"Airmatic Dual Control" is a fully supporting air suspension. "DC" (Dual Control) means that both the suspension and the damping can be adjusted. Depending on the road surface condition and driving style, an additional air volume is switched to or away from the suspension struts. This causes a change in spring rate. The entire static and dynamic carrying share is taken over by the 4 bellows located at the wheels.

The complete function of Airmatic can be subdivided into 3 subfunctions:

- **Level control** enables a manual, as well as a speed-dependent automatic raising or lowering of the vehicle level. In the process the vehicle level reduces by 10 mm automatically, as soon as a speed of 140 km/h (110 km/h (except )) is exceeded, it reduces by a further 5 mm (except ) when the speed of 180 km/h is exceeded. The vehicle raises itself in stages (except ) to the normal level again when the vehicle speed of 130 km/h (repositioning stage 2) and 90 km/h (repositioning stage 1) is not reached.

- **The electronic level control system** controls the vehicle level at the front and rear axles and ensures that the vehicle level remains constant according to the driving and vehicle loading conditions.

- **The "adaptive damping system" (ADSII)** adapts the damping forces to the road surface condition and driving style or driver's wishes. The road conditions are determined by vertical acceleration pickups at the body of the vehicle. The...
With the version, the vehicle level reduces automatically by 10 mm, as soon as a speed of 110 km/h is exceeded and raises itself automatically to normal level again when a speed of 60 km/h is not reached.

Advantages of AIRmatic
Greater driving safety and ride comfort due to:

- Speed-dependent level control and connecting an additional air volume for each suspension strut an increased ride comfort due to a softer base suspension at lower speed and normal driving style.
- Switching off the additional air volume as well as lowering the vehicle level and changing the damping characteristic of the ADSII for a sporty driving style and at higher speed, no compromises in driving dynamics have to be made.
- Adaptation of suspension to the road surface condition and driving style.
- Adaptation of damping to the road surface condition and driving style.
- Achieving a lower center of gravity position.
- Achieving a lower aerodynamic drag and thus a lower fuel consumption.
- Less lift at the front axle.
- An individual adaptation by increasing the vehicle level for poor roads or driveways.
- Provision for adjustment of 3 damping stages for comfortable, sporty or extremely sporty driving style.
- Driver information indicating increased vehicle level stages and sporty shock absorber setting by function lights in switches as well as warning on multifunction display (A1p13) in instrument cluster (A1) when vehicle level is too low.

Overview of system components

Sensor system
- B7: AIRmatic pressure sensor
- B22/3: Rear axle level sensor
- B22/8: Left front level sensor
- B22/9: Right front level sensor
- B24/3: Left front body lateral acceleration sensor
- B24/4: Right front body lateral acceleration sensor
- B24/6: Right rear body lateral acceleration sensor
- N49: Steering angle sensor
- N72S18: Level adjustment switch

Actuators
- Y36/6: AIRmatic central reservoir charge valve
- Y51: Left front axle damping valve unit
- Y51/1: Left front suspension strut AIRmatic valve unit
- Y52: Right front axle damping valve unit
- Y52/1: Right front suspension strut AIRmatic valve unit
- Y53: Left rear axle damping valve unit
- Y53/1: Left rear suspension strut AIRmatic valve unit
- Y54: Right rear axle damping valve unit
- Y54/1: Right rear suspension strut AIRmatic valve unit

Voltage supply
- Circuit 31: Y51
- Circuit 30: Y52
- Circuit 87: Y53
- Circuit 10: Y54
- CAN-C: Engine compartment CAN
- CAN-B: Interior CAN

Driver information
- A1: Instrument cluster
- A1p13: Multifunction display

Pressure generation
- A9/1: AIRmatic compressor unit
- A9/1m1: AIRmatic compressor motor
- A9/1y1: AIRmatic pressure reduction valve

Involved control units
- N3/9: CDI control unit (on diesel engines)
- N3/10: ME-SFI (ME) control unit
- N47-5: ESP, SPS [PML] and BAS control unit
- N51: AIRmatic with ADS control unit
- N72: Lower control panel control unit
- N72S18: Level adjustment switch
- N72S25: Comfort and sport switch
- Y3/8n4: Fully integrated transmission control (VGS) control unit

P3.22-2297-09
**Function overview**

The corresponding functions of the pneumatic closed loop of the AIRmatic and of the electrohydraulic closed loop of the adaptive damping system (ADS) are controlled with the electrical and electronic components.

The AIRmatic with ADS control unit (N51) receives input signals from the following components via the CAN data bus:

- ESP control module (N47-5) (wheel speed signal and stop lamp switch signal)
- ME control unit (N3/10) (on vehicles with gasoline engine)
- CDI control unit (N3/9) (on vehicles with diesel engine)
- Fully-integrated transmission control module (VGS) (Y3/8n4) (target and actual gear)
- Central gateway control unit (N93)
- Instrument cluster (A1) (outside temperature and circuit 61 "engine running")
- Steering angle sensor (N49)
- Signal on engine compartment CAN via steering column module (N80)
- Comfort and sport switch (N72s25)
- Level positioning switch (N72s18)

The input signals are processed in the AIRmatic with ADS control unit (N51) into output signals for the following components N51:

**Actuators of the Adaptive Damping System (ADSII)**

- **Left front axle damping valve unit (Y51)**
  - Solenoid valve 1, front left (Y51y1)
  - Solenoid valve 2, front left (Y51y2)
- **Right front axle damping valve unit (Y52)**
  - Solenoid valve 1, front right (Y52y1)
  - Solenoid valve 2, front right (Y52y2)
- **Left rear axle damping valve unit (Y53)**
  - Solenoid valve 1, rear left (Y53y1)
  - Solenoid valve 2, rear left (Y53y2)
- **Right rear axle damping valve unit (Y54)**
  - Solenoid valve 1, rear right (Y54y1)
  - Solenoid valve 2, rear right (Y54y2)

**For driver information**

- Multifunction display (A1p13) in the instrument cluster (A1)
- Check lamps in comfort and sport switch (N72s25) as well as in level adjustment switch (N72s18)

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