

OSRAM VALVE
TYPE PT.2

(For use with 2-volt
Accumulators).

**Pentode Low Frequency
Amplifying Valve.**

Price, 20/-

The OSRAM PT.2 is a dull emitter pentode valve designed primarily for use in the last stage of 2-volt battery-operated sets employing one stage of L.F. amplification only. The valve is extremely sensitive to weak signals and when used as the output valve in such a set will increase the range of the receiver. It should not, however, be employed when the signal would be sufficiently strong to overload an ordinary power valve such as the L.P.2 or P.2 types.

For best results the maximum permissible screen voltage should be employed, the screen being connected either to the side terminal on the base or the centre pin, according to the type of base fitted.



OSRAM VALVE
TYPE DG.2

(For use with 2-volt
Accumulators).

**Dull Emitter Four-
Electrode Valve.**

Price, 20/-

The OSRAM DG.2 is a valve having an inner grid in addition to the normal control grid.

The DG.2 is recommended for use as the frequency changer in circuits of the Super-Heterodyne type. In such a case the inner grid may be joined through the oscillator coupling coil to the positive end of the filament. The valve is fitted with a standard 5-pin base the centre pin of which is connected to the inner grid.



Purpose.	Anode Volts.	Inner Grid Volts.	Recommended Grid Bias Volts.	Average Anode Current m.a.	Approximate Inner Grid Current m.a.
As Amplifier. As Frequency Changer in Super-Hot Sets.—	15-25	+20	-3 to -4½	1.2-2.0	11.0
Anode Bend Detection Leaky Grid Detection.	40-80 40-80	To + filament.	-6 to -15 Grid leak to + filament.	very small 1.1-2.4	negligible.

Anode Volts.	Screen Grid Volts.	Recommended Negative Grid Bias Volts.	Average Anode Current m.a.
150	150	4.5	6.5
125	125	3.0	5.8

NOMINAL RATING.

Filament Volts	...	...	...	2.0 max.
Filament Current	...	...	...	0.2 amp.
Anode Volts	...	...	...	150 max.
Screen Grid Volts	...	...	...	150 max.
Mutual Conductance	...	...	...	2.5

NOMINAL RATING.

Filament Volts	...	...	...	2.0 max.
Filament Current	...	...	...	0.2 amp.
Anode Volts	...	...	...	100 max.
Inner Grid Volts	...	...	...	20 max.
Amplification Factor	...	...	...	4.5
Impedance	...	...	...	3,750 ohms.
Mutual Conductance	...	...	...	1.2

OSRAM "FOUR"

NEW "MUSIC MAGNET."

In the New OSRAM "FOUR" all the advantages of the original OSRAM Music Magnet kit are retained, namely:

- (1) Two stages of tuned H.F. screen grid amplification giving unrivalled range.
- (2) One tuning knob only.
- (3) Both medium and long broadcast bands covered by operation of one external switch.
- (4) Superb quality of reproduction.

With the following additional advantages:

- (1) Better volume control, this being an essential for listeners residing nearby a high power station.
- (2) Better selectivity control—a very important feature in view of the increase in the number of high power stations broadcasting.
- (3) Greatly improved appearance due to introduction of a walnut wood cabinet of extremely handsome design.
- (4) Easy conversion to all-electric operation from the A.C. mains thus doing away with the necessity for batteries.

Both in the battery and the A.C. Mains Construction special attention has been paid to simplicity in assembly. The construction of the OSRAM "FOUR," can be undertaken by anyone with no knowledge of wireless.

Write for particulars of the OSRAM "FOUR." Full details as to how to construct this new and novel circuit obtainable from The General Electric Co., Ltd., Magnet House, Kingsway, W.C.2, or your Wireless Dealer.

Price of Kit with 4 OSRAM Battery Type VALVES,

£10 15 0

Hire Purchase, Deposit £1 5 0; 12 Monthly Payments of 17/.

OSRAM VALVES FOR 4-VOLT BATTERY SETS.

Type.	Purpose.	Filament Current Amps.	Amplification Factor.	Impedance Ohms.	Mutual Conductance m.a./volt.
S.410	Screen Grid H.F. valve.	0.1	200	200,000	1.0
HL.410	Detector H.F. and L.F. Amplifier.	0.1	25	20,800	1.2
L.410	L.F. Amplifier valve.	0.1	15	8,500	1.77
P.410	L.F. and Loudspeaker Power valve.	0.1	7.5	5,000	1.5
P.415	Loudspeaker Super-Power valve.	0.15	5.0	2,080	2.4
PT.425	Pentode	0.25	100	80,000	2.0

For those who employ 4-volt accumulators for their broadcast receiving sets the above range of OSRAM 4-volt battery valves will fulfil all requirements.

They are economical in current consumption and have a characteristic efficiency of a high order.

ALL-ELECTRIC RECEIVERS FOR A.C. MAINS.

OSRAM VALVES FOR 6-VOLT BATTERY SETS.

Type.	Purpose.	Fila- ment Cur- rent Amps.	Anode Volts max.	Amplifi- cation Fac- tor.	Imped- ance Ohms.	Mutual Con- ductance m.u./ volts
S.610	Screen Grid H.F. valve.	0.1	150	210	200,000	1.05
H.610	R.C. Amplifier.	0.1	150	40	60,000	0.67
HL.610	Detector and Amplifier valve	0.1	150	30	90,000	1.0
L.610	L.F. Amplifier valve	0.1	150	15	7,500	2.0
P.610	L.F. and Loud- speaker Power valve.	0.1	150	8	8,500	2.3
P.625A	Super Power valve.	0.25	200	3.7	1,600	2.3
P.625	Power Output valve.	0.25	250	6	3,400	2.5
PT.625	Power Pentode	0.25	*250	80	43,000	1.88

*Screen Volts 200 max.

The range of OSRAM 6-volt valves cover all the requirements of those who operate their broadcast receiving sets from a 6-volt accumulator.

In particular the OSRAM P.625A and P.625 are recommended as loudspeaker output valves which have proved their reliability and efficiency.

OSRAM A.C. Mains valves are used exclusively in all GECOPHONE A.C. Mains Receivers and also the OSRAM "FOUR" (New Music Magnet) when constructed for All A.C. Mains operation.

In addition, you can convert your last year's OSRAM MUSIC MAGNET 4 and the new Battery Model of the OSRAM "FOUR" to A.C. Mains operation by the use of the GECOPHONE A.C. All Power Unit and OSRAM A.C. Mains valves.

The following are new GECOPHONE All Electric Receivers using OSRAM A.C. Mains valves.

GECOPHONE Compact All Electric Screen Grid Receiver for A.C. Mains, Catalogue Number B.C. 3235.

GECOPHONE Table Four All Electric Screen Grid Receiver for A.C. Mains, Catalogue Number B.C. 3240.

GECOPHONE Console All Electric Screen Grid Receiver for A.C. Mains, Catalogue Number B.C. 3244.

GECOPHONE All Electric Radio Gramophone for A.C. Mains, Catalogue Number B.C. 3248.

The above receivers embody all that is most modern in Radio design and are recommended for reliability, long distance reception and the finest quality reproduction. They fulfil every need, from the local station listener by whom an outdoor aerial is rarely required, to the enthusiast who wishes to receive a large number of distant stations clearly and with considerable volume. Great simplicity of operation and economy in running are assured by use of OSRAM A.C. Mains valves including the new OSRAM Pentode P.T.4.

For fuller particulars of GECOPHONE Radio Receivers, see page 56 at the end of this booklet.

OSRAM VALVES FOR A.C. MAINS SETS.

Type.	Purpose.	Filament		Anode Volts max.	Amplification Factor.	Impedance, ohms.	Mutual Conductance m.a./ volt.
		Volts.	Current amps.				
M.S4- VMS4	Screen Grid H.F. valve.	4.0	1.0	200	550	500,000	1.1
MS.4B	Screen Grid H.F. valve.	4.0	1.0	200	1120	350,000	3.2
M.H4	Detector and R.C. Amplifier.	4.0	1.0	200	40	11,100	3.5
M.HL4	Detector and Amplifier.	4.0	1.0	200	20	8,000	2.5
M.L4	L.F. and Loudspeaker Power valve.	4.0	1.0	200	12	2,860	4.2
P.X.4	12 watt Power valve.	4.0	1.0	250	5.0	830	6.0
L.S.5A	13.5 watt Power valve.	5.25	0.8	400	2.5	2,750	6.9
L.S.6A	25 watt Power valve	6.0	2.0	400	3.0	1,300	2.3
P.T.4	Pentode (directly heated)	4.0	1.0	200	110	50,000	2.2
M.PT4	Pentode (Indirectly Heated)	4.0	1.0	*250	100	33,000	3.0

*Screen volts 200 max.

All OSRAM A.C. Mains Valves are designed to ensure the utmost reliability in service, coupled with a very high degree of consistency between valve and valve, absence of hum, and characteristics suited to modern broadcast requirements. In particular, the OSRAM MS4 Screen Grid valve offers many advantages in improving the overall selectivity and stability of a receiver.

OSRAM VALVE

TYPE MS.4B

(For operation from A.C.
Mains).

**Screen Grid, High Fre-
quency Amplifying Valve.**

Price, 22/6



The OSRAM MS.4B is an Indirectly Heated Screen Grid H.F. amplifying valve designed with a high value of mutual conductance or "slope." This, combined with a very low value of grid-anode leakage capacity makes the valve particularly suitable for A.C. mains-operated sets designed with a single stage of H.F. amplification in which the greatest possible magnification is required from the one stage.

The characteristics chosen for the OSRAM MS.4B enable a set to be designed which is very sensitive to weak signals.

Anode Volts	Screen Grid Volts.	Recommended Negative Grid Bias Volts.	Average Anode Current m.a.	Average Screen Grid Current m.a.
150-200	80	1.0 to 1.5	3.4	1.2

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. (approx.)
Anode Volts	...	...	...	200 max.
Screen Grid Volts	...	...	...	80 max.
Amplification Factor	...	...	...	1120
Impedance	...	...	...	350,000 ohms.
Mutual Conductance	...	...	...	3.2

OSRAM VALVE
TYPE M.S4

(For operation from A.C.
 Mains).

Screen Grid High Fre-
 quency Amplifying Valve.

Price, 22/6.

The OSRAM M.S4 is an Indirectly Heated Screen Grid H.F. amplifying valve for which the principal and most important features are:

- (1) An extremely low measured value of grid-anode leakage capacity and moderate value of mutual conductance or "slope" making for stability.
- (2) A long straight characteristic, which avoids "cross modulation," improving selectivity.

These features combine to make the OSRAM M.S4 the ideal screen grid valve for use in sets employing two or more stages of H.F. amplification.



OSRAM VALVE
TYPE V.MS4

(For operation from A.C.
 Mains).

Special Screen Grid
 H.F. Amplifying Valve.

Price, 22/6

The OSRAM V.MS4 is a modification of type M.S4 having a characteristic particularly well adapted to smooth and efficient volume control by variation of grid bias, without introduction of distortion or interference.

The mutual conductance, or "slope," of the V.MS4 is variable from a maximum at low negative bias to an extremely small value at a negative bias of approximately 40 volts. By means of a suitably arranged resistance, smooth control of volume can be obtained from a maximum to a minimum, at the same time avoiding "cross modulation" interference. This improves the selectivity and also the quality of reproduction.



Anode Volts.	Screen Grid Volts.	Recommended Grid Bias Volts.	Average Anode Current m.a.	Approx. Screen Current m.a.
150—200	60	-1.5 to -3	2.4 to 1.6	0.3

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	200 max.
Screen Grid Volts	...	...	...	60 max.
Amplification Factor	...	...	...	550
Impedance	...	...	...	500,000 ohms
Mutual Conductance	...	...	...	1.1

Anode Volts.	Screen Grid Volts.	Recommended Grid Bias Volts.
150—200	60	-1.5 to -40

NORMAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	200 max.
Screen Grid Volts	...	...	...	70 max.
Mutual Conductance	...	...	...	1.1.
(At $E_a=200$, $E_{g1}=-60$, $E_{g2}=-0.5$)	...	...	...
Mutual Conductance	...	...	...	0.005
(At $E_g=-40$)	...	...	...

OSRAM VALVE

TYPE M.H4(For operation from A.C.
Mains).**Detector and Amplifying
Valve.****Price, 15/-**

The OSRAM M.H4 is an Indirectly Heated Cathode Valve for A.C. mains sets.

It is of extremely rigid construction, ensuring complete freedom from microphonic noise. Thus is particularly commended for the Detector stage either for anode bend, leaky grid, or power grid detection. In addition the high Amplification Factor combined with the relatively low Impedance enables the M.H4 to provide very efficient magnification in the first stage of an L.F. amplifier.



Purpose.	Anode Volts.	Recommended Grid Bias Volts.	Average Anode Current m.a.
As grid leak Detector.	50-100	Grid leak joined to cathode.	3.5 to 7.3
As power grid Detector.	150	Grid leak joined to cathode.	12.5
As anode bend Detector.	50-200	-1.5 to -6	Very small.
In L.F. amplifier (first stage only)	150-200	-2 to -3	4.4 to 4.7

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	200 max.
Amplification Factor	...	...	...	40
Impedance	...	...	...	11,100 ohms.
Mutual Conductance	...	...	...	3.6
Anode Dissipation	...	...	...	2.5 watts, max.

OSRAM VALVE

TYPE M.HL4(For operation from A.C.
Mains).**H.F. or L.F. Amplifier or
Detector Valve.****Price, 15/-**

The OSRAM M.HL4 is an Indirectly Heated Cathode Valve with characteristics intermediate between the high Amplification Factor M.H4 and the low Impedance M.L4 types. It is thus a very useful valve for circuits in which a considerable voltage amplification combined with moderately low value of Impedance is required such as the stage preceding an H.F. or L.F. transformer designed for a valve of about 8,000 ohms.



Purpose.	Anode Volts.	Recommended Grid Bias Volts.	Average Anode Current m.a.
In H.F. amplifier (stabilised)	50-150	Positive, zero or negative according to method of stabilising or damping.	3.0 to 15
As grid leak Detector.	50-150	Grid leak joined to cathode.	3.0 to 9.0
As power grid Detector.	150	Grid leak joined to cathode.	16.0
In L.F. amplifier.	150-200	-4 to -6	5.5 to 7.0

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	200 max.
Amplification Factor	...	...	...	20
Impedance	...	...	...	8,000 ohms.
Mutual Conductance	...	...	...	2.5
Anode Dissipation	...	...	...	4 watts max.

OSRAM VALVE

TYPE M.L.4

(For operation from A.C.
Mains).

L.F. Amplifier and Power
Valve.

Price, 17/6

The OSRAM M.L.4 is an Indirectly Heated Cathode valve suitable for use in the intermediate L.F. amplifying position of sets fitted with a super-power valve in the last stage, or as a Loudspeaker valve. The high Amplification Factor coupled with low Impedance enables adequate loudspeaker strength to be obtained for a very small applied signal.

The OSRAM M.L.4 is specially recommended as a Loudspeaker valve in sets where the High Tension consumption is limited by the type of rectifier employed.

Automatic grid bias is recommended and the value of the grid bias resistance may be 350 to 500 ohms for each valve.



Anode Volts.	Average Anode Current m.a.	Approximate Negative Grid/ Bias Volts.
100	10.0	5
150	16.0	7
200	19 to 25	10 to 8.5

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	200 max.
Amplification Factor	...	...	...	12
Impedance	...	...	...	2,860 ohms.
Mutual Conductance	...	...	...	4.2
Anode Dissipation	...	...	...	5.0 watts max.

OSRAM VALVE

TYPE PX.4

(For operation from A.C.
Mains).

Last Stage Power
Amplifying Valve.

Price, 20/-.



The OSRAM PX.4 is a high efficiency power output valve designed for a moderate H.T. voltage. The valve will give its best results at a maximum anode voltage of 250, but if this voltage is not available it will provide considerable undistorted loudspeaker volume at anode voltages of the order of 200.

The OSRAM PX.4 is strongly recommended for use in the output stage of radio or electric gramophones. It is fitted with a Directly Heated filament which may be fed from A.C. through a suitable step-down transformer.

Automatic grid bias is recommended, and the value of the grid bias resistance may be approximately 700 ohms for each valve.

Anode Volts	Average Anode Current m.a.	Approximate Negative Grid Bias Volts.
250	48	34
200	40	26
150	38	16

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	250 max.
Amplification Factor	...	...	...	5
Impedance	...	...	...	830 ohms.
Mutual Conductance	...	...	...	6.0
Anode Dissipation	...	...	...	12 watts max.

OSRAM VALVE

TYPE PT.4(For operation from A.C.
Mains).**Pentode and Power
Amplifying Valve.****Price, 25/-**

The OSRAM PT.4 is a Power Pentode valve fitted with a Directly Heated 4-volt filament giving generous electron emission and long life. It is designed to operate in the last stage of sets obtaining their filament supply from A.C. mains through a transformer of suitable ratio.

For best results the greatest permissible screen grid voltage should be applied, and under maximum conditions of screen and anode voltage the valve will provide ample undistorted loudspeaker volume for all normal conditions.

Automatic grid bias is recommended, and the value of the grid bias resistance may be approximately 500 ohms, for each valve.

Anode Volts.	Screen Grid Volts.	Recommended Negative Grid Bias.	Average Anode Current m.a.	Average Screen Current m.a.
200	200	18	30.0	8.0

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	200 max.
Screen Grid Volts	...	...	...	200 max.
Amplification Factor	...	...	...	110
Impedance	...	...	...	50,000 ohms.
Mutual Conductance	...	...	...	2.2
Anode Dissipation	...	...	...	6 watts max.



OSRAM VALVE

TYPE M.PT4(For operation from A.C.
Mains).**Pentode Power Amplify-
ing Valve.****Price, 25/-**

The OSRAM M.PT4 is an Indirectly Heated Cathode Pentode Valve suitable for use in the last stage of A.C. Mains sets designed with a single stage of L.F. amplification. To ensure absence of distortion the resistance of the anode load circuit should be kept moderately low—not exceeding 10,000 ohms.

The OSRAM M.PT4 may also be used as a Detector for which purpose it is capable of providing sufficient power to operate a loudspeaker direct if desired.

Automatic grid bias is recommended and the value of the grid bias resistance may be 300 ohms. for each valve.

Anode Volts.	Screen Grid Volts.	Recommended Negative Grid Bias Volts.	Average Anode Current m.a.	Average Screen Current m.a.
250	300	11.0	32	5.0

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts	...	...	...	250 max.
Screen Grid Volts	...	...	...	200 max.
Amplification Factor	...	...	...	100
Impedance	...	...	...	33,000 ohms.
Mutual Conductance	...	...	...	3.0
Anode Dissipation	...	...	...	8 watts max.



OSRAM VALVE

TYPE LS.5A

Power Amplifying Valve.

Price, 25/-

The OSRAM LS.5A has for years been recognised as setting a standard in power amplifying valves of the 400 volt class; it is perhaps one of the most widely used power valves for amplifiers in which provision can be made for an H.T. supply up to 400 volts, and a D.C. power dissipation of the order of 12 to 13 watts is required.



Anode Volts.	Approximate Anode Current m.a.	Average Negative Grid Bias Volts.*
300	25	80
350	28	97
400	33.5	112

*The negative grid bias should be adjusted for each individual valve to give the requisite anode current, and automatic grid bias is recommended, in which case the value of the grid bias resistance may be approximately 3,200 ohms for each valve.

NOMINAL RATING.

Filament Volts	---	---	5.25
Filament Current	---	---	0.8 amp. approx.
Anode Volts	---	---	400 max.
Amplification Factor	---	---	2.5
Impedance	---	---	2,750 ohms.
Mutual Conductance	---	---	0.91
Anode Dissipation	---	---	13.5 watts max.

OSRAM VALVE

TYPE LS.6A

Power Amplifying Valve.

Price, 30/-



The OSRAM LS.6A is a power amplifying valve designed with a large power handling capacity to supply a considerable undistorted volume. It is fitted with a molybdenum anode and under maximum conditions operates normally with the anode at a red heat.

It is intended for use in the last stage of L.F. amplifiers where provision is made for adequate H.T. supply, and will give sufficient undistorted power output to feed moving coil loudspeakers of the larger type.

Anode Volts.	Approximate Anode Current m/a.	Average Negative Grid Bias Volts.*
300	55	60
350	60	76
400	63	91

*The negative grid bias should be adjusted for each individual valve to give the requisite anode current and automatic grid-bias is recommended, in which case the value of the grid bias resistance may be approximately 1440 ohms for each valve.

NOMINAL RATING.

Filament Volts	---	---	---	6.0
Filament Current	---	---	---	2.0 amps. approx.
Anode Volts	---	---	---	400 max.
Amplification Factor	---	---	---	3.0
Impedance	---	---	---	1,300 ohms.
Mutual Conductance	---	---	---	2.3
Anode Dissipation	---	---	---	25 watts max.

OSRAM RECTIFYING VALVES.

Type.	Class.	Filament		Anode Volts R.M.S. max.	Rectified Current Smoothed with 4 mfd condenser. m.a. max.
		Volts.	Current amps.		
U.10	Full wave	4.0	1.0	250+250	60
U.12	Full wave	4.0	2.5	350+350	120
U.14	Full wave	4.0	2.8	500+500	120
*G.U.1	Half wave	4.0	3.0	Up to 1,000	250

*Mercury Vapour Type.

OSRAM Rectifying Valves are designed with adequate factors of safety to cater for normal line fluctuations at the maximum rectified current. They can be relied upon to give consistently good lives in circuits where their maximum rectified current rating is not exceeded.

OSRAM VALVE

TYPE U.10

Full Wave Rectifying
Valve.

Price, 15/-



The OSRAM U.10 is the standard type of rectifier valve for all broadcast receiving sets and H.T. Battery eliminators working from the A.C. mains where a total rectified current of not more than 60 milliamperes is required.

The valve is designed for full wave rectification which simplifies the smoothing necessary and increases the output obtained. An input transformer may be used to supply to the two anodes a maximum voltage of 250 R.M.S. each with a filament winding to supply 4 volts, 1 ampere.

The following figures for approximate D.C. rectified volts are obtained assuming a 4 mfd. condenser to be connected across the output of the rectifier.

A.C. volts R.M.S. input.	Load Current.	Approximate D.C. Volts Output (neglecting voltage drop across smoothing choke).
250 + 250	60	270
	40	280
	15	320
200 + 200	60	200
	40	220
	15	250

NOMINAL RATING.

Filament Volts	...	...	...	4.0 A.C.
Filament Current	...	...	...	1.0 amp. approx.
Anode Volts R.M.S.	...	...	...	250 + 250 max.
Rectified Current	...	...	...	60 milliamps max. (smoothed with 4 mfd condenser).