TECHNICAL MANUAL

DIRECT SUPPORT MAINTENANCE MANUAL

STATIC POWER INVERTER PP-7274D/A
(EMP MODEL PS 227-3)
(NSN 6125-00-148-8342)
(SERIAL NO.'S 8044-410-24 and following)

This copy is a reprint which includes current pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY
6 AUGUST 1982

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL
2. IF POSSIBLE , TURN OFF THE ELECTRICAL POWER
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL
4. SEND FOR HELP AS SOON AS POSSIBLE
5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

Change

No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 June 1986

Direct Support Maintenance Manual

STATIC POWER INVERTER PP-7274D/A
(EMP MODEL PS-227-3)
(NSN 6125-00-148-8342)
(SERIAL NUMBERS 8015-369-24 AND FOLLOWING)

TM 11-6125-261-30, 6 August 1982, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.

Remove pages	Insert pages
i and ii	i and ii
3-11 and 3-12	3-11 and 3-12
3-21 and 3-22	3-21 and 3-22
3-31 through 3-32.2	3-31 through 3-32.4
Figure FO-3 (Sheet 2 of 2)	Figure FO-3 (Sheet 2 of 2)
Figure FO-4 (Sheet 2 of 2)	Figure FO-4 (Sheet 2 of 2)
Figure FO-5 (Sheet 2 of 2)	Figure FO-5 (Sheet 2 of 2)

2. File this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM JR.
General, United States Army
Chief of Staff

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Brigadier General, United States Army
The Adjutant General

DISTRIBUTION :

To be distributed in accordance with DA Form 12-36 literature requirements for PP-7274D/A.

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 23 August 1983

DIRECT SUPPORT MAINTENANCE MANUAL
STATIC POWER INVERTER PP-7274D/A
(EMP MODEL PS-227-3)
(NSN 6125-00-148-8342)
(SERIAL NUMBERS 8015-369-24 AND FOLLOWING)

TM 11-6125-261-30, 6 August 1982, is changed as follows:

1. The title of the manual is changed as shown above.

2. New or revised material is indicated by a vertical bar in the margin. Added or revised illustrations are indicated by a vertical bar opposite the figure caption.

3. Remove old pages and insert new pages as follows:

Remove pages	*Insert pages*
i and ii	i, ii, and iii/(iv blank)
1-3	1-3/(1-4 blank)
3-1 and 3-2	3-1 and 3-2/(3-3 blank)
3-9 through 3-12	3-9 through 3-12
3-19 through 3-22	3-19 through 3-22
3-31 and 3-32	3-31 through 3-32.2
3-33 and 3-34	3-33 and 3-34
FO-1 through FO-5	FO-1 through FO-5

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Distribution:
To be distributed in accordance with DA Form 12-31, Direct and General Support Maintenance Requirements for AH-lS Aircraft.

Technical Manual

NO.11-6125-261-30

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 6 August 1982

DIRECT SUPPORT MAINTENANCE MANUAL STATIC POWER INVERTER PP-7274D/A (EMP MODEL PS-227-3) (NSN 6125-00-148-8342) (SERIAL NUMBERS 8015-369-24 AND FOLLOWING)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual directly to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, NJ 07703-5007. A reply will be furnished to you.

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WARNINGS

Dangerous voltages exist in this equipment (115 volts AC). Serious injury or DEATH may result from contact with terminals carrying these voltages. Make sure all switches or circuit breakers supplying power to the PP-7274 (#)/ U are in the "OFF" position before connecting or disconnecting the input or output power cables from the unit or starting any maintenance procedures. Do not attempt internal service or adjustment unless another person capable of rendering first aid and resuscitation is present. Follow the five emergency steps for electric shock.

Personnel performing instructions involving operating procedures and practices which are included or implied in this technical manual shall observe the following precautions. Disregard of these warnings and precautionary information may result in injury death, or an aborted mission.

Adquate ventilation should be provided while using TRICHLOROTRIFLUOROE-THANE. 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 skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

Compressed air shall not be used for cleaning purposes except where reduced to less than 29 pounds per square inch (psi) and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when TRICHLOROTRI-FLUOROETHANE has been used. Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel.

HAZARDOUS VOLTAGES AND HIGH CURRENT

To avoid electrical shock, be extremely careful when making required measurements and adjustments.

CAUTION

The PP-7274D/A is under a two year warranty with the contractor. Check the data plate for the expiration date of the warranty. If the unit is still under warranty, it must be returned to the contractor at the address provided on the data plate. If any seals are broken, the warranty is void.

CHAPTER 1
INTRODUCTION

Section I. General

1-1. Scope

This manual contains the direct support maintenance instructions for the Static Power Inverter PP-7274D/A (EMP Model PS277-3), (inverter. The maintenance allocation chart for the inverter is located in TM 11-1520-236-20.

1-2. Index of Technical Publication

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.

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 (Army).

b. *Report of Packaging and Handling Deficiencies.* Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR-735-1l-2/ DLAR 4140.55/ NAVMATINST 4355.73/ AFR 400-54/ MCO 4430.3E.

c. *Discrepancy in Shipment Report (DISREP) (SF361) as prescribed in AR55-38/NAVSUPINST4610.33B /AFR 75-18/MCO 4610.19/DLAR 4500.15.*

1-4. Reporting Equipment Improvement Recommendations (EIR)

If you Static Power Inverter PP-7274D/ A 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. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report), Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. Well send you a reply.

1-5. Administrative Storage

a. If inverter is to be stored for longer than 3 years, operate inverter for 1 hour before storage (see *b* below). After 3 years in storage, remove inverter from barrier materiel and operate inverter for 1 hour. Inverter may be returned to storage for another 3 years. Inverter can be stored for a maximum of 10 years. After this time, the electrolytic capacitors in the input capacitor bank must be replaced.

b. Install plastic caps on connectors Jl and J2. Position inverter in barrier material (Specification MIL-B-0131). Install two units of desiccant dehydrator (Specification MIL-D-3464) into barrier material and heat seal barrier material.

c. It is desirable that storage temperature not exceed 37° C (127° F). For further information on storage requirements, refer to TM 740-90-1, Administrative Storage.

1-6. 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

1-7. Purpose and Use

Static Power Inverter PP-7274D / A (EMP Model PS277-3) converts a nominal 28 V dc input to 400 Hz, 3 phase 115 V ac output, and is generally intended for use in aircraft.

1-8. Description

The inverter consists of a single electronic equipment package, as shown in figure 1-1. The unit is normally secured in place using four nuts, two on each side. No unit controls are available externally. It maybe operated in any position and within the environmental limits of the design. A DC INPUT connector and an AC OUTPUT connector are provided for power connections. An internally mounted fan provides cooling for the inverter.

1-9. Tabulated Data

Tables 1-1 and 1-2 contain the electrical and physical characteristics of the inverter.

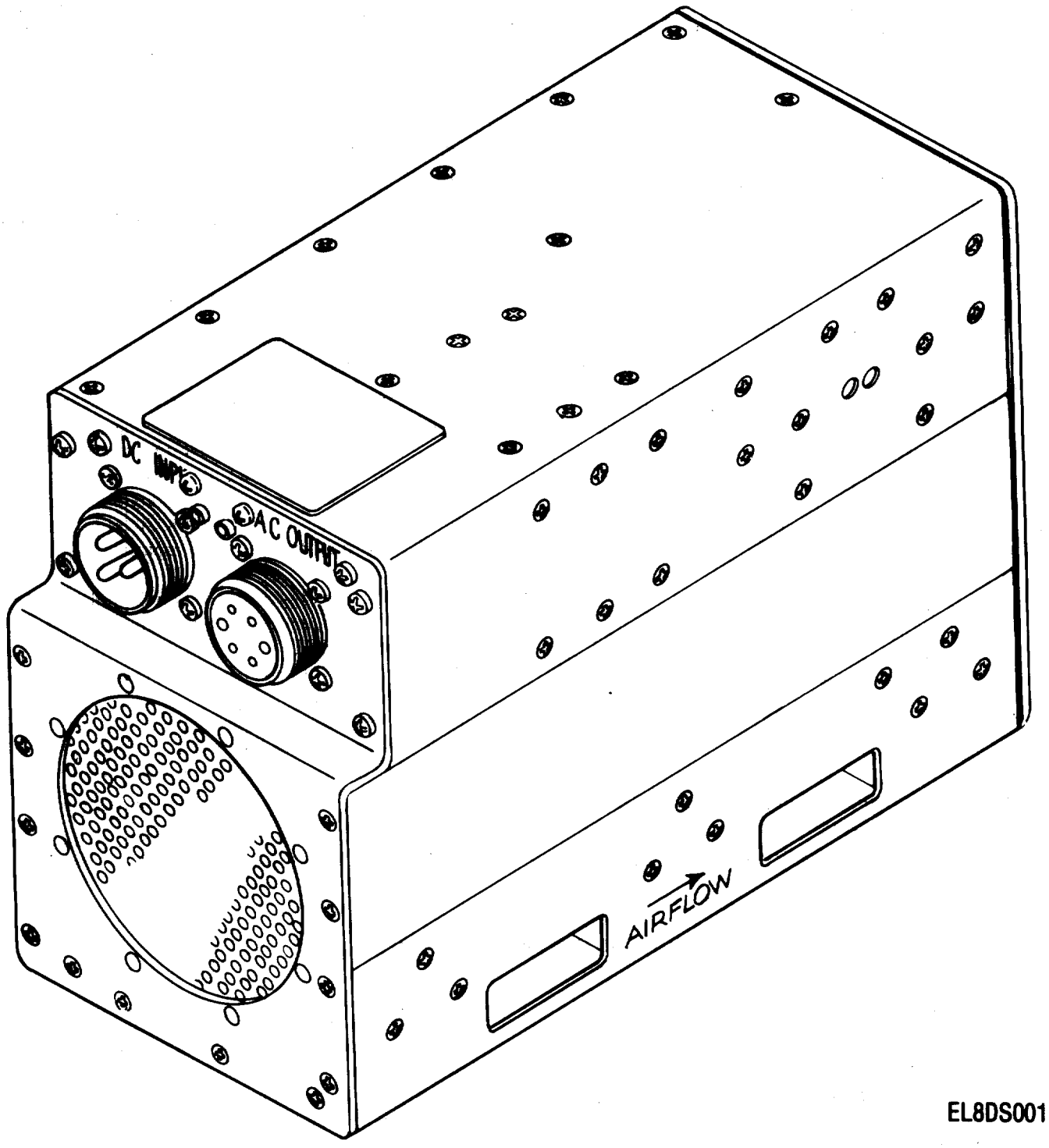


Figure 1-1. Inverter.

Table 1-1. Electrical Charaeteristics

Parameters and conditions	Values
Input voltage	+28 V dc
Input current	41 amp maximum
Output voltage	115 +2.5 true rms
Output power	250 VA at 2.18 amp per phase
Output frequency	400 +7 Hz
Output distortion	5% thd maximum
Efficiency	65% minimum
Load power factor	0.95 capacitive to 0.75 inductive
Overload	50 Vac minimum at 200% rated current for 5 seconds
Short circuit	Internal protection is provided at 250% rated current for 5 seconds minimum into a short circuit, automatic current limiting will then occur after 5 seconds limiting short circuit current to 150% (approximate rated current). Unit will recover automatically (into any rated load) with 2.0 seconds upon removal of short circuit (or overload).
Reduced input voltage	Unit will provide 110-117.5 Vac (at any rated load) with input between 18 and 26 Vdc. Unit will not be damaged with input between 0 and 18 Vdc..
Excessive input voltage	May be operated for 5 minutes maximum. Between 29 and 32 Vdc unit will meet all transient and surge requirements.
Reduced input voltage	Unit will provide 110-l17.5 Vac (at any rated load) with input between 18 and 26 Vdc. Unit will not be damaged with input between 0 and 18 Vdc.
Excessive input voltage	May be operated for 5 minutes maximum. Between 29 and 32 Vdc unit will meet all transient and surge requirements.

Table 1-2. Physical Characteristics

Parameters and conditions	Specifications
Overall dimensions	Height: 8.00 inches maximum Width: 5.50 inches maximum Length: 11:50 inches maximum
Weight	23 pounds maximum
Operating temperature range	-55° C to 85° C (-67° F to 185° F)
Cooling	Internal fan

1- 10. Differences in Equipment Improvements in the Phase Rotation Circuit (oscillator function) were incorporated starting with serial Numbers 8220-841-24 and subsequent. Most of the changes were made in the Printed Circuit Board Assemblies A21 and A22. Some minor change was made in the Main Wiring Harness. All differences and equipments affected are identified in this manual.

CHAPTER 2
FUNCTIONING OF EQUIPMENT

Section I. BASIC OPERATION

2-1. Overall Functional Description

a. As an aid in understanding the operation of the inverter described in this chapter, refer to the detailed block diagram, figure FO-1. schematics, FO-2 through FO-5. and waveforms. figure 3-1.

NOTE

Circuit function titles can be used to cross reference the block diagram, schematics, and theory description.

b. The operation of the inverter is demonstrated by reviewing the block diagram (fig. FO-1) and referring to the waveform illustrations (fig. 3-1) referenced on the block diagram. The inverter in its simplest form is demonstrated by referring to the pulser, the integrator, the inverter switches, and the main transformer. The 28 V dc input is changed to a pulse controlled current source (pulser) which is fed through the integrator to the primary center tap of the main transformer. The end taps of the transformer primary are alternately switched to ground at a 400 hertz rate by the inverter switches. A 400 hertz sine wave is formed in the tuned secondary of the transformer for output power. This is duplicated for each phase.

2-2. Repetitive Circuits

Since the three phases of the inverter function basically the same way, the detailed functional description discusses primarily phase A. Phase B and phase C are discussed separately only where they differ. In all cases where there is a duplicate function, the reference designators for phase B and phase C follow the reference designator for phase A. The detailed description begins with the input filter and proceeds logically to the output.

Section II. DETAILED FUNCTIONAL DESCRIPTION

2-3. 28 V Dc Filter

The +28 V dc filter has three purposes. The filter prevents external high frequency noise from entering the unit, it prevents internal high frequency noise from leaving the unit, and it serves as a surge current storage bank to compensate for very high current requirements of the inverter. The first two functions are performed by the A44 filter assembly and A3L1 (fig. FO-2). The current storage bank consists of A 13C1 through A 13C17. The filter A44 is a sealed, encapsulated unit.

2-4. +16.5 V Dc Regulator

The regulator is a standard series regulator. Zener diodes A22CR102 and A22CR 103 (fig. FO-3) provide a reference of 18 volts ±0.9 vo1ts. A22Q101 and A22Q102are the series pass transistors. The bias supply output at the emitter of Q102 is + 16.5 volts ±0.9 volts.

2-5. +16.5 *V* Dc Requlator

The +16.5 V dc output serves as the bias voltage for the higher current +16 V dc pass transistor A24Q16 which provides the +16 V dc output at the emitter. This bias supply serves phase B and C circuits.

2-6. Oscillator Control

The oscillator control, transistor A22Q104 (fig. FO-2) (OB-A21Q110, 0C-A21Q10) is also a series regulator. However the bias is provided by the Vout error detector (para. 2-7). The oscillator control provides the supply voltage for the oscillator at its emitter. The output will vary from about 8 V dc to about 14 V dc.

2-7. Vout Voltage Divider and Error Detector

a The output voltage feedback is first applied to a voltage divider A24R29 and A24R31 (fig. FO2) for phase A. The feedback output is reduced to approximately 55 V ac. This voltage is then rectified, filtered and reduced by an additional voltage divider. The Vout feedback is applied to the error detector transistor A22Q103 (fig. FO-3). Since the emitter bias of QI03 is determined by a 6.2 V zener diode, A22CR104, the transistor will not turn on until the feedback signal exceeds 6-8 V (6.2 V ±0.6 V for Q103 emitter-base junction). The voltage at the collector is the bias for the oscillator control. A22CR104 provides the reference voltage for all three phases.

b. Phase B and phase C operated slightly different. Phase B feedback is applied through stepdown transformer A24T5 (fig. FO-2). Phase C feedback is applied through stepdown transformer A24T6. The reduced signals are then fed through A24U28, a temperature compensation module. Duplicate circuit action resumes at this point.

c. As the feedback voltage increases, the voltage at the collector of A22Q103 (fig. FO-3) decreases, and the voltage at the emitter of Ql04 (oscillator supply voltage) also decreases. Potentiometer A22R109(OB-A21RI101, OC-A21R1) controls the feedback signal until the point of output voltage regulation is reached.

2-8. Oscillator

a. The oscillator consists of a tank circuit, high gain amplifier and a capacitor feedback. Transistor A22Q105 (fig. FO-3) (OB-A21Q104 (fig. FO.-4, OC-A21Q4) (fig. FO-5) drives the tank circuit which is made up of A22L101, (OB-A21L1), A22C106, (OB-A21C105, OC-A21C5), and A22C104, (OB-A21C106, (OC-A21C6). To complete the oscillator circuit, A22C103 provides the required feedback to the base of the oscillator amplifier. The oscillator frequency (400 Hz ±0.5 Hz) is determined by the values of L101 with C106 and C104 in parallel. To change the frequency of the oscillator, capacitor C 104 maybe changed. An increase of 0.01 microfarads will produce a frequency decrease of approximately 3 hertz.

b. The oscillator has three functions. It is the reference sine wave, the 400 hertz switch signal, and the inverter regulating signal. As the reference sine wave, the oscillator signal must have less than 2 percent harmonic distortion. After amplification, the output must match this signal. The inverter can not meet the requirements if this signal has greater than 2 percent harmonic distortion. Regulation is determined by the peak to peak value of the signal. The AC error detector and the oscillator control circuits make the peak voltage increase or decrease in response to the output voltage through control of the error detector and oscillator control.

2-9. **Phase Locking**

a. The correct phase relationship and phase rotation for the three phase operation is established in the three oscillator circuits. The positive zero voltage crossing of phase B lags behind the positive zero voltage crossing of phase A by 120º or one third of a cycle. Similarly, phase C positive zero voltage crossing lags behind phase A positive zero voltage crossing by 240° or two thirds of one cycle.

b. The oscillator coils each have a secondary winding. These are connected in delta with phase B and phase C secondaries each having one end grounded. Phase A is the predominant phase. The three secondaries form a single winding. there is a 180° difference from ground through all three windings and back to ground. At the one third points, the difference is only 60° from the ends. But if phase A is the reference, add 60° and 180° (or invert the signal) ther difference is 240°, which is needed for phase C. For phase B the phase signal precedes phase A by 60°. The result is minus 60° plus 180° which equal 120°. The inversion of 180° takes place on phase Bat the halfwave rectifier. The inversion for phase C takes place by reversing the drive at the interstage transformers.

2-10. **Half and Full Wave Rectifiers**

At the output of the oscillator, two rectifiers split the signal for different purposes. A22CR105 (fig. FO-3) (0B-A21CR108, (fig. FO-4), OC-A21CR8) fig. FO-5) provides a positive going half wave rectified signal to the 400 hertz switching amplifier. A22CR 106 and A22CR107 (0B-A21CR104, A21CR106, 0C-A21CR4, A21CR6) provide a negative going full wave rectified signal to the pulser drive. The 400 hertz switching is discussed first followed by the pulser drive.

2-11.400 Hertz Switching Amplifier

A22Q106 (0B-A21Q107, 0C-A21Q7) amplifies the Signal from the half wave retifier with A22Q107(OB-A21Q106, OC-A21Q6) being used as a paraphase amplifier. Signals are taken from both the collector and emitter in a paraphase amplifier because they switch exactly opposite to each other. The two opposing signals then drive A22Q110 and Ql11 (0B-A2IQ105 and A21Q109, 0C-A21Q5 and A21Q9).

2-12. Complementary Switch

Q110 and Ql11 work together as a complementary switch. If Q110 is turned "ON", Q1ll must be turned "OFF" and vice versa. This situation will continue through two stages of amplification. In all cases if one half of the switch is **"ON"** the other half must be OFF.

2-13. Inverter Switch Drive Transformer

a. Each pair of complimentary switches drives one inverter switch transformer. A22Q110 and A22Q111 drive A2T3 for phase A. A2IQ105 and A21Q109 drive A2T2 for phase B. A21Q5 and A21Q9 drive A2T4 for phase C.

b. The interstage transformer has three centertapped windings. The primary winding (pins 1 and 3) is driven by the complementary switch. Pin 2 is tied to the + 16V dc. Secondary N1 provides the base drive for the main power switch transistors. The power switch current will vary with, the load but the complementary switch drive cannot compensate for this. Since the base current must increase if the switched current increases, the emitter is tied to ground through. secondary N2. An increase in switched current will assist in boosting the base current to the necessary level. The inverter current sense is taken from the center top of the base drive winding.

2-14. Inverter Switches

Due to the very high currents which must be switched, six transistors are used for each phase. Phase A used A2Q20, Q21 and Q22 and A2Q29, Q30 and Q31. Phase B used A2Q17, Q18, and Q19and A2Q26, Q27, Q28. Phase C uses A2Q23, Q24 and Q25 and A2Q32 Q33 and Q34. Each inverter switch drive transformer drives six transistors. For . each phase, three transistors will be "ON" and three transistors will be "OFF". A low value resistor in each base drive circuit assists in stabilizing the base drive current. A2CR 10 through CR15 provide a clamp against negative voltage spikes. As the transistors are switched (three — ON, three -OFF), the ends of the main transformer primary windings A3T1 are alternately grounded. Any current being applied to the center tap of the transformer must switch back and forth to whichever end is grounded.

2-15. **Pulser Circuit**

The pulser section controls the current being applied to the main transformer center tap. Paragraphs 2-16 through 2-20 describe the pulser operation.

2-16. Summing Network

Two resistors form a current summing network. One side is fed by the negative going full wave rectified sine wave. The other side of the network is fed by a positive going full wave rectified signal which is fed back from the center tap of the main transformer A3T1. The two resistors A22R113 and A22R114 (0B-A21R104 and A 21R112, 0C-A21R4 and A21R12) are selected so that the result of the two opposing signals is close to zero at their junction. Since both signals are continously changing, this is not true and some changes to the signal can be seen. The negative going input to the summing network is the reference signal. The positive going signal is the feedback of what is actually being fed to the main transformer. The desired result is for the pulser section (which the junction signal controls) to approximate the reference signal as closely as possible.

2-17. Schmidt Trigger

The difference signal from the summing network is fed to the base of A22Q108 (0B-A21Q103, 0C-A21Q3). Since the emitter of Q108 is near ground, the difference signal will be biased approximately 0.7 volts signal. If the pulser feedback is greater than the reference, the signal at the base of Q108 is biased more positive and turns Q108 "ON". If the pulser feedback is less than the reference, the signal at the base of Q108 is more negative and Q108 turns "OFF". Q108 drives A22Q109 (0B-A21Q102, 0C-A21Q2) in the standard common emitter ciruit. The signal at the collector of Q109 is the inverse of the signal of Q108.

2-18. Pulser Switch Amplifier

a. The signal from the schmidt trigger is further amplified before being applied to the pulser switches. Like the inverter switches, the pulser switches are divided into three identical sections. Transistors A1Q13, Q14, and Q15 receive the signal from the three schmidt triggers. Phase A drives A1Q14, phase B drives A1Q13, and phase C drive A1Q14. They boost the switching signal current to drive transistors A1Q1 through A1Q12. In each phase, the first transistor in a complementary darlington circuit. This is necessary to insure that the switching signal generated by the Schmidt trigger has been boosted sufficiently to drive the very high power transistor switches.

b. The pulser switching is responsible for controlling the current being applied to the center taps of the main transformer A3T1. In operation, the switches are turned "ON" and "OFF" at approximately a 40 kilohertz rate. This switching changes as the load increases or decreases. When the inverter is operating with a very small load on the output, only 4 or 5 pulses per half cycle are necessary to maintain the output at the proper voltage. As the load requirement increases, the pulser will increase the number of pulses per half cycle to supply the increased current requirement.

2-19. Pulse Integrator

The pulse integrator shapes the current from the pulser. Each power switch transistor in the pulser is tied to an inductor A1L2-L10 and a capacitance A28C18, C 19, A28C20, C21, A28C22, C23 with resistors A28R32, R33, and R33 in series to maintain the ESR (effective series resistance). The 40 kilohertz switching rate of the pulser is too fast to feed to the center tap of the main transformer. The transformer needs a current source that is operating at 400 hertz sinusoidal. Since the 28 V dc pulsed current source is positive only, the result is a wave form that is full wave rectified. The inductor and capacitor combine to smooth out the high speed 40 kilohertz signal into the 400 hertz sinusoidal waveform.

2-20. Main Transformer

The positive voltage pulsed current source in transformed by main transformer A3T1 to the alternating current that is desired at the output. The pulsed current source is alternately switched by the inverter switches. The transformer couples the now alternating current to the secondary winding which then puts out the complete sine wave signal. The transformer output receives more filtering before being put out at connector J2. The main transformer is specially designed for 3 phase operation. It includes a tertiary (third) winding to eliminate the third harmonic noise.

2-21. Fan Transformer

Transformer A3T7 taps off a small amount of the output from the main transformer to drive the cooling fan.

2-22. Turning Capacitors

For correct operation, the capacitance must be selected so that the secondary winding and capacitors A27C24 with A8C24A, A27C25 with A8C25A, and A27C26 with A8C26A, form resonant tanks for 400 hertz. This action is a very effective filter for eliminating the harmonic signals that are apart of any oscillator/amplifier. The capacitance required is approximately 10 mfd for each phase. A27C25 and A8C25A are the tuning capacitors for phase B. A27C26 and A27C26A are the tuning capacitors for phase A, and A27C24 and A27C24A are the tuning capacitors for phase C.

2-23. Output RFI Filter

This circuit is the final filter. The series inductors and parallel capacitors in filter A5 have values chosen to eliminate the possibility of any radio frequency energy being on the output power line. This includes RFI which may be emitted by the inverter and RFI being reflected back from external sources.

2-24. Over Current Detector

The overcurrent circuit is designed to protect the inverter when an overload situation occurs. The overcurrent may exist if the unit is simply overloaded (the output is greater than 3.27 amps per phase) or if the unit is completely shorted. The basic sense point for overcurrent of phase A is at resistor A2R26 mounted on A2T3, phase B overcurrent is sensed by A2R25 and phase C overcurrent is sensed by A2R27. This resistor senses the amount of base drive current that is being required by the inverter switches. The voltage at this point is normally about -0.2 volts at full load. As the load increases, this voltage will become more negative.

2-25. **Overcurrent Amplifier**

Transistor A220112 (0B-A21Q101, 0C-A21Q1) serves as the overcurrent-amplifier. Under normal load conditions, resistor A22R124 (0B-A21R108, 0C-A21R8) provides just enough bias current to keep Q112 turned on. The voltage at the collector of Q112 is 0.6 volts. An alternate input occurs through A22CR112 (0B-A21CR102) when the unit goes into an overcurrent mode. A resistor divider consisting of A22R125 (0B-A21R121, 0C-A21R21) and A22R 126(0B-A21R114, 0C-A21R14) determines the trip point. The overcurrent feedback signal is applied to one end of R125. Approximately +16volts is at the other end of the divider. At the junction of the two resistors the voltage is normally slightly above ground (approximately +0.1 volts). This leaves diode CR112 with too low a voltage drop across it to conduct. But when the overcurrent feedbaek goes more negative because of an overload, the voltage at R125/R126 junction also goes more negative. The current through R124 is enough to keep Q112 turned "ON", but if CR112 shunts any current away, Q112 will turn off slightly. As the current sense voltage goes more negative, the junction voltage also goes more negative, the current through CR112 increases and Q112 is turned "OFF" even more.

b. When Q112 is turned "OFF" the voltage at the collector will increase to several volts. This signal will forward bias A22CR108 (ØB-A21CR102 ØC-A21CR3) and cause the transformer input current feedback signal to be too high as it feeds the pulser drive summing network. The pulser drive will then turn off in proportion to the amount of overcurrent. The output voltage will reduce to 50 to 60 V ac when the output current is twice the rated current of 2.18 amps per phase. If the inverter output is shorted, this initial protection will limit the output to approximately 5.45 amps of output current per phase.

2-26. Short Circuit Detector

The inverter is not designed to maintain the initial limit of 5.45 amps per phase. A separate circuit sets up a delay which will reduce the output current after five seconds. The detector for this circuit is transistor A22Q113. The base signal for this circuit is similar to the circuit for Q112. Normally, the transistor is turned "ON". The three overcurrent signals are tied together at the output of the filter and diode OR gate, A24U29. The gate does not have enough voltage drop across it to conduct. When the overcurrent feedback is sufficiently negative (as in a shorted output) the gate is forward biased and Q113 is turned "OFF". The voltage at the collector may now go high.

2-27. Overcurrent Delay Timer

The delay time is determined by the resistor-capacitor combination of A22L130 and A22C109 which work with transistor A22Q115. When Q113 is turned "Off", the voltage at the collector of Q113 will begin to rise as Q115 is set up so that Q115 will turn "ON" when the voltage at the base exceeds approximately 5 volts. When the RC network is charged sufficiently, Q115 will turn "ON". This takes approximately 5 seeonds.

2-28. Timer Amplifier

Transistor A22Q114 is an emitter follower which feeds the control voltage to the overcurrent summing network. The voltage at the emitter will be 0.6 volts below the voltage at the base. The base voltage is normally high (approximately +16.0 volts) but when Q115 turns "ON" the voltage at the base of Q114 goes low and the emitter voltage follows the base. The emitter voltage feeds the overcurrent summing network. With the high end of this network now at +2.0 volts instead of + 16.0 volts, the summing signal is pulled even more negative and swamps the overcurrent amplifier "OFF". The pulser drive is recduced to a safe level of operation that can be maintained by the inverter for several minutes. This fold back is easily detected by observing either the inverter inpur current or the output current. The initial output current of 5.45 amps per phase wil;will reduce to about one half or about 2.7 amps per phase. There is a corresponding reduction in the input current. When the short or overload is removed the conditions discussed in paragraphs 2-25 through 2-28 will reverse themselves automatically and the inverter will resume full output capacity in less than two seconds.

CHAPTER 3
DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

NOTE

The maintenance allocation chart for the inverter is located in TM 11-1520-236-20.

3-1. Voltage and Resistance Measurements

a. Table 3-1 shows the voltage and resistance measurements that can be expected in the inverter. Voltages were measured with no load on the output.

WARNING

Relatively low voltage but high current is present in the inverter.

b. Resistance measurements are shown in the forward and back mode. The resistance on the top indicates the forward resistance and the value on the bottom indicates back resistance.

c. Table 3-2 is across reference between the components for all three phases that have the same function.

d. Figure 3-1, sheets 1 through 6, contain all the significant waveforms required for maintenance. Each waveform is coded to the test points (Al through A20) shown on the block diagram figure FO-1. Also shown is the reference designator of the component or terminal where the measurement is taken.

3-2. Wire List

a. The inverter uses two wire harnesses and one wire assembly. in addition the A1 module uses nine short jumpers of No. 18 bus wire and 18 short jumpers of No. 16 black insulated wire.

b. The 277B2023 wire hamess is composed of No. 16, 20, 22 and 24 gauge wire for control signals. The 277B3300 wire harness is composed of No. 16 guage wire for high current signal connections to the main transformer. The 277C1340 wire assembly is composed of No. 14 gauge red insulted wire for the M28 V dc power bus. All insulted wire is in accordance with MIL-W-16878/1 or MIL-W-16878/4A. The crimp lugs are AMP Products Corp., Valley Forge, PA. 19482, FSCM00779 or equivalent.

c. Table 3-3 contains a to-from wire list for the inverter.

Table 3-1. Voltage end Resistance Measurements

TEST CONDITIONS

A. Voltage measurements

1. Input voltage	+28.0 V dc
2. Output voltage	Adjust to 115.5 V ac f V sc 400 Hz No Load.
3. Voltage listing	Voltages are references to ground.

NOTE

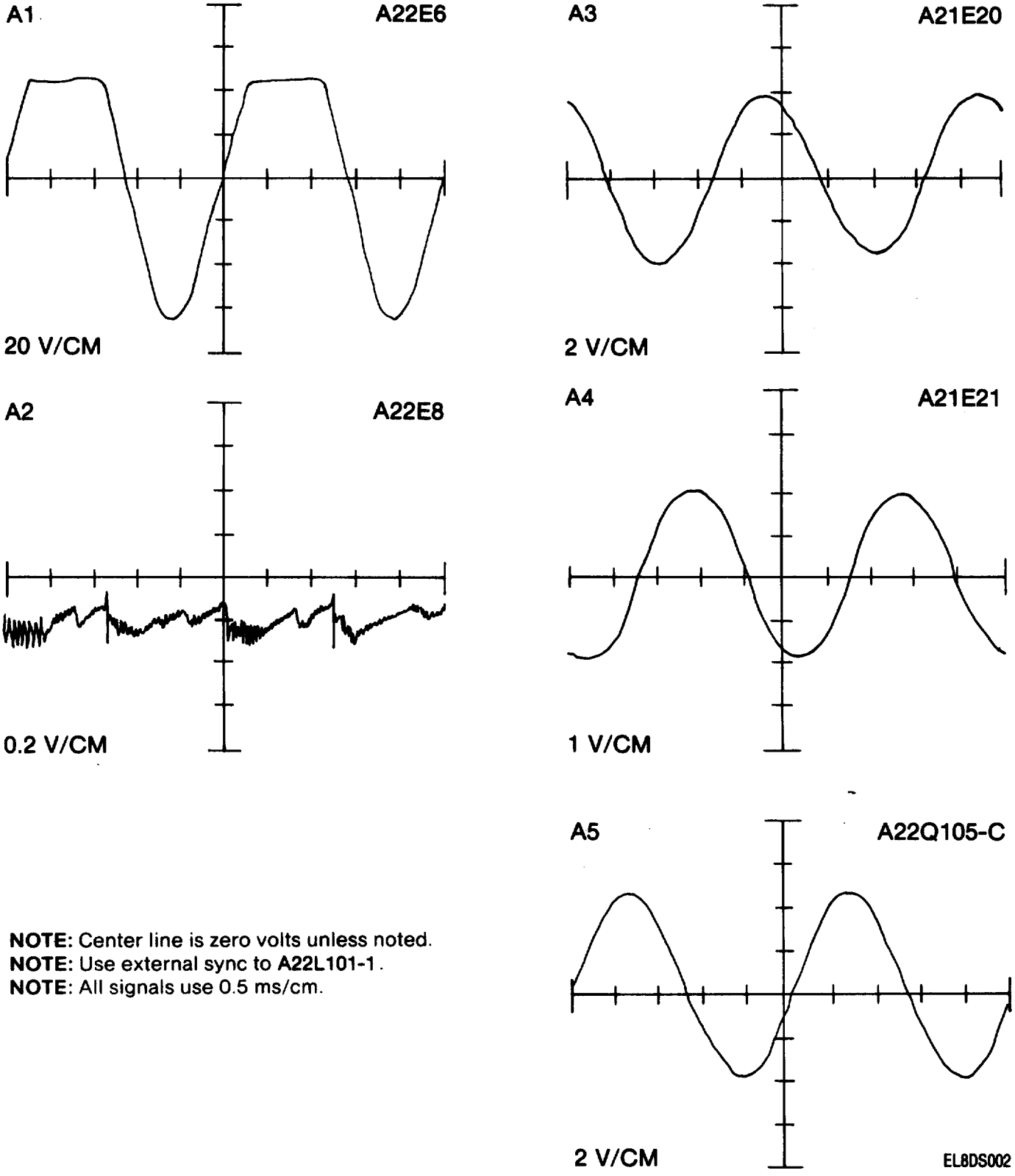
The A-number in the voltage columns indicate the test point reference number of the waveform. Refer to figure 3-1.

. Resistance measurements.

1. Unit OFF and disconrectcd from the +28 V dc source
2. All resistance measurements are ±5%.
3. Remove associated Z elements indicated by *.
4. Resistance measurements were made with a standard 20,000 ohm/volt VOM on the Xl scale.
5. The transistor type is noted below the referenced designation. All transistors and diodes are silicon types
6. This table shows the transistors, for OA only. Refer to table 3-2 for equivalent ±B and ±C transistors.
7. **Top number in** Resistance column indicates forward resistance, bottom, backwards **resistance.**

Table 3-1. Voltage and Resistance Measurements

Reference Designation	Voltage Waveform			Resistance	
	E	B	C	C-B	E-B
AA 1Q6 thru 8* (NPN)	A10, sh3		28vdc	3 20K	3 20K
A1Q14 (PNP)	28 V dc	A9, sh 2	A10, sh 3	50 15K	50 200
A22Q101 (NPN)	19 V dc	19.7 V dc	28 V dc	7 2K	7 6K
A22Q102 (NPN)	17 V dc	17.7 V dc	28 V dc	5 3K	5 5K
A22Q103 (NPN)	6.2 V dc	6.9 V dc	10 V dc	6 2K	6 6K
A22Q104 (NPN)	9.3 V dc	10 V dc	17 V dc	7 5K	7 15K
A22Q105 (PNP)		—	A5, sh 1	100K 7	100K 7
A22Q106 (NPN)	0.0 V	—	—	7 100K	7 100k
A22Q107 (NPN)	A12, sh 3	-	All, sh 3	7 7K	7 7K
A22Q108 (NPN)	0.0 V	A8. sh 2	—	7 8K	7 3.5K
A22Q109 (NPN)	0.0 V	—	A9, sh 2	7 6K	7 3K
A22Q110 (NPN)		Al1, sh 3	A13, sh 3	5 00	5 16
A22Q111 (NPN)		A12, sh 3	A14, sh 3	5 00	5 40
A22Q112 (NPN)	0.0 V	0.7 V dc	0.0 V	7 3K	7 3K
A22Q113 (NPN)	0.0 V	0.7 V dc	0.0 V	7 100K	7 100K
A22Q114 (NPN)	15 V dc	15.7 V dc	17 V dc	7 4K	7 9K
A22Q115 (NPN)	2.7 V dc	0.0 V	15.7 V dc	7 30K	7 30K
A22Q116 (NPN)	16.5 V dc	17 V dc	28 V dc	4 1OK	4 8K



NOTE: Center line is zero volts unless noted.
NOTE: Use external sync to **A22L101-1**.
NOTE: All signals use 0.5 ms/cm.

Figure 3-11. Waveforms (sheet 1 of 6).

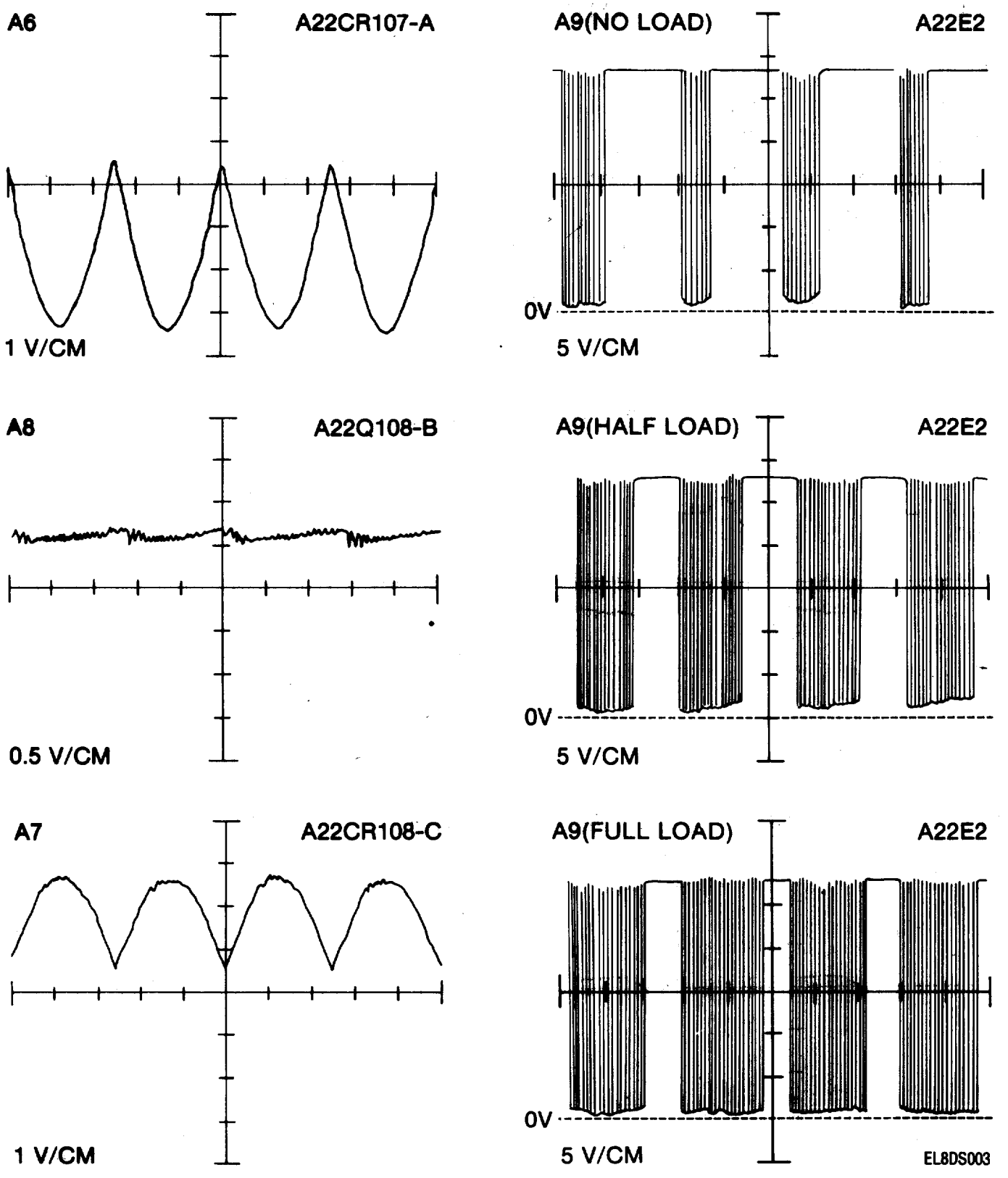


Figure 3-1 2. Waveforms (sheet 2 of 6).

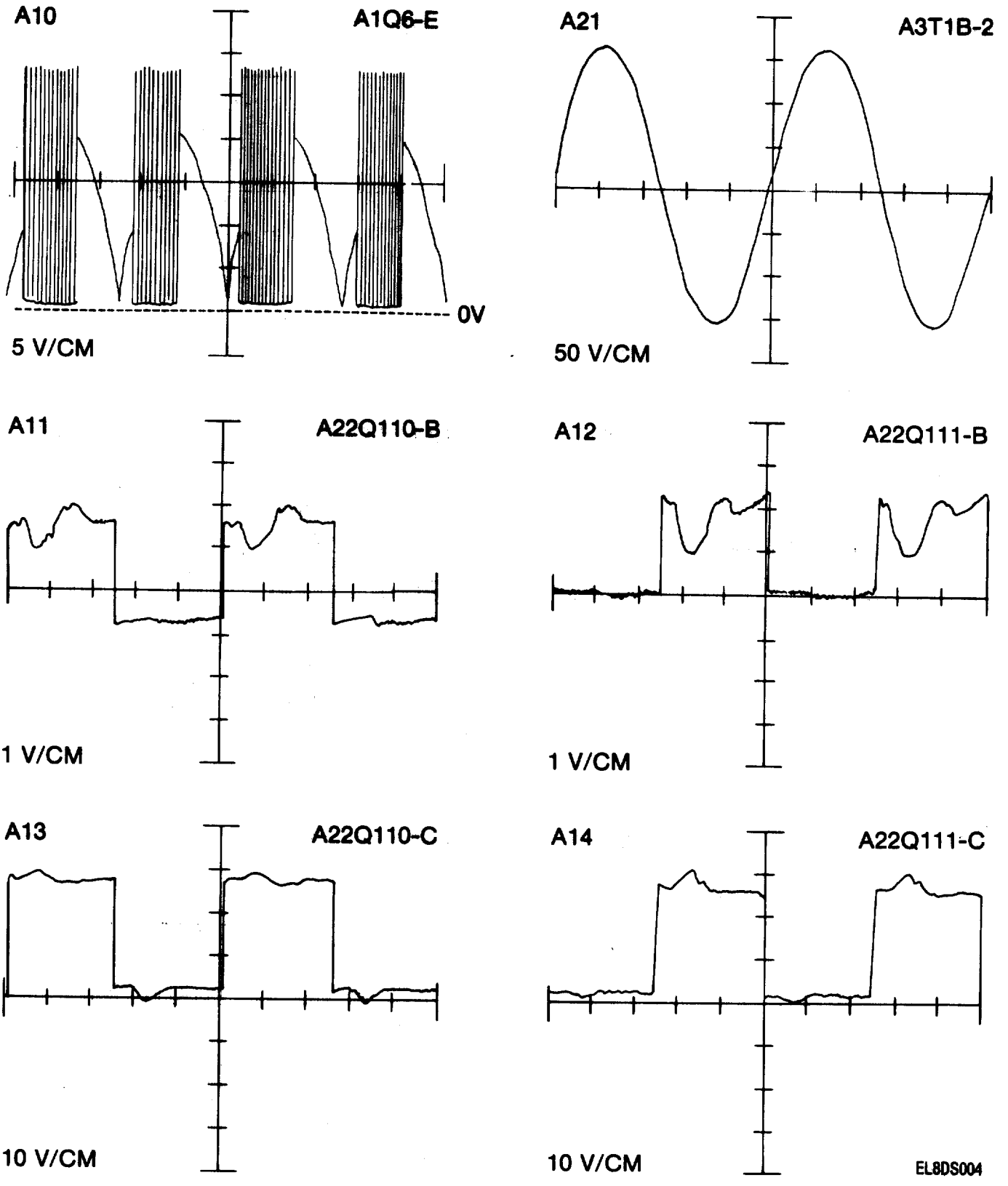


Figure 3-1 3. Waveforms (sheet 3 of 6).Text

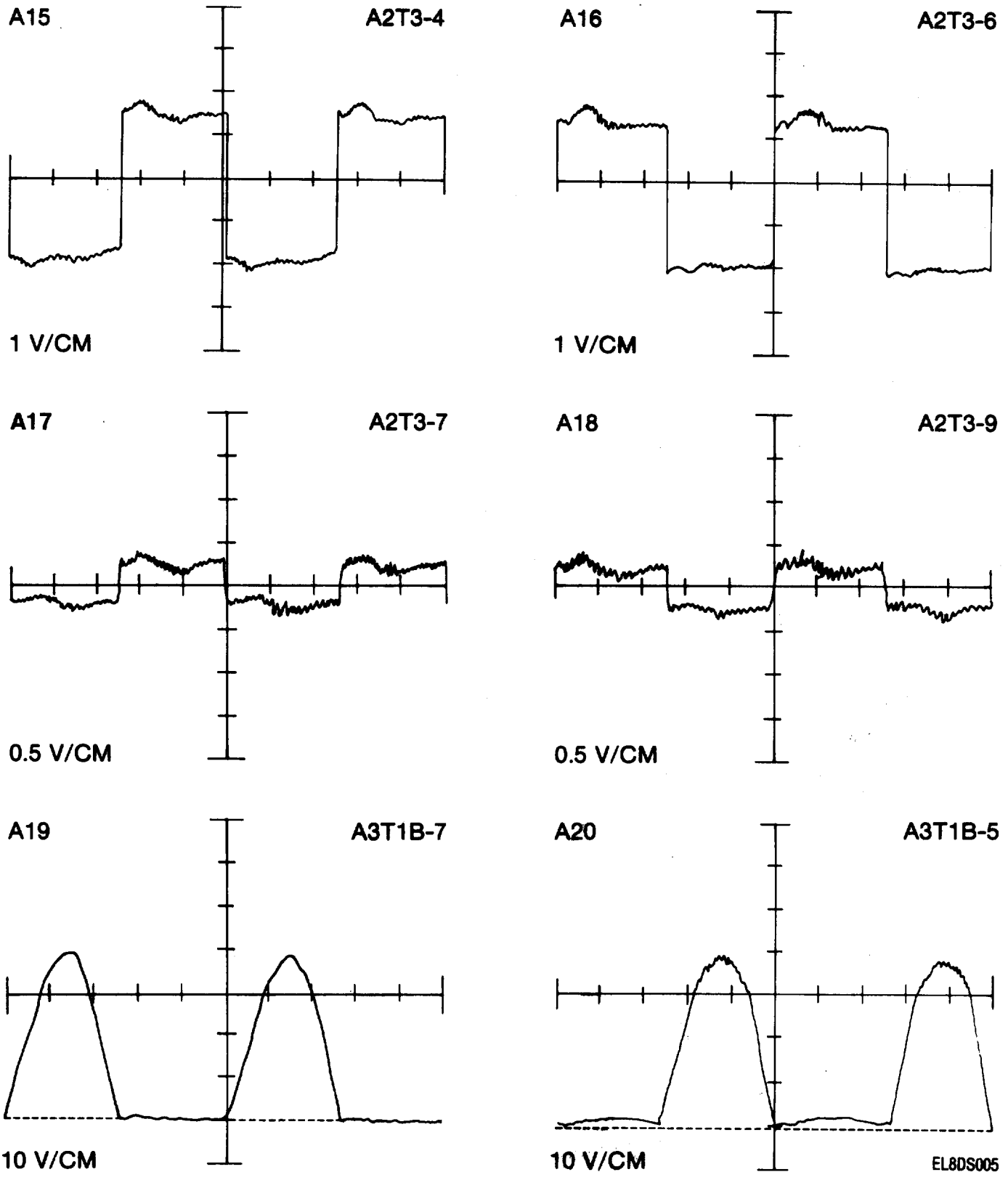


Figure 3-1 4. Waveforms (sheet 4 of 6).

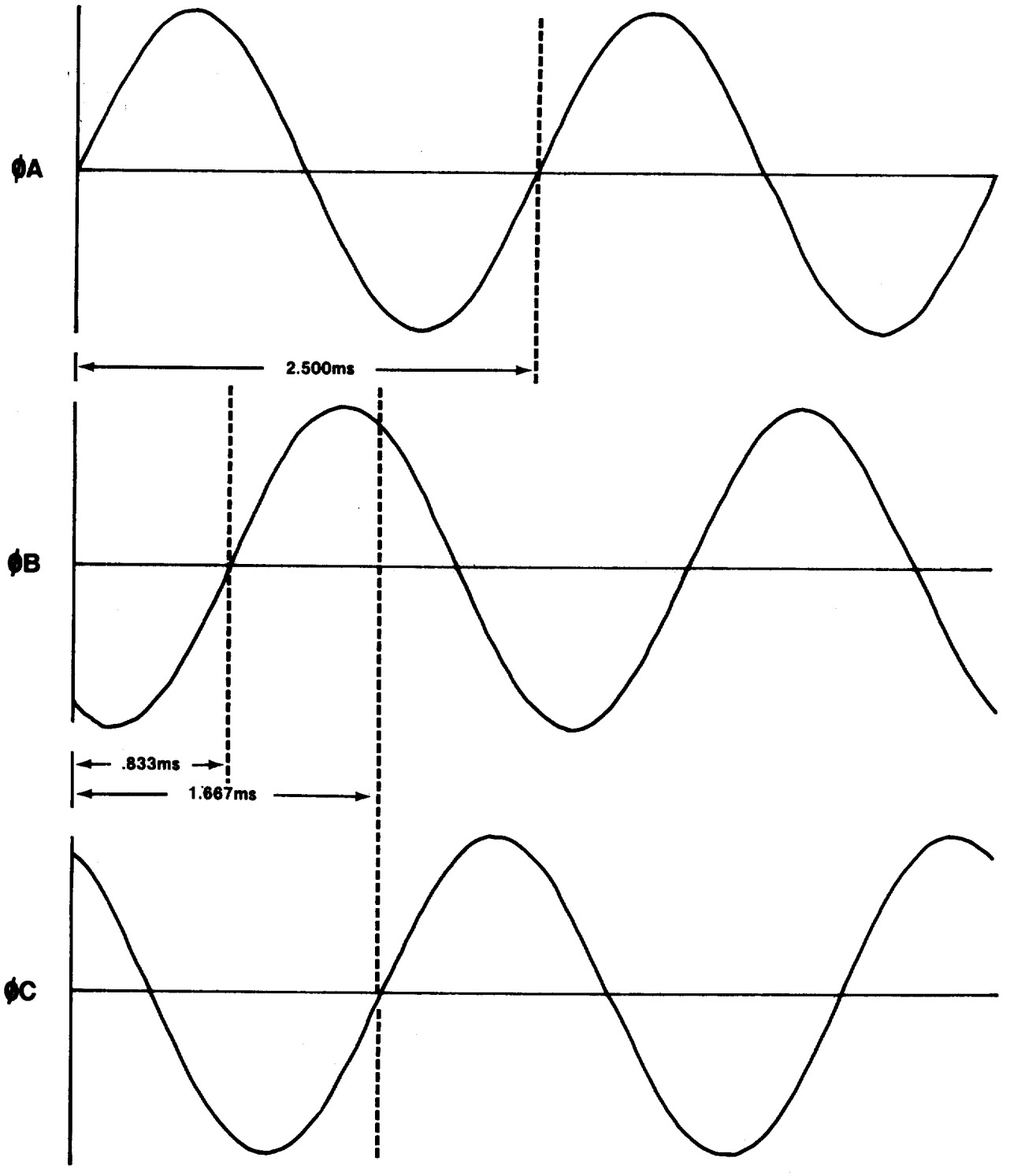
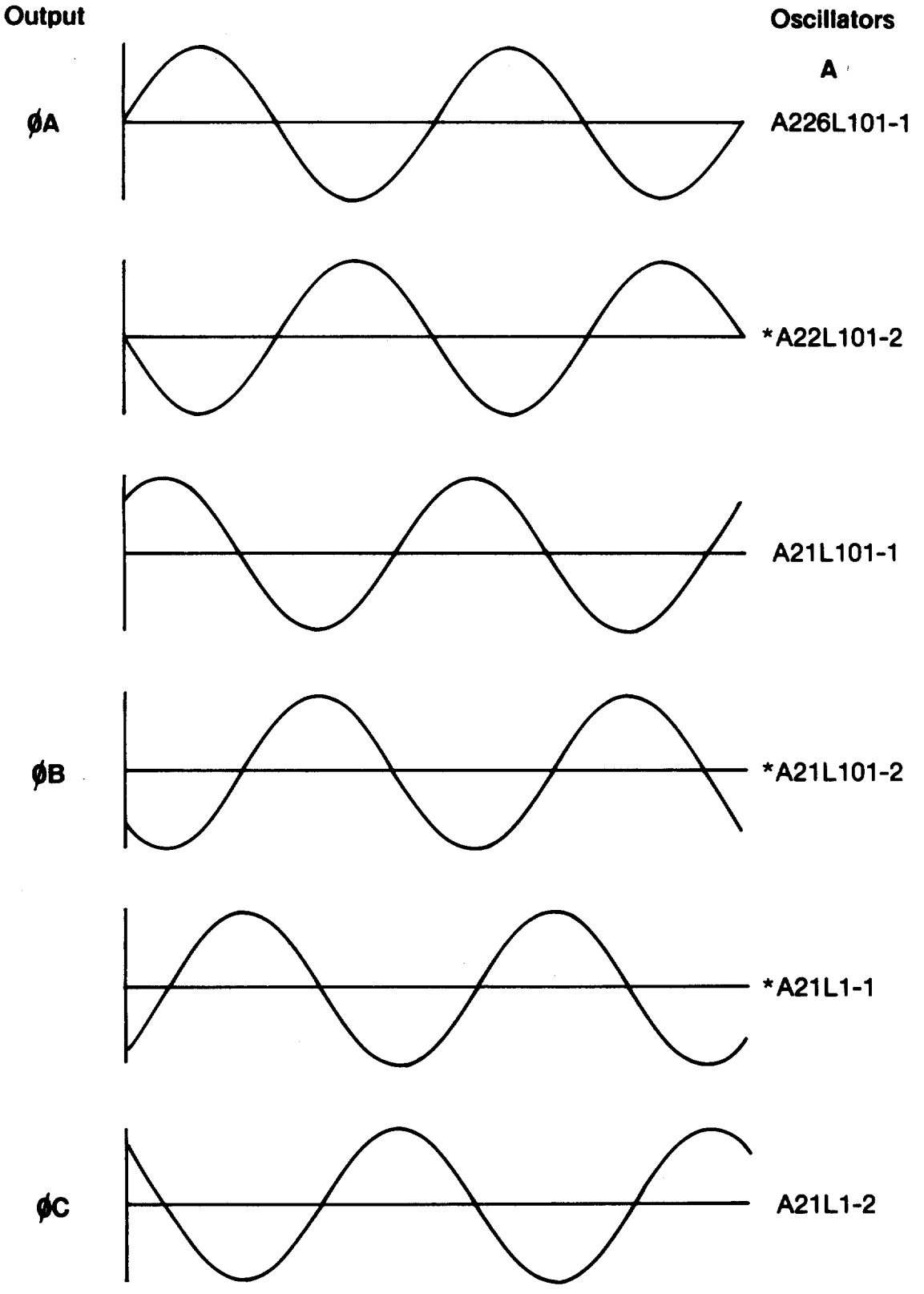


Figure 3-1 5. Waveforms (sheet 5 of 6).



*Indicates Inverter Switch Drive Signal Source.
Sine Waveform Relationships.

EL8DS007

Figure 3-1 6. Waveforms (sheet 6 of 6).

Table 3-2. Component Reference

Phase A	Phase B	Phase C	Phase A	Phase B	Phase C	Phase A	Phase B	Phase C
R101	—	—	R136	R107	R7	L101	L101	L1
R102	—		R137	—		Q101	—	-
R103	—		R138			Q102	—	-
R104	R125	R25	R139		—	Q103	Q108	Q8
* R105	R120	R20	* R140	—		Q104	Q110	Q10
R106	R106	R6	* R141	—		Q105	Q104	Q4
R107	R119	R19	R142		—	Q106	Q107	Q7
R108	R105	R5	R143	R126	R26	Q107	Q106	Q6
R109	R101	R1	R144	R127	R27	Q108	Q103	Q3
R110	R124	R24	CR101	* CR101	* CR1	Q109	Q102	Q2
R111	R113	R13	CR102	—	—	Q110	Q109	Q9
R112	R123	R23	CR103			QIII	Q105	Q5
R113	R112	R12	CR104	—	—	Q112	Q101	Q1
R114	R104	R4	CR105	CR108	CR8	Q113	—	-
R115	RI11	R11	CR106	CR104	CR4	Q114	—	-
R116	R122	R22	CR107	CR106	CR6	Q115		-
R117	R117	R17	CR108	CR103	CR3	*C117		-
R119	R110	R10	CR109	CR107	CR7	**C118	C111	C11
R120	R116	R16	CR110	CR110	CR10	**R142	R128	R28
R121	R109	R9	CR111	CR109	CR9			
R122	R103	R3	CR112	CR102	CR2			
R124	R108	R8	C101	C102	C2			
R125	R121	R21	C102	C107	C7			
R126	R114	R14	C103	C104	C4			
R127		—	C104	C106	C6			
R128	—		C105					
R129	—	—	C106	C105	C5			
R130			C107	C108	C8			
R131	—	—	C108	C109	C9			
R132		—	C109					
R133	—		C110	—	—			
R134	.		C112	C103	C3			
R135		—	* C113					
			C114	—	—			
			C115	—	—			
			C116					

NOTE

Prefix all Phase A reference designations with A22. Prefix all Phases B and C reference designations with A21.
*Used only on serial numbers 8015-369-24 to 8148-807-24.
**Used only in serial numbers 8220-841-24 and up.

Phase A	Phase B	Phase C	Phase A	Phase B	Phase C
Q5	Q1	Q9	Z10	Z6	Z13
Q6	Q2	Q10	CR4	CR1	CR7
Q7	Q3	Q11	CR5	CR2	CR8
Q8	Q4	Q12	CR6	CR3	CR9
Q14	Q13	Q15	L5	L2	L8
Z2	Z1	Z3	L6	L3	L9
Z8	Z4	Z11	L7	L4	L10
Z9	Z5	Z12	R2	R1	R3
			R5	R4	R6

NOTE

All reference designations in the above table have a prefix of A1.

Phase A	Phase B	Phase C	Phase A	Phase B	Phase C
Q20	Q17	Q23	R19	R16	R22
Q21	Q18	Q24	R20	R17	R23
Q22	Q19	Q25	R21	R18	R24
Q29	Q26	Q32	R26	R25	R27
Q30	Q27	Q33	CR11	CR10	CR12
Q31	Q28	Q34	* CR14	CR13	CR15
R 10	R7	R13	T3	T2	T4
R11	R8	R 14			
R12	R9	R15			

NOTE

All referenec designations in the above table have a prefix of A2.
*Used only in serial numbers 8015-369-24 to 8148-807-24.

Table 3-3. Wire List

Wire Harness Part. NO. 277B2023

NOTE

* Indicates crimp lug part no. 31885. Wire no. 57,63,76 terminate at A28-4 with one crimp lug only. Wire no. 64 and 75 terminate at A 24-8 with one crimp lug only.
**Used only in serial numbers 8015-369-24 to 8148-807-24.
***Used only in serial numbers 8220-841-24 and up.

Wire No.	Termination From	Termination To	Wire Color	Awg. No.
1	T1-A-l	A27-3	Gra	20
2	T1-A-2	A27-4	Wht/Gra	20
3	A28-1	A21-2	Red	22
4	T1-B-1	A44-6	Blk	20
5	T1-B-2	T7-3	Wht/Blk	20
6	A28-2	A22-7	Vio	22
7	T1-C-1	A27-1	Blu	20
8	T1-C-2	A27-2	Wht/Blu	20
9	A28-3	A21-12	Wht/Red	22
10	T2-1	A21-5	Grn	22
11	T2-2	A24-7	Wht/Vio	22
12	T2-2	T3-2	Wht/Vio	22
13	T2-3	A21-4	Yel	
14	T2-4	A29-E10*	Brn	22
15	T2-5	U29-1*	Orn	22
16	T2-6	A29-E5*	Orn	22
17	T2-7	A29-E6*	Brn	16
18	T2-7	A29-E7*	Brn	16
19	T2-9	A29-E3*	Orn	16
20	T2-9	A29-E4*	Orn	16
21	T3-1	A22-1	Brn	22
22	T3-2	T4-2	Wht/Vio	22
23	T3-3	A22-9	Wht	22
24	T3-4	A29-E20*	Brn	22
25	T3-5	U29-3	Gra	22
26	T3-6	A29-E15*	Orn	22
27	T3-7	A29-E16*	Brn	16
28	T3-7	A29-E17*	Brn	16
29	T3-9	A29-E13*	Orn	16
30	T3-9	A29-E14*	Orn	16

Table 3-3. Wire List - Continued

Wire No.	Termination From	Termination To	Wire Color	Awg. No,
31	T4-1	A21-14	Wht/Yel	22
32	T4-3	A21-15	Wht/Grn	22
33	T4-4	A29-E30*	Brn	22
34	T4-5	U29-2	Wht/Orn	22
35	T4-6	A29-E25*	Orn	22
36	T4-7	A29-E26*	Brn	16
37	T4-7	A29-E27*	Brn	16
38	T4-9	A29-E23*	Orn	16
39	T4-9	A29-E24*	Orn	16
40	T5-1	A8-3	Wht/Brn	22
41	T5-2	A8-4	Wht/Red	22
42	U28-3	A21-6	Wht/Blu	22
43	T6-1	A8-1	Brn	22
44	T6-2	A8-2	Red	22
45	U28-1	A21-16	Blu	22
46	T7-1	B1-2	Gra	20
47	T7-2	B1-1	Blk	20
48	T7-4	A27-5	Wht	20
49	A14-E7*	A21-1	Brn	22
50	A14-E8*	A22-2	Red	22
51	A14-E9*	A21-11	Wht/Brn	22
52	U29-1	A21-31	Orn	22
53	U29-2	A21-13	Wht/Orn	22
54	U20-3	A22-8	Gra	22
55	U29-4	A22-12	Wht/Grn	22
56	A21-8	A22-13	Gra	22
57	A21-7	A28-4*	Blk	22
58	A21-10	A22-11	Wht	22
59	A21-17	A24-7	Wht/Vio	22
60**	A21-20	A24-9	Blk	24
61	A21-20	A22-14	Blk	24
62	A21-21	A22-15	Gra	24
63	A22-3	A28-4*	Blk	22
64	A22-4	A24-8*	Yel	22
65	A22-5	A24-6	Grn	22
66	A22-6	A24-2	Blu	22
67**	A22-16	A24-4	Grn	24
68	A24-1	A8-5	Wht/Blk	22
69	A27-1	A44-5	Blu	20
70	A27-2	A44-4	Wht/Blu	20
71	S27-3	A44-3	Gra	20
72	A27-4	A44-2	Wht/Gra	20
73	A27-5	A44-1	Wht	20
74	A27-6	A44-6	Blk	20
75	A13-E3*	A24-8*	Yel	20
76	A21-9	A28-4*	Blk	22
77***	A21-26	A22-18	Yel	22
78***	A21-31	A22-19	Wht/Red	22
79***	A21-28	A21-29	Wht/Blk	22

Table 3-3. Wire List - Continued

Wire Harness Part N.o. 277B3300

NOTE

* Indicates crimp lug part no. 31885.

Wire No.	Termination		Wire Color	Awg. No.
	From	To		
1	T1-A5	A29-E1*	Gra	16
2	T1-A5	A29-E2*	Gra	16
3	T1-A6	A14-E1*	Brn	16
4	T1-A6	A14-E2*	Brn	16
5	T1-A6	A28-1	Brn	16
6	T1-A7	A29-E8*	Red	16
7	T1-A7	A29-E9	Red	16
8	T1-B5	A29-E11*	Wth	16
9	T1-B5	A29-E12*	Wht	16
10	T1-B6	A14-E3*	Vio	16
11	T1-B6	A14-E4*	Vio	16
12	T1-B6	A28-2	Vio	16
13	T1-B7	A29-E18*	Yel	16
14	T1-B7	A29-E19*	Yel	16
15	T1-C5	A29-A21*	Blu	16
16	T1-C5	A29-E22*	Blu	16
17	T1-C6	A14-E5*	Grn	16
18	T1-C6	A14-E6*	Grn	16
19	T1-C6	A28-3	Grn	16
20	T1-C7	A29-E28	Red	16
21	T1-C7	A29-E29*	Red	16

*

Table 3-3. Wire - Continued

Wire Assembly Part No. 277C1340

NOTE

*Indicates more than one wire in the same crimp lug.

Wire No.	From	Lug P/N	To	Lug P/N	To	Lug P/N
1	L1-2*	33460	A13-E1	33456	A14E22	322234
2	L1-2*	33460	A13-E2*	33456	—	—
3	L1-2*	33460	A13-E2*	33456	—	-
4	L1-2*	33460	A13-E3	33456	A14E23	322234
5	L1-2*	33460	A13-E4	33456	A14E24	322234

Section II. TOOLS AND EQUIPMENT

3-3. Test Equipment

Common types of test equipment, considered as normal direct and general support inventory items, amused on the maintenanec and test of the inverter. These items are listed in table 3-4. This equipment is required but is not supplied with the inverter. Substitution of equipment as listed in table 3-4 is authorized if substitute equipment is of the same quality as the original equipment noted.

3-4. Test Fixture

Table 3-5 contains the parts list for the test fixture shown in the test setup, figure FO-6.

Table 3-4. Test Equipment Required

Item	Nomenclature Part Number	National/NATO Stock Number	Qty
Oscilloscope	AN/ USM-281	6625-0228-2201	1
Digital Voltmeter	AN/GSM-64	6625-00-165-5779	3
Voltmeter	ME-30	6625-00-643-1670	1
AMMeter, 100 A.A.C.	—	.	1
Counter	AN/USM-207	6625-0044-3228	1
Distortion Analyzer	TS-723A	6625-00-668-9418	1
Multimeter	AN/ USM-223	6625-00-999-7465	1
Power Supply	—	—	1
Tool Kit, Electronic Equipment	TK-100	5180-00-605-0079	1
Tool Kit, Electronic Equipment	TK-101	5180-00-064-5178	1
Stopwatch,Seconds	—	—	1

Table 3-5. Test Fixture Parts List

Item	Description	Manufacturer	Qty
Variable Auto Transformer	0-125 V ac, 400 Hz, 1 KVA	Staco Type 501	3
Calibrated Shunt (R1,2,3)	0.01 ohms 100W Calibrated	Commercial	3
Switch (S1 ,2, 4, 6)	SP3T, 115 V ac, 10A	Commercial	4
Switch (S3)	4 gang SP3T, 115 V ac, 5a	Commercial	1
Switch (S5)	SP3T, 115 V ac, 10A Momentary, Normally OFF	Commercial	1
Load (+.75) (R7, 8,9 Cl, 2, 3)	Resistor 55.7 ±l% 500W Capacitor 2.3 uf ±3%, 150 vac	Commercial	3
Load(-.95) (R4, 5, 6 L1, 2, 3)	Resistor 70.6 ±l% 500W Inductor 28.5 mh ±3%5A 115 V ac	Commercial	3
Load (+1.0) (R10, 11, 12, 13, 14, 15)	Resistor 52.9 ±1% 500W	Commercial	6
Connector (P1)	MS3106F-22-6S		1
Connector (P2)	MS3106F-22-5P		1
Fan, Portable		Commercial	1

NOTE

Alternate Loads — Any reasonable combinations of resistance, capacitance, and inductance maybe used to satisfy the load requirements, provided that the ratio of resistance to reactance provides the specified power factor and a variable auto transformers used to allow adjustment of the applied load current. In this method the entire dummy load fixture must be calibrated by means of the external voltmeter/ammeter.

Section III. TROUBLESHOOTING

WARNING

To avoid electrical shock, be extremely careful when making required measurements and adjustments.

3-5. General

a. Since there are no external controls or indicators on the inverter, performance indications may be measured with the inverter disassembled on the test bench. While voltages in the inverter are relatively low (that is. M28 V dc and 115 V ac). current levels are high (up to 45 amperes in normal operation. and much higher in short circuit situations where the input capacitor bank can discharge through the short). Failures may be evident upon inspection. Voltages should not be applied to the unit until it has been opened and visually inspected for burned or otherwise damaged components. Where failed circuits are located. resistance and continuity check should be performed to isolate the faulty components and to identify the cause of the failure. It will "be necessary to remove protective coating from leads to take readings.

b. Troubleshooting will be performed with the inverter disassembled as necessary. Connect the test fixture shown in figure FO-6.

c. Once the cause of the malfunction has been determined and corrected, ensure that the defective component was the cause of the problem and not the result of another defective component,

d. Table 3-6 provides instructions for troubleshooting and corrective action of the inverter. Become familiar with all of the malfunctions listed before proceeding. Some malfunctions are similar but have different causes. The signal waveforms referenced in this table are shown in figure 3-1.

Table 3-6. Troubleshooting Chart

Malfunction	Test conditions	Posible cause	Checks	Correct reading	Corrective action
1. Excess input current	Vin less than 1 volt. I is greater than 2 amps.	M28 V dc bus shorted to ground.	a. Disconnect P1 at J1.	*a.* Ohmeter Xl scale plus probe at J1-C, minus probe at chassis. Infinity reading. Reverse leads. Large capacitor bank will charge up.	a.Disassemble unit as necessary for troubleshooting.
			b. Use standard VOM to check Ji-C for a short to the chassis.		*b.* Inspect for pinched or broken wires. Repair as required.
					c. There are 5 areas which may be shorted. may be shorted. The A44 I/0 filter, the A13 capacitor bank, the Al pulscr assy, A24Q16, and the A22 printed circuit assembly, Disconnect the wiring as necessary to isolate the short to a particular item. Repair or replace the item as required.
2. Excess input current.	Vin approximately 5-7 volts. I is greater than 10. amps. No load.	a. Improper inverter switch drive.	a. Remove right side transistor cover panel, pars 3-11. use scilloscope to check signals at transistor collectors.	a. Signals should duplicate A19 and A20 in phase with appropriate OA, OB or OC output	a. Disassemble unit to gain access to circuit boards A21 and A22, Inspect for burned or overheated components at A22Q110,Q111 and R120. Also A21Q5, Q9, R16, Q105, Q109 and R116. Replace both switch driver

Table 3-6. Troubleshooting Chart -Continued

Malfunction	Test conditions	Posible cause	Checks	Correct reading	Corrective action
					transistors if either one of a pair is faulty. Inspect for burned resistors A22R136, A21R107 or R7. Failure of any of these resistors indicates failure of the high power sections for that phase. Repair as required.
		b. Phasing out of sync.	b. Transistors not burned. Disconnect the +28 V dc cable from the pulser at A14E4, E5, and E6. Check signals at A22 Q110, Q1I1, A21Q5, Q9, Q105, Q109.	b. Signals should duplicate A13 and A14 (fig.-3-1). Noise level is lower and waveforms should be clean and square.	b. If one phase has bad signals but the drive transistors check good, disconnect the wire a from terminals 4 and 5 of the associated interstage transformer (OA-A2T3, OB-A2T2 and OC-A2T4). If signals A13 and A14 return to normal, the high power switch transistors have failed. If the signal remains distorted, the interstate transformer is defective. The high power transistors may also be bad if the transformer is burned out. Replace components as required.
		C. Phase locking circuit open.	c. Two channel Oscilloscopec. required. Disconnect the pulser as above.	Compare the phase relationship of A3, A4, and A5 two phases at a time. Use A5 as the scope sync. Vp-p may vary but phase relationships must be stable.	c. Check “or broken wires and repair as required. Check for an open ding of the inductor secondary. It should read about 100 ohms. Replace connector if the secondary is open.
		d. Output tuning capacitors open or shorted.	d . Remove the A27 and A8 modules and inspect for burned capacitors. Inspect the A44 filter for any leakage of black U .		*d.* Replace burned capacitors. Replace the A44 filter if there is any evidence of black gum. To check for open capacitors, disconnect transformer A3T2 at pin 2 of all three phases. Check the capacitance with a capacitor checker. The capacitance should be 11 mfd for each phase. (One mfd is internal to the A44 filter.
3. No output all 3 phases.	V is 28 V.dc ±1V. lin is less than 100 ma.	a. Vcc regulator failed	a Use voltmeter at the + lead of A22C105.	a m17.5 V ±l V.	O. Check A22Q101, Q102, CR102, CR103. Replace as required.
		b. OverCurrent timer failure. Unit is in permanent foldback.	b. Use voltmeter at A22E13.	b. +17 volts normal. +2 Volts after overload foldback only.	*b.* Overload does not exist but A22E13 equals 2 Volts. Check A22Q113, A114, and Q115 with a VOM and replace as required.

Table 3-6. Troubleshooting Chart-Continued

Malfunction	Test conditions	Posible cause	Checks	Correct reading	Corrective action
			c. Use oscilloscope probe at A22E12.	c. A noisy d.c. voltage similar to A2 within .5v of ground.	c. Replace A24U29 if signal is incorrect.
4. No output or very low output of OB and OC together.	Vin is 28 V dc 01V. Iin not more than 10 Amps. No load.	A24Q16 failed.	Use voltmeter at pin 2 of A2T2.	±17V, 01 V.	Check to assure that the output lead of A24 Q16 is not shorted to ground. Replace A24 Q16.
5. a. No output or very low output of one phase only (any phase).	Vin + 28 V dc. No load.	a Oscillator failure.	a. Use oscilloscope to check signals A3, A4, and A5.	a Sine wave at least 4Vpp 400 Hz.	a. Check the oscillator transistor and replace if required. Check the inductor for an open or short. The inductor should measure about 50 ohms from each side to the center ground connection. Replace as required.
b. No output or very low output of one phase only.		*b.* Pulser inoperative.	*b.* Use oscilloscope to check for signal A9 of the defective phase.	b. Signal A9 per figure three.	b. If signal A9 remains him check signals A6 and A7. If A6 is not present but A7 is okay, replace diodes in full wave rectifier. If A7 is high and remains high, check the overcurrent ampifier transistor (A22Q112 for OA) with a VOM. Replace as required.
6. Output voltage of any phase does not regulate. Output exceeds 125 V ac.	a. Vin + 18 V dc. No had. Iin less than 10 amps. CAUTION To trouble-shoot, decrease Vin until the bad Vout is 125 V ac or less. Continuous high Vout will cause failure of the output tuning capacitors.	a. Feed back loop open.	a. Check for signal Al at A22BE(OA). Check for feedback signals at A21E6 for OB and A21 E16 for OC.	a. For OA, signal All as shown. For OB and OC, a modified halfwave rectified sine wave.	a. If the feedback signals are not present, repair the wiring if required. Check the A24R29 and R32 for OA. Check A24T5 and U24 for OB and A24T6 and U24 for OC. Replace components as required.
		b. Vout error detector defective or oscillator control defective.	b. Refer to Table 3-1. Check the emitter of A22Q103.	b. 6.2 V dc 0.2 V dc.	b. Refer to the discussion in Chapter 2 Section 2, paragraph 2-7 and 2-8. The analog signals should react as stated. Replace the error detector (OA-A22Q103) as required.
		c. Pulser shorted	c. Check signal A10 for the defective phase.	c. As indicated by the waveform A1O in figure 3-1.	c. Check to see that signal A9 is as required. If A9 is good, check the signal at the base of three high current pulser switches. This signal should resemble A10 in form. If this signal is good, at least one of the

Malfunction	Test conditions	Possible cause	Cheeks	Correct reading	Corrective action
					3 pulser switches is shorted collector to emitter. Replace all three. A failure of this type may take out all five transistors in a pulser section. Check the other two transistors carefully. Replace as required.
7. Fan does not operate.	Vin 26-29 V ac. All outputs normal. Any load condition. Note Fan may slow down under some load conditions but air must continue to flow at all times.	Defective fan.	Check for 115 V ac at pins as noted 1 and 2 of fan and a phase shifted voltage at pin 3.		Replace fans if voltages are correct. Replace C35 if pin 3 voltage not present or if waveform is in the same phase as pin 2.
8. Frequency not 400±7 Hz.	Any normal operating condition. See Table 1-1.	Open padding capacitor.			Proceed to Section IV, Maintenance and adjust the frequency in accordance with para 3-7.
9. Unit does not meet distortion specifications.					Refer to malfunctions 2,4 and 5 of this table. If these did not correct the problem, replace the main transformer A3T1, para 3-11E. Refer to malfunctions 2,4 and 5 of this table. Check that output ammeters are calibrated for 400 Hz. Clamp-on type ammeters should be avoided as they are generally accurate for 60 Hz only.
10. Unit has low efficiency.					
11. Overload input current exceeds specification but doesn't limit.	Vin + V dc Load equals 4.36 amps per phase or greater.	Overload misadjusted.	With Vin at 26 V dc and each phase at 4.36 amps load.	Vout should be 65 V ac ±5 V ac.	Refer to Section IV Maintenance, paragraph 3.
12. No limits on overload. Usually on one phase only.	Vout should begin to decrease when lout exceeds 3 amps per phase.	Broken wire, defective diode, defective transistor.	Refer to Chapter 2. Check voltages of divider carefully.	2. Signal A2 goes more negative with higher loads.	Check A22CR112, Q112, and CR108 (6A). Replace as required.
13. Short circuit output current less than 5.45 amps per phase.					Refer to Section IV Maintenance, paragraph 3-9.
14. Short circuit output current less than 5.45 amps per phase.					Refer to Section IV Maintenance, paragraph 3-9.
15. Unit does not fold back in more than 5 sec. or less than 20 sec.	Vin + 27 V dc ±1 V dc. Output shorted all 3 phases.	U29 defective A220113, 0114, 115 defective.	Refer to Chapter 2.	As noted.	Use a VOM to check transistors A22Q113, Q114 and Q115. Replace if defective. U29 should show about 35 ohms from pin 4 to any other pin. This diode is in series with a small inductor. Replace if any pin shows a high resistance.
16. Unit does not recover quickly after short circuit or overload test.		A22R129 value too high.		A22R129 is nominally 68K.	Refer to Section IV Maintenance paragraph 3-9.

Section IV. MAINTENANCE

3-6 Adjustments

Table .3-7 lists the adjustments and circuits involved which affect the operation of the inverter. The paragraphs following the table give the method for making these adjustments. Any deviation from the procedure as listed will cause improper operation of the inverter.

Table 3-7. Adjustments and Alinements.

Inverter adjustment	Circuit involved	Adjustment procedure
Output frequency adjustment	Oscillator circuit	Paragraph 3-7
output voltage adjustment	Regulator circuit	Paragraph 3-8
Output distortion	Pulser output circuit	Paragraph 3-10
Short circuit time delay	Current limiting circuit	Paragraph 3-9
Overcurrent limit adjustment	Current limiting circuit	Paragraph 3-9

3-7. Output Frequency Adjustment

a. To adjust the output frequency proceed as follows:

(1) If the inverter has not been previously opened, do so as described in paragraph 3-11. Disassemble until printed circuit boards A21 and A22 are accessible.

(2) Disconnect the +28 V dc bus at El, E2, and E3 of circuit card A14.

(3) Disconnect the following wires at the A21 PCB.

A21E20	Blk
A21E21	Gry

(4) Connect frequency counter to A22L101 pin 1 or pin 3 (lower pins).

(5) Apply 28 V dc to the inverter.

NOTE

Input current will not exceed 1.0 ampere. If current is high, troubleshoot inverter as described in table 3-6.

(6) Check frequency on frequency counter; it shall be 400 ± 0.5 Hz. If the frequency is not 400 ± 0.5 Hz, proceed to (7) below.

(7) If the oscillator frequency is high, increase the value of C 104. If the frequency is low, decrease the value of C104.

NOTE

A 0.01 ufd change in capacitance will change the frequency approximately 5 Hz.

(8) Connect frequency counter to A21L1 pin 2.

(9) Check frequency on frequency counter; it shall be 400 ± 0.5 Hz. If the frequency is not 400±0.5 Hz, refer to (7) above.

NOTE

Refer to table 3-2 for correct capacitor reference designation for phases B and C.

(10) Connect frequency counter to A21L101 pin 1.

(11) Check frequency on frequency counter; it shall be 400 ±0.5 Hz. If the frequency is 400±0.5 Hz, proceed to (12) below. If the frequency is not 400 ±0.5 Hz, refer to (7) above.

(12) Recheck frequency at A22L101 pin 1, A21L1 pin 2 and A21L101 pin 1 to ensure proper frequency before proceeding.

(13) Turn off the 28 V dc power to the inverter.

(14) Replace the wires removed in (2) and (3) above.

NOTE

Apply HYSOL N22H to all solder connections made during this adjustment procedure.

b. If no other troubleshooting or adjustment is indicated, reassemble the inverter as described in paragraph 3-12 and check inverter for proper operation as described in Section V, Final Tests.

3-8. Output Voltage Adjustment

a. To adjust the Phase A output voltage, proceed as follows:

(1) Connect inverter to test fixture as shown in figure FO-6.

CAUTION

Isolate voltmeter chassis from earth ground to avoid damage in inverter.

(2) Set test fixture switches as follows: S 1 — No load; S2 — WYE; S3 — phase A; S4 — +1.0; S5 — Off; S6 —Off.

(3) Energize the test equipment and slowly (over - approximately 10 seconds) raise the input voltage to +28 V dc. If input current exceeds approximately 15 amperes at any point, turn off the equipment and troubleshoot as described in table 3-6.

NOTE

Input current should reach approximately 10 amperes when the input voltage reaches +15 to + 16 V dc. Input current should then drop to a final value of approximately 4 to 6 amperes at +28 V dc.

(4) with input set at +28 V dc, the output indications on the true RMS voltmeter shall be exactly 115.5 V ac. If it is not, adjust potentiometer A22R109 for 115.5 V ac on the voltmeter.

NOTE

Brush on protective coating to reseal potentiometer adjustment screws after this adjustment procedure has been completed.

(5) If the output cannot be set to 115.5 V ac, turn off the equipment and troubleshoot inverter as described in table 3-6.

b. Phase B. Output Voltage.

(1) Set test fixture switches as follows: S1 — No load; S2— Phase B; S3— PhaseB;S4—+1.0; S5—Off; S6 — Off.

(2) Repeat steps 3 to 5 of phase A adjustment procedure, except if adjustment is necessary adjust A21R1.

c. Phase C Output Voltage.

(1) Set test fixture switches as follows: S1 — No load; S2 — WYE; S3— Phase C; S4— + 1.0; S5 — Off; S6— Off.

(2) Repeat Steps 3 to 5 of phase A adjustment procedure, except if adjustment is necessary adjust A21R101.

3-9. Overcurrent Limit Adjustment

a. Use test procedure 3 of table 3-9 to check for proper operation.

NOTE

This adjustment is factory set and should not require readjustment unless the interstage transformer (A2T2, T3 or T4) and/or the current sense resistor (A2R25, R26and R27) is changed.

b. With the inverter off, disconnect one end of A22R125, A21R21 and A21R121. Jumper in a resistor decade box. Set the decade box to the same value as the disconnected resistor. (In serial numbers 8439-1310C and up, it is not necessary to use the decade box and disconnect and replace resistors, because the fixed resistors were changed to variable resistors.)

NOTE

Due to the differences between individual test stations, the following setting is not always the same. The approximate setting will have to be determined by trial and error.

d. Preset the load box to the approximate setting, which will give a load of 4.36 amps per phase at 65 V ac.

CAUTION

The overcurrent limit foldback will act within 20 seconds or less. Make adjustments and readings quickly. Set S1 and S6 to off and allow the inverter to cool at no load at least one minute for every 15 seconds of overload operation. The overload operations may then be repeated until this adjustment procedure is completed.

NOTE

The three phase transformer of the inverter will load share between phases. Adjusting one phase will change the other two phases.

e. Set S1 to load and S6 to overload. Adjust the autotransformers for an output of 4.36 amps ±0.02 amps per phase. The output voltage should be 65 V ac ±5 V ac.

f. If the output voltage is too high, decrease the resistance of A22R125 for phase A, A21R121 for phase B, or A21R21 for phase C as required. If the output voltage is too low, increase the resistance. Readjust the load for the changed voltage.

g. When correct operation if achieved, set S1 and S6 to off and set Vin to 0.0 volts. Disconnect the inverter and install the correct value resistors. Verify that the inverter now functions properly.

3-10. **Output Distortion Adjustment**

NOTE

This adjustment is factory set and should not require readjustment unless transformer was not replaced, perform all other adjustment procedures before making this adjustment.

a. To adjust the output distortion, proceed as follows:

NOTE

If the inverter fails to meet any voltage, current, frequency or phasing requirement during the course of the following test, troubleshoot the defective circuits in accordance with the applicable paragraph. After repairs have been made, repeat the entire output distortion check.

(1) The output distortion check shall be performed with the inverter completely assembled to provide adequate cooling air. Note that if the output distortion check does not meet specifications, the inverter will have to be disassembled to adjust the affected circuits.

(2) Connect the inverter to the test equipment as shown in figure FO-6.

CAUTION

Isolate the true RMS voltmeter, the distortion analyzer and the frequency counter chassis from earth ground to avoid inadvertent shorts in the inverter output.

(3) If distortion exceeds that specified in table 3-10, select a new capacitance value which gives best overall

distortion while not exceeding specified limits. The capacitors to be padded or replaced are A8C26A, for phase A, A8C25A for phase B, and A8C24A for phase C.

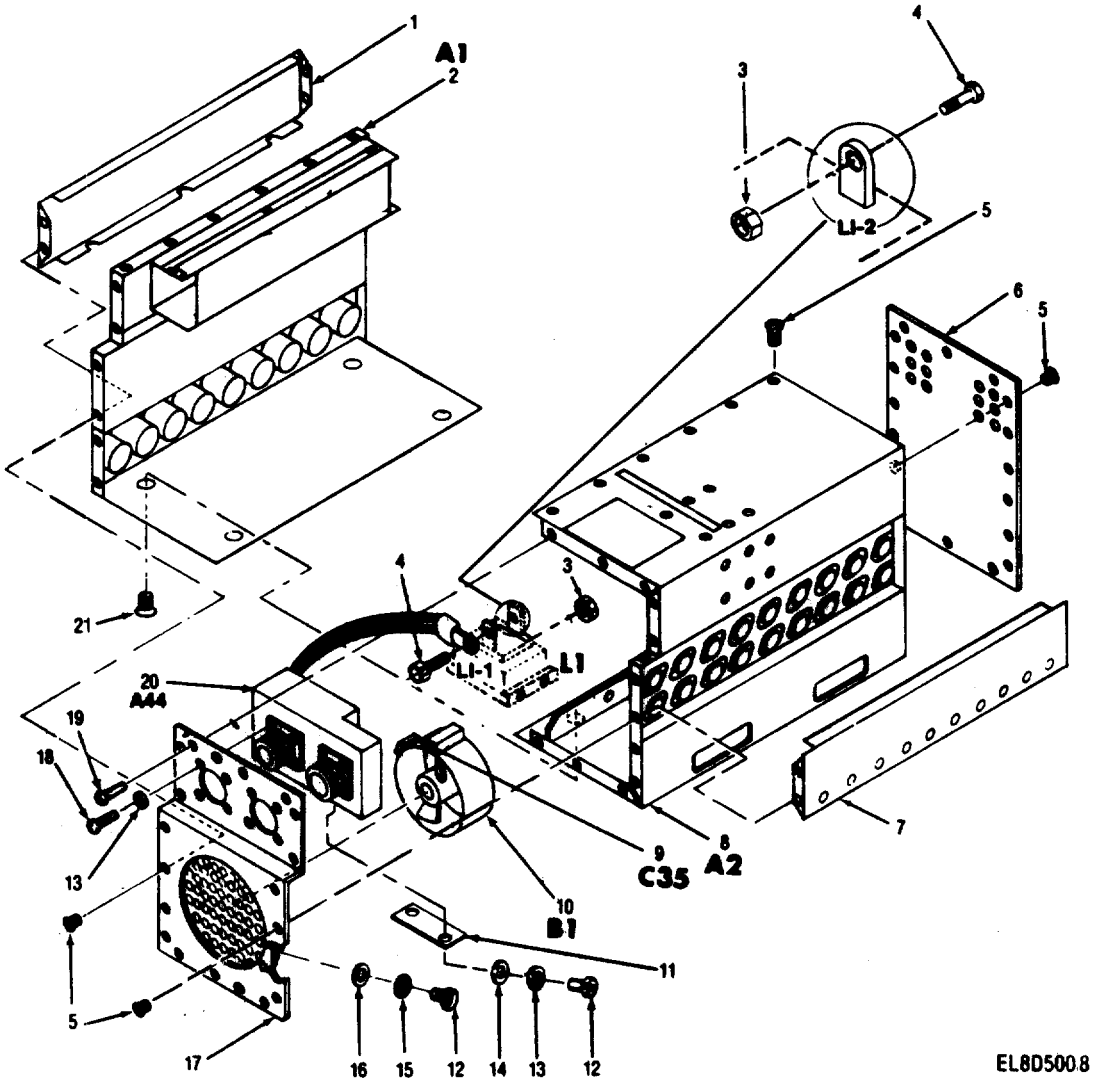
(4) Decrease thevalue of the tuning capacitor if the no load distortion is excessive. Increase the value of the tuning capacitor if the full load distortion, especially for the +0.75 power factor, (inductive load) condition, is execssive.

(5) After the tuning capacitor value has becn modified, repeat the no load test above, the full load inductive test above and the procedure of procedures which originally failed.

(6) If the output distortion still does not meet specifications, further modify the tuning capacitor as described in the procedures above. If the output distortion is found to be within specifications for these worse case conditions, repeat the entire distortion test to be sure that the output distortion has not been increased in other test conditions.

b. When the output distortion meets the specified levels, turn off the test equipment. If not further troubleshooting or adjustment procedures are necessary, disconnect the test equipment and reassemble the inverter.

3-11. Disassembly Instructions (Figure 3-2)



Legend for Figure 3-2.

1. Cover, left side
2. Pulser ass'y
3. Nut, lock, 10-32
4. Screw, cap, 10-32 x G
5. Screw, mach, ft. hd., 4-40 x 5/16
6. Cover, rear
7. Cover, right side
8. Inverter ass'y
9. Capacitor, fxd, plastic
10. Fan ass'y
11. Cover, terminal *
12. Screw, mach, 4-40 x F *
13. Washer, lock, no. 4 *
14. Washer, flat, no. 4 *
15. Washer, lock
16. Washer
17. Grill ass'y
18. Screw, mach
19. Screw, mach
20. Filter ass'y
21. Screw, selflock, 4-40 x F

*Used only in serial numbers 8015-369-24 to 8148-807-24.

Figure 3-2. Inverter, Power, Static PP-7274D/A Final Assembly.

a. To disassemble the basic assembly, proceed as follows:

(1) Remove 20 screws (5) from rear cover (6).

(2) Remove rear cover.

CAUTION

Wires are connected to front cover via filter (20) and fan (10). Do not force cover as damage to wire or connections may result.

(3) Remove 12 screws (5) and 8 screws (19) from front cover (17).

(4) Remove 6 screws (5) from top of inverter.

(5) Remove 6 screws (21) from bottom of inverter.

CAUTION

Wires are connected from the pulser assembly to the inverter assembly. Caution must be taken not to break them when separating the units.

(6) Separate pulser assembly (2) from inverter assembly (8).

(7) Remove front cover.

(8) Remove side covers (1 and 7) by gently prying outward at one corner of the cover.

(9) Mark and disconnect cable terminations at L1-1 and L1-2 by removing one screw (4) and one nut (3) for each cable.

b. To disassemble front cover assembly, proceed as follows (fig. 3-2):

(1) Remove 4 screws (12), lock washer (15) and flat washers (16) from front cover assembly (17).

(2) Remove fan (10) from front cover assembly.

(3) Mark and disconnect wires attached to fan.

(4) Remove 8 screws (18) and lock washers (13) from front cover assembly.

(5) Remove filter (20) from front assembly.

(6) Remove two screws (12), lockwashers (13), and flat washers (14) from terminal cover (11), and remove terminal cover.

(7) Mark and disconnect wires attached to filter.

c. To disassemble pulser assembly Al proceed as follows (item numbers below refer to figure 3-3 sheets 1 and 2 unless otherwise indicated):

(1) Mark and disconnect wires to inductors L2-L10 (2).

(2) Remove 9 screws (24) from pulser chassis.

(3) Mark (schematic reference designation) and remove inductors L2-L10.

(4) Mark and disconnect the cable from the capacitor assembly (12).

(5) Remove 6 screws (19) from pulser chassis.

(6) Remove capacitor assembly.

NOTE

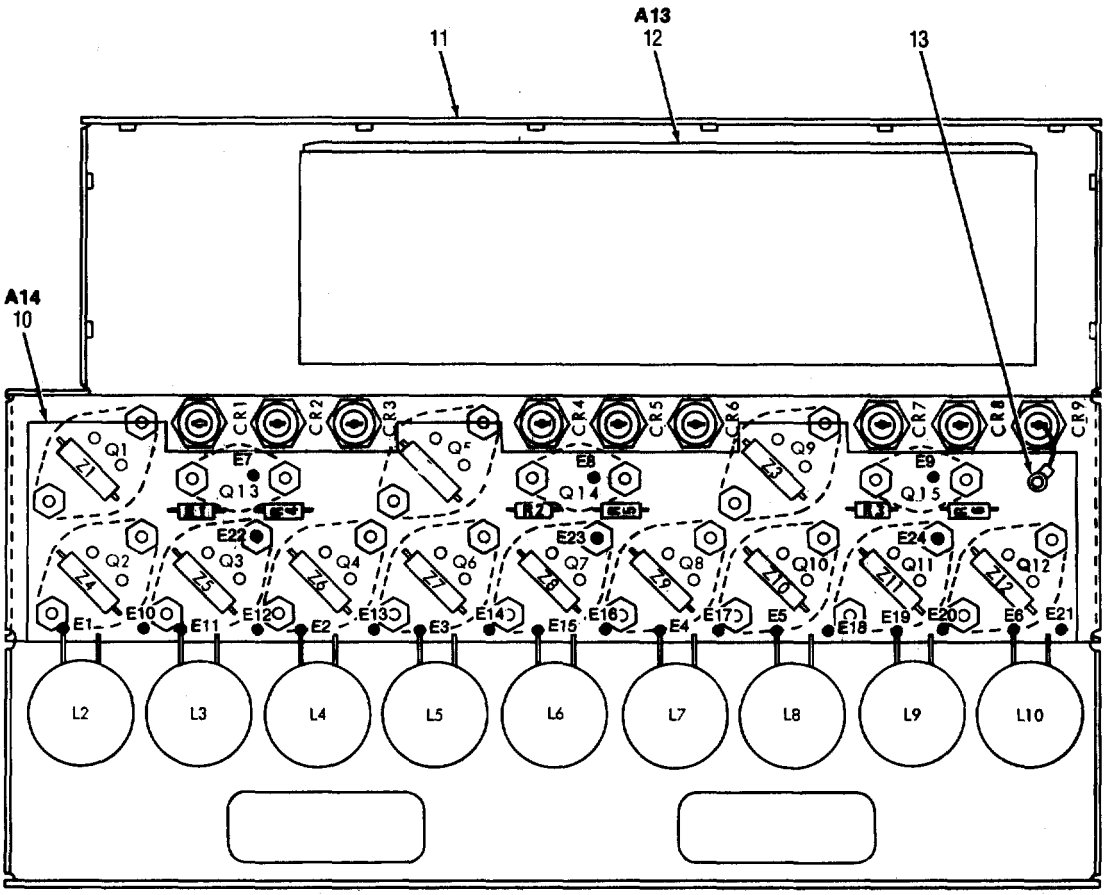
The following portion of this procedure is to disassemble transistors Q1-Q14 (3, 4, and 5, fig. 3-3). Instructions will be given to disassemble one transistor. If more than one transistor is to be removed, repeat this procedure for each transistor.

(7) Mark and disconnect wires that attach the base and emitter of the transistor being removed, to the circuit board (10).

(8) Remove the two nuts (14) on the outside of the transistor.

(9) Remove transistor from the chassis (11).

(10) Remove the transistor insulator (15 or 25) from the transistor.



LEGEND

REF DES	ITEM NO.	REF DES	ITEM NO.	REF DES	ITEM NO.	REF DES	ITEM NO.
CR1	1	L6	2	Q9	3	Z1	8
CR2	1	L7	2	Q10	4	Z2	8
CR3	1	L8	2	Q11	4	Z3	8
CR4	1	L9	2	Q12	4	Z4	9
CR5	1	L10	2	Q13	5	Z5	9
CR6	1	Q1	3	Q14	5	Z6	9
CR7	1	Q2	4	Q15	5	Z7	9
CR8	1	Q3	4	R1	6	Z8	9
CR9	1	Q4	4	R2	6	Z9	9
L2	2	Q5	3	R3	6	Z10	9
L3	2	Q6	4	R4	7	Z11	9
L4	2	Q7	4	R5	7	Z12	9
L5	2	Q8	4	R6	7		

NOTE: PREFIX ALL REFERENCE DESIGNATORS WITH A1

EL8DS009

Legend for Figure 3-3.

1. Diode
2. Inductor
3. Transistor
4. Transistor
5. Transistor
6. Resistor
7. Resistor
8. Impedence element
9. Impedence element
10. Printed circuit bd
11. Chassis, right
12. Capacitor assy
13. Screw, mach, 4-40 x F
14. Nut, self lock, 6-32
15. Insulator
16. Nut, hex, 6-32
17. Washer, lock, F in
18. Washer, flat, F in
19. Terminal lug
20. Mount, transistor
21. Screw, mach, 6-32 X 7/16
22. Stud
23. Mount, transistor
24. Screw, self lock, 4-40 XJ
25. Insulator

Figure 3-3 (1). Pulser Assembly A1 (Sheet 1 of 2).

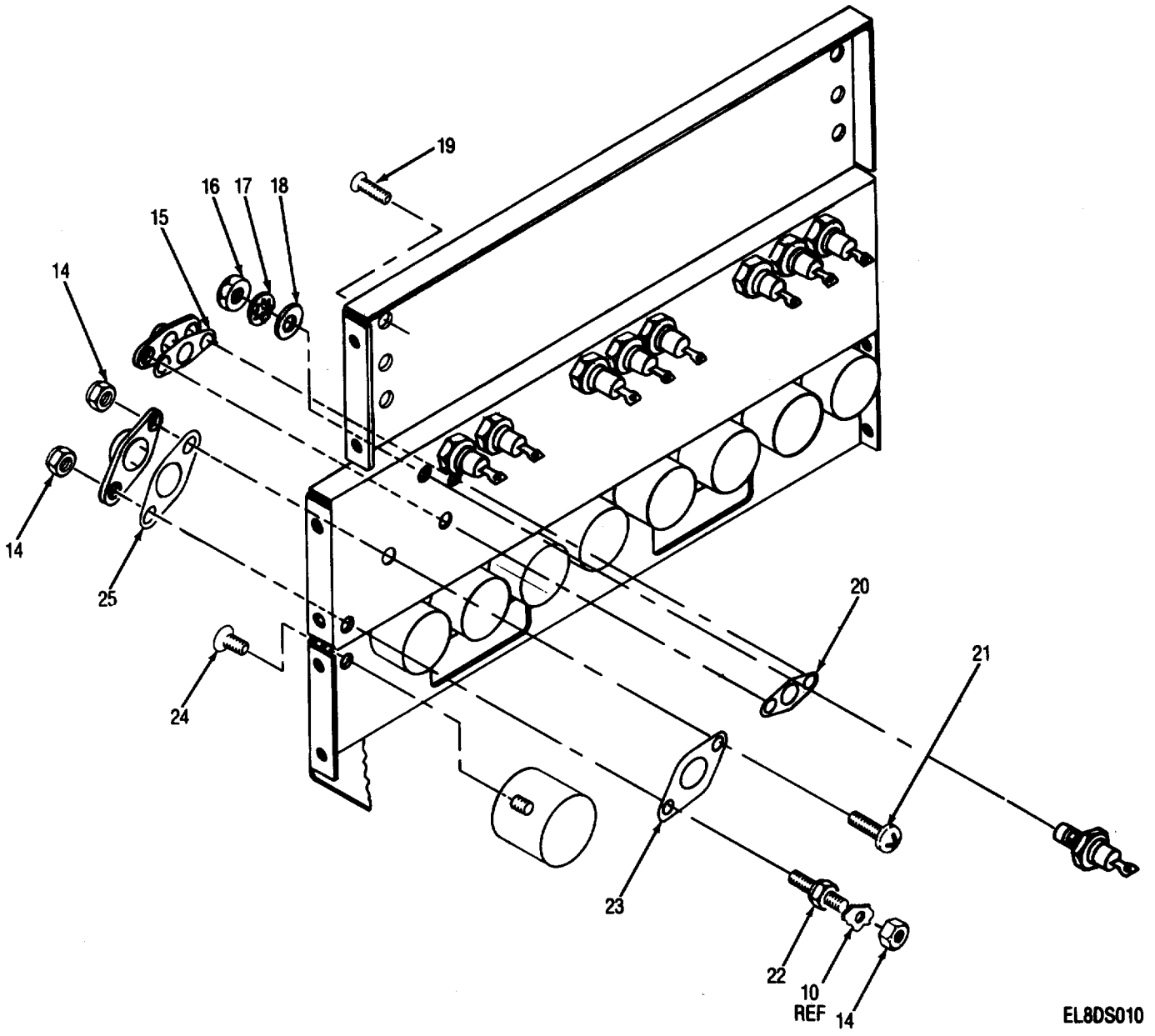


Figure 3-3 (2). Pulser Assembly A1 (Sheet 2 of 2)

d. To disassembly capacitor assembly A13, proceed as follows (fig. 3-4):

(1) Remove 6 screws (2) and 6 washers (8).

(2) Mark and disconnect all the positive capacitor leads from the bottom board (4) and remove board.

(3) Mark and disconnect the negative capacitor leads from the top board (1) and remove capacitors (3).

(4) Remove 6 screws (2) and separate the top board from the bracket (5).

e. To disassemble inverter assembly A2, proceed as follows (Item numbers below refer to figure 3-5 sheets 1 and 2 unless otherwise indicated):

(1) Mark and disconnect wires from transformer T7 (33) and capacitor C34 (32).

(2) Remove screw (13) attaching transformer to the chassis (14).

(3) Remove transformer and capacitor from chassis.

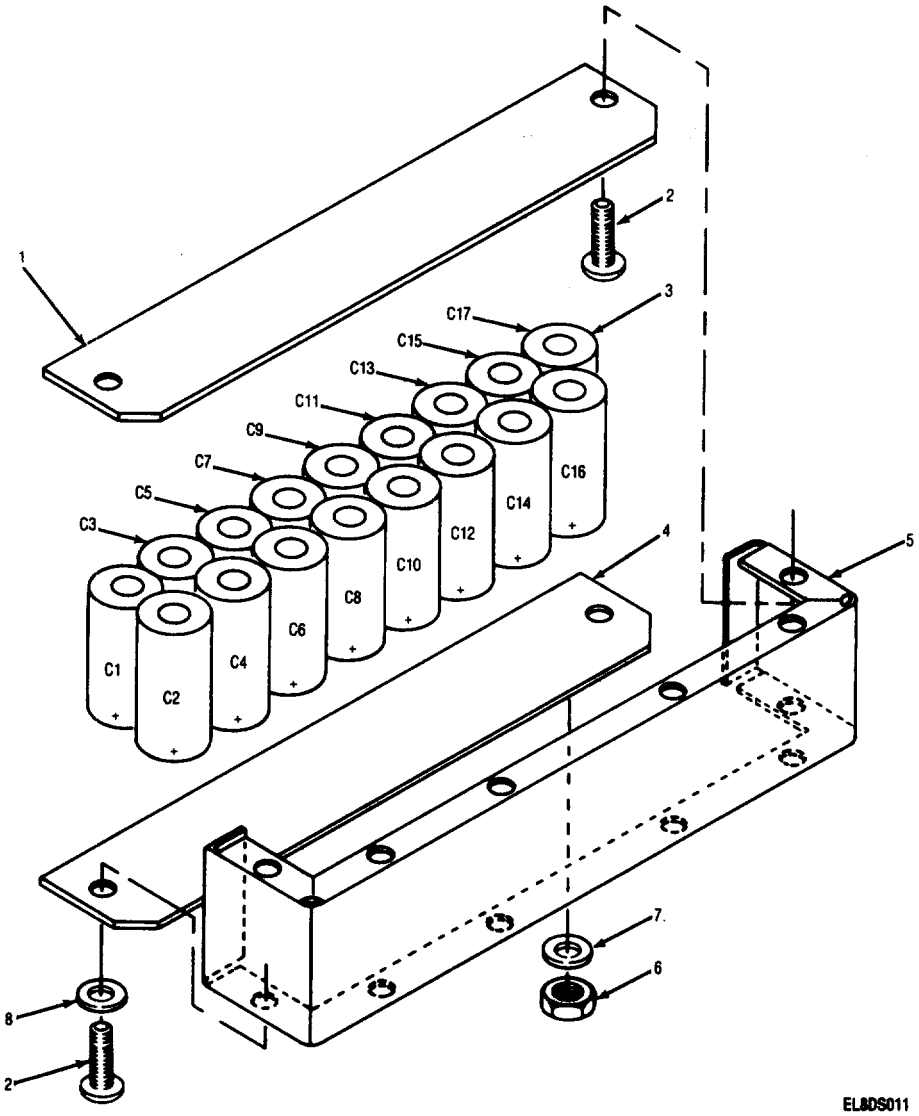
(4) Mark and disconnect the wires from transformer T1 (31).

(5) Remove 14 screws (30) and slide out inductor L1 (27).

NOTE

The following procedures defines the removal of modules A21 (15), Al1 (16), A24 (25), A28 (17), A27 (18), and A8 (19). If only one module is to be removed, refer to the illustration and remove only the hardward securing the module.

(6) Remove 19 screws (12), nine screws (13), three screws (23), and six lockwashers (24).



Legend for Figure 3-4.

1. Board, top
2. Screw, mach, 4-40 x F
3. Capacitor
4. Board, bottom
5. Bracket
6. Nut, hex, 6-32
7. Washer, lock, no. 6
8. Washer, nylon shoulder

Figure 3-4. Capacitor Assembly A13.

(7) Remove three brackets (20,21,22).
(8) Mark and disconnect any leads to the modules.
(9) Remove modules A21, A22, and A24.
(10) Remove six screws (12) from top of chassis (14).
(11) Remove modules A8, A27, and A28.
(12) Further disassemble any module are required by removing individual components as shown on figures 3-6, 3-7, 3-8, or 3-9.

NOTE

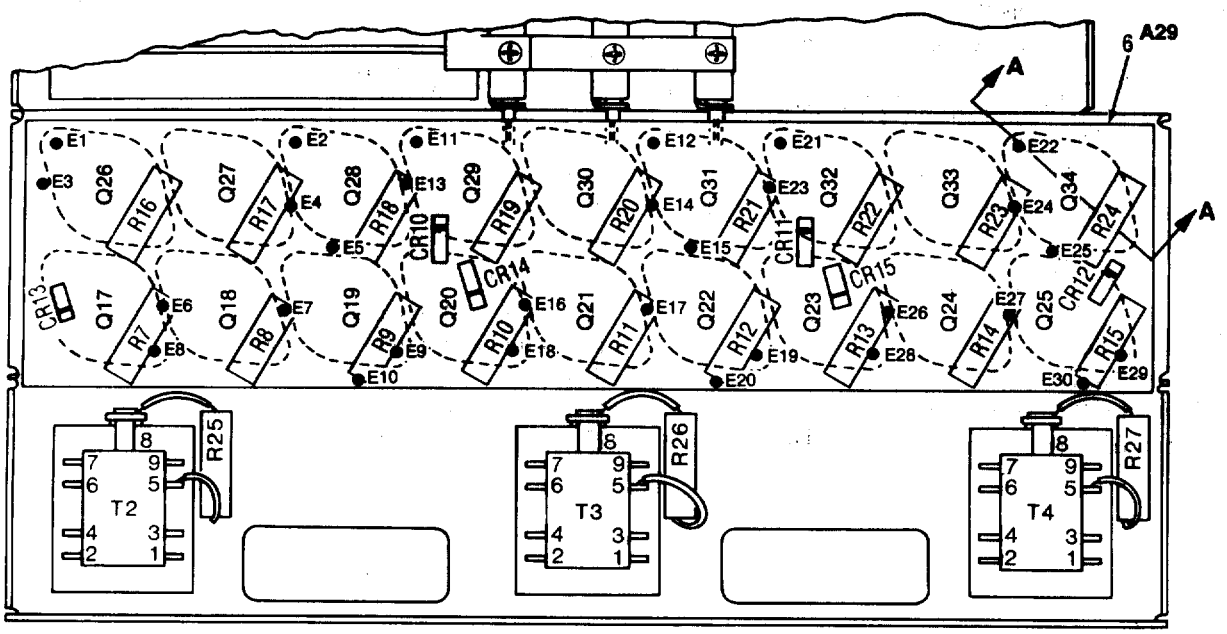
The following procedure defines the removal of transformer T2, T3, or &4 (5, Fig. 3-5). Repeat the procedure for each transformer.

(13) Mark and disconnect transformer leads.
(14) Remove one screw (12) and two screws (35) from the chassis (14).
(15) Remove transformer.

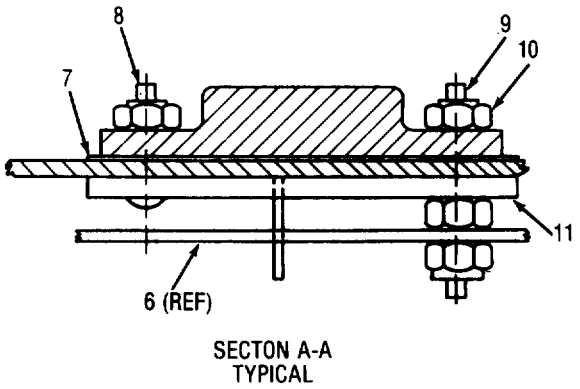
NOTE

To disassemble transistors Q17 through Q34 (2), proceed as follows: Instructions are given for the removal of one transistor. Repeat procedure for each transistor removed.

(16) Mark and disconnect base and emitter leads.
(17) Remove two nuts (10) from the case side of the transistor.
(18) Remove transistor from mount (11).
(19) Remove insulator (7) from transistor.



NOTE: TRANSFORMER SECTION REMOVED FOR CLARITY. SEE SHEET 2 FOR COMPLETE ASSEMBLY DETAILS.



SECTON A-A
TYPICAL

LEGEND					
REF DES	ITEM NO	REF DES	ITEM NO	REF DES	ITEM NO.
CR10	1	Q27	2	R15	3
CR11	1	Q28	2	R16	3
CR12	1	Q29	2	R17	3
CR13	1	Q30	2	R18	3
CR14	1	Q31	2	R19	3
CR15	1	Q32	2	R20	3
Q17	2	Q33	2	R21	3
Q18	2	Q34	2	R22	3
Q19	2	R7	3	R23	3
Q20	2	R8	3	R24	3
Q21	2	R9	3	R25	4
Q22	2	R10	3	R26	4
Q23	2	R11	3	R27	4
Q24	2	R12	3	T2	5
Q25	2	R13	3	T3	5
Q26	2	R14	3	T4	5

NOTE: PREFIX ALL REFERENCE DESIGNATORS WITH A2.

EL8DS012

Legend for Figure 3-5.

1. Diode
2. Transistor
3. Resistor
4. Resistor
5. Transformer
6. Printed ckt board
7. Insulator
8. Screw, mach, 6-32 x 7/16
9. Stud
10. Nut, hex, 6-32
11. Mount, transistor
12. Screw, mach, 4-40 XF
13. Screw, self lock, 4-40XF
14. Chassis assy, left
15. Circuit card assy
16. Circuit card assy
17. Pulser filter assy
18. Capacitor assy
19. Capacitor assy
20. Retainer brkt
21. Retainer brkt
22. Retainer brkt
23. Screw, mach 4-40 XF
24. Washer, lock, no. 4
25. Regulator assy
26. Frame, left
27. Inductor power fltr
28. Frame, right
29. Screw, mach, 6-32 XG
30. Screw, self lock, 6-32 x G
31. Transformer
32. Capacitor
33. Transformer
34. Terminal strip
35. Screw, self lock, 4-40 x 3/16

Figure 3-5 (l). lnverter Assembly A2 (Sheet 1 of 2).

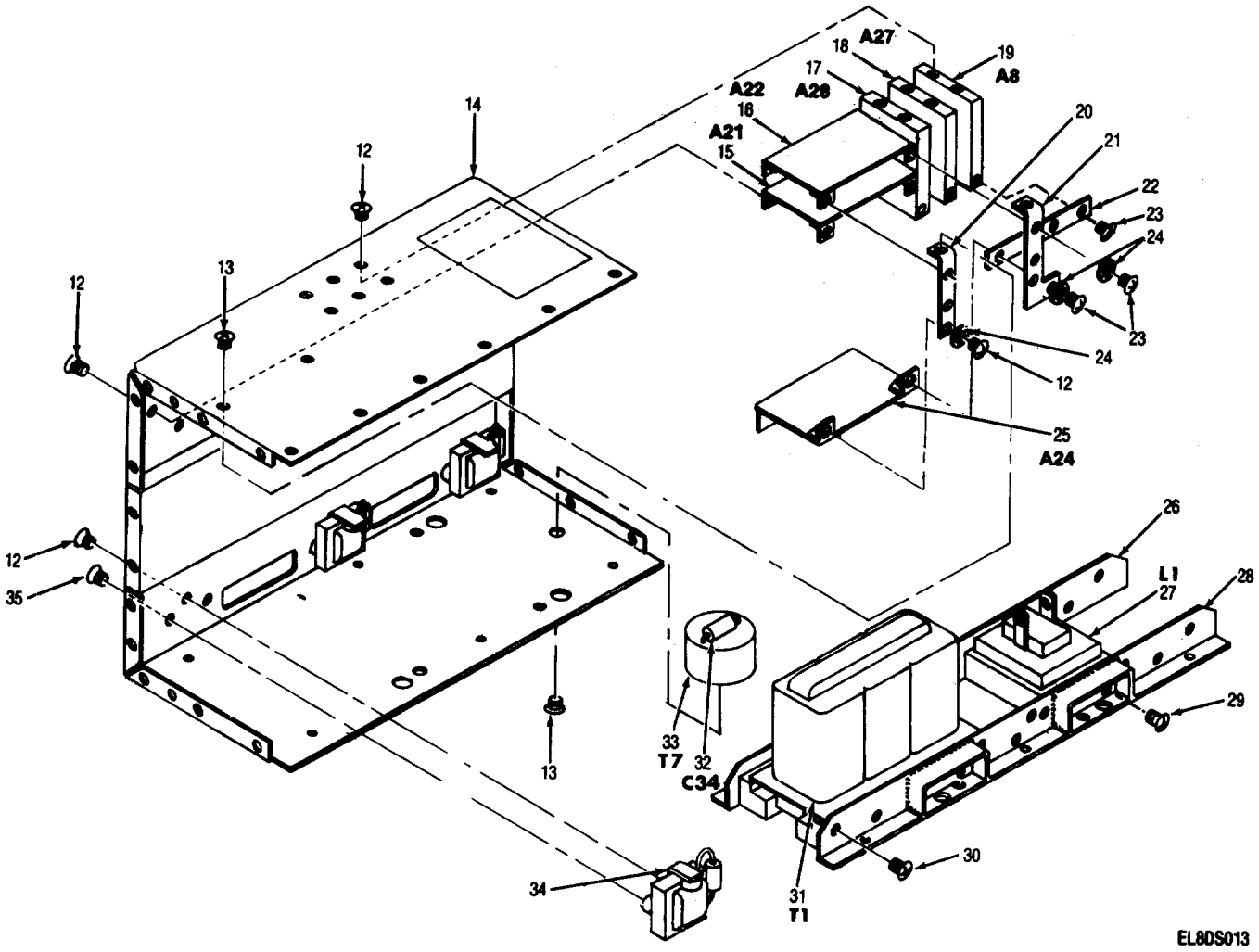
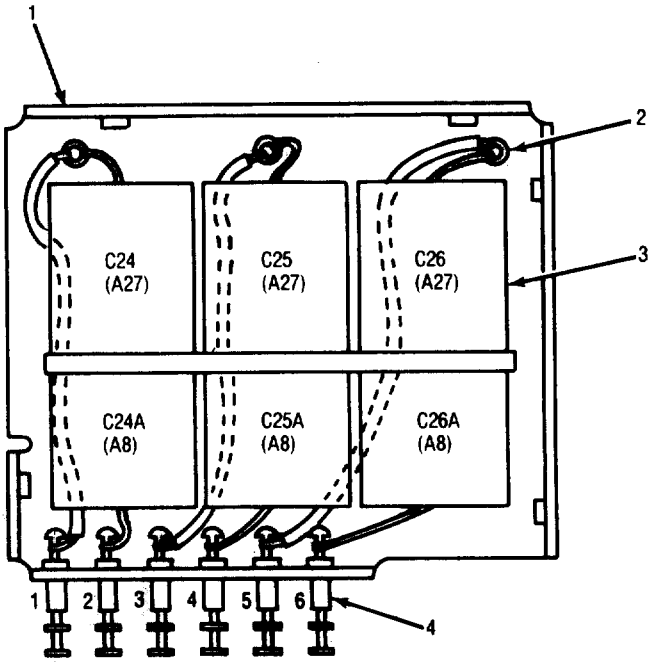
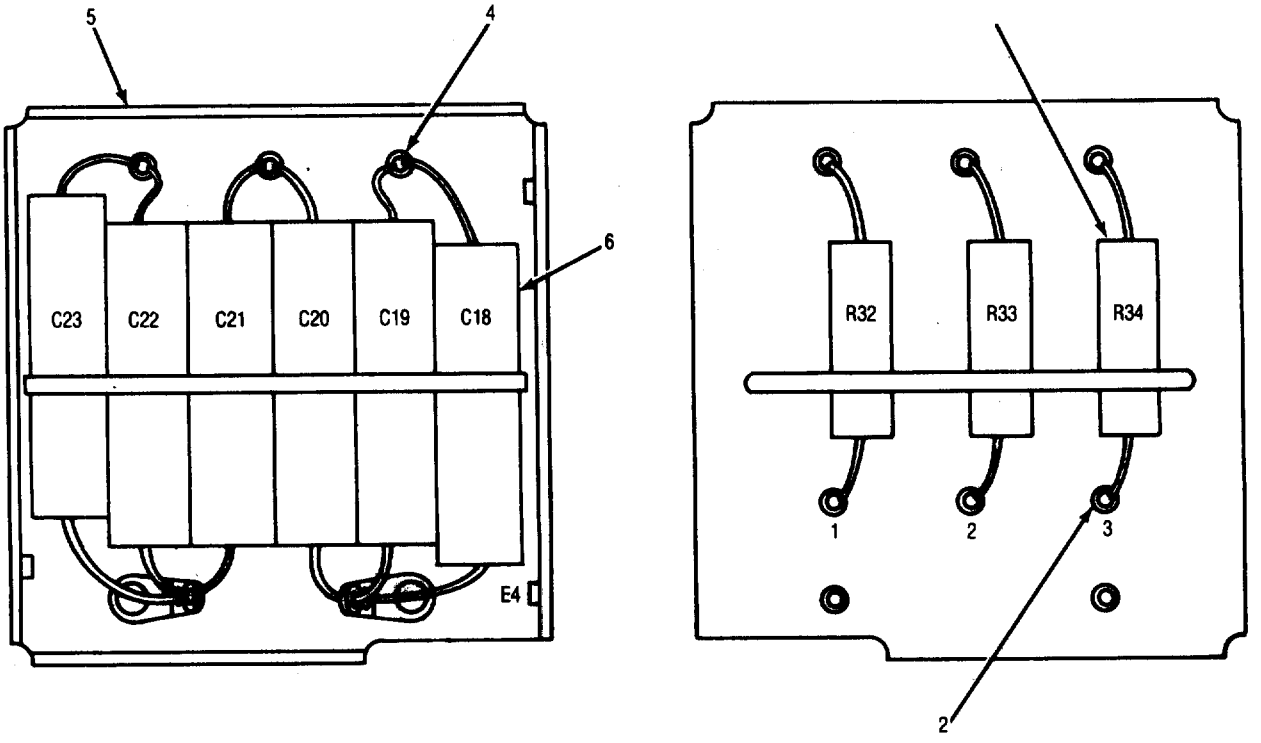


Figure 3-5 (2) Inverter Assembly A2 (Sheet 2 of 2).



A8 AND A27



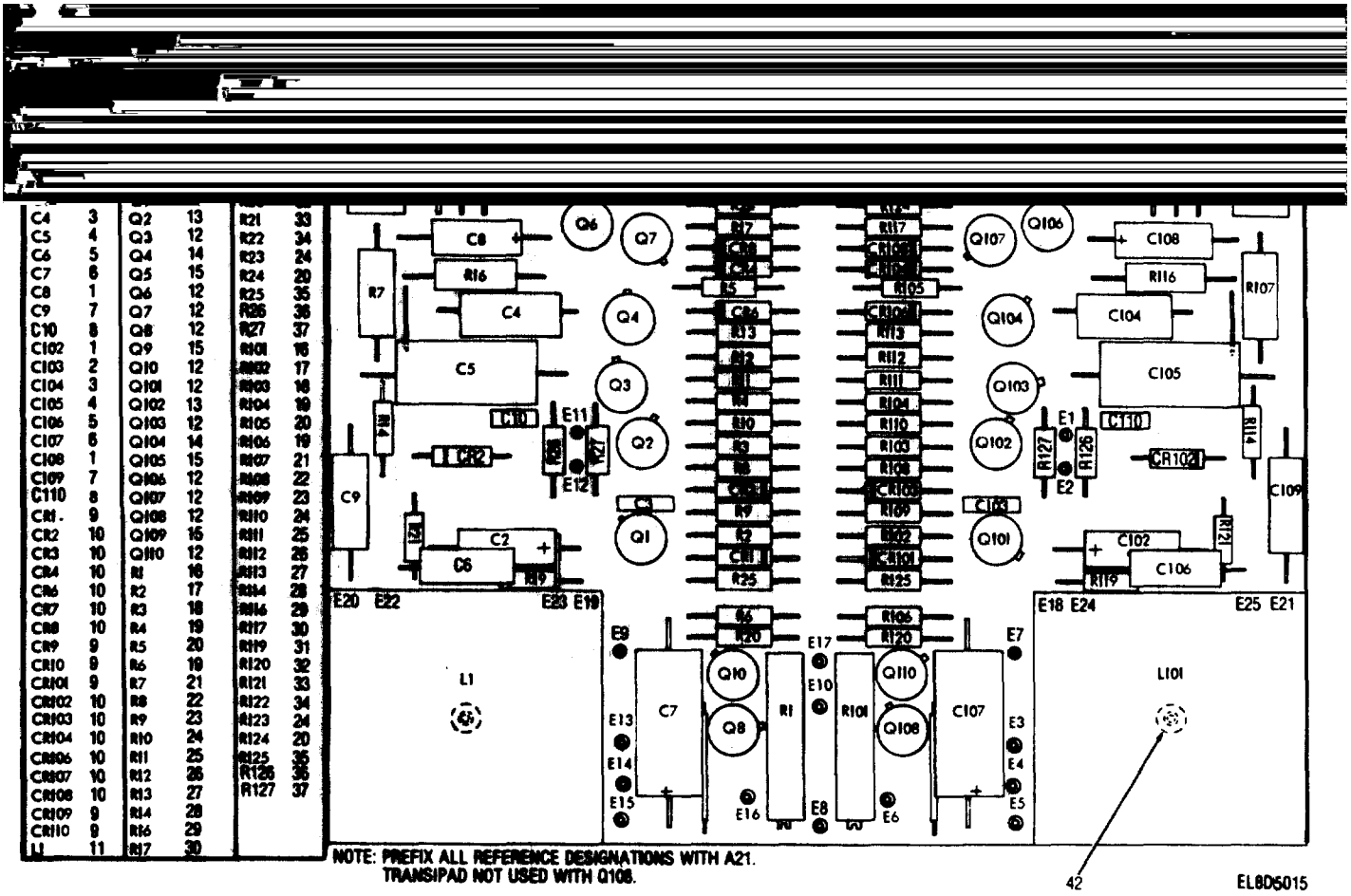
A28

EL8DS014

Legend for Figure 3-6.

1. Mounting bracket
2. Terminal, stand-off
3. Capacitor
4. Terminal, feed-thru
5. Mounting bracket
6. Capacitor
7. Resistor

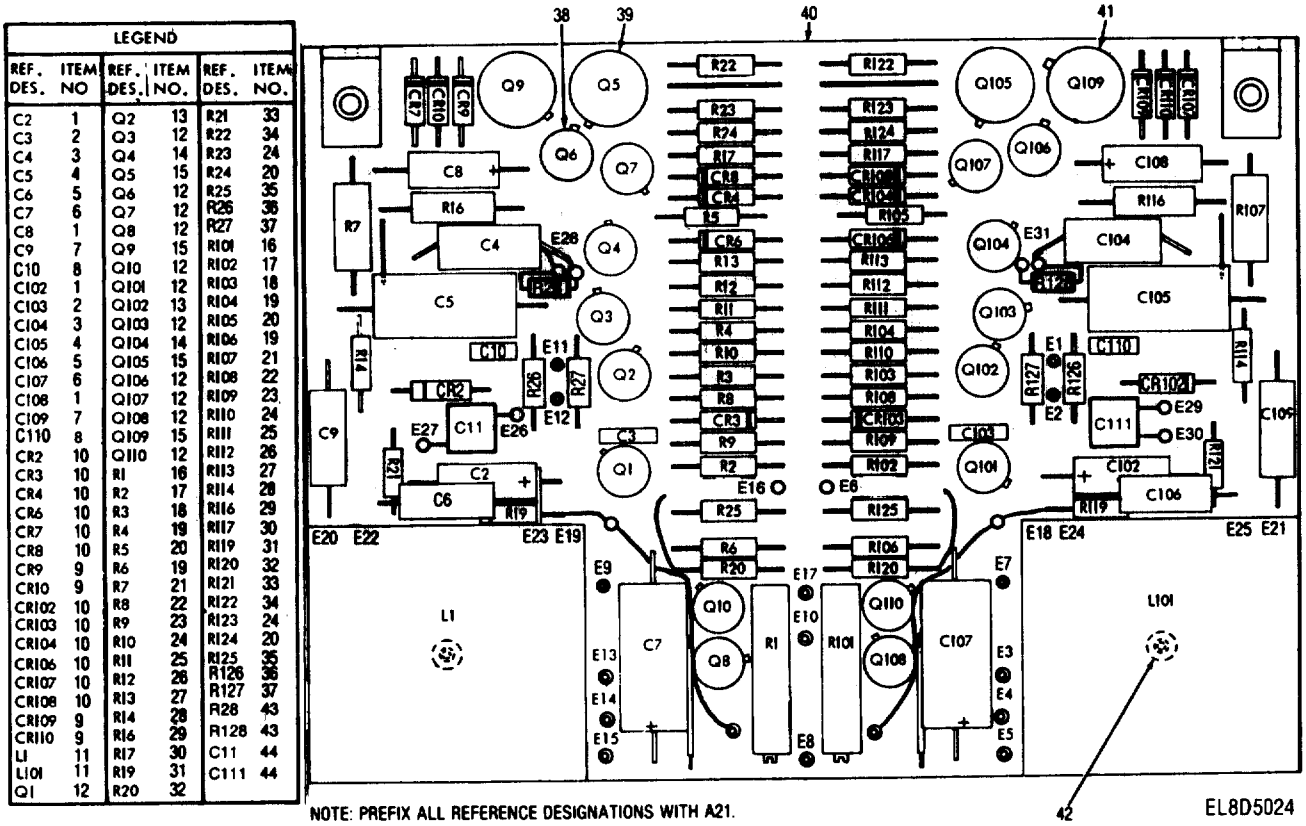
Figure 3-6. Capacitor Assemblies A8 and A27, and Filter Assembly A28.



Legend for Figure 3-7 (Sheet *1 of* 3)

1. Capacitor, elect
2. Capacitor, elect
3. Capacitor, ceramic
4. Capacitor, plastic
5. Capacitor, plastic (select)
6. Capacitor, elect
7. Capacitor, plastic
8. Capacitor, ceramic
9. Diode
10. Diode
11. Inductor
13. Transistor
14. Transistor
15. Transistor
16. Resitor, variable
17. Resistor, film
18. Resistor, film
19. Resistor, film
20. Resistor, comp
21. Resistor, comp
22. Resistor, film
23. Resistor, comp
24. Resistor, comp
25. Resistor, comp
26. Resistor, film
27. Resistor, film
28. Resistor, film
29. Resistor, comp
30. Resistor, comp
31. Resistor, film
32. Resistor, film
33. Resistor, film (select)
34. Resistor, comp
35. Resistor, comp
36. Resistor, comp
37. Resistor, comp
38. Mtg pad, transistor
39. Mtg pad, transistor
40. Printed circuit bd
41. Mtg pad, transistor
42. Screw, mach., 4-40 x 3 16

Figure 3-7. Printed Circuit Board Assembly A21 (Sheet 1 of 3)
Serial Number 8015-369-24 To 8148-807-24.

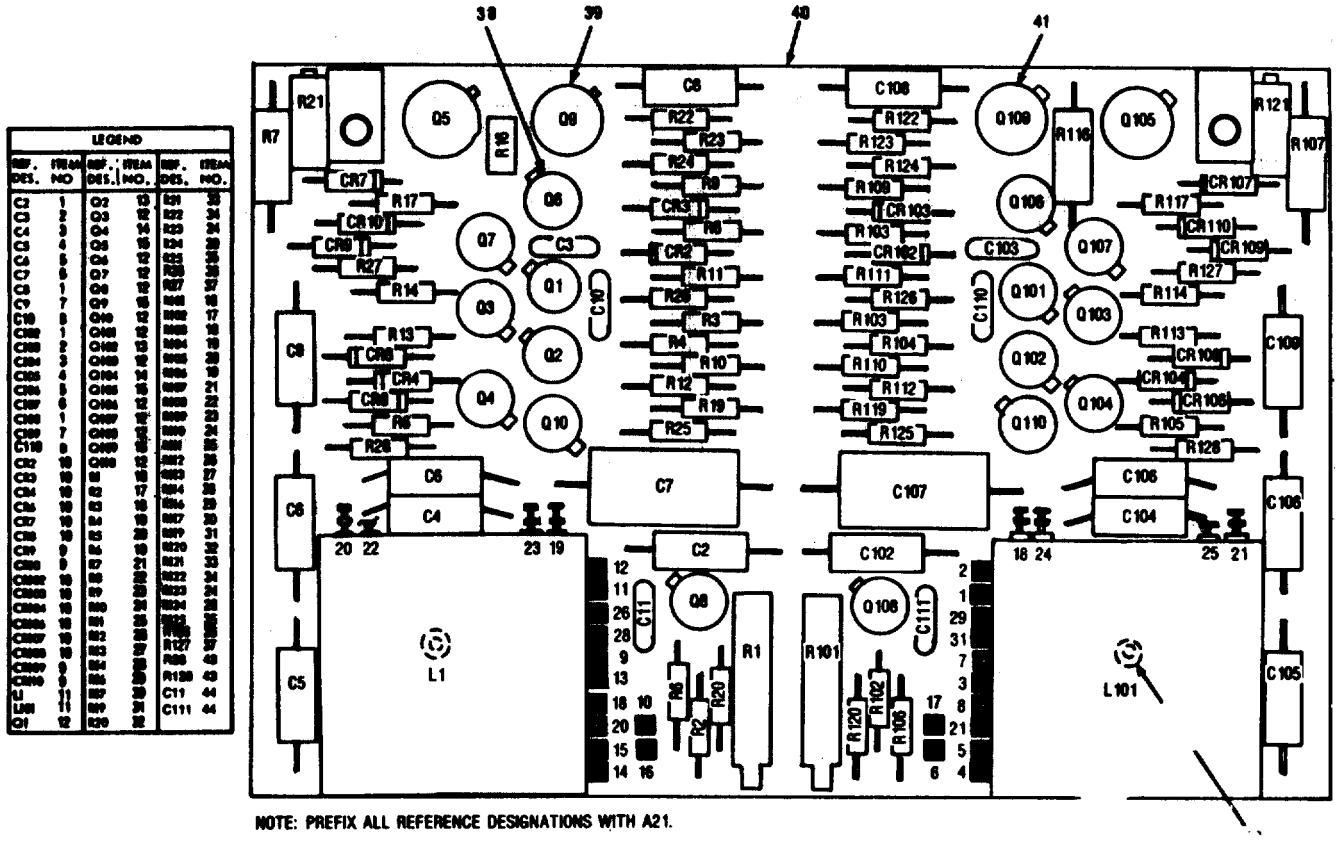


REF. DES.	ITEM NO	REF. DES.	ITEM NO.	REF. DES.	ITEM NO.
C2	1	Q2	13	R21	33
C3	2	Q3	12	R22	34
C4	3	Q4	14	R23	24
C5	4	Q5	15	R24	20
C6	5	Q6	12	R25	35
C7	6	Q7	12	R26	36
C8	1	Q8	12	R27	37
C9	7	Q9	15	R101	16
C10	8	Q10	12	R102	17
C102	1	Q101	12	R103	18
C103	2	Q102	13	R104	19
C104	3	Q103	12	R105	20
C105	4	Q104	14	R106	19
C106	5	Q105	15	R107	21
C107	6	Q106	12	R108	22
C108	1	Q107	12	R109	23
C109	7	Q108	12	R110	24
C110	8	Q109	15	R111	25
CR2	10	Q110	12	R112	26
CR3	10	R1	16	R113	27
CR4	10	R2	17	R114	28
CR6	10	R3	18	R116	29
CR7	10	R4	19	R117	30
CR8	10	R5	20	R119	31
CR9	9	R6	19	R120	32
CR10	9	R7	21	R121	33
CR102	10	R8	22	R122	34
CR103	10	R9	23	R123	24
CR104	10	R10	24	R124	20
CR106	10	R11	25	R125	35
CR107	10	R12	26	R126	36
CR108	10	R13	27	R127	37
CR109	9	R14	28	R28	43
CR110	9	R16	29	R128	43
L1	11	R17	30	C11	44
L101	11	R19	31	C111	44
Q1	12	R20	32		

Legend for Figure 3-7 (Sheet 2 of 3)

1. Capacitor, elect
2. Capacitor, elect
3. Capacitor, ceramic
4. Capacitor, plastic
5. Capacitor, plastic (select)
6. Capacitor, elect
7. Capacitor, plastic
8. Capacitor, ceramic
9. Diode
10. Diode
11. Inductor
12. Transistor
13. Transistor
14. Transistor
15. Transistor
16. Resitor, variable
17. Resistor, film
18. Resistor, film
19. Resistor, film
20. Resistor, comp
21. Resistor, comp
22. Resistor, film
23. Resistor, comp
24. Resistor, comp
25. Resistor, comp
26. Resistor, film
27. Resistor, film
28. Resistor, film
29. Resistor, comp
30. Resistor, comp
31. Resistor, film
32. Resistor, film
33. Resistor, film (select)
34. Resistor, comp
35. Resistor, comp
36. Resistor, comp
37. Resistor, comp
38. Mtg pad, transistor
39. Mtg pad, transistor
40. Printed circuit bd
41. Mtg pad, transistor
42. Screw, mach., 4-40 x 3 16
43. Resistor, comp
44. Capacitor, ceramic

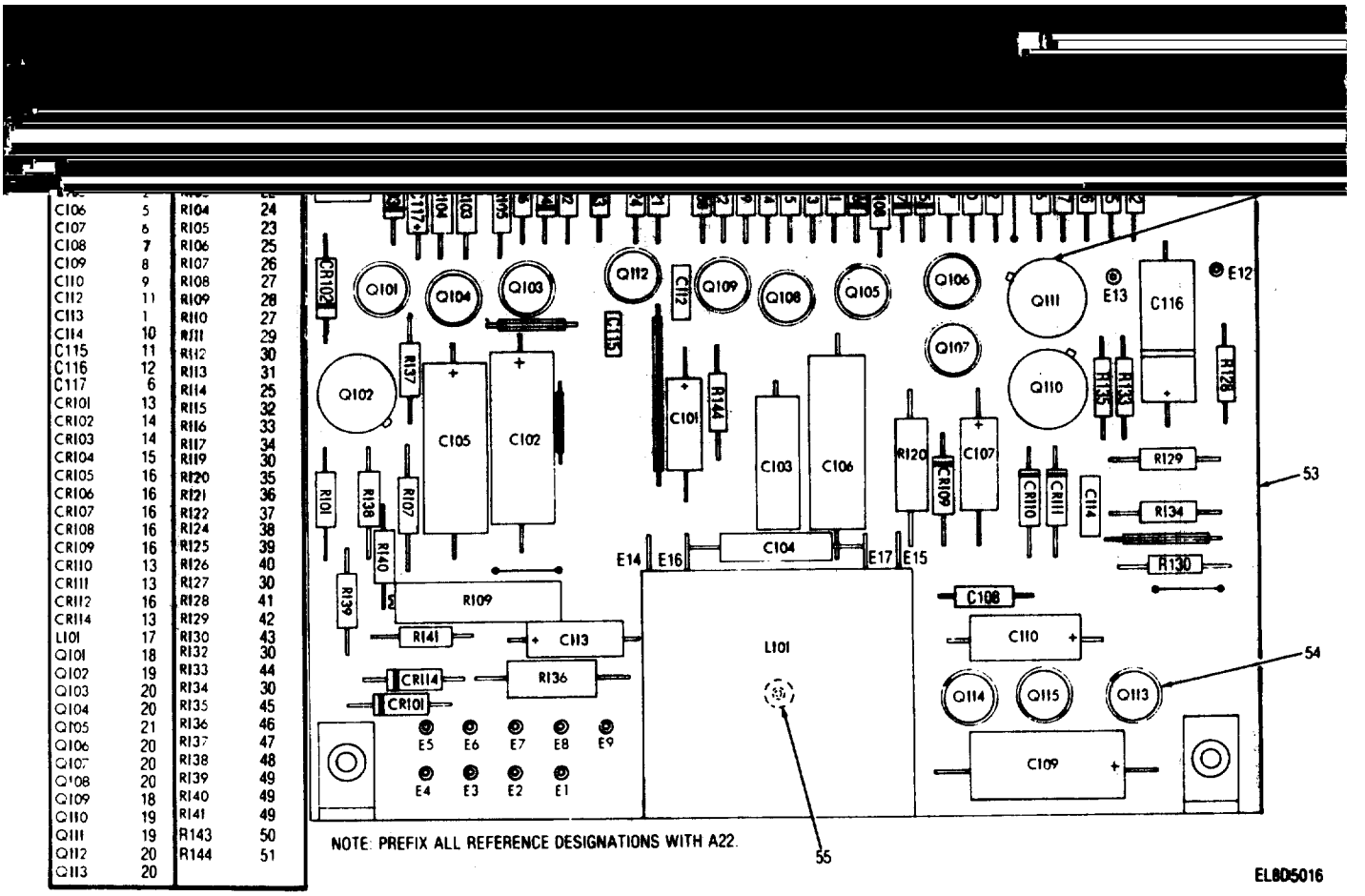
Figure 3-7. Printed Circuit Board Assembly A21 (Sheet 2 of 3)
Serial Numbers 8220-841-24 To 8439-1309.



Legend for Figure 3-7 (Sheet 3 of 3)

1. Capacitor, elect
2. Capacitor, elect
3. Capacitor, ceramic
4. Capacitor, plastic
5. Capacitor, plastic (select)
6. Capacitor, elect
7. Capacitor, plastic
8. Capacitor, ceramic
9. Diode
10. Diode
11. Inductor
12. Transistor
13. Transistor
14. Transistor
15. Transistor
16. Resitor, variable
17. Resistor, film
18. Resistor, film
19. Resistor, film
20. Resistor, comp
21. Resistor, comp
22. Resistor, film
23. Resistor, comp
24. Resistor, comp
25. Resistor, comp
26. Resistor, film
27. Resistor, film
28. Resistor, film
29. Resistor, comp
30. Resistor, comp
31. Resistor, film
32. Resistor, film
33. Resistor, variable
34. Resistor, comp
35. Resistor, comp
36. Resistor, comp
37. Resistor, comp
38. Mtg pad, transistor
39. Mtg pad, transistor
40. Printed circuit bd
41. Mtg pad, transistor
42. Screw, mach., 4-40 x 3 16
43. Resistor, comp
44. Capacitor, ceramic

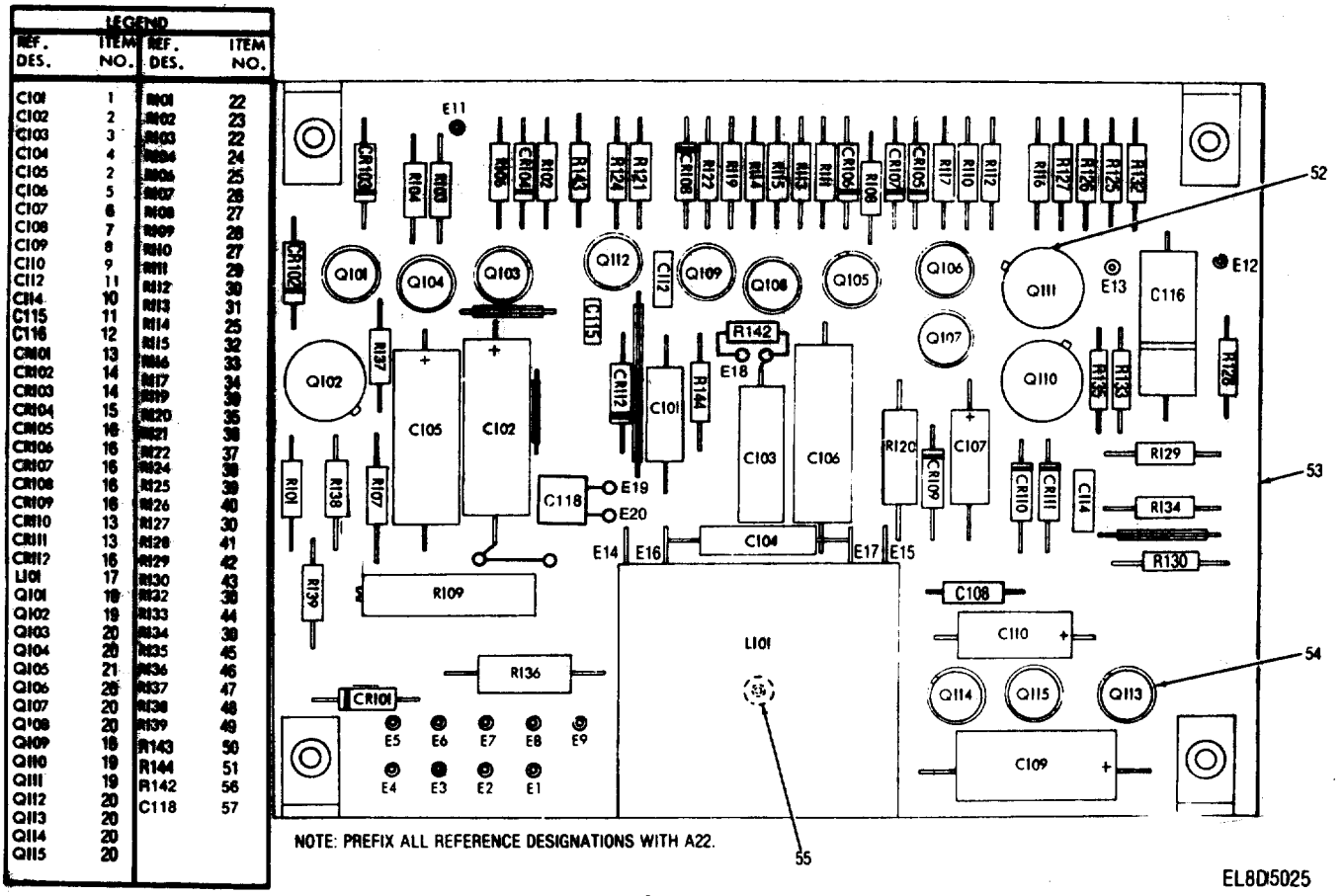
Figure 3-7. Printed Circuit Board Assembly A21 (Sheet 3 of 3)
Serial Numbers 8439-1310C and up



Legend for Figure 3-8 (Sheet 1 of 3)

1. Capacitor, elect
2. Capacitor, elect
3. Capacitor, plastic
4. Capacitor, plastic (select)
5. Capacitor, plastic
6. Capacitor, elect
7. Capacitor, plastic
8. Capacitor, elect
9. Capacitor, elect
10. Capacitor, ceramic
11. Capacitor, ceramic
12. Capacitor, ta
13. Diode
14. Diode
15. Diode
16. Diode
17. Inductor
18. Transistor
19. Transistor
20. Transistor
21. Transistor
22. Resistor, comp
23. Resistor, film
24. Resistor, comp
25. Resistor, film
26. Resistor, film
27. Resistor, comp
28. Resistor, variable
29. Resistor, film
30. Resistor, comp
31. Resistor, film
32. Resistor, comp
33. Resistor, comp
34. Resistor, comp
35. Resistor, comp
36. Resistor, comp
37. Resistor, film
38. Resistor, film
39. Resistor, film
40. Resistor, film
41. Resistor, comp
42. Resistor, comp (select)
43. Resistor, comp (select)
44. Resistor, comp
45. Resistor, comp
46. Resistor, comp
47. Resistor, comp
48. Resistor, comp
49. Resistor, film
50. Resistor, comp
51. Resistor, ww
52. Mtg pad, transistor
53. Printed circuit bd
54. Mtg pad, transistor
55. Screw, mach, 4-40 x .188 lg

Figure 3-8. Printed Circuit Board Assembly A22 (Sheet 1 of 3)
Serial Numbers 8015-369-24 to 8148-807-24.

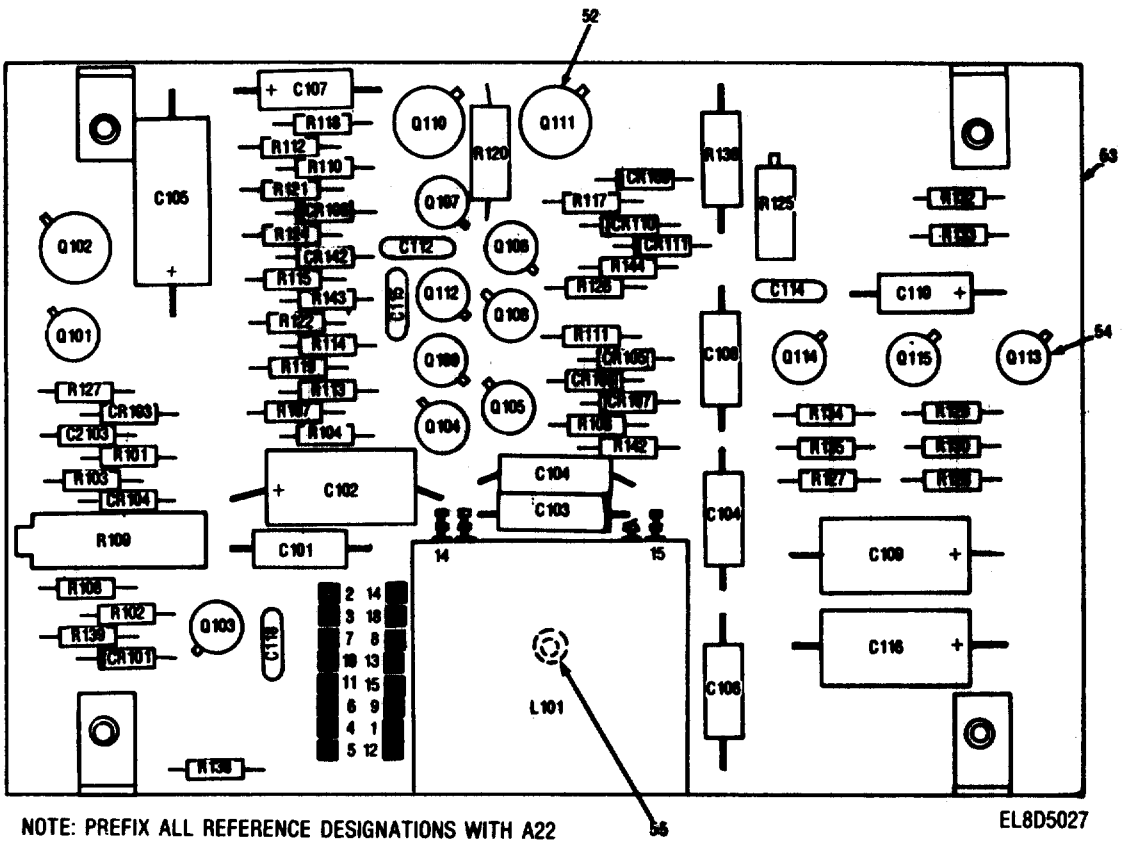


Legend for Figure 3-8 (Sheet 2 of 3)

1. Capacitor, elect
2. Capacitor, elect
3. Capacitor, plastic
4. Capacitor, plastic (select)
5. Capacitor, plastic
6. Capacitor, elect
7. Capacitor, plastic
8. Capacitor, elect
9. Capacitor, elect
10. Capacitor, ceramic
11. Capacitor, ceramic
12. Capacitor, ta
13. Diode
14. Diode
15. Diode
16. Diode
17. Inductor
18. Transistor
19. Transistor
20. Transistor
21. Transistor
22. Resistor, comp
23. Resistor, film
24. Resister, comp
25. Resistor, film
26. Resistor, film
27. Resistor, comp
28. Resistor, variable
29. Resistor, film
30. Resistor, comp
31. Resistor, film
32. Resistor, comp
33. Resistor, comp
34. Resistor, comp
35. Resistor, comp
36. Resistor, comp
37. Resistor, film
38. Resistor, film
39. Resistor, film (select)
40. Resistor, film
41. Resistor, comp
42. Resistor, comp (select)
43. Resistor, comp (select)
44. Resistor, comp
45. Resistor, comp
46. Resistor, comp
47. Resistor, comp
48. Resistor, comp
49. Resistor, film
50. Resistor, comp
51. Resistor, ww
52. Mtg pad, transistor
53. Printed circuit bd
54. Mtg pad, transistor
55. Screw, mach, 4-40 x .188 lg
56. Resistor, comp
57. Capacitor, ceramic

Figure 3-8. Printed (Circuit Board Assembly A22 (Sheet 2 of 3)
Serial Numbers 8220-841-24 To 8439-1309

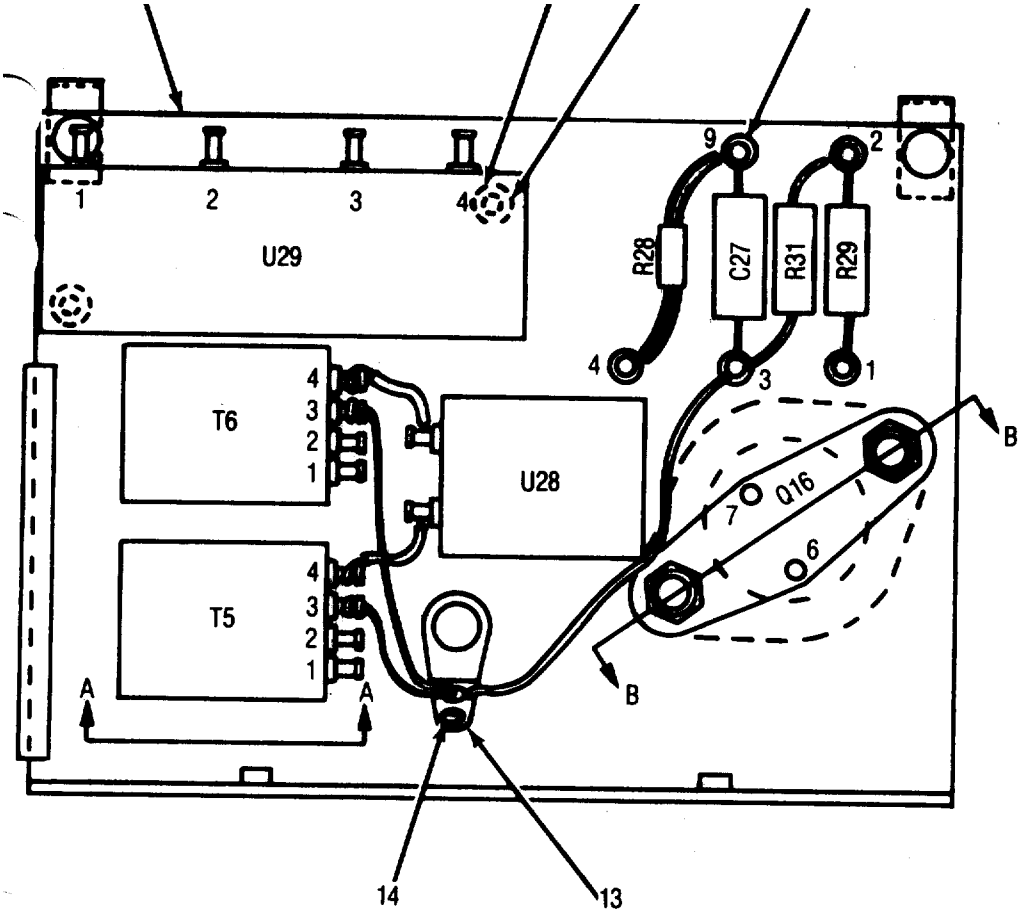
LEGEND			
REF. DES.	ITEM NO.	REF. DES.	ITEM NO.
C101	1	R101	22
C102	2	R102	23
C103	3	R103	22
C104	4	R104	24
C105	2	R105	25
C106	5	R107	26
C107	6	R108	27
C108	7	R109	28
C109	8	R110	27
C110	9	R111	29
C112	11	R112	30
C114	10	R113	31
C115	11	R114	32
C116	12	R115	33
CR101	13	R116	33
CR102	14	R117	34
CR103	14	R119	35
CR104	15	R120	35
CR105	16	R121	36
CR106	16	R122	37
CR107	16	R124	38
CR108	16	R125	39
CR109	16	R126	40
CR110	13	R127	39
CR111	13	R128	41
CR112	16	R129	42
L101	17	R130	43
Q101	18	R132	39
Q102	19	R133	44
Q103	20	R134	39
Q104	20	R135	45
Q105	21	R136	46
Q106	20	R137	47
Q107	20	R138	48
Q108	20	R139	49
Q109	18	R143	50
Q110	19	R144	51
Q111	19	R142	56
Q112	20	C118	57
Q113	20		
Q114	20		
Q115	20		



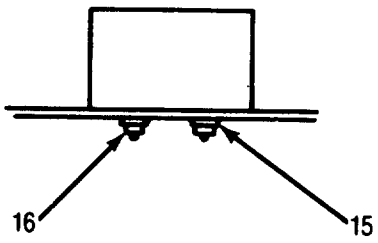
Legend for Figure 3-8 (Sheet 3 of 3)

1. Capacitor, elect
2. Capacitor, elect
3. Capacitor, plastic
4. Capacitor, plastic (select)
5. Capacitor, plastic
6. Capacitor, elect
7. Capacitor, plastic
8. Capacitor, elect
9. Capacitor, elect
10. Capacitor, ceramic
11. Capacitor, ceramic
12. Capacitor, ta
13. Diode
14. Diode
15. Diode
16. Diode
17. Inductor
18. Transistor
19. Transistor
20. Transistor
21. Transistor
22. Resistor, comp
23. Resistor, film
24. Resistor, comp
25. Resistor, film
26. Resistor, film
27. Resistor, comp
28. Resistor, variable
29. Resistor, film
30. Resistor, comp
31. Resistor, film
32. Resistor, comp
33. Resistor, comp
34. Resistor, comp
35. Resistor, comp
36. Resistor, comp
37. Resistor, film
38. Resistor, film
39. Resistor, Variable
40. Resistor, film
41. Resistor, comp
42. Resistor, comp (select)
43. Resistor, comp (select)
44. Resistor, comp
45. Resistor, comp
46. Resistor, comp
47. Resistor, comp
48. Resistor, comp
49. Resistor, film
50. Resistor, comp
51. Resistor, ww
52. Mtg pad, transistor
53. Printed circuit bd
54. Mtg pad, transistor
55. Screw, mach, 4-40 x .188 lg
56. Resistor, comp
57. Capacitor, ceramic

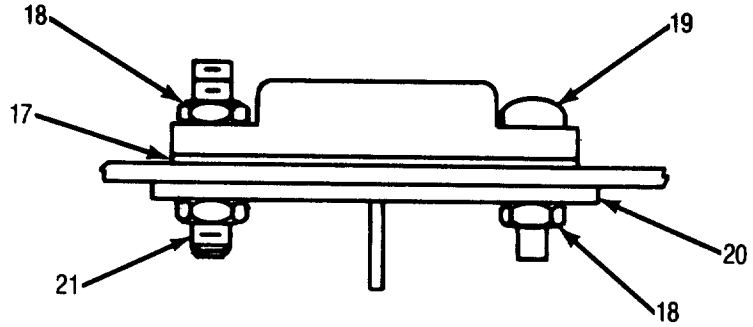
Figure 3-8. Printed Circuit Board Assembly A22 (Sheet 3 of 3)
Serial Numbers 8439-1310C and up



REF DES	ITEM NO.
C27	1 *
Q16	2
R28	3 *
R29	4
R31	5
T5	6
T6	6
U28	7
U29	8



SECTION A-A



SECTION B-B

EL8DS017

1. Capacitor, plastic *
2. Transistor
3. Resistor, comp *
4. Resistor, ww
5. Resistor, comp
6. Rransformer
7. Compensation module
8. Filter module
9. Bracket
10. Screw, mach, 4-40 x 3/16
11. Washer, lock, no. 4
12. Terminal, insulated
13. Terminal, lug
14. Rivet
15. Washer, lock, no. 2
16. Nut, hex, 2-56
17. Insulator
18. Nut, self lock, 6-32
19. Screw, mach 6-32 x H
20. Transistor mount
21. Stud

*Used only in serial numbers 8015-369-24 to 8148-807-24.

Figure 3-9. Regulator Assembly A24.

3-12. Assembly Instructions

a. To assemble the PP-7274D/A Static Power Inverter, follow the disassembly instructions in reverse order. When making solder connections, use only approved solder QQ571, part number Sn63-W-RA-P3. After a connection is made, brush on Hysol 22H (Electra Science Laboratories, Inc., Pennsauken, NJ. 08110, FC52539 or equivalent) to protect solder joints.

b. When assembling the pulser assembly A1 (2, fig. 3-2) follow the disassembly instructions in reverse order using the following precautions.

CAUTION

Use a new insulator when installing a transistor. The plastic insulator is only .005 thick. Any burrs or nicks on either the transistor or the chassis will bite through the insulator. Both the transistor and the chasses should be cleaned thoroughly with an approved dry cleaning solvent prior to installation. Remove any burrs or nicks with a fine grit sand paper or emery cloth.

(1) Make sure that transistors Q1 through Q15 (3, 4, and 5, fig. 3-3) are installed with nuts (14) and proper insulators (15 or 25). The replacement insulators are precoated with a heat transfer compound. To insure that the transistors are properly installed, connect the positive lead of an ohmmeter (set to the highest scale) to the case (collector) of the transistor and the negative lead to the chassis (ground). The resistance should read 50 megohms or greater with the collector wiring disconnected.

(2) Before installing inductors L2 through L10 (2, fig. 3-3), coat the bottom lightly with epoxy C-7 (J.S. Sevilzer Assoc., Paramount CA, FC09011 or equivalent).

CAUTION

When assembling capacitor assembly A13 (12, fig. 3-3), shoulder washers (8, fig. 3-4) must be properly installed. Do not allow the washer to be cocked to one side. The washer insulates the +28 vdc from ground.

c. When assembling the inverter assembly A2 (8, fig. 3-2), follow the disassembly instructions in reverse order using the following precautions.

CAUTION

Use a new insulator when installing transistor. The plastic insulator is only .005 thick. Any burrs or nicks on either the transistor or the chassis will bite through the insulator. Both the transistor and the chassis should be cleaned thoroughly with an approved dry cleaning solvent prior to installation. Remove any burrs or nicks with a fine grit sand paper or emery cloth.

(1) Make sure that transistors Q17 through Q34 (2, fig. 3-5) are installed with nuts (10) and insulator (7). The replacement insulator is precoated with a heat transfer compound. To insure that the transistors are properly installed, perform the ohmmeter check described in paragraph 3-12b(l).

(2) When installing a resistor (4, fig. 3-5) on transformer T2, T3, or T4 (5) lightly coat the mounting surface of the resistor with epoxy C7 or equivalent.

d. When installing regulator assembly A24 (25, fig. 3-5), attach a two inch piece of Grom Strip (Part No. GSN-1, ICO/RALLY, Palo Alto, CA, FA51705 or equivalent) to the edge of bracket (9, fig. 3-9) to prevent harness chafing. Lightly cost the mounting surface with epoxy C7 or equivalent.

Section V. FINAL TESTS

3-13. General

a. The following test procedures shall be used to, insure that the inverter is ready for operational use. To qualify as operational, all performance standards shall be met. Failure of any one test will fail the unit and disqualify it for field use.

b. Special attention to test equipment control settings shall be made. Adherence to testing sequence is mandatory. Test equipment control settings and inverter measurements can be used in subsequent tests.

c. If during testing it is determined that an adjustment must be made to bring the unit to acceptable standards, all previous tests shall be repeated to be sure that no other test measurement has changed.

d. PhysicalTest and Inspection of the Inverter.

(1). Test Equipment and Materials. Tool Kit Electronic Equipment TK-100/G.

(2). Test Connections and Conditions. None required.

(3). Initial Test Equipment Settings. None required.

(4). Procedure. Test shall be performed in the order presented in table 3-8.

Table 3-8. Physical Inspection

Test procedure	Performance standard
a. Inspect all assemblies for loose or missing screws.	*a.* Screws shall be tight; none missing.
b. Inspect all surfaces for dents, scratches or gouges.	*b.* There shall be no dents, scratches or gouges.
c. Inspect all painted surfaces for chips or excessive wear.	*c.* There shall be no chips or sign of excessive wear.
d. Inspect all electronic connections and electronic components for fungus proofing.	*d.* All connections shall be coated with HYSOL 22H.

3-14. Final Test for Inverter.

a. Test Equipment and Materials. Test equipment and materials shall be as shown in test fixture parts list table 3-5 and test equipment list (table 3-4).

b. Test Connections and Conditions. Connect test equipment and material as shown in figure FO-6.

c. Initial Test Equipment Settings.

(1) Activate all test equipment and let stabilize for one-half hour.

(2) Turn power supply output voltage to zero before connecting supply to inverter.

d. Procedure. Tests shall be performed in the order presented in table 3-9 and meet the referenced test specifications shown in table 3-10. The inverter has no external adjustments. If it fails any of the tests, stop testing and perform troubleshooting in accordance with table 3-6 or adjustments in table 3-7.

Table 3-9. Final Test Procedures

Step No.	Control settings: Test Equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	**Refer to column 2,N/A table 3-10.**		*a.* Set output load conditions. Switches shall be as described in table 3-10, column 2.	
			b. Adjust input voltage to ±.5v of table 3-10 listing. Voltage shall be as described in table 3-10, column 3.	
			c. Adjust output. Output current shall be as shown in table 3-10, column 5.	
			d. Measure and record: (1) Input current (2) Output current for three phases (3) Output voltages for three phases (4) Frequency of any one phase (5) Total harmonic distortion for three phases	Refer to table 3-10, columns 4,5, 6,7,8 for limits.
2	Refer to column 2, N/A table 3-10.		Repeat steps la through le until all sections of table 3-10 have been completed.	Tests will be performed in the order presented in table 3-10.

Table 3-9. Final Test Procedures - Continued

Step No.	Control settings: Test Equipment	Control settings: Equipment under test	Test procedure	Performance standard
3	Reset all controls to test step 8 of table 3-10.		*a. Set* S6 to 200% Load.	*a.* Outputs are 65 V ac ± 5vac with 4.36 amp load.
			b. Adjust the autotransformers to provide a load of 4.36 amps per phase.	*b.* Input current does not exceed 50 amps.
			NOTE Make adjustments and readings quickly. Overcurrent foldback willoccur after a few seconds of overload operation.	
			c. Set S6 off Set S1 to No Load. Allow inverter 5 minutes to cool before proceeding.	*c.* None
4	Reset all controls to test 8 of table 3-10. **CAUTION** Allow inverter 5 minutes to cool at No Load between step 3 and 4 of table 3-9.		*a.* Depress S5 and hold. Read input current.	*a.* 50 amps max.
			b. Measure time in seconds until the input current reduces to about one half the initial level.	*b.* Minimum 5 seconds. Maximum 20 seconds.
			c. Read the input current.	*c.* 20 amps maximum
			d. Release S5.	*d.* None
			e. Measure the recovery time to full load within all specification limits.	*e.* Time to recover is less than two seconds,
			Set Vin to Zero. Disconnect the inverter. Test complete.	

Table 3-10. Test Specifications

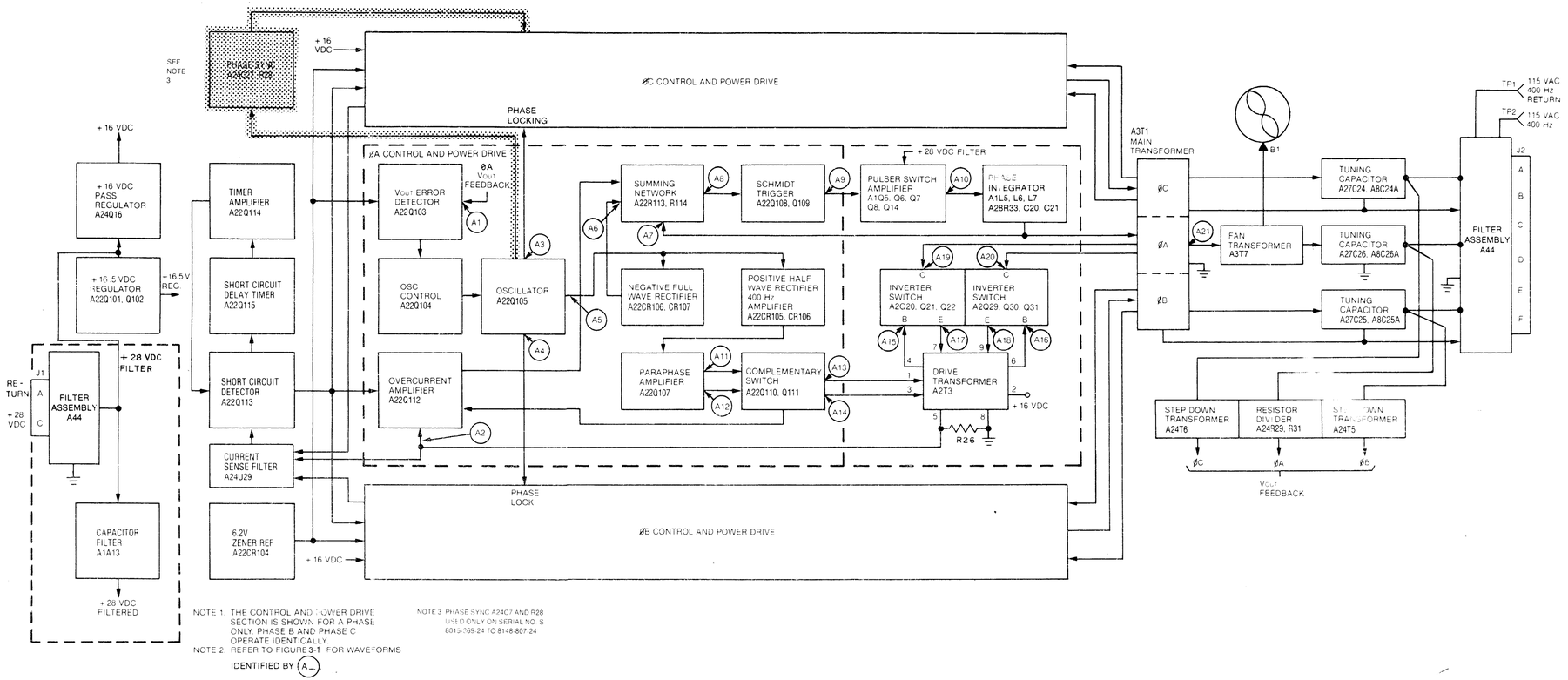
1	2						3	4	5	6	7	8	9
TEST STEP	TEST FIXTURE SWITCH POS. S1	S2	S3	S4	S5	S6	INPUT VOLTAGE VDC(±.50)	INPUT CURRENT AMPS (MAX)	OUTPUT CURRENT I (.02A)	OUTPUT VOLTAGE VAC(±2.5)	PUTPUT FREQ. (HERTZ)	PUTPUT DIST. (MAX)	TEST SECTION
1	NL	Y	0A	+1	OFF	OFF	+18	12		100	400 ±7	20%	NO LOAD Y (WYE) MODE
2	NL	Y	±A	+1	OFF	OFF	28	9.3	2.18	115.0	400 ±7	5%	
3							26 & 29	10 9	2.18	115.0	N/A	5%	
4	NL	Y	0B	+1	OFF	OFF	28	9.3	2.18	115.0	400 ±7	5%	
5							26 & 29	10 9	2.18	115.0	N/A	5%	
6	NL	Y	0C	+1	OFF	OFF	28	9.3	2.18	115.0	400 ±7	5%	
7							26 & 29	10 9	2.18	115.0	N/A	5%	
8	FL	Y	0A	+1	OFF	OFF	28	41	2.18	115.0	400 ±7	5%	FULL LOAD Y (WYE)
9							26 & 29	44.4 39.8	2.18	115.0	N/A	5%	MODE
10	FL	Y	0B	+1	OFF	OFF	28	41	2.18	115.0	400 ±7	5%	
11							26 & 29	44.4 39.8	2.18	115.0	N/A	5%	
12	FL	Y	0C	+1	OFF	OFF	28	41	2.18	115.0	400 ±7	5%	FULL LOAD Y (WYE)
13							26 & 29	44.4 39.8	2.18	115.0	N/A	5%	MODE
14	FL	Y	0A	-.95	OFF	OFF	28	30.8	2.18	115.0	400 ±7	5%	
15							26 & 29	33.3 29.9	2.18	115.0	N/A	5%	
16	FL	Y	0B	-.95	OFF	OFF	28	30.8	2.18	115.0	400 ±7	5%	
17							26 & 29	33.3 29.9	2.18	115.0	N/A	5%	
18	FL	Y	0C	-.95	OFF	OFF	28	30.8	2.18	115.0	400 ±7	5%	
19							26 & 29	33.3 29.9	2.18	115.0	N/A	5%	
20	FL	Y	0A	+.75	OFF	OFF	28	38.0	2.18	115.0	400 ±7	5%	
21							26 & 29	42.2 37.8	2.18	115.0	N/A	5%	
22	FL	Y	0B	+.75	OFF	OFF	28	38.9	2.18	115.0	400 ±7	5%	
23							26 & 29	42.2 37.8	2.18	115.0	N/A	5%	
24	FL	Y	0C	-.75	OFF	OFF	28	38.9	2.18	115.0	400 ±7	5%	FULL LOAD Y (WYE)
25							26 & 29	42.2 37.8	2.18	115.0	N/A	5%	MODE
26	FL		0A	+1	OFF	OFF	28	41	2.18	115.0	400 ±7	5%	FULL LOAD (DELTA)
27							26 & 29	44.4 39.8	2.18	115.0	N/A	5%	MODE
28	FL		0B	+1	OFF	OFF	28	41	2.18	115.0	400 ±7	5%	
29							26 & 29	44.4 39.8	2.18	115.0	N/A	5%	
30	FL		0C	+1	OFF	OFF	28	41	2.18	115.0	400 ±7	5%	
31							26 & 29	44.4 39.8	2.18	115.0	N/A	5%	

APPENDIX A
REFERENCES

Following is a list of references applicable to direct and general support maintenance personnel of Static Power Inverter PP-727D/A.

DA Pam 310-4	Index of Technical Publications.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment used by the Army.
TM 11-1520-236-20	Organizational Maintenance Manual: Electronic Equipment Configurations, Army Model AH-lS Helicopter (NSN 1520-00-504-9112).
TM 11-6625-255-14	Operator's, Organizational, Direct Support and General Support Maintenance Manual: Spectrum Analyzer TS-723A/U, TS-723B/U, TS-723C/U, and TS-723D/U (NSN 6625-00-668-9418).
TM 11-6625-320-12	Operator's and Organizational Maintenance Manual: Voltmeter, Meter ME-30A/U and Voltmeters, Electronic ME-30B/U, ME-30C/U, and ME-30E/U.
TM 11-6625-444-14-1	Operators, Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools Lists: Voltmeter, Digital AN/GSM-64B (NSN 6625-00-022-7894) Including Plug-In, Electronic Test Equipment PL-1370/GSM-64B (NSN 6625-00-137-8366).
TM 11-6625-654-14	Operators, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair and Special Tools List) for Multimeter AN/USM-223.
TM 11-6625-700-14-1	Operator, Organizational, Direct Support and General Maintenance Manual Including Repair Parts and Special Tools List (Including Depot Repair Parts and Special Tools): Digital Readout Electronic Counter AN/USM-207A (NSN 6625-00-044-3228).
TM 11-6625-2658-14	Operator's, Organizational, Direct Support and General Support Maintenance Manual for Oscilloscope AN / USM-281C (NSN 6625-00-106-9622).
TM 38-750	The Army Maintenance Management System (TAMMS).

Subject — Paragraph, Figure, Table Number



NOTE 1. THE CONTROL AND POWER DRIVE SECTION IS SHOWN FOR A PHASE ONLY. PHASE B AND PHASE C OPERATE IDENTICALLY.

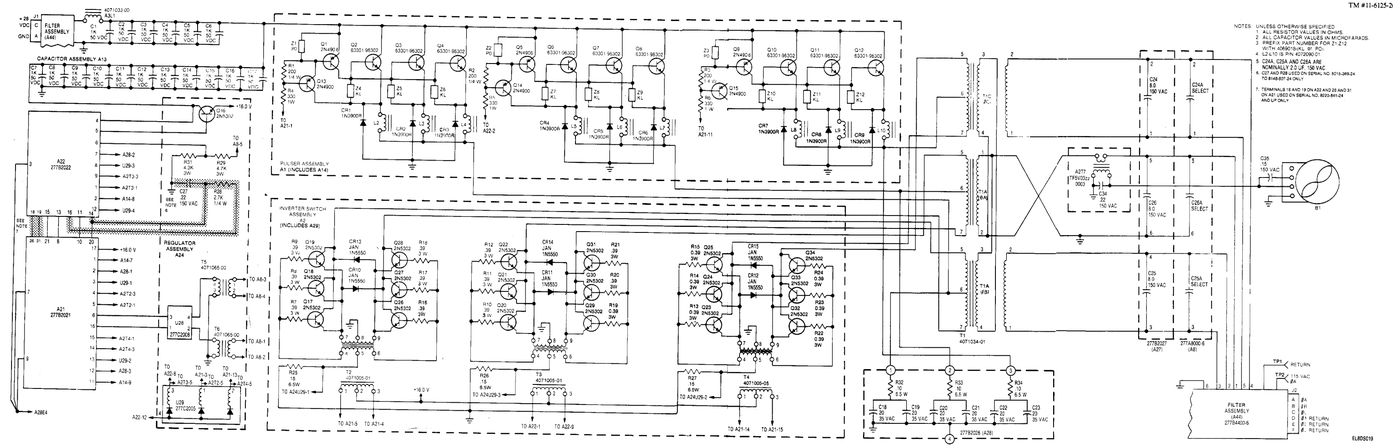
NOTE 2. REFER TO FIGURE 3-1 FOR WAVEFORMS IDENTIFIED BY (A_)

NOTE 3. PHASE SYNC A24C7 AND R28 USED ONLY ON SERIAL NO.S 8015-769-24 TO 8148-807-24

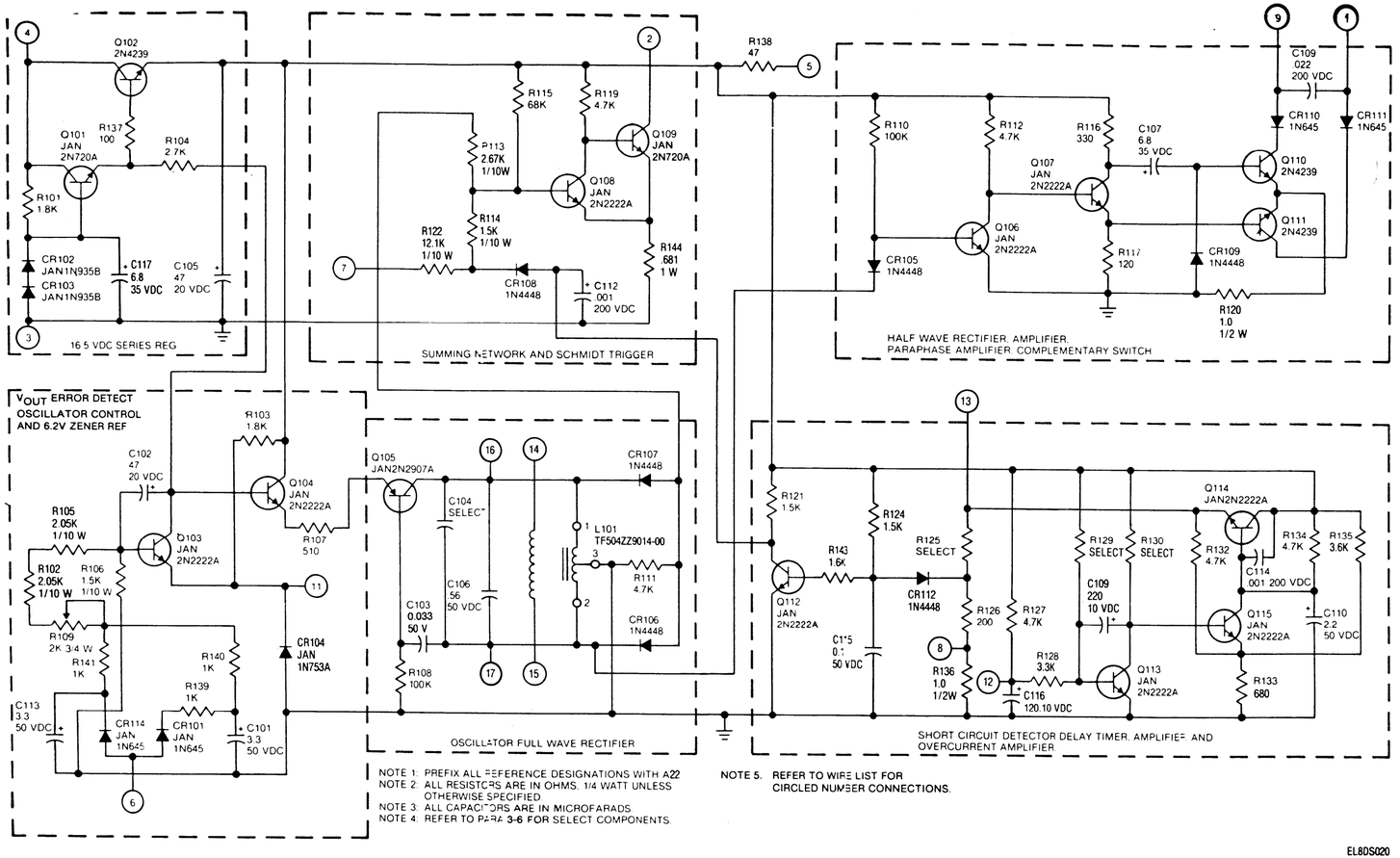
EL8DS018

Change 1

Figure FO-1. Detailed Block Diagram.



Change 1 **Figure FO-2. Inverter, PP-7274/D/A Schematic Diagram.**



EL8DS020

Figure FO-3. Phase A Schematiac Diagram.
(Sheet 1 of 2) Serial Numbers 8015-369-24
To 8148-807-24

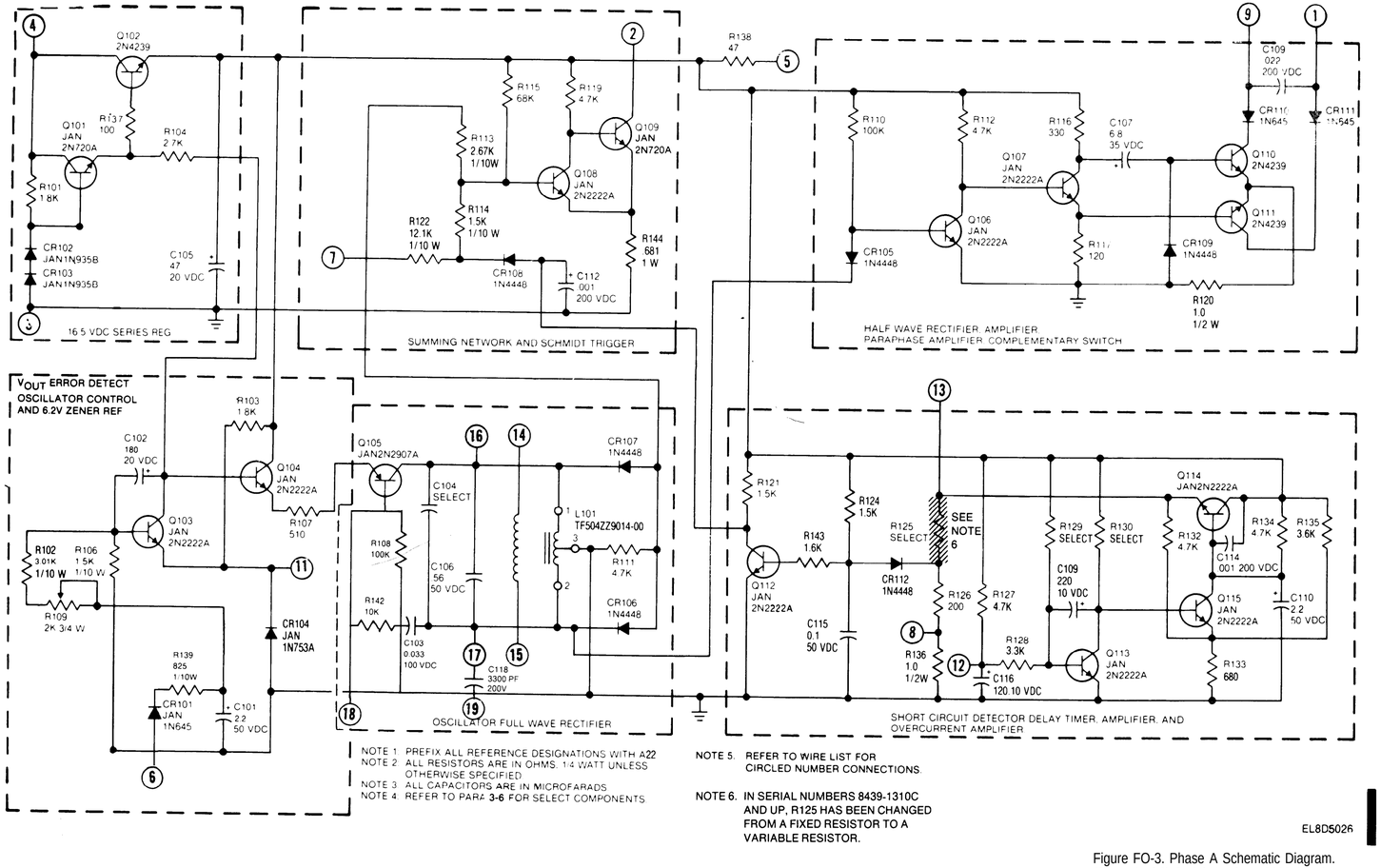


Figure FO-3. Phase A Schematic Diagram. (Sheet 2 of 2) Serial Numbers 8220-841-24 And Up

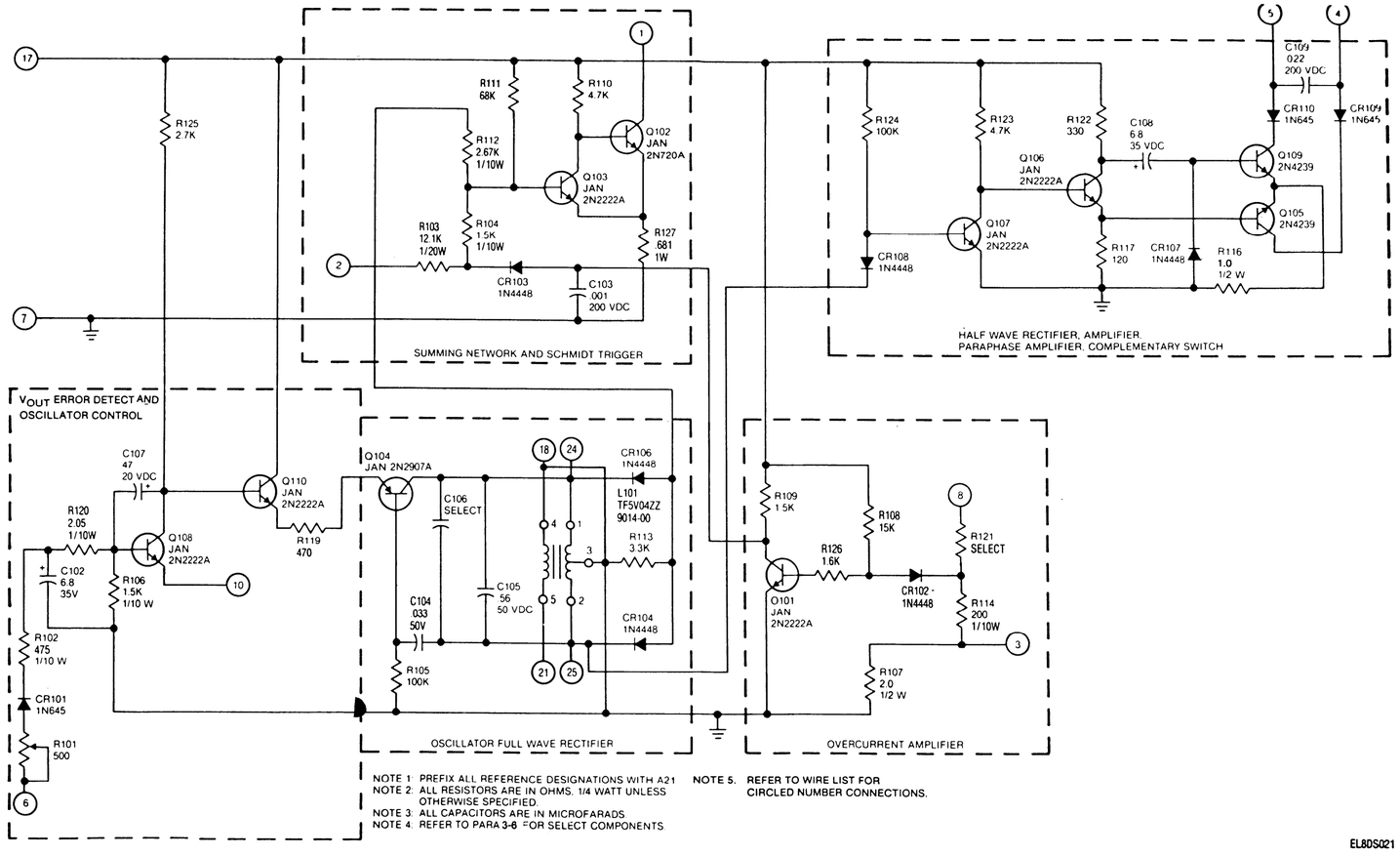
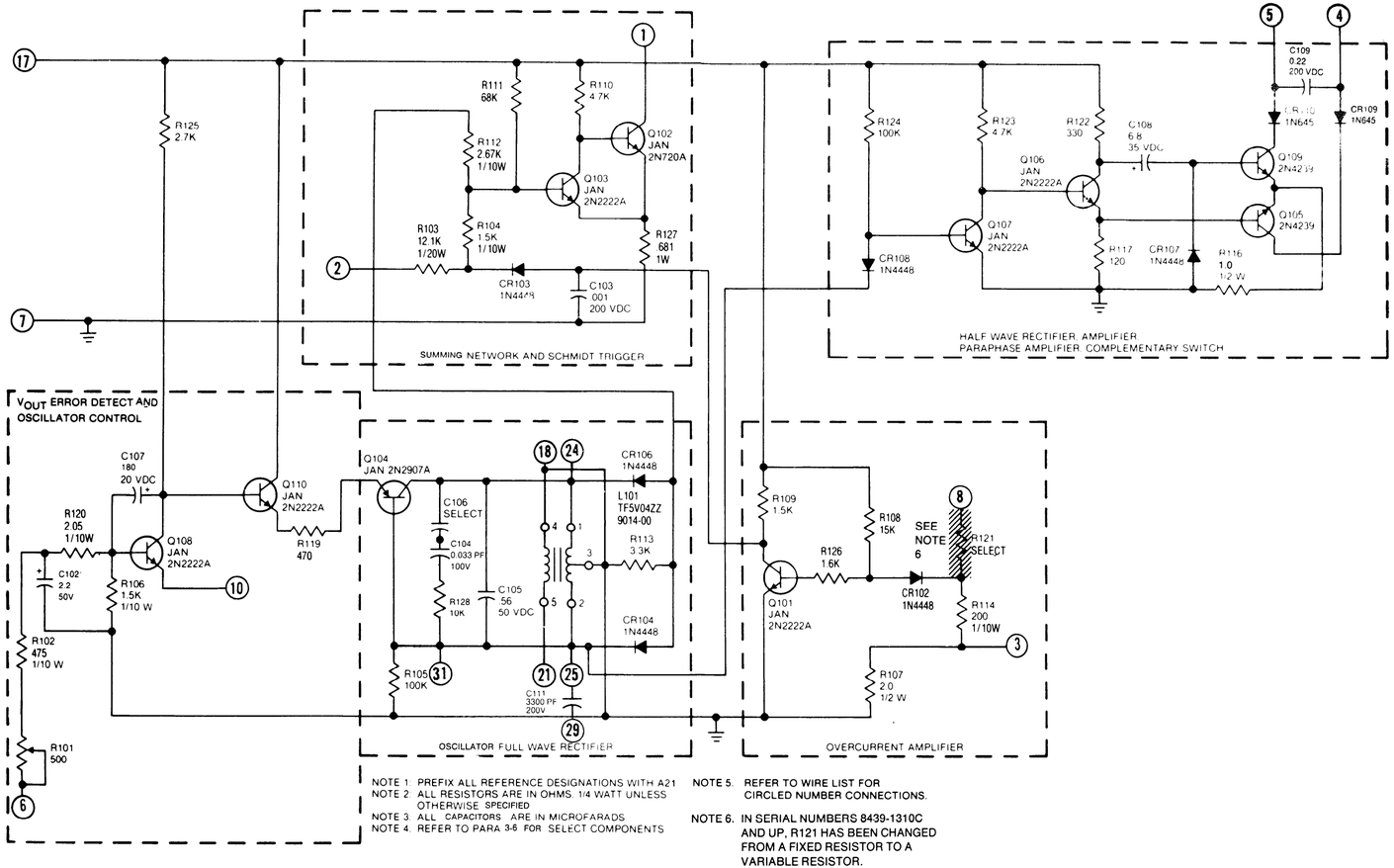


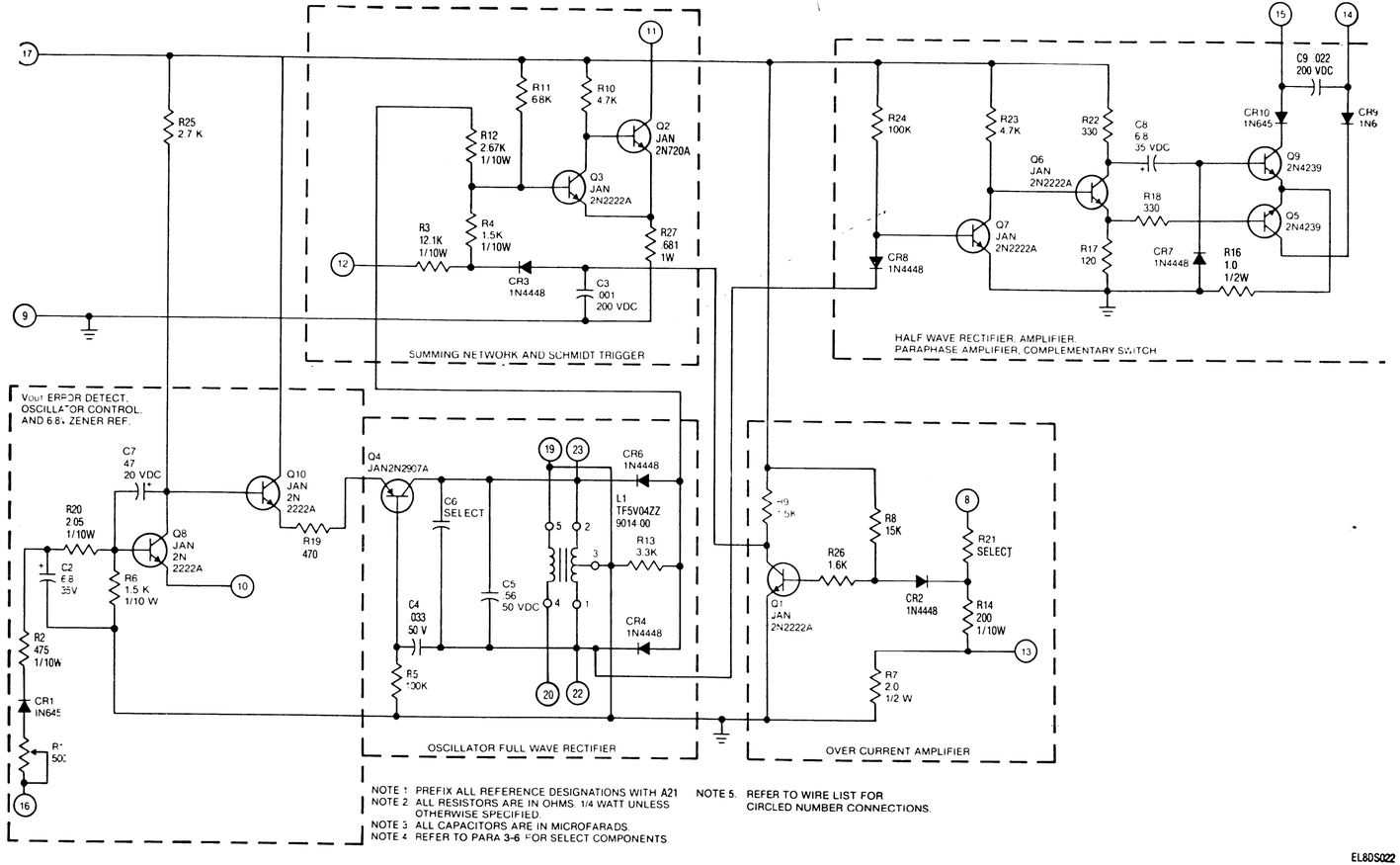
Figure FO-4. Phase B Schematic Diagram. (Sheet 1 of 2) Serial Numbers 8015-369-24 To 8148-807-24



NOTE 1. PREFIX ALL REFERENCE DESIGNATIONS WITH A21
NOTE 2. ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE SPECIFIED
NOTE 3. ALL CAPACITORS ARE IN MICROFARADS
NOTE 4. REFER TO PARA 3-6 FOR SELECT COMPONENTS
NOTE 5. REFER TO WIRE LIST FOR CIRCLED NUMBER CONNECTIONS.
NOTE 6. IN SERIAL NUMBERS 8439-1310C AND UP, R121 HAS BEEN CHANGED FROM A FIXED RESISTOR TO A VARIABLE RESISTOR.

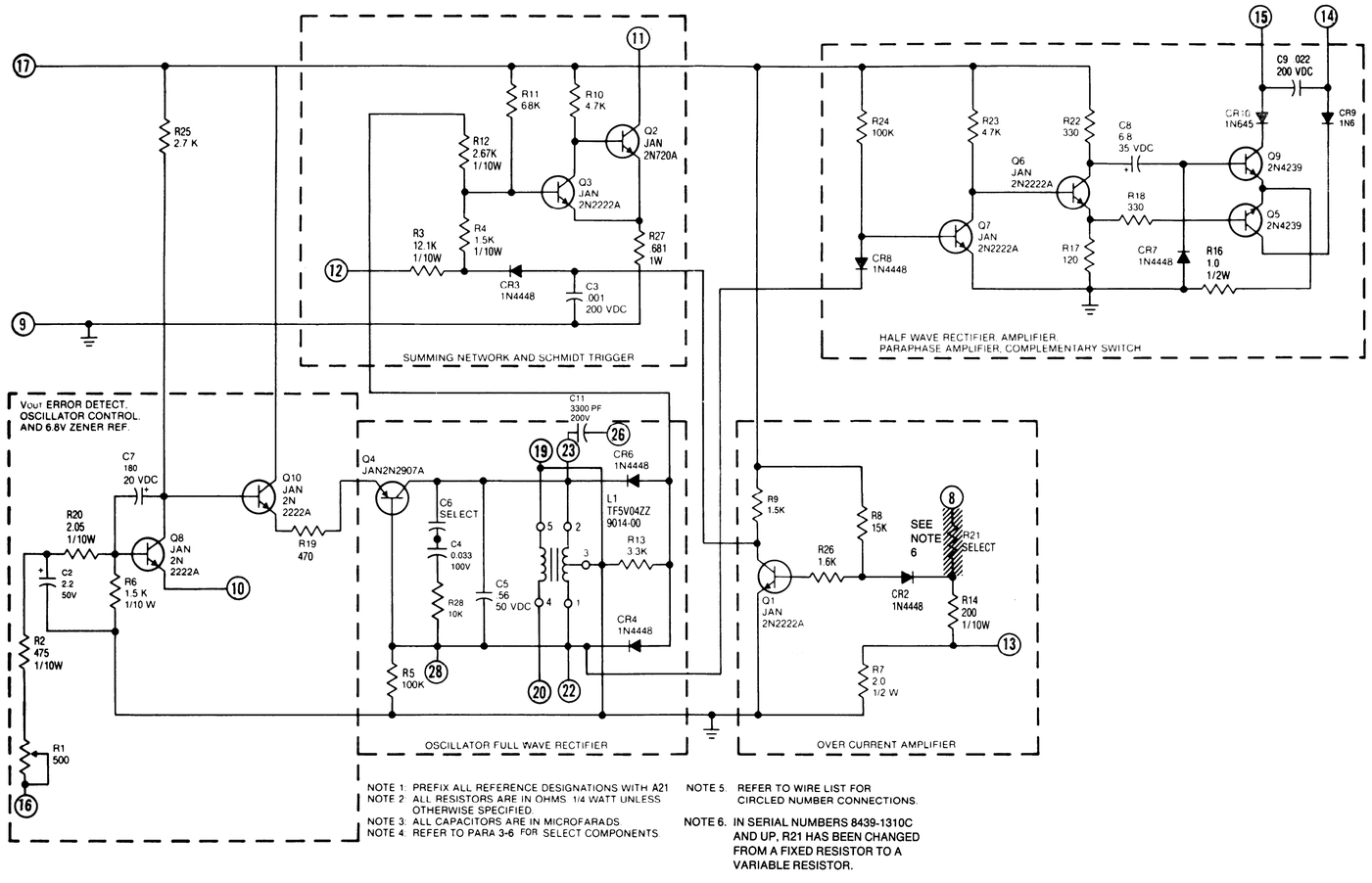
EL8D5027

Figure FO-4. Phase B Schematic Diagram. (Sheet 2 of 2) Serial Numbers 8220-841-24 And Up



EL80S022

Figure FO-5. Phase C Schematic Diagram. (Sheet 1 of 2) Serial Numbers 8015-369-24 To 8148-807-24



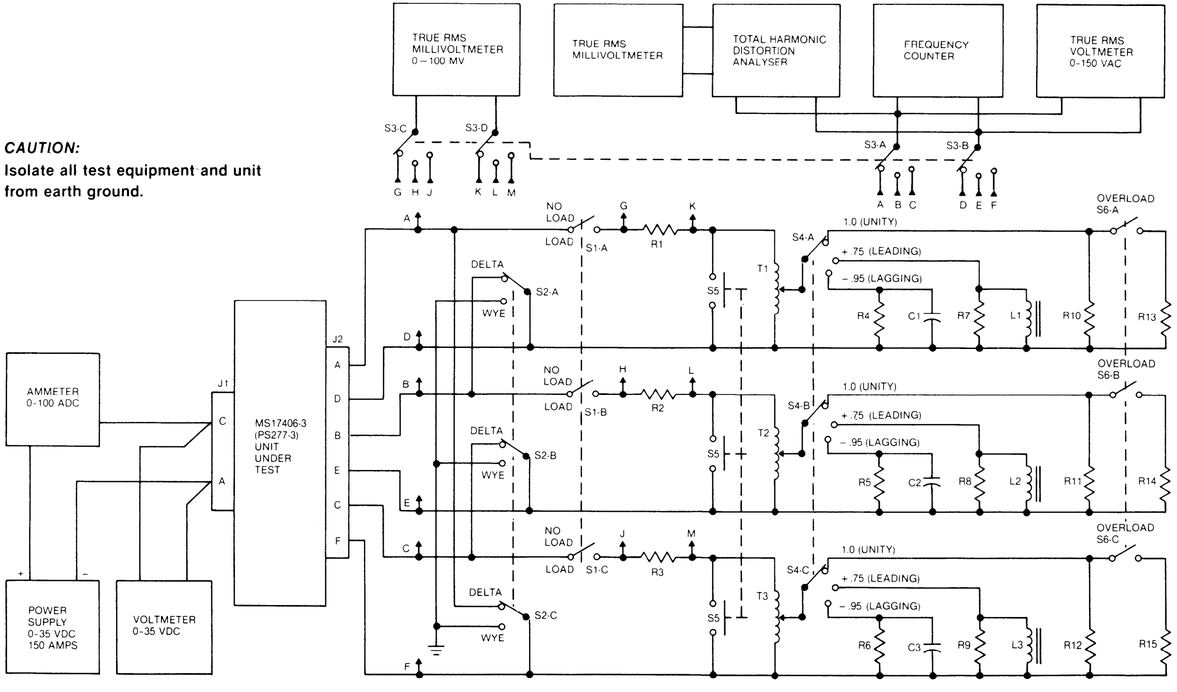
NOTE 1: PREFIX ALL REFERENCE DESIGNATIONS WITH A21.
NOTE 2: ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE SPECIFIED.
NOTE 3: ALL CAPACITORS ARE IN MICROFARADS.
NOTE 4: REFER TO PARA 3-6 FOR SELECT COMPONENTS.
NOTE 5: REFER TO WIRE LIST FOR CIRCLED NUMBER CONNECTIONS.
NOTE 6: IN SERIAL NUMBERS 8439-1310C AND UP, R21 HAS BEEN CHANGED FROM A FIXED RESISTOR TO A VARIABLE RESISTOR.

EL8D5028

Figure FO-5. Phase C Schematic Diagram. (Sheet 2 of 2) Serial Numbers 8220-841-24 And Up

CAUTION:

Isolate all test equipment and unit from earth ground.



WARNING:

Unit is electrically "HOT" in the DELTA MODE. Touching the unit and ground may cause serious injury or death.

EL8DS023

Figure FO-6. Test Setup and Tester Schematic.

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SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
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Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703

DATE SENT
10 July 1975

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

BE EXACT. . . PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
2-25	2-28		
3-10	3-3		3-1
5-6	5-8		
		FO3	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Recommend that the installation antenna alignment procedure be changed throughout to specify a 2^{o} IFF antenna lag rather than 1^{o}.

REASON: Experience has shown that with only a 1^{o} lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2^{o} without degradation of operation.

Item 5, Function column. Change "2 db" to "3db."

REASON: The adjustment procedure the the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.

Add new step f.1 to read, "Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

Zone C 3. On J1-2, change "+24 VDC to "+5 VDC."

REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
SSG I. M. DeSpiritof 999-1776

SIGN HERE
I. M. DeSpiritof

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PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-6125-261-34	6 AUG 1982	Static Power Inverter PP-7274D/A

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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

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