

**TYPE N AND ON CARRIER REPEATERS – REPEATERED HIGH-FREQUENCY LINE
REPEATER TESTS – ELECTRON TUBE REPEATERS
HEATER AND DC REGULATOR MEASUREMENTS**

The purpose of this test is to measure and adjust the heater current of the electron tubes and the current through the voltage regulator tube.

This section is reissued to update power supply arrangements using a constant-current regulator. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

At a repeater point, the power to operate the electron tube repeater is furnished either from a local power supply or over the cable facilities from another terminal or repeater. This power is used for the heaters, plates, and screens of the electron tubes and also the thermistor heaters. The plate voltage for the electron tubes is nonregulated. In a repeater receiving power from a remote point, the heater voltage, the screen of the 304-kc oscillator tube, and the thermistors use regulated voltage under control of the voltage regulator tube (427A) in the V41 socket (see Fig. 1).

The power supply source for remote repeaters in some installations may be regulated by a constant current regulator at the power supply location. This will decrease the voltage regulator current requirements for the remote repeater as specified in the following test procedures.

APPARATUS:

1 — 2P Tube Test Set

STEP	PROCEDURE
1	<p>A. Preparation for Testing</p> <p>Check that the V41 socket is correctly equipped as follows:</p> <ul style="list-style-type: none"> (a) At the repeater receiving local power, if the voltage is 125 to 133, the V41 socket should be equipped with a 377A shorting plug; if the voltage is 134 to 137, the V41 socket should be equipped with a 16A resistance lamp. (b) At the repeater receiving remote power, the V41 socket should be equipped with a 427A electron tube.
2	<p>Connect the 2P test set to the repeater by inserting the W-E, E-W, and OSC plugs into the W-E FIL ACT, E-W FIL ACT, and TEST jacks, respectively, as shown in Fig. 2.</p>

STEP	PROCEDURE																							
3	<p>B. Repeater Receiving Power from Local Source</p> <p>Operate switch on 2P test set to HTR CUR and measure the heater current.</p> <p>Requirement: 95 to 105 percent; readjust 100 percent.</p> <p>Note: These values apply for average office battery voltage. If the battery voltage departs from average battery voltage, the requirement is offset 1 percent (plus if voltage is high; minus if low) for each volt departure from the average.</p>																							
4	If the requirement is not met, adjust the FIL CUR potentiometer to obtain 100 percent.																							
5	If the adjustment cannot be made within the range of the FIL CUR potentiometer, the VR CUR potentiometer may be used in addition.																							
	<p>C. Repeater Receiving Remote Power</p>																							
6	<p>Operate switch on 2P test set to HTR CUR and measure the heater current.</p> <p>Requirement: 98 to 102 percent; readjust 100 percent.</p>																							
7	If the requirement is not met, adjust the FIL CUR potentiometer to obtain 100 percent.																							
8	<p>Operate switch on 2P test set to V41 CUR and measure the VR tube current.</p> <p>Requirement:</p>																							
	<table border="1"> <thead> <tr> <th data-bbox="269 1184 607 1205">CABLE TEMPERATURE °F (ESTIMATED)</th> <th data-bbox="873 1176 971 1213">TEST (PERCENT)</th> <th data-bbox="1230 1176 1328 1213">READJUST (PERCENT)</th> </tr> </thead> <tbody> <tr> <td data-bbox="269 1247 435 1285">Unregulated</td> <td data-bbox="490 1247 646 1268">-10 to +30</td> <td data-bbox="860 1247 980 1268">155 to 85</td> <td data-bbox="1253 1247 1305 1268">120</td> </tr> <tr> <td data-bbox="269 1289 435 1327">Line Current</td> <td data-bbox="490 1289 646 1310">+30 to +70</td> <td data-bbox="860 1289 980 1310">135 to 65</td> <td data-bbox="1253 1289 1305 1310">100</td> </tr> <tr> <td data-bbox="269 1331 435 1369"></td> <td data-bbox="490 1331 662 1352">+70 to +110</td> <td data-bbox="860 1331 980 1352">115 to 45</td> <td data-bbox="1269 1331 1305 1352">80</td> </tr> <tr> <td data-bbox="269 1373 435 1411">Regulated</td> <td data-bbox="490 1373 662 1394"></td> <td data-bbox="860 1373 980 1394"></td> <td data-bbox="1198 1373 1360 1394"></td> </tr> <tr> <td data-bbox="269 1415 435 1453">Line Current</td> <td data-bbox="490 1415 662 1436">-40 to +140</td> <td data-bbox="860 1415 980 1436">150 to 40</td> <td data-bbox="1198 1415 1360 1436">(See Step 9)</td> </tr> </tbody> </table> <p>Note: For unregulated line current, these values apply for average office battery voltage. Since the V41 current varies directly about 5 percent for each volt change, corrections should be made for departure from average voltage. For regulated line current, office battery variations do not change these values.</p>	CABLE TEMPERATURE °F (ESTIMATED)	TEST (PERCENT)	READJUST (PERCENT)	Unregulated	-10 to +30	155 to 85	120	Line Current	+30 to +70	135 to 65	100		+70 to +110	115 to 45	80	Regulated				Line Current	-40 to +140	150 to 40	(See Step 9)
CABLE TEMPERATURE °F (ESTIMATED)	TEST (PERCENT)	READJUST (PERCENT)																						
Unregulated	-10 to +30	155 to 85	120																					
Line Current	+30 to +70	135 to 65	100																					
	+70 to +110	115 to 45	80																					
Regulated																								
Line Current	-40 to +140	150 to 40	(See Step 9)																					
9	<p>If the requirements are not met for unregulated line current, adjust the VR CUR potentiometer to the readjust value. A repeater receiving power over a long 22-gauge cable section and providing sealing current to an adjacent section may not meet the readjust value. In such a case, adjust to as high a value as possible. If the requirements are not met for regulated line current, adjust the VR CUR potentiometer to a repeater input line voltage as close to 140 volts as possible. The input line voltage is measured at pins 1 (positive) and 6 (negative) of the TEST jack. If the requirements still cannot be met and the V41 CUR tube measurement exceeds the test limit, replace the repeater.</p>																							

STEP	PROCEDURE
10	Repeat Steps 6 through 9 until proper readings are obtained for HTR CUR and V41 CUR switch settings. This is necessary because there is interaction between the two adjustments.
11	Operate the switch on 2P test set to PWR V and measure. <i>Requirement: 95 to 105 percent.</i>
12	If this requirement is not met, recheck Steps 6 through 11.

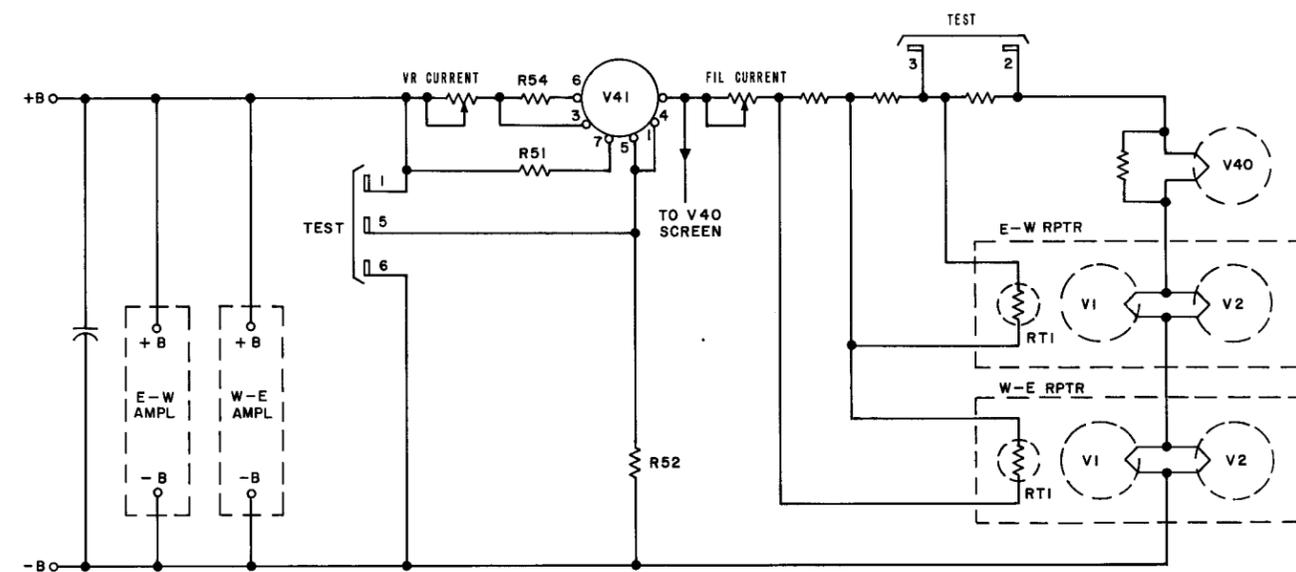


Fig. 1 — Power Regulator, Distributor Circuit

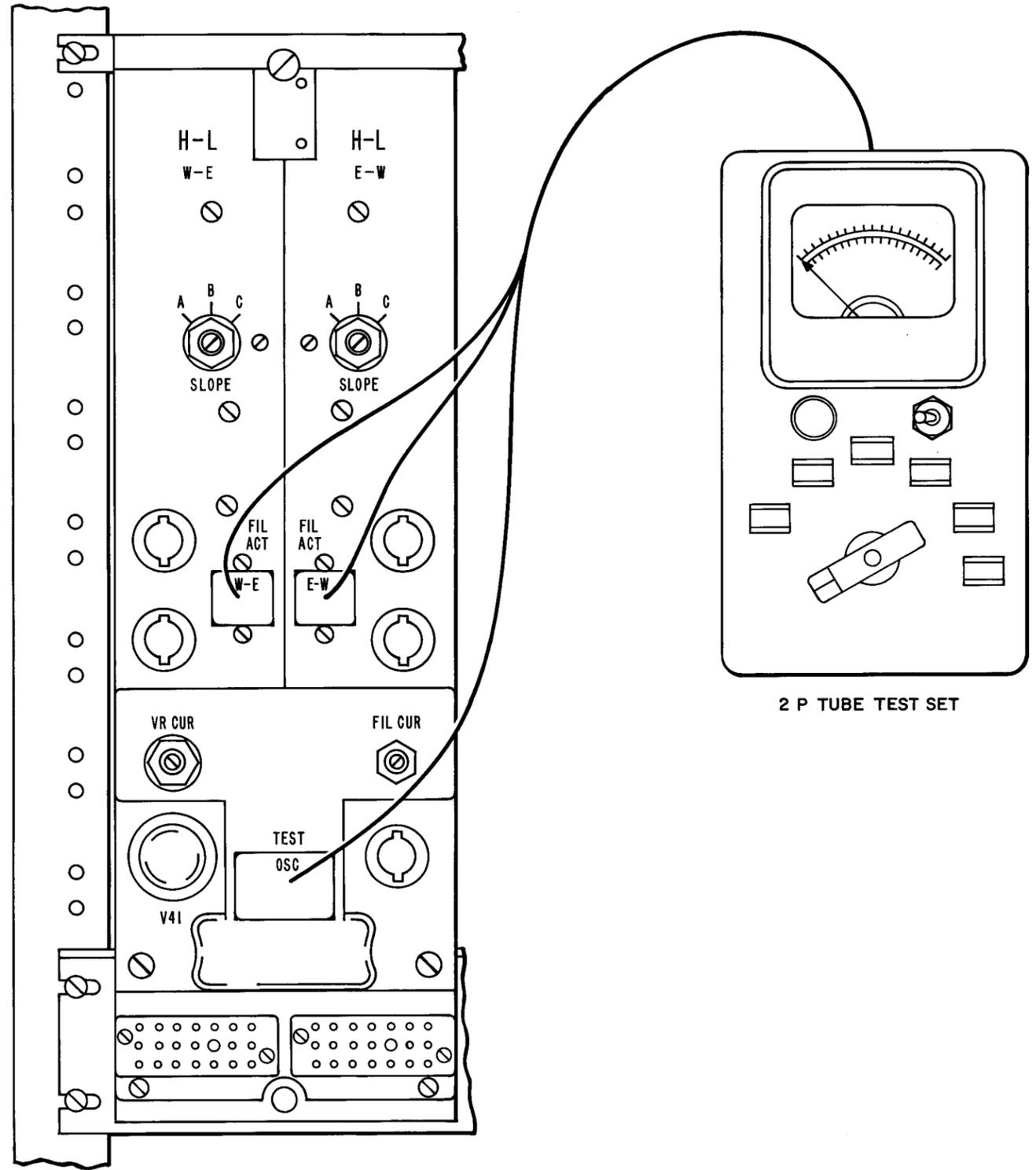


Fig. 2 — Heater and DC Regulator Measurements, Test Layout