WARNING
HIGH VOLTAGE

Voltages in excess of 115 volts ac are used in this equipment. Be careful when working on the ac line connections. Serious injury or death may result from contact with these terminals. Make sure power source switches are shut down before working on equipment.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with the skin must be avoided. When necessary, use gloves that the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

WARNING

Be extremely careful when making the voltage measurements. Use insulated test probes and do not touch any internal parts of the inverter when it is energized.

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LIST OF TABLES

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual covers Inverter PU-724A/G hereafter referred to as the inverter. The manual provides instructions for installation, operation, and maintenance for operator, organizational, and direct support repair personnel.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-1/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

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 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4. Warranty

The inverter is warranted by ATACS Corporation for a period of 90 days. The warranty starts on date found on DA Form 2408-6 in the log book. Report any defects in material or workmanship to your supervisor who will take appropriate action.

1-5. Reporting Equipment Improvement Recommendations (EIR)

If your inverter needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications - Electronics Command and Fort Monmouth, Attn: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

1-6. Administrative Storage

Administrative Storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage the PMCS should be performed to assure opperational readiness.

1-7. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

Section II. DESCRIPTION AND DATA

1-8. Purpose and Use

a. Purpose. Inverter PU-724A/G is a true sine wave inverter which provides 400 volt amperes (maximum) of 60 Hz alternating current (ac) power at a nominal 115 volts. Input voltage is 27.5 direct current (dc) plus or minus 10 percent.

b. Use. The inverter is used to provide power to teletype equipment installed in Radio Teletype Shelter AN/GRC-122B/142B. It may also be used in other applications which require similar dc/ac characteristics.

1-9. Description of Equipment

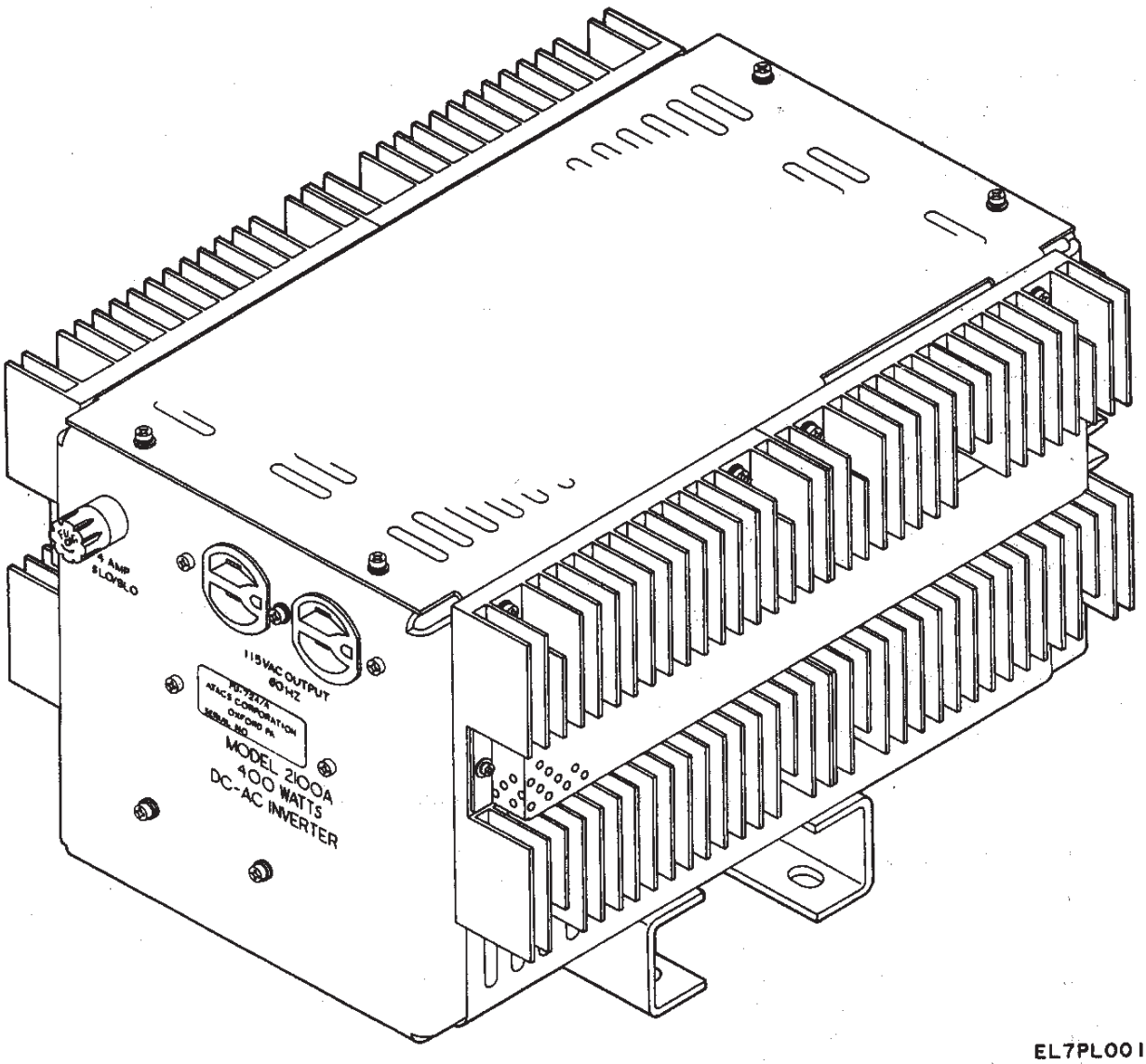
The inverter consists of solid state designed circuitry mounted in an enclosed metal chassis fabricated for securing to an equipment shelf by base mounting hardware. There are no operating controls on the inverter. Openings for cooling air are located at the bottom, top and rear of the enclosure. Input and output connections are located on the back of the inverter. See figure 1-1 for fuse location.

1-10. Differences Between Models

This publication covers only one model, PU-724A/G.

1-11. Tabulated Data

Characteristics of Inverter PU-724A/G are listed in table 1-1.



EL7PL001

Figure 1-1. Inverter PU-724A/G.

Table 1-1. Tabulated Data

Model No.:	PU-724A/G.
Primary Input power requirements:	
Type	27.5 V dc ±10%, 22 amperes at maximum power.
Source	External power source.
Physical characteristics:	
Weight	33 pounds.
Dimensions	9-1/8 inches wide, 8-3/16 inches high, 13-3/16 inches deep.
Warmup time	1 minute (to stabilize circuitry).
Mounting	Two mounting feet; drilled for bolt mounting; 3/8 inch elongated bolt holes on 4-7/8 × 3 inch centers.
Output characteristics:	
Duty	Continuous.
Frequency	60 Hz ±3% true sine wave.
Voltage	115 volts ±10%; 2.6 amps, single phase. Any load including short circuit.
Power	300 volt/amps nominal; 400 volt amps maximum
Operating ambient Temperature	0 deg. C (+32 deg. F) to plus 40 deg. C (+104 deg. F).

CHAPTER 2
SERVICE UPON RECEIPT AND INSTALLATION

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. Unpacking

The inverter is shipped in a cardboard carton to protect the unit against damage. When unpacking the inverter observe the following instructions:

a. Unpack the inverter carefully to keep from damaging the unit.

b. Visually inspect inverter for any damage which may have occurred in transit. Save the carton and protective cushioning in case the inverter eventually requires reshipment.

2-2. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage in accordance with paragraph 1-3.

b. Check the equipment against the parts illustrations and listings in appendix F and the packing slip to see if the shipment is complete. Report all discrepancies in accordance with paragraph 1-3.

c. Check to see if the equipment has been modified. (Equipment which has been modified will have the MWO number on the front panel, near the nomenclature plate.) Check also to see if all currently applicable MWO's have been applied. (Current MWO's applicable to the equipment are listed in DA Pam 310-1).

Section II. INSTALLATION INSTRUCTIONS

2-3. Location
(fig. 2-1)

a. The inverter should be shelf-mounted.

b. The air vents must be clear and sufficient openings in the rack should be provided to allow adequate air circulation through the inverter.

c. Locate the inverter so the output ac receptacles are convenient to use; input power wires/cabling should not exceed 5 feet.

d. Drill mounting hole arrangements and secure the inverter with mounting hardware following figure 2-1 dimensions.

2-4. Cable Fabrication

The inverter is shipped completely assembled, ready for operation except for the input and output cabling or wiring. These cables must be fabricated by installation team according to table 2-1 before using the inverter.

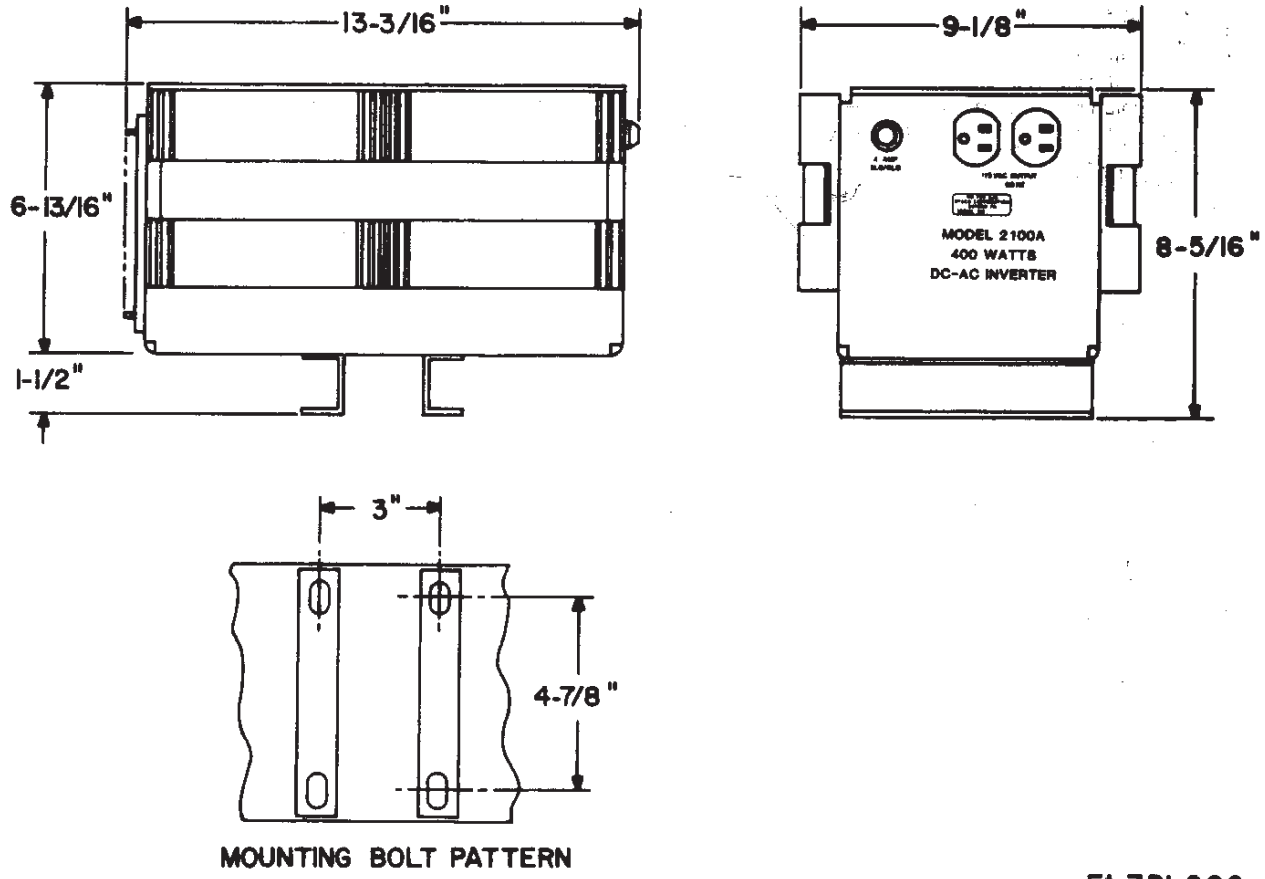


Figure 2-1. Installation Drawing.

Table 2-1. Cable Fabrication

Cable	Length	Conductors		Installed	
		No.	Size	From	To
Input Power Positive Lead	5 feet or under	One	No. 12 AWG	27.5 Vdc positive	Terminal No. 1 or 2
Input Power Negative Lead	5 feet or under	One	No. 12 AWG	27.5 Vdc negative	Terminal No. 3 or 4
Output Power	5 feet or under	Three (incl. ground)	No. 12 AWG	Convenience Outlet (requires mating plug	Operating Equipment

NOTE

Additional wiring for alternate connecting arrangements (para 2-5) are to be fabricated with the above materials.

2-5. Electrical Connection

WARNING

Voltages in excess of 115 volts ac are used in this equipment. Be careful when working on the ac line connections. Serious injury or death may result from contact with these terminals. Make sure power source switches are shut down before working on equipment.

a. Determine placement and arrangement for the source power (28 V dc).

b. Determine placement and arrangement for the equipment to be serviced by the inverter.

c. Fabricate input and output cables or wiring (refer to table 2-1).

d. Shut down external dc power source.

WARNING

Make sure that the inverter is properly grounded to its mounting rack. Use external tooth lockwashers and remove paint as needed to assure positive grounding.

e. Connect the inverter following figures 2-2, 2-3, or 2-4 and connect the equipment to the ac receptacle for operation.

f. When a standby switch is required; connect as shown in figure 2-3. Closing the switch will short terminals 7 and 8 and place the inverter in standby condition.

2-6. Parallel Operation

Two inverters can be electrically connected to provide additional output power if needed to operate installed equipment. Make parallel installations as follows:

a. Plan the physical layout considering available space, power source, equipment to be served, and minimizing wiring distances.

b. Install the inverters (para 2-3).

WARNING

Voltages in excess of 115 volts ac are used in this equipment. Be careful when working on the ac line connections. Serious injury or death may result from contact with these terminals. Make sure power source switches are shut off before working on equipment.

c. Connect the dc source to both inverters as shown in figure 2-4.

d. Prepare the ac output connection to serve the operating equipment. The connection between the two inverters must be wired according to the needs of the equipment to be operated.

2-7. Preliminary Check-out

Before operation, conduct the services described in the PMCS, chapter 4. Check output voltages; carefully observe initial operation to detect malfunctioning of the inverter or operating equipment.

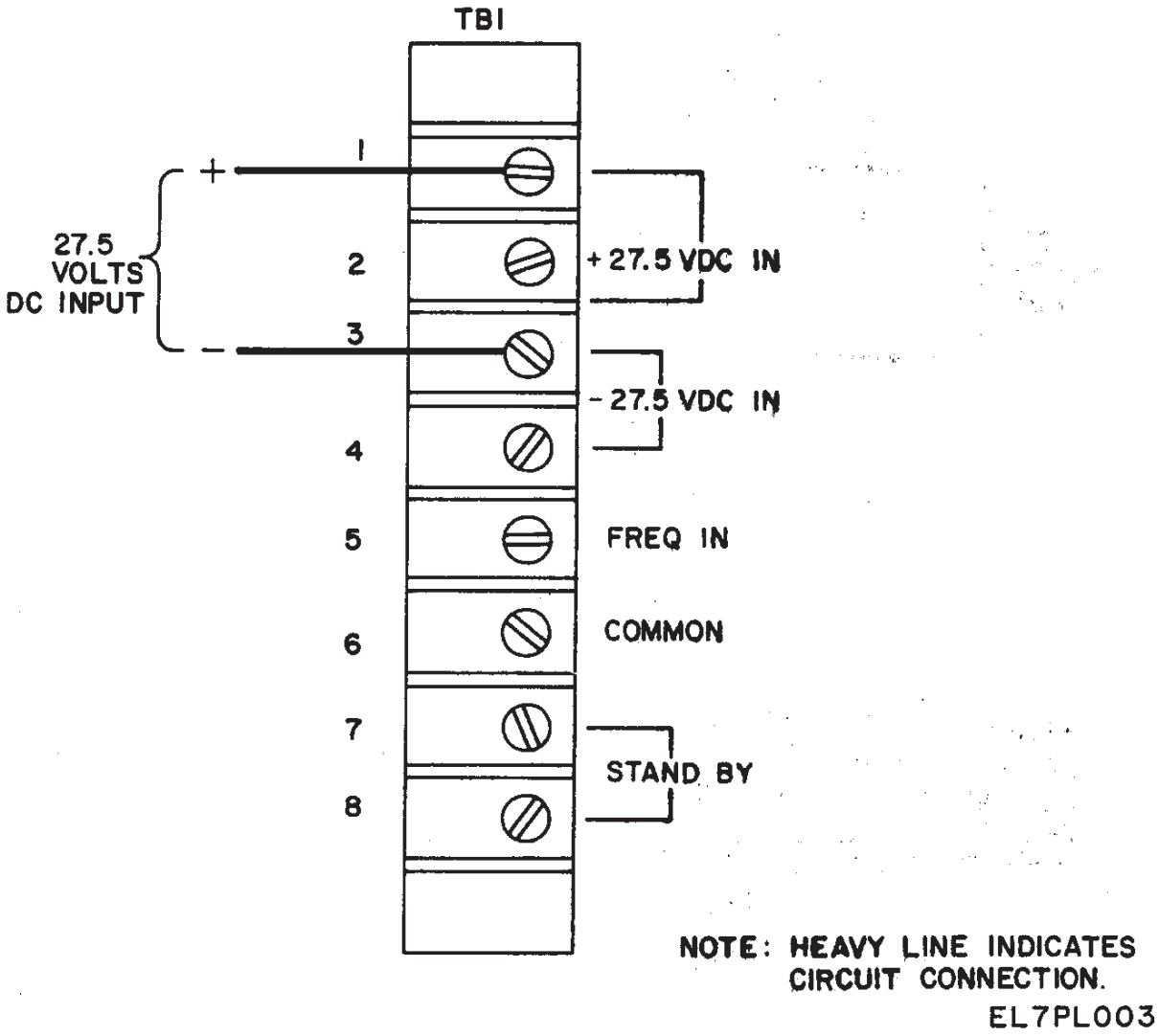


Figure 2–2. Single Unit Standard Connection.

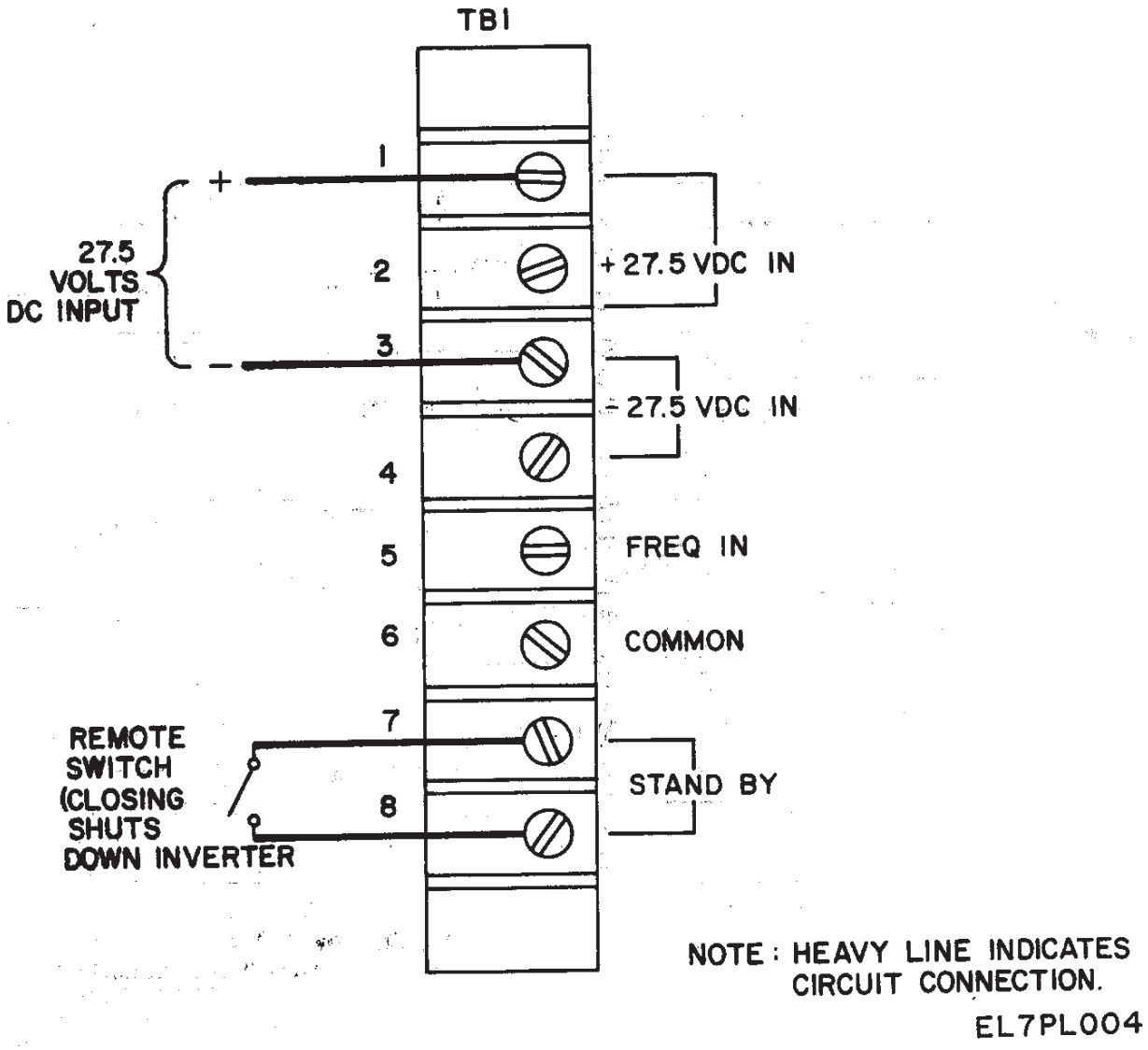


Figure 2-3. Single Unit Standard Connection.

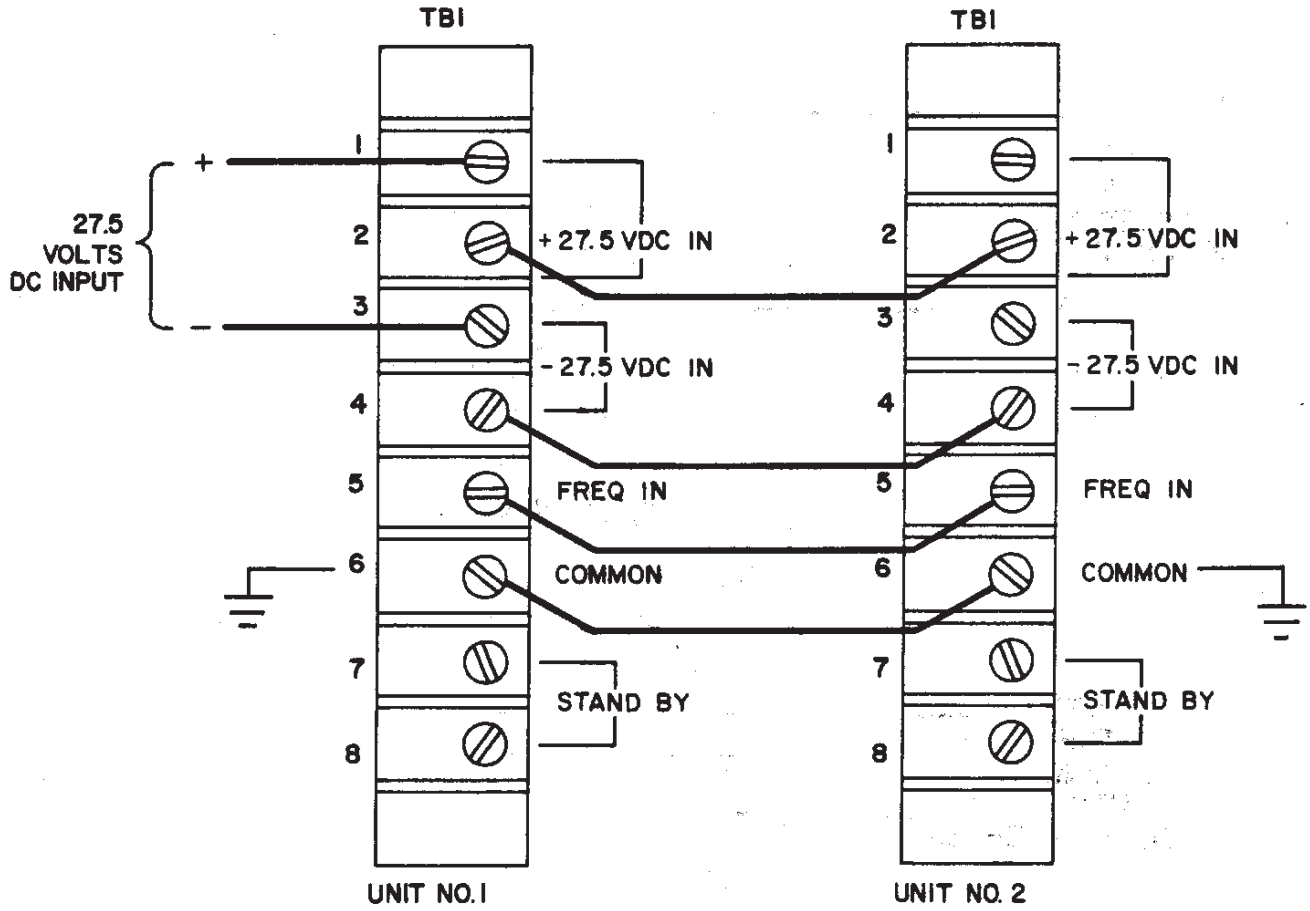


Figure 2-4. Parallel Unit Connection.

CHAPTER 3
OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

3-1. Damage From Improper Settings

Read this chapter carefully before using the inverter. Follow the instructions in paragraphs 3-3, 3-4, and 3-5 to operate the inverter.

3-2. Operator Controls and Indicators

There are no operator controls or indicators on the inverter. External connections and fuses located on the front and rear of the inverter are identified in table 3-1 and figure 3-1.

Table 3-1. Controls, Indicators, and Connectors

Control or Indicator	*Function*
4 AMP fuse	Protects inverter circuits from overload.
115 VAC OUTPUT 60 HZ connector Terminal board TB1:	AC Convenience outlet to connect equipment
Terminal 1 +27.5 V dc IN	Connects +27.5 V dc source.
Terminal 2 +27.5 V dc IN	Connects +27.5 V dc to parallel inverter.
Terminal 3 -27.5 V dc IN	Connects negative lead to dc source.
Terminal 4 -27.5 V dc IN	Connects negative lead to parallel inverter.
Terminal 5 FREQ IN	Parallel connection- frequency.
Terminal 6 COMMON	Parallel connection- common (Ground).
Terminal 7 STAND BY	Connects standby switch option.
Terminal 8 STAND BY	Connects standby switch option.

Section II. OPERATION

3-3. General

The inverter is initially energized from an external dc power source when the power supply is turned on.

3-4 Starting Procedure

The inverter is active when the imput and outputs are connected and the external dc power supply is on. Refer to TM 11-5815-334-12 (AN/GRC-122B/142B) for starting procedures.

3-5. Stopping Procedure

Stop the inverter by shutting down the dc power input to the unit. It is not necessary to turn off the teletypewriter before stopping the inverter.

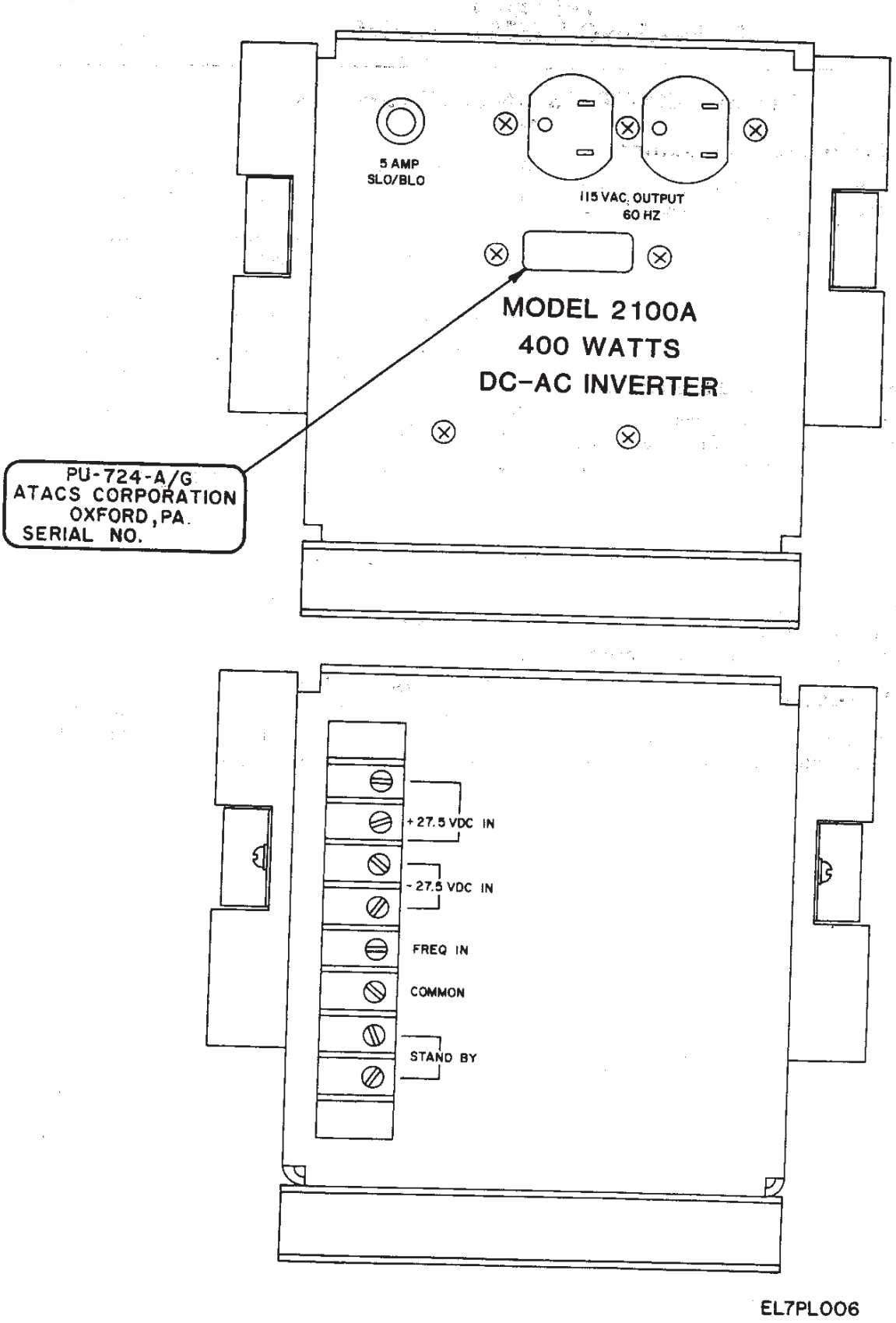


Figure 3-1. Controls, Indicators, and Connectors.

CHAPTER 4
OPERATOR'S AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. TOOLS AND EQUIPMENT

4-1. Special Tools and Test Equipment

Refer to the maintenance allocation chart, appendix B, section III, for the tools and equipment used at operator and organizational maintenance level.

4-2. Materials Required

Refer to appendix E, section II for expendable supplies and materials.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-3. General

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

a. Systematic Care. The procedures given in paragraphs 4-4 and 4-5 cover the systematic care essential to proper upkeep and operation of the inverter.

b. Preventive Maintenance Service and Inspection. The preventive maintenance checks and services tables 4-1 and 4-2 outline inspections to be made at specific intervals. These inspections are made to maintain equipment in good operating conditon. Records and reports of these inspections must be made in accordance with TM 38-750.

4-4. Procedures

Tables 4-1 and 4-2 specify checks and services that must be accomplished before, during and after operation, weekly and monthly or under the special circumstances listed below:

a. When the inverter is initially installed.

b. When the inverter is reinstalled after relocation for any reason.

c. At least once each week if equipment is maintained in a standby condition.

Table 4-1. Operator/Crew Preventive Maintenance Checks and Services

B-Before A-After
D-During

Item No.	Interval B	D	A	Item to be Inspected	Procedures	For readiness reporting, equipment is not ready/ available if:
1	•		•	Exterior surfaces	Clean the exterior	
2	•		•	Intercabling and connectors	Inspect all interconnecting cables and connectors for breaks: inspect connectors to insure that they are tight.	Operation is impaired.
3	•		•	Equipment mounting	Check to see that equip- is securely mounted and that mountings are firmly bolted in place.	

Table 4-2. Organizational Preventive Maintenance Checks and Services

W-Weekly Q-Quarterly A-Annually
M-Monthly S-Semiannually B-Biannually

Item No.	Interval W	M	Q	S	A	B	Item to be Inspected	Procedures	For readiness reporting, equipment is not ready/ available if:
1					•		Installation	Check to see that equipment is properly installed.	Operation is impaired.
2					•		Preservation	Check all equipment surfaces for evidence of fungus or rust corrosion. Clean fungus areas and remove rust. Paint surfaces as needed.	
3		•					Voltage	Check input/output voltage.	Output not 115 V ±10%

4-5. Cleaning

Inspect the exterior of the equipment. The exterior surface must be free of dust, dirt, grease and fungus.

a. Remove dust and loose dirt with a clean, soft brush.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUROETHANE dissolves natural oils, prolonged contact with the skin must be avoided. When necessary, use gloves that the solvent

cannot penetrate. If the solvent is taken internally, consult a physician.

b. Remove grease, fungus and ground-in dirt from equipment using a cloth dampened (not wet) with trichlorotrifluoroethane. Use a soft brush to clean contact surfaces which are difficult to clean with a cloth.

4-6. Rustproofing and Painting.

a. Rustproofing. When the finish on the inverter has become badly scarred or damaged, rust and corrosion can be prevented by touching up the bare spots. Use No. 000 sandpaper to clean the surface down to bare metal. Obtain a bright smooth finish.

b. Painting. Apply primer; after drying, brush two thin coats of paint on the bare metal to protect it. Refer to the applicable cleaning and refinishing practices specified in TB 43-0118.

Section III. OPERATOR AND ORGANIZATIONAL TROUBLESHOOTING

4-7. General Troubleshooting Procedures

a. General. Troubleshooting procedures for the inverter are based on the normal operation of the equipment being used. When an abnormal indication is observed, note the symptom and use the troubleshooting chart in this chapter to identify the probable cause. Follow the instructions given in the *Corrective Measures* column when the problem has been identified. If recommended solutions do not correct the problem, a higher category of maintenance is required.

b. Visual Inspection.

(1) Before troubleshooting, inspect the equipment for visible defects. This saves repair time and may prevent further damage. Inspect the following for obvious defects:

(a) The security of all cable connectors.

(b) Cracked or broken cables.

(c) Equipment completeness.

(2) If visual inspection does not locate the trouble, proceed to troubleshooting table 4-3.

Table 4-3. Operator and Organizational Troubleshooting Procedures

a. Symptom Index.

	Troubleshooting Procedure (para)
NO OUTPUT VOLTAGE	1
OUTPUT VOLTAGE ERRATIC	2
OUTPUT VOLTAGE OUT OF TOLERANCE	3

b. Troubleshooting Procedures.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. NO OUTPUT VOLTAGE

Step. 1. Check for 27.5 V dc input power present at terminals 1, 2, 3, or 4 of terminal board TB1 (see fig. FO-2).
Make sure dc power is being applied to inverter. If 27.5 V dc is not present (see TM 11-5815-334-12).

Step. 2 Check if fuse F1 has blown.
Replace. If fuse blows again, check the cabling/equipment connected to the inverter connections.
Higher level maintenance required.

2. OUTPUT VOLTAGE ERRATIC

Step 1. Check if input or output cables or connections are loose or damaged.
Repair cabling and connections; replace as needed.

Step. 2. Check for erratic input power.
Check the power source providing the 27.5 V dc input power to the inverter (see TM 11-5815-334-12). If input voltage is stable and within tolerance. Higher level of maintenance required.

3. OUTPUT VOLTAGE OUT OF TOLERANCE (PLUS OR MINUS 10 PERCENT)

Step 1. Check if output voltage out of tolerance.
Check the power source providing the 27.5 V dc input power to the inverter (see TM 11-5815-334-12). Higher level of maintenance required.

CHAPTER 5
FUNCTIONING OF EQUIPMENT

5-1. General

a. The PU-724A/G is a true sine wave inverter which provides a maximum of 400 volt amperes of 60 Hz power at a nominal voltage of 115 volts rms. The input voltage is 27.5 V dc ±10 percent. Efficiency is greater than 55 percent.

b. A 20 kHz switching regulator is pulse modulated by a full wave rectified sinusoidal reference. The output of the 20 kHz switcher passes through an L-C filter which detects the average of the pulse width modulation. The filtered output is fed to the center tap of the transformer primary. Each end of the primary is switched to the input power return on alternate cycles of the half sinusoid. The flux in the transformer is thus reversed and the secondary of the low frequency power transformer provides the sinusoidal waveform desired.

c. A diode (CR21) in series with the positive input line protects the switching circuitry against the application of reverse input voltage. Although the unit is current limited and is short circuit proof, a 4 ampere output fuse is provided.

d. Remote shutdown is available by shorting pins 7 and 8 of the input terminal board.

e. RF filtering at both the input and output reduce the radiated and conducted RFI to acceptable levels consistent with MIL-STD-461.

f. The control card is a proprietary design of the manufacturer and when faulty, is replaced as a nonrepairable item and returned to depot for further processing.

5-2. Circuit Functioning

(fig. 5-1 and FO-2)

a. The input dc voltage is fed through diode CR21 and the input filter to a switching circuit. Diode CR21 will not conduct if a negative voltage is applied and therefore protects the switching drivers Q14/15/16. The input filter attenuates the 20 kHz switching waveform and protects the input line from radiated and conducted RFI. Diode CR22, resistor R82, capacitors C30 and C31 provide RF filtering of input.

b. The switching circuit converts the dc input to a pulse width modulated train of pulses. The repetition frequency is 20 kHz and the pulse width is set between 45 microseconds to 55 microseconds. The train of pulses is fed from U2, through Q7 to drive Q14, Q15, and Q16, which operates as a saturated switch. The combination of CR22, L2 and C16 filters the 20 kHz pulses to detect the modulation which is available at C16+. This waveform is fed back through transformer T1 and is compared to the reference signal. U2 operates on the difference between these signals.

c. The reference signal and the signal at C16+ are half cycle pulses. The signal at C16+ is fed to the primary center tap and each end of the primary is alternatively switched to common. When SW1 is energized current flows during the pulse designated (1) and when SW2 is energized current flows during the pulse designated (2). The reversal flux in the transformer between (1) and (2) results in the sine wave generated at the secondary of the transformer. Inductor L3 and capacitors C18 and C19 provide RF filtering of output.

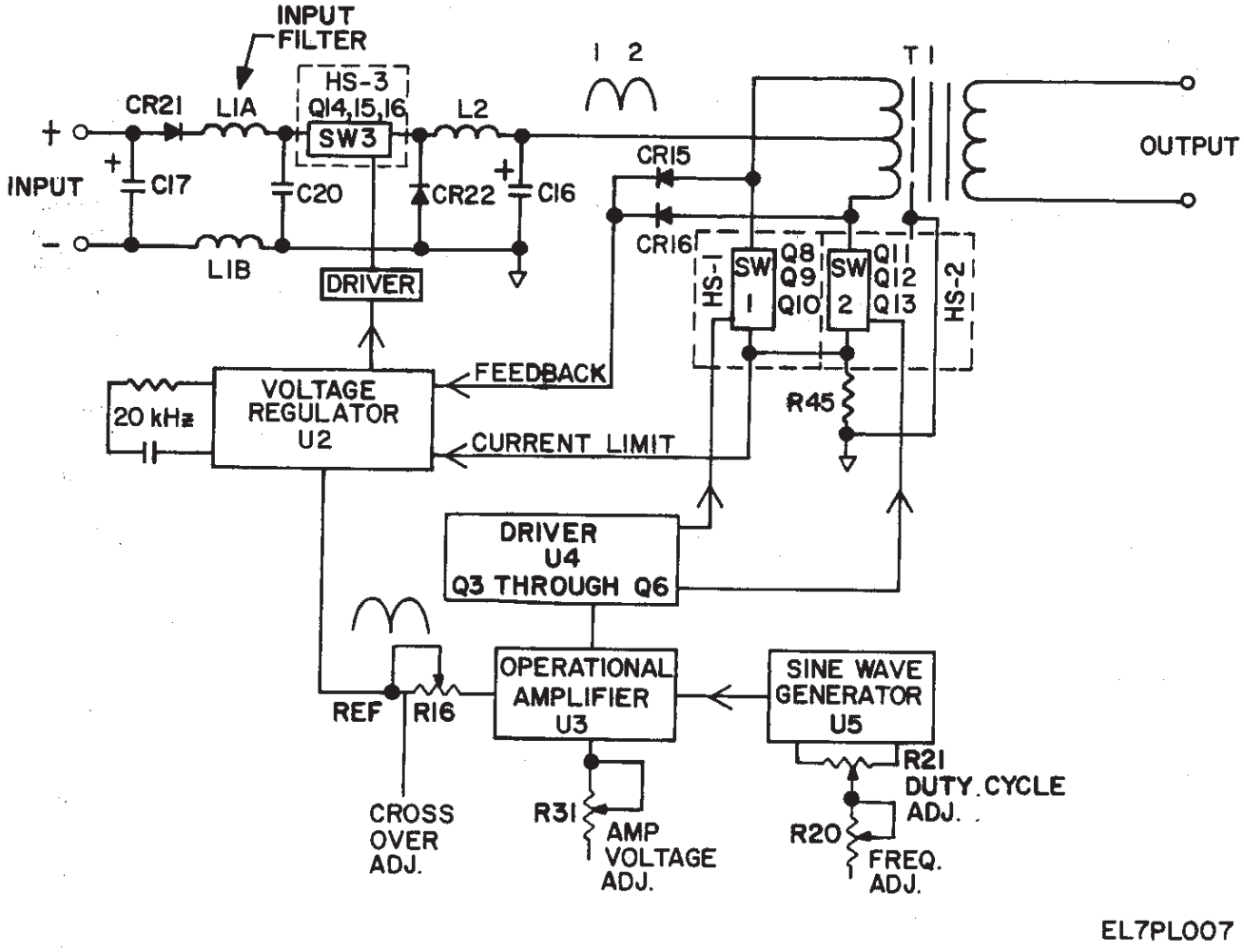


Figure 5-1. Block Diagram, PU-724A/G.

CHAPTER 6
DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

6-1. Color Codes

Color codes for standard resistors, inductors, and capacitors are shown in figure FO-1.

6-2. Transformer and Inductor Resistance Measurements

a. Table 6-1 gives the resistance measurements for transformer T1, inductors L1A, L1B, L2, and L3. The values given apply to each set of windings.

b. Table 6-2 provides voltage and resistance measurements throughout the inverter.

c. Table 6-3 gives the waveforms for various points throughout the inverter.

Table 6-1. Transformer and Inductor Resistance Measurements

a. Inductor L1A:	
Terminals	*Resistance*
1-2	5 milliohms
b. Inductor L1B:	
Terminals	*Resistance*
3-4	5 milliohms
c. Inductor L2:	
Terminals	*Resistance*
1-2	2 milliohms
d. Inductor L3:	
Terminals	*Resistance*
1-2	3 milliohms
2-3	3 milliohms
e. Transformer T1:	
Terminals	*Resistance*
Primary winding:	
Brown (4) to white (1)	4.8 milliohms
Green (2&3) to white (1)	3.7 milliohms
Green (2&3) to brown (4)	3.3 milliohms
Secondary winding:	
Green (5) to Blue (6)	33.0 milliohms
White (7) to Gray (8)	11.7 milliohms
Violet (9) to Gray (8)	11.4 milliohms
Violet (9) to White (7)	17.3 milliohms

6-3. Voltage and Resistance Measurements

WARNING

Be extremely careful when making voltage measurements. Use insulated test probes and do not touch any internal part of the inverter while it is energized.

Refer to inverter schematic diagram (fig. FO-2 and table 6-2) for available data on voltage and resistance values. Make all resistance measurements with the equipment deenergized. Voltage values which can be adjusted are described in paragraph 6-10.

6-4. Voltage and Waveforms

WARNING

Be extremely careful when making waveform measurements. Use insulated test probes and do not touch any internal part of the inverter while it is energized.

Refer to inverter schematic diagram (fig. FO-2 and table 6-3) for available data on waveforms and voltage values. Make all measurements with the equipment energized. Voltage and waveforms which can be adjusted, are described in paragraph 6-10.

Table 6-2. Voltage and Resistance Measurements

a. Voltage (volts dc):

Transistor	*Base*	*Emitter*	*Collector*
Q14-REGULATOR	20 to 28	22 to 30	12 to 15
Q15-REGULATOR	11.5 to 16	11 to 15	22 to 30
Q16-POWER AMPLIFIER	11.5 to 16	11 to 15	22 to 30
Q8-POWER AMPLIFIER	0.7 to 1.5	0.5 to 1.0	11 to 15
Q9-POWER AMPLIFIER	0.5 to 1.0	75 to 85 mv	11 to 15
Q10-POWER AMPLIFIER	0.5 to 1.0	60 to 95 mv	11 to 15
Q11-POWER AMPLIFIER	0.75 to 1.2	60 to 95 mv	11 to 15
Q12-POWER AMPLIFIER	0.60 to 0.95	70 to 100 mv	11 to 15
Q13-POWER AMPLIFIER	0.60 to 0.95	70 to 100 mv	11 to 15

b. Resistance (ohms):

Test Prods		*Transistor*		
Negative	*Positive*	*Q14*	*Q15*	*Q16*
Emitter	Collector	10	22K	22K
Collector	Emitter	24K	9.0	9.0
Emitter	Base	Infinity	7.5	7.5
Base	Collector	10	22K	22K
		Q8	*Q11*	*Q9*
Emitter	Collector	20K	20K	20K
Collector	Emitter	9.5	9.5	9.0
Emitter	Base	8.0	8.0	9.0
Base	Collector	Infinity	Infinity	22K
		Q10	*Q12*	*Q13*
Emitter	Collector	20K	20K	20K
Collector	Emitter	9.0	9.0	9.0
Emitter	Base	9.0	9.0	9.0
Base	Collector	22K	22K	22K

Section II. TOOLS AND TEST EQUIPMENT REQUIRED

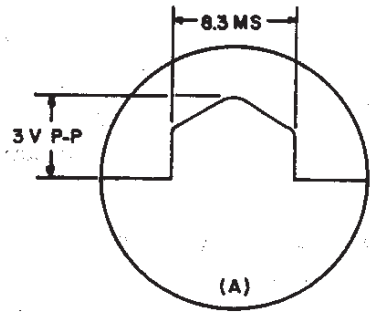
6-5. Tools, Materials, and Test Equipment

The following tools, materials, and test equipment are required for maintenance, troubleshooting, and repair:

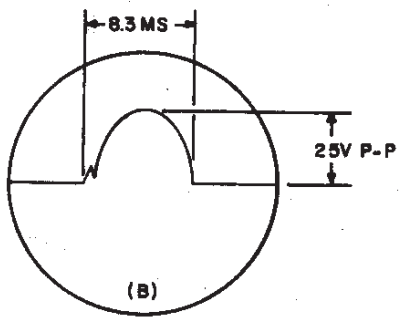
a. Tool Kit, Electronic Equipment TK-100/G.

b. Voltmeter AN/USM-223.

TABLE 6-3. WAVEFORMS

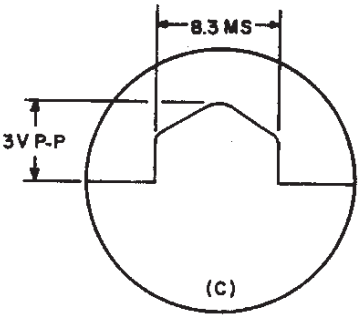


WAVEFORM AT BASE Q8

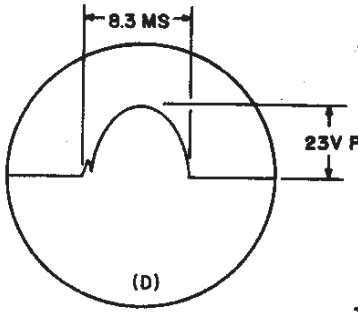


WAVEFORM AT COLLECTOR Q10

HS-1

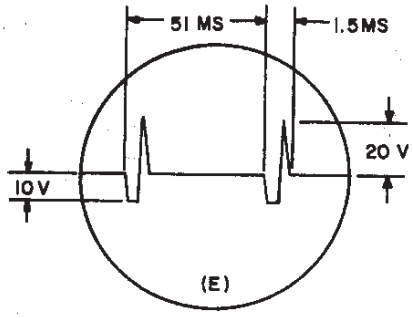


WAVEFORM AT BASE Q11

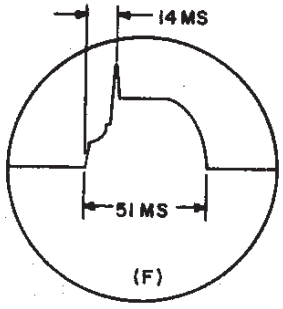


WAVEFORM AT COLLECTOR Q13

HS-2

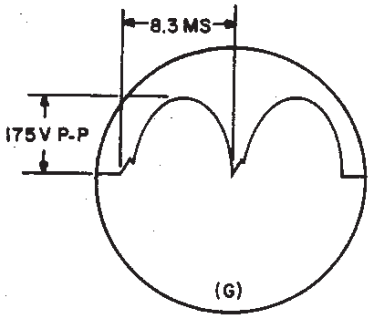


WAVEFORM AT BASE Q14

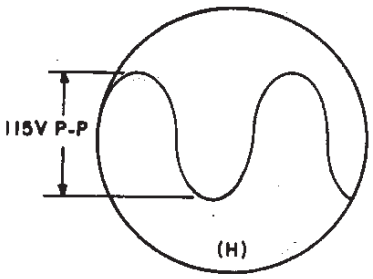


WAVEFORM AT COLLECTOR Q14

HS-3



WAVEFORM AT T1
TERMINAL 2



WAVEFORM AT INVERTER OUTPUT

EL7PL018

c. Digital Multimeter AN/USM-451
d. Oscilloscope AN/USM-281C.
e. Power Supply PP-4763A/GRC.
f. Transistor Test Set TS-1836D/U.
g. Ammeter ME-489/U.
h. Variable resistor, 50 ohms, 400 watt.
i. Tool Kit, Electronic Equipment TK-101/G
j. Frequency Counter AN/USM-459.

Section III. TROUBLESHOOTING

6-6. Troubleshooting Information

Troubleshooting at direct support level includes all the techniques outlined for operator's and organizational maintenance level and any special or additional techniques required to isolate a defective part.

a. General. The first step in servicing a defective inverter is to sectionalize the fault. Sectionalization means tracing the fault to the input or output portion of the unit. The second step is to localize the fault. Localization means tracing the fault to a defective circuit responsible for the condition. Some faults, such as burned-out resistors, arcing, and shorted transformers, can often be located by sight, smell and sound. The majority of faults, however, must be isolated by checking voltages and resistances.

b. Sectionalization and Localization. The tests given in (1) and (2) below will reduce unnecessary work and aid in tracing trouble in a defective inverter. The inverter is a single unit and is theoretically divided into several sections for convenience in troubleshooting as input, rectifier, ac output, and control card.

(1) *Visual inspection.* The purpose of visual inspection is to locate faults without testing or measuring circuits. All components should be observed and an attempt made to sectionalize and localize the fault to a particular part.

(2) *Operational test.* Operational test frequently indicate the general location of trouble. In many instances, the test will help in determing the exact nature of the fault. The operational procedures given in paragraphs 3-3, 3-4, and 3-5, with the normally expected indications called out in the procedures, provide good operational tests.

(3) *Troubleshooting table.* The troubleshooting table 6-4 lists symptoms of common troubles and gives the corrective measures or references. The table cannot include all trouble symptoms that may occur; therefore, the technician should use this table as a guide in analyzing symptoms that may not be listed.

(4) *Component locations.* Figure F-1 shows the component locations on the inverter.

c. Troubleshooting Chart. Table 6-4 outlines procedures for localizing troubles within the various circuits of the inverter. Refer to figure F-1 for parts location. Refer to the overall schematic diagram (fig. FO-2) to identify circuit components. Depending on the nature of the operational symptoms, one or more of the localizing procedures will be necessary. When the trouble has been localized to a particular circuit, use voltage and resistance measurements to isolate the trouble to a particular part.

d. Use of Troubleshooting Table 6-4. When an abnormal symptom is observed in the equipment, look for a description of the symptom in the Malfunction column, and perform the corrective action given in *Correction action* column.

e. Condition to Test. All checks outlined in the troubleshooting table 6-4 are to be conducted with the inverter under power and operating. Troubleshooting of internal components of the inverter should be done in a shop area with adequate bench testing facilities.

f. Transistor Troubleshooting. When troubleshooting, observe the following:

(1) When measuring voltages, use sleeving to insulate the test probe except for the extreme tip.

(2) Check the open circuit voltage across the ohmmeter test leads. Do not use the ohmmeter if the open circuit voltage exceeds 1.5 volt. Do not use the R X 1 scale when testing low power transistors.

(3) Any change in the output circuit of one transistor amplifier stage can affect all preceding stages.

(4) Common-emitter transistor amplifiers have an 180-degree phase shift between input and output voltages. However, there will be no phase shift if the base is shorted on the collector.

(5) The dc base voltage should be slightly higher than the emitter voltage during normal operation of a common-emitter transistor amplifier. However, an open circuit between the base and the emitter will result in the emitter voltage approximately ground potential and a base voltage considerably greater than normal.

(6) An unusually high dc collector voltage can be caused by:

(a) An open emitter circuit.
(b) An open collector circuit.
(c) A short between base and emitter.
(d) An open circuit between base and emitter.

(7) An unusually low dc collector voltage indicates a short circuit across the output impedance or between:

(a) Collector and ground.
(b) Collector and emitter.
(c) Collector and base.

(8) When checking the base-to-emitter resistance of NPN transistors, the ohmmeter ground must be connected to the emitter lead. The resistance indicated on the R X 1 scale should be greater

than 10 ohms, but less than 50 ohms. However, when meter leads are reversed, the emitter-to-base resistance should be several thousand times greater.

(9) When unsoldering transistor leads, use long-nosed pliers as a heat sink.

Table 6-4. Direct Support Troubleshooting Procedures

a. Symptom Index.

	Troubleshooting Procedure (para)
NO OUTPUT VOLTAGE	1
ERRATIC VOLTAGE OUTPUT	2
OUTPUT VOLTAGE OUT OF TOLERANCE	3
FREQUENCY DISTORTION	4
FREQUENCY OUT OF TOLERANCE	5

b. Initial Setup for Troubleshooting PU-724A/G.

1. Test Equipment
   - Power Supply PP-4763A/GRC.
   - Oscilloscope AN/USM-281C.
   - Voltmeter AN/USM-223.
   - Ammeter ME-489/U.
   - Variable resistor, 50 ohms, 400 watt.
   - Toggle Switch S1.
   - Frequency Counter AN/USM-459.
2. Equipment Conditions

a. Connect the test equipment as shown in figure 6-4. Apply power and allow to warmup for 5 minutes (minimum).

b. Apply power to inverter.

c. Adjust variable resistor load for 250 to 300 volt ampere output load.

c. Troubleshooting Procedures.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. NO OUTPUT VOLTAGE

Step 1. Check if fuse F1 has blown.
Replace fuse.
If fuse blows again, remove power from inverter and check for shorts.

NOTE
Table 6-1 provides resistance measurements. Refer to inverter schematic diagram fig. F0-2 and fig. F-1 for parts location.

Step 2. Check Q9, Q10 (HS1) and Q12, Q13 (HS2) for shorted or open transistor (para 6-6*f*).
Replace a faulty transistor.

NOTE
If a faulty power amplifier transistor (Q9, Q10, Q12, Q13) is found, also check Q8 and Q11 for possible connected problems.

Step 3. Check Q15 and Q16 (HS3) for shorted or open transistor (para 6-6*f*).
Replace a faulty transistor.

NOTE
If a faulty regulator synchronizer transistor (Q15 or Q16) is found, also check Q14 for possible connected problems.

Step 4. Check diodes VR4 and VR5 for shorts.
Replace faulty VR4 or VR5.

Step 5. Check transformer T1 for short to ground or open circuit.
Replace a faulty transformer T1 or repair connecting wiring.

Step 6. Check other chassis components, wiring, and connections for open circuits or shorts.
Replace faulty parts.
Repair faulty wiring.

Step 7. Check the control card by substituting a known good control card for the installed card.
Replace a faulty control card.

2. ERRATIC OUTPUT VOLTAGE

Setup test equipment (table 6-4*b*)

Step 1. Check Q9, Q10 (HS1) and Q12, Q13 (HS2) for a faulty transistor (para 6-6*f*).
Replace a faulty transistor.

NOTE
If a faulty power amplifier transistor (Q9, Q10, Q12, or Q13) is found, also check Q8 and Q11 for possible connected problems.

Step 2. Check Q15 and Q16 (HS3) for a faulty transistor (para 6-6*f*).
Replace a faulty transistor.

NOTE
If a faulty regulator synchronizer transistor (Q15 or Q16) is found also check Q14 for possible connected problems.

Step 3. Check other chassis components, wiring, and connections
Replace faulty parts.
Replace faulty wiring.

Step 4. Check the control card by substituting a known good control card for the installed card (para. 6-9).
Replace a faulty control card.

3. OUTPUT VOLTAGE OUT OF TOLERANCE (PLUS OR MINUS 10 PERCENT)

Setup test equipment (table 6-4*b*)

Step 1. Check adjustment of output voltage amplitude.
Refer to paragraph 6-10.

Step 2. Check Q9, Q10 (H21) and Q12, Q13 (HS2) for a faulty transistor (para 6-6*f*).
Replace a faulty transistor.

NOTE
If a faulty power amplifier transistor (Q9, Q10, Q12, or Q13) is found, also check Q8 and Q11 for possible connected problems.

Step 3. Check Q15 and Q16 (HS3) for a faulty transistor (para 6-6*f*).
Replace a faulty transistor.

NOTE
If a faulty regulator synchronizer transistor (Q15 or Q16) is found also check Q14 for possible connected problems.

Step 4. Check the control card by substituting a known good control card for the installed card (para 6-9).
Replace a faulty control card.

4. FREQUENCY DISTORTION

Setup test equipment (table 6-4*b*)

Step 1. Check the output sine wave as described in paragraph 6-10.
Adjust the zero cross-over of the sine wave to correct cross-over distortion if

present (para 6-10c).
Step 2. Check the control card by substituting a known good control board for the installed card (para 6-9).
Replace a faulty control card.

5. FREQUENCY OUT OF TOLERANCE.
Step 1. Remove the control card (para 6-9).
Step 2. Aline the control card (para 6-11).

Section IV. MAINTENANCE

6-7. Parts Replacement Techniques

The majority of parts comprising the inverter are accessible when the top cover is removed (fig. F-1). It may be necessary to remove the heat sink retaining hardware and lift the heat sinks away from the chassis to gain complete access to components.

WARNING

Open circuit breaker or disconnect switch in the dc supply ahead of inverter before removing any panels.

a. Special instructions for the removal and replacement of the control card are provided in paragraph 6-9. When removing parts or repairing wiring, tag leads and mark terminals for positive identification before disconnecting any wiring to assure proper reconnection. When wiring is replaced, use wire that conforms with the original wiring size and marking. Most parts can be reinstalled by remounting them in their original locations with the original hardware and reconnecting the leads.

CAUTION

Remove and install components that are soldered with a pencil-type soldering iron having a 25-watt maximum capacity. The inverter is transistorized; if the soldering iron must be used with ac voltage use an isolating transformer between the soldering iron and the line. Do not use soldering gun; damaging voltages can be induced in the circuit components.

b. When soldering transistor leads, solder quickly; whenever wiring permits, use a heat sink (such as a long-nosed pliers) between the soldered joint and the transistor. Use the same length and dress of transistor leads as used originally.

c. Make well soldered connections; a carelessly soldered joint may create a new trouble, and is one of the most difficult troubles to isolate. Be careful not to allow drops of solder to fall into the equipment; this action may cause short circuits.

6-8. Inverter Removal and Replacement

WARNING

Open circuit breaker or disconnect switch in the dc supply ahead of inverter before working on the unit.

a. Removal.

(1) Disconnect the operating equipment from the ac output receptacle.

(2) Tag and disconnect input wires from terminal board TB1.

(3) Removal the hardware attaching the inverter at the mounting feet (fig. 2-1). Retain hardware for reinstallation.

CAUTION

Inverter weighs 33 pounds. Use care when handling.

(4) Remove the inverter for its mounting location.

b. Replacement. Refer to paragraph 2-3 for instructions on installation. Position the inverter. Aline mounting rack with holes. Install hardware removed in (para 6-8*a*(3)). Connect input wires TB-1.

6-9. Control Card Removal and Replacement

(fig. 6-1)

a. Access. Refer to figure 6-1 to gain access to the control card.

b. Removal. After gaining access as described above, the control card can be removed by separating the connector (J1) from the control card (A1).

c. Replacement.

(1) When a malfunction has been isolated to the control card, the faulty card must be returned for depot repair and replacement with a known good control card. Because inherent variations exist in the transformer and coils between inverters, it may be necessary to adjust the output sine wave for zero cross-over and output voltage amplitude. These adjustments are described in paragraph 6-10.

(2) Refer to figure 6-1 to replace the control card.

6-10. Adjustment of the Output Sine Wave

NOTE

Variable resistors R16 and R31 are the only adjustment points recommended for adjustment on the control card. Do not attempt adjustment of R18, R19, R20, or R21. These are set at the factory. Paragraph 6-11 describes a bench alinement procedure which can be used if these factory adjustments have been changed.

a. General. Only two adjustments on the control card should be necessary at direct support. These are adjustment of the zero cross-over of the sine wave and adjustment of the output voltage ampli-

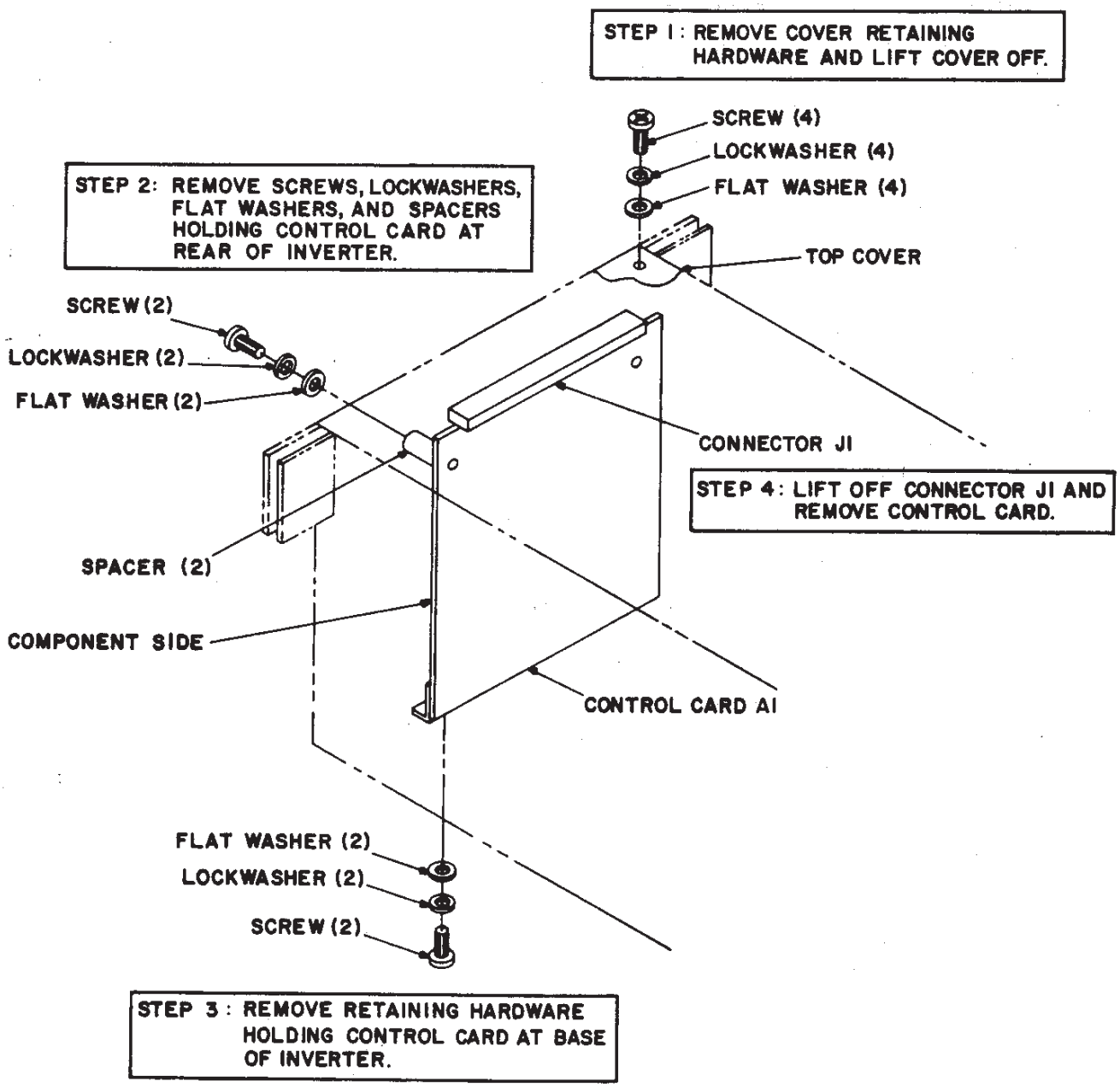


Figure 6-1. Control Card Removal.

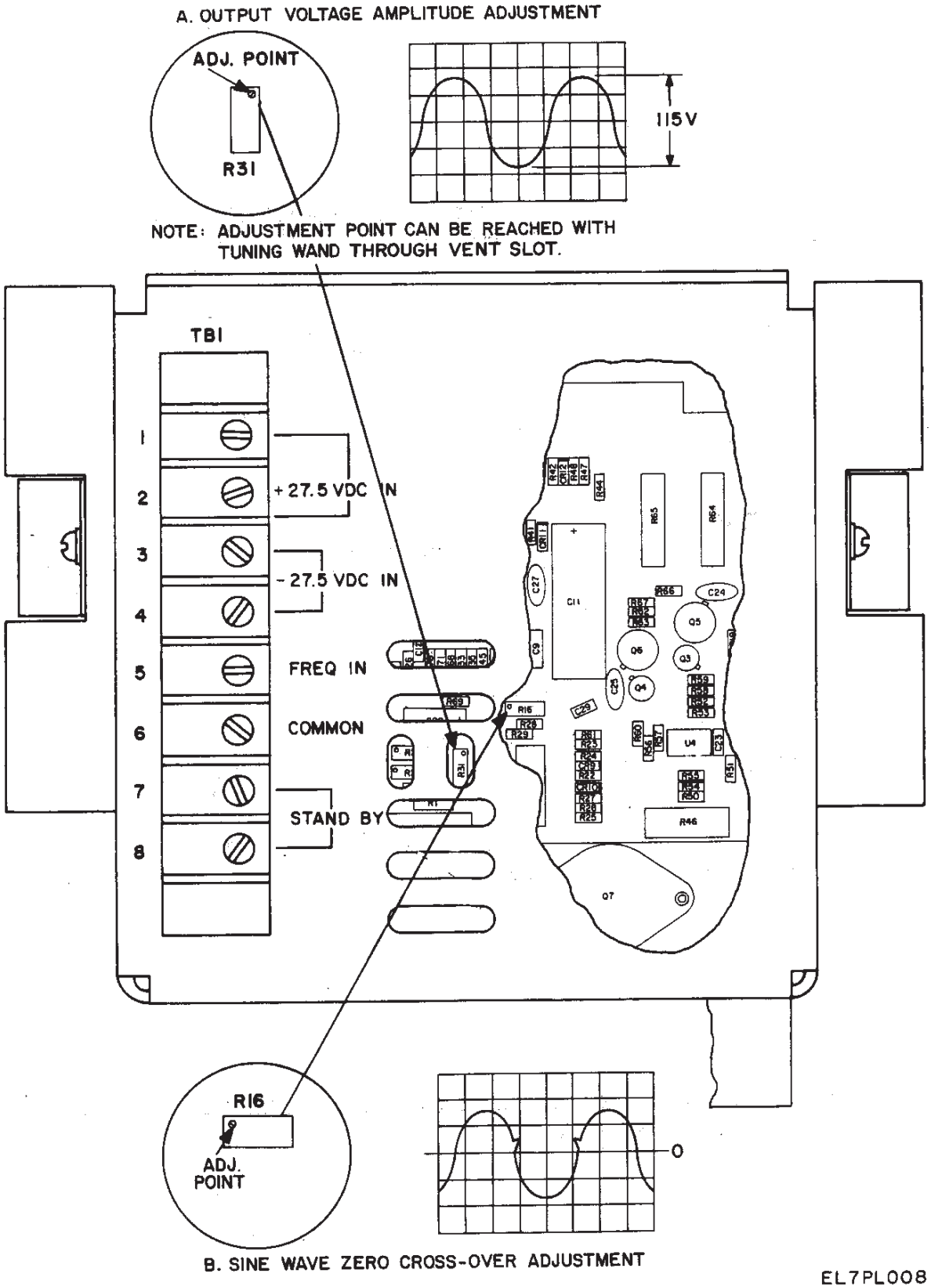
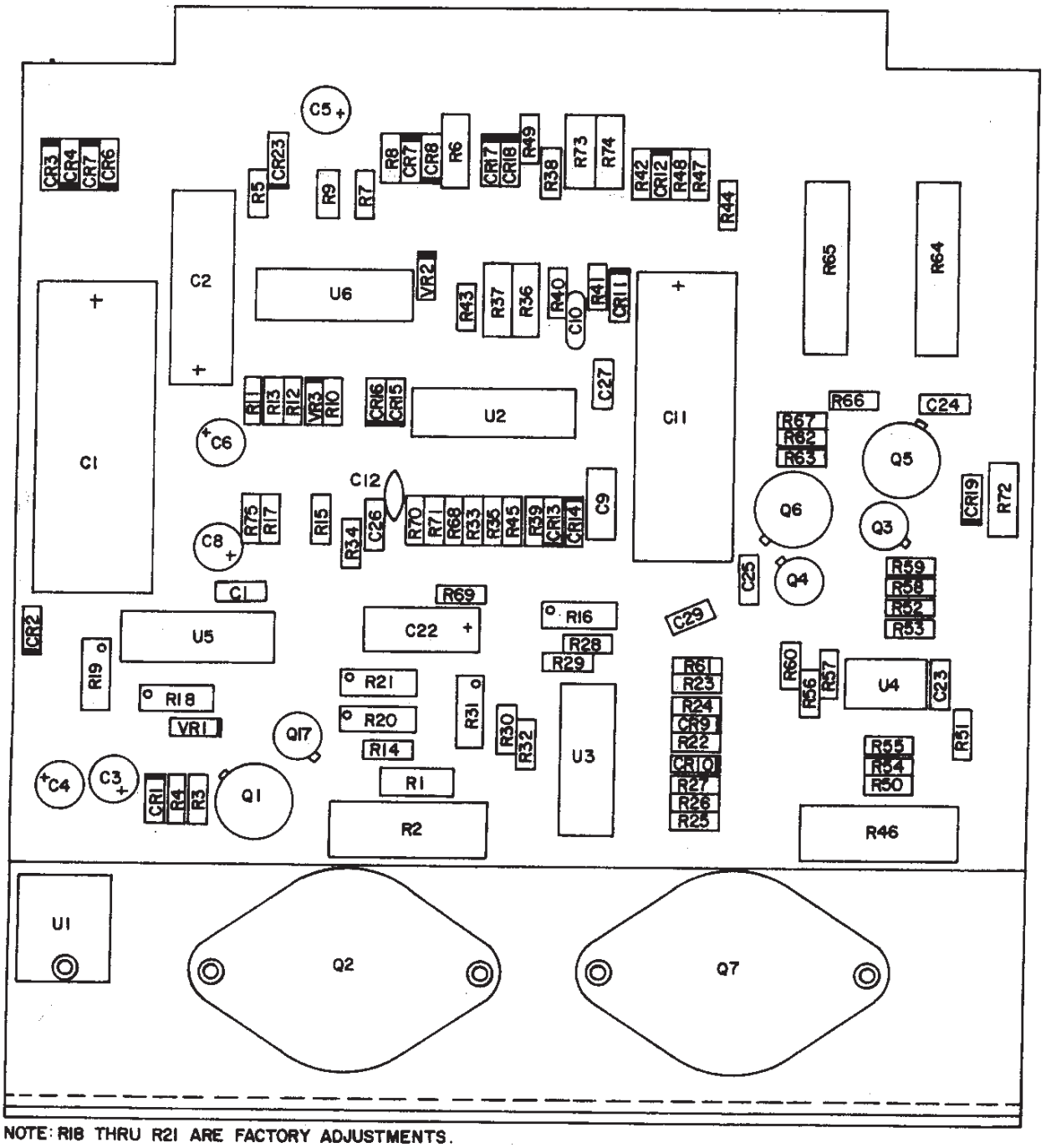


Figure 6-2. Control Card Adjustments.



NOTE: R18 THRU R21 ARE FACTORY ADJUSTMENTS.

EL7PL009

Figure 6-3. Control Card, Parts Location.

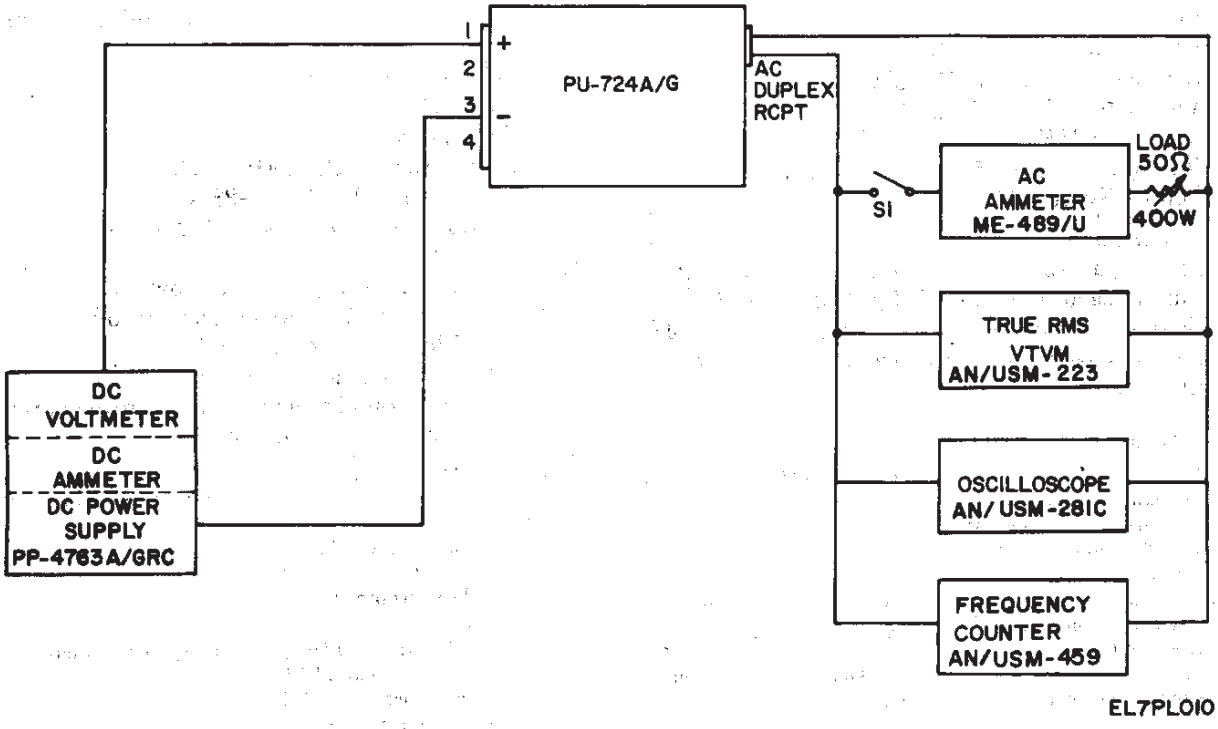


Figure 6-4. Test Setup, Schematic Diagram.

tude. The first is discussed in subparagraph *c*, second in subparagraph *d*.

b. Conditions (fig.6-1, 6-2, and 6-3). Control card adjustment can be made with the card removed, or in place in the inverter, as follows:

(1) To remove the control card, refer to paragraph 6-9 and figure 6-1. Lay the card on a sheet of insulating material while maintaining connection to the inverter through connection J1. Proceed to subparagraphs *c* or *d* for adjustment.

(2) To adjust the control card in place refer to figure 6-2. Access to the adjustment points is provided through the air circulation holes at the back of the inverter. Proceed to subparagraphs *c* or *d* for adjustment.

c. Zero Cross-over Adjustments

INITIAL SETUP

Test Equipment

Power Supply PP-4763A/GRC.
Oscilloscope AN/USM-281C.
Voltmeter AN/USM-223.
Ammeter ME-489/U.
Variable resistor, 50 ohms, 400 watt.
Toggle Switch S1

Equipment Conditions

1. Provide access to adjustment point R16 on the control card (para 6-10*b*, fig. 6-2 and 6-3).
2. Connect the equipment as shown in figure 6-4. Apply power and allow to warmup for 5 minutes (minimum).

List of Tasks

Task No.	*Task*	*Performance Standard*
1.	Apply power to interver.	
2.	Adjust variable resistor load for 250 to 300 volt ampere output.	
3.	Observe the output sine wave (B) figure 6-2 on the AN/USM-281C.	The spike at zero cross-over shall be minimum.
4.	Adjust R16 while observing outout waveform.	The spike at zero cross-over shall be minimum.

d. Output Voltage Amplitude Adjustment.

INITIAL SETUP

Test Equipment

Power Supply PP-4763A/GRC.
Oscilloscope AN/USM-281C.
Voltmeter AN/USM-223.
Ammeter ME-489/U.
Variable resistor, 50 ohms, 400 watt.
Toggle Switch, S1

Equipment Conditions

1. Provide access to adjustment point R31 on the control card (para 6-10*b*, fig. 6-2 and 6-3).
2. Connect the equipment as shown in figure 6-4. Apply power and allow to warmup for 5 minutes (minimum).

List Tasks

Task No.	*Task*	*Performance Standard*
1.	Apply power to inverter.	
2.	Adjust variable resistor load for 250 to 300 volt ampere output.	
3.	Observe the output sine wave (A) figure 6-2 on the AN/USM-281C.	The output sine wave shall minimum distortion.
4.	Measure the output voltage on the AN/USM-223.	The output voltage shall measure 115 volts.
5.	Adjust R31 for output voltage of 115 volts.	The output voltage shall measure 115 volts.

6-11. Control Card Bench Alinement Procedure

a. General. This procedure may be used to adjust factory set points R18, R19, R20, and R21.

b. Conditions. Remove the control card (para 6-9).

c. Alinement Procedure.

INITIAL SETUP

Test Equipment

Power Supply PP-3940A/GRC
Oscilloscope AN/USM-281C
Frequency Counter AN/USM-459

Equipment Conditions

1. Connect the equipment as shown in figure 6-5.
2. PP-3940A/GRC connections are to be:
   +20 Vdc to C1 positive lead;
   -20 Vdc to C2 negative lead.
3. Connect ground to control card common ground pin terminals 5, 6, and 7.

List of Tasks

Task No.	*Task*	*Performance Standard*
1.	Connect AN/USM-281C probe to + end of C22 and AN/USM-281C ground to control card common ground.	
	Adjust R18 and R19 for symmetrical sine wave. R18 for positive portion, and R19 for negative portion.	3.0 V p-p (nominal)
	Adjust R21 for proper symmetry.	Symmetrical wave form 60 Hz ±3%
	Adjust R20 for proper frequency on the frequency counter (AN/USM-459).	
2.	Connect AN/USM-281C between junction of R31 and R33 and AN/USM-281C ground to control card common ground.	
	Adjust R16 for operational amplifier balance.	Minimum notch at zero point.
	Adjust R31 voltage trimmer	3.0 V p-p 120 Hz
3.	Connect AN/USM-281C probe to terminal 18 of the control card connector and AN/USM-281C ground to control card common ground.	

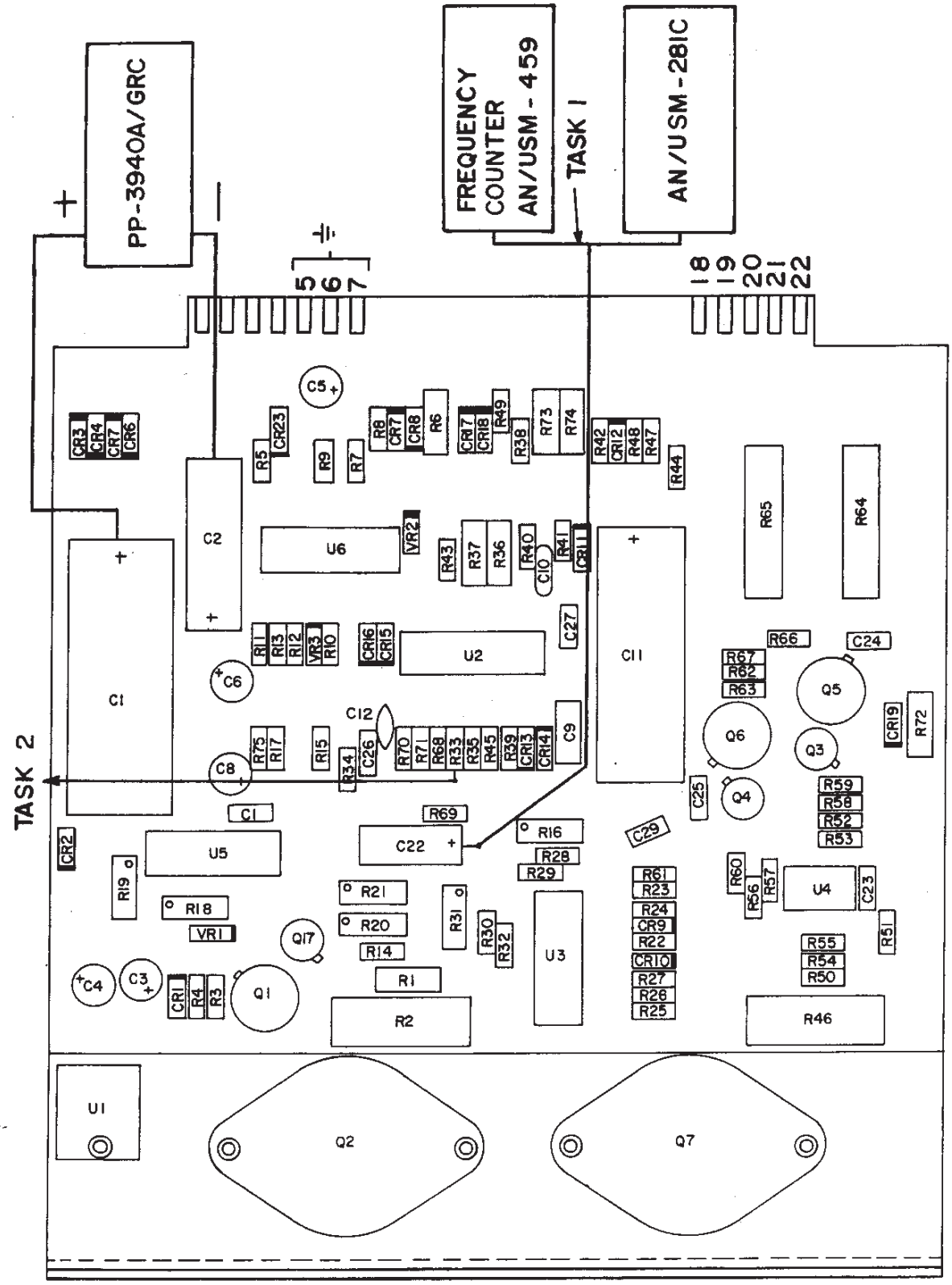


Figure 6-5. Control Card Bench Alinement Setup.

Observe output voltage.	20 V p-p square wave 60 Hz ±3%
4. Connect AN/USM-281C probe to terminal 20 of the control card connector and AN/USM-281C ground to control card common ground.	
Observe output voltage.	20 V p-p square wave 60 Hz ±3%

Section V. DIRECT SUPPORT TEST PROCEDURES

6-12. General

This section provides instructions for direct support personnel to determine the operational readiness of an inverter that has been repaired. These instructions take the form of physical tests and inspections as well as operational tests. The performance standards specified for these must be successfully obtained before a unit can be considered serviceable. The test contained herein are provided in paragraphs 6-13 and 6-14.

6-13. Physical Inspection Chart

INITIAL SETUP

List of Tasks

Task	*Results*
1. Inspect top cover, chassis, heat sinks for damage, missing parts, and condition of paint.	No damage evident or parts missing. External surfaces to be painted not show bare metal. Panel lettering is legible.
NOTE Touchup painting is recommended instead of refinishing whenever practical; screw-heads, binding posts, receptacles, and other plated parts will not be painted or polished with abrasives.	
2. Inspect top cover for loose or missing screws.	All screws are tight; none are missing.
3. Inspect connectors, wiring and heat sinks for looseness or damage.	No loose parts or damage.

6-14. Operational Checks Chart

INITIAL SETUP

Test Equipment

Power Supply PP-4763A/GRC.
Oscilloscope AN/USM-281C.
Voltmeter AN/USM-223.
Ammeter ME-489/U.
Variable resistor, 50 ohms, 400 watt.
Toggle Switch S-1

Equipment Conditions

Connect the equipment as shown in figure 6-4. Apply power and allow to warmup for 5 minutes (minimum).

List of Tasks

Task No. *Task*	*Performance Standard*
1. Apply power to inverter.	
2. Adjust variable resistor load for 250 to 300 volt ampere output.	
3. Observe the output sine wave on the AN/USM-281C	The output sine wave shall have minimum distortion.
4. Measure the output voltage on the AN/USM-223.	The output voltage shall measure 115 V ±10%.

APPENDIX A
REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
SB 11-573	Painting and Preservation of Supplies Available for Field Use for Electronic Command Equipment.
TB 43-0118	Field Instructions for Painting and Preserving Electronic Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM-11-5815-334-12	Operator's and Organizational Maintenance Manual for Radio Teletypewriter Sets AN/GRC-142, AN/GRC-142A (NSN 5815-00-401-9720), AN/GRC-142B (5815-00-443-5511), AN/ GRC-142C (5815-01-100- 6815), AN/GRC-142D (5815- 01-104-7264), AN/GRC- 142E (5815-01-095-6258), AN/GRC-122, AN/GRC- 122A (5815-00-401-9719), AN/GRC-122B 5815-00- 937-5295), AN/GRC-122C (5815-01-095-1211), AN/GRC-122D (5815-01-104- 7264), and AN/GRC-122E (5815-01-095-1212).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 43-0139	Painting Instructions for Field Use.
TM 750-244-2	Procedures for Destruction of Electronics Material to Prevent Enemy Use (Electronics Command).

APPENDIX B
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations for PU-724A/G Inverter. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. Maintenance Functions

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 of an item and comparing those characteristics with prescribed standards.

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. Operation required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), preserve, drain, paint or 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. Aline. To adjust specified variable elements of an item to bring 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, or 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, aline, 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. This function does not include the trial and error replacement of running spare type items such as fuses, lamps or electron tubes.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards 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.

B-3. Explanation of Columns in the Maintenance Allocation Chart (MAC)

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 the purpose of having the group members in the MAC and Repair Parts and Special Tools Lists 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 of complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate 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 operation 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 *Remarks* in section IV which are pertinent to the item opposite the particular code.

B-4. Explanation of Columns in Tool and Test Equipment Requirements

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 of test equipment for the maintenance functions.

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

SECTION II MAINTENANCE ALLOCATION CHART
FOR
INVERTER PU-724A/G

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	INVERTER, POWER PU-724A/G	Inspect		0.1					
		Service		0.1					
		Replace		0.8				9	
		Test		0.5				3,5,9	A
		Test			0.5			1,2,3,5,6,7	B
		Repair		0.1					C
		Repair			2.0			1,2,3,5 thru 8	D
01	CONTROL CARD	Inspect			0.2				
		Test			0.5			1 thru 8	B,E
		Adjust			1.0			1 thru 5,8, 10,11	F,G
		Replace			0.5			8	

APPENDIX C
COMPONENTS OF END ITEM LIST AND BASIC ISSUE ITEMS

SECTION I. INTRODUCTION

C-1. Scope

This appendix lists integral components of and basic issue items for the PU-724A/G to help you inventory items required for safe and efficient operation.

C-2. General

This components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the PU-724A/G and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the PU-724A/G in operation, to operate it, and to perform emergency repair. Although shipped separately packed they must accompany the PU-724A/G during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates figure number of the illustration on which the item is shown.

(2) *Item number.* The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

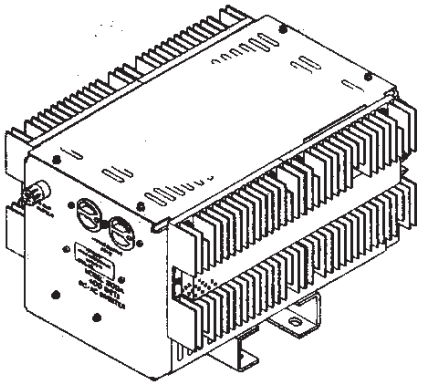
c. Part Number. Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

g. Quantity. This column is left blank for use during an inventory. Under the Revd column, list the quantity you actually receive on your major item. The date columns are for you use when you inventory the major item at a later date; such as for shipment to another site.



SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION (FSCM) AND PART NUMBER / USABLE ON CODE	(4) U/M	(5) QTY REQD
1	6130-01-092-5998	INVERTER (80058) PU-724A/G	EA	1

SECTION III BASIC ISSUE ITEMS

(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION (FSCM) AND PART NUMBER / USABLE ON CODE	(4) U/M	(5) QTY REQD
		No Basic Issue Items Authorized		

APPENDIX E
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. Scope

This appendix lists expendable supplies and materials you will need to maintain the inverter.

E-2. Explanation of Columns

a. Column 1, Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., Use cleaning compound, item 5, app F).

b. Column 2, Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational
F - Direct support
H - General support
L - Specialized Repair Activity

c. Column 3, National Stock Number. This is the NSN assigned to the item; use it to request or requisition the item.

d. Column 4, Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the FSCM in parenthesis, if applicable.

e. Column 5, Unit of Measure. Indicates the measure used in performing the actual maintenance function. The measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in pr, etc.). If the unit of measure differs from the unit of issue, requisition the lowest unit that will satisfy your requirement.

SECTION II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UNIT OF MEAS
1	O	8020-00-262-9084	BRUSH, PAINT, FLAT 1/2-INCH	EA
2	O	8305-00-267-3015	CLOTH, COTTON CHEESECLOTH	ROLL
3	O	6850-00-105-3084	TRICHLOROTRIFLUOROETHANE OT620 (18845)	OZ
4	O	8010-00-582-5318	PRIMER, ZINC CHROMATE	QT
5	O	8010-00-817-1213	ENAMEL, BLACK, LUSTERLESS	PT
6	O	5350-00-186-8854	SANDPAPER, FINE, NO. 0000	SHT

APPENDIX F
REPAIR PARTS LIST

Section I. Introduction

F-1. Scope

This manual lists spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE), and other special support equipment required for performance of organizational and direct support maintenance of the PU-724A/G. It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes.

F-2. General

This Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in numeric sequence, with the parts in each group listed in figure and item number sequence.

b. Section III. Special Tools List. Not applicable.

c. Section IV. National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National stock numbers (NSN) appearing in the listings, followed by a list, in alphameric sequence, of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

F-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration on which the item is shown.

(2) *Item number.* The number used to identify item called out in the illustration.

b. Source, Maintenance, and Recoverability (SMR) Codes.

(1) *Source code.* Source codes indicate the manner of acquiring support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	*Definition*
PA—	Item procured and stocked for anticipated or known usage.
XA—	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.
XB—	Item is not procured or stocked. If not available through salvage, requisition.
XD—	A support item that is not stocked. When required, item will be procured through normal supply channels.

NOTE

Cannibalization or salvage may be used as a source of supply for any items source coded above except those coded XA and aircraft support items as restricted by AR 750-1.

(2) *Maintenance code.* Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code	*Application/Explanation*
F—	Support item is removed, replaced, used at the direct support level.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes:

Code	*Application/Explanation*
L—	Repair restricted to designated specialized repair activity.
Z—	Nonreparable. No repair is authorized.

(3) *Recoverability code.* Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows:

Recoverability codes	*Definition*
Z—	Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.
L—	Reparable item. Repair, condemnation, and disposal not authorized below depot/specialized repair activity level.

c. National Stock Number. Indicates the National

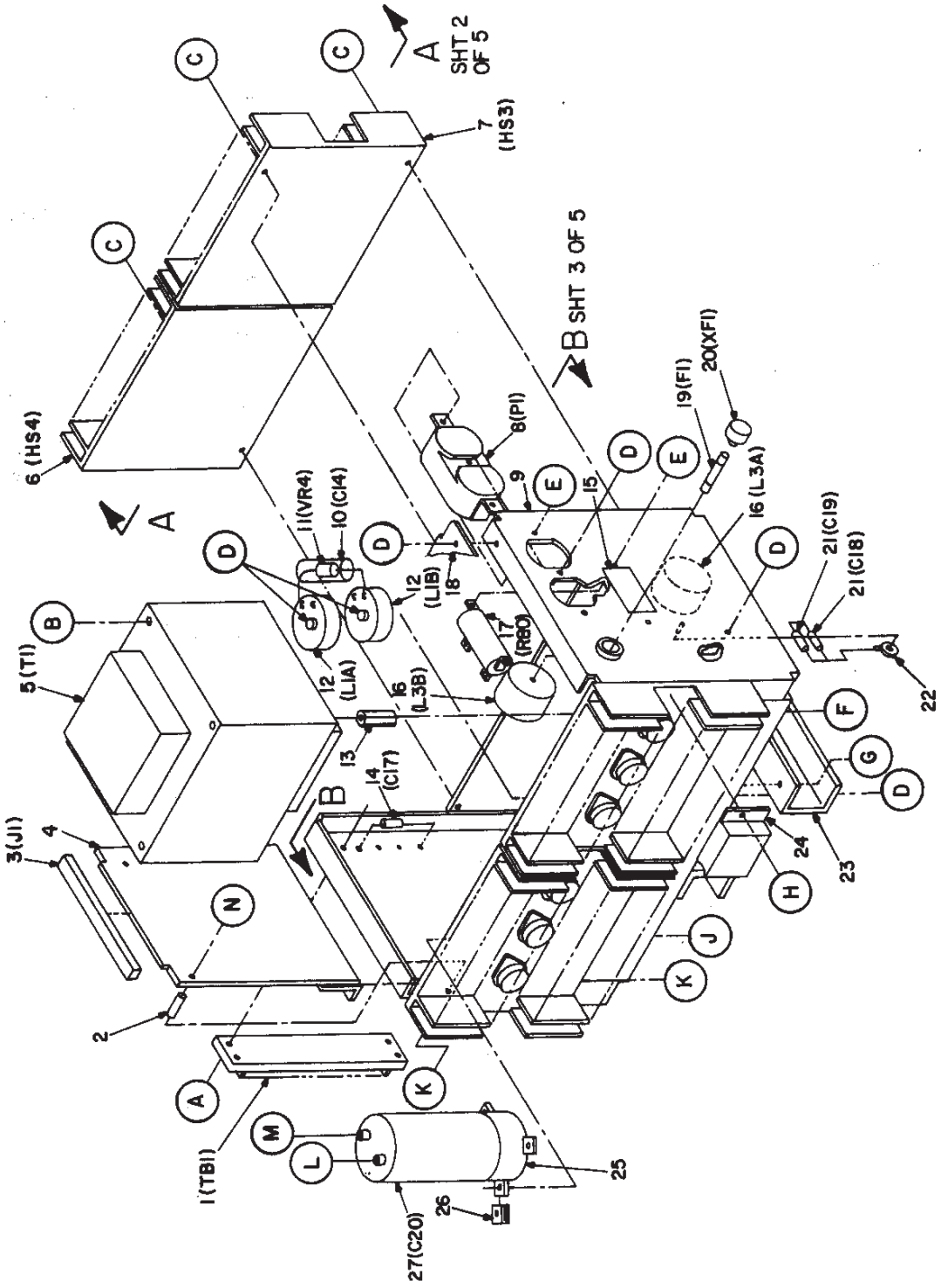
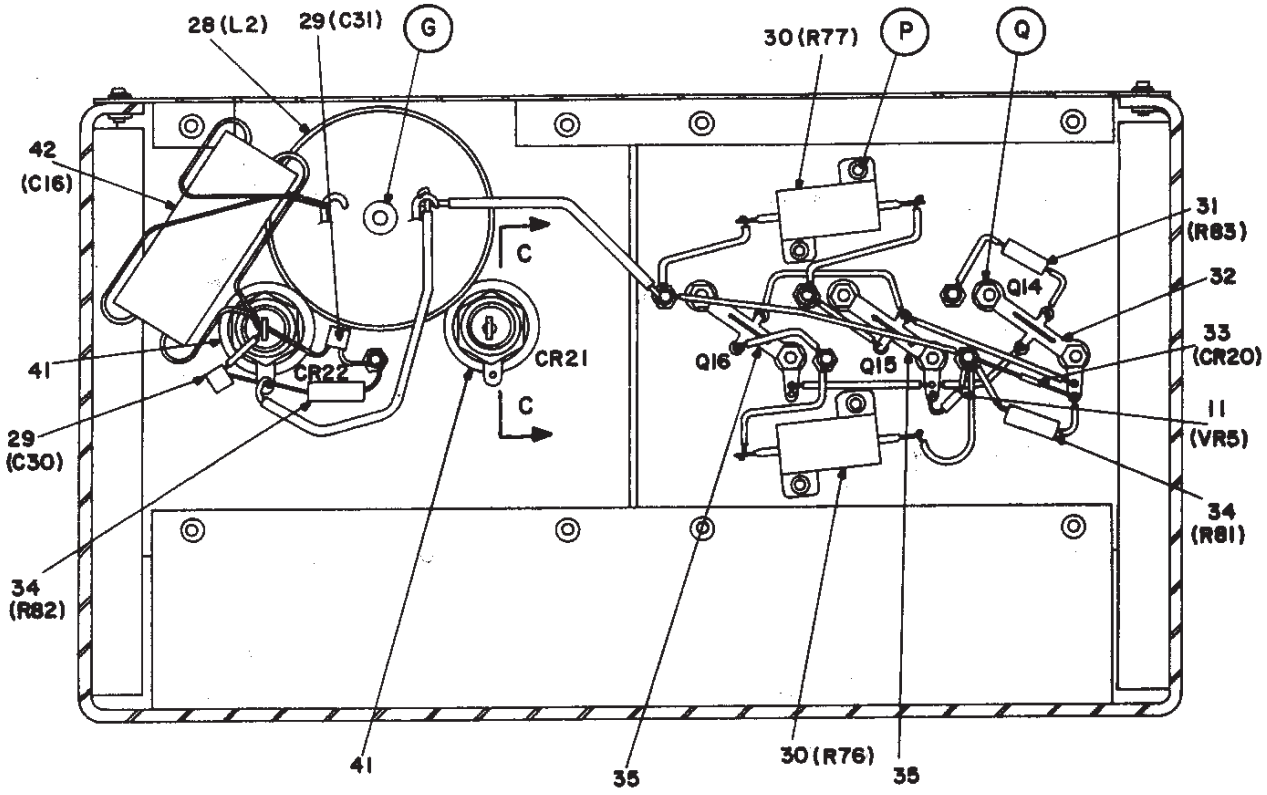
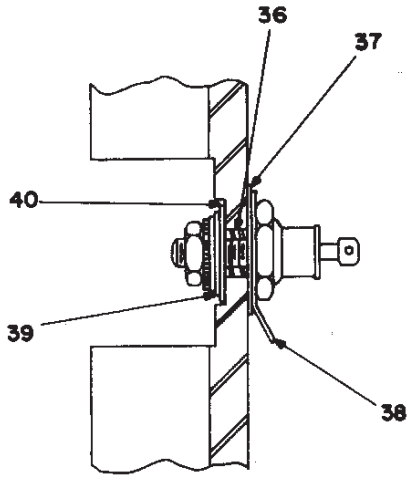


Figure F-1. Inverter, Exploded View (Sheet 1 of 5).



SECTION A-A



SECTION C-C

SEE SHEETS 4 & 5 FOR ENCIRCLED DETAILS.

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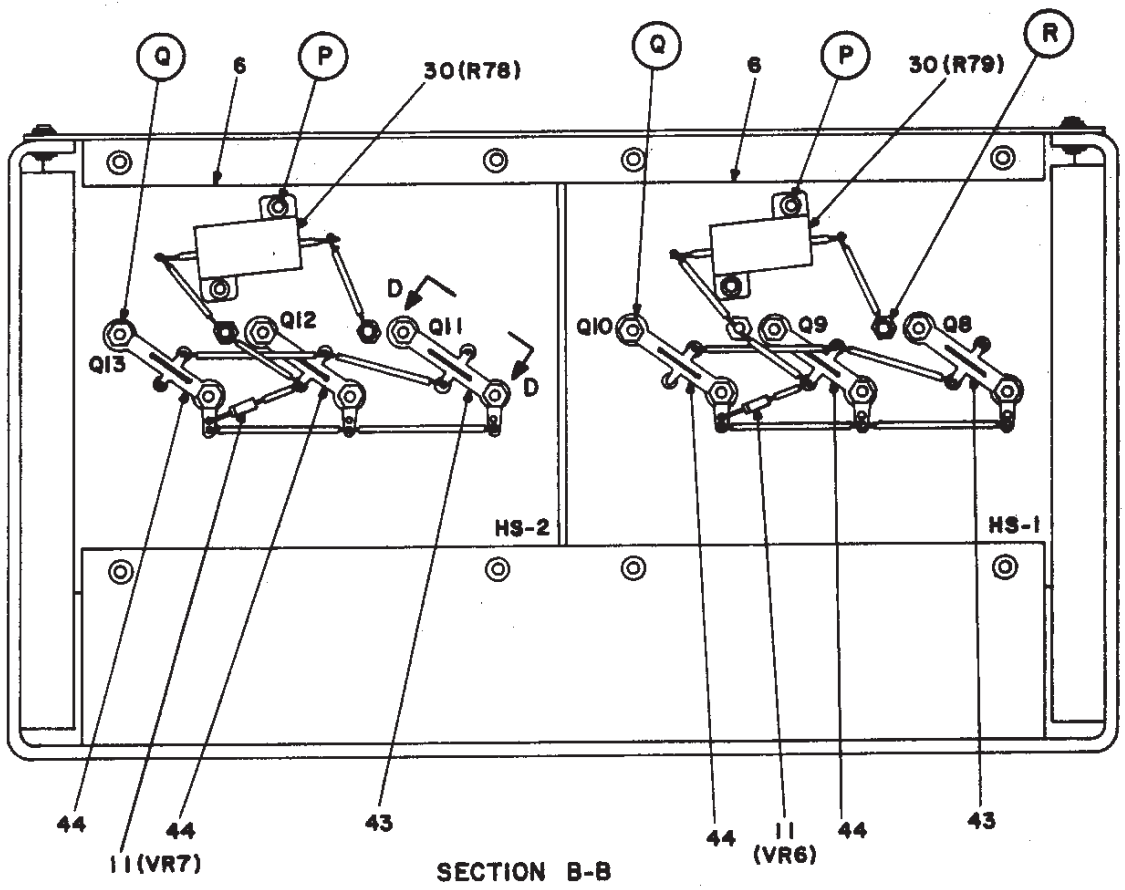
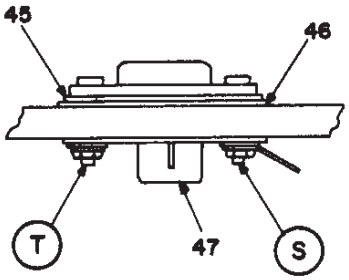
Figure F-1. Inverter, Exploded View (Sheet 2 of 5).



SECTION B-B



SECTION D-D (TYP.)

SEE SHEETS 4 & 5 FOR ENCIRCLED DETAILS.

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Figure F-1. Inverter, Exploded View (Sheet 3 of 5).

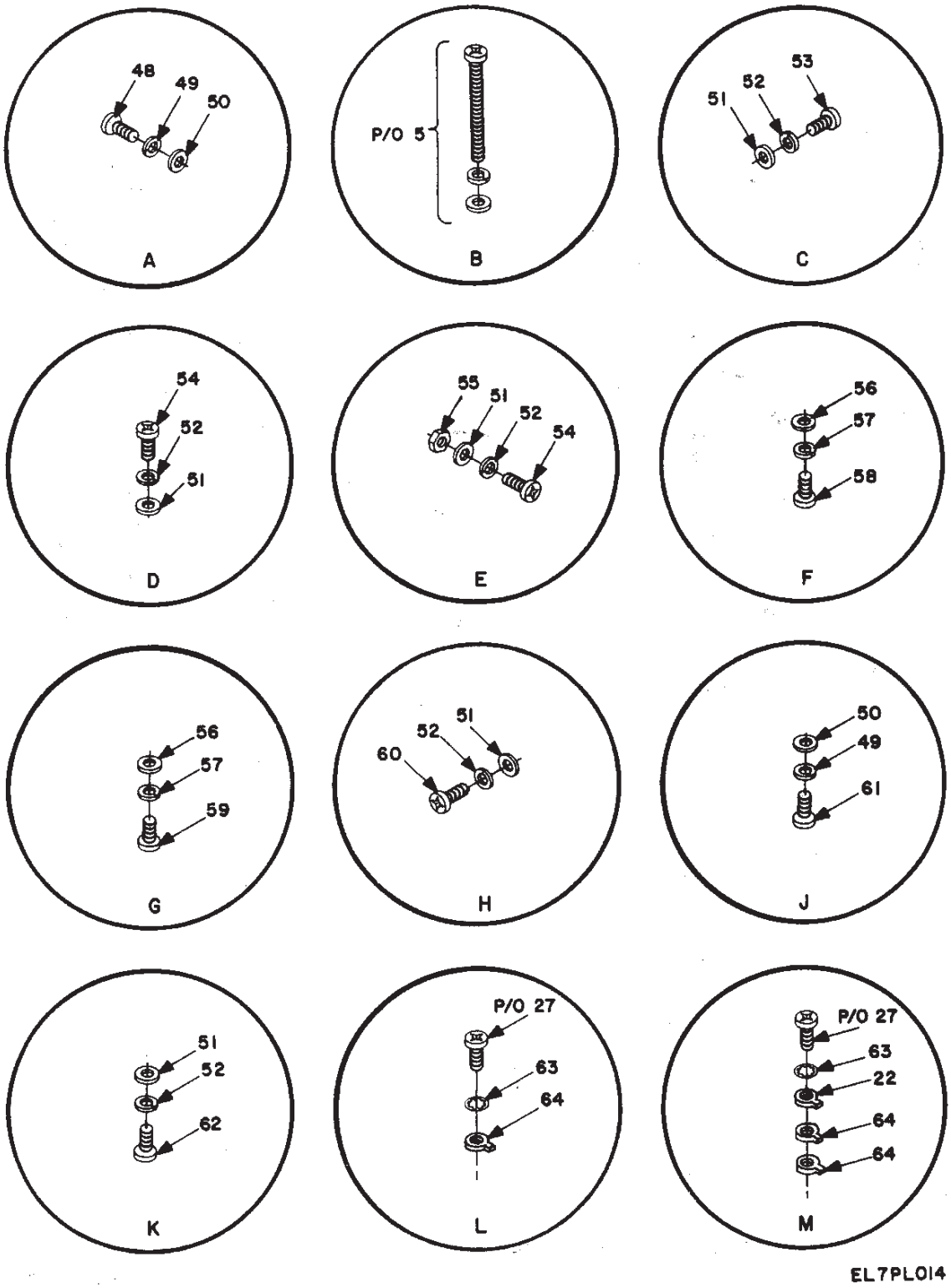

Figure F-1. Inverter, Exploded View (Sheet 4 of 5).

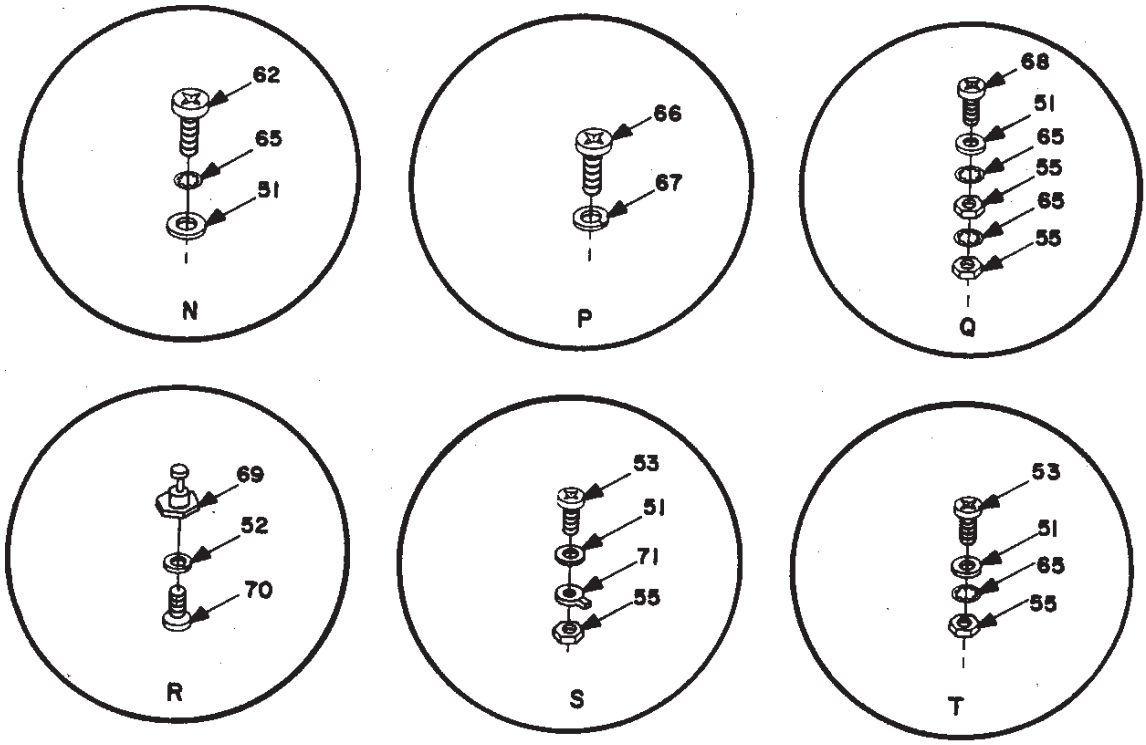

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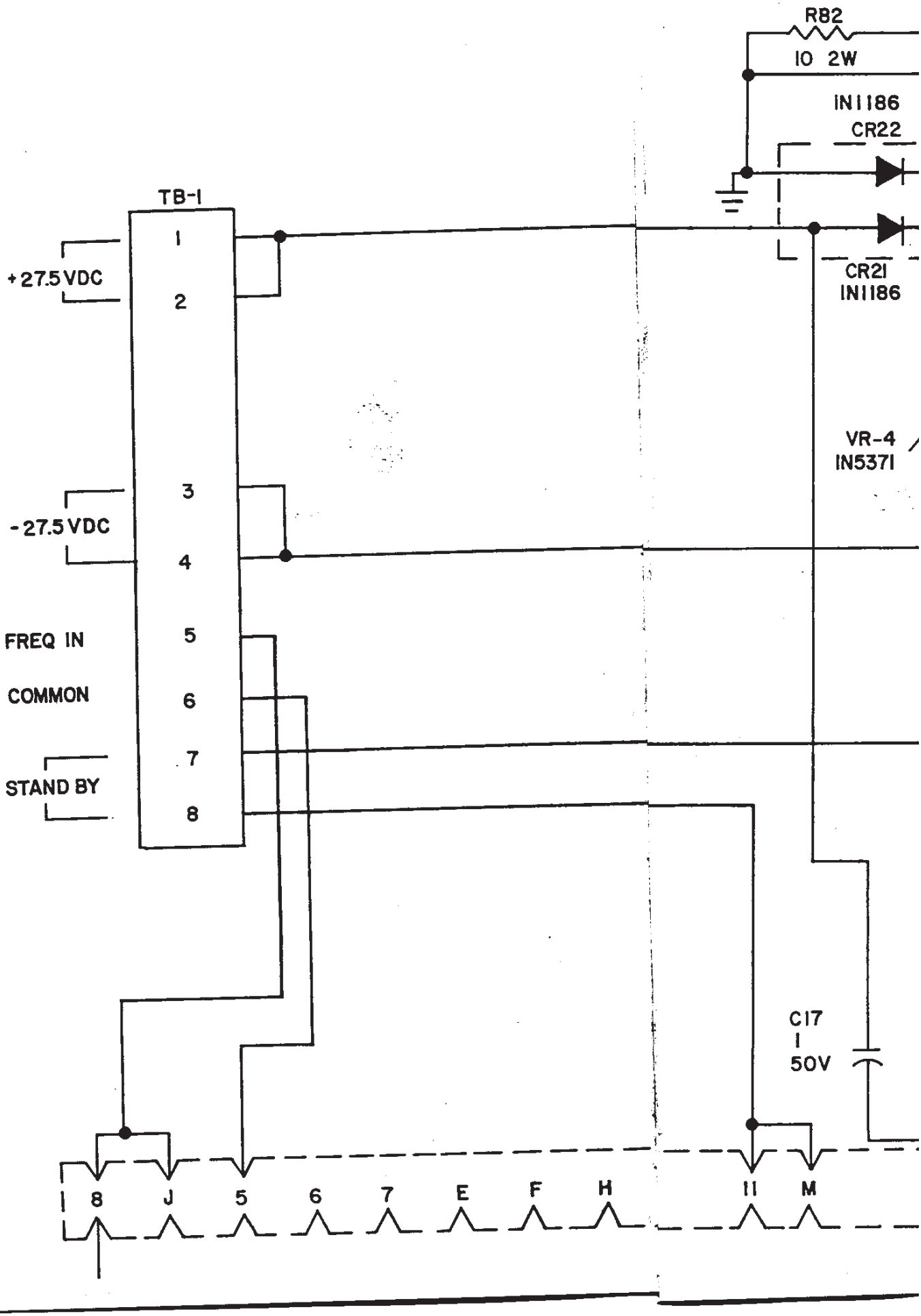
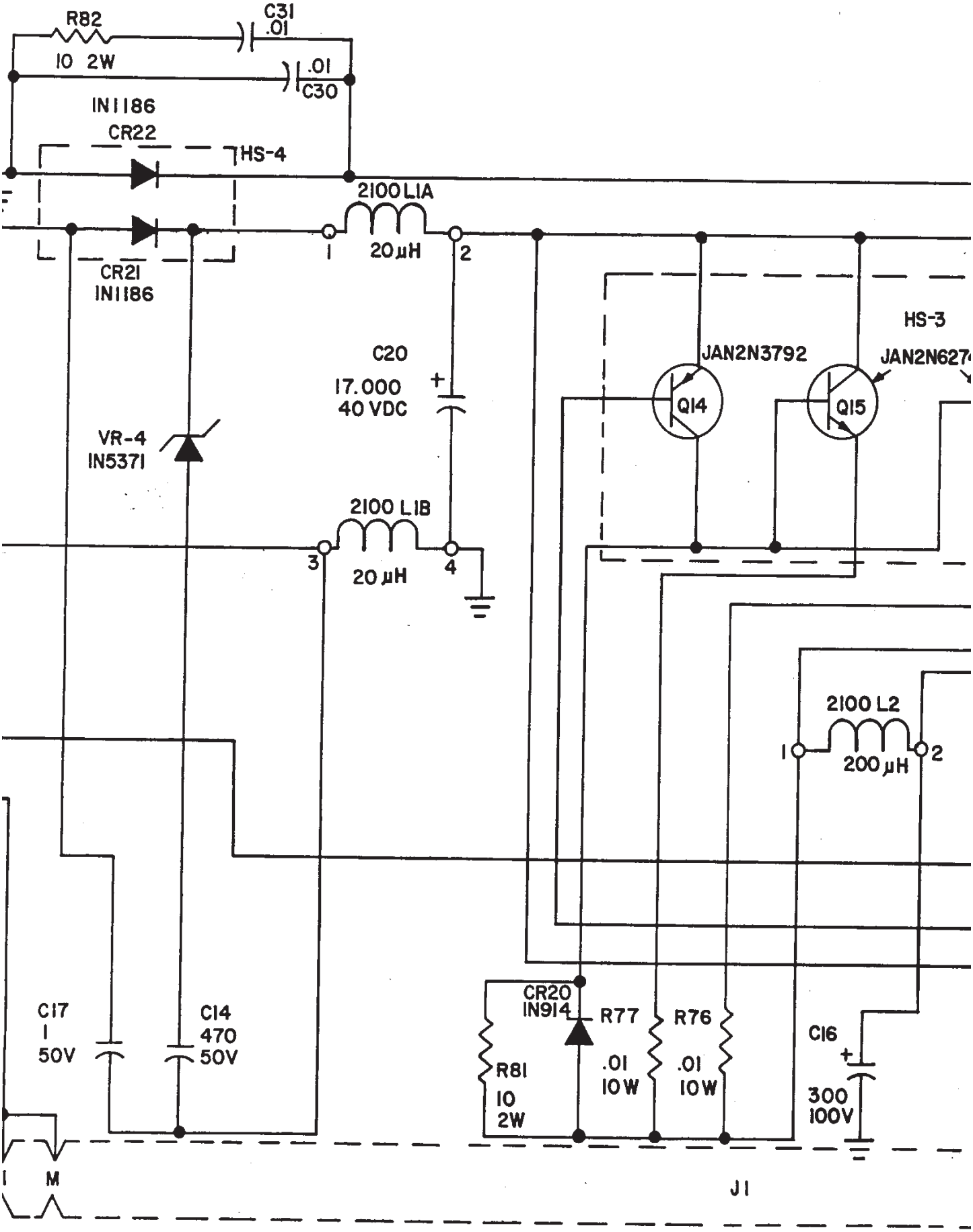
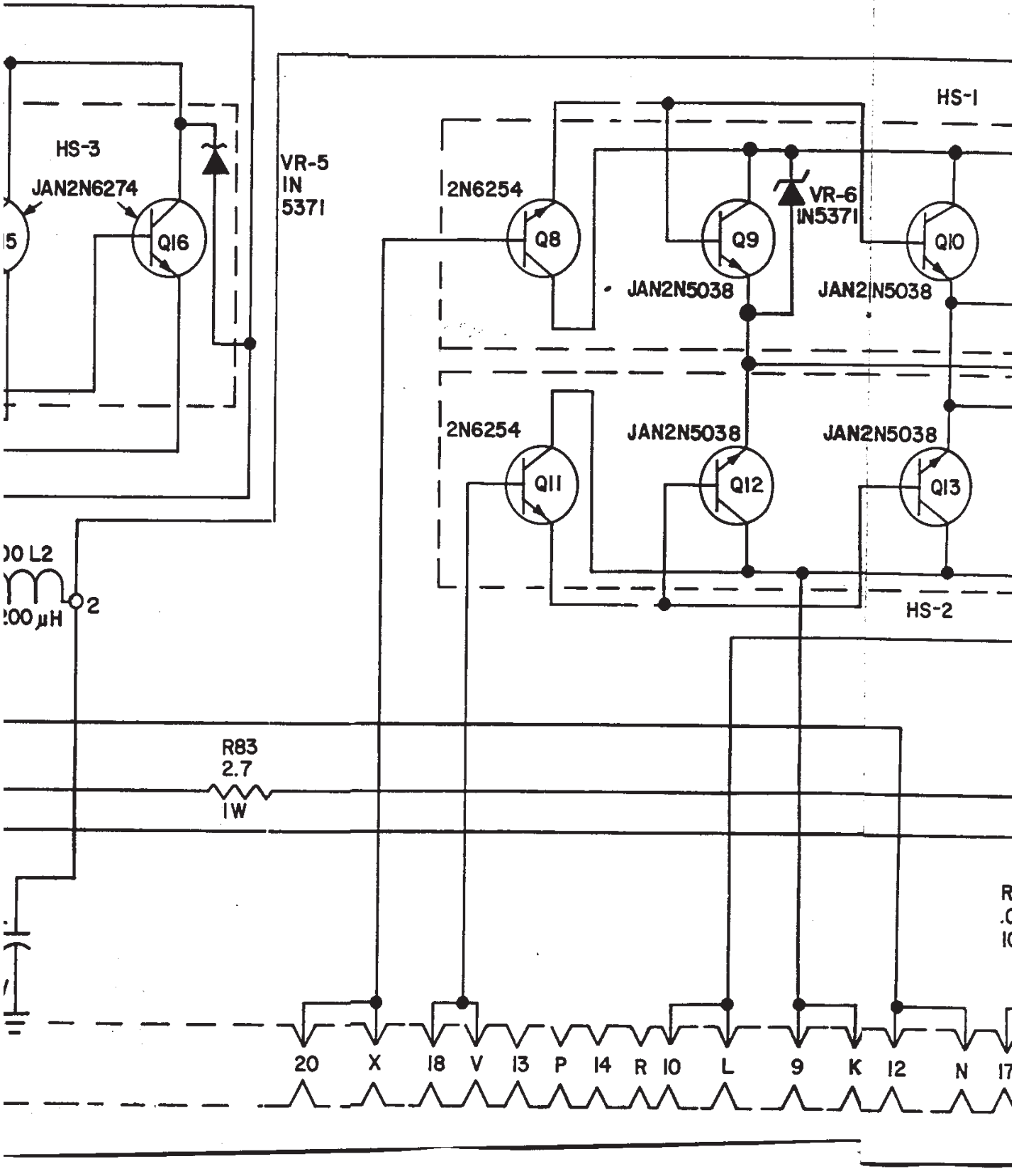
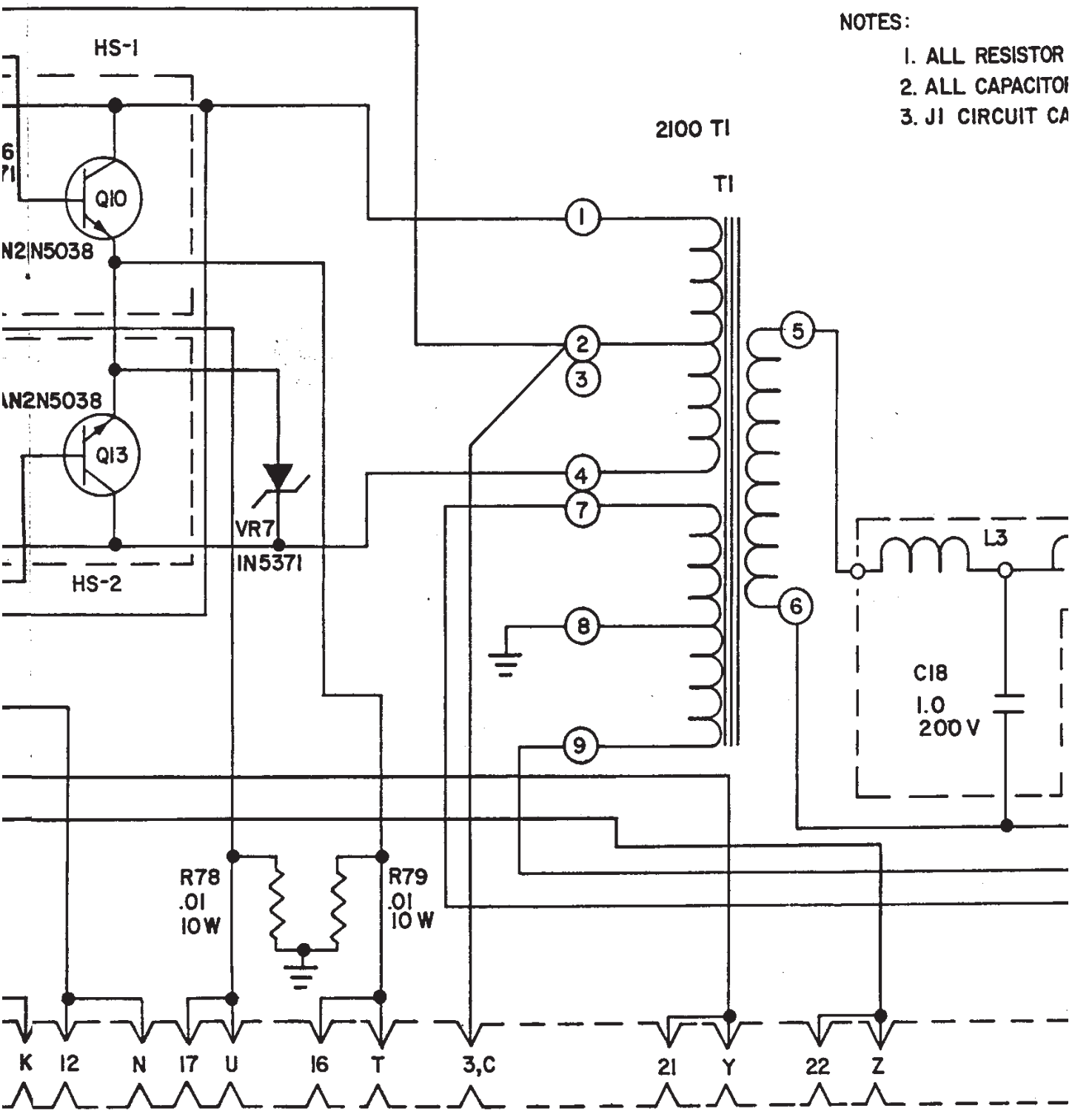
Figure F-1. Inverter, Exploded View (Sheet 5 of 5).

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 00 INVERTER,POWER PU-724/A		
1	1	PAFZZ		21233	21308	TERMINAL STRIP	EA	1
1	2	PAFZZ		83330	8346	POST,ELECTRICAL-MEC	EA	2
1	3	PAFZZ	5935-00-355-4919	81349	M21097/21-163	CONNECTOR,RECEPTACL	EA	1
1	4	PAFZA	5999-01-101-4464	30790	720809	CIRCUIT CARD ASSEMB	EA	1
1	5	PAFZZ		30790	2100T1	TRANSFORMER,POWER	EA	1
1	6	XDFZZ		30790	720806-3	HEATSINK,ELEC EQPT	EA	1
1	7	XDFZZ		30790	720806-2	HEATSINK,ELEC EQPT	EA	3
1	8	PAFZZ	5935-00-795-3129	74545	5262	CONNECTOR,RECEPTACL	EA	1
1	9	XAFZZ		30790	720803	CHASSIS,ELEC EQPT	EA	1
1	10	PAFZZ		50930	CE02-W	CAPACITOR,FXD,ELEC	EA	1
1	11	PAFZZ		81349	JAN1N5371A	DIODE	EA	4
1	12	PAFZZ		30790	2100L1	COIL	EA	2
1	13	PAFZZ		05323	2250-1032-5-2	POST,BINDING,ELECT	EA	4
1	14	PAFZZ		54473	EQCM1H105KZ	CAPACITOR	EA	8
1	15	XBFZZ		30790	720820	NAMEPLATE	EA	1
1	16	PAFZZ		30790	2100L3AB	COIL	EA	1
1	17	PAFZZ	5905-00-280-0992	44655	0206	RESISTOR,FIXED,WIRE	EA	1
1	18	XDFZZ		30790	720802	COVER,TOP	EA	1
1	19	PAFZZ		75915	3AG-4A	FUSE,CARTRIDGE	EA	1
1	20	PAFZZ		75915	3420348	FUSEHOLDER,BLOCK	EA	1
1	21	PAFZZ		50930	V161X472	CAPACITOR,FIXED PA	EA	2
1	22	PAFZZ		96906	MS26036-103	RING,LUG	EA	1
1	23	XDFZZ		30790	720801	FOOT,MOUNTING	EA	2
1	24	XDFZZ		30790	720805	COVER,SIDE	EA	2
1	25	PAFZZ	5910-00-151-7544	90201	VR-8	RETAINER,CAPACITOR	EA	1
1	26	PAFZZ	5310-00-144-4453	96906	MS90724-7	NUT SHEET SPRING	EA	3
1	27	PAFZZ		90201	CGS173U040V4C	CAPACITOR,FIXED,ELE	EA	1
1	28	PAFZZ		30790	2100L2	COIL	EA	1
1	29	PAFZZ	5910-00-124-0659	81349	M39014/01-1575	CAPACITOR,FIXED,CER	EA	2
1	30	PAFZZ		91637	RH-25	RESISTOR,FIXED,WIRE	EA	4
1	31	PAFZZ	5905-00-101-7817	81349	RC32GF2R7J	RESISTOR,FIXED,COMP	EA	1
1	32	PAFZZ	5961-00-136-4162	81349	JAN2N3792	TRANSISTOR	EA	1
1	33	PAFZZ	5961-00-842-9864	81349	JAN1N914	SEMICONDUCTOR DEVIC	EA	1
1	34	PAFZZ	5905-00-153-4356	81349	RCR42G100JS	RESISTOR,FIXED,COMP	EA	2
1	35	PAFZZ		81349	JAN2N6274	TRANSISTOR	EA	2
1	36	PAFZZ		86928	5612-69-100	WASHER,INSULATOR	EA	2
1	37	PAFZZ		06540	3723-07FR-25	INSULATOR,DISC	EA	2
1	38	PAFZZ	5940-00-577-0741	83330	1496	TERMINAL,LUG	EA	2
1	39	PAFZZ		06540	7424	INSULATOR,MICA	EA	2


R82
10 2W
IN1186
CR22
TB-1
1
+27.5VDC
2
CR21
IN1186
VR-4
IN5371
3
-27.5VDC
4
FREQ IN
5
COMMON
6
7
STAND BY
8
C17
1
50V
I
8
J
5
6
7
E
F
H
11
M


R82
10 2W
C31
.01
.01
C30
IN1186
CR22
HS-4
2100 L1A
20 µH
1
2
CR21
IN1186
C20
17.000
40 VDC
+
VR-4
IN5371
2100 L1B
3
20 µH
4
HS-3
JAN2N3792
JAN2N627
Q14
Q15
2100 L2
1
200 µH
2
C17
1
50V
C14
470
50V
CR20
IN914
R77
R76
R81
10
2W
.01
10W
.01
10W
C16
+
300
100V
J1
M


HS-3
JAN2N6274
Q16
VR-5
IN
5371
HS-1
2N6254
Q8
Q9
VR-6
IN5371
Q10
JAN2N5038
JAN2N5038
2N6254
Q11
JAN2N5038
Q12
JAN2N5038
Q13
HS-2
R83
2.7
1W
20
X
18
V
13
P
14
R
10
L
9
K
12
N


NOTES:
1. ALL RESISTOR
2. ALL CAPACITOI
3. J1 CIRCUIT CA
HS-1
2100 T1
T1
Q10
N2N5038
N2N5038
Q13
VR7
IN5371
HS-2
L3
C18
1.0
200 V
R78
.01
10W
R79
.01
10 W
K
12
N
17
U
16
T
3,C
21
Y
22
Z

)TES:

1. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%, UNLESS OTHERWISE NOTED.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE NOTED.
3. J1 CIRCUIT CARD SIDE SCHEMATIC IS PROPRIETARY INFORMATION.

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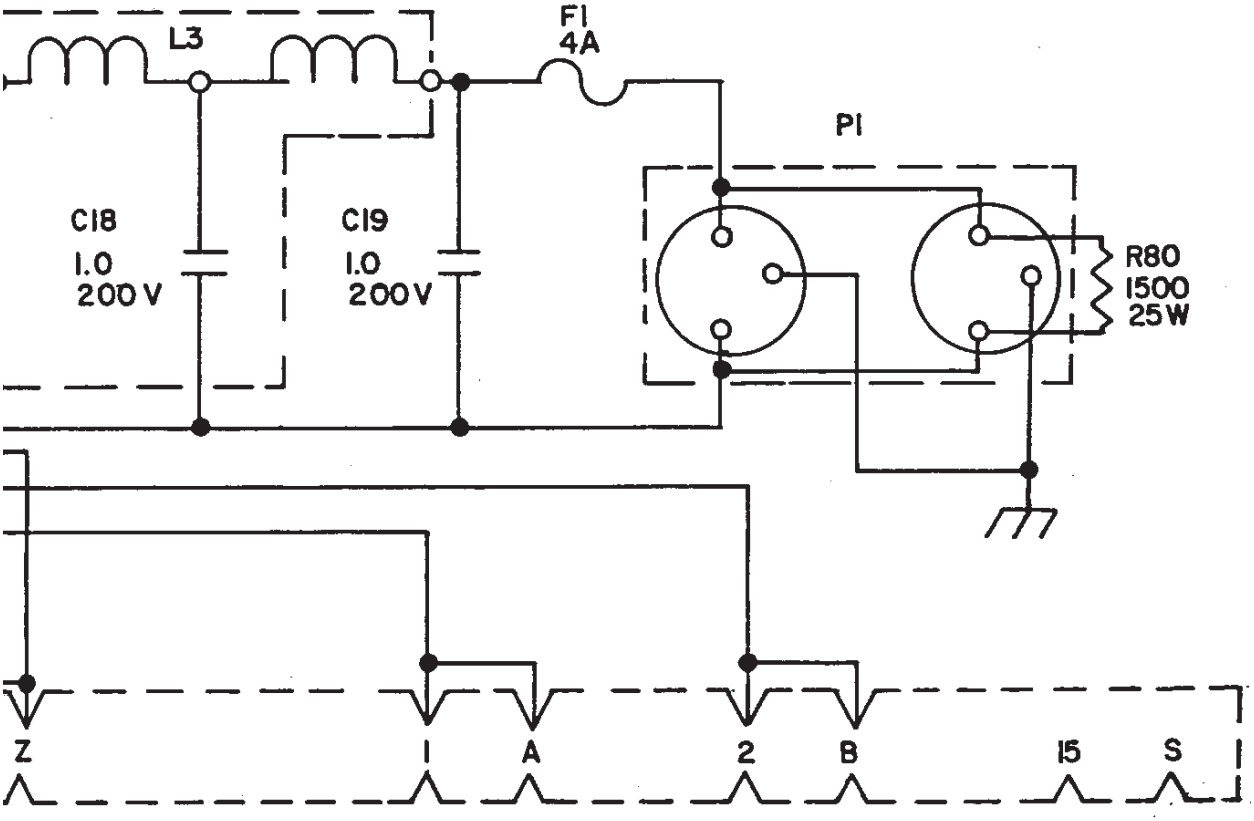

Figure FO-2. Schematic Diagram PU-724A/G