Please give credit where credit is due! These DIY's were completed ENTIRELY by Gary Thompson, Ph.D. Please make sure to say thanks to Gary, and if you ever see him at a bar, buy em a beer. These DIY's are more complete than anything Bentley has ever written!!

PLEASE ALSO NOTE : GARY HAS ABSOLUTELY NO AFFILIATION WITH GRUVENPARTS.COM !!! DO NOT CONTACT HIM DIRECTLY CONCERNING ANY PARTS SOLD ON THIS WEBSITE. HE HAS MERELY GIVEN PERMISSION FOR ME TO MIRROR HIS GREAT WRITE UPS FOR YOUR BENEFIT.

Please also DO NOT COPY AND PASTE THESE DIY's to another website without first getting approval from either GruvenParts.com or Gary!! He worked hard on all this stuff so you dont waste time trying to learn it on your own. He is VERY generous, but he deserves your asking him before you start posting this stuff on your own website!

Please also note that these DIY's are to be used for REFERENCE ONLY. While Gary has probably forgotten more about VW's than the rest of us will ever learn in our lifetime, neither he nor me are responsible if you screw something up. Bottom line - dont touch your car if you dont know what you are doing.

The replacement intake manifold rod bushings can be purchased from www.GruvenParts.com.

REPLACING THE SHIFTER ROD ON A MKIV 12V VR6

The following procedure describes how to replace the shifter rod on a MKIV 12v VR6. The shifter rod, whose real name is the intake manifold rotary change-over valve, is a long, 6-holed cylinder in the upper intake manifold that rotates 90° at certain RPMs to maximize torque and horsepower in a given RPM range by switching between long and short intake runners. The change-over valve is more commonly known as the 'shifter rod', probably because VW lists the part as the 'shiftrod' in their parts database. A picture of the shifter rod can be seen below.

The OEM shifter rod has a serious flaw in that the bushings that are used to keep the rod tight inside the manifold wear prematurely and cause the rod to rattle significantly somewhere between 2500 and 4000 RPMs. When the rattle is bad enough, you can hear it inside the cabin of the car while driving and is loud enough to drive you nuts! To eliminate the rattle, you need to either (1) install a new OEM shifter rod (which comes with new OEM bushings) or (2) install a set of Paul's redesigned aftermarket bushings (www.gruvenparts.com) on your existing, compatible shifter rod (it must be the newer version of the rod, VW Part# 021 133 653 - if you have the older version of the rod, VW Part# 021 133 697 A, then you need to buy a new OEM rod to use Paul's bushings). This DIY will explain how to perform both of the above solutions.

Note: If you want to know more about how the shifter rod works, check out 'DEMYSTIFYING THE SHIFTER ROD - WHAT IT IS, HOW IT WORKS AND WHAT GOES WRONG' (this is still in the works - a link will be posted when it's done).

The procedure below is based on a '99.5 Jetta GLS VR6, but should be applicable to all MKIV VR6s.

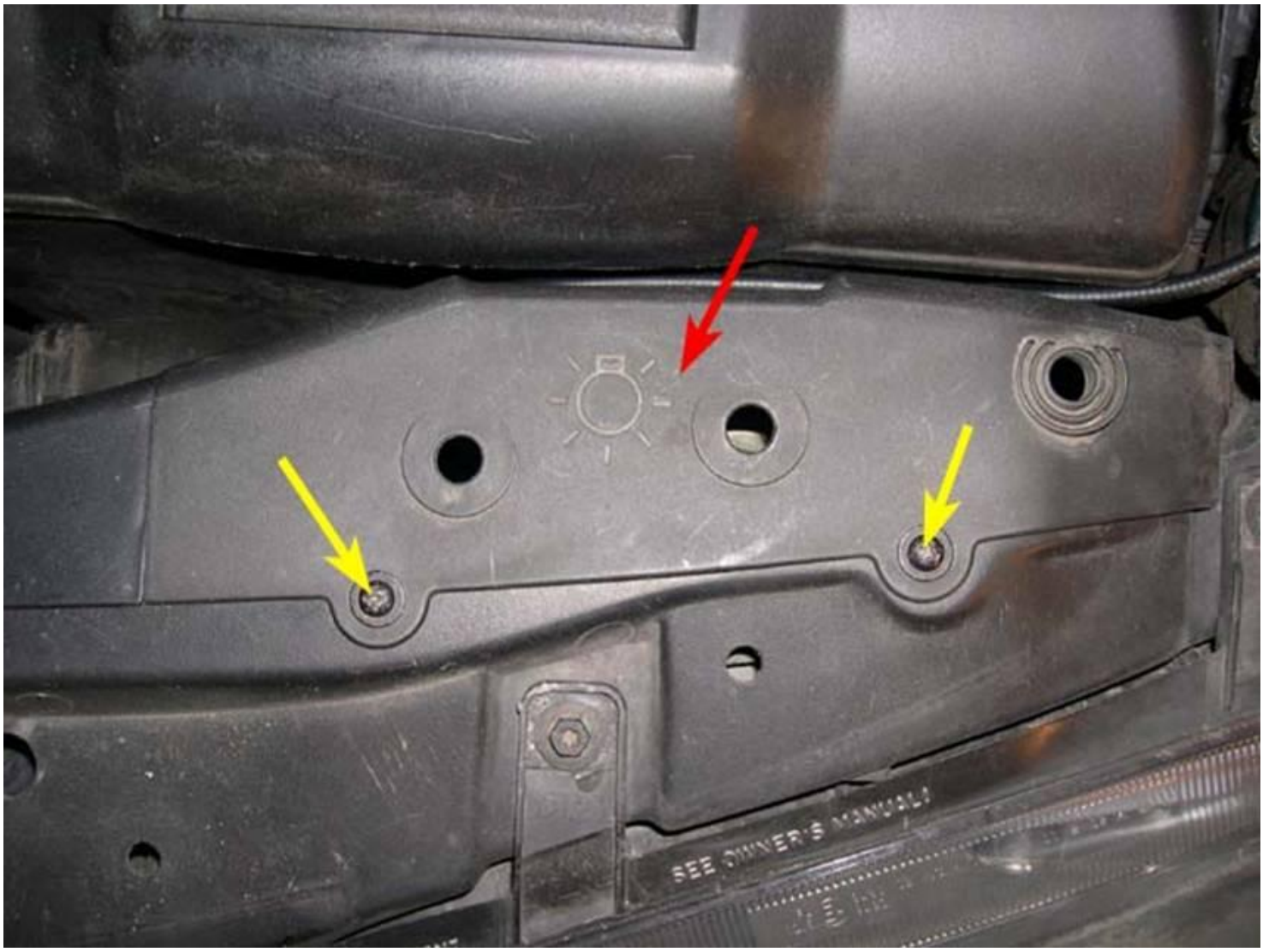
To replace the shifter rod, the following items are required:

- Phillips screwdriver
- T30 Torx screwdriver or wrench
- Large and small flat-blade screwdrivers

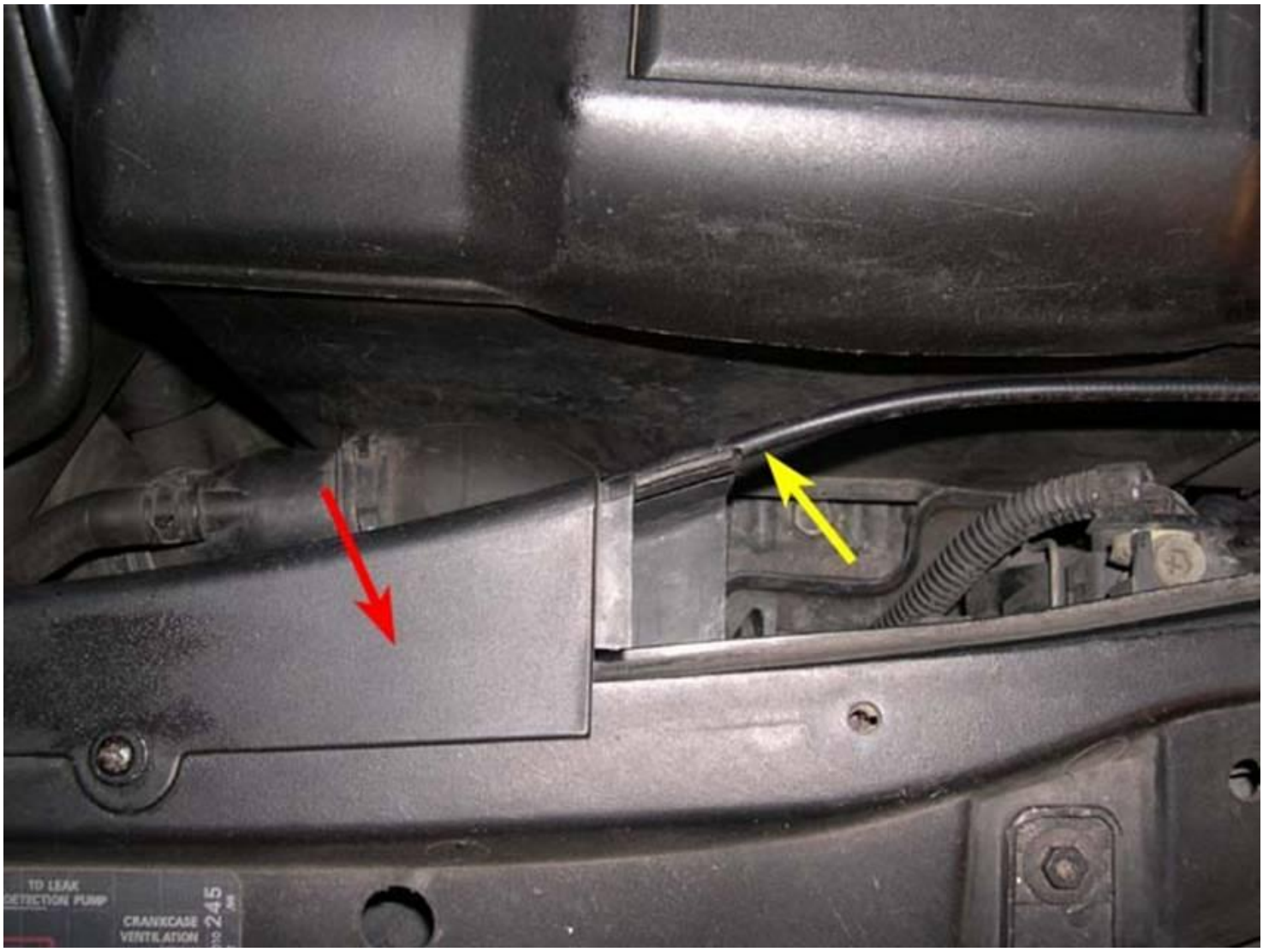
REMOVING THE SHIFTER ROD:

1. The shifter rod is located in the top, front section of the upper intake manifold, just to the left (passenger's side) of the VW insignia and to the front of the VR6 logo on the engine cover, as indicated by the yellow area in the picture below.

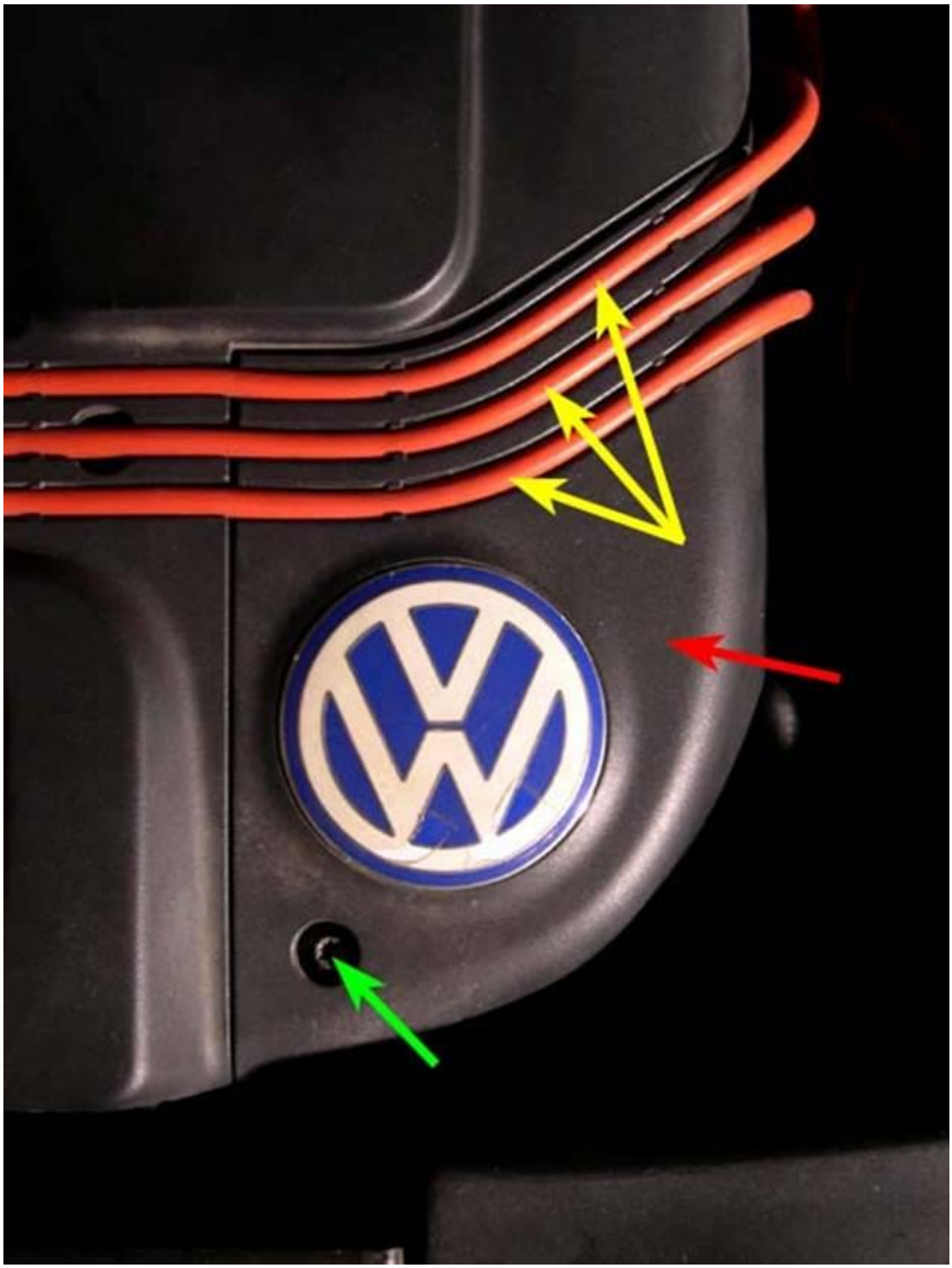
2. Remove the trim piece behind the driver's side headlight (actually part of the stock intake) by removing the two (2) Philips screws (yellow arrows in picture below) and pulling straight up on the trim piece (red arrow).



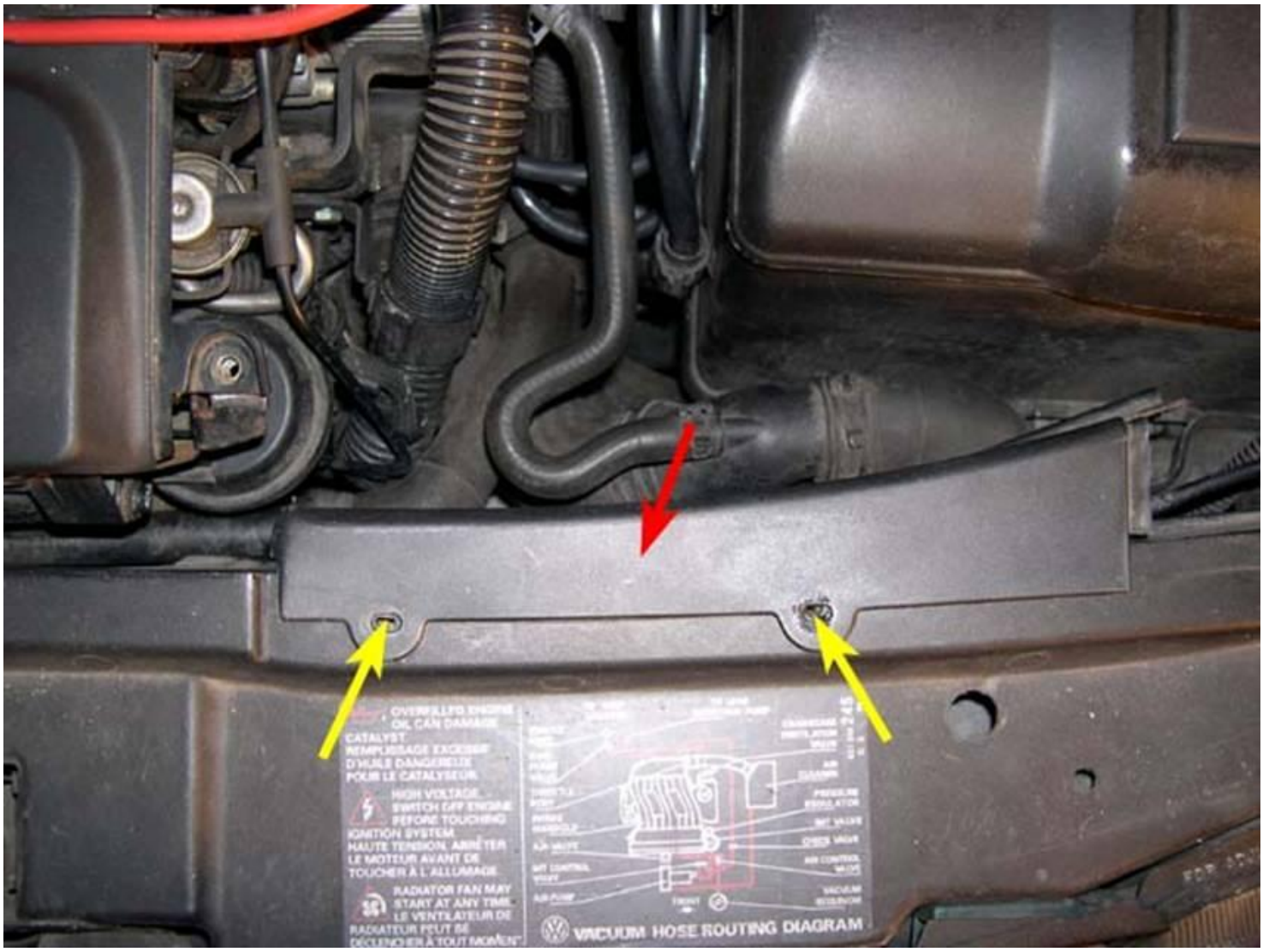
3. Pop the hood release cable (yellow arrow) out of its groove in the trim piece (also part of the stock intake) marked by the red arrow in the picture below.



4. Carefully pop the spark plug wires (yellow arrows in picture below) out of their grooves in the small engine cover (red arrow), remove the one (1) T30 screw (green arrow) and remove the engine cover piece (some wiggling may be necessary to get it out from under the wires).

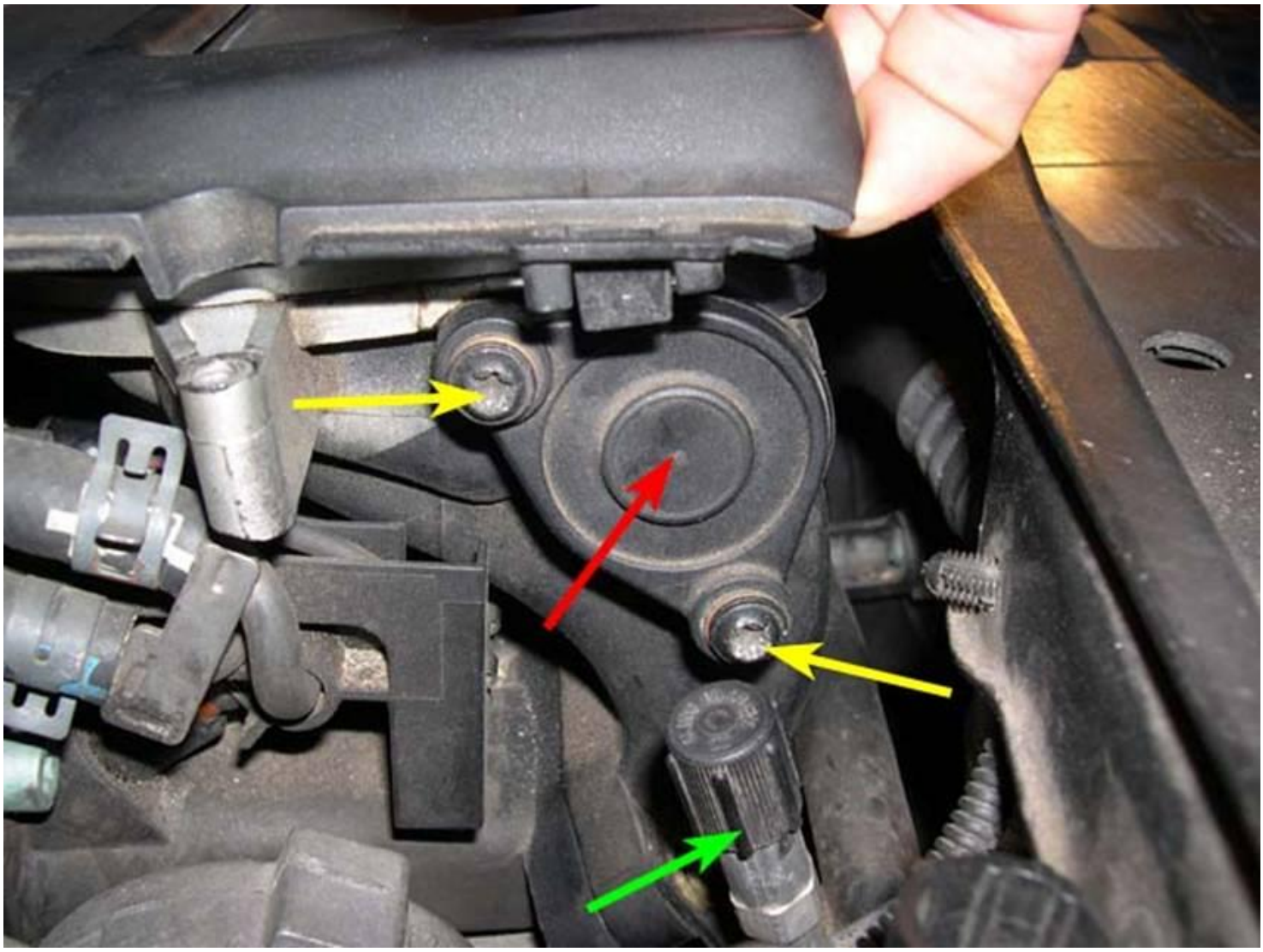


5. Remove the trim piece marked by the red arrow in the picture below by removing the two (2) Phillips screws (yellow arrows) and then sliding the trim piece toward the rear of the car and then up and out. The hood release cable may catch on the inside surface of the trim piece while doing this, so some wiggling may be required.

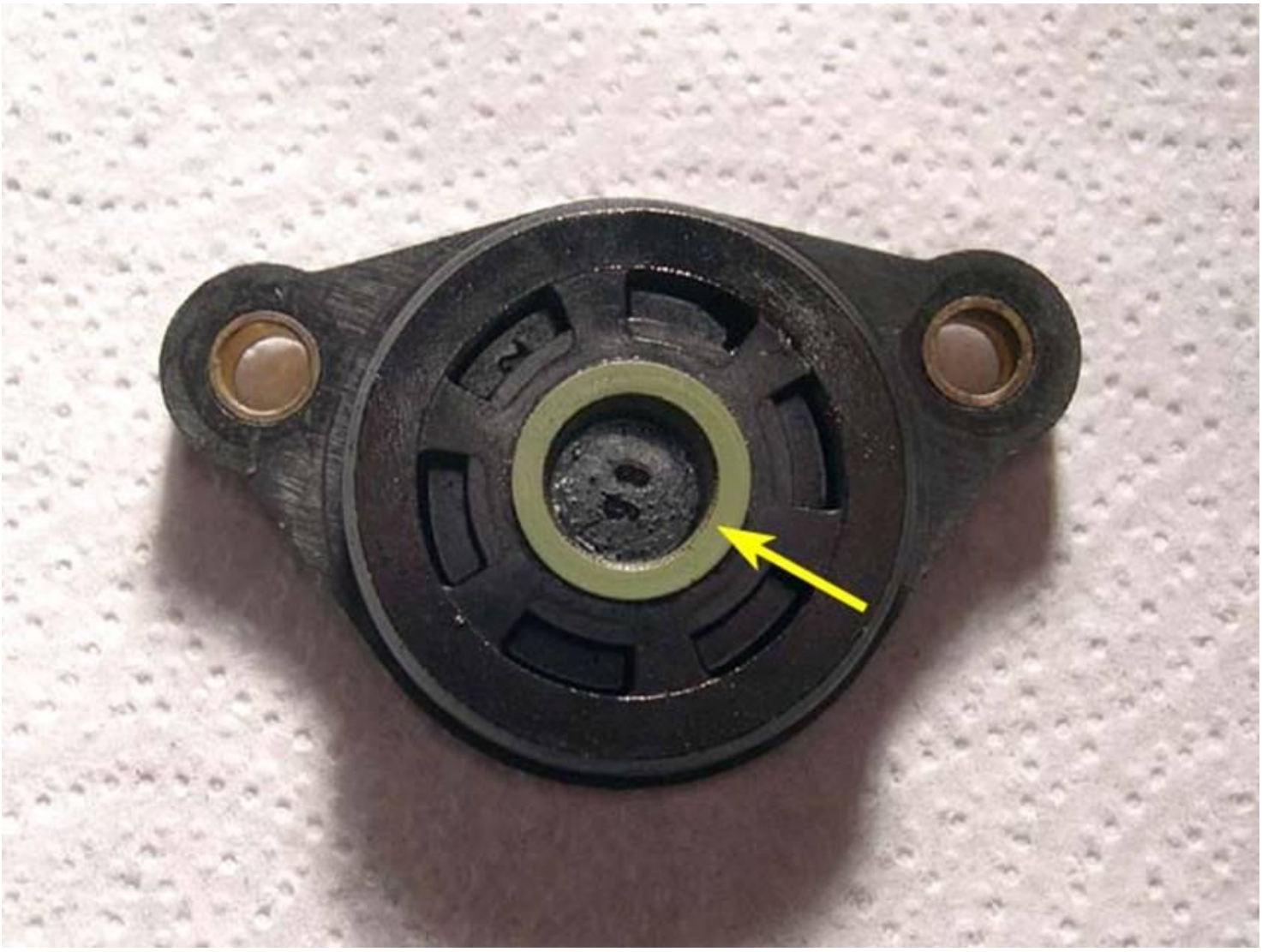


6. Remove the long, thin engine cover piece on the passenger's side of the engine (red arrow in picture below) by removing the two (2) T30 Torx screws (yellow arrows) and carefully pulling up on the trim piece.

7. Remove the passenger's side end cap for the shifter rod (red arrow in picture below) from the side of the upper intake manifold by removing the two (2) T30 screws (yellow arrows) and then pulling the end cap off. The lower screw may be partially blocked by the A/C service port marked by the green arrow. You can carefully hold this port to the side to access the screw (it will be tough to do most likely), but don't be too rough with it. Just move it enough to get the screw out.

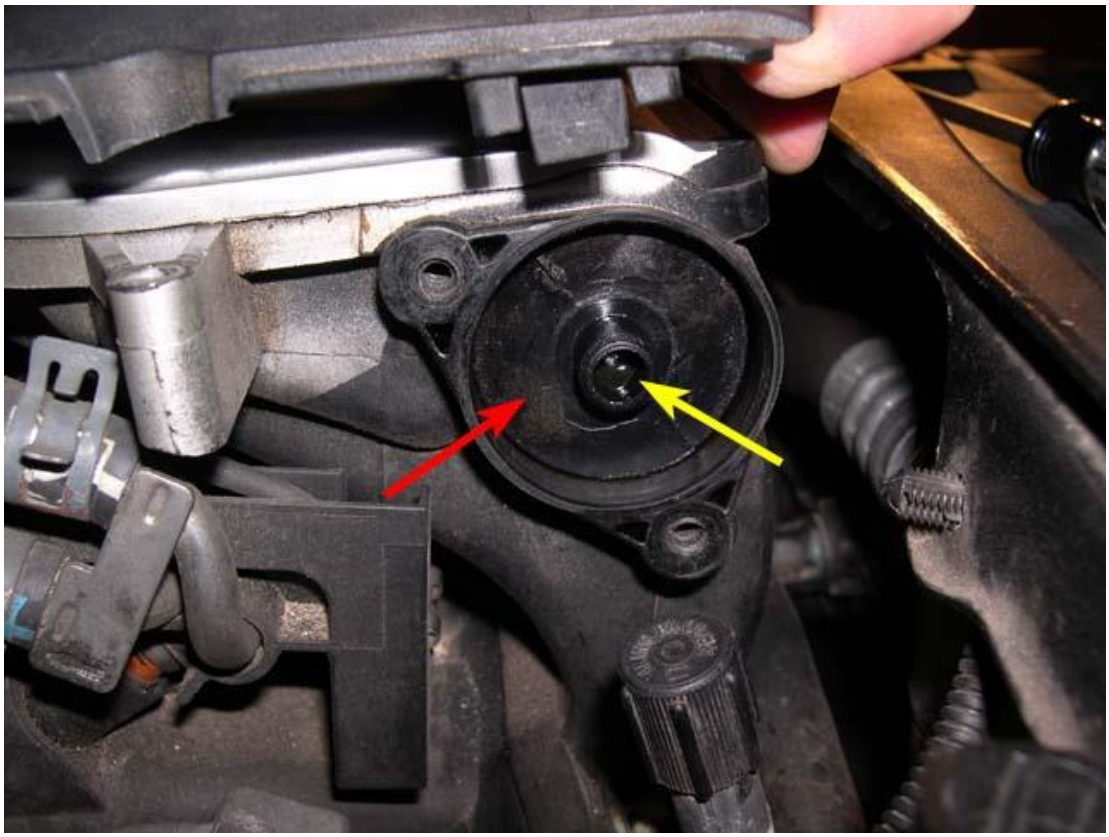


8. The picture below shows the inside surface of the end cap that was just removed. Note the green rubber bushing (yellow arrow) in the middle of the cap that supports and cushions the end of the shifter rod. Make sure that this bushing does not get lost.

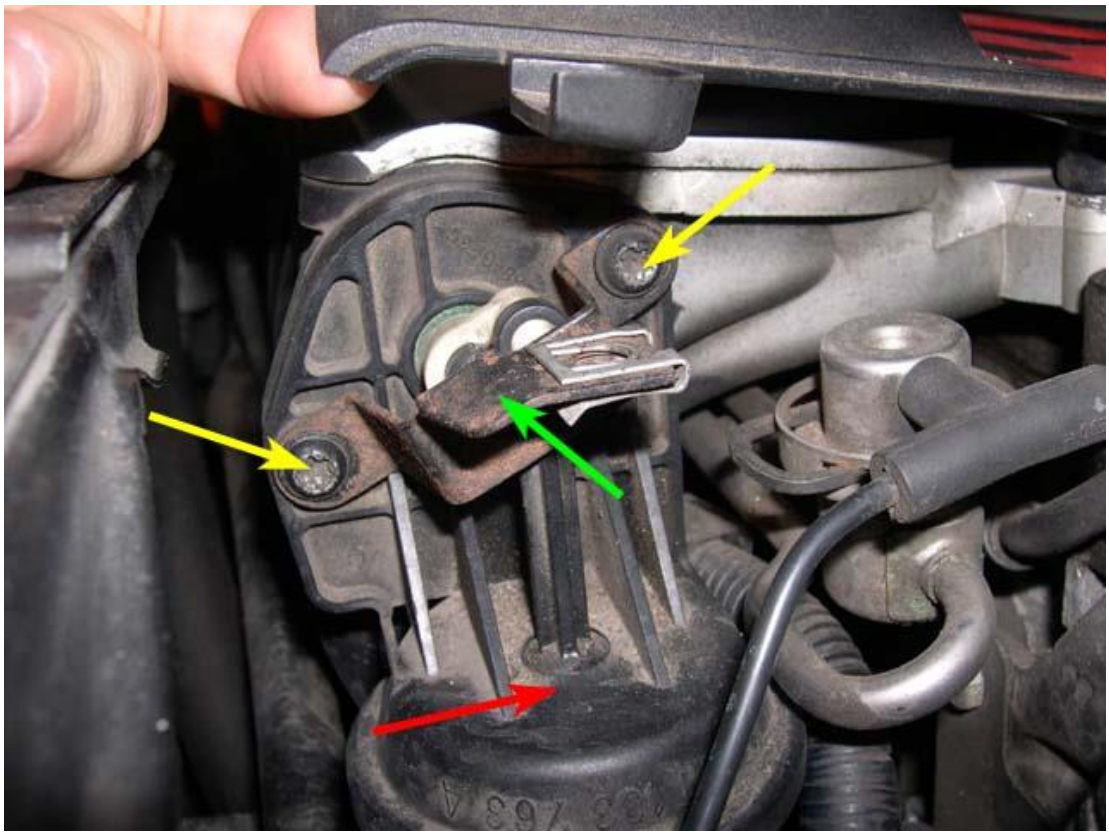


9. The picture below shows the passenger's side of the manifold with the end cap removed. The red arrow points to the end of the shifter rod still installed in the manifold. If the green bushing shown in the image above is not in the end cap, then check the small shaft on the end of the shifter rod (yellow arrow). If it's still on that shaft, then pull it off and place it in the end cap. If it's not there, then it was lost somewhere and you'll need to buy a new one. You can get one as part of the SHIFTER ROD REPAIR KIT, which is VW Part# 071 198 763 . (FYI, the green bushing mentioned above and the red bushing in the repair kit (also mentioned in Step 16) are the same thing. The color doesn't matter. The green seal in the repair kit is different than the green bushing and is used to seal around the part of the shifter rod that protrudes through the vacuum drive unit (mentioned in Step 10).)

Note: Some people will say that you don't need to remove the passenger's side end cap to replace the shifter rod, which is true. However, by removing this end cap and making sure that the green bushing is not attached to the shifter rod, you ensure that the bushing will not fall down into one of the intake manifold runners when sliding the shifter rod out later in this DIY. You don't want this to happen, unless you like removing the whole manifold to fish the bushing out. Trust me. I've had to do it.

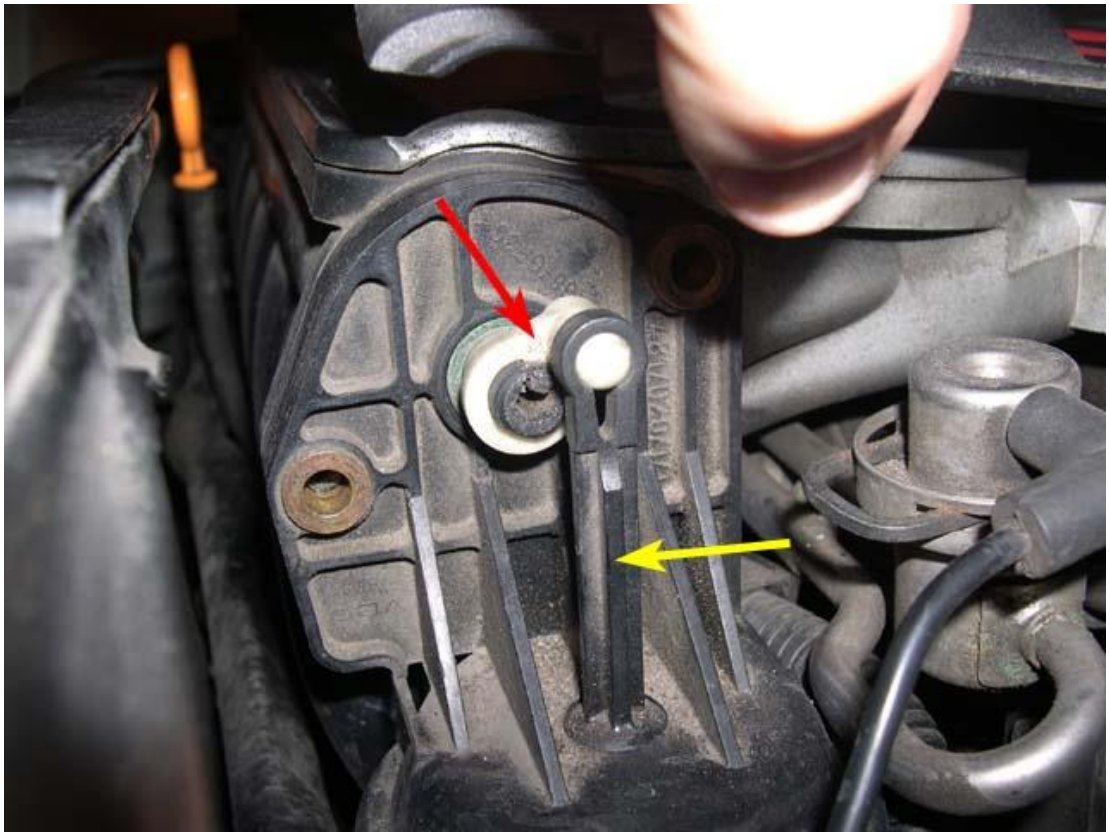


10. The picture below shows the shifter rod's vacuum drive unit (red arrow) on the driver's side of the upper intake manifold. Remove the support bracket (green arrow) for the small engine cover piece (already removed) by removing the two (2) T30 screws marked by the yellow arrows.



11. The picture below shows a better view of the vacuum drive unit (which also serves as the driver's side end cap) and how

it operates the shifter rod. When a vacuum is applied to the drive unit (controlled by the ECU and a solenoid valve), the actuator rod (yellow arrow) moves downward, causing the end of the white connecting lever (red arrow) to also move downward and resulting in the clockwise rotation of the shifter rod 90° (there is a tab on the driver's side end of the shifter rod and a corresponding groove in the drive unit that limits the rotation of the shifter rod).



12. The red arrow in the picture below points to the locking tab that secures the white connecting lever to the shifter rod. In order to remove the drive unit from the manifold, the lever needs to be disconnected from the shifter rod. This is accomplished by depressing the locking tab and separating the lever and rod.

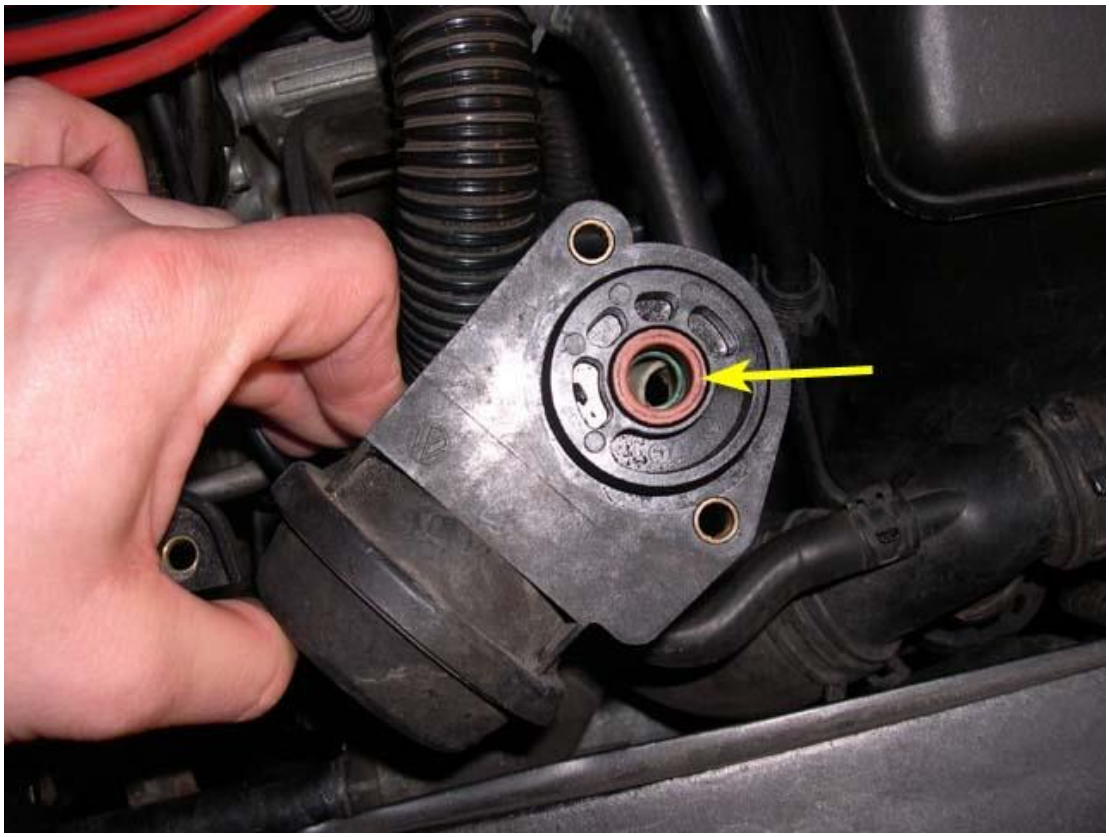
13. You can attempt to depress the locking tab and then slide the connecting lever toward the driver's side of the car, but this is easier said than done. Some people have used too much force and reported that the tab has broken when doing this, so be careful if you decide to use this method. The easiest way that I have found to disconnect the lever and rod is to use a large flat-blade screwdriver to simultaneously depress the tab slightly and push the shifter rod slightly INTO the manifold. The two pictures below illustrate how to do this. Basically, you place the tip of the screwdriver on the locking tab (make sure it's not touching the white lever though), hold the screwdriver parallel to the front edge of the car and ~30° relative to the ground and then give the handle end of the screwdriver a light whack with the palm of your hand (this may require more than one attempt, depending on how hard you hit it).

Note: This method works best on shifter rods that are worn, since the loose fit of the rod in manifold allows it to easily slide into the manifold. This method may be more difficult when the rod is new or not worn that much or if Paul's (A2T) replacement bushings are already installed since the tight fit of the rod in the manifold will offer more resistance. This method will still work with a rod that has a tight fit, but make sure not to go too nuts with how hard you hit the screwdriver placed on the locking tab. You don't want to accidentally break the locking tab and be forced to buy a new rod.

14. The picture below shows the rod having been pushed into the manifold by doing the above procedure. FYI, the rod doesn't need to completely move inside the manifold like shown below. It really only needs to move a few millimeters for the lever and rod to disconnect, so don't worry if yours doesn't end up looking exactly like mine. The picture does illustrate well though how worn my shifter rod and intake manifold were at 180k miles when this DIY procedure was performed. If I had hit the screwdriver hard enough, the shifter rod would have shot out of the far end of the manifold!

15. With the connecting lever and shifter rod disconnected, you can now pull the vacuum drive unit off of the intake manifold. Remember that the base of the drive unit is connected to a vacuum hose and this hose limits how much and in what direction you can move the drive unit (you need to move it out of the way slightly so that the shifter rod can slide out of the manifold - I usually tuck it up under the front end). Be careful not to separate the drive unit and vacuum hose, but if you do, it's no big deal. Just reconnect the two and all will be good.

16. The picture below shows the vacuum drive unit disconnected from the intake manifold. Make sure that the red bushing (yellow arrow) that supports and cushions the end of the shifter rod is in the drive unit. If it's still on the shifter rod, then remove it and place it in the drive unit.



17. Finally, slide the shifter rod out of the driver's side of the intake manifold, as shown below. If the bushings on the rod are worn, it will slide out very easily and it will become very clear why the rod rattles so badly in the 2500-4000 RPM range. If your shifter rod still has a tight fit in the manifold (doubtful), then you might need to lightly tug on the rod to get it out. Be careful not to cut your fingers as some of the edges of the rod can be sharp!

REINSTALLING THE SHIFTER ROD:

18. Slide the shifter rod into the driver's side opening in the intake manifold. If you are installing a new OEM rod or your existing rod with Paul's aftermarket bushings, then the rod should be more difficult to install than it was to remove, especially after the point where one of the bushings enters the manifold. Most likely the difference will be great enough that you'll need to push fairly hard to get the new rod in. If using Paul's bushings, the fit will most likely be so tight that you'll need to use a rubber mallet or something similar to carefully pound the rod into the manifold. While this may seem odd or wrong at first, it's actually a good thing since the extra tight fit helps to ensure that the rod remains tight in the manifold and the rattle never returns.

19. Insert the shifter rod so that it is roughly centered in the manifold. The ends of the rod relative to the edges of the manifold should be roughly the same and similar to what's shown in Step 9.

20. Reinstall the passenger's side end cap and tighten the two (2) T30 screws.

21. Rotate the shifter rod so that the locking tab on the driver's side end of the rod is roughly at the 1 o'clock position. Refer to the picture in Step 12 for an idea of the correct position.

Note: It is possible to install the shifter rod with the locking tab at either the 1 o'clock or 7 o'clock position. ONLY THE 1 O'CLOCK POSITION IS CORRECT! If the rod is installed with the tab at the 7 o'clock position, the rod will not be able to rotate and either the white connecting lever or the drive unit actuator rod may break when the drive unit attempts to rotate the rod.

22. Install the vacuum drive unit by sliding it over the driver's side end of the shifter rod and reconnecting the white connecting lever to the rod. You may or may not hear a click when the locking tab catches.

23. Line up the engine cover support bracket with the holes in the drive unit and then install and tighten the two (2) T30 screws.

24. Reinstall the long, thin engine cover piece removed in Step 6 and tighten the two (2) T30 screws.

25. Reinstall the trim piece removed in Step 5, making sure that the hood release cable is between the trim piece and the front of the car and the piece fits into the appropriate slots. Pop the hood release cable back into the groove in the trim piece.

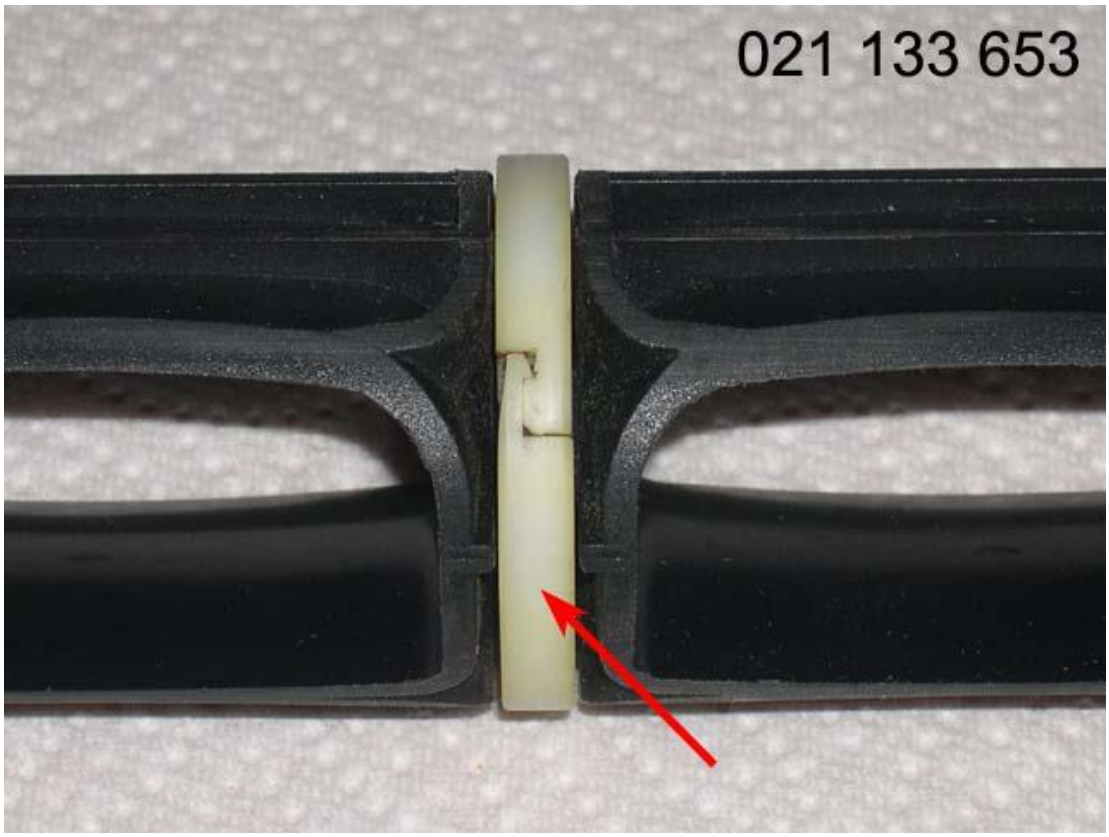
26. Reinstall the engine cover piece removed in Step 4 and pop the spark plug wires back in their grooves.

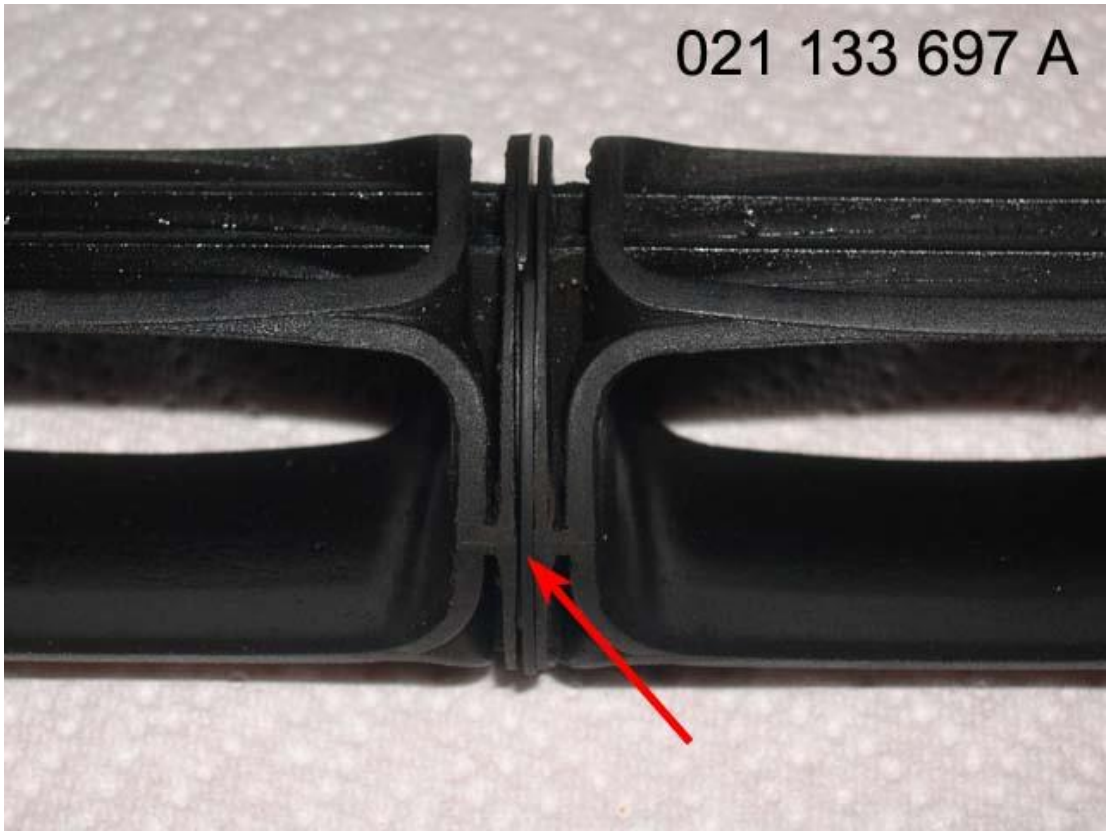
27. Reinstall the trim piece removed in Step 2, making sure that the hood release cable is to the rear of the trim piece and the driver's side edge of the trim piece fits into the appropriate slot.

28. That's it!

REPLACING THE OEM SHIFTER ROD BUSHINGS WITH PAUL'S AFTERMARKET BUSHINGS

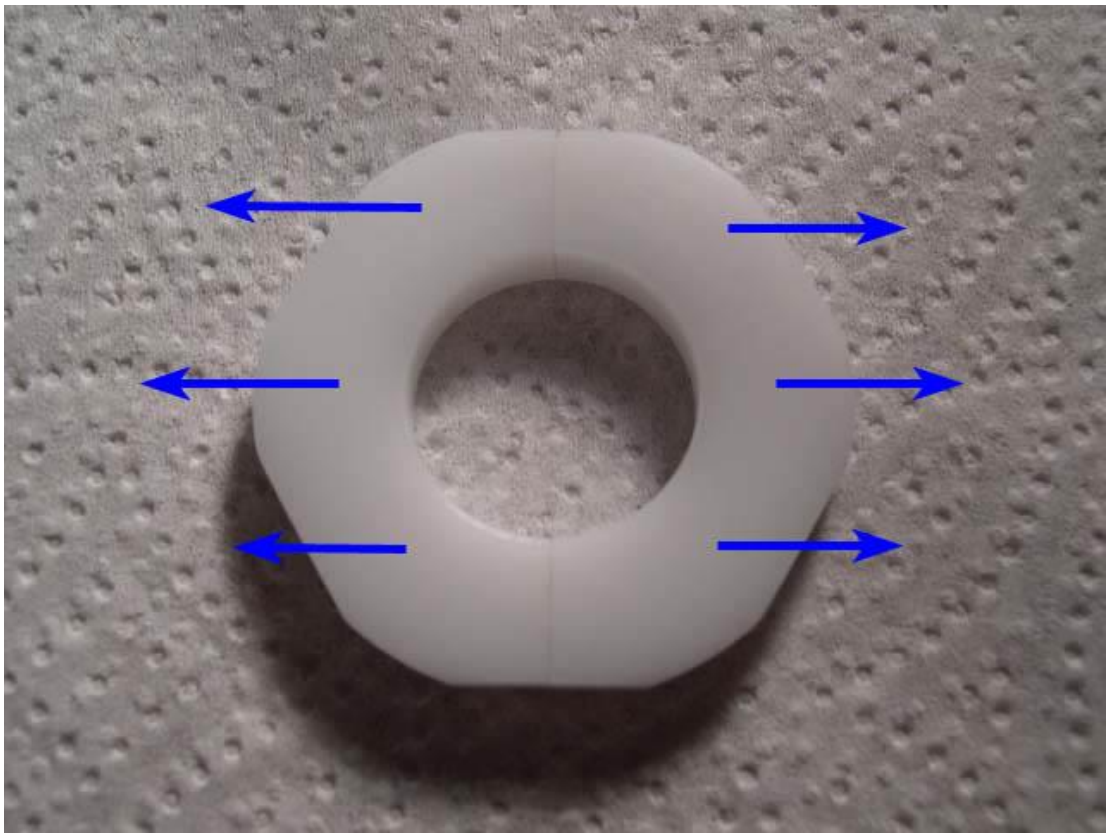
If you have a newer-style OEM shifter rod that has two, thick bushings (021 133 653 - see picture below) and not an older-style shifter rod with five, thin bushings (021 133 697 A - see picture below), then you can replace the two OEM bushings with a set of Paul's aftermarket bushings (see picture below). The design of the aftermarket bushings is far superior to the OEM design and should prevent the return of shifter rod rattle caused by worn bushings.


021 133 653

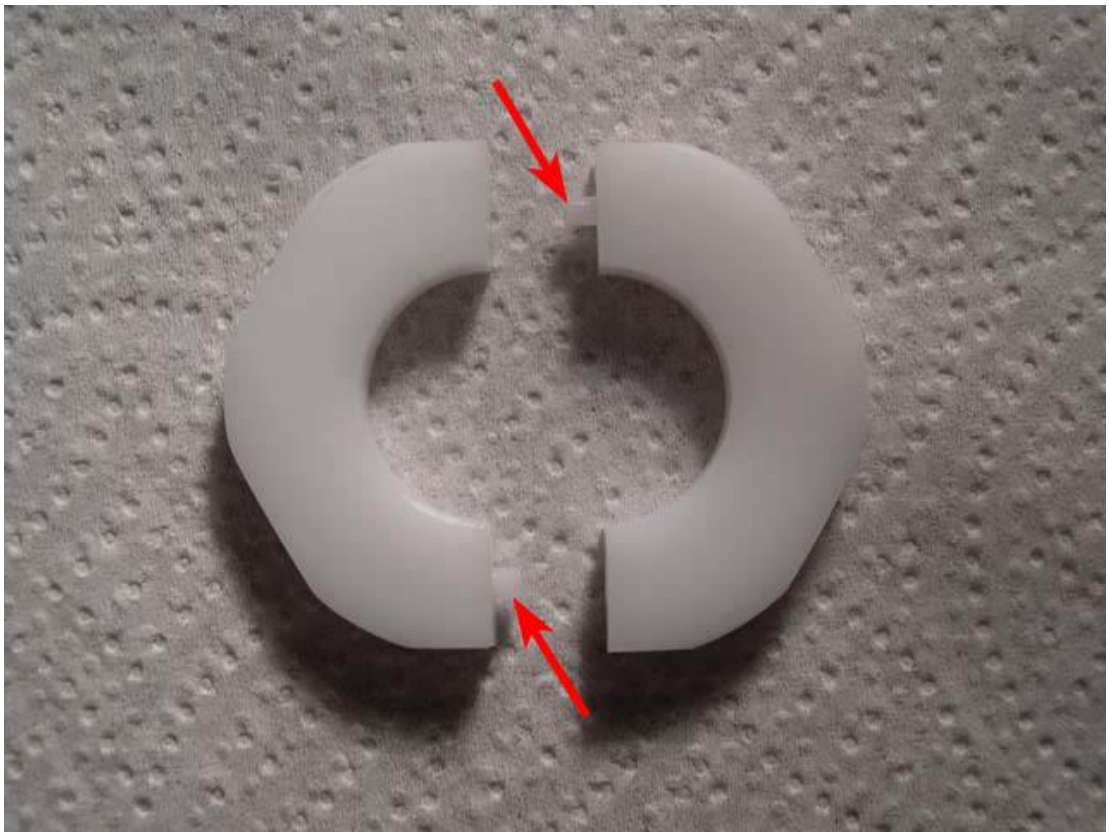

021 133 697 A

29. To remove the OEM bushings from the shifter rod, insert a small screwdriver into the gap between the locking tabs on the edge of the OEM bushing (as shown below) and twist to separate the two halves of the bushing. Spin the bushing 180° and repeat. Remove the bushing from the rod. Repeat the above procedure for the other OEM bushing.

30. Separate one of Paul's bushings into its two halves by pulling them apart, as shown below.



31. The two halves are secured by small pins (red arrows in picture below) and need a light tug to be separated.



32. Install the bushing halves on the OEM rod and press the two halves TIGHTLY together (they may snap together, they may not - just make sure the two halves are touching).

33. Install the improved shifter rod by following Steps 18 through 28.