



www.OdometerGears.com

BMW 6 Series (E24) Instrument Cluster Light Upgrade Odometer Gear Replacement

<http://www.z3bimmer.com/OffTopic/E24Bimmer/OdoGear/>

Cost: \$25 (plus shipping) each gear, \$3.00 for the bulbs

Pros: Fairly easy repair, Working odometer, Easier to see instruments

Cons: Delicate job, Working odometer (for areas where insurance cost is based in part on mileage)

Time: ~3 hours

Please read the first few steps carefully as these are our most common questions we receive after a client has performed a repair and the odometer still does not work.

The reason the original gear or gears have failed is that they are made of urethane and lubricated with petroleum grease. This combination breaks down the urethane into a waxy substance which flakes and breaks away. This will also leave a waxy film and deposits on the shafts, gears, housing and peg on the pods.

* Work smart, meaning have a clean area to work and the proper tools to perform the repair. General tools that will be needed depending on the vehicle are small standard screwdriver, small Phillips screwdriver, assortment of torx drivers, diagonal cutters (dikes), 1/4" socket set are just a few of the items that may be needed.

* No grease is needed with the new gears. Our gears are made using Celcon® which has graphite mixed into the material and does not require any additional lubricant.

* For VDO and MotoMeter units: the E1 gear is the gear that attaches to the stepper motor that drives the odometer. The original gear material would not allow the gear to hold firmly to the shaft and turn the odometer. This is why they molded the gear around the brass bushing. You need to remove this bushing in order to install the new gear. **(You are going to deform the bushing so that it can be removed. Wear safety glasses because the bushing can break and fly off)** With side cutters (dikes, wire cutters), squeeze brass fitting where small gear was across the diameter with a firm handshake grip. Then turn the shaft two clicks and repeat with a firm handshake grip. Put the tool down and remove the brass bushing with fingers. If it does not remove with your fingers, repeat using the side cutters until it comes off. **DO NOT USE ANY TOOLS** to pull the brass bushing off as this could damage the motor.

* Make sure that you have blown the speedometer and odometer assembly clean with high pressure compressed air. **Even if you think that you have found all of the broken pieces you still need to perform this step.**

* Wipe the area around the gears, any shaft or shafts that the gears may ride on, the motor shaft and the peg on the pod that the small gear spins on clean, using a clean cloth and rubbing alcohol. Any residue left over from the old gears can allow the new gears to stick and not allow the odometer to work.

A very common problem in the BMW 635CSi is the breaking of the plastic gears in the instrument cluster. The most likely culprit of this would be gears made of a material not able to hold up to the temperature changes the poorly- insulated instrument pod might be subjected. After 15 plus years, the gears can become brittle. A trip meter and the odometer which has ceased recording mileage is a symptom of broken odometer gears. Most owners report their odometer fails after they reset the trip meter - particularly if the car is moving. Both of these

actions - and in particular the latter - put a greater amount of stress on the gears than any other time, thus causing the brittle gears to break.

After determining which gear I needed, I ordered the replacement gear from <http://members.ispwest.com/jkcaplan/gearwebpage/gear.html> (please tell them Z3Bimmer.com sent you). They have reproduced gears made from a stronger, more heat tolerant resin material. The gears are produced using molds cast from OEM gears. I only ordered the one smaller gear (called E1). One of these days I may buy and replace the other 2 gears just so I won't have to worry about them breaking.

These procedures are based on my 1985 635CSiA with an **M** style steering wheel and no airbag. I don't have enough experience with other years and variations of the 635 to determine how many variances you might experience applying these procedures to your car.

If you have the original dim 3w instrument cluster light bulbs, replacing them with a set of 5w bulb will make the instruments much easier to read at night. I used a pair of Sylvania 2825 European Lamps. I understand the Sylvania 168 will also work.

Some say it isn't necessary to remove the steering wheel. I did it simply because without an airbag, it is very easy to do and gets it out of your way. If you decide not to remove the steering wheel, simply skip this and the next step.

Using a bladed screwdriver





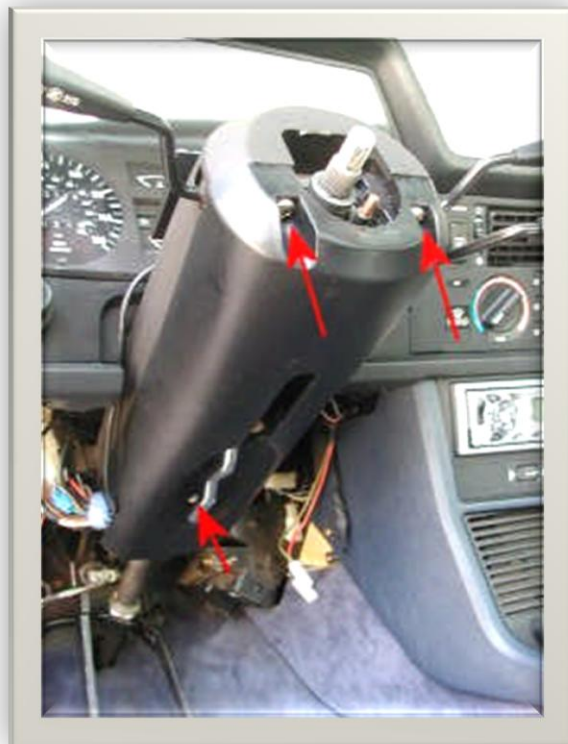
Using a 22mm socket with a 3 inch or more extension, remove the steering wheel nut. Before removing the steering wheel, note the V shaped mark etched on the spindle, and the line etched on the steering wheel adjacent to the hole. These are the reference points for properly installing the steering wheel. Remove the nut and the steering wheel from the spindle.



Remove 4 screws to remove the knee panel.



Remove the connectors and vacuum hose from the knee panel mounted equipment. Note where they came from...or take pictures beforehand.



Loosen the steering column lever to gain access to and remove 3 screws holding the bottom steering column cover.



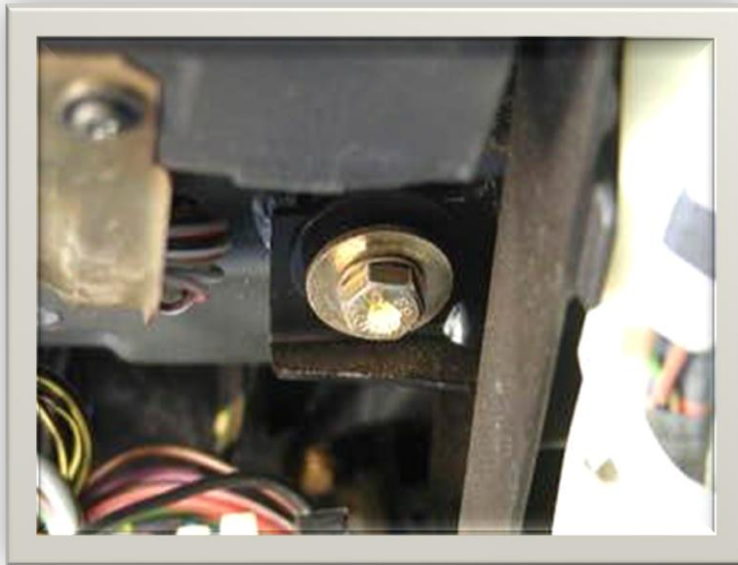
Using a thin bladed screw driver, carefully pry the bottom of the check panel cover out. The check panel cover is held in place with 2 tabs at the top. Do not try to pry the cover off from the top.



Remove 3 screws holding the check panel module in place.



Carefully pull the module out so that the connector to the cable bundle at the back of the check panel module is accessible. Carefully disconnect the wire bundle connector and set the check panel module aside in a safe place.



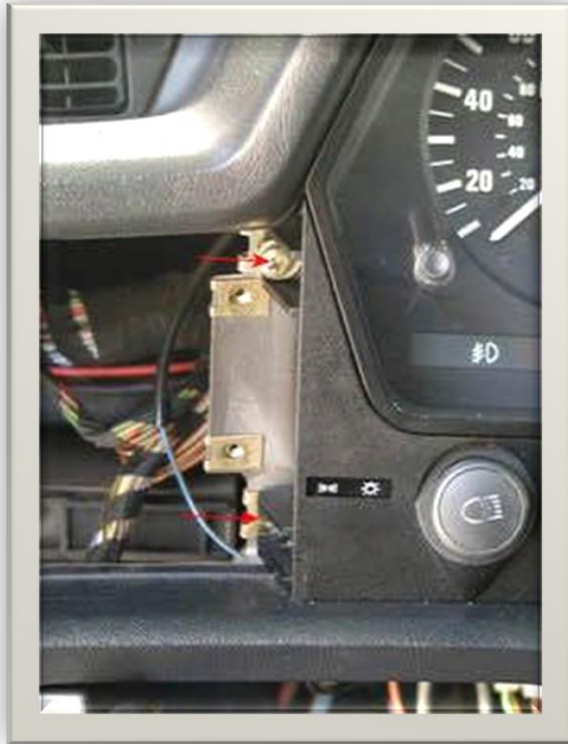
Use a 13mm socket wrench to remove 2 bolts on either side of the steering column. These hold the steering column in place. When removing the second bolt, support the steering column and gently lower it until it rests in place.



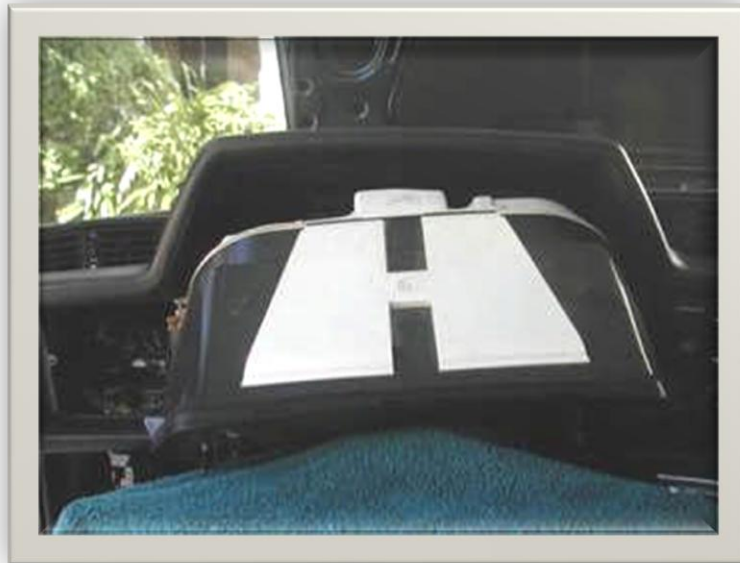
Using a thin bladed screw driver, carefully pry loose the molding to the right of the instrument cluster.



Remove the 2 right side instrument cluster mounting screws.



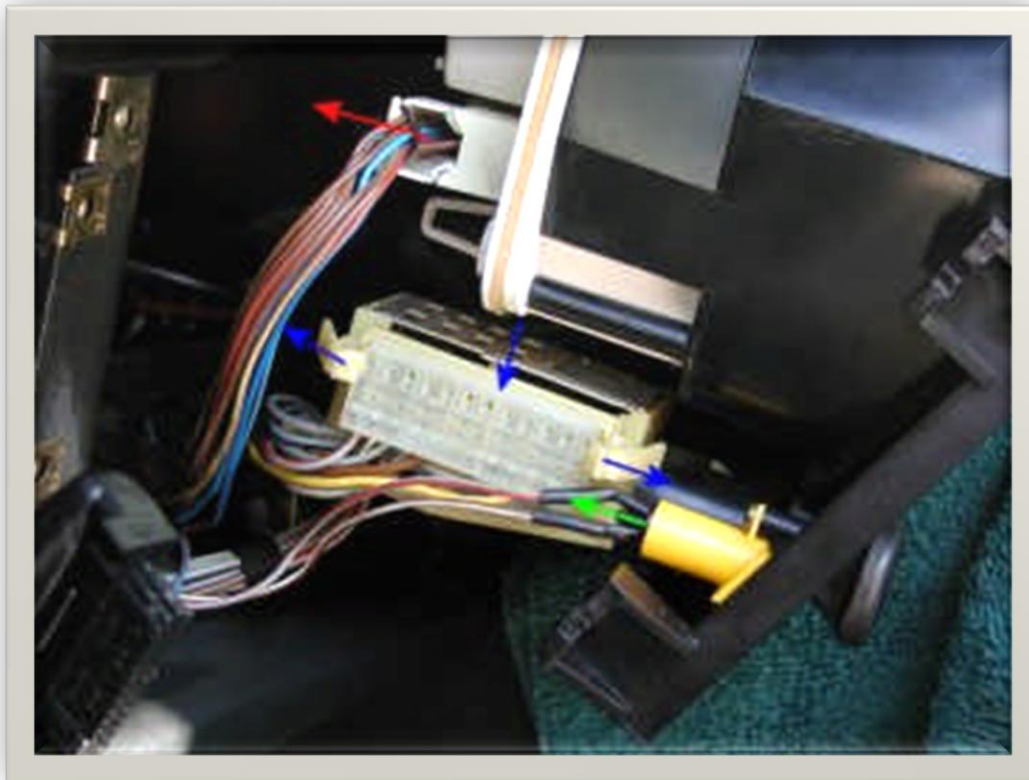
Remove the 2 left side instrument cluster mounting screws.



Place a thick towel or other padded covering over the top of the steering column. Gently pull the instrument cluster out to lay face down on the top of the steering column.



Remove the fog light switch light bulb by pulling the bulb straight out of the yellow holder.



Remove the head light switch light bulb by pulling the bulb straight out of the yellow holder (green arrow).

While spreading the 2 locking tabs, disconnect the headlight wire bundle connector (blue arrow). Be careful to pull the connector straight out and to not break the connector.

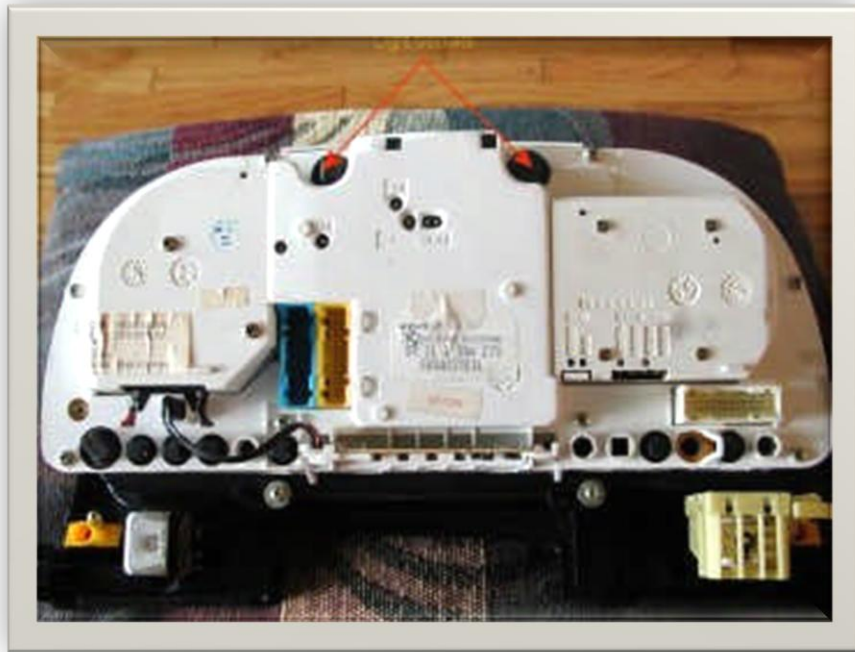
Disconnect the speedometer wire bundle (red arrow). Be careful to pull the connector straight out and to not break the connector.



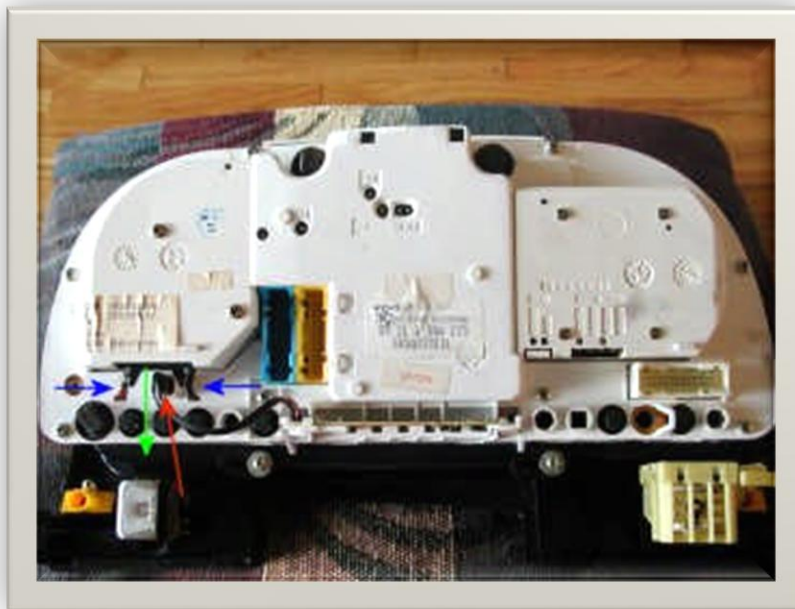
Disconnect the odometer wires (red arrows), the main SI board bundle connector (blue arrow), and the Gas/Temp gauge bundle connectors (green arrow). Connectors should be disconnected in the direction of the arrows. Be careful to pull the connector straight out and to not break the connector.



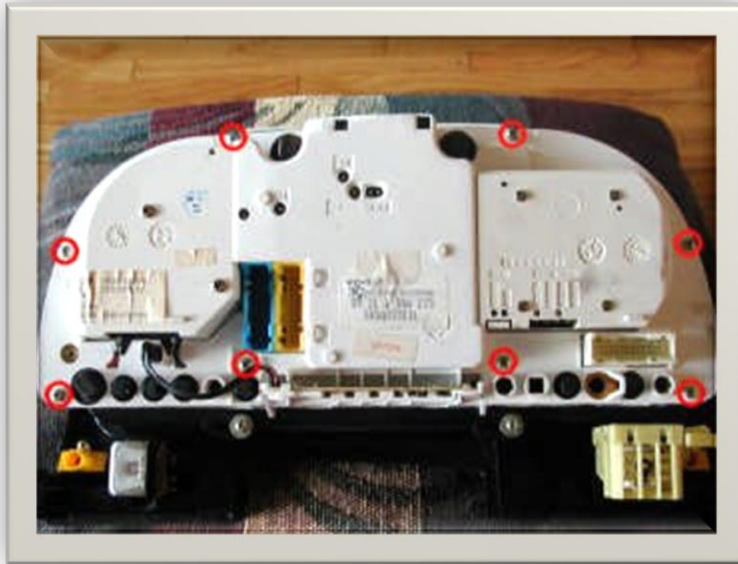
Disconnect the fog light switch wires (red arrows) and the Anti-Lock instrument bulb (green arrow). Be careful to pull the connector straight out and to not break the connector. After these connectors are disconnected, the instrument cluster will be freed.



Lay the instrument cluster face down on a soft, well padded surface. A throw pillow works nicely. If you are changing the instrument cluster light bulbs, this is the time to do it. Remove the two bulb sockets by turning the socket left 90 degrees to unlock it. You can use a 5/6 open end wrench to turn the socket. Simply slide the old bulb out of the socket and replace with the new one. Lock the bulb and socket back in place. I also took this opportunity to remove the other bulbs (along the bottom of the cluster) and clean them. Over the years, they had accumulated a layer of dirt. After cleaning the bulbs, they too were noticeably brighter.



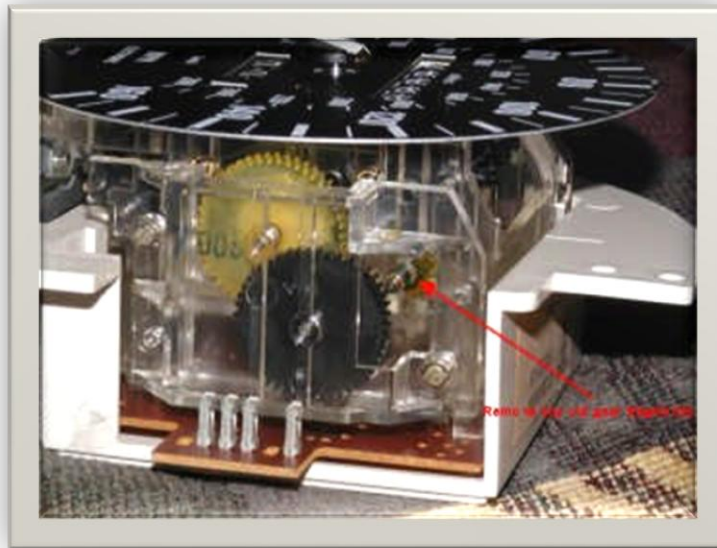
If you will be removing the tachometer for some reason, you will need to: Remove the real-time mileage gauge wire (red arrow)
Press the tachometer locking tabs in the direction of the blue arrows, and remove the locking key by pulling in the direction of the green arrow.



Remove the 8 instrument cluster screws. Gently pull the instrument cluster electronics straight up and out of the body. Set the body and the pillow aside.



Lay the cluster assembly face up on a sturdy surface. The speedometer is attached to the circuit board by a pin connector on the circuit board. At the points indicated, gently rock, lift and disconnect the speedometer from the circuit board. Be especially careful not to touch and damage the instrument needles. They are easily bent. Set the remainder of the instrument assembly aside where it cannot get damaged.



Inspect the gears on the right side of the speedometer. It is advisable to replace the first three gears as they will all fail.

*First remove the clear cover

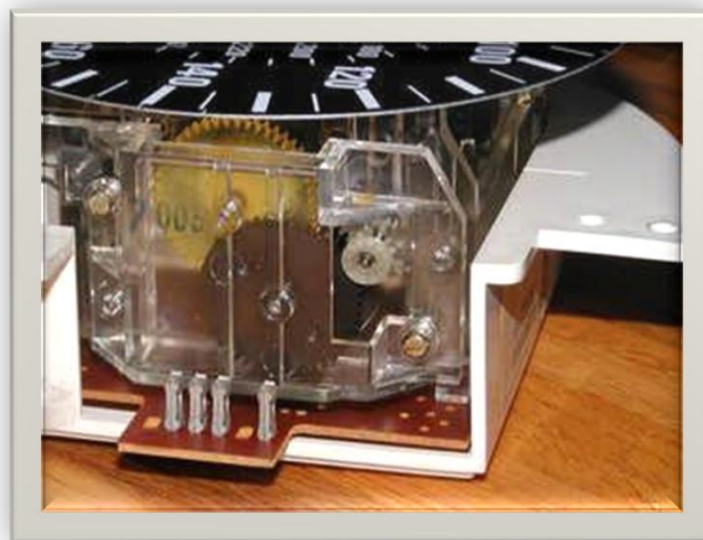
*Remove all of the gears

*Pull the two shafts out with pliers that the larger gears were on

!!!!Do **NOT** try and remove the shaft that the twelve tooth drive gear is located on as this will damage the motor!!!!

*First remove and put aside the four rubber spacers that are on the rear of the speedometer circuit board. Blow everything out with high pressure compressed air. You cannot use too much pressure. Use the air throughout the unit. Any small pieces of the old gear can disable the odometer as the motor is not very strong. After using the compressed air inspect the unit for any stray pieces.

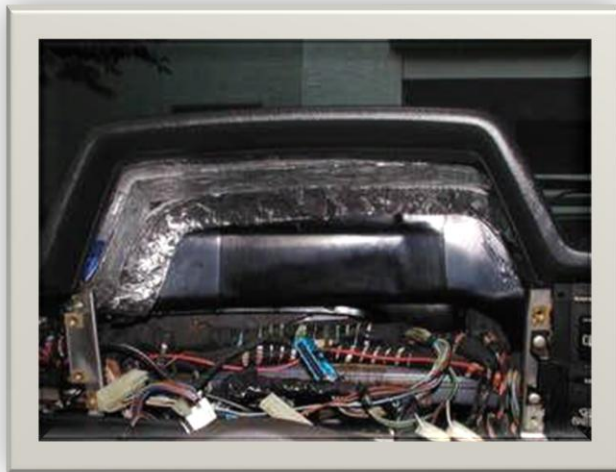
*Wipe clean all areas where the gears sit: plastic cover, housing, metal shafts, plastic original gear that is not replaced. Any residue that is left from the old gears and grease can cause the new gears to stick and not work properly.





Brass gear that needs to be removed and discarded

* (You are going to deform the bushing so that it can be removed. **Wear safety glasses because the bushing can break and fly off**) with side cutters (dikes, wire cutters), squeeze brass fitting where small gear was, across the diameter with a firm handshake grip. Then turn the shaft two clicks and repeat with a firm handshake grip. Put the tool down and remove the brass bushing with fingers. If it does not remove with your fingers, repeat using the side cutters until it comes off. **DO NOT USE ANY TOOLS** to pull the brass bushing off as this could damage the motor. You do not need this bushing with the new gear. Press the new gear on starting with the larger side of the hole in the middle of the new gear using your fingers, Hold the motor side cover while pressing on the new gear. Only press the new gear on to where the top of the shaft and the top of the gear meet. There should be a small amount of up and down movement of the shaft, this has to be there.



Reassemble and reinstall the instrument cluster in reverse order of disassembly. One of the reasons for the breaking of the odometer gears is in part because of the material of the gears, but also because the dash under which the instrument cluster is mounted is not isolated at all. Exposure to sun and cold contributes to making the gears brittle. Before remounting my cluster, I lined the underneath of the dash with insulation material to help protect the instrument cluster from the Sandy Eggo heat.