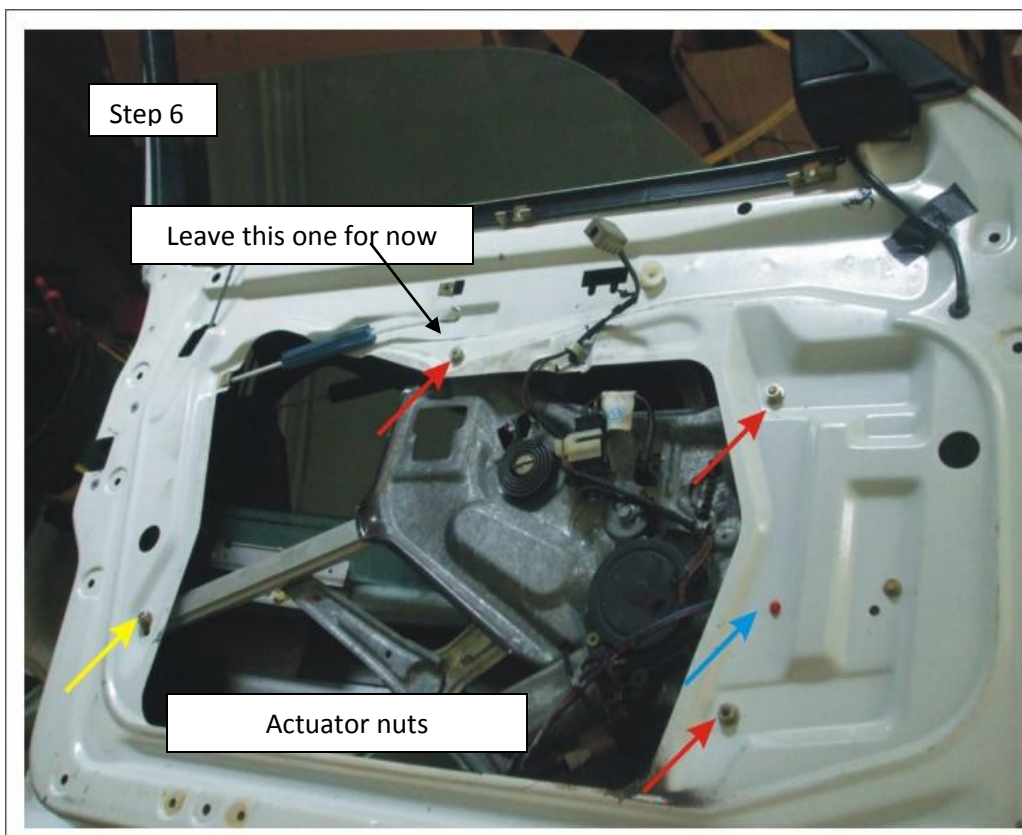


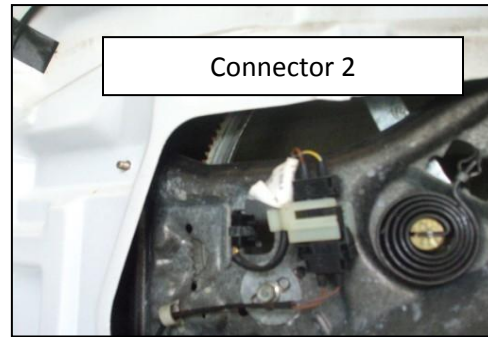
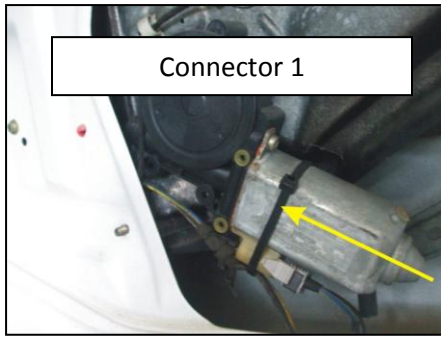
## Door electrolysis setup

Several years ago I came up a procedure using electrolysis to remove rust from motorcycle tanks. Google "Ken French Electrolysis". It has been very successful and I have always thought it would work on rusty doors so I decided to try it out. Although time consuming it works amazing well. Here is my setup.

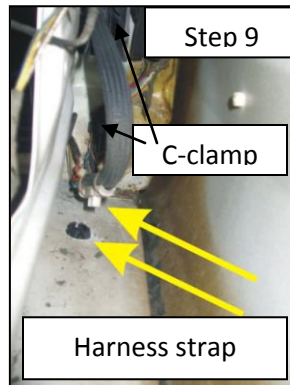
1. Anything worth doing is worth doing right. This process is no exception.
2. Remove tweeter speaker and door panel.
3. Loosen door seal (I like to mark the seal so its easy to figure out how to put it back on)
4. Lower window until only about 2" of glass shows.
5. Remove inner window seal. Remove the glass,
6. Mark the nut with the yellow arrow. I use a permanent marker. Then remove the actuator mounting nuts (Red arrows). Remove 3 of the four nuts. Leave the top nut on until you remove the connectors. Make sure you mark the position of the nut with the yellow arrow. The blue arrow indicates a wire stay, push it through.



7. Disconnect both connectors on the actuator. Cut tie. Unscrew final nut and remove actuator.



8. Reach into the door and loosen wire straps to free up wire harness. Two of these clamps are c-clamps and can be opened with your fingers.



9. Look under the door and remove the final wire clamp. Push a punch into the grommet to release the clamp.



10. Strip all of the old cloth electrical tape off of the wiring harness. Most of the garbage in the door was from this old cloth electrical tape. Wipe down wires and rewrap the entire harness with high quality electrical tape.

11. Remove two screws from electrical connector (yellow arrows) on the door frame. Pull connector out of pillar and unlock connector by inserting screwdriver into the top of the connector and pry up.

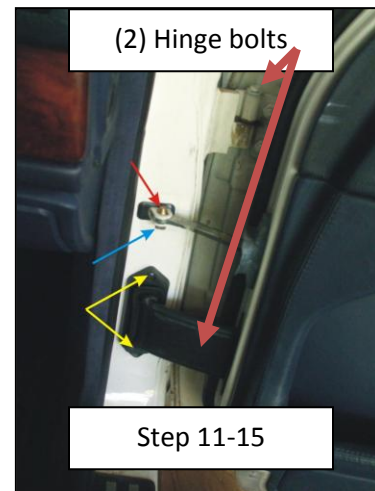
12. Remove clip (Blue arrow) on door brace

13. Drive pin out of door brace (Red arrow)

14. Remove two bolts (10mm) from door hinges. I tape the area so I don't bugar up the paint if I miss with the punch or hammer.

15. Remove the two bolts on the door hinges.

16. Standing between the door and the frame reach around window frame and cradle mirror under one arm and grab top of door frame with the other hand. Lift gently and evenly. You might want someone else to hold the outer edge of the door for support. But don't let them apply any pressure. The idea is to lift as close to the hinges as possible. Be careful and you will not scratch the paint. I have a large piece of carpet I set the door on.



17. I use a angle grinder and grind down all of the rust on the door.



18. Vacuum the channel and use a wire to remove any debris. I have a small vacuum crevice tool that works well. There are two weep holes on the bottom of the door and over years of use these can become clogged. I have found anything from dead bugs to dry rotted electrical tape.

19. Turn the door upside down and using a long

air-chuck blow air into the channel to remove debris. Then vacuum the channel again. I have a long very thin screwdriver that I run up and down the channel while vacuuming.

20. Wash out the channel on the door. I wash the doors outside on a plastic sheet with the door leaning against a tree. I use a parts brush with long bristles to scrub out the channel on the inside of the door. Tipping the door at a 45 degree angle helps also.

21. Use turpentine to wash out channel with the parts brush.

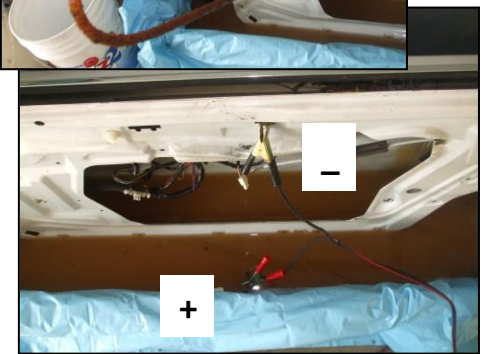
22. Wash with water again

23. Place door in electrolysis tank (Wooden box with slanted sides, lined with thick plastic sheeting) I built mine out of 2x10" planks. About 5' long x 16" wide.

24. Fill tank with electrolysis solution (1/2 cup "Washing soda per 5 gallons of warm water) Fill the tank until you have the solution above all rusty areas.

25. \*\*\*\*This is critical don't mix up the positive and negative connections or you will remove metal from the door and not rust\*\*\*Connect battery charger, **NEGATIVE** on door, I use the little metal clip (you need a good ground). Place the **POSITIVE** on the sacrificial cathode. I use a piece of bent rebar for the anode.

26. Cook the door for one day.





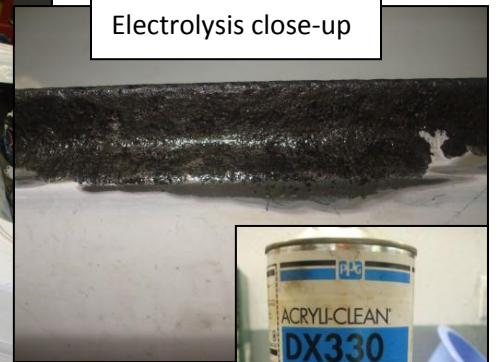
27. This is a good time to clean the door frame. I use turpentine and clean with water and then wax.
28. Remove the door from the tank and inspect the rusty areas. I used a screwdriver and a brass brush to scrape the rusty areas and scrape over bubbled paint (rust under bubbles). Wash out door again.
29. Cook the door for another day. Depending on the severity of the rust could take several days. Repeat step 15. When the door is done all rusty areas will be black.
30. When your done cooking the door remove the door and wash the channel with water one more time
31. Plug all of the channel weep holes with a small piece of duct tape and then pour a couple of bottles of rubbing alcohol into the channel and let it set for a few minutes. The alcohol will displace the water in the



- channel. I save the used alcohol so I remove only the tape from one of the drain hole and collect it in a catch basin
32. Let the door dry for one day or you can use a heat gun or hair dryer but be careful with a heat gun you don't blister the paint.
33. Sand areas on outside of the door to be painted with 100-150 grit sandpaper. I use painting wax and grease remover on bottom of door before painting.



Electrolysis close-up



34. Paint treated areas with Rust Bullet. <http://www.rustbullet.com/application.asp> I used Rust Bullet 3 years ago on my 535i doors and the rust has not returned. You will want to wear plastic gloves and long sleeves when painting this on the door. I tape the sleeves to my gloves with duct tape. You don't want to get any of this stuff on you because you will wear it for months. I have found that if you get some on you it can be removed using paint thinner as long as you get it while it is wet i.e. 5 minutes or less. You will need three thin even coats. Two hours before recoating on a warm dry day. Top coat after 24 hours. My preference for RB is the six shooter pack. Once you open a can you only have a short time



to use it all. I use throw away long bristle brushes I get from Harbor Freight. Never paint out of the can always pour the Rust Bullet into a small container like a butter dish. One container will cover two doors. I use a small nail and punch a hole in the RB can under the lip of the lid. This lets the RB drain back into the can. Always keep the lid closed and when finished if you want save the RB put a piece of plastic wrap between the lid and the can before closing.

35. Paint the outside of the door with matching vehicle paint if desire to. Paint inside and out with rubberized undercoating. I put drinking straws into the channel weep holes and pull them out after the undercoating sets up. The idea is to keep the water off the metal and get it away from the car as fast as possible. Between the RB and the undercoating it should last for years.
36. After a month or two wax the paint and install the trim. After all of this work you will want to remove the strips every year or two to inspect and re-wax.

