660-TYPE POWER PLANT
OPERATING METHODS

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1. GENERAL

1.01 The 660 power plant converts negative 48-volt central office battery to a 130-volt dc output. It is designed primarily for small loads up to a maximum of 15 amperes.

1.02 The 660 power plant uses multiple 2-ampere or 5-ampere dc-to-dc converters to provide a positive or negative 130-volt dc supply. Converters of the same rated capacity are arranged for parallel operation. Up to four 2-ampere converters may be connected in parallel to deliver a maximum of 6 amperes and up to four 5-ampere converters may be paralleled to deliver a maximum of 15 amperes. Since there is no 130-volt battery associated with the 660 power plant, one more converter than the number required to carry the peak load is provided so that failure of a single converter will not reduce the capacity of the plant.

1.03 A minor alarm is provided to indicate the failure of a single converter and a major alarm is provided to indicate low output voltage. If the converters are mounted in an enclosed cabinet, a MULT ALARM lamp is provided to indicate either the failure of a converter or the operation of a discharge fuse.

1.04 Checks and adjustments, other than those required by trouble conditions, should be made during a period when they will not interfere with service.

1.05 These instructions are based on drawing SD-81889-01. For a detailed description of the circuit operation, refer to the corresponding circuit description.

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

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

2. LIST OF TOOLS AND TEST APPARATUS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
—	3-Inch C Screwdriver
TEST APPARATUS	
—	70-Type Fuse (blown)

3. OPERATION

PREPARING TO START

3.01 Before putting the plant in service, check that:

(a) The 48-volt fuses at the 48-volt power board are removed.

(b) All external connections are made in accordance with the schematic drawings covering the circuits associated with the plant.

(c) The converters in the plant are connected for the proper output polarity.

(d) All circuit breakers are in the OFF position.

(e) The OUTPUT VOLT ADJ potentiometer of each converter is rotated fully ccw.

(f) The output fuse of each converter is removed.

(g) All load fuses are removed.

Caution: Inductive filtering should not be used between the 48-volt battery and the converter inputs, since an input filter may cause voltage peaks which may damage components in the converter.

STARTING

3.02 To place the plant in service, proceed as follows.

(1) Install the 48-volt fuses at the 48-volt power board.

(2) Operate the circuit breaker on the first converter to the ON position.

(3) Insert the converter output fuse to connect the converter to the load bus.

(4) Rotate the OUTPUT VOLT ADJ potentiometer cw until the converter output voltage is 130 volts dc.

(5) Repeat (1) and (2) for the second converter.

(6) Rotate the OUTPUT VOLT ADJ potentiometer of the second converter cw until the converter output voltage is 130 volts direct current.

(7) Insert the output fuse to connect the second converter to the load bus.

(8) Install the load fuses (see 3.03 before installing load fuses).

3.03 ***CHG SEL Switch:*** To install load fuses for plants with decentralized filters, the CHG SEL switch is operated. This places the CHG resistor in series with the load to limit the filter charging current, thereby preventing fuse operation. To install a load fuse in these plants, proceed as follows.

(1) Operate the CHG SEL switch to the selected load position (LOAD 1 or LOAD 2).

(2) Install the load fuse.

(3) Operate the CHG SEL switch to the center position.

3.04 If the load is greater than the rating of one converter, additional converters are required. To place additional converters in service, proceed as in 3.02 (5) through (7).

3.05 When adding a new converter to an existing plant, proceed as follows.

(1) Repeat 3.02 (1) and (2) and operate the converter for 30 minutes to allow the voltages to temperature-stabilize.

(2) After this time interval, rotate the OUTPUT VOLT ADJ potentiometer cw until the output voltage is approximately 1 volt below the bus voltage.

(3) Insert the converter output fuse to connect the converter to the load bus.

(4) Rotate the OUTPUT VOLT ADJ potentiometer cw until the ammeter indicates the desired output current.

OPERATION OF THE PLANT

3.06 With all input and output fuses in place and circuit breakers closed, the converters should continuously operate in parallel to supply a regulated voltage to the load. It is not necessary that the converters share the load equally.

3.07 ***Stopping and Restarting Converters:***

(a) To stop an individual converter, proceed as follows.

Caution: Before disconnecting any converter, a working spare unit should be connected

to the load bus to prevent overloading the remaining converters.

(1) Remove the converter output fuse to disconnect the converter from the load bus.

(2) Operate the circuit breakers to the OFF position.

(3) Remove the 48-volt input fuse to disconnect the converter from the battery bus.

(b) To restart the converter, follow the procedure in 3.02 (5) and (7).

3.08 To restart the plant in the event of a fault which has caused complete plant shutdown, proceed as follows.

(1) Remove the load fuse.

(2) Remove the converter output fuses.

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

(4) Repeat the procedure in 3.02 (2) through (8). If necessary, repeat 3.04.

4. ROUTINE CHECKS

4.01 ***Load Bus Bar Alarm Fuses:*** Check the FA alarm associated with these fuses as follows.

(1) Remove the 70-type fuse from the alarm fuse socket.

(2) Install the blown 70-type fuse in the alarm fuse socket.

Requirement: The FA alarm operates.

(3) Remove the 70-type fuse.

(4) Install the original 70-type fuse in the alarm fuse socket.

4.02 ***Converter Failure Alarms:*** Periodically check these alarms by stopping and restarting the converters as covered in 3.07. Check that when one converter is stopped, a minor alarm is given and that when the first two converters are stopped or a low voltage condition occurs, a major alarm is given.

4.03 Since it is not necessary that the converters equally share the load, a periodic check should be made on converters indicating no output current to be sure that no malfunction exists. Raising the output voltage of the converter in question should cause it to deliver output current.

5. TROUBLES

5.01 The following troubles pertain to the supply circuit. For troubles in the converter units, refer to the appropriate Bell System Practices.

TROUBLE	POSSIBLE CAUSE
(a) Output voltage low	Converter(s) overloaded.
(b) Output voltage high	Converter(s) out of adjustment.
(c) No output current	Input supply open (fuse blown or converter malfunction).