

UNCLASSIFIED

TECHNICAL MANUAL

for

HIGH VOLTAGE RECTIFIER

AX-103



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

OTTAWA, ONTARIO

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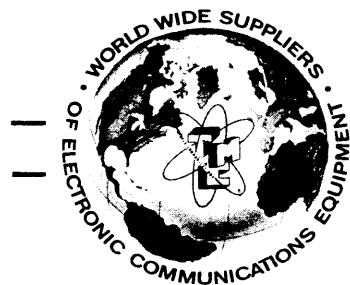
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NOTICE

THE CONTENTS AND INFORMATION CONTAINED IN THIS INSTRUCTION MANUAL IS PROPRIETARY TO THE TECHNICAL MATERIEL CORPORATION TO BE USED AS A GUIDE TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR WHICH THE MANUAL IS ISSUED AND MAY NOT BE DUPLICATED EITHER IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER WITHOUT THE WRITTEN CONSENT OF THE TECHNICAL MATERIEL CORPORATION.



THE TECHNICAL MATERIEL CORPORATION

C O M M U N I C A T I O N S E N G I N E E R S

700 FENIMORE ROAD

MAMARONECK, N. Y.

W a r r a n t y

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes* furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

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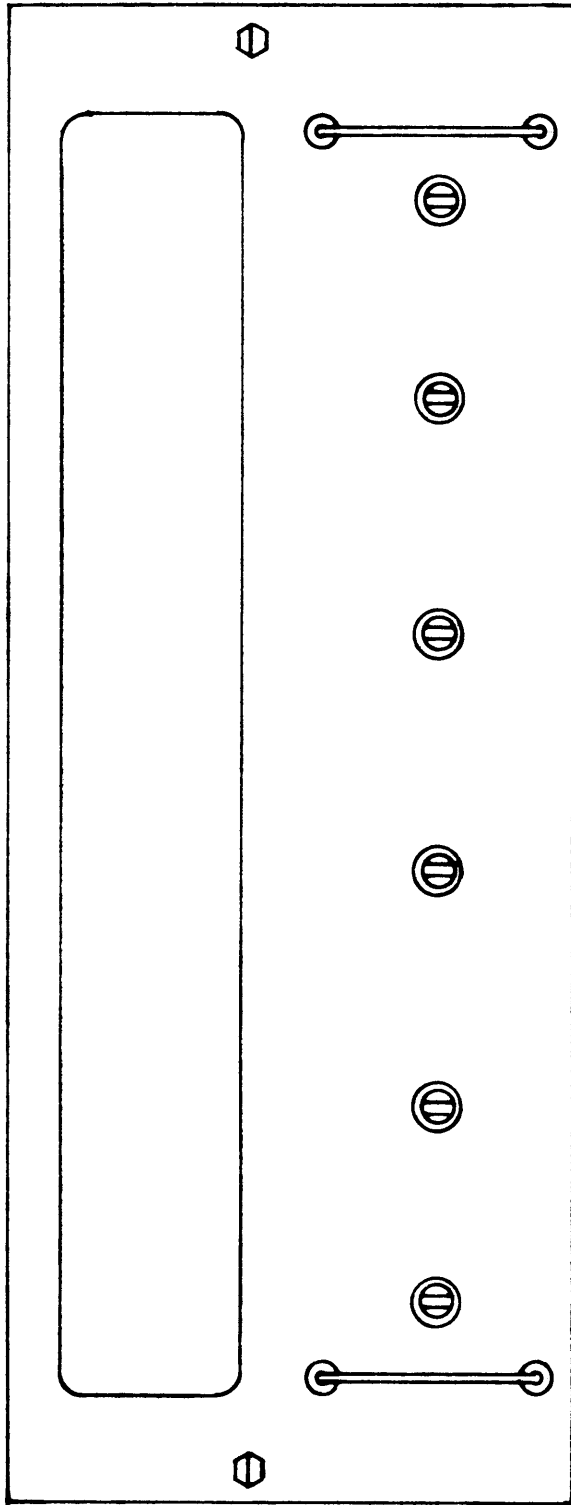


Figure 1-1. High Voltage Rectifier, AX-103

SECTION 1

GENERAL INFORMATION

1-1. DESCRIPTION OF EQUIPMENT.

High Voltage Rectifier AX-103 is a three-phase, full-wave, gaseous-tube rectifier that provides plate voltage for the 10-kw power amplifier stage of a transmitter. The unit also provides half-wave rectification for the 3200-volt section of the transmitter's power supply.

The high voltage rectifier is provided with slides for ease of installation and maintenance in the transmitter frame. The front panel of the unit has a plexiglass window that permits viewing the tubes. Six indicator type fuses, protecting the filament circuits, are included on the front panel.

Input and output connections are made with button contacts on the rear panel of the unit.

1-2. TECHNICAL CHARACTERISTICS.

Inputs:	1. 6222 vac, 3-phase, 50/60 cps, 1 ampere per phase
	2. 230 vac, single-phase, 50/60 cps 1.25 ampere
Output:	7500 vdc at 3 amperes
Dimensions:	28.75" wide x 10.75" high x 16.75" deep
Weight:	76 pounds

1-3. ELECTRON TUBE AND FUSE COMPLEMENT.

High Voltage Rectifier AX-103 uses six type 827A mercury-vapor rectifier tubes, and six 1-amp time lag fuses, TMC part number FU102-1

SECTION 2
INSTALLATION

High voltage Rectifier AX-103 is shipped in a wooden crate; packing material is included inside the crate to protect the unit against shock and against the elements. The mercury-vapor rectifier tubes are normally shipped in a separate crate. Upon arrival at the operating site, unpack the equipment carefully; inspect the unit for damage that may have occurred during shipment. With respect to equipment damage for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

Before installing the high voltage rectifier, insert the six mercury-vapor rectifier tubes in the six sockets (marked V600 through V605).

To install the high voltage rectifier, extend the appropriate slides from the transmitter cabinet. Fit the slides on the high voltage rectifier into the slides mounted to the transmitter frame. Push the rectifier toward the transmitter cabinet until the catches in the slides engage. Depress the button catches in the slides and push the rectifier into the transmitter cabinet. Secure the front panel of the rectifier unit to the frame of the transmitter with the captive screws in the front panel of the rectifier.

SECTION 3

OPERATOR'S SECTION

The high voltage rectifier has no operating controls. Control of filament primary power and high voltage a-c input to the unit is accomplished in the transmitter's control circuits. After a long period of idleness (as after shipment) or after replacement of a tube, filament power should be applied at least 30 minutes before application of high voltage. During operation of the transmitter, the high-voltage rectifier tubes should be observed; unusual flashing may indicate faulty tubes.

Operator's maintenance consists of the replacement of fuses.

WARNING

Never replace a fuse with one of higher current rating. If a fuse burns out immediately after replacement, do not replace it a second time until the cause of trouble has been corrected.

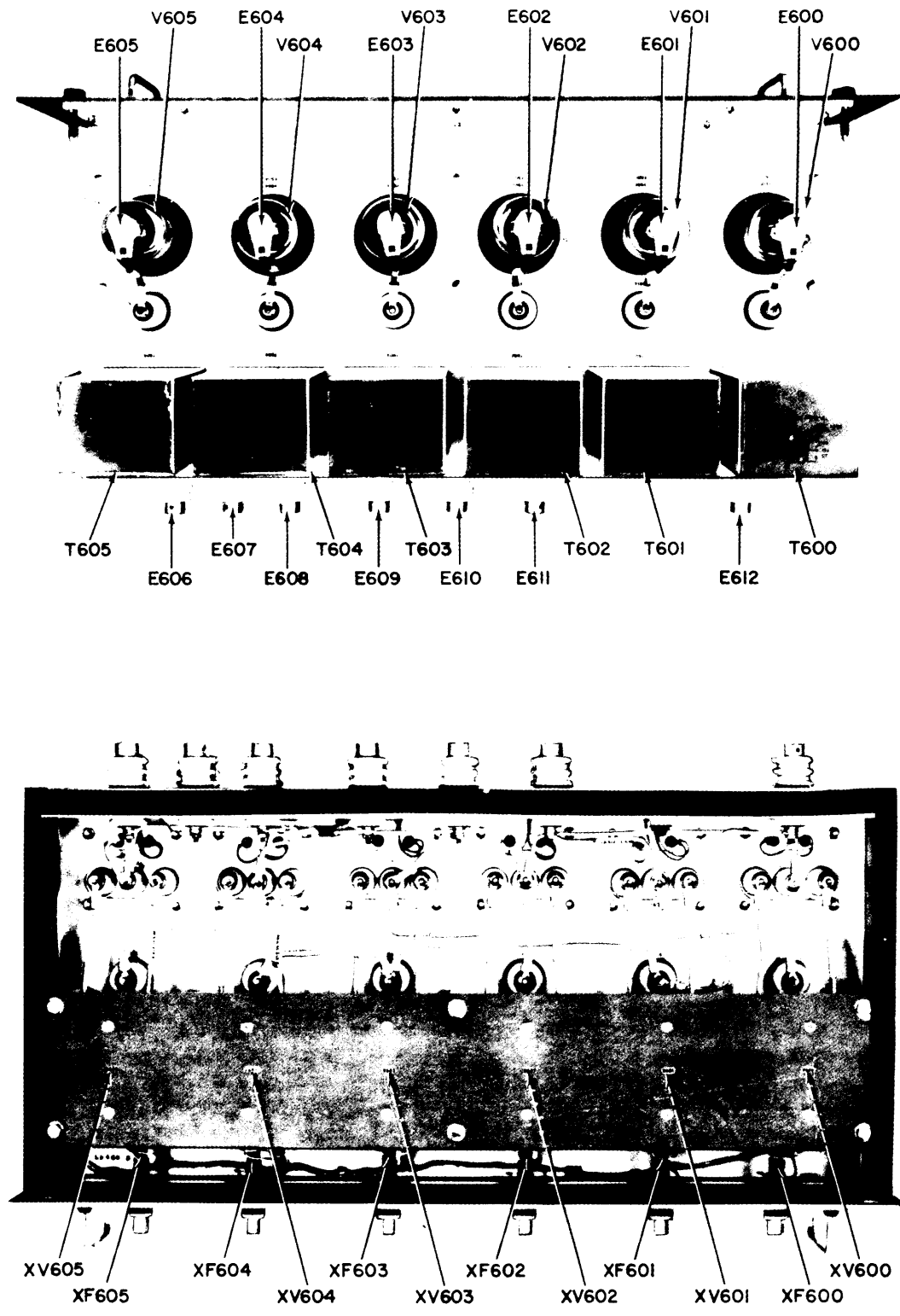
SECTION 4
PRINCIPLES OF OPERATION

Refer to schematic diagram, figure 7-1. The AX-103 comprises a standard 3-phase, full-wave, bridge rectifier. The unit converts the 6222-volt output from a wye-connected transformer secondary to 7500 volts d-c.

SECTION 5
MAINTENANCE

Maintenance of the AX-103 consists of periodically inspecting the unit for leaking or overheating transformers and faulty tubes. A faulty transformer can usually be detected by making secondary-to-primary and secondary-to-ground insulation checks. Resistance in both cases should be infinite. Faulty tubes are evidenced by internal arcing, open or shorted filament, or low output voltage. A blown fuse indicates that either the associated filament transformer or rectifier tube is shorted. To find a poorly conducting tube when the rectifier's output voltage is low, operate the unit with the suspected tube disconnected (plate lead removed). If no further decrease in output voltage is noted, the tube is probably defective. The output voltage decreases when a properly operating tube is disconnected.

Refer to figure 5-1 to locate components in the AX-103.



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Figure 5-1. AX-103, Top and Bottom Views

SECTION 6

PARTS LIST

6-1. INTRODUCTION

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on schematic diagrams are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

- a. Generic name.
- b. Reference designation.
- c. TMC part number.
- d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

PARTS LIST
for
HIGH VOLTAGE RECTIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C600	CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 uuf, $\pm 10\%$; 300 WVDC; char. B.	CM35B103K
C601	Same as C600.	
DS600	Non-replaceable item. Part of XF600.	
DS601	Non-replaceable item. Part of XF601.	
DS602	Non-replaceable item. Part of XF602.	
DS603	Non-replaceable item. Part of XF603.	
DS604	Non-replaceable item. Part of XF604.	
DS605	Non-replaceable item. Part of XF605.	
E600	Non-replaceable item. Part of W600.	
E601	Non-replaceable item. Part of W601.	
E602	Non-replaceable item. Part of W602.	
E603	Non-replaceable item. Part of W603.	
E604	Non-replaceable item. Part of W604.	
E605	Non-replaceable item. Part of W605.	
E606	CONTACT ASSEMBLY: brass, nickel plate; 7/8" dia. x 1/2" long button; w/threaded shaft, 1/4-20 thds.	AX172
E607 thru E612	Same as E606.	
F600	FUSE, CARTRIDGE: 1 amp; time lag; 1-1/4" long x 1/4" dia.; slow blow.	FU102-1
F601 thru F605	Same as F600.	
MP600	INSULATOR: round pillar type; white glazed steatite; 1" long x 3/4" dia.; tapped 10-32 x 3/8" deep each end.	NS3W0308
MP601	Same as MP600.	

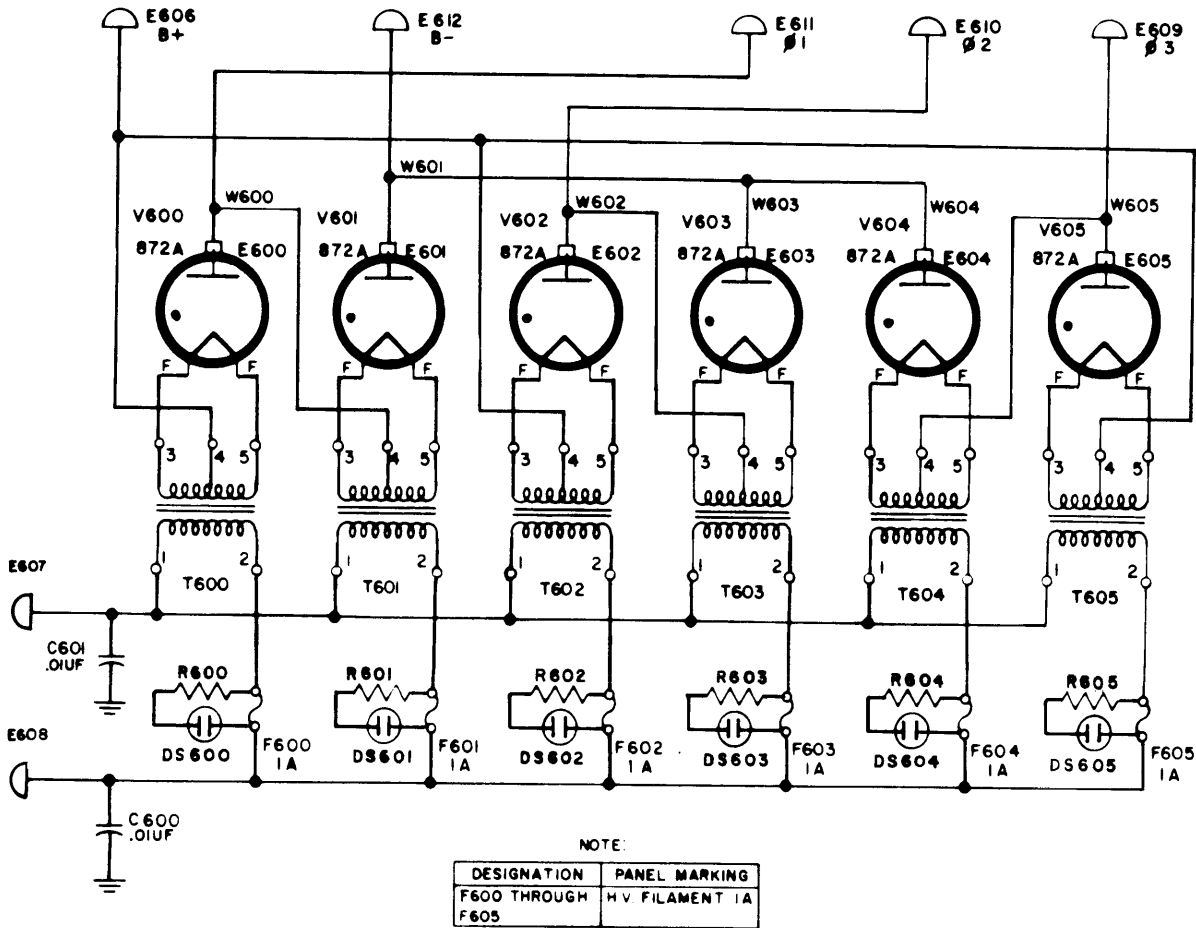
PARTS LIST (CONT)
HIGH VOLTAGE RECTIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
MP602	INSULATOR: round pillar type; white glazed steatite; 2" long x 1" dia.; tapped 1/4-20 x 1/2" deep each end.	NS3W0432
MP603 thru MP607	Same as MP602.	
MP608	WINDOW, front panel.	PX440
MP609	SCREW	SC139
MP610	Same as MP609.	
R600	Non-replaceable item. Part of XF600.	
R601	Non-replaceable item. Part of XF601.	
R602	Non-replaceable item. Part of XF602.	
R603	Non-replaceable item. Part of XF603.	
R604	Non-replaceable item. Part of XF604.	
R605	Non-replaceable item. Part of XF605.	
T600	TRANSFORMER, POWER STEP DOWN: primary- 230 V, 50/60 cps, single phase; secondary- 5 V, 10 amps, CT; insulated for 2,500 volts primary and 15 Kv secondary; hermetically sealed rectangular steel case.	TF201
T601 thru T605	Same as T600.	
V600	TUBE, ELECTRON: mercury vapor, half wave rectifier: 4 pin base.	872A
V601 thru V605	Same as V600.	
W600	CABLE ASSEMBLY, ELECTRICAL: number 18 stranded single conductor wire, rubber-covered; consist of plate cap on one end, E600, terminal lug on other end.	CA409-15-4.75
W601	Same as W600. Consists of E601.	

PARTS LIST (CONT)
HIGH VOLTAGE RECTIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
W602	Same as W600. Consists of E602.	
W603	Same as W600. Consists of E603.	
W604	Same as W600. Consists of E604.	
W605	Same as W600. Consists of E605.	
XF600	FUSEHOLDER, LAMP INDICATING: accommodates cartridge fuse 1-1/4" long x 1/4" dia.; 90 to 300 V, 20 amps; neon lamp type with a 220K ohm lamp resistor; clear transparent flat sided knob; black body. Consists of DS600, R600.	FH104-3
XF601	Same as XF600. Consists of DS601, R601.	
XF602	Same as XF600. Consists of DS602, R602.	
XF603	Same as XF600. Consists of DS603, R603.	
XF604	Same as XF600. Consists of DS604, R604.	
XF605	Same as XF600. Consists of DS605, R605.	
XV600	SOCKET, ELECTRON TUBE: 4 pin base; twist lock type.	TS123-211-100
XV601 thru XV605	Same as XV600.	

SECTION 7
SCHEMATIC DIAGRAMS



316-13

Figure 7-1. Schematic Diagram, High Voltage Rectifier, AX-103