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 μμF.
*Grid to Earth	9·25 μμF.
Anode to Grid	0·03 μμF.
†Grid to Filament	1·5 μμF.
†Grid to Filament and Screen	6·5 μμF.
Grid to Screen	5·0 μμF.
Grid to Suppressor	0·75 μμF.

Triode Section.

*Anode to Earth (less G. to A.)	6·5 μμF.
*Grid to Earth (less G. to A.)	4·5 μμF.
Anode to Grid	4·5 μμF.

* " 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.

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.

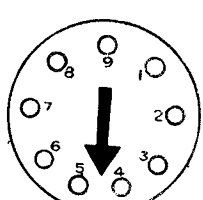
The Mazda TP.22 has variable-mu characteristics suitable for use with delayed diode automatic volume control. It is recommended that frequency changing should be accomplished by heterodyne injection in the filament leads as shown in Fig. 1, but injection in the suppressor grid may be used at the cost 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.

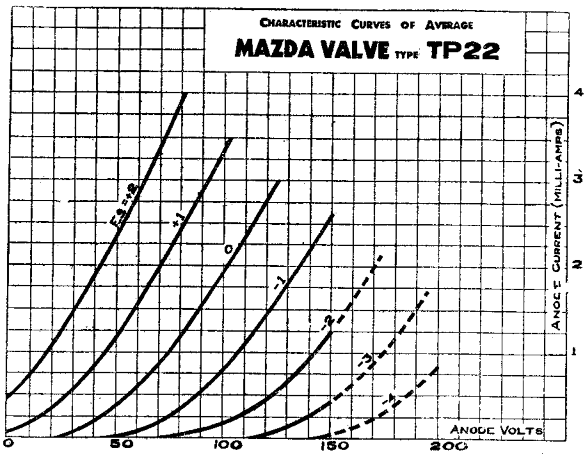
BASING.

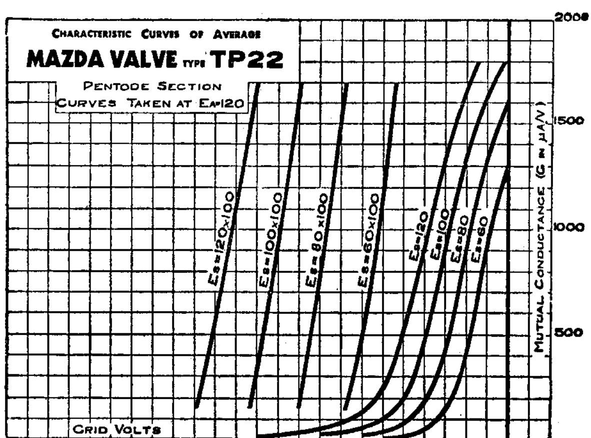


Viewed from the free end of the base.

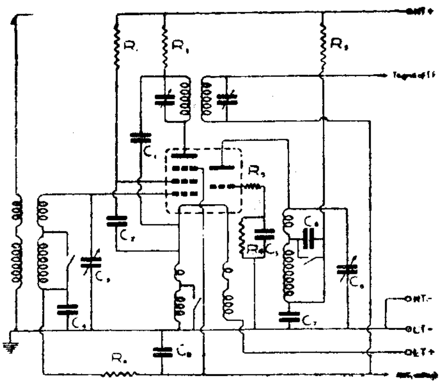
Pin No. 1.	Screen.
2.	Pentode Anode.
3.	Suppressor Grid.
4.	Filament.
5.	Filament.
6.	——
7.	Oscillator Anode.
8.	Oscillator Grid.
9.	Metallising.
Top Cap.	Pentode Control Grid.

MAZDA


Characteristic Curves of Average
MAZDA VALVE type TP22
Eg=+2
+1
0
-1
-2
-3
-4
Anode Current (Milli-amps)
1
2
3
4
Anode Volts
0
50
100
150
200

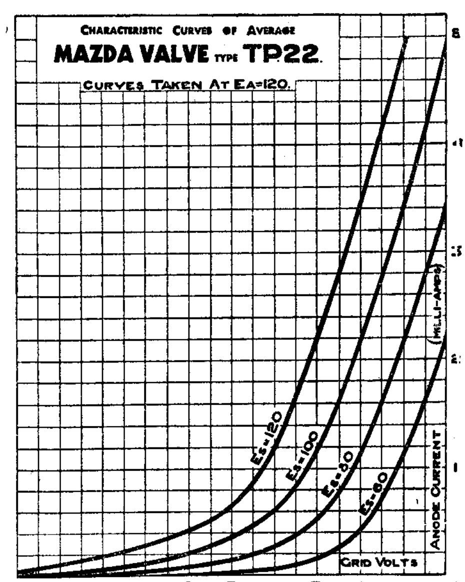

Characteristic Curves of Average
MAZDA VALVE type TP22
Pentode Section
Curves Taken at Ea=120
Es=120x100
Es=100x100
Es=80x100
Es=60x100
Es=120
Es=100
Es=80
Es=60
Mutual Conductance (G in μA/V)
2000
1500
1000
500
Grid Volts
-20
-15
-10
-5
0

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.



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd., London and Rugby.