

9A TRANSMISSION MEASURING SET

1. GENERAL

1.01 This section describes the 9A transmission measuring set, a portable receiving set for measuring transmission losses from 0 to 10 db in the frequency range from about 300 to 4000 cycles. An external source of standard testing power is required for calibrating and for measuring.

2. EQUIPMENT AND CIRCUIT FEATURES

2.01 The 9A transmission measuring set consists of an input repeating coil shunted by a resistance, a rheostat, and a db meter with self-contained copper-oxide rectifier, all assembled in a moulded bakelite case, the approximate dimensions of which are 3-3/4 x 5-1/2 x 2-1/4 inches. It is equipped with a carrying handle and two binding posts to which external connections are made. Its total weight is twenty-eight ounces.

2.02 The general arrangement and face view of the set is shown in Fig. 1, and the circuit diagram is shown in Fig. 2.

2.03 The repeating coil and the shunt resistance provide a d-c. path of about 125 ohms for holding a circuit busy when necessary and an impedance of approximately 600 at a frequency of 1000 cycles per second. The rheostat, adjustable by means of a screwdriver, provides the calibrating feature of the set. The Weston Model 301 Rectifier type a-c. milliammeter is calibrated in db as shown in Fig. 1.

3. TRANSMISSION PERFORMANCE

3.01 The accuracy of the 9A set for 1000-cycle measurements in the 0-5 db range immediately after calibration at 0 db is $\pm .3$ db, at normal room temperatures. Under the same conditions the accuracy for the 5-10 db range is $\pm .5$ db. The copper-oxide rectifying element of the meter in the 9A set, like all copper-oxide rectifiers, varies in impedance and rectification efficiency with temperature. If the set is calibrated at 70° and the temperature is reduced to 60° or raised to 90°, the reading of the set will change a few tenths of a db, which change can be corrected by recalibration with the standard testing power source. As the temperature is reduced below 60° the error becomes in-

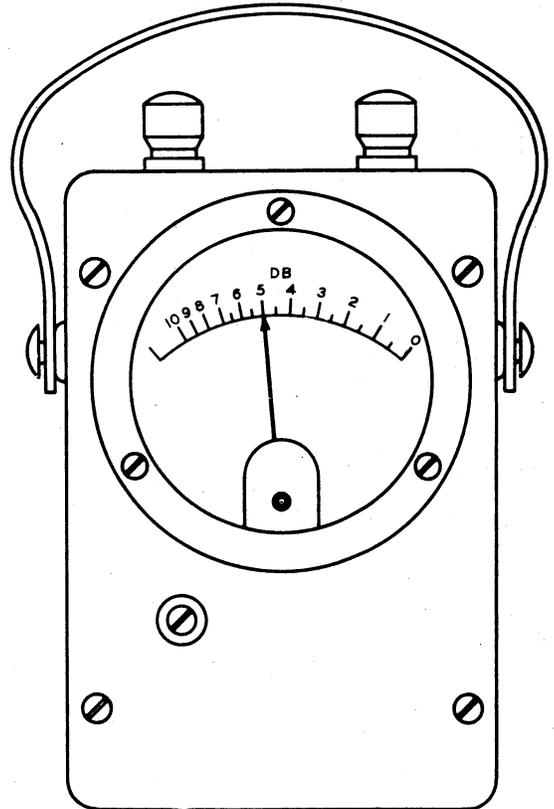


Fig. 1.

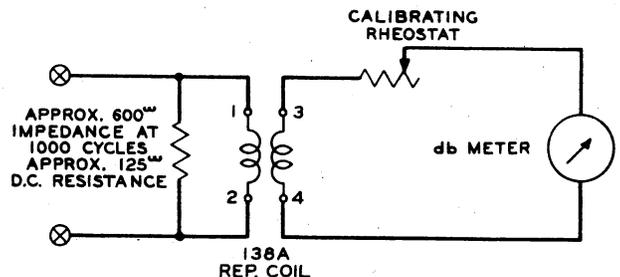


Fig. 2.

creasingly greater until, at temperatures below freezing, it may be as much as 3 or 4 db, which is beyond the ability of the adjusting dial to correct. The set should therefore not be used in cold locations, and after exposure to cold should be al-

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lowed to warm up to at least 60° before using.

3.02 The frequency characteristic of the set is substantially flat between 300 and about 4000 cycles, so that when calibrated at 1000 cycles, the accuracy of loss measurements is not impaired more than .2 db if other frequencies are used in measuring. The frequency characteristic falls off below about 300 cycles thus limiting the use of the set to the range above that frequency.

3.03 The input impedance of the set varies slightly with both frequency and testing power. At 1000 cycles with a deflection near 0 db the impedance is approximately 600 ohms. The impedance decreases with the frequency below 1000 cycles, and increases as the testing power is reduced below 1mW. However, within the operating range of the set, between 300-4000 cycles and 0-10 db, the impedance is always within ± 100 ohms of the nominal 600-ohm value.

4. OPERATING FEATURES

4.01 The 9A set should be in a horizontal position when measurements are to be made.

4.02 The circuit to be tested is connected to the set by means of a cord with spade tips or with wire as required without regard to polarity.

4.03 The measurement in db is indicated directly on the meter.

5. CALIBRATION

5.01 The calibration of the 9A set can be checked and the calibrating rheostat readjusted by means of a screwdriver when necessary so that with the standard testing power of one milliwatt a meter scale reading of 0 db is indicated. This can be done at an office where the standard testing power is available. It can be calibrated at points other than zero on the scale by observing readings when measuring an attenuator or 600-ohm pads of known loss and noting the deviations from the meter scale calibration.

5.02 Curves giving the performance characteristics of a particular 9A transmission measuring set can be prepared from calibration data to obtain better accuracy than the nominal values given above.