OSCILLOSCOPE CONNECTIONS FOR TESTING SILICON SEMITRON RECTIFIER POWER SUPPLIES

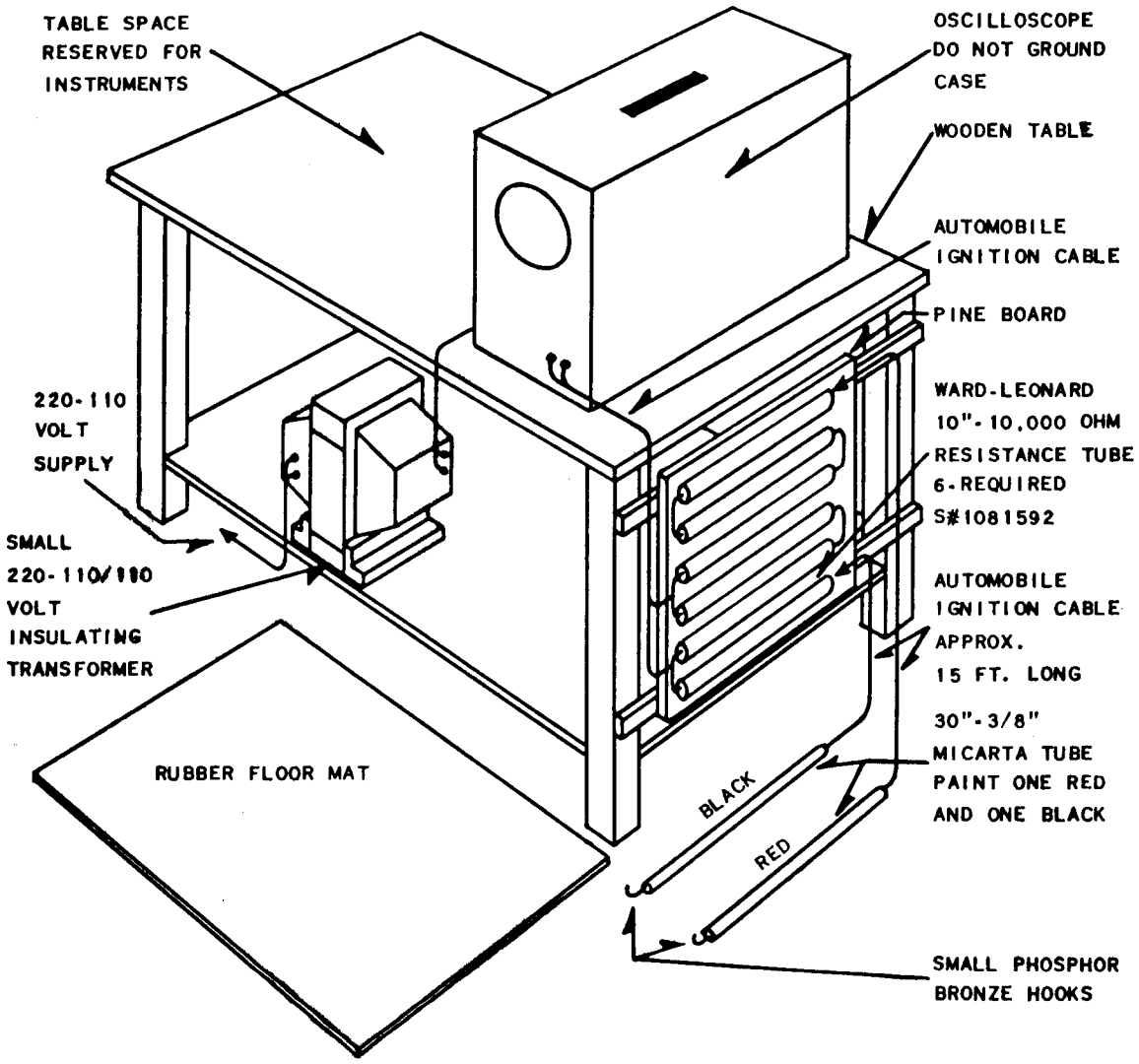

Fig. 1 Set-up of the Testing Unit

PURPOSE

It is the purpose of this instruction leaflet to outline a safe oscilloscope testing set-up for use in testing Silicon Semitron Rectifier Power Supplies.

INTRODUCTION

It is often desirable to view the various rectifier circuit voltages on an oscilloscope. Such testing can be done safely by observing the necessary precautions.

CAUTION

It should be kept in mind at all times that the rectifier is power type apparatus. The danger to personnel and equipment which can result from accidental shorts cannot be overemphasized. It is therefore necessary when testing a rectifier that the test equipment be in first-class condition.

TEST SET-UP

Fig. 1 shows an outline of a set-up for use in testing rectifiers. The steps listed below should be followed in testing rectifiers:

1. Mount the six 10,000 ohm, 10 inch resistor tubes on an insulated board as shown. For clarity in the picture, a cover for these tubes is not shown. Such a cover should be provided, however, which will safely insulate the hot terminals on the tubes while not restricting the ventilation to them.

2. Connect all the resistor tubes in series.

3. Make a pair of test leads sufficiently long to reach from the test table to all points on the rectifier. These test leads should have an insulation strength approximately equal to five times the d-c voltage of the rectifier, but not less than 5000 volts.

4. Connect one end of the test lead pair across the full 60,000 ohms of the resistor rack.

5. Make test probes for the other end of the test leads from 20 to 30 inches of Micarta tubing. The inside diameter should provide a snug fit for the test lead. The wall thickness should be about 1/8 inch.

6. Thread the test cable through the probe and solder small phosphor bronze hooks to the end of the lead. This hook should be about 1-1/2 inches long with a 1/4 inch eye. Pull the cable back through the probe to seat the hook firmly and secure tightly with tape to the tubing. Taper the hook end of the probe tubing if necessary.

7. Paint one probe black and the other red. The other end of the black probe should connect to the bottom tube of the resistor rack. The red probe lead will then be connected to the top end of the resistor rack.

8. Connect the oscilloscope ground lead to the opposite end of the resistor connected to the black probe lead. The other scope lead can be connected to the resistor rack to give a voltage at the scope of 1/6, 1/3, 1/2 or 2/3 of the voltage at the test probe. Always leave at least one resistor tube between this scope lead and the red probe lead. These connections assure that there is at least one 10,000 ohm tube from each test probe to the oscilloscope. This will limit the fault current due to accidental grounds at the oscilloscope.

   It is recommended that the scope leads be connected across as few tubes as possible to provide maximum protection.

9. Use the red probe connection for the high potential test point and the black probe lead for the low potential test point.

10. An insulating transformer is recommended as shown for the scope supply. This transformer should have the same insulation level as the test leads.

11. Do not ground the oscilloscope case. Provide a rubber mat for the oscilloscope operator to insulate him from ground.

12. Check all connections thoroughly before using or making changes. Make sure that all test leads are so located that they will not be stepped on, tripped over, run over by wheels, squeezed in doors, etc. Keep all connections neat so that they may be easily checked.

13. Be especially careful when connecting the test probe hooks into the circuit. The hook should be connected where it will be rigidly held in place and cannot slide loose or be easily pulled away. The hooks should be short enough that they cannot bridge between points of differing potentials when making the connections or in case the hook or probe becomes loose and falls off.