puissance d'attaque pour une tension de signal max.	0	watt.
Puissance de sortie pour une tension de signal max.	44	watts.

AMPLIFICATEUR DE PUISSANCE H.F. PUSH-PULL A MODULATION PAR L'ANODE
Classe C Téléphonie
Conditions de la porteuse pour une modulation maximum de 100 % (par tube)
A - Refroidissement naturel
LIMITES DES CONDITIONS DE FONCTIONNEMENT

Mode de fonctionnement	T.C.C. (4)	T.A.C.I. (8)
Tension d'anode C.C.	600 max.	600 volts max.
Tension de grille n°2 (écran) C.C.	225 max.	225 volts max.
Tension de grille n°1 (contrôle) C.C.	-175 max.	-175 volts max.

Voir notes page 4.970 - 6

REPRODUCTION INTERDITE.

MAZDA

829 B

829-B

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUÉES CONCERNENT LES DEUX ÉLÉMENTS.

Courant d'anode C.C.	212 max.	212 mA max.
Courant de grille n° 1 C.C.	15 max.	15 mA max.
Puissance d'entrée sur l'anode	67,5 max.	90 watts max.
Puissance d'entrée sur la grille n° 2	7 max.	7 watts max.
Dissipation sur l'anode	21 max.	28 watts max.
Pointe de tension filament-cathode	± 100 max.	± 100 volts max.
Température de l'ampoule	235 max.	235 °C max.

EXEMPLES TYPIQUES D'UTILISATION
(Refroidissement naturel)

Mode de fonctionnement	T.C.C. (4)	T.A.C.I. (8)		
Tension d'anode C.C.	600	425	600	volts.
Tension de grille n° 2 C.C. (9)	200	200	200	volts.
	15,5	6,4	13,3	kΩ.
Tension de grille n° 1 C.C. (10) (11)	−70	−60	−70	volts.
	8,7	5,5	5,8	kΩ.
Tension de pointe H.F. de grille n° 1 à grille n° 1	160	154	172	volts.
Courant d'anode C.C.	112	212	150	mA.
Courant de grille n° 2 C.C.	26	35	30	mA.
Courant de grille n° 1 C.C.	8	11	12	mA approx.
Puissance d'attaque	0,6	0,8	0,9	watt approx.
Puissance de sortie	50	63	70	watts.

B - Refroidissement par air forcé
LIMITES DES CONDITIONS DE FONCTIONNEMENT

Mode de fonctionnement	T.C.C. (4)	T.A.C.I. (8)
Tension d'anode C.C.	600 max.	600 volts max.
Tension de grille n° 2 C.C.	225 max.	250 volts max.
Tension de grille n° 1 C.C.	−175 max.	−175 volts max.
Courant d'anode C.C.	212 max.	240 mA max.
Courant de grille n° 1 C.C.	15 max.	20 mA max.
Puissance d'entrée sur l'anode	90 max.	120 watts max.
Puissance d'entrée sur la grille n° 2	7 max.	8 (12) " max.
Dissipation sur l'anode	28 max.	40 watts max.
Pointe de tension filament-cathode	± 100 max.	± 100 volts max.
Température de l'ampoule	235 max.	235 °C max.

EXEMPLES TYPIQUES D'UTILISATION
(Refroidissement par air forcé)

Mode de fonctionnement	T.C.C. (4)		T.A.C.I. (8)	
Tension d'anode C.C.	425	600	600	volts.
Tension de grille n° 2 C.C. (9)	200	200	200	volts.
	6,4	13,3	13,3	kΩ.
Tension de grille n° 1 C.C. (10) (11)	−60	−70	−80	volts.
	5,5	5,8	5,3	kΩ.

Voir notes page 4.970 - 6

REPRODUCTION INTERDITE.

829-B

MAZDA

829 B

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS
AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUÉES CONCERNENT LES DEUX ÉLÉMENTS.

Tension de pointe H.F. de grille n°1 à grille n°1	154	172	210	volts.
Courant d'anode C.C.	212	150	200	mA.
Courant de grille n°2 C.C.	35	30	30	mA.
Courant de grille n°1 C.C.	11	12	15	mA approx.
Puissance d'attaque	0,8	0,9	1,4	watt approx.
Puissance de sortie	63	70	85	watts approx.

AMPLIFICATEUR DE PUISSANCE H.F. PUSH-PULL ET OSCILLATEUR
Classe C Télégraphie
Régime avec la clé abaissée, sans modulation (13)
A - Refroidissement naturel
LIMITES DES CONDITIONS DE FONCTIONNEMENT

Mode de fonctionnement	*T.C.C.* (4)	*T.A.C.I.* (8)
Tension d'anode C.C.	750 max.	750 volts max.
Tension de grille n°2 C.C.	225 max.	225 volts max.
Tension de grille n°1 C.C.	-175 max.	-175 volts max.
Courant d'anode C.C.	240 max.	240 mA max.
Courant de grille n°1 C.C.	15 max.	15 mA max.
Puissance d'entrée sur l'anode	90 max.	120 watts max.
Puissance d'entrée sur la grille n°2	7 max.	7 watts max.
Pointe de tension filament-cathode	± 100 max.	± 100 volts max.
Température de l'ampoule	265 max.	265 °C max.

EXEMPLES TYPIQUES D'UTILISATION
(Refroidissement naturel)

Mode de fonctionnement	*T.C.C.* (4)		*T.A.C.I.* (8)	
Tension d'anode C.C.	750	500	750	volts.
Tension de grille n°2 C.C. (11)	200	200	200	volts.
	16,2	9,3	18,3	kΩ.
Tension de grille n°1 C.C. (10) (15)	-50	-45	-45	volts.
Résistance à insérer dans le circuit grille (10) (15)	6,3	3,75	4,6	kΩ.
Résistance à insérer dans le circuit cathode (10) (15)	310	160	270	Ω.
Tension de pointe H.F. de grille n°1 à grille n°1	120	124	140	volts.
Courant d'anode C.C.	120	240	160	mA.
Courant de grille n°2 C.C.	34	32	30	mA.
Courant de grille n°1 C.C.	8	12	12	mA approx.
Puissance d'attaque	0,45	0,7	0,8	watt approx.
Puissance de sortie	65	83	87	watts approx.

Voir notes page 4.970 - 6

REPRODUCTION INTERDITE.

MAZDA

829 B

829-B

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUEES CONCERNENT LES DEUX ELEMENTS.

AMPLIFICATEUR DE PUISSANCE H.F. PUSH-PULL ET OSCILLATEUR
Classe C Télégraphie
Régime clé abaissée, sans modulation (13)
B – Refroidissement par air forcé

LIMITES DES CONDITIONS DE FONCTIONNEMENT

	T.C.C. (4)	*T.A.C.I. (8)*
Mode de fonctionnement		
Tension d'anode C.C.	750 max.	750 volts max.
Tension de grille n°2 C.C.	225 max.	250 volts max.
Tension de grille n°1 C.C.	-175 max.	-175 volts max.
Courant d'anode C.C.	240 max.	240 mA max.
Courant grille n°1 C.C.	15 max.	20 mA max.
Puissance d'entrée sur l'anode	120 max.	150 watts max.
Puissance d'entrée sur la grille n°2	7 max.	8 watts max.
Dissipation sur l'anode	40 max.	45 watts max.
Pointe de tension filament-cathode	± 100 max.	± 100 volts max.
Température de l'ampoule	235 max.	235 °C max.

EXEMPLES TYPIQUES D'UTILISATION
(Refroidissement par air forcé)

Mode de fonctionnement	*T.C.C. (4)*		*T.A.C.I. (8)*	
Tension d'anode C.C.	500	750	750	volts.
Tension de grille n°2 C.C. (14).	200	200	200	volts.
	9,3	18,3	16,2	kΩ.
Tension de grille n°1 C.C. (10) (15).	-45	-55	-50	volts.
Résistance à insérer dans le circuit grille (10) (15)	3,75	4,6	3,1	kΩ.
Résistance à insérer dans le circuit cathode (10) (15)	160	270	200	Ω.
Tension de pointe H.F. de grille n°1 à grille n°1	124	140	150	volts.
Courant d'anode C.C.	240	160	200	mA.
Courant de grille n°2 C.C.	32	30	34	mA.
Courant de grille n°1 C.C.	12	12	16 mA	approx.
Puissance d'attaque	0,7	0,8	1,1 watt	approx.
Puissance de sortie	83	87	110 watts	approx.

BLINDAGE ET DECOUPLAGE

Le blindage du tube 829-B est recommandé afin d'obtenir un fonctionnement stable en amplificateur H.F. Le moyen le plus pratique de blinder le tube est de l'enfoncer dans le trou d'une platine métallique, l'écran interne affleurant le plan de cette platine. Etant donné l'importance d'obtenir aux très hautes fréquences les connexions les plus courtes possibles, le découplage H.F. doit se faire directement sur les broches du tube. Des connexions en

Voir notes page 4.970-6

REPRODUCTION INTERDITE.

MAZDA

829 B

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUEES CONCERNENT LES DEUX ELEMENTS.

ruban peuvent être utilisées comme armatures de condensateurs de découplage. Tous les circuits de retour doivent être reliés à la connexion cathode. Il est judicieux de placer des bobines de choc H.F. dans les circuits d'alimentation.

Notes

figurant sur les pages 4.970-2/3/4 et 5

3 - L'indice 1 indique qu'il ne doit y avoir aucun courant de grille n°1 pendant le cycle d'entrée.

4 - Trafic commercial continu.

5 - Valeur moyenne pour fréquence audible et onde sinusoïdale.

6 - Tension obtenue de préférence au moyen d'une source séparée, ou en utilisant un diviseur de tension sur l'alimentation d'anode.

7 - Le mode de couplage à l'entrée ne doit pas introduire une trop grande résistance dans le circuit de la grille n°1. Le couplage par transformateur ou impédance est recommandé. La résistance C.C. en circuit de grille n°1 ne doit pas dépasser 10kΩ lorsque cette électrode est alimentée par une tension fixe négative. Une alimentation séparée pour la cathode n'est pas recommandée.

8 - Trafic amateur ou commercial intermittent.

9 - Tension obtenue en partant d'une source séparée, modulée soit par l'alimentation de l'anode, soit par l'alimentation de l'anode déjà modulée en utilisant des résistances de valeurs indiquées.

10 - La résistance en circuit de grille n°1 ne doit jamais dépasser au total 15kΩ par tube ou 30kΩ par élément. N'importe quelle alimentation complémentaire nécessaire peut être fournie par une liaison résistance avec la cathode ou par une polarisation fixe.

11 - Tension obtenue au moyen de résistances de valeurs indiquées (par tube) en circuit de grille ou par une méthode d'auto-polarisation.

12 - En service T.A.C.I. (8) pour des fréquences inférieures à 20MH$_z$ on peut admettre 12 watts comme puissance d'entrée maximum sur la grille n°2, si le taux de modulation ne dépasse pas 20 % et si le temps de fonctionnement n'excède pas 30 secondes.

13 - Une modulation essentiellement négative peut être utilisée si la pointe positive de l'enveloppe B.F. n'excède pas 115 % des conditions de la porteuse.

14 - Obtenue soit à partir d'une source séparée, soit à partir de l'alimentation anode avec un diviseur de tension, soit au travers de résistances de la valeur indiquée. Pendant les manipulations clé levée, la tension ne doit jamais excéder 600 volts.

15 - La tension indiquée peut être obtenue à partir soit d'une alimentation fixe, soit à partir d'une résistance en circuit grille ou en circuit cathode, soit à partir d'une combinaison de ces différentes méthodes.

REMARQUES

1° - *Les limites indiquées ci-dessus et relatives à la tension d'anode et à la puissance d'entrée sur l'anode sont valables pour une fréquence d'utilisation de 200MH$_z$ - 425MH$_z$ on ne peut compter que sur les 89 % de ces valeurs.*

2° - *La pointe du queusot ne doit pas dépasser le plan passant par les extrémités des 3 broches les plus longues.*

REPRODUCTION INTERDITE.

MAZDA

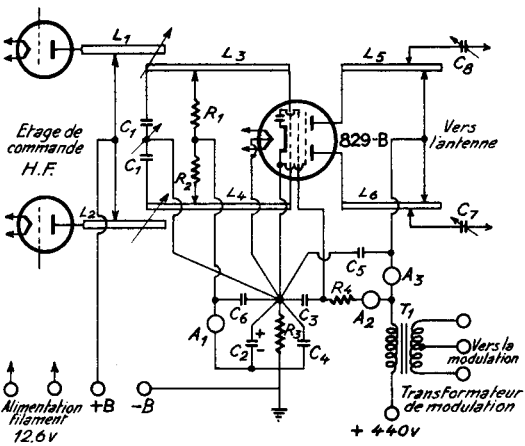
829-B

829-B

TETRODE PUSH-PULL A FAISCEAUX DIRIGES

AMPLIFICATEUR PUSH-PULL H.F. DE PUISSANCE A MODULATION PAR L'ANODE

FREQUENCE D'UTILISATION : 200 MH_z approx.



C_1 = 1,2 à 10 µF par section
C_2 = 25 µF, 200 volts
C_3, C_4, C_5, C_6 = 500 pF (mica)
C_7, C_8 = 3 à 35 pF
R_1, R_2 = 7,5 à 15 kΩ/1 watt
R_3 = 60 Ω/10 watts
R_4 = 6,4 kΩ/15 watts

MILLIAMPEREMETRES

A_1 de 0 à 25 mA
A_2 de 0 à 75 mA
A_3 de 0 à 500 mA

L_1, L_2 = les dimensions dépendent de l'étage de commande; en principe, elles sont approximativement les mêmes que celles de L_5 et L_6

L_3, L_4 = tube de Cuivre; ∅ 6,35 mm; longueur 254 mm; entr'axe 22,2 mm.

L_5, L_6 = tube de Cuivre; ∅ 9,5 mm; longueur 177,8 mm; entr'axe 22,2 mm.

Ajuster le couplage de L_1, L_2 et L_3, L_4 pour l'excitation grille optimum.

Ajuster les résistances de grille de L_3 et L_4 à la tension d'anode.

Les informations et schémas que nous communiquons ne sauraient engager notre responsabilité. Ils sont fournis sans garantie quant à leur protection éventuelle par des tiers.

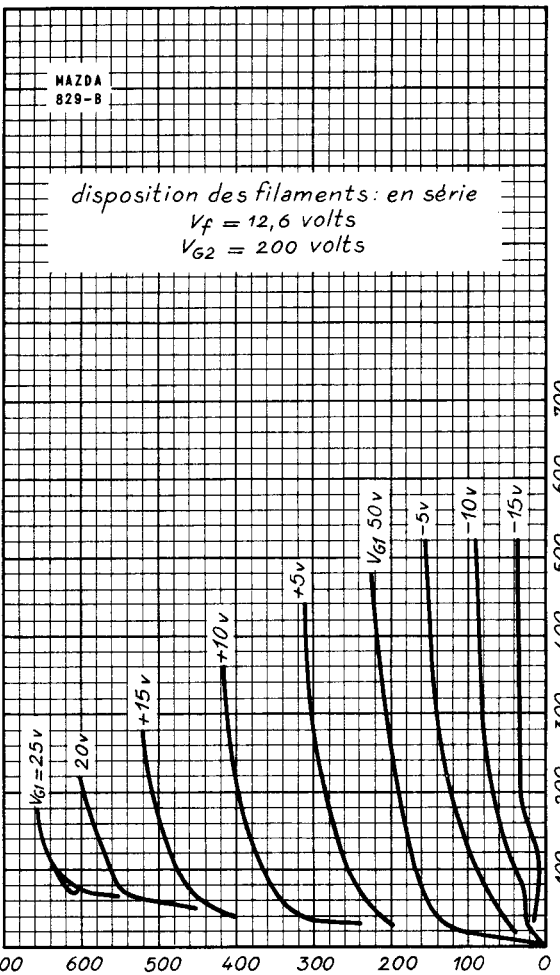
REPRODUCTION INTERDITE.

829-B

MAZDA

829 B

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE
(PAR ÉLÉMENT)



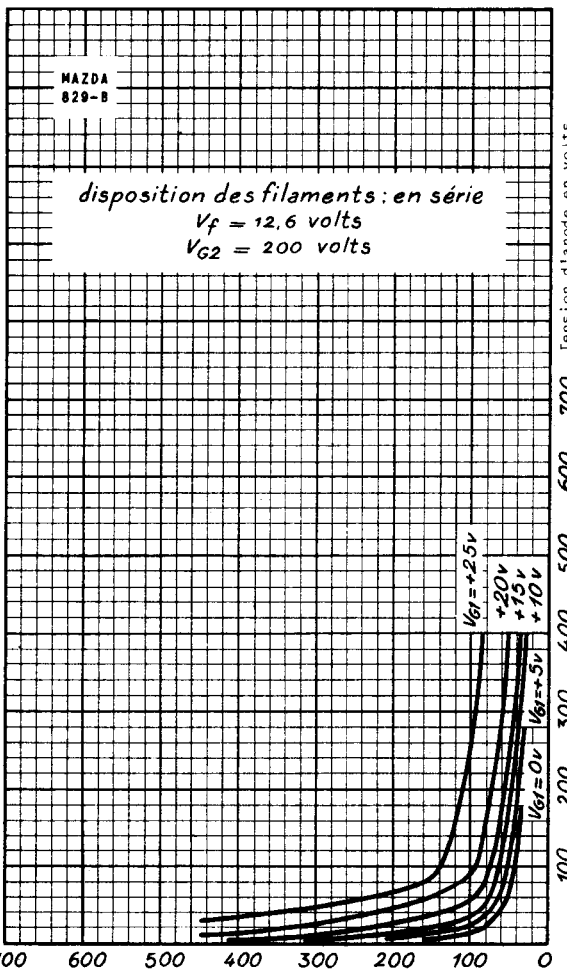
REPRODUCTION INTERDITE.

MAZDA

829 B

829-B

COURBES DU COURANT DE GRILLE N° 2 EN FONCTION DE LA TENSION D'ANODE (PAR ÉLÉMENT)



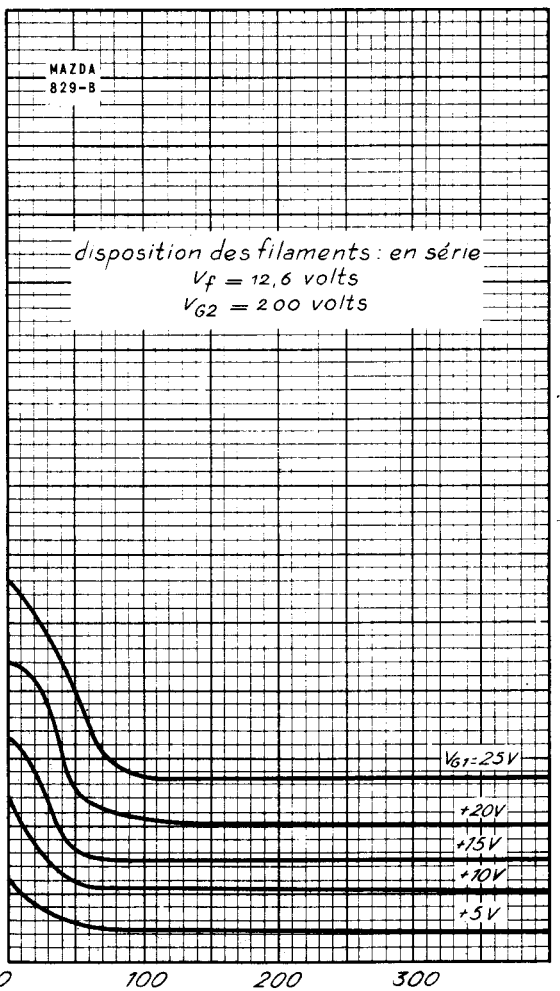
REPRODUCTION INTERDITE.

829-B

MAZDA

829 B

COURBES DU COURANT DE GRILLE N° 1
EN FONCTION DE LA TENSION D'ANODE
(PAR ÉLÉMENT)



REPRODUCTION INTERDITE.

MAZDA

832-A

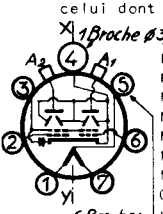
832A

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS
AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUEES CONCERNENT LES DEUX ELEMENTS.

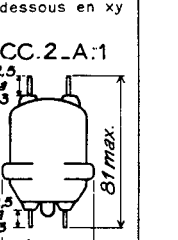
Cathode à chauffage indirect			
Dispositions du filament :	*Série*	*Parallèle*	
Tension filament	12,6 + 10 %	6,3 + 10 %	Volts CC ou CA
Intensité filament	0,8	1,6	Ampère.
Pente de chaque élément, mesurée pour une tension de grille n°2 de 135 VCC. et un courant d'anode de 30 mA.		3,5	mA/V approx.
Coefficient d'amplification G_2/G_1 de chaque élément mesuré pour une tension de grille n°2 de 250 VC.C. et un courant d'anode de 30 mA.		6,5	
Capacités interélectrodes (par élément) :			
Capacité grille n°1 anode (1)		0,07	pF max.
Capacité d'entrée		8	pF
Capacité de sortie		3,8	pF
Capacité grille n°2 - cathode (2)		65	pF max.
Encombrement			CC.2 - A.1.
Hauteur maximum (broches comprises)		81	mm max.
Diamètre maximum		60,5	mm max.
Brochage			7.E - UA
Position de montage			indifférente.
Température de l'ampoule (au point le plus chaud)		200 °C	max.

Le plan des électrodes de chaque élément est parallèle à celui dont la trace est figurée ci-dessous en xy



BROCHES :

N° 1-Filament.
N° 2-Grille n° 1 (élément n° 2)
N° 3-Grille n° 2.
N° 4-Cathode, déflecteurs.
N° 5-Point milieu du filament.
N° 6-Grille n° 1 (élément n° 1).
N° 7-Filament.
Chaque anode est réunie à une des sorties du sommet.
A_1 anode (élément n° 1); A_2 anode (élément n° 2).



Broches de la base, face à l'observateur.

(1) - Avec un blindage externe situé au niveau de l'anneau de scellement.
(2) - La valeur indiquée comprend celle du condensateur à découplage inséré à l'intérieur du tube dans le circuit grille n°2 - cathode.

REPRODUCTION INTERDITE.

832A

MAZDA

832-A

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS
AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUÉES CONCERNENT LES DEUX ELEMENTS.

AMPLIFICATEUR PUSH-PULL H.F. DE PUISSANCE A MODULATION PAR L'ANODE.
Classe C - Téléphonie
Conditions de la porteuse pour une modulation maximum de 100 % (par tube)
LIMITES DES CONDITIONS DE FONCTIONNEMENT.

Mode de fonctionnement	T.C.C. (3)	T.A.C.I. (4)
Tension d'anode C.C.	600 max	600 volts max.
Tension de grille n°2 (écran) C.C.	250 max.	250 volts max.
Tension de grille n°1 (contrôle) C.C.	-175 max.	-175 volts max.
Courant d'anode C.C.	75 max.	95 mA max.
Courant de grille n°1 C.C.	6 max.	6 mA max.
Puissance d'entrée sur l'anode	22 max.	36 watts max.
Puissance d'entrée sur la grille n°2	3,4 max.	5 watts max.
Dissipation sur l'anode	10 max.	15 watts max.
Pointe de tension filament-cathode	± 100 max.	± 100 volts max.

EXEMPLES TYPIQUES D'UTILISATION.

Mode de fonctionnement	T.C.C. (3)		T.A.C.I. (4)	
Tension d'anode C.C.	425	600	600	volts.
Tension de grille n°2 C.C. (5)	200	200	200	volts.
Valeur de la résistance à insérer dans le circuit de la grille n°2	14	25	20	kΩ.
Tension de grille n°1 C.C. (6) (7)	-60	-65	-70	volts.
Valeur de la résistance à insérer dans le circuit de la grille n°1	25	25	23	kΩ.
Tension H.F. de crête entre grilles n°1	140	150	160	volts.
Courant d'anode C.C.	52	36	60	mA.
Courant de grille n°2 C.C.	16	16	20	mA.
Courant de grille n°1 C.C.	2,4	2,6	3,0	mA approx.
Puissance d'attaque	0,15	0,18	0,21	watt approx.
Puissance de sortie	16	17	26	watts approx.

AMPLIFICATEUR PUSH-PULL H.F. DE PUISSANCE ET OSCILLATEUR
Classe C - Télégraphie
Régime avec la clé abaissée, par tube, sans modulation (8)
LIMITES DES CONDITIONS DE FONCTIONNEMENT.

Mode de fonctionnement	T.C.C. (3)	T.A.C.I. (4)
Tension d'anode C.C.	750 max.	750 volts max.
Tension de grille n°2 (écran) C.C.	250 max.	250 volts max.

Voir notes page 4.975 - 4

REPRODUCTION INTERDITE.

MAZDA

832A

832-A

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS
AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUEES CONCERNENT LES DEUX ELEMENTS.

Tension de grille n° 1 (contrôle) C.C.	−175 max.	−175 volts max.
Courant d'anode C.C.	90 max.	115 mA max.
Courant de grille n° 1 C.C.	6 max.	6 mA max.
Puissance d'entrée sur l'anode	36 max.	50 watts max.
Puissance d'entrée sur la grille n° 2	5 max.	5 watts max.
Dissipation sur l'anode	15 max.	20 watts max.
Pointe de tension filament-cathode	± 100 max.	± 100 volts max.

EXEMPLES TYPIQUES D'UTILISATION

Mode de fonctionnement	T.C.C. (3)		T.A.C.I. (4)	
Tension d'anode C.C.	500	750	750	volts.
Tension de grille n° 2 C.C. (9)	200	200	200	volts.
Valeur de la résistance à insérer dans le circuit de la grille n° 2	21	37	25	kΩ.
Tension de grille n° 1 C.C. (6)	−65	−65	−50	volts.
Résistance à insérer dans le circuit G_1	25	23	12,5	kΩ.
Résistance à insérer dans le circuit cathode	730	1000	550	Ω.
Tension H.F. de crête entre grilles n° 1	150	150	130	volts.
Courant d'anode C.C.	72	48	65	mA.
Courant de grille n° 2 C.C.	14	15	22	mA.
Courant de grille n° 1 C.C.	2,6	2,8	4,0	mA approx.
Puissance d'attaque	0,18	0,19	0,24	watt approx.
Puissance de sortie	26	26	35	watts approx.

LIMITES DES CARACTERISTIQUES

	Note	min.	max.	
Intensité filament (par section)	10	0,76	0,84	Ampère.
Capacité grille n° 1 – anode (par élément)	1	–	0,07	pF.
Capacité d'entrée (par élément)	–	6,6	9,4	pF.
Capacité de sortie (par élément)	–	2,8	4,8	pF.
Courant d'anode (par élément)	11	18	42	mA.
Courant de grille n° 2 (par élément)	11	0,1	5,5	mA.
Courant de grille n° 1 (par élément)	12	8	52	mA.

Voir notes page 4.974 - 4

REPRODUCTION INTERDITE.

832A

MAZDA

832-A

TETRODE PUSH-PULL A FAISCEAUX DIRIGÉS AMPLIFICATEUR H. F. DE PUISSANCE-OSCILLATEUR

SAUF INDICATION CONTRAIRE, LES VALEURS INDIQUEES CONCERNENT LES DEUX ELEMENTS.

Puissance utilisable (par tube)	13	14	–	Watts

BLINDAGE ET DECOUPLAGE

Le blindage du tube 832-A est recommandé afin d'obtenir un fonctionnement stable en amplificateur H F. La méthode la plus pratique du blindage consiste à enfoncer le tube dans le trou d'une platine métallique, l'écran interne du tube affleurant le plan de cette platine. Etant donné l'importance d'obtenir aux très hautes fréquences les connexions les plus courtes possibles, le découplage H.F. doit se faire directement sur les broches du tube. Des connexions en ruban peuvent être utilisées comme armatures des condensateurs de découplage. Tous les circuits doivent être reliés à la connexion cathode. Il est judicieux de placer des bobines de choc H.F. dans les circuits d'alimentation.

Notes

figurant sur les pages 4.975 - 2 et 3

3 – Trafic commercial continu.
4 – Trafic amateur ou commercial intermittent.
5 – Tension obtenue de préférence à partir d'une alimentation séparée modulée avec l'alimentation anode, ou à partir de la modulation d'anode, ou travers d'une résistance de la valeur indiquée.
6 – La résistance en circuit grille ne doit jamais dépasser 25 kΩ, par tube ou 50 kΩ par l'élément.
7 – Tension obtenue à partir soit d'une résistance de la valeur, indiquée, soit par autopolarisation.
8 – Une modulation essentiellement négative peut être utilisée si la pointe positive de l'enveloppe B.F. n'excède pas 115 % des conditions de la porteuse.
9 – Tension obtenue soit à partir d'une source séparée, soit à partir de l'alimentation anode avec un diviseur de tension, soit au travers de résistances de la valeur indiquée. Pendant les manipulations, clé levée, la tension de l'écran ne doit jamais dépasser 600 volts.
10 – Limites pour une tension de 6,3 volts appliquée à la section filament en essai.
11 – Limites pour une tension de 6,3 volts appliquée aux deux sections filament en parallèle, une tension d'anode C.C. de 250 volts appliquée à l'élément en essai, une tension de grille n°2 C.C. de 135 volts, une tension de grille n°1 C.C. de – 10 volts appliquée à l'élément en essai et une tension de grille n°1 C.C. de – 100 volts, appliquée à l'élément non en essai.
12 – Limites pour une tension de 6,3 volts appliquée aux deux sections filament en parallèle, une tension d'anode C.C. de 90 volts appliquée à l'élément en essai, une tension de grille n°2 C.C. de 90 volts, une tension de grille n°1 C.C. de + 20 volts appliquée à l'élément en essai et une tension de grille n°1 C.C. de – 100 volts appliquée à l'élément non en essai.
13 – Limites pour un circuit oscillateur push-pull auto-excité, une tension de 11 volts appliquée aux deux sections filament en série, une tension d'anode C.C. de 400 volts sur chaque élément, une tension de grille n°2 C.C. de 250 volts max., un courant total d'anode C.C. de 90 mA, un courant total de grille n°1 C.C. compris entre 2 et 6 mA, une résistance en circuit grille n°1 de valeur comprise entre 8 et 18 kΩ et une fréquence de 200 MH_z.

REMARQUES.

1° – Les limites indiquées ci-dessus et relatives à la tension d'anode et à la puissance d'entrée sur l'anode sont valables pour une fréquence d'utilisation de 200 MH_z. A 250 MH_z on ne peut compter, que sur les 89 % de ces valeurs.
2° – La pointe du queusot ne doit pas dépasser le plan passant par les extrémités des 3 broches les plus longues.

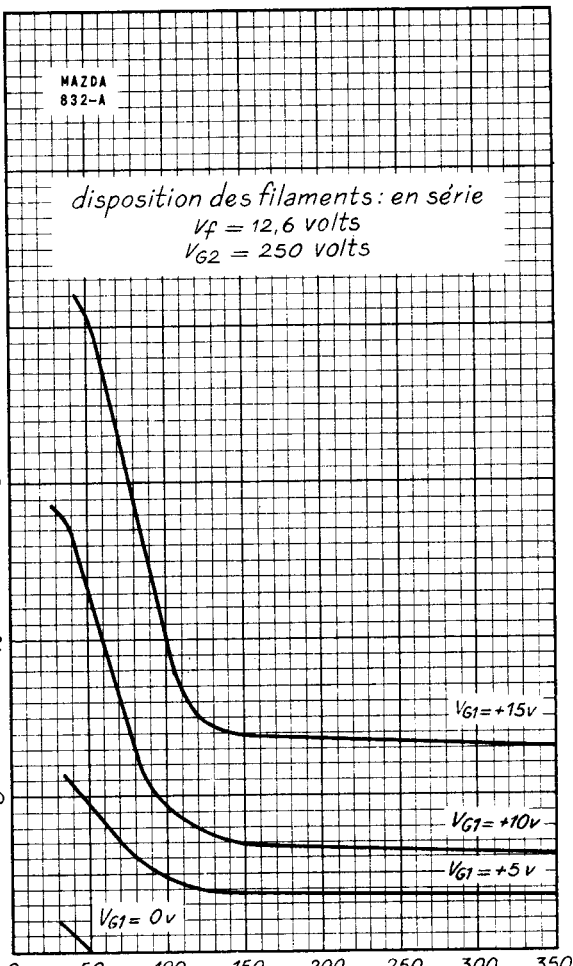
REPRODUCTION INTERDITE.

MAZDA

832A

832-A

COURBES DU COURANT DE GRILLE N° 1
EN FONCTION DE LA TENSION D'ANODE
(PAR ÉLÉMENT)



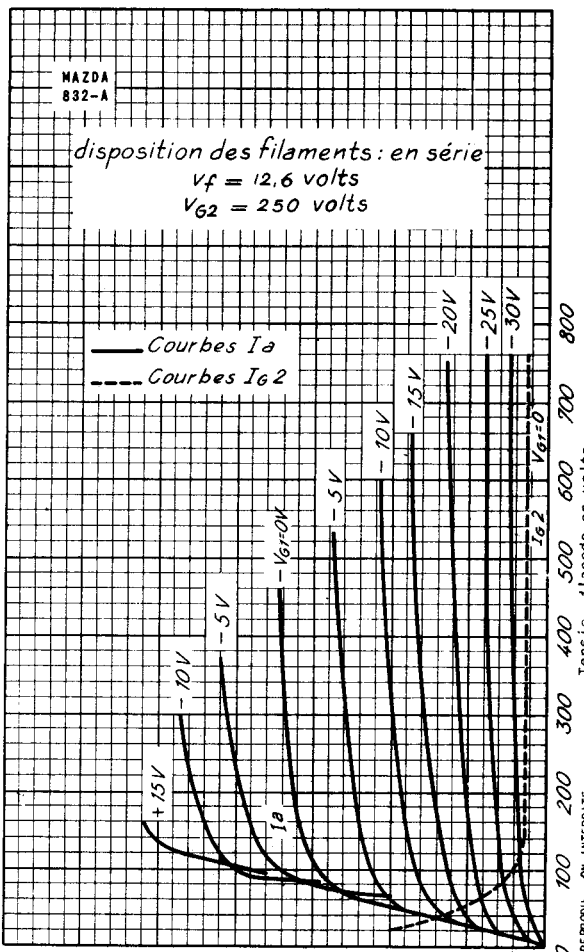
REPRODUCTION INTERDITE.

832A

MAZDA

832-A

COURBES DES COURANTS D'ANODE
ET DE GRILLE N° 2
EN FONCTION DE LA TENSION D'ANODE
(PAR ÉLÉMENT)



REPRODUCTION INTERDITE.

MAZDA

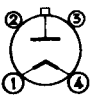
879

879

TUBE REDRESSEUR MONOPLAQUE A VIDE

Cathode à chauffage direct	
Tension filament (CA ou CC)	2,5 Volts
Intensité filament	1,75 Amp.
Hauteur maximum	115 mm
Diamètre maximum	38 mm
Ampoule	V 51
Culot	N° 6.179

Broches:
N°1–Filament.
N°2–Non connectée.



Broches:
N°3–Non connectée.
N°4–Filament.
Anode reliée à la coiffe du sommet.

Broches du culot face à l'observateur.

Conditions maxima

Tension anode CA efficace en redressement monoplaque	2.700 Volts max.
Tension de crête inverse	7.500 Volts max.
Courant moyen maximum	7,5 mA max.

Il est nécessaire que l'isolement du transformateur de chauffage corresponde à la tension de crête inverse existant dans le montage.

Deux tubes 879 peuvent être utilisés dans un circuit doubleur de tension pour obtenir une tension redressée approximativement double de celle obtenue avec un seul tube en redresseur monoplaque avec la même tension alternative appliquée. Cependant, un enroulement de chauffage séparé est nécessaire pour chaque tube.

En raison du faible courant exigé par les tubes à rayons cathodiques, le filtrage peut être réalisé par un filtre à résistance-capacité. Avec un courant de charge de 1 milli ampère, un condensateur de 0,05 µF suivi d'une résistance de 0,5 Mégohm et un second condensateur de 0,15 µF sont suffisants. Quand la chute de tension doit être réduite au minimum on peut utiliser un condensateur de 0,5 µF à 2 µF en parallèle sur le pont diviseur de tension.

Reproduction interdite

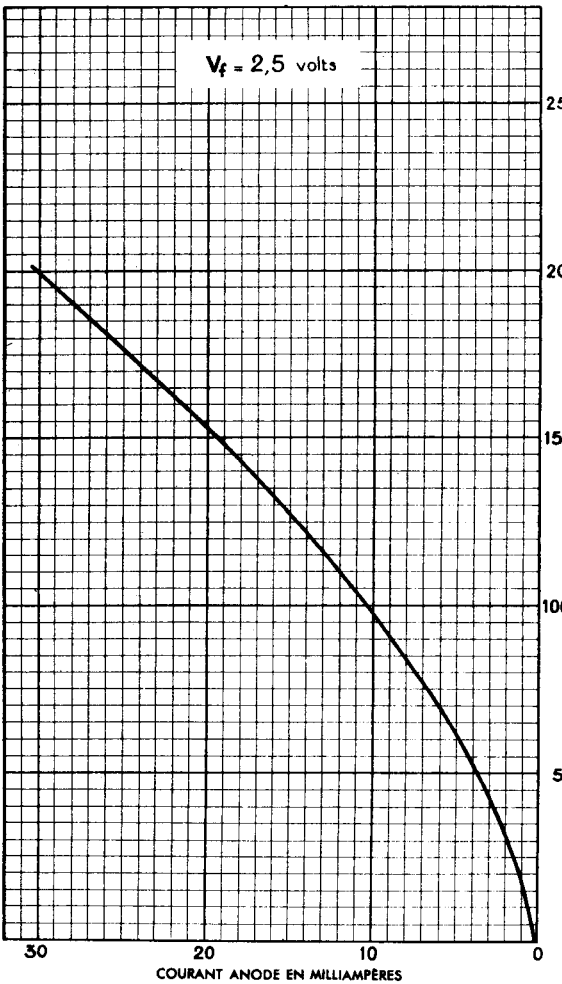
MAZDA

879

879

COURBE DU COURANT ANODE

en fonction de la tension anode



REPRODUCTION INTERDITE

MAZDA

884

884

TRIODE A GAZ A CATHODE CHAUDE ET A GRILLE DE CONTROLE

Cathode à chauffage indirect.	
Tension filament (CA ou CC)	6,3 Volts
Intensité filament	0,6 Amp.
Capacités inter-électrodes :	
Capacité grille-anode	3,5 µµF
Capacité grille-cathode	3,5 µµF
Capacité anode-cathode	2,5 µµF
Chute de tension	16 Volts approx.
Hauteur maximum	105 mm
Diamètre maximum	38 mm
Ampoule	V 51
Culot	N°6218

Broches:
N°1-Non connectée.
N°2-Filament.
N°3-Anode.
N°4-Broche manque.
N°5-Grille.
N°6-Broche manque.
N°7-Filament.
N°8-Cathode.

Broches du culot, face à l'observateur.

Utilisation en oscillateur de relaxation

Tension anode instantanée	300 Volts max.
Tension de crête (entre deux électrodes quelconques)	350 Volts max.
Courant anode de pointe	300 mA max.
Courant anode moyen :	
Pour des fréquences inférieures à 200 cycles/sec.	3 mA max.
Pour des fréquences supérieures à 200 cycles/sec.	2 mA max.

Résistance de grille: La résistance de grille ne doit pas être inférieure à 1.000 ohms par volt instantané appliqué à la grille. Des valeurs dépassant 500.000 ohms peuvent provoquer une instabilité du circuit.

Utilisation en redresseur à grille de contrôle (1)

Pour des fréquences inférieures à 75 cycles par seconde.

Tension de crête (entre deux électrodes quelconques)	350 Volts max.
Courant anode de pointe	300 mA max.
Courant anode moyen (en moyenne sur moins de 30 secondes)	75 mA max.
Tension filament-cathode (CC)	-100 à + 25 Volts max.

Résistance de grille: La résistance de grille ne doit pas être inférieure à 1.000 ohms par volt instantané appliqué à la grille. Des valeurs dépassant 500.000 ohms peuvent provoquer une instabilité du circuit.

(1) La tension filament doit être appliquée trente secondes avant l'utilisation.

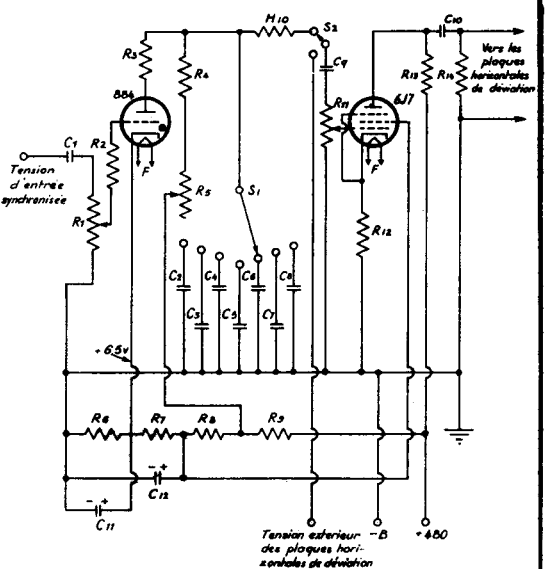
Reproduction interdite

MAZDA

884

884

OSCILLATEUR DE RELAXATION AVEC AMPLIFICATEUR



C_1	=	0,1 µF,	500 V.	R_8	=	500 Ohms,	0,5 W.
C_2	=	0,25 µF,	500 V.	R_4	=	0,3 Mégohm,	0,5 W.
C_3	=	0,1 µF,	500 V.	R_5	=	1 Mégohm.	
C_4	=	0,04 µF,	500 V.	R_6	=	2.000 Ohms,	0,5 W.
C_5	=	0,015 µF,	500 V.	R_7	=	25.000 Ohms,	1 W.
C_6	=	0,005 µF,	500 V.	R_8	=	60.000 Ohms,	1 W.
C_7	=	0,002 µF,	500 V.	R_9	=	60.000 Ohms,	1 W.
C_8	=	0,0008 µF,	500 V.	R_{10}	=	1 Mégohm,	0,5 W.
C_9	=	0,5 µF,	250 V.	R_{11}	=	0,5 Mégohm.	
C_{10}	=	0,5 µF,	500 V.	R_{12}	=	850 Ohms,	0,5 W.
C_{11}	=	25 µF,	15 V.	R_{13}	=	0,1 Mégohm,	1 W.
C_{12}	=	8 µF,	200 V.	R_{14}	=	2 Mégohms,	1 W.
R_1	=	0,25 Mégohm.		S_1	=	Commutateur.	
R_2	=	25.000 Ohms,	0,5 W.	S_2	=	Inverseur.	

Bandes approximatives de fréquence (cycles par sec)

Commutateur sur:		C_2	C_3	C_4	C_5	C_6	C_7	C_8
R_8	Max.....	20	40	110	280	670	1.500	3.600
	Min.....	60	130	340	880	2.200	4.900	11.400

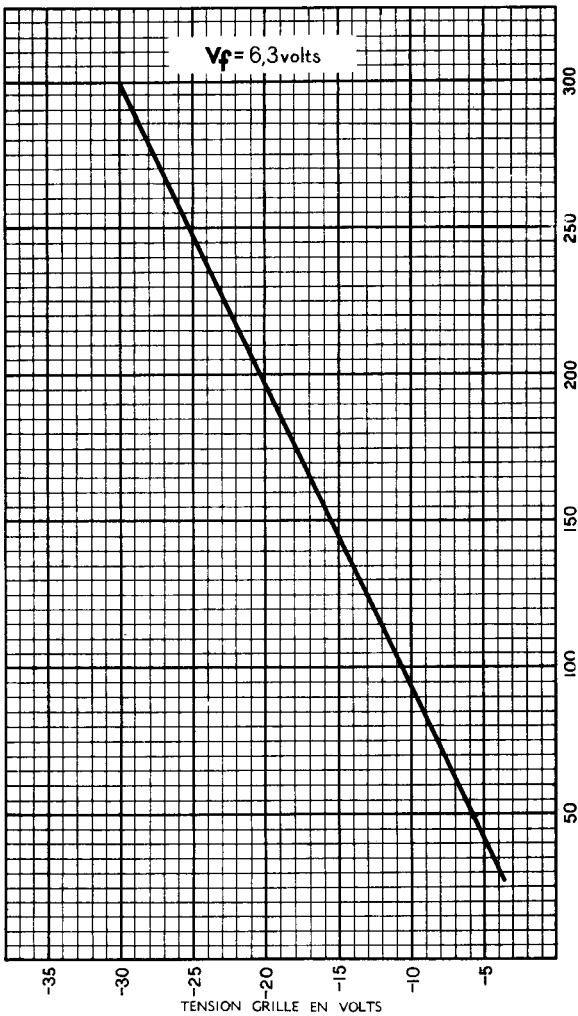
Reproduction interdite

MAZDA

884

884

COURBES DE LA TENSION GRILLE
en fonction de la tension anode



REPRODUCTION INTERDITE

MAZDA

927

927

CELLULE PHOTOÉLECTRIQUE A GAZ

Cathode demi-cylindrique à recouvrement de césium	
Dimensions de la fenêtre de cathode	22 × 11 mm
Capacité entre électrodes	2 pF
Encombrement	C.8 - A.1
Hauteur maximum (broches comprises)	67 mm
Diamètre maximum	17,5mm
Brochage	2.w - YA
Position de montage	Indifférente

Broches :

N°1 - Non connectée.
N°2 - Anode.
N°3 - Cathode.

Broches de la base, face à l'observateur.

CONDITIONS MAXIMA D'UTILISATION

Tension continue d'anode, ou tension alternative de crête	90 V max.
Courant moyen de cathode	2$^{\mu}$ A max.
Température ambiante	+100°C max.

CARACTERISTIQUES

Sensibilité (avec une source lumineuse dont la couleur de filament correspond à une température de 2.870°K) :	
à 0 période	125 μA/lumen
à 5.000 périodes	110 μA/lumen
à 10.000 périodes	100 μA/lumen
Coefficient d'amplification dû au remplissage gazeux	10
Résistance de charge minimum :	
pour une tension d'alimentation d'anode	
1° inférieur à 75 volts	pas de minimum
2° de 90 volts	0,1 M Ω minimum

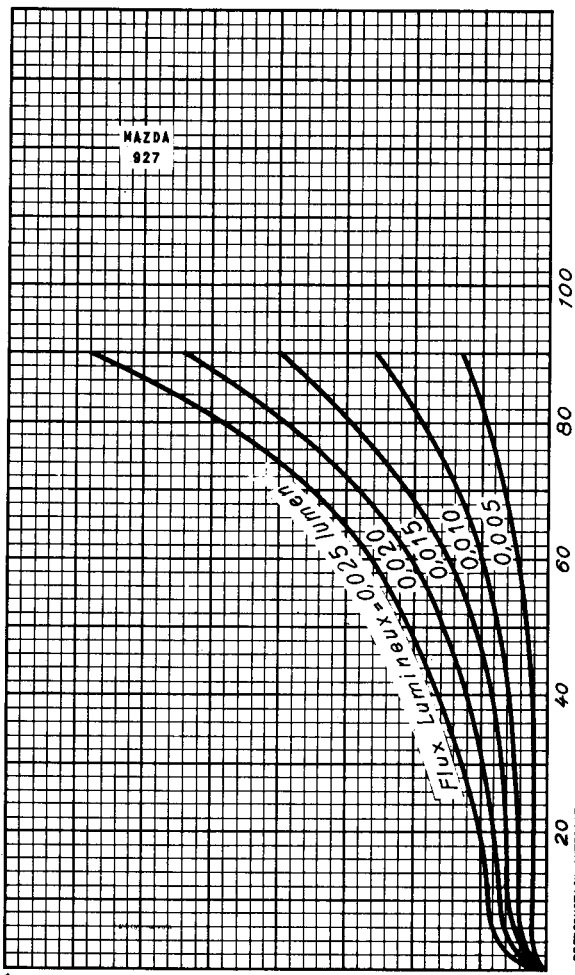
REPRODUCTION INTERDITE

927

MAZDA

927

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



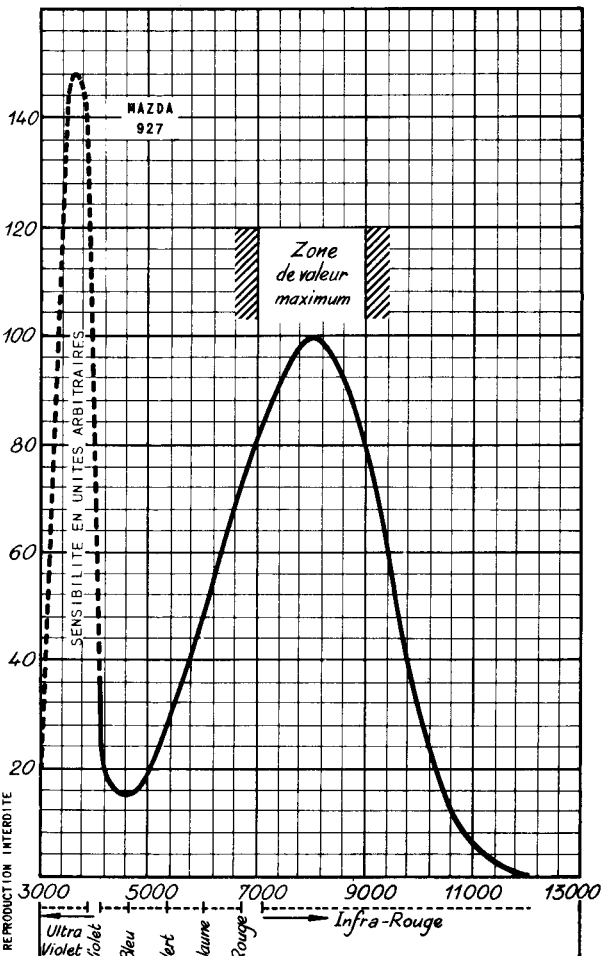
REPRODUCTION INTERDITE

MAZDA

927

927

COURBE DE LA SENSIBILITÉ SPECTRALE EN FONCTION DE LA LONGUEUR D'ONDE POUR UNE MÊME VALEUR DU FLUX LUMINEUX



LONGUEUR D'ONDES EN ANGSTROMS

REPRODUCTION INTERDITE

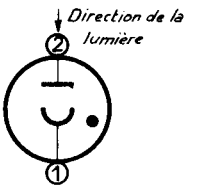
MAZDA

927 d

927 d

CELLULE PHOTOÉLECTRIQUE A GAZ

Cathode demi-cylindrique à recouvrement de césium	
Dimensions de la fenêtre de cathode	22 × 11 mm
Capacités entre électrodes	2 pF
Encombrement	C.8 - A.1
Hauteur maximum (broches comprises)	67 mm
Diamètre maximum	17,5 mm
Brochage	2.F - YB
Position de montage	indifférente



Brocnes :

N° 1 - Cathode
N° 2 - Anode

Broches de la base, face à l'observateur.

Pour toutes les autres caractéristiques et les courbes de fonctionnement, voir le tube 927 - Ces 2 tubes sont identiques à l'exception du culot.

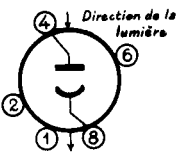
MAZDA

929

929

CELLULE PHOTOÉLECTRIQUE A VIDE

Cathode demi-cylindrique	
Dimension de la fenêtre de cathode	20 × 18 mm
Capacité entre électrodes	2,6 pF
Encombrement	C.7 – 0.1
Hauteur maximum (broches comprises)	78 mm
Diamètre maximum	32 mm
Brochage	2.0 – YA
Position de montage	Indifférente



Broches :

N° 1 – Non connectée.
N° 2 – Non connectée.
N° 4 – Anode.
N° 6 – Non connectée.
N° 8 – Cathode.

Broches de la base, face à l'observateur.

CONDITIONS MAXIMA D'UTILISATION

Tension d'anode continue ou tension alternative de crête	250 V max.
Courant de crête de cathode	20 μA max.
Courant moyen de cathode	5 μA max.
température ambiante	+75°C max.

CARACTERISTIQUES

Sensibilité en lumière blanche pour une longueur d'onde de 4.000 Angstroms	70 μA/lumen
Seuil de sensibilité	7.000 Angstroms

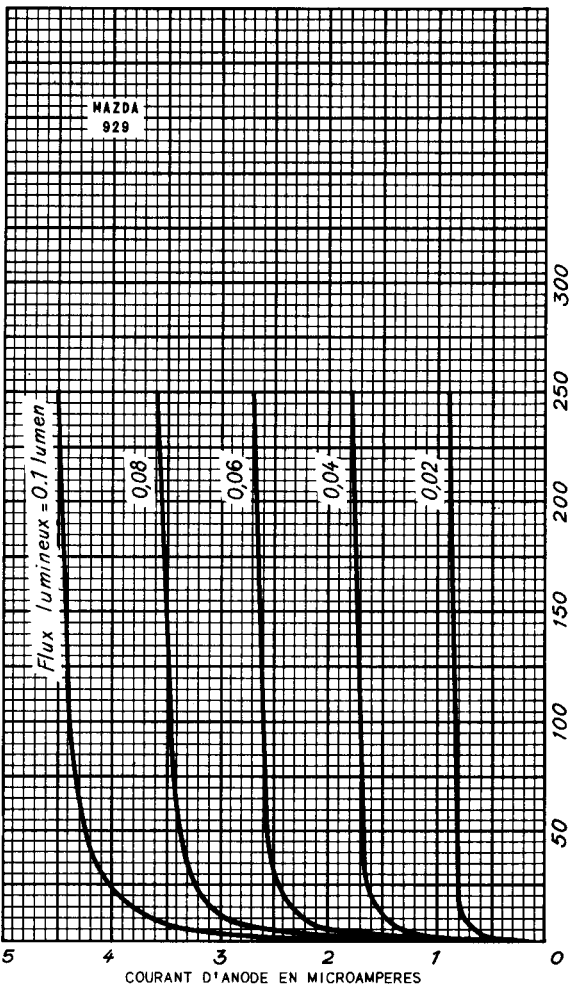
REPRODUCTION INTERDITE

929

MAZDA

929

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE

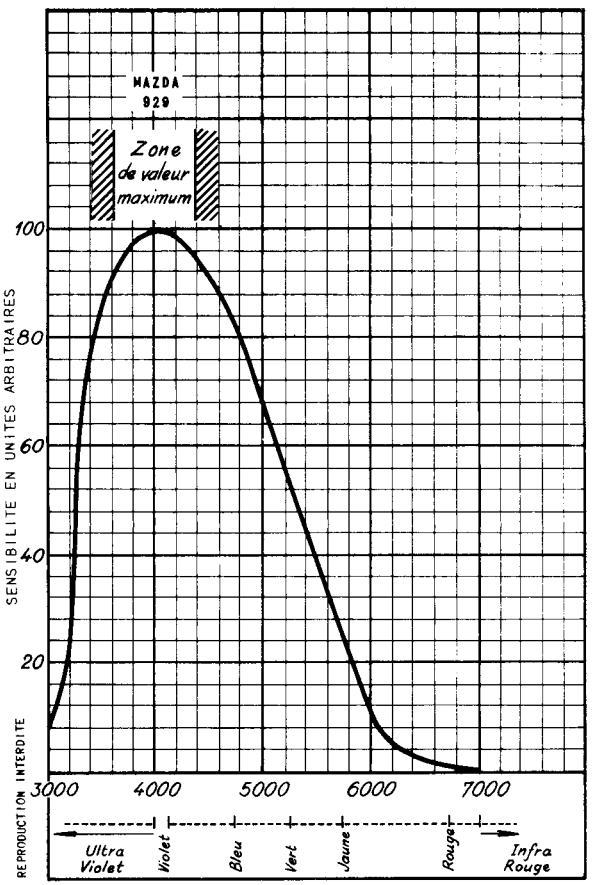


REPRODUCTION INTERDITE

MAZDA

929

COURBE DE LA SENSIBILITÉ SPECTRALE EN FONCTION DE LA LONGUEUR D'ONDE POUR UNE MÊME VALEUR DU FLUX LUMINEUX



REPRODUCTION INTERDITE

MAZDA

1007

1007

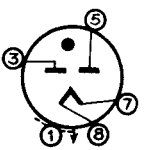
REDRESSEUR BIPLAQUE A GAZ

Tube à chauffage direct, à cathode chaude ou froide.
Filament à oxydes

Tension filament	1 Volt (+ 10 %)
Intensité filament	1,2 Ampère
Encombrement	M.21-0.1
Hauteur maximum (broches comprises)	66,8 mm
Diamètre maximum	33,5 mm
Culot	Octal
Brochage	5.0-LA

Broches :

N° 1 – BLINDAGE EXTERNE.
N° 2 – BROCHE MANQUE.
N° 3 – ANODE N° 1.
N° 4 – BROCHE MANQUE.
N° 5 – ANODE N° 2.
N° 6 – BROCHE MANQUE.
N° 7 – FILAMENT.
N° 8 – FILAMENT.
● ATMOSPHÈRE GAZEUSE.



Broches du Culot, face à l'observateur.

CONDITIONS MAXIMA D'UTILISATION

Tension filament	1	0 Volt	
Tension inverse maximum	1.080	1.080 Volts	max.
Courant maximum de crête	1	1 Amp.	max.
Courant moyen redressé	120	120 mA	max.
Courant moyen redressé	–	30 mA	min.
Tension d'amorçage min.	150	– Volts	min.
Chute de tension interne	35	35 Volts	max.
Température de fonctionnement		−55 à + 70°C	

REPRODUCTION INTERDITE.

MAZDA

1883

1883

VALVE BIPLAQUE A VIDE

Cathode à chauffage indirect.	
Tension filament CA	5 Volts
Intensité filament	1,6 Amp.
Hauteur maximum	105 mm
Diamètre maximum	45 mm
Ampoule	V-61
Culot	6.249

Broches:

N° 1 - Filament.
N° 2 - Non connectée.
N° 3 - Anode N° 1.
N° 4 - Non connectée.

Broches :

N° 5 - Non connectée.
N° 6 - Anode N° 2.
N° 7 - Non connectée.
N° 8 - Filament et cathode.

Broches du culot, face à l'observateur.

Exemples d'utilisation avec condensateur d'entrée.

Tension efficace par anode	350	400 max. Volts eff.
Courant redressé	125 max.	110 max. mA

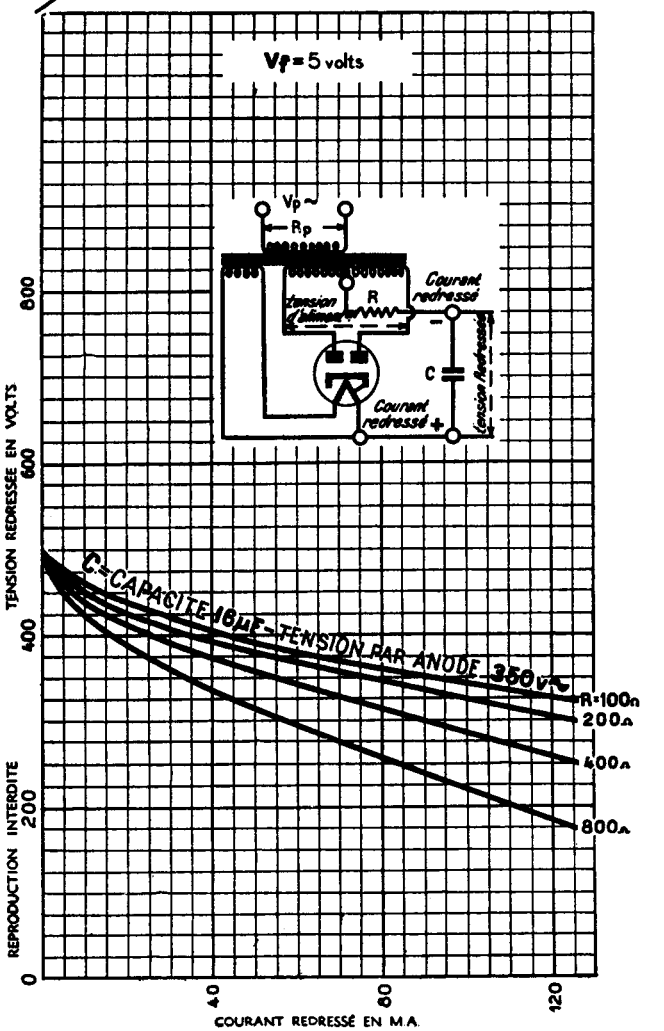
REPRODUCTION INTERDITE.

1883

MAZDA

1883

Courbes du courant redressé en fonction de la tension redressée



REPRODUCTION INTERDITE

MAZDA

6196

6196

ELECTROMÈTRE DOUBLE
MINIATURE 9 BROCHES A CHAUFFAGE DIRECT

Filament à oxydes		
Tension filament	3	Volts
Courant filament	45 min. 50 moy. 55 max.	mA
Capacité grille n°2 (élément de mesure) par rapport à toutes les autres électrodes	3,7	pF
Encombrement		V.2-V.1
Hauteur (broches comprises)	64 mm max.	
Diamètre	22,2 mm max.	
Base		MN9
Brochage		8.N-UA

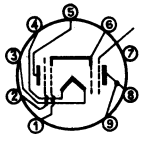
CONDITIONS MAXIMA DE FONCTIONNEMENT

Tension d'anode	9	Volts max.
Tension de grille n°1	6	Volts max.
Tension de grille n°2	-2	Volts max.

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode	9	Volts
Tension de grille n°1	6	Volts
Tension de grille n°2	-4	Volts
Courant d'anode par élément	25	µ A
Courant de grille n°1	750	µ A
Pente par élément	> 20	µ A/V
Résistance équivalente d'entrée de la grille de mesure	$>10^{15}$	Ω
Courant total inverse de la grille de mesure	2.10^{-15}	A approx.

NOTA : Pour les mesures le point de référence est le pôle négatif du filament (broche 4).



Broches de la base, face à l'observateur.

N°1 - Grille N°1.
N°2 - Grille N°2 de la partie non isolée.
N°3 - + filament.
N°4 - - filament.
N°5 - Anode de la partie non isolée.
N°6 - Grille N°1.
N°7 - Non connectée.
N°8 - Anode de mesure.
N°9 - Anode de mesure.

La grille N°2 de mesure est reliée au sommet de l'ampoule

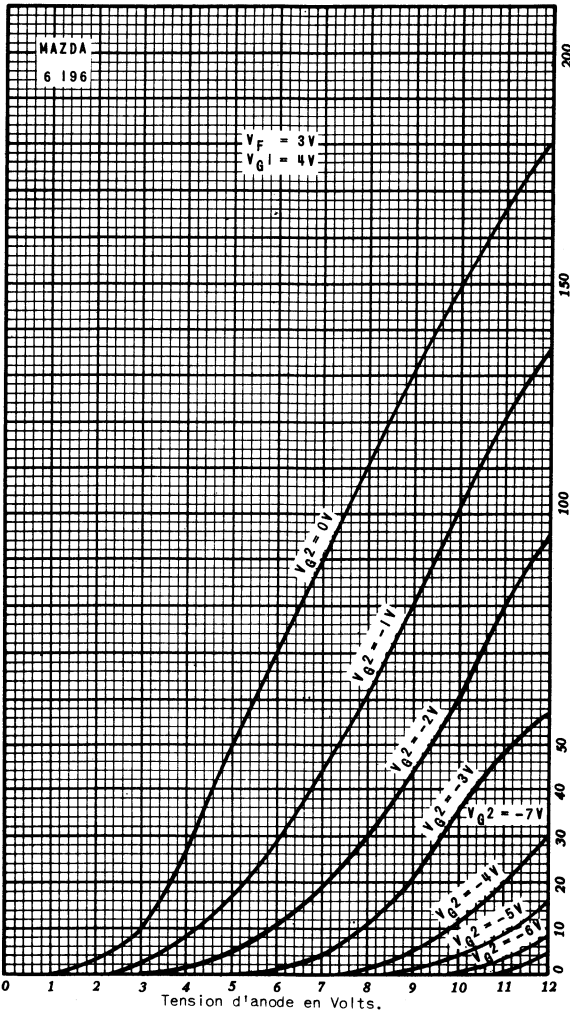
REPRODUCTION INTERDITE.

6196

MAZDA

6196

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



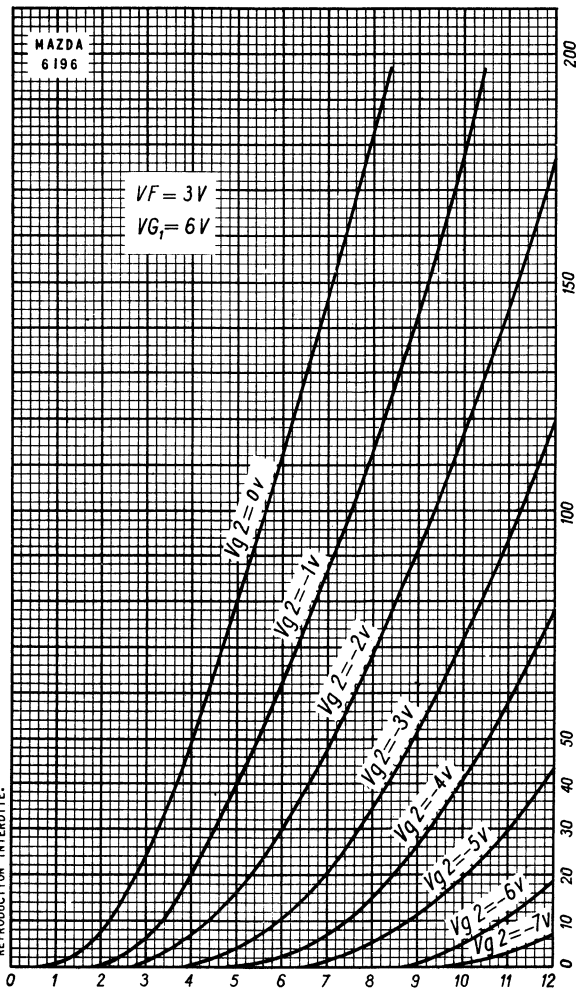
REPRODUCTION INTERDITE.

MAZDA

6 196

6196

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



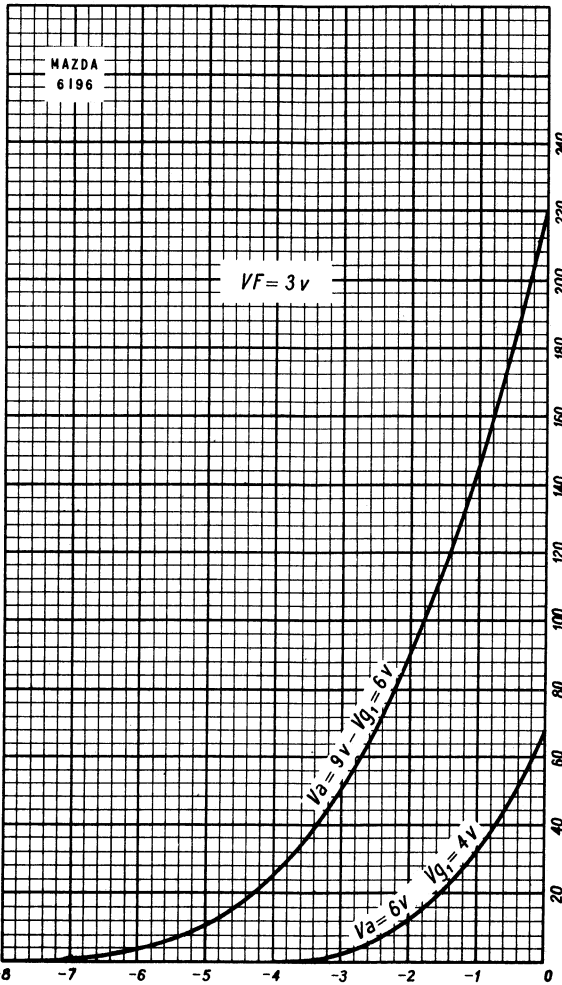
REPRODUCTION INTERDITE.

6196

MAZDA

6 196

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION DE GRILLE N° 2



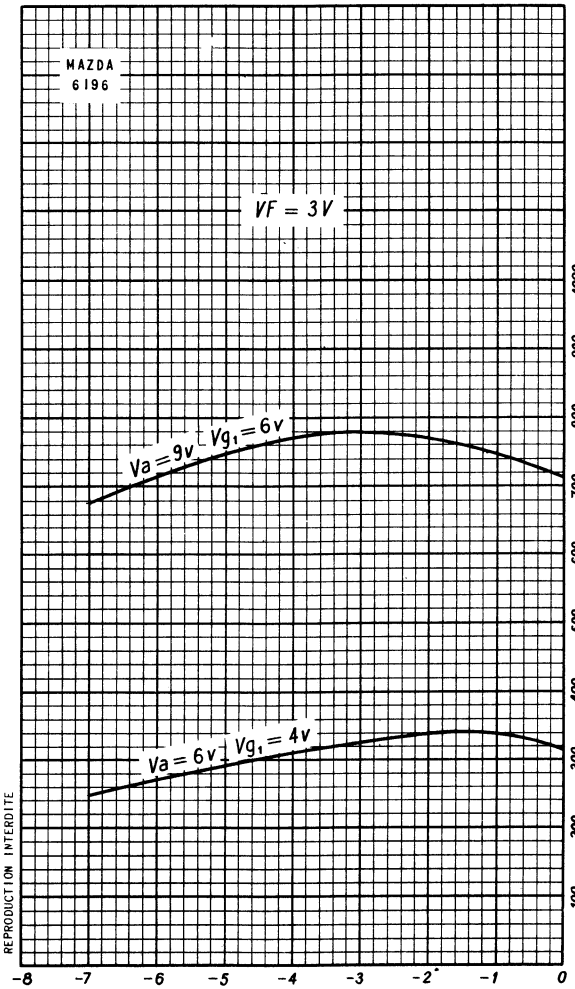
REPRODUCTION INTERDITE

MAZDA

6 196

6196

COURBES DU COURANT DE GRILLE N° 1
EN FONCTION DE LA TENSION DE GRILLE N° 2



REPRODUCTION INTERDITE

MAZDA
6250

6250

ÉLECTROMÈTRE SIMPLE
MINIATURE 9 BROCHES A CHAUFFAGE DIRECT

Filament à Oxydes		
Tension filament	2,5 Volts	
Courant filament	40 min. 45 moy. 50 max.	mA
Capacité grille n°2 (élément de mesure) par rapport à toutes les autres électrodes	5,8	pF
Encombrement	V.2-N.1	
Hauteur (broches comprises)	64 max.	mm
Diamètre	22,2 max.	mm
Base	9C12	
Brochage	6.N-CA	

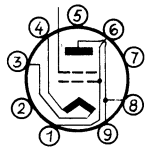
CONDITIONS MAXIMA DE FONCTIONNEMENT

Tension d'anode	9 Volts max.
Tension de grille n°1	6 Volts max.
Tension de grille n°2	- 2 Volts max.

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode	9	Volts
Tension de grille n°1	6	Volts
Tension de grille n°2	- 4	Volts
Courant d'anode	75	µ A
Courant de grille n°1	525	µ A
Pente par élément	50	µ A/V
Résistance équivalente d'entrée de la grille de mesure	$>10^{15}$	Ω
Courant total inverse de la grille de mesure	2.10^{-15} A approx.	

NOTA : Pour les mesures le point de référence est le pôle négatif du filament (broche 4).



Broches de la base, face à l'Observateur.

N° 1 - Grille N° 1
N° 2 - Connexion interne.
N° 3 - + filament.
N° 4 - - filament.
N° 5 - Connexion interne.
N° 6 - Grille N° 1.
N° 7 - Non connectée.
N° 8 - Anode.
N° 9 - Anode.

La grille N°2 de mesure est reliée au sommet de l'ampoule.

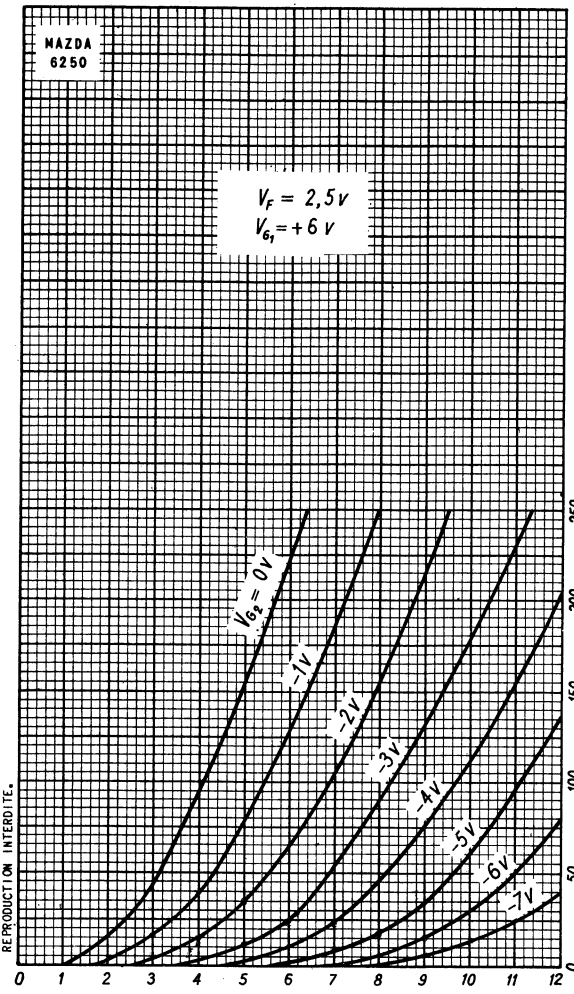
REPRODUCTION INTERDITE

MAZDA

6250

6250

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



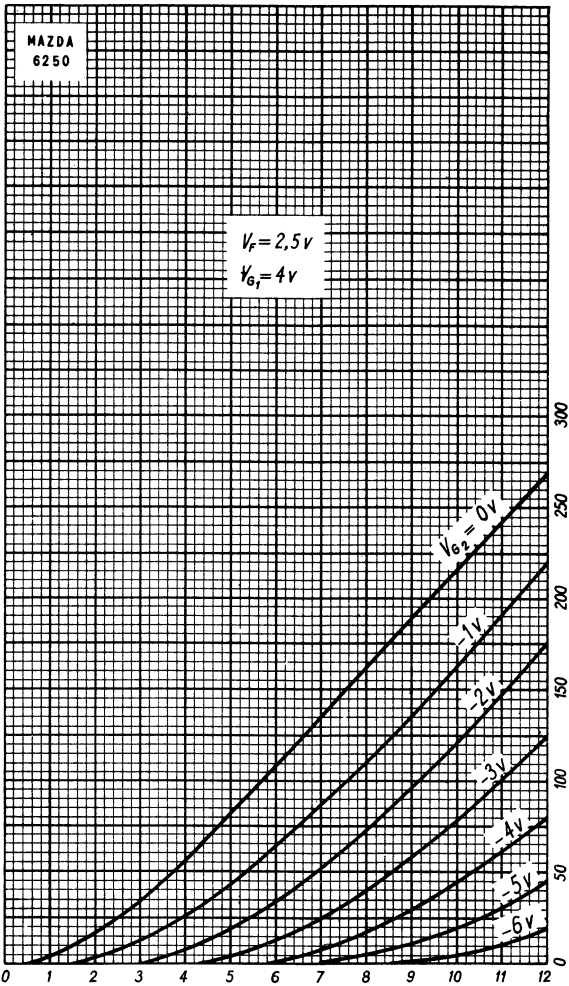
REPRODUCTION INTERDITE.

6250

MAZDA

6250

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



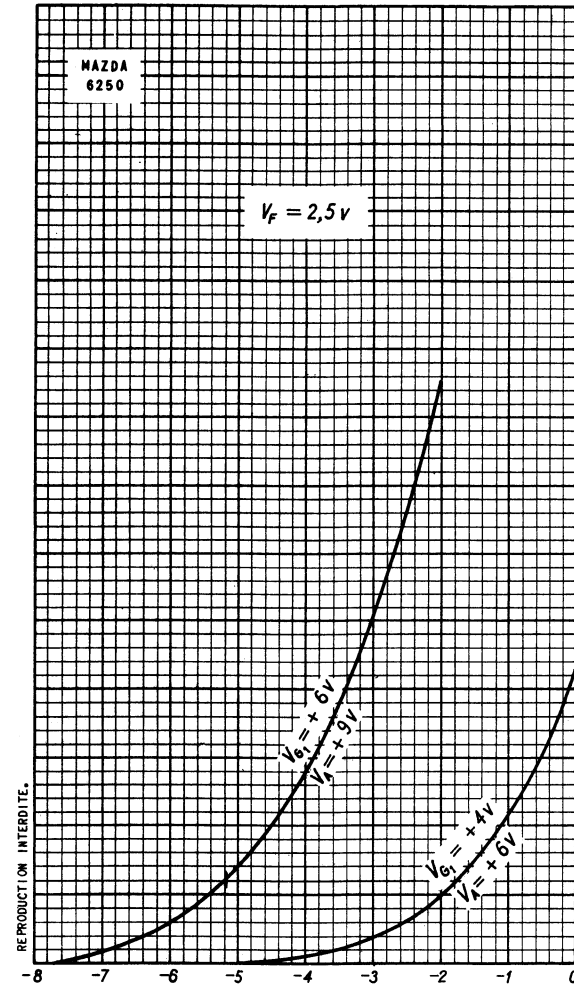
REPRODUCTION INTERDITE

MAZDA

6250

6250

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION DE GRILLE N° 2



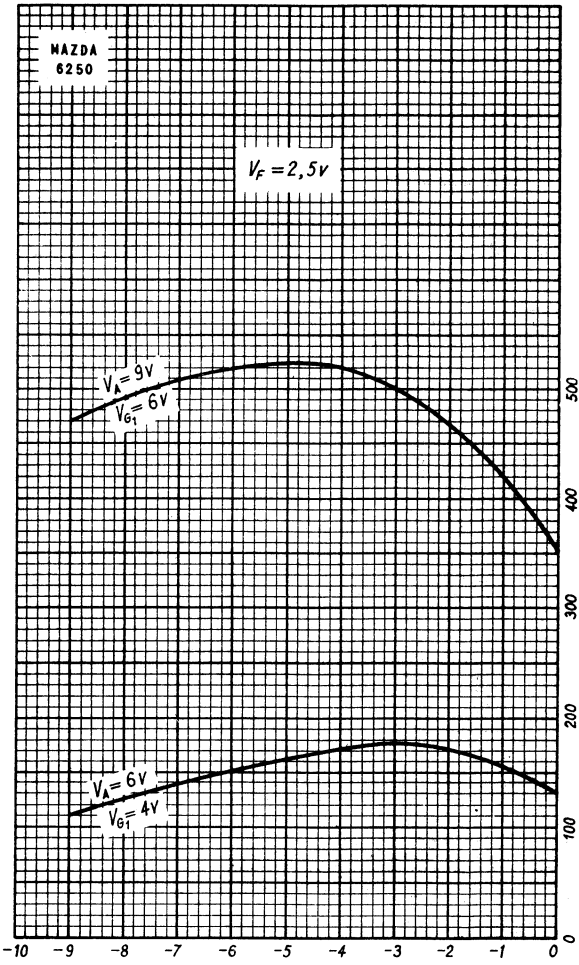
REPRODUCTION INTERDITE.

6250

MAZDA

6250

COURBES DU COURANT DE GRILLE N° 1
EN FONCTION DE LA TENSION DE GRILLE N° 2



REPRODUCTION INTERDITE

MAZDA

7233

7233

TRIODE DE PUISSANCE A TRÈS FAIBLE COEFFICIENT D'AMPLIFICATION
RÉGULATION SÉRIE DES ALIMENTATIONS STABILISÉES
SÉRIE MINIATURE 9 BROCHES NOVAL

Le tube 7233 est une triode de puissance à très faible coefficient d'amplification, spécialement conçue pour la régulation série des alimentations stabilisées.

Pour une tension d'alimentation d'anode de 50 V et une résistance de cathode de 22 Ω, le courant d'anode est de 120 mA, la pente de 17,5 mA/V, le coefficient d'amplification de 4, la résistance interne de 230 Ω.

CARACTERISTIQUES GENERALES

ELECTRIQUES

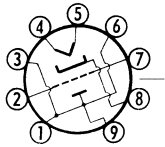
Cathode à chauffage indirect		
Tension filament	6,3	V
Courant filament	1,25	A

MECANIQUES

Embase		noval
Diamètre de l'ampoule	22,2	mm max.
Hauteur, broches non comprises	71,4	mm max.
Position de montage		indifférente

BROCHES :

N°1 – Anode.
N°2 – Grille.
N°3 – Anode.
N°4 – Filament.
N°5 – Filament.
N°6 – Anode.
N°7 – Grille.
N°8 – Cathode.
N°9 – Anode.



Brochage

Broches de la base, face à l'observateur.

CAPACITES INTERELECTRODES
(sans blindage externe)

Capacité anode-grille	14	pF
Capacité d'entrée	7,5	pF
Capacité de sortie	2,2	pF

REPRODUCTION INTERDITE

7233

MAZDA

7233

TRIODE DE PUISSANCE A TRÈS FAIBLE COEFFICIENT D'AMPLIFICATION
RÉGULATION SÉRIE DES ALIMENTATIONS STABILISÉES
SÉRIE MINIATURE 9 BROCHES NOVAL

LIMITES MAXIMALES d'UTILISATION

Système des Limites hybrides

Tension d'anode	330 V max.
Tension continue positive de grille	0 V max.
Tension continue négative de grille	135 V max.
Dissipation d'anode	7,5 W max.
Courant continu de cathode	140 mA max.
Tension entre le filament et la cathode	
– filament positif par rapport à la cathode	300 V max.
– filament négatif par rapport à la cathode	300 V max.
Résistance du circuit de grille	
– en polarisation fixe (1)	0,1 MΩ max.
– en polarisation cathodique	1 MΩ max.
Résistance de cathode, valeur minimale	note 2
Température de l'ampoule au point le plus chaud	200°C max.

CARACTERISTIQUES NOMINALES

Tension d'alimentation d'anode	–	50	V
Tension d'anode	125	–	V
Résistance de polarisation de cathode	–	22	Ω
Facteur d'amplification	–	4	
Résistance interne (env.)	–	230	Ω
Pente	–	17,5	mA/V
Courant d'anode	–	120	mA
Tension de grille pour un courant d'anode de 1 mA.	–60	–	V

(1) L'utilisation d'une polarisation fixe n'est pas recommandée quand plusieurs tubes sont montés en parallèle.

(2) Dans le cas où plusieurs tubes sont utilisés en parallèle, une résistance de cathode de valeur égale ou supérieure à la valeur minimale indiquée feuillet n°5.210-3 doit être utilisée en série dans chaque circuit de cathode.

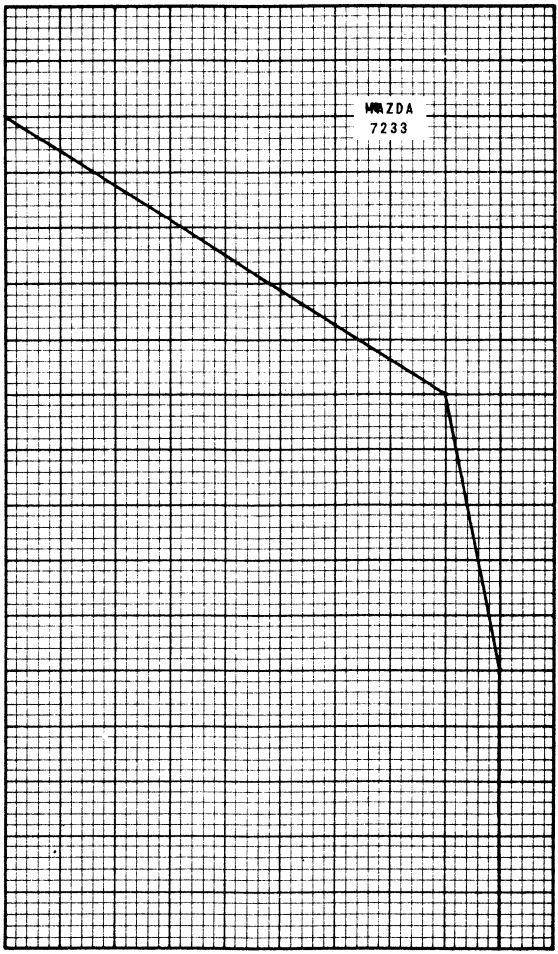
REPRODUCTION INTERDITE

MAZDA

7233

7233

COURBE DE LA RÉSISTANCE DE CATHODE
EN FONCTION DE LA TENSION DU CIRCUIT
D'UTILISATION



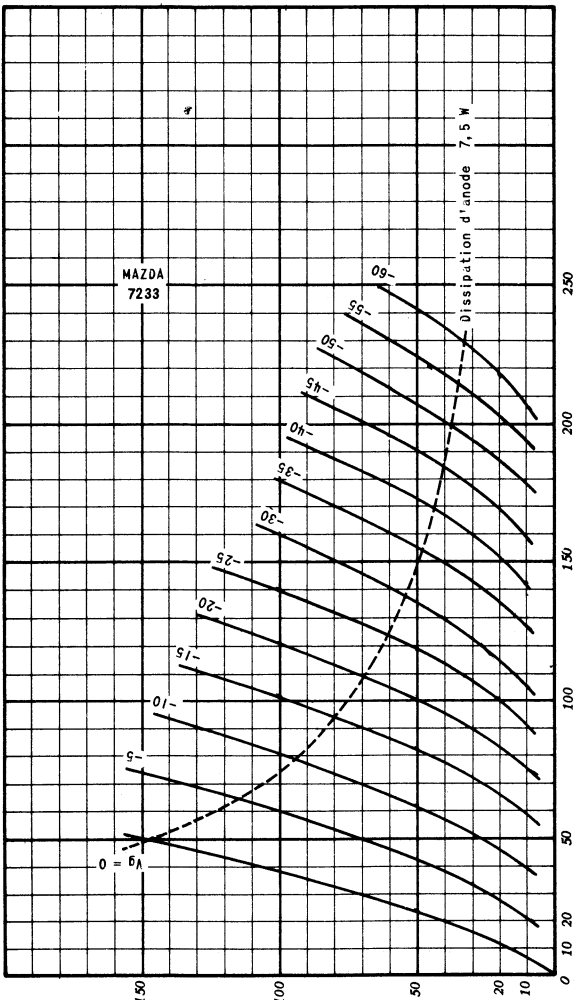
REPRODUCTION INTERDITE

7233

MAZDA

7233

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



MAZDA

7242

7242

TRIODE DE PUISSANCE
POUR REGULATION DE SERIE
CULOT CERAMIQUE 7 BROCHES
STRUCTURE RENFORCEE

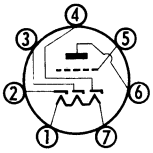
CARACTERISTIQUES GENERALES

MECANIQUES

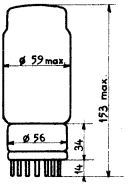
Culot céramique 7 broches JETEC - A 7-17
Accélération aux chocs pendant 1 ms 450 g
Accélération maxima en vibration (10 à 25 Hz) 2,5 g
Poids moyen 170 g

BROCHES :

N° 1 - Filament.
N° 2 - Cathode n° 1.
N° 3 - Cathode.
N° 4 - Cathode n° 3.
N° 5 - Grille.
N° 6 - Anode.
N° 7 - Filament.



Broches de la base, face à l'observateur



Encombrement

Position de montage : quelconque
En position horizontale, le plan des montants de grille doit être vertical.

ELECTRIQUES

Courant de chauffage	7,5 A
Tension de chauffage	6,3 V
Pente	111 mA/V
Coefficient d'amplification	9
Temps de chauffage minimum de la cathode	30 sec.

LIMITES MAXIMALES D'UTILISATION

Système des limites absolues

Valeurs pour chaque section

Tension continue d'anode	400 V max.
Courant continu d'anode	900 mA max.
Courant par cathode	300 mA max.
Dissipation d'anode	100 W max.
Tension entre le filament et la cathode	
- filament positif par rapport à la cathode	300 V max.
- filament négatif par rapport à la cathode	300 V max.
Tension de grille	
- valeur positive	0 V max.
- valeur négative	300 V max.
Courant de grille	0 mA max.
Résistance du circuit de grille	500 Ω min.
- en polarisation fixe	20 kΩ max.
- en polarisation cathodique	200 kΩ max.
Température de l'ampoule au point le plus chaud	300 °C max.
Altitude maximale sans pressurisation	3 km

REPRODUCTION INTERDITE

7242

MAZDA

7242

NOTES RELATIVES A L'UTILISATION DE CE TYPE A STRUCTURE RENFORCEE

Le 7242 est surtout utilisé comme tube régulateur série dans les alimentations stabilisées.

Il est recommandé de polariser le tube au moyen d'une résistance placée dans le circuit de cathode. Ce mode de polarisation présente les avantages suivants :

1 – Il constitue une protection permanente du tube. La résistance de cathode doit être au moins de 10 Ω et la tension à ses bornes doit être au moins égale au 1/10 de la tension de polarisation de la grille.

2 – Dans le cas où l'on utilise deux sections en parallèle, les résistances de cathode sont alors indispensables car elles contribuent aussi à égaliser les courants qui circulent dans les deux sections.

3 – Pour une même protection du tube, la résistance placée dans le circuit d'anode devrait être (μ + 1) fois plus élevée que la résistance du circuit de cathode.

Dans le cas du 7242, pour lequel μ = 9, la valeur de la résistance de cathode est seulement le dixième de la résistance d'anode et la puissance dissipée sera dix fois plus faible.

Si plusieurs tubes sont montés en parallèle, une résistance doit être placée en série dans le circuit de grille de chaque tube. Elle doit avoir une valeur suffisamment élevée pour éviter l'apparition d'oscillations parasites, mais pas trop élevée pour éviter la perte du contrôle de grille par suite du passage d'un faible courant dans cette électrode. La valeur de 1 000 ohms satisfait à ces deux conditions.

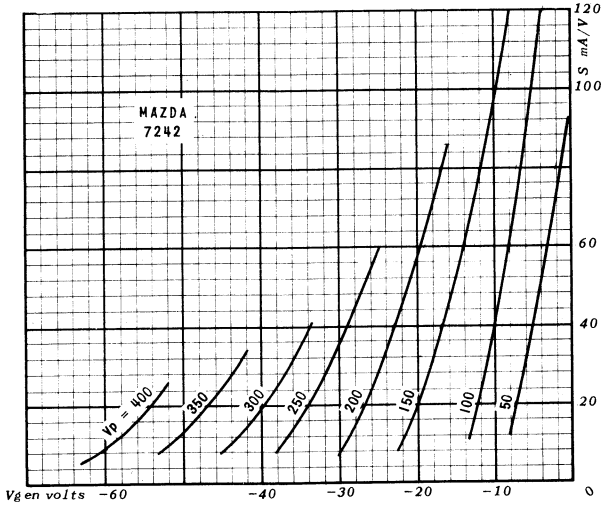
La tension d'alimentation du filament, *mesurée directement sur les broches du tube,* doit être aussi proche que possible de 6,3 volts.

REPRODUCTION INTERDITE

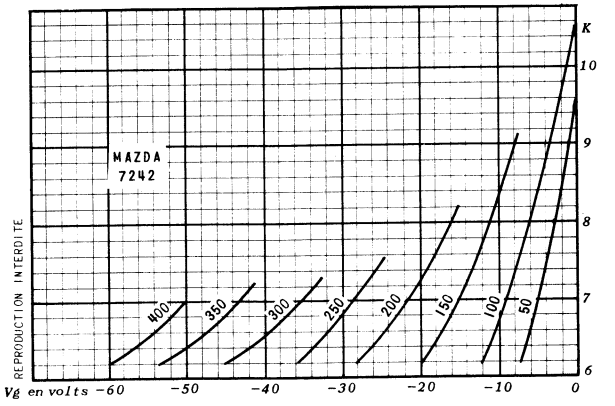
MAZDA
7242

7242

COURBES DE LA PENTE "S"
EN FONCTION DE LA TENSION GRILLE



COURBES DU COEFFICIENT D'AMPLIFICATION "K"
EN FONCTION DE LA TENSION GRILLE

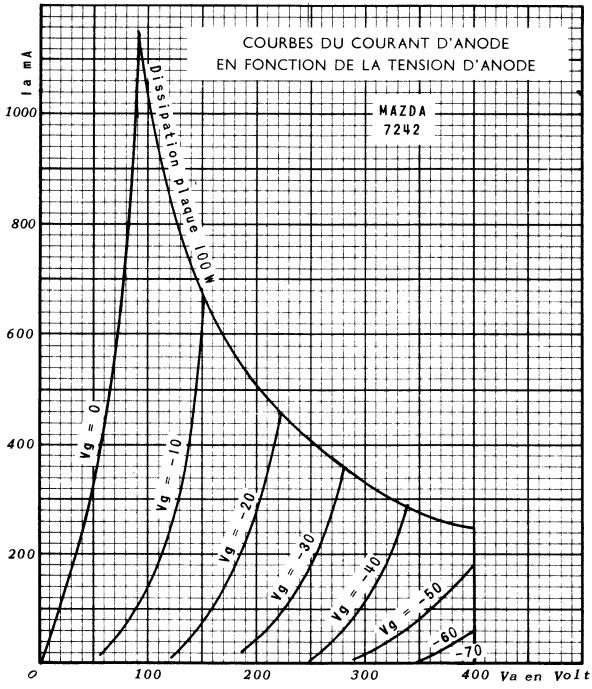


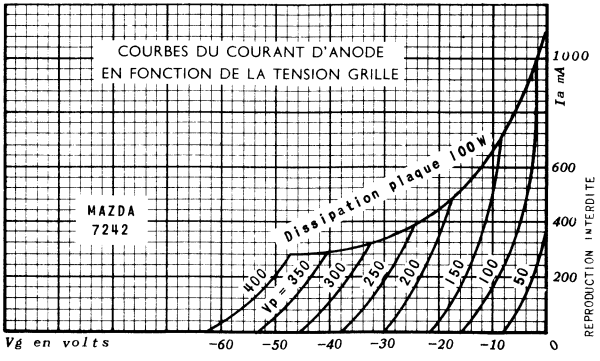
REPRODUCTION INTERDITE

7242

MAZDA

7242





REPRODUCTION INTERDITE

MAZDA

7377

7377

DOUBLE TÉTRODE D'ÉMISSION
AMPLIFICATEUR PUSH-PULL CLASSE C
TRIPLEUR DE FRÉQUENCE JUSQU'A 1000 MHz

Le 7377 est une double tétrode d'émission à chauffage indirect. Il comporte des connexions courtes et présente des capacités internes de faible valeur, d'où un bon fonctionnement dans la gamme V.H.F.

Le 7377 est conçu à l'origine pour être utilisé en amplificateur push pull Classe C ou en tripleur de fréquence jusqu'à 1.000 MHz.

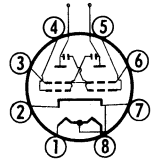
CARACTERISTIQUES GENERALES

Cathode à chauffage indirect

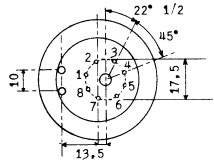
	en série	*en parallèle*
Branchement du filament		
Tension filament	12,6	6,3 V
Courant filament	0,3	0,6 A
Ampoule		voir dessins
Embase		
Position de montage		indifférente

CAPACITES INTERELECTRODES

– Pour chaque section	
Capacité grille n° 1 – anode	0,145 pF
Capacité d'entrée	4,5 pF
Capacité de sortie	1,35 pF
– Les deux sections en montage push-pull	
Capacité d'entrée	2,40 pF
Capacité de sortie	0,82 pF



Broches de la base, vue face à l'observateur.



BROCHAGE :

N° 1 – Filament.
N° 2 – Cathode.
N° 3 – Grilles n° 2.
N° 4 – Grille n° 1, élément 2.
N° 5 – Grille n° 1, élément 1.
N° 6 – Grilles n° 2.
N° 7 – Cathode, point milieu du filament.
N° 8 – Filament.

REPRODUCTION INTERDITE

7377

MAZDA

7377

DOUBLE TÉTRODE D'ÉMISSION
AMPLIFICATEUR PUSH-PULL CLASSE C
TRIPLEUR DE FRÉQUENCE JUSQU'A 1000 MHz

CARACTERISTIQUES NOMINALES

Tension d'anode	350	V
Tension de grille n° 2	200	V
Courant d'anode	25	mA
Pente	10,5	mA/V
Coefficient d'amplification g2/g1	28	

FONCTIONNEMENT en AMPLIFICATEUR
Classe C - Télégraphie
Montage push-pull

Limites maximales d'utilisation
Système des Limites absolues

	T.C.C. (1)	*T.A.C.I.* (2)
Tension continue d'anode	400	400 V max.
Tension continue de grille n° 2	225	225 V max.
Tension négative de grille n° 1	100	100 V max.
Courant moyen d'anode	2 × 45	2 × 50 mA max.
Courant moyen de grille n° 1	2 × 4	2 × 4 mA max.
Puissance appliquée à l'anode	2 × 10	2 × 12 W max.
Dissipation d'anode	2 × 8	2 × 10 W max.
Dissipation de grille n° 2	2 × 1,5	2×1,75 W max.
Fréquence	960	960 MHz max.
Température de l'ampoule au point le plus chaud et au scellement des broches	220	220° C max.

CONDITIONS NORMALES D'UTILISATION

	T.C.C. (1)	*T.A.C.I.* (2)
Tension continue d'anode	250	250 V
Tension continue de grille n° 2	160 (3)	170 (4) V
Tension continue de grille n° 1	-15	-15 V
Courant moyen d'anode	2 × 35	2 × 40 mA
Courant moyen de grille n° 2	15	15 mA
Courant moyen de grille n° 1	2 × 0,75	2 × 0,75 mA
Puissance appliquée à l'anode	2 × 8,8	2 × 10 W
Dissipation d'anode	2 × 5,4	2 × 5,4 W
Dissipation de grille n° 2	2,5	2,9 W
Résistance du circuit de grille n° 1	20	20 kΩ
Puissance d'attaque	1,4	1,4 W
Puissance de sortie	7	8 W
Puissance utile dans la charge	4	5 W
Fréquence	960	960 MHz

Notes : voir feuillet 3.951K - 3A

REPRODUCTION INTERDITE

MAZDA

7377

7377

DOUBLE TÉTRODE D'ÉMISSION
AMPLIFICATEUR PUSH-PULL CLASSE C
TRIPLEUR DE FRÉQUENCE JUSQU'A 1000 MHz

TRIPLEUR DE FREQUENCE
Montage push-pull

Limites maximales d'utilisation
Système des limites absolues

	T.C.C. (1)	*T.A.C.I.* (2)
Tension continue d'anode	400	400 V max.
Tension continue de grille n° 2	225	250 V max.
Tension négative de grille n° 1	100	100 V max.
Courant moyen d'anode	2 × 40	2 × 40 V max.
Courant moyen de grille n° 1	2 × 4	2 × 5 mA max.
Puissance appliquée à l'anode	2 × 10	2 × 12 W max.
Dissipation d'anode	2 × 8	2 × 10 W max.
Dissipation de grille n° 2	2 × 1,5	2 × 1,75 W max.
Fréquence	960	960 MHz max.
Température de l'ampoule au point le plus chaud et au scellement des broches	220	220° C max.

CONDITIONS NORMALES D'UTILISATION

	T.C.C. (1)	*T.A.C.I.* (2)
Fréquence	320/960	320/960 MHz
Tension continue d'anode	250	250 V
Tension continue de grille n° 2	150	170 V
Résistance de grille n° 1	20	20 kΩ
Courant moyen d'anode	2 × 37,5	2 × 40 mA
Courant moyen de grille n° 2	15	16 mA
Courant moyen de grille n° 1	2 × 2,25	2 × 2,25 mA
Puissance appliquée à l'anode	2 × 9,5	2 × 10 W
Dissipation d'anode	2 × 8	2 × 8,5 W
Dissipation de grille n° 2	2,25	2,8 W
Puissance d'attaque	3	3 W
Puissance de sortie	2,75	3 W
Puissance utile dans la charge	1,5	1,8 W

(1) T.C.C. : Trafic Commercial continu
(2) T.A.C.I. : Trafic amateur ou commercial intermittent
(3) Ajuster la valeur de la tension de grille n°2 de façon à obtenir une valeur du courant d'anode de 2×35 mA à la puissance maximale.
(4) Ajuster la valeur de la tension de grille n°2 de façon à obtenir une valeur du courant d'anode de 2×40 mA à la puissance maximale.

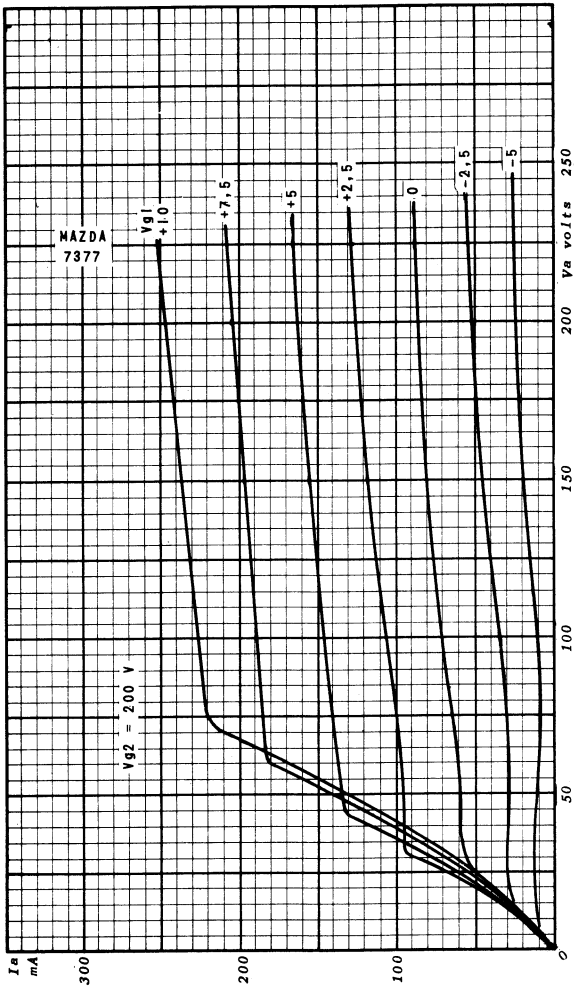
REPRODUCTION INTERDITE

7377

MAZDA

7377

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE
Vg 2 = 200 V



REPRODUCTION INTERDITE

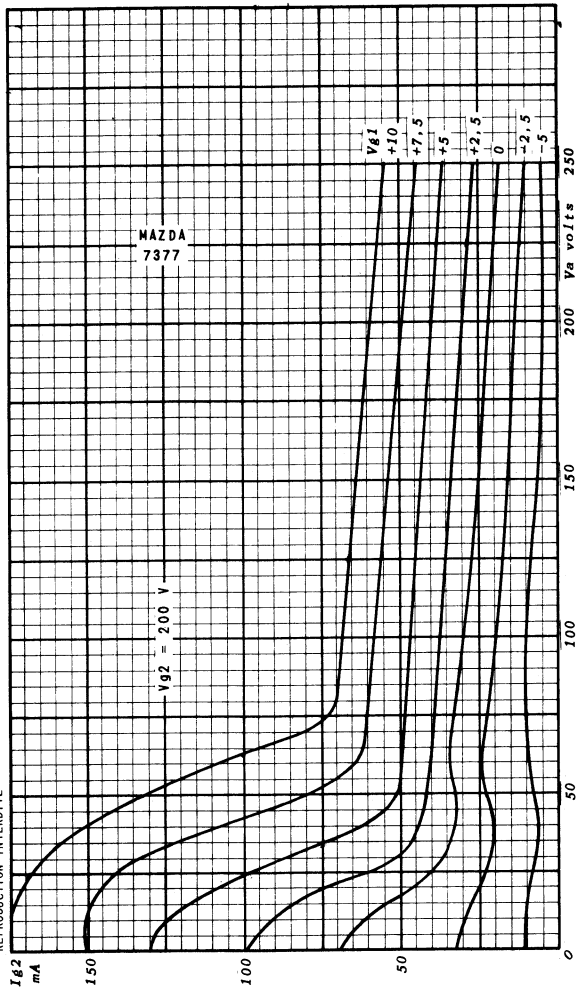
MAZDA

7377

7377

COURBES DU COURANT DE GRILLE Nº 2
EN FONCTION DE LA TENSION D'ANODE

Vg 2 = 200 V



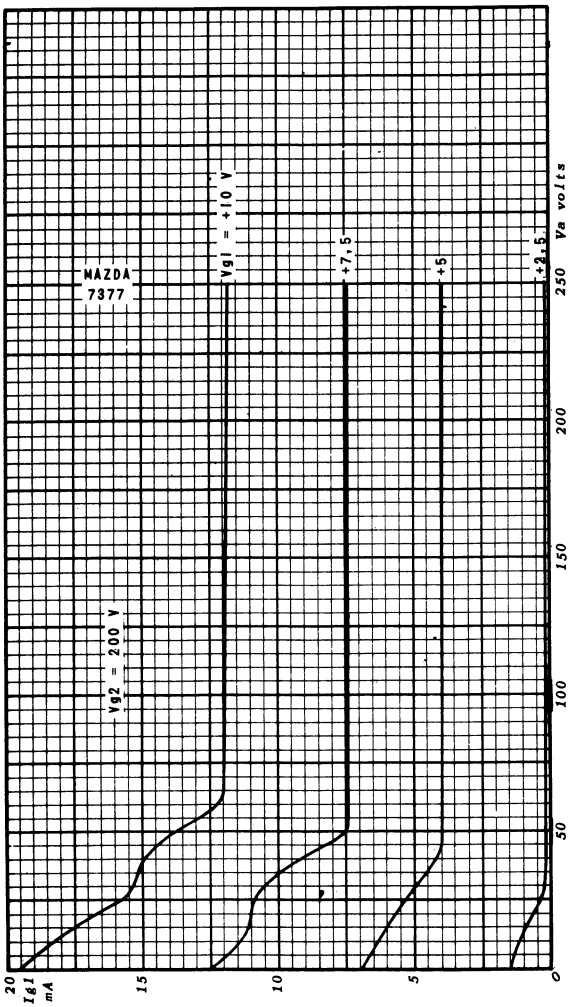
REPRODUCTION INTERDITE

7377

MAZDA

7377

COURBES DU COURANT DE GRILLE N° 1
EN FONCTION DE LA TENSION D'ANODE
Vg 2 = 200 V



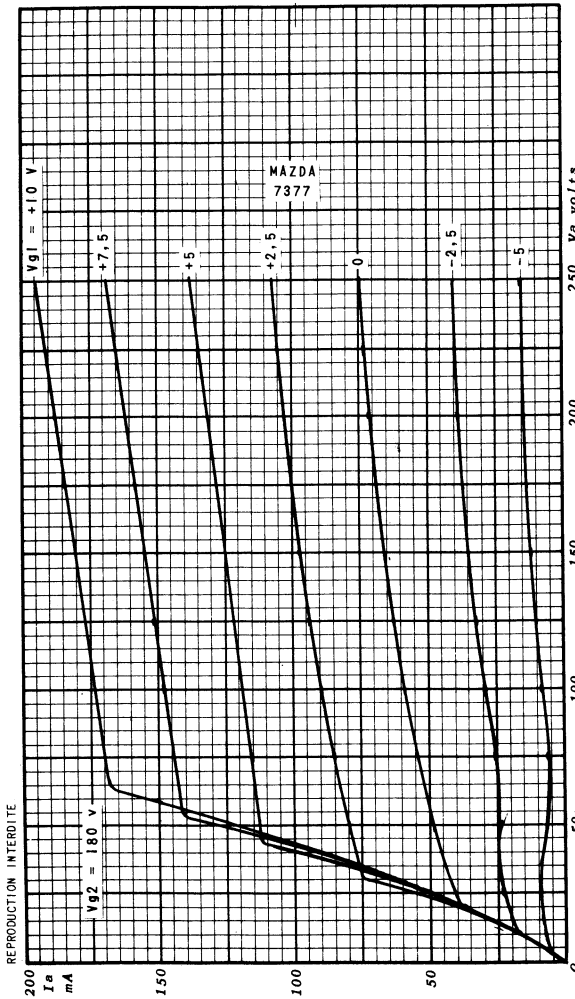
RÉPRODUCTION INTERDITE

MAZDA

7377

7377

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE
Vg 2 = 180 V



REPRODUCTION INTERDITE

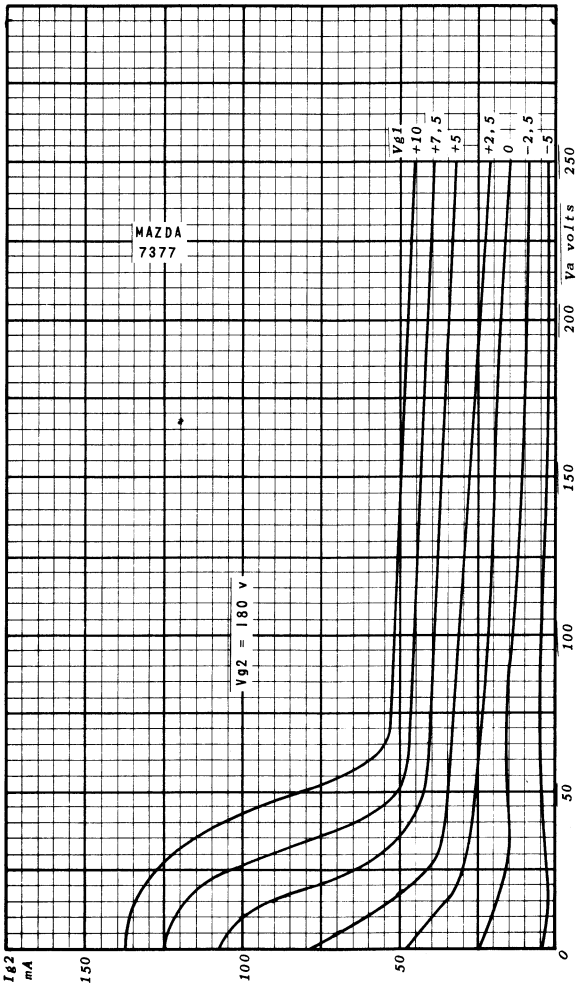
7377

MAZDA

7377

COURBES DU COURANT DE GRILLE N° 2
EN FONCTION DE LA TENSION D'ANODE

Vg 2 = 180 V



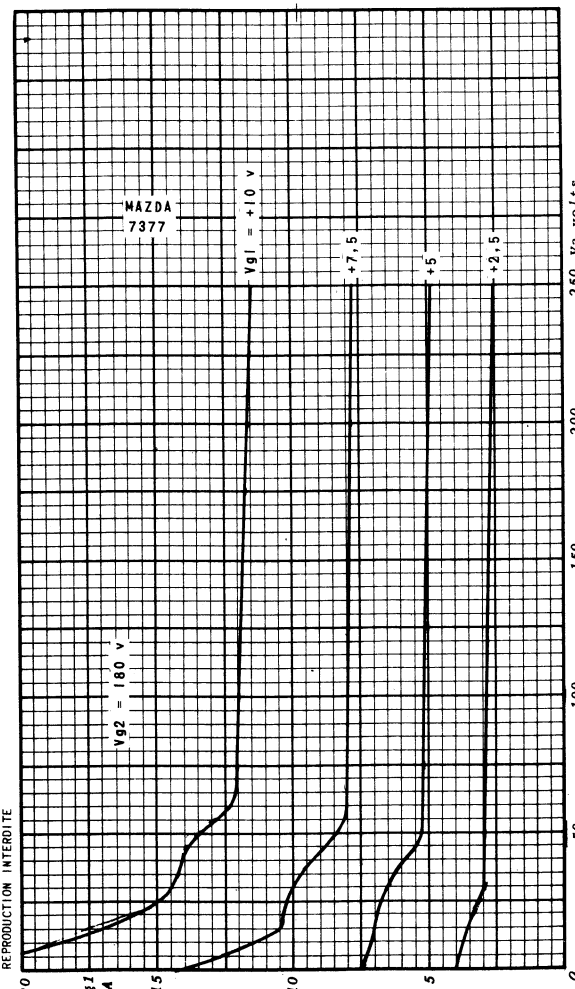
REPRODUCTION INTERDITE

MAZDA

7377

7377

COURBES DU COURANT DE GRILLE N° 1
EN FONCTION DE LA TENSION D'ANODE
Vg 2 = 180 V



REPRODUCTION INTERDITE

MAZDA

7745 / 4 Y 100 D

7745 / 4 Y 100 D

DOUBLE TÉTRODE D'ÉMISSION A FAISCEAUX ÉLECTRONIQUES DIRIGÉS AMPLIFICATEUR H. F.

Le tube 7 745/4Y100D est un double tétrode d'émission constitué de deux éléments de 4Y100AI réunis dans la même ampoule.

Ce tube double permet :

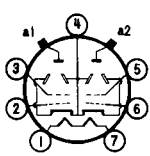
- de remplacer deux tubes 4Y100AI par un seul, dans le fonctionnement en push-pull,
- d'obtenir, avec les deux éléments en parallèle, une puissance de plus de 200W avec un tube unique et pour des tensions d'anode et d'écran de 750V et 300V respectivement,
- d'obtenir, avec les deux éléments en parallèle, une puissance de sortie de 100W avec une tension anodique ne dépassant pas 600V, ce qui conduit à une simplification notable des alimentations qui peuvent être réalisées avec du matériel standard.

CARACTERISTIQUES GENERALES

ELECTRIQUES		
Tension filament	12,6	V
Intensité filament	3,6	A
CAPACITE INTERELECTRODES		
Capacité anode-grille	0,5	pF
Capacité d'entrée	26	pF
Capacité de sortie	19	pF
Hauteur maximale (broches comprises)	135	mm max.
Diamètre maximal	71	mm max.
Brochage		7.E-UA

Le plan des électrodes de chaque élément est parallèle à celui dont la trace passe par l'axe de la broche 4 et par le milieu de l'intervalle séparant les broches n°1 et 7 (trace figurée sur le schéma de brochage par l'axe xy).

BROCHAGE



Broches face à l'observateur

DIAMETRE DES BROCHES

n°s 1-2-3-5-6-7: Ø = 1,5mm
n° 4: Ø = 3,2mm

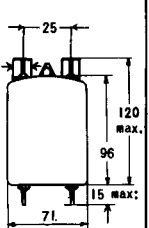
REPARTITION DES BROCHES :

N° 1-filament
N° 2-grille n° 1 (élément n° 1)
N° 3-grille n° 2 (élément n° 1)
N° 4-Cathode et grille n° 3 (ou déflecteurs).
N° 5-grille n° 2 (élément n° 2)
N° 6-grille n° 1 (élément n° 2)
N° 7-filament

Chaque anode est réunie à une des sorties du sommet

a_1-anode élément n° 1
a_2-anode élément n° 2

ENCOMBREMENT



Cotes maximales en millimètres

REPRODUCTION INTERDITE

7745 / 4Y100D

MAZDA

7745 / 4 Y 100 D

DOUBLE TÉTRODE D'ÉMISSION A FAISCEAUX
ÉLECTRONIQUES DIRIGÉS
AMPLIFICATEUR H. F.

AMPLIFICATEUR H.F. CLASSE C TELEGRAPHIE
Limites maximales d'utilisation

Tension continue d'anode	800	V max.
Tension continue de grille n°2	350	V max.
Tension continue de grille n°1	-300	V max.
Dissipation d'anode	60	W max. par élément
Dissipation de grille n°2	15	W max. "
Dissipation de grille n°1	2	W max. ".
Fréquence	80	MHz max.

CONDITIONS NORMALES D'UTILISATION
les deux éléments en parallèle

Tension d'anode	600	600	750	V
Tension de grille n°2	250	300	300	V
Tension de grille n°1	-85	-100	-100	V
Tension de crête de grille n°1	95	110	110	V
Courant moyen d'anode	250	340	390	mA
Courant moyen de grille n°2	60	72	70	mA
Courant moyen de grille n°1	11	8	13	mA
Puissance appliquée	150	204	293	W
Puissance de sortie	105	160	220	W env.
Puissance de commande	1	0,9	1,4	W

AMPLIFICATEUR H.F. CLASSE C TELEPHONIE
MODULATION PAR L'ANODE ET LA GRILLE-ECRAN
Limites maximales d'utilisation

Tension d'anode	750	V max.
Tension de grille n°2	300	V max.
Tension de grille n°1	-300	V max.
Dissipation d'anode	60	W max. par élément
Dissipation de grille n°2	15	W max. par élément
Dissipation de grille n°1	2	W max.

CONDITIONS NORMALES D'UTILISATION
les deux éléments en parallèle

Tension d'anode	550	600		V
Résistance du circuit de grille n°2	5	5		kΩ
Tension de grille n°1	-90	-100		V
Tension de crête de grille n°1	100	105	V	environ
Courant moyen de grille n°1	11	9	mA	"
Courant moyen de cathode	290	300	mA	"
Puissance appliquée	160	180	W	"
Puissance de sortie	110	150	W	"
Puissance de commande	1,1	1	W	"

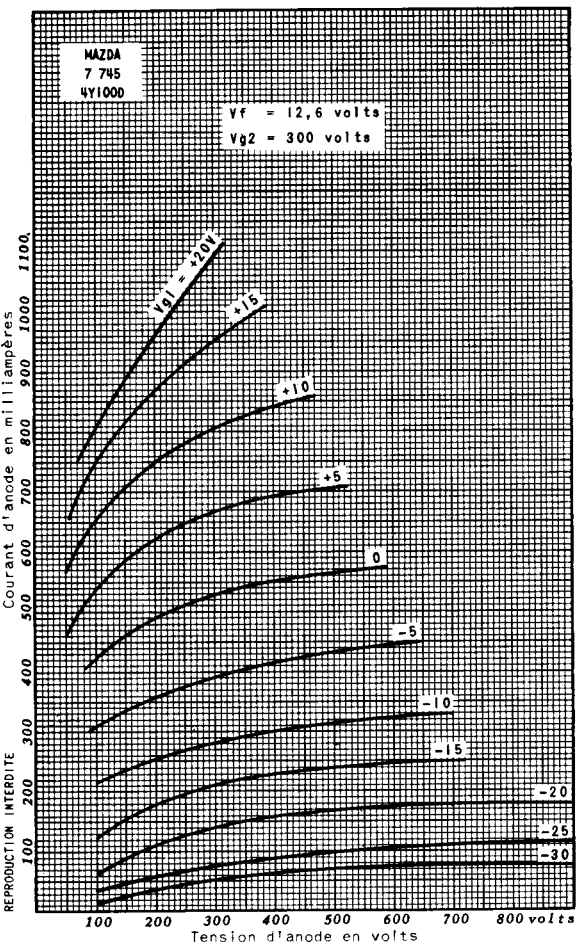
REPRODUCTION INTERDITE

MAZDA

7745 / 4 Y 100 D

7745 / 4 Y 100 D

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



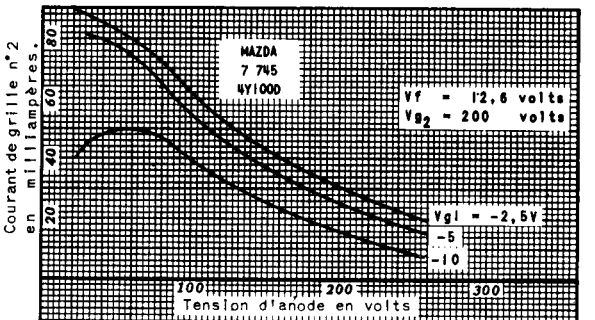
REPRODUCTION INTERDITE

7745
4Y100D

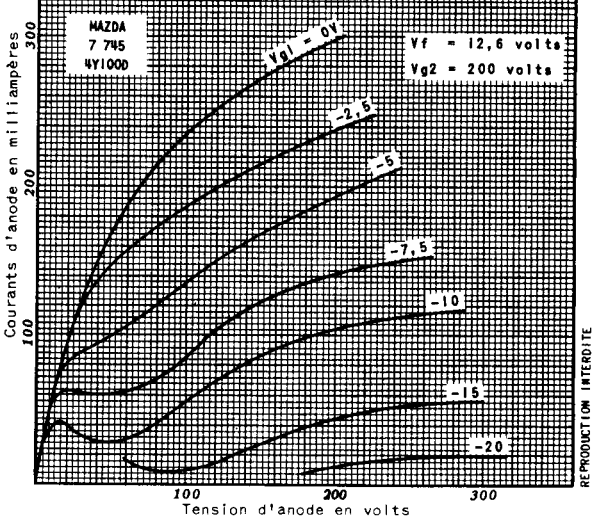
MAZDA

7745 / 4 Y 100 D

COURBES DU COURANT DE GRILLE Nº 2
EN FONCTION DE LA TENSION D'ANODE



COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION D'ANODE



REPRODUCTION INTERDITE

MAZDA
8418

8418

JAUGE A IONISATION BROCHAGE SERIE "A"

La jauge à ionisation 8418 a été conçue pour la mesure des basses pressions, inférieures à 0,5 pascal (soit $3,75 \times 10^{-3}$ torr.).

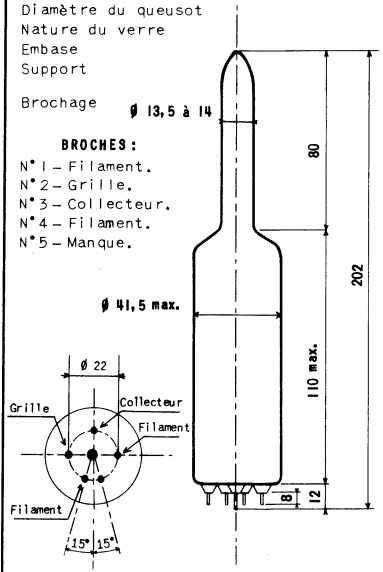
Cette jauge est un tube comportant 3 électrodes dont la grille, faisant office de collecteur d'électrons, est portée à un potentiel positif élevé et la plaque, faisant office de collecteur d'ions, à un potentiel négatif par rapport à celui du filament.

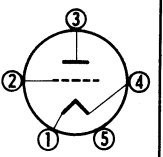
CARACTERISTIQUES GENERALES

Hauteur totale	202	mm
Diamètre de l'ampoule	41,5	mm max.
Diamètre du queusot	13,5 à 14	mm (1)
Nature du verre	S.146.03	Sovirel
Embase		voir dessin S 25/50 E
Support		voir dessin ci-dessous
Brochage		

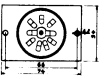
BROCHES :

N° 1 – Filament.
N° 2 – Grille.
N° 3 – Collecteur.
N° 4 – Filament.
N° 5 – Manque.





Broches de la base, vue face à l'observateur



(1) Cette dimension est la plus couramment utilisée. Toutefois, la jauge peut être fournie avec un queusot de diamètre différent. Ce diamètre doit alors être précisé à la commande.

REPRODUCTION INTERDITE

8418

MAZDA

8418

JAUGE A IONISATION BROCHAGE SERIE "A"

LIMITES MAXIMALES d'UTILISATION
Système des Limites absolues

DEGAZAGE		
Tension filament	6	V max.
Tension de grille et de collecteur réunis	750	V max.
Dissipation de grille et de collecteur réunis	75	W max.
dont pour la grille	7,5	W max.
MESURES		
Tension filament	4,5	V max.
Courant de grille	25	mA max.
Tension de grille	500	V max.
Dissipation de grille	5	W max.

CONDITIONS d'UTILISATION

DEGAZAGE		
Tension filament	5	V env.
Courant filament	4,7	A env.
Tension de grille et de collecteur réunis	500	V
Courant de grille et de collecteur réunis	100	mA
MESURES		
Tension filament	4,2	V env.
Courant filament	4,2	A env.
Tension de grille	+ 250	V
Courant de grille (2)	10	mA
Tension de collecteur	-30	V

ETALONNAGE

Pour les conditions d'utilisation indiquées ci-dessus, la jauge a, pour l'argon, une sensibilité de 1370 µA ± 5 % par pascal (soit de 182 µA ± 5 % par µm de mercure).

Plus généralement, pour un courant électronique compris entre 0 et 12 mA, la sensibilité de la jauge est de 137 µA par pascal et par milliampère de courant électronique dans l'argon (soit 18,2 µA par µm de mercure et par milliampère de ce même courant).

Pour l'air sec, la sensibilité s'obtient en multipliant la valeur de la sensibilité pour l'argon par le facteur 0,76.

Cet étalonnage est valable pour des pressions comprises entre 10^{-4} et 5×10^{-1} Pa, soit $7,5 \times 10^{-7}$ et $3,75 \times 10^{-3}$ torr.

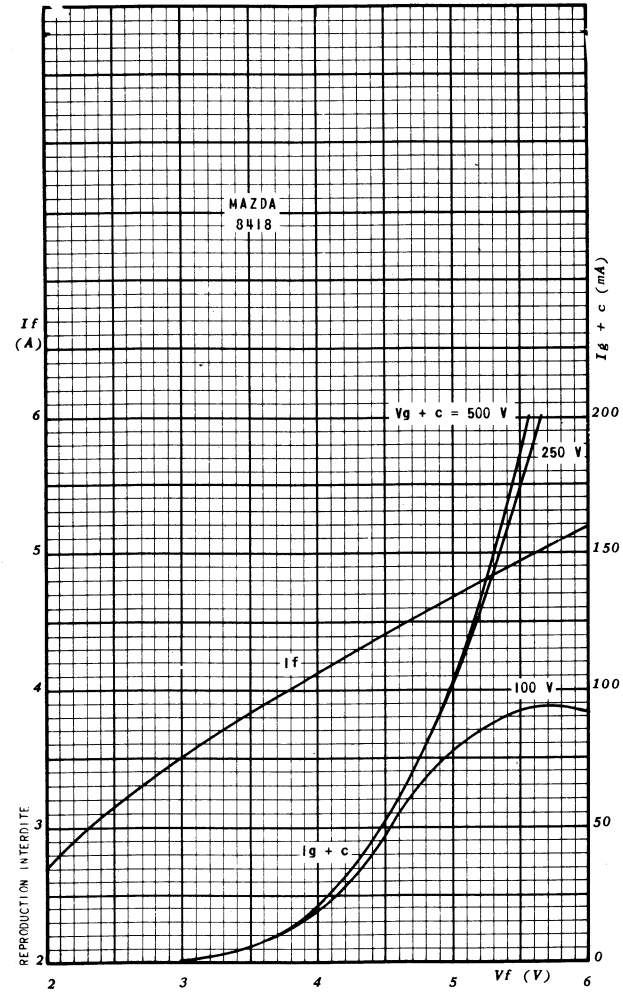
(2) Ajuster la tension aux bornes du filament de façon à obtenir un courant de grille de 10 mA.

REPRODUCTION INTERDITE

MAZDA
8418

8418

COURBES CARACTÉRISTIQUES



REPRODUCTION INTERDITE

EDISWAN

68504

FULL WAVE TUNGAR RECTIFIER

68504

GENERAL

Type 68504 is a Hot Cathode Discharge Full Wave Rectifier designed for use in low voltage battery charging equipment.

RATING

Filament Voltage (volts)	V_f	2.3
Filament Current (amps)	I_f	18.0
Striking Voltage (volts)	V_s	12.0
Anode to Cathode Voltage drop (volts)		10.0
D.C. Output	30 volts	5 amps ←

DIMENSIONS

Maximum Overall Length (mm)	170
Maximum Overall Diameter (mm)	80
Approximate Nett Weight (ozs)	4
Approximate Home Packed Weight (ozs)	8
Approximate Export Packed Weight (ozs)	12

MOUNTING POSITION - Vertical

BASE G.E.S. - Filament

TOP CONNECTIONS Loose Leads - Anodes.

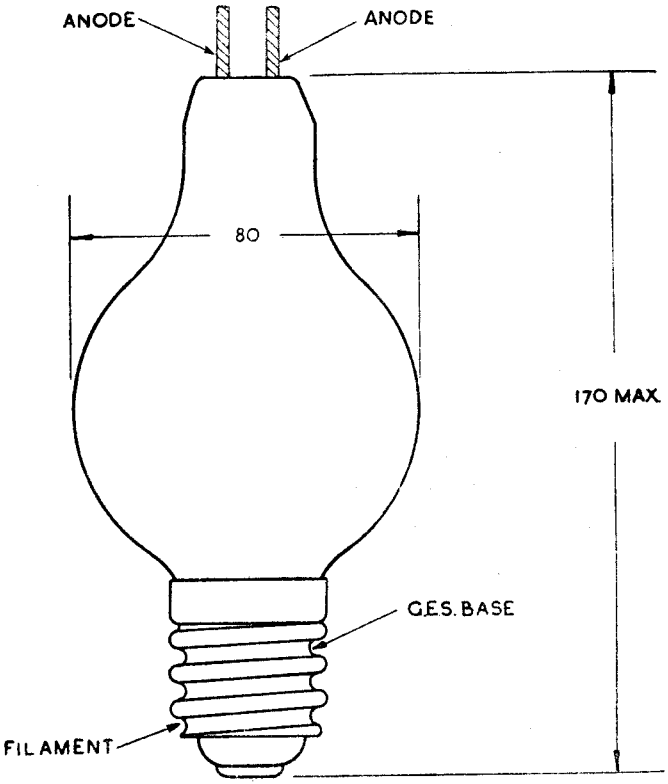
Indicates a change ←

68504

EDISWAN

68504

FULL WAVE TUNGAR RECTIFIER



EDISWAN

68506

HALF-WAVE TUNGAR RECTIFIER

68506

GENERAL

Type 68506 is a Hot Cathode Gas Discharge Half-Wave Rectifier designed for use in low voltage battery charging circuits.

RATING

Filament Voltage (volts)	V_f	2.3
Filament Current (amps)	I_f	18.0
Striking Voltage (volts)	V_s	15.0
Anode to Cathode Voltage drop (volts)		10.0
D.C. Output	75 volts 6 amps.	

DIMENSIONS

Maximum Overall Length (mm)	170
Maximum Overall Diameter (mm)	80
Approximate Nett Weight (ozs)	4.0
Approximate Home Packed Weight (ozs)	8.0
Approximate Export Packed Weight (ozs)	12.0

MOUNTING POSITION - Vertical

BASE G.E.S. - Filament

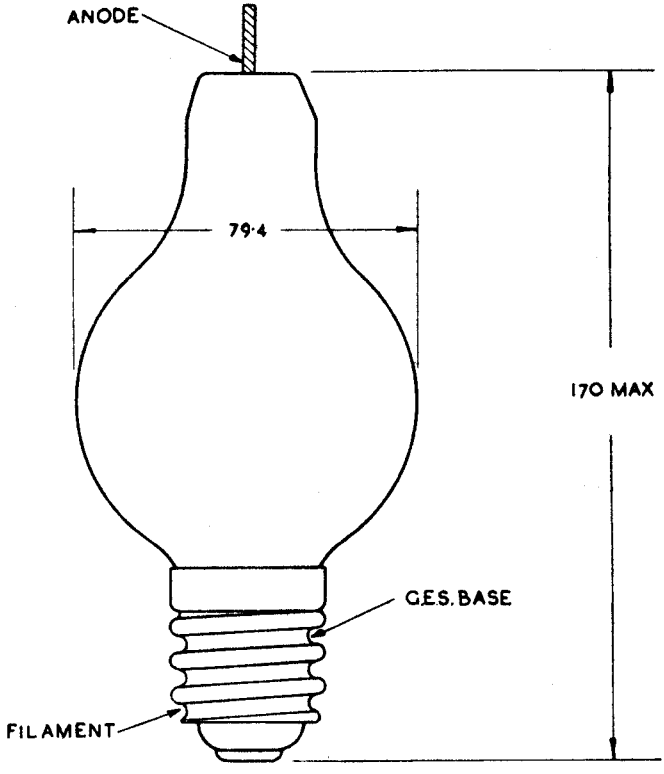
TOP CAP Loose lead - Anode.

68506

EDISWAN

68506

HALF-WAVE TUNGAR RECTIFIER



EDISWAN
MAZDA
68508

68508

HALF WAVE TUNGAR RECTIFIER

GENERAL

Type 68508 is a Hot Gas Discharge Half-Wave Rectifier designed for use in low voltage battery charging equipment.

RATING

Filament Voltage (volts)	V_f	2.5
Filament Current (amps)	I_f	25.0
Striking Voltage (volts)	V_s	12.0
Anode to Cathode Voltage Drop (volts)		10.0
D.C. Output	60 volts	15 amps

DIMENSIONS

Maximum Overall Length (mm)	214
Maximum Overall Diameter (mm)	96
Approximate Nett Weight (ozs)	4.0
Approximate Home Packed Weight (ozs)	8.0
Approximate Export Packed Weight (ozs)	12.0

MOUNTING POSITION - Vertical

BASE - G.E.S. - Filament

TOP CONNECTION Loose Lead - Anode

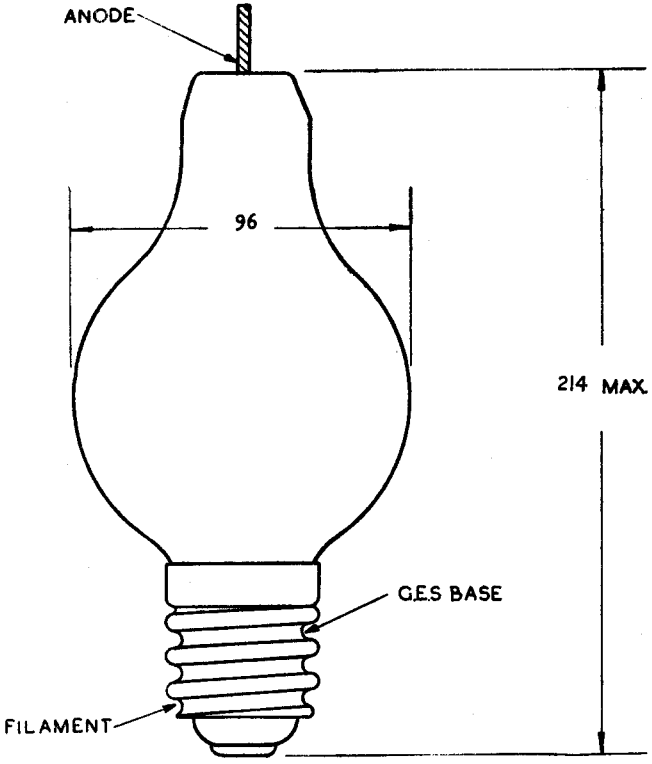
68508

EDISWAN

MAZDA

68508

HALF WAVE TUNGAR RECTIFIER



EDISWAN

68510

HALF WAVE TUNGAR RECTIFIER

68510

GENERAL

Type 68510 is a Hot Gas Discharge Half-Wave Rectifier designed for use in low voltage battery charging equipment.

RATING

Filament Voltage (volts)	V_f	2.0
Filament Current (amps)	I_f	12.0
Striking Voltage (volts)	V_s	15.0
Anode to Cathode Voltage drop (volts)		10.0
D.C. Output	50 volts	2 amps
	75 volts	1.5 amps

DIMENSIONS

Maximum Overall Length (mm)	105
Maximum Overall Diameter (mm)	51
Approximate Nett Weight (ozs)	2½
Approximate Home Packed Weight (ozs)	4½
Approximate Export Packed Weight (ozs)	6

MOUNTING POSITION - Vertical

EDISWAN

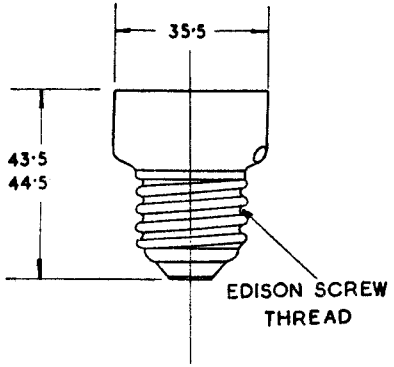
68510

HALF WAVE TUNGAR RECTIFIER

BASE G.E.S. - Filament

LOOSE LEAD Anode

BASE P11O (25)
68510 FILAMENT AND ANODE CAP



December 1948 *VALVE & CRT DIVISION* Issue 1/5

SIEMENS EDISON SWAN LIMITED

EDISWAN

68530

FULL WAVE GAS DISCHARGE RECTIFIER

GENERAL

Type 68530 is a full wave gas discharge rectifier suitable for use in low voltage charging circuits.

RATING

Filament Voltage (volts)	V_f	2.0
Filament Current (amps)	I_f	8.0
D.C. Output		30 volts 6 amps

DIMENSIONS

Maximum Overall Length (inc. pins) (mm)	150
Maximum Diameter (mm)	80
Approximate Nett Weight (ozs)	4
Approximate Home Packed Weight (ozs)	8
Approximate Export Packed Weight (ozs)	16

MOUNTING POSITION—Vertical

BASE—Special 4-pin

CONNECTIONS

Pin 1	Filament	f
Pin 2	Anode	a
Pin 3	Anode	a
Pin 4	Filament	f

January 1960 *INDUSTRIAL VALVE & CRT DIVISION* Issue 2/6

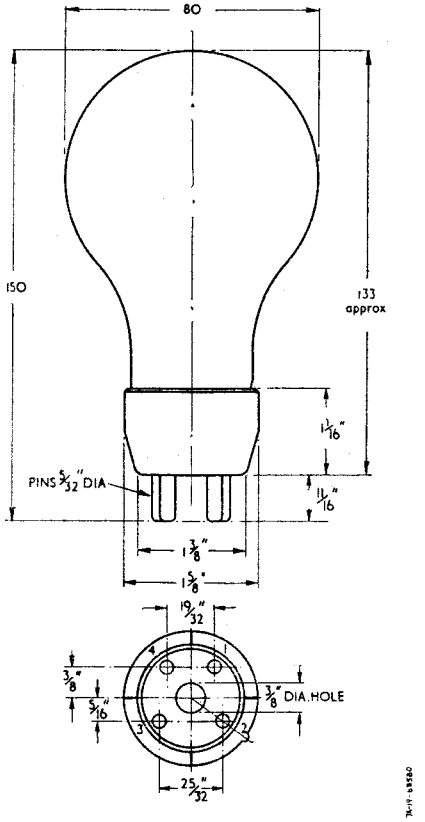
SIEMENS EDISON SWAN LIMITED

68530

EDISWAN

68530

FULL WAVE GAS DISCHARGE RECTIFIER



All dimensions in mm unless otherwise stated.

INDUSTRIAL
January 1960 *VALVE & CRT DIVISION* Issue 2/6

SIEMENS EDISON SWAN LIMITED

EDISWAN

68532

68532

FULL WAVE GAS DISCHARGE RECTIFIER

(Previously U235)

REPLACEMENT TYPE ←

GENERAL

Type 68532 is a full wave gas discharge rectifier suitable for use in low voltage charging circuits. ←

RATING

Filament Voltage (volts)	V_f	2·0
Filament Current (amps)	I_f	3·5
D.C. Output	20 volts	2 amps

DIMENSIONS

Maximum Overall Length (including Pins) (mm)	110
Maximum Diameter (mm)	45
Approximate Nett Weight (ozs)	$1\frac{1}{2}$
Approximate Home Packed Weight (ozs)	$2\frac{1}{2}$
Approximate Export Packed Weight (ozs)	4

MOUNTING POSITION—Vertical

Indicates a change ←

Industrial
July, 1957 *VALVE & CRT DIVISION* Issue 2/6
SIEMENS EDISON SWAN LIMITED

68532

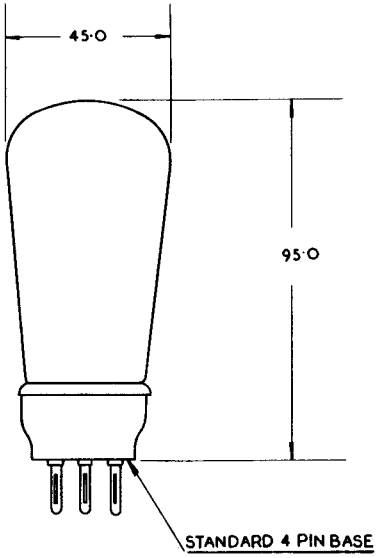
EDISWAN

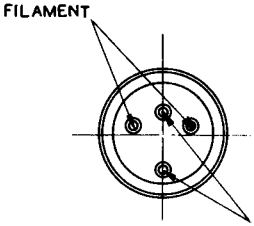
68532 ←

FULL WAVE GAS DISCHARGE RECTIFIER

(Previously U235) ←

REPLACEMENT TYPE ←





ALL DIMS IN m.m ←

Indicates a change ←

July, 1957 *Industrial* *VALVE & CRT DIVISION* Issue 2/6

SIEMENS EDISON SWAN LIMITED

A40 and A41

ACORN VALVES

RATINGS.

	Triode Type A.40	Pentode Type A.41
Heater Voltage	4·0	4·0
Heater Current (amps.)	0·25	0·25
Maximum Anode Voltage	200	250
Amplification Factor	25	—
Maximum Screen Voltage	—	100
Mutual Conductance (mA/V)	*2	†2

* At Ea=100. † At Ea=250 ; Es=100.

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	0·6	3·0 $\mu\mu$F.
Grid to Cathode	1·0	3·0 $\mu\mu$F.
Anode to Grid	1·4	0·0025 $\mu\mu$F.

DIMENSIONS.

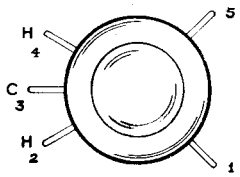
Maximum Overall Length	34	46 mm.
Maximum Diameter	30	30 mm.

GENERAL.

These Acorn Valves are valves in which the electrodes have been reduced to very small dimensions, whilst the working conductances have been maintained at a normal value. The feature of small electrode dimensions, combined with the small bulb, the extremely short terminal connections, and unconventional pin spacing, make operation on ultra-short waves down to 0·5 metre possible with ordinary valve circuits. The basing connections are given overleaf.

APPLICATION.

The triode is suitable for operation as Detector or Oscillator, and the pentode as Detector or H.F. amplifier at ultra high frequencies.

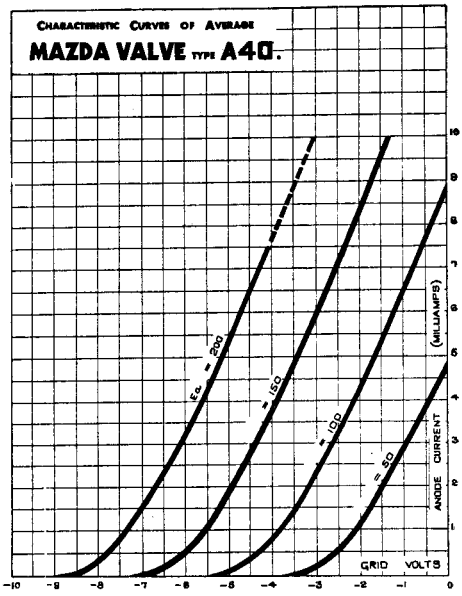


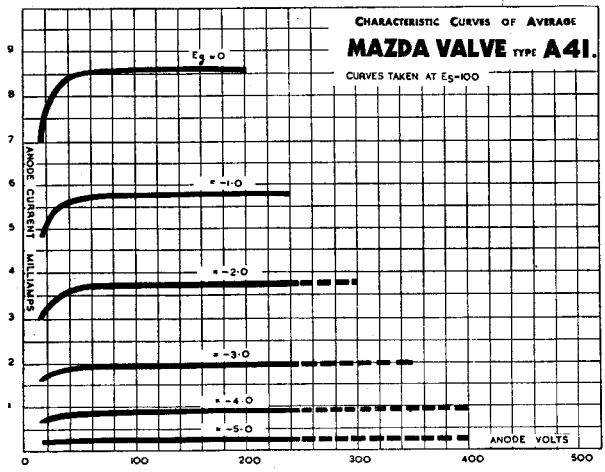
BASING.

The drawing shows a plan view of the acorn triode, the connections being as follows :

Pin No. 1. Anode.
5. Grid.

In the acorn pentode the anode and grid are brought out to pins at the top and bottom of the bulb. When viewed from the anode pin No 5 is then the suppressor grid and No. 1 the screen.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

A.C.2/HL

A.C. MAINS TRIODE

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	1.0
Maximum Anode Voltage	200
*Mutual Conductance (mA/V)	6.5
*Amplification Factor	75
*Anode A.C. Resistance (ohms)	11,500

*Taken at Ea=100; Eg=0.

TYPICAL OPERATION.

Anode Voltage	100	150	200
Grid Bias (Anode-bend Detector)	−1.5 to −3	−3 to −6	−4.5 to −7.5
Grid Bias Amplifier	−1.0	−1.25 to −1.75	−1.5 to -2.25

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	6.0 $\mu\mu$F.
Grid to Cathode	9.0 $\mu\mu$F.
Anode to Grid	6.5 $\mu\mu$F.

DIMENSIONS.

Maximum Overall Length	115 mm.
Maximum Diameter	45 mm.

GENERAL.

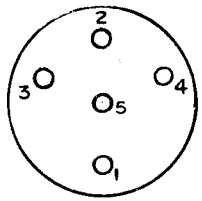
The AC2/HL is an indirectly heated triode for A.C Mains operation. It has a very high operating mutual conductance and amplication factor The bulb is metallised, and the valve is fitted with a standard 5-pin base. the connexions to which are given overleaf.

APPLICATION.

The low impedance of this valve, together with its high mutual conductance, makes it suitable for use as an anode-bend detector. The table above may be used as a rough guide when choosing the required value for bias, though the actual amount depends mainly on the amplitude of the applied signal.

The valve may be used as a low-frequency amplifier with either transformer choke or resistance-capacity coupling. With resistance coupling an anode coupling resistance of 50,000-100,000 ohms will be found satisfactory. By keeping the anode coupling resistance down to these values

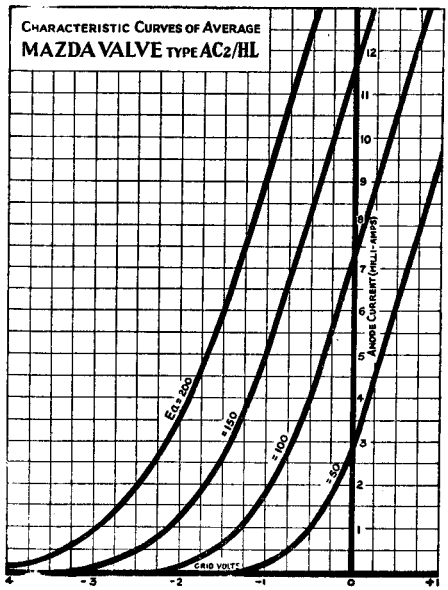
it is assured that the higher audio-frequencies are produced without attenuation. When using transformer or choke coupling, the primary inductance need not be high, the anode A.C. Resistance of the AC2/HL being exceptionally low for this class of valve.



BASING.

Pin No. 1. Anode.
2. Control Grid.
3. Heater.
4. Heater
5. Cathode and Metallising.

Viewed from the free end of the base.



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AC2/PEN.

A.C. MAINS OUTPUT PENTODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·75
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Maximum Anode Dissipation (watts)	10·0
*Mutual Conductance (mA/V)	8·0

* Taken at Ea=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	250
Screen Voltage	250
Grid Voltage	5·3
Anode Current (mA)	32·0
Screen Current (mA) (approx.)	6·0
Optimum Load Resistance (ohms)	6,700
Self-Bias Resistance (ohms)	140
Maximum Undistorted Power Output (watts)	3·5
Input Swing (Volts R.M.S.)	3·2

DIMENSIONS.

Maximum Overall Length	133 mm.
Maximum Diameter	54 mm.

GENERAL.

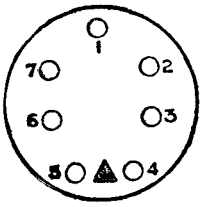
The AC2/PEN is an indirectly heated output pentode for use in A.C. mains receivers. The valve is fitted with a standard 7-pin base, the connexions to which are given overleaf.

APPLICATION.

In receivers employing diode A.V.C. it is possible to obtain ample power output by feeding the AC.2/PEN direct from the diode without an intermediate L.F. stage. Owing to the low anode to grid capacity of the valve, transformer or resistance capacity coupling may be used without appreciable high note loss. It is essential to decouple the grid circuit in order to avoid loss in the lower register, and this may be done by connecting a 50 mfd. electrolytic condenser across the self-bias resistance, or by the usual resistance condenser filter in the grid circuit. The grid bias must be obtained by means of a self-bias resistance in series with the cathode. It is recommended that a condenser filter be connected across the primary winding of the output transformer in order to prevent increase of load impedance with rising frequency. Suitable values are 7,000 ohms and ·01 to ·015 mfds. A resistance of approximately 50 ohms should be inserted in the anode circuit close to the anode pin to prevent parasitic oscillations. The resistance of the grid to cathode circuit should not exceed 1 megohm.

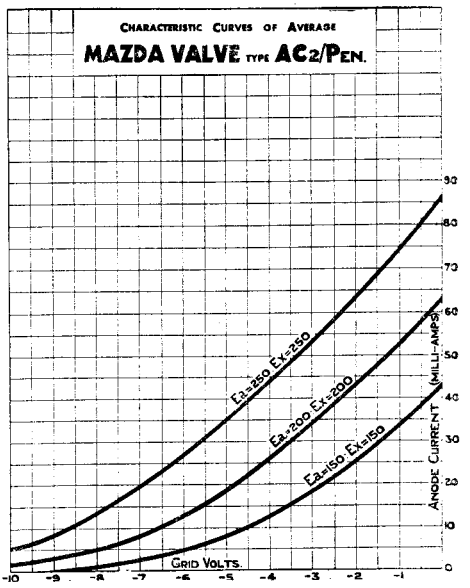
MAZDA

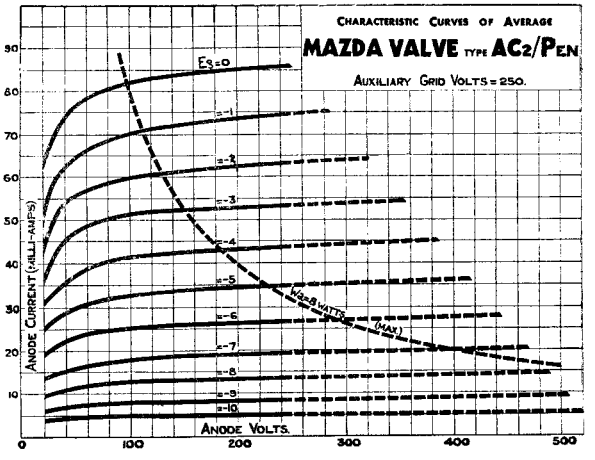
BASING.



Pin No. 1. ———
2. Control Grid.
3. Screen.
4. Heater.
5. Heater.
6. Cathode
7. Anode.

Viewed from the free end of the base.





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MAZDA

AC2/PEN.DD

A.C. MAINS DOUBLE DIODE OUTPUT PENTODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	2·0
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Maximum Anode Dissipation (watts)	10·0
*Mutual Conductance (mA/V)	8·0

* Taken at Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	250
Screen Voltage	250
Grid Voltage	5·3
Anode Current (mA)	32·0
Screen Current (mA) (approx.)	6·0
Optimum Load Resistance (ohms)	6,700
Self-Bias Resistance (ohms)	140
*Maximum Undistorted Power Output (watts)	3·5
*Input Swing (Volts R.M.S.)	3·2
Delay Voltage	10·5

* For 5 per cent. Second Harmonic and Third Harmonic not exceeding 5 per cent.

DIMENSIONS.

Maximum Overall Length	146 mm.
Maximum Diameter	54 mm.

GENERAL.

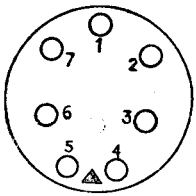
The AC.2/PEN DD is an indirectly heated double diode output pentode for use in A.C. mains receivers. In operation the two diodes and the pentode are independent of each other except for the common cathode sleeve, and the two sections may be treated as two separate valves. The valve is fitted with a standard 7-pin base, the connexions to which are given overleaf.

MAZDA

APPLICATION.

The AC2/PEN DD is suitable for use in practically any circuit where delayed A.V.C. is required, and by its use it is possible to dispense with an intermediate L.F. stage. In order to obtain maximum power output, care should be taken to prevent R.F. voltages being applied to the grid of the pentode, and it is most satisfactory in practice to insert an H.F. choke between the diode anode and the diode load resistance. In addition a ·001 mfd. condenser is desirable between the anode and cathode of the pentode. A resistance of approximately 50 ohms should be inserted in the anode circuit, close to the anode pin, and the lowest reflected speech coil impedance should be equal to the optimum load. It is recommended that a delay voltage of the order of 10—15 should be employed. The resistance of the grid to cathode circuit should not exceed 1 megohm.

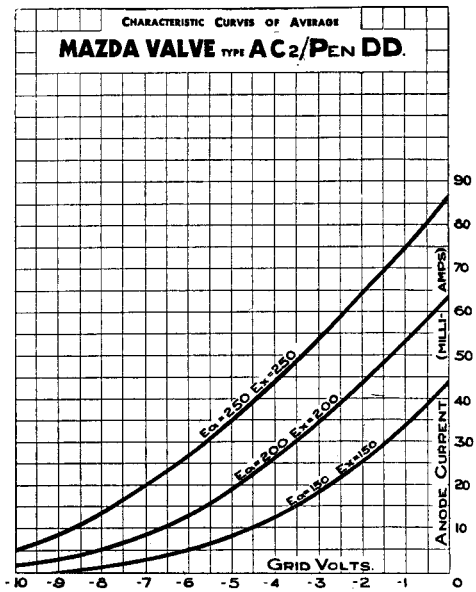
BASING.

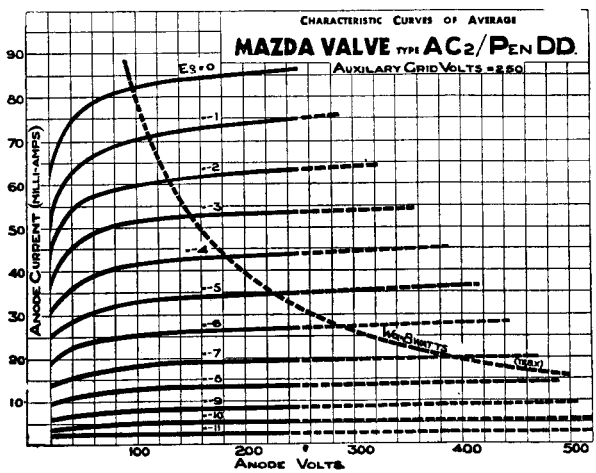


Viewed from the free end of the base.

Pin No. 1.	Diode 1.
2.	Anode.
3.	Diode 2.
4.	Heater
5.	Heater.
6.	Cathode.
7.	Screen.
Top Cap.	Control Grid.

MAZDA





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EDISWAN RADIO

MAZDA

AC4/PEN

BEAM POWER OUTPUT VALVE FOR A.C. MAINS

RATING.

Heater Voltage	4·0
Heater Current (amps)	1·75
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Maximum Dissipation (watts)	16
*Mutual Conductance	11

*At Va=100 ; Vs=100 ; Vg=0.

OPERATING CONDITIONS.

Anode Voltage	225	250
Screen Voltage	225	250
Grid Bias	8·0	8·75
Anode Current (mA)	52	64
Screen Current (mA)	10	13
Anode Load (ohms)	3,700	3,300
Input Swing (r.m.s.)	4·25	4·85
Bias Resistance (ohms)	118	114
*Power Output (watts)	5·1	6·9

*For no individual harmonic exceeding 5 per cent.

DIMENSIONS.

Maximum Overall Length	129 mm.
Maximum Diameter	54 mm.

GENERAL.

The AC4/Pen. is an indirectly heated "beam power" output valve giving a power output greater than that of the AC5/Pen, with anode and screen voltages of 250. It is primarily intended for use in radio receivers requiring greater volume than that given by the normal output pentode.

The valve is a tetrode in which the secondary emission from the anode is suppressed by the space charge of the anode current. The absence of a suppressor grid enables very efficient operation of the valve to be obtained with decreased harmonic distortion. The valve is fitted with a standard 7-pin base, the connections to which are given overleaf.

OPERATION.

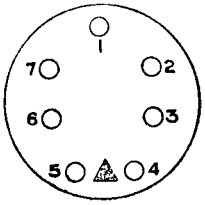
In the case of speakers with good bass response it will be necessary to provide good smoothing for the H.T. supply or extra smoothing for the screen. The valve should always be self-biased and the grid-cathode circuit should not exceed 150,000 ohms.

The anode load should not be less than that specified for the operating conditions or the second harmonic distortion will be increased at all power levels. The load may be kept constant by means of a condenser resistance filter but in speakers having an attenuated upper register, the rise of load at frequencies above 4,000 cycles is not of great importance.

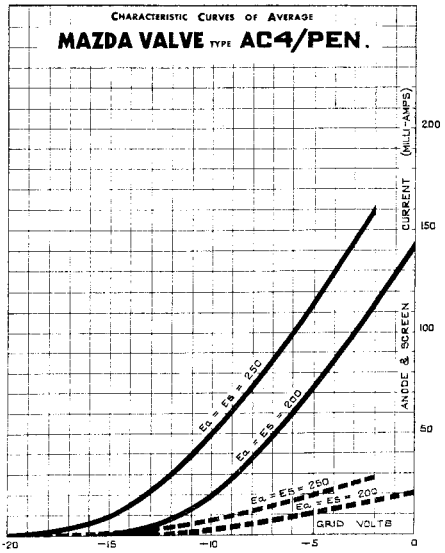
The voltage applied to the heater terminals must be 4·0 volts when the transformer is operating at the average voltage of the primary tapping used.

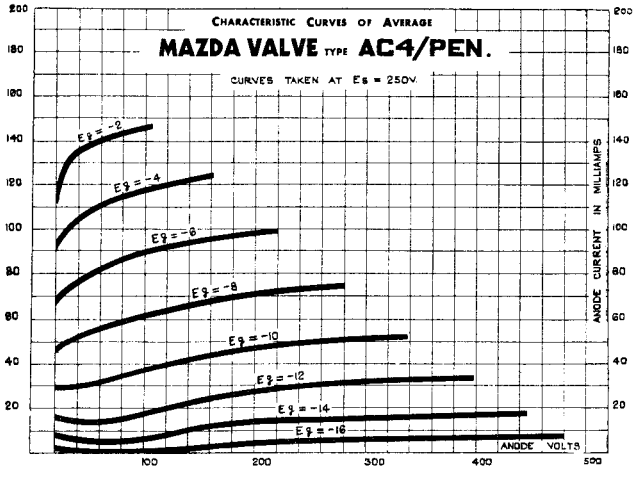
BASING.

Pin No. 1. ——
2. Control Grid.
3. Screen.
4. Heater.
5. Heater.
6. Cathode.
7. Anode.



Viewed from the free end of the base.





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MAZDA

AC5/Pen and AC5/Pen.DD

BEAM POWER AMPLIFIERS FOR A.C. MAINS

RATING.	*AC5/Pen*	*AC5/Pen.DD*
Heater Voltage	4·0	4·0
Heater Current (amps.)	1·75	2·0
Maximum Anode Voltage	250	250
Maximum Screen Voltage	250	250
*Mutual Conductance (mA/V)	9·0	9·0

*at Ea=100 ; Es=100 ; Eg=0.

OPERATING CONDITIONS (Both Types).		
Anode Voltage	250	
Screen Voltage	250	
Grid Bias	8·5	
Quiescent Anode Current (mA)	40	
Quiescent Screen Current (mA)	7·5	
Self-bias Resistance (ohms)	175	
Power Output (watts)	4·85*	5·80†
Anode Load (ohms)	5,200*	4,500†
Input Swing (Volts r.m.s.)	4·0*	5·0†
Anode Current with input swing (mA) ...	41·5*	42·5†
Input swing for 50 mW. output (r.m.s.) ...	·36	·38
Input Swing for 250 mW. output (r.m.s.) ...	·81	·85

* For 5% 3rd harmonic and 2nd harmonic not exceeding 5%.
† For 7% 3rd harmonic and 2nd harmonic not exceeding 7%.

INTER-ELECTRODE CAPACITIES.	*AC/5Pen.DD*
*Anode to Earth	9·75 $\mu\mu$F
*Grid 1 to Earth	18·5 $\mu\mu$F
Anode to Grid 1	0·9 $\mu\mu$F
*Diode 1 to Earth	4·25 $\mu\mu$F
*Diode 2 to Earth	4·0 $\mu\mu$F
Diode 1 to Diode 2	0·15 $\mu\mu$F

* "Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.	*AC5/Pen.*	*AC5/Pen.DD*
Maximum overall length...	129	142 mm.
Maximum diameter	54	54 mm.

GENERAL.

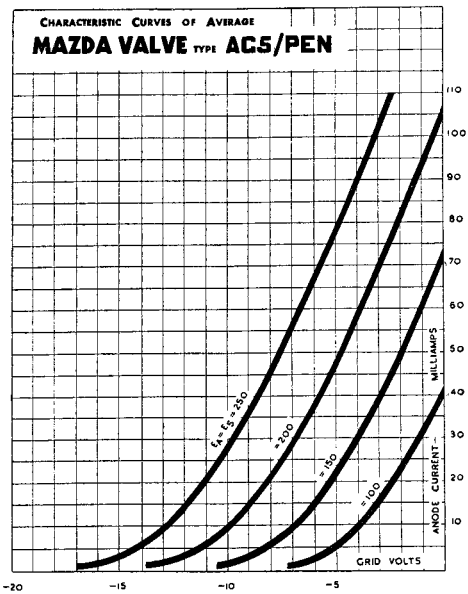
The AC5/Pen. and AC5/Pen.DD are indirectly heated beam power amplifying valves for operation with screen and anode voltages of 250 in the output stage of A.C. mains receivers.

The AC5/Pen.DD is similar to the AC5/Pen, but has two additional diode anodes operated from a common cathode. The diode section is completely screened within the valve from the tetrode section.

The AC5/Pen has a similar sensitivity to that of the AC2/Pen up to the maximum power output available from the latter. By increasing the input swing the power output can be increased to the order of 5 watts without exceeding 5 per cent. of any individual harmonic. The absence of the suppressor grid enables a very low " knee " voltage to be obtained on the anode current—anode volts curve which gives increased power output with decreased distortion.

AC5/PEN OPERATION.

It is recommended that the grid bias should be obtained from a self-bias resistance and the grid-cathode circuit resistance should not exceed one megohm.



Anti-parasitic resistances should be included in the grid and/or anode circuits, suggested values being 5,000 and 50 ohms respectively.

The required transformer ratio for connecting the valve to the speaker can be calculated by multiplying the D.C. resistance of the speech coil by 1·1 and dividing this figure into the optimum load. The correct ratio is then the square root of the result.

The anode load must be prevented from rising with frequency by means of a suitable filter across the output transformer. Suggested values are ·02 μF and 5,000 ohms, but these are governed by the attenuation in the earlier stages of the receiver and the characteristics of the speaker.

AC5/PEN.DD OPERATION.

In normal operation one diode anode (Pin No. 1) is employed as an audio-frequency detector and the other (Pin No. 3) to provide A.V.C. voltage.

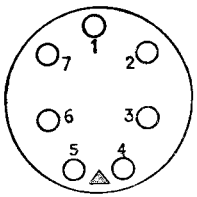
The load resistance of the detector diode should be returned to the cathode and the load resistance of the A.V.C. diode should be returned to a point at negative potential to provide the necessary delay voltage. A delay voltage of over 8 may be obtained from the drop across the self-bias resistance.

It is recommended that a delay voltage of 15-20 be used, which can be obtained from an extra resistance inserted in the self-bias circuit.

The operating conditions of the AC5/Pen.DD tetrode portion are similar to those of the AC5/Pen and the same precautions regarding parasitic oscillation should be taken. The grid-cathode resistance should not exceed one megohm.

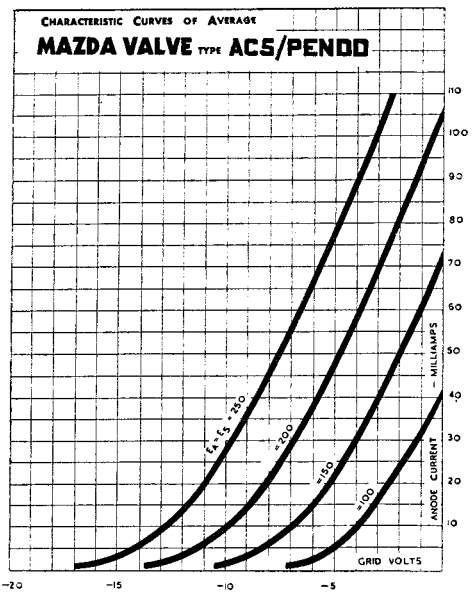
Note.—Owing to the high power handling capacity of these valves the bulbs are very hot in service and adequate ventilation should be provided.

BASE CONNECTIONS.



Viewed from end of pins.

	AC5/Pen.	*AC5/Pen.DD.*
Pin No. 1.	Blank	Diode No. 1
Pin No. 2.	Control Grid	Anode
Pin No. 3.	Screen Grid	Diode No. 2
Pin No. 4.	Heater	Heater
Pin No. 5.	Heater	Heater
Pin No. 6.	Cathode	Cathode
Pin No. 7.	Anode	Screen Grid
Top Cap.	—	Control Grid



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EDISWAN RADIO

AC6/PEN

TELEVISION BEAM POWER AMPLIFIER

RATING.

Heater Voltage	4·0
Heater Current (amps.)	1·75
Maximum Anode Voltage	330
Maximum Screen Voltage	220
*Mutual Conductance (mA/V)	8.5
Maximum Screen Watts	3·0
Maximum Anode Watts	20
Maximum Peak Anode Volts	3,000

*At Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

	Single Valve.	Pair in Parallel.
Anode Voltage	310	280
Screen Voltage	210	170
Anode Current (per valve) (mA)	63	45
Screen Current (per valve) (mA)	14	9
Grid Bias Voltage	6·9	6·0
Minimum Instantaneous Anode Voltage	>80	>80
Maximum Anode Voltage	3,000	3,000
Self-bias Resistance (per valve) (ohms)	90	110
Available Output in Volt-Amperes in Anode Circuit (excluding black borders)	24·5	30

NOTE.—The values given above for feed currents and operating voltages are for the specified output. Voltages are referred to cathode.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	7·0 $\mu\mu$F.
*Grid to Earth	22·0 $\mu\mu$F.
Anode to Grid	1·0 $\mu\mu$F.

* "Earth" denotes the remaining earthy potential electrodes joined to cathode.

DIMENSIONS.

Maximum Overall Length	139 mm
Maximum Diameter	54 mm.

GENERAL.

The AC6/PEN is a beam power amplifier designed for use in the output stage of a time base for magnetic scanning. The valve has been designed to stand the high peak anode voltages required by this class of service, and is based in a standard 7-pin base, the connexions to which are given overleaf.

APPLICATION.

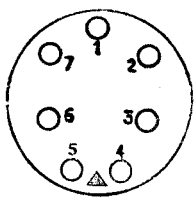
It is recommended that the valve should be operated with an anode voltage of the order of 300 and a screen voltage not exceeding 220. The screen voltage should be preferably dropped from the higher voltage through a series resistance and decoupled with a condenser, the latter

being returned to cathode. The valve should always be used under the self bias method of operation, and, due to the high dissipation, it should preferably be mounted in a vertical position. The T.41 thyratron is recommended for use with this valve. In order to keep the screen dissipation from rising above the normal value, and, to prevent excessive distortion, it is recommended that the instantaneous anode voltage should not be allowed to drop below 80 volts.

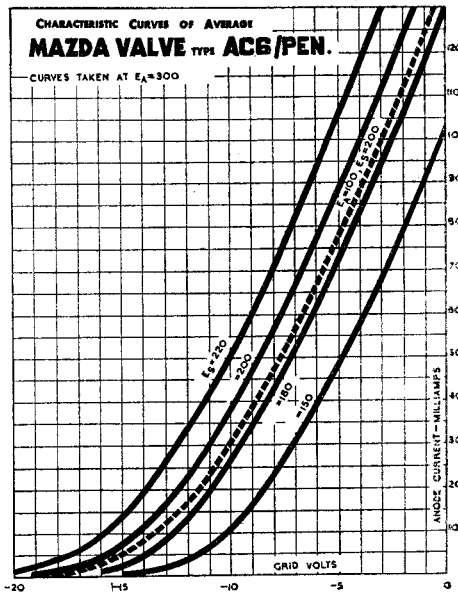
The output transformer should be designed to provide a suitable load across which the voltage drop due to its resistive and inductive load components will meet the conditions on page 1. Unless a high H.T. time base supply voltage is employed, the output of the valve will be limited by the allowable screen dissipation of 3 watts rather than the maximum anode dissipation of 20 watts. Care should therefore be taken when designing the circuit to ensure that the screen wattage under normal conditions does not exceed the rating of the valve. The bias and screen resistances must also be calculated for these working conditions, as the screen current rises appreciably with the input signal while the anode current falls. It is recommended that the equivalent grid to cathode resistance per valve should be kept as low as possible, and in any case should not exceed 1 megohm for anode dissipation not exceeding 18 watts, and $\frac{1}{2}$ megohm for anode dissipation not exceeding 20 watts.

BASING.

Pin No. 1. ——
2. Control Grid.
3. Screen Grid.
4. Heater.
5. Heater.
6. Cathode.
7. ——
Top Cap. Anode.



Viewed from the free end of the base.



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MAZDA

AC/HL

A.C. MAINS TRIODE

RATING.

Heater Voltage	4·0
Heater Current (amps.)	1·0
Maximum Anode Voltage	200
Maximum Anode Current (mA)	12
*Mutual Conductance (mA/V)	3
*Amplification Factor	35
*Anode A.C. Resistance (ohms)	11,700

*At Ea=100 v. ; Eg=0.

OPERATION.

Anode Voltage	100	150	200
Bias (Anode-bend Detector)	—3 to —4·5	—3 to —6	—4·5 to —7·5
Bias (Amplifier)	—1·5	—1·5 to —3	—3 to —4·5

INTER-ELECTRODE CAPACITIES.

	Clear	Metallised
*Anode to Earth	7·0	11·5 $\mu\mu$F.
*Grid to Earth	7·0	8·0 $\mu\mu$F.
Anode to Grid	3·5	3·25 $\mu\mu$F.

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	113 mm.
Maximum Diameter	45 mm.

GENERAL.

The AC/HL is an indirectly-heated triode for A.C. mains operation. It has a high amplification factor as well as a low anode A.C. resistance, and is suitable for use in any position in the set with the exception of the last or output stage. The valve is available with clear or metallised bulb. The valve is fitted with a standard 5-pin base, the connections to which are given overleaf.

APPLICATION.

Detector.

The valve will be found very suitable for use as a cumulative-grid detector ; it has a particularly high-detection efficiency coupled with low damping. A condenser of 0·0001 to 0·0002 micro-farad with a grid leak of 1 to 2 megohms will be found suitable.

This valve is especially suitable for use as a power-grid detector, a condenser of 0·0001 μF., and a leak of 100,000 to 250,000 ohms being required. The anode voltage should be at least 100 volts. With either type of detection the grid return should be connected to the cathode.

The low impedance of this valve makes it particularly suitable for use as an anode-bend detector.

Amplifier.

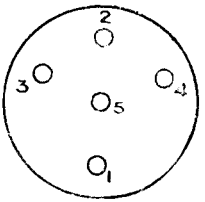
The valve may be used as a low-frequency amplifier with either transformer, choke, or resistance-capacity coupling. With resistance-capacity

coupling an anode resistance of 50,000 to 100,000 ohms will be found suitable.

When using transformer or choke coupling the primary inductance need not be excessively high.

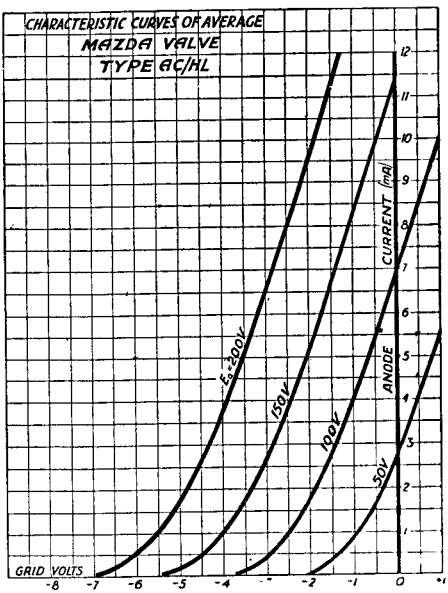
In the case of the metallised valve care should be taken to ensure that the cathode is connected to earth either directly or through a non-inductive condenser.

BASING.



Pin No. 1. Anode.
2. Control Grid.
3. Heater.
4. Heater.
5. Cathode and Metallising.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

AC/HL. DD

A.C. MAINS DOUBLE DIODE TRIODE

RATING.

Heater Voltage	4·0
Heater Current (amps)	1·0
Anode Voltage (maximum)	250
*Mutual Conductance (mA/V)	2·6
*Amplification Factor	36
*Anode A.C. Resistance (ohms)	13,800

*At Ea=100 ; Eg=0.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	9·75 $\mu\mu$F.
*Grid to Earth	5·0 $\mu\mu$F.
Anode to Grid	2·0 $\mu\mu$F.
*Diode 1 to Earth	4·0 $\mu\mu$F.
*Diode 2 to Earth	4·0 $\mu\mu$F.
Diode 1 to Diode 2	0·3 $\mu\mu$F.

* " Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H. and M. joined to cathode.

DIMENSIONS.

Maximum Overall Length	123 mm.
Maximum Diameter	45 mm.

GENERAL.

The AC/HL. DD is an indirectly heated double diode triode designed as a combined detector amplifier and automatic volume control valve for use in A.C. mains operated receivers. It consists of two separate diodes and a triode on a common cathode sleeve. The diode section is completely screened within the valve from the triode section, and in operation the two sections are independent of each other. The bulb is metallised, and the valve is fitted with a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

The resistance between heater and cathode is of a very high order, so that the valve is eminently suitable for use in amplified A.V.C. circuits in which the triode unit acts as a combined audio-frequency amplifier and D.C. amplifier for A.V.C. purposes.

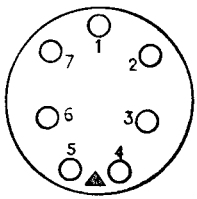
In normal operation one diode anode (pin No. 1) is employed as an audio frequency detector and the other (pin No. 3) to provide A.V.C. voltage. The detector diode load should be returned to cathode and the A.V.C. diode load to a point at negative potential to provide the necessary delay voltage.

The damping introduced by the diode detector may be made quite small provided the load resistance is kept high, say 0·5 to 1 megohm.

It is essential to ensure that the effective impedance to audio frequencies of the circuit between the diode anode and cathode, is as nearly equal as possible to the D.C. resistance of this circuit, otherwise distortion at high modulation percentages will occur. The resistance in the grid circuit of the triode should be at least twice that of the diode load resistance.

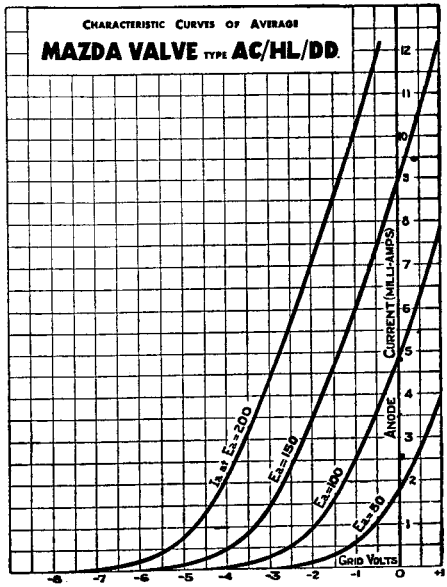
The use of the detector at high signal inputs necessitates the provision of a low frequency gain control between the detector output and the first low frequency amplifying valve, to prevent any possibility of overloading this amplifier.

BASING.



Viewed from the free end of the base.

Pin No. 1.	Diode 1.
2.	Metallising.
3.	Diode 2.
4.	Heater.
5.	Heater.
6.	Cathode.
7.	Anode.
Top Cap.	Control Grid.



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MAZDA

AC/ME

A.C. MAINS CATHODE RAY TUNING INDICATOR

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	0·5
Maximum Anode Voltage	250
Maximum Target Voltage	250

OPERATING CONDITIONS.

H.T. Supply Voltage	250
Target Current (mA) (approx.)	1·5
*Anode Current (at Vg=0) (approx.)	0·24
*Grid Volts (0° shadow angle) (approx.)	22·0

* For anode load resistance of 1 megohm

DIMENSIONS.

Maximum overall length	107 mm.
Maximum diameter	38 mm.

GENERAL.

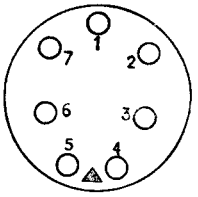
The AC/ME is an indirectly heated cathode ray tuning indicator, for use on A.C. mains. It is designed to indicate visually, by means of a fluorescent target, the effects of change of the applied voltage on the control grid. The cathode acts as a source of electrons which are attracted to a positively charged target coated with a fluorescent material. The electrons impinging on the coated target cause it to glow, and the extent of the fluorescent area is controlled by means of a ray control electrode placed between the cathode and the target. When the potential of the control electrode is increased from a low positive potential to a high positive potential, the area of shadow produced on the target is reduced. The electrode is connected internally to the anode of the triode, and in use a high resistance is placed in the triode anode circuit so that it operates as a resistance coupled D.C. amplifier. The shadow which starts with an angle of approximately 90° with zero bias, can be reduced to zero by applying sufficient bias to the control grid. The target should be connected directly to a positive supply of 250 volts, and the triode anode connected to the target through a load resistance of about 1 megohm. The cathode should be connected to the cathode of the detector valve. The valve is based in a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

The grid of the valve should always be controlled from the detector circuit, and not the A.V.C. diode circuit, so as to enable visual tuning to be obtained below the delay point. This also eliminates the possibility of two tuning positions giving a minimum value if either transformer has a double humped primary response. The tapping values controlling the ratio of D.C. volts applied to the control grid should be arranged to give a suitable deflection on a local station.

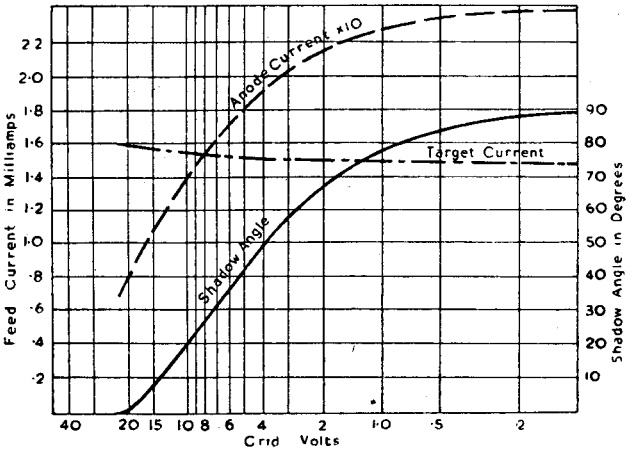
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. —
2. Control Grid.
3. Target.
4. Heater.
5. Heater.
6. Cathode.
7. Anode.



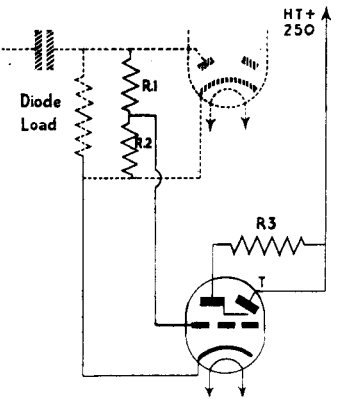
CIRCUIT DIAGRAM.

Values of components:

R_1 2 megohms.
R_2 2 megohms.
R_3 1 megohm.

These values are representative only and the value of R_2 may need alteration to suit individual circuit conditions.

IMPORTANT. A condenser of 0·1 mfd. should be connected between the grid and cathode of the AC/ME.



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MAZDA

AC/P & AC/P 1

A.C. MAINS TRIODE

RATING.

	AC/P	AC/P1
Heater Voltage	4.0	4.0
Heater Current (amps.)	1.0	1.0
Maximum Anode Voltage	200	200
*Mutual Conductance (m/AV)	3.75	3.7
*Amplification Factor	10	5.4
*Anode A.C. Resistance (ohms)	2,650	1,450
Maximum Anode Watts	4.0	5.0.

* Taken at Ea=100 ; Eg=0.

DIMENSIONS.

Maximum Overall Length	125 mm.	125 mm.
Maximum Diameter	45 mm.	45 mm.

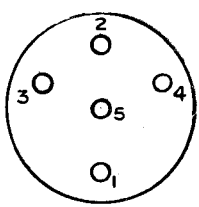
GENERAL.

The AC/P and the AC/P1 are indirectly heated A.C. Mains triodes. The valves are fitted with standard 5 pin bases and the connexions are given overleaf.

APPLICATION.

The valves may be used as L.F. amplifiers with either transformer or choke coupling, when it is desired to supply a high power output valve requiring a large grid swing. The AC/P may also be used as a detector either with cumulative-grid or anode-bend rectification.

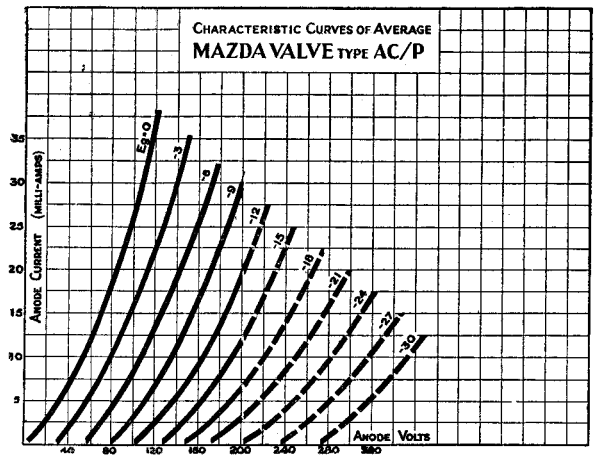
BASING.

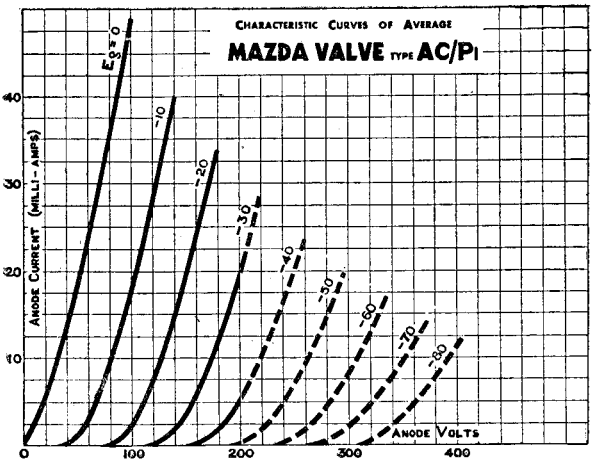


Viewed from the free end of the base.

Pin No. 1. Anode.
2. Grid.
3. Heater.
4. Heater.
5. Cathode.

MAZDA





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MAZDA

AC/P4

A.C. MAINS TRIODE FOR TELEVISION SCANNING CIRCUITS

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·0
Maximum Anode Voltage	700
*Mutual Conductance (mA/V)	7·0
*Amplification Factor	20

*Taken at Ea=100 ; Eg=0.

OPERATING CONDITIONS (As Push Pull Amplifier).

	Frame Frequency.		Line Frequency.	
H.T. Supply Voltage	1,100	1,200	1,100	1,200
Anode Load (ohms)	200,000		90,000	
Anode Current (mA)	2·6	2·8	5·9	6·1
Self-Bias Resistance (ohms) ...	11,000		4,500	5,000
Peak-Peak Volts Output (average Grade R valves)	—		1,800	2,000

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	4·4 $\mu\mu$F.
*Grid to Earth	8·4 $\mu\mu$F.
Anode to Grid	5·7 $\mu\mu$F.

* " Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	130 mm.
Maximum Diameter	39 mm.

GENERAL.

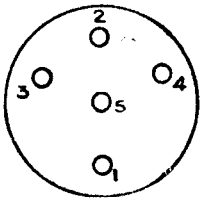
The AC/P4 has been designed for use in the output stages of a scanning circuit for use with electrostatically deflected cathode ray tubes. The valves are graded to facilitate adjustment of the paraphase tapping, the curve shown being that of an average valve. The valve is fitted with a standard 5-pin base, the connexions to which are given overleaf.

APPLICATION.

To ensure maximum output for a given H.T. supply these valves are graded into three classes distinguished by the brand letters Q, R and S Grade R. has characteristics shown in the curve. Grade Q is on the lower limit of amplification factor and Grade S on the higher. When used in a paraphase amplifier time base, the lower limit should be used in the first stage.

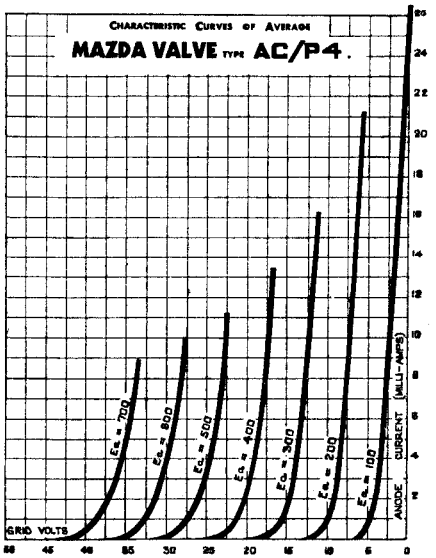
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. ——
2. Control Grid.
3. Heater.
4. Heater.
5. Cathode.
Top Cap. Anode.



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MAZDA

AC/PEN

A.C. MAINS OUTPUT PENTODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·0
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	2·5
Maximum Anode Dissipation (watts)	8·0

*Taken at Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	200	250
Screen Voltage	200	250
Anode Current (mA)...	24	32
Self-Bias Resistance (ohms)	300	250
*Optimum Load (ohms)	8,000	7,500
*Power Output (Watts)	2·0	3·3
*Input Swing (Volts RMS)	8·0	10·0

*For 5% Third Harmonic, and Second Harmonic not exceeding 5%.

DIMENSIONS.

Maximum Overall Length	134 mm.
Maximum Diameter	58 mm.

GENERAL.

The AC/PEN is an output pentode designed for use in A.C. mains receivers. The valve is fitted with a 7-pin base, the connexions to which are given overleaf.

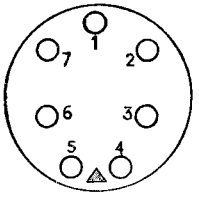
APPLICATION.

The valve should always be self-biased, and the bias resistance by-passed by a 50 mfd. condenser. In order to prevent excessive rise of anode load with frequency a condenser resistance filter should be connected across the anode load circuit. The condenser should have a capacity of ·01 mfd. and the resistance should be about 7,500. The grid to cathode resistance should not exceed 1 megohm.

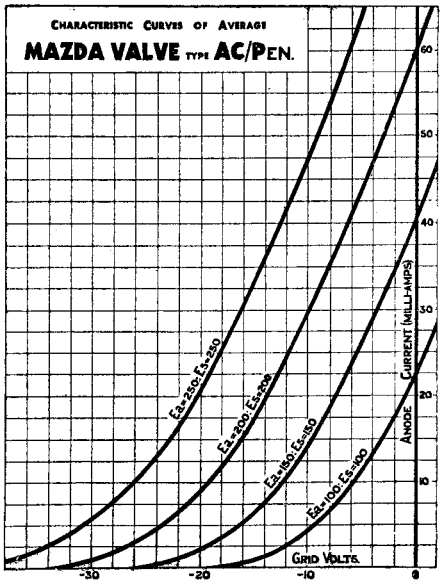
MAZDA

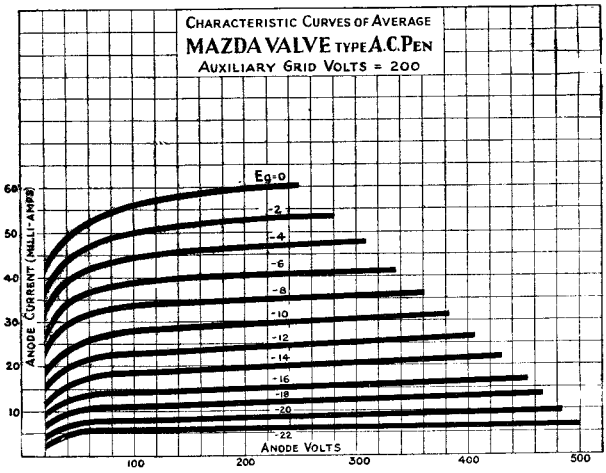
BASING.

Pin No. 1. —
2. Control Grid.
3. Screen.
4. Heater.
5. Heater.
6. Cathode.
7. Anode.



Viewed from the free end of the base.





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MAZDA

A.C./S.2 PEN

A.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	1.0
Maximum Anode Voltage	250
Maximum Screen Voltage	150
*Mutual Conductance (mA/V)	5.8

*Taken at Ea=200; Es=100; Eg=0.

TYPICAL OPERATION. (Frequency Changer with Cathode Injection).

Anode Voltage	250
Screen Voltage	120
Grid Bias	4.5
Anode Current (mA)	4.5
Screen Current (mA)	1.5
Peak Heterodyne Voltage	3.5
Conversion Conductance (μA/V)	1700

INTER-ELECTRODE CAPACITIES.

*Grid to Earth	13.5 $\mu\mu$F.
*Anode to Earth	8.75 $\mu\mu$F.
Anode to Grid	0.009 $\mu\mu$F.

*"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	45 mm.

GENERAL.

The AC/S2 Pen is a high slope screened pentode valve for use as a frequency changer, detector or amplifier. The bulb is metallised. The valve is fitted with a standard 7-pin base, the connexions to which are given overleaf.

APPLICATION.

The valve will be particularly suitable for use as a self-oscillating frequency changer with cathode injection. For this purpose only about two turns will be required in the cathode coil on medium waves. The anode volts should be kept high, of the order of 200—250, and the screen volts may be obtained from a voltage dropping resistance of about 150,000 ohms, and the metallised coating should be connected to earth. The screen decoupling condenser should also be returned to earth potential.

MAZDA

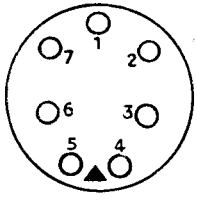
High gain self-oscillating frequency changers tend inherently to "squegger," and to avoid this the time constant of the resistance and by-pass condenser should be kept low. A self-bias resistance of 1,000 ohms will be suitable, and the value of the by-pass condenser should not exceed 0.1 μF., a lower value being preferable.

A grid leak of $\frac{1}{2}$ to 1 megohm should also be included in the grid circuit to limit the damping that may be introduced in the tuned circuit by excessive grid currents. This leak should be by-passed by a condenser. As re-radiation is dependent on the magnitude of the grid-cathode capacity, all additions to this capacity should be avoided.

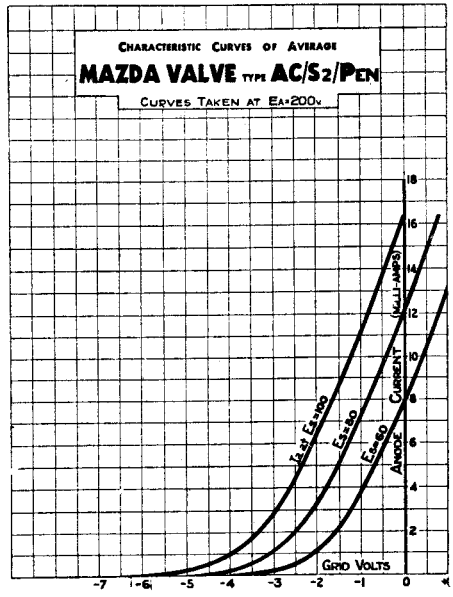
BASING.

Pin No. 1. Metallising.
2. Control Grid.
3. Suppressor Grid.
4. Heater.
5. Heater.
6. Cathode.
7. Screen.

Top Cap. Anode.



Viewed from the free end of the base.



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MAZDA

AC/SP.1

A.C. MAINS H.F. PENTODE

RATINGS.	AC/SP.1
Heater Voltage	4·0
Heater Current (amps.)	1·0
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	2·7

*Ea=250 ; Es=200 ; Eg=0.

TYPICAL OPERATION.	Noise Suppression.	Automatic Tuning.
Screen Voltage	200	200
Grid Bias, G1	3·0	2·85
Grid Bias, G3	0—20	4·3
Mutual Conductance (G1)	2·65	1·45
Anode Current (mA)	4·9	2·9
Screen Current (mA)	4·1	6·2

INTER-ELECTRODE CAPACITIES (Cold).

*Grid to Earth	13·0 $\mu\mu$F.
*Anode to Earth	0·75 $\mu\mu$F.
Anode to Grid	0·0035 $\mu\mu$F

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	45 mm.

GENERAL.

The AC/SP.1 is a screened pentode for use in noise suppression and automatic tuning circuits. The performance of the valve is characterised by the fact that the gain available for an input on the control grid G1 can be reduced to zero by applying 15 volts negative to the grid G3. The valve is based in a standard 7-pin base the connections to which are given overleaf.

MAZDA

APPLICATION.

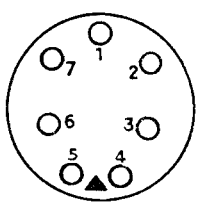
In noise suppression circuits the valve is used as an L.F. amplifier and the grid G3 is initially biased to approximately 15 to 20 volts negative. This can also be the delay voltage for the A.V.C. diode. The incoming carrier is then rectified in such a manner as to apply positive volts to the grid G3, so that when the carrier output on the last I.F. valve reaches the delay voltage the initial bias on Grid G3 is neutralised and the valve is working at its full amplification.

A resistance of between $\frac{1}{2}$ and 1 megohm should be included in series with the grid G3, in order to prevent it being driven positive, and this resistance together with a condenser between G3 and cathode may be utilised as the filter to remove audio-frequency components. An anode resistance of between 10,000 and 20,000 should be employed, and this will give working gains of the order of 20–40.

Both the initial biases of the grids G1 and G3 should be obtained by means of a tapped self-bias resistance in the cathode circuit.

When this valve is used in automatic tuning arrangements, the tuned circuit of the oscillator is included in the anode circuit of the valve, and a resistance of the order of 100,000 ohms, in series with a blocking condenser, is connected between the anode and grid G1, while a small condenser is connected between grid G1 and cathode ; in this manner a voltage in quadrature is applied to the control grid, and this gives an anode circuit admittance equivalent to a negative inductance across the oscillator tuning circuit. This admittance is directly proportional to the working slope of the grid G1. By initially biasing grid G3 in the middle of its operating characteristic it is possible to vary the frequency of the oscillator either up or down by applying either additional positive or negative volts from a frequency-discriminating circuit to grid G3. The initial biases on grid G1 and G3 should be obtained by the self-bias method, and the resistance in the grid G3 should not exceed $3\frac{1}{2}$ megohms.

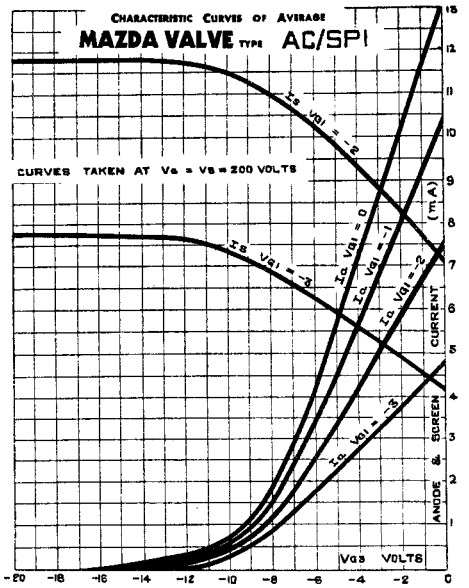
BASING.

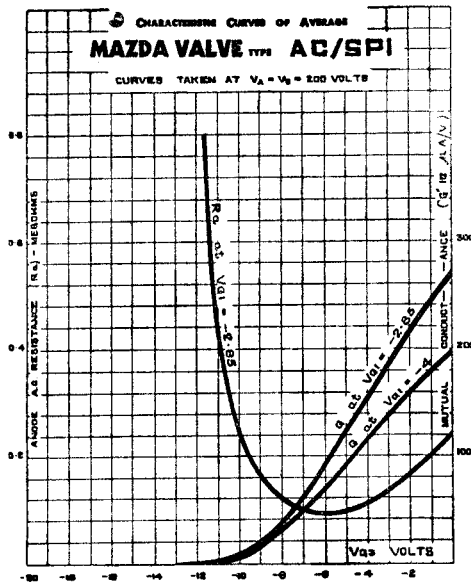


Vi ewed from the free end of the base.

Pin No. 1. Metallising.
2. Control Grid.
3. Suppressor Grid.
4. Heater.
5. Heater.
6. Cathode.
7. Anode.

MAZDA


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE AC/SPI
CURVES TAKEN AT Va = Vs = 200 VOLTS
Ia Vg1 = -2
Is Vg1 = -2
Ia Vg1 = 0
Ia Vg1 = -1
Ia Vg1 = -2
Is Vg1 = -3
Ia Vg1 = -3
ANODE & SCREEN CURRENT (mA)
Vg3 VOLTS
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0
1 2 3 4 5 6 7 8 9 10 11 12 13


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE AC/SPI
CURVES TAKEN AT Va = Vs = 200 VOLTS
Ra at Vg1 = -2·85
Gm at Vg1 = -2·85
Gm at Vg1 = -4
ANODE A.C. RESISTANCE (Ra) — MEGOHMS
MUTUAL CONDUCTANCE (Gm) IN μA/V
Vg3 VOLTS
0·8
0·6
0·4
0·2
3000
2000
1000

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

EDISWAN RADIO

AC/SP 3

A.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	1.0
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	7.5

* Taken at Ea=250; Es=100; Eg=−1.5

TYPICAL OPERATING CONDITIONS.

Anode Voltage	250	250	250	250
Screen Voltage	80	100	160	200
Grid Bias	1.25	1.7	2.75	3.5
Anode Current (mA)	7.8	7.9	10.5	12.3
Screen Current (mA)	2.45	2.50	3.3	3.85
Mutual Conductance (mA/V) ...	7.0	7.0	7.45	7.6
Anode A.C. Resistance (megohms)	0.55	0.55	0.4	0.34
Input Capacity (hot) ($\mu\mu$F.) ...	20	19.9	19.7	19.5

INTER-ELECTRODE CAPACITIES (cold).

*Anode to Earth	11.0 $\mu\mu$F.
*Grid to Earth	14.5 $\mu\mu$F.
Anode to Grid	.005 $\mu\mu$F.

*"Earth" denotes all remaining electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	129 mm.
Maximum Diameter	39 mm.

GENERAL.

The AC/SP 3 is an indirectly heated screened H.F. Pentode for use on A.C. Mains. The valve is intended for use in short wave receivers and especially television receivers. The valve is fitted with a standard 7 pin base, the connexions to which are given overleaf.

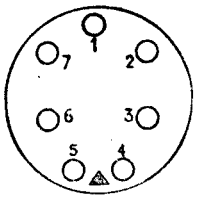
APPLICATION.

The AC/SP 3 is equally suitable for use in radio frequency, I.F. and video frequency stages. In the latter it will develop sufficient voltage swing to modulate an Ediswan Cathode ray tube when fed from a Mazda D1. Owing to its high working slope a very good stage gain can be obtained from the valve with normal precautions against stray capacity in the wiring of the circuit.

For R.F. and I.F. stages the recommended screen voltage is 80—100 volts, and the value of the grid leak should be as low as possible.

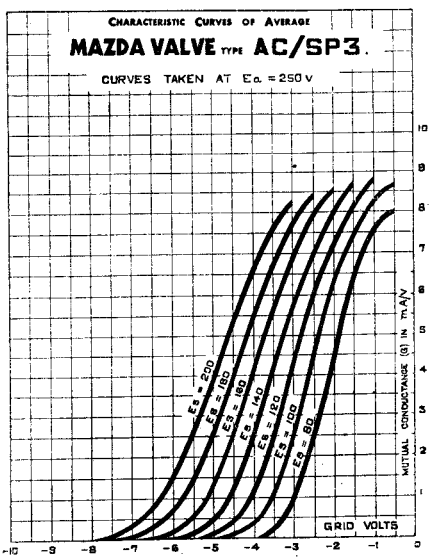
Video Frequency Output Stages.—When fed from a diode with zero bias the screen voltage should not exceed 140. The quiescent anode current under these conditions will be of the order of 30 mA. For screen voltages between 160 and 200 volts the anode current should not be allowed to exceed 14 mA. In all cases the grid resistance should not exceed a few thousand ohms.

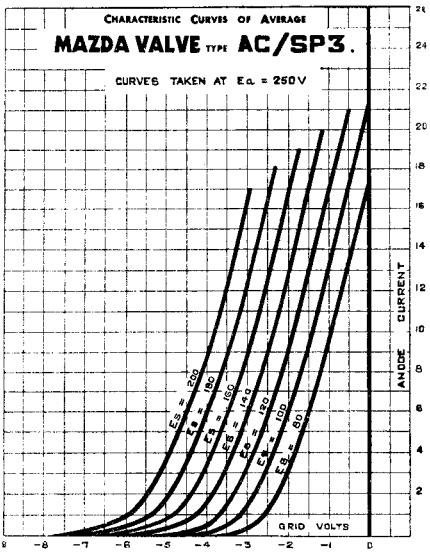
BASING.



Viewed from the free end of the base.

Pin No. 1. Metallising.
2. Anode.
3. Suppressor Grid.
4. Heater.
5. Heater.
6. Cathode.
7. Screen.
Top Cap Control Grid.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD, LONDON, W.C.2

EDISWAN

AC/SP3/RH

LOW NOISE H.F. PENTODE

Indirectly heated—for parallel operation.

GENERAL

The AC/SP3/RH is an indirectly heated screened high slope H.F. Pentode. A special construction has been employed to minimise hum, noise and microphony within the valve which is intended for use in Audio or Video Amplifiers.

RATING

Heater Voltage	(volts)	V_h	4·0
Heater Current	(amps)	I_h	1·0
Maximum Anode Voltage	(volts)	$V_{a(max)}$	250
Maximum Screen Voltage	(volts)	$V_{g2(max)}$	250
Mutual Conductance	(mA/V)	g_m	7·5*

* Measured at $V_a = 250v$. $V_{g2} = 100v$. $V_{g1} = -1·5v$.

INTER-ELECTRODE CAPACITANCES (pF)

Grid 1/Anode	c_{g1-a}	0·005
Grid 1/All	c_{g1-all}	14·5
Anode/All	c_{a-all}	11·0

DIMENSIONS

Maximum Overall Length	(mm)	129
Maximum Diameter	(mm)	39
Maximum Seated Height	(mm)	113
Approximate Nett Weight	(ozs)	2
Approximate Packed Weight	(ozs)	3

MOUNTING POSITION

Unrestricted.

INDUSTRIAL
June 1958 *VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

AC/SP3/RH

EDISWAN

AC/SP3/RH

LOW NOISE H.F. PENTODE

Indirectly heated—for parallel operation.

TYPICAL OPERATION—H.F. Amplifier

Anode Voltage	(volts)	V_a	250	250	250	250
Screen Voltage	(volts)	V_{g2}	80	100	160	200
Control Grid Bias Voltage	(volts)	V_{g1}	-1·25	-1·7	-2·75	-3·5
Anode Current	(mA)	I_a	7·8	7·9	10·5	12·3
Screen Current	(mA)	I_{g2}	2·45	2·5	3·3	3·85
Mutual Conductance	(mA/V)	g_m	7·0	7·0	7·45	7·6
Anode Impedance	(Megohms)	r_a	0·55	0·55	0·4	0·34
Input Capacity (hot)	(pF)	c_{in}	20·0	19·9	19·7	19·5

TYPICAL OPERATION—Resistance Capacity Coupled Amplifier.

H.T. Supply Voltage	(volts)	$V_{a(b)}$	250
Anode Load Resistance	(kilohms)	R_a	150
Screen Resistance	(kilohms)	R_{g2}	500
Control Grid Resistance	(kilohms)	R_{g1}	150
Cathode Bias Resistance	(ohms)	R_k	1000

NOTES—

All valves are tested for Noise Hum and Microphony, and a valve may be graded " B " on the results of any one of these tests. Grade "A" valves are approximately 6 db better for noise, 15 db better for hum, and 18 db better for microphony than valves graded " B " for any of these features.

When used under the given typical operating conditions in a high quality audio amplifier with a centre tapped heater supply a grade "A" valve will have a hum voltage of approximately 5 μV, and a noise voltage of not more than 8 μV present at the grid.

When used in R.F. and I.F. Amplifiers the screen voltage should be 80 to 100 volts with as low a value of grid resistor as possible.

June 1958 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

EDISWAN

AC/SP3/RH

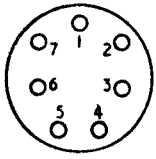
LOW NOISE H.F. PENTODE

Indirectly heated—for parallel operation.

When used in Video Frequency Output Stages fed from a diode with zero bias, the screen voltage should not exceed 140 volts. Under these conditions the quiescent anode will be approximately 30 mA. For screen voltages between 160 and 200 volts the anode current should not be allowed to exceed 14 mA. The grid resistor should not exceed a few thousand ohms.

BULB Metallised

BASE British 7 Pin (B.7)



Viewed from free end of pins.

CAP CT2.

VALVEHOLDER Ediswan Clix VH62/7

CONNECTIONS

Pin 1	Metallising	M
Pin 2	Anode	a
Pin 3	Suppressor Grid	g3
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Cathode	k
Pin 7	Screen	g2
Top Cap	Control Grid	g1

AC/TH 1

A.C. MAINS TRIODE HEPTODE

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	1.3
Heptode Section.	
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	3.1

*Taken at Ea=250, Es=100, Eg1=2, Eg°=0.

Triode Section.	
Maximum Anode Voltage	150
Maximum Peak Anode Current (m/A)	15
*Amplification Factor	16
*Mutual Conductance (mAV)	5.3

*Taken at Ea=100, Eg=0.

TYPICAL OPERATION CONDITIONS.

Heptode.		
Anode Voltage	250	250
Screen Voltage	100	100
Grid Bias (volts)	3.0	2.5
Anode Current (mA)	3.0	3.8
Screen Current (mA)	6.0	7.5
Conversion Conductance (μA/V)	750	870
Anode A.C. Resistance (megohms)	1.6	1.2
Heterodyne Volts (peak)	9	9
Working G1–E Capacity (Hot) ($\mu\mu$F)	12.2	12.7
*Conversion Conductance (μA/V)	3.0	
*Input Signal Handling Capacity (Peak Carrier Volts)	10.0	

*For 5% Total Audio Harmonic Distortion at 60% modulation. at Eg=43, Es=250 volts.

Triode.		
Anode Voltage	80	80
Anode Current (mA)	4 to 5	4 to 5

INTER-ELECTRODE CAPACITIES.

Heptode.		
*Anode to Earth	11.5	$\mu\mu$F
*Grid to Earth	9.5	$\mu\mu$F
Anode to Grid	0.0015	$\mu\mu$F
Triode.		
*Anode to Earth (less Go to Ao)	4.0	$\mu\mu$F
*Grid to Earth (less Go to Ao)	10.25	$\mu\mu$F
Anode to Grid	2.25	$\mu\mu$F

*"Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum Overall Length	128 mm.
Maximum Diameter	39 mm.

MAZDA

GENERAL.

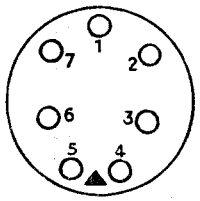
The A.C./TH.1 is a triode heptode frequency changer for use in A.C. Mains receivers. It has been specially designed to meet the requirements of all-wave receivers, and the inter-reaction between the input and the oscillator circuit has been reduced to a minimum. A high conversion conductance is provided with a large initial grid bias, thus ensuring that no grid current is taken on the short wave bands. The characteristics have been so designed as to provide large signal handling capacity with low cross modulation and low harmonic response. The valve is fitted with a standard 7-pin base, the connexions to which are given below.

APPLICATION.

The triode oscillator should be used with a parafed tuned anode circuit and the component values required are given in the circuit shown. If any trouble is experienced with "squegging" at the highest frequency the grid leak resistance may be reduced to 25,000 ohms. On the short wave bands the mean anode current of the triode will be of the order of 5 mA, while on the medium and long waves the current taken by the triode will be of the order of 3 to 3.5 mA. An average heterodyne voltage of 9 to 10 volts peak is required at the grid of the triode. The value of the grid resistance R3 will depend very largely on the design of the coils and the effect of stray capacities across the grid of the triode. On the short wave band this resistance is usually of the order of 50 or 60 ohms. The peak anode current of the triode should never be allowed to exceed 15 mA.

If parasitic oscillations are generated, these may be stopped by connecting a small resistance (R6) of 2.5–5 ohms close to the screen pin.

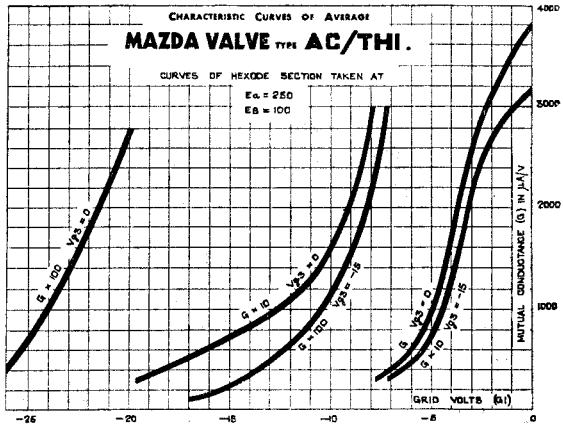
BASING.

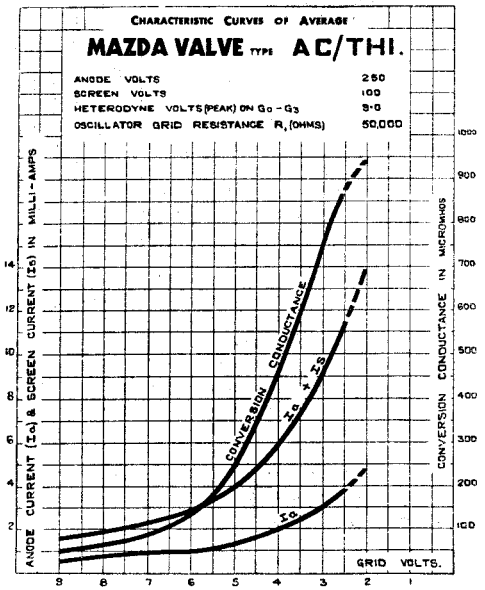


Viewed from the free end of the base.

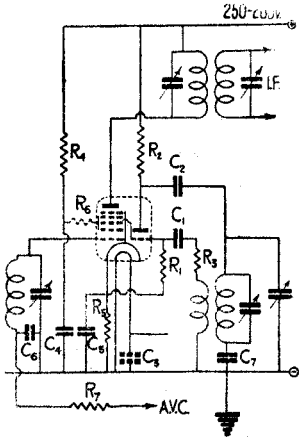
Pin No. 1. Oscillator Anode.
2. Oscillator Grid.
3. Screen Grid.
4. Heater.
5. Heater.
6. Cathode and Metallising.
7. Heptode Anode.
Top Cap. Heptode Control Grid.

MAZDA


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE AC/THI.
CURVES OF HEXODE SECTION TAKEN AT
Ea = 250
Eb = 100
G = 100
Vg3 = 0
G = 10
Vg3 = 0
Vg3 = -15
G = 100
Vg3 = -15
G
Vg3 = 0
G = 10
Vg3 = -15
MUTUAL CONDUCTANCE (G) IN μA/V
4000
3000
2000
1000
GRID VOLTS (G1)
-25
-20
-15
-10
-5
0

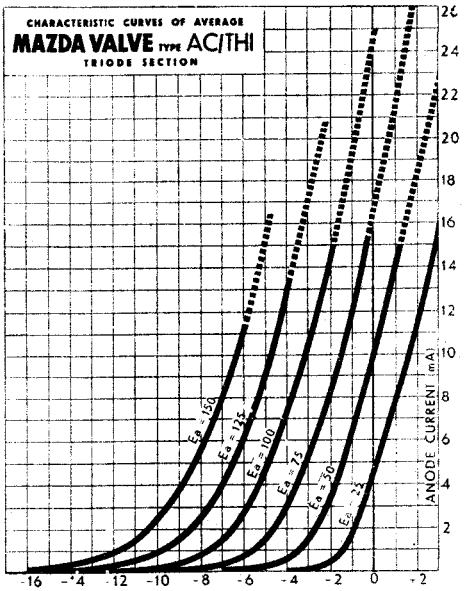

CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE AC/THI.
ANODE VOLTS 250
SCREEN VOLTS 100
HETERODYNE VOLTS (PEAK) ON G0 - G3 9·0
OSCILLATOR GRID RESISTANCE R1 (OHMS) 50,000
ANODE CURRENT (Ia) & SCREEN CURRENT (Is) IN MILLI-AMPS
CONVERSION CONDUCTANCE IN MICROMHOS
CONVERSION CONDUCTANCE
Ia + Is
Ia
GRID VOLTS.
9
8
7
6
5
4
3
2
1
14
12
10
8
6
4
2
1000
900
800
700
600
500
400
300
200
100

SUGGESTED CIRCUIT DIAGRAM USING A.C./THI.



Values o the components in the circuit diagram:—

R.1.	50,000 ohms.	C.1.	.0001 mfd.
R.2.	40,000 ohms.	C.2.	.0001 mfd.
R.3.	See above.	C.3.	.01 mfd.
R.4.	25,000 ohms.	C.4.	0.1—0.5 mfd.
R.5.	230—160 ohms.	C.5.	0.1—0.5 mfd.
R.6.	2.5—5 ohms (see above).		



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THE EDISON SWAN ELECTRIC CO., LTD.,
155, CHARING CROSS ROAD, LONDON, W.C.2

MAZDA

AC/TP

A.C. MAINS TRIODE PENTODE

RATING.

Heater Voltage	4·0
Heater Current (amps.)	1·25
Pentode Section.	
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Conversion Conductance (Maximum) (μA/V)	900
*Mutual Conductance (mA/V)	3·4
*At Ea=250 ; Es=200 ; Eg=0.	
Triode Section.	
Maximum Anode Voltage	200
Recommended Anode Voltage (approx.)	150
Maximum Mean Anode Current (mA)	2·0
*Amplification Factor	30
*Mutual Conductance (mA/V)	1·4
*At Ea=100 ; Eg=0.	

TYPICAL OPERATION.

Anode Voltage	250
Screen Voltage (Initial)	200
Grid Bias Voltage	5·0
Heterodyne Peak Voltage	3·0
Impedance (ohms) (approx.)	900,000
Anode Current (mA)	6·5
Screen Current (mA)	2·5
Oscillator Anode Current (mA)	1·5
Conversion Conductance (μA/V)	700
*Conversion Conductance at Eg=40 (μA/V) (approx.)	8
*Input Signal Handling Capacity (Peak Carrier Voltage)	12
*Screen Voltage rising to 250	

INTER-ELECTRODE CAPACITIES.

Pentode.	
*Anode to Earth	8·0 μμF.
*Grid to Earth	7·75 μμF.
Anode to Grid	0·06 μμF.
Triode.	
*Anode to Earth (less G. to A.)	4·0 μμF.
*Grid to Earth (less G. to A.)	5·25 μμF.
Anode to Grid	2·5 μμF.

* " Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H. and M. joined to cathode.

DIMENSIONS.

Maximum Overall Length	124 mm.
Maximum Diameter	45 mm.

GENERAL.

The AC/TP is an indirectly heated triode pentode valve which is designed for operation as a self oscillating frequency changer. The pentode section has variable-mu characteristics and can handle a 12-volt peak carrier

without distortion ; in addition it has a high working impedance. The triode oscillator and pentode frequency changer sections are screened from each other, and are, except for a common cathode connection, completely independent of each other, and both functions may, therefore, be carried out with circuit arrangements giving the best possible operation. For signal frequencies above 2 Mc/second, the AC/TH1 should be employed in preference to the AC/TP. The bulb is metallised, and the valve is fitted with a standard 9-pin base, the connections to which are given below.

APPLICATION.

When operating as a self-oscillating frequency changer, the AC/TP has variable-mu characteristics suitable for use with diode or amplified automatic volume control.

It possesses all the advantages usually associated with the use of a separate oscillator and frequency changer, including low oscillator harmonic content and minimum noise from leakage and Schrott effect.

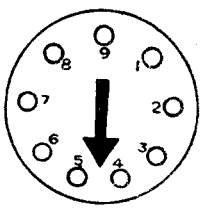
It is recommended that frequency changing should be accomplished by heterodyne injection in the common cathode circuit as shown in Fig. 1.

The variable-mu characteristic has been specially shaped to reduce whistles, repeat points and cross-modulation, and to ensure minimum interference the heterodyne peak voltage should not appreciably exceed 3 volts. A 12-volt peak carrier modulated at 60 per cent. can be handled with 5 per cent. distortion with a heterodyne voltage of 3 volts and screen voltage of 250 volts.

The screen of the pentode section can be operated at 250 volts, but it is advantageous to limit the initial screen volts to 200 volts at maximum gain by a series resistance. A common decoupling resistance (R2 in Fig. 1) may be used and should not be less than 5,000 ohms. The suppressor grid should be returned to cathode, and the screen and anode circuits must be decoupled to cathode and not to earth.

It is recommended that the voltage across the heater pins should be 4·0 volts ±5 per cent. under normal working conditions.

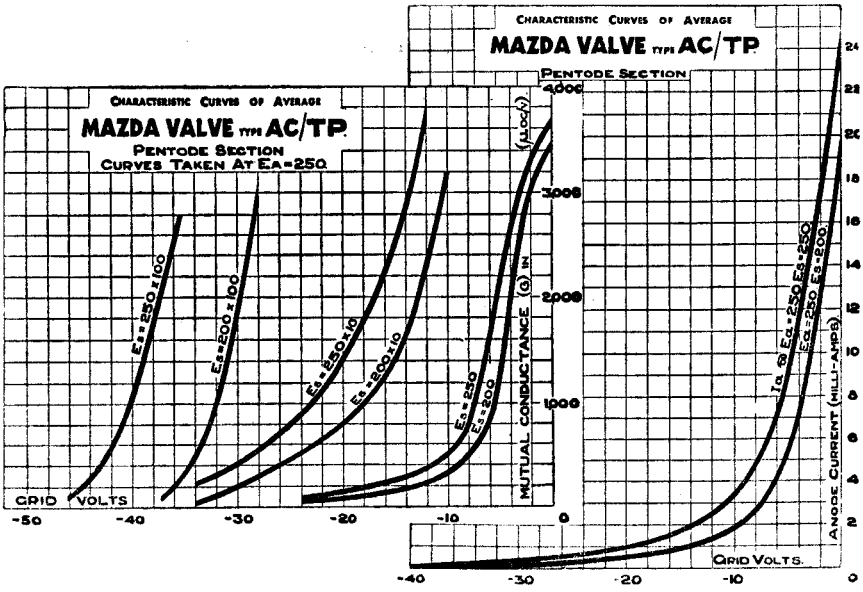
BASING.

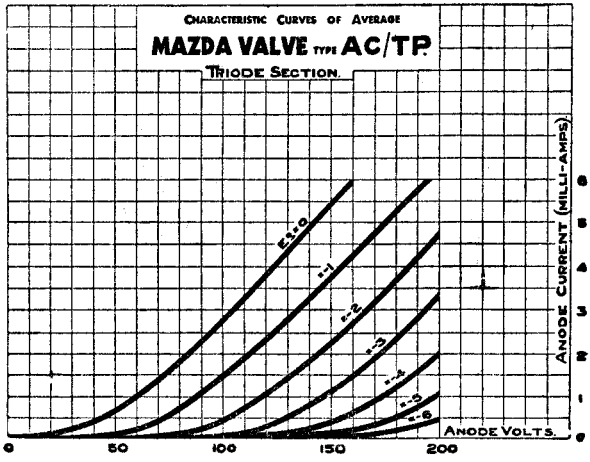


Viewed from the free end of the base.

Pin No.	1.	Screen.
	2.	Pentode Anode.
	3.	Suppressor Grid.
	4.	Heater.
	5.	Heater.
	6.	Cathode.
	7.	Oscillator Anode
	8.	Oscillator Grid.
	9.	Metallising.
Top Cap.		Pentode Grid.

MAZDA





EDISWAN RADIO

MAZDA

SUGGESTED CIRCUIT DIAGRAM USING AC/TP

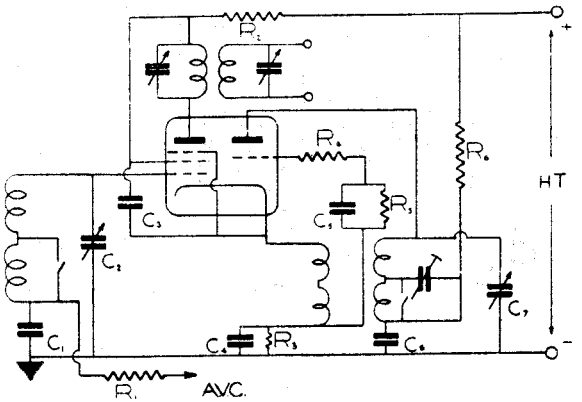


Fig. 1.

R1 1 megohm.
R2 5,000 to 7,000 ohms.
R3 500 ohms.
R4 1,500 to 2,000 ohms.
R5 50,000 ohms.
R6 50,000 ohms.

C1 0·1 μF.
C2 ·0005 μF
C3 0·5 μF.
C4 0·1 μF.
C5 ·0005 μF
C6 0·1 μF.
C7 ·0005 μF. (var.).

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

MAZDA

AC/VP.1 and AC/VP.2
A.C. MAINS H.F. PENTODES

RATING.

Heater Voltage	4·0
Heater Current (amps.)	0·65
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	3.0

*Ea=250 ; Es=200 ; Eg=0.

OPERATING CONDITIONS.

Anode Voltage	250	250
Screen Voltage	200	250
Grid Voltage	2·8	4·0
Anode Current (mA)	7·4	8·8
Screen Current (mA)	1·85	2·2
Mutual Conductance (mA/V)	2·0	2·0
Anode A.C. Resistance (megohms)	1·0	0·85
Grid Bias for Mutual Conductance (10μA/V)	34·5	43·0
*Maximum Peak Carrier Input Volts	8·0	10·0
Grid Bias for M.P.C.I. (volts)	33·0	41·0

*For 5 per cent. Total Distortion at 60 per cent. Modulation.

INTER-ELECTRODE CAPACITIES.	**AC/VP.2**	**AC/VP.1**
*Anode to Earth	9·5 $\mu\mu$F.	8·0 $\mu\mu$F.
*Grid to Earth	7·0 $\mu\mu$F.	9·5 $\mu\mu$F.
Anode to Grid	0·0025 $\mu\mu$F.	0·003 $\mu\mu$F.

*"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.	**AC/VP.2**	**AC/VP.1**
Maximum Overall Length	122 mm.	122 mm.
Maximum Diameter	38 mm.	39 mm.

GENERAL.

The AC/VP.1 and AC/VP.2 are indirectly heated variable-mu pentodes for high or intermediate frequency amplification for use on A.C. mains. The variable-mu characteristics which are the same for both types have been specially shaped to give very small cross-modulation at all values of bias. In each case the screen may be operated at 200 to 250 volts and a potentiometer is therefore unnecessary. The valves are based in standard 7-pin bases, the connections to which are given overleaf.

APPLICATION.

The valves are designed for operation as radio frequency amplifiers in the signal or intermediate frequency stages, and are particularly suitable with diode or amplified automatic volume control.

The screen may be operated at 250 volts, but it is recommended that the voltage at maximum gain should be limited to 200 volts by a series resistance. The screen current is of the order of 25 per cent. of the anode current. Minimum cross modulation and maximum signal handling capacity is thus achieved without excessive initial anode currents. Under these conditions a carrier of 10 volts peak, modulated at 60 per cent. can be accepted at a bias of approximately —4½ volts, without exceeding 5 per cent. distortion. The maximum output signal is dependent on the

impedance of the anode circuit and it is recommended that this should not be less than 100,000 ohms for the last I.F. stage.

The suppressor grid should be connected to cathode or a negative potential and the metal coating to earth. Either valve may be used as a variable-mu frequency changer with a separate oscillator and for a heterodyne voltage of 3 volts and a bias of approximately —38 volts a carrier of 9 volts peak, modulated at 60 per cent. can be accepted.

BASING.

AC/VP.1

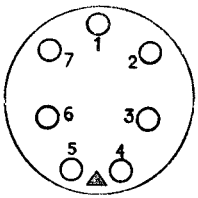
Pin No. 1. Metallising.
2. Control Grid.
3. Suppressor Grid.
4. Heater.
5. Heater.
6. Cathode.
7. Screen.

Top Cap. Anode.

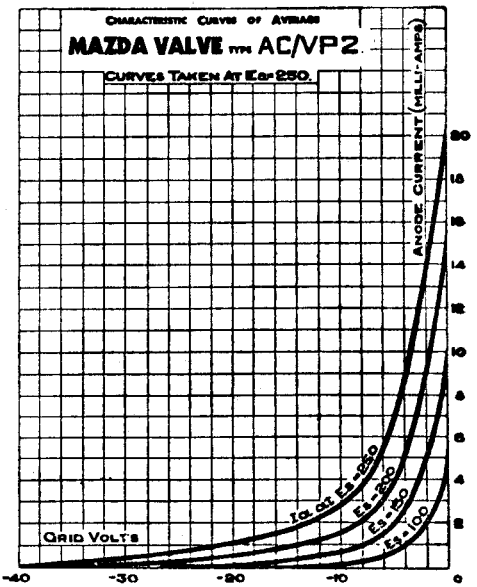
AC/VP.2

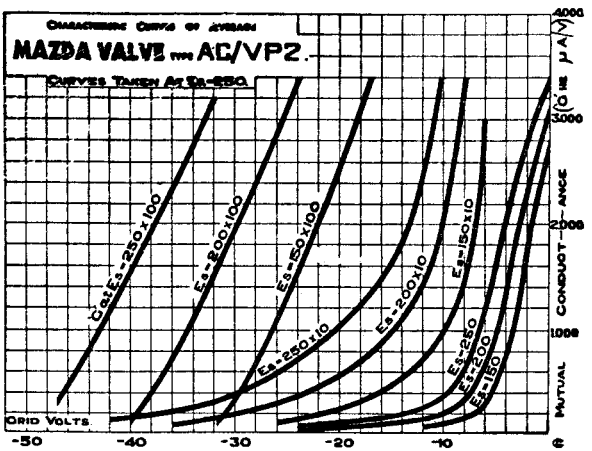
Pin No. 1. Metallising.
2. Anode.
3. Suppressor Grid.
4. Heater.
5. Heater.
6. Cathode.
7. Screen.

Top Cap. Control Grid.



Viewed from the free end of the base.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

C 127 S

C 127 S

CATHOSCOPE

Cathode à chauffage indirect.

Tension filament	6,3 Volts (CA ou CC)
Intensité filament	0,6 Amp.

Concentration et déviation : Electrostatiques.

Fluorescence : B_1 (écran bleu); V_1 (écran vert à persistance moyenne); V_2 (écran vert à longue persistance); W_1 (écran blanc).

Longueur totale	430 mm
Diamètre écran	127 mm
Encombrement	R.31-G.1
Culot	CL 100
Brochage	11.G-CA

CAPACITES INTER-ELECTRODES :

Grille n°1 (Wehnelt), aux autres électrodes	8 pF
P_1P_2	1,3 pF
P_3P_4	1,2 pF
P_1 aux autres électrodes	9,5 pF
P_3 aux autres électrodes	12 pF
P_1 aux autres électrodes (sauf P_2)	8 pF
P_2 aux autres électrodes (sauf P_1)	7,5 pF
P_3 aux autres électrodes (sauf P_4)	10 pF
P_4 aux autres électrodes (sauf P_3)	7,5 pF

Broches:

N°1 – Filament.
N°2 – Cathode.
N°3 – Plaque de déviation P_1 (1).
N°4 – Anode N°1.
N°5 – Chemise du culot.
N°6 – Plaque de déviation P_4.

Broches:

N°7 – Anode n°2.
N°8 – Plaque de déviation P_2 (1).
N°9 – Plaque de déviation P_3.
N°10 – Grille n°1 (Wehnelt).
N°11 – Filament.

Broches du culot, face à l'observateur.

ORIENTATION DES AXES DE DEVIATION :

Quand P_1 est positif par rapport à P_2, le spot est dévié vers la broche N°4.

CONDITIONS MAXIMA D'UTILISATION :

Tension anode n°2	2.200 Volts max.
Tension anode n°1	1.100 Volts max.
Tension Wehnelt (contrôle luminosité):	
Négative	125 Volts max.
Positive	0 Volt max.
Tension de crête entre anode n°2 et toute plaque de déviation	550 Volts max.
Tension entre filament et cathode	100 Volts max.

(1) Le jeu de plaques P_1 – P_2 est le plus proche de l'écran.

REPRODUCTION INTERDITE

C 127 S

MAZDA

C 127 S

CATHOSCOPE

CONDITIONS TYPIQUES D'UTILISATION :

Tension anode n°2 (2)	1.500	2.000	Volts
Tension anode n° 1 (3)	337	450	Volts
Tension Wehnelt pour cut-off visuel (4)	-30	-40	Volts
Sensibilités de déviation			
Plaques n° 1 et n°2	0,40	0,30	mm/Volt CC
Plaques n°3 et n°4	0,44	0,33	mm/Volt CC

VALEURS MAXIMA DES CIRCUITS :

Résistance intercalée dans le Wehnelt	1,5 Mégohm max.
Impédance du circuit d'une plaque de déviation à la fréquence d'alimentation filament.	1 Mégohm max.
Résistance dans le circuit d'une plaque de déviation (5)	5 Mégohms max

(2) La brillance et la finesse du spot décroissent avec la diminution de la tension d'anode n°2. En général cette tension ne doit pas être inférieure à 1.500 volts.

(3) Il peut y avoir, d'un tube à l'autre, une variation de + 25% à - 30% de ces valeurs pour des tensions de Wehnelt variant de 0 à la tension de cut-off.

(4) Extinction visuelle d'un spot stationnaire. L'alimentation doit être prévue pour des variations de ± 50% de ces valeurs.

(5) Il est recommandé de placer des résistances de valeurs égales dans le circuit des plaques de déviation.

REPRODUCTION INTERDITE

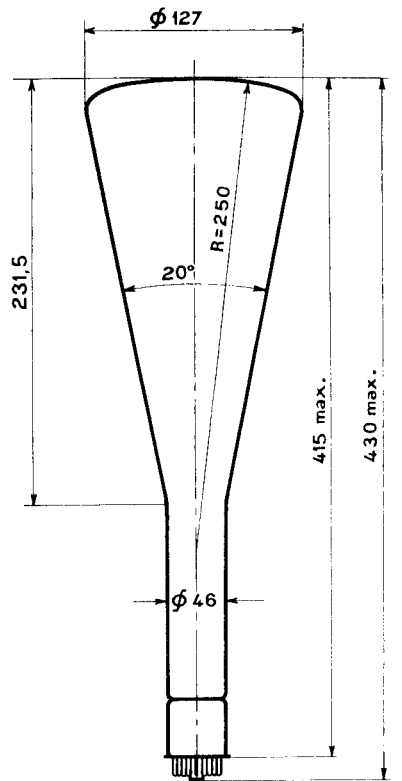
MAZDA

C 127 S

C 127 S

CATHOSCOPE

ENCOMBREMENT



R.31-6.1

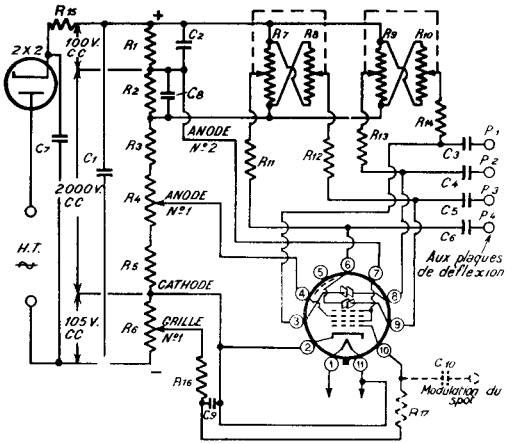
REPRODUCTION INTERDITE

C 127 S

MAZDA

C 127 S

CIRCUIT D'ALIMENTATION



C_1 = 0,1 µF
C_2 = 1,0 µF
C_3, C_4, C_5, C_6 = 0,5 µF (capacités de couplage) (1)
C_7 = 0,1 µF
C_8 = 1 µF
C_9 = 0,1 µF
C_{10} = 0,25 µF (2)
R_1, R_2 = 2 MΩ
R_3 = 6 MΩ
R_4 = Potentiomètre 2 MΩ
R_5 = 1 Mégohm
R_6 = Potentiomètre 0,5 MΩ
R_7, R_8 = Potentiomètre double 5 MΩ
R_9, R_{10} = Potentiomètre double 5 MΩ
R_{11}, R_{12}, R_{13}, R_{14} = 2 MΩ
R_{15} = 50 kilohms
R_{16} = 100 kilohms
R_{17} = 0,5 Mégohm

(1) Lorsque le -H.T. (ou la cathode) est relié à la masse, les capacités doivent avoir une tension de service élevée; lorsque l'anode N°2 est reliée à la masse, ces capacités peuvent avoir une basse tension de service. Si l'on veut utiliser l'oscillographe pour l'étude de tensions continues, les plaques de déflexion doivent être réunies directement à la source à étudier ou à la sortie de l'amplificateur à courant continu. Dans ce dernier cas, il est préférable de ne pas utiliser les résistances dans les circuits des plaques de déflexion afin de réduire au minimum la charge de l'amplificateur. Pour réduire la déconcentration du spot, il est nécessaire de relier l'anode N°2 à un point du circuit de l'amplificateur où existe la plus faible différence de potentiel entre l'anode N°2 et les plaques de déflexion.

(2) Lorsque le +H.T. (ou l'anode n°2) est relié à la masse, la capacité C10 doit avoir une tension de service élevée; lorsque la cathode est reliée à la masse, cette capacité peut avoir une basse tension de service.

REPRODUCTION INTERDITE

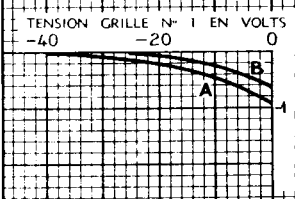
MAZDA

C 127 S

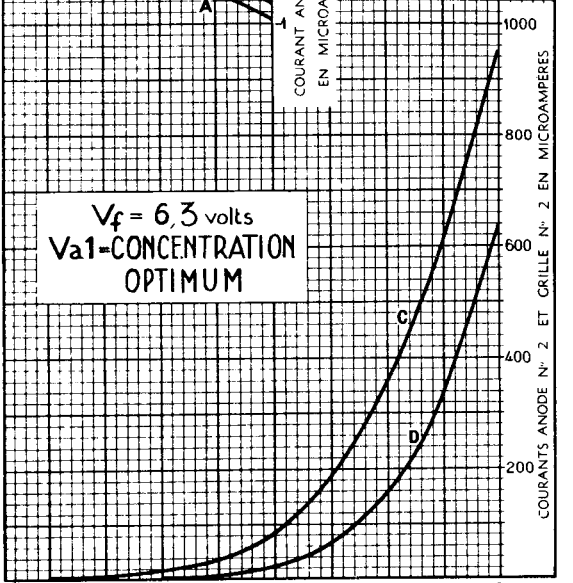
C 127 S

COURBES DES COURANTS ANODE N°2 ET GRILLE N° 2 EN FONCTION DE LA TENSION GRILLE N° 1

COURBES	COURANT	TENSION ANODE N°2 ET GRILLE N°2
A	ANODE N°1	2.000 VOLTS
B	ANODE N°1	1.500 VOLTS
C	ANODE N°2 ET GRILLE N°2	2.000 VOLTS
D	ANODE N°2 ET GRILLE N°2	1.500 VOLTS



$V_f = 6,3$ volts
Va1=CONCENTRATION OPTIMUM

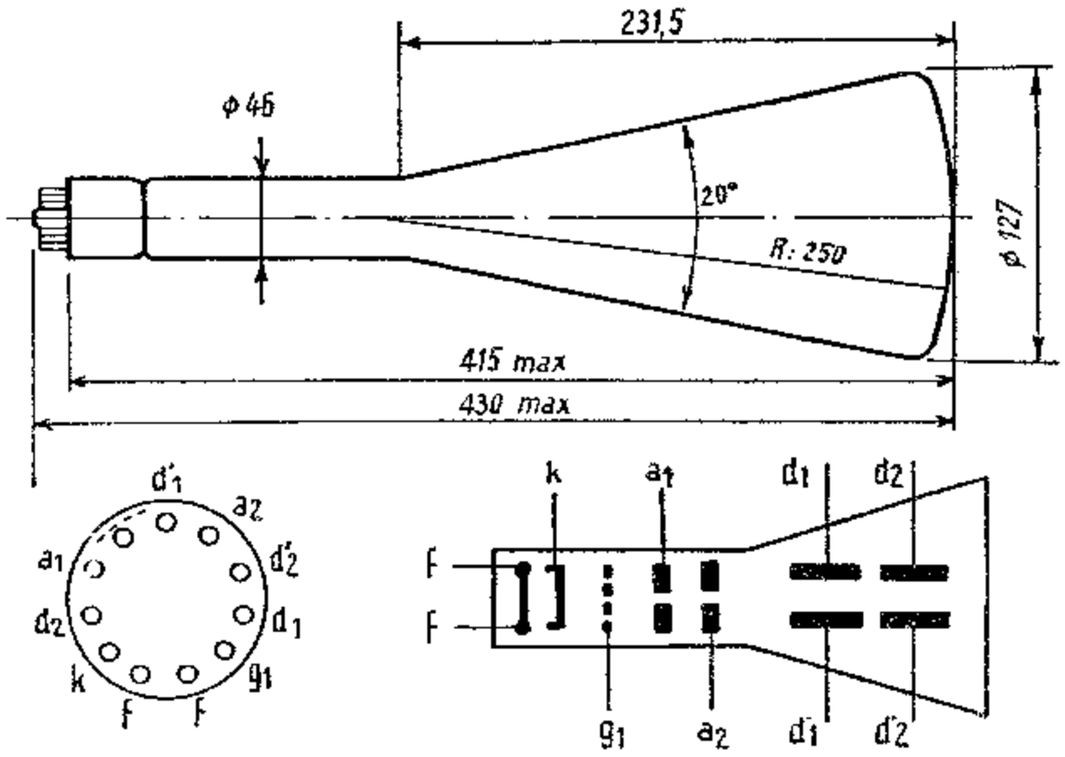


REPRODUCTION INTERDITE

MAZDA

C 127 S V1 C 127 S V2
C 127 S W1 C 127 S B1

TUBES ÉLECTROSTATIQUES DE 13 cm POUR OSCILLOGRAPHIE



CULOT — CHAUFFAGE

Magnal 11 broches — 6,3 V 0,6 A

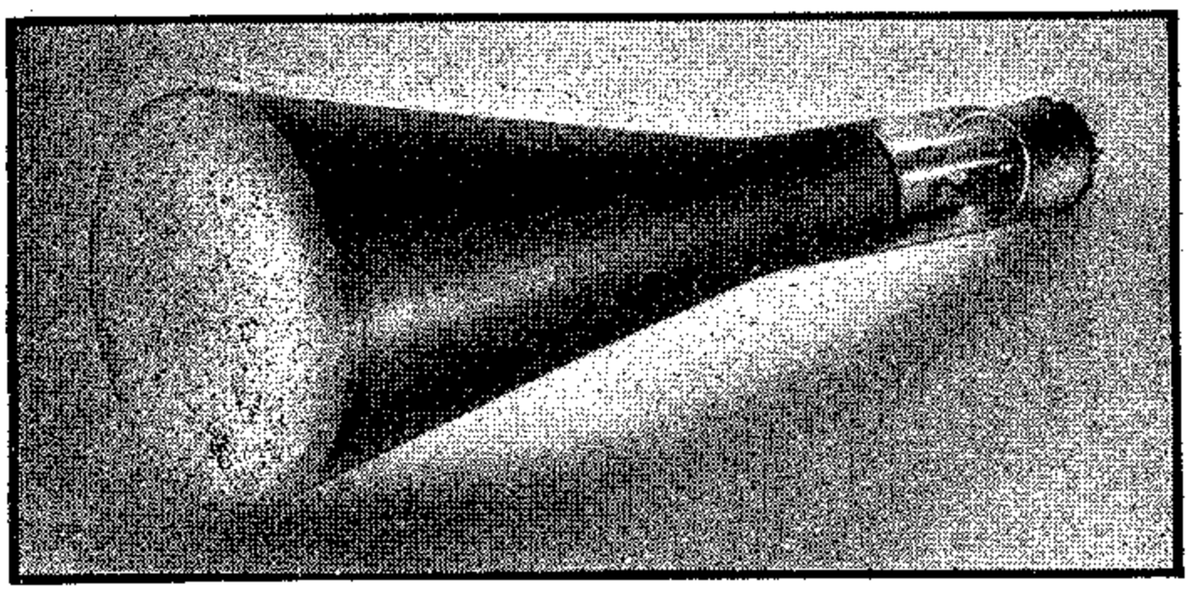
CAPACITES

Grille 1	8 pF
Plaque déviation d_1	12 pF
Plaque déviation d'_1	7,5 pF
Plaque déviation d_2	9,5 pF
Plaque déviation d'_2	7,5 pF
Plaque d_1 à plaque d'_1	1,2 pF
Plaque d_2 à plaque d'_2	1,3 pF

NOTES

Axe de déviation : lorsque d_2 est positive par rapport à d'_2, le spot est dévié vers la broche correspondant à l'anode 1.

Les tubes C 127 S, comme les tubes des séries 8 SA et 10 SA, bénéficient d'une nouvelle structure comportant en particulier un canon à deuxième anode fractionnée, ce qui supprime la consommation de l'anode 1 et rend la concentration indépendante de la luminosité.



CARACTERISTIQUES D'UTILISATION

Premier exemple :

Tension d'anode 2	1 500 V
Tension d'anode 1	340 V
Tension de grille correspondant à l'extinction du spot	—30 V
Sensibilité plaques 1	0,44 mm/V
Sensibilité plaques 2	0,4 mm/V

Deuxième exemple :

Tension d'anode 2	2 000 V
Tension d'anode 1	450 V
Tension de grille correspondant à l'extinction du spot	—40 V
Sensibilité plaques 1	0,33 mm/V
Sensibilité plaques 2	0,3 mm/V

CARACTERISTIQUES LIMITES

Tension d'anode 2	2 200 V
Tension d'anode 1	1 100 V
Tension minimum de grille	0 V
Tension maximum de grille	—125 V
Tension maximum entre anode 2 et une plaque quelconque de déviation	550 V
Tension maximum filament-cathode	100 V
Résistance maximum dans la grille	1,5 MΩ
Impédance maximum du circuit d'une plaque de déviation (à la fréquence d'alimentation du filament)	1 MΩ
Résistance maximum dans le circuit d'une plaque de déviation	5 MΩ

MAZDA

C220MW1

C220MW1

CATHOSCOPE

Cathode à chauffage indirect.	
Tension filament (CA ou CC)	6,3 Volts
Intensité filament	0,6 Amp.
Concentration	magnétique
Déflexion	magnétique
Nature de l'écran	W
à fluorescence blanche pour reproduction des images de Télévision.	
Hauteur totale	365 mm
Diamètre écran	220 mm
Encombrement	R.41-0C.1
Culot	CL 221
Brochage	40-BA
Capacités inter-électrodes:	
Wehnelt, par rapport aux autres électrodes	8 pF max.
Cathode, par rapport aux autres électrodes	8 pF max.
Demi-angle d'ouverture du faisceau	30 à 31 degrés

Broches:

Broches:

N° 1- Filament.
N° 2- Cathode.
N° 3- Non connectée.
N° 4- Wehnelt.
N° 5- Non connectée.
N° 6- Non connectée.
N° 7- Non connectée.
N° 8- Filament.
L'anode d'accélération est reliée à la forme du ballon.

Broches du culot, face à l'observateur.

Conditions normales d'utilisation

Tension maximum d'anode	7.000 Volts max.
Tension normale d'anode	5.000 Volts
Tension de Wehnelt pour extinction de l'image	-50 à -55 Volts
Tension de crête moyenne pour un courant de faisceau de 90 µA	20 Volts app.
Dimensions de l'image normale	135x180 mm
Bobine de concentration	400 Amp./Tours
Résolution maximum	550 Lignes

Utilisation

Le Cathoscope Mazda C 220 MW 1, à concentration et déflexion magnétiques, est pourvu d'un écran donnant des images de télévision en blanc et noir.

Il est recommandé d'utiliser le tube avec une tension d'anode d'au moins 5.000 volts. La tension choisie dépend largement de la brillance d'image désirée et de la puissance de balayage disponible.

La puissance de balayage nécessaire est directement proportionnelle à la tension d'anode du tube. En tous cas, pour obtenir une couleur d'écran agréa-

(Suite au Verso)

REPRODUCTION INTERDITE

MAZDA

C220MW1

CATHOSCOPE

ble à l'oeil, il est recommandé de ne pas adopter une tension d'anode inférieure à 4.500 volts.

Une résistance de protection d'environ 25.000 ohms doit être placée entre l'anode du tube et l'alimentation H.T.

Le chauffage du tube doit être assuré par un enroulement du transformateur d'alimentation séparé et une extrémité de cet enroulement doit être reliée à la cathode du tube.

Les éléments du récepteur de télévision, particulièrement les transformateurs, doivent être blindés ou convenablement placés afin que les champs de fuite ne provoquent pas une distorsion du spot ou une déformation de l'image.

La position de la bobine de concentration dépend de la dimension du spot désirée. Cette dimension est choisie de telle sorte que les lignes de l'image ne puissent pas être discernées à la distance normale de vue de l'écran. Pour une distance égale à environ six fois la hauteur de l'image et pour une tension d'anode de 5.000 volts, l'écartement entre le diaphragme du Wehnelt et le milieu de l'entrefer de la bobine doit être de l'ordre de 50 mm. Ceci s'applique à des bobines de concentration ayant des entrefers de l'ordre de 6 mm. Dans ces conditions, 400 Ampères tours environ sont nécessaires pour la concentration

Le fait de déplacer la bobine de concentration vers le diaphragme du Wehnelt accroit la dimension du spot et le nombre d'ampères-tours requis et, inversement, le fait de l'éloigner réduit la dimension du spot et le nombre d'ampères-tours.

Les bobines de déflexion doivent être montées aussi près que possible de l'épaulement du col.

Nota.-

1. La tension élevée qui est appliquée au tube C 220 MW 1 est très dangereuse. De grandes précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension; par exemple, des disjoncteurs doivent couper le circuit primaire de l'alimentation H.T. et la décharge du condensateur doit être assurée automatiquement dès l'ouverture du panneau de protection de l'appareil.

2. Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous chocs ou contraintes brusques, car l'"implosion" du tube peut provoquer des accidents graves. Dans les appareils de télévision ou autres montages utilisant le C 220 MW 1, une glace de protection épaisse doit être placée en permanence devant l'écran du tube.

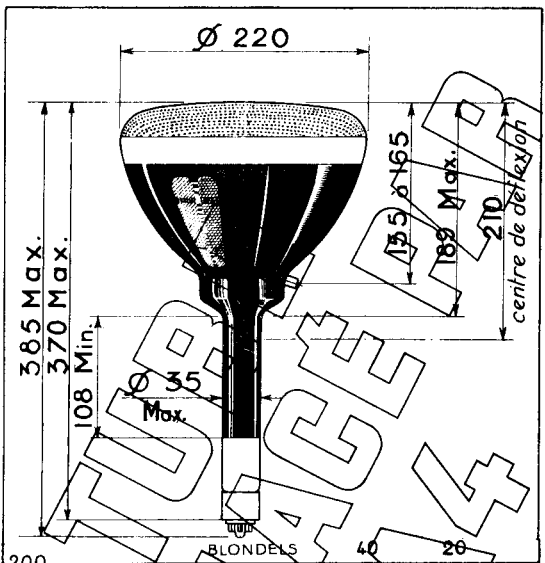
REPRODUCTION INTERDITE

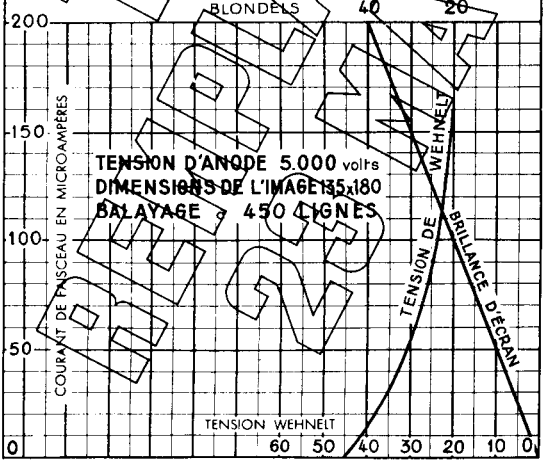
MAZDA

C220MW1

CATHOSCOPE

C220MW1





REPRODUCTION INTERDITE

MAZDA

C 30 S

C30S

CATHOSCOPE

Cathode à chauffage indirect.

Tension Filament	6,3 Volts (CA ou CC)
Intensité Filament	0,6 Ampère
Déviation : Electrostatique	
Fluorescence: Bl, (écran bleu); Vl (écran vert); V2 (écran vert à persistance); Wl (écran blanc).	
Hauteur	135 mm.
Diamètre écran	30 mm.
Brochage	7.0-CA

Capacités inter-électrodes :

Grille N° l par rapport aux autres électrodes	10,5 pF
Plaque de déviation N° l - Plaque de déviation N° 2	3,6 pF
Plaque de déviation N° 3 - Plaque de déviation N° 4	4,3 pF

Conditions maxima d'utilisation :

Tension anode N° 2 (ampoule-Anode N° 2)	550	Volts max.
Tension anode N° l (Electrode de mise au point)	125	Volts max.
Tension grille		jamais positive
Tension grille pour cut-off (1)	-85	Volts max.
Pointe de tension entre anode N° l et une plaque quelconque de déviation	250	Volts max.
Résistance dans le circuit grille	1.5	Megohm max.
Puissance d'entrée sur l'écran par cm^2	5	mW max.

Conditions normales d'utilisation :

Tension anode N° 2	400	500 Volts
Tension anode N° l	80	100 Volts
Tension grille à ajuster d'après la luminosité du spot		
Sensibilité de déviation :		
Plaques numéros l et 2	0,09	0,07 mm/V.CC
Plaques numéros 3 et 4	0,13	0,10 mm/V.CC

(1) Pour une tension anode N°1 égale à 125 volts.

REPRODUCTION INTERDITE

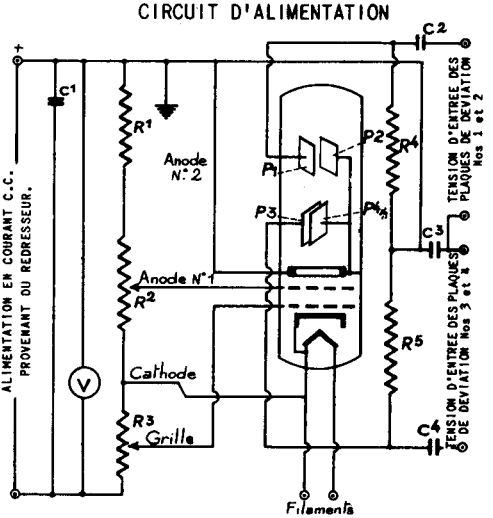
C30S

MAZDA

C 30 S

CATHOSCOPE

CIRCUIT D'ALIMENTATION



C = Condensateur de filtrage de 0,5 à 2 µF

R1 + R2 + R3 = Pont d'alimentation

R1 = 0,5 Mégohm R3 = 0,02 Mégohm

R2 = 0,2 Mégohm R4, R5 = .1 à 10 Mégohm

V = Voltmètre

Note 1 – Les plaques N°s 2 et 4 sont réunies à l'intérieur du tube à l'anode N° 2 et à la masse.

Note 2 – Dans la plupart des applications du tube C 30 S il est recommandé de mettre l'anode N° 2 à la terre.

Ces informations sont fournies à titre purement indicatif.

Leur utilisation ou leur reproduction ne saurait en aucun cas engager notre responsabilité.

FLUORESCENCE

B1 = Fluorescence bleue

V1 = Fluorescence verte

V2 = Fluorescence bleue-verte à longue persistance.

W1 = Fluorescence blanche.

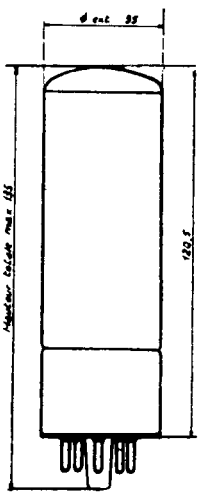
REPRODUCTION INTERDITE

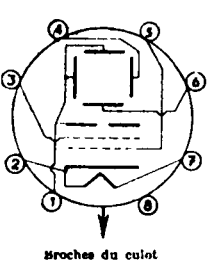
MAZDA

C 30 S

TUBE A RAYONS CATHODIQUES

C 30 S





Broches du culot
face à l'observateur

Broche N° 1 - Plaques N° 2 et 4 Anode N° 2 - Masse
Broche N° 2 - Filament cathode
Broche N° 3 - Anode N° 1
Broche N° 4 - Plaque de déviation N° 1
Broche N° 5 - Grille
Broche N° 6 - Plaque de déviation N° 3
Broche N° 7 - Filament
Broche N° 8 - Non connectée

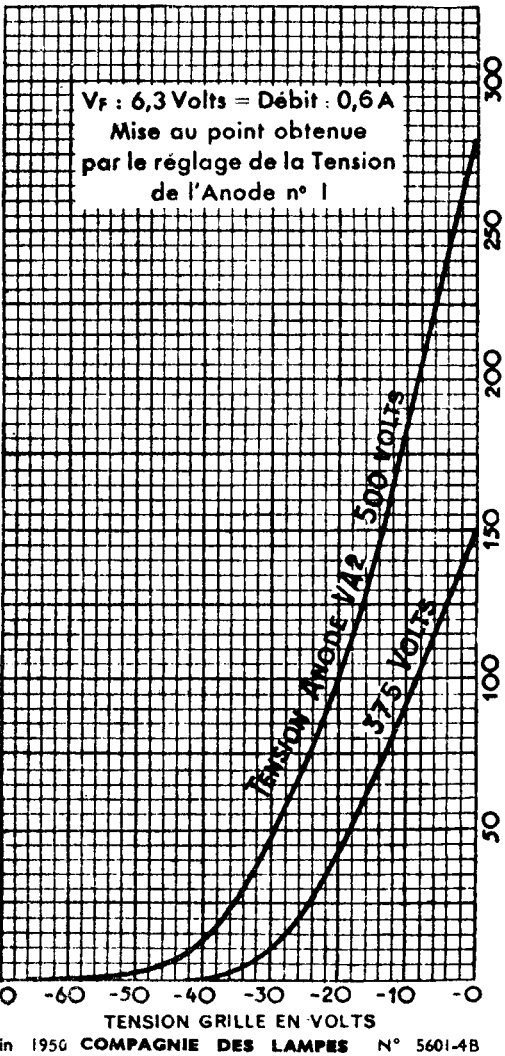
REPRODUCTION INTERDITE

C 30 S

MAZDA

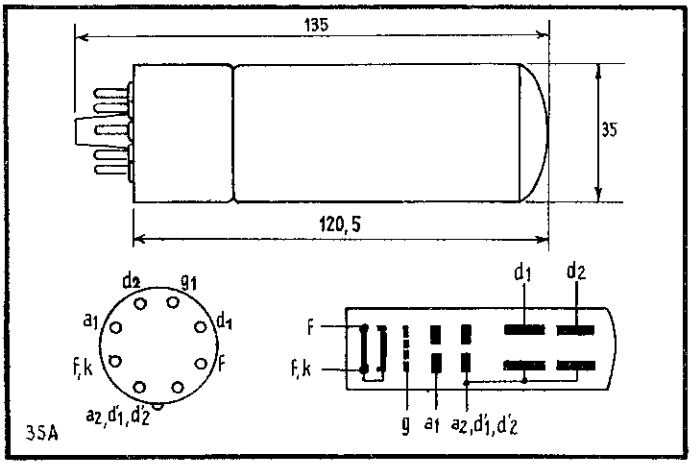
C 30 S

TUBE A RAYONS CATHODIQUES



REPRODUCTION INTERDITE

Juin 1950 **COMPAGNIE DES LAMPES** N° 5601-4B



MAZDA

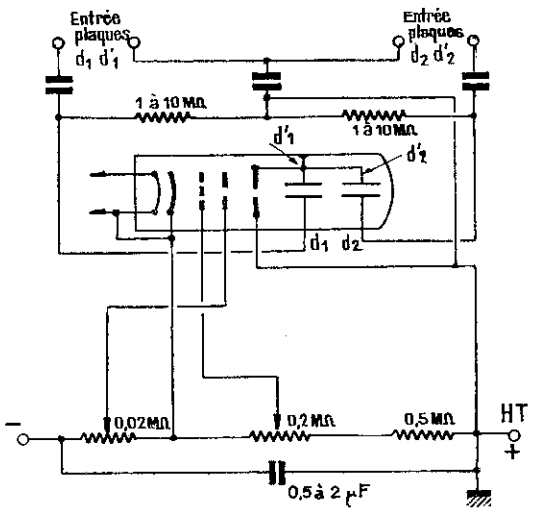
C 30 S V1 · C 30 S V2
C 30 S W1 · C 30 S B1

TUBES ÉLECTROSTATIQUES DE 3 cm POUR OSCILLOGRAPHIE

CULOT	CHAUFFAGE
Octal 8 broches	6,3 V 0,6 A

CAPACITES

Grille 1	10,5 pF
Plaque d_1 à plaque d'_1	4,3 pF
Plaque d_2 à plaque d'_2	3,6 pF



Circuit-type d'alimentation des tubes de cette série.

NOTES

La tension de grille correspondant à l'extinction est de —90 V pour 125 V sur l'anode 1.

Les plaques d'_1 et d'_2 sont réunies intérieurement à l'anode 2 ; il est recommandé de connecter cet ensemble à la masse.

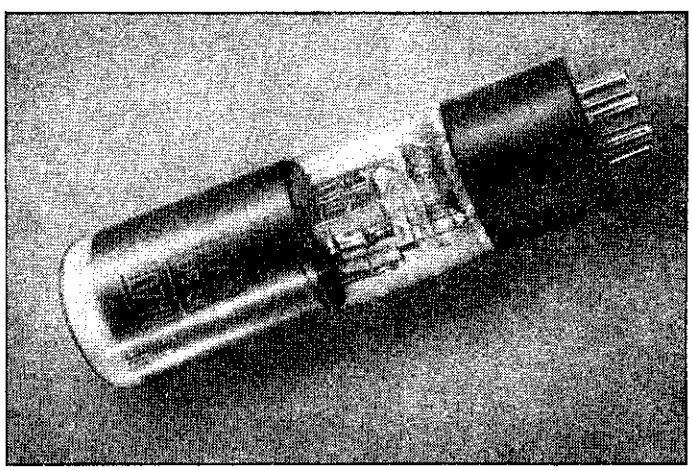
Les tubes de la série C 30 S, de dimensions réduites, sont le plus souvent utilisés comme indicateurs visuels (formes de courants, contrôle de fréquences, profondeur de modulation, etc.).

CARACTERISTIQUES D'UTILISATION

Premier exemple :	
Tension d'anode 2	400 V
Tension d'anode 1	80 V
Sensibilité plaques 1	0,13 mm/V
Sensibilité plaques 2	0,09 mm/V
Deuxième exemple :	
Tension d'anode 2	500 V
Tension d'anode 1	100 V
Sensibilité plaques 1	0,1 mm/V
Sensibilité plaques 2	0,07 mm/V

CARACTERISTIQUES LIMITES

Tension maximum d'anode 2	550 V
Tension maximum d'anode 1	125 V
Tension minimum de grille	0 V
Tension maximum de grille	—90 V
Tension maximum entre anode 1 et une plaque quelconque de déviation	250 V
Résistance maximum dans la grille	1,5 MΩ
Dissipation maximum de l'écran	5 mW/cm²



MAZDA

C31OMWI

C31OMWI

CATHOSCOPE

Cathode à chauffage indirect	
Tension filament (CA ou CC)	6,3 Volts
Intensité filament	0,6 Amp.
Concentration	magnétique
Déflexion	magnétique
Nature de l'écran à fluorescence blanche pour reproduction des images de Télévision.	W 1
Hauteur totale	490 mm
Diamètre écran	310 mm
Encombrement	R.51-OC. 1
Culot	CL 221
Brochage	4,0-BA
Capacités inter-électrodes :	
Wehnelt, par rapport aux autres électrodes	8 pF max.
Cathode, par rapport aux autres électrodes	8 pF max.
Demi-angle d'ouverture du faisceau	26 à 27 degrés

Broches:

N° 1-Filament.
N° 2-Cathode.
N° 3-Non connectée.
N° 4-Wehnelt.
N° 5-Non connectée.

Broches:

N° 6-Non connectée.
N° 7-Non connectée.
N° 8-Filament.
L'anode d'accélération est reliée à la corne du ballon.

Broches du culot, face à l'observateur.

Conditions normales d'utilisation

Tension maximum d'anode	7.000 Volts max.
Tension normale d'anode	5.500 Volts
Tension de Wehnelt pour extinction de l'image	-33 à -60 volts
Tension de crête moyenne pour un courant de faisceau de 150 µA	24,5 Volts app.
Dimensions de l'image normale	190 × 253 mm
Bobine de concentration	450 Amp./Tours
Résolution maximum	819 Lignes

Utilisation

Le Cathoscope Mazda C 310 MW 1, à concentration, et déflexion magnétiques, est pourvu d'un écran donnant des images de télévision en blanc et noir.

Il est recommandé d'utiliser le tube avec une tension d'anode d'au moins 5.500 volts. Cette tension dépend largement de la brillance d'image désirée et de la puissance de balayage disponible.

La puissance de balayage nécessaire est directe-

(Suite au Verso)

REPRODUCTION INTERDITE

MAZDA

C310MW1

CATHOSCOPE

ment proportionnelle à la tension d'anode du tube. En tous cas, pour obtenir une couleur d'écran agréable à l'oeil, il est recommandé de ne pas adopter une tension d'anode inférieure à 5.000 volts.

Une résistance de protection d'environ 25.000 ohms doit être placée entre l'anode du tube et l'alimentation H.T.

Le chauffage du tube doit être assuré par un enroulement du transformateur d'alimentation séparé et une extrémité de cet enroulement doit être reliée à la cathode du tube.

Les éléments du récepteur de télévision, particulièrement les transformateurs, doivent être blindés ou convenablement placés afin que les champs de fuite ne provoquent pas une distorsion du spot ou une déformation de l'image.

La position de la bobine de concentration dépend de la dimension du spot désirée. Cette dimension est choisie de telle sorte que les lignes de l'image ne puissent pas être discernées à la distance normale de vue de l'écran. Pour une distance égale à environ six fois la hauteur de l'image et pour une tension d'anode de 5.500 volts, l'écartement entre le diaphragme du Wehnelt et le milieu de l'entrefer de la bobine doit être de l'ordre de 27 mm. Ceci s'applique à des bobines de concentration ayant des entrefers de l'ordre de 6 mm. Dans ces conditions 450 Ampères-tours environ sont nécessaires pour la concentration.

Le fait de déplacer la bobine de concentration vers le diaphragme du Wehnelt accroît la dimension du spot et le nombre d'ampères-tours requis et, inversement, le fait de l'éloigner réduit la dimension du spot et le nombre d'ampères-tours.

Les bobines de déflexion doivent être montées aussi près que possible de l'épaulement du col.

Note.

1. La tension élevée qui est appliquée au tube C 310 MW 1 est très dangereuse. De grandes précautions doivent être prises pour protéger l'utilisateur du contact avec cette tension; par exemple, des disjoncteurs doivent couper le circuit primaire de l'alimentation H.T. et la décharge du condensateur doit être assurée automatiquement dès l'ouverture du panneau de protection de l'appareil.

2. Au cours du transport ou de la manipulation du tube, il est recommandé d'éviter de le soumettre à tous chocs ou contraintes brusques, car l'"implosion" du tube peut provoquer des accidents graves. Dans les appareils de télévision ou autres montages utilisant le C 310 MW 1, une glace de protection épaisse doit être placée en permanence devant l'écran du tube.

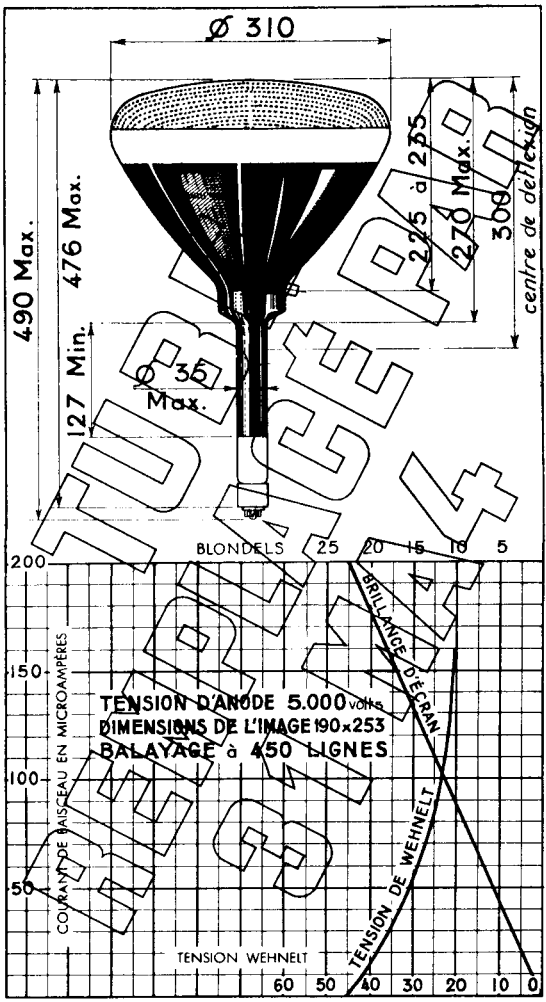
REPRODUCTION INTERDITE

MAZDA

C310MW1

C310MW1

DIMENSIONS ET COURBE
CARACTÉRISTIQUE



REPRODUCTION INTERDITE

MAZDA

C 75 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ

C 75 S

Cathode à Chauffage indirect
Tension Filament 6,3 V. (CA ou CC)
Intensité Filament 0,8 Amp.
Déviation : Electrostatique
Fluorescence : B1 (écran bleu) ; V1 (écran vert) ; V2 (écran vert à persistance) ; W1 (écran blanc)
Hauteur 312,5 mm.
Diamètre écran 75 mm.
Culot N° 6221

Capacités inter-électrodes :

Grille N°1 par rapport aux autres électrodes	10 $\mu\mu$F max.
Plaque de déviation N° 1 Plaque de déviation N° 2	4 $\mu\mu$F max.
Plaque de déviation N° 3. Plaque de déviation N° 4	3 $\mu\mu$F max

Conditions maxima d'utilisation :

Tension anode N° 2	1.200 Volts max.
Tension anode N° 1 (Electrode de mise au point)	400 Volts max.
Tension grille	jamais positive
Pointe de tension entre anode N° 2 et une des plaques de déviation	600 Volts max.
Tension grille pour cut-off (1)	-75 Volts max.
Résistance dans le circuit grille	1,5 Mégohm max.
Puissance d'entrée sur l'écran par çm2	10 m W max.

Conditions normales d'utilisation :

Tension anode N° 2	600	800	1.000	1.200	Volts
Tension anode N° 1 ajustable à ± 20 % des valeurs indiquées	170	230	285	345	Volts
Tension grille à ajuster d'après la luminosité du spot					
Sensibilité de déviation :					
Plaques N° 1 et 2	0,55	0,41	0,33	0,27	mm /V. CC
Plaques N° 3 et 4	0,58	0,44	0,35	0,29	mm /V. CC

(1) Pour une tension anode N° 1 égale à 400 volts.

REPRODUCTION INTERDITE

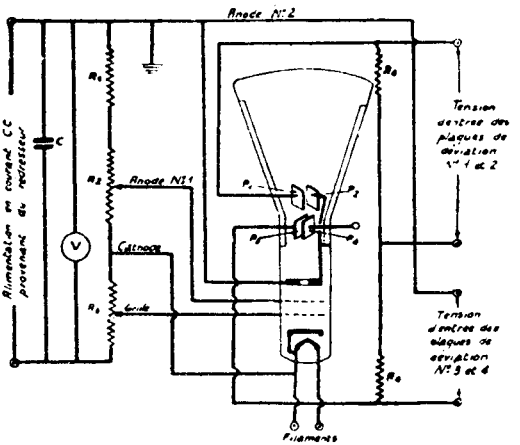
C 75 S

MAZDA

C 75 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ

CIRCUIT D'ALIMENTATION



C - Condensateur de filtrage de 0,5 à 2 µF

R1, R2, R3 = Pont d'alimentation

R1 = 0,45 Méghom R3 = 0,02 Mégohm

R2 = 0,25 Mégohm R4 = 1 à 10 Mégohm

V = Voltmètre

Ces informations sont fournies à titre purement indicatif.

Leur utilisation ou leur reproduction ne saurait en aucun cas engager notre responsabilité.

FLUORESCENCE

B 1 = Fluorescence bleue

V2 = Fluorescence bleue verte à longue persistance

V1 = Fluorescence verte.

W1 = Fluorescence blanche

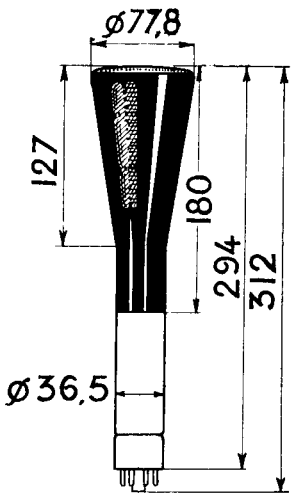
REPRODUCTION INTERDITE

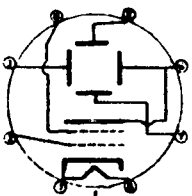
MAZDA

C 75 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ

C 75 S





Broches du culot face à l'observateur

Broche N° 1 - Filament-cathode
Broche N° 2 - Grille
Broche N° 3 - Plaque de déviation N° 1
Broche N° 4 - Anode N° 1
Broche N° 5 - Plaque de déviation N° 3
Broche N° 6 - Anode N° 2 et plaque de déviation N° 2
Broche N° 7 - Plaque de déviation N° 4
Broche N° 8 - Filament

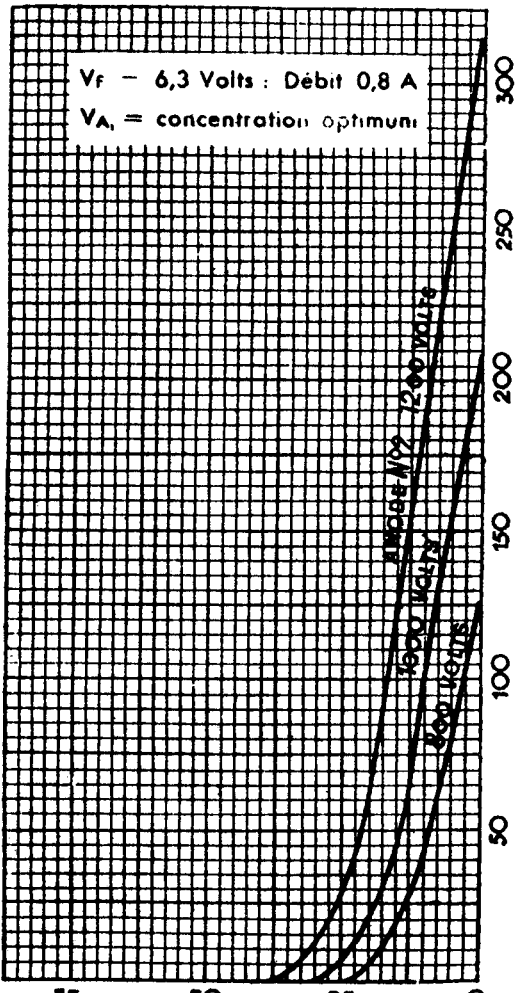
REPRODUCTION INTERDITE

C 75 S

MAZDA

C 75 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ



REPRODUCTION INTERDITE

MAZDA

C 95 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ

C 95 S

Cathode à Chauffage indirect

Tension Filament	6,3 V. (CA ou CC)
Intensité Filament	0,8 Amp

Déviation : Electrostatique

Fluorescence : B1 (écran bleu) ; V1 (écran vert) ; V2 (écran vert à persistance) ; W1 (écran blanc).

Hauteur	355 mm.
Diamètre écran	95 mm.
Culot	N° 6288

Capacités inter-électrodes :

Grille N° 1 - par rapport aux autres électrodes	12 µµF
Plaque de déviation N° 1 - plaque de déviation n° 2	3 µµF
Plaque de déviation N° 3 - plaque de déviation N° 4	2 µµF

Conditions maxima d'utilisation :

Tension anode N° 2	1.500	Volts max.
Tension anode N° 1 (Electrode de mise au point)	450	Volts max.
Tension grille	jamais	positive
Pointe de tension entre anode N° 2 et une des plaque de déviation	600	Volts max.
Tension grille pour cut-off (1)	-56	Volts max.
Résistance dans le circuit grille	1,5	Mégohm max.
Puissance d'entrée sur l'écran par cm2	10	mW. max.

Conditions normale d'utilisation :

Tension anode N° 2	800	1.000	1.200	1.400	Volts
Tension anode N° 1 ajustable à ± 20 % des valeurs indiquées	200	240	280	320	Volts
Tension grille : à ajuster d'après la luminosité du spot.					
Sensibilité de déviation :					
Plaques N° 1 et 2	0,60	0,48	0,40	0,35	mm/V. CC
Plaques N° 3 et 4	0,62	0,50	0,42	0,37	mm/V. CC

(1) Pour une tension anode N° 1 égale à 450 volts.

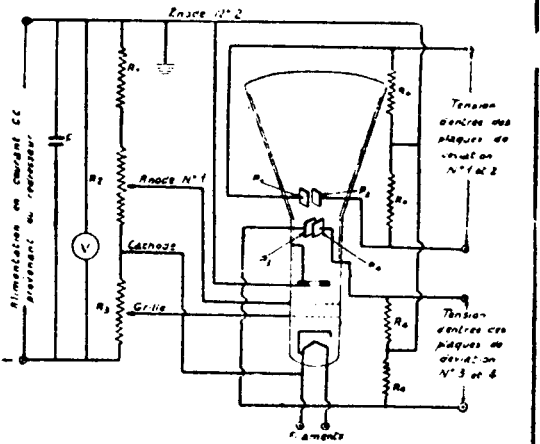
REPRODUCTION INTERDITE

C 95 S

MAZDA

C 95 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ



C = **Condensateur de filtrage de 0,5 à 2 µF**

R1 + R2 + R3 = **Pont d'alimentation.**

R1 = **0,5 Mégohm** **R3** = **0,02 Mégohm**

R2 = **0,2 Mégohm** **R4** = **1 à 10 Mégohm**

V = **Voltmètre**

Ces informations sont fournies à titre purement indicatif.

Leur utilisation ou leur reproduction ne saurait engager en aucun cas notre responsabilité.

FLUORESCENCE

B1 = **Fluorescence bleue**

V1 = **Fluorescence verte**

V2 = **Fluorescence bleue-verte à longue persistance**

W1 = **Fluorescence blanche**

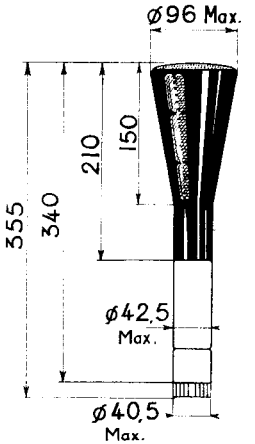
REPRODUCTION INTERDITE

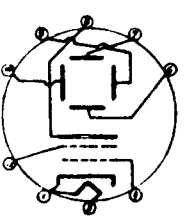
MAZDA

C 95 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ

C 95 S





Broches du culot face à l'observateur

Broche N°	1	- Filament cathode
Broche N°	2	- Filament
Broche N°	3	- Grille
Broche N°	4	- Manque
Broche N°	5	- Manque
Broche N°	6	- Plaque de déviation N° 3
Broche N°	7	- Plaque de déviation N° 4
Broche N°	8	- Anode N° 2
Broche N°	9	- Plaque de déviation N° 1
Broche N°	10	- Plaque de déviation N° 2
Broche N°	11	- Manque
Broche N°	12	- Anode N° 1

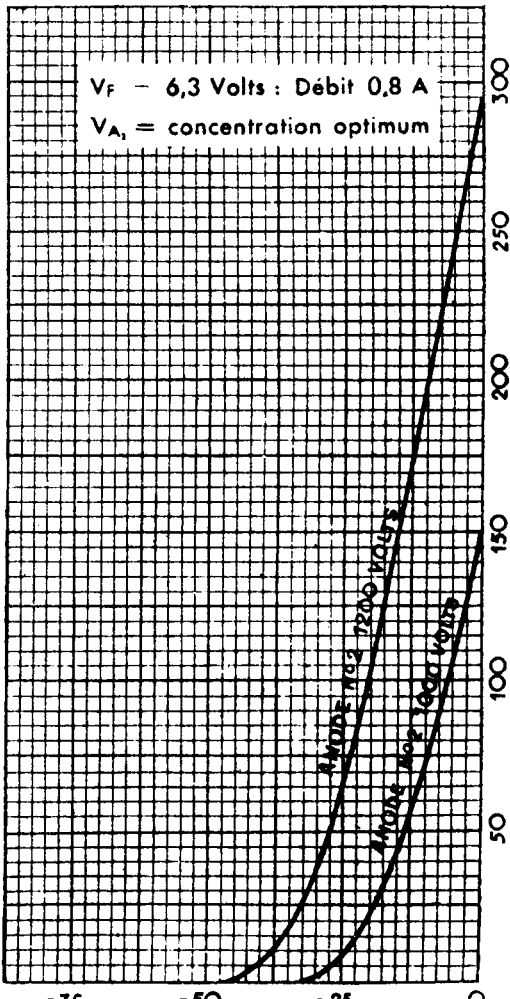
REPRODUCTION INTERDITE

C 95 S

MAZDA

C 95 S

TUBE A RAYONS CATHODIQUES A VIDE POUSSÉ



REPRODUCTION INTERDITE

CRM 121

CATHODE RAY TUBE

RATING.

Heater Voltage	2.0
Heater Current (Amps.)	1.4
Maximum Anode Voltage	6,000

TYPICAL OPERATION.

Anode Voltage	5,500
Grid Bias for Cut-off of Raster (Volts)	33–60
Average Peak to Peak Modulating Voltage for Modulation up to 150 μA	24.5
Maximum Peak to Peak Modulating Voltage for Modulation of limit C.R. tube up to 150 μA	28.0

INTER-ELECTRODE CAPACITIES.

Grid 1 to all other electrodes	5.0 $\mu\mu$F.
Cathode to all other electrodes	5.0 $\mu\mu$F.

NOTE.—These capacities include a Benjamin Type Wafer Octal Holder.

DIMENSIONS.

Maximum Overall Length	465 mm.
Maximum Diameter	312 mm.

GENERAL.

The CRM 121 is a magnetically focused and deflected cathode ray tube designed primarily for reproduction of television pictures. The screen, measuring approximately 12″, is coated with a compound giving a substantially black and white picture. The tube is fitted with a Mazda Octal base, the connexions to which are given overleaf.

APPLICATION.

It is recommended that the tube should be operated with an anode voltage of the order of 5,500 volts, although the actual voltage employed depends to a large extent upon the brilliance of the picture required, as well as the scanning power available. The scanning power required is directly proportional to the anode voltage on the tube. It is recommended that in any case the tube should not be operated at a mean anode voltage of less than 5,000 volts, when screen colour considerations are

of importance. A protective resistance of the order of 25,000 ohms should be connected between the anode terminal of the tube and the H.T. supply.

The heater supply should be provided by a separate winding on the transformer, and one end of this heater winding should be permanently connected to the cathode of the tube.

The associated equipment of the television receiver, particularly power transformers, must be adequately screened, or suitably positioned within the cabinet, so that stray fields will not cause distortion of the spot or a pattern on the screen. It is recommended that the tube should be mounted so that the rubber support for the bulb is at least 6" from the screen end of the black coating on the inside of the bulb. If a rubber mask is employed, this should be mounted on the bulb, and should not be allowed to touch any component from which leakage may occur. Alternatively, if the mask is fixed to the cabinet, an air gap should be provided between the bulb and the mask.

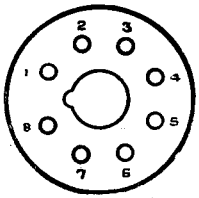
The position of the focusing coil which acts as a lens depends upon the size of the spot required. The spot size required is determined by the viewing distance chosen, as it is desirable that with the normal viewing distance employed a "flat field" should be obtained, i.e. that the individual lines of the raster should not be discernible. It is recommended that for a normal viewing distance of the order of six times the picture height, the distance between the modulator grid aperture and the centre of the focusing coil gap should be of the order of 2.7 cms. This applies with focusing coils having gaps of the order of $\frac{1}{4}$", and under these conditions approximately 680 ampere turns will be required for focusing. The actual value of the ampere turns required will depend to a certain extent on the shape of the iron circuit and the permeability of the iron. Moving the focusing coil closer to the grid aperture will increase the spot size and the ampere turns required for focusing, and, conversely, moving the focusing coil further away from the grid aperture will reduce the spot size and also reduce the ampere turns required for focusing. The above positions and ampere turns are given for an anode voltage of 5,500 volts. The length of the line deflecting coils for good scanning is of the order of 2" overall. The deflecting coils should be mounted as close as possible to the bulb shoulder.

The high voltages at which the CRM 121 tube is operated are very dangerous. Great care should be taken in the design of the equipment to prevent the user coming into contact with these high voltages. Precautions should include the enclosing of high potential terminals; the use of interlocking switches to break the primary circuit of the high voltage power supply when access to the apparatus is required; and provision for discharging the high voltage condenser.

The handling of the CRM 121 tube in transportation, storage and use requires care, because the tube may be broken if subjected to sudden jars, scratches or excessive strains or, if abused, the tube may be weakened so that it may subsequently implode owing to the pressure on the tube due to the vacuum within. The equipment in which the cathode ray tube is utilised should be designed to prevent the bulb from being damaged,

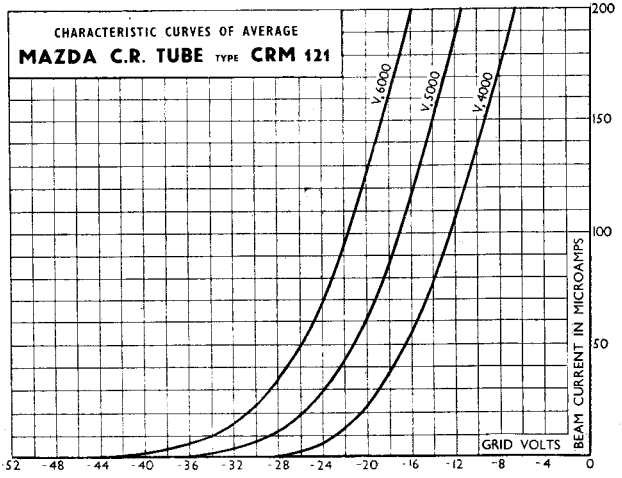
and to protect the user from the effects of an implosion if the bulb is damaged or has been weakened by prior handling. The screen of the tube should be covered with a plate of safety glass, and goggles worn when handling the tube.

BASING.



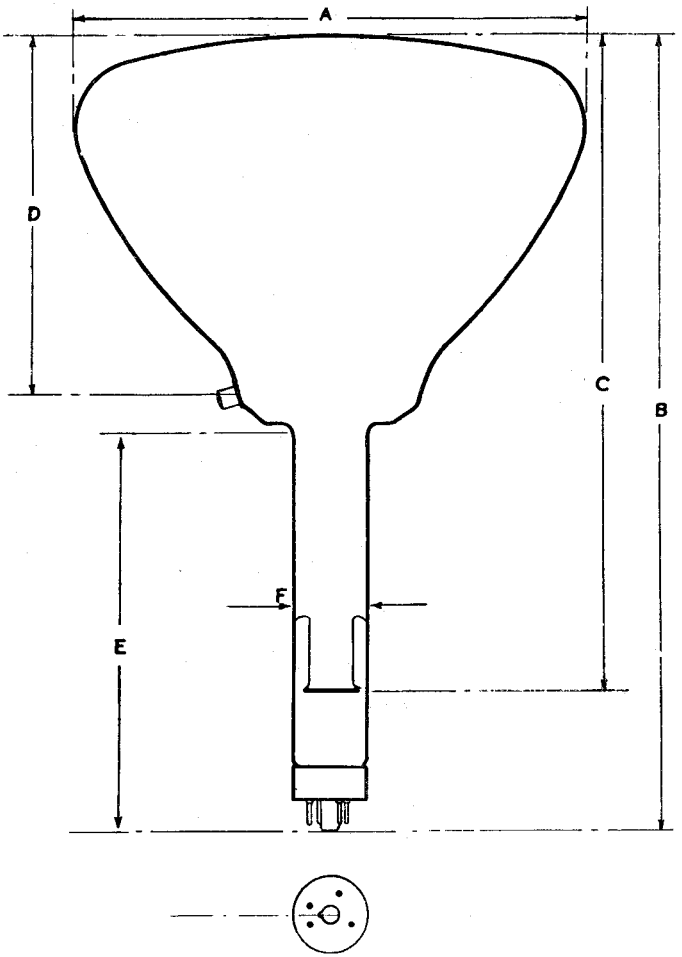
Viewed from the free end of the base.

Pin No. 1. Heater.
2. Omitted.
3. Cathode.
4. Omitted.
5. Control Grid.
6. Omitted.
7. Omitted.
8. Heater.
Cap Anode.



MAZDA

OUTLINE DRAWING OF CRM 121



All dimensions in millimetres.
A. 312 B. 460 C. 397 D. 270 E.178 F. 34.5

Mazda Cathode Ray Tubes are manufactured in Great Britain for the British Thomson-Housion Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD LONDON, W.C.2.

MAZDA

CRM 71

CATHODE RAY TUBE

RATING.

Heater Voltage	2.0
Heater Current (Amps.)	1.4
Maximum Anode Voltage	4,000

TYPICAL OPERATION.

Anode Voltage	3,500
Grid Bias for Cut-off of Raster (volts)	21.5–42.0
Average Peak to Peak Modulating Voltage for Modulation up to 100 μA	18
Maximum Peak to Peak Modulating Voltage for Modulation of limit C.R. tube up to 100 μA	21
Average Peak to Peak Modulating Voltage for Modulation up to 150 μA	21
Maximum Peak to Peak Modulating Voltage for Modulation of limit C.R. tube up to 150 μA	24.5

INTER-ELECTRODE CAPACITIES.

Grid 1 to all other electrodes	5.0 $\mu\mu$F.
Cathode to all other electrodes...	5.0 $\mu\mu$F.

NOTE.—These capacities include a Benjamin Type Wafer Octal Holder

DIMENSIONS.

Maximum Overall Length	373mm.
Maximum Diameter	180mm.

GENERAL.

The CRM 71 is a magnetically focussed and deflected cathode ray tube designed primarily for reproduction of television pictures. The screen, measuring approximately 7" is coated with a compound giving substantially a black and white picture. The tube is fitted with a Mazda Octal base, the connexions to which are given overleaf.

APPLICATION.

It is recommended that the tube should be operated with an anode voltage of the order of 3,500 volts, although the actual voltage employed depends to a large extent upon the brilliance of the picture required, as well as the scanning power available. The scanning power required is directly proportional to the anode voltage on the tube. It is recommended that the tube should not be operated at a mean anode voltage appreciably lower than 3,500 volts when screen colour considerations are of importance. A protective resistance of the order of 25,000 ohms should be connected between the anode terminal of the tube and the H.T. supply.

The heater supply should be provided by a separate winding on the transformer, and one end of this heater winding should be permanently connected to the cathode of the tube.

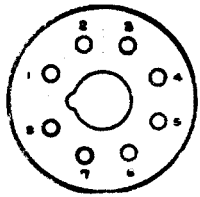
The associated equipment of the television receiver, particularly power transformers, must be adequately screened, or suitably positioned within the cabinet, so that stray fields will not cause distortion of the spot or a pattern on the screen. It is recommended that the tube should be mounted so that the rubber support for the bulb is at least 2" from the screen end of the black coating on the inside of the bulb. If a rubber mask is employed this should be mounted on the bulb, and should not be allowed to touch any component from which leakage may occur. Alternatively, if the mask is fixed to the cabinet, an air gap should be provided between the bulb and the mask.

The position of the focusing coil which acts as a lens depends upon the size of the spot required. The spot size required is determined by the viewing distance chosen, as it is desirable that with the normal distance employed a "flat field" should be obtained, i.e. that the individual lines of the raster should not be discernable. It is recommended that for a normal viewing distance of five to six times the picture height, the distance between the modulator grid aperture and the centre of the focusing coil gap should be of the order of 4 cm. This applies with focusing coils having gaps of the order of $\frac{1}{4}$", and under these conditions approximately 450 ampere turns will be required for focusing. The actual value of the ampere turns required will depend to a certain extent on the shape of the iron circuit and the permeability of the iron. Moving the focusing coil closer to the grid aperture will increase the spot size and the ampere turns required for focussing, and, conversely, moving the focusing coil further away from the grid aperture will reduce the spot size and also reduce the ampere turns for focusing. The above positions and ampere turns are given for an anode voltage of 3,500 volts. The length of the line deflecting coils for good scanning is of the order of $2\frac{1}{2}$" overall. The deflecting coils should be mounted as close as possible to the bulb shoulder.

The high voltages at which the CRM 71 tube is operated are very dangerous. Great care should be taken in the design of the equipment to prevent the user coming into contact with these high voltages. Precautions should include the enclosing of high potential terminals; the use of interlocking switches to break the primary circuit of the high voltage power when access to the apparatus is required; and provision for discharging the high voltage condenser.

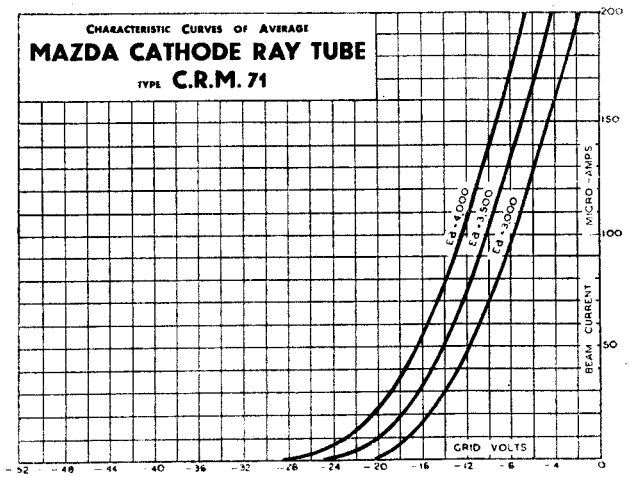
The handling of the CRM 71 tube in transportation, storage and use requires care, because the tube may be broken if subjected to sudden jars or excessive strains or, if abused, the tube may be weakened so that it may subsequently implode owing to the pressure on the tube due to the vacuum within. The equipment in which the cathode ray tube is utilised should be designed to prevent the bulb from being damaged, and to protect the user from the effects of an implosion if the bulb is damaged or has been weakened in prior handling. The screen of the tube should be covered with a plate of safety glass, and goggles worn when handling the tube.

BASING



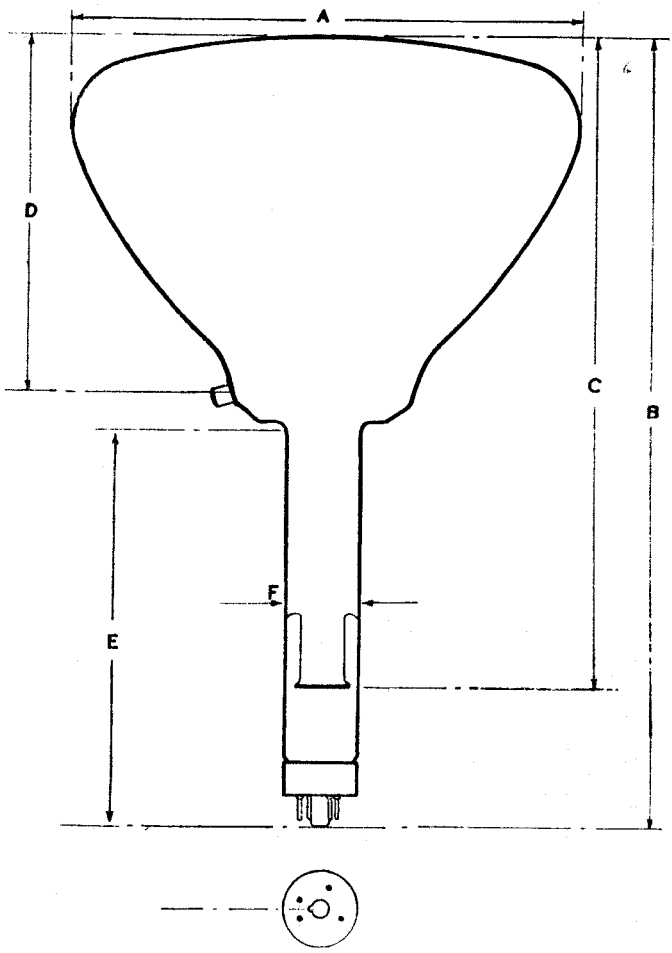
Viewed from the free end of the base.

Pin No. 1. Heater.
2. Omitted.
3. Cathode.
4. Omitted.
5. Control Grid.
6. Omitted.
7. Omitted.
8. Heater.
Cap. Anode.



MAZDA

OUTLINE DRAWING OF CRM 71.



All dimensions in millimetres.

A. 180 B 368. C. 305 D. 166 E. 190 F. 34.5

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THE EDISON SWAN ELECTRIC CO., LTD.
155 CHARING CROSS ROAD. LONDON, W.C.2

CRM 91

CATHODE RAY TUBE

RATING.

Heater Voltage	2.0
Heater Current (Amps.)	1.4
Maximum Anode Voltage	6,000

TYPICAL OPERATION.

Anode Voltage	5,000
Grid Bias for Cut-off of Raster (Volts)	30–55
Average Peak to Peak Modulating Voltage for Modulation up to 150 μA	23
Maximum Peak to Peak Modulating Voltage for Modulation of limit C.R. tube up to 150 μA	26.5

INTER-ELECTRODE CAPACITIES.

Grid 1 to all other electrodes	5.0 $\mu\mu$F.
Cathode to all other electrodes...	5.0 $\mu\mu$F.

NOTE.—These capacities include a Benjamin Type Wafer Octal Holder.

DIMENSIONS.

Maximum Overall Length	361 mm.
Maximum Diameter	228 mm.

GENERAL.

The CRM 91 is a magnetically focused and deflected cathode ray tube designed for reproduction of television pictures. The screen, measuring approximately 9", is coated with a compound giving substantially a black and white picture. The tube is fitted with a Mazda Octal base, the connexions to which are given overleaf.

APPLICATION.

It is recommended that the tube should be operated with an anode voltage of the order of 5,000 volts, although the actual voltage employed depends to a large extent upon the brilliance of the picture required, as well as the scanning power available. The scanning power required is directly proportional to the anode voltage on the tube. It is recommended that in any case the tube should not be operated at a mean anode voltage of less than 4,500 volts, when screen colour considerations are of importance. A protective resistance of the order of 25,000 ohms should be connected between the anode terminal of the tube and the H.T. supply.

The heater supply should be provided by a separate winding on the transformer, and one end of this heater winding should be permanently connected to the cathode of the tube.

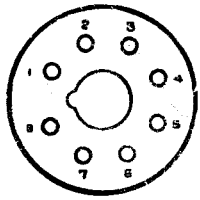
The associated equipment of the television receiver, particularly power transformers, must be adequately screened, or suitably positioned within the cabinet, so that stray fields will not cause distortion of the spot or a pattern on the screen. It is recommended that the tube should be mounted so that the rubber support for the bulb is at least 2″ from the screen end of the black coating on the inside of the bulb. If a rubber mask is employed, this should be mounted on the bulb and should not be allowed to touch any component from which leakage may occur. Alternatively, if the mask is fixed to the cabinet, an air gap should be provided between the bulb and the mask.

The position of the focusing coil which acts as a lens depends upon the size of the spot required. The spot size required is determined by the viewing distance chosen, as it is desirable that with the normal viewing distance employed a "flat field" should be obtained, i.e. that the individual lines of the raster should not be discernible. It is recommended that for a normal viewing distance of the order of six times the picture height, the distance between the modulator grid aperture and the centre of the focusing coil gap should be of the order of 3 cm. This applies with focusing coils having gaps of the order of $\frac{1}{4}$″, and under these conditions approximately 600 ampere turns will be required for focusing. The actual value of the ampere turns required will depend to a certain extent on the shape of the iron circuit and the permeability of the iron. Moving the focusing coil closer to the grid aperture will increase the spot size and the ampere turns required for focusing, and, conversely, moving the focusing coil further away from the grid aperture will reduce the spot size and also reduce the ampere turns required for focusing. The above positions and ampere turns are given for an anode voltage of 5,000 volts. The length of the line deflecting coils for good scanning should not exceed 2″ overall. The deflecting coils should be mounted as close as possible to the bulb shoulder.

The high voltages at which the CRM 91 tube is operated are very dangerous. Great care should be taken in the design of the equipment to prevent the user coming into contact with these high voltages. Precautions should include the enclosing of high potential terminals; the use of interlocking switches to break the primary circuit of the high voltage power supply when access to the apparatus is required; and provision for discharging the high voltage condenser.

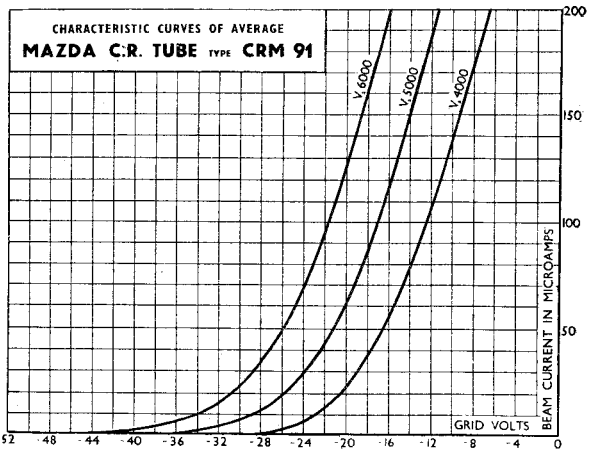
The handling of the CRM 91 tube in transportation, storage and use requires care, because the tube may be broken if subjected to sudden jars, scratches, or excessive strains or, if abused, the tube may be weakened so that it may subsequently implode owing to the pressure on the tube due to the vacuum within. The equipment in which the cathode ray tube is utilised should be designed to prevent the bulb from being damaged, and to protect the user from the effects of an implosion if the bulb is damaged or has been weakened in prior handling. The screen of the tube should be covered with a plate of safety glass, and goggles worn when handling the tube.

BASING.



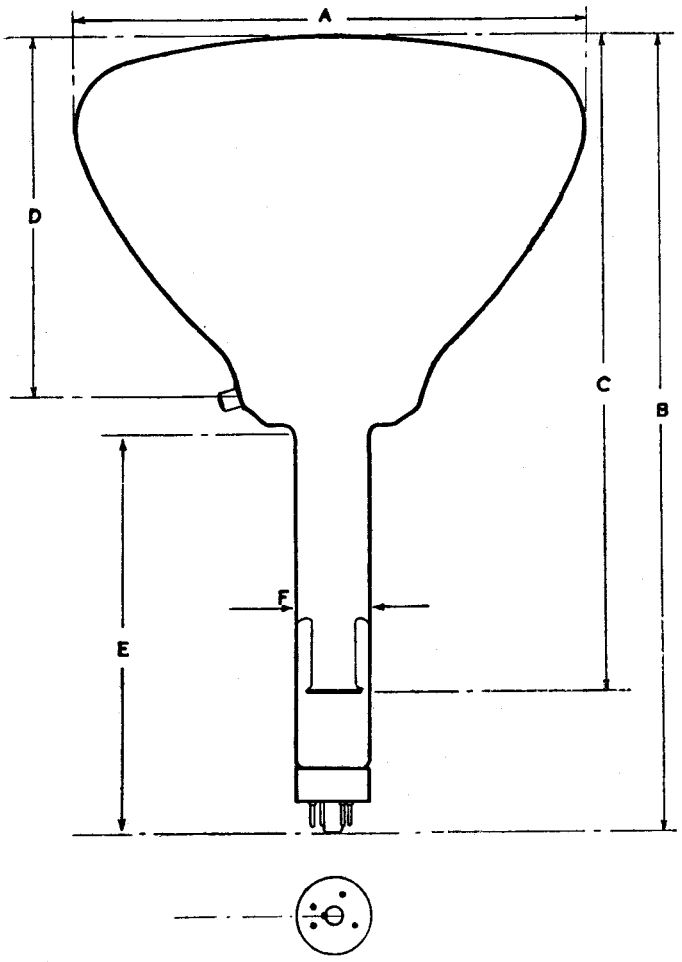
Viewed from the free end of the base.

Pin No. 1. Heater.
2. Omitted.
3. Cathode.
4. Omitted.
5. Control Grid.
6. Omitted.
7. Omitted.
8. Heater.
Cap. Anode.



MAZDA

OUTLINE DRAWING OF CRM 91



All dimensions in millimetres.

A. 228 B. 356 C. 293 D. 166 E. 178 F. 34.5

Mazda Cathode Ray Tubes are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

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MAZDA

CRM 92

CATHODE RAY TUBE

RATING.

Heater Voltage	2.0
Heater Current (Amps.)	1.4
Maximum Anode Voltage	6,000

TYPICAL OPERATION.

Anode Voltage	5,000
Grid Bias for Cut-off of Raster (Volts)	30-55
Average Peak to Peak Modulating Voltage for Modulation up to 150 *HF*	23
Maximum Peak to Peak Modulating Voltage for Modulation of limit C.R. tube up to 150 μA	26.5

INTER-ELECTRODE CAPACITIES.

Grid 1 to all other electrodes	5.0 $\mu\mu$F.
Cathode to all other electrodes	5.0 $\mu\mu$F.

NOTE.—These capacities include a Benjamin Type Wafer Octal Holder.

DIMENSIONS.

Maximum Overall Length	... 374 mm.
Maximum Diameter	... 228 mm.

GENERAL.

The CRM 92 is a magnetically focussed and deflected cathode ray tube designed for reproduction of television pictures. The screen, measuring approximately 9″, is coated with a compound giving substantially a black and white picture. The tube is fitted with a British Octal base, the connexions to which are given overleaf. By increasing the overall length by 13 mm. over that of the CRM.91 and modifying the ratio of the bulb length to the neck length, the deflecting power required by the CRM.92 has been materially reduced. A deflecting coil length $2\frac{1}{4}$″ overall is recommended as the best compromise between reduced power consumption and picture quality.

APPLICATION.

It is recommended that the tube should be operated with an anode voltage of the order of 5,000 volts, although the actual voltage employed depends to a large extent upon the brilliance of the picture required, as well as the scanning power available. The scanning power required is directly proportional to the anode voltage on the tube. It is recommended that in any case the tube should not be operated at a mean anode voltage of less than 4,500 volts, when screen colour considerations are of importance. A protective resistance of the order of 25,000 ohms should be connected between the anode terminal of the tube and the H.T. supply.

The heater supply should be provided by a separate winding on the transformer, and one end of this heater winding should be permanently connected to the cathode of the tube.

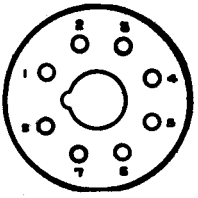
The associated equipment of the television receiver, particularly power transformers, must be adequately screened, or suitably positioned within the cabinet, so that stray fields will not cause distortion of the spot or a pattern on the screen. It is recommended that the tube should be mounted so that the rubber support for the bulb is at least 2″ from the screen end of the black coating on the inside of the bulb. If a rubber mask is employed, this should be mounted on the bulb and should not be allowed to touch any component from which leakage may occur. Alternatively, if the mask is fixed to the cabinet, an air gap should be provided between the bulb and the mask.

The position of the focusing coil which acts as a lens depends upon the size of the spot required. The spot size required is determined by the viewing distance chosen, as it is desirable that with the normal viewing distance employed a "flat field" should be obtained, i.e. that the individual lines of the raster should not be discernible. It is recommended that for a normal viewing distance of the order of six times the picture height, the distance between the modulator grid aperture and the centre of the focusing coil gap should be of the order of 32 mm. The neck length of the CRM.92 being rather shorter than that of the CRM.91 an "end gap" focusing coil should be employed having a gap of $\frac{1}{4}$″. Under these conditions approximately 580 ampere turns will be required for focusing. The actual value of the ampere turns required will depend to a certain extent on the shape of the iron circuit and the permeability of the iron. Moving the focusing coil closer to the grid aperture will increase the spot size and the ampere turns required for focusing, and, conversely, moving the focusing coil further away from the grid aperture will reduce the spot size and also reduce the ampere turns required for focusing. The above positions and ampere turns are given for an anode voltage of 5,000 volts. The deflecting coils should be mounted as close as possible to the bulb shoulder.

The high voltages at which the CRM 92 tube is operated are very dangerous. Great care should be taken in the design of the equipment to prevent the user coming into contact with these high voltages. Precautions should include the enclosing of high potential terminals ; the use of interlocking switches to break the primary circuit of the high voltage power supply when access to the apparatus is required ; and provision for discharging the high voltage condenser.

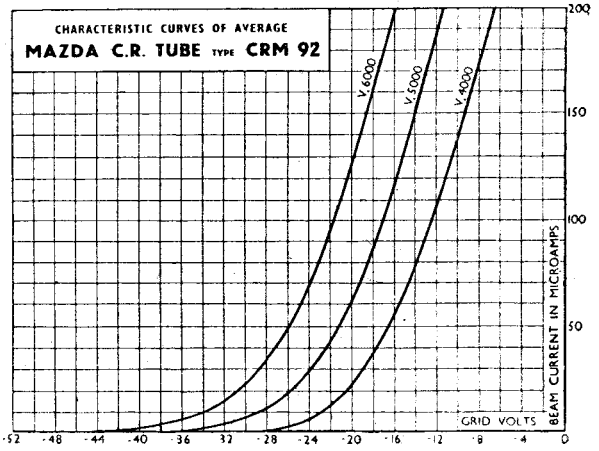
The handling of the CRM 92 tube in transportation, storage and use requires care, because the tube may be broken if subjected to sudden jars, scratches, or excessive strains or, if abused, the tube may be weakened so that it may subsequently implode owing to the pressure on the tube due to the vacuum within. The equipment in which the cathode ray tube is utilised should be designed to prevent the bulb from being damaged, and to protect the user from the effects of an implosion if the bulb is damaged or has been weakened in prior handling. The screen of the tube should be covered with a plate of safety glass, and goggles worn when handling the tube.

BASING.



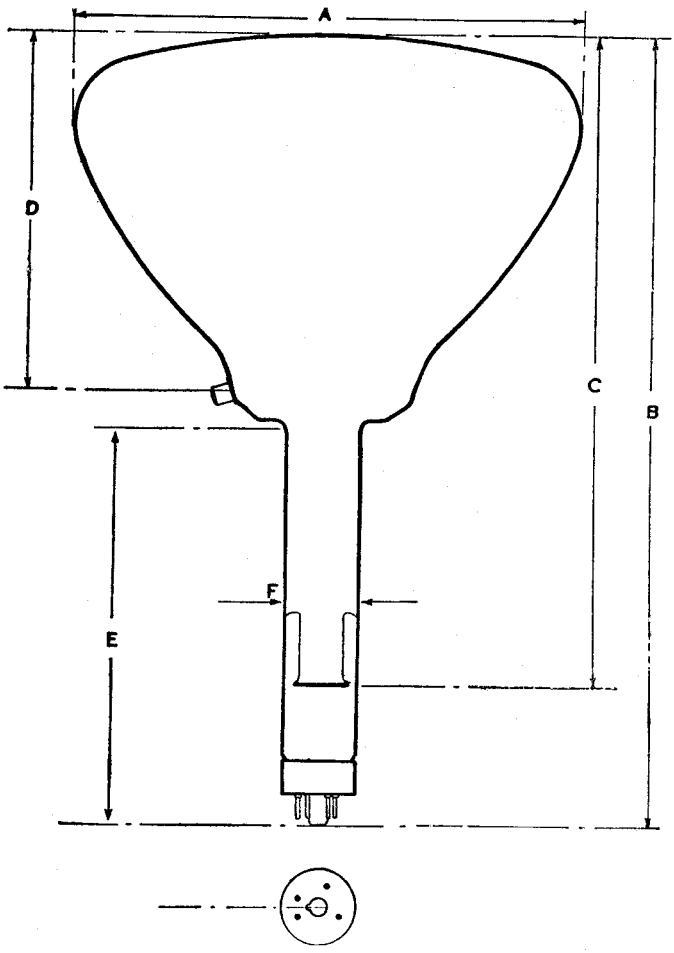
Pin No. 1. Heater.
2. Omitted.
3. Cathode.
4. Omitted.
5. Control Grid.
6. Omitted.
7. Omitted.
8 Heater.
Cap. Anode.

Viewed from the free end of the base.



MAZDA

OUTLINE DRAWING OF CRM 92



All dimensions in millimeters.

A 228. Max. B. 369±5 C. 309±2 D. 190 Max. E. 164 Nom. F. 35.0 Max

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MAZDA

D.1

TELEVISION SINGLE DIODE

RATING.

Heater Voltage	4·0
Heater Current (amps.)	0·2
Maximum Peak Anode Current (mA)	50
Maximum Peak Inverse Anode Voltage	500

TYPICAL OPERATION.

Vision Signal Detector—Half Wave.

Anode Load (R) (ohms)	3,700
Compensating Inductance (L) (μH)	140

$CR = 95{,}000 \text{ ohms} \times \mu\mu F. \qquad \frac{L}{CR^2} = 0{\cdot}4$

D.C. Restoring in Cathode Ray Tube.

Load Resistance (megohms)	1
Coupling Condenser (μF.)	0·005

INTER-ELECTRODE CAPACITIES.

Anode—Cathode	1·35 $\mu\mu$F.
Anode Heater	0·45 $\mu\mu$F.
Heater—Cathode	2·4 $\mu\mu$F.

The Hot Heater–to–Cathode capacity increases by 0·2 $\mu\mu$F.
The Hot Anode–to–Cathode capacity increases by 0·1 $\mu\mu$F.

DIMENSIONS.

Maximum Overall Length	46 mm.
Maximum Diameter	11 mm.

GENERAL.

The D.1 is a single diode specially designed and constructed for use in television circuits. The self-capacity has been reduced to a minimum by the use of short pins sealed through the glass bulb to which the electrodes are joined. It is important that leads are *not soldered direct to these pins* and a special anti-capacity holder should be used. The connections to the pins are given overleaf.

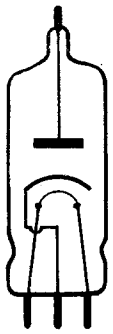
MAZDA

APPLICATION.

When used as a diode detector in television receivers it is recommended that the D1 should be connected with its cathode at the high potential end of the tuned circuit, and the load connected between the anode and the chassis. By using it in this position it is possible appreciably to reduce the stray capacities across the load circuit, and this in turn allows the use of a higher load resistance. It is recommended that in the average television receiver where no compensation is attempted in the diode load, a C.R. product of the order of 95,000 ohms should be employed in order to prevent phase shift troubles. This C.R. product should be used combined with an $\frac{L}{CR^2}$ of the order of 0·4.

D.C. Restoring to the Cathode Ray Tube Grid.

In the case of circuits using the high potential anode of the cathode ray tube at earth potential, the D1 will have to be fed through a separate winding on the transformer insulated to the high voltage. This secondary winding should be connected to the anode of the D1. This is necessary in order to prevent a high voltage being developed across the heater to cathode insulation of the valve. This high voltage may be caused by a low insulation resistance between the windings of the transformer. The circuit constants should also be calculated so as to ensure that the peak voltage across the D.C. restoring diode load resistance does not exceed 500 volts on switching on.



D.I.

The drawing shows the connections to the pins.

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

DD.41

A.C. MAINS DOUBLE DIODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	0·5

INTER-ELECTRODE CAPACITIES.

*Diode 1 to Earth	4·0 $\mu\mu$F
*Diode 2 to Earth	4·25 $\mu\mu$F
Diode 1 to Diode 2	0·06 $\mu\mu$F

* " Earth " denotes the remaining earthy potential electrodes H. and M. joined to cathode.

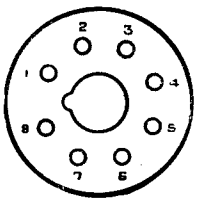
DIMENSIONS.

Maximum Overall Length	85 mm.
Maximum Diameter	32 mm.

GENERAL.

The DD.41 is an indirectly heated double diode for rectification of H.F. signals and for providing automatic volume control in A.C. Mains receivers. The valve is not suitable for H.T. rectification. Each diode has its own separate cathode and is completely screened from the other by a shield which is brought out to a separate pin. This complete independence between the diode systems in the valve offers increased flexibility in the circuit design. The bulb is of small dimensions, and the valve is fitted with a Mazda Octal Base, the connexions to which are given below.

BASING.



Viewed from the free end of the base.

Pin No. 1. Heater.
2. Cathode 1.
3. Diode 1.
4. Shield.
5. Diode 2.
6. Metallising.
7. Cathode 2.
8. Heater.

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EDISWAN RADIO

DD.101

A.C./D.C. MAINS DOUBLE DIODE

RATING.

Heater Voltage	10·0
Heater Current (Amps.)	0·2

INTER-ELECTRODE CAPACITIES.

*Diode 1 to Earth	5·0 $\mu\mu$F
*Diode 2 to Earth	4·6 $\mu\mu$F
Diode 1 to Diode 2	0·06 $\mu\mu$F

* "Earth" denotes the remaining earthy potential electrodes, H. and M. joined to cathode.

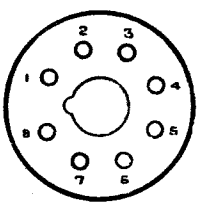
DIMENSIONS.

Maximum Overall length	85 mm.
Maximum Diameter	32 mm.

GENERAL.

The DD.101 is an indirectly heated double diode for rectification of H.F. signals and for providing automatic volume control in A.C./D.C. mains receivers. The valve is not suitable for H.T. rectification. Each diode has its own separate cathode and is completely screened from the other by a shield which is brought out to a separate pin. This complete independence between the diode systems in the valve offers increased flexibility in the circuit design. The bulb is of small dimensions, and the valve is fitted with a Mazda Octal Base, the connexions to which are given below.

BASING.



Viewed from the free end of the base.

Pin No. 1. Heater.
2. Cathode.
3. Diode 1.
4. Shield.
5. Diode 2.
6. Metallising.
7. Cathode 2.
8. Heater.

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EDISWAN RADIO

MAZDA

DD.207

BATTERY DOUBLE DIODE

RATING.

Filament Voltage	2·0
Filament Current (Amps.)	0·075

INTER-ELECTRODE CAPACITIES.

Diode 1 to Filament	4·0 $\mu\mu$F.
Diode 2 to Filament	3·25 $\mu\mu$F.
Diode 1 to Diode 2	0·8 $\mu\mu$F.

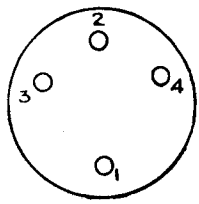
DIMENSIONS.

Maximum Overall Length	100 mm.
Maximum Diameter	39 mm.

GENERAL.

The DD.207 is a double diode for use in battery operated receivers and enables a very high diode efficiency to be obtained. The bulb is metallised, and the valve is fitted with a standard 4-pin base, the connexions to which are given below.

BASING.



Viewed from the free end of the base.

Pin No. 1. Diode 1.
2. Diode 2.
3. Filament.
4. Filament.

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EDISWAN RADIO

MAZDA

DD.620

AC/DC MAINS DOUBLE DIODE

RATING.

Heater Voltage	6·0
Heater Current (amps.)	0·2
Maximum Rectified Current (mA)	1·0

INTER-ELECTRODE CAPACITIES.

*Diode 1 to Earth	3·5 $\mu\mu$F.
*Diode 2 to Earth	3·0 $\mu\mu$F.
Diode 1 to Diode 2	0·25 $\mu\mu$F.

* " Earth " denotes cathode and heater connected together.

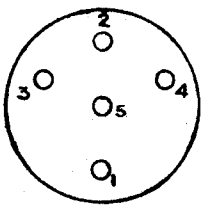
DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	41 mm.

GENERAL.

The DD.620 is an indirectly heated double diode valve for rectification of H.F. signals and for providing automatic volume control in A.C./D.C. mains receivers. The valve is not suitable for H.T. rectification. The valve is fitted with a standard 5-pin base, the connections to which are given below.

BASING.



Viewed from the free end of the base.

Pin No. 1. Diode 2.
2. Diode 1.
3. Heater.
4. Heater.
5. Cathode.

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

EDISWAN RADIO

EDISWAN

VACUUM THERMAL DELAY SWITCH

TYPE DLS.10

RATING.

Filament Voltage	4.0
Filament Current (approx. at 4 v.)	1.4
Delay Time at 4 v. (secs.)	min. 30 : max. 90
Maximum Peak Current (Low Voltage Rating)	6 amps. at 250 v.
Maximum Peak Current (High Voltage Rating)	200 mA at 2,000 v.

DIMENSIONS.

Maximum Overall Length	116 mm.
Maximum Diameter	45 mm.

GENERAL.

This vacuum delay switch is designed on a new principle intended to overcome the disadvantages of the ordinary bi-metallic strip delay switch. The operating parts are enclosed in a glass bulb which is evacuated, thus rendering the action immune from atmospheric influence.

A small filament is mounted vertically on a glass stem, and adjacent to it is a thin strip of special thermostatic metal. Attached to this strip is a springy contact which is normally clear of a fixed contact. On application of current to the filament the metal strip is heated by radiation and curves away from the filament. This springy contact then presses firmly against the fixed contact and remains in position as long as the heater is alight.

On switching off the heater the contact is broken after a lapse of some seconds. The time taken for the contact to close can be varied by inserting a series resistance in the heater circuit to reduce the temperature.

APPLICATION.

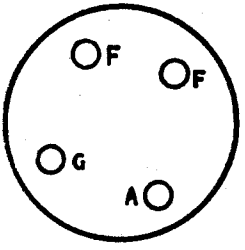
This delay switch is recommended for use with all mercury vapour rectifiers in order to provide the necessary delay before the anode voltage is applied. The normal delay time is 60 seconds but the periods of delay up to approximately 1½ minutes can be arranged for if necessary. The heater should be connected across the rectifier filament (4v.) and the contacts on the pins A and G are connected in the H.T. positive supply.

It is essential that negligible potential difference should exist between the filament and moving contact, or trouble may be experienced due to thermionic emission. Alternatively the switch contacts may be connected in the primary of the H.T mains transformer.

NOTE.

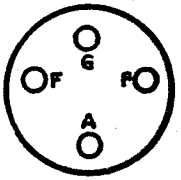
This switch is normally intended to operate at 4.0 volts and higher values of heater voltage will affect the life adversely.

BASING.

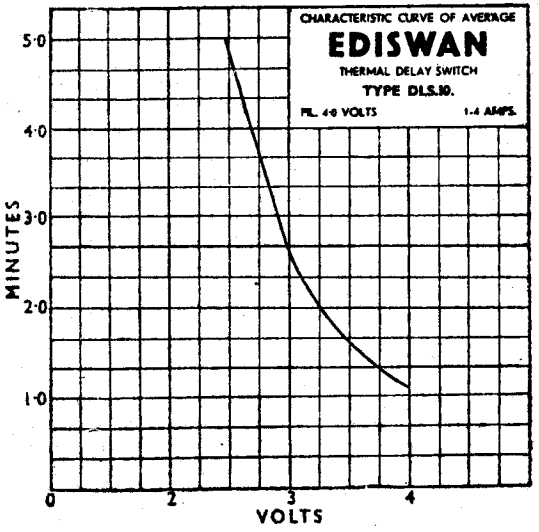


DLS.10.

American U.X. (made to order).



B.V.A. 4-pin base (Standard)



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MAZDA

DLS15 & DLS16

VACUUM THERMAL DELAY SWITCHES

GENERAL

The DLS.15 and DLS.16 are designed for similar applications as the DLS.10 but are intended to fill the demand for a delay switch of reduced dimensions.

RATING

		DLS.15	DLS.16
Filament Voltage (volts)	V_f	4	6.3
Filament Current (amps)	I_f	.75	.48
Delay Time (secs)		min. 30 - max. 90	
Maximum Mean Current (Low Voltage Rating)	I_{pk}	5 amps @ 240 v.	
Maximum Mean Current (High Voltage Rating)	I_{pk}	100 m/a @ 1,000 v.	

DIMENSIONS

Maximum Overall Length	(mm)	60 N.I.P. *	
Maximum Diameter	(mm)	32	
Maximum Height	(mm)	60	65

* Not Including Pins

MOUNTING POSITION - Unrestricted.

BASE

DLS.15 B.V.A. 4 pin	DLS.16 International Octal Base
Pin 1 - Fixed Contact	Pin 1 - -
Pin 2 - Moving Contact	Pin 2 - Filament
Pin 3 - Filament	Pin 3 - -
Pin 4 - Filament	Pin 4 - Moving Contact
	Pin 5 - -
	Pin 6 - Fixed Contact
	Pin 7 - -
	Pin 8 - Filament

IMPORTANT NOTE

To prevent any potential difference existing between the moving contact and heater, the two should be tied externally.

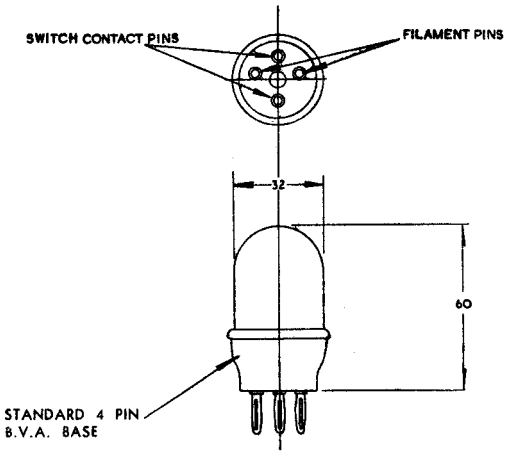
DLS15/16

MAZDA

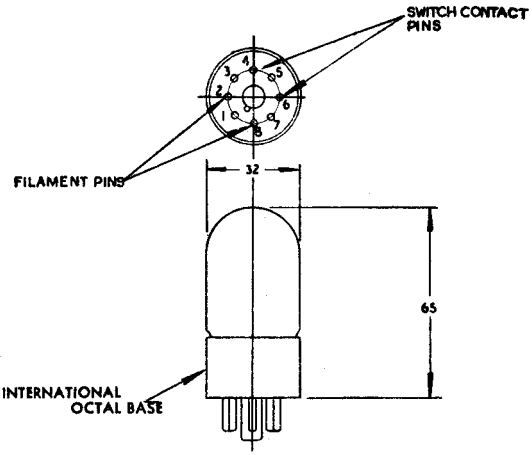
DLS15 & DLS16

VACUUM THERMAL DELAY SWITCHES

DLS.15



DLS.16



EDISWAN

DLS17

VACUUM THERMAL DELAY SWITCH

GENERAL

The DLS17 is a Vacuum Thermal Delay Switch with an AC switch rating of 6 amps at 250 volts, or 200 mA at 1,000 volts. It has a heater rating of 1·5 amps at 4 volts and switch closure delay times of from 30 to 90 seconds, the switch being open when cold.

RATING

Heater Voltage	(volts)	V_h	4·0
Heater Current	(amps)	I_h	1·5
Minimum Delay Time	(secs)	$t_{sd(min)}$	30
Maximum Delay Time	(secs)	$t_{sd(max)}$	90
Maximum Switch Current at 250 volts r.m.s. (AC)	(amps)	$I_{(rms)max}$	6
Maximum Switch Current at 1 kV r.m.s.(AC)	(mA)	$I_{(rms)max}$	200

DIMENSIONS

Maximum Overall Length	(mm)	150
Maximum Seated Height	(mm)	120
Maximum Diameter	(mm)	45
Approximate Nett Weight	(ozs)	1½
Approximate Packed Weight	(ozs)	2½

MOUNTING POSITION—Unrestricted

DLS17

EDISWAN

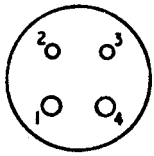
DLS17

VACUUM THERMAL DELAY SWITCH

OPERATION

See "Application notes on Vacuum Thermal Delay Switches"

BASE—UX 4 pin



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Fixed Contact	cf
Pin 3	Moving Contact	cm
Pin 4	Heater	h

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SIEMENS EDISON SWAN LIMITED

EDISWAN

DLS19

VACUUM THERMAL DELAY SWITCH

GENERAL

The DLS19 is a miniature-based Vacuum Thermal Delay Switch with an AC switch rating of 2 amps at 250 volts, or 100 mA at 500 volts. It has a heater rating of 0·5 amps at 6·3 volts, and switch closure delay times of from 35 to 70 seconds, the switch being open when cold. It is compensated to maintain a constant closure delay time in the ambient temperature range— 40°C to +85°C.

RATING

Heater Voltage	(volts)	V_h	6·3
Heater Current	(amps)	I_h	0·5
Minimum Delay Time	(secs)	$t_{sd(min)}$	35
Maximum Delay Time	(secs)	$t_{sd(max)}$	70
Maximum Switch Current at 250 volts r.m.s. (AC)	(amps)	$I_{(rms)max}$	2
Maximum Switch Current at 500 volts r.m.s. (AC)	(mA)	$I_{(rms)max}$	100
Maximum Switch Current at 250 volts (DC)	(amps)	$I_{(DC)max}$	1
Maximum Heater to Contact Voltage	(volts)	V_{h-c}	200

DIMENSIONS

Maximum Overall Length	(mm)	54
Maximum Seated Height	(mm)	48
Maximum Diameter	(mm)	19
Approximate Nett Weight	(ozs)	$\frac{1}{4}$
Approximate Packed Weight	(ozs)	$\frac{1}{2}$

MOUNTING POSITION—Unrestricted

April 1958 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

DLS19

EDISWAN

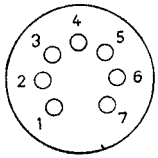
DLS19

VACUUM THERMAL DELAY SWITCH

OPERATION

See "Application notes on Vacuum Thermal Delay Switches"

BASE—B7G



Viewed from free end of pins

VALVE HOLDER—Ediswan Clix VH337/701 and VH437/701 series

CONNECTIONS

Pin 1	Heater	h
Pin 2	No Connection	NC
Pin 3	Moving Contact	cm
Pin 4	Fixed Contact	cf
Pin 5	No Connection	NC
Pin 6	No Connection	NC
Pin 7	Heater	h

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SIEMENS EDISON SWAN LIMITED

DLS23

EDISWAN

DLS23

VACUUM THERMAL DELAY SWITCH

GENERAL

The DLS23 is a Vacuum Thermal Delay Switch with an AC switch rating of 5 amps at 240 volts, or 100 mA at 1,000 volts. It has a heater rating of 1 amp at 2.5 volts and a switch closure delay time of from 30 to 90 seconds, the switch being open when cold.

RATING

Heater Voltage	(volts)	V_h	2.5
Heater Current	(amps)	I_h	1.0
Minimum Delay Time	(secs)	$t_{sd(min)}$	30
Maximum Delay Time	(secs)	$t_{sd(max)}$	90
Maximum Switch Current at 240 volts r.m.s. (AC)	(amps)	$I_{(rms)max}$	5
Maximum Switch Current at 1 kV r.m.s. (AC)	(mA)	$I_{(rms)max}$	100

DIMENSIONS

Maximum Overall Length	(mm)	65
Maximum Seated Height	(mm)	60
Maximum Diameter	(mm)	32
Approximate Nett Weight	(ozs)	1
Approximate Packed Weight	(ozs)	$2\frac{1}{2}$

MOUNTING POSITION—Unrestricted

April 1958 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

DLS23

EDISWAN

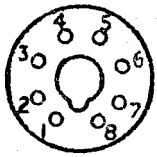
DLS23

VACUUM THERMAL DELAY SWITCH

OPERATION

See "Application Notes on Vacuum Thermal Delay Switches"

BASE—International Octal



Viewed from free end of pins

VALVE HOLDER

Ediswan Clix VH330/8, VH238/8, VH248/8

CONNECTIONS

Pin 1	No Connection	NC
Pin 2	Heater	h
Pin 3	Heater	h
Pin 4	No Connection	NC
Pin 5	Fixed Contact	cf
Pin 6	No Connection	NC
Pin 7	Moving Contact	cm
Pin 8	No Connection	NC

April 1958 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

DLS24

EDISWAN

DLS24

VACUUM THERMAL DELAY SWITCH

REVERSE ACTION

GENERAL

The DLS24 is a Miniature based Reverse Action Vacuum Thermal Delay Switch having AC switch ratings of 1 amp at 240 volts or 200 mA at 500 volts. It has a heater rating of 0.5 amps at 6.3 volts and a switch opening delay time of from 30 to 90 seconds, the switch being closed when cold. It is compensated to maintain a constant opening delay time in the ambient temperature range —40°C to +85°C.

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.5
Minimum Delay Time (secs)	$t_{sd(min)}$	30
Maximum Delay Time (secs)	$t_{sd(max)}$	90
Maximum Switch Current at 240 volts (r.m.s.) (AC) (amps)	$I_{(r.m.s.)\ max}$	1.0
Maximum Switch Current at 500 volts (r.m.s.) (AC) (mA)	$I_{(r.m.s.)\ max}$	200
Maximum Heater to Contact Voltage (volts)	$V_{h\text{-}c}$	200
Heater Resistance (cold) (ohms)	r_h (min)	1.3

DIMENSIONS

Maximum Overall Length	(mm)	54
Maximum Seated Height	(mm)	48
Maximum Diameter	(mm)	19
Approximate Nett Weight	(ozs)	$\frac{1}{4}$
Approximate Packed Weight	(ozs)	$\frac{1}{2}$

MOUNTING POSITION—Unrestricted

OPERATION

See 'Application notes on Vacuum Thermal Delay Switches.'

May 1960 Issue 1/7

RADIO & ELECTRONIC COMPONENTS DIVISION

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

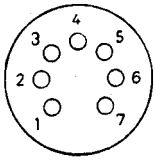
DLS24

EDISWAN

DLS24

VACUUM THERMAL DELAY SWITCH
REVERSE ACTION

BASE—B7G



Viewed from free end of pins

VALVE HOLDER—Ediswan Clix VH337/702 and VH437/702 series.

CONNECTIONS

Pin 1	Heater	h
Pin 2	No Connection	NC
Pin 3	Moving Contact	cm
Pin 4	Fixed Contact	cf
Pin 5	No Connection	NC
Pin 6	No Connection	NC
Pin 7	Heater	h

May 1960 Issue 1/7

RADIO & ELECTRONIC COMPONENTS DIVISION

ASSOCIATED ELECTRICAL INDUSTRIES LTD.

EDISWAN

DLS.D

DLS.D

VACUUM THERMAL DELAY SWITCH

GENERAL

This vacuum switch is a specially designed double action delay switch with the operating parts enclosed in an evacuated glass bulb thereby rendering the action immune from atmospheric influences.

ACTION

The filament is mounted adjacent to a centre movable contact with one side connected to this contact and then to the centre pin of the 5 pin base.

When the filament is cold the contact is closed between the centre pin on the base and a fixed contact which is in connexion with the Anode pin of the base.

When the filament is Hot the contact between the Anode pin and the centre pin opens and contact is then made between the centre pin and the grid pin.

The delay time for the opening of the first contact and the closing of the second contact is 35 secs. approximately while that for the return action on switching the filament off is 85 secs. It will be seen therefore that the maximum time for the complete cycle is of the order of 120 secs.

RATING

Filament Voltage (volts)	4.0
Filament Current (amps)	1.5
Delay Time at 4 volts (secs) for closure of 2nd contact	35
Time for complete cycle (secs)	120
Maximum Peak Current @ 250v. (amps)	5
Maximum Peak Current @ 500v.	200 m/A

DIMENSIONS

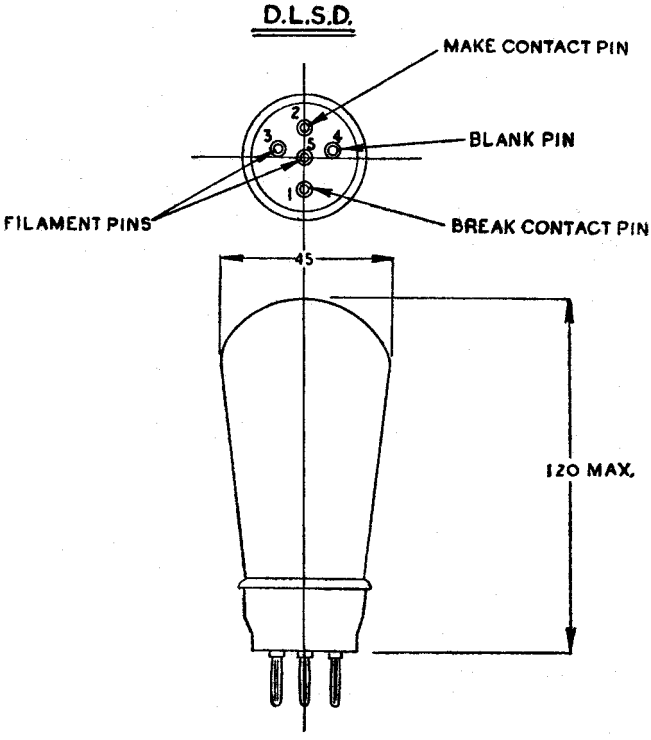
Maximum Overall Length (mm)	• 116 N.I.P.
Maximum Diameter (mm)	45

• Not including Pins

EDISWAN

D.L.S.D

VACUUM THERMAL DELAY SWITCH



ALL DIMS IN m.m. UNLESS STATED OTHERWISE

July 1949 RADIO DIVISION Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

DRG36/2

DRG36/2

TELEPHONE LINE PROTECTOR

GENERAL

The DRG36/2 is a Neon/Helium filled Telephone Line Protector. It is intended for use in discharging limited surges on a pair of Telephone lines, and is especially suitable for use with underground lines.

RATING

Minimum Striking Voltage (volts r.m.s.)	$V_{ign(min)}$	130
Maximum Glow to Arc Transition Voltage Line resistance 60 ohms (volts r.m.s.)		250
Maximum Glow to Arc Transition Current per line (amps)		1.0
Maximum Current per line (amps)	$I_{sur(max)}$	7.5
Maximum Charge passed at Maximum Current through both lines simultaneously (coulombs)		150
Breakdown Delay at 3000 volts (Statistical Max) (Micro Seconds)		5*

* To ensure regularity of striking, each tube contains a radioactive source for ionising purposes.

DIMENSIONS

Maximum Overall Length	(mm)	158
Maximum Diameter	(mm)	35
Maximum Seated Height	(mm)	133
Approximate Nett Weight	(ozs)	2½
Approximate Packed Weight	(ozs)	3¼

DRG36/2

EDISWAN

DRG36/2

TELEPHONE LINE PROTECTOR

MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION

One protector is installed at each end of a telephone loop. The two line electrodes are connected across the pair of lines and the single electrode is earthed in the most suitable way depending on the terrain. At normal carrier plus signal voltages the tube is inert and imposes no load upon the line.

A surge of voltage from an external source (e.g. parallel power lines, electric storms, etc.) induced on the telephone lines causes the device to strike within microseconds thus providing a low impedance path to earth until the surge is cleared. Clearance of both lines is simultaneous since each is connected to the same tube. After clearing a surge the tube again becomes inert until another surge is induced.

Small surges are discharged through a red neon glow discharge carrying up to 0.5 amp.

Larger surges cause the tungsten arc to strike and currents of 0.5A to 15A are borne without damage. Larger surges giving currents greater than 15 Amps will be cleared but, if prolonged, may damage or destroy the tube.

Limiting impedance (provided the earthing is efficient) is that of the telephone line between the point where the surge strikes and the Telephone Line Protector (i.e. 300 ohms maximum for a typical loop).

When used on overhead lines the tube may be placed in parallel with a spark gap which will discharge the very heavy surges due to lightning strokes preserving the tube for the clearing of more limited surges.

September 1959 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

EDISWAN

DRG36/2

TELEPHONE LINE PROTECTOR

DRG36/2

TOP CAP—Thumb Screw Terminal 2BA.

BASE—Edison Screw.

CONNECTIONS

Screw Centre	Line Electrode 1
Screw Thread	Line Electrode 2
Top Cap	Earth Electrode

September 1959 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

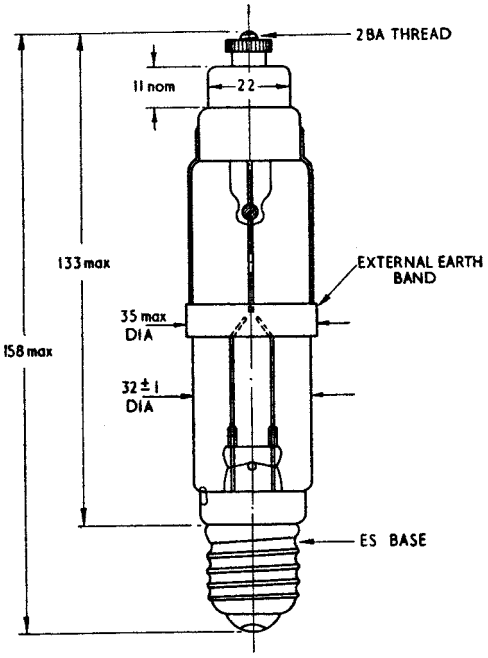
SIEMENS EDISON SWAN LIMITED

DRG36/2

EDISWAN

DRG36/2

TELEPHONE LINE PROTECTOR



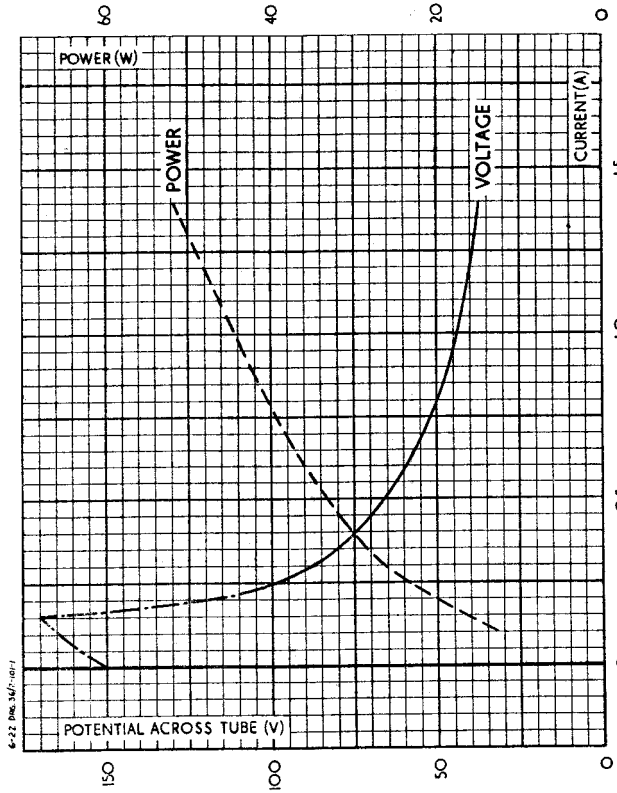
All dimensions in m.m.

EDISWAN

DRG36/2

TELEPHONE LINE PROTECTOR

AVERAGE CHARACTERISTIC CURVES: V,P/I



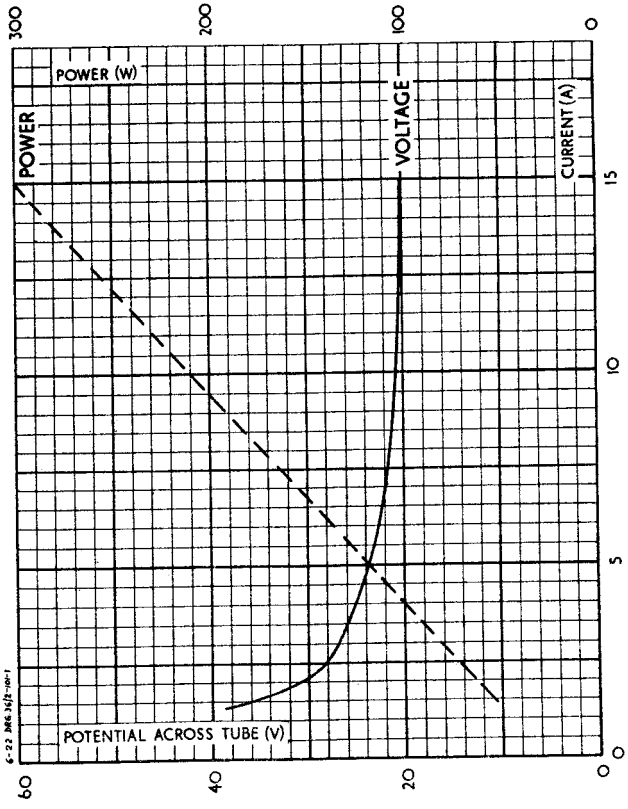
DRG36/2

EDISWAN

DRG36/2

TELEPHONE LINE PROTECTOR

AVERAGE CHARACTERISTIC CURVES: V,P/I



September 1959 INDUSTRIAL VALVE & CRT DIVISION Issue 1/7

SIEMENS EDISON SWAN LIMITED

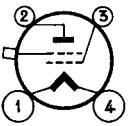
MAZDA

E 1

ÉLECTROMÈTRE SIMPLE

Filament: tungstène thorié

Tension filament	2,5 Volts
Courant filament	0,085 Amp.
Hauteur maximum	160 mm
Diamètre maximum	40 mm
Encombrement	K. I-AC.I
Culot	CL.173
Brochage	4. A-CA



Broches :

N°1 – Filament.
N°2 – Anode.

Broches :

N°3 – Grille n°1.
N°4 – Filament.

La grille n°2 est connectée au chapeau du sommet.
Broches du culot, face à l'Observateur.

CONDITIONS LIMITES DE FONCTIONNEMENT

Tension anode	9 Volts
Tension grille n°1	6 Volts
Tension grille n°2	– 2 Volts

EXEMPLE TYPIQUE D'UTILISATION

Tension d'anode	9 Volts
Tension grille n°1	6 Volts
Tension grille n°2	– 4 Volts
Courant anode	140 µA
Courant grille n°1	200 µA
Courant grille n°2	5.10^{-15} A
Résistance d'isolement de la grille n°2	10^{14} à 10^{16} Ohms
Pente (pour chaque élément)	30 µA/V

POUR TOUT RENSEIGNEMENT COMPLÉMENTAIRE SUR L'ÉLECTROMÈTRE E1 SE REPORTER A LA BROCHURE CONCERNANT LES "TUBES ELECTROMETRES" MAZDA.

Voir schémas d'utilisation page 5-751-2

REPRODUCTION INTERDITE

E I

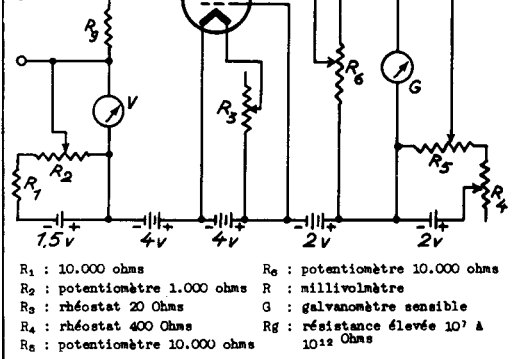
MAZDA

E I

ÉLECTROMÈTRE SIMPLE

SCHEMAS D'UTILISATION

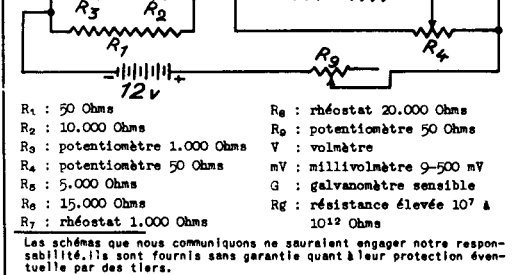
1 – MONTAGE SIMPLE.



R_1 : 10.000 ohms
R_2 : potentiomètre 1.000 ohms
R_3 : rhéostat 20 Ohms
R_4 : rhéostat 400 Ohms
R_5 : potentiomètre 10.000 ohms
R_6 : potentiomètre 10.000 ohms
R : millivolmètre
G : galvanomètre sensible
Rg : résistance élevée 10^7 à 10^{12} Ohms

II – MONTAGE STABILISE

permettant d'éviter la dérive du zéro de l'instrument de mesure, due aux variations de tension de l'alimentation



R_1 : 50 Ohms
R_2 : 10.000 Ohms
R_3 : potentiomètre 1.000 Ohms
R_4 : potentiomètre 50 Ohms
R_5 : 5.000 Ohms
R_6 : 15.000 Ohms
R_7 : rhéostat 1.000 Ohms
R_8 : rhéostat 20.000 Ohms
R_9 : potentiomètre 50 Ohms
V : volmètre
mV : millivolmètre 9–500 mV
G : galvanomètre sensible
Rg : résistance élevée 10^7 à 10^{12} Ohms

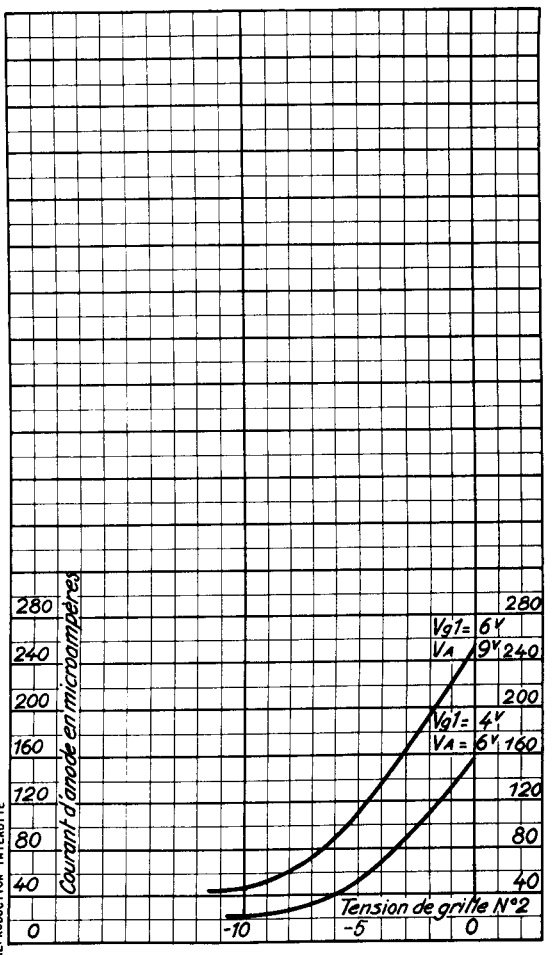
Les schémas que nous communiquons ne sauraient engager notre responsabilité. Ils sont fournis sans garantie quant à leur protection éventuelle par des tiers.

REPRODUCTION INTERDITE

MAZDA

E I

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION GRILLE N° 2



REPRODUCTION INTERDITE

MAZDA

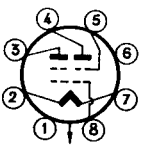
E2

E 2

ELECTROMÈTRE DOUBLE

Filament à oxydes	
Tension filament	2 Volts C.C.
Courant filament	0,1 Amp.
Hauteur maximum	140 mm
Diamètre maximum	40 mm
Encombrement	K.2 - 0.1
Culot	CL. 218
Brochage	6.0 - UA

Broches:
N°1- Non connectée.
N°2- Filament (-).
N°3- Anode de mesure.
N°4- Anode de la partie non isolée.



Broches:
N°5- Grille n°2 de la partie non isolée.
N°6- Non connectée.
N°7- Filament(+).
N°8- Grille n°1 commune aux deux éléments

La grille n°2 à fort isolement est connectée au sommet de l'ampoule (connexion souple).
Broches du culot, face à l'observateur

CONDITIONS LIMITES DE FONCTIONNEMENT

Tension anode	9 Volts max.
Tension grille n°1	6 Volts max.
Tension grille n°2	-2 Volts max.

EXEMPLE TYPIQUE D'UTILISATION

Tension anode	9 Volts
Tension grille n°1	6 Volts
Tension grille n°2	-4 Volts
Courant anode (pour chaque éléments)	130 µA
Courant grille n°1	200 µA
Courant grille n°2 de mesure	$5,10^{-15}$ A
Résistance d'isolement grille n°2 de mesure	10^{14} à 10^{16} ohms
Coefficient d'amplification	1,2
Pente (pour chaque élément)	30 µA/V

Voir schémas d'utilisation page 5.752-2

REPRODUCTION INTERDITE

Pour tout renseignement complémentaire sur l'électromètre E2 se reporter à la brochure concernant les "Tubes Electromètres" MAZDA.

E2

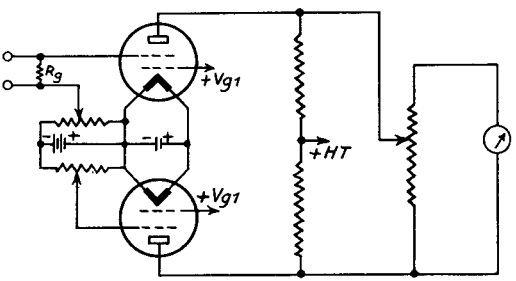
MAZDA

E 2

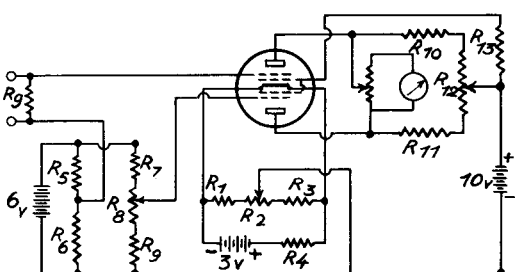
ELECTROMÈTRE DOUBLE

SCHEMAS D'UTILISATION

I - MONTAGE EN PONT



II - MONTAGE UTILISANT UN GALVANOMETRE SENSIBLE



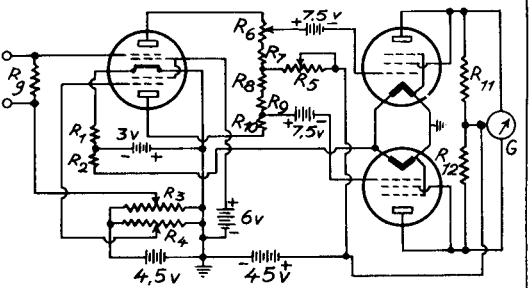
R 1 :	200 ohms	R 6 :	20.000 ohms	R 11 :	5.000 ohms
R 2 :	100 ohms potentiomètre	R 7 :	10.000 ohms	R 12 :	potentiomètre 100 ohms
R 3 :	200 ohms	R 8 :	potentiomètre	R 13 :	15.000 ohms
R 4 :	10 ohms	R 9 :	10.000 ohms	Rg :	résistance 10^7 à 10^{13} ohms
R 5 :	4.000 ohms	R 10 :	5.000 ohms	G :	galvanomètre sensible

Les schémas que nous communiquons ne sauraient engager notre responsabilité. Ils sont fournis sans garantie quant à leur protection éventuelle par des tiers.

REPRODUCTION INTERDITE

ELECTROMÈTRE DOUBLE

III - MONTAGE TRANSPORTABLE UTILISANT UN APPAREIL DE MESURE PEU SENSIBLE



R 1 :	100 ohms	R 5 :	100.000 ohms potentiomètre	R 9 :	25.000 ohms
R 2 :	30 ohms	R 6 :	50.000 ohms potentiomètre	R 10 :	25.000 ohms
R 3 :	10.000 ohms potentiomètre	R 7 :	300.000 ohms	R 11 :	10.000 ohms
R 4 :	10.000 ohms potentiomètre	R 8 :	300.000 ohms	R 12 :	10.000 ohms

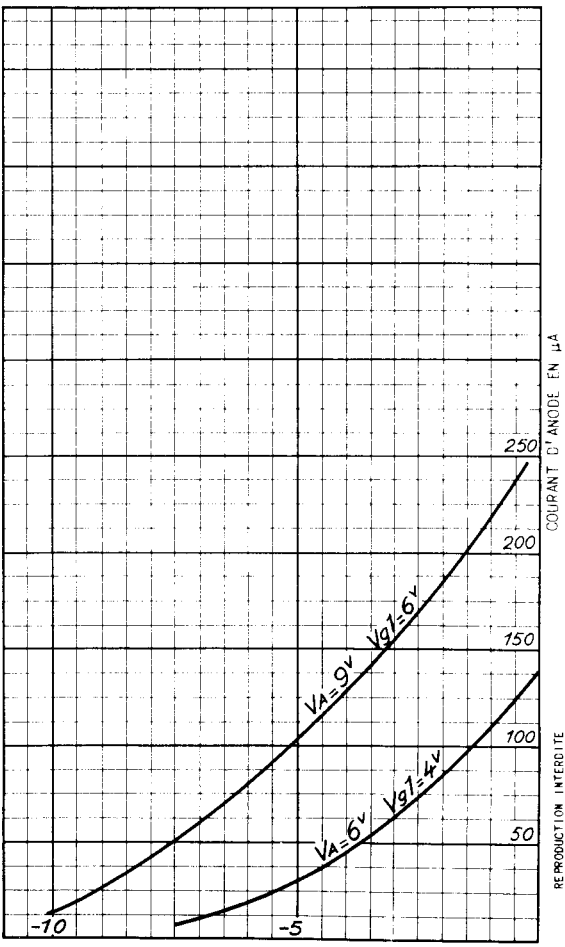
REPRODUCTION INTERDITE

E2

MAZDA

E 2

COURBES DU COURANT D'ANODE EN FONCTION DE LA TENSION GRILLE N° 2



REPRODUCTION INTERDITE

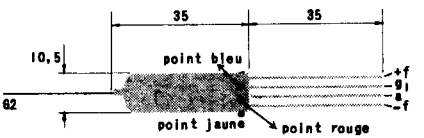
MAZDA

E 5

E5

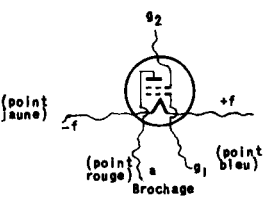
ELECTROMÈTRE TÉTRODE SUBMINIATURE

Cathode à chauffage direct (filament à oxydes)	
Tension filament	1,25 volt
Intensité filament	0,01 Amp.
Encombrement :	Ø 10,5 × 35 max.
Sorties par fils souples	
point jaune : – filament	
point rouge : anode	
point bleu : grille n°1	
Côté connexion unique : grille n°2	
Brochage	4.S.CC
Position de montage	indifférente



Encombrement

NOTA :
Pour les mesures le point de référence est le pôle négatif du filament.



Brochage

CONDITIONS MAXIMA D'UTILISATION

Tension d'anode	+ 9 volts
Tension de grille n°1	+ 4,5 volts
Tension de grille n°2	– 2 volts

Exemple typique d'utilisation

Tension anode	+ 6 volts
Tension grille n°1	+ 4 volts
Tension grille n°2	– 3 volts
Courant d'anode	30 µA
Courant cathodique max.	250 µA
Résistance équivalente d'entrée :	10^{15} ohms min.
Courant de grille n°2 :	10^{-14} A max.
Pente :	15 µA/V
Coefficient d'amplification :	1,2
Résistance interne :	80 KΩ

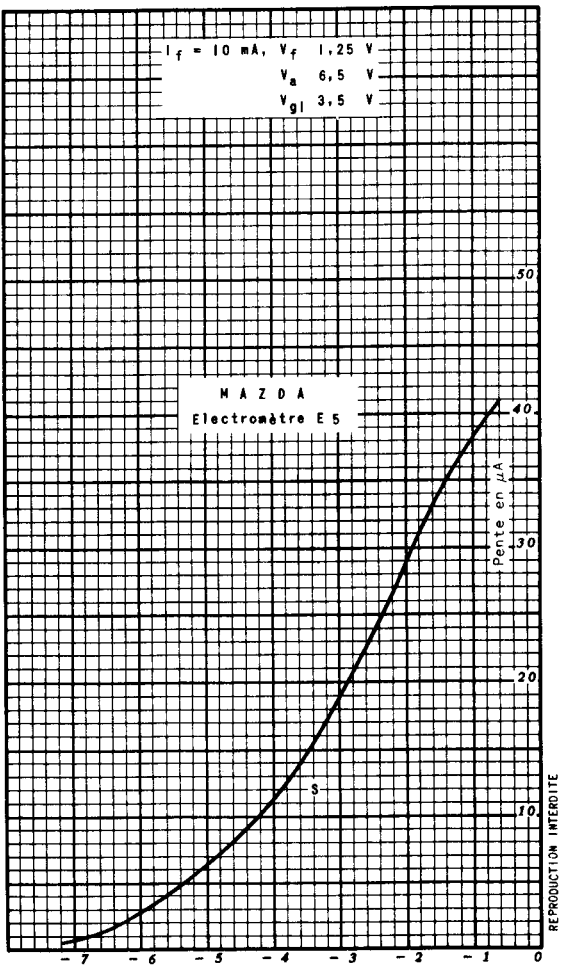
REPRODUCTION INTERDITE

E5

MAZDA

E 5

COURBE DE LA PENTE EN FONCTION
DE LA TENSION DE GRILLE N° 2



Tension de grille n° 2 en volts

REPRODUCTION INTERDITE

MAZDA

E6

E6

DOUBLE TETRODE SUBMINIATURE
A SORTIES DE FILS
APPLICATIONS ELECTROMETRIQUES AVEC MONTAGE EN PONT

Le E6 comporte un filament unique à faible consommation et, de chaque côté du filament, une grille n°1 à charge d'espace, une grille n°2 de commande et une anode. Une des grilles n°2 est connectée à une sortie par fil placée au sommet de l'ampoule: c'est la grille de mesure. L'autre grille n°2 sert à l'équilibrage des montages symétriques en pont.
Le E6 est traité intérieurement et extérieurement afin aue la grille de mesure ait une résistance d'isolement très élevée et un courant total inverse très faible.

Caractéristiques générales

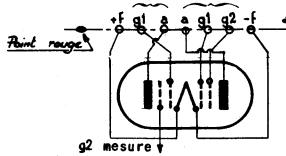
Chauffage direct

Tension continue de filament	1,25 V
Courant filament	20 mA
Diamètre de l'ampoule	10 mm max.
Hauteur de l'ampoule	45 mm max.

Brochage : En partant du point rouge

Sortie n°1	=	+filament	–
" n°2	=	grille n°1	– élément de mesure
" n°3	=	anode	– élément de mesure
" n°4	=	anode	– élément d'équilibrage
" n°5	=	grille n°1	– élément d'équilibrage
" n°6	=	grille n°2	– élément d'équilibrage
" n°7	=	–filament	

Sortie au sommet de l'ampoule: grille de commande élément de mesure.



LIMITES MAXIMALES D'UTILISATION

Système des limites absolues

Tension continue d'anode	10 V max.
Tension continue de grille n°1	5 V max.
Tension continue négative de grille n°2	2 V min.
	10 V max.
Tension filament	1,5 V max.
Courant de cathode	1 mA max.

CONDITIONS NORMALES D'UTILISATION

Tension filament	1,25 V
Courant filament	20 mA
Tension continue d'anode	4,5 V
Tension continue de grille n°1	3 V
Tension continue de grille n°2	–3 V
Courant d'anode	50 µA
Courant de grille n°1	200 µA
Pente	25 µA/V
Résistance équivalente d'entrée de la grille de mesure	>10^{15} Ω
Courant total inverse de la grille de mesure	<10^{-14} A

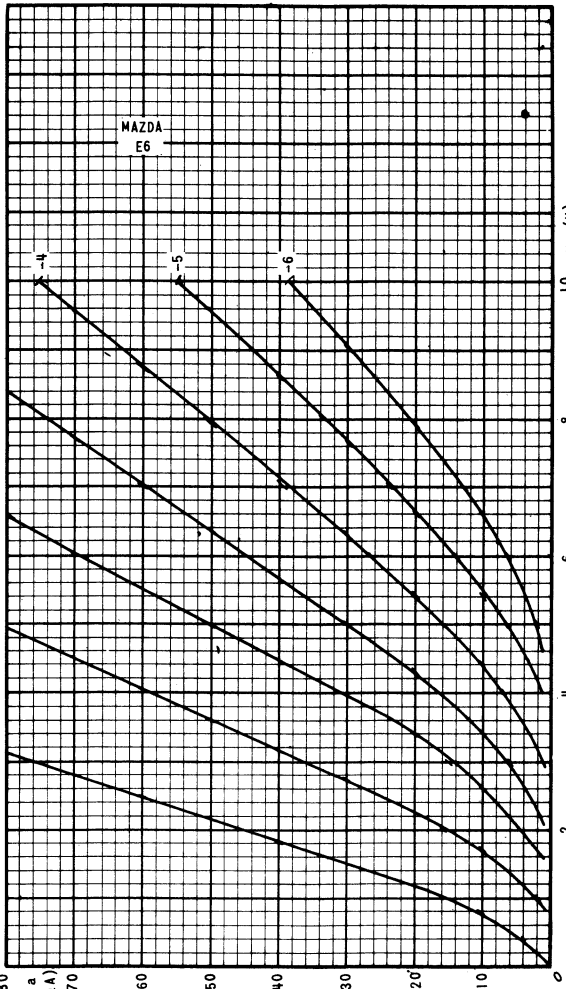
REPRODUCTION INTERDITE

E6

MAZDA

E6

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



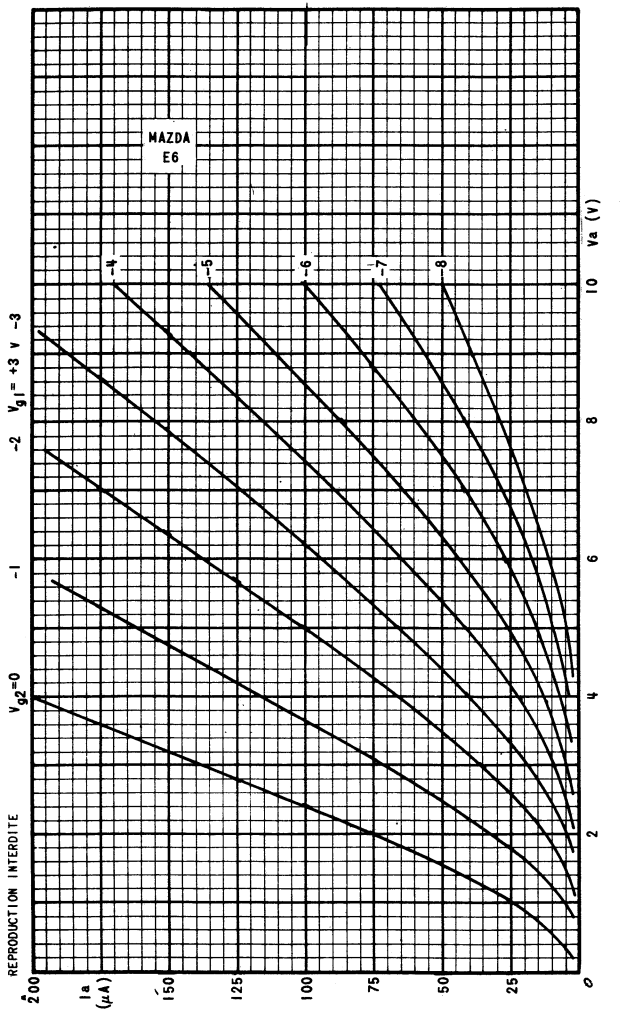
REPRODUCTION INTERDITE

MAZDA

E6

E6

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE

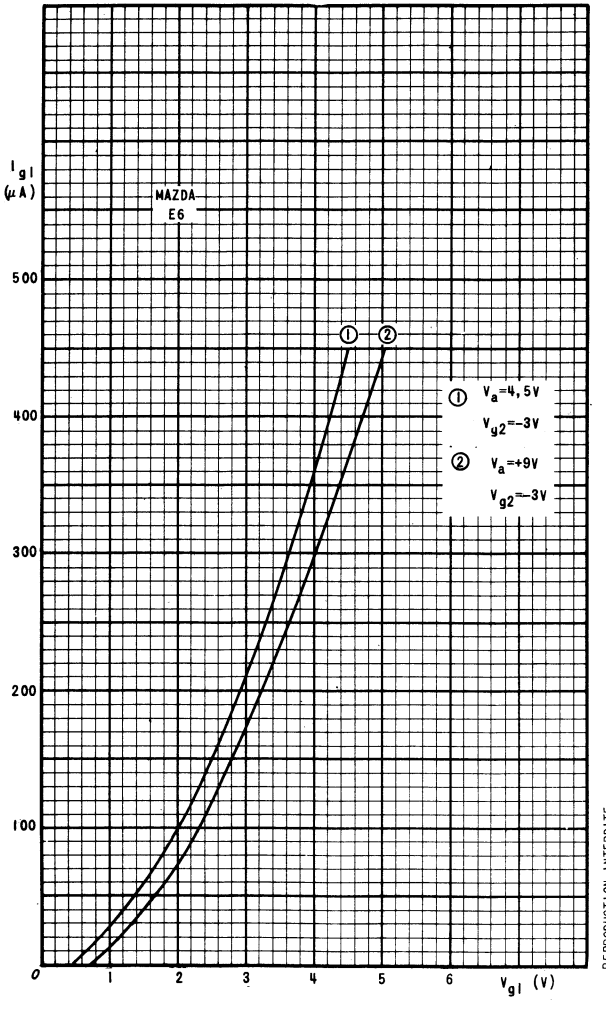


REPRODUCTION INTERDITE

MAZDA

E6

COURBES DU COURANT DE GRILLE N° 1
EN FONCTION DE LA TENSION DE GRILLE N° 1



REPRODUCTION INTERDITE

MAZDA
E 7

E 7

PENTODE SUBMINIATURE
A SORTIE PAR FILS
APPLICATIONS ELECTROMETRIQUES

Le E 7 est un tube pentode subminiature à sorties par fils pour applications électrométriques.

A chauffage direct, il comporte un filament de faible consommation.

La grille de commande est connectée à une sortie par fil située au sommet de l'ampoule.

Le E 7 est traité intérieurement et extérieurement afin que cette grille ait une résistance d'isolement élevée et un courant total inverse très faible.

CARACTERISTIQUES GENERALES

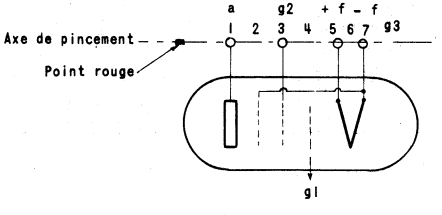
Chauffage direct	
Tension continue de filament	1,25 V
Courant filament	9 mA
Embase	7 L 7
Ampoule *	A 7 × 10 – 3
Longueur des sorties par fils	
– au sommet (grille n° 1)	18 mm min.
– à l'embase	38,1 mm min.

BROCHAGE

En partant du point rouge

Sortie n° 1 : anode.
Sortie n° 2 : manque.
Sortie n° 3 : grille n° 2.
Sortie n° 4 : manque.
Sortie n° 5 : + filament.
Sortie n° 6 : manque.
Sortie n° 7 : – filament, grille n° 3.

Sortie au sommet de l'ampoule : grille n° 1 (grille de commande).



* la hauteur de l'ampoule, corne comprise, est de 42 mm max.

REPRODUCTION INTERDITE

E 7

MAZDA
E 7

PENTODE SUBMINIATURE
A SORTIE PAR FILS
APPLICATIONS ELECTROMETRIQUES

LIMITES MAXIMALES D'UTILISATION

Système des limites absolues

Tension continue de filament	1,5 V max.
Tension continue d'anode	22,5 V max.
Courant de cathode	250 µA max.

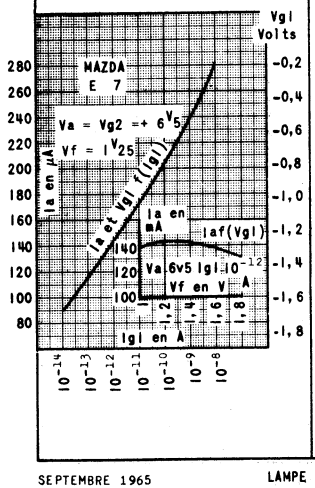
CARACTERISTIQUES EN CONNEXION TRIODE

La grille n° 2 reliée à l'anode

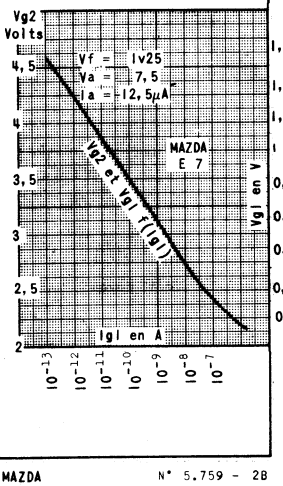
Tension filament	1,25 V
Courant filament	9 mA
Tension continue d'anode	10,5 V
Tension continue de grille n° 1	- 3 V
Courant d'anode	195 µA
Pente	120 µA/V
Coefficient d'amplification	1,9
Courant total inverse de la grille n° 1	0,5 × 10^{-12} A max.
Résistance d'isolement de la grille n° 1	10^{15} Ω min.

EXEMPLE D'UTILISATION EN CARACTERISTIQUES LOGARITHMIQUES

EXEMPLE EN TRIODE



EXEMPLE EN PENTODE

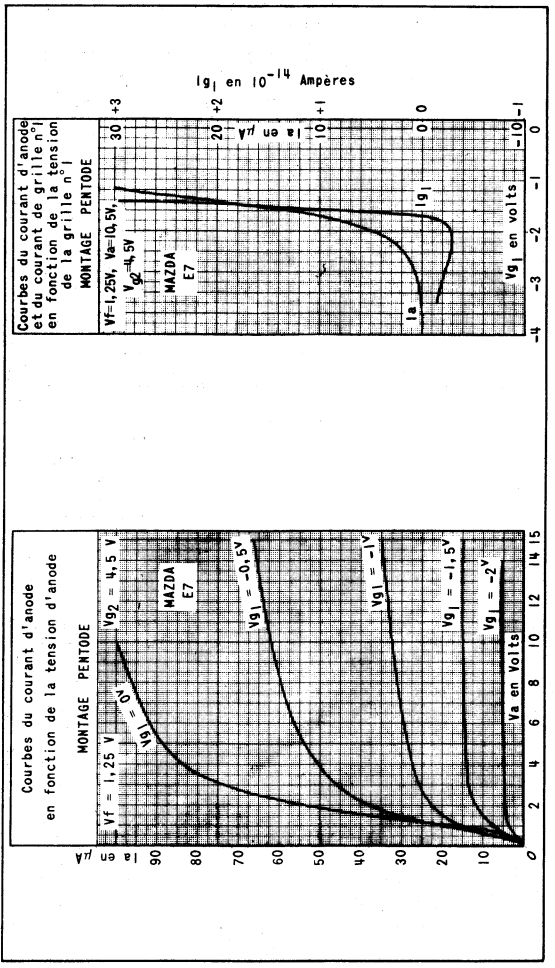


REPRODUCTION INTERDITE

MAZDA
E 7

E7

COURBES CARACTERISTIQUES



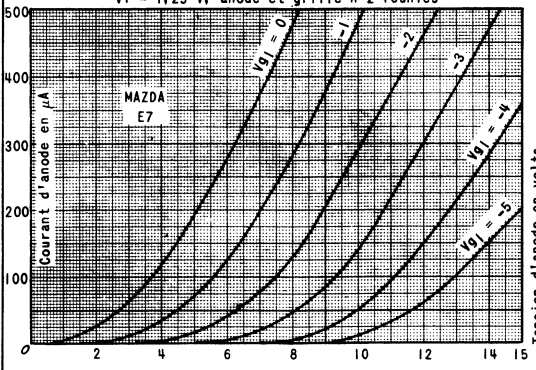
REPRODUCTION INTERDITE

E7

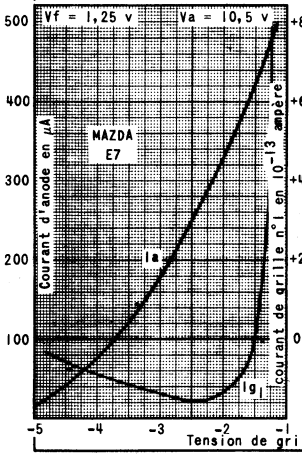
MAZDA
E 7

COURBES CARACTERISTIQUES

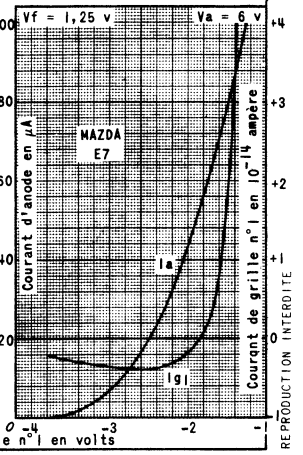
Courbes du courant d'anode en fonction de la tension d'anode
MONTAGE TRIODE
Vf = 1,25 V, anode et grille n°2 réunies



Courbes du courant d'anode et du courant de grille n° 1 en fonction de la tension de la grille n° 1
MONTAGE TRIODE



Courbes du courant d'anode et du courant de grille n° 1 en fonction de la tension de la grille n° 1
MONTAGE TRIODE



Tension de grille n°1 en volts

REPRODUCTION INTERDITE

MAZDA

E 9

E9

PENTODE SUBMINIATURE
A SORTIE PAR FILS
APPLICATIONS ELECTROMETRIQUES

Le tube E9 est un tube pentode subminiature a sorties par fils pour applications électrométriques. Il comporte un filament à très faible consommation.

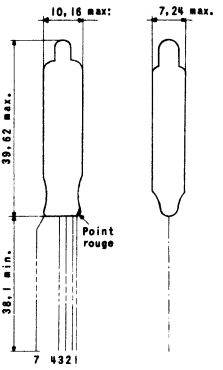
Le tube E9 est traité intérieurement et extérieurement afin que la grille de mesure ait une résistance d'isolement tres élevée et un courant total inverse très faible.

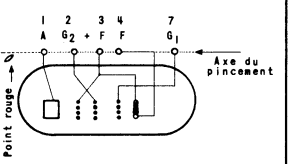
En utilisation triode, sa pente élevée lui permet de commander directement des circuits simples. En utilisation pentode, son coefficient d'amplification élevé permet d'obtenir un gain en tension important.

Ce tube peut être utilisé en caractéristiques logarithmiques soit en diode, soit en triode, soit en pentode.

Caractéristiques générales

- Tension continue filament 1,25 V
- Courant filament 9,2 mA
- Ampoule A7x10-3 bis
- Embase 7 C 7
- Résistance entre la grille de mesure et toutes les autres électrodes réunies $10^{15}\ \Omega$
  Grille n° 1 (toutes les autres électrodes réunies) 2,8pF
  Grille n° 1 (grille n° 2 et anode réunies) 2,3pF





Brochage en partant du trait rouge

Sortie n° 1 Anode
Sortie n° 2 Grille n° 2
Sortie n° 3 + filament
Sortie n° 4 - filament
Sortie n° 5 manque
Sortie n° 6 manque
Sortie n° 7 grille n° 1

REPRODUCTION INTERDITE

E9/

MAZDA
E 9

PENTODE SUBMINIATURE
A SORTIE PAR FILS
APPLICATIONS ELECTROMETRIQUES

LIMITES MAXIMALES D'UTILISATION

- Tension anode ..... 22,5 V
- Tension g_2 ..... 22,5 V
- Tension g_1 ..... - 15V
- Tension filament ..... 1,5 V
- Courant cathodique .....300 μA

CONDITIONS TYPIQUES D'UTILISATION

	Triode	Pentode
Tension filament	1,25 V	1,25 V
Courant filament	9 mA	9 mA
Tension d'anode	10 V	10,5 V
Tension grille n° 2	-	4,5 V
Tension grille n° 1	- 3 V	- 2 V
Courant anode	175 μA	5 μA
Courant écran	-	3 μA
Coefficient d'amplification	1,9	-
Pente	140 μA/V	12 μA/V
Résistance interne	-	20 MΩ
Courant grille	1,2 10^{-13}A	3 10^{-15}A

POUR LES

COURBES CARACTERISTIQUES

VOIR

ELECTROMETRE

E7

Feuillets n° 5.759 - 2, 3 et 4

REPRODUCTION INTERDITE

MAZDA

DOUBLE TRIODE
Ampli de sortie
pour platines de chrominance (Secam)

ECC 812

CARACTERISTIQUES GENERALES

Electriques

Cathode à chauffage indirect
Alimentation du filament en parallèle

Tension filament	6,3 V
Courant filament	430 mA

Capacités interélectrodes (sans blindage extérieur)

Pour chaque section

Capacité d'entrée	3,3 pF
Capacité de sortie	3,0 pF
Capacité anode/grille	1,8 pF

Mécaniques

Embase	noval
Hauteur, broches comprises	mm max.
Diamètre	22,2 mm max.
Position de montage	indifférente

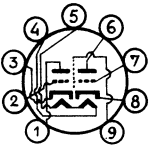
BROCHAGE

1 - Anode
2 - Grille
3 - Cathode
} Triode n° 2

4 - Filament
5 - Filament

6 - Anode
7 - Grille
8 - Cathode
} Triode n° 1

9 - Blindage



Broches de la base, face à l'observateur

REPRODUCTION INTERDITE

ECC 812

LIMITES MAXIMALES D'UTILISATION

Système des limites moyennes

Pour chaque section

Tension d'anode à courant nul	550	V max. (1)
Tension d'anode	300	V max.
Dissipation d'anode	1,5	W max. (1)
Courant de cathode	15	mA max. (1)
Tension négative de pointe de la grille	100	V max.
Tension entre le filament et la cathode	150	V max.
Résistance du circuit de grille		
- avec une polarisation pour résistance de cathode	3	MΩ max.
- avec une polarisation fixe	2	MΩ max.

CARACTERISTIQUES NOMINALES

Tension d'anode	100	V
Tension de grille	−1	V
Courant d'anode	6,5	mA
Pente	10	mA/V
Coefficient d'amplification	58	

REPRODUCTION INTERDITE

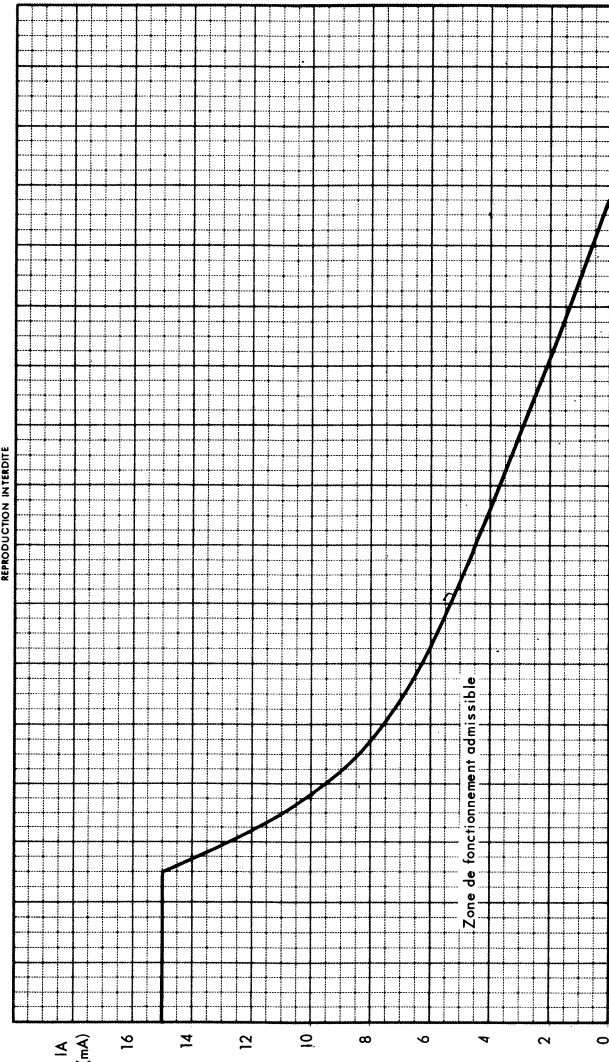
(1) L'emploi du tube à l'intérieur des limites est conditionné par les valeurs maximales de la tension d'anode, du courant de cathode et de la dissipation.

Pour vérifier que ces conditions ne sont pas dépassées, se reporter au diagramme de la page 3 sur lequel la droite de charge du régime de fonctionnement choisi peut être tracée.

MAZDA

ECC 812

Courbe du courant d'anode en fonction de la tension d'anode



REPRODUCTION INTERDITE

ECF 202

Le type ECF 202 est une triode-pentode Décal destinée à l'équipement des platines de décodage des récepteurs de télévision en couleur. (Système SECAM).

CARACTERISTIQUES GENERALES

Electriques

Cathode à chauffage indirect
Alimentation du filament en parallèle

Tension filament	6,3	V
Courant filament	380	mA

Mécaniques

Embase	décal	
Ampoule	A 22 - 2	
Hauteur, sans les broches	49,2	mm max.
Diamètre	22,2	mm max.

Capacités interélectrodes (sans blindage extérieur).

Pentode

Capacité d'entrée	6,1	pF
Capacité de sortie	3,3	pF
Capacité grille n° 1/cathode	3,7	pF
Capacité grille n° 1/anode	5	mpF max.
Capacité grille n° 1/grille n° 2	1,75	pF

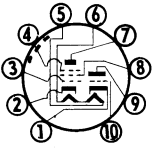
Triode

Capacité d'entrée	3,3	pF
Capacité de sortie	3,0	pF
Capacité grille/anode	1,8	pF

Entre sections

Capacité anode-pentode/anode-triode	15	mpF max.
Capacité grille 1-pentode/anode-triode	1,2	mpF max.
Capacité grille 1-pentode/grille-triode	1,5	mpF max.

BROCHAGE



Broches de la base, face à l'observateur

Broche n° 1	Cathode Triode
Broche n° 2	Cathode Pentode
Broche n° 3	Grille n° 1
Broche n° 4	Grille n° 3, blindage
Broche n° 5	Filament
Broche n° 6	Filament
Broche n° 7	Anode Pentode
Broche n° 8	Grille n° 2
Broche n° 9	Anode Triode
Broche n° 10	Grille Triode

REPRODUCTION INTERDITE

ECF 202

LIMITES MAXIMALES D'UTILISATION
Système des limites moyennes

Pentode

Tension d'anode, à courant nul	550	V max.
Tension d'anode	250	V max.
Dissipation d'anode	2,1	W max.
Tension de grille n° 2, à courant nul	550	V max.
Tension de grille n° 2	250	V max.
Dissipation de grille n° 2	0,75	W max.
Courant de cathode	20	mA max.
Tension entre le filament et la cathode	150	V max.
Résistance du circuit de grille n° 1	1	MΩ max.

Triode

Tension d'anode, à courant nul	550	V max.
Tension d'anode	400	V max.
Dissipation d'anode	1,5	W max.
Courant de cathode	15	mA max.
Tension négative de pointe de la grille	100	V max.
Tension entre le filament et la cathode	150	V max.
Résistance du circuit de grille		
- avec une polarisation par résistance de cathode	3	MΩ max.
- avec une polarisation fixe	2	MΩ max.

REPRODUCTION INTERDITE

CARACTERISTIQUES NOMINALES

Pentode

Tension d'anode	160	V
Tension de grille n° 2	135	V
Tension de grille n° 1	- 1,7	V
Courant d'anode	13	mA
Courant de grille n° 2	5	mA
Pente	14	mA/V
Coefficient d'amplification g2/g1	50	

Triode

Tension d'anode	100	V
Tension de grille	- 1	V
Courant d'anode	9	mA
Pente	10,5	mA/V
Coefficient d'amplification	50	

CONDITIONS NORMALES D'UTILISATION

Pentode (amplification de sous-porteuse de chrominance).

Tension d'alimentation	200 V
Résistance d'anode	3,3 kΩ
Résistance de grille nº 2	12 kΩ
Résistance de cathode	680 Ω
Tension de grille nº 1	+12 V
Courant d'anode	13 mA
Courant de grille nº 2	6 mA
Pente	14 mA/V

Triode (amplification de sortie des signaux de différence de couleur.)

Tension d'anode	150 V
Résistance de cathode	330 Ω
Courant d'anode	7 mA
Pente	9,5 mA/V
Coefficient d'amplification	50

REPRODUCTION INTERDITE

MAZDA

TRIODE - PENTODE

ECL 802

Balayage images (télévision en couleur)

CARACTERISTIQUES GENERALES

Electriques

Cathode à chauffage indirect
Alimentation du filament en parallèle

Tension filament	6,3 V
Courant filament	860 mA

Capacités interélectrodes

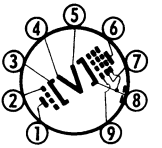
Capacité grille n° 1 pentode-anode pentode	450 mpF
Capacité grille triode-anode pentode	25 mpF max.
Capacité grille n° 1 pentode-anode triode	70 mpF max.
Capacité grille triode-filament	110 mpF max.
Capacité grille n° 1 pentode-filament	190 mpF max.

Mécaniques

Embase	noval
Hauteur, broches comprises	78 mm max.
Diamètre	22,2 mm max.
Position de montage	indifférente

BROCHAGE

1 - anode triode
2 - grille triode
3 - cathode triode
4 - filament
5 - filament
6 - anode pentode
7 - grille n° 2
8 - cathode pentode, grille n° 3, blindage
9 - grille n° 1 pentode



Broches de la base, face à l'observateur

REPRODUCTION INTERDITE

ECL 802

LIMITES MAXIMALES D'UTILISATION

Système des limites moyennes *

Elément pentode

Tension d'anode pour un courant d'anode nul	500	V max.
Tension continue d'anode	250	V max.
Tension de crête positive d'anode (1)	2.000	V max.
Tension de grille n° 2 pour un courant d'anode nul	550	V max.
Tension continue de grille n° 2	250	V max.
Dissipation d'anode	9	W max.
Dissipation de grille n°2	2,5	W max.
Courant moyen de cathode	75	mA max.
Résistance du circuit de grille n° 1		
- en polarisation fixe	1	mΩ max.
- en polarisation automatique	2,2	mΩ max.
Résistance du circuit entre le filament et la cathode	20	kΩ max.
Tension entre le filament et la cathode	220	V max.

Elément triode

Tension d'anode pour un courant d'anode nul	550	V max.
Tension continue d'anode	250	V max.
Dissipation d'anode	0,5	W max.
Courant moyen de cathode	15	mA max.
Courant de crête de cathode (2)	200	mA max.
Résistance du circuit de grille		
- en polarisation fixe	1	MΩ max.
- en polarisation automatique	3,3	MΩ max.
Tension entre le filament et la cathode	220	V max.
Résistance du circuit entre le filament et la cathode	20	kΩ max.

(1) durée d'impulsion limitée à 5 % d'un cycle de balayage vertical avec un maximum de 1 ms.

(2) impulsion d'une durée de 200 μs max.

* Cf. Recommandations relatives à l'utilisation des Tubes Electroniques FNIE 011 - p. 8.

REPRODUCTION INTERDITE

ECL 802

VALEURS CARACTERISTIQUES D'UN TUBE MOYEN

Elément pentode

Tension d'anode	170	50	65 V
Tension de grille n° 2	170	170	210 V
Tension de grille n° 1	– 15	– 1	– 1 V
Courant d'anode	41	200	240 mA
Courant de grille n° 2	2,7	40	50 mA
Pente	7,5	-	- mA/V
Résistance interne	25	-	- kΩ

Elément triode

Tension d'anode	100 V
Tension de grille	– 0,8 V
Courant d'anode	5 mA
Pente	6,5 mA/V
Cœfficient d'amplification	50
Résistance interne	7,6 kΩ

REPRODUCTION INTERDITE

CONDITIONS NORMALES D'UTILISATION

Balayage vertical

Elément pentode

Tension d'anode en fin de cycle de balayage	55(3)	55(3)	75 V(4)
Tension de grille n° 2	170	200	210 V
Tension de grille n° 1 en fin de cycle de balayage	– 6	– 9,5	– 11 V
Dissipation moyenne de grille n° 2	1,1	1,4	1,35 W
Courant de crête d'anode	135	135	125 mA

Pour un tube neuf moyen, le courant d'anode de crête est de 200 mA pour des tensions d'anode de 50 V, de grille n° 2 de 170 V et de grille n° 1 de – 1 V.

Afin de tenir compte des tolérances de fabrication, du vieillissement du tube, des variations de la tension du réseau et de la dispersion des caractéristiques du circuit, ce dernier devra être conçu pour des courants d'anode de crête ne dépassant pas les valeurs indiquées dans le tableau ci-dessus. Ces valeurs, correspondant respectivement aux polarisations indiquées pour un tube neuf, pourront encore être obtenues d'un tube en fin de vie si la valeur de la polarisation en fin de cycle de balayage est de – 1 volt.

(3) circuits non stabilisés.

(4) circuits stabilisés.

MAZDA
ED 501

ED 501

TRIODE DE PUISSANCE - EMBASE MAGNOVAL

Type spécialement conçu pour la régulation parallèle des alimentations THT à faible débit dont, en particulier, celles des récepteurs de TELEVISION EN COULEUR

CARACTERISTIQUES GENERALES

ELECTRIQUES

Cathode à chauffage indirect

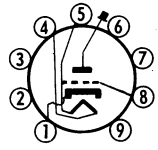
Tension filament	6,3	V
Courant filament	0,2	A

MECANIQUES

Embase	Magnoval
Diamètre de l'ampoule	39,7 mm max
Hauteur, hors-tout	115 mm max
Position de montage	indifférente

BROCHAGE

Broche n° 1 Cathode
Broche n° 2 Connexion interne (1)
Broche n° 3 Connexion interne (1)
Broche n° 4 Filament
Broche n° 5 Filament
Broche n° 6 Connexion interne (1)
Broche n° 7 Connexion interne (1)
Broche n° 8 Grille
Broche n° 9 Connexion interne (1)
Coiffe Anode



L'anode est connectée à la coiffe du sommet. Broches de la base, face à l'observateur.

CAPACITES INTERELECTRODES

Capacité grille-anode	0,018	pF
Capacité d'entrée	2,6	pF
Capacité de sortie	0,5	pF

(1) Les broches "connexion interne" ne doivent pas être utilisées. L'application de tension à ces broches - à la suite de leur utilisation comme relais - peut affecter le fonctionnement du tube et le détériorer.

REPRODUCTION INTERDITE

ED 501

MAZDA
ED 501

TRIODE DE PUISSANCE - EMBASE MAGNOVAL

Type spécialement conçu pour la régulation parallèle des alimentations THT à faible débit dont, en particulier, celles des récepteurs de TELEVISION EN COULEUR

LIMITES MAXIMALES D'UTILISATION

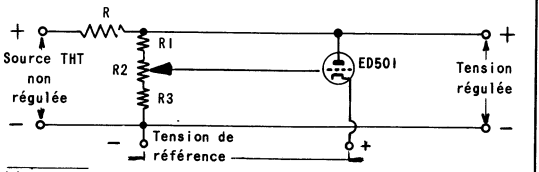
Système des limites hybrides

Tension Filament	6,9 V max
	5,7 V min
Tension continue d'anode	27 000 V max
Tension continue d'alimentation non régulée	60 000 V max
Tension négative de grille	
Valeur continue	135 V max
Valeur de crête (1)	440 V max
Courant continu d'anode	1,6 mA max
Dissipation d'anode	40 W max
Tension de crête entre le filament et la cathode	
Filament négatif par rapport à la cathode	450 V max
Filament positif par rapport à la cathode	déconseillé
Résistance du circuit de grille	3 MΩ max

EXEMPLE D'UTILISATION

Régulateur de tension en parallèle (voir schéma ci-dessous)

Tension de la source non régulée	36 000 V
Résistance équivalente de la source R	11 MΩ
Valeur du diviseur de tension	
Résistance R1 (5 watts)	220 MΩ
Résistance R2 (2 watts)	1 MΩ
Résistance R3 (1/2 watt)	820 kΩ
Tension de référence	200 V
Résistance équivalente de la source de référence	1 000 Ω
Pente effective	0,2 mA/V
Courant d'anode	
pour un courant de charge nul	1 000 µA
pour un courant de charge de 1 mA	45 µA
Tension de sortie régulée	
pour un courant de charge nul	25 000 V
pour un courant de charge de 1 mA	24 500 V



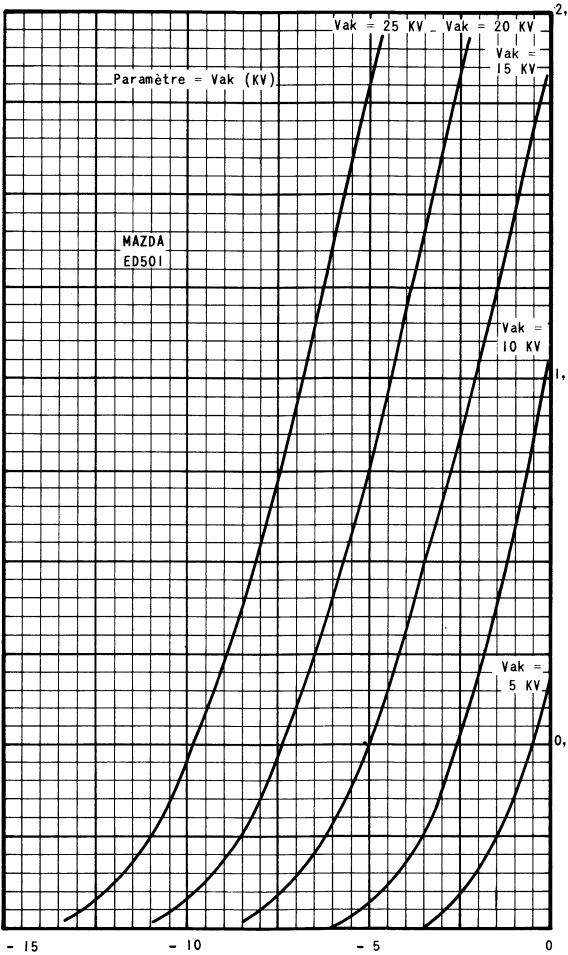
(1) Pendant 20 secondes max., lors de la mise sous tension de l'appareil

REPRODUCTION INTERDITE

MAZDA
ED 501

ED 501

COURBES DU COURANT D'ANODE EN FONCTION
DE LA TENSION DE GRILLE



REPRODUCTION INTERDITE

MAZDA

EF 816

EF 816

PENTODE A DOUBLE ANODE, PENTE FIXE ET FAIBLE RECUL DE GRILLE POUR EXTRACTION ET SÉPARATION DES SIGNAUX DE SYNCHRONISATION EN TÉLÉVISION
SERIE MINIATURE 9 BROCHES NOVAL

Le EF 816 est une pentode miniature Noval à pente fixe, à faible recul de grille. Il comporte, comme toute pentode, une cathode et 3 grilles, mais il a deux anodes distinctes, accessibles par des broches séparées. La grille n° 1 qui est une grille-cadre, confère à ce tube une pente élevée (8,5 mA/V)

Le tube pentode à double anode EF 816 permet d'établir des circuits assurant très économiquement les fonctions d'extraction et de séparation des signaux de synchronisation des récepteurs de télévision.

L'ensemble des propriétés du EF 816 permet de réaliser des balayages stables et bien entrelacés dans une très grande gamme d'amplitude du signal complet de télévision.

CARACTERISTIQUES GENERALES

ELECTRIQUES

Cathode à chauffage indirect	
Alimentation du filament en série ou en parallèle	
Tension filament	6,3 V
Intensité filament	0,3 A

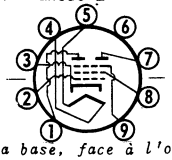
MECANIQUES

Embase	noval
Hauteur maximale, broches non comprises	60,3 mm.
Diamètre maximal	22,2 mm.

CAPACITES

Capacité d'entrée	10 pF
Capacité de sortie (par anode)	1,5 pF
Capacité grille n° 1 – anode 1	150 mpF
Capacité grille n° 1 – anode 2	5 mpF

BROCHES :
N° 1 – Anode n° 1.
N° 2 – Grille n° 1.
N° 3 – Cathode.
N° 4 – Filament.
N° 5 – Filament.



BROCHES :
N° 6 – Blindage interne
N° 7 – Anode n° 2
N° 8 – Grille n° 2
N° 9 – Grille n° 3

Broches de la base, face à l'observateur.

LIMITES MAXIMALES D'UTILISATION
Système des limites moyennes

Tension d'anode pour un courant nul	550 V max.
Tension d'anode	250 V max.
Tension de grille n° 2 pour un courant nul	550 V max.
Tension de grille n° 2	250 V max.
Dissipation d'anode : par anode	1,2 W max.
Dissipation d'écran	0,9 W max.
Courant de cathode	25 mA max.
Tension négative de crête de grille n° 1	150 V max.
Tension entre filament et cathode	150 V max.
Résistance externe entre filament et cathode	20 kΩ max.

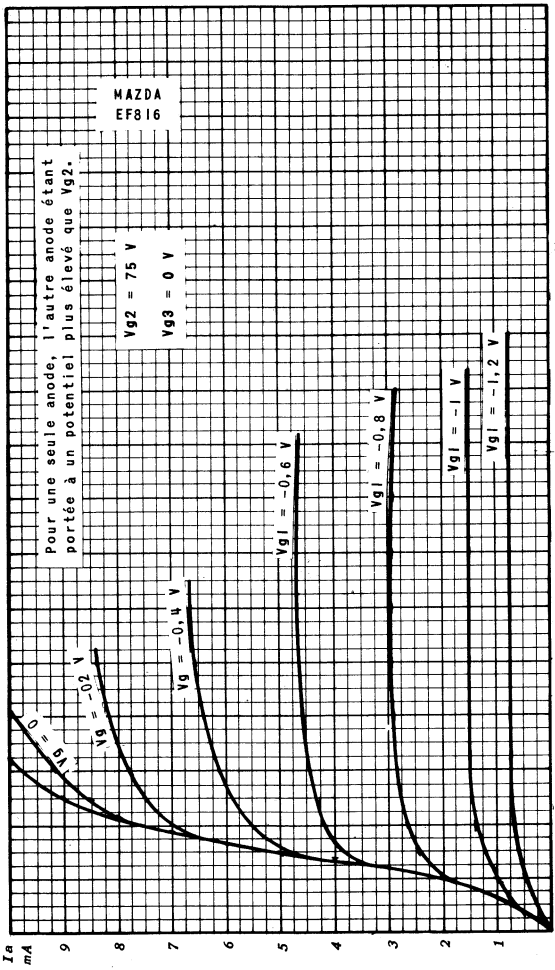
REPRODUCTION INTERDITE

EF 816

MAZDA

EF 816

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



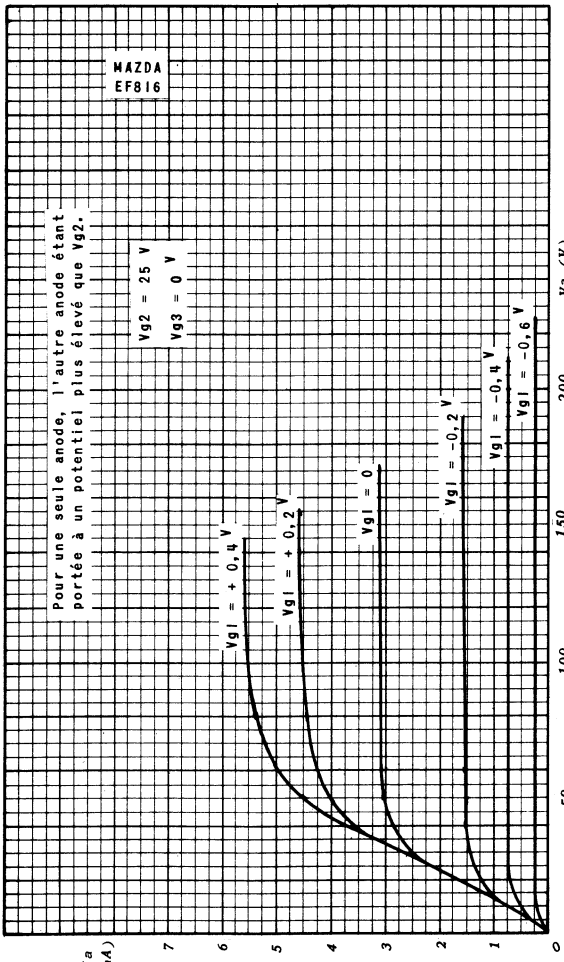
REPRODUCTION INTERDITE

MAZDA

EF 816

EF 816

COURBES DU COURANT D'ANODE
EN FONCTION DE LA TENSION D'ANODE



REPRODUCTION INTERDITE

EHA.2500

EDISWAN

EHA.2500

FORCED AIR COOLED TRIODE

GENERAL

The EHA 2500 is a three electrode valve designed for use as a Radio Frequency Amplifier or Oscillator. The anode is fitted with a special radiator and cooling is obtained by forced air.

As the design minimises lead inductance, this valve is particularly suitable for H.F. applications.

RATING

Filament Voltage (volts)	V_f		8.0
Filament Current (amps)	I_f		80.0
Maximum Anode Voltage (volts)	$V_{a(max)}$		7,500
Average Maximum Filament Emission (amps)	F_{em}		4.5
Maximum Anode Dissipation (kW)	$W_{a(max)}$		2.5
Mutual Conductance (mA/V)	S_m	•	5.5
Amplification Factor	μ	•	55.0
Anode Impedance (ohms)	r_a	•	10,000
Maximum Operating Frequency at full rating		†	40 Mc/s

• Taken at V_a = 7,000v; I_a = 400mA.

† At higher frequencies the maximum permissable anode voltages and inputs must be reduced.

INTER-ELECTRODE CAPACITANCES

Anode/Grid (μμF)	C_{a-g1}	11.0
Anode/Filament (μμF)	C_{a-f}	1.0
Grid/Filament (μμF)	C_{g1-f}	12.0

AIR FLOW

200 cubic feet per minute. 15 cubic feet per minute on to seals. When the valve is mounted with glass end up arrangements should be made to draw the cooling air through the radiator. If this is not possible it is recommended that the valve should be mounted with the glass end down and the leads passed through the sides of a special supporting cylinder. The outline drawing of this cylinder is shown on the next page and can be supplied.

DIMENSIONS

Maximum Overall Length (mm)	240
Maximum Diameter (mm)	150
Approximate Nett Weight (lbs)	13.0
Approximate Packed Weight (lbs)	54.0

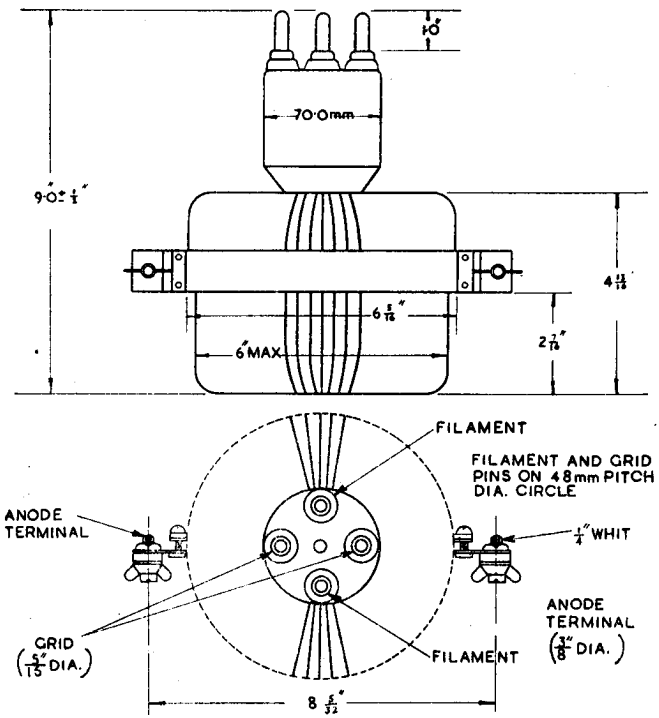
MOUNTING POSITION - Vertical

EDISWAN

EHA.2500

FORCED AIR COOLED TRIODE

EHA 2500



ALL DIMS IN ins UNLESS STATED OTHERWISE

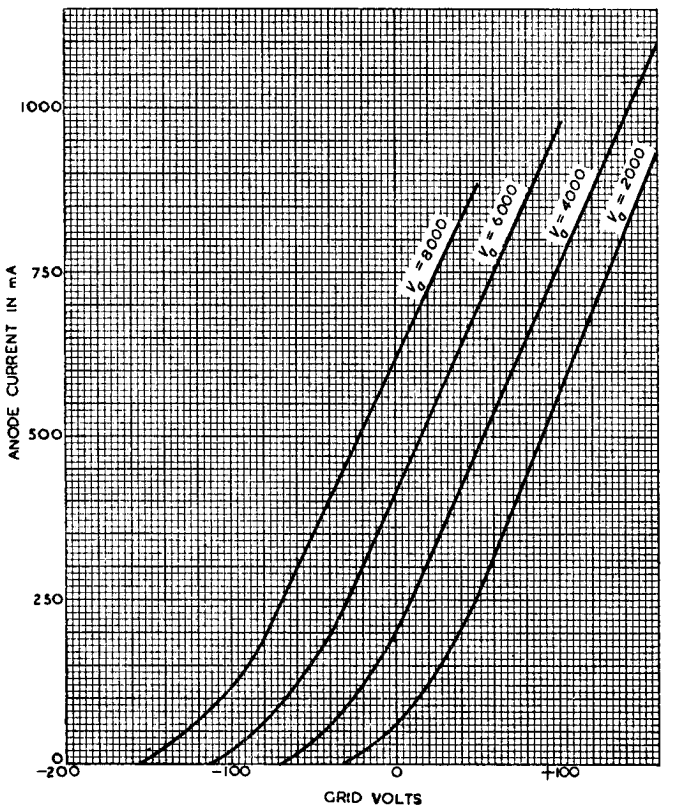
EHA.2500

EDISWAN

EHA.2500

FORCED AIR COOLED TRIODE

AVERAGE CHARACTERISTICS



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THE EDISON SWAN ELECTRIC COMPANY LTD.

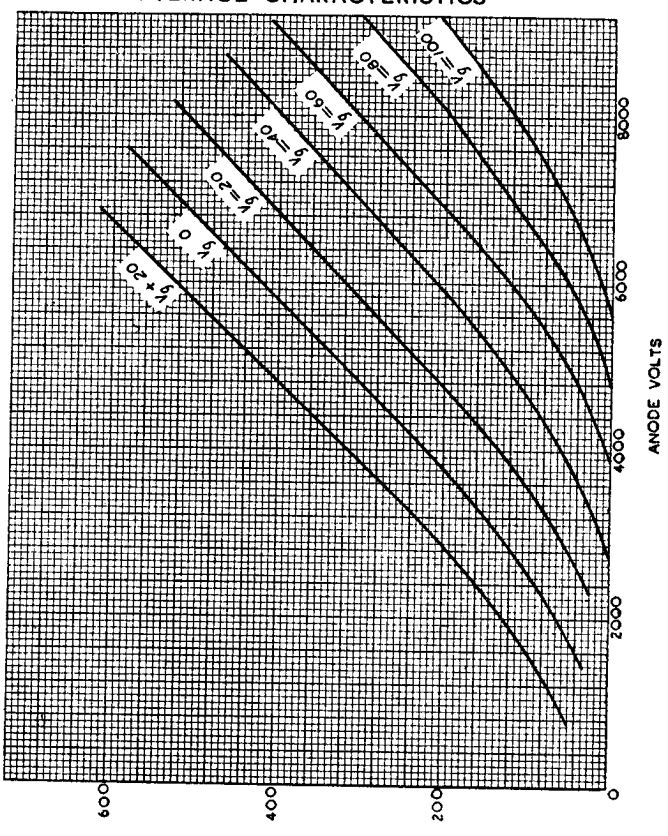
EHA.2500

EDISWAN

EHA.2500

FORCED AIR COOLED TRIODE

AVERAGE CHARACTERISTICS



August 1948 RADIO DIVISION Issue 1/4

THE EDISON SWAN ELECTRIC COMPANY LTD.

EHA.2500

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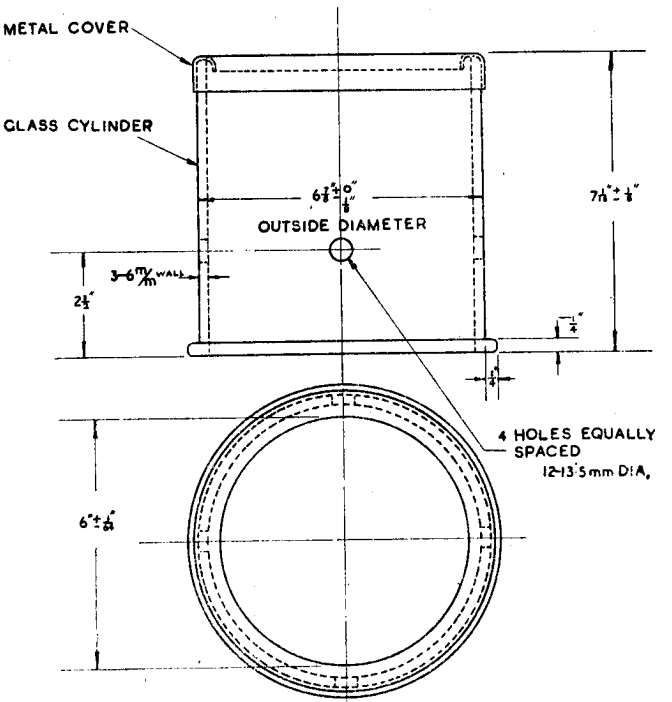
EHA.2500

FORCED AIR COOLED TRIODE

SUPPORT TYPE G.C.2.



NOTE THIS SUPPORT IS USED WHEN VALVE IS OPERATED IN AN INVERTED POSITION

ALL DIMS IN ins UNLESS STATED OTHERWISE

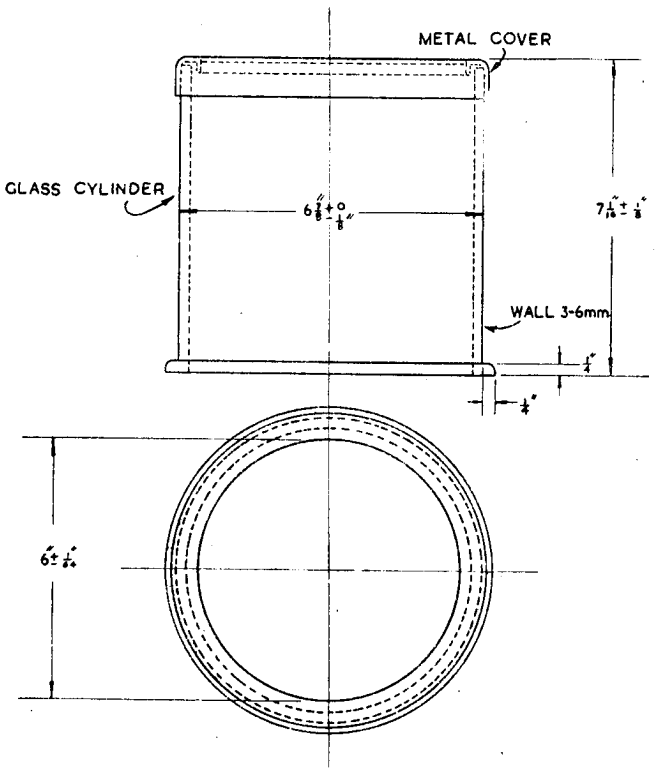
EHA.2500

EDISWAN

EHA.2500

FORCED AIR COOLED TRIODE

SUPPORT TYPE G.C.1.



ALL DIMS IN ins UNLESS
STATED OTHERWISE

FOR USE WHEN VALVE IS MOUNTED WITH GLASS END UP

EHA.5000

EDISWAN

EHA.5000

FORCED AIR COOLED TRIODE

GENERAL

The EHA.5000 is a three electrode valve designed for use as a Radio Frequency Amplifier or Oscillator. The anode is fitted with a special radiator and cooling is obtained by forced air. The design minimises lead inductance and this valve is particularly suitable for use in R.F. heating equipments. It is the direct equivalent of the American type 889R.

RATING

Filament Voltage (volts)	V_f		11.0
Filament Current (amps)	I_f		125
Maximum Anode Voltage (volts)	$V_{a(max)}$		8,500
Maximum Filament Emission (amps)	F_{em}		11.0
Maximum Anode Dissipation (kW)	$W_{a(max)}$		5.0
Mutual Conductance (mA/V)	g_m	‡	10
Amplification Factor	μ	‡	20
Anode Impedance (ohms)	r_a	‡	2,000
Maximum Operating Frequency at full rating		§	25 Mc/s

‡ Taken at V_a = 5,000v; I_a = 1,000mA.

§ At higher frequencies the maximum permissable anode voltages and inputs must be reduced.

INTER-ELECTRODE CAPACITANCES

Anode/Grid (μμF)	c_{a-g1}	20.7
Anode/Filament (μμF)	c_{a-f}	2.5
Grid/Filament (μμF)	c_{g1-f}	19.5

AIR FLOW (MAIN)

500 cubic feet per minute. In addition, 15 cubic feet per minute should be directed on to the seals.

DIMENSIONS

Maximum Overall Length (mm)	298.5
Maximum Diameter (mm)	192.0
Approximate Nett Weight (lbs)	34.0
Approximate Packed Weight (lbs)	72.0

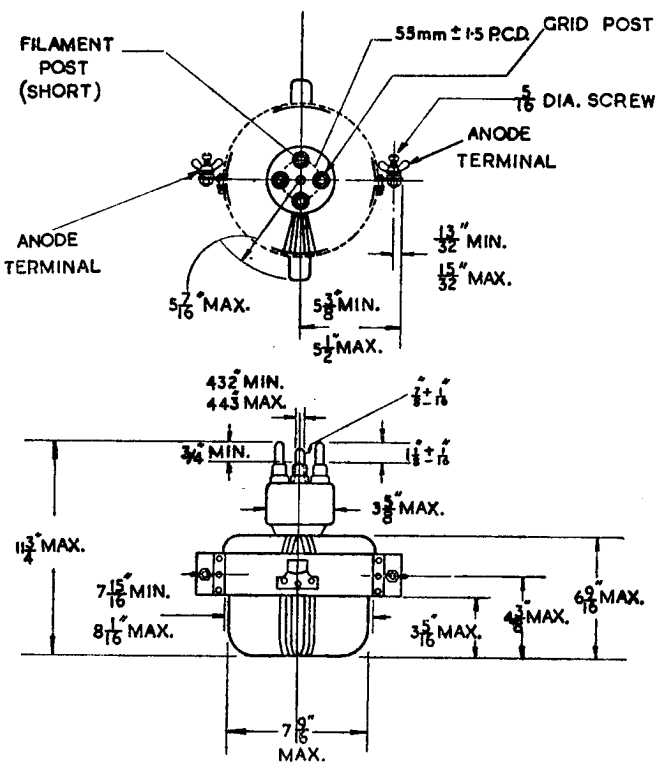
MOUNTING POSITION - Vertical

EDISWAN

EHA.5000

FORCED AIR COOLED TRIODE

EHA.5000



LIFTING HANDLES IN LINE WITH FIL. PINS

ALL DIMS IN ins UNLESS STATED OTHERWISE

EDISWAN

EHT.15

HALF WAVE MERCURY VAPOUR RECTIFIER

GENERAL

The EHT.15 is a directly heated high voltage half wave rectifier of the hot mercury vapour type and is capable of rectifying up to 30 kW of power at a D.C. voltage of 10,000 - 12,000. Owing to the very low and constant voltage drop in the rectifier good regulation is obtained with high efficiency. This valve must be operated in an inverted position.

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	15
Maximum Inverse Peak Anode Voltage (kV)	P.I.V.	20
Peak Anode Current (amps)	$I_{a(pk)}$	15
Maximum Mean Anode Current (amps)	$I_{a(mean)}$	3.0
Circumambient Temperature (°C)		10° - 50°
Cathode Heating Delay (secs)		60

DIMENSIONS

Maximum Overall Length (mm)	425
Maximum Diameter (mm)	150

APPLICATION

Standard smoothing circuits may be used with the valves, whether operated singly or in pairs for full wave rectification. The latter arrangement is recommended as being more efficient. To guard against damage from overload it is necessary to include a fuse as a connexion to the anode cap and this should be mounted as close to the cap as possible. To avoid the possibility of flash - back on reverse voltage, the temperature of the rectifier should never be allowed to exceed 50°C.

For this reason it is essential that the valve be mounted in a cool well - ventilated position, and if the air temperature is liable to reach a high value a draught from an ordinary domestic fan should be applied to the bulb. The cathode voltage should be 4.0v. and not be allowed to fall below this value.

IMPORTANT NOTE

It is important that the cathode be allowed to attain full operating temperature before the H.T. voltage is applied to the Anode. When first placed into service, it is essential that the filament is run at its rated value for 15 mins. before applying H.T. to anode and thereafter a delay of at least a minute should elapse before the anode supply is switched on. When switching off, disconnect the H.T. supply before the cathode supply.

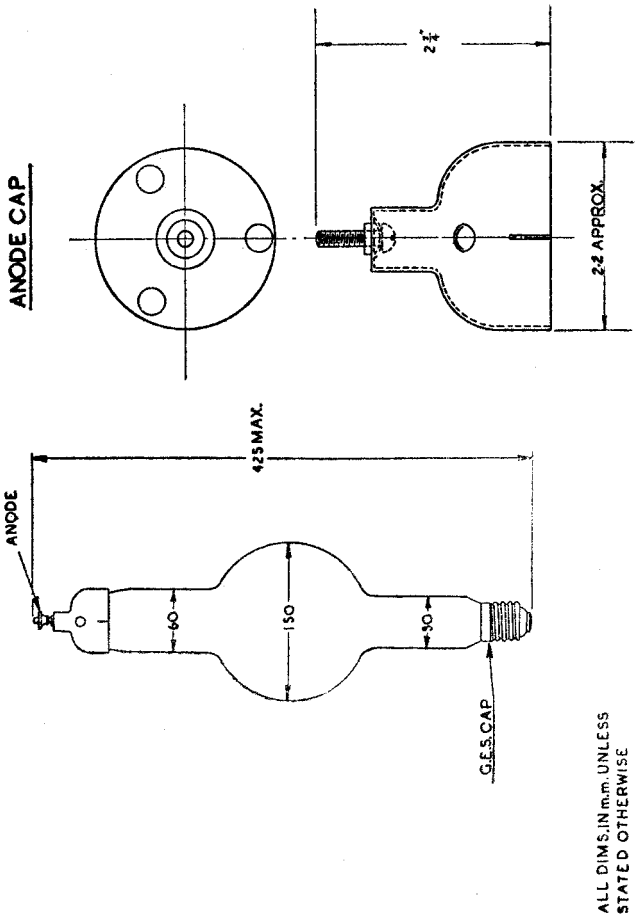
When rectifiers are kept as spares it is recommended that they be run under operating conditions at frequent intervals to ensure that they have suffered no deterioration through being kept in stock.

EHT.15

EDISWAN

EHT.15

HALF WAVE MERCURY VAPOUR RECTIFIER



THE EDISON SWAN ELECTRIC COMPANY LTD

EHW.3000

EDISWAN

EHW.3000

WATER COOLED TRIODE

GENERAL

The EHW.3000 is a triode designed for use as a radio-frequency amplifier or oscillator. The anode is water-cooled and is capable of dissipating up to 3 kilowatts, depending upon the class of service. The design minimizes lead inductance and makes the valve particularly suitable for high frequency applications.

RATING

Filament Voltage (volts)	V_f	8.0
Filament Current (amps)	I_f	80.0
Maximum Anode Voltage (volts)	$V_{a(max)}$	7,500
Average Maximum Filament Emission (amps)	$F_{em(av)}$	4.5
Maximum Anode Dissipation (watts)	$P_{a(max)}$	3,000
Mutual Conductance (mA/V)	g_m •	5.5
Amplification Factor	μ •	55
Anode Impedance (ohms)	r_a •	10,000
Maximum Operating Frequency at full rating		:10 Mc/s

• Taken at V_a = 7,000v; I_a = 400 mA.

: At higher frequencies the maximum permissable anode voltages and inputs must be reduced.

INTER-ELECTRODE CAPACITANCES

Anode/Grid (μμF)	$c_{a,g}$	11.0
Anode/Filament (μμF)	$c_{a,f}$	1.0
Grid/Filament (μμF)	$c_{g,f}$	12.0

WATER FLOW 2 gallons per minute

AIRFLOW 15 Cubic feet should be directed on to the seals.

DIMENSIONS

Maximum Overall Length (mm)	245
Maximum Diameter (mm)	70
Approximate Nett Weight (lb)	4
Approximate Packed Weight (lb)	11
Approximate Export Packed Weight (lb)	14

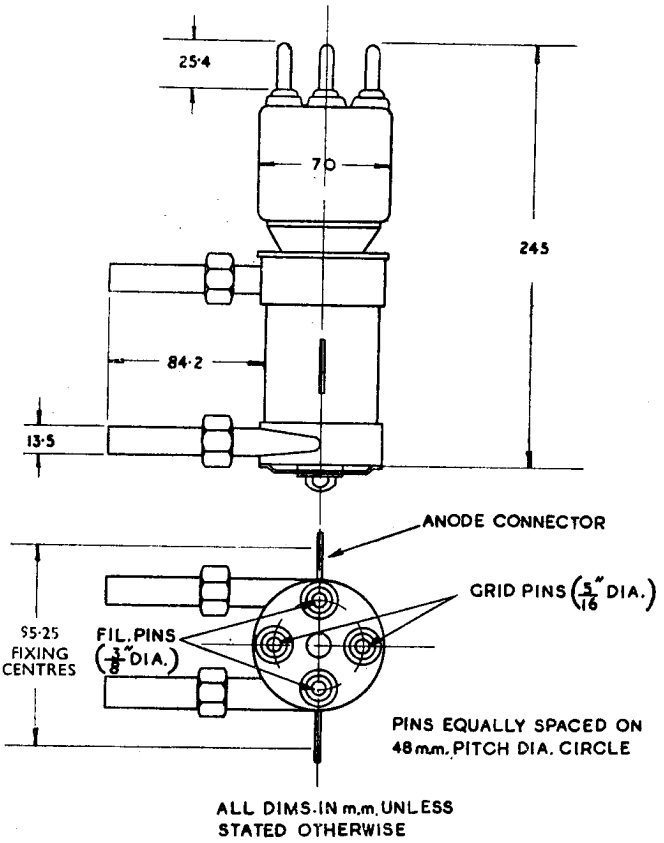
MOUNTING POSITION - Vertical

EHW.3000

EDISWAN

EHW.3000

WATER COOLED TRIODE



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THE EDISON SWAN ELECTRIC COMPANY LTD

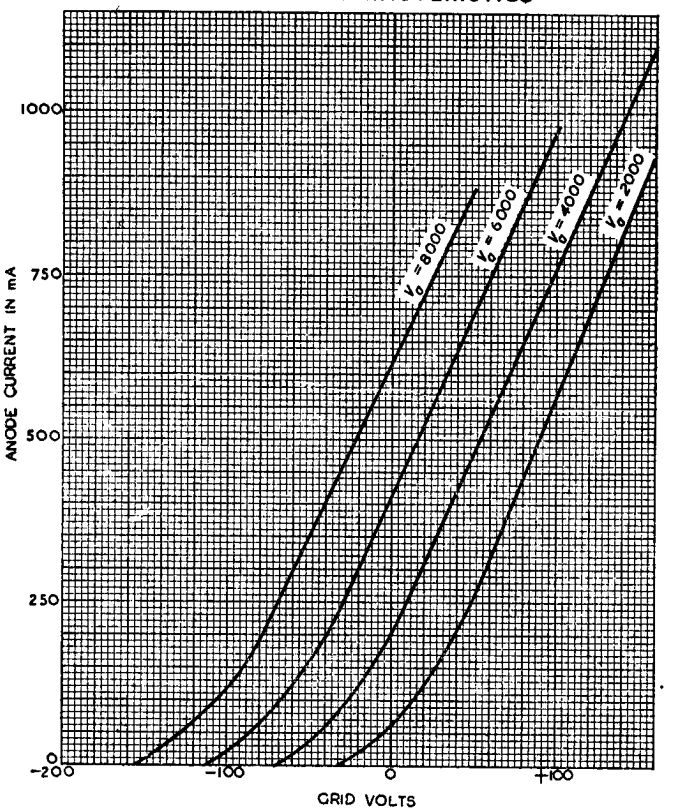
EHW.3000

EDISWAN

EHW.3000

WATER COOLED TRIODE

AVERAGE CHARACTERISTICS



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THE EDISON SWAN ELECTRIC COMPANY LTD

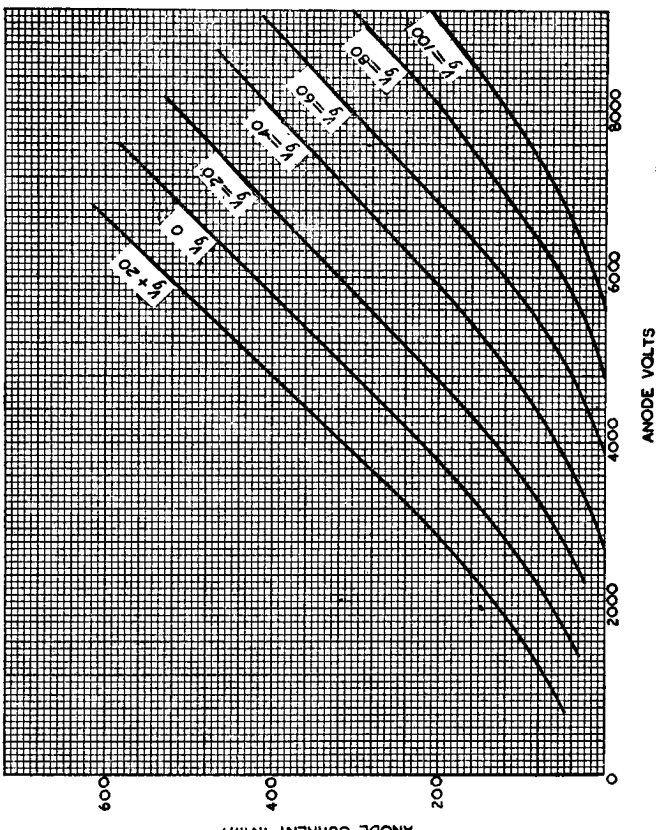
EHW.3000

EDISWAN

EHW.3000

WATER COOLED TRIODE

AVERAGE CHARACTERISTICS



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THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

EL 183

EL 183

PENTODE DE PUISSANCE
AMPLIFICATEUR VIDEO
SÉRIE MINIATURE - 9 BROCHES

La pentode EL183 est un tube à très forte pente étudiée spécialement pour l'amplification à gain élevé et à large bande. Il peut être utilisé par exemple comme étage final video, oscilloscopes, appareils de mesure,.....

Cathode à chauffage indirect

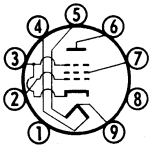
	Série	Parallèle
Branchement du filament		
Tension filament	12,6	6,3 V CC ou CA
Intensité filament	0,3	0,6 Ampère
Capacités interélectrodes (sans blindage externe) :		
Capacité d'entrée		13 pF
Capacité de sortie		5,4 pF
Capacité anode-grille n° 1		80 mpF max.
Encombrement :		V-3-N. 1
Hauteur maximum (broches comprises):		67 mm
Diamètre maximum		22,2 mm
Brochage		6.N-DD
Position de montage		indifférente

Broches :

N° 1 – Connexion interne (1).
N° 2 – Grille n° 1.
N° 3 – Cathode, grille n° 3.
N° 4 – Filament.
N° 5 – Filament.

Broches :

N° 6 – Anode.
N° 7 – Grille n° 2.
N° 8 – Connexion interne (1).
N° 9 – Point milieu du filament.



Broches de la base, face à l'observateur

MAXIMUM DES LIMITES DES CARACTERISTIQUES

Système des limites moyennes

Tension d'anode	250	Volts
Tension de grille n° 2	250	Volts
Dissipation d'anode	6	Watts max.
Dissipation de grille n° 2	2,2	Watts max.
Courant de cathode	60	mA max.
Résistance en circuit de grille n° 1	1	MΩ max.
Tension entre filament et cathode	200	Volts max.
	(150 V CC + 50 V crête)	

(1) – Les broches indiquées "Connexion interne" ne sont pas à utiliser de quelque façon que ce soit.

REPRODUCTION INTERDITE

EL183

MAZDA

EL183

PENTODE DE PUISSANCE
AMPLIFICATEUR VIDEO
SÉRIE MINIATURE - 9 BROCHES

CARACTERISTIQUES NOMINALES

Tension d'alimentation	220 volts
Tension d'anode	150 volts
Tension de grille n°2	220 volts
Courant d'anode	40 mA
Courant de grille n°2	7 mA
Tension de grille n°1	- 2,1 volts
Pente	25 mA/V
Résistance interne	20 kΩ
Coefficient d'amplification G1/G2 env.	40

EXEMPLE D'UTILISATION EN AMPLIFICATEUR VIDEO

Tension d'alimentation	220 volts
Tension de grille n°2	220 volts
Résistance d'anode	1800 Ω (1)
Résistance du circuit de cathode	130 Ω (2)
Courant d'anode au repos	21 mA

(1) - Pour une tension d'alimentation de 220 volts, la résistance du circuit d'anode ne doit pas être inférieure à 1.800 ohms.

(2) - Il est recommandé d'utiliser une polarisation par résistance de cathode.

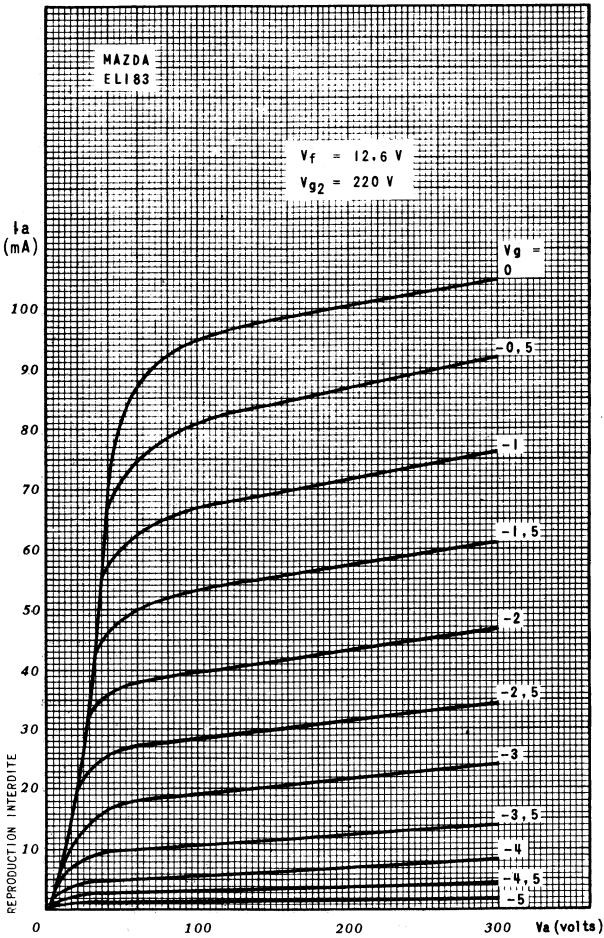
REPRODUCTION INTERDITE

MAZDA

EL 183

EL 183

COURBES DU COURANT D'ANODE EN FONCTION
DE LA TENSION D'ANODE



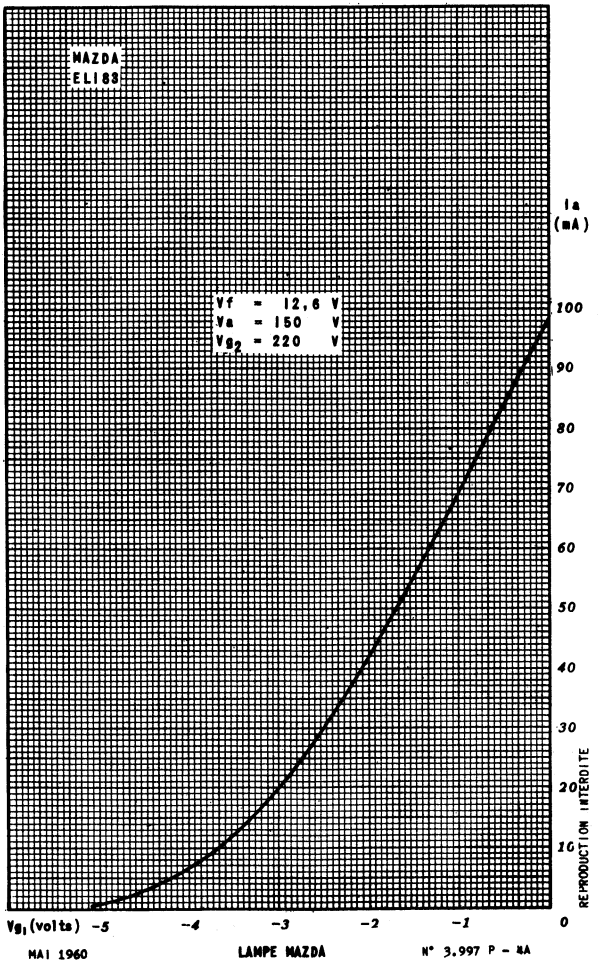
REPRODUCTION INTERDITE

EL 183

MAZDA

EL 183

COURBES DU COURANT D'ANODE EN FONCTION
DE LA TENSION DE GRILLE N° 1



REPRODUCTION INTERDITE

MAZDA
EL503

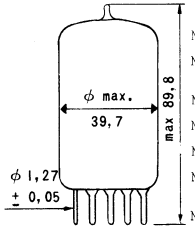
EL503

TETRODE
AMPLIFICATRICE DE PUISSANCE POUR A.F.
EMBASE : MAGNOVAL

Chauffage :

Indirect (cathode isolée du filament) — Vf = 6,3 V
Alimentation du filament en parallèle — If = 1,2 A

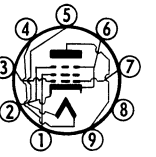
Encombrement



Diamètre d'enroulement des broches : 17,45 mm

Brochage :

N° 1 – Grille n° 2
N° 2 – Cathode, grille n° 3
N° 3 – Grille n° 1
N° 4 – Filament
N° 5 – Filament
N° 6 – Cathode, grille n° 3
N° 7 – Grille n° 1
N° 8 – Connexion interne
N° 9 – Anode



Broches de la base, face à l'observateur

Conditions nominales d'emploi :

Tension de l'anode	Va = 250	V
Tension de la grille 2	Vg2 = 250	V
Tension de la grille 1	Vg1 = − 13,2	V
Courant anodique	Ia = 100	mA
Courant de la grille 2	Ig2 = 8,5	mA
Pente	S = 23	mA/V
Résistance interne	p = 7,3	kΩ
Coefficient d'amplification g2 g1	μg2 g1 = 13	

Emploi comme amplificatrice BF, classe AB, push-pull.

Vba	=	265	V				
Vbg2	=	265	V				
Rk commune	=	56	Ω				
Za a'	=	2,4	kΩ				
Ia	=	2	× 100	2	× 118	mA	
Ig	=	2	× 8,5	2	× 32,5	mA	
Vi	=	0		11,5		Veff	
d	=	–		5 %			
Wo	=	0		40		W	

REPRODUCTION INTERDITE

EL503

MAZDA
EL503

TETRODE
AMPLIFICATRICE DE PUISSANCE POUR A.F.
EMBASE : MAGNOVAL

Valeur à ne pas dépasser :

Tension de l'anode	Va max = 300	V
Tension de la grille 2	Vg2 max = 300	V
Courant cathodique	Ik max = 200	mA
Puissance dissipée sur l'anode	Pa max = 27	W
Puissance dissipée sur la grille 2	Pg2 max = 4	W
Puissance crête dissipée sur la grille 2	Pg2 crête max 8,5	
Résistance du circuit de grille 1 en polarisation automatique	Rg1 max = 0,5	MΩ
Tension entre filament et cathode	VkF max = 100	V

REPRODUCTION INTERDITE

ES.75

EDISWAN

ES.75

TRIODE POWER AMPLIFIER

GENERAL

The ES.75 is a power valve for use in public address equipment and large power amplifiers in general. It will be found suitable for relay service work where it can be used in place of a number of smaller output valves with a corresponding simplification of circuit. The ES.75 is similar to the ES.75.H, but has a lower amplification factor with a corresponding increase in the grid bias under working conditions. Basing connexions are shown overleaf.

RATING

Filament Voltage (volts)	V_f	10.0
Filament Current (amps)	I_f	4.2
Maximum Anode Voltage (volts)	$V_{a(max)}$	1,000
Maximum Anode Dissipation (watts)	W_a	75
Audio Output (watts) (approx.)	W_{out}	15
Amplification Factor	μ	5.0
Impedance (ohms)	r_a	2,100
Mutual Conductance (mA/V)	g_m	2.4
Grid Voltage (approx.)	V_g	150 volts negative at 1,000 anode volts.

DIMENSIONS

Maximum Overall Length (mm)	202
Maximum Diameter (mm)	57

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THE EDISON SWAN ELECTRIC COMPANY LTD.

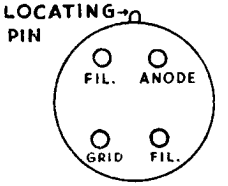
ES.75

EDISWAN

ES.75

TRIODE POWER AMPLIFIER

BASE Jumbo



Viewed from free end of pins.

APPLICATION

The rated value of 75 watts dissipation should never be exceeded. Owing to the small bulb and the special heat-resisting glass employed, the bulb becomes hot during normal operation and it should be mounted in an open well ventilated position. It is advisable to mount the valve in a vertical position with the base downwards, but if this is not desirable the filament should be in the vertical plane when the valve is mounted horizontally.

The filament may be supplied from alternating current and the anode and grid return leads should be taken to the centre tap of the filament transformer. If direct current is used for the filament, the return should be to the positive lead. When the valves are operated in parallel or push-pull, a small choke coil or low resistance should be connected in the grid circuit of each valve to prevent oscillation.

NOTE

The valve is supplied in a special wooden carrying crate to protect it from shock and vibration and it should be kept in this crate when not in use in the valve socket. When valves are kept as spares, they should be periodically used in the amplifier to ensure that they have not deteriorated over a long period.

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THE EDISON SWAN ELECTRIC COMPANY LTD.

ES.75

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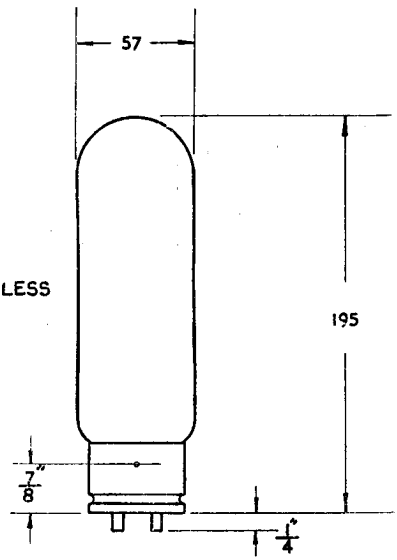
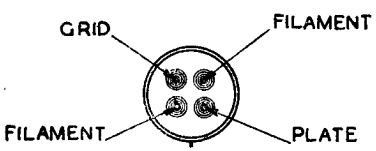
ES.75

TRIODE POWER AMPLIFIER



ALL DIMS IN m.m. UNLESS STATED OTHERWISE



UNDERSIDE VIEW OF BASE

HARD GLASS BULB

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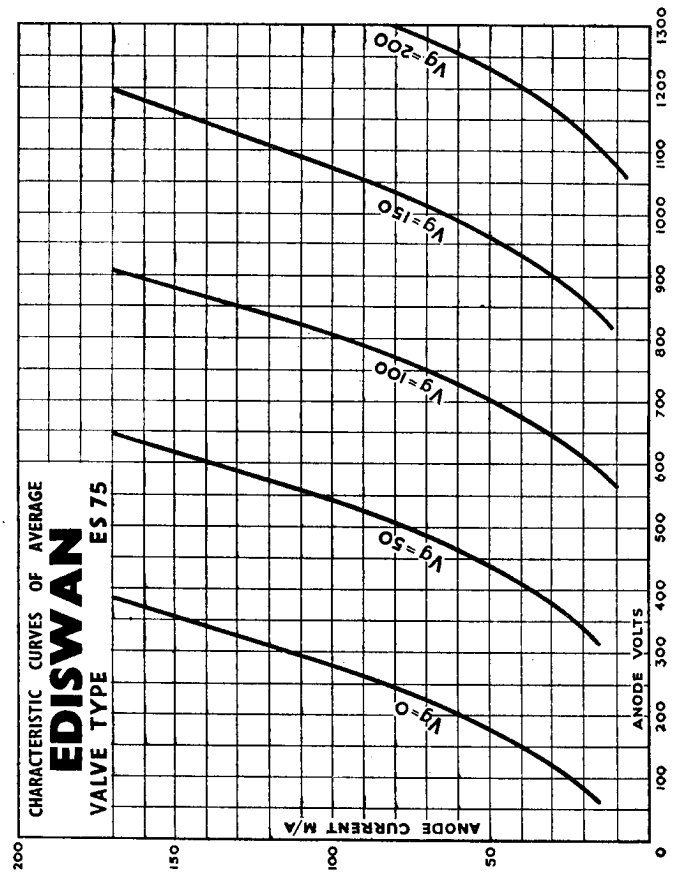
THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ES.75

TRIODE POWER AMPLIFIER



EDISWAN

ES 75 H

POWER AMPLIFIER

RATING.

Filament Voltage	10.0
Filament Current (Amps)	4.2
Maximum Anode Dissipation (Watts)	75
Maximum Anode Voltage	1,000
Amplification Factor	11
Anode A.C. Resistance (ohms) (approx.)	3,200
Mutual Conductance (mA/V)	3.4

DIMENSIONS.

Maximum Overall Length	202 mm.
Maximum Diameter	57 mm.

GENERAL.

The ES 75 H is a power valve for use in public address equipment and large power amplifiers in general. It has a thoriated tungsten filament and the anode is of graphite, giving greater heat dissipating properties and constancy of characteristic. The valve is fitted with a large American base (UX type).

APPLICATION.

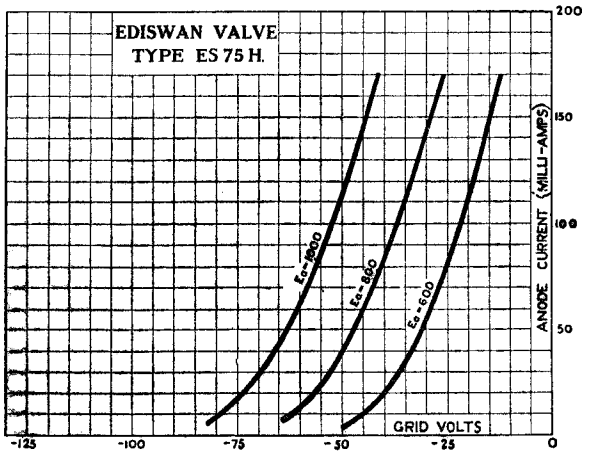
The rated value of 75 watts dissipation should never be exceeded. Owing to the small bulb and the special heat-resisting glass employed, the bulb becomes hot during normal operation and it should be mounted in an open well ventilated position. It is advisable to mount the valve in a vertical position with the base downwards, but if this is not desirable the filament should be in the vertical plane when the valve is mounted horizontally.

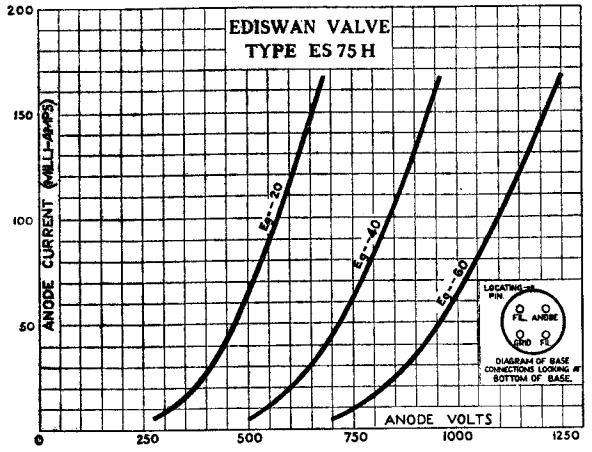
The filament may be supplied from alternating current and the anode and grid return leads should be taken to the centre tap of the filament transformer. If direct current is used for the filament, the return should be to the positive lead. When the valves are operated in parallel or push-pull, a small choke coil or low resistance should be connected in the grid circuit of each valve to prevent oscillation.

NOTE.

The valve is supplied in a special wooden carrying crate to protect it from shock and vibration and it should be kept in this crate when not in use in the valve socket. When valves are kept as spares, they should be periodically used in the amplifier to ensure that they have not deteriorated over a long period.

EDISWAN





THE EDISON SWAN ELECTRIC CO., LTD.

155, CHARING CROSS RD. LONDON, W.C.2.

EDISWAN RADIO

EDISWAN

ES 250 M

POWER AMPLIFYING VALVE

RATING.

Filament Voltage	11.0
Filament Current (Amps)	4
Maximum Anode Dissipation (Watts)	250
Maximum Anode Voltage	2,000
Amplification Factor	15
Impedance (ohms)	4,000

DIMENSIONS.

Maximum Overall Length	307 mm.
Maximum Diameter	125 mm.

BASING.

Top Connexion (cap with knife)	Grid and Filament
Bottom Connexion	Anode

GENERAL.

The ES 250 M is a high power amplyifing valve with a dull-emitter filament. The construction is very robust and the special hard glass envelope ensures freedom from electrolysis and enables the vacuum to be maintained without deterioration throughout life. The anode is of molybdenum, giving remarkable constancy of characteristic and free radiation of heat. The valve is also suitable for use as an oscillator.

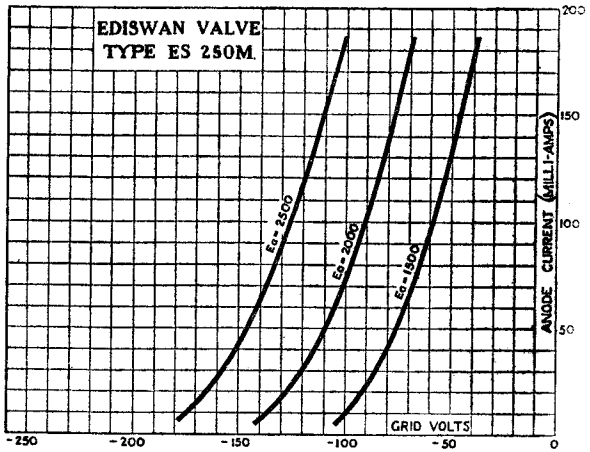
APPLICATION.

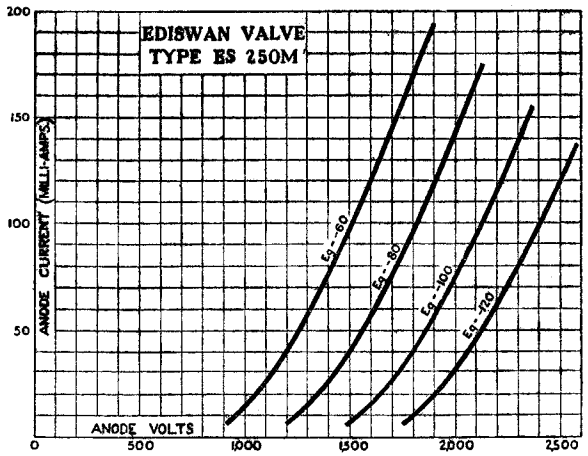
The valve is particularly suitable for use in the output stage of large audio-frequency amplifiers and is capable of supplying up to 30 watts of audio power to the reproducing system. As an oscillator or high frequency amplifier, it is suitable for working at frequencies up to 20 megacycles, although at the latter frequency the anode dissipation should not exceed 200 watts. It is desirable to state the working frequency when ordering this valve.

NOTE.

The valve is supplied in a wooden crate to ensure safety in transit. This crate should be kept intact, and the valve should be stored in it when not actually required for use.

EDISWAN





THE EDISON SWAN ELECTRIC CO., LTD.

155, CHARING CROSS RD, LONDON, W.C.2.

EDISWAN RADIO

ES.450.X

EDISWAN

ES.450.X

RADIATION COOLED TRIODE

GENERAL

The ES.450.X is a transmitting type triode with a pure tungsten filament. It is particularly suitable for use as an R.F. Oscillator in small R.F. heating equipments.

RATING

Filament Voltage (volts)	V_f	18.0
Filament Current (amps)	I_f	5.15
Maximum Anode Voltage (volts)	$V_{a(max)}$	5,000
Maximum Anode Dissipation (watts)	$W_{a(max)}$	450
Mutual Conductance (mA/V)	g_m *	1.5
Amplification Factor	μ *	30
Anode Impedance (ohms)	V_a *	20,000
Maximum operating frequency at full rating.		1 Mc/s

* Taken at V_a = 2,000. V_g = 0.

DIMENSIONS

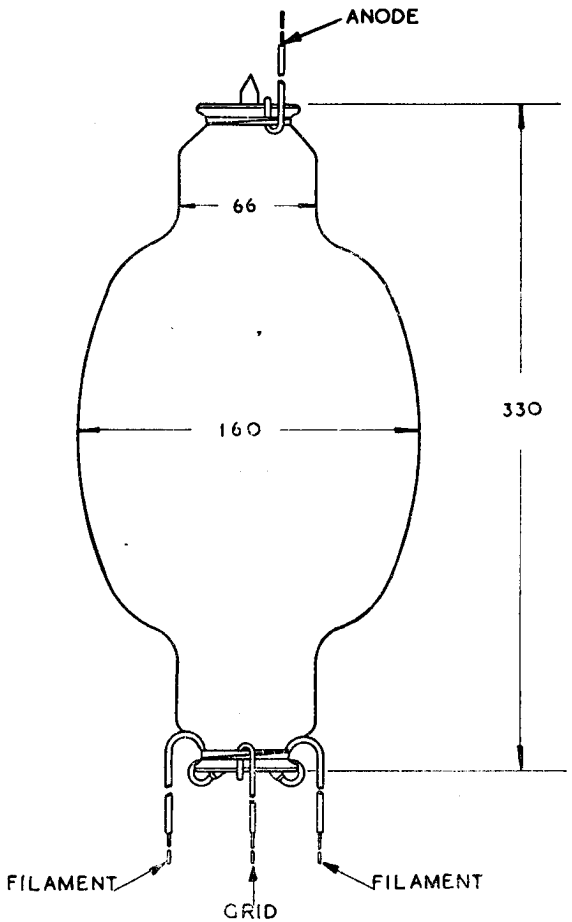
Maximum Overall Length (mm)	330
Maximum Diameter (mm)	160
Approximate Nett Weight (ozs)	22.0
Approximate Home Packed Weight (lbs)	8.0
Approximate Export Packed Weight (lbs)	8.5

MOUNTING POSITION - Vertical.

EDISWAN

ES.450.X

RADIATION COOLED TRIODE



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THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ES 1500

MEDIUM WAVE OSCILLATOR

RATING.

Filament Voltage	15.5
Filament Current (Amps)	24
Maximum Anode Voltage	7,500
Maximum Anode Dissipation (Watts)	1,500
Amplification Factor	45
Mutual Conductance (mA/V)	2.25
Impedance (ohms)	20,000

DIMENSIONS.

Maximum Overall Length	565 mm.
Maximum Diameter	185 mm.

BASING.

Top Connexion	Anode
Bottom Connexion	Filament and Grid

GENERAL.

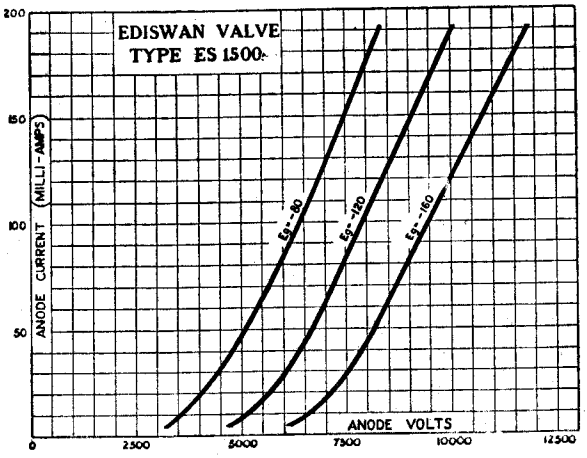
The ES 1500 is a high power medium wave oscillator designed for working at frequencies up to 1.0 Mc/sec.

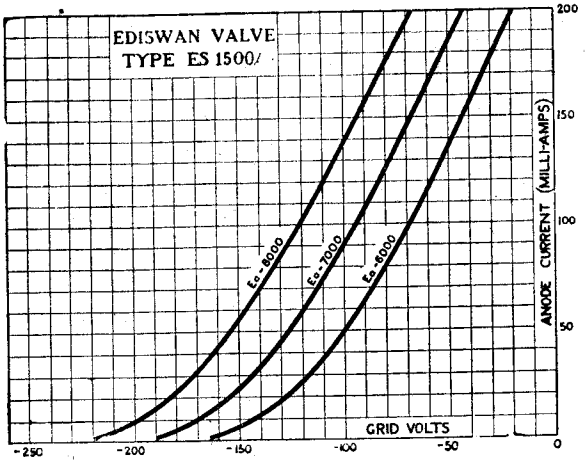
The valve is air-cooled, and is intended for operation in a well-ventilated position.

It is suitable for use in high-frequency oscillators for eddy current heating.

The maximum current capacity of the seals is 5.0 amps H.

EDISWAN





THE EDISON SWAN ELECTRIC CO., LTD.

155, CHARING CROSS RD. LONDON, W.C.2.

EDISWAN RADIO

EDISWAN

ES 1500 A

SHORT WAVE OSCILLIATOR

RATING

Filament Voltage	15.5
Filament Current (Amps)	24
Maximum Anode Voltage	7,500
Maximum Anode Dissipation (Watts)	1,500
Amplification Factor	45
Mutual Conductance (mA/V)	2.25
Impedance (ohms)	20,000

DIMENSIONS.

Maximum Overall Length	528 mm.
Maximum Diameter	186 mm.

BASING.

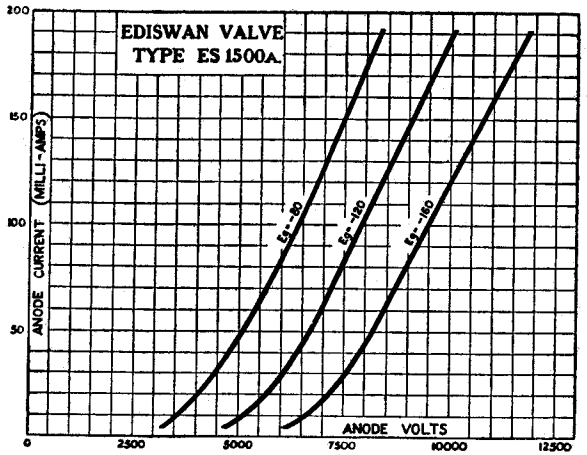
Top Connexion	Anode
Bottom Connexion	Filament and Grid

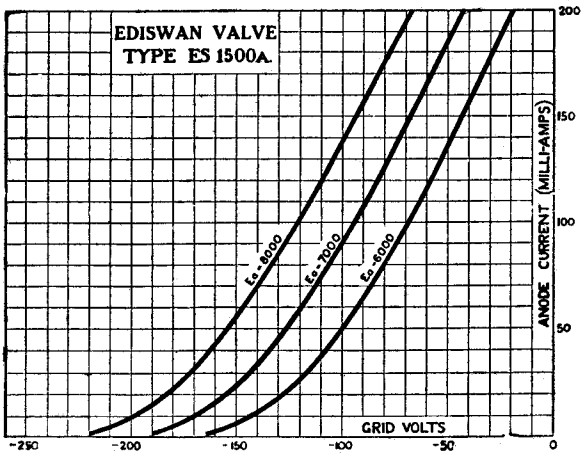
GENERAL.

The ES 1500 A is a high power short-wave oscillator or amplifier designed for short-wave working at frequencies up to 20 megacycles. The valve is constructed in hard glass, which eliminates envelope puncture and permits a very high degree of vacuum to be obtained, ensuring absolute stability in working. Single valves of this type are capable of supplying 2.5 kilowatts of energy at wave lengths down to 15 metres working at anode voltages up to 7,500. At reduced anode wattage the valves can be operated down to 10 metres.

The maximum grid and anode seal capacity

EDISWAN





THE EDISON SWAN ELECTRIC CO., LTD.

155, CHARING CROSS RD. LONDON, W.C.2.

EDISWAN RADIO

ES 1500 C

MEDIUM WAVE OSCILLATOR

RATING.

Filament Voltage	14.5
Filament Current (Amps)	28
Maximum Anode Voltage	7,500
Maximum Anode Dissipation (watts)	1,500
Amplification Factor	35
Mutual Conductance (mA/V)	2.2
Impedance (ohms)	16,000

DIMENSIONS.

Maximum Overall Length	550 mm.
Maximum Diameter	185 mm.

BASING.

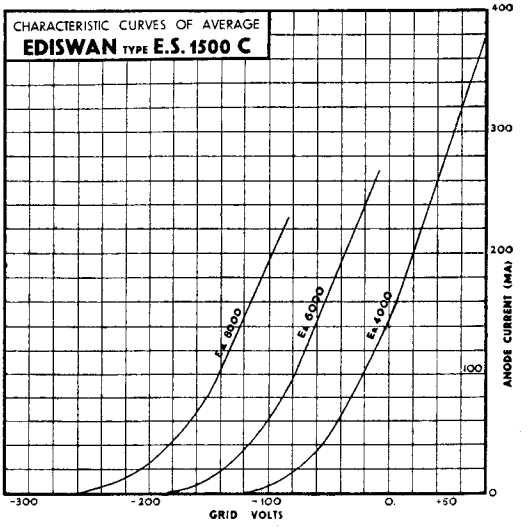
Top Connexion	Anode
Bottom Connexion	Filament and Grid

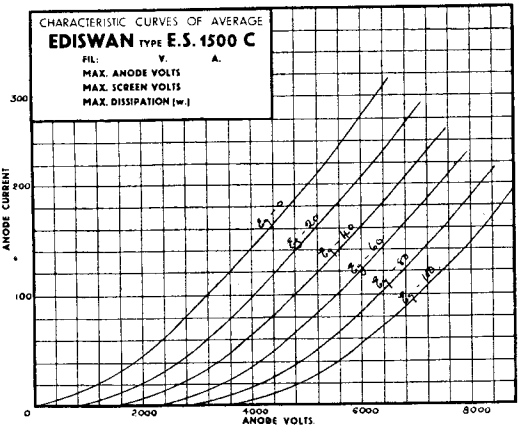
GENERAL.

This valve has a hard glass envelope, and is constructed for use under more severe operating conditions than the ES 1500.

The maximum current capacity of the seals is 15.0 amps. H.F.

EDISWAN





THE EDISON SWAN ELECTRIC CO., LTD.

155, CHAR2NG CROSS RD.
LONDON, W.C.2.

EDISWAN RADIO

ESG.250

EDISWAN

ESG.250

POWER TETRODE

RATING		
Filament Voltage (volts)	V_f	11.25
Filament Current (amps)	I_f	8.0
Maximum Anode Voltage (volts)	$V_{a(max)}$	5,000
Maximum Screen Voltage (volts)	$V_{g2(max)}$	1,000
Maximum Anode Dissipation (watts)	$W_{a(max)}$	250
Maximum Screen Dissipation (watts)	$W_{g2(max)}$	100
Mutual Conductance (mA/V)	g_m	‡ 1.0
Amplification Factor	μ	‡ 100

‡ V_a = 3,000v; V_{g2} = 600v; V_{g1} = -40v.

INTER-ELECTRODE CAPACITANCES		
Anode - Filament (μμF)	C_{a-f}	0.7
Anode - Grid 1 (μμF)	C_{a-g1}	1.2
Grid 1 - Filament (μμF)	C_{g1-f}	6.4

DIMENSIONS	
Maximum Overall Length (mm)	395
Maximum Diameter (mm)	160
Approximate Nett Weight (lbs)	2
Approximate Packed Weight (lbs)	7½

MOUNTING POSITION - Vertical

August 1948 RADIO DIVISION Issue 1/5

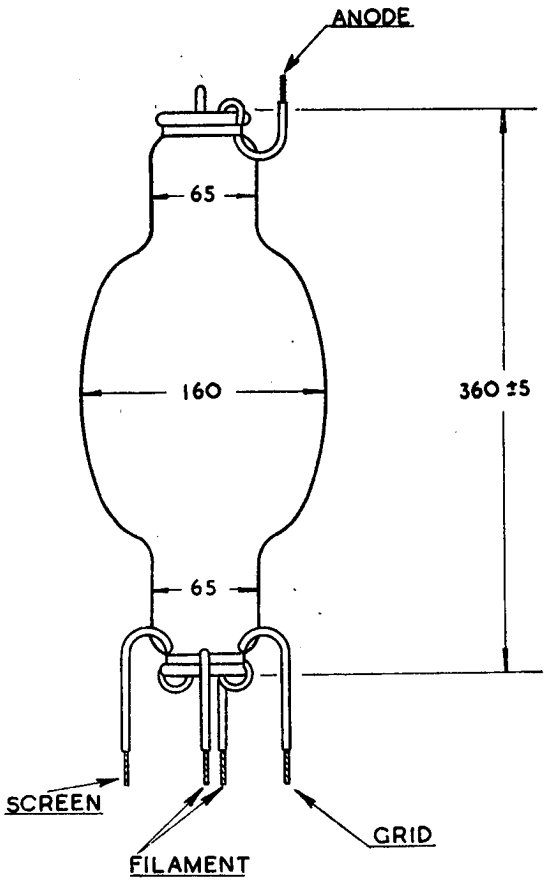
THE EDISON SWAN ELECTRIC COMPANY LTD

EDISWAN

ESG.250

POWER TETRODE

E.S.G. 250



ALL DIMS IN m/m UNLESS STATED OTHERWISE

August 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD

EDISWAN

ESU15

HALF WAVE MERCURY VAPOUR RECTIFIER

(Previously EHT15)

REPLACEMENT TYPE ←

GENERAL ←

The ESU15 is a directly heated high voltage half wave rectifier of the mercury vapour type and must be operated in an inverted position.

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	15
Maximum Peak Inverse Anode Voltage (kV)	P.I.V.	20
Peak Anode Current (amps)	$I_{a(pk)}$	15
Maximum Mean Anode Current (amps)	$I_{a(mean)}$	3.0
Cathode Heating Delay (secs)		60
Maximum Condensed Mercury Temperature (°C)		60 ←

DIMENSIONS

Maximum Overall Length (mm)	425
Maximum Diameter (mm)	150

OPERATING NOTE ←

When operating the valve above 10 kV P.I.V. attention must be paid to the cooling of the valve as the condensed mercury temperature should be kept lower than the maximum temperature rating of the valve (i.e. 60°C). For maximum safety factor a condensed mercury temperature of 40°C is recommended.

ESU15

EDISWAN

ESU15

HALF WAVE MERCURY VAPOUR RECTIFIER

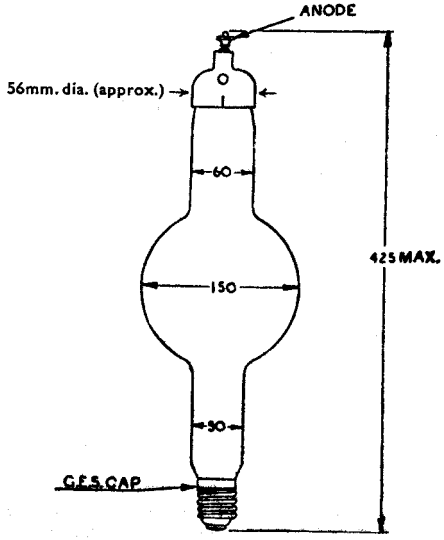
(Previously EHT15)

REPLACEMENT TYPE ←

IMPORTANT NOTE

It is important that the cathode be allowed to attain full operating temperature before the H.T. voltage is applied to the Anode. When first placed into service, it is essential that the filament is run at its rated value for 15 mins. before applying H.T. to anode and thereafter a delay of at least a minute should elapse before the anode supply is switched on. When switching off, disconnect the H.T. supply before the cathode supply.

When rectifiers are kept as spares it is recommended that they be run under operating conditions at intervals of six months to ensure that they have suffered no deterioration through being kept in stock.



All Dimensions in mm.

Indicates a change ←

December 1958 — *INDUSTRIAL VALVE & CRT DIVISION* — Issue 2/6

SIEMENS EDISON SWAN LIMITED

EDISWAN

ESU74

HIGH VACUUM HALF WAVE RECTIFIER

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	11.5
Maximum Peak Inverse Voltage (volts)	P.I.V. (max)	40,000
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	80
Average Maximum Filament Emission (amps)	I_{em}	1.1
Maximum Anode Dissipation (watts)	P_a	50

DIMENSIONS

Maximum Overall Length	(mm)	250
Maximum Diameter	(mm)	60
Approximate Nett Weight	(ozs)	7.0
Approximate Packed Weight	(lbs)	2.0
Approximate Packed Export Weight	(lbs)	2.0

MOUNTING POSITION—Vertical.

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Associated Electrical Industries Limited

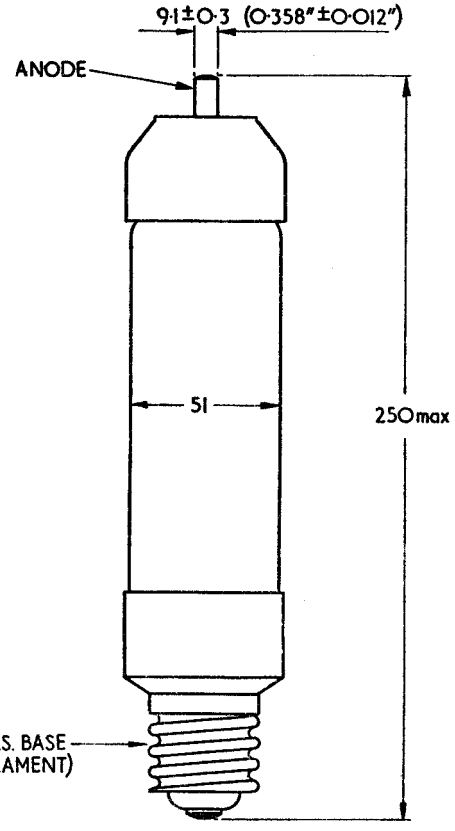
RADIO & ELECTRONIC COMPONENTS DIVISION

ESU74

EDISWAN

ESU74

HIGH VACUUM HALF WAVE RECTIFIER



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Associated Electrical Industries Limited

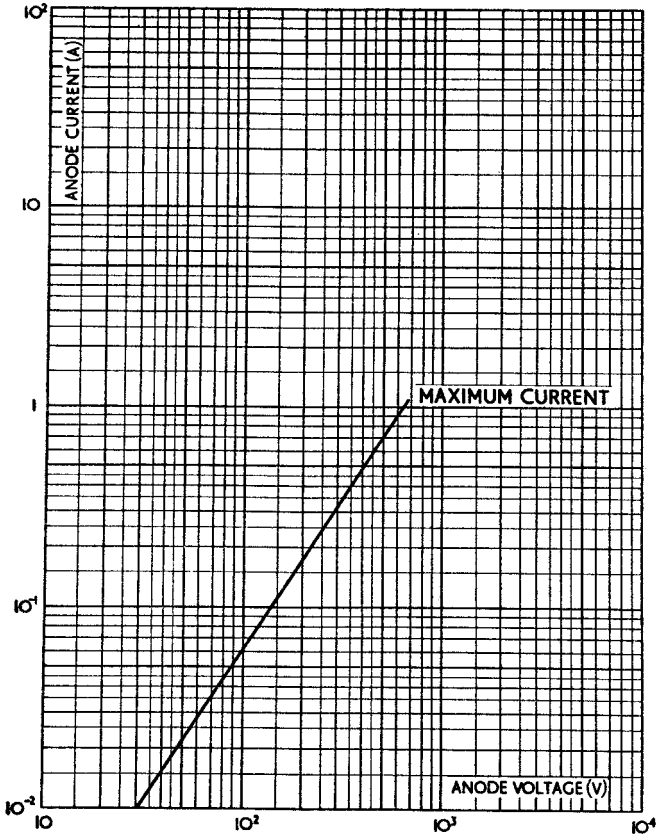
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

ESU74

HIGH VACUUM HALF WAVE RECTIFIER

TYPICAL CHARACTERISTIC CURVES: I_a/V_a



November, 1960 Issue 1/6

Associated Electrical Industries Limited
RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

ESU 75

MERCURY VAPOUR RECTIFIER

RATING.

Filament Voltage	2.0
Filament Current (Amps.)	10.0
*Maximum Peak Inverse Voltage	7,000
Maximum Peak Anode Current (Amps.)	0.9
Voltage Drop	12

*For Circumambient Air Temperature 10° to 50° C.

DIMENSIONS.

Maximum Overall Length (Approx.)	185 mm.
Maximum Diameter (Approx.)	78 mm.

GENERAL.

The ESU 75 is a half-wave mercury vapour rectifier suitable for supplying high tension current to output valves, such as in public address amplifiers, transmitters, etc., and has been designed particularly to work in conjunction with the ES 75 and ES 75 H power amplifiers. The valve is fitted with a Goliath Edison screw cap and the anode is connected to a terminal at the top of the bulb.

In mercury vapour rectifiers, as distinct from thermionic rectifiers, the current is carried by mercury ions produced by the collision of electrons with the molecules of mercury vapour present in the bulb. In operation the bulb of the rectifier is filled with a blue glow, which is characteristic of mercury vapour-filled bulbs. The ionisation of the vapour serves to neutralise the spacecharge round the cathode and thus reduces the internal resistance of the valve. It is this property which gives mercury vapour rectifiers their excellent regulation characteristics and enables large currents to pass between anode and cathode with low power loss. The voltage drop in the valve is of the order of 10–15, and remains constant under variation in load current up to the maximum rating of the valve.

As long as this low-voltage drop is maintained there is no danger of positive ion bombardment destroying the emissive properties of the cathode. To avoid this, it is essential that no attempt is made to exceed the maximum peak anode current for the particular size of cathode employed. When the cathode is first switched on, if the anode voltage is simultaneously applied, the cathode is unable to supply the full emission required by the output circuit. The voltage drop under these conditions is excessive, causing violent bombardment of the cathode and its ultimate destruction. It is advisable to employ a thermal delay switch in mercury vapour rectifier circuits, or arrange that the anode voltage is switched on after the cathode has attained its full temperature.

APPLICATION.

When a mercury vapour rectifier is first placed in service, its filament should be operated at normal voltage for approximately 15 minutes without anode voltage in order to distribute the mercury properly. This procedure need not be repeated unless, during subsequent handling, the mercury is spattered on to the filament and anode.

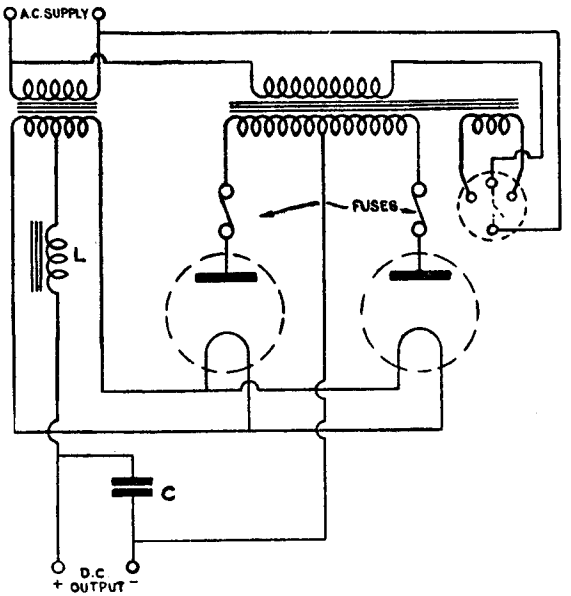
Mount the rectifier vertically in a well-ventilated position as the bulb becomes hot during continuous operation. To avoid the possibility of flash-back on reverse voltage, the temperature of the rectifier bulb should not be allowed to exceed 50° C. Where there is a possibility of the air temperature rising considerably, an air draught cooling should be used.

To prevent damage to rectifier and equipment in case of a short circuit, it is necessary to connect a fuse of suitable value in series with each rectifying valve anode.

Unless the valve is operated on very light loads, the filament must be allowed to attain its full operating temperature before the anode voltage is applied, and a delay of at least 10 seconds should elapse before the anode supply is switched on. A delay switch is recommended for full load operation (see DLS 10).

The filament supply should not be switched off before the H.T. supply.

SUGGESTED CIRCUIT DIAGRAM FOR USE WITH ESU 75.



A typical H.T. rectifier circuit using a thermal delay switch in the primary of the H.T. transformer.

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS RD. LONDON, W.C.2.

ESU.76

EDISWAN

ESU.76

HALF-WAVE MERCURY VAPOUR RECTIFIER

GENERAL

When the rectifier is first placed in service the filament should be operated at normal voltage for 15 minutes without anode voltage in order to obtain correct distribution of the mercury. Care must be taken in installation to ensure free circulation of air around the bulb in order that the temperature limits are not exceeded.

RATING

Filament Voltage (volts)	V_f	2.0	
Filament Current (amps)	I_f	7.5	←
Maximum Peak Inverse Voltage (volts)	P.I.V.(max)	10,000	←
Maximum Average Anode Current (amps)	$I_{a(max)}$	0.25	←
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	0.9	
Ambient Temperature Range (°C)		20 - 60	
Cathode Heating Delay Time (secs)		60	

DIMENSIONS

Maximum Overall Length (mm)	175
Maximum Diameter (mm)	54
Approximate Nett Weight (ozs)	4
Approximate Packed Weight (ozs)	6½
Approximate Packed Export Weight (lbs)	2

MOUNTING POSITION - Vertical

Indicates a change ←

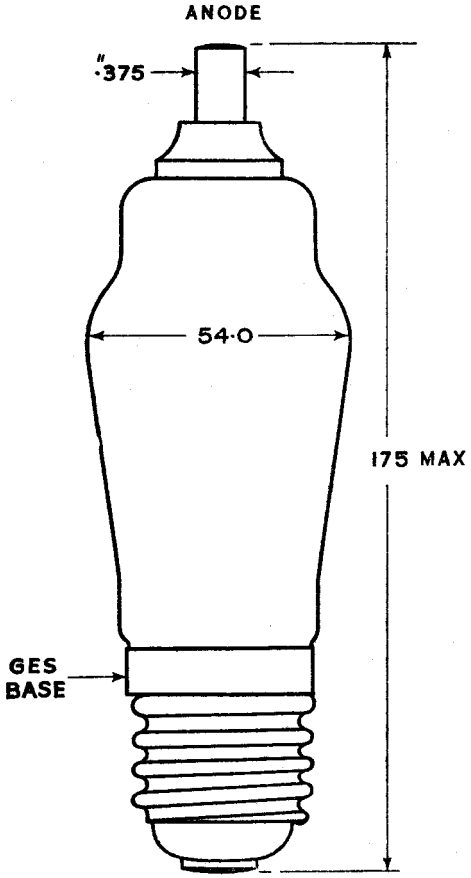
THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU.76

EDISWAN

ESU.76

HALF-WAVE MERCURY VAPOUR RECTIFIER



All dimensions in mm. unless otherwise stated

March 1953 *RADIO DIVISION* Issue 2/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA
ESU.77
HALF-WAVE HIGH VACUUM RECTIFIER

RG.4857B/1

GENERAL

The ESU.77 is a directly heated Thoriated Tungsten filament high voltage half-wave rectifier employing a tantalum anode.

RATING

Filament Voltage (volts)	V_f	4
Filament Current (amps)	I_f	12
Maximum Peak Inverse Voltage (kV)	P.I.V.max.	40
Maximum Peak Anode Current for Rectifier and Diode charging conditions (amps)	$I_{a(pk)max.}$	1.1
Maximum Anode Dissipation (watts)	P_a	130
Nominal Internal Resistance at 300 mA (ohms)		600

DIMENSIONS

Maximum Overall Length (mm)	270
Maximum Diameter (mm)	61

BASE - G.E.S.

MOUNTING POSITION - Vertical

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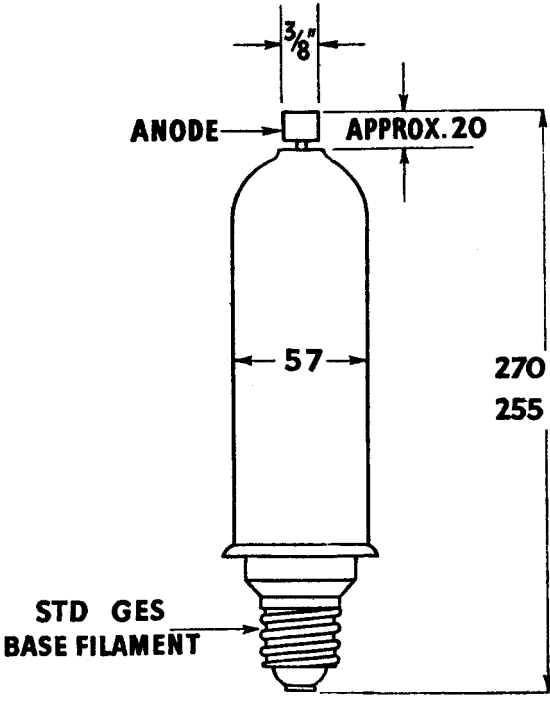
RADIO DIVISION
THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU.77

MAZDA
ESU.77
HALF-WAVE HIGH VACUUM RECTIFIER



RG.4857C/1

HARD GLASS BULB

All dimensions in mm. unless stated otherwise

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RADIO DIVISION

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ESU101

HALF-WAVE MERCURY VAPOUR RECTIFIER

TENTATIVE

GENERAL

The ESU101 is a directly heated high voltage half-wave mercury vapour rectifier, which has been designed for use in radio relay amplifiers.

RATING

Filament Voltage (volts)	V_f	4·0
Filament Current (amps)	I_f	2·7
Maximum Peak Inverse Voltage (kV)	P.I.V.(max)	10·0
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	1·25
Maximum Mean Anode Current(amps)	$I_{a(av)max}$	0·25
Voltage Drop (approx) (volts)	V_{drop}	16
Condensed Mercury Temperature Range (°C)		20 to 60
Heating Time (seconds)		60

DIMENSIONS

Maximum Overall Length	(mm)	139
Maximum Diameter	(mm)	48
Approximate Nett Weight	(ozs)	2
Approximate Packed Weight	(ozs)	$3\frac{1}{4}$

MOUNTING POSITION Vertical, base downwards.

TYPICAL OPERATION

A Biphase Half Wave Rectifier using two valves can give an output of 500 mA at 3.2 kV.

NOTES

The H.T. supply to the anode should not be switched on until the specified filament heating time has elapsed. When newly installed or after a period of disuse the filament should be run at normal temperature for 15 minutes before the application of the H.T. voltage.

ESU101

EDISWAN

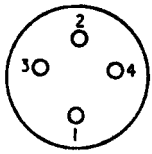
ESU101

HALF-WAVE MERCURY VAPOUR RECTIFIER

TENTATIVE

BULB Clear.

BASE British 4 Pin (B4).



Viewed from free end of pins.

CAP $\frac{11}{16}$ ins. diameter.

VALVEHOLDER EDISWAN CLIX VH300/4, VH42/4.

TOP CAP CONNECTOR EDISWAN CLIX TC434

CONNECTIONS

Pin 1	No Connection	NC
Pin 2	No Connection	NC
Pin 3	Filament	f
Pin 4	Filament	f
Top Cap	Anode	a

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SIEMENS EDISON SWAN LIMITED

EDISWAN

ESU103

HALF-WAVE XENON RECTIFIER

TENTATIVE

GENERAL

The ESU103 is a directly heated half-wave Xenon Rectifier requiring a heating delay time of 10 seconds. Two rectifiers in a Full-wave circuit will give an output of 0.5 amps at 3.2kV or 1.0 amp at 1.6kV. This rectifier may be operated in the ambient temperature range —50°C to +75°C.

RATING

Filament Voltage (volts)	V_f	2.5	
Filament Current (amps)	I_f	5.0	
Maximum Peak Inverse Voltage (kV)	PIV (max)	5.0	10.0
Maximum Peak Anode Current (amps)	$i_{a(pk)max}$	2.0	1.0
Maximum Mean Anode Current (amps)	$I_{a(av)max}$	0.5	0.25
Maximum Voltage Drop (volts)			12.0
Minimum Heating Time (secs)			10
Ambient Temperature Range (°C)			—55 to +75

DIMENSIONS

Maximum Overall Length	(mm)	160
Maximum Seated Height	(mm)	144
Maximum Diameter	(mm)	52
Approximate Nett Weight	(ozs)	4
Approximate Packed Weight	(ozs)	8

MOUNTING POSITION—Unrestricted

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Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

ESU103

EDISWAN

ESU103

HALF-WAVE XENON RECTIFIER

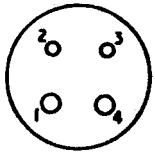
TENTATIVE

TYPICAL OPERATION—Full-wave (2 Valves)

Peak Inverse Voltage Rating (kV)	PIV(max)	5	10
Output Voltage (kV)	V_{out}	1.6	3.2
Output Current (amps)	I_{out}	1.0	0.5

TOP CAP—CT3

BASE—UX4 with Bayonet



Viewed from free end of pins.

VALVE HOLDER—Ediswan Clix VH262/4

TOP CAP CONNECTOR—Ediswan Clix TC433

CONNECTIONS

Pin 1	Filament	f
Pin 2	No Connection	NC
Pin 3	No Connection	NC
Pin 4	Filament, Shield	f,s
Top Cap	Anode	a

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EDISWAN

ESU104

HALF-WAVE XENON RECTIFIER

TENTATIVE

ESU104

GENERAL

The ESU104 is a directly heated half-wave Xenon Rectifier requiring a heating delay time of 10 seconds. Two rectifiers in a Full Wave circuit will give an output of 0.5 amps at 3.2kV or 1.0 amp at 1.6kV. This rectifier may be operated in the ambient temperature range—50°C to +75°C.

RATING

Filament Voltage (volts)	V_f	4.0	
Filament Current (amps)	I_f	2.8	
Maximum Peak Inverse Voltage (kV)	$PIV_{(max)}$	5.0	10.0
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	2.0	1.0
Maximum Mean Anode Current (amps)	$I_{a(av)max}$	0.5	0.25
Maximum Voltage Drop (volts)			12.0
Minimum Heating Time (secs)			10
Ambient Temperature Range (°C)		—50 to +75	

DIMENSIONS

Maximum Overall Length	(mm)	160
Maximum Seated Height	(mm)	144
Maximum Diameter	(mm)	52
Approximate Nett Weight	(ozs)	4
Approximate Packed Weight	(ozs)	8

MOUNTING POSITION—Unrestricted

TYPICAL OPERATION—Full Wave (2 valves)

Peak Inverse Voltage Rating (kV)	$PIV_{(max)}$	5.0	10.0
Output Voltage (kV)	V_{out}	1.6	3.2
Output Current (amps)	I_{out}	1.0	0.5

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RADIO & ELECTRONIC COMPONENTS DIVISION

ESU104

EDISWAN

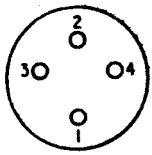
ESU104

HALF-WAVE XENON RECTIFIER

TENTATIVE

TOP CAP—CT3

BASE—B4



Viewed from free end of pins

VALVE HOLDER—Ediswan Clix VH300/4, VH42/4

TOP CAP CONNECTOR—Ediswan Clix TC433

CONNECTIONS

Pin 1	No Connection	NC
Pin 2	No Connection	NC
Pin 3	Filament	f
Pin 4	Filament, Shield	f,s
Top Cap	Anode	a

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Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

ESU105

HALF-WAVE XENON RECTIFIER

TENTATIVE

GENERAL

The ESU105 is a directly heated half-wave Xenon Rectifier requiring a heating delay time of 10 seconds. Two rectifiers in a Full Wave circuit will give an output of 0.5 amps at 3.2kV or 1.0 amp at 1.6kV. This rectifier may be operated in the ambient temperature range —50°C to +75°C.

RATING

Filament Voltage (volts)	V_f	2.0	
Filament Current (amps)	I_f	7.0	
Maximum Peak Inverse Voltage (kV)	$PIV_{(max)}$	5.0	10.0
Maximum Peak Anode Current (amps)	$i_{a(pk)max}$	2.0	1.0
Maximum Mean Anode Current (amps)	$I_{a(av)max}$	0.5	0.25
Maximum Voltage Drop (volts)			12.0
Minimum Heating Time (secs)			10
Ambient Temperature Range (°C)		—50 to +75	

DIMENSIONS

Maximum Overall Length	(mm)	170
Maximum Diameter	(mm)	52
Approximate Nett Weight	(ozs)	4
Approximate Packed Weight	(ozs)	8

MOUNTING POSITION—Unrestricted

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Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

ESU105

EDISWAN

ESU105

HALF-WAVE XENON RECTIFIER

TENTATIVE

TYPICAL OPERATION—Full Wave (2 valves)

Peak Inverse Voltage Rating (kV)	$PIV_{(max)}$	5.0	10.0
Output Voltage (kV)	V_{out}	1.6	3.2
Output Current (amps)	I_{out}	1.0	0.5

TOP CAP—CT3

BASE—GES

VALVE HOLDER—Ediswan Clix 4857

TOP CAP CONNECTOR—Ediswan Clix TC433

CONNECTIONS

Base Centre	Filament, Shield	f,s
Base Shell	Filament	f
Top Cap	Anode	a

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Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

ESU106

HALF-WAVE MERCURY VAPOUR RECTIFIER

TENTATIVE

GENERAL

THE ESU106 is an indirectly heated half-wave Mercury Vapour Rectifier having a normal cathode heating delay time of five minutes. Two rectifiers in a full wave circuit will give an output of 6 amps at 6.3kV. This rectifier may be operated with condensed mercury temperatures in the range +25°C to +70°C.

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	14.0 to 16.0
Maximum Peak Inverse Voltage (kV)	PIV(max)	20.0†
Maximum Peak Anode Current (amps)	$i_{a(pk)max}$	15.0†
Maximum Mean Anode Current (amps)	$I_{a(av)max}$	3.0†
Maximum Voltage Drop (volts)		15.0
Minimum Cathode Heating Time (at 15°C) (minutes)		5.0*
Condensed Mercury Temperature Range (°C)		+25 to +70
Maximum Surge Cathode Current (0.1 sec max) (amps)	$I_{k(surge)max}$	150

* At free air ambient temperature 10°C heating time is 10 minutes, at 5°C heating time is 20 minutes.

† See " Typical Operation " for temperature derating.

DIMENSIONS

Maximum Overall Length	(mm)	310
Maximum Diameter	(mm)	78
Approximate Nett Weight	(lbs)	1
Approximate Packed Weight	(lbs)	8

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Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

ESU106

EDISWAN

ESU106

HALF-WAVE MERCURY VAPOUR RECTIFIER

TENTATIVE

MOUNTING POSITION—Vertical, base downwards

TYPICAL OPERATION

A Full Wave Rectifier using 2 valves can deliver an output of 6 amps at 6.3kV.

Condensed Mercury Temperature (°C)		70	65	60	55—25
Maximum Peak Inverse Voltage (kV)	$PIV_{(max)}$	5	10	15	20
Maximum Peak Cathode Current (amps)	$i_{k(pk)max}$	30	20	18	15
Maximum Mean Cathode Current (amps)	$I_{k(av)max}$	7	5	4	3

NOTE

The cathode of this rectifier should be allowed an adequate heating time, preferably longer than the specified absolute minimum but in any circumstances no shorter, before the application of anode voltage.

The condensed mercury temperature, which may be measured with a thermocouple attached to the coolest part of the bulb, should never pass outside the specified limits during operation.

After transportation, or a period of storage, or when first placed in service, an initial cathode heating time of 30 minutes should be allowed to ensure the correct distribution of the mercury within the valve.

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Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

ESU106

EDISWAN

ESU106

HALF-WAVE MERCURY VAPOUR RECTIFIER

TENTATIVE

BASE—GES

TOP CAP—CT3

VALVE HOLDER—Ediswan Clix 4857

TOP CAP CONNECTOR—Ediswan Clix TC433

CONNECTIONS

Base Centre	Heater, Cathode	h,k
Base Shell	Heater	h
Top Cap	Anode	a

November, 1960 Issue 1/6

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

EDISWAN

ESU115

HALF-WAVE MERCURY VAPOUR RECTIFIER

GENERAL

The ESU115 is a directly heated high voltage half-wave mercury vapour rectifier, which has been designed for use in radio relay amplifiers.

RATING

Filament Voltage (volts)	V_f	4·0
Filament Current (amps)	I_f	2·7
Maximum Peak Inverse Voltage (kV)	P.I.V.(max)	6·5
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	1·25
Maximum Mean Anode Current(amps)	$I_{a(av)max}$	0·25
Voltage Drop (approx) (volts)	V_{drop}	16
Condensed Mercury Temperature Range (°C)		20 to 60
Heating Time (seconds)		60

DIMENSIONS

Maximum Overall Length	(mm)	139
Maximum Diameter	(mm)	48
Approximate Nett Weight	(ozs)	3
Approximate Packed Weight	(ozs)	3¼

MOUNTING POSITION—Vertical, base downwards.

TYPICAL OPERATION

A Biphase Half Wave Rectifier using two valves can give an output of 500 mA at 2·0 kV.

NOTES

The H.T. supply to the anode should not be switched on until the specified filament heating time has elapsed. When newly installed or after a period of disuse the filament should be run at normal temperature for 15 minutes before the application of the H.T. voltage.

July, 1960 Issue 1/6

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

ESU115

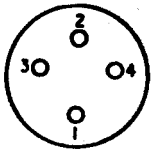
EDISWAN

ESU115

HALF-WAVE MERCURY VAPOUR RECTIFIER

BULB—Clear.

BASE—British 4 Pin (B4).



Viewed from free end of pins.

CAP—CT2.

VALVEHOLDER—EDISWAN CLIX VH300/4, VH42/4.

TOP CAP CONNECTOR—EDISWAN CLIX TC430.

CONNECTIONS

Pin 1	No Connection	NC
Pin 2	No Connection	NC
Pin 3	Filament	f
Pin 4	Filament	f
Top Cap	Anode	a

July, 1960 Issue 1/6

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

ESU 150

MERCURY VAPOUR RECTIFIER

RATING.

Filament Voltage	4.0
Filament Current (Amps.) (approx.)	10.0
Maximum Anode Voltage (RMS)	3,500
*Maximum Peak Inverse Voltage	10,000
Peak Anode Current (Amps.)	1.8
Voltage Drop (approx.)	12

* For Circumambient Air Temperature O° C to 50° C.

DIMENSIONS.

Maximum Overall Length	210 mm.
Maximum Diameter	58 mm.

GENERAL.

The ESU 150 is a half-wave rectifier suitable for supplying high tension current to large power valves employed in public address amplifiers, transmitting valves, etc. The valve is constructed in hard glass and is fitted with a Goliath Edison screw cap and the anode is connected to a terminal at the top of the bulb.

In mercury vapour rectifiers, as distinct from thermionic rectifiers, the current is carried by mercury ions produced by the collision of electrons with the molecules of mercury present in the bulb. In operation the bulb of the rectifier is filled with a blue glow, which is characteristic of mercury vapour filled bulbs. The ionisation of the vapour serves to neutralise the space-charge round the cathode and thus reduces the internal resistance of the valve. It is this property which gives mercury vapour rectifiers their excellent regulation characteristics and enables large currents to pass between anode and cathode with low power loss. The voltage drop in the valve is of the order of 10–15, and remains constant under variations in load current up to the maximum rating of the valve.

As long as this low voltage drop is maintained there is no danger of positive ion bombardment destroying the emissive properties of the cathode. To avoid this, it is essential that no attempt is made to exceed the maximum peak anode current for the particular size of cathode employed. When the cathode is first switched on, if the anode voltage is simultaneously applied, the cathode is unable to supply the full emission required by the output circuit. The voltage drop under these conditions is excessive, causing violent bombardment of the cathode and its ultimate destruction. It is advisable to employ a thermal delay switch in mercury vapour rectifier circuits, or arrange that the anode voltage is switched on after the cathode has attained its full temperature.

APPLICATION.

When a mercury vapour rectifier is first placed in service, its filament should be operated at normal voltage for approximately 15 minutes, without anode voltage in order to distribute the mercury properly. This procedure need not be repeated unless, during subsequent handling, the mercury is spattered on to the filament and anode.

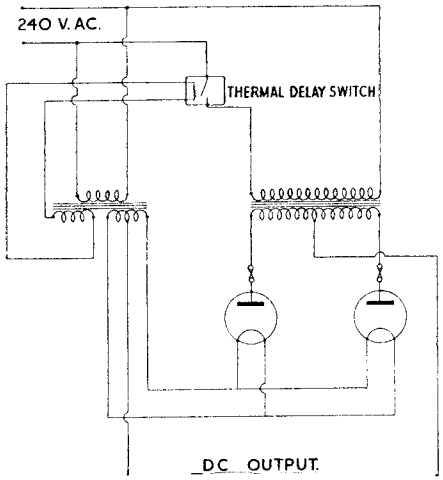
Mount the rectifier vertically in a well-ventilated position as the bulb becomes hot during continuous operation. To avoid the possibility of flash-back on reverse voltage, the temperature of the rectifier bulb should not be allowed to exceed 50°C. Where there is a possibility of the air temperature rising considerably an air draught cooling should be used.

To prevent damage to rectifier and equipment in case of a short circuit in the output, it is necessary to connect a fuse of suitable value in series with each rectifying valve anode.

Unless the valve is operated on very light loads, the filament must be allowed to attain its full operating temperature before the anode voltage is applied, and a delay of at least 10 seconds should elapse before the anode supply is switched on. A delay switch is recommended for full load operation.

The filament supply should not be switched off before the H.T. supply.

SUGGESTED CIRCUIT DIAGRAM FOR USE WITH ESU 150.



A typical H.T. rectifier circuit using a thermal delay switch in the primary of the H.T. transformer.

THE EDISON SWAN ELECTRIC CO., LTD. 155, CHARING CROSS RD. LONDON, W.C.2.

EDISWAN
MAZDA
ESU200

ESU200

HALF WAVE MERCURY VAPOUR RECTIFIER

GENERAL

The ESU.200 is a directly heated oxide coated filament High voltage Half Wave Mercury Vapour Rectifier.

When first placed into operation it is essential that the filament is run at its rated value for 15 minutes without any anode voltage being applied.

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	11.0
Maximum Peak Inverse Anode Voltage (kV)	P.I.V.(max)	**15
Maximum Peak Anode Current (amps)	I_a(pk)(max)	**5.0
Maximum Average Anode Current (amps)	I_a(av)(max)	1.25
Voltage Drop (volts) approx.		12
Ambient Temperature Range		20° 60° C
Cathode Heating Delay Time (secs)	- t -	60

DIMENSIONS

Maximum Overall Length	(mm)	270
Maximum Diameter	(mm)	57
Approximate Nett Weight	(ozs)	8
Approximate Packed Weight	(lbs)	1½
Approximate Packed Export Weight	(lbs)	1¾

MOUNTING POSITION - Vertical

TOP CAP - Anode

BASE G.E.S. - Filament

**Note:- Maximum ratings cannot necessarily be used simultaneously. Normally if either the maximum P.I.V. or maximum mean current are to be used, the other factor has to be reduced appreciably.

ESU.206

EDISWAN

ESU.206

HIGH VACUUM HALF-WAVE RECTIFIER

RATING

Filament Voltage (volts)	V_f	11.5
Filament Current (amps)	I_f	5.0
Maximum Peak Inverse Voltage (volts)	P.I.V.	10,000
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	100

DIMENSIONS

Maximum Overall Length (mm)	260
Maximum Diameter (mm)	102
Approximate Nett Weight (ozs)	9
Approximate Packed Weight (lbs)	5
Approximate Packed Export Weight (lbs)	5½

MOUNTING POSITION - Vertical

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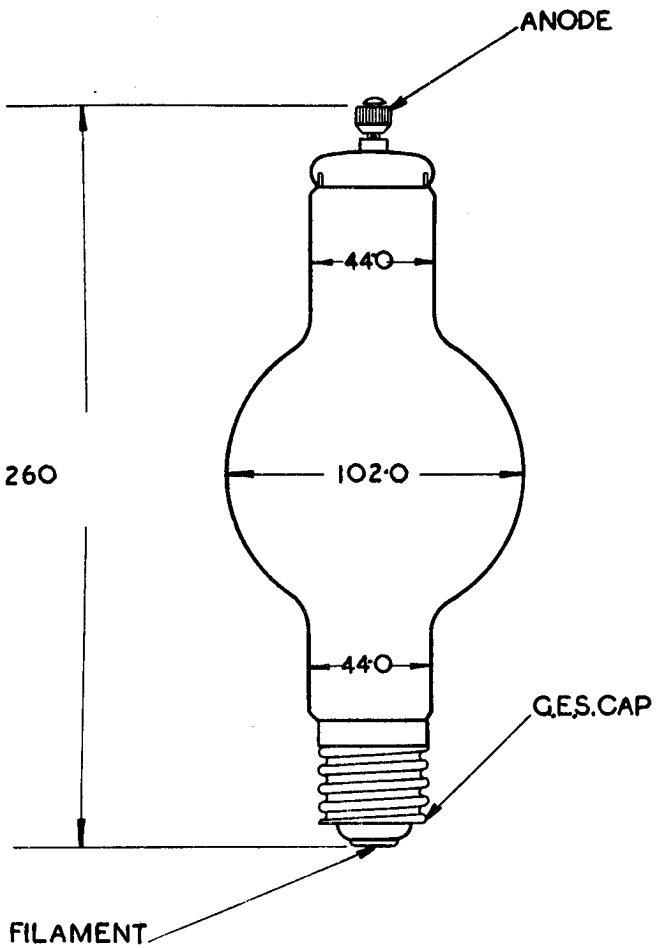
THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU.206

EDISWAN

ESU.206

HIGH VACUUM HALF-WAVE RECTIFIER



HARD GLASS BULB

October 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU 300

MERCURY VAPOUR RECTIFIER

RATING.

Filament Voltage	4.0
Filament Current (Amps)	13.5
*Maximum Peak Inverse Voltage	14,000
Peak Anode Current (Amps)	3.0

*For Circumambient Air Temperature.

DIMENSIONS.

Maximum Overall Length	250 mm.
Maximum Diameter	65 mm.

GENERAL.

The ESU 300 is a half wave rectifier suitable for supplying high tension current to large power valves employed in public address amplifiers, transmitters, etc. The valve is constructed in hard glass, and is fitted with a Goliath Edison screw cap and the anode is connected to a terminal at the top of the bulb.

In mercury vapour rectifiers, as distinct from thermionic rectifiers, the current is carried by mercury ions produced by the collision of electrons with the molecules of mercury vapour present in the bulb. In operation the bulb of the rectifier is filled with a blue glow, which is characteristic of mercury vapour filled bulbs. The ionisation of the vapour serves to neutralise the space-charge round the cathode and thus reduces the internal resistance of the valve. It is this property which gives mercury vapour rectifiers their excellent regulation characteristics and enables large currents to pass between anode and cathode with low power loss. The voltage drop remains constant under variations in load current up to the maximum rating of the valve.

As long as this low voltage drop is maintained there is no danger of positive ion bombardment destroying the emissive properties of the cathode. To avoid this, it is essential that no attempt is made to exceed the maximum peak anode current for the particular size of cathode employed. When the cathode is first switched on, if the anode voltage is simultaneously applied the cathode is unable to supply the full emission required by the output circuit. The voltage drop under these conditions is excessive, causing violent bombardment of the cathode and its ultimate destruction. It is advisable to employ a thermal delay switch (see DLS 10) in mercury vapour rectifier circuits, or arrange that the anode voltage is switched on after the cathode has attained its full temperature

APPLICATION.

When a mercury vapour rectifier is first placed in service, its filament should be operated at normal voltage for approximately 15 minutes without anode voltage in order to distribute the mercury properly. This procedure need not be repeated unless, during subsequent handling, the mercury is spattered on to the filament and anode.

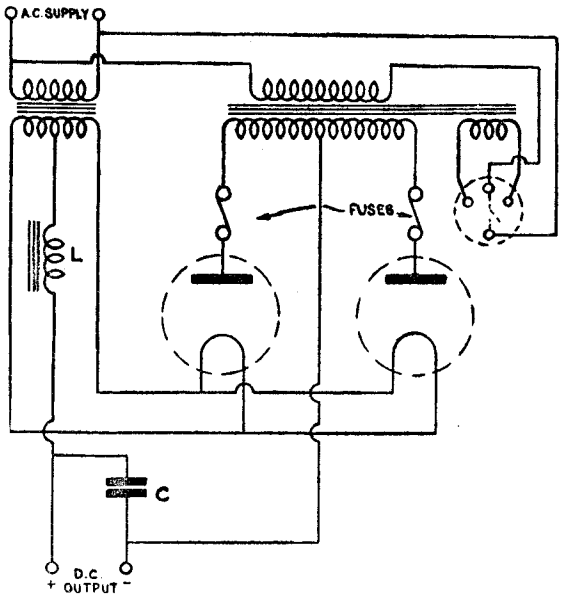
Mount the rectifier vertically in a well-ventilated position, as the bulb becomes hot during continuous operation. To avoid the possibility of flash-back on reverse voltage, the temperature of the rectifier bulb should not be allowed to exceed 50° C. Where there is a possibility of the air temperature rising considerably, an air draught cooling should be used.

To prevent damage to the rectifier and equipment in case of a short circuit in the output, it is necessary to connect a fuse of suitable value in series with each rectifying valve anode.

Unless the valve is operated on very light loads, the filament must be switched on at least 30 seconds before the anode voltage is applied. A delay switch is recommended for full load operation (see DLS 10).

The filament supply should not be switched off before the H.T. supply.

SUGGESTED CIRCUIT DIAGRAM FOR USE WITH ESU 300



A typical H.T. rectifier circuit using a thermal delay switch in the primary of the H.T. transformer.

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS RD. LONDON, W.C.2.

ESU.303

EDISWAN

ESU.303

HALF-WAVE MERCURY VAPOUR RECTIFIER

GENERAL

The ESU.303 is a hot cathode half-wave mercury vapour rectifier. Care must be taken in installation to ensure free circulation of air around the bulb in order that the temperature limits are not exceeded.

When the rectifier is first placed in service the filament should be operated at normal voltage for 15 minutes without anode voltage in order to obtain correct distribution of mercury.

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	12.5
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	14,000
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	3.0
Maximum Average Anode Current (amps)	$I_{a(av)}$	0.75
Ambient Temperature Range		10–40°C
Cathode Heating Delay Time (secs)	t	60

DIMENSIONS

Maximum Overall Length (mm)	285
Maximum Diameter (mm)	64
Approximate Nett Weight (ozs)	12
Approximate Packed Weight (lbs)	4.0
Approximate Packed Export Weight (lbs)	4½

MOUNTING POSITION - Vertical

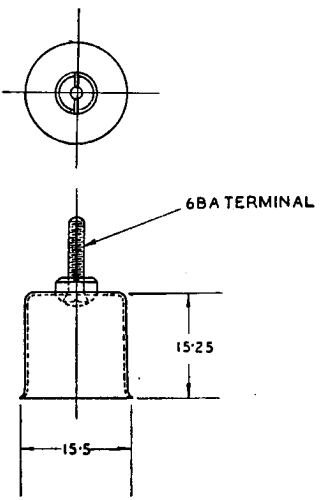
ESU.303

EDISWAN

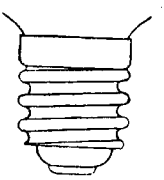
ESU.303

HALF-WAVE MERCURY VAPOUR RECTIFIER

TOP CAP Anode



BASE G.E.S. - Filament



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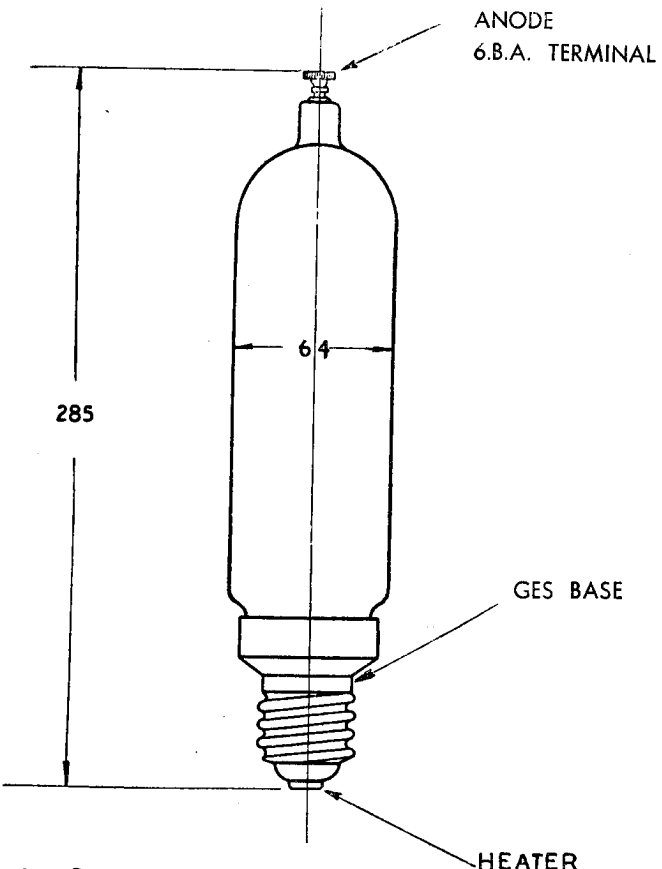
THE EDISON SWAN ELECTRIC COMPANY LTD

EDISWAN

ESU.303

HALF-WAVE MERCURY VAPOUR RECTIFIER

ESU 303



ALL DIMS. IN m.m. UNLESS STATED OTHERWISE

October 1948 RADIO DIVISION Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU.400

EDISWAN

ESU.400

HALF-WAVE MERCURY VAPOUR RECTIFIER

TENTATIVE

RATING		
Filament Voltage (volts)	V_f	5.0
Filament Current (amps)	I_f	12.5
Maximum Peak Anode Current (amps)	$I_{a(pk)}$	6.0
Maximum Peak Inverse Voltage (volts)	P.I.V.(max)	14,000
Approximate Voltage Drop (volts)	V_{ir}	10.0
Filament Heating Time (secs)		60
Ambient Temperature (C°)		20 60
DIMENSIONS		
Maximum Overall Length (mm)		250
Maximum Diameter (mm)		78
Approximate Nett Weight (ozs)		10½
Approximate Packed Weight (lbs)		4
Approximate Packed Export Weight (lbs)		4½

MOUNTING POSITION - Vertical

BASE - Jumbo

SPECIAL NOTE

When the rectifier is first placed into service, the filament should be operated at Normal Voltage for 15 minutes without the anode voltage. This will enable the mercury anode to be correctly distributed.

ESU.400

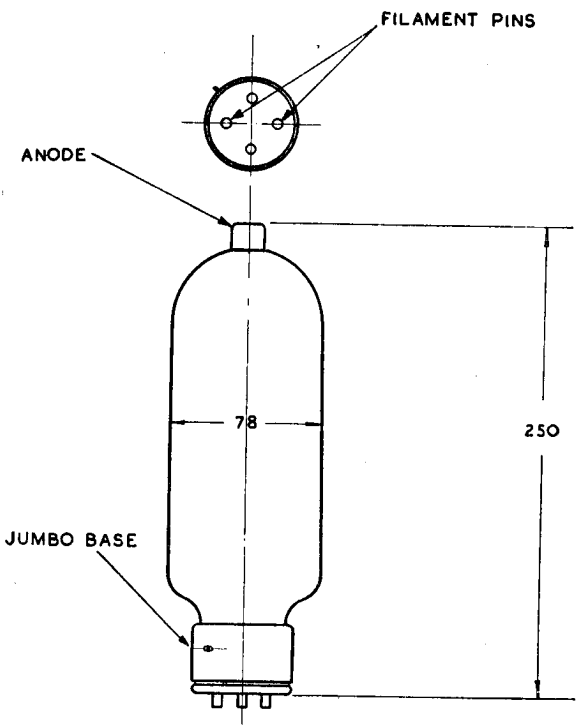
EDISWAN

ESU.400

HALF-WAVE MERCURY VAPOUR RECTIFIER

TENTATIVE

ESU400



ALL DIMS IN mm. UNLESS STATED OTHERWISE

August 1948 RADIO DIVISION Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU.450

EDISWAN

ESU.450

HIGH VACUUM HALF-WAVE RECTIFIER

RATING

Filament Voltage (volts)	V_f	17.0
Filament Current (amps)	I_f	6.6
Maximum Anode Voltage (volts)	$V_{a(max)}$	1,000
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	20,000
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	0.4
Maximum Anode Dissipation (watts)	$P_{a(max)}$	450

DIMENSIONS

Maximum Overall Length (mm)	345
Maximum Diameter (mm)	160
Approximate Nett Weight (ozs)	18
Approximate Packed Weight (lbs)	8
Approximate Packed Export Weight (lbs)	9

MOUNTING POSITION - Vertical

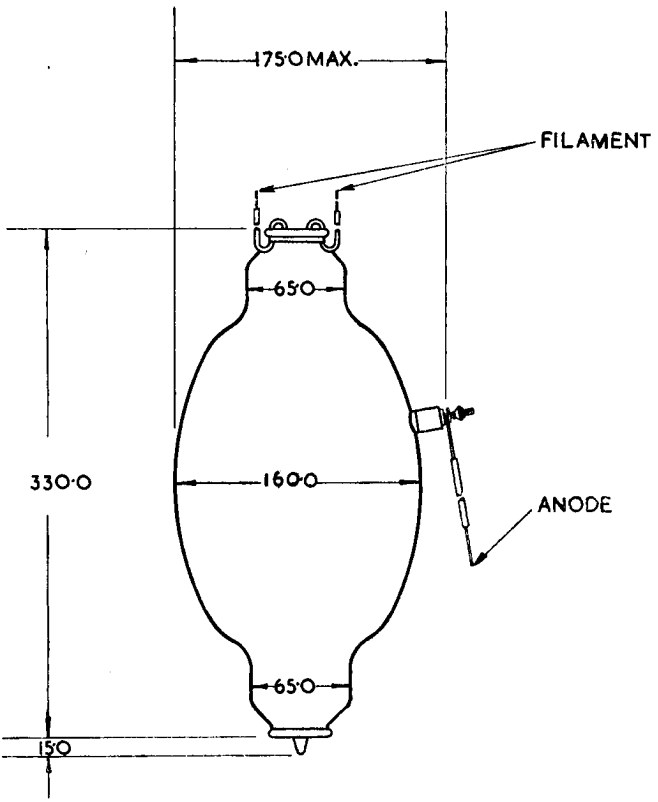
October 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ESU.450

HIGH VACUUM HALF-WAVE RECTIFIER



ALL DIMS. IN m.m. UNLESS
STATED OTHERWISE

October 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ESU575

ESU575

HALF WAVE MERCURY VAPOUR RECTIFIER

Directly heated

RATING

Filament Voltage (volts)	V_f	5·0
Filament Current (amps)	I_f	10·0 ←
Maximum Peak Anode Current (amps)	$I_{a(pk)max.}$	7·0 ←
Maximum Mean Anode Current (amps)	$I_{a(av)max.}$	1·75 ←
Maximum Peak Inverse Voltage (volts)	P.I.V.(max)	15,000
Approximate Voltage Drop (volts)	V_{ir}	10·0
Filament Heating Time (secs)		60
Condensed Mercury Temp. (°C)		20–60

DIMENSIONS

Maximum Overall Length (mm)		275 ←
Maximum Diameter (mm)		78
Approximate Nett Weight	(ozs)	10½
Approximate Packed Weight	(lbs)	4
Approximate Packed Export Weight	(lbs)	4½

MOUNTING POSITION—Vertical.

BASE—Jumbo.

SPECIAL NOTE. When the rectifier is first placed into service, the filament should be operated at Normal Voltage for 15 minutes without the anode voltage. This will enable the mercury to be correctly distributed.

Indicates a change ←

June 1953 *VALVE & CRT DIVISION* Issue 2/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

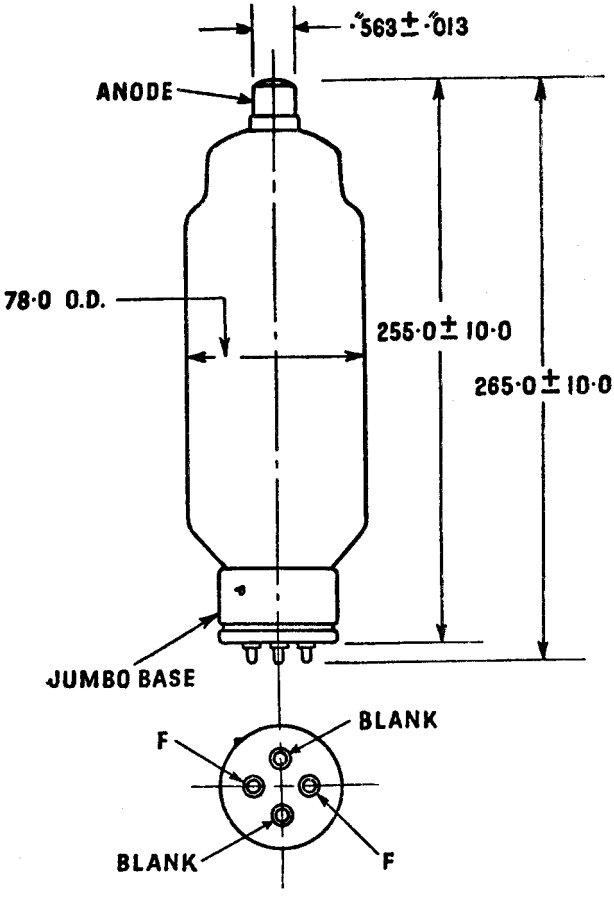
ESU575

EDISWAN

ESU575

HALF WAVE MERCURY VAPOUR RECTIFIER

Directly heated



UNDERSIDE VIEW OF BASE

ALL DIMENSIONS IN M.M. UNLESS OTHERWISE STATED

June 1953 *VALVE & CRT DIVISION* Issue 2/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ESU673

HALF WAVE MERCURY VAPOUR RECTIFIER

Directly heated

RATING

Filament Voltage (volts)	V_f	5·0
Filament Current (amps)	I_f	10·0
Maximum Peak Anode Current (amps)	$I_{a(pk)max.}$	7·0
Maximum Mean Anode Current (amps)	$I_{a(av)max.}$	1·75
Maximum Peak Inverse Voltage (kV)	P.I.V.(max)	15
Approximate Voltage Drop (volts)	V_{ir}	10·0
Cathode Heating Time (secs)		60
Condensed Mercury Temperature (°C)		20–60

DIMENSIONS

Maximum Overall Length	(mm)	282
Maximum Diameter	(mm)	78
Approximate Nett Weight	(ozs)	10½
Approximate Packed Weight	(lbs)	4
Approximate Packed Export Weight	(lbs)	4½

MOUNTING POSITION—Vertical.

BASE—Super Jumbo—Filament.

TOP CAP—Anode.

SPECIAL NOTE

When the rectifier is first placed into service, the filament should be operated at Normal Voltage for 15 minutes without the anode voltage. This will enable the mercury to be correctly distributed.

THE EDISON SWAN ELECTRIC COMPANY LTD.

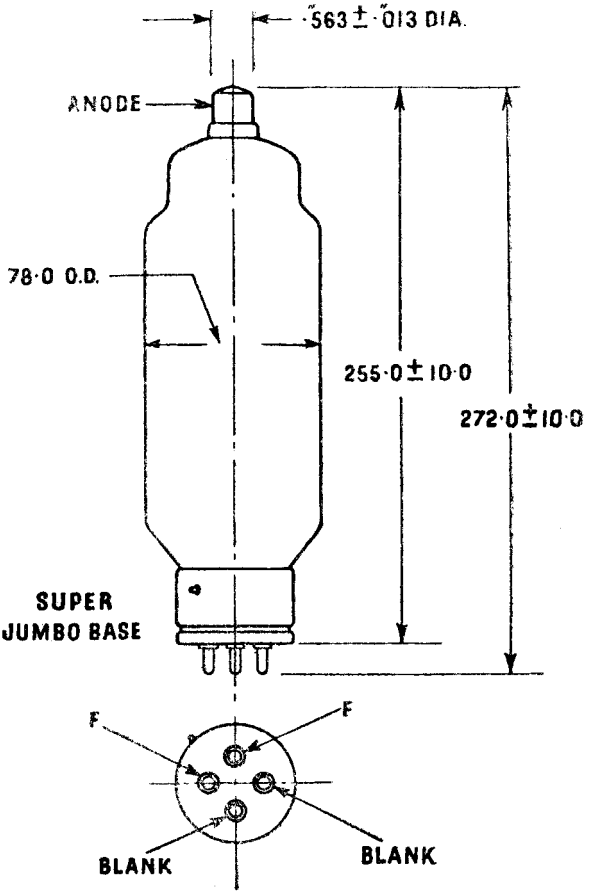
ESU673

EDISWAN

ESU673

HALF WAVE MERCURY VAPOUR RECTIFIER

Directly heated



UNDERSIDE VIEW OF BASE

ALL DIMENSIONS IN M.M. UNLESS OTHERWISE STATED

May 1953 *VALVE & CRT DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU.751

EDISWAN

ESU.751

HALF-WAVE MERCURY VAPOUR RECTIFIER

RATING

Filament Voltage (volts)	V_f	2.0
Filament Current (amps)	I_f	10.0
Maximum Peak Inverse Voltage (volts)	P.I.V.(max)	5,000
Maximum Peak Anode Current (amps)	$I_{a(pk)}$	0.9
Cathode heating delay time (secs)		15.0
Ambient Temperature Range (°C)		10-50

DIMENSIONS

Maximum Overall Length (mm)	150
Maximum Diameter (mm)	58
Approximate Nett Weight (ozs)	3½
Approximate Packed Weight (ozs)	6
Approximate Packed Export Weight (lbs)	2

MOUNTING POSITION - Vertical

NOTE: See ESU.75 for initial installation instructions.

October 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

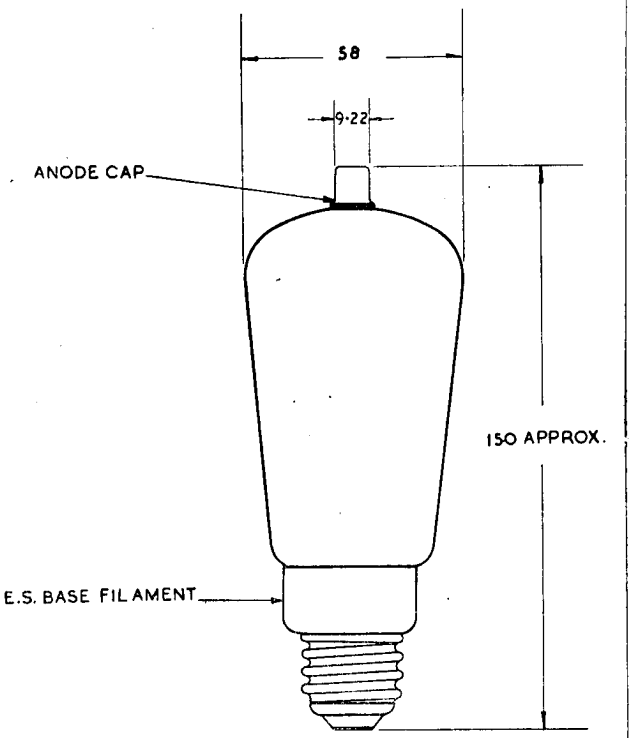
EDISWAN

ESU.751

HALF-WAVE MERCURY VAPOUR RECTIFIER

TOP CAP Anode

BASE EDISON SCREW - Filament



ALL DIMS IN m.m. UNLESS STATED OTHERWISE

October 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

ESU.866

ESU.866

HALF WAVE MERCURY VAPOUR RECTIFIER

RATING

Filament Voltage (volts)	V_f	2.5
Filament Current (amps)	I_f	5.0
Maximum Peak Anode Current (amps)	$I_{a(pk)}$	1.0
Maximum Peak Inverse Voltage (volts)	P.I.V (max)	10,000
Maximum Mean Anode Current (amps)	$I_{a(av)max}$	0.25
Approximate Voltage Drop (volts)	V_{ir}	15
Cathode Delay Time (secs)	t	60
Ambient Temperature (C°)		20-60

DIMENSIONS

Maximum Overall Length (mm)	170
Maximum Diameter (mm)	66
Approximate Nett weight (ozs)	3
Approximate Packed Weight (lbs)	1¼
Approximate Packed Export Weight	2

RG.4857K/1

MOUNTING POSITION Vertical

BASE

U.X. 4 pin. This valve can also be supplied fitted with an E.S. base, in which case it is known as the ESU.866/ES.

TOP CAP Anode

SPECIAL NOTE

When first placed into operation it is essential that the filament is run at the rated value for 15 minutes without any anode voltage being applied.

October 1953 Issue 2/5

[redacted] RADIO DIVISION [redacted]

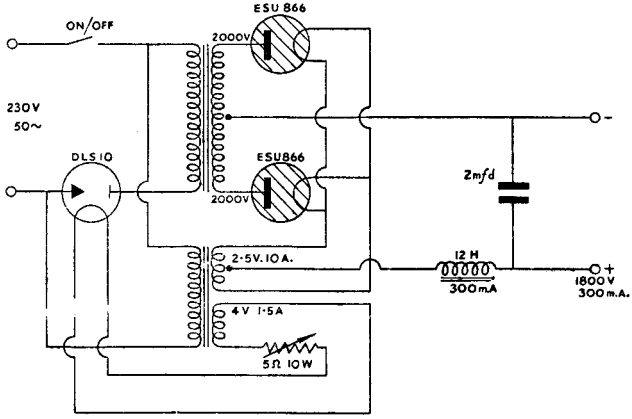
THE EDISON SWAN ELECTRIC COMPANY LTD.

ESU.866

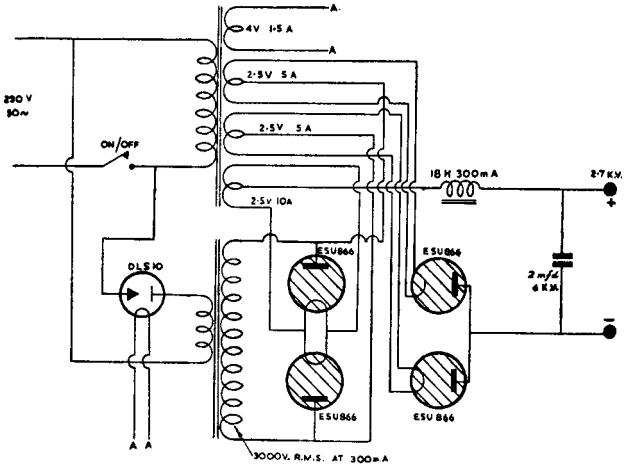
MAZDA
ESU.866

HALF WAVE MERCURY VAPOUR RECTIFIER

FULL WAVE CIRCUIT TO SUPPLY 1·8 KV AT 300 m A.



BRIDGE RECTIFIER CIRCUIT TO SUPPLY 2·7 K.V. AT 300 m.A.

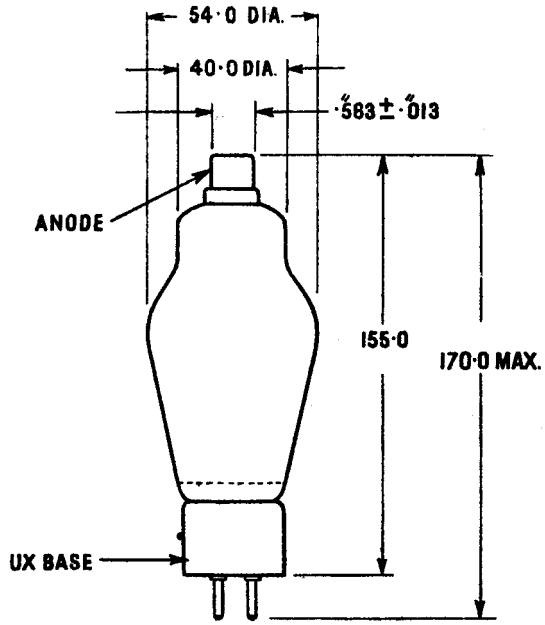


RG.4857L/1

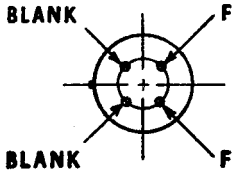
MAZDA

ESU.866

HALF WAVE MERCURY VAPOUR RECTIFIER



RG.4857V/1



UNDERSIDE VIEW OF BASE

ALL DIMENSIONS IN M.M. UNLESS OTHERWISE STATED

March 1953 Issue 2/5

RADIO DIVISION

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

ESU.872

HALF WAVE MERCURY VAPOUR RECTIFIER

ESU.872

GENERAL

This directly heated rectifier is designed to withstand high peak inverse voltages and to conduct at relatively low applied voltages.

RATING

Filament Voltages (volts)	V_f	5.0
Filament Current (amps)	I_f	7.5
Maximum Peak Inverse Anode Voltage (KV)	P.I.V.	10
Peak Anode Current (amps)	$I_{a(pk)}$	5
Maximum Mean Anode Current (amps)	$I_{a(mean)}$	1.25
Condensed Mercury Temperature (°C)		20-60
Cathode Heating Delay Time (secs)		60
Voltage Drop (volts)		15

DIMENSIONS

Maximum Overall Length (inches)	8½
Maximum Diameter (inches)	2.5/16

BASE Jumbo - filament

TOP CAP - Anode

APPLICATION

When a mercury vapour rectifier is first placed in service, its filament should be operated at normal voltage for approximately 15 minutes without anode voltage in order to distribute the mercury properly. This procedure need not be repeated unless, during subsequent handling, the mercury is spattered on to the filament and anode.

Mount the rectifier vertically in a well-ventilated position as the bulb becomes hot during continuous operation. To avoid the possibility of flash-back on reverse voltage, the temperature of the rectifier bulb at the point where the mercury vapour condenses should not be allowed to exceed 60°C. Where there is a possibility of the air temperature rising considerably, an air draught cooling should be used.

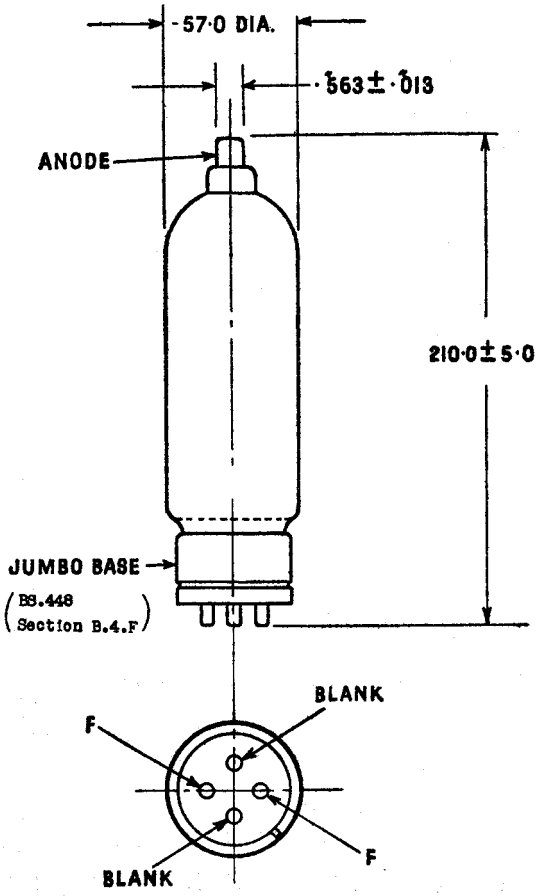
Unless the valve is operated on very light loads, the filament must be allowed to attain its full operating temperature before the anode voltage is applied, and the Cathode Delay Time should elapse before the anode supply is switched on. A delay switch is recommended for full load operation (see DLS range of swich The filament supply should not be switched off before the H.T. supply.

ESU.872

MAZDA

ESU.872

HALF WAVE MERCURY VAPOUR RECTIFIER



UNDERSIDE VIEW OF BASE

ALL DIMENSIONS IN M.M. UNLESS OTHERWISE STATED

February 1954 *RADIO DIVISION* Issue 2/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

ESU.8008

HALF WAVE MERCURY VAPOUR RECTIFIER

ESU.8008

GENERAL

This directly heated rectifier is designed to withstand high peak inverse voltages and to conduct at relatively low applied voltages.

RATING

Filament Voltages (volts)	V_f	5.0
Filament Current (amps)	I_f	7.5
Maximum Peak Inverse Anode Voltage (KV)	P.I.V.	10
Maximum Peak Anode Current (amps)	$I_{a(pk)}$	5
Maximum Mean Anode Current (amps)	$I_{a(mean)}$	1.25
Condensed Mercury Temperature (°C)		20-60
Cathode Heating Time (secs)		60
Approximate Voltage Drop (volts)		10

DIMENSIONS

Maximum Overall Length (inches)	8½
Maximum Diameter (inches)	2.5/16

BASE Super Jumbo - filament

TOP CAP - Anode

APPLICATION

When a mercury vapour rectifier is first placed in service, its filament should be operated at normal voltage for approximately 15 minutes without anode voltage in order to distribute the mercury properly. This procedure need not be repeated unless, during subsequent handling, the mercury is spattered on to the filament and anode.

Mount the rectifier vertically in a well-ventilated position as the bulb becomes hot during continuous operation. To avoid the possibility of flash-back on reverse voltage, the temperature of the rectifier bulb at the point where the mercury vapour condenses should not be allowed to exceed 60°C. Where there is a possibility of the air temperature rising considerably, an air draught cooling should be used.

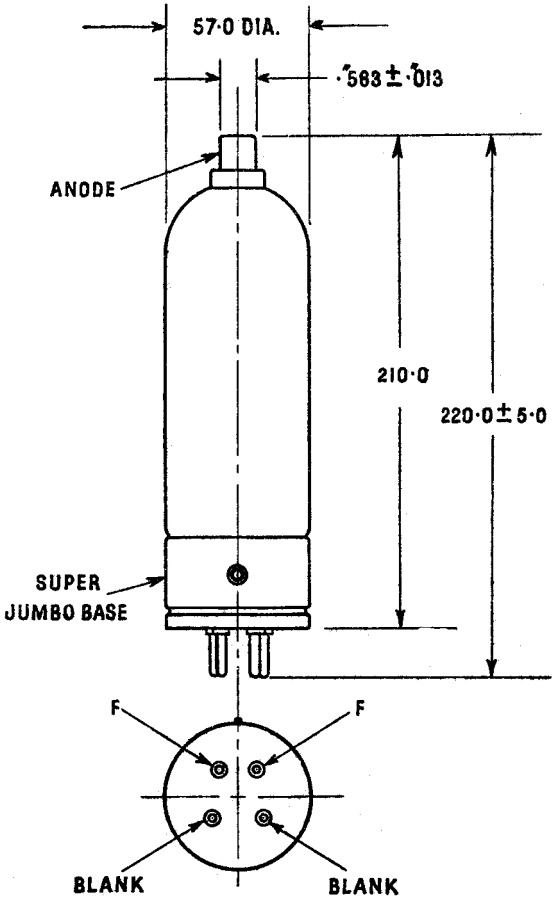
Unless the valve is operated on very light loads, the filament must be allowed to attain its full operating temperature before the anode voltage is applied, and the Cathode Delay Time should elapse before the anode supply is switched on. A delay switch is recommended for full load operation (see DLS range of switches). The filament supply should not be switched off before the H.T. supply.

ESU.8008

MAZDA

ESU.8008

HALF WAVE MERCURY VAPOUR RECTIFIER



UNDERSIDE VIEW OF BASE

ALL DIMENSIONS IN M.M. UNLESS OTHERWISE STATED

February 1954 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

ESW.204

EDISWAN

ESW.204

RADIATION COOLED TRIODE

GENERAL

The ESW.204 is a U.H.F. triode suitable for use in industrial and transmitting equipment. The filament is of the thoriated Tungsten type.

RATING

Filament Voltage (volts)	V_f		11.0
Filament Current (amps)	I_f		7.0
Maximum Anode Voltage (volts)	$V_{a(max)}$		2,000
Average Maximum Filament Emission	$Fem_{(av)}$		2.5
Maximum Anode Dissipation (watts)	$Wa._{(max)}$		250
Mutual Conductance (mA/V)	gm	*	2.0
Amplification Factor	μ	*	18.0
Anode Impedance (ohms)	r_a	*	9,000
Maximum Operating Frequency at full rating		†	80 Mc/s

* Taken at V_a = 2,000v; I_a = 125 mA

† At higher frequencies the maximum permissable anode voltages and inputs must be reduced.

INTER-ELECTRODE CAPACITANCES

Anode/Grid ($\mu\mu$F)	$ca,_{gl}$	8.4
Anode/Filament ($\mu\mu$F)	$ca,_f$	1.56
Grid/Filament ($\mu\mu$F)	$gl,_f$	3.23

DIMENSIONS

Maximum Overall Length (mm)	290.0
Maximum Diameter (mm)	110.0

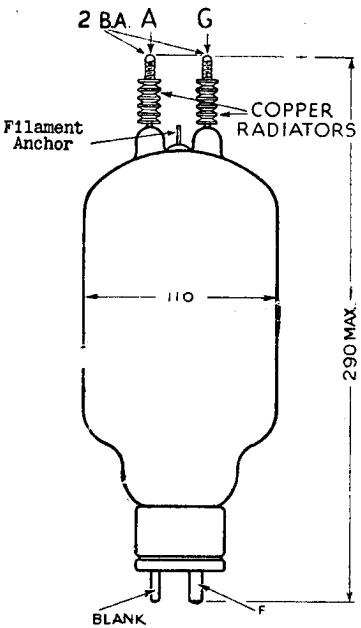
MOUNTING POSITION - Vertical

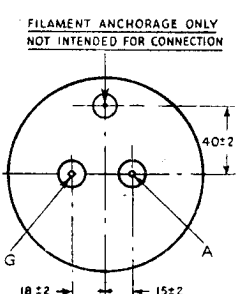
ESW.204

EDISWAN

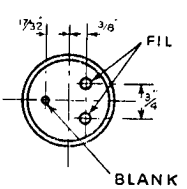
ESW.204

RADIATION COOLED TRIODE





TOP VIEW OF BULB



UNDERSIDE VIEW OF BASE

ALL DIMENSIONS IN mm. UNLESS OTHERWISE STATED

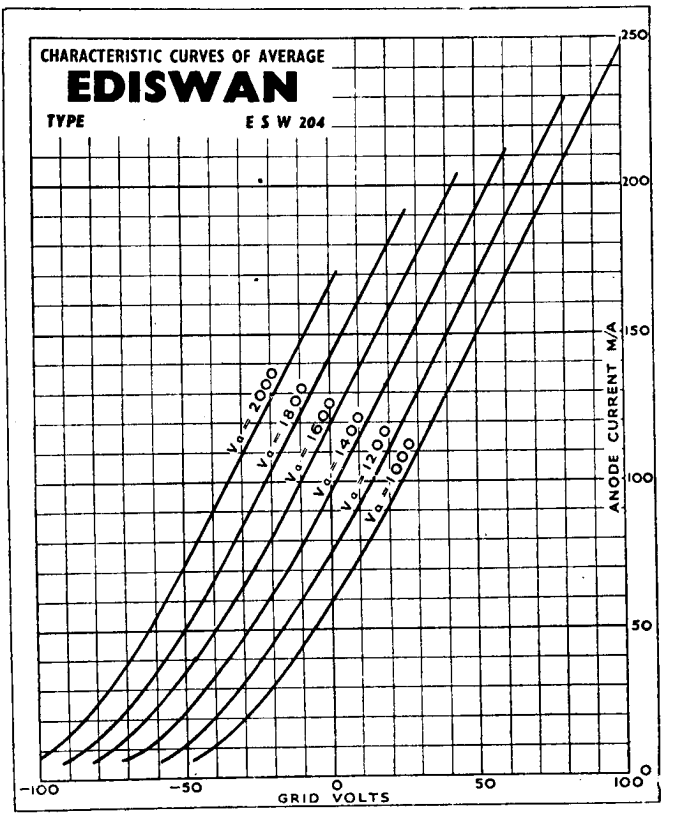
Base blank pin in alignment with Anode terminal on top of bulb

ESW.204

EDISWAN

ESW.204

RADIATION COOLED TRIODE



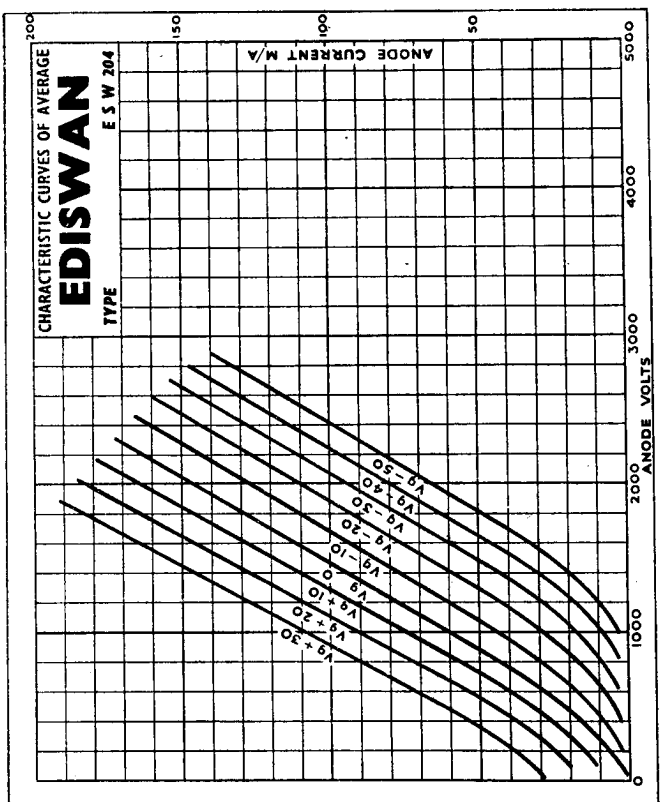
August 1948 *RADIO DIVISION* Issue 1/4

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ESW.204

RADIATION COOLED TRIODE



August 1948 *RADIO DIVISION* Issue 1/4

THE EDISON SWAN ELECTRIC COMPANY LTD.

EDISWAN

ESW 501

SHORT WAVE OSCILLATOR

RATING.

Filament Voltage	6.0
Filament Current (Amps)	4
Maximum Anode Voltage	1,500
Impedance (ohms)	6,200
Amplification Factor	8.0
Maximum Anode Dissipation (watts)	60
Filament Emission (approx.) (Amps)	1
Mutual Conductance (mA/V)	1.3

DIMENSIONS.

Maximum Overall Length	215 mm.
Maximum Diameter	58 mm.

INTER-ELECTRODE CAPACITIES.

Anode to Filament	1.26 $\mu\mu$F.
Grid to Filament	1.63 $\mu\mu$F.
Anode to Grid	4.0 $\mu\mu$F.

GENERAL.

This valve is designed specifically for short wave work up to very high frequencies and may be operated at the full rated dissipation down to wave lengths of the order of five metres. A special form of construction is adopted, the anode and grid being brought out to separate contacts at the top of the bulb.

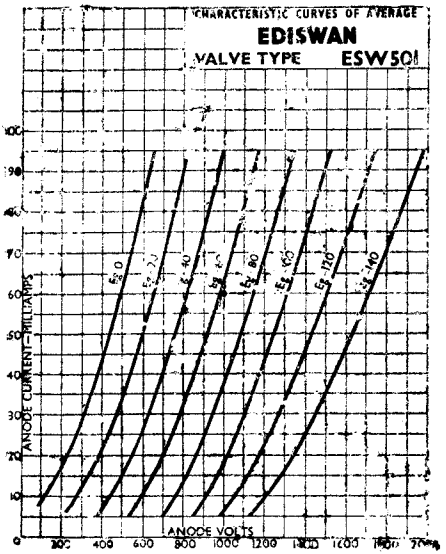
APPLICATION.

By the use of a graphite anode the bulb dimensions have been kept small for the capacity of the valve, and as the bulb becomes quite hot under normal conditions free circulation of air is necessary. Alternating current should be used to heat the filament whenever possible, and the anode and grid circuits returned to a centre tap on the secondary of the filament transformer.

Where direct current is used for filament heating, the anode and grid circuits should be returned to the positive filament terminals.

Whilst the construction is robust, precautions should be taken to isolate the valves from extreme mechanical vibration, and vertical mounting is recommended.

EDISWAN



THE EDISON SWAN ELECTRIC CO. LTD.

155, CHARING CROSS RD. LONDON. W.C.2

EDISWAN RADIO

DIODE DE RECUPERATION
SERIE MINIATURE 9 BROCHES

EY 81 F

Cathode à chauffage indirect	
Tension filament	6,3 Volts C.A. ou C.C.
Intensité filament	0,9 Ampère
Encombrement	V.7-NC. 1
Hauteur maximum (broches comprises)	89 mm
Diamètre maximum	22,2 mm
Brochage	3.N-AA
Position de montage	Indifférente
Temps de chauffage	23 secondes

Broches :

Nº 1 - Connexion interne (1).
Nº 2 - Anode
Nº 3 - Connexion interne (1).
Nº 4 - Filament.
Nº 5 - Filament.
Nº 6 - Connexion interne (1).
Nº 7 - Connexion interne (1).
Nº 8 - Connexion interne (1).
Nº 9 - Anode.
La Cathode est réunie à la coiffe du sommet.

Broches de la base, face à l'observateur.

Pour toutes les autres caractéristiques voir le tube PY81F.

(1) - les broches indiquées "Connexion interne" ne doivent être utilisées de quelque manière que ce soit.

REPRODUCTION INTERDITE

EY 802

REDRESSEUR T.H.T.
pour récepteurs de télévision noir et blanc fonctionnant à 20 KV.

CARACTERISTIQUES GENERALES

Electriques

Cathode à chauffage indirect

Tension filament	6,3
Courant filament	120

Mécaniques

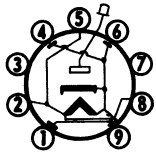
Ampoule	siliconée
Embase	"noval"
Diamètre de l'ampoule	22,2 mm max.
Hauteur, broches non comprises	67,5 mm max.
Position de montage	indifférente

Capacité interélectrode (sans blindage extérieur)

Capacité anode-autres électrodes	1,2 pF

BROCHAGE

Broche n° 1 : Filament, cathode et bague intérieure anti-corona.
Broche n° 2 : Filament
Broche n° 3 : Connexion interne
Broche n° 4 : Identique à broche n° 1
Broche n° 5 : Filament
Broche n° 6 : Identique à broche n° 1
Broche n° 7 : Connexion interne
Broche n° 8 : Filament
Broche n° 9 : Identique à broche n° 1
Coiffe : Anode



Broches de la base, face à l'observateur

LIMITES MAXIMALES D'UTILISATION
(Système des limites moyennes, sauf indication contraire)

Tension inverse de pointe	25 kV max. (1)
(limite absolue)	30 kV max. (1)
Courant redressé	500 µA max.
Courant anodique de pointe	50 mA max.
Capacité de filtrage	2 000 pF max.

Tension filament - La variation de la tension appliquée au filament ne doit pas être supérieure à ± 15 % par rapport à la valeur de centrage qui est de 1,4 volt.

Cette dispersion tient compte des variations possibles de réglage du téléviseur, c'est-à-dire du courant redressé, de la largeur de l'image, du standard utilisé, etc. En aucun cas, la tension de filament ne devra être en dehors des limites spécifiées.

Pour vérifier qu'il en est bien ainsi, il est recommandé de procéder aux mesures comme indiqué dans la brochure "Recommandations relatives à l'utilisation des tubes électroniques".
- Spécification Syndicale FNIE 011 de Mai 1959, pages 54 et 55.

(1) pendant 22 % au plus d'un cycle de balayage lignes avec un maximum de 22µs.

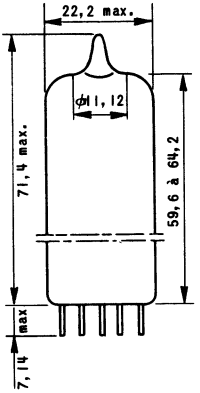
REPRODUCTION INTERDITE

MAZDA

GROUPE DE 4 TUBES POUR L'ENSEIGNEMENT

F 7024

F 7024 A : diode
F 7024 C : triode
F 7024 E : tétrode
F 7024 L : pentode



Ce groupe de 4 tubes électroniques a pour but de montrer, lors des manipulations des élèves, l'influence des diverses grilles sur les variations du courant d'anode, en fonction de la tension anode-cathode.

Ces 4 tubes sont constitués d'électrodes semblables ; ils ne diffèrent entre eux que par le nombre de grilles.

Le F7024L est une pentode de puissance, conventionnelle. Par rapport à cette pentode, les autres tubes ne diffèrent, dans leur structure que :

- par l'omission de la grille 3, pour la tétrode F 7024 E
- par l'omission des grilles 2 et 3, pour la triode F 7024 C
- par l'omission des grilles 1, 2, 3, pour la diode F 7024 A.

REPRODUCTION INTERDITE

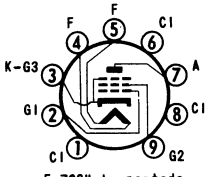
CARACTERISTIQUES GENERALES

Cathode à chauffage indirect

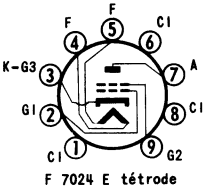
Tension filament	6,3 V ± 10 %
Courant filament	0,76 A

BROCHAGES

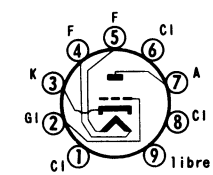
Vues face à l'observateur



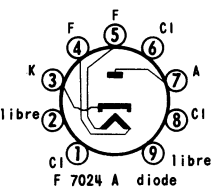
F 7024 L pentode



F 7024 E tétrode



F 7024 C triode



F 7024 A diode

MAZDA
F 9102

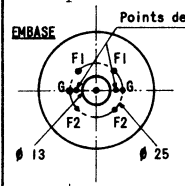
F 9102

JAUGE A IONISATION

La jauge à ionisation F 9102 a été conçue pour la mesure des basses et très basses pressions comprises entre 10^{-4} Torr et 10^{-10} Torr.

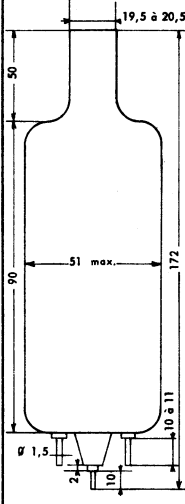
La jauge F 9102 est du type Bayard-Alpert. C'est un tube à 3 électrodes dont la grille, faisant office d'accélérateur et de collecteur d'électrons, est portée à un potentiel positif élevé et le collecteur d'ions à un potentiel négatif par rapport à celui du filament. Le courant ionique du collecteur est proportionnel, entre certaines limites, limites à la pression du gaz.

Le F 9102 comporte deux filaments ayant chacun des sorties indépendantes.



CARACTERISTIQUES GENERALES

Hauteur	172 mm
Diamètre de l'ampoule	51 mm max.
Diamètre du queusot	20 ± 0,5 mm
Nature du verre	747.01 Sovirel
Embase	Voir dessin



DEGAZAGE PAR BOMBARDEMENT (la grille et le collecteur réunis)

Tension alternative de filament	6,5 V eff
Tension alternative de grille et collecteur	500 V eff
Courant de grille et de collecteur	100 mA max.
Dissipation de grille et de collecteur	50 W max.

MESURES

Tension filament	4,8 V env.
Courant filament	2,5 A env.
Tension de la grille	+ 200 V
Tension de collecteur	− 50 V
Courant électronique de grille.	10 mA
Sensibilité, pour l'air sec, à 10^{-4} Torr	13 μA
Gamme de pression à mesurer	10^{-4} à 10^{-10} Torr
Variation du courant filament en fonction de la tension filament	voir au verso
Variation du courant de grille en fonction de la tension filament	voir au verso

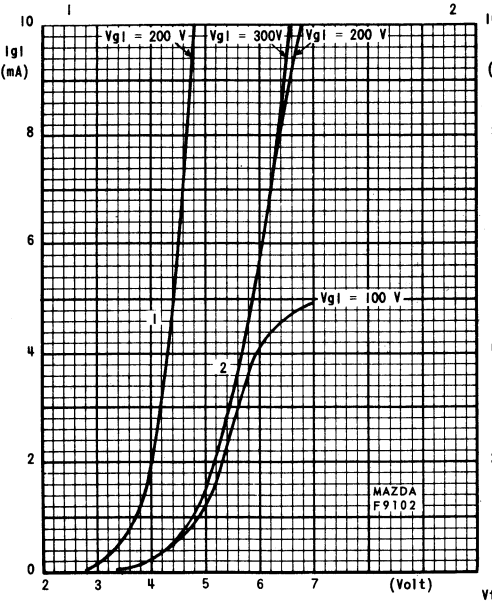
REPRODUCTION INTERDITE

F 9102

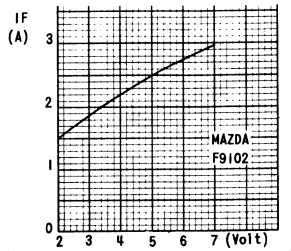
MAZDA
F 9102

JAUGE A IONISATION

Courbes du courant de grille N° 1 en fonction de la tension filament



Courbe du courant filament en fonction de la tension filament



REPRODUCTION INTERDITE

MAZDA
F9116

F9116

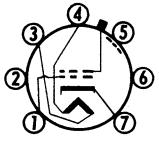
ELECTROMETRE
POUR
MESURES SOUS DES TENSIONS ELEVEES

L'electromètre F9116 est prévu pour fonctionner suivant le principe de la triode inversée. Il est constitué d'une cathode à chauffage indirect, d'une grille n°1 portée à un potentiel positif (électrode de mesure), d'une grille n°2 à fort isolement portée à un potentiel négatif (électrode de commande) et d'un blindage qui doit être porté à un potentiel plus négatif que celui de la grille n°2.

CARACTERISTIQUES GENERALES

Cathode à chauffage indirect

Tension filament	6,3 V
Courant filament	150 mA
Diamètre de l'ampoule	19 mm
Hauteur maximale	40,4 mm
Embase miniature 7 broches	



Broches de la base, face à l'observateur.

Brochage :

Broche n°1 : grille n°1
Broche n°2 : connexion interne (1)
Broche n°3 : filament
Broche n°4 : filament
Broche n°5 : blindage interne
Broche n°6 : connexion interne (1)
Broche n°7 : cathode
Coiffe du sommet : grille n°2

(1) ne pas utiliser les cosses correspondantes du support.

LIMITES MAXIMALES D'UTILISATION - Système des limites hybrides

Tension négative du blindage interne	250	V max.
Tension négative de la grille n°2	10	V min.
	200	V max.
Tension positive de la grille n°1	10	V max.
Courant de grille n°1	3,5	mA max.

CARACTERISTIQUES NOMINALES - Conditions d'utilisation en TRIODE INVERSEE.

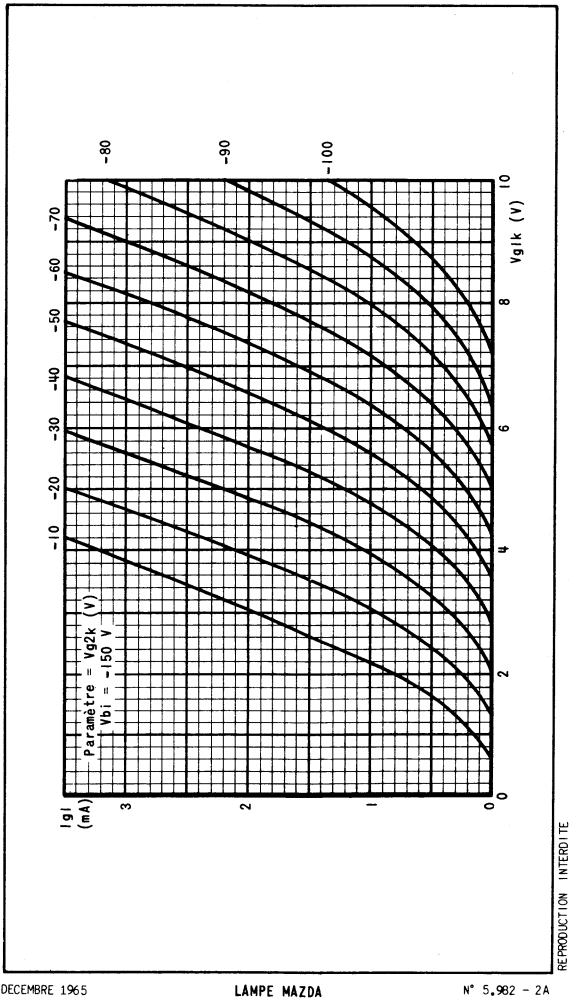
Tension du filament	6,3	V
Tension du blindage	- 150	V
Tension de la grille n°2	- 50	V
Tension de la grille n°1	5,6	V
Coefficient d'amplification	0,08	
Résistance interne (mesurée sur g1)	1,25	k Ω
Courant de grille n°1	1	mA
Courant maximal de grille n°2	5 x 10-12	A

REPRODUCTION INTERDITE

F9116

MAZDA
F9116

COURBES DU COURANT DE GRILLE N° 1 EN FONCTION DE LA TENSION DE GRILLE N° 1, POUR UNE TENSION DE 150 V APPLIQUEE SUR LE BLINDAGE INTERNE



REPRODUCTION INTERDITE

FC. 141

BATTERY (DRY CELL) PENTAGRID

RATING.

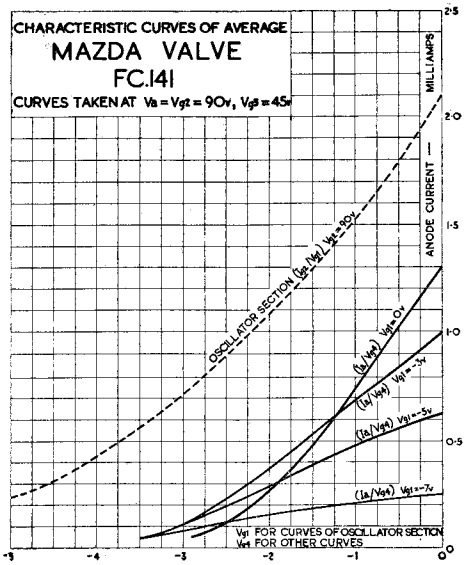
Filament Voltage	1.4
Filament Current (amp)	0.05
Maximum Anode Voltage	90
Maximum Screen Voltage	90
Maximum Oscillator Anode Voltage	90

TYPICAL OPERATION.

Anode Voltage	90
Screen Voltage	45
Oscillator Anode Voltage	90
Input Grid Bias Voltage (to G4)	0
Oscillator Grid Resistance (ohms)	200,000
Conversion Conductance (μA/V)	250
Conversion Conductance at Vg4= —3 (μA/V) (approx.)	5.0
Anode Current (mA)	0.55
Screen Current (mA)	0.6
Oscillator Anode Current (mA)	1.2
Oscillator Grid Current (mA)	0.035
Total Cathode Current (mA)	2.4

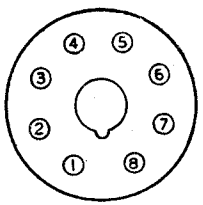
DIMENSIONS.

Maximum Overall Length	98 mm.
Maximum Diameter	30 mm.



BASING.

Pin No.	1.	Filament.
	2.	—
	3.	Anode.
	4.	Oscillator Anode (G2).
	5.	Oscillator Grid (G1).
	6.	Metallising.
	7.	Screen Grids (G3 & G5)
	8.	Filament.
Top Cap.		Control Grid (G4).



Viewed from the free end of the base

MAZDA
GY86

GY86

DIODE DE REDRESSEMENT TRES HAUTE TENSION
POUR LA TELEVISION

Le tube GY86 est un nouveau tube redresseur de très haute tension pour téléviseurs.

Les nouvelles ferrites utilisées pour les transformateurs THT sont de dimensions plus faibles que précédemment. De ce fait, l'emplacement réservé à l'enroulement destiné au chauffage du filament est lui-même plus réduit et il est nécessaire d'utiliser des tubes demandant un nombre de spires minimal pour cet enroulement.

Jusqu'à présent, le tube DY86 avait été utilisé puisque la tension de chauffage nécessaire n'était que de 1,4 Volt. Cependant, même avec une seule spire, la tension aux bornes du filament est de l'ordre de 2,6 Volts. Afin de ramener cette tension filament à une valeur de l'ordre de 1,4 Volt, il fallait placer une résistance en série dans le circuit d'alimentation.

C'est dans le but de supprimer cette résistance qui, par ailleurs, risque de provoquer des incidents, est une complication pour le fabricant et provoque une consommation d'énergie supplémentaire que le tube GY86 a été créé afin de permettre de se servir de la tension fournie par une seule spire, soit environ 2,6 Volts pour des très hautes tensions comprises entre 16 KV et 18 KV.

CARACTERISTIQUES GENERALES

Electriques

Cathode à chauffage indirect		
Tension filament		2,6 Volts
Courant filament	environ	0,3 mA

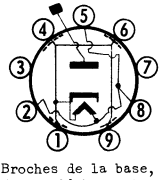
Mecaniques

Diamètre de l'ampoule	22,2 mm max.
Hauteur, broches non comprises	67,5 mm max.
Position de montage	indifférente

Brochage

Broche n° 1	filament, cathode et bague anti-corona intérieure
n° 2	filament
n° 3	non connectée
n° 4	identique à broche n° 1
n° 5	filament
n° 6	identique à broche n° 1
n° 7	non connectée
n° 8	filament
n° 9	identique à branche n° 1

L'anode est réunie à la coiffe du sommet.



Broches de la base, face à l'observateur

REPRODUCTION INTERDITE

GY86

MAZDA
GY86

DIODE DE REDRESSEMENT TRES HAUTE TENSION POUR LA TELEVISION

Limites maximales d'utilisation – (système des limites moyennes sauf indication contraire).

Tension filament	3 Volts max. 2,25 Volts min.(1)
Tension inverse de crête	22 kV max.
Tension inverse de crête pour un courant redressé nul	24 kV max.
Tension inverse de crête absolue)	27 kV max.
Courant redressé	0,5 mA max.
Courant anodique de pointe	40 mA max.
Capacité de filtrage	2000 pF max.

Note 1 La variation admise de tension appliquée au filament est de ± 15 % par rapport à 2,6 Volts qui est la valeur de centrage.

Cette dispersion tient compte des variations possibles de réglage du téléviseur c'est-à-dire du courant redressé, de la largeur de l'image,du standard utilisé (819 lignes ou 625 lignes) etc... En aucun cas la tension filament ne devra être en dehors des limites indiquées.

Pour vérifier que ces limites ne sont pas dépassées, il est recommandé de procéder aux mesures comme il est indiqué dans la brochure "Recommandations relatives à l'utilisation des tubes électroniques" Spécification Syndicale FNIE 011 de Mai 1959, pages 54 et 55.

REPRODUCTION INTERDITE

MAZDA

REDRESSEUR T.H.T.
pour récepteurs de télévision noir et blanc fonctionnant à 20 KV.

GY 802

CARACTERISTIQUES GENERALES

Electriques

Cathode à chauffage indirect

Tension filament	2,6
Courant filament	310

Mécaniques

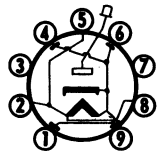
Ampoule	siliconée
Embase	"noval"
Diamètre de l'ampoule	22,2 mm max.
Hauteur, broches non comprises	67,5 mm max.
Position de montage	indifférente

Capacité interélectrode (sans blindage extérieur)

Capacité anode-autres électrodes	1,2 pF

BROCHAGE

Broche n° 1 : Filament, cathode et bague intérieure anti-corona.
Broche n° 2 : Filament
Broche n° 3 : Connexion interne
Broche n° 4 : Identique à broche n° 1
Broche n° 5 : Filament
Broche n° 6 : Identique à broche n° 1
Broche n° 7 : Connexion interne
Broche n° 8 : Filament
Broche n° 9 : Identique à broche n° 1
Coiffe : Anode



Brochage de la base, face à l'observateur

LIMITES MAXIMALES D'UTILISATION
(Système des limites moyennes, sauf indication contraire)

Tension inverse de pointe	25 kV max. (1)
(limite absolue)	30 kV max. (1)
Courant redressé	500 µA max.
Courant anodique de pointe	50 mA max.
Capacité de filtrage	2 000 pF max.

Tension filament - La variation de la tension appliquée au filament ne doit pas être supérieure à ± 15 % par rapport à la valeur de centrage qui est de 1,4 volt.

Cette dispersion tient compte des variations possibles de réglage du téléviseur, c'est-à-dire du courant redressé, de la largeur de l'image, du standard utilisé, etc. En aucun cas, la tension de filament ne devra être en dehors des limites spécifiées.

Pour vérifier qu'il en est bien ainsi, il est recommandé de procéder aux mesures comme indiqué dans la brochure "Recommandations relatives à l'utilisation des tubes électroniques".
- Spécification Syndicale FNIE 011 de Mai 1959, pages 54 et 55.

(1) pendant 22 % au plus d'un cycle de balayage lignes avec un maximum de 22µs.

REPRODUCTION INTERDITE

MAZDA

H. 141 D

BATTERY (DRY CELL) SINGLE DIODE TRIODE

RATING.

Filament Voltage	1.4
Filament Current (amp.)	0.05
Maximum Anode Voltage	90
*Mutual Conductance (mA/V)	0.48
*Amplification Factor	65
*Anode Current (mA)	0.33
Anode A.C. Resistance (ohms)	135,000

*At Ea=90 ; Eg=0.

TYPICAL OPERATION.

H.T. Voltage	82
Anode Load (ohms)	500,000
Anode Current (mA) (approx.)	0.065
Grid Resistance of following stage (MΩ)	2.0
Voltage Amplification	35
†Grid Bias	0

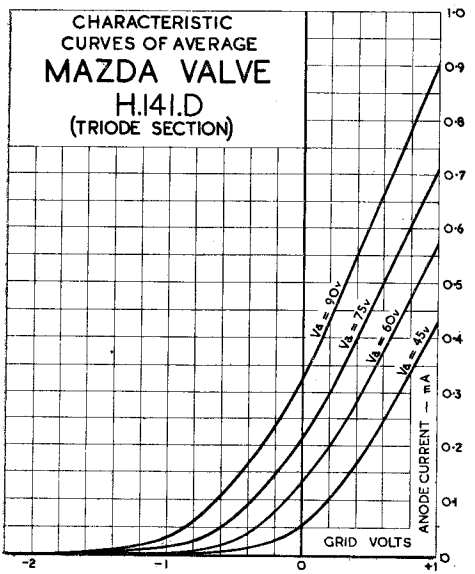
† Grid Bias must be obtained by a grid leak of 4-5 megohm returned to L.T.—ve. Diode Load should be returned to LT.—ve.

INTER-ELECTRODE CAPACITIES.

Grid to Earth	1.8 $\mu\mu$F.	Diode to Earth	2.5 $\mu\mu$F.
Anode to Earth	6.0 $\mu\mu$F.	Diode to Grid	0.008 $\mu\mu$F.
Anode to Grid	2.3 $\mu\mu$F.	Diode to Anode	0.13 $\mu\mu$F.

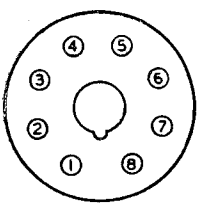
DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.



BASING.

Pin No. 1.	F—ve.
2.	Omitted.
3.	Anode.
4.	—
5.	Diode.
6.	Metallising.
7.	Omitted.
8.	F+ve.
Top Cap.	Grid.



Viewed from the free end of the base.

MAZDA

HL.2 and L.2

BATTERY TRIODES

RATINGS.

	HL.2	L.2
Filament Volts	2·0	2·0
Filament Amps.	0·1	0·1
Maximum Anode Volts	150	150
*Mutual Conductance (mA/V)	1·5	1·9
*Amplification Factor	32	19
*Anode A.C. Resistance (ohms)	21,000	10,000

*At Ea=100 ; Eg=0.

INTER-ELECTRODE CAPACITIES.

Anode to Filament	5·25	5·25 $\mu\mu$F.
Grid to Filament	3·0	3·75 $\mu\mu$F.
Anode to Grid	4·5	4·75 $\mu\mu$F.

DIMENSIONS.

Maximum Overall Length	108	108 mm.
Maximum Diameter	39	39 mm.

GENERAL.

The valves are general purpose triodes for use in battery operated receivers. The bulbs are metallised, and the valves fitted with standard 4-pin bases, the connections to which are given overleaf.

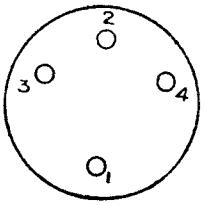
APPLICATION.

The HL.2 makes a highly efficient H.F. amplifier with aperiodic or tuned-anode circuits. Each valve is suitable for cumulative-grid or anode-bend detection, although in the latter method the HL.2 should be used with resistance-capacity coupling. When used as a cumulative grid detector, the grid return lead should be connected to the positive end of the filament.

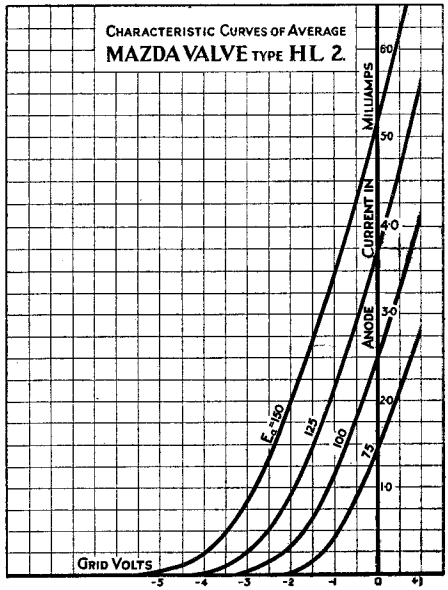
The valves are recommended as intermediate L.F. amplifiers with resistance-capacity or transformer coupling. Comparatively low values of anode resistance are required, 100,000 for HL.2 and 50,000 for the L.2, and consequently uniform amplification even at high frequencies is assured. When using the HL.2 with transformer coupling the primary impedance of the transformer should be high.

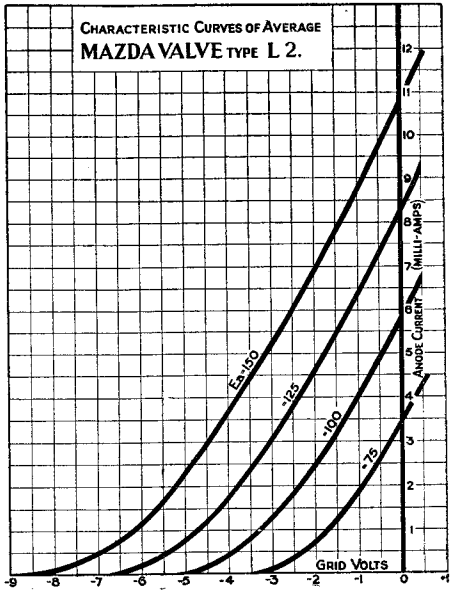
BASING (Both Types)

Pin No. 1. Anode.
2. Grid.
3. Filament and Metallising.
4. Filament.



Viewed from the free end of the base.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson Houston Co. Ltd., London and Rugby.

MAZDA

HL.21/DD and L.21/DD

BATTERY DOUBLE DIODE TRIODES.

RATINGS.

	HL.21/DD	L.21/DD
Filament Volts	2·0	2·0
Filament Current (amps.)	0·15	0·1
Maximum Anode Volts	150	150
*Mutual A.C. Conductance (mA/V)	1·5	1·85
*Amplification Factor	32	18·5
*Anode A.C. Resistance (ohms)	21,000	10,000

*Ea=100 ; Eg=0.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	7·0	6·75 $\mu\mu$F.
*Grid to Earth	2·5	2·25 $\mu\mu$F.
Anode to Grid	3·5	3·25 $\mu\mu$F.
*Diode 1 to Earth	4·5	3·5 $\mu\mu$F.
*Diode 2 to Earth	5·0	3·75 $\mu\mu$F.

* " Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement and metallising.

DIMENSIONS.

Maximum Overall Length	119	117 mm.
Maximum Diameter	39	39 mm.

GENERAL.

The valves are double diode triodes for use in battery operated receivers, and in operation the two sections are independent of each other. The bulbs are metallised, and the valves are fitted with standard 5-pin bases, the connections to which are given overleaf.

APPLICATION.

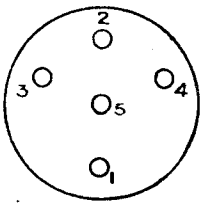
The valves are recommended for performing the simultaneous functions of detection, automatic volume control, and audio frequency amplification. Transformer or resistance coupling may be used in the triode anode circuit. Care must be exercised in the use of the diodes owing to the different potentials at which the diode anode current starts. Pin No. 3 must always be connected to L.T. negative, and the diode connected to Pin No. 5 used for detection, and that connected to Pin No. 2 for automatic volume control. The detector diode load resistance should be returned to the negative terminal of the L.T. battery. The A.V.C. diode anode current starts at approximately 1·0 volt positive on the HL.21DD and 1·4 volts positive on the L.21DD, so that it gives a delay voltage of 1·0 and 1·4 volts respectively, which when used in conjunction with a high frequency valve requiring an initial bias of 1·5 volts gives an effective delay voltage of 2·5 and 2·9 volts respectively.

The triode sections of the HL.21DD and the L.21DD are similar to those of the HL.2 and L.2 respectively. The operating conditions of the L.21DD as a driver valve for a Class B stage are the same as those for the valve type L.2.

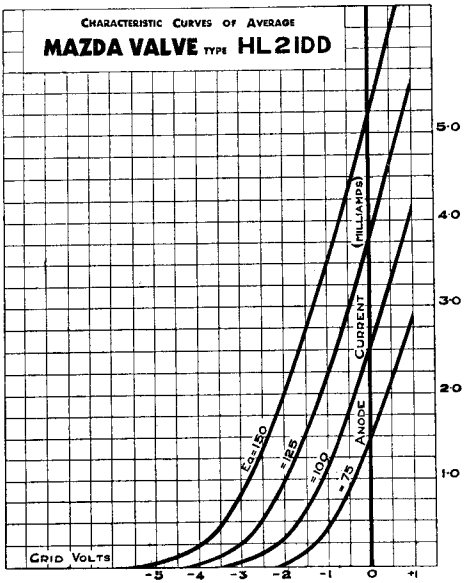
BASING (Both Types).

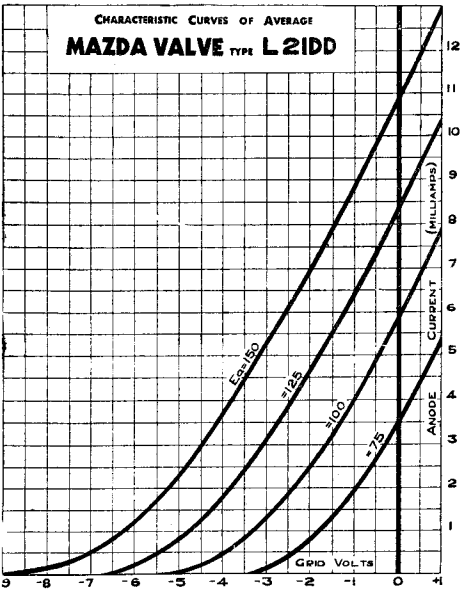
P.n No. 1. Anode.
2. Diode 1.
3. Filament and Metallising.
4. Filament.
5. Diode 2.

Top Cap. Control Grid.



Viewed from the free end of the base.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

HL. 22

BATTERY TRIODE

RATING.

Filament Voltage	2·0
Filament Current (Amps.)	0·1
Maximum Anode Voltage	150
*Amplification Factor	32
*Mutual Conductance (mA/V)	1·5
*Anode A.C. Resistance (ohms)	21,000

* Taken at Ea = 100 ; Eg = 0.

OPERATING CONDITIONS.

H.T. Voltage	120	120
Anode Load (ohms)	50,000	100,000
Grid Bias	1·5	1·0
Anode Current (mA.)	0·5	0·45

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	5·25 $\mu\mu$F.
Grid to Cathode	2·75 $\mu\mu$F.
Anode to Grid	5·0 $\mu\mu$F.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

GENERAL.

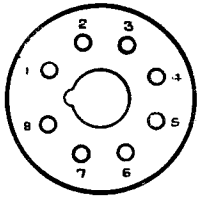
The HL.22 is a general purpose triode for use in battery-operated receivers. The bulb is of small dimensions and metallised, and the valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

APPLICATIONS.

Owing to its high mutual conductance, coupled with a comparatively low anode A.C. resistance, the HL.22 will be found suitable for use in either the oscillator, detector or L.F. positions in a receiver. When used as an oscillator, the grid leak should be returned to L.T. positive. This connexion should also be employed when the valve is used as a cumulative grid detector, although in some receivers, in order to obtain the smoothest possible reaction control, it may be desirable to return the grid leak tapping on a potentiometer across the L.T. battery. Normal practice should be followed when the valve is used as an L.F. amplifier, and representative operating conditions are given above.

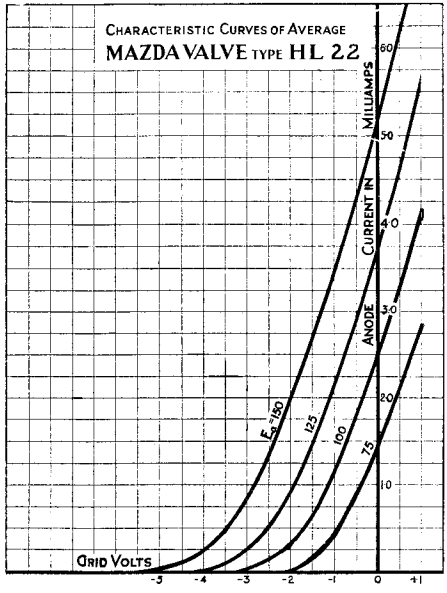
MAZDA

BASING.



Pin No. 1. Filament.
2. Omitted.
3. Anode.
4. Omitted.
5. Control Grid.
6. Metallising.
7. Omitted.
8. Filament.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD, LONDON, W.C.2

MAZDA

HL.23

BATTERY ECONOMY TRIODE

RATING.

Filament Voltage	2·0
Filament Current (amps.)	0·05
Maximum Anode Voltage	150
*Mutual Conductance (mA/V)	1·5
*Amplification Factor	32
*Anode A.C. Resistance (ohms)	21,000

*At Ea=100 ; Eg=0.

OPERATING CONDITIONS.

H.T. Voltage	120	120
Anode Load (ohms)	50,000	100,000
Grid Bias	1·5	1·0
Anode Current (mA)	0·5	0·45

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	5·25 $\mu\mu$F.
Grid to Cathode	2·75 $\mu\mu$F.
Anode to Grid	5·0 $\mu\mu$F.

DIMENSIONS.

Maximum Overall Length	85 mm.
Maximum Diameter	32 mm.

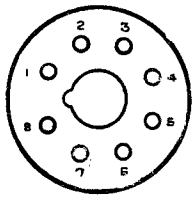
GENERAL.

The HL.23 is a general purpose triode for use in battery operated receivers. The special feature of this valve is that it has been designed for battery economy, and due to the exceptionally low filament consumption is therefore particularly recommended for use in battery portable receivers. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf

APPLICATION.

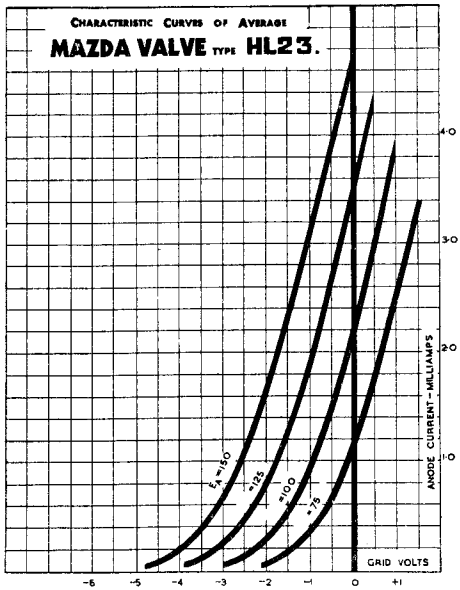
Owing to its high mutual conductance, coupled with a comparatively low anode A.C. resistance, the HL.23 will be found suitable for use in either the oscillator, detector or L.F. positions in a receiver. When used as an oscillator, the grid leak should be returned to L.T. positive. This connection should also be employed when the valve is used as a cumulative grid detector, although in some receivers, in order to obtain the smoothest possible reaction control, it may be desirable to return the grid leak tapping on a potentiometer across the L.T. battery. Normal practice should be followed when the valve is used as an L.F. amplifier, and representative operating conditions are given above.

BASING.



Pin No. 1. Filament.
2. Omitted.
3. Anode.
4. Omitted.
5. Control Grid.
6. Metallising.
7. Omitted.
8. Filament.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

HL.23 DD.

BATTERY ECONOMY DOUBLE DIODE TRIODE

RATING.

Filament Voltage	2·0
Filament Current (amps.)	0·05
Maximum Anode Voltage	150
*Mutual Conductance (mA/V)	1·2
*Amplification Factor	25
*Anode A.C. Resistance (ohms)	21,000

*At Ea=100 ; Eg=0.

TYPICAL OPERATION.

H.T. Voltage	120	120
Anode Load (ohms)	50,000	100,000
Grid Bias	—1·5	—0·9
Anode Current (mA)	0·6	0·5

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	6·0 $\mu\mu$F.
*Grid to Earth	2·0 $\mu\mu$F.
Anode to Grid	3·5 $\mu\mu$F.
*Diode 1 to Earth	3·5 $\mu\mu$F.
*Diode 2 to Earth	3·0 $\mu\mu$F.
Diode 1 to Diode 2	0·1 $\mu\mu$F.

*" Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement and metallising.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

GENERAL.

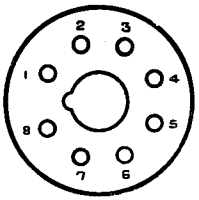
The HL.23DD is a double diode triode for use in battery operated receivers. The two diodes operate on a separate portion of the filament, with the result that in operation the two diodes and the triode are independent of each other. The special feature of this valve, is that it has been designed for battery economy, and due to the exceptionally low filament consumption is therefore particularly recommended for use in battery portable receivers. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

The HL.23DD is recommended for performing the simultaneous functions of detection, automatic volume control and audio frequency amplification. The anode current of each diode starts at different potentials. In use, therefore, Pin No. 1 should be connected to the negative terminal of the L.T. battery, and for normal purposes the Diode No. 2 should be employed as a detector diode. The diode load resistance should be returned to the negative end of the filament, whilst diode No. 1 should be

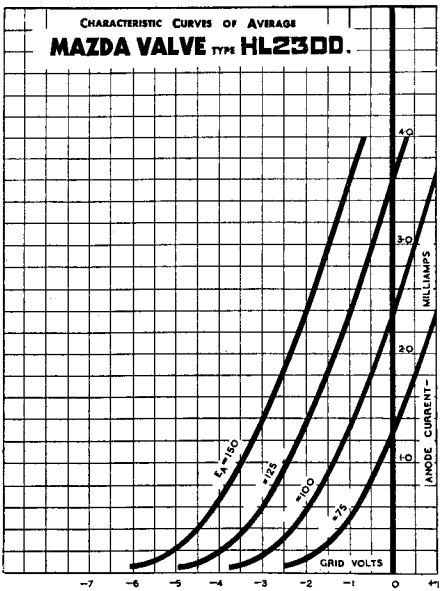
used as an A.V.C. diode. In this way an extra delay voltage of the order of 1·4 volt is obtained. When the valve is used in conjunction with an H.F. valve requiring an initial bias of 1·5 volts, a total delay voltage of about 2·9 is obtained. It is recommended that the diode load resistance should not be less than 0·5 megohm. When the triode is used as a resistance-coupled L.F. amplifier an anode load of the order of 100,000 ohms should be used. When used with a parafed transformer circuit, a lower resistance may be necessary, but this will depend upon the transformer design.

BASING.



Pin No. 1.	Filament.
2.	—
3.	Anode.
4.	—
5.	Diode 2.
6.	Metallising.
7.	Diode 1.
8.	Filament.
Top Cap.	Control Grid.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

HL.41

A.C. MAINS TRIODE

RATING.

Heater Voltage	4·0
Heater Current (amps.)	0·65
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	3·5
*Amplification Factor	36
*Anode A.C. Resistance (ohms)	10,300

* at Ea=100 ; Eg=0.

OPERATING CONDITIONS as R.C.C. Amplifier.

H.T. Voltage	250	260
Decoupling Resistance (ohms)	0	20,000
Anode Load (ohms)	50,000	50,000
Anode Current (mA)	2·2	1·9
Grid Bias Voltage	3·1	2·75
Voltage Amplification	27	27
Self-Bias Resistance (ohms)	1,400	1,450
Output Voltage (RMS) for $2\frac{1}{2}$ per cent. total harmonic distortion	45	40

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	4·5 $\mu\mu$F
*Grid to Earth	5·25 $\mu\mu$F
Anode to Grid	5·25 $\mu\mu$F

* "Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum overall length	94 mm.
Maximum diameter	32 mm.

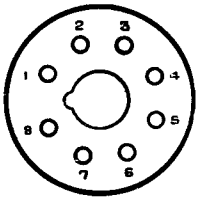
GENERAL.

The HL.41 is an indirectly heated triode for A.C. mains operation. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

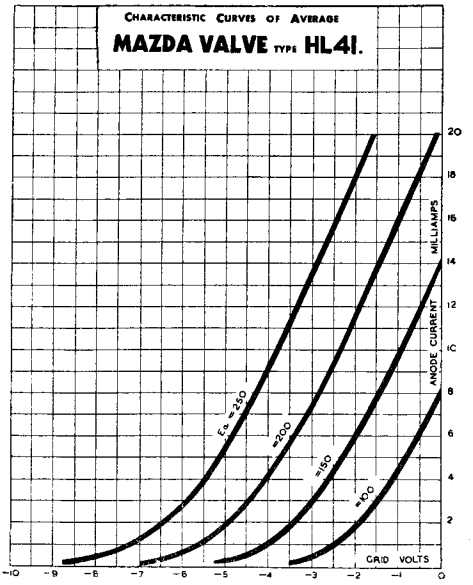
The HL.41 may be used as an L.F. amplifier with either R.C. or transformer coupling, or as an oscillator where a high mu triode is required.

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. Control Grid.
6. Metallising.
7. Omitted.
8. Heater.
—

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

HL.41 DD

A.C. MAINS DOUBLE DIODE TRIODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	0·65
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	2·5
*Amplification Factor	30
*Anode A.C. Resistance (Ohms)	12,000

*at Ea=100 ; Eg=0.

TYPICAL OPERATION.

H.T. Voltage after decoupling	250	250	250
Anode Load (ohms)	50,000	30,000	20,000
Anode Current (mA)	2·2	3·2	4·25
Cathode Self Bias Resistance (ohms)	1,400	1,000	700
Voltage Amplication	22·5	20	17·5
Maximum Output Voltage for 2½%			
Second Harmonic Distortion (Volts RMS)	38·5	35	30

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	4·5 $\mu\mu$F
Grid to Cathode	3·5 $\mu\mu$F
Anode to Grid	3·5 $\mu\mu$F
*Diode 1 to Earth	3·25 $\mu\mu$F
*Diode 2 to Earth	3·25 $\mu\mu$F

* "Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum overall length	105 mm.
Maximum diameter	32 mm.

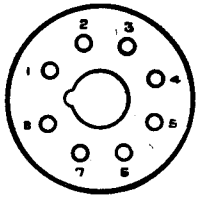
GENERAL.

The HL.41 DD is an indirectly heated double diode triode for A.C. Mains operation. It consists of two separate diodes and a triode on a common cathode sleeve. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

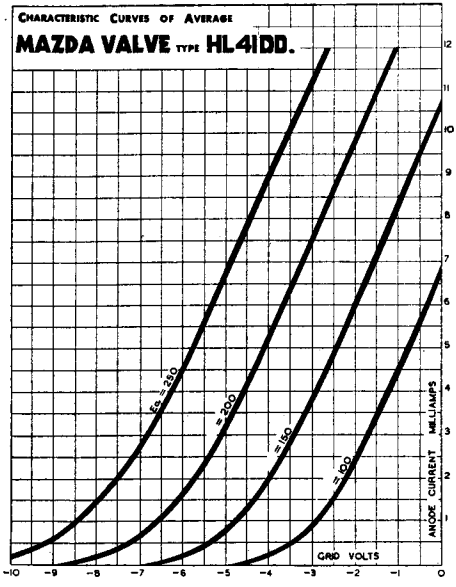
The HL.41 DD is recommended for performing the simultaneous functions of A.V.C. detection and A.F. amplification. When the valve is used for detection, only D2 (pin No. 5) should be used for the purpose. If the other diode is not required, it should be connected to the cathode. The control grid should be biased by means of a self-bias resistance which should be by-passed with a condenser of 25–50 mFd.

BASING.



Viewed from the free end of the base.

Pin No.	1.	Heater.
	2.	Cathode.
	3.	Anode.
	4.	—
	5.	D2.
	6.	Metallising.
	7.	D1.
	8.	Heater.
Top Cap		Control Grid.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

HL 42 DD

A.C. MAINS DOUBLE DIODE TRIODE

RATING

Heater Voltage	4.0
Heater Current (Amps.)	0.65
Maximum Anode Voltage	250
*Mutual Conductance (m/AV)	2.9
*Amplification Factor	23
*Anode A.C. Resistance (ohms)	8,000

*Taken at Ea=100, Eg=0

TYPICAL OPERATION.

H.T. Supply	260	260
Decoupling Resistance (ohms)	20,000	20,000
Anode Load Resistance (ohms)	50,000	100,000
Bias Volts (initial)	1.25	1.25
Self-Bias Resistance (ohms)	450	700
Anode Current (initial) (mA)	2.8	1.75
Voltage Amplification at Vg—1.25	17.5	18.5
Voltage Amplification at Vg—20 (approx.)	2	2.7

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	4.5 $\mu\mu$F
*Grid to Earth	3.5 $\mu\mu$F
Anode to Grid	3.5 $\mu\mu$F
*Diode to Earth	3.25$\mu\mu$F
*Diode to Earth	3.25$\mu\mu$F
Diode 1 to Diode 2	0.65$\mu\mu$F

*"Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M. joined to cathode.

DIMENSIONS.

Maximum Overall Length	105 mm.
Maximum Diameter	32 mm.

GENERAL.

The HL.42 DD. is an indirectly heated double diode triode for use in A.C. Mains receivers. The triode section has variable gain characteristics. The valve consists of two separate diodes and a triode on a common cathode sleeve, and the diode section is completely screened within the valve from the triode section. The valve is fitted with a Mazda Octal base, the connexions to which are given overleaf.

MAZDA

APPLICATION.

The valve is particularly suitable for use in all-wave receivers where it is desired to improve inadequate A.V.C. characteristics with low delay voltages. For this purpose a portion of the A.V.C. voltage is applied to the grid of the HL.42 DD. and an extra gain control of 8 or 9 to 1 may be obtained for a bias of 20 to 25 volts. The L.F. output under these conditions is sufficient to drive a Pen. 44 valve with negligible distortion. The valve may also be employed as a variable gain L.F. valve for manual volume control in remote control receivers. Under these conditions when it is desired to reduce the sound output the portion of the characteristic beyond –20 to –25 volts may be employed by using an available negative bias of the order of 50 volts. It is undesirable to employ negative feed back circuits with the HL. 42 DD.

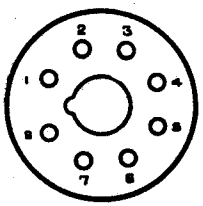
NOTE.

For L.F. signal handling capacity curves see page headed "Suggested Circuit diagram for use with Mazda Variable-mu Double Diode Triode valves" filed at the end of Section 4.

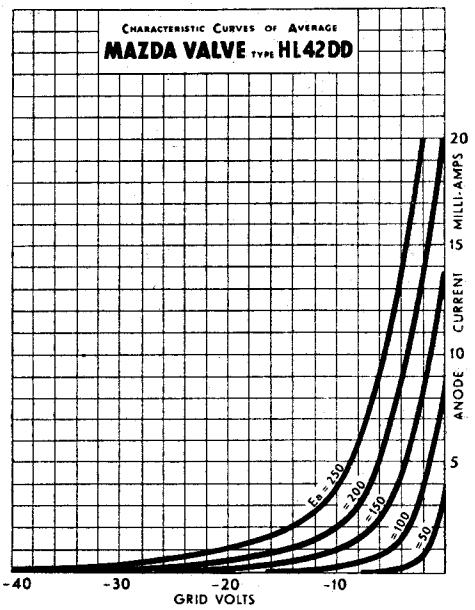
BASING.

Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Blank.
5. Diode 2.
6. Metallising.
7. Diode 1.
8. Heater.

Top Cap. Control Grid.



Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.,
115, CHARING CROSS ROAD, LONDON W.C.2

MAZDA

HL.133

A.C./D.C. MAINS TRIODE

RATING.

Heater Voltage	13·0
Heater Current (Amps.)	0·2
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	3·4
*Amplification Factor	36
*Anode A.C. Resistance (Ohms)	10,600

* at Ea=100 ; Eg=0.

TYPICAL OPERATION as R.C.C. Amplifier.

H.T. Supply	165	185
Decoupling Resistance (Ohms)	10,000	10,000
Anode Load (Ohms)	50,000	50,000
Anode Current (mA)	1·3	1·4
Grid Bias (Volts) (Approx.)	1·95	2.1
Self Bias Resistance (Ohms)	1,500	1,500
Voltage Amplification	25·5	26.0
Max. Output Volts RMS for 2½% Harmonic Content	22·0	25.5

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	5·0 $\mu\mu$F
*Grid to Earth	4·0 $\mu\mu$F
Anode to Grid	4·75 $\mu\mu$F

* " Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum overall length	105 mm.
Maximum diameter	32 mm.

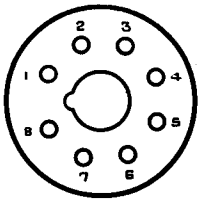
GENERAL.

The HL.133 is an indirectly heated triode for use in D.C., A.C./D.C. mains or car radio receivers. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

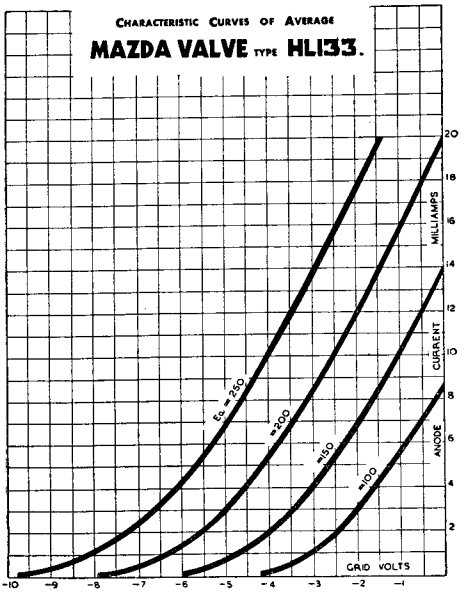
The HL.133 may be used as an A.F. amplifier either with R.C. or transformer coupling, or as an oscillator where a high mu triode is required. The heater is designed for series operation, the normal current being 0·2 ampere, and it may also be used on a 12-volt battery in a car radio receiver.

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. —
6. Metallising.
7. Omitted.
8. Heater.
Top Cap Control Grid.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

HL.133 DD

A.C./D.C. MAINS DOUBLE DIODE TRIODE

RATING.

Heater Voltage	13·0
Heater Current (Amps)	0·2
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	2·5
*Amplification Factor	32
*Anode A.C. Resistance (Ohms)	12,800

* at Ea=100 ; Eg=0.

OPERATING CONDITIONS.

H.T. Supply	165	185
Decoupling Resistance (ohms.)	10,000	10,000
Anode Load (ohms)	50,000	50,000
Anode Current (mA)	1·25	1·45
Grid Bias Voltage	2·2	2·5
Self-Bias Resistance (ohms)	1,750	1,750
Voltage Amplification	20	21
Maximum Output Volts R.M.S. for 2½% Harmonic Content	22½	27

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	4·5 $\mu\mu$F
Grid to Cathode	3·5 $\mu\mu$F
Anode to Grid	3·5 $\mu\mu$F
*Diode 1 to Earth	3·25 $\mu\mu$F
*Diode 2 to Earth	3·25 $\mu\mu$F
Diode 1 to Diode 2	0·6 $\mu\mu$F

* "Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H. and M. joined to cathode.

DIMENSIONS.

Maximum overall length	105 mm.
Maximum diameter	32 mm

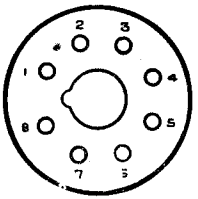
GENERAL.

The HL.133DD is an indirectly heated double diode triode for use in D.C., A.C./D.C. mains, and car radio receivers. It consists of two separate diodes and a triode on a common cathode sleeve. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

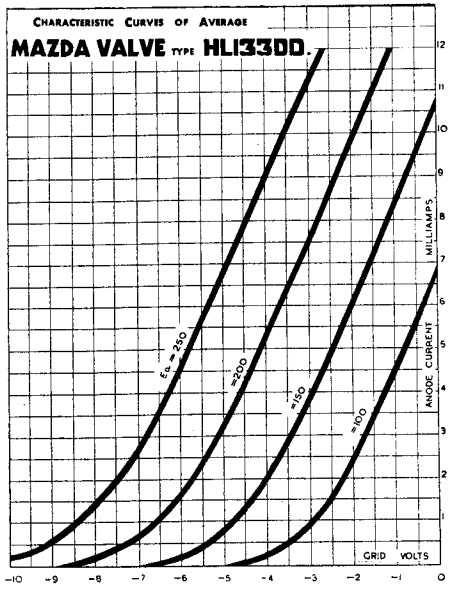
The HL.133DD is recommended for performing the simultaneous functions of A.V.C., detection and amplification. When the valve is used for detection, only D2 (pin No. 5) should be used for the purpose. If the other diode is not required, it should be connected to the cathode. The control grid should be biased by means of a self-bias resistance which should be by-passed with a condenser of 25–50 mFd.

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. D2.
6. Metallising.
7. D1.
8. Heater.
Top Cap Control Grid.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

HL.1320

AC/DC MAINS TRIODE

RATING.

Heater Voltage	13·0
Heater Current	0·2
Maximum Anode Volts	250
*Mutual Conductance...	3·0
*Amplification Factor	30
*Anode A.C. Resistance	10,000

*At Ea=100 ; Eg=0.

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	5·25 $\mu\mu$F.
Grid to Cathode	5·0 $\mu\mu$F.
Anode to Grid	2·5 $\mu\mu$F.

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	39 mm.

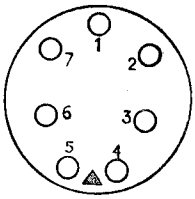
GENERAL.

The HL.1320 is an indirectly heated triode for use in D.C., A.C./D.C., or car radio receivers. The valve has been specially designed for use as a detector, amplifier, or oscillator. The bulb is metallised, and the valve is fitted with a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

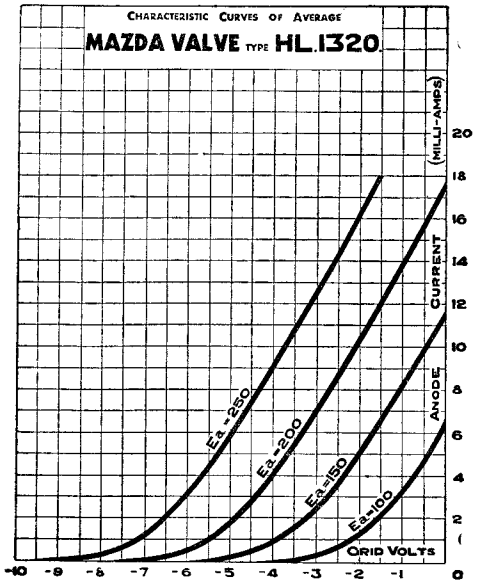
The HL. 1320 may be used as an A.F. amplifier either with R.C. or transformer coupling, or as an oscillator where a high mu triode is required. The heater is designed for series operation, the normal current being 0·2 ampere, and it may also be used on a 12 volt battery in a car radio receiver.

BASING.



Viewed from the free end of the base.

PIN No.	1.	Metallising.
	2.	—
	3.	—
	4.	Heater.
	5.	Heater.
	6.	Cathode.
	7.	Anode.
Top Cap.		Control Grid.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

HL/DD.1320

AC/DC MAINS DOUBLE DIODE TRIODE

RATING.

Heater Voltage	13·0
Heater Current (amps)	0·2
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	2·0
*Amplification Factor	30
*Anode A.C. Resistance (ohms)	15,000

*At Ea=100 ; Eg=0.

INTER-ELECTRODE CAPACITIES.

Anode to Cathode	10·5 $\mu\mu$F.
Grid to Cathode	4·25 $\mu\mu$F.
Anode to Grid	2·0 $\mu\mu$F.
*Diode 1 to Earth	3.75 $\mu\mu$F.
*Diode 2 to Earth	3·5 $\mu\mu$F.
Diode 1 to Diode 2	0·3 $\mu\mu$F.

*" Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum overall length	125 mm.
Maximum Diameter	39 mm.

GENERAL.

The HL DD.1320 is an indirectly heated double diode triode for use in D.C., A.C./D.C. Mains, or car radio receivers. It is designed to operate as a combined detector-amplifier with or without A.V.C. The diode section is completely screened from the triode section inside the valve. The bulb is metallised, and the valve is fitted with a standard 7-pin base, the connections to which are given overleaf.

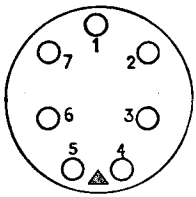
APPLICATION.

The resistance between heater and cathode is of a very high order, so that the valve is eminently suitable for use in amplified A.V.C. circuits in which the triode unit acts as a combined audio-frequency amplifier and D.C. amplifier for A.V.C. purposes. In normal operation one diode anode (Pin No. 1) is employed as an audio frequency detector and the other (Pin No. 3) to provide A.V.C. voltage. The detector diode load should be returned to the cathode and the A.V.C. diode load to a point at negative potential to provide the necessary delay voltage.

The damping introduced by the diode detector may be quite small provided the load resistance is kept high, say 0·5 to 1 megohm. It is essential to ensure that the effective impedance to audio frequencies of the circuit between the diode anode and cathode, is as nearly equal as possible to the D.C. resistance of this circuit, otherwise distortion at high modulation percentages will occur. The resistance in the grid circuit of the triode should be at least that of the diode load resistance.

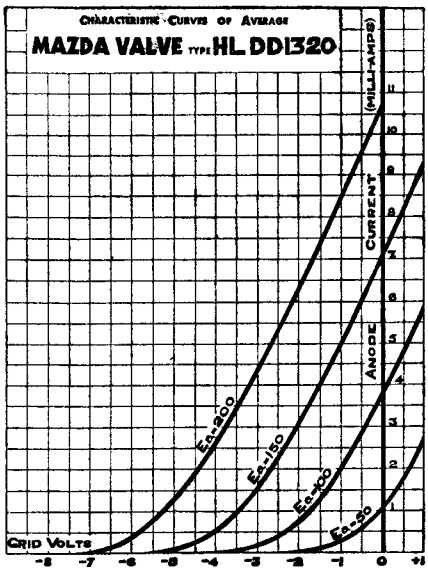
The use of the detector at high signal inputs necessitates the provision of a low frequency gain control between the detector output and the low frequency amplifying valve, to prevent any possibility of overloading this amplifier.

BASING.



Viewed from the free end of the base.

Pin No.	1.	Diode 1.
	2.	Metallising.
	3.	Diode 2.
	4.	Heater.
	5.	Heater.
	6.	Cathode.
	7.	Anode.
Top Cap.		Control Grid.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA
JA IO

JA IO

JAUGE A IONISATION - BROCHAGE "NOVAL" 9 BROCHES

La jauge à ionisation JAIO permet de mesurer des pressions entre 10^{-4} et 10^{-6} mm (torr.). Elle a un encombrement très réduit.

L'électrode collectrice, de faibles dimensions, est plus facile à dégazer et l'on obtient, de ce fait, une très bonne stabilité lors de la mesure des faibles pressions.

Le filament de wolfram, situé dans l'axe du montage, sert de source émettrice d'électrons ; la grille qui l'entoure est portée à un potentiel positif et recueille ainsi le flux électronique. Le collecteur, porté à un potentiel négatif de 30 volts, est constitué de deux tiges placées de part et d'autre de la grille. On règle la tension aux bornes du filament pour obtenir un courant de grille de IO mA.

Un raccord étanche étudié spécialement permet de relier la jauge JAIO aux divers types d'enceinte à vide. La mise en place de ce raccord est d'une exécution facile et très rapide (voir page 2).

CARACTERISTIQUES GENERALES		CARACTERISTIQUES ELECTRIQUES		
Hauteur totale	105 mm	Tension filament	3,8 V	env.
Diamètre maximal	22,2 mm	Courant filament	3,2 A	env.
Diamètre du filament	0,08mm	Tension de grille	250	V
Diamètre intérieur de la grille	5,25mm	Courant de grille	IO	mA
Surface du collecteur	0,6cm²	Tension du collecteur	-30	V
		Courant du collecteur	voir ci-après	
		Pression limite mesurable	10^{-6}	mm Hg (torr.)

COURANT DU COLLECTEUR

La tension du collecteur et le courant de grille étant maintenus respectivement à -30 V et IO mA, le courant du collecteur est fonction de la tension de grille et de la pression.

La page 4 donne les courbes du courant du collecteur en fonction de la pression pour diverses valeurs de la tension de grille

La page 3 donne les courbes du courant du collecteur en fonction de la tension de grille pour diverses valeurs de la pression.

REPRODUCTION INTERDITE

JA 10

MAZDA

JA 10

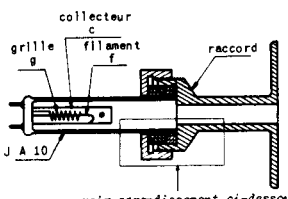
JAUGE A IONISATION - BROCHAGE "NOVAL"
9 BROCHES

Brochage de la jauge JA10

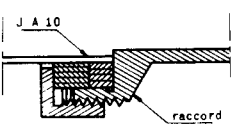
Broche n°	1	collecteur
"	2	collecteur
"	3	grille
"	4	filament
"	5	collecteur
"	6	collecteur
"	7	grille
"	8	filament
"	9	filament

Broches de la base, face à l'observateur

Montage de la jauge sur son raccord

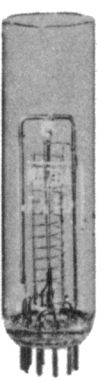


voir agrandissement ci-dessous.



Vue agrandie du joint J A 10 - raccord

Encombrement de la jauge JA10



REPRODUCTION INTERDITE

MAZDA

K 25000 A 1

K 25000 A 1

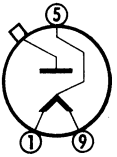
KENOTRON POUR HAUTE TENSION

SÉRIE "A"

Nature du filament		Tungstène pur
Tension filament	2,5	Volts env.
Intensité filament	9	Amp. env.
Hauteur broches comprises	139	mm max.
Diamètre	50	mm max.
Support Mazda à utiliser	SP100A	

BROCHES :

N° 1 – Filament
N° 2-3-4 – manquent
N° 5 – Point milieu filament



BROCHES :

N° 6-7-8 – manquent
N° 9 – Filament
L'anode est reliée à la couronne métallique

Broches de la base, face à l'observateur

CONDITIONS D'UTILISATION MAXIMALES

Tension inverse de crête	25.000	V
Courant anodique de crête	70	mA
Courant anodique moyen	70	limité par la saturation de mA

CONDITIONS D'UTILISATION EN REGULATEUR DE TENSION

Chauffage.	Min.		Max.	
Tension filament	2	V	3	V
Courant filament (env.)	7,8		10,3	
Tension inverse max. (crête)	25.000	V	25.000	V
Courant anodique (crête) (env.)	13	mA	300	mA
Courant anodique moyen max. (limité par la saturation de 13 mA).			150	mA

REPRODUCTION INTERDITE

L.22/DD

BATTERY DOUBLE DIODE TRIODE

RATING.

Filament Volts	2.0
Filament Current (amps.)	0.1
Maximum Anode Volts	150
*Mutual A.C. Conductance (mA/V)	1.85
*Amplification Factor	18.5
*Anode A.C. Resistance (ohms)	10,000

*Va=100 ; Vg=0.

TYPICAL OPERATION.

H.T. Voltage	120	120
Anode Load (ohms)	75,000	50,000
Grid Bias	—3.0	—3.0
Anode Current (mA)	0.6	0.8

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	6.75 $\mu\mu$F.
*Grid to Earth	2.25 $\mu\mu$F.
Anode to Grid	3.25 $\mu\mu$F.
*Diode 1 to Earth	3.25 $\mu\mu$F.
*Diode 2 to Earth	3.25 $\mu\mu$F.
Diode 1 to Diode 2	0.1 $\mu\mu$F.

* " Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement and metallising.

DIMENSIONS.

Maximum Overall Length	... 106 mm.
Maximum Diameter	... 32 mm.

GENERAL.

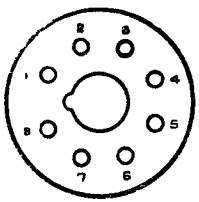
The valve is a double diode triode for use in battery operated receivers, and in operation the two sections are independent of each other. The bulb is metallised, and the valve is fitted with a British Octal Base, the connexions to which are given overleaf.

APPLICATION.

The valve is recommended for performing the simultaneous functions of detection, automatic volume control and audio frequency amplifications. The anode current of each diode starts at different potentials. In use, therefore, Pin No. 1 should be connected to the negative terminal of the L.T. battery, and for normal purposes the Diode No. 2 should be employed as a detector diode. The diode load resistance should be returned to the negative end of the filament, whilst diode No. 1 should be used as an A.V.C. diode. In this way an extra delay voltage of the order of 1.4 volts is obtained. When the valve is used in conjunction with an H.F.

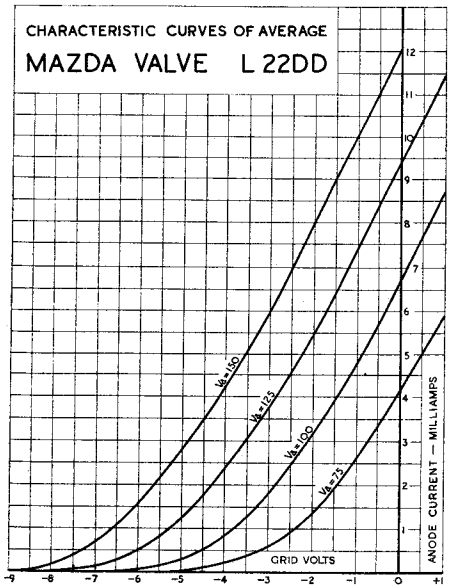
valve requiring an initial bias of 1.5 volts, a total delay voltage of about 2.9 is obtained. It is recommended that the diode load resistance should not be less than 0.5 megohm. When the triode is used as a resistance-coupled L.F. amplifier an anode load of the order of 75,000 ohms should be used. When used with a parafed transformer circuit, a lower resistance may be necessary, but this will depend upon the transformer design.

BASING.



Pin No. 1. Filament –ve.
2. –
3. Anode.
4. –
5. Diode 2.
6. Metallising.
7. Diode 1.
8. Filament +ve.
Top Cap. Control Grid.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

MAZDA

ME.41

A.C. MAINS CATHODE RAY TUNING INDICATOR

RATING.

Heater Voltage	4·0
Heater Current (amps.)	0·5
Maximum Anode Voltage	250
Maximum Target Voltage	250

OPERATING CONDITIONS.

H.T. Supply Voltage	250
Target Current (mA) (approx.)	1·16
*Anode Current (mA) (approx.) at Vg-0.5	0·23
*Grid Voltage (0° shadow angle) (approx.)	22·5

* For anode load resistance of 1 megohm.

DIMENSIONS.

Maximum overall length	90 mm.
Maximum diameter	28·5 mm.

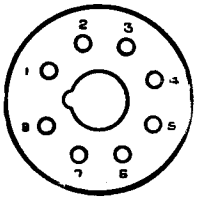
GENERAL.

The ME.41 is an indirectly heated cathode ray tuning indicator for use on A.C. mains. It is designed to indicate visually, by means of a fluorescent target, the effects of change of the applied voltage on the control grid. The cathode acts as a source of electrons which are attracted to a positively charged target coated with a fluorescent material. The electrons impinging on the coated target cause it to glow, and the extent of the fluorescent area is controlled by means of a ray control electrode placed between the cathode and the target. When the potential of the control electrode is increased from a low positive potential to a high positive potential, the area of shadow produced on the target is reduced. The electrode is connected internally to the anode of the triode, and in use a high resistance is placed in the triode anode circuit so that it operates as a resistance coupled D.C. amplifier. The shadow which starts with an angle of approximately 90° with zero bias, can be reduced to zero by applying sufficient bias to the control grid. The target should be connected directly to a positive supply of 250 volts, and the triode anode connected to the target through a load resistance of about 1 megohm. The cathode should be connected to the cathode of the detector valve. The valve is based in a British Octal Base, the connections to which are given overleaf.

APPLICATION.

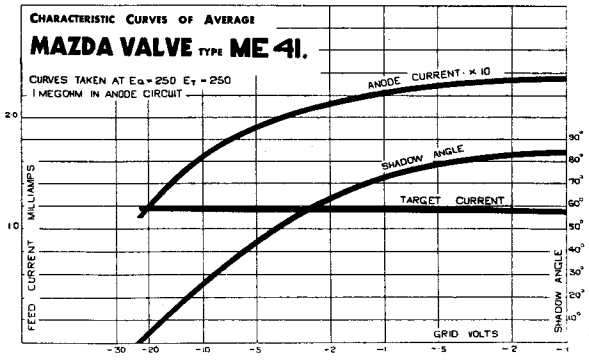
The grid of the valve should always be controlled from the detector circuit, and not the A.V.C. diode circuit, so as to enable visual tuning to be obtained below the delay point. This also eliminates the possibility of two tuning positions giving a minimum value if either transformer has a double humped primary response. The tapping values controlling the ratio of D.C. volts applied to the control grid should be arranged to give a suitable deflection on a local station.

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. Control Grid.
6. —
7. Target.
8. Heater.

Viewed from the free end of the base.



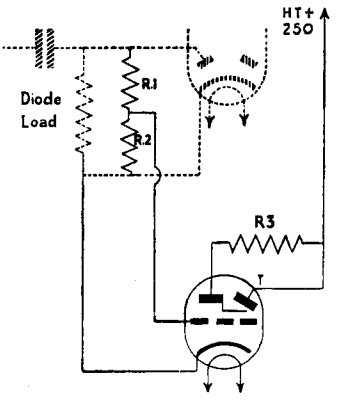
CIRCUIT DIAGRAM.

Values of components:

R_1 2 megohms.
R_2 2 megohms.
R_3 1 megohm.

These values are representative only and the value of R_2 may need alteration to suit individual circuit conditions.

IMPORTANT. A condenser of 0·1 mfd. should be connected between the grid and cathode of the ME.41



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

ME.91

A.C./D.C. MAINS CATHODE RAY TUNING INDICATOR

RATING.

Heater Voltage	9·0
Heater Current (Amps).	0·2
Maximum Anode Voltage	200
Maximum Target Voltage	200

OPERATING CONDITIONS.

H.T. Supply Voltage	150	175
Target Current (mA) (approx.)	2·1	2·7
*Anode Current (mA) (approx.) at Vg—0.5	0·135	0·16
*Grid Voltage (0° shadow angle) (approx.)	17	19

* For anode load resistance of 1 megohm.

DIMENSIONS.

Maximum overall length	90 mm.
Maximum diameter	28·5 mm.

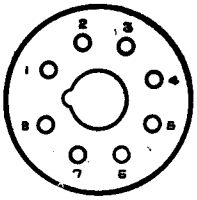
GENERAL.

This valve is the equivalent of the ME.41 and is intended for use in A.C./D.C. receivers. The valve is based in a British Octal Base, the connections to which are given overleaf.

APPLICATION.

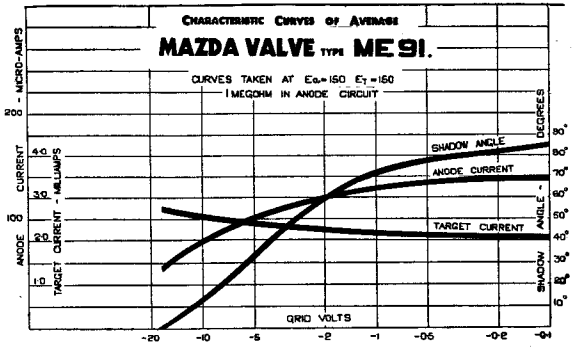
The grid of the valve should always be controlled from the detector circuit, and not the A.V.C. diode circuit, so as to enable visual tuning to be obtained below the delay point. This also eliminates the possibility of two tuning positions giving a minimum value if either transformer has a double humped primary response. The tapping values controlling the ratio of D.C. volts applied to the control grid should be arranged to give a suitable deflection on a local station.

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. Control Grid.
6. —
7. Target.
8. Heater.

Viewed from the free end of the base.



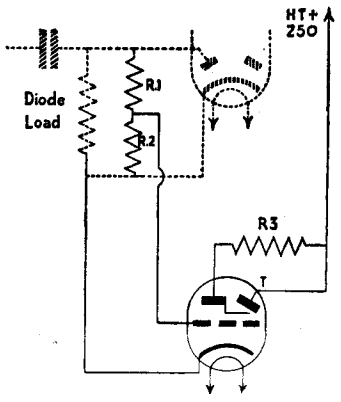
CIRCUIT DIAGRAM.

Values of components:

R_1 2 megohms.
R_2 2 megohms.
R_3 1 megohm.

These values are representative only and the value of R_2 may need alteration to suit individual circuit conditions.

IMPORTANT. A condenser of 0·1 mfd. should be connected between the grid and cathode of the ME.91.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

ME.920

A.C./D.C. MAINS CATHODE RAY TUNING INDICATOR

RATING.

Heater Voltage	9.0
Heater Current (Amps.)	0.2
Maximum Anode Voltage	200
Maximum Target Voltage	200

OPERATING CONDITIONS.

H.T. Supply Voltage	175
Target Current (mA) (approx.)	2.6
*Anode Current (at Vg=0) (approx.)	0.18
*Grid Volts (0° shadow angle) (approx.)	19.0

*For anode load resistance of 1 megohm.

DIMENSIONS.

Maximum overall length	109 mm.
Maximum diameter	38 mm.

GENERAL.

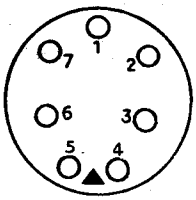
The ME.920 is an indirectly heated cathode ray tuning indicator, for use in A.C./D.C. mains receivers. It is designed to indicate visually, by means of a fluorescent target, the effects of change of the applied voltage on the control grid. The cathode acts as a source of electrons which are attracted to a positively charged target coated with a fluorescent material. The electrons impinging on the coated target cause it to glow, and the extent of the fluorescent area is controlled by means of a ray control electrode placed between the cathode and the target. When the potential of the control electrode is increased from a low positive potential to a high positive potential, the area of shadow produced on the target is reduced. The electrode is connected internally to the anode of the triode, and in use a high resistance is placed in the triode anode circuit so that it operates as a resistance coupled D.C. amplifier. The shadow which starts with an angle of approximately 90° with zero bias, can be reduced to zero by applying sufficient bias to the control grid. The target should be connected directly to a positive supply of 200 volts, and the triode anode connected to the target through a load resistance of about 1 megohm. The cathode should be connected to the cathode of the detector valve. The valve is based in a standard 7-pin base, the connexions to which are given overleaf.

APPLICATION.

The grid of the valve should always be controlled from the detector circuit, and not the A.V.C. diode circuit, so as to enable visual tuning to be obtained below the delay point. This also eliminates the possibility of two tuning positions giving a minimum value if either transformer has a double humped primary response. The tapping values controlling the ratio of D.C. volts applied to the control grid should be arranged to give a suitable deflection on a local station.

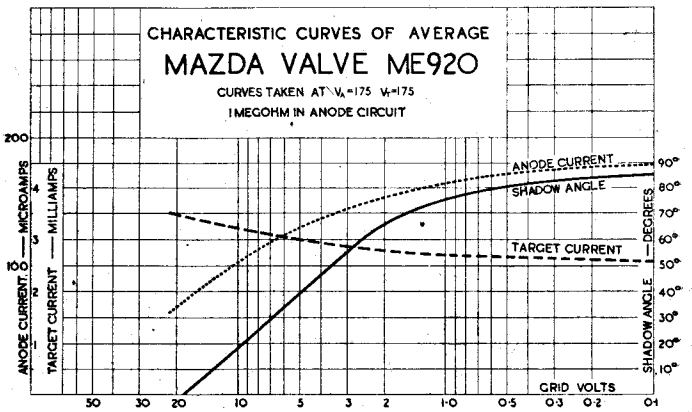
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. —
2. Control Grid.
3. Target.
4. Heater.
5. Heater.
6. Cathode.
7. Anode.



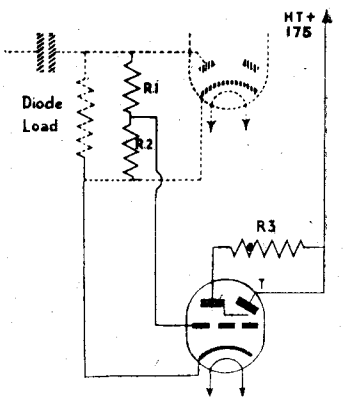
CIRCUIT DIAGRAM.

Values of components :

R_1 2 mehogms.
R_2 2 megohms.
R_3 1 megohm.

These values are representative only and the value of R_2 may need alteration to suit individual circuit conditions.

IMPORTANT. A condenser of 0.1 mfd should be connected between the grid and cathode of the ME.920.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

MR.15

EDISWAN

MR.15

GRID CONTROLLED MERCURY VAPOUR RECTIFIER

GENERAL

When this rectifier is first placed in service the filament should be operated at normal voltage for 15 minutes without the anode voltage in order to obtain correct distribution of the mercury.

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	15.0
Maximum Peak Inverse Voltage (volts)	P.I.V.(max)	20,000
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	15
Control Ratio (approx.)		90
Ambient Temperature Range °C		10-40
Cathode heating delay time (secs)		60

DIMENSIONS

Maximum Overall Length (mm)	440
Maximum Diameter (mm)	150
Approximate Nett Weight (oz)	18
Approximate Packed Weight (lb)	9
Approximate Packed Export Weight (lb)	10

MOUNTING POSITION - Vertical

BASE G.E.S.

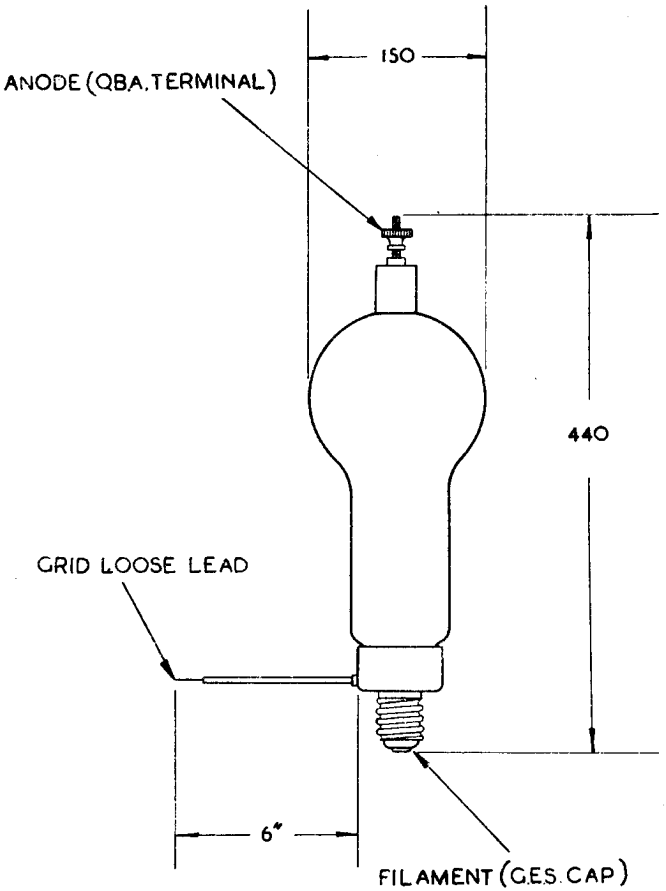
SPECIAL NOTE

The grid is connected by means of an insulated loose flexible lead through the base.

EDISWAN

MR.15

GRID CONTROLLED MERCURY VAPOUR RECTIFIER



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STATED OTHERWISE

November 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

MR.304

EDISWAN

MR.304

GRID CONTROLLED MERCURY VAPOUR RECTIFIER

GENERAL

Hot Cathode Half-Wave Grid Controlled Rectifier. Care must be taken in installation to ensure free circulation of air around the bulb in order that the temperature limits are not exceeded.

When the rectifier is first placed in service the filament should be operated at normal voltage for 15 minutes without anode voltage in order to obtain correct distribution of the mercury. The rectifier should be mounted vertically.

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	12.5
Maximum Peak Inverse Voltage (kV)	P.I.V.(max)	14.0
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	3.0
Maximum Average Anode Current (amps)	$I_{a(av)max}$	0.75
Control Ratio		500
Ambient Heating Delay Time (secs)		60
Ambient Temperature Range	°C	10-40

DIMENSIONS

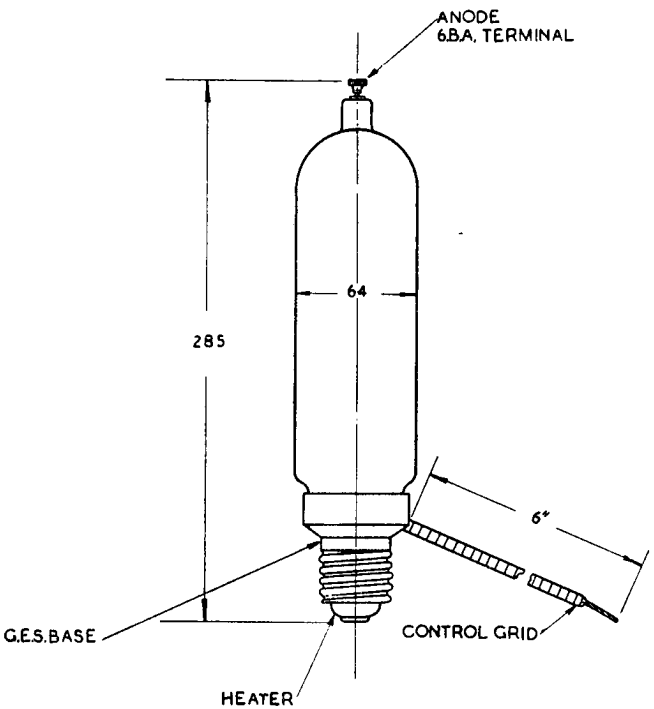
Maximum Overall Length (mm)	285
Maximum Overall Diameter (mm)	64

MR.304

EDISWAN

MR.304

GRID CONTROLLED MERCURY VAPOUR RECTIFIER



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October 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

MU 2

HALF WAVE MERCURY VAPOUR RECTIFIER

RATING.

Filament Voltage	2·0
Filament Current (Amps.)	3·1

Rating No. 1—High Current delayed switching.

*Peak Inverse Voltage	5,000
*Peak Anode Current (Amps.)	0·3
Valve Voltage Drop (approx.) (volts)	15

*The filament of the MU.2 should be allowed to come up to operating temperature before the anode voltage is applied. For average conditions the delay is approximately 10 seconds.

Rating No. 2—Low Current high voltage simultaneous switching.

**Peak Inverse Voltage (max.)	12,500
Mean Rectified Current (mA) (max.)	5·0
Peak Anode Current (mA) (max.)	50

**For Circumambient Air Temperature 0° to 50° C.

DIMENSIONS.

Maximum Overall Length	121 mm.
Maximum Diameter	39 mm.

GENERAL.

The MU.2 is a directly heated half-wave mercury vapour rectifier, for use in mains H.T. rectifier circuits, and has been particularly designed for use in exciter units with high voltage cathode ray tubes. The valve is fitted with a standard 4-pin base, the connexions to which are given overleaf.

APPLICATION.

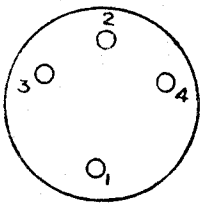
If the valve is to operate at full load current, it is essential to allow the cathode to attain operating temperature before the anode voltage is applied. If, however, the load current does not exceed that specified above, simultaneous switching is allowed. A suitable delay switch for use with the valve is the Ediswan DLS.10.

The rectifier must have an effective resistance in series with the anode of 10,000 ohms minimum for the Rating No. 2 condition. This resistance may be obtained in the distributed resistance of the transformer windings. The capacity of the first condenser of the capacity filter should not exceed 0·5 mfd.

Note.—After transit the valve should be run with the heater volts on for about 15 minutes before the anode voltage is applied.

MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1.	—
2.	—
3.	Filament.
4.	Filament.
Top Cap.	Anode.

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.,
155, CHARING CROSS ROAD, LONDON, W.C.2

MU.25

EDISWAN

MU.25

HALF-WAVE MERCURY VAPOUR RECTIFIER

GENERAL

This is an indirectly heated oxide coated cathode half-wave rectifier. Care should be taken in installation to ensure free circulation of air around bulb in order that the temperature limits are not exceeded. When the mercury vapour rectifier is first placed into service, the cathode should be operated at normal voltage for 15 minutes, without anode voltage in order to obtain correct distribution of the mercury.

RATING

Filament Voltage (volts)	V_f	4.0
Filament Current (amps)	I_f	28 0
Maximum Peak Inverse Anode Voltage (volts)	P.I.V (max)	500
Maximum Peak Anode Current (amps)	$I_{a(pk)max}$	100
Maximum Average Anode Current (amps)	$I_{a(av)max}$	25
Ambient Temperature Range		10° -40°C
Cathode Heating Delay Time (mins)	t	5.0

DIMENSIONS

Maximum Overall Length (mm)	395
Maximum Diameter (mm)	110
Approximate Nett Weight (lbs)	1½
Approximate Packed Weight (lbs)	8
Approximate Packed Export Weight (lbs)	8½

MOUNTING POSITION - Vertical

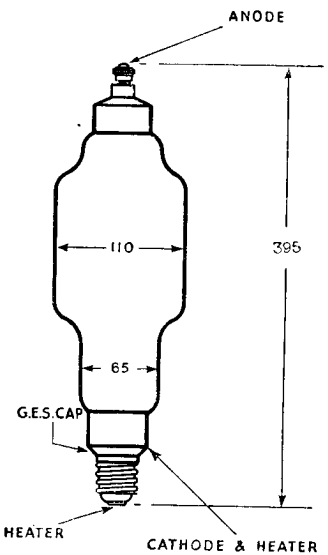
MU.25

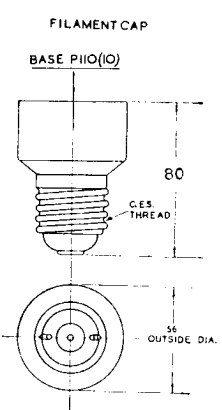
EDISWAN

MU.25

HALF-WAVE MERCURY VAPOUR RECTIFIER

BASE C.E.S. TOP CAP Screw.





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August 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD.

P.41

A.C. MAINS TRIODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	0·95
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	8·0
*Amplification Factor	17
Maximum Peak Anode Current (mA.)	30
Maximum Anode Watts	4·0

* Taken at Ea=100 ; Eg=0.

TYPICAL OPERATION.

As an oscillator.

Anode Voltage (approx.)	40
Anode Current (mA.)	4 to 5

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	4·75 $\mu\mu$F.
*Grid to Earth	7·0 $\mu\mu$F.
Anode to Grid	3·5 $\mu\mu$F.
Cathode to Heater	7·0 $\mu\mu$F.

* " Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	88 mm.
Maximum Diameter	32 mm.

GENERAL.

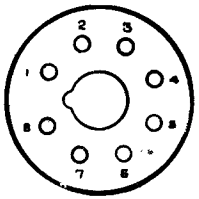
The P.41 is an indirectly heated triode particularly suitable for use as an oscillator. The bulb is of small dimensions and metallised. The valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

APPLICATION.

The valve has been primarily designed for use as an oscillator in television receivers where it is desired to use a frequency changer consisting of an SP.41 with injection into the grid circuit. Under these conditions conversion conductances of the order of 2,700 are obtained with a very much better signal to noise ratio than is obtainable with any other form of frequency changer. It should be realised when designing oscillators for operation at these high frequencies (32 megacycles) that the constants given can only apply to one particular lay-out as very small changes in the disposition of leads or the length of the leads of the oscillator circuit will appreciably affect its performance. This valve may also be used as an oscillator in all-wave receivers where a combined frequency changer is not employed.

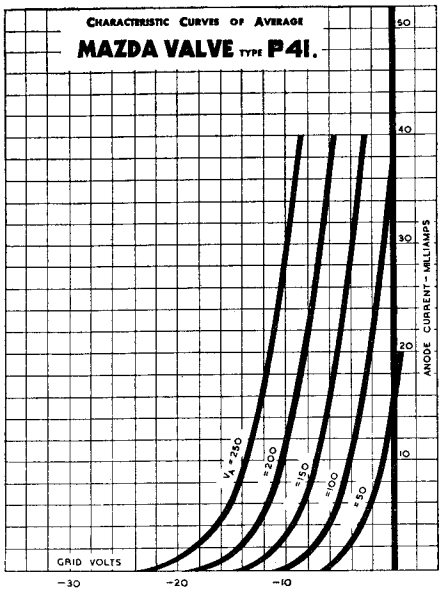
MAZDA

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. Control Grid.
6. Metallising.
7. Omitted.
8. Heater.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD LONDON, W.C.2.

MAZDA

P.61

A.C. MAINS TRIODE

RATING.

Heater Voltage	6.3
Heater Current (amps.)	0.6
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	8.0
*Amplification Factor	17
Maximum Peak Anode Current (mA.)	30
Maximum Anode Watts	4.0

*Taken at Ea=100 ; Eg=0.

TYPICAL OPERATION.

As an oscillator.

Anode Voltage (approx.)	40
Anode Current (mA.)	4 to 5

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	4.75 $\mu\mu$F.
*Grid to Earth	7.0 $\mu\mu$F.
Anode to Grid	3.5 $\mu\mu$F.
Cathode to Heater	7.0 $\mu\mu$F.

* " Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	88 mm.
Maximum Diameter	32 mm.

GENERAL.

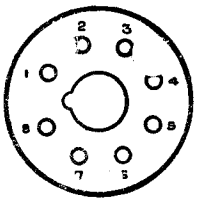
The P.61 is an indirectly heated triode particularly suitable for use as an oscillator. The bulb is of small dimensions and metallised. The valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

APPLICATION.

The valve has been primarily designed for use as an oscillator in television receivers where it is desired to use a frequency changer consisting of an SP.61 with injection into the grid circuit. Under these conditions conversion conductances of the order of 2,700 are obtained with a very much better signal to noise ratio than is obtainable with any other form of frequency changer. It should be realised when designing oscillators for operation at these high frequencies (32 megacycles) that the constants given can only apply to one particular lay-out as very small changes in the disposition of leads or the length of the leads of the oscillator circuit will appreciably affect its performance. This valve may also be used as an oscillator in all-wave receivers where a combined frequency changer is not employed.

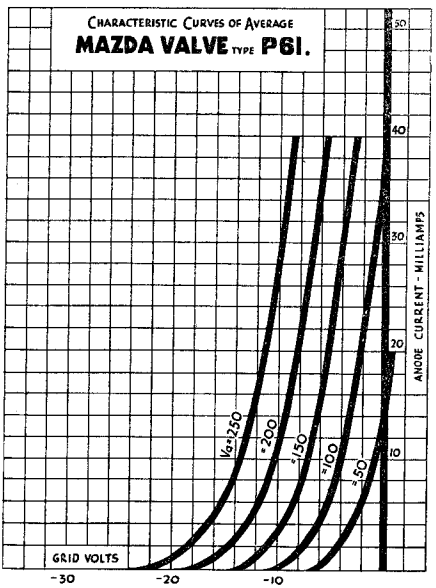
MAZDA

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. Control Grid.
6. Metallising.
7. Omitted.
8. Heater.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD, LONDON, W.C.2

P.220 and P.220A

BATTERY OUTPUT TRIODES

RATING.

	P.220	P.220A
Filament Voltage	2·0	2·0
Filament Current (amps.)	0·2	0·2
Maximum Anode Voltage	150	150
Maximum Anode Current (mA)	10	17
*Mutual Conductance (mA/V)	3·4	3·5
*Amplification Factor	12·5	6·5
*Anode A.C. Resistance (ohms)	3,700	1,850

*At Ea=100 ; Eg=0.

DIMENSIONS.

Maximum Overall Length	107	105 mm.
Maximum Diameter	39	45 mm.

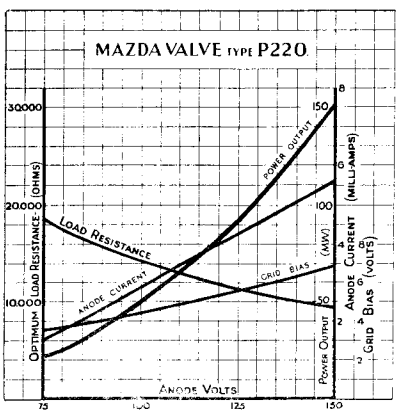
GENERAL.

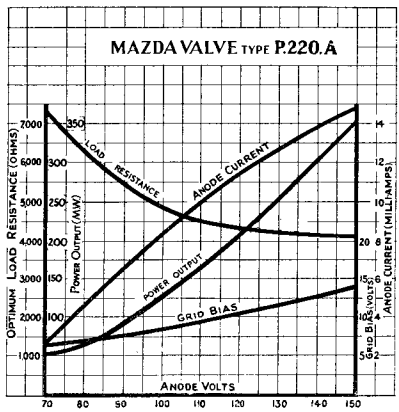
The valves are output triodes for use in battery operated receivers. The P.220 is recommended for sets where the consumption is limited to 5–7 milliamps. The valves are fitted with a standard 4-pin base, the connections to which are given overleaf.

APPLICATION.

The P.220 operates at a lower anode current and has a higher sensitivity than the P.220A, but the latter is capable of supplying a larger power output. When the valves are employed in a resistance-capacity coupled amplifier, the grid circuit resistance should not exceed 2 megohms and 1 megohm respectively. The P.220 may be used as a driver valve in conjunction with the PD.220, when it (P.220) should be biased to give an anode current of approximately 3 milliamps.

The optimum operating conditions and average anode current, when the valves are used as power amplifiers can be obtained from the curves.

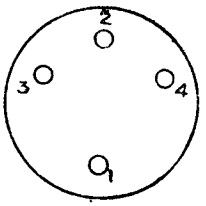




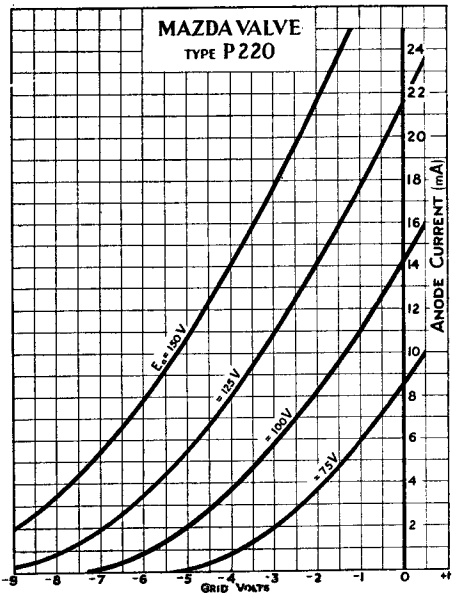
MAZDA

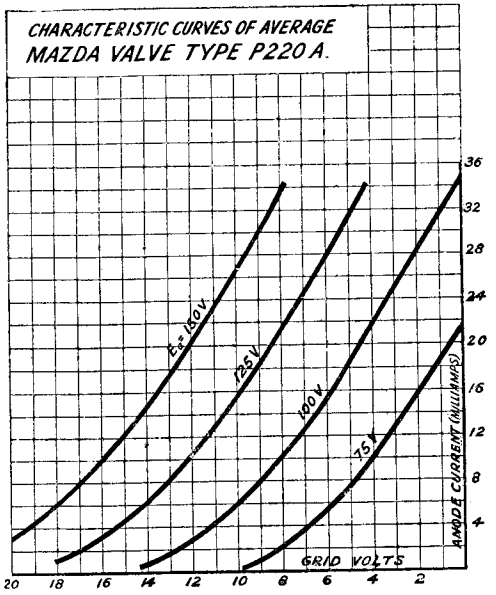
BASING
(Both Types)

Pin No. 1. Anode.
2. Grid.
3. Filament.
4. Filament.



Viewed from the free end of the base.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

PA.20

DIRECTLY HEATED MAINS OUTPUT TRIODE

RATING.

Filament Voltage	2·0
Filament Current (Amps.)	2·0
Maximum Anode Voltage	300
*Mutual Conductance (mA/V)	6·5
*Amplification Factor	6·5
*Anode A.C. Resistance (Ohms)	1,000
Maximum Continuous Anode Dissipation (Watts)	15

* at Ea=100 v. ; Eg=0.

TYPICAL OPERATION.

	Straight.			Push-Pull.	
Anode Volts	250	250	300	250	300
Anode Current (Quiescent) (mA)	42	50	48	84	84
Grid Bias for A.C. Filament Heating	29	27·2	36	29	37·2
Self-Bias Resistance (Ohms) ...	690	545	750	345	440
Anode A.C. Resistance (Ohms) ...	1,200	1,150	1,200	1,200	1,200
Mutual Conductance (mA/V) ...	5·0	5·4	5·4	5·0	5·0
*Optimum Anode Load (Ohms) ...	2,750	2,220	3,000	—	—
*Optimum Anode to Anode Load (Ohms)	—	—	—	4,600	5,300
*R.M.S. Input Grid Volts per Valve...	19·8	18·5	24·8	19·8	25·6
*Anode Current at M.U.P.O., with fixed Bias	48	57·5	57·5	96	112
*Power Output (Watts)	2·65	2·75	4·2	5·6	9·0

* For a total harmonic content not exceeding 5 per cent.

DIMENSIONS.

Maximum overall length	140 mm.
Maximum diameter	58 mm.

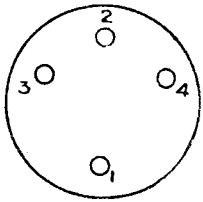
GENERAL.

The PA.20 is a directly heated power output triode for use in A.C. mains receivers. The characteristics of this valve with the exception of filament voltage are identical with the PP3/250. It has been designed to reduce hum level present with 4-volt directly heated valves when these are used in other than push-pull circuits. The valve is fitted with a standard 4-pin base, the connections to which are given overleaf.

APPLICATION.

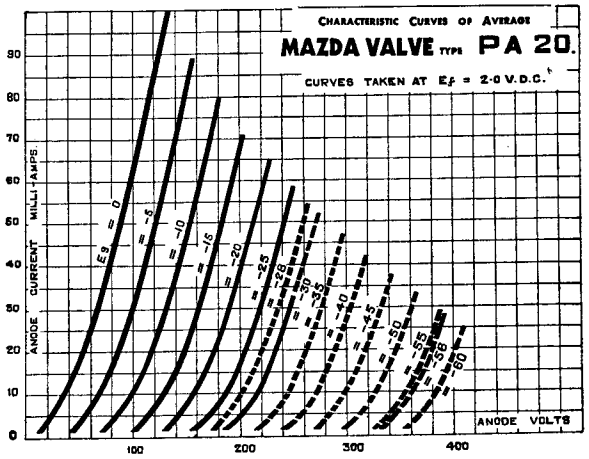
It is recommended that the bias voltage be obtained by means of a self-bias circuit, the resistance being by-passed with a large condenser. Approximately 50 μF. is a suitable value. The grid-filament circuit resistance should not exceed 0·5 megohms with 12 watts dissipation, or 0·25 megohms with 15 watts dissipation, with each valve individually self-biased. This same resistance should not exceed 0·25 megohms with 12 watts dissipation and 0·05 megohms with 15 watts dissipation with fixed or common bias.

BASING.



Pin No. 1. Anode.
2. Grid.
3. Filament.
4. Filament.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

P.A.40

DIRECTLY HEATED MAINS OUTPUT TRIODE

RATING.

Filament Voltage	4·0
Filament Current (amps.)	2·0
Maximum Anode Volts	450
*Mutual Conductance (mA/V)	10
*Amplification Factor	4·25
*Anode A.C. Resistance (ohms)	425
Maximum Continuous Anode Dissipation (watts)	40

*At Ea=100 v. ; Eg=0.

TYPICAL OPERATION (Push-Pull).

Anode Voltage	400	450
Total Anode Current (Quiescent) (mA)	100	110
Grid Bias for A.C. Filament Heating	85	96·5
Mutual Conductance (mA/V)	4·5	4·5
*Optimum Anode to Anode Load (ohms)	3,700	4,000
*R.M.S. Input Grid Volts per Valve	60	68
*Total Anode Current at M.U.P.O. with fixed Bias	210	230
*Power Output (watts)	33·5	41

*For a total harmonic content not exceeding 5 per cent.

DIMENSIONS.

Maximum Overall Length	156 mm.
Maximum Diameter	64 mm.

GENERAL.

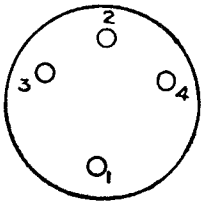
The PA.40 is a directly heated power output triode for use in public address equipment, and is intended for use in Class AB operation. The valve is fitted with a standard 4-pin base, the connections to which are given overleaf.

APPLICATION.

The valve should only be used with individual bias adjustment from a separate source to give the correct quiescent feed current. The grid-cathode resistance should be kept low, and in any case should not exceed 50,000 ohms. The valve is not intended for " positive drive " conditions of operation.

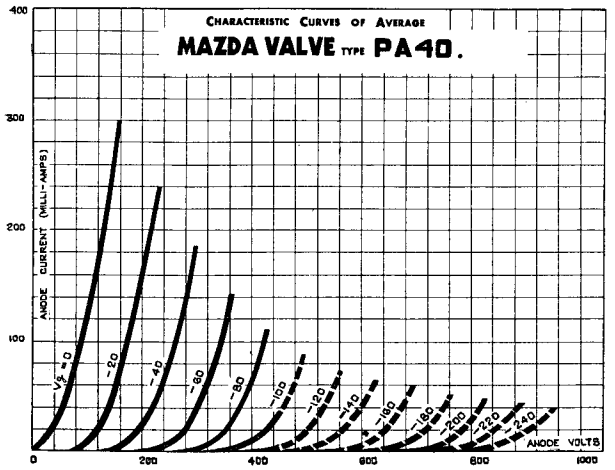
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. Anode.
2. Grid.
3. Filament.
4. Filament.



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PD.220 and PD.220.A

BATTERY DOUBLE TRIODE OUTPUT VALVES

RATINGS.	PD.220	PD.220.A
Filament Voltage	2·0	2·0
Filament Current (amps.)	0·2	0·2
Maximum Anode Voltage	150	150
Quiescent Current (mA)	0·8	2·5
Maximum Permissible Peak Anode Current (per Triode) (mA)	45	50
*Mutual Conductance	0·9	1·6

*At Ea=100 ; Eg=0.

TYPICAL OPERATION.	PD.220			PD.220.A		
Anode Volts	120	135	150	120	135	150
Bias Volts	0·8	1·0	1·15	4·8	5·5	6·0
Total Quiescent Feed Current mA	0·7	0·75	0·8	1·9	2·0	2·5

DIMENSIONS (Both Types).	
Maximum Overall Length	110 mm.
Maximum Diameter	39 mm.

GENERAL.

The valves are low consumption twin output valves for "Class B" positive drive output stage for battery operated receivers. They will deliver an exceptionally high power output for a very economical anode current and will operate a moving-coil loudspeaker at full volume. The valves are fitted with standard 7-pin bases, the connections to which are given overleaf.

APPLICATION.

In the case of all "Class B" positive drive valves, the power output is essentially determined by the power available from the driver. An L.2 valve will provide sufficient output for most purposes, but a P.220 should be used if a maximum possible power is required.

The bias of the driver and output valves should be obtained by means of a potentiometer across the bias battery The actual values of the resistances for the potentiometer will depend upon the type of battery used, but the bias voltage should decrease at from 25 to 30 per cent. faster than the rate of fall of the H.T. battery voltage. The required initial bias of the output valves, as well as the total feed current at different anode voltages are given in the table overleaf. The PD.220 valve may be operated with zero bias, but in order to obtain optimum quality it is essential the bias values given in the table should be employed.

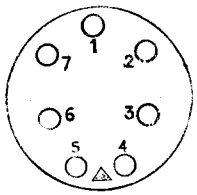
With some circuit lay-outs parasitic oscillations may be developed in the output stage. The likelihood of these oscillations being encountered will depend upon the design of the individual transformers used. These parasitic oscillations may be cured by connecting condensers (about ·001 to ·002 μF.) between anodes and H.T.+.

A resistance-condenser filter should be incorporated so as to keep the impedance of the anode to anode load constant with frequency.

PRECAUTIONS.

Do not allow the valve to generate parasitic oscillations. The anode voltage should not be disconnected when a signal is applied to the grids of the output valve.

Driver Valve	Anode Voltage	Driver Anode Current mA	Anode-Anode Load Ohms		Overall Driver Transformer	
PD.220 and PD.220.A	PD.220 and PD.220.A	PD.220 and PD.220.A	PD.220	PD.220.A	PD.220	PD.220A.
Mazda L.2	120	1·5	17,000	14,000	2:1	1·35:1
	135	2·0	16,000	14,000	2:1	1·35:1
	150	*2·0	15,000	14,000	2:1	1·35:1
Mazda P.220	120	2·70	11,500	10,000	1·5:1	1·2:1
	135	3·0	11,500	10,000	1·6:1	1·2:1
	150	3·5	10,000	10,000	1·6:1	1·2:1

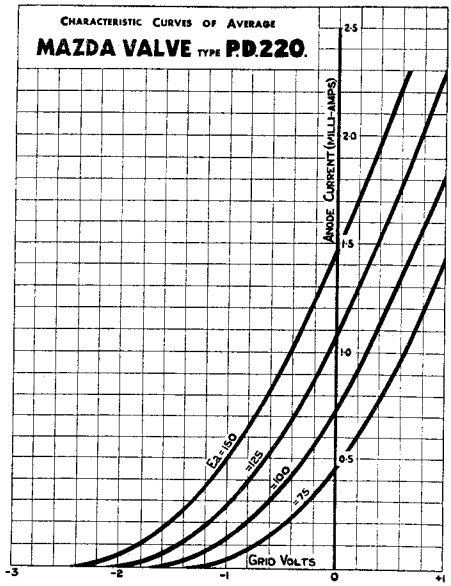


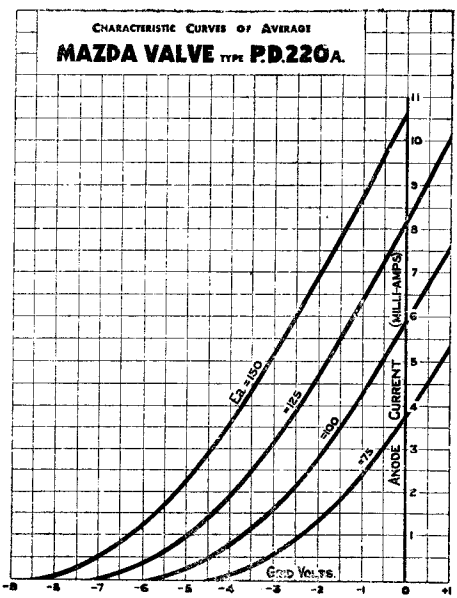
Viewed from the free end of the base.

BASING.

Pin No. 1. Control Grid 2.
2. Control Grid 1
3. Anode 1.
4. Filament.
5. Filament.
6. ——
7. Anode 2.

MAZDA


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE P.D.220.
ANODE CURRENT (MILLI-AMPS)
2·5
2·0
1·5
1·0
0·5
Ea = 150
=125
=100
=75
GRID VOLTS
-3
-2
-1
0
+1


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE P.D.220A.
ANODE CURRENT (MILLI-AMPS)
11
10
9
8
7
6
5
4
3
2
1
Ea = 150
=125
=100
=75
GRID VOLTS
-8
-7
-6
-5
-4
-3
-2
-1
0
+1

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

EDISWAN RADIO

MAZDA

PE50

PHOTO ELECTRIC CELL

PE50

GENERAL

The Mazda PE50 is a Miniature Gas-Filled Photo Electric Cell with a Caesium-Oxygen-Silver cathode surface, having maximum sensitivity in the red and infra-red region of the spectrum. The bulb is blackened except for a window 21 x 11.6 mm opposite the cathode.

RATING

Approximate Overall Sensitivity (average)	(μA/lumen)	120	ø
Approximate Primary Sensitivity (average)	(μA/lumen)	20	⊥
Maximum Gas Amplification Factor		10	●
Maximum Working Voltage (volts)		90	
Maximum Average Cathode Current	(μA)	2.5	$
Maximum Peak Cathode Current	(μA)	8.0	
Maximum Peak Cathode Current Density	(μA/sq cm)	15	
Maximum Dark Current	(μA)	0.1	x
Minimum Insulation resistance between electrodes	(Mᾱ)	1,000	

NOTES

ø Measured at 0.02 lumens with lamp colour temperature 2700°K and a cell series resistance of 1.0 Mᾱ. Anode Voltage = 90 volts.

● Gas Amplification Factor is the ratio of current at 90 volts to current at 25 volts under the conditions mentioned above.

x Measured at 90 volts with 1.0 Mᾱ. series resistance, zero illumination.

⊥ The Primary sensitivity is measured at an anode voltage of 25 volts at which ionisation has not taken place.

$ Average over a period not greater than 30 secs.

All Maximum Ratings are Absolute values not Design Centres.

INTER-ELECTRODE CAPACITANCE

Anode to Cathode (μμF)	3.0

PE50

MAZDA

PE50

PHOTO ELECTRIC CELL

DIMENSIONS

Max. Overall Length (mm)	69.0
Max. Seated Height (mm)	60.5
Light Centre from Seat (mm) (nominal)	42.5
Max. Bulb Diameter (mm)	16.25
Max. Base Diameter (mm)	16.15
Cathode Length (mm) (nominal)	21.0
Effective Cathode Width (mm)	11.6
Window Area (sq. cm.)	2.4
Projected Cathode Area (sq. cm.)	2.4
Approximate Nett Weight (oz)	1
Approximate Packed Weight (oz)	4¾

MOUNTING POSITION Unrestricted.

BASE Miniature 4. Pin (B4B)

CONNECTIONS

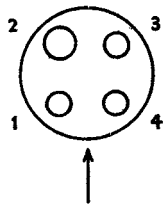
Pin No. 1. Anode

2. -

3. Cathode

4. -

Viewed from free end of pins



Direction of Light.

MAZDA

PE51

PHOTO-ELECTRIC CELL

PE51

GENERAL

The Mazda PE.51 is a Gas Filled Photo Electric Cell with a Caesium-Oxygen-Silver Cathode surface, having maximum sensitivity in the red and infra-red region of the spectrum.

RATING

Average Overall Sensitivity (μA/lumen)	100+
Average Primary Sensitivity (μA/lumen)	20•
Maximum Gas Amplification Factor	8.0$
Maximum Working Voltage (volts)	90
Maximum Average Cathode Current (μA)	5.0¢
Maximum Peak Cathode Current (μA)	15
Maximum Peak Cathode Current Density (μA/sq cm)	15
Maximum Dark Current (μA)	0.1=
Minimum Insulation resistance between electrodes (MΩ)	1,000

NOTES

+ Measured at 0.05 lumens with lamp colour temperature 2700°K and a cell series resistance of 0.5.MΩ Anode Voltage = 90 volts

$ Gas Amplication Factor is ratio of current at 90 volts to current at 25 volts under the conditions mentioned above.

= Measured at 90 volts with 0.5.MΩ series resistance: zero illumination.

• The Primary sensitivity is measured at an anode voltage of 25 volts at which ionisation has not taken place.

¢ Average over a period not greater than 30 secs.

All Maximum Ratings are Absolute values not Design Centres.

INTER-ELECTRODE CAPACITANCE

Anode to Cathode (μμF)	1.9

PE51

MAZDA

PE51

PHOTO-ELECTRIC CELL

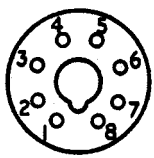
DIMENSIONS

Max. Overall Length (mm)	78.0
Max. Seated Height (mm)	63.5
Light Centre from Seat (mm) (nominal)	41.0 ± 2.5
Max. Bulb Diameter (mm)	28.5
Max. Base Diameter (mm)	32.0
Cathode Length (mm)	22.0
Effective Cathode Width (mm)	21.5
Projected Cathode Area (sq.cm)	4.7
Approximate Nett Weight (oz)	1
Approximate packed weight (oz)	4¾

MOUNTING POSITION - Unrestricted

BASE Mazda Octal (B08)

Direction of Light



Viewed from free end of pins

CONNECTIONS

Pin 1	Cathode	k
Pin 2	+Internal Connection	i.c.
Pin 3	-	-
Pin 4	-	-
Pin 5	Anode	a
Pin 6	-	-
Pin 7	-	-
Pin 8	-	-

+ In use Pin 2 should be left free.

MAZDA

PE52

PHOTO-ELECTRIC CELL

PE52

GENERAL

The Mazda PE.52 is a vacuum Photo-Electric Cell with a Caesium-Oxygen-Silver Cathode Surface, having maximum sensitivity in the red and infra-red region of the spectrum.

RATING

Approximate Sensitivity (μA/lumen)	20 +
Max. Working Voltage (volts)	250
Max. Dark Current (μA)	0.1=
Max. Average Cathode current (μA)	8 •
Maximum Peak Cathode Current (μA)	25
Max. Peak Cathode Current Density (μA/sq.cm)	15
Min. Insulation resistance between electrodes (MΩ)	1800

NOTES

+ Measured at 0.05 lumen with 90 volts applied, and a 0.5 MΩ series resistance: Lamp at colour temperature 2700°K.

= Measured at 90 volts, with 0.5 MΩ series resistance: zero illumination.

• Averaged over a period not greater than 30 secs.

All Maximum Ratings are absolute values not Design Centres.

INTER-ELECTRODE CAPACITANCE

Anode to Cathode (μμF)	1.9

PE52

MAZDA

PE52

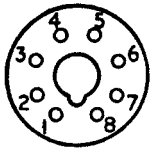
PHOTO-ELECTRIC CELL

DIMENSIONS

Maximum Overall Length (mm)	78.0
Maximum Seated Height (mm)	63.5
Light Centre from Seat (mm)	41.0 ± 2.5
Maximum Bulb Diameter (mm)	28.5
Maximum Base Diameter (mm)	32.0
Cathode Length (mm)	22.0
Effective Cathode Width (mm)	21.5
Projected Cathode Area (Sq.cm)	4.7
Approximate Nett Weight (oz)	1
Approximate packed weight (oz)	4¾

MOUNTING POSITION - Unrestricted

BASE - Mazda Octal (B.O.8) Direction of light ↓



Viewed from free end of pins

CONNECTIONS

Pin 1	Cathode	k
Pin 2	$ Internal Connection	i.c
Pin 3	-	-
Pin 4	-	-
Pin 5	Anode	a
Pin 6	-	-
Pin 7	-	-
Pin 8	-	-

$ In use Pin 2 should be left free

MAZDA
PE54

PE54

PHOTO ELECTRIC CELL

GENERAL

The Mazda PE54 is a Gas Filled Photo Electric Cell with a rectangular wire anode and a Caesium Antimony Cathode surface, having maximum sensitivity in the blue region of the spectrum.

RATING

Average Overall Sensitivity (approx) μA/Lumen	90*
Average Primary Sensitivity (approx) (μA/Lumen)	30$
Maximum Gas Amplification Factor	6‡
Maximum Working Voltage (volts)	90
Maximum Average Cathode Current (μA)	6§
Maximum Peak Cathode Current (μA)	20
Maximum Peak Cathode Current Density (μA/sq.cm)	15
Maximum Dark Current (μA)	0.1†
Minimum Insulation Resistance between Electrodes (Megohms)	1,000

NOTES

* Measured at 0.085 lumens with lamp at colour temperature 2,700 K and a cell series resistance of 1 Megohm.

$ The Primary Sensitivity is measured at an anode voltage of 25, at which ionisation has not taken place.

‡ Gas Amplification factor is a ratio of current at 90 volts to current at 25 volts under conditions of the overall sensitivity measurement.

§ Averaged over a period not greater than 30 seconds.

† Measured at 90 volts and 1 Megohm series resistance, zero illumination.

All Maximum Ratings are absolute values, not design centres.

November, 1957 *Industrial VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

PE54

MAZDA
PE54

PHOTO ELECTRIC CELL

INTER-ELECTRODE CAPACITANCES (pF)

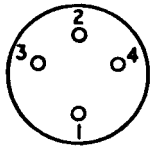
Anode to Cathode	1.6

DIMENSIONS

Maximum Overall Length (mm)	98.0
Maximum Seated Height (mm)	83.0
Light Centre from Seat (mm)	51–57
Maximum Bulb Diameter (mm)	26.5
Maximum Base Diameter (mm)	30.5
Cathode Length (nominal) (mm)	35.0
Effective Cathode Width (mm)	18.0
Projected Cathode Area (sqcm.)	6.3
Approximate Nett Weight (ozs)	$1\frac{1}{4}$
Approximate Packed Weight (ozs)	$2\frac{1}{2}$

MOUNTING POSITION—Unrestricted

BASE—British 4 Pin.



Viewed from free end of pins
Direction of light

CONNECTIONS

Pin 1	Anode	a
Pin 2	Cathode	k
Pin 3	No Pin	NP
Pin 4	No Pln	NP

November, 1957 *Industrial VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

EDISWAN
PE55

PE55

PHOTO ELECTRIC CELL

GENERAL

The Ediswan PE55 is a Gas Filled Photo Electric Cell with a rectangular wire anode and Caesium-Oxygen-Silver Cathode Surface having Maximum sensitivity in the red and infra-red regions of the spectrum.

RATING

Average Overall Sensitivity (approx) (μA/Lumen)		90‡
Average Primary Sensitivity (μA/lumen)		20*
Maximum Gas Amplification Factor	$A_{g(max)}$	9$
Maximum Working Voltage (volts)		90
Maximum Average Cathode Current (μA)	$I_{k(av)max}$	6†
Maximum Peak Cathode Current (μA)	$I_{k(pk)max}$	20
Maximum Peak Cathode Current Density (μA/sq.cm)		15
Maximum Dark Current (μA)	$I_{dark(max)}$	0.1§
Minimum Insulation Resistance between electrodes (megohms)		10^5

NOTES

‡ Measured at 0.085 lumens with lamp at colour temperature 2,700° K and a cell series resistance of 1 Megohm.

$ Gas Amplification factor is a ratio of current at 90 volts to current at 25 volts under the above conditions.

§ Measured at 90 volts and 1 Megohm series resistance; zero illumination.

* The Primary Sensitivity is measured at an anode voltage of 25, at which ionisation has not taken place.

† Averaged over a period not greater than 30 seconds.

All Maximum Ratings are absolute values, not Design Centres.

INDUSTRIAL
Otober, 1958 *VALVE & CRT DIVISION* Issue 1/7
SIEMENS EDISON SWAN LIMITED

PE55

EDISWAN

PE55

PHOTO ELECTRIC CELL

INTERELECTRODE CAPACITANCE (pF)

Anode to Cathode	$c_{a\text{-}k}$	3.1

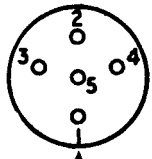
DIMENSIONS

Maximum Overall Length	(mm)	109
Maximum Seated Height	(mm)	94
Light Centre from Seat	(mm)	60+3
Maximum Bulb Diameter	(mm)	26.5
Maximum Base Diameter	(mm)	30.5
Cathode Length	(mm)	35
Cathode Width	(mm)	18
Projected Cathode Area	(sq.cm)	6.3
Approximate Nett Weight	(ozs)	$1\frac{1}{4}$
Approximate Packed Weight	(ozs)	$2\frac{1}{2}$

MOUNTING POSITION—Unrestricted

BASE—British 4 Pin.

Viewed from free end of pins



Direction of light

CAP—CT1

VALVE HOLDER—Ediswan Clix VH42/4

CONNECTIONS

Pin 1	Anode	a
Pin 2	No Connection	NC
Pin 3	No Connection	NC
Pin 4	No Connection	NC
Top Cap	Cathode	k

INDUSTRIAL
Otober, 1958 *VALVE & CRT DIVISION* Issue 1/7
SIEMENS EDISON SWAN LIMITED

PEN.24

BATTERY OUTPUT PENTODE

RATING.

Filament Volts	2·0
Filament Current (amps.)	0·3
Maximum Anode Volts	150
Maximum Screen Volts	150
*Mutual Conductance (mA/V)	5·7

*At Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	100	120
Screen Voltage	100	120
Grid Bias Voltage	2.35	3·3
Anode Current (mA)	4·2	5·0
Screen Current (mA)	0·83	1·0
Anode Load (ohms)	16,000-18,000	14,000-16,000
Power Output (mW)	*260	†440
Input Swing (Volts R.M.S.)	*1·66	†2·25
Anode Current (mA) (with output Swing)	*5·0	†:·3

*For 15 per cent. Third Harmonic, and Second Harmonic not exceeding 12·5 per cent.

†For 12 per cent. Third Harmonic, and Second Harmonic not exceeding 10 per cent.

DIMENSIONS.

Maximum Overall Length	93 mm.
Maximum Diameter	32 mm.

GENERAL.

The Pen.24 is a high sensitivity output Pentode for use in battery operated receivers. The bulb is of small dimensions. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

The valve has a similar sensitivity to the Pen.231, but the maximum power output available has been increased to approximately 450 milliwatts. To obtain this output, a lower load is recommended than in the case of the Pen.231 and 15,000 ohms will be found suitable. With the type of speaker usually employed with this size of output valve, the degree of distortion quoted above can be tolerated. The bias should be obtained by means of a common resistance in the H.T. negative lead and this should be by-passed with a large condenser. When operated in receivers employing variable-mu valves, the quiescent anode current may be lower than the figure specified above, provided that it rises to the recommended value when the receiver is operated on a powerful carrier.

The sensitivity of the Pen.24 is such that it should be used immediately following the detector valve. The use of an intermediate stage of L.F. amplification is not recommended. If transformer coupling is used, it is recommended that a resistance of 50,000—70,000 ohms be connected across the primary winding to avoid damage to the pentode due to surges in the receiver. If resistance-capacity coupling is used, the grid circuit resistance should not exceed 500,000 ohms.

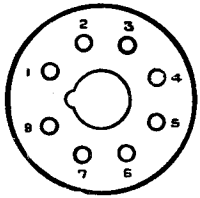
To prevent distortion at higher audio frequencies, a condenser-resistance filter should be connected across the speaker.

A condenser of about 2μF connected across the H.T. battery tappings will prevent any tendency to instability, particularly with the high internal resistance of an old battery.

The anode or screen should not be allowed to exceed 150 volts.

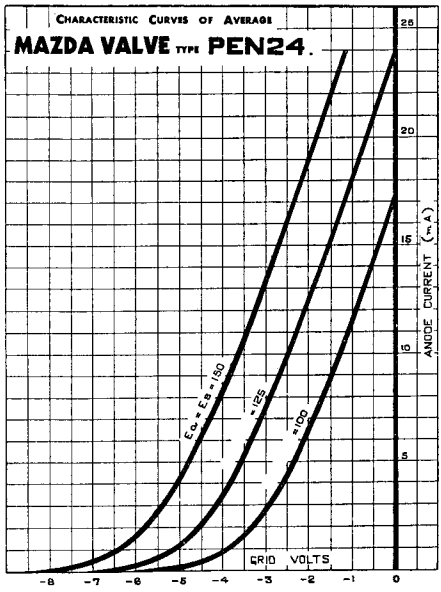
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. Filament.
2. Omitted.
3. Anode.
4. Screen.
5. Control Grid.
6. —
7. Omitted.
8. Filament.



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MAZDA

PEN.25

BATTERY ECONOMY OUTPUT PENTODE

RATING.

Filament Voltage	2·0
Filament Current (amps.)	0·15
Maximum Anode Voltage	150
Maximum Screen Voltage	150
*Mutual Conductance (mA/V)	4·5

*At Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	90	100	120
Screen Voltage	90	100	120
Grid Bias Voltage	2·45	2·85	3·6
Anode Current (Quiescent) (mA) ...	3·75	4·2	5·0
Screen Current (Quiescent) (mA) ...	0·75	0·84	1·0
Anode Load (ohms)	*15,000	*14,000	†14,000
Power Output (mW)	*195	*260	†400
Input Swing (volts RMS)	*1·65	*1·9	†2·25
Input Swing (volts RMS) for 50 mW ...	0·66	0·65	0·58

*For 10 per cent. Third and not exceeding 11 per cent. Second Harmonic.

†For 11 per cent. Third and not exceeding 11 per cent. Second Harmonic.

DIMENSIONS.

Maximum Overall Length	87 mm.
Maximum Diameter	32 mm.

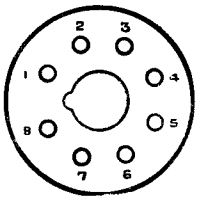
GENERAL.

The Pen.25 is a high sensitivity output pentode for use in battery operated receivers. The special feature of this valve is that it has been designed for battery economy, and due to the exceptionally low filament consumption is therefore particularly recommended for use in battery portable receivers. The bulb is of small dimensions. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

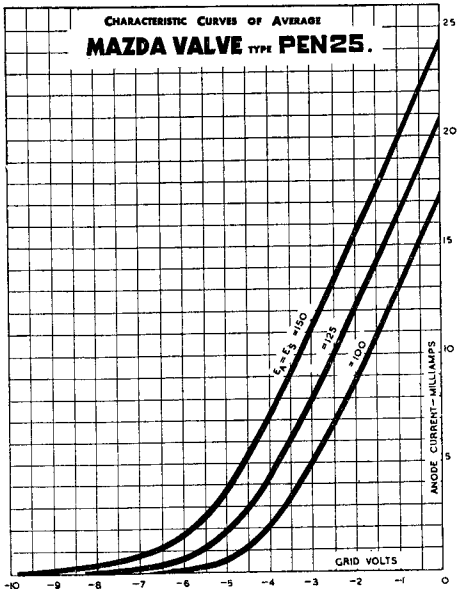
The Pen.25 is suitable for use in all battery receivers where the large power output available from a Q.P.P. valve is not required, and output of 400 mW can be obtained with a 120-volt H.T. battery. The valve should be biased by means of a resistance connected in the common negative H.T. lead. An anode load of the order of 14,000 ohms will be found suitable, and this should be the load transferred to the anode circuit of the valve at medium frequencies. When operating in receivers employing variable-mu valves, the quiescent anode current may be made lower than that specified above, provided that it rises to the recommended value when the receiver is operated on a powerful carrier.

BASING.



Viewed from the free end of the base.

Pin No. 1. Filament.
2. Omitted.
3. Anode.
4. Screen.
5. Control Grid.
6. ——
7. Omitted.
8. Filament.



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PEN 44

BEAM POWER AMPLIFIER FOR A.C. MAINS

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	2.1
Maximum Anode Voltage	275
Maximum Screen Voltage	275
*Mutual Conductance (mA/V)	11
Maximum Anode Dissipation (watts)	18

*Taken at Ea=100; Es=100; Eg=0.

TYPICAL OPERATION

	Push-Pull	Single Stage			
Anode Volts	260	240		260	
Screen Volts	270	250		270	
Grid Bias	11.1	10.1		11.1	
Anode Current per valve (mA)	70	64		70	
Screen Current per valve (mA)	12	11		12	
Power Output (watts)	20‡	*6.9	7.85†	*8.0	9.25†
Anode Load (ohms.)	—	*3,000	2650†	*3,000	2650†
Anode to Anode Load (ohms.)	4,000‡	—	—	—	—
Input Swing Volts per valve (RMS)	7.5‡	*5.3	6.1†	*5.65	6.7†
Anode Current with Input Swing (mA)	83‡	*67	70†	*73	76†
Input Swing (RMS) for 50 mW output	—	0.39	0.41	0.38	0.4
Input Swing (RMS) for 250 mW output	—	0.88	0.92	0.86	0.9

‡ For 4% Third Harmonic.
* For 5% Third Harmonic and Second Harmonic not exceeding 5%.
† For 7% Third Harmonic and Second Harmonic not exceeding 7%.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11.0 $\mu\mu$F.
*Grid to Earth	24.0 $\mu\mu$F.
Anode to Grid	0.9 $\mu\mu$F.

*"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	119 mm.
Maximum Diameter	54 mm.

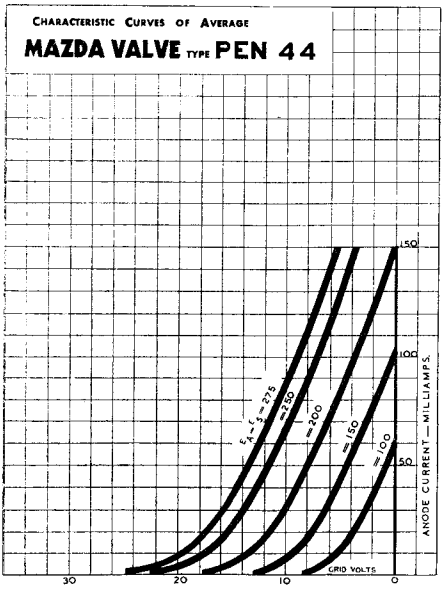
GENERAL.

The Pen 44 is a high power indirectly heated beam power amplifier for use in the output stages of A.C. Mains receivers requiring a larger power output than that available with the Pen 45. The lower portion of the valve is metallised, and the valve is fitted with a Mazda Octal base, the connexions to which are given overleaf.

APPLICATION.

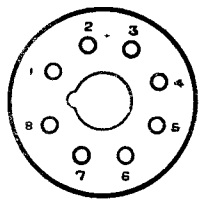
The valve may be used with an anode dissipation up to 18 watts and is equally suitable for use in either single or push-pull output stages. The valve should always be self-biased. The grid circuit must be efficiently decoupled, and this may be achieved either by connecting an electrolytic condenser of 50 to 75μF across the self-bias resistance, or decoupling the grid circuit in the usual manner. An anti-parasitic resistance of the moulded type and of low self-capacity should be connected in the grid or anode circuit and mounted close to the actual valve terminals. A value of 50 ohms is satisfactory in the case of an anode resistance. The grid to cathode circuit resistance must not exceed $\frac{1}{2}$ megohm.

When using two valves in push-pull it is desirable to keep the load low, as in this case the second harmonic is mainly cancelled out, and the low load would tend to keep the third harmonic down. In all cases the recommended anode load should be the lowest reflected anode load at the primary of the output transformer, and should include resistance losses in the transformer as well as grid bias net-work if cathode degeneration is employed.



BASING.

Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Control Grid.
6. Metallising.
7. Omitted.
8. Heater.



Viewed from the free end of the base.

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155, CHARING CROSS ROAD, LONDON, W.C.2

PEN 45 and PEN 45DD.

BEAM POWER AMPLIFIERS FOR A.C. MAINS

RATING.

	Pen.45	Pen.45DD.
Heater Voltage	4·0	4·0
Heater Current (amps.)	1·75	2·0
Maximum Anode Voltage	250	250
Maximum Screen Voltage	250	250
*Mutual Conductance (mA/V)	9·0	9·0

*At Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION (Both Types).

Anode Voltage	250	
Screen Voltage	250	
Grid Bias Voltage	8·5	
Quiescent Anode Current (mA)	40	
Quiescent Screen Current (mA)	7·5	
Power Output (watts)	4·85*	5·8†
Anode Load (ohms)	5,200*	4,500†
Input Swing R.M.S.	4·0*	5·0†
Anode Current (mA) (with input swing) ...	41·5*	42·5†
Input Swing (volts RMS) for 50 mW	0·36	0·38
Input Swing (volts RMS) for 250 mW	0·81	0·85
Self Bias Resistance (ohms)	175	

*For 5 per cent. Third Harmonic, and Second Harmonic not exceeding 5 per cent.

†For 7 per cent. Third Harmonic, and Second Harmonic not exceeding 7 per cent.

DIMENSIONS.

	Pen.45	Pen.45.DD
Maximum Overall Length	110	134 mm.
Maximum Diameter	45	45 mm.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	12·25	12·75 $\mu\mu$F.
*Grid to Earth	22·75	19·5 $\mu\mu$F.
Anode to Grid	0·85	0·7 $\mu\mu$F.
*Diode 1 to Earth	...	4·5 $\mu\mu$F.
*Diode 2 to Earth	...	4·5 $\mu\mu$F.
Diode 1 to Diode 2	...	0·05 $\mu\mu$F.

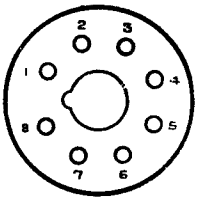
*" Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

GENERAL.

The Pen.45 and Pen.45DD. are indirectly heated beam power amplifiers for use in A.C. mains. In the latter a double diode section is added which is completely screened within the valve from the pentode section, so that the two sections may be treated as two separate valves as far as circuit considerations are concerned. The bulbs are of reduced dimensions and each are partly metallised. The characteristics of the two types are identical and the valves are fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

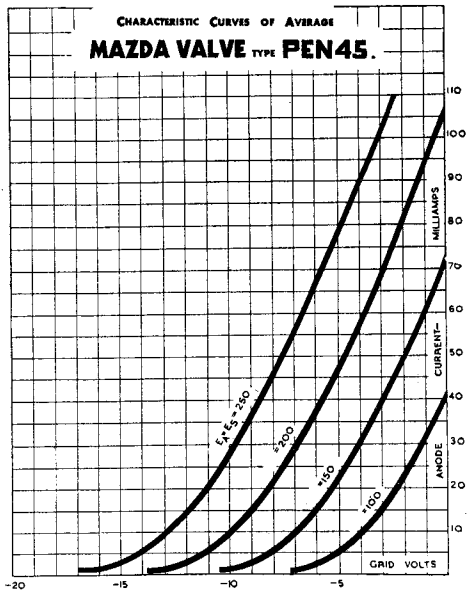
Both valves are designed for use with screen voltages of 250 volts and a mean anode dissipation of 10 watts. It is recommended that the grid bias be obtained by means of a self bias resistor, and the resistance of the grid to cathode circuit should not exceed 1 megohm. Due to the large gain, an electrolytic condenser of 50 to 75 μF. across the self bias resistance, or decoupling the grid circuit in the usual manner, will prevent attentuation of the lower audio frequencies. Anti-parasitic resistances should be included in the grid and/or anode circuits. To obtain optimum performance, the anode load should not be higher than that recommended, and consideration must be given to any rise of load with frequency or loss of output will result. In the case of the Pen.45DD. one diode (D2.) is employed as an audio detector, while the other diode (D1.) is employed to provide the A.V.C. voltage. The load resistance of the detector diode should be returned to the cathode, while that in circuit with the anode of the A.V.C. diode should be returned to a negative potential to provide the requisite delay voltage. This should be between 15 and 20 volts.



Viewed from the free end of the base.

BASING.

	Pen.45	Pen.45DD.
Pin No. 1.	Heater.	Heater.
2.	Cathode.	Cathode.
3.	Anode.	Anode.
4.	Screen.	Screen.
5.	Control Grid.	Diode 2.
6.	Metallising.	Metallising.
7.	Omitted.	Diode 1.
8.	Heater.	Heater.
Top Cap.	——	Control Grid



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd. London and Rugby.

PEN 46

TELEVISION BEAM POWER AMPLIFIER

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	1.75
Maximum Anode Voltage	330
Maximum Screen Voltage	220
*Mutual Conductance (mA/V)	8.5
Maximum Screen Watts	3.0
Maximum Anode Watts	20.0
Maximum Peak Anode Voltage	3,000

*Taken at Ea=100, Es=100, Eg=0.

TYPICAL OPERATION.

Anode Voltage	315
Screen Voltage	210
Anode Current (mA) (per valve)	63.0
Screen Current (mA) (per valve)	14.0
Grid Bias (volts)	6.9
Minimum Instantaneous Anode Volts	>80
Maximum Peak Anode Volts	3,000
Self-Bias Resistance per valve (ohms)	90
Maximum Available Output in Volt-Amperes in Anode Circuit	25.0

Note. The values given above for feed currents and operating voltages are for the specified output. Voltages are referred to Cathode.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	6.0 $\mu\mu$F
*Grid to Earth	22.0 $\mu\mu$F
Anode to Grid	1.25 $\mu\mu$F

*"Earth" denotes the remaining earthy potential electrodes joined to cathode.

DIMENSIONS.

Maximum Overall Length	129 mm.
Maximum Diameter	54 mm.

GENERAL.

The PEN.46 is a beam power amplifier designed for use in the output stage of a time base for magnetic scanning. The valve has been designed to stand the high peak anode voltages required by this class of service, and is based in a Mazda Octal Base, the connexions to which are given overleaf.

APPLICATION.

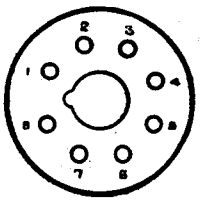
It is recommended that the valve should be operated with an anode voltage of the order of 300 and a screen voltage not exceeding 220. The screen voltage should be preferably dropped from the higher voltage through a series resistance and decoupled with a condenser, the latter

being returned to cathode. The valve should always be used under the self bias method of operation, and, due to the high dissipation, it should preferably be mounted in a vertical position. The T.41 thyratron is recommended for use with this valve. In order to keep the screen dissipation from rising above the normal value, and, to prevent excessive distortion, it is recommended that the instantaneous anode voltage should not be allowed to drop below 80 volts.

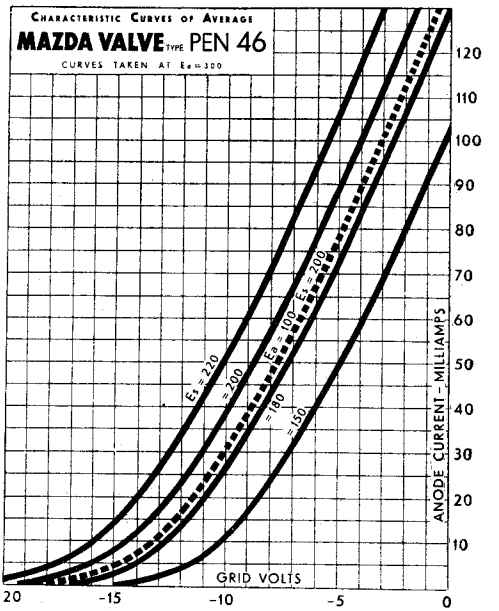
The output transformer should be designed to provide a suitable load across which the voltage drop due to its resistive and inductive load components will meet the conditions on page 1. Unless a high H.T. time base supply voltage is employed, the output of the valve will be limited by the allowable screen dissipation of 3 watts rather than the maximum anode dissipation of 20 watts. Care should therefore be taken when designing the circuit to ensure that the screen wattage under normal conditions does not exceed the rating of the valve. The bias and screen resistances must also be calculated for these working conditions, as the screen current rises appreciably with the input signal while the anode current falls. It is recommended that the equivalent grid to cathode resistance per valve should be kept as low as possible, and in any case should not exceed 1 megohm for anode dissipation not exceeding 18 watts, and ½ megohm for an anode dissipation not exceeding 20 watts.

BASING.

Pin No. 1. Heater.
2. Cathode.
3. —
4. Screen.
5. Control Grid.
6. —
7. Omitted.
8. Heater.
Top Cap. Anode.



Viewed from the free end of the base.



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155, CHARING CROSS ROAD, LONDON, W.C.2

MAZDA

PEN. 141

BATTERY (DRY CELL) OUTPUT PENTODE

RATING.

Filament Voltage	1.4
Filament Current (amp.)	0.1
Maximum Anode Voltage	90
Maximum Screen Voltage	90

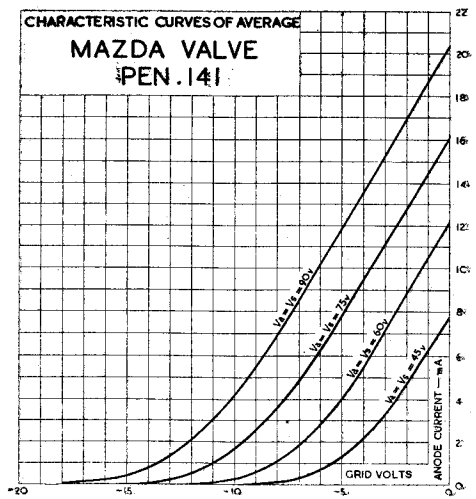
TYPICAL OPERATING CONDITIONS.

Anode Voltage	82	90
Screen Voltage	82	90
Grid Bias	8.1	9.0
Anode Current (mA)	5.0	5.5
Screen Current (mA)	1.0	1.1
Anode Load (ohms)	10,000	10,000
Power Output (watts)	210*	240†
Input Swing (volts RMS)	4.9*	5.4†
Input Swing (volts RMS) for 50 mW	1.85	2.0

* For 10% 3rd harmonic and 2nd harmonic not exceeding 7.5%.
† For 10% 3rd harmonic and 2nd harmonic not exceeding 6.5%.

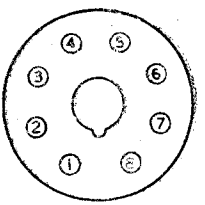
DIMENSIONS.

Maximum Overall Length	89 mm.
Maximum Diameter	32 mm.



BASING.

Pin No. 1. F—ve.
2. Omitted.
3. Anode.
4. Screen Grid.
5. Control Grid.
6. —
7. Omitted.
8. F+ve.



Viewed from the free end of the base.

MAZDA

PEN.231 and PEN.220

BATTERY OUTPUT PENTODES

RATINGS.	PEN.231	PEN.220
Filament Voltage	2·0	2·0
Filament Current (amps.)	0·3	0·2
Maximum Anode Voltage	150	150
Maximum Screen Voltage	150	150
*Mutual Conductance (mA/V)	5·3	2·5

*At Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATING CONDITIONS.	PEN.231	PEN.220	
Anode Volts	110	120	120
Screen Volts	110	120	120
Grid Bias	2·2	2·5	4·5
Anode Current (mA)	4·6	5·0	5·0
Screen Current (mA)	0·9	1·0	1·0
*Anode Load (ohms)	19,000		17,000
*Power Output (watts)	·29	·37	·35
*Input Swing (Volts RMS)	1·4	1·65	3·1

*For no individual harmonic exceeding 10 per cent.

DIMENSIONS.		
Maximum Overall Length	117	112 mm.
Maximum Diameter	39	45 mm.

GENERAL.

The Pen.231 and Pen.220 are output Pentodes for use in battery operated receivers. They have been designed to give a large power output with economy when used with H.T. batteries of between 100 to 120 volts. Under these conditions, the anode current consumption is approximately 5 milliamps only.

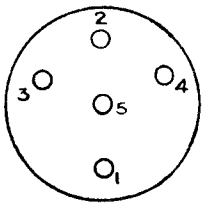
APPLICATION.

The filament should be operated off a 2-volt accumulator, and no series resistance must be used. Pin No. 3 should be connected to LT—ve and HT—ve. The anode or screen voltage should not be allowed to exceed 150 volts.

The Pen.231 must always be used under self-bias conditions, i.e., the bias must be obtained by means of a common resistance in the H.T. negative lead and this resistance should be by-passed with a large condenser. If the resistance is not by-passed with a large condenser, the individual stages should be decoupled in the screen, anode and grid circuits, in order to prevent backcoupling which might cause degenerative effects or instability.

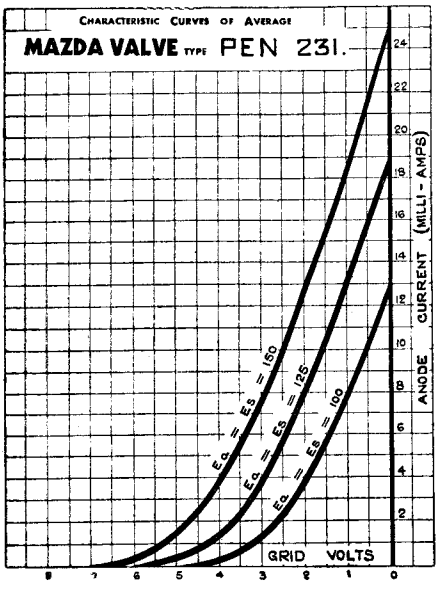
The Pen.231 valve gives a larger power output than the Pen.220, but with a larger percentage distortion. This however, can be permitted at the moderate power outputs available even with the use of high sensitivity speakers having flux densities up to 11,000 lines. The Pen.220 may be used with fixed bias, although self bias is to be preferred.

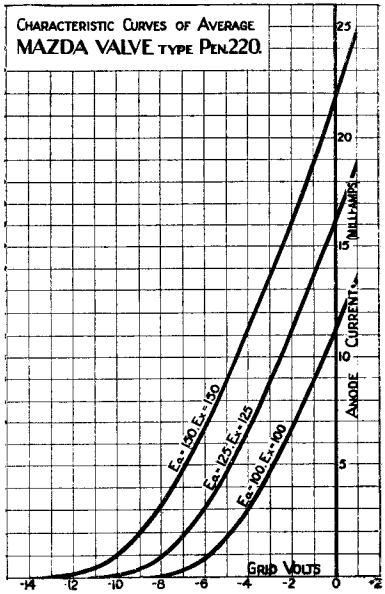
BASING (Both Types).



Viewed from the free end of the base.

Pin No. 1. Anode.
2. Control Grid.
3. Filament.
4. Filament.
5. Screen.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

PEN. 383

BEAM POWER AMPLIFIER FOR AC/DC MAINS

RATING.

Heater Voltage	38·0
Heater Current (Amps.)	0·2
Maximum Anode Voltage	200
Maximum Screen Voltage	200
Maximum Anode Dissipation (watts)	10
*Mutual Conductance (mA/V)	12

*Taken at Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	138	150	160
Screen Voltage	150	150	175
Grid Bias	8·7	8·75	10·0
Anode Current (mA.)	50	50	64
Screen Current (mA.)	10	10	13
*Anode Load (ohms)	2,800	2,900	2,600
*Power Output (watts)	2·65	2·95	3·75
*Input Swing Volts (RMS)	4·7	4·8	5·5
Bias Resistance (ohms)	145	145	130

* For 5 per cent. Third Harmonic, and Second Harmonic not exceeding 5 per cent.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	13·5 $\mu\mu$F.
*Grid to Earth	21·5 $\mu\mu$F.
Anode to Grid	0·7 $\mu\mu$F.

* "Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	... 120 mm.
Maximum Diameter	... 54 mm.

GENERAL.

The PEN. 383 is an indirectly-heated beam power amplifier for use in A.C. D.C. receivers. A band of metallising covers the lower portion of the bulb, and the valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

APPLICATION.

When used with average A.C. mains with series speaker field circuit, in which the speaker field requires approximately 6 watts, a screen voltage of the order of 145 to 150 will be obtained. Approximately 2·7 watts will be delivered, without exceeding 5 per cent. of either second or third harmonic, with an output transformer resistance of 250 ohms.

In the case of parallel speaker fields, approximately 3·75 watts will be delivered using an output transformer with resistance of 250 ohms, and a 300 ohms smoothing choke smoothing a speaker field of 6 watts.

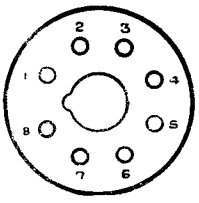
The valve should always be self-biased, and the value required is given on the preceding page. The grid to cathode circuit should be kept as low as possible and should not exceed 1 megohm for an anode dissipation limit of 10 watts. The grid circuit must be efficiently decoupled, and this may be achieved either by connecting an electrolytic condenser of 50 to 75 μF. across the self-bias resistance, or decoupling the grid circuit in the usual manner. An anti-parastic resistance of the moulded type, and of a low self-capacity should be connected in the grid or anode circuit, and mounted close to the actual valve terminals. A value of 50 ohms is satisfactory in the case of an anode resistance.

The anode load should be accurately determined, and kept reasonably constant by the provision of a suitable condenser filter.

The heater is designed to operate at 0·2 amps. and the series heater resistance should be such that the heater current has this value at average line voltage.

BASING.

Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Control Grid.
6. Metallising.
7. Omitted.
8. Heater.



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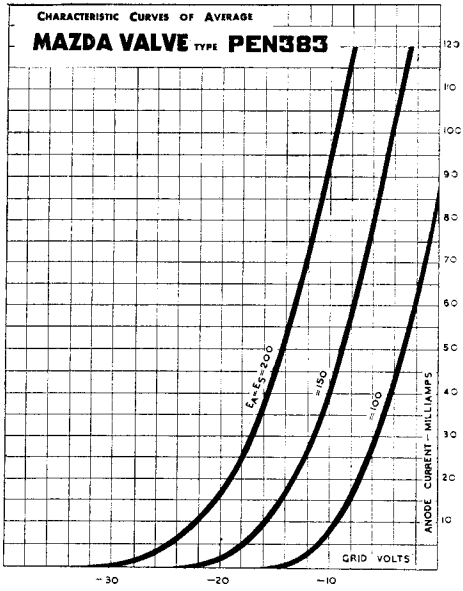

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PEN. 384

BEAM POWER AMPLIFIER FOR AC/DC MAINS

RATING.

Heater Voltage	38.0
Heater Current (amps.)	0.2
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Maximum Anode Dissipation (watts)	10
*Mutual Conductance (mA/V)	12.5

*Taken at Va=100 ; Vs=100 ; Vg=0.

TYPICAL OPERATION.

Anode Voltage	85	110
Screen Voltage	95	110
Grid Bias	7.0	7.0
Anode Current (mA.)	27	40
Screen Current (mA.)	2.0	2.9
*Anode Load (ohms)	2,600	2,200
*Power Output (watts)	1.0	1.9
*Input Swing Volts (RMS)	3.9	4.8
Bias Resistance (ohms)	240	160

* For 7 per cent. Third Harmonic, and Second Harmonic not exceeding 7 per cent.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11.5 $\mu\mu$F.
*Grid to Earth	22.0 $\mu\mu$F.
Anode to Grid	0.4 $\mu\mu$F.

* "Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	120 mm.
Maximum Diameter	54 mm.

GENERAL.

The PEN. 384 is an indirectly-heated beam power amplifier for use in A.C./D.C. receivers operating on 110 v. mains. A band of metallising covers the lower portion of the bulb, and the valve is fitted with a British octal base, the connexions to which are given overleaf.

APPLICATION.

It is intended that the valve be used with Permanent Magnet Loud-speaker in view of the low H.T. voltage available.

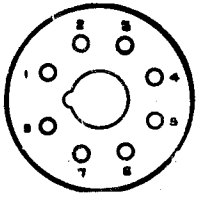
The valve should always be self-biased, and the value required is given on the preceeding page. The grid to cathode circuit should be kept as low as possible and should not exceed 1 megohm for an anode dissipation limit of 10 watts. The grid circuit must be efficiently decoupled, and this may be achieved either by connecting an electrolytic condenser of 50 to 75 μF. across the self-bias resistance, or decoupling the grid circuit in the usual manner. An anti-parastic resistance of the moulded type, and of a low self-capacity should be connected in the grid or anode circuit, and mounted close to the actual valve terminals. A value of 50 ohms is satisfactory in the case of an anode resistance.

The anode load should be accurately determined, and kept reasonably constant by the provision of suitable condenser filter.

The heater is designed to operate at 0.2 amps. and the series heater resistance should be such that the heater current has this value at average line voltage.

BASING.

Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Control Grid.
6. Metallising.
7. Omitted.
8. Heater.



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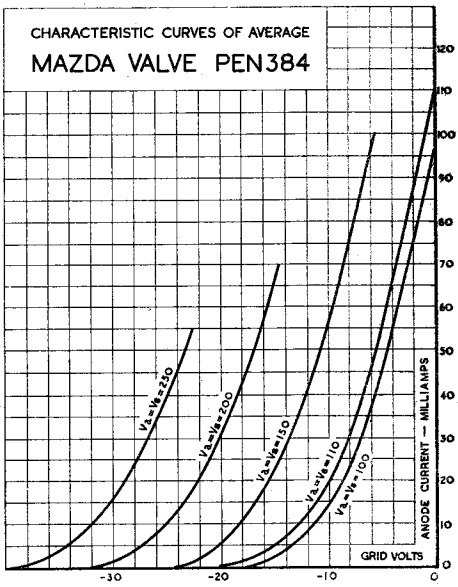

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MAZDA

PEN. 453 DD

DOUBLE DIODE BEAM POWER AMPLIFIER FOR AC/DC MAINS

RATING.

Heater Voltage	45·0
Heater Current (Amps.)	0·2
Maximum Anode Voltage	200
Maximum Screen Voltage	200
*Mutual Conductance (mA/V)	12
Maximum Anode Dissipation (watts)	10

Taken at Ea = 100 ; Es = 100 ; Eg 0.

TYPICAL OPERATION.

Anode Voltage	138	150	160
Screen Voltage	150	150	175
Grid Bias Voltage	8·7	8·75	10
Anode Current (mA.)	50	50	64
Screen Current (mA.)	10	10	13
*Anode Load (ohms)	2,800	2,900	2,600
*Power Output (watts)	2·65	2·95	3·75
*Input Swing (volts) (RMS)	4·7	4·8	5·5
Bias Resistance (ohms)	145	145	130

* For 5 per cent. Third Harmonic, and Second Harmonic not exceeding 5 per cent.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	13·0 $\mu\mu$F.
*Grid to Earth	18·75 $\mu\mu$F.
Anode to Grid	0·75 $\mu\mu$F.
*Diode 1 to Earth	4·75 $\mu\mu$F.
*Diode 2 to Earth	4·5 $\mu\mu$F.
Diode 1 to Diode 2	0·05 $\mu\mu$F.

* " Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum Overall Length	131 mm.
Maximum Diameter	54 mm.

GENERAL.

The PEN.453 DD is an indirectly heated double diode output pentode for use in A.C./D.C. mains receivers. In operation the two diodes and the pentode are independent of each other except for the common cathode sleeve, and the two sections may be treated as two separate valves as far as circuit considerations are concerned. The characteristics are identical with those of the PEN. DD.4021, and a band of metallising covers the lower portion of the bulb. The valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

APPLICATION.

When used with average A.C. mains with series speaker field circuit, in which the speaker field requires approximately 6 watts, a screen voltage of the order of 145 to 150 will be obtained. Approximately 2·7 watts will be delivered, without exceeding 5 per cent. of either second or third harmonic, with an output transformer resistance of 250 ohms.

In the case of parallel speaker fields, approximately 3·75 watts will be delivered using an output transformer with resistance of 250 ohms, and a 300 ohms smoothing choke smoothing a speaker field of 6 watts.

The valve should always be self-biased, and the value required is given on the preceding page. The grid to cathode circuit resistance should be kept as low as possible and should not exceed 1 megohm for an anode dissipation limit of 10 watts. The grid circuit must be efficiently decoupled, and this may be achieved either by connecting an electrolytic condenser of 50 to 75 μF. across the self-bias resistance, or decoupling the grid circuit in the usual manner. An anti-parasitic resistance of the moulded type, and of a low self-capacity should be connected in the grid or anode circuit, and mounted close to the actual valve terminals. A value of 50 ohms is satisfactory in the case of an anode resistance.

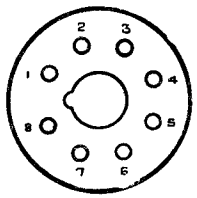
In the normal operation one diode (connected to Pin No. 5) is employed as an audio detector, and the other (connected to Pin No. 7) to provide the A.V.C. voltage. The load resistance of the detector diode should be returned to cathode, and that of the A.V.C. diode to a negative voltage to provide the requisite delay voltage. A value of 15 to 20 should be employed, and $8\frac{1}{2}$ to 10 volts may be obtained from the voltage drop across the resistor. For a higher value, an additional resistor should be placed between the terminal of the self-bias resistor and the chassis (H.T. negative) of the receiver.

The anode load should be accurately determined, and kept reasonably constant by the provision of a suitable condenser filter.

The heater is designed to operate at 0·2 amps., and the series heater resistance should be such that the heater current has this value at average line voltage.

BASING.

Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Diode 2.
6. Metallising.
7. Diode 1.
8. Heater.
Top Cap. Control Grid.



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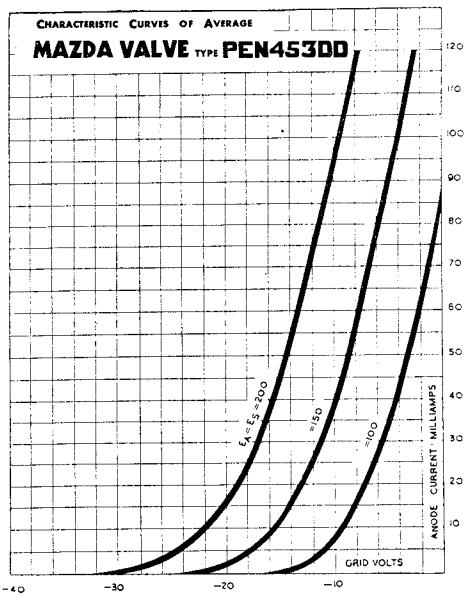


MAZDA

PEN. 3520

RATING.

Heater Voltage	35
Heater Current (Amps.)	0·2
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	7·0
Maximum Anode Dissipation (wa ts)	8·0

* Taken at Ea=100 ; Es=100 ; Eg=0.

OPERATING CONDITIONS.

Anode Voltage	185	200
Screen Voltage	185	200
Anode Current	36·5	40
Screen Current	7·3	8·0
Grid Bias Volts	7·25	8·0
*Optimum Load (ohms)	4,400	4,400
Self-bias Resistance (ohms)	165	165
*Power Output (watts)	2·3	3·0
*Input Swing (volts R.M.S.)	3·8	4·3

* For 5 per cent. Third Harmonic and Second Harmonic not exceeding 5 per cent.

DIMENSIONS.

Maximum Overall Length	132 mm.
Maximum Diameter	54 mm.

GENERAL.

The PEN.3520 is an indirectly heated output pentode for use in A.C./D.C. receivers. The valve is based in a standard 7-pin base, the connexions to which are given overleaf.

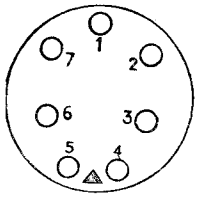
APPLICATION.

In receivers employing A.V.C. it is possible to obtain ample power output without an intermediate L.F. stage, by feeding the PEN.3520 direct from the diode. Suitable values for the condenser resistance filter in the anode circuit are 5,000 ohms and 0·02 μF., when the valve is operating a B.T.H. R.K. speaker. The valve must always be self-biased, and the resistance of the grid-cathode circuit should not exceed 1 megohm.

MAZDA

BASING.

Pin No. 1. ——
2. Control Grid.
3. Screen.
4. Heater.
5. Heater.
6. Cathode
7. Anode.



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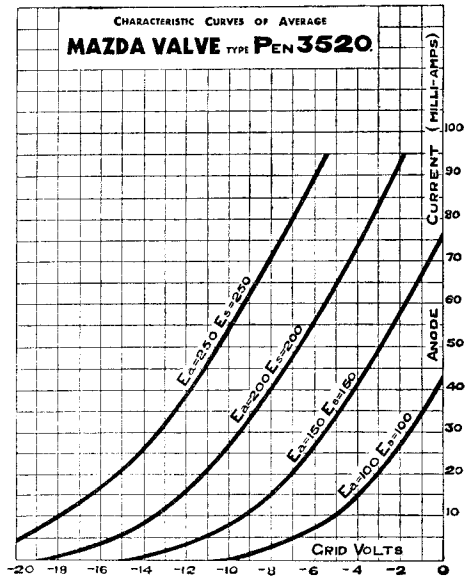

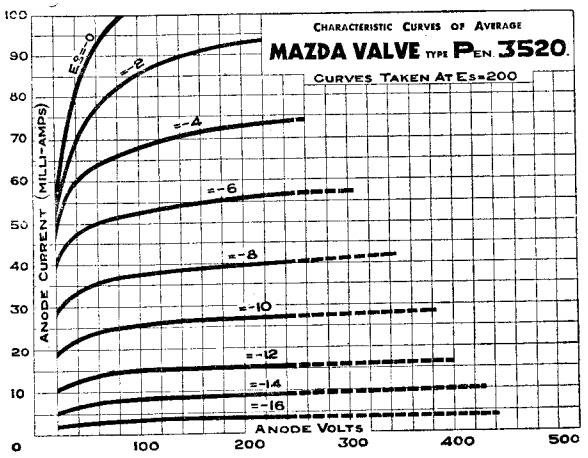

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MAZDA

PEN. 3820

BEAM POWER AMPLIFIER FOR AC/DC MAINS

RATING.

Heater Voltage	38·0
Heater Current (amps.)	0·2
Maximum Anode Voltage	200
Maximum Screen Voltage	200
*Mutual Conductance (mA/V)	12
Maximum Anode Watts	10

*At Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	138	150	160
Screen Voltage	150	150	175
Grid Bias	8·7	8·75	10·0
Anode Current (mA)	50	50	64
Screen Current (mA)	10	10	13
*Anode Load (ohms)	2,800	2,900	2,600
*Power Output (watts)	2·65	2·95	3·75
*Input Swing Volts (RMS)	4·7	4·8	5·5
Bias Resistance (ohms)	145	145	130

* For 5 per cent. Third Harmonic and Second Harmonic not exceeding 5 per cent.

DIMENSIONS.

Maximum Overall Length	129 mm.
Maximum Diameter	54 mm.

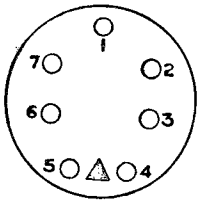
GENERAL.

The Pen.3820 is an indirectly heated beam power amplifying valve. It is primarily designed to provide a power output of the order of 3 watts, when used with a series speaker field in AC/DC receivers. It may also be used to provide a higher power output with parallel speaker field circuits. The valve is based in a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

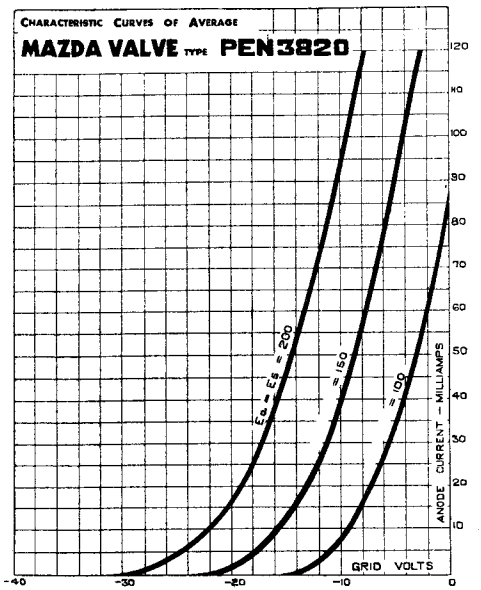
The valve has been designed for use in the output stage of AC/DC receivers where the diode sections included in the Pen. DD.4021 are not required. The characteristics of the valve have been adjusted to provide adequate power output in receivers employing a speaker field for smoothing. Under these conditions, the dissipation on the anode does not exceed 10 watts, and a grid leak resistance of one megohm may be employed, provided the valve is self-biased. The heater is designed to operate at 0·2 ampere, and the resistance placed in series with the heaters should be such that the heater is operated at this current at average line voltage. Every precaution should be taken to see that the valves are operated at the correct heater current to enable them to withstand the variations which will be met in practice.

BASING.



Pin No. 1. —
2. Control Grid.
3. Screen.
4. Heater.
5. Heater.
6. Cathode.
7. Anode.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

PEN. DD 4020

AC/DC MAINS DOUBLE-DIODE OUTPUT PENTODE

RATING.

Heater Voltage	40
Heater Current (amps)	0·2
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Maximum Anode Dissipation (watts)	10
*Mutual Conductance (mA/v)	7·0

*Taken at Ea = 100 ; Es = 100 ; Eg = 0.

OPERATING CONDITIONS.

Pentode.

Anode Voltage	185	200	240
Screen Voltage	185	200	250
Anode Current (mA)	29	32	43
Bias Voltage	5·7	6·3	7·75
Optimum Load (ohms)	5,400	5,400	4,800
Self Bias Resistance (ohms)	165	165	150
Maximum Undistorted Power Output (watts)	2·1	2·4	3·9
Input Voltage (RMS)	3·25	3·4	4·35

INTER-ELECTRODE CAPACITIES.

Diode 1 to Earth	4.0 $\mu\mu$F.
Diode 2 to Earth	3·75 $\mu\mu$F.
Diode 1 to Diode 2	0·1 $\mu\mu$F.

DIMENSIONS.

Maximum Overall Length	146 mm.
Maximum Diameter	54 mm.

GENERAL.

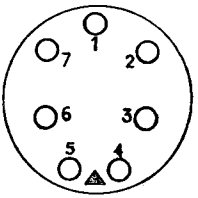
The Pen. DD.4020 is an indirectly heated double diode output pentode for A.C./D.C. mains operation designed to combine the functions of detector, A.V.C. and output valve. The diodes and the pentode form two entirely separate units within the same bulb, mounted on a common cathode with two separate emitting surfaces. The valve is fitted with a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

To maintain power output, the anode and screen voltages should be kept as high as possible without exceeding the maximum rating. The valve must always be self-biased, and the resistance of the grid to cathode circuit should not exceed 1 megohm. When used in A.V.C. circuits a delay voltage of the order of 15 volts is recommended. The grid circuit must be decoupled in the usual manner by connecting a 50 mfd. condenser across the self-bias resistance, and sometimes it is necessary to connect a 50 ohm anti-oscillation resistance as close as possible to the anode pin. The diode connected to pin No. 3 should be used for A.V.C. bias.

The optimum anode load given in the table is the lowest speaker speech coil impedance in the audio frequency range referred to the primary. The required transformer ratio may be calculated with sufficient accuracy from the D.C. resistance of the speech coil, plus 10 per cent.

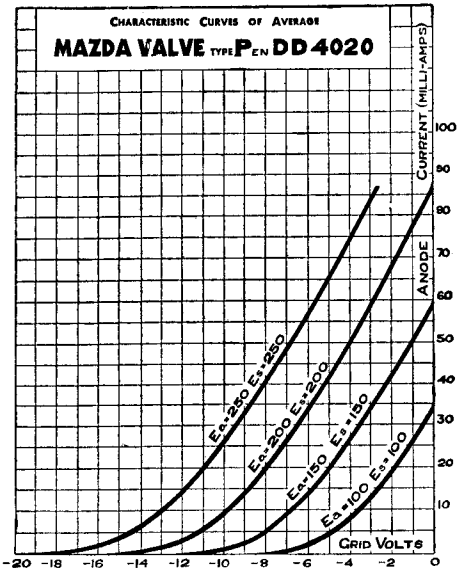
The heaters of AC/DC valves are designed to operate at a constant current of 0·2 ampere, and when the heaters are wired in series the ballast resistance should be such that the current has this value at average line voltage.

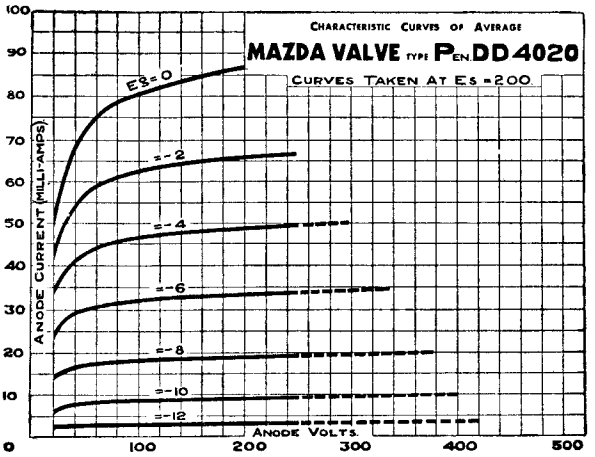


BASING.

Pin No.	1.	Diode 1.
	2.	Anode.
	3.	Diode 2.
	4.	Heater.
	5.	Heater.
	6.	Cathode.
	7.	Screen.
Top Cap.		Control Grid.

Viewed from the free end of the Base.





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MAZDA

PEN.DD.4021

BEAM POWER OUTPUT VALVE FOR A.C./D.C. MAINS

RATING.

Heater Voltage	45
Heater Current (amps.)	0·2
Maximum Anode Voltage	200
Maximum Screen Voltage	200
Maximum Dissipation (watts)	10
*Mutual Conductance (mA/V)	12

*At Va=100 ; Vs=100 ; Vg=0.

OPERATING CONDITIONS.

Anode Voltage	138	150	160
Screen Voltage	150	150	175
Grid Bias	8·7	8·75	10
Anode Current (mA)	50	50	64
Screen Current (mA)	10	10	13
Anode Load (ohms)	2,800	2,900	2,600
Power Output (watts)	2·65	2·95	3·75
Bias Resistance (ohms.)	145	145	130

*For 5 per cent. 3rd harmonic, and 2nd harmonic not exceeding 5 per cent.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	9·25 $\mu\mu$F.
*Grid to Earth	18·0 $\mu\mu$F.
Anode to Grid	1·1 $\mu\mu$F.
*Diode 1 to Earth	4·0 $\mu\mu$F.
*Diode 2 to Earth	4·0 $\mu\mu$F.
Diode 1 to Diode 2	0·1 $\mu\mu$F.

*" Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum Overall Length	140 mm.
Maximum Diameter	54 mm.

GENERAL.

The Pen.DD.4021 is an indirectly heated " beam power " output valve, incorporating a double diode, for use in A.C./D.C. receivers. It is primarily intended for use in radio receivers requiring greater volume than that given by the normal pentode. The diode section is completely screened within the valve from the beam power section, so that both sections may be treated as separate valves as far as circuit considerations are concerned. The bulb is partly metallised and the valve is fitted with a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

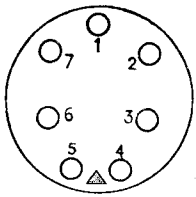
The valve should always be self-biased, and the bias resistance by-passed by a 50 mfd. condenser. The grid-cathode circuit resistance should

not exceed 1 megohm for an anode dissipation of 10 watts. It is advisable to connect a resistance of about 50 ohms in the anode circuit to prevent parasitic oscillation.

The diode connected to Pin No. 1 should be used for detection, and the diode connected to Pin No. 3 should be used for A.V.C. A delay voltage of 15—18 volts is recommended.

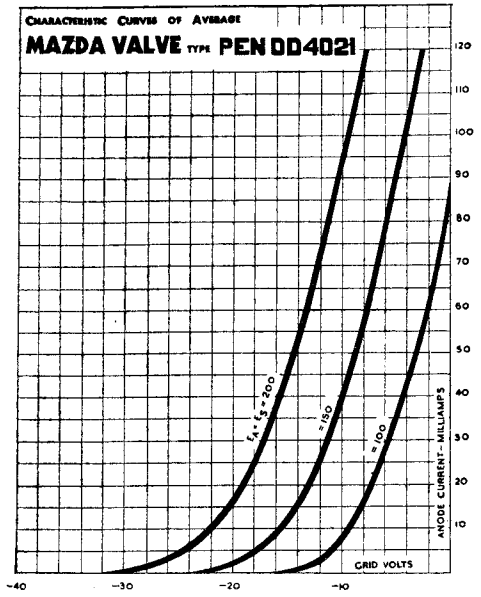
The anode load should not drop below the optimum value recommended.

BASING.



Pin No. 1. Diode 1.
2. Anode.
3. Diode 2.
4. Heater.
5. Heater.
6. Cathode and Metallising.
7. Screen.
Top Cap. Control Grid.

Viewed from the free end of the base.



MAZDA

PP.3/250

OUTPUT TRIODE

RATING.

Filament Voltage	4·0
Filament Current (Amps.)	1·0
Maximum Anode Voltage	300
*Mutual Conductance (mA/V)	6·5
*Amplification Factor	6·5
Anode A.C. Resistance (ohms)	1,000
Maximum Anode Dissipation (watts)	15

*At Ea=100 ; Eg=0.

TYPICAL OPERATION.

	Single.			Push Pull.	
Anode Voltage	250	250	300	250	300
Anode Current (Quiescent) (mA)	42	50	48	84	84
Grid Bias for A.C. Filament Heating	30	28·2	37	30	38·2
Self-Bias Resistance for A.C. Filament Heating (ohms)	715	565	775	357·5	455
Grid Bias for D.C. Filament Heating	28	26·2	35	28	36·2
Anode A.C. Resistance (ohms)	1,200	1,150	1,200	1,200	1,200
Mutual Conductance (mA/V)	5·0	5·4	5·4	5·0	5·0
*M.U. Power Output (watts)	2·65	2·75	4·2	5·6	9·0
*Optimum Anode Load (ohms)	2,750	2,200	3,000	—	—
*Optimum Anode to Anode Load (ohms)	—	—	—	4,600	5,300
*R.M.S. Input Grid Volts per valve	19·8	18·5	24·8	19·8	25·6
*Anode Current at M.U.P.O. with Fixed Bias (mA)	48·0	57·5	57·5	96	112

* For a Total Harmonic Content of 5 per cent.

DIMENSIONS.

Maximum Overall Length	140 mm.
Maximum Diameter	58 mm.

GENERAL.

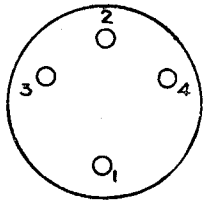
The PP.3/250 is a directly heated power triode, primarily for use in the output stage of A.C. receivers, but may be used with D.C. if required. The valve is fitted with a standard 4-pin base, the connexions to which are given overleaf.

APPLICATION.

It is recommended that the bias voltage be obtained by means of a self-bias circuit, the resistance being by-passed with a large condenser. Approximately 50 mfd. is a suitable value. The grid-filament circuit resistance should not exceed 0·5 megohm with 12 watts dissipation, or 0·25 megohm with 15 watts dissipation, with each valve individually self-biased. This same resistance should not exceed 0·25 megohms with 12 watts dissipation and 0·05 megohms with 15 watts dissipation with fixed or common bias.

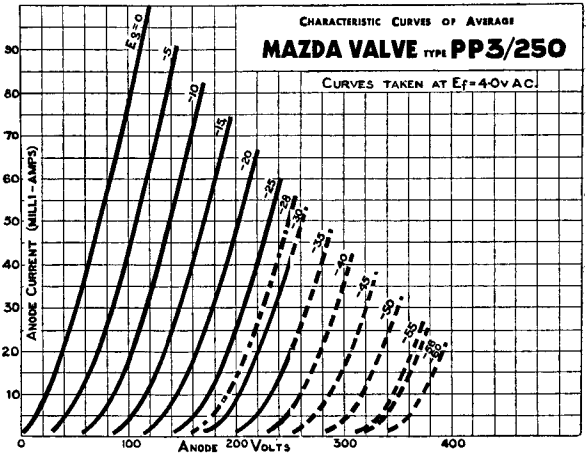
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. Anode.
2. Grid.
3. Filament.
4. Filament.



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MAZDA

PP.3521

AC/DC MAINS OUTPUT TRIODE

RATING

Heater Voltage	35
Heater Current	0·2
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	10
*Amplification Factor	6
*Anode A.C. Resistance (ohms)	600
Max. Anode Dissipation (watts)	15

*At Ea=100 ; Eg=0.

OPERATING CONDITIONS.

	Single.	Push-Pull
Anode Voltage	200	175	200
Anode Current (mA)	70	60	140
Grid Bias	25	22·5	25
Optimum Load (ohms)	2,000	2,800	2,500
Self-bias Resistance (ohms) (per valve)	360	375	360
Power Output (for 5 per cent. total harmonic) (watts)	2·3	1·5	6·0

DIMENSIONS.

Maximum Overall Length	132 mm.
Maximum Diameter	54 mm.

GENERAL.

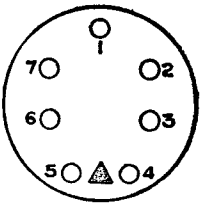
The PP.3521 is an indirectly heated triode of very low impedance for use in the output stage of A.C./D.C. mains receivers, when large power outputs are required. The valve is based in a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

For the maximum power output to be obtained, the anode voltage should be as high as possible up to the permissible limit. Each valve must be individually self-biased and for this purpose a 360 ohm resistance should be inserted in each cathode lead. To prevent loss of bass, this resistance should be by-passed with a high-capacity condenser which can be of the low voltage electrolytic type. The grid to cathode resistance must not exceed 150,000 ohms per valve.

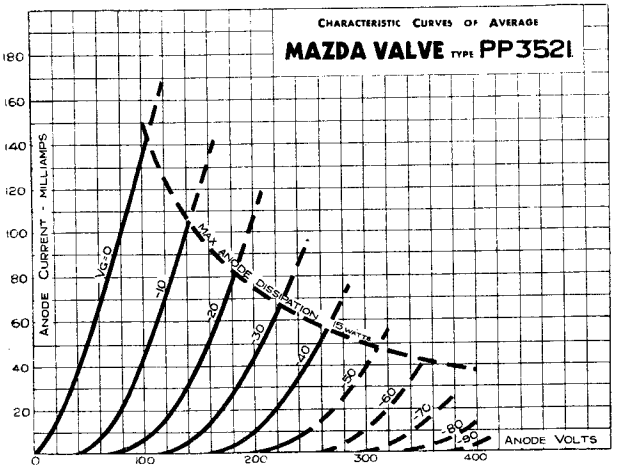
The heater is designed to operate at 0.2 amp, and the series heater resistance should be such that the filament current has this value at average line voltage.

BASING.



Pin No. 1. —
2. Control Grid.
3. —
4. Heater.
5. Heater.
6. Cathode.
7. Anode.

Viewed from the free end of the base.



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MAZDA

PP5/400

OUTPUT TRIODE

RATING.

Filament Voltage	4·0
Filament Current (Amps.)	2·0
Maximum Anode Voltage	400
Maximum Anode Dissipation (watts)	25
*Mutual Conductance (mA/V)	6·0
*Amplification Factor	9·0
*Anode A.C. Resistance (ohms)	1,500

*Taken at Ea=100 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	400
Anode Current (mA)	62·5
Grid Voltage for A.C. Filament Operation	32·0
Self-bias Resistance for A.C. Filament Heating (ohms)	510
Grid Voltage for D.C. Filament Operation	30
Amplification Factor	8·8
Anode A.C. Resistance (ohms)	1,220
Mutual Conductance (mA/V)	7·2
Optimum Anode Load (ohms)	2,700
M.U. Power Output (watts)	5·85
R.M.S. Input Grid Volts (per valve)	21·2
Anode Current at M.U.P.O. with Fixed Bias (mA)	70

DIMENSIONS.

Maximum Overall Length	150 mm.
Maximum Diameter	64 mm.

GENERAL.

The PP.5/400 is a directly heated power triode for use in the output stage where a 450-volt supply is available. For anode voltages of 300 and below, the PP.3/250 or PA.20 will, in general, be more suitable than the PP.5/400. The valve is fitted with a standard 4-pin base, the connexions to which are given overleaf.

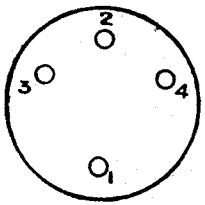
APPLICATION.

It is recommended that the bias voltage be obtained by means of a self-bias circuit, the resistance being by-passed with a large condenser. Approximately 50 mfd. is a suitable value. The grid filament circuit resistance should not exceed 0·25 megohms.

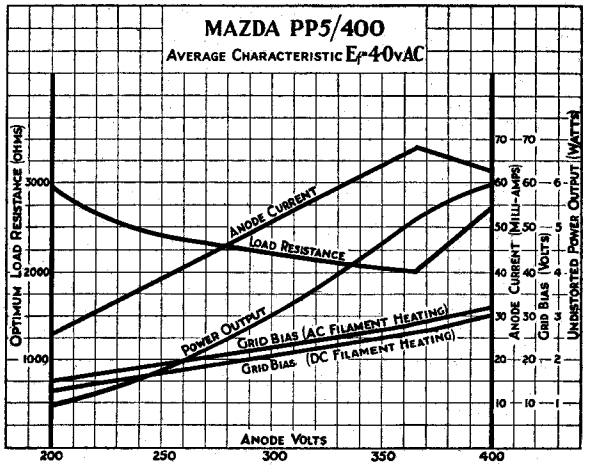
MAZDA

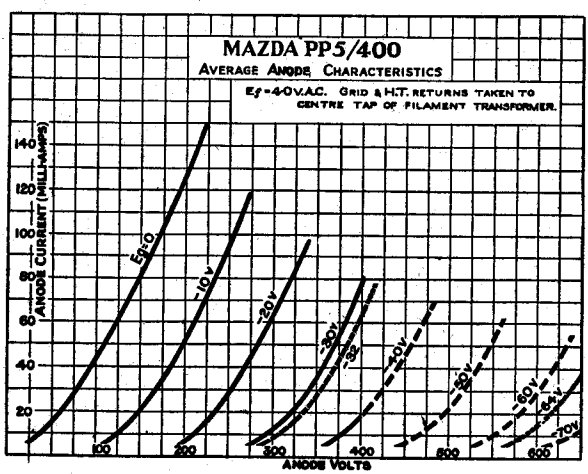
BASING.

Pin No. 1. Anode.
2. Grid.
3. Filament.
4. Filament.



Viewed from the free end of the base.





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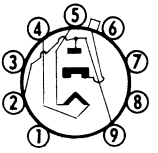
MAZDA

DIODE DE RECUPERATION
Série miniature de 9 broches

PY 81 F

Cathode à chauffage indirect

Tension filament	17 Volts CC ou CA
Intensité filament	0,3 Ampère
Encombrement	V.7-NC. I
Hauteur (broches comprises)	89 mm
Diamètre	22,2 mm
Base	MN.9
Brochage	3.N-AA
Position de montage	Indifférente
Temps de chauffage	23 secondes



Broches de la base, face à l'observateur.

RÉPRODUCTION INTERDITE

BROCHES

N° 1 - Connexion interne (1)
N° 2 - Anode
N° 3 - Connexion interne (1)
N° 4 - Filament
N° 5 - Filament

BROCHES

N° 6 - Connexion interne (1)
N° 7 - Connexion interne (1)
N° 8 - Connexion interne (1)
N° 9 - Anode
La cathode est réunie à la coiffe du sommet.

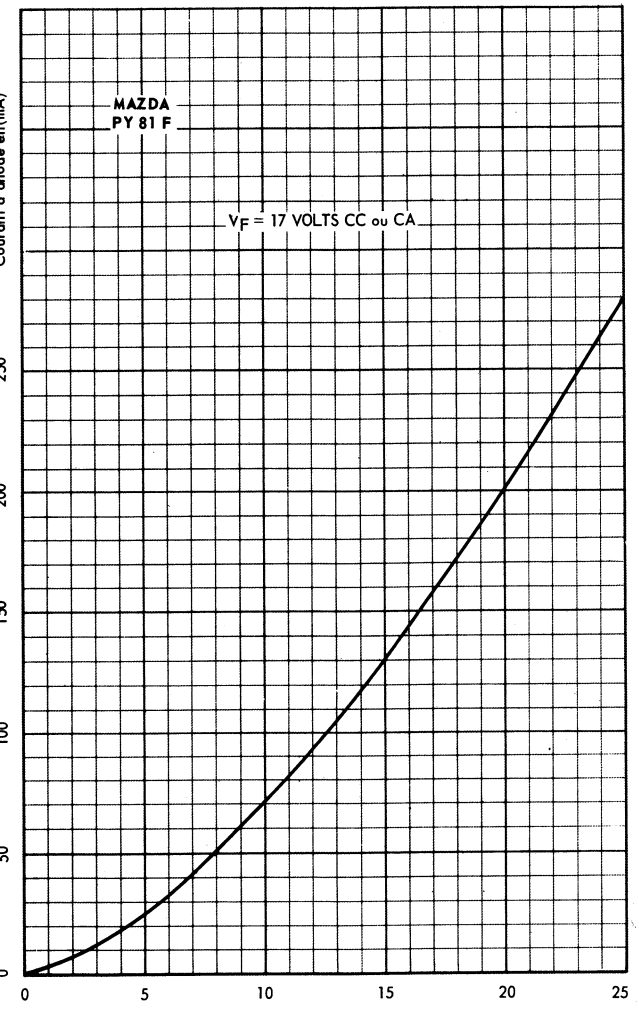
CARACTERISTIQUES LIMITES
(Système des valeurs moyennes)

Tension d'alimentation sans débit	550	V max.
Tension d'alimentation d'anode	250	V max.
Dissipation sur l'anode	3,5	W max.
Courant d'anode	150	mA max.
Courant d'anode de pointe	450	mA max.
Tension de pointe anode-cathode (2)(3)	5.000	V max.
Tension de pointe anode-cathode (2)(3)(4)	5.600	V max.
Tension de pointe filament-cathode (2)	5.000	V max.
Tension entre filament et terre	220	V eff. max.

(1) - Les broches indiquées "Connexion interne" ne doivent pas être utilisées de quelque manière que ce soit.
(2) - Durée maximum de l'impulsion : 22 % d'un cycle, avec un maximum de 18 μs.
(3) - Cathode positive par rapport à l'anode.
(4) - Valeur maximum absolue.

PY 81 F

Courbe du courant d'anode en fonction de la tension d'anode



REPRODUCTION INTERDITE

Q.P.25

BATTERY DOUBLE PENTODE OUTPUT VALVE

RATING.

Filament Voltage	2.0
Filament Current (Amps.)	0.2
Maximum Anode Voltage	120
Maximum Screen Voltage	120
*Mutual Conductance (mA/V)	3.0

*Taken at Ea=100; Es=100; Eg=0.

TYPICAL OPERATION.

H.T. Battery Voltage	90	108	120	130
Anode Voltage	83.5	100	110	120
Screen Voltage	83.5	100	110	120
Grid Bias Voltage	6.1	7.7	8.65	9.75
Total Quiescent Anode Current (mA)	3.2	3.85	4.25	4.65
Total Quiescent Screen Current (mA)	0.6	0.72	0.8	0.87
Total Quiescent Current (mA)	3.8	4.6	5.0	5.5
Anode to Anode Load (ohms)	17,000	17,000	16,000	15,500
Power Output Watts	0.45	0.75	0.95	1.2
Input Swing per valve, R.M.S.	4.3	5.45	6.1	6.9

DIMENSIONS.

Maximum Overall Length	91 mm.
Maximum Diameter	32 mm.

GENERAL.

The QP 25 is a double pentode for use in the output stage of battery receivers employing Quiescent Push-pull. The valve is fitted with a Mazda Octal base, the connexions to which are given overleaf.

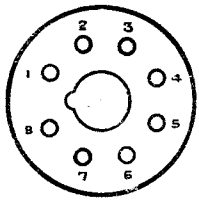
APPLICATION.

The valve is particularly suitable for use in battery portables where, even when used with H.T. battery voltages of as low as 90 volts a power output of the order of 450 mW is available.

Each pentode is accurately matched as regards its operating characteristics. The screens are operated at the full H.T. voltage, and no extra battery tappings are required. It is recommended that the bias be obtained by means of a resistance in the negative H.T. lead, and this resistance should be by-passed with a large condenser of about 50 μF.

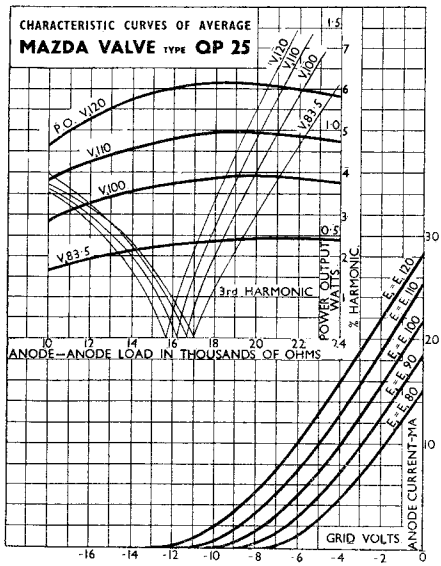
With self-bias operation, in order to prevent distortion and loss of power output, the total current of both anodes for a screen voltage of 110 should never be less than 3.5 milliamperes. The output transformer should be of normal Q.P.P. design, and an anode to anode load of the order of 16,000 to 18,000 will be satisfactory.

BASING.



Viewed from the free end of the base.

Pin No. 1. Filament.
2. —
3. Anode (a)
4. Screens.
5. Control Grid (a)
6. Control Grid (b)
7. Anode (b)
8. Filament.



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MAZDA

QP.230

BATTERY DOUBLE PENTODE OUTPUT VALVE

RATING.

Filament Voltage	2·0
Filament Current (amps)	0·3
Maximum Anode Volts	150
Maximum Screen Volts	150
*Mutual Conductance (mA/V)	3·0

*At Ea=100 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Anode Volts	100	110	120
Screen Volts	100	110	120
Grid Bias Volts	7·65	8·6	9·6
Total Quiescent Anode Current (mA) ...	3·85	4·25	4·65
Total Quiescent Screen Current (mA) ...	0·9	1·05	1·15
Anode to Anode Load (ohms)	16,000 to 18,000		
R.M.S. Swing per Valve	5·4	6·0	6·8
Power Output (watts) (for 5% total Harmonic)	0·57	0·7	0·85

DIMENSIONS.

Maximum Overall Length	108 mm.
Maximum Diameter	39 mm.

GENERAL.

The QP.230 combines in one valve two accurately matched high efficiency pentodes for quiescent push-pull operation. It is intended for use in the output stage of battery receivers.

The valve is based in a standard 7-pin base, the connections to which are given overleaf.

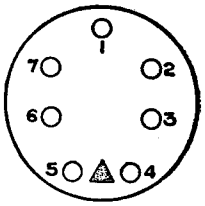
APPLICATION.

The valve has been primarily designed for use under self-bias operation, thus reducing to a large extent the variation in the useful life of the H.T. battery due to incorrect running down of the bias battery. The power output is approximately two-thirds of that available from the QP.240, but both the H.T. and L.T. current consumption are more economical. Ample power output is available for normal conditions with a H.T. battery having a total voltage of 120 volts.

The screens are connected to a common pin and should be operated at the full H.T. voltage. With self-bias operation, in order to prevent distortion, the total current for both anodes should never be less than $3\frac{1}{2}$ mA with a screen voltage of 110 volts. The bias should be obtained by means of a resistance in the common H.T. negative lead, and this resistance should be by-passed with a large condenser of 50 μF. or more. The output transformer should be of the normal Q.P.P. design and the usual forms of stabilisation against parasitic oscillations will be necessary.

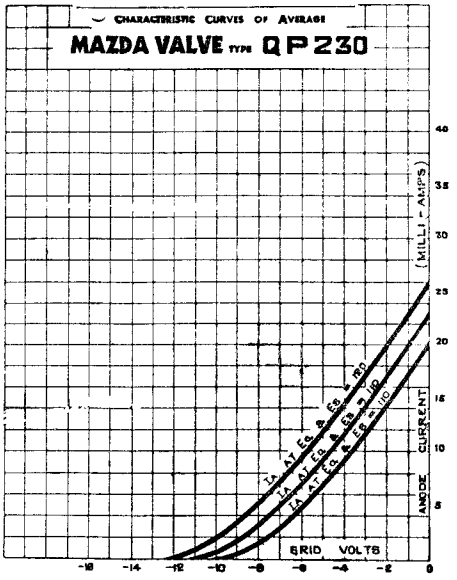
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. Control Grid (B)
2. Control Grid (A)
3. Anode (A)
4. Filament.
5. Filament.
6. Screens (A & B)
7. Anode (B)



Note—The diagram indicates the anode current characteristic of one half of the valve only

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QP. 240

BATTERY DOUBLE PENTODE OUTPUT VALVE

RATING.

Filament Volts	2·0
Filament Current (amps.)	0·45
Maximum Anode Volts	150
Maximum Screen Volts	150
*Mutual Conductance (mA/V)	4·0

* At Ea=100 ; Es=100 ; Eg=0.

DIMENSIONS.

Maximum Overall Length	108 mm.
Maximum Diameter	39 mm.

GENERAL.

The QP.240 is a double pentode for use in the output stage of battery receivers employing Quiescent Push-pull. The valve is based in a standard 9-pin base, the connections to which are given overleaf.

APPLICATION.

The two sections of the valve are distinguished by the letters "A" and "B" stamped on the base opposite pins 2 and 7.

Valves are carefully matched before dispatch, but to obtain the greatest economy in anode current it is recommended that the screen voltage be adjusted for individual sections of the valve. To enable this to be done the valves are further marked with code letters on the base to conform to the following table. The screen voltage should be adjusted to the values shown for corresponding values of anode and grid voltage.

The recommended operating anode voltage is 135, and tappings should be supplied in $7\frac{1}{2}$-volt steps on the high tension battery down to $103\frac{1}{2}$ volts. These tappings are required for matching by adjustment of screen voltage. The screen of each section of the valve should be connected to the voltage tap as indicated by the grade letter on the side of the bulb. Values of screen voltage for anode voltages of 120, 135 and 150 are given in the table overleaf.

The intervalve transformer ratio will depend on the type of detector valve used, for power grid detection the ratio should be about 1 : 8. If the Mazda Valve Types HL.21/DD and L.21/DD are used as detector amplifiers the transformer ratios should be 1 : 2 and 1 : 4 respectively.

All symmetrical push-pull circuits are liable to generate parasitic oscillation. This can be avoided by connecting resistances up to 50,000 ohms in series with the pentode grids close to the valve pins or, alternatively, by connecting condensers 0·001 mf. capacity between the anodes and filament, or by a combination of both.

OUTPUT CIRCUIT.

The loudspeaker is coupled to the pentode by means of a centre tapped transformer in an identical manner to the more common method of push-pull.

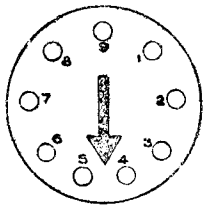
$$\text{Transformer ratio} = \sqrt{\frac{\text{Anode to Anode Load}}{\text{Minimum Speaker Impedance.}}}$$

The recommended value of anode to anode load is 16,000 ohms.

In order to prevent undue impedance rise in the output circuit at the higher audio frequencies with consequent harmonic distortion, a

condenser resistance filter must be connected across the primary of the output transformer. A suitable value of resistance is 15,000 ohms and condenser ·015 mfd. The absolute value of filter components will depend on the type of loudspeaker employed, and may be modified to produce the degree of tone correction required.

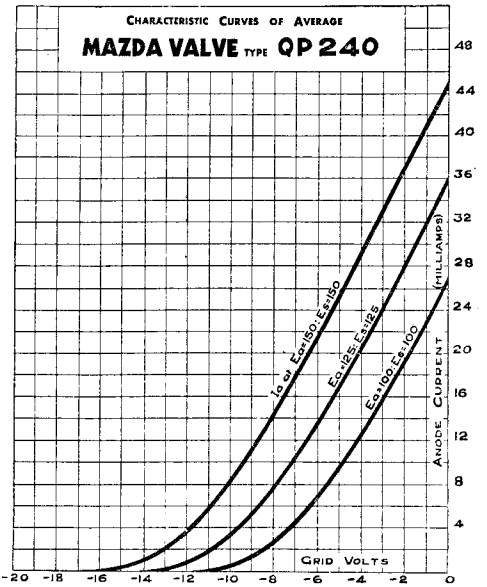
Anode Volts	Grid Bias	Screen Voltage for Code Letters.					Anode to Anode (Load ohms)	Approx. Total Quiescent Anode Current mA
		P.	Q.	R.	S.	T.		
150	−11·5	112·5	121·5	130·5	139·5	148·5	15,000	4·0
135	−10·5	103·5	111	118·5	126	133·5	16,000	3·3
120	− 9·0	91·5	97·5	103·5	109·5	115·5	17,000	3·0



Viewed from the free end of the base.

BASING.

Pin No. 1. Control Grid (a).
2. Anode (a).
3. Screen (a).
4. Filament.
5. Filament.
6. ——
7. Screen (b).
8. Anode (b).
9. Control Grid (b).



Note. The diagram indicates the anode current characteristic of one half of the valve only.

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

EDISWAN

S6F12

SPECIAL QUALITY H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE

GENERAL

The S6F12 is a Special Quality H.F. Pentode having characteristics similar to the 6F12, and is intended for use in AC or DC powered equipment having parallel connected heater chains. A special shock resistant construction is employed which gives increased reliability and life expectancy.

Quality tests are performed on electrical characteristics, vibration noise, base strain, glass strain, electrode resonance, vibration fatigue, shock resistance, heater cycling, stability and life.

The characteristic curves of the S6F12 are similar to those of the 6F12.

RATING

Heater Voltage	(volts)	V_h	6.3
Heater Current	(amps)	I_h	0.3
Maximum Anode Voltage	(volts)	$V_{a(max)}$	300
Maximum Screen Voltage	(volts)	$V_{g2(max)}$	300
Maximum Anode Dissipation	(watts)	$P_{a(max)}$	3.0
Maximum Screen Dissipation	(watts)	$P_{g2(max)}$	0.9
Maximum Heater to Cathode Voltage	(volts DC)	$V_{h\text{-}k(max)}$	150
Maximum Grid 1 to Cathode Resistance (cathode bias)	(MΩ)	$R_{g1\text{-}k(max)}$	0.5*
Mutual Conductance	(mA/V)	g_m	7.5**
Inner Mu		$\mu_{g1\text{-}g2}$	75**
Maximum Shock (short duration)	(g)		500
Maximum Acceleration (continuous operation)	(g)		2.5
Maximum Bulb Temperature	(°C)		200

* Maximum value for fixed bias operation = 100kΩ.

** $V_a = V_{g2} = 250$ v ; $I_a = 10$ mA ; $I_{g2} = 2.5$ mA ; $V_{g1} = -2$v.

All maximum ratings are Absolute Values not Design Centres.

S6FI2

EDISWAN

S6FI2

SPECIAL QUALITY H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE

INTER-ELECTRODE CAPACITANCES (pF)

Anode/Grid 1	c_{a-g1}	0.008†
Anode-Earth	c_{out}	3.25††
Grid 1/Earth	c_{in}	7.6 ††

† Total capacity including a Benjamin B7G holder type 75/833 and cylindrical screen can 75/832.

†† Inter-electrode capacity with holder capacity balanced out but with cylindrical screen can.

" Earth " denotes the remaining earthy potential electrodes, heater and shields connected to cathode.

DIMENSIONS

Maximum Overall Length	(mm)	54.5
Maximum Diameter	(mm)	19
Maximum Seated Height	(mm)	47.5
Approximate Nett Weight	(ozs)	$\frac{1}{4}$
Approximate Packed Weight	(ozs.)	$\frac{1}{2}$

MOUNTING POSITION—Unrestricted.

TYPICAL OPERATION

Anode Voltage	(volts)	V_a	250
Screen Voltage	(volts)	V_{g2}	250
Grid Bias Voltage	(volts)	V_{g1}	−2
Anode Current	(mA)	I_a	10
Screen Current	(mA)	I_{g2}	2.5

BULB—Clear.

February 1958 *INDUSTRIAL VALVE & CRT DIVISION* Issue 1/7

SIEMENS EDISON SWAN LIMITED

EDISWAN

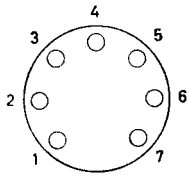
S6F12

SPECIAL QUALITY H.F. PENTODE

Indirectly heated—for parallel operation

TENTATIVE

BASE—B7G



Viewed from free end of pins.

CONNECTIONS

Pin 1	Control Grid	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode	a
Pin 6	Suppressor Grid	g3
Pin 7	Screen Grid	g2

MAZDA

SP. 22

BATTERY SCREENED H.F. PENTODE

RATING.

Filament Voltage	2·0
Filament Current (Amp.)	0·1
Maximum Anode Voltage	150
Maximum Screen Voltage	150
*Mutual Conductance (mA/V)	1·7

*at Ea=120 ; Es=120 ; Eg=0.

OPERATING CONDITIONS.

Anode Voltage	120	120	120
Screen Voltage	60	80	120
Grid Bias	0	0	1
Mutual Conductance (mA/V)	0·9	1·2	1·2
Anode Current (mA)	·55	1·1	1·1
Screen Current (mA)	·16	·35	·38
Anode A.C. Resistance (megohms) ...	2·7	1·35	1·35

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	12·5 $\mu\mu$F
*Grid to Earth	7·75 $\mu\mu$F
Anode to Grid	0·0055 $\mu\mu$F

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum overall length	103 mm.
Maximum diameter	32 mm.

GENERAL.

The SP.22 is a screened H.F. Pentode for use as a fixed gain amplifier frequency changer, or detector in battery operated receivers. The characteristics of the valve are identical, except for the inter-electrode capacities, with those of the SP.210. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

The SP.22 can be used as an H.F. or I.F. amplifier in circuits where the bias applied to the valves is fixed, or as a self-oscillating frequency changer with cathode injection. When used as an H.F. amplifier, an aerial control should be provided. When used as a detector with cumulative grid rectification, a screen voltage of 50-60 is recommended. This voltage may be obtained from a tap on the H.T. battery or preferably by means of a dropping resistance from the full H.T. supply. This reduces detector overloading to a great extent. A grid leak of 0·5 to 2·0 megohms should be used and the end should be returned to the positive L.T. terminal. Smooth reaction can best be obtained by returning the grid leak to a centre-tapped potentiometer across the filament supply.

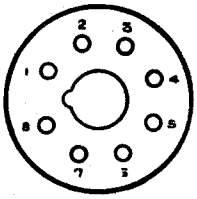
To avoid instability, the metal coating should always be connected to earth.

MAZDA

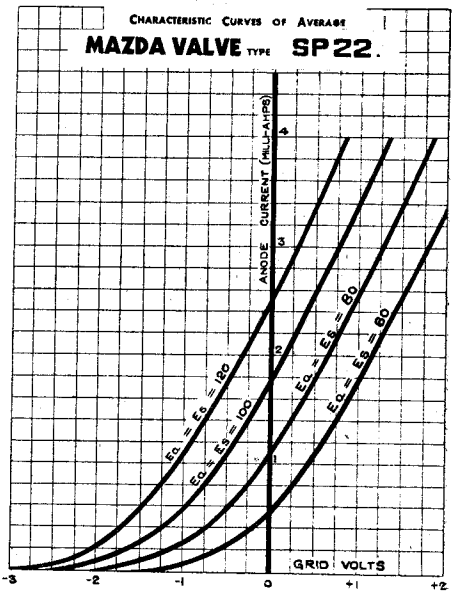
BASING.

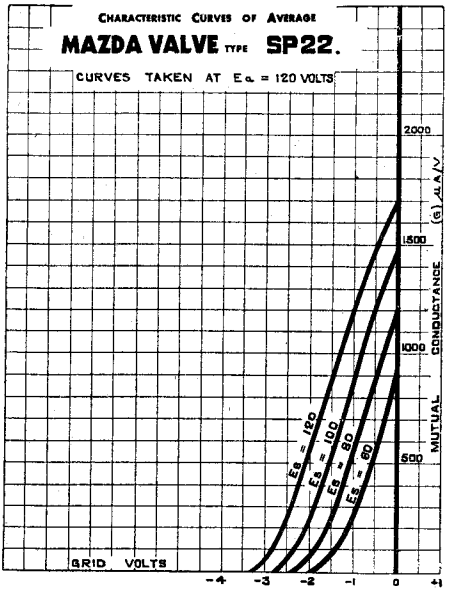
Pin No. 1. Filament.
2. Omitted.
3. Anode.
4. Screen Grid.
5. Suppressor Grid
6. Metal Coating.
7. Omitted.
8. Filament.

Top Cap—Control Grid.



Viewed from the free end of the base.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

SP.41

A.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	0·95
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	8·5

*Taken at Ea=200 ; Es=200 ; Eg=1·5.

TYPICAL OPERATION.

Anode Voltage	—	200	200	250
Screen Voltage	250†	200	200	250
Grid Voltage	1·0	1·8	1·5	2·1
Anode Current (mA)	22†	8·5	10·9	11·1
Screen Current (mA)	5·5†	2·1	2·7	2·8
Mutual Conductance (mA/V)	—	7·6	8·5	8·4
Input Capacity Working ($\mu\mu$F.)	—	15	15·25	15·25
(Change in Input Capacity poduced by biasing valve to cut-off ΔC) ($\mu\mu$F.)	—	4·0	4·25	4·25
Self Bias Resistance (ohms)	37	170	110	150
Input Loss at 45 Mc. (ohms)	—	2,500	2,200	2,300

† Maximum permissible rating as Video Output valve, anode volts must not exceed 200 volts. Grid cathode circuit resistance should not appreciably exceed 5,000 ohms.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	5·0 $\mu\mu$F.
*Grid to Earth	10·75 $\mu\mu$F.
Anode to Grid	0·003 $\mu\mu$F.

* "Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

GENERAL.

The SP.41 is a screened H.F. Pentode for use in A.C. mains in the H.F. and I.F. stages of a television receiver. It may also be used in the video output stage where the capacity across the output load is comparitively low. The bulb is of small dimensions and metallised. The valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

MAZDA

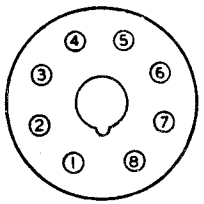
APPLICATION.

H.F. and I.F. Amplifiers.—Particular care has been taken in the design of the valve to reduce the input loss at high frequencies to a minimum, and the equivalent input resistance at 45 Mc. is shown in the tables on page 1. When designing circuits for use at very high frequency where the valve capacities form a large percentage of circuit capacity, difficulty is often experienced in obtaining control of amplification without adversely affecting response curves. This is largely on account of the change of the portion of capacity between grid and cathode due to space charge (designated $\triangle C$) caused by biasing back G1. In the SP.41 this change of capacity is about 4·25 $\mu\mu$F. when the valve is biased to cut-off or 3.25 for a reduction of amplification to 1/7th. This capacity change can be reduced from 3·25 to about $\pm$ 0·25 by biasing back the suppressor grid in addition to the control grid, and the circuit given at the end of the section shows how this may be accomplished. It will be seen that the bias applied to the control grid is about 1/17th of that applied to the suppressor grid. With this method of control the input loss also remains constant with variation of amplification.

Frequency Changers.—The SP.41 makes an exceptionally good frequency changer for television receivers when used in conjunction with a separate oscillator. It is recommended that the heterodyne voltage be injected in the grid circuit and the P.41 has been designed to fulfil the function of oscillator. A suitable circuit for the complete frequency changer employing these two valves is given at the end of the section, and conversion conductances up to the order of 3,000 μA. per volt may be obtained with this arrangement.

Video Output.—The suitability of the SP.41 for the output stage depends on the sensitivity of the cathode ray tube and the maximum permissible value of the anode load. In the case of the Mazda CRM.71, 91 and 121 cathode ray tubes, the SP.41 running at its maximum rating will deliver the required output with loads down to the order of 2,600 to 3,000 ohms. For larger outputs the SP.42 is recommended.

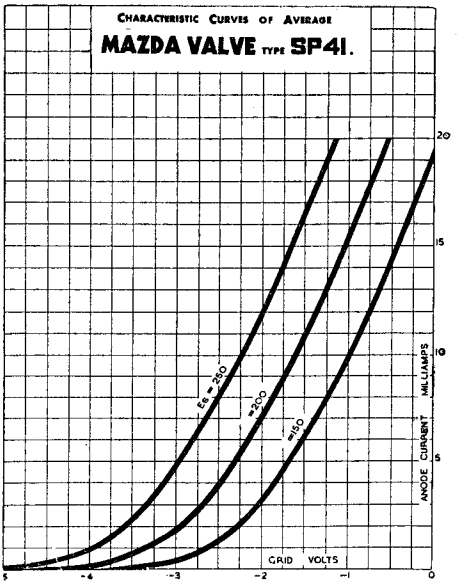
BASINGS.

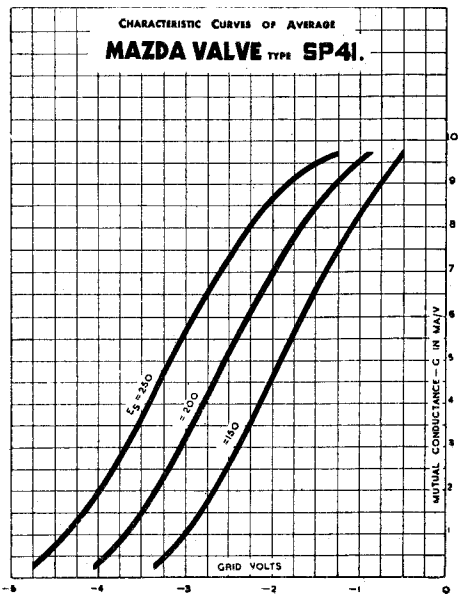


Viewed from the free end of the base.

Pin No. 1.	Heater.
2.	Cathode.
3.	Anode.
4.	Screen.
5.	Suppressor Grid.
6.	Metallising.
7.	Omitted.
8.	Heater.
Top Cap.	Control Grid.

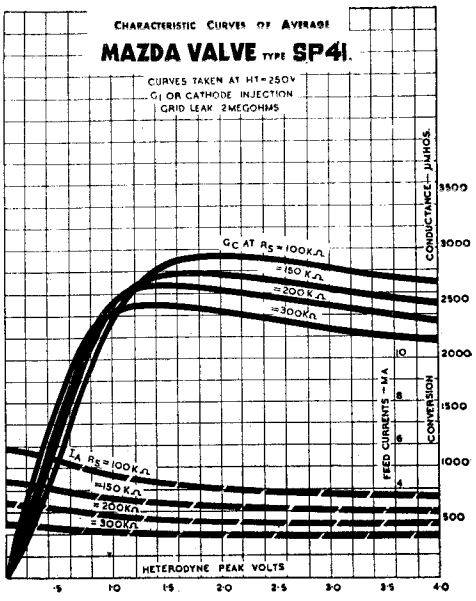
MAZDA





EDISWAN RADIO

MAZDA



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD, LONDON, W.C.2

MAZDA

SP.42

A.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	4·0
Heater Current (amps.)	0·95
Maximum Anode Voltage	200
Maximum Screen Voltage	200
*Mutual Conductance (mA/V)	9·0

*At Ea=200 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Screen Cathode Voltage (approx.)	140	115	95	100
Grid Bias Voltage	1·25	1·25	1·0	1·25
Quiescent Anode Current (mA)	27·0	20·0	16·0	16·0
Quiescent Screen Current (mA)	6·75	5·0	4·0	3·75
Bias and Feed-Back Resistance (ohms.)	37	50	50	67
Anode Load Resistance (ohms.)	1,850	2,600	4,000	4,000
Total Cathode Resistance (ohms)	37	50	1,000	2,000

INTER-ELECTRODE CAPACITIES.

†Anode to Earth	7·0$\mu\mu$F
†Grid to Earth	10·0$\mu\mu$F
Anode to Grid	0·004$\mu\mu$F

†"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

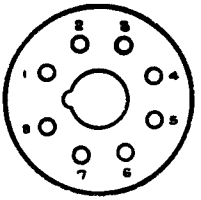
GENERAL.

The SP.42 is an A.C. Mains screened pentode for use in the video output stage in television receivers. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

When the valve is used with common D.C. restoring circuits it is recommended that a screen voltage of 115 should be used, the anode load being of the order of 3,000 ohms. When the synchronising separator is fed off a resistance in the cathode of the video output valve, and a D.C. connection is employed between the cathode ray tube shield and the anode of the video output valve, the screen should be connected directly to the 115 volt stabiliser. If in addition the time base supply is also obtained from this stabiliser, the synchronising becomes independent of mains voltage variations. Under these conditions an initial bias of 1 to 1¼ volts will be required for an anode load of the order of 4,000 ohms and a total cathode resistance of the order of 1,000 ohms. Under certain circuit conditions it is desirable to increase the amount of synchronising output available from the above arrangement, and this may be achieved by increasing the total cathode load resistance to 2,000 ohms, the extra screen voltage required being obtained by inserting a resistance in series with the stabiliser.

MAZDA

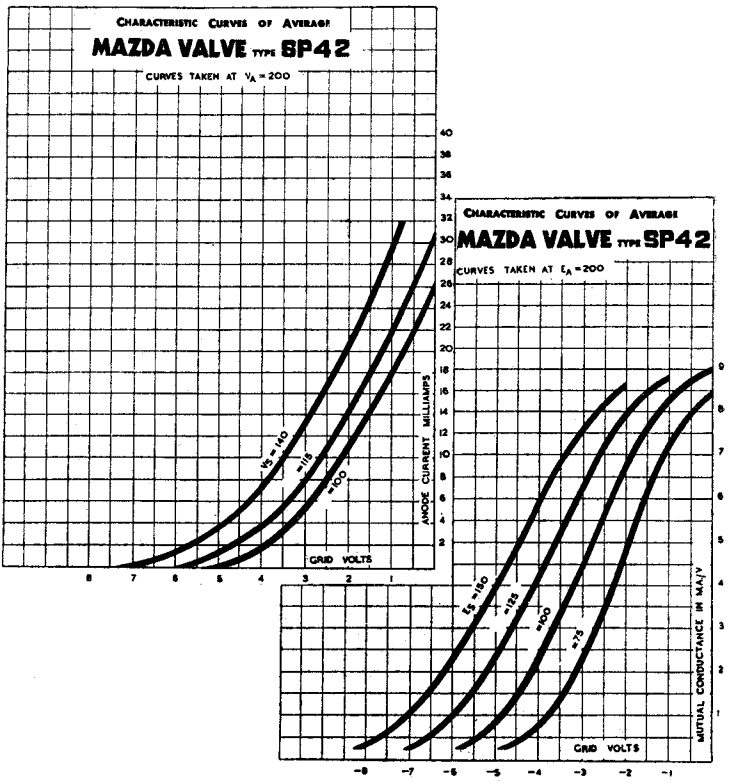


BASING.

Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Suppressor Grid.
6. Metallising.
7. Omitted.
8. Heater.

Top Cap. Control Grid.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

SP.61

A.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	6.3
Heater Current (Amps.)	0.6
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	8.5

*Taken at Va=200 ; Vs=200 ; Vg=1.5.

TYPICAL OPERATION.

Anode Voltage	—	200	200	250
Screen Voltage	250†	200	200	250
Grid Voltage	1.0	1.8	1.5	2.1
Anode Current (mA)	22†	8.5	10.9	11.1
Screen Current (mA)	5.5†	2.1	2.7	2.8
Mutual Conductance (mA/V)	—	7.6	8.5	8.4
Input Capacity Working ($\mu\mu$F.)	—	15	15.25	15.25
Change in Input Capacity produced by biasing valve to cut-off ΔC) ($\mu\mu$F.)	—	4.0	4.25	4.25
Self Bias Resistance (ohms)	37	170	110	150
Input Loss at 45 Mc. (ohms)	—	2,500	2,200	2,300

† Maximum permissible rating as Video Output valve, anode volts must not exceed 200 volts. Grid cathode circuit resistance should not appreciably exceed 5,000 ohms.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	5.0 $\mu\mu$F.
*Grid to Earth	10.75 $\mu\mu$F.
Anode to Grid	0.003 $\mu\mu$F.

* "Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

GENERAL.

The SP 61 is a screened H.F. Pentode for use in A.C. mains in the H.F. and I.F. stages of a television receiver. It may also be used in the video output stage where the capacity across the output load is comparitively low. The bulb is of small dimensions and metallised. The valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

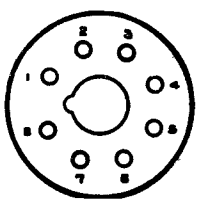
APPLICATION.

H.F. and I.F. Amplifiers.—Particular care has been taken in the design of the valve to reduce the input loss at high frequencies to a minimum, and the equivalent input resistance at 45 Mc. is shown in the tables on page 1. When designing circuits for use at very high frequency where the valve capacities form a large percentage of circuit capacity, difficulty is often experienced in obtaining control of amplification without adversely affecting response curves. This is largely on account of the change of the portion of capacity between grid and cathode due to space charge (designated ΔC) caused by biasing back G1. In the SP.61 this change of capacity is about 4.25 $\mu\mu$F. when the valve is biased to cut-off or 3.25 for a reduction of amplification to 1/7th. This capacity change can be reduced from 3.25 to about $\pm$0.25 by biasing back the suppressor grid in addition to the control grid, and the circuit given at the end of the section shows how this may be accomplished. It will be seen that the bias applied to the control grid is about 1/17th of that applied to the suppressor grid. With this method of control the input loss also remains constant with variation of amplification.

Frequency Changers.—The SP.61 makes an exceptionally good frequency changer for television receivers when used in conjunction with a separate oscillator. It is recommended that the heterodyne voltage be injected in the grid circuit and the P.61 has been designed to fulfil the function of oscillator. A suitable circuit for the complete frequency changer employing the SP.41 and P.41 (similar valves electrically) is given at the end of the section, and conversion conductances up to the order of 3,000 μA. per volt may be obtained with this arrangement.

Video Output.—The suitability of the SP.61 for the output stage depends on the sensitivity of the cathode ray tube and the maximum permissible value of the anode load. In the case of the Mazda CRM.71, 91 and 121 cathode ray tubes, the SP.61 running at its maximum rating will deliver the required output with loads down to the order of 2,600 to 3,000 ohms. For larger outputs the SP.62 is recommended.

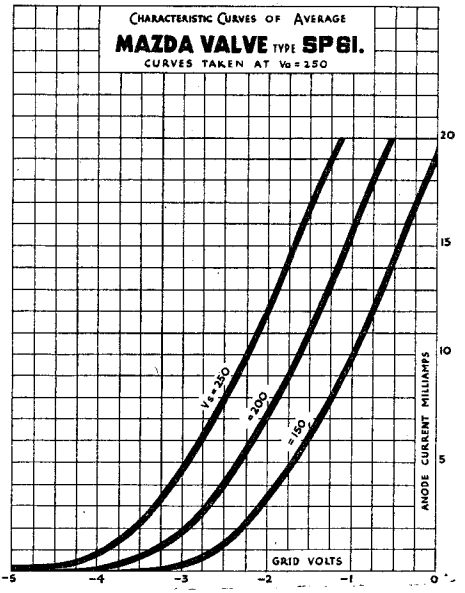
BASINGS.

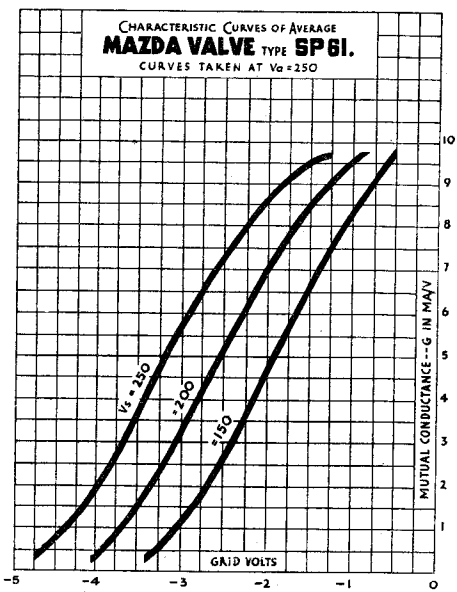


Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Suppressor Grid.
6. Metallising.
7. Omitted.
8. Heater.
Top Cap. Control Grid.

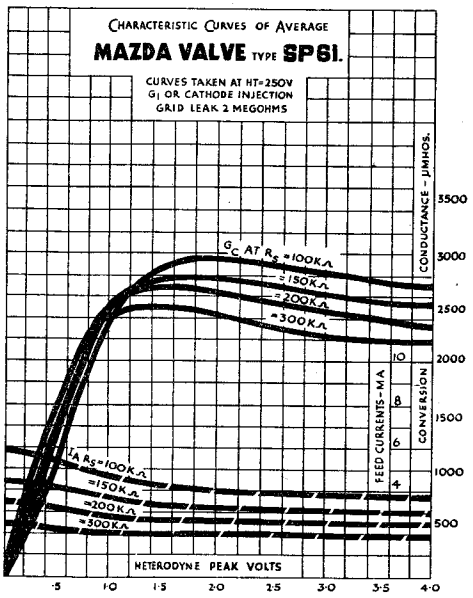
Viewed from the free end of the base.

MAZDA


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE SP61.
CURVES TAKEN AT Va = 250
Vs = 250
= 200
= 150
ANODE CURRENT MILLIAMPS
GRID VOLTS
20
15
10
5
0
-5
-4
-3
-2
-1


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE SP61.
CURVES TAKEN AT Va = 250
Vs = 250
= 200
= 150
MUTUAL CONDUCTANCE--G IN MA/V
GRID VOLTS
10
9
8
7
6
5
4
3
2
1
0
-5
-4
-3
-2
-1

MAZDA



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.,
155, CHARING CROSS ROAD, LONDON, W.C.2

MAZDA

SP. 62

A.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	6.3
Heater Current (amps)	0.6
Maximum Anode Voltage	200
Maximum Screen Voltage	200
*Mutual Conductance (mA/V)	9.0

*At Ea=200 ; Es=100 ; Eg=0.

TYPICAL OPERATION.

Screen Cathode Voltage (approx.) ...	140	115	95	100
Grid Bias Voltage	1.25	1.25	1.0	1.25
Quiescent Anode Current (mA)	27.0	20.0	16.0	16.0
Quiescent Screen Current (mA)	6.75	5.0	4.0	3.75
Bias and Feed-Back Resistance (ohms.) ...	37	50	50	67
Anode Load Resistance (ohms.)	1,850	2,600	4,000	4,000
Total Cathode Resistance (ohms)	37	50	1,000	2,000

INTER-ELECTRODE CAPACITIES.

†Anode to Earth	7.0$\mu\mu$F
†Grid to Earth	10.0$\mu\mu$F
Anode to Grid	0.004$\mu\mu$F

†"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

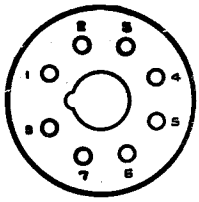
GENERAL.

The SP.62 is an A.C. Mains screened pentode for use in the video output stage in television receivers. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connexions to which are given overleaf.

APPLICATION.

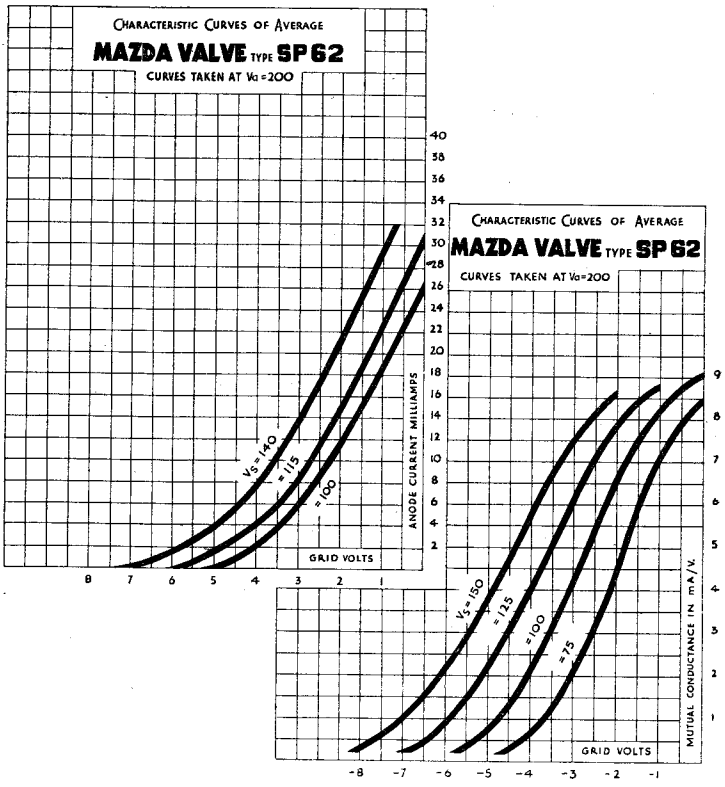
When the valve is used with common D.C. restoring circuits it is recommended that a screen voltage of 115 should be used, the anode load being of the order of 3,000 ohms. When the synchronising separator is fed off a resistance in the cathode of the video output valve, and a D.C. connection is employed between the cathode ray tube shield and the anode of the video output valve, the screen should be connected directly to the 115 volt stabiliser. If in addition the time base supply is also obtained from this stabiliser, the synchronising becomes independent of mains voltage variations. Under these conditions an initial bias of 1 to 1¼ volts will be required for an anode load of the order of 4,000 ohms and a total cathode resistance of the order of 1,000 ohms. Under certain circuit conditions it is desirable to increase the amount of synchronising output available from the above arrangement, and this may be achieved by increasing the total cathode load resistance to 2,000 ohms, the extra screen voltage required being obtained by inserting a resistance in series with the stabiliser.

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Suppressor Grid.
6. Metallising.
7. Omitted.
8. Heater.
Top Cap. Control Grid.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

Note : Valves dealt with in this supplement are designed for satisfactory operation from a 1.5 volt-cell without any additional resistance.

SP. 141

BATTERY (DRY CELL) H.F. PENTODE

RATING.

Filament Voltage	1.4
Filament Current (amp.)	0.05
Maximum Anode Voltage	90
Maximum Screen Voltage	90
*Mutual Conductance (mA/V)	0.9

*at Va=90 ; Vs=90 ; Vg=0.

OPERATING CONDITIONS.

Anode Voltage	83	90
Screen Voltage	83	90
Grid Bias	0	0
Mutual Conductance (mA/V)	0.75	0.8
Anode Current (mA)	1.55	1.5
Screen Current (mA)	0.5	0.6

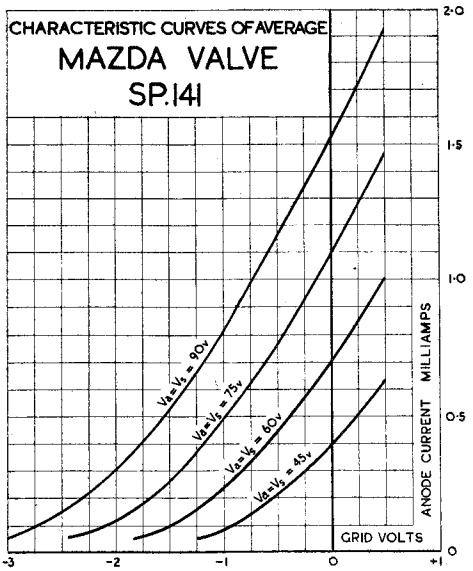
INTER-ELECTRODE CAPACITIES. ... ...

*Anode to Earth	10	$\mu\mu$F.
*Grid to Earth	7.5	$\mu\mu$F.
Anode to Grid	0.006	$\mu\mu$F.

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

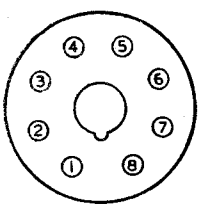
DIMENSIONS.

Maximum overall length	95 mm
Maximum diameter	32 mm



BASING.

Pin No. 1.	Filament—ve.
2.	Omitted.
3.	Anode.
4.	Screen Grid.
5.	—
6.	Metallising.
7.	Omitted.
8.	Filament+ve.
Top Cap.	Control Grid.



Viewed from the free end of the base.

EDISWAN RADIO

SP. 181

A.C./D.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	18.0
Heater Current (Amps.)	0.2
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	8.5

*Taken at Ea=200 ; Es=200 ; Eg 1.5.

TYPICAL OPERATION.

Anode Voltage	175	200	200
Screen Voltage	175	200	200
Grid Voltage	1.8	1.8	1.5
Anode Current (mA)	6.3	8.5	10.9
Screen Current (mA)	1.6	2.1	2.7
Mutual Conductance (mA/V)	6.6	7.6	8.5
Input Capacity Working ($\mu\mu$F.)	15.0	15	15.25
Change in Input Capacity produced by biasing valve to cut-off ΔC ($\mu\mu$F.)	3.75	3.75	4.0
Self Bias Resistance (ohms)	230	170	110
Input Loss at 45 Mc. (ohms)	2,510	2,400	2,150

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	5.0 $\mu\mu$F.
*Grid to Earth	10.75 $\mu\mu$F.
Anode to Grid	0.003 $\mu\mu$F.

* "Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

GENERAL.

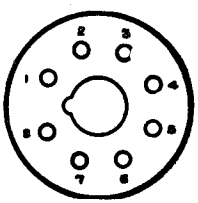
The SP.181 is a screened H.F. Pentode for use in the H.F. stages of Short Wave A.C./D.C. receivers. The bulb is of small dimensions and metallised. The valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

MAZDA

APPLICATION.

H.F. and I.F. Amplifiers.—Particular care has been taken in the design of the valve to reduce the input loss at high frequencies to a minimum, and the equivalent input resistance at 45 Mc. is shown in the tables on page 1. When designing circuits for use at very high frequency where the valve capacities form a large percentage of circuit capacity, difficulty is often experienced in obtaining control of amplification without adversely affecting response curves. This is largely on account of the change of the portion of capacity between grid and cathode due to space charge (designated ΔC) caused by biasing back G1. In the SP.181 this change of capacity is about 4 $\mu\mu$F. when the valve is biased to cut-off. This capacity change can be reduced by biasing back the suppressor grid in addition to the control grid, and the circuit given at the end of the section for the SP.41 shows how this may be accomplished. With this method of control the input loss also remains constant with variation of amplification.

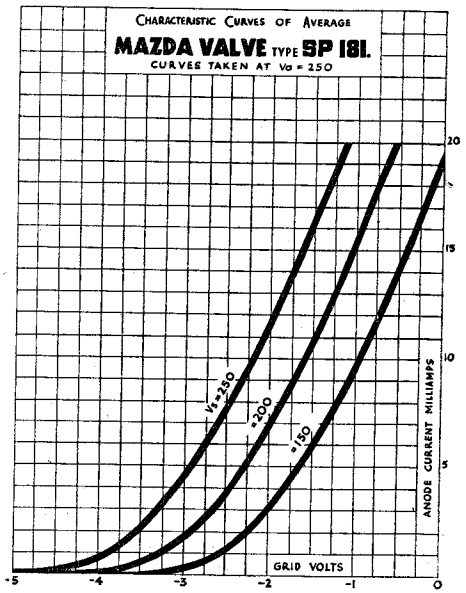
BASING

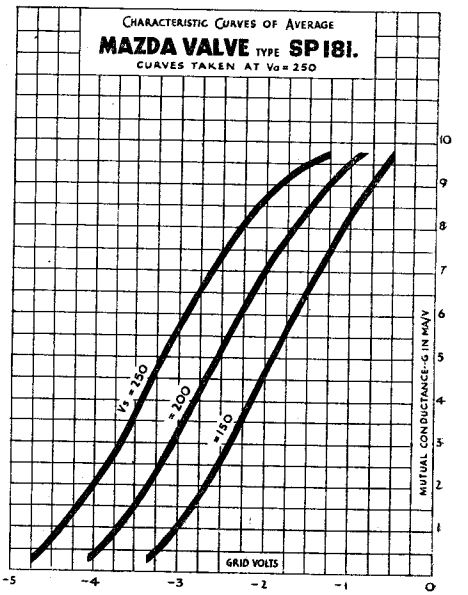


Viewed from the free end of the base.

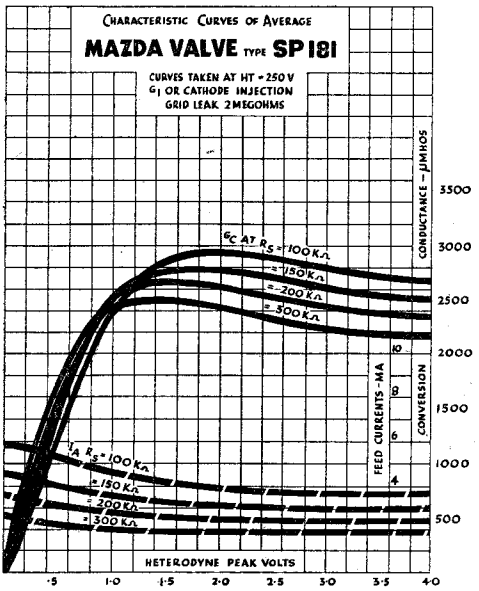
Pin No.	1.	Heater.
	2.	Cathode.
	3.	Anode.
	4.	Screen.
	5.	Suppressor Grid.
	6.	Metallising.
	7.	Omitted,
	8.	Heater.
Top Cap.		Control Grid.

MAZDA


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE SP 181.
CURVES TAKEN AT Va = 250
Vs=250
=200
=150
ANODE CURRENT MILLIAMPS
GRID VOLTS
20
15
10
5
0
-5
-4
-3
-2
-1


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE SP 181.
CURVES TAKEN AT Va = 250
Vs = 150
=200
=150
MUTUAL CONDUCTANCE-G IN MA/V
GRID VOLTS
10
9
8
7
6
5
4
3
2
1
0
-5
-4
-3
-2
-1

MAZDA



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MAZDA

SP.210

BATTERY SCREENED H.F. PENTODE

RATING.

Filament Voltage	2·0
Filament Current (amps.)	0·1
Maximum Anode Volts	150
Maximum Screen Volts	150
*Mutual Conductance (mA/V)	1·7

*Ea=120 ; Es=120 ; Eg=0.

OPERATING CONDITIONS.

Anode Voltage	120	120
Screen Voltage	60	120
Grid Bias	0	1
Anode Current (mA)	0·55	1·1
Screen Current (mA)	0·16	0·33
Mutual Conductance (mA/V)	0·9	1·2
Anode AC. Resistance (megohms)	4·0	2·0

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11·0 $\mu\mu$F
*Grid to Earth	10·0 $\mu\mu$F
Anode to Grid	0·005 $\mu\mu$F

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	39 mm.

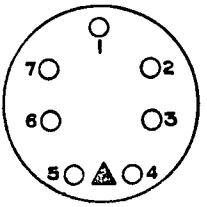
GENERAL.

The SP.210 is a screen grid H.F. Pentode for use in battery operated receivers. The bulb is metallised. The valve is fitted with a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

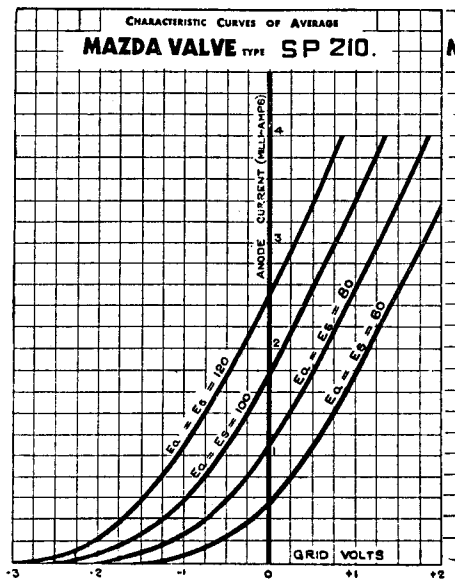
The valve is specially suitable for use as a cumulative grid or anode bend detector, or as an H.F. amplifier when a variable-mu characteristic is not desired. When used as the former, a screen voltage of 50-60 volts is recommended. This should be preferably obtained by means of a dropping resistance from the full H.T. supply, as this reduces detector overloading to a great extent. A grid leak of the order of 1 to 2 megohms with a condenser of about 0·00005 to ·0001 μF. should be connected in series with the control grid in order to provide self bias, and the grid return should be connected to L.T. positive. In battery superheterodyne receivers the discard point of the high tension battery occurs when the frequency changer stops oscillating, and the oscillator circuits must, therefore, be designed to operate with a high tension voltage equal to the desired discard point of the high tension battery. In practice this is generally taken to be approximately 60 per cent. of the initial voltage.

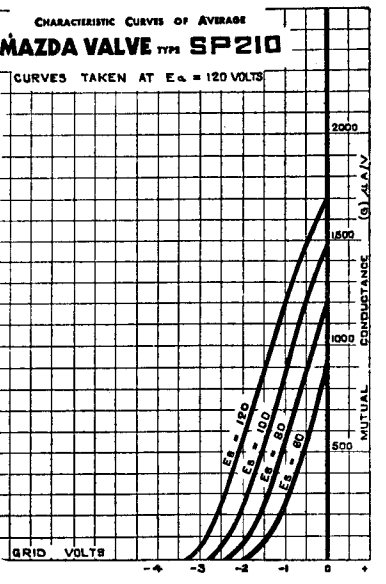
BASING.



Viewed from the free end of the base.

Pin No. 1. Metallising.
2. Control Grid.
3. Suppressor Grid.
4. Filament.
5. Filament.
6. —
7. Screen.
Top Cap Anode.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

SP.2220

A.C./D.C. MAINS H.F. PENTODE

RATINGS.	SP.2220
Heater Voltage	22
Heater Current (amps.)	0·2
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	2·7

*Ea=250 ; Es=200 ; Eg=0.

TYPICAL OPERATION.	Noise Suppression.	Automatic Tuning.
Screen Voltage	200	200
Grid Bias, G1	3·0	2·85
Grid Bias, G3	0—20	4·3
Mutual Conductance (G1)	2·65	1·45
Anode Current (mA)	4·9	2·9
Screen Current (mA)	4·1	6·2

INTER-ELECTRODE CAPACITIES (Cold).

*Grid to Earth	13·0 $\mu\mu$F.
*Anode to Earth	8·75 $\mu\mu$F.
Anode to Grid	0·0035 $\mu\mu$F.

* "Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	45 mm.

GENERAL.

The SP.2220 is a screened pentode for use in noise suppression and automatic tuning circuits. The performance of the valve is characterised by the fact that the gain available for an input on the control grid G1 can be reduced to zero by applying 15 volts negative to the grid G3. The valve is based in a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

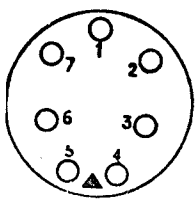
In noise suppression circuits the valve is used as an L.F. amplifier and the grid G3 is initially biased to approximately 15 to 20 volts negative. This can also be the delay voltage for the A.V.C. diode. The incoming carrier is then rectified in such a manner as to apply positive volts to the grid G3, so that when the carrier output on the last I.F. valve reaches the delay voltage the initial bias on Grid G3 is neutralised and the valve is working at its full amplification.

A resistance of between $\frac{1}{2}$ and 1 megohm should be included in series with the grid G3, in order to prevent it being driven positive, and this resistance together with a condenser between G3 and cathode may be utilised as the filter to remove audio-frequency components. An anode resistance of between 10,000 and 20,000 should be employed, and this will give working gains of the order of 20–40.

Both the initial biases of the grids G1 and G3 should be obtained by means of a tapped self-bias resistance in the cathode circuit.

When this valve is used in automatic tuning arrangements, the tuned circuit of the oscillator is included in the anode circuit of the valve, and a resistance of the order of 100,000 ohms, in series with a blocking condenser, is connected between the anode and grid G1, while a small condenser is connected between grid G1 and cathode ; in this manner a voltage in quadrature is applied to the control grid, and this gives an anode circuit admittance equivalent to a negative inductance across the oscillator tuning circuit. This admittance is directly proportional to the working slope of the grid G1. By initially biasing grid G3 in the middle of its operating characteristic it is possible to vary the frequency of the oscillator either up or down by applying either additional positive or negative volts from a frequency-discriminating circuit to grid G3. The initial biases on grid G1 and G3 should be obtained by the self-bias method, and the resistance in the grid G3 should not exceed $3\frac{1}{2}$ megohms.

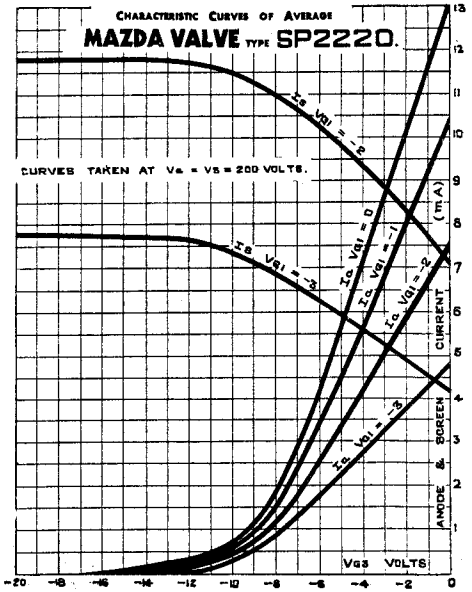
BASING.

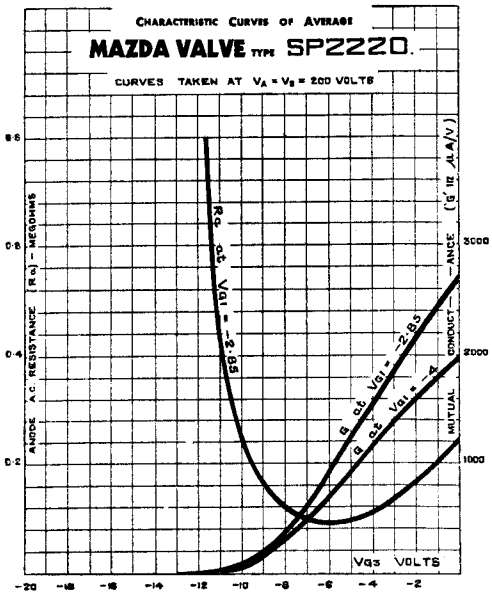


Viewed from the free end of the base.

Pin No. 1. Metallising.
2. Control Grid.
3. Suppressor Grid.
4. Heater.
5. Heater.
6. Cathode.
7. Anode.

MAZDA





EDISWAN RADIO

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

EDISWAN RADIO

MAZDA

S T 130

RÉGULATEUR DE TENSION AU NÉON

ST130

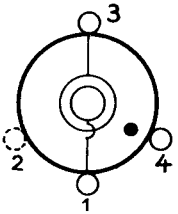
Hauteur maximum	126 mm
Diamètre maximum	50 mm
Encombrement	V.88-F.1
Culot	CL.146
Brochage	2.F-WA

Broches:
N° 1- Plaque intérieure

N° 2- Broche manque

Broches:
N° 3- Plaque extérieure

N° 4- Non connectée.



Broches du culot, face à l'observateur.

CARACTERISTIQUES DE FONCTIONNEMENT

Tension d'amorçage	140 Volts max.
Intensité moyenne	30 mA
Intensité maximum de pointe	50 mA
Variation maximum de la tension aux bornes du régulateur pour une variation de débit de 10 à 50 mA	10 Volts
Tension moyenne de régulation	130 Volts
Limites de la tension de régulation	120 à 140 Volts

Reproduction interdite

MAZDA

T.11

THYRATRON

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·2
Peak Anode Current (mA.)	300
Maximum Peak to Peak Volts Sweep Output	700
Peak Voltage between two electrodes	700
Gas Voltage Drop (approx.)	15
Control Ratio	20
Maximum Frequency when used in time base circuits	5 kC.

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	39 mm.

GENERAL.

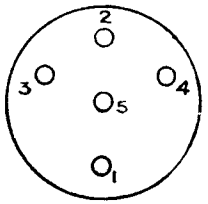
The T.11 is a three-electrode thyratron in which a trace of mercury vapour has been introduced. The ions produced by collision of the mercury vapour molecules with the electron emission from the cathode serve to neutralise the normal space charge. When ionisation is established the internal resistance of the thyratron is negligible and the current flowing in the anode circuit is limited only by external resistance. The ionisation potential of the gas is approximately 15 volts and the flow of current will be maintained as long as the anode potential exceeds this value. The function of the grid is to control the anode potential at which ionisation takes place. The " Control Ratio " of the thyratron is the amount by which anode potential for ionisation must be raised for each volt of bias applied to the grid. Once the ionisation has taken place variation of grid potential within wide limits will not affect it, and the anode potential must be reduced below the critical value in order to stop the discharge. The thyratron is fitted with a 5-pin base, the connexions to which are given overleaf.

APPLICATION.

The T.11 is suitable for use in time base circuits and may be used for all purposes replacing the Ediswan MR/AC.1. To prolong the life of the thyratron the cathode should be allowed to reach its full operating temperature before the application of the anode voltage. A resistance should be incorporated in the grid circuit to limit the flow of grid current when the thyratron strikes. When used as a grid controlled rectifier this grid resistance should not exceed 0·5 megohm in any case. In scanning circuits a minimum value of 500 ohms per volt is permissible.

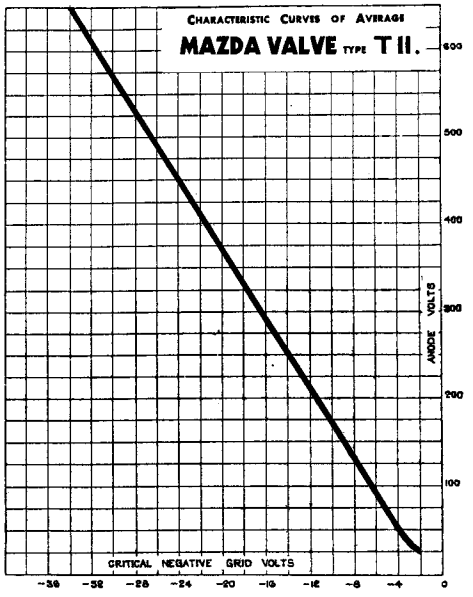
MAZDA

BASING.



Pin No. 1. —
2. Control Grid.
3. Heater.
4. Heater.
5. Cathode.
Top Cap. Anode.

Viewed from the free end of the base.



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MAZDA

T.21

THYRATRON

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·2
Peak Anode Current (mA.)	300
Max. Peak to Peak Volts Scan Output	120
Peak Voltage between two electrodes	17
Gas Voltage Drop (approx.)	20
Maximum Frequency when used in time base circuits	15 kC

DIMENSIONS.

Maximum Overall Length	128 mm.
Maximum Diameter	39 mm.

GENERAL.

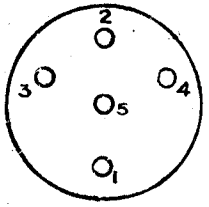
The T.21 is a three electrode thyratron in which a trace of gas has been introduced. The ions produced by collision of the gas molecules with the electron emission from the cathode serve to neutralise the normal space charge. When ionisation is established the internal resistance of the thyratron is negligible and the current flowing in the anode circuit is limited only by external resistance. The ionisation potential of the gas is approximately 17 volts and the flow of current will be maintained as long as the anode potential exceeds this value. The function of the grid is to control the anode potential at which ionisation takes place. The "Control Ratio" of the thyratron is amount by which anode potential for ionisation must be raised for each volt of bias applied to the grid. Once the ionisation has taken place variation of grid potential within wide limits will not affect it, and the anode potential must be reduced below the critical value in order to stop the discharge. The thyratron is fitted with a 5-pin base, the connexions to which are given overleaf.

APPLICATION.

Owing to its low voltage drop the T.21 is suitable for use in scanning circuits where the overall H.T. voltage is limited and it is recommended for use in circuits employing magnetic deflection. The T.21 is also suitable for use for grid controlled rectifier service. To prolong the life of the thyratron the cathode should be allowed to reach its full operating temperature before the application of the anode voltage. A resistance should be incorporated in the grid circuit to limit the flow of grid current when the thyratron strikes and a resistance should also be inserted in the anode circuit to limit the discharge current to 300 mA. peak. When used as a grid-controlled rectifier this grid resistance should not exceed 0·5 megohm in any case. In scanning circuits a minimum value of 500 ohms per volt is permissible.

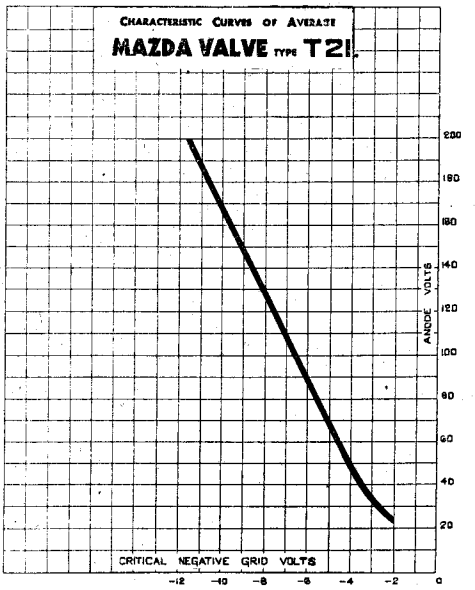
MAZDA

BASING.



Pin No. 1. —
2. Control Grid.
3. Heater.
4. Heater.
5. Cathode.
Top Cap. Anode.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

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T.31

THYRATRON

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·5
Peak Anode Current (mA.)	500
Maximum Peak to Peak Volts Scan Output	120
Peak Voltage between two electrodes	400
Gas Voltage Drop (approx.)	40
Control Ratio	20
Maximum Frequency when used in time base circuits	15 kC.

TYPICAL OPERATION.

Generated Peak to Peak Scan Voltage	20–30	60
Mean Anode Current (mA.)	2·5	1·5
Minimum Grid to Cathode Resistance at Scan Frequency (ohms/bias volt)	500	500
Recommended Grid-Cathode Resistance at Scan Frequency (ohms)	30,000 to 50,000	

DIMENSIONS.

Maximum Overall Length	128 mm.
Maximum Diameter	39 mm.

GENERAL.

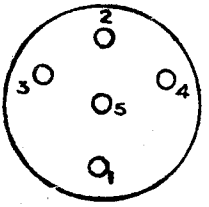
The T.31 is a three-electrode thyratron in which a trace of gas has been introduced. The ions produced by collision of the gas molecules with the electron emission from the cathode serve to neutralise the normal space charge. When ionisation is established the internal resistance of the thyratron is negligible and the current flowing in the anode circuit is limited only by external resistance. The ionisation potential of the gas is approximately 40 volts and the flow of current will be maintained as long as the anode potential exceeds this value. The function of the grid is to control the anode potential at which ionisation takes place. The "Control Ratio" of the thyratron is the amount by which anode potential for ionisation must be raised for each volt of bias applied to the grid. Once the ionisation has taken place variation of grid potential within wide limits will not affect it, and the anode potential must be reduced below the critical value in order to stop the discharge. The thyratron is fitted with a 5-pin base, the connexions to which are given overleaf.

APPLICATION.

The T.31 is suitable for use as a frame or line sweep voltage generator in television receivers with either electrostatic or magnetic deflection. To prolong the life of the thyratron the cathode should be allowed to reach its full operating temperature before the application of the anode voltage. A resistance should be incorporated in the grid circuit to limit the flow of grid current when the thyratron strikes. When used as a grid-controlled rectifier this grid resistance should not exceed 0·5 megohm in any case. In scanning circuits a minimum value of 500 ohms per volt is permissible.

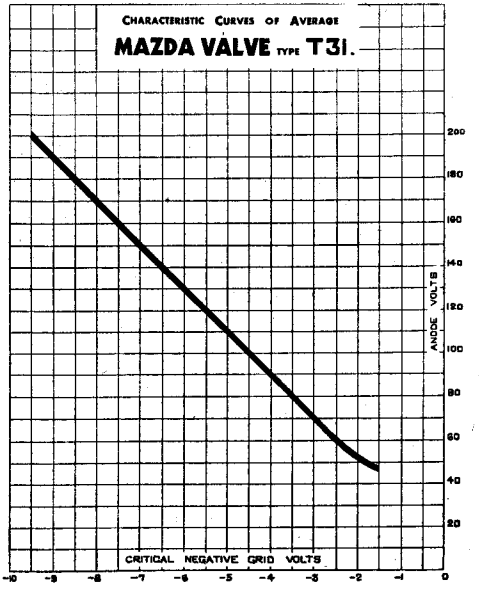
MAZDA

BASING.



Pin No. 1. —
2. Control Grid.
3. Heater.
4. Heater.
5. Cathode.
Top Cap. Anode.

Viewed from the free end of the base.



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MAZDA

T.41
THYRATRON

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·5
Maximum Anode Voltage	400
Control Ratio	20
Maximum Peak Anode Current (mA)	500
Voltage Drop (at 150 mA)	40
Maximum Peak-Peak Scan Output Voltage	120

OPERATING CONDITIONS.

Generated Peak-Peak Scan Voltage	20–30	> 60
Mean Anode Current (mA)	2·5	1·5
Minimum Grid-Cathode Resistance at Scan Frequency (ohms/bias volt)	500	500
Recommended Grid-Cathode Resistance at Scan Frequency (ohms)	30,000 to 100,000	

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	3·75 $\mu\mu$F
*Grid to Earth	4·5 $\mu\mu$F
Anode to Grid	2·0 $\mu\mu$F

*"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	90 mm.
Maximum Diameter	32 mm.

GENERAL.

The type T.41 thyratron is intended for use as a scanning generator in both the line and frame time bases of television receivers with magnetic deflecting systems. The bulb is metallised and fitted with a Mazda Octal Base, the connexions to which are given overleaf.

APPLICATION.

Owing to the construction of the T.41 it is not recommended that it be used in circuits having a high overall H.T. voltage. The anode-cathode voltage should not be allowed to exceed 400 in order to prevent the possibility of cold discharge in the valve.

The peak discharge current should be limited to 500 mA by inserting a resistance of suitable value in the anode circuit. For satisfactory operation the mean anode current through the valve should be adjusted to the average values given above under "Operating Conditions."

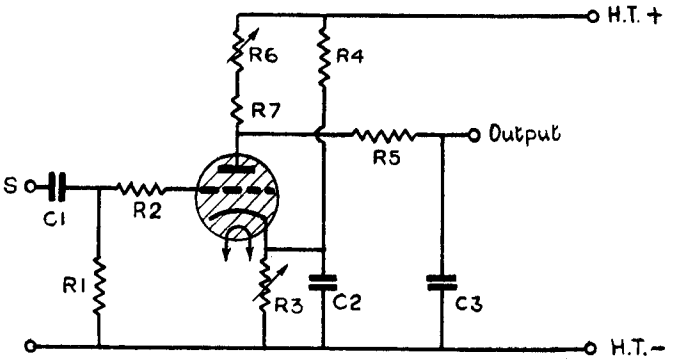


Figure A.

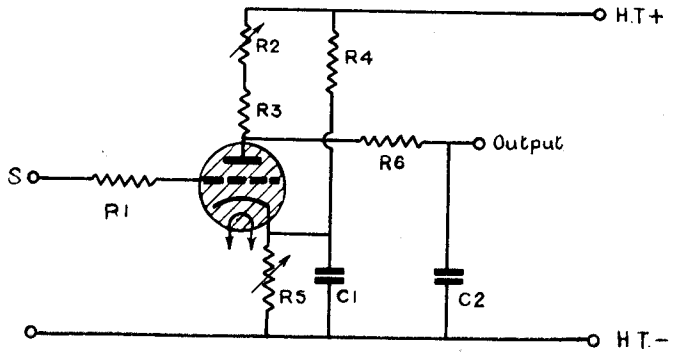


Figure B.

TYPICAL CIRCUIT CONSTANTS.

Figure A.

H.T. Voltage 330

Line,				Frame.			
R1.	50,000 ohms.	C1.	50 $\mu\mu$F	R1.	50,000 ohms.	C1.	0.1 μF
R2.	5,000 ohms.	C2.	1 μF	R2.	30,000 to 50,000	C2.	50 μF
R3.	1,500 ohms.	C3.	0.007 μF	R3.	3,000 ohms.	C3.	0.5 μF
R4.	130,000 ohms.			R4.	130,000 ohms.		
R5.	100 ohms.			R5.	300 ohms.		
R6.	50,000 ohms.			R6.	100,000 ohms.		
R7.	70,000 ohms.			R7.	100,000 ohms.		

Figure B.

H.T. Voltage 330

R1. 30,000 to 50,000 ohms. All other values as in Figure A.

APPLICATION (contd.)

The circuits on the opposite page show the use of the thyratron as a scanning generator, the output being fed to an amplifier of the beam pentode type (Mazda Pen. 46, Sheet 18/5).

In order to protect the cathode, the minimum grid-cathode resistance at the scanning frequency should not be less than 500 ohms per volt of grid bias, but it is recommended that this resistance should be of the order of 30,000-100,000 ohms. Such a high resistance should not be in series with the grid as it would tend to bend the line synchronising pulse and render the synchronising less accurate.

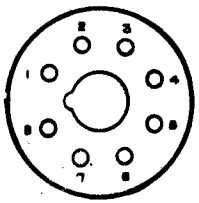
In order that the above conditions may be satisfied without appreciably affecting the sharpness of the synchronising pulse the circuit shown at (a) may be used. The resistance in series with the grid is limited to 5,000 ohms which will not affect the sharpness of the pulse, the high resistance being provided by R.1. The effect of a low resistance in a preceding circuit is isolated by the use of a low capacity condenser for C1.

In the case of frame time bases whose synchronising pulse is provided from an " integrator " type of separator, the high resistance can be connected directly in the grid circuit without appreciably affecting the shape of the pulse, so that R2. in Figure A may be increased.

This circuit cannot be used where the synchronising pulse is obtained directly from the signal diode load or from the cathode of the video frequency amplifier and the high resistance must be connected directly in series with the grid of the T.41 as in diagram (b) at the expense of the sharpness of the pulse.

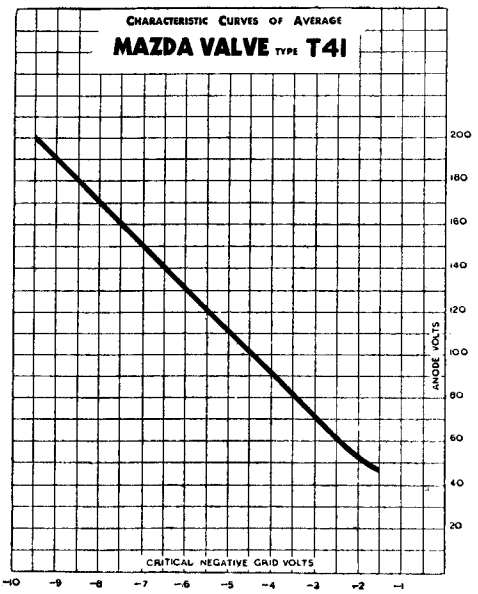
MAZDA

BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. —
5. Control Grid.
6. Metallising.
7. Omitted.
8. Heater.

Viewed from the free end of the pins.



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MAZDA

TH 41

A.C. MAINS TRIODE HEPTODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·3
Heptode.	
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	3·1
*Taken at Ea=250 ; Es=100 ; Eg1=2 ; Eg=0.	
Triode.	
Maximum Anode Voltage	150
Maximum Peak Anode Current (mA)	15
*Amplification Factor	16
*Mutual Conductance (mA/V)	5·3
*Taken at Ea=100 ; Eg.=0	

TYPICAL OPERATION.

Heptode.		
Anode Voltage	250	250
Screen Voltage	100	100
Grid Bias	—3	—2·5
Anode Current (mA)	3·0	3·8
Screen Current (mA)	6·0	7·5
Conversion Conductance (μA/V)	750	870
Anode A.C. Resistance (megohms)	1·6	1·2
Heterodyne Volts (peak)	9·0	9·0
Working G1-E Capacity (Hot) ($\mu\mu$F.)	12·2	
*Maximum Input Signal Handling Capacity (Eg=—43 ; Es=250) (Peak Carrier Volts)		10
*Conversion Conductance (Eg—43 ; Es=250) (μA/V) (approx.)		3

*For 5 per cent. Total Audio Harmonic Distortion at 60 per cent. modulation.

Triode.	
Anode Voltage	80
Anode Current (mA)	4 to 5

INTER-ELECTRODE CAPACITIES.

Heptode.	
*Anode to Earth	11·25 $\mu\mu$F.
*Grid to Earth	9·25 $\mu\mu$F.
Anode to Grid	0·0005 $\mu\mu$F.
Triode.	
*Anode to Earth (less G0 to A0)	3·5 $\mu\mu$F.
*Grid to Earth (less G0 to A0)	10·5 $\mu\mu$F.
Anode to Grid	2·4 $\mu\mu$F.

*" Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum Overall Length	108 mm.
Maximum Diameter	32 mm.

MAZDA

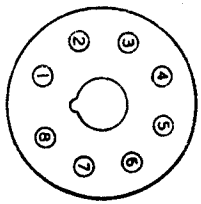
GENERAL.

The TH.41 is a triode heptode frequency changer for use in A.C. mains receivers. It has been specially designed to meet the requirements of all-wave receivers, and the inter-reaction between the input and the oscillator circuit has been reduced to a minimum. A high conversion conductance is provided with a large initial grid bias, thus ensuring that no grid current is taken on the short wave bands. The characteristics have been so designed as to provide large signal handling capacity with low cross modulation and low harmonic response. The valve is of small dimensions and is fitted with a Mazda Octal base, the connexions to which are given below.

APPLICATION.

The triode oscillator should be used with a parafeed tuned anode circuit and the component values required are given in the circuit shown. If any trouble is experienced with "squegging" at the highest frequency the grid leak resistance may be reduced to 25,000 ohms. On the short wave bands the mean anode current of the triode would be of the order of 4 to 4·5 milliamps, while on the medium and long waves the current taken by the triode will be of the order of 3 to 3·5 milliamps. An average heterodyne voltage of 9 to 10 volts peak is required at the grid of the triode. The value of the grid resistance R3 will depend very largely on the design of the coils and the effect of stray capacities across the grid of the triode. On the short wave band this resistance is usually of the order of 50 to 60 ohms. The peak anode current of the triode should never be allowed to exceed 15 mA. If parasitic oscillations are generated, these may be stopped by connecting a small resistance (R6) of 2·5 to 5 ohms close to the screen pin.

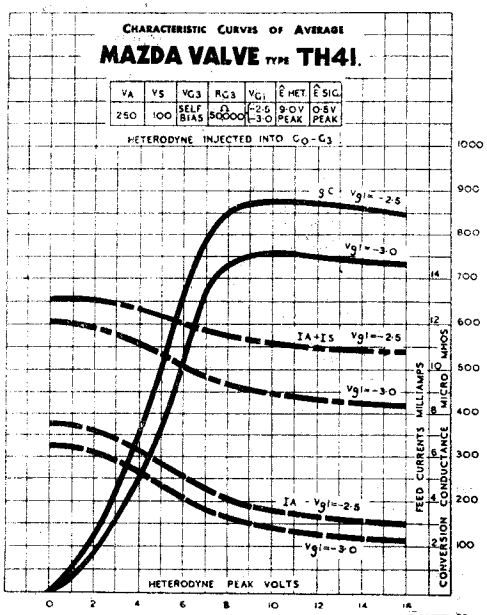
BASING.

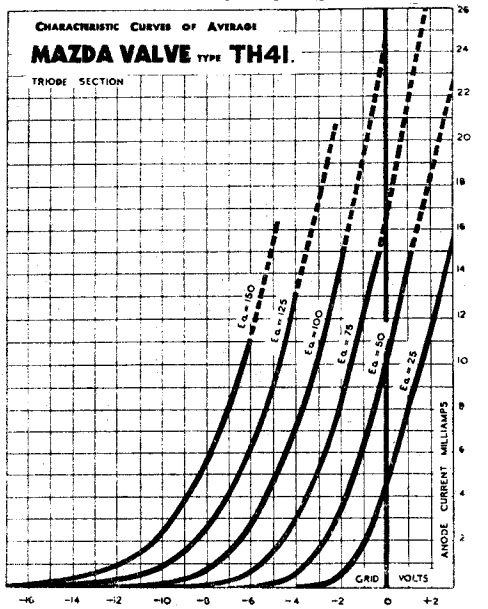


Viewed from the free end of the base.

Pin No.	1.	Heater.
	2.	Cathode.
	3.	Heptode Anode.
	4.	Oscillator Anode.
	5.	Oscillator Grid.
	6.	Metallising.
	7.	Heptode Screen.
	8.	Heater.
Top Cap.		Heptode Control Grid.

MAZDA

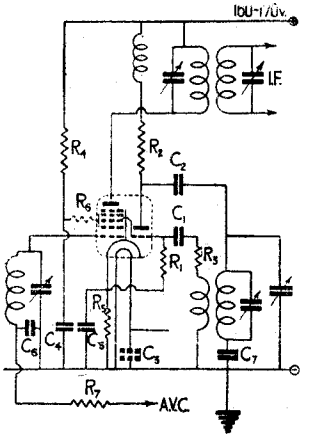




EDISWAN RADIO

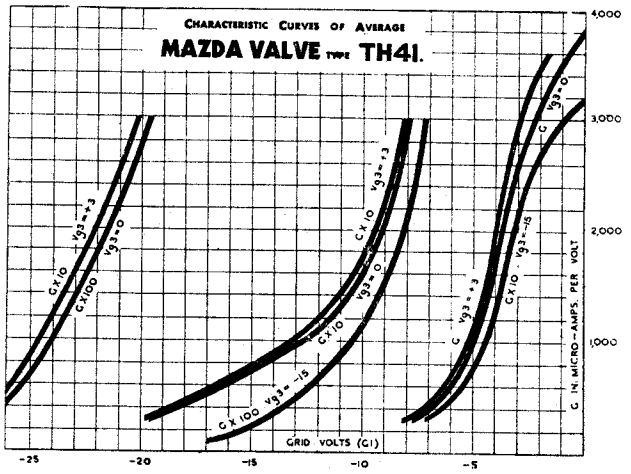
MAZDA

SUGGESTED CIRCUIT DIAGRAM USING TH41



Values of the components in the circuit diagram :—

R.1.	50,000 ohms.	C.1.	·0001 mfd.
R.2.	40,000 ohms.	C.2.	·0001 mfd.
R.3.	See above.	C.3.	·01 mfd.
R.4.	25,000 ohms.	C.4.	0·1—0·5 mfd.
R.5.	230—160 ohms.	C.5.	0·1—0·5 mfd.
R.6.	2·5—5 ohms (see above).		



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MAZDA

TH. 2320

A.C./D.C. MAINS TRIODE HEPTODE

RATING.

Heater Voltage	23.0
Heater Current (Amps.)	0.2

Heptode.

Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	3.0

*Taken at Ea=150; Es=100; EG=-2; EGO=0.

Triode.

Maximum Anode Voltage	150
*Mutual Conductance (mA/V)	5.3
*Amplification Factor	16
Maximum Peak Anode Current (mA)	15

*Taken at Ea=100; Eg=0.

TYPICAL OPERATION.

Screen Voltage (initial)	100
Grid Bias	3
Anode Current (mA)	3
Screen Current (mA)	6
Conversion Conductance (μA/V)	750
Heterodyne Volts Peak	9

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11.5 $\mu\mu$F.
*Grid to Earth	9.5 $\mu\mu$F.
Anode to Grid	0.0015 $\mu\mu$F.
*Anode 0 to Earth (less G0 to A0)	4.0 $\mu\mu$F.
*Grid 0 to Earth (less G0 to A0)	10.25 $\mu\mu$F.
Anode 0 to Grid 0	2.25 $\mu\mu$F.

*"Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum Overall Length	128 mm
Maximum Diameter	39 mm.

GENERAL.

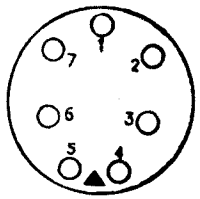
The TH 2320 is a triode heptode frequency changer for use in AC/DC receivers. It has been specially designed to meet the requirements of all wave receivers, and the inter-reaction between the input and oscillator circuits has been reduced to a minimum. A high conversion conductance is provided with a large initial grid bias, thus ensuring that no grid current is taken on the short wave bands. The characteristics have been so designed as to provide large signal handling capacity with low cross modulation, and low harmonic response. The valve is fitted with a standard 7 pin base, the connexions to which are given overleaf.

APPLICATION.

For notes on the above, reference should be made to valve type AC/TH1.

The characteristics of the TH2320 are identical with those of the AC/TH1, and any reference should be made to the curves under this heading.

BASING.



Pin No.	1.	Oscillator Anode.
	2.	Oscillator Grid.
	3.	Heptode Screen.
	4.	Heater.
	5.	Heater.
	6.	Cathode & Metallising.
	7.	Heptode Anode.
Top Cap.		Heptode Grid.

Viewed from the free end of the base.

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MAZDA

TH 2321 and TH 233

AC/DC MAINS TRIODE HEPTODES

RATING (Both Types).

Heater Voltage	23·0
Heater Current (Amps.)	0·2
Heptode.	
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	3·0
*Taken at Ea=150 ; Es=100 ; Eg=−2 ; Eg=0.	
Triode.	
Maximum Anode Voltage	150
Maximum Peak Anode Current (mA)	15
*Amplification Factor	16
*Mutual Conductance (mA/V)	5·3
*Taken at Ea=100 ; Eg=0.	

TYPICAL OPERATION.

Heptode.		
Anode Voltage	175	175
Screen Voltage (Initial)	100	100
Grid Bias	3	2·5
Anode Current (mA)	2·6	3·1
Screen Current (mA)	5·6	6·9
Conversion Conductance (μA/V)	640	770
Anode A.C. Resistance (megohms)	1·3	1·0
Heterodyne Volts Peak	8·0	8·0
*Maximum Input signal handling capacity (Eg=34 ; Es=175)		9
*Conversion Conductance (Eg=−34 ; Es=175 (μA/V) (approx.))		9

*For 5 per cent. Total Audio Harmonic Distortion at 60 per cent. Modulation.

Triode.	
Anode Voltage	80
Anode Current (mA)	4 to 5

INTERNAL-ELECTRODE CAPACITIES.

	TH 2321	TH 233	
Heptode.			
*Anode to Earth	11·5	11·25	$\mu\mu$F.
*Grid to Earth	9·5	9·25	$\mu\mu$F.
Anode to Grid	0·0015	0·0005	$\mu\mu$F.
Triode.			
*Anode to Earth (less G0 to A0)	4·0	3·5	$\mu\mu$F.
*Grid to Earth (less G0 to A0)	10·25	10·5	$\mu\mu$F.
Anode to Grid	2·25	2·4	$\mu\mu$F.

*" Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

DIMENSIONS.

Maximum Overall Length	127 mm.	108 mm.
Maximum Diameter	39 mm.	32 mm.

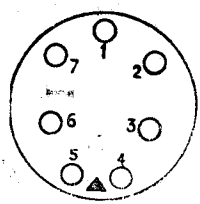
MAZDA

GENERAL.

The TH.2321 and TH.233 are triode heptode frequency changers for use in A.C./D.C. mains receivers. They have been specially designed to meet the requirements of all wave receivers, and the inter-reaction between the input and oscillator circuits have been reduced to a minimum. A high conversion conductance is provided with a large initial grid bias, thus ensuring that no grid current is taken on the short wave bands. The characteristics, which are identical for both types, have been so designed as to provide large signal handling capacity with low cross modulation and low harmonic response. The TH.2321 is fitted with a standard 7-pin base, while the TH.233 is of small dimensions and fitted with the Mazda Octal base. The connexions are given below.

APPLICATION.

In each case the triode oscillator should be used with a parafeed tuned anode circuit and the component values required are given in the circuit shown. If any trouble is experienced with "squegging" at the highest frequency the grid leak resistance may be reduced to 25,000 ohms. On the short wave bands the mean anode current of the triode would be of the order of 4 to 4·5 mA, while on the medium and long waves the current taken by the triode will be of the order of 3 to 3·5 mA. An average heterodyne voltage of 8 to 10 volts peak is required at the grid of the triode. The value of the series grid resistance R.3 will depend very largely on the design of the coils and the effect of stray capacities across the grid of the triode. On the short wave band this resistance is usually of the order of 50 or 60 ohms. It may be necessary to insert a wave wound coil between the H.T. supply and the parafeed resistance R.2 in order to remove the damping effect of this resistance on the long and medium wave oscillator circuits. The peak anode current of the triode should never be allowed to exceed 15 mA. If parasitic oscillations are generated, these may be stopped by connecting a resistance (R.6) of 2·5 to 5 ohms close to the screen pin. The heater is designed to operate at 0·2 ampere and the resistance placed in series with the heaters should be such that the heater current has this value at average line voltage.

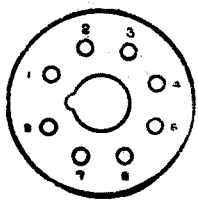


Viewed from the free end of the base.

BASING.

TH.2321.

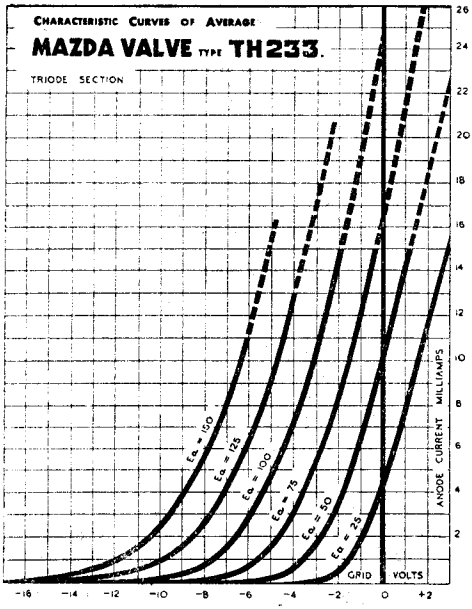
Pin No. 1.	Oscillator Anode.
2.	Oscillator Grid.
3.	Heptode Screen.
4.	Heater.
5.	Heater.
6.	Cathode and Metallising.
7.	Heptode Anode.
Top Cap.	Heptode Control Grid.

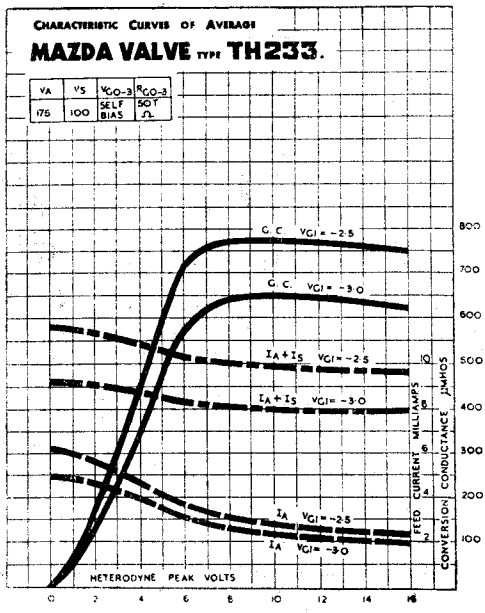


TH.233.

Pin No. 1.	Heater.
2.	Cathode.
3.	Heptode Anode.
4.	Oscillator Anode.
5.	Oscillator Grid.
6.	Metallising.
7.	Heptode Screen.
8.	Heater.
Top Cap	Heptode Control Grid.

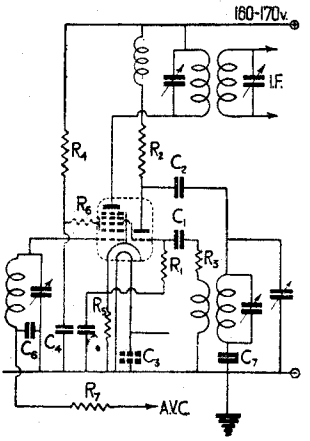
MAZDA


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE TH233.
TRIODE SECTION
Ea = 150
Ea = 125
Ea = 100
Ea = 75
Ea = 50
Ea = 25
GRID VOLTS
ANODE CURRENT MILLIAMPS
26
24
22
20
18
16
14
12
10
8
6
4
2
-16
-14
-12
-10
-8
-6
-4
-2
0
+2


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE TH233.
VA | VS | VCO-3 | RCO-3
175 | 100 | SELF BIAS | 507 Ω
C. C. VG1 = -2.5
C. C. VG1 = -3.0
IA + IS VG1 = -2.5
IA + IS VG1 = -3.0
IA VG1 = -2.5
IA VG1 = -3.0
FEED CURRENT MILLIAMPS
CONVERSION CONDUCTANCE μMHOS
HETERODYNE PEAK VOLTS
800
700
600
500
400
300
200
100
10
8
6
4
2
0
2
4
6
8
10
12
14
16

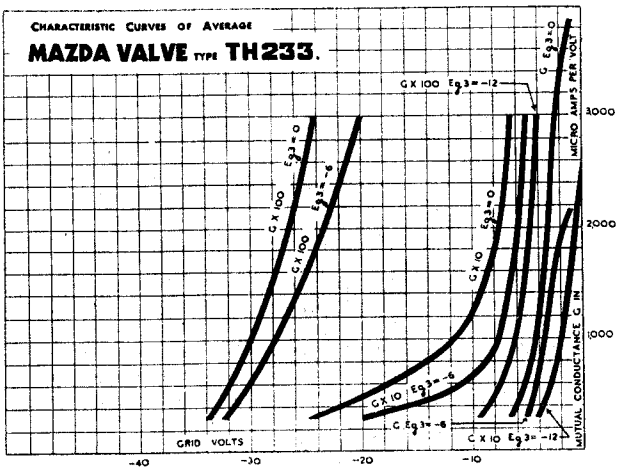
MAZDA

SUGGESTED CIRCUIT DIAGRAM USING TH 2321 and TH 2 33



Values of the components in the circuit diagram :—

R1.	50,000 ohms.	C1.	.0001mfd.
R2.	15,000 to 20,000 ohms.	C2.	.0001mfd.
R3.	See above.	C3.	0.01mfd.
R4.	11,500 to 9,500 ohms.	C4,	0.1—0.5mfd
R5.	250 to 180 ohms.	C5.	0.1—0.5mfd.
R6.	2.5 to 5 ohms (see above).		



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

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MAZDA

TP.22

BATTERY TRIODE PENTODE

RATING.

Filament Voltage	2·0
Filament Current (amps.)	0·25
Pentode Section.	
Maximum Anode Voltage	150
Maximum Screen Voltage	150
*Mutual Conductance (mA/V)	1·3
*At Ea=120 ; Es=60 ; Eg=0.	
Triode Section.	
Maximum Anode Voltage	150
Amplification Factor	34
*Mutual Conductance (mA/V)	1·4
*At Ea=100 ; Eg=0.	

OPERATING CONDITIONS.

(As frequency changer with cathode injection).

Anode Voltage	150	120
Screen Voltage	60	60
Heterodyne Volts	3	3
Anode Current (mA)	1·2	1·15
Screen Current (mA)	0·4	0·4
Oscillator Anode Current	0·8	0·8
Total H.T. Current	2·4	2·35
Conversion Conductance	500	450
Anode A.C. Resistance (meg.)	1·6	0·9
Conversion Conductance	10*	10†
**Signal Handling Capacity (Peak Carrier Volts)	4·2	3·2
At Bias Volts	19·5	15·5

*At Eg—16·5 ; Es=150.
†At Eg—13·0 ; Es=120.
** For 5 per cent. Total Harmonic Distortion.

INTER-ELECTRODE CAPACITIES.

Pentode Section.	
*Anode to Earth	10·0 $\mu\mu$F.
*Grid to Earth	9·25 $\mu\mu$F.
Anode to Grid	0·03 $\mu\mu$F.
†Grid to Filament	1·5 $\mu\mu$F.
†Grid to Filament and Screen	6·5 $\mu\mu$F.
Grid to Screen	5·0 $\mu\mu$F.
Grid to Suppressor	0·75 $\mu\mu$F.
Triode Section.	
*Anode to Earth (less G. to A.)	6·5 $\mu\mu$F.
*Grid to Earth (less G. to A.)	4·5 $\mu\mu$F.
Anode to Grid	4·5 $\mu\mu$F.

* " Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, and metallising joined to filament.
† Not including metallising.

DIMENSIONS.

Maximum Overall Length	126 mm.
Maximum Diameter	45 mm.

MAZDA

GENERAL.

The TP.22 is a triode pentode valve designed to operate as a self-oscillating frequency changer in battery operated super heterodyne receivers. The pentode section has variable-mu characteristics and is independent of the triode section. The oscillator is thus unaffected by a change in the operating conditions of the pentode. Special features of this valve are low H.T. consumption with high conversion efficiency, decreasing H.T. consumption when receiving powerful signals, and large signal handling capacity. The valve is based in a standard 9-pin base, the connections to which are given below.

APPLICATION.

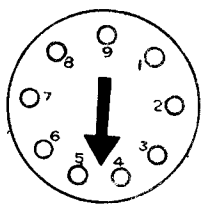
The Mazda TP.22 has variable-mu characteristics suitable for use with delayed diode automatic volume control. It is recommended that frequency changing should be accomplished by heterodyne injection in the filament leads as shown in Fig. 1, but injection in the suppressor grid may be used at the cost of slightly higher anode current and lower conversion gain. It is important that the coils in the filament leads should have a resistance of not more than two-thirds ohm.

It is recommended that the screen voltage should be obtained through a series dropping resistance from the H.T. battery as this allows the screen voltage to rise when the frequency changer is operating at low gain and provide large signal handling capacity. The value of this resistance may be calculated by assuming the screen current to be 25 per cent. of the anode current. If the maximum signal handling capacity is not required the screen should be connected through a series resistance to a lower tap on the H.T. battery. A decoupling condenser should be connected from screen to filament negative and the anode voltage of the pentode section must be supplied through a decoupling resistance and condenser, the condenser being connected to filament negative. A resistance of 5,000 ohms is suitable.

The triode anode should be supplied from the full H.T. voltage through a voltage dropping resistance and it should be self-biased by a grid leak and condenser. A grid leak of 100,000 ohms to 150,000 ohms, and condenser of ·0005 μF. will be found satisfactory. The grid return lead should be connected to L.T. positive. Excessive values of heterodyne voltage should be avoided and a value of from 3 to 3·5 volts peak is recommended. The minimum heterodyne voltage over the wave ranges should not be less than 2·75 volts peak. A series grid resistance of 500 to 1,000 ohms should be connected in the grid circuit adjacent to the grid of the oscillator valve ; this will assist in keeping the heterodyne voltage more constant over the wave band, and will also help to reduce oscillator harmonics.

Cathode injection should not be used for higher signal frequencies than about 2Mc/second. For this purpose the TP.23 or TP.25 should be employed.

BASING.

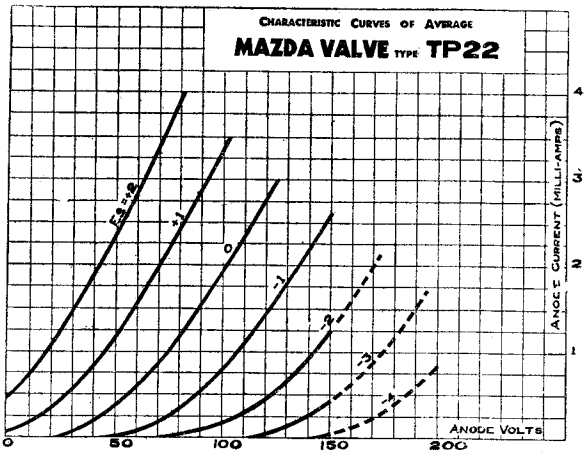


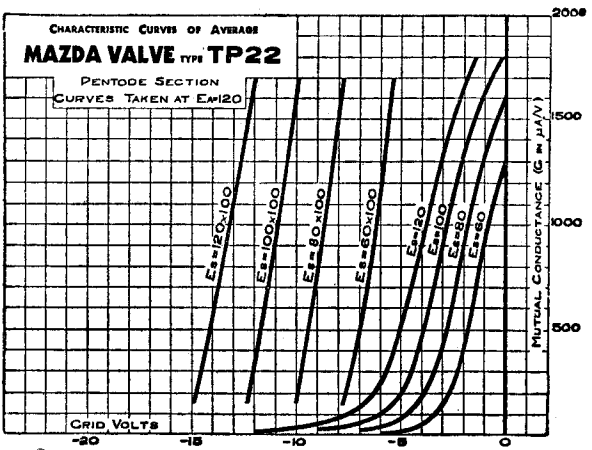
Viewed from the free end of the base.

Pin No. 1. Screen.
2. Pentode Anode.
3. Suppressor Grid.
4. Filament.
5. Filament.
6. ——
7. Oscillator Anode.
8. Oscillator Grid.
9. Metallising.

Top Cap. Pentode Control Grid.

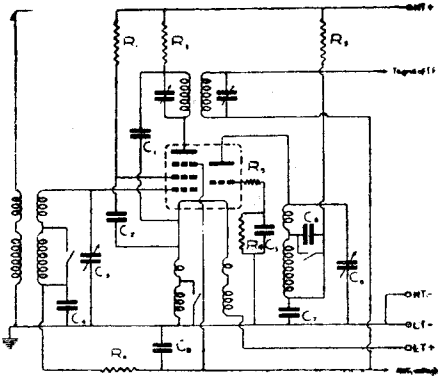
MAZDA


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE TP22
Eg=+2
+1
0
-1
-2
-3
-4
ANODE CURRENT (MILLI-AMPS.)
4
3
2
1
0
50
100
150
200
ANODE VOLTS


CHARACTERISTIC CURVES OF AVERAGE
MAZDA VALVE TYPE TP22
PENTODE SECTION
CURVES TAKEN AT Ea=120
Eg=-120×100
Eg=-100×100
Eg=-80×100
Eg=-60×100
Eg=-120
Eg=-100
Eg=-80
Eg=-60
MUTUAL CONDUCTANCE (G in μA/V)
2000
1500
1000
500
GRID VOLTS
-20
-15
-10
-5
0

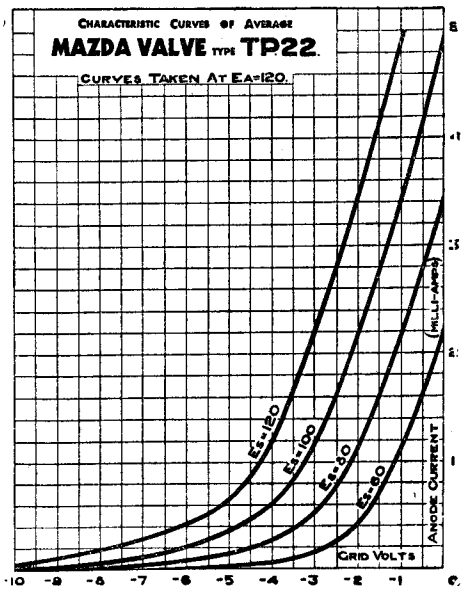
MAZDA

SUGGESTED CIRCUIT DIAGRAM USING TP. 22



R_1 = 100,000 to 150,000 ohms.
R_2 = 5,000 ohms.
R_3 = 1,000 to 2,000 ohms.
R_4 = 150,000 to 250,000 ohms.
R_5 = 25,000 to 50,000 ohms.
R_6 = 0·5 megohm.
C_1 = 0·1 μF.
C_2 = 0·1 μF.
C_3 = ·0005 μF. (variable).
C_4 = value specified for coil.
C_5 = ·0005 μF.
C_6 = padding condenser.
C_7 = 0·1 μF.
C_8 = ·0005 μF. (variable).
C_9 = 0·1 μF.

Fig. 1.



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MAZDA

TP.23

BATTERY TRIODE PENTODE

RATING.

Filament Volts	2·0
Filament Current	0·25
Pentode Section.	
Anode Volts (maximum)	150
Screen Volts (maximum)	150
*Mutual Conductance	1·2

*At Ea=120 ; Es=60 ; Eg=0.

Triode Section.	
Anode Volts (maximum)	150
*Amplification Factor	20
*Mutual Conductance	2·1
Maximum Peak Anode Current (mA)	20

* At Ea=100 ; Eg=0.

TYPICAL OPERATION.

	Suppressor Injection.	Cathode Injection.
Anode Voltage	120	120
Screen Voltage	60	60
Fixed Bias	1·5	1·5
Anode Current (mA)	0·55	1·0
Screen Current (mA)	0·95	0·5
Peak Heterodyne Volts	8·0	3·0
Conversion Conductance (μA/V)	250	400

INTER-ELECTRODE CAPACITIES.

*Anode 1 to Earth	12·25 $\mu\mu$F
*Grid 1 to Earth	9·25 $\mu\mu$F
Anode 1 to Grid 1	0·02 $\mu\mu$F
*Anode 0 to Earth (less G0 to A0)	8·75 $\mu\mu$F
*Grid 0 to Earth (less G0 to A0)	13·75 $\mu\mu$F
Anode 0 to Grid 0	4·5 $\mu\mu$F

* " Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement and metallising joined to filament.

DIMENSIONS.

Maximum Overall Length	126 mm.
Maximum Overall Diameter	45 mm.

MAZDA

GENERAL.

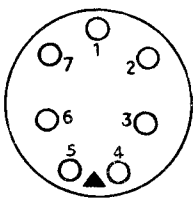
The TP.23 is a triode pentode designed for use as a self-oscillating frequency changer in battery operated receivers covering frequencies up to the order of 20 Mc/second. The frequency changer has variable-mu characteristics, i.e., the gain can be controlled by applying bias to the input grid. The oscillator grid and the suppressor grid of the pentode are joined internally. The valve is based in a standard 7-pin base, the connections to which are given below.

APPLICATION.

The valve is primarily intended for use with suppressor grid injection, though it may be used with combined cathode and suppressor grid injection.

In all-wave receivers when used with suppressor-grid injection the triode anode should be parafed and a tuned anode circuit employed. The coupling condenser should have a value of ·0001 mfd. A wave-wound coil should be inserted between the H.T. supply and the parafed resistance in order to remove the damping effect of this resistance on the long and medium wave oscillator tuned circuit. This coil should have a natural resonance outside the oscillator band and a small self-capacity. A grid leak of 50,000 ohms and grid condenser of ·0005 mfd. should be used and the grid leak should be returned to the L.T.+. The circuit diagram shows a suggested arrangement.

BASING.



Viewed from the free end of the base.

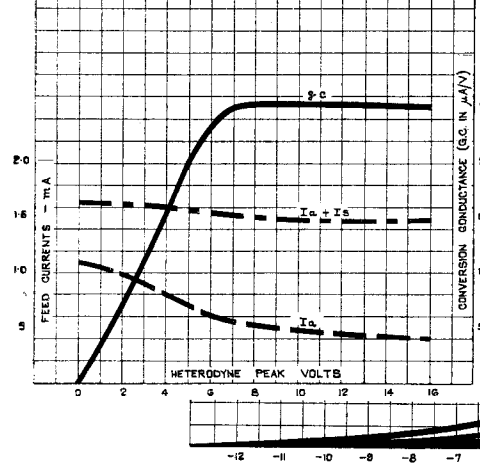
Pin No. 1. Oscillator Anode.
2. Oscillator Grid & G3.
3. Screen.
4. Filament.
5. Filament.
. Metallising.
7. Pentode Anode.
Top Cap. Control Grid.

MAZDA

CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE TYPE TP23.

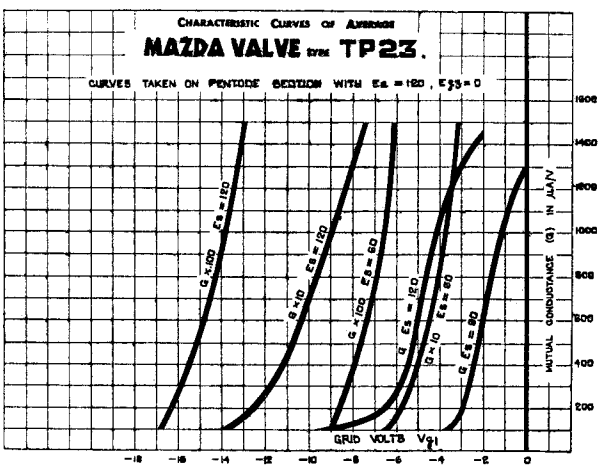
ANODE VOLTS	120
SCREEN VOLTS	80
GRID BIAS (VOLTS)	-1·5
OSCILLATOR GRID RESISTANCE (OHMS)	50,000



CHARACTERISTIC CURVES OF AVERAGE

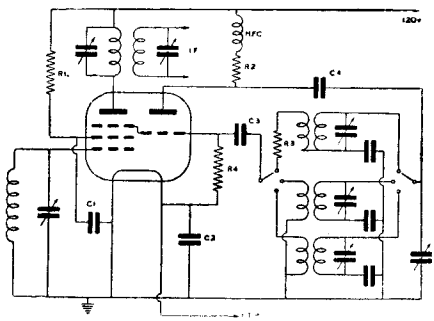
MAZDA VALVE TYPE TP23.

CURVES TAKEN ON PENTODE SECTION WITH Ea = 120, Es3 = 0



SUGGESTED CIRCUIT DIAGRAM USING

TP.23



Values.

R.1	60,000.	C.1	·05 mfd.
R.2 } R.3 }	Depend on coils	C.2	·01 mfd.
		C.3	·0005 mfd.
R.4	50,000.	C.4	·0001 mfd.

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MAZDA

TP.25

BATTERY ECONOMY TRIODE PENTODE

RATING.

Filament Voltage	2·0
Filament Current (Amps.)	0·2
Pentode Section.	
Maximum Anode Voltage	150
Maximum Screen Voltage	150
*Mutual Conductance (mA/V)	1·0
*Taken at Ea=120 ; Es=60 ; Eg=0.	
Triode Section.	
Maximum Anode Voltage	150
*Mutual Conductance (mA/V)	1·7
*Amplification Factor	18
Maximum Peak Anode Current (mA)	15
*Taken at Ea=100 ; Eg=0.	

TYPICAL OPERATION.

Anode Voltage	120
Screen Voltage	60
Fixed Bias	1·5
Anode Current (mA)	0·5
Screen Current (mA)	1·0
Peak Heterodyne Volts	8·0
Conversion Conductance (μA/V)	225
Grid Leak from Go, G3 to L.T. +ve (ohms)	50,000

INTER-ELECTRODE CAPACITIES.

Pentode Section.		
*Anode to Earth	8·0	$\mu\mu$F.
*Grid to Earth	6·5	$\mu\mu$F.
Anode to Grid	0·01	$\mu\mu$F.
Triode Section.		
*Anode to Earth (less Go to Ao)	4·0	$\mu\mu$F.
*Grid to Earth (less Go to Ao)	9·0	$\mu\mu$F.
Anode to Grid	2·0	$\mu\mu$F.

*" Earth " denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to filament.

DIMENSIONS.

Maximum Overall Length	... 103 mm.
Maximum Diameter	... 32 mm.

MAZDA

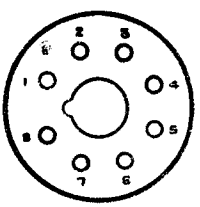
GENERAL.

The TP.25 is a triode pentode for use as a self-oscillating frequency changer in battery operated all-wave receivers. The special feature of this valve is that it has been designed for battery economy, and due to the low filament consumption is therefore particularly suitable for use in battery portable receivers. The frequency changer has variable-mu characteristics, i.e., the gain can be controlled by applying bias to the input grid. The oscillator grid and the suppressor grid of the pentode are joined internally. The bulb is of small dimensions and metallised, and the valve is fitted with a Mazda Octal Base, the connexions to which are given below.

APPLICATION.

The valve may be used with either suppressor grid injection or combined cathode and suppressor grid injection. In all-wave receivers when used with suppressor-grid injection the triode anode should be parafed and a tuned anode circuit employed. The coupling condenser should have a value of ·0001 mfd. A wave-wound coil should be inserted between the H.T. supply and the parafed resistance in order to remove the damping effect of this resistance on the long and medium wave oscillator tuned circuit. This coil should have a natural resonance outside the oscillator band and a small self-capacity. A grid leak of 50,000 ohms and grid condenser of ·0005 mfd. should be used and the grid should be returned to L.T. positive. The circuit diagram shows a suggested arrangement.

BASING.

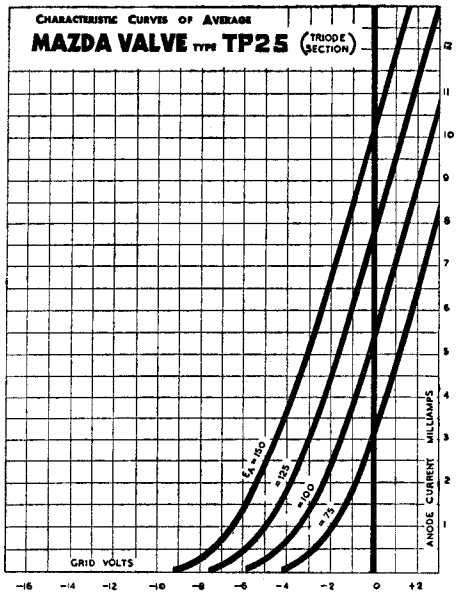


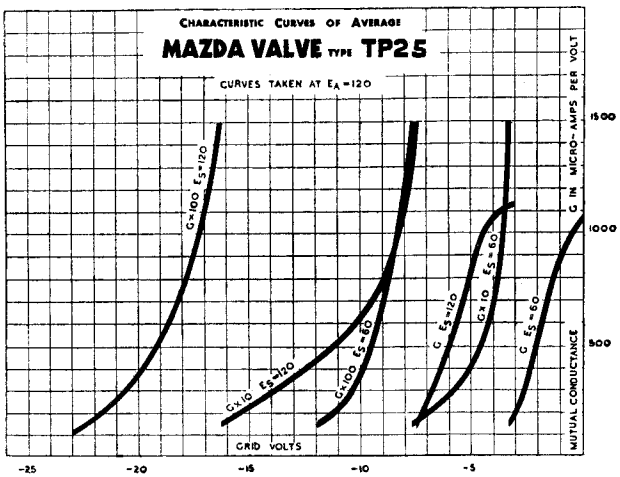
Pin No. 1. Filament.
2. ——
3. Pentode Anode.
4. Oscillator Anode
5. Oscillator Grid.
6. Metallising.
7. Pentode Screen.
8. Filament.

Top Cap. Pentode Control Grid.

Viewed from the free end of the base.

MAZDA

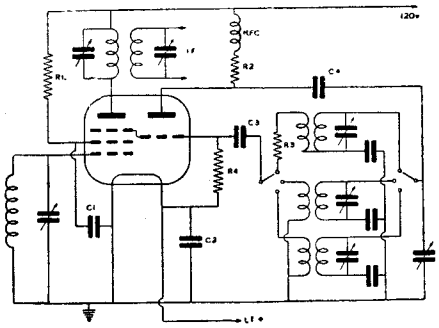




EDISWAN RADIO

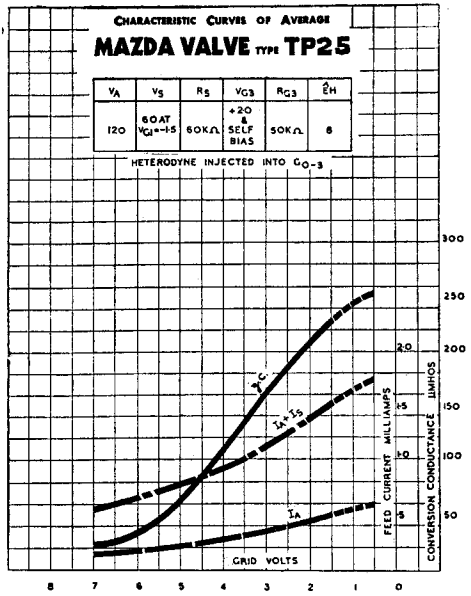
MAZDA

SUGGESTED CIRCUIT DIAGRAM USING TP.25



Values.

R.1	60,000.	C.1	·05 mfd.
R.2 }	Depend	C.2	·01 mfd.
R.3 }	on coils	C.3	·0005 mfd.
R.4	50,000.	C·4	·0001 mfd.



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MAZDA

T.P.26

BATTERY ECONOMY TRIODE PENTODE

RATING.

Filament Voltage	2.0
Filament Current (Amps.)	0.2

Pentode Section.

Maximum Anode Voltage	150
Maximum Screen Voltage	150
*Mutual Conductance (mA/V)	1.55

*Taken at Ea=120 ; Es=60 ; Eg=0.

Triode Section.

*Mutual Conductance (mA/V)	1.3
*Amplification Factor	28
*Anode A.C. Resistance (ohms)	21,500

*Taken at Ea=100 ; Eg=0.

TYPICAL OPERATION.

Cathode Injection.

H.T. Battery Voltage	90	108	108	120
Anode Voltage (approx.)	77	95	92	103
Screen Voltage (approx.) (Initial) ...	61	61	65	65
Fixed Bias	*—	*—	*—	*—
Anode Current (mA)	1.0	1.0	1.2	1.2
Screen Current (mA)	0.25	0.25	0.3	0.3
Peak Heterodyne Volts	4.0	4.0	3.0	3.0
Conversion Conductance (μA/V) ...	480	500	525	550
Grid Leak from G.I to L.T. –ve (megohms)	3	3	3	3
Series Screen Resistance (megohms) ...	0.1	0.17	0.13	0.17
†Max. Signal Handling Capacity (Peak Carrier Volts)	—	0.9	0.9	1.2
†Grid Bias for above (Volts)	—	7.5	7.5	8.5
Triode Anode Current (mA) (approx.)	0.9	0.9	0.9	0.9

*Bias volts are obtained by self bias due to grid current through a 3-megohm resistance returned to L.T. –ve.

†For 5% total audio harmonic distortion and 60% modulated carrier, the screen volts rise with increase of bias to the anode voltage.

INTER-ELECTRODE CAPACITIES.

Pentode Section.

*Anode to Earth	8.25 $\mu\mu$F.
*Grid to Earth	6.75 $\mu\mu$F.
Anode to Grid	0.02 $\mu\mu$F.

Triode Section.

*Anode to Earth (less Go to Ao)	4.25 $\mu\mu$F.
*Grid to Earth (less Go to Ao)	3.75 $\mu\mu$F.
Anode to Grid	2.0 $\mu\mu$F.

*"Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to filament.

MAZDA

DIMENSIONS.

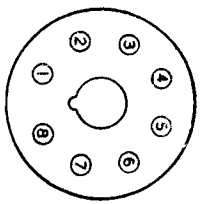
Maximum Overall Length	105 mm.
Maximum Diameter	32 mm.

GENERAL.

The TP 26 is a triode pentode for use as a self-oscillating frequency changer designed for use in battery portable receivers. The valve is characterised by its high gain and high signal-to-noise ratio. The bulb is of small dimensions and metallised, and the valve is fitted with a Mazda Octal base, the connexions to which are given below.

APPLICATION.

The valve is designed or operation on the medium and long wave bands only. It is designed for use with cathode injection which enables a high conversion conductance and good signal-to-noise ratio to be obtained with low feed currents. The characteristics of the valve have been so designed as to be capable of handling the maximum input signal that is likely to occur in a portable receiver under any conditions of operation. It is recommended that both the anode and screen of the pentode section should be decoupled to the negative end of the filament and not to chassis. The circuit diagram shows a suggested arrangement. When used with a VP 23 I.F. stage, half the A.V.C. bias applied to the V.P 23 should be applied to the TP 26.



Viewed from the free end of the base.

BASING.

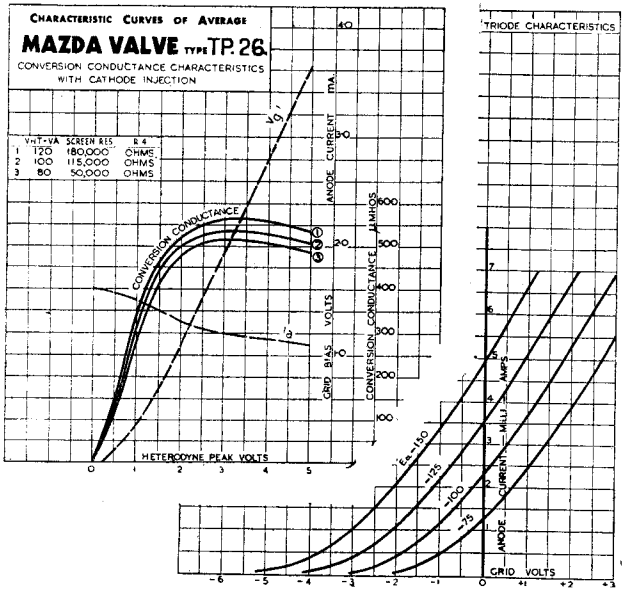
Pin No. 1.	Filament.
2.	—
3.	Pentode Anode.
4.	Oscillator Anode.
5.	Oscillator Grid.
6.	Metallising.
7.	Pentode Screen.
8.	Filament.
Top Cap.	Pentode Grid.

C1. C2.	·0005 μF Tuning Cond.
C3.	5–40 μμF Trimmers.
C4.	05 μF
C5.	05 μF
C6.	·0003 μF
C7.	·1 μF
C8.	Medium Wave Padder.
C9.	Long Wave Padder.
C10.	Long Wave Pre-Set.

*Exact value depends upon Oscillator Coils.

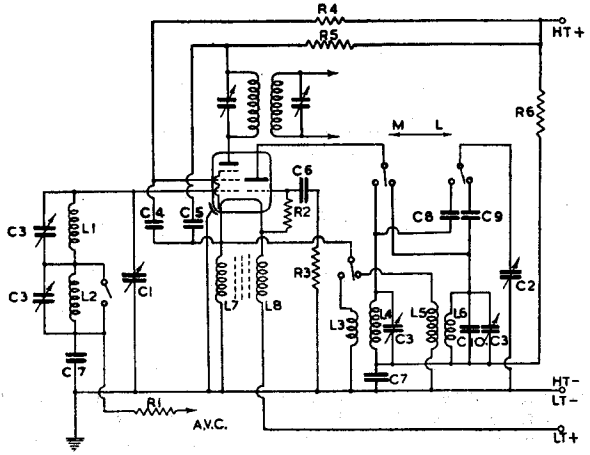
R1	3	Megohms.
R2	50,000	Ohms.
R3	500–2,000	Ohms.*
R4	170,000	Ohms.
R5	10,000	Ohms.
R6	40,000	Ohms.*

L1–L2 M. & L. Wave Frame Aerial.
L3–L4 M Wave Oscillator Coils.
L5–L6 L. Wave Osciliator Coils.
L7–L8 Filament Chokes.

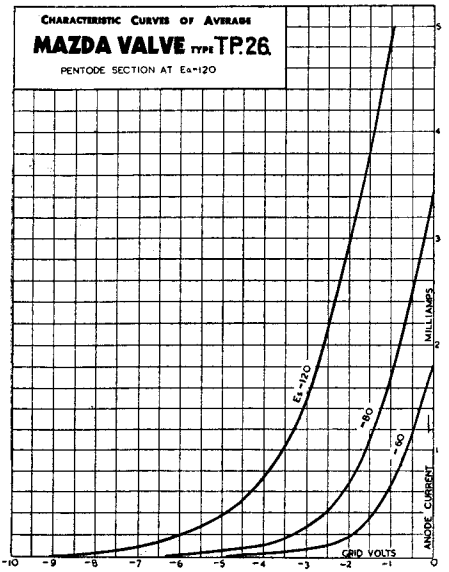


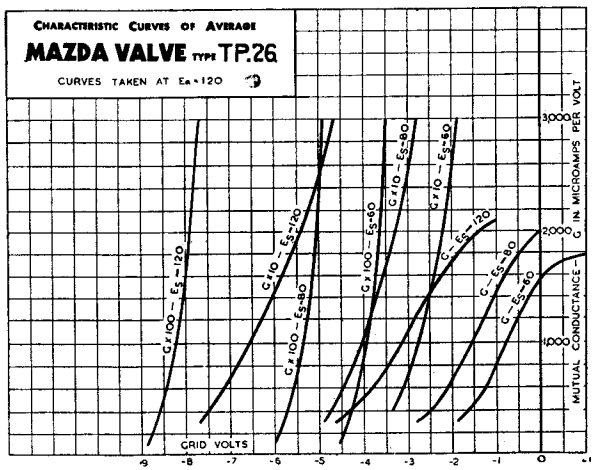
The screen voltage is adjusted by means of a series screen resistance to give a total anode and screen current of 1·5 mA. at a Heterodyne voltage of 3v peak.

The mean bias on the control grid (Vg1) is obtained by means of the rectified grid current through the 3 megohm resistance R1 which is connected to LT— ; see circuit below.



MAZDA





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD. LONDON, W.C.2

MAZDA

TP. 2620

AC/DC MAINS TRIODE PENTODE

RATING.

Heater Voltage	26
Heater Current (amps.)	0.2
Pentode Section.	
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Conversion Conductance (Maximum) (μA/V)	900
*Mutual Conductance (mA/V)	3.4
*At Ea=250 ; Es=200 ; Eg=0.	
Triode Section.	
Maximum Anode Voltage...	200
Recommended Anode Voltage (approx.)	150
Maximum Mean Anode Current (mA)	2.0
†Amplification Factor	30
†Mutual Conductance (mA/V)	1.4
†At Ea=100 ; Eg=0.	

TYPICAL OPERATION.

Anode Voltage	200
Screen Voltage (Initial)	200
Grid Bias Voltage	5.0
Heterodyne Peak Voltage	3.0
Impedance (ohms) (approx.)	700,000
Anode Current (mA)	6.5
Screen Current (mA)	2.5
Oscillator Anode Current (mA)	1.5
Conversion Conductance (μA/V)	650
Input Signal Handling Capacity (Peak Carrier Voltage)	10

INTER-ELECTRODE CAPACITIES.

Pentode.	
‡Anode to Earth	7.75 $\mu\mu$F.
‡Grid to Earth	8.0 $\mu\mu$F.
Anode to Grid	0.1 $\mu\mu$F.
Triode.	
‡Anode to Earth	4.25 $\mu\mu$F.
‡Grid to Earth	5.75 $\mu\mu$F.
Anode to Grid	2.5 $\mu\mu$F.

‡ "Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H. and M. joined to cathode.

DIMENSIONS.

Maximum Overall Length	118 mm.
Maximum Diameter	45 mm.

GENERAL.

The TP.2620 is an indirectly heated triode pentode valve which is designed for operation as a self oscillating frequency changer. The pentode section has variable-mu characteristics and can handle a 12-volt peak carrier

without distortion ; in addition it has a high working impedance. The triode oscillator and pentode frequency changer sections are screened from each other, and are, except for a common cathode connection, completely independent of each other. Hence the oscillator frequency is independent of the operating conditions of the frequency changer section. For signal frequencies above 2 Mc/second, the TH.2321 should be employed in preference to the TP.2620. The bulb is metallised, and the valve is fitted with a standard 9-pin base, the connexions to which are given below.

APPLICATION.

When operating as a self oscillating frequency changer, the TP.2620 has variable-mu characteristics suitable for use with diode or amplified automatic volume control.

It possesses all the advantages usually associated with the use of a separate oscillator and frequency changer, including low oscillator harmonic content and minimum noise from leakage and shot effect.

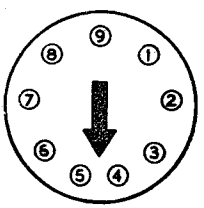
It is recommended that frequency changing should be accomplished by heterodyne injection in the common cathode circuit as shown in Fig. 1. the H.T. applied being 200 volts.

The variable-mu characteristic has been specially shaped to reduce whistles, repeat points and cross-modulation, and to ensure minimum interference the heterodyne peak voltage should not appreciably exceed 3 volts. A 10-volt peak carrier modulated at 60 per cent. can be handled with 5 per cent. distortion with a heterodyne voltage of 3 volts and screen voltage of 200 volts.

A common decoupling resistance (R2 in Fig. 1) may be used and should not be less than 5,000 ohms. The suppressor grid should be returned to cathode, and the screen and anode circuits must be decoupled to cathode and not to earth.

The heater connected to pin No. 5 should be at the lowest A.C. potential with respect to H.T-ve.

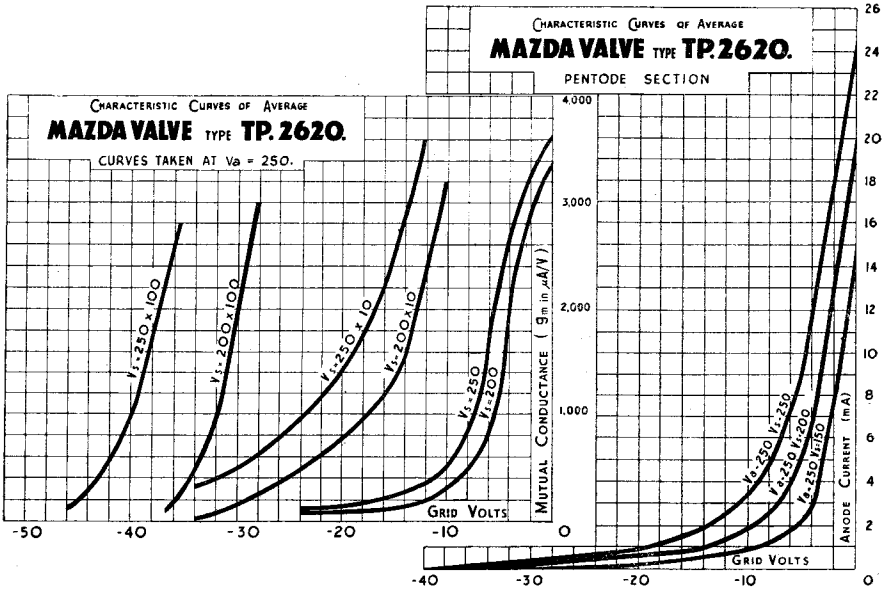
BASING.

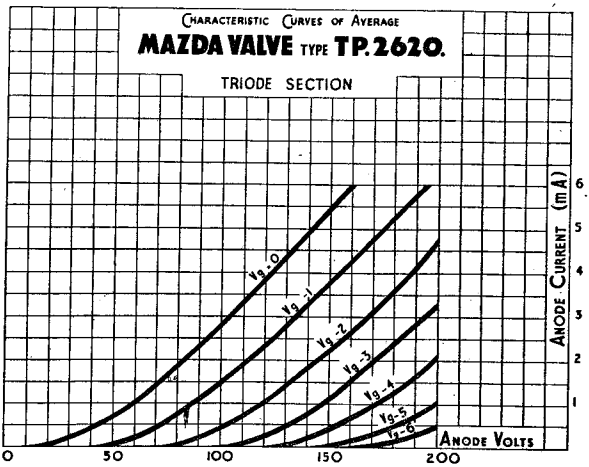


Pin No. 1. Screen.
2. Pentode Anode.
3. Suppressor Grid.
4. Heater.
5. Heater.
6. Cathode.
7. Oscillator Anode.
8. Oscillator Grid.
9. Metallising.
Top Cap. Pentode Grid.

Viewed from the free end of the base.

MAZDA





EDISWAN RADIO

SUGGESTED CIRCUIT DIAGRAM USING TP 2620

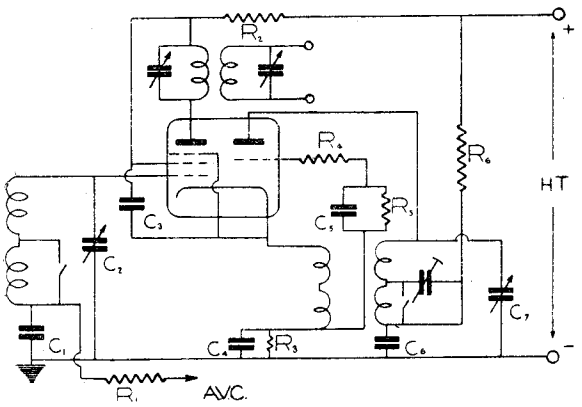


Fig. 1.

R1 1 megohm.
R2 5,000 ohms.
R3 500 ohms.
R4 1,500 to 2,000 ohms.
R5 50,000 ohms.
R6 30,000 ohms.

C1 0.1 μF.
C2 .0005 μF.
C3 0.1 μF.
C4 0.1 μF.
C5 .0002 μF.
C6 0.1 μF.
C7 .0005 μF. (var.).

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

U.21 & U.22

HIGH VOLTAGE RECTIFIERS

RATING.	U.21	U.22
Heater Voltage	2·0	2·0
Heater Current (Amps.)	1·85	2·0
Maximum Anode Voltage (RMS)	4,500	4,500
Maximum Peak Inverse Voltage	12,500	12,500
Maximum Mean Anode Current (mA.)	5·0	5·0
Maximum Peak Anode Current (mA.)	55	55

TYPICAL OPERATION.

U.21—

Anode Voltage (RMS)	3,700	4,000	4,500
Reservoir Capacity (μF.)	0·25	0·25	0·25
Mean Load Current (mA.)	0·5	0·5	0·5
D.C. Volts Output	5,000	5,450	6,100
Ripple Volts RMS 50 $\sim$ (approx.)	10	10	10

Heating Time Delay—Approx. 15 per cent. of final output at 35 secs.

TYPICAL OPERATION.

U.22—

Anode Voltage (RMS)	3,700	4,000	4,500
Reservoir Capacity (μF.)	0·1	0·1	0·1
Mean Load Current (mA.)	0·25	0·25	0·25
D.C. Volts Output	5,000	5,450	6,100
Ripple Volts RMS 50 $\sim$ (approx.)	14	14	14

Heating Time Delay—Approx. 15 per cent. of final output at 35 secs.

DIMENSIONS.	U.21	U.22
Maximum Overall Length	121 mm.	96 mm.
Maximum Diameter	39 mm.	28·5 mm.

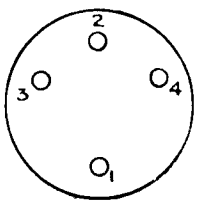
GENERAL.

The U.21 and U.22 are indirectly heated half-wave rectifiers for use in the H.T. supply for the cathode ray tube in television receivers. The heater of either valve is designed to provide a suitable time delay, thus obviating the need for a time delay switch. The U.21 is fitted with a standard 4-pin base and the U.22 with the Mazda octal base, the connexions to which are given overleaf.

APPLICATION.

The use of either of these valves in the H.T. supply unit of the cathode ray tube avoids the use of special delay switching and protects the cathode ray tube from excessive voltage stress during heating time of the tube cathode. If a UD.41 or similar valve is used in the H.T. supply unit of the time base, when switching on, the heaters of the thyratrons and output valves reach operating temperature and H.T. is applied to the time base. After a short period the U.21 or U.22 reaches its operation temperature and H.T. is applied to the cathode ray tube anode. With this sequence of operation it is possible to safeguard not only the cathode of the tube but also to eliminate the possibility of burning the screen with a stationary spot.

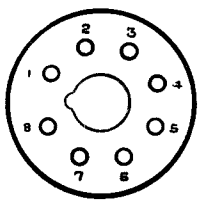
BASING. U.21.



Pin No. 1.	—
2.	—
3.	Heater and Cathode.
4.	Heater.
Top Cap.	Anode.

Viewed from the free end of the base.

BASING. U.22.



Pin No. 1.	Heater and Cathode.
2.	Omitted.
3.	—
4.	Omitted.
5.	—
6.	Omitted.
7.	Omitted.
8.	Heater.
Top Cap.	Anode.

Viewed from the free end of the base.

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by
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MAZDA
U.22
HIGH VOLTAGE H.W. RECTIFIER
Indirectly Heated

RATING

Heater Voltage (volts)	V_h	2.0	2.0
Heater Current (amps)	I_h	2.0	2.0
Maximum Anode Voltage (volts RMS)	$V_{a(rms)max}$	5,200	-
Maximum Peak Inverse Anode Voltage (volts) (Working)	P.I.V.(max)	14,500	10,000
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	1.0	5.0
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	20	55.0
Minimum Limiting Resistance (ohms) *		50,000	30,000

* This resistance may be obtained in the distributed resistance of the transformer winding.

INTER-ELECTRODE CAPACITANCE

Anode/Heater+Cathode ($\mu\mu$F)	C_{a-all}	2.2

DIMENSIONS

Maximum Overall Length (mm)	96
Maximum Diameter (Base) (mm)	29.5
Maximum Seated Height (mm)	83
Approximate Nett Weight (ozs)	1
Approximate Packed Weight (ozs)	1¼

MOUNTING POSITION - Unrestricted.

U.22

MAZDA

U.22

HIGH VOLTAGE H.W. RECTIFIER

Indirectly Heated

TYPICAL OPERATION

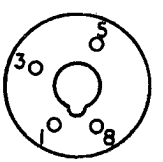
A.C. Input Volts (RMS)	3,700	4,000	4,500	4,800	5,150
Reservoir Condenser (μF)	0.1	0.1	0.1	0.1	0.1
D.C. Load Current (mA)	0.25	0.25	0.25	0.25	0.25
D.C. volts Output (kV)	5.0	5.45	6.1	6.5	7.0
Ripple Volts (RMS) at 50 cps (approx.)	14	14	14	14	14

NOTE . Heating time delay approximately 15% of final output voltage at 35 secs.

BULB Clear

CAP Standard BVA

BASE British Octal (B04)



Viewed from underside of Base.

CONNEXIONS

Pin 1	Heater, Cathode & Shield	h, k and s
Pin 2	Omitted	-
Pin 3	-	-
Pin 4	Omitted	-
Pin 5	-	-
Pin 6	Omitted	-
Pin 7	Omitted	-
Pin 8	Heater	h
Top Cap	Anode	a

NOTE This sheet supersedes leaflet U22/Sheet 12/6.

MAZDA

U.24

HIGH VOLTAGE HALF WAVE RECTIFIER

Indirectly heated – for R.F. E.H.T. Supply

TENTATIVE

RATING

Filament Voltage (volts)	V_f	2.0
Filament Current (amps)	I_f	0.15
Maximum Peak Inverse Voltage (No Load) (kV)	P.I.V.(max)	22.0
Maximum Peak Inverse Voltage (On Load) (kV)	P.I.V.(max)	20.0
Maximum Anode Voltage (RMS) (kV)	V_a	7.8
Maximum Mean Anode Current with Oscillator Operation (mA)	I_a	0.5
Maximum Mean Anode Current with Pulse operation (mA)	I_a	0.1
Maximum Peak Anode Current (mA)	$I_{a(pk)}$	15.0

INTER-ELECTRODE CAPACITANCES

Anode/Heater & Shield (μμF)	$C_{a,h\ \&\ s}$	1.3

DIMENSIONS

Maximum Overall Length (mm)	110
Maximum Bulb Diameter (mm)	28.5
Maximum Base Diameter (mm)	31.5
Maximum Seated Height (mm)	97
Approximate Nett Weight (ozs)	1¼
Approximate Packed Weight (ozs)	1⅝

MOUNTING POSITION – Unrestricted.

U.24

MAZDA

U.24

HIGH VOLTAGE HALF WAVE RECTIFIER

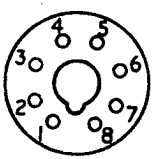
Indirectly heated – for R.F. E.H.T. Supply

TENTATIVE

BULB Clear

TOP CAP American Miniature

BASE International Octal (I08)



Viewed from free end of pins.

CONNEXIONS

Pin 1	-	-
Pin 2	Heater	h
Pin 3	-	-
Pin 4	-	-
Pin 5	-	-
Pin 6	-	-
Pin 7	Heater and Cathode	h & k
Pin 8	Shield	s
Top Cap	Anode	a

NOTE

All pins with the exception of No. 2 should be connected to Pin No. 7 on the holder and Pin No. 7 connected to the reservoir condenser.

EDISWAN
MAZDA
U25
MINIATURE HIGH VOLTAGE H.W. RECTIFIER
Indirectly heated—for R.F. and
"Fly-back" E.H.T. Supply

RATING

Heater Voltage (volts)	V_h			2.0	
Heater Current (amps)	I_h			0.2	
		Oscillator		Fly-back	
Maximum Frequency		250kc	350kc	Pulse §	
Maximum Peak Inverse Voltage (Absolute) (kV)	P.I.V.(max)	22	16.5	22	←
Maximum Peak Inverse Voltage (Design Centre) (kV)	P.I.V.(max)	19	15	19	←
Maximum Anode Voltage (rms) (kV)	$V_{a\ (max)}$	7.8	5.85		
Maximum Rectified Voltage (volts DC) (kV)			7.0	16*	←
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	0.5	0.5	0.2	
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	15	15	25	

* 16kV is a Design Centre Rating. An absolute rating of 18kV must not be exceeded.

§ The pulse ratings are for Television Line Scan where the applied voltage pulse does not exceed 15% of one scanning cycle or 15μsecs. duration.

INTER-ELECTRODE CAPACITANCES (pF)

Anode/Heater, Cathode	$c_{a\text{-}h,k}$	0.6

Indicates a change ←

U25

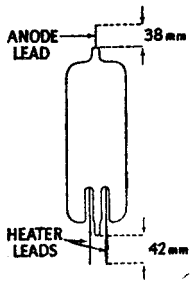
EDISWAN
MAZDA
U25
MINIATURE HIGH VOLTAGE H.W. RECTIFIER
Indirectly heated—for R.F. and
"Fly-back" E.H.T. Supply

DIMENSIONS

Maximum Overall Length (excluding leads)	(mm)	58
Maximum Bulb Diameter	(mm)	19
Approximate Nett Weight	(ozs)	$\frac{1}{4}$
Approximate Packed Weight	(ozs)	$1\frac{1}{2}$

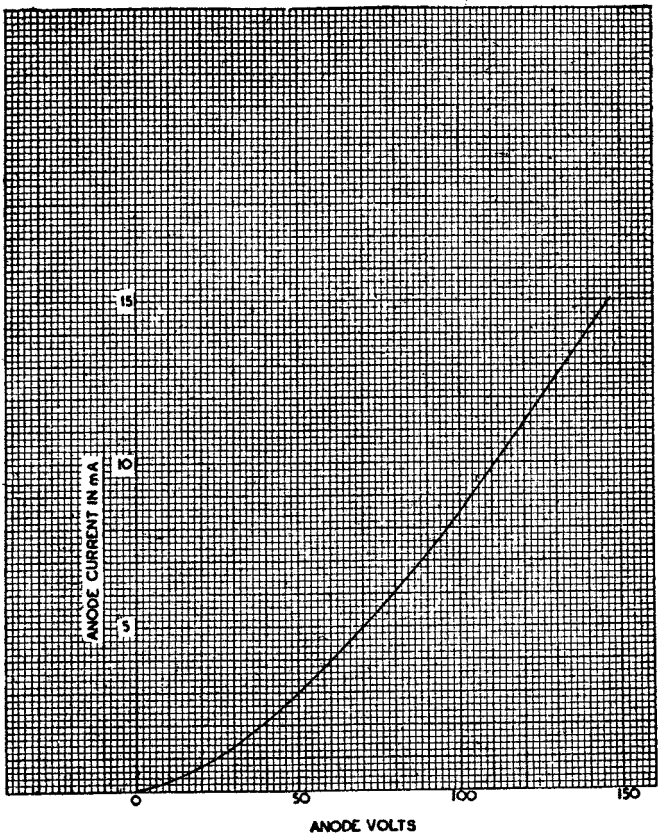
MOUNTING POSITION—Unrestricted

CONNECTIONS—Wire Leads



EDISWAN
MAZDA
U25
MINIATURE HIGH VOLTAGE H.W. RECTIFIER
Indirectly heated—for R.F. and
"Fly-back" E.H.T. Supply

AVERAGE CHARACTERISTIC CURVES



June 1959 VALVE & CRT DIVISION Issue 3/2

SIEMENS EDISON SWAN LIMITED

MAZDA

U26

U26

HIGH VOLTAGE HALF WAVE RECTIFIER
Indirectly heated—for flyback E.H.T. supplies

RATING

Heater Voltage (volts)	V_h	2.0
Heater Current (amps)	I_h	0.35
Maximum Peak Inverse Voltage (Design Centre) (kV)	$PIV_{(max)}$	23.5
Maximum Peak Inverse Voltage (Absolute) (kV)	$PIV_{(max)}$	27
Maximum Mean Anode Current with Pulse Operation (mA)	$I_{a\ (max\ av)}$	△0.2
Maximum Peak Anode Current (mA)	$I_{a\ (max\ pk)}$	*80

△ Maximum current Pulse Duration 6.0 μsecs. Maximum frequency of operation 15,000 pps.

* This maximum rating is an absolute value not a design centre.

INTER-ELECTRODE CAPACITANCES (pF)

Anode to Heater, Cathode and Shield	$C_{a-h,k,s}$	†0.9

† Total capacity including unscreened B9A ceramic holder, i.e., without can or skirt.

DIMENSIONS

Maximum Overall Length (mm)	76
Maximum Diameter (mm)	21
Maximum Seated Height (mm)	69

U26

MAZDA

U26

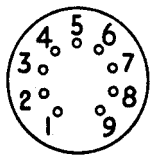
HIGH VOLTAGE HALF WAVE RECTIFIER
Indirectly heated—for flyback E.H.T. supplies

MOUNTING POSITION—Unrestricted

BULB—Clear

CAP—CT1

BASE—Noval B9A



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater, Cathode and Shield	h,k,s
Pin 2	Heater	h
Pin 3	See below	‡
Pin 4	Heater, Cathode and Shield	h,k,s
Pin 5	Heater	h
Pin 6	Heater, Cathode and Shield	h,k,s
Pin 7	See below	‡
Pin 8	Heater	h
Pin 9	Heater, Cathode and Shield	h,k,s
Cap	Anode	a

‡ Pins 3 and 7 are floating, but must not be left unconnected. They should be connected to the external circuit with not more than 100v between adjacent pins.

The Cathode, shield and one end of the heater are connected to pins 1, 4, 6 and 9. The other end of the heater is connected to pins 2, 5 and 8.

NOTE.—Some early experimental samples may have pins 3 and 7 connected to cathode.

March 1957 *VALVE & CRT DIVISION* Issue 1/2

SIEMENS EDISON SWAN LIMITED

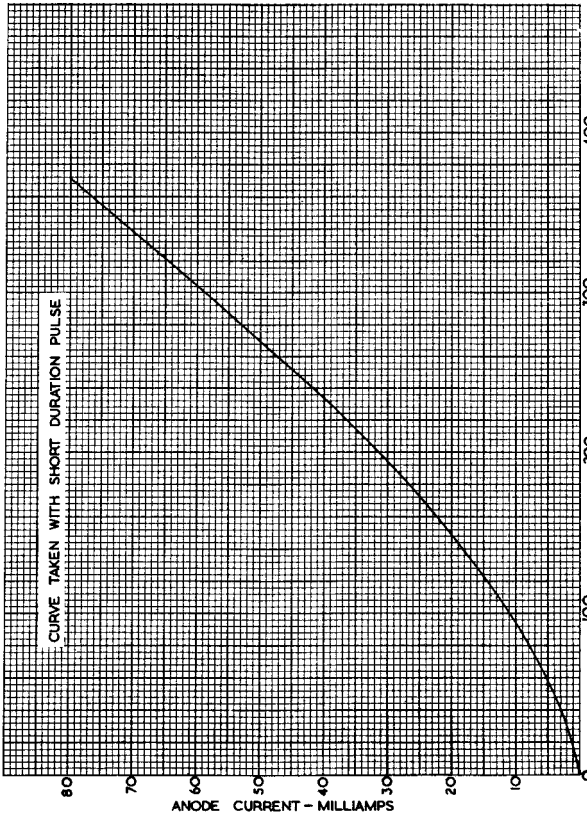
MAZDA

U26

U26

HIGH VOLTAGE HALF WAVE RECTIFIER

Indirectly heated—for flyback E.H.T. supplies



MAZDA
U191

EFFICIENCY DIODE
Indirectly heated—for series operation

GENERAL

The U191 is intended for use as an Efficiency Diode in television receivers having series connected heaters and is suitable for A.C./D.C. operation.

RATING

Heater Current (amps)	I_h		0·3
Heater Voltage (volts)	V_h		19·0
Maximum Peak Inverse Anode Voltage (kV)	P.I.V. (max)		4·5*‡
Maximum Anode Current (mean) (mA)	$I_{a\ (av)\ max}$	120	150
Maximum Anode Current (peak) (mA)	$I_{a\ (pk)\ max}$	600	450
Maximum Heater-Cathode Voltage (volts) (h—ve, D.C. + Peak A.C.)	$V_{h-k(max)}$		900†
Maximum Heater-Cathode Voltage (h—ve, pulse) (kV)	$V_{h-k\ (pk)\ max}$		4·5*‡
Maximum Heater to Anode Volts (h+ve pulse) (kV)	$V_{a-h\ (max)}$		3*

* Rated for T.V. Line Scan where the duty cycle does not exceed 15% and the pulse duration does not exceed 15 μ secs.

† Measured with respect to the higher potential heater pin. The D.C. component should not exceed 600 volts.

‡ 4·5 kV is a Design Centre Rating. The absolute rating of 5·3 kV must not be exceeded.

INTER-ELECTRODE CAPACITANCES (pF)

Anode to Heater plus Cathode	$c_{a-h,k}$	7·7
Cathode to Heater plus Anode	$c_{k-h,a}$	9·0

MAZDA

U191

EFFICIENCY DIODE

Indirectly heated—for series operation

DIMENSIONS

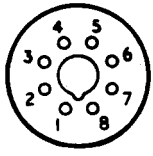
Maximum Overall Length (mm)	90
Maximum Diameter (mm)	32
Maximum Seated Height (mm)	77
Approximate Nett Weight (ozs)	$1\frac{1}{4}$
Approximate Packed Weight (ozs)	$2\frac{1}{4}$

MOUNTING POSITION—Unrestricted.

BULB—Clear

TOP CAP—CT1

BASE—International Octal (1O5)



Viewed from Free End of Pins

CONNECTIONS

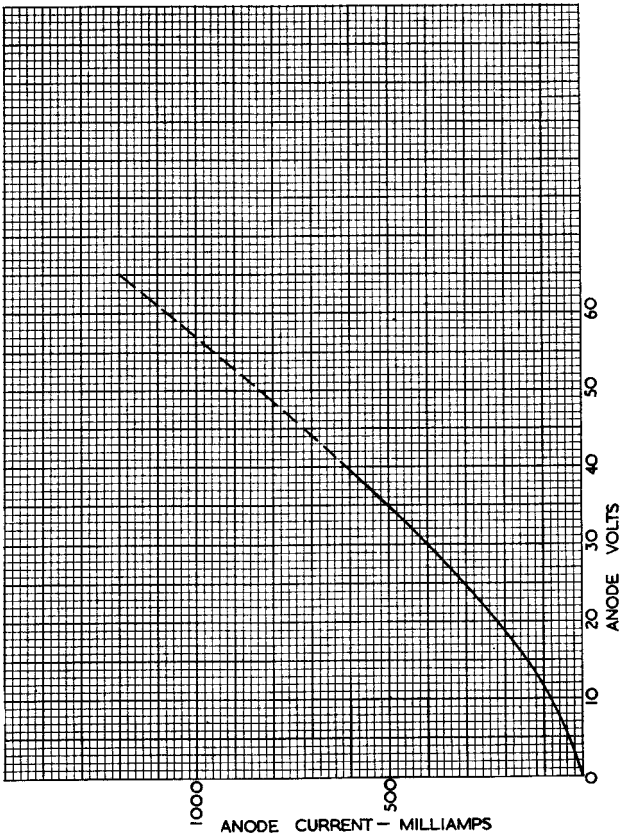
Pin 1	No Pin	NP
Pin 2	Internal Connection	IC
Pin 3	Internal Connection	IC
Pin 4	No Pin	NP
Pin 5	Anode	a
Pin 6	No Pin	NP
Pin 7	Heater	h
Pin 8	Heater	h
Cap	Cathode	k

NOTE: When the anode is pulsed, it is recommended that contacts 1 and 6 on the valve holder should be removed.

MAZDA
U191

EFFICIENCY DIODE

Indirectly heated—for series operation



March 1957 *VALVE & CRT DIVISION* Issue 1/2

SIEMENS EDISON SWAN LIMITED

EDISWAN

MAZDA

U193

EFFICIENCY DIODE

Indirectly heated—for series operation

TENTATIVE

U193

GENERAL

The U193 is an Efficiency Diode, designed for use in the line output stage of television receivers using 110° and 114° cathode ray tubes. The basing is B9A (Noval) with the cathode brought out to a top cap connection.

RATING

Heater Current	I_h	0·3 A
Heater Voltage	V_h	19 V
Maximum Peak Inverse Voltage	P.I.V.(max)	5·5kV*‡
Maximum Mean Anode Current	$I_{a(av)max}$	150 mA
Maximum Peak Anode Current	$i_{a(pk)max}$	450 mA
Maximum Peak Heater/Cathode Voltage (Heater negative)	$v_{h\text{-}k(pk)max}$	5·5kV*‡

* Rated for television line scan where the duty cycle does not exceed 15% and the pulse duration does not exceed 15 μsecs.

‡ 5·5kV is a design centre rating. The absolute rating of 6·6 kV must not be exceeded.

INTER-ELECTRODE CAPACITANCES (pF)

		§	†	††
Anode to Heater plus Cathode	$c_{a\text{-}h,k}$	6·6	7·8	10·0
Cathode to Heater plus Anode	$c_{k\text{-}h,a}$	7·9	8·0	8·0

§ Interelectrode capacities in fully shielded socket without can.

† Interelectrode capacities with holder capacity balanced out.

†† Total interelectrode capacity including B9A Nylon Phenolic Holder without skirt or radial shield (Clix type VH19/902).

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

U193

EDISWAN

MAZDA

U193

EFFICIENCY DIODE

Indirectly heated—for series operation

TENTATIVE

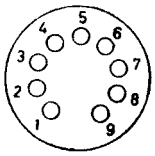
DIMENSIONS

Maximum Overall Length	82 mm
Maximum Diameter	22·2 mm
Maximum Seated Height	75 mm

MOUNTING POSITION—Unrestricted.

TOP CAP—CT1.

BASE—Noval (B9A).



Viewed from free end of pins.

CONNECTIONS

Pin 1	Internal Connection	IC
Pin 2	Internal Connection	IC
Pin 3	Internal Connection	IC
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Internal Connection	IC
Pin 7	Internal Connection	IC
Pin 8	Internal Connection	IC
Pin 9	Anode	a
CAP	Cathode	k

December, 1960 ADVANCE DATA

Associated Electrical Industries Limited

RADIO & ELECTRONIC COMPONENTS DIVISION

U.235

EDISWAN

U.235

FULL WAVE GAS DISCHARGE RECTIFIER

GENERAL

Type U.235 is a full wave gas discharge rectifier suitable for use in low voltage charging circuits.

RATING

Filament Voltage (volts)	V_f	2.0
Filament Current (amps)	I_f	3.5
D.C. Output	20 volts	2 amps

DIMENSIONS

Maximum Overall Length (including Pins) (mm)	110
Maximum Diameter (mm)	45
Approximate Nett Weight (ozs)	1⅛
Approximate Home Packed Weight (ozs)	2⅛
Approximate Export Packed Weight (ozs)	4

MOUNTING POSITION - Vertical

December 1948 RADIO DIVISION Issue 1/5

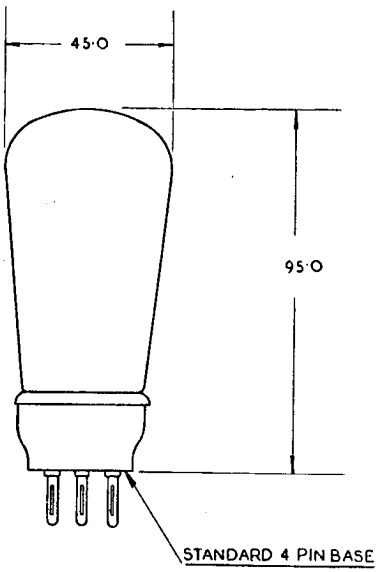
THE EDISON SWAN ELECTRIC COMPANY LTD.

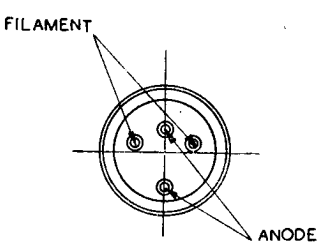
EDISWAN

U.235

FULL WAVE GAS DISCHARGE RECTIFIER

U.235





ALL DIMS IN m.m. UNLESS STATED OTHERWISE

December 1948 *RADIO DIVISION* Issue 1/5

THE EDISON SWAN ELECTRIC COMPANY LTD

MAZDA

U.301

EFFICIENCY DIODE

Indirectly heated—for series operation

RATING			
Heater Current (amps)	I_h		0.2
Heater Voltage (volts)	V_h		28
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)		* 4,500
Maximum Mean Anode Current (mA)	$I_{a(av)max.}$	120	150
Maximum Peak Anode Current (mA)	$I_{a(pk)}$	600	450
Maximum Heater to Cathode Voltage with Heater negative (Volts D.C. + peak A.C.)	$V_{h-k(max)}$	§ 900	
Maximum Peak Pulse Heater to Cathode Voltage with Heater negative (volts)	$V_{h-k(pk)max.}$		* 4,500
Maximum Peak Pulse Heater to Anode Voltage with Heater positive (volts)	$V_{h-a(pk)max.}$		* 3,000

NOTE When the anode is pulsed it is recommended that contacts 1 and 6 on the valveholder should be removed.

* Rated for Television Line Scan where the duty cycle does not exceed 15% and the pulse duration does not exceed 15 μ secs. 4.5 k.V. is the design centre value. The absolute rating of 5.3 k.V. should not be exceeded.

§ Measured with respect to the higher potential heater pin. The D.C. component should not exceed 600 volts.

INTER-ELECTRODE CAPACITANCES		
Anode/All (μμF)	C_{a-all}	7.7
Cathode/All (μμF)	C_{k-all}	9.0

DIMENSIONS	
Maximum Overall Length (mm)	107
Maximum Diameter (mm)	32
Maximum Seated Height (mm)	94
Approximate Nett Weight (ozs)	$1\frac{1}{4}$
Approximate Packed Weight (ozs)	$1\frac{3}{4}$

MOUNTING POSITION - Unrestricted.

U.301

MAZDA

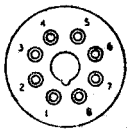
U.301

EFFICIENCY DIODE

Indirectly heated—for series operation

BULB - Clear CAP CTI.

BASE - International Octal



Viewed from free end of pins.

CONNECTIONS

Pin 1	Omitted	-
Pin 2	• Internal Connection	i.c.
Pin 3	• Internal Connection	i.c.
Pin 4	Omitted	-
Pin 5	Anode	a
Pin 6	Omitted	-
Pin 7	Heater	h
Pin 8	Heater	h
Top Cap	Cathode	k

"Internal Connection" indicates that the pin is connected to an electrode for the purpose of improving mechanical rigidity. The connection may not always be made to the same electrode on a given valve type, and it is essential that the corresponding valve holder socket be left unconnected.

THE EDISON SWAN ELECTRIC COMPANY LTD.

U.403

AC/DC MAINS HALF WAVE RECTIFIER

RATING.

Heater Voltage	40·0
Heater Current (Amps.)	0·2
Maximum Anode Voltage (R.M.S.)	250
Maximum Output Current (mA.)	120

TYPICAL OPERATION.

Input Volts (R.M.S.)	200	230	200	230
D.C. Load Current (mA.)	90	90	120	120
Reservoir Capacity (μF.)	16	16	16	16
D.C. Rectified Output	193*	237*	175*	218*
D.C. Volts Drop across Rectifier ...	8·5	8·5	11	11

* Voltage Output with 50 ohms limiting resistance in series with rectifier.

DIMENSIONS.

Maximum Overall Length	100 mm.
Maximum Diameter	38 mm.

GENERAL.

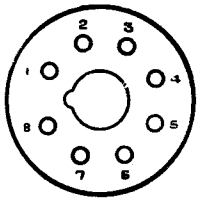
The U.403 is an indirectly heated half wave rectifier suitable for use in A.C./D.C. receivers. The bulb is metallised, and the valve is fitted with a Mazda octal base, the connexions to which are given overleaf.

APPLICATION.

To safeguard the valve from the large current surges present on switching, it is imperative to use a 50-ohm resistance in series with the anode. In A.C./D.C. receivers it is usually desirable to connect this resistance in series with the reservoir condenser in order not to reduce the voltage output on D.C. mains. The reservoir capacity should not exceed 16 μF. unless an appreciably higher limiting resistance is employed. In use, the metal coating should be connected to the chassis.

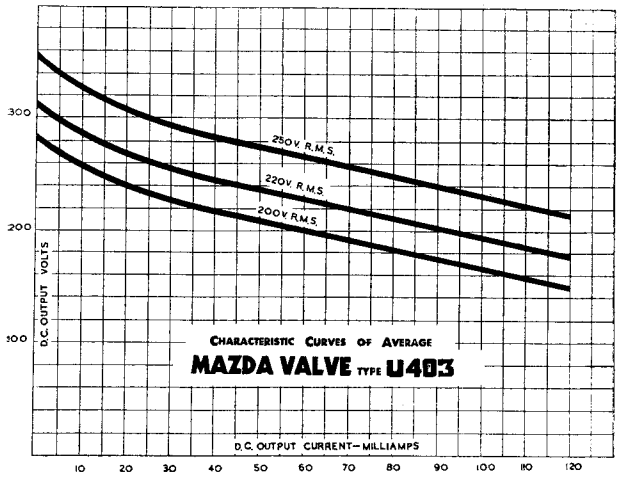
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. Heater.
2. Omitted.
3. Cathode.
4. Omitted.
5. Anode.
6. Metallising.
7. Omitted.
8. Heater.



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155, CHARING CROSS ROAD, LONDON, W.C.2.

MAZDA

U.404

HALF WAVE RECTIFIER

Indirectly heated – for series operation

RATING		
Heater Current (amps)	I_h	0.1
Heater Voltage (volts)	V_h	40.0
Maximum Anode Voltage (volts RMS)	$V_{a(rms)max}$	250
Maximum Peak Inverse Anode Voltage (volts)	P.I.V.(max)	750
Maximum Mean Anode Current (mA)	$I_{a(av)max}$	90
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	700
Maximum Peak Potential Heater/Cathode with Heater negative (volts)	$V_{h-k(max)}$	550

DIMENSIONS	
Maximum Overall Length (mm)	76
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	63
Radius Over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	$\frac{3}{4}$
Approximate Packed Weight (ozs)	1

MOUNTING POSITION – Unrestricted.

U.404

MAZDA

U.404

HALF WAVE RECTIFIER

Indirectly heated – for series operation

TYPICAL OPERATION

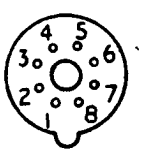
D.C. Load Current (mA)		70		90	
D.C. Rectified Output with 230 volts R.M.S. input	* 248		† 235 * 235		† 220
Reservoir Condenser (μF)		16		16	
D.C. Voltage drop across rectifier (volts)		8.0		9.5	

* Voltage output with 50 ohms limiting resistance in series with rectifier.

† Voltage output with 100 ohms limiting resistance in series with rectifier.

BULB Clear

BASE B.8.A.



Viewed from free end of pins

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode	a
Pin 3	Blank	
Pin 4	Internal Connexion b	
Pin 5	Internal Connexion b	
Pin 6	Internal Connexion b	
Pin 7	Cathode	k
Pin 8	Heater	h

b "Internal Connexion" indicates that the pin is connected to an electrode for the purpose of improving mechanical rigidity. The connexion may not always be made to the same electrode on a given valve type and it is essential that the corresponding valve holder socket be left unconnected.

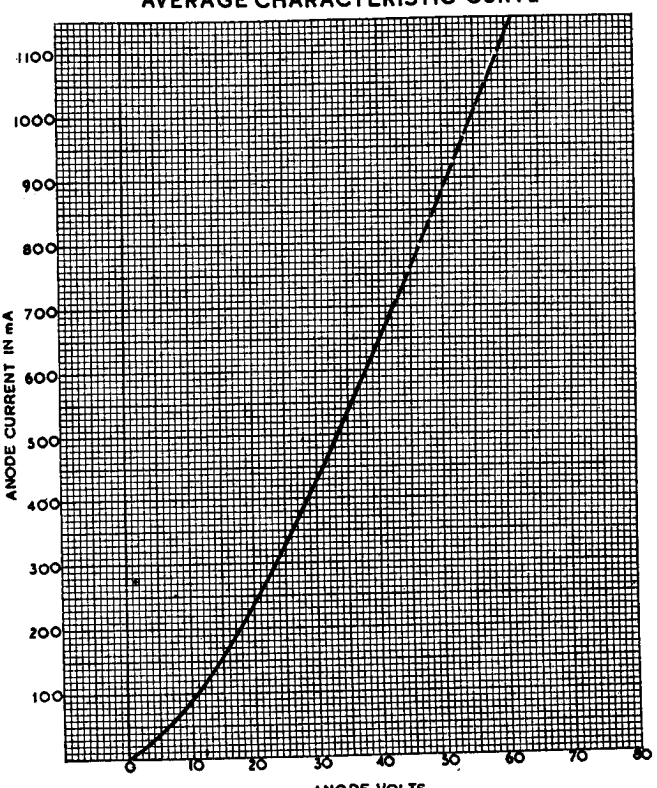
MAZDA

U.404

HALF WAVE RECTIFIER

Indirectly heated – for series operation

AVERAGE CHARACTERISTIC CURVE



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THE EDISON SWAN ELECTRIC COMPANY LTD.

U.404

MAZDA

U.404

HALF WAVE RECTIFIER

Indirectly heated – for series operation

CHARACTERISTIC CURVES OF AVERAGE

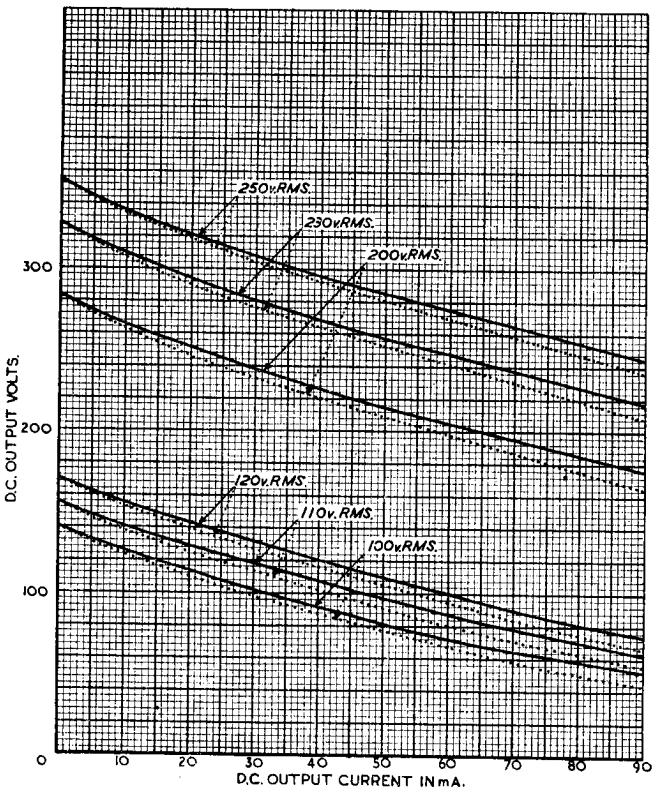
MAZDA VALVE U404

HALF WAVE RECTIFICATION REGULATION CHARACTERISTIC

Curves taken with 8μF Reservoir Condenser.

Key —— *no Limiting Resistance in Anode Circuit.*

..... *50Ω Limiting Resistance in Anode Circuit.*



June 1948 *RADIO DIVISION* Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

U.404

HALF WAVE RECTIFIER

Indirectly heated – for series operation

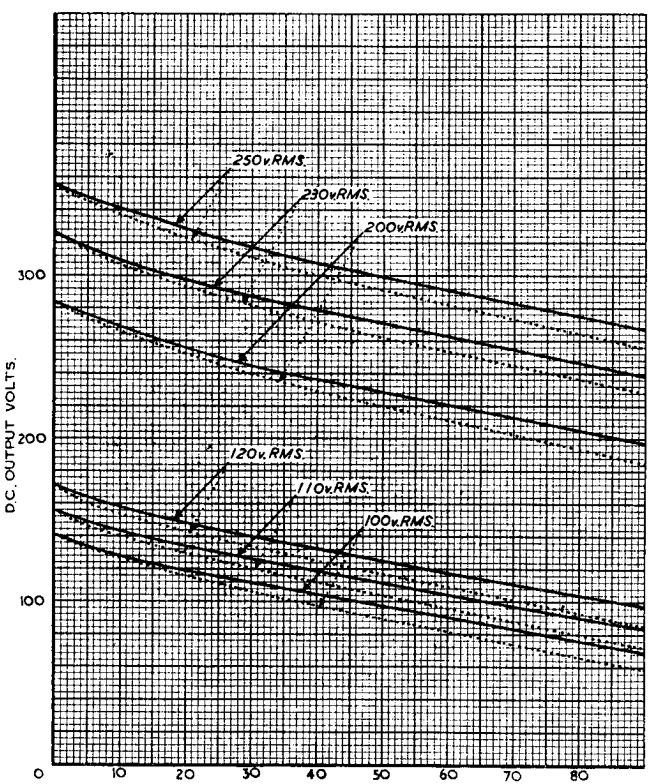
CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE U404

HALF WAVE RECTIFICATION REGULATION CHARACTERISTIC

Curves taken with 12μF Reservoir Condenser.

Key { —— *no Limiting Resistance in Anode Circuit.*
Key { ····· *50Ω Limiting Resistance in Anode Circuit.*



June 1948 RADIO DIVISION Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD.

U.404

MAZDA

U.404

HALF WAVE RECTIFIER

Indirectly heated – for series operation

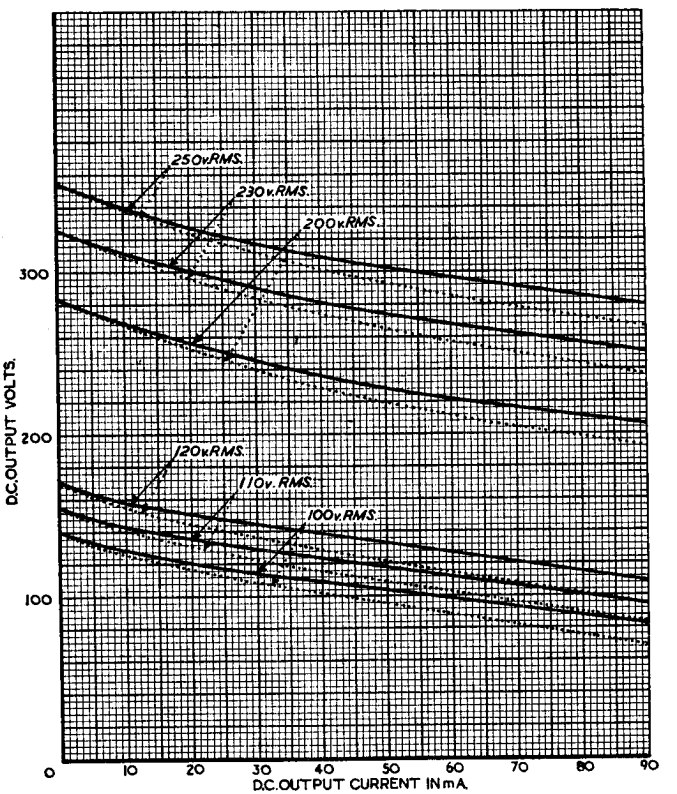
CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE U404

HALF WAVE RECTIFICATION REGULATION CHARACTERISTIC

Curves taken with 16μF Reservoir Condenser.

Key { —— no Limiting Resistance in Anode Circuit.
..... 50Ω Limiting Resistance in Anode Circuit.



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THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

U.404

HALF WAVE RECTIFIER

Indirectly heated – for series operation

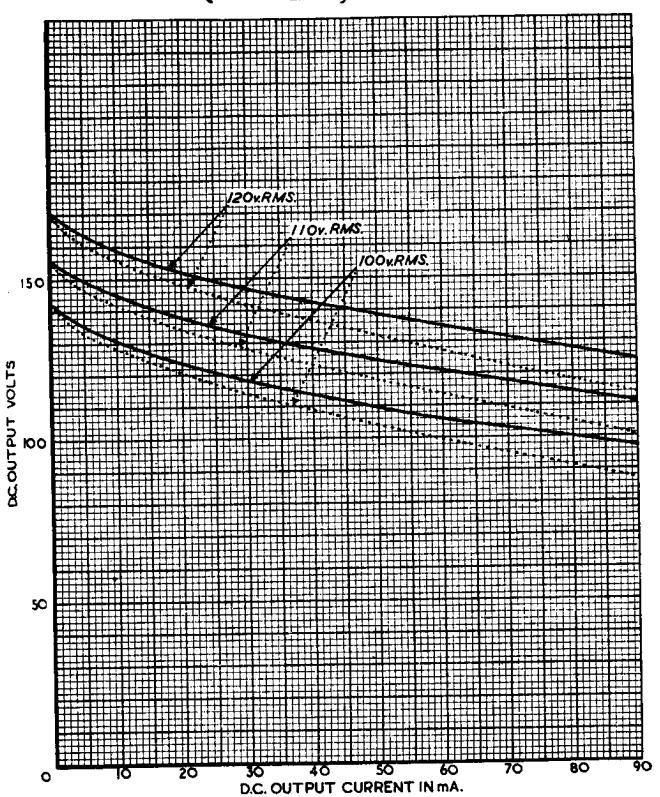
CHARACTERISTIC CURVES OF AVERAGE

MAZDA VALVE U.404

HALF WAVE RECTIFICATION REGULATION CHARACTERISTIC

Curves taken with 32μF Reservoir Condenser.

Key { —— *no Limiting Resistance in Anode Circuit.*
..... *225Ω. Limiting Resistance in Anode Circuit.*



MAZDA

U. 4020

A.C./D.C. MAINS HALF WAVE RECTIFIER

RATING.

Heater Voltage	40·0
Heater Current (Amps.)	0·2
Maximum Anode Volts (R.M.S.)	250
Maximum Output Current (mA)	120

TYPICAL OPERATION.

Input Volts (RMS.)	200	230	200	230
D.C. Load Current (mA)	90	90	120	120
Reservoir Capacity (μF)	16	16	16	16
D.C. Rectified Output	*193	*237	*175	*218
D.C. Volts Drop across Rectifier	8·5		11·0	

* Voltage Output with 50 ohms limiting resistance in series with rectifier.

DIMENSIONS.

Maximum Overall Length	122 mm.
Maximum Diameter	38 mm.

GENERAL.

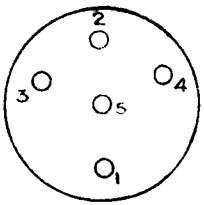
The U.4020 is an indirectly heated half wave rectifier, suitable for use in A.C./D.C. receivers. The valve is fitted with a standard 5-pin base the connexions to which are given overleaf.

APPLICATION.

Owing to the very low internal impedance of this valve a limiting resistance should be placed in the anode circuit to prevent the development of momentary arcs between anode and cathode due to switching surges. The minimum value of this resistance should be 50 ohms, and it should be connected between the anode and the smoothing circuit. Due to the use of an indirectly heated cathode the rectified H.T. voltage is developed slowly, and this will be found to be of considerable advantage when high power output valves are used or when electrolytic condensers are used in the smoothing circuits. The heater is designed to operate at 0.2 amps., and the series heater resistance should be such that the filament current has this value at average line voltage.

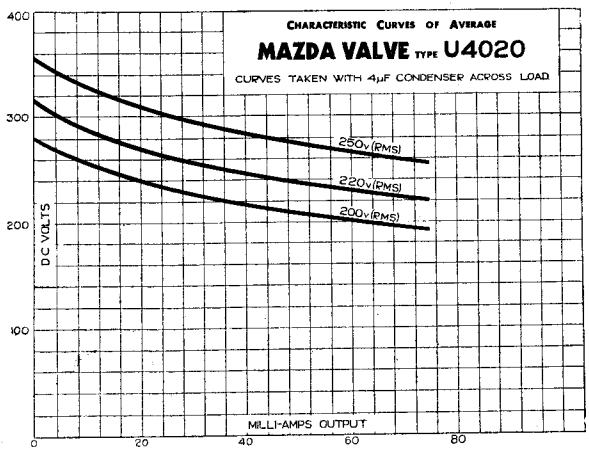
MAZDA

BASING.



Viewed from the free end of the base.

Pin No. 1. Anode.
2. —
3. Heater.
4. Heater.
5. Cathode.



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MAZDA

UD41

RECTIFIER FOR VOLTAGE DOUBLING CIRCUITS

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	1·15
Maximum Anode Voltage (RMS per anode)	550
Maximum Mean Anode Current (mA.)...	35

TYPICAL OPERATION.

Transformer Secondary Volts, RMS (VI)	500	500	550	550	550
Mean Anode Current (mA.) ...	20	20	25	25	30
D.C. Output Volts (Vo.) ...	1,240	1,240	1,320	1,320	1,380
C1 (μF.)	2	2	2	2	2
C2 (μF.)	2	4	2	4	4
Ripple Volts (RMS 100 $\sim$ approx.)	12·5	7·5	15·5	9·5	11

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	45 mm.

GENERAL.

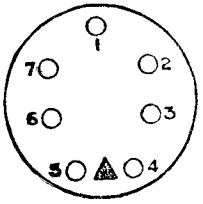
The UD.41 is an indirectly heated voltage doubler designed for use in H.T. supply units for television scanning time bases. The valve is fitted with a standard 7-pin base, the connexions to which are given overleaf.

APPLICATION.

Due to the valve having a suitable heating time the use of this valve in the time base circuits of a television receiver using an electrostatic tube obviates the use of delayed switching when used to provide the H.T. supply. At the same time the screen of the cathode ray tube will be safeguarded. T.31 thyratrons and AC/P.4 valves (in paraphase amplifier) are recommended for use in the time base circuit.

The heaters of vision and sound receivers as well as the time base valves reach operating temperature before the UD.41 applies the H.T. supply to the time base. A short period after the scanning voltage is applied to the deflecting plates of the cathode ray tube, the U.21 (in the tube H.T. supply unit) reaches its operating temperature and the H.T. is applied to the cathode ray tube anodes. With this sequence of operation it is possible to safeguard not only the cathode ray tube, but also to eliminate the possibility of burning the screen with a stationary spot.

BASING.



Viewed from the free end of the base.

Pin No. 1. —
2. —
3. Heater 1 and Cathode 1.
4. Heater 1.
5. Heater 2.
6. Heater 1, Cathode 2 and Anode 1.
7. Anode 2.

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UU.4 AND UU.5

A.C. MAINS RECTIFYING VALVES

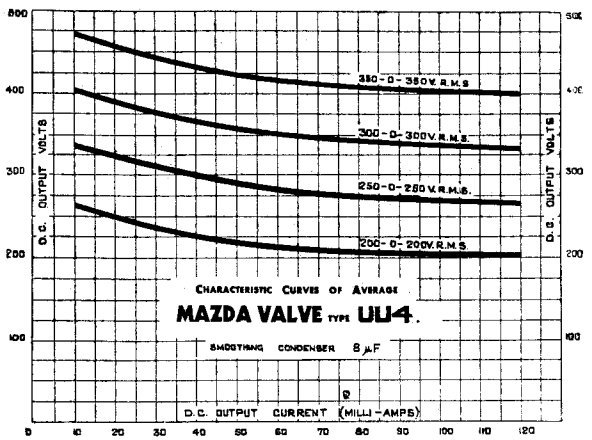
RATING.	UU4.	UU5
Heater Voltage	4·0	4·0
Heater Current (amps.)	2·2	2·3
Maximum Anode Volts, RMS per anode	350	500
Maximum Mean Anode Current (2 anodes) ...	120 mA	120 mA

TYPICAL OPERATING CONDITIONS.		
Volts RMS per anode	350	500
D.C. Output Current (mA)	120	120
D.C. Output Volts (approx.)	400	580
Reservoir Condenser (mfd.)	8	8

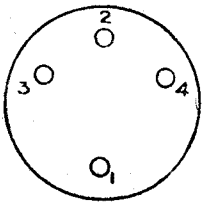
DIMENSIONS.		
Maximum Overall Length	122 mm.	122 mm.
Maximum Diameter	45 mm.	45 mm.

GENERAL.

The UU.4 and UU.5 are indirectly heated rectifiers for use on A.C. mains. The UU.4 may be used to replace both the UU.3 and UU.120/350. The UU.5 may be used to replace the UU.120/500. The valves are fitted with standard 4-pin bases, the connections to which are given overleaf.

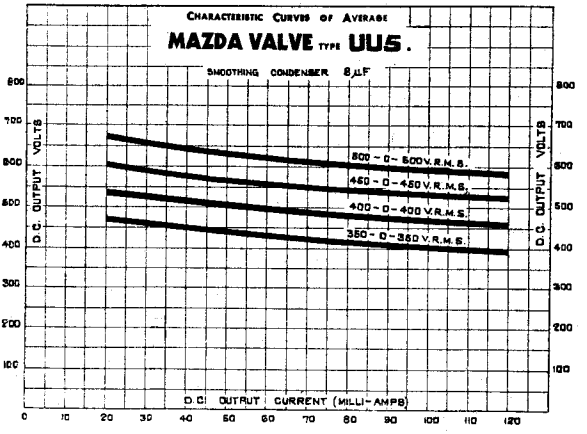


BASING.



Pin No. 1. Anode.
2. Anode.
3. Heater and Cathode.
4. Heater.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

UU.6

A.C. MAINS RECTIFYING VALVE

RATING.

Heater Voltage	4·0
Heater Current (amps.)	1·4
Maximum Anode Volts (RMS) per anode	350
Maximum Total Mean Anode Current (mA)	120
Maximum Reservoir Capacity (μF)	16

TYPICAL OPERATION.

Full Wave Rectifier.

Volts R.M.S. per anode ...	300	350	300	350	300	350
*Mean Rectified Volts (approx.)	360	425	340	405	325	395
Mean Rectified Current (mA)	60	60	90	90	120	120
Reservoir Capacity (μF) ...	8	8	8	8	8	8

*The above D.C. Output volts assume very low transformer resistances and reactances. In practice the D.C. output is not increased by changing from 8 to 16 μF, but the hum ripple is reduced.

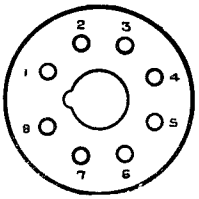
DIMENSIONS.

Maximum Overall Length	97 mm.
Maximum Diameter	32 mm.

GENERAL.

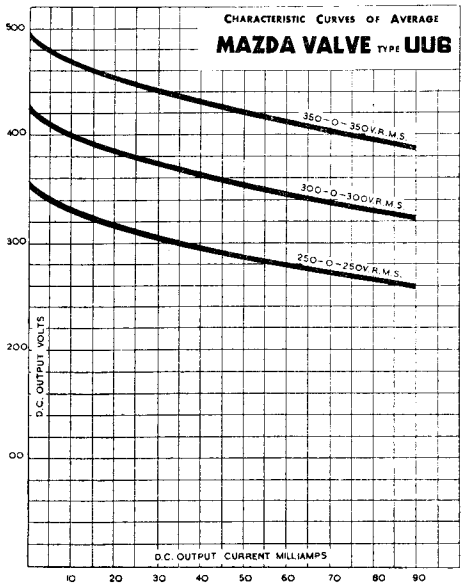
The UU.6 is an indirectly heated rectifier designed for use in A.C. Mains receivers. The bulb is of small dimensions and metallised. In view of this the valve will be found suitable for mains portable receivers or any receivers where rectifier hum trouble is experienced due to cramped lay-out. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

BASING.



Pin No. 1. Heater and Cathode
2. Omitted.
3. Anode.
4. Omitted.
5. Anode.
6. Metallising.
7. Omitted.
8. Heater.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

UU.7

A.C. MAINS RECTIFYING VALVE

RATING.

Heater Voltage	4·0
Heater Current (amps)	2·3
Maximum Anode Volts R.M.S. per anode	350
Maximum Anode Volts R.M.S. per anode	400
*Maximum Mean Anode Current (two anodes) (mA)	120
†Maximum Mean Anode Current (two anodes) (mA)	180

*For maximum anode current of 120 mA, Maximum Anode Volts 400
†For maximum anode current of 180 mA, Maximum Anode Volts 350

TYPICAL OPERATION.

Full Wave Rectifier.

Volts R.M.S. per anode ...	300	300	300	350	350	350
*D.C. Output Volts (approx.)	340	325	315	405	390	385
D.C. Output Current (mA)	120	120	180	120	120	180
Reservoir Condenser (μF)	16	8	16	16	8	16

The Reservoir condenser must not exceed 16μF.

*The above D.C. Output Volts assume very low transformer resistances and reactances. In practice D.C. Output is not increased by changing from 8 to 16μF, but the hum ripple is reduced.

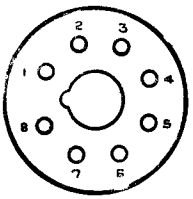
DIMENSIONS.

Maximum Overall Length	113 mm.
Maximum Diameter	45 mm.

GENERAL.

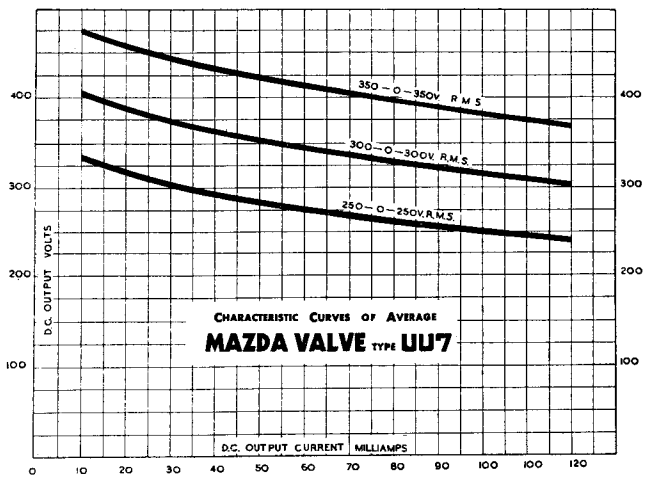
The UU.7 is an indirectly heated rectifier designed for use in A.C. Mains receivers. The bulb is of small dimensions and metallised. In view of this the valve will be found suitable for mains portable receivers or any receivers where rectifier hum trouble is experienced due to cramped lay-out. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

BASING.



Viewed from the free end of the base.

Pin No. 1. Heater and Cathode.
2. Omitted.
3. Anode.
4. Omitted.
5. Anode.
6. Metallising.
7. Omitted.
8. Heater.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

UU 8

A.C. MAINS RECTIFYING VALVE

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	2.8
Maximum Anode Volts R.M.S. per anode	350
Maximum Mean Anode Current (Two Anodes) (mA)	250

TYPICAL OPERATION.

Full Wave Rectifier

Volts R.M.S. per anode	300	300	350	350
*D.C. Output Volts (Approx.)	320	295	380	355
D.C. Output Current (mA)	250	250	250	250
Reservoir Condenser (μF)	16	8	16	8

The Reservoir condenser must not exceed 16 μF.

*The above D.C. Output Volts assume very low transformer resistances and reactances. With transformer sizes usually encountered in practice D.C. Output is not increased by changing from 8 to 16 μF, but the hum ripple is reduced.

DIMENSIONS.

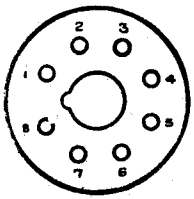
Maximum Overall Length	114 mm.
Maximum Diameter	54 mm.

GENERAL.

The UU.8 is an indirectly heated high current full-wave rectifier designed for use in A.C. Mains equipment. The bulb is of small dimensions and metallised. It is primarily intended for use in television receivers and other equipments requiring current outputs up to 250 mA with an input voltage not exceeding 350 volts R.M.S. per anode. The valve is fitted with a Mazda Octal base, the connexions to which are given overleaf.

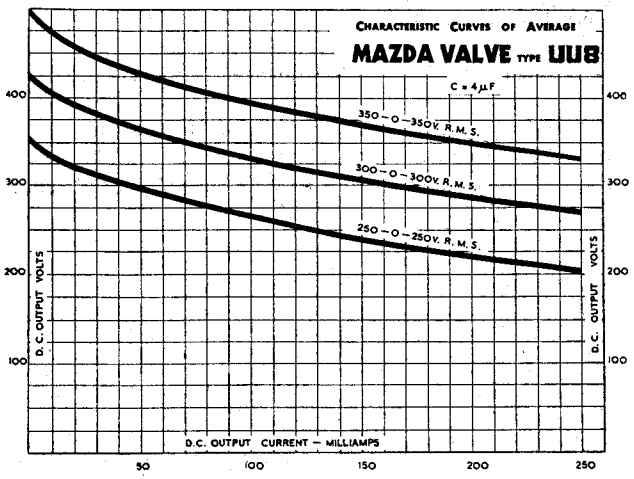
MAZDA

BASING



Pin No. 1. Heater and Cathode.
2. Omitted.
3. Anode.
4. Omitted.
5. Anode.
6. Metallising.
7. Omitted.
8. Heater.

Viewed from the free end of the base.



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THE EDISON SWAN ELECTRIC CO. LTD.,
155, CHARING CROSS ROAD, LONDON, W.C.2

U.U.9

MAZDA

U.U.9

FULL WAVE RECTIFIER

Indirectly heated – for parallel operation

RATING

Heater Voltage (volts)	V_h	6.3
Heater Current (amps)	I_h	0.63
Maximum Anode Voltage (volts RMS per anode)	$V_{a(rms)max}$	350
Maximum Peak Inverse Voltage (volts)	P.I.V.(max)	1100
Maximum Total Mean Anode Current (mA)	$I_{a(av)max}$	90
Maximum Peak Anode Current (mA)	$I_{a(pk)max}$	360
Maximum Reservoir Condenser (μF)		16
Maximum Peak Potential Heater/Cathode with Heater negative (volts DC)	$V_{h-k(max)}$	* 300

* This rating is applicable only to vibrator power supplies.

DIMENSIONS

Maximum Overall Length (mm)	76
Maximum Diameter (mm)	22
Maximum Seated Height (mm)	63
Radius Over Location Key (mm)	12.25
Approximate Nett Weight (ozs)	$\frac{3}{4}$
Approximate Packed Weight (ozs)	1

MOUNTING POSITION - Unrestricted

June 1948 RADIO DIVISION Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD

MAZDA

U.U.9

FULL WAVE RECTIFIER

Indirectly heated – for parallel operation

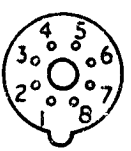
TYPICAL OPERATION (as Full Wave Rectifier)

Voltage per anode (volts RMS)	300	350	300	350
Approximate DC Rectified Output (volts) †	360	425	340	405
DC Load Current (mA)	60	60	90	90
Reservoir Condenser (μF)	8	8	8	8

† These voltages assume very low transformer resistances and reactances.

BULB Clear

BASE B.8.A.



Viewed from free end of pins.

CONNEXIONS

Pin 1	Heater	h
Pin 2	Anode 2	a"
Pin 3	Internal Connexion ¶	
Pin 4	Internal Connexion ¶	
Pin 5	Internal Connexion ¶	
Pin 6	Anode 1	a'
Pin 7	Cathode	k
Pin 8	Heater	h

¶ "Internal Connexion" indicates that the pin is connected to an electrode for the purpose of improving mechanical rigidity. The connexion may not always be made to the same electrode on a given valve type and it is essential that the corresponding valve holder socket be left unconnected.

U.U.9

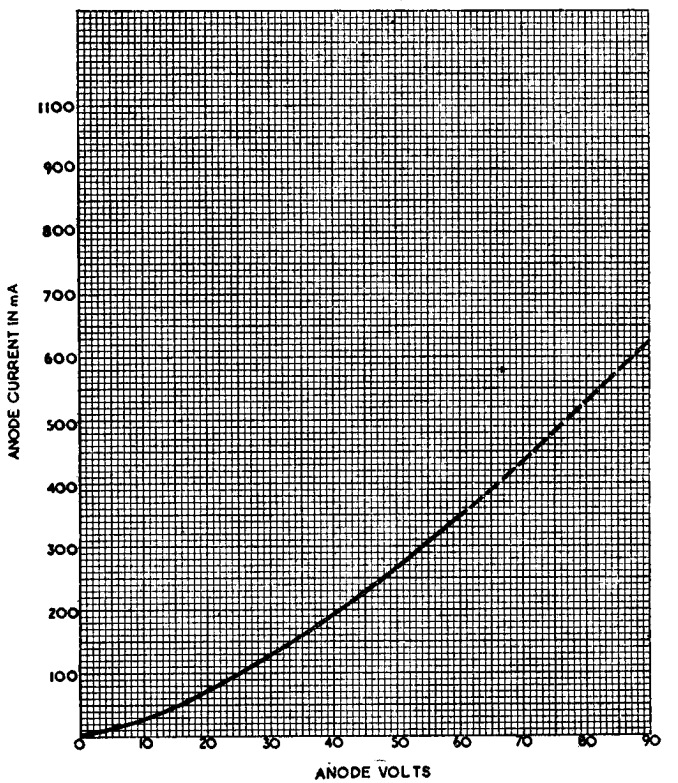
MAZDA

U.U.9

FULL WAVE RECTIFIER

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVE



October 1948 RADIO DIVISION Issue 1/2

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA V248A

(ATP4 - CV1366)

Directly heated transmitting screened pentode.

RATING

Filament Voltage	2.0 volts
Filament Current	0.3 amps
Max. Anode Voltage	150 volts
Max. Screen Voltage	150 volts
Max. Anode Dissipation	5.0 watts
Mutual Conductance	5.2 ma/V

(Measured at $v_A = Vg_2 = 150$; $Vg = -10$.)

CAPACITANCES (uuF)

Cag (max.)	2.0
Ca-all	18.0
Cg-all	19.2

BASE Mazda Octal

CONNECTIONS

Pin 1	Filament Negative
2	No Connection
3	No connection
4	Screen grid
5	Control grid
6	No connection
7	No connection
8	Filament Positive
T.C.	Anode

Used as transmitter output in WS18 set, with VP23 (ARP12 CV1331) and HL23DD (AR8, CV1306)

V.312

A.C. MAINS TRIODES

RATING.

Heater Voltage	4.0
Heater Current (Amps.)	0.65
Maximum Anode Voltage	250
*Mutual Conductance (mA/V)	2.5
*Amplification Factor	30
*Anode A.C. Resistance (ohms)	12,000

* Taken at Ea = 100, Eg = 0.

TYPICAL OPERATION.

Anode Voltage	150	150
Anode Current (mA)	3.0	2
Mutual Conductance (mA/V)	2.0	1.6
Grid Bias (Volts)	2.75	3.3

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	4.5	$\mu\mu$F.
*Grid to Earth	4.5	$\mu\mu$F.
Anode to Grid	2.2	$\mu\mu$F.

* "Earth" denotes all remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	127 mm.
Maximum Diameter	39 mm.

GENERAL.

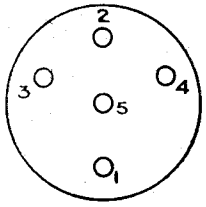
The V.312 is an indirectly heated triode specially intended for use in microphone amplifiers and similar applications where low hum level and valve noise are required. The bulb of the valve is metallised, and the valve is fitted with a standard 5 pin base, the connexions to which are given overleaf. The grid is connected to the top cap.

APPLICATION.

This valve may be used as a low-frequency amplifier with either transformer, choke or resistance-capacity coupling. With resistance-capacity coupling an anode resistance of 50,000 to 100,000 ohms will be found suitable.

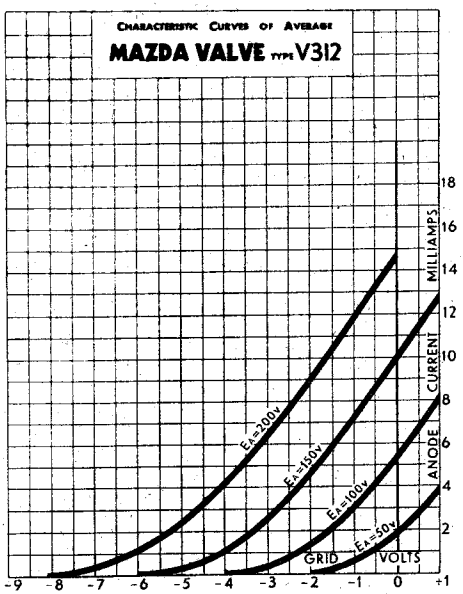
MAZDA

BASING.



Pin No. 1. Anode.
2. ——
3. Heater.
4. Heater.
5. Cathode and Metallising.
Top Cap. Control Grid.

Viewed from the free end of the base.



Mavda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by
THE EDISON SWAN ELECTRIC CO., LTD.
155 CHARING CROSS ROAD LONDON, W.C.2.

V.339

MAZDA

V.339

TRIODE

Indirectly heated – for Valve Voltmeter

REPLACEMENT ONLY – not for new equipment

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.58
Maximum Anode Voltage (volts)	V_a(max)	250
Amplification Factor	μ	* 73
Mutual Conductance (mA/V)	gm	* 1.7
Anode A.C. Resistance (ohms)	r_a	* 43,000
Maximum Potential Heater/Cathode (volts DC)	$V_{h-k(max)}$	150

* Taken at V_a = 100v; V_g = 0v.

INTER-ELECTRODE CAPACITANCES

Anode/Earth ($\mu\mu$F)	C_{out}	4.7
Anode/Control Grid ($\mu\mu$F)	$C_{a,gl}$	3.6
Control Grid/Earth ($\mu\mu$F)	C_{in}	3.6

DIMENSIONS

Maximum Overall Length (mm)	95
Maximum Diameter (mm)	38
Maximum Seated Height (mm)	80
Approximate Nett Weight (ozs)	1½
Approximate Packed Weight (ozs)	2½

MOUNTING POSITION - Unrestricted.

NOTE

This valve is designed for use as a Valve Voltmeter, providing a very linear scale shape. It is capable of operating with high resistance input circuits.

MAZDA

V.339

TRIODE

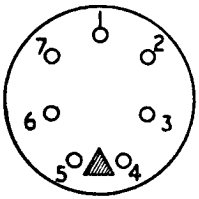
Indirectly heated – for Valve Voltmeter

REPLACEMENT ONLY – not for new equipment

BULB Metallised

CAP BVA Standard

BASE British 7 pin



Viewed from free end of pins.

CONNEXIONS

Pin 1	Blank	-
Pin 2	Metallizing	M
Pin 3	Blank	-
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Cathode	k
Pin 7	Anode	a
Top Cap	Control Grid	g1

V.453

MAZDA

V.453

SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

GENERAL

The V.453 is a low "hum", low noise, non-microphonic valve for use in the early stages of high gain amplifiers where the "Miller" input loading must be kept at a minimum, and where the elimination of "flicker" noise is of particular importance.

RATING

Heater Voltage (volts)	V_h	4.0
Heater Current (amps)	I_h	0.65
Maximum Anode Voltage (volts)	$V_{a(max)}$	250
Maximum Screen Voltage (volts)	$V_{g2(max)}$	150
Mutual Conductance (mA/V)	g_m	¶ 2.0

¶ Taken at V_a = 250 v; V_{g2} = 100 v; V_{g1} = -1.8v.

INTER-ELECTRODE CAPACITANCES

Anode/Earth (μμF)	c_{out}	11.6
Anode/Control Grid (μμF)	$c_{a,g1}$	.004
Control Grid/Earth (μμF)	c_{in}	6.75

DIMENSIONS

Maximum Overall Length (mm)	107
Maximum Diameter (mm)	32
Maximum Seated Height (mm)	94
Approximate Nett Weight (ozs)	1¼
Approximate Packed Weight (ozs)	2

MOUNTING POSITION – Unrestricted.

August 1948 RADIO DIVISION Issue 1/6

THE EDISON SWAN ELECTRIC COMPANY LTD.

V.453

MAZDA

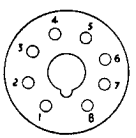
V.453

SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

BULB Metallised.

BASE British Octal (B.O.7.)



Viewed from free end of pins.

CAP B.V.A. Standard

CONNEXIONS

Pin 1	Heater	h
Pin 2	Cathode	k
Pin 3	Anode	a
Pin 4	Screen Grid	g_2
Pin 5	Suppressor Grid	g_3
Pin 6	Metallising	M
Pin 7	Omitted	-
Pin 8	Heater	h
Top Cap	Control Grid	g_1

August 1948 RADIO DIVISION Issue 1/6

THE EDISON SWAN ELECTRIC COMPANY LTD.

V.453

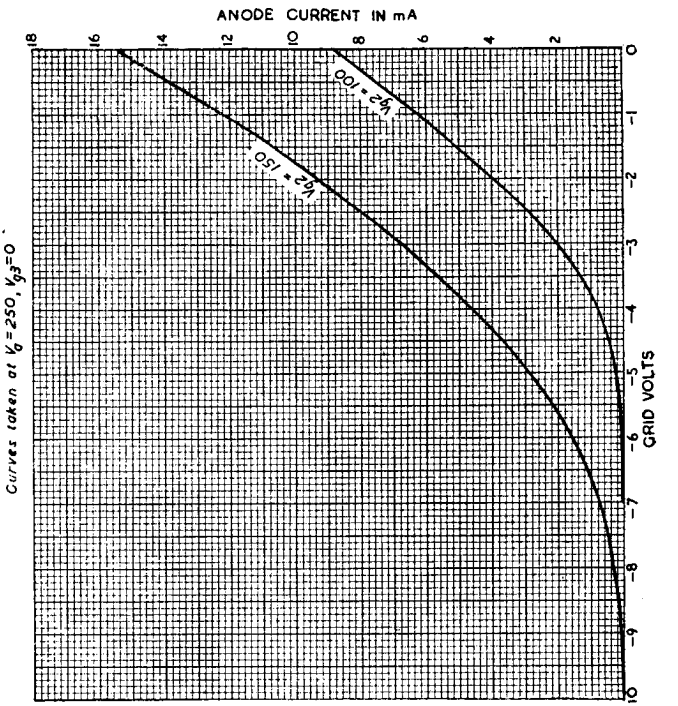
MAZDA

V.453

SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES



August 1948 RADIO DIVISION Issue 1/6

THE EDISON SWAN ELECTRIC COMPANY LTD.

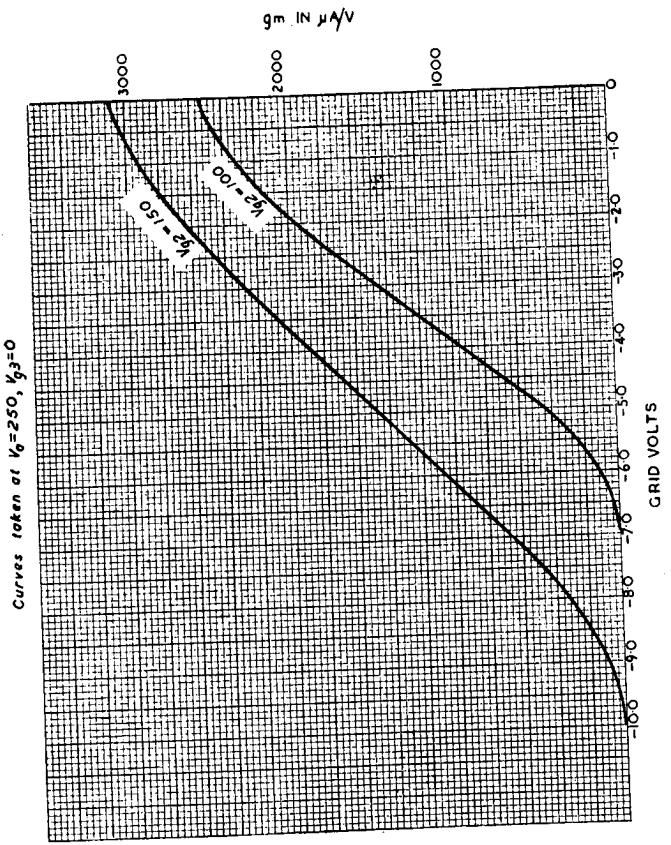
MAZDA

V.453

SCREENED R.F. PENTODE

Indirectly heated – for parallel operation

AVERAGE CHARACTERISTIC CURVES



August 1948 RADIO DIVISION Issue 1/6

THE EDISON SWAN ELECTRIC COMPANY LTD.

MAZDA

V.503

DIRECTLY HEATED MAINS OUTPUT TRIODE

RATING.

Filament Voltage	4.0
Filament Current (amps.)	2.0
Maximum Anode Volts	450
*Mutual Conductance (mA/V)	10
*Amplification Factor	4.25
*Anode A.C. Resistance (ohms)	425
Maximum Quiescent Anode Dissipation per Valve (watts) ...	25

*At Ea=100 v. ; Eg=0.

TYPICAL OPERATION (Push-Pull).

Anode Voltage	400	450
Total Anode Current (Quiescent) (mA)	100	110
Grid Bias for A.C. Filament Heating	85	96.5
Mutual Conductance (mA/V)	4.5	4.5
*Optimum Anode to Anode Load (ohms)	3,700	4,000
*R.M.S. Input Grid Volts per Valve	60	68
*Total Anode Current at M.U.P.O. with fixed Bias ...	210	230
*Power Output (watts)	32	40

*For a total harmonic content not exceeding 5 per cent.

DIMENSIONS.

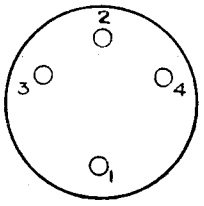
Maximum Overall Length	156 mm.
Maximum Diameter	64 mm.

GENERAL.

The V.503 is a directly heated power output triode for use in public address equipment, and is intended for use in Class AB operation. The valve is fitted with a standard 4-pin base, the connexions to which are given overleaf.

APPLICATION.

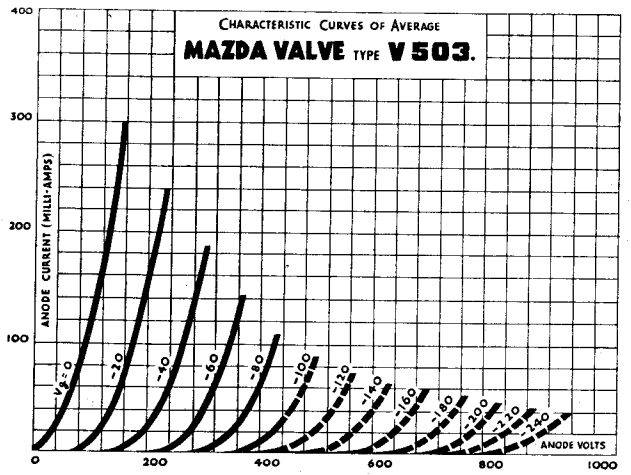
The valve should only be used with individual bias adjustment from a separate source to give the correct quiescent feed current. The grid-cathode resistance should be kept low, and in any case should not exceed 50,000 ohms. The valve is not intended for " positive drive " conditions of operation.



BASING.

Pin No. 1. Anode.
2. Grid.
3. Filament.
4. Filament.

Viewed from the free end of the base.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

V. 914

A.C. MAINS DOUBLE DIODE

RATING.

Heater Voltage	4·0
Heater Current (Amps.)	0·3
Maximum Rectified Current (mA)	1·0

INTER-ELECTRODE CAPACITIES.

*Diode 1 to Earth	3·5 $\mu\mu$F.
*Diode 2 to Earth	3·0 $\mu\mu$F.
Diode 1 to Diode 2	0·25 $\mu\mu$F.

* " Earth " denotes heater and cathode connected together.

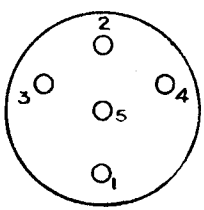
DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	41 mm.

GENERAL.

The V.914 is an indirectly heated double diode for rectification of H.F. signals and for providing automatic volume control in A.C. mains receivers. The valve is not suitable for H.T. rectification. The valve is fitted with a standard 5-pin base, the connexions to which are given below

BASING.



Viewed from the free end of the base.

Pin No. 1. Diode 2.
2. Diode 1.
3. Heater.
4. Heater.
5. Cathode.

Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby, and distributed by

THE EDISON SWAN ELECTRIC CO., LTD.
155, CHARING CROSS ROAD, LONDON, W.C.2.

EDISWAN RADIO

EDISWAN

V1901

HALF WAVE RECTIFIER

REPLACEMENT TYPE ←

GENERAL

The V1901 is a directly heated High Voltage Half Wave High Vacuum rectifier with a pure Tungsten filament, and is suitable for application in X-Ray supply units.

RATING

Filament Voltage (volts)	V_f	16.5
Filament Current (amps)	I_f	15.2
Maximum Peak Inverse Anode Voltage (kV)	P.I.V.(max)	60
Maximum Mean Anode Current (mA)	$I_{a(av)}$ max	400

DIMENSIONS

Maximum Overall Length (mm)	455
Maximum Diameter (mm)	160

Indicates a change ←

July 1958 *INDUSTRIAL VALVE & CRT DIVISION* Issue 2/6

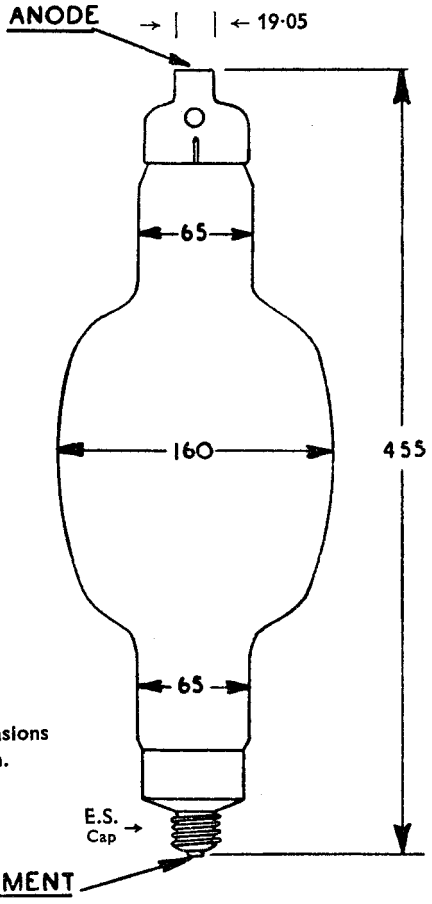
SIEMENS EDISON SWAN LIMITED

EDISWAN

V1901

HALF WAVE RECTIFIER

REPLACEMENT TYPE



Indicates a change

July 1958
INDUSTRIAL VALVE & CRT DIVISION
Issue 2/6
SIEMENS EDISON SWAN LIMITED

MAZDA

VP. 22

BATTERY VARIABLE-MU H.F. PENTODE

RATING.

Filament Voltage	2·0
Filament Current (Amps.)	0·1
Maximum Anode Voltage	150
Maximum Screen Voltage	150
*Mutual Conductance (mA/V)	1·4

*at Ea=120 ; Es=60 ; Eg=0.

OPERATING CONDITIONS.

Anode Voltage	120
Screen Voltage (initial)	60
Grid Bias	1·5
Mutual Conductance (mA/V)	0·8
Anode A.C. Resistance (megohms)	1·3
Anode Current (mA)	1·2
Screen Current (mA)	·32
Mutual Conductance (μA/V) at Es=60 ; Eg=−8.	10
Mutual Conductance (μA/V) at Es=120 ; Eg=−15.	28

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	12·5 $\mu\mu$F
*Grid to Earth	7·0 $\mu\mu$F
Anode to Grid	0·0045 $\mu\mu$F

*"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	103 mm.
Maximum Diameter	32 mm.

GENERAL.

The VP.22 is a variable-mu screened Pentode for use as an H.F. amplifier in battery operated receivers. The characteristics of the valve are identical except for the inter-electrode capacities, with those of the VP.210. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

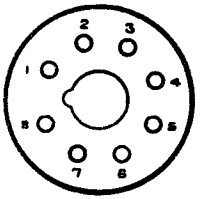
APPLICATION.

When used as a high frequency amplifier, the screen volts can be obtained from a separate tapping on the high tension battery. It is preferable, however, to connect the screen to the full H.T. voltage through a series dropping resistance. In calculating the value of this resistance, the screen current may be taken to be one-quarter of the anode current. An initial screen voltage of the order of 60 volts is recommended with a minimum bias of 1·5 volts, this will rise to practically the full H.T. voltage as the control grid is biased back to reduce mutual conductance. The advantage of this method of screen supply, is that large signal handling capacity is provided when the amplifier is operating at low gain, whilst the total high tension consumption is relatively low when the valve is being operated at minimum bias. In receivers provided with A.V.C. the initial bias voltage of 1·5 volts will form part of the delay voltage. If desired, this voltage may be slightly increased or decreased provided the initial screen volts are suitably adjusted to give the required maximum gain. The suppressor grid should be connected to earth (H.T. negative), or to a potential negative to earth. The metallising should be connected to H.T. negative.

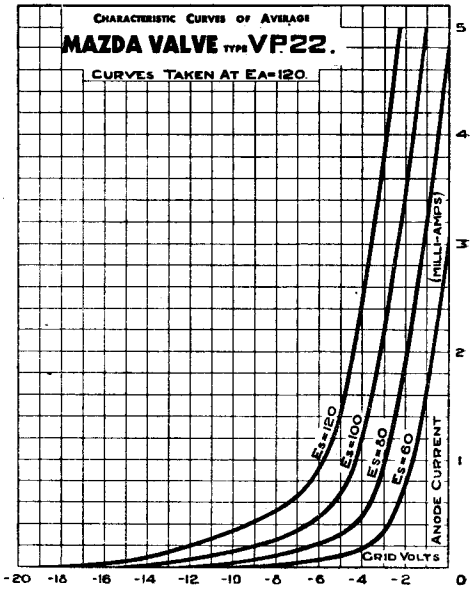
MAZDA

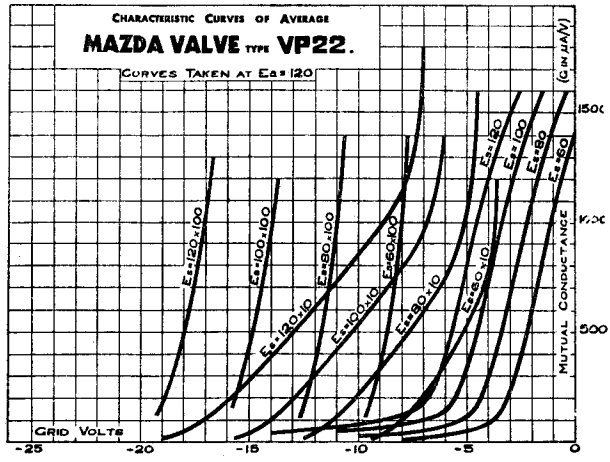
BASING.

Pin No.1. Filament.
2. Omitted.
3. Anode.
4. Screen Grid.
5. Suppressor Grid.
6. Metal Coating.
7. Omitted.
8. Filament.
Top Cap. Control Grid.



Viewed from the free end of the base.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby

MAZDA

VP.23

BATTERY ECONOMY H.F. PENTODE

RATING.

Filament Voltage	2·0
Filament Current (amps.)	0·05
Maximum Anode Voltage	150
Maximum Screen Voltage	150
*Mutual Conductance	1·3

*At Ea=120 ; Es=60 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	120	120
Screen Voltage	60	60
Grid Bias (initial)	—1·5	—2·0
Anode Current (mA)	1·45	1·0
Screen Current (mA)	0·5	0·35
Mutual Conductance (mA/V)	1·08	0·8
Mutual Conductance (μA/V) at Eg—9½ ; Es=60 ...	10	10
*Signal Handling Capacity Peak Carrier Volts at —15 Vg.	4	4

*For 5 per cent. total audio harmonic distortion and 60 per cent. modulated carrier, and for screen volts rising to the anode voltage.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11·0	$\mu\mu$F.
*Grid to Earth	8·0	$\mu\mu$F.
Anode to Grid	0·006	$\mu\mu$F.

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	95 mm.
Maximum Diameter	32 mm.

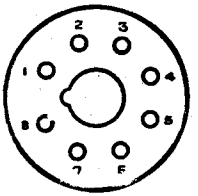
GENERAL.

The VP.23 is a variable-mu screened pentode for use in battery operated receivers. The special feature of this valve is that it has been designed for battery economy, and due to the exceptionally low filament consumption is therefore particularly recommended for use in battery portable receivers. The bulb is of small dimensions and metallised. The valve is based in a British Octal Base, the connections to which are given overleaf.

APPLICATION.

The valve may be used in the H.F. and I.F. stages of a receiver, and also as a frequency changer if a separate oscillator is employed. For this purpose the HL.23 will be found suitable. When used as an H.F. or I.F. valve in superheterodyne receivers, it is recommended that the screen voltage should be obtained by means of a series dropping resistance connected to the full H.T. supply. By this means a large input and output signal handling capacity is obtained without sacrificing the mutual conductance for a given anode current at the point of maximum gain. An initial bias of 1½ volts (with an initial screen voltage of 60) is recommended, and this will form part of the delay voltage in receivers provided with A.V.C. A saving of anode current for a given gain may be obtained by reducing the initial bias and screen voltage. To avoid instability, the metal coating should be always connected to earth.

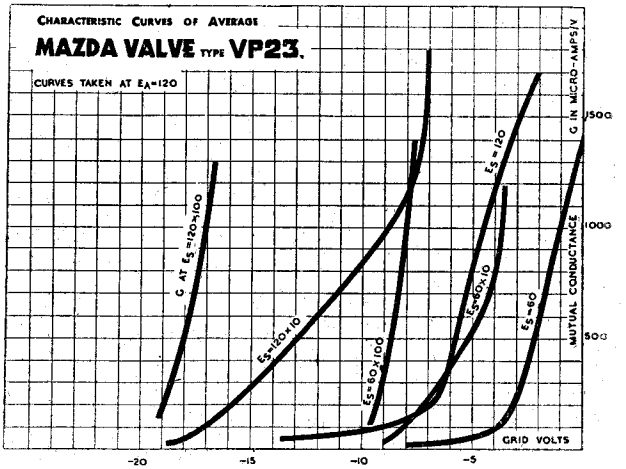
BASING.

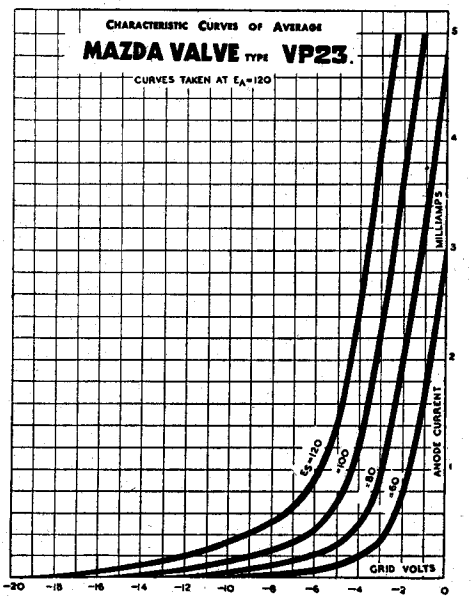


Viewed from the free end of the base.

Pin No. 1. Filament.
2. Omitted.
3. Anode.
4. Screen.
5. Suppressor Grid.
6. Metallising.
7. Omitted.
8. Filament.

Top Cap. Control Grid.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

MAZDA

VP.41

A.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	4·0
Heater Current (amps)	0·65
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	3·0

*Taken at Ea=250 ; Es=200 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	250	250
Screen Voltage	200	250
Grid Bias Voltage	2·7	4·0
Anode Current (mA)	7·7	8·6
Screen Current (mA)	2·0	2·3
Mutual Conductance (mA/V)	2·0	2·0
Anode A.C. Resistance (ohms)	1·3	1·2
Grid Bias for Mutual Conductance 10uA/v	35·4	44·2
Input Capacity Working ($\mu\mu$F)	7·8	7·8
Change in Input Capacity produced by biasing the valve to cut-off (▲.C.) ($\mu\mu$F)	1·1	1·1
Input Loss at 45 Mc (ohms)	10,000	10,000
†Maximum Peak Carrier Input Volts	8·0	10·0
Grid Bias for M.P.C.I.	33·0	41·0

†For 5 per cent. Total Harmonic Distortion at 60 per cent. Modulation.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11·5 $\mu\mu$F
*Grid to Earth	6·5 $\mu\mu$F
Anode to Grid	0.0025 $\mu\mu$F

*"Earth" denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	105 mm.
Maximum Diameter	32 mm.

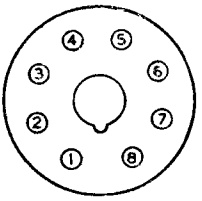
GENERAL.

The VP.41 is a variable-mu screened pentode designed for use in A.C. Mains receivers, and is particularly suitable for use in the H.F. stage of television receivers when a variable-mu characteristic is required. Modulation hum has been eliminated due to the provision of a non-inductive heater. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

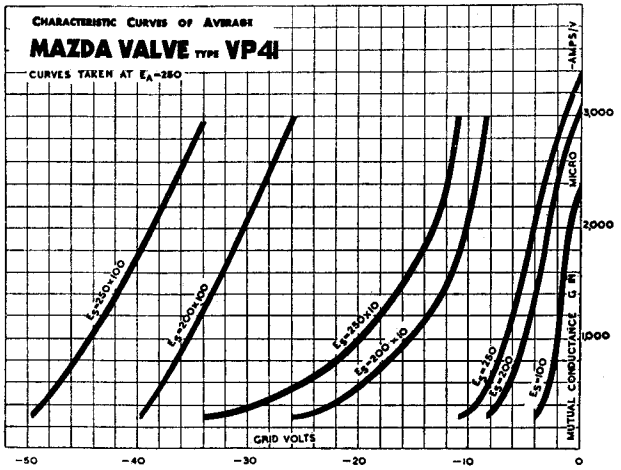
The valve has a large signal handling capacity, and will accept a modulated signal of over 10 volts peak carrier at bias without distortion, and cross-modulation has been reduced to a very low value for all values of grid bias. Under normal conditions the valve should be operated with self bias on the cathode, and the screen fed either directly from the H.T. line or through a series dropping resistance, according to whether it is necessary to decouple the screen from the point of view of stability. In the H. F. stage an initial screen voltage of 200 will prove satisfactory. When the valve is employed in the I.F. stage it is essential to apply only a fraction of the A.V.C. voltage to the last I.F. valve, unless a local distance switch is employed. When used with the TH.41 valve approximately half the A.V.C. voltage should be employed.

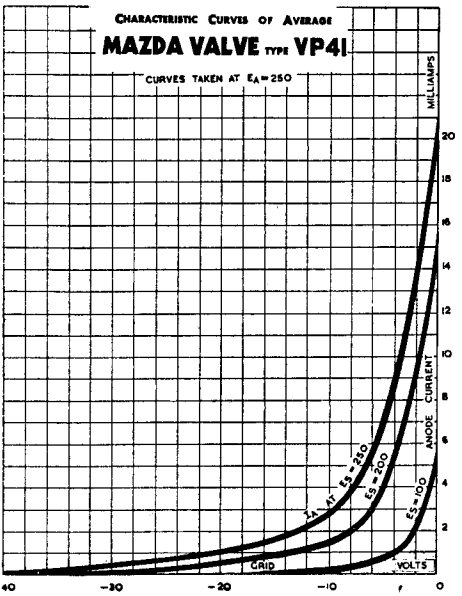
BASING.



Viewed from the free end of the base.

Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Suppressor Grid.
6. Metallising.
7. Omitted.
8. Heater.
Top Cap. Control Grid.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.

VP.133

A.C./D.C. MAINS H.F. PENTODE

RATING.

Heater Voltage	13·0
Heater Current (amps)	0·2
Maximum Anode Voltage	200
Maximum Screen Voltage	200
*Mutual Conductance (mA/V)	3·1

*Taken at Ea=200 ; Es=150 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	150	150	165	175
Screen Voltage (initial)	100	150	165	175
Grid Bias	—0·7	—2·7	—3·6	—3·9
Mutual Conductance (mA/V)	2·35	2·1	2·0	2·0
Anode Current (mA)	7·2	8·0	8·0	8·5
Screen Current (mA)	2·0	2·2	2·2	2·3
Anode A.C. Resistance (meghoms) ...	0·8	0·7	0·8	0·8
Grid Bias for Mutual Conductance of 10 uA/V	—	—	—	43·5
†Maximum Peak Carrier Input Volts ...	—	—	—	9·5
Grid Bias for M.P.C.I.	—	—	—	38

†For 5 per cent. Total Distortion with a 60 per cent. Modulation.

Note.

For the case of initial screen voltages of 100, 150 or 165, the signal handling capacity (M.P.C.I.V.) grid bias and gain will be the same as in the last column if the screen voltage is allowed to rise to 175 volts.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11·5$\mu\mu$F
*Grid to Earth	7·0$\mu\mu$F
Anode to Grid	0·0025$\mu\mu$F

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	105 mm.
Maximum Diameter	32 mm.

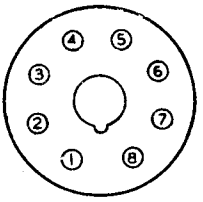
GENERAL.

The VP.133 is a variable-mu H.F. Pentode for use in A.C./D.C. receivers. The bulb is of small dimensions and metallised. The valve is fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

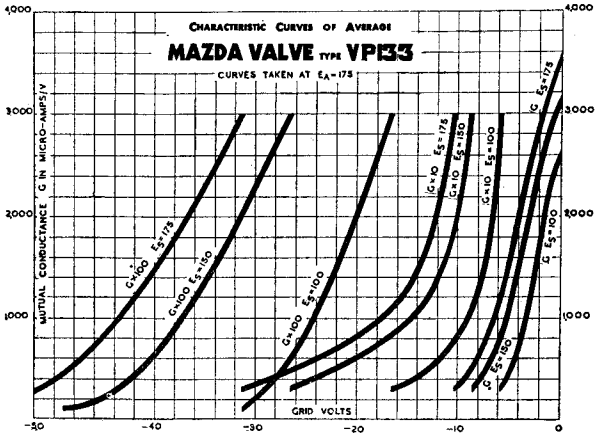
The valve has been specially designed for operation in A.C./D.C receivers employing the loud speaker field winding for smoothing. Under these conditions, the screen voltage does not rise above 175 volts with an average mains tapping. It is recommended that this valve should be used in a super-heterodyne receiver with a Mazda TH.2321 converter. When so used, in a receiver provided with automatic volume control the bias applied to the valve should be one-half to two-thirds of the bias applied to the TH.2321.

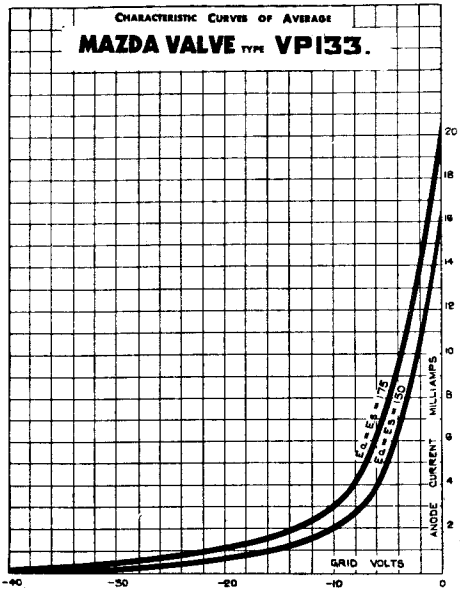
BASING.



Pin No. 1. Heater.
2. Cathode.
3. Anode.
4. Screen.
5. Suppressor Grid.
6. Metallising.
7. Omitted.
8. Heater.
Top Cap. Control Grid.

Viewed from the free end of the base.





Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

MAZDA

VP.210

BATTERY H.F. SCREENED PENTODE

RATING.

Filament Voltage	2·0
Filament Current (amps.)	0·1
Maximum Anode Volts	150
Maximum Screen Volts	150
Mutual Conductance (mA/V)	†1·40

†Ea=120 ; Es=60 ; Eg=0.

OPERATING CONDITIONS.

Anode Voltage	120	120
Screen Voltage	60	70
Grid Bias	1·5	1·5
Anode Current (mA)	1·1	1·8
Screen Current (mA)	0·385	0·63
Mutual Conductance (mA/V)	0·82	1·03
Anode AC Resistance (megohms)	1·45	0·89

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	11·0 $\mu\mu$F
*Grid to Earth	8·75 $\mu\mu$F
Anode to Grid	0·004 $\mu\mu$F

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	125 mm.
Maximum Diameter	39 mm.

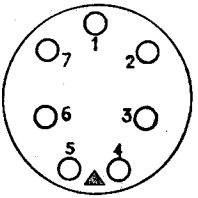
GENERAL.

The VP.210 is a variable-mu H.F. Pentode for use in battery operated receivers. The valve is based in a standard 7-pin base, the connections to which are given overleaf.

APPLICATION.

The valve has variable-mu characteristics with high signal handling capacity, suitable for use in H.F. amplifiers, or as a frequency changer with a separate oscillator. The screen volts should preferably be obtained by means of a dropping resistance from the full H.T. supply, as this reduces detector overloading to a great extent. When used as an H.F. amplifier, an initial screen voltage of the order of 60 volts is recommended at the minimum bias of 1.5 volts, and when used under these conditions will form part of the delay voltage in receivers provided with A.V.C. If desired, this voltage may be slightly increased or decreased, provided the initial screen volts are suitably re-adjusted to give the maximum gain. The suppressor grid and metallising should be connected to earth. When used as a frequency changer, cathode injection is recommended, and a suitable valve for the oscillator stage is the HL.2. A heterodyne voltage of 3 volts peak is suitable, and an initial screen voltage of 40 to 70 according to whether the valve is self-biased by its own grid current or provided with separate grid bias.

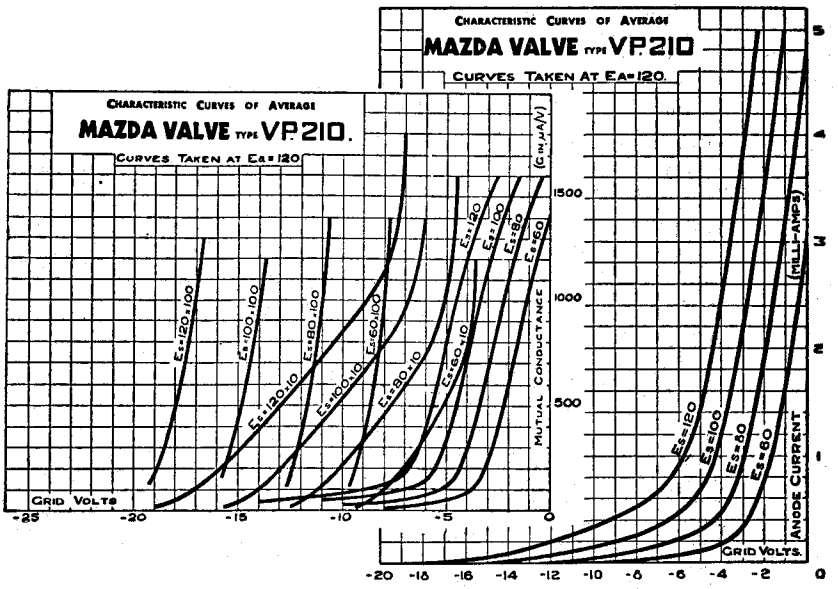
BASING.



Viewed from the free end of the base.

Pin No. 1. Metallising.
2. Control Grid.
3. Suppressor Grid.
4. Filament.
5. Filament.
6. —
7. Screen.

Top Cap. Anode.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co., Ltd., London and Rugby.

VP.1321 and VP.1322

A.C./D.C. MAINS VARIABLE-MU H.F. PENTODES

RATINGS.

Heater Voltage	13
Heater Current (amps.)	0·2
Maximum Anode Voltage	250
Maximum Screen Voltage	250
*Mutual Conductance (mA/V)	3

*Ea=250 ; Es=200 ; Eg=0.

TYPICAL OPERATION.

Anode Voltage	200	250	250
Screen Voltage	100	200	250
Grid Bias Voltage	—1·0	—2·8	—4
Anode Current (mA)	3·3	7·4	8·8
Screen Current (mA)	0·85	1·85	2·2
Impedance (megohms)	>2·0	1·0	0·85
Mutual Conductance (mA/V)	1·7	2·0	2·0
Grid Bias for Mutual Conductance (10μA/V)	—15	—34·5	—43
Maximum Input Signal Handling Capacity Voltage (approx.)		8	10
Bias for Maximum Input Signal Handling Capacity Voltage (approx.)		33	41

INTER-ELECTRODE CAPACITIES.

	VP.1321	VP.1322	
*Anode to Earth	8·5	9·5	$\mu\mu$F.
*Grid to Earth	9·75	7·0	$\mu\mu$F.
Anode to Grid	0·005	0·0025	$\mu\mu$F.

*" Earth " denotes the remaining earthy potential electrodes and metallising joined to cathode.

DIMENSIONS.

Maximum Overall Length	122 mm.	122 mm.
Maximum Diameter	39 mm.	38 mm.

GENERAL.

The VP.1321 and VP.1322 are indirectly heated variable-mu H.F. pentodes for use in D.C., A.C./D.C., or car radio receivers. The screen may be operated at 200 or 250 volts potential and a screen potentiometer is therefore unnecessary. Either will handle a modulated signal of 10 volts peak carrier without distortion. The characteristics are identical for both types. The valves are based in standard 7-pin bases, the connections to which are given overleaf.

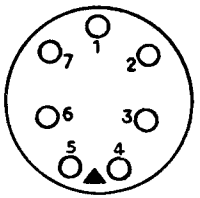
APPLICATION.

The valves are designed for H.F. or I.F. amplification and are also suitable for use in A.V.C. circuits. When a supply voltage exceeding 200 is available it is advantageous to limit the screen voltage to this figure at minimum bias by the use of a series resistance in the screen circuit. The value of this resistance may be calculated by assuming the screen current to be 25 per cent. of the anode current. Self-bias is recommended for the control grid.

The A.V.C. line must be decoupled to the cathode.

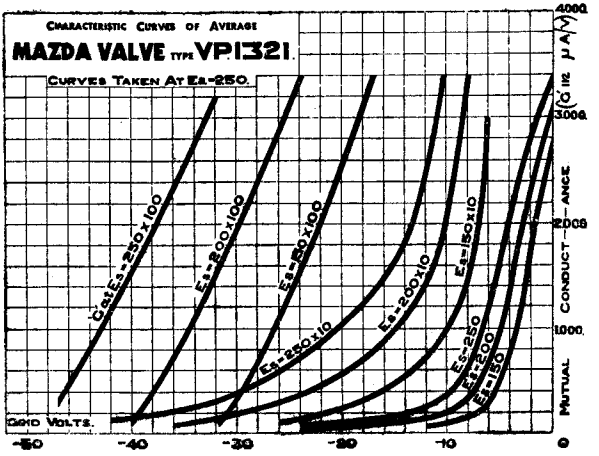
The valves may also be used as frequency changers in conjunction with the HL.1320 as an oscillator. A heterodyne voltage of 3-volt peak is suitable with an initial bias of 4-volt at a screen potential of 200.

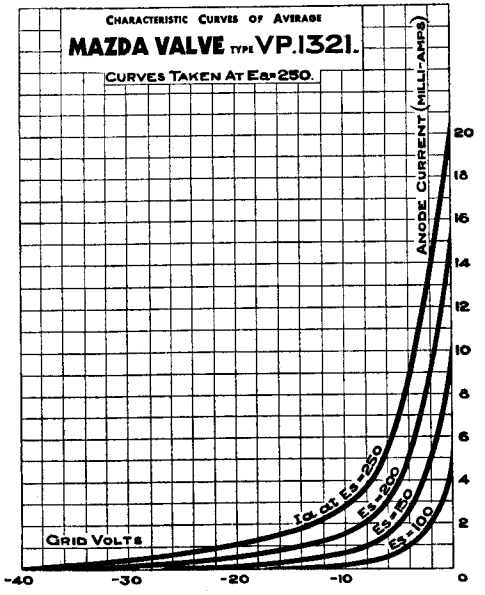
BASING.



Viewed from the free end of the base.

	VP.1321	VP.1322
Pin No. 1.	Metallising.	Metallising.
2.	Control Grid.	Anode.
3.	Suppressor Grid.	Suppressor Grid.
4.	Heater.	Heater.
5.	Heater.	Heater.
6.	Cathode.	Cathode.
7.	Screen Grid.	Screen Grid.
Top Cap.	Anode.	Control Grid.





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