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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

**OPERATOR, ORGANIZATIONAL, FIELD AND DEPOT
MAINTENANCE MANUAL**

WATTMETER AN/URM-120

This copy is a reprint which includes current
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HEADQUARTERS, DEPARTMENT OF THE ARMY
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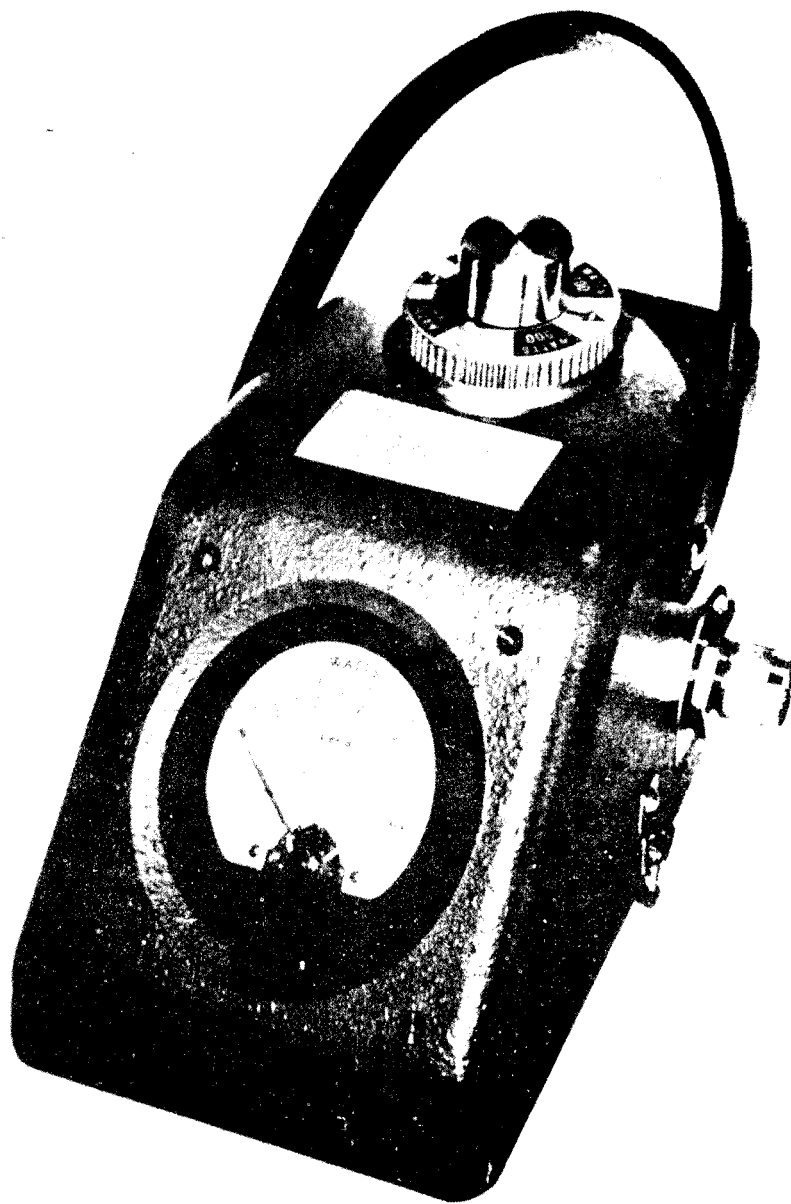


Figure 1-1. Wattmeter AN/URM-120

SECTION I

INTRODUCTION AND DESCRIPTION

1-1. IDENTIFICATION OF EQUIPMENT.

1-2. This publication contains instructions for operation and maintenance of Wattmeter AN/URN-120, manufactured by Sierra Electronics Company, Menlo Park, California, under Bureau of Aeronautics Contract NOas 59-0238-f.

1-3. GENERAL DESCRIPTION.

1-4. Wattmeter AN/URM-120 (figure 1-1) is designed to measure incident and reflected r-f power from 10 to 1000 watts within a frequency range of 2 to 1000 mc. Three coupler-detectors, each rated to cover a portion of this frequency range (table 1-1), are supplied with the wattmeter.

1-5. The wattmeter is housed in a small metal case weighing about 6-1/2 pounds and is about 7 inches wide, 6-5/8 inches high and 7-1/2 inches deep. It contains a coaxial primary line, indicating meter, and cable for interconnecting the meter to a coupler-detector. The coupler-detector has a knurled knob which projects through a hole in the top of the wattmeter case. On the knurled knob is a nameplate to indicate power range, and centered on the nameplate is the power range knob which can be rotated 360 degrees to any desired power range. The coupler-detector rotates only 180 degrees along the coaxial line. Two type-N connectors, one male and one female, are located on either side of the wattmeter case for connection between the power source and load.

1-6. Upper and lower parts of the wattmeter case are held together with quick acting fasteners, which permit easy access to the coupler-detector, the primary line, and the indicating meter. The primary line is held by four screws to the lower part of the case, and the meter yoke is held against the inside front slope of the case by four screws. Three plastic wedges, circled by a metal band and clamp, keep the coupler-detector seated above the primary line.

1-7. The coupler-detector is considered a separate part of the wattmeter only in the sense that it can be removed from the wattmeter case and replaced with a similar unit differing only in frequency and power characteristics. Three separate coupler-detectors are supplied with the wattmeter. Selection of a particular unit will depend upon the power source to be measured. Characteristics of each coupler-detector are tabulated in table 1-1.

1-8. Although the watt meter case assembly and coupler-detector function together, they can be stored separately when not in use. Principle elements of the case assembly are the indicating meter and primary line of the directional coupler.

1-9. PRINCIPLES OF OPERATION.

1-10. Power measurements are made by inserting the proper coupler-detector and connecting the wattmeter in series with the coaxial transmission line between the load and the r-f power source. To determine incident power, the arrow on the coupler-detector is rotated toward the load and the power range knob is positioned for peak meter reading. The reading is taken directly from the graduated meter scale which is made to correspond to the power range selected. Reflected power is also determined by peak meter reading, but the coupler-detector is rotated in the opposite direction toward the r-f source.

1-11. In effect, rotation of the coupler-detector orients the directional coupler which responds only to a wave traveling in a particular direction on the primary transmission system, while being unaffected by a wave traveling in the opposite direction on the primary line. A standard diode rectifier in the coupler-detector rectifies the energy picked up by the coupler. This energy is then measured across a known 50-ohm impedance system and metered as incident or reflected power. (See figure 1-2.)

TABLE 1-1. Coupler-Detector Characteristics

Model No.	Freq. Range (MC)	Power Range (Watts)	Insertion VSWR (Max. value with type-N connectors on primary line)	
			Lowest Power Range	3 Highest Power Ranges
CU-753/URM-120	2-30	50, 100, 500, 1000	1.08	1.08
CU-754/URM-120	25-250	10, 50, 100, 500	1.08	1.05
CU-755/URM-120	200-1000	10, 50, 100, 500	1.08	1.05