01-13-2009, 11:32 AM #1

KarTek

Boy adventurer...

Join Date: Jun 2007
Location: Bahama/Eno Twp, NC
Posts: 2,327

View Photos By: KarTek

How I fixed my duovalve (W210), got my heat back and saved myself $250!

Details, pictures/writeup at 11... Sorry, I can't upload pictures at work...

_____
-Evan

Last edited by KarTek; 01-13-2009 at 12:04 PM.

Quote

01-13-2009, 08:55 PM #2

KarTek
Boy adventurer...

Join Date: Jun 2007
Location: Bahama/Eno Twp, NC
Posts: 2,327

View Photos By: KarTek

Update!

Now that Winter is here, having heat in the car is near and dear to most everyone. With the possible exception of our friends in Southern California... Heating season here began with an early cold snap in mid November but at that time, I discovered to my dismay, that the car was producing no heat to speak of.

The engine warmed up fine, ran great, the blower blew but alas, it was only lukewarm air. I went through the usual checks: Bubbles in the cooling system, duo-valve unplugged, aux water pump pumping... Everything seemed to check out fine. Then I started in on the next level of troubleshooting: Take it apart!

I took the hoses off, forced water through them and it flowed freely. I took the aux water pump apart and it was in perfect shape. I also found out that it's magnetically driven so it's not likely to fail. If you can hear it running, it's pumping! Next I moved on to the duovalve and upon close inspection, discovered that it was ultimately the source of my problems. The seals had completely rotted and swolen to the point that the valves would no longer flow anything more than a trickle.

A quick look through the Fastlane/All Parts Express revealed no replacement parts so I called Phil to see if there were any other options. Sadly no rebuild kit or seals seemed to be available and it was looking like I was facing the purchase of a $250 replacement valve. "OK" I said, "I'll see if I can do anything with it".

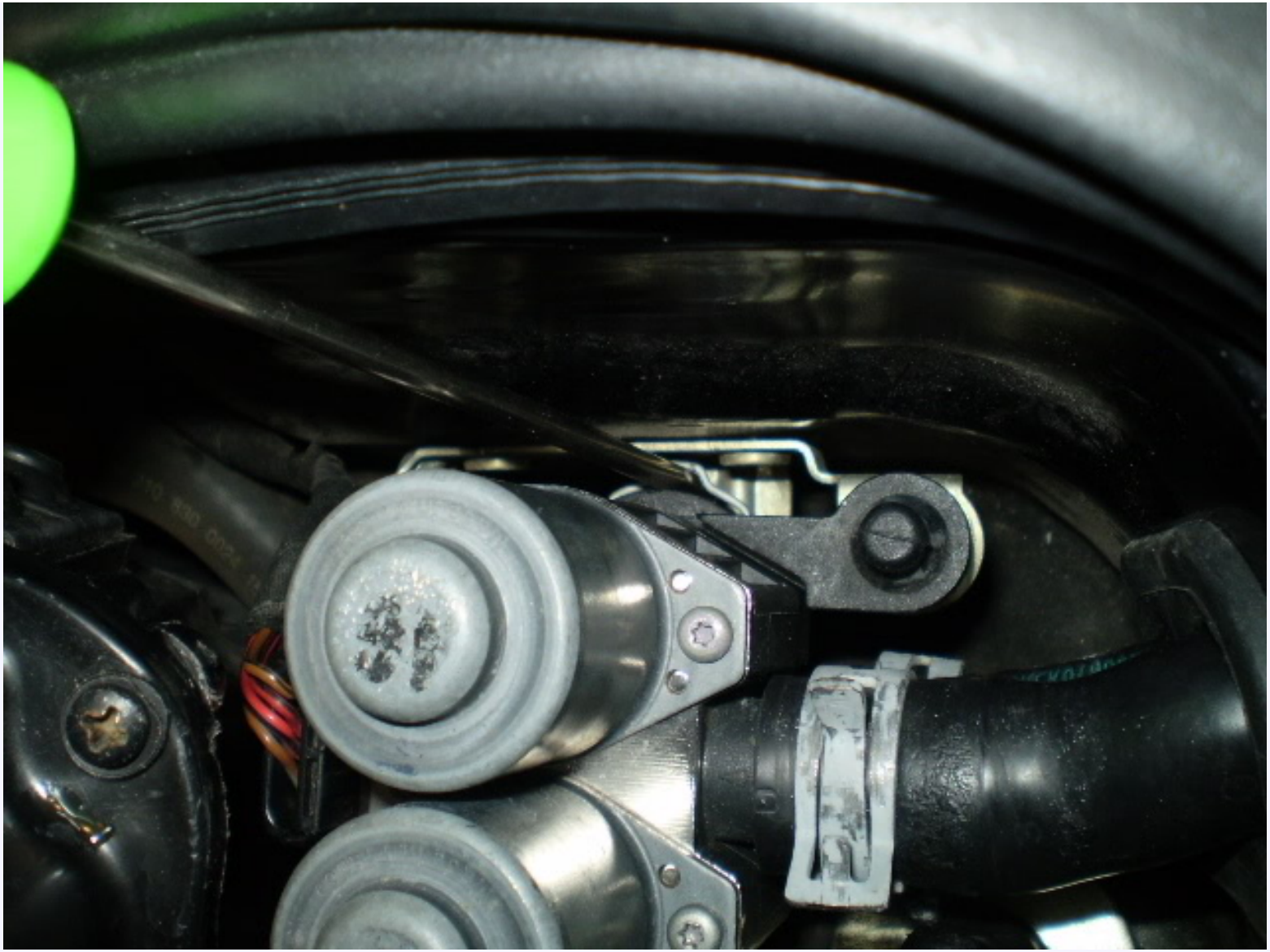
Happily, after some experimentation, I figured out that the repair can be done for about $2 worth of off the

shelf plumming parts from Home Depot or Lowes.

If you're having the same troubles with your W210 car (or probably W208 or any car with a similar duovalve), here's how to get it back in working condition.

To remove the duovalve, first unlatch the top of the air filter housing and move it aside for better access to the hoses. Then remove the top spring clamp and hose. Next, push the top hose and the large rubber grommet out of the hole in front of the bulkhead.

Take a screwdriver and gently pry the lower retaining clips out until they make a small "snap" sound at which point, they'll stay in the out position. There's one on each side.



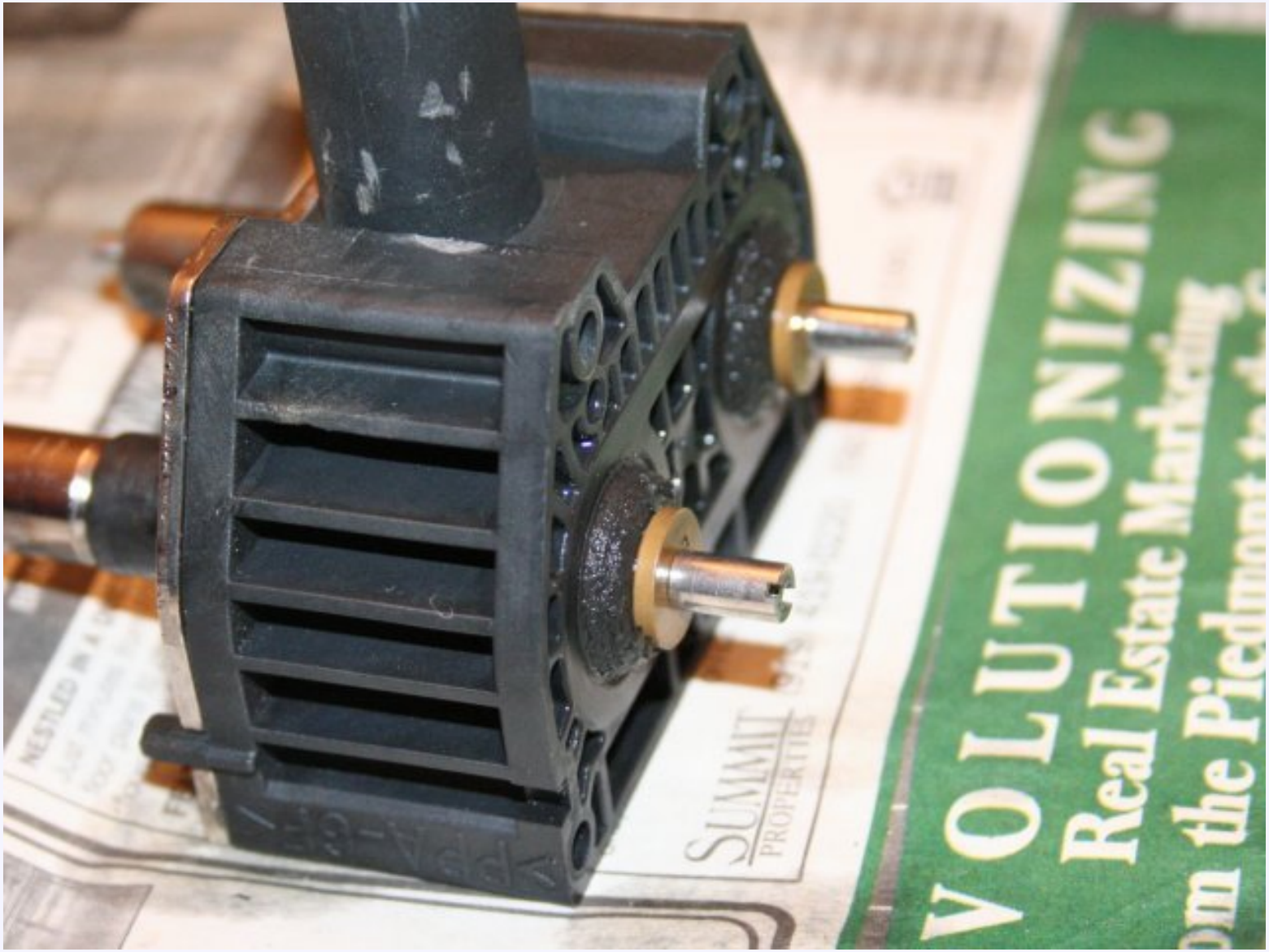
After the clips are opened, grasp the two metal coil housings and gently wiggle and pull them upward to free the upper assembly from the lower one. You may need to place the tip of the screwdriver on the flange of the bottom piece and gently press downward while pulling up to free the parts. Once the top part is free, unplug the electrical connection and then remove the bottom spring clamp and hose.

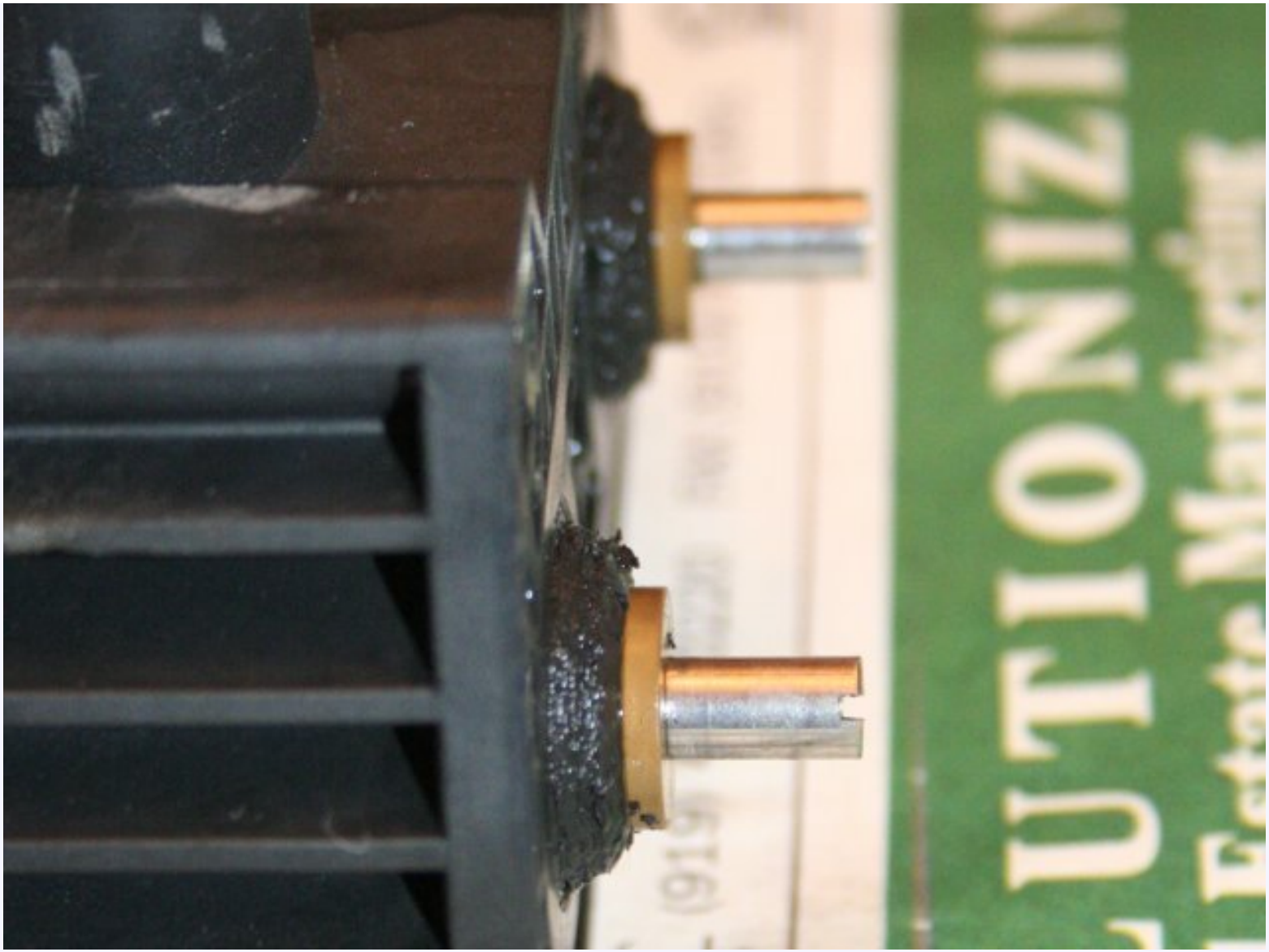
Now that you have the valve free, set yourself up a clean work area to do the disassembly.

First, take a Torx T-10 driver and carefully remove the 5 screws holding the valve assembly together. Then, carefully remove the silver coil assembly. Finally, you can pull the two lower halves apart. Take care to

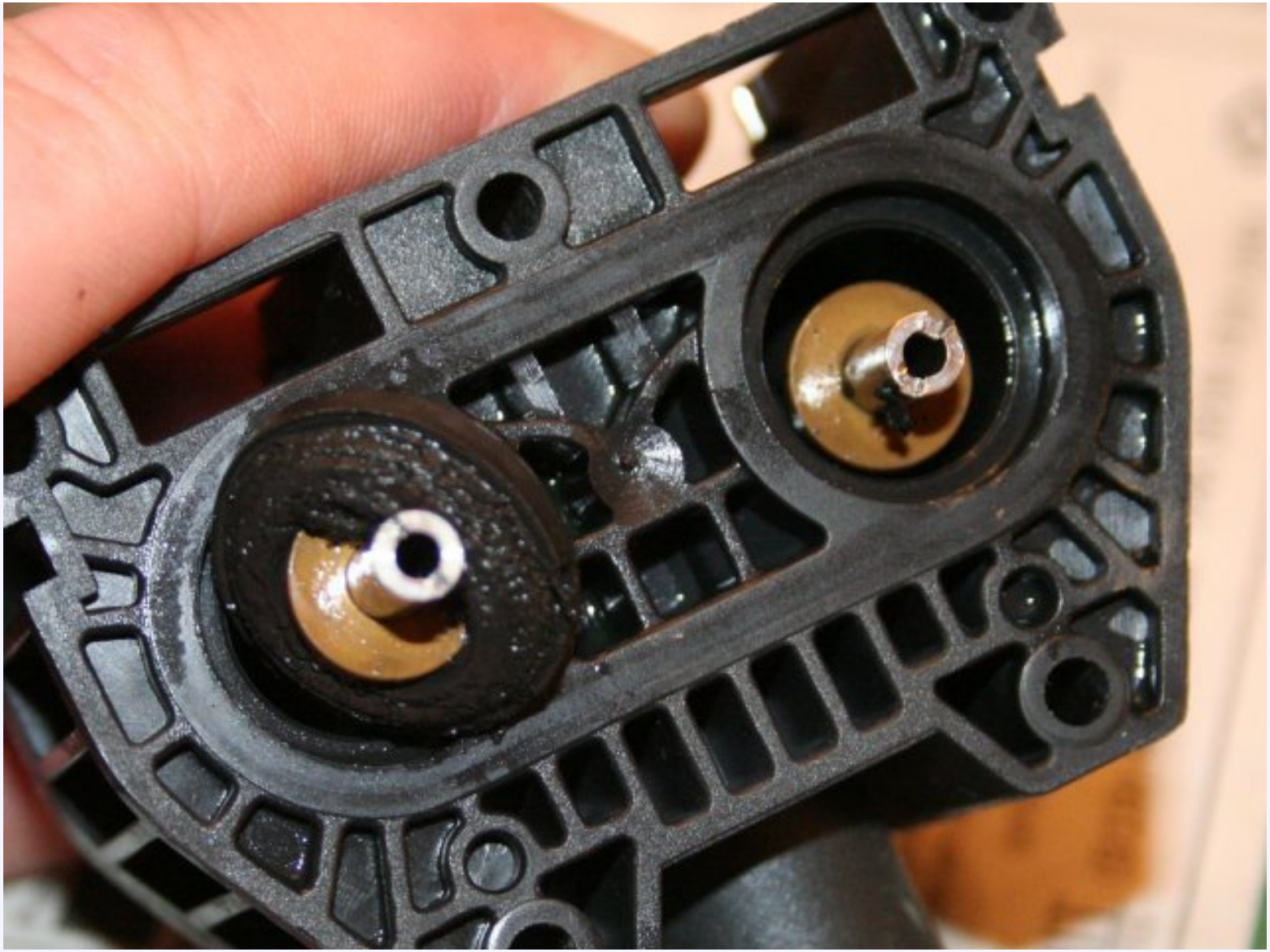
not lose or damage the two small brass "umbrella" shaped valve poppets.

These pictures show why the valve quit working. The seal had swolen to such an extent that it prevented the valve from opening and allowing water through. You can see valves pushed out by the swolen rubber. They should actually stick out a little but not nearly that far.





Press the valve control rods down and this will allow you to slip a screwdriver under them and pry out the seals.



Once the seals are out, the silver plate with the valve control rods will slide out of the top of the assembly.

This is a closeup of the valve seal showing the poor shape it's in:

There are two more identical seals in the lower half of the valve. Take a screwdriver, inserted through the lower hole and press against each of the two seals and the brown plastic retaining cylinders. A little bit of force is needed to dislodge them. Once free, you can pull them out by hand and then pry out the rubber seals.


SOLD
Howard Perry
and Walston
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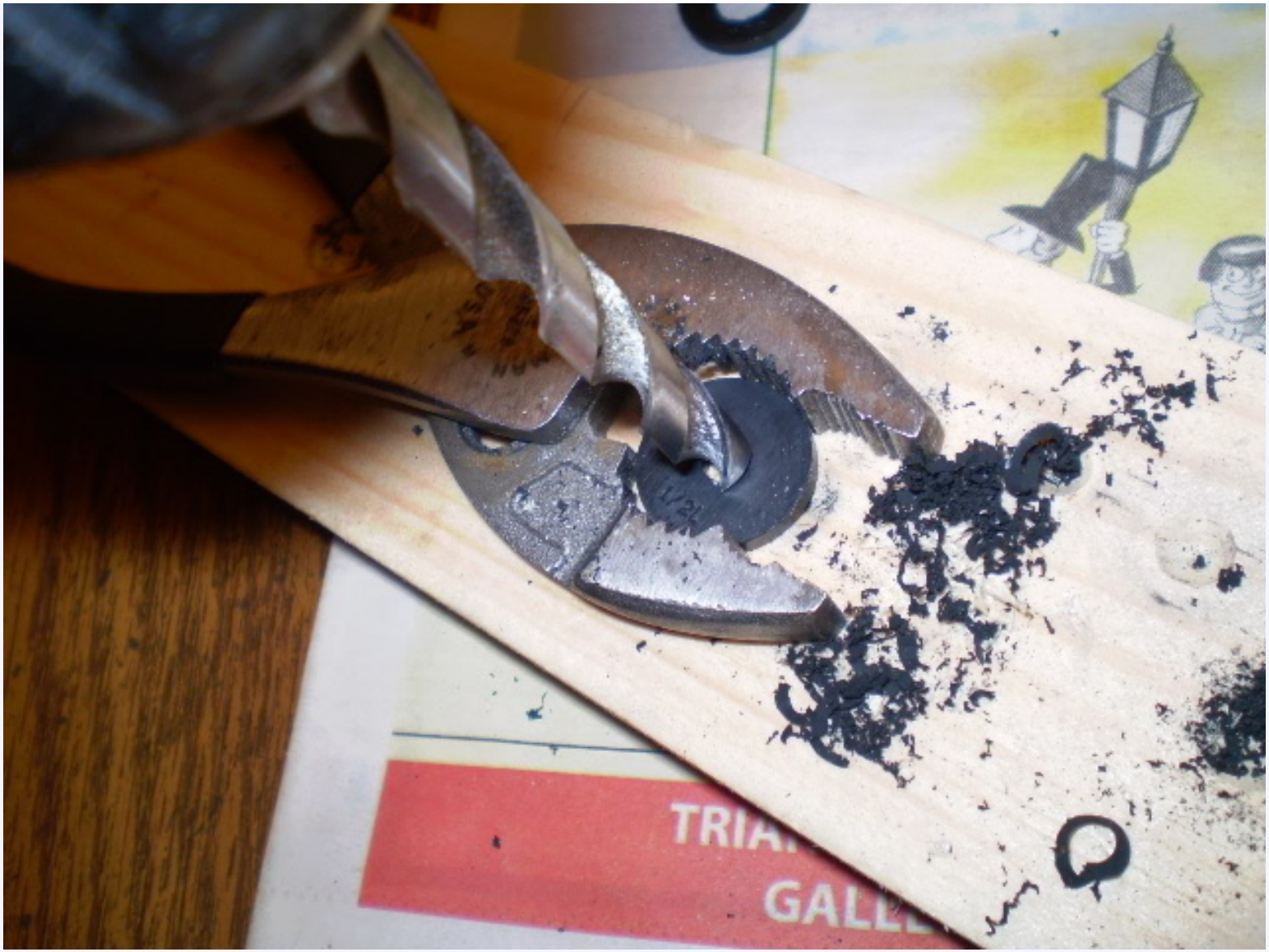
There will also be 2 O-ring seals, one between each section. Depending on the condition of the parts, you may need to do some trimming to make them usable again. I took a pair of scissors and carefully trimmed the excess rubber of in order to re-use them. The two pieces on the right were discarded.

Now for the fun part. Go to the store and pick up a box of 1/2L faucet washers.

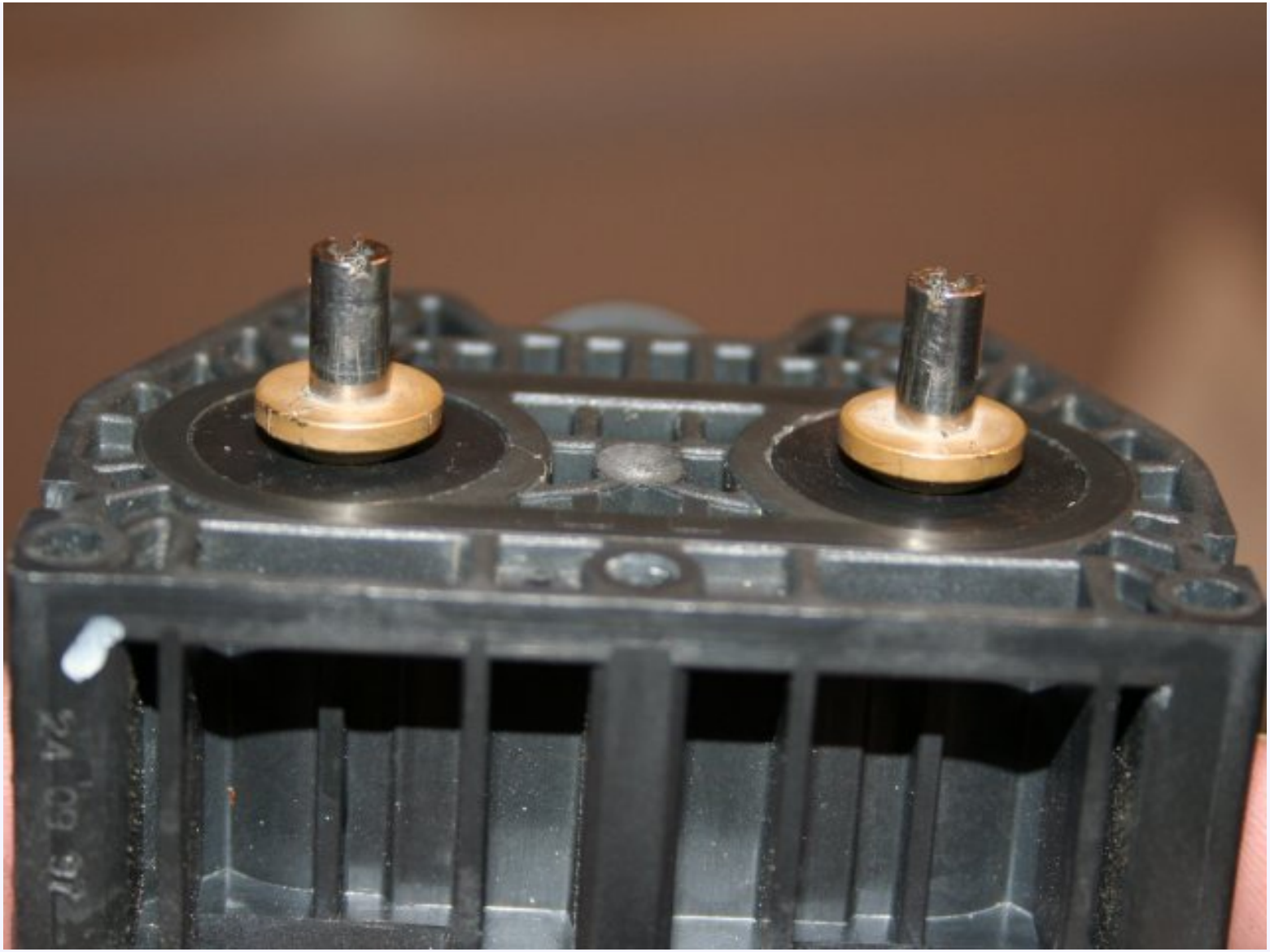
Take a 5/16" drill and carefully enlarge the center holes in 4 of them. I used a pair of pliers and gently held the washer in place while drilling in order to keep from distorting it. It's not critical to get the hole perfect because the tapered valve poppets are self-centering.

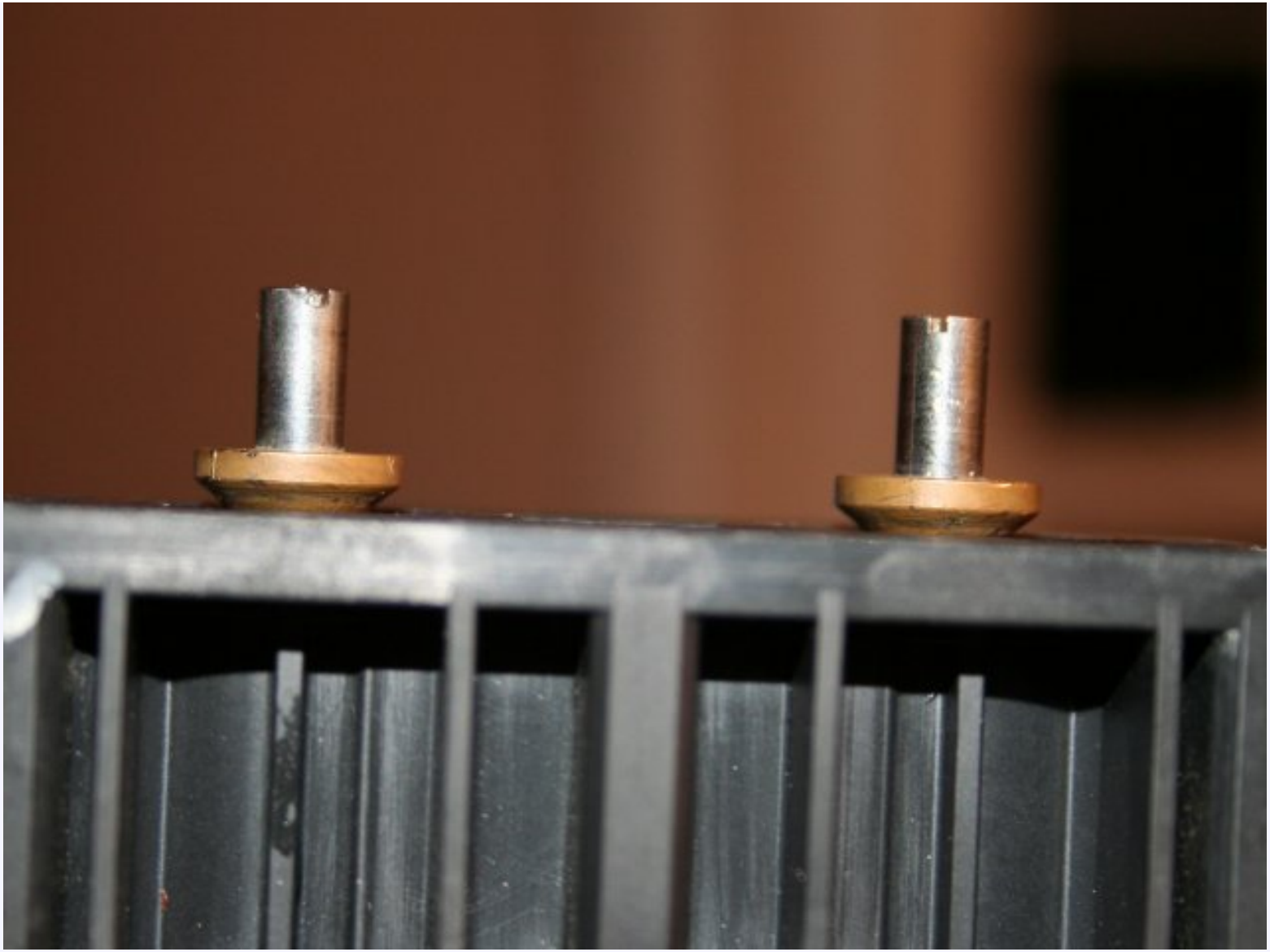


This is what they should look like when you're done:

Next, insert one in each side of the bottom half. Press them all the way down then re-insert the brown plastic Cylinders. The cylinders have a shallow "key" in the back that keeps them aligned so insert them carefully and press them down all the way. When installed correctly, they will not be quite flush with the top surface of the valve body. When you're finished, it should look like this:

On the top half, first take one of the oval shaped O-rings and place it in the groove on the top side of the valve body. Then slide the silver plate and valve control rods back in. With one hand, press on the valve control rods (the side with the silver cylinders) and compress the springs fully. This will allow you to work the new rubber seals over the brass parts and into place in the valve body with the other hand. This part is a bit of a struggle but it's not too bad. Be careful to avoid bending the control rods. They should look like the photo below when you're done. Note that the brass parts stick up just a bit above the surface of the valve body. This is critical to the proper operation of the valve.





Finally, place the remaining oval O-ring on the opposite half of the valve body.

Return the loose umbrella shaped poppets to their position in the ends of the valve control rods and then slide the two halves together. There are two additional O-rings on the top side of the assembly for sealing the electromagnetic coils. Make sure they are in place then slide the coil assembly back onto the valve body. While holding it all together with one hand, insert and tighten the 5 T-10 screws sungly. When assembly is completed, you should be able to shake the valve back and forth and hear it rattle.

Reverse the removal process to re-install the valve into the car. You can take some coolant and moisten the O-rings on the bottom fittings to make them easier to insert. Check the coolant level, start the car and warm it to operating temperature.

Test the function of the valve by setting the temp selector to "HI". You should feel warm air from the side and floor vents. After the interior has warmed up sufficiently, set the temp control to "LO". Within about 30 seconds, you should feel the air direction change and cool air begin to blow from the center vents.

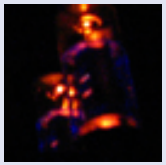
Finally... Enjoy your heat!

_____
-Evan

Last edited by KarTek; 01-14-2009 at 09:05 PM.

Quote

01-13-2009, 09:54 PM #3



Southern

Registered User

Join Date: Jan 2000
Location: Carol Stream, Il, USA
Posts: 601

Thanks for sharing your information. I hope that those faucet washers hold up to the extreem temps.

_____
Ray
1998 Mercedes E320, 200K Miles
2001 Acura 3.2TL, 178K Miles
1992 Chevy Astro, 205K Miles

Quote

01-13-2009, 10:47 PM #4

Turbo E320

Im a Jeanyus

Join Date: Nov 2007
Location: Jeffersonville, Indiana
Posts: 470

So that's what that thing is I was wondering about that. So if I disconnected that I would lose my heat, interesting. Does the secondary pump just constantly circulate the coolant through that duo valve or is it somehow tied into other engine functions to regulate its speed?

_____
1997 Mercedes E320 Turbo
Garrett T3/60-1 Turbocharger
Custom Water Intercooler Setup
352rwhp/366rwtq @ 8.6psi in '08


Quote

01-13-2009, 11:13 PM #5

KarTek
Boy adventurer...

Join Date: Jun 2007
Location: Bahama/Eno Twp, NC
Posts: 2,327

View Photos By: KarTek

Quote:

> Originally Posted by **Turbo E320**
> *So that's what that thing is I was wondering about that. So if I disconnected that I would lose my heat, interesting. Does the secondary pump just constantly circulate the coolant through that duo valve or is it somehow tied into other engine functions to regulate its speed?*

If you disconnect it, it defaults to heat all the time so it'll roast you out. The duovalve is a 2x2 way bypass valve. When it's energized, it bypasses the hot water back into the cooling circuit. When it's idle, water circulates through the heater cores. The climate control system opens and closes each side of the valve on a variable duty cycle based on the temperature set on the display. The more it's energized, the colder the air is.

You can set the temp on the panel to a level colder than the ambient temp and then go out and feel of the valve and you'll feel it pulsing more rapidly. Warmer = slower.

The aux water pump provides the thrust to circulate the water on a normal basis and also when the "Rest" button is activated when the engine is off. As far as I can tell, it always spins at the same speed.

_____
-Evan

Quote

01-14-2009, 07:37 PM #6

platt-deutsch
Registered User

Join Date: Dec 2007
Location: Iowa
Posts: 94

Nice Job! I have also rewound the solonoid coils in my 96 S600. The orings failed and coolent got in the coils and ate the copper coils...I wonder why those poppets swelled like that? Never seen that before.

Quote

01-14-2009, 08:02 PM #7

Texholdem

Texholdem

Join Date: Mar 2007
Location: Dallas
Posts: 756

View Photos By: Texholdem

Thanks for the great DIY write-up, the best part is the "1/2L faucet washers"; just genial to come up with them.

_____
1996 E320 since 1/16/08, 171K miles as of Feb 2011

1989 300CE - R.I.P. Dec 29 2007
Other MBs (sold): 1992 300E-24 - 1979 350SLC - 1984 230E - 1990 300CE

Quote

01-14-2009, 09:07 PM #8

Matt L

Registered User

Join Date: Oct 2005
Posts: 4,264

Nice job. This should be added to the wiki.

Quote

01-14-2009, 10:11 PM #9

Chad300tdt

Benz Obsessed

Join Date: May 2007
Location: North Wales, PA
Posts: 3,645

View Photos By: Chad300tdt

nice job, KT. i do have one added suggestion for folks and that would be to stuff rag below and around the duo-valve assembly prior to dismantling. it'll serve to catch coolant flowing out, as well as the errant screw which may escape your fingers.

_____
-- raymond~
47º 34'N 122º 18'W

Quote

01-15-2009, 05:24 AM #12

KarTek
Boy adventurer...

Join Date: Jun 2007
Location: Bahama/Eno Twp, NC
Posts: 2,327

View Photos By: KarTek

Thank you all for the comments! It's fun finding these "Easter Egg" kind of solutions.

Raymond~, thanks for the suggestion. I guess I should add to the story the part of the job where I took a turkey baster and drew off as much coolant as I could reach from the expansion container... Not a drop flowed out of the open connections...

_____
-Evan

Quote

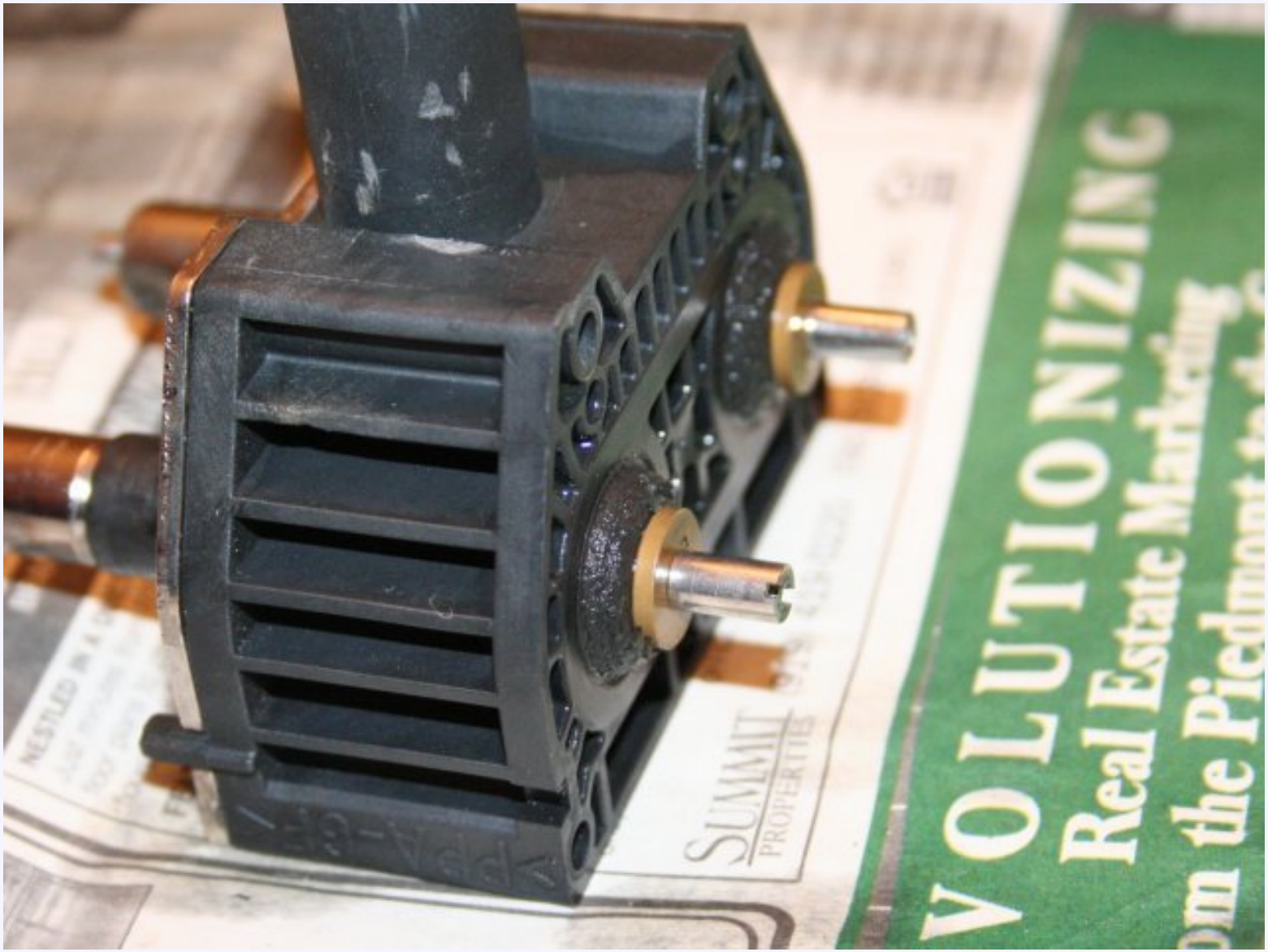
05-17-2009, 05:18 PM #13

Parrot of Doom
1997 W210 E300TD 243,000

Join Date: Mar 2006
Location: Manchester, UK
Posts: 983

GREAT HELP! Thanks so much. Just wanted to note that these instructions apply to the W210 E300 and E420 and probably NO OTHER W210 models (however they could be adapted to be helpful). The E420/ E300 have TWO inlets and TWO outlets for some reason, and the rest of the W210 lineup only has one inlet and two outlets (or vice versa on the inlets/outlets).

I actually ended up rehabbing my valve using parts from a valve off an E320 so was able to compare them side by side. Basically, the E420/E300 valve has an extra layer... which is pretty much this section from previous photos...



I believe the biggest issue with my valve was the degraded O ring... this part...

The center section from that seal was all gummed up inside the valve. Probably would have had a pretty good chance of the valve working right just by cleaning up/trimming the center section as outlined in the instructions (and also removing the tattered bits, of course). I was able to scavenge a similar seal off the surplus E320 valve I found.

I also used two rubber washers that were in good shape from my extra valve. I don't think it had the four washers like the E420/E300 valve with the extra layer, but that was OK as two of the washers from my orig valve were in good shape.

KarTek
Boy adventurer...

Join Date: Jun 2007
Location: Bahama/Eno Twp, NC
Posts: 2,327

View Photos By: KarTek

Glad I can help you all out!

_____
-Evan

Quote

12-26-2011, 04:25 PM #18

ca_tallguy
Registered User

Join Date: Oct 2007
Posts: 14

EEEK! I was feeling pretty good about the repair but now I have constant heat from both left and right side vents. Center vent does seem to be changing between hot and cold OK. Any suggestions? Is this most likely a problem with my duovalve repair or is it more likely that fixing the duovalve unmasked other issues?

_____
Search Mercedes forums and websites at http://www.everythingbenz.com

Quote

12-27-2011, 09:34 PM #19

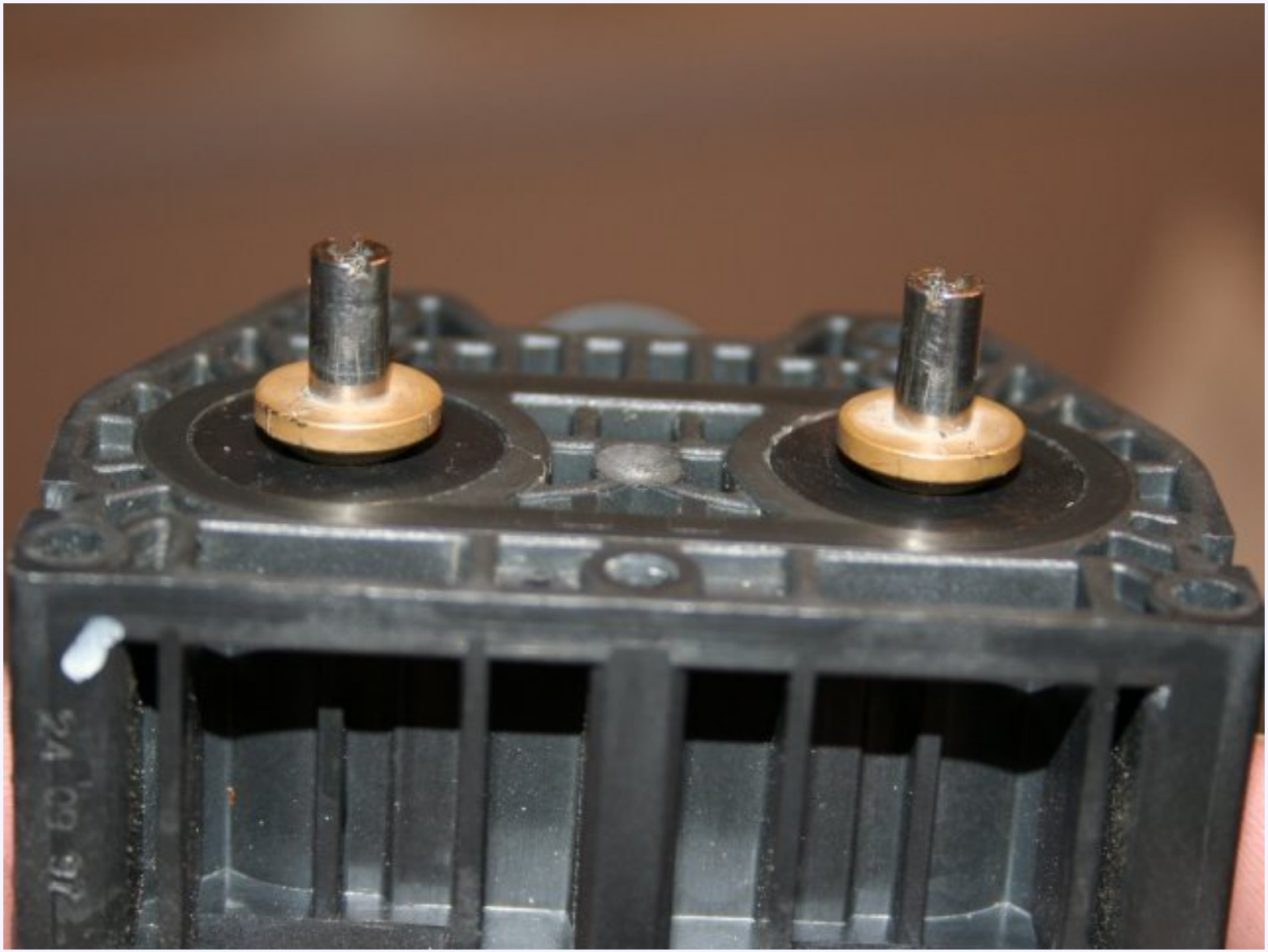
KarTek
Boy adventurer...

Join Date: Jun 2007
Location: Bahama/Eno Twp, NC
Posts: 2,327

View Photos By: KarTek

Sounds like you either didn't get the electrical connector secured properly or you didn't ensure that the valve poppets were positioned exactly like the ones in the earlier picture.

It's critical that they sit up just like the picture because there's a balance in the distance between open and closed. The balance ensures that the valve can direct water either of two ways. If the balance is disrupted, the valve will be biased towards too cold or too hot.



Also, hot air doesn't typically come out of the center vents. Only the sides, defrost and floor.

————————————————

-Evan

Quote

12-27-2011, 11:43 PM #20

ca_tallguy

Registered User

Join Date: Oct 2007
Posts: 14

That makes sense. I think the problem may be that the other end of the poppit things that slide in there... those were broken. I was hoping they would still work with just the short part of the shaft to keep them in place but after taking the valve back out, it looks like they were rolling around in there. I'm going to try the "rivet fix" that I read about on another forum to replace those stems. Unfortunately, the spare valve I had for a normal W210 also had broken poppits. It seems that those parts would have worked had they been intact on my spare valve (just FYI for anyone trying to scavenge parts for a repair).

Thanks so much for the follow up. I'll post again as I work through this to hopefully share any further info for others coming across this in the future.

_____
Search Mercedes forums and websites at http://www.everythingbenz.com

Quote

12-28-2011, 07:19 PM #21

ca_tallguy

Registered User

Join Date: Oct 2007
Posts: 14

Quick update - I took the valve apart and did the "rivet fix" for the broken plastic poppits and I also changed around the seals and everything so far seems to be working well. I may have flipped around the seals before when I removed them from the very bottom area of the valve for inspection.

On reassembly, I had to guess and it seemed like the concave portion would be the logical side for the poppits to seal against. But in looking at photos here and in other threads, it seems like the opposite is true and the flatter side was supposed to be facing the poppits.

When the concave portion is facing inwards, that creates a much larger distance for the poppits to travel in order to seal them up. So if you are embarking on this repair, make sure you pay close attention to all the little details like this when you are on the disassembly portion! I'm not 100% sure that I'm correct on the final position of these washers but so far, so good. I'll try to post again if I encounter further problems with the valve in operation.

_____
Search Mercedes forums and websites at http://www.everythingbenz.com

Quote

09-12-2012, 07:45 PM #22

Riccie420

Registered User

Join Date: Jun 2012
Location: NYC
Posts: 3

VALVE CLICKING When OFF

Thanks for Posting a great article. I did all of this and seems great ! However

When I shut my Car off, I hear "Click....Pause "Click"...pause..."Click... I put my thumb on the Duo-valve and besides it being burning Hot, The Valve doesn't stop "Clicking "...It actually I think killed my battery after not driving the car for a week.

I pulled the fuse and it stops, left the car 2 weeks battery is no issue...

*NOTE: I followed your easy directions because the Duo-Valve was making this sound Prior....

Any help would be appreciated

Quote