AP-3A POWER SUPPLY INSTRUCTION MANUAL

1.0 General Information

1.1 Introduction

The AP-3A is a lightweight power supply capable of supplying 12 volts dc to an AT-3 transmitter, or recharge a 12 volt dc battery. The ac power source for the AP-3A can have a frequency range of 50 to 400 cycles per second, and a voltage range of 75 to 270 volts rms.

This manual is divided into sections consisting of operating instructions, theory of operation and parts list.

1.2 Electrical Specifications

Input voltage - 75 to 270 vac rms
Input frequency - 50 to 400 cps
} absolute limits

Operating ambient temperature - -20°C to +50°C.

Storage temperature - -65°C to +85°C.

Output voltage - no load - 12.5 vdc ±2-1/2% (power supply)
- 15 vdc ±5% (battery charger)
Full load - 12 vdc ±2.5% (power supply)

Output ripple from power supply - 225 mv rms at full load as defined below.

Load - peak load current 1.0 amperes
average load current - 6 amperes (all tests were performed using an AT-3 transmitter operating in the IDY mode for one hour.)

1.3 Physical Specifications

Weight - 7.5 lbs.

Size -

1.4 Controls and Indicators

"ON" switch - push button (located on left end plate)

"OFF" switch - push button (located on left end plate)

CB1 - Circuit Breaker (located on left end plate)

"PWR ON" light (located on left end plate)

"BATT" light (located on left end plate)

"POWER SUPPLY 12 VOLTS DC" connector (located on right end plate)

"BATTERY 15 VOLTS DC" connector (located on right end plate)

Power Cord (located on left end plate)

2.0 Operating Instructions

2.1 Equipment Interconnection

The AP-3A contains two connectors for operation with either the AT-3 transmitter or charging a battery pack. For operation with the AT-3, the connector labeled "POWER SUPPLY" 12 volts d.c. is used. For use as a battery charger, the connector labeled "BATTERY", 15 volts d.c. is used.

2.2 Operating Instructions

2.2.1 Power Supply

1. Unwind power cable from a compartment located at the left hand side of the AP-3A case and connect to an a.c. power source ranging from 50 to 400 cps at 75 to 270 volts rms.

2. To turn unit on, press red "ON" button and red "PWR ON" lamp will light. To protect the power supply there is a ten second delay circuit which will prevent the unit from being turned on immediately after being connected to the power source or after being turned off.

3. To turn unit off, press black "OFF" button.

2.2.2 Battery Charger

1. Connect battery (see paragraph 2.1) and turn on AP-3A, as explained in paragraph 2.2.1.

2. The battery charging rate is indicated by a light labeled "BATT" located on the left hand side of the AP-3A. When this lamp is bright, the battery voltage is low. When the lamp goes off, the battery is fully charged.

3.0 Theory of Operation

3.1 Introduction

This section contains the theory of operation of the AP-3A. It is divided into a general discussion of the overall unit and a detailed discussion of the major sections.

3.2 General Discussion

A block diagram of the AP-3A is presented in Figure 1. An input voltage ranging in magnitude from 75 to 270 volts rms and 50 to 400 cps in frequency is applied to the phase controlled bridge rectifier circuit. The phase control circuit uses silicon controlled rectifiers to convert the wide range of ac input voltages to a constant 80 volts d-c.

This 80 volt dc output is applied to a d-c to d-c converter through an overload protection circuit. The protection circuit senses the 80 volt dc and the converter current. If either of these become excessive the circuit opens up, removing the 80 volt dc from the converter.

The converter provides isolation between the 12.5 volt dc output and the input line voltage. The 80 v dc is chopped at a 5.3 Kc rate. Four transistors arranged in a bridge configuration perform this function. The converter output is rectified and filtered and applied to a series regulator circuit.

The regulator decreases the a-c ripple voltage and provides 12.5 v dc or 15 v dc for charging a 12 v dc battery pack. Operating in conjunc-

tion with the regulator is a current limiting circuit, which prevents more than 18 amperes from passing through the series regulator. Both the current limiting and overload protection circuits will operate when the output is short circuited.

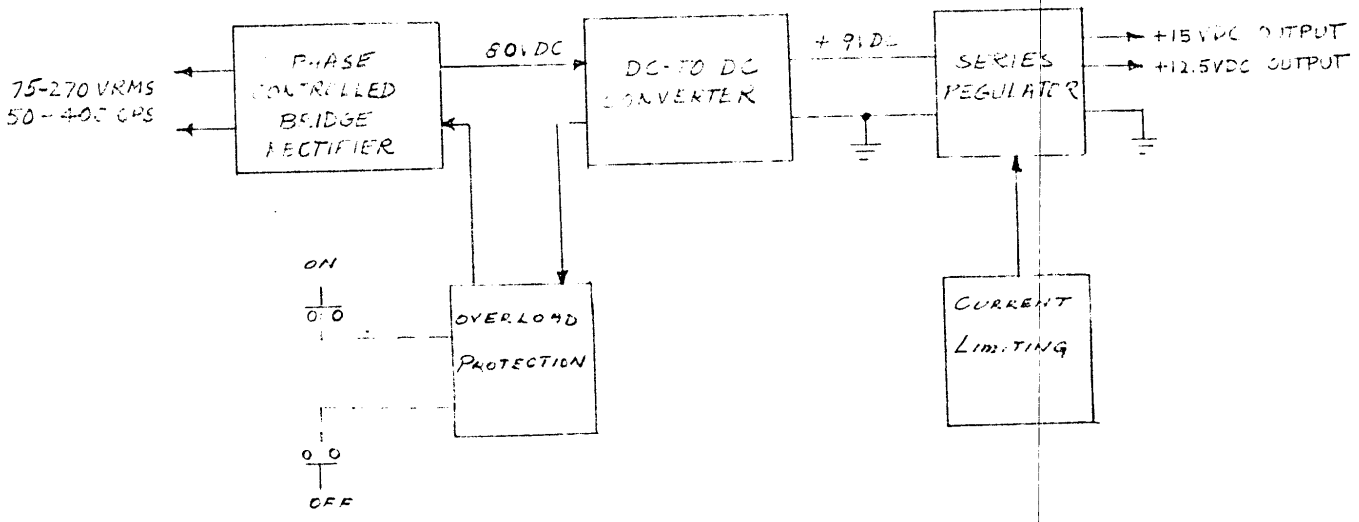

FIG. 1 - BLOCK DIAGRAM - AP-3A PWR. SUP.