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**jddaigle**

Member



Join Date: May 30th, 2003  
 Location: Denver, CO  
 Posts: 6,553  
 Vehicles: 2008 Passat Wagon  
 VR6 4motion, 2013 FIAT 500 Sport

DIY: Replacing the Intake Manifold Gaskets, Valve Cover Gasket, and PCV Oil Separator Diaphragm Valve in a 2008+ 3.6 VR6

12-06-2016 09:58 PM

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#1

When I changed my oil a few weeks ago I opened the hood to discover the dipstick tube popped up, and lots of blowby around the oil fill cap. Plus there was a loud whistle from the [hole on the back of the valve cover](#) which means...time for a new [PCV diaphragm valve](#)!

In theory the procedure is pretty simple, but I ran into enough little gotchas that I figured a DIY would be worthwhile. Please forgive the filthy engine compartment.

**In brief:** the Oil Separator where the faulty diaphragm valve lives is inside the driver's end of the valve cover. As far as VW is concerned none of the above is serviceable, so until recently if yours went bad you had to get a whole new valve cover to the tune of \$450. But there are now two companies offering aftermarket diaphragm valves, [one in Europe](#) and [one in the US](#).

Since you need to get to the underside of the valve cover, you need to remove both the intake manifold and the valve cover. For 2006-2007 3.6 VR6 owners with the one piece manifold that means taking the front bumper and everything behind it off to get to the bolts holding the manifold to the head. Sadly this DIY is not for you.

Fortunately I own a 2008 with the two-piece manifold, where the upper part that covers the valve cover can be removed easily. That's what this DIY covers.

**What You'll Need:****Parts**

Along with the diaphragm valve (see the links above) you'll need to replace all the gaskets you disturb, namely the valve cover gasket (part no. 03H 103 483 C) and the gaskets that seal the upper intake manifold to the lower intake manifold (4 x 03H 133 237 G and 2 x 03H 133 237 J).

**Tools**

The upper manifold is attached to the lower manifold by T30 bolts, and attached to brackets mounted to the head by two T30 bolts (one on each side) and one M10 triple square bolt at the back.

On my car the Valve Cover is held on by 17 10mm bolts, though some have reported a T30 mixed in.

You'll also need a torque wrench that can be set to 10NM, which is the torque spec for both the upper-to-lower manifold bolts and the valve cover gasket bolts.

OK, enough of that--on to the pictures!

**Removing Upper Intake Manifold**

The first thing to do is remove the cover over the wiring harness for the ignition coils. It's the plastic bar with the VW logo and the chrome "V6" lettering. First unclip the rear side, then carefully pull it off the metal clips on the front:



Be careful, it will be brittle and may break. The good news is that a little super glue will fix it right up.

Once it's off, remove the electrical connectors from the coils by *gently* using a screwdriver to push in on the clip on the side while pulling straight up:

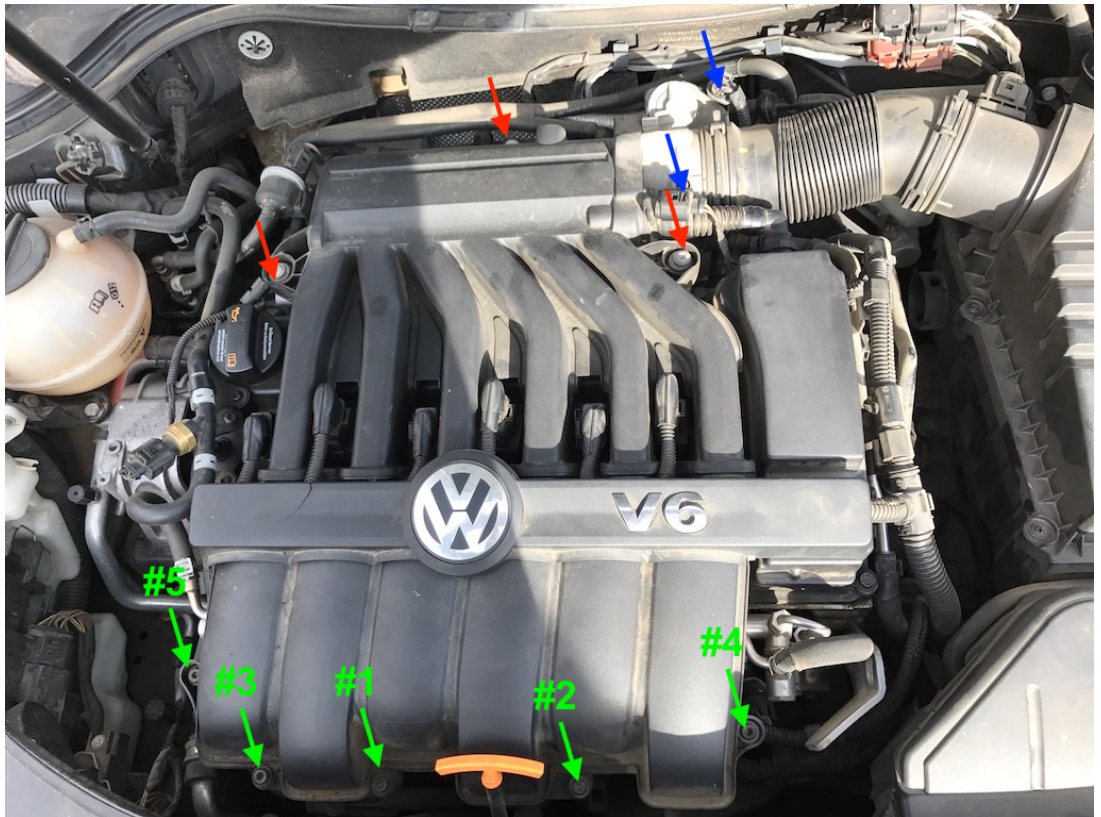


Next, unclip the tray holding the coil harness from the intake manifold. It's held in by three "Christmas tree" clips which come out with firm but judicious pressure:



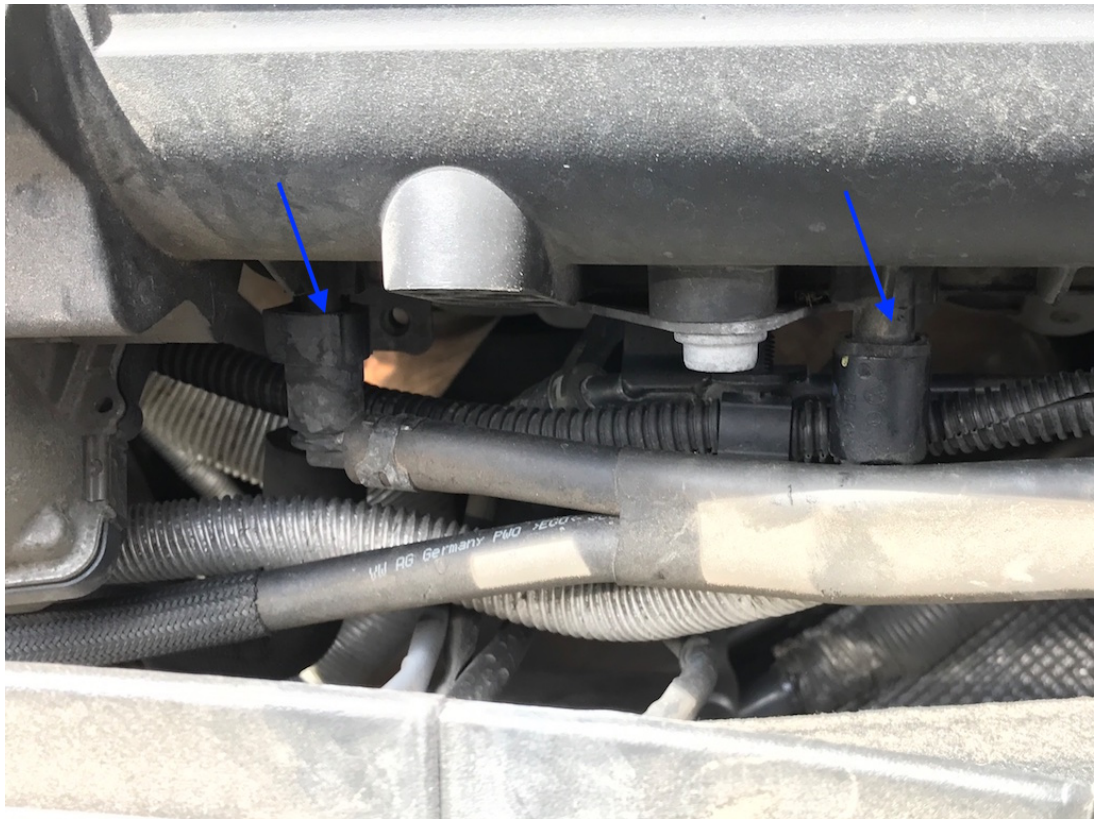


Set the tray to the right, over the air box. Next you need to unplug the electrical connections marked by the arrows in blue:



Once you're done with that, remove the two vacuum hoses from the back of the manifold, marked by the blue arrows:



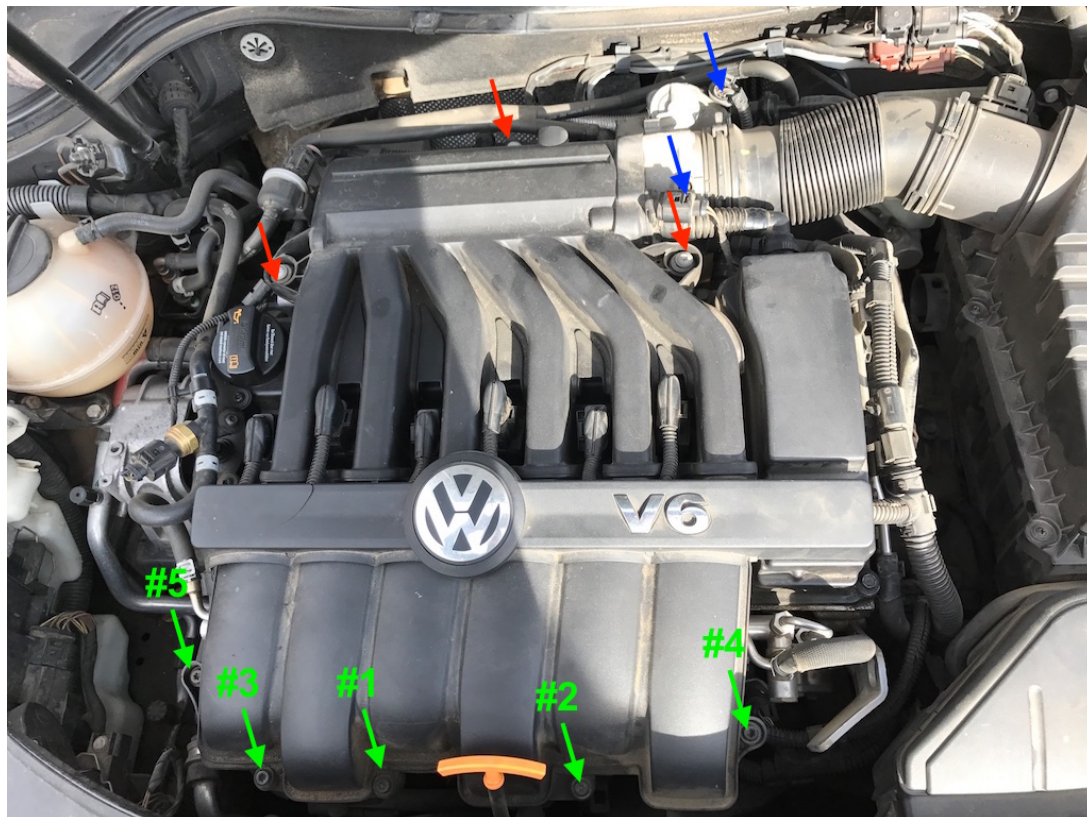


The one on the right in this photo (passenger's side) is a snap-on compression connection. The other one uses the same clip that VW uses on fuel lines. To remove it, press in on the white-ish clip and pull out:



Now set to unbolting the manifold:





First unbolt the fuel line bracket directly in front of the oil fill cap. It attaches to the Valve Cover with two T30 screws.

Next it's time to free up the upper manifold. The arrows in red point to the bolts attaching the manifold to the mounting brackets. As mentioned above the one on the back is a M10, and the two on the sides are T30s.

The arrows in green show the bolts holding the upper intake manifold to the lower, and are numbered in order of removal/installation. I loosened them in three steps: break then loose, loosen 1/2 turn, loosen 1 full turn, and then take them all out. They are captive, so don't expect them to come all the way out.

Now you're ready to lift off the upper manifold. You can do this without disconnecting the dipstick tube, but it's easier if you remove the dipstick itself.

When the manifold is free, it's time to disconnect it from the throttle body. Use some channel-lock pliers to move the ring clamp off of the fitting, then wiggle the rubber boot off the manifold:



Stuff the throttle body pipe and exposed intake manifold runners with clean rags, and you're ready to pull out the coils:

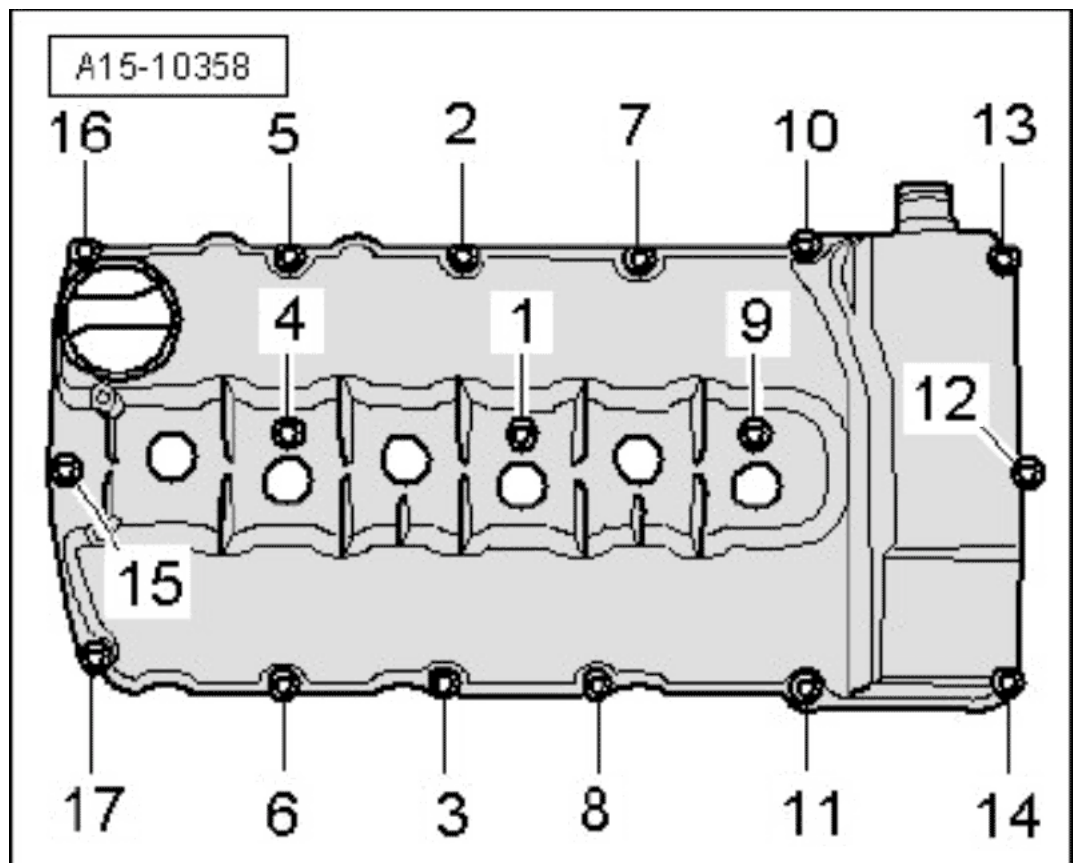




VW says a special tool is required, but with the manifold out of the way all you need is your hands. The spark plugs can remain as they are threaded into the head.

#### Removing the Valve Cover

The Valve Cover bolts should be removed and replaced in this order:



I loosened them in the same manner as the manifold bolts: break then loose, loosen 1/2 turn, loosen 1 full turn, and then take them all out.

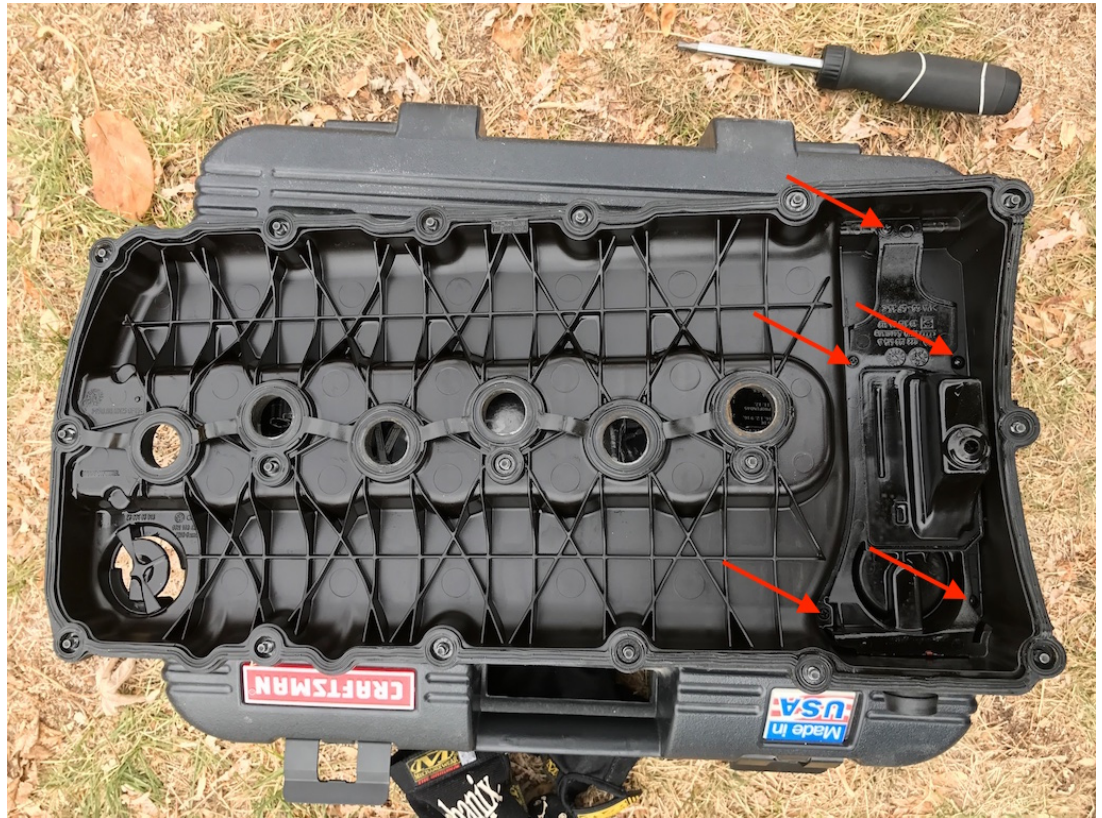
Even with the bolts all the way out the Valve Cover will stick to the head. Take off the oil fill cap and hook your fingers in there to get the upper corner loose, then carefully work your way around so you don't crack the plastic Valve Cover.

#### Accessing the Diaphragm Valve



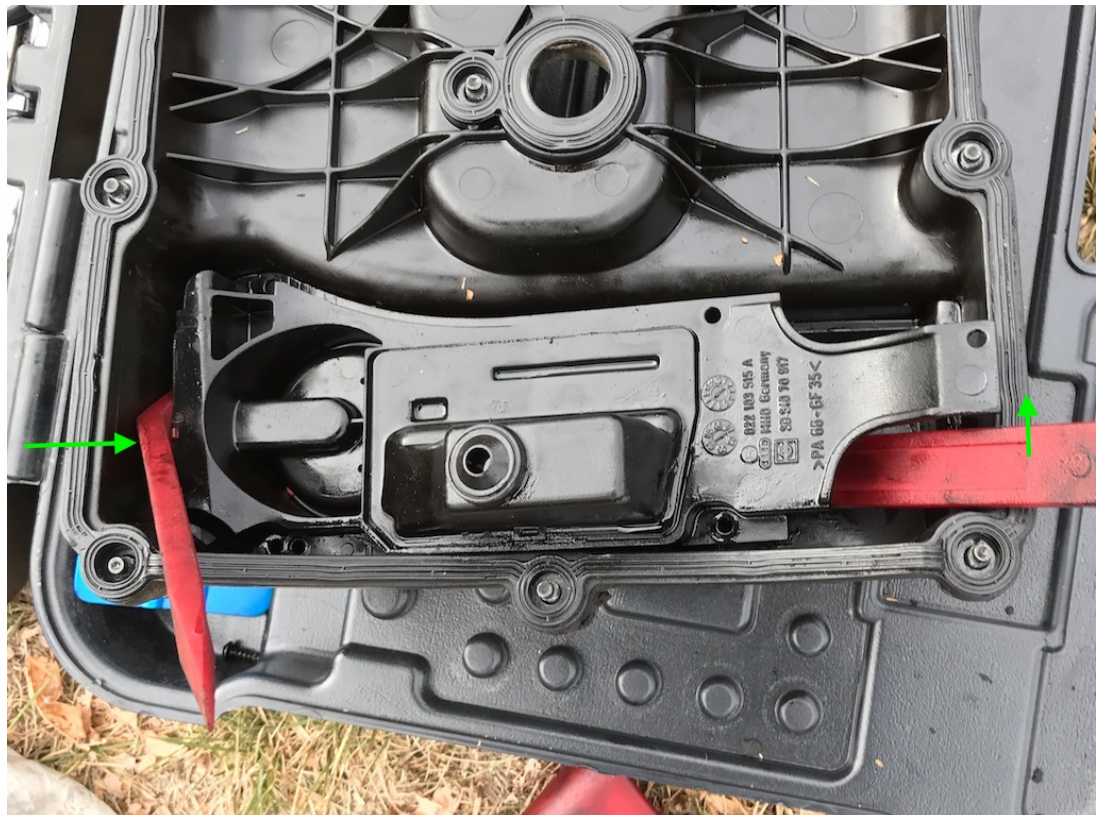
Now you've got the valve cover free. The Oil Separator that houses the faulty diaphragm valve is on the driver's side of the manifold. It's obvious that none of the items were designed to be serviced, so getting them disassembled is a bit of a pain.

First, remove the 5 P2 phillips head screws holding the Oil Separator to the Valve Cover (red arrows):



Even with the screws removed the sucker is going to be pretty well stuck in there. In theory you remove it by pulling straight up and out, but the gasket at the front of the Valve Cover won't want to let go.

After much trial and error I found that by prying the Oil Separator away from the front of the valve cover while also prying up will get the sucker to pop out:



Be sure to pry with something that won't harm the plastic that the Valve Cover and Oil Separator are made of. I used nylon trim removal tools.

Remove the gasket on the front of the Oil Separator. I didn't replace it because I couldn't find the part number before starting the job, but if you remove it carefully you should be able to re-use it:



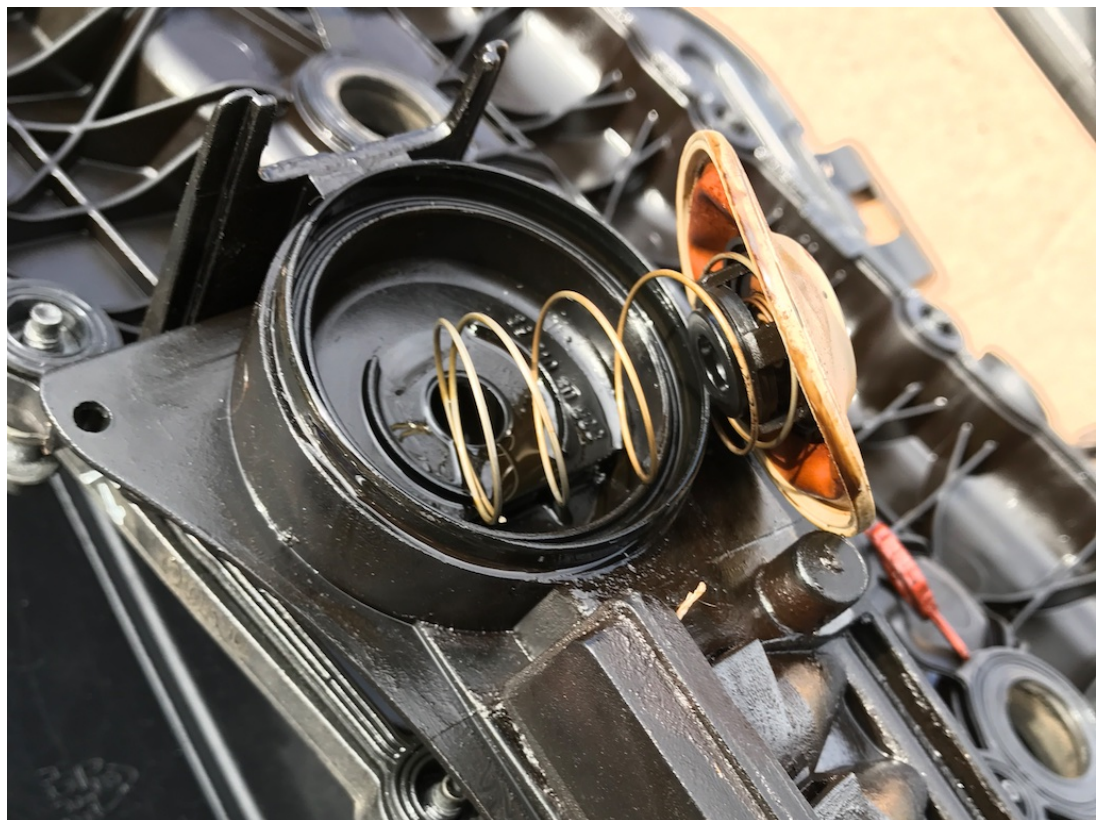


In case anyone wants to try to order one, the part number molded into it is 23 017 33 141:





The diaphragm valve is inside the disc-shaped area right behind the gasket. I was able to pry it open by using a putty knife to work my way around the lid. Here's what you'll find inside:



And here's the OEM Valve next to RKXTech's aftermarket replacement. Front:





And back:



RKXTech's is made out of a much thicker material. This shouldn't cause problems as the valve's response is controlled by the springs on either side.

The failure of the OEM valve isn't visible in the photo, but it had many hairline cracks all around the center.

Move the springs and the black plastic hub from the old valve to the new, and put the Oil Separator back together. Make sure the valve doesn't get snagged by the plastic lid, it needs to sit inside the Oil Separator and be able to move freely.

#### **Putting it All Back Together**

Remove the old Valve Cover Gasket. The bolts are held captive by rubber washers on top and the gasket on the bottom, so some may fall out. Just make sure you push them back through the new gasket as you install it:

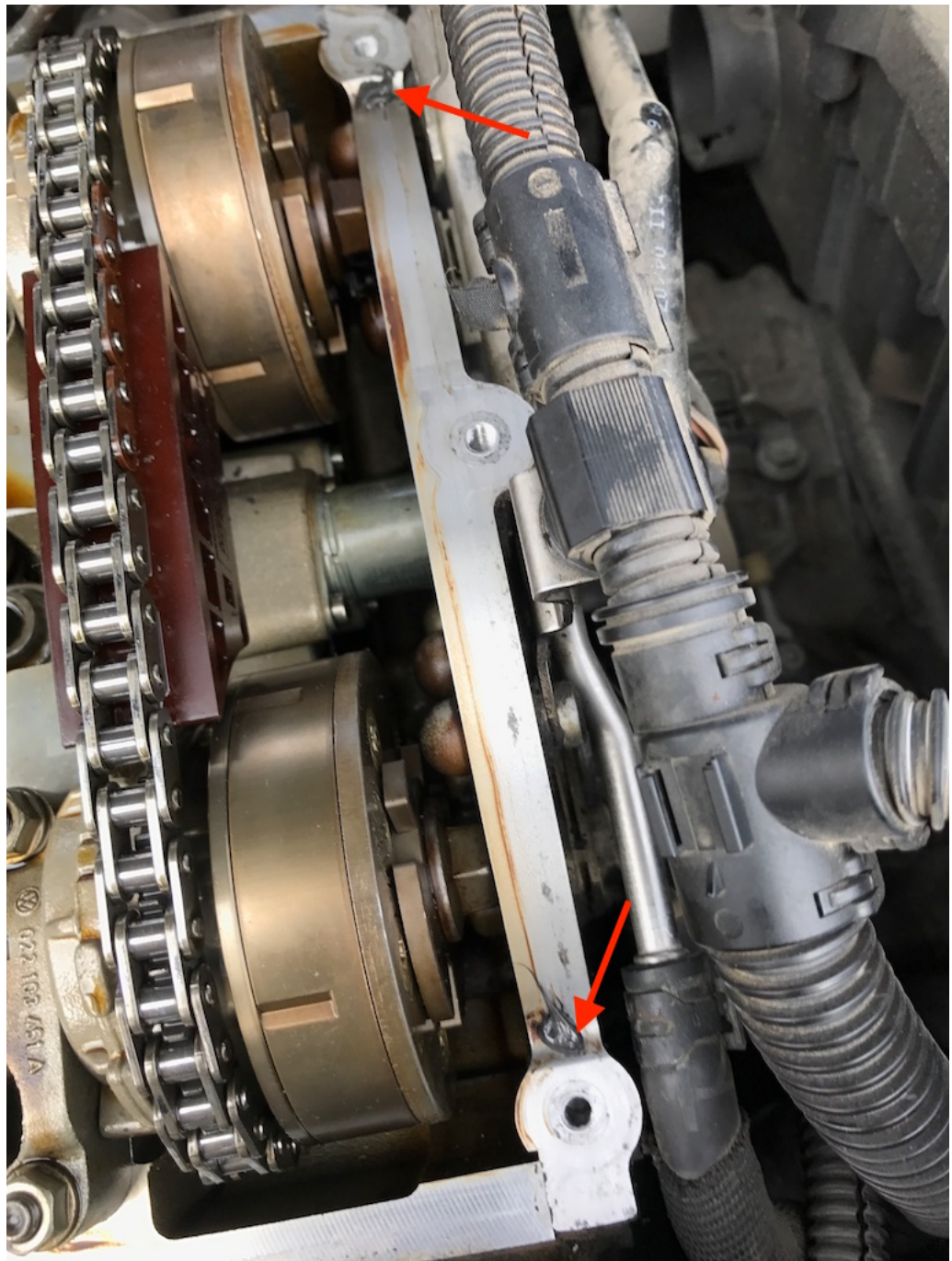




I put a light coat of fresh engine oil on the gasket with my finger.

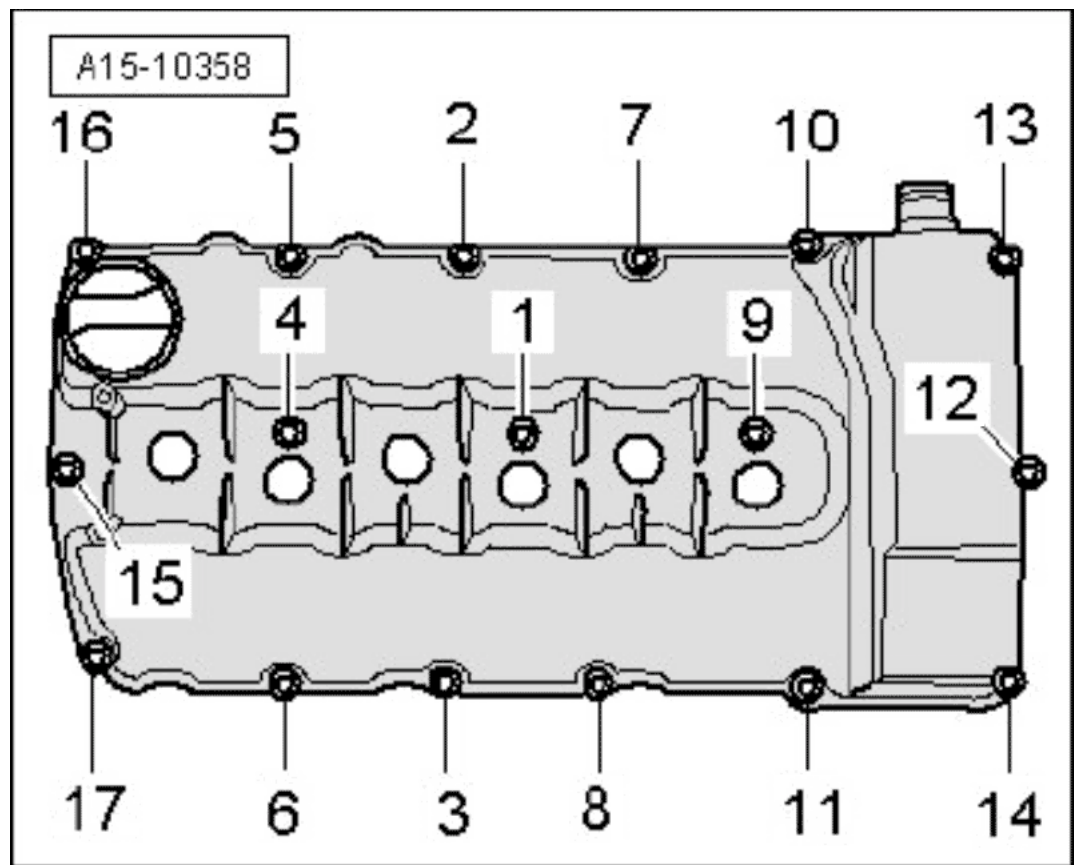
There are two spots that need a little help from gasket maker. VW calls for D 454 300 A2, which is about \$60 a tube, so that wasn't an option. I went with Permatex Ultra Black.

You only need a pea-sized spot on either end of the upper timing chain cover:



Set the Valve Cover into place and tighten the bolts to 10Nm, in sequence, in steps. I went finger tight, 5Nm, 10Nm. Here's the sequence again:

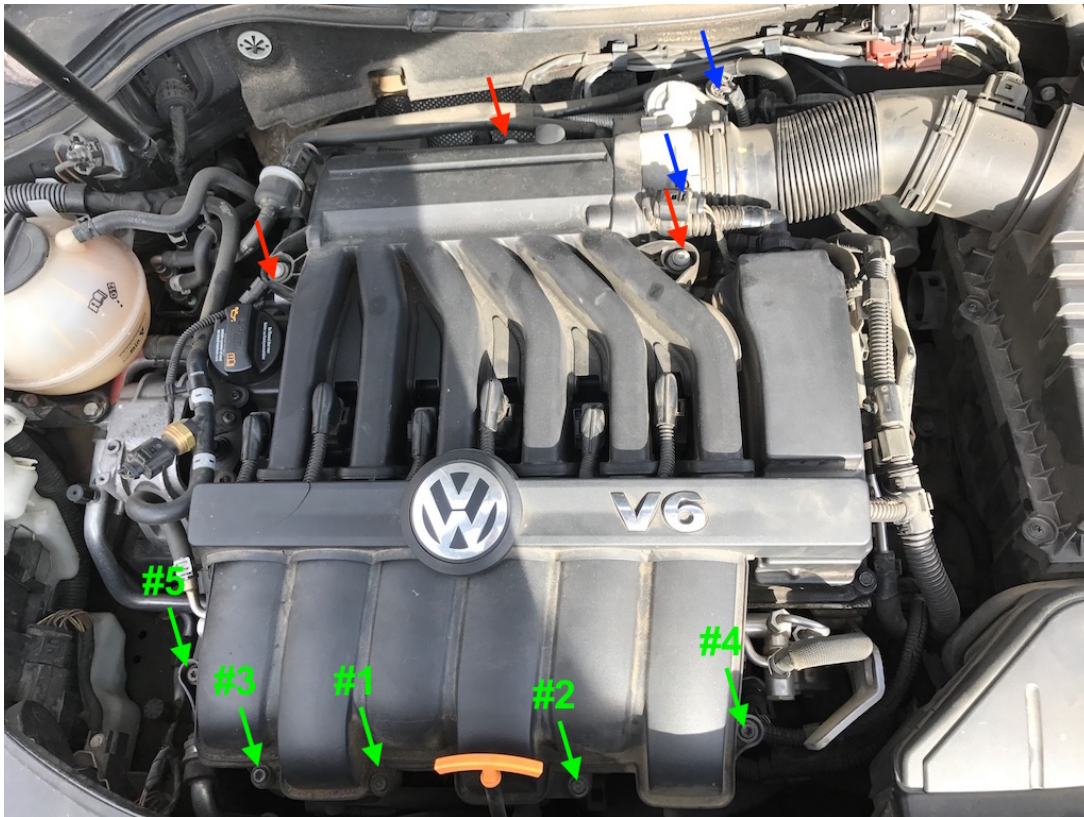




Re-insert the coils, then replace the gaskets on the upper intake manifold with a little fresh oil on both sides:



Set the manifold back in place. Tighten the bolts to the lower manifold in the order shown, again going finger tight, 5Nm, then 10Nm:



Clip the coil harness tray back in place, reconnect the throttle body and re-set the ring clamp, reconnect all electrical connections, replace the coil harness cover, and you're done!

Take it for a test drive that will let the engine get to operating temperature, and run in through the rev range. If there's a leak between the upper and lower manifolds you'll get a CEL. If the valve cover is leaking you'll see oil seeping out. Hopefully all's well! Now enjoy the fact that you'll (hopefully, probably) never have to do this job again!

Last edited by jddaigle; 12-09-2016 at 09:48 AM.

- Jeff  
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**dkarolj**

Semi-n00b  
Join Date: Apr 10th, 2016  
Posts: 11

12-07-2016 02:54 AM [Reply](#) #2

Nice DIY...did this on my 3.6 a while back.  
Poslano sa mog SM-J320FN koristeći Tapatalk

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**sebasEuRo**

Member



Join Date: Feb 26th, 2006  
Location: Seattle/Europe  
Posts: 11,894  
Vehicles: '17 Passat SEL, '17 Sportwagen 4motion

12-08-2016 11:26 PM [Reply](#) #3

Great write-up! Just curious, how many miles on your 2008 Passat?  
Sent from my SM-G930T using Tapatalk

\*\*\*\*\*AMBER CluB\*\*\*\*\*  
 Volkswagen AktienGesellschaft In North America

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**jddaigle**

Member



12-09-2016 12:04 AM [Reply](#) #4

Originally Posted by **sebasEuRo**   
Great write-up! Just curious, how many miles on your 2008 Passat?  
Sent from my SM-G930T using Tapatalk



Join Date: May 30th, 2003  
Location: Denver, CO  
Posts: 6,553  
Vehicles: 2008 Passat Wagon  
VR6 4motion, 2013 FIAT 500 Sport

Thanks! When I did the job the car had 91,400 miles on it.

- Jeff  
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**theMOTHY**

Junior Member



Join Date: Aug 17th, 2011  
Posts: 83

12-09-2016 08:14 AM [Reply](#) #5

Great writeup!  
One thing though, double check that part number on the gasket for the oil separator. Should be:  
23 017 33 141  
Not, 23 017 44 131  
Sent from my SM-G930V using Tapatalk



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**jddaigle**

Member



Join Date: May 30th, 2003  
Location: Denver, CO  
Posts: 6,553  
Vehicles: 2008 Passat Wagon  
VR6 4motion, 2013 FIAT 500 Sport

12-09-2016 09:49 AM [Reply](#) #6

Originally Posted by **theMOTHY**  
Great writeup!  
One thing though, double check that part number on the gasket for the oil separator. Should be:  
23 017 33 141  
Not, 23 017 44 131  
Sent from my SM-G930V using Tapatalk

Good catch! 📱

- Jeff  
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**sebasEuRo**

Member



Join Date: Feb 26th, 2006  
Location: Seattle/Europe  
Posts: 11,894  
Vehicles: '17 Passat SEL, '17 Sportwagen 4motion

12-10-2016 11:21 PM [Reply](#) #7

Originally Posted by **jddaigle**  
Thanks! When I did the job the car had 91,400 miles on it.

Nice, I just bought my wife a 1owner '08 Passat 3.6 4motion, it's super nice having a B6 4motion again... this thing has 94k on it, all maintenance at the dealer, will watch out in case this issue comes up, thanks!

\*\*\*\*\*AMBER CluB\*\*\*\*\*  
🇺🇸 Volkswagen AktienGesellschaft In North America 🇺🇸

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**thekoolaid**

Member



Join Date: Apr 5th, 2011  
Location: Sacramento, CA  
Posts: 468  
Vehicles: Jetta 24v


07-22-2017 09:44 PM [Reply](#) #8

Hey how much different is this to do on a VR6 3.2?

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jddaigle

Member



Join Date: May 30th, 2003

Location: Denver, CO

Posts: 6,553

Vehicles: 2008 Passat Wagon  
VR6 4motion, 2013 FIAT 500 Sport

Originally Posted by **thekoolaid**

Hey how much different is this to do on a VR6 3.2?

Conceptually not that different. The diaphragm will be the same, but you'll have a one-piece intake manifold, and the valve cover bolt layout may be different as well.

- Jeff

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thekoolaid

Member



Join Date: Apr 5th, 2011

Location: Sacramento, CA

Posts: 468

Vehicles: Jetta 24v

Originally Posted by **jddaigle**

Originally Posted by **thekoolaid**

Hey how much different is this to do on a VR6 3.2?


Conceptually not that different. The diaphragm will be the same, but you'll have a one-piece intake manifold, and the valve cover bolt layout may be different as well.

And front bumper needs to come off for this right ?

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jddaigle

Member



Join Date: May 30th, 2003

Location: Denver, CO

Posts: 6,553

Vehicles: 2008 Passat Wagon  
VR6 4motion, 2013 FIAT 500 Sport

Originally Posted by **thekoolaid**

And front bumper needs to come off for this right ?

Correct. Here's a DIY for the Passat that starts after you remove the front end, I'm guessing it'll be pretty similar to a MkV R32:  
[http://nateronline.com/Intake\\_Manifo...emoval\\_BLV.pdf](http://nateronline.com/Intake_Manifo...emoval_BLV.pdf)

- Jeff

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