3 Operating Modes of a Direct Current Power Supply System

Figure 3.1 gives an overview of the operating modes of d.c. power supply systems currently in application. Table 2.1 applies to the operating voltages of communications systems.

3.1 Rectifier Mode

In the rectifier mode, also called the direct feed mode, there is no battery. The communications system is supplied with direct voltage directly from the mains via the rectifier (Fig. 3.2). The supply is interrupted for the duration of any power failure or in the event of a breakdown of the rectifier. The rectifier automatically switches on again on return of the mains. This mode is used with small to medium-sized communications systems when occasional interruptions in operation can be accepted.

3.2 Battery (Charge-Discharge) Mode

Because of its relatively low efficiency and the especially large strain on the battery, this mode of operation is used in today’s telecommunications power supply systems only when the mains supply fails and consequently the continued presence of a.c. power must be insured by a mains-independent power supply system. In a typical case, two emergency power generators of relatively short operating time charge the battery through rectifiers. The generators actually run for a few hours only, whereas the load is continuously supplied from the battery. The maintenance intervals for the generators can thus be lengthened.

The battery mode (not illustrated in Fig. 3.1) can also be used in solar-generating or wind-driven generating systems.

3.3 Standby Parallel Mode

If the communications system is required to provide continuous unrestricted service during a power failure, or in the case of other troubles, a reserve of energy (preferably in the form of a lead battery) should be kept ready. In the parallel mode the rectifier, battery and communications system are constantly connected in parallel (Fig. 3.3). If the rectifier fails, the battery takes over the further supply
3.3 Standby Parallel Mode

Fig. 3.1. Operating modes of d.c. power supply systems

of the communications system until the rectifier, e.g. on return of the mains, starts operating again. The rectifier then supplies the communications system again and also charges the battery.

In the parallel mode a distinction is made between the floating mode (not illustrated in Fig. 3.1) and the standby parallel mode. In the floating mode the