

Procedure for repair of damaged pixels in the instrument cluster of E39 5-series

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Before starting the removal of your instrument cluster I must dissuade anyone that has never worked with electronics from attempting this repair.

I will try to be the as precise as possible, but if questions arise on the procedure I recommend you stop and ask questions before proceeding.

PART 1: Disassembly

Begin with the removal of trim panels on the left and right sides of the steering column. These pieces can be removed by hand (or a small screwdriver with tape or cloth on the end) as they are only pressed in place. Next remove the frame to the odometer by removing the screws highlighted with yellow.



Once the screws have been removed, the frame can be tilted toward you (arrow direction) to remove it.



This picture shows the frame removed with two of the screw locations circled.



This picture shows the cluster being removed with the screw locations circled.



Once the cluster has been separated from the dash, there are several cables that need to be disconnected. The three connectors that need to be disconnected to fully remove the cluster are shown in the highlighted areas.



The odometer is now out of the car and Part 2 begins:



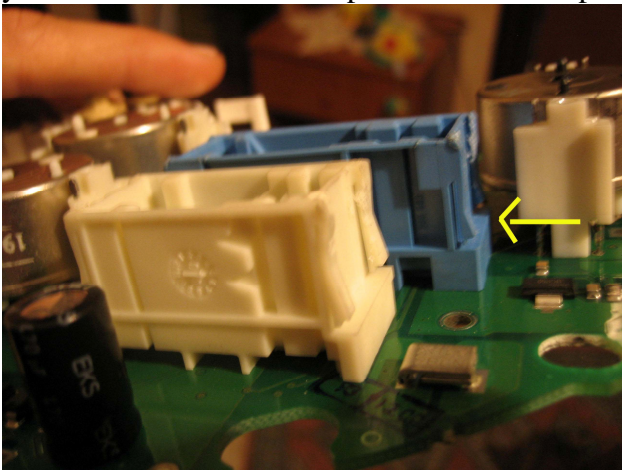
Part 2: Odometer Repair

Let's dive into the most complicated part of the procedure. The opening of the cluster!

To open the cluster assembly, it is necessary to separate 4 joints using a pair of pliers (joint locations are highlighted with the circles) which are all positioned on the back part of the cluster. This procedure is not difficult, but it requires some patience. The unhooking of two or three joints is a bit tricky. (Note also that the three connectors are boxed in yellow in this photo.) With a small screwdriver unhook the connectors that connect to the base (highlighted with the rectangle) and you remove the odometer from the back case. The connectors are mounted on the circuit board so the case slides over each of them.



This photo shows the retainer clip on one of the connectors after the back shell has been removed. The yellow arrow shows the clip that needs to be pushed in to allow the cover to slide over the connector,



Once the rear cover is removed, the front surround can be removed and the cluster assembly is revealed.

You now need to remove the screws on the face of the cluster- shown in the yellow circles.



You have in fact reached the most complicated part of the entire operation. Take off the gloves now! (Hey- you've gotten this far, why stop?)

Personally I recommend you work off of the photos provided so that you remember the correct positions. (Or take pictures of your own unit to remember orientation.) The dials for the speedo and tach have 'pins' that hold the dial at 'zero'- also the speedo and RPM drive have a 'hard stop' at this point, so reassembly will be easy to calibrate.

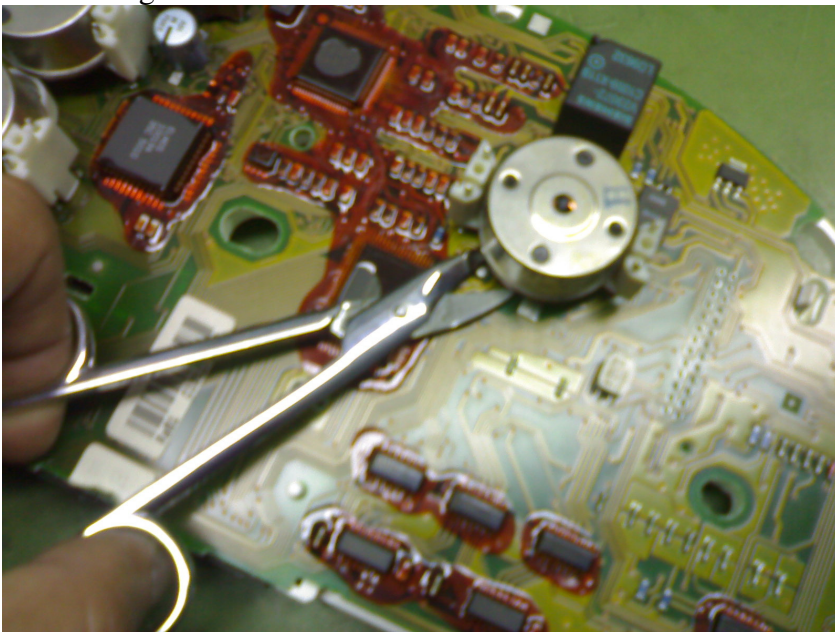
Unfortunately, the fuel and temperature gauges don't have a point of reference to use.

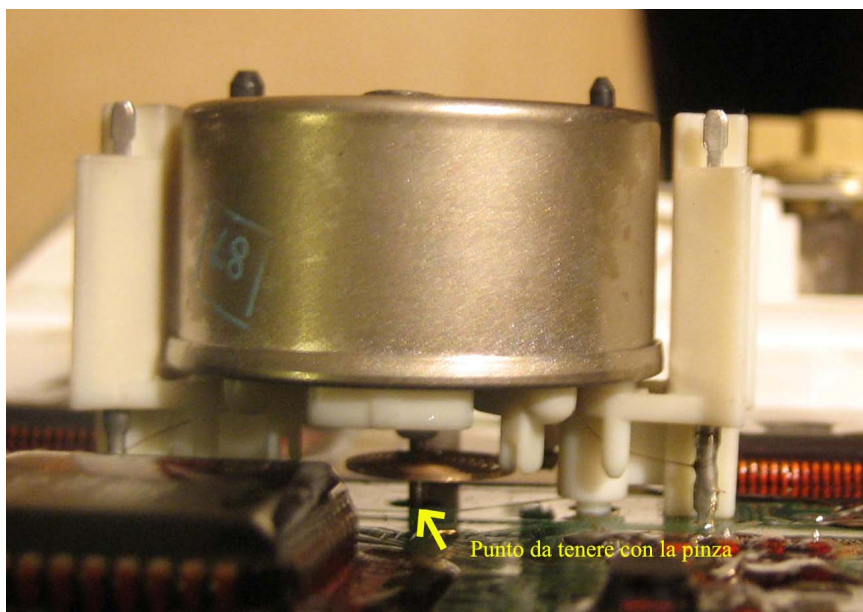
You need to remove the dials from the shafts that are attached to the electromagnetic drives on the circuit board. You must solidly grasp the drive pin or shaft when removing these.

You will need a very thin pair of pliers to be able to remove the metal pivot of the motor, be careful not to ruin the spring on the electromagnetic drive.

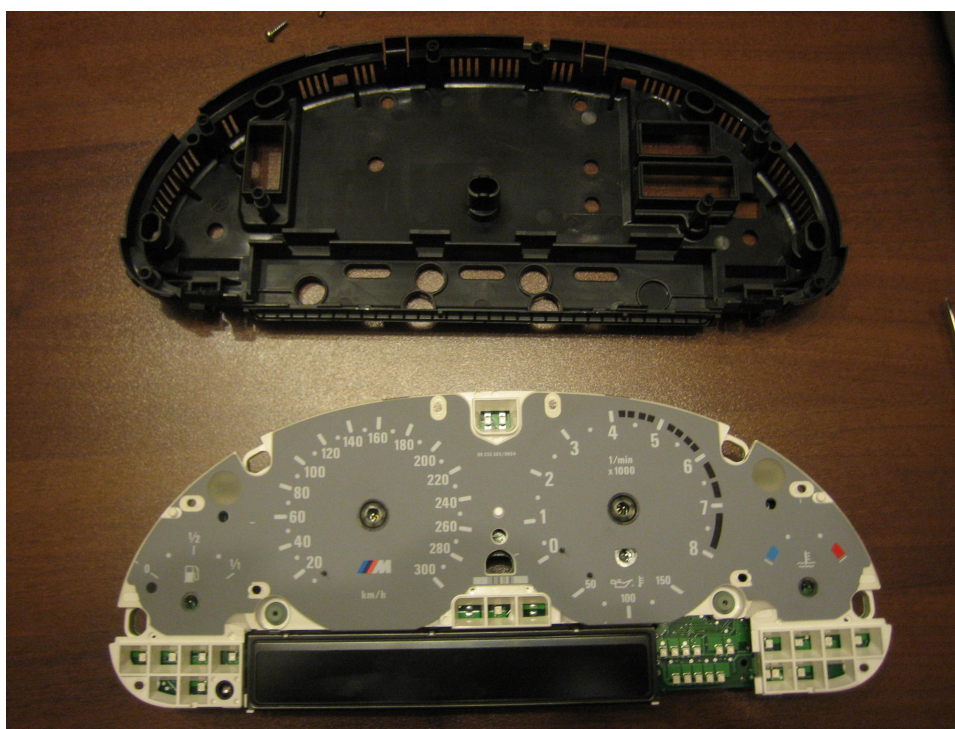
ATTENTION!!! DO NOT TRY TO REMOVE THE HAND/ARM WITHOUT FIRST REMOVING THE PIVOT OF THE MOTOR, YOU WILL END UP THROWING OUT THE HAND/ARM WITH EVERYTHING ELSE CAUSING DAMAGE TO THE PIVOT.

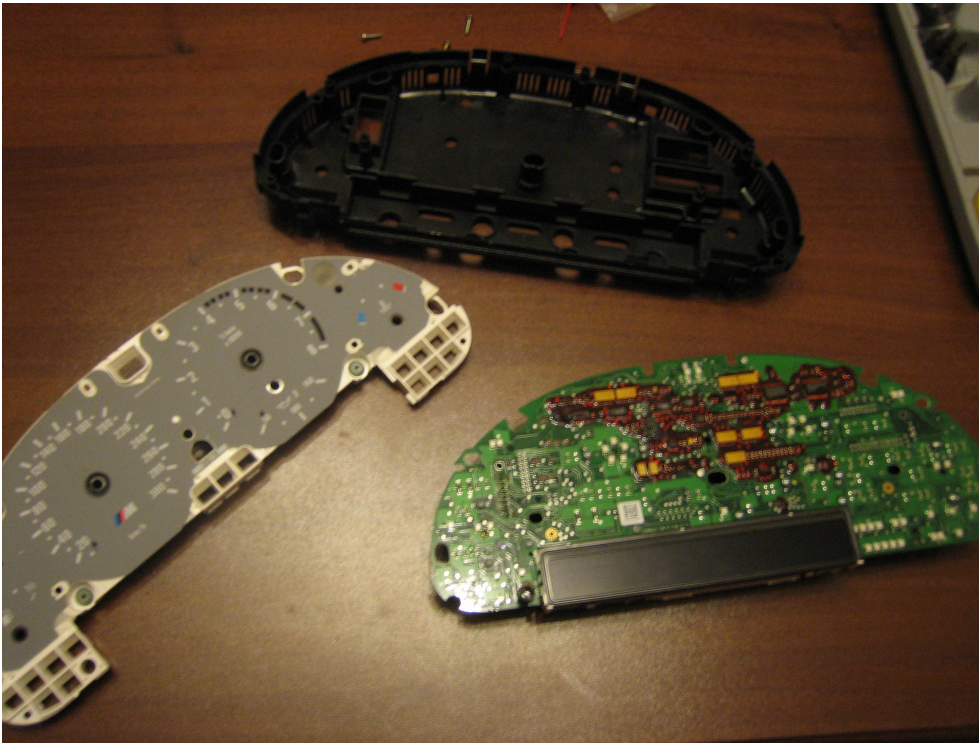
Once done put down the pliers and proceed by hand to firmly hold the circuit board and proceed to unthreading the motor from the stem.



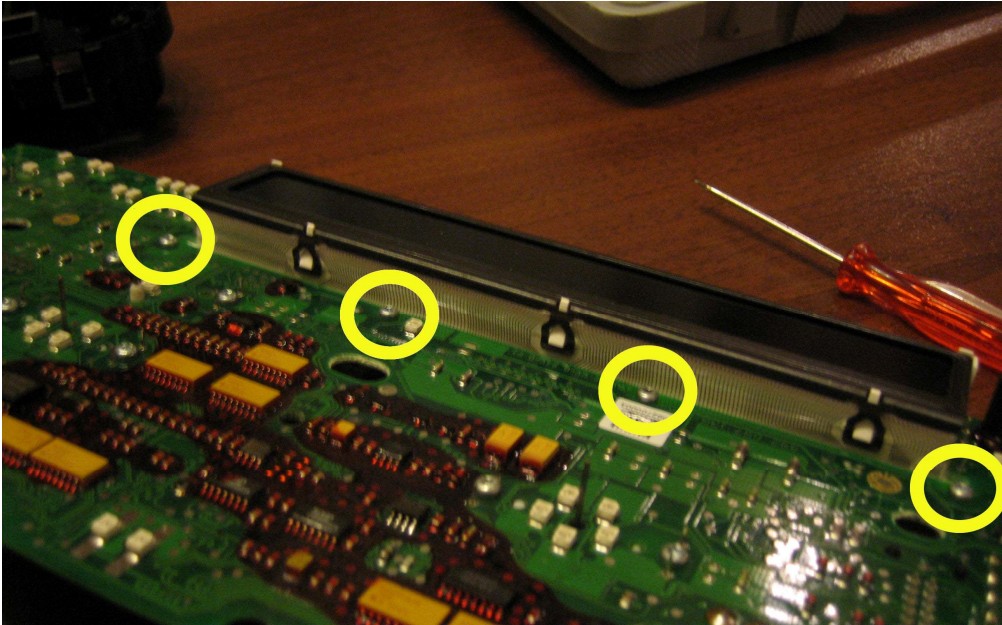


Translation?: Use the clamp on this point.

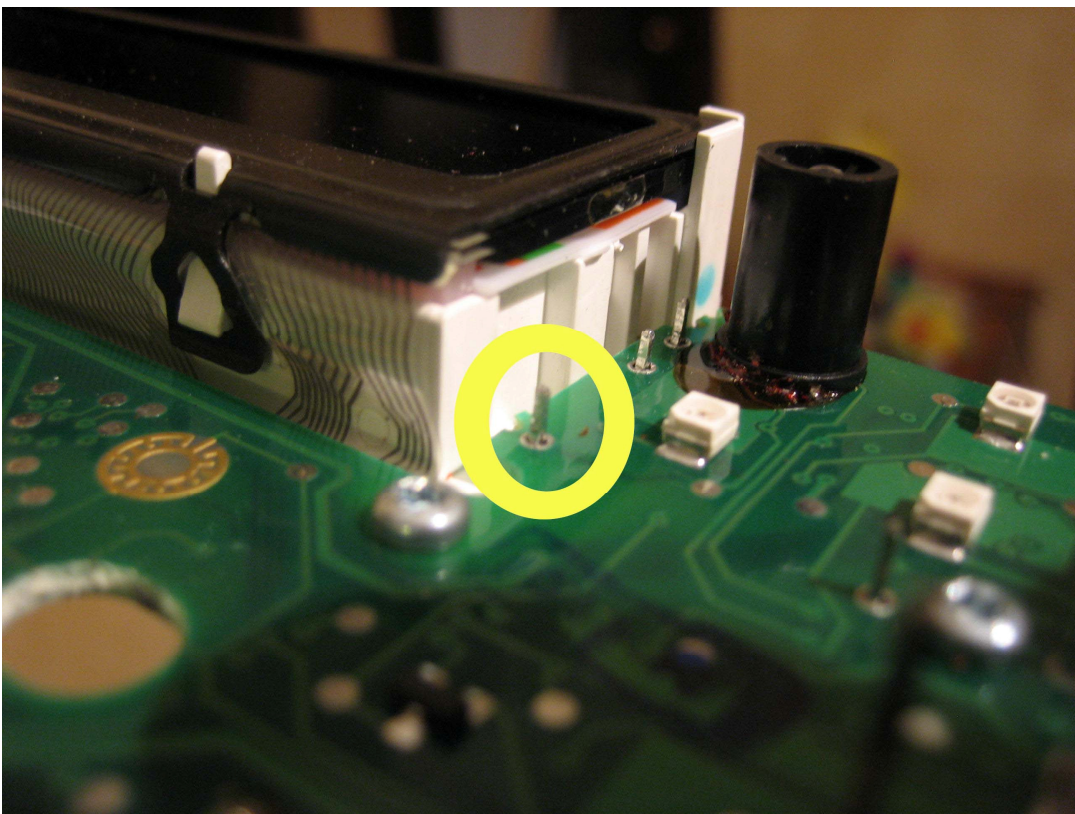




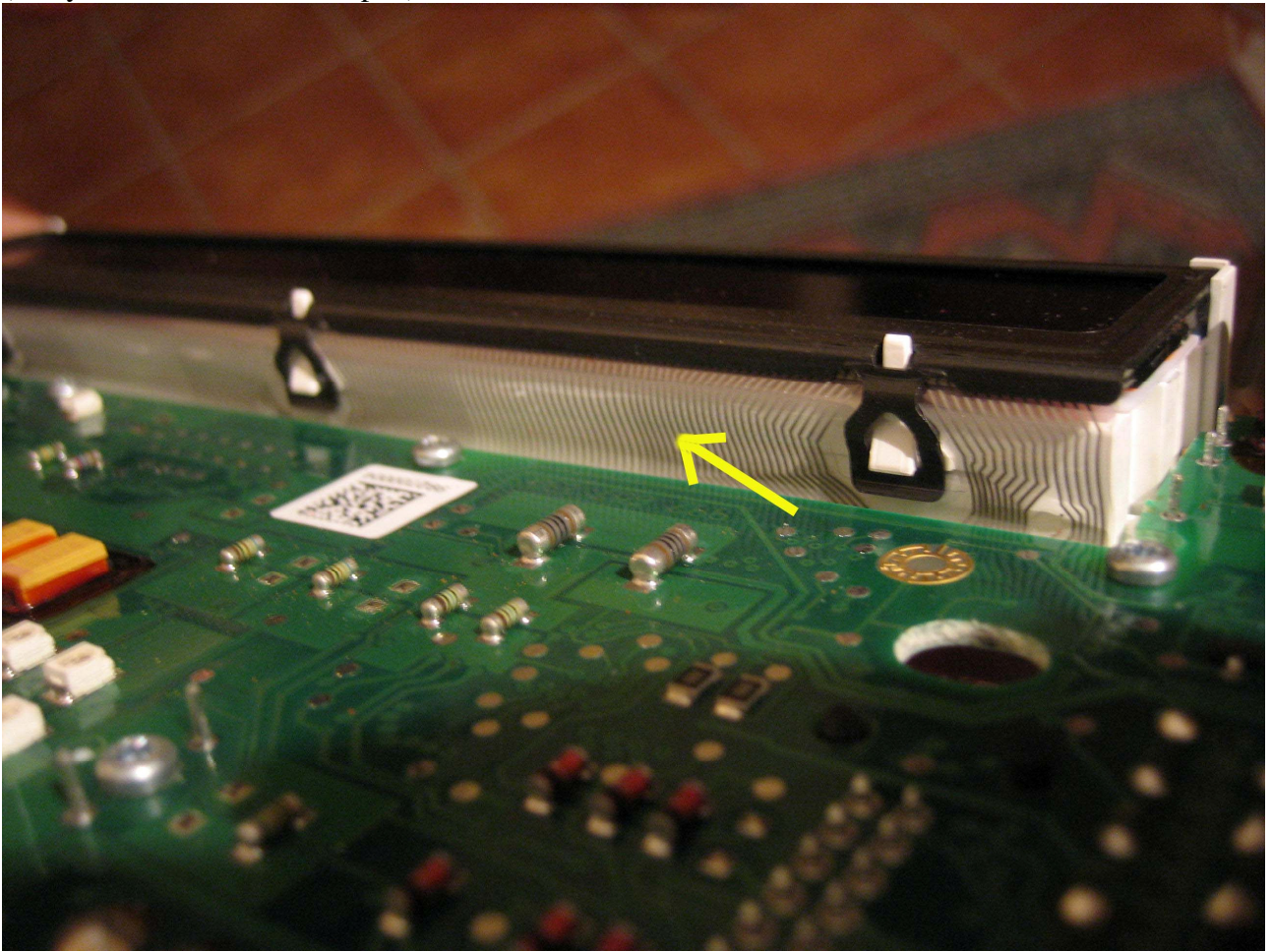
If you made it this far you have paid close attention. You will realize that the Pixel Display cover is attached to the board with screws and with four pins that are clipped around the base of the Display. These can be removed by applying pressure to disengage the clip. It may be necessary to use a pliers to reinstall. Apply pressure to get them to reconnect watching carefully not to cause damage.



[Editors Note: It is not sure how these pins connect to the display. It appears the display has individual 'sockets' for each pin]



Once the display cover is removed you will be able to see the famous filament that creates the defect!
(See yellow arrow, for example.)



Once here, use a soldering iron with the proper head to repair the filament(s)



It will be necessary for you to hold the soldering iron for a few seconds on the filament until it is attached again to repair the electric circuit.

Naturally it will be your job to figure out whether you need to repair the entire filament or to solder the base area on the circuit board. Visual inspection is key to determine how much repair is necessary to repair the electric circuit. Keep in mind that the position along the filament and contacts correspond to the underlying position of the pixels in the display, therefore if the pixel is not working the damaged filament that needs repair is directly behind that area and will need to be soldered.

Once completed and prior to reassembling of the odometer. I recommend that you reattach the circuit board to the connectors in the car and verify that you have correctly repaired the damaged pixel area(s). Repeat the soldering procedure if areas were repaired incorrectly or missed.

Display Circuit Board connected to car connections for test... Looks good



Part 3: Reassembly

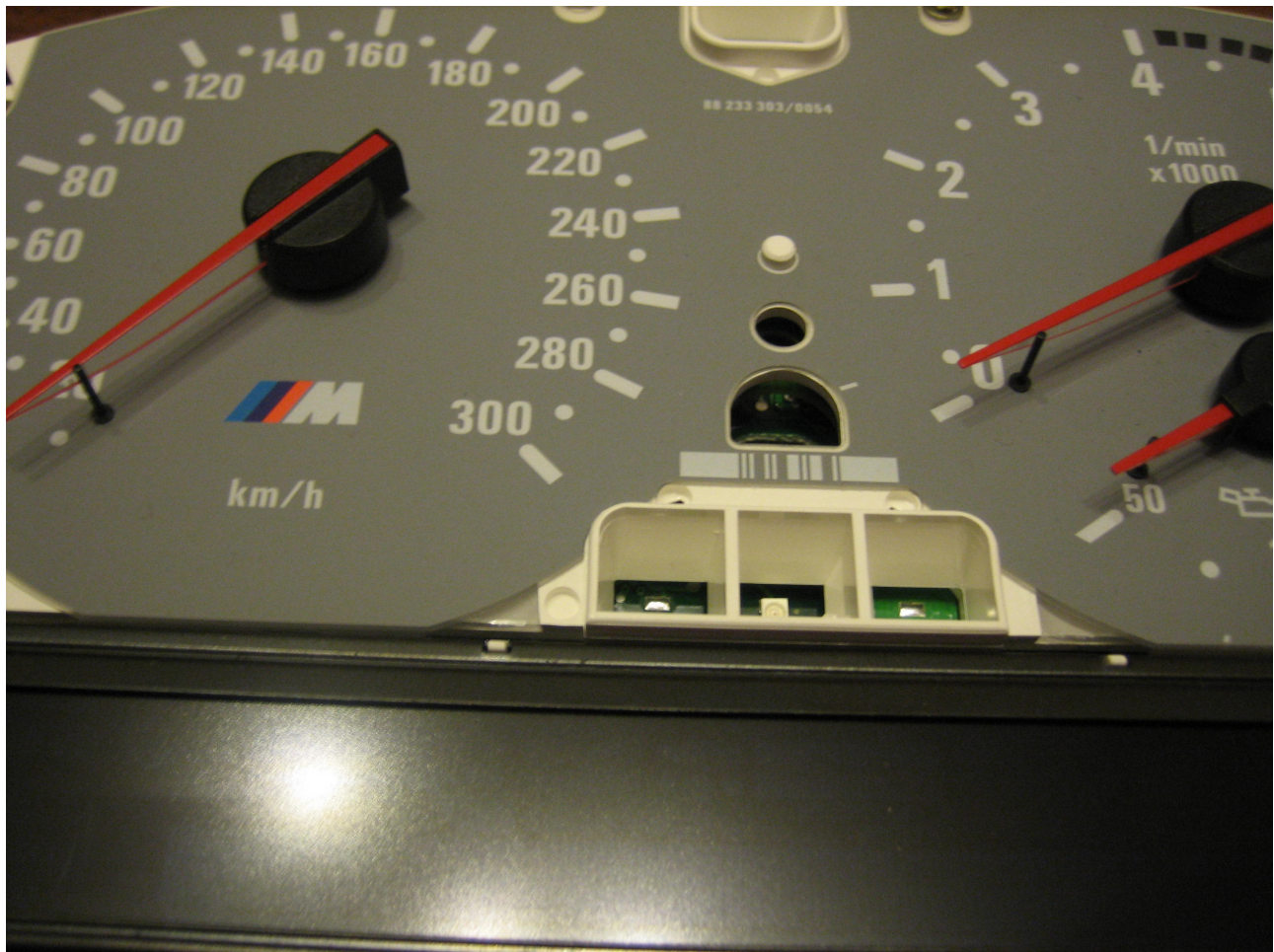
We reassemble the odometer.

You reassemble the odometer in the same order in which you have removed it.

To calibrate the hands use the photos below

The hands must be inserted in the following way:

You turn the motor (actually the electromagnetic drive) fully counterclockwise until it stops- this will be the 'zero' position for both the RPM and speedo (actually the dial will be at the stop when the motor shaft is fully counterclockwise).



The hands of the fuel and temperature gauges require more attention being the pivots don't have a stopping point. It is for this reason that following the procedure precisely and referencing the photos is key. [Editors note- you can add a small indelible mark to try and get these parts aligned on re-assembly.]

Another suggestion, relative to the temperature, only partly insert it before installing it completely. Then verify it is correctly placed in the car by driving the car and bring it up to temperature to check if the gauges are correctly centered and reading true to your speed, fuel level and temperature.

I hope I have succeeded in being clear and of some assistance to others with this problem.