

allroad quattro



Design and Function

Self-Study Program
Course Number 992003



Audi of America, Inc.
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Always check Technical Bulletins and the Audi Worldwide Repair Information System for any information that may supersede any information included in this booklet.

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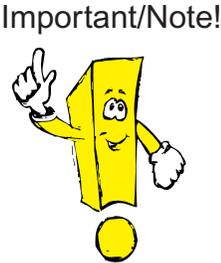
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The allroad quattro

The allroad quattro is Audi's first model with built-in off-road capability. It combines the excellent road qualities of the A6 with the ability to cross all kinds of rough surfaces should the need arise. In other words, it offers the best of both worlds.



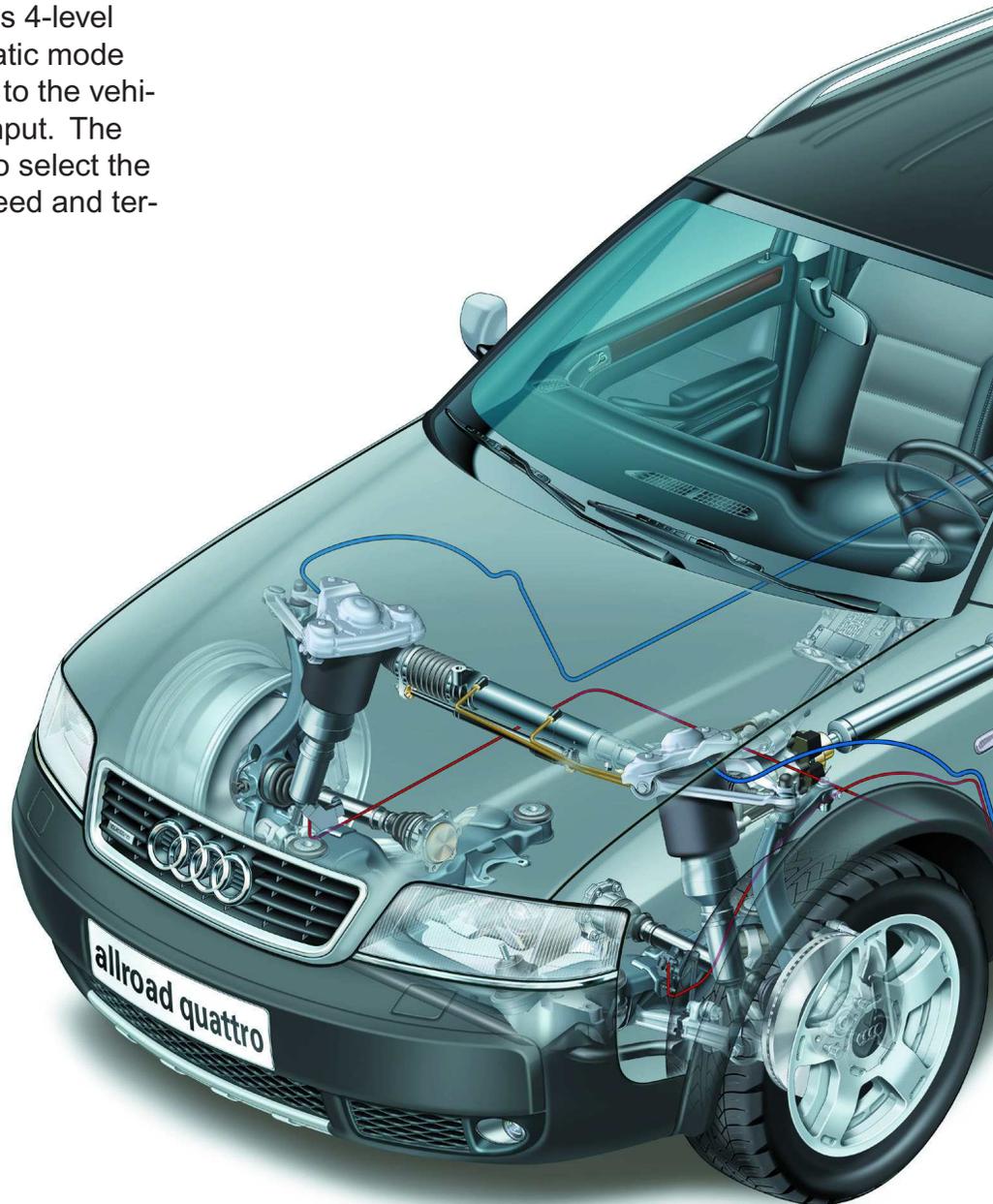
INTRODUCTION

allroad quattro Features

The allroad quattro was not created by simply changing shocks and springs to give an A6 more ground clearance. There are more than 1,100 new parts that make the allroad a true all-terrain vehicle.

A 4-level suspension system uses many new parts for vehicle elevation, keeping the driver in control no matter what situation arises.

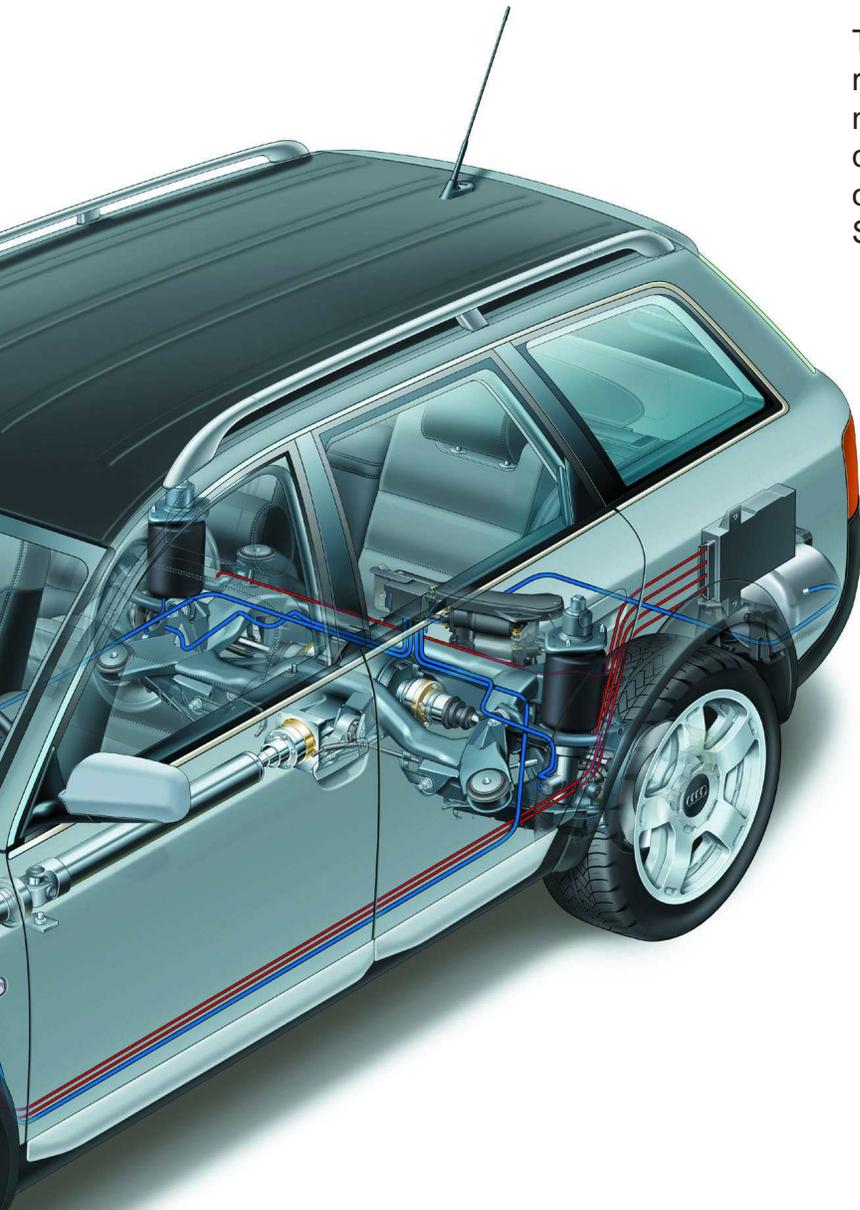
There are two main modes to this 4-level suspension system. The automatic mode adjusts vehicle height according to the vehicle speed and needs no driver input. The manual mode allows the driver to select the vehicle height, depending on speed and terrain.



allroad quattro Features continued

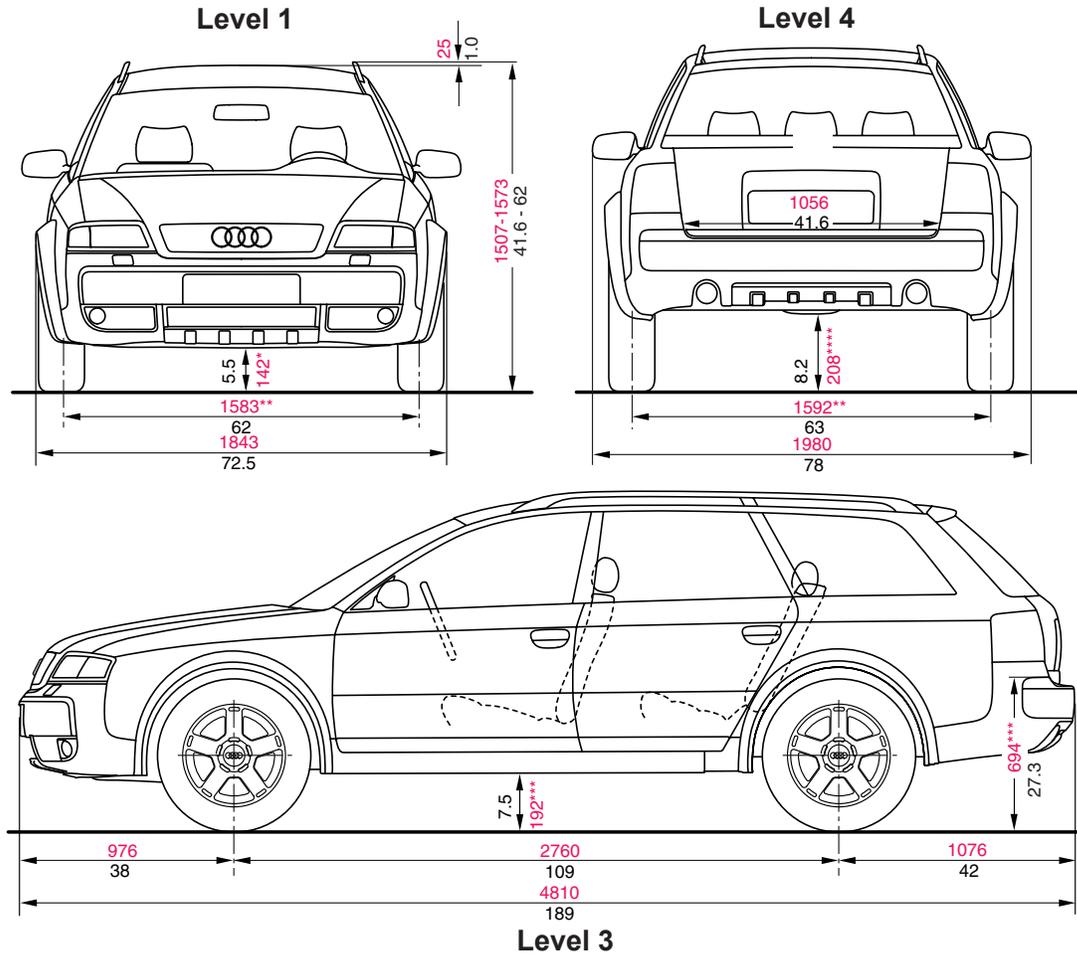
Many functional and visual changes other than the suspension system were made for the allroad quattro to appear and function differently than an A6 Avant.

The allroad quattro has larger exterior mirrors, front and rear underbody protection, matte paint finish on the bumpers, roof and door sills, redesigned headlamps and many other changes which will be covered in this Self-Study Program.



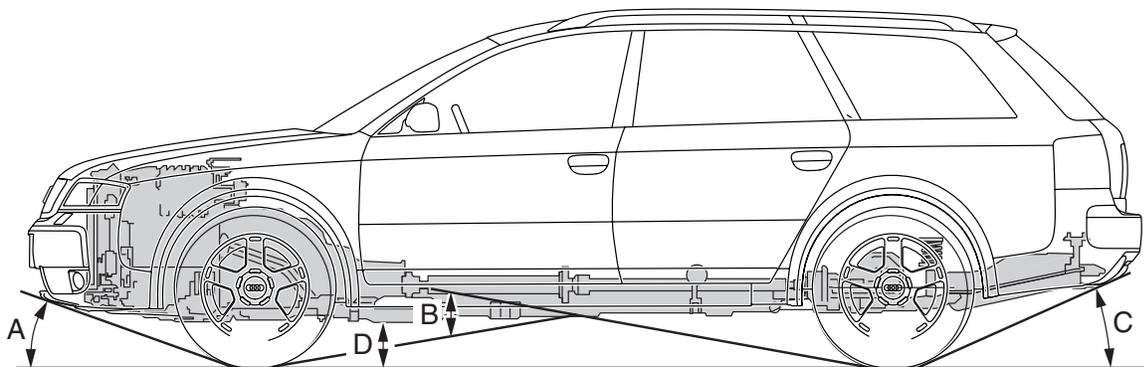
INTRODUCTION

Measurements



Dimensions: black = inches red = millimeters

- * = Level 1
- ** = Level 2
- *** = Level 3
- **** = Level 4



Front overhang angle A: approx. 20 degrees
 Ramp angle B: approx. 19 degrees
 Rear overhang angle C: approx. 23 degrees
 Ground clearance D: approx 8.2 inches (208 mm)
 All clearance angles measured with vehicle at Level 4

Audi allroad quattro Specifications		
Engine / Electrics		
Engine type	Six-cylinder spark ignition V engine, two lightweight cylinder heads, DOHC, two turbochargers	
Valve control / number of valves per cylinder	Variable camshaft control; hydraulic cup tappets / 5	
Displacement / bore x stroke / compression ratio	2671cc / 81.0mm X 86.4mm / 9.3:1	
Maximum power output	184 kW (250 bhp) at 5800 rpm	
Maximum torque	350 Nm (258 lb-ft)	
Engine management	Motronic: fully electronic sequential fuel injection, coordinated engine torque control, air mass measurement, adaptive lambda control, mapped ignition with direct high-voltage distribution, cylinder selective adaptive knock control via 2 sensors, cylinder bank selective exhaust gas temperature control	
Exhaust emission control	OBD II	
Alternator specifications	120 Amps	
Drive / transmission		
Drive layout	Permanent four-wheel drive with Torsen center differential and Electronic Stability Program (ESP)	
Clutch	Single-plate dry clutch; dual-mass flywheel	Hydraulically operated torque converter with lock-up clutch
Gearbox type	6-speed manual	5-speed Tiptronic with DSP
Gear ratio in 1st / 2nd gear	3.750 / 2.059	3.665 / 1.999
Gear ratio in 3rd / 4th gear	1.417 / 1.071	1.407 / 1.000
Gear ratio in 5th / 6th gear	0.857 / 0.730	0.742 / -
Reverse gear / Final drive ratio	3.455 / 4.375	4.096 / 3.091
Running gear / steering / brakes		
Front axle	Four-link independent wheel suspension, tubular anti-roll bar, air suspension spring strut with twin-tube gas shock absorbers	
Rear axle	Double wishbones, sub-frame, anti-roll bar, load controlled damping via air suspension spring strut	
Steering / steering ratio / turning circle	Power-assisted, maintenance-free rack-and-pinion / 16.2 / 11.68	
Brake system	Dual-circuit brake system with diagonal split, ABS/EBD, brake servo, front: ventilated disc brakes / rear: disc brakes	
Wheels/tires	7.5 X 17 inch 5-spoke cast aluminum / 225/55 R 17 W	
Performance / fuel consumption		
Maximum speed	236 km/h (147 mph)	234 km/h (245 mph)
Acceleration, 0-60 mph	7.4 sec	7.7 sec
Fuel requirement	Premium, 91 octane	
Fuel consumption city / highway	13 mpg / 24 mpg	12.4 mpg / 24.2 mpg
Service		
Oil change	every 8,000 miles / 12,000 kilometers	
Weights / loads		
Vehicle weight / gross vehicle weight rating (GVWR) - lbs	1795 / 5346	4023 / 5412
Front axle load limit - lbs	2778	2833
Rear axle load limit - lbs	2866	
Trailer load limit - trailer with brakes - lbs	Unavailable	
Trailer load limit - trailer without brakes - lbs	Unavailable	
Roof load limit - lbs	220	
Capacities		
Cooling system volume	6.3 quarts (6 liters)	
Engine oil volume (including filter)	6.3 quarts (6 liters)	
Fuel tank volume	18.4 gal (70 liters)	
Body		
Body type	Unitized, fully-galvanized, steel, aluminum engine hood, 5 doors with additional side protection	
Number of doors, seats	5 doors, 5 seats	
Luggage capacity (rear seat up / rear seat folded)	16 cubic feet / 56 cubic feet	

ENGINE

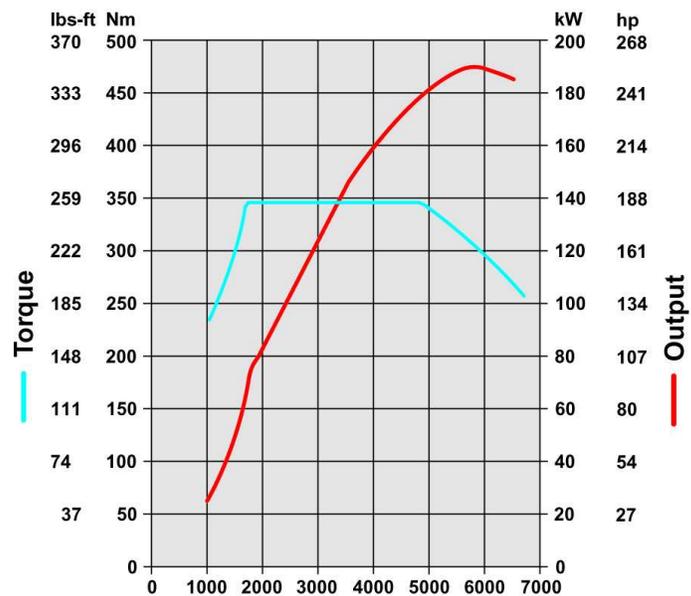
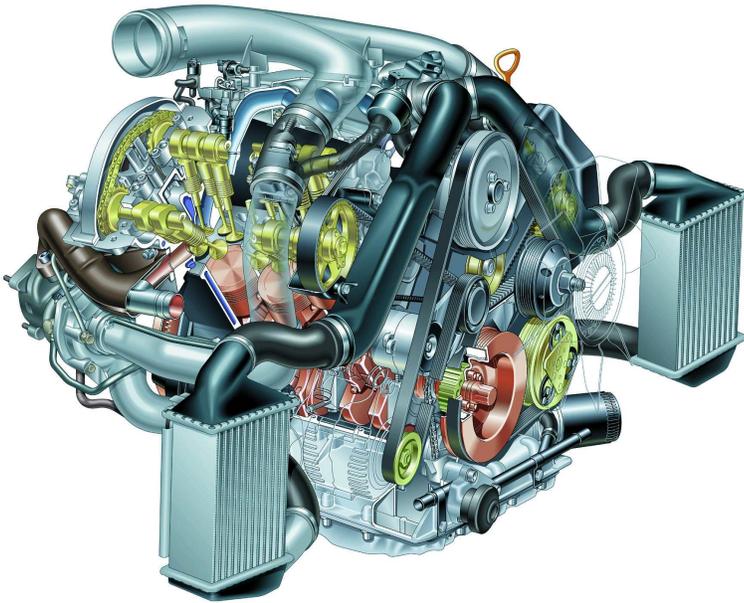
Engine

The Audi allroad quattro has the 2.7 L V6 biturbo engine. This is the same engine that is in the S4 and the A6.

One turbocharger is fitted to each bank of cylinders on the V6 engine. The turbocharger design responds quickly to throttle inputs, creating high torque values even at low speeds.

Each bank of cylinders has an intercooler, which reduces the temperature of the intake air. Cooler intake air permits higher cylinder charge density, which in turn creates greater power and efficiency.

For more information regarding the 2.7L biturbo engine, refer to SSP 992903.



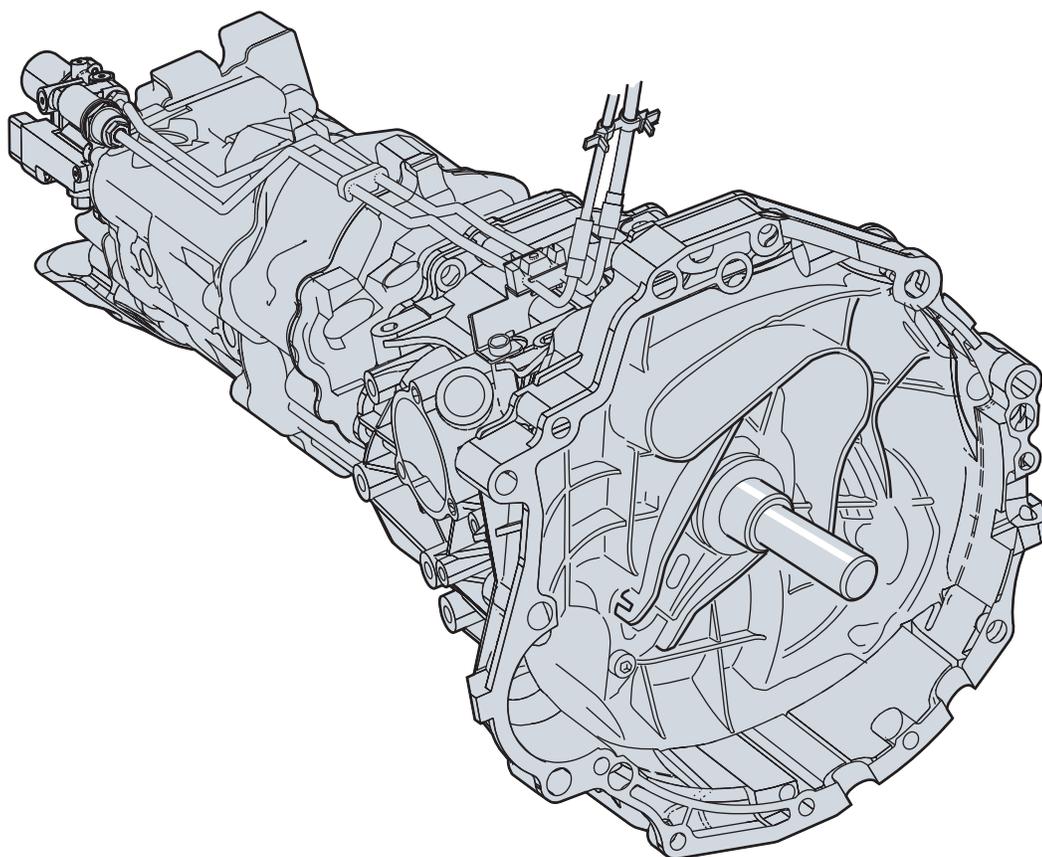
Available Transmissions

Two transmissions are used in the allroad quattro. They are the 01E 6-speed manual and the 01V 5-speed automatic.

6-speed Manual Transmission

The 01E 6-speed manual transmission is available in the allroad quattro. This transmission is similar to versions used in other Audi high performance models.

6-speed Manual Transmission	
1 st Gear	3.750
2 nd Gear	2.059
3 rd Gear	1.417
4 th Gear	1.071
5 th Gear	0.857
6 th Gear	0.730
Reverse	3.455
Final Drive Ratio	4.375



01E 6-Speed Manual Transmission

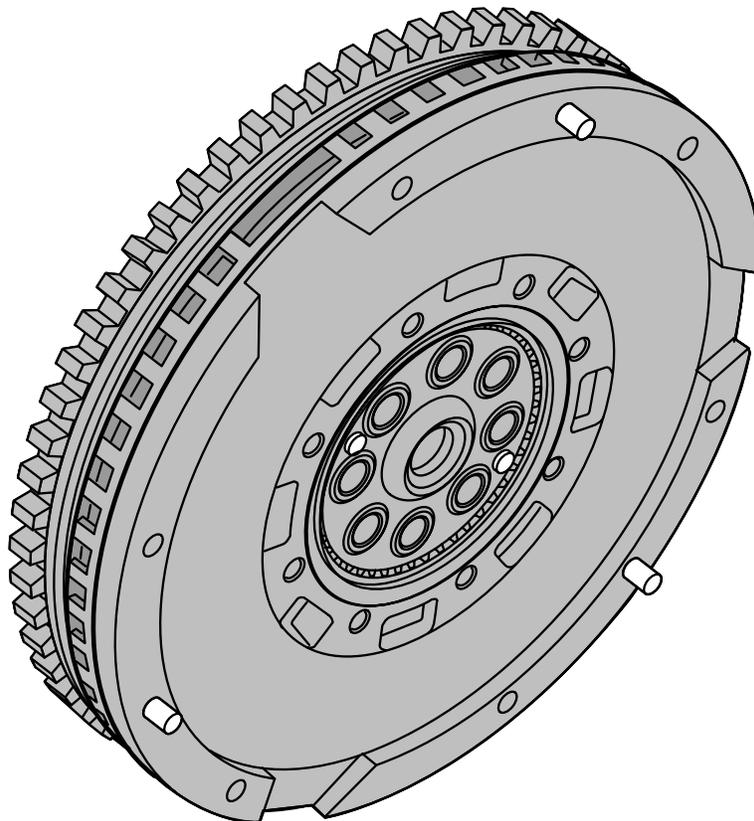
TRANSMISSIONS

6-speed Manual Transmission continued

Dual Mass Flywheel

The dual mass flywheel consists of two plates that are connected by a series of springs.

The springs between the flywheels transform piston power pulsations into smooth, continuous power.



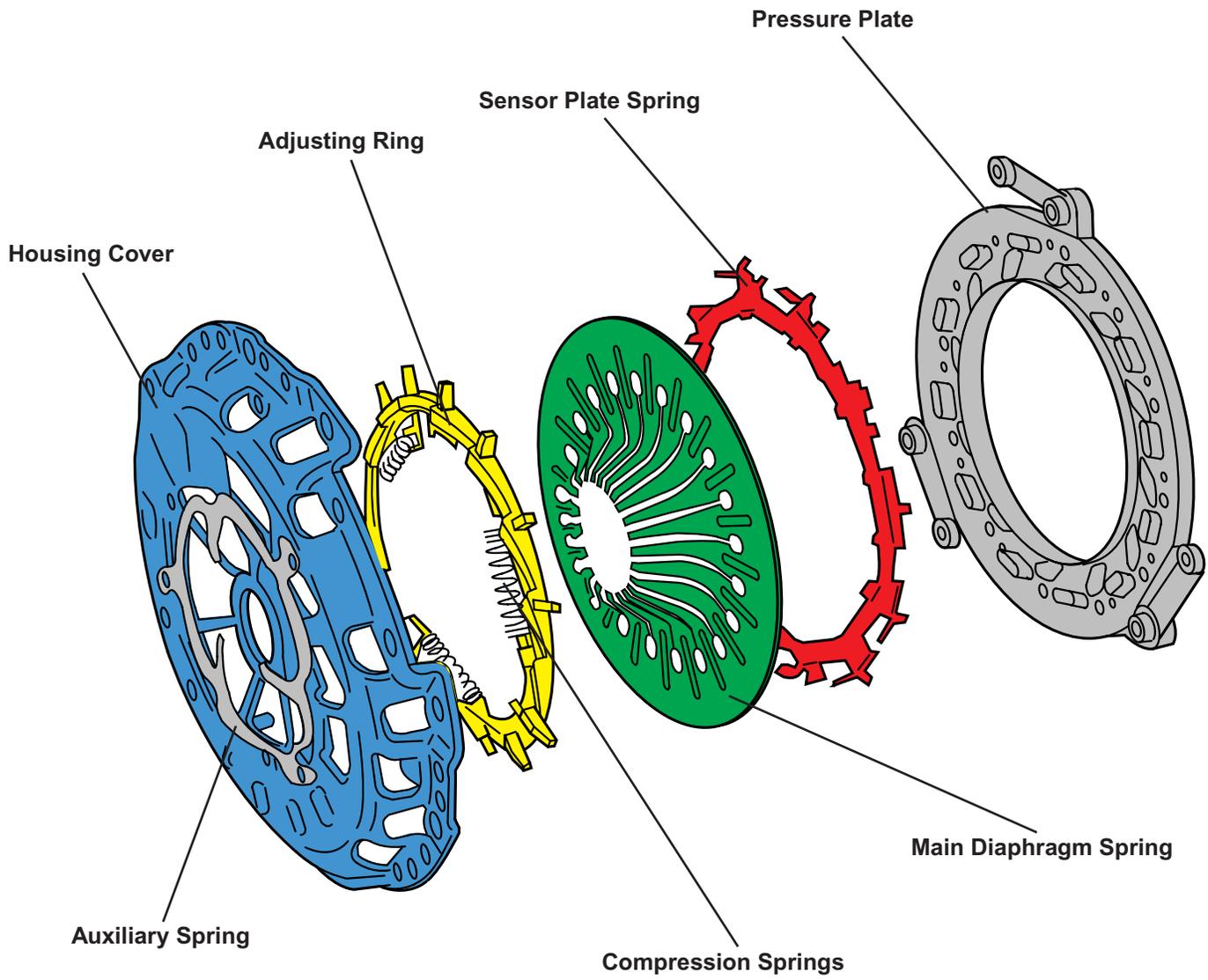
Dual-Mass Flywheel

6-speed Manual Transmission continued

Self-Adjusting Clutch

This transmission has the SAC, or Self-Adjusting Clutch. The function of the SAC is to prevent clutch pedal drop as the clutch wears.

The design and function of this clutch are described in SSP 992903.



Self-Adjusting Clutch

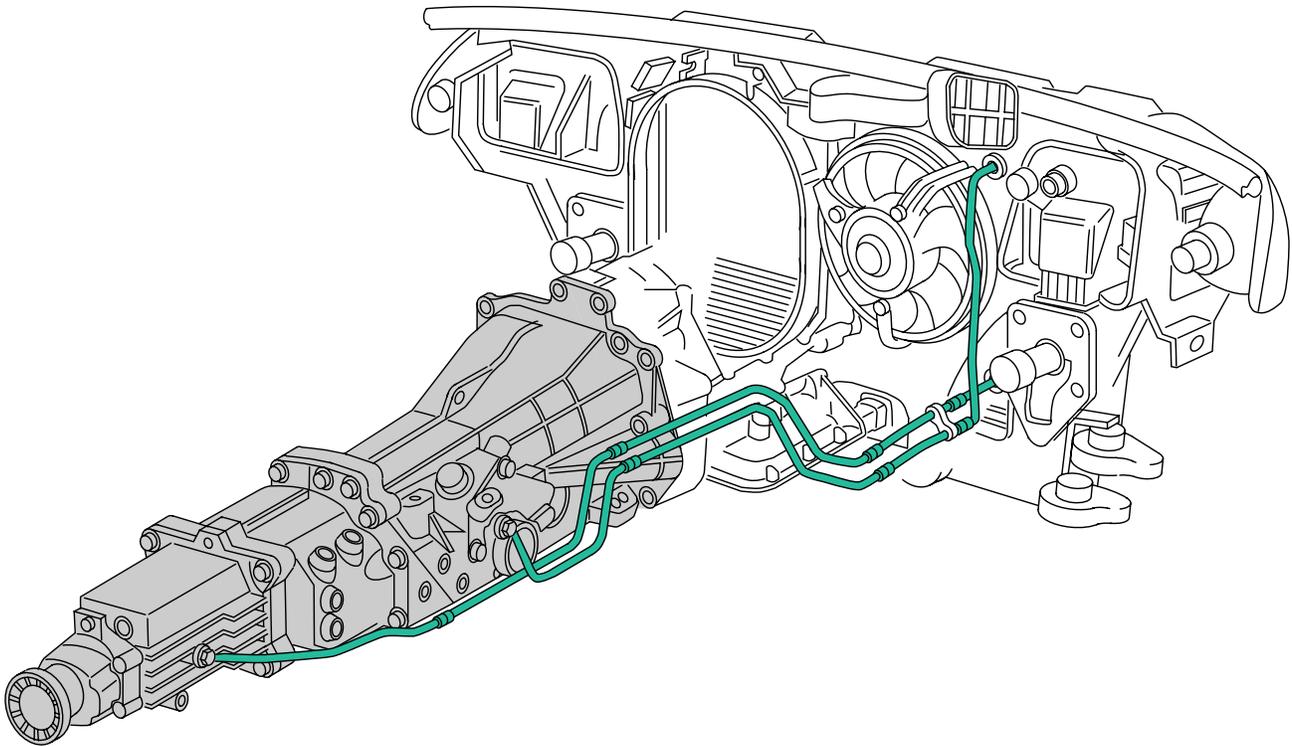
TRANSMISSIONS

6-speed Manual Transmission continued

Oil Cooler

An oil cooler is used to keep heat at a normal level even under heavy use conditions.

The oil cooler consists of a pump inside of the transmission and a cooler in the radiator.



Transmission Oil Cooler

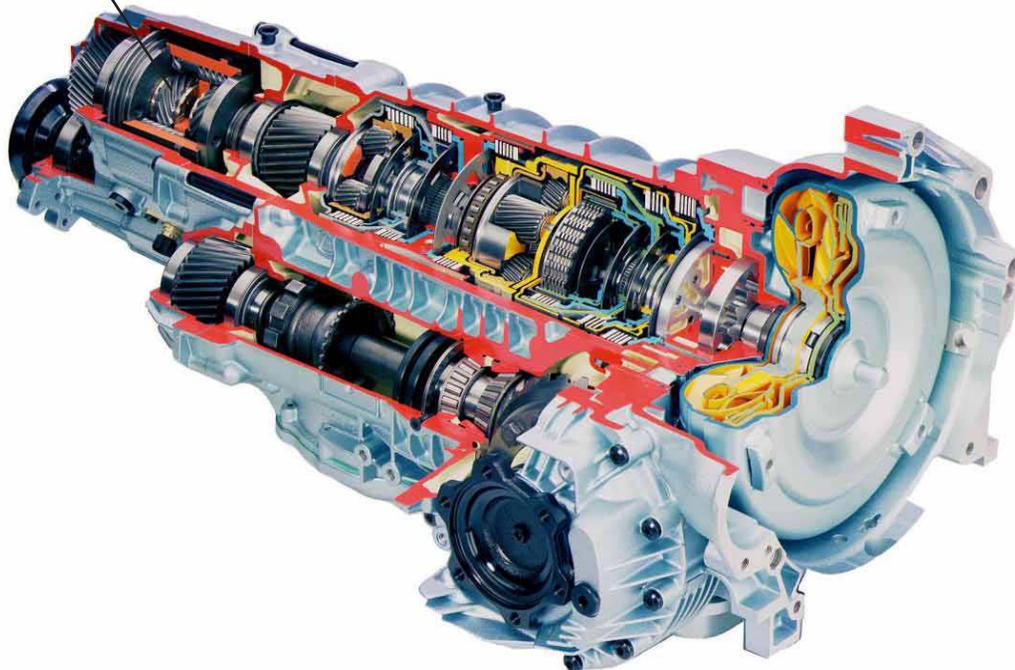
5-speed 01V Automatic Transmission

The 5-speed 01V automatic transmission has Tiptronic shifting and adaptive shift control.

This transmission also houses the Torsen® center differential.

5-speed Tiptronic	
1 st Gear	3.665
2 nd Gear	1.999
3 rd Gear	1.407
4 th Gear	1.000
5 th Gear	0.742
Reverse	4.096
Final Drive Ratio	3.091

Torsen® Differential



01V Automatic Transmission

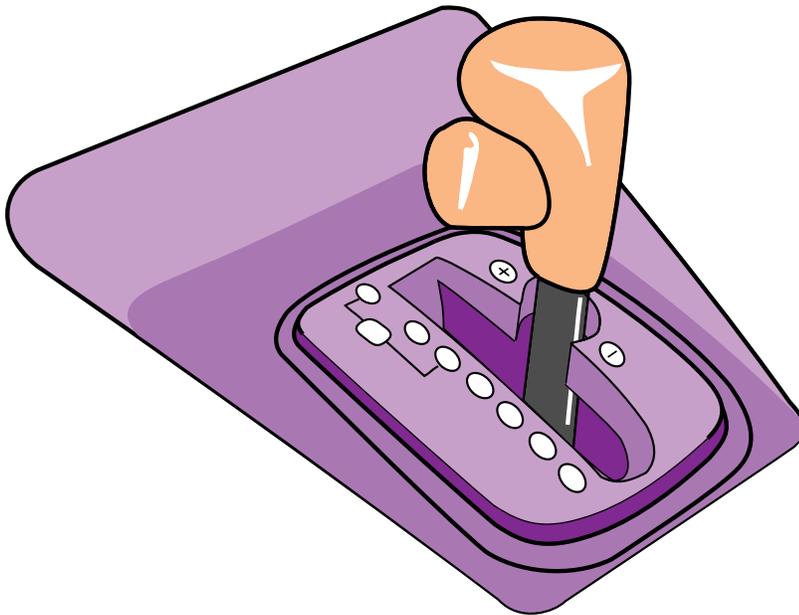
TRANSMISSIONS

5-speed 01V Automatic Transmission continued

Tiptronic Shifting

Tiptronic shifting allows the driver to select which gear the transmission will shift into by simply pushing the shift lever forward or pulling it back (when the shift lever is in the Tiptronic gate).

Tiptronic programming will not allow the driver to shift into a gear that would cause excessive engine rpm. Also, Tiptronic will shift the vehicle to the next gear when excessive engine rpm is reached.



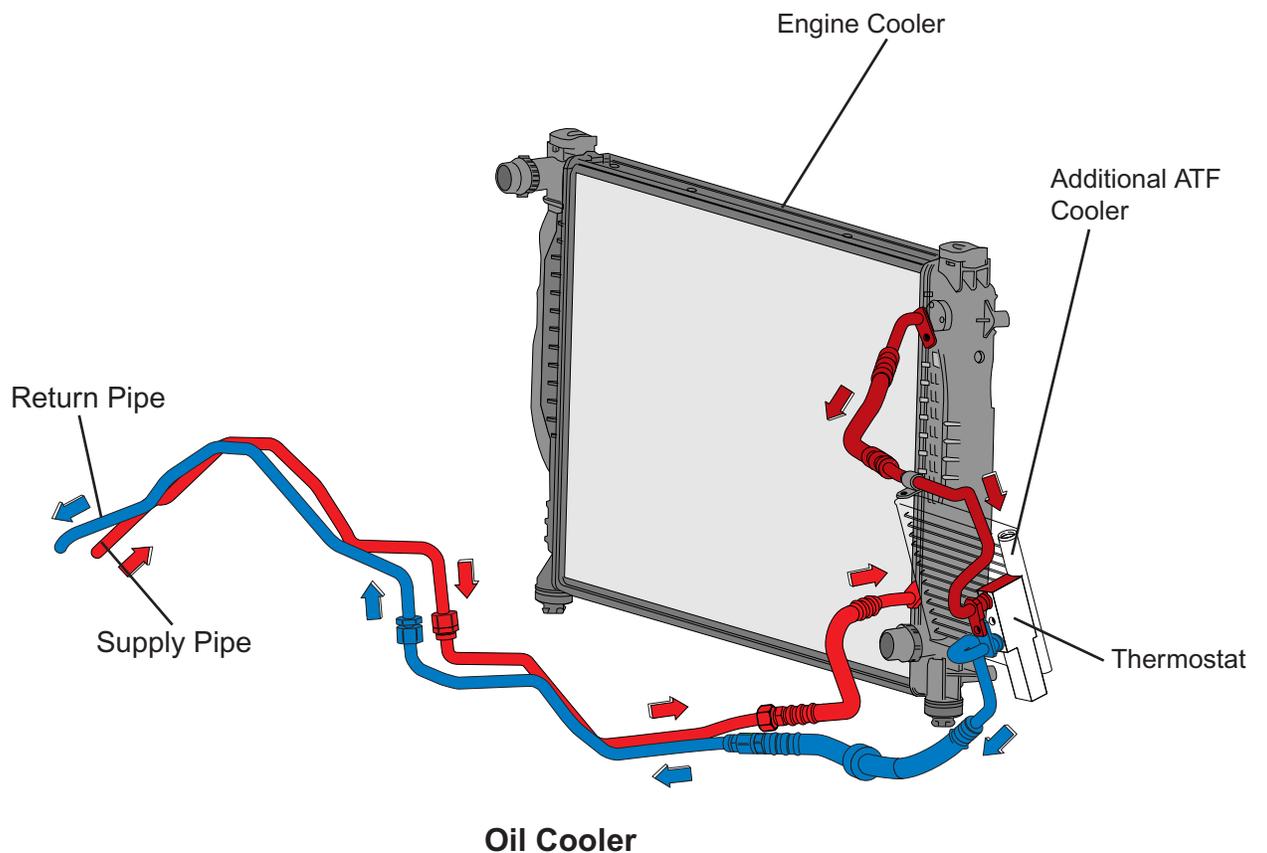
Tiptronic Selector Gate

5-speed 01V Automatic Transmission continued

Oil Cooler

The allroad quattro 01V is also equipped with an additional automatic transmission fluid cooler to help keep transmission temperatures low.

The transmission fluid flow to the cooler is thermostatically controlled.



TRANSMISSIONS

Torsen Differential

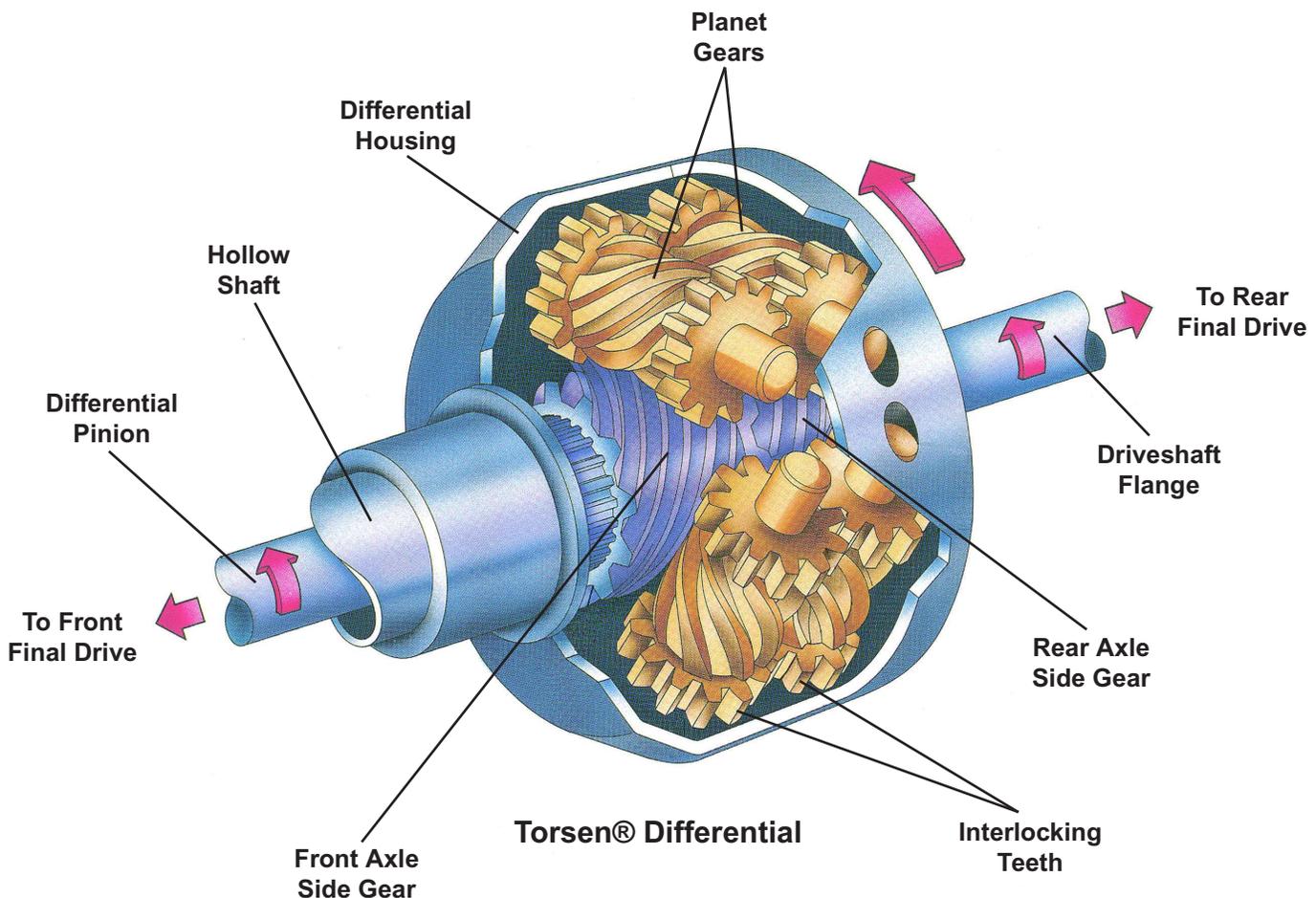
The allroad quattro relies on the same Torsen® center differential as the A6 quattro to distribute power between the front and rear axles. Torsen stands for TORque-SENsing differential.

The biggest advantage to the Torsen differential is that it works without driver input. There are no electrical connections or computer controls. The Torsen differential is a sealed unit and is located in the rear of the manual or automatic transmission cases.

The Torsen differential is composed of the following components:

- Differential housing
- Planet gears (with interlocking teeth)
- Front axle side gear
- Rear axle side gear
- Front driveshaft
- Rear driveshaft

For more information regarding the Torsen center differential, refer to SSP 951903.



Running Gear

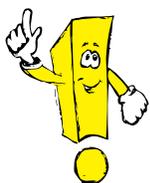
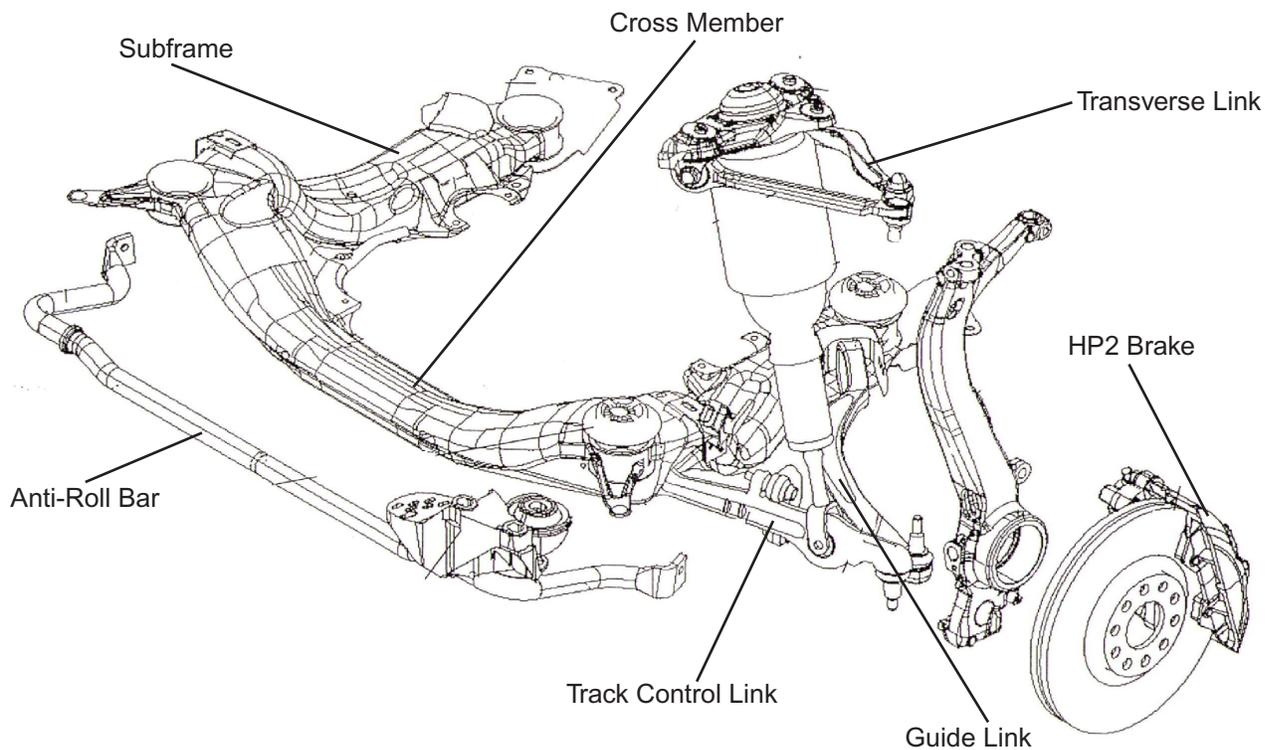
The running gear originates from the A6 quattro and has an air-supporting suspension system that provides four different ride heights.

There are many modifications in the running gear that accommodate the new air-supporting suspension system.

Front Axle

The strength of the subframe is increased, and the driveshaft area is deepened for extra suspension travel.

The axle level sensor brackets are welded to the subframe.



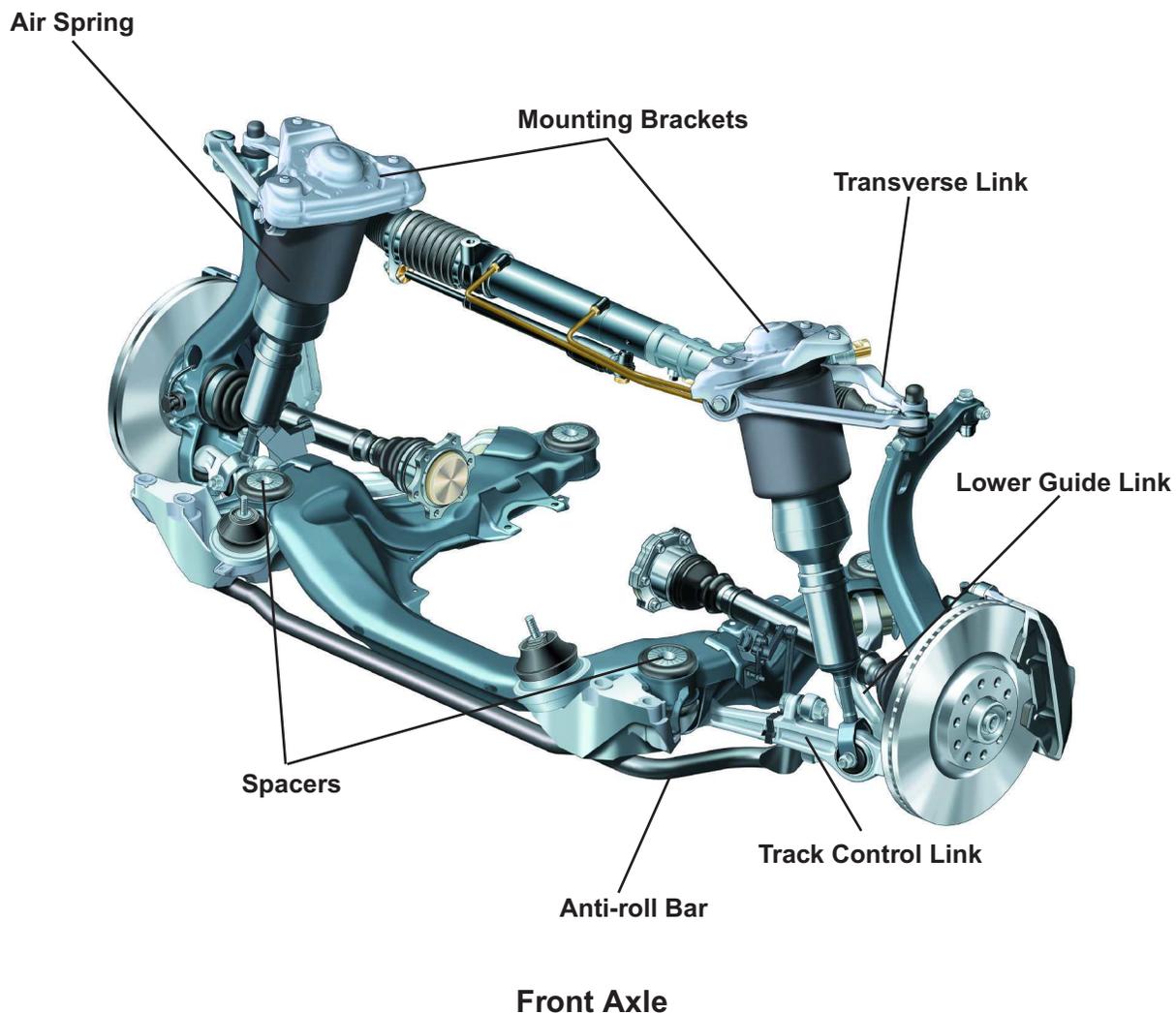
All components belonging to the allroad quattro that could be easily confused with A6 components are marked with a brown dot.

RUNNING GEAR

Front Axle continued

The following are differences from other A6 models:

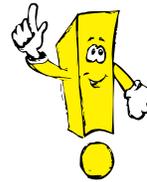
- The suspension strut eye is lowered, and the bracket for the coupling rod and levelling sender is moved towards the inside due to clearance between the lower guide link and suspension strut.
- The cross section of the ball stud at the aluminum guide link is extended.
- The angle of the upper rear transverse link is changed to accommodate the modified suspension.
- The mounting bracket is completely redesigned and forms part of the air spring damper.
- The spacers at the front axle are all 1 inch (25 mm) thick.



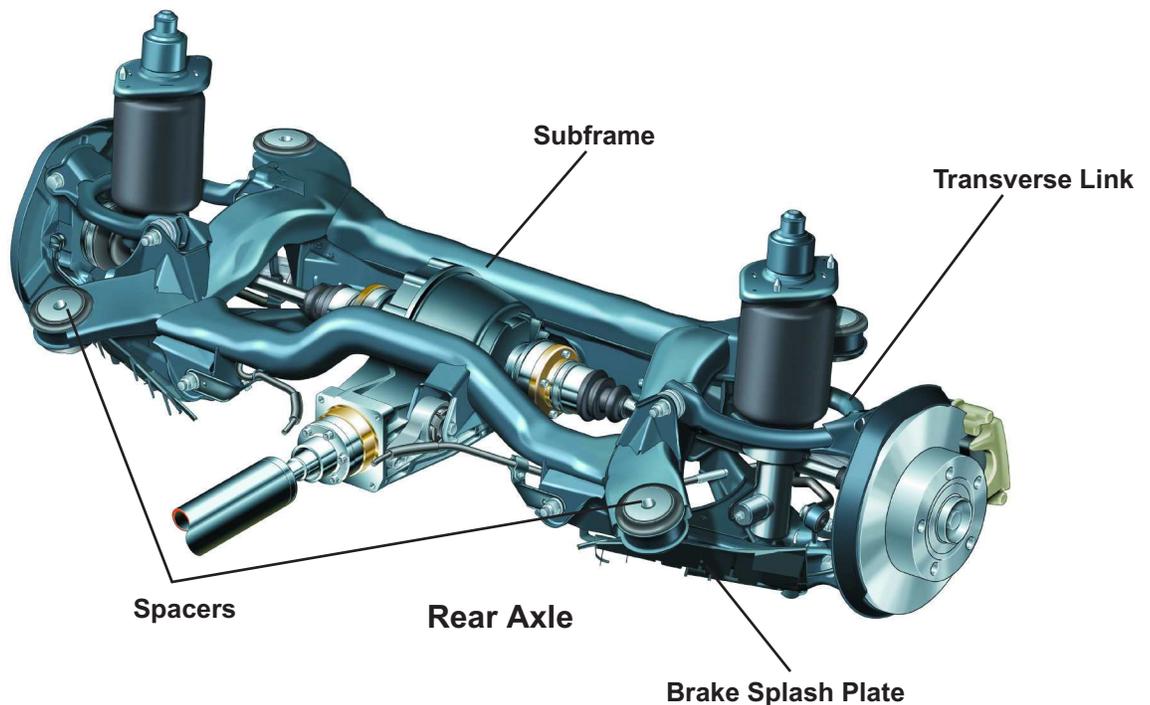
Rear Axle

The following are the differences between the allroad quattro and other A6 models:

- The transverse link is changed and accommodates the air springs.
 - The pivot point of the upper transverse link is set to a higher position in the wheel carrier to optimize wheel clearance.
 - The track rod is made of molded aluminum for increased rigidity and improved tracking ability.
 - A brake splash plate is added to the rear axle. This plate helps to deflect debris away from the brakes.
 - The shape of the anti-roll bar is changed to make room for the air supply unit.
- Due to the thicker, eccentric spacers, longer bolts are used to attach the rear suspension to the subframe.
 - There are two types of rear spacers with different thicknesses to accommodate the driveshaft angle:
 - 1 inch (25 mm)
 - 0.9 inches (23.5 mm)



All components belonging to the allroad quattro that could be easily confused with A6 components are marked with a brown dot.



RUNNING GEAR

Drive Train

The following are the drive train differences between the allroad quattro and other A6 models:

- The front drive shafts are changed due to the different suspension characteristics.
- The diameter of the rear drive shafts is increased and the outer joints are reinforced.
- The center bearing of the propshaft is adapted to the raised body.
- Due to the raising of the body, adaptations have been made to almost all lines and hoses which lead to the drive train and the running gear (e.g. brake lines).

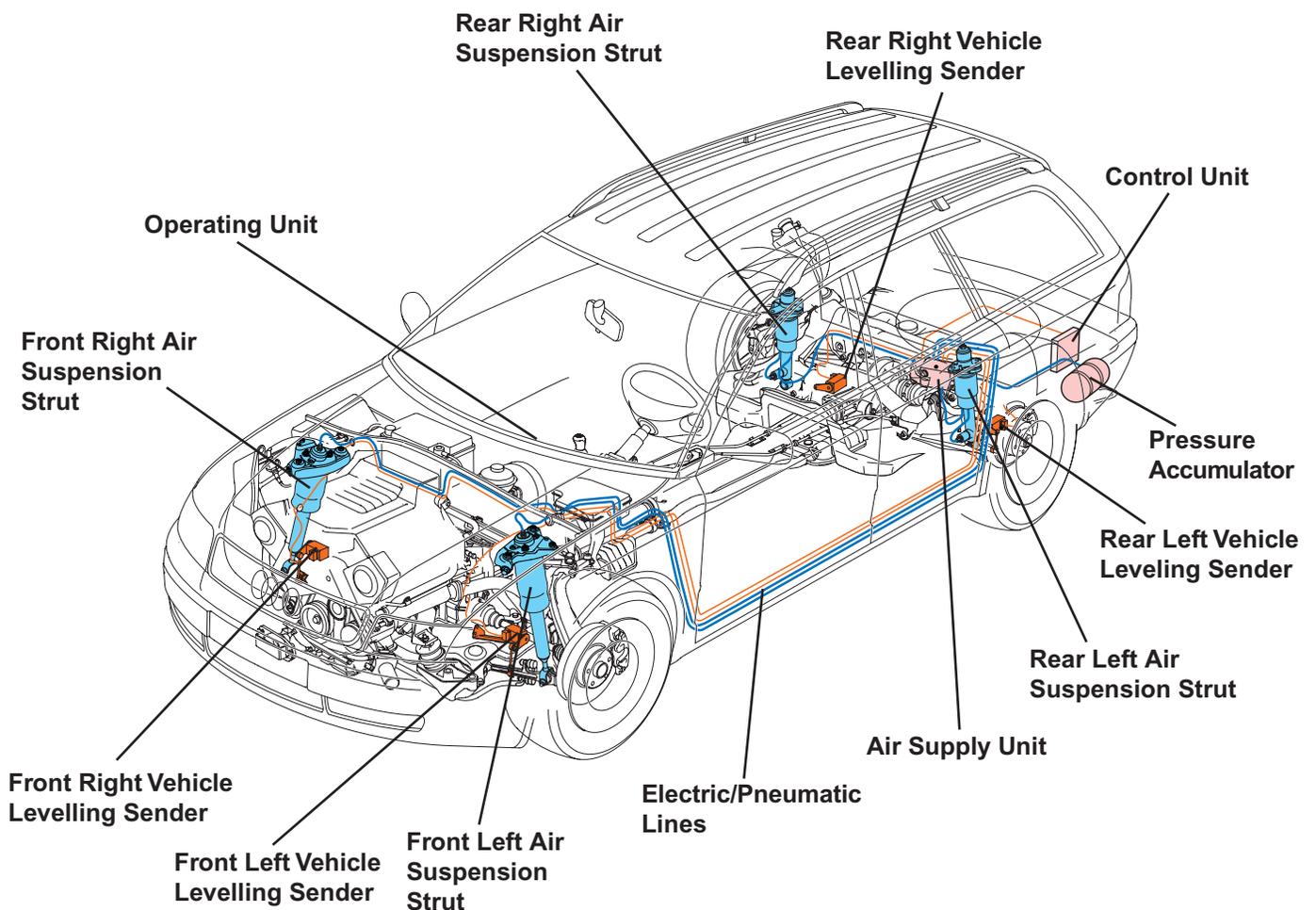
4-Level Air Suspension

The 4-level air suspension system is designed to control the overall vehicle height. The system alters ground clearance by 2.6 inches (66 mm) in four stages. The four stages can be controlled manually or automatically.

The 4 level air suspension system is composed of:

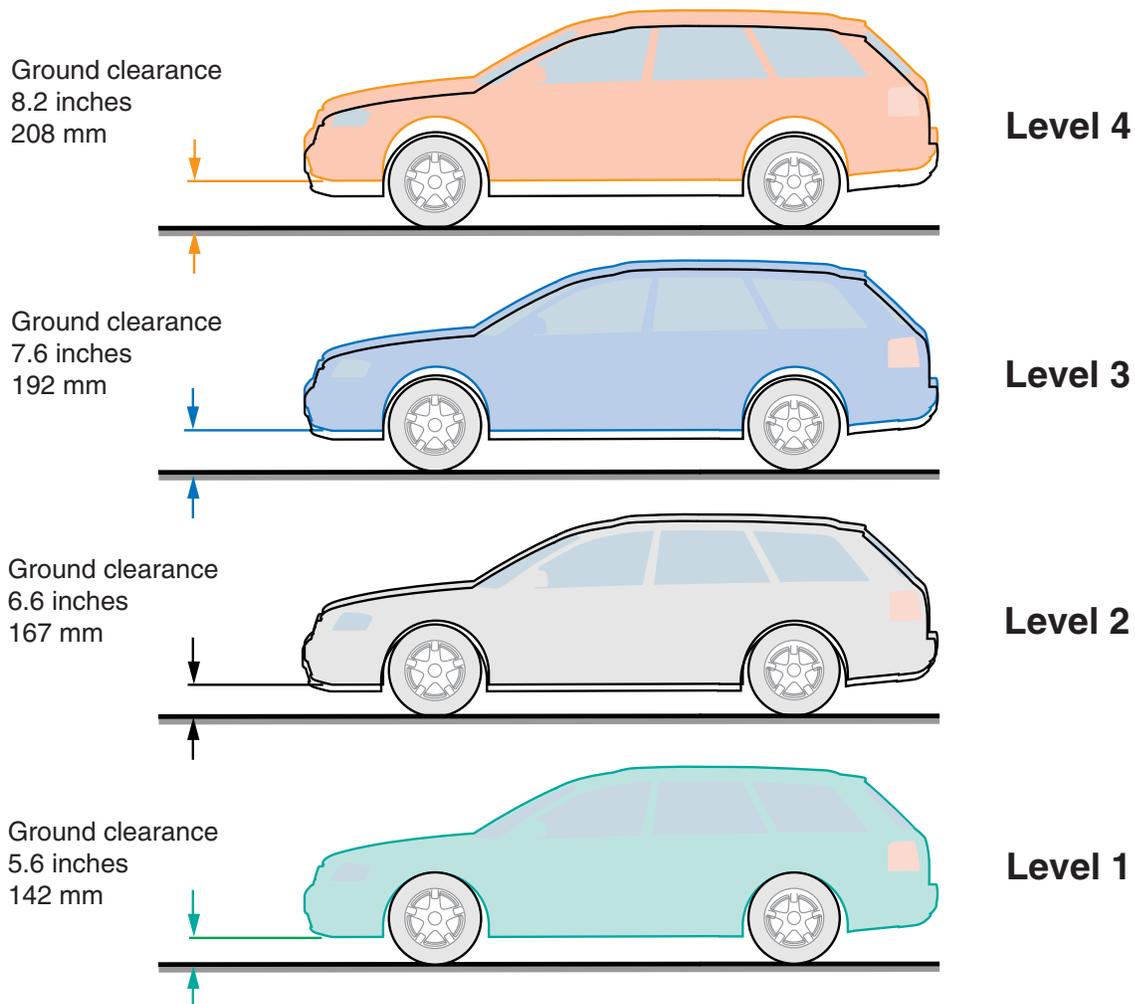
- A dashboard display
- A warning light
- Air springs
- Solenoid valves
- A pressure sensor
- Levelling senders
- A compressor
- A temperature sensor
- An accumulator

The air suspension system is designed for fast response, low noise and the ability to protect the power supply of the vehicle.



SUSPENSION OPERATION

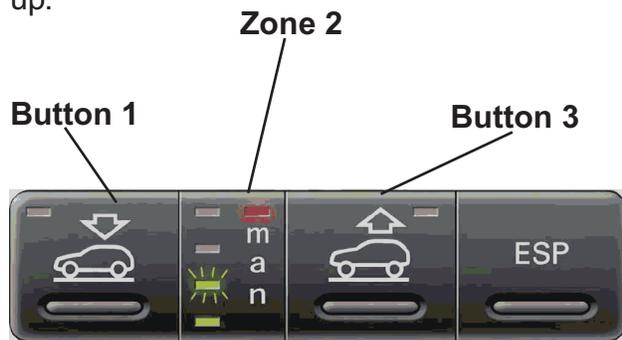
Air Suspension Levels				
	Height Increase		Ground Clearance	
Level 1			5.6 inches	142 mm
Level 2	1 inch	+ 25 mm	6.6 inches	167 mm
Level 3	1 inch	+ 25 mm	7.6 inches	192 mm
Level 4	0.6 inches	+ 16 mm	8.2 inches	208 mm



Air Suspension Control Display

The air suspension control display is located on the dashboard above the radio. The following is a description of how to operate the air controlled suspension system:

The LED in Zone 2 indicates the ride height. To change between manual and automatic modes, press Buttons 1 or 3 for two seconds. When manual mode is selected, the LED above the “man” inscription illuminates up.



In manual mode, the vehicle height is increased by pressing Button 3. If Button 3 is pressed more than once, the height can be increased in stages from the lowest level to the highest level. As the ride height is increasing, Zone 2 shows the actual level as a steady height and the selected level as a flashing light.

After pressing Button 1, the vehicle drops to a lower level. The current level flashes in Zone 2 and the selected level (not yet reached) is indicated by a steady LED in the display.

Manual mode, level 2 requested, vehicle currently in level 1.



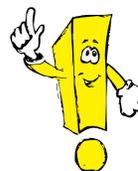
Automatic mode, moving to level 1, vehicle currently in level 2.



Automatic mode, moving to level 3, vehicle currently in level 1.



Automatic mode, moving to level 4, vehicle currently in level 3.

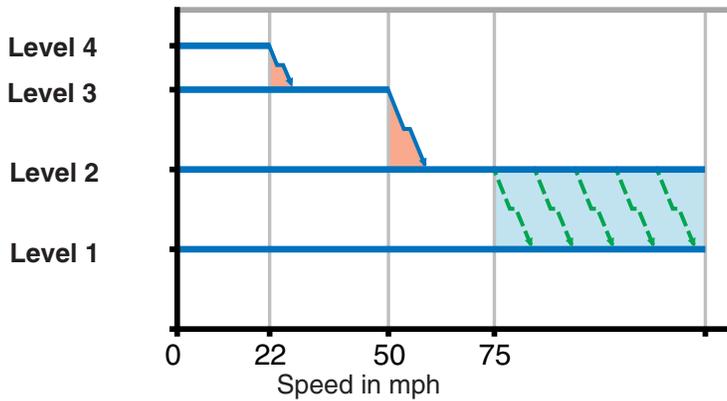


Continual flashing of the LED shows the denial of a level request (e.g. when speed is too high).

SUSPENSION OPERATION

Automatic Suspension Control

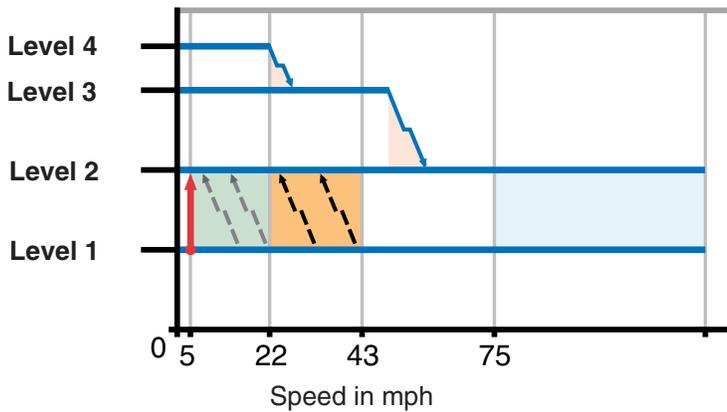
Automatic suspension control works without driver interaction. It raises and lowers the vehicle according to the speed and level chart below.



Height decrease procedures

Automatic lowering

After 30 seconds



Height increase procedures when vehicle is commanded to Level 3 or Level 4 after the ignition is on.

After 30 seconds

After 120 seconds

Raising immediately



Height increase procedures when vehicle is in Level 3 or Level 4 before the ignition is on

After 30 seconds

Raising immediately

Automatic Mode Logic

Manual Suspension Control

Manual suspension control allows the vehicle operator to determine what height the vehicle is at. However, manual control does not allow the vehicle operator to override the basic height-to-speed settings. The vehicle will still automatically lower when a certain road speed has been reached.

Pressing either the up or down button for about two seconds will switch the air suspension system between manual and automatic modes.

Conditions for manual operating mode

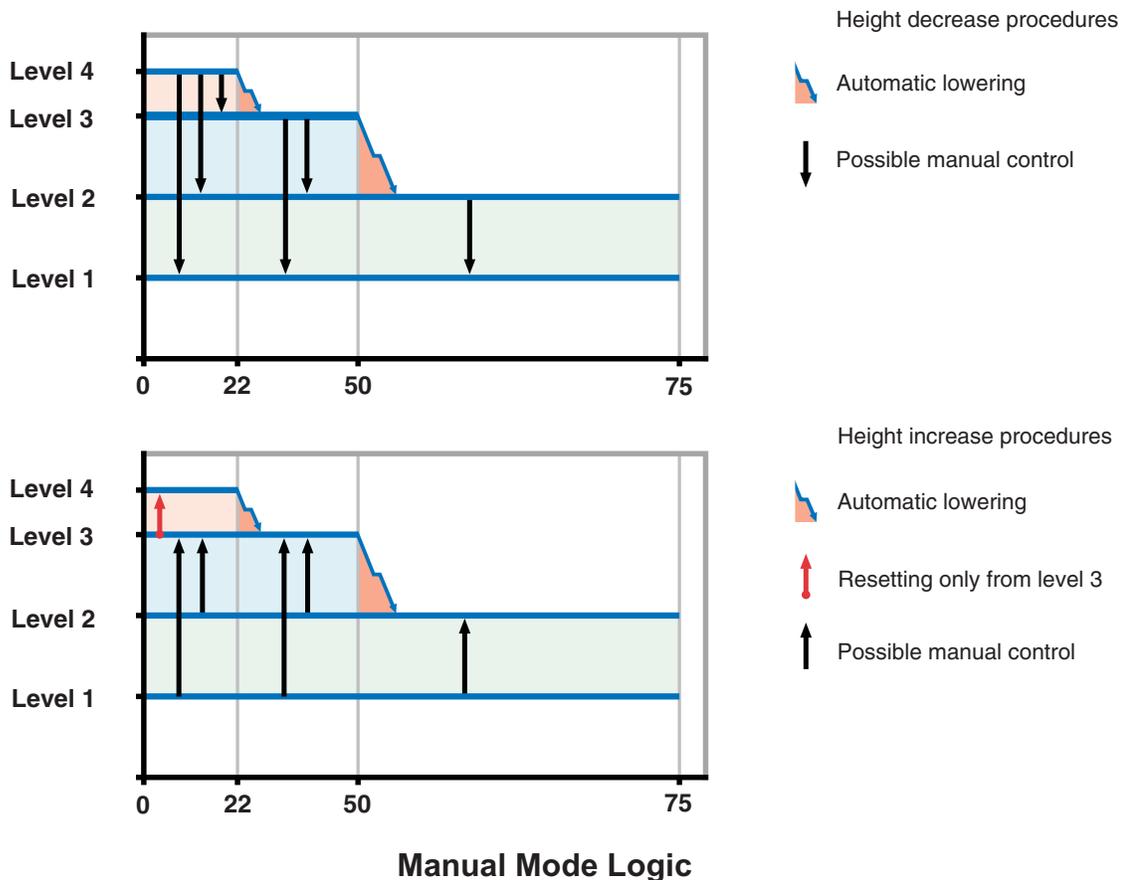
The vehicle can be raised in manual mode as long as no relevant fault codes are stored in memory.

When the engine is running, the vehicle can be raised as long as:

- The compressor temperature is below 230° F (110° C)
- Sufficient accumulator pressure is present (at least 3 bar (44 psi) difference between the pressure accumulator and the air springs)

When the engine is not running, the vehicle can be raised as long as sufficient accumulator pressure is present.

Lowering is possible as long as no relevant errors are stored in fault memory.



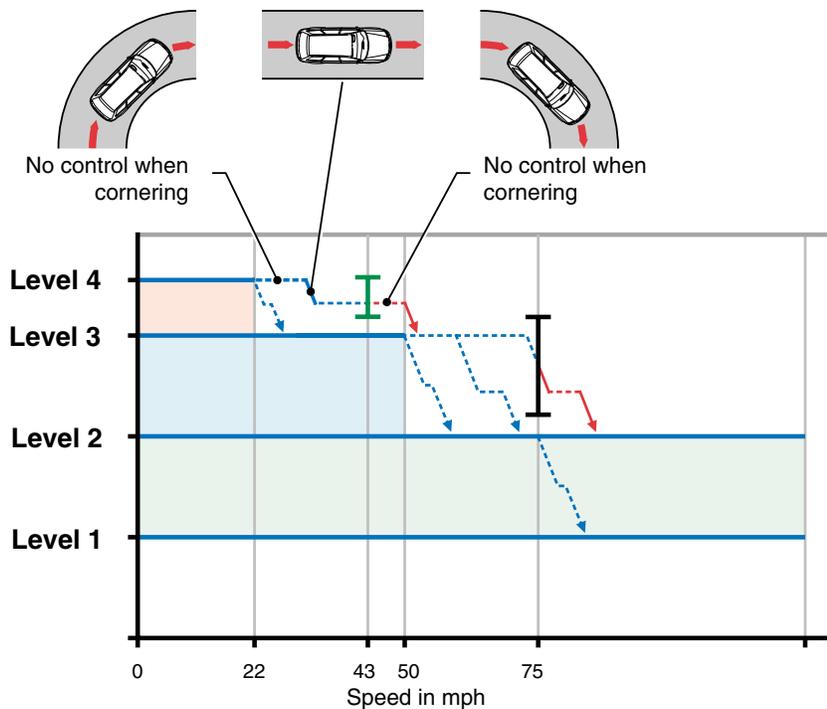
SUSPENSION OPERATION

Cornering

If the vehicle is cornering, it will not raise or lower until it is through the corner, even if it is in the process of changing the vehicle height. Instead, the height request will be stored and carried it out when the vehicle is driving in a straight line.

If the vehicle is accelerated quickly down a very twisty road, it is possible for the suspension to stay in a high position, regardless of road speed. In this case, the Electronic Stabilization Program (ESP) will activate, even if the driver had turned it off manually. ESP remains activated until the suspension system has a chance to lower the vehicle.

The system determines if the vehicle is cornering by measuring the wheel speeds. Wheel speeds are measured using the ABS wheel speed sensors.



Service (Jack) Mode

Before raising the allroad quattro on a hoist or jack, the vehicle should be put into service mode. When the vehicle is put into service mode, air is not let into or out of the 4-level suspension system.

Service mode can be switched on or off by pressing and holding both the raise and lower buttons for five seconds. When the allroad quattro is in service mode, the manual row of LEDs, both the raise and lower buttons and the warning lamp K134 will illuminate.

Service mode will be automatically switched back on again when a road speed of approximately 6 mph (10 km/h) is exceeded. The service mode will not switch on again, regardless of speed, if the hoist mode is recognized.

Hoist Mode

The control unit goes into hoist mode if the height signal of a stationary vehicle is increased due to a lift or jack.

The hoist mode prevents excessive ventilation of the air springs when the vehicle is raised for service.

Lifting of the vehicle should be carried out as quickly as possible, so that the control unit clearly knows it should enter hoist mode.

For shop repairs, Audi recommends that the service mode is activated before lifting the vehicle.

SUSPENSION COMPONENTS

Warning Lamp K134

When a fault occurs in the 4-level air suspension system, warning lamp K134 will illuminate.

Warning lamp operation:

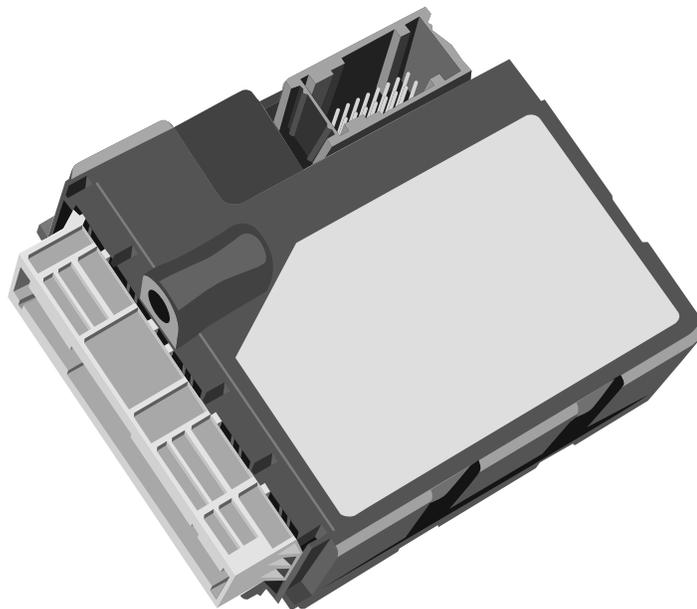
- During suspension system failures or when the system is disabled, the warning lamp will constantly illuminate.
- When basic system setting has not been carried out successfully, the warning lamp will constantly illuminate.
- Extremely low or high levels will cause the warning lamp to flash.
- Output diagnostic test mode will cause the warning lamp to flash.



Control Unit J197

The Control Unit J197 is the brain of the 4-level air suspension system. It monitors many inputs and commands the vehicle to raise or lower, depending on road speed, vehicle height and driver requests.

J197 is located in the left rear of the vehicle, near the accumulator.



Control Unit J197

SUSPENSION COMPONENTS

Air Suspension Functional Diagram

E281	Operating unit for self-levelling suspension
F216	Contact switch for switchable rear fog light
G76	RL vehicle levelling sender
G77	RR vehicle levelling sender
G78	FL vehicle levelling sender
G289	FR vehicle levelling sender
G290	Compressor temperature sender, self-levelling suspension
G291	Pressure sender for self-levelling suspension
J197	Control unit for self-levelling suspension
J403	Compressor relay for self-levelling suspension
J429	Control unit for central locking
J431	Control unit for headlamp range control
N111	Discharge valve for self-levelling suspension
N148	FL suspension strut valve
N149	FR suspension strut valve
N150	RL suspension strut valve
N151	RR suspension strut valve
N311	Pressure accumulator valve, self-levelling suspension
K134	Self-levelling suspension warning lamp
V48	Left headlight range control servomotor
V49	Left headlight range control servomotor
V66	Motor for self-levelling suspension compressor

- ① CAN low
- ② CAN high
- ③ From door and tailgate contact switch
- ④ Diagnosis connection
- ⑤ From anti-theft alarm
- ⑥ From trailer socket
- ⑦ Terminal 50b
- ⑧ Speed signal

- I Terminal 56
- II Diagnosis connection
- II To instrument panel
- I Speed signal

- A Terminal 58s
- B Terminal 58d
- C To ESP control unit
- D From ESP control unit



= Input Signal



= Output Signal



= Positive

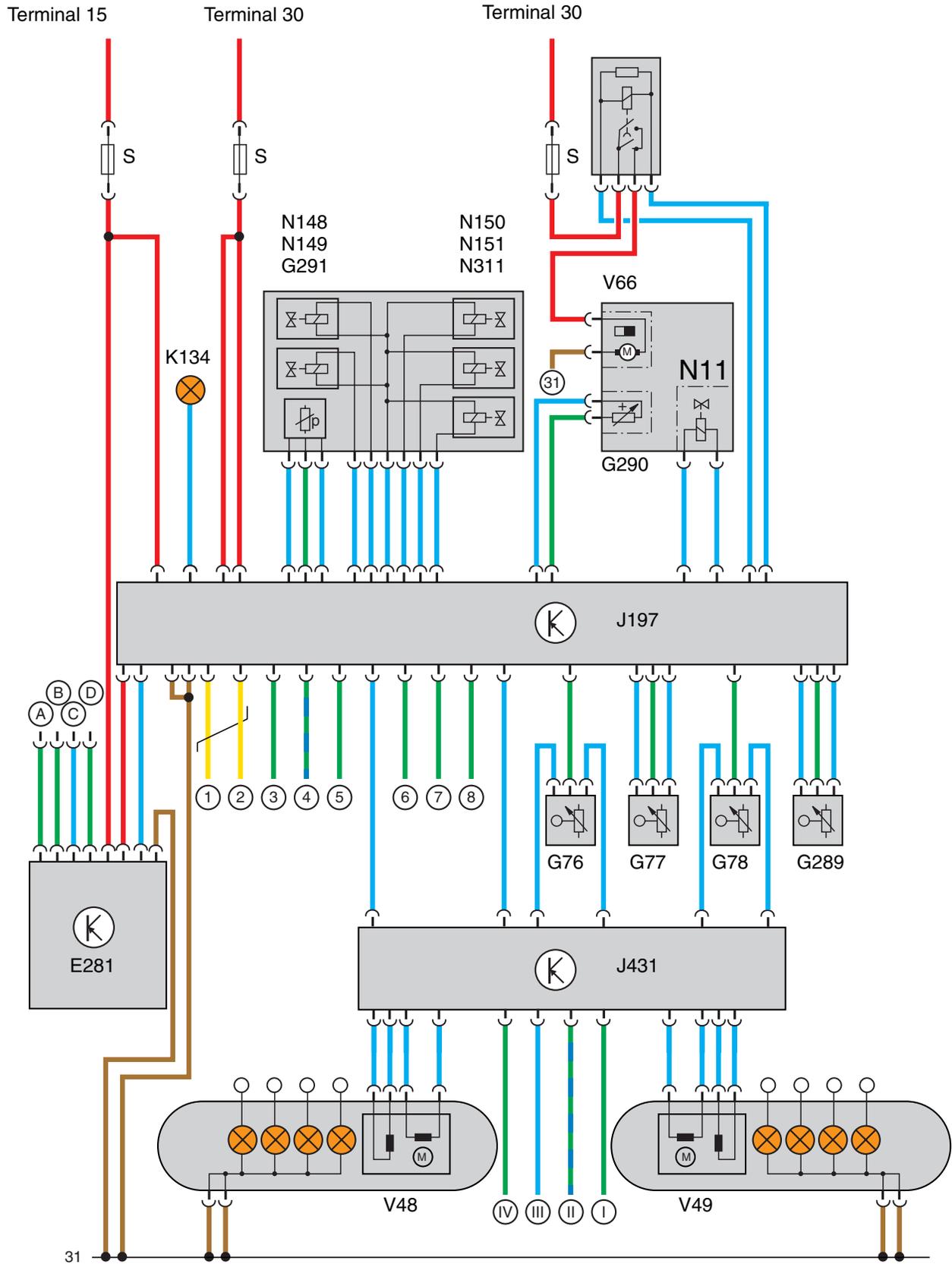


= Ground



= Bi-Directional, CAN-BUS

SUSPENSION COMPONENTS



SUSPENSION COMPONENTS

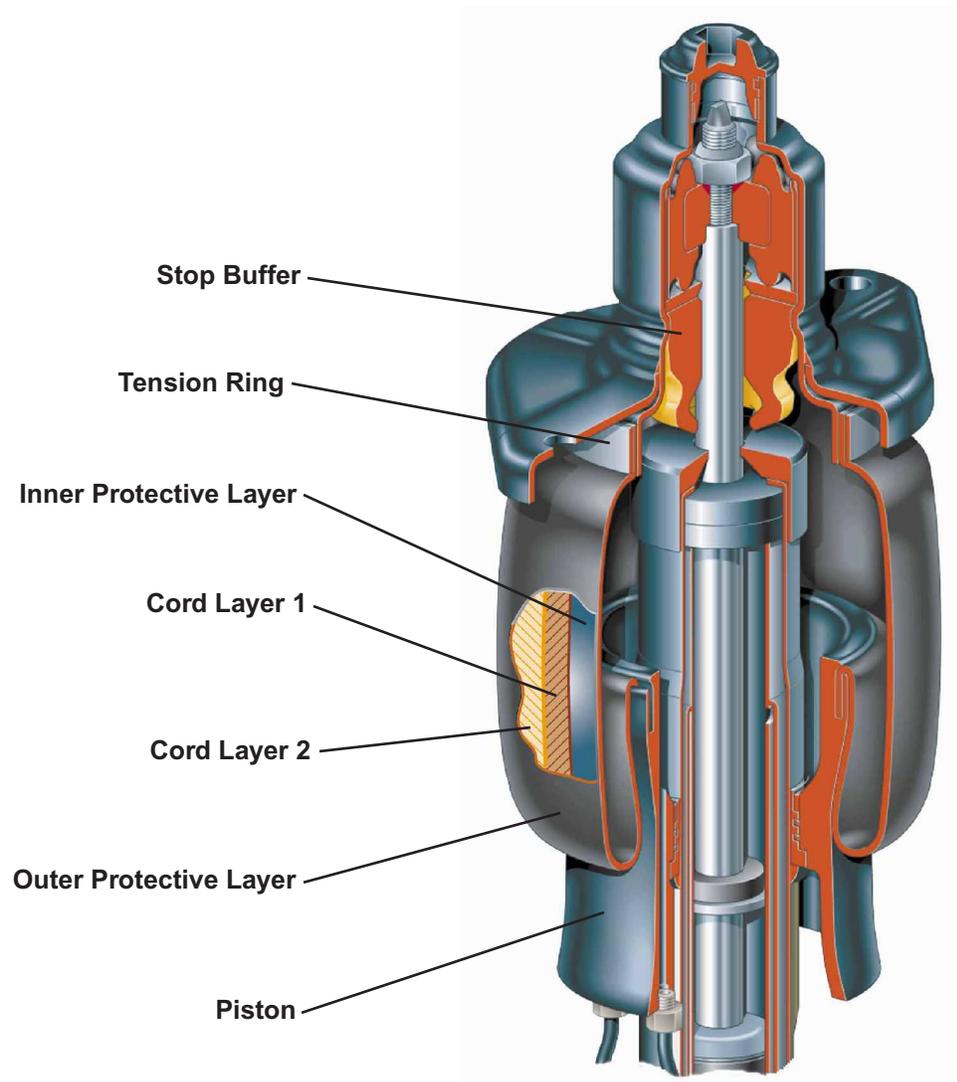
The Air Springs

The air spring design is not new to Audi. Air springs have been used in the rear suspension of the European A6 and A8 to level the vehicle when heavy loads are put in.

The allroad quattro simply takes the air springs another step by putting them on both the front and rear of the vehicle.

With air springs in place of all steel springs, the allroad quattro has the capability to raise and lower the entire vehicle, changing ground clearance.

The air springs are made up of a reinforced bag that surrounds the shock absorber. When the bag is pressurized, it will roll from the bottom to the top of the shock absorber, raising the vehicle.



Air Spring Components

Compressor

The compressed air is generated by a single stage piston compressor that has an integrated air dryer.

The compressor is dry-running, meaning that it does not use oil for its operation. This eliminates any possible oil contamination in the air springs.

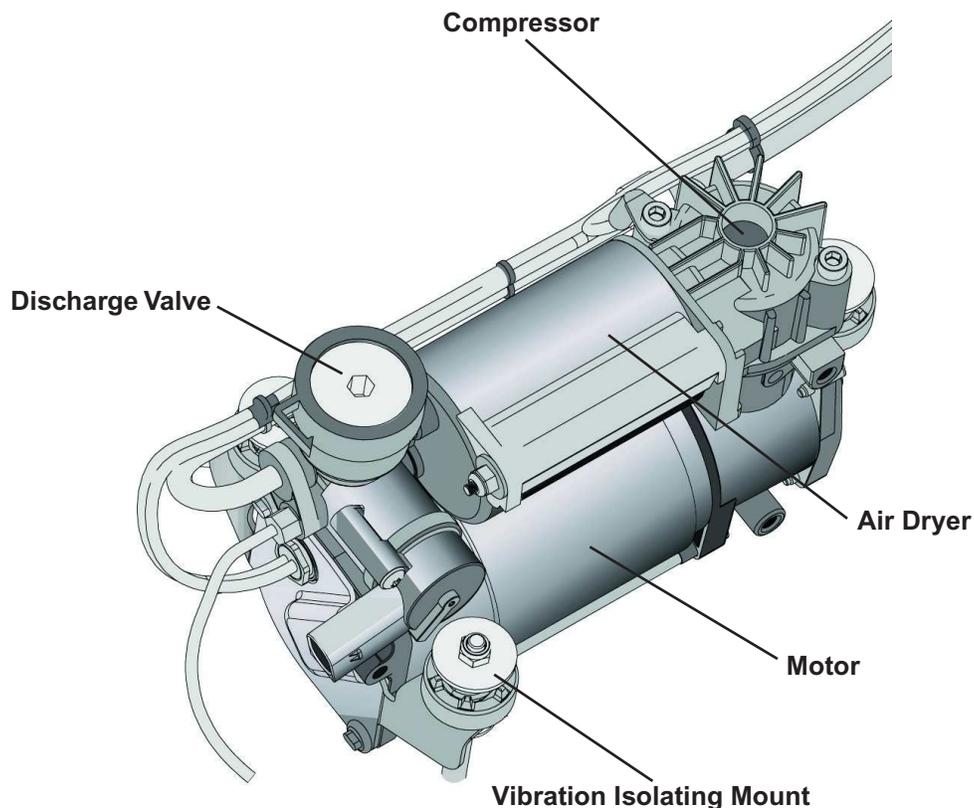
During normal operation, the compressor will only operate when the engine is running.

Exceptions:

- Final Control Diagnosis
- Basic System Settings
- When the key is on and the system detects an extremely low level

The special features of the 4-level allroad quattro suspension system are:

- The maximum operating pressure is 16 bar (232 psi).
- Suction and discharge of the air is performed by an air filter/noise damper in the spare wheel well.
- Temperature monitoring is performed by a temperature sensor at the cylinder head and a calculation formula in the control unit.
- Pressure monitoring is performed using a pressure sensor in the valve block.



SUSPENSION COMPONENTS

Temperature Sensor G290

The temperature sensor G290 is attached to the cylinder head of the compressor to determine the compressor temperature.

The temperature sensor sends a signal to the control unit, J197. The control unit determines if the signal is within normal operating range.

If the signal is not within normal operating range, the compressor will be shut off until a normal operating temperature has been reached.

Solenoid Valves

The four-level suspension has six solenoid valves.

The discharge valve N111 is integrated into the dryer housing. The function of N111 is to both limit and retain pressure in the air suspension system.

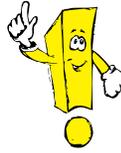
The four air shock valves (transverse check valves) N148, N149, N150, N151 and the accumulator valve N311 are combined in one valve unit located in front of the spare tire housing.

All of the solenoid valves are directional valves and are closed without current.

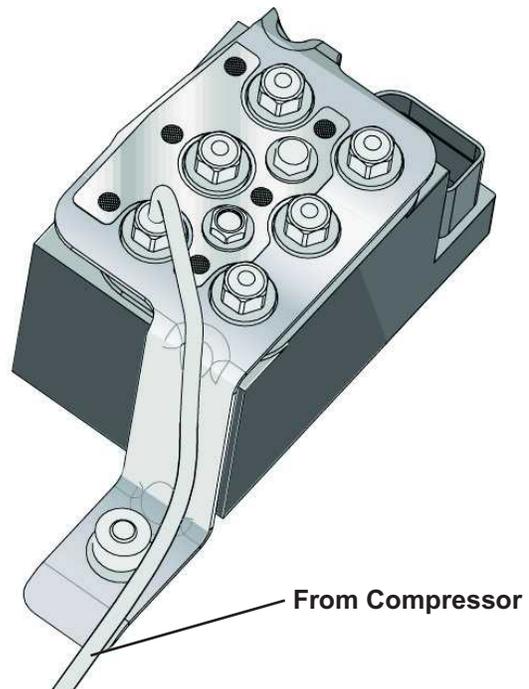
Pressure Sensor G291

The pressure sensor G291 is integrated into the valve unit, and is used to monitor both the accumulator pressure and the pressure to each air shock.

G291 sends a voltage signal that is proportional to the pressure to J197, the suspension control unit.



If the compressor has been shut down due to overheating, it may take 15 minutes until the compressor temperature lowers enough for the pump to operate again. The compressor takes approximately 1 hour to fully cool.



Solenoid Valve Unit

The Pressure Accumulator

The pressure accumulator is the component that stores compressed air for later use. If there is sufficient pressure in the pressure accumulator, the vehicle can be raised without compressor assistance.

The pressure accumulator is made of aluminum and has a capacity of approximately 6.5 liters.

The pressure accumulator is filled by the compressor under two conditions:

- When driving at a speed of approximately 22 mph (36 km/h) or above so the noise is not noticeable.
- When the accumulator does not have enough pressure to raise the vehicle to the requested level.

Sufficient pressure means that the pressure accumulator must have at least 3 bar (44 psi) more pressure than the air springs have.

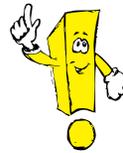
Air Supply Strategy

While driving at road speeds below 22 mph (36 km/h), the air supply is primarily taken from the pressure accumulator (as long as sufficient pressure is present).

While driving at road speeds above 22 mph (36 km/h), the air supply is primarily taken from the compressor.

This supply strategy ensures that compressor noise will not be heard over road noise in the passenger compartment.

The voltage supply is protected by running the compressor only when the engine is producing plenty of electrical power.



The maximum accumulator pressure is 16 bar (232 psi).



SUSPENSION COMPONENTS

The Levelling Senders G76, G77, G78, G289

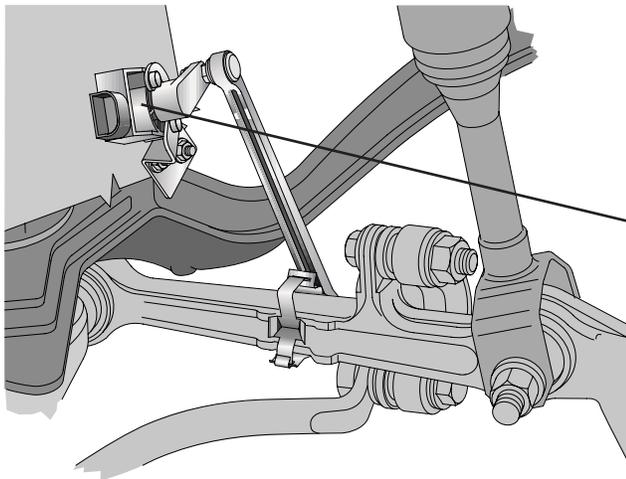
The levelling senders are inductive sensors that determine the angle of the surface they are mounted on and send it to the control unit J197. Signals from these senders are sent from the control unit, J197, to the 4-level air suspension system and to the headlight range control unit.

Both the suspension and the headlight control systems use different angle signals for operation. One signal output provides an angle-proportional voltage. A second signal output provides an angle-proportional pulse-width modulated (PWM) signal. Each levelling sender provides both types of signals.

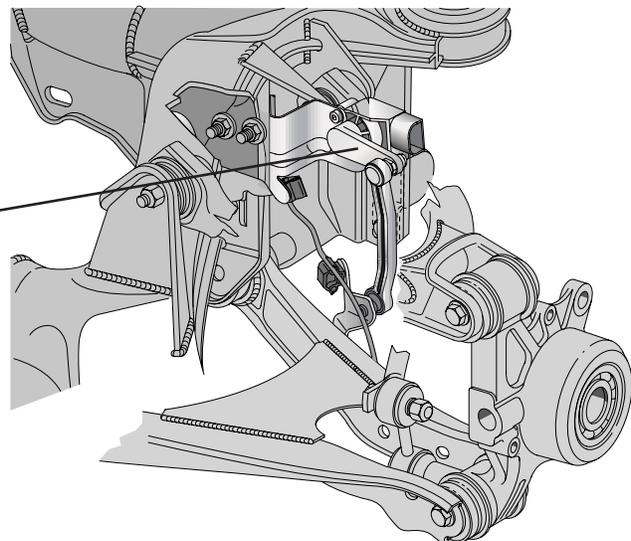
The 4-level air suspension uses the PWM signal and the headlight control uses the voltage signal.

Power is supplied to the left levelling sensors, G78 and G76, by the headlight range control unit.

Power is supplied to the right levelling sensors, G289 and G77, by the suspension control unit J197. This assures that headlight control will still operate even if J197 fails.



Front Level Sender



Rear Level Sender

Self-diagnosis

These are some of the important self-diagnostic functions of the 4-level air suspension in the allroad quattro. They are all located under Address Word 34 Self-levelling Suspension.



This Self-Study Program is not a Workshop Manual!
For maintenance and repair work, always refer to the current technical literature.

01 Control unit identification

4Z7 907 553A	2C1A1	X019
Coding 25501		WSC 00000

Identification of control unit manufacturer
2C1 = Hardware Status
A1 = Project (allroad quattro)

Software status for start of series production

07 Coding of control unit

Position	Meaning
Ten thousands	1 = headlight control not installed 2 = headlight control installed
Thousands	5 = specified height of front axle 402 mm
Hundreds	5 = specified height of rear axle 402 mm
Tens	0 = not used
Units	0 = RoW 1 = USA

SUSPENSION DIAGNOSIS

03 Output Diagnostic Test Mode

During output diagnostic test mode, service mode is switched off automatically and the warning lamp K134 flashes. The following functions are carried out:

- The vehicle will raise or lower to level 2.
- The self-levelling suspension LED's on the dashboard will illuminate.
- The vehicle is lowered at the front left
- The vehicle is lowered at the front right
- The vehicle is moved to normal level
- The vehicle is lowered at the rear left
- The vehicle is lowered at the rear right
- The vehicle will raise or lower to level 2.
- The pressure accumulator will perform a function test.
- END

The pressure accumulator will either fill or vent until 10 bar (145 psi) of pressure is left in the accumulator. Then, the pressure difference between the pressure accumulator and the pressure sender are checked. A pressure difference of less than 0.5 bar (7 psi) is acceptable.

04 Basic Setting

System ventilation / filling

The system can be bled or filled in function 04 within the display group numbers 20-31.

Procedure:

- Switch the ignition ON
- Go to address word 34
- Switch off control manually
- Carry out function 11, login procedure (login code 08367)
- Go to 04, basic setting
- Select display group below

The system can take up to 65 seconds to bleed fully. If the residual holding pressure of approx. 3.5 bar (51 psi) is not achieved during this time, "ventilation function aborted" appears on the tester display. It is recommended that this test be performed several times to verify a failure.

With function 04, the pressure in the system can only be bled to the residual holding pressure of approx. 3.5 bar (51 psi). Bleeding of the pressure accumulator is possible without initiating the login-procedure.

The filling time for a system component is limited to a maximum of 65 seconds. The limit pressure (air springs 9 bar (131 psi) / pressure accumulator 13 bar (189 psi)) should be achieved within this time. If the limit pressure is not achieved, it is recommended that the test be performed several times to verify the failure.

Display Group Number	Function
20 + 21	Bleeding of pressure accumulator
22 + 23	Bleeding of air springs at front axle
24 + 25	Bleeding of air springs at rear axle
26 + 27	Filling air springs at front axle
28 + 29	Filling air springs at rear axle
30 + 31	Filling pressure accumulator

WHEELS AND TIRES

Wheels

There are two different wheels available for the allroad quattro. Both have been specially designed for this vehicle and for off-road use.

5-spoke aluminum wheel

One of the available wheels on the allroad quattro is the 5-spoke aluminum wheel. This wheel is also used for the spare tire, regardless of which exterior wheel is on the vehicle.



5-spoke Aluminum Wheel

Dual spoke Twinforce wheel

The dual-spoke Twinforce wheel is made up of two pieces that are secured together with titanium bolts. This design gives high strength and great load bearing capacity.

Snow chains are only allowed on the rear wheels. Vehicle damage may occur if snow chains are put on the front wheels.



Dual-spoke Twinforce Wheel



The titanium bolts must not be loosened under any circumstances. If the bolts are loosened, the wheel must be replaced.

Tires

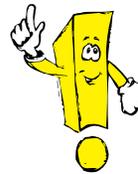
The 225/55 R17 tires were specially designed for the allroad quattro. This tire combines the abilities of both a high-grade road and a high-grade off-road tire. This is achieved through new material mixtures and a special tread design.

To save trunk space, the spare tire is a deflated full-size spare tire that has a compressor. This tire is a 205/70 16 and should be mounted on the vehicle before inflating.

The spare tire can be returned to its folded shape by discharging the air. A wheel cap is included that will remove the stem core, allowing the tire pressure to be released quickly.



Allroad Tire



Before raising the vehicle with a jack or lift, the air suspension must be switched off. Refer to page 25 for more information on switching off the suspension.

Compressor



Folding Spare

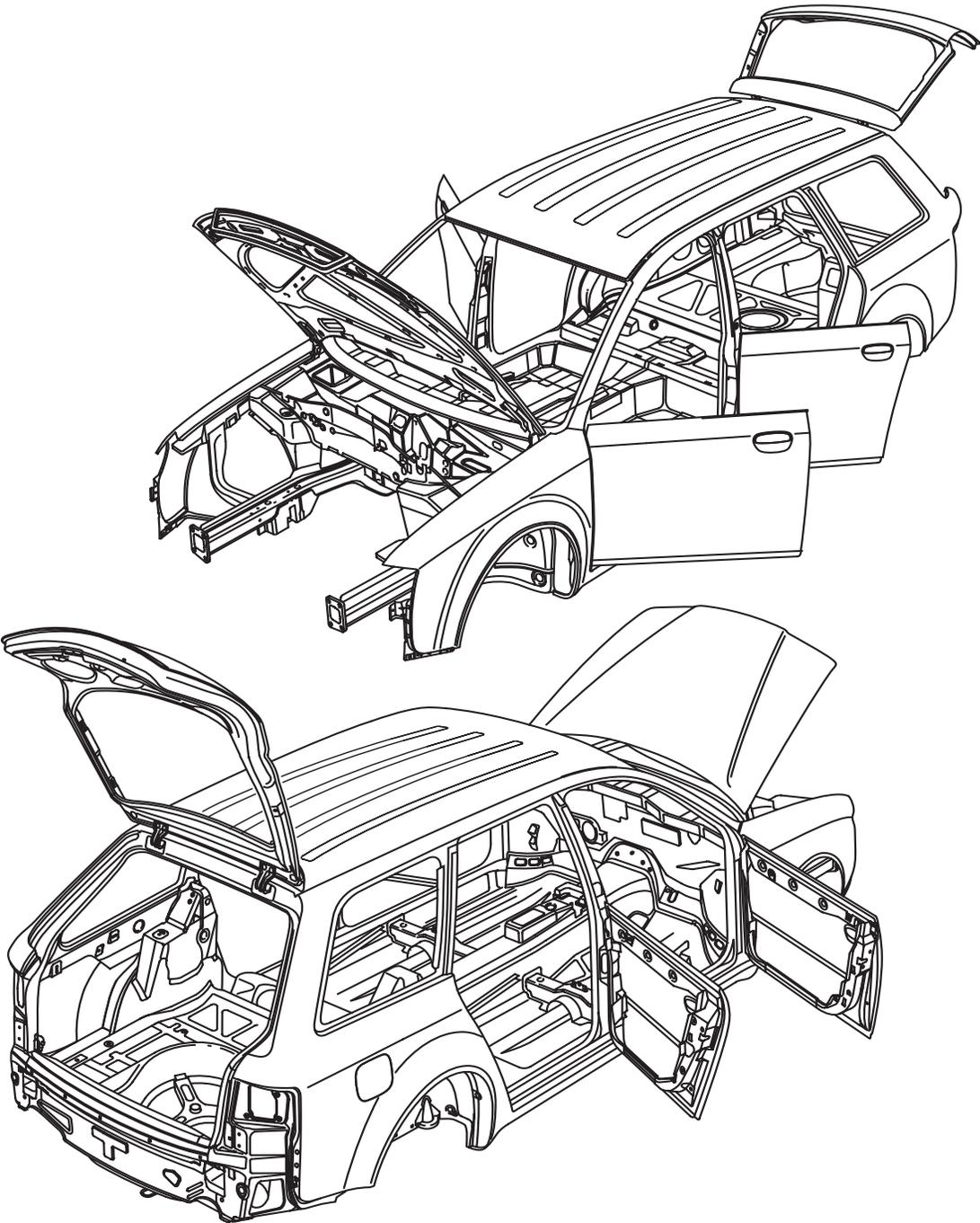


Folding Spare with Compressor

BODY

Body

Apart from the visual modifications to the A6 Avant body, many parts have been reinforced and stiffened to stand up to offroad use.



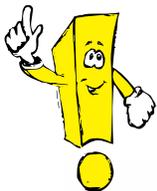
allroad quattro Exterior Features

Aluminum Look Package

The allroad quattro offers an aluminum look package that includes the roof rail, the boot trim and the door trim strips in an aluminum silk matte finish. The side window trim is highly polished aluminum.

Matte Paint

Certain areas of the vehicle are painted with a matte, scratch-resistant finish. These are the front and rear bumpers, the paint under the door cover trim, the wheel housing flares and the roof.



No hard waxes or polishes should be used on the matte paint areas of the vehicle, or the matte finish will be permanently damaged.

Underbody Protection

The underbody protection is integrated into the center lower part of the front and rear bumpers. It is made of ridged stainless steel that looks very similar to the aluminum on the rest of the vehicle.

This protection is reinforced on the inside with a plastic honeycomb structure. In the event the vehicle comes in contact with the ground, the underbody protection helps to keep the bumper and other components from being damaged.



BODY

allroad quattro Exterior Features continued

Roof

The matte-painted roof has a rib structure that matches the underbody protection. The weight carrying capacity of the roof is 200 lbs, evenly distributed.

Wheel Housings

Wider matte-painted wheel housings made of plastic give the vehicle a more aggressive look and house the larger, all-terrain tires.

Bumpers

The matte-painted front and rear bumpers are integrated to the wheel housings to make the vehicle appear more aggressive. The front bumper has also been changed to accommodate the redesigned headlamps.

Exterior Mirrors

The exterior mirrors on both sides have been enlarged to provide excellent rear visibility when on-road and off-road.

Electrically folding exterior mirrors are optional. These mirrors fold in by turning the remote mirror control switch to the rear. This feature can be used for extra clearance on both sides of the vehicle.

Headlamps

The design of the allroad quattro headlamps is different from that of an A6, however, the function is still identical.

Side Window Trim

Roof Rail



Underride
Protection

Boot Trim

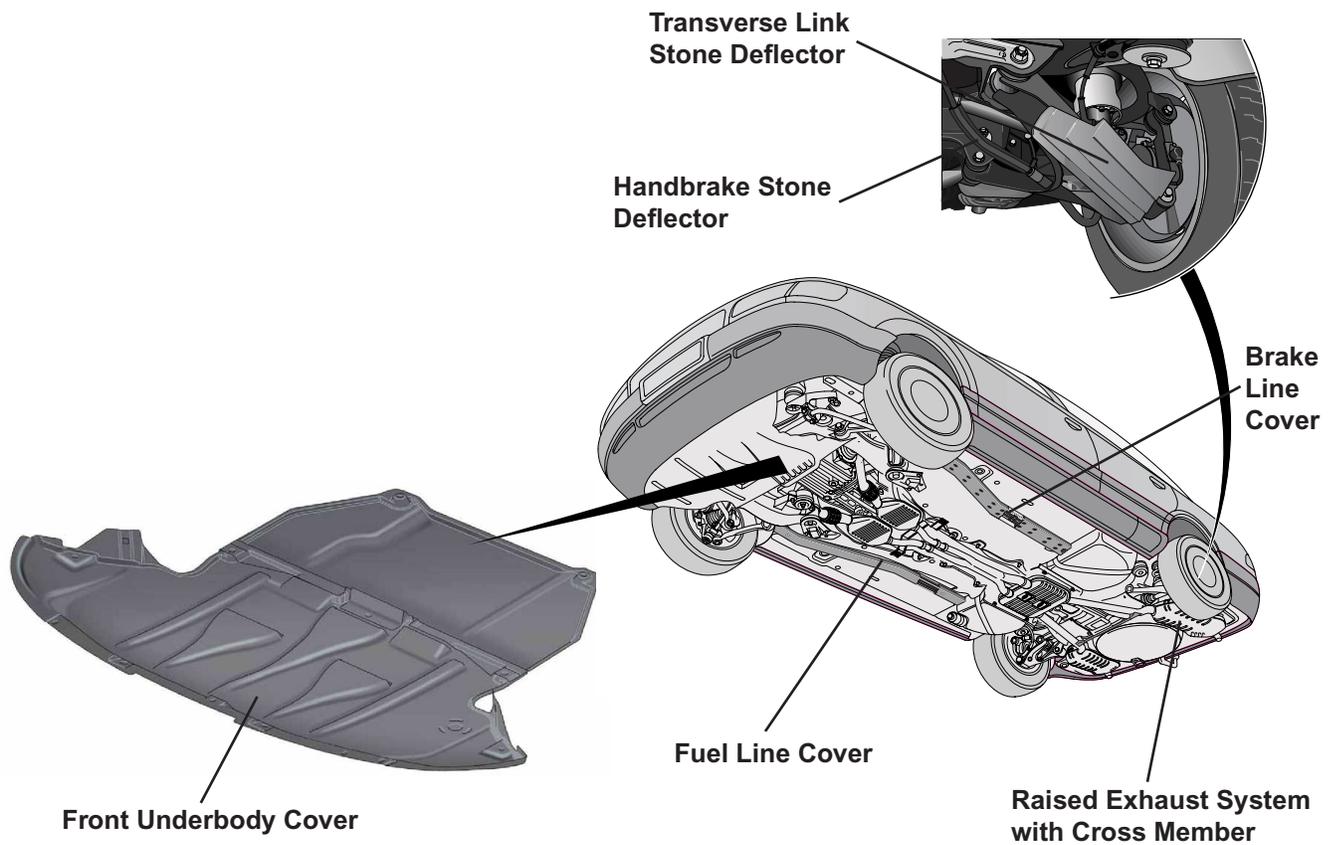
**allroad quattro Exterior Features
continued**

Underbody covers

Underbody covers protect the engine and transmission from stone impact and are also used as sound protection.

Glass fiber mats reinforce the underbody covers on the inside and outside. An additional large area of the cover near the oil pan is reinforced with a high proportion of glass fiber.

The underbody covers are not designed for ground collision protection and do not protect the drivetrain against sharp objects. These covers will not withstand the weight of the vehicle.



BODY

allroad quattro Interior Features

Seats

The seats were developed with off-road driving in mind. They offer a high degree of side support combined with excellent comfort. This gives the driver security during fast cornering or under heavy off-road conditions.

Interior

Aluminum trim surrounds the gauges in the instrument panel, as well as the circle at the center of the steering wheel.

The instrument panel, door inserts and shifter knob (manual or automatic) are light walnut.

allroad quattro Safety

The allroad quattro fulfills the current maximum requirements in terms of crash safety and passenger protection.

Together with the passenger safety cell, ESP, and the extensive airbag system, the allroad offers the same high level of safety as the A6 Avant.

1. What type of clutch does the 6-speed manual allroad quattro have?

1. Multiplate wet clutch
2. Self-adjusting clutch
3. Dual-plate clutch
4. None of the above

2. Technician A says that both the 6-speed manual and the 5-speed automatic transmissions have coolers.

Technician B says that only the 5-speed automatic transmission has a cooler.

Who is right?

1. Technician A
2. Technician B
3. Both Technician A and Technician B
4. Neither Technician A or Technician B

3. The Torsen differential:

1. Transfers most of the power to the front axle
2. Transfers most of the power to the rear axle
3. Transfers power to the wheel with the most resistance
4. Transfers power to the wheel with least resistance

4. The allroad quattro suspension and driveline originates from:

1. The A8
2. The A6 4.2
3. The A6 2.7
4. The A4 2.8

5. The front axle spacers are

1. Both 27 mm thick
2. 23.5 mm 25 mm thick
3. 25 mm and 27 mm thick
4. Both 25 mm thick

6. The rear axle spacers are:

1. Both 27 mm thick
2. 23.5 mm and 25 mm thick
3. 25 mm and 27 mm thick
4. Both 25 mm thick

TELETEST

7. The exterior rearview mirrors can be folded in by:
1. Turning the ignition off and pressing on the mirror control button for two seconds
 2. Pressing the mirror control button for two seconds when the vehicle is running
 3. Turning the mirror control knob to the rear
 4. The mirrors do not fold in
8. allroad quattro components that could easily be confused with standard A6 components are:
1. Not marked
 2. Marked with a red dot
 3. Marked with a blue dot
 4. Marked with a brown dot
9. The 4-level air suspension system can alter ground clearance by:
1. 2.6 inches
 2. 3.6 inches
 3. 4.6 inches
 4. 5.6 inches
10. When one of the up or down buttons on the instrument panel is pressed and held for two seconds:
1. The air suspension system goes into manual or automatic mode
 2. The air suspension system goes into or out of "control"
 3. Nothing happens
 4. The air suspension system raises to its highest level
11. When the up and down buttons on the instrument panel are pressed and held for five seconds:
1. The air suspension system goes into manual or automatic mode
 2. The air suspension system goes into or out of service mode
 3. Nothing happens
 4. The air suspension system raises to its highest level

-
12. Technician A states that paste wax or polished cannot be used on the matte-painted areas of the allroad quattro.

Technician B states that the vehicle will raise or lower, even during cornering maneuvers

Who is right?

1. Technician A
 2. Technician B
 3. Both Technician A and Technician B
 4. Neither Technician A or Technician B
13. Switching service mode on:
1. Raises the vehicle to its highest level
 2. Locks the suspension system
 3. Lowers the vehicle to its lowest level
 4. Frees the suspension system
14. Which of the following activates the lifting platform mode?
1. Quickly raising the vehicle
 2. Quickly lowering the vehicle
 3. Stopping quickly
 4. Driving in a tight circle
15. The maximum operating pressure of the air suspension system is:
1. 14 bar (203 psi)
 2. 15 bar (218 psi)
 3. 16 bar (232 psi)
 4. 17 bar (247 psi)
16. The accumulator capacity is approximately _____ liters.
1. 2
 2. 3
 3. 4
 4. 5
17. The maximum amount of time the air suspension system can take to be bled is:
1. 65 seconds
 2. 75 seconds
 3. 90 seconds
 4. The system cannot be bled
-

TELETEST

18. The titanium bolts on the Twinforce wheel:
1. Can be removed, as long as they are tightened to 45 lb-ft
 2. Can be removed, as long as they are tightened to 65 lb-ft
 3. Can only be removed by the dealer
 4. Should never be removed
19. The deflated full-size spare tire:
1. Should be inflated using the compressed air can in the tool kit
 2. Should be inflated on the ground
 3. Should be inflated after mounting on the vehicle
 4. Should be inflated after the vehicle is lowered
20. Which of the following **cannot** be used on the matte painted areas of the vehicle:
1. Paste wax
 2. Hot wax in a car wash
 3. Soap and water
 4. All of the above can be used
21. The available engines in the allroad quattro are:
1. The 2.7L biturbo and the 4.2L V8
 2. The 2.8L and the 2.7L biturbo
 3. The 4.2L only
 4. The 2.7L biturbo only
22. The purpose of the dual mass flywheel is:
1. To multiply torque
 2. To transform pulsations into smooth power
 3. To reduce peak torque output of the engine when releasing the clutch
 4. To provide engine output readings to the ECM
23. Continual flashing of the level indication LED on the instrument panel means that:
1. The vehicle is at the highest level
 2. An air spring has failed
 3. A level sender has failed
 4. The vehicle level request has been denied

24. The accumulator is primarily filled above which speed?

1. 22 mph
2. 29 mph
3. 32 mph
4. 39 mph

25. The front underbody cover that protects the engine is made of:

1. Kevlar fiber
2. Carbon fiber
3. Fiberglass
4. None of the above

ANSWER WORKSHEET

Automated Telephone Testing Instructions

Testing Times: 24 hours a day

To take an Automated Telephone test:

- Record your responses to test questions in the boxes below.
- Dial 1-800-228-9500.
- Enter your Social Security Number, Social Insurance Number, or Employee Identification -Number.
- Enter the six-digit Course Number. The Course Number for this test is 992003.
- Enter your test answers by pressing the corresponding numbers on the telephone key pad when prompted by the Audio Response system — enter answers in groups of five.
- If you want to change your previous answers, press 8. You may change your answers at this time only. Failure to change incorrect answers could result in an incorrect score.
- You will be given your results at the completion of the test.
- If you did not achieve a score of 80% you must wait 24 hours before retaking the exam.

If you are using a rotary dial telephone, or have difficulty with the Audio Response system while taking your test, please call 1-888-565-7366, Monday-Friday, 7 a.m. to 7 p.m. (Central Time).

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