J87275 RECTIFIER
SEMICONDUCTOR-TYPE—AUTOMATIC REGULATION
OPERATING METHODS

1. GENERAL

1.01 This rectifier provides regulated dc power from an ac power source for use in charging and floating the emergency cells in the 708A power plant. The rectifier is rated at 1 to 100 amperes, 9 volts direct current. The input power requirement is 3-phase, 3-wire, 58- to 63-Hz alternating current. Taps are provided on the input transformer to match the ***nominal*** ac line voltage. The rectifier operates within the absolute limits of 190 to 260 or 380 to 500 volts alternating current, depending upon the option provided. The rectifier, with either option, will operate with a permissible change from the nominal input voltage of -10 percent to +5 percent.

> ***Caution: Voltages inside the rectifier cabinet 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, as destructive or dangerous short circuits may occur.***

1.02 This section is reissued to update the section due to equipment changes.

1.03 The circuit is designed to provide for plant control of the rectifier during end-cell switching.

1.04 The abbreviations cw and ccw refer to clockwise and counterclockwise, respectively.

1.05 Routine checks should be made during a period when they will cause the least unfavorable reaction to service.

1.06 The instructions are based on circuit schematic drawing SD-81750-01. For detailed description of the operation, see the corresponding circuit description.

1.07 For more detailed information on operation and maintenance of related equipment or apparatus, refer to the appropriate Bell System Practices.

2. LIST OF TOOLS AND TEST APPARATUS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
—	3-Inch C Screwdriver
—	Blocking and insulating tools (Use tools and apply as covered in Section 069-020-801.)
TEST APPARATUS	
KS-8039	DC Volt-Milliammeter

3. OPERATION

3.01 ***Normal Settings of Controls for Automatic Operation:***

(a) The PWR ON-PWR OFF switch is set to the ON position.

(b) The VOLTS ADJ (R14) potentiometer is adjusted for battery voltage requirement.

3.02 The rectifier is completely automatic in the regulation of float voltage and should require no day-to-day adjustments.

4. ROUTINE CHECKS

4.01 If the relays are mounted on circuit boards, they cannot be checked and must be replaced in case of malfunction. If possible, periodically check all other relays for condition of contacts,

making sure that they are in accordance with the circuit requirements table and Bell System Practices which apply.

4.02 The dc output voltage 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.

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.

4.04 Remove the rectifier from service when making the following tests:

Output Voltage Adjustment—

(1) Operate the PWR ON-PWR OFF switch to the ON position.

(2) Slowly rotate the VOLTS ADJ (R14) potentiometer cw until the voltage output of the rectifier is equal to the battery float requirement at the associated power plant or 2.17 volts per cell if no battery float requirement is given.

Requirement: The M1 OUTPUT ammeter indicates 100 amperes when the proper load is connected to the A and B terminals of the rectifier.

Note 1: If the rectifier shuts down before the desired output voltage is reached, rotate the HV (R26) potentiometer one-quarter revolution cw and repeat (2).

Note 2: If the requirement was not met in (2), proceed with (3) and (4).

(3) Determine that sufficient load is connected to the ▶A and B terminals◀ of the rectifier to increase its output current to 110 amperes.

(4) Rotate the CUR LIM (R9) potentiometer to the maximum cw position; then, rotate slowly ccw until the M1 OUTPUT meter indicates 100 amperes.

High-Voltage Shutdown Adjustment—

(5) Rotate the HV (R26) potentiometer fully cw.

(6) Adjust the VOLTS ADJ (R14) potentiometer to the desired high-voltage shutdown point or approximately 2.3 volts for each cell being charged.

(7) Slowly rotate the HV (R26) potentiometer ccw until the rectifier shuts down.

Note: ▶There will be a delay in shutdown by the RT2 thermistor. Once the rectifier shuts down the RF1 locks up. The voltage should be 2.35 volts per cell when shutdown occurs.

(8) Rotate VOLTS ADJ (R14) potentiometer fully ccw.

(9) Operate the POWER ON-OFF switch to restart the rectifier.

(10) Adjust the VOLTS ADJ (R14) potentiometer for normal operating output voltage level as indicated by the M2 OUTPUT voltmeter.

Low-Voltage Adjustment—

(11) Operate the POWER ON-OFF switch to the OFF position. Check that the LV relay releases at a voltage of 2.1 volts per cell.

CH and CMD or RFA Lead Check—

(12) Check the alarms on the RFA and CH leads when the rectifier shuts down.◀

5. TROUBLES

5.01 ▶In general, the only items likely to become defective with use are the electrolytic capacitors and semiconductor stacks or diodes.◀

5.02 Should a diode or PNPN (SCR) device in the rectifier stack become defective, replace the complete rectifier stack.

5.03 Should any component of the following circuits become defective, replace the complete circuit:

- Regulator (CP1 and CP2)
- Regulator Power and Error Detector (CP3)
- Alarms (CP4)
- HI-LO Voltage Detector (CP5).

Trouble Chart

5.04 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 direct current output	Failure or disconnection of the input power.
	Operation of HV or LV relay in HI-LO voltage detector.
	Incorrect input phase sequence.
	Blown ac power fuses or fuses in the rectifier.
	CUR LIM (R9) potentiometer out of adjustment.
	VOLTS ADJ (R14) potentiometer out of adjustment.
	Open R+ or R− voltage ← sensing lead.
Low dc voltage (with output less than 100 amperes)	Low input voltage.
	Incorrect input phase sequence.
	Shorted capacitors.
	Incorrect transformer taps used.
	Defective diode or PNPN device in rectifying element.
	VOLTS ADJ (R14) potentiometer out of adjustment.
High dc voltage	VOLTS ADJ (R14) potentiometer out of adjustment.
	Defective diode or PNPN device in rectifying element.
	Defective CP1, CP2, or CP3 cards.
Erratic dc current or voltage	Loose connections at potentiometers or resistors.
	Intermittent open or short in any component.
	Improper T1 transformer secondary taps.
	Incorrect input phase sequence.
	Damaged CR1 rectifier stack.
	Damaged CP1 card.