

INVERTER

J87326

OPERATING METHODS

1. GENERAL

1.01 The J87326 20-Hz, 0.5 ampere dc-to-ac ringing inverter circuit is intended for initial application with the 841A Ringing and Tone Power Plant for the No. 2 Electronic Switching System (ESS). The basic function of this inverter is to provide two isolated filtered 86-volt, 20-Hz outputs and one isolated 105-volt, 20-Hz output. Each of the two isolated 86-volt outputs is provided with a transformer winding tap that supplies a 97-volt, 20-Hz output for dial long line circuits. The isolated 105-volt output is also provided with a winding tap that supplies an additional unfiltered 86-volt, 20-Hz output.

1.02 This issue does affect the Equipment Test List.

1.03 Electrically the dc-to-ac inverter is comprised of a low pass dc input line filter, a 20-Hz oscillator inverter, a driver inverter, a power inverter, a two-coil ferroresonant regulator, and 86-volt output filters. The *low pass dc input line filter* consists of an L1 inductor, C1.1 and C1.2 capacitors, and CR1 and CR2 diodes. The components comprising the *20-Hz oscillator inverter* are contained in the oscillator (J87326B) plug-in package. The one exception is the T2 transformer which is mounted on the inverter chassis. The power inverter is contained in the amplifier (J87326C) plug-in package. The C3 capacitor in combination with the T3A inductor and the T3B transformer comprise the *two-coil filtered ferroresonant regulator* which is mounted on the inverter chassis. The components which comprise the 86-volt output filters mounted on the inverter chassis are the L3 inductor and the C4 and C6 capacitors for the 86-volt (A) output and the L4 inductor and the C5 and C7 capacitors for the 86-volt (B) output.

Caution: *The voltages in the inverter unit are as high as 400 volts to ground and between parts of the circuit. Every*

precaution should be observed to avoid any contact with exposed metal parts or terminals when the inverter is in operation. Do not allow a test pick to touch two metal parts at the same time as dangerous and destructive short circuits may occur.

1.04 The instructions in this practice are based on circuit schematic drawing SD-81908-01. For a detailed description of operation, see the corresponding circuit description.

2. LIST OF TOOLS AND TEST APPARATUS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
KS-16346 L2	Soldering Copper
—	3-Inch C Screwdriver
—	P Long-Nose Pliers
TEST APPARATUS	
KS-14510	Volt-Ohm-Milliammeter
—	AC Weston Model 904 Voltmeter

3. OPERATION

3.01 The dc-to-ac inverter has no disconnecting switches and is permanently connected to both the dc input power and the output load from the Ringing and Tone Power Plant when all external connections are made. If it is necessary to remove an inverter from service, refer to the operating practice of the Ringing and Tone Power Plant for the recommended procedure for removing the power from either side of the plant. Ensure that the inverter is not supplying ringing power to the Ringing and Tone Power Plant; then remove the alarm and the 5-ampere fuses in the ringing distribution circuit.

SECTION 161-249-301

3.02 To restore the inverter to normal service, replace the 5-ampere and the alarm fuses in the ringing distribution circuit; then refer to the operating practice of the Ringing and Tone Power Plant for the recommended procedure to restore power to the plant.

4. ROUTINE CHECKS

4.01 Electrolytic capacitors should be maintained in accordance with Section 032-110-701.

4.02 Keep the ventilating passages of the inverter unobstructed to ensure adequate cooling.

4.03 The ac output voltage should be checked periodically or whenever experience indicates the need. Using the Weston model 904 voltmeter set on the 150-volt scale for output voltages of 86V, 97V, and 105V, connect the meter leads across the terminals specified in Table A to indicate the correct output voltage.

Caution: *Frequency, output voltage, and output noise adjustments are made at the factory. Under no circumstances are the taps on the L2, T3A inductors, T3B transformer, and the setting of the R1 potentiometer to be changed in the field.*

5. TROUBLES

5.01 Various trouble symptoms and possible causes are listed in 5.04. Since unsatisfactory conditions may damage more than one component, all checks listed under a given cause should be made even though defective components are revealed before the entire check procedure has been completed.

5.02 Test and replace semiconductor devices in accordance with Section 032-173-301.

Caution: *In making continuity checks, use the ohmmeter portion of the KS-14510 volt-ohm-milliammeter. Do not use the*

TABLE A

OUTPUT	CONNECT METER LEADS TO (TB2) TERM.	NORMAL INPUT VOLTAGE BETWEEN 48 AND 52.5V DC		EMERGENCY INPUT VOLTAGE BETWEEN 43 AND 53.5V DC	
		OUTPUT VOLTS MINIMUM	RMS MAXIMUM	OUTPUT VOLTS MINIMUM	RMS MAXIMUM
86V(A)	2 and 8	84	88	75	90
86V(B)	4 and 9	84	88	75	90
86V(C)	6 and 7	80	92	70	92
97V(A)	1 and 2	94	101	84.5	101.6
97V(B)	3 and 4	94	101	84.5	101.6
105V	5 and 7	102	110	90	110

X10,000 position for testing semiconductors as the higher voltage may damage them.

5.03 If the L2 inductor, C2 capacitor, CR5 diode, R1 variable resistor, or R4 resistor should fail, the OSCILLATOR (J87326B) plug-in unit must be replaced with a factory adjusted unit. If any of the components in the AMPLIFIER (J87326C) should fail, they must be replaced with the proper replacement part. If the T3 (2188A) transformer and/or C3 capacitor should fail, the unit is to be sent back to the factory for repair.

Caution: *Disconnect the -48 volt dc input before removing or inserting plug-in units.*

5.04 Should any of the following troubles develop, it is suggested that the possible causes be checked in the order given. If the trouble is not found, look for loose or open connections or short circuits due to foreign matter lying across wiring terminals.

TROUBLE	POSSIBLE CAUSE
(a) No output voltage and no input voltage	5-ampere input fuse defective. Any of Q1 through Q8 transistors shorted. C1.1 or C1.2 capacitors defective. CR8 diode defective.
(b) No output voltage but input voltage present	C3 capacitor shorted. T3B transformer shorted. Output overloaded or shorted. C6 or C7 capacitors shorted. CR5 diode defective.
(c) Low output voltage	Overloaded output. Low oscillator frequency. Low dc input voltage. T3 transformer defective. T1 transformer defective.
(d) High output voltage	High oscillator frequency. High dc input voltage.