RECTIFIERS

J87201A L1 AND J87201B L1

OPERATING METHODS

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1. GENERAL

1.01 The J87201A L1 and J87201B L1 semiconductor-type, unregulated rectifiers are intended for emergency cell recharging in the 303A power plant.

1.02 This section is reissued to add an alarm provision for indicating exhaustion of end cell potential.

1.03 The J87201A L1 and J87201B L1 rectifiers use silicon diodes for full-wave rectification. An ammeter is provided to indicate the rectified dc current output. The output is fused in both leads and is ungrounded at the terminals. ▶An ECA lead is provided on an optional basis to the charge and discharge circuit (see SD-81448-01). The ECA lead indicates the exhaustion of end cell potential which might occur in the event of a fault in the rectifier or extended loss of ac power service. The alarm comes in when the battery voltage drops to 2.1 volts.◀ The rectifiers are suitable for use in room temperatures from 50 through 104°F (10 through 40°C) and are rated as follows:

AC INPUT (J87201A L1 AND J87201B L1): 210-, 230-, and 250-volt ±10%, 60-Hz ±2%, single phase

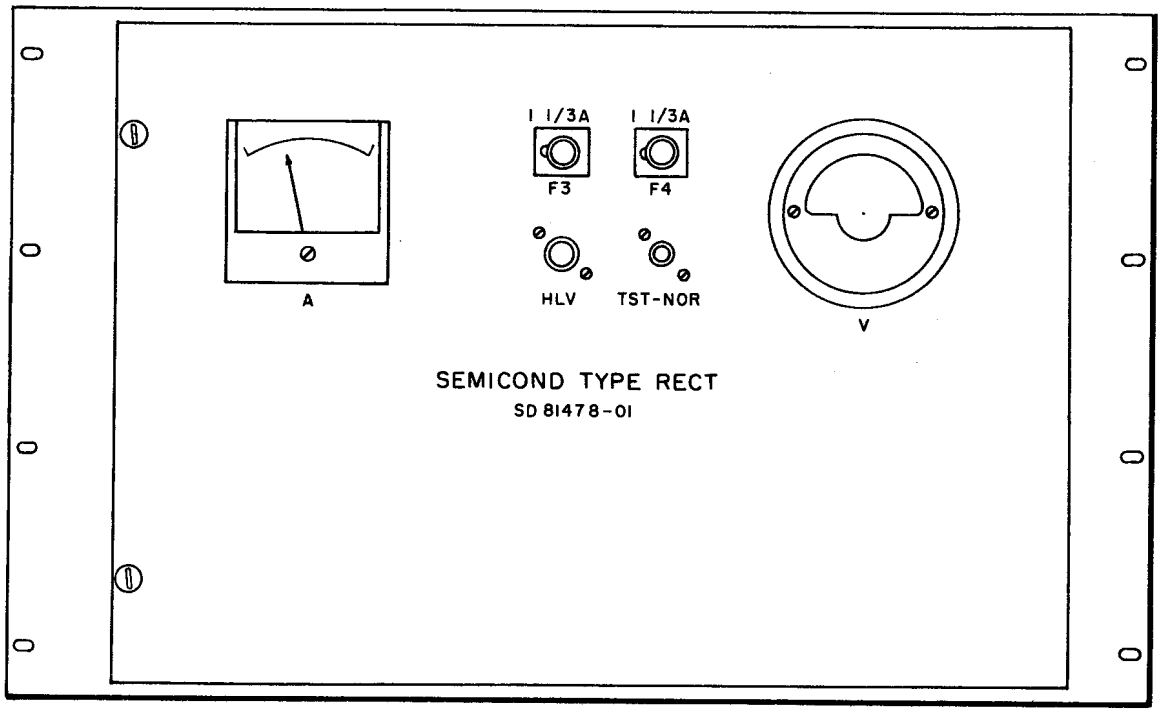
DC OUTPUT (J87201A L1): 5 volts direct current at 200 amperes, unfiltered (two series-connected battery cells)

DC OUTPUT (J87201B L1): 2.5 volts direct current at 250 amperes, unfiltered (a single battery cell)

Caution 1: Voltages inside the rectifier exceed 200 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 and dangerous short circuits may occur. Disconnect the ac supply before opening covers to work inside the rectifier except as necessary to make tests.

Caution 2: When the rectifier output is connected to the battery, the F1 and F2 fuses and other parts of the output circuit are at a potential of 50 volts with currents approaching 200 amperes direct current (J87201A L1) and 250 amperes direct current (J87201B L1). Take care to observe the proper safety precautions and not cause a short circuit between parts when working on parts of the output circuits.

1.04 *J87201A L1 (See Fig. 1):* This rectifier will connect to the ac line and charge two series connected emergency battery cells after the emergency cell switch in the associated power plant has operated and returned to normal. The rectifier will disconnect from the ac line and stop charging the emergency cells when the voltage of the cells has increased to 2.4 volts direct current per cell.



NOTE:
THE NOR LO CHG SWITCH CONTROL AND THE F1 AND F2 OUTPUT FUSES ARE ACCESSIBLE WHEN THE FRONT HINGED COVER PANEL IS OPENED.

Fig. 1—J87201A L1 Rectifier—Front View

Starting and stopping the rectifier at the low and high voltage limits of the cells is effected by the V voltmeter relay. Two dc charging current ranges may be selected by manual operation of the NOR LO CHG switch. In the NOR position, the range is 140 to 250 amperes. In the LO position the range is 30 to 135 amperes. The position selected depends on the ampere-hour capacity of the connected storage battery and on local requirements.

Note: The NOR LO CHG switch control is accessible when the front hinged cover panel is opened.

1.05 ***J87201B L1 (See Fig. 2):*** This rectifier operates automatically, the same as the J87201A L1 rectifier, in response to control signals from the associated power plant and differs from the J87201A L1 rectifier as follows:

(a) The rectifier is intended for charging a single emergency cell to 2.4 volts direct current.

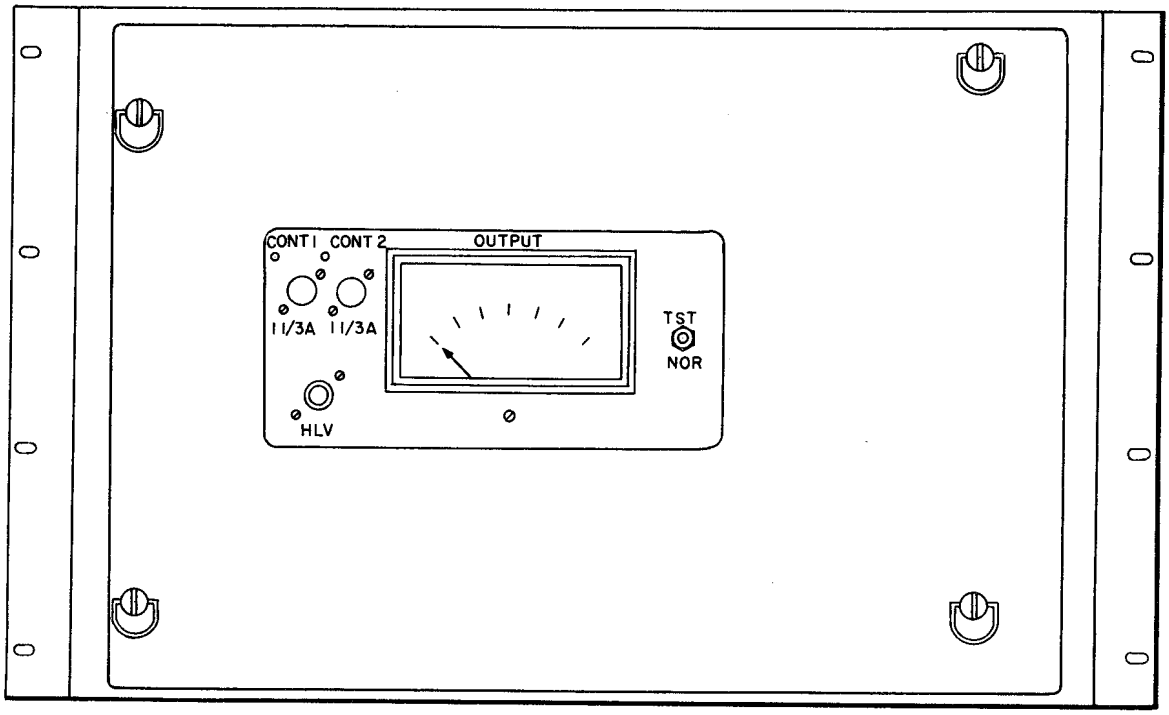
(b) Starting and stopping the rectifier is effected by the CP1 voltage detecting plug-in unit (printed circuit board).

(c) The charging current range is from 30 to 250 amperes direct current.

1.06 Keeping the ventilating passages and rectifying elements clean is especially important to avoid excessive heating.

1.07 Routine checks are intended to detect defects, and insofar as possible, to guard against circuit failures which interfere with service. Checks and adjustments, other than those required by trouble conditions should be made during a period when there will be a minimum interference with service.

1.08 The instructions are based on SD-81478-01, Fig. 1 for the J87201A L1 rectifier and Fig. 2 for the J87201B L1 rectifier. See the



NOTE:
THE F1 AND F2 OUTPUT FUSES ARE ACCESSIBLE WHEN THE FRONT COVER IS REMOVED.

Fig. 2—J87201B L1 Rectifier—Front View

associated circuit description for a detailed description of operation.

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

2. TOOLS AND TEST APPARATUS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
KS-14220	Wrench consisting of:
L1	Sliding Tee Handle
L7	6-Inch Extension Bar
L14	7/16-Inch Socket Wrench
—	Fuse Puller, Ideal Industries, Inc, Cat. No. 34-002, 7-1/2 Inches Long (or equivalent)
—	3-Inch C Screwdriver
TEST APPARATUS	
KS-14510	Volt-Ohm-Milliammeter

3. OPERATION

3.01 ***Preparing to Start:*** When preparing to put the unit into service, check that:

(a) AC power supply fuses (not in rectifier) and F1 through F4 fuses are provided and are of the proper size.

Caution: Use the KS-14220 socket wrench on the mounting screws of the F1 and F2 Amptrap fuses in the J87201A L1 rectifier. When working on the fuses, do not allow the wrench to touch any other metal parts at the same time as destructive and dangerous short circuits may occur. Use the fuse puller for removing the F1 and F2 fuses in the J87201B L1.

(b) The correct primary taps on the T1 transformer are selected, as covered on the SD- drawings, for the ac service voltage. Use the KS-14510 meter to measure the voltage.

Caution: When using any portable instrument, the leads should be carefully examined

to make sure the insulation is undamaged. The leads should be properly connected to the instruments 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 the equipment being tested, or if test picks are being used, they should be removed from the equipment under test.

(c) All external connections are made in accordance with the SD- drawings covering the associated circuit of which the unit is a part.

(d) The V voltmeter relay in the J87201A L1 rectifier and the CP1 plug-in sensor in the J87201B L1 rectifier have been adjusted for output voltage operating limits. See Section 167-623-301 covering the 303A power plant.

3.02 The J87201A L1 and J87201B L1 rectifiers have no disconnecting switches and are connected to both the ac power source and the associated power plant, including parts of the battery, when the fuses are in place.

Note: The J87201A L1 rectifier is equipped with a NOR LO CHG switch for the selection of either of two charging ranges. See 1.04.

4. ROUTINE CHECKS

4.01 To check that the high and low alarms operate satisfactorily, see Section 167-623-301 covering the 303A power plant and proceed as follows:

(a) J87201A L1 Rectifier

(1) Unlock and swing open the hinged front panel cover.

(2) On the V relay, connect a jumper between the C and H terminals. Note that the HLV lamp on the rectifier lights.

(3) Remove the connection. ▸The HLV lamp should extinguish.◂

(4) On the V relay, connect a jumper between the C and L terminals. Note that the HLV lamp lights ▸and that an alarm is sent over the charge and discharge circuit.◂

(5) Remove the connection. ▸The lamp should extinguish and the alarm silence.◂

(6) Close and lock the front panel cover in place.

(b) J87201B L1 Rectifier

(1) In the associated power plant, reduce the output of the emergency cell trickle charger to allow the battery voltage to drop to 2.1 volts. In the J87201B L1 rectifier, note that the HLV lamp on the rectifier lights ▸and that an alarm is sent over the charge and discharge circuit.◂

(2) In the associated power plant, restore the trickle charger and check that the emergency cell switch is in the NOR position. ▸The HLV lamp should extinguish and the alarm silence.◂

(3) In the J87201B L1 rectifier, operate the TST NOR switch to the TST position to start the rectifier. Release the switch. When the battery voltage increases to 2.4 volts note that the HLV lamp lights.

Note: When the rectifier is charging and the battery voltage increases from 2.1 to 2.15 volts, the HLV lamp will extinguish. When the battery voltage increases to 2.4 volts, the lamp will light and the rectifier will shut down automatically. As the battery voltage decreases to 2.35 volts, the lamp will extinguish and light again when the voltage has decreased to 2.1 volts. ▸At 2.1 volts, an alarm is sent over the charge and discharge circuit.◂

4.02 To check the operation of the rectifier manually, proceed as follows:

(a) In the associated power plant, check that the emergency cell switch is in the NOR position.

(b) Operate the TST NOR test key switch to the TST position and release it.

(c) Observe that output current is indicated on the output ammeter.

4.03 As often as local experience demands, the relays should be inspected for adjustment and condition of contacts, making sure that they are in accordance with the circuit requirements tables and sections which apply.

5. TROUBLES

5.01 At times, troubles may be caused by faulty relay operation (see 4.03).

5.02 When the CP1 printed circuit board of J87201B L1 becomes defective, do not attempt to replace any of the parts on the board. Replace the defective board.

Note: The board is a plug-in unit and is fastened in place with screws.

5.03 ***Trouble Chart:*** Should any of the following troubles develop, it is suggested that the possible causes listed be checked. If the trouble is not found, look for loose or open connections, or short circuits due to foreign matter lying across wiring terminals. Loose connections will cause heating and may result in failure of the rectifier. Any one of the following troubles may be caused by an open or short circuit or by an aging or drift in the constants of some faulty component.

TROUBLE	POSSIBLE CAUSE
(a) No output voltage	Failure or disconnection of the input power.
	AC contactor open.
	Defective transformer.
	Blown or missing ac supply fuses or other fuses in the rectifier.
(b) Low dc current	Low input voltage.
	Incorrect transformer primary taps.
	CHG switch accidentally changed from the NOR to the LO position (J87201A L1).
	Loose connections anywhere in the dc output circuit.
(c) High dc current	High input voltage.
	Incorrect transformer primary taps.
	CHG switch accidentally changed from the LO to the NOR position (J87201A L1).
(d) Erratic dc current or voltage	Loose connections at any component.
	Intermittent open or short in any component.