

## 681A POWER PLANT OPERATING METHODS

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### 1. GENERAL

**1.01** The 681A power plant (J86904) is a dc-to-dc converter power plant that provides the -12V, -24V +130V, and +250V required in TD-2 radio bays. The 681A plant is intended as a 425A power plant replacement for TD-2 radio stations and is designed to fit in the radio area of a station.

**1.02** Whenever this section is reissued, the reason for reissue will be listed in this paragraph. This section does not affect the Equipment Test List as no tests are required.

**Warning:** *Voltages inside this power plant exceed 150 volts to ground and between parts of the circuit. Every precaution should be observed to avoid any contact with exposed metal parts or terminals. Do not allow a test pick to touch two metal parts at the same time as dangerous or destructive short circuits may occur.*

**1.03** These instructions are based on SD-82309, Issue 1. If this section is to be used with equipment or apparatus reflecting later issue(s) of the drawing(s), reference should be made to the SDs and CDs to determine the extent of the changes and the manner in which the section may be affected.

**1.04** The 681A plant is mounted in a 9-foot high, 19-inch wide, unequal flange, duct-type, ED-97170-50 frame. A basic J86904A power plant bay is equipped with two J86904AA converter assemblies and one J86904AB alarm panel. When fully equipped, the power plant bay (Fig. 1) contains six J86904AA converter assemblies plus one J86904AB alarm panel and will supply the -12V, -24V, +130V, and +250V required for operating 12 TD-2 radio bays in repeater stations (six E-W bays and six W-E bays). Additional TD-2 radio bays are powered from J86904AA converter assemblies mounted in a J86904B supplementary bay.

**1.05** The input power source required for the operation of the J86904AA converter assemblies in the 681A plant is provided by a suitable external -24V power plant. Each converter assembly requires a separate, single, -24V feeder. Each converter unit includes two -24V to -12V dc-to-dc converters with input circuit breaker; and two -24V to +130V and +250V dc-to-dc converters with input circuit breaker.

**1.06** Each of the dc-to-dc converters contains a plug-in inverter section and a plug-in rectifier section. For the -12V converter, the inverter is a 178A power unit; the rectifier is a 179A power unit. For the +130/250V converter, the inverter is a 75F power unit; the rectifier is a 76F power unit. The -24V is provided by means of circuit breakers on the J86904AA converter assembly.

**1.07** At TD-2 radio installations where TD-3D radio bays are provided for growth beyond the earlier TD-2 type bays, power for the TD-3D bays, which are arranged for only -24 volt input power, is distributed through the 681A plant by means of J86904AC circuit breaker assemblies. Each circuit breaker bus bar on the circuit breaker assembly is fed by a feeder from the battery plant and serves two pairs of E-W and W-E bays in relay stations and three bays maximum in the same direction in main stations.

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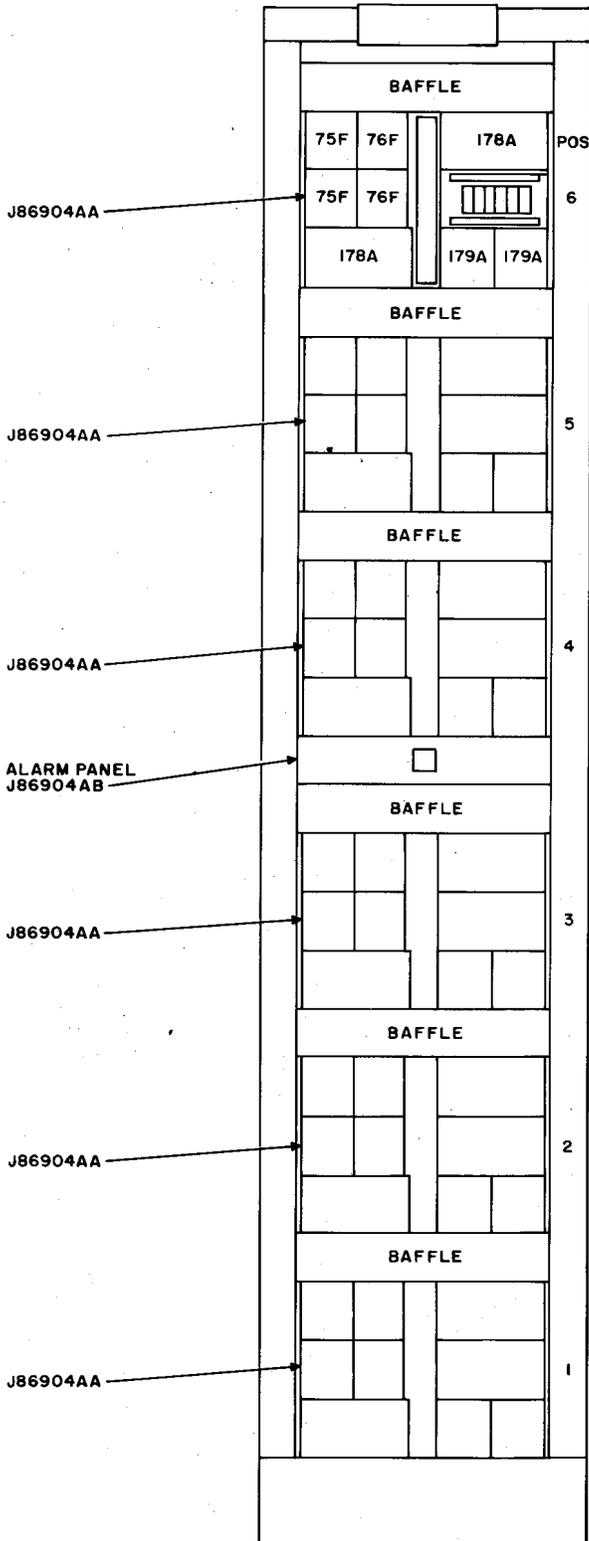


Fig. 1—J86904A Converter Power Plant

**1.08** Each J86904AB alarm panel serves all units of the same plant. Redundant power from two feeders, as obtained from the first two converter units on the first frame, is used to power the frame alarm lamp and the alarm relays. Ground signals are initiated by converter or circuit breaker "power off" conditions and are extended to the alarm panel to initiate alarm indications as appropriate in the radio station. An alarm cutoff key is provided to permit manual modification of the alarm indications. Alarm indications are retired upon full restoration of power.

**1.09** For more detailed information on the operation and maintenance of individual equipment or apparatus, refer to the appropriate Bell System Practices. All relays and other apparatus should be adjusted, and/or maintained when required, in accordance with these sections and the circuit requirements tables on the circuit drawings.

**1.10** Routine equipment checks should be performed when the least service interruption will occur.

**2. LIST OF TOOLS AND TEST APPARATUS**

CODE OR SPEC NO.	DESCRIPTION
<b>TOOLS</b>	
—	Trimpot Screwdriver
<b>TEST APPARATUS</b>	
KS-20599-L4	Digital Multimeter or approved equivalent (4 1/2 digits minimum)

**3. OPERATION**

*Preparing to Start*

- 3.01** Before putting the plant in service, ascertain that:
- (a) All external plant connections are made in accordance with the SD drawings covering the circuits associated with the plant.
  - (b) All circuit breakers on each J86904AA converter assembly and J86904AC circuit breaker assembly are in the OFF position.

- (c) The correct size and type fuses are installed as required in each -24V power supply lead.
- (d) All plug-in units in the J86904AA converter assemblies are firmly in place.

### **Starting**

**3.02** To start the plant, place the associated -24V circuit breaker(s) at the associated power plant in the ON position thus providing the -24V input power required for operation of the J86904AA converter assembly(s) and J86904AC circuit breaker assembly(s).

**Note:** Each J86904AA and J86904AC circuit breaker bus bar is powered by a separate power lead from the associated power plant. This provides flexibility in selectively supplying power to radio bays and, in addition, assures that the loss of a main fuse at the -24V plant will not affect more than one half, plus one, of the radio channels in any direction.

**3.03** Operate circuit breakers CB1 through CB6, as required, on the selected J86904AA converter unit(s) to the ON position.

**Note:** The ON/OFF switch on each -12V converter must also be operated to the ON position after the associated circuit breaker has been turned on.

**Requirement:** The converter starts; power is supplied to the associated radio bays.

**3.04** Operate circuit breakers CB1 through CB8, as required, on the selected J86904AC circuit breaker assembly(s) to the ON position.

**Requirement:** Power is supplied to the associated radio bays.

### **Stopping**

**3.05** To stop the J86904AA converter unit, operate circuit breakers CB1 through CB6 to the OFF position.

**Requirement:** The converter unit shuts down, power is removed from the associated radio bays; the plant ALARM ACO lamp lights, and office alarms are activated.

**3.06** To stop the J86904AC circuit breaker assembly(s), operate circuit breakers CB1 through CB8 to the OFF position.

**Requirement:** Power is removed from the associated radio bays, the plant ALARM ACO lamp lights, and office alarms are activated.

**3.07** Depress the ALARM ACO lamp switch to extinguish the audible alarm.

**Requirement:** The audible alarm is retired.

## **4. ROUTINE CHECKS**

**4.01 *Battery Maintenance:*** Maintain the batteries associated with this plant, via the associated battery plant, in accordance with Section 157-601-701 and local office procedures.

**4.02 *Output Voltage and Current Checks:*** Periodically, using the KS-20599 digital multimeter set on the appropriate scale, check the output of the J86904AA converter units to ascertain that the output meets the requirements listed in Table A. Each converter should regulate its actual voltage to the percentage shown and current range shown through a temperature range 0-65° centigrade (+40F - +120F).

**Caution:** *When using a portable instrument, the leads should be carefully examined to make sure the insulation is undamaged. The leads should be properly connected to the instrument before making any contact with the circuit to be tested. If connections are to be changed from one instrument range to another, the power should first be disconnected from equipment being tested or, if test picks are being used, they should be removed from the equipment under test.*

## **5. TROUBLES**

**5.01** The troubles and possible causes listed below are not necessarily all-inclusive but are merely indicative of some of the difficulties that may be encountered when the various 681A power plants are not operating in a normal manner. If the trouble is not found with the assistance of the trouble chart, reference must be made to the sections covering the J86904AA converters, schematic diagrams, and circuit descriptions.

TABLE A

NOM. VOLTS	ACTUAL VOLTS	REGULATION	CURRENT RANGE
-12V	-11V to -12V*	±1%	1.0A to 17.0A
+130V	+136V	±1.5%	.01A to .70A**
+250V	+263V	±2.5%	.01A to .38A**
<p>* Output voltage of the -12V converter will be set at <math>11.0 \pm 0.1</math> volts, measured at the radio bay with radio bay operating.</p> <p>** Total output of the +130/+250V converter is limited to 100 watts.</p>			
<p><i>Note:</i> The -24 volt output of the converter assembly is determined by the battery plant.</p>			

J86904AA - CONVERTER ASSEMBLYTROUBLEPOSSIBLE CAUSE

No -12V dc Output,  
ALARM ACO Lamp  
Lighted.

CB3/CB4 Circuit Breaker(s) tripped or switch on -24V converter unit in OFF position. Check for trouble in associated converter and connected equipment. Reset circuit breaker (See Note).

No +130V/+250V dc  
Output, ALARM ACO  
Lamp Lighted.

CB1/CB2 Circuit Breaker(s) tripped. Check for trouble in associated converter and connected equipment. Reset circuit breaker (See Note).

No -24V Output,ALARM ACO  
Lamp Lighted.

CB5/CB6 Circuit Breaker(s) tripped. Check for trouble in connected equipment. Reset circuit breaker (See Note).

No -12V, +130V/+250V, -24V  
dc Output, ALARM ACO Lamp  
Not Lighted.

Check for loose connection of -24V supply lead at circuit breaker bus bar. Check for operated -24V supply fuse at the associated battery plant (See Note).

J86904AC - CIRCUIT BREAKER ASSEMBLY

No -24V Output, ALARM ACO  
Lamp Lighted.

CB1 - CB8 Circuit Breaker(s) tripped. Check for trouble in connected equipment. Reset circuit breaker (See Note).

No -24V Output, ALARM ACO  
Lamp Not Lighted.

Check for operated -24V supply fuse at the associated battery plant (See Note).

*Note:* Correct the cause of tripped circuit breaker or operated fuse before restoring power.