

SERVICE MANUAL

K-B PRODUCTS



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1. FOREWORD

In presenting this Manual to the service men and departments of K-B Authorized Dealers, we have endeavoured to treat upon every possible problem that might arise.

We would recommend that this Manual be carefully studied so that quick reference may be made in the future as the occasion requires. Familiarize yourself with the information it contains.

If any perplexing problem should arise in the future to which there is no answer herein, write to the K-B Service Engineer, outlining your problem with as much detail as possible. Behind Kolster-Brandes there is a Service Department ready at all times to extend every co-operation to you.

The information contained herein is for use in servicing K-B products only, and must be regarded as strictly confidential.

This Manual consists of a series of sections, each dealing with a particular product or model, in addition to a section dealing with general installation problems. Each section is printed on distinctively-coloured paper, to facilitate quick reference. As new models become available, further sections will be issued, and any sheet becoming obsolete will be replaced. In the event of any further information becoming available after the issue of the appropriate section, an additional sheet will be issued.

This information is presented gratis to every K-B Authorized Dealer and Distributor, and additional copies are available at cost price.

2. INSTALLATION NOTES

2.1. AERIAL AND EARTH

The majority of the receivers described and dealt with herein are designed for use with the K-B "Rejectostat" Aerial System, but will work equally well, where electrical interference is absent, with the conventional open aerial.

When a receiver is to be installed with a "Rejectostat" aerial, make sure that the "Rejectostat" section of this Manual has been read and understood by the man in charge of the installation. When a normal open aerial is to be used, no special precautions need be taken. For super-het. receivers advantage should be taken of their feature of not losing their selectivity when used with long and high aerials, as in this way the ratio of required signal to unwanted noise (or "mush") is improved.

The choice of an earth connection warrants a little more thought than is usually given to it. Our experience shows that the best earth normally available in domestic installations is the main water pipe or lightning conductor. Never earth to a gas pipe, and electric wiring conduits and hot-water systems are rarely satisfactory.

2.2. MAINS SUPPLY CONNECTION

When installing mains-operated receivers, connectors which do not quite fit are sometimes used. These are a very frequent cause of "noisy background" complaints, and should be carefully guarded against.

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Always make sure you have correctly adjusted the mains tapping device before making the connection for the first time, and reflect that many A.C. models are ruined each year by accidentally being connected to D.C. mains.

Check also that the loudspeaker plug (if any) is in position, as damage is immediately done to the electrolytic condensers of certain receivers if they are switched on with the loudspeaker plug not in place.

2.3. MAINS TO CHASSIS CONDENSER

A condenser is fitted on certain sets between one end of the mains-transformer primary winding and the chassis. The function of this is to eliminate the possibility of "modulation hum"—the peculiar hum only heard when a station's carrier wave is being received. With such receivers a small spark will be noticed when the earth wire is removed from or connected to the chassis if the supply mains have one wire to earth and the mains connector is inserted in such a way as to cause the non-earthed main to be connected to the condenser. The remedy is to remove the connector and re-insert if the other way round.

3. NOTES ON CONSTRUCTION

3.1. GANG CONDENSERS

To prevent microphonicity, this unit is flexibly mounted on rubber pads in most receivers. Should microphonicity be suspected at any time it is best tested for when receiving a strong, unmodulated carrier wave; if necessary supplied from a signal generator or test oscillator. See that the condenser is perfectly free; perhaps the tuning knob spindle may be fouling the cabinet or even the packing fitted during shipment to lock the condenser has not been removed. If the condenser be removed make sure that the washers are correctly replaced.

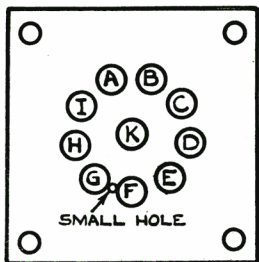
3.2. COILS

Do not remove coils from a chassis unless absolutely necessary, as these have been very accurately matched and should the winding or leads be disturbed it may be impossible to line up the receiver properly. The colour of the stripe on the edge of the coil base indicates that the coil is appropriate to a particular model, while the coloured dots indicate the long wave matching group in which the coil falls. The number of dots indicates the position of the coil in the circuit. The medium wave matching group appears as a colour on the tubular former visible through the slots in the coil base. It is extremely unlikely that a coil should become faulty as they are solidly embedded in high-melting-point wax, impervious to moisture, acids, ordinary high temperatures and mechanical shock. Should it occur, however, it will be necessary to quote the model and serial number of the receiver, together with the matching colours as explained when ordering replacements. The official designations of the colours are:—

Dark blue, light blue, green, yellow, orange, red.

3.3. TAGS ON COIL BASES

The tags on coil bases are lettered according to the diagram shown in Fig. 1, and these letters correspond to those shown on the circuit diagram.



LETTERING OF TAGS ON COIL BASES
(SEEN FROM UNDERSIDE OF INVERTED CHASSIS)

Fig. 1

3.4. TESTING CONDENSERS

Two types of fixed condensers are used :—solid-dielectric and electrolytic. The former condensers may be tested by charging them with not more than 200 volts D.C. and noting their ability to hold a charge. This can be determined by short-circuiting the condenser terminals after charging as above, and the size of the flash will depend on the capacity of the condenser and the voltage used for charging it.

If a condenser fails to hold a charge, it should be replaced, as to allow it to remain in the circuit may result in damage to other components.

The electrolytic condensers, since they are of an entirely different construction, should be tested by measuring the leakage current. The leakage of a six or eight-microfarad unit should not exceed 1 milliampere after charging for 4 minutes at 450 volts D.C. whilst the leakage of the low-voltage type should not exceed $\frac{1}{2}$ milliampere after charging for 30 seconds at 25 volts D.C.

3.5. WIRING

In order to facilitate the tracing of circuits, the wiring is carried out incoloured insulated wire, the colour indicating the circuit in accordance with the following code :—

Red insulation	...	...	...	...	H.T. supply circuits.
Blue	„	...	...	...	Anode circuits.
Green	„	...	...	...	Control Grid circuits.
Orange	„	...	...	...	Auxiliary Grid circuits.
Dark Brown insulation	...	...	...	...	Heater or filament circuits.
Light Brown	„	...	...	...	Cathode circuits.
Yellow	„	...	...	...	Automatic volume control circuits.
Black with red tracer	Negative side of smoothing circuits.
Black insulation	Earth connections.

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3.6. VALVES

The selection of replacement valves deserves careful consideration. It is best to test the set with valves previously tested in a similar chassis. It hardly seems necessary to caution Service Departments to make certain that the valves are installed in their proper positions, although complaints of unsatisfactory operation have been traced to the interchanging of valves of various types.

When changing valves, remove valve screens (if fitted) carefully. If the top of the screen touches the cabinet top, lift the valve from its holder by the base, whereupon the two may be tilted and the screen removed. On unscrewing the anode terminal the disc carrying the anode lead may be removed. Never attempt to force the screen off without first lifting the valve from its holder.

3.7. RESISTANCES

Many colour-coded resistances are employed in these products, and the code is, therefore, given below. It will be remembered that three colours appear on each resistance :—

- (1) The general colour of the body.
- (2) The colour of one end.
- (3) The colour of the dot or stripe at the centre.

Each colour indicates a number :—

The colour of the **body** gives the **first** figure.

The colour of the **end** gives the **second** figure, and

The colour of the **dot** or **stripe** gives the **number** of **zeros** following the two figures already given.

Code

Colour	Number	Colour	Number
Black	0	Green	5
Brown	1	Blue	6
Red	2	Violet	7
Orange	3	Grey	8
Yellow	4	White	9

Examples

(a) A resistance has a red body, a green end and a yellow stripe at the centre. What is its resistance ?

The red body gives the first figure — 2.

The green end gives the second figure — 5, and the yellow stripe gives the number of zeros following the above two figures — 0000.

Result :—250,000 ohms.

(b) What colour is a resistance of 600 ohms ?

The first figure is 6, therefore the body is blue.

The second figure is 0, therefore the end is black.

There is one zero following these two figures, therefore the centre stripe is brown.

N.B.—If there appears to be no special colour at the end or in the middle, it is, of course, the same as the body. A red stripe on a red body, for example, cannot be seen separately.

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4. SERVICE PROCEDURE

If the service man is well versed in his subject he will, of course, be familiar not only with the electrical and circuit characteristics of the set he is servicing, but with the functions of the various circuits. A superficial inspection with no definite starting point or object in view is not the proper method of procedure, and does not create a favourable impression on the customer.

Much useful information may be obtained by the service man and, consequently, considerable time and effort saved if he carefully questions the customer with reference to the complaint. It is usually possible to secure a fairly definite idea of the source of the trouble in this way, thus eliminating the necessity of checking with the idea in mind of investigating every possible fault which could exist.

4.1. VOLTAGE AND CURRENT TABLES

Although fairly satisfactory servicing may be done with a high resistance voltmeter, a modern testing set of approved design is practically indispensable. An analysis of the filament voltage, anode voltage, bias voltages and anode current in each circuit enables the service man quickly to diagnose the trouble and correct it. Such analyses also provide a fairly reliable means of testing valves to determine whether they are in good condition or require replacement. Normal voltage readings for each product taken with an ordinary testing set are given in the following sections of this Manual. Slight variations may be expected due to difference in mains voltage, valves, and type of testing set employed.

4.2. ALIGNMENT OF CIRCUITS

Obviously, unsatisfactory performance of any receiver due to improper adjustment of I.F., band-pass or oscillator circuits will not be indicated by any readings made with a voltage and current testing set. Although tuning adjustments can be made by utilizing a received signal, such adjustments are, at best, inaccurate and inefficient. It is imperative that the Service Department of each dealer and distributor be equipped with some form of signal generator and output measuring device which may be either purchased or constructed by the Service Department.

A signal generator intended for use with K-B receivers should consist essentially of a modulated oscillator covering the two broadcast frequency bands with accurate adjustments at 1,400, 600, 300 and 175 Kc/s. It should also incorporate a 130 Kc/s. output capable of accurate adjustment. The output indicating device may be any one of the standard output meters obtainable, a current squared galvanometer connected across the secondary of the output transformer or a low-range A.C. voltmeter connected across the speaker speech coil.

It is impossible to secure satisfactory trimmer adjustments without using a special insulated box spanner. Proper results cannot be obtained using a metal box spanner due to capacity effects and the fact that several of the adjustment nuts are above earth potential. (A special bakelite box spanner may be obtained from the factory at cost.)

Complete step-by-step instructions are given for the alignment of circuits in each section of this Manual.

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5. SHORT-WAVE RECEPTION

If reception is desired in the short-wave broadcast band (14-80 metres approximately), a K-B Short-Wave Converter (type K-B 357) is available, and the majority of 1934 K-B mains-driven receivers are designed for operation with it.

To connect the Converter, it is only necessary to plug the four-pin plug on the end of a lead issuing from the converter into the appropriate socket on the receiver chassis, and the triple-pin plug on the screened wire into the aerial and earth sockets of the receiver. Connect the aerial and earth to the converter, tune the receiver to the mark "S.W. Converter," adjust the wave switch to "medium," and switch the converter on.

When it is again desired to receive on medium or long waves, it is only necessary to switch the converter off, which automatically connects the aerial and earth through to the receiver.

The converter consists of a high frequency pentode acting as a frequency changer, in exactly the same manner as the oscillating-first-detector of the superheterodyne receivers, and when in use every feature of the receiver is available. The sensitivity and selectivity of this system are, of course, very high.

6. RETURN OF PRODUCTS FOR SERVICE

Should it be necessary to return a product to us for repair, or for any other purpose, it should be addressed to the Distributor or Depot whence you receive your supplies. Goods should not be sent directly to the factory at Sidcup, unless specially requested or arranged, except in the case of Dealers in the London Area.

Faulty products received at the Service Depots are assumed to be customers' repairs in the absence of instructions to the contrary; and in accordance with the rulings of the B.V.A., faulty valves will be returned with the product, with a note on the Invoice or Advice Note indicating which valves are faulty.

In cases, therefore, of products that have been delivered faulty, or which have become faulty before leaving an Authorized Dealer's premises, this fact must clearly be stated on an Advice Note or Packing Slip, as, naturally, the personnel of the Service Departments cannot be aware of the Dealer's shipments and sales.

In cases where free service under guarantee is required, a definite claim must be made on some document accompanying the returned product, and preferably a separate claim should be despatched by post at the same time, giving full details, including the guarantee number, the serial number and K-B type of the product.

When a dismantled component is returned, and service under guarantee is required, a claim must also be made as above, but the guarantee number and also serial number of the product of which it is a component must be quoted on some document enclosed with the faulty part.

Remember always that the inclusion of complete details of the trouble experienced with a faulty product will greatly expedite its re-delivery to you, and full information as to the history of the product will eliminate the misunderstandings which arise, for example, when a product, faulty on delivery, is treated as a customer's repair.