

ELECTRICAL & ELECTRONIC  
**T**EST **E**QUIPMENT **D**ATA  
HANDBOOK

**VOLUME 1**

**VOLTAGE AND CURRENT  
MEASURING EQUIPMENT**

**FREDERICK RESEARCH CORPORATION**  
2601 UNIVERSITY BOULEVARD, WEST  
WHEATON, MARYLAND



TO THE USERS OF THIS HANDBOOK:

In recognition of the many problems associated with the selection of electrical-electronic test equipment for specific applications, Frederick Research Corporation has compiled a series of volumes which contain test equipment descriptions. The items described in the volumes are primarily those used by government agencies and contractors. At the request of the government, and in the interest of providing users with the desired information without the necessity of costly search and compilation, this firm has made this unclassified data available to government agencies and contractors for many years.

The United States Senate has twice cited the Frederick Research Corporation in the Congressional Record (1955 and 1960) for its achievements in efforts to save the government millions of dollars by avoiding duplication in government purchases and promoting the development and utilization of the best test equipment at the lowest cost consistent with quality. We believe that the material in these volumes should provide a means for users to review their test equipment requirements with a minimum expenditure of funds and technical man-hours.

FREDERICK RESEARCH CORPORATION



## AIDS TO USE OF THE VOLUMES

This series of volumes has been prepared for the purpose of aiding engineers and other personnel in the selection of electrical-electronic test equipment to satisfy numerous test requirements. Thus, the format of the descriptive sheets has been specifically designed to provide the concise equipment data necessary for the selection procedure - functional description, electromechanical characteristics, reference source data, and other pertinent information. All data is as complete and current as the information available at the time the equipment description was prepared.

To save the maximum amount of time and to facilitate easy location of a particular item, the complete series has been divided into volumes based upon the accepted functional classification of equipment types. Thus, all equipments performing a specific type of test, monitoring, or measurement function are contained in one volume. For example, all equipments performing Voltage and Current Measuring functions are contained in Volume 1. Where the number of equipment descriptions in a particular class is insufficient to warrant an entire book, more than one volume (class) of equipment descriptions may be included in one book. For example, Volumes 5, 6, 7, 8 and 9 are contained in one book. The volumes are separated by green divider sheets.

Conversely, where the number of equipment descriptions is so large that a single book would be cumbersome, the volume will consist of two or more parts. For instance, Volume 10 is sufficiently large to warrant its division into parts.

Within each functional class and its subclasses, the descriptive sheets are arranged in alpha-numerical order based upon the equipment designation, e. g. , ME-6B/U, ME-6D/U, ME-30/U, TS-375/U, and similarly until all descriptions in one particular class are covered.

The definitions and index of the functional classification categories and subclassifications will be found on the following pages. The alpha-numerical arrangement is provided to aid the user in his search for items in the event that only item nomenclature is known.

As an example of use of the Handbook, assume specific test requirements arise which dictate the use of a vacuum tube voltmeter (VTVM). To determine if there is an equipment having the necessary characteristics, locate the List of Handbook Volumes on Page iii in any

of the Handbook volumes and note that voltage and current measuring equipments are located in Volume 1.

In Volume 1 turn to the Electronics Test Equipment Functional Classifications to find the functional class under which VTVM's appear. From the listing, it is seen that voltage measuring equipments are assigned the functional class of 1.1 and that VTVM's are most likely included in the subclass 1.1.1 Electronic Voltmeter. A check of the functional class definitions provided on Page vii will verify this.

Next, turn to the yellow divider, 1.1 Voltage Measuring Equipment, and proceed in that section to the equipment descriptions assigned the functional class 1.1.1. All VTVM descriptions will appear in alpha-numerical order within this section. Alpha-numerical listings of equipment descriptions within each subclass are provided in the Table of Contents.

Data on specific pieces of test equipment may also be quickly located. For instance, assume that one wanted to look up the characteristics of the ME-6D/U Electronic Multimeter. First, locate the correct volume as in the above example, which in this case is again Volume 1. In Volume 1 refer to the Alpha-Numerical Index, locate the item and note its functional class as being 1.1.1. Next, turn to the yellow divider 1.1 Voltage Measuring Equipment and proceed in that section to the descriptions assigned the functional class 1.1.1. The ME-6D/U is placed alpha-numerically in this class, physically located between the ME-6B/U and the ME-30/U.

A standard data format is used throughout the Handbook. Once the user has become familiar with this format, he will find it easy to locate specific data on a given instrument as well as convenient for the comparison of several instruments.

## LIST OF HANDBOOK VOLUMES

Title	Volume
Voltage and Current Measuring Equipment	1
Frequency Measuring Equipment	2
Waveform Measuring and/or Analyzing Equipment	3
Signal Generating Equipment	4
Field Strength and Intensity Measuring Equipment	5
Impedance and Standing Wave Ratio Measuring Equipment	6
Active Networks for Test Purposes	7
Time Measuring and Counting Equipment	8
Nuclear Energy Test and Measuring Equipment	9
Multifunction Test and Measuring Equipment	10
Associated Devices for Test and Measuring Equipment	11
Passive Networks for Test Purposes	12
Standards and Calibration Equipment for Test and Measuring Equipment	13
Power and Energy Measuring Equipment	14
Temperature Indicating, Measuring, and Recording Equipment	15
Stress, Strain and Flaw Detecting and Measuring Equipment	16
Gas and/or Liquid Measuring and Analyzing Equipment	17
Kinematic Test and Measuring Equipment	18
Optical Testing, Measuring and Aligning Equipment	19





ELECTRONICS TEST EQUIPMENT  
FUNCTIONAL CLASSIFICATION

1. VOLTAGE AND CURRENT MEASURING EQUIPMENT
  - 1.1 Voltage Measuring Equipment
    - 1.1.1 Electronic Voltmeter
    - 1.1.2 AC Voltmeter
    - 1.1.3 DC Voltmeter
    - 1.1.4 Recording Voltmeter
    - 1.1.5 AC-DC Voltmeter
  - 1.2 Current Measuring Equipment
    - 1.2.1 Electronic Ammeter
    - 1.2.2 AC Ammeter
    - 1.2.3 DC Ammeter
    - 1.2.4 Recording Ammeter
    - 1.2.5 AC-DC Ammeter
  - 1.3 Multimeter
    - 1.3.1 Electronic Multimeter
      - 1.3.1.1 Electronic Volt-Ohm-Ammeter
      - 1.3.1.2 Electronic Volt-Ohmmeter
      - 1.3.1.3 Electronic Volt-Ammeter
    - 1.3.2 Nonelectronic Multimeter
      - 1.3.2.1 Nonelectronic Volt-Ohm-Ammeter
      - 1.3.2.2 Nonelectronic Volt-Ohmmeter
      - 1.3.2.3 Nonelectronic Volt-Ammeter
  - 1.4 Galvanometer
  - 1.5 Potentiometer
  - 1.6 Electrometer



ELECTRONICS TEST EQUIPMENT  
FUNCTIONAL CLASSIFICATION - DEFINITIONS

- 1. VOLTAGE AND CURRENT MEASURING EQUIPMENT  
Equipment used to measure the magnitude of alternating and/or direct current and/or voltage.
- 1.1 VOLTAGE MEASURING EQUIPMENT  
An equipment used to measure the magnitude of alternating or direct voltage.
- 1.1.1 ELECTRONIC VOLTMETER  
A device utilizing the characteristics of an electron tube circuit in the measurement of voltage.
- 1.1.2 AC VOLTMETER  
A nonelectronic device for measuring alternating voltage.
- 1.1.3 DC VOLTMETER  
A nonelectronic device for measuring direct voltage.
- 1.1.4 RECORDING VOLTMETER  
A device used to provide a permanent record of either alternating or direct voltage.
- 1.1.5 AC-DC VOLTMETER  
A nonelectronic device for measuring alternating and direct voltage.
- 1.2 CURRENT MEASURING EQUIPMENT  
An equipment used to measure the magnitude of alternating or direct current.
- 1.2.1 ELECTRONIC AMMETER  
A device utilizing the characteristics of an electron tube circuit in the measurement of electric current.
- 1.2.2 AC AMMETER  
A nonelectronic device for measuring alternating electric current.
- 1.2.3 DC AMMETER  
A nonelectronic device for measuring direct electric current.

ELECTRONICS TEST EQUIPMENT  
FUNCTIONAL CLASSIFICATION - DEFINITIONS

- 1.2.4      RECORDING AMMETER  
            A device used to provide a permanent recording of either alternating or direct electric current.
- 1.2.5      AC-DC AMMETER  
            A nonelectronic device used to measure the magnitude of either alternating or direct electric current.
- 1.3         MULTIMETER  
            An instrument used to measure two or more electrical quantities, at least one of which is a voltage or electric current, usually on a single calibrated scale, by means of associated circuits and switches.
- 1.3.1      ELECTRONIC MULTIMETER  
            A device employing the characteristics of an electron tube circuit for the measurement of electrical quantities, at least one of which is a voltage or electric current, on a single calibrated scale.
- 1.3.1.1    ELECTRONIC VOLT-OHM-AMMETER  
            A device employing the characteristics of an electron tube circuit for measuring voltage, resistance, and electric current on a single calibrated scale.
- 1.3.1.2    ELECTRONIC VOLT-OHMMETER  
            A device employing the characteristics of an electron tube circuit for the measurement of voltage and resistance on a single calibrated scale.
- 1.3.1.3    ELECTRONIC VOLT-AMMETER  
            A device employing the characteristics of an electron tube for the measurement of voltage and current on a single calibrated scale.
- 1.3.2      NONELECTRONIC MULTIMETER  
            A device employing electrical circuitry, but not involving the use of electron tubes, for measuring electrical quantities, at least one of which is a voltage or electric current, on a single calibrated scale.

ELECTRONICS TEST EQUIPMENT  
FUNCTIONAL CLASSIFICATION - DEFINITIONS

1. 3. 2. 1      NONELECTRONIC VOLT-OHM -AMMETER  
                  A device employing electrical circuitry, but not involving the use of electron tubes, for measuring voltage, resistance, and electric current on a single calibrated scale.
1. 3. 2. 2      NONELECTRONIC VOLT-OHMMETER  
                  A device employing electrical circuitry, but not involving the use of electron tubes, for measuring voltage and resistance on a single calibrated scale.
1. 3. 2. 3      NONELECTRONIC VOLT-AMMETER  
                  A device employing electrical circuitry, but not involving the use of electron tubes, for the measurement of voltage and electric current on a single calibrated scale.
1. 4            GALVANOMETER  
                  An instrument which indicates the presence of small electric currents by means of mechanical motion resulting from electromagnetic forces set up by the current. Its scale usually indicates relative deflection rather than absolute values of current.
1. 5            POTENTIOMETER  
                  A variable resistance unit for measuring potential difference which makes use of a calibrated voltage divider, a reference potential, and a null detector.
1. 6            ELECTROMETER  
                  An instrument for detecting or measuring voltage by means of the electrostatic forces exerted between electrically charged bodies.



## TABLE OF CONTENTS

Functional Classification	Designation	Name
1.	VOLTAGE AND CURRENT MEASURING EQUIPMENT	
1.1	VOLTAGE MEASURING EQUIPMENT	
1.1.1	ME-6B/U	Electronic Multimeter
1.1.1	ME-6D/U	Electronic Multimeter
1.1.1	ME-30/U	Voltmeter Meter
1.1.1	ME-30A/U	Voltmeter, Electronic
1.1.1	TS-375/U	Voltmeter
1.1.1	TS-375A/U	Voltmeter
1.1.1	TS-487/U	Voltmeter
1.1.1	TS-619( )/U	Vacuum Tube Voltmeter
1.1.1	Ballantine 300	Voltmeter
1.1.1	Ballantine 320	Voltmeter
1.1.1	Boonton 91C	Voltmeter
1.1.1	Computer PVM-4B	Voltmeter, Precision
1.1.1	Fluke 803	Voltmeter
1.1.1	Fluke 8011A	DC Voltmeter
1.1.1	General Radio 1800A	Vacuum Tube Voltmeter
1.1.1	Hewlett-Packard 400AB	Vacuum Tube Voltmeter
1.1.1	Hewlett-Packard 400C	Vacuum Tube Voltmeter
1.1.1	Hickok 110B	Vacuum Tube Voltmeter
1.1.2	AN/PSM-3	Voltmeter
1.1.2	AN/PSM-3(XA-2)	Voltmeter
1.1.2	AN/URM-14	Microphone Simulator Set
1.1.2	IS-185	Voltmeter
1.1.2	ME-64/U	Voltmeter
1.1.2	TS-518/U	Voltmeter
1.1.2	Weston 433	AC Voltmeter

TABLE OF CONTENTS (Continued)

Functional Classification	Designation	Name
1. 1. 2	Weston 528	AC Voltmeter
1. 1. 2	Weston 904	AC Voltmeter
1. 1. 3	AN/URM-45	Voltmeter
1. 1. 3	TS-443/U	Voltmeter
1. 1. 3	G. E. (PL)7705055G1	Servo Test Meter
1. 1. 3	Sensitive Research S	DC Voltmeter
1. 1. 3	Simpson 377	DC Voltmeter
1. 1. 3	Weston 45	DC Voltmeter
1. 1. 5	AN/URM-12	Voltage Point Test Set
1. 1. 5	TS-340/U	Voltmeter
1. 1. 5	Rawson 518	AC, DC Voltmeter
1. 1. 5	Sensitive Research ESD	Electrostatic Voltmeter
1. 1. 5	Weston 341	Voltmeter
1. 2	CURRENT MEASURING EQUIPMENT	
1. 2. 2	IS-70	Ammeter
1. 2. 2	IS-76	Ammeter
1. 2. 2	IS-139	Ammeter
1. 2. 2	ME-32/U	RF Ammeter
1. 2. 2	ME-65/U	Ammeter
1. 2. 2	Weston 425	Thermo-Milliammeter
1. 2. 2	Weston 633 Type A1	AC Clamp Ammeter
1. 2. 3	I-139-A	Test Set
1. 2. 3	I-206-A	Test Set
1. 2. 3	I-206-B	Test Set
1. 2. 3	I-206-C	Test Set
1. 2. 3	ME-29/U	Ammeter
1. 2. 3	TS-60/U	Test Meter



TABLE OF CONTENTS (Continued)

Functional Classification	Designation	Name
1. 2. 3	TS-199/CPM-4	Test Meter
1. 2. 3	Emerson F. S. 120	Ammeter
1. 2. 3	Simpson 373	DC Milliammeter
1. 2. 3	Westinghouse PX-5	Ammeter
1. 2. 3	Weston 301	DC Ammeter
1. 2. 3	Weston 622	DC Microammeter
1. 2. 3	Weston 931	Ammeter
1. 2. 5	Sensitive Research A	Thermocouple Milli- ammeter
1. 3	MULTIMETERS	
1. 3	ME-74/U	Multimeter
1. 3. 1	RCA 195-A	Voltohmyst
1. 3. 1. 1	AN/USM-34	Multimeter
1. 3. 1. 1	ME-25A/U	Multimeter
1. 3. 1. 1	TS-389/U	Multimeter
1. 3. 1. 1	Hewlett-Packard 412A	Vacuum Tube Voltmeter
1. 3. 1. 2	AN/PRM-15	Multimeter
1. 3. 1. 2	AN/PRM-16	Multimeter
1. 3. 1. 2	ME-26/U	Multimeter Meter
1. 3. 1. 2	TS-294C/U	Voltohmmeter
1. 3. 1. 2	TS-363A/U	Voltmeter
1. 3. 1. 2	TS-505/U	Electronic Multimeter
1. 3. 1. 2	Hewlett-Packard 410B	Vacuum Tube Voltmeter
1. 3. 1. 2	Simpson 303	Vacuum Tube Voltohmmeter
1. 3. 1. 3	Sperry 1, 000, 308	Voltmeter
1. 3. 2. 1	AN/PSM-4	Multimeter
1. 3. 2. 1	AN/PSM-6	Multimeter

TABLE OF CONTENTS (Continued)

Functional Classification	Designation	Name
1. 3. 2. 1	I-167-A	Multimeter
1. 3. 2. 1	I-176	Test Unit
1. 3. 2. 1	IS-189	Voltmeter
1. 3. 2. 1	ME-48A/U	Multimeter
1. 3. 2. 1	TS-297/U	Multimeter
1. 3. 2. 1	TS-352/U	Multimeter
1. 3. 2. 1	TS-352A/U	Multimeter
1. 3. 2. 1	TS-352B/U	Multimeter
1. 3. 2. 1	TS-380/U	Multimeter
1. 3. 2. 1	Triplett 310	Volt-Ohm-Milliammeter
1. 3. 2. 2	I-166	Voltohmmer
1. 3. 2. 2	TS-26A/TSM	Test Set
1. 3. 2. 3	AN/USM-33	Multimeter
1. 3. 2. 3	I-50	Voltammeter
1. 3. 2. 3	I-201	Test Unit
1. 3. 2. 3	I-201-A	Test Unit
1. 3. 2. 3	I-201-B	Test Unit
1. 3. 2. 3	ME-1/U	Multimeter
1. 3. 2. 3	ME-67/U	Multimeter
1. 3. 2. 3	ME-75/ARC-21	Multimeter
1. 3. 2. 3	TS-178/ARM-1	Test Unit
1. 3. 2. 3	TS-555/GMQ-2	Ceilometer Test Set
1. 4	GALVANOMETERS	
1. 4	Leeds & Northrup 2420	Portable Galvanometer
1. 5	POTENTIOMETERS	
1. 5	Leeds & Northrup P-7552	Precision Potentiometer

## ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
AN/PRM-15	Multimeter	1.3.1.2
AN/PRM-16	Multimeter	1.3.1.2
AN/PSM-3	Voltmeter	1.1.2
AN/PSM-3(XA-2)	Voltmeter	1.1.2
AN/PSM-4	Multimeter	1.3.2.1
AN/PSM-6	Multimeter	1.3.2.1
AN/URM-12	Voltage Point Test Set	1.1.5
AN/URM-14	Microphone Simulator Set	1.1.2
AN/URM-45	Voltmeter	1.1.3
AN/USM-33	Multimeter	1.3.2.3
AN/USM-34	Multimeter	1.3.1.1
I-50	Voltammeter	1.3.2.3
I-139-A	Test Set	1.2.3
I-166	Voltohmeter	1.3.2.2
I-167-A	Multimeter	1.3.2.1
I-176	Test Unit	1.3.2.1
I-201	Test Unit	1.3.2.3
I-201-A	Test Unit	1.3.2.3
I-201-B	Test Unit	1.3.2.3
I-206-A	Test Set	1.2.3
I-206-B	Test Set	1.2.3
I-206-C	Test Set	1.2.3
IS-70	Ammeter	1.2.2
IS-76	Ammeter	1.2.2
IS-139	Ammeter	1.2.2
IS-185	Voltmeter	1.1.2

ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
IS-189	Voltmeter	1.3.2.1
ME-1/U	Multimeter	1.3.2.3
ME-6B/U	Electronic Multimeter	1.1.1
ME-6D/U	Electronic Multimeter	1.1.1
ME-25A/U	Multimeter	1.3.1.1
ME-26/U	Multimeter Meter	1.3.1.2
ME-29/U	Ammeter	1.2.3
ME-30/U	Voltmeter Meter	1.1.1
ME-30A/U	Voltmeter, Electronic	1.1.1
ME-32/U	RF Ammeter	1.2.2
ME-48A/U	Multimeter	1.3.2.1
ME-64/U	Voltmeter	1.1.2
ME-65/U	Ammeter	1.2.2
ME-67/U	Multimeter	1.3.2.3
ME-74/U	Multimeter	1.3
ME-75/ARC-21	Multimeter	1.3.2.3
TS-26A/TSM	Test Set	1.3.2.2
TS-60/U	Test Meter	1.2.3
TS-178/ARM-1	Test Unit	1.3.2.3
TS-199/CPM-4	Test Meter	1.2.3
TS-294C/U	Volt Ohmmeter	1.3.1.2
TS-297/U	Multimeter	1.3.2.1
TS-340/U	Voltmeter	1.1.5
TS-352/U	Multimeter	1.3.2.1
TS-352A/U	Multimeter	1.3.2.1
TS-352B/U	Multimeter	1.3.2.1
TS-363A/U	Voltmeter	1.3.1.2
TS-375/U	Voltmeter	1.1.1

## ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
TS-375A/U	Voltmeter	1. 1. 1
TS-380/U	Multimeter	1. 3. 2. 1
TS-389/U	Multimeter	1. 3. 1. 1
TS-443/U	Voltmeter	1. 1. 3
TS-487/U	Voltmeter	1. 1. 1
TS-505/U	Electronic Multimeter	1. 3. 1. 2
TS-518/U	Voltmeter	1. 1. 2
TS-555/GMQ-2	Ceilometer Test Set	1. 3. 2. 3
TS-619( )/U	Vacuum Tube Voltmeter	1. 1. 1
Ballantine 300	Voltmeter	1. 1. 1
Ballantine 320	Voltmeter	1. 1. 1
Boonton 91C	Voltmeter	1. 1. 1
Computer PVM-4B	Voltmeter, Precision	1. 1. 1
Emerson F. S. 120	Ammeter	1. 2. 3
Fluke 803	Voltmeter	1. 1. 1
Fluke 8011A	DC Voltmeter	1. 1. 1
G. E. (PL) 7705055G1	Servo Test Meter	1. 1. 3
General Radio 1800A	Vacuum Tube Voltmeter	1. 1. 1
Hewlett-Packard 400AB	Vacuum Tube Voltmeter	1. 1. 1
Hewlett-Packard 400C	Vacuum Tube Voltmeter	1. 1. 1
Hewlett-Packard 410B	Vacuum Tube Voltmeter	1. 3. 1. 2
Hewlett-Packard 412A	Vacuum Tube Voltmeter	1. 3. 1. 1
Hickock-110B	Vacuum Tube Voltmeter	1. 1. 1
Leeds & Northrup- 2420	Portable Galvanometer	1. 4
Leeds & Northrup- P-7552	Precision Potentiometer	1. 5

## ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
Rawson 518	AC, DC Voltmeter	1.1.5
RCA 195-A	Voltohmyst	1.3.1
Sensitive Research A	Thermocouple Milliammeter	1.2.5
Sensitive Research ESD	Electro-Static Voltmeter	1.1.5
Sensitive Research S	DC Voltmeter	1.1.3
Simpson 303	Vacuum Tube Voltmeter	1.3.1.2
Simpson 373	DC Milliammeter	1.2.3
Simpson 377	DC Voltmeter	1.1.3
Sperry 1,000, 308	Voltmeter	1.3.1.3
Triplett 310	Volt-Ohm-Milliammeter	1.3.2.1
Westinghouse PX-5	Ammeter	1.2.3
Weston 45	DC Voltmeter	1.1.3
Weston 301	DC Ammeter	1.2.3
Weston 341	Voltmeter	1.1.5
Weston 425	Thermo-Milliammeter	1.2.2
Weston 433	AC Voltmeter	1.1.2
Weston 528	AC Voltmeter	1.1.2
Weston 622	DC Microammeter	1.2.3
Weston 633 Type A1	AC Clamp Ammeter	1.2.2
Weston 904	AC Voltmeter	1.1.2
Weston 931	Ammeter	1.2.3

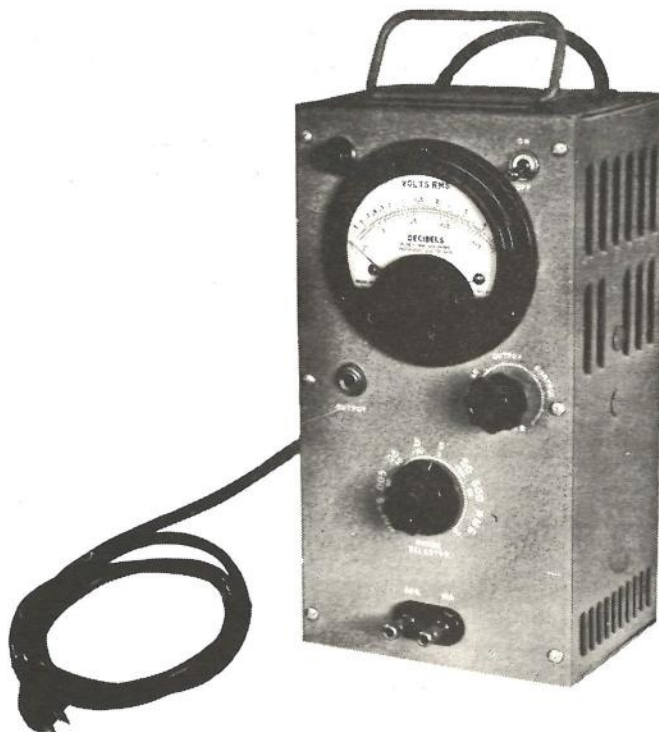
## 1.1 VOLTAGE MEASURING EQUIPMENT





## ELECTRONIC MULTIMETER ME-6B/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, vacuum tube voltmeter used to measure AC voltage. An output jack is provided to substitute a potentiometer for the rectifier and meter enabling the voltmeter to function as an amplifier. When connected across suitable resistances, it can be used as an ammeter. The meter has a logarithmic scale calibrated in volts, root mean square, and a linear scale calibrated in decibels.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Ballantine Model 300A Voltmeter except the ME-6B/U meets JAN specifications and has an extended voltage range.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** Consists of a multi-stage amplifier, rectifier, and a DC indicating instrument in which the deflection is proportional to the logarithm of the current through it. For stability purposes, a negative feedback circuit is provided whereby energy of reversed phase is brought back from the rectifier to the input circuit.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Standard	Standard	
<b>STOCK NOS.</b>		F16-Q-172854-200	
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	Navy	<b>DESIGN COG.:</b>	Navy, BuShips
<b>F.I.I.N.:</b>	FUNCTIONAL CLASS.NO.: 1.1.1		
- Electronics Test Equipment -			ME-6B/U



## ELECTRONIC MULTIMETER ME-6D/U



### FUNCTIONAL DESCRIPTION:

A portable test instrument with a wide range of applications. This equipment is a highly sensitive vacuum tube voltmeter which accurately measures AC voltages. It also serves as a flat, high-gain, wideband amplifier. A single panel meter is calibrated in AC volts and decibels. Meter readings are substantially independent of variations in line voltage, tube aging, and replacement of circuit components.

### RELATIONSHIP TO OTHER EQUIPMENT:

This model differs radically from previous models of the ME-6/U. It is neither mechanically nor electrically interchangeable.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The circuit consists of a multistage amplifier terminated by electron tube type diodes connected in a bridge circuit. A panel mounted meter indicates rectified current. The meter is designed with sloped pole pieces so that indications are proportional to the log of the rectified current. The rectified current is accurately proportional to the input voltage of the working range of the instrument. Stability of the amplifier gain is achieved by feeding back amplified voltage to part of the input circuit. A jack is provided for inserting a telephone plug when the set is used as a high-gain amplifier.

**Power Supply:** 117 volts, AC, 50 to 400 cycles per second, single-phase.

**Frequency Range:** 15 cycles per second to 250 kilocycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USN	DESIGN COG.:	USN, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.1.1
	- Electronics Test Equipment -		ME-6D/U

## ELECTRONIC MULTIMETER ME-6D/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

Voltage Range: 500 microvolts to 500 volts, AC, in 6 steps; 0.005, 0.05, 0.5, 5, 50, 500 volts, rms.

Meter Scale: AC Voltage: 0.5 to 5 volts.

Decibels: -5 to +17 (based on 0 decibel = 0.001 watt in 600 ohms).

Rectifier Voltage: 250 volts, DC (approximately).

Maximum Voltage Gain: 4500 (approximately).

### MANUFACTURERS' OR CONTRACTORS' DATA:

The Daven Company, 191 Central Avenue, Newark 4, New Jersey; Navy Contract No. NObsr-59640.

### TUBE COMPLEMENT:

1 JAN-5879, 2 JAN-6AH6, 1 JAN-5726/6AL5W, 1 JAN-OA2WA, 1-2A12.

### REFERENCE DATA AND LITERATURE:

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Electronic Multimeter ME-6D/U	1.06	9-5/8	10-1/2	18	20

### EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Electronic Multimeter ME-6D/U			5-13/16	6-1/2	11-7/32	9.6
2	Instruction Book			11	8-1/2	3/16	0.67

ME-6D/U

- Electronics Test Equipment -

VOLTMETER METER ME-30/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



FUNCTIONAL DESCRIPTION:

A portable, general purpose vacuum tube voltmeter, used to measure voltage in the audio, supersonic, and lower RF regions, amplifier gain, network response, output level, hum level, power circuit voltages, video voltages, carrier voltages, capacity, and coil figure of merit. The instrument may also be used as a high gain, broad band amplifier to increase sensitivity of oscilloscopes, bridges and other equipment requiring additional sensitivity. Indication is on a meter dial in rms volts and dbm. This instrument has a wide voltage range with high sensitivity at all ranges and good stability. The high input impedance causes a minimum of disturbance to the circuit whose voltage is measured. The large overvoltage capacity minimizes the probability of damaging the meter movement or associated circuitry due to overloads.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hewlett-Packard Vacuum Tube Voltmeter Model 400 C.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard	Standard	
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
- Electronics Test Equipment -			ME-30/U

## VOLTMETER METER ME-30/U

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** A high gain, broadband amplifier amplifies the input which then goes to a full wave rectifier. The rectifier output actuates a 1 milliampere meter movement. The meter movement is ruggedized.

**Power Supply:** 115/230 volts  $\pm 10\%$  AC, 50/60 cycles per second, single phase, 70 watts.

**Frequency Range:** 20 cycles per second to 2 megacycles per second.

**Voltage Range:** 0 to 300 volts in 12 ranges: 0 to 0.001, 0.003, 0.010, 0.030, 0.100, 0.300, 1.00, 3.00, 10.0, 30.0, 100.0, 300.0 volts.

**Calibration:** Calibrated to read rms value of sine wave. Voltage indication is proportional to average value of full sine wave. This minimizes errors due to turn-over and waveform variation. It has a linear voltage scale with decibel calibration from -12 to +2 dbm. There are 10 decibel intervals between voltage ranges. Dbm can be read directly from -72 to +52. (0 dbm = 1 milliwatt into 600 ohms.)

**Input Impedance:** 10 megohms shunted by 15 micromicrofarads on 1.0 volt to 300 volt ranges; 24 micromicrofarads on 0.001 volt to 0.3 volt ranges.

**Output Circuit:** Maximum output is 0.3 volt corresponding to full scale deflection of meter. Internal impedance is 1000 ohms. Gain is 300 when the instrument is on the 0.001 volt range.

### Accuracy:

$\pm 3\%$  below 100 kilocycles per second, over-all (full scale).

$\pm 5\%$  from 100 kilocycles per second to 2 megacycles per second, over-all (full scale).

### MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, Palo Alto, California; Navy Contract NObsr-44604; Approximate Cost per Unit, \$200.00, 1952.

### TUBE COMPLEMENT:

1 JAN-6AQ6, 1 JAN-0A2, 4 JAN-6AK5, 1 JAN-6SQ7, 1 JAN-6AU5GT, 1 JAN-6X5GT.

### REFERENCE DATA AND LITERATURE:

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltmeter Meter, ME-30/U (Domestic Packed)	0.52	10-1/2	7-15/16	10-3/4	18
ME-30/U - Electronics Test Equipment -						

VOLTMETER METER ME-30/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter Meter ME-30/U	Steel		8-1/2	7-1/2	9-1/2	14
- Electronics Test Equipment -							ME-30/U





## VOLTMETER, ELECTRONIC ME-30A/U



### FUNCTIONAL DESCRIPTION:

A portable general purpose vacuum tube voltmeter used to measure voltage in the audio, supersonic, and lower RF regions, amplifier gain, network response, output level, hum level, power circuit voltages, video voltages, carrier voltages, capacity, and coil figure of merit. The instrument may also be used as a high gain, broadband amplifier to increase sensitivity of oscilloscopes, bridges, and other equipment requiring additional sensitivity. Indication is on a meter dial in rms volts and dbm. This instrument has a wide voltage range with high sensitivity at all ranges and good stability. The high input impedance causes a minimum of disturbance to the circuit whose voltage is measured. The large overvoltage capacity minimizes the probability of damaging the meter movement or associated circuitry due to overloads.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hewlett-Packard Vacuum Tube Voltmeter Model 400D.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-936158		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USN	DESIGN COG.:	USN, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.1.1
	- Electronics Test Equipment -		ME-30A/U

## VOLTMETER, ELECTRONIC ME-30A/U

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The voltmeter input terminals feed into a cathode follower with a grid impedance of 10 megohms. High stability for the cathode follower is accomplished by 35 decibels of local feedback. Range switching for the voltmeter is accomplished by tapping the resistor of the cathode follower. The output of the cathode follower is applied to a maximally flat-maximally stable four-stage amplifier which is stabilized with 56 to 60 decibels of negative feedback at midband. The output of the amplifier is applied to a full-wave rectifier circuit. The rectifier in turn feeds a DC indicating meter.

**Power Supply:** 115 to 230 volts,  $\pm 10\%$ , AC, 50 to 1000 cycles per second, single phase, 70 watts.

**Frequency Range:** 10 cycles per second to 4 megacycles per second.

**Voltage Range:** 0 to 300 volts, AC, in 12 ranges: 0 to 0.001, 0.003, 0.010, 0.030, 0.100, 0.300, 1.00, 3.00, 10.0, 30.0, 100.0, 300.0 volts.

**Calibration:** Calibrated to read rms value of sine wave. Voltage indication is proportional to average value of applied wave. This minimizes errors due to turn-over and waveform variation. It has linear voltage scales with decibel calibration from -12 to +2 dbm. There are 10 decibel intervals between voltage ranges. Dbm can be read directly from -72 to +52. (0 dbm= 1 milliwatt into 600 ohms.)

**Input Impedance:** 10 megohms shunted by 15 micromicrofarads on 1.0 volt to 300 volt ranges; 10 megohms shunted by 25 micromicrofarads on 0.001 volt to 0.3 volt ranges.

**Amplifier:** Maximum output is 0.15 volt rms corresponding to full scale deflection of meter. Internal impedance is 50 ohms. Gain is approximately 150 when the instrument is on the 0.001 volt range.

### Accuracy:

$\pm 2\%$  from 20 cycles per second to 1 megacycle per second (full scale).

$\pm 3\%$  from 20 cycles per second to 2 megacycles per second (full scale).

$\pm 5\%$  from 10 cycles per second to 4 megacycles per second (full scale).

### MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; USN Contract No. NObsr-64076; Approximate Cost per Unit, \$225.00; 1954.

### TUBE COMPLEMENT:

6 JAN-6CB6, 1 JAN-6AX5GT, 1 JAN-6AU5, 1 JAN-OB2.

### REFERENCE DATA AND LITERATURE:

VOLTMETER, ELECTRONIC ME-30A/U

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltmeter, Electronic ME-30A/U (Domestic Packed)					24

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter, Electronic ME-30A/U	Aluminum	7CAC-936158	10-3/4	7	10-1/2	19



VOLTMETER TS-375/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



FUNCTIONAL DESCRIPTION:

A portable, general purpose, vacuum-tube voltmeter used to measure both alternating and direct voltages.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts  $\pm 10\%$ , 50 to 1600 cycles per second, 28 watts.

Frequency Range: 40 cycles per second to 50 kilocycles per second using panel terminals; 10 kilocycles per second to 150 megacycles per second using probe; up to 300 megacycles per second with correction curve.

Input Impedance:

AC probe input capacitance: 8 micromicrofarads.

AC probe input resistance: 5 megohms.

DC probe resistance: 5 megohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		Not Classified
STOCK NOS.	7CAC-801319-245	F17-V-89061-6411	3F4325-375
PROCUREMENT INFO.:	Navy Spec. No. CS-79A, EP-280, 16V2(RE)		
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuAer
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
	- Electronics Test Equipment -		TS-375/U

## VOLTMETER TS-375/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

#### Full Scale Range:

Alternating Volts: 1.2, 3.0, 12.0, 30.0, and 120 volts (rms).

Direct Volts: 1.2, 3.0, 12.0, 30.0, 120, and 300 volts (average).

#### Accuracy (full scale):

AC: 10 to 50 cycles per second  $\pm 5\%$ ; 50 cycles per second to 50 megacycles per second  $\pm 4\%$ ; 50 to 150 megacycles per second  $\pm 6\%$  without calibrating curve, or  $\pm 3\%$  with calibrating curve; 150 to 300 megacycles per second  $\pm 8\%$  with calibrating curve.

DC:  $\pm 3\%$  of full scale range.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Company, Newark 5, New Jersey; Navy Contract No. N5SA-2923; Approximate Cost per Unit, \$150.00; Navy Dept. Contract No. 48-933, Approximate Cost per Unit, \$301.00; AF 47-2076E, Approximate Cost per Unit, \$335.00.

### TUBE COMPLEMENT:

2 JAN-6SJ7, 1 JAN-5Y3GT, 1 JAN-6SL7, 2 JAN-991 neon tubes, 2 type Raytheon CK-606.

### REFERENCE DATA AND LITERATURE:

TO 16-35TS375-3 (Maintenance Instructions).

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltmeter, TS-375/U, with accessories.	0.68	10.63	10.63	10.5	35
TS-375/U - Electronics Test Equipment -						

VOLTMETER TS-375/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter TS-375/U (Complete)		7CAC-801319-245 F17-V-89061-6411 3F4325-375	10-1/2	10-1/2	6-3/4	18.5
1	Probe MX-660/U		7CWQ-122049  3F3711-660	53			0.1
1	Probe MX-661/U		7CWQ-D122067  3F3711-661	54			0.3
1	Line Cord CX-337/U		7CAC-170264-865  3E6000-337-96	96 long			0.4
2	Test Lead CX-529/U		7CAC-468919-7  3E6000-529	60 long			0.1
1	Ground Prod			1-1/2			0.03
2	Alligator Clip			1-1/2			0.03
1	Box Spare Parts						





## VOLTMETER TS-375A/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, high impedance AC and DC vacuum tube voltmeter for servicing and testing radio and radar equipment. It is intended particularly for voltage measurements where the sensitivity or frequency range of standard voltmeters is insufficient; for example, DC grid bias voltage, and audio or radio frequency voltage.

### RELATIONSHIP TO OTHER EQUIPMENT:

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts  $\pm 10\%$ , 50 to 1600 cycles per second, 28 watts.

Frequency Range: 40 cycles per second to 50 kilocycles per second using panel terminals; 10 kilocycles per second to 150 megacycles per second using probe; up to 300 megacycles per second with correction curve.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Standard	Standard	Not Classified
<b>STOCK NOS.</b>	7CAC-801319-244	ASO-R16-AN-TS-375/U	3F4325-375A
<b>PROCUREMENT INFO.:</b>	Navy Spec. No. CS-79A, Spec. No. 17V4(Aer).		
<b>PROCUREMENT COG.:</b>	Navy		DESIGN COG.: Navy, BuAer
<b>F.I.I.N.:</b>	FUNCTIONAL CLASS. NO: 1.1.1		
	- Electronics Test Equipment -		TS-375A/U

## VOLTMETER TS-375A/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

**Input Impedance:**

AC probe input capacitance: 8 micromicrofarads.  
 AC probe input resistance: 5 megohms.  
 DC probe resistance: 5 megohms.

**Full Scale Range:**

Alternating Volts: 1.2, 3.0, 12.0, 30.0, and 120 volts (rms).  
 Direct Volts: 1.2, 3.0, 12.0, 30.0, 120 and 300 volts (average).

**Accuracy (full scale):**

AC: 10 to 50 cycles per second  $\pm 5\%$ ; 50 cycles per second to 50 megacycles per second  $\pm 4\%$ ; 50 to 150 megacycles per second  $\pm 6\%$  without calibrating curve, or  $\pm 3\%$  with calibrating curve; 150 to 300 megacycles per second  $\pm 8\%$  with calibrating curve.

DC:  $\pm 3\%$  of full scale range.

Temperature Range:  $-40^{\circ}$  C. to  $+55^{\circ}$  C.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Company, Newark 5, New Jersey; Approximate Cost per Unit, \$150.00.

### TUBE COMPLEMENT:

2 JAN-6SJ7, 1 JAN-5Y3GT, 1 JAN-6SL7, 2 JAN-991 neon tubes, 2 type Raytheon CK-606.

### REFERENCE DATA AND LITERATURE:

TO 16-35TS375-3 (Maintenance Instructions).  
 TO 16-55-417 (Spare Parts List).

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltmeter TS-375A/U with accessories (Shelf Packed).	0.57	10.75	10.75	8.5	20

TS-375A/U

- Electronics Test Equipment -

VOLTMETER TS-375A/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter TS-375A/U (Complete)		7CAC-801319-244 R16-ANTS-375/U 3F4325-375A	10-1/2	10-1/2	6-3/4	18.5
1	Probe MX-660/U		7CWQ-122049 3F3711-660	53 long			0.1
1	Probe MX-661/U		7CWQ-D122067 3F3711-661	54 long			0.3
1	Line Cord CX-337/U		7CAC-170264-865 3E6000-337-96	96 long			0.4
2	Test Lead CX-529/U		7CAC-468919-7 3E6000-529	60 long			0.1
1	Ground Prod			1-1/2 long			0.03
- Electronics Test Equipment -							TS-375A/U



VOLTMETER TS-487/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to measure peak-to-peak voltages of recurrent waves, particularly of the type found in radar video circuits. The voltmeter is used to set levels of both video and synchronizing voltages in radar equipment. Test results are indicated by a meter located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

NI

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set consists basically of an integrating circuit, a DC amplifier, a meter (0 to 100 microamps full-scale deflection), and a power supply.

Power Supply: 105 to 120 volts, 50 to 1600 cycles per second, 25 watts.

Ranges: 0 to 3, 10, 50 volts.

Input Impedance: 51, 75, 470 ohms and infinity.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Navy, BuShips		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
- Electronics Test Equipment -			TS-487/U

VOLTMETER TS-487/U

MANUFACTURERS' OR CONTRACTORS' DATA

Meridian, Inc., 880 Main Street, Stanford, Connecticut, approximate unit cost, \$150.00

TUBE COMPLEMENT:

(3) 6H6, (1) 6SN7W.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 900, 607.

SC Form 567.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter TS-487/U	metal	F16-Q-304583-200(USN)	7-1/2	8-3/4	5	13
1	Cord (Power)			72" long			
1	Video Cable RG-39/U			48" long			
1	Operating Instructions						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltmeter TS-487/U					

TS-487/U

- Electronic Test Equipment -

VACUUM TUBE VOLTMETER TS-619( )/U



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, self-contained instrument used to measure AC voltage. Measurements are indicated on a meter calibrated to read 0.707 of the peak value of the applied voltage. On the lower ranges the instrument approximates a true square-law device.

**RELATIONSHIP TO OTHER EQUIPMENT:**

The TS-619( )/U is the military designation for General Radio 727-A.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: Two Burgess W20P1, one Burgess W5BP, and three Burgess 2F batteries.

Range: 0.05 to 300 volts in 7 ranges.

Accuracy:  $\pm 3\%$  of full scale on 0.3-volt range,  $\pm 2\%$  on all other ranges. An additional  $\pm 3\%$  error may occur on the 30-, 100-, and 300-volt ranges due to long period aging of the dividing resistors.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: USN		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
- Electronics Test Equipment -			TS-619( )/U

VACUUM TUBE VOLTMETER TS-619( )/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Error:

20 cycles per second to 30 megacycles per second: Less than 1%

65 megacycles per second: 5%

100 megacycles per second: 10%

Input Impedance:

0.3-, 1-, 3-, and 10-volt ranges: 16 micromicrofarads shunted by 5 megohms.

30-, 100-, and 300-volt ranges: 16 micromicrofarads shunted by 3 megohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, Cambridge 39, Massachusetts, approximate unit cost, \$205.00.

TUBE COMPLEMENT:

(2) 155, (1) 957.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog M.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Voltmeter TS-619( )/U	Walnut		11	6-5/8	5-7/8	10-7/8

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Vacuum Tube Voltmeter TS-619( )/U					

TS-619( )/U

- Electronic Test Equipment -



**VOLTMETER  
MODEL 300  
(Ballantine Laboratories)**



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, vacuum tube voltmeter used to measure AC voltage. An output jack is provided enabling the voltmeter to function as an amplifier. When connected across suitable resistances, it can be used as a microammeter. The meter has a logarithmic scale calibrated in volts, root mean square, and a linear scale calibrated in decibels.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Same as Electronic Multimeter ME-6/U.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: Consists of a multi-stage amplifier, rectifier and a DC indicating instrument in which the deflection is proportional to the logarithm of the current through it. For stability purposes a negative feedback circuit is provided whereby energy of reversed phase is brought back from the rectifier to the input circuit.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>	7800-970515		3F8100-3
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	<b>DESIGN COG.:</b> Commercial		
<b>F.I.I.N.:</b>	<b>FUNCTIONAL CLASS. NO.:</b>		1.1.1
- Electronics Test Equipment -			Model 300

VOLTMETER  
MODEL 300

(Ballantine Laboratories)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts  $\pm$ 5 volts, AC, 50 to 60 cycles per second, single phase, or 230 volts  $\pm$ 10 volts, AC, 50 to 60 cycles per second, single phase.

Frequency Range: 10 to 150,000 cycles per second.

Voltage Range: 0.001 volt to 100 volts root mean square in five decade ranges: 0.001 to 0.01, 0.01 to 0.1, 0.1 to 1.0, 1.0 to 10, 10 to 100.

Decibel Scale: 0 to 20 decibels with zero of the decibel scale corresponding to 1 on the voltage scale.

Input Impedance: 0.5 megohms shunted by 30 micromicrofarads.

Output Impedance: 0 to 15,000 ohms.

Overload Characteristics:

Range	Maximum Voltage	Overload Ratio
0.001 to 0.01	2	200
0.01 to 0.1	20	200
0.1 to 1.0	200	200
1.0 to 10	400	40
10 to 100	400	4

Stability: Changes with variation in power supply voltage from 110 volts to 120 volts, about 1%; temperature coefficient negligible.

Accuracy: 2% over the entire range. (Effective January 1, 1953.)

Amplifier Characteristics:

Maximum Voltage Gain: 70 decibels

Maximum Output Voltage: 30 volts.

Output Impedance: 15,000 ohms at maximum gain.

MANUFACTURERS' OR CONTRACTORS' DATA:

Ballantine Laboratories, Inc., Boonton, New Jersey; Approximate Cost per Unit, \$200.00, 1 January 1953.

TUBE COMPLEMENT:

1-RETMA1620 or RETMA6J7, 2-RETMA6SJ7, 1-RETMA6H6, 1-RETMA6X5, 2-RETMA991.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog No. 15, April 1952.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
Model 300 - Electronics Test Equipment -						

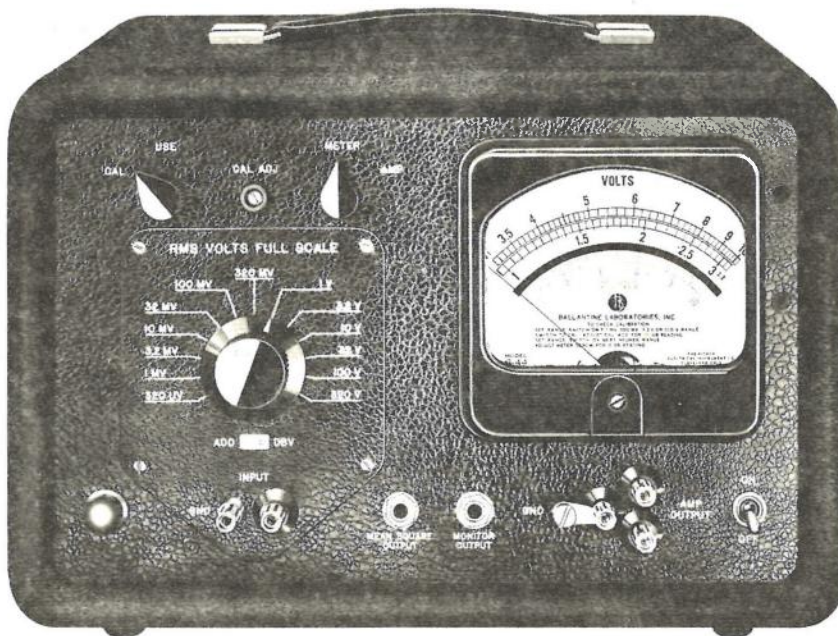
VOLTMETER  
MODEL 300  
(Ballantine Laboratories)

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter Model 300	Metal	7800-970515  3F8100-3	4-1/2	5-3/4	11	9.5
- Electronics Test Equipment -							Model 300



**VOLTMETER  
MODEL 320  
(Ballantine Laboratories)**



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose equipment used for AC voltage measurements at power, audio, and ultrasonic frequencies. The instrument determines the rms magnitude of periodic complex waves or noise potentials. Results are indicated on a logarithmic scale calibrated in volts and a linear scale calibrated in decibels referred to 1 volt.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The unit consists essentially of a high impedance attenuator followed by a degeneratively stabilized amplifier which feeds a quadratic detector. Current from the detector is fed to a moving coil meter.

**Power Supply:** 115 or 230 volts AC, 50 to 420 cycles per second, 75 watts.

**Voltage Range:** 100 microvolts to 320 volts rms in 13 ranges in steps of 10 decibels  
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:			Commercial
F. I. I. N.:	FUNCTIONAL CLASS. NO.:		1.1.1
- Electronics Test Equipment -			Model 320

VOLTMETER MODEL 320  
(Ballantine Laboratories)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Decibel Range: -80 to +50 decibels referred to 1 volt.

Frequency Range: 5 to 500,000 cycles per second.

Crest Factor Range: 1 to 5 (0 to 14 decibels) for full scale readings; 1 to 15.8 (0 to 24 decibels) for bottom scale readings.

Accuracy:

Sine Waves:  $\pm 3\%$  15 to 150,000 cycles per second.

$\pm 5\%$  5 to 15 cycles per second and 150,000 to 500,000 cycles per second.

Nonsinusoidal Waves:  $\pm 3\%$  if all component frequencies are in the same range from 15 to 150,000 cycles per second;  $\pm 5\%$  for all other conditions within the allowable frequency and crest factor ranges. Accuracy applies to all points on meter scale and for all ranges.

Calibrating Source Stability:  $\pm 0.5\%$  for line voltage variations of 105 to 125 volts AC or 210 to 250 volts AC, and for long term usage.

Input Impedance: 10 megohms shunted by approximately 18 micromicrofarads to 10 millivolts; 10 megohms shunted by approximately 8 micromicrofarads above 10 millivolts.

Meter Scale: Logarithmic voltage scales reading from 1 to 3.2 and from 3.1 to 10; decibel scale from 0 to 10.

Output Characteristics:

Amplifier Voltage Gain: 90  $\pm 1$  decibel balanced to ground, decreasing in 10 decibel steps to -30 decibels.

Monitor Output Voltage Gain: 84  $\pm 1$  decibel single ended, in phase with the input, decreasing in 10 decibel steps to -36 decibels.

Mean Square Output: Negative DC, output voltage of 0.2 volts corresponding to fully scale meter deflection, time constant is 0.1 second.

MANUFACTURERS' OR CONTRACTORS' DATA

Ballantine Laboratories, Boonton, New Jersey, approximate unit cost, \$425.00.

TUBE COMPLEMENT:

(4) 5654, (2) 6U8, (1) 12AV7, (1) 0A2, (1) 0B2, (1) 5651, (1) 5V4G.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltmeter Ballantine 320					
Model 320 - Electronic Test Equipment -						

VOLTMETER MODEL 320  
(Ballantine Laboratories)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter Ballantine 320	metal		14-3/8	10-1/8	12-3/8	21
- Electronics Test Equipment -				Model 320			





VOLTMETER  
MODEL 91C  
(Boonton Electronics Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose equipment used for measurements of low level RF voltage. Measurements include amplifier gain, attenuator loss, mixer gain, transistor gain, filter network loss, and signal generator output measurements. The instrument can also be used as a null indicator. Results are indicated on an illuminated meter calibrated in volts and decibels.

**RELATIONSHIP TO OTHER EQUIPMENT:**

The Boonton 91C is similar to the Boonton 91B except that the Boonton 91C has an increased RF range, a redesigned meter scale, modified circuit design, and is inclosed in a modified cabinet. The Boonton 91B is similar to the Boonton 91A except that the Boonton 91B has an increased RF range.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The instrument consists essentially of a hermetically sealed diode detector, a DC amplifier, a meter, a power supply and associated switch-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:			DESIGN COG.: Commercial
F. I. I. N.:	FUNCTIONAL CLASS. NO.:		1.1.1
- Electronics Test Equipment -			Model 91C

VOLTMETER MODEL 91C  
(Boonton Electronics Corporation)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

ing circuits. The high impedance probe unit consists of a full wave germanium diode circuit operating as a square law detector providing rms response below 0.1 volt. When used as a null detector, the sensitivity and noise level of the instrument is sufficiently low to permit detection of a signal level of 400 microvolts at frequencies above 1000 megacycles per second. The probe is used in conjunction with a 52-ohm coaxial adapter. The equipment is fused.

Power Supply: 105 to 125 volts, 55 to 65 cycles per second, single-phase, 30 watts.

Range: 0.001 to 0.003, 0.01, 0.03, 0.1, 0.3, 1, 3 volts.

Frequency Range: 50 kilocycles per second to 600 megacycles per second.

Accuracy:  $\pm 5\%$  of full scale to 200 megacycles per second,  $\pm 10\%$  of full scale to 600 megacycles per second.

Power Sensitivity: 0.02 microwatts.

VSWR of Coaxial Adapter: Less than 1.2

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Boonton Electronics Corporation, Morris Plains, New Jersey, approximate unit cost, \$395.00.

**TUBE COMPLEMENT:**

NI

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter Boonton 91C	metal					

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltmeter Boonton 91C					

Model 91C

- Electronic Test Equipment -

VOLTMETER, PRECISION  
 Model PVM -4B  
 (Computer Company of America)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, DC voltmeter designed to measure voltages by the null balance method. The instrument includes a power supply, means for calibration, a precision attenuator, and a null indicator. The value of the measured voltage is read directly from the attenuator setting.

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is similar to model PVM-4. The B model has greater accuracy, reliability, and ease of operation.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuit is designed so that when an unknown voltage is connected to one side of a null indicator, and the output of an attenuator is applied to the other side of the indicator, the attenuated voltage may be adjusted to produce a null on the indicator. At the null point the unknown voltage is equal to the attenuated voltage and no current is drawn from the measuring circuit.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-936000		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
	- Electronics Test Equipment -		Computer PVM-4B

VOLTMETER, PRECISION  
Model PVM-4B  
(Computer Company of America)

ELECTROMECHANICAL DESCRIPTION: (Continued)

The attenuating network consists of fixed resistors and a ten-turn helical potentiometer. The attenuator controls are calibrated in terms of output voltage. The null indicator is a zero-center panel meter incorporating a large resistor in series with the meter to reduce sensitivity and prevent high current drains during null adjustment. The resistor may be shorted out for final null adjustments.

The internal power supply consists of a mercury battery, two series regulators, and two difference amplifiers. The output of this power supply is calibrated by an internal Weston standard cell.

Power Supply: 100 to 135 volts, AC, 50 to 60 cycles per second, single-phase, 24 watts.

Internal Power Output: 600 volts, DC.

Voltage Ranges: 0 to  $\pm 10$ , 0 to  $\pm 100$ ,  $\pm 100$  to  $\pm 200$ ,  $\pm 200$  to  $\pm 300$ ,  $\pm 300$  to  $\pm 400$ ,  $\pm 400$  to  $\pm 500$ ,  $\pm 500$  to  $\pm 600$  volts, DC.

Accuracy: 0.1%  $\pm 10$  millivolts between 0 and 10 volts. 0.1%  $\pm 100$  millivolts between 10 and 600 volts.

Resolution: At least 5 millivolts between 0 and 10 volts. At least 50 millivolts between 10 and 600 volts.

Input Impedance: Infinite at null. Greater than 2.5 megohms per volt at 1/4 division off null.

Standard Cell Voltage: 0.01859 volts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Computer Company of America, Division of Bruno-New York Industries Corp., 460 West 34th Street, New York 1, New York; Contract No. AF 33(600)22852.

TUBE COMPLEMENT:

1 JAN-12AT7, 3 JAN-12AX7, 1 Amperite 3TFV4.

REFERENCE DATA AND LITERATURE:

Manufacturer's Instruction Manual.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
Computer PVM-4B - Electronics Test Equipment -						

VOLTMETER, PRECISION  
 Model PVM-4B  
 (Computer Company of America)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers	Overall Dimensions (inches)			Weight (Lbs.)			
				(USAF)	(Navy)	(Army)		H	W	D
1	Voltmeter, Precision (Computer Company PVM-4B)		7CAC-936000				10	11-1/4	11	



VOLTMETER  
MODEL 803  
(John Fluke Manufacturing Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used to perform AC and DC measurements. The instrument may be used as a vacuum tube voltmeter, as a differential DC voltmeter, as a differential AC voltmeter, and as a secondary calibration standard. Results are directly displayed by a 5-place decimal readout indicating rms value of a sine wave.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The instrument consists basically of a 500-volt DC source, a Kelvin-Varley voltage divider, a network of range resistors, a vacuum tube voltmeter, and an AC to DC converter. The 500-volt DC source is used as a reference voltage for comparison with the voltage to be measured. Means are

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:			DESIGN COG.: Commercial
F.I.L.N.:			FUNCTIONAL CLASS. NO.: 1.1.1.
- Electronics Test Equipment -			Model 803

VOLTMETER MODEL 803  
(John Fluke Manufacturing Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

provided for calibration of the reference voltage. A divider network of range resistors provides three lower reference voltage levels. One of the four reference voltages is then applied across the Kelvin-Varley divider. The vacuum tube voltmeter determines the approximate value of the voltage to be measured and also functions as a null detector for measuring the difference between the unknown voltage and the internal reference voltage. The AC-DC converter, during AC voltage measurements, changes the AC to DC for comparison with the DC reference source. All major circuits are of the printed-circuit type mounted on plug-in boards. The circuits are protected against accidental overload.

Power Supply (External): 117 or 234 volts AC, 50 to 60 cycles per second, single-phase, 175 watts.

Ranges:

Alternating Voltage: 0 to 5, 50 and 500 volts.

Direct Voltage: 0 to 0.5, 5, 50 and 500 volts.

Accuracy:

Alternating Voltage:  $\pm 0.2\%$  from 0.5 to 500 volts, 30 cycles per second to 5 kilocycles.

Direct Voltage:  $\pm 0.05\%$  from 0.1 to 500 volts,  $\pm 0.1\%$  or 50 microvolts, whichever is greater below 0.1 volt.

Null Sensitivity Ranges:

Alternating Voltage: 0 to 0.01, 0.1, 1, 10 and 100 volts.

Direct Voltage: 0 to 0.01, 0.1, 1 and 10 volts.

Input Impedance:

Alternating Voltage: 1 megohm shunted by 25 micromicrofarads.

Direct Voltage: Infinite at null.

Maximum Meter Resolution: 50 microvolts.

Converter Frequency Response: 30 cycles per second to 5 kilocycles.

Reference Stability:  $\pm 0.01\%$  for 25% change in line voltage;  $\pm 0.01\%$  per hour after 30 minute warmup.

MANUFACTURERS' OR CONTRACTORS' DATA:

John Fluke Manufacturing Company, Seattle 33, Washington, approximate unit cost, \$875.00.

TUBE COMPLEMENT:

NI

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.



VOLTMETER MODEL 803  
(John Fluke Manufacturing Company)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter Fluke 803	metal		9-3/4	13	16	30

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltmeter Fluke 803					
Model 803 - Electronic Test Equipment -						



DC VOLTMETER  
MODEL 8011A  
(John Fluke Manufacturing Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose equipment used to perform DC voltage measurement with a minimum of loading error. The instrument may be used as a substitute for conventional potentiometers, as a differential DC voltmeter, as a conventional DC vacuum tube voltmeter, and as a secondary calibration standard. Test results are directly displayed by a 5-place decimal readout.

**RELATIONSHIP TO OTHER EQUIPMENT:**

The Fluke 8011A is similar to the Fluke 801 except that the Fluke 8011A has an increased VTVM accuracy, an increased stability of reference supply, a higher VTVM input resistance on the 0.1 volt range, and is housed in a larger militarized case. The Fluke 801 is similar to Voltmeter AN/USM-98 ( ).

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The instrument is comprised basically of a Zener reference, a 500-volt DC reference source, a five dial Kelvin-Varley voltage divider, and  
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.:		Commercial
F. I. I. N.:	FUNCTIONAL CLASS. NO.:		1.1.1
- Electronics Test Equipment -			Model 8011A

DC VOLTMETER MODEL 8011A  
(John Fluke Manufacturing Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

a chopper stabilized null detector. The Zener comparison circuit is factory set to the actual Zener voltage available in each instrument to eliminate error due to resistor tolerances in the calibrator circuit. The same approach is used in the decade divider strings. The circuits are protected against accidental over load.

Power Supply: 115 volts  $\pm 10\%$ , 50 to 60 cycles per second, 60 watts.

Potentiometer:

Ranges:

Input Voltage Range	Recommended Null Voltage Range	Input Resistance Minimum 1% Off Null
50-500	10-0-10	100 Megohms/v input
	1-0-1	1000 Megohms/v input
5-50	1-0-1	1000 Megohms/v input
	0.1-0-0.1	10,000 Megohms/v input
0.5-5	0.1-0-0.1	10,000 Megohms/v input
	0.01-0-0.01	68,750 Megohms/v input
0-0.5	0.1-0-0.1	10,000 Megohms/v input
	0.01-0-0.01	68,750 Megohms/v input

The input resistance is essentially infinite at null values.

Accuracy:  $\pm 0.05\%$  of input voltage from 0.1 to 500 volts,  $\pm 0.1\%$  of input voltage or 0.5 millivolts, whichever is greater below 0.1 volt.

Resolution:

Input Voltage Range	Dial Limits Volts	Maximum Meter Resolution
50-500	0.01	5 millivolts
5-50	0.001	500 microvolts
0.5-5	0.0001	50 microvolts
0-0.5	0.00001	50 microvolts

Vacuum Tube Voltmeter:

Direct Voltage Ranges: 0 to 0.01, 0.1, 0.5, 1, 5, 10, 50, 500 volts; ranges 0 to 0.001, 0.01, 0.1, 1 and 10 are obtained by setting the null range to desired sensitivity and the five voltage dials to 0.

Accuracy:  $\pm 3\%$  of full scale on all ranges.

Input Resistance: 10 megohms for all voltage ranges except the 0.01 range which is 6.875 megohms.

Stability of Reference Supply:  $\pm 0.01\%$  for  $\pm 10\%$  change in line voltage,  $\pm 0.01\%$  per hour after warmup.

DC VOLTMETER MODEL 8011A  
(John Fluke Manufacturing Company)

MANUFACTURERS' OR CONTRACTORS' DATA:  
John Fluke Manufacturing Company, Seattle 33, Washington.

TUBE COMPLEMENT:  
NI

REFERENCE DATA AND LITERATURE:  
Manufacturer's Catalog.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Voltmeter Model 8011A	metal		11-1/2	19	19-1/2	57

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	DC Voltmeter Model 8011A					
Model 8011A - Electronic Test Equipment -						



VACUUM TUBE VOLTMETER  
 MODEL NO. 1800A  
 (General Radio Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, test instrument used to measure AC voltages at audio and radio frequencies and also to measure DC voltages. When used with the 50 ohm terminating resistor it can measure current and power in the termination of lines or other locations. Although calibrated to give rms values of approximately sinusoidal voltages, it is also possible to determine peak values of a complex voltage wave except at the lowest voltage ranges.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used to test Radar Set AN/CPN-4 and Radio Set AN/FPN-16. AN Designation TS-620/U.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The high frequency probe contains an acorn type diode rectifier connected to the input capacitor which is a small button-type unit mounted on a

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-970948		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
	- Electronics Test Equipment -		Model No. 1800A

VACUUM TUBE VOLTMETER  
MODEL NO. 1800A  
(General Radio Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

low-loss insulating disc. A metal cap screws onto the end of the probe and is used to attach various fittings and terminations to the probe input. The cable, which also supplied heater power to the diode in the probe, carries the rectified voltage to a DC amplifier and indicating meter in the cabinet of the instruments. Power Supply: 115 or 230 volts  $\pm 10\%$ , AC, single phase, 50 to 60 cycles per second, power input 25 watts.

Frequency Range: 20 cycles to 500 megacycles per second.

Voltage Ranges:

AC: 0.1 to 150 volts in six ranges; 0.5, 1.5, 5, 15, 50, and 150 volts full scale.

DC: 0.01 to 150 volts in six ranges; 0.5, 1.5, 5, 15, 50, and 150 volts full scale.

Multipliers available allowing 1500 volt measurements (at extra cost).

Input Impedance:

Low Frequencies: The equivalent parallel resistance of the AC input circuit is 25 megohms.

Audio Frequencies: The equivalent parallel capacitance is 3.2 micromicrofarads approximately (probe cap and plug removed).

Radio Frequencies: The equivalent parallel capacitance is 3.1 micromicrofarads (probe cap and plug removed). The probe cap and plug add approximately 1.2 micromicrofarads.

DC Ranges: Two values of input resistance, 10 megohms and open grid.

Accuracy: AC,  $\pm 2\%$  of full scale sinusoidal voltages. DC,  $\pm 2\%$  of full scale.

Frequency Correction: 10% at 300 megacycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, Cambridge, Massachusetts; Approximate Cost per Unit, \$371.00, February 1954.

TUBE COMPLEMENT:

1 RETMA-6AT6, 1 RETMA-6C4, 1 RETMA-6SL7GT, 1 RETMA-6SU7GT, 1 RETMA-6X5GT, 2 RETMA-991, 2 RETMA-9005, 1 Amperite 3-4.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog M, 1951.

Manufacturer's Operating and Maintenance Instructions.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Vacuum Tube Voltmeter Model No. 1800A	1.8	18	14	12	20
Model No. 1800A - Electronics Test Equipment -						



VACUUM TUBE VOLTMETER  
 MODEL NO. 1800A  
 (General Radio Company)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Voltmeter Model 1800A	Wood and Alum- inum	7CAC-970948	11-1/8	7-1/2	7-3/8	13
1	Line Connector Cord						
1	Termination Type 274						
1	Termination Type 874						
1	50 ohm Terminating Resistor for Probe						



VACUUM TUBE VOLTMETER  
 MODEL 400AB  
 (Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to measure amplifier gain; network response; and audio, carrier current, and supersonic output levels. The instrument measures small differential voltages, serves as a null indicator, and may also be used as an amplifier.

RELATIONSHIP TO OTHER EQUIPMENT:

The 400AB is similar to the 400A except for greater ranges of measurement and higher sensitivity. The 400AB replaces the 400A. The 400A is similar to NT-60123.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 or 230 volts  $\pm$  10%, 50 to 1000 cycles per second, 70 watts (Approximately).

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
	- Electronics Test Equipment -		Model 400AB

VACUUM TUBE VOLTMETER MODEL 400AB  
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Ranges:

Alternating Voltage: 0.003, to 0.01, 0.03, 0.1, 0.3, 1.0, 3.0, 10.0, 30, 100, 300 volts.

Frequency: 10 cycles per second to 600 kilocycles per second.

Decibels: -10 to +2 decibels, 0 decibels equals 1 milliwatt into 600 ohms.

Calibration: The meter is an average value meter calibrated to present sine-wave rms values.

Input Impedance: 10 megohms shunted by less than 25 micromicrofarads.

Accuracy: ± 2% from 20 cycles per second to 100 kilocycles; ± 3% from 10 cycles per second to 600 kilocycles.

Amplifier: Response same as voltmeter above 20 cycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California, approximate unit cost, \$200.00.

TUBE COMPLEMENT:

NI

REFERENCE DATA AND LITERATURE:

Manufacturer's data.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Voltmeter Hewlett-Packard 400AB	metal		11-1/4	7-1/4	7	13 lbs.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Vacuum Tube Voltmeter Hewlett-Packard 400AB		12-3/4	10-3/4	14-3/4	25 lbs.

VACUUM TUBE VOLTMETER  
 MODEL NO. 400C  
 (Hewlett-Packard Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, test instrument used to measure voltage in audio, supersonic, and lower radio frequency region. It can also be used to measure amplifier gain, network response, output level, hum level, power circuit voltages, video voltages, and carrier current voltages. The calibrated linear scale reads directly in rms volts or decibels.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used to test Moving Target Indicator Group AN/GPA-7 and AN/GPA-7A.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** Includes a high gain, broad band, amplifier whose output is applied to a full wave rectifier actuating a meter movement. Inverse feedback is employed over the entire system for stability purposes.

**Power Supply:** 115/230 volts, 50 to 60 cycles per second, 70 watts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-970824		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
- Electronics Test Equipment -			Model No. 400C

**VACUUM TUBE VOLTMETER  
MODEL NO. 400C  
(Hewlett-Packard Company)**

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

Frequency Range: 20 cycles per second to 2 megacycles per second.  
 Voltage Range: 0-0.001, 0.003, 0.01, 0.03, 0.1, 0.3, 1, 3, 10, 30, 100, 300 volts.  
 Input Impedance: 10 megohm shunted by 15 micromicrofarads on 1 volt to 300 volts ranges. 24 micromicrofarads on 0.001 volt to 0.3 volt ranges.  
 Output Circuit: Maximum 0.3 volt full scale. Internal impedance 1000 ohms.  
 Meter Scale: 3" linear. Voltage ranges related by 10 decibel steps. Decibel calibration: -12 to +2 dbm. Zero level 1 milliwatt into 600 ohms.  
 Accuracy: ±3% full scale, 20 cycles per second to 100 kilocycles per second.  
 ±5% full scale, 100 kilocycles per second to 2 megacycles per second.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, \$200.00, 1950.

**TUBE COMPLEMENT:**

1 RETMA-6AQ6, 1 RETMA-0A2, 4 RETMA-6AK5, 1 RETMA-6SQ7, 1 RETMA-6AU5GT, 1 RETMA-6X5GT.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog No. 21-A, 1952.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Voltmeter Model No. 400C	Steel	7CAC-970824	8-1/2	7-1/2	9-1/2	15

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Vacuum Tube Voltmeter Model No. 400C (Commercially Packed)	2.5	15-1/2	21	13-1/2	26
Model NO. 400C - Electronics Test Equipment -						

VACUUM TUBE VOLTMETER  
 MODEL NO. 110B  
 (Hickok Electrical Instrument Co.)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose test instrument used to measure either DC or AC voltages. Readings are registered on a single meter with five scales. For DC measurements, the meter is calibrated in volts; for AC measurements, the rectified AC or radio frequency voltage measured is the peak voltage of the AC input, but the meter scale is calibrated in rms values.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Hickok Model No. 110A Vacuum Tube Voltmeter except the "B" model has improved circuitry and a higher DC and AC voltage range. Same as TS-520/U Electronic Multimeter.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: Consists of a balanced bridge circuit which is upset by the application of a DC input voltage and causes a deflection of the meter pointer. A

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-970949		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.1		
- Electronics Test Equipment -			Model 110B

**VACUUM TUBE VOLTMETER  
MODEL NO. 110B  
(Hickok Electrical Instrument Co.)**

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

voltage divider resistor network in the input circuit extends the range of the instrument. For AC measurements, a high-frequency diode tube fitted into the probe housing converts AC and radio frequency voltages to DC voltages. The rectified DC voltage is then filtered and applied to the voltage-divider resistor network for measurement by the DC Vacuum Tube Voltmeter.

**Power Supply:** 115 volts  $\pm 10$  volts, AC, 50 to 70 cycles per second or 220 volts, AC, 50 to 70 cycles per second.

**Frequency Ranges:** 10 cycles per second to approximately 200 megacycles per second.

**Voltage Ranges:**

DC Ranges: 0 to 2.5, 10, 50, 250, 1000, 2500, 10,000 volts.

AC Ranges: 0 to 2.5, 10, 50, 250, rms volts.

**Input Impedance:**

2.5, 10, 50, 250 and 1000 volt DC ranges: 14 megohms (approximately).

2500 and 10,000 volt DC ranges: 118 megohms (approximately).

60 cycle AC voltages: above 10 megohms (approximately).

20 kilocycle AC voltages: 1 megohm (approximately).

200 kilocycle RF voltages: 100,000 ohms (approximately).

2 megacycle RF voltages: 10,000 ohms (approximately).

20 megacycle RF voltages: 1000 ohms (approximately).

**Accuracy:** 2500 and 10,000 volt ranges:  $\pm 5\%$ . All other ranges:  $\pm 3\%$ .

**MANUFACTURERS' OR CONTRACTORS' DATA:**

The Hickok Electrical Instrument Co., 10514 Dupont Avenue, Cleveland 8, Ohio;  
Approximate Cost per Unit, \$75.00.

**TUBE COMPLEMENT:**

2 JAN-6SN7GT, 1 JAN-OD3/VR-150, 1 JAN-6X5GT/G, 1 JAN-9006.

**REFERENCE DATA AND LITERATURE:**

TM 11-2654 (TO 16-45-158)(Maintenance Instructions).

Manufacturer's Operating Instructions.

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

Model 110B

- Electronics Test Equipment -



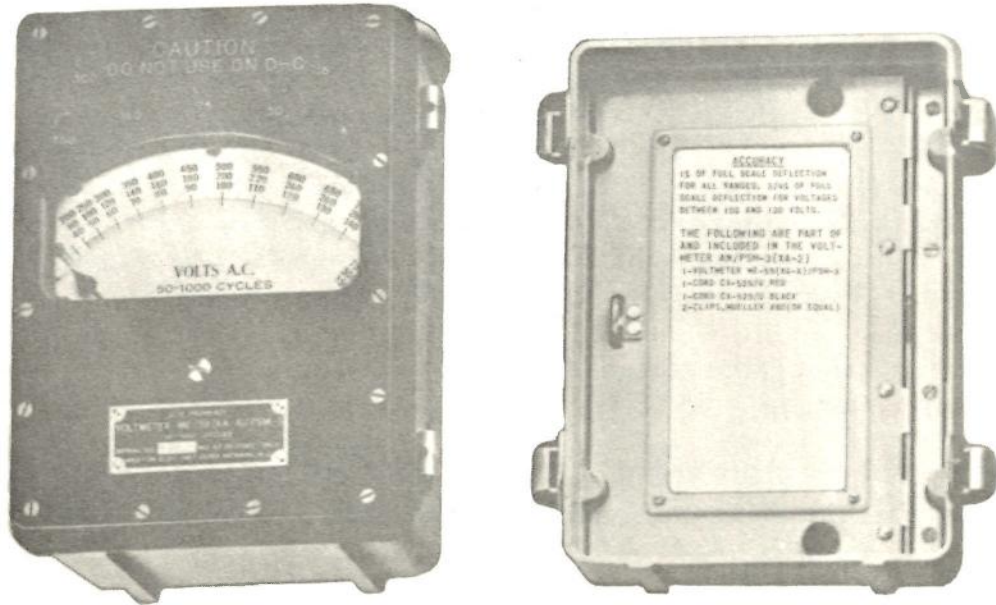
VACUUM TUBE VOLTMETER  
 MODEL NO. 110B  
 (Hickok Electrical Instrument Co.)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Voltmeter Model 110B	Metal	7CAC-970949	12-3/4	13-1/4	7-3/4	15.5
1	AC Probe & Cable Assembly			42 long			0.6
1	DC Test Lead			42 long			0.25
1	Ground Lead			42 long			0.12
1	Ground Lead			8 long			0.1
- Electronics Test Equipment - <span style="float: right;">Model 110B</span>							



## VOLTMETER AN/PSM-3



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, iron-vane voltmeter used for AC voltage measurements. It is used in organizational, field, and depot maintenance. Indications are read on a dial.

### RELATIONSHIP TO OTHER EQUIPMENT:

The AN/PSM-3 is similar to Voltmeter IS-185 except for internal wiring changes and an internal transformer. The AN/PSM-3 and the AN/PSM-3(XA-2) are similar except that the AN/PSM-3(XA-2) has a slightly different case and uses a CX-529/U cord.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** An AC voltmeter using a damped iron-vane type mechanism in conjunction with a potential transformer both mounted in a sealed case.

**Power Supply:** None

**Frequency Range:** 50 to 1000 cycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: USAF, C&N		
F.I.L.N.:	FUNCTIONAL CLASS. NO.: 1.1.2		
- Electronics Test Equipment -			AN/PSM-3

## VOLTMETER AN/PSM-3

### ELECTROMECHANICAL DESCRIPTION: (Continued)

Alternating Voltage Range: 0 to 15, 30, 75, 150, 300, 750 volts rms.

Burden: Approximately 6 volt-amp.

Impedance at 60 Cycles Per Second: 40.65 ohms on 15-volt range, 166 ohms on 30-volt range, 1000 ohms on 75-volt range, 4340 ohms on 150-volt range, 16,100 ohms on 300-volt range, 102,500 ohms on 750-volt range.

Sensitivity: 2.7 ohms per volt for 15-volt range, 5.6 ohms per volt for 30-volt range, 13.3 ohms per volt for 75-volt range, 28.9 ohms per volt for 150-volt range, 53.7 ohms per volt for 300-volt range, 136.7 ohms per volt for 750-volt range.

Accuracy:  $\pm 1\%$  of full scale deflection on all ranges.

Temperature Range: - 65°C to + 65°C operating; - 65°C to + 85°C storage.

### MANUFACTURERS' OR CONTRACTORS' DATA

Weston Electrical Instrument Corporation, Newark 5, New Jersey, Contract No. AF 33(038)13605, April 1950.

### TUBE COMPLEMENT:

NA

### REFERENCE DATA AND LITERATURE:

USAF SC Form 567

### EQUIPMENT SUPPLIED:

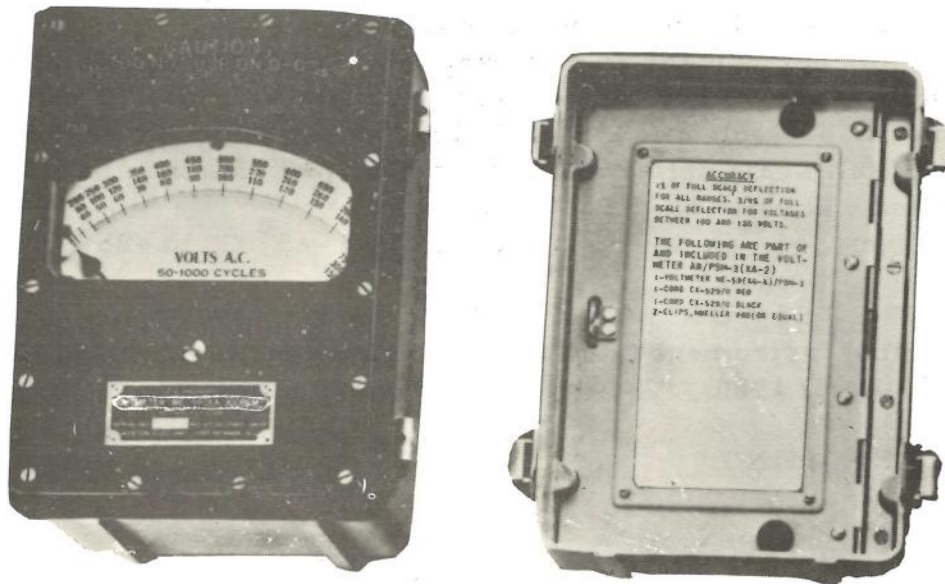
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter AN/PSM-3	aluminum		7-1/2	6	4-5/8	8 lbs.
1	Cord CX-1331A/U		7CAC-468919-7 (USAF) 3E6000-529(US A)		48		

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltmeter AN/PSM-3					

AN/PSM-3 - Electronic Test Equipment -

## VOLTMETER AN/PSM-3(XA-2)



### FUNCTIONAL DEVELOPMENT:

A small, general purpose, precision, iron vane voltmeter used for AC voltage measurements. It is used in organizational, field, and depot maintenance. Indication is on a calibrated dial in volts AC.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Voltmeter IS-185 except for internal wiring changes and an internal transformer in the AN/PSM-3(XA-2).

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** An AC voltmeter using a damped iron vane type of mechanism in conjunction with a potential transformer both mounted in a sealed case.

**Power Supply:** None required.

**Frequency Range:** 50 to 1000 cycles per second.

**Voltage Range:** 0 to 15, 30, 75, 150, 300, 750 volts, rms.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Development		
<b>STOCK NOS.</b>			
<b>PROCUREMENT INFO.:</b> USAF Exhibit MCREE-718, 27 Dec 49 & Am.1, 13 Dec 51			
<b>PROCUREMENT COG.:</b> USAF		<b>DESIGN COG.:</b> USAF, C&N	
<b>F.I.I.N.:</b>		<b>FUNCTIONAL CLASS. NO.:</b> 1.1.2	
- Electronics Test Equipment -		AN/PSM-3(XA-2)	

VOLTMETER AN/PSM-3(XA-2)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Burden: Approximately 6 volt-amperes.

Impedance at 60 Cycles Per Second: 40.65 ohms on 15 volt range, 166 ohms on 30 volt range, 1000 ohms on 75 volt range, 4340 ohms on 150 volt range, 16,100 ohms on 300 volt range, 102,500 ohms on 750 volt range.

Sensitivity: 2.7 ohms per volt for 15 volt range, 5.6 ohms per volt for 30 volt range, 13.3 ohms per volt for 75 volt range, 28.9 ohms per volt for 150 volt range, 53.7 ohms per volt for 300 volt range, 136.7 ohms per volt for 750 volt range.

Accuracy:  $\pm 1\%$  of full scale deflection on all ranges;  $\pm 0.75\%$  of full scale deflection between 100 and 130 volts on the 150 volt range.

Temperature Range:  $-65^{\circ}$  C. to  $+65^{\circ}$  C. operating;  $-65^{\circ}$  C. to  $+85^{\circ}$  C. storage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Contract No. AF 33(038)13605, April 1950.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Weston Final Engineering Report dated 5 August 1953.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
AN/PSM-3(XA-2) - Electronics Test Equipment -						

## VOLTMETER AN/PSM-3(XA-2)

### EQUIPMENT SUPPLIED:

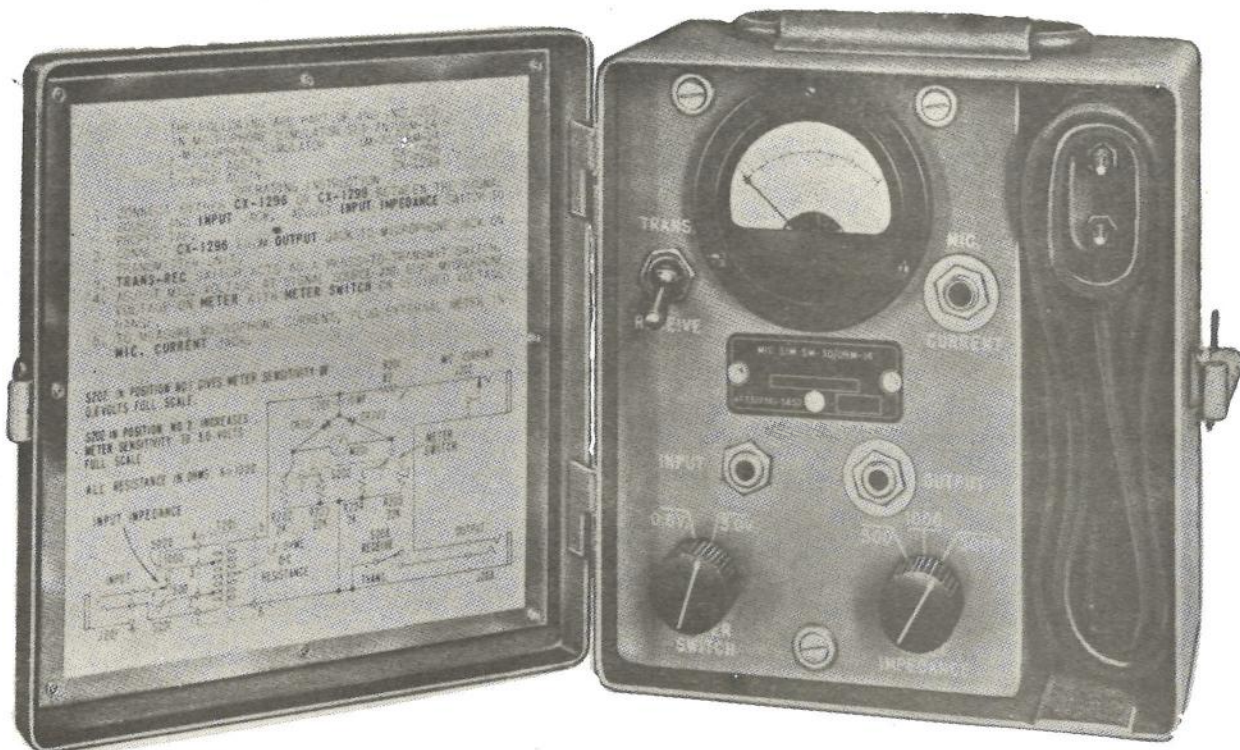
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter AN/PSM-3(XA-2) Including:	Alum- inum Alloy		7-1/2	6	4-1/2	7.8
1	Voltmeter ME-59(XA-A)/ PSM-3			7-1/2	5-1/2	3-1/2	
1	Cord CX-529/U (Red)		7CAC-468919-7  3E6000-529	48 long			
1	Cord CX-529/U (Black)		7CAC-468919-7  3E6000-529	48 long			
2	Clip, Mueller #60						





MICROPHONE SIMULATOR SET AN/URM-14  
(SIMULATOR. MICROPHONE, AN/URM-14)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose equipment which measures the level of audio voltage applied to the microphone input circuit of transmitters having carbon microphone input. In testing radio sets, the microphone simulator has application in checking the clipping level and measuring the audio gain of the modulator.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used with Receiver-Transmitter RT-173/ARC-33.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The microphone simulator is basically a voltmeter with rectifiers and multipliers to permit measurement of audio voltage. Applied audio voltage is passed through the microphone simulator's crystal rectifiers where it is converted to direct current and then conducted to the voltmeter.

**Power Supply:** None.

**Frequency Range:** 100 to 10,000 cycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-725230		2B2171-14
PROCUREMENT INFO.:	Spec. MIL-M-4673 (USAF) dated 27 April 1953.		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.2		
- Electronics Test Equipment -			AN/URM-14

**MICROPHONE SIMULATOR SET AN/URM-14  
(SIMULATOR, MICROPHONE, AN/URM-14)**

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

Basic Meter Movement: 0 to 100 microamperes.

Voltage Range: 0 to 3 volts.

Input and Output Impedances: 500, 1000, 5000 ohms.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Bendix Radio Division, Bendix Aviation Corporation, Baltimore 4, Maryland;  
USAF Contract Nos. W33-038-ac-13465, Bendix Dwg. No. C211778; AF 33(038)5652,  
Bendix Dwg. No. N200402; Approximate Cost per Unit, \$92.00; AF 33(038)14117,  
Bendix Dwg. No. N200402, dated 6/21/50; Approximate Cost per Unit, \$66.00.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

AN 16-30URM14-1 (Operating Instructions).

AN 16-30URM14-2 (Service Instructions).

AN 16-30URM14-4 (Parts Breakdown).

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Microphone Simulator Set AN/URM-14		7	7-1/16	3-13/16	
AN/URM-14 - Electronics Test Equipment -						

MICROPHONE SIMULATOR SET AN/URM-14  
(SIMULATOR, MICROPHONE, AN/URM-14)

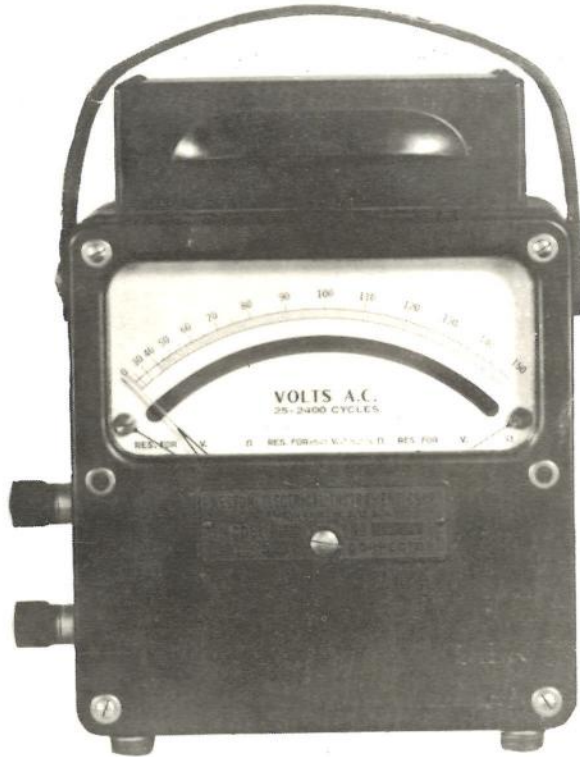
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Microphone Simulator Set AN/URM-14 Including:	Aluminum	7CAC-725230 2B2171-14	7	7-1/16	3-13/16	4.25
1	Microphone Simulator SM-30/URM-14		7CAC-725250 2C1160-30	6-1/2	4-9/16	3-5/8	2.25
1	Special Purpose Cable Assembly CX-1296/U		7CAC-170270-1362 3E6000-1296.1	60 long			0.234
1	Special Purpose Cable Assembly CX-1299/U		7CAC-170270-1358 3E6000-1299.1	60 long			0.296



VOLTMETER IS-185

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A general purpose, magnetically shielded, iron vane type, AC voltmeter. It incorporates a frequency-compensated movement which permits accurate voltage measurements on alternating voltages of non-sinusoidal waveforms.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Weston Electrical Instrument Company Model 433.

**ELECTROMECHANICAL DESCRIPTION:**

**Power Supply:** The meter consumes 4.4 watts for a 115-volt measurement at 25 to 60 cycles per second from the voltage source under test.

**Frequency Range:** 25 to 2400 cycles per second.

**Alternating Voltage Range:** 0 to 150 volts.

**Meter Resistance:** 3000 ohms

**Input Impedance:** 3000 ohms.

**Accuracy:** ±1.25% at 25° C.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Standard		
<b>STOCK NOS.</b>	7CAC-952090	ASO-R16-V-1955	3F7385
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b> USAF		<b>DESIGN COG.:</b> USAF, C&N	
<b>F.I.I.N.:</b>		<b>FUNCTIONAL CLASS. NO.:</b> 1.1.2	
- Electronics Test Equipment -			IS-185

VOLTMETER IS-185

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Company, Newark 5, New Jersey; Contract No. 981-45RA, 1/17/45; Approximate Cost per Unit, \$33.00; Contract No. 2015-45RA, 2/12/45; Approximate Cost per Unit, \$33.00; Contract No. 2114-45RA, 3/10/45; Approximate Cost per Unit, \$30.00; Contract No. 2133-45RA, 31 March 1945; Approximate Cost per Unit, \$32.00; Contract No. 273-45, 31 March 1945; Approximate Cost per Unit, \$33.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter IS-185	Phe- nolic	7CAC-952090 R16-V-1955 3F7385	7	5-3/4	3-1/2	2.5

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltmeter, IS-185, (Water Resistant Carton).	0.35	10	10	6	6

IS-185

- Electronics Test Equipment -

## VOLTMETER ME-64/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, miniature, AC voltmeter used to check small electrical components in general field and laboratory testing. The meter has a double scale calibrated in volts, AC.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Weston Model 528 Voltmeter.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The meter movement is of the movable iron vane type.

Power Supply: None required.

Frequency Range: 25 to 125 cycles per second.

Voltage Ranges: 0 to 150 and 0 to 600 volts, AC.

Input Resistance: 100,000 ohms for 0 to 600 volts; 25,000 ohms for 0 to 150 volts.

Scale Length: 2.03 inches.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.1.2
- Electronics Test Equipment -			ME-64/U

VOLTMETER ME-64/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Scale Divisions: 30.

Accuracy:  $\pm 2\%$  of scale reading.

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$32.00, November 1949.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter ME-64/U	Bakelite		3-27/32	3-5/32	2-1/8	0.7
2	Test Lead			48 long			
1	Case	Leather					

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

ME-64/U

- Electronics Test Equipment -



## VOLTMETER TS-518/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to measure AC voltages. Measurement values are indicated on a calibrated scale.

### RELATIONSHIP TO OTHER EQUIPMENT:

The TS-518/U is the military designation for the Voltmeter Weston 155.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The meter is a movable iron-vane type. The meter scale incorporates a mirror to minimize parallax error.

**Power Supply:** None

**Ranges:**

Voltage: 0 to 150 volts in increments of one volt.

Frequency: 25 to 60 cycles per second.

**Sensitivity:** 20 ohms per volt.

**Accuracy:** 0.5% of full-scale deflection.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.:		USN
F. I. I. N.:	FUNCTIONAL CLASS. NO.:		1.1.2
- Electronics Test Equipment -			TS-518/U

VOLTMETER TS-518/U

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey.

TUBE COMPLEMENT:

NA

REFERENCE DATA AND LITERATURE:

SC Form 567.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers	Overall Dimensions (inches)			Weight (Lbs.)	
				(USAF) (Navy) (Army)	H	W		D
1	Voltmeter TS-518/U	walnut			7	7-1/8	3-1/4	
1	Instruction Manual							

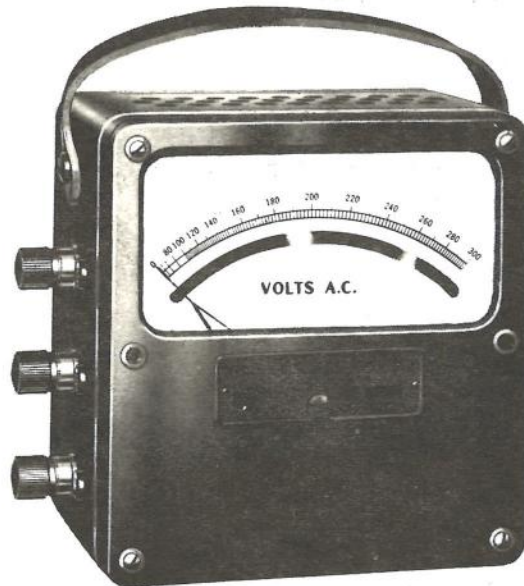
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltmeter TS-518/U					

TS-518/U

- Electronic Test Equipment -

AC VOLTMETER  
 MODEL NO. 433  
 (Weston Electrical Instrument Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose AC voltmeter used to test Interceptor Guidance Group AN/GPA-6. Indications are viewed on a meter calibrated in volts AC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Voltmeter IS-185 except for more limited frequency range.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: Magnetically shielded, iron-vane type AC voltmeter.

Power Supply: 115 volts, 60 cycles per second.

Frequency Range: 25 to 125 cycles per second.

Voltage Range: 0 to 300 volts AC.

Resistance: 22,000 ohms approximately.

Scale: 4.04 inches.

Scale Division: 150.

Accuracy: Within 0.75%.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-948550		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.1.2		
	- Electronics Test Equipment -		Model No. 433

AC VOLTMETER  
 MODEL NO. 433  
 (Weston Electrical Instrument Company)

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$57.00, February 1950.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Circular A-8-A, February 1950.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter, AC Model No. 433	Phen-olic	7CAC-948550	5	5-1/4	3-1/4	2.5

Model No. 433 - Electronics Test Equipment -

**AC VOLTMETER  
MODEL 528  
(Weston Electrical Instrument Corporation)**



**FUNCTIONAL DESCRIPTION:**

A miniature, portable, AC Voltmeter for general purpose use. Double scale is calibrated in volts AC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: Iron-vane type.

Frequency Range: 25 to 125 cycles per second.

Scale: Double Scale 2.03 inches long.

Voltage Ranges: 0 to 150 and 0 to 600 volts.

Resistance: Approximately 100,000 ohms on high scale. Approximately 25,000 ohms on low scale.

Accuracy: Within 2% of scale reading.

Scale Division: 30.

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>			
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	<b>DESIGN COG.:</b> Commercial		
<b>F.I.I.N.:</b>	<b>FUNCTIONAL CLASS. NO.:</b>		1.1.2
- Electronics Test Equipment -			Model 528

AC VOLTMETER  
MODEL 528  
(Weston Electrical Instrument Corporation)

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Voltmeter with case: Approximate Cost per Unit, \$32.00, November 1949.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Circular A-23-A dated November 1949.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	AC Voltmeter Model 528	Bake-lite		3-5/32	3-27/32	2-1/8	0.7
2	Test Lead			48 long			
1	Case	Leather					

AC VOLTMETER  
 MODEL 904  
 (Weston Electrical Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose nonelectronic instrument used to measure AC voltages. The meter scale is 5-1/2" long with a mirror back. A knife edge pointer is used to eliminate parallax errors.

**RELATIONSHIP TO OTHER EQUIPMENT:**

The AC Voltmeter Weston 904 can be used to measure voltages above those indicated on the scale by using external multipliers, or by using a Potential Transformer Weston 311.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The voltmeter contains a meter movement of the moving iron vane type. The meter movement is shielded from external magnetic fields. Three binding posts are mounted on top of the case for connecting to the test leads.

Accuracy:  $\pm 0.5\%$  of full scale.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1.1.2		
- Electronics Test Equipment -			Model 904

**AC VOLTMETER MODEL 904**  
(Weston Electrical Instrument Corporation)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

Power Supply: None

Alternating Voltage Ranges: 0 to 75 volts, 0 to 150 volts. 150 scale divisions.

Meter Resistance: 6800 ohms (approx.)

Limiting Operating Conditions: The voltmeter is standardized at ambient temperature of 25°C. A change of 10° causes a change of reading which is less than 1/4 of the rated accuracy.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Weston Electrical Instrument Corporation, Newark 5, New Jersey, Approximate unit cost, \$109.75.

**TUBE COMPLEMENT:**

NA

**REFERENCE DATA AND LITERATURE:**

Weston Circulars A-22-E, A-22-G, and E-7-A.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	AC Voltmeter Weston 904	bake-lite		7-1/2	7-1/4	3-5/8	4-3/4

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	AC Voltmeter Model 904 Weston Electrical Instrument Corporation					
Model 904 - Electronic Test Equipment -						



## VOLTMETER AN/URM-45

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multifilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, ruggedized, DC voltmeter, calibrated in volts and millivolts. The basic movement is shielded against outside magnetic fields. The meter is changed from one range to another by choosing the appropriate binding post for connection of the positive test lead. It is possible to use this instrument as an ammeter by connecting standard aircraft 50 millivolt shunts across the appropriate terminals.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Westinghouse Type PX-14, with the specified ranges.

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: None required.

Voltage Ranges: 0 to 50 millivolts, 0 to 15 volts, 0 to 30 volts, DC.

Scale: Black on White, Hand Calibrated, 75 scale divisions.

Sensitivity: 1000 ohms per volt.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.	7CAC-979564		
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuAer	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.1.3	
- Electronics Test Equipment -			AN/URM-45

VOLTMETER AN/URM-45

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy:

0 to 50 millivolt range,  $\pm 2\%$  of reading.

0 to 15 volt range,  $\pm 0.5\%$  from 13.5 to 14.5 volts.  $\pm 1\%$  from 12 volts to full scale.  $\pm 2.5\%$  at all other points.

0 to 30 volt range,  $\pm 0.5\%$  from 27 to 29 volts.  $\pm 1\%$  from 24 volts to full scale.  $\pm 2.5\%$  at all other points.

MANUFACTURERS' OR CONTRACTORS' DATA:

Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter AN/URM-45 Including:	Plastic	7CAC-979564	1-3/4	5-1/4	4-1/4	2.5
2	Test Lead			50 long			
1	Carrying Case with strap	Leather					

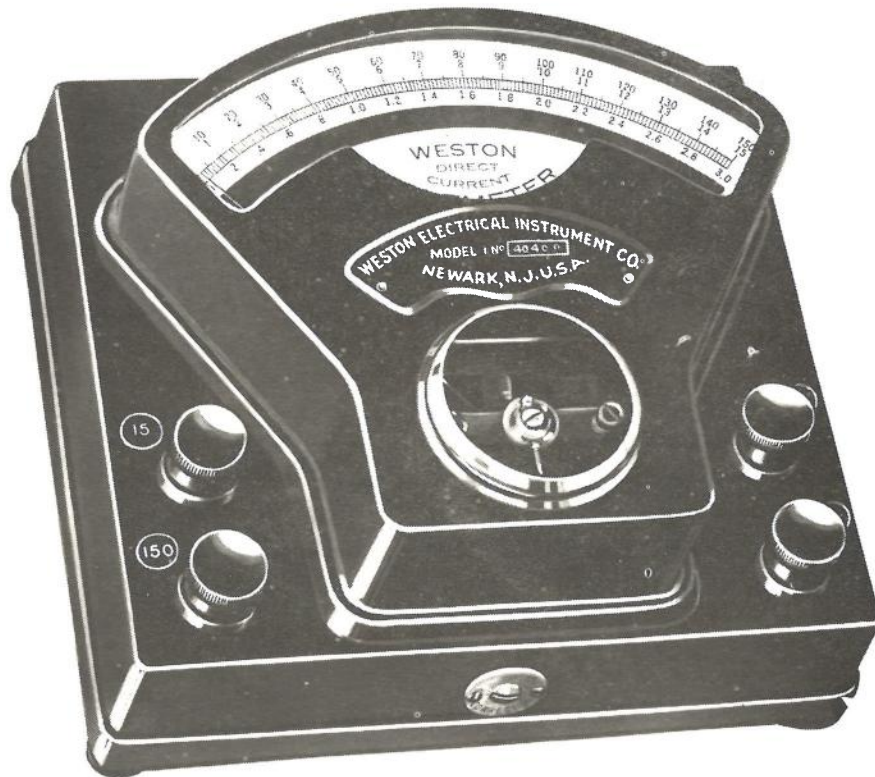
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

AN/URM-45

- Electronics Test Equipment -

## VOLTMETER TS-443/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose meter, used to make DC voltage measurements within its ranges. It contains hand-calibrated mirror scales with 150 scale divisions. The instrument is equipped with a leather carrying case. The front panel contains the calibrated dial and four test lead screw type connectors. Test leads are supplied and carried in the instrument case. A screwdriver zero adjustment facilitates pointer correction when the meter is not connected to a circuit.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Weston Model 1 DC Voltmeter.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The movement is a permanent magnet moving coil type. Resistances in series make possible the multiple range feature.

**Power Supply:** None required.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Standard		
<b>STOCK NOS.</b>			3F8150-52
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	Army	<b>DESIGN COG.:</b>	Army, CSL
<b>F.I.I.N.:</b>		<b>FUNCTIONAL CLASS. NO.:</b>	1.1.3
	- Electronics Test Equipment -		TS-443/U

VOLTMETER TS-443/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Voltage Measuring Ranges: 0 to 3/15/150 volts, DC.

Current Drain at Full Scale: 10 milliamperes.

Sensitivity: 100 ohms per volt.

Scale Length: 5-1/8 inches.

Accuracy: ±0.25% of indicated voltage at full scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Company, Newark 5, New Jersey; Approximate Cost per Unit, \$124.31.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Instruction Book.

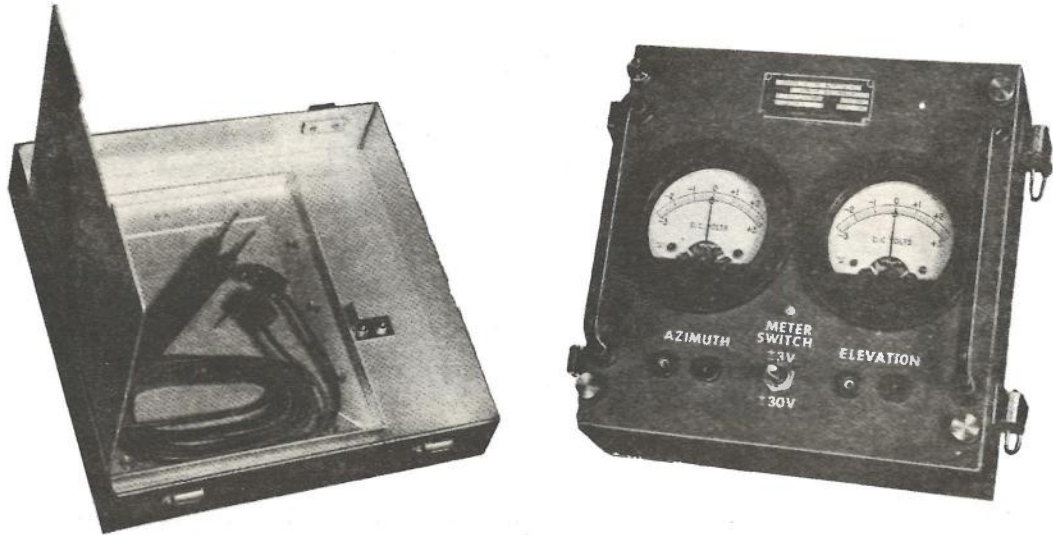
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter TS-443/U Including:	Bake-lite	3F8150-52	4-3/4	11	9-5/16	10.0
1	Leather Case						1.8
1	Set of Test Leads						0.2
						Total:	12.0

SERVO TEST METER  
Part No. (PL)7705055G1  
(General Electric Company)



**FUNCTIONAL DESCRIPTION:**

A portable test meter used to measure azimuth and elevation circuit voltages of radar antenna control amplifier units. By the use of two similar DC voltmeters it is possible to measure simultaneously both the azimuth and elevation circuit voltage.

**RELATIONSHIP TO OTHER EQUIPMENT:**

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** Connections with the unit under test are made by means of test leads. Voltages from the azimuth and elevation circuit outputs are indicated on two voltmeters. With the three-position meter switch on the front panel of the meter set on the three-volt range the current goes directly to the voltmeters. By placing the meter switch on the thirty-volt range the current is passed through resistors in series with the voltmeter coils. The indicating needles of the voltmeters are normally at rest at 0 volt in the center of the scale. By swinging to

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>	7CAC-530034		
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>		<b>DESIGN COG.:</b> Commercial	
<b>F.I.I.N.:</b>		<b>FUNCTIONAL CLASS. NO.:</b> 1.1.3	
- Electronics Test Equipment - G. E. (PL)7705055G1			

**DC VOLTMETER MODEL S**  
(Sensitive Research Instrument Company)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

Power Supply: None  
 Direct Voltage Range: 0 to 10 volts.  
 Accuracy: 0.5 of 1%.  
 Sensitivity: 50,000 ohms per volt  
 Period: 3 seconds  
 Reference Temperature: 25°C  
 Temperature Coefficient: ±0.02% per °C

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Sensitive Research Instrument Corporation, 310-316 Main Street, New Rochelle, New York, approximate unit cost, \$195.00.

**TUBE COMPLEMENT:**

NA

**REFERENCE DATA AND LITERATURE:**

Manufacturer's bulletin.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Voltmeter Sensitive Research Model S	wood		8	7-1/2	4-1/2	7

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	DC Voltmeter Model S Sensitive Research Corporation					
Model S - Electronic Test Equipment -						

DC VOLTMETER  
 MODEL 377  
 (Simpson Electric Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, self-contained instrument used to measure DC voltage. The instrument is used to measure A and B dry-battery voltage, and grid, filament, and plate voltages in battery-operated radio receivers. Measurements are indicated on a direct-reading calibrated scale.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: None

Direct Voltage Range: 0 to 1, 2.5, 5, 10, 25, 50, 100, 250, 500, and 1000 volts.

Sensitivity: 1000 ohms per volt

Accuracy:  $\pm 3\%$

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.:		Commercial
F.I.L.N.:	FUNCTIONAL CLASS. NO.:		1.1.3
- Electronics Test Equipment -			Model 377

DC VOLTMETER MODEL 377  
(Simpson Electric Company)

MANUFACTURERS' OR CONTRACTORS' DATA:

Simpson Electric Company, 5200-5218 West Kenzie Street, Chicago 44, Illinois, approximate unit cost, \$19.95.

TUBE COMPLEMENT:

NA

REFERENCE DATA AND LITERATURE:

Manufacturer's catalog.

EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Voltmeter Simpson 377	bake-lite		3	5-7/8	2-1/2	1-1/4

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	DC Voltmeter Simpson 377					3
Model 377 - Electronic Test Equipment -						



DC VOLTMETER  
MODEL 45  
(Weston Electrical Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used to measure direct voltages. It can also be used as an indicating instrument for electrical tachometers for speed measurements in field and laboratory testing and as a "master" instrument in checking other speed indicators. The meter has a double scale calibrated in volts DC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used in testing Radio Sets AN/CPN-4 and 18 and Radar Set AN/FPN-16.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** A permanent magnet moving coil type direct current voltmeter which is shielded from external magnetic effects.

**Power Supply:** None required.

**Voltage Range:** 0 to 150 volts and 0 to 300 volts.

**Current for full scale:** 2 milliamperes.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>	7CAC-964700		
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	<b>DESIGN COG.:</b> Commercial		
<b>F.I.I.N.:</b>	<b>FUNCTIONAL CLASS. NO.:</b>		1.1.3
- Electronics Test Equipment -			Model 45

**DC VOLTMETER  
MODEL 45**

(Weston Electrical Instrument Corporation)

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

Sensitivity: 1000 ohms per volt.

Accuracy:  $\pm 0.5\%$  of full scale.

Scale Length: 5.18 inches.

Scale Divisions: 150.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$105.00.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Circular D-3-E "Weston, DC Tachometers."

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Voltmeter Model 45	Wood	7CAC-964700	8	8	4-3/4	9.9

Model 45

- Electronics Test Equipment -

VOLTAGE POINT TEST SET AN/URM-12  
(VOLTMETER AN/URM-12)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



FUNCTIONAL DESCRIPTION:

A portable, special purpose voltmeter used to check voltages on each of the sub-chassis of Radio Sets AN/ARC-33 and AN/FRC-18. Each subchassis has a socket suitable for connection to the 11-pin octal plug and cable permanently attached to the test set.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The meter is housed in a metal case with an 11 position selector switch located on the front panel. Meter is a sealed 0 to 100 microampere basic movement. Input to meter is by a permanently attached cable terminated in an 11-pin octal plug which is suitable for connection to the test socket located on each chassis of the radio set under test.

Two RF probes containing a crystal rectifier, a RF filter condenser and two

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		Not Classified
STOCK NOS.	7CAC-801319-2665		3F3945-12
PROCUREMENT INFO.: USAF Spec. MIL-T-954			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.1.5	
- Electronics Test Equipment -			AN/URM-12

VOLTAGE POINT TEST SET AN/URM-12  
(VOLTMETER AN/URM-12)

ELECTROMECHANICAL DESCRIPTION: (Continued)

resistors, furnished with the test set, can be inserted in the tube sockets of the RF monitor chassis to permit alignment of the transformers located on the monitor chassis.

Power Supply: None Required.

Voltage Range: 0.3 to 400 volts AC or DC.

Basic Movement: 0 to 100 microamperes.

MANUFACTURERS' OR CONTRACTORS' DATA:

Bendix Aviation Corporation, Baltimore 4, Maryland; Contract W-33-038-ac-13465, AF 33(038)-5652; Approximate Cost per Unit, \$165.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

- AN 16-30URM12-1 (Operating Instructions).
- AN 16-30URM12-2 (Service Instructions).
- AN 16-30URM12-3 (Overhaul Instructions).
- AN 16-30URM12-4 (Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
AN/URM-12 - Electronics Test Equipment -						

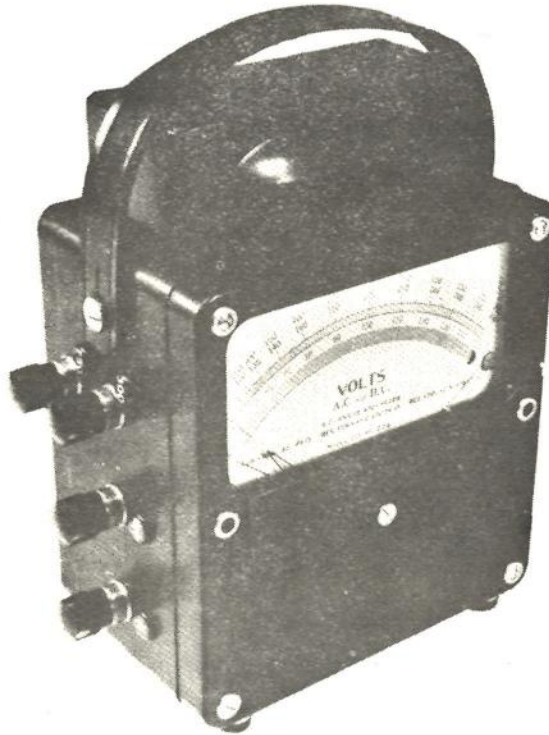
VOLTAGE POINT TEST SET AN/URM-12  
(VOLTMETER AN/URM-12)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltage Point Test Set AN/URM-12		7CAC-80319-2665 3F3945-12	6.875	8.625	3.625	5.675
1	Voltmeter ME-36/URM-12	Alum- inum	7CAC-530834 3F8400-1	6.687	4.062	2.75	1.750
1	RF Probe MX-1016/URM-12		7CBR-L200392-1 3F3703-2	36 long			0.312
1	RF Probe MX-1017/URM-12		7CBR-L200392-2 3F3703-2.1	36 long			0.312
1	Voltmeter Plug						
- Electronics Test Equipment - AN/URM-12							



VOLTMETER TS-340/U



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, and self-contained, electrodynamic-type voltmeter used to measure both alternating and direct voltage. The meter is calibrated in volts AC and DC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Weston Model 455.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: None required.

Frequency Range: 25 to 400 cycles per second.

Meter Ranges:

Alternating Voltage: 0 to 150, 300, and 750 volts.

Direct Voltage: 0 to 150, 300, and 750 volts.

Scale Length: 4.04 inches.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.			3F4325-340
PROCUREMENT INFO.: Signal Corps Spec. No. 71-2202A			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.1.5	
- Electronics Test Equipment -			TS-340/U

VOLTMETER TS-340/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Scale Divisions: 150.

Accuracy:  $\pm 0.5\%$ .

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$133.00, May 1948.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltmeter TS-340/U	1.18				8

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter TS-340/U (Complete)	Bake-lite	3F4325-340	6-5/8	5-3/4	3-1/2	3.62

TS-340/U - Electronics Test Equipment -



AC, DC VOLTMETER  
MODEL 518  
(Rawson Electrical Instrument Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used to measure AC and DC voltages where low-current drain is required. Indications are true rms values, regardless of waveform or frequency. The instrument is used at laboratory and depot levels. Measurements are indicated on a 5.5-inch hand-calibrated scale.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The instrument is of the electrostatic type, consisting basically of a fixed element, a moving element, and a clamping system. The meter-moving system has an air-damping vane to prevent indicator oscillation after a sudden change in deflection. The pivots of the moving system are sharpened and polished under a microscope and move in polished jewels. The jewels are mounted with cushion springs for protection from shock. The pivots are so arranged that both are vertical and pointing downward. This

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1.1.5		
- Electronics Test Equipment -		Model 518	

AC, DC VOLTMETER MODEL 518  
(Rawson Electrical Instrument Company)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

method presents an accurately defined axis of rotation and makes possible a mechanical clamp which lifts the weight from the pivots, and clamps the moving system for protection when the meter is not in use. All moving-meter parts are at ground potential.

Power Supply: None

Range: 0 to 500 volts AC or DC.

Insulation Resistance: Greater than 1,000,000 megohms.

Accuracy: Not less than  $\pm 1\%$ .

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Rawson Electrical Instrument Company, 110 Potter Street, Cambridge 42, Massachusetts, approximate unit cost, \$165.00.

**TUBE COMPLEMENT:**

NI

**REFERENCE DATA AND LITERATURE:**

Manufacturer's catalog.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	AC, DC Voltmeter Rawson 518	walnut		9-1/2	9	6	

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	AC, DC Voltmeter Rawson 518					
Model 518 - Electronic Test Equipment -						

**ELECTROSTATIC VOLTMETER  
MODEL ESD  
(Sensitive Research Instrument Corporation)**



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, test instrument used to measure voltages on alternating, radio frequency, and direct current circuits. The meter is calibrated in rms volts.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used to test Decade Scaler, Mark 13, Model 10.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** Two pivot method of construction. Contains a stator and rotor with meter deflection controlled by the attraction and repulsion between two electrified surfaces.

**Power Supply:** None.

**Frequency Range:** All frequencies.

**Voltage Range:** 400 to 2000 volts, DC or AC. Also available in ranges of 120 volts to 5000 volts full scale.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>			
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	<b>DESIGN COG.:</b> Commercial		
<b>F.I.I.N.:</b>	<b>FUNCTIONAL CLASS. NO.:</b>		1.1.5
- Electronics Test Equipment -			Model ESD

ELECTROSTATIC VOLTMETER  
MODEL ESD  
(Sensitive Research Instrument Corporation)

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

Scale Length: 5 inches.

Insulation Resistance: Better than  $1 \times 10^{15}$  ohms.

Accuracy:  $\pm 1\%$ .

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Sensitive Research Instrument Corporation, 9-11 Elm Avenue, Mt. Vernon, New York; Approximate Cost per Unit, \$145.00, 15 August 1952.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog No. 61 "Electrical Measuring Instruments."

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

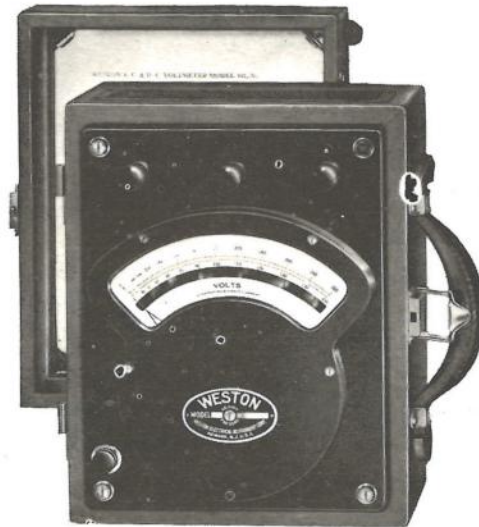
**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Electrostatic Voltmeter Model ESD	Wood		8	7-1/2	6	

Model ESD

- Electronics Test Equipment -

VOLTMETER  
MODEL 341  
(Weston Electrical Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, self-contained instrument used to measure both alternating and direct voltage and to measure rms voltage when used on common waveforms. The meter has a double scale calibrated in volts AC and DC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used in testing AN/APS-45 Radar Set.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** This instrument is an electro-dynamometer type shielded from external magnetic effects.

**Power Supply:** None required.

**Frequency Range:** 25 to 125 cycles per second.

**Voltage Ranges:** 0 to 15 volts and 0 to 30 volts.

**Sensitivity:** Approximately 150 milliamperes.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>	7CAC-952030		
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	<b>DESIGN COG.:</b> Commercial		
<b>F.I.I.N.:</b>	<b>FUNCTIONAL CLASS. NO.:</b>		1.1.5
- Electronics Test Equipment -			Weston 341

**VOLTMETER  
MODEL 341  
(Weston Electrical Instrument Corporation)**

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

Resistance: Approximately 100 ohms for 0 to 15 volts; approximately 200 ohms for 0 to 30 volts.

Accuracy:  $\pm 0.25\%$  of full scale.

Scale Length: 5.25 inches.

Scale Divisions: 150.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$210.00, May 1950.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Circular A-28-A "Weston Portable Standards."

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	AC Voltmeter Model 341	Wood	7CAC-952030	8-1/2	10-3/8	5-7/8	11

Weston 341

- Electronics Test Equipment -

## 1.2 CURRENT MEASURING EQUIPMENT





This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multifilithed in U.S.A.

## AMMETER IS-70



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, panel type, flush mounted, radio frequency instrument, designed to measure alternating current in radio and radar antenna systems and transmitter circuits. Indication is on a calibrated dial in milliamperes.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Weston Model 425 and Westinghouse Style DY-17290-10 Type NT-35.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** This meter uses a thermocouple with a D'Arsonval type movement connected across it for measuring radio frequency energy.

**Power Supply:** None required.

**Current Range:** 0 to 500 milliamperes (non-magnetic).

**Power Rating:** 35 watts, maximum.

**Torque Rating:** 0.069 millimetergrams.

**Damping Factor:** 2.5.

**Response Time:** 2.5 seconds.

**Resistance:** 1.2 ohms.

**Insulation Rating:** 750 volts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Not Classified		
STOCK NOS.	3300-325486190	N17-M-18170-8221	3F950-35
PROCUREM'T INFO.:	Army Spec. ASA-C39.2, 1943		
PROCUREM'T COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.2.2		
	- Electronics Test Equipment -		IS-70

AMMETER IS-70

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy:  $\pm 2\%$  of indicated current over the entire range.

Temperature Range:  $-55^{\circ}\text{C}$ . to  $+85^{\circ}\text{C}$ .

Scale Length: 2.4 inches.

MANUFACTURERS' OR CONTRACTORS' DATA:

Westinghouse Electric Corporation, 2519 Wilkins Avenue, Baltimore 3, Maryland.

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$30.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

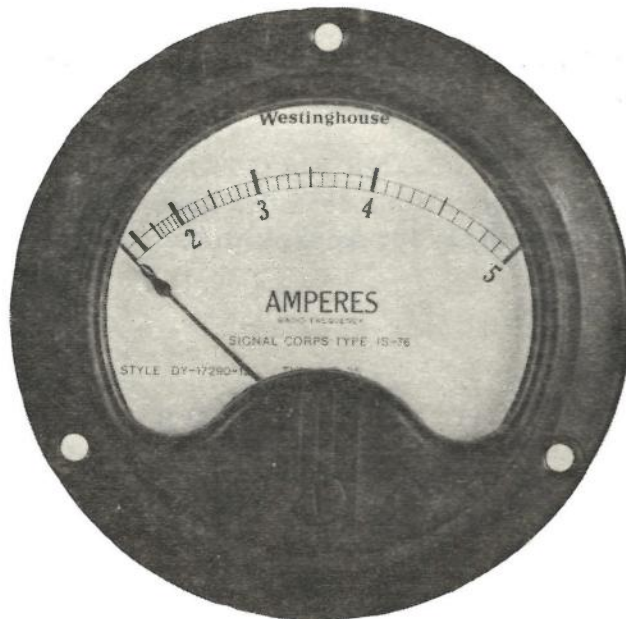
Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter IS-70	Mold-arta	3300-325486190 N17-M-18170-8221 3F950-35	2-2/5	3-1/2 dia.		0.94

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Ammeter IS-70 (Shelf Package - Waterproof Carton)	0.058	4	5	5	1.2
IS-70 - Electronics Test Equipment -						

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multifilth in U.S.A.

## AMMETER IS-76



### FUNCTIONAL DESCRIPTION:

A general purpose, panel type, flush mounted, AC ammeter used to measure RF currents in antenna systems, transmitter circuits and similar devices. The dial face is calibrated directly in amperes.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Westinghouse Style DY-17290-12 Type NT 35.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The basic meter movement is a D'Arsonval type used in conjunction with a thermocouple.

**Power Supply:** None required.

**Frequency Range:** 0 to 30 megacycles per second.

**Current Range:** 0 to 5 amperes.

**Insulation Voltage Rating:** 750 volts.

**Torque:** 0.077 millimetergrams.

**Damping Factor:** 2.5.

**Response Time:** 2.5 seconds.

**Temperature Range:** -30° C. to +50° C.

**Maximum Relative Humidity:** 95%.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			Not Classified
STOCK NOS.	3300-325634000		3F1005-25
PROCUREMENT INFO.:	Navy Spec. 17-I-12, Dwg. No. : RL-D-6162		
PROCUREMENT COG.:	USAF	DESIGN COG. : USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO. : 1.2.2		
	- Electronics Test Equipment -		IS-76

AMMETER IS-76

ELECTROMECHANICAL DESCRIPTION: (Continued)  
Scale Length: 2.4 inches.

MANUFACTURERS' OR CONTRACTORS' DATA:

Westinghouse Electric Corporation, 2519 Wilkins Avenue, Baltimore, Maryland;  
Contract No. 11744-43, dated 3/1/43; Approximate Cost per Unit, \$11.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter IS-76	Phenolic	3300-325634000 3F1005-25	3-1/2		1-3/5 dia.	0.633

SHIPPING DATA:

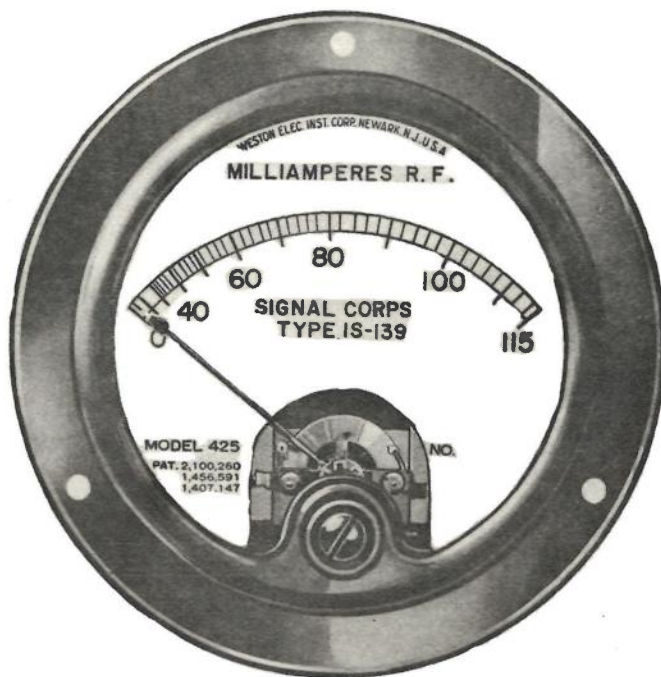
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

IS-76

- Electronics Test Equipment -

AMMETER IS-139

This research was supported in whole or in part by the United States Air Force under Contract AF 33(038)12897, monitored by Wright Air Development Center, Air Research and Development Command - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, flush mounted, radio frequency, thermomilliammeter designed to measure alternating current. The dial is calibrated directly in milliamperes with a square law scale. The instrument is calibrated for non-magnetic panel mounting.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Weston Model 425 Thermomilliammeter.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** An element sensitive to temperature changes is heated by the radio frequency energy. This sets up a difference of potential from one end of the element to the other. A direct current D'Arsonval movement registers this difference of potential.

**Power Supply:** None.

**Frequency Range:** 20 kilocycles per second to 65 megacycles per second.

**Current Indicating Range:** 0 to 115 milliamperes.

**Power Drain:** 0.15 to 0.4 watts per ampere.

**Internal Resistance:** 5.2 ohms.

**Accuracy:** ±2% of indicated reading at full-scale.

**Scale Length:** 2.36 inches.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Not Classified		Standard
STOCK NOS.	3300-325366000		3F911
PROCUREMENT INFO.:	Army Spec. 71-515-B(SigC)		
PROCUREMENT COG.:	USAF	DESIGN COG.:USAF, Rome	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.2.2		
- Electronics Test Equipment -			IS-139

AMMETER IS-139

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Army Order No. 14741-PHILA-43; Approximate Cost per Unit, \$24.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-40IE9-5 (TM 11-5026) (Instruction Book for IE-9-C).

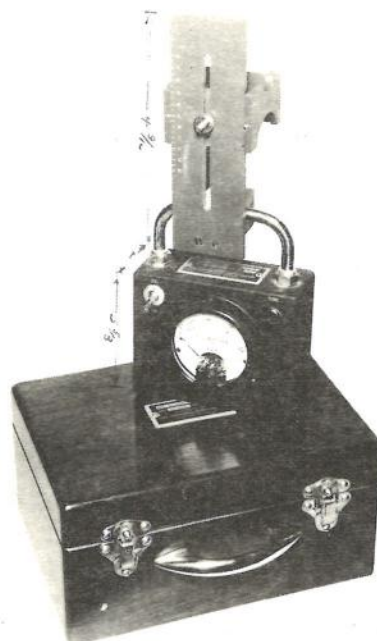
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter IS-139	Bake-lite	3300-325366000 3F911	2-21/50	3-1/2 dia.		0.5

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

RF AMMETER ME-32/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose, RF ammeter for measuring alternating current.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Arcturus type CA-1024.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The basic meter movement is a D'Arsonval type used in conjunction with a thermocouple.

Power Supply: None required.

Current Range: 0 to 120 milliamperes.

Accuracy:  $\pm 2\%$ .

MANUFACTURERS' OR CONTRACTORS' DATA:

Arcturus Manufacturing Corporation, Venice, California; Navy Order NObsr-44520.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Tentative Standard		
STOCK NOS.		F17-M-18128-7451	
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USN	DESIGN COG.:	USN, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.2.2
- Electronics Test Equipment -			ME-32/U

RF AMMETER ME-32/U

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Ammeter ME-32/U		F17-M-18128-7451	4	5	2	
1	Mounting Bracket						
1	Carrying Case						

ME-32/U

- Electronics Test Equipment -



AC CLAMP AMMETER  
 MODEL NO. 633, TYPE A1 with CASE  
 (Weston Electrical Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, test instrument that permits the measurement of alternating current without breaking the circuit. Measurements can be made on both insulated and non-insulated conductors up to 2" in diameter. The dial is calibrated in amperes AC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used to test Radar Sets AN/CPS-5 and AN/CPS-6B.

Similar to Multimeter ME-67/U except the 633 is not provided with voltage feature or equipped with an adjustable pointer stop. Type A1 can be supplied with a pointer stop at slight additional cost if ordered. Type VA1 incorporates voltage features and is also available with an adjustable pointer stop.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: None.

Frequency: 50 to 70 cycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-028985		
PROCUREMENT INFO.:			
PROCUREMENT COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.2.2	
- Electronics Test Equipment - Model No. 633 Type A1			

AC CLAMP AMMETER  
 MODEL NO. 633, TYPE A1 with CASE  
 (Weston Electrical Instrument Corporation)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

Scale Ranges: 0 to 10, 25, 50, 100, 250, 500 amperes.

Scale Length: 2.36 inches.

Voltage Breakdown Test: 3700 volts AC.

Accuracy: Within 3%.

Accuracy Variation with Temperature: Less than 1% from 0° to 43° C.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$113.50, December 1949.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Handbook Circular A-13-B, September 1947.

Manufacturer's Handbook Circular A-16-B, October 1949.

TO 16-45-49 (Maintenance Instructions).

**SHIPPING DATA:**

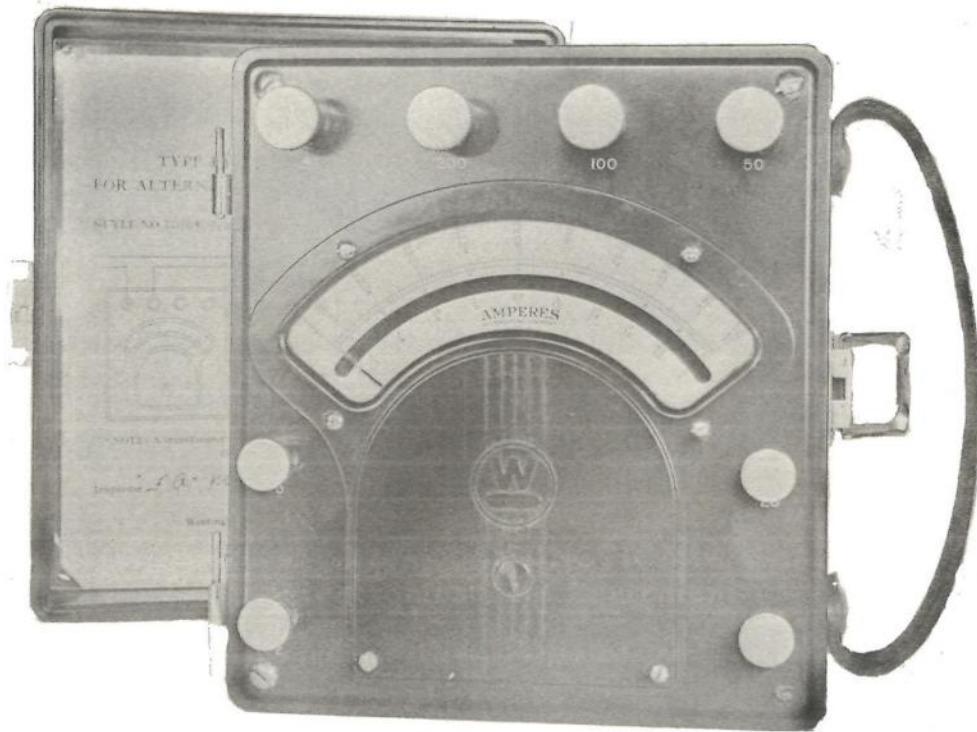
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter AC Clamp Model No. 633 Type A1	Bake-lite	7CAC-028985	13-5/8	4-3/8	2-1/2	3.75
1	Carrying Case	Leather		14-1/2	5-1/2	3-5/8	2.25

Model No. 633 Type A1 - Electronics Test Equipment -

## AMMETER ME-65/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose ammeter used for measuring alternating current. The instrument is used to make measurements under field conditions, in depots, and in laboratories. Indications appear on a uniformly divided scale with a mirror strip for quick reading and accuracy.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Westinghouse Model PA-5 Ammeter.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The meter movement is of the movable iron vane type.

Power Supply: None required.

Frequency Range: 20 to 135 cycles per second.

Current Ranges: 0 to 2, 5, 10, 20, 50, 100, and 200 amperes, AC.

Accuracy:  $\pm 1\%$  between 15° C. and 35° C.

Scale Length: 5 inches.

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>			
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b> Army		<b>DESIGN COG.:</b> Army, SSL	
<b>F.I.I.N.:</b>		<b>FUNCTIONAL CLASS. NO.:</b> 1.2.2.	
<b>- Electronics Test Equipment -</b>			<b>ME-65/U</b>

AMMETER ME-65/U

MANUFACTURERS' OR CONTRACTORS' DATA:

Westinghouse Electric Corporation, Meter Division, Newark, New Jersey.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter ME-65/U	Mol- darta		4	8-1/16	7-1/4	6.25

SHIPPING DATA:

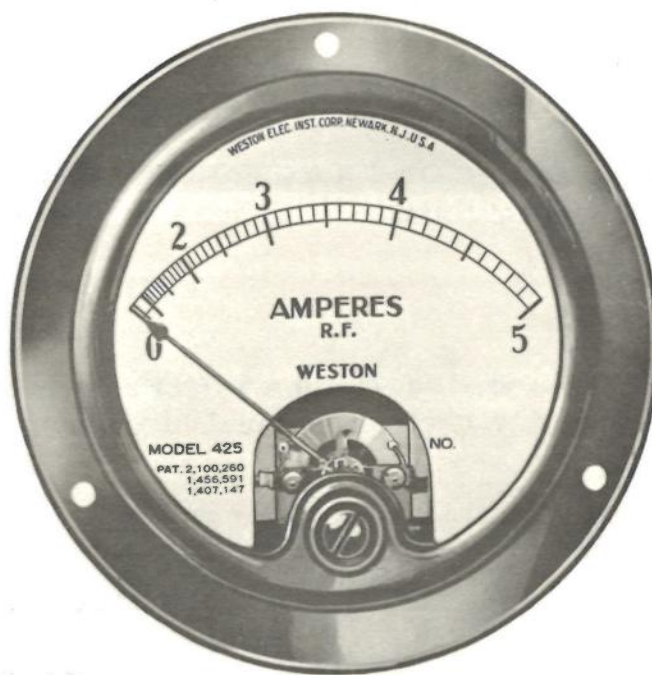
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

ME-65/U

- Electronics Test Equipment -

**THERMO-MILLIAMMETER  
MODEL 425  
(Weston Electrical Instrument Company)**

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, flush-mounted, thermo-milliammeter, designed to measure direct and radio frequency currents. The instrument is calibrated for non-magnetic panel mounting. The dial is calibrated directly in milliamperes with a square law scale.

**RELATIONSHIP TO OTHER EQUIPMENT:**

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The basic meter movement is a D'Arsonval type used in conjunction with a vacuum thermocouple.

**Power Supply:** None.

**Frequency Range:** 0 to 65 megacycles per second.

**Current Range:** 0 to 20 milliamperes.

**Resistance:** 22 ohms.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>			
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>		<b>DESIGN COG.:</b> Commercial	
<b>F.I.I.N.:</b>		<b>FUNCTIONAL CLASS NO.:</b> 1.2.2	
- Electronics Test Equipment -			Weston 425

THERMO-MILLIAMMETER  
MODEL 425  
(Weston Electrical Instrument Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy:  $\pm 2\%$  of full scale.

Scale Length: 2.36 inches.

Scale Divisions: 40.

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturers' Circular A-7-C "Weston Panel Instruments."

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Thermo-Milli- ammeter Weston 425	Bake- lite		3-1/2 dia.		1-3/4	0.5

SHIPPING DATA:

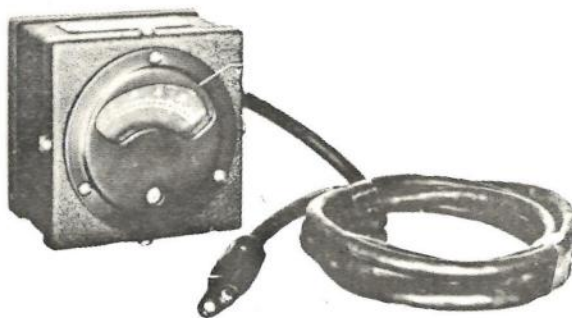
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

Weston 425

- Electronics Test Equipment -

TEST SET I-139-A  
(AMMETER I-139-A)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, direct current milliammeter for use with radio and radar equipment. It is designed to check low range direct current or voltage, but may be used to measure radio frequency output of ECM equipments when used with Pickup Assembly TS-131/AP.

All indications appear on a 2-1/2 inch meter face.

**RELATIONSHIP TO OTHER EQUIPMENT:**

I-139-A is similar to TS-60/U.

Similar to Weston Type 501 milliammeter with special Radio Frequency Jack UG-13/U.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: None required.

Meter Range: 0 to 1 milliampere direct current.

Meter Resistance: Internal, 26 ohms. External, 49 ohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard	Limited Standard	Standard
STOCK NOS.	7CAC-028680	F16-Q-303315-200	3F4139A
PROCUREMENT INFO.:	USAF Dwg. No. 51C13019, Spec. MIL-M-7911		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.2.3		
- Electronics Test Equipment -			I-139-A

TEST SET I-139-A  
(AMMETER I-139-A)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy: Approximately  $\pm 3\%$ .

Temperature Range:  $-20^{\circ}$  F. to  $122^{\circ}$  F.

MANUFACTURERS' OR CONTRACTORS' DATA:

Rauland Corporation, 4245 North Knox Avenue, Chicago, Illinois; Contract No. 12014-43; 10/27/43; Approximate Cost per Unit, \$11.00.

Hudson American Company, 25 West 43rd Street, New York, New York; Contract No. 359-45-SE; 8/28/44; Approximate Cost per Unit, \$11.00.

Argus, Inc., 405 South 4th Street, Ann Arbor, Michigan; Contract No. 205-45-SE; 8/5/44; Approximate Cost per Unit, \$11.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-10-111 (Operation and Maintenance Instructions for IE-19-A).

TO 16-55-93 (Spare Parts List).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-139-A (Complete)	Metal	7CAC-028680 F16-Q-303315-200 3F4139A	4	3	4	1.1

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, I-139-A (Wooden Box).	0.16	8	7	5	3

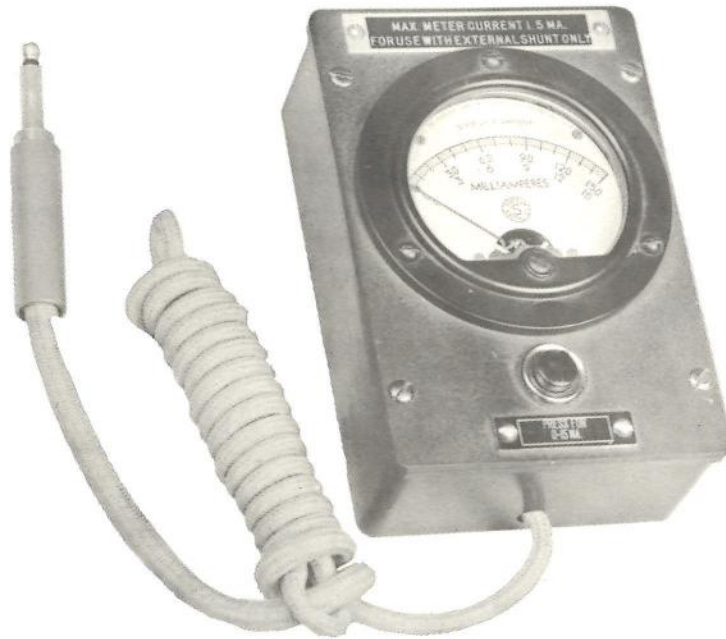
I-139-A

- Electronics Test Equipment -



**TEST SET I-206-A  
(AMMETER I-206-A)**

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multifilthed in U. S. A.



**FUNCTIONAL DESCRIPTION:**

A portable, special purpose, self-contained, dual-range direct current milliammeter used to indicate plate and grid current values of Radio Transmitting Set AN/AXT-2. It cannot be used as an ammeter with any other equipment because of ammeter shunts provided in the prime equipment.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Navy Type CRV-60058.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The test set consists of a 1.5 milliampere direct current meter with an internal resistance of 90 ohms and a push-button which shorts out a 900 - ohm resistor in series with the meter and a permanently attached cord terminated in a Plug, PL-55.

Power Supply: None required.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Limited Standard		Not Classified
<b>STOCK NOS.</b>	7CAC-801319-257	ASO-R16-M-2039	3F4190-206A
<b>PROCUREMENT INFO.:</b>	USAF Spec. No. 71-1768; RCA Dwg. No. 712946		
<b>PROCUREMENT COG.:</b>	USAF	DESIGN COG.:	USAF, ARL
<b>F. I. I. N.:</b>	FUNCTIONAL CLASS. NO.: 1. 2. 3		
- Electronics Test Equipment -			I-206-A

TEST SET I-206-A  
(AMMETER I-206-A)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Meter Ranges: 0 to 15 and 0 to 150 milliamperes direct current.

Meter Resistance: 990 ohms (0 to 150 milliamperes scale), 90 ohms (0 to 15 milliamperes scale).

Accuracy: ±3%.

MANUFACTURERS' OR CONTRACTORS' DATA:

RCA Manufacturing Company, Inc., Camden, New Jersey; Order No. 3749-ARL-42.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-206-A (Complete)	Bake-lite	7CAC-801319-257 R16-M-2039 3F4190-206A	5-5/8	3-3/4	2-1/2	3

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set I-206-A. (Packed in water resistant carton).	0.07	7	4	4	4

I-206-A - Electronics Test Equipment -

**TEST SET I-206-B  
(AMMETER I-206-B)**

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, special purpose, self-contained, dual-range direct current milliammeter used to indicate plate and grid current values of Radio Transmitting Set AN/AXT-2. It cannot be used as an ammeter with any other equipment because of ammeter shunts provided in the prime equipment.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Navy Type CRV-60058.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The test set consists of a 1.5 milliampere direct current meter with an internal resistance of 90 ohms and a push-button which shorts out a 900 - ohm resistor in series with the meter and a permanently attached cord terminated in a Plug, PL-55.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Limited Standard		Not Classified
<b>STOCK NOS.</b>	7CAC-801319-2572	ASO-R16-M-2039	3F4190-206B
<b>PROCUREMENT INFO.:</b>	USAF Spec. No. 71-1768; AWS Spec. No. C39 2-1944		
<b>PROCUREMENT COG.:</b>	USAF	DESIGN COG.:	USAF, ARL
<b>F.I.I.N.:</b>	FUNCTIONAL CLASS. NO.: 1.2.3		
	- Electronics Test Equipment -		I-206-B

TEST SET I-206-B  
(AMMETER I-206-B)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: None required.

Meter Ranges: 0 to 15 and 0 to 150 milliamperes direct current.

Meter Resistance: 990 ohms (0 to 150 milliamperes scale), 90 ohms (0 to 15 milli-ampere scale).

Accuracy: ±3%.

MANUFACTURERS' OR CONTRACTORS' DATA:

RCA Manufacturing Company, Inc., Camden, New Jersey; Order No. 3749-ARL-2; Approximate Cost, \$20.00, Unit Cost, \$35.10.

R. L. Drake Company, 11 Longworth St., Dayton 2, Ohio; Order No. 1098-DAY-44.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-206-B (Complete)	Bake-lite	7CAC-801319-2572 R16-M-2039 3F4190-206B	5-5/8	3-3/4	2-1/2	3

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, I-206-B. (Packed in Water Resistant Fiber Box.)	0.07	7	4	4	4.0

I-206-B - Electronics Test Equipment -

TEST SET I-206-C



**FUNCTIONAL DESCRIPTION:**

This is a portable special purpose, self-contained, dual-range, direct current milliammeter used to indicate plate and grid current values of Radio Transmitting Sets AN/AXT-2B, 2C, and 3. It cannot be used as an ammeter with any other equipment because the ammeter shunts are provided in the prime equipment.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Electrically interchangeable with Test Set I-206-B, except that the control button position has been reversed and the case on the I-206-C is aluminum.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The test set consists of a direct current milliammeter with a panel push button which shorts out an internal resistor wired in series with the meter. The button is depressed to read the low range on the meter scale. A permanently attached cord terminates in a jack-type plug.

**Power Supply:** None required.

**Current Range:** 0 to 15 and 0 to 150 milliamperes, DC.

**Meter Resistance:** 990 ohms (0 to 150 milliamperes scale), 90 ohms (0 to 15 milliamperes scale).

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, WADC, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1, 2, 3	
- Electronics Test Equipment -			I-206-C

TEST SET I-206-C

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy:  $\pm 3\%$ .

Plug Type: PJ-055B.

MANUFACTURERS' OR CONTRACTORS' DATA:

Engineering Specialties, 7113 Miami Avenue, Madeira, Ohio.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 33A1-8-113-14 (Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

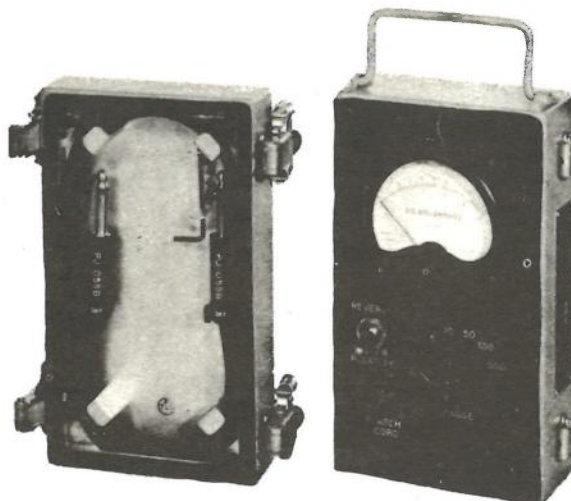
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-206-C	Alumi-num		4	4	5	2

I-206-C

- Electronics Test Equipment -

## AMMETER ME-29/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, DC milliammeter used for checking direct currents in tube circuits. The meter is provided with a range selector switch, a meter polarity reversing switch, a patch cord receptacle, and a milliammeter scale; all located on the operating panel.

### RELATIONSHIP TO OTHER EQUIPMENT:

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: None required.

Current Range: 0 to 1, 5, 10, 50, 100, 500 milliamperes DC.

Accuracy:  $\pm 5\%$  for full scale reading.

Basic Meter Movement: 1 milliampere full scale deflection.

Overall Resistance: At the lower ranges of current, yet greater than 1 milliampere (5, 10, and 50), resistors are in series with the meter and shunts. These re-

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Sub-Standard		Not Classified
<b>STOCK NOS.</b>	7CAC-028975		3F890-29
<b>PROCUREMENT INFO.:</b>	EXHIBIT WLENG-108-A, USAF Dwg. D/L 51C54261		
<b>PROCUREMENT COG.:</b>	USAF	DESIGN COG.:	USAF, Rome
<b>F.I.I.N.:</b>	FUNCTIONAL CLASS. NO.: 1.2.3		
	- Electronics Test Equipment -		ME-29/U

AMMETER ME-29/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

sistors increase the overall resistance of the ammeter so that except for the 100 and 500 milliamperere ranges, the overall resistance of the ammeter is approximately 100 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Electric Company, Electronics Park, Syracuse, New York; USAF Contract No. W-33-038-ac-16195, AF 33(038)9739, AF 33(038)15086, Unit Cost, \$95.88.

T. L. G. Electric Corporation, New York, New York; USAF Contract No. AF 33(038)27398; Approximate Cost per Unit, \$62.00, 3 February 1954.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-35ME29-11 (Operating Instructions).

TO 16-35ME29-12 (Service Instructions).

TO 16-35ME29-14 (Parts Breakdown).

TO 16-55-465 (Spare Parts List).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter ME-29/U	Aluminum	7CAC-028975 3F890-29	3-1/2	5-1/4	7-1/4	3
1	Cord			48 long			
1	Hex Wrench L-Shape						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Ammeter, ME-29/U (Domestic Packed)	0.35	6.75	8.5	10.5	5.63

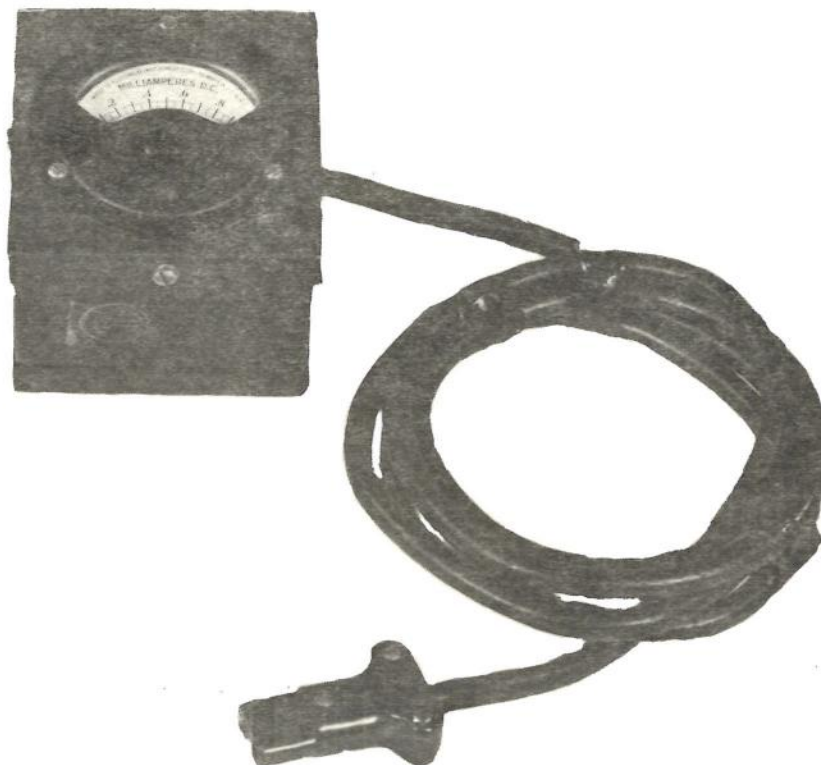
ME-29/U

- Electronics Test Equipment -



TEST METER TS-60/U  
(AMMETER, TS-60/U)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, direct current milliammeter for use with radio and radar equipment. It is designed to check low range direct current, but may also be used to measure radio frequency output of ECM equipments when used with Pick-up Assembly TS-131/AP.

All indications appear on a 2-1/2 inch meter face.

**RELATIONSHIP TO OTHER EQUIPMENT:**

TS-60/U is similar to I-139-A.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: None required.

Meter Range: 0 to 1 milliampere direct current.

Meter Resistance: Internal, 26 ohms; External, 49 ohms.

Accuracy: Approximate  $\pm 3\%$  of meter range 0 - 1 milliampere DC (full scale).

Temperature Range:  $-20^{\circ}$  F. to  $+122^{\circ}$  F.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>		Limited Standard	Not Classified
<b>STOCK NOS.</b>	7CAC-524050	ASO-R16-AN-TS-60/U	3F4325-60
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>	Navy	<b>DESIGN COG.:</b> Navy, BuShips	
<b>F.I.I.N.:</b>	<b>FUNCTIONAL CLASS. NO.:</b> 1.2.3		
	- Electronics Test Equipment -		TS-60/U

TEST METER TS-60/U  
(AMMETER, TS-60/U)

MANUFACTURERS' OR CONTRACTORS' DATA:

Delco Products, Kokomo, Indiana; Contract No. NXsa-49662; Approximate Cost per Unit, \$11.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-55-93 (Spare Parts List).

TO 16-10-111 (Maintenance Instructions for IE-19-A).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set TS-60/U	Metal	7CAC-524050 R16-AN-TS-60/U 3F4325-60	4	3	4	1.1

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Meter, TS-60/U (Domestic Packed).	0.16	8	5	7	3
TS-60/U - Electronics Test Equipment -						

TEST METER TS-199/CPM-4  
(AMMETER, TS-199/CPM-4)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A direct current milliammeter with an associated jack, reversing switch, and pushbutton multiplier switch used for measuring currents in the AN/CPM-4.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Replaced by ME-29/U.

**ELECTROMECHANICAL DESCRIPTION:**

Direct Current Range: 0 to 1 milliamperes.

0 to 5 milliamperes.

Basic Meter Resistance: 96 ohms.

Basic Meter Accuracy:  $\pm 2\%$  of 1 milliampere basic meter movement.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

General Electric Company, Schenectady, New York; Signal Corps Contract No. W-3435-sc-264; Navy Order No. 473-MPD-43; Approximate Cost per Unit, \$59.00. G. E. Dwg. No. DL-4W469A-G1. (Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Standard		Not Classified
<b>STOCK NOS.</b>	7CAC-028955	SNSN-F17-M-19405-8211	3F4325-199
<b>PROCUREM'T INFO.:</b>	USAF Spec. No. R-7405.		
<b>PROCUREM'T COG.:</b>	USAF	<b>DESIGN COG.:</b> USAF, Rome	
<b>F.I.I.N.:</b>	FUNCTIONAL CLASS. NO.: 1.2.3		
	- Electronics Test Equipment -		TS-199/CPM-4

TEST METER TS-199/CPM-4  
(AMMETER, TS-199/CPM-4)

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-1089 (TO 16-35TS199-5) (Instruction Manual).  
TO 16-35TS199-3 (Maintenance Instructions).  
TO 16-55-198 (Spare Parts List).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Meter TS-199/CPM-4		7CAC-028955 SNSN-F17-M-19405- 8211 3F4325-199	8	5	3	40
1	Carrying Case	Alum- inum					
1	Cord CX-648/CPM-4			96 long			
1	Cable Assembly CX-1267/U			72 long			

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	4 each of Test Meter TS-199/CPM-4 including accessories.	1.89	24	13	10-1/2	10
TS-199/CPM-4 - Electronics Test Equipment -						

AMMETER  
 MODEL F. S. 120  
 (Emerson Electric Manufacturing Company)



**FUNCTIONAL DESCRIPTION:**

A portable general purpose milliammeter used to measure direct current. This unit consists of a DC panel type meter mounted in a case for field use and is equipped with a 1/16 amp fuse and a test cord.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Incorporates Weston Model 1031 Panel Meter.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The basic meter movement is a permanent magnet moving coil type.

Power Supply: None required.

Current Range: -60 to 0 to +60 milliamperes, DC.

Accuracy:  $\pm 2\%$  of full scale deflection.

Meter Resistance: Approximately 0.8 ohm.

Scale Length: 2.36 inches.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-028982		
PROCUREMENT INFO.:	Tentative Spec. 71-5056A		
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1, 2, 3		
	- Electronics Test Equipment -		Emerson F. S. 120

AMMETER  
 MODEL F. S. 120  
 (Emerson Electric Manufacturing Company)

MANUFACTURERS' OR CONTRACTORS' DATA:

Emerson Electric Manufacturing Company, 8100 Florissant Avenue, St. Louis 21, Missouri.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter Emerson Model F.S. 120	Aluminum	7CAC-028982	6-5/8	5-1/2	5-1/16	21

Emerson F. S. 120 - Electronics Test Equipment -

DC MILLIAMMETER  
 MODEL 373  
 (Simpson Electric Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used to measure DC currents of small amplitudes. The instrument is normally used at field and depot levels. Current measurements are indicated on a calibrated scale.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The instrument comprises a meter utilizing a D'Arsonval-type movement and a range-selector switching circuit.

**Power Supply:** None

**Direct Current Range:** 0 to 1, 5, 10, 25, 50, 100, 250, and 1000 milliamps

**Accuracy:**  $\pm 3\%$  full-scale deflection

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:		DESIGN COG.: Commercial	
F. I. I. N.:		FUNCTIONAL CLASS. NO.: 1. 2. 3	
- Electronics Test Equipment -			Model 373

DC MILLIAMMETER MODEL 373  
(Simpson Electric Company)

MANUFACTURERS' OR CONTRACTORS' DATA:

Simpson Electric Company, 5200 West Kenzie Street, Chicago 44, Illinois, approximate unit cost, \$19.95.

TUBE COMPLEMENT:  
NA

REFERENCE DATA AND LITERATURE:

Manufacturer's catalog.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Milliammeter Simpson 373	bake-lite		3	5-7/8	2-1/2	

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	DC Milliammeter Simpson 373					

Model 373 - Electronic Test Equipment -



**AMMETER  
MODEL PX-5  
(Westinghouse Electric Corporation)**



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, self-contained instrument used to make direct current measurements. Test results are read on a calibrated dial.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The ammeter utilizes a permanent-magnet moving-coil mechanism in which a portion of the current to be measured is permitted to flow through a low-resistance moving coil mounted between the poles of a permanent magnet. Interaction of the magnetic field associated with the current flowing in the moving coil, with the magnetic field of the permanent magnet causes deflection directly proportional to current magnitude. The

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1. 2. 3		
- Electronics Test Equipment -			Model PX-5

**AMMETER MODEL PX-5**  
(Westinghouse Electric Corporation)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

meter indicator, which is attached to the moving coil, moves across a 5-inch calibrated scale to provide the current indication. A major portion of the current being measured is passed through an internal shunt connected between the two terminal posts located on top of the instrument case. The instrument is magnetically shielded to minimize the effect of stray magnetic fields. Input to the meter is through two terminal posts with appropriate polarity markings.

The posts are located on top of the meter case.

Power Supply: None

Direct Current Range: 0 to 10 amps.

Accuracy: 0.5% of full scale.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Westinghouse Electric Corporation, Newark, New Jersey, approximate unit cost, \$164.00.

**TUBE COMPLEMENT:**

NA

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog Section 43-100.

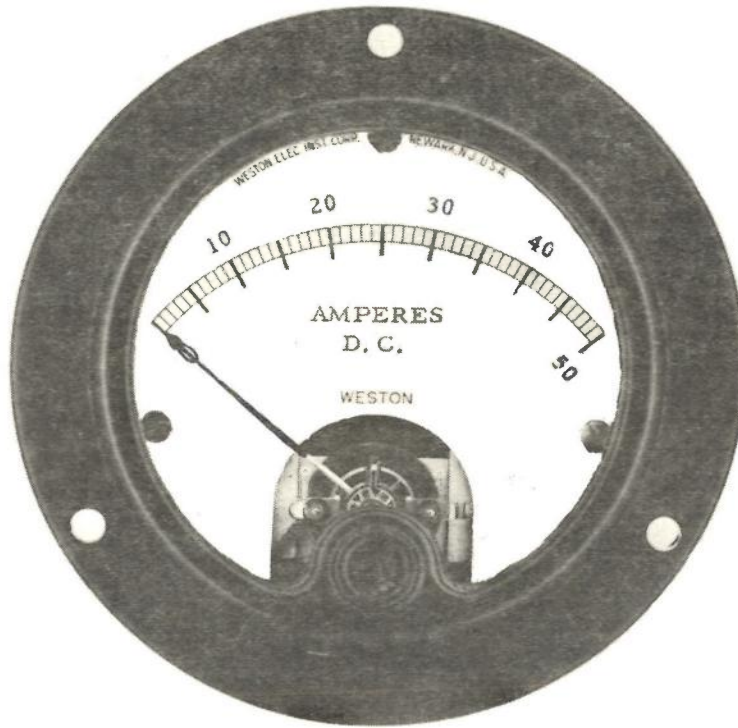
**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter Westinghouse PX-5	bake- lite		7-3/4	8-5/8	4	8

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Ammeter Westinghouse PX-5					10
Model PX-5 - Electronic Test Equipment -						

DC AMMETER  
 MODEL NO. 301  
 (Weston Electrical Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A general purpose, panel mounted type instrument used to measure direct current. The meter has a single scale calibrated in amperes DC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used in testing Radio Set SCR-188-A.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The meter movement is of the permanent magnet moving coil type. The instrument is supplied with a self-contained shunt of 50 amperes.

**Power Supply:** None required.

**Current Range:** 0 to 50 amperes.

**Accuracy:**  $\pm 2\%$  of full scale.

**Scale Length:** 2.36 inches.

**Scale Divisions:** 50.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-025000		3F1050-13
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		1.2.3
	- Electronics Test Equipment -		Weston 301

DC AMMETER  
MODEL NO. 301  
(Weston Electrical Instrument Corporation)

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$15.23, February 1954.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Circular A-7-B "Weston Panel Instruments."

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Ammeter Model 301	Bake-lite	7CAC-025000 3F1050-13	3-1/2	3-1/2	1-18/25	0.5

Weston 301

- Electronics Test Equipment -

DC MICROAMMETER  
MODEL 622  
(Weston Electrical Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument designed to measure DC current with laboratory-required accuracy. Test results are indicated on a single 6.1-inch scale.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The meter is of the permanent-magnet, moving-coil, double-pivot type. The instrument is shielded to minimize electrostatic effects and external magnetic field influence. The meter incorporates a mirror scale to minimize parallax error and a knife-edge pointer.

**Power Supply:** None

**Range:** 0 to 100  $\mu$ a in 100 divisions.

**Coil Resistance:** 600 ohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.:		Commercial
F. I. I. N.:	FUNCTIONAL CLASS. NO.:		1, 2, 3
- Electronics Test Equipment -			Model 622

DC MICROAMMETER MODEL 622  
(Weston Electrical Instrument Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy: 0.5%

Controls and Data Presentation: An adjusting knob located on the front panel is used to zero-adjust the meter.

Fittings, Connections, and Accessories: Two binding posts are provided to accommodate test leads.

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey, approximate unit cost, \$278.00.

TUBE COMPLEMENT:  
NA

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog A-20-C.

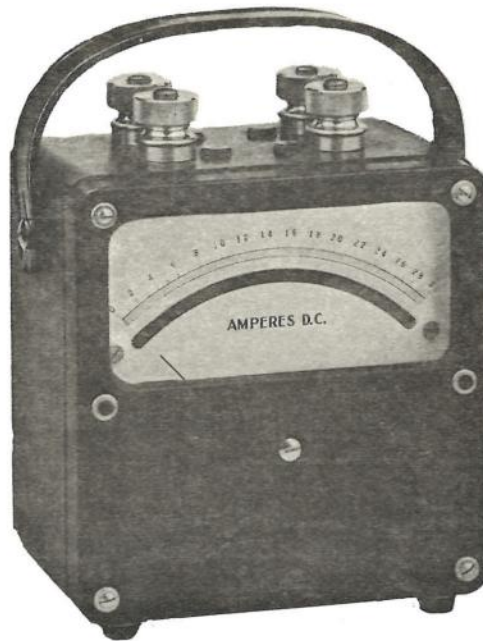
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Microammeter Weston 622	bake-lite		8-3/4	7-3/4	4	8.5

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	DC Microammeter Weston 622					
Model 622 - Electronic Test Equipment -						

AMMETER  
Model 931  
(Weston Electrical Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable general purpose self-contained instrument used to measure direct current. The meter has a single scale calibrated in amperes DC.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Weston Model 931 DC Ammeter can also be obtained with ranges from 0-1 to 0-50 amperes in various range combinations.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The meter movement is of the permanent magnet moving coil type. It is shielded from external magnetic fields.

**Power Supply:** None.

**Current Range:** 0 to 30 amperes.

**Accuracy:**  $\pm 0.5\%$ .

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>			
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b>		<b>DESIGN COG.:</b> Commercial	
<b>F.I.I.N.:</b>		<b>FUNCTIONAL CLASS. NO.:</b> 1.2.3	
- Electronics Test Equipment -			Weston 931

AMMETER  
Model 931  
(Weston Electrical Instrument Corporation)

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit, \$76.00, 1955.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Circular A-8-A "AC and DC Portable Instruments."

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ammeter Weston 931			3-1/4	5	5-1/4	2

Weston 931

- Electronics Test Equipment -



**THERMOCOUPLE MILLIAMMETER  
MODEL A**  
(Sensitive Research Instrument Corporation)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used for measuring alternating current and direct current in the audio-frequency range. Results are indicated on a calibrated multirange meter.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The instrument consists essentially of a vacuum thermocouple, a meter, and appropriate shunt resistors. The instrument's moving system is mounted on a shaft equipped with a diamond pivot on each end. The pivots rotate in shock-mounted jewels. A network is incorporated which automatically compensates for variations in room temperature. The instrument is shielded from the influence of external magnetic fields.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.:		Commercial
F. I. L. N.:	FUNCTIONAL CLASS. NO.:		1. 2. 5
- Electronics Test Equipment -			Model A

**THERMOCOUPLE MILLIAMMETER MODEL A**  
(Sensitive Research Instrument Corporation)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

Power Supply: None

Range: 0 to 1500 milliamps in 9 ranges.

Frequency Range: DC to 15,000 cycles per second.

Accuracy: 0.75 of 1% up to 15,000 cycles per second.

Temperature: Automatically compensated from 20°C to 30°C.

Scale Width: 6.3 inches.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Sensitive Research Instrument Corporation, New Rochelle, New York, approximate unit cost, \$348.00.

**TUBE COMPLEMENT:**

NA

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Thermocouple Milliammeter Model A	wood		8	7-1/2	4-1/2	7

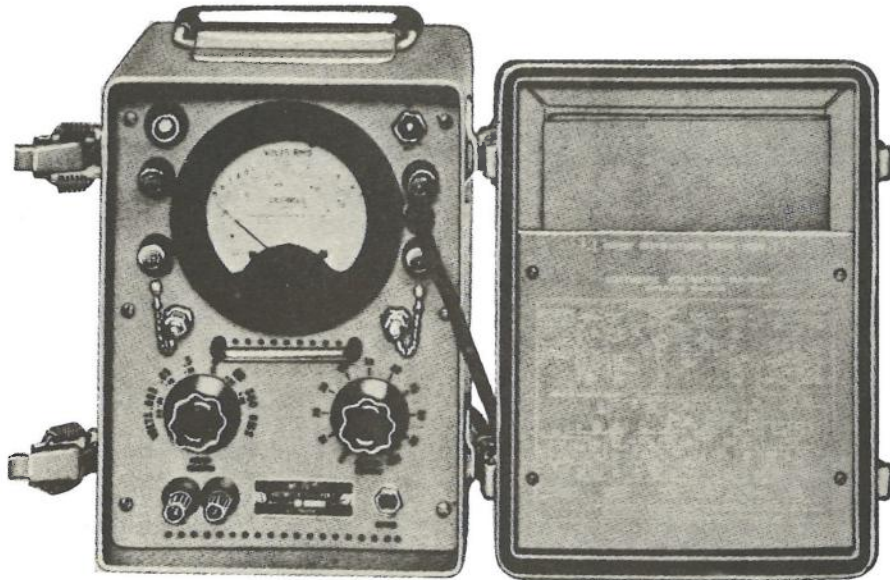
**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Thermocouple Milliammeter Model A					
Model A - Electronic Test Equipment -						

### 1.3 MULTIMETERS



MULTIMETER ME-74/U



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used to measure AC voltage and power. The instrument may also be used as an amplifier. Test results are indicated on a logarithmic scale calibrated in root mean square volts and a linear scale calibrated in decibels.

**RELATIONSHIP TO OTHER EQUIPMENT:**

The equipment is equivalent to Electronic Multimeter ME-6B/U differing only in that the meter is shock and vibration resistant with a watertight case.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: The circuitry consists of a multistage amplifier, a rectifier, and a DC indicating instrument in which deflection is proportional to the logarithm of the current flow through it. For stability purposes, a negative feedback circuit is provided where by energy of reversed phase is brought back from the rectifier to the input circuit. An output jack allows a potentiometer  
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: USN		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1.3		
- Electronics Test Equipment -			ME-74/U

MULTIMETER ME-74/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

to be substituted for the rectifier and meter and thereby enabling the instrument to function as an amplifier.

Power Supply: 110 volts, 60 to 1000 cycles per second, single-phase, 31 watts.  
 Ranges:

Frequency: 15 cycles per second to 250 kilocycles per second.

Alternating Voltage: 500 microvolts to 500 volts in 6 ranges.

Power: -65 to + 57 decibels in 6 steps (1 milliwatt into 600 ohms).

Input Impedance: 2 megohms shunted by 15 micromicrofarads.

Output Impedance: 0 to 2000 ohms.

Meter Sensitivity: 1260 microamps, 60 microamps zero-suppressed.

Accuracy: ± 2% full scale.

Amplifier Characteristics: Gain 1600 (63 decibels).

MANUFACTURERS' OR CONTRACTORS' DATA:

Electronic Instrument Company, Inc., 84 Withers Street, Brooklyn, New York,  
 Contract No. NObsr-52295

TUBE COMPLEMENT:

(4) 6AK5, (1) 6X4, (1)6AQ5, (1) 5651, (2) 6J6.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92523

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter ME-74/U	aluminum		9-3/4	7-1/4	7	
1	Instruction Book						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Multimeter ME-74/U					
ME-74/U - Electronic Test Equipment -						

VOLTHOMYST  
MODEL 195-A  
(Radio Corporation of America)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used to measure AC and DC voltage, resistance, and sound level in decibels. Test results are indicated on a calibrated meter.

**RELATIONSHIP TO OTHER EQUIPMENT:**

The Volthomyst RCA 195-A is similar to the TS-294C/U.

**ELECTROMECHANICAL DESCRIPTION:**

- Power Supply: 105 to 125 volts AC, 60 cycles per second, 14 watts; 1.5 volts DC (two Batteries RCA VSO36).
- Meter Movement: 200 microamps.
- Meter Accuracy: 2% of full scale.
- Direct Voltage:
  - Range: 0 to 1000 volts in 6 ranges.
  - Input Impedance: 9.9 megohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. L. N.:	FUNCTIONAL CLASS. NO.: 1. 3. 1		
- Electronics Test Equipment -			Model 195-A

VOLTOHMYST MODEL 195-A  
(Radio Corporation of America)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Ohmmeter:

Range: 0.1 ohm to 1000 megohms in 6 ranges.

Center Scale Indications: 10, 100, 1000, 10,000 ohms; 0.1 and 10 megohms.

Alternating Voltage:

Ranges: 0 to 1000 volts in 6 ranges.

Input Impedance: 200,000 ohms shunted by 170 micromicrofarads.

Frequency Response: 30 cycles per second to 100 kilocycles.

Maximum Input Voltages:

Power Frequencies: 1000 volts rms.

Audio Frequencies: 100 volts rms.

Output Meter Ranges: -20 to +16, -14 to +22, 0 to +36, +6 to +42, +20 to +56, +26 to +62 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Radio Corporation of America, Harrison, New Jersey.

TUBE COMPLEMENT:

(2) 6K6-GT, (1) 6H6, (1) 6X5-GT.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

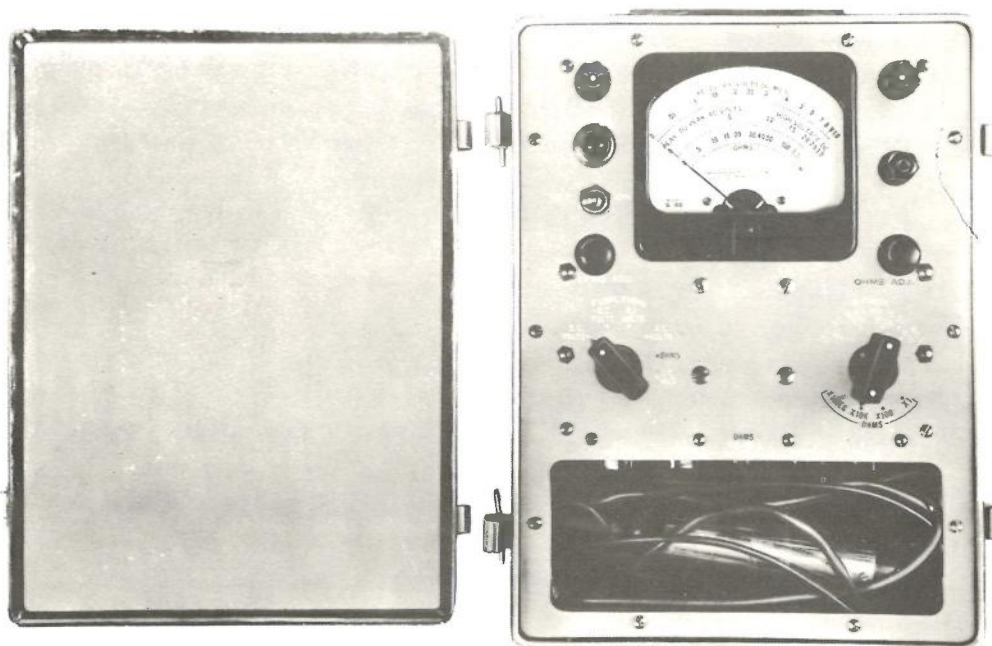
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltohmyst Model 195-A Radio Corporation of America					
Model 195-A - Electronic Test Equipment -						







## MULTIMETER AN/USM-34



### FUNCTIONAL DESCRIPTION:

A portable general purpose combination electronic multimeter designed to measure AC and DC voltages, currents, and resistances. The equipment includes a probe and shielded cable for measuring RF voltages. The power cable and test leads are permanently attached to the meter. Features of this meter are (1) voltage indications are based on peak-to-peak or rms values of the AC voltage being measured, (2) an electronic milliammeter circuit is employed, (3) the meter scales are logarithmic, (4) the equipment is water tight.

### RELATIONSHIP TO OTHER EQUIPMENT:

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The meter circuit consists of an electronic bridge, one side of which is made up of the triode sections of a twin triode tube. The bridge is electrically balanced by the remainder of the meter circuit. Input to the grid passes through a voltage dividing network which is isolated from the meter circuit by a cathode follower circuit. Input to the grid unbalances the bridge and causes the meter to indicate the unknown voltage. Direct current for ohmmeter measurements is obtained by rectifying the AC filament supply, making it unnecessary to use a dry battery.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>			
<b>STOCK NOS.</b>			
<b>PROCUREMENT INFO.:</b>			
<b>PROCUREMENT COG.:</b> USN	<b>DESIGN COG.:</b> USN, BuShips		
<b>F.I.I.N.:</b>	<b>FUNCTIONAL CLASS. NO.:</b> 1.3.1.1		
- Electronics Test Equipment -			AN/USM-34

MULTIMETER AN/USM-34

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 105 to 125 volts, AC, 50 to 1000 cycles per second, single-phase.

Frequency Range: 50 cycles per second to 100 megacycles per second.

Input Impedance: DC: 13.3 megohms (without test prod).

38.3 megohms (with test prod).

RF: 8 micromicrofarads shunted by 13 megohms on 100-volt, AC range.

Meter Ranges: DC Voltage: 0 to 3000 volts.

AC Voltage: 0 to 1000 volts.

DC Current: 0 to 1000 milliamperes.

Resistance: 0 to 2000 megohms.

Accuracy: DC Voltage: Up to 1000 volts,  $\pm 4\%$ ; over 1000 volts (with high voltage probe),  $\pm 6\%$ .

AC Voltage: Up to 100 volts,  $\pm 6\%$ ; over 100 volts,  $\pm 7\%$ .

DC Current:  $\pm 5\%$ .

Resistance:  $\pm 5^\circ$  of arc at center scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hickok Electrical Instrument Company, 10514 Dupont Avenue, Cleveland 8, Ohio;  
Contract Nos. NObsr-52719 and NObsr-57494.

TUBE COMPLEMENT:

1 JAN-5751, 1 JAN-5814-A, 1 JAN-9006, 1 JAN-5726.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92197 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

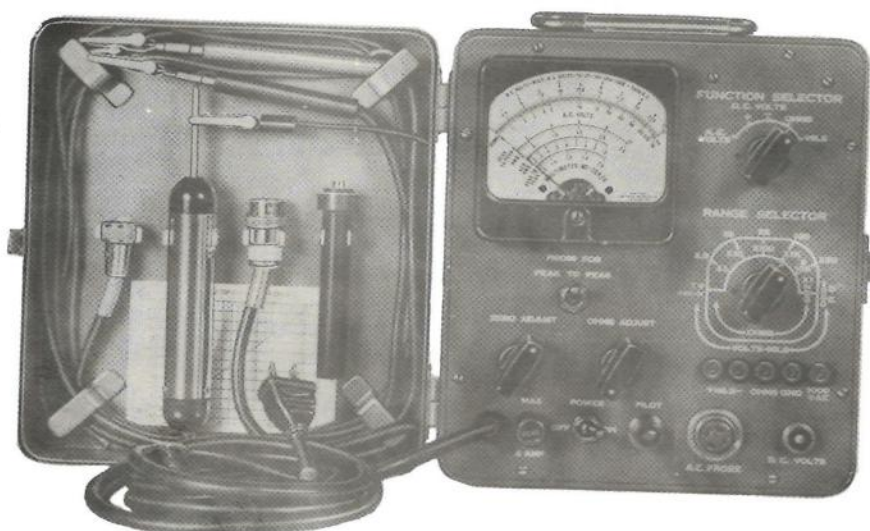
AN/USM-34

- Electronics Test Equipment -





## MULTIMETER ME-25A/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, combination electronic test set that includes the functions of a voltmeter, ohmmeter, and milliammeter. It is capable of measuring AC voltages expressed in rms or peak to peak values, DC voltages, resistance, and direct current. The meter has multiple, multicolor scales calibrated in AC volts, rms, AC volts peak to peak, DC volts, ohms and milliamperes.

### RELATIONSHIP TO OTHER EQUIPMENT:

This meter supersedes Multimeter ME-25/U. The "A" model gives either rms or peak to peak measured values over a wider range.

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts  $\pm$ 10 volts, AC, single phase, 50 to 1600 cycles per second, 12 watts. One 1.5 volt Battery BA-30 for ohmmeter section.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-Q-170888-200	3F3324-9
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		1.3.1.1
- Electronics Test Equipment -			ME-25A/U

MULTIMETER ME-25A/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Volts, AC (measured in peak to peak; calibrated in peak to peak and rms):

0 to 1.0, 2.5, 10, 25, 100, and 250 volts, rms.

0 to 2.5, 10, 25, 100, 250, and 1000 volts peak to peak.

Frequency Range: 50 cycles per second to 100 megacycles per second.

Input Impedance: 13 megohms shunted by 7 micromicrofarads.

Accuracy:  $\pm 5\%$  of full scale.

Volts, AC (measured in average value, calibrated in rms):

0 to 1,000 volts.

Frequency Range: 50 to 3000 cycles per second, approximately.

Input Impedance: 5 megohms shunted by 10 micromicrofarads.

Accuracy:  $\pm 5\%$  of full scale.

Volts, DC: 0 to 1.0, 2.5, 10, 25, 100, 250, and 1000 volts.

0 to 5000 volts (using auxiliary test prod).

Input Impedance: 13.3 megohms; 66.5 megohms using test prod.

Accuracy:  $\pm 4\%$  of full scale on four lower ranges.

$\pm 5\%$  of full scale on 250 volts, 1000 volts and 5000 volts ranges.

Resistance: 0 to 1000, 10,000, 100,000 ohms, 1.0, 10, and 1000 megohms.

Accuracy: Within  $3^\circ$  arc from absolute value of resistance indicated on meter scale.

Direct Current: 0 to 2.5, 10, 25, 100, 250, and 1000 milliamperes.

Accuracy:  $\pm 3\%$  of full scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

The Hickok Electrical Instrument Company, 10514 Dupont Avenue, Cleveland 8, Ohio; Contract No. NObsr-43313, 19 May 1949.

TUBE COMPLEMENT:

1 JAN-12AU7, 1 JAN-6X4, 1 JAN-6AL5.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91415 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Multimeter, ME-25A/U	1.9	13-1/2	12-1/2	19-1/2	41

ME-25A/U

- Electronics Test Equipment -



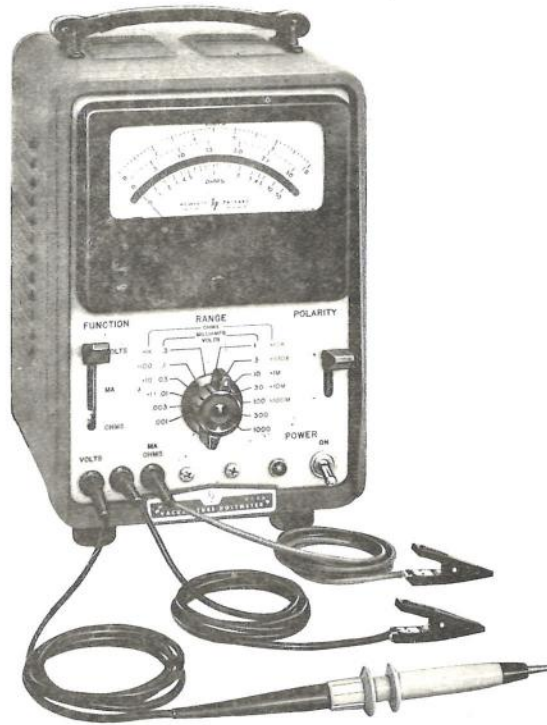
MULTIMETER ME-25A/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter ME-25A/U Including:	Steel	F16-Q-170888-200 3F3324-9	9-3/4	8-7/8	6-5/8	13 com- plete
1	AC Probe and Cable Assembly W-101		N17-L-63205-7691 3E8000-48.13	48 long			
1	Ground Lead W-105		N17-L-63205-4190 3E8000-48	48 long			
1	Test Lead (Shielded) W-102		N17-L-63205-8851 3E8000-44.2	48 long			
1	Test Lead (Unshielded) W-103		N17-L-63205-4185 3E8000-48.1	48 long			
1	Ground Lead W-104		N17-L-63386-2427 3E8000-5.1	3-1/4 long			
1	Test Prod MX-1101/U		N17-P-84837-7361 3F3705-19	5-3/16 long	5/8 dia.		
2	Alligator Clip		N17-C-802585-401 3Z1087-15	7/16	2-5/16	5/16	
2	Instruction Book						



VACUUM TUBE VOLTMETER  
 MODEL 412A  
 (Hewlett-Packard Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose instrument used for resistance and DC current and voltage measurements. The unit may also be used as a DC preamplifier to drive a recorder. Test results are indicated on a linear mirror scale.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The equipment consists basically of a modified Kelvin bridge circuit, voltage divider circuits, and a power supply. The use of a photo conductor chopper eliminates the need for a zero set control.

**Power Supply:** 115 or 230 volts, 50 to 60 cycles per second, single-phase, 35 watts.

**Voltmeter:**

**Direct Voltage Ranges:** 1 millivolt to 1000 volts positive and negative in 13 ranges. (Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.1.1		
- Electronics Test Equipment -			Model 412A

VACUUM TUBE VOLTMETER MODEL 412A  
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy:  $\pm 1\%$  of full scale.

Input Resistance:

10 megohms  $\pm 1\%$  on 1, 3, and 10 millivolt range.

30 megohms  $\pm 1\%$  on 30 millivolt range.

100 megohms  $\pm 1\%$  on 100 millivolt range.

200 megohms  $\pm 1\%$  on 300 millivolt range.

Ammeter:

Direct Current Range: 1 microamp to 1 amp positive and negative in 13 ranges.

Accuracy:  $\pm 2\%$  of full scale.

Input Resistance: Decreasing from 1000 ohms on 1 microamp scale to 0.1 ohm on 1 amp scale.

Ohmmeter:

Resistance Range: 0.02 ohm to 5000 megohms in 9 ranges.

Accuracy:  $\pm 5\%$  of reading, 0.2 ohm to 500 megohms,  $\pm 10\%$  of reading 0.1 to 0.2 ohm and 500 to 5000 megohms.

Amplifier:

Voltage Gain: 1000 maximum.

AC Rejection: 3 decibels at 1 cycle per second, 80 decibels at 50 and 60 cycles per second.

Voltage Output: Proportional to meter indication; 1 volt or 1 at full scale (full scale corresponds to 1.0 on upper scale).

Output Impedance: Less than 2 ohms at 0 cycles per second.

Noise: Less than 0.1% of full scale on any range.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California, approximate unit cost, \$350.00.

TUBE COMPLEMENT:

NI

REFERENCE DATA AND LITERATURE:

Manufacturers Catalog

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Vacuum Tube Voltmeter Model 412A					14 lbs
Model 412A - Electronic Test Equipment -						





## MULTIMETER AN/PRM-15



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, pocket-sized, ruggedized volt-ohmmeter, used to measure direct voltage and DC resistance in high impedance circuits. Indication is on a dial calibrated in volts and megohms. This instrument is intended for use by all maintenance echelons. Battery condition test facilities are provided with go-no-go indications on the dial labeled "GOOD" and "REPLACE".

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Volt-ohmmeter I-107, but improved mechanically. Similar to AN/PRM-16 except that the AN/PRM-16 uses an AC power supply instead of batteries.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The meter is 3.5 inches, hermetically sealed, with a sensitivity of 100 microamperes per full scale deflection. The compartment for batteries which supply necessary power is in a separate but mechanically and

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:	Spec.MIL-M-11271A(SigC) dtd 31 Mar 52 & AM.1 dtd 7 Aug 52		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		1.3.1.2
- Electronics Test Equipment -			AN/PRM-15

MULTIMETER AN/PRM-15

ELECTROMECHANICAL DESCRIPTION: (Continued)

electrically interlocking case which is detachable from the unit.

Power Supply: 45 volts DC (plate power), 3 volts DC (ohmmeter), 1-1/2 volts DC (filament power). Voltage is supplied by one 45 volt Battery BA-414/U and three 1.5 volt Battery BA-30.

Voltage Range: 0 to 1000 volts DC in 6 steps: 0 to 2.5, 10, 25, 100, 250, and 1000 volts; or 0 to  $\pm 500$  volts DC in 6 steps: 0 to  $\pm 1.25$ ,  $\pm 5$ ,  $\pm 12.5$ ,  $\pm 50$ ,  $\pm 125$ ,  $\pm 500$  volts.

Resistance Range: 0 to 100 megohms in 6 steps: Rx1, Rx10, Rx100, Rx1K, Rx10K, Rx100K.

Input Impedance: 11 megohms on DC voltage ranges.

Accuracy:  $\pm 3\%$  of full-scale readings.

Ambient Temperature:  $+25^{\circ}$  C.

MANUFACTURERS' OR CONTRACTORS' DATA:

A. W. Barber Laboratories, Flushing, New York; Army Contract W36-039-sc-33638 (Development).

TUBE COMPLEMENT:

1 Raytheon-CK525AX.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

AN/PRM-15

- Electronics Test Equipment -



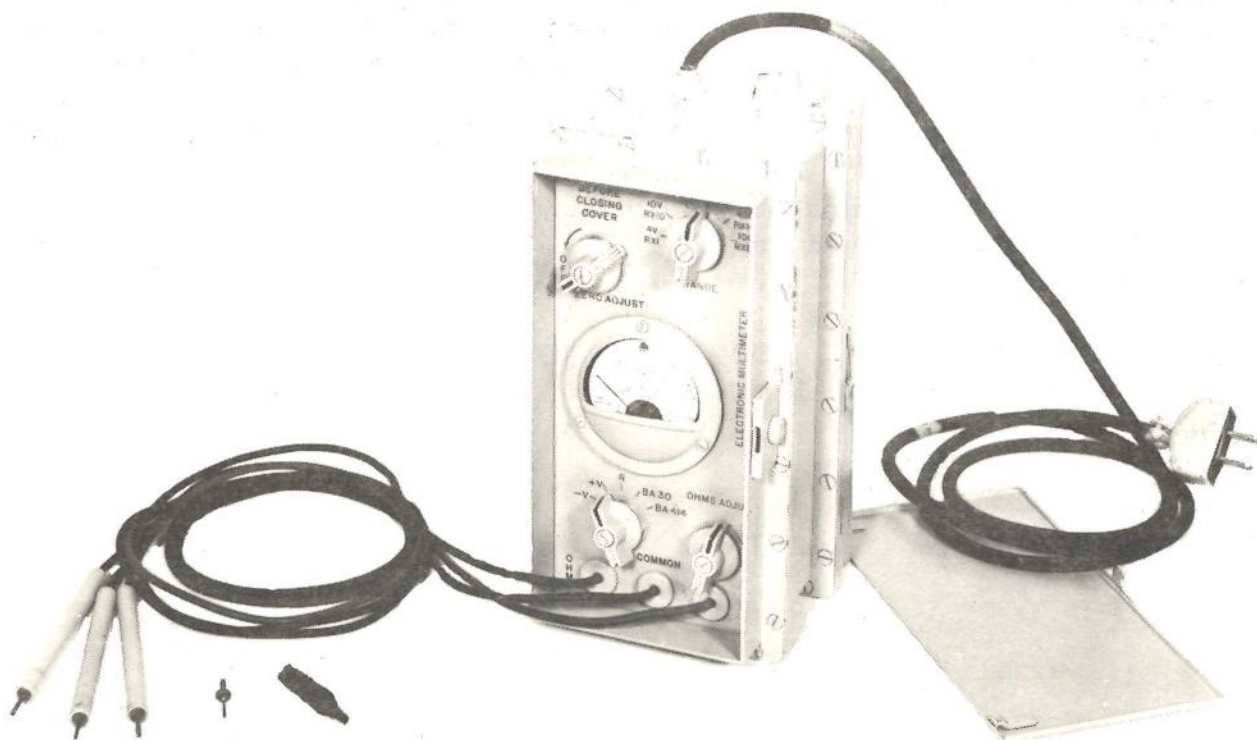
MULTIMETER AN/PRM-15

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter AN/PRM-15 Including:	Alum- inum		8-3/4	4-1/2	5	9.75
1	Electronic Multimeter TS-618(XC)/U	Alum- inum		8-3/4	4-1/2	2-1/2	
1	Set of 3 Test Leads			48 long			
1	Spare Tube (Raytheon CK525AX)						
1	Reversing Switch						
1	Zero Center Scale						
1	Battery Box CY-1057(XC)/PRM	Alum- inum		8-3/4	4-1/2	2-1/2	
- Electronics Test Equipment -							AN/PRM-15



## MULTIMETER AN/PRM-16



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, pocket-sized, ruggedized volt-ohmmeter, used to measure direct voltage and DC resistance in high impedance circuits. Indication is on a dial calibrated in volts and megohms. This instrument is intended for use by all maintenance echelons.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Volt-ohmmeter I-107, but improved mechanically. Similar to AN/PRM-15 except that the AN/PRM-15 uses batteries instead of an AC power supply.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The meter is 3.5 inches, hermetically sealed, with a sensitivity of 100 microamperes per full scale deflection. A power supply containing metallic rectifiers is located in a separate but mechanically and electrically interlocking case.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:	Spec. MIL-M-11271A(SigC) dtd 31 Mar 52 & AM.1 dtd 7 Aug 52		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.3.1.2
	- Electronics Test Equipment -		AN/PRM-16

MULTIMETER AN/PRM-16

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts, AC, 50 to 1000 cycles per second, single phase, 3 watts.  
 Voltage Range: 0 to 1000 volts, DC, in 6 steps: 0 to 2.5, 10, 25, 100, 250, and 1000 volts; or 0 to  $\pm 500$  volts, DC, in 6 steps: 0 to  $\pm 1.25$ ,  $\pm 5$ ,  $\pm 12.5$ ,  $\pm 50$ ,  $\pm 125$ ,  $\pm 500$  volts.  
 Resistance Range: 0 to 100 megohms in 6 steps: Rx1, Rx10, Rx100, Rx1K, Rx10K, Rx100K.  
 Input Impedance: 11 megohms on DC voltage ranges.  
 Accuracy:  $\pm 3\%$  of full-scale readings.  
 Ambient Temperature:  $+25^{\circ}$  C.

MANUFACTURERS' OR CONTRACTORS' DATA:

A. W. Barber Laboratories, Flushing, New York; Army Contract W-36-039-sc-3368 (Development).

TUBE COMPLEMENT:

1 Raytheon - CK525AX.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
AN/PRM-16 - Electronics Test Equipment -						





MULTIMETER METER ME-26/U



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose vacuum tube AC-DC voltmeter and ohmmeter. It is used to measure audio frequency, supersonic, radio frequency, and very high frequency voltages, antenna voltage, current and power, transmission line characteristics, standing waves, DC voltages in high impedance circuits, and gain in audio, video, and very high frequency amplifiers. Its large frequency range when operating as an AC meter is made possible by a specially designed diode probe. It is highly stable with very low drift, requiring only one zero adjustment on all ranges for each kind of measurement. The meter movement is ruggedized, and overload protection is provided making damage to the meter due to overload virtually impossible.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Hewlett-Packard Model 410A High Frequency Vacuum Tube Voltmeter.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: A vacuum tube voltmeter with AC peak reading and DC volt-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-587939	F17-M-27515-3156	
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.3.1.2	
- Electronics Test Equipment -			ME-26/U

## MULTIMETER METER ME-26/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

meter circuits, an ohmmeter circuit, and overload protection circuits are inside the meter case. The diode probe is connected at the end of the RF test lead.

Power Supply: 115 volts, AC, 50 to 60 cycles per second, single phase, 40 watts, plus 3 volts supplied by two 1.5 volt Batteries BA-30 for the ohmmeter circuit.

Frequency Range (on AC Voltage Measurement): 20 cycles per second to 700 megacycles per second.

Voltage Ranges: 0 to 300 volts AC, rms, in 6 ranges: 0 to 1, 3, 10, 30, 100, 300 volts. 0 to 1000 volts DC, in 7 ranges: 0 to 1, 3, 10, 30, 100, 300, 1000 volts.

Resistance Ranges: 0.2 to 500 megohms in 7 ranges: 0.2 to 500, 5000, 50,000, 500,000, 5,000,000, 50,000,000, 500,000,000 ohms. Midscale readings: 10, 100, 1000, 10,000, 100,000, 1,000,000, 10,000,000 ohms.

#### Input Impedance:

Input capacitance is 1.3 micromicrofarads across the input resistance.

Input resistance is 10 megohms at low frequencies (under approximately 0.02 megacycles per second), and decreases at high frequencies due to high dielectric losses.

DC Input Resistance is 100 megohms for all ranges.

Frequency Response: Flat within  $\pm 1$  decibel up to 700 megacycles per second and drops off less than 1 decibel at 20 cycles per second. Probe resonant frequency is about 2000 megacycles per second, but indication can be obtained up to 3000 megacycles per second.

Accuracy:  $\pm 3\%$  of full scale on all ranges on sinusoidal AC voltages and on DC voltages.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, Palo Alto, California; Navy Contract NObsr-40943; Approximate Cost per Unit, \$698.50, 3 February 1954.

### TUBE COMPLEMENT:

1 JAN-5Y3GT, 1 JAN-6SN7GT, 2 JAN-6AG7, 1 JAN-1N34, 1 Amperite 6-4, 1 E1MAC 2-01C (diode).

### REFERENCE DATA AND LITERATURE:

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Multimeter Meter ME-26/U with accessories (Domestic Packed)	0.58	14-5/8	8-5/16	8-1/4	23
ME-26/U - Electronics Test Equipment -						



MULTIMETER METER ME-26/U

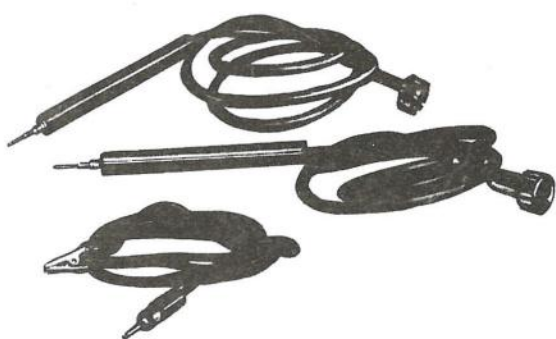
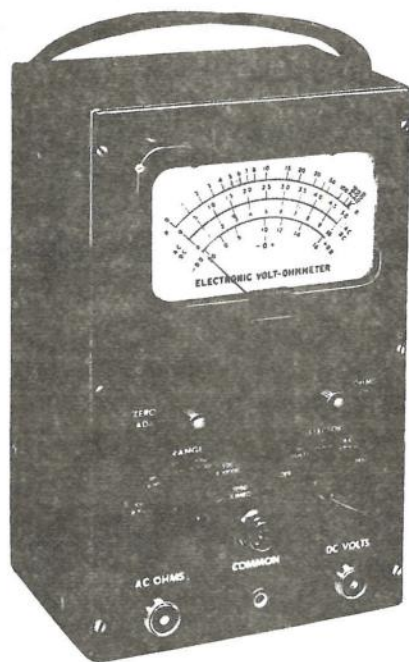
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter Meter ME-26/U Including:	Metal	7CAC-587939 F17-M-27515-3156	12-1/16	7-5/16	6-1/4	16
1	Set of Spare Tubes						
1	Set of Test Leads						
- Electronics Test Equipment -							
							ME-26/U



VOLTOHMMETER TS-294C/U  
(MULTIMETER TS-294C/U)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, wide range, self-contained, vacuum-tube voltohmmeter used for measuring alternating or direct voltages and resistances in high impedance, electronic circuits. It will measure oscillator strength, automatic volume control voltage, bias cell voltage without damage to the cell, automatic frequency control discriminator voltage, frequency modulation discriminator voltage, and leakage through insulation of capacitors or coil windings with negligible effect on the circuit under test. Voltage and resistance values are indicated on a 4-1/2 inch meter.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to RCA Voltohmyst 195. All models of TS-294/U are interchangeable as to function, but not as to parts.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** This instrument contains an indicating meter, a balanced DC bridge, a copper-oxide rectifier, and a power supply.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			Limited Standard
STOCK NOS.		F16-T-20136-1501	3F4072-1,1
PROCUREMENT INFO.:	Army Spec. 71-8249.		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.1.2		
	- Electronics Test Equipment -		TS-294C/U

**VOLTOHMMETER TS-294C/U  
(MULTIMETER TS-294C/U)**

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

**Power Supply:** 105 to 125 volts, AC, 50 to 60 cycles per second, single phase, 14 watts. For the ohmmeter section, 3 volts supplied by two 1.5 volt Batteries BA-30.

**Frequency Range:** 30 to 100,000 cycles per second.

**Meter Ranges:**

**Direct Voltage:** 0 to 5, 10, 50, 100, 500, 1000 volts.

**Alternating Voltage:** 0 to 5, 10, 50, 100, 500, 1000 volts rms.

**Resistance:** 0.1 ohm to 1000 megohms in six ranges. Center-scale indications at 10, 100, 1000, 10,000, 100,000, 10,000,000 ohms.

**Power Ratio:** -20 to +62 decibels in 6 ranges: -20 to +16, -14 to +22, 0 to +36, +6 to +42, +20 to +56, +26 to +62 decibels,

**DC Sensitivity:** 3,660,000 ohms per volt.

**AC Sensitivity:** 1000 ohms per volt.

**DC Input Impedance:** 10 megohms.

**AC Input Resistance and Capacitance:** 200,000 ohms shunted by 170 micromicrofarads.

**Meter Movement:** 0 to 200 microamperes.

**Accuracy:** ±2% full scale.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Radio Corporation of America, Princeton, New Jersey; Approximate Cost per Unit, \$80.00.

**TUBE COMPLEMENT:**

1 JAN-6H6, 2 JAN-6K6GT, 1 JAN-6X5WGT.

**REFERENCE DATA AND LITERATURE:**

TM 11-2624B and C1 (TO 16-35TS294-5) (Instruction Book).

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Two each Volt ohmmeter TS-294C/U (Domestic Packed)	2.92	28	15	12	50

TS-294C/U - Electronics Test Equipment -





## VOLTMETER TS-363A/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed to measure AC and DC voltages. The meter indicates the rms value of sinusoidal voltages and 0.707 of the peak value of nonsinusoidal voltages. The meter may also be used as a high-range ohmmeter.

### RELATIONSHIP TO OTHER EQUIPMENT:

An external battery or other source of DC potential is required when the TS-363A/U is used as an ohmmeter. With the proper associated equipment, the TS-363A/U can be used as a light intensity and quantity instrument. The TS-363A/U is similar to and interchangeable with the TS-363/U except for the addition of JAN components.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The voltmeter utilizes stabilized, balanced, degenerative amplifiers to facilitate changing DC voltage ranges without zero-adjusting on

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:		DESIGN COG.:	USA, SCEL
F. I. L. N.:		FUNCTIONAL CLASS. NO.: 1. 3. 1. 2	
- Electronics Test Equipment -			TS-363A/U

## VOLTMETER TS-363A/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

each range. A balanced diode circuit minimizes zero drift on the AC voltage ranges. A detachable probe is provided to minimize lead-length error in high-frequency voltage measurements. For voltage measurements at low or medium frequencies, where lead length is not a consideration, the probe may be mounted on convenient carrying jacks on the rear of the instrument. When the meter is used to make DC measurements, the input circuit is connected directly to the grid of the DC amplifier, and the external 10-megohm grid leak resistor may be removed. Range selection pushbuttons facilitate switching from one range to another. When an external source of potential is used, the meter may be used as an ohmmeter with a range of 0.1 to over 100,000 megohms. Measurements are read on a large calibrated scale. A step-down transformer to adapt the voltmeter for use on 220 volts, 50 cycles per second, is available on special order.

Power Supply: 115 volts, AC, 60 cycles per second, 24 watts.

Voltage Range: 0 to 1, 3, 10, 30, 100 volts full scale, AC or DC.

Accuracy:  $\pm 2\%$  of full scale on each range, AC and DC.

Frequency Range: 30 cycles per second to 150 megacycles per second with less than 10% error. Resonant frequency of the probe, with input terminals charted, is 300 megacycles per second.

Input Impedance: 7 micromicrofarads shunted by a resistance ranging from 2.5 megohms at 0.01 megacycles per second to 10,000 ohms at 150 megacycles per second.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Telectro Industries, SigC Order No. 4721-PH-49, approximate unit cost, \$135.00.

### TUBE COMPLEMENT:

(1) 6H6, (1) 5W4, (2) 6C5.

### REFERENCE DATA AND LITERATURE:

TS-363A/U: SC Form 567.

TS-363/U: Manufacturer's Catalog.

### SHIPPING DATA:

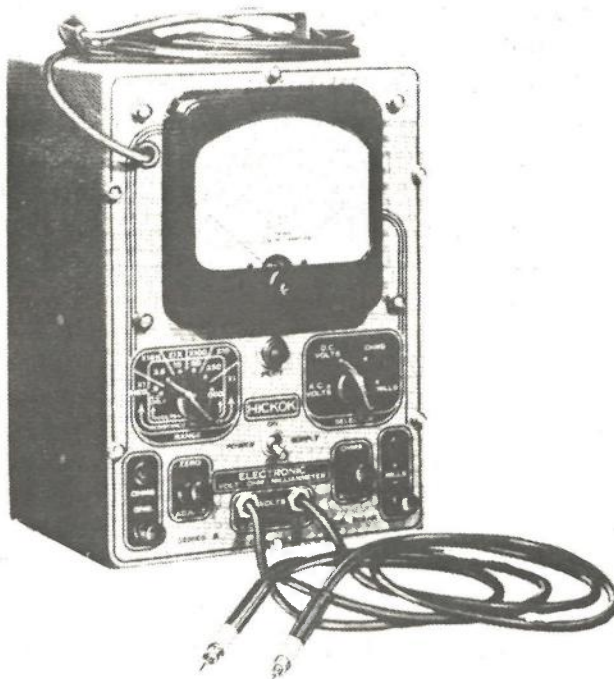
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Voltmeter, TS-363A/U					
TS-363A/U - Electronic Test Equipment -						







## MULTIMETER TS-389/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment, combining the functions of four test instruments: a DC milliammeter and three electronic devices; AC voltmeter, DC voltmeter, and ohmmeter. A selector switch is used to change the circuits and to shift the indicating device so that any one of the four test instruments is available for use. A single 400 microampere, 5 inch, DC meter is used as the indicating device for all measurements made with the multimeter. The equipment is used at all maintenance levels.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hickok Model 202-NX Electronic Volt-Ohm-Milliammeter.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The bare meter is shunted by a 15 microfarad, 25 volt, electrolytic capacitor which protects against damage due to current surges, and prevents meter pointer fluctuations.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F17-M-28070-8997	3F4072-14
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		1.3.1.1
- Electronics Test Equipment -			

## MULTIMETER TS-389/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 110 volts, AC, 50 to 60 cycles per second, single phase, plus two 1.5 volt Batteries BA-30 for the ohmmeter function only.

Frequency Range: (AC voltmeter only) Up to 20,000 cycles per second.

AC Voltmeter Ranges: 0 to 0.5, 2.5, 10, 50, 250, 1000 volts.

DC Voltmeter Ranges: 0 to 2.5, 10, 50, 250, 1000 volts.

Ohmmeter Ranges: 0.1 to 1000 ohms with multipliers of 10, 100, 1000, 10,000, and 1,000,000 giving it a maximum scale reading of 1000 megohms.

Milliammeter Ranges: 0 to 2.5, 10, 50, 250, 1000 milliamperes.

Minimum Input Impedance as an AC Voltmeter: Approximately 1.3 megohms.

Constant Input Resistance as a DC Voltmeter: Approximately 11 megohms.

Meter Resistance: 800 ohms.

Meter Accuracy:  $\pm 2\%$  of indicated value.

Overall Sensitivity: On AC, 5 megohms per volt. On DC, 14 megohms per volt.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Hickok Electrical Instrument Company, Cleveland, Ohio.

### TUBE COMPLEMENT:

1 JAN-6SJ7, 1 JAN-0D3/VR-150, 2 JAN-6SN7GT, 1 JAN-6X5GT.

### REFERENCE DATA AND LITERATURE:

TO 16-35TS389-5 (Operating and Maintenance Instructions).

### EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter TS-389/U Including:	Steel	F17-M-28070-8997	12-1/8	7-7/8	6	26
2	Test Lead			36 long			

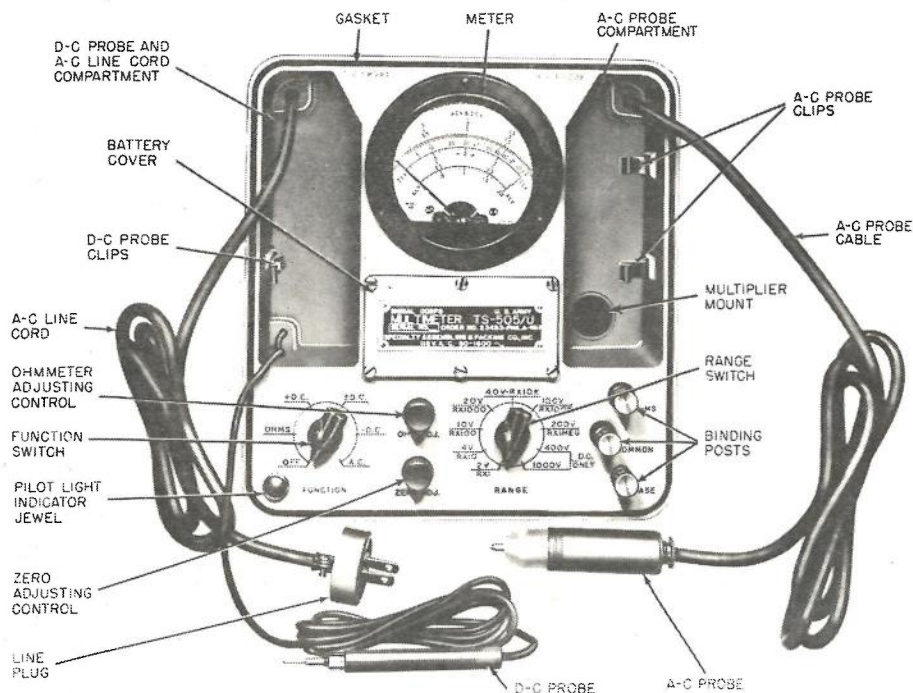
### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Multimeter TS-389/U (Export Packed)	1.9	17-1/2	14	13-1/2	35

TS-389/U - Electronics Test Equipment -

## ELECTRONIC MULTIMETER TS-505/U (MULTIMETER, TS-505/U)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained combination vacuum tube voltmeter and DC ohmmeter designed to measure AC and DC voltage and resistance over relatively wide ranges. Measurements are made on a specially calibrated milliammeter. The AC meter scale is peak indicating; however, it is calibrated to read rms volts. A zero center DC scale permits measurement of DC voltage of unknown polarity. Resistance measurements are read in ohms. The set contains both an AC rectifier probe and a DC probe.

### RELATIONSHIP TO OTHER EQUIPMENT:

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 ±15 volts, AC, 50 to 1600 cycles per second; approximately 20 volt-amperes. Two 1.5 volt Batteries BA-30 for ohmmeter section only.

Frequency Range: 30 cycles per second to 500 megacycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
<b>TYPE CLASS.</b>	Standard		Standard
<b>STOCK NOS.</b>	7CAC-587943		3F4325-505
<b>PROCUREMENT INFO.:</b>	SigC Spec. 71-3346		
<b>PROCUREMENT COG.:</b>	Army	DESIGN COG.: Army, CSL	
<b>F.I.I.N.:</b>	FUNCTIONAL CLASS. NO.: 1.3.1.2		
- Electronics Test Equipment -			TS-505/U

ELECTRONIC MULTIMETER TS-505/U  
(MULTIMETER, TS-505/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Voltage Range:

AC: 0 to 200 volts, rms, in seven ranges: 0 to 2, 4, 10, 20, 40, 100, 200 volts rms.

DC: 0 to 1000 volts in nine ranges: 0 to 2, 4, 10, 20, 40, 100, 200, 400, 1000 volts. 0 to  $\pm 500$  volts (zero center scale) in nine ranges: -5 to +5, -1 to +1, -2 to +2, -10 to +10, -20 to +20, -50 to +50, -100 to +100, -200 to +200, -500 to +500.

Resistance Range: 0 to 1000 megohms in seven ranges: 0 to 1000 ohms with 30 ohm center scale; 0 to 10,000 ohms with 300 ohm center scale; 0 to 100,000 ohms with 3000 ohm center scale; 0 to 1 megohm with 30,000 ohm center scale; 0 to 10 megohms with 300,000 ohm center scale; 0 to 100 megohms with 3 megohm center scale; 0 to 1000 megohms with 30 megohm center scale.

Input Impedance: At least 6 megohms shunted by 2 micromicrofarads at audio frequencies; 50 megohms on 1000 volts, DC, and  $\pm 500$  volts, DC, ranges; 20 megohms on all other DC ranges.

Indicating Meter: 1 milliampere DC for full scale deflection.

Accuracy:  $\pm 4\%$  of full scale on DC voltage;  $\pm 6\%$  of full scale for AC sinusoidal: input from 30 cycles per second to 500 megacycles per second;  $\pm 4\%$  of ohmmeter arc length on ohms scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

Specialty Assembly and Packing Company, Inc., Brooklyn 5, New York; Order No. 23493-Phila-49-7; Approximate Cost per Unit, \$94.25.

TUBE COMPLEMENT:

1 RTMA-5935, 1 JAN-6AL5, 1 JAN-6AU6, 1 JAN-12AT7, 2NE-32, 1 JAN-6X4.

REFERENCE DATA AND LITERATURE:

TO 16-35TS505-5 (TM 11-5511) (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Electronic Multimeter TS-505/U (Export Packed)	1.09	11-1/4	13	13	23
TS-505/U - Electronics Test Equipment -						

ELECTRONIC MULTIMETER TS-505/U  
(MULTIMETER, TS-505/U)

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs. )
				H	W	D	
1	Electronic Multimeter TS-505/U	Alum- inum	7CAC-587943 3F4325-505	6-1/4	10	9-1/2	15
4	Test Lead with Alligator Clips		8800-256400 1B818.14	48 long			
2	Fuse, 1 amp little fuse Type 3 AG (Spares)		8800-361200 3Z1926				
- Electronics Test Equipment -							
							TS-505/U





VACUUM TUBE VOLTMETER  
 MODEL NO. 410B  
 (Hewlett-Packard Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, test instrument designed primarily as an AC voltmeter, but also used as an ohmmeter and a DC voltmeter. Used to measure audio frequency, supersonic, RF, and VHF voltages; it can also measure antenna voltage, current and power, transmission line characteristics, standing waves, etc. The dial is calibrated in volts and ohms.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Hewlett-Packard Model No. 410A, except for improved circuitry and increased sensitivity. Used to test A-2 Fire Control System.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The circuit consists of a broad-band rectifier, a DC amplifier, and an indicating meter.

**Power Supply:** 115/230 volts  $\pm 10\%$ , 50 to 60 cycles per second, 40 watts.

**Frequency Range:** 20 cycles per second to 700 megacycles.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-936200		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.1.2		
- Electronics Test Equipment -		Model No. 410B	

VACUUM TUBE VOLTMETER  
MODEL NO. 410B  
(Hewlett-Packard Company)

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

AC Ranges: Six: 1, 3, 10, 30, 100, and 300 volts full scale.

DC Ranges: Seven: 1, 3, 10, 30, 100, 300, and 1000 volts full scale.

Resistance Ranges: Seven: Mid-scale values of 10, 100, 1000, 10,000, and 100,000 ohms, and 1 megohm and 10 megohms.

Frequency Response: Constant within 1 decibel from 20 cycles per second to 700 megacycles per second.

Input Impedance: Input capacity less than 2 micromicrofarads; input resistance is 10 megohms or more at low frequencies, decreasing at high frequencies because of dielectric losses.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, \$245.00, November 1950.

**TUBE COMPLEMENT:**

2 JAN-12AU7, 1 JAN-6X4, 1 JAN-2-01C, 1 JAN-0B2, 1 Amperite 6-4.

**REFERENCE DATA AND LITERATURE:**

Hewlett-Packard Journal, Volume 2, No. 3, November 1950.

Manufacturer's Catalog 21-A, 1952.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Voltmeter Model No. 410B	Metal	7CAC-936200	10-1/2	7	6-3/4	12

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

Model No. 410B - Electronics Test Equipment -



VACUUM TUBE VOLTOHMMETER MODEL 303  
(Simpson Electric Company)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

Impedance (with Cable): Approximately 200 micromicrofarads shunted by 275,000 ohms.

**AF Voltage:**

Ranges: 0 to 1.2, 12, 60 volts.

Frequency Response: Flat from 25 to 100,000 cycles per second.

**RF Voltage (with Accessory Crystal Probe):**

Range: 20 volts max.

Frequency Response: Flat from 20 kilocycles to 100 megacycles.

**Ranges:**

Resistance: 0 to 1000 ohms, 100,000 ohms, 1 megohm, 10 megohms, 1000 megohms.

Decibels: -20 to +3, -10 to +23, +4 to +37, +18 to +51, +30 to +63 decibels (1 milliwatt into 600 ohms).

Galvanometer: Zero center for FM discriminator alignment and other galvanometer applications.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Simpson Electric Company, Chicago, Illinois, approximate unit cost, \$58.75.

**TUBE COMPLEMENT:**

(1) 6AL5, (1) 12AU7.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog.

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Voltohmmeter Simpson 303	bake-lite		5-1/4	7	3-1/8	4

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Vacuum Tube Voltohmmeter Simpson 303	400 cubic inches	11	7-1/4	5	6-1/2
Model 303 - Electronic Test Equipment -						

VOLTMETER, VACUUM TUBE PHASE SENSITIVE  
 Part No. 1,000,308  
 (Sperry Gyroscope Company)



FUNCTIONAL DESCRIPTION:

A portable test equipment used in testing the Altitude Control Assembly Analyzer Sperry Part Number 1,000,307.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The voltmeter circuit consists of a power supply, a two-stage voltage amplifier, a limiter, and a phase-sensitive demodulator. The panel contains a DC microammeter, a double-pole, double-throw switch for turning the instrument on or off, and a nine-position, rotary, attenuator switch for selecting the known maximum voltage to be encountered in the test. This switch is connected to an attenuator assembly of resistors in the instrument chassis. Two binding posts are provided for signal input. A pilot lamp on the panel lights to indicate that power is on. The power cable to the test set should be connected to the same power source that furnishes excitation for the signal to be measured. This is

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 1.3.1.3		
	- Electronics Test Equipment -		Sperry 1,000,308

VOLTMETER, VACUUM TUBE PHASE SENSITIVE

Part No. 1,000,308

(Sperry Gyroscope Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

because the built-in power supply of the test set is used as a phase reference within the unit, and using a different power source can result in a phase difference causing an erroneous reading.

Power Supply: 115 volts, AC, 400 cycles per second, single-phase, 1.25 amperes.

VTVM Range: 0 to 100 volts, AC.

Microammeter Range: 25-0-25 microamperes.

Attenuator Positions: 0.01, 0.03, 0.1, 0.3, 1.0, 3.0, 10, 30, and 100 volts, AC.

Accuracy: ±2%.

MANUFACTURERS' OR CONTRACTORS' DATA:

The Sperry Gyroscope Company, Division of Sperry-Rand Corporation, Great Neck, Long Island, New York.

TUBE COMPLEMENT:

2 JAN-12AT7, 1 JAN-6X4.

REFERENCE DATA AND LITERATURE:

TO 33A1-12-97 (Instructions and Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltmeter, Vacuum Tube Phase Sensitive (Sperry 1,000,308)			13-1/2	7-1/4	7-1/4	13

Sperry 1,000,308

- Electronics Test Equipment -

## MULTIMETER AN/PSM-4

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, non-electronic type multirange AC-DC volt-ohm-milliammeter designed for general electronic and electrical service work.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Weston Part/Dwg. No. 135961, Model 979.

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: 1.5 volts supplied by 1 Battery BA-30 (1.5 volts), and 22.5 volts supplied by 1 Battery BA-261/U (22.5 volts).

#### Voltage Ranges:

DC: 0 to 2, 4, 10, 20, 40, 100, 200, 400, 1000, 4000 volts full scale; sensitivity: 20,000 ohms per volt.

AC: 0 to 2, 4, 10, 20, 40, 100, 200, 400, 1000 volts, full scale; sensitivity: 1000 ohms per volt.

Current Ranges, DC: 0 to 100 microamperes: 0 to 4, 10, 40, 100, 400, 1000 milliamperes, 0 to 10 amperes. (Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	Not Classified
STOCK NOS.		F16-Q-172840-200	
PROCUREMENT INFO.:	Spec. MIL-M-15134 (Ships)		
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.1		
	- Electronics Test Equipment -		AN/PSM-4

MULTIMETER AN/PSM-4

ELECTROMECHANICAL DESCRIPTION: (Continued)

Ohmmeter Ranges:

- R x 1: 10,000 ohms center scale 30 ohms.
- R x 10: 100,000, center scale 300 ohms.
- R x 100: 1 megohm center scale 3000 ohms.
- R x 1000: 10 megohms, center scale 30000 ohms.
- R x 10,000: 100 megohms, center scale 300,000 ohms.

Accuracy:

- ±3% on DC ranges (except the 4000 volt range).
- ±4% on 4000 volt DC range.
- ±3% on AC ranges.
- ±3% on resistance and current ranges.

Basic Sensitivity of Meter: 50 microamperes (20,000 ohms per volt).

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, 619 Frelinghuysen Avenue, Newark 5, New Jersey. Navy Contract NObsr 49273, 30 June 1950.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

AN/PSM-4

- Electronics Test Equipment -



MULTIMETER AN/PSM-4

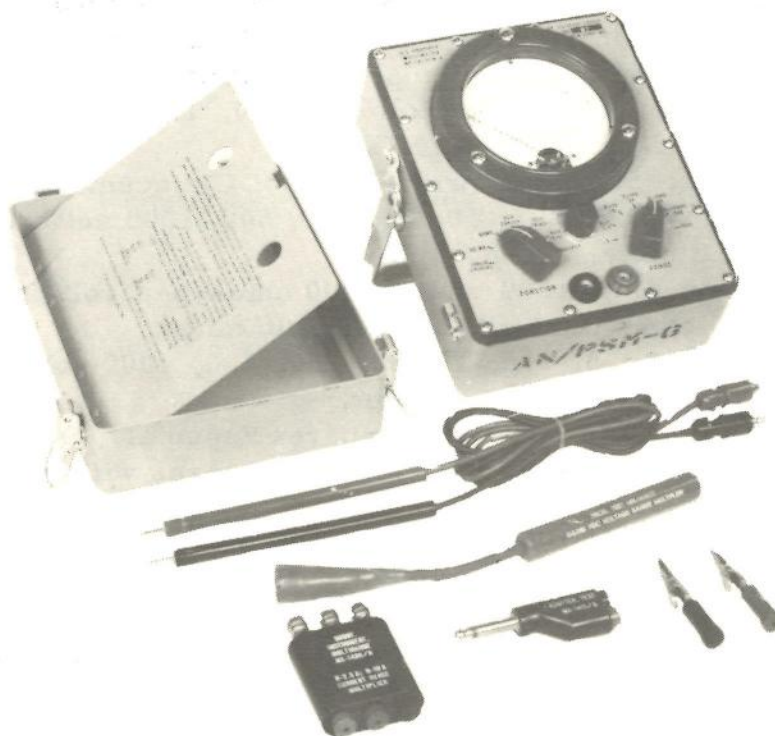
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter AN/PSM-4 Consists of:	Bake- lite	F16-Q-172840200	6	4-25/32	7-3/8	5.3
1	Multimeter, ME-48/U						
2	Cords, CX-529A/U			48 long			
1	Test Lead, CX- 2091/PSM-4			48 long			
1	Cover, Panel CW-291/PSM-4	Alum- inum					
2	Alligator Clips						
1	Telephone Plug						
2	Instruction Books						
- Electronics Test Equipment - AN/PSM/4							



## MULTIMETER AN/PSM-6

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, multi-range instrument for use in circuit analysis and troubleshooting on electrical and electronic equipment. Accurate and reliable readings of voltage, current, and resistance are given on a multicalibrated dial even under extreme service conditions. Indication is on a 4-1/2 inch sealed ruggedized meter.

### RELATIONSHIP TO OTHER EQUIPMENT:

Interchangeable functionally, but not as to parts, with TS-352A/U. AN/PSM-6 has been reduced 50% in size and weight, and features greater ease of operation and added ranges.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Two rotary switches are used to connect the basic meter to the proper multipliers, shunts, battery or rectifier circuit to provide the desired function and range. AC voltage ranges are obtained by use of a full wave, two  
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-589073-3		
PROCUREMENT INFO.: USAF Spec. MIL-M-4552 dated 12 May 1953			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1,3,2,1	
- Electronics Test Equipment -			AN/PSM-6

## MULTIMETER AN/PSM-6

### ELECTROMECHANICAL DESCRIPTION: (Continued)

element, copper oxide instrument rectifier. The circuit has been temperature compensated for use over a wide temperature range.

Ohmmeter Power Source: Mercuric Oxide Battery, 13.4 volts tapped at 1.34 volts, Frequency Range: 0 to 30 kilocycles per second.

Basic Meter Movement: 50 microampere,  $\pm 2\%$ , DC movement.

DC Voltage Ranges: 0 to 0.5, 2.5, 10, 50, 250, 500, 1000 volts; 0 to 5000 volts with Voltage Range Multiplier.

DC Voltage Sensitivity: Both 1000 and 20,000 ohms per volt for all ranges up to 1000 volts; 20,000 ohms per volt for 5000 volt range.

AC Voltage Ranges: 0 to 0.5, 2.5, 10, 50, 250, 500, 1000 volts.

AC Voltage Sensitivity: 1000 ohms per volt.

Direct Current Ranges: 0 to 100 microamperes "special"; 0 to 0.5, 2.5, 10, 50, 250, 500, 1000 milliamperes; 0 to 2.5, 10 amperes with Current Range Multiplier.

DC Resistance Ranges: 0 to 1000, 10,000, 100,000, 1,000,000, 10,000,000 ohms with center scale readings at approximately 25, 250, 2500, 25,000, 250,000 ohms respectively.

Internal Resistance: 850 ohms (100 microamperes DC "special" function).

Output Measurement: Available for use at all AC range settings.

Accuracies: (Expressed in percentage of scale length.)

Ambient Temperature	+25° C.	-40° C.	+55° C.
All DC voltage, current, and resistance ranges	$\pm 3\%$	$\pm 6\%$	$\pm 5\%$
All AC voltage ranges except 0.5; 0 to 30 kilocycles per second.	$\pm 4\%$	$\pm 7\%$	$\pm 6\%$

#### Note:

100 microamperes DC "special" - accuracy  $\pm 3\%$  at +25° C. only.

0.5 volt AC - no accuracy specified; influenced by impedance.

Output - no accuracy specified; influenced by frequency.

Ohms - not operable at -40° C.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Bruno-New York Industries Corporation, New York, New York; Contract No. AF 33(038)30053, dated 22 June 1951; Approximate Cost per Unit, \$75.00.

### TUBE COMPLEMENT:

None.

### REFERENCE DATA AND LITERATURE:

AN 16-30PSM6-1 (Operation Instructions).

AN 16-30PSM6-2 (Service Instructions).

AN 16-30PSM6-4 (Parts Breakdown).

MULTIMETER AN/PSM-6

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter AN/PSM-6 Including:	Alum- inum Alloy	7CAC-589073-3	8-1/2	7-1/4	4-1/2	7.44
1	Multimeter ME-70/PSM-6			8	7	4-1/4	6.75
1	Shunt, Instrument, Multirange MX-1409/U			3	2-1/16	3/4	0.19
1	Prod, Test MX-1410/U			8-3/4	5/8 dia.	5/8	0.125
1	Adapter, Test MX-1411/U			3-3/16	1-1/8	1/2	0.06
1 pair	Test Lead Set CX-2140/U			55-3/8	7/16	7/16	0.25
2	Alligator Clip						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

- Electronics Test Equipment -

AN/PSM-6





MULTIMETER I-167-A

ELECTROMECHANICAL DESCRIPTION: (Continued)

Sensitivity: DC: 20,000 ohms per volt; AC: 1,000 ohms per volt.

Accuracy: DC: ±2% for all ranges except the 1000 volt range; ±3% for 1000 volt range; AC: ±3% up to 250 volts; ±4% up to 1000 volts.

Temperature Range: Error within 2% from +40° to +110° F.

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electric Instruments Corporation, Newark 5, New Jersey.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM11-1200 (Radar Test Equipment).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter I-167-A (Complete)	Wood	1690-325908050 3F1716A	15	5	8-3/4	8.5
2	Test Lead Weston Nos. 70033 and 70034		3300-327462000 3F4056/L1				

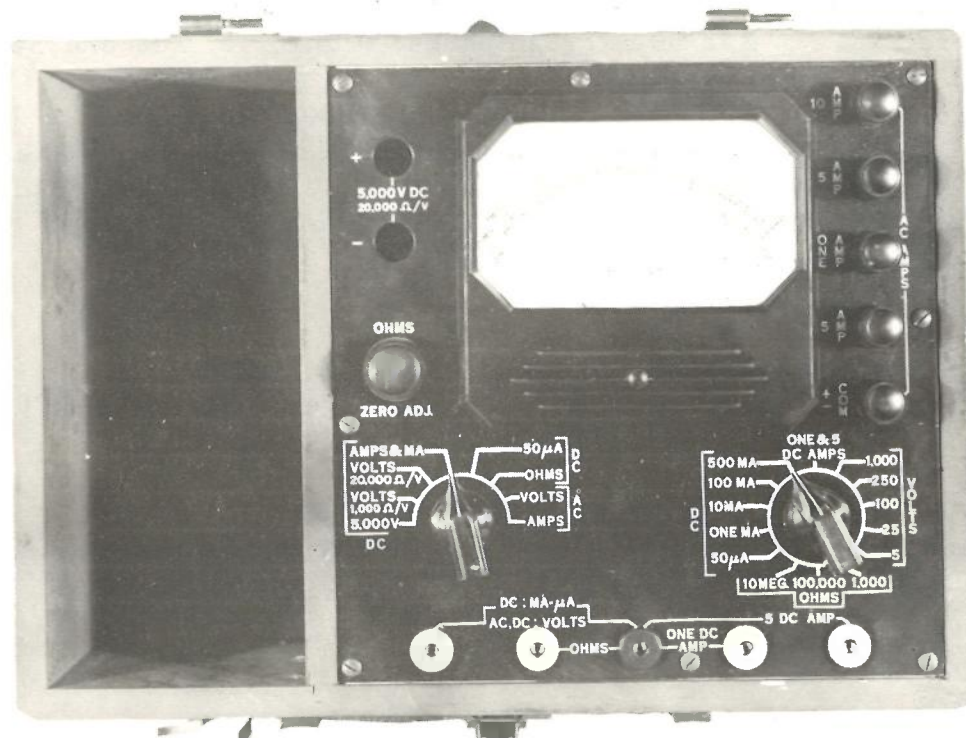
I-167-A

- Electronics Test Equipment -



TEST UNIT I-176  
(MULTIMETER I-176)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, multi-range meter of high sensitivity designed to measure alternating currents and voltages, direct currents and voltages, and resistances over a wide range of values.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Part of Test Set I-56-K.  
Replaced by AN/PSM-6.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: One 22.5 volt Battery BA-2 and one 1.5 volt Battery BA-30.  
Measurement Ranges Available:

- Alternating Voltages: 0 to 5, 25, 100, 250, and 1000 volts.
- Alternating Current: 0 to 0.5, 1, 5, 10 amperes.
- Direct Voltage: 0 to 5, 25, 100, 250, 1000 and 5000 volts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			Limited Standard
STOCK NOS.	1600-327922150	N17-R-50802-3351	3F4470-176
PROCUREMENT INFO.:	Army Spec. No. 171-1767, Dwg. No. SC-C-6226-A		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.1		
- Electronics Test Equipment -			I-176

TEST UNIT I-176  
(MULTIMETER I-176)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Direct Current: 0 to 50 microamperes; 0 to 1, 10, 100 and 500 milliamperes; 0 to 1 and 5 amperes.  
 Resistance: 0 to 1000, 100,000 and 10,000,000 ohms.  
 Sensitivity: 1,000 or 20,000 ohms per volt on all DC scales except the 0 to 5,000 volt range.  
                   20,000 ohms per volt on the 0 to 5,000 direct volt range.  
                   1,000 ohms per volt on all AC ranges.  
 Accuracy (at 25° C.), Over-all:  
   ±4% of full-scale value for all DC scales.  
   ±5% of full-scale value for all AC scales, 40 to 60 cycles.  
   ±5% of full-scale value for the 5,000 direct voltage range at the 4,000 volt graduation (10% of full-scale reading at any other deflection).

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Company, 614 Frelinghuysen Avenue, Newark 5, New Jersey.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-2626, C1 and C2 (Technical Manual).  
 TO 16-401176-5 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	3 each, Test Units, I-176. (Export Packed).	3.8	18	31	12	60
I-176 - Electronics Test Equipment -						





VOLTMETER IS-189

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



FUNCTIONAL DESCRIPTION:

A general purpose, portable and self-contained combination test instrument designed to measure alternating and direct voltages, direct current, resistance and power in decibels.

All indications appear on a five-inch meter.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Simpson Model 260.

Replaced by Multimeter AN/PSM-6.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: One 1.5 volt and two 3 volt batteries.

Ranges:

Alternating and Direct Voltage: 0 to 2.5, 10, 50, 250, 1000 and 5000 volts.

Direct Current: 0 to 100 microamperes. 0 to 10, 100 and 500 milliamperes.

Decibels: 0 to +52 decibel in five ranges.

(Continued)

	AIR FORCE ,	NAVY	ARMY
TYPE CLASS.	Not Classified		Limited Standard
STOCK NOS.	7CAC-587854	N16-T-1449-189	3F7389
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.1		
- Electronics Test Equipment -			IS-189

VOLTMETER IS-189

ELECTROMECHANICAL DESCRIPTION: (Continued)

Resistance: 0 to 1000, 100,000 and 10,000,000 ohms.

Sensitivity:

DC: 20,000 ohms per volt.

AC: 1,000 ohms per volt.

Accuracy:

DC:  $\pm 2\%$  at 25° C.

AC:  $\pm 5\%$  at 25° C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Simpson Electric Company, Chicago 44, Illinois; Contract Nos. 977-45, 1/16/45, 627-44, 11/12/45; Approximate Cost per Unit, \$33.00.

Electronic Designs, Inc., New York, New York.

Galvin Manufacturing Corporation, Chicago, Illinois; Contract Nos. 12077-43, 30 June 1943; Approximate Cost per Unit, \$26.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-40IS189-2 (Maintenance Instructions).

TO 16-40IS189-5 (TM 11-1244) (Instruction Book).

TO 16-55-173 (Spare Parts List).

NAVAER 08-5QS-16 (Instruction Book).

SHIPPING DATA:

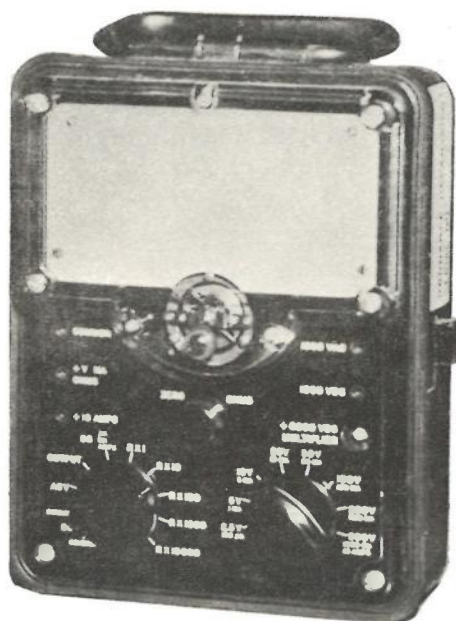
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltmeter, IS-189, with accessories. (Water resistant carton).	0.23	10	8	5	5
IS-189 - Electronics Test Equipment -						







## MULTIMETER ME-48A/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, miniature instrument used for measuring AC and DC voltage, DC current, and resistance. The meter is used in organizational, field, and depot maintenance. Test results are obtained from the multiscale meter.

### RELATIONSHIP TO OTHER EQUIPMENT:

The ME-48A/U is similar to the ME-48/U except that the ME-48A/U has extended ranges and is made by a different manufacturer. The ME-48A/U is functionally interchangeable with Multimeter AN/PSM-4A.

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The multimeter is a light, compact nonelectronic instrument.

Conventional circuits are used throughout. The instrument utilizes a 50 microamps meter movement.

**Power Supply:** Batteries, 1.5-volt (BA-30) and 22.5-volt.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.:		Navy BuShips
F. I. L. N.:	FUNCTIONAL CLASS. NO.:		1. 3. 2. 1
- Electronics Test Equipment -			ME-48A/U

## MULTIMETER ME-48A/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

Direct Current Range: 0 to 10 amps in 9 ranges.

Resistance Range: 0 to 30 megohms in 5 ranges.

Voltage Range: 0 to 5000 volts AC in 10 ranges; 0 to 1000 volts DC in 9 ranges.

#### Accuracy:

Resistance Range:  $\pm 3\%$

AC Ranges:  $\pm 5\%$ .

DC Ranges:  $\pm 3\%$ .

### MANUFACTURERS' OR CONTRACTORS' DATA:

Simpson Electric Company, 5208 West Kenzie Street, Chicago, Illinois.

### TUBE COMPLEMENT:

NA

### REFERENCE DATA AND LITERATURE:

ME-48A/U: SC Form 567.

### EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter ME-48A/U	plas- tic		8	6	4-1/2	

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Multimeter ME-48A/U					
ME-48A/U - Electronic Test Equipment -						

## MULTIMETER TS-297/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, multi-range test instrument incorporating a 2-1/2 inch hermetically sealed meter for measuring voltage, current and resistance. With the addition of a capacitor (0.1 microfarad with voltage rating exceeding the voltage in the circuit under test), it may also be used as an output meter. Three scales are calibrated in DC volts and milliamperes, ohms, and AC volts.

### RELATIONSHIP TO OTHER EQUIPMENT:

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: For resistance measurements only, 1.5 volts supplied by one 1.5 volt Battery BA-42.

Alternating Voltage Ranges: 0 to 4, 10, 40, 100, 400, and 1000 volts.

Direct Voltage Ranges: 0 to 4, 10, 40, 100, 400, and 1000 volts.

Direct Current Ranges: 0 to 4, 40, 100, and 400 milliamperes.

Resistance Ranges: 0 to 1000, 10,000 and 100,000 ohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		Standard
STOCK NOS.	7CAC-587845	N17-M-28083-2186	3F4325-297
PROCUREMENT INFO.:	MIL-M-10263(SigC) 26 Apr. 50&Am; SigC Dwg. SC-C24403		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.1		
	- Electronics Test Equipment -		TS-297/U

## MULTIMETER TS-297/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

Meter Resistance: 100 ohms (at the 0 to 4 milliampere pin jacks).

Sensitivity: 1000 ohms per volt for all alternating and direct voltage ranges.

#### Accuracies (full scale):

All Direct Current Ranges:  $\pm 3.0\%$  at  $+25^{\circ}$  C.

$\pm 6.0\%$  at  $-40^{\circ}$  C.

$\pm 5.0\%$  at  $+55^{\circ}$  C.

All Alternating Current Ranges:  $\pm 5.0\%$  at  $+25^{\circ}$  C.

$\pm 8.0\%$  at  $-40^{\circ}$  C.

$\pm 6.0\%$  at  $+55^{\circ}$  C.

All Ohm Ranges:  $\pm 3.0\%$  at  $+25^{\circ}$  C.

$\pm 5.0\%$  at  $+55^{\circ}$  C.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Chicago Industrial Instrument Company, 536 West Elm Street, Chicago 10, Illinois; Contract No. W36-039-sc-35613 (1948); Order No. 11906-Phila-47-77.

Utility Electronics Corporation, Newark, New Jersey.

Radio City Products Company, Inc.; SigC Order No. 6872-PH-51.

### TUBE COMPLEMENT:

None.

### REFERENCE DATA AND LITERATURE:

TO 16-35TS297-5 (Instruction Book).

TM 11-5500, C1 and C2 (Instruction Book).

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	TS-297/U Multimeter Including accessories and Technical Manual. (Packed for Export Shipment).	0.11	7-1/2	5-1/2	4-1/2	3.3
TS-297/U - Electronics Test Equipment -						

MULTIMETER TS-297/U

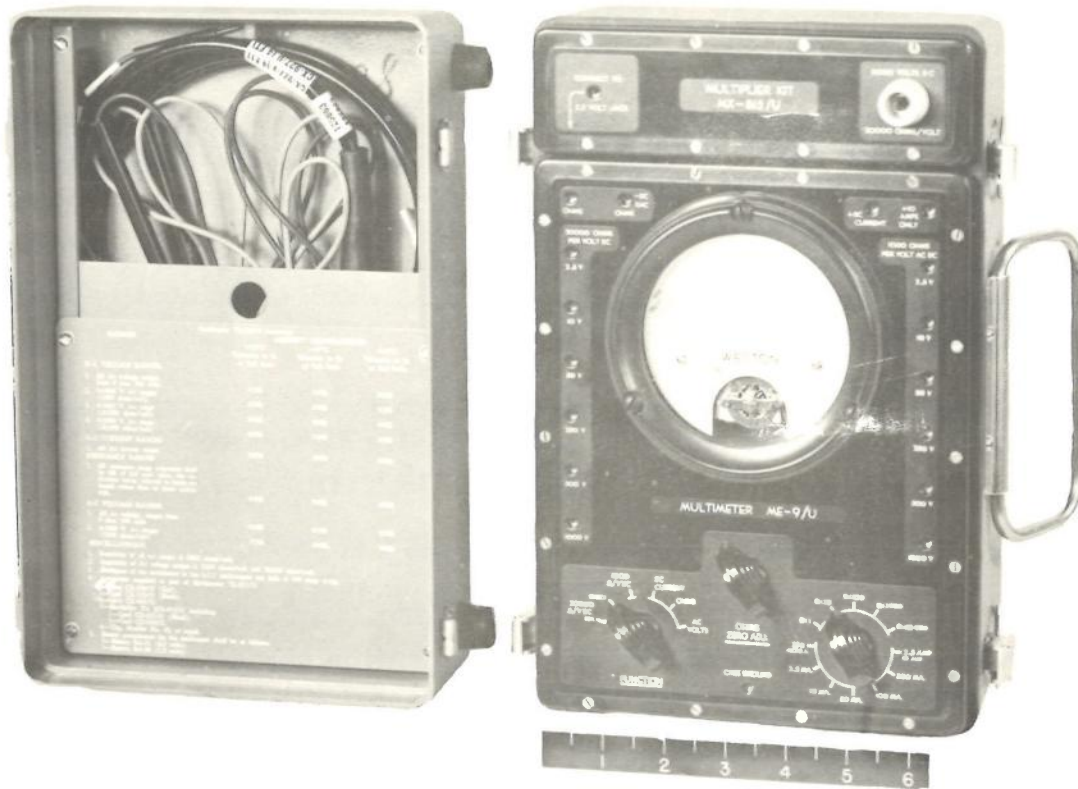
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter TS-297/U (Complete)	Alum- inum	7CAC-587845 N17-M-28083-2186 3F4325-297	6-1/8	3-1/4	3-1/4	2.38
2	Cord CX-1331/U		7CAC-468850  3E8000-53	48 long			
1	Cord CX-1332/U		7CAC-468875  3E8000-53.1	48 long			
- Electronics Test Equipment -							
							TS-297/U



MULTIMETER TS-352/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



FUNCTIONAL DESCRIPTION:

A portable, general purpose, multi-range instrument for use in circuit analysis and trouble-shooting on electrical and electronic equipment. Accurate and reliable readings of voltage, current, and resistance are given even under extreme service conditions on a multi-calibrated dial.

RELATIONSHIP TO OTHER EQUIPMENT:

Replaced by Multimeter AN/PSM-6 for USAF use.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The indicating instrument is a 50 microampere DC meter of the D'Arsonval type. Essentially the voltmeter circuit is a resistor in series with the meter. The alternating voltage input is rectified by a full wave metallic rectifier unit before it is applied to the meter.

Power Supply: 1.5 volts supplied by one Battery BA-30 (1.5 volts) and 13.5 volts supplied by three Battery BA-31 (4.5 volts) required for operation of ohmmeter only.

Frequency Range: 25 to 5000 cycles per second, useful to 20,000 cycles per second. Alternating Voltage Ranges: 0 to 2.5, 10, 50, 250, 500 and 1000 volts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard	Standard	Standard
STOCK NOS.	7CAC-801319-233	ASO-R16-AN-TS-352/U	3F4325-352
PROCUREMENT INFO.:	USAF Spec. 7090A (26 Nov. 46), SigC Spec. SCL-111		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.1		
	- Electronics Test Equipment -		TS-352/U

MULTIMETER TS-352/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Direct Voltage Ranges: 0 to 2.5, 10, 50, 250, 500, and 1000 volts.  
0 to 5000 volts using multiplier MX-815/U.

Direct Current Ranges: 0 to 0.25, 2.5, 10, 50, 100, 500, 2500, 10000 milliamperes.

Resistance Ranges: 0 to 1000, 10000, 100000, 1000000, 10000000 ohms.

Sensitivity: 1000 ohms per volt for all AC ranges.

1000 or 20000 ohms per volt for DC voltage ranges.

Dial Scales: The top arc is used for ohms. The center arc is used for all DC readings, both voltage and current. The lower arc, which is printed in red, is used for all AC readings.

Accuracy:

DC ranges:  $\pm 3\%$  at  $+25^{\circ}\text{C}.$ ,  $\pm 6\%$  at  $-40^{\circ}\text{C}.$ ,  $\pm 5\%$  at  $+55^{\circ}\text{C}.$ , except for 0 to 1,000 volt scale (20,000 ohms per volt) with  $\pm 4\%$  at  $+25^{\circ}\text{C}.$ ,  $\pm 8\%$  at  $-40^{\circ}\text{C}.$ ,  $\pm 6\%$  at  $+55^{\circ}\text{C}.$ , and the 0 to 5000 volt scale with  $\pm 6\%$  at  $+25^{\circ}\text{C}.$ ,  $\pm 9\%$  at  $-40^{\circ}\text{C}.$ ,  $\pm 8\%$  at  $55^{\circ}\text{C}.$

AC Ranges:  $\pm 4\%$  at  $+25^{\circ}\text{C}.$ ,  $\pm 7\%$  at  $-40^{\circ}\text{C}.$ ,  $\pm 5\%$  at  $+55^{\circ}\text{C}.$ , except for 0 to 1000 volt scale with  $\pm 5\%$  at  $+25^{\circ}\text{C}.$ ,  $\pm 8\%$  at  $-40^{\circ}\text{C}.$ ,  $\pm 6\%$  at  $+55^{\circ}\text{C}.$

Resistance Ranges:  $\pm 3\%$  at  $+25^{\circ}\text{C}.$ ,  $\pm 6\%$  at  $-40^{\circ}\text{C}.$ ,  $\pm 5\%$  at  $+55^{\circ}\text{C}.$ , (Accuracies shall be percent of full scale value, the indication being referred to meter arc length rather than to ohms indicated.)

Frequency Error:  $\pm 3\%$  at 10 kilocycles per second;  $\pm 7\%$  at 20 kilocycles per second.

Ambient Temperature Range:  $-40^{\circ}\text{C}.$  to  $+55^{\circ}\text{C}.$

MANUFACTURERS' OR CONTRACTORS' DATA:

(Using ME-9/U) Weston Electrical Instrument Company, Newark, New Jersey Contract No. W33-038-ac-18059; Approximate Cost Per Unit, \$75.00.

(Using ME-9A/U) Utility Electronics Corporation, 231 Grant, Newark, New Jersey, Contract AF 33(038)7378 and AF 33(038)5153, dated 16 June 1949; Approximate Cost Per Unit, \$59.00.

(Using ME-9B/U) Phaostron Company, South Pasadena, California, Contracts AF 33(038)9974, dated 31 January 1949, AF 33(038)15118, dated 29 August 1950, AF 33(038)15541 dated 30 August 1950, AF 33(038)10958, dated 2 May 1950; Approximate cost per Unit \$69.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

ME-9/U: TO 16-35TS352-3 and TO 16-35TS352-4.

ME-9A/U: TO 16-35TS352-6, TO 16-35TS352-7, and TO 16-35TS352-8.

ME-9B/U: TO 16-35TS352-10, and TO 16-35TS352-12.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Multimeter, TS-352/U, with accessories. (Shelf Package-water resistant carton)	0.95	15	11	10	20.9

TS-352/U

- Electronics Test Equipment -



MULTIMETER TS-352/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter TS-352/U Including:	Aluminum	7CAC-801319-233 ASO-RI6-AN-TS-352/U 3F4325-352	11-3/8	8-1/4	6	13.72
1	Multimeter ME-9/U or ME-9A/U or ME-9B/U		2Z6409	9	7	5-1/2	4.69
1	Multiplier Kit MX-815/U			2-1/4	7	5-1/2	0.5
1	Patch Cord CX-939/U		7CWQ-125861	8-1/2 long			0.015
1	Cord CX-927/U		7CAC-468919-35	48 long			0.200
1	Cord CX-468/U		1690-322975605 3E6000-468	48 long			0.250
1	Test Lead CX-529/U, (Red)		7CAC-468919-7 3E6000-529	48 long			0.050
1	Test Lead CX-529/U, (Black)		7CAC-468919-7 3E6000-529	48 long			0.050
4	Alligator Clip Mueller No. 60			1-1/2 long			0.030
1	Cover			11-3/8	8-1/4	2-1/2	2.44
1	Case			11-3/8	8-1/4	3-1/2	5.47
- Electronics Test Equipment -							
							TS-352/U



## MULTIMETER TS-352A/U



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, multi-range instrument for use in circuit analysis and troubleshooting on electrical and electronic equipment. Accurate and reliable readings of voltage, current, and resistance are given even under extreme service conditions on a multicalibrated dial.

### RELATIONSHIP TO OTHER EQUIPMENT:

Replaced by Multimeter AN/PSM-6 for USAF use.

### ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The indicating instrument is a 50 microampere DC meter of the D'Arsonval type. Essentially the voltmeter circuit is a resistor in series with the meter. The alternating voltage input is rectified by a full wave metallic rectifier unit before it is applied to the meter.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-801319-266	R16-AN-TS-352A/U	3F4325-352A
PROCUREMENT INFO.:	USAF Spec. MIL-M-4269, dtd 16 Mar 51 & Am. 2 dtd 24 Apr 53		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		1.3.2.1
	- Electronics Test Equipment -		TS-352A/U

## MULTIMETER TS-352A/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 1.5 volts supplied by one Battery, BA-30 (1.5 volts) and 13.5 volts supplied by three Battery, BA-31 (4.5 volts) required for operation of ohmmeter only.

Frequency Range: 25 to 5000 cycles per second, useful to 20,000 cycles per second.

Alternating Voltage Ranges: 0 to 2.5, 10, 50, 250, 500 and 1000 volts.

Direct Voltage Ranges: 0 to 2.5, 10, 50, 250, 500 and 1000 volts.

0 to 5000 volts using Multiplier MX-815/U.

Direct Current Ranges: 0 to 0.25, 2.5, 10, 50, 100, 500, 2500, 10,000 milliamperes.

Resistance Ranges: 0 to 1000, 10,000, 100,000, 1,000,000, 10,000,000 ohms.

Sensitivity: 1000 ohms per volt for all AC ranges.

1000 or 20,000 ohms per volt for DC voltage ranges.

Dial Scales: The top arc is used for ohms. The center arc is used for all DC readings, both voltage and current. The lower arc, which is printed in red, is used for all AC readings.

### Accuracy:

DC ranges:  $\pm 3\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 6\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 5\%$  at  $+55^{\circ}\text{C}$ ., except for 0 to 1000 volt scale (20,000 ohms per volt) with  $\pm 4\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 8\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 6\%$  at  $+55^{\circ}\text{C}$ . and the 0 to 5000 volt scale with  $\pm 6\%$  at  $25^{\circ}\text{C}$ .,  $\pm 9\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 8\%$  at  $+55^{\circ}\text{C}$ .

AC ranges:  $\pm 4\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 7\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 5\%$  at  $+55^{\circ}\text{C}$ ., except for 0 to 1000 volt scale with  $\pm 5\%$  at  $25^{\circ}\text{C}$ .,  $\pm 8\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 6\%$  at  $+55^{\circ}\text{C}$ .

Resistance ranges:  $\pm 3\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 6\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 5\%$  at  $+55^{\circ}\text{C}$ . (Accuracies shall be percent of full scale value, the indication being referred to meter arc length rather than to ohms indicated).

Frequency Error:  $\pm 3\%$  at 10 kilocycles per second;  $\pm 7\%$  at 20 kilocycles per second.

Ambient Temperature Range:  $-40^{\circ}\text{C}$ ., to  $+55^{\circ}\text{C}$ .

### MANUFACTURERS' OR CONTRACTORS' DATA:

(Using ME-9C/U) Phaostron Company, South Pasadena, California; Contract AF 33(038)30488; Approximate Cost per Unit, \$68.00.

(Using ME-9D/U) Technicraft Corporation, Kansas City, Missouri; Contract AF 33(038)14134; Approximate Cost per Unit, \$68.00.

(Using ME-9E/U) Weston Electrical Instrument Company, Newark, New Jersey; Contract AF 33(600)17777; Approximate Cost per Unit, \$68.00.

(Using ME-9F/U) Lanagon and Hoke, Warrington, Pennsylvania; Contract AF 33(038)21107.

### TUBE COMPLEMENT:

None.

### REFERENCE DATA AND LITERATURE:

ME-9D/U: TO 16-35TS352-14 and TO 16-35TS352-16.

ME-9E/U: TO 16-35TS352-42 and TO 16-35TS352-44.

MULTIMETER TS-352A/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter TS-352A/U Including:	Aluminum	7CAC-801319-266 R16-AN-TS-352A/U 3F4325-352A	11-3/8	8-1/4	6	13.72
1	Multimeter ME-9C/U, or ME-9D/U, or ME-9E/U, or ME-9F/U		2Z6409	9	7	5-1/2	4.69
1	Multiplier Kit MX-815/U			2-1/4	7	5-1/2	0.50
1	Patch Cord CX-939/U		7CWQ-125861	8-1/2 long			0.01
1	Cord CX-927/U		7CAC-468919-35	48 long			0.20
1	Cord CX-1332/U			48 long			0.25
1	Test Lead Set CX-1331A/U			49-1/2 long			0.13
1	Cover	Aluminum		11-3/8	8-1/4	2-1/2	2.44
1	Case	Aluminum		11-3/8	8-1/4	3-1/2	5.47
4	Alligator Clip Muller No. 60			1-1/2			0.03

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Multimeter, TS-352A/U with accessories. (Shelf-Package Water Resistant Carton)	0.95	15	11	10	20.9

- Electronics Test Equipment - TS-352A/U



MULTIMETER TS-352B/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose, multi-range instrument for use in circuit analysis and troubleshooting on electrical and electronic equipment. Accurate and reliable readings of voltage, current and resistance are given even under extreme service conditions on a multi-calibrated dial.

RELATIONSHIP TO OTHER EQUIPMENT:

Replaced by Multimeter AN/PSM-6 for USAF use.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The indicating instrument is a 50 microampere DC meter of the D'Arsonval type. Essentially the voltmeter circuit is a resistor in series with the meter. The alternating voltage input is rectified by a full wave metallic rectifier unit before it is applied to the meter.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		ASO-R16-A N-TS-352B/U	3F4325-352B
PROCUREMENT INFO.:	USAF Spec.MIL-M-4269, dtd 16 Mar 51, & Am.2 dtd 24 Apr 53		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.3.2.1
	- Electronics Test Equipment -		TS-352B/U

## MULTIMETER TS-352B/U

### ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 1.5 volts supplied by one Battery BA-30 (1.5 volts) and 13.5 volts supplied by three Battery BA-31 (4.5 volts) required for operation of ohmmeter only.

Frequency Range: 25 to 5000 cycles per second, useful to 20,000 cycles per second.

Alternating Voltage Ranges: 0 to 2.5, 10, 50, 250, 500, and 1000 volts.

Direct Voltage Ranges: 0 to 2.5, 10, 50, 250, 500, and 1000 volts.

0 to 5000 volts using Multiplier MX-815/U.

Direct Current Ranges: 0 to 0.25, 2.5, 10, 50, 100, 500, 2500, 10,000 milliamperes.

Resistance Ranges: 0 to 1000, 10,000, 100,000, 1,000,000, 10,000,000 ohms.

Sensitivity: 1000 ohms per volt for all AC ranges.

1000 or 20,000 ohms per volt for DC voltage ranges.

Dial Scales: The top arc is used for ohms. The center arc is used for all DC readings, both voltage and current. The lower arc, which is printed in red, is used for all AC readings.

### Accuracy:

DC ranges:  $\pm 3\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 6\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 5\%$  at  $+55^{\circ}\text{C}$ . except for 0 to 1000 volt scale (20,000 ohms per volt) with  $\pm 4\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 8\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 6\%$  at  $+55^{\circ}\text{C}$ . and the 0 to 5000 volt scale with  $\pm 6\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 9\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 8\%$  at  $+55^{\circ}\text{C}$ .

AC ranges:  $\pm 4\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 7\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 5\%$  at  $+55^{\circ}\text{C}$ . except for 0 to 1000 volt scale with  $\pm 5\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 8\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 6\%$  at  $+55^{\circ}\text{C}$ .

Resistance ranges:  $\pm 3\%$  at  $+25^{\circ}\text{C}$ .,  $\pm 6\%$  at  $-40^{\circ}\text{C}$ .,  $\pm 5\%$  at  $+55^{\circ}\text{C}$ . (Accuracies shall be percent of full scale value, the indication being referred to meter arc length rather than to ohms indicated).

Frequency Error:  $\pm 3\%$  at 10 kilocycles per second;  $\pm 7\%$  at 20 kilocycles per second.

Ambient Temperature Range:  $-40^{\circ}\text{C}$ . to  $+55^{\circ}\text{C}$ .

### MANUFACTURERS' OR CONTRACTORS' DATA:

Phaotron Company, S. Pasadena, California; USAF Contract AF 33(604)8726, 1953; Approximate Cost per Unit, \$67.00.

### TUBE COMPLEMENT:

None.

### REFERENCE DATA AND LITERATURE:

TO 16-35TS352-31.

TO 16-35TS352-32.

TO 16-35TS352-34.



MULTIMETER TS-352B/U

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Multimeter TS-352B/U with accessories (Shelf Package - Water Resistant Carton)	0.95	15	11	10	20.9

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter TS-352B/U Including:	Aluminum	R16-AN-TS-352B/U 3F4325-352B	11-3/8	8-1/4	6	13.72
1	Multimeter ME-9G/U		2Z6409	9	7	5-1/2	4.69
1	Multiplier Kit MX-815B/U			2-1/4	7	2-1/4	0.50
1	Patch Cord CX-939/U		7CWQ-125861	8-1/2 long			0.01
1	Cord CX-927/U		7CAC-468919-35	48 long			0.20
1	Adapter, Test U-144/U			2-1/2	1	1/2	0.25
1	Test Lead Set CX-1331A/U			49-1/2 long			0.13
1	Cover	Aluminum		11-3/8	8-1/4	2-1/2	2.44
1	Case	Aluminum		11-3/8	8-1/4	3-1/2	5.47
4	Alligator Clip Mueller No. 60			1-1/2 long			0.03



MULTIMETER TS-380/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, volt-ohm-milliammeter which will measure AC and DC voltage, direct current, and resistance. It is for maintenance use with ground wire communication equipment in checking wiring or apparatus.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Western Electric D-166852 Volt-Ohm-Milliammeter.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** An internal copper-oxide rectifier provides means for use of the DC meter movement as an AC voltmeter.

**Power Supply:** 4.5 volts supplied by one 4.5 volt Battery BA-31.

**Voltage Ranges:** 0 to 3, 15, 30, 150, 300 volts, AC or DC.

**Current Ranges:** 0 to 0.15, 3, 15 amperes DC.

**Resistance Ranges:** 0 to 1,000, 10,000, 100,000, 1,000,000 ohms.

**Meter Movement:** 100 microamperes for full scale deflection.

**Voltmeter Sensitivity:** 2,000 ohms per volt.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		Standard
STOCK NOS.	1600-328086100		3F7127
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.1		
	- Electronics Test Equipment -		TS-380/U

MULTIMETER TS-380/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracies: All DC Measurements:  $\pm 2\%$ .

All AC Measurements:  $\pm 5\%$ .

Resistance Measurements at center scale:  $\pm 2\%$ .

Outer Scale Length: 3 inches.

MANUFACTURERS' OR CONTRACTORS' DATA:

Western Electric Company, 120 Broadway, New York 5, New York. Army Orders 2674-MPD-44 and 1319-MPD-45.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-40-10 (TM 11-2042) (Instruction Book).

EQUIPMENT SUPPLIED:

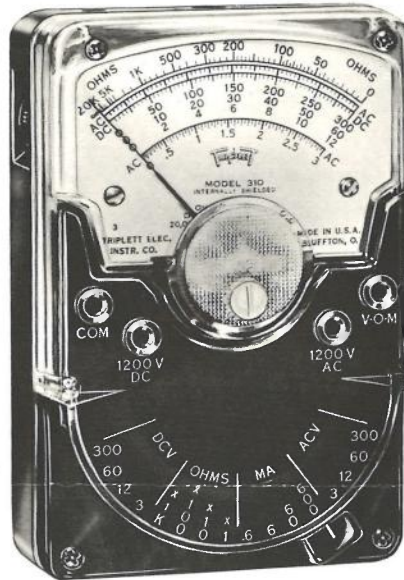
Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter TS-380/U	Bake-lite	1600-328086100 3F7127	7-1/2	4-1/2	3	3.25
2	Test Pick Lead						
2	Test Clip Lead						
1	Carrying Case	Fiber		9	7	6	1.75

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Multimeter, TS-380/U (Domestic Packed)	0.28	9-1/2	7-1/2	6-3/4	6.5

TS-380/U - Electronics Test Equipment -

VOLT-OHM-MILLIAMMETER  
MODEL 310  
(Triplett Electrical Instrument Company)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, self-contained instrument used to measure AC and DC voltage, milliamperes, and resistance. The instrument is used at field and depot levels of maintenance. Test results are indicated on a calibrated meter.

**RELATIONSHIP TO OTHER EQUIPMENT:**

NI

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The instrument consists essentially of a meter, switching circuits, a crystal rectifier circuit and a power supply. The metering circuit is shielded against external magnetic fields.

**Power Supply:** One 1.5-volt and one 15-volt battery.

**Ranges:**

Direct Voltage: 0 to 3, 12, 60, 300, 1200 volts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.: Commercial		
F.I.L.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.1		
- Electronics Test Equipment -			Model 310

VOLT-OHM-MILLIAMMETER MODEL 310  
(Triplett Electrical Instrument Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Alternating Voltage: 0 to 3, 12, 60, 300, 1200 volts.

Direct Current: 0 to 0.6, 6, 60, 600 milliamperes at 250 microvolts.

Ohms: 0 to 20,000, 200,000 ohms; 2, 20 megohms.

Sensitivity: 20,000 ohms per volt DC; 5000 ohms per volt AC.

Accuracy (on Sine Wave at 77°F at 60 cycles per second): 3% (DC); 4% (AC).

MANUFACTURERS' OR CONTRACTORS' DATA:

Triplett Electrical Instrument Company, Bluffton, Ohio, approximate unit cost, \$34.50.

TUBE COMPLEMENT:

NA

REFERENCE DATA AND LITERATURE:

Manufacturer's Instruction Manual.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Volt-Ohm-Milliammeter Triplett 310					
Model 310 - Electronic Test Equipment -						

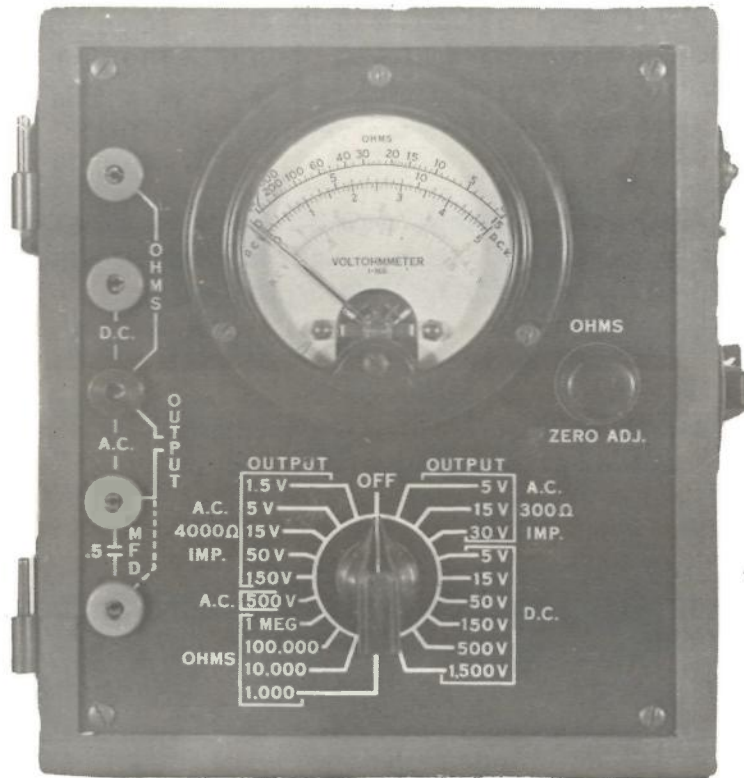






VOLTOHMMETER I-166  
(MULTIMETER, I-166)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multifilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, self-contained, measuring instrument especially designed for the servicing of radio and radar equipment. It is capable of measuring alternating and direct current voltages as well as direct current resistance.

**RELATIONSHIP TO OTHER EQUIPMENT:**

This unit is furnished both as an individual unit and as a component of other sets.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: 4.5 volts DC, supplied by one Battery, BA-31 (4.5 volts).

Audio Frequency Voltage Ranges:

At 4000 ohms Impedance: 0 to 1.5, 5, 15, 50 and 150 volts.

At 300 ohms Impedance: 0 to 5, 15, and 30 volts.

Alternating Voltage Range: 0 to 500 volts (Sensitivity: 2,666 ohms per volt).

Direct Voltage Ranges:

At a sensitivity of 1000 ohms per volt: 0 to 5, 15, 50, 150, 500, and 1500 volts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Not Classified		Limited Standard
STOCK NOS.	1600-328088750	N17-M-27527-2982	3F7166
PROCUREMENT INFO.:	Army Spec. No. 71-1766, Dwg. No. SC-C-6228		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.2		
	- Electronics Test Equipment -		I-166

VOLTOHMMETER I-166  
(MULTIMETER, I-166)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Direct Current Resistance Ranges: 0 to 1,000, 10,000, 100,000, and 1,000,000 ohms.  
Accuracy: ±2%. (When audio frequency voltages are measured while using the series capacitor, the accuracy of meter readings is affected at frequencies below 500 cycles).

MANUFACTURERS' OR CONTRACTORS' DATA:

Triplett Electrical Instrument Company, 286 Harmon Road, Bluffton, Ohio; Order Nos. 43399-Phila-45, 33720-Phila-43, 4444-Phila-44.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-2613 and C1 (Technical Manual).

TO 16-401166-5 (Instruction Book).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltohmmeter I-166 (Complete)	Wood	1600-328088750 N17-M-27527-2982 3F7166	5-1/2	6	7	4.75
		or Steel		5-1/2	6	7	5.50
2	Test Leads		1600-326432600 3F3153	48 long			
4	Detachable Alligator Clips		8800-154780 3Z1087	2			
2	Technical Manuals TM 11-2613						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltohmmeter, I-166 and accessories (Packed for domestic shipment).	0.361	7-1/2	9-5/8	8-5/8	6

I-166

- Electronics Test Equipment -

TEST SET TS-26A/TSM  
(TEST SET, ELECTRICAL POWER, TS-26A/TSM)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, line testing volt-ohmmeter used to detect grounds, crosses, shorts, and opens, and to measure insulation and conductor resistance as well as line and battery voltage. It also may be used for the location of opens by means of the capacitance kick method. The meter is calibrated in ohms and volts DC. One switch provides for polarity reversing of the test leads and another switch provides for inserting a 45 volt battery and a series resistor in the circuit.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to TS-26/TSM except that the "A" model has an internal resistance of 760 ohms rather than the 2000 ohms of the older model. Other differences would include changes in internal wiring and differences in types of components. Similar to Volt-ohmmeter TS-291A/U and Weston 564 except for the addition of the switching panel for line testing on the TS-26A/TSM.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F4325-26A
PROCUREMENT INFO.:	Spec. MIL-T-2502, Dwg. No. SC-A-7895		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.3.2.2
	- Electronics Test Equipment -		TS-26A/TSM

TEST SET TS-26A/TSM  
(TEST SET, ELECTRICAL POWER, TS-26A/TSM)

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The test set consists essentially of a standard, self-contained, volt-ohmmeter unit and a separate switch panel which facilitates certain tests peculiar to line maintenance.

**Power Supply:** 4.5 volts, DC, supplied by one Battery BA-31, or 45 volts, DC, supplied by one Battery BA-59.

**Voltage Range:** 0 to 3, 30, 300, 600 volts DC.

**Resistance Range:** 0 to 1000, 10,000, 100,000, 1,000,000 ohms. With the series resistor switched into the circuit the range is extended to 10 megohms.

**Sensitivity:** 1000 ohms per volt.

**Accuracy:** ±2%.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

J. H. Bunnell and Company, Brooklyn, New York.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

TM 11-2017 (TO16-35TS26-5) (Instruction Book with changes C1 and C2).

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set TS-26A/TSM		3F4325-26A	5-1/2	8-5/32	7-1/8	
1	Cord		1B1018.1	48 long			
1	Cord		1B1018	48 long			
							Total: 8.5 including batteries

**SHIPPING DATA:**

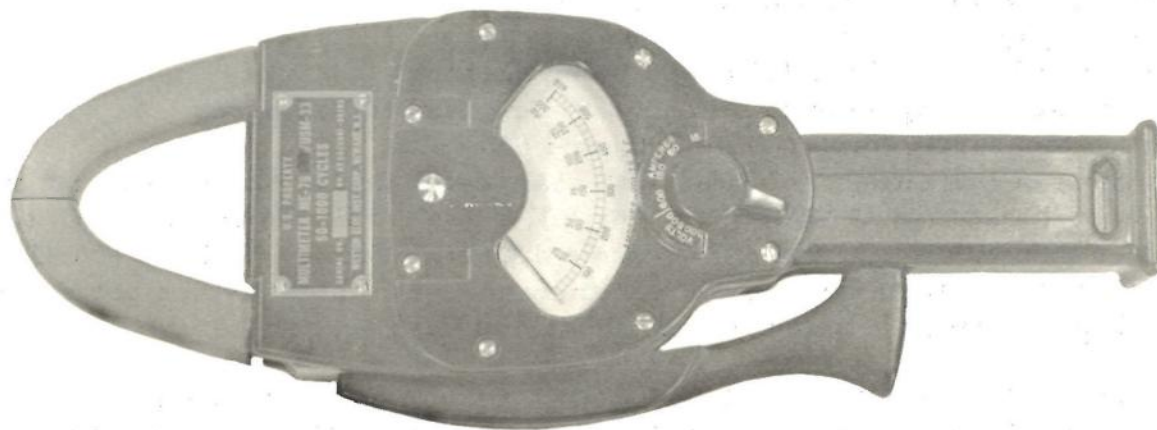
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set TS-26A/TSM (Export Packed)	1.6	12-1/2	15-1/2	14-1/2	19

TS-26A/TSM

- Electronics Test Equipment -

## MULTIMETER AN/USM-33

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, AC, clamp-on line type multimeter. The instrument measures voltages and currents within its indicating and frequency ranges. The special feature of clamping on a line makes possible the measurements of current without electrically altering the circuit to be measured, making for convenient, fast operation. The special included leads are required to make voltage measurements. The meter is housed in a watertight enclosure for protection against inclement weather conditions.

### RELATIONSHIP TO OTHER EQUIPMENT:

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** The meter has a basic DC indicating type movement with a germanium diode crystal rectifier in a bridge rectifier circuit to adapt it for AC measurements. Shunt and series resistor circuits select the ranges and types

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Tentative Standard		
STOCK NOS.			
PROCUREMENT INFO.: USAF Exhibit MCREE-848-A.			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.3.2.3	
- Electronics Test Equipment -			AN/USM-33

## MULTIMETER AN/USM-33

### ELECTROMECHANICAL DESCRIPTION: (Continued)

of operation through a switching arrangement. The clamp constitutes the secondary of the transformer to create a magnetic linkage between the meter circuits and the line whose current is to be measured.

Power Supply: None required.

Frequency Range: 50 to 1000 cycles per second.

Current Measuring Range: 0 to 15, 60, 150, and 600 amperes.

Voltage Measuring Range: 0 to 300, and 600 volts.

Accuracy of Indication:  $\pm 2\%$  for full-scale deflection at  $+25^{\circ}\text{C}$ . and 60 cycles per second; less than  $\pm 3\%$  additional for full-scale deflection from  $-40^{\circ}\text{C}$ . to  $\pm 25^{\circ}\text{C}$ .; less than  $\pm 2\%$  additional of full-scale deflection from  $+25^{\circ}\text{C}$ . to  $+55^{\circ}\text{C}$ .;  $\pm 2\%$  additional full-scale deflection, maximum change from 60 cycles per second to any other frequency between 50 and 1000 cycles per second.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Company, Newark, New Jersey; USAF Contract AF 33(038)30102.

### TUBE COMPLEMENT:

1 JAN-1N34 (crystal rectifier).

### REFERENCE DATA AND LITERATURE:

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

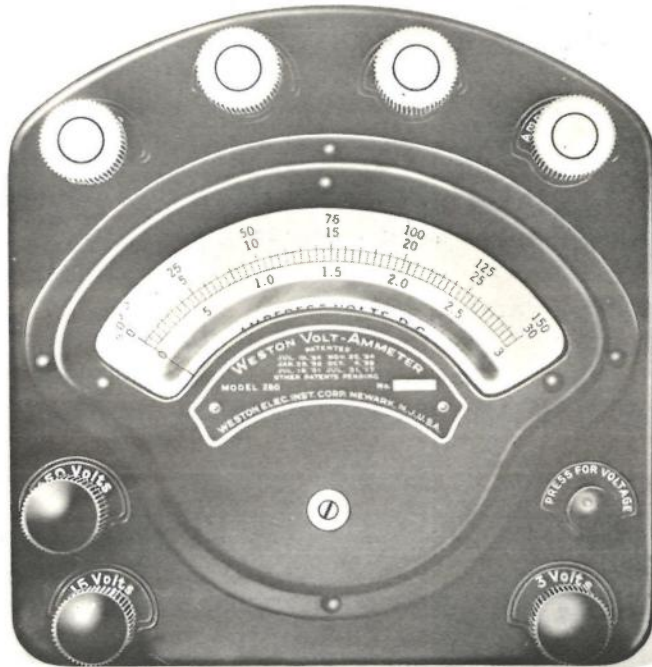
AN/USM-33 - Electronics Test Equipment -







VOLTAMMETER I-50  
(MULTIMETER I-50)



**FUNCTIONAL DESCRIPTION:**

A pocket size, portable, general purpose, non-electronic instrument used to measure direct current and direct voltage of electrical equipment. All indications are shown on a triple scale dial.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to Weston Model No. 280, Volt-Ammeter.

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: A permanent magnet, moving coil type meter shielded from external magnetic fields. Scale employs a knife edged pointer and mirror to eliminate parallax errors.

Power Supply: None required.

Voltage Range: 0 to 150 volts, DC, in three ranges: 0 to 3, 15, 150 volts.

Current Range: 0 to 30 amperes, DC, in three ranges: 0 to 3, 15, 30 amperes.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-930150	F17-M-27338-5786	3F6050
PROCUREMENT INFO.:	Army Spec. 71-294		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		1.3.2.3
- Electronics Test Equipment -			I-50

VOLTAMMETER I-50  
(MULTIMETER, I-50)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Movement Sensitivity: 10 milliamperes.  
 Movement Resistance: 2.5 ohms.  
 Dial Scale: 2.76 inches long with 60 divisions.  
 Accuracy:  $\pm 1\%$ .

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instruments, Inc., Newark 5, New Jersey; Approximate Cost per Unit, \$60.00 with carrying case, November 1949.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltammeter I-50		7CAC-930150 F17-M-27338-5786 3F6050	4-1/2	4-1/2	1-1/2	1.1

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
I-50 - Electronics Test Equipment -						

TEST UNIT I-201  
(TEST SET, RADIO I-201)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



FUNCTIONAL DESCRIPTION:

A multi-range analyzer, consisting of four meters with associated cordage used for checking and measuring various voltages and currents at predetermined points in target-control transmitting and receiving equipments. It will measure plate and grid current values in target-control transmitters and limiter grid current and audio voltages in target-control receivers.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: None.

Meter Ranges:

Direct Current: 0 to 200 microamperes.

0 to 1, 5, and 150 milliamperes.

Alternating Voltage: 0 to 20 volts.

Meter Accuracy: Within  $\pm 5\%$ .

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		Not Classified
STOCK NOS.	7CAC-801319-2582		3F4470-201
PROCUREMENT INFO.:	USAF Spec. No. 271-1755; Dwg. No. 47G41323 & 47B41324		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, ARL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.3		
	- Electronics Test Equipment -		I-201

TEST UNIT I-201  
(TEST SET, RADIO I-201)

ELECTROMECHANICAL DESCRIPTION: (Continued)  
Voltmeter Sensitivity: 1000 ohms per volt.

MANUFACTURERS' OR CONTRACTORS' DATA:  
Doolittle Radio Inc., Chicago 36, Illinois, Order 11792-WF-43.

TUBE COMPLEMENT:  
None.

REFERENCE DATA AND LITERATURE:  
TO 16-40I201-3 (Maintenance Instructions).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Unit I-201 (Complete)	Wood	7CAC-801319-2582  3F4470-201	11-7/16	10-11/16	5-1/2	10.0
1	Trimmer Screw Driver		7900-678112120  6R14996	4-1/8 long			

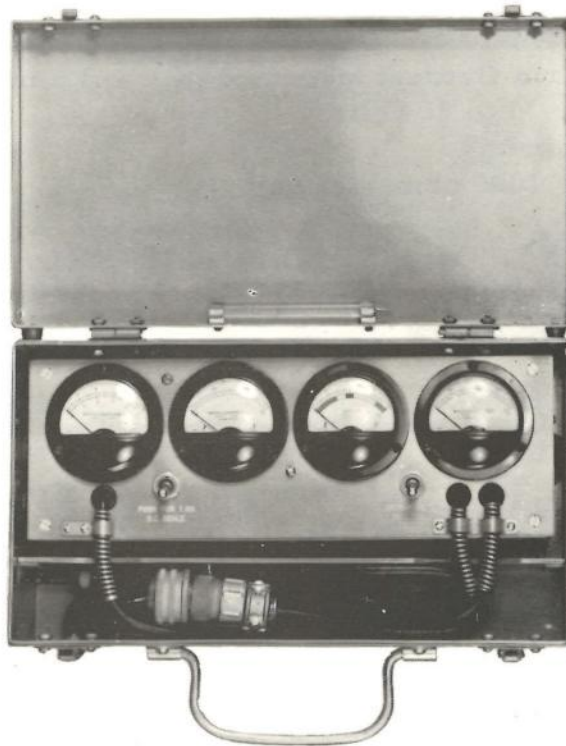
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Unit, I-201, with accessories. (Packed in water resistant carton).	0.68	14	12	7	12.0

I-201 - Electronics Test Equipment -

TEST UNIT I-201-A  
(TEST SET, RADIO, I-201-A)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



**FUNCTIONAL DESCRIPTION:**

A multi-range analyzer, consisting of 4 meters with associated cordage, used for checking and measuring various voltages and currents at predetermined points in target-control transmitting and receiving equipments. It will measure plate and grid current values in target-control transmitters and limiter grid currents and audio voltages in target-control receivers.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Test Unit I-201-A consists of Test Unit I-201 redesigned and shock mounted inside an aluminum case.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: None.

Meter Ranges:

Direct Current: 0 to 200 microamperes. Limiter Discriminator Meter.  
Plate Current Meter: 0 to 150 milliamperes.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		Not Classified
STOCK NOS.	7CAC-801319-2592		3F4470-201A
PROCUREMENT INFO.:	USAF Dwg. Nos. 47G41323 and 47B41324		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, ARL
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.3		
	- Electronics Test Equipment -		I-201-A

TEST UNIT I-201-A  
(TEST SET, RADIO, I-201-A)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Grid Current Meter: 0 to 1 and 5 milliamperes.

Alternating Voltage: 0 to 20 volts.

Meter Accuracy: Within  $\pm 5\%$ .

Voltmeter Sensitivity: 1000 ohms per volt.

MANUFACTURERS' OR CONTRACTORS' DATA:

Frampton Electric Company; Contract No. W33-038-ac-18769;      Approximate  
Cost per Equipment, \$75.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-401201-3 (Maintenance Instructions).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Unit I-201-A (Complete)	Alum- inum	7CAC-801319-2592  3F4470-201A	4-3/4	7-1/2	12-7/8	7.0
1	Trimmer Screw Driver			4-1/8 long			

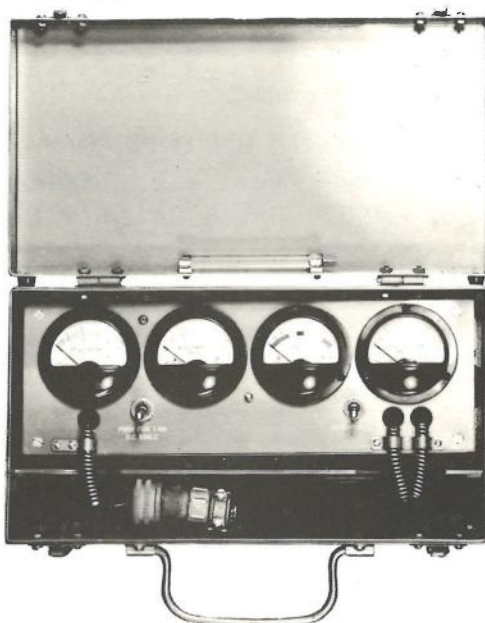
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Unit, I-201-A, with accessories. (Water resistant carton.)	0.44	6	9	14	8.0

I-201-A

- Electronics Test Equipment -

TEST UNIT I-201-B  
(TEST SET, RADIO, I-201-B)



FUNCTIONAL DESCRIPTION:

A multi-range analyzer consisting of four meters with associated cordage used for checking and measuring various voltages and currents at predetermined points in target-control transmitting and receiving equipments. It will measure plate and grid current values in target-control transmitters and limiter grid currents and audio voltages in target-control receivers.

RELATIONSHIP TO OTHER EQUIPMENT:

Test Unit I-201-B is functionally interchangeable with all previous models, but it features ruggedized meters, reduced size, and improved case.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: This equipment consists of sealed meters, a shunt, and switches.

Power Supply: None.

Frequency Range: Up to 10,000 cycles per second.

Meter Ranges:

Direct Current: Limiter Discriminator Meter: 0 to 200 microamperes.  
Plate Current Meter: 0 to 150 milliamperes.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Tentative Standard		
STOCK NOS.	7CAC-801319-2463		3F4470-201B
PROCUREMENT INFO.:	USAF Dwg. 52D13325; Spec. MIL-T-4626 (USAF) 3/4/53		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, WADC, ARL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		1. 3. 2. 3
- Electronics Test Equipment -			I-201-B

TEST UNIT I-201-B  
(TEST SET, RADIO, I-201-B)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Grid Current Meter: 0 to 1 milliamperes.

Audio Voltage: 0 to 20 volts, AC.

Accuracy of each Meter: Within  $\pm 3\%$ .

Voltmeter Sensitivity: 1000 ohms per volt.

MANUFACTURERS' OR CONTRACTORS' DATA:

Albert Manufacturing Corp., 524 West 43rd Street, New York 36, New York;  
USAF Contract No. AF 33(604)9557, dated 24 May 1954; Approximate Cost per  
Unit, \$112.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 33A1-12-26 (Instructions and Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Unit I-201-B (Including):	Aluminum	7CAC-801319-2463 3F4470-201B	2-7/8	6-1/8	12-3/8	7.0
1	Trimmer Screwdriver			4-1/8 long			

I-201-B

- Electronics Test Equipment -



MULTIMETER ME-1/U  
(VOLT-AMMETER ME-1/U)



**FUNCTIONAL DESCRIPTION:**

A portable, general purpose, hook-on volt-ammeter used to quickly measure alternating current and voltage. Alternating current can be read instantaneously on insulated and non-insulated power lines up to two inch diameter without cutting conductors or interrupting service. Pointer-stop mechanism provides for reading peak currents. Voltage measurements are made by use of two six foot leads connected to terminals on front of instrument.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to General Electric Company Hook-on Volt-Ammeter, Type AK-1.

**ELECTROMECHANICAL DESCRIPTION:**

Power Supply: None required.

Frequency Range: 25 to 90 cycles per second.

Current Range: 0 to 600 amperes in four ranges: 0 to 15, 60, 150, 600.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F6300
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	1.3.2.3
	- Electronics Test Equipment -		ME-1/U

MULTIMETER ME-1/U  
(VOLT-AMMETER ME-1/U)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

Voltage Range: 0 to 600 volts in two ranges: 0 to 150, 600.

Accuracy:  $\pm 3\%$  for 50 to 70 cycles per second frequency; slightly less accurate for greater frequency range.

Scale: 2.46 inches long with 30 divisions.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

General Electric Company, Syracuse, New York; Approximate Cost per Unit, \$90.00, 1952.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter ME-1/U		3F6300	13-1/2	3-3/16	4	3.5

ME-1/U

- Electronics Test Equipment -

## MULTIMETER ME-67/U

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



### FUNCTIONAL DESCRIPTION:

A portable, general purpose, clamp-on type volt-ammeter for measuring alternating current and voltages without breaking the circuit. Current measurements can be made on both insulated and non-insulated conductors up to 2 inches in diameter. Dial is calibrated in volts and amperes AC.

### RELATIONSHIP TO OTHER EQUIPMENT:

Similar to the Weston Electrical Instrument Corporation's Voltammeter Model 633, Type VA-1.

### ELECTROMECHANICAL DESCRIPTION:

Power Supply: None.

Frequency Range: 50 to 70 cycles per second.

Scale Ranges: Voltage, 3 scales: 0 to 175, 350, 700 volts (rms).

Current, 5 scales: 0 to 10, 25, 100, 250, 1000 amperes.

Scale Length: 2.36 inches.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.3.2.3	
	- Electronics Test Equipment -		ME-67/U

MULTIMETER ME-67/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Voltage Breakdown Test: 5000 volts AC (rms).

Accuracy:

Current: 3% maximum scale reading.

Voltage: 1% maximum scale reading.

Variation with Temperature: Less than 1% from 0° C. to 43° C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Corporation, Newark 5, New Jersey; Approximate Cost per Unit with leather case, \$113.50, December 1949.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter ME-67/U	Bake-lite		13-5/8	4-3/8	2-1/2	3.25
2	Potential Leads			60 long			
1	Carrying Case	Leather		14-1/2	5-1/2	3-5/8	2.25

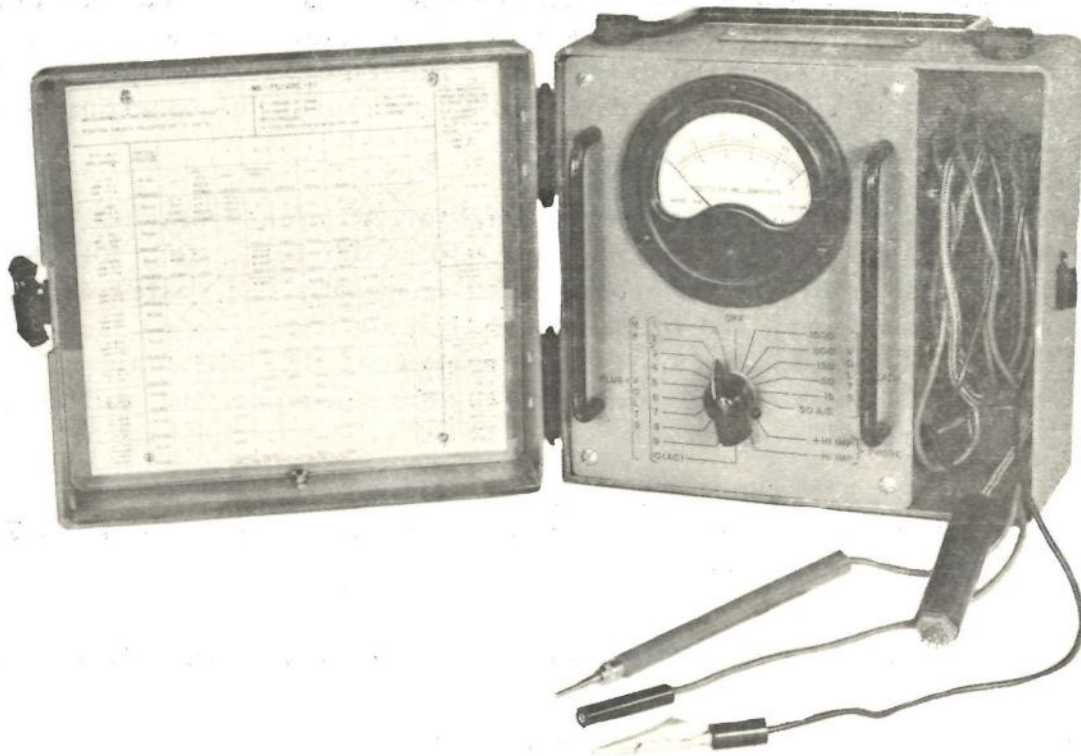
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

ME-67/U

- Electronics Test Equipment -

## MULTIMETER ME-75/ARC-21



### FUNCTIONAL DESCRIPTION:

A portable, special purpose multimeter, designed specifically for use in testing Radio Sets AN/ARC-21 and AN/ARC-21X only. It cannot be used as a multimeter with any other equipment because of milliammeter shunts provided in the prime equipment. This meter measures alternating and direct potentials in volts and direct current in milliamperes. A special chart, supplied with the equipment, indicates proper application of the male test plug or female test prod to the test sockets or male test points on the various components of the radio sets and the reading to be obtained for proper operation. The chart also indicates at what position the function switch must be set for proper indication at each test point of the radio set. By using this equipment and chart, personnel unfamiliar with either the meter or the radio set can perform the necessary operational checks.

### RELATIONSHIP TO OTHER EQUIPMENT:

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-587000		
PROCUREMENT INFO.: Spec. MIL-M-8182 (USAF)			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.3.2.3	
- Electronics Test Equipment -			ME-75/ARC-21

## MULTIMETER ME-75/ARC-21

### ELECTROMECHANICAL DESCRIPTION:

**Circuit Information:** Resistors are placed in series or parallel with the meter circuit by the function switch. A bridge rectifier circuit is used for AC measurements to present equivalent DC to the meter movement. Overload protection is provided so the meter will not be damaged by overloads due to wrong positioning of the function switch.

**Power Supply:** None required.

**Frequency Range:** Up to 400 cycles per second for AC measurement.

**Voltage Ranges:** (with leads): 15, 50, 150, 500, 1500 volts, DC, full scale, and 50 volts, AC, full scale. (With probes): 0.1 volt, DC, full scale, with high input impedance. (With plugs): 10 volts, AC, full scale.

**Current Ranges:** (With plugs): 50, 500 milliamperes, DC, full scale.

**Basic Meter Sensitivity:** 50 microamperes (20,000 ohms per volt) full scale.

**Accuracy:** ±5% overall.

### MANUFACTURERS' OR CONTRACTORS' DATA:

Radio Corporation of America, New York, New York; USAF contract AF 33(038) 18325. RCA Dwg. No. A-8826075.

### TUBE COMPLEMENT:

2 RETMA-CX-L3E2D Crystal Rectifiers (Bradley Labs., New Haven, Connecticut)

### REFERENCE DATA AND LITERATURE:

### EQUIPMENT SUPPLIED:

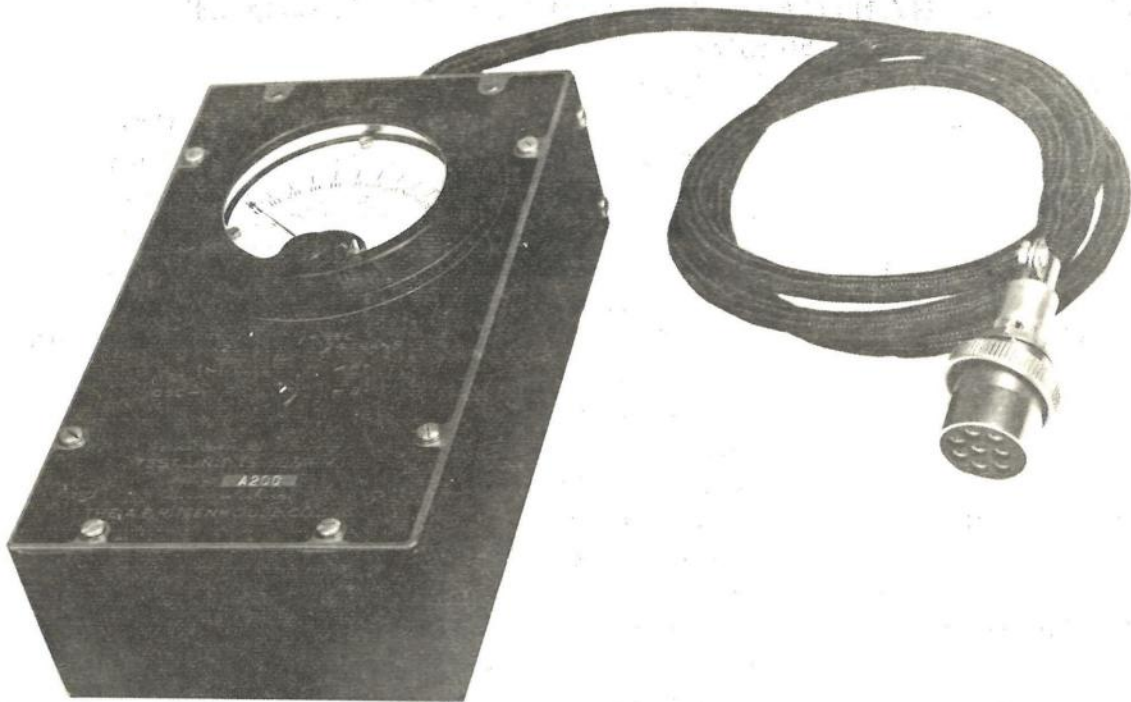
Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Multimeter ME-75/ARC-21	Aluminum	7CAC-587000	7-1/2	6-3/4	4	5

### SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
ME-75/ARC-21 - Electronics Test Equipment -						

TEST UNIT TS-178/ARM-1  
(MULTIMETER TS-178/ARM-1)

This research was supported by the USAF under Contract AF 33(038)12897 and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multifilithed in U.S.A.



FUNCTIONAL DESCRIPTION:

A special purpose meter designed to check voltages and currents in the various stages of the harmonic generator system for both transmitter and receiver of Radio Set AN/ARC-3. A panel type meter calibrated from 0 to 100 is mounted at the top of the front panel. Directly below is a selector switch marked "OSC", "1", "2", "3", "4 REC", "4 TRANS", "A+", and "B+".

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A switch with eight positions is provided for selecting the various portions of the circuits to be measured. The shunt and series resistors for determining the proper meter range are automatically connected by means of this switch. The normal full scale range of the meter itself without the shunt and

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		Not Classified
STOCK NOS.	1600-327879525		3F4325-178
PROCUREMENT INFO.:	Mil. Spec. No. MIL-T-5398; Signal Corps Spec. No.271-5053		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.3.2.3		
	- Electronics Test Equipment -		TS-178/ARM-1

TEST UNIT TS-178/ARM-1  
(MULTIMETER TS-178/ARM-1)

ELECTROMECHANICAL DESCRIPTION: (Continued)

multiplier resistors is 50 microamperes.

When Used with Transmitter T-67/ARC-3:

"OSC" Position: 18 ohms shunt resistance in transmitter.  
6.2 milliamperes DC full scale deflection.  
"1" Position: 39 ohms shunt resistance in transmitter.  
2.9 milliamperes DC full scale deflection.  
"2" and "3" Position: 22 ohms shunt resistance in transmitter.  
5 milliamperes DC full scale deflection.  
"4 TRANS" Position: 560,000 ohms in series with meter and combination  
shunted by 275 ohms.  
100 milliamperes DC full scale deflection.  
"A+" Position: One megohm series resistance in test set.  
50 volts DC full scale deflection.  
"B+" Position: 10 megohms series resistance in test.  
500 volts DC full scale deflection.

When Used with Receiver R-77/AR-3:

"OSC" Position: 2200 ohms shunt resistance in receiver.  
100 milliamperes full scale deflection.  
"1" Position: 1000 ohms shunt resistance in receiver.  
160 milliamperes full scale deflection.  
"2", "3", and "4 REC"  
Position: 10,000 ohms shunt resistance in receiver.  
61 milliamperes full scale deflection.  
"A+" Position: 1 megohm series resistance in test set.  
50 volts DC full scale deflection.  
"B+" Position: 10 megohms series resistance in test set.  
500 volts DC full scale deflection.

MANUFACTURERS' OR CONTRACTORS' DATA:

Sylvania Electric Products, Inc., Emporium, Pa.; Colonial Radio and Television  
Division, 254 Rano Street, Buffalo 7, New York; Order No. 84-DAY-45, 10/16/44,  
Approximate Cost per Unit, \$65.56.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

AN 16-30ARM1-2 (Maintenance Instructions).



TEST UNIT TS-178/ARM-1  
(MULTIMETER TS-178/ARM-1)

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy ) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Unit TS-178/ARM-1 (Complete)	Steel	1600-327879525  3F4325-178	8	5	4	2.8

**SHIPPING DATA:**

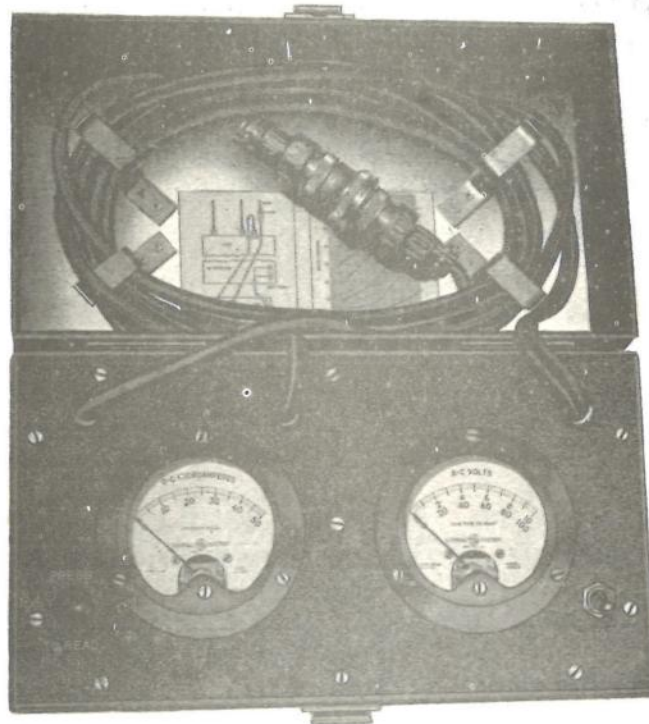
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Unit, TS-178/ARM-1. (Shelf package - water resistant carton).	0.24	10	7	6	4.0

- Electronics Test Equipment -

TS-178/ARM-1



CEILOMETER TEST SET TS-555/GMQ-2



**FUNCTIONAL DESCRIPTION:**

A portable, special purpose, test instrument used to measure thermal noise originating in the preamplifier input circuit, and the shot-noise voltage generated by the phototube, both in the detector component of a ceilometer equipment which measures the vertical distance to cloud formations by means of a reflected light beam. Measurements of current and voltage referred to a chart indicate whether thermal noise or shot noise are within required limits. These tests permit field checking of detector performance without the necessity of the presence of a signal from cloud reflections.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Used to test Ceilometer Equipment AN/GMQ-2.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F4325-555
PROCUREMENT INFO.:			
PROCUREMENT COG.: Army		DESIGN COG.: Army, ESL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 1.3.2.3	
- Electronics Test Equipment -			TS-555/GMQ-2

CEILOMETER TEST SET TS-555/GMQ-2

**ELECTROMECHANICAL DESCRIPTION:**

Circuit Information: Circuitry consists of an AC rectifier-type voltmeter with multiplying resistor, a DC microammeter with a contact button, and connecting cables to the prime equipment.

Power Supply: None required.

Voltage Measuring Range: 0 to 10 and 0 to 100 volts, AC.

Current Measuring Range: 0 to 50 microamperes, DC.

Voltmeter Sensitivity: 5000 ohms per volt.

Accuracy of Microammeter:  $\pm 2.5\%$ .

**MANUFACTURERS' OR CONTRACTORS' DATA:**

General Electric Company, Schenectady, New York; Navy Contract No. 69262.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

TM 11-2419 (TO 16-30GMQ2-5) (Ceilometer Equipment AN/GMQ-2).

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

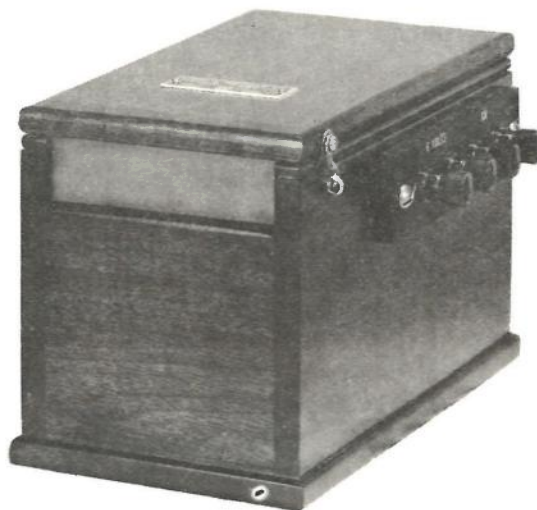
**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ceilometer Test Set TS-555/GMQ-2	Aluminum	3F4325-555	6-5/8	11	6-3/8	8

#### 1.4 GALVANOMETERS



PORTABLE GALVANOMETER  
Part No. 2420  
(Leeds & Northrup Company)



**FUNCTIONAL DESCRIPTION:**

A portable general purpose instrument used for moderately high sensitivity in bridge and potentiometer measurements.

**RELATIONSHIP TO OTHER EQUIPMENT:**

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** A choice of characteristics are available in this galvanometer.

The characteristics of major significance are sensitivity, critical damping, resistance, and period. Components of the systems may be easily changed to obtain different characteristics. Reading is given on a ground glass scale using a light image spot approximately 3/4 inch in diameter. Binding posts are provided on the side of the case.

**Power Supply:** 6 volts, DC, 0.5 ampere required for lamp.

**Scale Graduation:** Twenty-five one-millimeter division either side of central zero.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.4		
- Electronics Test Equipment - Leeds & Northrup 2420			

**PORTABLE GALVANOMETER**  
 Part No. 2420  
 (Leeds & Northrup Company)

**ELECTROMECHANICAL DESCRIPTION: (Continued)**

Sensitivity: 0.04 microampere per division of scale.  
 Period: 3 seconds.  
 Resistance: 10,000 ohms, external critical damping.  
 300 ohms, coil.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Leeds & Northrup Company, 4970 Stenton Avenue, Philadelphia 44, Pennsylvania; Approximate Cost per Unit, \$66.00.

**TUBE COMPLEMENT:**

None.

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog "E".

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Portable Galvanometer Leeds & Northrup Part No. 2420	Wood		5-3/8	5-1/2	8-1/2	

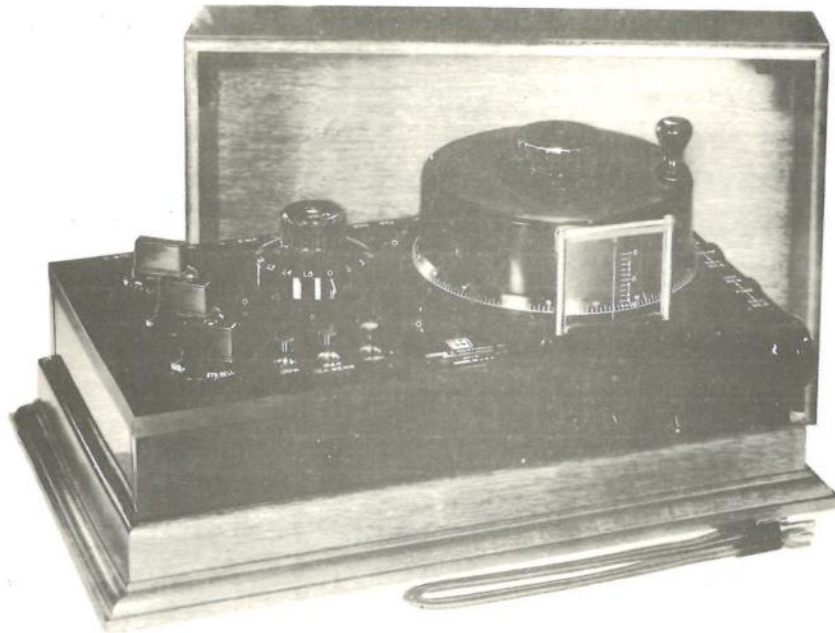
Leeds & Northrup 2420 - Electronics Test Equipment -



## 1.5 POTENTIOMETERS



PRECISION POTENTIOMETER  
 (TYPE K-2 POTENTIOMETER)  
 Part No. P-7552  
 (Leeds & Northrup Company)



**FUNCTIONAL DESCRIPTION:**

A portable triple-range precision potentiometer for general laboratory use. Especially adapted for use with thermocouples and potentiometer pyrometers.

**RELATIONSHIP TO OTHER EQUIPMENT:**

Similar to L&N Company type K-1 Potentiometer, except that a low voltage range has been added.

**ELECTROMECHANICAL DESCRIPTION:**

**Circuit Information:** The measuring circuit consists of resistors of approximately 5 ohms each, dial switches having concealed brushes and studs, and a continuously adjustable slidewise of approximately 5.5 ohms. Enclosed dial switches make possible the selection of ranges from 0 to 1.61, 0 to 0.161, and 0 to 0.0161 volts, as well as providing for the connecting of a galvanometer in the standard cell or EMF circuit. The unit may be standardized on any range. Three

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 1.5		
- Electronics Test Equipment - Leeds & Northrup P-7552			

PRECISION POTENTIOMETER  
(TYPE K-2 POTENTIOMETER)  
Part No. P-7552  
(Leeds & Northrup Company)

**ELECTROMECHANICAL DESCRIPTION:** (Continued)

current-adjusting rheostats provide coarse, medium, and fine adjustment of battery current. The standard cell dial is calibrated from 1.0176 to 1.0204 volts. Three keys are provided for galvanometer operation and have protective and damping resistance.

Ranges: 0 to 1.61; 0 to 0.161; 0 to 0.0161 volts.

Power Supply: None.

**MANUFACTURERS' OR CONTRACTORS' DATA:**

Leeds & Northrup Company, 4970 Stenton Avenue, Philadelphia 44, Pennsylvania; Approximate Cost per Unit, \$485.00.

**TUBE COMPLEMENT:**

**REFERENCE DATA AND LITERATURE:**

Manufacturer's Catalog "E".

**SHIPPING DATA:**

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

**EQUIPMENT SUPPLIED:**

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Precision Potentiometer Leeds & Northrup Part No. P-7552	Wood		7-1/2	18	9	
2	Test Lead						

**Leeds & Northrup P-7552 - Electronics Test Equipment -**



