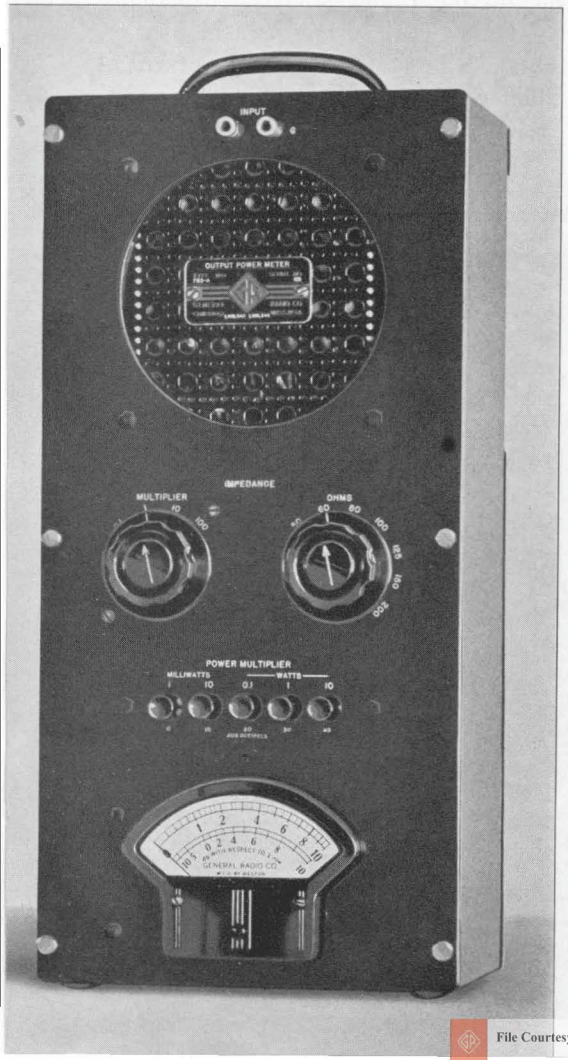
A 100-WATT OUTPUT POWER METER

● THE OUTPUT POWER METER for power-output and internal-impedance measurements on radio receivers, amplifiers, and oscillators was first introduced by General Radio nearly ten years ago.* Over a thousand of these instruments have been sold and, with the development of the art, their general utility around the communications laboratory is constantly increasing.

*"A Power Meter with a Wide Frequency Range," *Experimenter*, May, 1932. "A Direct-Reading Meter for Power and Impedance Measurements," *Experimenter*, November, 1932.

FIGURE 1. Panel view of the TYPE 783-A Output Power Meter.



It has been evident recently that there exists a field for an instrument of the same type but capable of dissipating greater amounts of power, and the new TYPE 783-A Output Power Meter has been designed to meet this need.

Nearly as sensitive at low power levels as the older TYPE 583, this new instrument has a much wider power range extending to a maximum of 100 watts. The power scale on the indicating meter extends from 0 to 10, and is used in conjunction with a set of five push-button-operated decade multipliers. An auxiliary decibel scale is provided on the meter, extending from −10 db to +10 db, referred to a level of 1 milliwatt.

The impedance range is 2.5 ohms to 20,000 ohms, covered by means of two switches, one direct reading in ohms, the other a multiplier.

The accuracies of both power and impedance indications are maintained over a considerably wider frequency range than in the TYPE 583.

A functional schematic diagram of the TYPE 783-A Output Power Meter is given in Figure 2. As can be seen from this diagram, the instrument is equivalent to an adjustable load impedance, across which is connected a voltmeter calibrated directly in watts dissipated in the load. It consists essentially of a voltage divider and an autotransformer for adjusting the impedance level, and a set of resistive pads for adjusting attenuation.

The operation of the output power meter is extremely simple. For measuring the power that a circuit is capable of delivering into a given impedance, the impedance switch and multiplier are set to the desired value, and the power is then indicated by the meter and its

multiplier. The internal impedance of the source under test can also be determined since it is equal to the impedance into which maximum power is delivered.

The output power meter is extremely useful in experimental work where a number of power and impedance measurements must be made as the characteristics of the circuit under measurement are varied. It is a valuable aid in the design and testing of amplifiers, oscillators, filters, transformers, and other networks, in making standard tests on radio receivers, and in measuring the power output of vacuum tubes. Its impedance range is wide enough to simulate all types of loudspeakers, and its sensitivity is sufficient to measure directly the output and internal impedance of a magnetic phonograph pickup.

Another use is in the measurement of the loss in a transformer working out of a given source impedance. The maximum output of the source is determined, after which the transformer is interposed between the source and the meter, and the maximum output of the transformer is found. The difference between the two readings on the decibel scale gives the transformer loss directly.

SPECIFICATIONS

Power Range: 0.2 milliwatt to 100 watts in five ranges (10 and 100 milliwatts, 1, 10, and 100 watts, full scale). An auxiliary decibel scale reads from −10 to +50 db referred to a level of 1 milliwatt.

Impedance Range: 2.5 to 20,000 ohms. Forty discrete impedances, distributed approximately logarithmically, are obtained by means of a ten-step OHMS dial and a four-step MULTIPLIER.

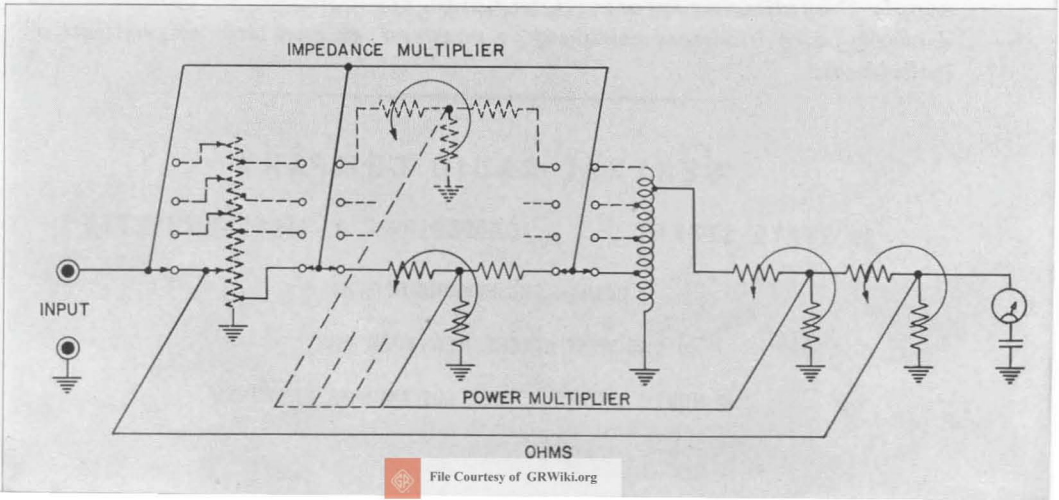
Impedance Accuracy: The input impedance is within ±2% of the indicated value, except at the higher audio frequencies, where the error for the higher impedance settings may exceed this value. At 15,000 cycles the input impedance error is about 5% for impedances from 10,000 to 20,000 ohms.

Power Accuracy: The indicated power is accurate to ±0.25 db at full-scale reading. At the lowest impedance multiplier setting (2.5 to 20 ohms) there may be an additional error of 0.2 db due to switch contact resistance when the power multiplier is set at 10 (10 to 100 watt range).

The over-all frequency characteristic of the power indication is flat within ±0.5 db from 20 cycles to 10,000 cycles; within ±0.75 db to 15,000 cycles.

Waveform Error: The indicating instrument used is a copper-oxide rectifier meter, calibrated in r-m-s values for a sinusoidal applied voltage. When non-sinusoidal voltages are applied an error in indication may occur, since the meter is not a true r-m-s indicating device. The error

FIGURE 2. Schematic circuit diagram of the TYPE 783-A Output Power Meter.



will depend on the magnitude and phase of the harmonics present, but, with waveforms normally encountered in measurement circuits at communications frequencies, will not be serious.

Temperature and Humidity Effects: Humidity conditions have a negligible effect on the accuracy of the instrument.

The instrument is calibrated at 77° Fahrenheit, and if the ambient temperature departs widely from this value, additional errors of indication may be expected. At high temperatures (95° Fahrenheit) this additional error may approach the nominal calibration error, particularly at the higher frequencies.

The heat dissipated by the instrument itself has no effect on the accuracy.

Accessories Supplied: One TYPE 274-M Plug.

Mounting: The instrument is mounted on a bakelite panel in a walnut cabinet.

Dimensions: 8 x 18 x 7 inches, over-all.

Net Weight: 17 pounds.

Type		*Code Word*	*Price*
783-A	Output-Power Meter	ABBEY	$185.00

This instrument is manufactured and sold under United States Patents Nos. 1,901,343 and 1,901,344.

RUBBER-COVERED CABLES

● **FOR THE PRESENT,** at least, we have sufficient rubber-covered power-supply cables and concentric-shielded cables on hand to supply with new equipment. We cannot yet estimate how long our supply will last, but as long as it does we will continue to furnish them. In the meantime we are searching for adequate substitutes.

Because of the now very limited supply, we are sorry that we will not be able to furnish rubber-covered cables either as spares with new equipment or for replacements. Although we believe that the cables we now supply as standard accessories are the best available, there are adequate substitutes for the power cables. Users are urged to conserve and repair broken concentric conductors, however, because substitutes for these, not employing rubber, are much more difficult to find.

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