Paton Electrical Proprietary Ltd.

INSTRUCTIONS MODEL V.C.T.

VALVE and CIRCUIT TESTER

90, VICTORIA STREET
ASHFIELD • SYDNEY

Telephone: UA 5266 (5 Lines)
Telegrams & Cables: "Palec," Sydney

METHOD OF VALVE TESTING

Just what constitutes the best method of testing a valve to determine its general condition, has been the subject of much discussion among radio engineers.

Opinions at one time were divided between the relative efficiency of the four existing methods viz: the true mutual conductance, the power output, the grid shift and the emission test.

An avalanche of new valves settled the controversy by bringing the emission tester into general favour as a commercial valve tester because it was the only system which could be adapted to incorporate all the following points:

1—Ability to cope with the hundreds of existing valves as well as future releases.

2—Simplicity and quickness of operation.

3—Reasonably low selling prices.

4—Practical accuracy.

The true mutual conductance tester, whilst the most accurate, is purely a laboratory instrument requiring as many controls and meters as there are elements in a valve. Therefore it can be regarded as impracticable for commercal purposes.

The Imitation of the so-called "grid shift" and power output systems, combined with the fact that a well designed emission tester may be the more accurate, has brought the latter into universal use. It will be realised that the only thing likely to happen to a radio valve in service, (apart from leakage between elements) is a depreciation of the emitting qualities of the cathode element. So why not test a tube for its emission current?

This has been confirmed by our own and overseas laboratory com-

When the emission type valve test was first developed, the mistake was made of applying a high voltage to the valve through a voltage dropping resistor. Consequently, the voltage applied to the valve (tested as a diode) depended on the current drain. This meant that a poor valve which had a low emission, was tested at a higher potential than a good one and that true differences of merit could not be arrived at. Then again, there arose the danger of harming a poorish valve through excessive voltage being applied to the grid and injuring the cathode coating.

In the "Palec" valve tester, a constant low voltage is applied and the current drain limited to well below saturation point.

This low voltage is not sufficent to ionise gas if present in a valve and produce extra emission. Consequently, the "Palec" valve tester is a true emission tester and shows the true condition of the cathode.

With regard to a gas test, it must be remembered that the percentage of gassy valves is low among new valves, as the manufacturers are usually careful that no such valves leave their factory.

The percentage of valves which become gassy with use is also extremely low, less than ½% actually.

Before a valve becomes gassy, it must usually be seriously overloaded. This overloading causes a drop in the emission capabilities of the cathode. The condition is detected by our tester.

Thus, the tester does, in almost every case, class a gassy tube as poor on account of its usually showing poor emission under the test applied.

METHOD OF CALIBRATING VALVES NOT LISTED

Take two or three Valves of any particular type of which the calibration figures are required and follow this procedure:—

(1 Check line voltage in the usual manner.

(2) Turn Filament Selector Switch to the voltage at which the particular tube is rated.

(3) Turn left bottom Switch to Merit test, turn Range Control to about five and plug in valve. (Be sure to connect up the grid cap, if any).

(4) Depress the merit button and then rotate Selector Switch through each one of its six points and leave set at the point which gives the greatest deflection on the meter.

(5) Now slowly turn the Range control until the Meter needle reads to within about ⅛ inch of full scale deflection.

Now plug one or two more Valves of the same type with the purpose of getting an average reading, as there is some discrepancy between new Valves of even the same make. The various points (such as Filament, Range Degree and Selector position) should then be noted for future reference.

CAUTION

Allow valve under test to heat up BEFORE pressing the Merit Button, this usually takes 30 to 60 seconds, Press button for the SHORTEST POSSIBLE PERIOD necessary to take reading. This instruction should be applied to all valves, particularly diodes.

The socket marked "Diode" is for testing all Diode valves with octal bases, test to be carried out in the same manner as all other valves.

To use the instrument as an output meter it must first be connected to the power, this being necessary to bring the rectifier into use, turn left hand switch to output volt position, connect leads where it is desired to take the measurement of output voltages, usually from the plate of the output valve through a series condenser to earth.

"PALEC" MODEL V.C.T.

Manufactured by

PATON ELECTRICAL PROPRIETARY LTD.

FOREWORD

The object of Paton Electrical Proprietary Ltd., in releasing the "Palec" Model V.C.T. is to place in the hands of the serviceman, a single self-contained instrument that will adequately cope with all general outside service problems and yet be conveniently portable.

The instrument will be found extremely easy and quick to operate and can be relied upon for a high dgree of accuracy if treated with reasonable care and not subjected to excessive overload.

INSTRUCTIONS FOR OPERATION.

The first test usually made on a service call is to test out the valves This operation is carried out in the following order:—

No. 1—ADJUST LINE VOLTAGE. Plug instrument into power supply and switch on. Turn bottom left rotary switch to "LINE CHECK." The meter needle should now swing over to full scale deflection. Should the needle stop above or below this position, adjust by means of the top rotary switch marked "LINE ADJ." It is important in some districts to constantly check the line voltage.

No. 2—Select correct filament voltages as shown on chart.

No. 3—Plug in valve.

No. 4—Test for inter-element shorts and leakages. While the valve is heating, move bottom left rotary switch to "ELEMENT SHORTS." Now rotate the selector switch (middle right) from point to point round the full circle.

A shorted element or leakage even as high as 100.000 ohms, will cause the neon electrodes to give off a distinct and definite glow. A very faint glow, which may sometimes be apparent, can be disregarded.

If the valve passes the above test, proceed as follows:

No. 5—Move bottom left rotary switch to "Merit."

No. 6—Turn selector switch to the point as shown on chart.

No. 7—Adjust range degree control, also as per chart.

No. 8—Press button marked "Press for Merit" and the meter will show directly the condition of the valve.

In the case of cathode type valves, allow plenty of time for the valve to become fully heated. This will show when the meter needle stops creeping and remains stationary.

N.B.—The meter dial is calibrated to show the percentage efficiency of a valve. A variation of 10% or so may be noted in some valves, particularly those of different manufacture. This is quite normal.

DIODE PLATES—A comparative test can be made on the Diode plates by turning "Range Control" to maximum position (unless otherwise stated) and "Selector Switch" to the respective point as shown on chart, marked DA.

The readings of both plates generally register between the 40% and 60% margin on meter dial, and should be approximately the same.

TO IDENTIFY THE SHORTING OR LEAKAGE ELEMENTS. The points of the Selector Switch correspond to the various elements of a valve and are numbered according to 1935 standard practice, with the exception that Valve Cap is numbered 8.

No. 2 is the plate position of all American valves, while No. 5 is the general cathode position.

Filament pins 3 and 4 are not represented on switch, being unnecessary. A glow at any one point denotes a short to filament, while a glow at any two points shows the short to be between the two elements indicated.

MULTITESTER RANGES.

The operation of the Multimeter section of the instrument is straight forward. All measurements are taken from the lower middle pair of wanda socket marked "Ext. Volts," in conjunction with either one or both of the bottom lower rotary switches.

All tests with the exception of mAs, Ohms and D.C. Volts necessitate the instrument being connected to the power supply. When this is done and the test prods are plugged into the wanda sockets, proceed as follows:—

MEGOHMS. Turn left rotary switch to "MEGOHMS."

It is perhaps desirable to connect the special alligator clips supplied, onto the end of the prods as the voltake across same is about 225 volts. The maximum power present, however, is only a fraction of a watt so that a shock would be more unpleasant than dangerous.

Now place the prods across the point to be measured and note the reading on the top scale of meter dial marked "Ohms," Multiply the figure indicated by 500.

The megohms range is very useful for not only measuring high resistors and potentiometers but also for testing the insulation properties of wires, sockets and paper condensers, etc.

The range extends from 0 — 10 megohms.

ELECTROLYTIC CONDENSERS. One of the most essential tests in the preliminary check of a radio set is to measure the condition of the electrolytic condensers therein.

Turn left rotary switch to "Electrolytic 500v type" for all types usually found in the filter network of the power supply. Fit the clips onto the test prods and attach across the electrolytic under test. **Make sure to observe the correct polarity.** Note.—It may be necessary to disconnect the positive lead of the condenser from the circuit before making the test.

If the electrolytic has not been used for some time, it will be necessary to allow a minute or two for it to "form." It will be noted that the meter needle will gradually go down the scale, finally becoming stationary. The direct reading dial will then show the condition, which is a measure of the condensers leakage.

The low voltage types are tested by turning rotary switch to the next lower stud.

NEON PAPER FLASH TEST. Another very useful test can be applied to the paper and mica condensers, as open circuited by-passing condensers are ordinarily very difficult to locate and can be the cause of much trouble in the way of oscillation and distortion.

Turn left rotary switch to "NEON COND. TEST." Now apply the prods across the condenser. (If the latter is paralleled by a resistor or any other component, it will be necessary to disconnect one end).

For sizes from .1 and over, clip on the prods and observe the neon. If the condenser is in good condition, it will flash regularly, the period of same depending on the size of the capacity. For lower values than .1, it may be necessary to touch the prods across and watch for a single flash that should occur. Extremely low valves (.001) will only generate a very minute flash and should be watched for very closely. A second flash will not take place unless either the prods are reversed or the condenser is discharged.

A pronounced continuous glow in the neon will indicate a leakage. This must not be confused with a faint glow which may be sometimes present, especially when the flexible cords of test prods are together or the operator's hands are on same.

MA'S. Four ranges of D.C. MAs are available by turning the left rotary switch to mAs position and selecting the required range by means of the right hand rotary switch. Care should be taken to always take an initial reading on the highest range as the majority of accidental overloads applied to the average meter occur while on the current ranges.

It is therefore advisable to take precautions by also cultivating the habit of turning the switch either to the blank stud or to the 1000'v position, the moment the current measurements have been finished with.

LOW OHMS. This range (0-30 ohms) will be found extremely valuable, especially as values of resistance as low as .1 on the ohm (half a division) can be indicated. The main uses will be found in checking for poor contacts, shorted turns in coils and dry joints, etc. NOTE: When testing for dry joints, place the prods on the wire and solder-lug respectively.

The low ohms range is operated on the shunt method and consequently, current flows continually from the battery when the rotary switches are on this setting. Therefore to avoid running down the 4.5v cell prematurely, care should be taken to turn either one or the other of the switches off the above mentioned position when not actually using same.

When the switches are positioned for "Low Ohms," the needle will go up scale. Adjust to the usual full scale deflection bp means of control marked "OHMS ADJ." NOTE.—When the test prods are shorted, the needle turns to within about half a division from zero. The resistance of the test cords themselves being responsible for the slight reading.

OHMS. Two ranges of series ohms are available, both being operated from the dry cell supplied and are read on the top scale. Before taking a reading, short prods together and adjust to full scale deflection by means of the control marked "OHMS ADJ."

D.C. VOLTS. Four ranges of D.C. volts can be utilized by turning the left rotary switch to D.C. volts and the right to range required. Start with the highest range and switch down if permissible.

A.C. VOLTS. The most advanced and important development of the V.C.T. is the inclusion of valve rectification for the measurement of A.C. volts. The valve is rapidly replacing the copperoxide rectifier in oversea test equipment.

The advantages are that it can be made to follow a linear scale; then again it cannot be damaged by applying an overload. This is a great feature as copperoxide units are extremely sensitive to overload and are costly to replace. Then again, the degree of accuracy obtained is very high, especially if an aged tube working at only a fraction of its normal output is used. (This is the case with the rectifier in our instrument.)

The procedure is similar to that of D.C. volts previously described, except that the instrument must be connected to the power supply to allow rectifier tube to operate.

Measurements of A.C. line voltage can be taken notwithstanding that the instrument is plugged into same.

QUIESCENT CURRENT. It will be noted that when the switch is turned to the lower A.C. range, the meter needle will advance two or three degrees off zero. This is quite normal when a valve is being worked as a diode.

The generation of this "idle" current is caused by the velocity at which some electrons are thrown from the heated cathode, thus causing them to reach the plate even though no positive attraction is applied to same.

The presence of this quiescent current at no input, however, does not influence or bring about the slightest inaccuracy when taking an actual measurement, on the contrary, should it be "bucked out" so that the needle starts off at zero, the inaccuracy will be introduced on a linear scale, particularly at the lower end of same. The effect will not be so apparent on higher ranges.

Should the purchaser of this instrument desire any further information re the operation of same, write direct to Paton Electrical Proprietary Ltd., 90 Victoria Street, Ashfield, Sydney. When writing, please quote the serial number of instrument, which will be found on front panel.

NOTES ON THE OPERATION
of the
MODEL V.C.T., A.C. — VIBRATOR TYPE

The operation of the A.C. – D.C. Model is identical on both A.C. and D.C. with the exception that when on A.C. the power cord is inserted into the 5 pin connection (in compartment) and then plugged into the power supply.

When D.C. operation is required, remove the power cord and replace with the special battery cable. Connect the alligator clips across a 6 volt accumulator observing the correct polarity.

To adjust the vibrator output to the correct voltage, turn bottom left selector to "Line Check" and adjust top left control marked "Line Adj." for full scale deflection. In other words the procedure is the same as when on the A.C. supply (see instructions).

NOTE—When checking the line before testing a valve, it is advisable, when using the D.C. section to have the valve in the instrument, otherwise, when the valve is plugged in there will be slight drop in voltages due to the wattage required to light the filament as the regulation of the transformer is naturally not as good when on the vibrator as when on the A.C. supply.

It will also be noticed that when on the paper condenser test, that only one flash is obtained from a good condenser. This is a sufficient indication that the condenser is 100%.

A slight constant glow may be noticed even when the hands are not touching the cords. This indicates a leakage, but as every condenser has a certain amount of leakage, the amount of same can be verified by applying the "Megohms Test."

AMERICAN VALVES

Type Valve	Fil.	Sel.	Range Degree	Type Valve	Fil.	Sel.	Range Degree
01A	5.0	1	18.0	1P5GT	1.4	8	12.0
1A4	2.0	8	21.0	1Q5GT	1.4	1	9.75
1A5G	1.4	1	16.0	1T5GT	1.4	1	14.0
1A6	2.0	6	22.0	1V	6.3	2	6.0
1A7G	1.4	1	23.0	2A3	2.5	1	9.0
1A7GT	1.4	1	23.0	2A5	2.5	6	11.0
1B4	2.0	8	21.0	2A6	2.5	8TA	9.0
1B5	2.0	5	17.25	do.	2.5	1DA	Max.
1C4	2.0	8	11.5	do.	2.5	6DA	Max.
1C5G	1.4	1	10.5	2A7	2.5	6	8.75
1C6	2.0	6	18.0	2B7	2.5	8TA	17.0
1C7G	2.0	1	16.0	do.	2.5	7DA	Max.
1D4	2.0	1	9.5	do.	2.5	6DA	Max.
1D5G	2.0	8	16.0	3Q5GT	1.4	5	9.75*
1D7G	2.0	1	22.0	5T4	5.0	1	7.0 *
1D8GT	1.4	1PA	14.5	do.	5.0	2 (2nd P.)	7.0 *
do	1.4	8TA	17.5	5U4G	5.0	1	8.0 *
do	1.4	5DA	Max.	do.	5.0	2 (2nd P.)	8.0 *
do	1.4	6DA	Max.	5V4G	5.0	1	5.5 *
1E5G	2.0	8	17.5	do.	5.0	2 (2nd P.-	5.5 *
1E7G	2.0	1	11.0	5W4	5.0	1	13.0 *
do.	2.0	6	11.0	do.	5.0	2 (2nd P)	13.0 *
1F4	2.0	1	12.5	do.	5.0	5	3.5 *
1F5G	2.0	1	10.0	5X3G	5.0	1	12.0 *
1F6	2.0	8TA	21.0	do.	5.0	2 (2nd P)	12.0 *
do.	2.0	5DA	Max.	5X4G	5.0	1	8.0 *
1F7G	2.0	8	21.0	do.	5.0	2 (2nd P)	8.0 *
do.	2.0	1	Max.	5Y3G	5.0	2	11.0 *
do.	2.0	6	Max.	do.	5.0	1 (2nd P)	11.0 *
1G4G	1.4	1	14.0	5Y4G	5.0	1	12.0
1G5G	2.0	1	11.0	do.	5.0	2 (2nd P)	12.0
1G6G	1.4	1	13.0	5Z3	5.0	1	7.0
do.	1.4	6	13.0	do.	5.0	2 (2nd P)	7.0
1H4G	2.0	1	20.5	5Z4	5.0	1	8.0
1H5G	1.4	8	14.0	do.	5.0	2 (2nd P)	8.0
1H5GT	1.4	8	14.0	6A3	6.3	1	10.0
1H6G	2.0	7TA	16.5	6A4	6.3	1	9.75
do.	2.0	1DA	Max.	6A6	6.3	1	9.5
do.	2.0	6DA	Max.	do.	6.3	6 (2nd P)	9.5
1J6G	2.0	1	15.0	6A67	6.3	6	5.25
do.	2.0	6	15.0	6A7	6.3	6	8.75
1K4	2.0	8	10.5	6A8	6.3	1	9.5
1K5G	2.0	8	12.0	6A8G	6.3	1	9.5
1K6	2.0	8TA	12.0	6A8GT	6.3	1	9.5
do.	2.0	1DA	Max.	6AB5/6N5	6.3	1	17.0
do.	2.0	6DA	Max.	6AE5GT	6.3	1	9.0
1K7G	2.0	8TA	12.0	6AG7	6.3	6	9.0
do.	2.0	1DA	Max.	6AC5G	6.3	1	8.75
do.	2.0	6DA	Max.	6B4G	6.3	1	9.0
1L5G	2.0	1	10.0	6B5	6.3	6	18.0
1M5G	2.0	8	11.0	6B6G	6.3	8TA	8.5
1N5G	1.4	8	12.0	do.	6.3	1DA	Max.
				do.	6.3	6DA	Max.

Type Valve	Fil.	Sel.	Range Degree	Type Valve	Fil.	Sel.	Range Degree
6B7	6.3	8TA	16.0	6N5	6.3	1	17.0
do.	6.3	7DA	Max.	6N6G	6.3	1	18.0
do.	6.3	6DA	Max.	6N7	6.3	1	10.0
6B7S	6.3	8TA	13.0	do.	6.3	6 (2nd P)	10.0
do.	6.3	7DA	Max.	6P5	6.3	1	10.0
do.	6.3	6DA	Max.	6P7G	6.3	8	17.5
6B8G	6.3	8TA	16.0			(Adaptor	needed)
do.	6.3	1DA	Mox.	6Q7	6.3	8TA	10.0
do.	6.3	6DA	Max.	do.	6.3	1DA	Max.
6C5G	6.3	1	9.75	do.	6.3	6DA	Max.
6C6	6.3	8	9.0	6R7	6.3	8TA	11.0
6C8G	6.3	1	9.5	do	6.3	1DA	Max.
do.	6.3	8	9.5	do	6.3	6DA	Max.
6D5	6.3	1	11.0	6S7	6.3	8	10.0
6D6	6.3	8	10.0	6S7G	6.3	8	10.0
6D8G	6.3	1	10.5	6SA7	6.3	1	7.5
6E5	6.3	1	17.0	6SC7	6.3	6	11.0
6D7	6.3	3	9.5	6SK7	6.3	6	9.0
6E7	6.3	8	10.0	6T7G	6.3	8	10.0
6F5	6.3	8	7.0	6U5	6.3	1	13.0
6F5G	6.3	8	7.0	6U7G	6.3	8	10.0
6F5GT	6.3	8	7.0	6V6G	6.3	1	6.0
6F6	6.3	1	12.5	6V7G	6.3	8	18.0
6F6G	6.3	1	11.0	do.	6.3	1DA	Max.
6F7	6.3	8	17.5	do.	6.3	6DA	Max.
do.	6.3	6 (2nd P)	Max.	6W5	6.3	1	8.0
6F8G	6.3	1	7.0	do.	6.3	2	8.0
do.	6.3	8	7.0	6W7G	6.3	8	9.5
6G5	6.3	1	13.0	6X5	6.3	1	7.25
6G6G	6.3	1	10.0	6X5G	6.3	1	7.25
6G8G	6.3	8	15.0	6X5GT	6.1	1	7.25
do.	6.3	1DA	Max.	6Y6G	6.3	1	6.5
do.	6.3	6DA	Max.	6Y7G	6.3	1	8.75
6H5	6.3	1	13.0	do.	6.3	6	8.75
6H6	6.3	1	6.5	6Z4	6.3	1	6.0
do.	6.3	2	6.5	do.	6.3	2	6.0
6J5G	6.3	1	8.5	6Z7G	6.3	1	9.0
6J7	6.3	8	9.0	do.	6.3	6	9.0
6J7G	6.3	8	9.5	6Z5YG	6.3	1	9.5
6J7GT	6.3	8	9.5	do.	6.3	2	9.5
6J8G	6.3	1TA	10.0	7A7LM	6.3	6	10.0
do.	6.3	8PA	7.5	7B5LT	6.3	6	11.0
6H4	6.3	6	6.5	7B6LM	6.3	1	8.5
6K6G	6.3	1	10.5	7B8LM	6.3	8	9.0
6K6GT	6.3	1	10.5	7C5LT	6.3	6	9.0
6K7	6.3	8	9.5	1O	7.5	1	18.0
6K7G	6.3	8	9.5	12A	5.0	1	11.5
6K7GT	6.3	8	9.5	12A7	12.5	8	17.5
6K8	6.3	1	6.5	12A8GT	12.5	1	9.0
6K8G	6.3	1	6.5	12C8	12.5	8	15.0
6L5G	6.3	1	10.5	do.	12.5	6	Max.
6L6	6.3	1	7.25	do.	12.5	1	Max.
6L6G	6.3	1	7.25	12F5GT	12.5	8	7.0
6L7	6.3	8	7.5	12J5GT	12.5	1	8.5
6L7G	6.3	8	7.5	12J7GT	12.5	8	10.0

Type Valve	Fil.	Sel.	Range Degree	Type Valve	Fil.	Sel.	Range Degree
12K7GT	12.5	8	11.5	43	25.0	6	7.75
12K8	12.5	1	6.5	44	6.3	8	8.0
12Q7GT	12.5	8	8.5	45	2.5	1	8.0
do.	12.5	1	Max.	46	2.5	1	13.0
do.	12.5	6	Max.	47	2.5	1	11.0
12SA7	12.5	1	7.5	48	30.0	6	
12SC7	12.5	2	8.5 *	49	2.0	1	17.5
do.	12.5	6	8.5 *	50	7.5	1	21.0
12SF5	12.5	6	7.0 *	53	2.5	1	9.5
12SJ7	12.5	6	8.25	do.	2.5	6 (2nd P)	9.5
12SK7	12.5	6	9.0	55	2.5	8TA	17.0
12Z3	12.5	2	5.0	do.	2.5	1DA	Max.
15	2.5	8	17.0	do.	2.5	6DA	Max.
19	2.0	1	14.75	56	2.5	1	11.5
do.	2.0	6 (2nd P)	14.75	57	2.5	8	9.0
24A	2.5	8	10.0	58	2.5	8	9.0
25AC5GT	25.0	1	8.75	59	2.5	7	11.5
25A6G	25.0	1	7.75	71A	5.0	1	16.5
25A7G	25.0	1	10.0	75	6.3	8TA	8.5
do.	25.0	7	7.0	do.	6.3	1DA	Max.
25B6G	25.0	1	9.0	do.	6.3	6DA	Max.
25C6	25.0	1	9.0	76	6.3	1	11.0
25D8	25.0	8	10.0	77	6.3	8	9.5
do.	25.0	1	8.5	78	6.3	8	10.5
do.	25.0	5	Max.	79	6.3	1	8.75
25L6GT	25.0	1	5.75	do.	6.3	8 (2nd P)	8.75
25S	2.0	5	17.25	80	5.0	2	12.0
25L6	25.0	1	7.0	do.	5.0	1 (2nd P)	12.0
25Z5	25.0	2	5.0	81	7.5	2	11.5
do.	25.0	5 (2nd P)	5.0	82	2.5	2	14.5
25Z6	25.0	1	6.0	do.	2.5	1 (2nd P)	14.5
do.	25.0	2	6.0	83	5.0	2	4.0
26	1.5	1	16.0	do.	5.0	1 (2nd P)	4.0
27	2.5	1	12.5	83V	5.0	2	5.0
30	2.0	1	16.5	do.	5.0	1 (2nd P)	5.0
31	2.0	1	23.0	84/6Z4	6.3	2	6.0
32	2.0	8	19.0	do.	6.3	1 (2nd P)	6.0
33	2.0	1	13.0	85	6.3	8TA	18.0
34	2.0	8	17.0	do.	6.3	1DA	Max.
35	2.5	8	10.0	do.	6.3	6DA	Max.
35Z4GT	30.0	1	5.0	89	6.3	8	12.0
36	6.3	8	10.0	1603	6.3	8	9.5
37	6.3	1	10.0	1613	6.3	1	11.0
38	6.3	8	11.0	1615	6.3	6	11.0
39/44	6.3	8	8.0	1617	6.3	6	11.0
41	6.3	6	10.0	1621	6.3	1	11.0
42	6.3	6	10.0	1622	6.3	1	9.0

* 5Z4 Socket

PHILIPS VALVES

Type Valve	Fil.	Sel.	Range Degree	Type Valve	Fil.	Sel.	Range Degree
A103	1.5	1	24.0	D243	2.5	1	11.5
A209	2.0	1	17.0	D243N	2.5	1	14.5
A409	4.0	1	14.5	E406	4.0	1	10.5
A415	4.0	1	10.5	E409	4.0	1	6.5
A425	4.0	1	12.75	E415	4.0	1	9.0
A442	4.0	1	18.5	E424	4.0	1	6.0
A609	5.0	1	13.5	E442	4.0	1	9.5
A615	5.0	1	10.25	E442S	4.0	1	11.5
A630	5.0	1	12.0	E443H	4.0	1	10.0
A635	5.0	1	20.5	E443N	4.0	1	13.5
A642	5.0	1	13.25	E444	4.0	6	5.5
AB2	4.0	1	9.0	do.	4.0	1DA	Max.
do.	4.0	2	9.0	E445	4.0	1	9.5
ABC1	4.0	8TA	8.0	E446	4.0	6	5.5
do.	4.0	7DA	8.0	E447	4.0	6	5.5
do.	4.0	6DA	8.0	E452T	4.0	1	4.75
AC2	4.0	8	6.5	E454	4.0	8TA	8.25
AF2	4.0	6	5.5	do.	4.0	5DA	Max.
AF3	4.0	8	7.5	do.	4.0	7DA	Max.
AF7	4.0	8	7.5	E455	4.0	1	5.0
AK1	4.0	6	6.0	E463	4.0	6	7.25
AK2	4.0	7	7.5	EBC1	6.3	8TA	8.5
AL2	4.0	8	8.0	do.	6.3	7DA	Max.
AL3	4.0	7	5.25	do.	6.3	6DA	Max.
AZ3	4.0	2	6.0	EBC3	6.3	8TA	8.75
do.	4.0	6 (2nd P)	6.0	do.	6.3	6DA	19.0
B217	2.0	1	17.0	do.	6.3	7DA	19.0
B240	2.0	1	8.0	EBF2	6.3	8TA	18.0
do.	2.0	6 (2nd P)	8.0	do.	6.3	1DA	Max.
B255	2.0	1	12.25	do.	6.3	6DA	Max.
B262	2.0	1	8.75	EBL1	6.3	8TA	5.5
B403	4.0	1	19.0	do.	6.3	7DA	20.0
B405	4.0	1	13.5	do.	6.3	6DA	20.0
B406	4.0	1	18.0	E444N	4.0	6	10.0
B409	4.0	1	10.0	EB4	6.3	1DA	8.5
B443	4.0	1	13.0	do.	6.3	6DA	8.5
B605	5.0	1	17.0	E406N	4.0	7	13.0
C243N	2.0	1	9.25	EF6	6.3	8	7.25
C443	4.0	1	14.5	EF5	6.3	8	7.25
C603	5.0	1	15.0	EK1	6.3	7	7.0
C643	5.0	1	15.0	EK2	6.3	7	9.0
CB1	12.5	1	11.0	EK2G	6.3	1	9.0
do.	12.5	8	11.0	EL2	6.3	8	6.75
CBC1	12.5	8TA	13.0	EL3	6.3	7	5.25
do.	12.5	6DA	Max.	EL3G	6.3	1	5.25
do.	12.5	7DA	Max.	EL5	6.3	7	5.5
CC1	12.5	8	6.75	EM1	6.3	7	Max. (40%)
CF1	12.5	8	7.25	EZ2	6.3	2	8.25
CF2	12.5	8	7.0	do.	6.3	6	8.25
CK1	12.5	7	7.5	EZ3	6.3	2	6.0
CL2	25.0	8	6.0	do.	6.3	6	6.0
CL4	30.0	8	6.0	EZ4	6.3	2	5.0
CY2	30.0	6	5.25	do.	6.3	6	5.0
do.	30.0	2 (2nd P)	5.25	F443	4.0	1	12.5

Type Valve	Fil.	Sel.	Range Degree	Type Valve	Fil.	Sel.	Range Degree
F443N	4.0	1	11.5	KK2	2.0	6	14.75
KBC1	2.0	8TA	12.5	(American 7 Pin base)			
do.	2.0	1DA	Max.	KK2G	2.0	1	15.0
do.	2.0	6DA	Max.	KL4	2.0	7	10.0
KC3	2.0	7	6.75	KL4G	2.0	1	10.0
KDD1	2.0	7	10.0	373	4.0	3	7.0
do.	2.0	1 (2nd P)	10.0	506	4.0	1	11.0
KF1	2.0	6	6.75	do.	4.0	2 (2nd P)	11.0
KF2	2.0	6	7.25	1561	4.0	1	10.0
KF3	2.0	8	14.0	do.	4.0	2 (2nd P)	10.0
KF3G	2.0	8	14.0	1867	4.0	1	9.0
KF4	2.0	8	12.5	do.	4.0	2 (2nd P)	9.0
KK2	2.0	7	15.0				

TA—Triode Anode
DA—Diode Anode

OSRAM VALVES

Type Valve	Fil.	Sel.	Range Degree	Type Valve	Fil.	Sel.	Range Degree
B21	2.0	6	16.5	MSP4	4.0	6	
B21	2.0	7 (2nd P)	16.5	MU12	4.0	1	6.5
DHD	12.5	8TA		do.	do.	2 (2nd P)	6.5
do.	dn.	1DA	Max.	MU14	4.0	1	6.5
do.	dn.	5DA	Max.	MU141	4.0	2 (2nd P)	6.5
DHX	12.5	1	6	MS4B/K/M	4.0	1	6.5
DL	12.5	1		P2	2.0	1	9.25
DPT	12.5	1	8.75	P215	2.0	1	1. 5
DS	12.5	1	8.5	PT2	2.0	1	8.75
DSB	12.5	1	6.75	PT4	2.0	1	
GUI	4.0	1	11	PT16	4.0	1	
H2	2.0	1	8	PT25	4.0	1	
H210	2.0	1	21	PX4	4.0	1	8.75
HL2	2.0	1	8.25	PX25	4.0	1	
HL210	2.0	1	11	S21	2.0	1	11.5
L21	2.0	1	9.5	S22	2.0	1	7
L210	2.0	1	16	S23	2.0	1	12
LP2	2.0	1		U10	4.0	1	11
LS6A	5.0	1		do.	do.	2 (2nd P)	11
MH4	4.0	1	5.5	U12	4.0	1	10
MH41	4.0	1	4.25	do.	do.	2 (2nd P)	10
MH4/K/M	4.0	1	6.5	U14	4.0	1	11
MHD4	4.0	8TA	6.5	do.	do.	2 (2nd P)	11
do.	do.	1DA	Max.	VSD	12.5	1	12.5
do.	do.	5DA	Max.	VDSB	12.5	1	
MH14	4.0	1	7.5	VMP4	4.0	6	
ML4	4.0	1	5.75	VMS4	4.0	1	
MPT4	4.0	1	7.5	VMS4B	4.0	1	
MPT4	4.0	6 (7 pin)	7.5	VMS4/K/M	4.0	1	7.5
MPT4/K	4.0	1	7.5	VP21	2.0	6	
MS4	4.0	1		VS24	2.0	1	8.25
MS4B	4.0	1					

TA—Triode Anode
DA—Diode Anode

MULLARD VALVES

Type Valve	Fil.	Sel.	Range Degree	Type Valve	Fil.	Sel.	Range Degree
AC3	1.5	1	16.0	PM5V	6.0	1	15.0
AC4	5.0	1	16.5	PM5X	6.0	1	15.0
ACO44	4.0	1	12.75	PM6	6.0	1	12.5
ACO64	4.0	1	14.5	PM22	2.0	1	20.0
AC104	4.0	1	10.0	PM22A	2.0	1	8.0
D026	4.0	1	11.0	PM24	4.0	1	12.5
DU2	4.0	1	10.0	PM202	2.0	1	10.5
do.	4.0	8 (2nd P)	10.0	PM24A	4.0	1	10.5
DU10	4.0	2	7.0	PM24B	4.0	1	8.25
DW4	4.0	1	10.0	PM24M	4.0	1	10.5
do.	4.0	2 (2nd P)	10.0	PM243	2.5	1	11.5
DW15	7.5	1	9.5	PM26	6.0	1	11.5
do.	7.5	2 (2nd P)	9.5	PM2BA	2.0	1	9.5
FC4	4.0	6	6.5	do.	2.0	6 (2nd P)	9.5
IW3	4.0	1	9.0	SP2	2.0	6	7.0
do.	4.0	2	9.0	SP4	2.0	6	5.5
MM4V	4.0	1	6.5	S4V	4.0	1	12.5
Pen4VA	4.0	6	6.5	S4VA	4.0	1	4.5
PM1A	2.0	1	18.5	S4VB	4.0	1	4.75
PM1DG	2.0	5	18.0	TDD2	2.0	8TA	12.25
PM1HF	2.0	1	18.0	do.	2.0	1DA	Max.
PM1HL	2.0	1	17.5	do.	2.0	6DA	Max.
PM1LF	2.0	1	17.5	TDD4	4.0	8TA	9.0
PM12	2.0	1	8.25	do.	4.0	5DA	11.0
PM12A	2.0	1	8.25	do.	4.0	7DA	11.0
PM12M	2.0	1	8.5	VM4V	4.0	6	
PM12V	2.0	1	14.25	VP2	2.0	6	6.25
PM14	4.0	1	18.5	VP4	4.0	6	5.5
PM16	6.0	1	20.0	102T	2.5	1	12.5
PM2A	2.0	1	8.25	104V	4.0	1	6.5
PM2B	2.0	1	8.0	164V	4.0	1	9.25
do.	2.0	6 (2nd P)	8.0	244V	4.0	1	5.75
PM2DX	4.0	1	13.0	354V	4.0	1	6.0
PM3	4.0	1	12.0	904V	4.0	1	5.5
PM4	4.0	1	14.5				
PM4DX	4.0	1	9.5				

TA—Triode Anode
DA—Diode Anode

ADDITIONAL RELEASES

Type		Fil.	Sel.	Range
6AC7		6.3	6	6
6SD7		6.3	6	8
6SE7		6.3	6	8
6SG7		6.3	6	6.5
6SH7		6.3	6	5
Shows Short on Selectors 1 and 2				
6SJ7		6.3	6	9
6SK7		6.3	6	7
6SS7		6.3	6	7
6S6		6.3	8	10.5
6S7		6.3	8	10.5
807		6.3	1	6
ECH33		6.3	8	6
ECH35		6.3	8	5.5
EL33A		6.3	1	5
EBF26/GT	(5Z4 Socket)	6.3	8	6.5
KT61		6.3	1	4.5
X61M		6.3	8	5
X76M		12.6	8	7
Y61		6.3	1	11
KT66		6.3	1	7.25
KTZ63		6.3	8	9
L63		6.3	1	7
EBF35	(5Z4 Socket)	6.3	8	6.5
DH63		6.3	6	Max.
DH63		6.3	1	Max.
DH63		6.3	8	11
DH76		12.5	6	Max.
DH76		12.5	1	Max.
DH76		12.5	8	11
H63		6.3	1	9.5
KTW61		6.3	8	7
U31		25.	1	7.5
U70		6.3	2	10.0
U70		6.3	1	10.0
U76		30	6	7.5
W76		12.5	8	9
Z63		6.3	8	10.5
2E26		6·3	1	4

The following additional valves may be tested on the VCT, VCT/V, MV and PV valve testers by using the Palec Valve Adaptor Panel.

Type	Adaptor	Fil.	Sel.	Range
IR5	PM2	1.5	1	13
IS5	PM3	1.5	7	20
IS5	PM3	1.5	2	Max.
IT4	PM2	1.5	7	13
3Q4	PM1	2.5	6	11
3S4	PM1	2.5	6	12
3V4	PM2	2.5	7	9.5
6AN7	PM5	6.3	2	6
6AN7	PM5	6.3	6	7.5
	Shows Short on Selector 7			
6AQ5	PM7	6.3	2	7.5
6AR7 GT	5Z4 Socket	6.3	8	7
6AR7 GT	5Z4 Socket	6.3	1	Max.
6AR7 GT	5Z4 Socket	6.3	5	Max.
6AU6	PM6	6.3	2	5.5
6AV6	PM6	6.3	2	7.0
6AV6	PM6	6.3	6	Max.
6AV6	PM6	6.3	1	Max.
6BA6	PM6	6.3	2	5.5
6BE6	PM6	6.3	2	5.0
6BD7	PM5	6.3	2	7.0
6BD7	PM5	6.3	7	Max.
6BD7	PM5	6.3	5	Max.
	Shows Short on Selectors 6 and 1			
6M5	PM5	6.3	2	6.0
	Shows Short on Selector 5			
6N8	PM5	6.3	2	6.0
6N8	PM5	6.3	1	Max.
6N8	PM5	6.3	5	Max.
6SA7	—	6.3	1	8
6SC7	PM4	6.3	5	11
6SC7	PM4	6.3	6	11
6SF7	PM4	6.3	7	10
6SF7	PM4	6.3	1	Max.
6SL7	PM4	6.3	6	8
6SL7	PM4	6.3	2	8
6SN7	PM4	6.3	2	7
6SN7	PM4	6.3	6	7
6SQ7	PM4	6.3	7	8
6SQ7	PM4	6.3	1	Max.
6SQ7	PM4	6.3	6	Max.
6SR7	PM4	6.3	7	13
6SR7	PM4	6.3	6	7
6SR7	PM4	6.3	1	7
6ST7	PM4	6.3	7	7
6ST7	PM4	6.3	1	Max.
6ST7	PM4	6.3	6	Max.
12BA6	PM6	12.6	2	5.5
12BE6	PM6	12.6	2	5.0
6X4	PM6	6.3	2	8
6X4	PM6	6.3	1	8.0
EL3NG	P. Base	6.3	7	5.5
N17	PM1	2.5	6	12

Type	Adaptor	Fil.	Sel.	Range
W17	PM2	1.5	7	13
X17	PM2	1.5	1	13
ZD17	PM3	1.5	7	20
ZD17	PM3	1.5	2	Max.
X81	PM8.	6.3	6	7.5
X81	PM8	6.3	7	6
X101	PM8	12.6	6	15
X101	PM8	12.6	7	17
B65GT	PM4	6.3	2	7.25
B65GT	PM4	6.3	6	7.25
DH77	PM6	6.3	6	Max.
DH77	PM6	6.3	1	Max.
DH77	PM6	6.3	5	11
DH81	PM8	6.3	1	Max.
DH81	PM8	6.3	7	Max.
DH81	PM8	6.3	2	11
	Shows Short on Selectors 5 and 6			
DH149	PM8	6.3	1	Max.
DH149	PM8	6.3	7	Max.
DH149	PM8	6.3	2	11.5
DL82	PM8	6.3	1	Max.
DL82	PM8	6.3	7	Max.
DL82	PM8	6.3	2	9.5
KT81	PM8	6.3	7	5.5
N78	PM6	6.3	2	4.5
	Shows Short on 1			
N144	PM6	6.3	2	7.25
U78	PM6	6.3	1	9.5
U78	PM6	6.3	2	9.5
U81	PM8	6.3	2	10
U81	PM8	6.3	7	10
	Shows Short on 5			
U82	PM8	6.3	2	9.5
U82	PM8	6.3	7	9.5
U84	PM8	4.0	2	11.0
U84	PM8	4.0	7	11.0
	Shows Short on Selector 5			
W77	PM6	6.3	2	7.5
W81	PM8	6.3	7	6
W101	PM8	12.5	7	7
X78	PM6	6.3	5	11.5
	Checks triode section only.			
X101	PM8	12.5	6	15
X101	PM8	12.5	7	17
X148	PM8	6.3	6	
X148	PM8	6.3	7	
7A4	PM8	6.3	7	8.5
7A5	PM8	6.3	7	5.0
7A6	PM8	6.3	2	Max.
7A6	PM8	6.3	7	Max.
7A7	PM8	6.3	7	7
7A8	PM8	6.3	6	9.5
7B4	PM8	6.3	7	9.5
7B5	PM8	6.3	7	10.5
7B6	PM8	6.3	2	8.0
7B6	PM8	6.3	1	Max.

Type	Adaptor	Fil.	Sel.	Range
7B6	PM8	6.3	7	Max.
7B7	PM8	6.3	7	9
7B8	PM8	6.3	6	9.5
7C5	PM8	6.3	7	6.0
7C6	PM8	6.3	2	11.5
7C6	PM8	6.3	1	Max.
7C6	PM8	6.3	7	Max.
7C7	PM8	6.3	7	10.25
7E6	PM8	6.3	2	11
7E6	PM8	6.3	1	Max.
7E6	PM8	6.3	7	Max.
7E7	PM8	6.3	7	10.25
7E7	PM8	6.3	6	Max.
7E7	PM8	6.3	2	Max.
7F7	PM8	6.3	6	8.5
7F7	PM8	6.3	1	8.5
7G7	PM8	6.3	7	5.75
7H7	PM8	6.3	7	6.25
7J7	PM8	6.3	6	5.0
7J7	PM8	6.3	7	5.0
7K7	PM8	6.3	6	9.25
7K7	PM8	6.3	1	Max.
7K7	PM8	6.3	7	Max.
7L7	PM8	6.3	7	7
7N7	PM8	6.3	6	7
7N7	PM8	6.3	1	7
7Q7	PM8	6.3	6	8
7R7	PM8	6.3	7	6.25
7R7	PM8	6.3	2	Max.
7R7	PM8	6.3	6	Max.
7S7	PM8	6.3	6	5
7S7	PM8	6.3	7	5
7V7	PM8	6.3	7	4.5
7W7	PM8	6.3	7	4.5
	Shows Short on 6 and 5			
7Y4	PM8	6.3	2	9
7Y4	PM8	6.3	7	9
7Z4	PM8	6.3	7	9
7Z4	PM8	6.3	2	9

James & James, Printers, 209 Liverpool Road, Ashfield