Subject:
Operating principles

Unit:
VW DSG 02E

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

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The Direct-Shift Gearbox

Part 2

Housed inside the six-speed direct-shift gearbox (DSG) is a Mechatronics assembly consisting of a control module, valve body and solenoids (see figures 1 and 2). It is the control center that shifts this manual gearbox automatically by turning on and off two separate clutch drums called the K1 and K2 clutches.

Each clutch supplies engine torque to its respective input shaft, which then drives one of two output shafts. The K1 clutch and Input Shaft 1 provide 1st, 3rd, 5th and reverse gears, and the K2 clutch and Input Shaft 2 provide 2nd, 4th and 6th gears (see figures 3 and 4). As you can easily determine, K1 is cycled on for 1st and then turns off while K2 is cycled on for 2nd and so on.

The output-shaft configurations are slightly different from those of the input shafts in that Output Shaft 1 consists of 1st, 2nd, 3rd and 4th gears and Output Shaft 2 consists of 5th, Neutral, 6th and reverse gears (see figures 5 and 6 on page 42).

Since the Mechatronics is control central, let's begin by seeing all that it is equipped with to operate this cleverly designed unit, starting with the 11 solenoids shown in figures 7 and 8.

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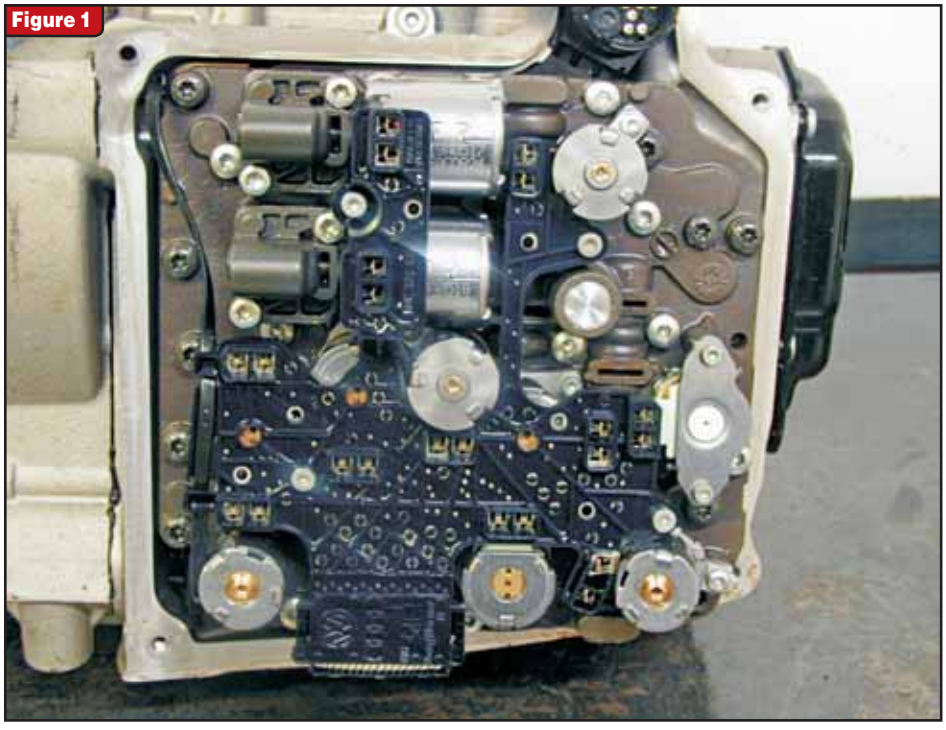
Figure 1

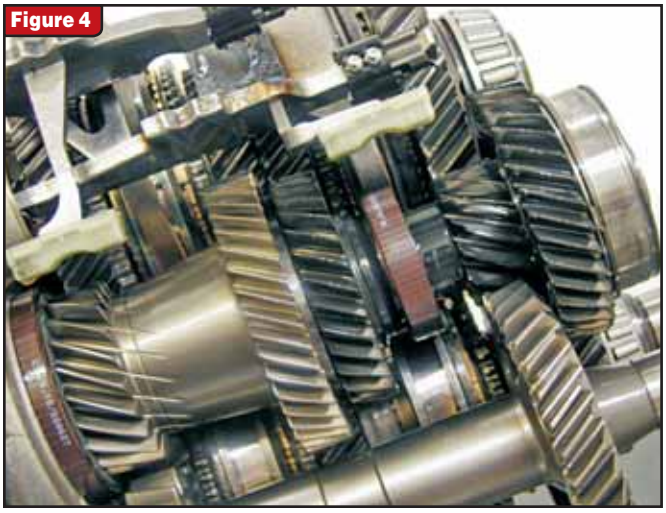


Valve-body and solenoid side of the Mechatronics assembly

Figure 2

Control-module side of the Mechatronics assembly

Figure 4



Two different colors are used to distinguish input shafts 1 and 2.

Figure 3

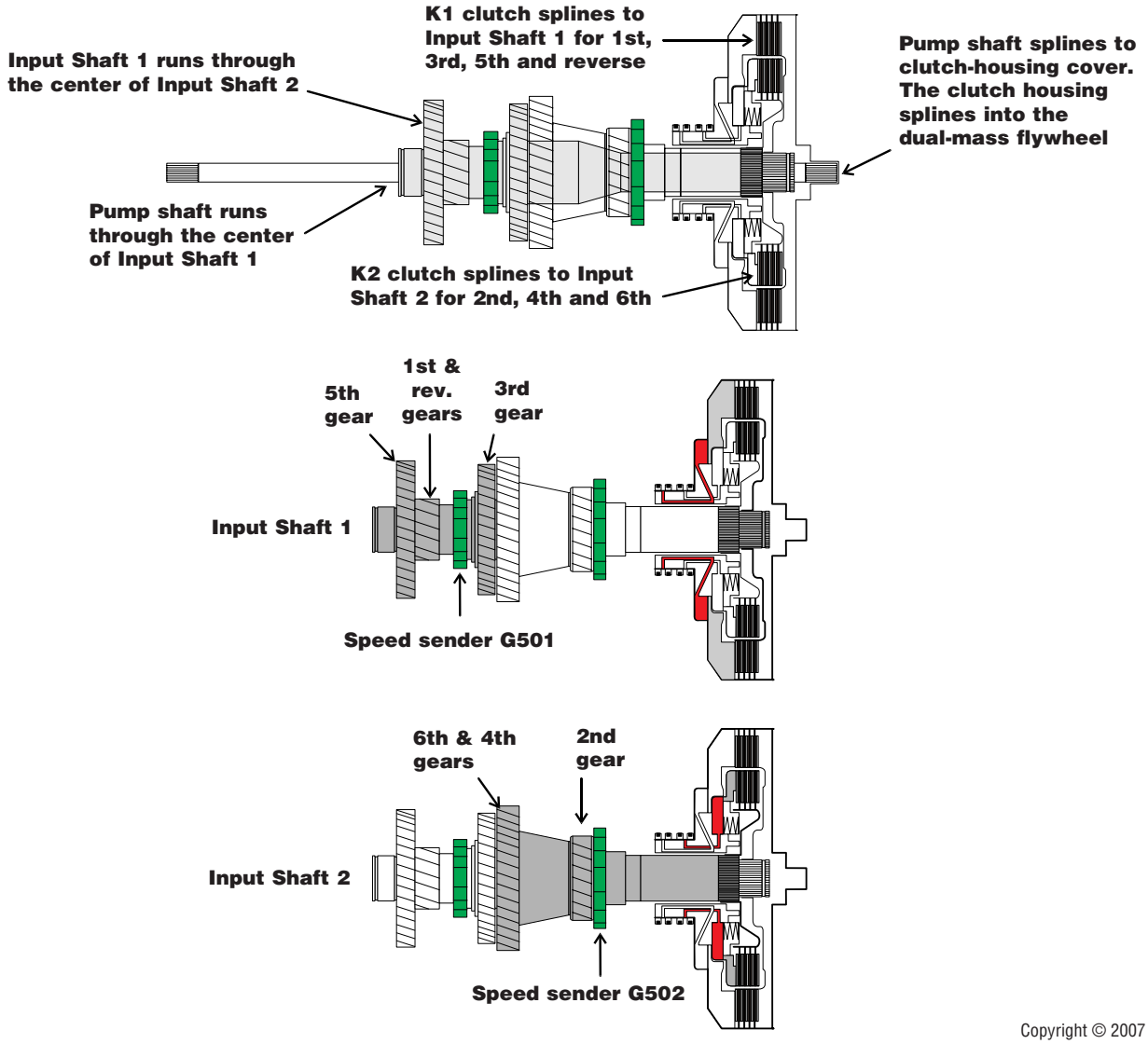
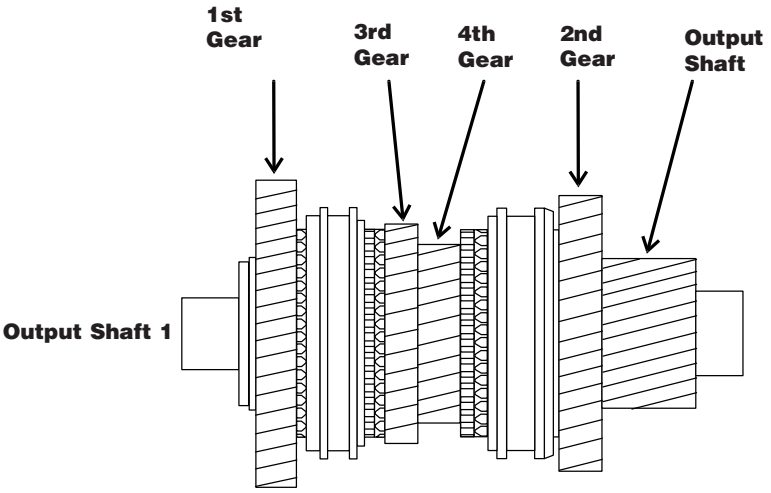


Figure 5

1st, 2nd and 3rd gears use a three-piece synchronizer that consists of an outer synchro ring, an intermediate ring and a friction cone that is integral to the gear.



Both output-shaft gears mesh with the final-drive ring gear

4th, 5th and 6th gears use a simple cone system consisting of a synchro ring and the friction cone on the gear. The speed difference with these gears is not as great as with 1st, 2nd and 3rd. As a result, the balance of speed requires less effort in synchronization, which takes place faster.

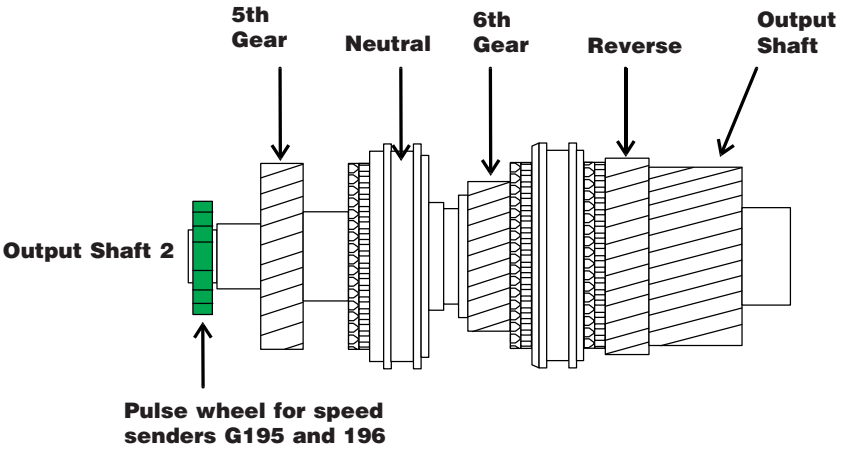


Figure 6

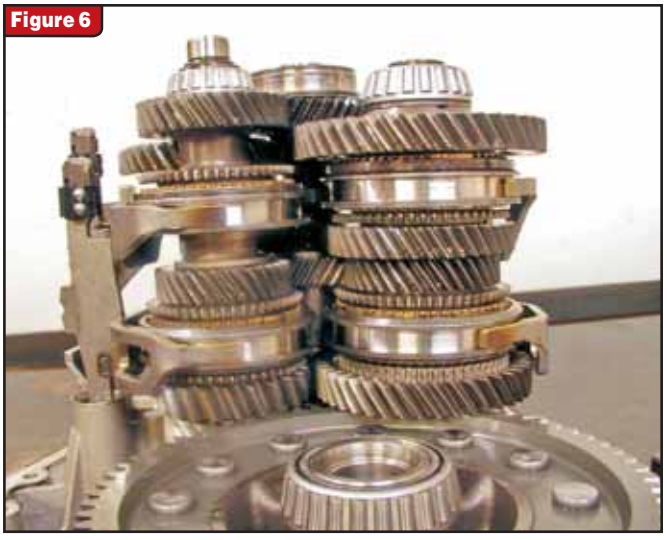


Figure 7