

**Subject:**

Operation of pressure-control  
and multiplexer solenoids

**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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Transmission Digest  
Technical Editor



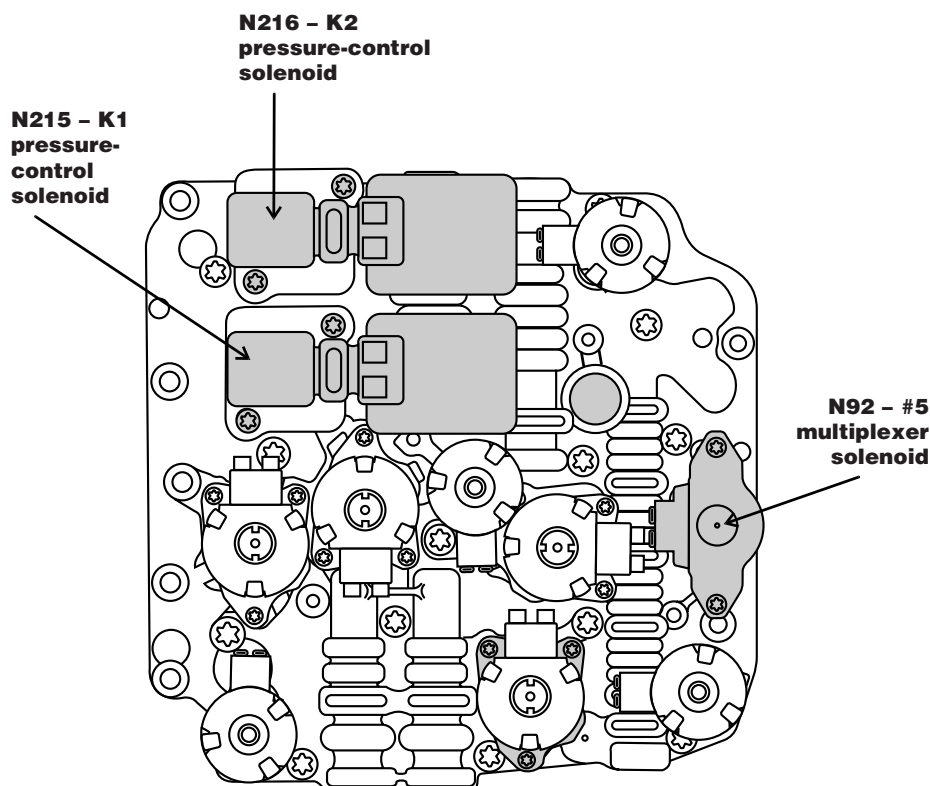
# Volkswagen's Direct-Shift Gearbox Part 4

Picking up where we left off last month, the remaining three solenoids to cover are two pressure-control solenoids – N215, which operates the K1 clutch, and N216, which operates the K2 clutch – and the N92 multiplexer solenoid (see Figure 1).

The multiplexer solenoid measures about 15 to 20 ohms, as shown in Figure 2 on page 12. Be careful not to

lose parts when removing this solenoid, as there are two O-rings, a directional ball seat and ball under the solenoid (see figures 3 through 5). Additionally, the attaching bolts hold together the solenoid assembly, which will fall apart in pieces as you can see in Figure 6. Figures 7 and 8 are close-up views showing the ball-seat and non-ball seat side of the disc, *continues page 12*

**Figure 1**



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which must be installed correctly. Figure 9 on page 20 shows details of the solenoid operation.

The N215 and N216 solenoids measure 4.5 to 6.5 ohms as seen in

Figure 10. When these two solenoids are removed, there is a one-piece silicone-beaded screen gasket similar in construction to Ford's 5R110W valve-body gasket (see

Figure 11). We have seen the negative effects mineral spirits have on the white silicone bead, and so my suspicion is that mineral spirits

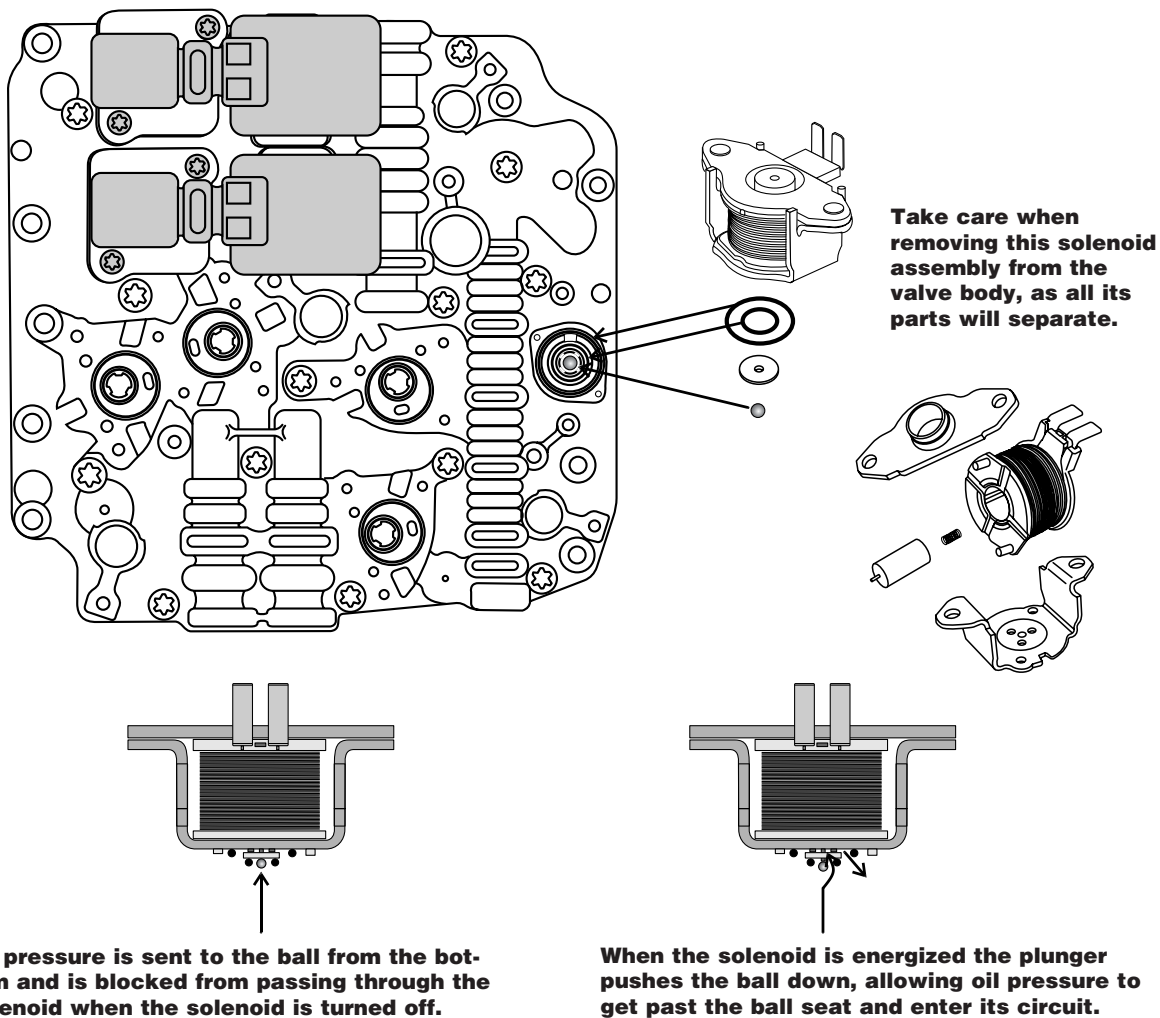
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**Figure 9**

Under the N92 #5 multiplexer solenoid are two O-rings, a thin ball seat (about 1.50mm) and a 3.94mm ball. The ball goes into the solenoid pocket, followed by two O-rings and the ball seat. The ball seat is directionally sensitive. Be sure that the flat side faces the solenoid and the tapered seat faces the ball.

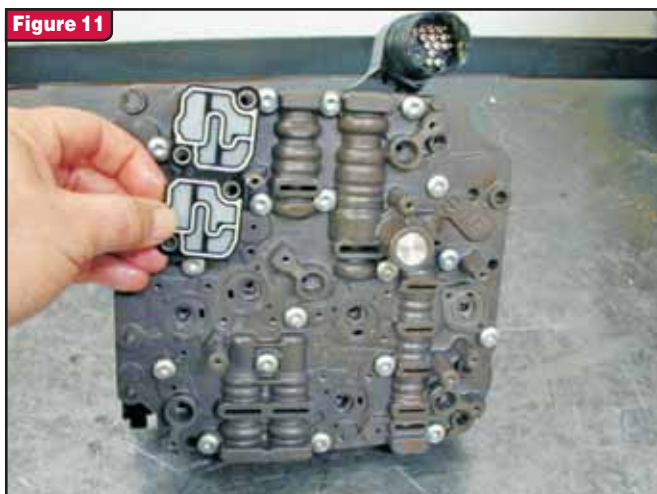


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**Figure 10**



**Figure 11**

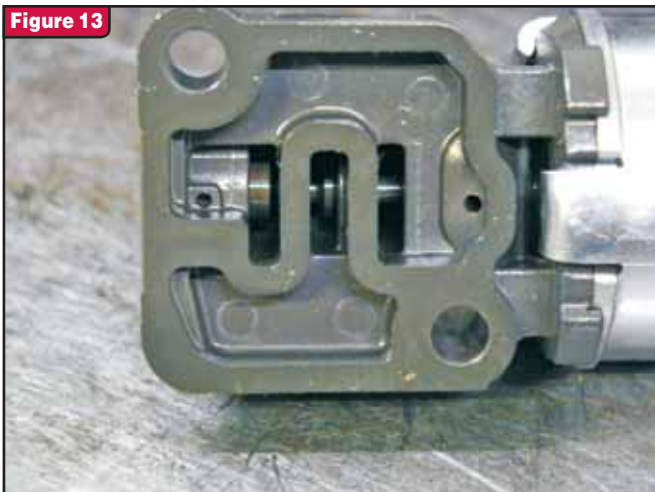




**Figure 12**

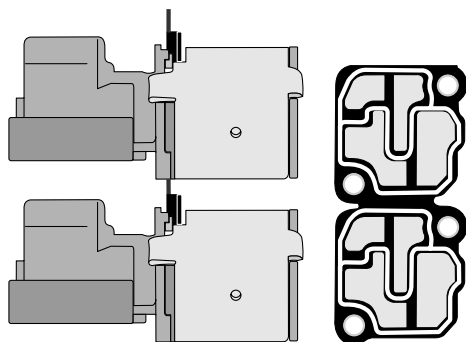


**Figure 13**

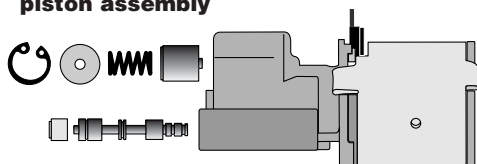


**Figure 14**

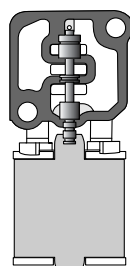
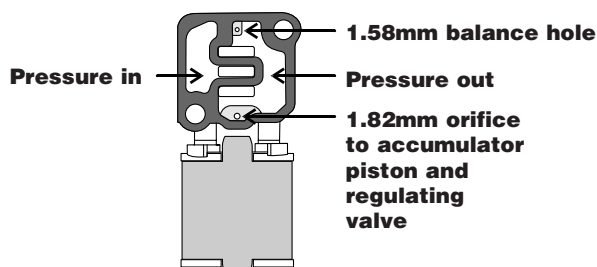
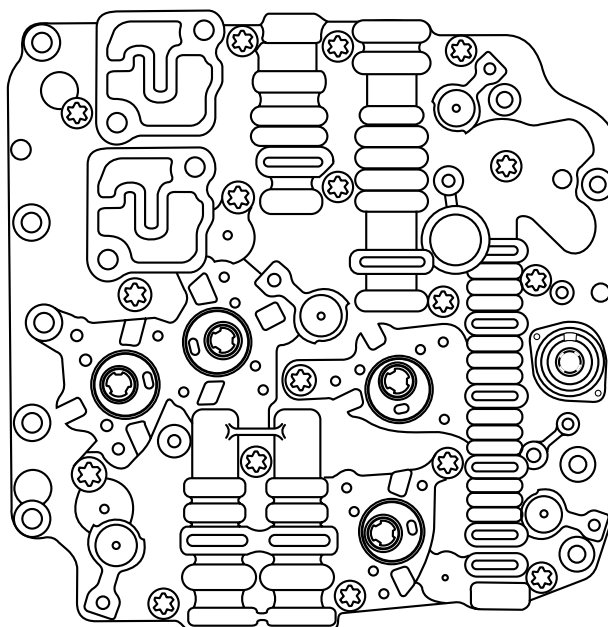
Under the K1 (N215) and K2 (N216) pressure-regulator solenoids is a molded gasket. Take care not to allow the gasket to make contact with mineral spirits, which will deteriorate the silicone bead.



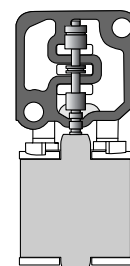
**Accumulator-spring and piston assembly**



**Regulator valve. The bore plug is press-fitted into the bore.**



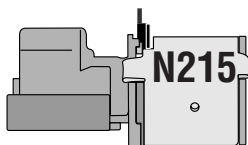
**When the solenoid is off the valve is held down by pressure acting on the end of the valve through the 1.58mm balance orifice.**



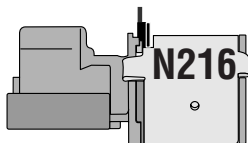
**When the solenoid regulates it pushes the valve up, allowing increased pressure into the accumulated clutch circuit.**

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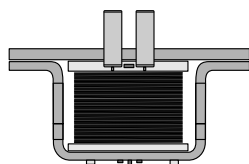
Figure 15



**Pressure-control solenoid #1 (N215) is a normally low solenoid that measures about 4.5 to 6.5 ohms. This solenoid regulates pressure to the K1 clutch. Engine torque influences the operation of this solenoid significantly. This solenoid could fail in the applied state, keeping the K1 clutch applied and causing the engine to stall at a stop. Failure of the solenoid also could prevent the K1 clutch from applying or cause it to apply partially, resulting in premature failure of the clutch.**



**Pressure-control solenoid #2 (N216) is a normally low solenoid that measures about 4.5 to 6.5 ohms. This solenoid regulates pressure to the K2 clutch. Engine torque influences the operation of this solenoid significantly. This solenoid could fail in the applied state, keeping the K2 clutch applied and causing the engine to stall at a stop. Failure of the solenoid also could prevent the K2 clutch from applying or cause it to apply partially, resulting in premature failure of the clutch.**



**The #5 multiplexer solenoid (N92) is an on/off solenoid that measures about 15 to 20 ohms. This solenoid is used to stroke the multiplexer valve in the valve body, which allows for one gear-actuator solenoid to provide two different gears.**

**OE manuals say:**

**When the solenoid is off, 1st, 3rd, 6th and reverse can be achieved.**

**Hydraulics reveal:**

**When the solenoid is off, 1st, 3rd, 5th and reverse can be achieved.**

**OE manuals say:**

**When the solenoid is turned on, 2nd, 4th and 5th can be achieved.**

**Hydraulics reveal:**

**When the solenoid is turned on, 2nd, 4th, 6th and neutral can be achieved.**

**Failure of this solenoid will cause incorrect selection of gears.**

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would damage the silicone bead on this screen gasket as well.

Each of these two solenoids consists of a free-floating valve and a spring-loaded accumulator (see Figure 12 on page 22). The valve is held in place by a pressed-in bore plug that is not removable – unless, of course, you drill into it and pull it out as I did. It is much easier to just shake the assembly to verify that the valve is not stuck.

Looking into the hydraulic side of the solenoid there are two orifices, one feeding the back end of

the valve and the other feeding the accumulator piston and clutch circuit (see figures 13 and 14). Figure 14 provides the operation of these clutch-control solenoids as well as orifice identification and dimensions. Figure 15 provides further details on the K1, K2 and multiplexer solenoids.

Next month's final installment on the DSG transmission will provide identification of the valve-body small parts and circuits, case-passage identification, shift-rail operation and TCM information. **TD**

## The Bottom Line:

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96 Useful information.

97 Not useful information.

98 We need more information.