

A recommended method of securing best results under all conditions is shown in Fig. 5 in which, in addition to the volume control, a tone

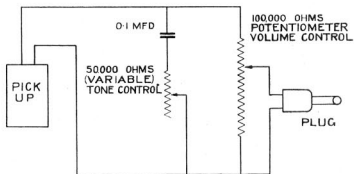


Fig. 5.

control is employed. It will be seen that this consists of a fixed condenser of 0.1 Mfd. capacity in series with a variable resistance having a maximum value of 50,000 ohms, connected across the leads from the pick-up. By decreasing the effective value of the resistance the reproduction of the higher frequencies can be suppressed to any desired extent. This may appear to reduce volume, in which case the volume control (100,000 ohms potentiometer) can be used to increase volume which will have the apparent effect of increasing the bass reproduction. The employment of the tone control is optional but is advisable and will be found extremely useful when reproducing certain records in which excessive reproduction of the higher frequencies may produce a harsh or discordant result.

**NOTE.** It is essential that the plug employed should fit the jack perfectly as if the tip and sleeve of the plug do not make good and reliable connections with the jack contact springs, unsatisfactory reproduction or no results will be obtained.

#### GENERAL NOTES.

Providing the foregoing instructions are followed carefully, excellent radio reception should be obtained from a number of British and Continental Broadcasting Stations and it will be possible to secure very pleasing and realistic gramophone reproduction.

All Kolster-Brandes Radio Products are thoroughly tested and inspected before leaving the factory and provided they are not subsequently tampered with or damaged in transit, they may be relied upon to give satisfactory and reliable service. In the unlikely event of any form of trouble developing after a period of use the receiving and rectifying valves should be carefully examined to ensure that any of them have not become defective or deteriorated in use. **If any valve is known or considered to be defective and has not been damaged by accidental mechanical shock or misuse, it should be returned direct to the makers for examination and report.** A special fuse is provided to protect the receiver and valves in the event of a temporary overload occurring on the mains. The position of this fuse in the receiver is clearly shown in Fig. 3 and if the set should fail to operate this may be due to the fuse having blown. **A new fuse should**

# KOLSTER-BRANDES

## 6-VALVE

### SUPER-HETERODYNE

### RECEIVER



Model K-B. 285 for 100-150 volts A.C. 40-60 cycles

Model K-B. 285/25 for 100-150 volts A.C. 25-60 cycles.

Model K-B. 286 for 200-250 volts A.C. 40-60 cycles.

Model K-B. 286/25 for 200-250 volts A.C. 25-60 cycles.

## INSTRUCTIONS FOR USE

The K-B. super-heterodyne Receiver utilises 6 valves, the functions of which are described in the following instructions and is designed for reception on long, medium and ultra-short wavelengths. It incorporates many novel features in design and is undoubtedly one of the most efficient instruments of its type.

It is completely self-contained and can be operated from any A.C. electric supply of any voltage and periodicity within the range specified for each model.

All circuits with variable tuning are ganged, tuning being effected by means of a single control. The only other controls are for varying the volume of reproduction and changing from one wave-range to another and therefore operation of the receiver is the essence of simplicity. It is the ideal instrument for those who wish to obtain reception from the maximum number of broadcasting stations with a minimum effort and excellent results can be obtained even by those listeners who have had no previous experience in the operation of radio receivers.

A feature which will appeal to many readers who reside under conditions which render it inconvenient to employ an outdoor aerial is the provision of means for using the electric supply mains as an aerial.

The loudspeaker is a very efficient electro-dynamic moving-coil instrument capable of giving reproduction of excellent quality and of handling considerable volume without overloading. The field coil is energised from the H.T. supply unit for the receiver.

Means are provided for the connection of an additional speaker externally, if required, and a jack at the back of the receiver enables a pick-up to be connected for electrical reproduction of gramophone recordings.

### AERIAL-EARTH SYSTEM.

If an external aerial-earth system is employed it is desirable that it should be well constructed electrically, and free from shielding or screening by surrounding obstacles, such as buildings, trees, overhead lines etc., and that a good earth connection be provided.

For an outdoor aerial the following items will be required:—

- 2 Aerial Poles or equivalent supports.
- 100 feet of 7/22 S.W.G. Copper Wire.
- Sufficient 14/36 rubber-covered copper wire for the aerial and earth lead-in connections to the set.
- 1 Porcelain or ebonite lead-in tube.
- 1 Lightning arrester or earthing switch.
- 4 large aerial insulators.
- 2 pulleys and sufficient guy rope.

The aerial should be erected as high as possible but the actual dimensions and arrangement will be largely dependent upon the space available and other individual conditions.

In some cases the free end may be supported by a pole, tree, or other convenient elevated support, while the lead-in end of the aerial may be attached to some point on the building in which the set is installed. Whenever possible the greater height should be at the free end.

Where conditions do not permit of an outside aerial, an indoor aerial may be employed and in fact the sensitivity of the receiver is so great that very satisfactory results can be obtained even with an aerial consisting of a length of wire suspended across the room in which the receiver is installed.

The "earth" may consist of a sheet of copper, or other metal, or even of a disused large metal utensil buried as deeply as possible in the earth. To this should be connected, by soldering, a length of 7/22 copper wire, the other end of which should be taken by the most direct path and connected to the "earth" terminal of the earthing switch from which a length of 14/36 rubber-covered wire should be run to the earth socket on the receiver.

Alternatively, the earth connection may also be made to the main feed water pipe, the surface of which should be thoroughly cleaned at the point of connection to ensure sound electrical contact. The earth wire should be connected to the latter by soldering or by means of an earthing clip or even by winding a number of turns of the cleaned bare wire around the pipe and wedging tightly.

**Mains "Earth."** If there is any difficulty in making an earth connection by any of the methods described above, it will be found that the receiver will operate satisfactorily without an external earth connection, although on certain electric supplies a slight amount of mains hum may occur.

#### SETTING UP THE RECEIVER FOR USE.

The installation and operation of the K-B. 6 valve super-heterodyne Receiver may be conducted with perfect safety providing the instructions are followed in detail, but it is pointed out that certain parts of the circuits are at high voltage when the apparatus is connected to the mains. The back of the cabinet cannot be removed without automatically breaking the electric supply. The user is warned against attempting to re-make this connection when the back of the cabinet is open. **On no account must any part of the interior be touched when the electric supply is connected to the receiver or the operator may receive a disagreeable or dangerous shock.**

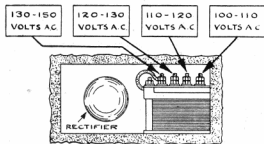
To prepare the receiver for the reception of broadcast programmes, proceed as follows:—

1. Remove the top part of the back of the cabinet by unscrewing the two milled-head screws which are near the base and pulling them towards you.
2. Adjust the voltage tapping lead \* on the mains transformer to suit the voltage of the electric supply, (See Figs. 1, 2 and 3.) Models K-B. 285 and K-B. 285/25 each have 4 mains voltage terminals as shown in Fig. 1, while models K-B. 286 and K-B. 286/25 have only 3 terminals as shown in Fig. 2. The tapping lead, to the end of which is attached a spade terminal tag should be connected to the appropriate terminal according to the supply voltage. The connection should be made securely, care being taken to ensure that the nut is properly tightened.
3. Insert the H.T. rectifying valve (Philips 1821) in the holder in the Mains Unit (See Figs. 1 and 3).

\* Models K-B 285 and K-B 285/25 are sent out from the factory properly adjusted for A.C. voltages from 126 to 150 and Models K-B 286 and K-B 286/25 are adjusted for voltages from 235 to 250. Therefore if the electric supply is of any voltage within either of these ranges it will not be necessary to alter the connection of the voltage tapping lead.

4. Insert the receiving valves †. Six valves are supplied for use in the positions indicated below and to serve the purposes specified in Fig. 3. Take care that the valves are inserted in the correct holders. The positions are indicated by numbers from left to right when looking at the back of the receiver.

POSITION	PURPOSE	VALVE
1	H.F. Amplifier	Mullard 84VB (metallised) or Cossor MSG/HA ..
2	1st Detector	" " "
3	Intermediate frequency amplifier	" " "
4	Oscillator	Mazda AC/HL
5	2nd Detector	Mazda AC2/HL (metallised) or Cossor 41.MHL ..
6	Output (Pentode)	Mazda AC/PEN or Mullard PEN4V



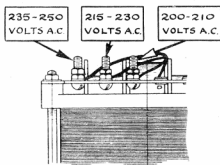
APERTURE IN MAINS UNIT SHOWING THE RECTIFYING VALVE AND VOLTAGE TAPPING TERMINALS - MODELS KB285 AND KB285/25

Fig. 1

5. Connect the three flexible leads to the terminals on the tops of the three screened grid valves, as shown in Fig. 3, and also the flexible lead to the side terminal on the pentode output valve.
6. Replace the back of the cabinet.

†After close technical co-operation between the members of the Radio Manufacturers' Association and the British Radio Valve Manufacturers' Association, our sets have been designed and tested for use with Radio Valves manufactured by members of the British Radio Valve Manufacturers' Association, who mark their valves with the monogram BVA, which is a guarantee of quality and British origin. No responsibility can be accepted for the performance of our sets if Radio Valves other than those recommended above are employed.

7. A length of connecting cable fitted with a lamp-holder adaptor is provided for connection to the electric supply. See that the mains



SECTION OF MAINS TRANSFORMER SHOWING VOLTAGE TAPPING TERMINALS MODELS K.B.286 AND K.B.286/25

Fig. 2

switch is in the "off" position and plug the adaptor into the nearest electric lamp-holder. If mains hum is experienced when working on certain electric supplies reversal of the adaptor may effect a remedy.

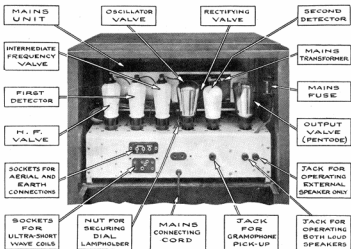


Fig. 3

## AERIAL AND EARTH CONNECTIONS.

If an ordinary type of aerial (indoor or outdoor) is employed, connect the aerial and earth wires to the two plugs supplied and for reception on the long and medium wave-ranges insert the plugs into the "Aerial 1" and "Earth" sockets respectively. For reception on ultra-short wavelengths the aerial should be plugged into the socket "Aerial 2."

For Mains Aerial Reception a special double-prong plug is provided. For reception on long and medium wave-ranges the plug should be inserted into sockets "Aerial 1" and "Aerial 2" so as to inter-connect the two. For mains aerial reception on ultra-short wavelengths the plug need not be used and no aerial connection whatsoever is required.

## OPERATION OF THE RECEIVER.

Until the owner is familiar with the operation of the receiver it is advisable to proceed in the following manner:—

1. Switch on the electric current by depressing the knob of the "on and off" switch at the left-hand side of the cabinet (see Fig. 4.) A short period should be allowed for the indirectly heated A.C. valves to attain the correct operating temperature before attempting to receive signals.

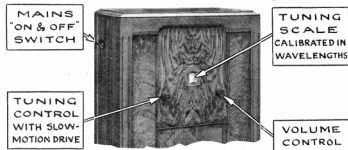


Fig. 4

2. Adjust the volume control to a position near to "minimum" (See Fig. 4.)

3. The wave-range switch is situated at the right-hand side of the cabinet. Set the knob of the switch to the position for reception on the required wave-range, as follows:—

Range	Wavelengths in Metres	Position of Switch Knob	Coil to be used for ultra-short wave reception
Long	From 800 to 2100	Down	—
Medium	.. 190 to 575	Up	—
Ultra-short	.. 16 to 38	Up	16/38 metres
	.. 38 to 70	Up	38/70 metres

4. **Reception on "Long" and "Medium" wave-ranges.** Ascertain the wavelength of the station from which reception is desired and rotate the main tuning control until the wavelength reading on the scale indicates that the control has been set to the correct position for reception of that station. It should be noted, however, that the wavelength readings on the scale are necessarily approximate and owing to the extreme selectivity of the receiver, with consequent sharp tuning, it may be necessary to rotate the control to-and-fro about the wavelength reading indicated on the scale in order to locate the required station, at the same time gradually increasing the volume control until reception is obtained at the required strength or volume.

5. When receiving from certain stations it may be found that maximum strength of reproduction is obtained when the volume control is not actually adjusted to the "maximum" position and that further adjustment of this control will not result in any increase in volume. When this condition occurs, it is undesirable that the volume control should be advanced beyond the point where no further increase is obtained for to attempt to secure greater volume in this manner will be unsuccessful and will only result in overloading the detector valve with consequent distortion of reproduction. Therefore, when receiving from any station it is advisable to retard the volume control until it is found that signals just begin to decrease. This will ensure that the detector valve is not overloaded and will maintain reproduction of good quality.

6. **Reception on "Ultra-short" Wave-ranges.** The operation of the receiver is the same for reception on ultra-short wavelengths as for the other ranges but it will be necessary to observe the following points:—

- (a) The aerial must be connected to socket "Aerial 2."
- (b) One of the two ultra-short wave coils, according to the range in which it is required to receive, must be plugged into the sockets provided at the back of the receiver. Care must be taken to establish good electrical contact by pressing the coil firmly into position so as to ensure the contact pins being fully engaged with the sockets.
- (c) The tuning scale is not calibrated for ultra-short wavelengths and therefore it will be necessary to search carefully until the desired station is located. To facilitate repetition of reception from ultra-short wave stations a log or chart may be prepared stating the name or call letters of the various stations with the wavelength and dial reading applicable to each.
- (d) Tuning adjustments will be very critical but by resting the hand against the cabinet it will be possible to effect very small adjustments of the tuning control knob. Care should be exercised when searching for ultra-short wave stations or they may be missed altogether.
- (e) For ultra-short wave reception, particularly within the 16-38 metre range, it may be necessary to use an external speaker only, owing to the tendency for microphonic feed-back to occur on these very short wavelengths. It is desirable to place the external speaker some distance from the receiver.

#### **IMMUNITY FROM 2nd CHANNEL INTERFERENCE.**

A disadvantage of certain super-heterodyne receivers is that they are often subject to a peculiar form of interference known as 2nd channel interference, this being due to the principle upon which this

type of receiver functions and it is not considered necessary to deal with the matter from a technical point of view. It is, however, a feature of the K-B Super-heterodyne receiver that it is practically immune from this form of interference on the "Long" and "Medium" wave-ranges. It should be noted, however, that when working on the ultra-short wave-range all stations can be tuned in at two distinct points on the tuning scale but in practice this will prove to be rather advantageous than otherwise.

#### **CONNECTING AN ADDITIONAL LOUDSPEAKER.**

Two jacks are provided at the back of the receiver for the connection of an additional speaker (see Fig. 3). The external speaker may be a balanced armature type of instrument of good design, or a moving coil speaker of either the permanent-magnet or electro-dynamic types, providing the effective impedance of the speaker is not lower than approximately 8,000 ohms, but if of the electro-dynamic type, means must be provided for supplying the necessary energising current for the field winding.

The external speaker (or extension lines if the external speaker is in another room) should be connected to a standard connecting plug which should be plugged into one of the jacks according to whether it is desired to operate both speakers simultaneously or the external speaker only. (See Fig. 3).

#### **DIAL ILLUMINATING LAMP.**

The tuning scale is illuminated by a small electric lamp carried in a screw type holder mounted immediately behind the scale.

The lamp-holder is mounted on a metal strip which runs beneath the mains unit and is secured in position by the milled-head nut (See Fig. 3). To change the lamp, if necessary, unscrew the nut when the metal strip carrying the lamp-holder can be lifted and withdrawn.

#### **CLOSING DOWN AFTER RECEPTION.**

When it is desired to discontinue reception simply cut off the electric supply by raising the knob of the mains switch to the "off" position.

If an outdoor aerial is employed, the earthing switch should be left in the position which connects the aerial directly to earth, when the receiver is not in use.

#### **GRAMOPHONE ELECTRICAL REPRODUCTION.**

##### **How to connect and use a gramophone pick-up.**

A jack is provided at the back of the receiver to enable a pick-up to be connected for the electrical reproduction of gramophone records. (See Fig. 3.)

The pick-up should be used in conjunction with a potentiometer type volume control having a resistance of 100,000 ohms (approx.). The volume control is essential and if a special model is supplied by the makers of the pick-up employed, this should be satisfactory.