

**POWER PLANT**  
**610B**  
**OPERATING METHODS**

**1. GENERAL**

- 1.01** This section describes the operation of the 610B power plant.
- 1.02** This section is reissued to revise the initial adjustment of the step regulator and to cover a later design voltage regulator.
- 1.03** The 610B power plants are small, relay-rack-mounted power plants which provide positive and negative 120- or 130-volt battery from a 48-volt battery input and are primarily intended for coin control supply in central offices.
- 1.04** Routine checks are intended to detect defects and insofar as possible to guard against circuit failures liable to interfere with service. Checks and adjustments other than those required by trouble conditions should be made during a period when they will cause the least reaction to service.
- 1.05** The instructions are based on SD-81504-01. For a detailed description of the operation, see the corresponding circuit description.
- 1.06** Reference should be made to the standard index of BSPs for maintenance of the apparatus used in this equipment. All relays and other apparatus should be adjusted, when required, in accordance with these sections and the circuit requirement tables on the circuit drawings.

**2. TOOLS AND TEST APPARATUS**

CODE OR SPEC NO.	DESCRIPTION
<b>TOOLS</b>	
—	3-Inch C Screwdriver
<b>TEST APPARATUS</b>	
KS-14510 L1	Volt-Ohm-Milliammeter
—	893 Cord Equipped With Two 360A Tools (1W13A cord) and Two 624A Tools

**3. OPERATION**

**Description**

- 3.01** The 610B power plant consists of a dc-to-dc converter equipped with either a step regulator or a voltage regulator circuit. Where additional reliability is required, duplicate converters and regulators are furnished. Where duplicate converters are furnished, the converters normally share the load, but either converter is capable of carrying the load in case of failure of the other.
- 3.02** Where step regulation is furnished, an NV alarm is provided to indicate failure of a converter. If duplicate converters are employed, failure of either converter will cause a minor alarm and failure of both converters will cause a major alarm. Where a single converter is used, failure of the converter will cause a major alarm.
- 3.03** Where voltage regulation is furnished, an HV alarm is provided in addition to the NV alarm and causes operation of major and minor alarms as covered in 3.02.

**Preparing to Start Initially**

- 3.04** Before putting the plant into service, check that:
- (a) All external connections are made in accordance with the SD- drawings covering the circuits associated with the plant.
  - (b) The proper size fuses are in place.

**Initial Adjustments**

- 3.05** The power plant has no disconnect switches and is connected to both the central office battery and the load when the associated fuses are in place. If it is necessary to take the plant out of service, remove the battery fuses. To restart, remount the fuses.

**3.06 Step Regulator:** Where step regulation is furnished, adjust each step regulator as follows.

- (a) Using the 3-inch C screwdriver, turn the SR ADJ potentiometer fully clockwise. The SR relay should release.
- (b) Connect the KS-14510 volt-ohm-milliammeter to the SR TEST and SR GRD jacks.
- (c) Adjust the SR TEST potentiometer to obtain a reading of 48.0 volts on the meter.
- (d) Slowly turn the SR ADJ potentiometer counterclockwise until the SR relay operates.
- (e) Readjust the SR TEST potentiometer until the relay just releases. The meter should read between 46.9 and 47.7 volts.
- (f) Turn the SR TEST potentiometer fully clockwise. Check that the SR relay is operated. Disconnect the KS-14510 meter.

**3.07 HV Alarm:** Where voltage regulation is provided, adjust the HV alarm associated with each voltage regulator as follows. Earlier design voltage regulator is equipped with ADJ 1 and ADJ 2 keys, later design with HV rotary switch (KS-14618 L25 switch).

- (a) Using the 3-inch C screwdriver, turn the HV ADJ potentiometer fully counterclockwise.
- (b) Hold the ADJ 1 button depressed or turn and hold the HV rotary switch in position ADJ 1 and very slowly turn the HV ADJ potentiometer clockwise until the V1 tube fires and the HV relay operates.
- (c) Release the ADJ 1 button or the HV rotary switch.
- (d) Press and then release the ADJ 2 button or turn the HV rotary switch to position ADJ 2 and then release. The HV relay should release and not reoperate and the V1 tube should not fire.

#### 4. ROUTINE CHECKS

##### Step Regulator

**4.01** Periodically check the step regulator adjustment as covered in 3.06.

##### Alarms

**4.02** Periodically check the alarms as covered in 4.03 through 4.06. Earlier design voltage regulator is equipped with two lamps, NV and HV, and two keys, ADJ 1 and ADJ 2. Later design voltage regulator is equipped with one HNV lamp and one HV rotary switch (KS-14618 L25 switch).

**4.03 NV Alarm — Single Converter:** Place a short across the winding of the NV relay using the 1W13A cord equipped with two 624A tools. The NV or HNV lamp should light and the major alarm should operate. Remove the cord.

##### 4.04 NV Alarm — Duplicate Converter

(a) Remove the +120V or +130V fuse associated with converter 1. The NV or HNV lamp associated with converter 1 should light and a minor alarm should operate. Remount the fuse. The alarm should be retired and the NV or HNV lamp should be extinguished.

(b) Remove the +120V or +130V fuse associated with converter 2. The NV or HNV lamp associated with converter 2 should light and a minor alarm should operate.

(c) Block the NV relay associated with converter 2 nonoperated. Remount the fuse.

(d) Remove the +120V or +130V fuse associated with converter 1. The NV or HNV lamp associated with converter 1 should light and a major alarm should operate. Remount the fuse. The major alarm should be retired and the NV or HNV lamp associated with converter 1 should be extinguished.

(e) Remove the block from the NV relay associated with converter 2. The minor alarm should be retired and the NV or HNV lamp associated with converter 2 should be extinguished.

**4.05 HV Alarm — Single Converter:** Press and release the ADJ 1 button or turn the HV rotary switch to position ADJ 1 and then release. The HV or HNV lamp should light and the major alarm should operate. Press and release the ADJ 2 button or turn the HV rotary switch to position ADJ 2 and then release. The alarm should be retired and the HV or HNV lamp should be extinguished.

**4.06 HV Alarm — Duplicate Converter**

- (a) Press and release the ADJ 1 button associated with converter 1 or turn to position ADJ 1 and then release the HV rotary switch associated with converter 1. The HV or HNV lamp associated with converter 1 should light and the minor alarm should operate. Press and release the ADJ 2 button associated with converter 1 or turn to position ADJ 2 and then release the HV rotary switch associated with converter 1. The alarm should be retired and the HV or HNV lamp associated with converter 1 should be extinguished.
- (b) Press and release the ADJ 1 button associated with converter 2 or turn to position ADJ 1 and then release the HV rotary switch associated with converter 2. The HV or HNV lamp associated with converter 2 should light and the minor alarm should operate.
- (c) Press and release the ADJ 1 button associated with converter 1 or turn to position ADJ 1 and then release the HV rotary switch associated with converter 1. The HV or HNV lamp associated with converter 1 should light and the major alarm should operate.
- (d) Press and release the ADJ 2 button associated with converter 1 or turn to position ADJ 2 and then release the HV rotary switch associated with converter 1. The major alarm should be retired and the HV or HNV lamp associated with converter 1 should be extinguished.
- (e) Press and release the ADJ 2 button associated with converter 2 or turn to position ADJ 2 and then release the HV rotary switch associated with converter 2. The minor alarm should be retired and the HV or HNV lamp associated with converter 2 should be extinguished.

**4.07 Operation of V1 Tube in HV Alarm Circuit:**

Since the V1 tube in the HV alarm circuit may be operated infrequently, the characteristics of the tube may change; therefore, in order to insure that the tube will operate properly, the following procedure should be performed at least once a year.

- (a) Press the ADJ 1 button or turn the HV rotary switch to position ADJ 1. The V1 tube should fire and the HV relay should oper-

ate. If the tube fails to fire, hold the ADJ 1 button depressed or the HV rotary switch in position ADJ 1 and adjust the HV ADJ potentiometer until it does fire.

- (b) Allow the tube to conduct for at least 1 minute.
- (c) Release the ADJ 1 button or the HV rotary switch.
- (d) Press and then release the ADJ 2 button or turn the HV rotary switch to position ADJ 2 and then release. The HV relay should release and not reoperate and the V1 tube should not fire.
- (e) If duplicate converters are furnished, repeat the procedure for the V1 tube associated with the second converter.

**5. TROUBLES**

**5.01** In general, the only items likely to become defective with use are the electrolytic capacitors and semiconductor devices.

**5.02** If trouble develops, check the possible causes in the order given below. If the trouble is not apparent, check for loose or open connections or short circuits due to foreign matter lying across wiring terminals. If the trouble cannot be determined from the possible causes listed below, it is advisable to check all resistors for the resistance values shown on SD-81504-01.

TROUBLE	POSSIBLE CAUSE
(a) No output voltage	Battery not connected
	Blown fuses
	Shorted capacitors
	Defective bridge transistors (see note)
(b) Low output voltage	Voltage regulator defective
	Voltage regulator defective
	Damaged capacitors
	Failure of semiconductor devices

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<b>TROUBLE</b>	<b>POSSIBLE CAUSE</b>
(c) High output voltage	Step regulator improperly adjusted or voltage regulator defective Damaged capacitors Failure of semiconductor devices
(d) Erratic output	Loose connections

**Note:** The following check may be made to determine whether a bridge transistor (Q1-Q4) is shorted.

(1) Remove plant from service.

(2) Remove transistors from sockets.

(3) Using Rx1 range, connect KS-14510 meter across collector and emitter of each transistor in turn. A reading of less than 50 ohms indicates a shorted transistor. Replace transistors as required.

(4) After mounting transistors and before putting the plant back in service, check each transistor to make sure that its collector has not been accidentally grounded. To do this, connect the KS-14510 meter between one of the screws which mount the transistor and a mounting screw of the associated socket.