

Section 5 ELECTRICAL

ELECTRICAL

INTERIOR ELECTRICAL POWER SUPPLY

Refer to Figure 5-1 and 5-2.

Two electric power supplies are provided for recreational vehicles, a 110 volt and a 12 volt system. The 110 volt power is supplied by means of a power cord which is attached to a suitable receptacle at a campsite or, optionally, by an engine-generator set. This 110 volt power source then connects to the vehicle electric circuits through the power converter or breaker box.

The primary source for 12 volt power is the battery system. Trailers can also use the 12 volt power from the tow vehicle. For either motorhomes or trailers a converter is available which converts 110 volt A.C. to 12 volt D.C. Auxiliary battery chargers operate from 110V and convert it to 12V DC for charging the batteries.

Service instructions for the various components of these systems are included in this section. Wiring diagrams are also shown.

WARNING: Before servicing any electrical component, disconnect external power to the vehicle, turn off the engine-generator set of vehicles so equipped. Disconnect the converter, disconnect trailers from their tow vehicle's electrical system and disconnect all battery negative (ground) leads from the batteries.

WARNING: Before servicing electrical system, turn off external power to motor home, shut down generator and disconnect battery cables from positive terminals.

When welding is being performed, disconnect battery cables from battery. Do not weld or smoke adjacent to battery when charger is operating.

CONVERTERS – 110V AC – 12V DC

Converters change 110V AC into 12V DC. When connected to an external 110V supply, all the 12 volt appliances such as lights, water pumps, fans, etc., can be operated with no drain on the battery.

A step down transformer in the converter changes the 110V AC to 12V AC. Diodes and filters convert the 12V AC to 12V DC. The 12V DC is then run to individual circuit breakers for supplying voltage to the 12V DC circuits.

Converter circuit breakers protect the individual 110V circuits in the vehicle. The 110V circuits supply power to the 110V receptacles, and the 110V refrigerator circuits.

Abbreviated circuit diagram Figure 5-3 only provides general information.

CAUTION: Do not disassemble or attempt repairs on the Triad converter. Repair must be performed by factory service.

TRIAD CONVERTER

Refer to Figure 5-4.

Removal and Replacement

1. Turn off power to converter.
 - a) Generator "OFF".
 - b) Circuit breakers "OFF".
 - c) Power cord to motor home disconnected.
 - d) Positive terminals on both batteries disconnected.
2. Unplug converter from outlet.
3. Remove converter leads from fuse panel.
4. Remove screws holding converter to floor.
5. Remove converter.

Replacement

1. Reverse procedure and check for operation.

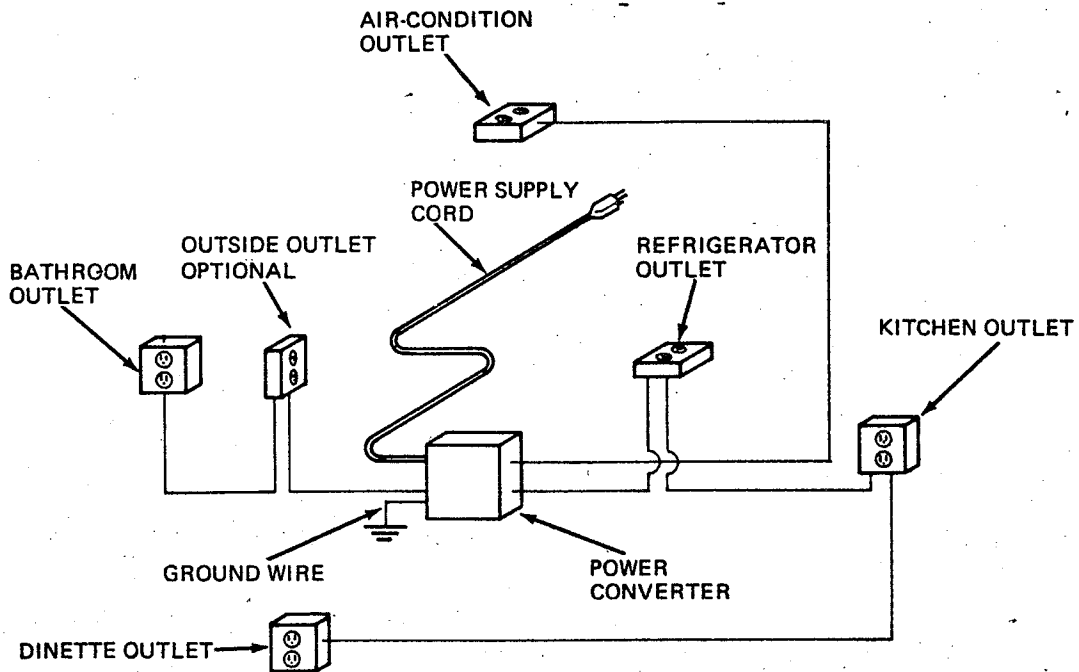


FIGURE 5-1 Typical 110 volt electrical system

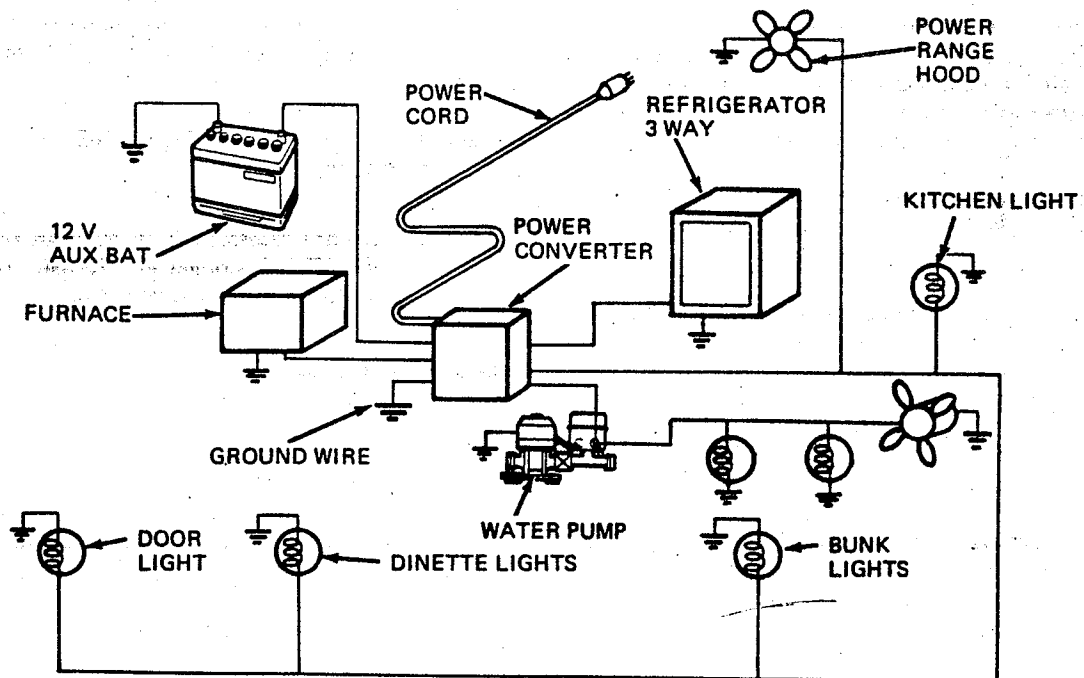


FIGURE 5-2 Typical 12 volt electrical system

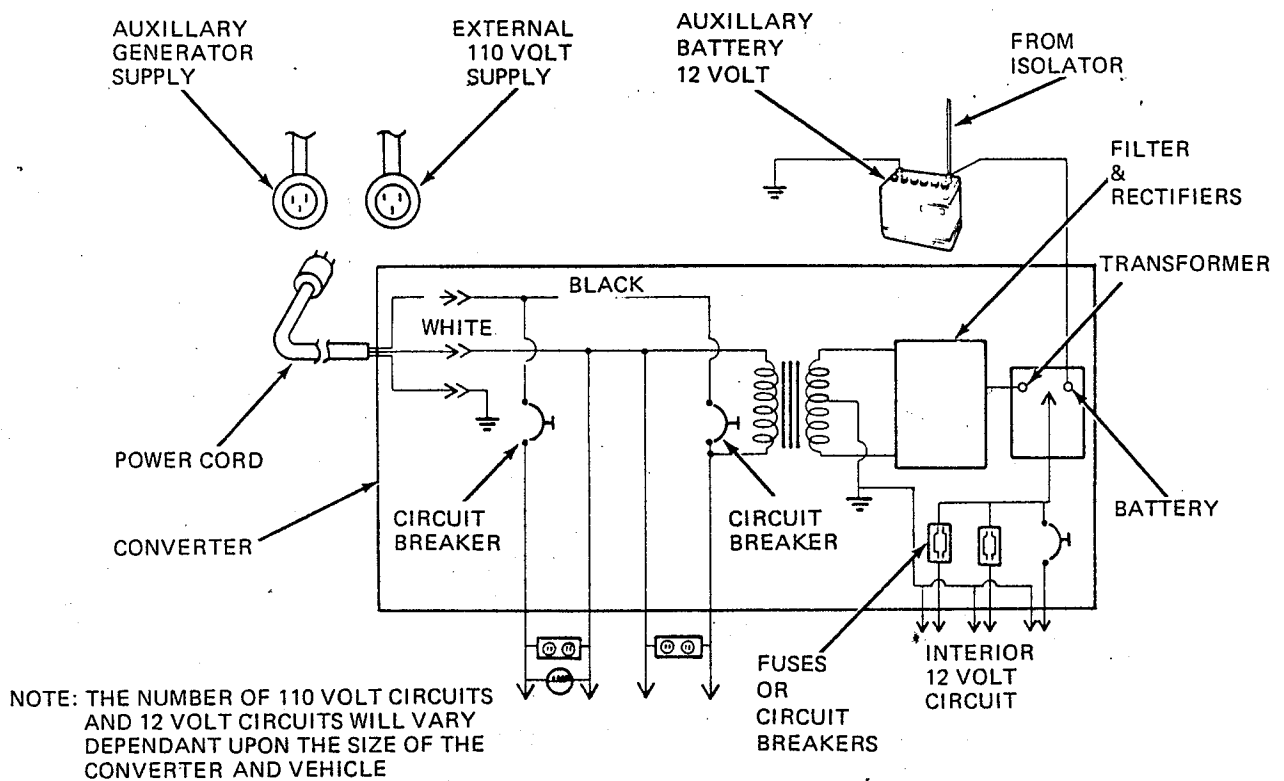


FIGURE 5-3 Converter & vehicle circuit

PROGRESSIVE DYNAMICS CONVERTER

Refer to Figure 5-4.

Removal

1. Turn off power to converter.
 - a) Generator "OFF".
 - b) Circuit breakers "OFF".
 - c) Power cord to motor home disconnected.
 - d) Positive terminals on both batteries disconnected.
2. Open converter door.
3. Remove screws from circuit breaker cover plate.
4. Remove wires from breakers and ground connection.
5. From rear of unit loosen 110V cable clamps and remove cables and power cord.
6. Unplug 12V connectors.
7. Remove screws mounting converter to wall or floor panel.
8. Slide forward and disconnect 12V ground wire.
9. Remove unit.

Replacement

1. Reverse procedure and check for operation.

POWER CORD - 110V

Refer to Figure 5-5.

Removal

1. Turn off power to converter.
 - a) Generator "OFF"
 - b) Circuit breakers "OFF"
 - c) External power cord to motor home disconnected.
 - d) Positive terminals on both batteries disconnected.
2. Remove converter. (See converter removal in this section.)
3. Disconnect power cord from converter by removing screws from strain relief clamp and from supply buss connections.
4. Remove power cord from cord compartment.

CIRCUIT BREAKER

Refer to Figure 5-6.

Removal

1. Disconnect power cord from external power supply.

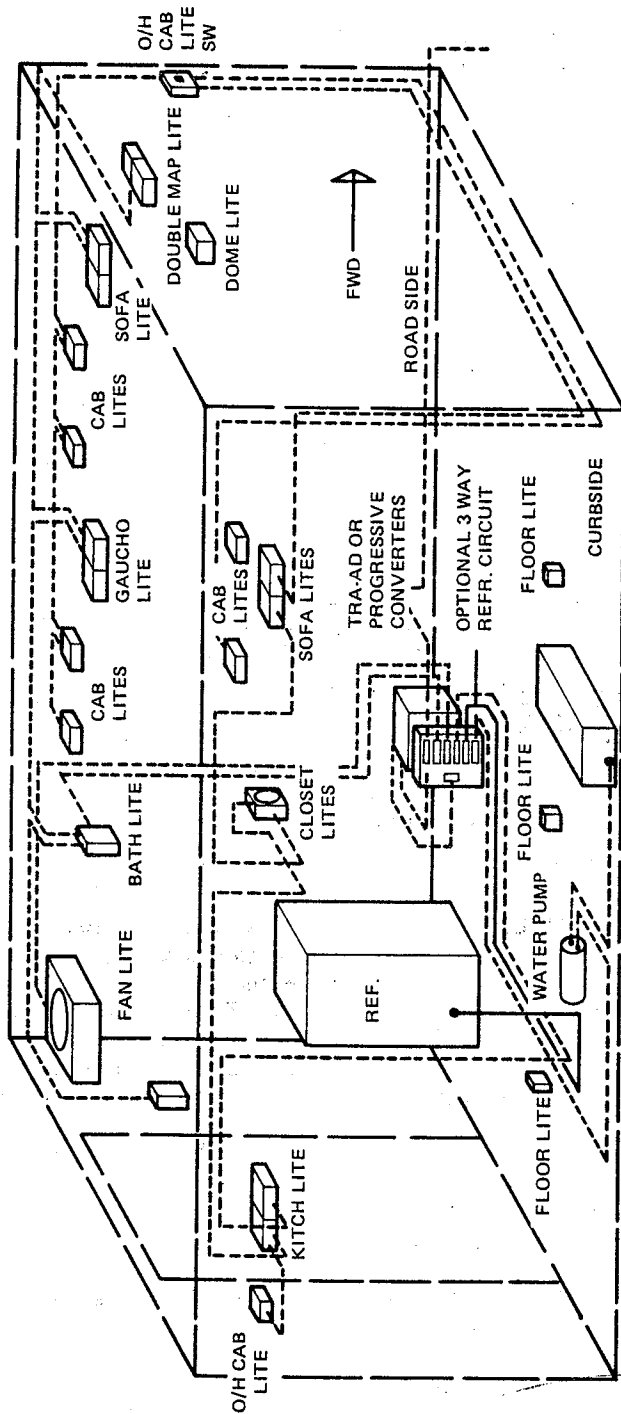


FIGURE 5-4 Tri-ad or Progressive optional electrical system

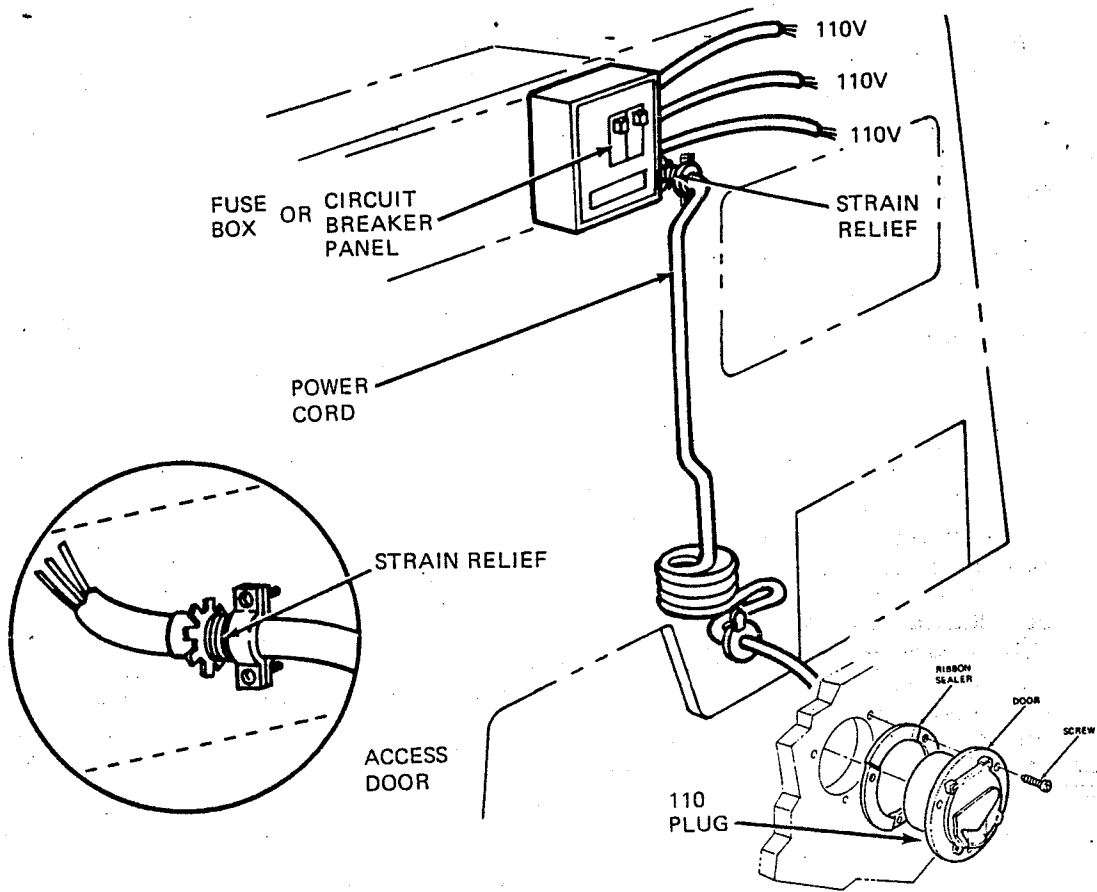


FIGURE 5-5 Power cord 110V

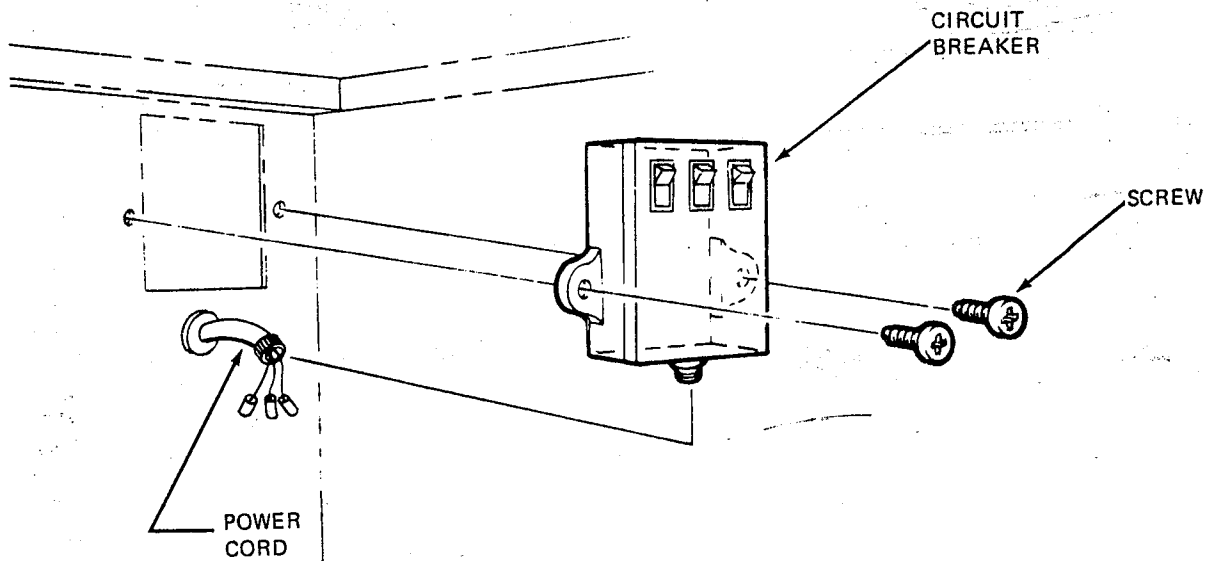


FIGURE 5-6 Circuit breaker

2. Generator "OFF".
3. Loosen screws on circuit breaker panel.
4. Remove cover.
5. Circuit breakers may be removed by prying loose from buss bar.

Replacement

1. Install circuit breaker by snapping in place on circuit breaker panel buss bar.
2. If main utility supply circuit breaker or main generator circuit breaker has been replaced, make sure that interlock has been installed and secured with 2 screws.
3. Replace cover. Secure with 1 screw.
4. Connect power supply or start generator and check for proper operation.

WARNING: Bathroom and external outlets must be connected to a ground fault breaker located in breaker box.

GROUND FAULT BREAKER TESTING

1. With 110V power on in vehicle, press test button on ground fault breaker.
2. Breaker will trip to "OFF" position.
3. Reset breaker by FIRMLY pressing breaker button to "OFF" position prior to turning "ON".

AUTOMOTIVE ELECTRICAL CIRCUITS

FUSE PANEL

Refer to Figure 5-7.

Automotive fuses are located under dash. 110 and 12-volt fuses and circuit breakers are located in the power converter. Fuse panels on the Champion and Titan models are located either on the front of the vehicle or adjacent to the steering column inside the vehicle. Detailed electrical schematics can be obtained from the chassis manufacturer. Fuse sizes are marked on the fuse panel along with a description of the circuit they protect. Fuse replacement is identical with that of a passenger car. Directional flasher and emergency flasher are plug-in items on fuse block.

AUTOMOTIVE LIGHTING CIRCUITS

Detailed electrical circuit diagrams can be obtained from the chassis manufacturer as noted in your owner's manual. The abbreviated diagrams (Figures 5-8, 5-9, 5-10, 5-11, 5-12) shown in this section are intended only as a general guide. Multi-filament bulbs such as stop & directional signal or parking light & directional signal are shown as an individual lamp on separate diagrams and with one wire where in reality multiple wiring is used.

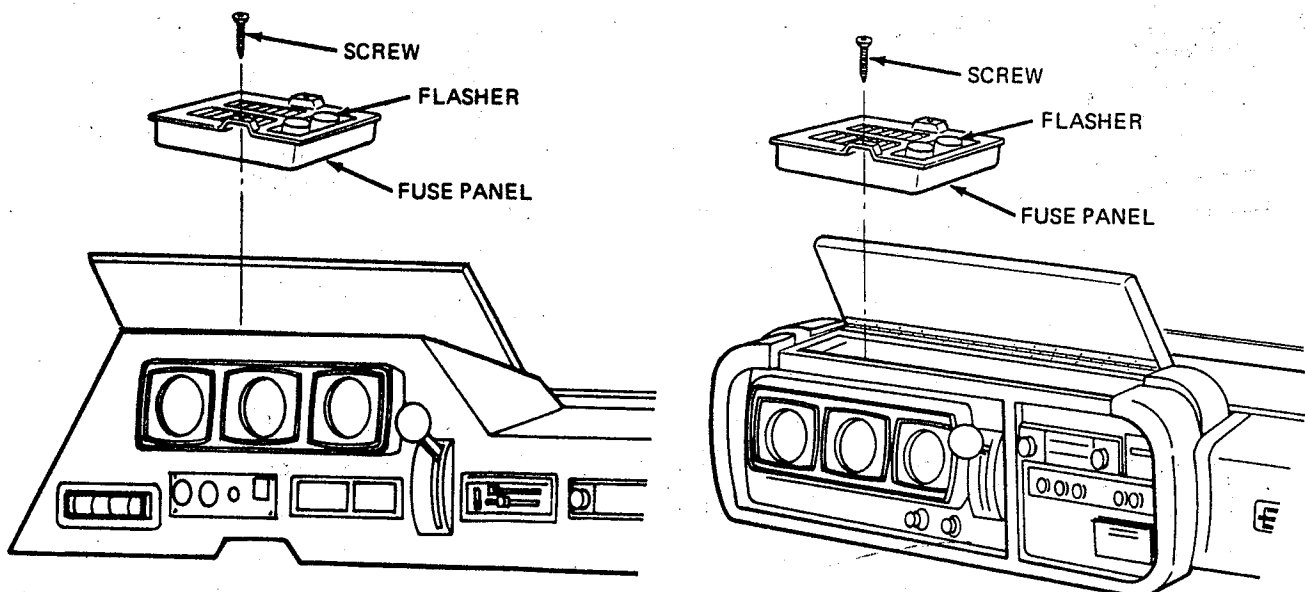


FIGURE 5-7 Fuse panel (interior and exterior)

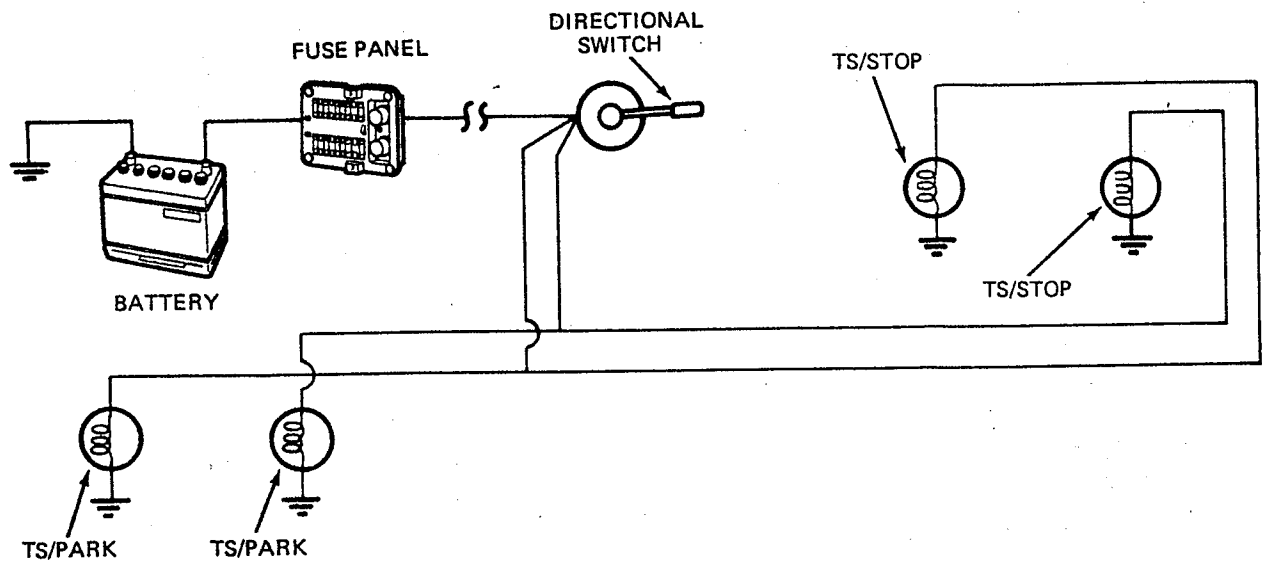


FIGURE 5-8 Abbreviated directional lamp circuit

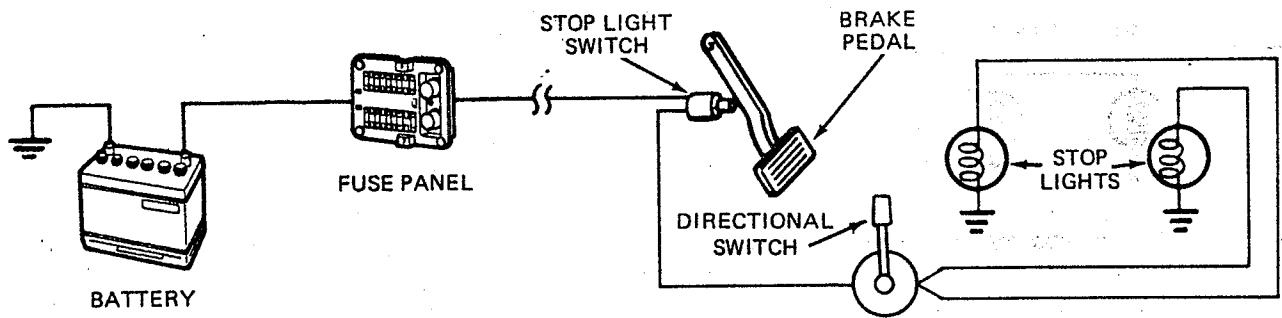


FIGURE 5-9 Abbreviated stop light circuit

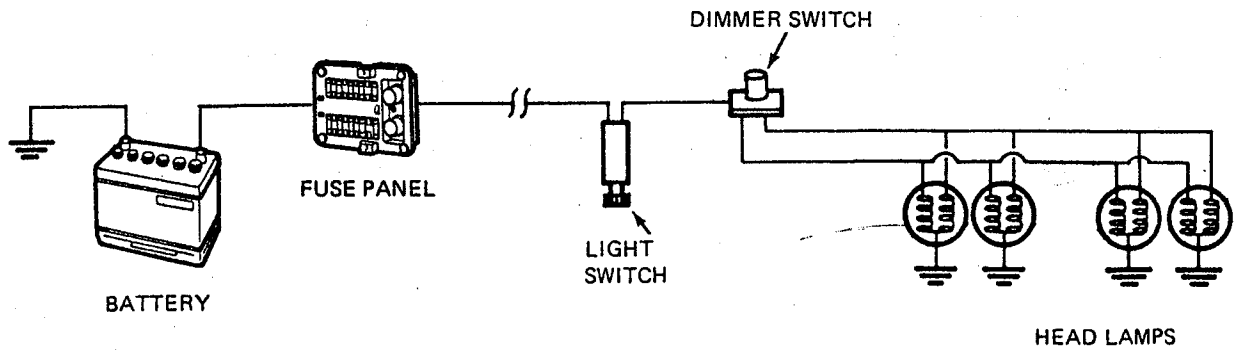


FIGURE 5-10 Head light circuit

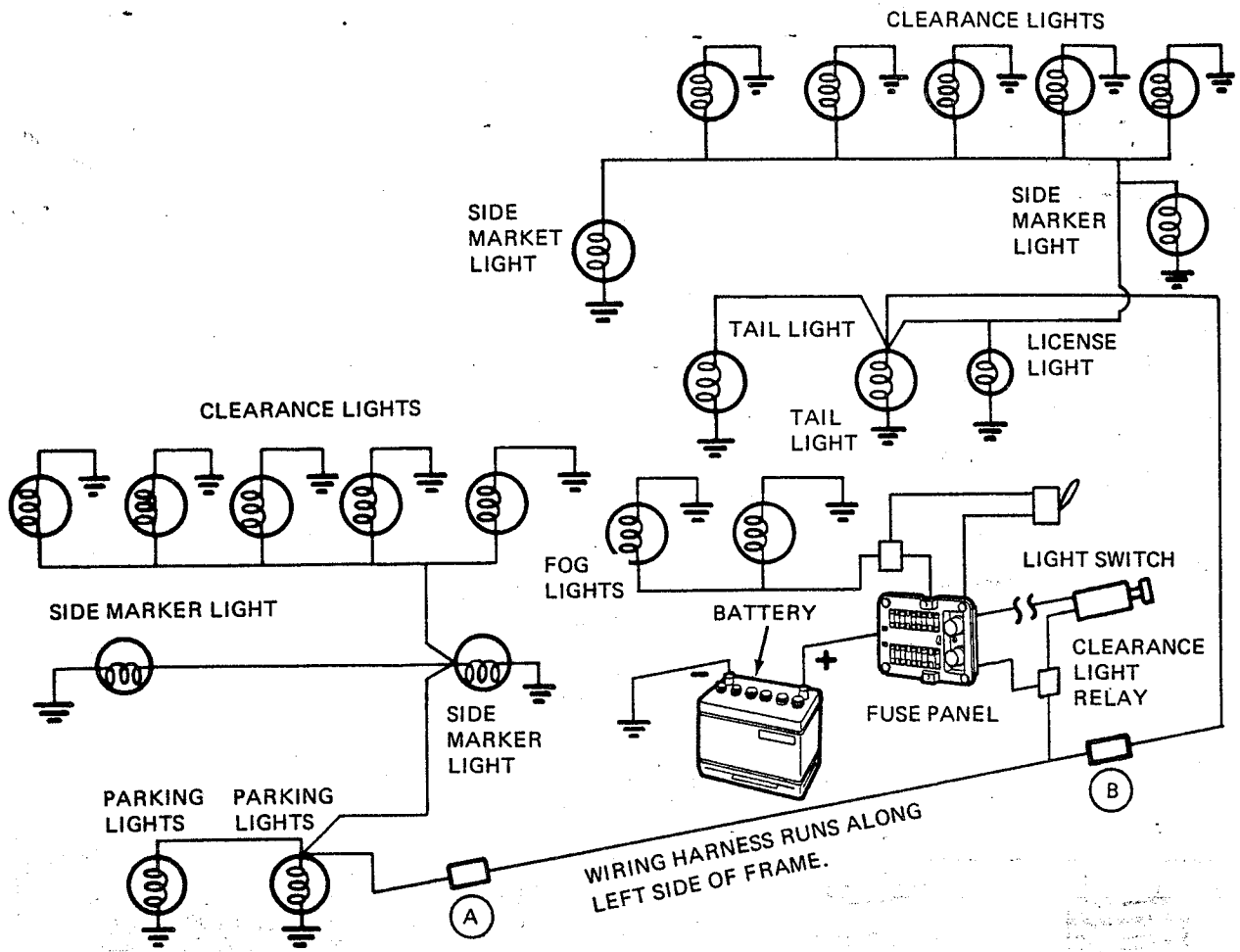


FIGURE 5-11 Abbreviated clearance license, parking side marker taillight and foglight circuit
abbreviated exterior lighting circuit

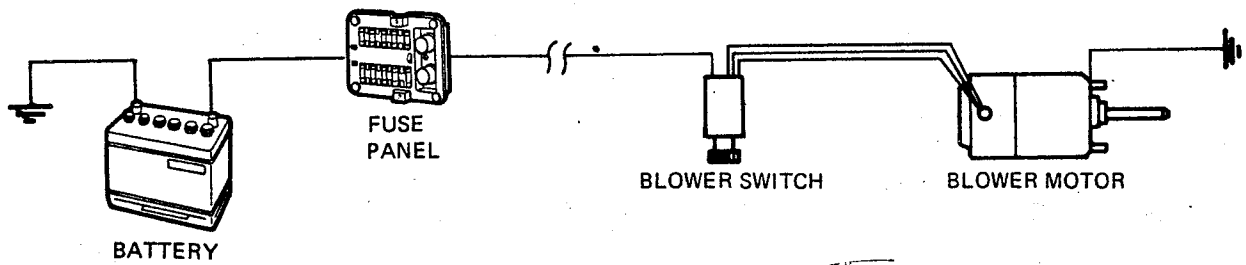


FIGURE 5-12 Abbreviated heater circuit

DUAL BATTERY CIRCUITS

Refer to Figures 5-13, and 5-14.

Dual battery systems require the use of an isolator to prevent discharging the vehicle engine battery when 12 volt appliances and lighting are used. Champion vehicles use a diode type isolator. These diodes act as a one way switch and are installed between the A and B terminals on the isolator. Current is allowed to flow from A to either B terminal, however, current is prevented from flowing from B to A or B to B by the action of the diodes.

Isolators can be bench tested by using an ohmmeter or continuity tester or checked on the vehicle with a DC voltmeter.

NOTE: A test light can be used in place of a DC voltmeter to check isolator operation, but it will not indicate proper charge voltages.

BENCH TEST PROCEDURE

1. Identify wires so that they can be returned to same terminal posts.
2. Remove wires.
3. Using tester or meter connect leads to terminal post A and terminal post B. If no reading is indicated or test light does not light, reverse leads. Meter should indicate or test light should light, indicating diode inside unit is functioning properly. If light does not light or meter shows open circuit in both directions, diode is defective. If light or meter indicate continuity in both directions, diode is defective.
4. Repeat test between A and B₂, then A and B₃. If any diodes are defective replace the isolator.
5. Check between all terminals and the isolator case. The meter should show an open circuit. If continuity is indicated between any terminal and the case, the isolator is shorted and should be replaced.

VEHICLE TEST PROCEDURE

1. Check that the engine is "OFF" and no external power is being applied to the vehicle.

NOTE: On vehicles equipped with an emergency start solenoid, it may be necessary to disconnect the battery leads from the solenoid as a defective solenoid can invalidate this test.

2. With a DC voltmeter, check the voltage at the A terminal. It should read "0" VDC. A slight movement of the needle may occur but it should be well under "1" VDC. If a voltage reading is obtained, disconnect the A lead and check the lead and terminal separately. If a voltage reading is obtained at the terminal, the isolator is defective and should be replaced. If the terminal reads "0" and the wire is hot, check for reversed wires or a defective vehicle charge circuit.
3. Check the voltage at both B terminals. They should indicate their respective battery voltages. A low or "0" reading is an indication of defective batteries or disconnected wiring between the batteries and the isolator.
4. If the A terminal reads "0" and the B terminals read their appropriate battery voltage, start the engine.
5. Check the voltage at the A terminal. It should read the appropriate charge voltage or approximately 13-15 VDC. For readings out of this range, refer to the chassis service manual for further service instructions.
6. Check the voltage at both B terminals. It should show an increase over the readings taken in step 3 and be 1/2 to "1" volt below the reading taken from the A terminal in step 5. If there is no increase in voltage, disconnect the B lead and recheck the voltage at that B terminal. A "0" volt reading or any reading over "1" volt below the A terminal reading indicates a defective isolator. If the reading is normal, check the battery and its associated circuits for shorted circuits or excessive current draw.

NOTE: In those installations where a 12 volt/110 volt compressor type refrigerator with dual 6 volt batteries are used, isolator connections are illustrated in Figure 5-13.

Detailed information regarding automotive alternator testing and battery charging circuit information can be obtained from Chassis Service Manuals.

EMERGENCY START SOLENOID

Refer to Figure 5-14.

The emergency start solenoid connects the auxiliary battery to the engine battery for additional starting power. It is activated by a spring loaded switch on the dash with power obtained from the RV 12 volt fuse panel.

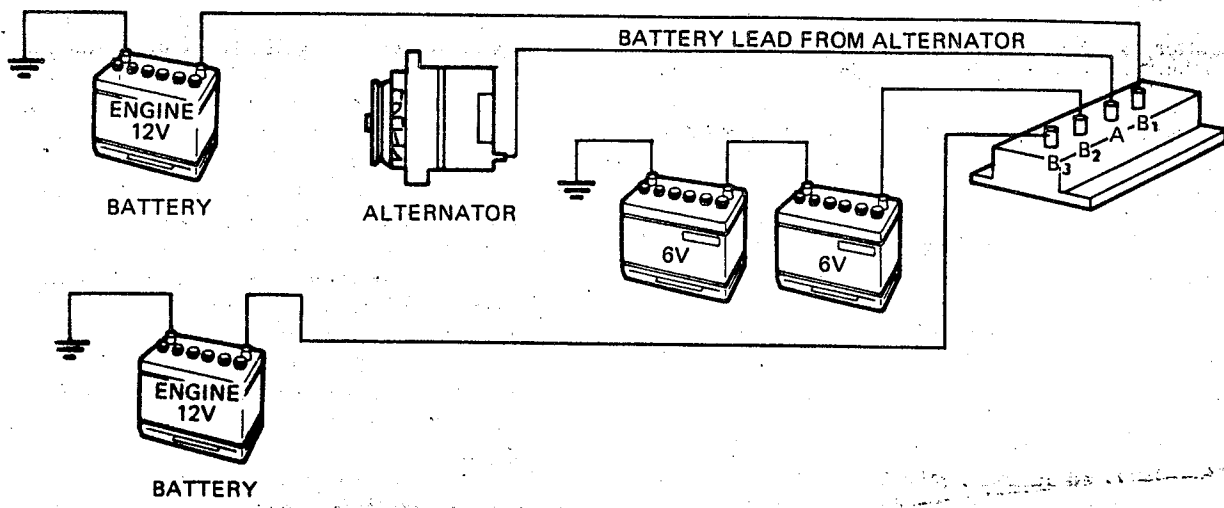


FIGURE 5-13 Isolator wiring diagram (2) 6 volt batteries

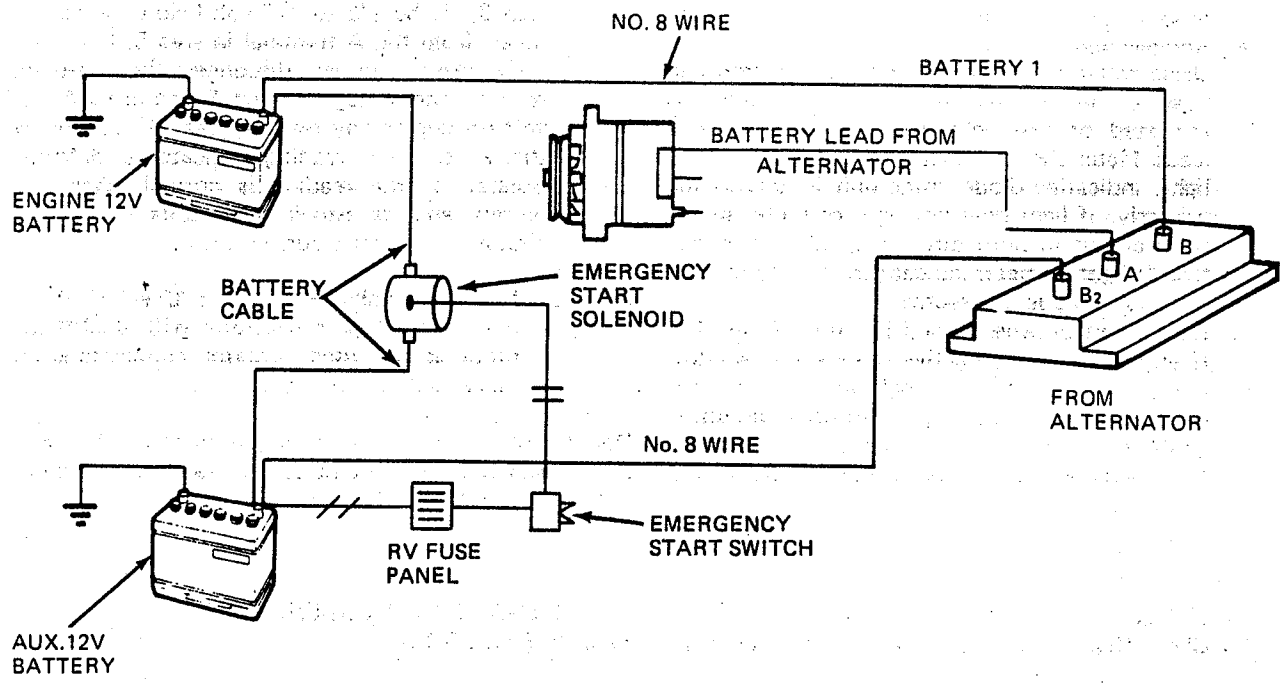


FIGURE 5-14 Isolator wiring diagram 12 volt batteries with emergency start

LIGHTS

Headlight assemblies, parking lights and clearance light assemblies can be easily replaced by removing only necessary items as outlined in this section.

HEADLIGHT – SEALED BEAM REPLACEMENT

Refer to Figure 5-15.

Removal

1. Remove front trim of headlight assembly by removing single screw as shown.
2. Remove screws in headlight retaining ring and remove ring.
3. Remove sealed beam lamp by unplugging from electrical connector.

Replacement

1. Reverse order of removal.

HEADLIGHT ASSEMBLY REPLACEMENT

Refer to Figure 5-15.

Removal

1. Remove front trim by removing screw.
2. Remove screws attaching headlight assembly to door panel.
3. Unplug electrical connectors.
4. Remove headlight assembly.

Replacement

1. Reverse above procedure.

PARKING LIGHT BULB REPLACEMENT

Refer to Figure 5-15.

1. Remove screws attaching lens to lamp body.
2. Remove lens and replace bulb.
3. Replace lens and screws.

PARKING LIGHT ASSEMBLY REPLACEMENT

Refer to Figure 5-15.

1. Remove screws attaching lens to lamp body.
2. Remove screws attaching lamp body to mounting surface.
3. Pull lamp forward and disconnect wire from body.
4. Connect wire to replacement lamp body.
5. Apply ribbon sealer to back of replacement lamp.
6. Position lamp on vehicle and secure with screws.
7. Test.
8. Re-install lens.

STOP, BACK UP AND TAIL LIGHT ASSEMBLY

Refer to Figure 5-16.

Lens-Removal and Replacement.

Removal :

FASTENER TYPE

Remove screws holding lens in place. Remove lens. Install new lens and secure with screws.

Assembly – Removal and Replacement

1. Remove lens (see above).
2. Remove screws attaching assembly to vehicle.
3. Pull assembly from vehicle far enough to provide access to wires.
4. Cut one wire at a time, and immediately re-connect that wire to the identical wire on the replacement lamp assembly. Continue until all wires have been reconnected.
5. Test, by operating the light switch, by shifting into reverse and by depressing brake pedal.
6. Apply ribbon sealer to back edge of lamp assembly.
7. Attach lamp to vehicle.
8. Install lens.

CLEARANCE LIGHTS AND SIDE MARKER LIGHTS

Refer to Figure 5-17.

Removal and Replacement

1. Pry off lens with screw driver.
2. Remove screws holding housing to body.
3. Pull housing from body and cut wire at back of light housing as close as possible to lamp.
4. Reconnect wire to new lamp housing.
5. Apply ribbon sealer to back of housing.
6. Secure housing to vehicle with screws.
7. Test.
8. Snap lens in place.

LAMP – ENTRANCE DOOR

Refer to Figure 5-17.

Removal

1. Remove screws attaching lamp housing to vehicle.
2. Pull forward to remove from vehicle.
3. Disconnect wires.

Replacement

1. Connect wires to replacement unit.
2. Apply ribbon sealer to lamp mounting face.
3. Secure with screws.

GENERATOR

Refer to Figure 5-18.

NOTE: Generator slides out for easy repair or service. If generator does not slide out, use following procedure for generator removal.

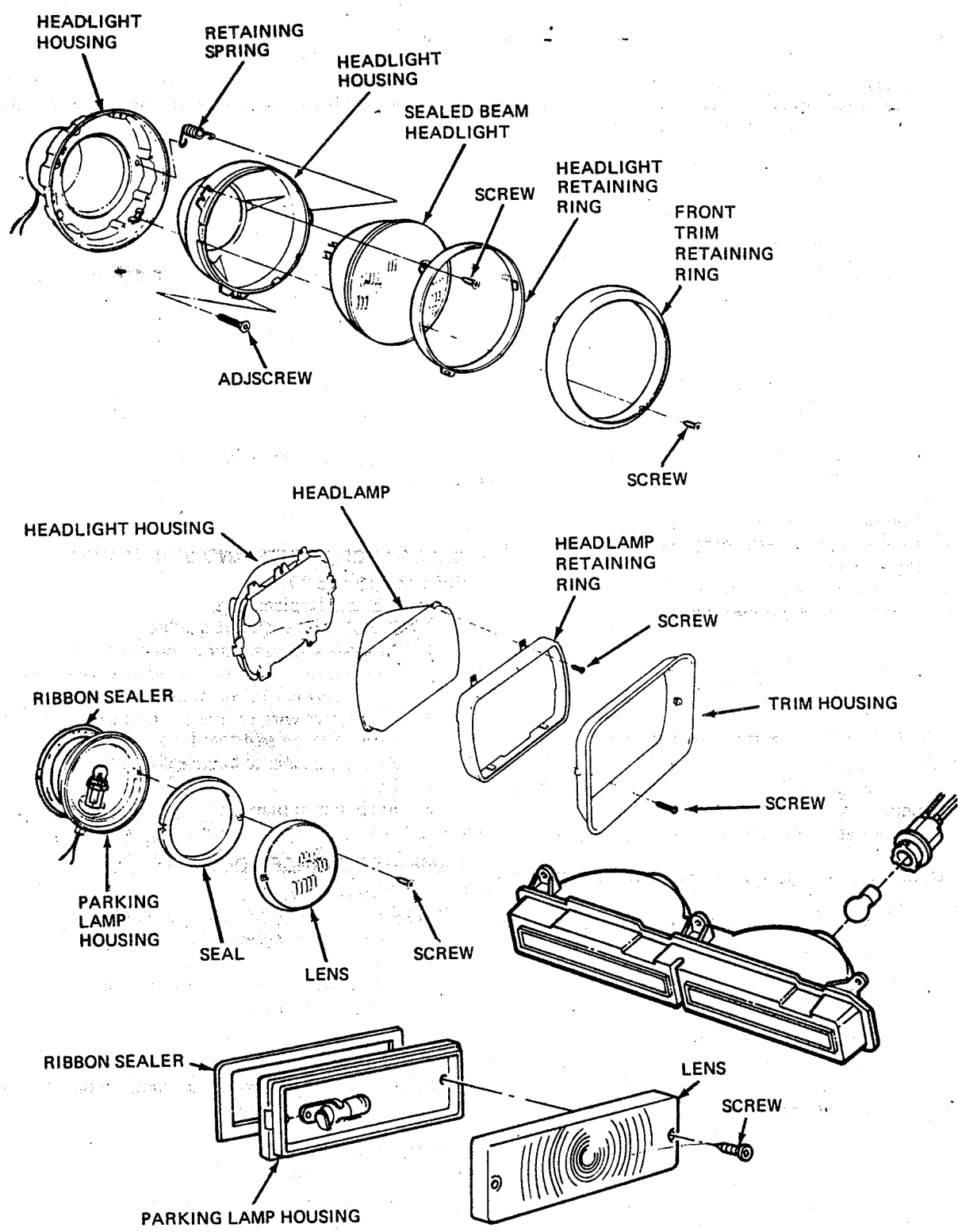


FIGURE 5-15 Sealed beam & parking lamp replacement

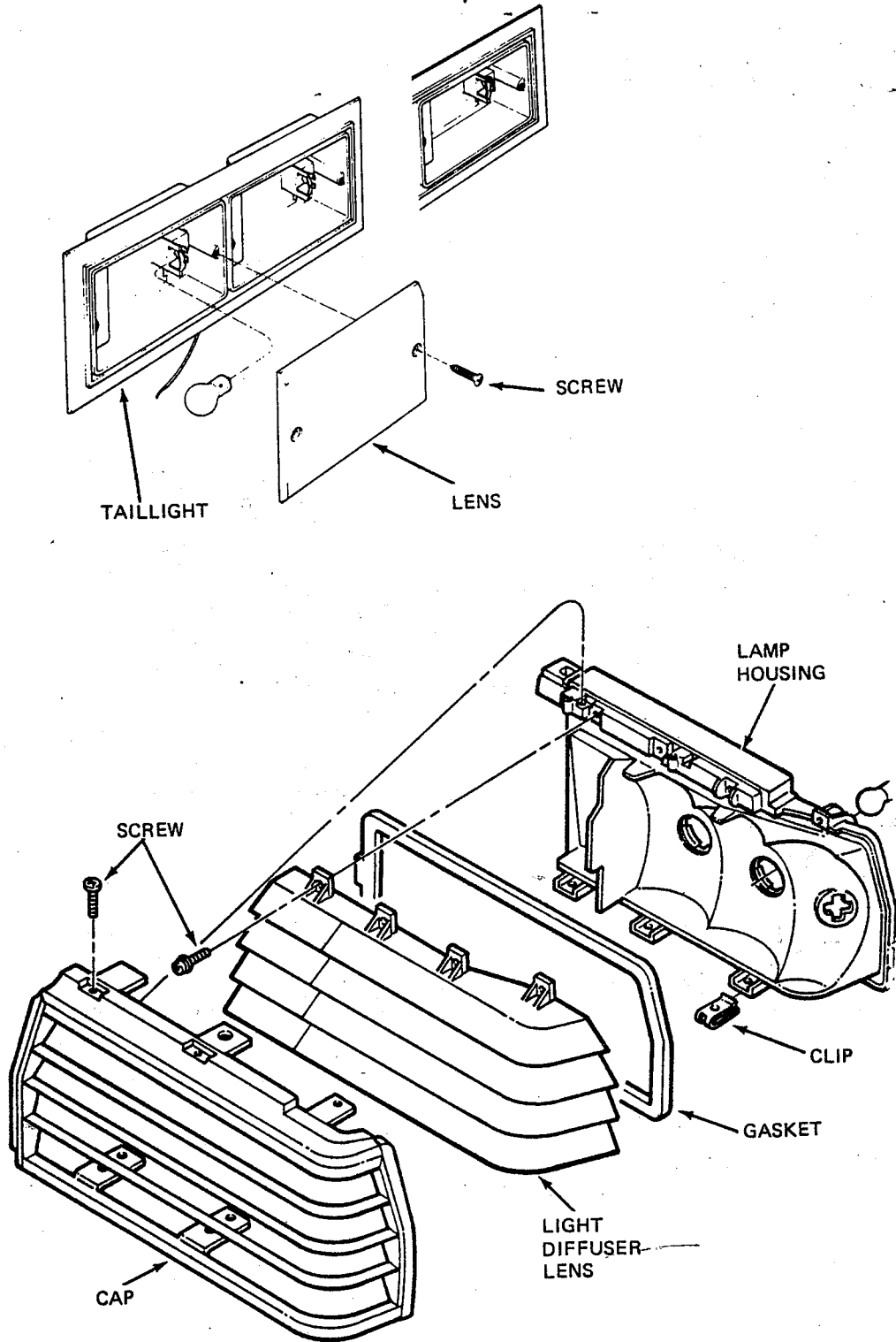


FIGURE 5-16 Stop, back-up & tail light assy

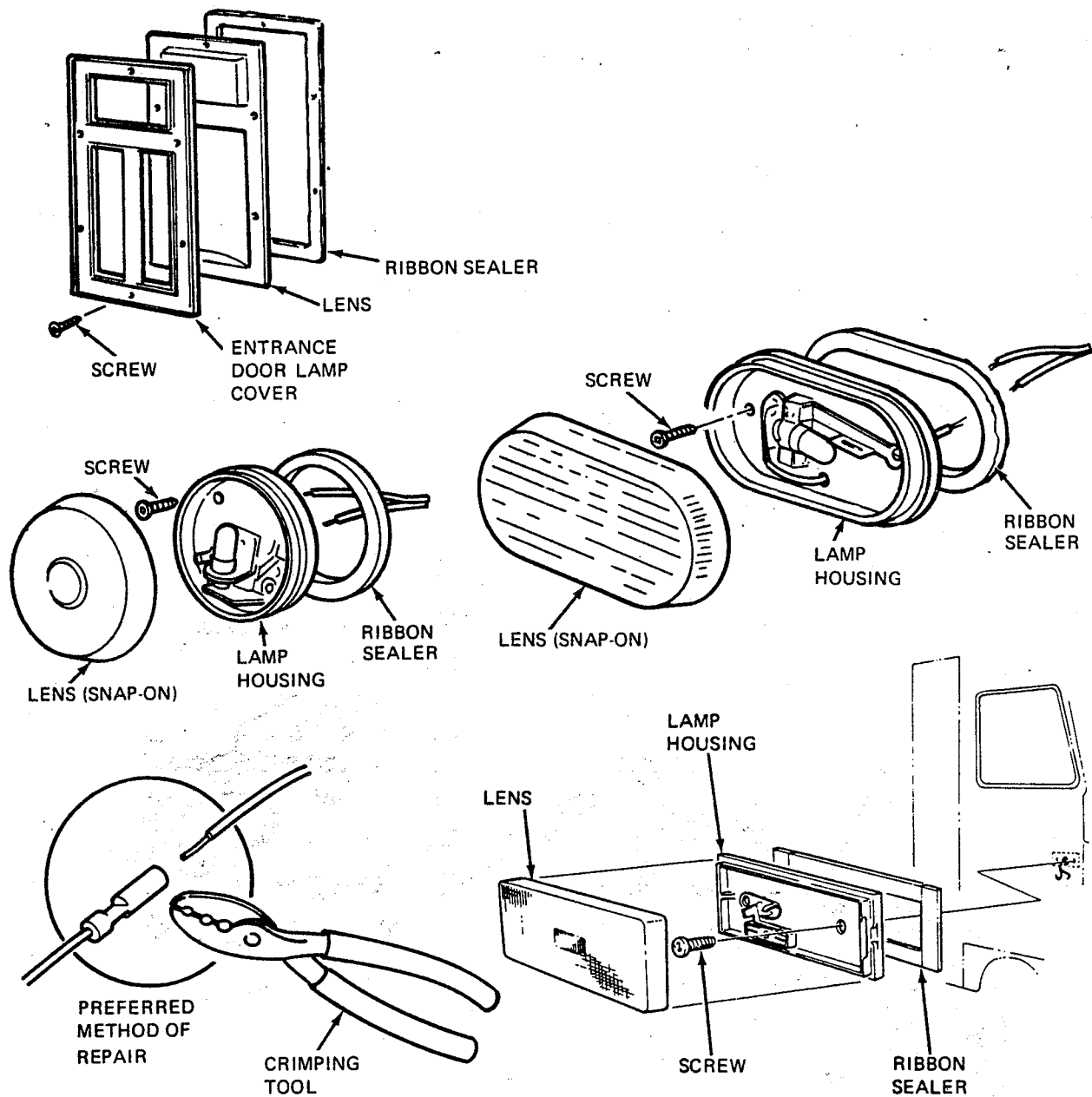


FIGURE 5-17 Clearance lights, marker lights, and entrance door lamp

Removal

1. Disconnect gasoline line.
2. Disconnect electrical connections to circuit breaker.
3. Disconnect muffler.
4. Unbolt generator from frame.
5. Remove generator.

Installation

1. Reverse steps 1 through 5.

WARNING: Tail pipe of generator must be extended to side or rear of vehicle to prevent exhaust fumes from entering motor home.

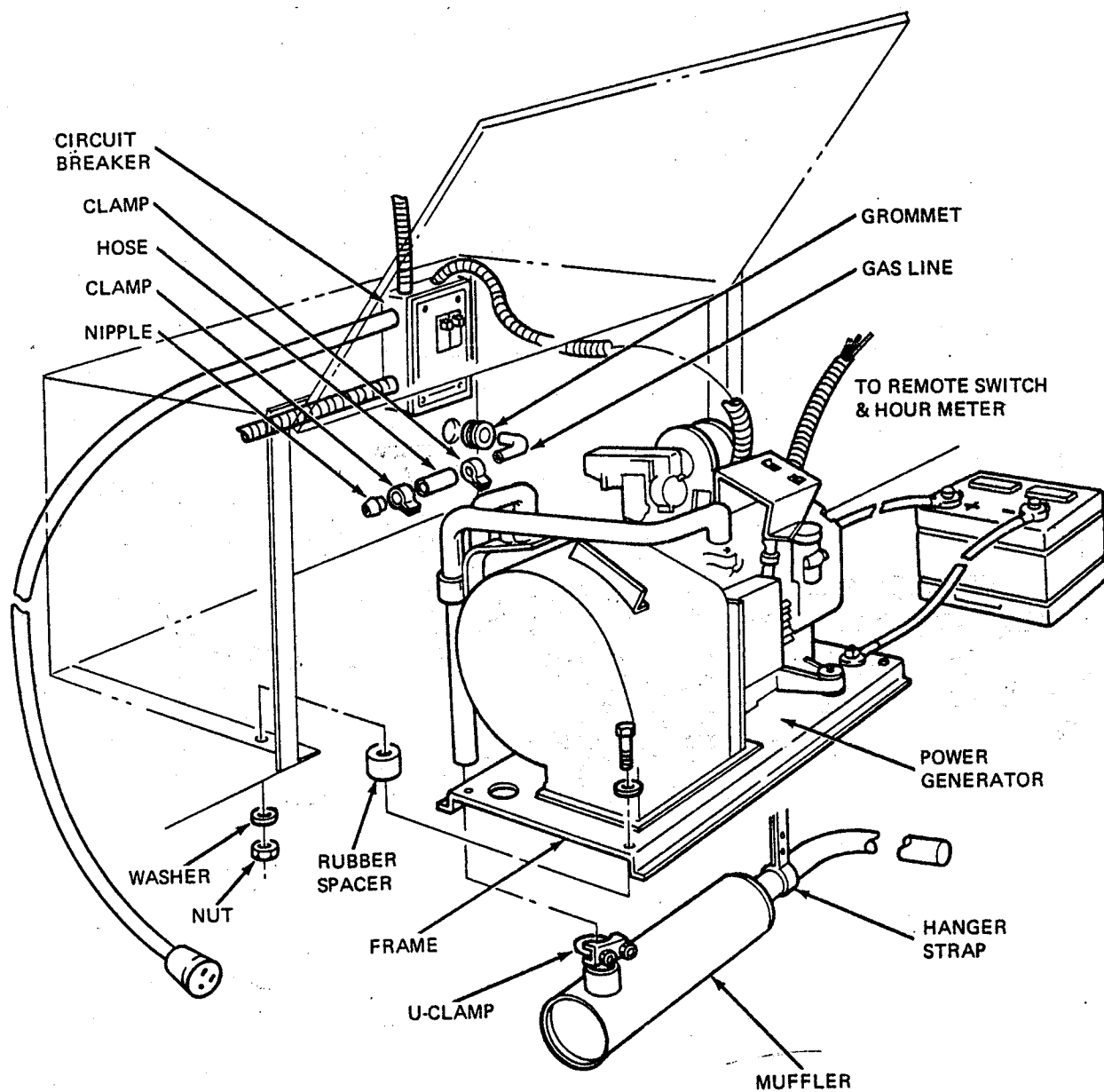


FIGURE 5-18 Generator installation

INTERIOR OUTLETS (110 VOLT A.C.)

Refer to Figure 5-19.

Removal

1. Switch main circuit breaker to "OFF".
2. Remove screw and faceplate.
3. Remove 2 screws and pull out receptacle.
4. Remove ground lead and 2 main leads.

Replacement

1. Connect ground lead to ground terminal on receptacle.
2. Connect main leads to receptacle.
3. Push receptacle into place and secure with 2 screws.
4. Install faceplate and secure with screw.
5. Switch main circuit breaker to "ON" and check for proper operation.

3. Disconnect wires.

4. Remove light.

Replacement

1. Reverse order of removal.

SHORT CIRCUIT

If a short circuit develops, it will be characterized by continually blowing fuses, or circuit breakers in either 110 volt or 12 volt circuits. The first step is to determine which interior circuit is causing the problem.

NOTE: If 12 volt circuit is defective check the fuse holder before proceeding and make sure it is installed tightly. A loose holder can short circuit.

LIGHT REPLACEMENT

Refer to Figure 5-20.

Removal

1. Unsnap light diffuser lens.
2. Remove screws.

MAIN CAUSES OF SHORT CIRCUITS

1. Sheet metal screws or staples from interior fixtures contacting wires.
2. Defective appliances or fixtures.
3. Moisture or water.

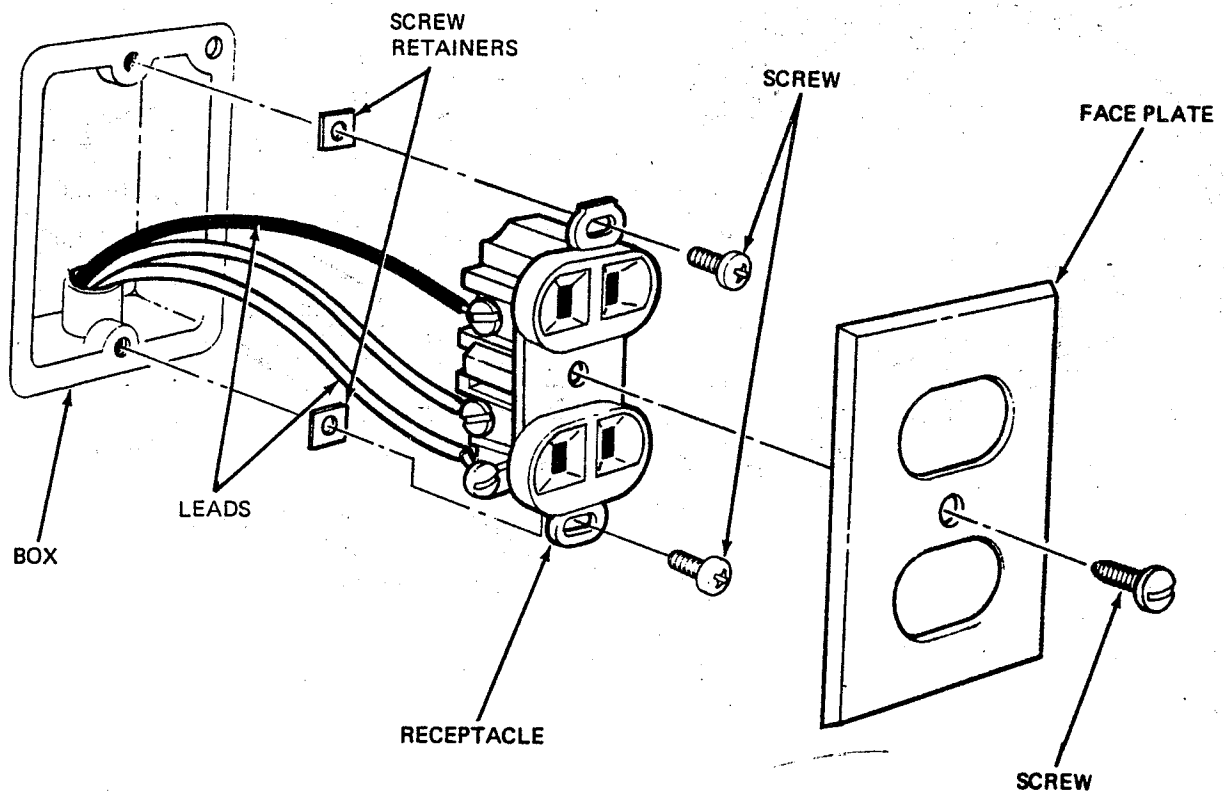


FIGURE 5-19 Interior outlets

LOCATING SHORT CIRCUIT

1. Disconnect all appliances (vents, fans, etc.) from the circuit that is affected.
2. Install new fuse, or reset circuit breaker, then turn on electricity.
3. If fuse or circuit breaker does not blow, check the disconnected appliances by connecting them one by one. If a fuse or circuit breaker blows during this procedure, the defective appliance has been determined. Repair or replace.

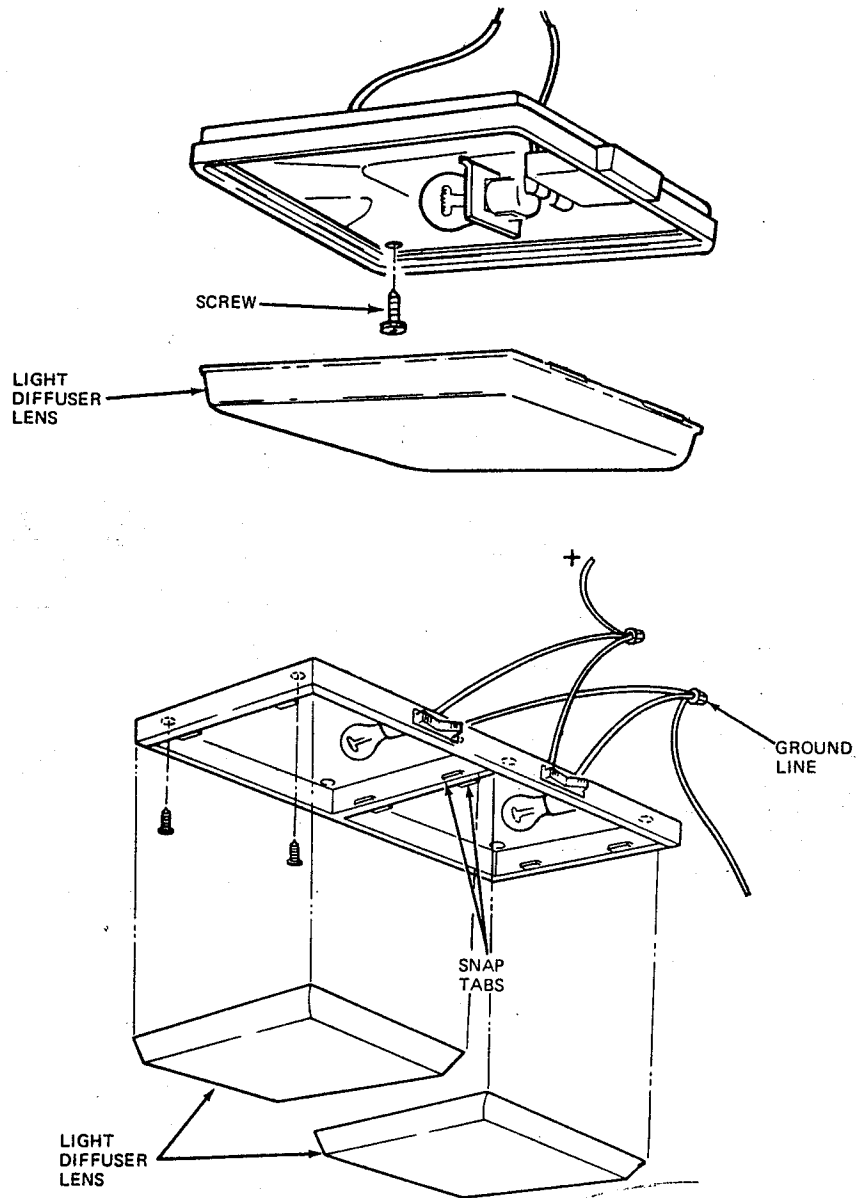


FIGURE 5-20 Interior 12V light replacement

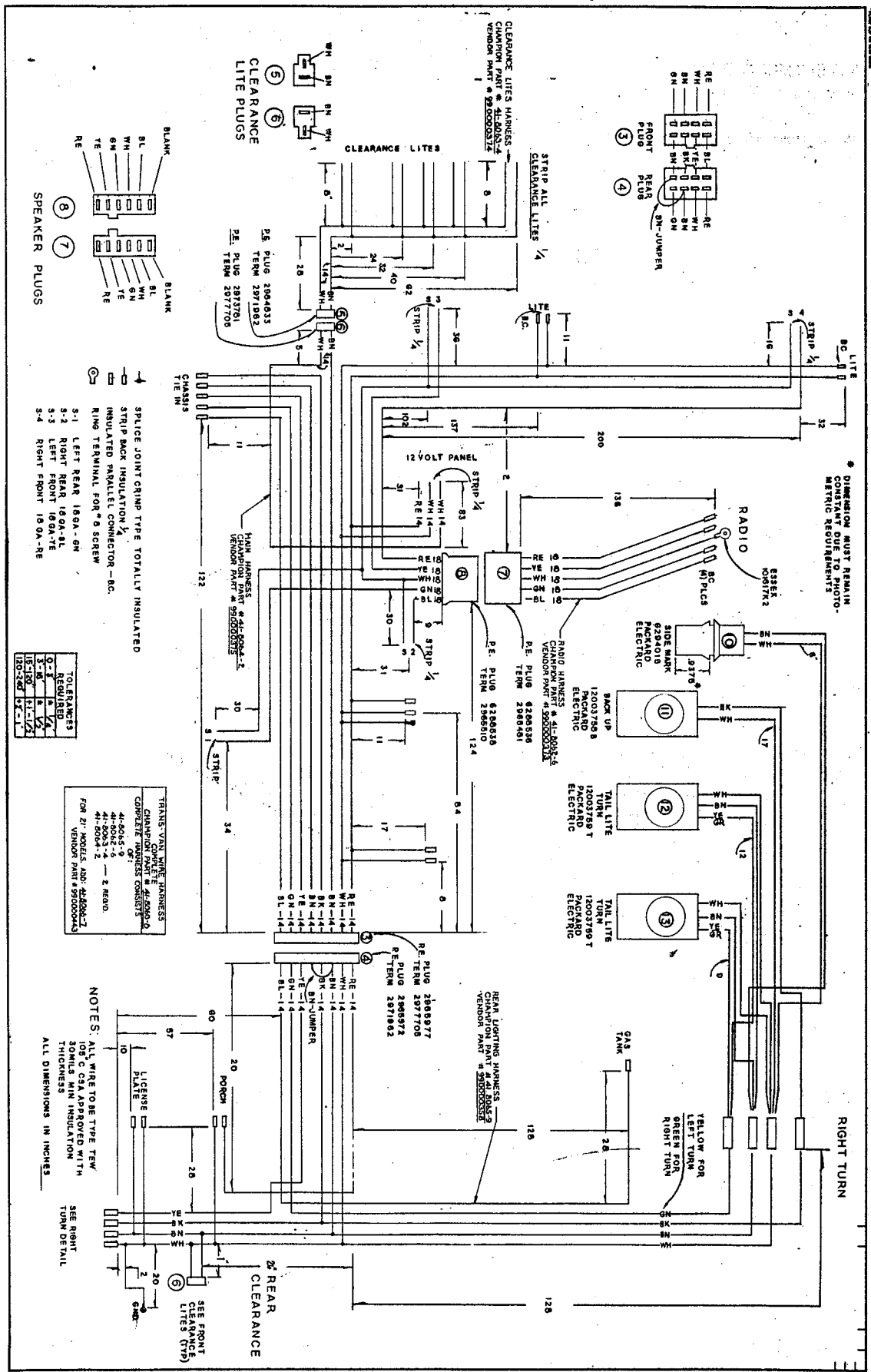


FIGURE 5-21 Trans-Van wiring harness.

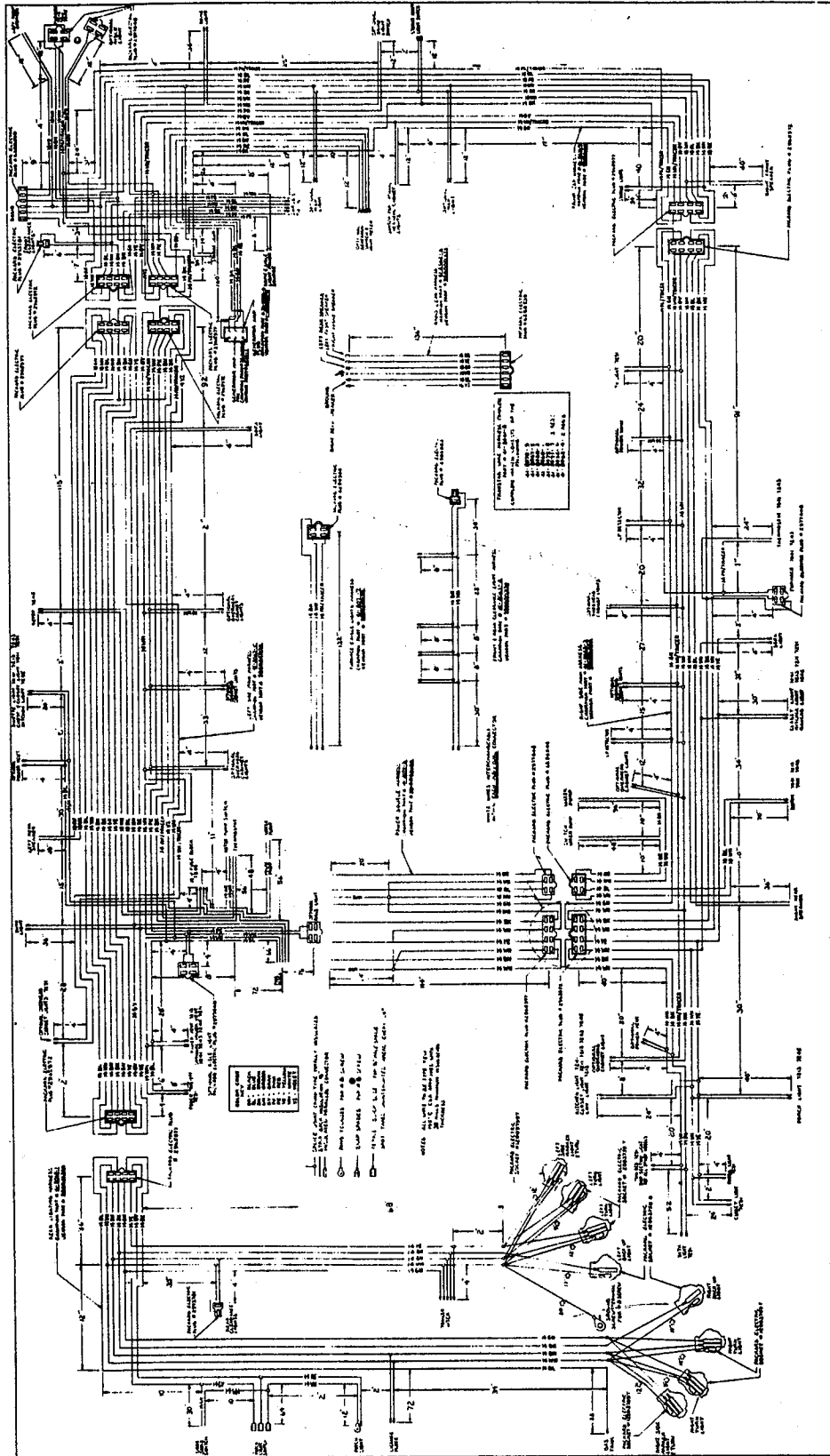


FIGURE 5-22 Transtar wiring harness

