

MODEL 212
up to model year 2014
with CODE 488 (Steel/air suspension)

Function requirements, general

- Status "Circuit 61 ON"

System in general

The air suspension system is a combination of a steel suspension at the front axle and an air suspension at the rear axle with continuous damper adjustment where the damping is adapted at each wheel according to the road surface condition and driving style. The damping stage last set is active when the ignition is switched on.

i The steel suspension at the front axle consists of wheel-guiding steel suspension struts (3-link axle) that ensure a high level of transverse force compensation.

The air suspension system consists of the following subfunctions:

- **Wake-up mode, function**
- **Rear-axle air suspension, function**
- **Locking position, function**
- **Variable damping, function**
- **System and warning messages, function**

Wake-up mode, function

When the vehicle is unlocked, the AIRmatic control unit (N51/3) is activated (woken up) by the active chassis CAN (CAN E) in order to check and, if necessary, correct the current vehicle level at the rear axle.

Waking of the AIRmatic control unit starts an initialization period which is used to correct the vehicle level at the rear axle. This reduces the amount of time which passes before level correction is performed, therefore increasing vehicle availability.

Level control at the rear axle is performed in wake-up mode (e.g. when the vehicle is being loaded and unloaded) without the AIRmatic compressor (A9/1) being activated, provided that the fill level of the AIRmatic central reservoir is sufficient.

Raising the vehicle from a critical level (e.g. if the luggage compartment is overloaded) is performed even if at first the on-board electrical system voltage is inadequate. The rear SAM control unit with fuse and relay module (N10/2) evaluates the voltage of the on-board electrical system continuously and sends a signal via the interior CAN (CAN B) to the front SAM control unit with fuse and relay module (N10/1). The latter then forwards the signal to the AIRmatic control unit. The AIRmatic control unit then interrupts or prevents the raising procedure if necessary. Current-intensive consumers are shut down in a fixed sequence until a predetermined minimum voltage is reached again.

Rear-axle air suspension, function

Under normal operating conditions, the air suspension operates with different pressures depending on the load. The AIRMATIC compressor is used to supply pressure. The AIRmatic compressor is activated by the AIRmatic control unit via the AIRmatic relay (K67).

The air pressure is distributed to the individual air spring bellows of the rear axle via the AIRMATIC valve unit (Y36/6).

The air suspension system has an AIRmatic central reservoir in which compressed air is stored so that the vehicle level at the rear axle can be adjusted rapidly, irrespective of whether the compressor is functioning or not.

The pressure in the AIRmatic central reservoir is monitored by the AIRmatic pressure sensor (Y36/6b1) integrated in the AIRmatic valve unit. As soon as the pressure in the AIRmatic central reservoir drops below a threshold value, the AIRmatic compressor is activated.

The vehicle level at the rear axle is adjusted by 2 air spring bellows.

If the AIRmatic compressor or the AIRmatic central reservoir feeds compressed air to an air spring bellows via the left rear level control valve (Y36/6y3) or right rear level control valve (Y36/6y4), the vehicle level is raised at the wheel concerned.

The locking position is canceled automatically if the AIRmatic control unit receives wheel speed signals from the left front and right front with $v \neq 0$ km/h from the Premium Electronic Stability Program control unit (N30/7) via the chassis CAN. The level control functions are then reactivated.

Actuation of the output stages by the AIRmatic control unit via the Diagnosis Assistance System (DAS) is performed irrespective of the locking position status, i.e. actuation is always possible.

Variable damping, function

The electronically regulated, continuous damping system operates fully automatically.

It provides improved driving comfort and driving safety, compared to the conventional steel suspension.

Damping is set harder or softer by the electronics of the AIRmatic control unit depending on the driving situation.

If the sensor system detects, for example, a sporty driving style, the comfortable basic damping becomes harder automatically.

This automatic program can be preset by the driver using the AMG suspension button (S193/2). The following suspension modes are available:

- Comfort (both light-emitting diodes (LEDs) OFF)
- Sport (one LED ON (left))
- Sport+ (both LEDs ON)

Actuation of the AMG suspension button is read in by the transmission mode control unit (N145) via direct lines, evaluated and sent to the AIRmatic control unit via the chassis CAN.

The two LEDs of the AMG suspension button are actuated following the reverse path.

i A suspension setting and transmission mode setting which were stored beforehand independently of each other can be activated using the AMG button (S193/3), which is also read in by the transmission mode control unit via direct lines. To store a desired combination of suspension setting and transmission mode setting, the AMG button must be pressed and held down for at least 2.5 s.

The electronics works continuously within a broadly spread damping performance map.

The damping force is adapted individually and automatically at each wheel to the current requirements, the road condition and the driving conditions.

As a result, the vehicle rolls smoothly even on poor road surfaces, without impairing driving stability.

The AIRmatic control unit determines the current vehicle level and the damper speeds via the left front level sensor (B22/8), right front level sensor (B22/9), left rear level sensor (B22/7) and right rear level sensor (B22/10).

The AIRmatic control unit determines the body acceleration and body speed of the vehicle via the left front body acceleration sensor (B24/3), right front body acceleration sensor (B24/4) and left rear body acceleration sensor (B24/5).

Based on the input signals, the AIRmatic control unit determines the optimum damping stage for each shock absorber and directly actuates the left front axle damping valve unit (Y51), right front axle damping valve unit (Y52), left rear axle damping valve unit (Y53) and right rear axle damping valve unit (Y54) accordingly. These can be adjusted for each wheel, i.e. the damping can be adjusted continuously at each individual wheel.

System and warning messages, function

System and warning messages with safety and system-relevant instructions for the driver are displayed on the instrument cluster.

To output the messages, the AIRmatic control unit sends appropriate messages to the instrument cluster via the chassis CAN. There are various system and warning messages with different fault priorities, depending on the severity of the fault and the urgency of the request for action to be taken.

Conversely, the vehicle level is lowered if air is released from the air spring bellows through the left rear level control valve or right rear level control valve in the AIRmatic valve unit and at the AIRmatic pressure reduction valve (A9/1y1) in the AIRmatic compressor.

Locking position, function

To ensure that, when intentionally raising the vehicle (e.g. with a vehicle jack), compressed air is not continuously released from the air spring bellows of the rear axle (which would lower the vehicle), it is necessary to detect this reduction in wheel load automatically and then to initiate a locking position.

The locking position is purely a software function that prevents actuation of the left rear level control valve and right rear level control valve (discharge procedure). If the locking position has been detected by the AIRmatic control unit, nothing is displayed in the instrument cluster (A1) and no faults are stored.

If several faults exist at the same time, several fault messages will be issued accordingly.

Texts displayed in instrument cluster:

- "Stop, car too low", in addition signal tone
- "Vehicle being raised, wait briefly"
- "Fault", no signal tone

The following system message is also displayed in the instrument cluster:

- "Vehicle is lifting up", no signal tone

	Electrical function schematic for AIRmatic		PE32.32-P-2050-97DAA
	Air suspension, location of components		GF32.22-P-0001-01FLX
	Air suspension, block diagram of electrical system		GF32.22-P-0001-03FLX
	Component description for instrument cluster	A1	GF54.30-P-6000FL
	Component description for ME-SFI (ME) control unit	MODEL 212.077/277 with ENGINE 156.985 up to model year 2014 with CODE 488 (Steel/air suspension) N3/10	GF07.61-P-6000MAW
	Component description for ME-SFI (ME) control unit	MODEL 212.0/2 with ENGINE 157.9, 278.9 up to model year 2014 with CODE 488 (Steel/air suspension) N3/10	GF07.61-P-6000MMA
	Component description for front SAM control unit with fuse and relay module	N10/1	GF54.21-P-6070FL
	Component description for rear SAM control unit with fuse and relay module	N10/2	GF54.21-P-6030FL
	Component description for Electronic Stability Program control unit	MODEL 212 (except 212.095/098/298) up to model year 2014 with CODE 488 (Steel/air suspension) N30/7	GF42.45-P-5119FL
	AIRmatic control unit, component description	MODEL 212 up to model year 2014 with CODE 488 (Steel/air suspension) without CODE 489 (AIRMATIC (air suspension with continuous damper adjustment))MODEL 212 up to model year 2014 with CODE 489 (AIRMATIC (air suspension with continuous damper adjustment)) without CODE 488 (Steel/air suspension) N51/3	GF32.22-P-5109FL
	Component description for transmission mode control unit	MODEL 212.0/2 with TRANSMISSION 722.930 up to 5/31/11, 722.931 as of 6/1/11 up to model year 2014 with CODE 488 (Steel/air suspension) N145	GF27.19-P-1350AHX