

## Bleeding ABS Brakes of Volkswagen Vehicle

ABS (Anti-lock Braking System) is an active safety system of vehicle. It helps prevent the wheels from locking and keeps the vehicle stable during full braking.

Working principle of ABS system: it gets signal from the wheel speed sensor of each braked wheel and is activated immediately whenever the tendency of wheel locking occurs. Braking force to the wheel will be decreased at this moment to avoid locking. When the brake pedal is depressed, the brake fluid goes to the electromagnetic hydraulic valve and then to the wheel cylinder so that the brake is activated to slow down the vehicle. The wheels tend to be locked from rolling and slipping.

When the ECU gets the signal from each wheel speed sensor that the slippage is in the range of 8 ~ 35%, ABS ECU makes the electromagnetic hydraulic valve be supplied with small current so that the valve moves up for shutting off the brake liquid channel. The liquid pressure keeps unchanged. When the slippage is over 35%, the valve will be supplied with large current for moving up further and opening the liquid return channel. Some of the liquid returns to the return pump and pressure reducer. The return pump is operated to pump the liquid to the main brake line to balance the braking pressure caused by the increase of pedal force. The return pump is operated at pressure 22 ~ 25MPa. The driver can feel the rebound of the pedal. When the vehicle speed increases owing to the decrease of brake pressure, ABS ECU will send the signal to cut off the power to the electromagnetic valve so that the valve body will move down under the spring force. The brake line is turned on again and the brake pressure increases. The procedure will be repeated until the vehicle stops.

The braking performance is directly related to the vehicle safety. If there is air in the brake lines, the braking effect will be diminished. Manual bleeding of air is performed for traditional brake system. When doing so, one person unscrews the bleed screw while the other depresses the brake pedal. However, scan tool must be used when air bleeding is performed to ABS equipped Volkswagen vehicles.

Now let's take LAUNCH X-431 scan tool as an example to describe the air bleeding procedure for ABS of Volkswagen vehicle:

Necessary procedure: enter channel No. 01 through 16 in the function [Basic setting]. Air bleeding is ended in channel No.17.

Number of operators needed: 3 people (one for depressing the pedal, one for filling the brake fluid, another for unscrewing/tightening the bleeding screw).

Condition: enter ABS system and clear the fault memory. The following steps can be performed only after you are sure that no fault is in the ABS system.

Procedure:

1. Connect X-431 scan tool and turn on the ignition.
2. Select Volkswagen vehicle make
3. Enter ABS system.
4. Select the function [Read fault memory] and make sure that no fault is in the system.
5. Select [Basic setting] and enter channel No.01
  - a) Follow the prompts: depress and hold the brake pedal; unscrew the bleed screws for two front wheels.
  - b) Pump the brake pedal for 10 times and then tighten the bleed screw.
6. Click [PAGE DOWN] button so that the screen displays channel No.02.

a) Follow the prompts: depress and hold the brake pedal; unscrew the bleed screws for two front wheels.

b) Pump the brake pedal for 10 times and then tighten the bleed screw.

7. Click [PAGE DOWN] button so that the screen displays channel No.03. Follow the prompts to repeat the steps a) and b).

8. Click [PAGE DOWN] and repeat the steps a) and b) for each channel until channel No.16.

9. Click [PAGE DOWN]. The screen displays channel No.17. Finish the air bleeding procedure.

The above steps must be performed channel by channel from 01 to 17. Do not skip any channel. If you feel that the air in the system is not bled thoroughly, you can repeat the above mentioned steps after the car runs 15 kilometers for completing the bleeding.

When such scan tool is not available, the air can be bled using the following procedure:

1. Do conventional air bleeding at first.

2. Suddenly accelerate the vehicle in an open area and then scam. Keep the brake pedal depressed for air bleeding. Repeat the procedure several times.