

Power Antenna Mast Replacement



Once a car gets out of warranty, its power accessories seem to be among the last things fixed when they fail. Now the customer is the one footing the bill. Some non-essential power accessories like air conditioners and power antennas can find themselves outside the customer's auto repair budget when they break.

Antennas are especially vulnerable to both the subtle ravages of water and corrosion, and some not-so-subtle attacks by car washes and vandals.

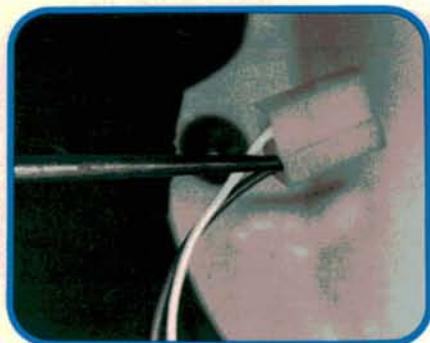
Some customers automatically assume that the only way to get that antenna working again is to buy the entire assembly. In most cases, however, a simple antenna mast replacement is all that's required. Masts

usually cost a fraction of what an entire assembly costs, and aren't at all hard to install. And since you'll already have the assembly apart to replace the mast, you can clean and relube the drive mechanisms to get things working smoothly again.

A replacement mast and the labor to install it will be less expensive for the customer than an entire assembly. You, however, can actually make more on labor by repairing the antenna than you would if you simply replaced the entire assembly with a new one.

We chose two antennas, one European on a BMW, and one Japanese, on a Toyota Celica. We'll start with the BMW.

—By Ralph Birnbaum



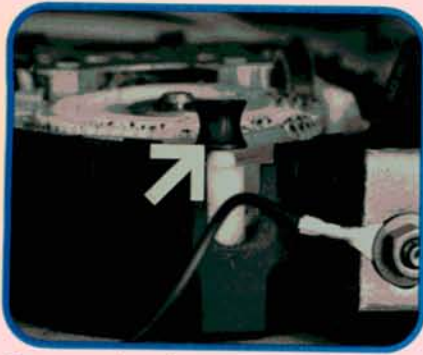
1

Before condemning an inoperative antenna on this BMW, check to see it's getting power. With the ignition off, the red wire should be hot. Key on? Both wires should be hot. This takes a second to check and saves the embarrassment of removing and disassembling the antenna for a dead wire. Also check the ground connection to the chassis.



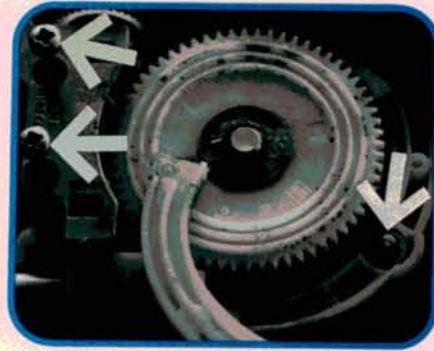
2

Carefully unscrew the trim collar (needle nose pliers worked well in the slotted collar). Then loosen the threaded collar below it that holds the mast in the guide tube. This is much easier than fighting corroded threads on a workbench. Now remove the assembly.



3

Remove the plastic cover from the assembly by carefully prying back on the plastic snap clips that hold it in place. Don't lose the rubber bumpers between the housing and the cover. This is important as the drive mechanism "floats" between the housing and cover on six of these. Check the ground connection to be sure it's clean and tight.



4

With the cover removed, we can see the drive mechanism. Remove the crescent-shaped, plastic retainer to expose the toothed drive cable and roller-tensioner that keeps it tight against the drive gear. Remove the two screws at left that hold the motor in place and pull it off to the side.



5

Now remove the small metal roller-tensioner. Note that the drive gear has an upper section that's driven by the motor, and a lower section that drives the toothed cable. With the roller removed and the drive motor off to the side, the drive gear will rotate freely.



6

Now finish unscrewing the collar holding the mast to the guide tube and pull the mast (or whatever is left of it) and the toothed cable from the assembly. Check the guide tube for signs of corrosion or damage. Clean and lubricate as necessary before reinstalling the new mast.



7

This ribbed belt runs between the drive motor and the worm gear. We checked to see if any of these internal parts were available, and they weren't. So please handle these internal components with care and make sure everything is clean and turning freely before you reassemble the unit.

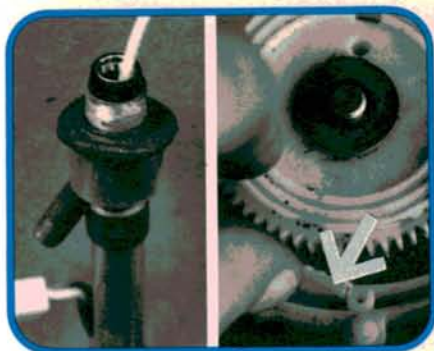


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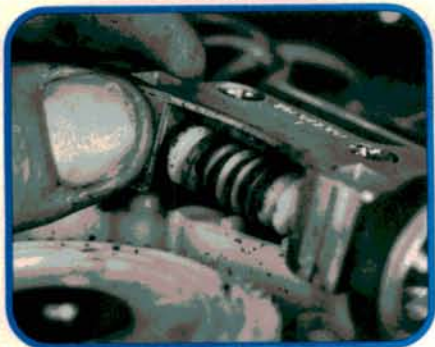
There is a dual drive mechanism that runs the cable. The top gear is driven by the motor and turns the bottom cable drive gear through a spring clutch. Grab the gear as shown and make sure it turns freely on the shaft. We don't want any sticking or binding of the gear on the shaft.

**9**

Try to turn the top gear while holding the lower one. There should be a springing action between the two, but you shouldn't be able to turn one without the other turning too. If that does happen, remove the circlip and top gear. Check that neither of the ears that sit in the clutch spring are broken.

**10**

Slide the new drive cable down the guide tube and route it around the lower drive gear and into the opening in the storage reel below the gears. Line up the drive teeth on the cable with the drive teeth of the gear. Reinstall the roller tensioner to keep the cable tight against the gear.

**11**

Now drop the motor back in place, carefully aligning the worm gear against the drive wheel. See all the crud on the gear? Take a second to wash away all the dirt and lightly lube the gears with a light weight grease that won't turn to concrete in really cold weather.

**12**

Reinstall the motor screws, the crescent shaped cable retainer, and the motor housing cover. Now plug in the motor, ground the ground wire with a jumper, and let the motor wind in the cable. Reinstall the antenna making sure the mount bracket is properly grounded, and you're all done.

Toyota Too

The antenna mast on this 1984 Celica is slightly different from the one on the BMW, but it's certainly no more difficult. There are a few things to watch for as you proceed, however, that will save you some hassles, and make the repair last longer.

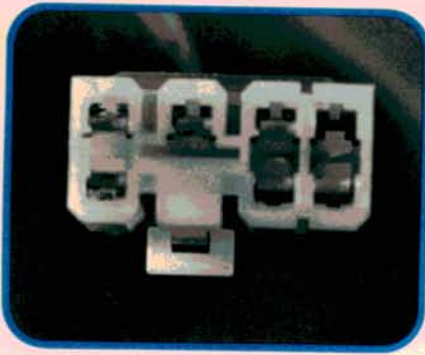
You'll notice that we mention a problem with the drain hose. When you install a new mast, always make sure the drain hose is properly connected and free to drain. If it's kinked or plugged, the assembly will just fill up with water again and stop working when it rusts tight, or the water freezes in January.

The drain hose on this particular antenna was kinked enough to close it. As if that wasn't bad enough, the quarter panel grommet it drains through had been plugged shut by a careless aftermarket undercoating job. Double trouble.

The other important thing to remember is that you don't have to pre-wind the drive cable and then try to install that nasty nylon coil into the reel. Believe it or not, I've seen fellas try to wind that coil and install it with the mast all the way down—especially on their first mast repair. You'll note I said try—I've never seen anyone actually do it.

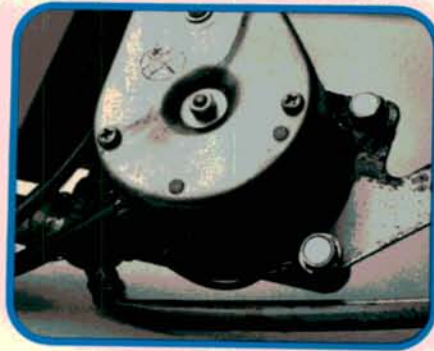
Instead, stake the cable to the drive hub. Leave the mast fully extended and reassemble the entire unit. Then just lay it in the trunk and run the motor. It'll reel the mast in for you. Unlike the antenna on the BMW, the Toyota antenna motor grounds through the harness, so you won't need an external jumper ground to get the motor to run.

When dealing with an antenna that's as badly rusted as this one was, make sure you take the time to thoroughly clean the housing and all the moving parts. Then lubricate them with a light grease.



13

Wire values at the multipoint connector are as follows: With the key in the on position, and the radio on, all wires except the white and black ground wire are hot. Key on, radio off? The yellow, white/blue, and red/green wires are hot. Key off? Only the white/blue wire is hot.



14

The antenna in the Toyota just growled but wouldn't go up. When we removed it we noticed a heavy build-up of rust around the mounting bracket. We also noted that kinked drain tube, its opening plugged with a huge wad of rustproofing. Not good signs. A clean, uninked drain is essential.



15

Remove the center nut on the cable drive cover, the two bolts holding the lower support bracket, and the phillips screw at left. You don't have to remove the other two phillips screws on the cover to do a mast replacement. Remove the cover. Note the location of any washers on the shaft.



16

That corrosion buildup on the outside was only the tip of the iceberg. Beneath the cover, we found this barnacled driven hub. We had to "unearth" the four screws holding the drive hub to the gear drive. Fortunately, a new hub and screws are provided with the replacement mast.



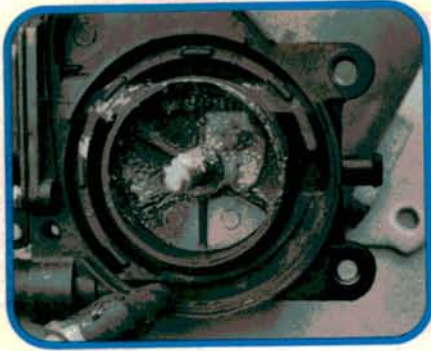
17

To save time, just snip the old nylon drive cable and discard it along with the old drive hub. There's no sense trying to free the cable from that old rusted hub. The Toyota, unlike the BMW, does not have a toothed cable. Its nylon cable is held on the drive hub by a single crimped tab.



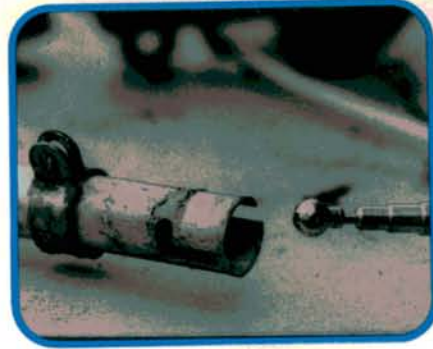
18

Remove the antenna mast guide tube next. Unscrew the phillips screw on the pinch clamp. The tube is a turn and pull removal from the antenna body. You'll have to scrape away the silicone sealer the factory applied where they join. Be careful not to get so physical that you break the plastic neck.



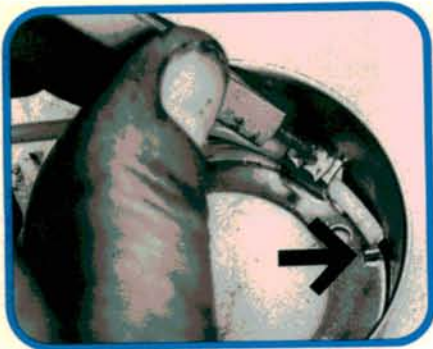
19

Lift the drive gear off the shaft. We're down to the motor and worm drive, and the bare plastic housing. Wash away that dirt and rust and blow the housing dry with compressed air. Make sure the hole in the neck of the housing for the new cable is clean and lubed. Relube the worm drive and shaft.



20

Insert the new mast in the guide tube and fully extend it. Guide the remaining nylon cable through the small hole in the neck of the plastic housing and reinstall the guide tube on the plastic housing. Apply silicone sealer where they join. Don't forget the screw/clamp and ground wire.



21

Install the nylon cable in the new driven hub. You don't have to keep track of which way the cable goes. Just use the raised tab as a stop for the cable. Place the hub on a hard, flat surface. Take a punch and stake the cable retainer tab down against the cable, just enough to hold it tight.



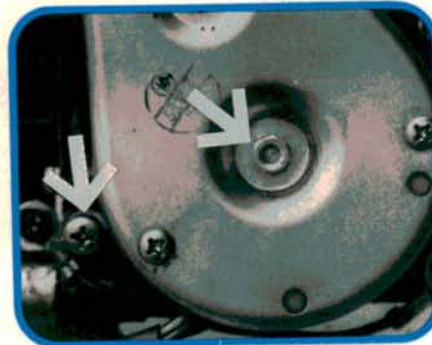
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Before we reinstall the driven hub, we'll have to slide this drive gear back on the shaft. See the small notch on the drive? The retainer tab we just staked over the cable fits in this notch when we put the driven hub/cable back on. Leave the antenna mast fully extended. Reinstall the four screws on the hub.



23

Take the time to thoroughly clean away all rust and corrosion from the inside of the drive assembly cover. We don't want the driven hub rubbing or binding in here. Also be sure you didn't lose that small washer between the cover and the driven hub. Make sure there's some lube between the two.



24

Reinstall the cover—two bolts and the lower support bracket—the phillips screw (arrow) and the small nut on the gear shaft. Now just lay the fully extended mast in the trunk and operate the drive motor to wind the cable. Reinstall the antenna.