CONNECTION TO LIMIT SWITCHES

- If using aftermarket limit switches, connect as shown in DIAGRAM "A"
- If using original GM limit switches, connect as shown in DIAGRAM "B".

**DIAGRAM "A"**

- Driver Side Limit Switch - OUTER - Gray
- Driver Side Limit Switch - INNER - Purple
- Passenger Side Limit Switch - OUTER - Dark Green
- Passenger Side Limit Switch - INNER - Light Green

**DIAGRAM "B"**

- Driver Side Limit Switch - OUTER - Brown
- Driver Side Limit Switch - INNER - Dark Blue
- Passenger Side Limit Switch - OUTER - Brown
- Passenger Side Limit Switch - INNER - Dark Blue

**RALLY SPORT DIODE HARNESS CONNECTIONS**

- Remove existing brown wire and terminal from ignition switch, plug it into the female connector, then plug this assembly into the male connector on the RALLY SPORT DIODE HARNESS.
- Plug this brown wire and terminal into the original cavity of the ignition switch from which you just removed the brown wire and terminal above.

**CONNECTION TO RELAY PANEL**

- Orange Power lead from Relay #1 connections
- 12 volt battery power
- 10 amp circuit breaker

**Rally Sport Headlight Connection Kit**

500687

American Autowire / Factory-Fit
800-482-9473
1967 Camaro RS Headlamp Doors

The material presented here supplements the coverage given in the 1967 Chassis Service Manual on Camaro headlamp doors. The Camaro headlamp door system consists of the following components.

1. **The Main Light Switch** turns the headlamps on and actuates the door opening motor circuit.
2. **The Ignition Switch** actuates the door closing circuit. The doors will not close with the ignition switch off.
3. **A One-Way Diode** in the ignition switch door relay actuating circuit, limits current flow to one direction.
4. **A Circuit Breaker** on the motor circuits is located on a panel under the left front fender.
5. **Three Identical Relays** to reverse the direction of door motor circuit, as needed for opening or closing, are mounted on a panel under the left front fender.
6. **Two Reversible Motors** that operate each door. Each motor is equipped with an integral circuit breaker.
7. **Limit Switches** to turn off the motors as the doors each full travel in either direction. Two switches are mounted at each door location.

The operation of the headlamp doors is as follows:

**In General**
The doors open anytime the main light switch is pulled on to the headlamp position. The doors will close only when the ignition switch is in the "ON" or "ACC" position and the main light switch is "OFF".

**Theory of Operation**
Two separate electrical circuits are used to operate the headlamp doors. The two circuits are:

1. **The headlamp door motor Operating Circuit** which consists of:
   a. Power source at the horn relay junction block
   b. A 10-amp circuit breaker
   c. Three switching relays
   d. Two limit switches at each door
   e. A motor at each door
   f. A harness connecting the above

2. **The Control Circuit**, used to switch the operating relays, which consists of:
   a. Main light switch
   b. Ignition switch
   c. The energizing coils of the three relays
   d. The harness between the above
   e. A one-way diode in the ignition switch side of the harness
   f. The headlamp filaments to ground

The doors open as follows:

1. The **Control Circuit** is energized when the headlamps are turned on (through the light blue wire). Relay coil R1 is energized to ground at headlamp ground wire. Relay coils R2 and R3 are not energized because the one-way diode prevents a complete ground path.
2. The **motor Operating Circuit** is as follows:
   a. From power source at horn relay junction, to
   b. Circuit breaker on mounting plate, to
   c. Relay R1 lower contacts (relay energized), to
   d. Limit switches on radiator support, to
   e. Door motor, to
   f. Limit switches on door assemblies, to
   g. Relay R3 upper contacts (relay not energized), to
   h. Ground at radiator support
3. The doors move from closed to open and bottom against the limit switches on the radiator support. The limit switch movement breaks the circuit and the door motors stop in the open position.

The doors close as follows:

1. The **Control Circuit** is energized when the headlamp switch is "OFF" and the ignition switch is "ON". Relay R1 is not energized. Relays R2 and R3 are energized through the ignition switch through the one-way diode, the relay coils, the headlamp switch terminal, the dimmer switch, and finally through the sealed beam filaments to ground.
2. The **motor Operating Circuit** is as follows:
   a. Power from source at horn relay junction, to
   b. Circuit breaker on mounting plate, to
   c. Relay R1 upper contacts (relay is not energized), to
   d. Limit switches on door assemblies, to
   e. Door motors, to
   f. Limit switches at door assemblies, to
   g. Relay R3 lower contacts (relay energized), to
   h. Ground at radiator support
3. When doors move to the closed position they bottom against the limit switches on the lamp assemblies. This limit switch movement breaks the circuit and the door motor stops in the closed position.
Headlamp Door Diagnosis

Functional Test

The following three steps should be performed during new car preparation or before any detailed diagnosis is performed:

I. Start with ignition and headlamp switch both OFF.
II. Pull headlamp switch to the "headlight "ON" position and check to see that:
   A. Headlamps come on. This circuit is needed to close the doors.
   B. Headlamp doors open
      1. If they open, one half of the control is ok go to step III.
      2. If they don’t open, the add on harness for this option may not be connected at:
         a. Double connector under dash.
         b. Main light switch (light blue wire).
         c. Double connector under dash.
   III. If the above mentioned steps do not pinpoint the problem, continue diagnosis as follows:

If neither door opens:

A. Check black ground wire from relay R3 to ground at radiator support. This is the motor ground path.
B. Check to see that Relay R1 is energized by unplugging the two wire connector. The relay should click as
   connector contact is broken and made. If not, use a test lamp between the two terminals of the two-wire
   connector. The lamps should light up if the wiring is ok and headlamp switch is "ON". If it does, replace relay R1.
C. Check to see that relay R3 is not energized by unplugging the two wire connector. The relay should not click
   when connector contact is broken and made. If the relay does click, there is a possible short in the brown wire
   to the ignition switch in combination with a broken wire such as might occur in a pinch condition. Check with a
   test light between ground and each terminal of the two-wire connector. The test light should light both times.
D. Use a test light and check from ground to the following terminals (test light should light up):

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Problem if test light does not light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horn Relay</td>
<td>Open circuit between battery and horn relay</td>
</tr>
<tr>
<td>Circuit breaker red wire terminal</td>
<td>Bad red wire or connector</td>
</tr>
<tr>
<td>Circuit breaker orange wire terminal</td>
<td>Bad circuit breaker</td>
</tr>
<tr>
<td>Relay R1 orange wire</td>
<td>Bad orange wire</td>
</tr>
</tbody>
</table>

If either door opens, look for a defect in area common to both motors:

A. Check for mechanical binding.
B. Check wiring from bottom of limit switch to ground at relay R3. Use test lamp from terminal to ground.
C. Replace limit switch if bad.

If one door does not operate the same as the other, look for a malfunction in that particular door’s motor, switches or wiring.

If neither door closes when lights are turned off, check for voltage at the green wire terminal on Relay R1 (use test light to ground) Note: ignition switch must be ON to energize system and the switch should be running during checking operation.

A. If there is voltage at green terminal, check for voltage further along the harness towards the motors. If there is no voltage at the brown wire terminal of Relay R2, the R2 and R3 (they are wired in parallel) are not actuated. Check for 12 volts across the two-terminal connectors of both relays (use one test light lead at each terminal of connector).
   1. If voltage is present, replace R2.
   2. If no voltage, check wiring to the ignition switch making sure that the diode is not open or in backwards.
   B. If voltage is present, due to action of circuit breaker, then R2 has pulled in but R3 has not. Check for 12 volts across the two-terminal connector of R3 (one test light lead at terminal connector). If voltage is present, replace R3. If no voltage, check wiring.
   C. If there is no voltage at green wire terminal of relay R1 (use test light to ground), check for voltage at orange wire terminal or R1.
      1. If voltage is present, replace R1
      2. If voltage is not present, check for open circuit breaker or wiring.

If door does not open:

A. Check for mechanical binding. If motor is being prevented from turning, a flashing blue light in its terminal housing will indicate that the motor’s thermal overload switch is operating.
B. Check for voltage between limit switch (on radiator support) and motor. Use test light from top limit switch terminal ground.
   1. If no voltage is present:
      a. Check connections at top and bottom of limit switch.
      b. Check wiring from relay R1 to bottom of limit switch using test light at bottom terminal of limit switch.
      c. Replace limit switch if bad.
   2. If there is voltage present, check for voltage between motor and limit switch on headlamp assembly. If voltage is present:
      a. Check connections at top and bottom of limit switch.
      b. Check wiring between bottom of limit switch and ground at relay R3.
      c. Replace limit switch of headlamp assembly if bad.

If door does not close:

A. Check for mechanical binding.
B. Check for voltage between limit switch and headlamp assembly and motor:
   1. If no voltage is present:
      a. Check limit switch connections - top and bottom
      b. Check wiring from relay R2 to bottom of limit switch. Use test lamp from terminal to ground.
      c. Replace switch if bad.
   2. If there is voltage present, check for voltage between motor and limit switch at radiator support.
      If voltage is present:
      a. Check limit switch connections - top and bottom
      b. Check wiring from bottom of limit switch to ground at relay R3.
      c. Replace limit switch if bad.

Motor does not stop running at end of door travel.

A. Check for loose connection in circuit.
B. Check for mechanical bind in the door mechanism (the motor’s thermal overload will probably be flashing)

If door moves jerkily:

A. Check for loose connection in circuit.
B. Check for mechanical bind in the door mechanism (the motor’s thermal overload will probably be flashing)

Headlight Door Adjustment

The headlight door adjustment is proper when:
A. There is clearance all the way around the door in the closed position.
B. The limit switch is actuated to shut off the door motor.
C. The door is flush in the opening.

Adjustments can be made as follows:

A. The door cover is retained by 4 screws threaded into caged nuts. These nuts have up to .090 movement in any direction. This should be adjusted to provide better than marginal clearance around the door.
B. If the door assembly is cocked at an angle (down or up) in the opening, shim the assembly at its radiator support mounting screws.
C. Adjustment of the limit switch, if needed, can be obtained by slotting the mounting bracket holes with a round file. This should be used only when the other adjustments fail to provide better than marginal clearance around the door.