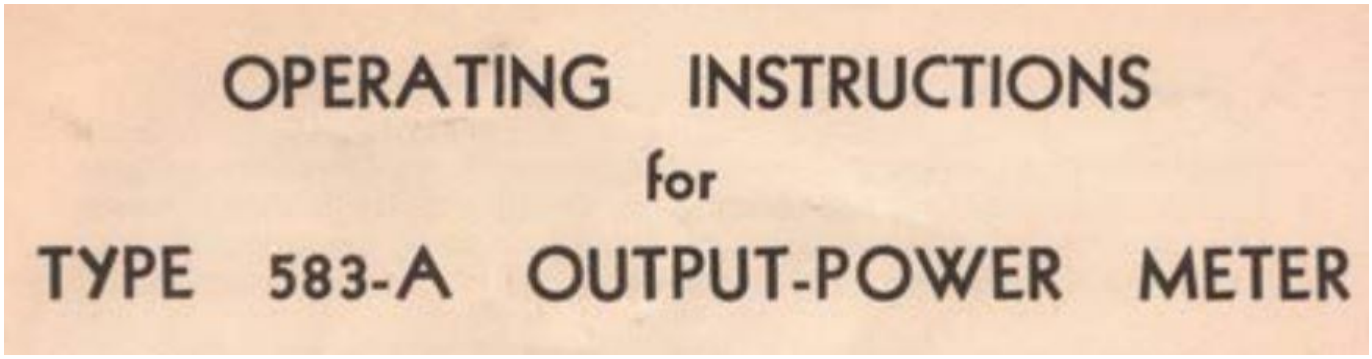
GENERAL RADIO TYPE 583-A Output Power Meter Instruction Manual

GENERAL RADIO TYPE 583-A Output Power Meter Instruction Manual



Contents

1 INTRODUCTION.

1.1 PURPOSE

The Type 583-A Output-Power Meter (Figure 1) gives a direct indication of the power output of audio-frequency circuits, and can be used to test amplifiers, transformers, oscillators, filters, and similar networks. The Output-Power Meter can also be used to measure the effect of load impedance on power delivered, and the characteristic impedance of telephone lines, phonograph pickups, oscillators, and similar equipment can be found by determination of the impedance that gives maximum power output. In the testing of radio receivers, the Output-Power Meter is very useful as an output indicator for standard selectivity, sensitivity and bandwidth tests; an auxiliary decibel scale is furnished on the meter for this purpose.

Figure 1. Type 583-A Output-Power Meter.

1.2 DBSCRIPTION

1.2.1 GENERAL. (See Figure 2.) The Output-Power Meter is functionally an adjustable load impedance, with a voltmeter calibrated directly in watts dissipated in the load. The input is actually connected through a multitap transformer and a resistance network to the output meter.

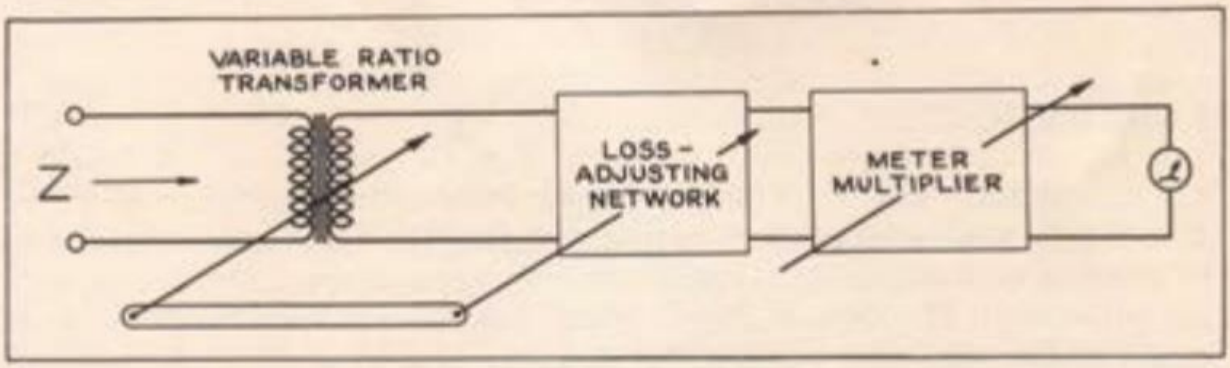


Figure 2. Schematic Diagram of Type 583-A Output-Power Meter.

1.2.2 CONTROLS AND CONNECTIONS. The following controls and connections are on the front panel of the instrument:

Name	Type	Function
none	jack-top binding posts(2)	Output from circuit under test should be connected here. Post marked G is ground.
IMPEDANCE OHMS	10-position selector switch	Product of these settings equals load impedance.
MULTIPLIER	4-position selector switch	Forty steps, from 2.5 to 20,000 ohms, are available.
MULTIPLIER DECIBELS	4-position selector switch	Selects power range.

2 OPERTION

To measure the power that a circuit can deliver into a given impedance, atmplyconnect the circuit output terminals to the Jots ..
put-Power Meter input tenn inala, set the load impedance to the desired value, and detennlne the power output from the meter indication and the meter MULTIPLIBR (DECmBLS) switch setting.

The Output Power Meter can also measure the internal impedance of tbe circuit under test, s nice that impedance equals the impedance into which maximum power is delivered.

You may want to know the loss ln a transformer working from a source. In such an application, determine the maximum output from the source, then lnsen the transformer between tbe source and the Output·
Power Meter a.Dd detennlne the maximum output from the transformer. The erected the two readings on the db(upper) select. ells the loss in the transformer.

3 ACCURACY OF MBASURBMBNT

3.1 GBNBRAL

The Output-Power Meter is not intended to be a precision instrument, and tbe uses for which it ts unusually do not justify precision methods. It combines convenience and wide range wth a reasonable deg-ree of accuracy, and permits high accuracy over a some what smaller range.

3.2 POWER ERROR

The error In lull-scale power reading does not exceeds decibel between ISO and2SOO cycles, nor does itexc:eedl.S decibels •t 20 and 10,000 cycles. The average error at 30 and 5000 cycles is 0.3 decibel Somewhat larger errors occur at the high and low ends of the useful frequency range. At 20 and 10,000 cycles the average error Is 0.6 decibel.

3.3 IMPBDANCB ERROR

Between ISO and 3000 cycles the Impedance error does not exceed 7 percent. The average error at 30 and 5000 cy· clews ts 8percent. At frequency extremes the Impedance error increases, and the average error at 20 and 10,000 cycles is 20 percent.
Figure 3 shows power output pilonce agaJJlst load resistance for a generator with an intimal impedance of SOO ohms. An analysis of the to this curve shows that errors are neg· ltgt. blew over most of the range.

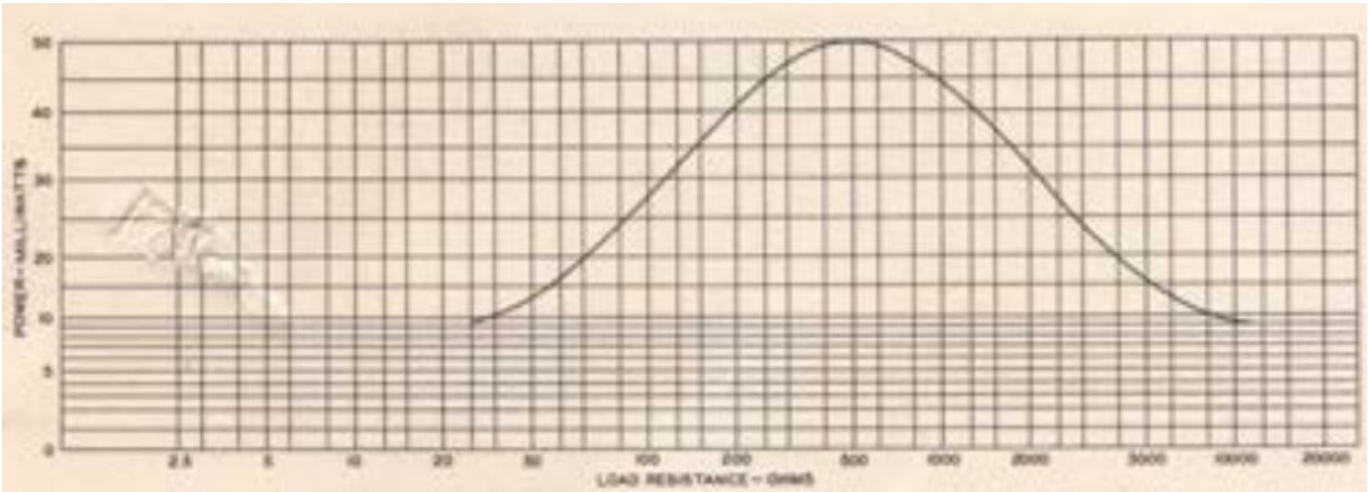


Figure 3. Power Output vs Load Resistance for a Generator with 500-ohm Internal Impedance.

3.4 WAVBFORM ERROR

The copper oxidic retailer type meter used In the Instrument is calibrated in nns values for · tags. and non sinusoidal voltages may cause errors, since the meter ts not a true rms instrument. The degree of error depends on the magnitude and phase of the harmonics present, and will be small with wave· funs normally encountered tn communications.

3.5 REACTANCE ERROR

The Output war Meter Is designed to work out of a resistive impedance, and wool be subject to error when used in measurements on a highly reactive source. Unless the reactance enlarge enough 10 act matert.ally tM power factor of the Internal Impedance of the circuit under test, this error i.e negUglble.

3.6 DIRBCT·CURRBNT ERROR

When the current flowing through the Output· Power Meter has a d-e component, a slight error may occur. An error of from 2 to 3 percent results under the following circumstances:

IMPEDANCE MULTIPLIER

Setting	DC
100	15 ma
10	50 ma
1.0	150 ma
0.1	500 ma

SPECIFICATIONS

Power Range:	0.1 to 5000 mw in four ranges. Auxiliary db scale on the meter reads from 0 to 17 db above 1 mw. With multiplier, total range is -10 to +37 db above 1 mw.
Impedance Range:	2.5 to 20,000 ohms. Forty discrete impedances, distributed approximately logarithmically, are obtained by a 10-step selector and 4-step multiplier.
Impedance Accuracy:	Max error does not exceed 7% from 150 to 3000 cycles, 50% at 20 and 10,000 cycles. Average error 8% at 30 and 5000 cycles, 20% at 20 and 10,000 cycles.
Power Accuracy:	Max error, full-scale reading, does not exceed 0.5 db from 150 to 2500 cycles, 1.5 db at 20 and 10,000 cycles. Average error 0.3 db at 30 and 5000 cycles, 0.6 db at 20 and 10,000 cycles.
Waveform Error:	Nonsinusoidal voltages may cause error, since meter is not true rms indicator. With waveforms normally encountered in communications work, the error is not serious (refer to paragraph 3.4).
Mounting:	Walnut cabinet, with aluminum panel.
Dimensions:	Length 10 in., width 7 in., height 6 in., over-all.
Weight:	8¼ lb.

GENERAL RADIO COMPANY

275 MASSACHUSETTS AVENUE

CAMBRIDGE 39 MASSACHUSETTS

DISTRICT OFFICES

NEW YORK: Broad Avenue at Linden
Ridgefield, New Jersey

WASHINGTON: 8055 13th Street
Silver Spring, Maryland

CHICAGO: 6605 West North Avenue
Oak Park, Illinois

LOS ANGELES: 1000 North Seward Street
Los Angeles 38, California

PHILADELPHIA: 1150 York Road
Abington, Pennsylvania

SAN FRANCISCO: 1182 Los Altos Avenue
Los Altos, California

CANADA: 99 Floral Parkway
Toronto 15, Ontario

REPAIR SERVICES

WEST COAST
Western Instrument Company
836 North Victory Boulevard
Burbank, California

EAST COAST
General Radio Company
Service Department
22 Baker Avenue
West Concord, Massachusetts

MIDWEST
General Radio Company
Service Department
6605 West North Avenue
Oak Park, Illinois

CANADA
Bayly Engineering, Ltd.
First Street
Ajax, Ontario

Form 321-D

Printed in U.S.A.

Documents / Resources

 OPERATING INSTRUCTIONS for TYPE 583-A OUTPUT-POWER METER	GENERAL RADIO TYPE 583-A Output Power Meter [pdf] Instruction Manual TYPE 583-A, TYPE 583-A Output Power Meter, Output Power Meter, Power Meter, Meter

References

- User Manual