

Notes on the Heathkit C-3 Condenser Checker

by

Kenneth G. Gordon W7EKB

- 1) For the leakage tests, the voltages at the various points (25, 150, 250, 350, 450 VDC.) are not very exact, even if the resistors are still within tolerance. The current through the voltage-divider string SHOULD be about 2.5 mA. (.0025 A). If that is so, and if all the resistors are within tolerance, then the calculated voltages will be about 25, 80, 135, 190, 245 VDC. Those resistors are always WAY out of tolerance, sometimes by several hundred percent though.
- 2) The 47 K resistor, which is actually across the 1629, was found to be over 110 K in the units I have checked. This resistor sets a) the voltage across the 1629, and b) the total current in the string.
- 3) The filter capacitor closest to the diode only has the voltage across the 1629 on it, which varies, when you are measuring leakage, from a low of about 100 volts, to a high of about 200 volts, so a 475 volt or higher capacitor is not needed here. The other filter capacitor, however, has whatever voltage is left after the 1629's requirements are met. The 1629 will operate properly with voltages as low as 100 VDC. Don't go over 250 VDC though. Doing so will severely shorten the life of the eye tube.
- 4) Calculating the true resistor values that would give the correct voltages for the leakage test results in: 10 K, 50K, 40K, 40K, 40K. Adjust the true value of the "47 K" resistor at the "top" of the voltage-divider so that the actual current drawn by the string is 2.5 mA, and the voltages are accurate or slightly high at no load. The Leakage Test does NOT work unless the Power Factor switch is in the "Electrolytic" position.
- 5) The last 22 K resistor between the voltage-divider string and the 450 VDC switch connection is only a current limiter, so its true resistance value is not too important.
- 6) Replace all the capacitors, except the filters and the micas, with metalized film capacitors. The increase in accuracy and repeatability of the instrument is amazing! You will have to replace the filters with new electrolytics. The micas are usually OK, but you may want to test yours anyway, and replace those if they are out of tolerance.
- 7) All resistors in the voltage divider string should be replaced with 2 watt units. The power dropped by each resistor in the voltage-divider string will be around 0.25 watt.
- 8) Make sure the two resistors associated with the 1629 are within tolerance. If either one is much lower in resistance than specified, the eye will not open fully, or could overlap when closed.
- 9) The maximum voltage that the 1629 should be subject to is 250 VDC. Current should not be more than about 4 mA.
- 10) If the line cord is replaced by a three-wire grounded type, the repeatability of the instrument will be greatly improved, since that, according to the manual, can depend greatly on which way the plug is inserted in the wall socket. With a three-prong plug, it always goes in the same way.
- 11) If you shunt each power-supply filter cap with a 100 Kohm, 5 watt resistor, it will level out the power supply variations very noticeably, and make your leakage and other tests much more stable. This will also make the filter caps last a lot longer.