

TYPE L3 CARRIER SYSTEM

MAIN AND AUXILIARY REPEATER POWER SUPPLIES

GENERAL TESTING CONSIDERATIONS

CONTENTS	PAGE
1. GENERAL	1
2. SAFETY	1
(A) Entering Huts	1
(B) Gas Precautions at Hut Locations	1
(C) Grounding Switch at Hut Locations	2
(D) Manhole Locations	2
(E) AC Line Voltage	2
(F) Turning Power Off — General	2
(G) Junction Repeaters — Observation That Power Is Turned Off	2
(H) Intermediate Repeaters — (Other Than Junction) Observation That Power Is Turned Off	3
(I) Main and Terminal Repeaters	3
3. ORDER WIRE AT AUXILIARY REPEATERS	3
4. AMPLIFIER AND REGULATOR HANDLING	3
5. SECTION FLOW CHART (Chart 1)	4
POWER FEED (Fig. 1)	4

1. GENERAL

1.01 This section and associated sections describe tests and adjustments on the L3 carrier system power supplies at main and auxiliary repeaters.

1.02 This section is reissued to show references to the PS1 and PS2 power systems. The original L3 power system has been designated the PS1 system and the new power system designated the PS2 system.

1.03 Measuring and testing apparatus should be maintained, calibrated and operated in accordance with standard instructions as outlined in Bell System Practices.

1.04 Operating procedures used to adjust power control equipment and the method to be followed when turning power off or on is included as part of this section. Initial and maintenance tests on the 505D power plant are covered in BSP Section A301.836 and are not repeated in this section.

1.05 Associated sections covering the various testing procedures are as follows:

- 359-020-511 — Initial Pilot and Power Line-up for PS1 and PS2 Power Systems
- 359-020-512 — Power Loading Adjustment — L3 Power Section — PS1
- 359-020-513 — Power Control Equipment
- 359-020-514 — Auxiliary Repeater Power Supplies — PS1 and PS2 Power Systems
- 359-020-515 — Equalizing Auxiliary Repeater Power Supplies
- 359-020-516 — Terminal Main Repeater Power Supplies — Constant Current Feed — Power Fed from Cable — PS1 and PS2 Power Systems
- 359-020-517 — Main and Terminal Repeater Power Supplies — Constant Voltage Feed
- 359-020-518 — Associated Power Supplies PS1 and PS2 Power Systems

2. SAFETY

(A) Entering Huts

2.01 Before entering a repeater hut the employee must be sure to remove the key (or keys) from the door lock (or locks) and retain same on his person as a precaution against being locked accidentally inside the building.

(B) Gas Precautions at Hut Locations

2.02 In some cases there is the possibility that natural, artificial or SF6 gas may accumulate in an unattended hut. This gas may come from any source such as a defect in an adjacent gas distributing system or in the case of SF6 gas from some defect in the telephone cable which

would allow the gas to escape into the hut. In case SF₆ gas is used or where local conditions are such that there is a possibility of natural or artificial gas being present, the hut door should be opened wide for at least five minutes before entering hut.

(C) Grounding Switch at Hut Locations

2.03 Along certain cable routes using lead sheath cable the apparatus cases are isolated from the cable. Along certain other cable routes lead polyethylene (lepeth) cable is used and the entrance cable sheath as well as the apparatus cases are isolated from the main cable. Where either of these conditions exists, a grounding knife switch is provided, mounted near the order wire cabinet, to ground, when operated, the apparatus cases and entrance cables. Upon entering a building where such a switch is installed, the employee must close switch immediately upon entering the hut to reduce the possibility of shock from any voltage which might appear on the cable sheath or apparatus cases. When leaving hut the switch must be opened in order to provide protection from lightning or other voltages which might damage the apparatus or cable conductors.

(D) Manhole Locations

2.04 Before entering a manhole repeater location the employee shall follow standard procedures for testing and ventilating manholes as covered in the outside plant series of Bell System Practices and any local instructions which may apply.

(E) AC Line Voltage

2.05 The AC line voltage on the Type L3 carrier system is dangerous to personnel. All safety procedures and cautions, as outlined in this and other sections, should be followed when working on the coaxial cable conductors or power supply equipment.

(F) Turning Power Off — General

2.06 The power control circuit feeds constant current at a high voltage directly to the power separation filters and thence through cable terminals to the associated coaxial conductors. When it is necessary to work on the coaxial cable or power equipment at auxiliary repeaters the procedures described below should be followed to protect personnel from the high voltages used

on the power loop. When power is turned off for work on the coaxial cable or power equipment at the auxiliary repeaters, power is also removed from the line transmitting and receiving equipment, and bias to the switching equipment. See Fig. 1 for a typical power feed on the Type L3 carrier system.

(G) Junction Repeaters — Observation That Power Is Turned Off

2.07 When it is necessary to work on the power equipment or coaxial cable at a junction repeater, power must be turned off, both in the power section which feeds power to the repeater equipment and the power section which is "looped" at the junction repeater. In order to make certain that power has been removed from both power sections proceed as follows:

(a) Remove one of the parallel patch plugs from the AMP OUT and LINE IN jacks of the amplifier receiving from the power "looped" power section. Connect the 7A pilot indicator into one of the jacks so vacated. Read 7A pilot indicator and as long as an indication of pilot is received, it will not be necessary to calibrate the 7A set.

(b) Connect 1AL power test set to the V TST connector on the ODD or EVEN TRANS panel and measure HTR 1 voltage. Meter should indicate approximately normal voltage.

(c) As power is being turned off at the main repeater *which does not* supply power to the repeater equipment, observe 7A pilot indicator reading. The reading on the 7A set should decrease as power is turned off. Use the 5 db scale for this observation.

(d) Read HTR 1 voltage with the 1AL power test set.

Requirement; HTR 1 voltage should read approximately normal value. If HTR 1 voltage *can not* be read at this time, power has been turned off in the power section which feeds the repeater equipment instead of the power "looped" section. At the main repeater, turn power on again and repeat items (c) and (d), while turning power off at the main repeater feeding the "looped" power section.

(e) While power is being turned off at the main repeater which supplies power to the repeater equipment, observe that the HTR 1 voltage decreases to 0.

(f) At the main or terminal repeater which supplies power, follow the procedure described in Part 2(I).

(g) At the junction repeater, disconnect LINE A, LINE B, LINE C and LINE D from corresponding cable terminals.

(h) Work may now proceed on the repeater equipment.

**(H) Intermediate Repeaters — (Other Than Junction)
Observation That Power Is Turned Off**

2.08 Intermediate auxiliary repeater power may be received from either direction of transmission. The following procedure describes the steps to be followed when it is necessary to turn power off to an intermediate auxiliary repeater.

(a) At the intermediate repeater connect the 1AL power test set to the V TST connector on either ODD or EVEN TRANS panel and measure HTR 1 voltage.

(b) While power is being turned off at the main repeater observe that HTR 1 voltage, at the intermediate repeater, decreases to 0.

(c) At the main or terminal repeater which supplies power, identify the power section involved and follow the procedure described in Part 2(I).

(d) At the intermediate repeater disconnect LINE A, LINE B, LINE C and LINE D from the corresponding cable terminals.

(e) Work may now proceed on the repeater equipment.

(I) Main and Terminal Repeaters

2.09 When necessary to turn power off to work on the coaxial cable or auxiliary repeater power equipment the following precautions must be observed at the main or terminal repeater which supplies the power.

(a) After power has been turned off, using the standard procedure, remove the safety fuse unit from the power control bay and display the "Men Working on Cable" side of the warning tag.

(b) Observe that the DISC lamps are lighted on the PSF panels involved then remove the cable terminal plugs.

(c) Fill out *one* power disconnect-restoration card for *each* party or crew working on cable or at auxiliary repeaters.

(d) **Do not** turn power on until the restoration side of *all* power disconnect-restoration cards have been completed.

2.10 When work is to be done on any of the rectifiers which furnish power to the local repeater equipment, coaxial line power need not be turned off at the power control bay. These power supplies may be turned off by removing the ac fuses in the power units themselves or by operating the circuit breakers on the later model power supplies.

3. ORDER WIRE AT AUXILIARY REPEATERS

3.01 A local 2-wire telephone circuit is provided between adjacent main repeaters with provisions at the auxiliary repeater location for signaling either of the main stations. The telephone set is permanently mounted in a cabinet, with a handset for its operation. Two keys are provided each designated with the name of the main station which it signals. The 2-wire telephone circuit is provided to furnish communication between auxiliary repeater locations and desired main station during line-up procedures and for subsequent communication.

3.02 Procedure:

(a) Plug handset into the TEL jack and operate the signal key bearing the designation of the main repeater to be signaled.

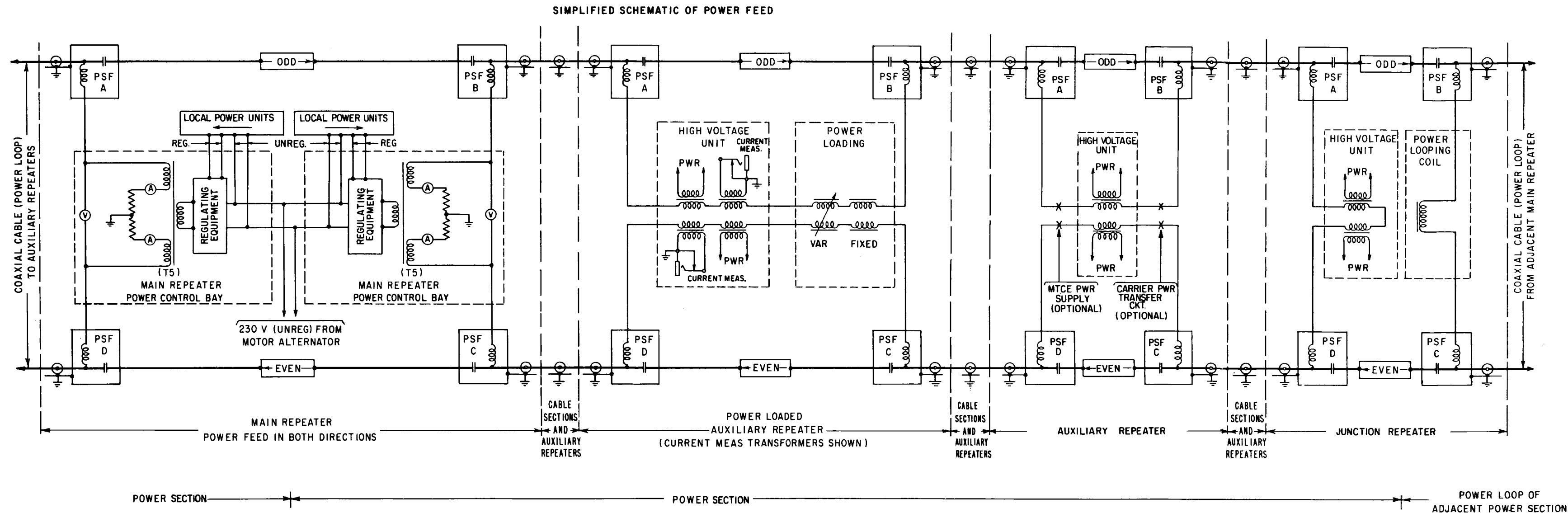
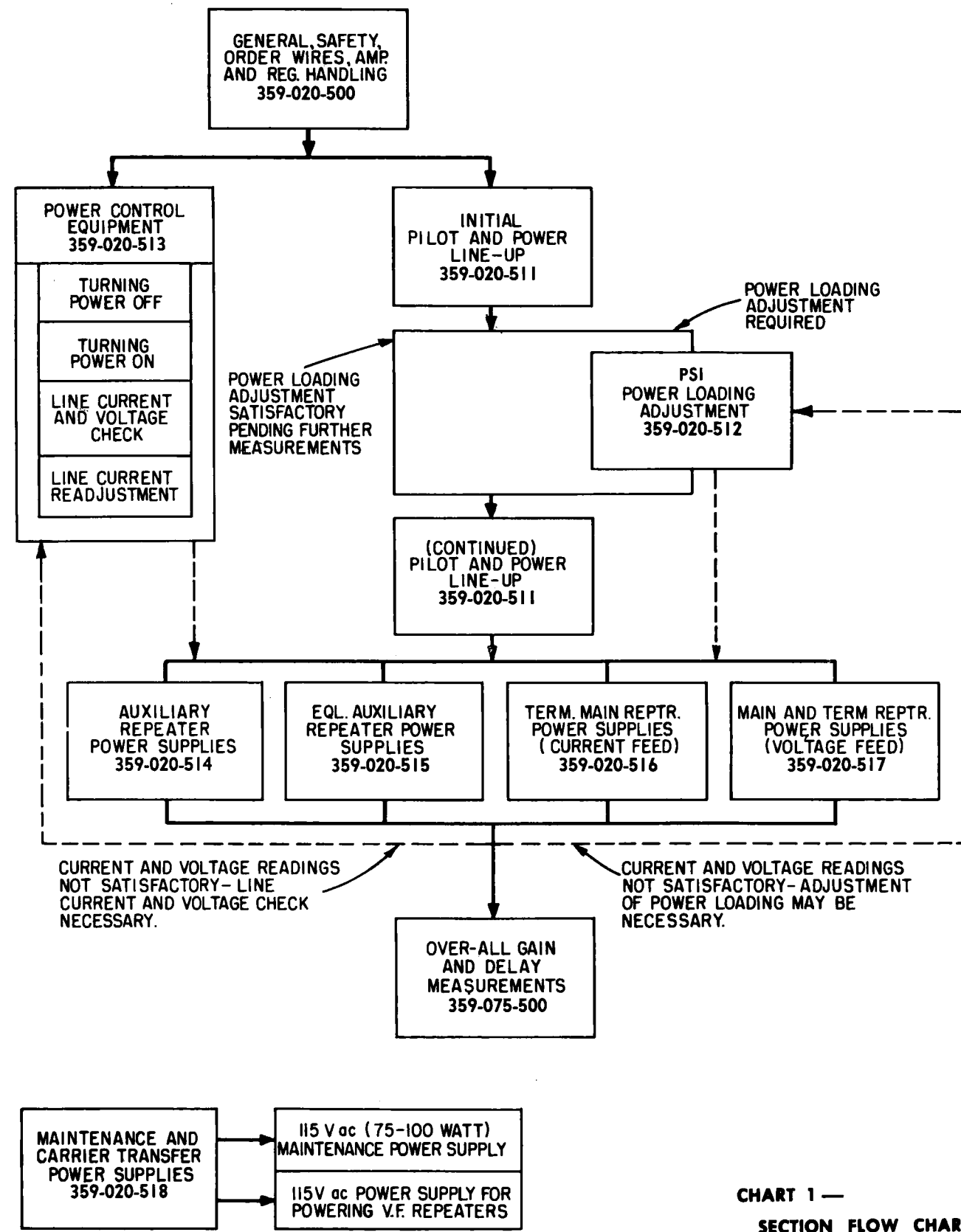
4. AMPLIFIER AND REGULATOR HANDLING

4.01 Amplifiers and regulators are marked "CAUTION: HANDLE CAREFULLY - DELICATE APPARATUS INSIDE". Care should be taken to minimize mechanical shock while handling or transporting. Despite the rugged appearance given by the die-cast case, shock will damage the delicate apparatus within the case such as electron tubes, crystals and transformers.

5. SECTION FLOW CHART AND POWER FEED

5.01 Chart 1. Block diagram showing the sections involved, and their use, in lining-up and maintaining the power supplies on the Type L8 carrier system.

5.02 Fig. 1. Describes the power feed on the Type L8 carrier system.

**MAIN REPEATER (Constant Voltage Feed)**

L3 carrier power at the main repeater is furnished from a locally generated AC source. This unregulated source is connected to the power control bay where it is regulated to supply the L3 carrier line equipment power supplies and "stepped-up" for application to the power section. In some applications the 230 volt unregulated supply is used to furnish power to the line connecting equipment power supplies.

AUXILIARY REPEATERS

Current measuring and Power loaded Maintenance power and Carrier power transfer (Optional)

Amplifier and regulator power is furnished from the coaxial cable conductors. The variable power loading coils and the current measuring jacks, where provided, are used when making power loading adjustments as covered in this series of sections. The maintenance power supply (optional) is used to provide power to operate testing and maintenance equipment at locations which are inaccessible to commercial or mobile power. The carrier power transfer circuit (optional) provides power for VF repeater power supplies.

JUNCTION REPEATER

Amplifier and regulator power is furnished from the coaxial cable conductors.

Caution: Junction repeaters have voltage from both power sections connected to the power equipment. Power must be removed from both power sections when working on the power supply equipment or coaxial cable conductors. See Paragraphs 2.05 and 2.09 of this section.

FIG. 1 — SIMPLIFIED SCHEMATIC OF POWER FEED ON THE TYPE L3 CARRIER SYSTEM