RECTIFIERS

J86228A AND J86228B

400 VOLTS, 0.1 AMPERE

OPERATING METHODS

1. GENERAL

1.01 The J86228 rectifier is used primarily as a plate supply and as a power supply for amplifiers and oscillators in type TD and TE radio relay systems.

1.02 This section is reissued to add information for silicon rectifier stack field conversion and to bring the section up to date. Since this reissue covers a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.03 These rectifiers are rated at 400 volts, 0.1 ampere, being adjustable to any voltage between 390 and 460 volts, with a regulation of ±1 percent over the line voltage and load current range. The input power requirement is single-phase, 50- to 60-hz alternating current. The rectifier operates within the absolute limits of 105- to 125-volts alternating current when the 377K (T2) transformer (N option) is provided. Taps are provided on this transformer to match the ***nominal*** ac line voltage. When a 377E (T2) transformer (M option) is provided, the ac supply should be held within the limits of 105 to 120 volts.

> ***Caution: Voltages inside the rectifier case are over 150 volts to ground. Avoid all contact with terminals. Do not allow a test pick to touch two metal parts at the same time or destructive and dangerous short circuits may occur. Disconnect the ac supply before working on the rectifier, except when necessary to make tests.***

1.04 Routine checks should be made during a period when they will not interfere with service.

1.05 The instructions given in this practice are based on circuit schematic drawing SD-81013-01. For a detailed description of operation, see the corresponding circuit description.

1.06 For more detailed information on operation and maintenance of associated equipment or apparatus, refer to the appropriate Bell System Practice.

2. TOOLS AND TEST APPARATUS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
—	3-inch Screwdriver
TEST APPARATUS	
KS-14510	Volt-Ohm-Milliammeter

3. OPERATION

Preparing to Start

3.01 When placing the rectifier into service after any trouble conditions have been corrected, or if the rectifier has been out of service for a long period of time, check that:

(a) Correct tubes are in the sockets.

(b) Connections between TS1 and transformers T1 and T2 are correct.

(c) Proper fuse F1 is provided when required, and proper service fuse in supply circuit is available.

(d) Either positive or negative output is grounded.

(e) All external connections are made in accordance with the schematic drawing covering the associated circuit of which the rectifier is a part.

Initial Adjustments

3.02 If S1 switch is provided the door must be closed before rectifier will operate.

STEP	PROCEDURE
1	Rotate ADJ VOLTS (P1) potentiometer to its maximum counterclockwise position.
2	Connect the KS-14510 meter to jacks J1 and J2 if the output voltmeter is not provided.
3	Connect the rectifier to the ac power supply.
4	Install service fuse in supply circuit. ***Requirement:*** The output voltage should appear in approximately 20 seconds and build up to the regulated value within three minutes.
5	Rotate ADJ VOLTS (P1) potentiometer clockwise until the KS-14510 meter or output meter indicates the desired regulated values.

4. ROUTINE CHECKS

4.01 As often as local experience demands, tubes should be checked in accordance with Bell System Practices which apply.

4.02 The dc output should be checked frequently to make certain that it is correct.

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

5. TROUBLES

5.01 The ADJ VOLTS (P1) potentiometer is enclosed and should be replaced if it becomes defective in any respect.

5.02 A defective V1 tube should be replaced with the 34A plug-in rectifier assembly (CR1), and associated conversion components, 189A terminal punching, and KS-19538 L1 rectifier (CR2), see Part 6. The conversion, if made, must be made in accordance with drawings SD-81013-01, T-81013-30, T-81013-80 and T-81013-81.

5.03 Should any of the following troubles develop, check the possible causes listed. 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
No dc voltage	Power failure
	Blown ac supply fuse or F1 fuse
	Failure of V1 tube or CR1 diode depending upon which is provided
	Shorted C1 through C6 capacitors
Low dc voltage	ADJ VOLTS (P1) potentiometer incorrectly set
	Low emission on V1 tube or short circuit in CR1 diode
	Rectifier overloaded
	Low ac line voltage
	V4 tube not functioning properly
	Aged V2 series tube
	C8, C9 or C13 capacitor shorted
	Open in R19 resistor
	Excessive grid current in V3 or V4 tube

TROUBLE	POSSIBLE CAUSE
High dc voltage	ADJ VOLTS (P1) potentiometer incorrectly set
	V5 tube aged; voltage drop too high
	High ac line voltage
	V3 tube not functioning properly
	C10, C12, or C13 capacitor shorted
	Insufficient load
	Shorted CR2, when provided
	Excessive grid current in V2 or V4 tube
Erratic dc voltage	Loose connection at ADJ VOLTS (P1) potentiometer
	Variable drop in V5 tube
High ripple	Flashing in V5
	Insufficient load
	Excessive grid current in V2 or V4 tube

6. CONVERSION OF V1 TUBE TO CR1 RECTIFIER ASSEMBLY

STEP	PROCEDURE
1	Disconnect ac and dc power connections.
2	Remove V1 and V2 tubes.
3	Remove front upper-left mounting screw from T1 transformer, install 189A terminal punching, and secure with T1 transformer and transformer mounting screw.
4	If connections are made to terminals 3 and 7 on T2 transformer, remove connection from terminal 3 and connect to terminal 4; remove connection from terminal 7 and connect to terminal 6.
5	Connect a black, 20-gauge wire from terminal 1 of CR1 rectifier socket to 189A terminal punching.
6	Connect CR2 diode between terminals 4 and 6 on V2 tube socket.
7	Install 34A rectifier in CR1 socket, and 421A tube in V2 tube socket. ***Caution: The 421A or 422A tubes or 34A rectifier must not be used in combination with the 6AS7-G or 5R4GY tubes.***
8	Erase V1 tube code, and stamp 34A in the same location.
9	Erase V1 on both front and rear of chassis, and stamp CR1 in the same locations.