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Nothing But AIR! VW 09G

A 2005 Volkswagen Jetta with a 09G transmission came in with a complaint of shifting 1-2-3 then neutral when hot. When cold the car shifted okay and there were no codes.

The shop found updated software available and reprogrammed the transmission control module but unfortunately, this didn't fix the concern.

Let's take a look at the steps required to confirm the problem and repairs necessary to fix it.

The 09G transmission uses six linear solenoids and two on/off solenoids to control the shifts. Solenoid N93 is the EPC solenoid and the N91 solenoid controls the torque converter clutch.

There are four linear solenoids that control four separate clutch packs; here are the clutch packs and the solenoids that control their operation:

- K1 clutch — N92 solenoid
- K2 clutch — N282 solenoid
- B1 clutch — N283 solenoid
- K3 clutch — N90 solenoid

There are two on/off solenoids — N88 and N89 — that apply temporarily and alternately during the 4th to 6th gear shifts.

Now let's take a look at the clutch apply chart (figure 1). In 3rd gear, the

Clutch Apply Chart						
Gear	K1	K2	K3	B1	B2	F1
1st	X				*	X
2nd	X			X		
3rd	X		X			
4th	X	X				
5th		X	X			
6th		X		X		
Rev			X		X	

Figure 1

Range		Solenoid					
		N92	N90	N282	N283	N88	N89
Park		X	X	X	X		
Reverse		X		X	X		
Neutral		X	X	X	X		
Neutral Control		X			X		
D	1st		X	X	X	A	A
	2nd		X	X			
	3rd			X	X	C	C
S	4th		X		X	C	C
	5th	X			X	C	C
	6th	X	X			C	C

Figure 2

K1 and K3 clutches are both on. On the 3-4 shift the K3 clutch has to release and the K2 clutch apply. The K1 clutch remains on in both gears.

The N282 solenoid turns off to apply the K2 clutch. If the N282 solenoid sticks, it won't apply the K2 clutch, and the transmission shifts back to 1st gear. This feels like the transmission is in neutral because of road speed.

The solenoid apply chart (figure 2)

shows the solenoids turn off to apply the clutches. In 3rd gear, solenoids N282 and N283 are on. During the shift to 4th gear, the N88 and N89 cycle and the N90 comes on to release the K3 clutch.

Here's what we found

Mark the solenoids and their locations on the valve body so you can return them to their original locations

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after the repair. Figure 3 shows the solenoid ID and locations. Use an old hot plate to heat a pan of ATF to 200°F and drop the solenoid in (figure 4). Heating the solenoid lets you confirm that the solenoid sticks when hot.

CAUTION: Be careful handling the solenoids when they're hot.

Use a small screwdriver and push the valve to the spring side (figure 5). Then tip the solenoid end over end; you should feel the armature move from one end to the other. If not, the solenoid bushings are bad or sticky.

Disassemble the Solenoids

There are many different methods and tools available to take the solenoids apart and crimped back together. Figure 6 shows the solenoid taken apart and the parts labeled. Figure 7 shows the armature stuck in the N282 solenoid bushing. This confirms the complaint.

When replacing the solenoid bushing you have some choices to make. Some kits come with the solenoid cans that help the wire connector stay in place when the solenoid connector is broken. Also some crimping tools work better with new cans.

Others come with the bushing only, so make sure you know what you're buying and what works best with the tools you choose. Some kits require no special tools and allow you to clean your bushings.

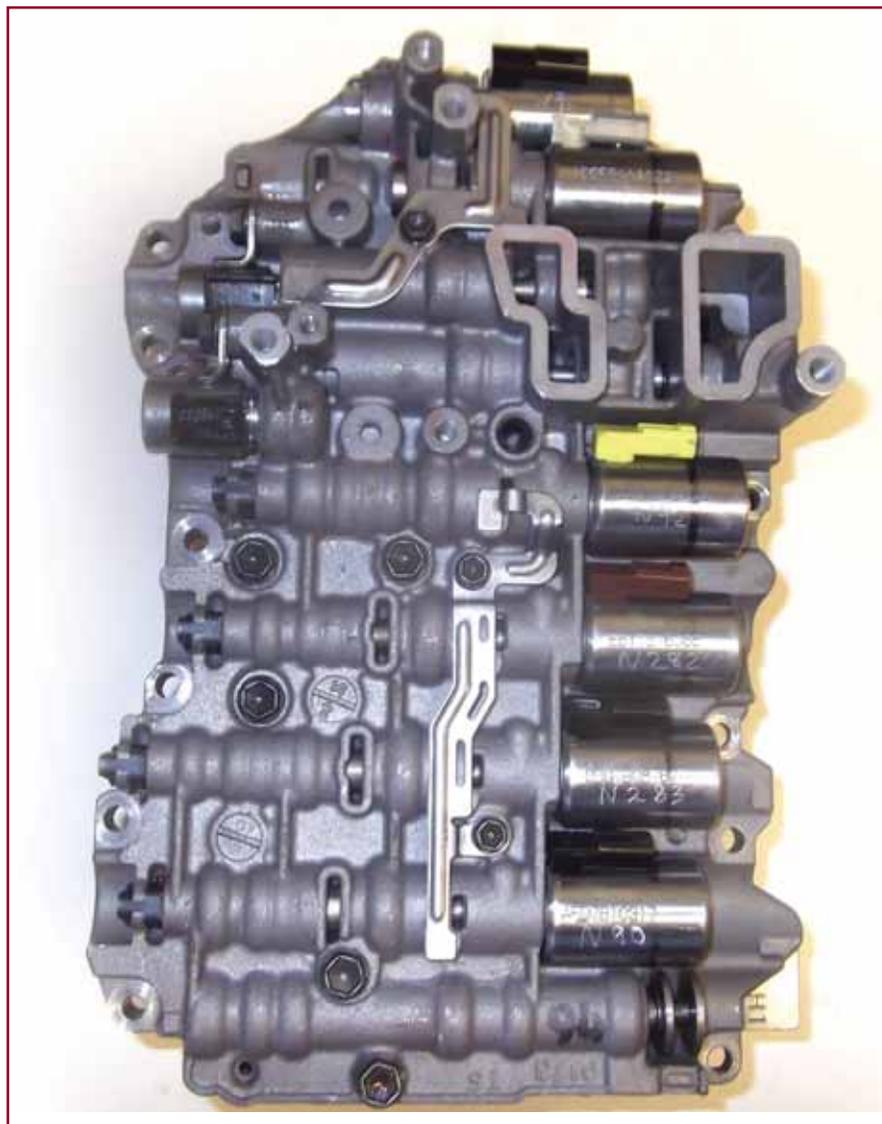


Figure 3



Figure 4



Figure 5

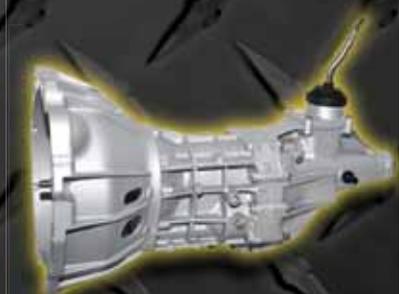


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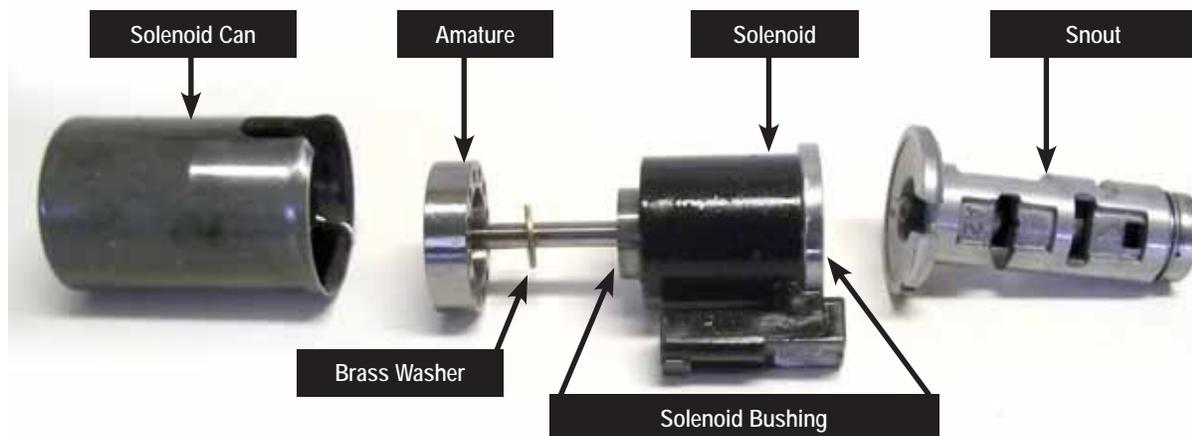


Figure 6

A few tips about the solenoid bushings:

1. After you get the bushing out, make sure there are no nicks or burs before you press the new bushing into the solenoid.
2. Always press bushings in straight with an arbor press or vise.
3. Use a small amount of Loctite to help keep the bushing in place.
4. Make sure armature falls out of solenoid under its own weight. Make sure the cap on the end of the snout is tight and isn't leaking.

Now that you've fixed the most common problem with the 09G, here are a few other issues to check.

The 09G has two solenoid modulator valves: One is in the lower valve body section and is a very active regulating valve. The solenoid modulator valves are like a GM actuator feed limit valve. Their job is to feed the solenoid with regulated feed oil. With a worn solenoid modulator bore you can have low or high pressure, depending on the wear location.

There are many different ways to check the lower solenoid modulator valve: wiggle test, visual inspection, wet air test, or vacuum test. Figure 8 shows the bore and test areas.

To vacuum test this valve (figure 9), place small amount of transmission assembly lube on the test port and cover. Notice the low vacuum reading: this bore needs to be addressed. I prefer the vacuum test because you can put a number with the test results and compare it to new, but use what



Figure 7

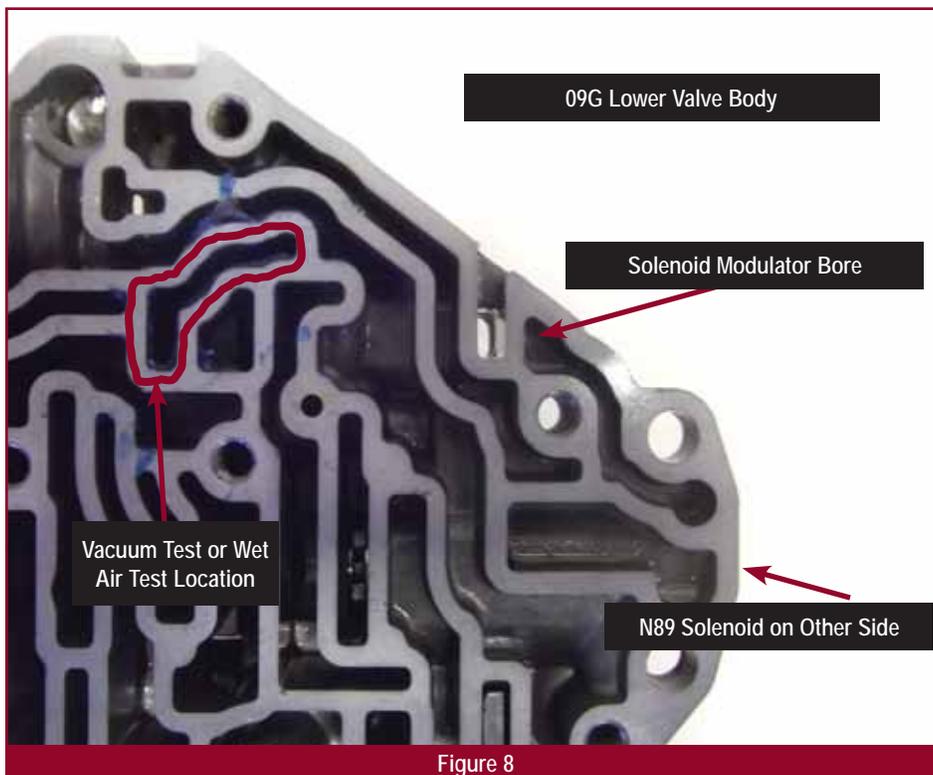


Figure 8

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you're comfortable with. The most important thing is to look for wear. It's a good idea to start a test log for passing and failing valve body bores.

The second solenoid modulator valve is located in the upper valve body, which also holds the TCC control valve. Figure 10 shows the test location for these valves. You can test these valves in the same manner.

To wet air test this location, pour a small amount of oil in the bore and cover it with a plate. Apply low air pressure; if ATF and air leak out the port next to the test location, the bore is worn.

If the valve and its bore failed one or more of the tests, contact your parts supplier for the repair.

There are other areas of the valve body you may want to check for wear, depending on miles and customer complaint. Lockup valve, pressure regulator, and clutch control valves have some wear issues. We'll address these areas in a future article.

After the repair, fill the transaxle with the proper fluid and check the fill level with the transmission between 95°F and 113°F (35°C to 45°C). Check and clear all modules for codes. Then reset transmission adapts with a capable scan tool, as disconnecting the battery doesn't always work.

You need to bring the transmission to operating temperature for the relearn to start adapting. Drive the car at 20% throttle and get the transaxle into sixth gear, then slow back down. Repeat this procedure five to ten times for the computer to learn the up- and downshifts.

Next it needs to relearn the engagements. Put the transmission into neutral and wait five seconds, shift into reverse and wait five seconds; repeat five times. Do the same for forward engagements.

That should be all there is to it; the car should be ready to deliver.

At around 70,000 miles of normal

driving, the first signs of a problem may start to show up. Some of the symptoms are a flared shift, neutrals on the shift, or delay-bang engagements. The transmission will work okay cold at times, but the longer you drive the worse it gets.

There are a few common problems with the 09G valve body and solenoids that can cause temperature sensitive problems. You should now be able to inspect and find the problems with this valve body and solenoid.



Figure 9

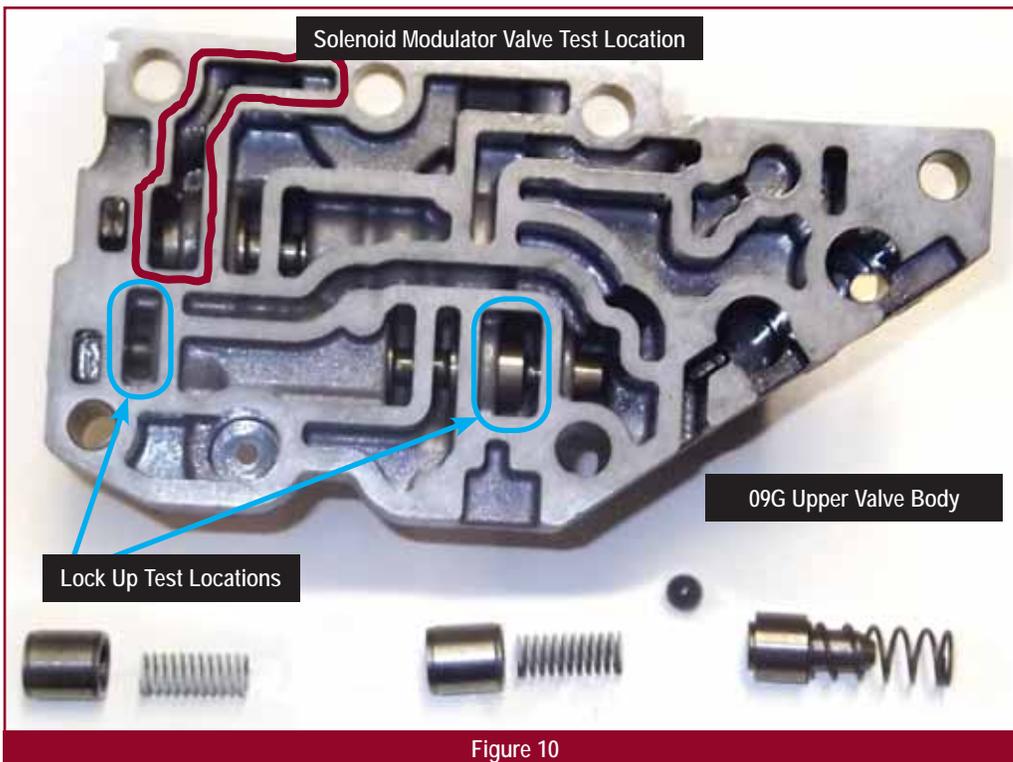


Figure 10

Make sure the car has the latest updated software. Check the transmission fluid level and reset transmission adapts. Follow the test drive procedure to help the computer relearn the engagements and shifts. These steps will lead you to a profitable repair. Another successful tale from the bench.

Thanks to Perfection Plus Transmission Parts for the use of the valve body.





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