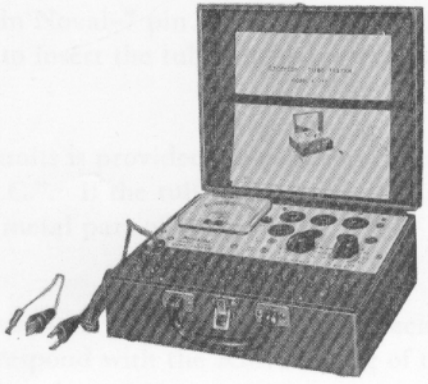
Kyoritsu TUBE TESTER

MODEL K-118 & K-119

OPERATING INSTRUCTIONS

(K-118)



(K-119)

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.
TOKYO JAPAN

This Unit is a modern and compact Tube Tester designed to provide speedy yet efficient operation. The Model will test tube types used in Radio, Hi-Fi, Monochrome, color, TV, etc., for quality of emission and inter-electrode shorts.

Sockets and circuits have been provided for testing the new Noval and Sub-Minar types in addition to the Octal, Loctal and 7-pin miniature types, as well as new 9- and 12-pin Compactron tubes and Nuvistor tubes. The socket for Noval can take a 10-pin tube of this type.

Before attempting to use the tester, we suggest you read the operating instructions contained in this manual in order to acquire a proper understanding of how this unit works.

DESCRIPTION OF SWITCHES AND CONTROLS

TUBE SOCKETS

Eight sockets are provided—Octal—Loctal–9 pin Noval–7 pin miniature–8 pin sub-minar, 9 and 12 pin Compactron and Nuvistor tubes. Be sure to insert the tube in the correct socket in all cases.

TOP CAP LEAD

This lead, supplied as the integral part of this units is provided for connection to tubes having a top cap and for insertion in the jack marked "T.C.". If the tube under test does not have a top cap, take care not to allow the lead to touch any metal part of the tester.

ELEMENTAL SLIDE SWITCHES

These switches are used to connect the various tube elements to their respective test circuits. The switches are numbered from 1 to 12 and correspond with the RMA basing of the tube.
The letters F, N, P and K provide the following functions:

F—(Filament) When any element is switched to this position, the voltage selected by the filament voltage switch is applied between this element and all other elements left in the "K" position.

N—(Neutral) When any elements is switched to this position, it is isolated from all other elements in the tube. It can be used, for example, to isolate a tapped filament from all other elements during a tube test.

P—This position inserts the meter into the circuit during quality tests and the indicator lamp during the "short" test of an element. More than one element should never be placed in the "P" position.

K—(Cathode) Switches not used in the actual test are left in this position and act as part of the cathode or return circuit.

LEAKAGE-QUALITY SWITCH

This switch determines the type of test performed by the UNIT. When placed in the QUAL position, the quality or emission of the tube under test is indicated on the meter. The SPEC position applies a higher test voltage to the tube and is used only when the letter (S) appears after an element in the "P" column of the chart. In the LEAK position inter-element shorts and leakage are indicated by the leakage indicator lamp.

LEAKAGE INDICATOR

Used in conjunction with the leakage-quality switch, it provides a steady glow when an inter-element short or leakage is present in a tube. A "flash" of the indicator when switches are moved should be disregarded. This is due to wiring and tube inter-element capacity.

METER

The quality (emission) of the tube under test is indicated on the meter. There are three calibrated portions of the scale.

1) The Replace—?—Good portion provides a broad indication of quality. The green (good) section indicates sufficient emission to assure quality performance, the white (?) section denotes borderline emission and the red (replace) section indicates below-normal emission.
2) The 0–100 calibration provides a more precise means of determining quality of emission and may be used to compare the relative emission of similar tubes.
3) The HV Diodes-OK calibration is for use in testing diodes only. Many diodes, especially high voltage rectifiers, have a high internal resistance, which reduces the emission reading. As a result, tubes of this type may produce an emission reading of as low as 20 and still be

perfectly good. Examples of the types of diodes falling into this category are the 1AX2, 1B3, 1V2, 1X2, 1Z2, 2V2, 2V3 and 3A3.

LOAD CONTROL

This control determines the amount of loading placed upon the tube under test. The smaller the number the greater the current drawn from the tube under test.

FILAMENT VOLTAGE SELECTOR

This selects the correct operating potential for the filament of the tube under test. The switch should always be set *before* inserting a tube. Never change the setting after a tube is inserted.

POWER SWITCH

This switch turns the unit on and additionally serves to adjust it to various AC line voltages. The HI position is for line voltages between 115 and 125 volts or 215 and 240 volts. The LO position is for line voltages between 105 and 115 volts or 200 and 215 volts. When in doubt as to the voltage of an AC power line, set switch to HI. Like all emission type testers, the Model provides a means of making two basic tests:

1) Tests for shorts and leakages.
2) Test for quality of emission.

Tests for shorts and leakages should be carried out first and then followed by the quality test. It is advisable to do so because if a "shorted" tube were tested for quality first it could cause serious damage to the meter. Proceeding with the tests in the order recommended will prevent this happening.

HOW TO TEST A TUBE FOR SHORTS OR LEAKAGES

1. Insert line cord into AC power outlet.
2. If the AC line voltage is between 115 and 125 volts or 215 and 240 volts, set POWER switch to "Hi"; if between 105 and 115 volts or 200 and 215 volts, set to "Lo." When in doubt, set to "Hi."

   Note : If an asterisk (*) appears before a tube listing in the chart, *always* set the switch to the "Lo" position.

3. Set the "Leakage-Quality" switch to LEAK.
4. Set the FIL. Volts switch to the position specified on the tube chart for the tube to be tested.
5. Set the appropriate elemental slide switches to the "F" and "N" positions (as specified on the tube chart). All other elemental switches should be set to the "K" position.
6. Insert the tube into its correct socket. Allow at least 30 seconds for it to warm up.
7. With the exception of those previously set to "F" and "N," move each elemental slide switch *one at a time* to the "P" position. Tap the tube and observe the LEAK IND lamp, moving each switch to the "P" position and then returning it to "K."
   WARNING: AT NO TIME MUST THERE BE MORE THAN ONE SWITCH IN THE "P" POSITION.
   A steady glow in the Leakage Indicator lamp when any one of the switches is set to "P" indicates a short.
   A slight glow may be disregarded when testing certain audio tubes such as the 6L6, 50L6, etc. These tubes have a high inherent leakage. This however, does not affect their normal operation. In all other cases, no glow is desirable, but a slight glow may be considered passable.
   Note: A steady glow on any of the elements listed in the filament continuity column does not indicate a "shorted" tube. This indicates filament continuity.
8. Remove the tube from the socket.

HOW TO TEST A TUBE FOR QUALITY

Do not conduct this test until you have checked the tube for shorts and leakage. If you have already done so and the tube appears normal with respect to shorts or leakage, proceed as indicated below. Do not change any of the control settings previously made for the tube under test unless instructed to do so.

1. Set the Leakage-Quality switch to QUAL. If the letter (S) appears after the element listed in the "P" column, set switch to SPEC. Disregard the glow of the indicator lamp in this position.
2. Set the elemental slide switches to the "F", "N" and "P" positions (as specified on the tube chart). All other elemental switches should be set to the "K" position.

3. Set the LOAD control to the position specified on the tube chart.
4. Insert the tube into its correct socket. Allow at least 30 seconds for it to warm up.
5. Read the quality of the tube directly on the meter.
   If the meter pointer does not move at all, the trouble may be due to an open filament. To verify, make the checks described in the following section.

HOW TO TEST FOR FILAMENT CONTINUITY

Proceed as in the test for shorts or leakages. Set either of the elemental slide switches listed in the filament continuity column to "P," with the other at "K"; the indicator lamp will glow if the filament is good. No glow indicates an open filament.

EXAMPLE OF A TYPICAL TUBE TEST

TYPE: 6CB6

FIRST—TEST FOR SHORTS AND LEAKAGE

1. Insert line cord into AC outlet.
2. Place the POWER switch to the appropriate setting, depending on the AC line voltage. If in doubt, use "Hi." Since no asterisk (*) appears with this tube listing, the switch may be left in the "Hi" position if necessary.
3. Locate data for 6CB6 on tube chart. This reads as follows:

TUBE	FIL. VOLTS	F	N	P	LOAD	FIL. CONT.
6CB6	D	3		1	30	3, 4

4. Set the Leakage-Quality switch to LEAK.
5. Set FIL. VOLTS to "D."
6. Set LOAD control to 30.

7. Set the # 3 elemental switch to "F." All other should be set to "K."
8. Insert the tube into the 7-pin socket, which is the correct one for the 6CB6. Allow at least 30 seconds for the tube to warm up.
9. One at a time, move each elemental slide switch (except number 3) to the "P" position. Tap the tube and observe the leakage indicator lamp. A steady glow when the switches are moved to "P" indicates a short. Be sure to return each switch to "K" as you proceed.

NOW—TEST FOR QUALITY

1. Set Leakage-Quality switch to QUAL.
2. With the # 3 elemental slide switch at "F," set the # 1 switch to "P." Make sure all other switches are at "K."
3. Read the quality of the tube directly on the "Replace—?—Good" portion of the scale.

Note: Tubes listed in the tube chart more than once are multi-purpose tubes, and are equivalent to several tubes in a single glass envelope. It is necessary, therefore, to test these tubes according to each listing just as you would several different tubes.

IN CASE OF DIFFICULTY

As a helpful guide to the user of this tube tester, we have compiled a list of problems commonly encountered during the use and operation of the unit.

SYMPTOM: The Tube Tester burns out the filaments on some tubes.
CAUSE : The knob on the filaments switch may have become loose and shifted position, thus applying incorrect voltage to filaments of tube under test. Make sure the fully counter-clockwise setting of the switch is aligned with letter A.
SYMPTOM: The tester tests 12 volt tubes as "bad" even though they are known to be "good."
CAUSE : Same as previous symptom. Knob on filament switch may have shifted.

SYMPTOM: Tester indicates "short" on good tubes when any one of the elemental switches is moved to the "P" position.

CAUSE : A shorted 0.01 μfd capacitor will cause a false short indication on all positions.

SYMPTOM: Tester indicates "short" on some tubes but not on others. All tubes are known to be good.

CAUSE : Due to incorrect operation. The element listed in the "P" column of the tube chart is placed in the "P" position for quality tests only. It should be returned to the "K" position before proceeding with the short test. Never place more than one switch in the "P" position at any one time.

SYMPTOM: Tester indicates "short" when *one* of the switches is set to "P." This occurs on all tubes tested.

CAUSE : Tubes are not shorted. The elemental switch which causes the indicator to light is the one listed under the "Fil. Cont." column of the tube chart. This indicates filament continuity and not a short.

SYMPTOM: Tester shows all tubes to be good, even though they are weak.

CAUSE : The load control and/or 470 ohm resistor may have been burnt out. (See note following.)

Note: The load control *must* be set according to the tube chart for quality tests. It should *never* be turned to zero during the quality test, otherwise damage to the control and tube will result.

SYMPTOM: Tester will not indicate "short" or filament continuity.

CAUSE : Trouble is usually caused by an open-circuit 0.01 μfd capacitor or defective neon lamp.

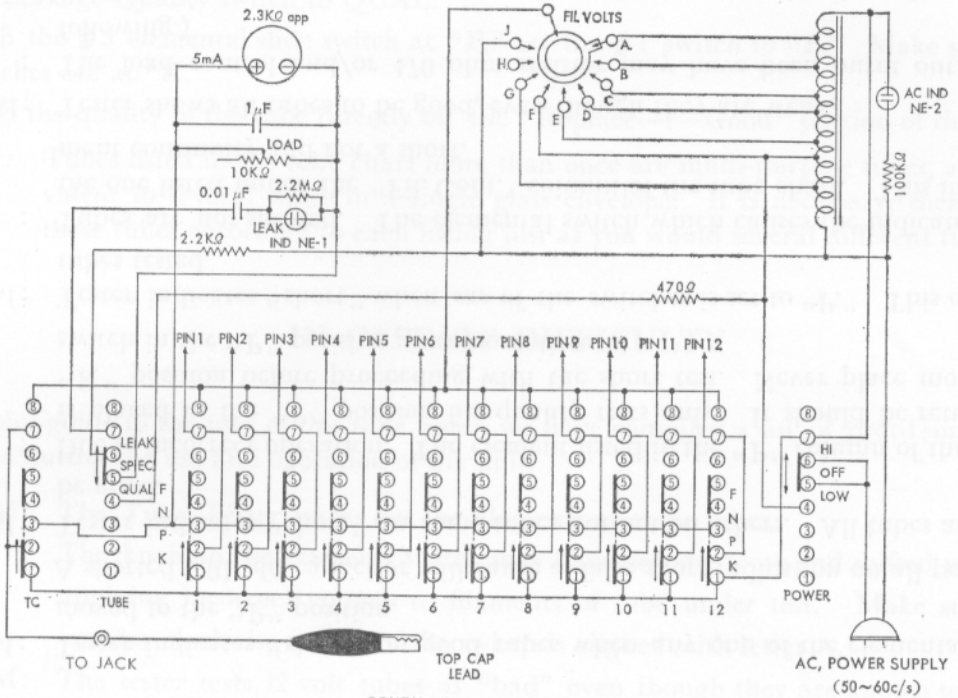
SYMPTOM: Tube tests good in the tester but will not operate satisfactorily in the radio or TV receiver.

CAUSE : An emission test is only one type of test that can be applied to a tube. It indicates the amount of electrons that leave the cathode of the tube. Although this test will

indicate the condition of the tube in most cases, certain other tests may be necessary to fully evaluate a tube's condition. Amplification factor, mutual conductance and transconductance are some of the factors that may cause a tube to act erratically. An emission test will not show up these tube characteristics.

SYMPTOM: The meter does not read to full scale on any tube. Even new tubes do not bring the meter to full scale.

CAUSE : This condition is normal. The circuit has been designed so that a normal good tube will never read full scale on the meter.



SCHEMATIC DIAGRAM