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HORN CIRCUIT

CIRCUIT CONFIGURATIONS

Two different horn wiring configurations were used on the various TR250/TR6 models, one with a relay, and the other without. Although I can't be certain, it seems that the decision to use a relay for the horns depended upon whether or not the car was equipped with an early type "A" overdrive, as the cars only had provisions for two relays. The earlier models used a relay for the hazard circuit, so that left only one space for a relay. If the space was needed for the OD unit, there was no place for a relay for the horns. If no OD was installed, it appears the OD relay was given over to the horn circuit. You will have to look at your particular car to determine which of the two horn arrangements you have. The two configurations are shown below in **figure 1**.

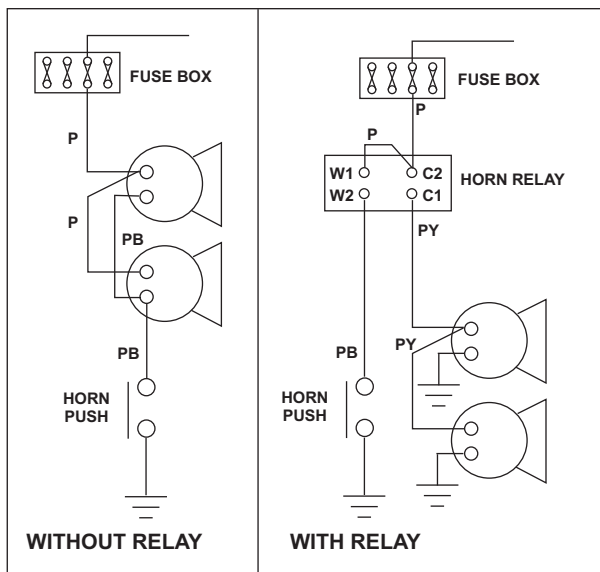


FIGURE 1

In cars without the relay, one side of each horn receives a constant 12 volts directly from the "purple" fuse. Power is present on the horns at all times, key on or not. To operate the horns, the push button in the center of the steering wheel grounds the other side of the horns when pushed. In cars with a horn relay, one side of each horn is permanently grounded, while one side of the coil winding in the horn relay receives a constant 12 volt supply. To operate the horns, the other side of the horn relay coil winding is grounded when the horn button is pushed. The relay is then energized, connecting the power from the "purple" fuse to the other side of the horns.

With either system, the horns are operable at all times,

regardless of the position of the ignition key. This is a safety feature, primarily for protection of your car, rather than personal safety, although it could prevent serious personal injury as well. You might be sitting in your car in a parking lot, waiting for someone to return to the car, when an idiot in one of the humongous land yachts decides to back up, and doesn't see your car. You don't want to have to get the key out of your pocket and turn the ignition on to warn the driver to stop! Or, you might be putting packages in your car when you notice the car moving in on you. Blowing your horn quickly could save serious injury.

TROUBLESHOOTING

By far, the two most common problems with the horn circuit are bad or missing grounds, or just plain bad horns. The horns can often be repaired, and this procedure is covered in chapter 19, Horn Repair. Ground problems can always be fixed, and will be covered here. In **figure 1**, left, the ground connection to the horn button looks pretty straight forward and simple; in reality, it's anything but!

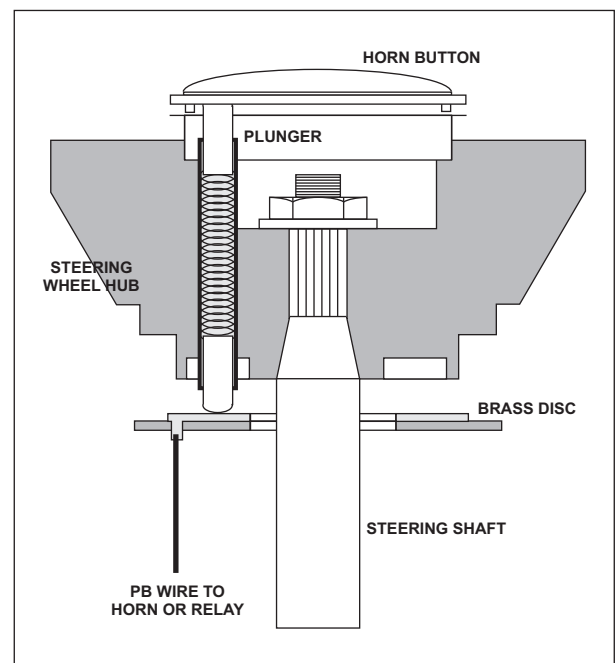


FIGURE 2

Looking at **figure 2** above, you can see that the ground path is quite torturous. Inside the steering column is a flat brass ring, isolated from ground, with a purple/black wire attached which connects to either the horns or the horn relay. Inserted into a hole in the steering wheel hub is a plastic sleeve with two brass plungers inside, separated

from each other by a spring. One of the plungers maintains constant contact with the brass ring, and the other maintains constant contact with the horn button.

When the horn button is pressed, part of it makes contact with the steering wheel hub, which is grounded. The resulting ground connection is then transferred to one of the plungers, through the spring to the other plunger, to the brass ring, and then to the horns or horn relay, causing the horns to operate. If the steering wheel hub is grounded properly, that is.

The steering wheel hub is grounded to the upper steering shaft, which rides in a pair of nylon bushings, isolating it from ground. At the end of this shaft is a flexible rubber joint connecting the upper shaft to the lower shaft. This joint, being made of rubber, is an insulator. The lower shaft is connected to the steering rack, which is isolated from the chassis by rubber shock absorbing mounts. So, with all the insulators, how does the horn circuit get grounded?

Photos 1 and 2 below show the required ground connections. **Photo 1** shows the flexible braided wire connecting the upper column to the lower column. One end of the wire is terminated under one of the mounting bolts, and the wire is then routed through the flexible coupling to the lower shaft, where it is terminated under one of the lower shaft mounting bolts. **Photo 2** shows the ground connection at the steering rack. This wire is routed directly to the car's chassis. These two items probably account for more horn problems than anything else, other than actual horn failures. If your horns don't work, this is the first place to look. No tools or test equipment is required, just a quick visual examination is all that's needed. If both of these ground connections are in place, then it's time to begin the troubleshooting procedure.

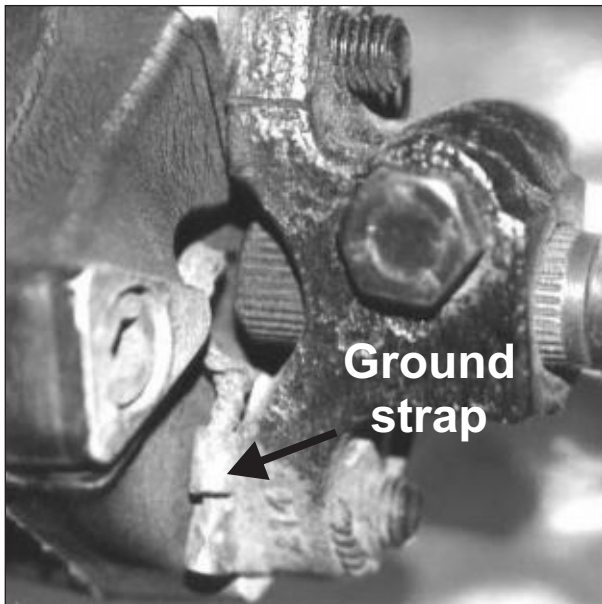


PHOTO 1

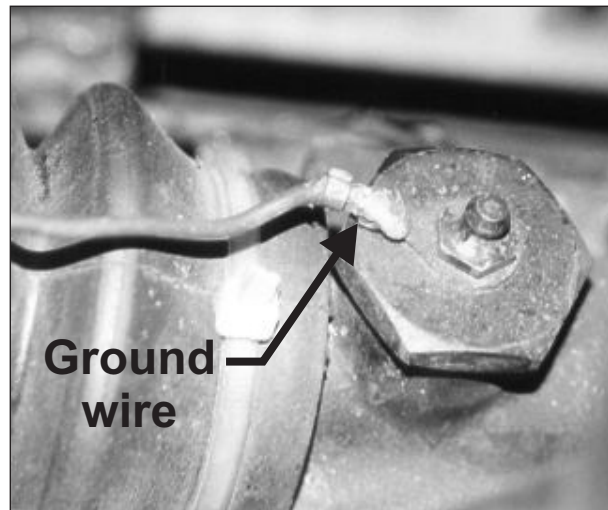


PHOTO 2

The horns receive power from the "purple" fuse, along with the courtesy lamps, high beam flash-to-pass, and the hazard flasher. If **NONE** of these items work, check for power from the fuse, and resolve this issue before proceeding. If **ANY** of these devices work, there is power at the fuse, so you can proceed with the troubleshooting steps outlined below.

A. If your car does **not** have a horn relay:

A1. Neither horn works

Step 1). The purple/black wire from the brass ring in the steering column, described previously, exits from the steering column just under the dash, where it connects to the remaining portion of the P/B wire with a bullet/sleeve termination. Locate this connection, and, with a short piece of wire, short this connection to ground. Short each side of the connection, in turn, with the original wires still connected, to ground, to ensure that the connection is not the problem. If the horns blow when you short one side of the connection to ground, but not the other side, the connection is bad, and will need to be cleaned and repaired. If the horns blow when either side is grounded, the ground connections in the steering column will need to be repaired, as describe previously. If the horns don't blow, proceed to step 2.

Step 2). Using a voltmeter or a test lamp, check for the presence of power on the purple wires at the horns. If you have power, proceed to step 3. If not, there is a break or bad connection in the purple wiring from the fuse box to the horns, which will need to be repaired. Check each horn in turn, as it's possible that you may have more than one problem. You might have, for example, a bad power connection to one horn, and a bad ground connection to the other.

Step3). Using a short piece of wire, ground the horn terminals with the purple/black wires. If the horns blow, there is a break in the P/B wire somewhere between the

brass ring in the steering column and the horns, which will need to be repaired. Test each horn in turn.

A2. One horn works, one doesn't.

Step 1). Using a voltmeter or a test lamp, check for voltage on the purple wire at the non working horn. If you have power here, go to step 2. If not, there is a break or bad connection in the purple wire from the fuse, which will need repair.

Step2). Using a short piece of wire, ground the horn terminal with the purple/black wire. If the horn now blows, there is a break in the purple/yellow wire, or a bad connection. If not, the horn is bad.

B. If your car *has* a horn relay.

B1. Neither horn works.

Step 1). With your hand on the horn relay, press the horn button in the steering wheel. If you can feel the relay click, go to Step 5. If not, go to step 2.

Step 2). Find the terminal on the horn relay with the purple/yellow wire attached (should be the W2 terminal, but could be the W1). With a short piece of wire, ground this terminal to a good ground point. If the relay clicks, go to Step 3. If not, go to Step 4.

Step 3). The purple/black wire from the brass ring in the steering column, described previously, exits from the steering column just under the dash, where it connects to the remaining portion of the P/B wire with a bullet/sleeve termination. Locate this connection, and, with a short piece of wire, short this connection to ground. Short each side of the connection, in turn, with the original wires still connected, to ground, to ensure that the connection is not the problem. If the relay clicks (or the horns blow) when you short one side of the connection to ground, but not the other side, the connection is bad, and will need to be cleaned and repaired. If the relay clicks or the horns blow when *either* side is grounded, the ground connections in the steering column will need to be repaired, as described previously. If the relay doesn't click or the horns don't blow, there is a break in the wiring between this point and the relay, which will need to be repaired.

Step 4). With a voltmeter or a test lamp, check for voltage on the relay terminals with the purple wire (should be C2 and W1, but could be C2 and W2, or C1 and W1, or C1 and W2). If you have voltage here, the relay is bad and will need to be replaced. If you don't have voltage here, there is a break or a bad connection in the wiring from the purple fuse to the relay, which will need to be repaired.

If, after completing Steps 1 through 4, the horns still don't work, proceed to step 5.

Step 5). With a voltmeter or a test lamp, check for the presence of voltage on the relay terminal with the purple/yellow wire (should be W2, but could be W1) while pressing the horn button in the steering wheel. If you have voltage, proceed to step 6. If not, the relay is bad, and will need to be replaced, or, the connection of the purple wire to the C2 terminal is bad.

Step 6). Connect your voltmeter or test lamp to the terminal on the LH horn with the purple/yellow wire. Press the horn button and monitor for the presence of power at this terminal as the button is depressed. If you have voltage, proceed to Step 7. If not, there is a break or a bad connection in the purple/yellow wire between the relay and the horn, which will need to be repaired.

Step 7). Using a short test lead with alligator clips on each end, connect the ground terminal of the LH horn to a good ground point, and press the horn button. If the horns blow, the ground connections are bad, and need repair. If not, the LH horn is bad. Repeat Steps 6 and 7 on the RH horn.

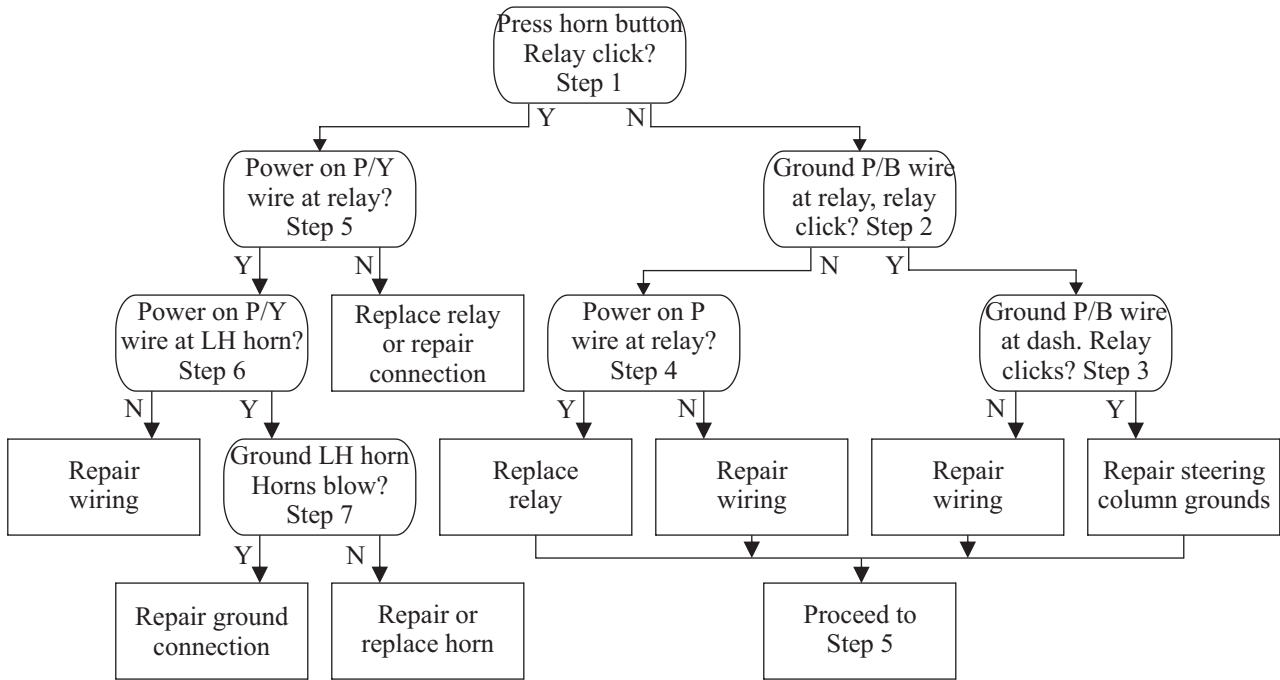
B2. One horn works, one doesn't

Step 1). Using a voltmeter or a test lamp, check for voltage on the purple/yellow wire at the non working horn, while pressing the horn button. If you have power here, go to step 2. If not, there is a break or bad connection in the P/Y wire from the horn relay, which will need repair.

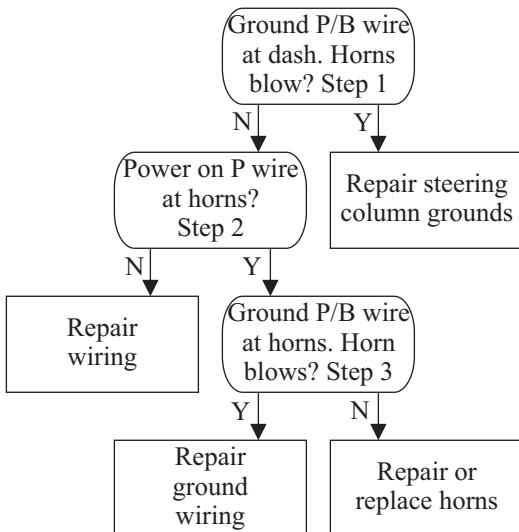
Step2). Using a short piece of wire, ground the horn terminal with the black wire while pressing the horn button. If the horn now blows, there is a break in the black wire, or a bad connection. If not, the horn is bad.

TROUBLESHOOTING FLOW DIAGRAMS

WITH HORN RELAY



WITHOUT HORN RELAY



ONE WORKS, ONE DOESN'T

