

# Window Motor Repair

- **Model & Year:** 97-03 5-Series
- **Expertise:** Intermediate
- **Date:** September 2014
- **Updated:** April, 2019
- **Time Estimate:** 4-6 hours

# 5 Series

## Tools Required

- T20 torx driver
- Inspection mirror
- Tweezers
- Small screwdriver and other pry tools
- Steel wool and/or wire brush
- Bentley or Haynes manual (optional)

## Facilities Needed

- None

## Parts Required

- None

## Getting Started

Do you have a door window that fails to open and only makes a "click-click" sound? Do you have a door window that worked intermittently and has now stopped working altogether? You probably have an electric window motor which has fouled with age and is in need of repair.

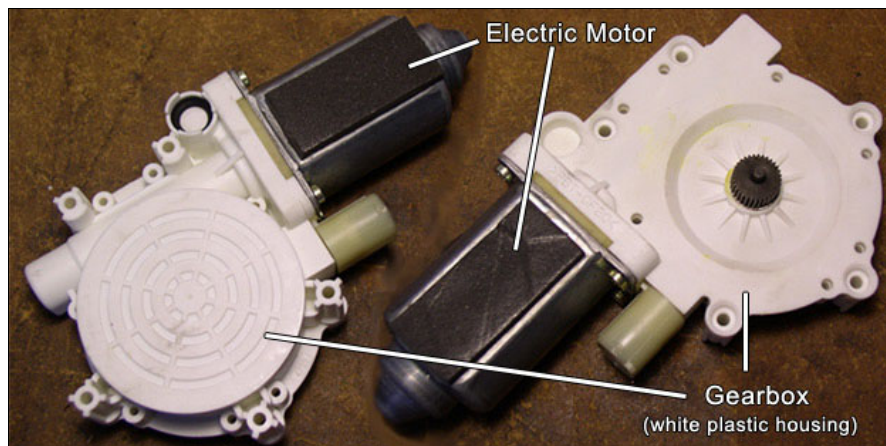
The official repair procedure is to replace the entire window regulator which includes the lifter cables and guides along with the attached electric motor. This entails removing the window glass along with all door trim, amounting to a very time-consuming, full-service repair costing around \$500 retail.

Others have correctly isolated the problem to the electric motor but, even though the motor is sold as a separate part, it cannot be replaced without removing the entire regulator assembly -- the same work as before. Some even proceed with futile attempts at electrical troubleshooting. But if your motor makes the "click-click" sound there's no need for that, since your motor is obviously getting power (otherwise there'd be no sound at all).

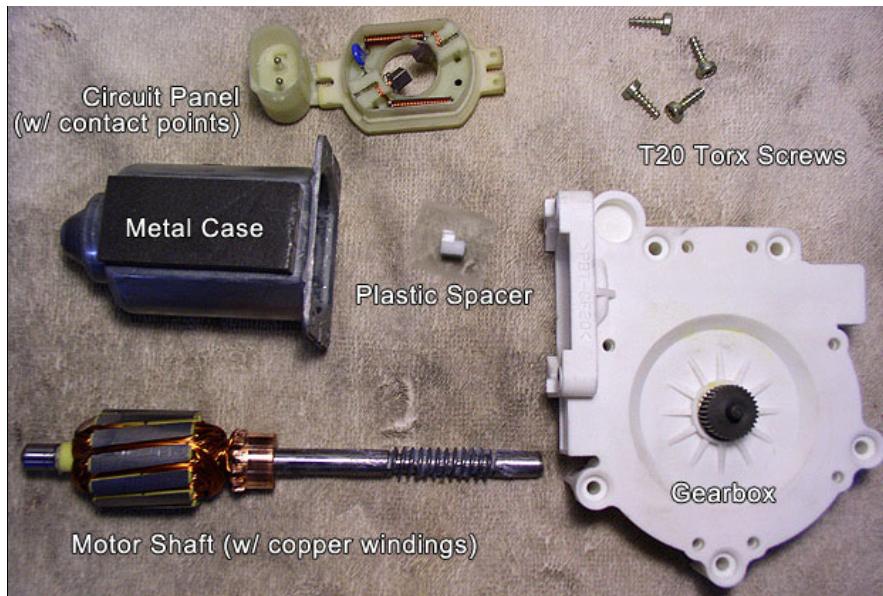
### The Problem Source

The problem resides inside the electric motor. And, I've discovered it's serviceable in place! A free fix! Only the door panel needs to be removed for access. (Some models may require the regulator be removed for access.)

For reference, the window motor is shown below:



It consists of two separable parts: 1) electric motor and, 2) mechanical gearbox. While the gearbox is attached to the window track/regulator mechanism, the electric motor is not. It's held to the gearbox by four T20 torx screws. Once separated, the motor's components are:



Inside the motor's metal case is the problem source: fouled contact points. These points are sometimes called "brushes" and are a common source of failure on electric motors. Specifically, the rotating copper contact area on the motor shaft becomes fouled with residue from the fixed contact points (brushes) as they wear down over time. Cleaning this area restores good contact and resolves the problem.

*NOTE: The same window motors are used on all '97-'03 BMW 5-series but with different regulator (lifter) assemblies. The only thing that matters is accessibility to the motor. If you can access the motor, it should be serviceable using the procedure below. If not, the regulator needs to be removed from the car to access the motor, but the repair procedure is still applicable.*

### Door Panel Considerations

Perhaps the most challenging aspect of this repair is removing the door panel undamaged. The panel is held in the upper door clips by trim which is very difficult to remove. *This is not mentioned in the Bentley manual.* In BMW parlance this trim is called the "waist rail trim strip" or "belt moulding". It must be pried up from the clips (with its attached weather strip) before panel removal.

The door panel's inner retaining form has a ridge which fits into slots on the upper door clips. If the panel is forced off the upper clips without first removing the trim, the panel retaining forms may separate from the panel and have to be glued back on prior to installation. This is a very, very common failure point on BMW door panels.

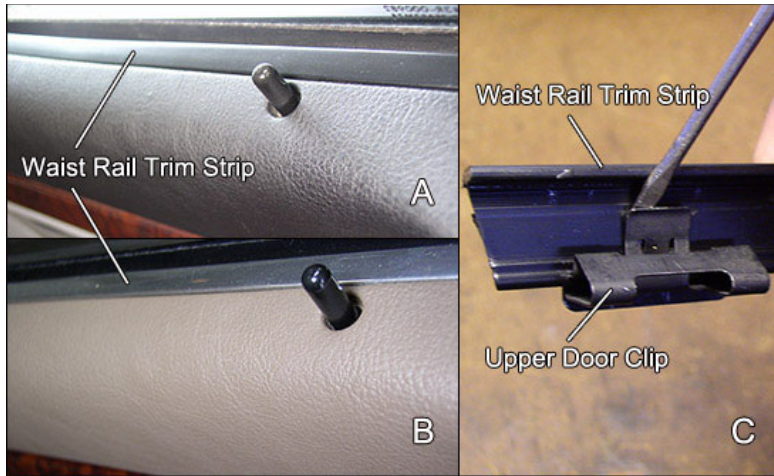
At the same time, the white plastic clips which hold the remainder of the panel to the door are easily broken during handling. You may want to have spares on hand. And while the door moisture barrier must also be removed, any door airbags can remain untouched.

## Procedure

### Door Panel Removal

Panel removal procedures vary slightly depending on front or rear location, and model year options. Review the Bentley manual for more specifics. The door window needs to be in the closed position. (Hopefully your window failed closed, otherwise the window glass needs to be removed for motor access.)

- 1) Pry up window switch and unplug. Remove torx screw from behind chrome door handle and remove handle or push inside panel. Pry out underside courtesy light and unplug.
- 2) Using a suitable pry tool between the panel and metal door, begin separating the lower three-quarters of the panel around the perimeter. The clips should release with an audible "pop".
- 3) Remove waist rail trim strip. Depending on your model, trim will be either black or chrome in color as shown in image panel A and B below:



Using a screwdriver or similar pry tool, insert between trim and top of door panel. Pry up using panel as a leverage surface. (You may want to place a protective cover on panel for protection.)

The upper door clips, which hold the trim strip, also hold the top of the panel to the door. If you can visually locate a clip beneath the trim, insert pry tool deeply into clip and twist (see image panel C above; clip removed for clarity), while prying upward on trim with a second screwdriver. In some cases the clips may come off the door with the trim. This is okay. Remember the weather strip is attached to the trim and should come off together. Grasping and pulling weather strip with pliers is not advised. But the same technique could be used on trim strip. However this will most likely mar the trim.

If the trim strip refuses to budge, you'll have to force the panel past the trim. This will likely damage the panel's inner retaining form which will need to be repaired before re-installation.

- 4) With the door panel now free, pull up and out to release panel from upper door clips while unplugging speaker wire.
- 5) Inspect removed door panel for damage.



Referencing the image above, check for separated inner retaining forms around upper clip area. If so, repair with a strong 2-part epoxy and allow panel to cure overnight. Using your fingers, squeeze the prongs of the white plastic retaining clips. If broken, replace clip. (Front door panels also use two yellow clips of longer length.)

- 6) Pull out and remove the black plastic moisture barrier covering the door access holes. Clean any sticky black goo off your fingers.

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### Window Motor Repair

- 1) The window motor should now be visible inside door:



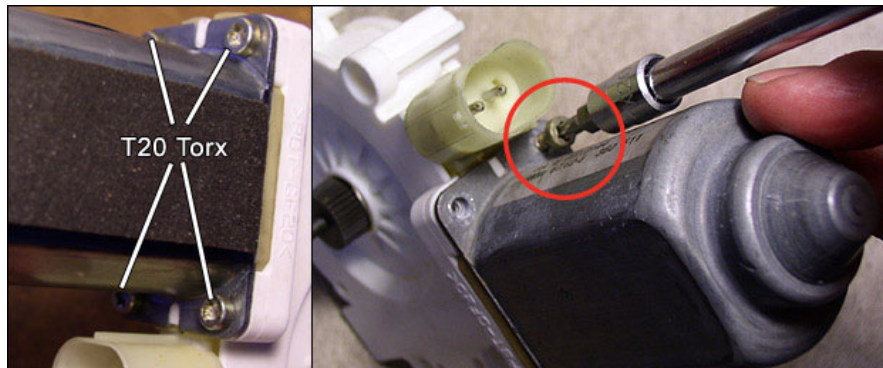


The motor will reside behind the regulator (lifter) assembly and therefore be partially obscured. The motor's white plastic gearbox is screwed to the cable drive in front, with an attached electric plug. Remember, your car's set-up will vary depending on model year and door. (530i right rear door shown above.)

The objective is to access the metal case protruding from behind the black regulator frame.

2) Unplug motor.

3) Remove the four T20 torx screws holding the motor's metal case to white gearbox. See image below (motor removed for clarity):

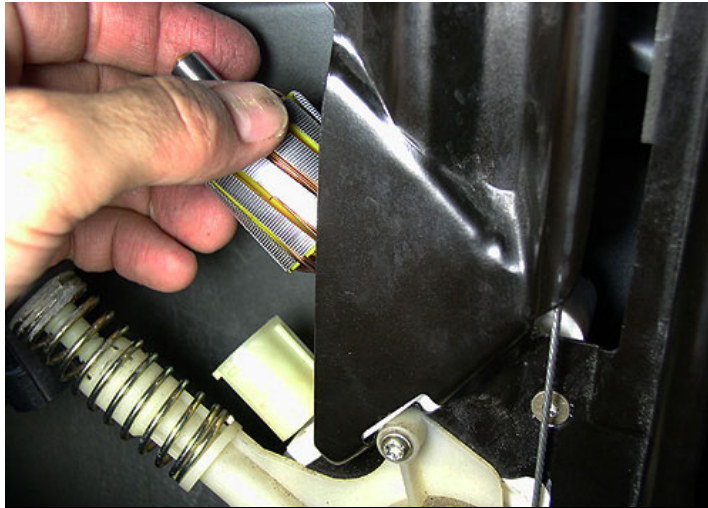


Visibility will be limited. Use an inspection mirror to help locate screws. Magnetize your torx driver to help prevent dropping screws as they're removed. If dropped, use tweezers to extract.

4) Pull metal case off motor. You will now see the motor shaft with its copper windings.

*Note which side of the metal case faces towards you. The case is the only part of the regulator/motor assembly that is NOT keyed for proper installation, and fits on the gearbox regardless of which side is visible. If re-installed "backwards", the magnets in the case will be 180 degrees out of phase, resulting in reversed motor operation. Ask me how I know!*

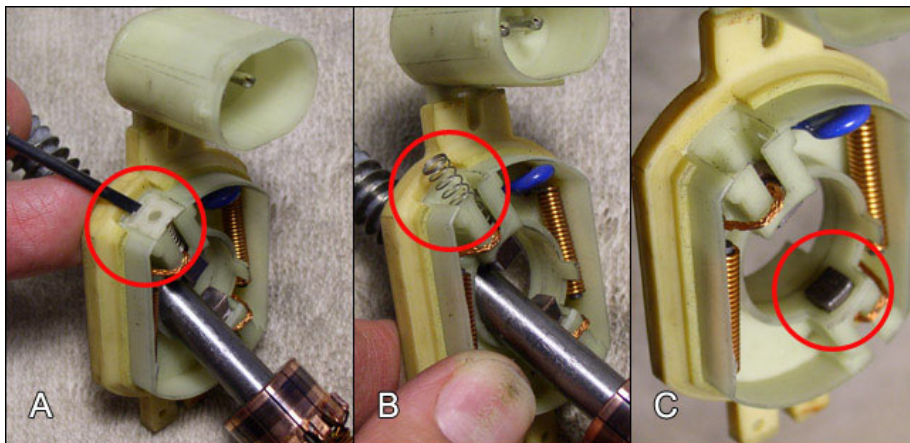
5) Pull out motor shaft with circuit panel.



With window closed, the gearbox will be under tension. Hand-turn motor shaft counter-clockwise about 3-4 revolutions to release tension. See image above. When motor shaft feels loose, wiggle and pull it free from gearbox, along with circuit panel -- which will probably hang on shaft as contact springs expand when shaft is extracted.

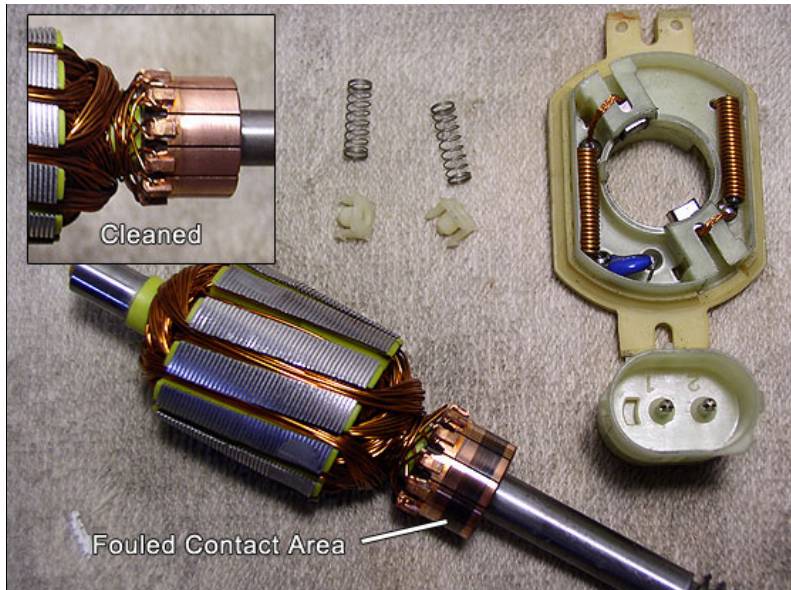
Locate the white plastic spacer if it has not come free with the motor shaft. An inspection mirror may help. If the spacer has fallen into the gearbox shaft, extract with tweezers. If spacer has remained seated in gearbox, leave it. Collect motor shaft, spacer (if loose), and circuit panel. Move to lighted workspace.

6) Remove circuit panel from motor shaft.



Using small screwdriver, pry out spring seats (panel A above). Remove springs (panel B above). With tweezers, push contact points back into their slots (panel C above). Slide panel off shaft.

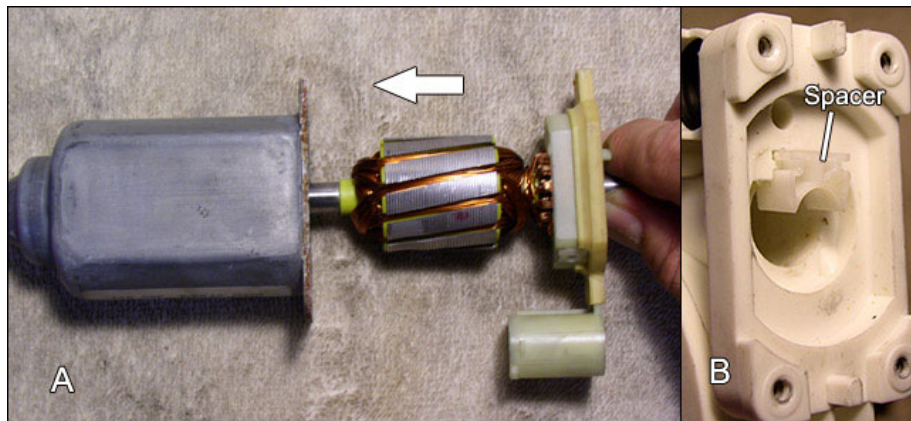
7) Inspect and clean shaft's copper contact area:



We've finally reached the heart of the problem. Using steel wool or equivalent, clean copper contact area on motor shaft. See image above. Clean also contact points on circuit panel and any other parts that contain dirt or dust. Done!

**8) Reassemble motor.**

Slide circuit panel over shaft, up to contact area. Hold circuit panel in place while inserting contact springs and seats. Then, slide shaft with panel into metal case until panel seats against case. Verify motor shaft is resting on its axis in the case and that the case is correctly oriented (see note in step 4). See image panel A below:



Use a piece of tape on the case's flat sides to temporarily hold the panel (and motor) to the case.

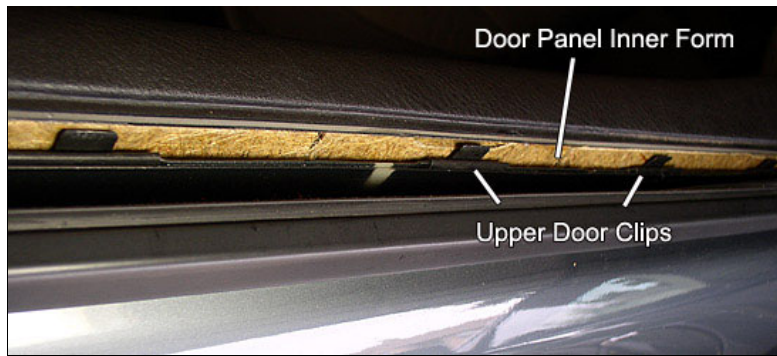
**9)** Insert plastic spacer back into its slot on gearbox. Use inspection mirror to verify its position. Spacer fits flush with long side pointing into gearbox. See image panel B above (spacer shown only partially inserted).

**10)** Insert motor with circuit panel (held with tape to case) back into gearbox. So as not to disturb spacer, align motor shaft as much as possible with gearbox. Insert straight in until back of circuit panel joins gearbox. Secure with screws. (Tape can remain in place.)

**11)** Re-connect motor plug and test window operation. (Have a beer!) Window motor should "re-learn" its travel limits when pressing the auto up/down feature. If not, hold switch in both full up and full down position for 5 seconds. See Bentley manual for more.

**12)** Re-attach door panel.





Re-attach door moisture barrier. Hold panel close to door and connect speaker wire; route window switch wire and underside courtesy light wire to their respective locations. Pull door handle thru.

Angle top of panel towards door and hang its inner form ridge from the slots in the upper clips. (You did glue the form back onto the panel, right?) See image above. Verify the center mounting clip is engaged by peering into the center of door from the side.

Working around perimeter of door, push in white door clips. Verify each clip aligns with its respective hole before applying force! Re-connect courtesy light and window switch. Secure handle with its torx screw.

Finally, install waist rail trim strip across top of panel by pushing downward, into the slots in the upper clips.

You're all done!

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