24
SEAT BELT INTERLOCKS

Beginning with the '72 models, Triumph began installing seat belt warning systems, which evolved into a seat belt/starter interlock system for the '74 model year. By the time the '75 models were introduced, the seat belt system had once again gone back to just a warning system, the starter interlock being bypassed. For the '76 model, the system was further simplified, and was, in many ways, actually a simpler setup than was used in the '72 models.

CIRCUIT OPERATION

'72 - '73 MODELS:

If the seat belts aren't "properly" fastened, a dash warning light is lit, and the buzzer will sound, the same buzzer used to warn the driver that key is still in the ignition lock if the driver's door is opened.

The first item to notice in this circuit, shown in **figure 1** below, is the diode. The purpose of this diode is to prevent power from the "purple' fuse from back feeding through the seat belt circuit to the "green" fuse. When the driver's door is open, the door switch is closed, applying power from the "purple" fuse to the key warning buzzer. The seat belt circuit is also wired to the driver's door switch, so if the switches in the seat belt circuit are not in

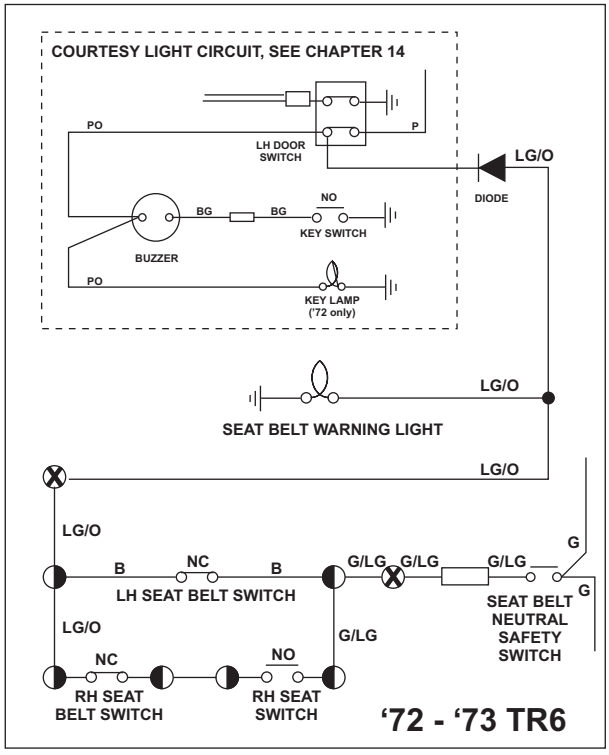


FIGURE 1

the correct position, all of the switch contacts between the door switch and the green wire feeding the transmission neutral safety switch will be closed. Normally, the green wires have power only if the key is on, but, without the diode, power would be applied even if the key is off.

The diode acts like a check valve, allowing current to flow in one direction only. Power from the green wire will flow to the door switch, but power from the door switch will not flow back to the green wire.

To help visualize the operational logic of this circuit, I have redrawn portions of the circuit in **figure 2** below. The warning buzzer will sound IF:

*The key is in the ignition **AND** the key is on **AND** the transmission is in any gear other than neutral **AND** either **[**the driver's seat belt is unfastened **OR (**there is a passenger in the passenger seat **AND** the passenger seat belt isn't fastened**)]***

Figure 2A shows the situation with only the driver in the car, the driver's seat belt unfastened, and the key on.

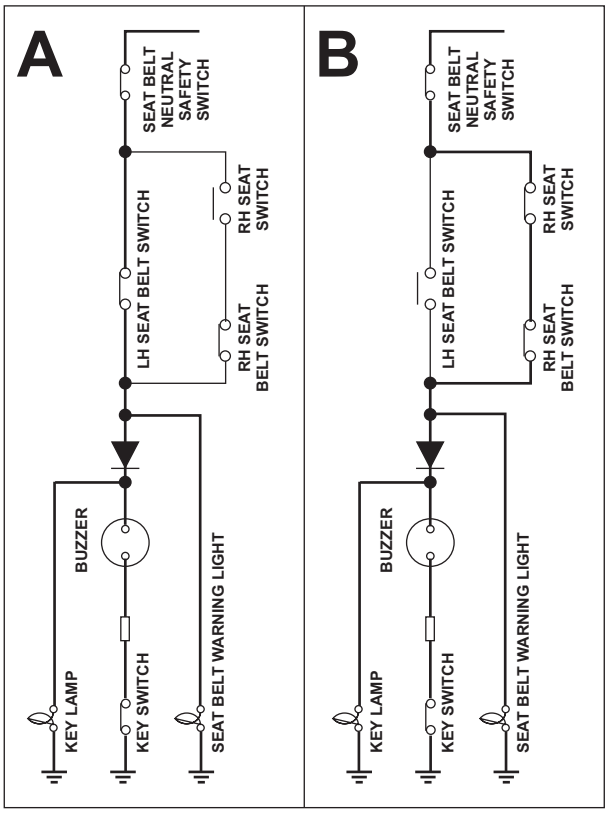


FIGURE 2

Figure 2B shows the situation with the driver's belt fastened, but the passenger is seated without fastening the seat belt.

In both cases, the current path is illustrated by the heavy line. There are another couple of items of note about this circuit. 1) the key illumination light will be on when the seat belt criteria haven't been satisfied, even if the driver's door is closed, and 2), the passenger seat sensor can't tell the difference between a passenger and a heavy bag of groceries. If you set a heavy item in the passenger seat, you will have to buckle it in to stop the buzzer.

'74 MODELS:

The circuit used in the '72 - '73 models was not a sterling example of the art of electrical engineering. As is often the case when a feature is retro-fitted, too many compromises were made to utilize existing wiring. For the '74 model, the designers got the chance to start clean, and design a new circuit for the seat belt warning system. Unfortunately, they were also required to meet more stringent governmental requirements. For this year, the seat belt circuit was tied to the starter circuit such that the car couldn't be started until the seat belts were fastened and the transmission placed in neutral.

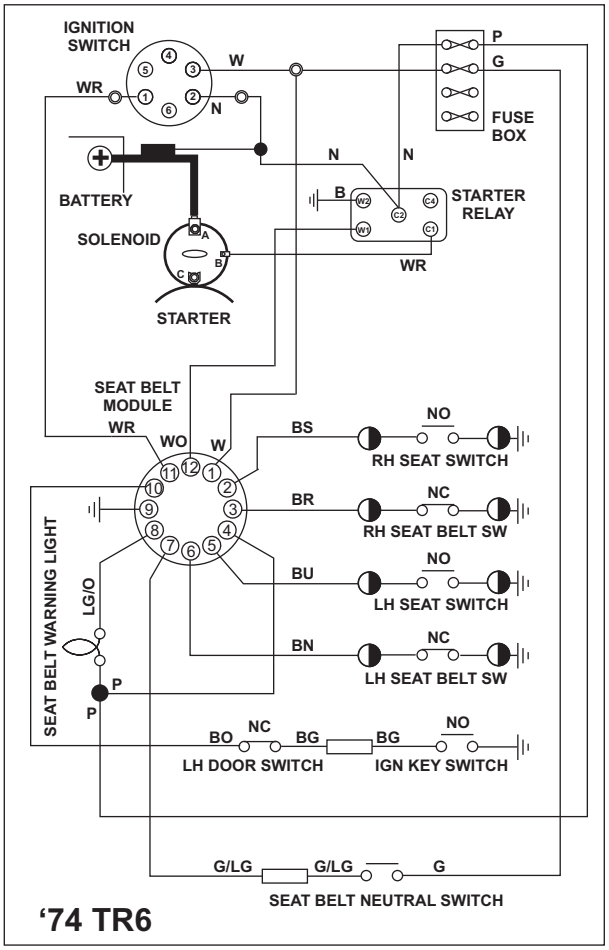


FIGURE 3

Figure 3, below left, depicts the circuit for this model year. This circuit operates quite a bit different than the previous scheme. The logic for this scheme is contained on a printed circuit board, using solid state components, and mounted inside a metal container. The ignition key warning buzzer is also inside the container, but it still does double duty, serving as belt warning buzzer as well.

The operational logic for this year differs from the previous year, in that a seat sensor for the driver has been added, a time limit has been placed on the buzzer, and, most significantly, the starter is interlocked with the system such that it will not operate if the seat belt interlock criteria haven't been met. The buzzer will sound until the seat belts have been properly fastened, or for 8 seconds after the key is turned on, whichever comes first. The warning light will operate indefinitely if the seat belts aren't fastened. The starter interlock also operates indefinitely, unless both the passenger's and the driver's side seat belts are fastened,.

The seat belt system will be active as long as:

*The key is in the ignition **AND** the key is on **AND** the transmission is in any gear other than neutral **AND** either **[(**the driver is in the seat **AND** the seat belt is unfastened **OR (**there is a passenger in the passenger seat **AND** the passenger seat belt isn't fastened**)]***

'75 MODELS:

With one exception, the '75 circuit is identical to the '74 circuit. For this year, the starter interlock has been eliminated by removing the white/red and the white/orange wire from the seat belt module, and connecting them together as shown in **figure 4** below. This modification can be back fit to the '74, if desired.

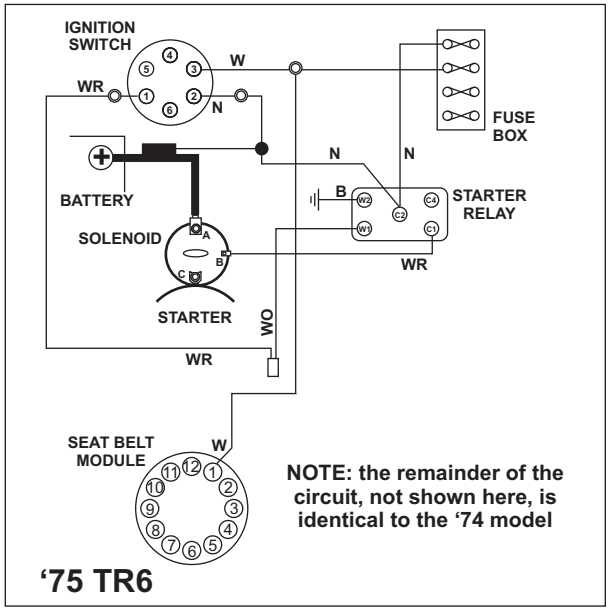


FIGURE 4

‘76 MODELS:

The ‘76 version of the seat belt interlock systems was greatly simplified over the previous designs. The ignition key warning buzzer function was retained, but only one input to the seat belt system itself was retained, that being the driver’s seat belt switch. The buzzer sounds for 8 seconds, or until the driver fastens the seat belt, which ever comes first. The warning light, just as on the previous models, stays on until the belt is fastened. The circuit diagram for this is shown in **figure 5** below.

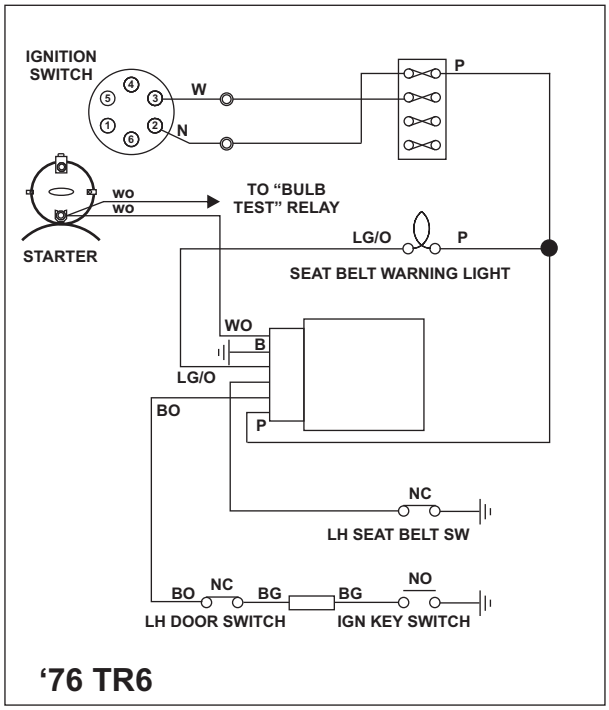


FIGURE 5

TROUBLESHOOTING

‘72 - ‘73 MODELS:

Before beginning the actual troubleshooting, a little analysis will help. Does the warning buzzer work when the key is in the ignition and the driver’s door is open? If so, we know the buzzer works, so we can concentrate our efforts elsewhere. If the buzzer doesn’t work with the ignition key, the troubleshooting procedure should start with the courtesy lights, and the buzzer circuit fixed from that circuit. Refer to chapter 13 for details.

Does the fasten seat belt light work? If it works, but not the buzzer, chances are the diode is bad. We know the seat belt circuit works up to the light, so any troubleshooting that needs to be done will only apply to the wiring from the light to the driver’s door switch.

Does the buzzer work, but not the light? If so, the most likely problem is a bad bulb, but there could also be a ground problem.

If it is determined that the problem is indeed in the seat belt circuit, then the troubleshooting procedures below should be followed. Keep in mind that the seat belt interlock system is powered from the “green” fuse, as are the WS wipers, WS washer, gauges, heater fan, brake and reverse lights, and the turn signals. If ***ANY*** of these are working, the fuse is good; if ***NONE*** of them are working, the fuse is most likely bad, and should be replaced, or the wiring to the fuse repaired.

Step 1). Locate the green/light green wire where it enters the cockpit from the transmission. Using your voltmeter or test lamp, and with the ignition key on and the transmission in any gear other than neutral, check for voltage on this wire, checking on both sides of the bullet/sleeve connector. If you have voltage here, go to step 2. If not, go to step 3.

Step 2). Locate the light green/orange wire where it connects to the seat belt and seat sensor switches, and check for voltage on this wire with the ignition key on and the transmission in any gear other than neutral. If you have voltage, there is a break or a bad connection in the wiring to the warning light and buzzer which will have to be repaired. If there is no voltage present, either the switches are bad, or there is a break in the wiring. Use your continuity tester or the ohms scale on your multi-meter to locate the problem. Disconnect the wiring harness before testing, to make sure you don’t get a bogus reading, as explained in chapter 2, General Procedures.

Step 3). You will now have to crawl under the car, and look for voltage on the green wire to the transmission neutral safety switch with the ignition key on and the transmission in any gear other than neutral. If you have voltage here, go to step 4. If not, there is a break or bad connection in the green wire between here and the fuse box, which must be repaired.

Step 4). While still under the car, check for voltage on the green/light green wire at the switch. If you have voltage here, there is a break in the G/LG wire to the seat belt switches. If not, the switch is bad, and must be replaced.

‘74 - ‘75 MODELS:

Unlike the earlier models, the seat belt system for these years requires power from the “green” fuse, the “purple” fuse, and from the white wire circuit. Before proceeding, you should verify that the green, purple, and white circuits are hot by analyzing the other systems that also receive power from these sources. Refer to chapter 7, Fuses, and chapter 23, Power Distribution, to see which items are powered from each of the sources.

The circuit is a bit complicated, and doesn’t lend itself well to the typical step-by-step troubleshooting procedure, so the troubleshooting will be divided up into four segments: power, key warning buzzer, the seat belt switching circuit, and the starter interlock circuit. As the

starter interlock function is critical to the operation of the car, it is assumed that if the starter isn't operating, you would want to fix that problem before worrying about the seat belt system, so that portion of the circuit is covered in chapter 25, Starter. The remaining items will be covered here.

A). Power:

Step 1). Pull the plug from the seat belt module (located inside the car over the passenger's foot well, on the left side), and check for voltage on the white (pin 1) and purple wires (pin 4), using your voltmeter or test lamp. You should have power on the purple wire with the key on or off, but the key will have to be on to measure power on the white wire. If you have power on both of these wires, proceed to the other test procedures below. If power is not available on either of the these, there is a break or a bad connection in the associated wiring between the module and the fuse box for the purple wire, and between the module and the ignition key for the white wire. Refer to chapter 23, Power distribution for help in tracing down the wiring.

B). Ignition key warning buzzer:

Step 1). Pull the plug from the seat belt module, and check for continuity to ground on the black/orange wire on pin 10 of the plug with the door open and the key in the ignition. If you are using a multi-meter, set it on the lowest ohms scale (reading X 1) ohms scale. If you are using a test lamp, connect the alligator clip to the positive post of the battery, and insert the tip into terminal 10. You should get very low ohms reading on the multi-meter, less than one ohm, or the test lamp, if that's what you are using, should glow at full brilliance. If so, the module is defective, and will need to be replaced. If not, go to step 2.

Step 2). With the plug still removed, use your ohmmeter or test lamp to check for continuity to ground on the black/green wire coming from the ignition switch, with the key inserted in the lock. The B/G wire exits the ignition lock just under the dash, and the green stripe on this wire spirals around the wire, rather than running lengthwise as on all other wires. This spiral tracer wire connects to another B/G wire, with lengthwise stripe, at a bullet/sleeve connector. Be sure to check both sides of the connector. If you have continuity to ground here, go to step 3. If not, the key switch is faulty, and the entire ignition lock assembly will have to be replaced, as the switch is in-accessable for repair.

Step 3). Locate the B/O and the B/G wires at the driver's door switch. With the plug still removed, the driver's door open, and the key in the ignition lock, check for continuity to ground on each of these wires. If you have continuity on the B/G wire, but not the B/O wire, the switch is bad. If don't have continuity on the B/G wire, there is a break in the wire to the connector mentioned in step 2, or the connection to the door switch is bad.

If the switch is bad, it can be repaired, although new ones are quite inexpensive if you prefer to replace it instead. Refer to chapter 9, Switches, Relays, and Solenoids for details.

C). SEAT BELT SWITCHING:

Step 1). Pull the plug from the seat belt module, and use your test lamp or voltmeter to check for the presence of voltage on the green/light green wire at pin 7 of the plug. For this test, the ignition key must be on, and the transmission in any gear other than neutral. If you have voltage here, go to step 4. If not, go to step 2.

Step 2). Locate the bullet/sleeve connector connecting the G/LG wire from the transmission switch to the G/LG wire to the module. Check for voltage on this connection with the key on and the transmission out of neutral. If you have power here, there is a break in the G/LG wire from here to the module. If not go to step 3.

Step 3). Crawl under the car and locate the neutral safety switch. Check for voltage on both the green and the G/LG wires. If you have voltage on the G wire but not on the G/LG wire, the switch is bad. If you don't have voltage on the G wire, there is a break or bad connection in the G wire between the neutral switch and the fuse, which will need to be repaired.

Step 4). Using your ohmmeter or test lamp as described in step B1 above, check for continuity to ground on each of the seat belt/seat sensor inputs. These are the black/slate, black/red, black/blue, and black/brown wires, connecting to pins 2, 3, 5, and 6, respectively (note: if your wire colors do not agree with the colors listed, go by the pin locations instead of colors. There have been discrepancies reported between the colors actually used by Triumph, versus colors shown in official factory documents). There should be continuity to ground on the seat belt switches only when the belt is un-fastened, and there should be continuity to ground on the seat sensor switches only when the seat is occupied. If you get any results other than that, either the switch is defective, or the wiring to that switch is defective - either open or shorted to ground.

Step 5). With the plug still removed, use a short piece of wire to short the light green/orange wire, pin 8, to ground. If the warning light doesn't come on, and you had power to the purple wire in step A1, either the bulb is bad or there is a break or bad connection in the wiring. Go to step 6. If the light does come on, but doesn't come on under normal operation, and you have resolved all the steps above, the module is bad, or there is a bad connection at the module plug.

Step 6). Check for voltage on the purple wire at the bulb. If you have voltage here, either the bulb or the bulb holder is bad, or there is a break in the LG/O wire to the module. If not, there is a break in the purple wire, which will have

to be traced and repaired.

'76 MODELS:

The seat belt system for this model year requires power from the "purple" fuse, Before proceeding, you should verify that the purple circuit is hot by analyzing the other systems that also receive power from this fuse. Refer to chapter 7, Fuses, and chapter 23, Power Distribution, to see which items are powered from each of the sources.

This circuit is much simpler than the previous years, but it still needs to be broken into three segments for troubleshooting - power, key warning buzzer, and the seat belt switching.

A). Power:

Step 1). Pull the plug from the seat belt module (located inside the car over the passenger's footwell, on the left side), and check for voltage on the purple wire, using your voltmeter or test lamp. The purple wire should be hot all the time, ignition key on or off. If you have power on this wires, proceed to the other test procedures below. If power is not available, there is a break or a bad connection in the associated wiring between the module and the fuse box. Refer to chapter 23, Power distribution, for help in tracing down the wiring.

B). Ignition key warning buzzer:

Step 1). Pull the plug from the seat belt module, and check for continuity to ground on the plug pin with the black/orange wire with the door open and the key in the ignition. If you are using a multi-meter, set it on the lowest ohms scale (reading X 1) ohms scale. If you are using a test lamp, connect the alligator clip to the positive post of the battery, and insert the tip into the plug terminal with the B/O wire. You should get very low ohms reading on the multi-meter, less than one ohm, or the test lamp, if that's what you are using, should glow at full brilliance. If so, the module is defective, and will need to be replaced. If not, go to step 2.

Step 2). With the plug still removed, use your ohmmeter or test lamp to check for continuity to ground on the black/green wire coming from the ignition switch, with the key inserted in the lock. The B/G wire exits the ignition lock just under the dash, and the green stripe on this wire spirals around the wire, rather than running lengthwise as on all other wires. This spiral tracer wire connects to another B/G wire, with lengthwise stripe, at a bullet/sleeve connector. Be sure to check both sides of the connector. If you have continuity to ground here, go to step 3. If not, the key switch is faulty, and the entire ignition lock assembly will have to be replaced, as the switch is in-accessable for repair.

Step 3). Locate the B/O and the B/G wires at the driver's door switch. With the plug still removed, the driver's door open, and the key in the ignition lock, check for continuity to ground on each of these wires. If you have continuity on the B/G wire, but not the B/O wire, the switch is bad. If don't have continuity on the B/G wire, there is a break in the wire to the connector mentioned in step 2, or the connection to the door switch is bad.

If the switch is bad, it can be repaired, although new ones are quite inexpensive if you prefer to replace it instead. Refer to chapter 9, Switches, Relays, and Solenoids, for details.

C). SEAT BELT SWITCHING:

Step 1). Pull the plug from the seat belt module, and, using your ohmmeter or test lamp as described in step B1 above, check for continuity to ground on the seat belt input wire (you will have to trace this wire from the seat belt to determine the color code, as it isn't listed in Triumph documentation - perhaps black/???). There should be continuity to ground on this wire only when the belt is un-fastened. If you get continuity to ground when the seatbelt is fastened, there is a short to ground on the wire from the switch. If you don't have continuity when the seatbelt is unfastened, there is a break or a bad connection in the wiring from the switch.

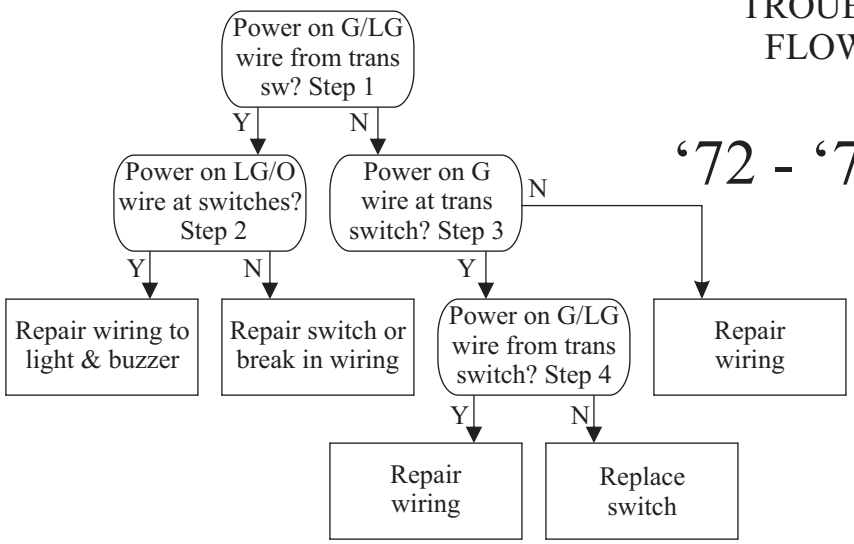
Step 2). With the plug still removed, use a short piece of wire to short the light green/orange wire to ground. If the warning light doesn't come on, and you had power to the purple wire in step A1, either the bulb is bad or there is a break or bad connection in the wiring. Go to step 3. If the light does come on, but doesn't come on under normal operation, and you have resolved all the steps above, the module is bad, or there is a bad connection at the module plug.

Step 3). Check for voltage on the purple wire at the bulb. If you have voltage here, either the bulb or the bulb holder is bad, or there is a break in the LG/O wire to the module. If not, there is a break in the purple wire, which will have to be traced and repaired.

TROUBLESHOOTING FLOW DIAGRAMS

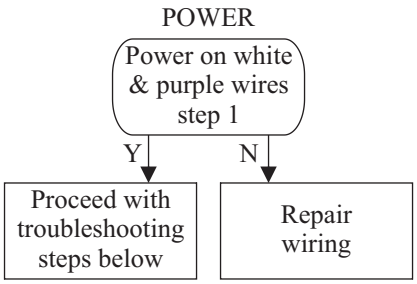
'72 - '73 MODELS

SEAT BELT WARNING

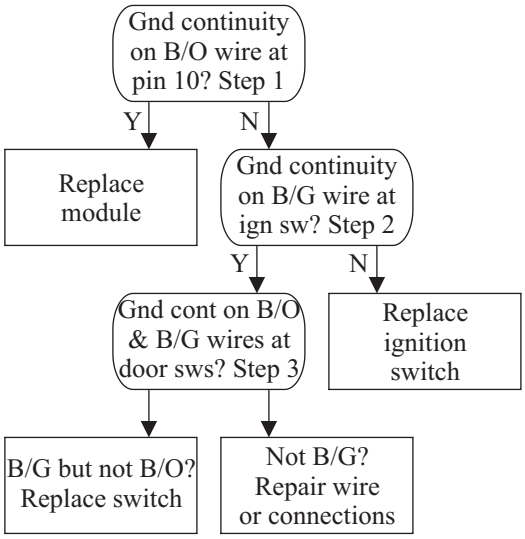


'74 - '75 MODELS

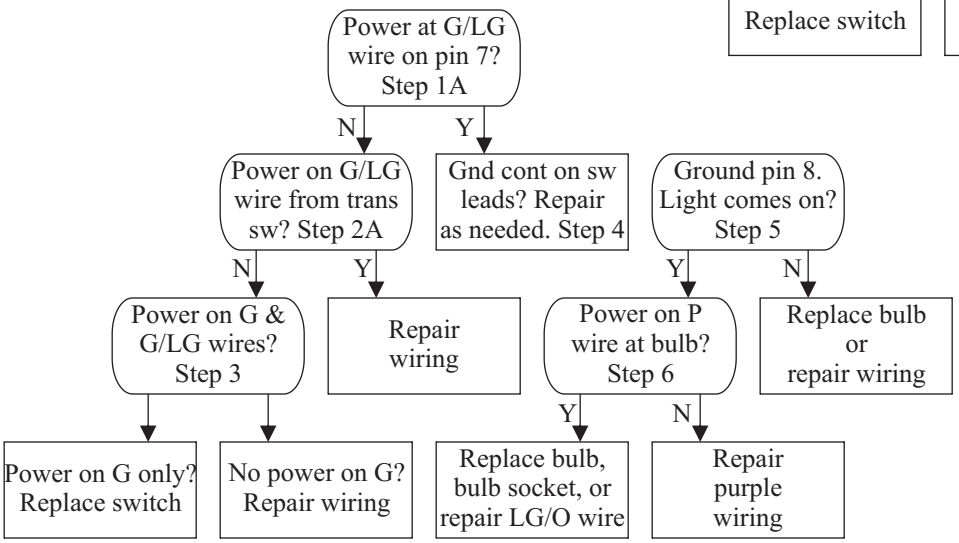
POWER



IGNITION KEY WARNING BUZZER



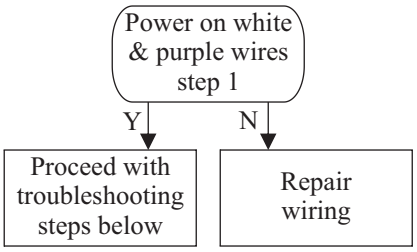
SEAT BELT SWITCHING



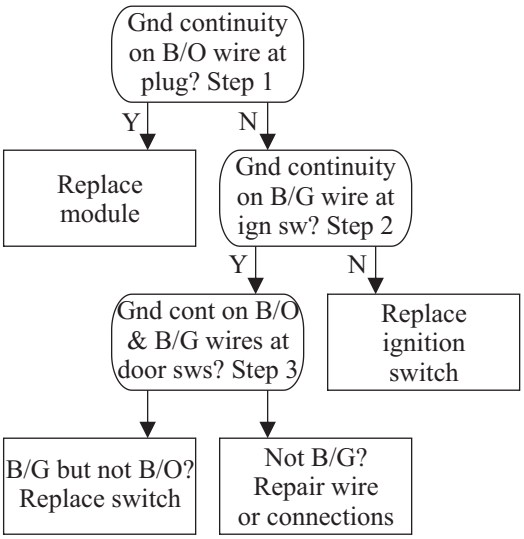
TROUBLESHOOTING FLOW DIAGRAMS

‘76 MODELS

POWER



IGNITION KEY WARNING BUZZER



SEAT BELT SWITCHING