

MC-9 MAINTENANCE MANUAL**SECTION 7**
ELECTRICAL SYSTEM

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DESCRIPTION

The coach uses a 24 volt electrical system. A self-rectified alternator is gear driven from the engine and can be reached through the left side rear engine compartment door.

Wiring diagrams for the electrical system are included at the end of this section.

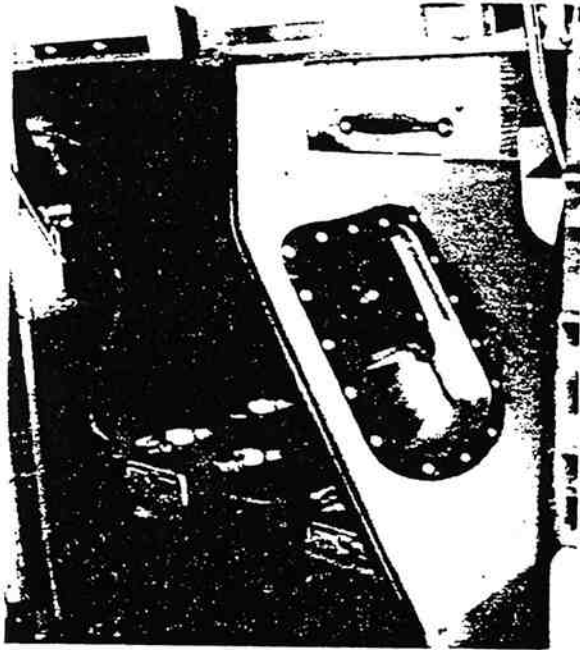


Figure 7-1. Battery Disconnect.

BATTERY DISCONNECT

A main battery disconnect switch is provided to shut off all electrical supply from the batteries. The switch is mounted on a vertical panel above the batteries and can be reached by opening the battery compartment door. To disconnect the batteries, pull knob down to OFF position. See figure 7-1.

TESTING CIRCUITS

A careful study of the wiring diagrams should be made to determine the source and flow of current through each electrical circuit. When a circuit is thoroughly understood, a point-to-point check can be made with the aid of the applicable wiring diagrams. Any circuit may be tested for continuity or shorts with a suitable volt-ohm meter.

All electrical connections must be kept clean and tight. Loose or corroded connections will cause discharged battery, difficult starting, dim lights, and improper functioning of other electrical equipment. Inspect all wiring connections at regular intervals. Make sure knurled nuts on all amphenol plugs are securely tightened.

CIRCUIT BREAKERS

All electrical circuits are protected by circuit breakers. The main circuit breaker and the two circuit breakers protecting the air conditioning system blower motors are located at the front of

the baggage compartment and can be reached through the left front baggage door. See figure 7-2.

The main circuit breaker (105 amp) is an automatic reset type. The condenser motor (105 amp) must be manually reset.

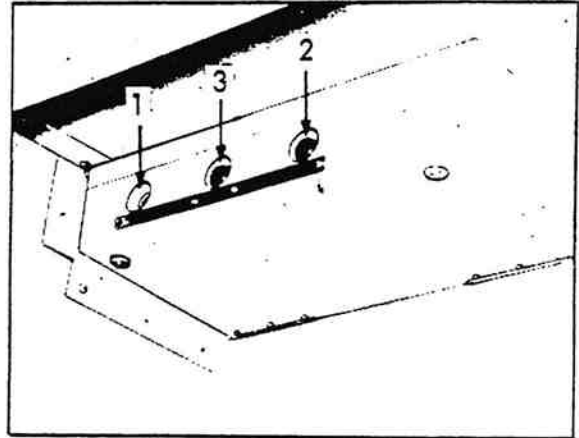


Figure 7-2. A/C Circuit Breaker in Left Front Baggage Compartment.

1. Automatic Reset Circuit Breaker (105 Amp.)
2. Manual Reset Condenser Motor Circuit Breaker (105 Amp.)
3. Manual Reset Evaporator Motor Circuit Breaker (80 Amp.)

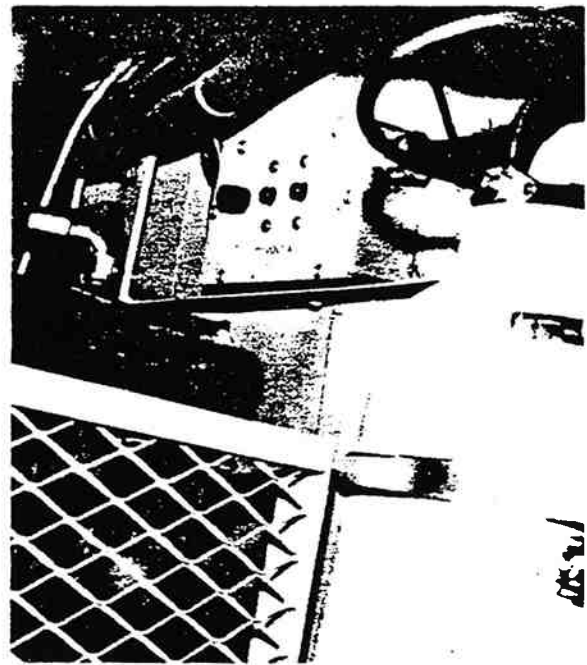


Figure 7-3. 110V In-Station Lighting Circuit Breaker Box in Left Front Service Compartment.

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The evaporator motor circuit breaker is 80 amp. The evaporator motor circuit breaker is also a manual reset type.

Smaller circuit breakers of the self-resetting type are located in an external junction panel at the left hand front below driver's window and in a panel at the left hand rear engine compartment wall. When one of these circuit breakers opens due to a shorted circuit, it will automatically reset itself when the breaker element cools. As long as the short exists, the breaker will continue to open and close intermittently. In this case, turn the defective circuit off until the cause can be located and corrected.

The circuit breaker box for optional in-station lighting is mounted to the rear wall of the left hand front service compartment. See figure 7-3.

RELAYS

Relays are used to automatically energize or de-energize a circuit from a remote location. The relay draws a very low current to energize its coil. Once the coil is energized, it develops a magnetic field which will pull a switch arm closed or open to either energize or de-energize a given component. Because the control current required for the coil is very low, the relay allows a remote station (e.g. driver's switch panel) to control a high energy circuit without running great lengths of costly high capacity cable. With the use of a relay, the need for high amperage switches and heavy connectors is eliminated.

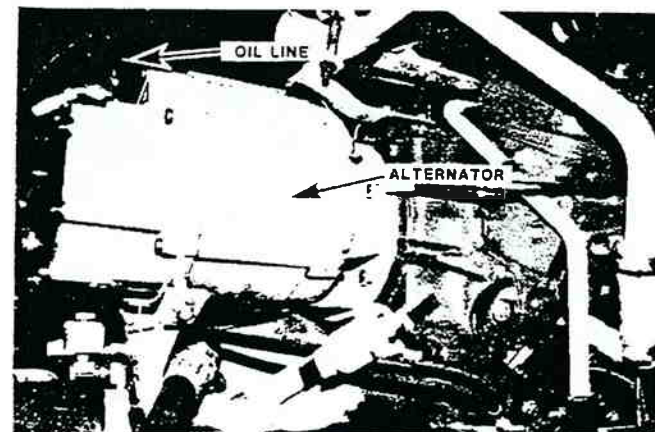


Figure 7-4. Alternator.

The MC-9 uses control relays for the Low and High Note Horns, Headlamps, Discharge and Blower cut-ins, Engine Stop, Stop Lights, Turn Lights, Reverse Solenoids, Starter Solenoid, Condenser and Evaporator Motor, Temp. & Level Sensors, Driver's Defroster, Step-Down Lamps at aisle, Alternator Field, and Heat Control Box.

NOTE: The relays should have the 5/16" stud nuts tightened to 50 ± 10 in. lbs. (5.6 ± Nm) torque.

GEAR DRIVEN ALTERNATOR — OIL COOLED

The gear driven, oil cooled alternator (figure 7-4) is a brushless, self-rectifying unit, in which all current carrying members, windings, diodes, and field coils are stationary. The only moving component is the rotor.

The oil-cooled alternator is a totally enclosed unit, cooled and lubricated by engine oil. The oil inlet is on the diode end cover, the oil drains back into the engine crankcase internally or through the drive end frame, drive adapter housing and the oil drain tube. The alternator should never be operated with the oil supply line disconnected. A continuous flow of engine oil flows through the alternator to lubricate the bearings and cool the assembly.

A relay or "R" terminal is tapped to energize a control relay in the electrical system.

CAUTION: The alternator is designed for use only on a negative ground system. If a positive ground battery is connected to the alternator, the alternator and wiring harness will be instantly destroyed. Always ensure that the alternator and batteries are negative ground. The alternator will not reverse to accept inverse polarity. Also, do not ground or short across any of the alternator or regulator terminals.

There are three components in the alternator which require electrical checks; the field winding, the six diodes, and the stator winding. See figure 7-5.

CAUTION: Before checking the alternator, turn off the battery disconnect switch.

FIELD WINDING — The field winding may be checked for shorts and opens with an ohmmeter. To check the field winding, connect the ohmmeter from the field terminal to ground. The normal resistance value is 3.0 to 3.3 ohms at 80°F (27°C). A resistance reading above normal indicates an open, and a reading less than normal indicates a short.

An alternate method of checking is to place a battery of specified voltage, and an ammeter in series with the field winding. The current should register 7.2 to 8.3 amperes at 24 volts.

A defective field can be replaced by removing the end frame on which the field terminal is located and then removing the four field coil mounting screws. See the section entitled Disassembly for a detailed procedure.

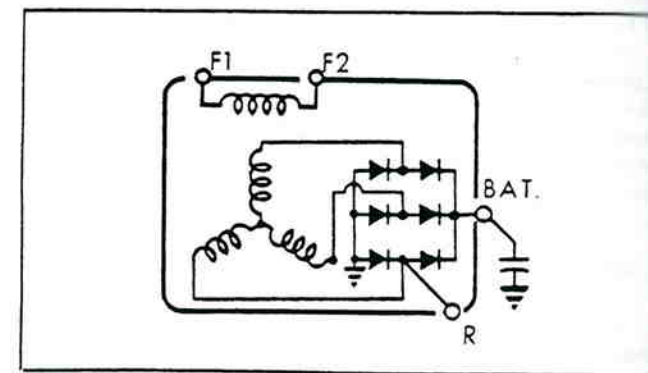


Figure 7-5. Alternator Wiring Diagram (Typical).

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CHECKING DIODES — Each diode may be checked for shorts and opens as follows:

1. Check to ensure the battery is disconnected.
2. Remove the pipe plug from underneath the end housing to drain the oil in the rectifier engine oil supply.
3. Remove the screws attaching the diode cover to the end housing.

CAUTION: Do not operate the alternator unless this unit is completely assembled.

4. Detach the DC terminals and relay terminal and disconnect the diode leads.

Each diode may be checked for shorts and opens with an ohmmeter as illustrated in figures 7-6, 7-7 and 7-8.

To check the diodes mounted in the diode supports for shorts, connect the ohmmeter positive lead to each diode lead and the ohmmeter negative lead to each support as shown in A, B and C (figure 7-6). To check the diodes mounted in the end frame for shorts, connect the ohmmeter positive lead to each diode lead and the ohmmeter negative lead to the end frame as shown in D, E and F. Ohmmeter readings may vary considerably when checking diodes for shorts, but if the reading is 300 ohms or less, the diode is likely defective and should be replaced. If the diode reads 300 ohms or less, it will allow excessive reverse current from the battery.

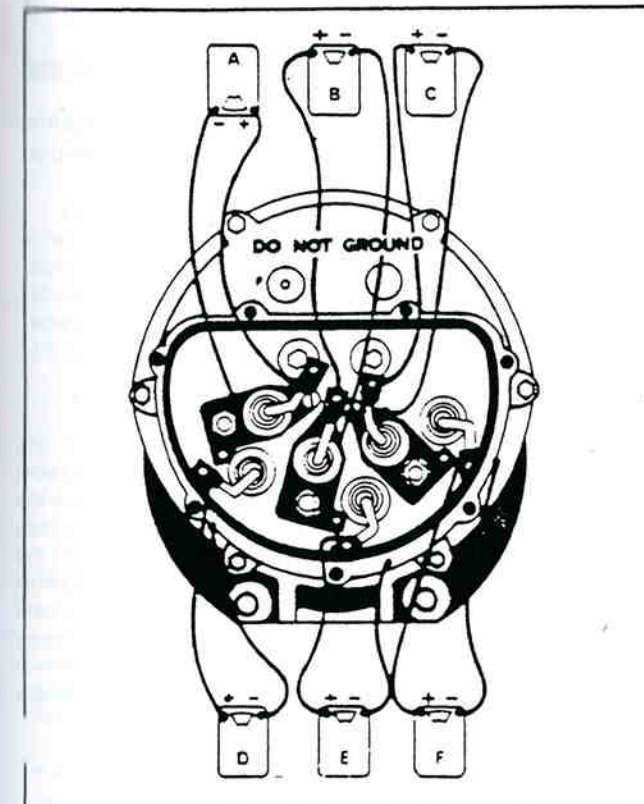


Figure 7-6. Checking Diodes for Opens Using Ohmmeter.

To check the diodes mounted in the diode supports for opens, connect the ohmmeter negative lead to each diode lead and the ohmmeter positive lead to each support as shown in A, B and C (figure 7-7). To check the diodes mounted in the end frame for shorts, connect the ohmmeter negative lead to each diode lead and the ohmmeter positive lead to the end frame as shown in D, E and F. An infinite resistance reading indicates an open diode.

Diodes can be replaced by following the procedure outlined in the section entitled Disassembly.

NOTE: When reinstalling diodes, tighten to 9-11 ft. lbs. (12-15 Nm) torque. Restake next to the threads in an arbor press with an 1/8" (3.2 mm) round punch. Press the punch with gradual pressure; do not strike as the shock may damage the diodes.

STATOR WINDING CHECKS — The stator windings may be checked for opens and shorts with an ohmmeter as follows (refer to figure 7-8):

OPENS: Connect the ohmmeter leads to two pairs of diode supports as shown in A and B (figure 7-8). The ohmmeter should show a low resistance. If a high or infinite resistance is measured in either one or both checks, the stator windings are open.

GROUNDS: To check for grounds, connect the ohmmeter as illustrated in C (figure 7-8). The ohmmeter should show a very high or infinite resistance. If zero or a very low resistance is measured, the windings are grounded.

The stator windings are difficult to check for shorts without finely calibrated laboratory test equipment due to the very low resistance values of the windings. However, if all other alternator checks are satisfactory, yet the unit fails to perform to specifications, shorted stator windings are likely.