KS-19212, L1 AND L2, RECTIFIERS
24 VOLTS, 1600 AMPERES
OPERATING METHODS

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1. GENERAL

1.01 The KS-19212, L1 and L2, semiconductor type rectifiers use silicon-controlled rectifier (SCR) control and provide current-regulated dc power from an ac power source. The rectifiers are primarily designed to float and charge storage batteries in 301C and 302A power plants but may be used wherever their characteristics and design apply. The rectifiers operate from a 3-phase, 3-wire, 60 Hz ±2 percent ac input. The rectifiers are equipped with taps to allow the KS-19212, L1, rectifier to operate from an ac power source of 190 to 250 volts and the KS-19212, L2, rectifier to operate from an ac power source of 400 to 500 volts, with the allowable line variations being no more than -10 percent or +5 percent.

1.02 This section is reissued for the following reasons:

(a) To add information on the KS-19212, L102 Thyristor replacement kit

(b) To revise the fuse alarm check in Part 4

(c) To add a reference to the trouble locating Bell System Practice.

Revision arrows are used to emphasize the more significant changes. This reissue does not affect the Equipment Test List.

Danger 1: 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.

Danger 2: Inductors and transformers of these rectifiers have class H insulation and the temperatures of the inner windings may be around 170°C (338°F). The outside temperatures will be proportionately high. Heat sinks and studs of semiconductor power devices may be around 90°C (194°F). Avoid all contact with these components to prevent burns from occurring.

Warning 1: Do not operate the TEST-MAN-AUTO switch to the MAN position unless the associated battery load or a 400-ampere minimum resistive load is connected to the output of the rectifier. The MAN position of the TEST-MAN-AUTO switch is used

primarily for locating rectifier troubles and should not be left unattended in this position. When the TEST-MAN-AUTO switch is in the MAN position, the rectifier cannot maintain a constant output if the input line voltage should vary.

Warning 2: Verify that the OFF-NOR switch is in the OFF position before operating the SW1 and SW2 switches from one position to another.

Note: ▶Due to the design of these rectifiers, the failure of one SCR results in the overload and sequential failure of the remaining SCRs. Whenever it is determined that an SCR failure has occurred, it is recommended that the KS-19212, L102, field retrofit SCR replacement kit be used. The kit replaces the original 24 SCRs with 6 and eliminates the sequential failure mode. The kit also includes thermostats which sense excessive heat sink temperature and turns the rectifier off before excessive damage occurs.◀

1.03 ***AR1 Ammeter Relay:*** The General Electric type-195 (AR1) ammeter relay supersedes the Bethlehem Instruments ammeter relay. The indicator set-point unit is basically a D'Arsonval-type indicator to which has been added control indication consisting of a lamp, light shield, and light switches. The set pointers may be adjusted to any position from zero to full scale. The control unit contains the auxiliary relays, and also supplies lamp and control power. Load signals to the plant are transmitted by contacts of the auxiliary relays.

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 service reaction.

1.06 The instructions given in this practice are based on circuit schematic drawing SD-81629-01, Issue 3B. For a detailed description of circuit operation, refer to the corresponding circuit description (CD). If this section is to be used with equipment or apparatus that is associated with an earlier or later issue of the circuit schematic drawing, reference should be made to the SD and CD to determine the extent of the changes and the manner in which the section may be affected.

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

1.08 Refer to Fig. 1 for a front view of the KS-19212, L1 and L2, rectifier with the door open.

2. LIST OF TOOLS, TEST APPARATUS, AND MATERIALS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
—	3-Inch C Screwdriver
—	10-Ohm, 50-Watt Minimum Resistor
—	6-Ampere, 125-Volt DC Rated Fuse
—	15-Ampere, 125-Volt DC Rated Switch
TEST APPARATUS	
R-1032	Thermometer
KS-3008	Stopwatch
KS-8039	DC Volt-Milliammeter, or equivalent, such as Weston Model 1240 Digital Multimeter
KS-16979	Volt-Ohm-Milliammeter
—	Weston Model 904 AC Voltmeter (8 Ranges 750/300/150/75/15/7.5/3)
MATERIALS	
KS-14666	Cleaning Cloth

Note: Equivalents may be substituted.

3. OPERATION

Warning: If the rectifier has been out of service and the SW2 switch is in the OPEN position, do not operate

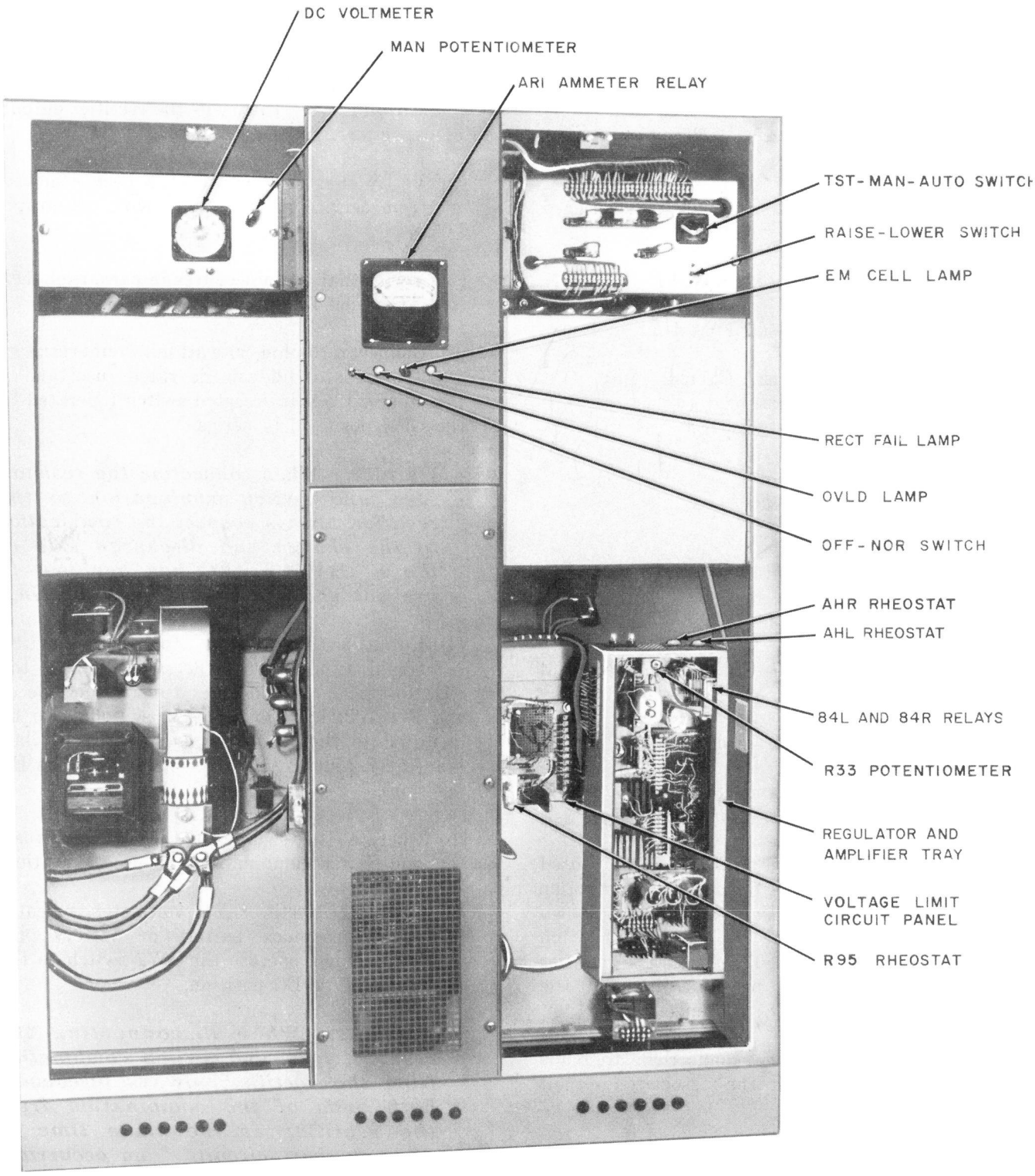

Fig. 1—KS-19212, L1 and L2, Rectifiers—Front View With Door Open

the SW2 switch to the BAT or EC position without first charging the output filter capacitors in accordance with paragraph 3.02.

3.01 ***Preparing to Start:*** When preparing to start the rectifier, proceed as follows:

(1) Verify that the following controls are positioned as indicated:

- Rectifier Circuit Breakers—OFF
- Associated Switch and Fuse Unit in Bus
- Duct or Power Service Cabinet—OFF
- OFF-NOR (S1) Switch—OFF
- SW1 Switch—F
- SW2 Switch—OPEN
- TEST-NOR (S4) Switch—NOR
- TEST-MAN-AUTO (43) Switch—AUTO
- RAISE-LOWER (84CS) Switch—Normal (Mid-position)
- MAN Potentiometer—Fully ccw.

Note 1: Do not change the settings of any rectifier controls unless so indicated.

Note 2: The TEST-NOR (S4) switch is used to switch the rectifier from automatic operation to manual operation without shutting down the rectifier. When the TEST-NOR (S4) switch is operated to the TEST position, the rectifier output current can be controlled by the RAISE-LOWER (84CS) switch.

(2) Verify that all external connections are made in accordance with the associated circuit schematic drawings.

(3) Verify that all associated fuses are of the proper type and size and are installed in their respective fuse holders.

(4) Verify that the low and high contacts of the AR1 ammeter relay are set at 80 and 1540 amperes, respectively, unless the associated power plant Bell System Practice specifies different values.

3.02 ***Charging Rectifier Output Filter Capacitors:*** To charge the rectifier output filter capacitors, proceed as follows:

(1) Verify that the rectifier has been removed from service in accordance with paragraph 3.05.

(2) Verify that the procedures in paragraph 3.01 have been followed.

(3) Connect a 10-ohm, 50-watt minimum resistor; a 6-ampere, 125-volt dc rated fuse; and a 15-ampere, 125-volt dc rated switch (operated to the OFF position) in series.

Warning: When connecting the resistor, fuse, and switch combination to the rectifier, always connect the combination to the charge and discharge side of the F (BAT) or EC bus bar last to prevent short circuits from occurring.

(4) Connect the resistor, fuse, and switch combination between the switch side of the FU8 fuse and the charge and discharge side of the F (BAT) bus bar (if SW2 switch is to be operated to the BAT position) or the EC bus bar (if SW2 switch is to be operated to the EC position).

(5) Operate the switch of the resistor, fuse, and switch combination to the ON position.

(6) When the rectifier VM voltmeter indicates the approximate battery or battery plus end-cell voltage, operate the SW2 switch to the desired BAT or EC position.

Warning: When disconnecting the resistor, fuse, and switch combination from the rectifier, always disconnect both ends of the combination from the rectifier at the same time to prevent short circuits from occurring.

(7) Operate the switch to the resistor, fuse, and switch combination to the OFF position and then disconnect the combination from the rectifier.

3.03 ***Starting For Automatic Operation:*** To start the rectifier for automatic operation, proceed as follows:

(1) Charge the output filter capacitors in accordance with paragraph 3.02.

(2) If the rectifier is to be used to charge end cells, operate the SW1 switch to the EC position.

(3) Operate the associated switch and fuse unit in the bus duct or power service cabinet to the ON position.

(4) Operate the rectifier circuit breakers to the ON position.

(5) Operate the OFF-NOR (S1) switch to the NOR position.

(6) Restore the rectifier to normal plant operation in accordance with the associated power plant Bell System Practice.

Note: The voltage indicated on the rectifier VM voltmeter may not be the same voltage that is actually available to the batteries. However, the associated power plant output voltmeter should indicate the actual voltage that is available to the batteries. The nominal float voltage for the batteries in a standard plant is usually 2.17 volts per cell. For additional information on the required voltages for different types of batteries, refer to Sections 157-601-301 and 157-601-701.

3.04 ***Starting for Manual Operation:*** To start the plant for manual operation, proceed as follows:

Warning 1: An operator must be on duty continuously when the rectifier is in the manual mode of operation.

Warning 2: The MAN potentiometer should be rotated fully ccw before operating the TEST-MAN-AUTO switch to the MAN position to prevent excessive output from the rectifier.

(1) Charge the output filter capacitors in accordance with paragraph 3.02.

(2) If the rectifier is to be used to charge end cells, operate the SW1 switch to the EC position.

(3) Operate the associated switch and fuse unit in the bus duct or power service cabinet to the ON position.

(4) Operate the rectifier circuit breakers to the ON position.

(5) Operate the OFF-NOR (S1) switch to the NOR position.

(6) Operate the RAISE-LOWER switch to the appropriate RAISE or LOWER position until the associated power plant output voltmeter indicates that the rectifier is supplying the required output voltage to the batteries (should be previously specified in the associated power plant Bell System Practice).

Note: The voltage indicated on the rectifier VM voltmeter may not be the same voltage that is actually available to the batteries. However, the associated power plant output voltmeter should indicate the actual voltage that is available to the batteries. The nominal float voltage for the batteries in a standard plant is usually 2.17 volts per cell. For additional information on the required voltages for different types of batteries, refer to Sections 157-601-301 and 157-601-701.

(7) Rotate the MAN potentiometer cw until the rectifier is providing the desired output current. Do not exceed the maximum rated output of the rectifier as damage to the rectifier may result.

3.05 ***Stopping:*** To stop the rectifier, proceed as follows:

(1) Remove the rectifier from plant operation in accordance with the associated power plant Bell System Practice.

(2) Operate the NOR-OFF switch to the OFF position.

(3) Operate the rectifier circuit breakers to the OFF position.

(4) Operate the associated switch and fuse unit in the bus duct or power service cabinet to the OFF position.

(5) Operate the SW2 switch to the OPEN position.

Note: If the rectifier is to be left out of service for an extended period of time, remove all associated fuses from their respective fuse holders, disconnect load from the output of the rectifier, and refer to Section 032-110-701 for information on maintaining electrolytic capacitors when they are not in service.

4. ROUTINE CHECKS

Warning: Turn off the rectifier before operating the SW1 and SW2 switches from one position to another to prevent equipment failures from occurring.

4.01 ***Clean Ventilating Passages:*** Keep the ventilating passages unobstructed to ensure adequate cooling during operation.

Danger: Use all necessary precautions when performing maintenance on the SW1 and SW2 switches with battery power connected to the switches or when disconnecting battery bus bars to prevent short circuits from occurring which could result in fires, equipment damage, or personal injury.

4.02 ***Testing, Inspecting, Cleaning, and Adjusting SW1 and SW2 Switches:*** Test, inspect, clean, and adjust the SW1 and SW2 switches in accordance with Section ▶169-712-701.◀ Before performing maintenance on the SW1 and SW2 switches, the rectifier must be disconnected from the ac input power and it is preferred that the rectifier be completely disconnected from the batteries. To perform maintenance on the switches with the rectifier completely disconnected from the ac input power and batteries, follow the procedures in subparagraphs 3.05(1) through 3.05(5) and the procedures in the ***Note*** of paragraph 3.05. If a supervisory decision is made not to disconnect the rectifiers from the batteries, follow only the procedures in subparagraphs 3.05(1) through 3.05(5). After performing the switch maintenance, restore the rectifier to normal operation in accordance with the appropriate procedures in paragraphs 3.01 and 3.03, or paragraph 3.04.

4.03 ***Check Calibration of VM Voltmeter:*** To check the calibration of the rectifier VM voltmeter, proceed as follows:

(1) Connect the KS-8039 volt-milliammeter, set on the 75 VOLTS scale, to the (-) J1 and (+) J2 test jacks on the rectifier.

Requirement: The rectifier VM voltmeter should indicate the same voltage that is indicated on the KS-8039 meter.

Note: If the requirement in (1) is met, proceed to (3). If the requirement is not met, continue with (2).

(2) Adjust the adjustment screw on the VM voltmeter until its indication agrees with the indication on the KS-8039 meter.

(3) Place a small strip of masking tape, with the date of calibration written on it, across the adjustment screw of the VM voltmeter.

(4) Disconnect the KS-8039 meter from the rectifier.

4.04 ***Voltage Limiting Circuit Check:*** To check the voltage limiting circuit, proceed as follows:

Note: The rectifier should be first removed from service in accordance with the associated power plant Bell System Practice before proceeding with this check.

(1) Operate the OFF-NOR (S1) switch to the OFF position.

(2) Position the following rectifier controls as indicated:

- SW1 Switch—F
- SW2 Switch—OPEN
- TEST-NOR (S4) Switch—NOR
- TEST-MAN-AUTO (43) Switch—TEST
- RAISE-LOWER (84CS) Switch—Normal (Midposition)
- MAN Potentiometer—Fully ccw.

Note 1: Do not change the settings of any rectifier controls unless so indicated.

Note 2: If the rectifier being checked is a KS-19212, L1 or L2, rectifier with a serial number of 139 or higher, follow only the procedures in (9) through (17) and (24).

(3) Remove the FU12 fuse from its respective fuse holder.

(4) Remove the FU11 fuse from its respective fuse holder.

(5) Disconnect the TB8-6 lead from terminal 9 of TB29 terminal board (board mounted on voltage limit circuit panel). Tape the end of the TB8-6 lead to ensure that it is insulated.

(6) Install the FU11 fuse in its respective fuse holder.

(7) Install the FU12 fuse in its respective fuse holder.

(8) Connect a jumper from terminal 9 of TB29 terminal board to terminal 2 of the FU8 fuse.

(9) Connect the KS-8039 volt-milliammeter, set on the 75 VOLTS scale, to the (-) J1 and (+) J2 test jacks.

(10) Operate the OFF-NOR (S1) switch to the NOR position.

(11) Operate the RAISE-LOWER (84CS) switch to the RAISE position and hold at least 2 minutes to increase the output voltage to the maximum voltage limit.

Note: It may be necessary to manually close the 59 relay on the voltage control panel before the output voltage will increase.

Requirement: The KS-8039 meter indicates the voltage value specified in the associated power plant Bell System Practice. In the absence of a plant requirement, the KS-8039 meter should indicate between 26.5 and 27.2 volts for an 11-cell battery or between 28.7 and 29.4 volts for a 12-cell battery.

Note: If the requirement in (11) is met, proceed to (14). If the requirement is not met, continue with (12).

(12) Operate the RAISE-LOWER (84CS) switch to the RAISE position and hold.

(13) Unlock the MAX VOLT LIMIT (R95) potentiometer and adjust the potentiometer until the KS-8039 meter indicates between 26.5 and 27.2 volts for an 11-cell battery or between 28.7 and 29.4 volts for a 12-cell battery.

(14) Lock the MAX VOLT LIMIT (R95) potentiometer in place being careful not to disturb the setting.

(15) Operate the RAISE-LOWER (84CS) switch to the LOWER position and hold until the rectifier output voltage cannot be reduced any more.

(16) Operate the OFF-NOR (S1) switch to the OFF position.

(17) Disconnect the KS-8039 meter.

(18) Disconnect the jumper from terminal 9 of TB29 terminal board and terminal 2 of the FU8 fuse.

(19) Remove the FU12 fuse from its respective fuse holder.

(20) Remove the FU11 fuse from its respective fuse holder.

(21) Remove the tape from the end of the TB8-6 lead and connect the lead to terminal 9 of the TB29 terminal board.

(22) Install the FU11 fuse in its respective fuse holder.

(23) Install the FU12 fuse in its respective fuse holder.

(24) Restore the rectifier to normal operation in accordance with the appropriate procedures in paragraphs 3.01 and 3.03, or paragraph 3.04.

4.05 ***Current Limiting Circuit Check:*** To check the current limiting circuit, proceed as follows:

Note: The rectifier should be first removed from service in accordance with the associated power plant Bell System Practice before proceeding with this check.

(1) Operate the OFF-NOR (S1) switch to the OFF position.

(2) Position the following rectifier controls as indicated:

- SW1 Switch—F
- SW2 Switch—BAT
- TEST-NOR (S4) Switch—NOR
- TEST-MAN-AUTO (43) Switch—AUTO
- RAISE-LOWER (84CS) Switch—Normal (Midposition)
- MAN Potentiometer—Fully ccw.

Note: Do not change the settings of any rectifier controls unless so indicated.

(3) Set the high contact of the AR1 ammeter relay at 2000 amperes.

(4) Verify that the rectifier load that is connected to the F and G terminals will allow the output current to increase to at least 1750 amperes.

(5) Block operated the associated ST relay in the plant control circuit for the rectifier being checked. Refer to Section 069-020-801 for information on relay blocking.

(6) Operate the OFF-NOR (S1) switch to the NOR position.

(7) Manually operate the 84R relay in the regulator and amplifier tray hold.

Requirement: The AR1 ammeter relay should indicate between 1660 and 1740 amperes.

Note: If the requirement in (7) is not met, it may be necessary to adjust the R33 potentiometer. Obtain the appropriate information on adjusting the R33 potentiometer from the General Electric Service Organization.

(8) Release the 84R relay.

(9) Manually operate the 84L relay in the regulator and amplifier tray and hold until the rectifier output voltage (indicated on VM voltmeter) will not decrease any more.

(10) Release the 84L relay.

(11) Operate the OFF-NOR (S1) switch to the OFF position.

(12) Unblock the associated ST relay in the plant control circuit.

(13) Set the high contact of the AR1 ammeter relay at 1540 amperes, unless the associated power plant Bell System Practice specifies a different value.

(14) Restore the rectifier to normal operation in accordance with the appropriate procedures in paragraphs 3.01 and 3.03, or paragraph 3.04.

4.06 ***Raise and Lower Rate Check:*** To check the rectifier raise and lower rate, proceed as follows:

Note: The rectifier should be first removed from service in accordance with the associated power plant Bell System Practice before proceeding with this check.

(1) Operate the OFF-NOR (S1) switch to the OFF position.

(2) Position the following rectifier controls as indicated:

- SW1 Switch—F
- SW2 Switch—BAT
- TEST-NOR (S4) Switch—NOR
- TEST-MAN-AUTO (43) Switch—AUTO

- RAISE-LOWER (84CS) Switch—NORMAL (midposition)
- MAN Potentiometer—Fully ccw.

Note: Do not change the settings of any rectifier controls unless so indicated.

(3) Verify that there is at least a 1600-ampere load connected to the output of the rectifier.

(4) Connect voltage regulated charging unit(s) with a total charging capacity of 1600 amperes (such as the KS-19212 voltage controlled rectifier) in parallel with the current controlled rectifier.

(5) Verify that the controls on the voltage regulated unit(s) are positioned for normal battery operation. If the KS-19212, L3 or L4, voltage regulated rectifier(s) is being used, position the rectifier controls as indicated:

- OFF-NOR (S1) Switch—OFF
- SW1 Switch—F
- SW2 Switch—BAT
- TEST-MAN-AUTO (43) Switch—AUTO
- MAN Potentiometer—Fully ccw.

(6) Operate the OFF-NOR (S1) switch on the voltage regulated unit(s) to the NOR position.

Requirement: The voltage regulated unit(s) should take the full load.

(7) Block the 84L relay nonoperated (relay located in regulator and amplifier tray).

(8) Operate the OFF-NOR (S1) switch on the rectifier being checked to the NOR position.

Note: Have the KS-3008 stopwatch ready for use.

(9) Manually operate the 84R relay and hold (relay located in regulator and amplifier tray). Then, using the KS-3008 stopwatch, check the time required for the current from the rectifier being checked to go from 160 to 1440 amperes.

Requirement: The current should increase from 160 to 1440 amperes within ±5 seconds of the plant raise rate time specified in the associated power plant Bell System Practice. In the absence of a plant requirement, the current should increase from 160 to 1440 amperes within 15 to 25 seconds.

(10) Release the 84R relay.

Note: If the requirement in (9) is met, proceed to (13). If the requirement is not met, continue with (11).

(11) If the rate of increase is too slow, unlock the AHR potentiometer and rotate the potentiometer cw until the requirement in (9) is met. If the rate of increase is too fast, unlock the AHR potentiometer and rotate the potentiometer ccw until the requirement in (9) is met.

(12) Lock the AHR potentiometer in place, being careful not to disturb the setting.

Note: Have the KS-3008 stopwatch ready for use.

(13) Unblock the 84L relay and hold the relay operated. Then, using the KS-3008 stopwatch, check the time required for the current from the rectifier being checked to go from 1440 down to 160 amperes.

Requirement: The current should decrease from 1440 to 160 amperes within ±5 seconds of the plant lower rate time specified in the associated power plant Bell System Practice. In the absence of a plant requirement, the current should decrease from 1440 amperes to 160 amperes within 15 to 25 seconds.

(14) Release the 84L relay.

Note: If the requirement in (13) is met, proceed to (17). If the requirement is not met, continue with (15).

(15) If the rate of decrease is too slow, unlock the AHL potentiometer and rotate the potentiometer cw until the requirement in (13) is met. If the rate of decrease is too fast, unlock the AHL potentiometer and rotate the potentiometer ccw until the requirement in (13) is met.

(16) Lock the AHL potentiometer in place, being careful not to disturb the setting.

(17) Operate the OFF-NOR (S1) switch on the rectifier being checked to the OFF position.

(18) Operate the OFF-NOR (S1) switch on the voltage regulated unit(s) to the OFF position.

(19) If the AHR or AHL potentiometers had to be adjusted, repeat the procedures in (6) through (18) that apply.

(20) Disconnect the voltage regulated unit(s) that were connected in (4).

(21) Restore the rectifier to normal operation in accordance with the appropriate procedures in paragraphs 3.01 and 3.03, or paragraph 3.04.

4.07 ***AR1 Ammeter Relay Check:*** The low and high contacts of the AR1 ammeter relay should be set at 80 and 1540 amperes, respectively, unless the associated power plant Bell System Practice specifies different values.

4.08 ***Fuse Alarm Check:*** To check the fuse alarms, proceed as follows:

Note 1: This check does not apply when the rectifiers are used in the 301C power plant.

Note 2: The rectifier should be first removed from service in accordance with the associated power plant Bell System Practice before proceeding with this check.

(1) Operate the OFF-NOR (S1) switch to the OFF position.

(2) Position the following rectifier controls as indicated:

- OFF-NOR (S1) Switch—OFF
- SW1 Switch—F
- SW2 Switch—OPEN
- TEST-NOR (S4) Switch—NOR
- TEST-MAN-AUTO (43) Switch—TST
- RAISE-LOWER (84CS) Switch—Normal (Midposition)
- MAN Potentiometer—Fully ccw.

Note: Do not disturb the settings of any rectifier controls unless so indicated.

(3) Remove the fuse from the FU7 fuse holder.

(4) Install a blown fuse in the FU7 fuse holder.

(5) Operate the OFF-NOR (S1) switch to the NOR position.

Requirement: The rectifier OVLD lamp lights.

(6) Operate the OFF-NOR (S1) switch to the OFF position.

Requirement: The rectifier OVLD lamp extinguishes.

(7) Remove the blown fuse from the FU7 fuse holder.

(8) Install the original fuse removed in (3) in the FU7 fuse holder.

(9) Repeat the procedures in (3) through (10), except use the FU10 and FU12 fuses instead of the FU7 fuse.

(10) Manually operate the AR relay in the associated power plant and hold.

Requirement: The rectifier RECT FAIL lamp lights.

(11) Release the AR relay in the associated power plant.

Requirement: The rectifier RECT FAIL lamp extinguishes.

4.09 ***SCR Check:*** To check the rectifier SCRs, proceed as follows:

Danger: The temperature of the heat sinks and studs of the rectifier semiconductor power devices may be as high as 194°F (90°C). Avoid all

contacts with these components to prevent burns from occurring.

(1) Verify that the rectifier has been operating for at least 4 hours and has been supplying some power to the load.

Danger: The heat sinks of the SCRs are electrically connected to the main battery bus. Disconnect the rectifier from the main battery bus before performing any maintenance on the rectifier.

Note: The rectifier should be first removed from service in accordance with the associated power plant Bell System Practice before proceeding with this check.

(2) Turn the rectifier off by following all of the procedures in paragraph 3.05, including the ***Note.***

(3) Measure the temperature of the various heat sinks (plates on which the SCRs are mounted), using the R-1032, detail 1, thermometer. Hold the bulb of the thermometer against the heat sink and cover the part of the thermometer that is not in contact with the heat sink with a piece of felt. Hold the thermometer in this position until the temperature stabilizes. Record the temperature indication and check the temperatures of the other heat sinks. If too much time passes before all of the temperature measurements can be made, the heat sinks may cool considerably causing incorrect temperature indications.

Requirement: The temperatures of the heat sinks should be approximately the same.

Note: If one sink is considerably colder than the other heat sinks, the associated SCR may not be sharing the load properly. Verify that the gate coaxial connector is not loose. If the requirement in (3) cannot be met, it may be necessary to obtain additional information from the General Electric Service Organization.

5. TROUBLES

5.01 ▶Whenever a trouble condition is encountered in the operation of the rectifier, refer to Section 169-713-311.◀