

Volkswagen Cabriolet DIY Guide

Adding Turn Signals to the Side Markers

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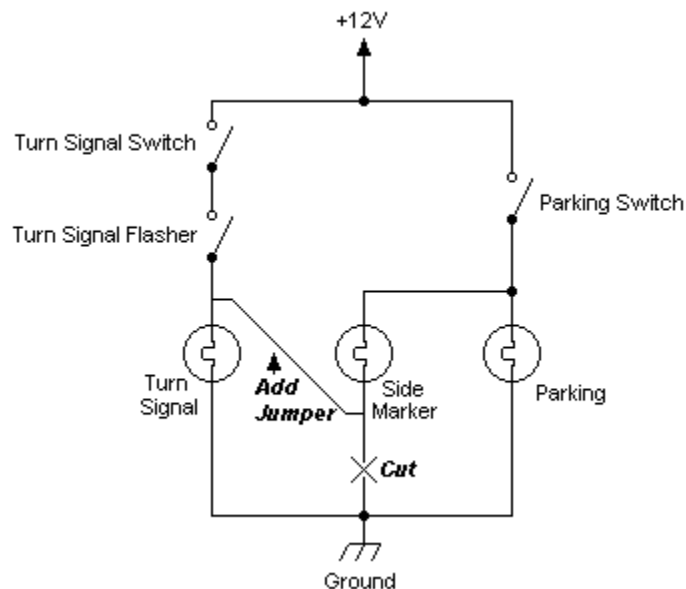
Goal of the Mod

The goal of this mod is to modify the behavior of the side marker lamps in the front fenders of North-American-spec cars. Currently those lamps are lit with the parking lights. The desired behavior is to continue to have them light with the parking lights, but also to have them blink with the turn signals. Specifically, the new behavior will be as follows:

- When the parking lights are off, the side marker will normally also be off. The exception is that when the turn signals are in use while the parking lights are off, the side marker light will flash in sync with the turn signal bulb on that side of the car.
- When the parking lights are lit, the side marker will also normally be lit. The exception is that when the turn signals are in use while the parking lights are lit, the side marker light will flash the opposite polarity to the turn signal bulb on that side of the car.

Wiring Overview

Currently the lamps in question are wired with one terminal connected to ground, and the other to switched 12V. In the case of the turn signal lamp, the switch is the turn signal blinker and switch; in the case of the parking and side marker lights, the switch is the headlight switch. Check out the simplified diagram below for details.



The change, which is also noted in the diagram above, is to lift the side marker lamp's ground connection and instead hook it up to the switched side of the turn signal lamp. FYI in VWs ground wires are always brown, but sometimes have a stripe of another color on them. The turn signal and the parking lights will still be wired as before (one side switched 12V, the other side ground). However the side marker lamp will now be connected between the switched 12V going to the turn signal lamp, and the switched 12V going to the parking lamps.

How It Works

To show the functionality of the mod, we'll have to consider a few different cases. Note that in these cases, when it is noted that the "turn signal is off", that means that the bulb is not illuminated. This might mean that either the turn signal switch is off, or that it is on but the blinker is in the half-cycle where the bulb is not to be illuminated. Likewise, "turn signal on" means that both the switch is on, and that the blinker is in the half-cycle where the bulb is to be illuminated:

Case 1: Parking lamps off, turn signal off. In this case both switched 12V signals (parking and turn) are at 0V since no power is applied to either. All of turn signal, parking, and side marker are off.

Case 2: Parking on, turn signal off. In this case there is 12V applied to the top of the parking lamp and the top of the side marker lamp. In looking at the simplified schematic above, you'll note that there is a complete circuit from 12V, through the side marker lamp, through the turn signal bulb, to ground. So on first thought, both the turn signal and the side marker lamp will light at half-brightness.

However this is where we depend on the fact that the side marker lamp is much smaller wattage, and therefore higher-resistance than the turn signal lamp. If we have a voltage divider with two resistors, most of the voltage will appear across the higher-valued resistor (in this case, the side marker lamp).

The second thing we depend upon is that incandescent lamps are by nature non-linear resistors. When the filament is cold, its resistance is much lower than when it is hot. So, by the principle above the side marker filament will get hotter than the turn signal filament, which will accentuate the differences in resistance. The effect is that the side marker bulb will glow at close to 100% of its full intensity, while the turn signal bulb will not glow at all.

Therefore in Case #2, the parking lights and side markers will be on, while the turn signal will be off. This is the effect we want.

Case 3: Parking lamps off, turn signal on. In this case there is 12V applied to the top of the turn signal (and therefore the *bottom* of the side marker lamp). In looking again at the simplified schematic above, you'll note that there is a complete circuit from 12V, through the side marker lamp, through the parking lamp, to ground. The same principle as noted above will be in effect here: even though the side marker and the parking lamp are in series, only the side marker bulb will illuminate. Therefore in this case, the turn signal and side markers will be on, while the parking lamp will be off.

Case 4: Parking lamps on, turn signal on. In this case there is 12V applied to both sides of the side marker light, so no current will flow and the bulb will be off. In this case, the turn signal and the parking light will be on, while the side marker will be off.

Results

So here is this overall effect:

- When the parking lights are off, the side marker will blink in sync with the turn signal bulb.
- When the parking lights are on, the side marker will be illuminated while the turn signal bulb is *not* illuminated, and the side marker will be extinguished when the turn signal bulb is *on*. Therefore it will also flash while the turn signal is flashing, but it will flash the opposite polarity.

Procedure

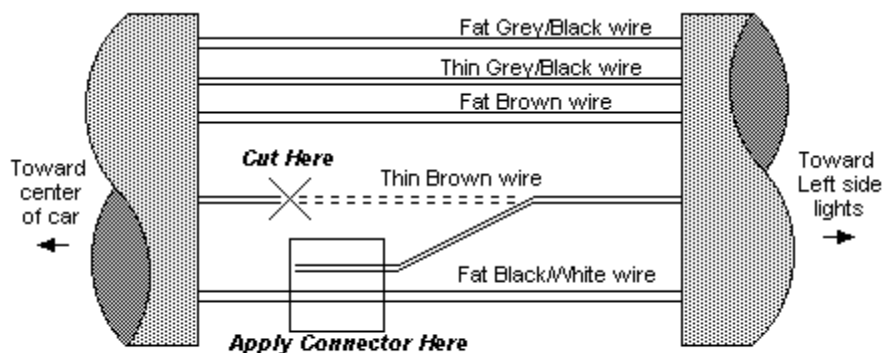
It's recommend that you fully read the instructions before you proceed in order to familiarize yourself with the process.

Parts required:

- Radio Shack Catalog # 64-3067 (four moisture-resistant tap-in connectors for 18-16 gauge wire; only 2 used in this operation)

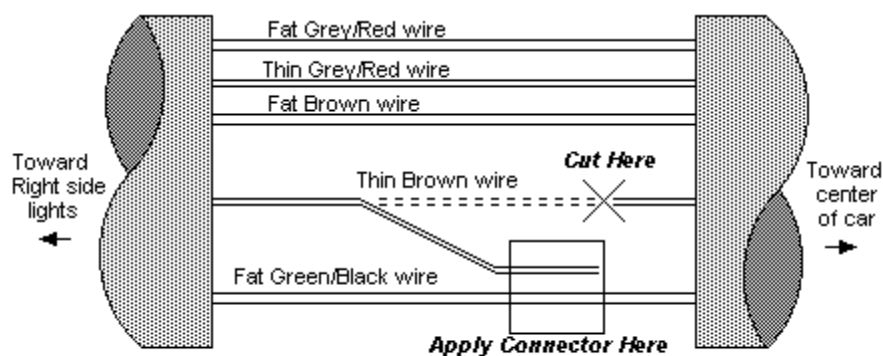
And here's the procedure.

- If you have a Bentley manual handy, I strongly recommend that you check out the wiring diagram to double-check my color codes. In my Bentley the appropriate diagram is on Page 97-237.
- I've found it easiest to do this with the headlights removed. To get them out, you'll unfortunately first have to remove the grille. To the best of my recollection, here's how you do it. Be **very** careful when removing the grille; I've already broken off two of the tabs that hold in mine.
 - Remove the four Phillips-head screws that go through the top radiator support down into the top of the grille.
 - **Carefully** press down on the four plastic clips in the grille which the screws held. Gently disengage the top of the grille from the top radiator support.
 - Use a screwdriver to **carefully** press the five or so plastic tabs that hold the bottom of the grille in. Gently disengage the bottom of the grille from above the bumper, and lift out the grille.
 - Using an 8mm socket, remove the four screws from each of the headlight assemblies; disconnect the headlight wires and set the headlight assemblies aside.
- For the purposes of this procedure, the notations of the **left** and **right** sides of the car are from the point of view of a person sitting in the driver's seat. Therefore the **left** side of the car is the driver's side (on North American spec cars, anyway).
- Start on the "Driver's Left" side since there's more room to work (at least on my early '96). Locate the wiring harness that runs below and inside the headlight opening. It will be wrapped in black tape. If you follow the outboard end it will split and feed the side marker lamp, and the turn/parking lamps in the front bumper.
- Using an Exacto knife or other cutting implement, gently slice away a 1.5-inch-long section of the black tape in the harness just below the headlight opening. Be careful not to cut or puncture the insulation of the wires inside!
- As a test, turn on the parking lights to make sure both side marker lights illuminate. Turn them off again.
- Check out the diagram below. Locate the thin brown wire (there may be a stripe on it) in the harness. **Be sure you identify the thin brown wire. Don't confuse it with the fat brown wire.** Cut the thin brown wire at the inboard-end of the gap in the black tape. Turn on the parking lights to verify that the side marker light on this side of the car does **not** illuminate. This will verify that you've cut the correct brown wire. **Note!** Some people who have done this mode have reported that their cars have *two* fat brown wires, but only one *thin* brown wire. As long as you only have one thin brown wire, that's the one you want. If you have more than one, I can't help you with which one to cut.



Left Side Harness

- **Important! When connecting the thin brown wire to the tap-in connector, make sure you connect the half that runs toward the outboard edge of the car, toward the side marker lamp! Do not connect to the half that runs inboard, to the wiring harness, and eventually to ground! If you connect to the wrong half, not only will the mod not work, it will also blow fuses (or worse) when you energize the turn signal. Double-check the schematic and the diagram above to make sure you get the correct half.**
- Locate the thick black/white wire. Apply this wire to the Tap-in Connector's "through wire" position. Be sure to have the Tap-in connector's "tap wire" position pointing toward the outboard edge of the car (to accept the longer end of the cut brown wire). Apply the longer end of the cut brown wire (the end which runs toward the side marker lamp) to the "tap wire" position. Close and lock the connector.
- Turn on the parking lights. Verify that the side marker light on this side of the car **does** illuminate. Turn on the emergency flashers. Verify that the side marker light flashes. Turn off the parking lights and flashers. You're done with the Driver's (left) side. Now move to the Passenger's (right) side. Locate the harness on this side of the car and carefully cut another 1.5-inch-long opening in the black tape wrap.
- Check out the diagram below. Note! Owners of non-1996 cars have noted that there may be more wires in this bundle than I've shown. Locate the thin brown wire (there may be a stripe on it) in the harness. Again, **be sure you identify the thin brown wire. Don't confuse it with the fat brown wire.** Cut the thin brown wire at the inboard-end of the gap in the black tape. Turn on the parking lights to verify that the side marker light on this side of the car does **not** illuminate. This will verify that you've cut the correct brown wire. **Note!** Some people who have done this mode have reported that their cars have *two* fat brown wires, but only one *thin* brown wire. As long as you only have one thin brown wire, that's the one you want. If you have more than one, I can't help you with which one to cut.



Right Side Harness

- Again, it's **important that you connect the half of the thin brown wire that runs toward the outboard edge of the car, toward the side marker lamp! Double-check the schematic and the diagram above to make sure.**
- Locate the thick green/black wire. Apply this wire to the Tap-in Connector's "through wire" position. Be sure to have the Tap-in connector's "tap wire" position pointing toward the outboard edge of the car (to accept the longer end of the cut brown wire). Apply the longer end of the cut brown wire (the end which runs toward the side marker lamp) to the "tap wire" position. Close and lock the connector.
- Turn on the parking lights. Verify that the side marker light on this side of the car **does** illuminate. Turn on the emergency flashers. Verify that the side marker light flashes. Turn off the parking lights and flashers. You're done with the Passenger's (right) side.
- Re-install the headlight assemblies and the grille. You're done!

*** * Remember, you are responsible for working on your car; Cabby-Info.com, VWvortex.com, VAG, VWoA, or anyone else are not responsible if anything goes wrong while you are working on, in and under your car! Use this information at your own risk! * ***