Description of systems

The individual components have the following functions:

ABS

Anti-lock Brake System

ABS prevents the wheel from locking up during hard braking initiated by the driver. Despite high brake effectiveness, lane stability and steering capacity are maintained.

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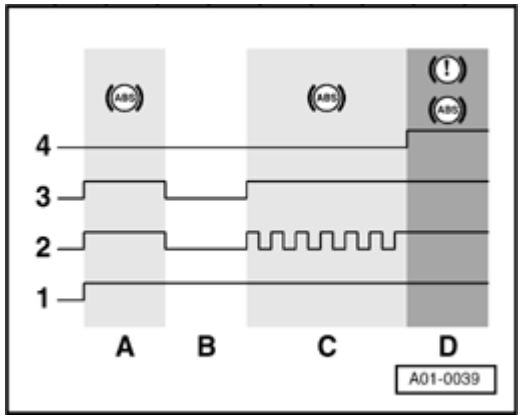
EBD

Electronic Brake Distribution

Specialized software stored in the ABS control module -J104-, called Electronic Brake Distribution (EBD), assumes the function of the brake pressure regulator.

The signal sent to the instrument cluster when ABS fails is pulsed if the EBD function remains operational in emergency mode. The instrument cluster distinguishes between no signal, a pulsed signal, and a steady signal. The ABS/EDL indicator lamp and the red symbol for "Brake system malfunction" will light up accordingly.

01-37



1 - Terminal 15

2 - Signal for controlling the ABS/EDL indicator lamp and the red "brake system malfunction" symbol.

3 - Voltage supply for the ABS/EDL indicator lamp.

4 - Voltage supply for the red "brake system malfunction" symbol.

A - In interval "A" (with "ignition on") a self-test of the ABS/EDL indicator lamp is carry outed for two seconds using signal "2" (lamp lights up). During this interval, the instrument cluster suppresses the red "brake system malfunction" symbol.

B - Signal "2" is not available in interval "B". The ABS/EDL indicator lamp and the red "brake system malfunction" symbol do not light.

C - In interval "C", the On Board Diagnostic recognized a DTC, which did not deactivate the EBD. Signal "2" is pulsed. Only the ABS/EDL indicator lamp comes on.

D - In interval "D", the On Board Diagnostic recognized a DTC, which did deactivate the EBD. Signal "2" is steady. Both the ABS/EDL indicator lamp and the red "brake system malfunction" symbol light up.

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The red "brake system malfunction" symbol indicates the EBD is deactivated. The vehicle is only allowed to be driven under restricted conditions; "Road test vehicle".

For additional information about EBD indicator lamp control, see: "Overview of warning lamp functions"; The vehicle version as relates to EBD can be recognized by checking the note column under "Check control module version".

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EDL

Electronic Differential Lock

The Electronic Differential Lock (EDL) is a traction control aid for driving away from a standstill. An electronically-controlled brake application at the wheel that is spinning provides a torque reaction point for the differential. This enables the wheel with better traction to make use of the engine power. EDL is effective in both forward and reverse.

EDL is part of the basic configuration of vehicles with All Wheel Drive (AWD). Although EDL only regulates the front wheels on vehicles with Front Wheel Drive (FWD), EDL regulates all four wheels on vehicles with All Wheel Drive (AWD). This makes it possible to eliminate the driver operated mechanical differential lock.

Onset of EDL regulation is permitted up to a speed of 40 km/h. The upper switch-off barrier for already active EDL is 40 km/h for vehicles with Front Wheel Drive (FWD), but 80 km/h for vehicles with All Wheel Drive (AWD).

The hydraulic unit is equipped with suction dampers. They improve pressure build-up in the appropriate brake cylinders during EDL regulation. The functional range of the pressure relief valve in the hydraulic unit is 170 ± 25 bar.

To reduce the risk of brake overheating, EDL regulation is not permitted above a specific brake temperature. The temperature limit is defined in the ABS control module (w/EDL) -J104-. The control module determines the actual brake temperature via an algorithm. If the algorithm determines that the brakes have reached a temperature below the temperature limit, the EDL system becomes effective again. Function of the vehicle brake system and ABS are not affected by intervention in this system.

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When ignition is switched off, the temperature calculated for the hot brakes is stored until ignition is switched on again. When ignition is switched on, the instrument cluster transmits a time signal so that the ABS control module (w/EDL) -J104- can calculate the standing time. This standing time is required by the temperature algorithm for calculation of the new brake temperature. If the indicated standing time exceeds one hour, the brake temperature is automatically set to the lowest temperature in the temperature algorithm.

EDL shut-off for temperature reasons is indicated in the measuring value block for a period of 20 ignition cycles.

01-42

ASR

Anti-Slip Regulation (ASR)

The ASR option is only available on Front Wheel Drive (FWD) vehicles. Observe control module coding for these vehicles. The function of ASR requires an exchange of signals between the ABS control module -J104-, the Engine Control Module (ECM) and the Transmission Control Module (TCM). The control modules communicate with each other.

There are two communication systems at work:

- Data is transferred via several single wires.
- Data is transferred via the CAN-bus. The CAN-bus only contains two lines. These transfer all required data.

To determine which communication system is transferring data, use the "Check control module version" function and check the table "Control module versions".

01-43

ASR prevents the wheels being powered from spinning during acceleration by reducing engine load. It is active throughout the entire speed range. The EDL and ASR functions work in combination during vehicle acceleration.

ASR can be switched on and off by pressing the traction control button in the center of the center console. ASR is re-activated on its own when the ignition is switched on. When the traction control button is operated, the ASR indicator lamp lights up in the instrument cluster. During adjustment mode, the indicator lamp blinks three times per second.

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ESP

Electronic Stabilization Program (ESP)

The Electronic Stabilization Program (ESP) is a driving dynamics regulation system. It stabilizes the vehicle both in understeer and oversteer situations. ESP regulation includes the functions of EBD, ABS, EDL and ASR. A special function of ESP is that it can brake individual wheels.

ESP includes the functions of EBD, ABS, EDL and ASR. The individual components have the following functions:

The ASR and ESP functions can be switched on and off using the ASR/ESP switch on the center console. If the driver steps on the brake pedal, the status of the ESP switch is ignored. When braking, ESP is always active. When the ignition is switched on, the ASR and ESP functions are activated.

When switched off, the ASR/ESP indicator light is lit up in the instrument cluster. During adjustment mode, the indicator lamp blinks three times per second.