terminals with tape and then bend the copper strip tight against the terminals and meter case. The thermocouple is usually between the two meter terminals just inside the case, so bending the copper strip tight against the case helps preserve the 50-ohm configuration. The acid test is to insert the meter in a line and see if the VSWR changes noticeably.

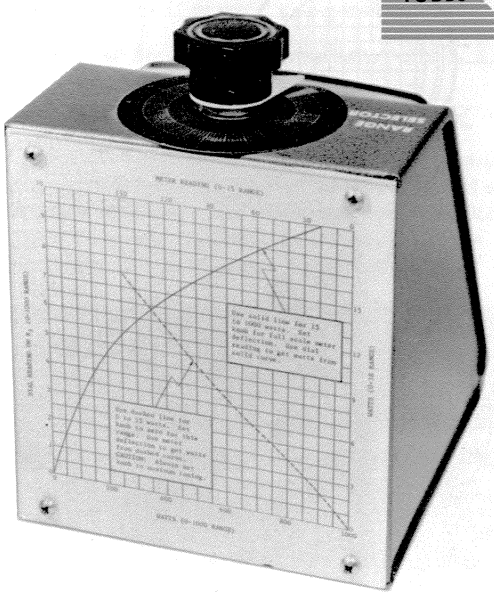
If you are suspicious of the accuracy of any RF ammeter used to calibrate the RF wattmeter, check the result as follows: Measure the true input to the RF amplifier connected to the load; be sure to check the plate current and plate voltage. From these figures calculate the DC watts input. If possible operate the amplifier under Class C conditions. Be sure the coupling is adjusted for maximum efficiency. Assume 70% efficiency when the foregoing conditions have been met. If the watts (I^2R) in the load check about 70% of the DC input, the cross check is reasonably close.

Other methods of calibration are also practical. Calibrate an oscilloscope from a 60 cycle AC voltage fed directly into the deflection plates. Then use it to measure the RF voltage across the 50-ohm dummy load. Use the measured voltage in the formula $\frac{E^2}{R} = W$ to find the RF output in watts. A VTVM with an RF probe, if its calibration is checked, can also be used in the same manner. Try checking power output several ways and take an average of the readings.

A good frequency to use for calibrating the RF wattmeter is 14 megacycles. It will probably then read 5% low on 4 megacycles and 5% high on 28 megacycles.

The calibration curves are attached to the back of the meter case and covered by a piece of $\frac{1}{16}$" thick lucite sheet. The two curves can be drawn in different colors or in different type lines, as shown in the sample chart, Fig. 3. The dashed curve reads 0 to 15 watts. Set R_3 at *zero* resistance for this range. Read the actual meter deflection and then find this reading on the curve, move over to the other axis and read the power output in watts. The solid curve is the 15 to 1000-watt range. Always set R_3 for a full scale reading and accurately note the dial reading on R_3. Use this figure to read watts from the 15 to 1000 watt scale on the calibration chart.

One word of caution: Always set R_3 fully clockwise, which automatically puts it on the highest range, when it is connected to an amplifier of unknown output. Obviously R_3 can be set for 500 watts ahead of time if the power output is known to be less than 500 watts. This device will stand a 100% overload for a few minutes, but don't be the first to prove this statement.



REAR VIEW of the indicator unit, showing the calibration curves fastened to the box and covered with $\frac{1}{16}$-inch thick clear plastic. Curve is shown in Fig. 3.

When constructed as described, we're sure you'll find the Low-Cost RF Wattmeter an almost essential addition to your amateur radio station. In fact, you're likely to wonder how you ever got along without it.

FIG. 3. CALIBRATION CHART for the wattmeter described, for use with a 0 — 150-microampere meter (G. E. type DO-91) and 25,000-ohm potentiometer at R_3. The solid line and figures at the left and bottom are for 15 to 1,000 watts; the dashed line and figures at the top and right are for the 0 to 15-watt range. Chart is shown actual size, so that it may be cut out and fastened to rear of meter box.