

INSTRUCTIONS FOR OPERATING CALSTAN MODEL 223

COMBINED TUBE CHECKER AND MULTITESTER

The CALSTAN combined tube checker and multi-tester is literally a universal instrument, its application being extremely simple. Its main uses are:-

TO TEST

The efficiency of valves.	Milliamps D.C. .5 ranges.
Shorts and leakage in valves.	Volts D.C.5 ranges.
Electrolytic condensers.	Volts A.C.5 ranges.
Dry type (static condensers).	Ohms.5 ranges.

EQUIPMENT:- 1 pr. top cap wires, 1 pr. test prods.

BATTERIES:- 3 No. 3678 Eveready, 1 U2 Eveready. These batteries should be replaced when the ohms scales can no longer be brought to full scale. They may be easily removed by slackening the screws holding the metal clamps.

OPERATION:- THE OPERATOR SHOULD READ THESE INSTRUCTIONS VERY CAREFULLY IF COMPLICATIONS ARE TO BE AVOIDED.

TUBE CHECKER PORTION:- Before a valve is tested it is necessary to check the line volts in order to register a faithful test. The reason for this test is because of the possible variation of the line above or below its rated voltage. A toggle switch is provided to change the application of the instrument from (200-220) to (230-250) volt lines. The test selector switch should be turned to the position marked VALVES and the main selector switch turned to the position marked L (line). On switching on the current the meter needle will deflect in close proximity to the arrow on the GOOD-BAD scale. The pri. adjust should now be rotated until the needle is as close as possible to the arrow. The instrument is now ready for use.

SHORTS-LEAKAGE:- Before a valve is tested for efficiency it is necessary for shorts or leakage. The operator's attention is strongly drawn to this precaution as shorted elements will cause the meter to become overloaded. Any valve which does not pass this test should be classed as faulty. Turn the main selector switch to the S (shorts) position and set the filament volts switch at its lowest setting and rotate the element selector switch slowly over its entire range. Tap the valve sharply during this operation as loose elements are a common fault. If any shorts are present a definite glow will be seen in the neon. A sharp glow may be seen when rotating the switches but as this is due to a condensor discharge it may be disregarded. A good idea of the nature of the

short may be gained from the intensity of the glow. A very low resistance short will be indicated by a brilliant glow. A faint glow indicates a high resistance short. In the case of most valves a very faint glow may be disregarded as this is quite normal. The numbers on the switch correspond to the system of numbering with 3 and 4 as heaters in each case. N0.2 is plate in most cases and 1 screen etc. As an example a glow on 8 and 2 denotes a short between top cap electrode and plate. A glow on one point only indicates a short between that element and heater. The filament volts may now be advanced to suit the valve (see chart, and the operation repeated. This tests the valve in a hot condition thereby tracing shorts due to hot and expanding elements. If a valve passes this test proceed with the next operation.

MERIT TEST:- Leave the filament switch on the correct position and turn the range control to its lowest setting. Now consult the chart for the position of the main selector and element selector switches. Set these at their correct positions and advance the range control to its correct position. The condition of the valve should be indicated on the scale.

DIODES, RECTIFIERS, ETC:- In the case of some valves this test is insufficient, so means are provided to test the minor elements. The most important of these are shown on the chart together with their switch settings. The testing of those elements should not be overlooked as they greatly impair the efficiency of the valve. The procedure is the same as for merit. NOTE:- When testing cathode type valves for efficiency the element selector switch should not be placed on the cathode position as this causes current to flow in the opposite direction. Always turn the range control to its lowest setting before rotating thereby protecting the meter from overloading.

ABBREVIATIONS USED IN CHART:- D1. (diode). 2nd D1. (2nd diode), 2nd P.(second plate).

To TEST ELECTROLYTICS:- Adjust the mains as explained in the instructions for testing valves. When this has been done turn the test selector switch to the position marked condensers. It will be noticed that five ranges are given on the main selector switch (condenser). These ranges correspond to the operating voltages of most electrolytic condensers. Now, if an electrolytic is placed across the terminals (marked) in correct polarity a current will flow through the meter. This current is determined by the capacity of the condenser and the voltage placed upon it. The range control (electrolytics) increases the range of the meter. As explained, the operating voltages are given on the switch so no difficulty should be experienced in selecting a range approximating that of the condenser to be tested. Advance the range control to its correct position (see chart) and the condition of the condenser will be given on the meter. The

doubtful position on the electrolytics scale is only a reminder that in the even of an open circuit the meter will not indicate. Always turn the range control to its lowest setting so as to protect the meter in the event of a short circuit.

RANGE CONTROL CHART:-

Microfarads	Degrees	Microfarads	Degrees
2	23	20.....	2
4.....	9	25.....	2
6.....	6	30.....	1
8.....	4	40.....	1
10.....	3	50.....	1
15.....	2		

DRY (STATIC CONDENSERS):- The same switch positions are used for these condensers. It must be remembered, however, that the positions on the main selector become merely reference points for various capacities. The smaller the condenser to be tested the smaller the setting on the switch. The minimum capacity which can be tested is .005 mfd. and the maximum 4 mfd. Now as a condenser is placed across the terminals (marked) a sharp flash will be seen in the neon. The switch should be adjusted until the sharpest and most distinct flash is seen. This indicates a good condenser. A bad condenser is indicated by continuous flashing or a steady glow in the lamp.

VOLTS OHMS MILLIAMPS PORTION:-

A.C. VOLTS:- The ranges for A.C. volts are 5,10,150,250,1250. Place the test selector switch on the A.C. volts position and select the required range on the main selector. The voltage to be measured should be placed across the terminals (marked). If in any doubt as to the pressure to be measured select the highest range first and work down until a satisfactory reading is obtained. A.C. volts should be read on the special A.C. scale on the meter. The ranges on the scale should be multiplied or divided according to the range in use. (Note A.C. volts above 25 should be read on the D.C. scale).

OUTPUT VOLTS:- The procedure is the same for the A.C. volts except that the voltage should be applied to the terminals marked accordingly.

D.C.VOLTS:- The ranges are the same as A.C. volts. Place the test selector on the D.C. volts position. The voltage to be measured should be placed across the terminals marked accordingly. Read on the D.C. linear scale.

D.C. MILLIAMPS:- Ranges 1,5,25,100,250. Place the test selector on the D.C. MA'S position and apply the current to be measured across the terminals marked accordingly.

OHMS:- The five ranges of ohms are:- divide by 100 (0-500), divide by 10(0-5000), Sc. (0-50,000), X10 (0-500,000), X100 (0-5,000,000). The X 100 scale can only be operated when the A.C. mains are switched on. The other ranges are operated by means of internal batteries. Place the test selector on ohms position and select the required range by means of the main selector switch and short circuit the terminals (marked). The needle should be adjusted for ohms zero by means of the ohms adjuster control. If the X100 scale is in use adjust by means of the pri.selector switch. Now open the terminals and place the resistance to be measure across the terminals. The scale should be multiplied or divided according to the range in use.

GENERAL:- Providing the instructions have been carefully followed no difficulty should be experienced in operating the instrument. The operator's attention is again drawn to several precautions:-

When testing valves and electrolytics be sure to see that the range controls are returned to zero. Advance after the required ranges have been selected.

When measuring volts etc., be sure to select the highest range first and work down until a satisfactory range is obtained.

Damage to the instrument due to neglect in this respect is not covered by the guarantee.

GUARANTEE:- The instrument is guaranteed for a period of twelve months from time of purchase. The 1V valve in the instrument is guaranteed for a period of three months. Damage due to misuse is not covered, but any electrical or mechanical defects which may arise will be repaired or replaced on return to the distributor from whom it was purchased or direct to Slade's Radio Pty. Ltd. When or if returning for repair kindly state the nature of the complaint as matters are thereby greatly simplified.

If any further information is required on the use or application of the instrument kindly write to :-

SLADE'S RADIO PTY. LTD.,

LANG STREET, CROYDON N.S.W.