Subject:
Valve-body components and operation

Unit:
VW DSG 02E

Vehicle Applications:
2004-up New Beetle, New Jetta, Golf GTI

Essential Reading:
- ☑ Rebuilder
- ☐ Shop Owner
- ☐ Center Manager
- ☑ Diagnostician
- ☐ R & R

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Volkswagen's Direct-Shift Gearbox

Part 5

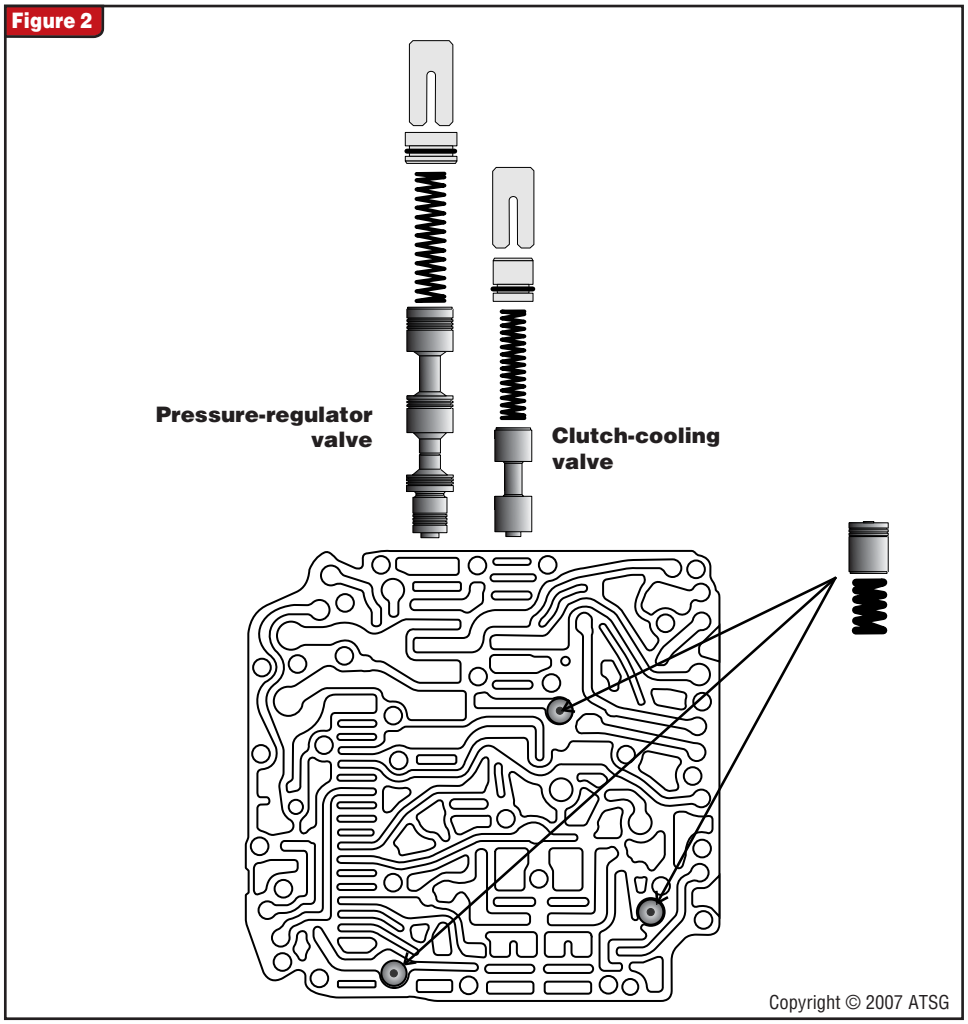
Figure 1

The DSG valve body is definitely one of the simplest we have seen in transmissions (see figures 1 through 5 here and on page 18). It contains only five valve lineups, two checkballs, three damper assemblies, two pressure senders (pressure sensors/transducers) and 13 filters (see figures 2, 3 and 5).

The two checkballs and pressure senders are in the K1- and K2-clutch pressure circuits, which are being

continues page 18

Figure 2



continued from page 10

used for precise clutch-pressure control and release. These sensors are integral to the TCM and are staked into the channel-plate portion of the valve body (see Figure 4), making these sensors non-serviceable separately. This also means that the TCM cannot be easily removed from the valve body even if you remove all the bolts (see Figure 6 on page 20). So it appears that if a pressure sender fails, you will be buying a TCM/valve-body assembly to correct the problem.

It is no secret that the manufacturers are doing everything they can to get us to the place where all we can do is unit replacements – very un-American, in my opinion. If you prevent the middle-class working man from earning a living, you weaken a country. It is not typical of me to get on a soapbox like this, but the things we are seeing in the automotive business have me very concerned.

Try to buy transmission parts for a Nissan Murano; it cannot be done. You are forced to buy a whole transmission. Our politicians do not give a hoot about America, just their back pocket. It sure would be nice if our automotive associations had more clout on The Hill. OK, I am done; back to tech. Thank you for giving me a few minutes to blow off some steam.

With the valve body as simple as it is, it does not take much effort to identify and trace hydraulic circuits, as I did in Figure 7. This becomes helpful in identifying case

continues page 20

Figure 3

Valve-Body Details

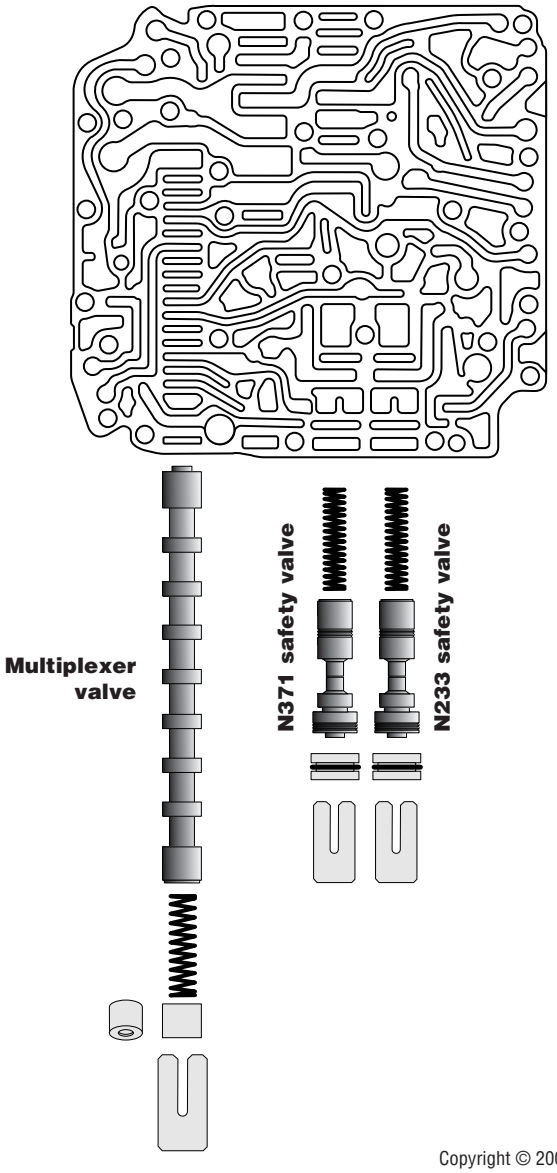


Figure 4

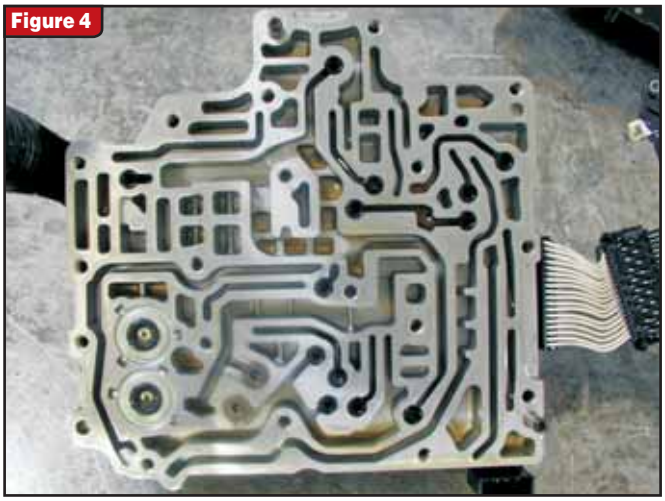


Figure 5

Valve-Body Details

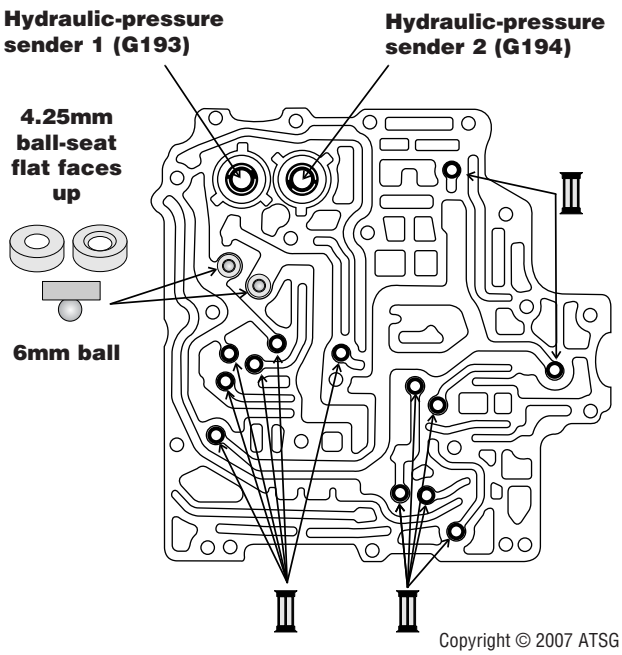
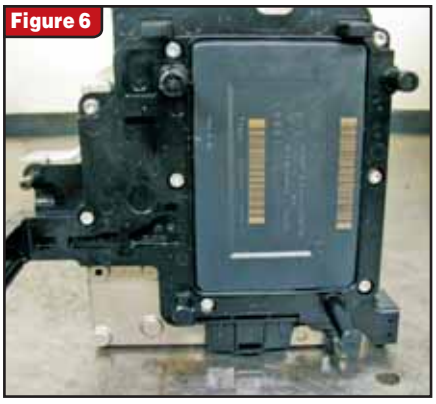


Figure 6



passages for testing. For example, if you look below the multiplexer valve in the hydraulic circuit shown in Figure 8 on page 22, the shift rails inside the transmission are represented. From left to right you have the 3-1 shift rail, the N-5, the R-6 and then the 4-6. Each end of these shift rails sits inside a cylinder containing a piston seal known as a gear actuator (see figures 9 and 10 on page 24). When you look at Figure 11, you can see how one can inspect these gear actuators for leaks with compressed air through their respective case passages.

You also will notice that there are slots and holes within the center of the case as shown in Figure 12. These are openings for various sensors built into the TCM, which are identified in Figure 13 on page 26. Four of those sensors are called "travel sensors." They monitor the position of the four shift rails by reading the magnet travel senders that are affixed to each of the rails (see figures 14 and 15).

The other sensors and senders identified in figures 13 and 15 are:

• The input-speed sender (G182) is a Hall-effect sensor that reads the outside of the K1/K2-clutch drum, which rotates at engine speed. This signal is used to calculate clutch slip for a more-precise control of clutch apply and release. In the event of a failure, the redundancy backup is an engine-speed signal, which the transmission computer receives over the CAN (controller area network) bus.

• The multiplate-clutch oil-temperature sender (G509) is also inside the same housing as the input-speed sender, and it measures the temperature of the oil as it comes from the outlet ports in the drum assembly. From this input, the transmission computer regulates the flow of clutch-cooling oil and initiates further measures to protect the gearbox. It measures temperatures rapidly and works within a range from –55° C to +180° C. As a backup

text continues page 24

Figure 7