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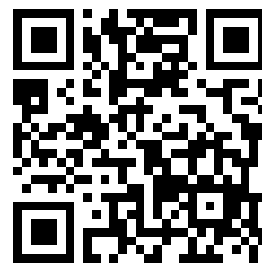
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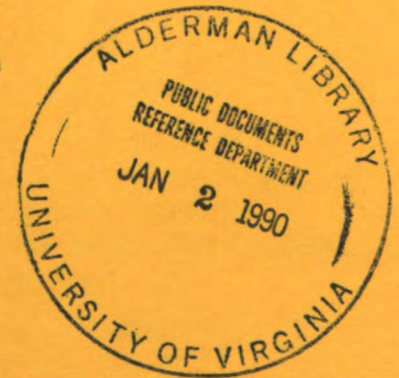
101.11:
1-5815-270-15

TM 11-5815-270-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL,
FIELD AND DEPOT MAINTENANCE MANUAL

RECTIFIERS RA-87
AND RA-87A



This reprint includes all changes in effect at the time of publication; changes 2 and 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1963





WARNING

DANGEROUS VOLTAGE

is used in this equipment

DEATH ON CONTACT

may result if
safety precautions
are not observed

Be careful not to contact the 115-volt input connections, or component connections when testing or servicing this equipment. Before making test connections or working inside this equipment, turn off the power and discharge the filter capacitors.

DON'T TAKE CHANCES!



Organizational, DS, GS, and Depot Maintenance Manual
Including Organizational Repair Parts and Special Tool Lists

RECTIFIERS RA-87 AND RA-87A

CHANGE }
No. 2 }

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 17 July 1967

TM 11-5815-270-15, 2 October 1963, is changed as follows:

The title is changed as shown above.

Change "5 amp" to: .5 amp, in the following places:

Page 6, paragraph 6a, chart, line 4.

Page 6, paragraph 8a, chart, line 1.

Delete the "note" in the following places:

Page 12, figure 6.

Page 18, figure 7.

Page 5, paragraph 2. Change heading to: Indexes of Equipment Publications.

Line 1. Add subparagraph designation:

a. DA Pam 310-4.

Add subparagraph b after subparagraph a:

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are Modification Work Orders (MWO's) pertaining to the equipment. DA Pam 310-7 lists all authorized Department of the Army modification work orders, identifying the type, model, series, and Federal stock number of the item to be modified; number, date, and classification of the MWO; category of maintenance authorized to perform the modification; and the man-hours

required to apply the modification to each item.

Paragraph 3. Delete subparagraph c and substitute:

c. *Reporting of Equipment Manual Improvements.* Report of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-MR-NMP-AD, Fort Monmouth, N. J., 07703.

Page 27, paragraph 38b. Add the following caution after the paragraph heading:

Caution: The output of the ZM-21/U is approximately 500 volts. Disconnect C1 and C2 (fig. 8) to prevent possible damage during insulation resistance tests.

Page 29, paragraph 39c, "Performance standard" column.

Step 5c. Change "75 volts ac (± 3)" to: 79 volts ± 3 .

Step 6c. Change "67 volts ac (± 3)" to: 71 volts ± 3 .

Step 7c. Change "61 volts ac (± 3)" to: 65 volts ± 3 .

Step 8c. Change "57 volts ac (± 3)" to: 60 volts ± 3 .

Page 37. Delete appendix II and substitute:

*This change supersedes C 1, 17 November 1964 and TM 11-5815-270-20P, 12 January 1965.

APPENDIX II

BASIC ISSUE ITEMS

Section I. INTRODUCTION

1. General

This appendix lists items for Rectifiers RA-87 and RA-87A, the component items comprising it, and the items which accompany it, or are required for installation, operation, or operator's maintenance.

2. Explanation of Columns

An explanation of the columns in section II is given below.

a. Source, Maintenance, and Recoverability Codes, Column 1.

- (1) *Source code, column 1a.* The selection status and source for the listed item is noted here. The source code used is:

Code	Explanation
P	Applies to repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.

- (2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here. The maintenance code used is as follows:

Code	Explanation
C	Organizational Maintenance
O	Operator/Crew

- (3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Note. When no code is indicated in the recoverability column, the part will be considered expendable.

Code	Explanation
R	Applies to repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

- b. *Federal Stock Number, Column 2.* The Federal stock number for the item is indicated in this column.

c. *Description, Column 3.* The Federal item name, a five digit manufacturer's code, a part number and when required, the model designator (*), which indicates different models of the end equipment, are included in this column.

d. *Unit of Issue, Column 4.* The unit used as a basis of issue (e.g., ea, pr, ft, yd, etc) is noted in this column.

e. *Quantity Incorporated in Unit Pack, Column 5.* Not used.

f. *Quantity Incorporated in Unit, Column 6.* The total quantity of the item used in the equipment is given in this column.

g. *Quantity Authorized, Column 7.* The total quantity of an item required to be on hand and necessary for the operation and maintenance of the equipment is given in this column.

h. *Illustrations, Column 8.*

- (1) *Figure number, column 8a.* The number of the illustration in which the item is shown is indicated in this column.

- (2) *Item or symbol number, column 8b.* The call out number used to reference the item in the illustration appears in this column.

Page 40. Delete appendix III and substitute:

APPENDIX III

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

This appendix provides a summary of the maintenance operations covered in the equip-

ment literature for Rectifiers RA-87 and RA-87A. It authorized categories of maintenance for specific maintenance functions on

SECTION II. BASIC ISSUE ITEMS LIST

(1)		BASIC ISSUE ITEMS LIST						(8)												
		(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNITS																
SOURCE CD (a)	MAINT. CD (b)			REC. CODE (c)	MODEL						QTY AUTH (7)	QTY INC IN UNIT (6)	QTY INC IN UNIT PACK (5)	FIGURE NUMBER (a)	ITEM OR SYMBOL NUMBER (b)					
		1	2		3	4	5	6												
P	C	R	5815-230-7257	<p>RECEIVER: 81349; RA-87; RA-87A (This item is nonexpendable.)</p> <p>TECHNICAL MANUAL TM 11-5815-270-15</p> <p>Requisition through pinpoint account number if assigned; otherwise through nearest Adjutant General facilities.</p> <p>NOTE: For technical manuals the quantity indicates the maximum number of copies authorized for packing (or issue) with the equipment. Where a number of these equipments are concentrated in a small area, the quantity on hand may be reduced to practical levels. Excess publications must be returned to publication supply central through AG channels.</p> <p>NOTE: Model column 1 refers to RA-87; column 2 refers to RA-87A, order numbers; 1768-PH-49, 18101-PH-50 6508-PH-51, 6510-PH-51, 3131-PH-51, 3164-PH-51; column 3 refers to RA-87A, order numbers; 3135-P-51, 3357-P-52 32254-P-53</p>						1						1				
P	C	R	5815-537-7896	*	*											1	2			
P	O		5920-280-5003	*	*											1	1	4	F1	
P	O		5920-199-9498	*	*											1	1	3	F2	
			5920-199-9498	*	*															
			5920-280-5003	*	*															

SEC-FM 10-4

repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

2. Explanation of Format for Maintenance Allocation Chart

a. *Group Number.* Not used.

b. *Component Assembly Nomenclature.* This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. *Maintenance Function.* This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

<i>Codes</i>	<i>Maintenance Category</i>
<i>C</i>	Operator/Crew
<i>O</i>	Organizational Maintenance
<i>F</i>	Direct Support Maintenance
<i>H</i>	General Support Maintenance
<i>D</i>	Depot Maintenance

d. *Tools and Equipment.* The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in section III.

e. *Remarks.* Self explanatory.

3. Explanation of Format for Tool and Test Equipment Requirements

The columns in the tool and test equipment requirements chart are as follows:

a. *Tools and Equipment.* The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool for the maintenance function.

b. *Maintenance Category.* The codes in this column indicate the maintenance category normally allocated the facility.

c. *Nomenclature.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. *Federal Stock Number.* This column lists the Federal stock number.

e. *Tool Number.* Not used.

Page 41. Add appendix IV:

APPENDIX IV ORGANIZATIONAL REPAIR PARTS

Section I. INTRODUCTION

1. General

This appendix contains a list of repair parts required for the performance of organizational maintenance for Rectifiers RA-87 and RA-87A.

Notes. No special tools, test, and support equipment are required for the RA-87 and RA-87A.

2. Explanation of Sections

This repair parts list is divided into three sections.

a. *Prescribed Load Allowance List (PLA), Section II.* The PLA is a consolidated listing of repair parts allocated for initial stockage at organizational maintenance. This is a mandatory minimum stockage allowance.

b. *Repair Parts for Organizational Maintenance, Section III.* Repair parts authorized for organizational maintenance is included in this section.

c. *Federal Stock Number Index, Section IV.* This is a cross reference index of Federal numbers to illustrations by figure and item number.

3. Explanation of Columns

An explanation of the columns in sections II and III is given below.

a. *Source, Maintenance, and Recoverability Codes, Column 1, Section III.*

(1) *Source code, column 1a.* The selection status and source for the listed item is noted here. Source codes and their explanations are as follows:

<i>Code</i>	<i>Explanation</i>
<i>P</i>	Applies to repair parts that are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
1	0	RA-87; RA-87A (continued)	6625-581-2036	
2	F, H, D	MULTIMETER AN/URM-105	6625-242-5023	
3	H, D	MULTIMETER TS-352/U	6625-646-9409	
4	O, F, H, D	MULTIMETER ME-26()/U TOOL EQUIPMENT TE-50B	5180-356-4602	

850-PM 10-46

RA-87; RA-87A

(Supersede edition of 1 Jan 64, which is obsolete)

Form 6013 1 Jun 65

Code *Explanation*

G — Applies to major assemblies that are procured with PEMA funds for initial issue only to be used as exchange assemblies at DSU and GSU category. These assemblies will not be stocked above DSU and GSU category or returned to depot supply category.

- (2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here.

Code *Explanation*

C Operator/Crew

O Organizational Maintenance

- (3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Notes. When no code is indicated in the recoverability column, the part will be considered expendable.

Code *Explanation*

R — Applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.

b. Federal Stock Number, Column 1; Section II; Column 2, Section III. The Federal stock number for the item is indicated in this column.

c. Description, Column 2, Section II, Column 3, Section III. The model designator, sequence number, Federal item name, a five digit manufacturer's code and a part number are included in this column. The designator (*) indicates the different models of the end equipment.

d. Unit of Issue, Column 4, Section III. The unit used as a basis of issue, e.g., ea, pr, ft, yd, etc is indicated in this column.

e. Quantity Incorporated in Unit Pack, Column 4, Section II; Column 5, Section III. Not used.

f. Quantity Incorporated in Unit, Column 6, Section III. The quantity of repair parts in an assembly is given in this column.

g. Maintenance Allowance, Column 3, Section II; Column 7, Section III.

(1) The allowance columns are divided into subcolumns. Indicated in each subcolumn is the total quantity of items authorized for the number of equipments supported. Items authorized for use as required but not for initial stockage are identified with an asterisk (*) in the allowance column.

(2) The quantitative allowances for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.

(3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-MR-NMP-CD, Fort Monmouth, N. J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand, or TAERS information.

h. Illustrations, Column 8, Section III.

(1) *Figure number, column 8a.* The number of the illustration in which the item is shown, is indicated in this column.

(2) *Item or symbol number, column 8b.* The callout number used to reference the item in the illustration appears in this column.

4. Location of Repair Parts

a. When the Federal stock number is un-

SECTION II. PRESCRIBED LOAD ALLOWANCE LIST

PRESCRIBED LOAD ALLOWANCE

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION	(3) 15-DAY ORG. MAINT. ALLOWANCE				(4) QTY INC IN UN PK		
		(A)	(B)	(C)	(D)			
		1-5	6-20	21-50	51-100			
NOTE: Model column 1 refers to RA-87; column 2 refers to RA-87A, order numbers; 1768-PH-49, 25578-PH-49, 18101-PH-50, 6508-PH-51, 6510-PH-51, 3131-PH-41, 3164-PH-51; column 3 refers to RA-87A, order numbers; 3135-P-51, 3357-P-52, 32254-P-53								
5920-199-9498	FUSE, CARTRIDGE: 81349; F02GR50QB	*	*	*	*	2	3	6
5920-280-5003	FUSE, CARTRIDGE: 81349; F15G15ROB	*	*	*	*	2	3	6

SECTION III. REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

(1)		REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE						(8) ILLUSTRATIONS								
		(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION							(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) IS DAY ORG. MAINT. ALW.			(a) FIGURE NUMBER
(a) MAINT. CD	(b) REC. CODE		1	2	3	4	5	6	(c) *				(d) *	(e) *	(f) *	
G	C R	5815-230-7257						RECTIFIERS: 81349; RA-87; RA-87A (This item is nonexchangeable.) NOTE: Model column 1 refers to RA-87; column 2 refers to RA-87A, order numbers; 1768-PH-49, 25578-PH-49, 18101-PH-50, 5508-PH-51, 6510-PH-51, 3131-PH-51, 3164-PH-51; column 3 refers to RA-87A, order numbers; 3135-P-51, 3357-P-52, 32254-P-53	ea				1			
P	O	5920-244-5150	*	*				CAP, ELECTRICAL: 71400; 94351/2	ea	2	*	*	*	3	6, F2	
P	O	5920-199-9498	*	*	*			FUSE, CARTRIDGE: 61349; F02GR500B	ea	1	*	2	3	6	3	6, F2
P	O	5920-280-5003	*	*	*			FUSE, CARTRIDGE: 61349; F15G15R0B	ea	1	*	2	3	6	4	17, F1

SECTION IV. FEDERAL STOCK NUMBER INDEX

INDEX — FEDERAL STOCK NUMBER CROSS REFERENCE TO
FIGURE AND ITEM NUMBER OR REFERENCE SYMBOL

STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL	STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL
5920-199-9498	3	6, F2			
5920-244-5150	3	6, F2			
5920-280-5003	4	17, F1			

known follow the procedures given in (1) through (4) below.

- (1) Locate the appropriate appendix of the repair parts list.
- (2) If the item or symbol number is available, locate the item by scrutiny of column 8b, of the repair parts list.
- (3) If the item, symbol, and figure number is not known check the description column (column 3) in the repair parts list to locate the part.
- (4) Locate the applicable illustration in this manual and note the figure number and item number. Use the repair

parts listing and locate the figure number and item number as noted on the illustration.

b. When the Federal stock number is known, use the repair parts listing to find the repair part and the figure and item numbers as noted in the Federal stock number index.

5. Federal Supply Codes

This paragraph lists the Federal supply code and the associated manufacturer's name.

Code	Manufacturer's Name
71400	Bussmann Mfg. Div. of McGraw-Edison Co.
81349	Military Specifications

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
CNGB (1)
OCC-E (7)
Dir of Trans (1)
CofEngrs (1)
TSG (1)
CofSptS (1)
USAARENBD (2)
USACDC Agcys (1)
USAMC (5)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMD (2)
USAMICOM (4)
USASTRATCOM (4)
USAESC (70)
USARHAW (5)
USARYIS (5)
MDW (1)
Armies (2) except
Eighth (5)
Corps (2)
USAC (3)

Svc Colleges (2)
USASESS (5)
USAADS (2)
USAAMS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USA Tng Cens (2)
WRAMC (1)
Army Pic Cen (2)
USACDCEC (10)
Instals (2) except
Ft Hancock (4)
Ft Gordon (10)
Ft Huachuca (10)
Ft Carson (25)
Ft Knox (12)
WSMR (5)
A Dep (2) except
LBAD (14)
SAAD (30)
TOAD (14)
LEAD (7)
NAAD (5)
SVAD (5)

ATAD (10)	11-86
Gen Dep (2)	11-87
Sig Sec Gen Dep (5)	11-97
Sig Dep (12)	11-98
Sig FLDMS (2)	11-117
AMS (1)	11-127
USAERDAA (2)	11-155
USAERDAW (13)	11-157
USACRREL (2)	11-158
MAAG (2)	11-237
USARMIS (2)	11-247
Units org under fol TOE: (2 copies each)	11-500 (GF, GH, GK, KA, NA-NC)
7	11-587
11-7	11-592
11-27	11-597
11-35	17
11-38	31-105
11-56	37
11-57	39-51
11-85	

NG: State AG (3); units — same as Active Army except allowance is one copy.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

CHANGE }
No. 3 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 19 September 1978

**Operator's, Organizational, Direct Support, General Support
and Depot Maintenance Manual for
RECTIFIERS RA-87 AND RA-87A (NSN 6130-00-230-7257)**

TM 11-5815-270-15, 2 October 1963, is changed as follows to incorporate a new Maintenance Allocation Chart:

Page 1, title. Change the title to read as indicated above.

Page 2, appendix II and III. Change to indicate appendix II is Basic Issue Items; appendix III is Maintenance Allocation.

Page 5, paragraph 3. Delete and substitute the following:

3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DLAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33A/AFR 75-18/MCO P4610.19B and DLAR 4500.15.

d. Reporting of Errors. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is

encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703.

e. Reporting Equipment Improvement Recommendations (EIR). EIR's will be prepared using SF-368, Quality Deficiency Report (Category II). Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

Page 15, paragraph 21a(1) and (2). Delete subparagraphs (1) and (2) and substitute: (See section III of appendix III.)

Page 23, paragraph 36. Delete and substitute:

36. Test Equipment and Materials

Tools and test equipment requirements are listed in section III of appendix III. Refer to appendix I for listing of test equipment publications and repair parts lists for Rectifiers RA-87 and RA-87A.

Page 36, appendix I. Delete and substitute the following:

**APPENDIX I
REFERENCES**

SB 11-573

Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.

TB 43-0118

Field Instructions for Painting and Preserving Electronics Com-

TM 11-5540	mand Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-5815-270-20P	Electric Light Assembly MX-1292/PAQ; Including Repair Parts and Special Tools List.
TM 11-5815-270-34P	Organizational Maintenance Repair Parts and Special Tools List for Rectifiers RA-87 and RA-87A (NSN 6130-00-230-7257).
TM 11-6625-200-15	Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Rectifiers RA-87 and RA-87A (NSN 6130-00-230-7257).
TM 11-6625-320-12	Operator's, Organizational, DS, GS, and Depot Maintenance Manual, Multimeters ME-26A/U, ME-26B/U, ME-26C/U, and ME-26D/U.
TM 38-750	Operator's and Organizational Maintenance Manual: Voltmeter, Meter ME-30A/U and Voltmeters, Electronic ME-30B/U, ME-30C/U and ME-30E/U.
<i>Pages 37 through 39, appendix III.</i>	The Army Maintenance Management System (TAMMS).
Delete and substitute the following:	

APPENDIX III MAINTENANCE ALLOCATION

Section I. INTRODUCTION

III-1. General

This appendix provides a summary of the maintenance operations for Rectifiers RA-87 and RA-87A. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

III-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition; i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align,

calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

III-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, ap-

propriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

- C — Operator/Crew
- O — Organizational
- F — Direct Support
- H — General Support
- D — Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

III-4. Tool and Test Equipment Requirements (Sec III).

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

III-5. Remarks (Sec IV).

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

**SECTION II MAINTENANCE ALLOCATION CHART
FOR
RECTIFIERS RA-57 AND RA-57A**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS	
			C	O	F	H	D			
00	RECTIFIERS RA-57 and RA-57A	Inspect		0.5						
		Test		0.5						
		Test			1.0				2, 4, & 5	A
		Test				2.0			2, 4 thru 10	B C C
		Service		0.5					1	
		Repair		1.0					1 & 2	A
		Repair				3.0			1 thru 5	B
Repair					6.0		1 thru 10	C		
		Overhaul					10.0	1 thru 10		

**SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
RECTIFIERS RA-87 AND RA-87A**

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O, F, H. & D	TOOL KIT, ELECTRONIC EQUIPMENT TK-101/08Q	5180-00-064-5178	
2	O, F, H. & D	MULTIMETER AM/USM-223	6625-00-999-7465	
3	F, H. & D	TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G	5180-00-605-0079	
4	F, H. & D	MULTIMETER TS-352(*)/U	6625-00-242-5023 or 6625-00-553-0142	
5	F, H. & D	MULTIMETER ME-26D/U	6625-00-913-9781	
6	H & D	VOLTMETER, ELECTRONIC ME-30(*)/U	6625-00-643-1670	
7	H & D	OHMMETER ZM-21(*)/U	6625-00-643-1030	
8	H & D	ELECTRIC LIGHT ASSEMBLY MX-1292/PAQ	6695-00-378-5449	
9	H & D	RESISTOR, FIXED, WW, 280 OHMS \pm 5 PERCENT *	5905-00-042-3137	
10	H & D	TRANSFORMER, VARIABLE CB-16B/U	5950-00-201-4291	
		* Adjust 1,000 ohms variable resistor, 100 watts, for 280 ohms.		

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	Organizational test is limited to equipment operation, and repair is limited to replacement of Fuses F1, F2, and Electrical Cap.
B	Direct Support test and repair and complete item.
C	General Support Repair is the same repairs as Direct Support, but additional tests are authorized.

Appendix IV, Organizational Repair Parts (as added by C2). Delete.

By Order of the Secretary of the Army:

Official:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

Distribution:

Active Army:

USAINSCOM (2)
COE (1)
TSG (1)
USAARENBD (1)
DARCOM (1)
TRADOC (2)
OS Maj Comd (4)
TECOM (2)
USACC (4)
MDW (1)
Armies (2)
Corps (2)
Svc Colleges (1)
USASIGS (5)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USAICS (3)
MAAG (1)
USARMIS (1)
USAERDAA (1)
USAERDAW (1)
Fort Gillem (10)
Fort Gordon (10)
Fort Huachuca (10)
Fort Carson (5)
Ft Monmouth (HISA) (26)
Ft Richardson (CERCOM) (2)

Army Dep (1) except

LBAD (14)
SAAD (30)
TOAD (14)
SHAD (3)
USA Dep (1)
Sig Sec USA Dep (1)
Units org under fol TOE:
(1 cy each unit, UNIONDC)
29-207 (2)
29-610 (2)
7
11-27
11-35
11-38
11-85
11-86
11-87
11-97
11-98
11-117
11-127
11-237
11-302
11-500 (AA-AC)
17
29-134
29-136
31-105
37
39-51

NG: State AG (3); Units — Same as Active Army except allowance is one Copy per unit.

USAR: None

For explanation of abbreviations used, see AR 310-50.

TECHNICAL MANUAL }
 No. 11-5815-270-15 }

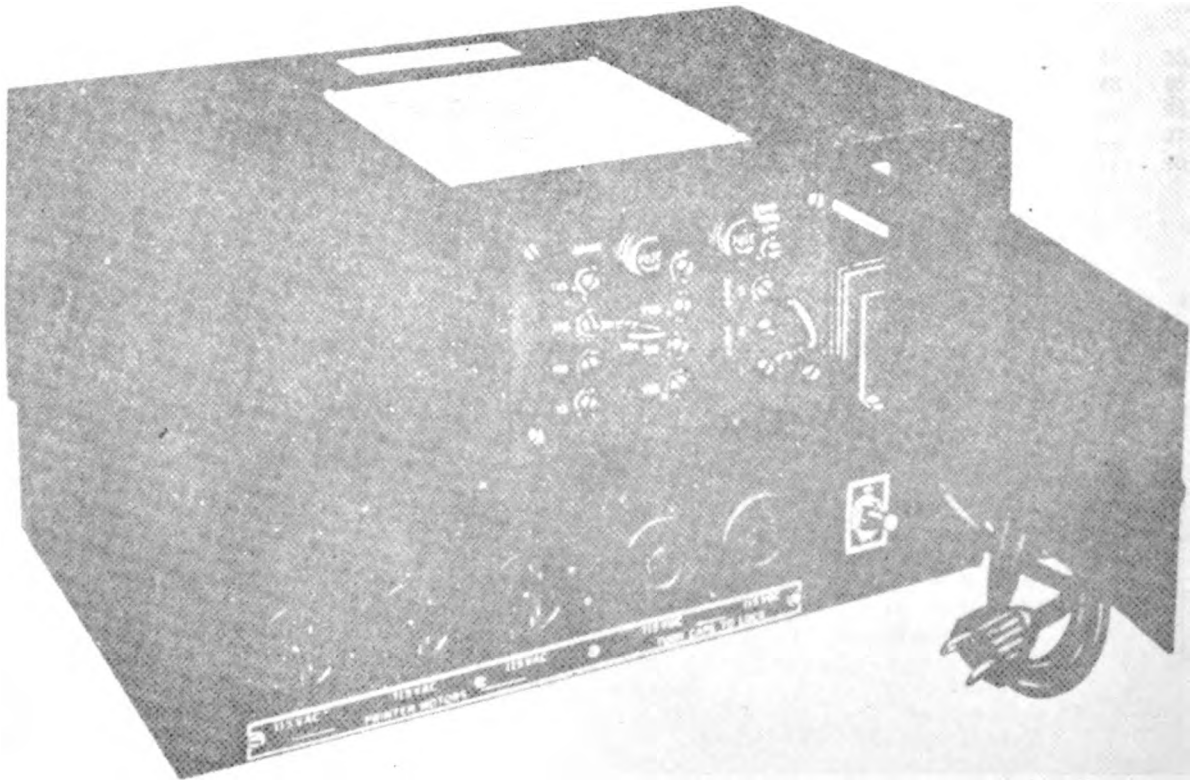
HEADQUARTERS,
 DEPARTMENT OF THE ARMY
 WASHINGTON, D.C., 2 October 1963

RECTIFIERS RA-87 AND RA-87A

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*This manual supersedes TM 11-957, 19 June 1943, including C 1, 4 November 1944; C 2, 27 November 1961; and C 3, 27 April 1962; and TM 11-957A, 27 March 1952, including C 1, 30 December 1952; C 2, 27 November 1961, and C 3, 17 May 1962.

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TM5815-270-(S-1

Figure 1. Rectifier RA-87A.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual describes Rectifiers RA-87 and RA-87A (fig. 1) and covers their installation, operation, and operator, organizational, field, and depot maintenance. It includes instructions appropriate to first and second echelons for preventive maintenance services; and to third, fourth, and fifth echelons for troubleshooting, testing, and repairing the equipment. Detailed functioning of the equipment is covered in chapter 4.

b. The complete manual for this equipment includes TM 11-5815-270-20P and TM 11-5815-270-35P.

c. Official nomenclature followed by (*) is used to indicate all models of the equipment covered in this manual. Thus, Rectifier RA-87(*) (rectifier) represents Rectifiers RA-87 and RA-87A.

2. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-10, -20, -35P,

etc) and the latest changes to and revisions of each equipment publication.

3. Forms and Records

a. *Reports of Maintenance and Unsatisfactory Equipment.* Use equipment forms and records in accordance with instructions in TM 38-750.

b. *Report of Damaged or Improper Shipment.* Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication No. 378 (Navy), and AFR 71-4 (Air Force).

c. *Reporting of Equipment Manual Improvements.* The direct reporting, by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended changes to DA technical manual parts lists or supply manual 7, 8, or 9) will be used for reporting these improvement recommendations. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to: Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, N.J., 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned officer, supervisor, etc).

Section II. DESCRIPTION AND DATA

4. Purpose and Use

a. Rectifier RA-87(*) converts 95 to 125 volts or 190 to 250 volts, 50 to 60 cycles per second (cps) alternating current (ac) to 115 volts direct current (dc). In addition, Rectifier RA-87(*) provides 115 volts, 50 to 60 cps ac.

b. Rectifier RA-87(*) is intended primarily to provide 115 volts dc for the operation of teletypewriter line circuits and 115 volts ac for the operation

of teletypewriter printer motors. Within the operating limits (par. 5), Rectifier RA-87(*) may be used to supply 115 volts ac or dc for any other purpose.

5. Technical Characteristics

Note. Unless otherwise indicated, the technical characteristics apply to all procurements of Rectifiers RA-87 and RA-87A.

a. *Input Power Requirements.*

- (1) *Voltage:* 95, 105, 115, 125, 190, 210, 230, or 250 volts ac (50-60 cps).

- (2) *Current:* 5 amperes maximum (all RA-87A, except those procured on Order No. 25578-Phila-49 and 18101-Phila-50). 5.80 amperes maximum (RA-87; and RA-87A procured on Order No. 25578-Phila-49 and 18101-Phila-50).

(3) *Power:* 600 watts (approx).

b. Ac Output.

- (1) *Voltage:* 115 volts ac, 50-60 cps.
 (2) *Current:* 4.35 amperes (maximum).
 (3) *Power:* 500 watts (maximum).

c. Dc Output.

- (1) *Voltage:* 115 volts dc.
 (2) *Current:* 400 milliamperes (ma) (maximum).
 (3) *Power:* 46 watts (approx).

6. Table of Components

Note. These listings *a* and *b* below, are based on the original shipment by the contractors. For the current official listing of components of individual models see the Basic Issue Items List, appendix III.

a. Rectifier RA-87.

Quantity	Item	Dimensions			Weight (lb)
		Height (in.)	Depth (in.)	Width (in.)	
1	Rectifier.....	7 1/2	8 1/2	14.554	40
	including:				
	1 Case CH-158 *	10 3/4	12 3/8	18 1/2	18 5
	4 Fuse 5 amp				
	2 Fuse 15 amp				

* Accessory item supplied with Rectifier RA-87.

b. Rectifier RA-87A.

Quantity	Item	Dimensions			Weight (lb)
		Height (in.)	Depth (in.)	Width (in.)	
1	Rectifier.....	7 1/2	8 1/2	14.554	50
	including:				
	1 Case CH-158 *	10 13/16	12 11/16	18 3/4	20
	2 Fuse 1/2 amp				
	2 Fuse 15 amp				

* Accessory item supplied with Rectifier RA-87A.

7. Description of Rectifier

Rectifier RA-87(*) (fig. 1) is a selenium-disk type of rectifier. All the components are mounted on a chassis and inclosed in a sheet steel case which may be removed to permit maintenance and repair operations. The upper section of the case is louvered

to provide ventilation and has a small door which permits access to the tap-changing panel and to the fuse which protects the rectifier circuit. Three ac output receptacles, two dc output receptacles, an ON-OFF switch, and a power cord are provided. Case CH-158 (chest) (fig. 2) is an accessory item supplied with the equipment, and is used to protect the rectifier when it is not in use and during transportation.

8. Differences in Models

a. Rectifiers RA-87 and RA-87A. Rectifiers RA-87 and RA-87A may be used interchangeably. The differences between the two models are as follows:

Item	Rectifier RA-87	Rectifier RA-87A
Dc fuse on tap and fuse panel	5 amp	1/2-amp time delay
Dc fuseholder	Clip type	Bayonet-extractor type
Spare fuseholder (dc fuse)	None	Bayonet-extractor type

b. Rectifier RA-87. A few minor differences exist among Rectifiers RA-87 procured on different orders; however, all Rectifiers RA-87 may be used interchangeably. A one-piece, molded plastic tap and fuse panel is used on all Rectifiers RA-87 procured on Orders No. 31529 Phila-43, 2191 Phila-44, and 7705 Phila-44.

c. Rectifier RA-87A (figs. 3, 4, and 5). A few minor differences exist among Rectifiers RA-87A procured on different orders; however, all Rectifiers RA-87A may be used interchangeably. The reference symbols which apply to similar components of equipments supplied on different orders differ. Throughout this manual the symbols applicable to Rectifiers RA-87A supplied on Order No. 6573-Phila-51 are used to identify parts. A conversion table for reference symbols follows.

Note. Reference symbols listed for Orders No. 25578-Phila-49, 18101-Phila-50, 3131-Phila-51, and 3164-Phila-51 also apply to all models of Rectifier RA-87.

Component	Reference symbol (Orders No. 25578-Phila-49, 18101-Phila-50, 3131-Phila-51, and 3164-Phila-51) (and all RA-87a)	RA-87A (Order No. 6573-Phila-51)
Transformer.....	1	T1
Reactor.....	2	L1
Rectifying assembly.....	3	CR1
Capacitor.....	4-1	C1

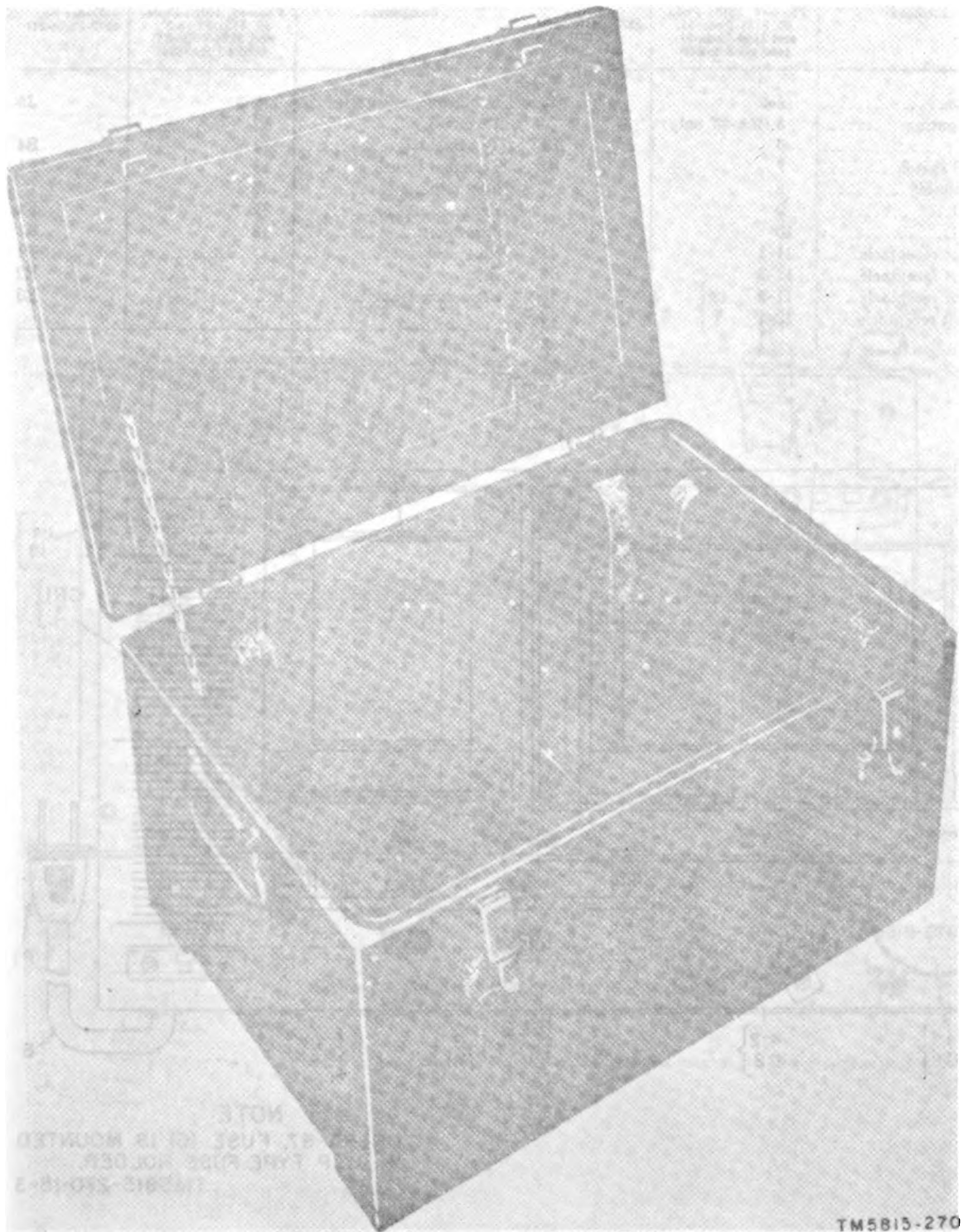
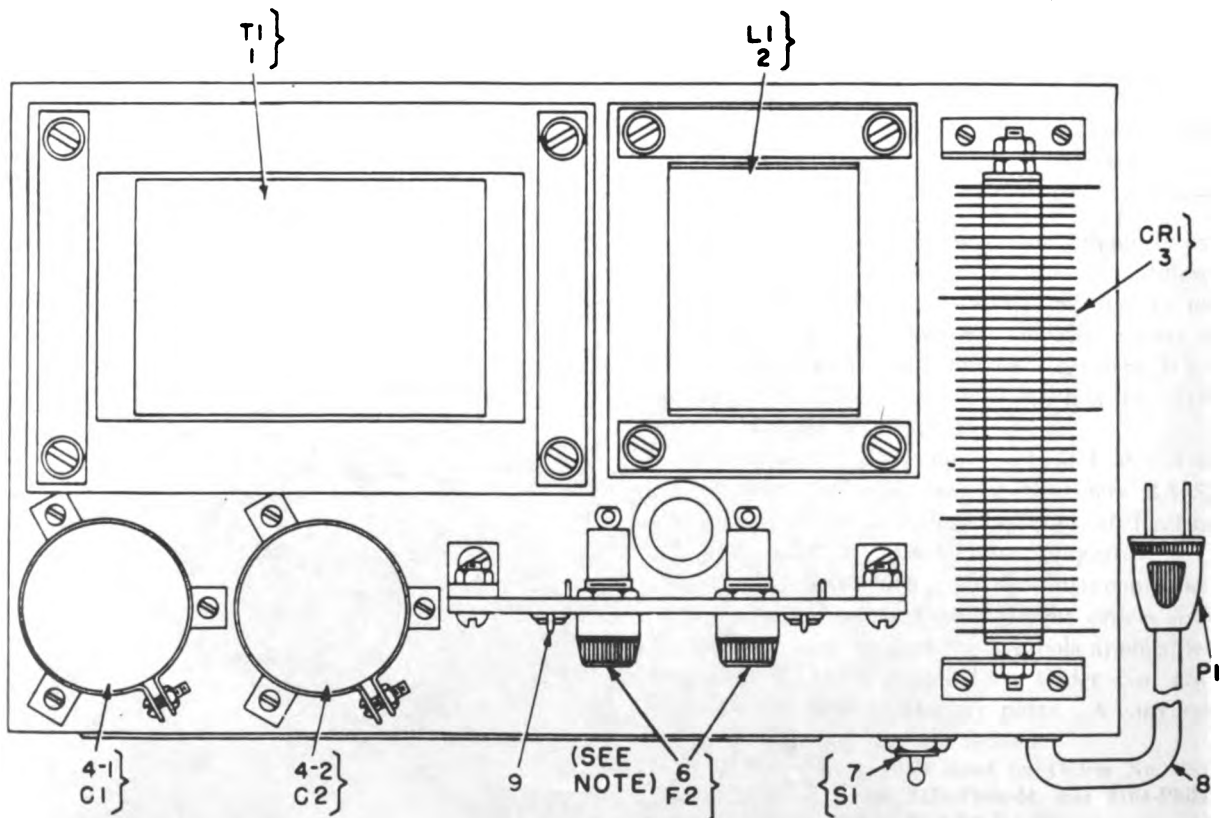


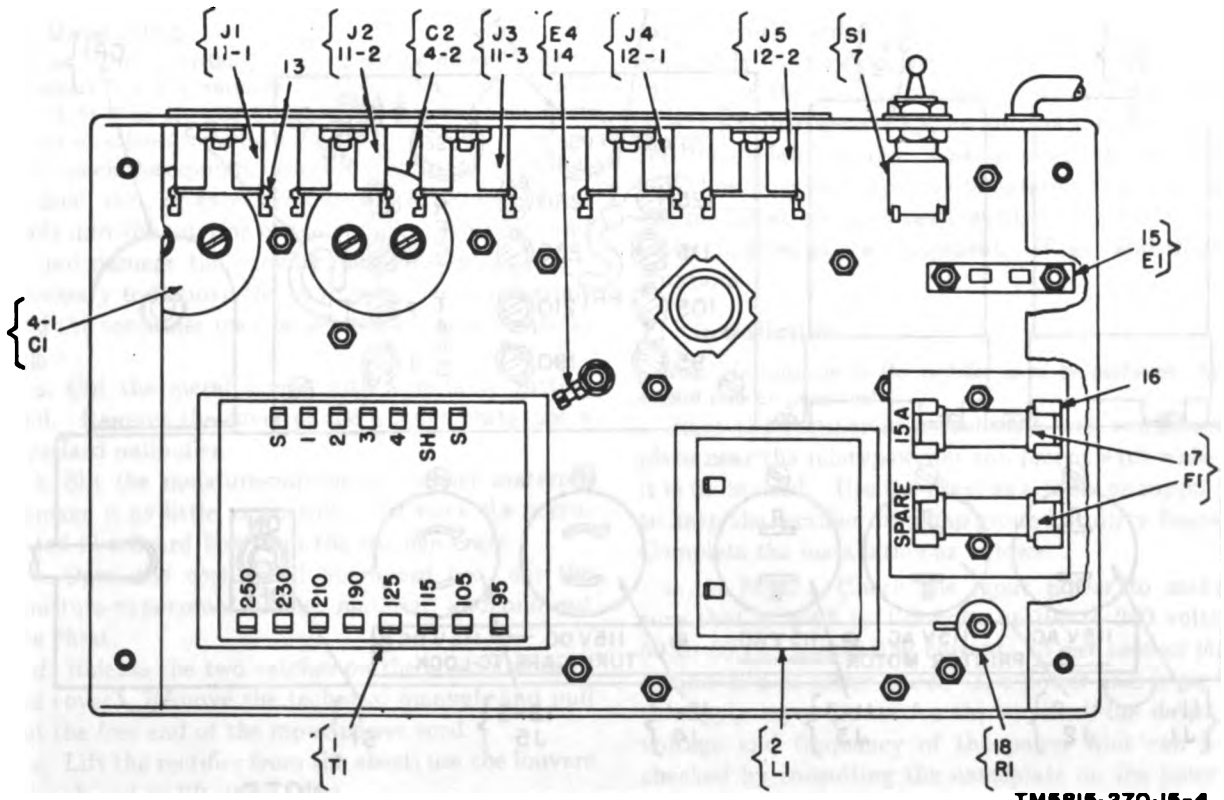
Figure 2. Chest CH-158.

Component	Reference symbol (Orders No. 25578- Phila-49, 18101-Phila- 50, 3131-Phila-51, and 3164-Phila-51; (and all RA-87s))	RA-87A (Order No. 6573-Phila-51)	Component	Reference symbol (Orders No. 25578- Phila-49, 18101-Phila- 50, 3131-Phila-51, and 3164-Phila-51) (and all RA-87s)	RA-87A (Order No. 6573-Phila-51)
Capacitor.....	4-2	C2	Dc output receptacle.....	12-2	J5
Fuse mounting.....	5 (RA-87 only)		Terminal.....	13	
Fuse.....	6	F2	Terminal lug.....	14	E4
ON-OFF switch.....	7	S1	Terminal board.....	15	E1
Cord assembly.....	8		Fuse clip.....	16	
Terminal.....	9		Fuse.....	17	F1
Terminal.....	10		Resistor.....	18	R1
Ac output receptacle.....	11-1	J1	Plug connector.....		P1
Ac output receptacle.....	11-2	J2	Primary lead.....		E2
Ac output receptacle.....	11-3	J3	Secondary lead.....		E3
Dc output receptacle.....	12-1	J4			



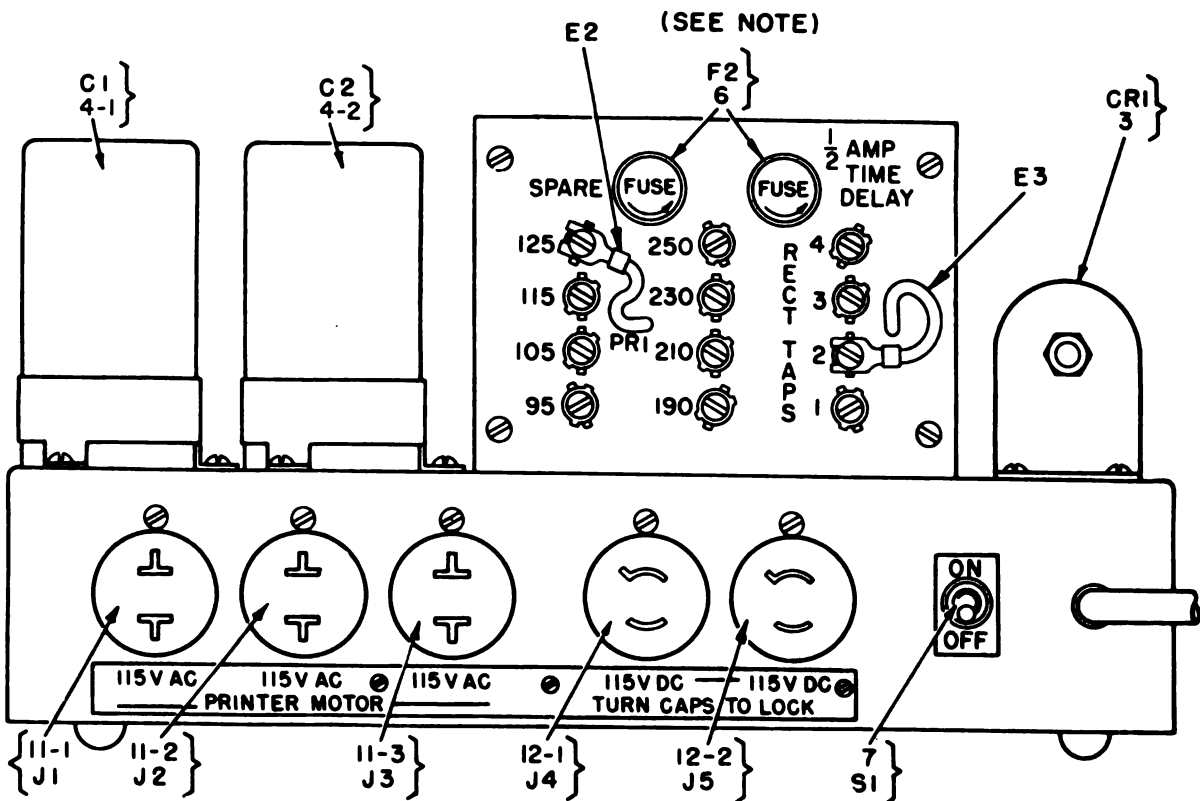
NOTE:
ON RA-87, FUSE (6) IS MOUNTED
IN CLIP TYPE FUSE HOLDER.
TM5815-270-15-3

Figure 3. Rectifier RA-87A, top view of chassis.



TM5815-270-15-4

Figure 4. Rectifier RA-87A, bottom view of chassis.



NOTE:
 ON RA-87 FUSE (6) IS MOUNTED
 IN CLIP TYPE FUSE HOLDER.
 TM5815-270-15-5

Figure 5. Rectifier RA-87A, front view of chassis.

CHAPTER 2

INSTALLATION AND OPERATION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

9. Unpacking

Note. The instructions in this paragraph do not apply to Rectifiers RA-87A supplied on Orders No. 3131-Phila-51 and 3164-Phila-51. Rectifiers RA-87A supplied on these orders are shipped mounted in Shelter HO-17A.

Unpack the equipment where it will not be exposed to dust, dirt, or excessive moisture. Do not thrust tools into the interior of the shipping container and do not damage the packing materials more than is necessary to remove the equipment; these materials and the container may be needed for future repacking.

a. Cut the metal straps with a suitable cutting tool. Remove the cover of the wooden crate; use a standard nailpuller.

b. Slit the moisture-vaporproof barrier material; damage it as little as possible. Remove the corrugated fiberboard box from the wooden crate.

c. Open the corrugated fiberboard box, slit the moisture-vaporproof barrier material, and pull out the chest.

d. Release the two catches on the chest and raise the cover. Remove the technical manuals and pull out the free end of the input power cord.

e. Lift the rectifier from the chest; use the louvers at each end as lifting handles.

10. Checking Unpacked Equipment

a. Inspect the rectifier for damage incurred during shipment. If the equipment has been damaged, report the damage according to instructions in paragraph 3b.

b. See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the table of components (par. 6). Report all discrepancies in accordance with TM 38-750. Shortages that do not affect the proper functioning of the equipment should not prevent the equipment from being used.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modifi-

cation work order (MWO). Current MWO's applicable to the equipment are listed in DA Pam 310-4. If the equipment has been modified, the MWO number should appear on the rectifier near the nomenclature plate. Check to see whether the MWO number and appropriate notations concerning the modification have been written into the schematic diagram of the equipment. If not, add these notations.

11. Installation

Note. Installation of the rectifier is to be performed by second echelon personnel.

Place the rectifier in a cool, dry, well-ventilated place near the teletypewriter equipment with which it is to be used. Use the chest as a table or support to keep the rectifier off damp ground or dirty floors. Complete the installation as follows:

a. *Ac Input.* Check the input power to make sure that it is 95 to 125 volts or 190 to 250 volts, 50 to 60 cps alternating current. *Never connect the rectifier to a dc power source.* If a power unit is used to supply input power for the rectifier, the output voltage and frequency of the power unit can be checked by consulting the nameplate on the power unit. If there is any doubt whether the input power is ac or dc, check the input power with a dc voltmeter. Alternating current will cause a very small vibrating or jiggling motion of the meter needle at or near 0 volt; dc will cause the needle to indicate steadily. Measure the value of the input voltage to the rectifier.

b. *Transformer Tap Connections* (fig. 6). Before connecting the rectifier to the input power or to the teletypewriter equipment, connect the primary tap movable lead, on the tap and fuse panel, to the primary tap whose voltage marking most nearly corresponds to the value of the input power. Connect the secondary tap lead to the secondary tap marked 1. Connect the input cord to the ac input

power, place the rectifier ON-OFF switch at ON, and check the dc output voltage at a dc output receptacle. The dc output voltage should be 115 volts dc. If the dc output voltage is not 115 volts dc, proceed as follows:

Warning: Do not make any adjustments with the power on.

- (1) *Primary input adjustment.* Place the rectifier ON-OFF switch at OFF. If the dc output voltage is higher than 115 volts dc, make the adjustment given in (a) below. If the dc output voltage is lower than 115 volts dc, make the adjustment given in (b) below.
- (a) If the dc output voltage is higher than 115 volts dc, connect the primary tap lead to the next highest voltage primary tap. Place the rectifier ON-OFF switch at ON and measure the dc output voltage at a dc output receptacle. If necessary, continue (using the same procedure) to raise the primary tap lead, and check the dc output voltage until the primary tap is found which most nearly provides a dc output voltage of 115 volts dc.
- (b) If the dc output voltage is lower than 115 volts dc, connect the primary tap lead to the next lowest voltage primary tap. Place the rectifier ON-OFF switch at ON and measure the dc output voltage at a dc output receptacle. If necessary, continue (using the same procedure) to lower the primary tap lead, and check the dc output voltage until the primary tap is found which most nearly provides a dc output voltage of 115 volts dc.
- (2) *Secondary output adjustment.* If, after the primary tap, which most nearly produces a 115-volt dc output, has been selected, and the dc output voltage is less than 115 volts dc, perform the adjustment given in (a) below; if the dc output voltage is more than 115 volts dc, perform the adjustment given in (b) below.
- (a) Place the rectifier ON-OFF switch at OFF. Connect the secondary lead to the secondary tap marked 2. Place the rectifier ON-OFF switch at ON and measure the dc output voltage at a dc output receptacle. If necessary, continue

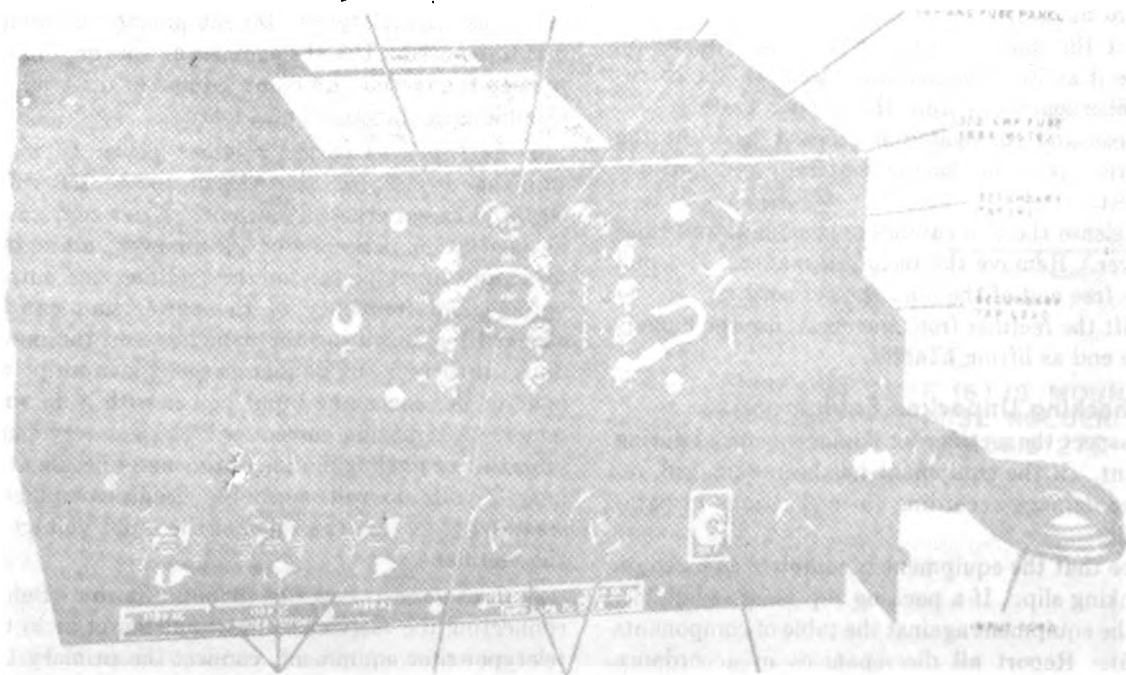


Figure 6. Rectifier RA-87A, front view.

(using the same procedure) to change the secondary lead, and measure the dc output voltage, until 115 volts dc is obtained. The output voltage will increase in steps of approximately 4 volts each as the secondary lead is moved successively to secondary taps 2, 3, and 4.

- (b) Place the rectifier ON-OFF switch at OFF. Connect the primary tap lead to the next highest voltage primary tap. Place the rectifier ON-OFF switch at ON and measure the dc output voltage at a dc output receptacle. Proceed as outlined in (a) above.

c. Teletypewriter Connections. Refer to the technical manuals, which pertain to the particular teletypewriter equipment with which the rectifier is to be used, for interconnection instructions. Be sure that the cords which carry power to the motors of the teletypewriter equipment are plugged into the ac output receptacles of the rectifier (three left-hand receptacles), never into the dc output receptacles. Power to operate the line circuits is taken from the dc output receptacles; lock the plugs tightly in place by turning them clockwise.

Note. In Rectifiers RA-87A supplied on Order No. 18101-Phila-50, the ac output receptacles are black and the dc output receptacles are brown.

Section II. OPERATION

12. Precautions

The maximum ac output power of the rectifier is 500 watts (4.35 amperes at 115 volts). Do not connect to the three ac output receptacles (fig. 6) a combined load that exceeds 500 watts. The maximum dc output power of the rectifier is 46 watts (400 milliamperes at 115 volts). Do not connect to the two dc output receptacles a combined load that exceeds 46 watts. In making all dc connections, be careful not to short-circuit the rectifier output.

13. Operating Procedure

Install and connect the rectifier according to the instructions given in paragraph 11; the operation of the unit then can be started and stopped by the ON-OFF switch (fig. 6). The only noticeable indications that the rectifier is operating are a faintly audible hum from the transformer and a gradual rise in the temperature of the rectifier. Under full load, the rectifier reaches its maximum temperature after 4 to 5 hours of operation.

CHAPTER 3 OPERATOR'S AND ORGANIZATIONAL MAINTENANCE

Section I. OPERATOR'S MAINTENANCE

14. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of the rectifier are listed below together with a reference to the paragraphs covering the specific maintenance function. The duties assigned do not require the use of tools or test equipment. Materials required for operator's maintenance are listed in paragraph 15.

- a. Daily preventive maintenance checks and services (par. 18).
- b. Cleaning (par. 19).

15. Materials Required for Operator's Maintenance

The following materials are required for operator's maintenance:

- a. Cleaning compound (FSN 7930-395-9542).
- b. Lint-free cloth (FSN 8305-170-5062).
- c. Small, soft bristle brush (FSN 8020-245-4509).

16. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. *Systematic Care.* The procedures given in paragraphs 17, 18, and 19 cover routine systematic care and cleaning essential to proper upkeep of this equipment.

b. *Preventive Maintenance Checks and Services.* The preventive maintenance checks and services

chart (par. 18) outlines functions to be performed at specific intervals; however, if the equipment is used as part of a set or system, follow the procedures established in the set or system manual. These checks and services are to maintain Army electronic equipment in a serviceable condition; that is, in good general (physical) condition and in good operational condition. To assist operators in maintaining serviceability, the chart indicates what to check, how to check, and what the normal conditions are; the references column lists the paragraphs or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by the operator, higher echelon maintenance is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

17. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the rectifier are required on a daily basis. Paragraph 18 specifies checks and services that must be accomplished daily or under the special conditions listed below:

- a. When the equipment is initially installed or reinstalled.
- b. At least once each week if the equipment is maintained in a *standby* (ready for immediate operation) condition.

18. Daily Preventive Maintenance Checks and Services Chart

Se- quence No.	Item	Procedure	References
1	Exterior surfaces.....	Inspect for and remove dirt and moisture from exterior surfaces, terminals, and receptacles.	Par. 19.
2	ON-OFF switch.....	Inspect ON-OFF switch for free movement and positive action.	
3	Cords and cables.....	Inspect line cord and load interconnecting cables for cracked or frayed insulation and signs of dry rot.	
4	Operation.....	During normal operation, be alert for any unusual occurrences.	

19. Cleaning

Note. Perform the following procedures as referenced by the daily preventive maintenance checks and services chart.

Inspect the exterior of the rectifier. The exterior surface should be free of moisture, dirt, grease, and fungus.

a. Remove moisture and loose dirt with a clean, soft, lint-free cloth.

Warning: Cleaning compound is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near a flame.

b. Remove grease, fungus, and ground-in dirt from the rectifier; use a soft, lint-free cloth dampened (not wet) with cleaning compound.

c. Remove dirt from the terminals and receptacles with a brush; remove moisture with a dry, soft lint-free cloth.

Section II. ORGANIZATIONAL (SECOND ECHELON) MAINTENANCE

20. Scope of Organizational Maintenance

The maintenance duties assigned to the organizational maintenance repairman of the rectifier are listed below together with a reference to the paragraphs covering the specific maintenance function. The duties assigned require the use of tools, test equipment, and materials listed in paragraph 21.

a. Quarterly preventive maintenance checks and services (par. 24).

b. Cleaning and painting (par. 25).

21. Tools, Test Equipment, and Materials Required

A list of parts authorized for second echelon maintenance appears in TM 11-5815-270-20P. The tools, test equipment, and materials required for organizational maintenance are listed below.

a. *Tools and Test Equipment.*

(1) Tool Equipment TE-50B.

(2) Multimeter AN/URM-105.

b. *Materials.*

(1) Fine sandpaper (No. 000)

(2) Lubricating Oil, General Purpose, Preservative (PL SPECIAL).

(3) Small, soft bristle brush (FSN 8020-245-4509)

22. Organizational Preventive Maintenance

a. Organizational preventive maintenance is the systematic care, inspection, and servicing of equip-

ment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all echelons concerned with the equipment and includes the inspection, testing, and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of the equipment at the second echelon level are made at quarterly intervals (at the same time as the daily (par. 18) preventive maintenance checks and services) unless otherwise directed by the commanding officer.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38-750.

23. Quarterly Maintenance

Quarterly preventive maintenance checks and services on Rectifier RA-87(*) are required. Periodic daily preventive maintenance checks and services (par. 18) constitute a part of the quarterly preventive maintenance checks and services. All deficiencies or shortcomings will be recorded in accordance with the requirements of TM 38-750. Perform all the checks and services listed in the quarterly preventive maintenance checks and services chart (par. 24) in the sequence listed.

24. Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Completeness	See that equipment is complete	App III.
2	Preservation	Check all surfaces for evidence of rust, corrosion, and fungus.	Par. 25.
3	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310-4.

Sequence No.	Item	Procedure	References
4	Modification.....	Check DA Pam 310-4 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately; all NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-4.
5	Fuse.....	Inspect fuse for proper rating.	Par. 25
6	Interior surfaces.....	Remove dust and dirt from interior surfaces.....	
7	Interior parts.....	Inspect interior parts for secure mounting, damage, and signs of overheating.	
8	Output voltage.....	Measure ac and dc output voltage at the front panel receptacles.	
9	Lubrication.....	Lubricate hinges and latches of rectifier access door and case cover	

25. Cleaning and Painting

Note. Perform the following procedures as referenced by the quarterly preventive maintenance checks and services chart.

a. Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to applicable cleaning and refinishing practices specified in TM 9-213.

b. Remove corrosion from terminals, receptacles, and contacts by lightly sanding them with fine sandpaper.

Warning: Do not use hot air to blow dust and dirt from inaccessible areas, because it may cause damage to capacitors or the rectifier.

c. Remove dust and dirt from interior surfaces of the rectifier with a soft bristle brush. Blow dust and dirt from inaccessible areas (such as those between the disks of the rectifier stack) with dry, cool air.

CHAPTER 4

FUNCTIONING OF RECTIFIER RA-87(*)

26. General

To assist personnel to operate, service, and repair Rectifier RA-87(*) properly, the following brief explanation of the operation of this equipment is provided. The functions and operation of the transformer, the rectifying assembly, and the filtering components are described in paragraph 27.

27. Description of Operation (fig. 7)

a. Transformer. Transformer T1 has two functions: It steps up or steps down, as required, the voltage of the ac input to provide 147 to 162 volts to the rectifier, and it increases or decreases the voltage of the input to 115 volts to supply the ac receptacles. The primary winding of the transformer is tapped at suitable points so that it may be connected to operate from a supply of 95 to 125 volts or 190 to 250 volts to produce in the secondary winding approximately the correct voltage to supply the rectifier. The secondary winding, also, is tapped at several points so that the voltage which most nearly will provide 115 volts dc may be supplied to the rectifier. The primary winding of the transformer acts also as an autotransformer and, when the input is connected to the proper tap, will supply 115 volts ac at the ac receptacles.

b. Rectifier CR1. The rectifying assembly consists of a stack of 36 selenium disks mounted on a bolt and furnished with suitable terminals and connections. The selenium disks have the property of conducting electrical energy readily in one direction (during 1 half-cycle of an alternation) and virtually not at all in the other (during the other half-cycle). The stack of disks of rectifier CR1 is divided into four sections by terminals located at the ends, quarter points, and center. The disks are arranged so that they will conduct energy only from the ends

or quarter points toward the center. Ac from the secondary winding of the transformer is connected to the two quarter-point terminals so that energy is carried by the first and third sections of the stack when the ac voltage from the transformer is impressed on one direction, and by the second and fourth sections when it is impressed in the opposite direction. Thus, full-wave rectification is effected and pulsating dc is produced. The center terminal of the stack becomes the positive dc terminal, and the end terminals (which are connected together) become the negative dc terminal. In Rectifiers RA-87A supplied on Orders No. 25578-Phila-49 and 18101-Phila-50, the polarity is reversed: the center terminal of the rectifier stack is the negative dc terminal; and the end terminals, connected together, become the positive dc terminal.

c. Filter. This group of components operates to remove the ripple (ac component) from the rectified ac and to stabilize the dc voltage. The pulsating dc passes from rectifier CR1 through reactor L1 which is a swinging-type choke; that is, its inductance varies with the load from 1.8 henrys at no load to .23 henry at full load. The reactor acts as a high impedance to the ac component of pulsating current and a low impedance to the flow of direct current; it removes most of the ripple from the rectified current. The current then passes to capacitors C 1 and C 2 which provide a low-impedance path for any pulsating current passed by reactor L1. The capacitors keep the current supplied to any fixed load at a nearly constant value. Resistor R1 is connected across the output of the capacitors to provide a constant load and to act as a bleeder to prevent the voltage of the dc output from rising excessively when the dc load is small. As a result of these operations, almost pure direct current with an actual voltage variation of less than one-half volt is supplied at the dc output receptacles.

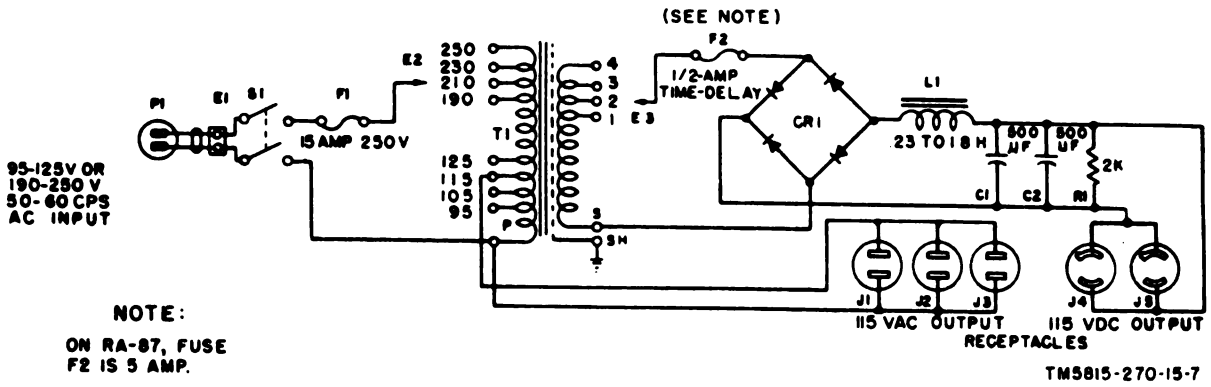


Figure 7. Rectifier RA-87/A, schematic diagram.

CHAPTER 5

TROUBLESHOOTING AND REPAIR

Section I. TROUBLESHOOTING

28. Organization of Troubleshooting Procedures

a. *General.* When troubleshooting Rectifier RA-87(*), the first step is to localize the fault to a section and then isolate the fault to the defective component. Some faults may be isolated by sight, touch, or hearing. The majority of faults, however, must be isolated by detailed electrical checks.

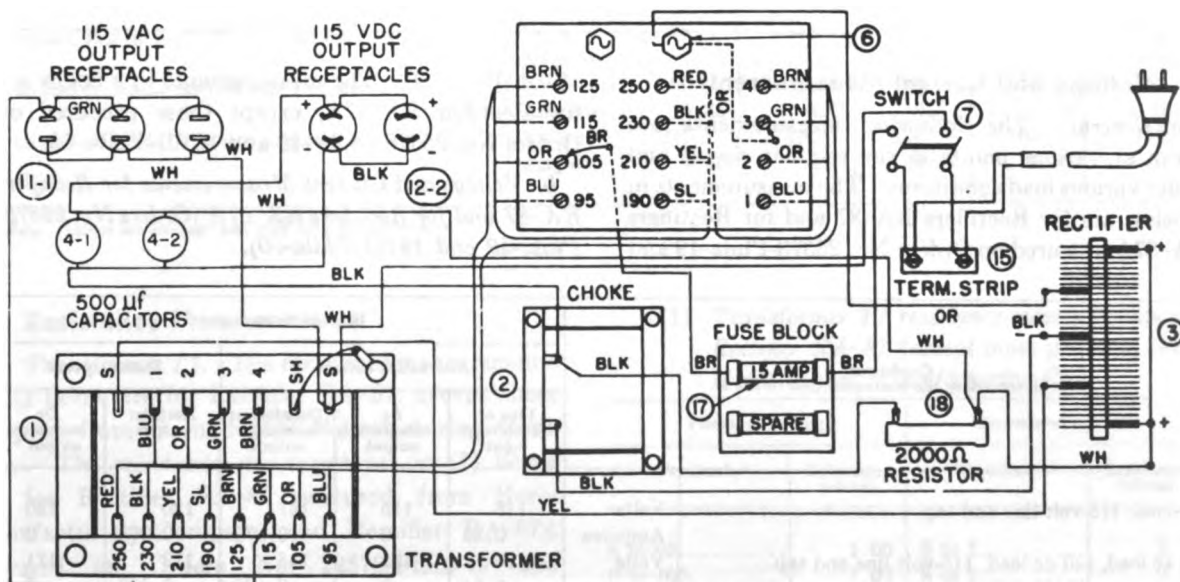
b. *Localization.* The tests listed below will aid in localizing the trouble to a section of the rectifier.

(1) *Visual inspection.* The purpose of a visual inspection is to locate faults without testing or measuring circuits or components. All visual signs should be analyzed to help localize the fault to a particular section of

the rectifier. The rectifier should be examined for signs of overheating, bulged capacitors, discolored or blistered resistor, and loose connections. Mechanical faults are most often localized through visual inspection.

(2) *Troubleshooting chart.* The trouble symptoms listed in the troubleshooting chart (par. 30) will aid in localizing trouble to a component part of the rectifier.

c. *Isolation.* Trouble is isolated to a component part through the use of voltage measurements (par. 31) and resistance measurements (par. 32). Refer to the schematic diagram (fig. 7) and the appropriate wiring diagram (figs. 8 or 13) when



NOTE:
 WIRES COLOR-CODED ORANGE IN RECTIFIERS SUPPLIED ON ORDER NO. 25578-P-49 ARE COLOR-CODED WHITE/YELLOW (W/Y) IN RECTIFIERS SUPPLIED ON ORDER NO. 18101-P-50.

TM 5815-270-15-8

Figure 8. Rectifier RA-87A (Order No. 25578-Phila-49 and 18101-Phila-56) wiring diagram.

troubleshooting. Most testing can be done without disconnecting or removing the part. Whenever a part is suspected to be defective or if the transformer or reactor winding may be open or shorted, disconnect and check the suspected faulty part.

29. Tools and Test Equipment Required

The following is a list of tools and test equipment required for troubleshooting the rectifier.

a. Tool Equipment TE-50-B.

b. Multimeter TS-352/U.

c. Multimeter ME-26A/U.

30. Troubleshooting Chart

a. *General.* The troubleshooting chart is designed to aid the repairman to localize faults within the rectifier. If the equipment performance at the time of fault is not known, perform the procedure given in paragraph 11 to establish the present condition of the rectifier.

b. *Troubleshooting Chart.*

Item	Symptom	Probable trouble	Corrective measure
1	No ac output voltage.....	Defective input cord, transformer T1, or switch S1. Defective fuse F1.....	Check and replace if necessary. Replace fuse.
2	No dc output voltage.....	Loose or dirty fuse clips on fuse block.... Loose terminals on ac output receptacles... Defective fuse FS.....	Clean and bend fuse clips. Tighten terminals. Replace fuse.
3	Ac and dc output voltages incorrect.	Loose terminals on dc output receptacles... Defective reactor L1, transformer T1, rectifier CR1, or capacitor C1 or C2. Primary tap lead connected wrong.....	Tighten terminals. Check and replace if necessary.
4	Dc output voltage incorrect....	Ac input voltage changed.....	Check connection (par. 11). Check ac input voltage.
5	Dc voltage excessively high....	Secondary tap lead connected wrong.....	Check connection (par. 11).
6	Ac ripple in dc output.....	Defective reactor L1 or resistor R1..... Defective reactor L1, capacitor C1 or C2, or rectifier CR1.	Check and replace if necessary. Check and replace if necessary.

31. Voltage and Current Measurements

a. *General.* The following measurements are taken at various points in the rectifier circuit and under various load conditions. The measurements in b below are for Rectifiers RA-87 and for Rectifiers RA-87A procured on Orders No. 25578-Phila-49 and

18101-Phila-50. The measurements in c below are for Rectifier RA-87A, except those procured on Orders No. 25578-Phila-49 and 18101-Phila-50.

b. *Voltage and Current Measurements for Rectifiers RA-87 and for Rectifiers RA-87A (Orders No. 25578-Phila-49 and 18101-Phila-50).*

Conditions (with secondary tap load connected to tap 1).		Point of measurement				
		Alternating current			Direct current	
		Line or transformer input	Ac receptacle output	Transformer secondary output	Rectifier output	Dc receptacle output ^a
No-load, 115-volt line and tap.....	Volts	115	115	147	120	120
	Amperes	0.34	0	0.070	0.060	0
No ac load, full dc load, 115-volt line and tap.....	Volts	115	115	145	112	111
	Amperes	0.84	0	0.490	0.457	0.40
Full ac and dc loads, 115-volt line and tap.....	Volts	115	115	145	112	111
	Amperes	5.00	4.35	0.490	0.457	0.40
Full ac and dc loads, 110-volt line on 115-volt tap.....	Volts	110	107	137	106	105
	Amperes	4.80	4.15	0.490	0.455	0.40
No ac load, full dc load, 95-volt line and tap.....	Volts	95	115	145	112	111
	Amperes	1.10	0	0.490	0.457	0.40

^a See footnote at end of table.

Conditions (with secondary tap load connected to tap 1).		Point of measurement				
		Alternating current			Direct current	
		Line or transformer input	Ac receptacle output	Transformer secondary output	Rectifier output	Dc receptacle output ^a
Full ac and dc loads, 95-volt line and tap.....	Volts	95	112	142	109	108
	Amperes	5.80	4.25	0.490	0.457	0.40
Full ac and dc loads, 230-volt line and tap.....	Volts	230	112	145	112	111
	Amperes	2.50	4.25	0.490	0.457	0.40

^a The output voltage at the dc receptacle may be increased to approximately 115 volts by changing the RECT TAPS connection from tap 1 to tap 4. This increase will have no effect on the output voltage at the ac receptacles.

c. Voltage Measurements for Rectifier RA-87A (except those procured on Orders No. 25578-Phila-49 and 18101-Phila-50).

Conditions (with secondary tap load connected to tap 1).		Point of measurement				
		Alternating current			Direct current	
		Line or transformer input	Ac receptacle output	Transformer secondary output	Rectifier output	Dc receptacle output ^a
No load, 115-volt line and tap.....	Volts	115	115	146	120	120
	Amperes	0.3	0	0.08	0	0
No ac load, full dc load, 115-volt line and tap.....	Volts	115	114	143	112	112
	Amperes	0.77	0	0.55	0.4	0.4
Full ac and dc loads, 115-volt line and tap.....	Volts	111	110	139	107	107
	Amperes	5	4.2	0.55	0.38	0.38
No ac load, full dc load, 95-volt line and tap.....	Volts	95	113	142	110	110
	Amperes	1	0	0.55	0.4	0.4
Full ac and dc loads, 95-volt line and tap.....	Volts	90	108	135	104	104
	Amperes	5.35	4.5	0.5	0.38	0.38
Full ac and dc loads, 230-volt line and tap.....	Volts	217	108	136	105	105
	Amperes	2.35	4	0.52	0.38	0.38

Note. Values are average and may vary ± 5 percent.

32. Resistance Measurements

a. Transformer T1. The resistance measurements in (1) below are for Rectifier RA-87, except those procured from Horni Signal Manufacturing Company. The resistance measurements in (2) below are for Rectifier RA-87 procured from Horni Manufacturing Company and Rectifier RA-87A procured on Orders No. 22578-Phila-49 and 18101-Phila-50. The resistance measurements in (3) below are for Rectifier RA-87A except those procured on Orders No. 22578-Phila-49 and 18101-Phila-50.

Note. Use Multimeter ME-26A/U to make the resistance measurements in (1), (2), and (3) below.

(1) *Transformer T1 resistance measurements for Rectifier RA-87 (except those procured from Horni Signal Manufacturing Co.)*

Primary winding		Secondary winding	
Terminals	Resistance (ohms)	Terminals	Resistance (ohms)
S to 95.....	1.00	S to 1.....	2.15
S to 105.....	1.02	S to 2.....	2.20
S to 115.....	1.10	S to 3.....	2.27
S to 125.....	1.11	S to 4.....	2.36
S to 190.....	1.70		
S to 210.....	1.86		
S to 230.....	2.10		
S to 250.....	2.26		

(2) *Transformer T1 resistance measurements for Rectifier RA-87 (procured from Horni Signal Manufacturing Co.) and Rectifier RA-87A (procured on Orders No. 22578-Phila-49 and 18101-Phila-50.)*

Primary winding		Secondary winding	
Terminals	Resistance (ohms)	Terminals	Resistance (ohms)
S to 95.....	0.689	S to 1.....	3.47
S to 105.....	0.723	S to 2.....	3.57
S to 115.....	0.758	S to 3.....	3.68
S to 125.....	0.794	S to 4.....	3.91
S to 190.....	1.270		
S to 210.....	1.438		
S to 230.....	1.582		
S to 250.....	1.761		

(3) *Transformer T1 resistance measurements for Rectifier RA-87A (except those procured on Orders No. 22578-Phila-49 and 18101-Phila-50.)*

Primary winding		Secondary winding	
Terminals	Resistance (ohms)	Terminals	Resistance (ohms)
P to 95.....	0.88	S to 1.....	2.14
P to 105.....	0.923	S to 2.....	2.21
P to 115.....	0.966	S to 3.....	2.28
P to 125.....	1.009	S to 4.....	2.36
P to 190.....	1.326		
P to 210.....	1.643		
P to 230.....	1.961		
P to 250.....	2.279		

Note. Resistance values are average and may vary ± 5 percent.

b. Rectifier CR1, Resistance Measurements. Disconnect the jumper which connects the end terminals of rectifier CR1. Use Multimeter TS-352/U to measure the resistance of each of the four sections of rectifier CR1. The resistance per section for Rectifiers RA-87 and for Rectifiers RA-87A (procured on Orders No. 25578-Phila-49 and 18101-Phila-50) is 1,500 to 2,000 ohms with the test prods connected one way, and 25,000 to 40,000 with the test prod connections reversed. The resistance per section for Rectifiers RA-87A (except those procured on Orders No. 25578-Phila-49 and 18101-Phila-50) is 17,000 to 19,000 with the test prods connected one way, and 250,000 to 280,000 with the test prod connections reversed.

Caution: Observe polarity when checking capacitors C1 and C2.

c. Capacitors C1 and C2. Discharge the capacitors by short-circuiting them with a well-insulated screwdriver. Use Multimeters TS-352/U to test the capacitors. The resistance of capacitors C1 and C2 for Rectifiers RA-87 and for Rectifiers RA-87A (procured on Orders No. 25578-Phila-49 and 18101-Phila-50) is between 5,000 to 10,000 ohms. The resistance of capacitors C1 and C2 for Rectifiers RA-87A (except those procured on Orders No. 25578-Phila-49 and 18101-Phila-59) will start at approximately 2,000 and increase gradually to approximately 50,000 ohms.

d. Reactor L1. The resistance of reactor L1 is from 2.0 to 2.5 ohms.

e. Resistor R1. The resistance of resistor R1 is from 1,800 to 2,220 ohms.

Section II. REPAIRS

33. Removal of Parts

Any component part of the rectifier can be removed easily and individually by unfastening its mounting screws, nuts, and lockwashers. No sequence of removal is necessary; however, it is advisable to unfasten, not disconnect, rectifier CR1 to remove the fuse block or the terminal board. Disconnect or unsolder only the leads or connections required to free the parts; label the leads carefully to identify them when connecting the replacement part.

34. Replacement of Parts

Be sure to reinstall all spacers, washers, and lockwashers in their proper places. Refer to the appropriate wiring diagram (fig. 8 or 13) for proper wire connections. Carefully resolder all electrical connections. When a replacement rectifier CR1 is being installed, be careful to connect the leads so that the polarity is correct. Take particular care, in soldering the connections to the terminals on rectifiers CR1, that no solder lodges between the disks; this would cause rectifier CR1 to overheat and to burn out.

CHAPTER 6

FOURTH ECHELON TESTING PROCEDURES

35. General

a. Testing procedures are prepared for use by Signal Field Maintenance Shops and Signal Service Organizations responsible for fourth echelon maintenance of electronic equipment to determine the acceptability of repaired signal equipment. These procedures set forth specific requirements that repaired electronic equipment *must* meet before it is returned to the using organization. The testing procedures may also be used as a guide to test equipment repaired at third echelon, provided the proper tools and test equipments are available. A summary of the performance standards is given in paragraph 42.

b. Comply with the instructions preceding each chart. Perform each test in sequence. Do not vary the sequence. For each step, perform all actions required in the control settings columns; perform each specific test procedure and verify it against its performance standard.

36. Test Equipment and Materials

All test and other equipment required to perform the testing procedures given in this section are listed in the following charts and are authorized under TA 11-17, Signal Field Maintenance Shops, and TA 11-100 (1-17), Allowance of Signal Corps Expendable Supplies for Signal Field Maintenance Shops (Continental United States).

a. Test Equipment.

Nomenclature	Federal stock No.	Technical manual
Voltmeter, Meter ME-30 A/U.	6625-669-0742	TM 11-6625-320-12
Multimeter TS-352/U.....	6625-242-5023	TM 11-5527
Ohmmeter ZM-21/U.....	6625-246-5890	TM 11-2050A
Electric Light Assembly	6695-537-4470	TM 11-5540

b. Other Equipment.

Equipment	Federal stock No.
Resistor, fixed, ww, 280 ohms ± 5 percent, 86 watts.	5905-185-8356
Transformer, Variable CN-16B/U.....	5950-235-2086
Two-way connector adapter.....	None.

37. Physical Tests and Inspection

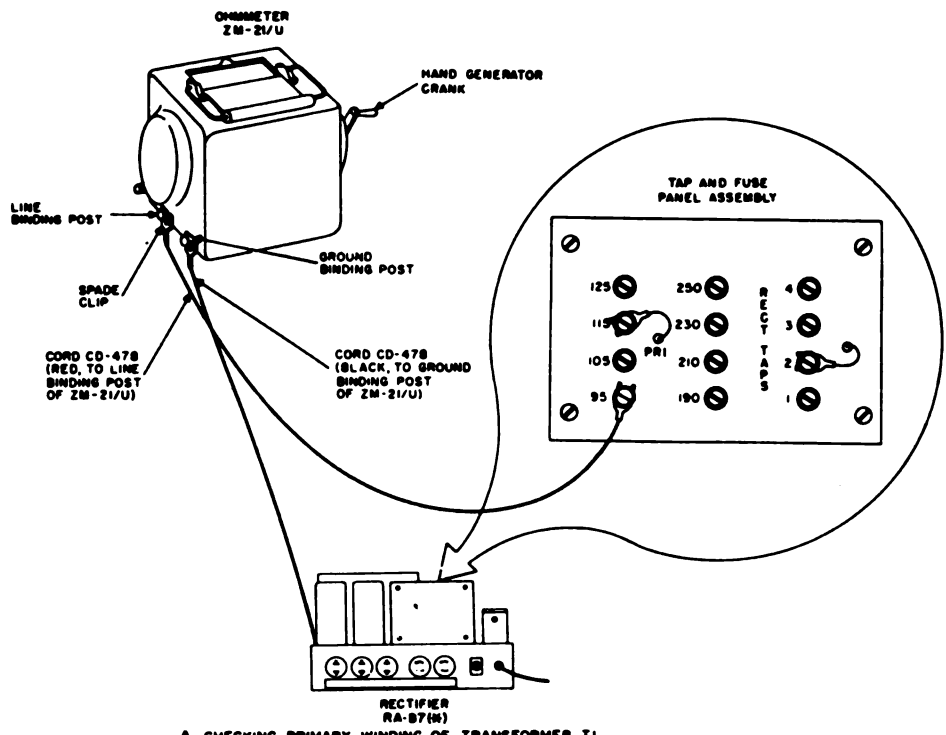
a. *Test Equipment.* Electric Light Assembly MX-1292/PAQ.

b. *Test Connections and Conditions.*

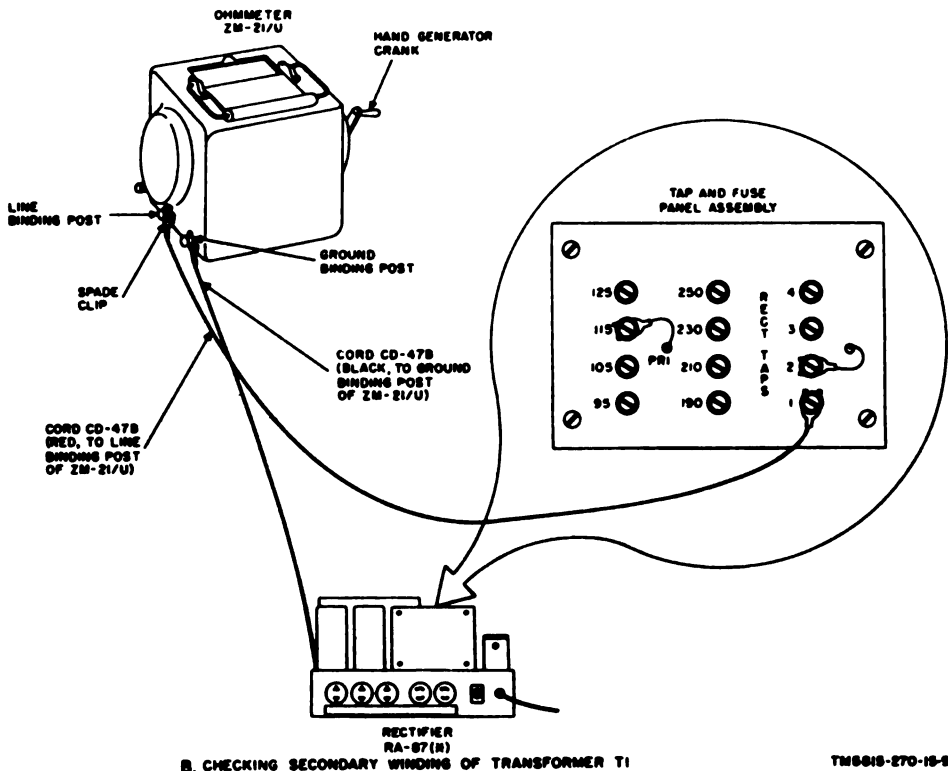
- (1) If the RA-87(*) is connected to a power source, disconnect the power cord of the RA-87(*) from the power source.
- (2) Remove the RA-87(*) case cover from the chassis.
- (3) Remove the base plate from the bottom of the chassis.
- (4) Prepare the MX-1292/PAQ for use by installing the wide transmission filter in the mercury-vapor lamp assembly and connecting power to the equipment.

c. Procedure.

Step	Control settings		Test procedure	Performance standard
	Test equipment	Equipment under test		
1	N/A.....	ON-OFF switch may be in any position.	<p>a. Inspect rectifier for loose or missing screws.</p> <p>b. Inspect power cord, plug, receptacles, and fuseholders for wear, looseness, and damage. Check rating of each fuse.</p> <p>c. Inspect ON-OFF switch for binding, freedom of movement, and positive action.</p> <p>d. Inspect tap and fuse panel assembly for loose terminals and loose, damaged, or missing primary and secondary leads.</p> <p>e. Inspect case cover and chassis for dents or cracks and for condition of finish.</p>	<p>a. All screws are tight; none missing.</p> <p>b. Power cord, plug, receptacles, and fuseholders are not worn, bent, or damaged. Proper rating of each fuse is marked adjacent to its fuseholder.</p> <p>c. ON-OFF switch moves freely with positive action to each position.</p> <p>d. All terminals are tight. Primary and secondary leads are not loose or damaged.</p> <p>e. Case cover and chassis are free from dents and cracks; painted surfaces do not show bare metal spots and there is no rust or corrosion.</p> <p><i>Notes.</i> Touchup painting is recommended instead of refinishing wherever practicable. Screwheads, terminals, and receptacles will not be painted or polished with abrasives.</p>
2	MX-1292/PAQ: 245 V. FOR M. V. LAMP switch: ON.	ON-OFF switch may be in any position.	<p>a. Expose portions of equipment that have been repaired or otherwise disturbed to direct rays of mercury-vapor lamp and inspect condition of moisture-proofing and fungiproofing (MFP) varnish.</p> <p>b. Turn off the mercury-vapor lamp.</p>	<p>a. All parts, wires, and chassis surfaces show continuous, unbroken coverage with MFP varnish.</p> <p><i>Notes.</i> MFP varnish glows blue-gray under the mercury-vapor lamp.</p> <p>b. None.</p>



A. CHECKING PRIMARY WINDING OF TRANSFORMER T1



B. CHECKING SECONDARY WINDING OF TRANSFORMER T1

TM6816-270-15-9

Figure 9. Transformer insulation resistance tests.

38. Transformer Insulation Resistance Tests

a. *Test Equipment.* Ohmmeter ZM-21/U.

b. *Test Conditions and Connections* (fig. 9).

(1) If the RA-87(*) is connected to a power source, disconnect the power cord of the RA-87(*) from the power source.

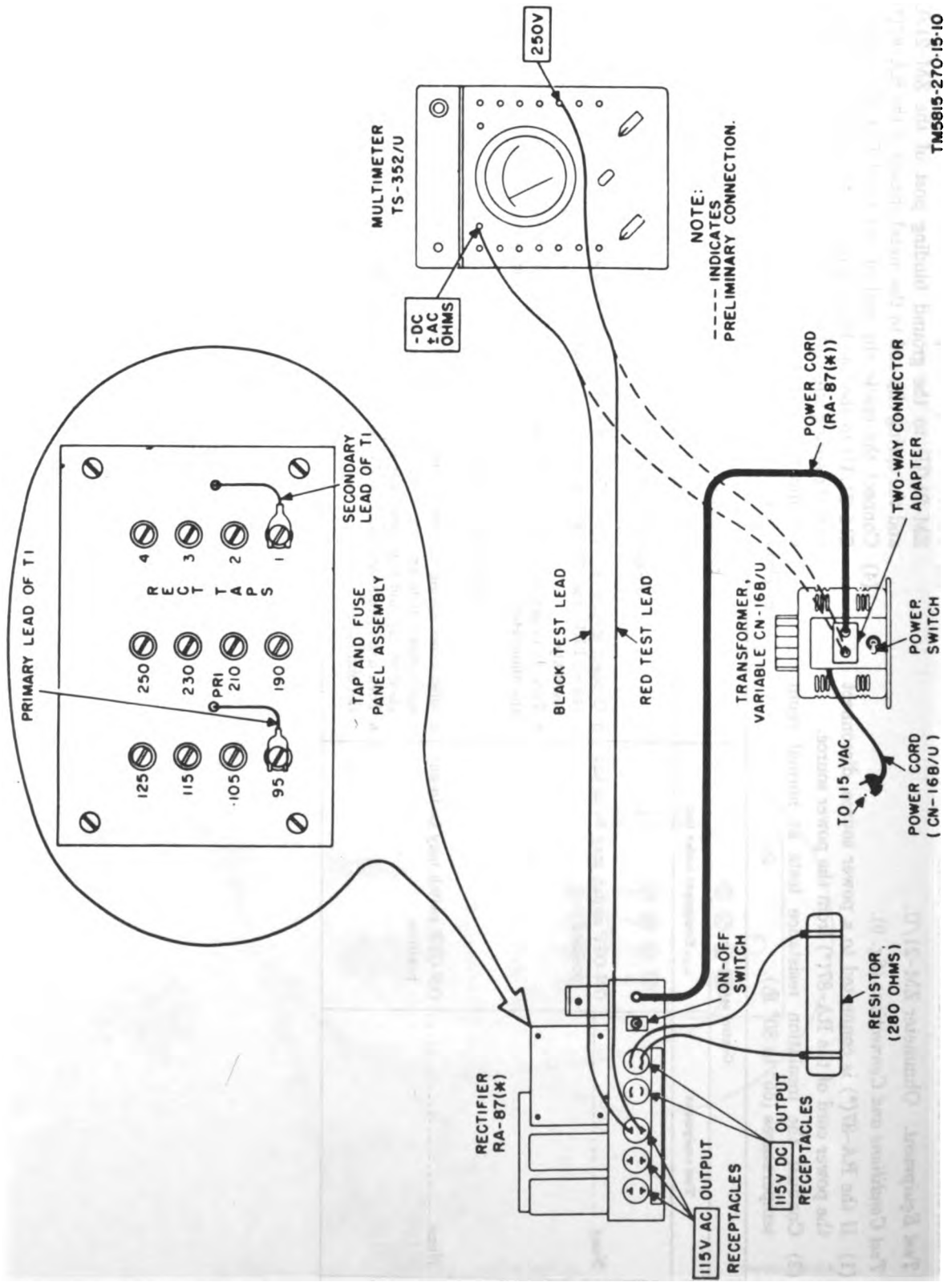
(2) Conduct the insulation resistance tests at normal room temperatures (65° to 80° F.).

(3) Connect the spade clip end of black Cord CD-478 (part of ZM-21/U) to the ground binding post of the ZM-21/U, and the spring clip end to the metal chassis of the RA-87(*).

(4) Connect the spade clip end of red Cord CD-478 (part of ZM-21/U) to the line binding post of the ZM-21/U. Connect the spring clip end of red Cord CD-478 to the RA-87(*) as indicated in *c* below.

c. *Procedure.*

Step	Control settings		Test procedure	Performance standard
	Test equipment	Equipment under test		
1	None.....	ON-OFF switch may be in any position.	<p>Primary winding</p> <p>a. Connect spring clip of red Cord CD-478 to any one of PRI taps (95-250) on tap and fuse panel assembly.</p> <p>b. Turn hand generator crank of ZN-21/U and read the ohmmeter.</p> <p>Secondary winding</p> <p>a. Disconnect spring clip end of red Cord CD-478 and connect it to any one RECT TAPS terminals (1-4) on tap and fuse panel assembly.</p> <p>b. Turn hand generator crank of ZM-21/U and read the ohmmeter.</p>	<p>a. None.</p> <p>b. Ohmmeter reading is at least 8 megohms.</p>
2	None.....	ON-OFF switch may be in any position.	<p>a. Disconnect spring clip end of red Cord CD-478 and connect it to any one RECT TAPS terminals (1-4) on tap and fuse panel assembly.</p> <p>b. Turn hand generator crank of ZM-21/U and read the ohmmeter.</p>	<p>a. None.</p> <p>b. Ohmmeter reading is at least 4 megohms.</p>

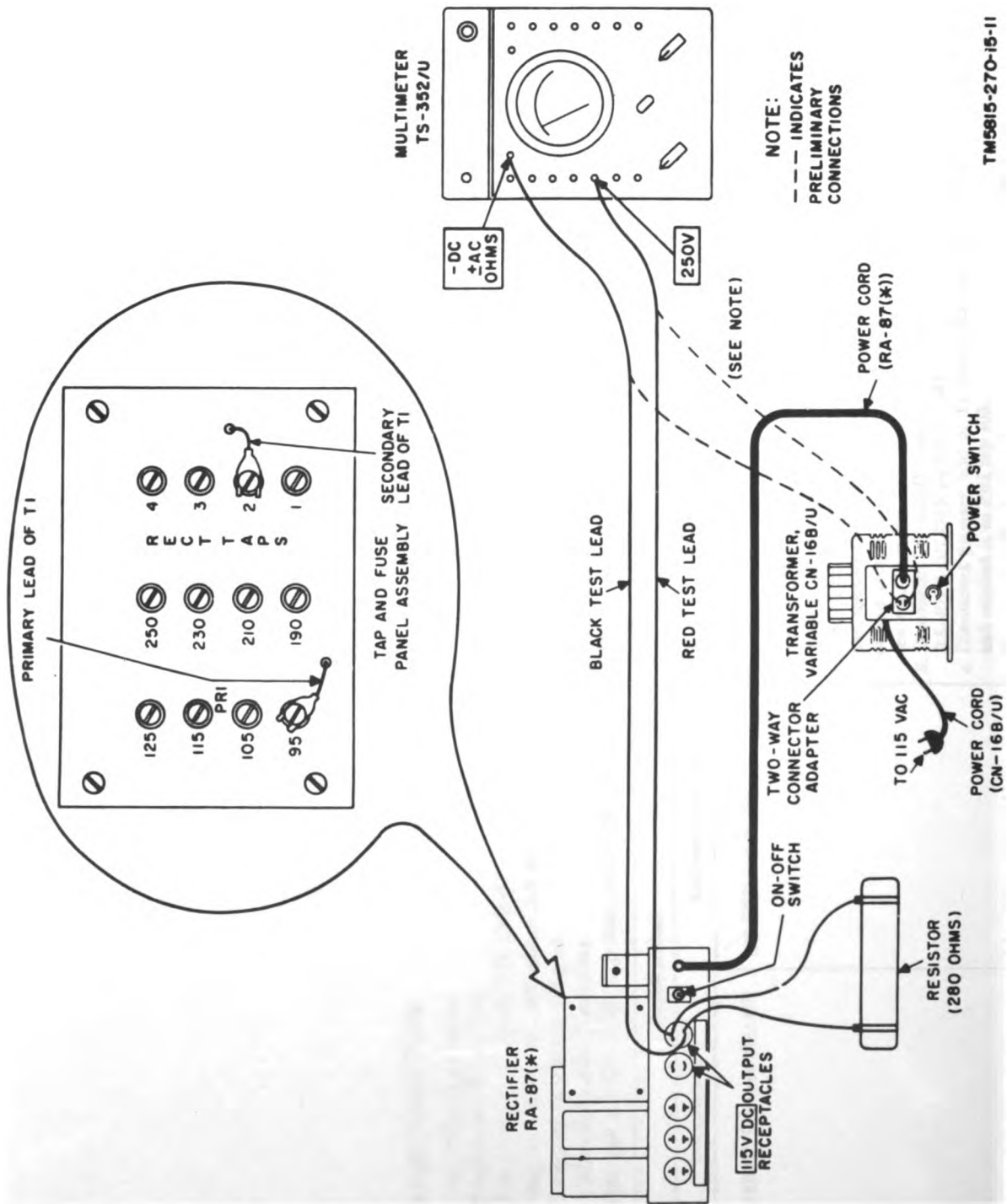


TM5815-270-15-10

Figure 10. Ac input-output tests.

d. Same as step No. 1d.
 e. Disconnect primary lead of T1 from PRI tan ins.
 f. None.

3	Unchanged.....	ON-OFF switch: ON.....	<p>d. Same as step No. 1c. e. Disconnect primary lead of T1 from PRI tap 105 and connect it to PRI tap 115. a. Same as step No. 1c. b. Adjust CN-16B/U control so that a reading of 115 volts ac is obtained on the TS-352/U. c. Same as step No. 2c. d. Same as step No. 1d. e. Disconnect primary lead of T1 from PRI tap 115 and connect it to PRI tap 125. a. Same as step No. 1c. b. Adjust the CN-16B/U control so that a reading of 125 volts ac is obtained on the TS-352/U. c. Same as step No. 2c. d. Same as step No. 1d. e. Disconnect primary lead of T1 from PRI tap 125 and connect it to PRI tap 190. a. Same as step No. 1c. b. Adjust CN-16B/U control so that a reading of 130 volts ac is obtained on the TS-352/U. c. Same as step No. 2c.</p>	<p>a. None. b. None. c. Same as step No. 2c. d. None. e. None. a. None. b. None. c. Same as step No. 2c. d. None. e. None. a. None. b. None. c. Meter of TS-352/U indicates 72 volts ac (± 3). d. None. e. None. a. None. b. None. c. Meter of TS-352/U indicates 67 volts ac (± 3). d. None. e. None. a. None. b. None. c. Meter of TS-352/U indicates 61 volts ac (± 3). d. None. e. None. a. None. b. None. c. Meter of TS-352/U indicates 57 volts ac (± 3). d. None. e. None. f. None.</p>
4	Unchanged.....	ON-OFF switch: ON.....	<p>d. Same as step No. 1d. e. Disconnect primary lead of T1 from PRI tap 190 and connect it to PRI tap 210. a. Same as step No. 1c. b. Same as step No. 5b. c. Same as step No. 2c.</p>	<p>a. None. b. None. c. Meter of TS-352/U indicates 67 volts ac (± 3). d. None. e. None.</p>
5	Unchanged.....	ON-OFF switch: ON.....	<p>d. Same as step No. 1d. e. Disconnect primary lead of T1 from PRI tap 210 and connect it to PRI tap 230. a. Same as step No. 1c. b. Same as step No. 5b. c. Same as step No. 2c.</p>	<p>a. None. b. None. c. Meter of TS-352/U indicates 61 volts ac (± 3). d. None. e. None.</p>
6	Unchanged.....	ON-OFF switch: ON.....	<p>d. Same as step No. 1d. e. Disconnect primary lead of T1 from PRI tap 230 and connect it to PRI tap 260. a. Same as step No. 1c. b. Same as step No. 5b. c. Same as step No. 2c.</p>	<p>a. None. b. None. c. Meter of TS-352/U indicates 57 volts ac (± 3). d. None. e. None.</p>
7	Unchanged.....	ON-OFF switch: ON.....	<p>d. Same as step No. 1d. e. Disconnect primary lead of T1 from PRI tap 260 and connect it to PRI tap 280. a. Same as step No. 1c. b. Same as step No. 5b. c. Same as step No. 2c.</p>	<p>a. None. b. None. c. Meter of TS-352/U indicates 57 volts ac (± 3). d. None. e. None.</p>
8	Unchanged.....	ON-OFF switch: ON.....	<p>d. Same as step No. 1d. e. Disconnect primary lead of T1 from PRI tap 280 and connect it to PRI tap 115. f. Operate CN-16B/U power switch to OFF.....</p>	<p>a. None. b. None. c. Meter of TS-352/U indicates 57 volts ac (± 3). d. None. e. None. f. None.</p>



TM5815-270-15-11

Figure 11. Dc output tests.

18-363/U: observe correct polarity. Upper slot of each re-

<p>TS-352/U: FUNCTION switch: DIRECT.</p>		<p>observe correct polarity. Upper slot of each receptacle is positive (\pm) connection and lower slot is negative ($-$) connection.</p> <p>a. Connect test leads of TS-352/U to either one of the RA-67(*) 115V DC output receptacles as shown by the solid lines (fig. 11).</p> <p>b. Disconnect TS-352/U from RA-67(*) and operate RA-67(*) ON-OFF switch to OFF.</p> <p><i>Note.</i> Satisfactory operation of RA-67(*) with primary lead of T1 at 95 and a 95-volt ac input is sufficient indication that satisfactory operation will be obtained throughout entire range of PRI taps and corresponding ac input voltages (95 through 340).</p> <p>c. Disconnect primary lead of T1 from PRI tap 95 and connect it to PRI tap 115.</p> <p>d. Disconnect secondary lead of T1 from RECT TAPS terminal 2 and connect it to RECT TAPS terminal 1.</p> <p>e. Connect test leads of TS-352/U to CN-16B/U as shown by dashed lines in figure 11.</p> <p>b. Adjust control of CN-16B/U so that a reading of 115 volts ac is obtained on TS-352/U.</p> <p>c. Disconnect test leads of TS-352/U from the CN-16B/U.</p> <p>a. Same as step No. 2a.</p> <p>b. Same as step No. 2b.</p> <p>c. Disconnect secondary lead of T1 from RECT TAPS terminal 1 and connect it to terminal 2.</p> <p><i>Note.</i> Let the primary lead of T1 connected to PRI tap 115 throughout remainder of dc output tests.</p> <p>Same as step No. 3.</p> <p>Same as step No. 2a.</p> <p>b. Same as step No. 2b.</p> <p>c. Disconnect secondary lead of T1 from RECT TAPS terminal 2 and connect it to terminal 3.</p> <p>Same as step No. 3.</p> <p>a. Same as step No. 2a.</p> <p>b. Same as step No. 2b.</p> <p>c. Disconnect secondary lead of T1 from RECT TAPS terminal 3 and connect it to terminal 4.</p> <p>Same as step No. 3.</p> <p>a. Same as step No. 2a.</p> <p>b. Same as step No. 2b.</p> <p>c. Operate CN-16B/U power switch to OFF.</p>	<p>a. Meter of TS-352/U indicates 115 volts dc (± 12).</p> <p>b. None.</p> <p>c. None.</p> <p>d. None.</p> <p>e. None.</p> <p>b. None.</p> <p>c. None.</p> <p>a. Meter of TS-352/U indicates 112 volts dc (± 12).</p> <p>b. None.</p> <p>c. None.</p> <p>None.</p> <p>a. Meter of TS-352/U indicates 116 volts dc (± 12).</p> <p>b. None.</p> <p>c. None.</p> <p>None.</p> <p>a. Meter of TS-352/U indicates 120 volts dc (± 12).</p> <p>b. None.</p> <p>c. None.</p> <p>None.</p> <p>a. Meter of TS-352/U indicates 124 volts dc (± 12).</p> <p>b. None.</p> <p>c. None.</p>
<p>CN-16B/U: Power switch: ON.</p> <p>TS-352/U: FUNCTION switch: AC VOLTS.</p>	<p>ON-OFF switch: ON</p>		
<p>CN-16B/U: Power switch: ON.</p> <p>TS-352/U: FUNCTION switch: DIRECT.</p>	<p>ON-OFF switch: ON</p>		
<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>	<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>		
<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>	<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>		
<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>	<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>		
<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>	<p>Same as step No. 3.</p> <p>Same as step No. 4.</p>		

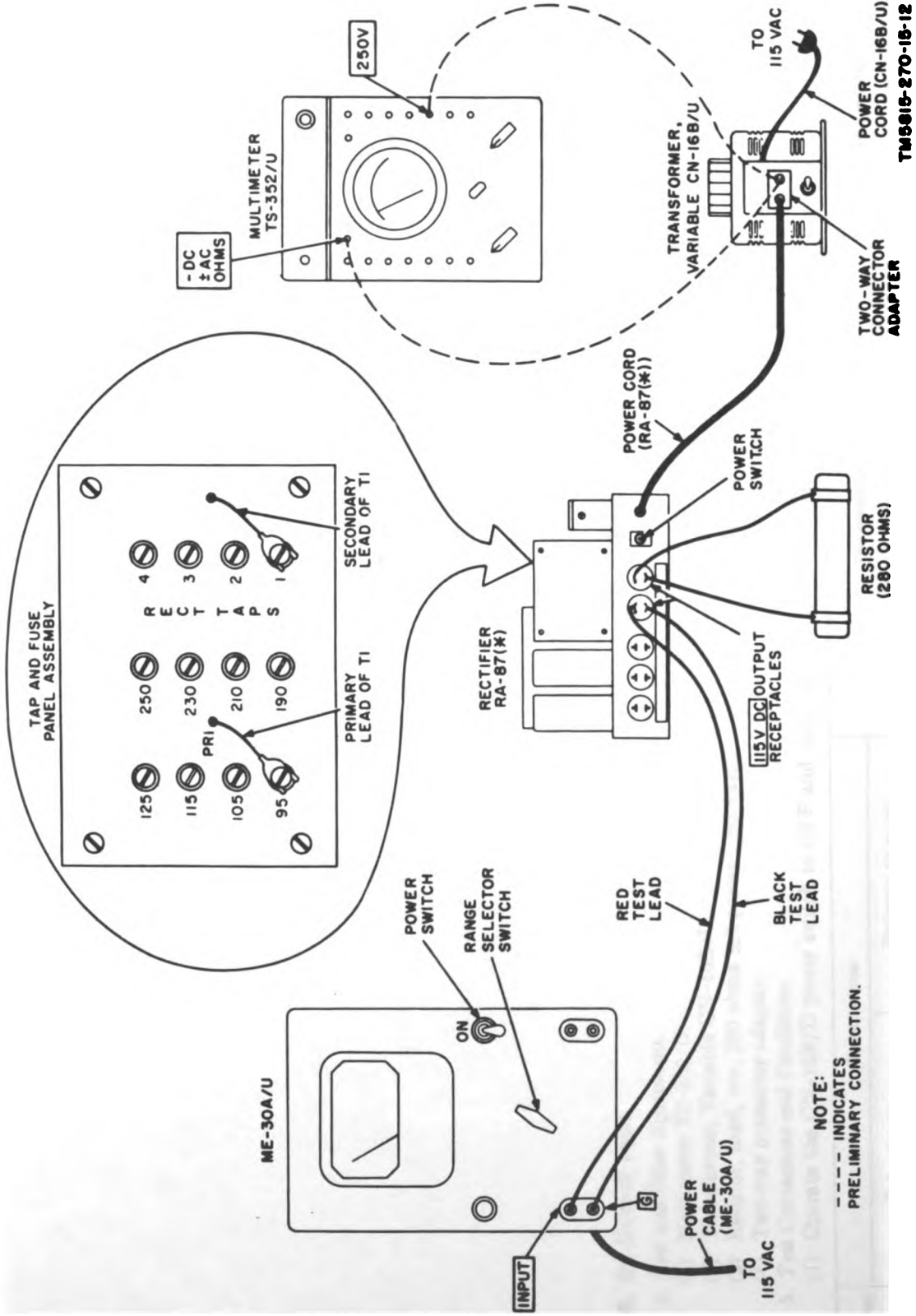


Figure 18. Bippig voltage test.

James H. Taper

<p>FUNCTION switch: AC VOLTS.</p>		
<p>2 CN-16B/U; Power switch: ON. ME-30B/U; Range selector switch: 300.</p>	<p>ON-OFF switch: ON</p>	<p>b. None. c. None. d. None. a. ME-30A/U meter reading is 0.5 volt ac or less. b. None. c. None. d. None.</p>
<p>3 Same as step No. 1</p>	<p>ON-OFF switch: OFF</p>	<p>a. None. b. None. c. None. d. None. e. Same as step No. 2a. b. None. c. None.</p>
<p>4 Same as step No. 2</p>	<p>ON-OFF switch: ON</p>	<p>c. None. d. None. e. Same as step No. 2a. b. None. c. None.</p>
<p>5 Same as step No. 1</p>	<p>ON-OFF switch: OFF</p>	<p>a. None. b. None. c. None. d. None. e. Same as step No. 2a. b. None. c. None.</p>
<p>6 Same as step No. 2</p>	<p>ON-OFF switch: ON</p>	<p>c. None. d. None. e. Same as step No. 2a. b. None. c. None.</p>
<p>7 Same as step No. 1</p>	<p>ON-OFF switch: OFF</p>	<p>a. None. b. None. c. None. d. None. e. Same as step No. 2a. b. None. c. None.</p>
<p>8 Same as step No. 2</p>	<p>ON-OFF switch: ON</p>	<p>c. None. d. None. e. Same as step No. 2a. b. None. c. None.</p>

42. Summary of Test Data

Arrange a checklist similar to that shown below. In the test indications column, record the actual meter readings obtained during each of the tests. These data may be used as a check against the findings the next time that the tests are performed.

RECTIFIER RA-67(*)

1. TRANSFORMER INSULATION RESISTANCE TESTS (par. 38).

Test or condition	Performance standards	Test indications
a. Primary winding.....	At least 8 megohms	
b. Secondary winding..	At least 4 megohms	

2. AC INPUT-OUTPUT TESTS (par. 39)

Test or condition	Performance standards	Test indications
a. 95-volt ac input on PRI tap 95.	115 volts ac (± 3)	
b. 105-volt ac input on PRI tap 105.	115 volts ac (± 3)	
c. 115-volt ac input on PRI tap 115.	115 volts ac (± 3)	
d. 125-volt ac input on PRI tap 125.	115 volts ac (± 3)	
e. 130-volt ac input on PRI tap 190.	75 volts ac (± 3)	
f. 130-volt ac input on PRI tap 210.	67 volts ac (± 3)	
g. 130-volt ac input on PRI tap 230.	61 volts ac (± 3)	

Test or condition	Performance standards	Test indications
a. 130-volt ac input on PRI tap 250.	57 volts ac (± 3)	

3. DC OUTPUT TESTS (par. 40)

Test or condition	Performance standards	Test indications
a. 95-volt ac input on PRI tap 95 with secondary tap 2.	115 volts dc (± 12)	
b. 115-volt ac input on PRI tap 115 with secondary tap 1.	112 volts dc (± 12)	
c. 115-volt ac input on PRI tap 115 with secondary tap 2.	116 volts dc (± 12)	
d. 115-volt ac input on PRI tap 115 with secondary tap 3.	120 volts dc (± 12)	
e. 115-volt ac input on PRI tap 115 with secondary tap 4.	124 volts dc (± 12)	

4. RIPPLE VOLTAGE TESTS (par. 41)

Test or condition	Performance standards	Test indications
a. 95-volt ac input on PRI tap 96.	0.5 volt ac or less	
b. 105-volt ac input on PRI tap 105.	0.5 volt ac or less	
c. 115-volt ac input on PRI tap 115.	0.5 volt ac or less	
d. 125-volt ac input on PRI tap 125.	0.5 volt ac or less	

CHAPTER 7

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

43. Preparation for Storage or Shipment

Clean the exterior of the unit and blow or brush out all dust and dirt from the interior. Inspect the exterior finish; if it is damaged, refinish the equipment according to the instructions in TM 9-213. Carefully inspect the entire unit to see that all wiring is in good condition, that all connections are clean and tight, and that all components are mounted securely. See that the proper complement of fuses (par. 6) is with the equipment. Be sure the

equipment is in good condition and ready to operate. Place Rectifier RA-87(*) in Case CH-158; close the chest and fasten the latches.

44. Storage and Shipment

If Rectifier RA-87(*) is to be stored for a short time or moved a short distance by truck, no crating is necessary. If the unit is to be shipped a considerable distance, pack the equipment in a suitable crate or box; use the original packaging material if it is available.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

45. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. Use the destruction procedures outlined in paragraph 46 to prevent further use of the equipment.

46. Methods of Destruction

Any or all of the methods of destruction given below may be used. The time available and the tactical situation will determine the method to be used when destruction of equipment is ordered. It is preferable to demolish completely some critical unit of the equipment than to partially destroy all of the units.

a. Smash. Smash the interior units of the rectifier; use sledges, axes, hammers, crowbars, or any other heavy tools available. Smash as many of the exposed parts as possible.

b. Cut. Cut cords and wiring; use axes, handaxes, machetes, or similar tools. Cut all cords and wires in a number of places.

Warning: Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

c. Burn. Burn the technical manuals first. Burn as much of the equipment as is flammable; use gasoline, oil, flamethrowers, and similar materials. Pour gasoline on the cut cords and internal wiring and ignite it. Use a flamethrower to burn spare parts or pour gasoline on the spares and ignite it. Use incendiary grenades to complete the destruction of unit interior.

d. Explode. Use explosives to complete demolition or to cause maximum damage when time does not permit complete demolition by other means. Powder charges, fragmentation grenades, or incendiary grenades may be used. Incendiary grenades usually are most effective if destruction of small parts and wiring is desired. For quick destruction of the rectifier, place an incendiary grenade on top of the unit. Get away from the unit after the grenade is placed.

e. Dispose. Bury or scatter destroyed parts or throw them into nearby waterways. This is particularly important if a number of parts have not been completely destroyed.

APPENDIX I

REFERENCES

The following is a list of applicable references available to the repairman of Rectifier RA-87(*):

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TA 11-17	Signal Field Maintenance Shops.
TA 11-100 (11-17)	Allowance of Signal Corps Expendable Supplies for Signal Field Maintenance Shops.
TM 9-213	Painting Instructions for Field Use.
TM 11-2050A	Ohmmeter ZM-21/U.
TM 11-5527	Multimeters TS-352/U, TS-352A/U, and TS-352B/U.
TM 11-5540	Electric Light Assembly MX-1292/PAQ.
TM 11-5815-270-20P	Organizational Maintenance Repair Parts and Special Tool Lists: Rectifier RA-87 and RA-87A.
TM 11-5815-270-35P	Field and Depot Maintenance Repair Parts and Special Tool Lists: Rectifier RA-87 and RA-87A.
TM 11-6625-200-12	Operator and Organizational Maintenance Manual: Multimeters ME-26A/U and ME-26B/U.
TM 11-6625-320-12	Operator's and Organizational Maintenance Manual: Voltmeter, Meter ME-30A/U: and Voltmeters, Electronic ME-30B/U and ME-30C/U.
TM 38-750	The Army Equipment Record System and Procedures.

APPENDIX II MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions to be performed by the lowest appropriate echelon. It also specifies the tool and test equipment authorized at each echelon for the performance of the assigned maintenance function.

b. Columns in the maintenance allocation chart are as follows:

- (1) *Part or component.* This column shows only the nomenclature or standard item name.
- (2) *Maintenance function.* This column indicates the various maintenance functions allocated to the echelon capable of performing the operation.
 - (a) *Service.* To clean, to preserve, and to replenish lubricants.
 - (b) *Adjust.* To regulate periodically to prevent malfunction.
 - (c) *Inspect.* To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.
 - (d) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages and meters.
 - (e) *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.
 - (f) *Overhaul.* To restore an item to completely serviceable condition as prescribed by serviceability standards. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum

disassembly of the item during the overhaul process.

- (3) *1st, 2d, 3d, 4th, 5th, echelons.* The symbol X placed in these columns indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by X are authorized to perform the indicated operation.
- (4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.
- (5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are as follows:

- (1) *Tools required for maintenance functions.* This column lists tools and test equipment required to perform the maintenance functions.
- (2) *1st, 2d, 3d, 4th, 5th echelon.* The dagger (†) symbol in these columns indicates the echelons normally allocated the facility.
- (3) *Tool code.* This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment.

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	SCHEDULE					TOOLS REQUIRED	REMARKS
		1	2	3	4	5		
RECTIFIER RA-57, RA-57A	service	X						Exterior parts Initial Voltage Adjustments Exterior Parts Resistance & Voltage Checks Check Load Currents Against voltage Readings All Tests
	adjust	X					4 1,4	
	inspect	X					4	
	test	X					1,4 2,4	
	repair				X		2,3,4	
	overhaul				X	X	4	

RA-57, RA-57A

RA-57, RA-57A

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

PART OR COMPONENT	SCHEMATIC					TOOL CODE	REMARKS
	1	2	3	4	5		
RECTIFIER RA87, RA-87A (continued)						1	
MULTIMETER AN/URM-105						2	
MULTIMETER TS-352/U.						3	
MULTIMETER ME-25A/U						4	
TOOL EQUIPMENT TE-50B							

Amesbury, Massachusetts, 01901-1100

WILSON 008 TP
1 Jun 63
RA87, RA-87A

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists items supplied for initial operation and for running spares. The list includes all items issued as part of the major end item. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

2. Columns

The columns are as follows:

a. Federal Stock No. This column lists the 11-digit Federal stock number.

b. Designation By Model. The dagger (†) indicates the model in which the part is used, and further, by its position designates the item number by which the item is identified.

c. Description. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

d. Unit of Issue. The unit of issue is each and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

e. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

f. Quantity Authorized. Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spare Items" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

g. Illustration. The "figure No." column is not used. The "item No." column lists the reference designations that appear on the part in the equipment. These same designations are also used on any illustrations of the equipment.

SECTION II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
5815-230-7257		RECTIFIER, RA-87, RA-87A: power supply, rectification, metallic; full wave; output, dc 115v, 400ma; input ac 95v to 125v or 190v to 250v, 50-60 cyc, single ph; 14-1/2 in lg X 8-1/2 in w X 7-1.2 in h Spec MIL-P-12780, type RA-87					
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
		MODEL COLUMN 1 Refers to RA-87; MODEL COLUMN 2 Refers to RA-87A					
	†	RECTIFIER RA-87 (Basic Component)		NX	1		
	†	RECTIFIER RA-87A (Basic Component)		NX	1		
	†	TECHNICAL MANUAL:			2		
	†	TECHNICAL MANUAL			2		
5815-537-7896	†	CASE, CH-158: Sig C Dwg No. SC-D-9554, SC-D-9555, SC-D-9550		NX	1		2
		RUNNING SPARE ITEMS					
5920-199-9498	†	FUSE, CARTRIDGE: 1/2 amp, 250V; slo blow; MIL type F02GR500B (Mounted in equip)			1		6
5920-199-9498	†				1		F2
5920-280-5003	†	FUSE, CARTRIDGE: 15 amp, 250V; MIL type F15G15ROB (Mounted in equip)			1		17
5920-280-5003	†				1		F1

R R R R R R R R R R R R

RA-87, RA-87A 2

By Order of the Secretary of the Army:

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Chief of Staff.

Official:

J. C. LAMBERT,
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The Adjutant General.

Distribution:

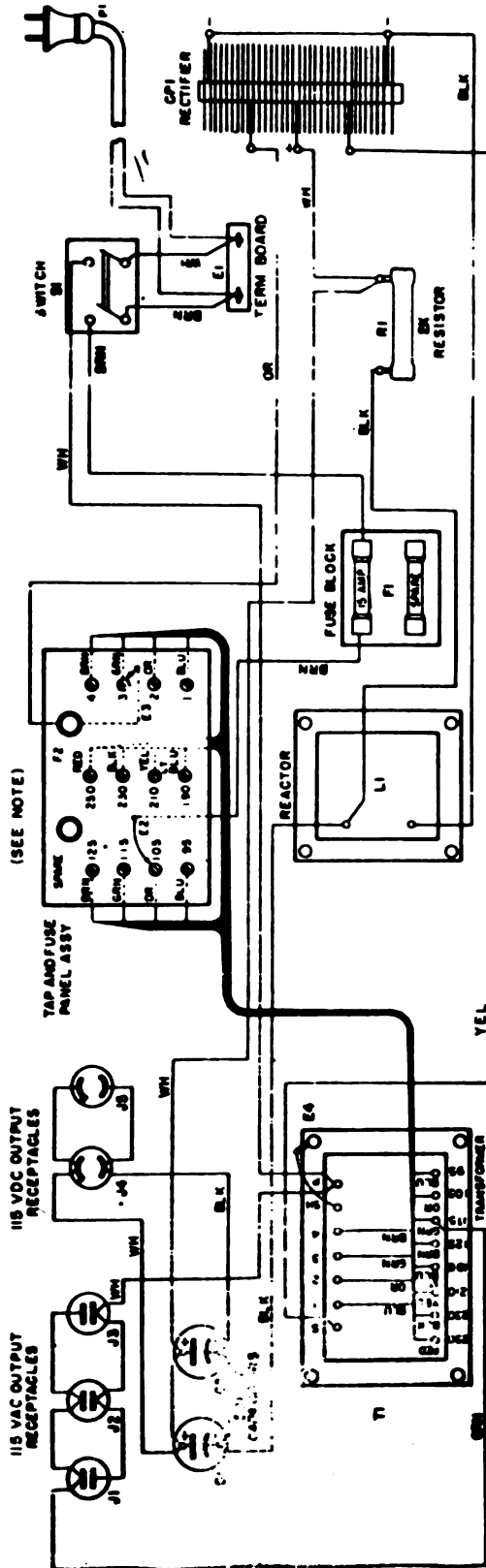
Active Army:

USASA (2)	GENDEP (OS) (2)	9-217
CNGB (1)	Sig Dep (OS) (12)	11-5
CofEngrs (1)	Sig Sec, GENDEP (5)	11-7
TSG (1)	Army Dep (2) except	11-16
CSigO (7)	Ft Worth (8)	11-35
CofT (1)	Lexington (12)	11-36
CofSpts (1)	Sacramento (28)	11-38
USA CD Agcy (1)	Tobyhanna (12)	11-39
USCONARC (5)	Navajo (5)	11-55
USAMC (5)	Atlanta (5)	11-57
ARADCOM (2)	USA Elet RD Actv, White Sands	11-85
ARADCOM Rgn (2)	(13)	11-86
OS Maj Comd (3)	USA Elet RD Actv, Ft Huachuca	11-87
OS Base Comd (2)	(2)	11-95
LOGCOMD (2)	USA Trans Tml Comd (1)	11-97
USAECOM (5)	Army Tml (1)	11-98
USAMICOM (4)	POE (1)	11-155
USASCC (4)	USAOSA (1)	11-157
MDW (1)	AMS (1)	11-158
Armies (2)	WRAMC (1)	11-237
Corps (2)	AFIP (1)	11-500 (AA-AE) (4)
USA Corps (3)	Army Pic Cen (2)	11-557
USATC AD (2)	USA Mbl Spt Cen (1)	11-587
USATC Engr (2)	USA Elet Mat Agcy (12)	11-592
USATC Inf (2)	Chicago Proc Dist (1)	11-597
USATC Armor (2)	USARCARIB Sig Agcy (1)	17
USASTC (5)	Sig Fld Maint Shop (3)	29-56
Instl (2) except	Units org under fol TOE's	32-67
Ft Monmouth (65)	(2 cy ea UNOINDC):	37
Svc Colleges (2)	7	39-51
Br Svc Sch (2)	7-52	57

NG: State AG (3); units—same as active Army except allowance is one copy each unit.

USAR: None.

For explanation of abbreviations used, see AR 320-50.



NOTE:
ON RA-87 FUSE F2 IS MOUNTED
IN A CLIP TYPE FUSE HOLDER
TMS815-270-15-13

Figure 15. Rectifier RA-87A (except those procured on Orders No. 26578-Phila-49 and 1R101-Phila-60), wiring diagram



