

Backup Lights Repair

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1976 Jaguar XJ-S*

Background

Being out of the driver's view, backup light (reverse light) failure can go unnoticed for months or even years. I did not discover mine were not working until I entered my car in a JCNA concours event in early 2003, although when I tracked down the problems (two, not just one) I came to know they had been out of service for at least a year. Here's how I tracked down the problems and fixed them.

By the way, the ignition switch has to be in the Accessories or Ignition position for these lights to work.

Summary

If you want the short story, this is it.

If neither of your reverse lights works it is most likely either the fuse (#6 above driver's footwell) or the switch on the gear selector mechanism. When checking the fuse, be sure to check the fuse holder too because these have been known to fail to make good contact with the fuse. If the fuse is good the switch has probably failed due to the contacts becoming oxidized. You have to remove the center console cover and the gear select cover to get at the switch. You can test it in place with an ohmmeter. It should read close to zero when in reverse. If it doesn't, screw it out and replace it. Or, if you're the type you can open it up and clean the contacts.

These is a remote chance the problem is a broken wire or some other break in continuity between the fuse and the lamp in the boot lid, rather than the switch. This is a more likely failure if work has been done on the car along the path of the harness to the boot lid. Some methodical work with a volt-ohm meter is required to track it down.

In my case, I had both a bad switch and a broken wire. But that's the longer story, below.

Diagnosis

I believe in always checking the easy things first. Looking at the circuit diagram in the Repair Operations Manual (ROM) I learned the reverse light circuit is protected by fuse #6, above the driver's footwell. I popped the fuse and tested it with my DVM and, unfortunately, found it to be good. Because the car is 27 years old, I then cleaned the fuse holder clips before reinserting the fuse. Still, no reverse lights.

Next, I took off one of the lenses in the boot lid to check the lamps. Admittedly, it's unlikely two would go at the same time, but for all I knew one could have gone out 5 years ago and the other one last month. Unfortunately, the lamp was good, and cleaning the contacts didn't help either. While I was there I tested the resistance from the battery negative to the grounded end of the lamp holder, finding it close to zero. At that point I knew I had a more challenging problem, e.g., perhaps the switch.

The ROM gives the procedure for removing and replacing the reverse switch (86.65.20). According to the ROM, to gain access you have to remove the center console cover, and the gear selector cover. Total removal of the console lid would entail disconnecting the wires to all the door and window switches, but I found that I could undo the connections only on the left side and move the cover aside. Before removing the connections I put sticky labels on the wires and the switches to make it easier to get them back right. Once the cover is out of the way the mounting bracket for the shift lever cover can be removed, revealing the subject switch, Figure 1. (Note: you might be able to get the switch out without removing the selector cover. I didn't try.)



Figure 1 Reverse switch

The switch is the aluminum hexagonal device with two wires connected, one green and the other green with brown stripe. The green wire comes from the fuse #6 and the striped one goes to the reverse lamps. As you can see in Figure 3 the switch is threaded at one end and screws into the shifter mechanism. There is a plunger at the threaded end that works in and out as the shifter is moved in and out of reverse. When in reverse it is all the way in, and the contacts inside the switch close, turning on the reverse lamps.

Just to be sure it was the switch causing my problem I decided to remove the connections and jumper them together. Guess what? The lights still did not come on!

So, strange as it may seem, I had a continuity problem somewhere. A quick test with my DVM on the green wire (ignition in Accessories position) told me I had power to the switch. I then made up a long lead, reaching back to the boot, so I could test continuity of the green/brown wire. The easy first test was to the hot side of the lamp holder since I still had the lens off. No continuity. I then disconnected the plug where the boot lid harness connects to the left reverse light and tested continuity from it to the front. No continuity. Finally, I unplugged the boot lid harness as it leaves the boot lid in the upper right hand corner of the boot, Figure 2. There I detected continuity in the green/brown wire to the switch, telling me the boot harness was bad.

I did not have to look far to find the problem with the harness. As can be seen in Figure 2, the boot harness is wrapped in tape. I unwrapped the tape between the connector and the grommet where it enters the lid reinforcement member, and there discovered a break in the brown/green wire!

It didn't take me long to figure out how this came about. About two years ago I discovered I had a severe rust problem in the parcel shelf. In order to fix it the body shop had to remove the gas tank, and that must have required unplugging the harness to get at the tank vent hoses in that area. As you can see in the photo the connector is in tight position, so being unable to get his hands on the connector the fellow must have yanked on the wires. The only surprise is that he broke only one wire in the bundle!

I decided it was easier to fix the problem myself than go back and try to get satisfaction from the shop. I quickly spliced the wire (using Sean Straw's technique) and reconnected the harness and the switch. Much to my surprise, though, I still had no reverse lights!

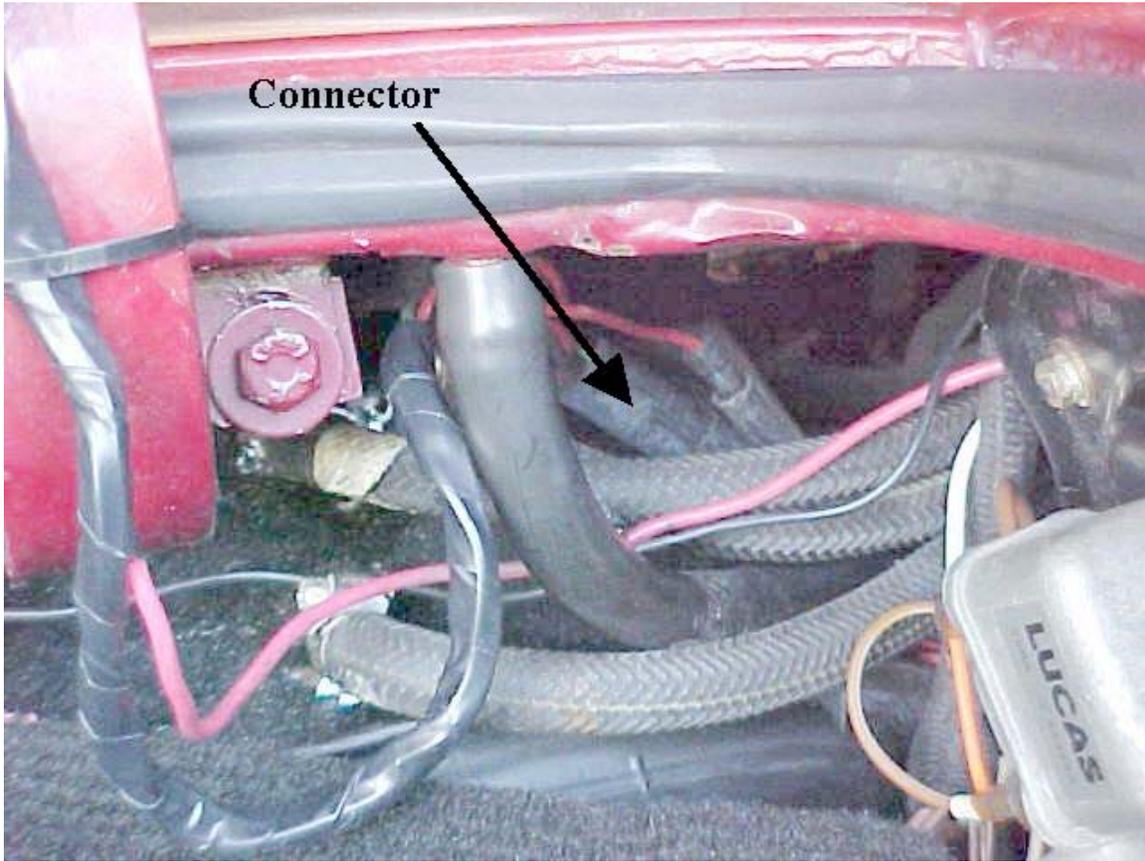


Figure 2 Boot lid harness connector

Once again I tested continuity, finding it was good from the switch to the lamp holder. Moreover, jumpering around the switch produced light. Now, I knew I had a switch that was either not being fully engaged by the shifter, or was simply bad. I was unable to resist doing a quick test of continuity between the two terminals with the shifter in reverse. As was predictable, the switch stayed open. This added no further information, as it still could be just out of adjustment. The only way forward was removal of the switch.

Removal of the Switch

A large pair of Channel-Lock pliers is a good tool to loosen the switch so you can screw it out. But before you do, note the washer around the threads in Figure 3. There actually may be several of these washers, of two different thicknesses (0.007" and 0.036" according to the parts book). Don't lose any when you take the switch off as they position the switch relative to the shifter, controlling how far the plunger goes in when in reverse gear.

With the switch out I hooked up the DVM to the terminals and worked the plunger. It remained open-circuit, confirming a bad switch.

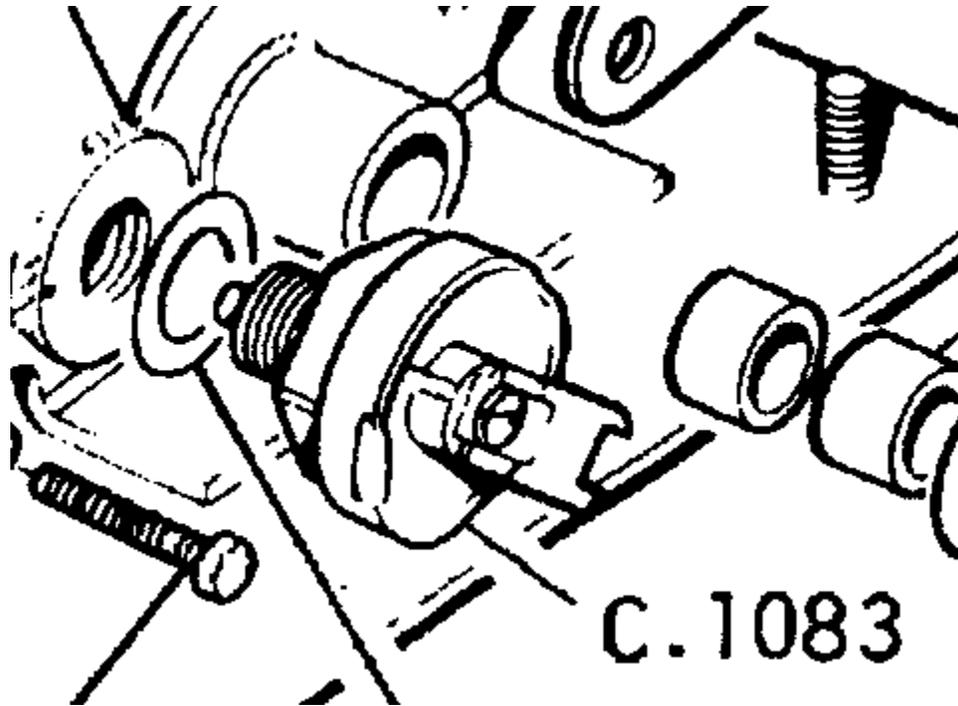


Figure 3 Switch (from XJ-S parts book)

Fixing the Switch

I did not price it, but the part looks expensive. Fortunately, it's not hard to fix. As you can see in Figure 1 the back edges of the switch body are dimpled to hold the fiberboard base in place. I tried to bend back the edge with pliers, but I finally resorted to a little careful work with a Dremel tool to get it open. Notice carefully where the two springs go when it comes apart. I wish I had take a photo of it while apart, but I was anxious to wind up the job so you will just have to follow the words here, hopefully fewer than a 1000.

Inside you will find there are two copper contact pads where the connectors come through the baseboard. There is also a copper bar with dimples that make contact with the connector pads. The copper bar is restrained by a spring between it and the baseboard, pushing it away from the contacts. The plunger, also spring loaded, acts on the other side of the bar. When the plunger is pushed in the bar is pushed toward the contacts, compressing the spring and finally closing the switch.

Failure is due to oxidation on the connector pads and the dimples on the copper bar. A little work with fine sandpaper cleans them up nicely. But, while you have it apart you might want to remove the plunger to clean it up and lubricate it. It has an O-ring that has to slide in the hole and in my case the lubricant had dried, preventing smooth operation. I cleaned both the hole and the plunger with acetone and put a little light grease on it. I used Finish Line Teflon fortified bicycle grease, but I suppose any light grease would do.

To reassemble, reinsert the plunger, with its small spring, into the hole. Put the copper bar and larger spring in place, and slip the baseboard back into the switch body. Grip the switch body in a vice and use a center punch or similar tool to dimple the edges while holding the base firmly seated. Test continuity between the terminals while working the plunger. Resistance should drop to almost zero when the plunger is in.

Reinstalling the Switch

Being sure all the thin washers are in place, screw the switch back into the shifter mechanism and tighten. Connect an ohmmeter and verify the resistance drops to zero as you move the shifter into reverse. Mine did, but if yours doesn't it may be because the plunger is not being pushed in far enough. Perhaps removing a washer or two will fix it. If not, I'm not sure what to advise.

Before replacing the shifter cover and console lid you might want to lubricate the shift mechanism. I applied a tiny squirt for my pressurized can of white lithium grease to each of the joints, trying to minimize the mess. I was surprised at how much better my shifter worked afterwards.