Audi RS6

Self Study Program
Course Number 991303

Audi

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

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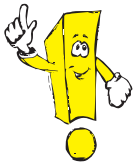
The Self Study Program provides you with information regarding designs and functions.

The Self Study Program is not a Repair Manual.

For maintenance and repair work, always refer to the current service repair information.



NOTE

CAUTION

The Audi RS6

The arrival of the Audi RS6 has given a whole new meaning to the term "vehicle dynamics." As was the case with the Audi RS4, the new top model in the Audi A6 Series was conceived by Audi's star designers at quattro GmbH and developed in conjunction with Audi AG.

The quattro four-wheel drive Audi RS6 has a 4.2-liter V8 engine with two turbochargers, five valves per cylinder and twin charge air cooling.

With 450 hp, 415 lb/ft of torque, Tiptronic 5-speed automatic transmission, and a sport suspension, the RS6 has the agility of a sports car, accelerating from 0 to 60 mph in 4.6 seconds (0-100 km/h in 4.9 seconds).

Adding to the sporty feel and appearance of the RS6 are the Formula 1-style Tiptronic shift "paddles" on the steering wheel.

Overview

Audi RS6 is the first vehicle to use the hydraulic active running gear system Dynamic Ride Control (DRC). This damper system eliminates much of the body roll and pitch encountered on cornering. A brake system with disc diameters of 365 mm (front) and 335 mm (rear) ensures balanced deceleration.

With its high-grade materials, the exclusive interior equipment of the Audi RS6 combines a sporty atmosphere and excellent comfort.

Standard features include leather, heated Recaro sports seats, carbon fiber interior trim, Symphony II radio with Bose sound system, and Xenon high intensity headlights.

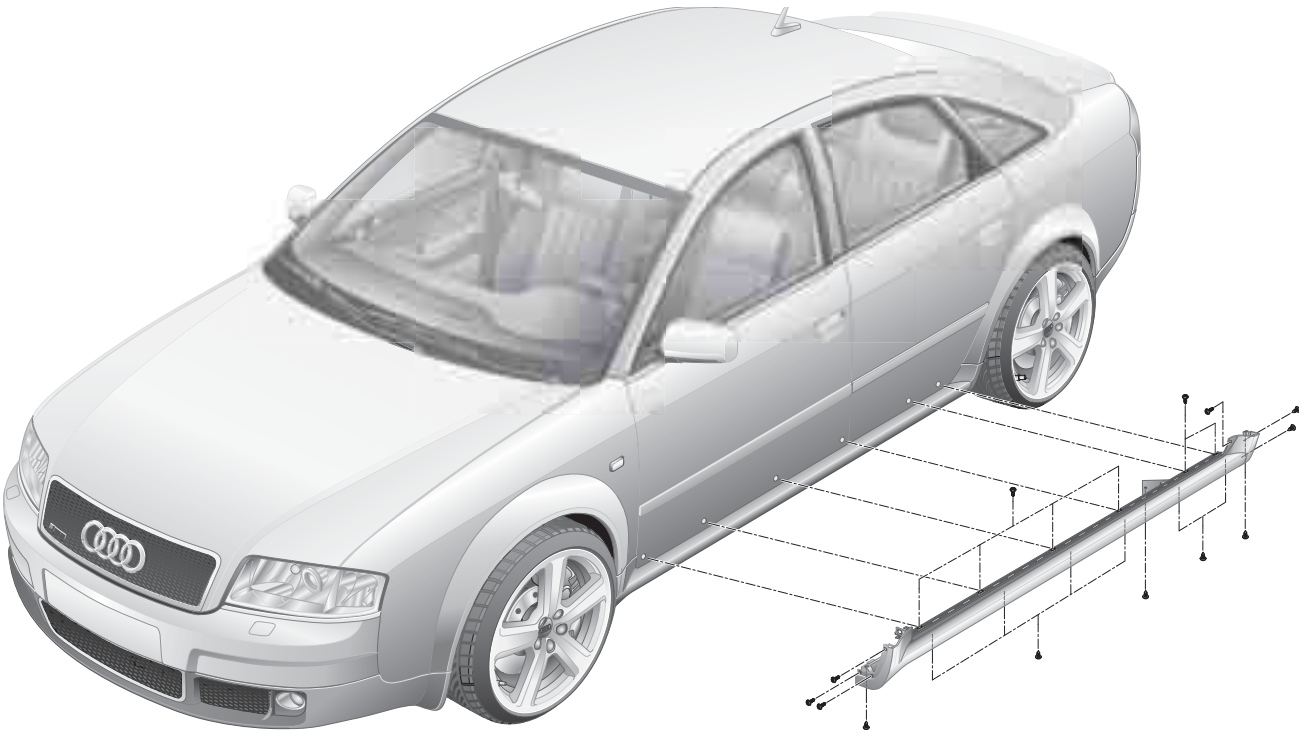
The Audi RS6 is not intended for trailer operation or the installation of an auxiliary heater.

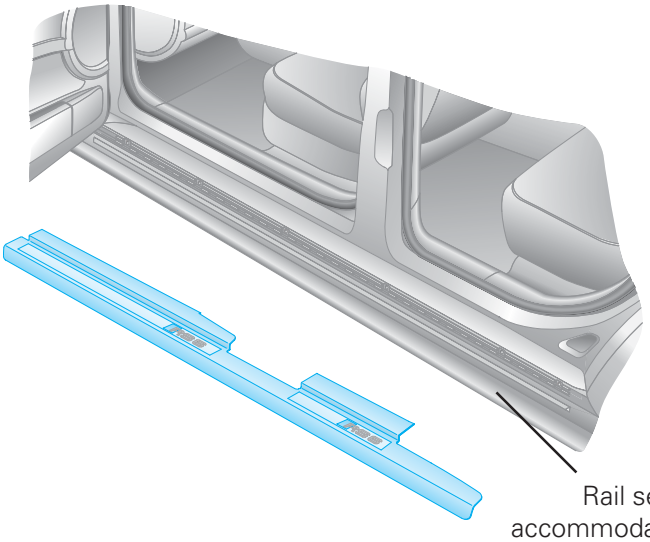
Sill Panels

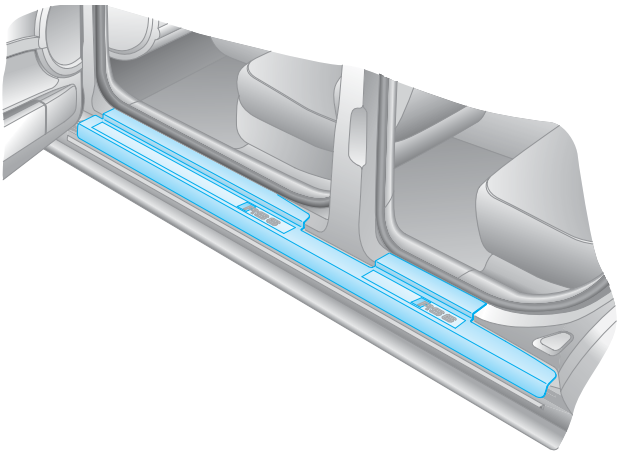
The new sill cover panel is bolted to the underbody as well as to the front and rear wings and is attached by means of plastic plugs to the top of the sill.

The side dirt deflectors forming part of the Audi A6 basic equipment are not fitted.

The upper fastening elements of the sill panel trim are concealed by the sill molding with the RS6 emblem.





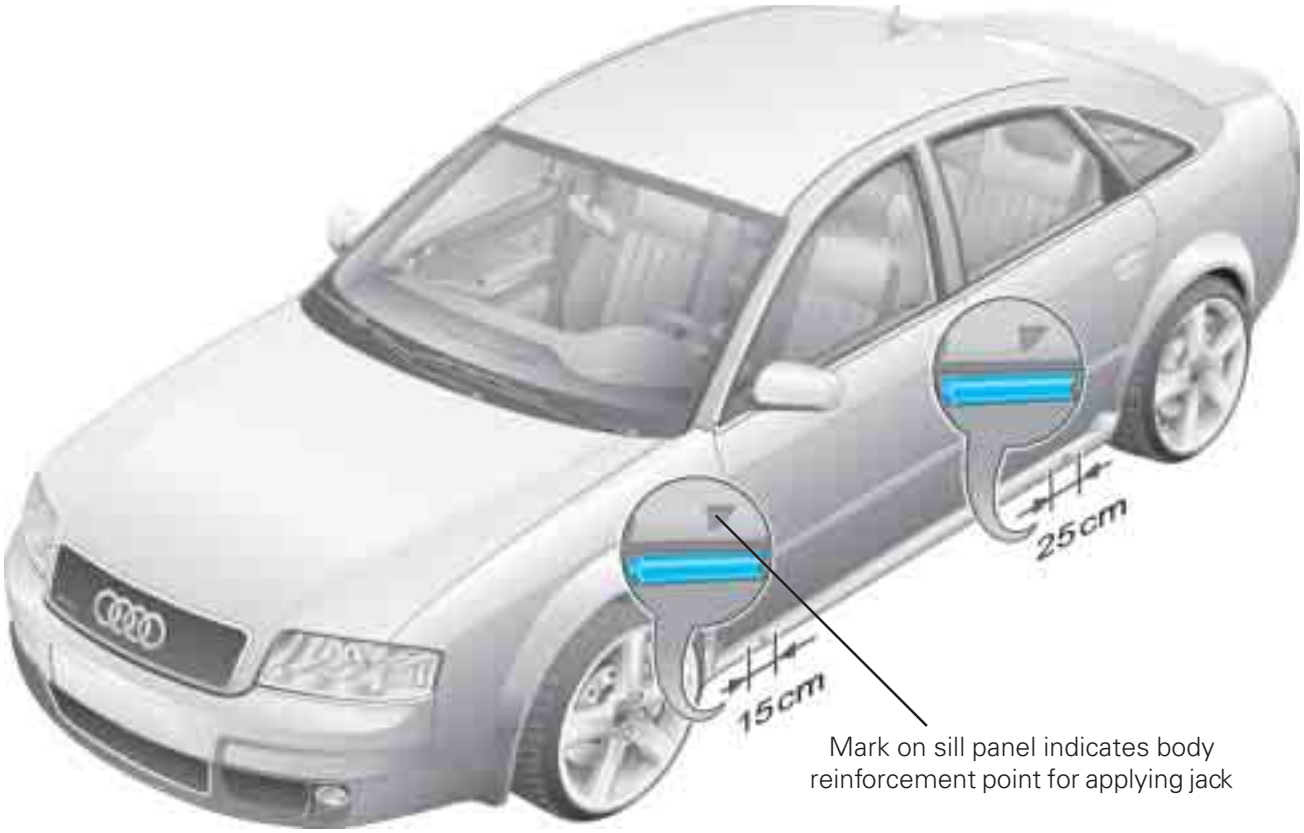


Rail section to accommodate sill molding

Jacking Points

The positions for jack and hoist application are marked on each sill panel. The reinforced parts of the body designed to safely withstand lifting forces are only to be found in this marked area.

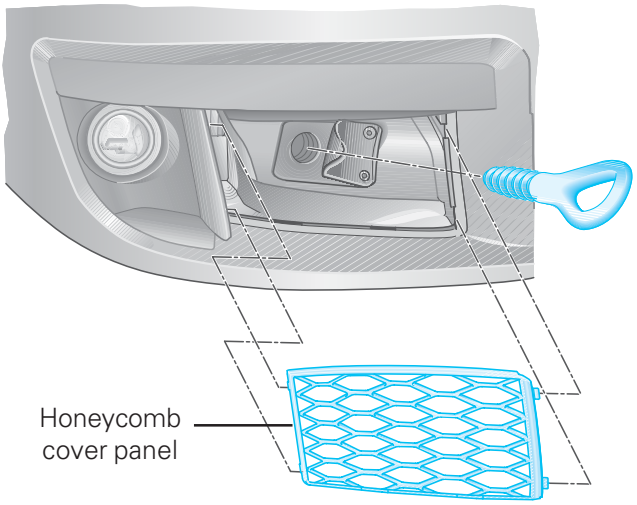
Raising the vehicle at other points could damage body components, including sill panels.



Mark on sill panel indicates body reinforcement point for applying jack

Front End

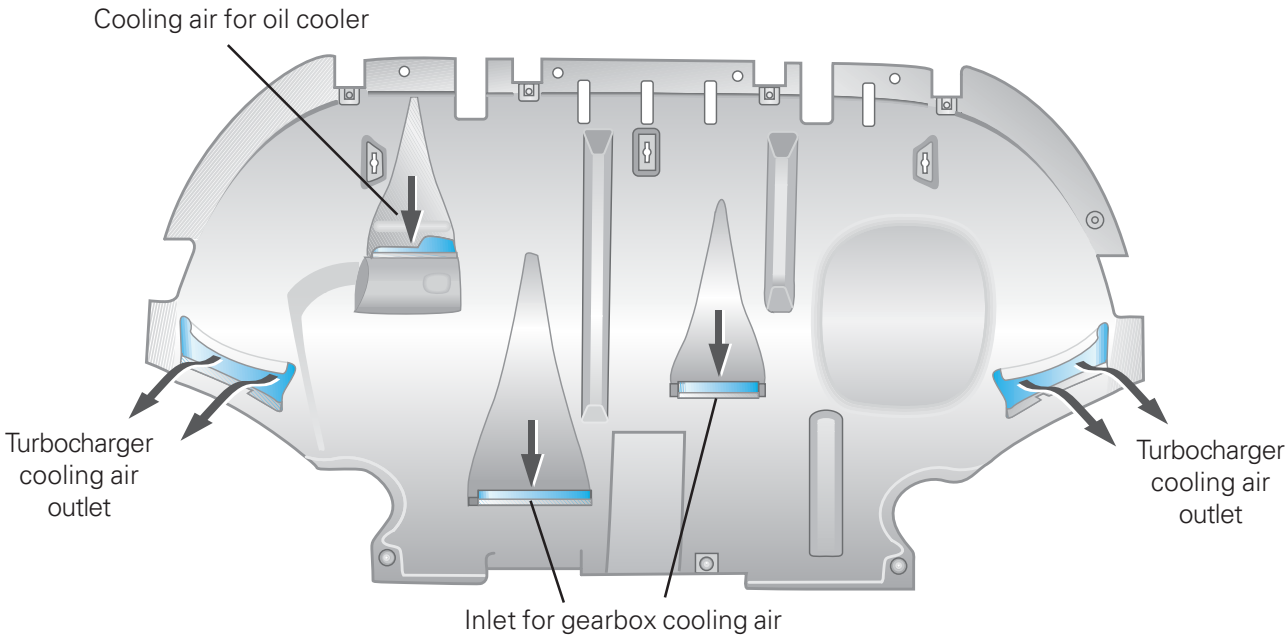
The front end has been modified in the area of the fog lights and charge-air inlet cover panel. The screw connection for the front towing eye is located directly behind this cover panel.



Engine Compartment Noise Insulation

To help muffle sound, a noise insulation plate is fitted on the underside of the engine compartment. The three center vents play an essential part in providing the large amount of additional cooling air required for the engine and transmission.

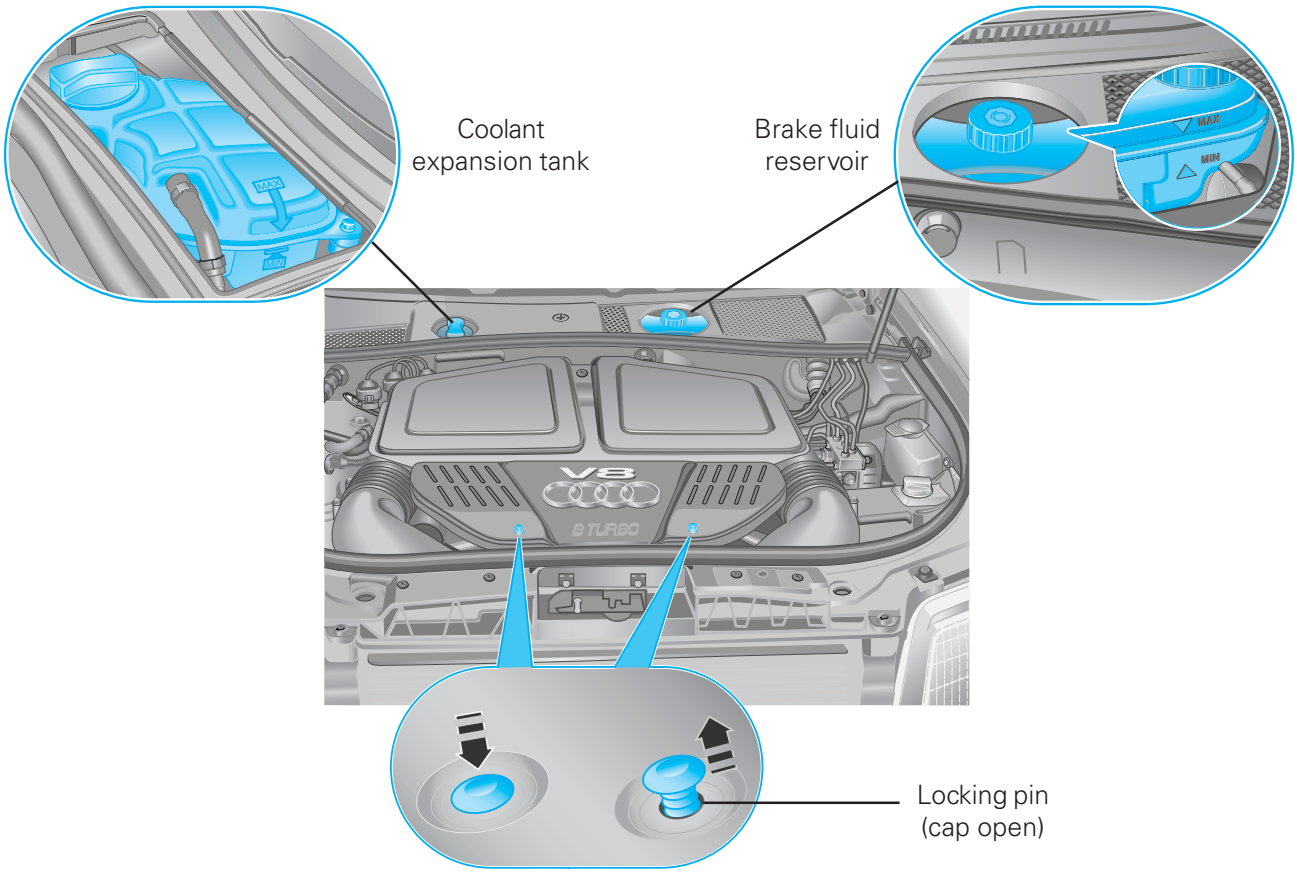
The flow of air is specifically directed to units subject to high thermal load. The two side vents enable the turbocharger cooling air to escape.



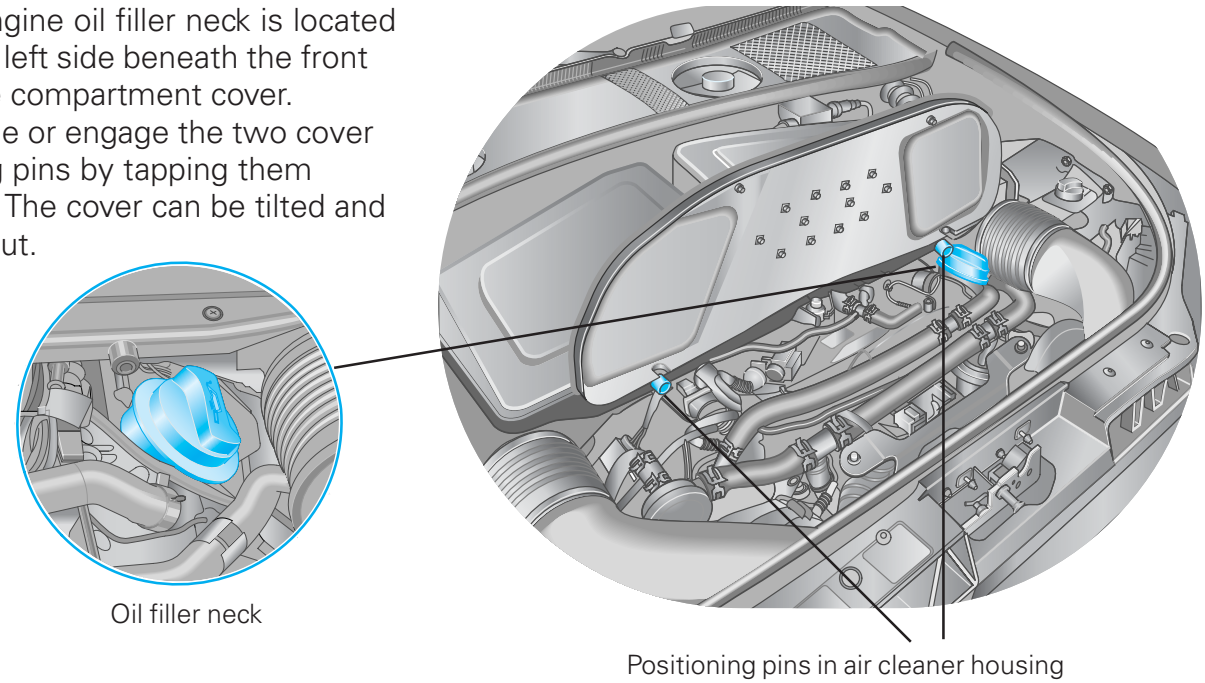
Engine Compartment

The coolant expansion tank and brake fluid reservoir have been relocated to the plenum chamber.

The levels in the expansion tank and reservoir can be checked in the usual manner after removing the two covers.

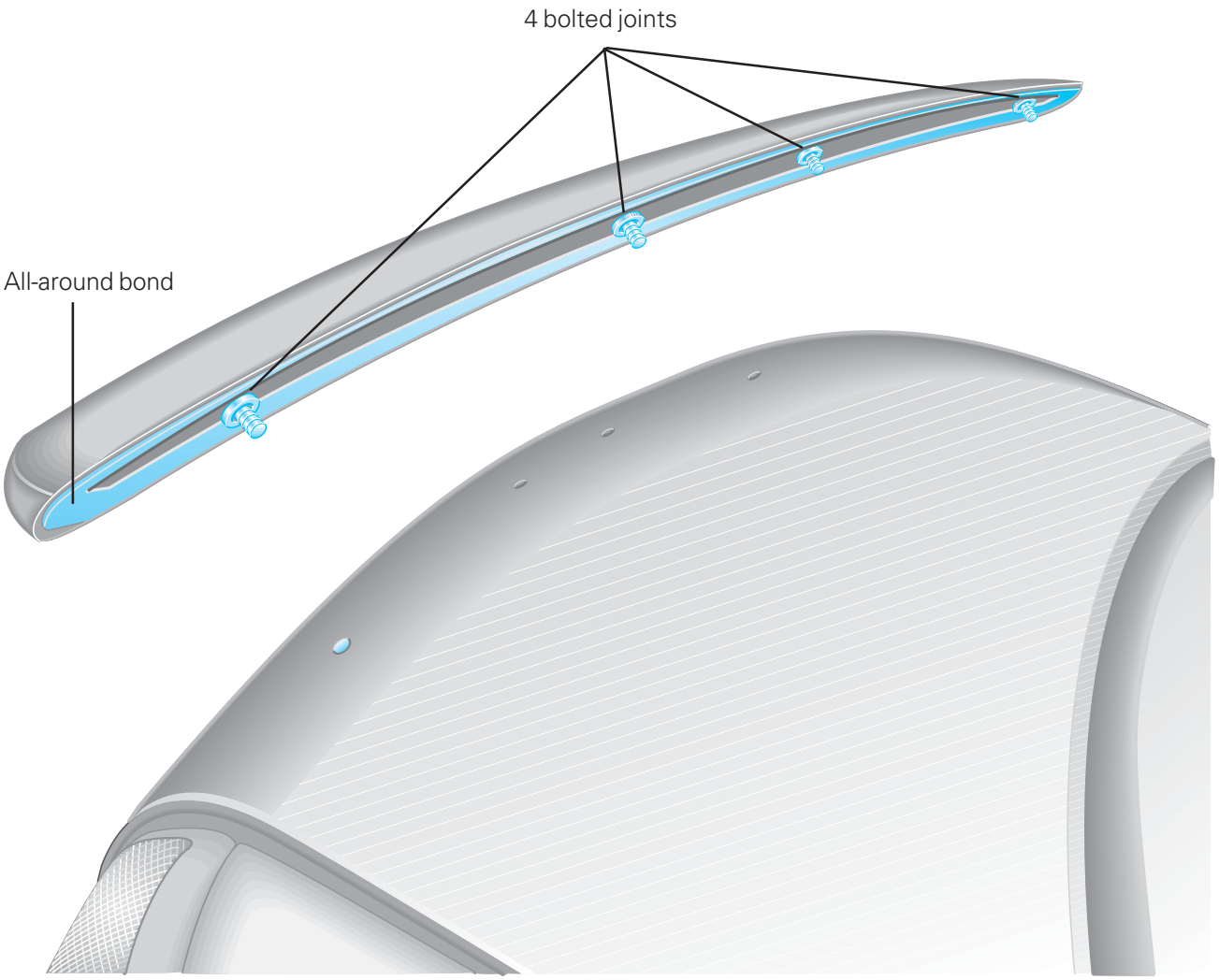


The engine oil filler neck is located on the left side beneath the front engine compartment cover. Release or engage the two cover locking pins by tapping them briefly. The cover can be tilted and lifted out.



Rear Spoiler

A rear spoiler is standard on the RS6. The spoiler is attached to the trunk lid using four bolts. To achieve an even form fit on the trunk lid contour, it is secured by means of all-around double-sided bonding.



Audi RS6 Engine

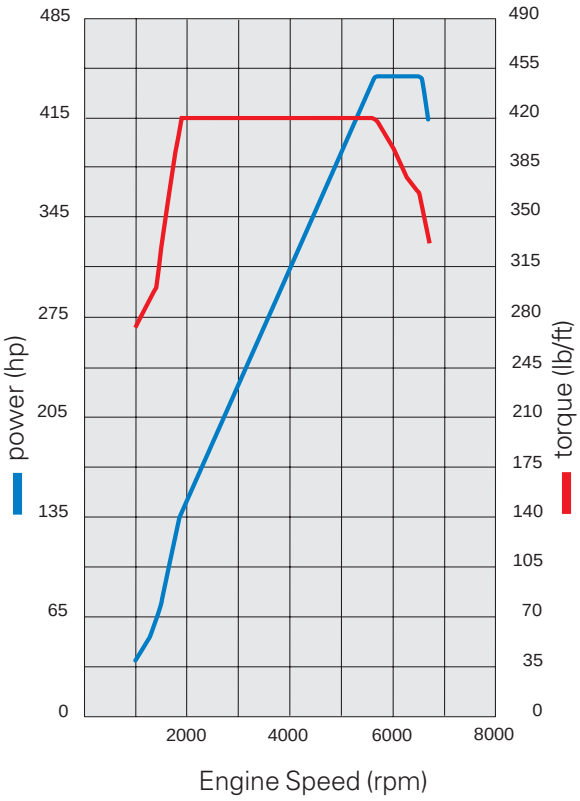
4.2L Biturbo V8

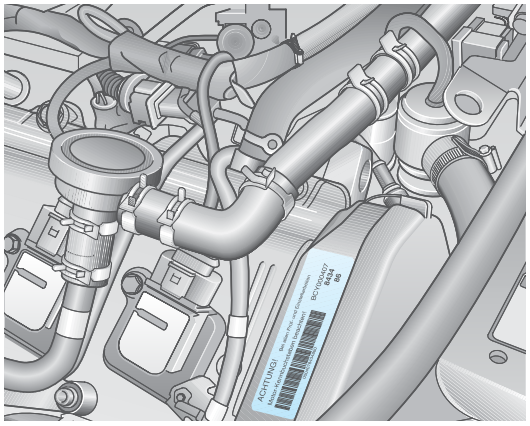
The engine was developed using the V8 engine of the Audi S6 as a base.

The goal was to create an engine that could achieve high torque levels at low engine speeds.

Engine Technical Data

Code letters:	BCY
Type:	Biturbo V8, 4.2-liter, 5-valve, 90°, 4-stroke, gasoline engine
Power:	450 hp at 5700 - 6400 rpm
Torque:	415 lb/ft of torque at 1950 - 5600 rpm
Max. engine speed:	6700 rpm
Bore:	3.32 in. (84.5 mm)
Stroke:	3.66 in. (93 mm)
Displacement:	255 cu. in. (4172 cc)
Compression ratio:	9.8 : 1
Firing order:	1 - 5 - 4 - 8 - 6 - 3 - 7 - 2
Engine Weight:	507 lbs.
Fuel Injection:	Motronic ME7.1.1 with electronic multi-point sequential fuel injection system
Emission system:	Two air-gap-insulated tubular manifolds, two underhood primary catalytic converters, heated oxygen sensors
Fuel:	Premium Plus unleaded recommended for maximum performance





A sticker indicating the engine code letters is attached to the toothed belt guard (refer to Repair Manual).

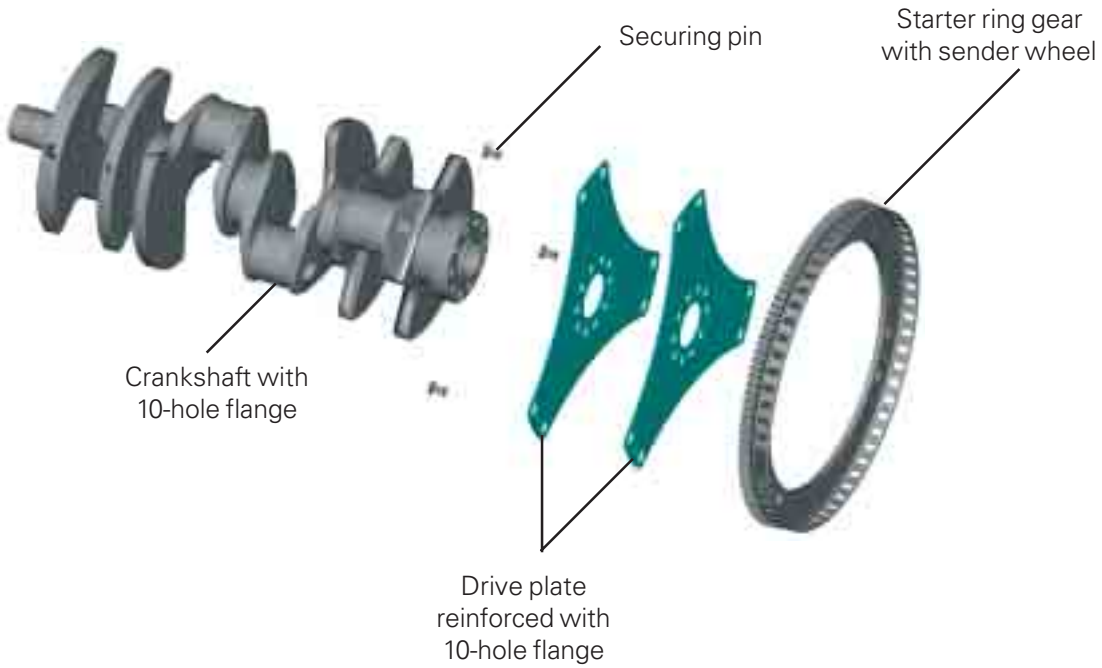
This sticker must be reattached if the toothed belt guard is replaced as part of repair work.

Crankshaft Group

Crankshaft

The crankshaft uses a standard shaft modified in the flange area.

Because engine speed and inertia forces are relatively low (greater compressive force), the V8 crankshaft is fitted with a doubly reinforced 10-hole flange drive plate.

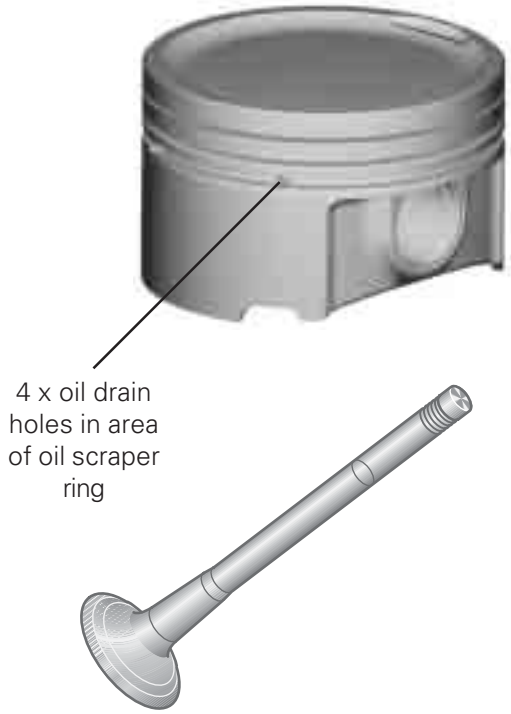


Pistons

The piston skirt is provided with a Ferrostan II bearing surface coating.

The piston design is such that cylinder bank assignment is not necessary.

The compression ratio is reduced to $\varepsilon = 9.8$.



Valves

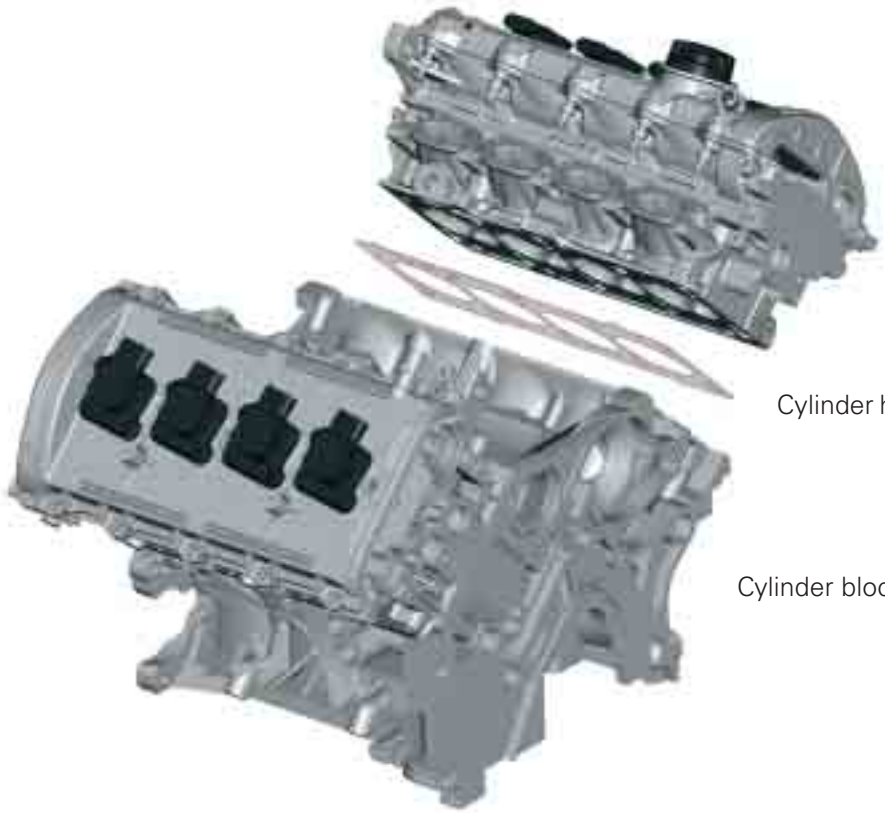
In the course of reworking the necessary valve throats, the diameters of the two exhaust valves per cylinder and the corresponding seat rings were reduced to d = 27 mm.

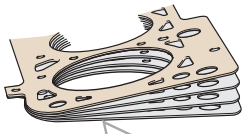
Cylinder Head

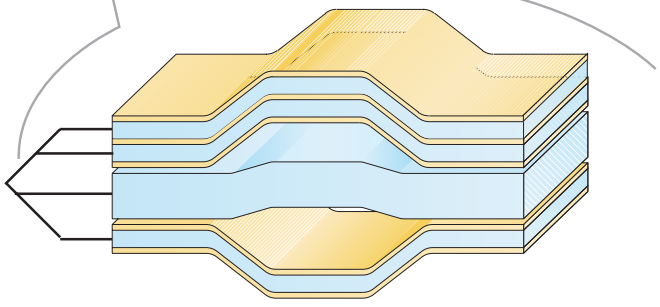
Cylinder Head Gasket

In line with the engine concept, the cylinder head made of a new Alumisil alloy is fitted with a four-layer sealing system at the cylinder block and crankcase. The increased power level with charged engines produces higher firing pressures.

The gasket materials are an important factor in the structural integrity of the engine. Their different profile heights permit optimum force distribution within the components and extend the service life of the sealing beads. As a central element, the gaskets are made up of beaded, elastomercoated spring steel layers.



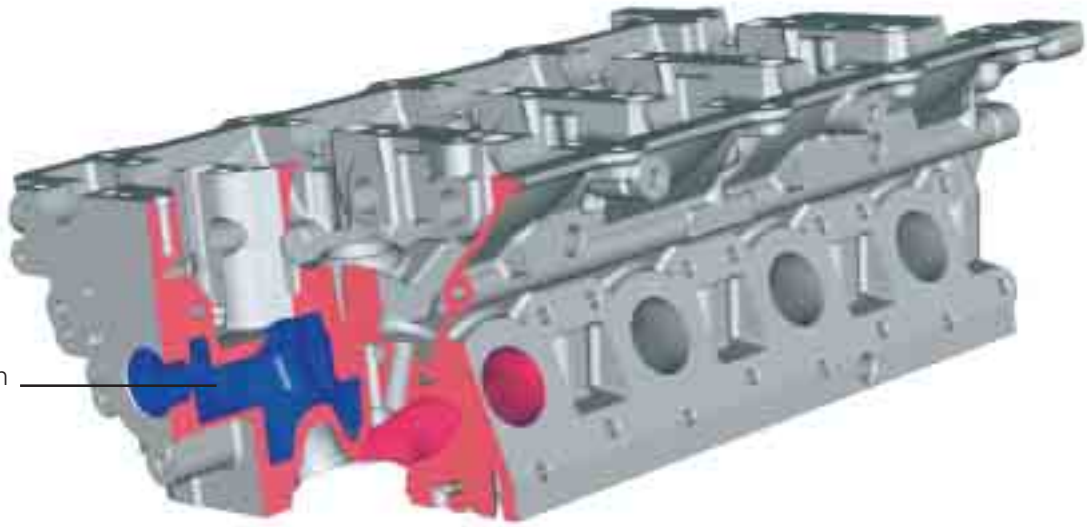

4-layer cylinder head gasket

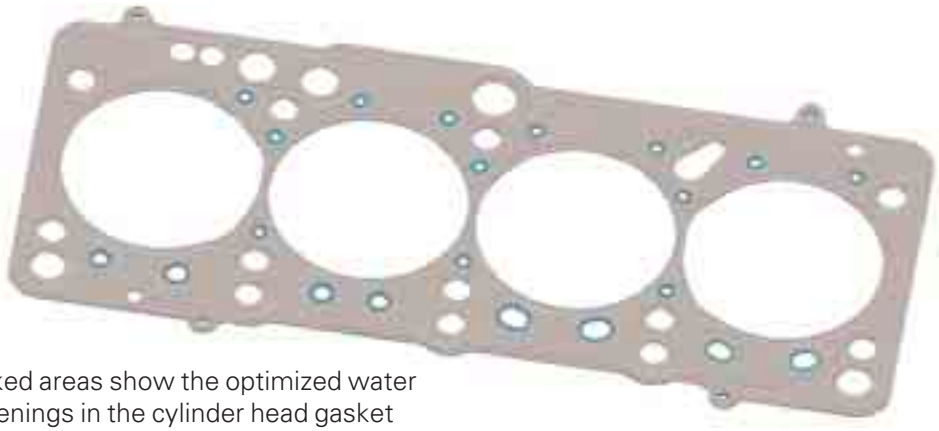

4-layer structure of sealing system

Cylinder Head Cooling

The light alloy cylinder head with five valves (three inlet and two exhaust valves per cylinder) has been adapted to meet the more exacting demands of the V8 biturbo engine through the use of different materials.

In the area of the combustion chambers and exhaust ports, the V8 engine has been fitted with an optimized water jacket for improved heat dissipation. This also necessitated appropriate adaptation of the openings in the multi-layer cyinder head gasket for the passage of coolant.





Marked areas show the optimized water openings in the cylinder head gasket

Because of the differences in water routing, there are specific cylinder head gaskets for each bank.

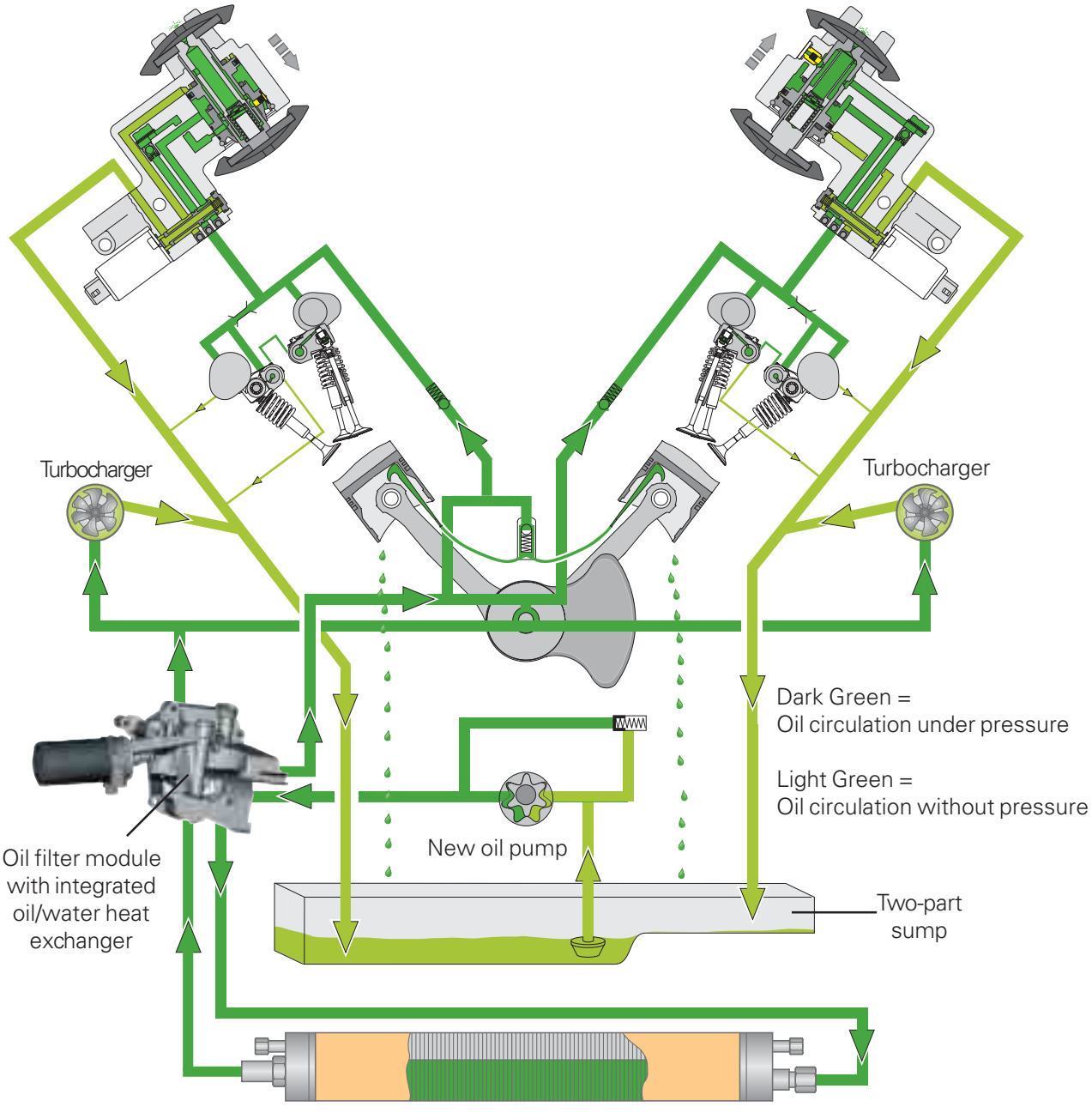
Oil Flow

The oil flow of the V8 biturbo is similar in design and operation to the V8 5V engine. Two turbochargers for increased power add to the number of temperature-intensive components in the oil circuit. A design modification at the oil pump enables the cut-off pressure in the oil circuit to be increased, ensuring constant supply and the proper cooling of all engine components.

Oil temperature is controlled by two separate coolers:

1st circuit — by the familiar oil/water heat exhanger in the oil filter module

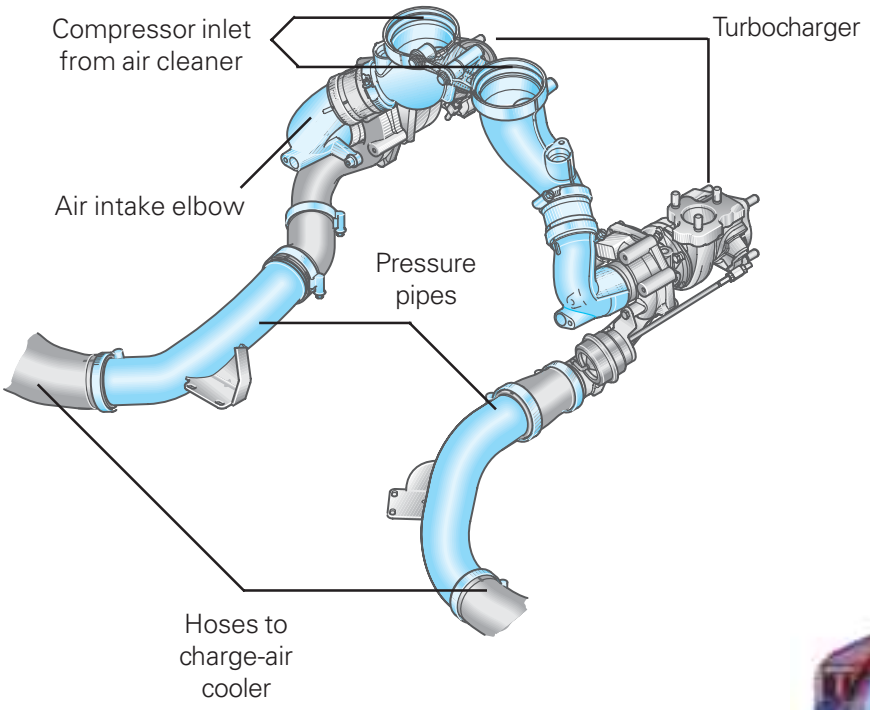
2nd circuit — with the air-to-oil cooler located at the front end beneath the radiator

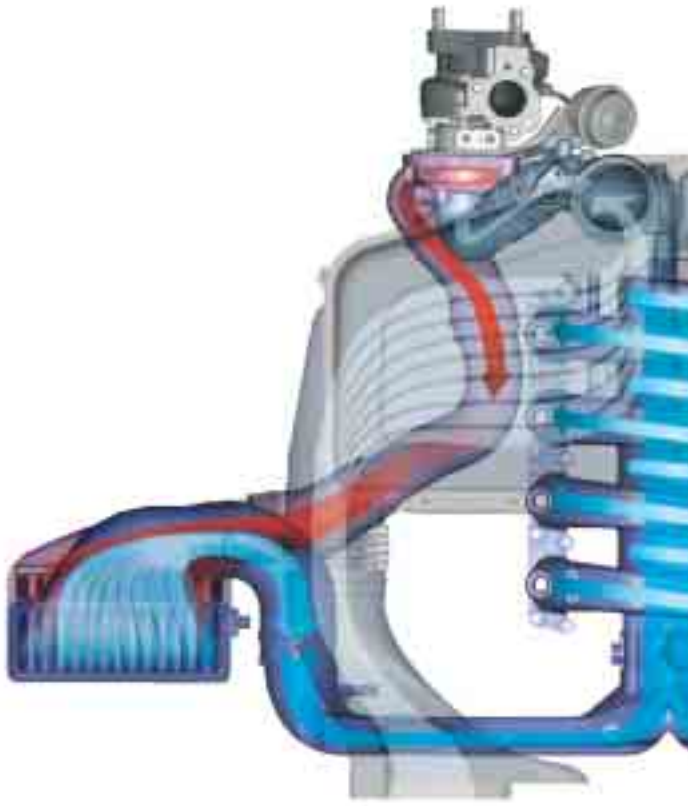


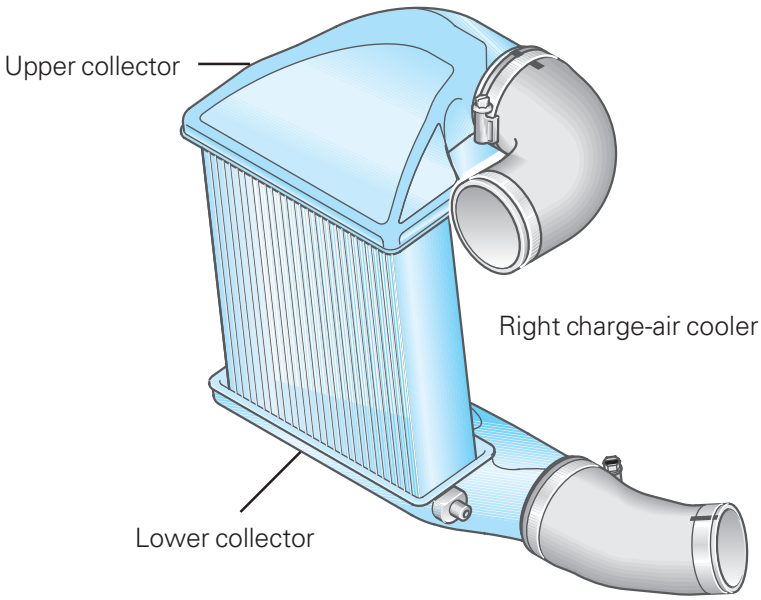
Air Supply

Two new, large air cleaner elements are used to cope with the increased air requirements of the turbo engine.

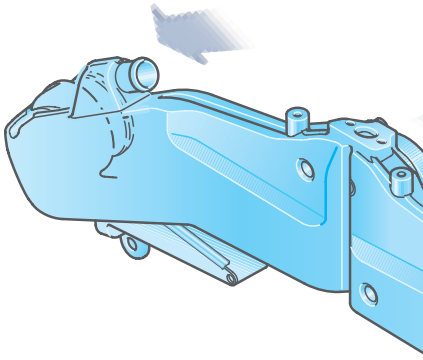
Cold air is drawn in through two separate inlets in the front end above the radiator.







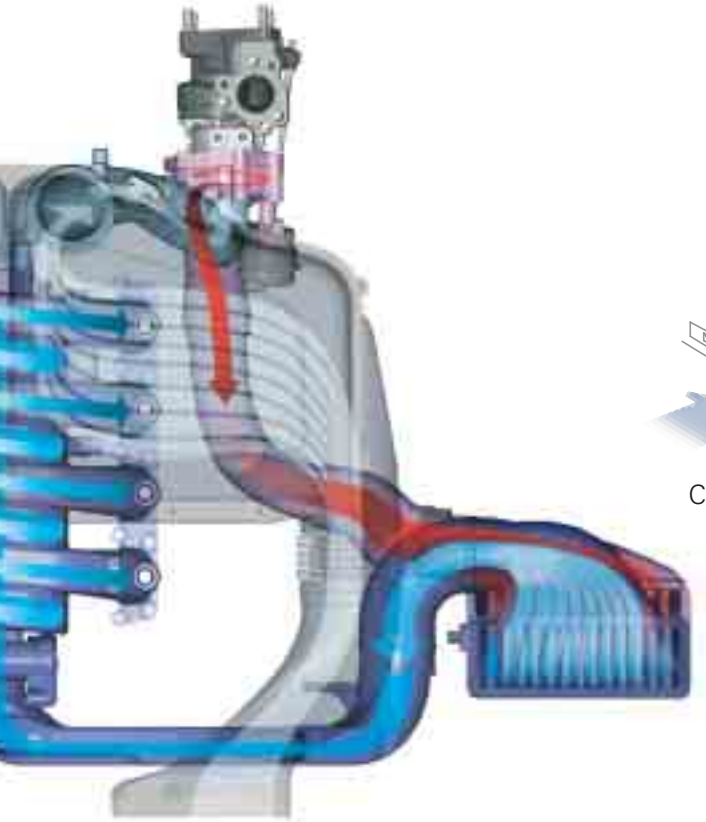
From charge-air cooler

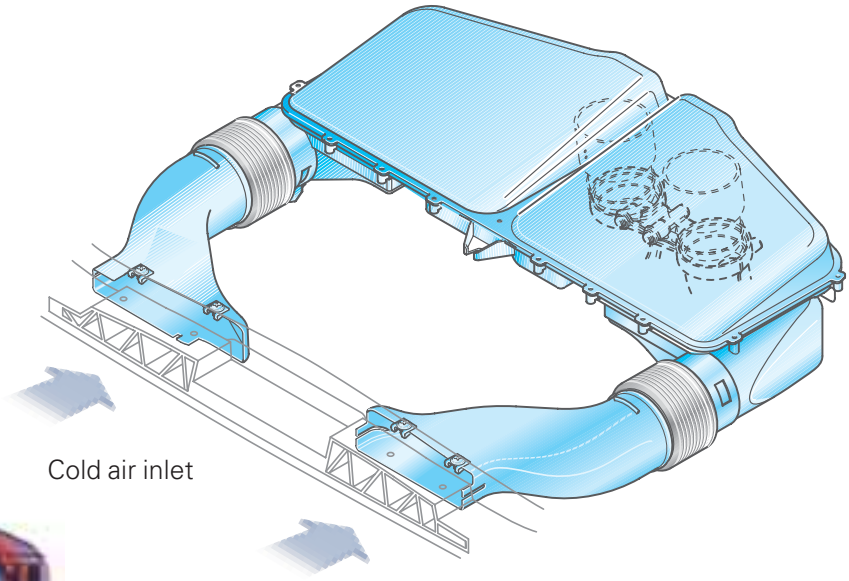


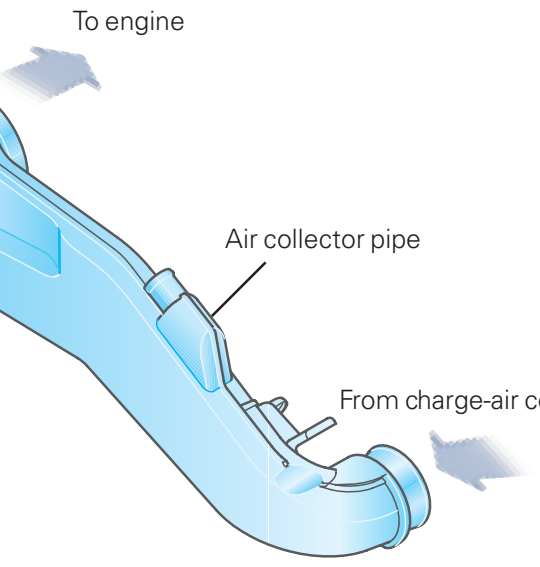
Advantages of charge-air cooling:

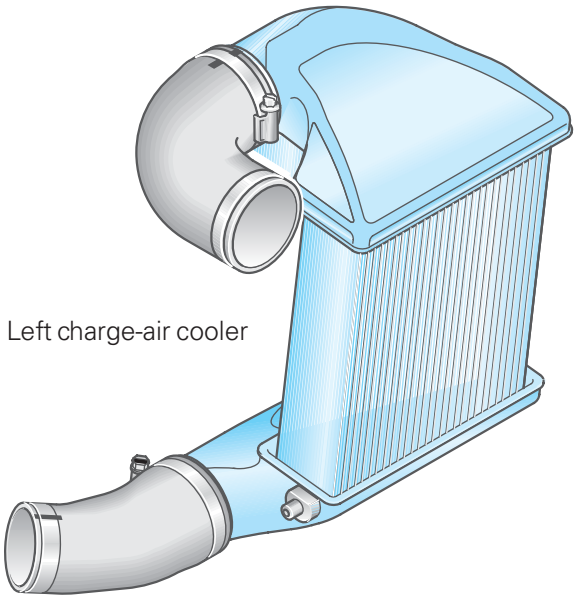
- Improved efficiency thanks to greater density of cooled air
- Lower temperatures, reduced knock tendency

After passing through the mass air flow sensors, the flow of air is routed through a piping system to the water-cooled turbochargers. Vibration-damping elements at the air cleaner outlet and pressure pipe connections ensure acoustic isolation of the entire system. From the turbocharger, the hot compressed air is routed to the charge-air coolers and then through the newly developed air collector pipe at the front of the engine. The intake manifold is responsible for distribution to the cylinders.





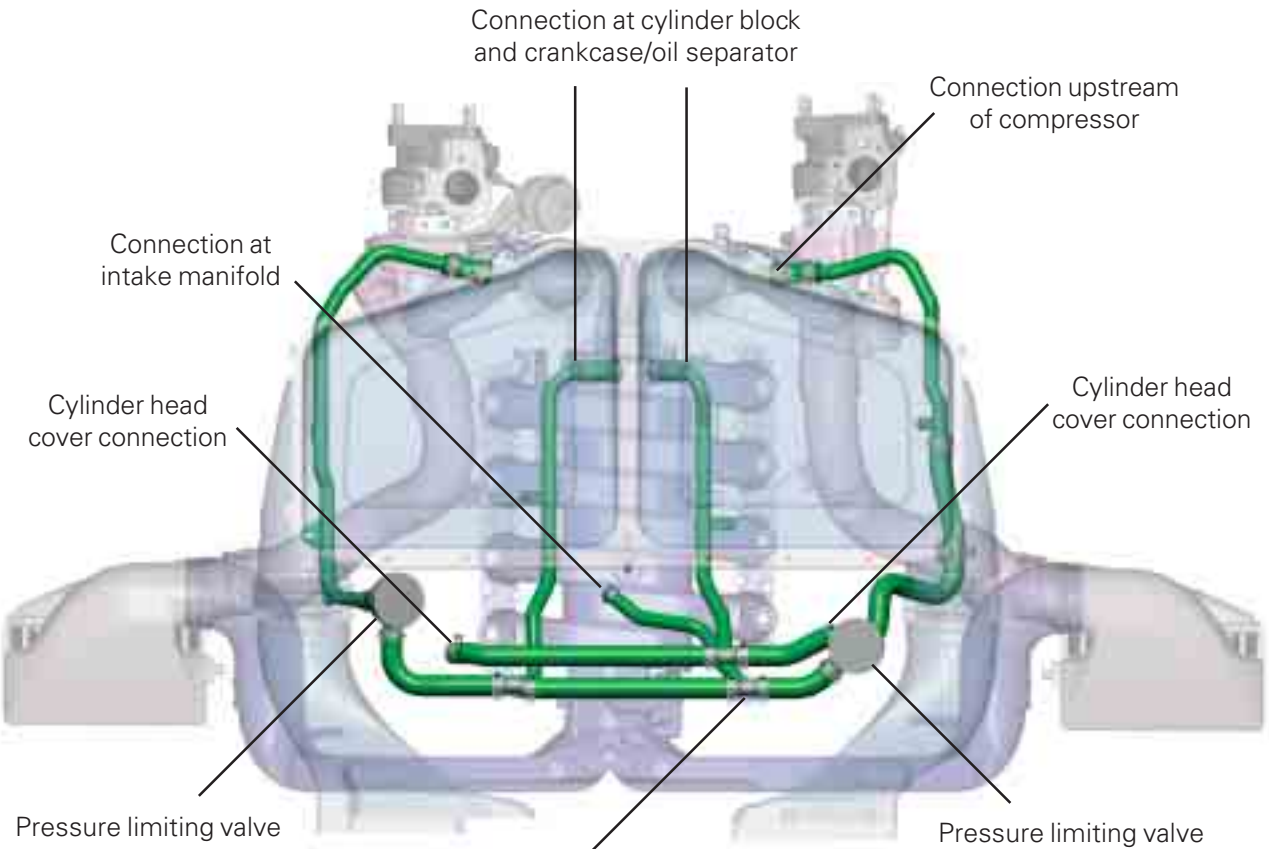


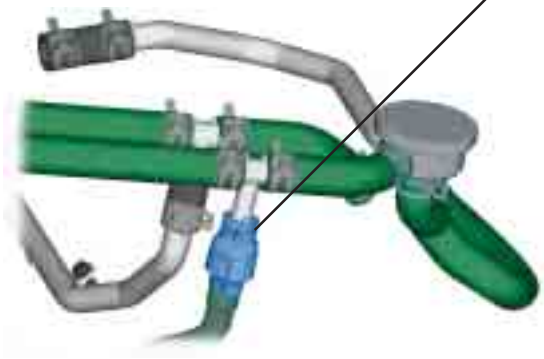


Crankcase Breather

The crankcase breather consists of the following:

- Pressure limiting valve
- Non-return valve
- Tubing with distributor





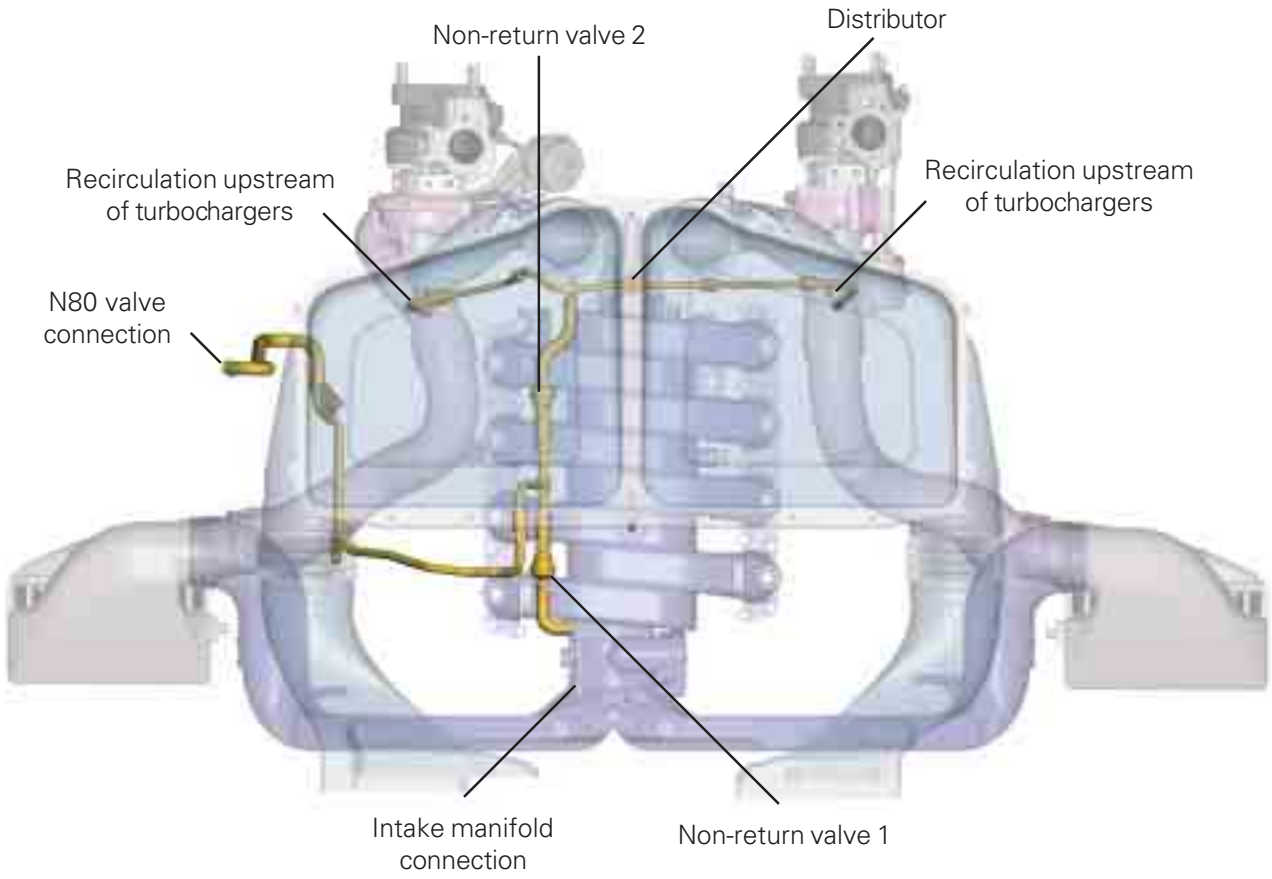
Non-return valve

For more details on design and operation of the crankcase breather, EVAP system, secondary air, charge-air control and recirculation control, refer to SSP 941903 — 2.7L V6 Biturbo.

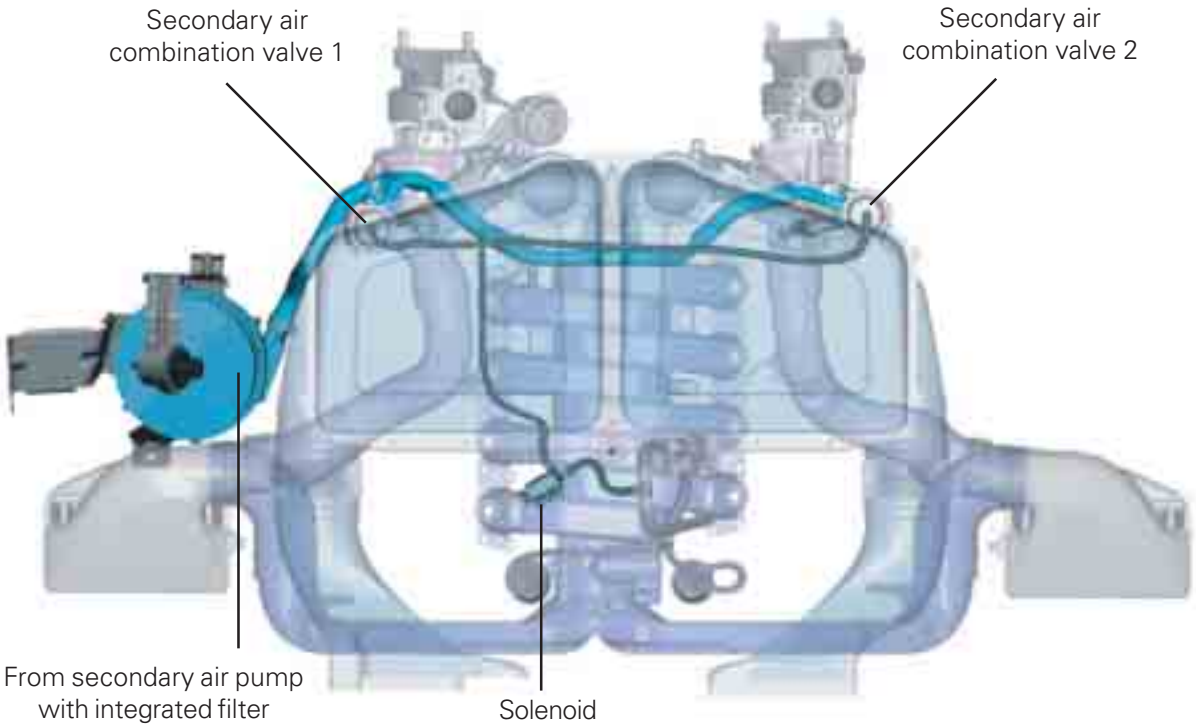
EVAP System

The EVAP system recirculates the fuel vapors from the activated charcoal filter via the EVAP cannister purge regulator valve N80 and two non-return valves to the intake manifold.

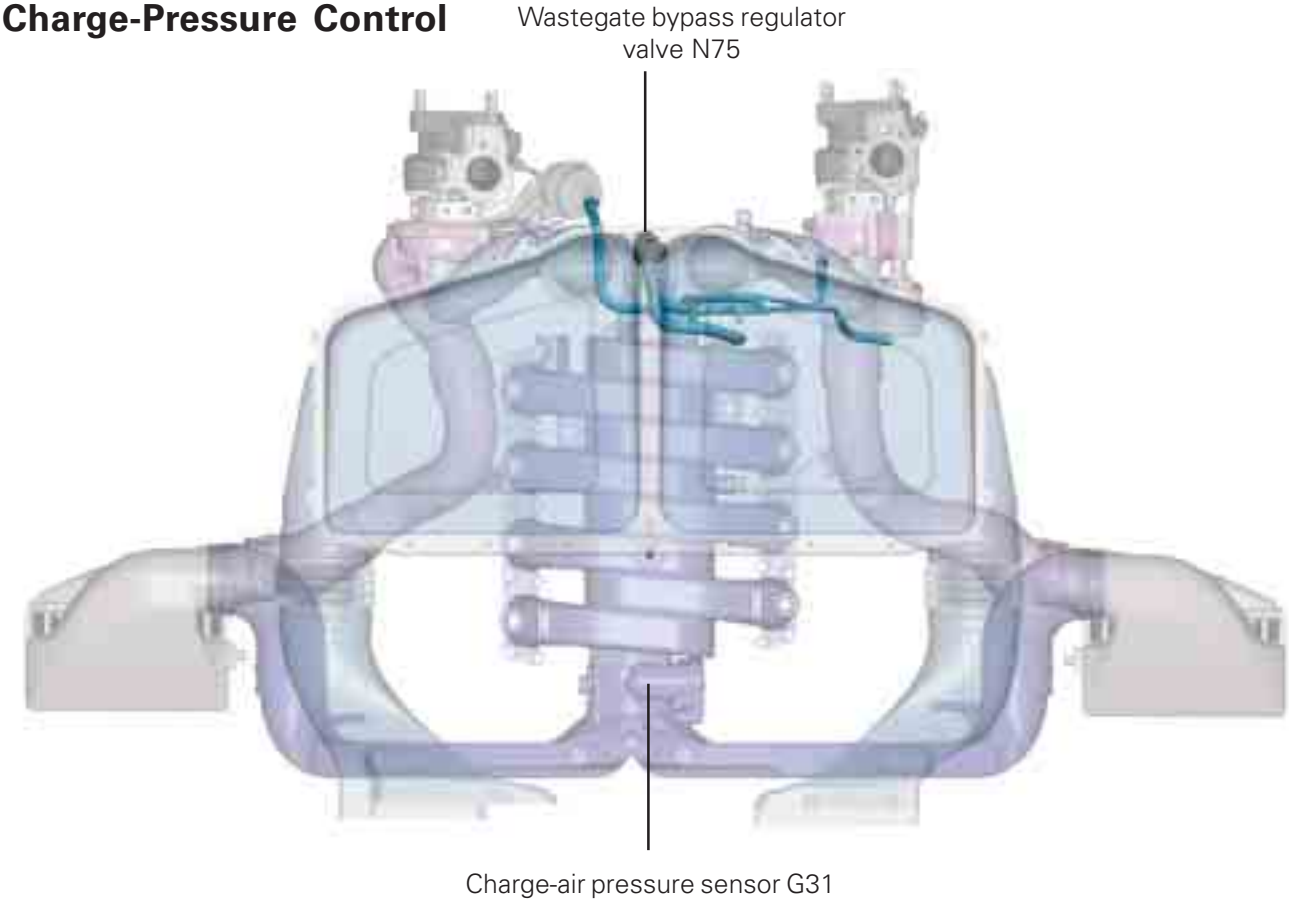
The N80 valve regulates fuel vapor recirculation on the basis of a duty cycle specified by the Motronic engine control module to suit the corresponding operating status.



Secondary Air System



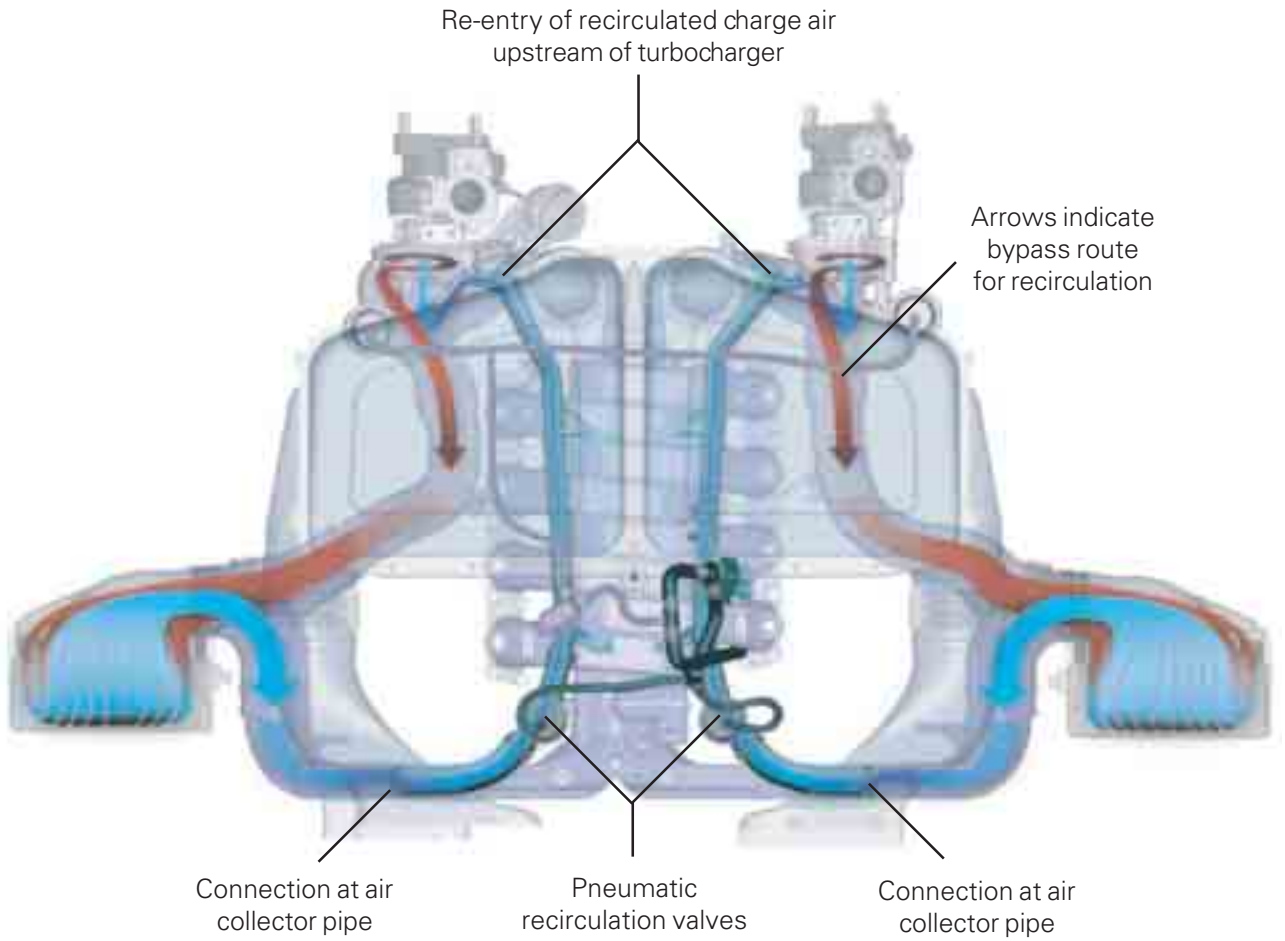
Charge-Pressure Control



Recirculation Valve

The sudden transition from operation under load to overrun produces a high back pressure between the turbocharger and throttle valve. To protect the turbochargers, this pressure is dissipated by opening the pneumatic recirculation valves. At the same time, this also reduces the drop in turbocharger speed and enhances re-operation response.

The recirculation valves are actuated by the Motronic engine control module via the solenoid turbocharger recirculating valve N249. By incorporating the vacuum reservoir, the recirculation valves can operate independently of the intake manifold.



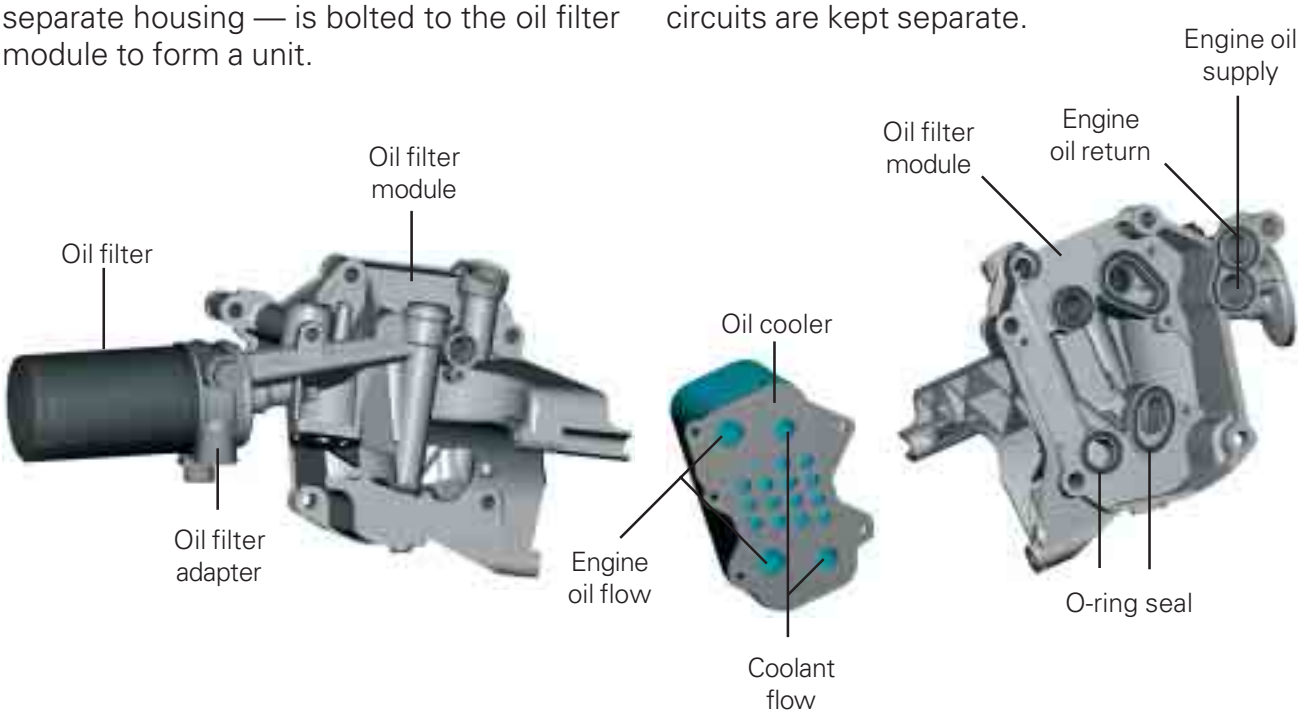
Vacuum reservoirs for controlling divert air valves are located in front left wheel housing

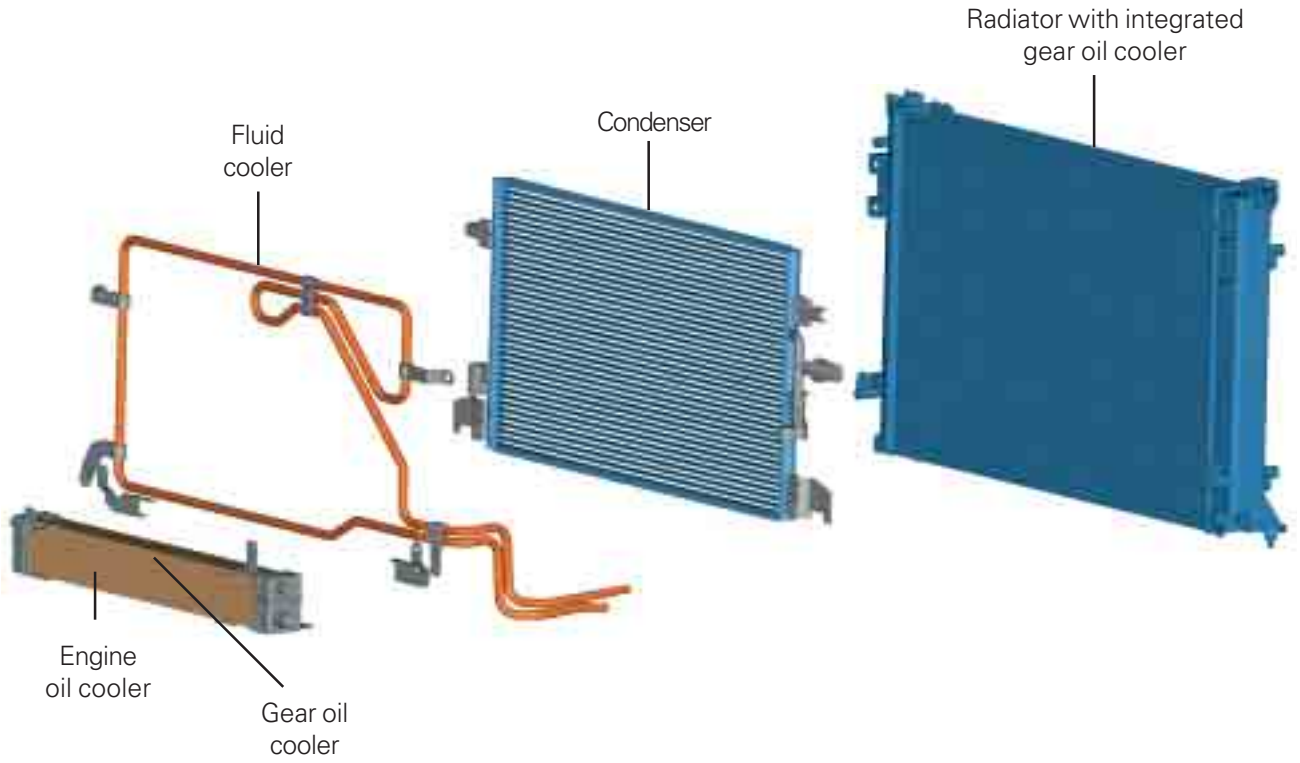
In the event of solenoid turbocharger recirculating valve N249 failure, the intake manifold pressure keeps the pneumatic recirculation valves open.

Cooling System

The combined engine and gear oil cooler, the fluid cooler, the air conditioner condenser and the radiator are arranged behind one another. The coolant/oil heat exchanger — an oil cooler without a separate housing — is bolted to the oil filter module to form a unit.

An additional oil/air heat exchanger is needed because of the high power output generated in the automatic transmission. The engine and gear oil cooling functions are combined in a joint cooler. The oil circuits are kept separate.

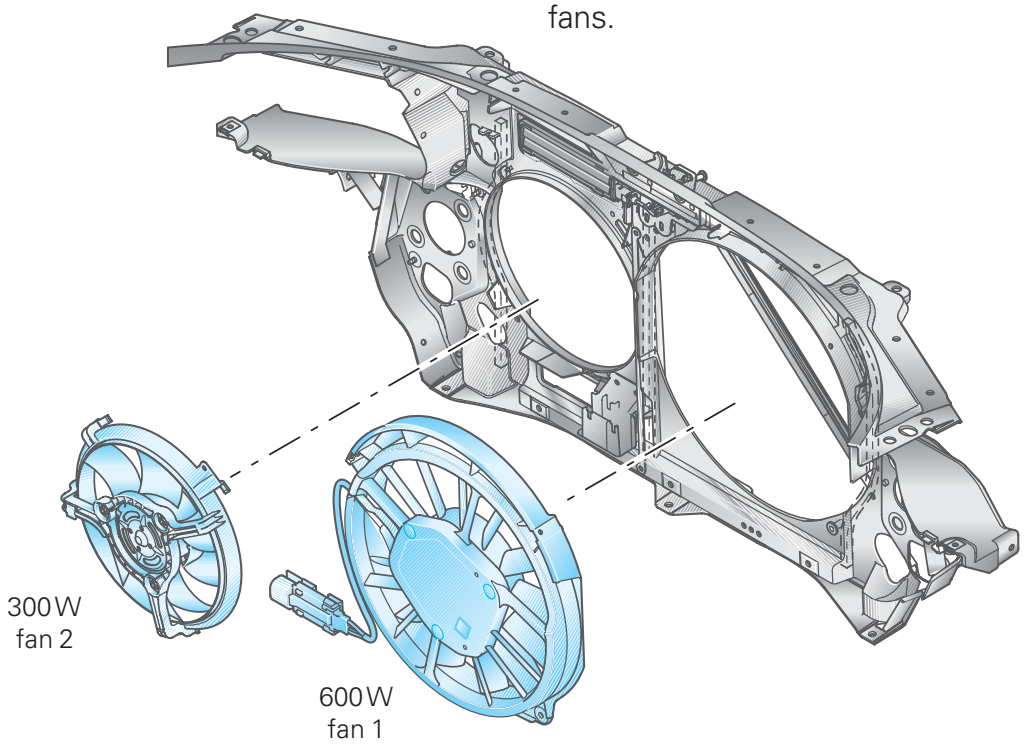




Fans

Two suction fans connected in parallel (600 W and 300 W) are used to provide cooling air. The fan control modules are actuated by way of the engine control module as a function of load.

The control module for the 600 W fan is integrated directly into the fan motor, whereas the 300 W fan has a separate control module/output stage. Different conditions apply to actuation of the two fans.



1. The fan request is transmitted by the air conditioner operating module via the CAN-bus to the engine control module, where it is then relayed directly to the fans.
2. In normal engine operation or at idle the fans are controlled as a function of engine and ambient temperature. Maximum selection is made between the air conditioner and engine temperature.
3. Triggering and duration of fan run-on after switching the engine off are governed by three different criteria:
   - Average fuel consumption > 7 ml/s and engine temperature > 220°F when engine is switched off
   - Measured engine temperature greater than 220°F and ambient temperature greater than 32°F
   - On switching off the engine, oil temperature greater than 200°F

If the fan control modules do not receive any information from the engine control module, the fans switch to emergency operation and this is recorded in the fault memory.

Checking fan operation with the engine running will not guarantee that the fans will respond in run-on mode. A separate check must always be made following repairs. Use the VAS 5051 Scan Tool for final control module diagnosis.

Coolant Flow

After-Run Coolant Pump

The coolant pump evenly distributes coolant to both cylinder banks. The engine oil cooler is integrated into the water circuit, using an electric water pump to avoid reheating.

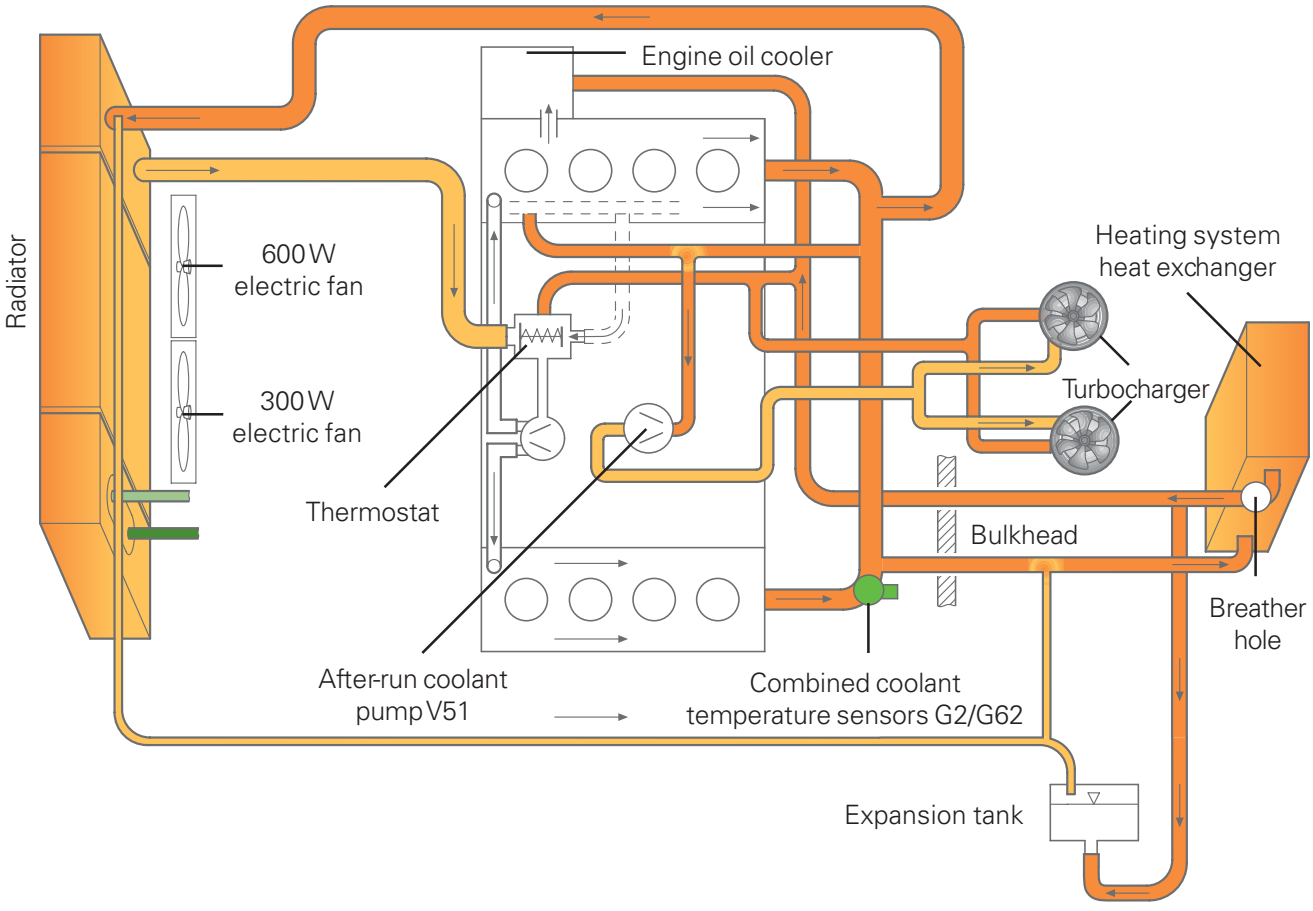
After switching off the engine, local overheating (vapor bubble formation) may occur due to reheating of the coolant in the area of the turbochargers.

To prevent this, continuous circulation is maintained by the after-run coolant pump V51 via the coolant circulation pump relay J151. This pump is actuated by the Motronic engine control module J220.

The cut-in criteria for the V51 pump are provided by the following sensor values:

- Coolant temperature (G2/G62)
- Engine oil temperature (G8)
- Ambient temperature (G42)

Coolant Circulation During Engine Operation

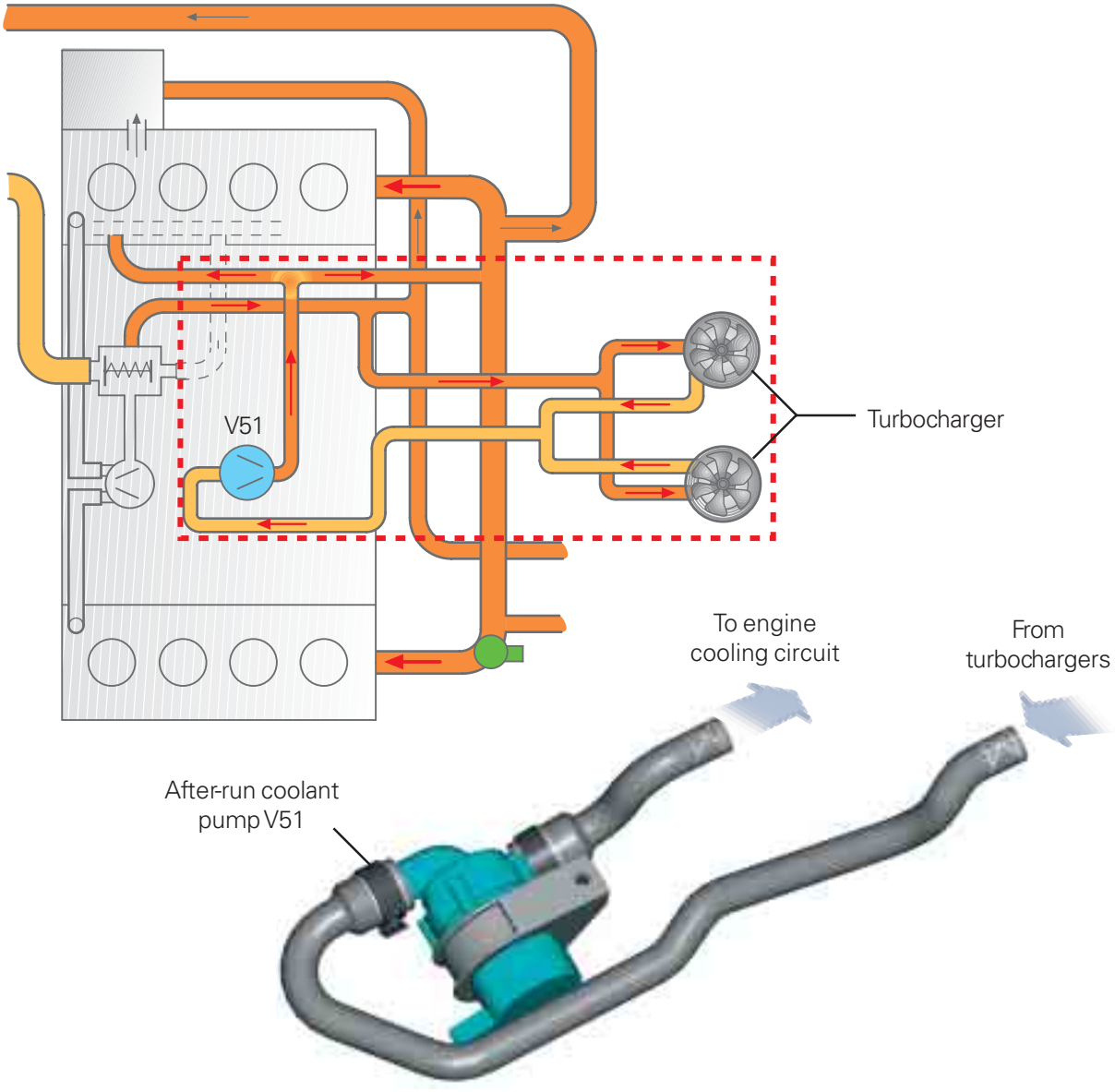


The V51 pump is located beneath the intake manifold. Pump operation is not required when the engine is running. The pump is not actuated directly. Actuation of the pump reverses the direction of coolant flow to the turbochargers.

At engine temperatures of >130°F, pump run-on is maintained for approximately 15 minutes before the main relay is finally de-energized.

The red arrows in the marked frame indicate the change in flow direction.

Coolant Circulation During Run-On



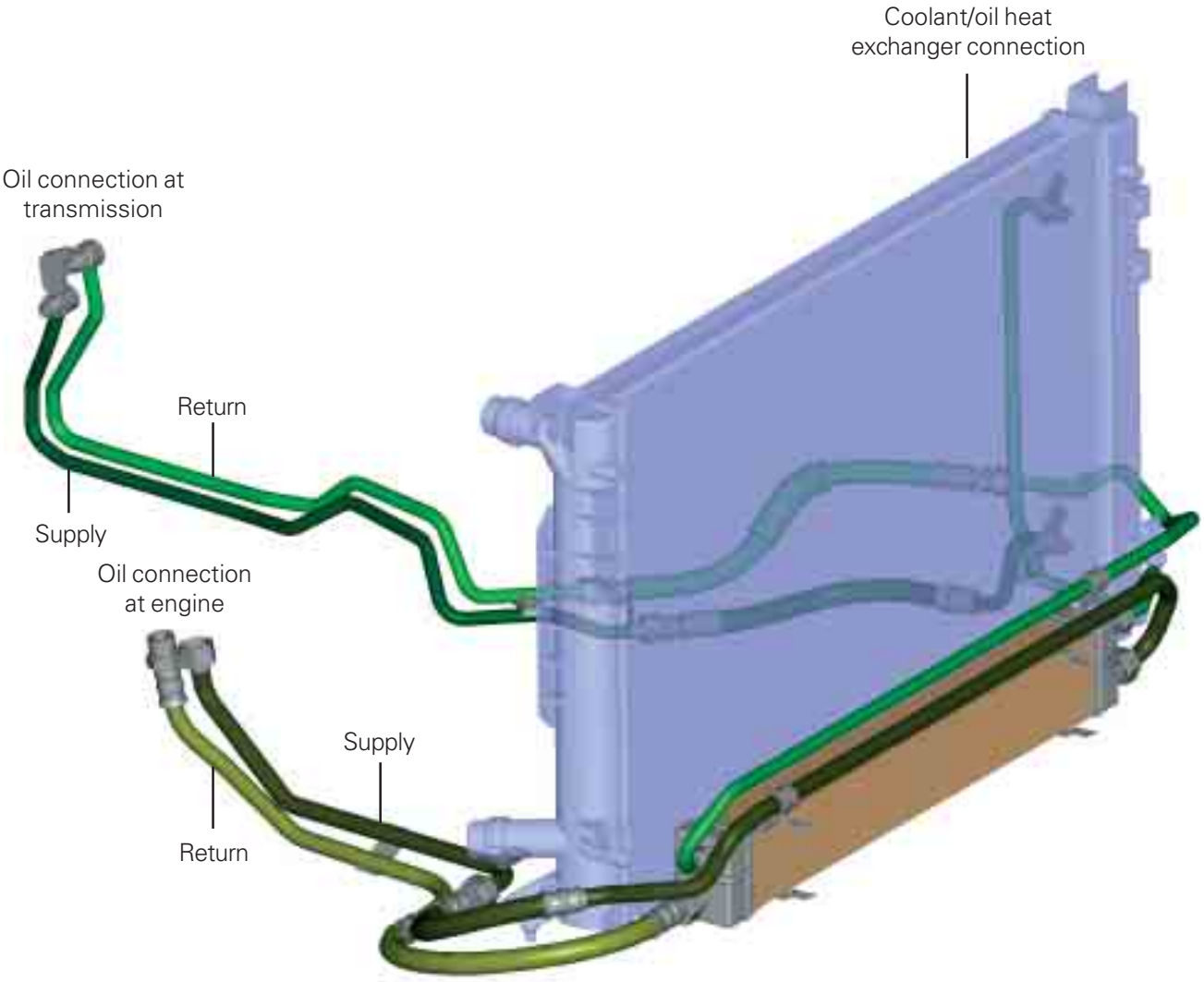
Oil Cooling

The oil cooling system is split up into two circuits:

Engine Oil Cooling

This is implemented by way of a constant flow through the coolant/oil heat exchanger (rapid attainment of engine oil operating temperature on cold starting by preheating via the heat exchanger). After reaching a specified temperature value, the second circuit to the air-to-oil cooler is switched on a thermostat controlled basis.

This circuit is located at the front end beneath the radiator and is fitted in a joint housing together with the additional gear oil cooler. The two have separate inputs, however, and operate independently. The direction of oil flow to be cooled is always the same to prevent thermal stress in the cooler housing.



Gear Oil Cooling

To ensure a long transmission service life, two coolers are used:

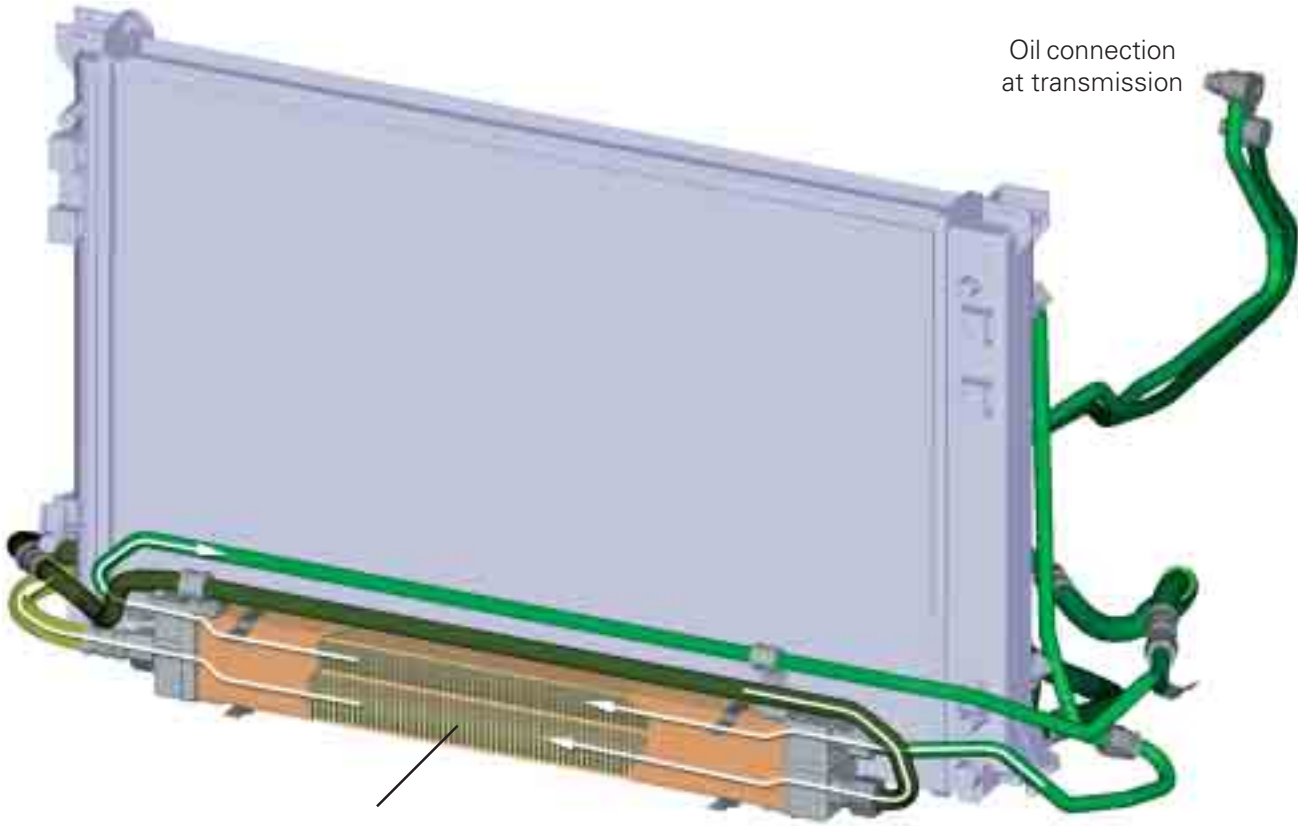
Water-to-Oil Cooler

After starting the engine, the oil starts to flow in the area of the water-to-oil cooler. As the coolant in the water circuit warms up more quickly, the gear oil attains its operating temperature sooner.

Air-to-Oil Cooler

The air-to-oil cooler additionally fitted in the circuit maintains the temperature at an optimum level when increased power is required.

Extremely low ambient temperatures could cause transmission problems if the gear oil were not preheated.



Split air-to-oil cooler:
1/3 gear oil cooling (top)
2/3 engine oil cooling (bottom)

Fuel System

The Audi RS6 features two fuel pumps with a hydraulic series connection to provide the necessary fuel:

- Fuel pump G6 (pre-supply pump) is located directly in the tank
- Transfer fuel pump G23 is fitted to the tank as an external pump unit

Both pumps are electrically actuated in parallel by way of the fuel pump control module J538, which is fitted next to the rear right seat belt reel beneath a cover. This control module is supplied with electrical system voltage by way of the fuel pump relay J17.

The Motronic engine control module J220 is responsible for cut-in of the two pumps as required via J538.

Depending on the immediate fuel requirement, the pumps are actuated either with maximum electrical system voltage (high requirement) or with voltage reduced to 10V (lower requirement).

The corresponding switching control signal is derived from the immediate fuel consumption calculated in the engine control module.

In the event of a change in the volume of fuel required, the fuel pump control module switches the pump voltage from maximum electrical system voltage to 10V and vice versa. The voltage reduced to 10V is provided by a voltage converter in the fuel pump control module.

Fuel tank with external fuel pump

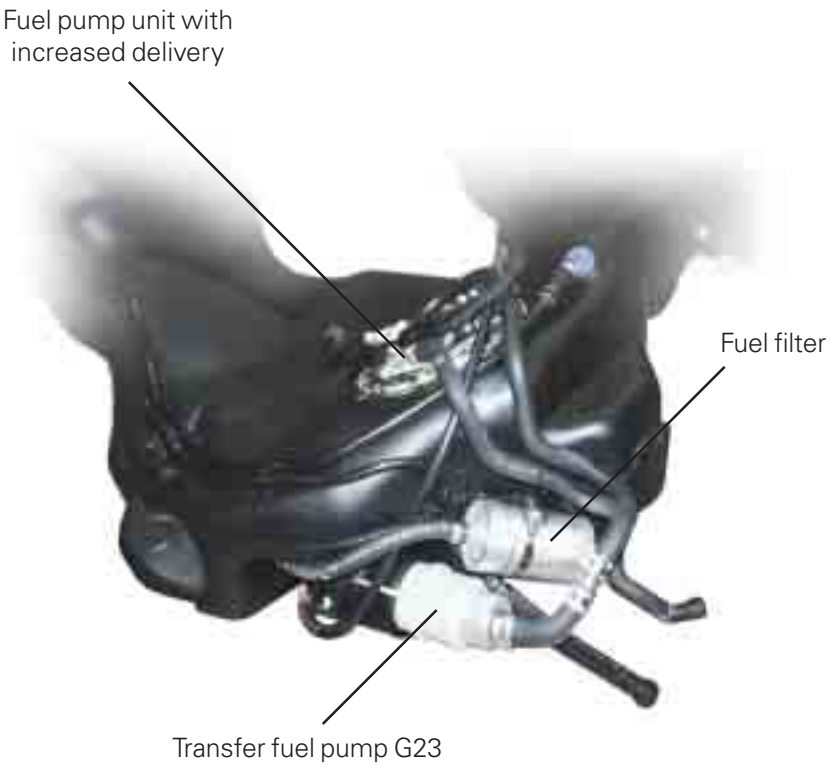
On starting the vehicle, the fuel pumps are actuated for roughly one second with maximum electrical system voltage. This ensures a rapid build-up of pressure in the fuel supply (a provision of standby pressure).

When driving, the pump voltages are switched in line with fuel consumption. On dropping below a defined fuel consumption rate the pump voltage is reduced to 10V after a delay of approximately two seconds.

In the case of "hot starting," the pump voltage remains at electrical system voltage level for roughly five seconds after starting to keep vapor bubbles from forming in the fuel pipe.

A conventional fuel pressure regulator at the fuel rail keeps the fuel pressure at a constant four bar relative to intake manifold pressure.

If a fault is detected, the engine will not start or it will switch to emergency operation.



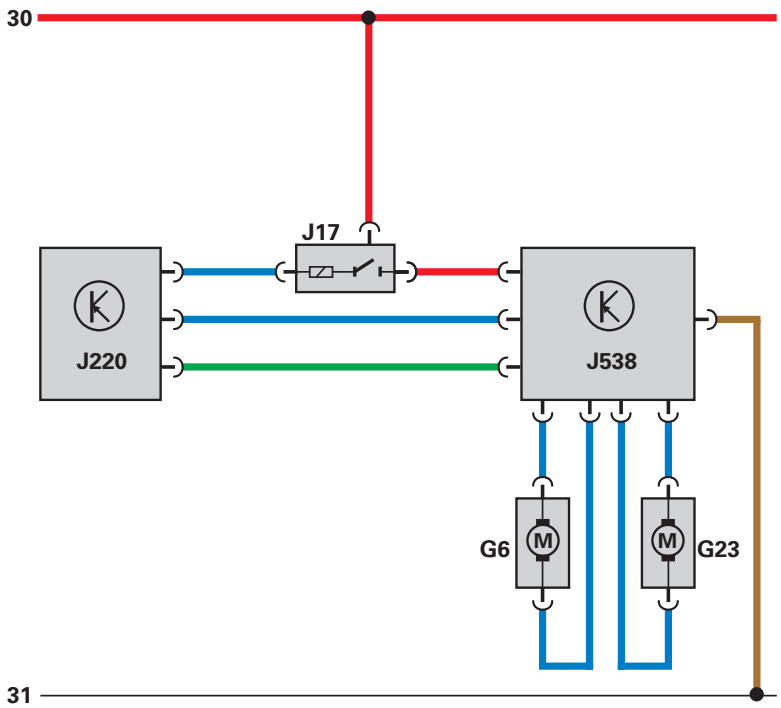
Diagnosis

The engine control module monitors the connections to the fuel pump control module. The fuel pump control module monitors the connections to the pumps and transmits the output voltage values to the engine control module. These values are monitored for plausibility

Following entry of a fault in the fault memory, it is either not possible to start the vehicle (fuel pump relay does not switch) or the engine will only run in emergency mode.

Fuel Pump Electrical Circuit

Control wire A voltage	Pump operating voltage
0 V	10 V
12 V	12 V



A (blue) control signal

B (green) feedback (pump status) from pump control module to engine control module

G6 Fuel pump (pre-supply pump)

G23 Transfer fuel pump

J17 Fuel pump relay

J220 Motronic engine control module

J538 Fuel pump control module

Fuel pump control module J538

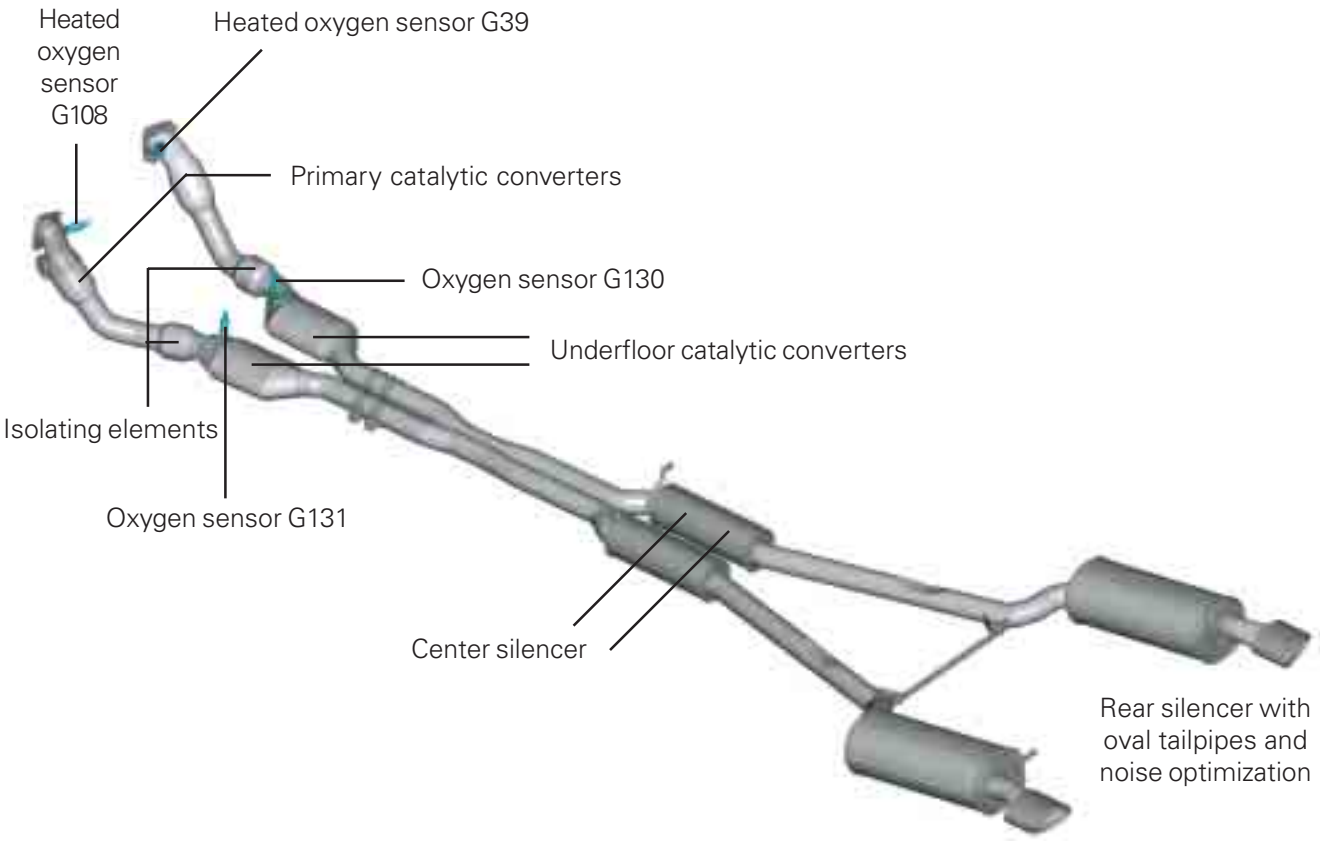
Exhaust System

The Audi RS6 has a dual-flow exhaust system. The two exhaust pipes of the V8 engine are routed separately from the engine to the two oval tailpipes, producing the unique RS6 sound.

Exhaust gas flows through individual pipes from the cylinders via the air-gap insulated manifolds directly downstream of the turbochargers to two primary catalytic converters of the metal substrate type.

Further downstream, two isolating elements provide the necessary vibration compensation (and acoustic isolation) as well as compensation for engine movement in relation to the exhaust system.

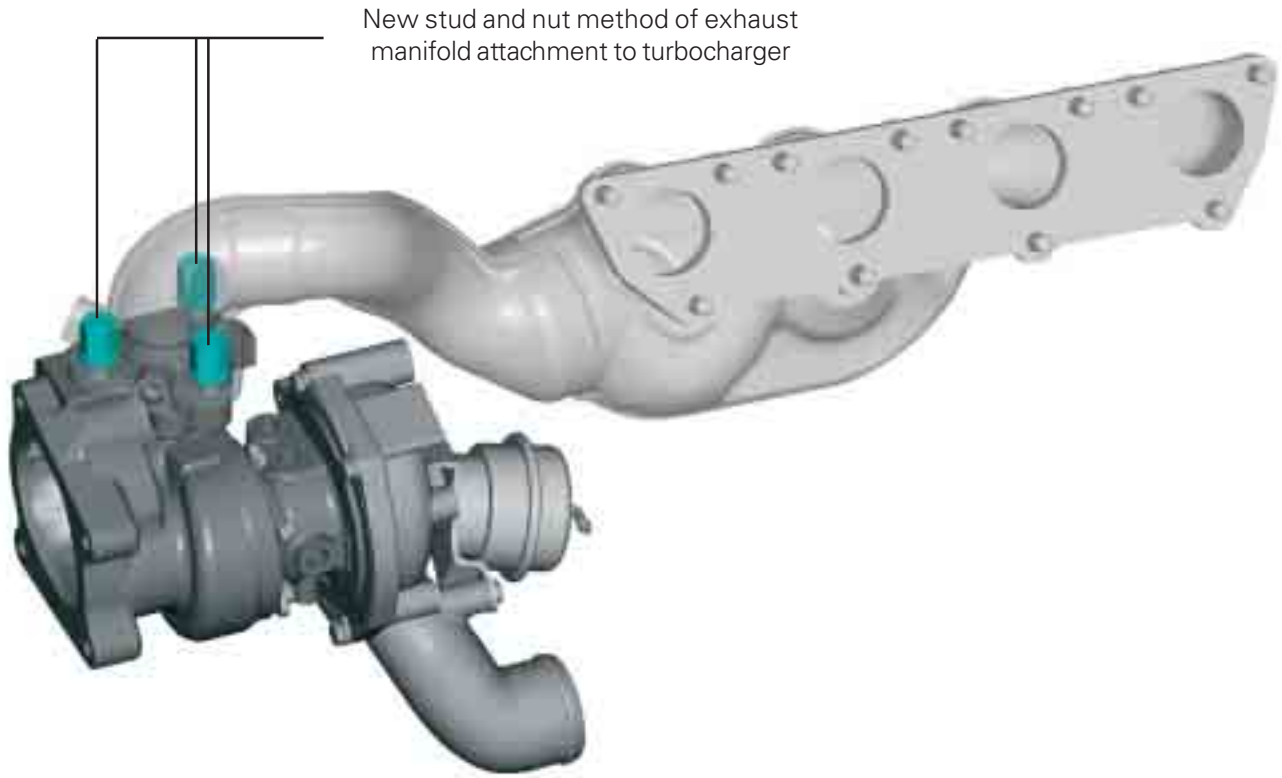
The following underfloor catalytic converters (metal substrate) achieve optimum emission control with low exhaust gas back pressure.



Turbochargers

Charging is provided by two water-cooled, rapid response, mechanically controlled turbochargers.

Charge-pressure control is implemented by way of the common wastegate bypass regulator valve N75.



The turbochargers should not be replaced separately, but as a pair to avoid differences in performance due to structural tolerances (old/new component).

Transmission

Engine torque is transmitted to the transmission by way of a hydrodynamic torque converter (diameter 280 mm) with lock-up clutch.

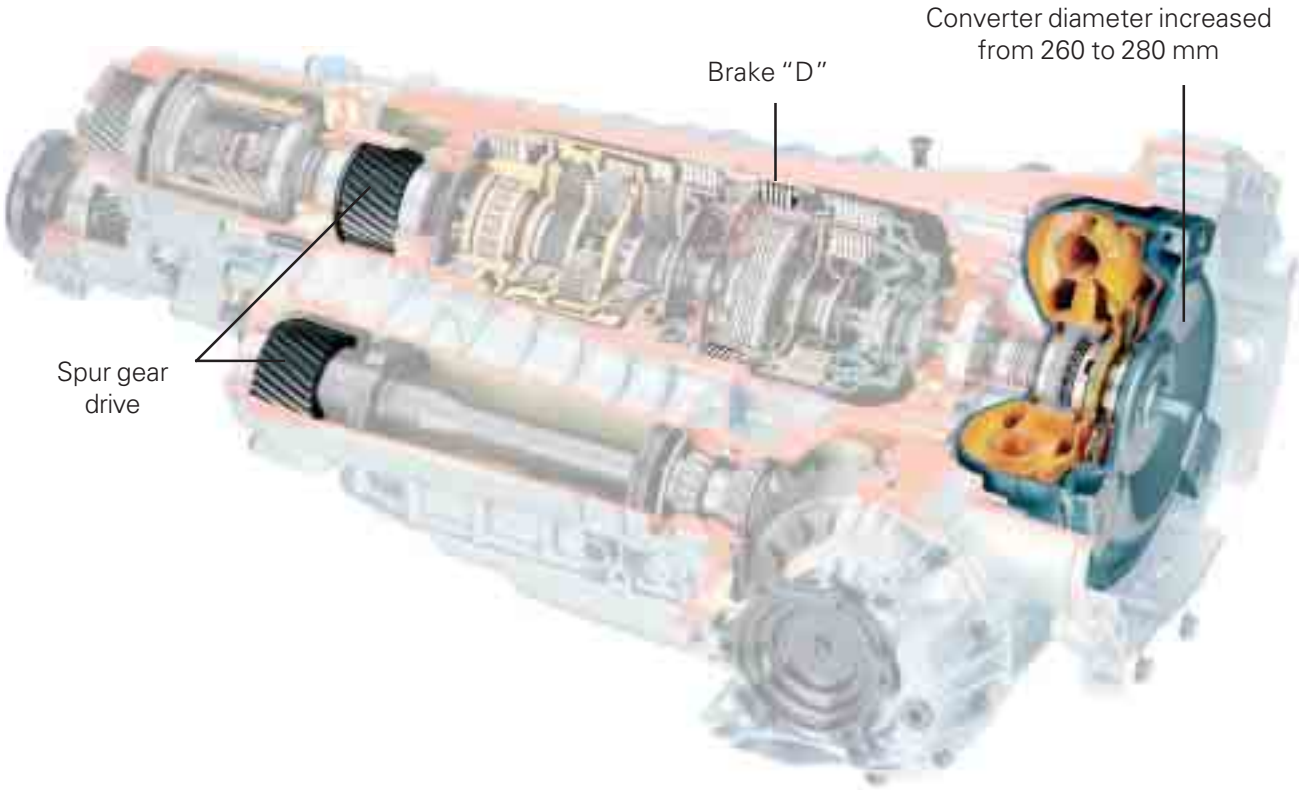
The transmission is based on a proven design for vehicles with high engine torque, employing Tiptronic and electronic throttle. It takes the form of an electro-hydraulically controlled 5-speed automatic transmission delivering 415 lb/ft of torque at 1950-5600 rpm.

The five forward gears and reverse gear are accessed through a planetary transmission.

Clutch, selector elements and brakes are controlled electro-hydraulically, permitting gear selection under load with no loss of tractive power.

The following modifications have been made to the previous transmission:

- Reinforced transfer gear and transmission housings
- Increased clutch pressure
- Brake "D" reinforced (one additional coated disc)
- Reinforced spur gear drive splines (modified material)



The transmission flange of the crankcase has been reinforced at the mounts. Modified transmission mounts are required to accommodate the forces occurring.

Three bolts are used on either side of the transmission housing for mounting.

Rear Final Drive

Because of the thermal load resulting from the drive power, the rear-axle transfer case features an additional aluminum cooling fin element.

A special thermal conduction paste between the housing and the fins of the aluminum heat sink ensures optimum heat dissipation.

Rear final drive with top-mounted aluminum cooling fin element

3-Spoke Sports Steering Wheel

Steering Wheel with Tiptronic Paddles

Paddles on the right and left of the sports steering wheel permit manual selection of the desired gears. The selector buttons can only be activated when the selector lever position is in the manual Tiptronic shift gate.

Change UP — tap right paddle (+) toward steering wheel

Change DOWN — tap left paddle (-) toward stearing wheel

System Layout

Motronic ME7.1.1 Sensors/Actuators

Mass air flow sensor G70
Mass air flow sensor (2) G246

Engine speed sensor G28

Camshaft position sensor G40 and camshaft position sensor (2) G163

Heated oxygen sensors G39, and (2) G108
Oxygen sensors G130 and (2) G131

Throttle valve control module J338 with angle sensor (1) G187 and (2) G188 for throttle drive G186

Intake air temperature sensor G42

Combined engine coolant temperature sensors G2 and G62

Charge-air pressure sensor G31

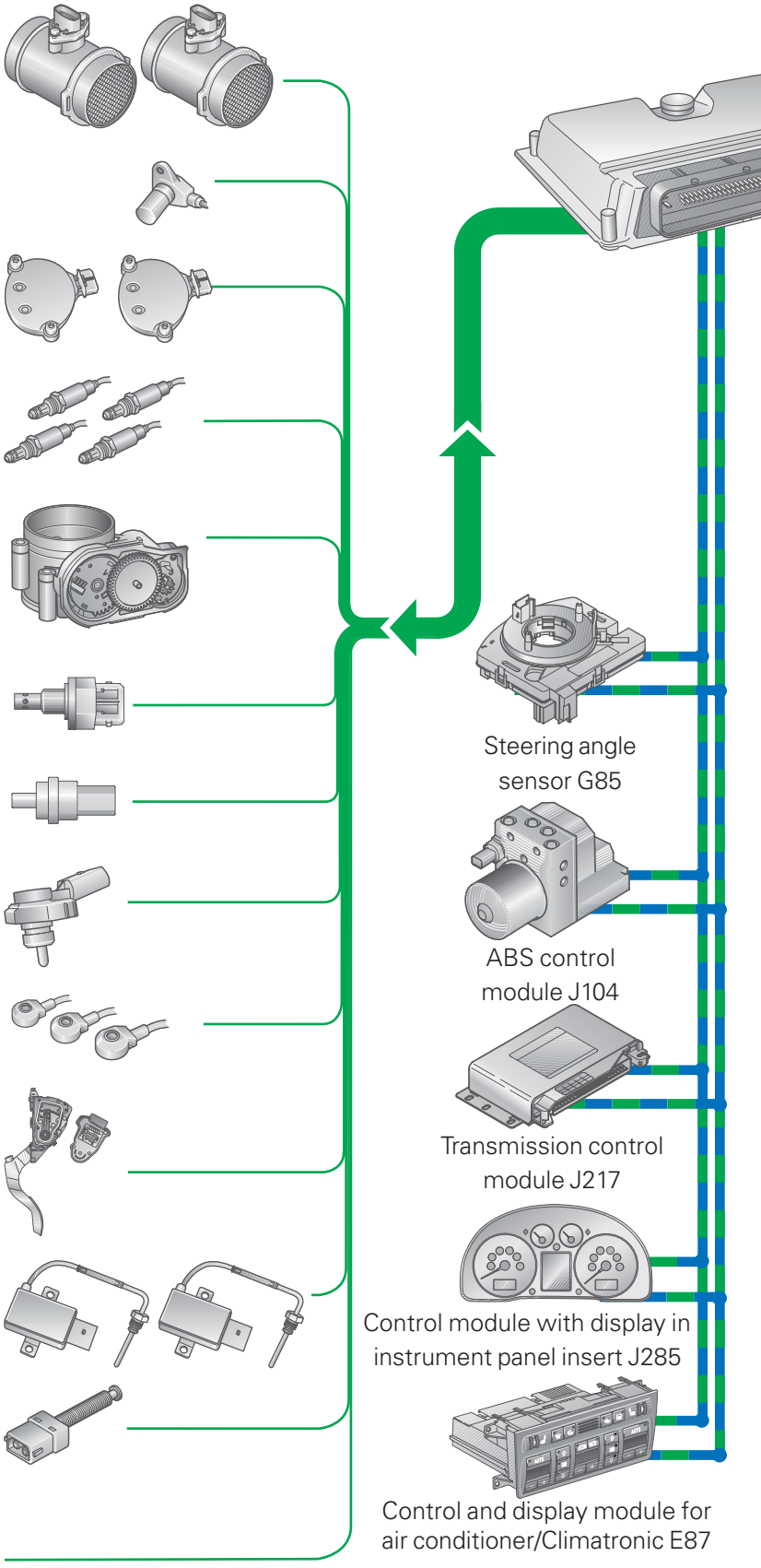
Knock sensor (1) G61, knock sensor (2) G66 and knock sensor (3) G198

Throttle position sensor G79 and accelerator pedal position sensor G185

Exhaust temperature sensors (1) G235 and (2) G236

Brake light switch F and brake pedal switch F47 (cruise control)

Additional signals



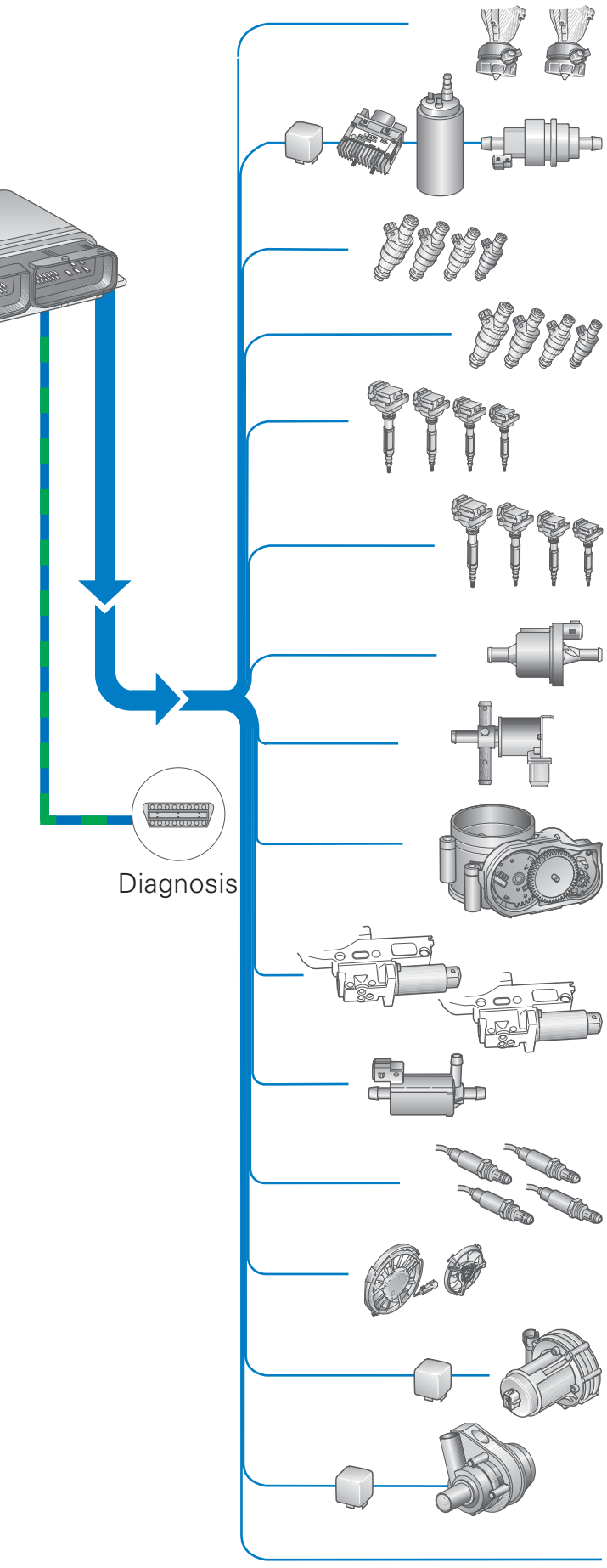
Steering angle sensor G85

ABS control module J104

Transmission control module J217

Control module with display in instrument panel insert J285

Control and display module for air conditioner/Climatronic E87



Left/right electro-hydraulic engine mount solenoid valves N144/N145

Fuel pump relay J17, fuel pump control module J538, fuel pump G6, transfer fuel pump G23

Fuel injectors (bank 1) N30, N31, N32, N33

Fuel injectors (bank 2) N83, N84, N85, N86

Ignition coil with power output stage (1) N70, (2) N127, (3) N291 and (4) N292

Ignition coil with power output stage (5) N323, (6) N324, (7) N325 and (8) N326

EVAP canister purge regulator valve N80

Wastegate bypass regulator valve N75

Throttle valve control module J338 with throttle drive G186 and throttle drive angle sensors (1) G187 and (2) G188

Camshaft adjustment valves (1) N205 and (2) N208

Turbocharger recirculating valve N249

Heated oxygen sensor Z19, Heated oxygen sensor (2) Z28, Oxygen sensors (1) Z29 and (2) Z30

Coolant fan control module J293, Coolant fan control module (2) J671, Coolant fan V7 and Coolant fan (2) V177

Secondary air injection pump relay J299, secondary air injection pump motor V101

Coolant circulation pump relay J151, after-run coolant pump V51

Additional signals

CAN Data Exchange

As with the Audi A6, data is exchanged in the Audi RS6 between the engine control module and the other control modules by way of the CAN-bus.

The system layout illustrates the exchange of data between the individual interlinked vehicle systems.

Engine Control Module

- Idling speed information
- Accelerator pedal position
- Kickdown switch
- Actual engine torques
- Engine speed
- Driver input torque
- Coolant temperature
- Brake light switch

Drive System CAN High

Drive System CAN Low

Transmission Control Module

- Gearshift active/not active
- AC compressor operation not permitted (shut-off)
- Torque converter clutch status
- Selector lever position
- Specified idling speed increase
- Gear information (actual/target gear)
- Motion resistance index (hill detection)
- Emergency programs (information via self-diagnosis)
- Converter loss moment (transmission mount moment)
- Specified engine torque
- Idle regulation adaptation release
- Engine torque gradient limitation (converter/transmission protection)

ESP/ABS Control Module

- TCS request
- SpecifiedTCS intervention torque
- Overrun torque limiting function request
- Overrun torque limiting function intervention torque
- Brake pedal status
- TCS/EBC warning lamp info (EBC = Engine Braking Control)
- ABS braking active/not active
- EBPD intervention active/not active (EBPD = Electronic Brake Pressure Distribution)
- Converter loss moment (transmission mount moment)
- Vehicle speed
- Wheel speeds

- Fault statuses of various messages
- AC compressor operation not permitted (shut-off)
- Vehicle speed
- Idling speed
- CCS switch positions (cruise control system)
- CCS specified speed
- Throttle valve angle
- Immobilizer
- Temperature in intake manifold
- Electronic throttle warning lamp info
- OBD II warning lamp info
- Fuel consumption
- Actual radiator fan actuation status
- Altitude information
- Pressure upstream of throttle valve (charge pressure)
- Emergency programs (information via self-diagnosis)
- Engine data for maintenance interval extension
- Oil level threshold for oil MIN warning

Instrument Panel

- Self-diagnosis information
- Coolant level sensor info
- Overheating lamp info
- Fuel level
- Vehicle speed
- Ambient temperature
- Coolant temperature
- Oil temperature
- Mileage
- Immobilizer

Air Conditioner and Heater Electronics

- Air conditioner requirement
- Heated rear window status
- Air conditioner compressor status
- Air conditioner pressure signal
- Coolant fan request

Data transmitted by engine control module

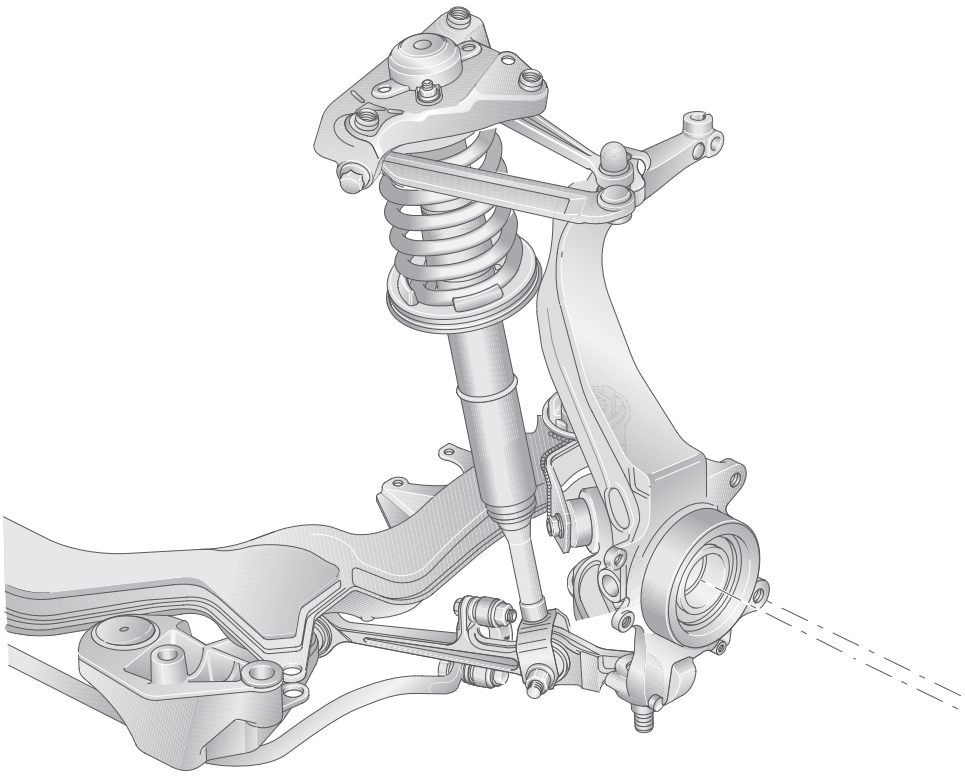
Data received and evaluated by engine control module

Front Axle

Brakes modifications to the front axle:

- New protective brake rotor back plates
- 8-piston Brembo brake calipers (four pads)
- Multi-layer brake rotors, each with a diameter of 365 x 34 mm

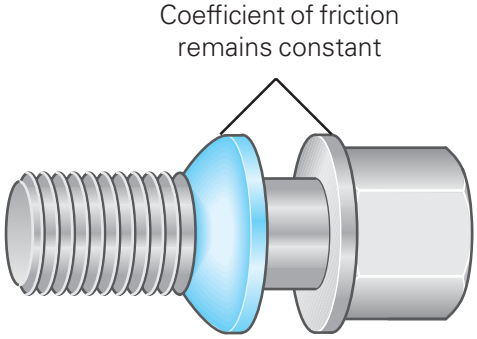
To accommodate the larger scale of the brake system, the diameter of the brake master cylinder was increased to 26.99 mm. This involved an increase in the hydraulic transmission ratio from i = 5.5 on the Audi S6 to i = 7 on the Audi RS6.

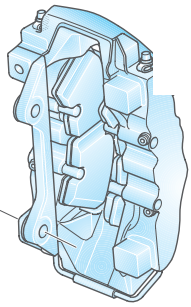


The Audi RS6 uses a new technology for the wheel bolts to maintain constant torque.

The tapered section of the bolt is not part of the body of the bolt. Similar to a packing plate, the tapered washer is only loosely attached to the bolt in the cylindrical section.

The particular advantage of this method of attachment is that previously used bolted joints only permit slight changes to the specified tightening torques for aluminum wheels due to contact corrosion.





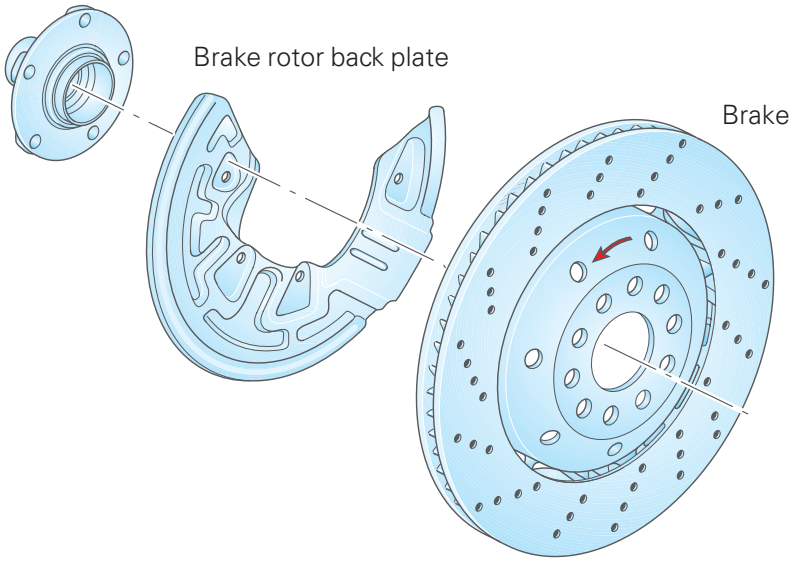
8-piston brake caliper

These are directional rotors, so the running direction of the rotor must always be adhered to.

Wheel hub

Brake rotor back plate

Brake rotor

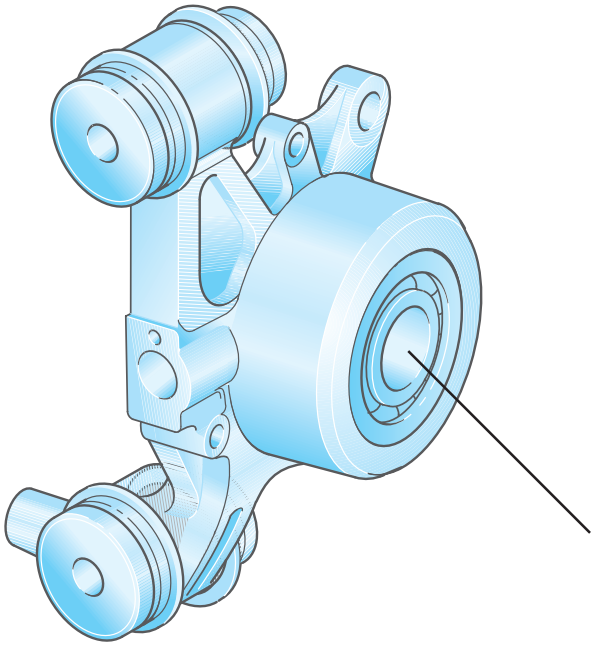


Rear Axle

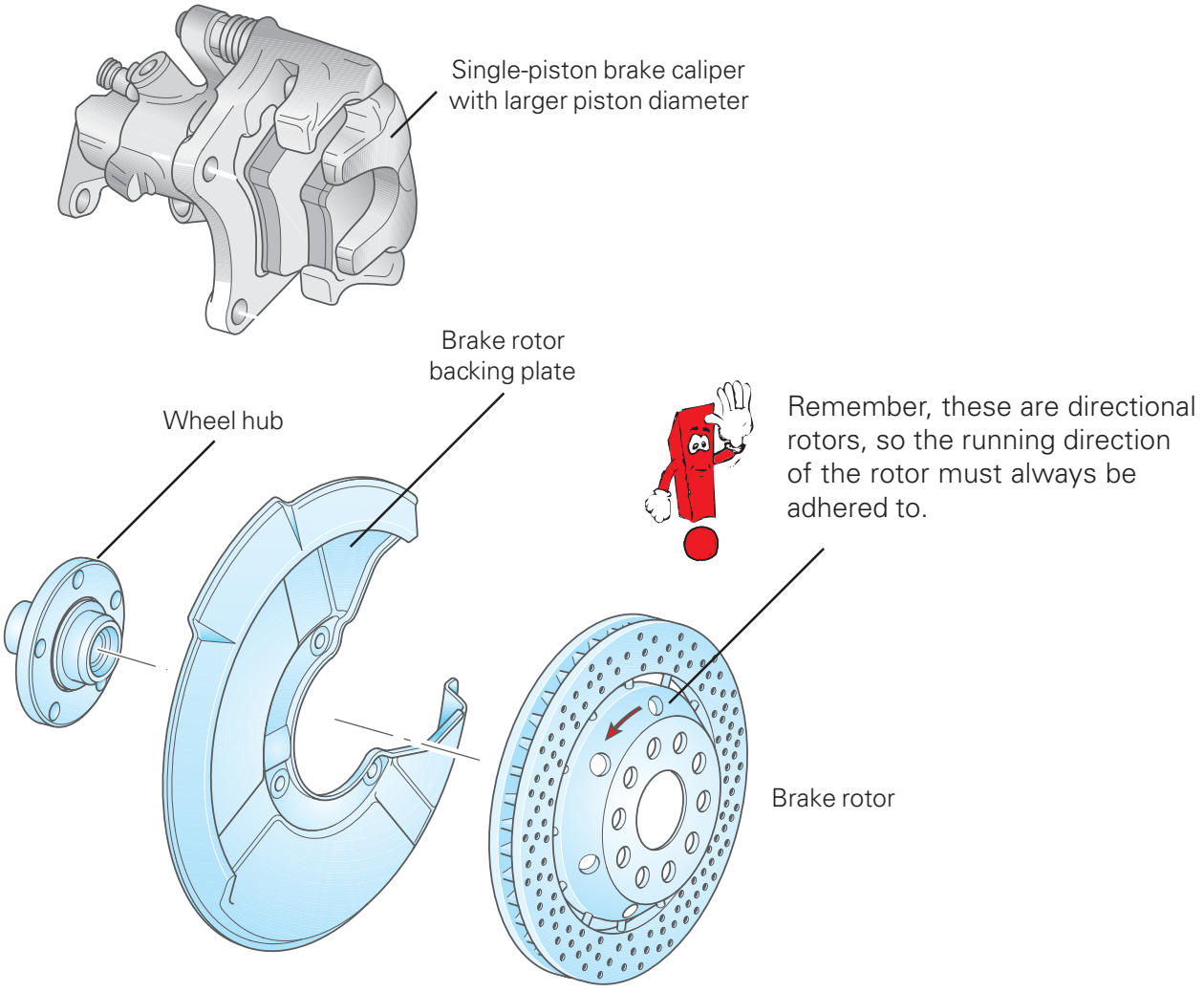
The Audi RS6 uses the proven Audi S6 rear axle design. Because of increased loads, the wheel bearing housings are made of steel, not aluminum. To achieve increased braking power, the system features larger diameter rear brake rotors (335 x 22 mm).

The diameter of the single-piston brake calipers has been enlarged.

The hand brake cable was lengthened for better installation.



Audi RS6 uses a steel wheel bearing housing


Single-piston brake caliper
with larger piston diameter
Brake rotor
backing plate
Wheel hub
Remember, these are directional rotors, so the running direction of the rotor must always be adhered to.
Brake rotor

Dynamic Ride Control (DRC)

Conventional spring/damper systems can only offer a compromise between maximum ride comfort and a sporty driving style. The basic requirements of ride comfort — minimum vertical body movement when negotiating uneven surfaces, and smooth rolling characteristics — are diametrically opposed to those associated with the sporty properties of a vehicle, for example, agile handling and less side tilt with high lateral acceleration.

Dynamic Ride Control (DRC) permits a basic setting of the spring/damper assembly which is relatively soft and comfortable for sporty vehicles. At the same time, DRC effectively suppresses body roll and pitch when cornering and braking under most driving conditions.

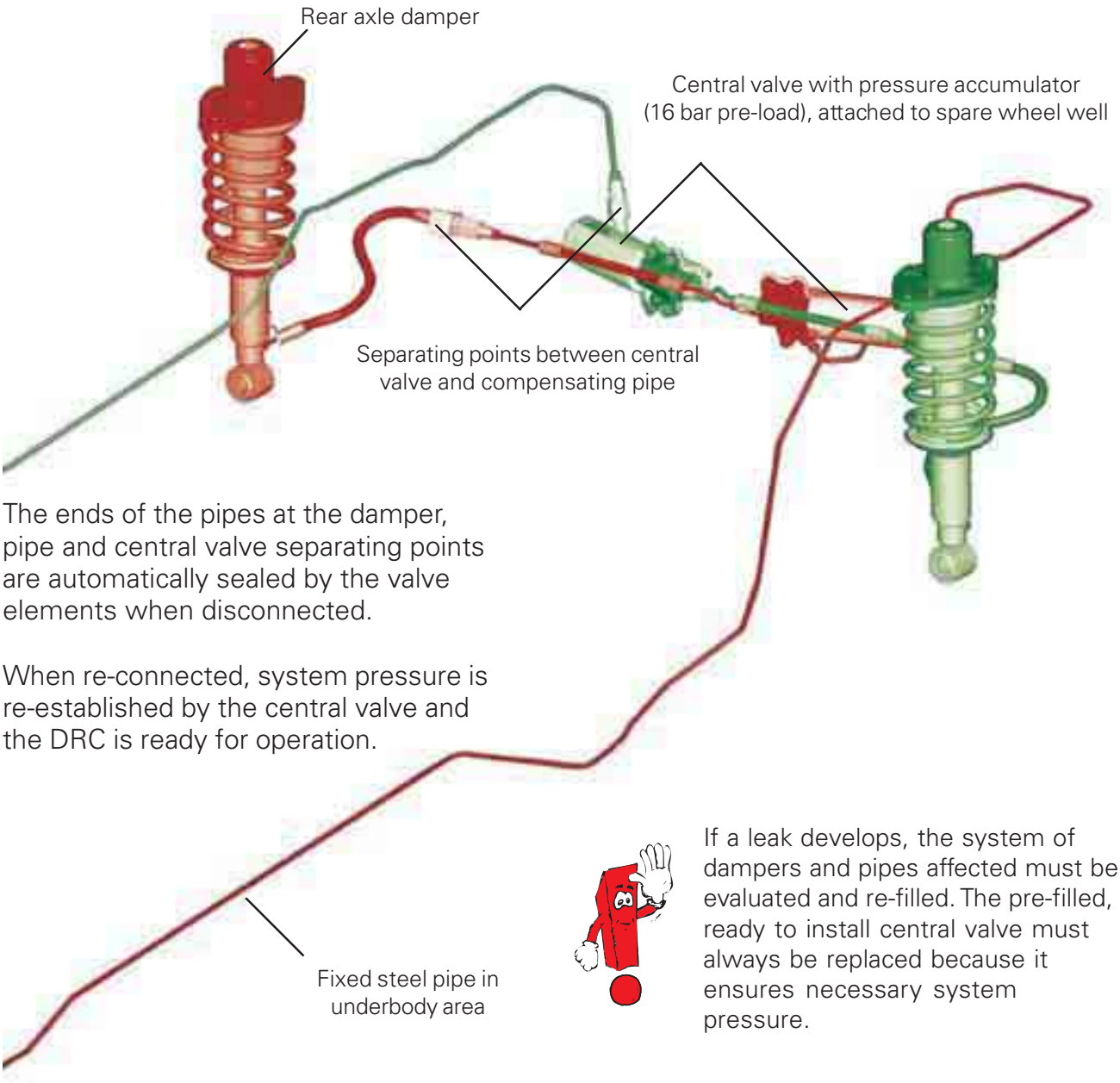
Operation of the DRC system is based on active utilization of the volume of oil displaced by the piston rod when the damper is compressed and the resultant change in pressure in the damping system. Conventional dampers provide compensation for the volume displaced by the piston rod by employing a compressible gas cushion (single-tube gas-filled damper) or through the use of an additional chamber into which the displaced oil can expand (twin-tube damper).

The diagonal connection between the respective front and rear dampers to form two linked systems makes use of the different pressures occurring with body movement to adapt the specific damper characteristic curves to these driving conditions.

The diagonal connections between the front and rear axle are geared in terms of pipe length and pipe cross section to the system as a whole.

Compensation for the volumes of oil displaced is provided by one gas-filled central valve per diagonal link.

The movement of the floating piston separating the gas-filled and hydraulic sections is controlled by its own damper.



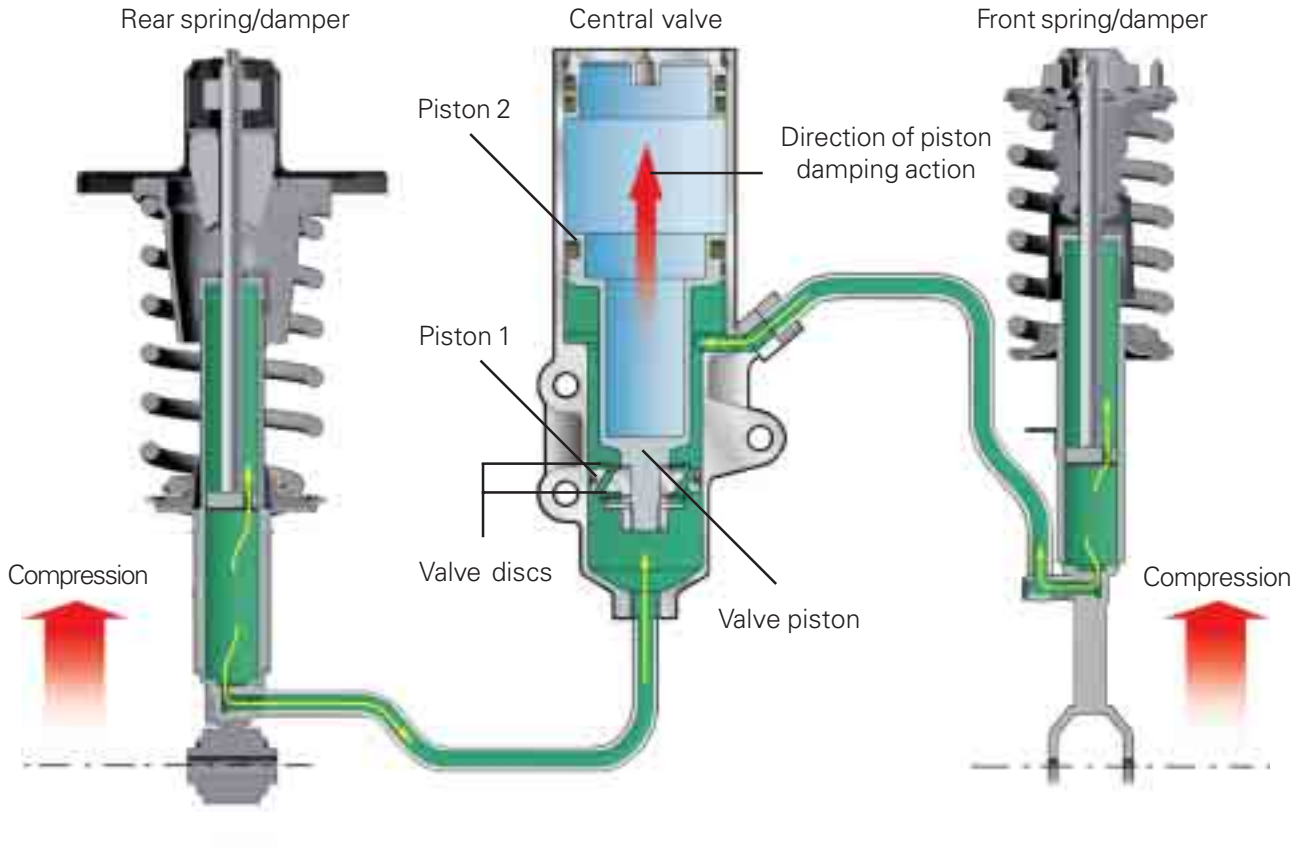
The ends of the pipes at the damper, pipe and central valve separating points are automatically sealed by the valve elements when disconnected.

When re-connected, system pressure is re-established by the central valve and the DRC is ready for operation.

If a leak develops, the system of dampers and pipes affected must be evaluated and re-filled. The pre-filled, ready to install central valve must always be replaced because it ensures necessary system pressure.

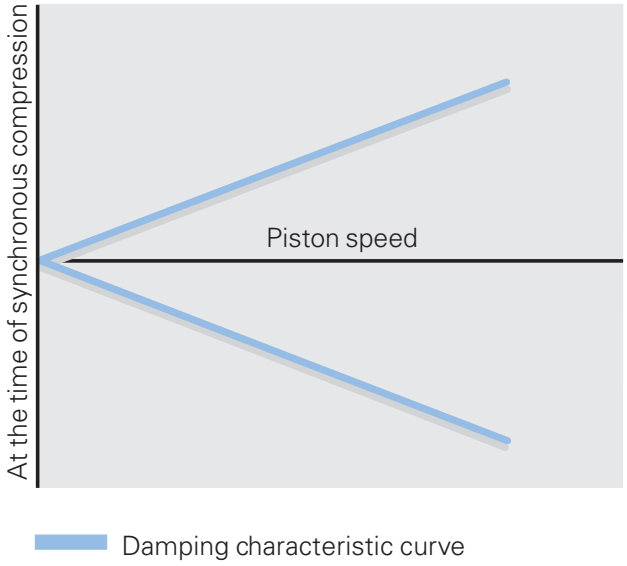
When working on a filled DRC system, the central valve must be completely connected before supporting the vehicle on its wheels. Otherwise, the damper piston rod gaskets may be damaged, making it necessary to replace the damper.

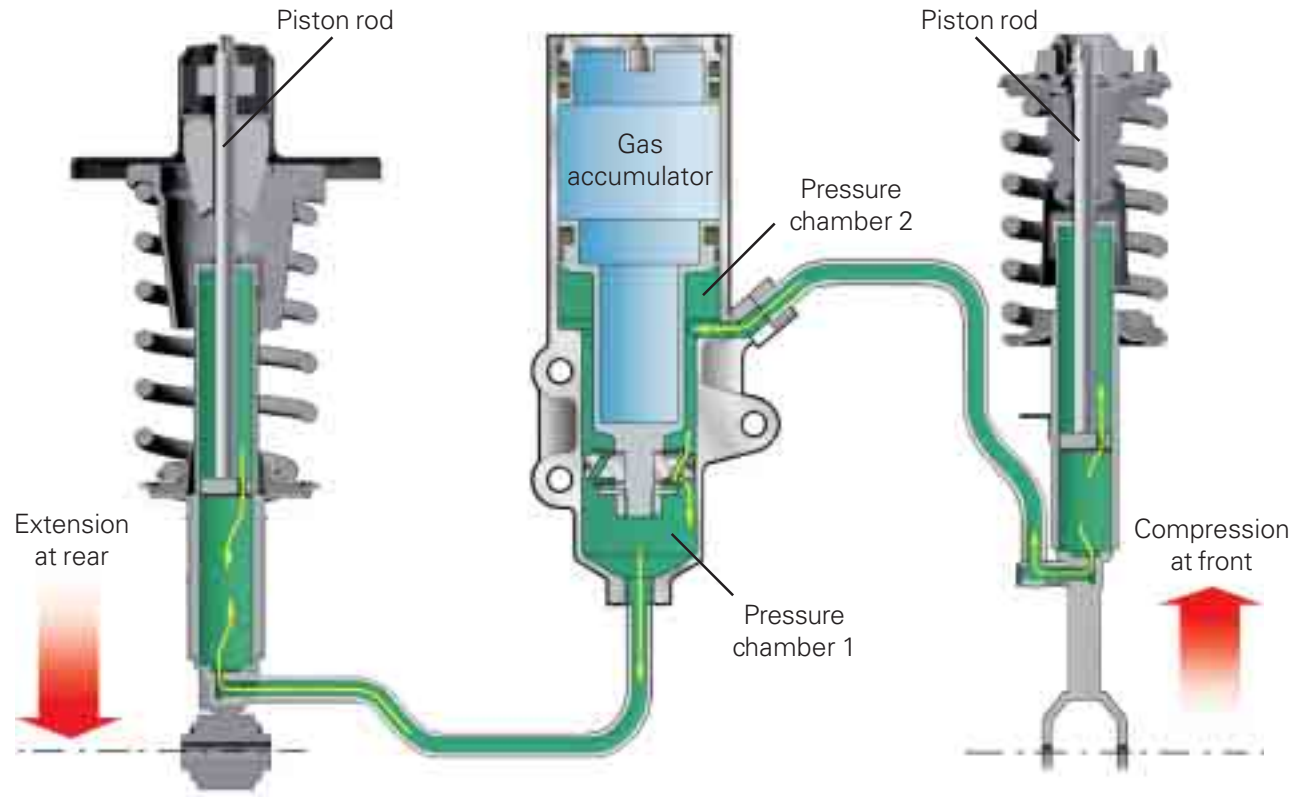
Hydraulic System Diagram



Synchronous Operation

If both dampers are compressed at the same time, the pressure builds up in the same direction in both pressure chambers. The active piston faces move jointly toward the gas cushion in the pressure accumulator. This results in damped compression (comfort setting) of the dampers as a function of the compression rate.



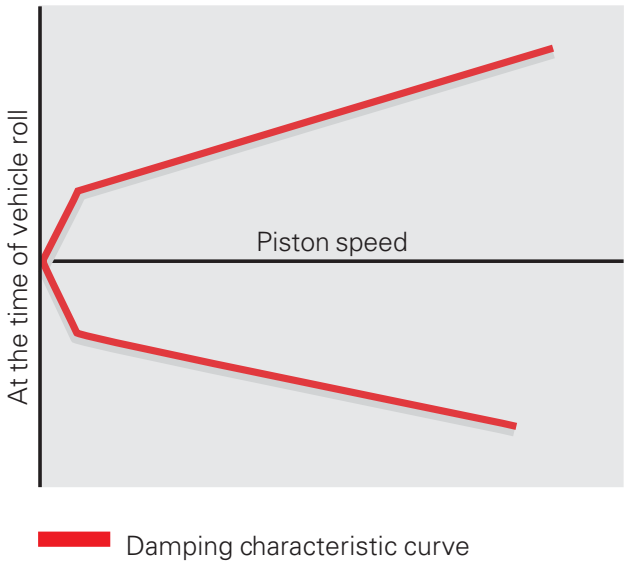


Non-Synchronous Operation

Movement of the piston rods in different directions produces different pressure potentials in pressure chambers 1 + 2 (refer to pressure direction as indicated by yellow arrows in illustration). Piston movement toward the gas accumulator is thus not possible or only possible to a limited extent.

The valve bores in piston 1 provide the necessary pressure equalization. These are sealed on one end by thin metal discs so that flow is only possible through the holes in the piston from one side and can only reach a certain threshold pressure.

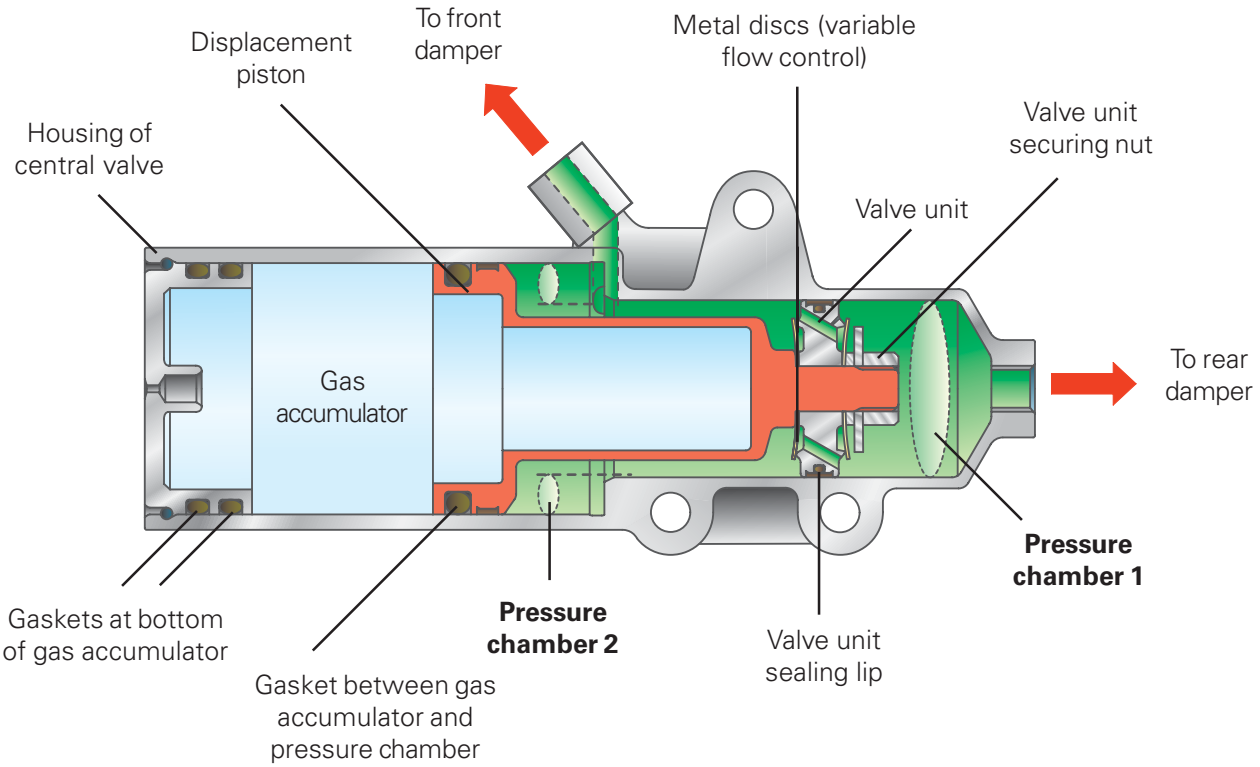
The setting of the dampers is governed by the internal workings of the dampers, and by the following: the ratio of the surface areas, the volume displaced by the damper piston rods, the bores in the piston of the central valve, and the threshold pressure applied to the piston valves.



Central Valve

The pressure accumulator (gas accumulator) in the central valve is pre-loaded by the supplier to a pressure of 16 bar. The damper system oil pressures applied to pressure chambers 1 and 2 provide damped pressure equalization in conjunction with the displacement piston.

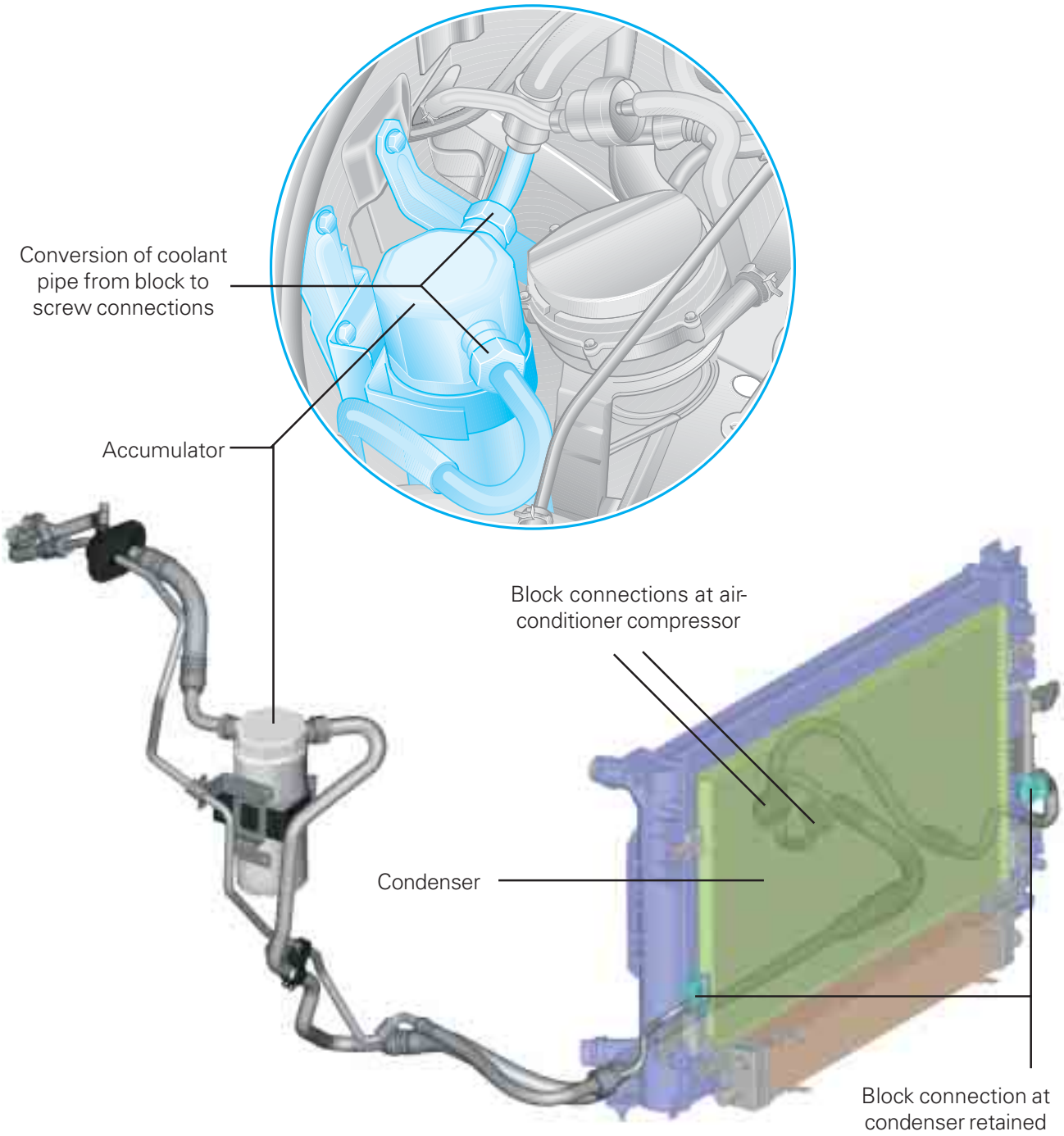
Components are supplied pre-filled with a pressure of 16 bar. Improper handling could lead to injury.



The pressure zones 1 and 2 shown represent the surfaces within the central valve acting on the displacement piston.

Air Conditioning System

The accumulator connections have been switched from block to screw type.



Other Features

Trunk

For space reasons and to improve weight distribution, the battery was relocated to behind the rear axle in the trunk area.

To remove the battery cover, fold down the passenger side rear seat to gain access to the forward facing fasteners. There is also an inward facing fastener and two bolts facing rear.

The spare tire is located under the trunk floor, with tire repair kit stowed behind the left access door, above the navigation unit. The air compressor is located behind the right access door.

Special Tool

DRC Tool VAS 6209

This tool is required for emptying, evacuating and filling the dampers and pipes of the DRC.

Navigation

Audi Telematics by OnStar is standard on all RS6 models.

Top Fin

RS6 models feature a GPS antenna for Navigation and OnStar.

Technical Data

Designation	Unit	4.2L biturbo
ENGINE		
Engine code letters		BCY
Engine design		8-cylinder 5-valve four-stroke biturbo gasoline engine in 90º V arrangement, 2 cylinder heads, variable camshaft adjustment, two sodium-cooled exhaust valves
Valve timing		Two overhead camshafts per cylinder head
Number of cylinders/valves per cylinder		8/5
Capacity	cm3	4172
Bore x stroke	in.	3.32 x 3.36
Compression ratio	: 1	9.8
Maximum charge pressure	bar	0.8
Fuel injection/ignition system		Motronic ME7.1.1 with charge-pressure control, electronic throttle
Cylinder spacing	mm	90
Idling speed	rpm	790/850
Maximum speed	rpm	6700
Rated power	hp @ rpm	450 @ 5700 - 6400
Maximum torque	lb/ft	1950 - 5600
Engine management		Fully electronic sequential multi-point injection with 2x air-mass metering, map controlled ignition with distributorless ignition system, pencil-type ignition coils and driver stages, camshaft timing control, cylinder bank-selective exhaust-gas temperature regulation, coordinated engine torque control, rapid start recognition, three knock sensors, speed sender emergency function, thermal protection and torque limitation for individual gears via charge-pressure control
Emission control system		Two air-gap insulated shell-type exhaust manifolds, two underhood metal substrate primary catalytic converters, engine-speed increase after starting (cold heating function), cylinder bank-selective heated oxygen sensors, secondary-air system
Firing order		1 - 5 - 4 - 8 - 6 - 3 - 7 - 2
Battery	volts	14 volts (110 amp/hr)
Alternator	volts	14 volts (150 amp)
Engine weight	lbs.	approximately 507 lbs.

Designation	Unit	4.2L biturbo
Transmission		
Drive system		quattro permanent four-wheel drive, automatic locking Torsen center differential, electronic differential lock EDL via brake application at all driven wheels
Type of gearbox		5-speed Tiptronic with dynamic shift program DSP
Running Gear / Steering / Brakes		
Front axle		RS6 sports running gear with (Dynamic Ride Control) DRC roll compensation
Rear axle		RS6 sports running gear with (Dynamic Ride Control) DRC roll compensation
Steering		Power-assisted maintenance-free rack and pinion steering
Overall steering ratio		14.3
Turning circle	ft.	2.8 (lock-to-lock), 37.4 (curb-to-curb)
Front/rear brake system		Dual-circuit diagonal brake system, ventilated front/rear disc brakes, with 8-piston high performance brakes at front, antilock brakes (ABS) with electronic brake pressure distribution (EBPD), electronic differential lock (EDL), traction control system (TCS), electronic stability program (ESP)
Front/rear brake diameter	in.	14.37 x 1.3/ 3.19 x 0.9
Wheels		Light alloy wheels 8.5 J x 18 RS 30 in 9-spoke design
Tire size		255/40 ZR 18 high performance tires

Designation	Unit	4.2L biturbo
Body / Dimensions		
Number of doors/seats		4/5
Overall length	in.	191.3
Width including mirrors	in.	78.4
Vehicle height	in.	approximately 56.1 (loaded)
Wheelbase	in.	108.6
Front/rear track	in.	62.1
Luggage capacity (EPA)	cu. ft.	15.0
Curb weight	lbs.	approximately 4024

Designation	Unit	4.2L biturbo
Capacities		
Engine coolant		VW G12
Cooling system (including heating)	qt.	11.6
Engine oil (including filter)	qt.	9.5
Fuel tank	gal.	21.7
Performance		
Top speed	mph	155 (250 km/h) electronically limited for North America
Acceleration		
0-50 mph (0-80 km/h)	sec.	3.5
0-60 mph (0-100 km/h)	sec.	4.6
1/4 mile	sec.	14.1
Type of fuel		Premium Plus unleaded
Fuel Economy		
City	mpg	15.0
Highway	mpg	22.0
Combined	mpg	18.0
Warranty / Maintenance		
4-year/50,000 mile new vehicle limited warranty / 4-year/ 80,000 km new vehicle limited warranty		
4-year/50,000 mile no-charge scheduled maintenance / 4-year/80,000 km no-charge scheduled maintenance		
12-year limited warranty against corrosion perforation		
24-hour Roadside Assistance for 4 years		

Knowledge Assessment

An online Knowledge Assessment (exam) is available for this Self Study Program.

The Knowledge Assessment may or may not be required for Certification. You can find this Knowledge Assessment at:

www.academy.accessaudi.com

From the academy.accessaudi.com Homepage, do the following:

- Click on the Certification tab
- Type the course number in the Search box
- Click "Go!" and wait until the screen refreshes
- Click "Start" to begin the Assessment

For assistance, please call:

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Learning Management Center Headquarters

1-866-AUDI-ALC

(8:00 a.m. to 8:00 p.m. EST)

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