

## CHAPTER 11. AIRCRAFT ELECTRICAL SYSTEMS

### SECTION 1. INSPECTION AND CARE OF ELECTRICAL SYSTEMS

**11-1. GENERAL.** The term “electrical system” as used in this AC means those parts of the aircraft that generate, distribute, and use electrical energy, including their support and attachments. The satisfactory performance of an aircraft is dependent upon the continued reliability of the electrical system. Damaged wiring or equipment in an aircraft, regardless of how minor it may appear to be, cannot be tolerated. Reliability of the system is proportional to the amount of maintenance received and the knowledge of those who perform such maintenance. It is, therefore, important that maintenance be accomplished using the best techniques and practices to minimize the possibility of failure. This chapter is not intended to supersede or replace any government specification or specific manufacturer’s instruction regarding electrical system inspection and repair.

**11-2. INSPECTION AND OPERATION CHECKS.** Inspect equipment, electrical assemblies, and wiring installations for damage, general condition, and proper functioning to ensure the continued satisfactory operation of the electrical system. Adjust, repair, overhaul, and test electrical equipment and systems in accordance with the recommendations and procedures in the aircraft and/or component manufacturer’s maintenance instructions. Replace components of the electrical system that are damaged or defective with identical parts, with aircraft manufacturer’s approved equipment, or its equivalent to the original in operating characteristics, mechanical strength, and environmental specifications. A list of suggested problems to look for and checks (Refer to the glossary for a description of the check types) to be performed are:

- a. **Damaged**, discolored, or overheated equipment, connections, wiring, and installations.
- b. **Excessive heat** or discoloration at high current carrying connections.
- c. **Misalignment** of electrically driven equipment.
- d. **Poor electrical bonding** (broken, disconnected or corroded bonding strap) and grounding, including evidence of corrosion.
- e. **Dirty equipment** and connections.
- f. **Improper, broken**, inadequately supported wiring and conduit, loose connections of terminals, and loose ferrules.
- g. **Poor mechanical** or cold solder joints.
- h. **Condition of circuit breaker** and fuses.
- i. **Insufficient clearance** between exposed current carrying parts and ground or poor insulation of exposed terminals.
- j. **Broken or missing safety wire**, broken bundle lacing, cotter pins, etc.
- k. **Operational check** of electrically operated equipment such as motors, inverters, generators, batteries, lights, protective devices, etc.
- l. **Ensure** that ventilation and cooling air passages are clear and unobstructed.

**m. Voltage check** of electrical system with portable precision voltmeter.

**n. Condition** of electric lamps.

**o. Missing safety shields** on exposed high-voltage terminals (i.e., 115/200V ac).

**11-3. FUNCTIONAL CHECK OF STAND-BY OR EMERGENCY EQUIPMENT.** An aircraft should have functional tests performed at regular intervals as prescribed by the manufacturer. The inspections or functional check periods should be clearly stated in the aircraft maintenance manual, along with the overhaul intervals.

**11-4. CLEANING AND PRESERVATION.** Annual cleaning of electrical equipment to remove dust, dirt, and grime is recommended. Suitable solvents or fine abrasives that will not score the surface or remove the plating may be used to clean the terminals and mating surfaces if they are corroded or dirty. Only cleaning agents that do not leave any type of residue must be used. Components must be cleaned and preserved in accordance with the aircraft handbooks or manufacturer's instructions. Avoid using emery cloth to polish commutators or slip rings because particles may cause shorting and burning. Be sure that protective finishes are not scored or damaged when cleaning. Ensure that metal-to-metal electrically bonded surfaces are treated at the interface with a suitable anti-corrosive conductive coating, and that the joint is sealed around the edges by restoring the original primer and paint finish. Connections that must withstand a highly corrosive environment may be encapsulated with an approved sealant in order to prevent corrosion.

**CAUTION: Turn power off before cleaning.**

**11-5. BATTERY ELECTROLYTE CORROSION.** Corrosion found on or near lead-acid batteries can be removed mechanically with a stiff bristle brush and then chemically neutralized with a 10 percent sodium bicarbonate and water solution. For Nickel Cadmium (NiCad) batteries, a 3 percent solution of acetic acid can be used to neutralize the electrolyte. After neutralizing, the battery should be washed with clean water and thoroughly dried.

**11-6. ADJUSTMENT AND REPAIR.** Accomplish adjustments to items of equipment such as regulators, alternators, generators, contactors, control devices, inverters, and relays at a location outside the aircraft, and on a test stand or test bench where all necessary instruments and test equipment are at hand. Follow the adjustment and repair procedures outlined by the equipment or aircraft manufacturer. Replacement or repair must be accomplished as a part of routine maintenance. Adjustment of a replacement voltage regulator is likely since there will always be a difference in impedance between the manufacturer's test equipment and the aircraft's electrical system.

**11-7. INSULATION OF ELECTRICAL EQUIPMENT.** In some cases, electrical equipment is connected into a heavy current circuit, perhaps as a control device or relay. Such equipment is normally insulated from the mounting structure since grounding the frame of the equipment may result in a serious ground fault in the event of equipment internal failure. Stranded 18 or 20 AWG wire should be used as a grounding strap to avoid shock hazard to equipment and personnel. If the end connection is used for shock hazard, the ground wire must be large enough to carry the highest possible current (0.1 to 0.2 ohms max.).

**11-8. BUS BARS.** Annually check bus bars for general condition, cleanliness, and security of all attachments and terminals. Grease, corrosion, or dirt on any electrical junction may cause the connections to overheat and eventually fail. Bus bars that exhibit corrosion, even in limited amounts, should be disassembled, cleaned and brightened, and reinstalled.

**11-9.—11-14. [RESERVED.]**

