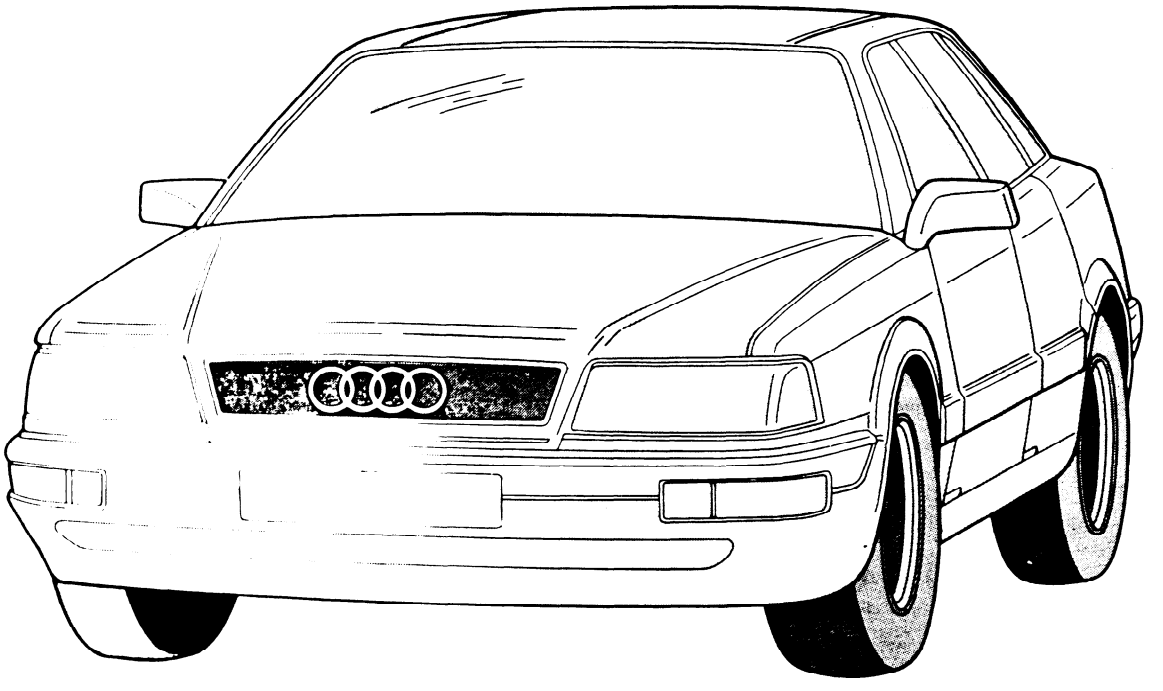
The New

Audi V8 Quattro



Service Training

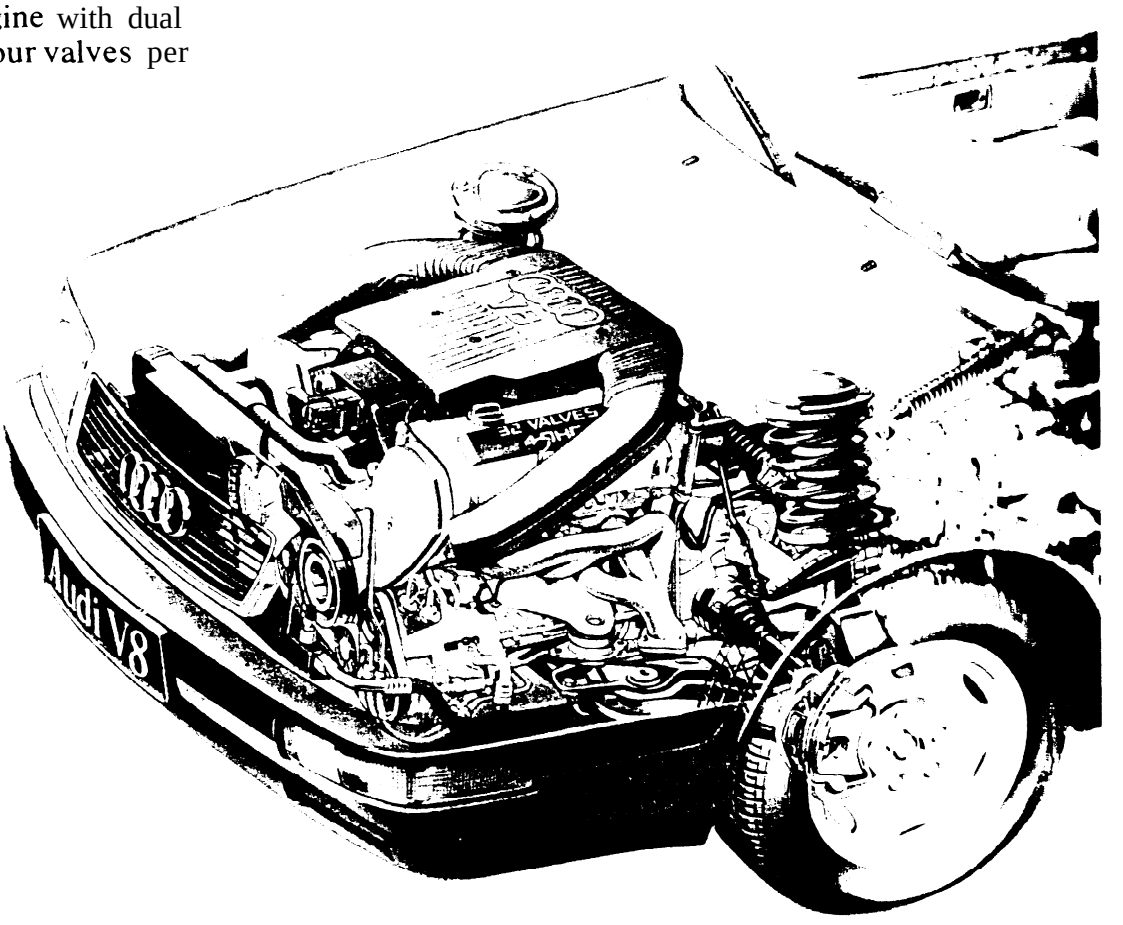
Contents

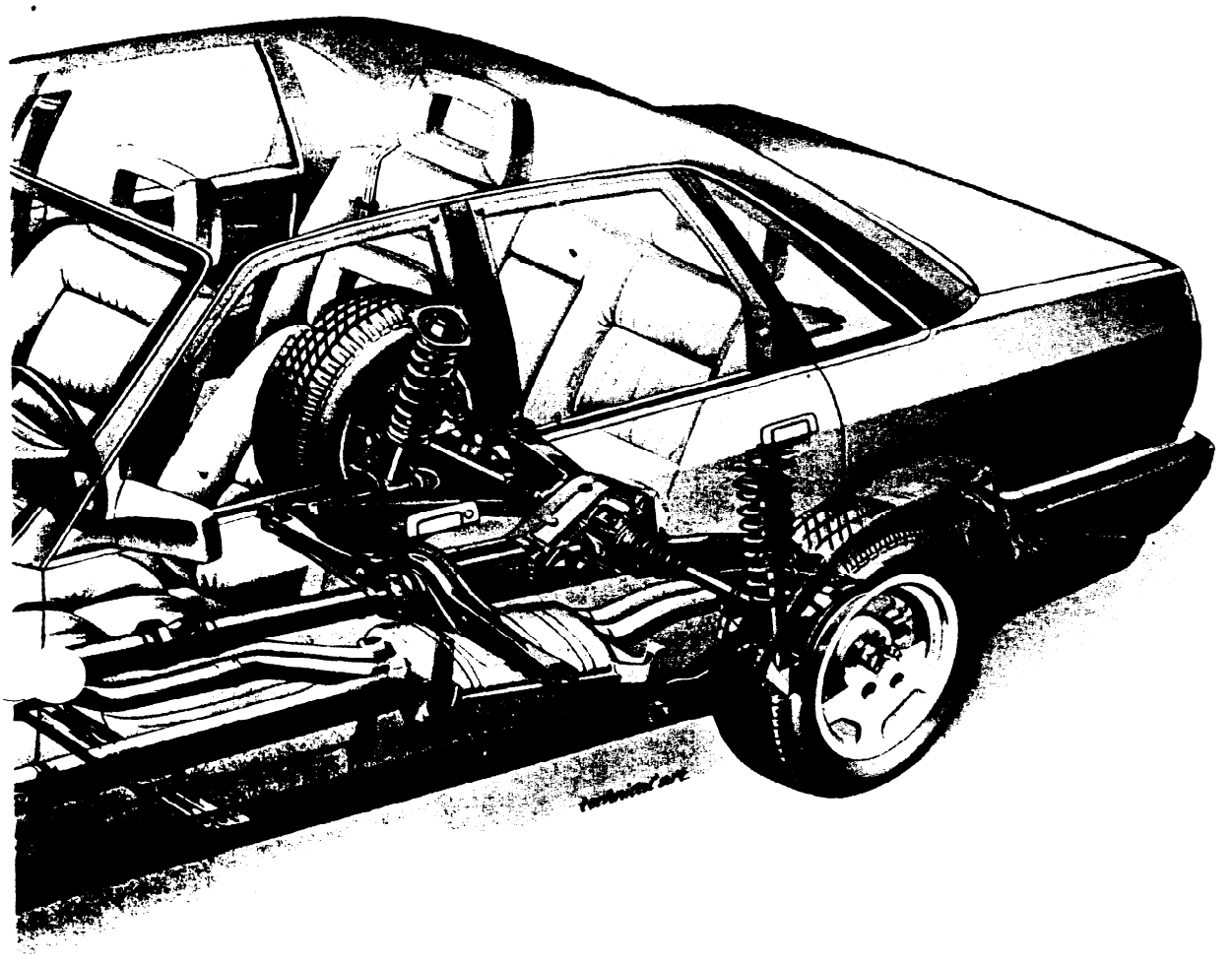
V8 Quattro Concept

The Audi V8 Quattro represents Audi's entry into the highest level of the international car market.

The combination of standard features on the Audi V8 Quattro is not offered by any other manufacturer in the world.

- Aluminum V8 3.6 liter engine with dual overhead camshafts and four valves per cylinder.
- Quattro all-wheel-drive technology.
- Electronically-controlled four-speed automatic transmission with lock-up torque converter.
- Anti-lock Braking System.





In addition, the Audi V8 Quattro also offers as standard equipment :

- Electronic engine management with adaptive learning ability .
- Driver's side air bag used together with automatic seat belt tensioners.
- All-weather comfort and convenience package which includes: thermostat-controlled heated front and rear seats, heated door locks and heated windshield washer nozzles.
- A fully-galvanized body shell backed by a ten year rust perforation warranty.
- Complete luxury equipment, including: leather upholstery , burled walnut trim, Audi/Bose® music system and a ''hands-free'' Motorola® cellular mobile telephone.

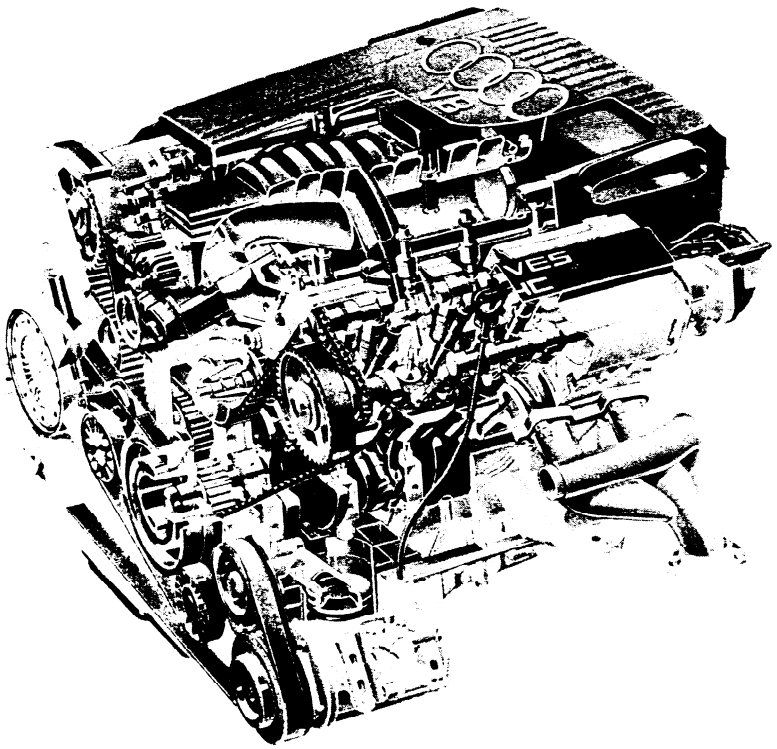
V8 Quattro Engine

The Audi VS Quattro engine is one of the most compact eight cylinder engines currently in production.

This was accomplished by developing a new cylinder block and crankcase, arrangement of the auxiliary units and a compact air intake system.

The V8 Quattro engine weighs 473 lbs. (2 15 kg) including al1 auxiliary units.

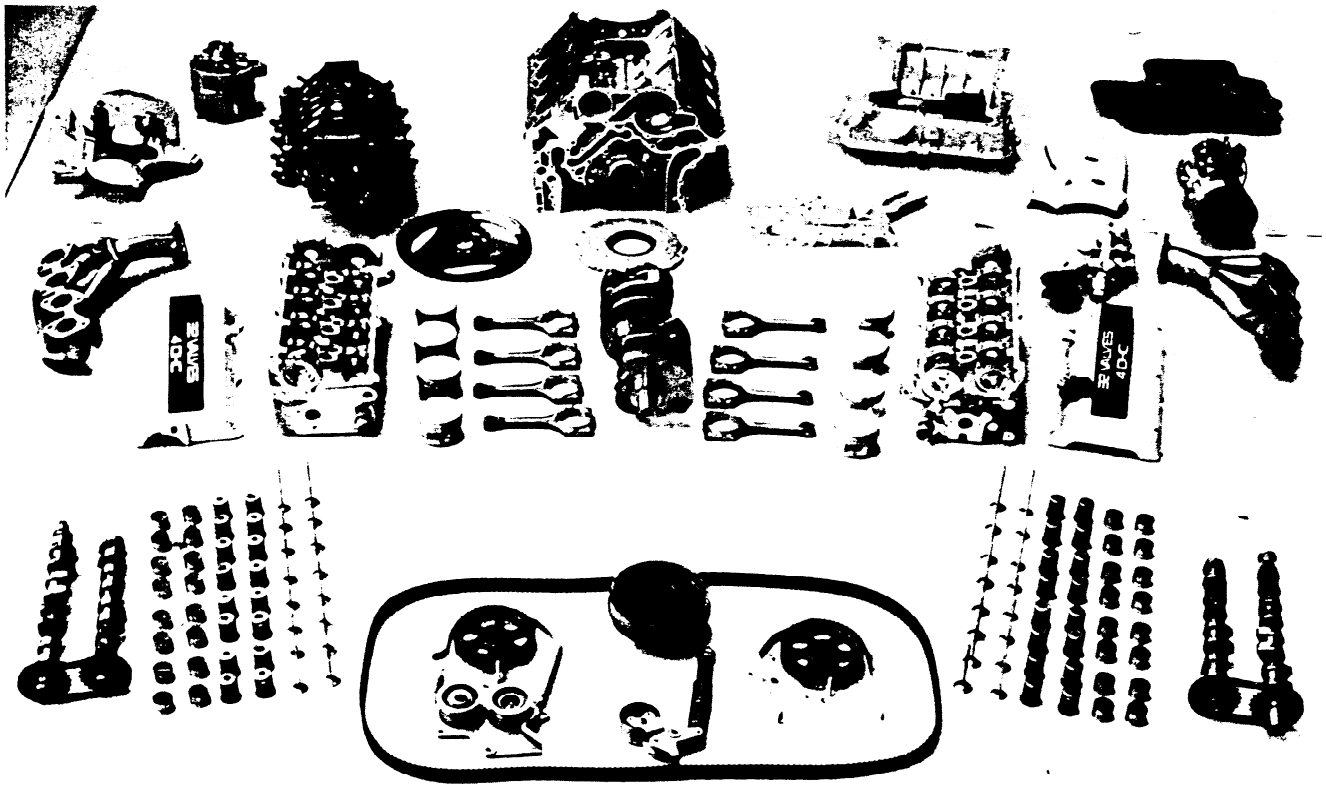
Overa11 appearance, as well as function, was a consideration in the design of the V8 Quattro engine.



Engine Data

Type	V-8 Quattro with 90° V-angle
Capacity	3.6liters
Bore/Stroke	81.0mm/86.4mm
Compression	10.6:1
Horsepower rating	.240 @ 5800 RPM
Torque	245 @4000RPM
Cylinderspacing	88.0mm
Cylinder offset from right to left	18.5 mm
Totallength	508mm
Total weight	215 kg
Engine management system	Bosch Motronic with two knock sensors
Exhaust emission control	Dual three-way catalytic converters; oxygen sensor
Fuel requirement	Unleaded premium (95 RON) recommended for maximum performance

Alloy Engine Components



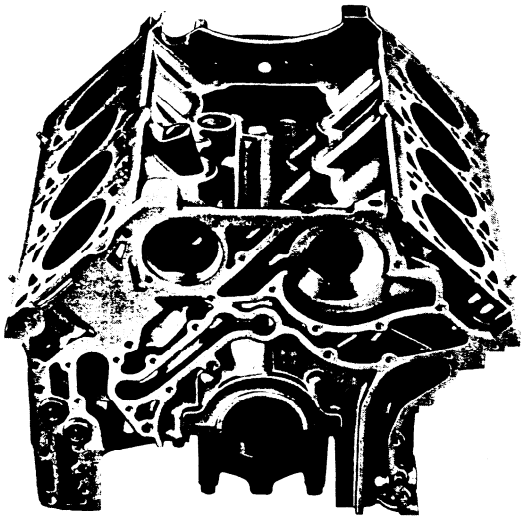
The cylinder heads, oil sump top section and toothed belt housing are made of aluminum.

The valve covers are die-cast magnesium and coated with a thin synthetic material to prevent corrosion.

To keep the engine compact. reduce external connections and to add to its durability. many components were designed as integral parts of the engine block. For example, the oil thermostat housing, oil filter flange, engine coolant thermostat housing, water pump housing, and the crankcase ventilation system are al1 part of the engine block.

V8 Quattro Engine

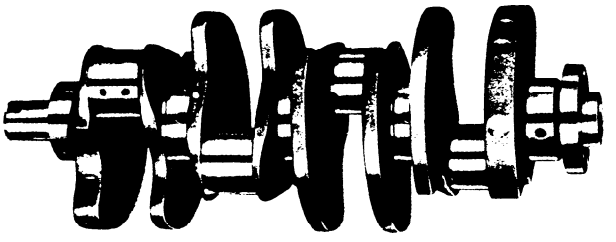
Cylinder Block Assembly



The cylinder block is cast in hypereutectic alloy of aluminum with a **17% silicon content and weighs only 62 lbs. (28.1** kg).

Cylinder areas are specially treated to etch away the aluminum and expose the hard silicon crystals as a bearing surface for the pistons and piston rings. This means that conventional cylinder sleeves are not needed.

A fully balanced heat treated steel crankshaft is used in the Audi V8 Quattro.



It is forged in a single plane and twisted while it is still hot so the rod journals are at 90° to each other. This process ensures the optimum formation of the crankshaft counterweights. The counterweights continue the momentum of the power strokes from cylinder to cylinder for smooth engine operation.

The crankshaft bearing caps are cast in nodular iron for strength and reduce the expansion of the main bearings in the aluminum cylinder block when the engine is hot.

The lightweight connecting rods are also forged from aluminum alloy. They are **154** mm long, 20.5 mm wide and weigh 621 grams, including the bearing.

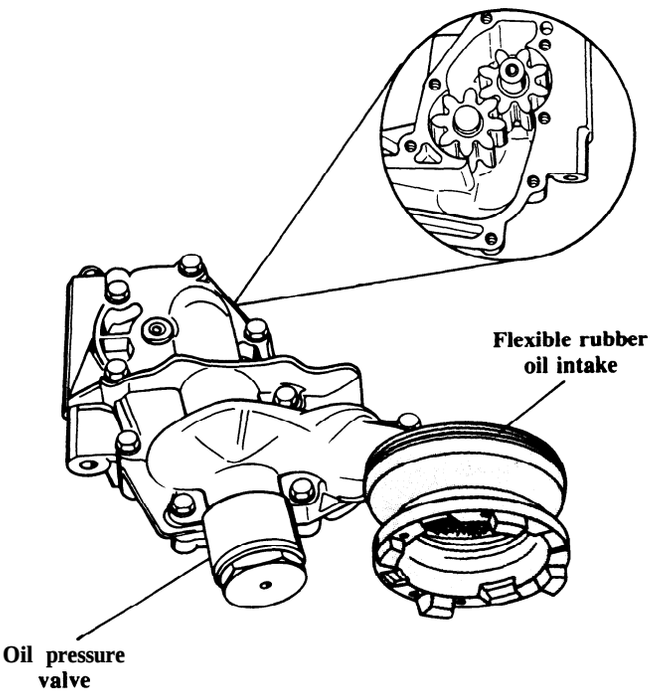
The aluminum slipper-skirt pistons are electroplated with iron, and then thinly coated with tin. In this way, the pistons and cylinder bores seat in together during the engine break-in period to give low-wear moving sur-faces.

Piston crowns are cooled on the underside by a jet spray of engine oil.

Lubrication System

Engine oil is delivered by a gear-type oil pump mounted in the crankcase.

The pump is driven by a pulley which is, in tum, driven by the same toothed belt that drives the camshafts and water pump.

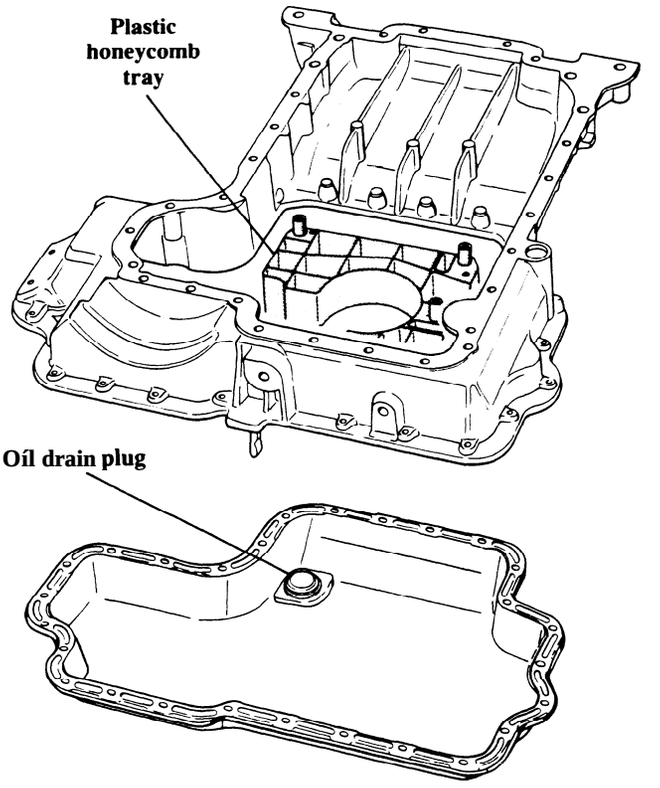


The oil sump is manufactured in two pieces. The upper section is die-cast aluminum and strengthens the lower engine.

The lower section is stamped steel. It will deform without cracking if hit from underneath.

If the lower sump cover is deformed by impact, a special rubber oil intake will flex without closing off the oil intake openings.

The oil sump also houses a special honeycomb tray that reduces foaming as the oil returns to the sump. This ensures a bubble-free oil supply under al1 driving conditions.

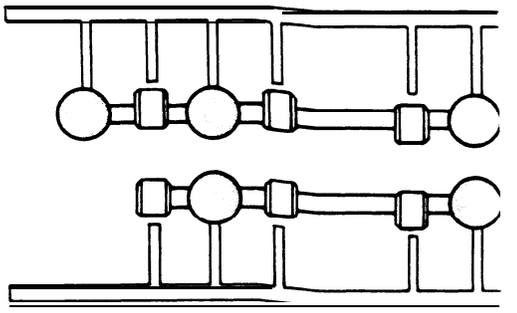


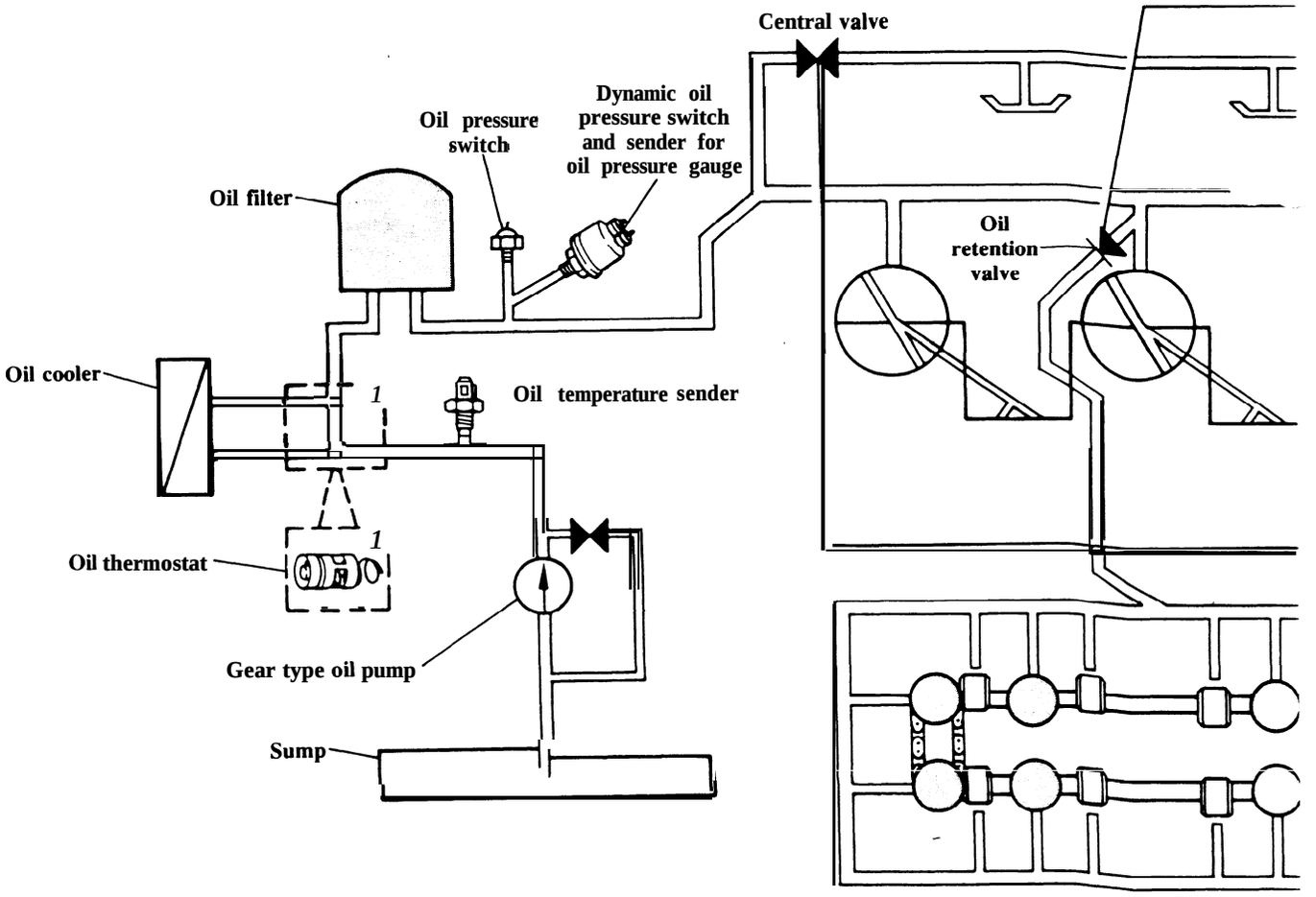
V8 Quattro Engine

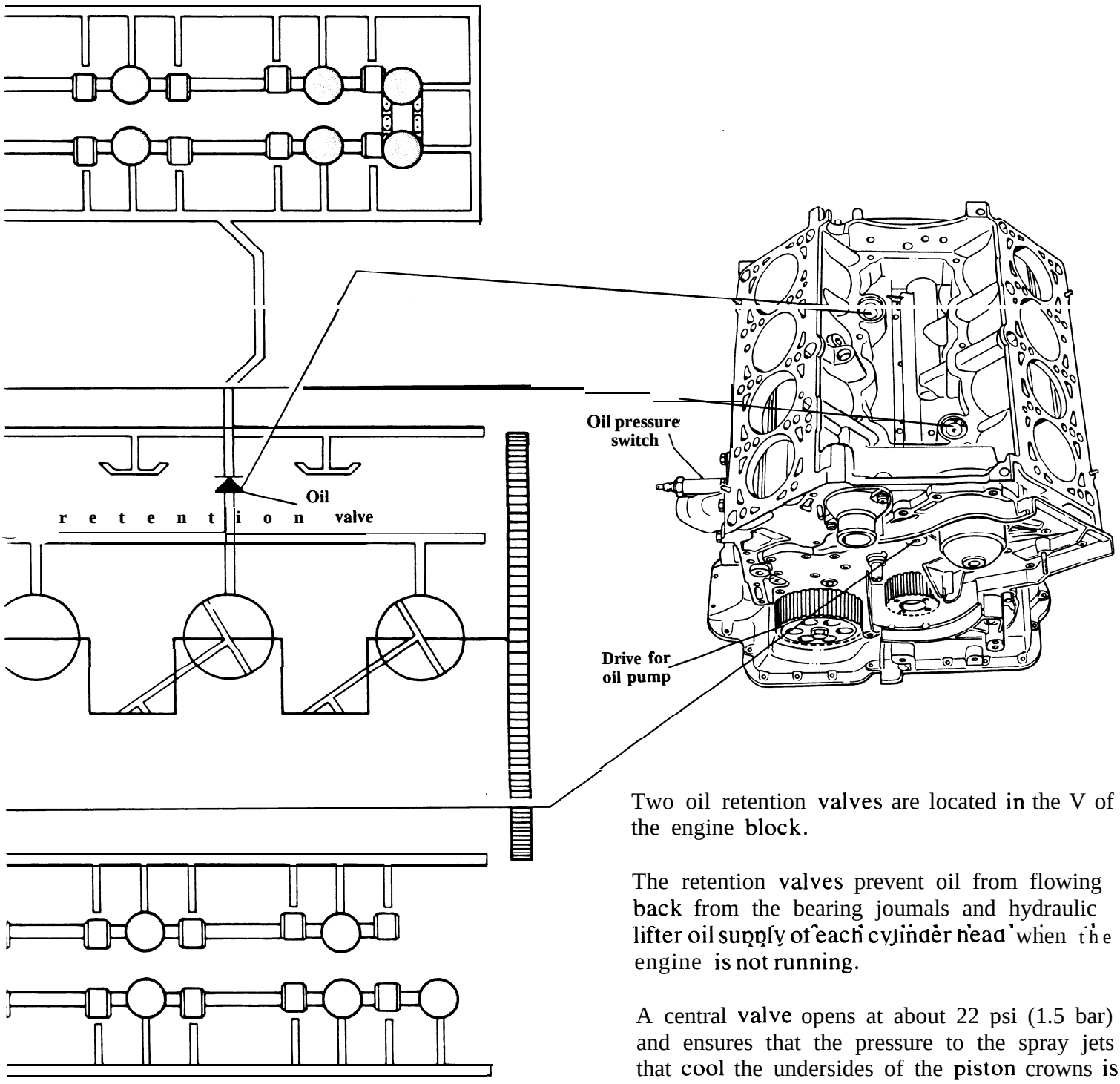
The oil pressure for the bearing points and for the double spray jets in the crankcase housing is provided by the gear oil pump.

The double spray jets (one unit for each pair of pistons) spray the undersides of the piston crowns with cooling oil.

A thermostat opens the oil duct to the oil cooler at a temperature of 212° F (100° C). The oil cooler is located below the engine coolant radiator and is cooled by the air flow while driving.





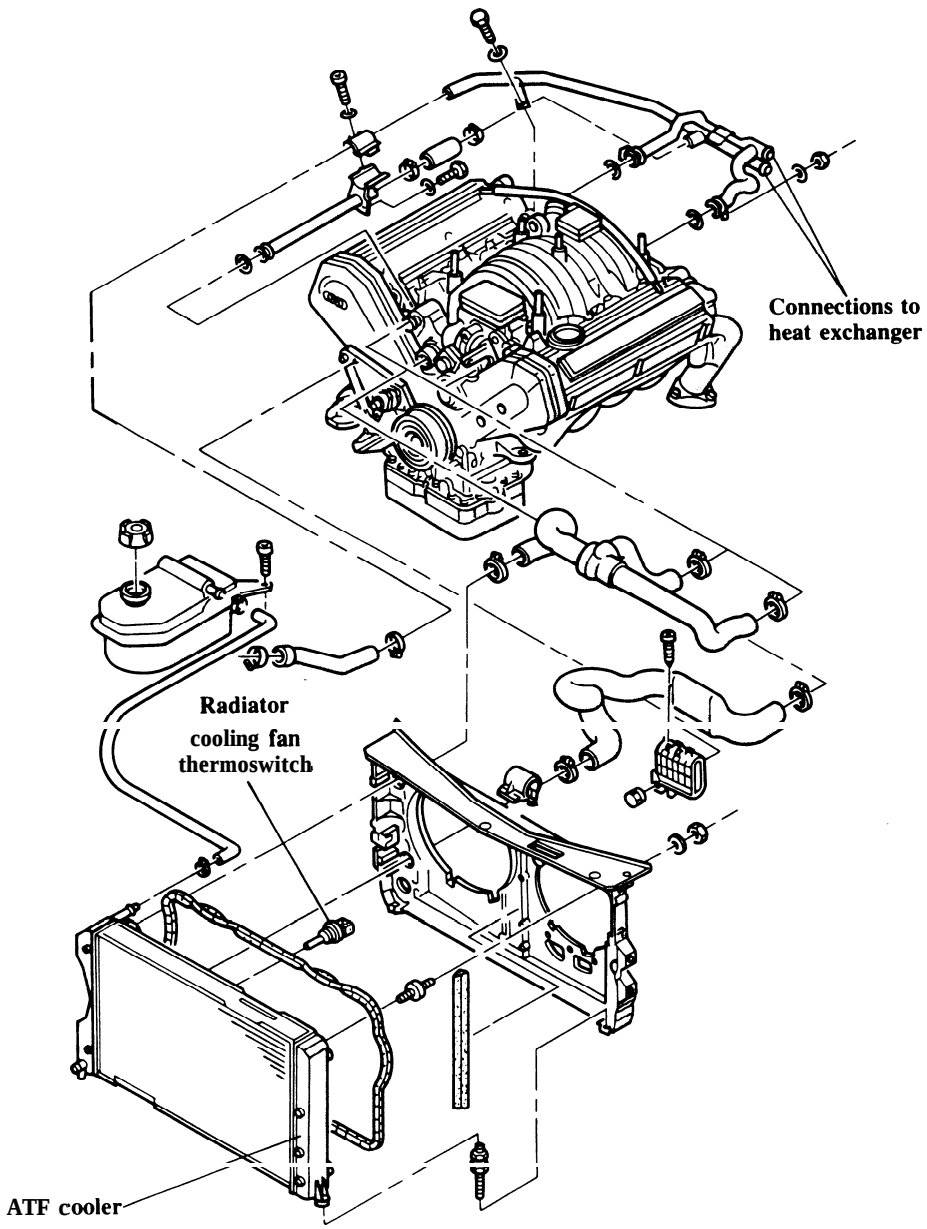


Two oil retention valves are located in the V of the engine block.

The retention valves prevent oil from flowing back from the bearing joumals and hydraulic lifter oil supply of each cylinder head when the engine is not running.

A central valve opens at about 22 psi (1.5 bar) and ensures that the pressure to the spray jets that cool the undersides of the piston crowns is the same at each jet.

Engine Cooling System



The V8 Quattro system holds ll qt. (10.5 liters) of special coolant G 11 VS (Part No. G 0011 V8) including the heater.

A special coolant is used because of the additional aluminum in the engine block and cylinder heads.

The V8 Quattro radiator also has a cooler for the automatic transmission fluid.

Coolant drains are located on each side of the cylinder block and also on the bottom of the radiator.

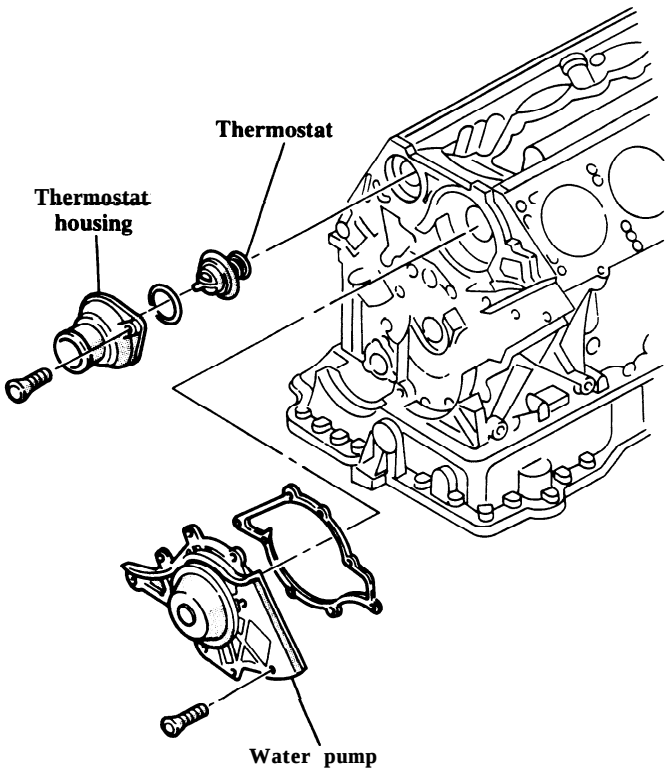
Engine coolant is circulated by an impeller-type water pump. Part of the water pump housing is integral with the engine block.

The pump is driven by the backside of the toothed belt that drives the camshafts.

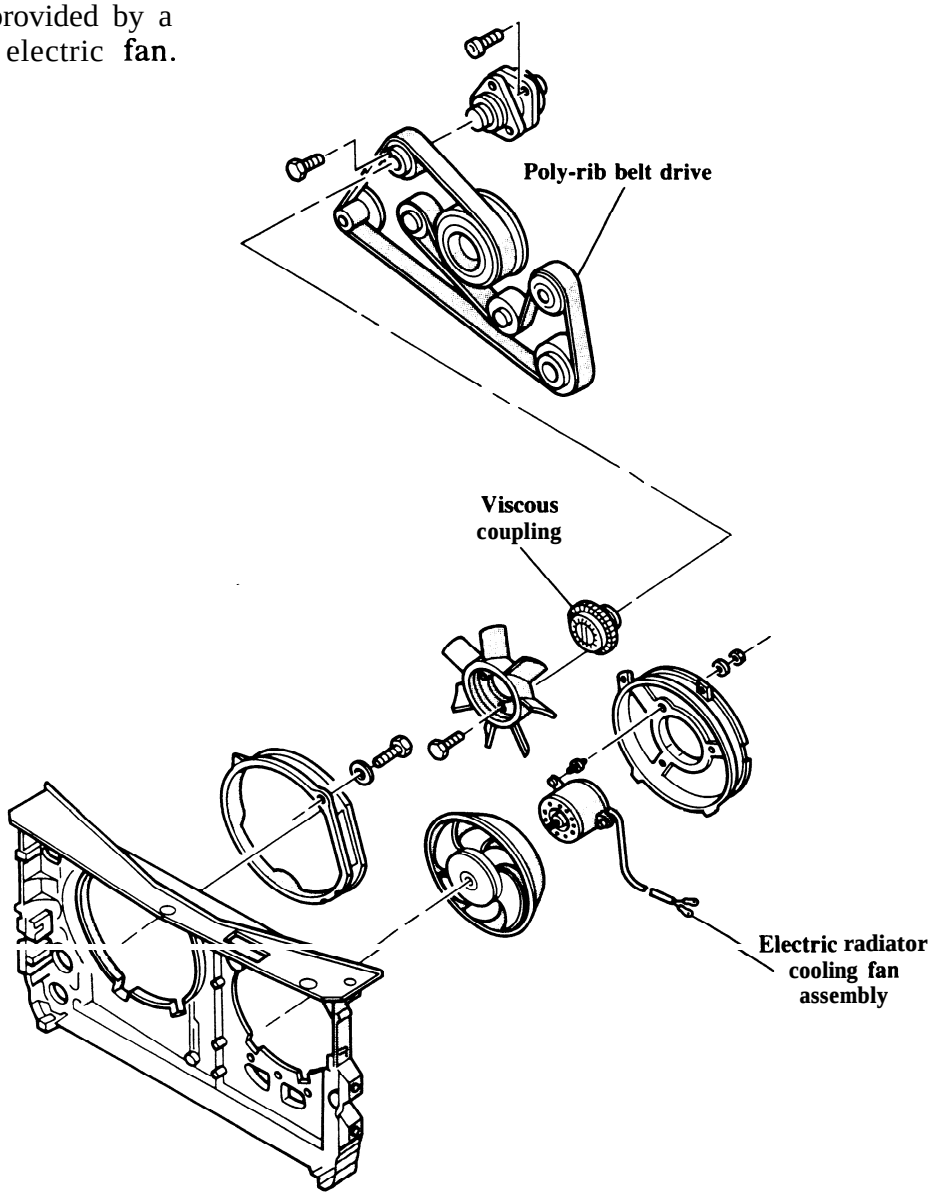
A thermostat located on the right side of the engine block regulates the flow of engine coolant.

The thermostat begins to open when the coolant temperature is 189° F (87° C) and is fully opened when the temperature reaches 216° F (102° C).

The thermostat opening is 8 mm when fully open.



The V8 Quattro uses two radiator cooling fans. The belt-driven cooling fan is operated by a temperature sensitive viscous coupling. Additional cooling is provided by a thermoswitch-operated electric fan.



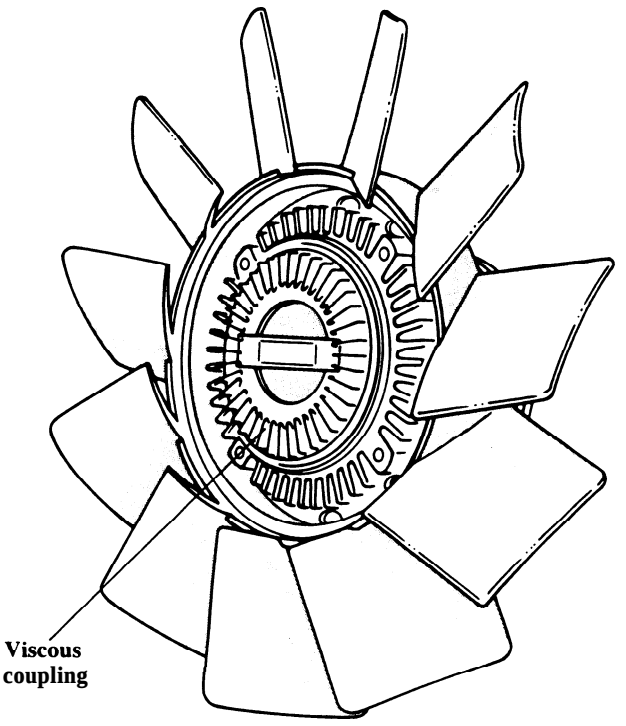
The electric fan is controlled by a thermoswitch in the lower right hand corner of the radiator.

A fuse mounted on the left front shock tower protects the electrical wiring of the fan circuit.

The viscous coupling consists of two chambers: the working chamber with the drive plate and the storage chamber. The drive plate turns at the same speed as the belt driven pulley.

Both chambers are connected by a valve and are filled with silicone oil. If the valve is opened, the silicone oil circulates between the two chambers.

Note:
Do not place the fan face down when storing or silicone oil could leak out. The fan should be placed in an upright position when storing.



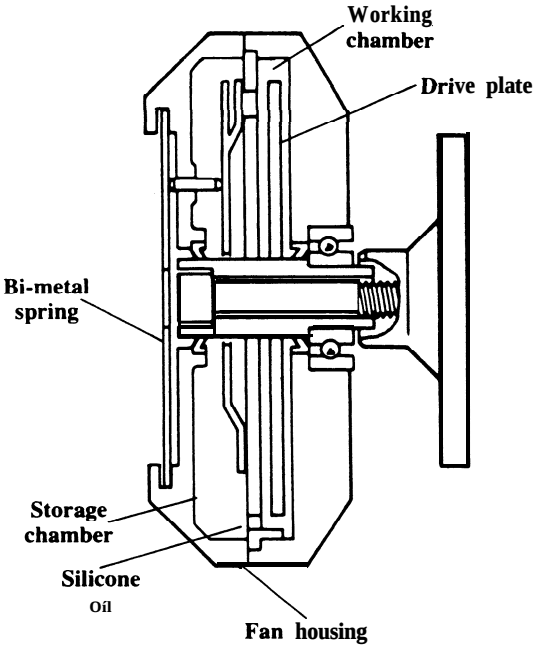
It works like this:

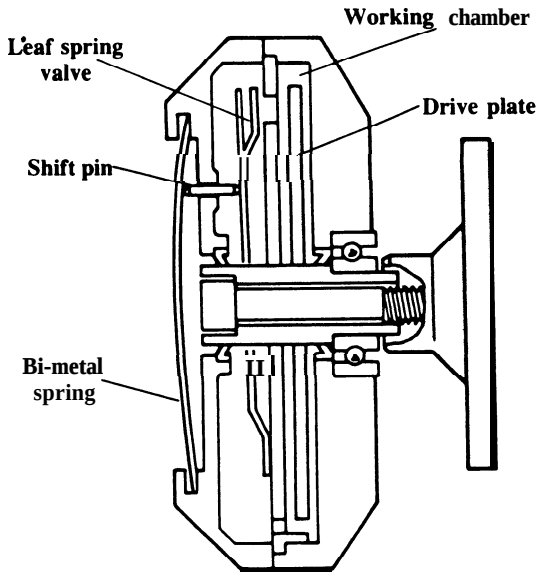
Engine Cold

The silicone oil is completely pumped into the storage chamber by the rotation of the drive plate. The valve, controlled by the bi-metal spring, is closed and no oil flows into the working chamber.

If there is no oil in the working chamber, there is no path of force between the drive plate and housing.

The fan turns at a very low speed.

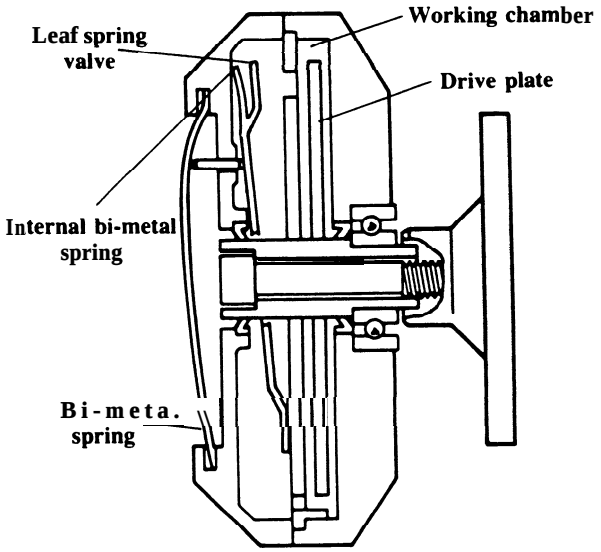




Engine Warm

The bi-metal spring opens the leaf spring valve via the shift pin. The silicone oil flows through the valve opening into the working chamber.

This creates a path of force between the drive plate and housing and the fan speed increases.



Engine Hot

The higher the temperature at the bi-metal spring, the greater the leaf spring valve movement . The valve opening becomes larger and a greater amount of silicone oil passes into the working chamber.

The fan tums at the same speed as the drive plate.

An interna1 bi-metal spring protects the viscous fan coupling from thermal overloading by acting against the valve spring at a predetermined temperature.

When this happens, the valve opening cross-section becomes smaller causing a reduction in the amount of oil supplied to the working chamber. The silicone oil in the storage chamber is cooled by the air flow over the coupling.

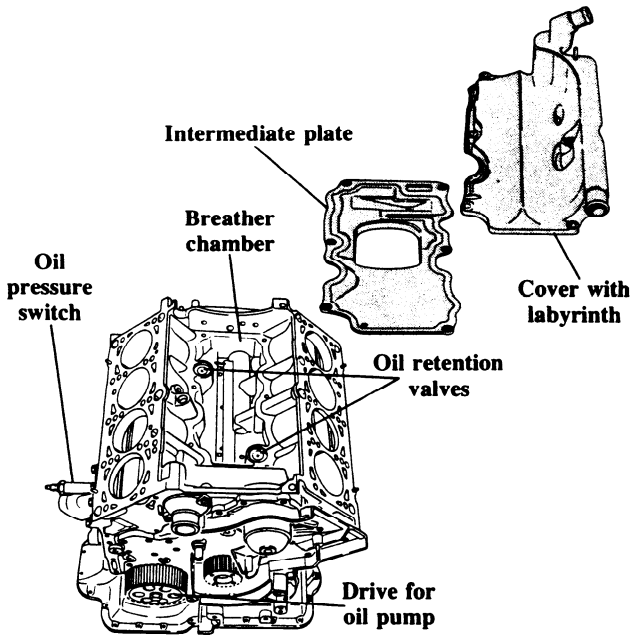
Crankcase Ventilation

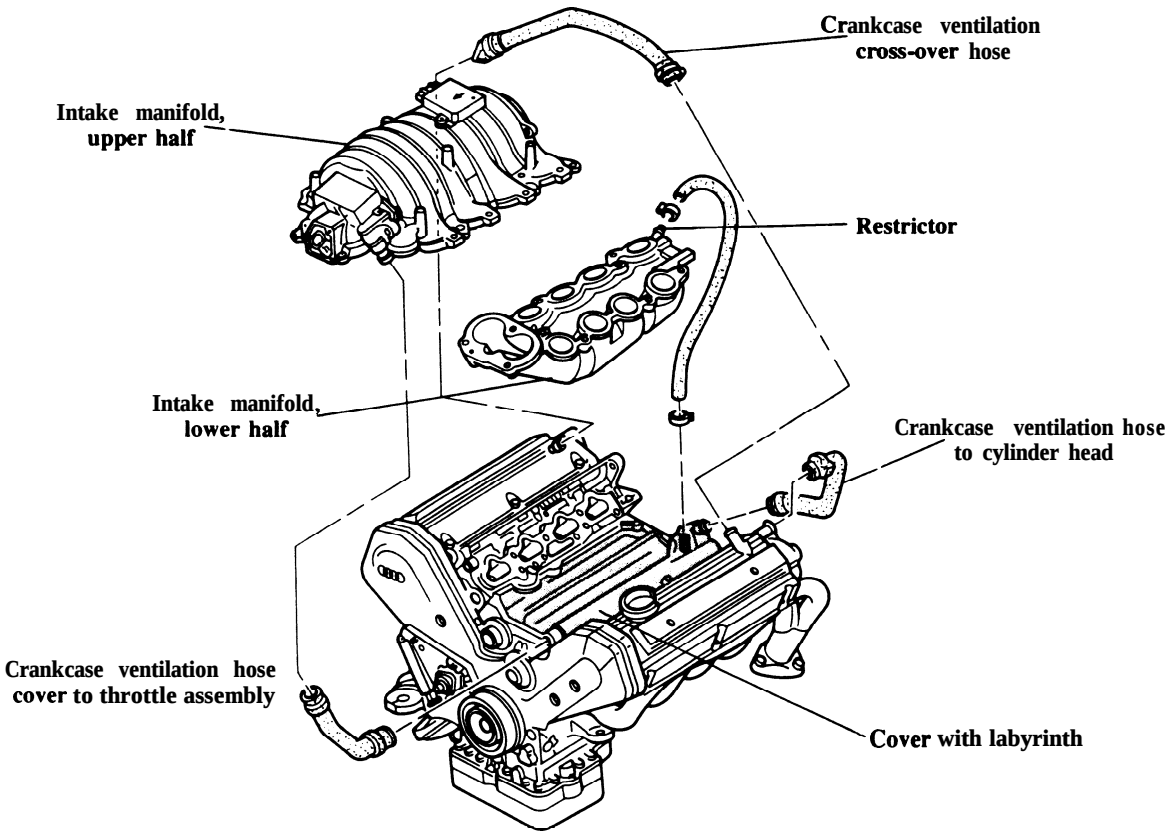
The crankcase breather is located between the cylinder banks.

An intermediate plate catches drops of oil and oil spray and carries them back to the sump.

The interior of the crankcase breather cover is a labyrinth design, which also helps to separate the finer drops of oil and prevent them from being drawn in by the engine.

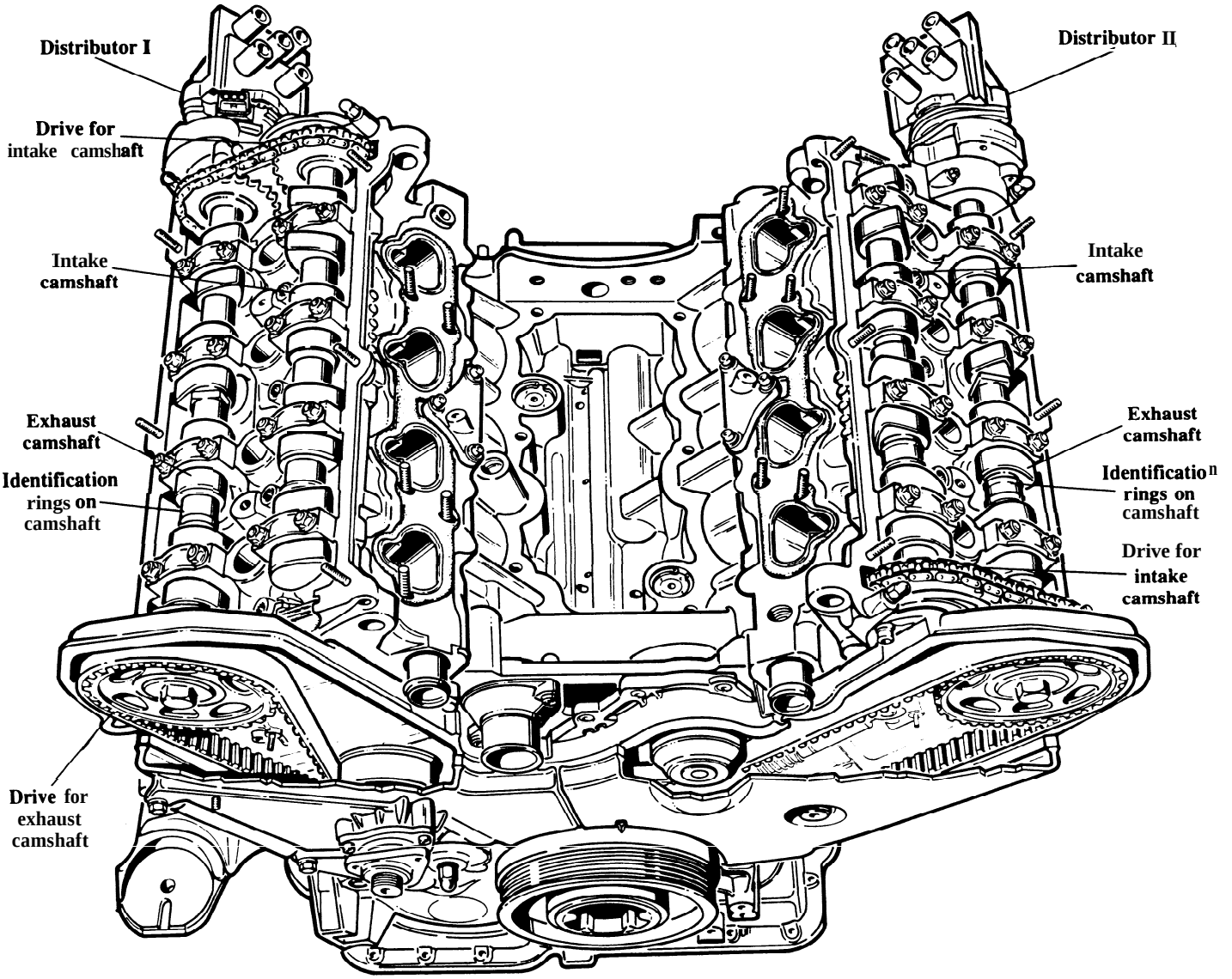
Fumes from the crankcase breather are drawn through a restrictor at the back of the intake manifold during idle. Additional ventilation takes place through the large hose connected to the throttle housing whenever the throttle is opened.





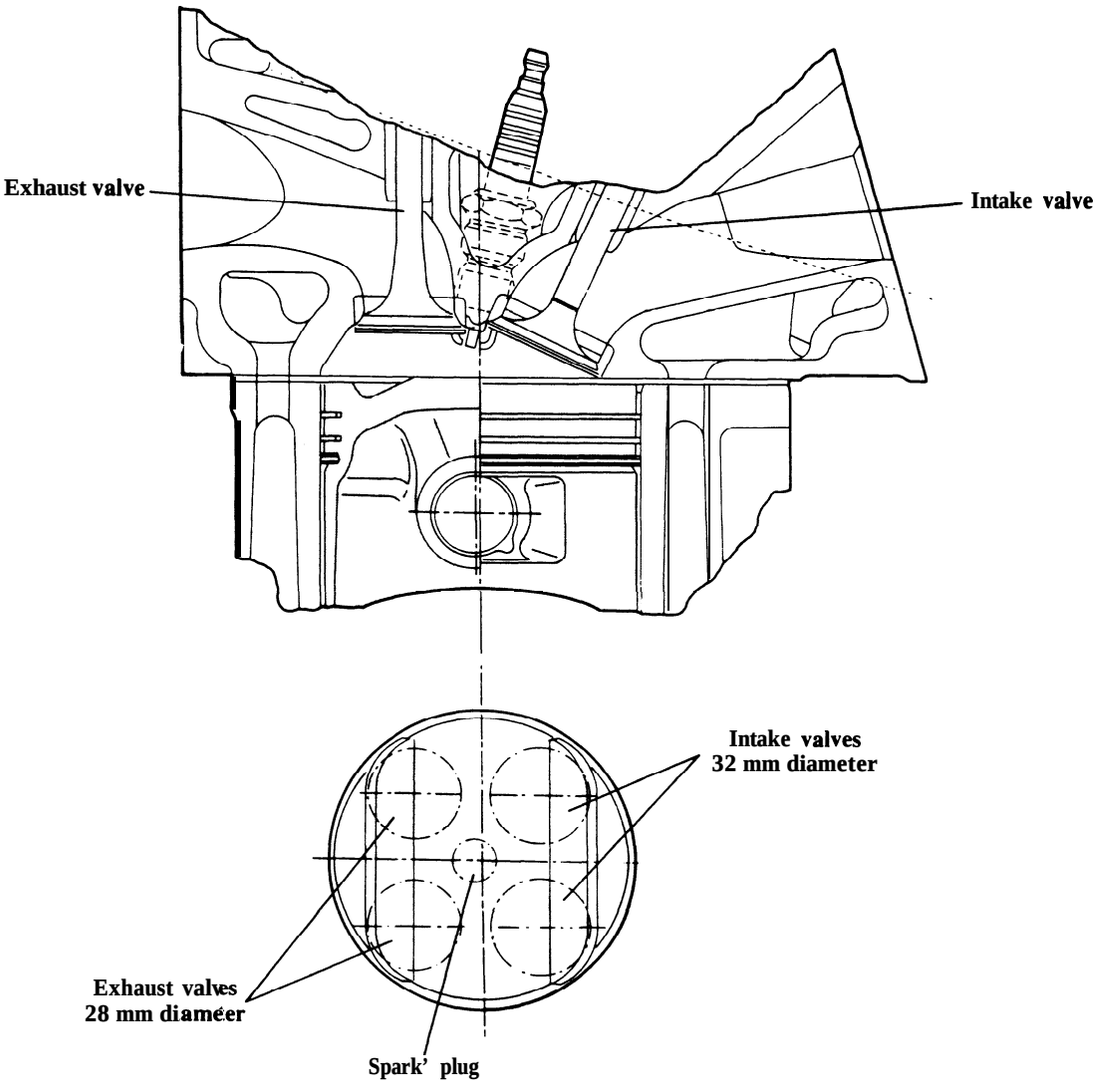
Cylinder Heads

Each bank of the Audi V8 engine is equipped with a 16 valve, double-overhead camshaft cylinder head.



The exhaust camshafts are driven by a toothed belt. The intake camshafts are chain-driven by the exhaust camshafts.

Labyrinth-style valve lifters are used, together with two oil retention valves (in the engine block) to ensure quiet running valves.



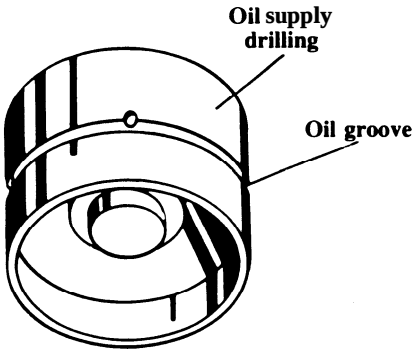
The cross-flow cylinder heads are manufactured from a modified aluminum alloy.

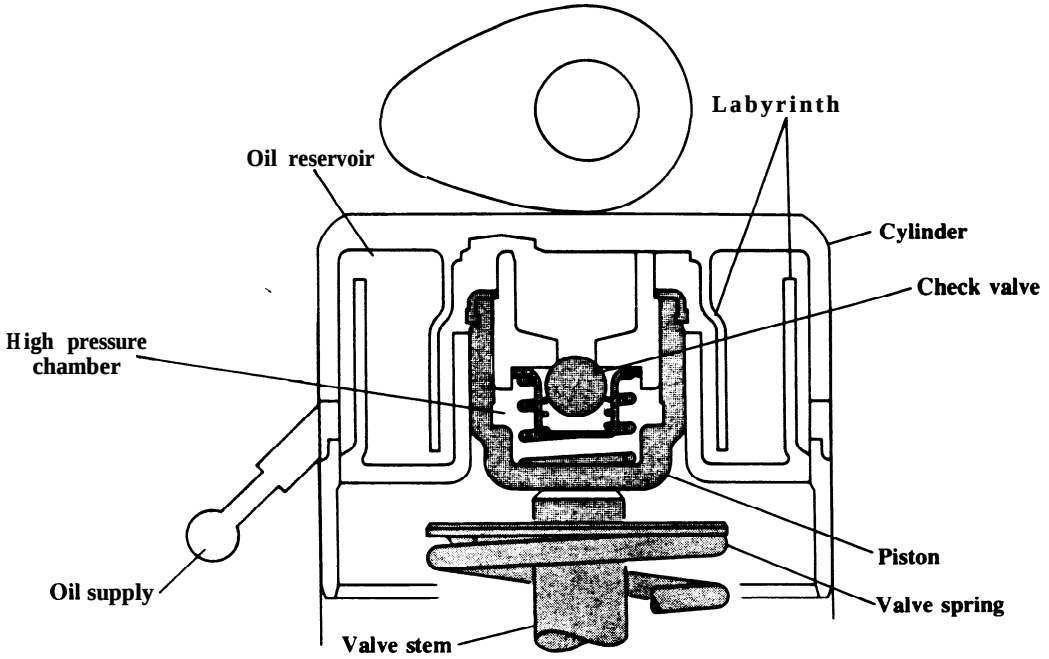
The two sodium-filled exhaust valves of each cylinder are in line with the cylinder axis. The intake valves are angled at 25°. This contributes to the compactness of the cylinder head.

The spark plug is located between the intake and exhaust valves. This encourages better flame propagation during the combustion process.

Hydraulic Valve Lifters

Newly designed hydraulic valve lifters are used in the V8 Quattro engine. The labyrinth design helps maintain an oil supply at the lifter when the engine is shut off. This results in noise reduction when starting a cold engine.





The hydraulic lifter consists of two moving parts, the piston and the cylinder. These two parts are forced apart by spring pressure until no clearance exists between the camshaft and the valve stem.

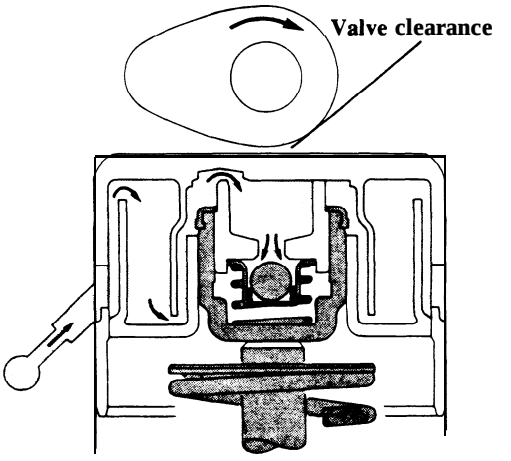
After the high pressure chamber is filled with oil, the check valve seals it off.

The labyrinth design of the oil reservoir prevents the lifter from bleeding down when the engine is not running.

When the valve has closed and the cam is not pressing against the lifter, the pressure in the high pressure chamber drops.

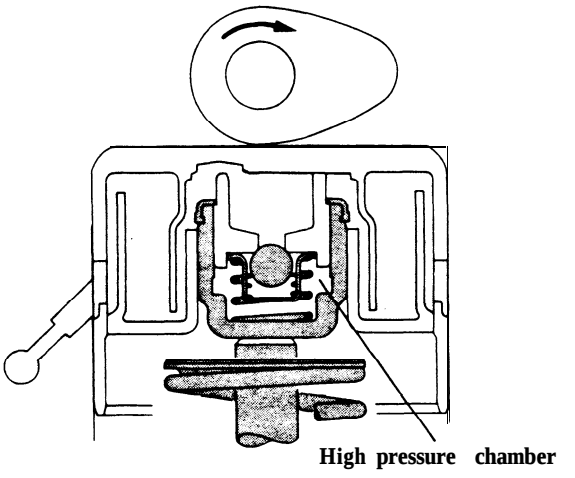
The compression spring presses the cylinder and piston apart until there is no play between the cam and lifter.

The check valve opens and oil flows from the reservoir into the high pressure chamber. The amount of oil that flows in depends on the valve clearance.



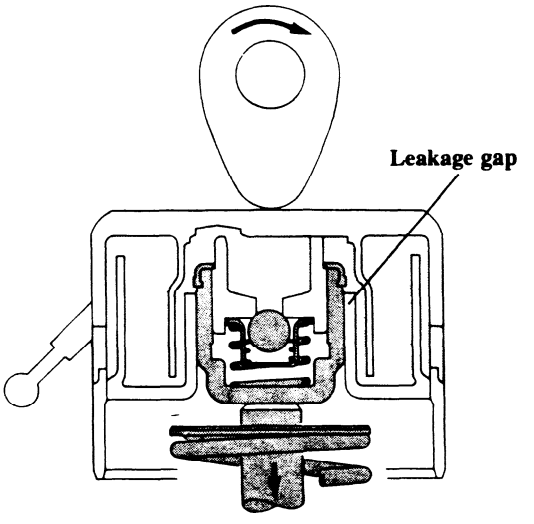
When the cam makes contact with the lifter, the check valve closes and pressure is built up in the high pressure chamber.

The oil trapped in the high pressure chamber cannot be compressed and the lifter acts as a rigid component.



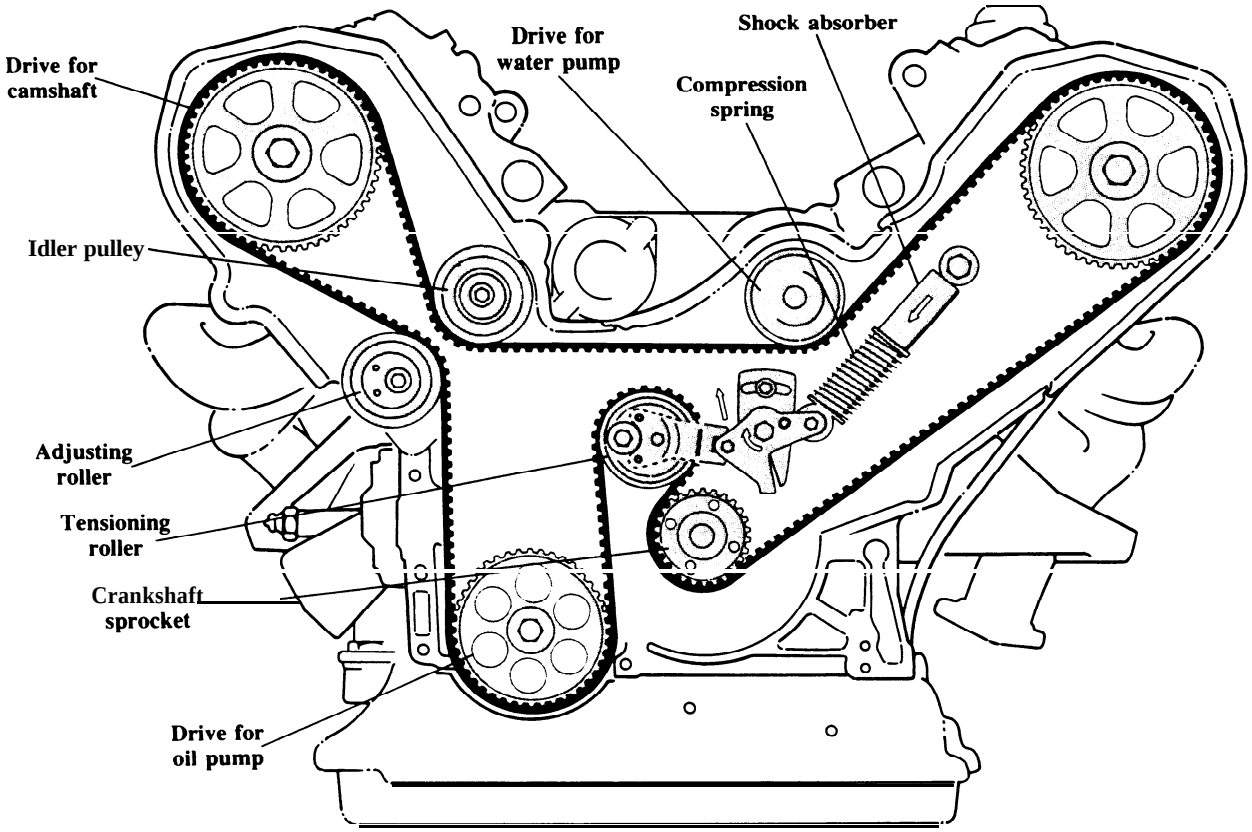
The cam exerts force on the lifter and the pressure in the high pressure chamber increases. A small amount of oil bleeds from the high pressure chamber via the leakage gap.

The lifter is, therefore, compressed 0.1 mm during the valve stroke. This allows the lifter to adapt as the space between camshaft and valve becomes smaller.



Toothed Belt

The exhaust camshaft gears, oil pump, and water pump are driven by a 30 mm wide, temperature resistant toothed belt with fiberglass cords to control stretching.



The basic setting for the toothed belt is made at the eccentrically-mounted adjusting roller.

An automatic tensioning device keeps the toothed belt at a constant tension via a compression spring and shock absorber.

This compensates for the thermal expansion of the engine or belt length tolerances.

The automatic tensioning roller is positioned so the belt teeth contact the crankshaft sprocket at the best possible angle.

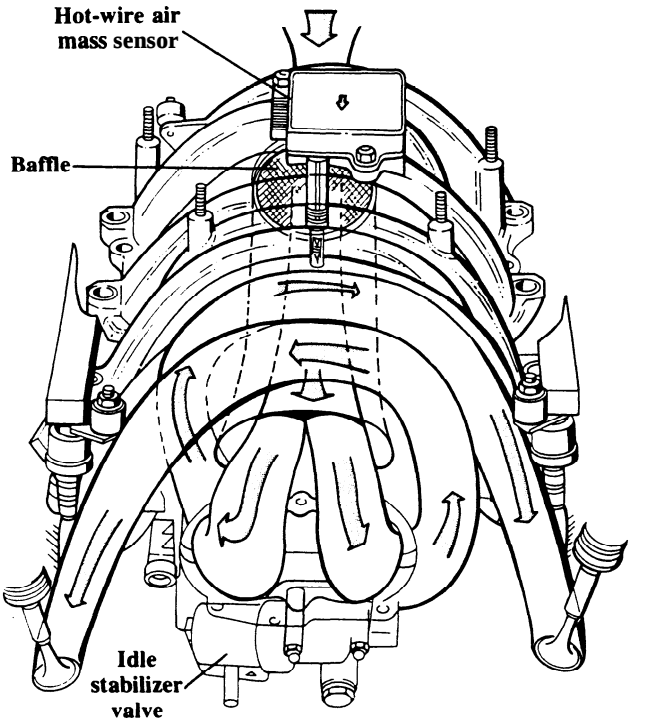
Intake Manifold

The two-piece intake manifold is designed to provide the least possible flow resistance. It is made from light alloy metal and has a plastic coating inside and out to smooth the air passages and provide insulation from heat.

The 19.2 in. (480 mm) long ram-type intake pipes minimize resistance to air flow and thus ensure a plentiful supply of air to the cylinders.

The intake manifold also provides an integral housing for the hot-wire air mass sensor that provides fuel metering signals for the Motronic fuel system.

Inside the intake manifold is a honeycomb air baffle. It is used to reduce air turbulence at the air mass sensor and thus, increases the accuracy of the sensor reading.

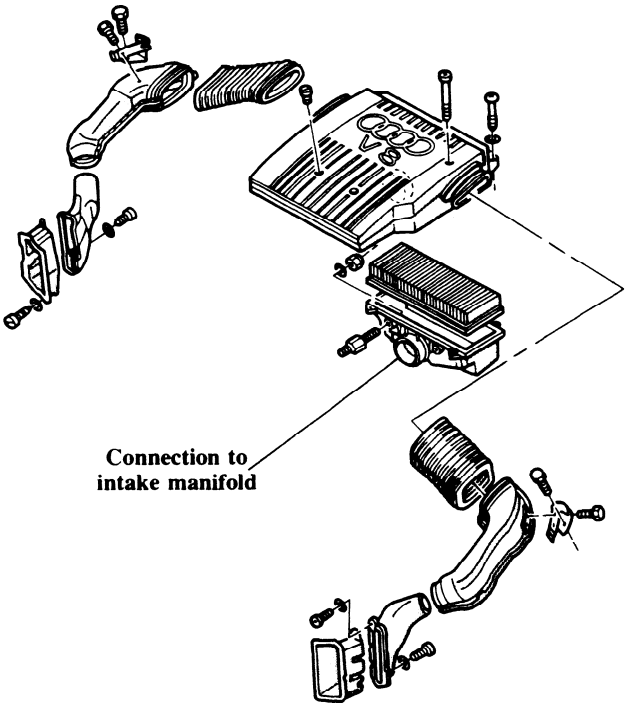


Air Filter Housing

Fresh air for the engine is inducted through two intake openings in front of the radiator.

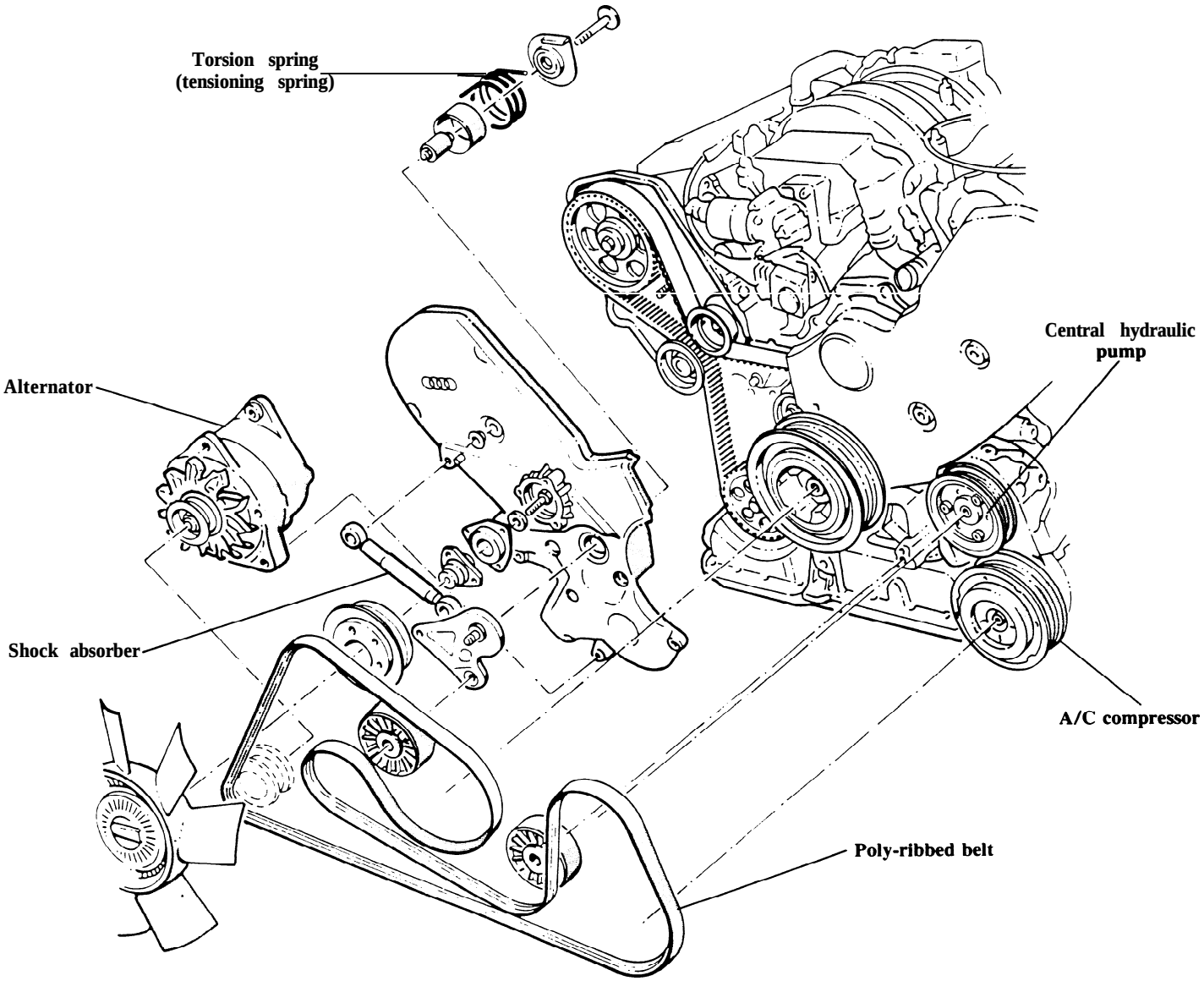
The inlet openings are protected from water and dirt by a shroud.

The intake pipes to the air cleaner are double-walled to reduce noise.



Poly-ribbed Drive Belt

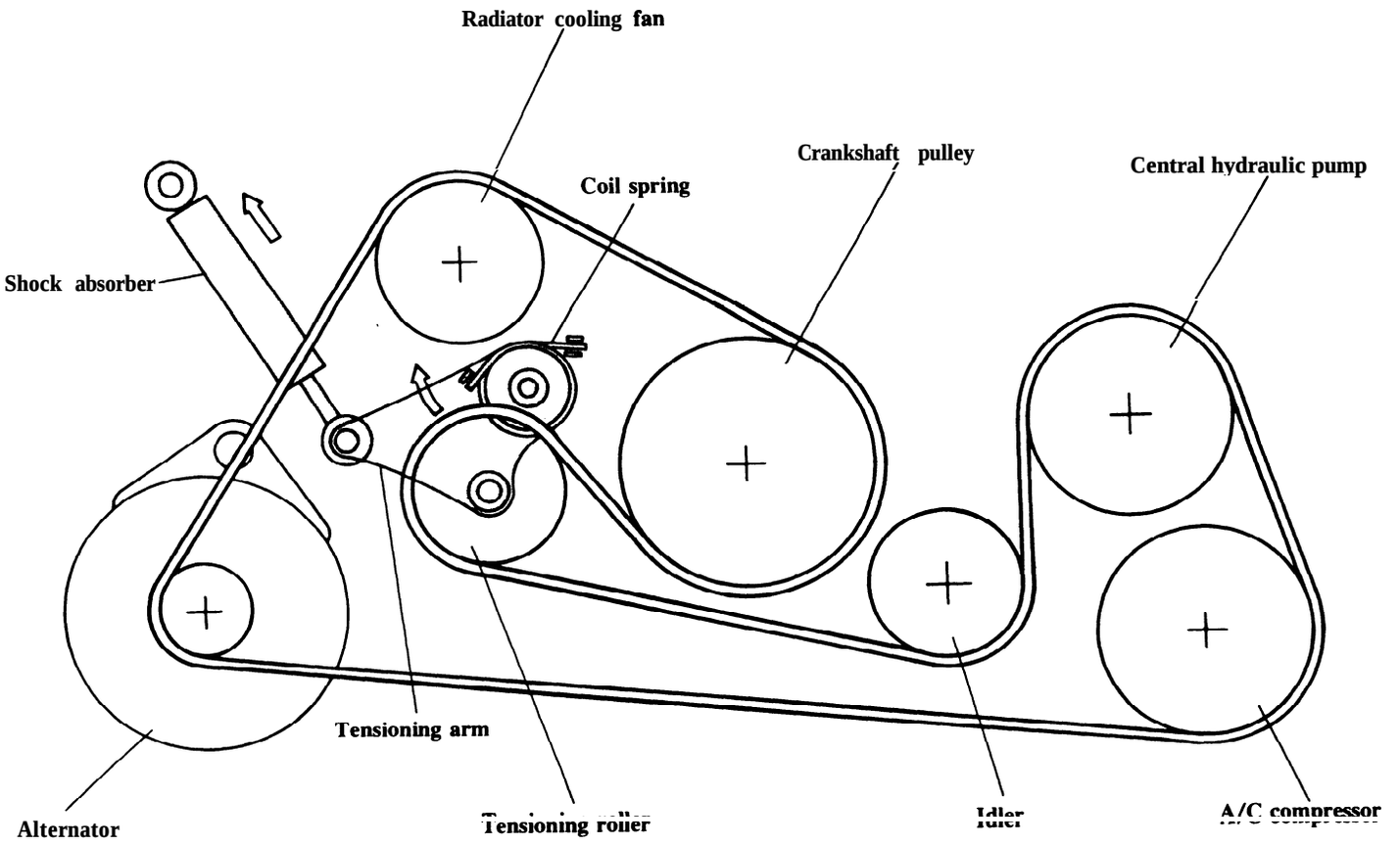
All auxiliary units are driven by an automatically-tensioned six rib belt.



The thinner poly-ribbed belt permits the use of smaller diameter pulleys while giving more or equivalent pulley surface area as conventional V-belt drive systems.

Al1 changes in the poly-ribbed belt length caused by thermal expansion or wear are compensated for by the automatic tensioner.

Under normal operating conditions, the belt does not need to be changed for the entire service life of the engine.



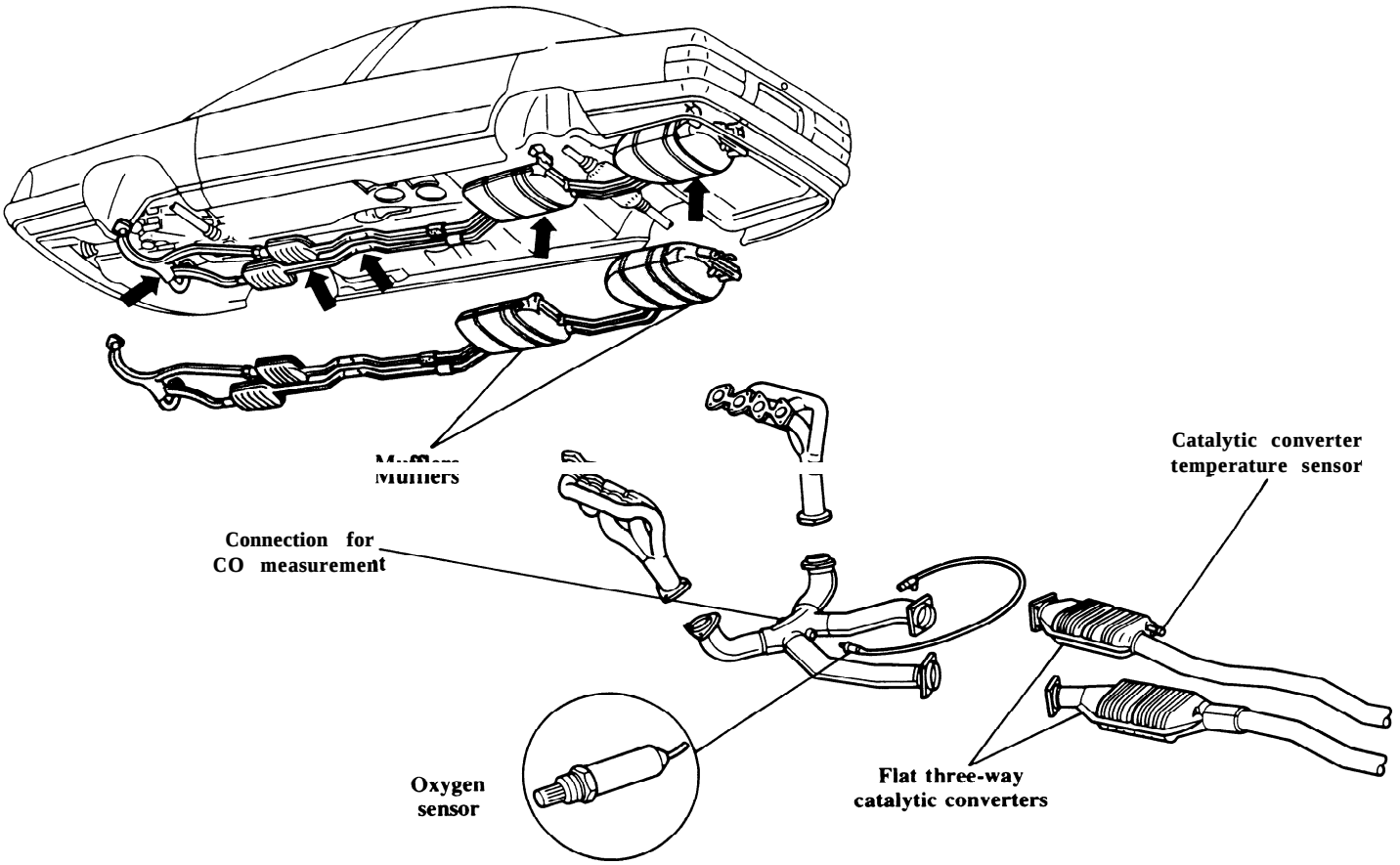
Force for the automatic tensioner is provided by a strong coil spring. The spring force is transferred to the tensioning roller via a tensioning arm.

The force to the tensioner is dampened by the varying pull and compression travel of the hydraulic shock absorber.

Exhaust System

The dual exhaust system, with 55 mm diameter tubing, is 100% stainless steel for durability.

It is designed so the engine is barely audible when at idle or during light throttle acceleration.



The exhaust manifolds are double-wall tubing. The tubing is made of two concentric pipes that fit together with zero clearance. This gives considerable noise reduction.

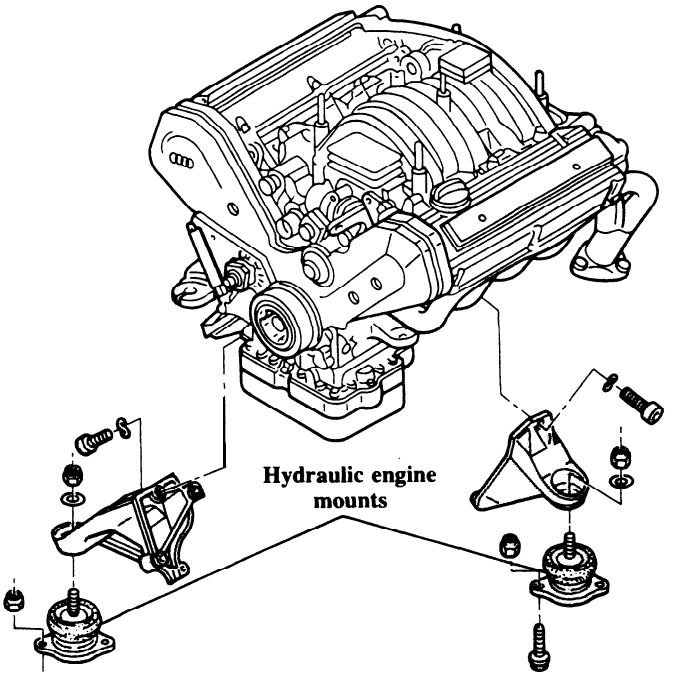
The down-pipes are joined together at a single point to distribute exhaust gases from the left and right cylinder banks uniformly between the two large catalytic converters.

An oxygen sensor is installed at the joint between the exhaust tubes so it measures exhaust gases from both sides together.

From the catalytic converters, exhaust gases flow through large-volume mufflers.

Hydraulic Engine Mounts

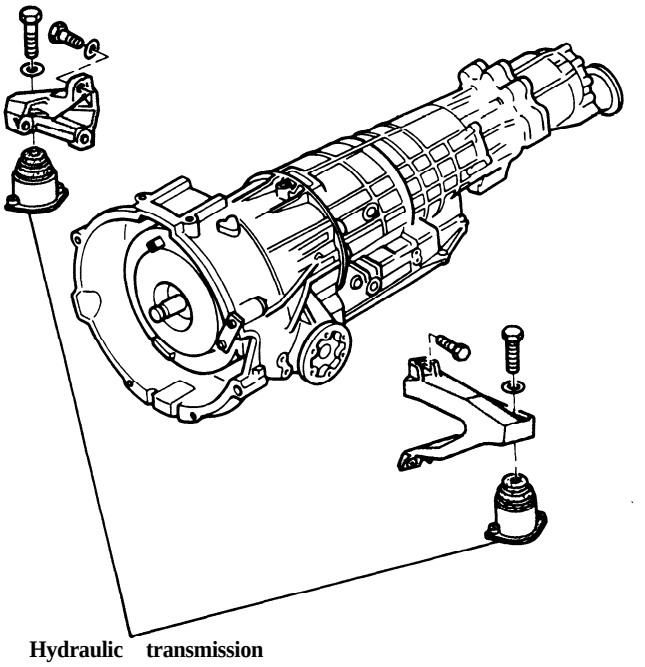
The Audi V8 Quattro uses hydraulic engine mounts as first introduced by Audi on the 5-cylinder engines.



Hydraulic Transmission Mounts

In addition to the engine mounts, the V8 Quattro also uses two hydraulic transmission mounts.

The hydraulic engine and transmission mounts provide a much improved dampening of vibrations caused by the engine/transmission unit due to uneven road sur-faces.

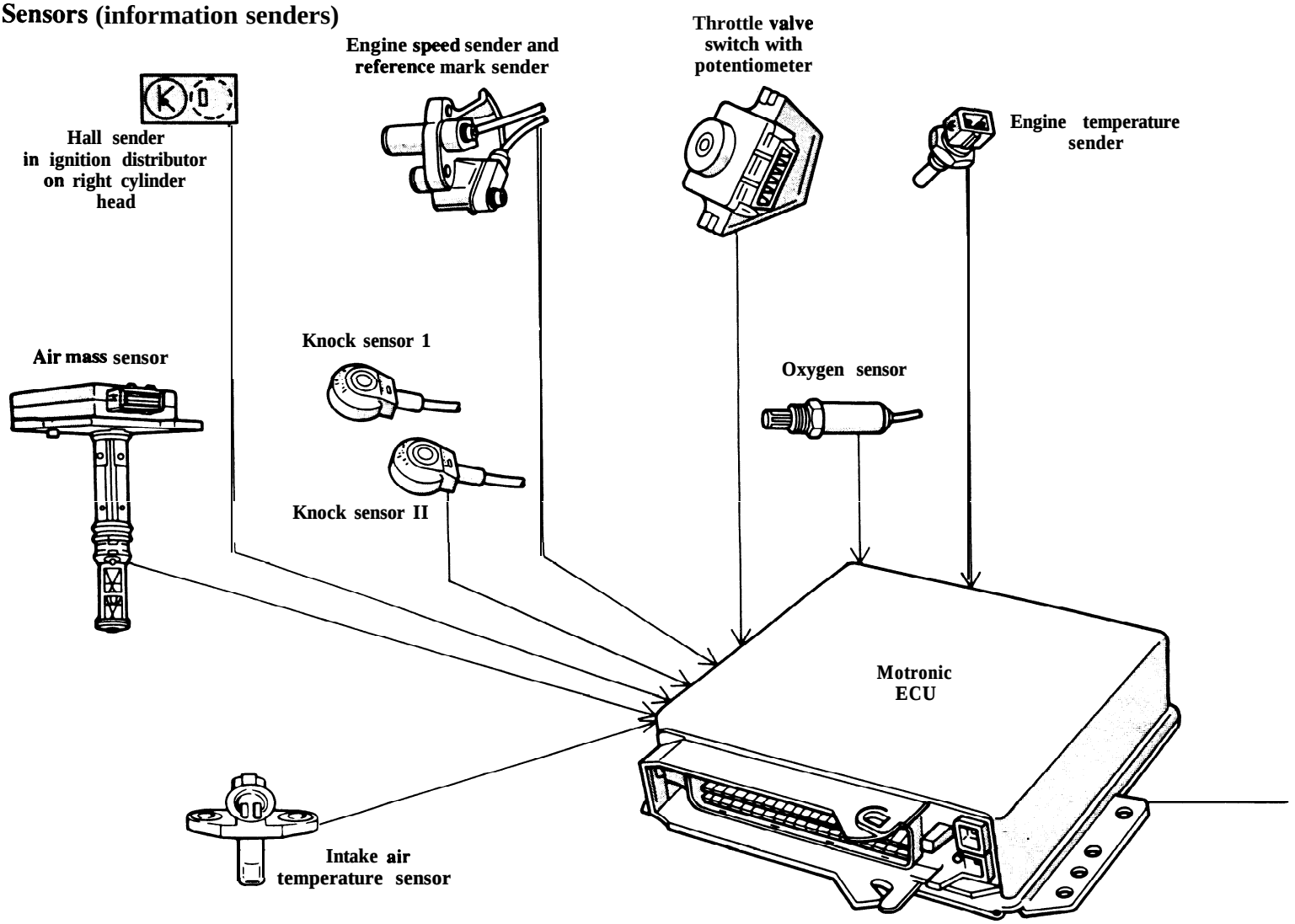


Engine Management System

Overview

A specially developed version of the Motronic engine management system controls al1 ignition and fuel injection functions on the Audi V8 Quattro.

Sensors (information senders)



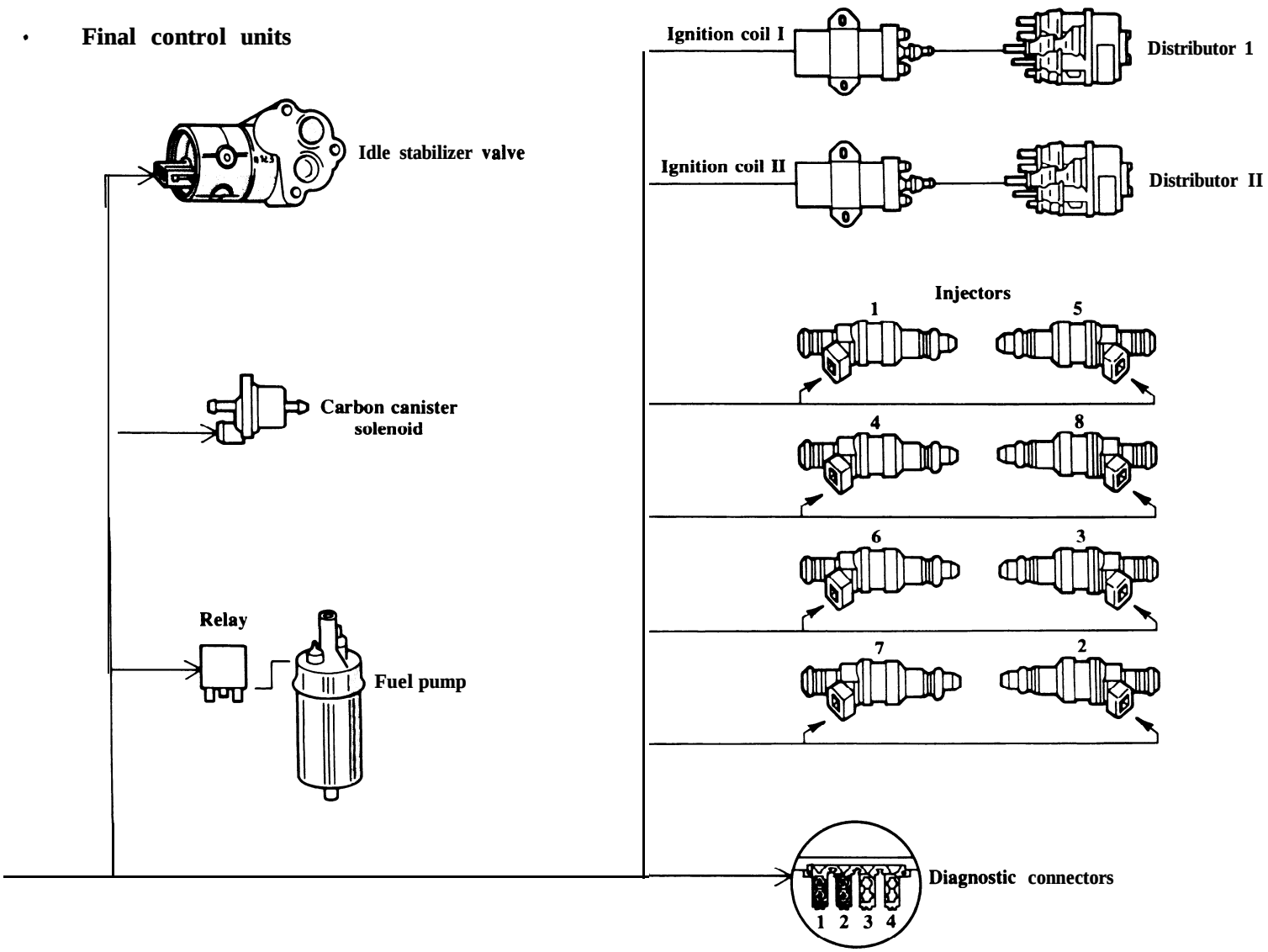
One electronic control unit (ECU) serves both the fuel and ignition systems of the Motronic system.

The use of one ECU for both functions means the ignition and fuel injection outputs are always based on identical rpm-load measurement values.

A digital electronic control unit (ECU) processes input signals, fílters out stray signals, and sends the results to the operating components of the fuel injection and ignition systems.

The ECU also provides for self-diagnosis of the Motronic system.

- **Final control units**

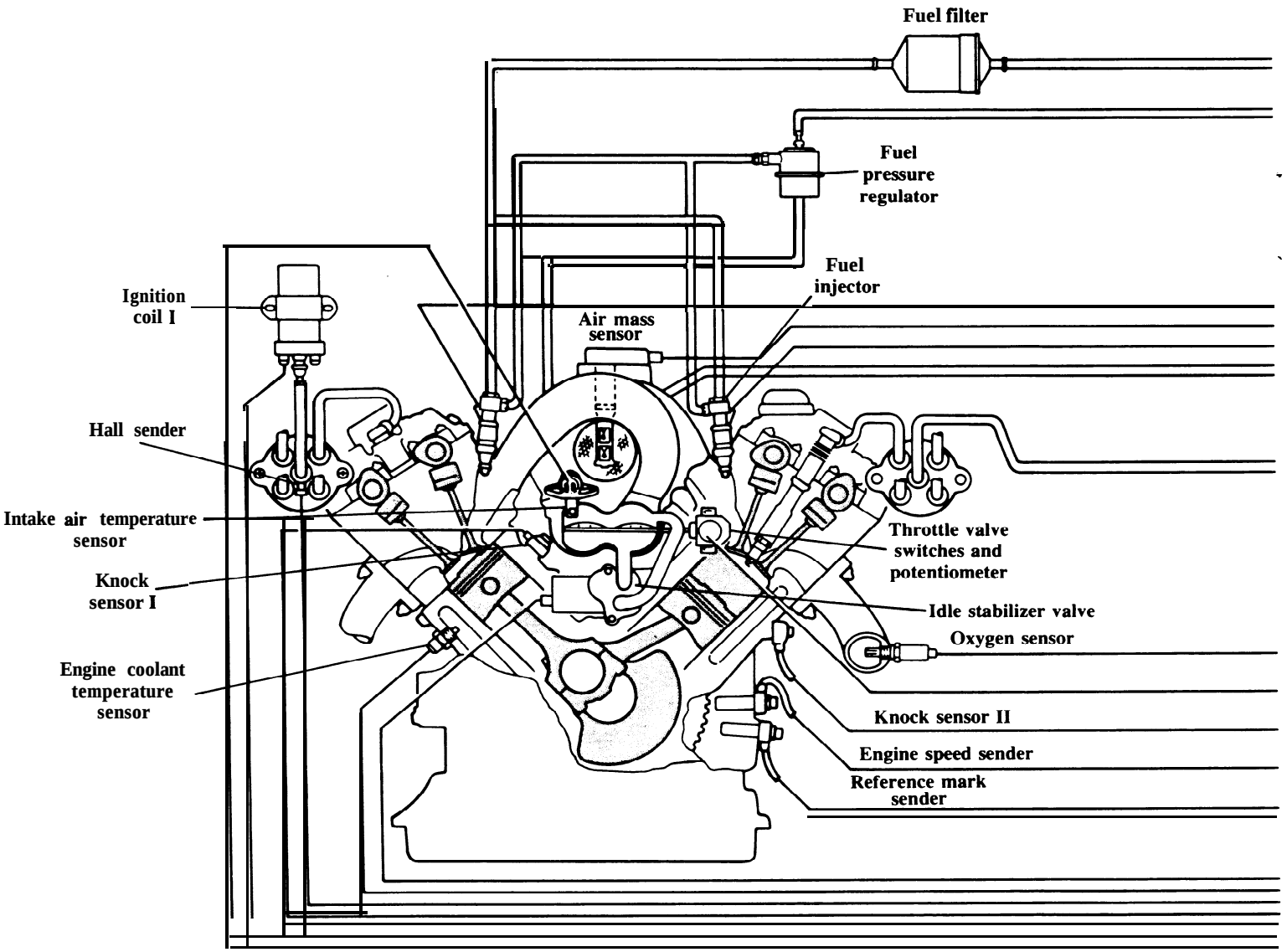


The Motronic system is adaptive or self-learning. The system learns continuously by using a sophisticated feedback system to constantly readjust the various basic control settings. These new values are then stored in its electronic memory .

The adaptive capability allows the system to compensate for changes in the engine's operating conditions, such as altitude changes, intake leaks or other deviations.

If the vehicle battery or Motronic ECU is disconnected, the vehicle must be driven for a few minutes so the Motronic unit can ''re-learn'' its operating conditions.

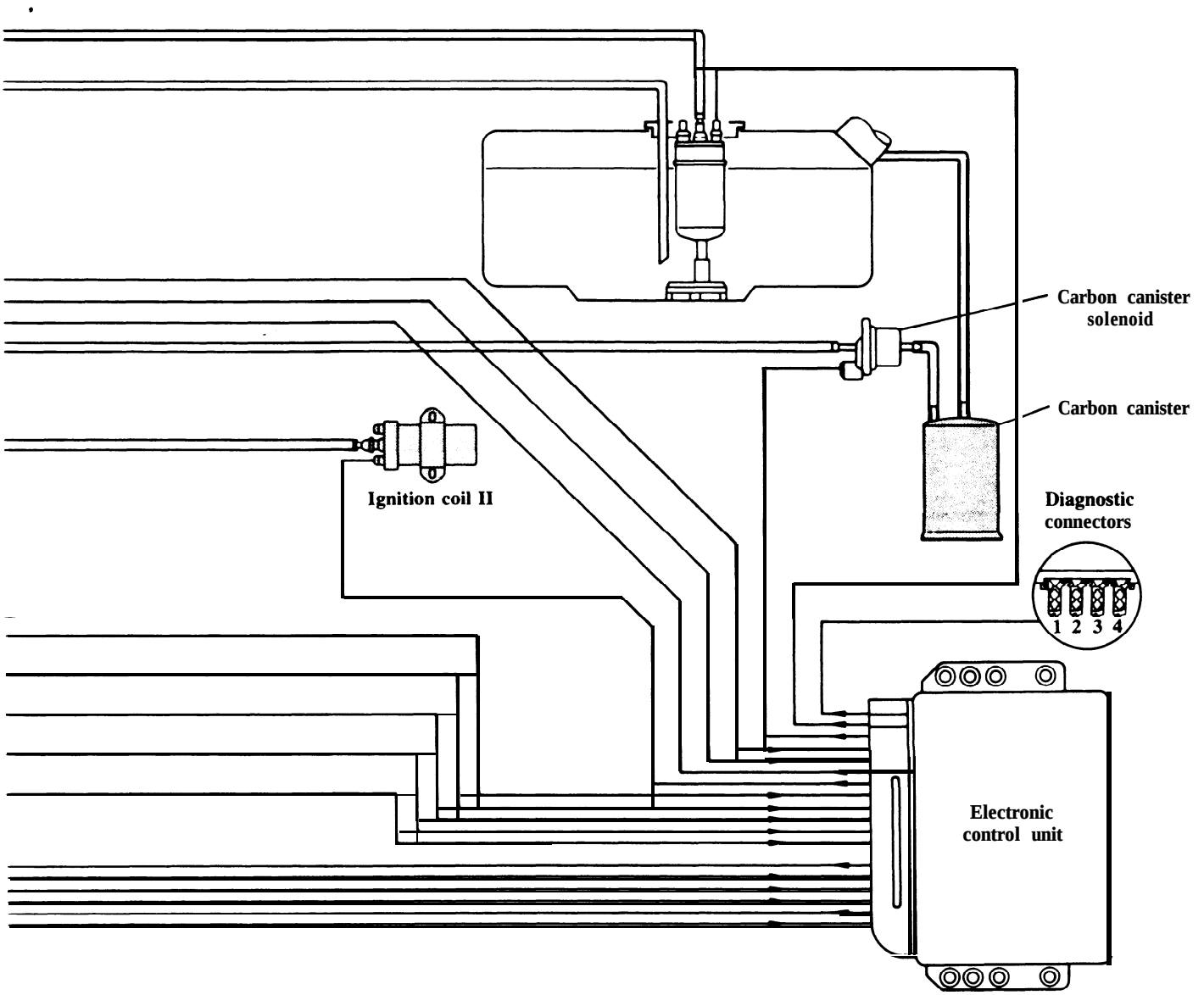
Engine Management System



The operation of the Motronic system is based on the data measured by numerous sensors. These keep the Motronic system constantly updated on engine speed and coolant temperature, oil temperature, throttle position (effective load) and the intake air volume.

Power to the Motronic ECU at terminal 18 is via a five amp fuse S27 in the main fuse/relay panel.

Power from fuse S27 energizes the power supply relay in the ECU when an engine cranking speed of 25 rpm is reached.

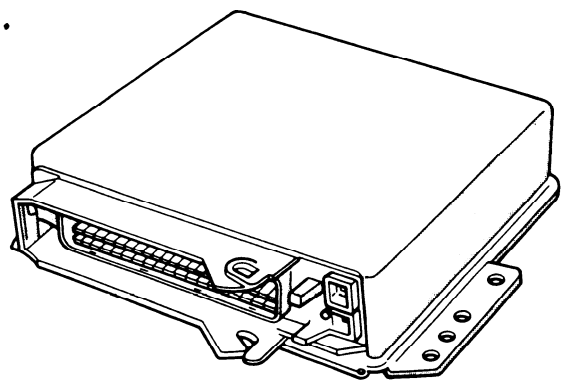


A Hall effect signal from the right ignition distributor helps the Motronic ECU quickly establish a reference point for the start of the sequential fuel injection. After the engine is running, the reference sender and speed sender near the flywheel provide the necessary information to the ECU for ignition and fuel injection.

The Motronic ECU also has a self-diagnostic feature. Any faults detected by the various sensors are recorded by the ECU memory and can be recalled and displayed on the V.A.G. 1551 diagnostic tool.

The fault codes can also be displayed using LED tester US11 15 and a jumper wire.

Electronic Control Unit

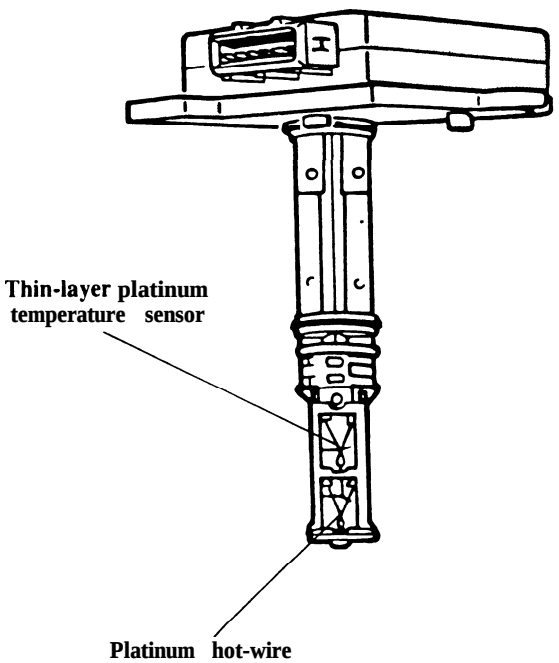


Based on information from the various sensors, the digital electronic control unit (ECU) calculates the correct output signals according to data programmed into the ECU memory.

The microprocessor signals are amplified by the power stage of the ECU and used to control the following:

- Fuel injectors
- Ignition coils
- Idle stabilizer valve
- Carbon canister solenoid

Hot Wire Air Mass Sensor



The VS uses a hot-wire air mass sensor mounted in the intake manifold to measure air flow to the engine.

A thin, electrically-heated, platinum hot-wire in the sensor is kept 356° F (180° C) above the air temperature measured by the thin-layer platinum temperature sensor.

As air flow increases, the wires are cooled and the resistance of the sensors changes. Current to the platinum hot-wire changes to maintain the constant temperature difference.

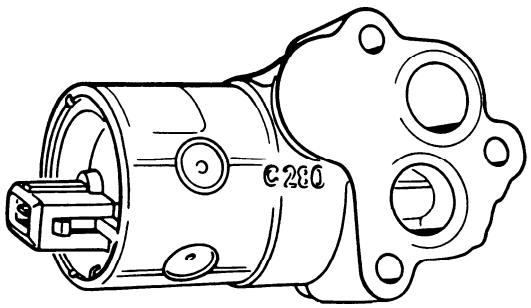
The resulting current change is converted to a voltage signa1 and is used by the Motronic ECU to calculate the volume of air taken in.

Dirt or other contamination on the platinum wire can cause inaccurate output signals.

Because of this, the platinum wire is heated to 1832° F (1000 °C) for a period of one second each time the engine is switched off to bum off this dirt of contamination.

Idle Stabilizer Valve

The idle stabilizer valve controls the amount of air for engineoperation at idle.

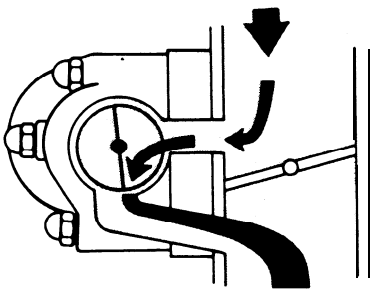


Depending on the control signa1 from the Motronic ECU, more or less air is allowed to bypass the throttle valve.

In this way, it is possible to adapt the flow of air to the engine load at idle with the throttle closed.

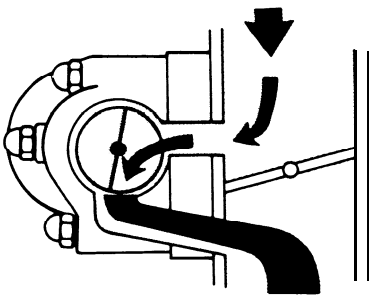
This is the same type of valve used on CIS Motronic and CIS-E III systems.

The idle stabilizer consists of a rotary valve connected to an armature.



During normal operation, a duty cycle is applied to the armature by the Motronic ECU. This causes the valve to rotate in a direction opposite to spring tension.

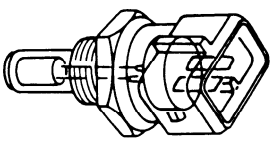
Lengthening or shortening the electrical pulses of the duty cycle causes the opening for the bypass air to become larger or smaller, and the idle speed rises or falls accordingly.

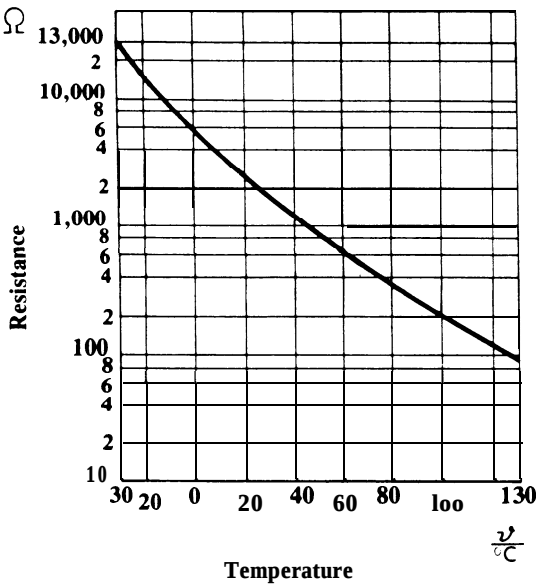


When there is no current to the rotary valve, it is pressed by spring pressure against a stop and maintains a specific air gap. This way, the engine will still idle if the stabilizer fails.

The amount of time the current to the valve is off or on is measured in a variable duty cycle from 5 to 95%.

Engine Coolant Temperature Sensor



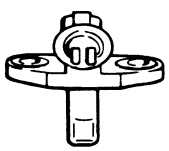


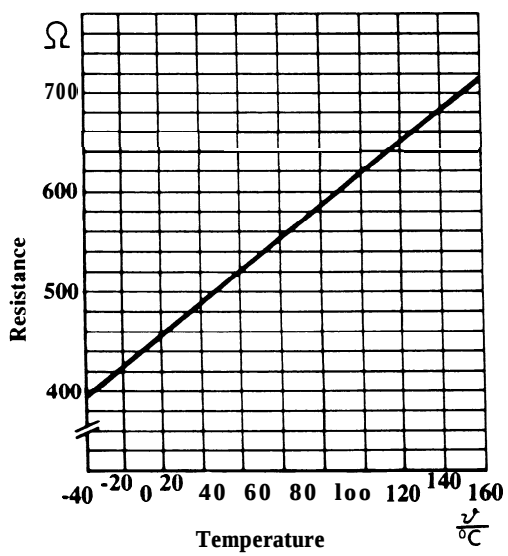
The engine coolant temperature sensor is used for many Motronic system functions. It is located on the back of the right cylinder head and has a white housing.

If this NTC-type sensor fails, the Motronic ECU is designed for an emergency running replacement value of 175° F (80° C) if the outside air temperature is above 32° F (0° C).

If the outside air temperature is below 32° F (0° C), the intake air temperature is used as a replacement variable for three minutes. After this, the signa1 is switched to 175° F (80° C).

Intake Air Temperature Sensor





The intake air temperature sensor is a PTC-type sensor. Its signa1 is needed for knock control. The sensor is located in the front of the intake manifold near the idle stabilizer.

Knock Sensors

The V8 Quattro engine has two knock sensors, one for each cylinder bank.

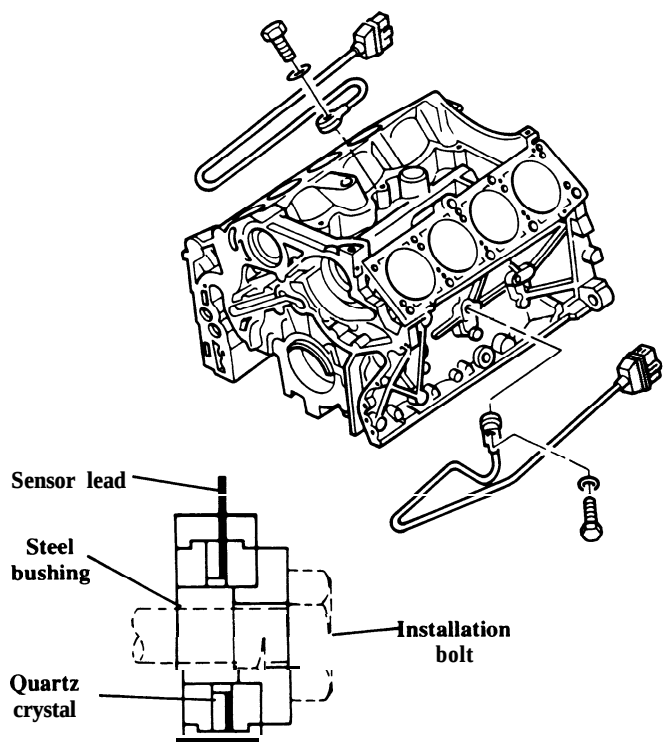
One sensor is located in the engine V near cylinder number three above the crankcase ventilation plate.

The other sensor is located near cylinder number six by the left exhaust manifold.

Vibrations in the engine will cause the quartz crystal in the knock sensor to generate a small voltage. By monitoring this voltage, the Motronic ECU can determine when ignition knock or detonation occurs. The ECU will then retard the ignition timing for that cylinder to prevent the ignition knock.

The torque for the knock sensor bolt is:

- 15-18 ft.-lbs. (20-25 Nm)



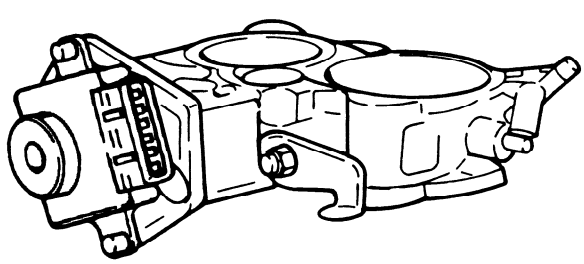
Throttle Valve Switches /Potentiometer

The idle and full throttle switches are located on the throttle valve housing on the front of the intake manifold.

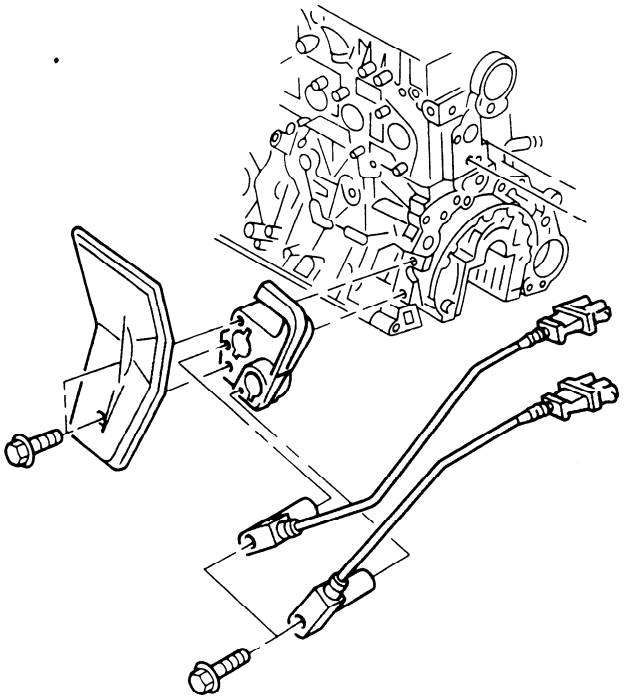
A potentiometer (used by the automatic transmission ECU to sense engine load) is also integrated in this housing.

The idle switch closes at less than 1.3° throttle valve opening angle, while the ful1 throttle switch closes above 72° throttle valve opening angle.

It's important to remember that the throttle valve potentiometer signa1 is used only for the automatic transmission ECU.

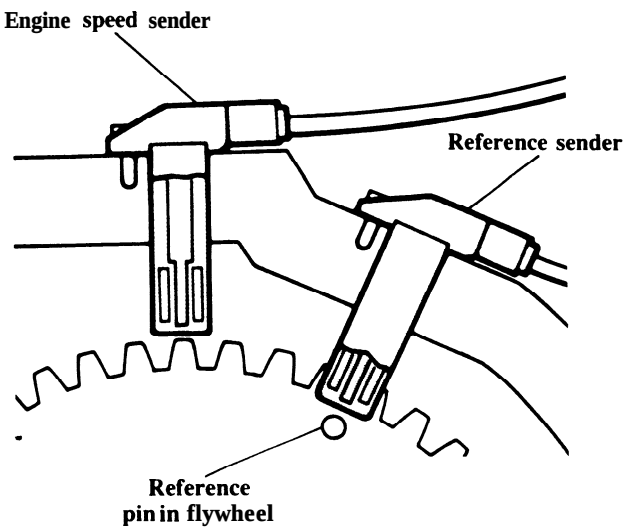


Reference And Engine Speed Senders



The reference sender and engine speed sender are identical in operation.

They are located in a common housing on the left side of the engine near the ring gear.



The engine speed sender scans the teeth of the starter ring gear while the reference sender scans for a single pin pressed into the flywheel which corresponds to TDC #1 cylinder.

The senders generate alternating voltage pulses through induction.

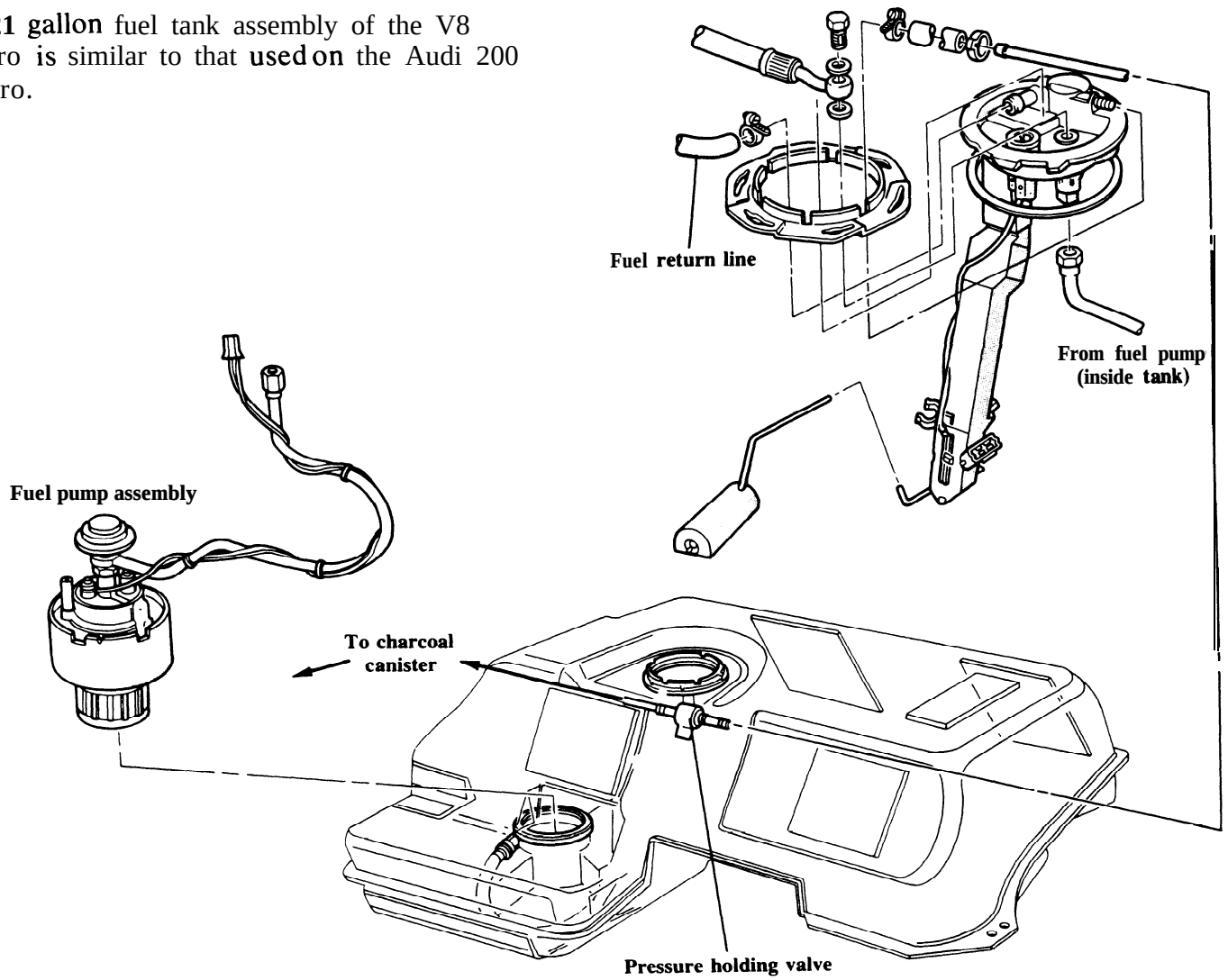
The ring gear teeth or pin moving past the sender causes the magnetic field in the sender windings to change.

These signals are used by the Motronic ECU as a reference to generate ignition and fuel injection timing points.

The engine cannot be started if one of the sensors fails. However, if the reference sender should fail while the engine is running, the engine will continue to run using a reference value stored in the ECU.

Fuel Delivery System

The 21 gallon fuel tank assembly of the V8 Quattro is similar to that used on the Audi 200 Quattro.



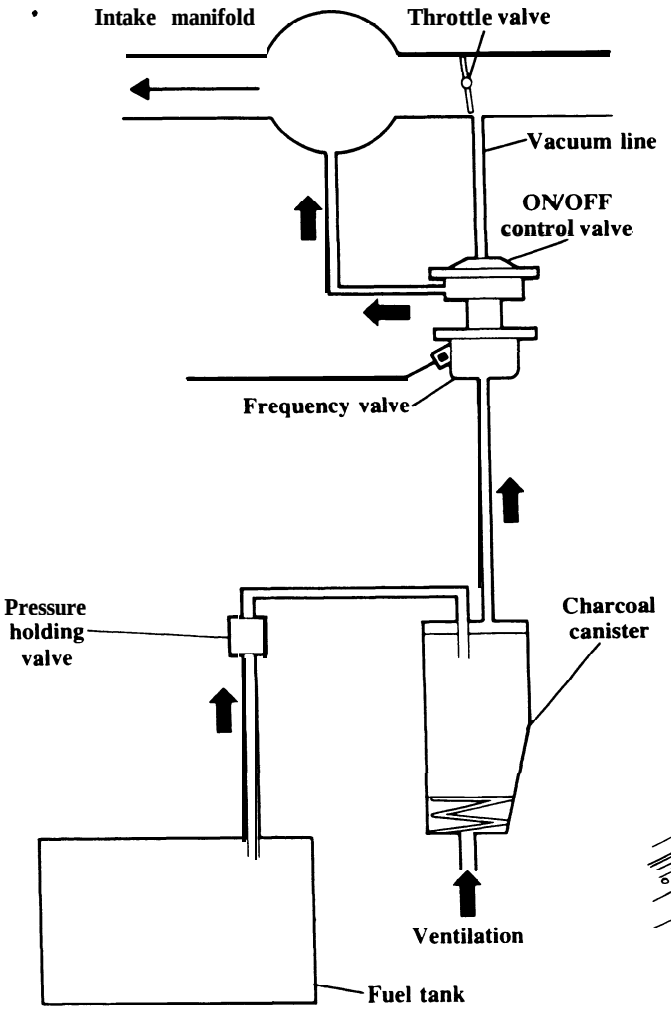
An electric fuel pump is mounted in the tank and pumps fuel through an externally mounted fuel filter to the rest of the fuel system.

The fuel tank assembly is removed from underneath the vehicle.

Fuel tank vapors pass through the roll-over valve (integral with the fuel leve1 sender), through the pressure holding valve and to the charcoal canister.

A pressure holding valve is used to regulate the flow of fuel vapors from the tank to the charcoal canister.

Evaporative Emissions System

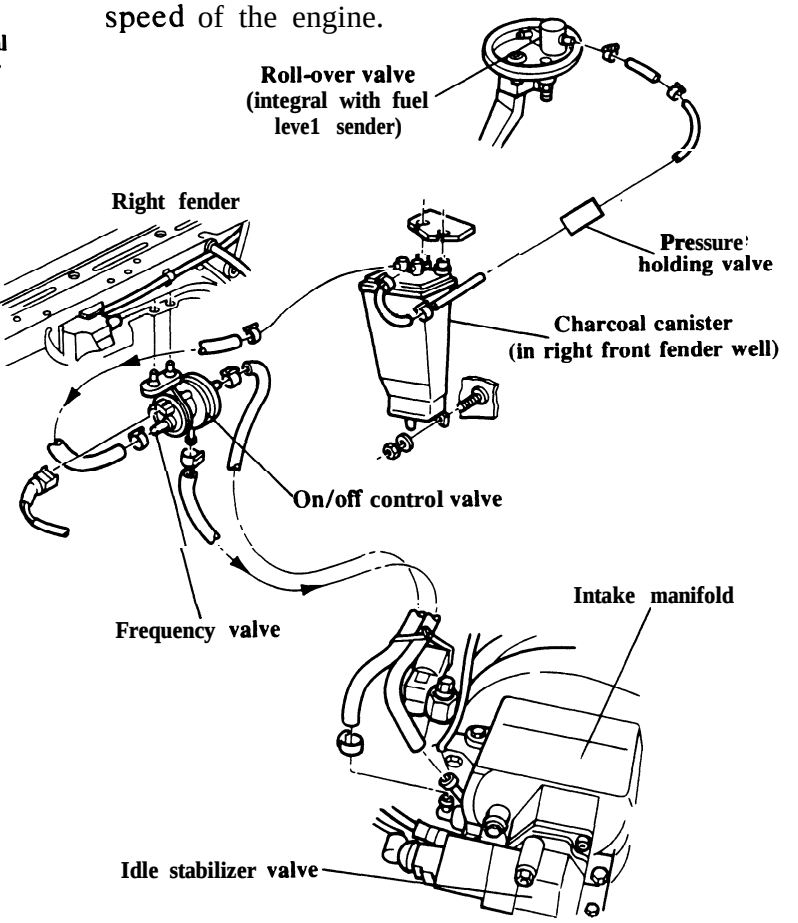


Fuel vapors from the fuel tank are directed to the roll-over valve (integral with the fuel leve1 sender housing), through a vent line to the carbon canister. The vapors are stored in the canister when the engine is not running.

When the engine is running, vapors are drawn into the intake manifold via an ECU controlled frequency valve and vacuum operated on/off control valve.

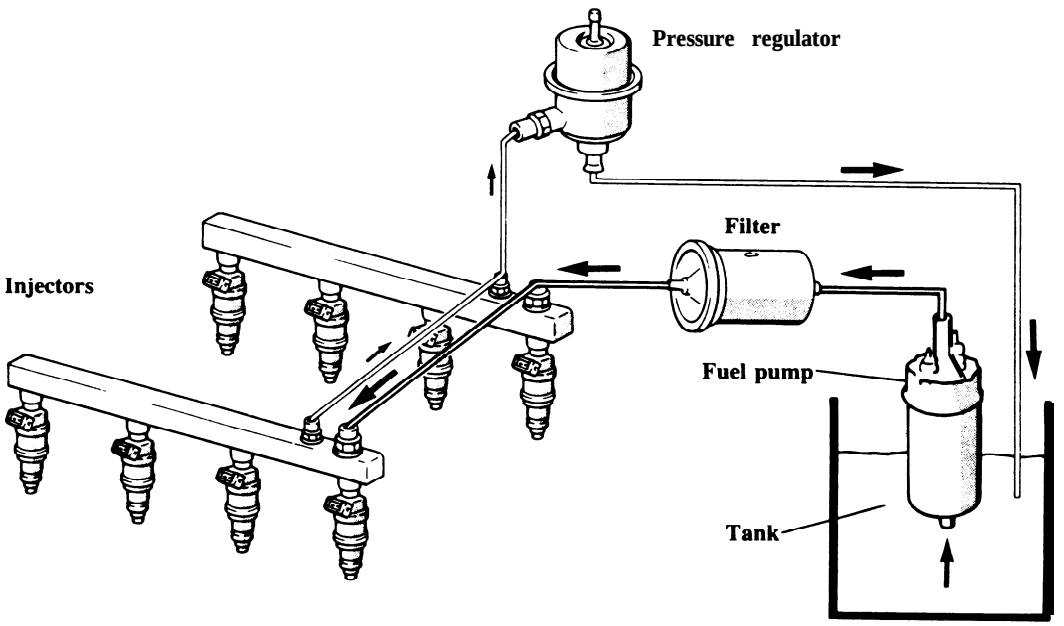
The combined frequency valve/vacuum on/off control valve is located in the right front fender.

The frequency valve is controlled by the Motronic control unit and is opened or closed depending on the engine load, temperature and speed of the engine.



Fuel Pressure Regulation

The tank-mounted fuel pump delivers fuel to the fuel injectors via the filter. Fuel is distributed to the injectors through the fuel rails.

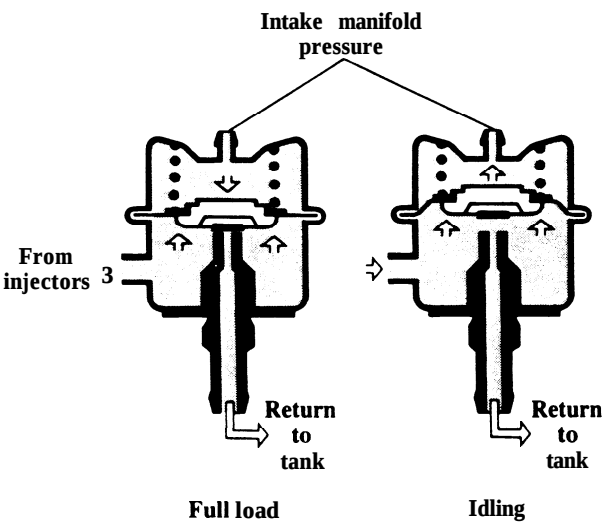


The pressure regulator sets the fuel pressure at the fuel injectors so there is approximately a 58 psi **(4.0** bar) pressure difference to the intake manifold pressure.

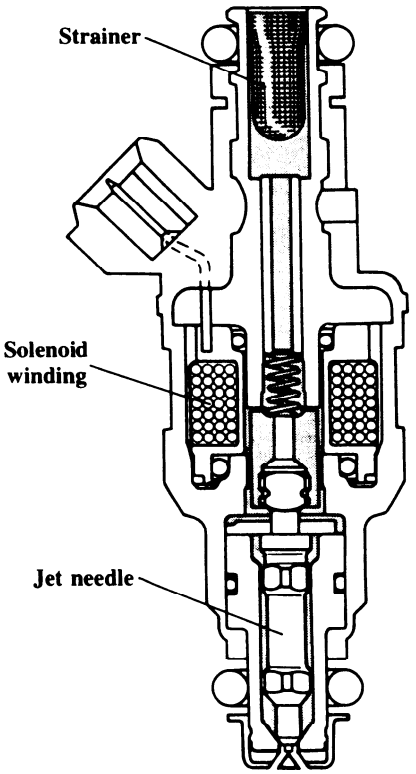
The intake manifold pressure influences the fuel pressure via the pressure regulator.

If the intake manifold pressure is low at idle, the fuel pressure also drops as the return to the tank is opened wider. The process during full load operation is the reverse.

This ensures that the difference in pressure between the intake manifold pressure and the fuel pressure remains constant.



Fuel Injectors

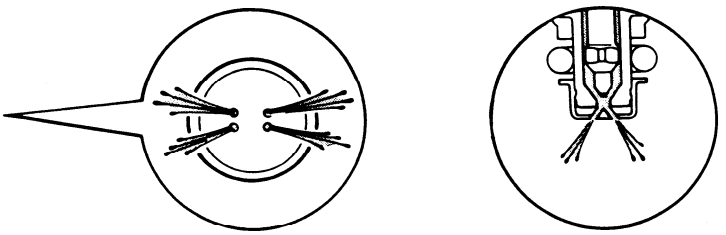


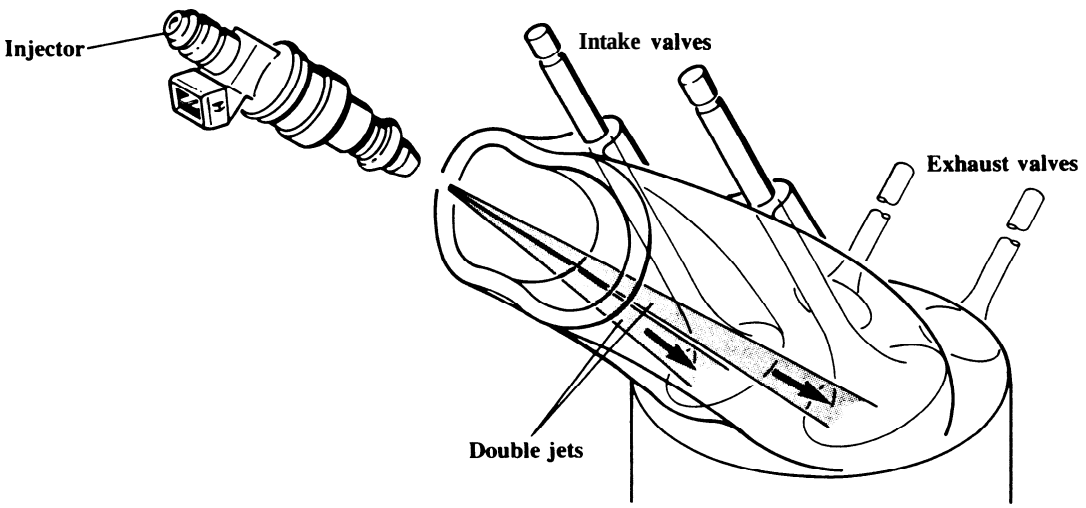
A new solenoid-type fuel injector is used in the V8 Quattro.

Two spray jets are aimed directly at the intake valves of each cylinder.

This prevents fuel from puddling in the land area between the intake valves.

This, in tum, cuts fuel consumption and exhaust emissions.





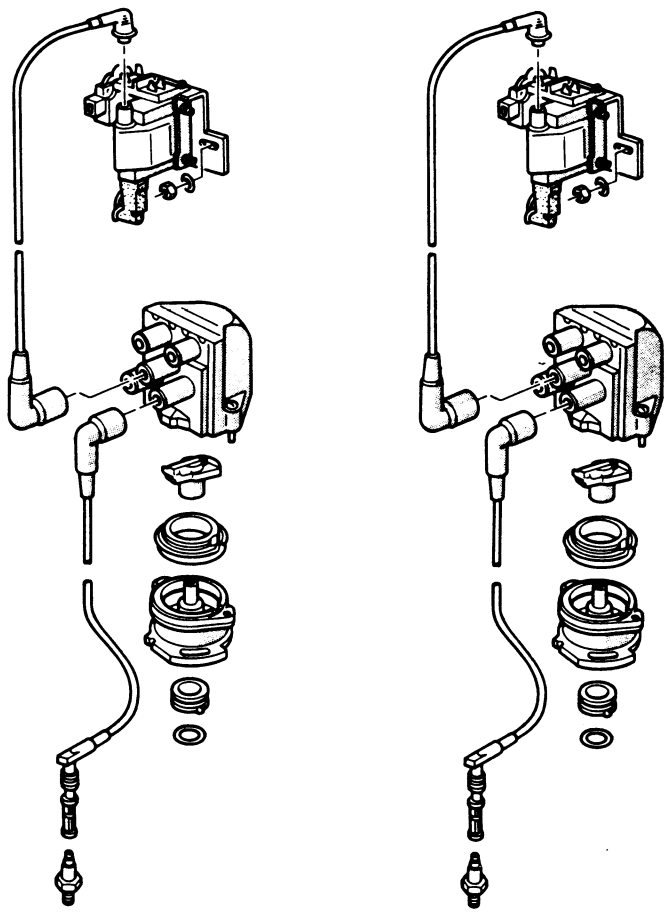
Ignition System

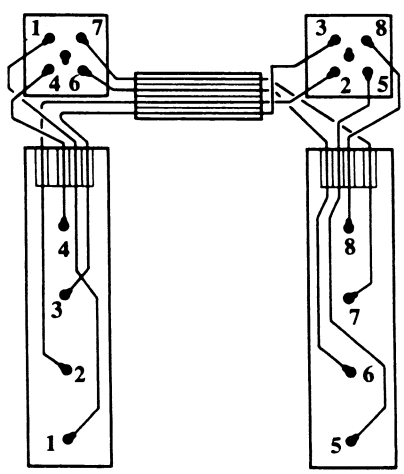
Two ignition coils with power stages and two distributors are used on the Audi V8 Quattro. They are both controlled by the Motronic ECU.

Each coil and distributor is responsible for providing spark to four cylinders.

One distributor is mounted on the back of each cylinder head. Both distributors are driven by lugs on the exhaust camshafts.

A Hall sender is installed in the distributor mounted on the right cylinder head. The signal from this Hall unit identifies cylinder #1 for the start of the sequential fuel injection and cylinder selective knock regulation.

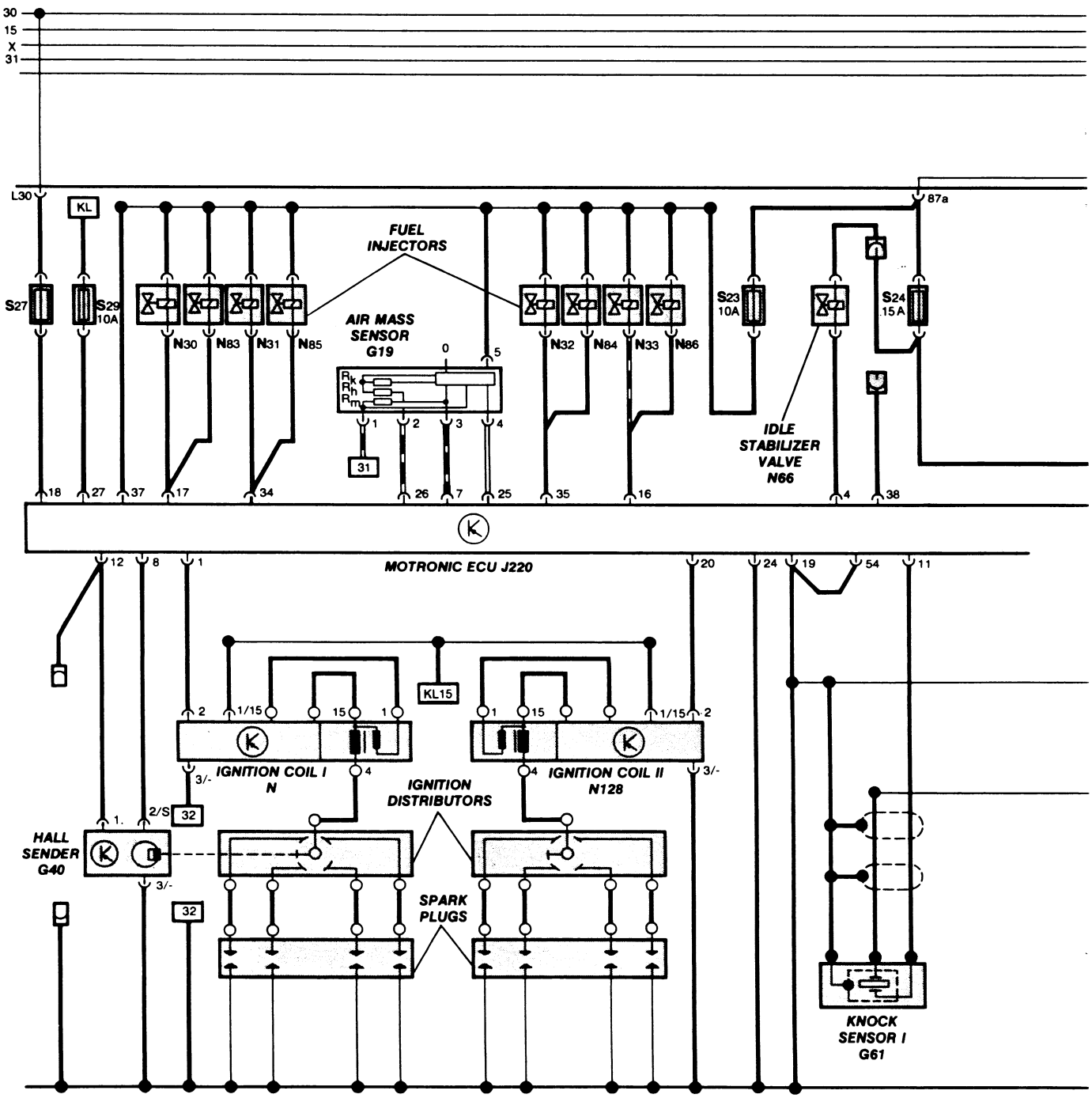


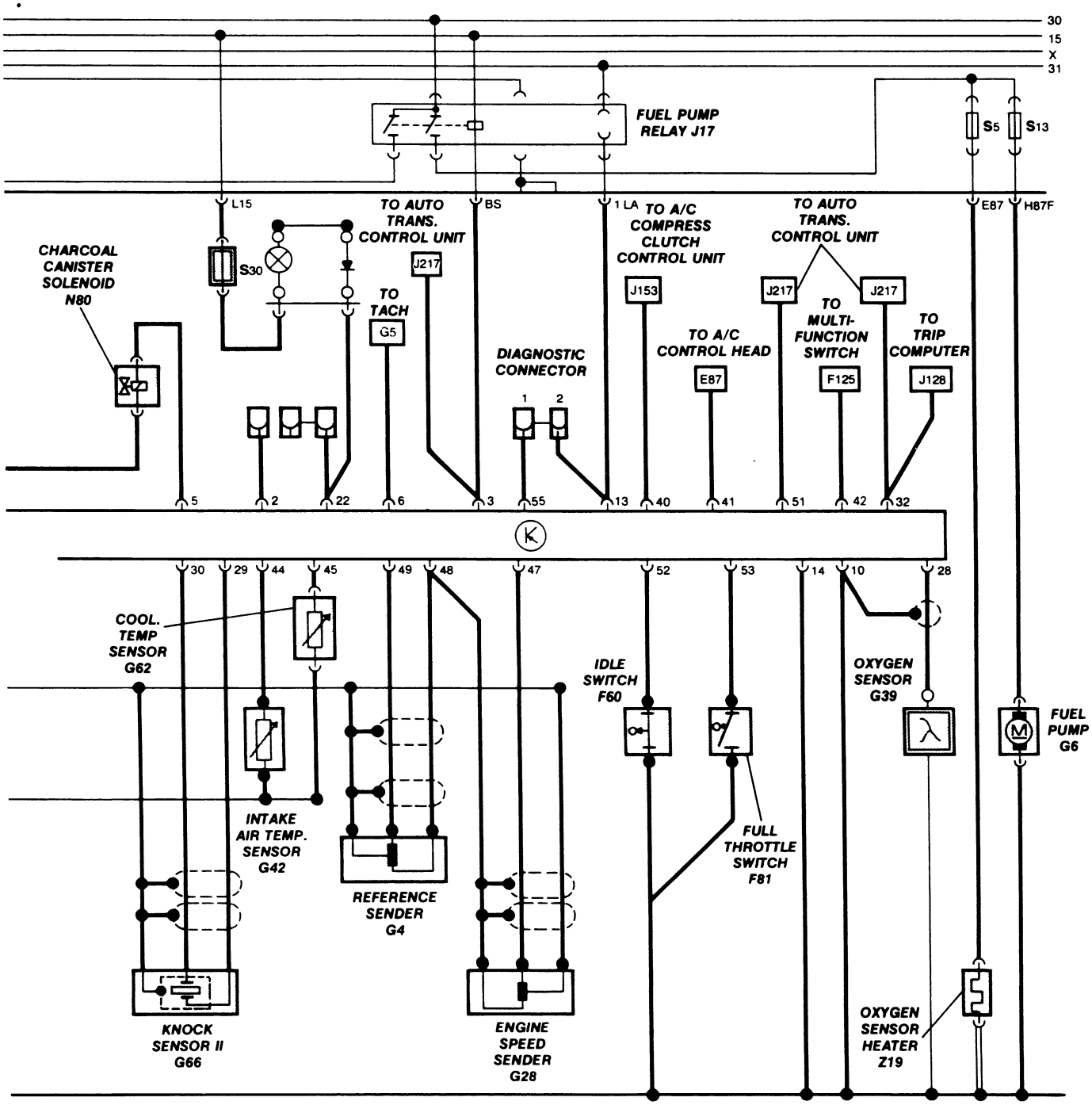


Right cylinder head

Left cylinder head

Functional Wiring Diagram




30
15
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FUEL PUMP RELAY J17
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L15
BS
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E87
H87F
CHARCOAL CANISTER SOLENOID N80
S30
TO AUTO TRANS. CONTROL UNIT
J217
TO TACH
G5
DIAGNOSTIC CONNECTOR
1
2
TO A/C COMPRESS CLUTCH CONTROL UNIT
J153
TO A/C CONTROL HEAD
E87
TO AUTO TRANS. CONTROL UNIT
J217
J217
TO MULTI-FUNCTION SWITCH
F125
TO TRIP COMPUTER
J128
5
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10
28
COOL. TEMP SENSOR G62
INTAKE AIR TEMP. SENSOR G42
REFERENCE SENDER G4
IDLE SWITCH F60
FULL THROTTLE SWITCH F81
OXYGEN SENSOR G39
FUEL PUMP G6
KNOCK SENSOR II G66
ENGINE SPEED SENDER G28
OXYGEN SENSOR HEATER Z19

Automatic Transmission

Overview

A new 4-speed, electronically-controlled automatic transmission has been developed for the Audi V8 Quattro.

In addition to four forward gears, the driver can select one of three driving programs: S for Sport, E for Economy, or M for manual.

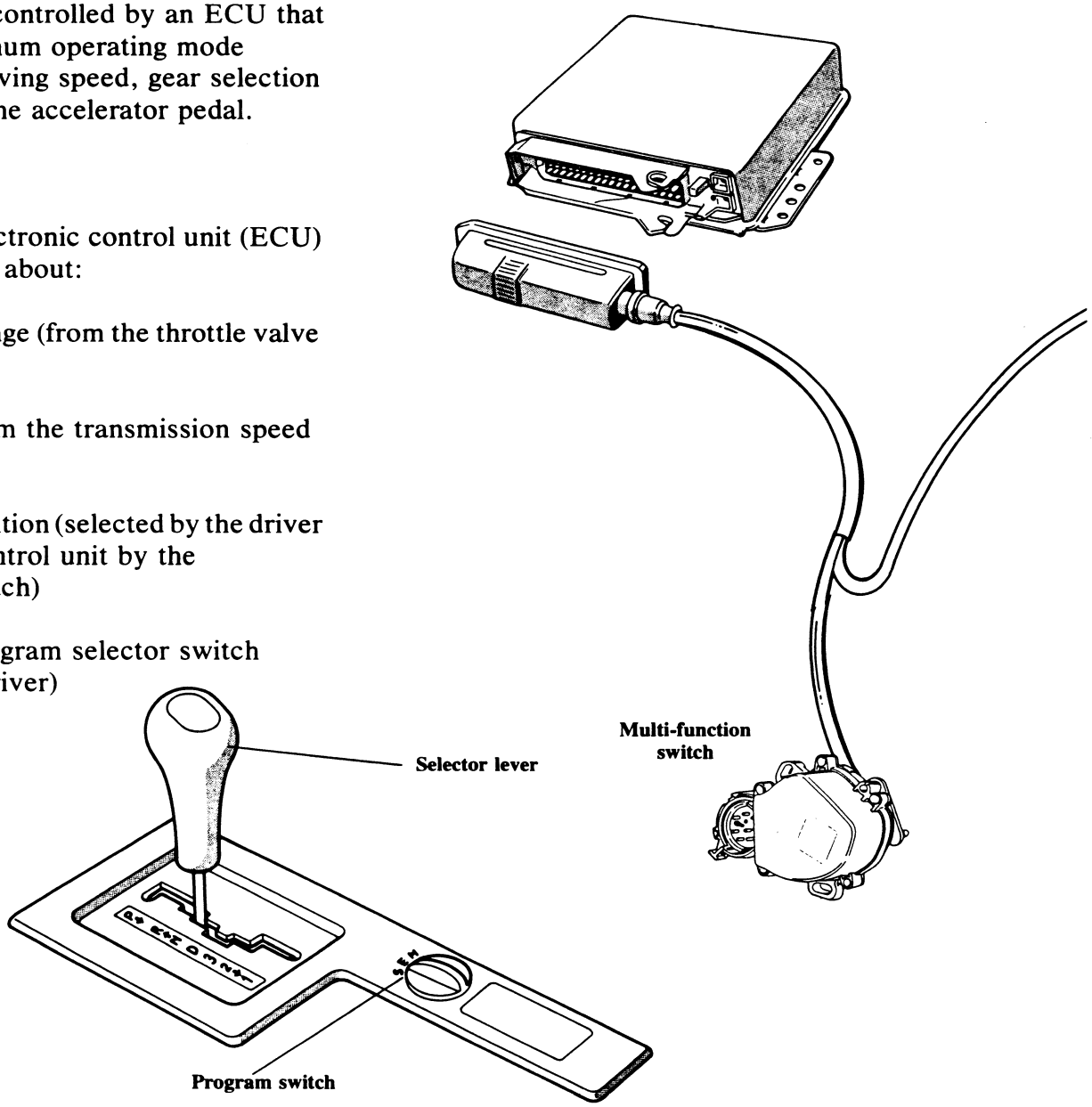
The transmission is controlled by an ECU that determines the optimum operating mode depending on the driving speed, gear selection and the position of the accelerator pedal.

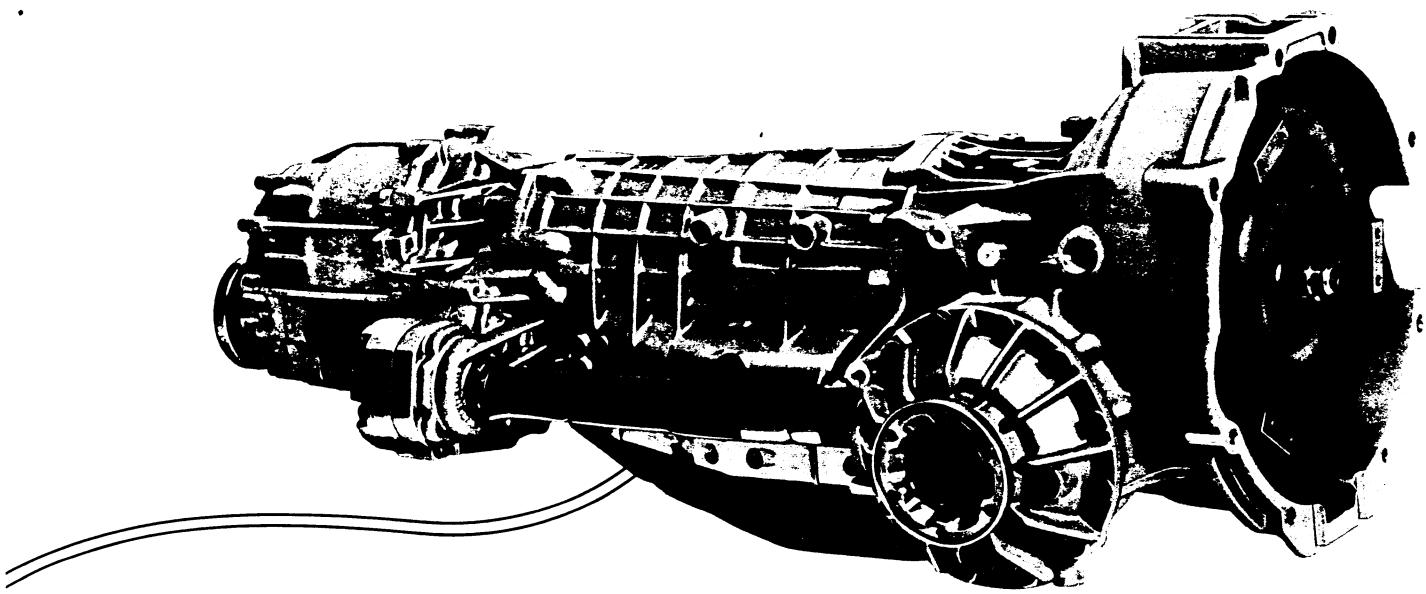
The transmission electronic control unit (ECU) receives information about:

- The engine load range (from the throttle valve potentiometer)
- Vehicle speed (from the transmission speed sensor)
- Gearshift lever position (selected by the driver and sent to the control unit by the multi-function switch)
- Position of the program selector switch (selected by the driver)

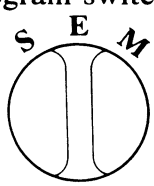
The ECU then calculates the gear required in each case and, if necessary, initiates a shift of gears.

Gear shifts are accomplished through solenoid valves in the transmission.





In addition to selecting the driving range (PRND321), the driver also selects the driving program through the program switch.



S - for Sport
E - for Economy
M- for Manual

In E position, the transmission upshifts during part throttle operation. This provides economical driving.

A solenoid returns the program switch to the E position whenever the ignition switch is turned to the start position.

In S position, the transmission will upshift at higher engine speeds. This allows a sporting style of driving. In S position, the transmission will not upshift into 4th gear until approximately 124 mph.

In E and S driving programs, full engine power is available at any time through the use of the kick-down switch.

In M position, the driver can select an appropriate gear manually from 1 to 4. This allows the vehicle to be driven the same as a vehicle with a manual transmission, but without operating a clutch pedal.

For example, the vehicle can be driven off in 3rd gear for controlled driving when the road surface is slippery.

The transmission selector lever position is displayed in the instrument cluster.

In the event of a problem with the transmission, it will automatically select 4th speed, and the entire gear selector display will light in the instrument cluster.

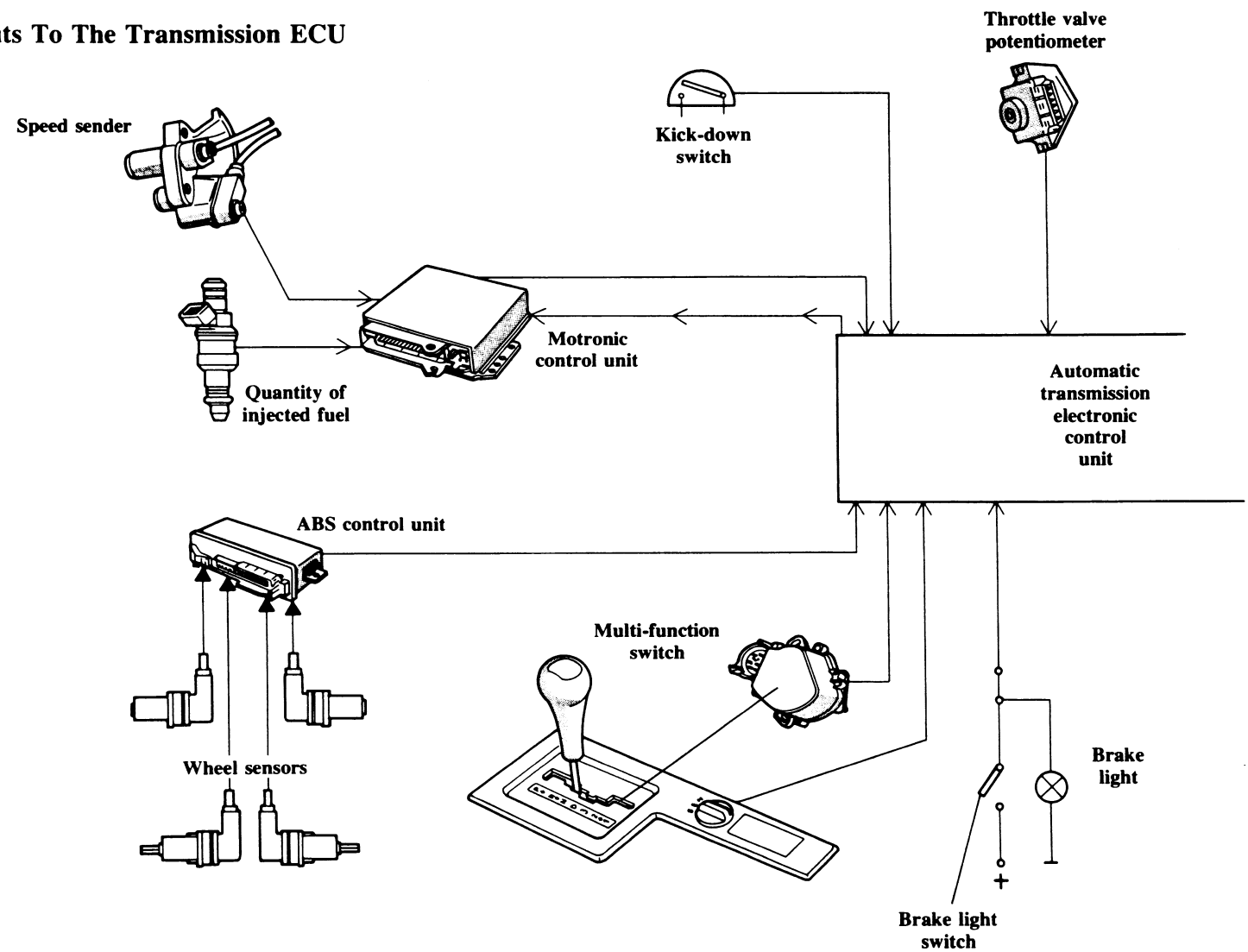
If the ignition is switched OFF and then ON, the transmission ECU is programmed to select 3rd gear and remain in 3rd gear while driving until the fault is corrected.

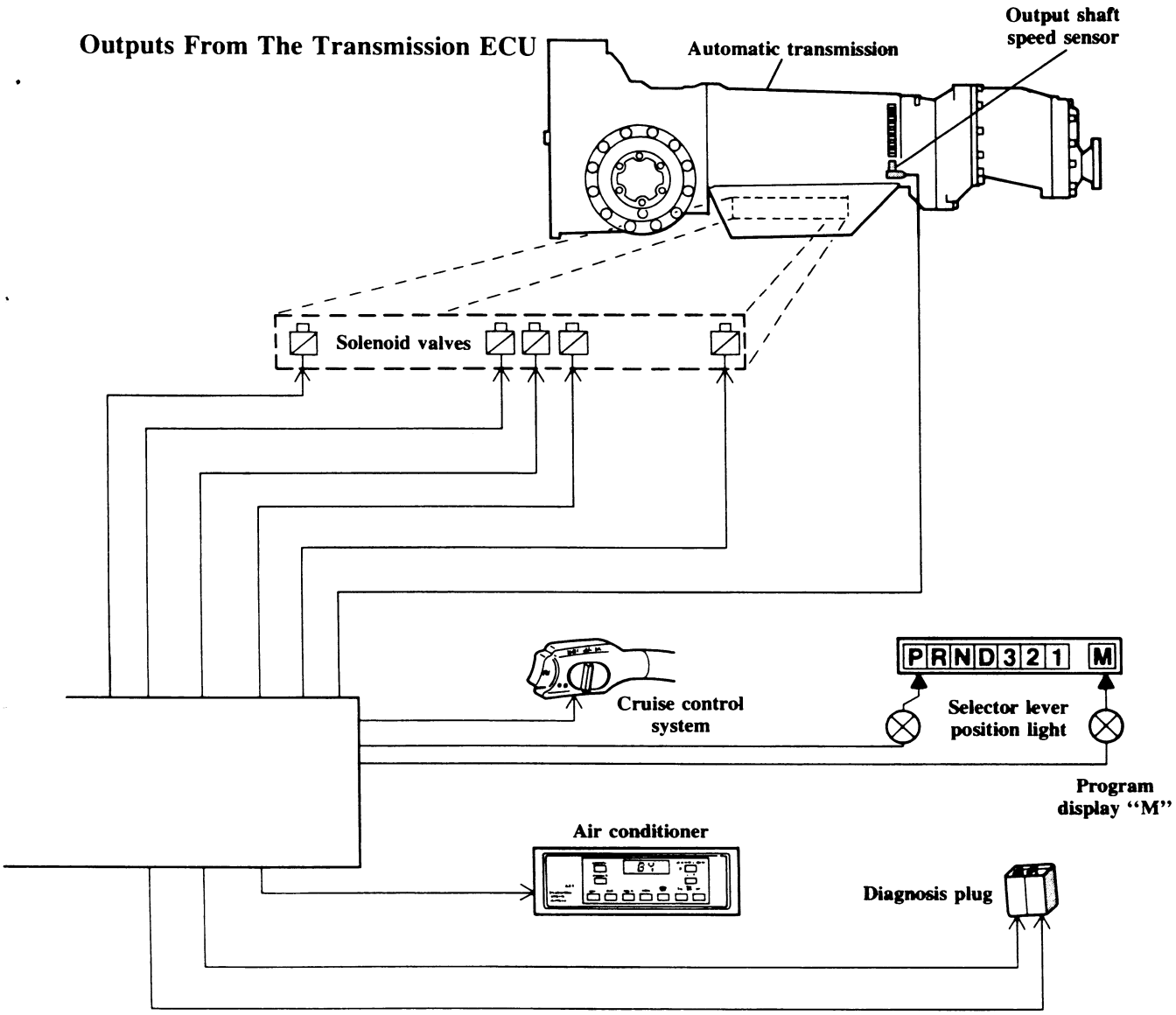
Before the control unit allows the transmission to shift, it compares the "specified" inputs such as selector lever position, program selection, throttle position and the kick-down switch, against the "actual" status from the wheel speed sensors.

The control unit then activates various solenoid valves in the transmission to apply or release the proper clutches and bands.

During the shifting process, the control unit influences the engine management, the A/C system and cruise control system so the shift "lurch" is reduced.

Inputs To The Transmission ECU





The torque converter lock-up piston is supplied ATF in 3rd and 4th gear via a solenoid valve so that it engages and locks the torque converter turbine and impeller. The torque converter will not lock up under speeds of 50 mph (80 km/h).

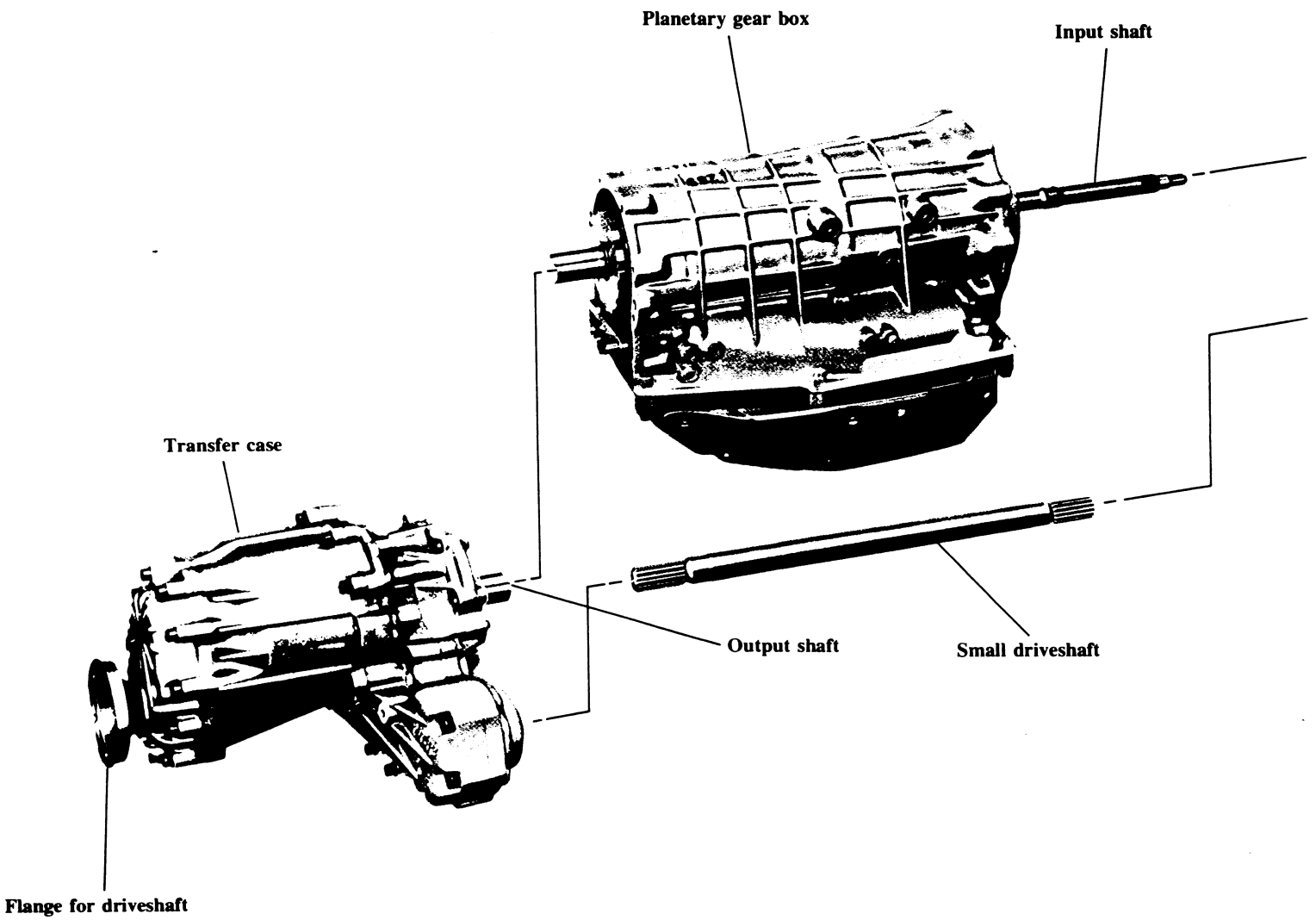
Another solenoid valve locks the multi-plate lock in the center differential if the front and rear axle speeds differ greatly.

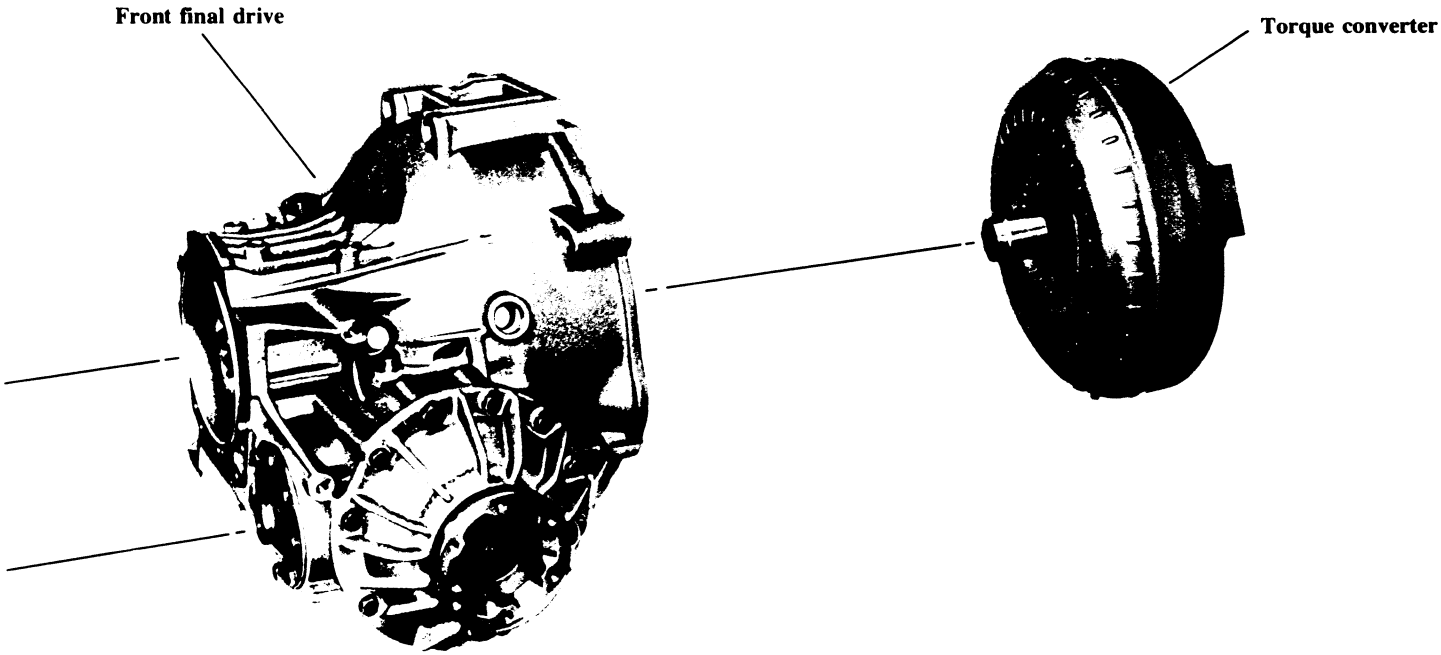
When stopped for a short time (for example, at a traffic light) and pushing the brake, the transmission shifts automatically to 3rd gear to reduce the tendency of the vehicle to creep. After releasing the brake, the transmission shifts automatically to 1st gear.

Components

The 4-speed automatic transmission consists of four components:

- Torque converter
- Front final drive (with differential)
- Planetary gear box
- Transfer case with planetary-type locking center differential





The power from the engine is transmitted to the automatic transmission via the torque converter and input shaft.

The transmission ECU selects the appropriate gear range depending on accelerator position (load), vehicle speed and selector lever position.

The output shaft of the transmission transfers torque to the center differential in the transfer case.

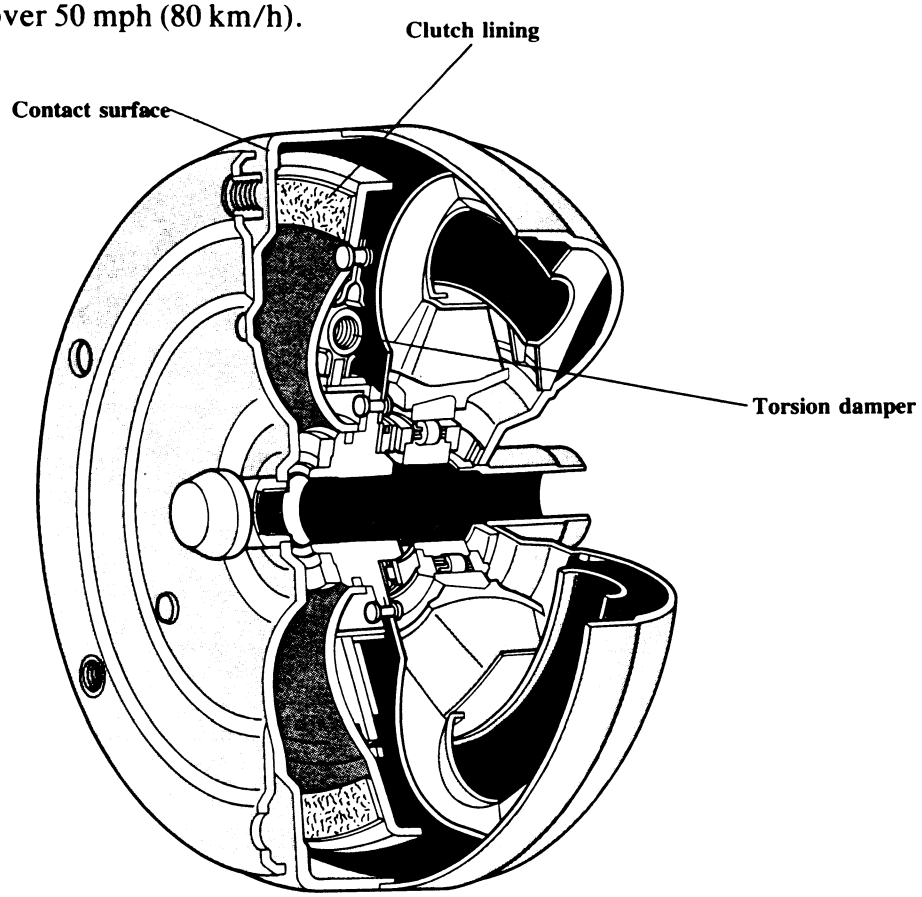
A planetary gearset in the transfer case distributes 50% percent of the torque to the Torsen rear differential and the remaining torque to the front final drive via a small external shaft.

Locking Torque Converter

The Audi V8 Quattro automatic transmission uses a lock-up torque converter.

With this type of torque converter, the impeller and turbine are mechanically locked together when the transmission shifts to 3rd or 4th gear and the vehicle speed is over 50 mph (80 km/h).

This eliminates the normal slippage that occurs in the torque converter and helps improve fuel economy.



The torque converter has three vaned wheels inside a housing:

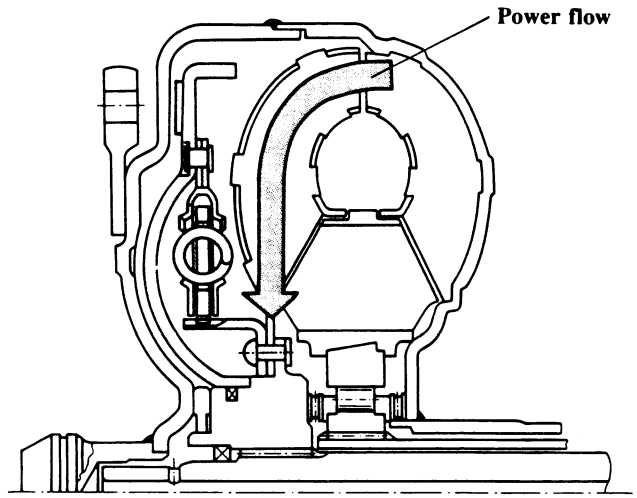
- The impeller (driven by the engine) converts mechanical energy into flow energy.
- The turbine converts flow energy back into mechanical energy.
- The stator changes the angular flow of the oil so that the torque from the turbine is greater than that of the impeller torque supplied from the engine.

The lock-up clutch eliminates slip between the impeller and turbine.

Torque Converter NOT Locked

The ATF in the torque converter flows with reduced main pressure past the lock-up piston, thus preventing the torque converter clutch from contacting the converter housing. (There is equal pressure on both sides of the lock-up piston.)

The ATF flow in the torque converter is the same as a torque converter without a lock-up clutch.



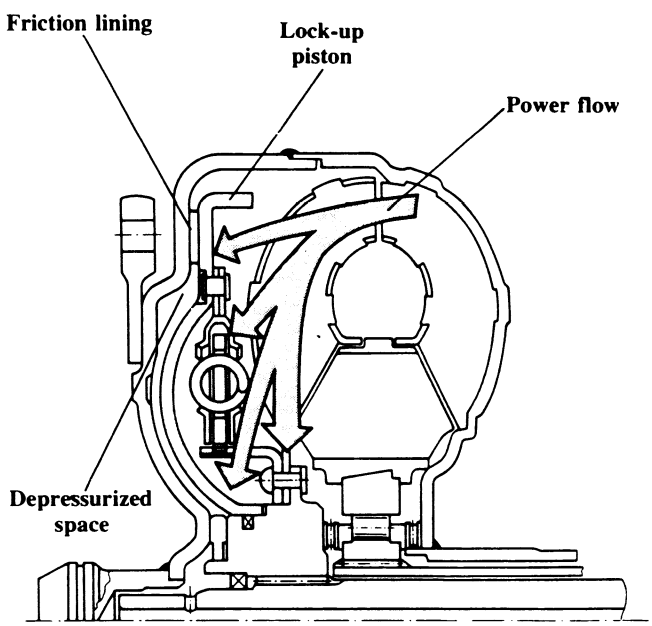
Torque Converter Locked

The torque converter pressure and flow rate increase as engine speed rises.

A solenoid valve, actuated by the transmission control unit, is opened at a defined time so the space between the torque converter housing and lock-up piston is depressurized.

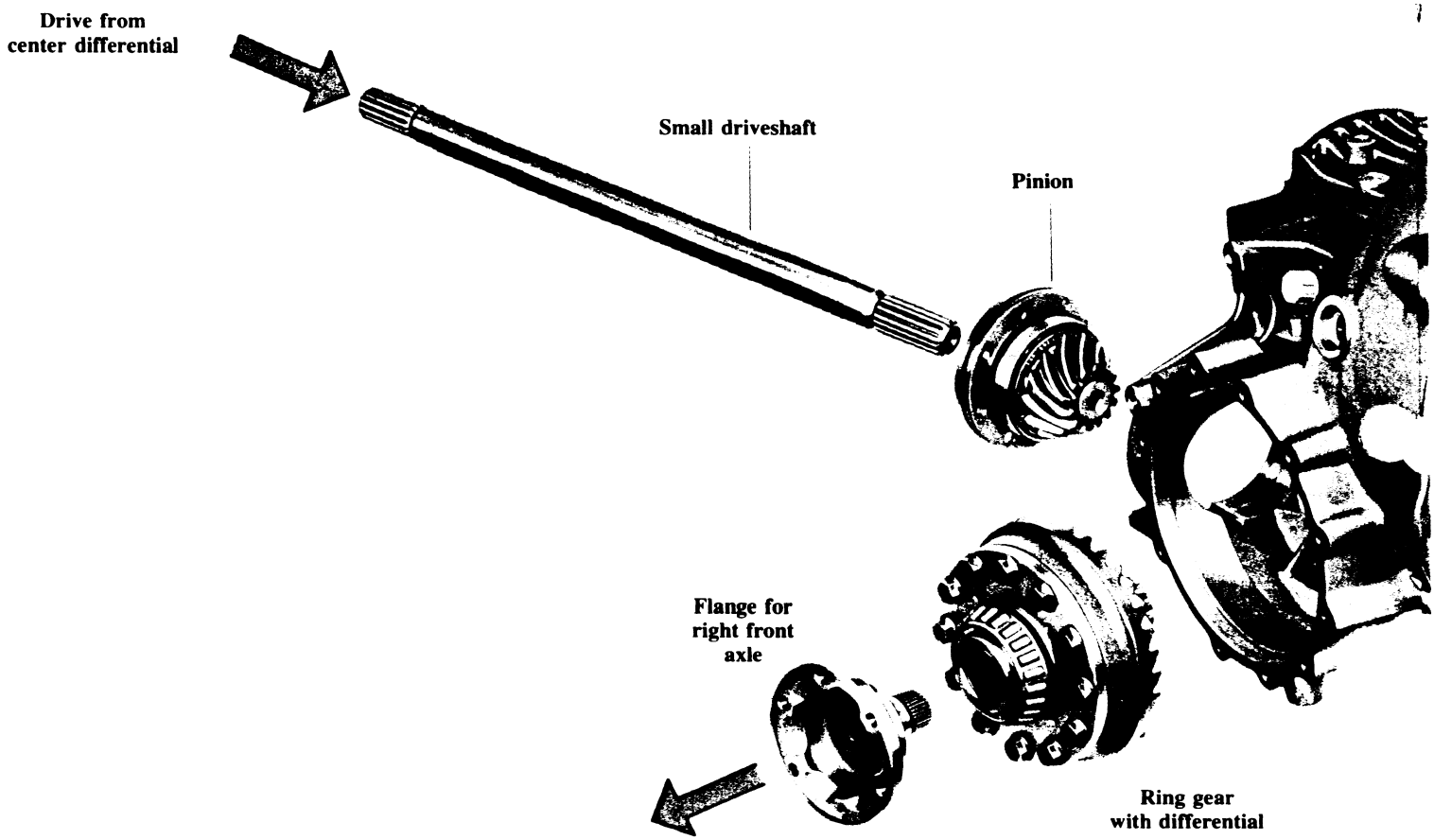
At the same time, the direction of the ATF flow changes.

The main pressure of the ATF acts against the surface of the lock-up piston. The lock-up piston makes contact with the converter housing via the friction lining. The mechanical connection is made.



Front Final Drive

The housing for the front final drive contains the front differential, transmission oil pump and torque converter.

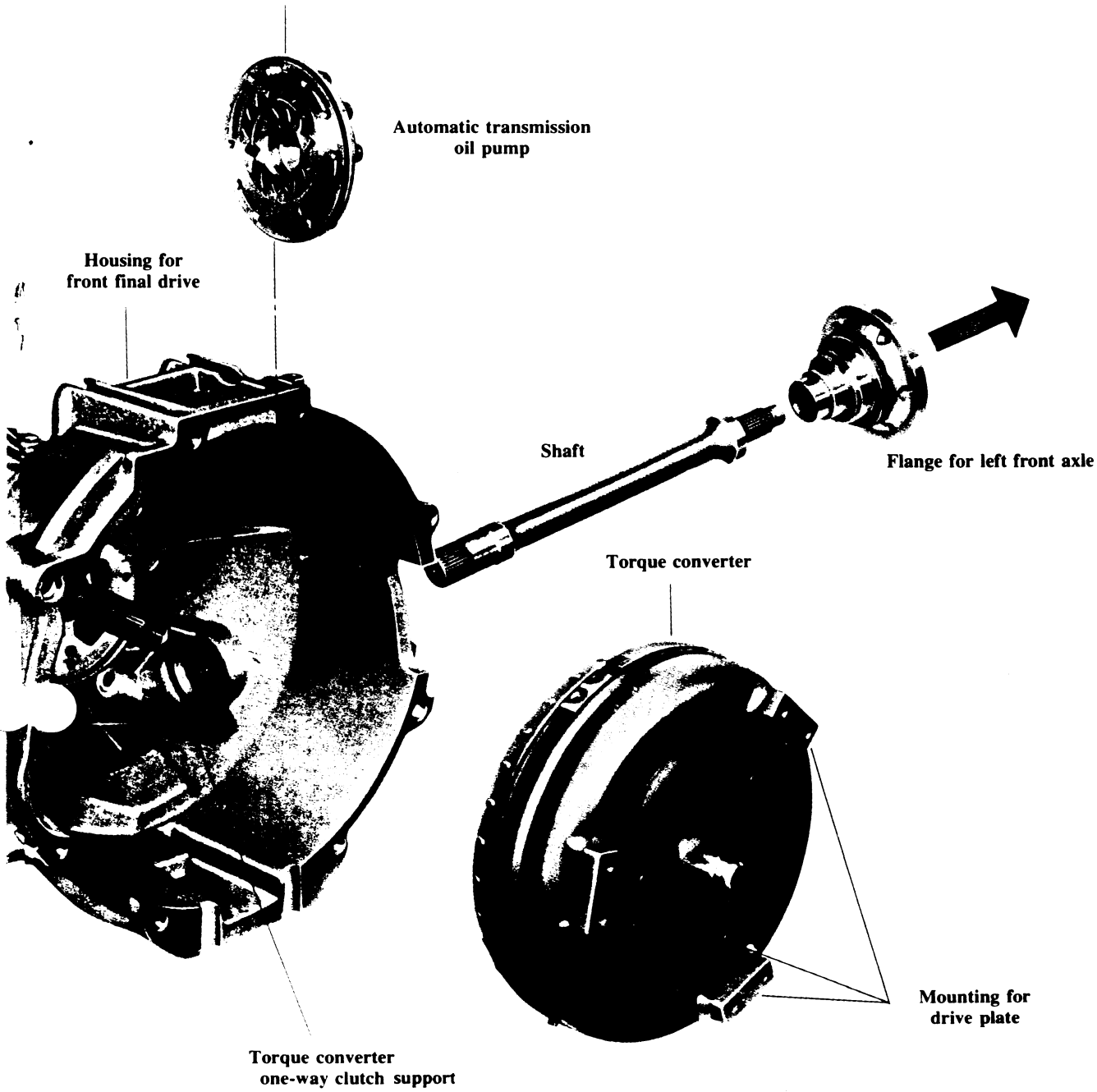


The front final drive receives its power input from the small driveshaft from the center differential.

The small driveshaft drives the differential pinion which, in turn, drives the differential ring gear.

The torque is then transferred to the left and right driveshaft flanges.

The front final drive is filled with .38 qts. (0.4 liter) of GL 5 gear oil.



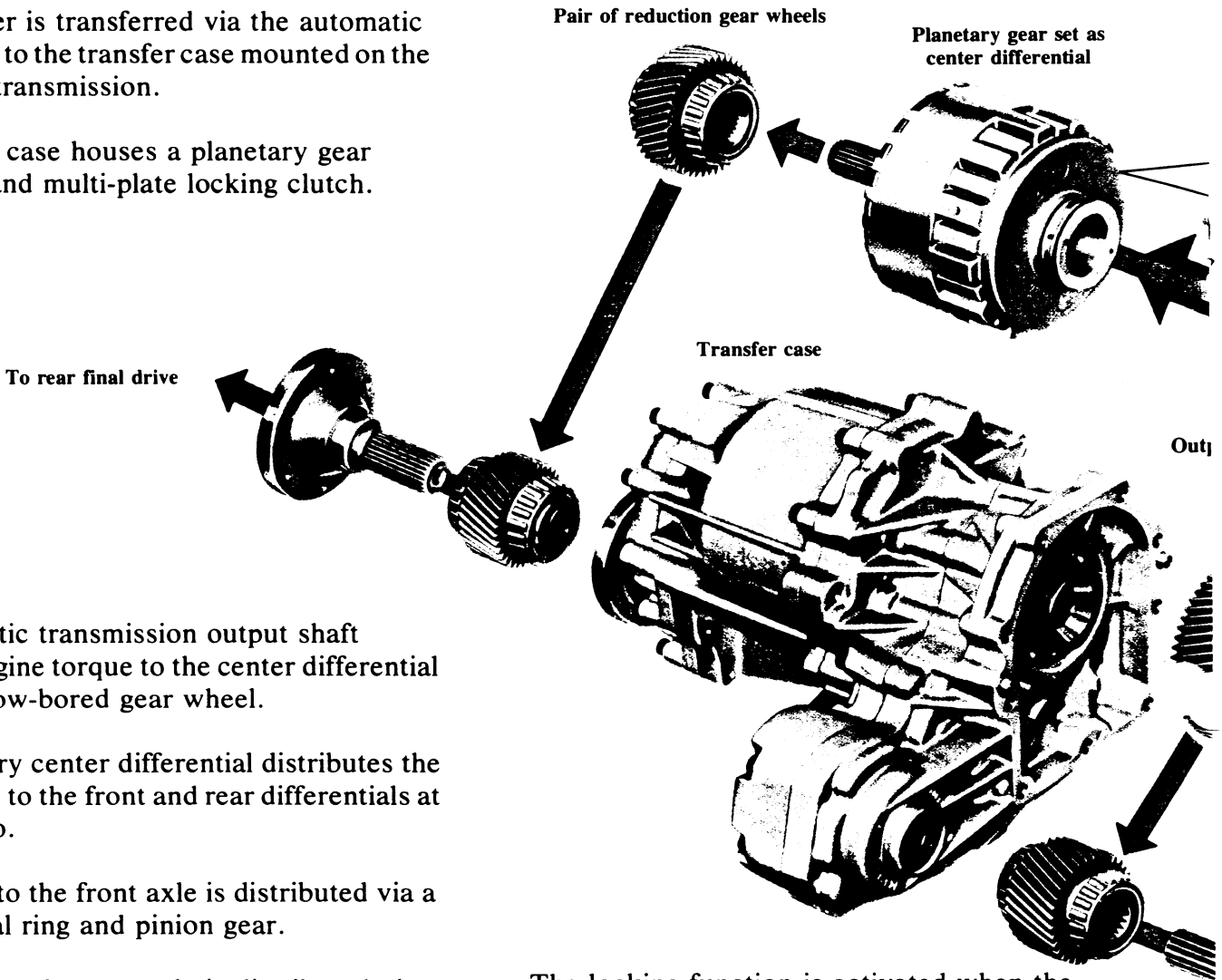
The torque converter is flange-mounted to the engine via a drive plate. Because of its weight, it provides the same function as a flywheel.

The transmission oil pump is driven by the torque converter impeller at engine speed. It supplies the necessary oil pressure to the torque converter and transmission planetary gear box.

Center Differential

Engine power is transferred via the automatic transmission to the transfer case mounted on the back of the transmission.

The transfer case houses a planetary gear differential and multi-plate locking clutch.



The automatic transmission output shaft transfers engine torque to the center differential via the hollow-bored gear wheel.

The planetary center differential distributes the drive torque to the front and rear differentials at a 50:50 ratio.

The torque to the front axle is distributed via a conventional ring and pinion gear.

The torque to the rear axle is distributed via a Torsen rear differential.

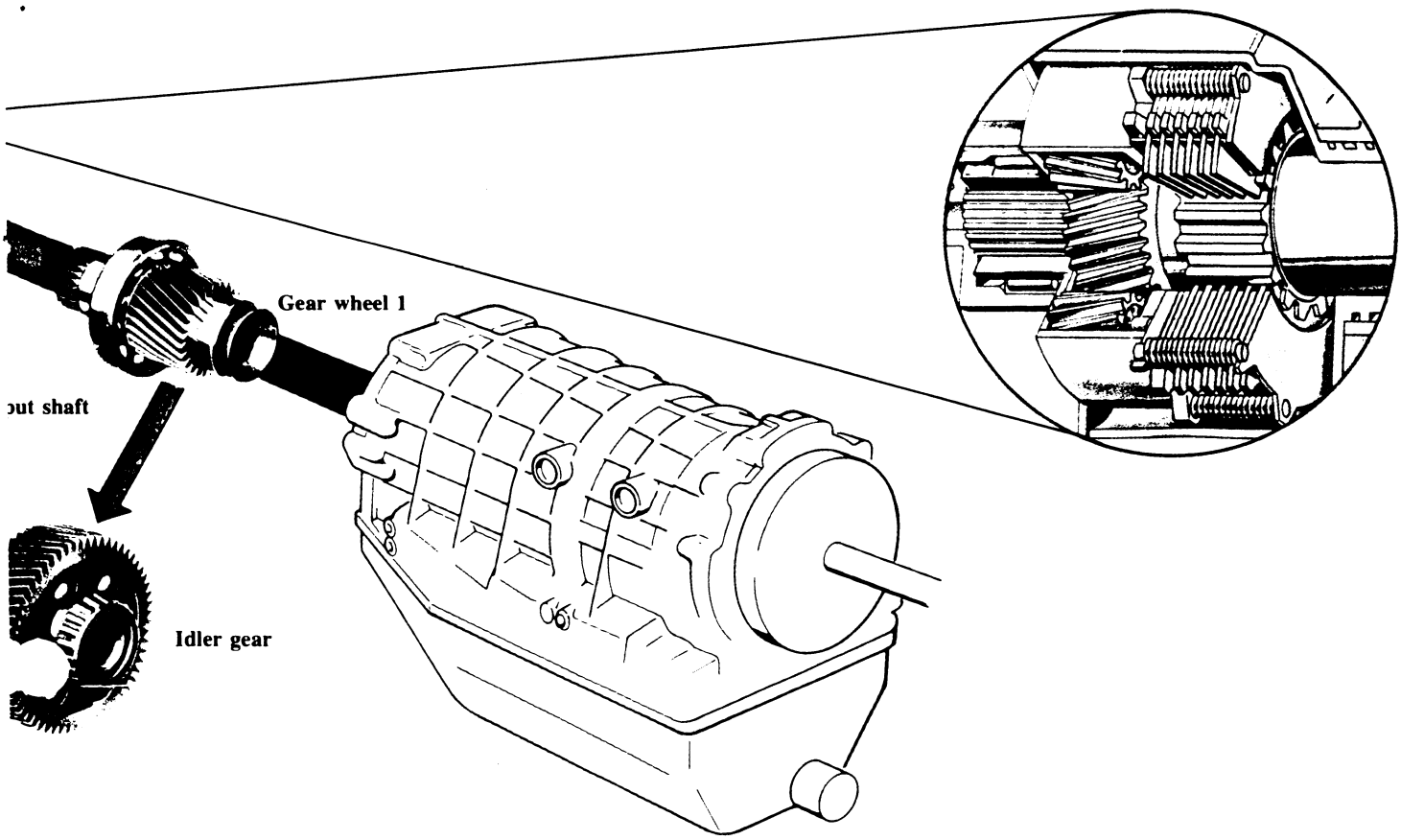
The planetary center differential compensates for differences between front and rear axle speed that may occur, for example, during cornering.

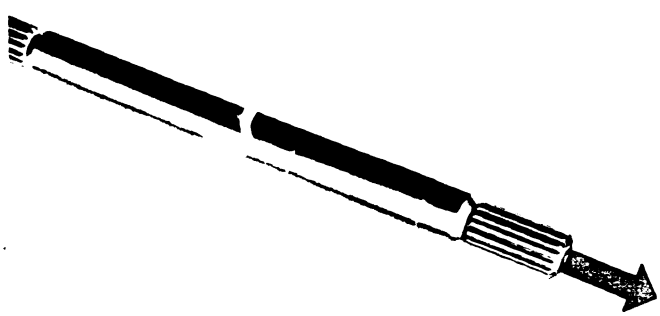
However, if there are large differences between front and rear axle speed because of heavy acceleration or adverse load conditions (like slippery roads), the differential is completely locked by the multi-disc clutch.

The locking function is activated when the automatic transmission's electronic control system detects an excessive increase in wheel slip or wheel slip speed on one or more wheels.

Input information for calculating the amount of slip is signaled to the control system by the ABS wheel speed sensors.

The control system operates so quickly that increases in wheel slip are detected within 20 milliseconds.





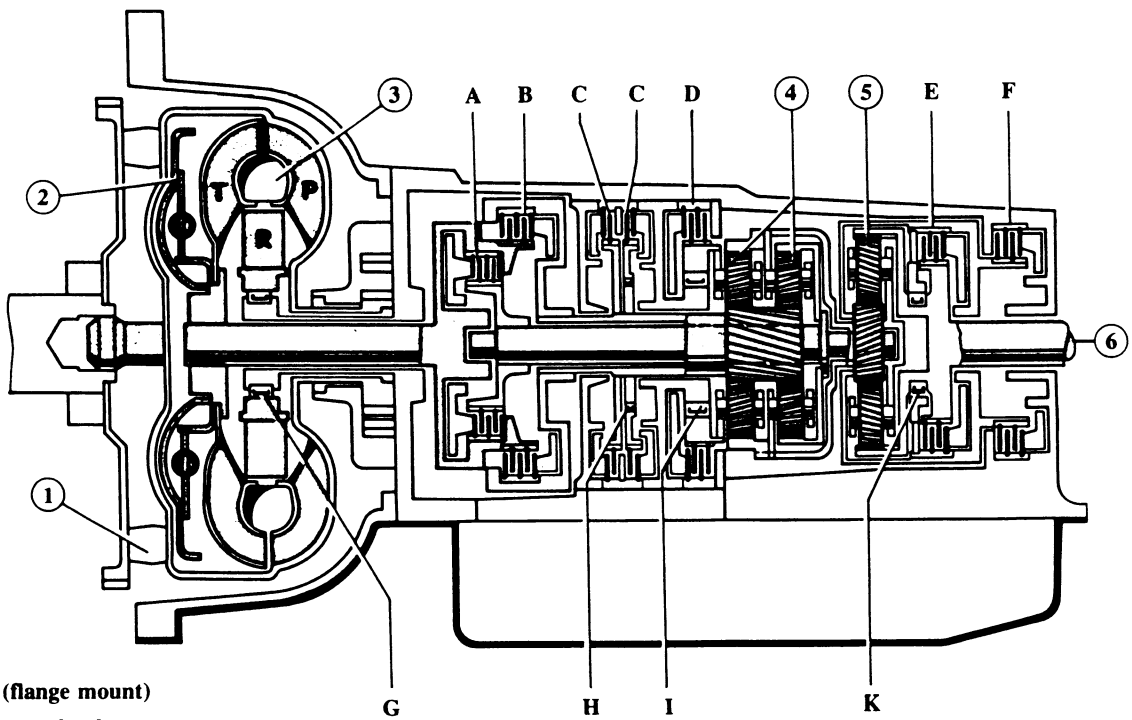
Every two seconds, the ECU evaluates the need for differential locking. The differential is prevented from locking if the vehicle speed is over 62 mph (100 km/h).

When decelerating or braking, the locking device is deactivated. This means the ABS system is completely functional.

The differential lock is also deactivated when the transmission control system detects that the vehicle is cruising.

Power Flow Chart

The mechanical part of the automatic transmission provides the power flow in the individual speeds.



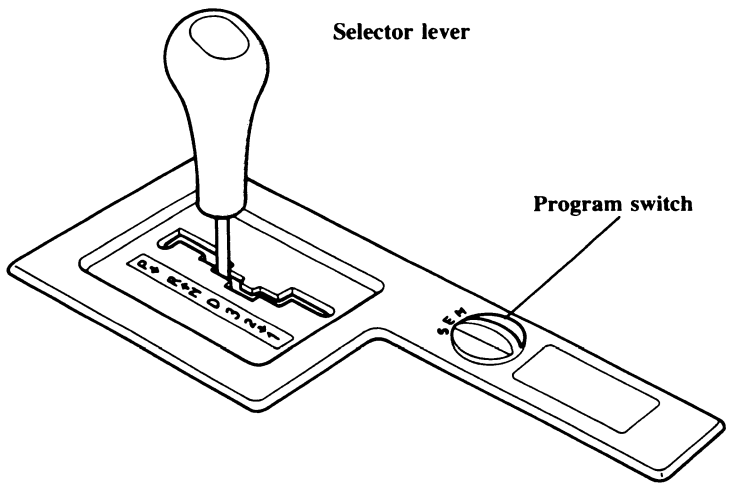
(1) Input (flange mount)
(2) Converter clutch
(3) Converter
(4) Planetary gear set
(5) Planetary gear set
(6) Output
T = Turbine
P = Impeller
R = Stator

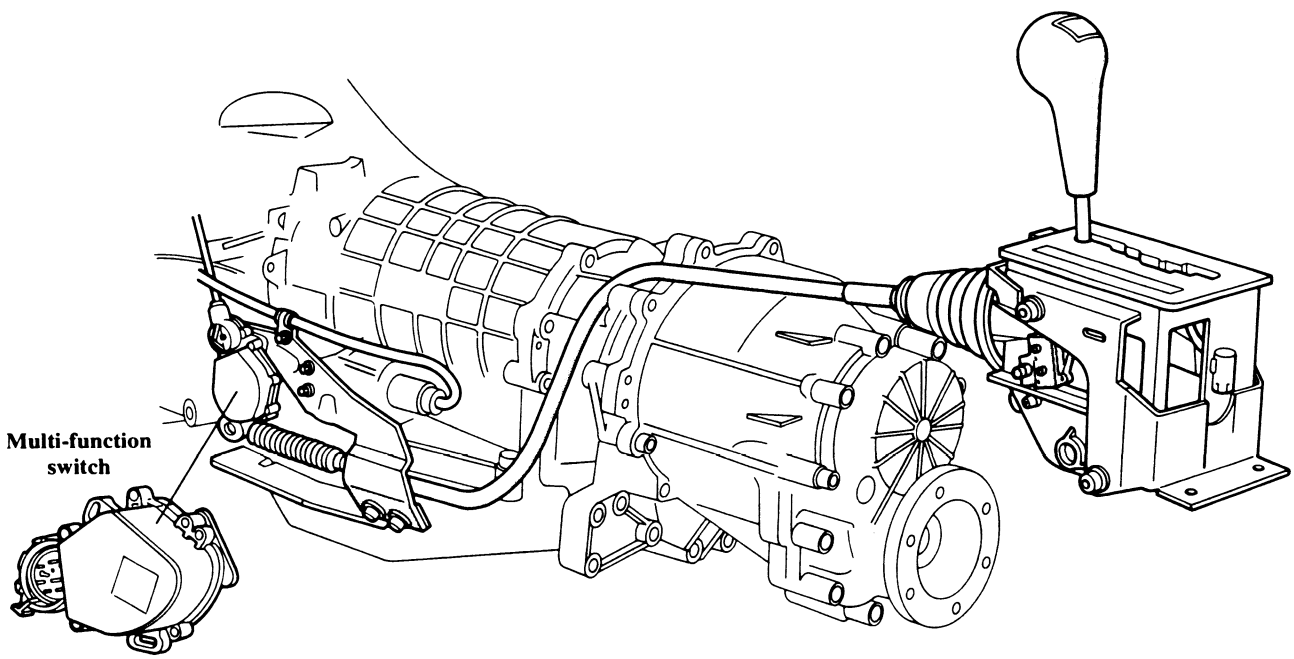
Gears	Clutch Pack			Brake Band				One-way Clutch				Converter Clutch
	A	B	E	C	C	D	F	G	H	I	K	
1	0		0			(0)		(0)		0	0	
2	0		0	0	0			(0)	0		0	
3	0	0	0		0			(0)			0	(0)
4	0	0			0		0	(0)				(0)
R		0	0			0		(0)				

0 = applied

Gear Selector Lever

The gear selector lever is attached to the transmission multi-function switch via an adjustable cable.





The multi-function switch tells the transmission ECU which selector lever position has been selected by the driver.

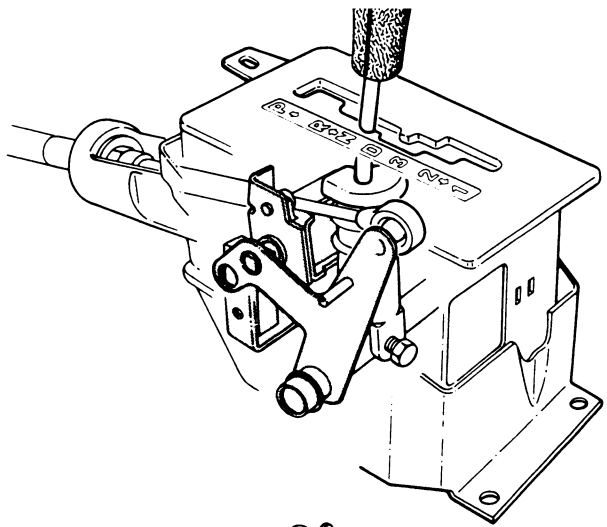
In addition, it also energizes the back-up light relay when the lever is in the R position and sends a signal to the Automatic Shift Lock control unit.

Before performing any repair work on the selector mechanism, the center console and the air duct for the rear passenger compartment must be removed.

Automatic Shift Lock

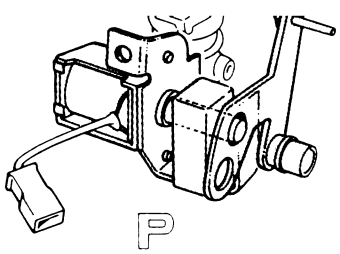
The Audi V8 Quattro, like all Audi vehicles with automatic transmissions, is equipped with Automatic Shift Lock.

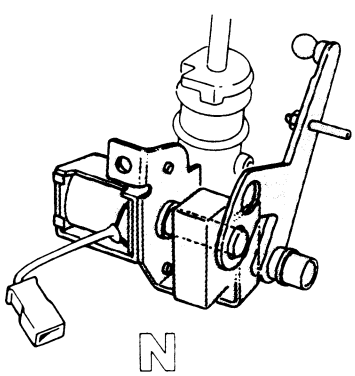
Automatic Shift Lock prevents the selector lever from being moved from the Park and Neutral positions unless the driver first steps on the foot brake.



When the shift lever is in Park or Neutral, a solenoid-actuated pin engages a hole in an arm on the side of the selector lever and prevents it from being moved. The arm has two holes which correspond to the Park and Neutral selector lever positions.

The Automatic Shift Lock system is controlled by an electronic relay.

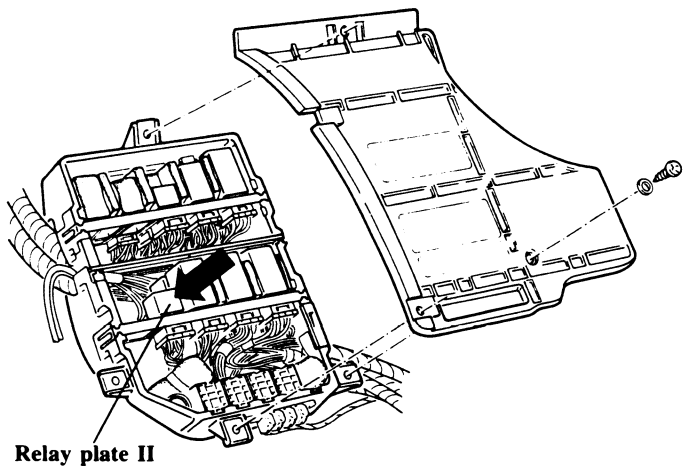




The relay will not allow the solenoid pin to engage when the vehicle speed is greater than approximately 3 mph (3 km/h).

The relay also delays solenoid engagement for about one second when shifting into Neutral from Reverse or Drive. This allows the driver to shift rapidly from Drive to Reverse when rocking the vehicle free from sand or snow.

The Automatic Shift Lock control unit is located in position 15 (arrow) on relay plate II of the auxiliary relay panel under the carpet of the right front footwell.

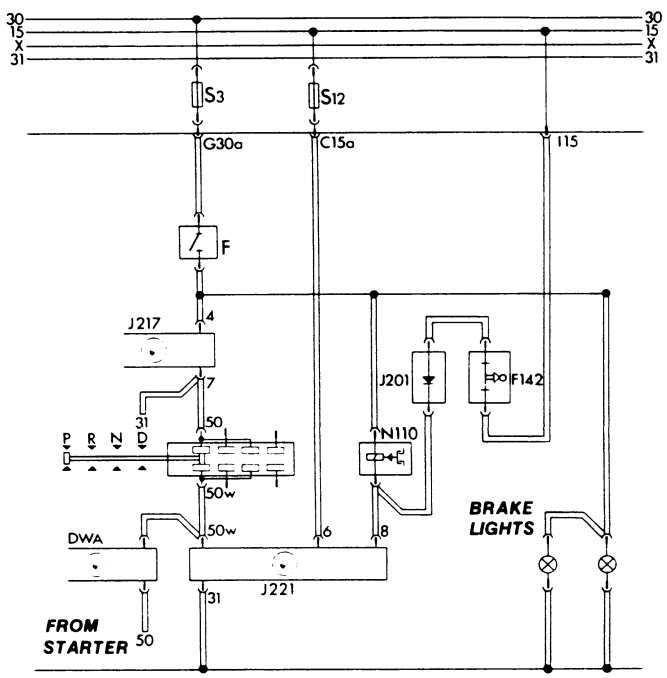


Relay plate II

When the ignition is switched on and the shift lever is in the **P** or **N** position, the shift lever solenoid (N 110) is activated.

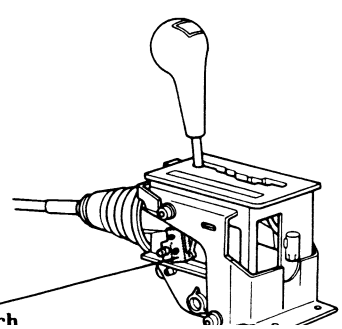
The power to the solenoid (N 110) comes from terminal 8 of the Automatic Shift Lock control unit (J 221) and goes to ground via the brake lights. The shift lever is locked.

When the brake pedal is pressed, voltage is supplied through the brake light switch (F) to the brake light bulbs and to the ground side of the shift lever solenoid (N 110). This releases the shift lever solenoid and the shift lever is unlocked.



Voltage is also supplied to the shift lever solenoid via switch F 142 to ensure that the shift lever remains unlocked when driving.

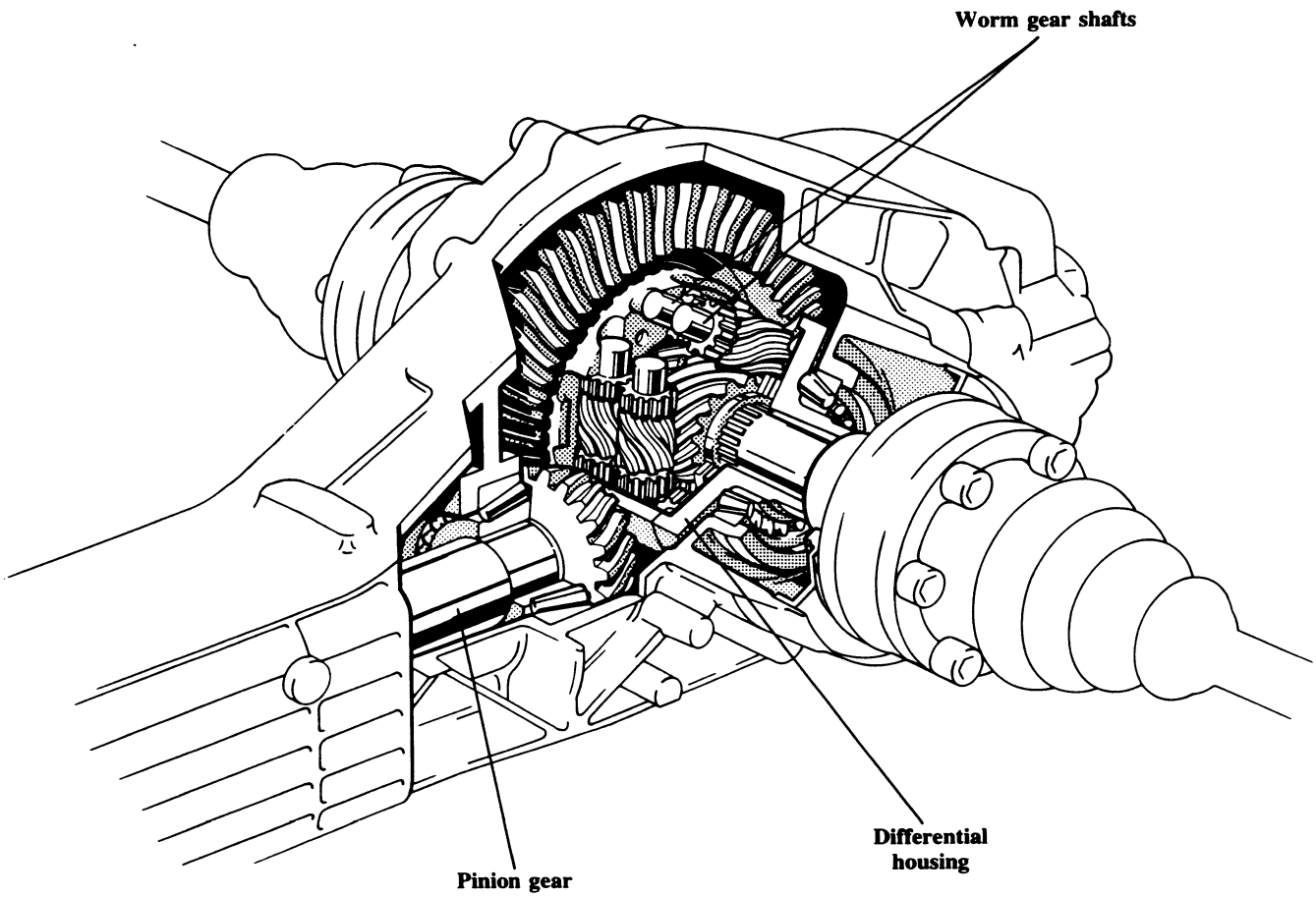
Vehicle speed information is sent to the Automatic Shift Lock control unit from the transmission. The shift lever can be moved fom the **N** position without stepping on the brake pedal any time the vehicle speed is over 3 mph.



Microswitch
F142

Torsen® Differential

The Audi V8 Quattro uses a Torsen® differential in the rear final drive.

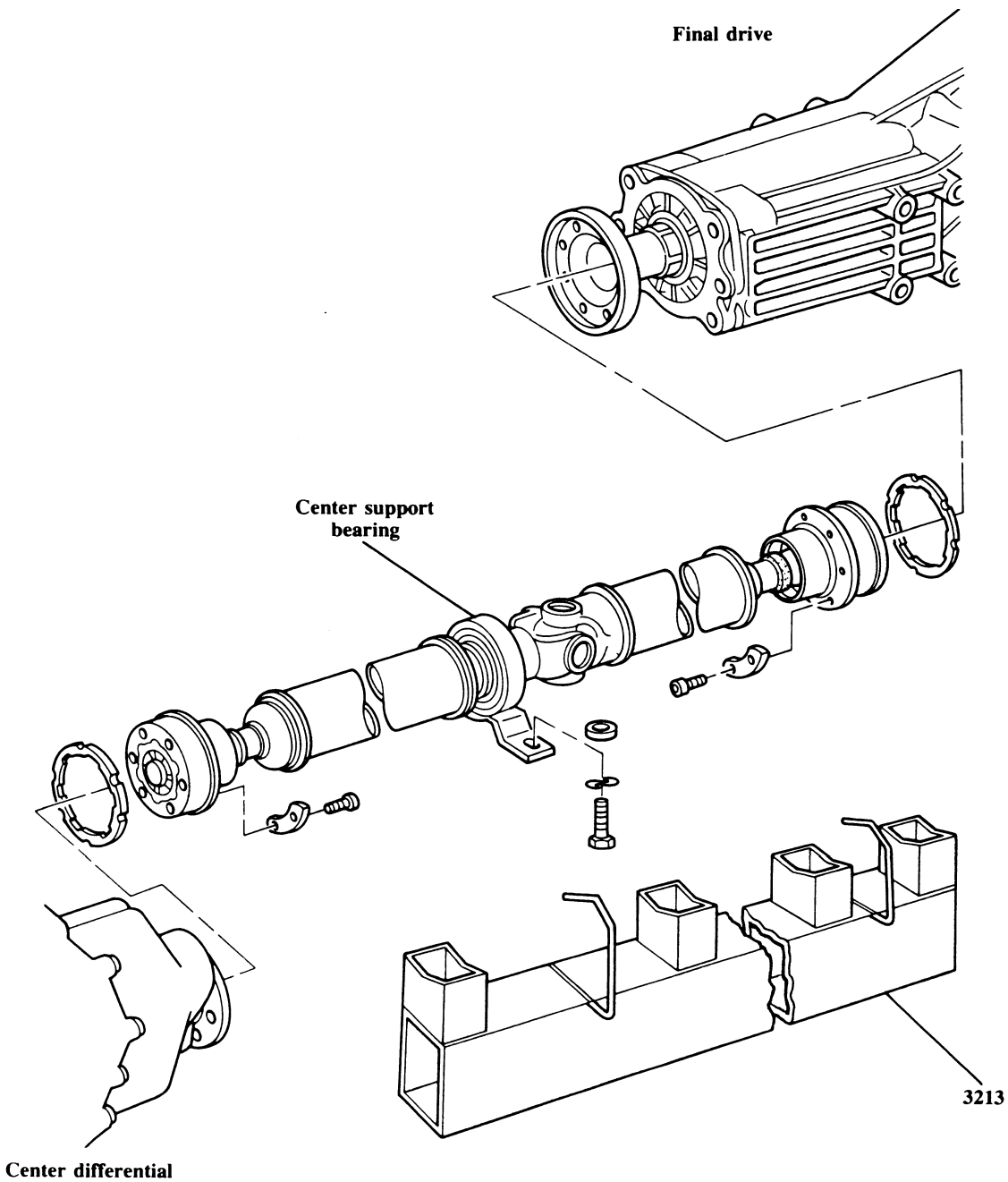


When the vehicle is being driven, the Torsen® differential distributes more torque to the slower turning pair of wheels. This provides a direct and immediate transfer of force to the wheels with greater traction.

The locking effect of the Torsen® differential is provided by the integrated worm gear. It permits a torque distribution between the rear wheels from 50:50% up to 20:80%.

The locking effect occurs only when the engine is supplying torque to the rear wheels. Because of this, the ABS remains effective over the entire speed range.

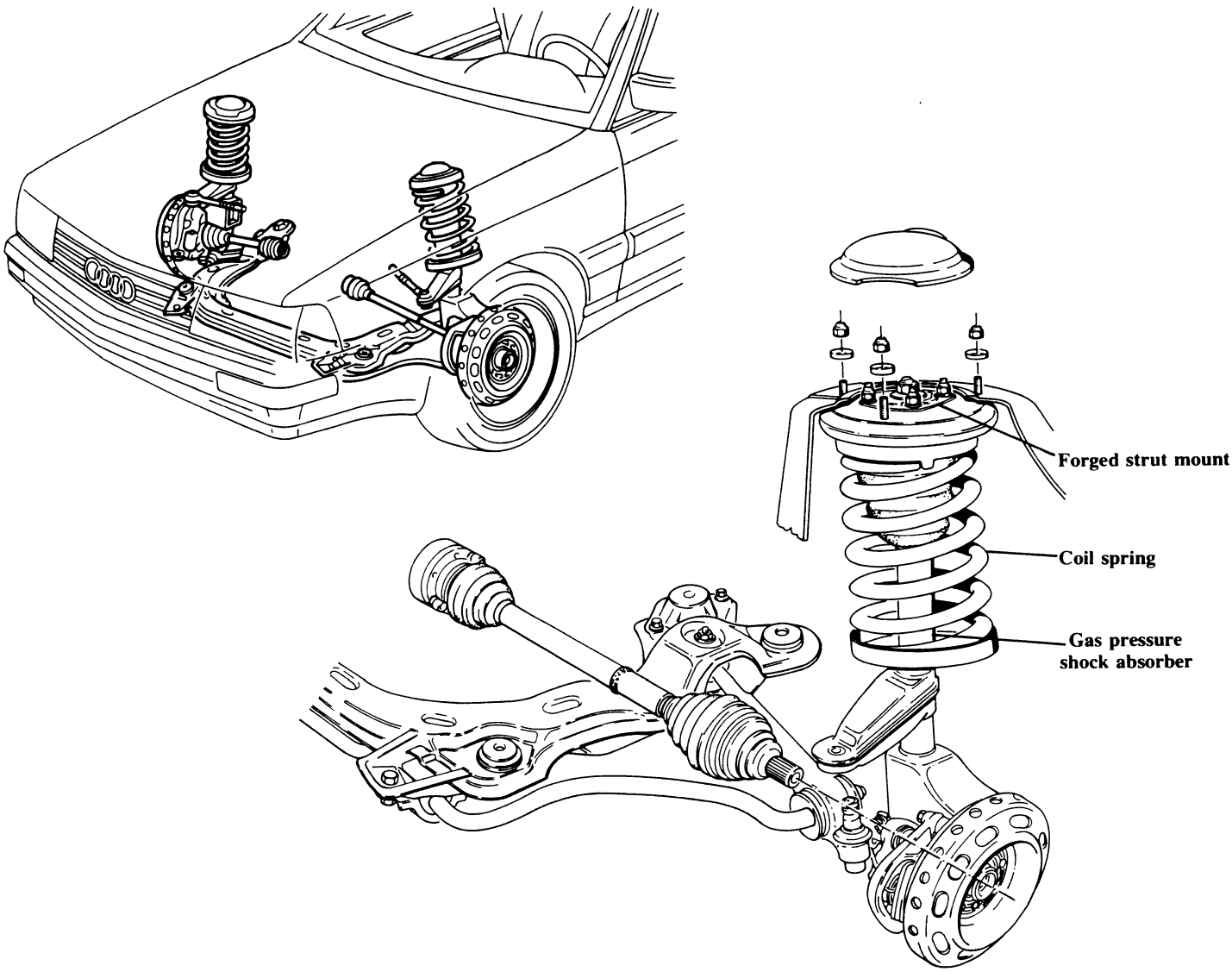
Driveshaft



The V8 Quattro driveshaft is similar to that used on the 200 Quattro. Because the driveshaft is shorter, a new driveshaft alignment tool, 3213, is needed for driveshaft removal and installation.

Front Suspension

The Audi V8 Quattro suspension is designed to combine high degrees of stability and active safety with road comfort.



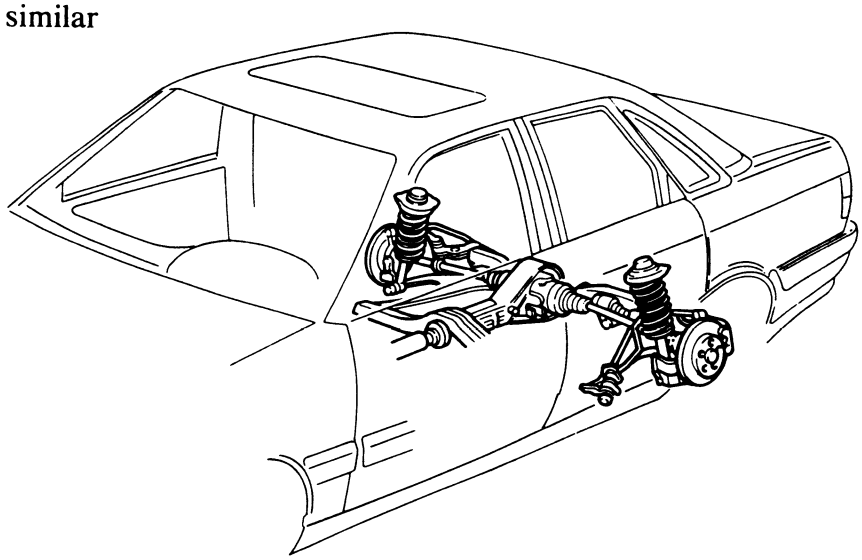
To reduce variations in wheel load and vibrations from the front suspension, the shock absorbers are mounted at an angle to the center line of the coil spring. Lateral forces on the shock absorber mountings are compensated for by springs with offset centers of force.

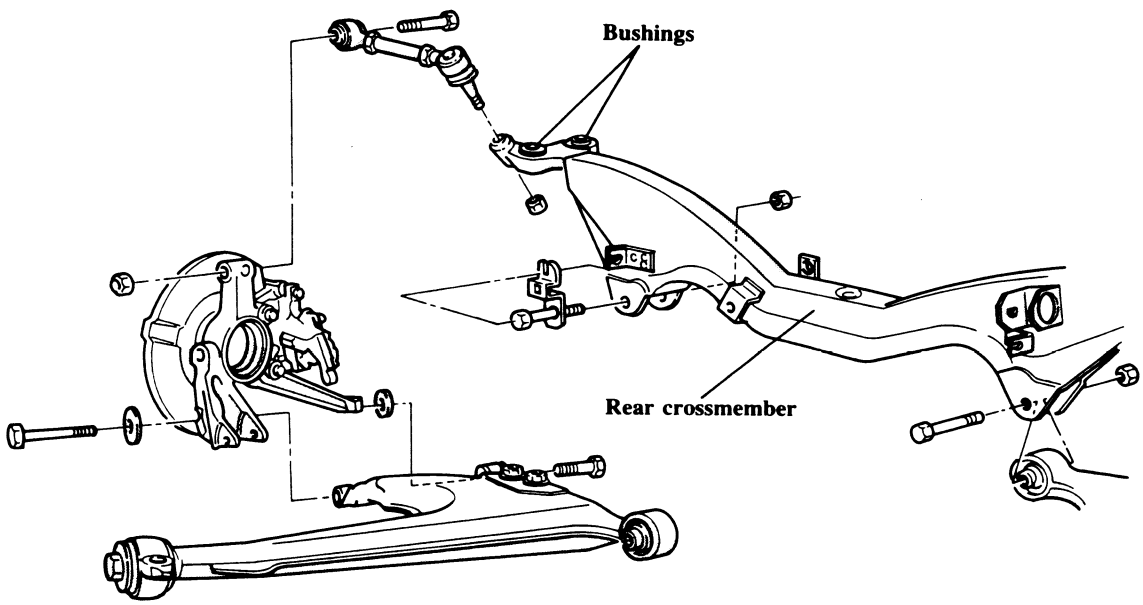
The front suspension (as well as rear) uses gas pressure shock absorbers.

Forged strut mountings are also installed.

Rear Suspension

The rear suspension of the V8 Quattro is similar to that used on the Audi 200 Quattro.



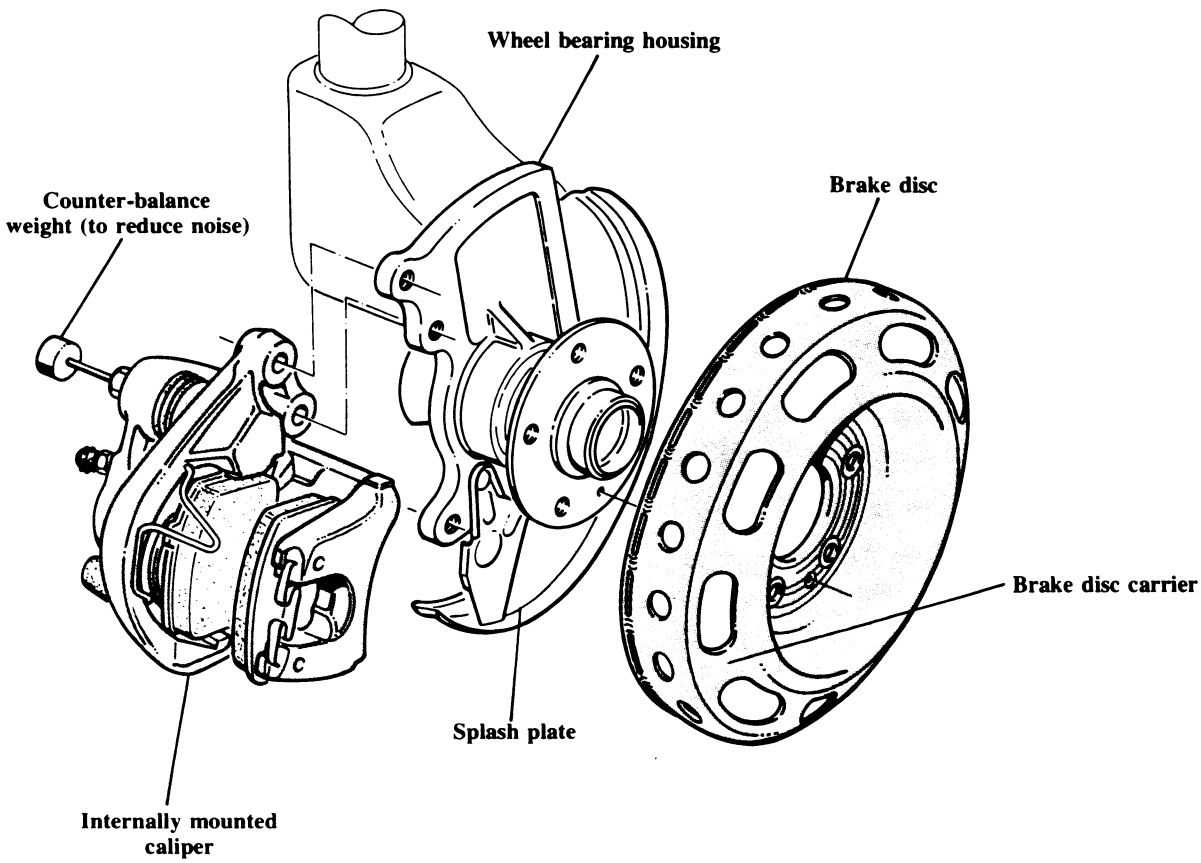


The suspension crossmember is now insulated from the body with rubber bushings. This helps reduce the amount of road noise and vibration transmitted to the body.

Forged strut mountings are used on the rear suspension of the Audi V8 Quattro.

Front Brakes

A new front brake system has been developed for the Audi V8 Quattro. This system, together with ABS, provides high performance braking and road-holding in steered braking maneuvers.



On conventional disc brake systems, the brake caliper is wrapped around the outside of the brake disc.

The Audi V8 Quattro system uses a caliper that grips the brake disc from the inside of the disc.

The internally mounted brake caliper is attached to the wheel bearing housing by three bolts.

The braking force is transmitted from the piston to the inner brake pad and then directly to the brake disc. This, in turn, forces the floating portion of the caliper back and pulls the outer brake pad into contact with the brake disc.

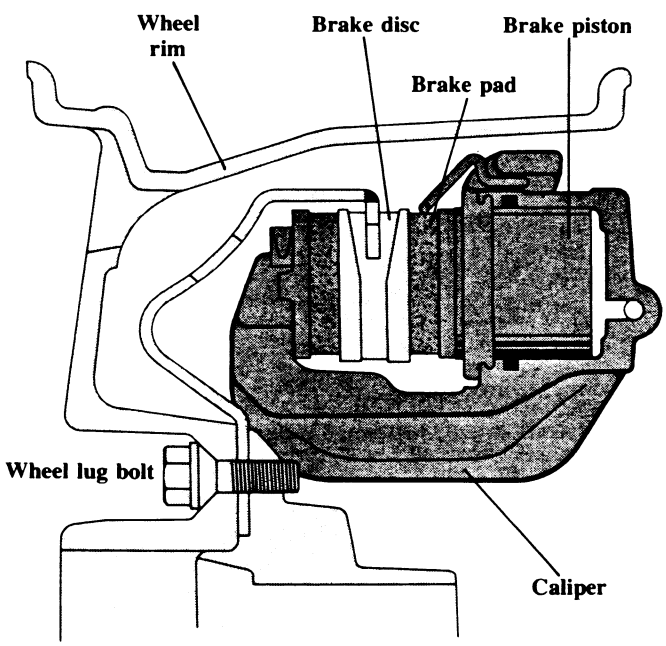
The new brake disc consists of a dished brake disc carrier and an internally ventilated brake disc. The brake disc and dished carrier are welded together around their outer circumferences.

The advantage of this system is that the entire space inside the road wheel can be utilized because little additional space is needed for the caliper.

Compared to the Audi 200, the V8 Quattro has 20% more brake swept area.

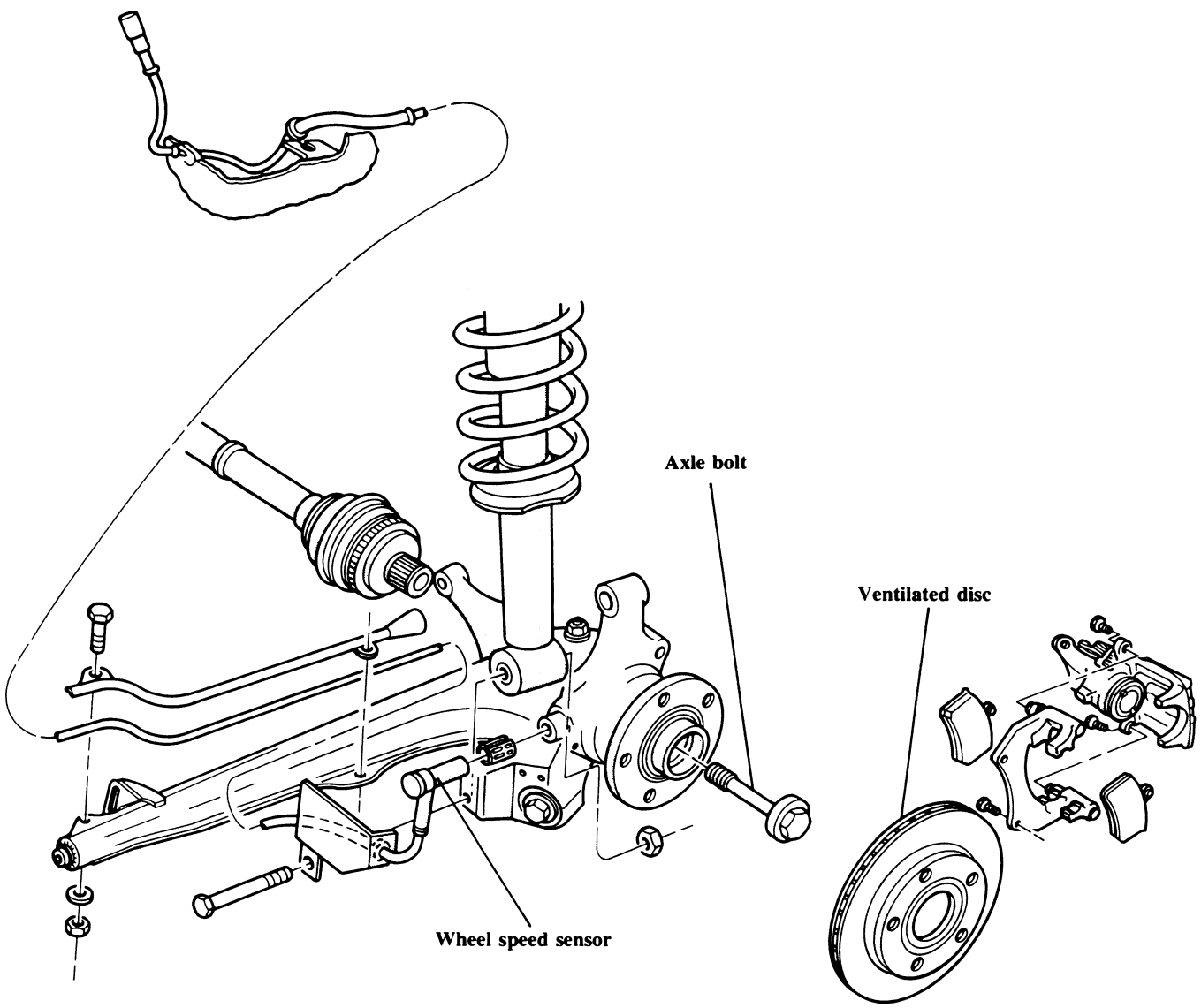
This lowers the level of braking pressure and substantially reduces operating temperatures.

The brake disc can be easily removed without removing the brake caliper assembly.



Rear Brakes

The rear brakes on the Audi V8 Quattro are similar to those used on the Audi 200 Quattro.

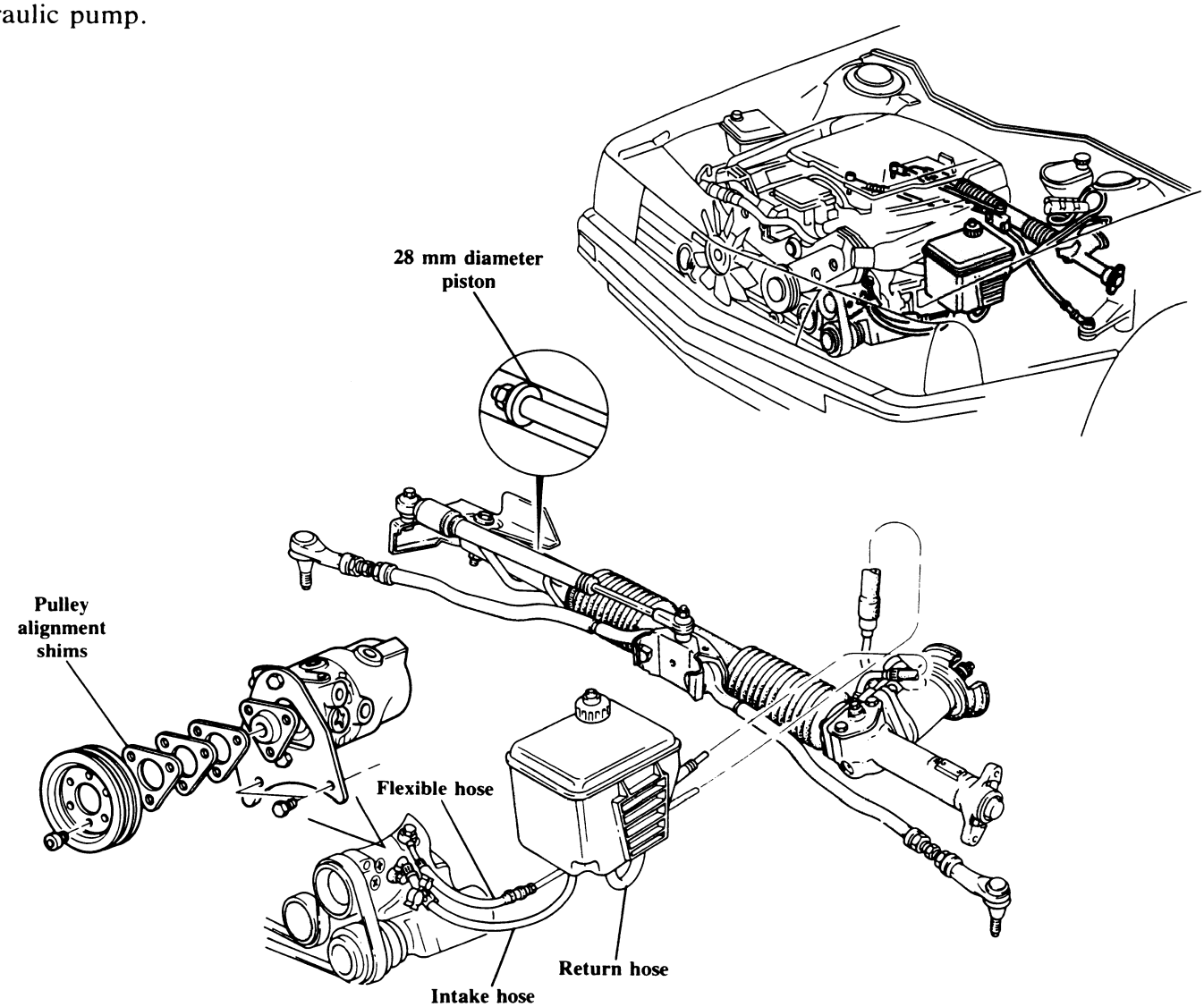


The ventilated rear brake discs are 269 mm in diameter and 20 mm thick.

Brake pressure to the rear is regulated by valves that are sensitive to brake pressure and lateral acceleration as on the 200 Quattro.

Components

Power steering assist is provided by the central hydraulic pump.



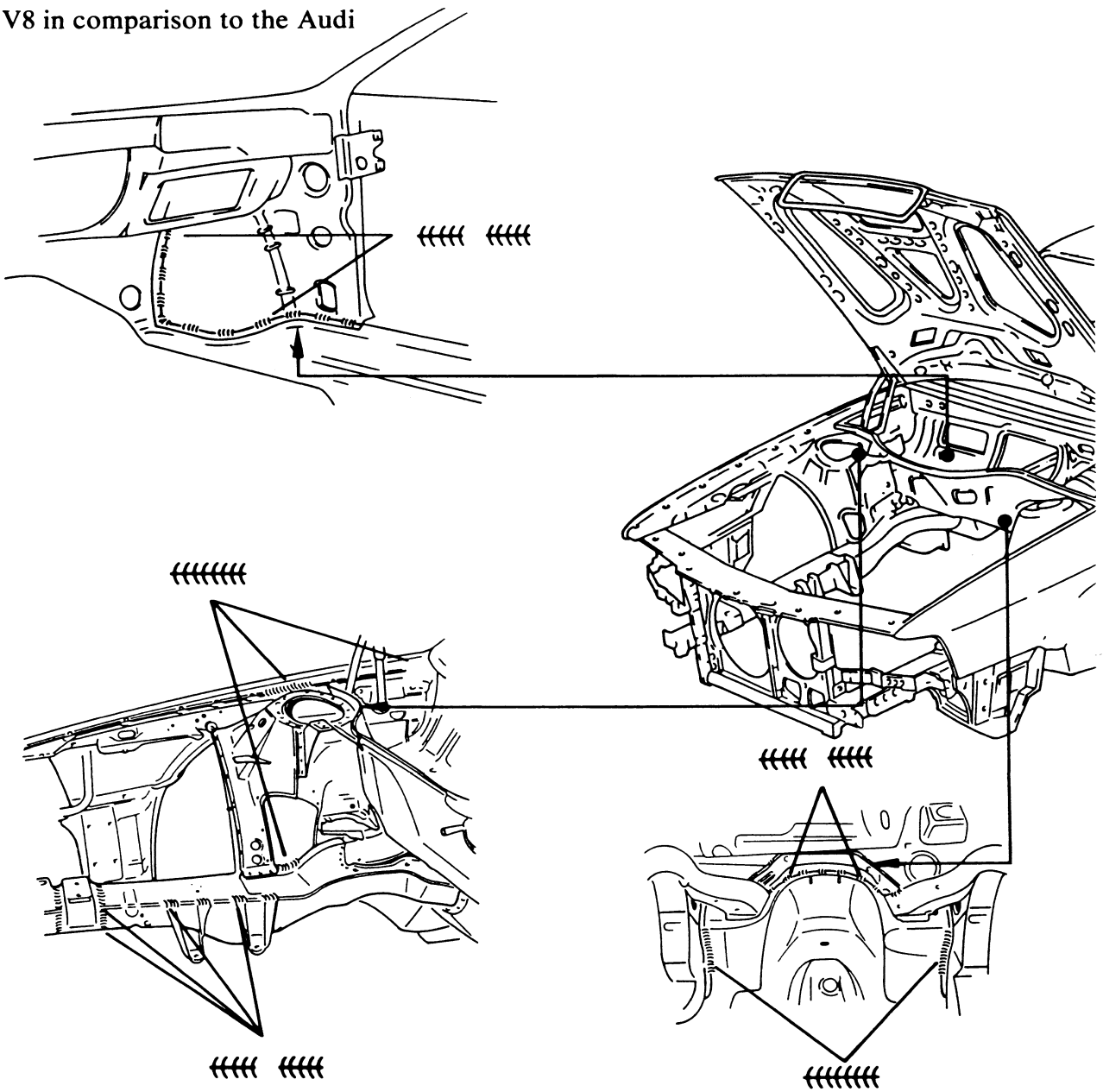
An eight piston hydraulic pump is used on the V8 Quattro. Two pistons provide power for the brake booster while six pistons supply power for the power steering assist.

The pump is driven by the poly-ribbed belt.

The hydraulic pump pulley is adjusted in or out with shims to align the pulley with the A/C compressor pulley.

Body Welds

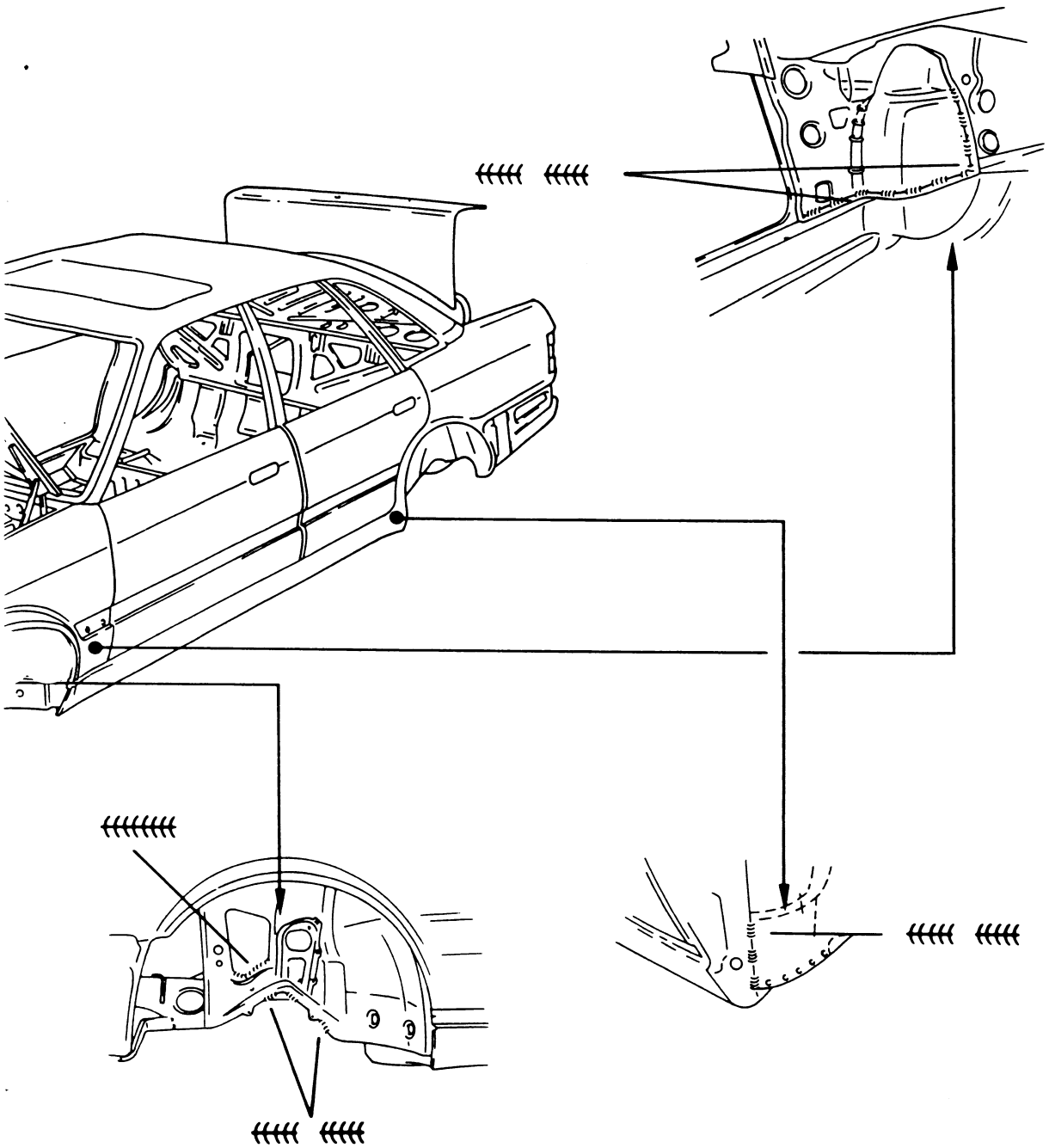
Considerable alterations have been made to the body shell of the V8 in comparison to the Audi 200.



The fully galvanized body provides rigidity and structural integrity in addition to meeting the demands of crash resistance and passive safety.

This is accomplished through additional reinforcements and shielded arc welding seams in many places.

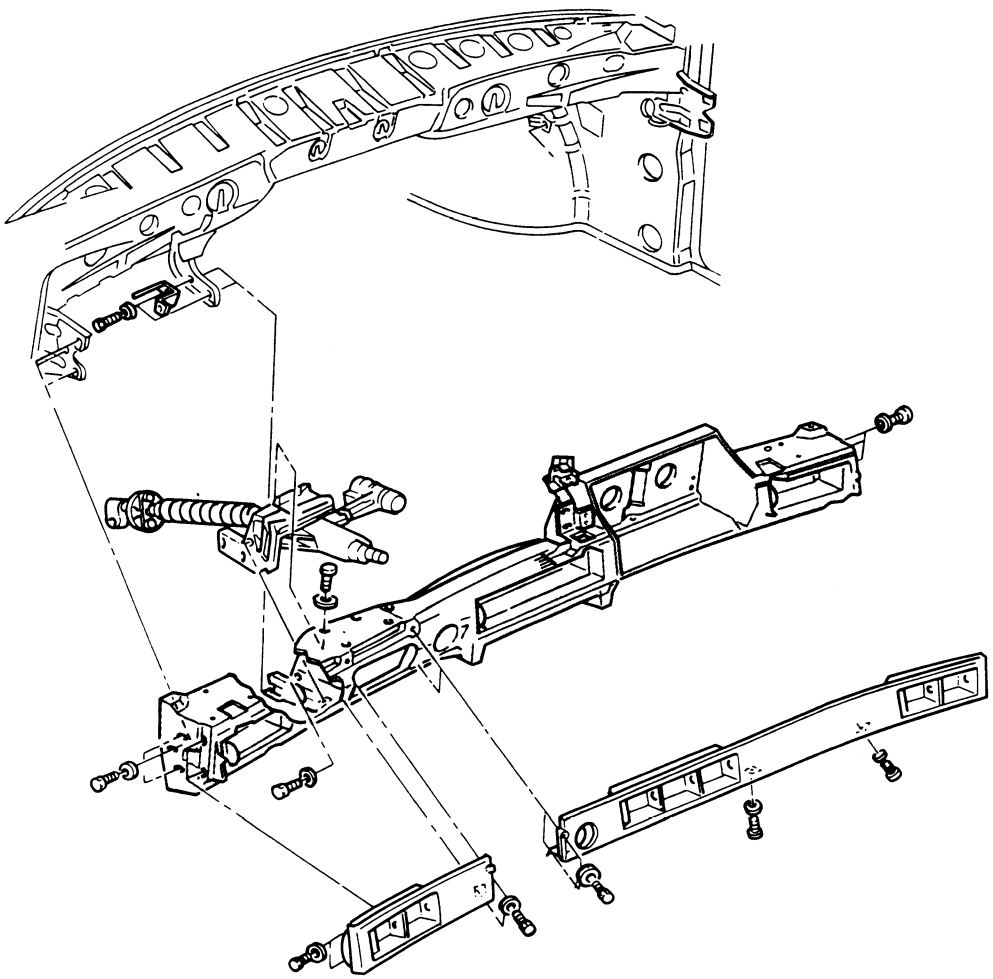
In a collision, the forces are distributed equally throughout the entire structure, and excess strain on individual areas is reduced.



Specific measures taken to improve side protection are:

- Larger volume sill panels and steering crossmembers.
- Larger cross section door pillars.
- Highly durable aluminum crossmember mounted between the windshield "A" pillars.
- Highly durable extruded sections around the doors.

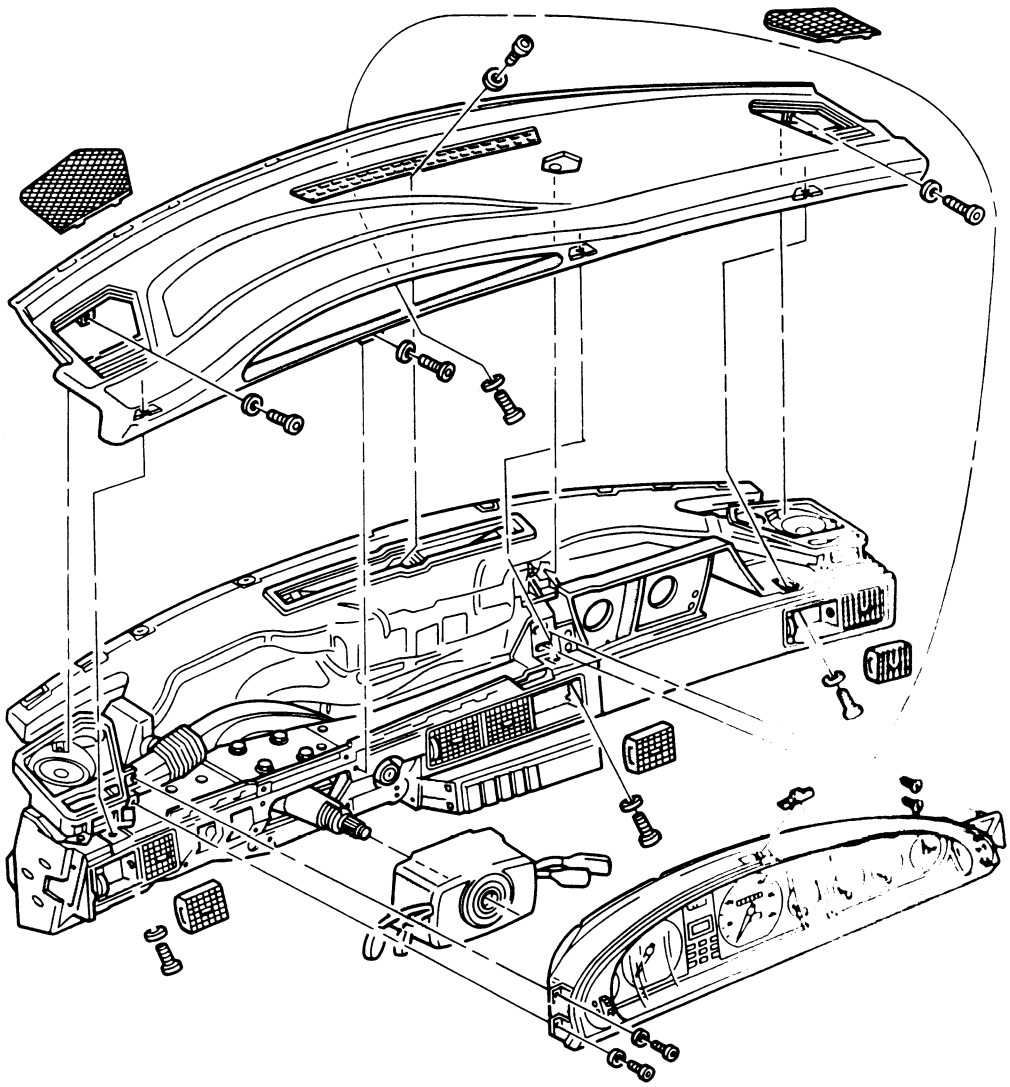
Aluminum Crossmember



An aluminum reinforcement crossmember is installed behind the instrument panel and bolted to the "A" pillars.

The crossmember provides additional strength to the passenger compartment.

To prevent the steering column from moving during a severe frontal collision, an additional brace is used to attach the steering column tube to this crossmember.

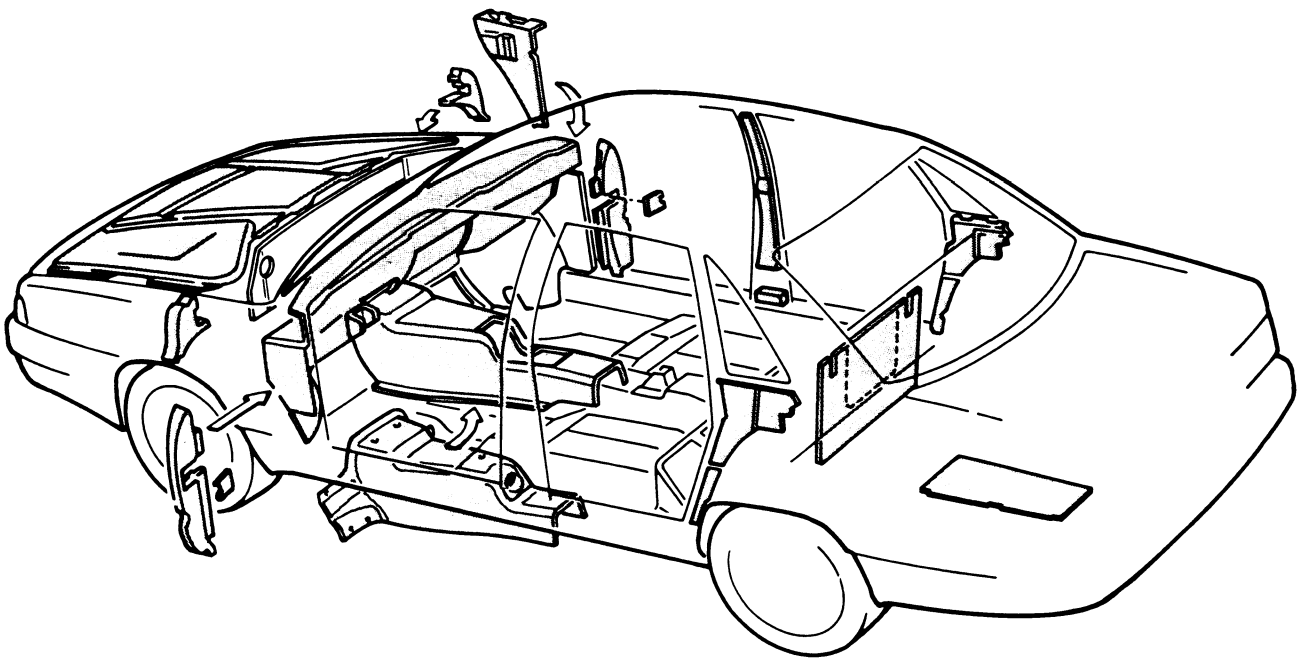


The instrument panel cover, instrument cluster and wood trim are all attached to the aluminum crossmember.

The lower trim panel under the steering wheel now acts as a knee bar. This will prevent the driver from sliding under the steering wheel in the event of a frontal collision.

The lower trim panel is attached to the crossmember with additional mounting brackets.

Sound Insulation



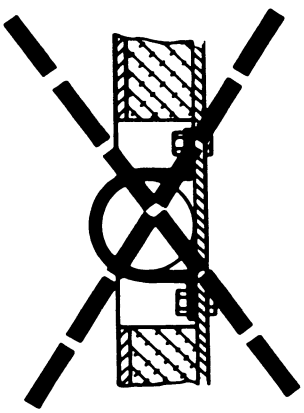
The extremely rigid body design is an important factor in achieving a low internal noise level.

Noise from driving through water or from flying stones is dampened by the plastic linings in the front and rear wheel arches.

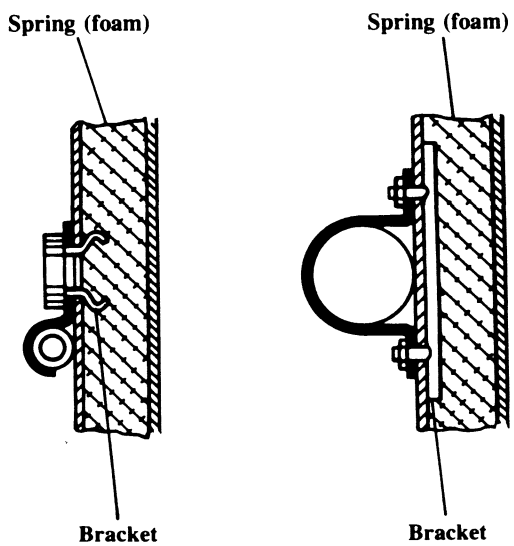
The body sound insulation is achieved by using thick fuse-welded sheets, mats and trim. In addition, the Audi V8 Quattro has a double sound bulkhead between the engine and the passenger compartments.

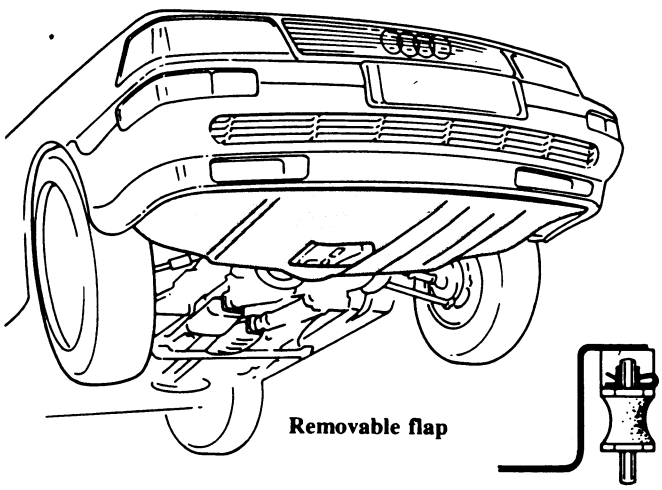
The newly developed sound-deadening, spring-mass bulkhead of foam (spring) and plating (mass) has been installed in the engine compartment and on the transmission tunnel.

The most important feature of the sound-deadening bulkhead is that the mountings for components, pipes and cables are molded into the foam material.



Certain components, for example, the ignition coil, are no longer fastened to the metallic wall. This also avoids unnecessary gaps in the insulation.



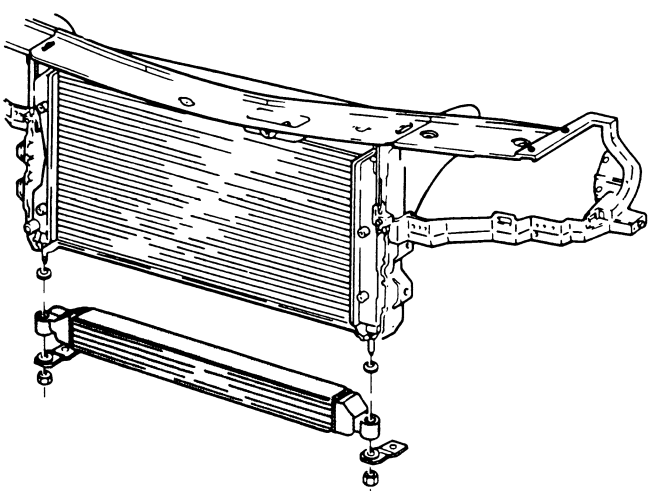


The bottom side of the engine compartment is completely enclosed.

In addition to streamlining the airflow underneath the vehicle, this also helps to reduce road and engine noise from being transmitted to the passenger compartment.

A removable flap is installed on the cover to allow easy access to the engine oil filter and drain plug.

The cover is secured in rubber mountings.

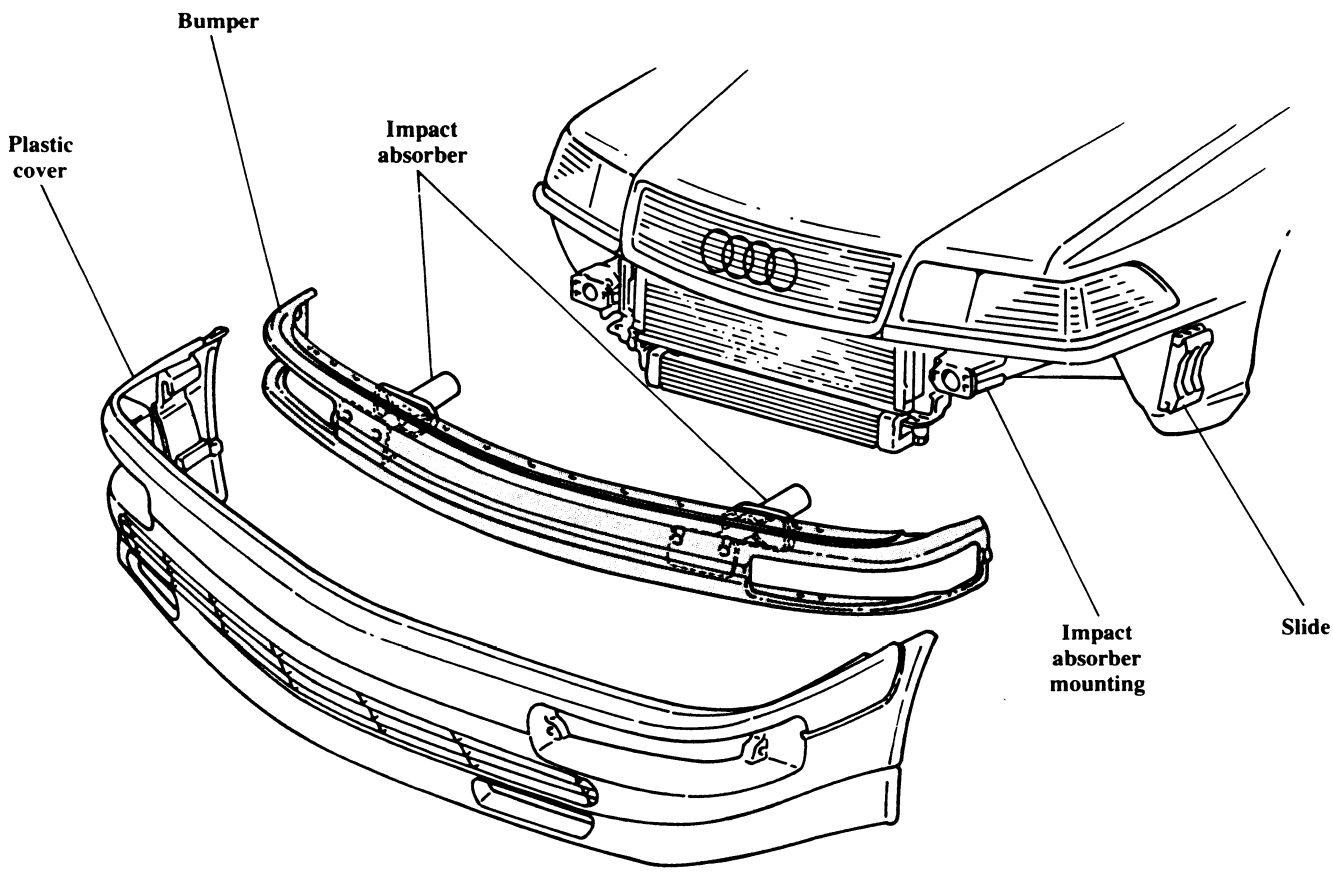


The flexible mounting of the oil cooler is another example of the efforts made to isolate the vibration of auxiliary units from the passenger compartment.

Oil pressure pulses from the pump can cause the oil cooler to vibrate. Since the oil cooler is mounted in rubber, these vibrations are not transmitted to the body.

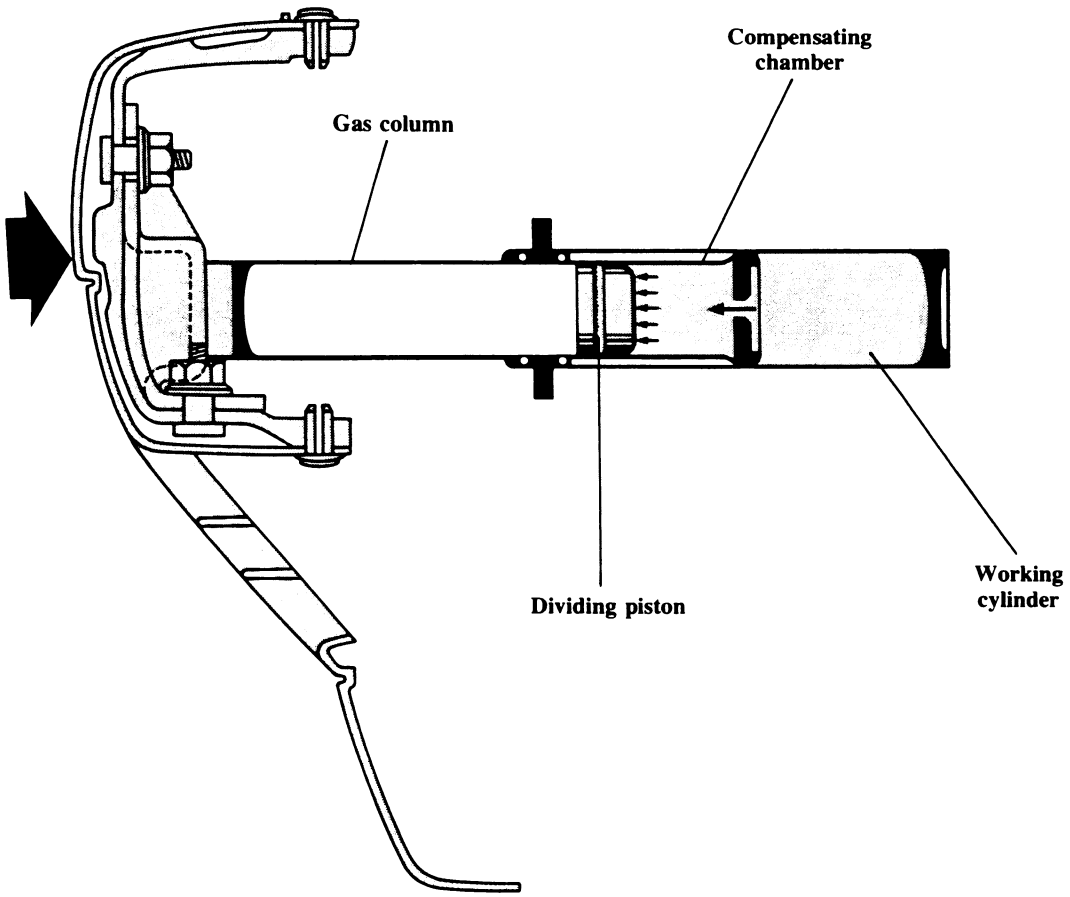
Bumpers With Impact Absorbers

The front and rear bumpers are each equipped with two hydraulic, two-way impact absorbers. Together with the large bumpers, these form a rigid barrier to absorb longitudinal impacts.



The bumper is manufactured from highly durable aluminum so the force of an impact is transmitted to the impact absorbers.

In a collision, the bumper is able to retreat 60 mm (2.4 in.) without dislocating the slide.



The impact absorber contains an oil-filled working cylinder and a gas-filled compensating chamber. The gas-filled chamber acts as a spring. Oil and gas are separated by a movable piston.

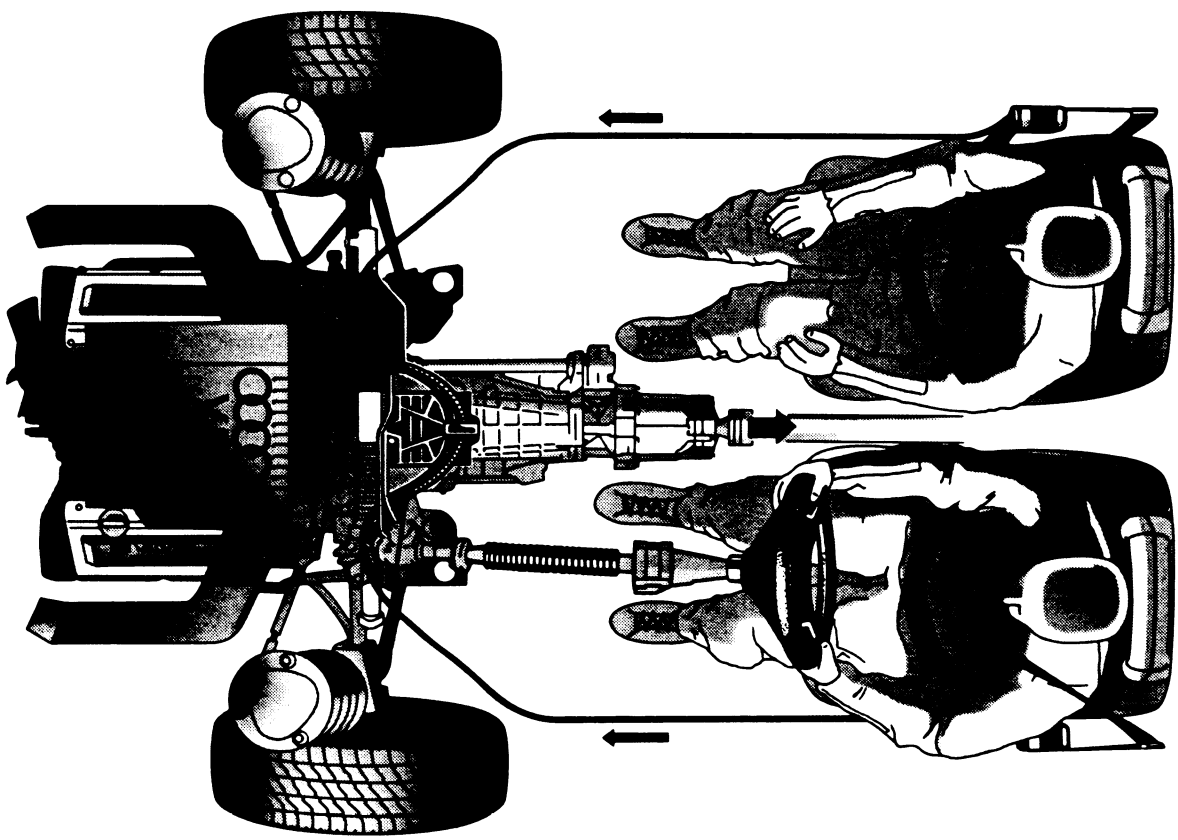
The working cylinder is sealed on the outside with rubber seals between the tubes.

During a collision, the inner tube is pushed into the outer tube. The hydraulic oil in the working cylinder flows through the restrictor drilling into the compensating chamber, moving the piston and compressing the gas column.

When movement starts, the hydraulic dampening force predominates because of the high relative speed. Towards the end of the compression, the greater part of the dampening effect is carried by the gas compression.

The high internal pressure returns the impact absorber to its original position even if distortion has occurred.

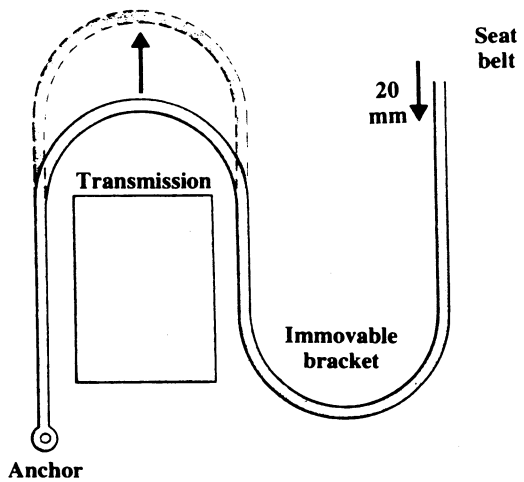
Automatic Seat Belt Tensioning



The Audi V8 Quattro features an automatic seat belt tensioning system. The system is entirely mechanical, using mass of the displaced engine and transmission to tension the front seat belts and hold the front passengers firmly in place.

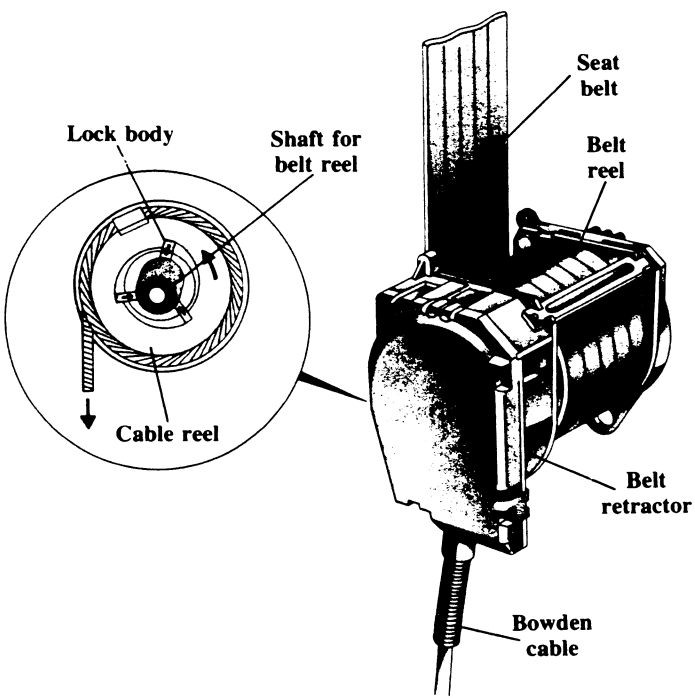
The system consists of two stainless steel, Teflon-coated Bowden cables that are wound around the seat belt retractors in opposite direction of the normal rotation. The cables run through the body and are looped around a cable guide which is part of the top of the transmission housing. The cables are then anchored to securing brackets on opposite sides in the engine compartment.

Automatic Seat Belt Tensioning



The system only operates in the event of a front end collision at impact speeds above approximately 15 mph (25 km/h). At lower vehicle speeds, impact energy is absorbed by the deformation of the body alone.

The system works on the principle of a block and tackle. The cable path to the seat belt retractors is twice as long as the relative movement between the engine and the body. In the event of a frontal collision, therefore, the reeling in of the seat belts occurs at twice the speed of the vehicle's front end deformation.



If a front end collision occurs and the engine moves rearward, the cables are tensioned at the transmission. The cables, which are connected to the seat belt retractors, tighten the seat belts by turning the retractors backwards.

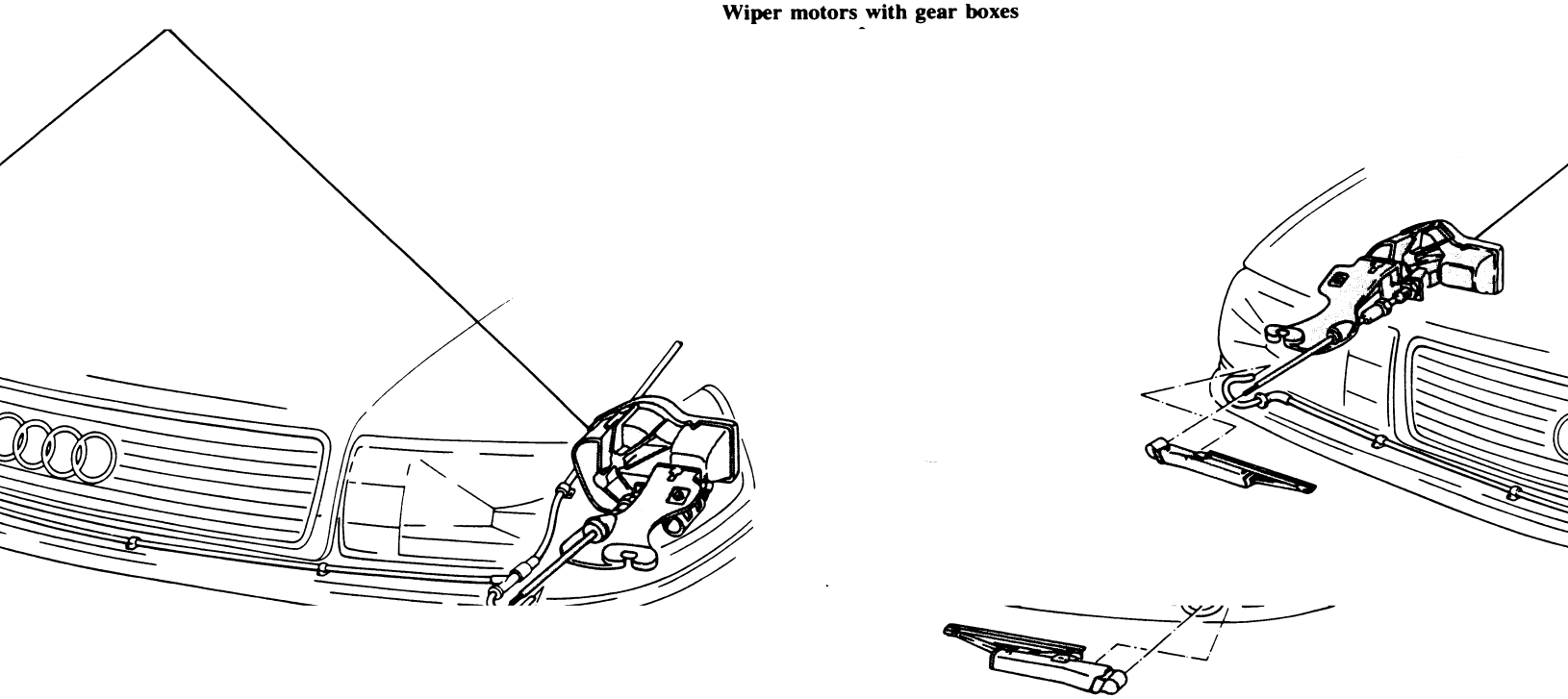
After an accident in which the system has been activated, the belts will no longer be able to be reeled in by the automatic retractors. When this occurs, the seat belts, retractors and cables must be replaced.

If seat belts require replacement for any reason, the belt, reel and cable will have to be replaced as a unit.

Headlight Washers/Wipers

The headlight washer system cleans the headlight lenses every time the windshield washer is activated.

Wiper motors with gear boxes



The wiper motors drive the wiper blades through a gear box and the blades wipe the lenses.

The headlight washer system operates when the windshield washer system is activated even if the headlights are switched off.

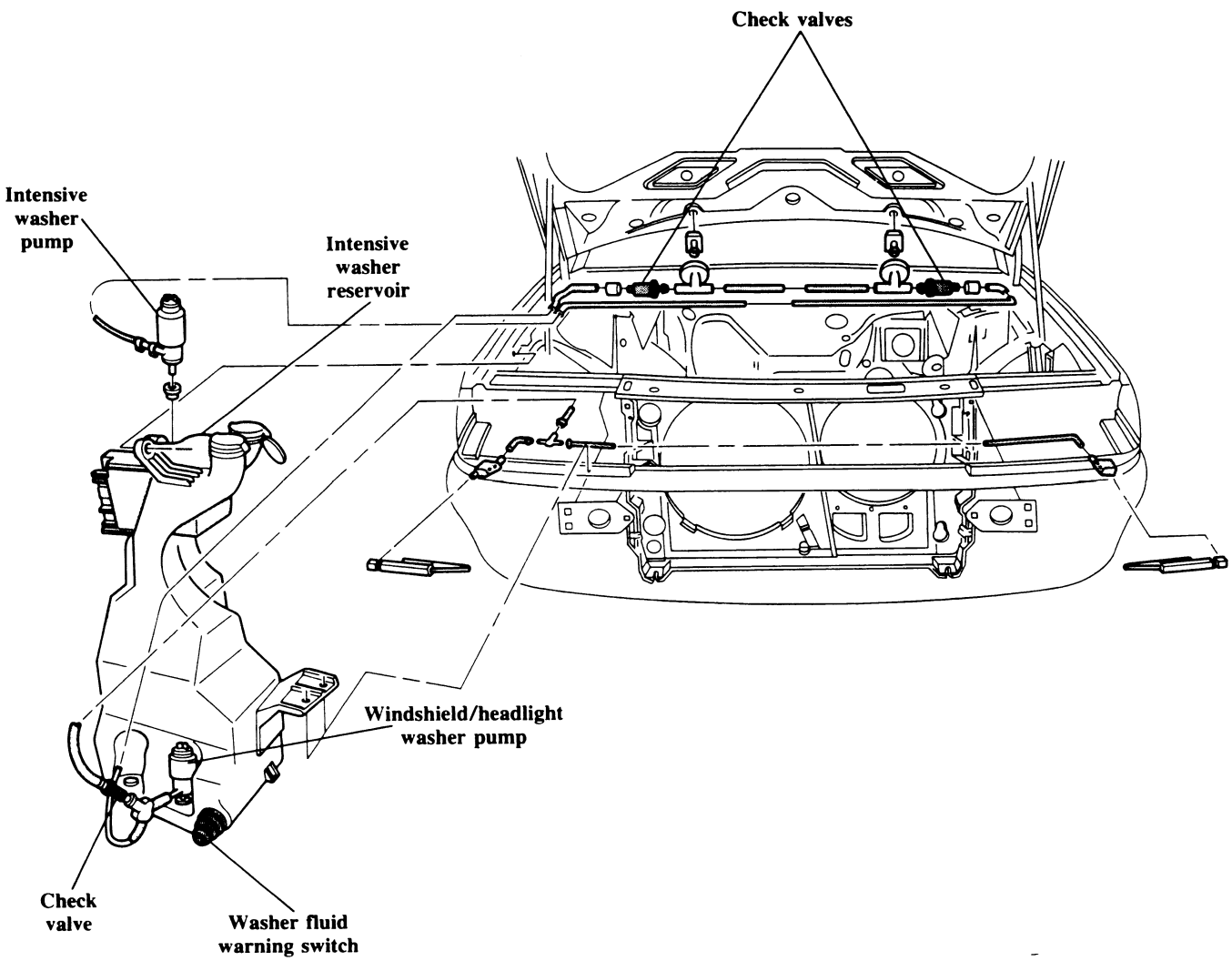
Headlight/Windshield Washers

A single pump is used for both the headlight and the windshield washer fluid. This pump is located on the bottom of the washer fluid reservoir.

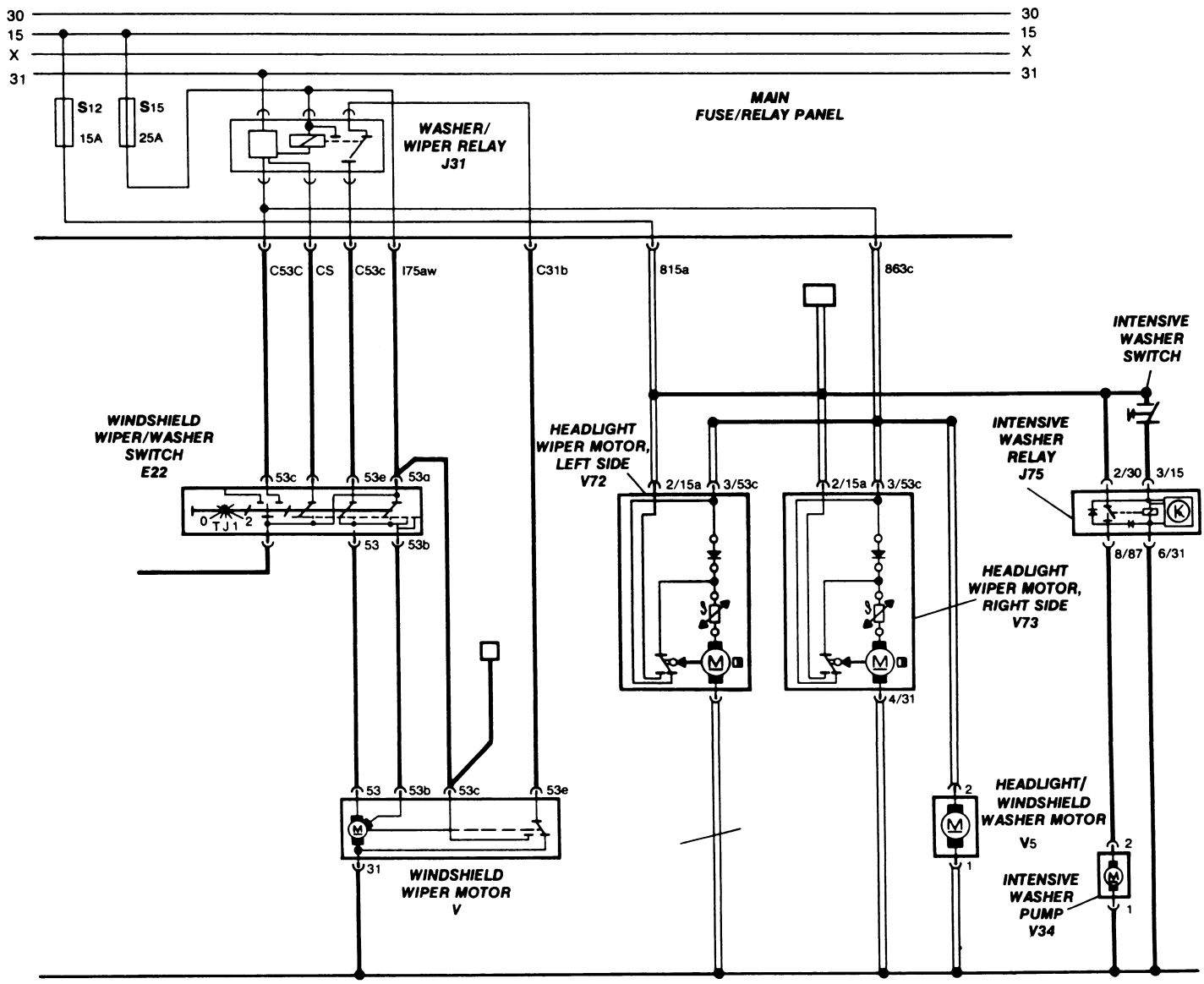
A second high intensity washer system is used for the windshield. This system has a separate reservoir which is located on top of the large washer reservoir.

The reservoir is filled with a special solution which will help remove wax and heavy film from the windshield. The intensive washers are activated by pressing a separate button on the end of the wiper stalk switch.

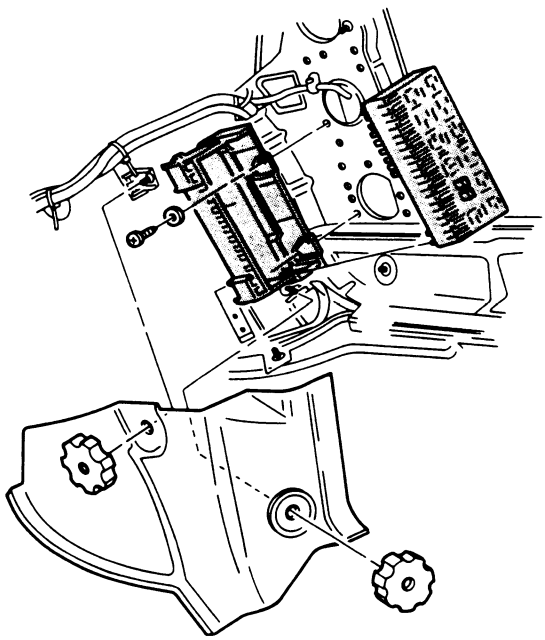
The intensive washer system and pump are connected to the windshield washer jets with one-way check valves.



Headlight, Washers/Wipers Wiring Diagram

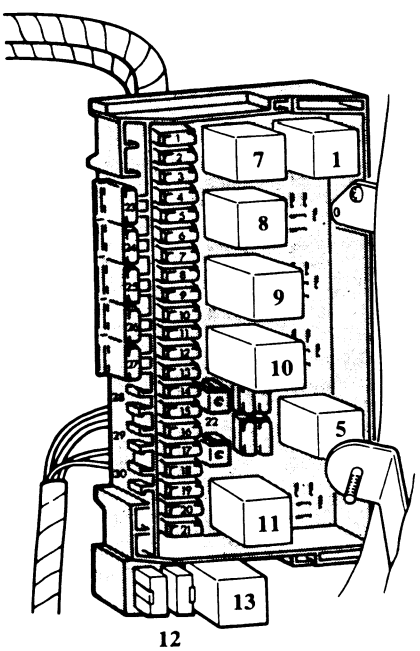


Fuse/Relay Panel



The main fuse relay panel is located behind the side kick panel cover in the front passenger footwell.

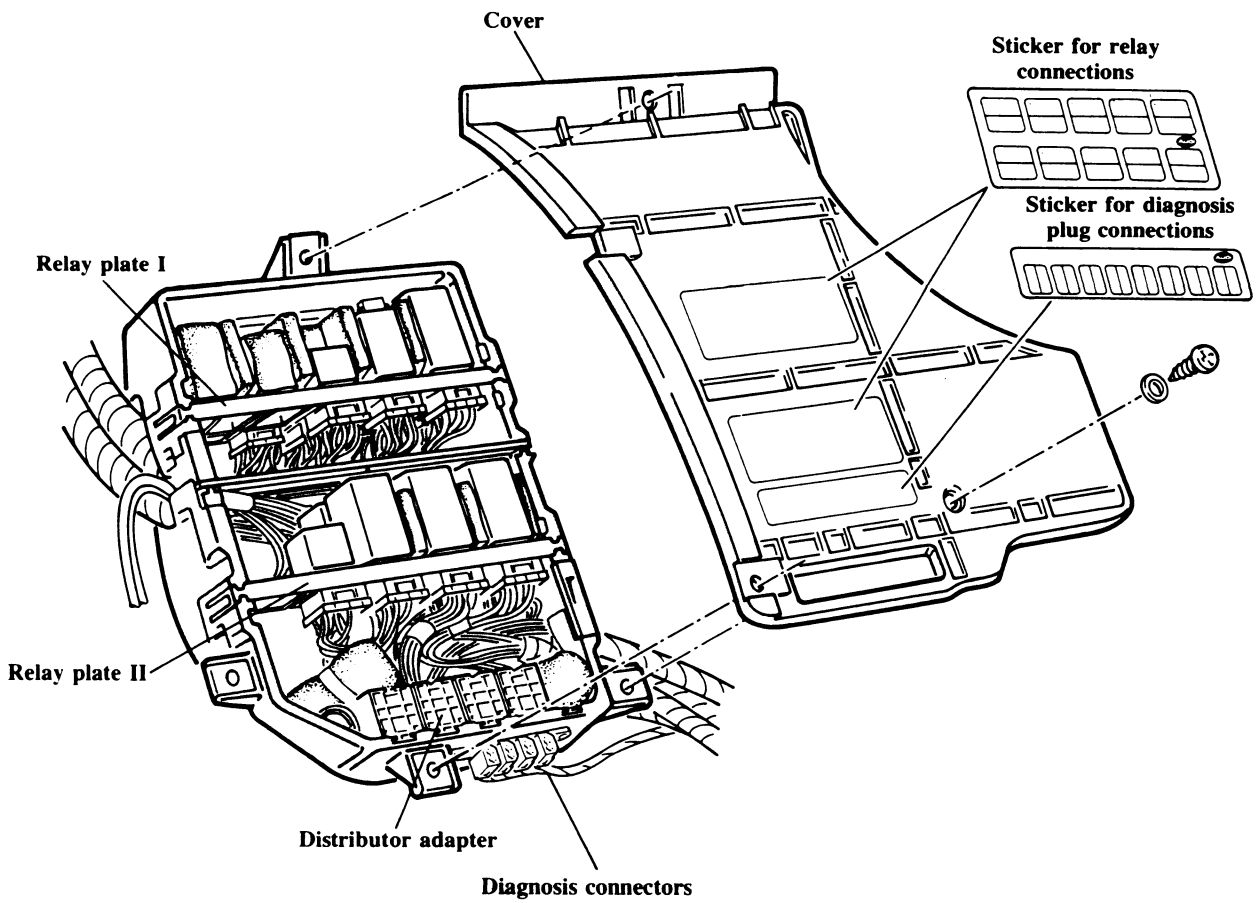
The relay panel is the same as used in other Audi models. The new location provides easy access for diagnosis and fuse replacement.



Relay locations on fuse/relay panel

Relay location number	Relay/control unit for	Code number in current flow diagram
1	Fog lights	J 5
2	Open	
3	Open	
4	Open	
5	Load reduction	J 59
6	Open	
7	Horn	J 4
8	Auto. trans.	J 60
9	Intermittent wash/wipe	J 31
10	Fuel pump	J 17
11	Open	
12	Circuit breakers for power windows, and power seat with memory	S 43 S 44
13	Rad. cool. fan 3rd speed	J 135

Auxiliary Relay Panel



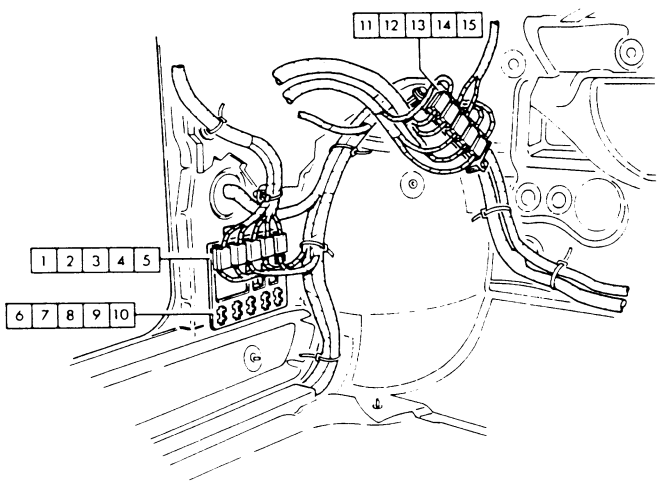
The auxiliary relay panel is located under the carpet in the passenger side footwell.

This provides a central location for the various relays. It also houses the connectors for the V.A.G. 1551 diagnostic tester.

Kostal Connectors

Electrical components and individual wiring harnesses are connected to one another with Kostal connectors.

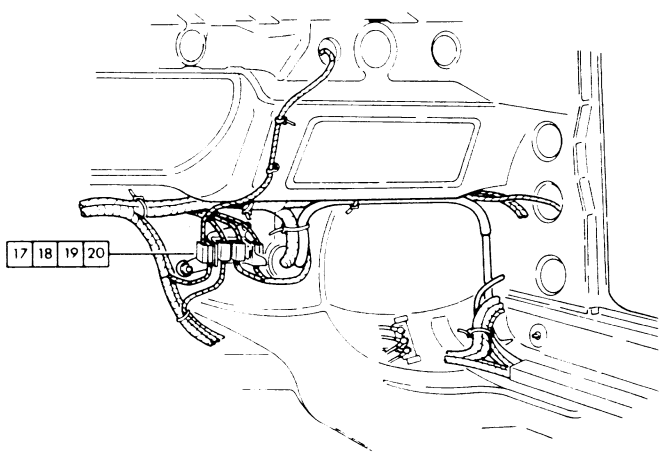
These are located at specific positions and coded for easy identification.



Driver's side kick panel

1 Engine compartment to instrument panel
2 Engine compartment to instrument panel
3 Engine compartment to instrument panel
4 Power window to instrument panel
5 Engine compartment to instrument panel

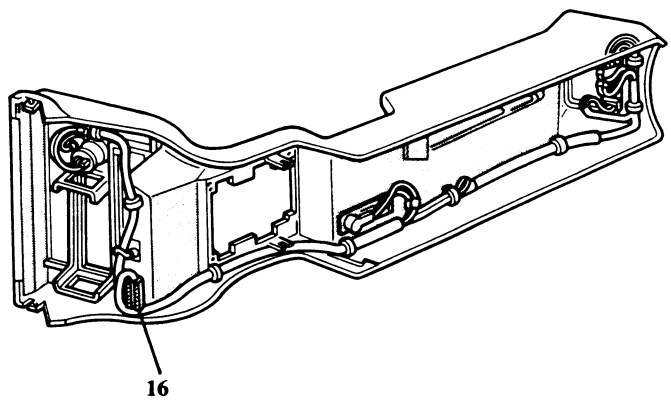
11 Motronic to automatic transmission
12 Instrument panel to auto transmission
13 Instrument panel to Motronic
14 Engine compartment to auto transmission
15 Engine compartment to Motronic



Passenger's side footwell area

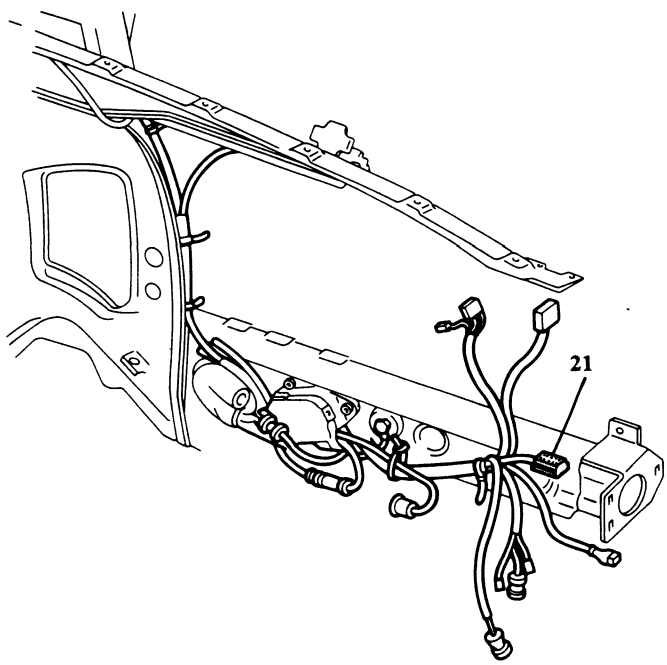
16 Instrument panel to center console (on center console)
17 Engine compartment to A/C
18 Heated seats to instrument panel
19 Taillights to instrument panel
20 Taillights to instrument panel

16 Instrument panel to center console

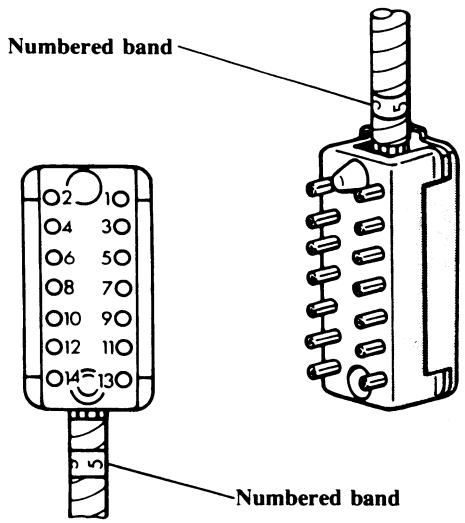


Under center console

21 Engine compartment to front bumper

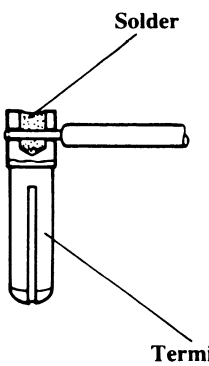


Right front frame sidemember



The cylindrical terminals of the Kostal connector are held in place by the hardshell cover. This ensures total reliability of the connection.

Each harness is numbered for ease of identification.



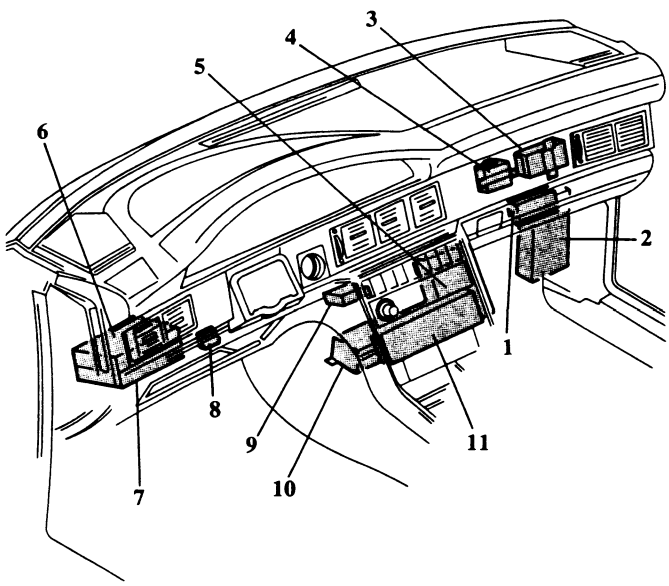
The terminals are silver-coated to provide high current capacity (maximum 30A with a 3.3 mm diameter) and a very low contact resistance.

Wires are soldered to the terminals at right angles so they occupy a minimum amount of space in the hardshell cover.

The wire is inserted into a hole in the terminal and soldered through the open end.

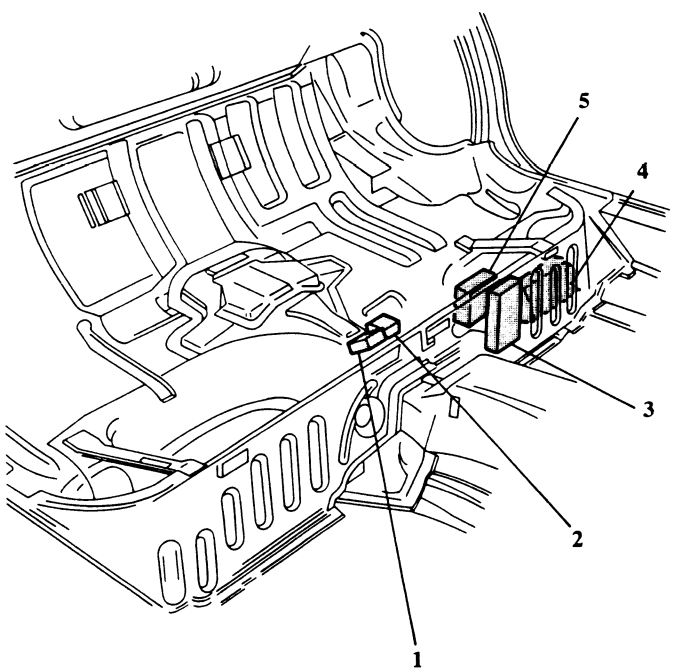
Control Unit Locations

	Description	Code in current flow diagram
1	A/C programmer	J 127
2	Fuse/relay panel	
3	Cruise control unit	J 213
4	Alarm control unit	J 85
5	Auxiliary relay panel (under carpet)	
6	Motronic ECU	J 220
7	Auto trans. control unit	J 217
8	Emergency flasher	J 2
9	Open	
10	Air bag triggering unit	J 178
11	A/C control head	E 87

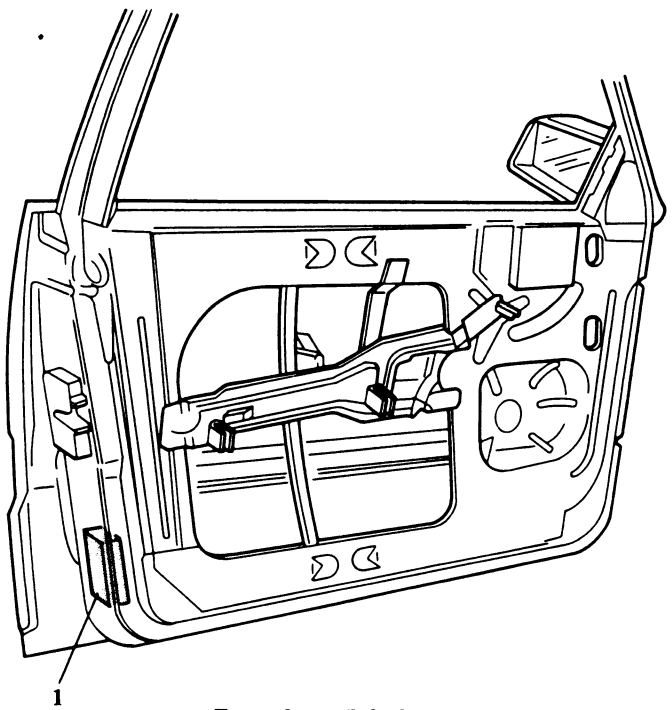


Front passenger compartment

	Description	Code in current flow diagram
1	Open	
2	Acceleration switch	F 113
3	Voltage transformer	N 96
4	ABS control unit	J 104
5	Air bag energy reserve	J 177

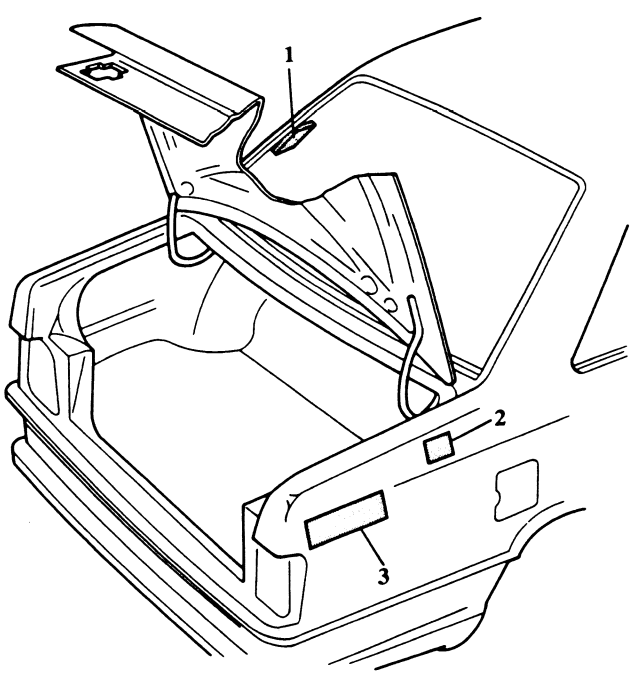


Under rear seat



Front doors (left shown)

	Description	Code in current flow diagrams
1	Heater door lock control unit	J 210 (LF door) J 211 (RF door)



Trunk

	Description	Code in current flow diagram
1	Antenna amplifier	R 24
2	Bulb monitoring unit, rear	J 124
3	Telephone transceiver	

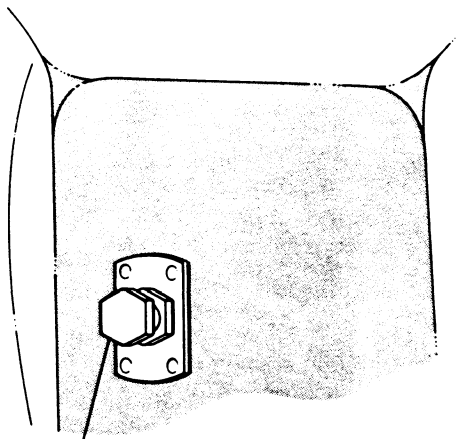
Jump Start Terminal

The battery for the V8 Quattro is located under the right side of the rear seat.

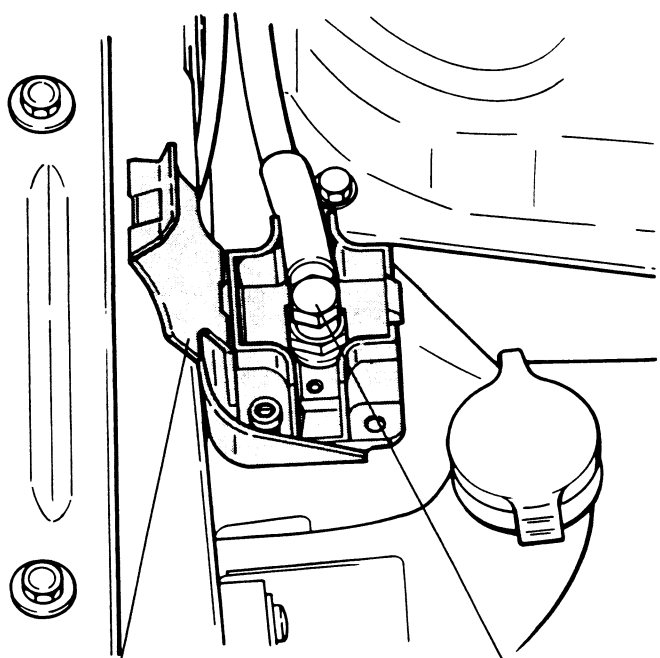
For this reason, positive (+) and negative (−) jump start terminals are located in the engine compartment.

The positive (+) terminal is connected to starter terminal 30 and the positive (+) side of the battery by a thick cable.

The negative (−) terminal is welded to the body near the right front strut mount.



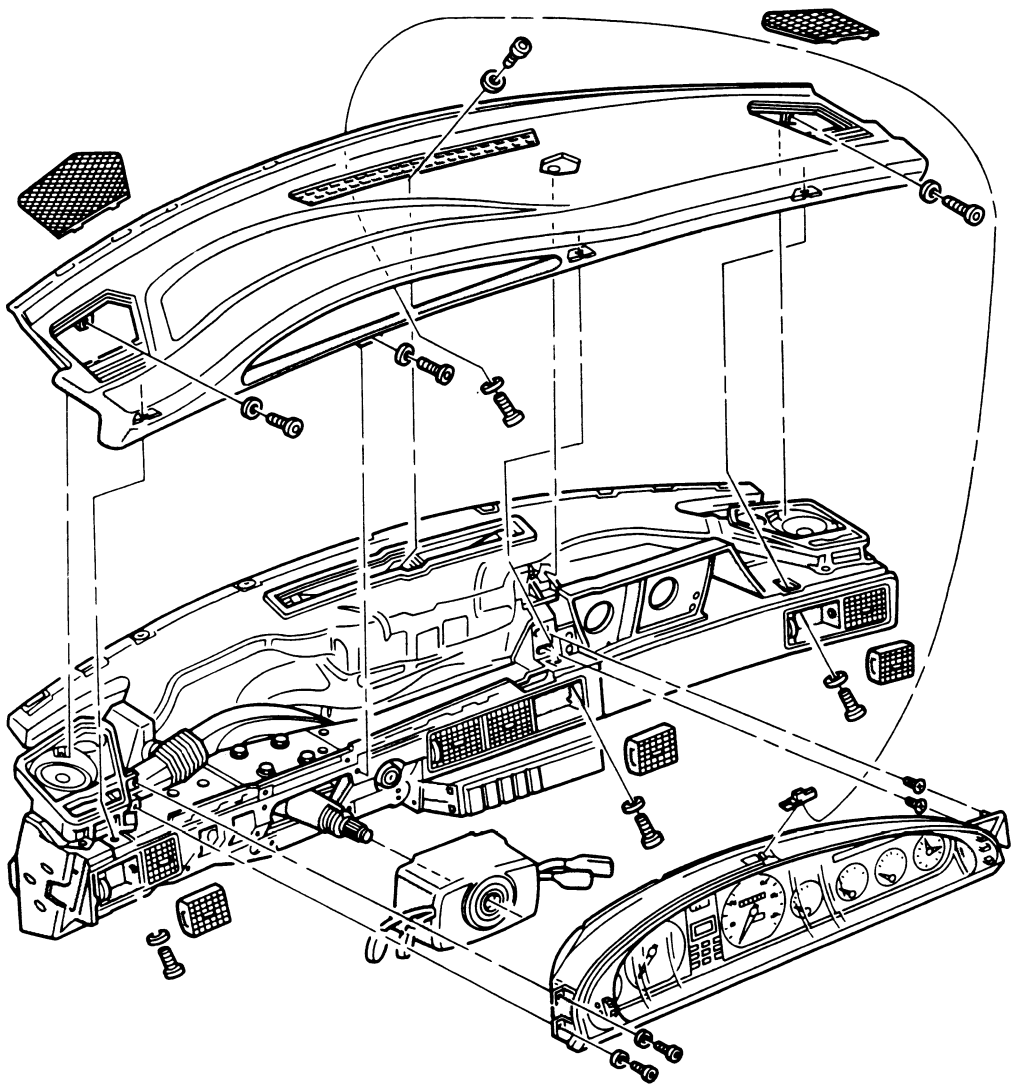
Negative terminal
(welded to body)



Cover

Positive terminal

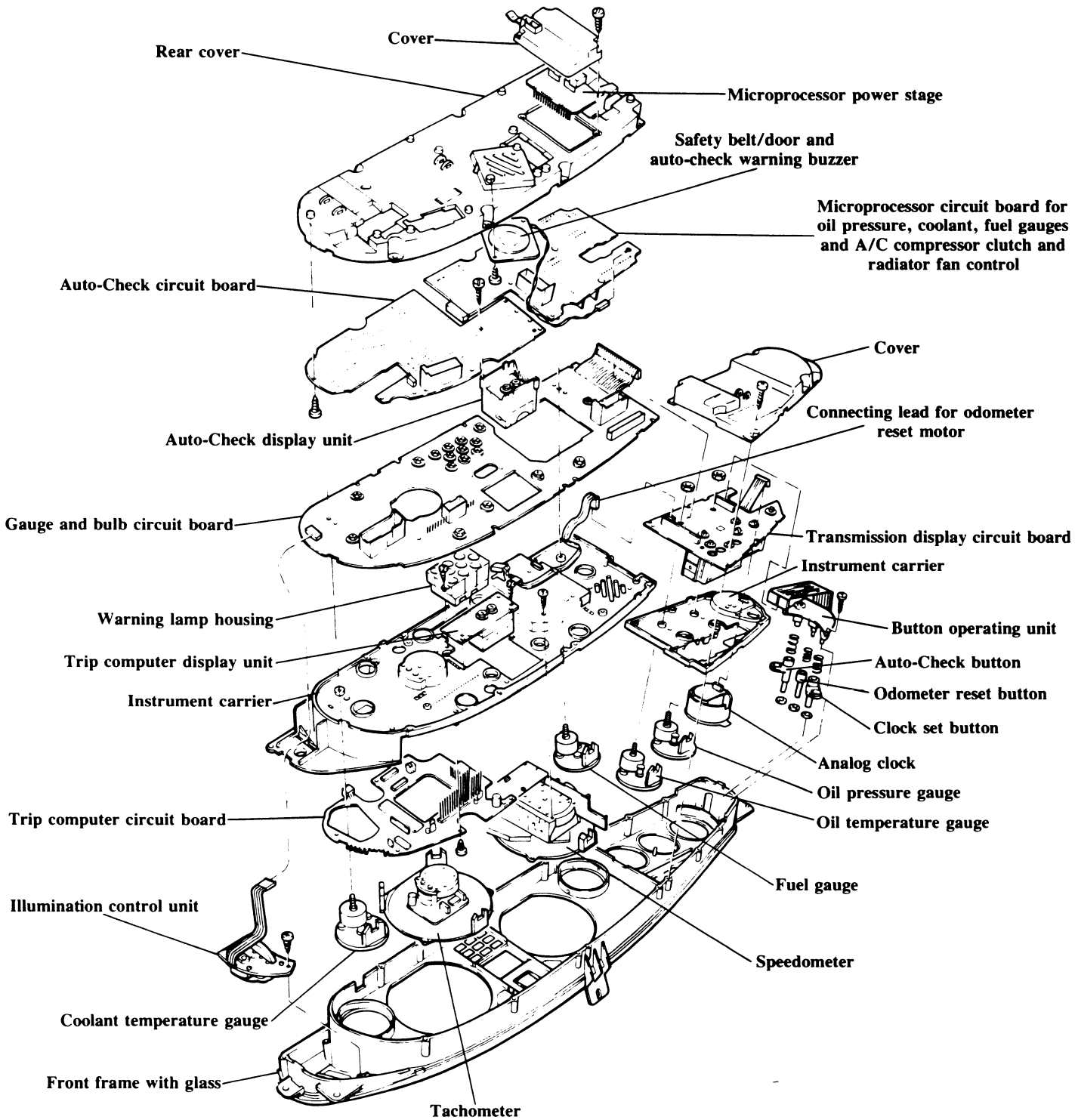
Instrument Cluster



The V8 Quattro instrument cluster is easily removed after first removing the instrument panel cover.

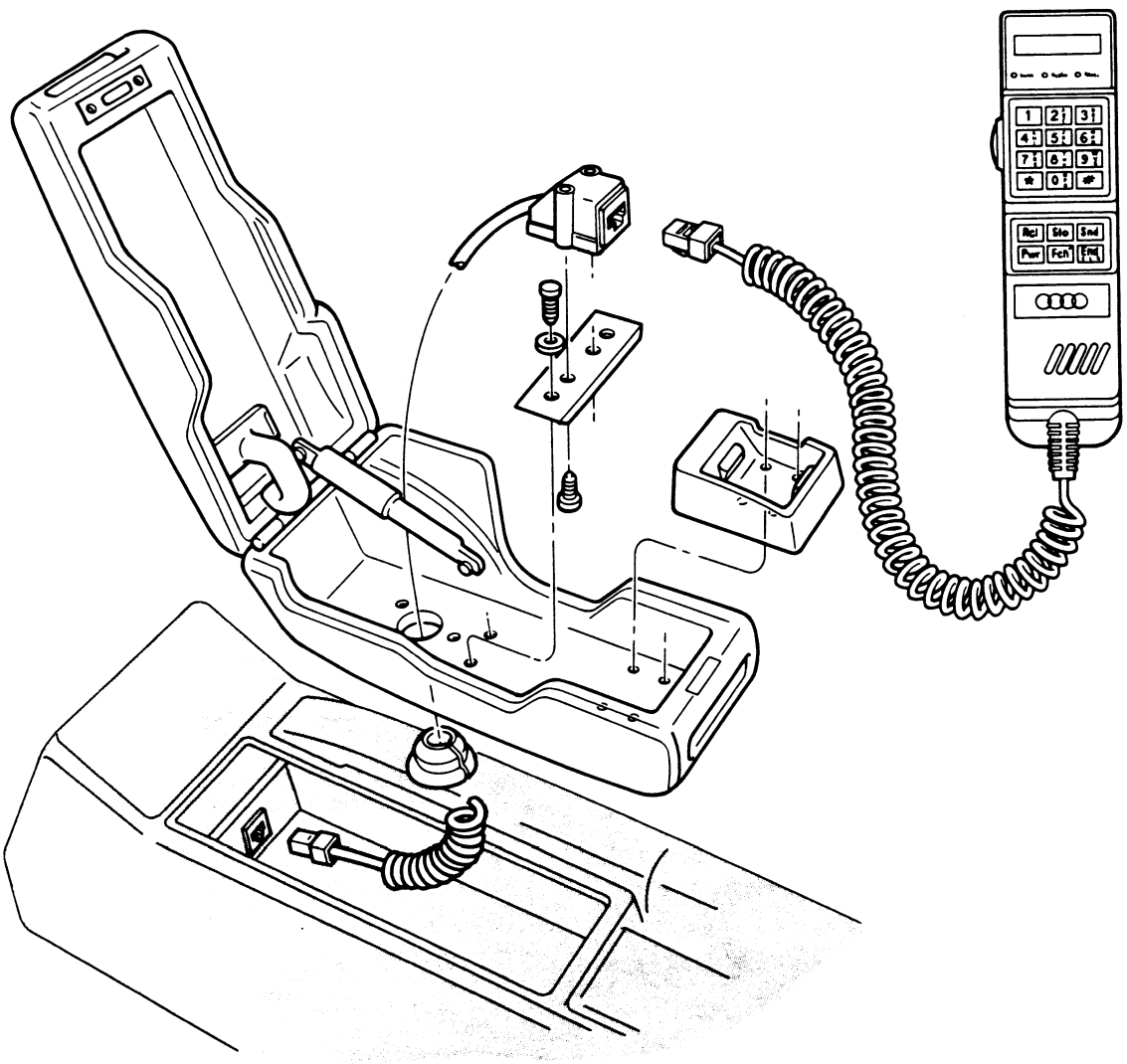
In addition to housing the various gauges and displays, microprocessors in the instrument cluster control the following functions:

- Radiator cooling fan speeds
- A/C compressor clutch
- Warning buzzer
- Interior lights
- Trip computer
- Auto-Check system


Cover
Rear cover
Microprocessor power stage
Safety belt/door and auto-check warning buzzer
Microprocessor circuit board for oil pressure, coolant, fuel gauges and A/C compressor clutch and radiator fan control
Auto-Check circuit board
Cover
Connecting lead for odometer reset motor
Auto-Check display unit
Gauge and bulb circuit board
Transmission display circuit board
Instrument carrier
Warning lamp housing
Button operating unit
Trip computer display unit
Auto-Check button
Instrument carrier
Odometer reset button
Clock set button
Analog clock
Oil pressure gauge
Trip computer circuit board
Oil temperature gauge
Fuel gauge
Illumination control unit
Speedometer
Coolant temperature gauge
Front frame with glass
Tachometer

V8 Quattro Cellular Telephone

Cellular Telephone



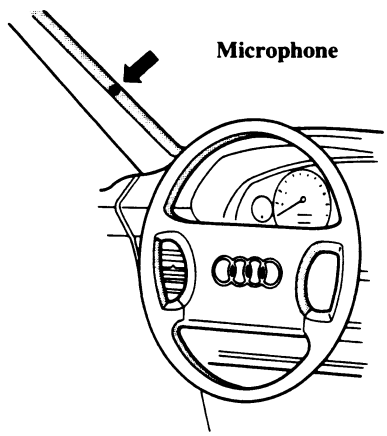
All Audi V8 Quattros will be equipped with a cellular phone from the factory.

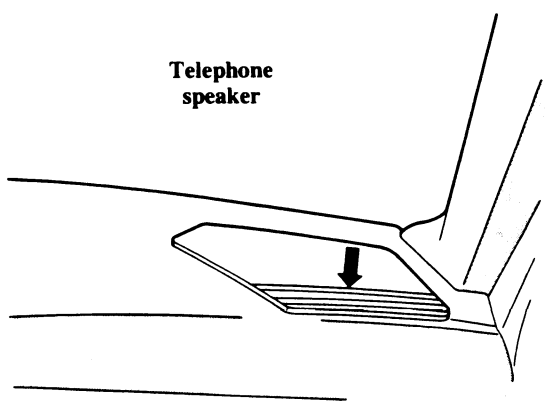
The phone is located in the armrest between the front seats.

The features of the phone include:

- Bold seven digit red LED display
- Illuminated keypad
- Factory-installed wiring and antenna
- Unlock code that protects against unauthorized phone calls. The unlock code can be any three digit number that is programmed into the phone; the factory code is 1 2 3.
- Security code that protects against unauthorized phone programming changes. The security code is a six digit number that is programmed into the phone; the factory code is 0 0 0 0 0 0.
- "Hands free" operation that allows a conversation with both hands on the steering wheel.

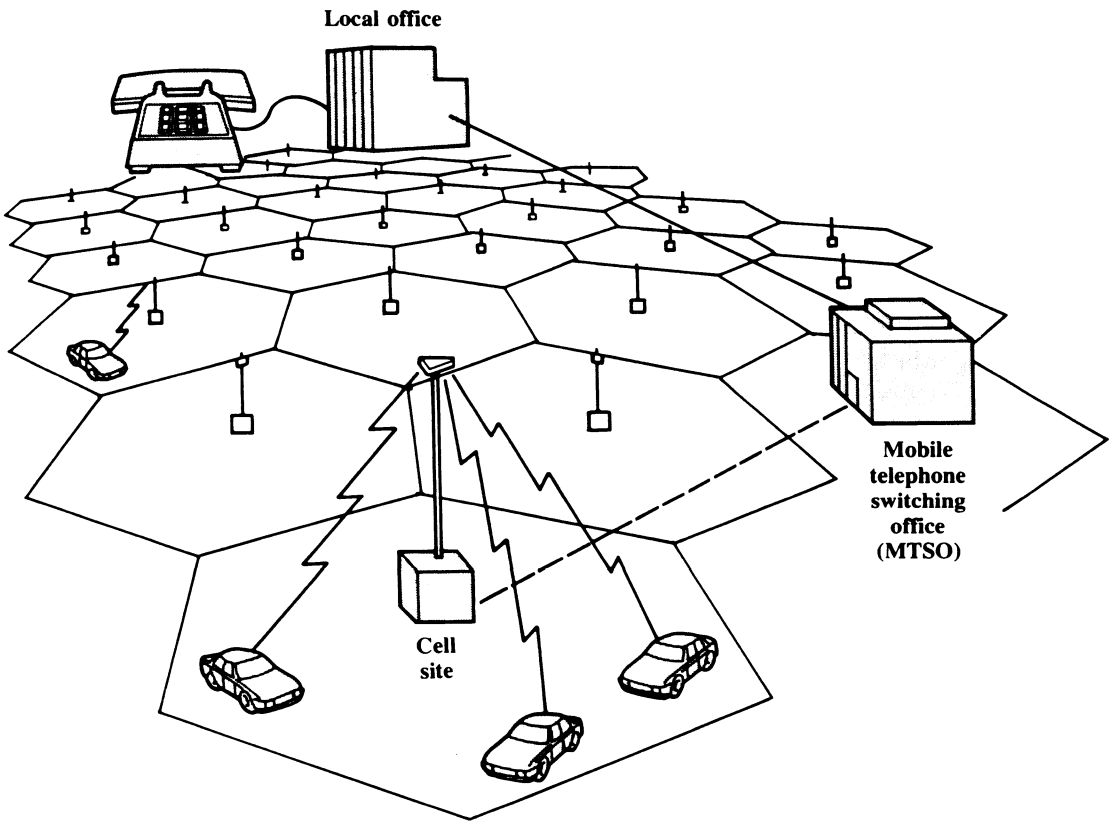
Conversations can be held by talking into the microphone in the left windshield "A" pillar and by listening through the "telephone-dedicated" right dash speaker.





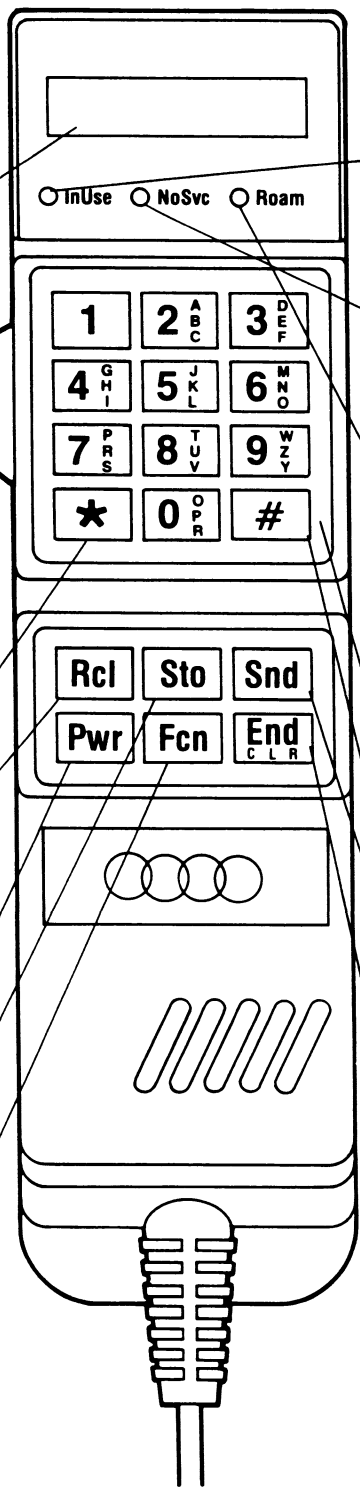
Service Area

The phone will operate within its service area much like a home telephone. A service area is the area in which the mobile telephone can place and receive calls. This service area can vary in size between cellular telephone service companies. A map showing the area that is covered should be obtained from the cellular telephone service company.



To activate and use the phone, the customer will need to obtain service and a phone number from a cellular telephone company. Once activated, the phone should be able to place and receive calls throughout its service area except in totally closed places, such as underground parking garages and tunnels. When the phone is in one of these areas or outside the service area, the "No Svc" indicator light will come on.

Handset



DIALED NUMBER DISPLAY

Provides a visual indication of telephone numbers and messages associated with mobile telephone service.

PUSHBUTTON VOLUME CONTROL

Repeatedly pressing the volume buttons will either increase or decrease sound level of received party audio or confirmation tones:

- Handset earpiece Volume — operate buttons while handset is not in hang-up cup.
- Speaker Volume — operate buttons while handset is in hang-up cup.
- Alert (Ringer) Volume — operate buttons after pressing Fcn button.

STAR KEY

Press to Scroll Foreward during programming.

RECALL

Press Recall and a two digit number to display telephone numbers stored in memory. Also press to display the last number entered if the display has gone blank.

POWER

Press to turn on. Press again to turn off.

STORE

Used in conjunction with a two digit number sequence to store telephone numbers.

FUNCTION

Used in combination with other buttons for specific user-programmed operations.

IN USE

Illuminates from the time a call is initiated or answered until the time the call is terminated.

NO SERVICE

Illuminates when the unit is out of range of the cellular system. Calls cannot be placed or received.

ROAM

Illuminates when the unit is within range of a cellular system other than its home registered system.

- Home-type system: steady
- Non-home-type system: blinking

NUMERIC KEYPAD

Used to enter telephone numbers. Numbers are entered prior to initiating a call.

POUND KEY

Used in combination with other keys.

SEND

Press to initiate a call to the entered telephone number or to answer a call. Press for switchhook flash when a call is in process.

END

Press to terminate call.

CLEAR

Press and release to clear the last digit entered. Press and hold to clear the display in the event of an error (does not affect numbers stored in memory).

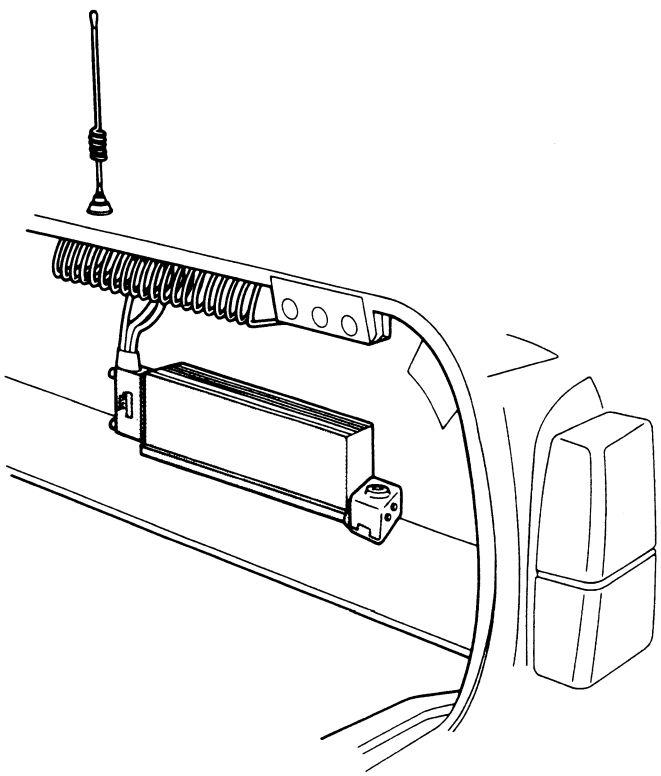
V8 Quattro Cellular Telephone

Antenna

The antenna is located on the right rear fender. The removable mast is threaded into the antenna base. The antenna lead runs from the antenna base to the transceiver.

Caution:
No one should touch the antenna mast when a call is being placed or received. During transmission of a call, the antenna gives off radiation.

Transceiver



The transceiver is located in the trunk on the right side.

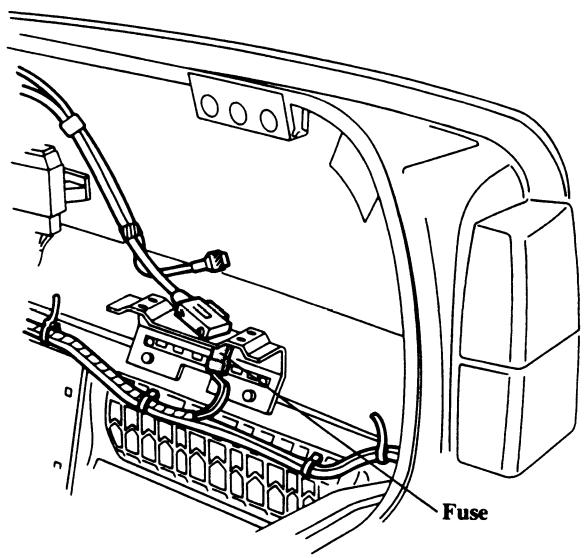
The transceiver contains the circuitry for the telephone's programming, memory and for sending and receiving calls.

Disconnecting the car's battery or disconnecting the wiring harness from the transceiver **does not** erase the telephone's programming or memory.

Fuse

The fuse for the phone is located in the trunk under the transceiver bracket behind the carpet. The amperage rating of the fuse is 10 Amps.

To replace or check the fuse, you must remove the transceiver's mounting track and peel back the trunk carpeting.



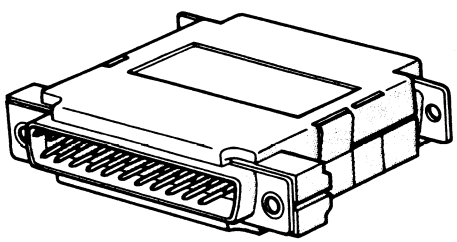
US 30844

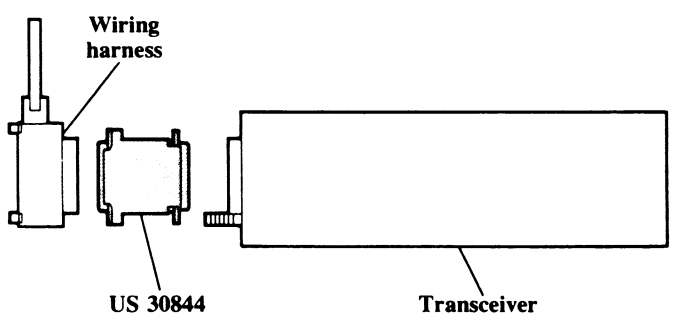
If the Electronic Serial Number, lock code or security code are forgotten, tool US 30844 allows access into the programming mode. You can also reset the counter that records the number of times the phone number has been changed.

The telephone is designed to allow up to three phone number changes. After three changes (and three presses of the Snd button,) the phone will block any further attempts at programming. You can unlock the phone with tool US 30844.

Tool US 30844 is installed between the transceiver and the wiring harness connector.

For information on how to use the tool, refer to Group 91 of the Audi V8 Quattro Microfiche.



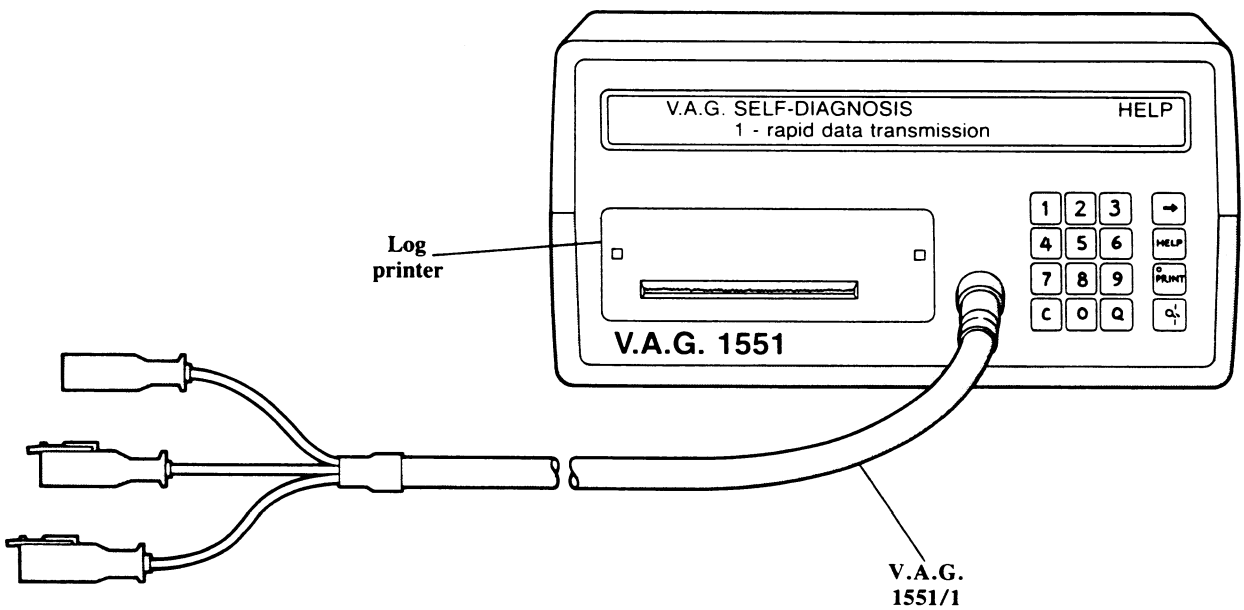


Fault Diagnosis

Many of the electronic control units used on the Audi V8 Quattro have permanent fault memory capability.

This means there is a program integrated in the control unit that monitors input and output signals, recognizes faults and stores them permanently.

On the Audi V8 Quattro, it is possible to test the Motronic ECU, the automatic transmission ECU and the instrument cluster using the V.A.G. 1551.



The faults stored by the control unit can be read by diagnostic tool V.A.G. 1551.

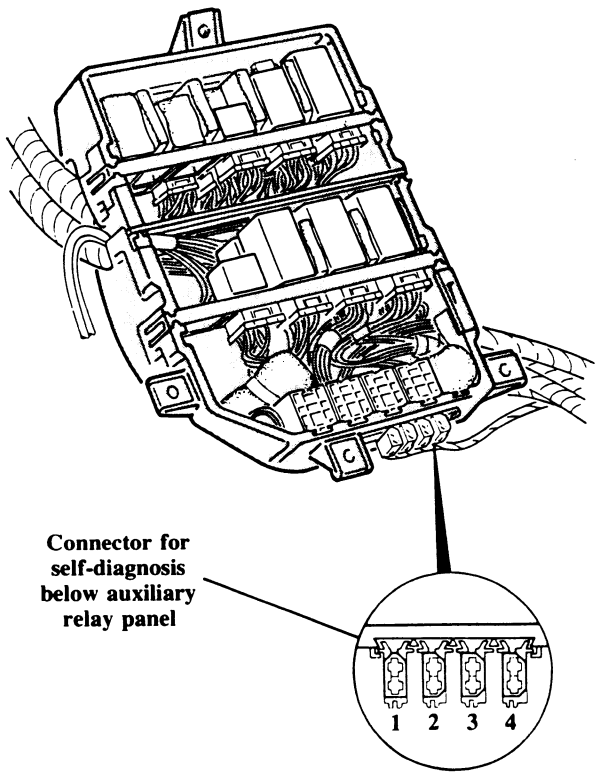
V.A.G. 1551 has a text display, numeric keypad and small printer. The unit is attached to the vehicle's diagnostic connectors via interface cable V.A.G. 1551/1 and operated through the keypad.

The LCD screen provides the text display while the printer takes care of documentation and operating instructions.

V.A.G. 1551 is attached to the diagnostic connectors located on the auxiliary relay panel beneath the front passenger footwell carpeting.

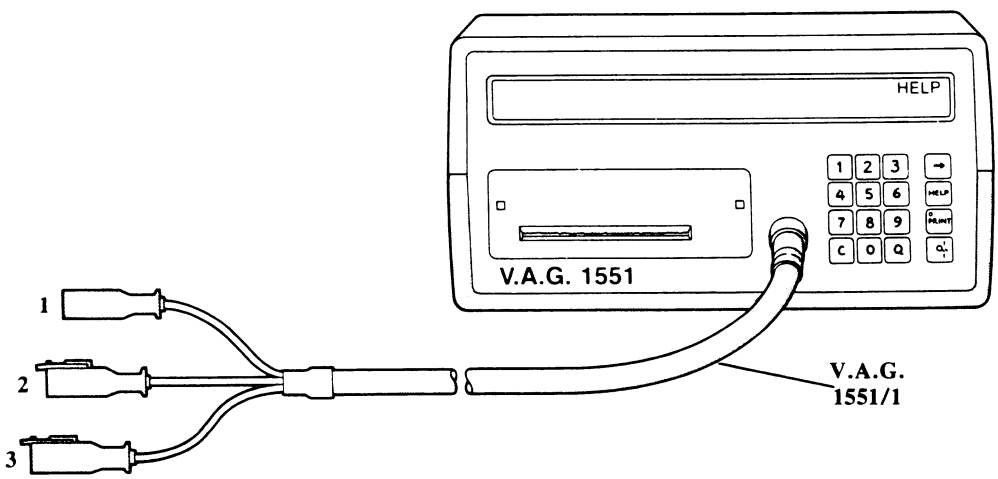
Diagnostic connector identification:

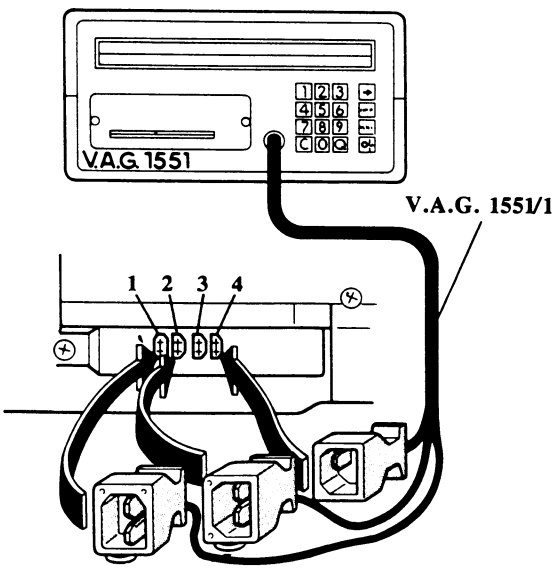
1 - Power supply for V.A.G. 1551
2 - Rapid data transmission for Motronic ECU and transmission ECU
3 - Instrument cluster
4 - Flash code for engine



V.A.G. 1551 test lead identification:

1 - L wire (for flash code diagnosis)
2 - K wire (for rapid data transmission)
3 - Power and ground for V.A.G. 1551

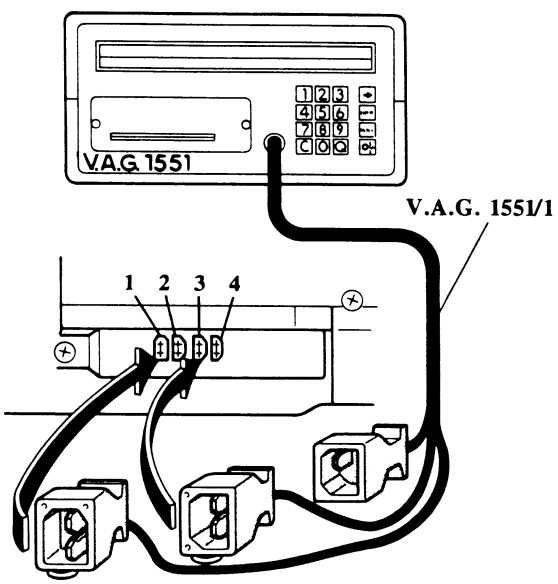




To test the Motronic or transmission ECU's, connect the V.A.G. 1551/1 as shown at right.

It is possible to use the rapid data and flash code diagnosis on the Motronic and transmission ECU's.

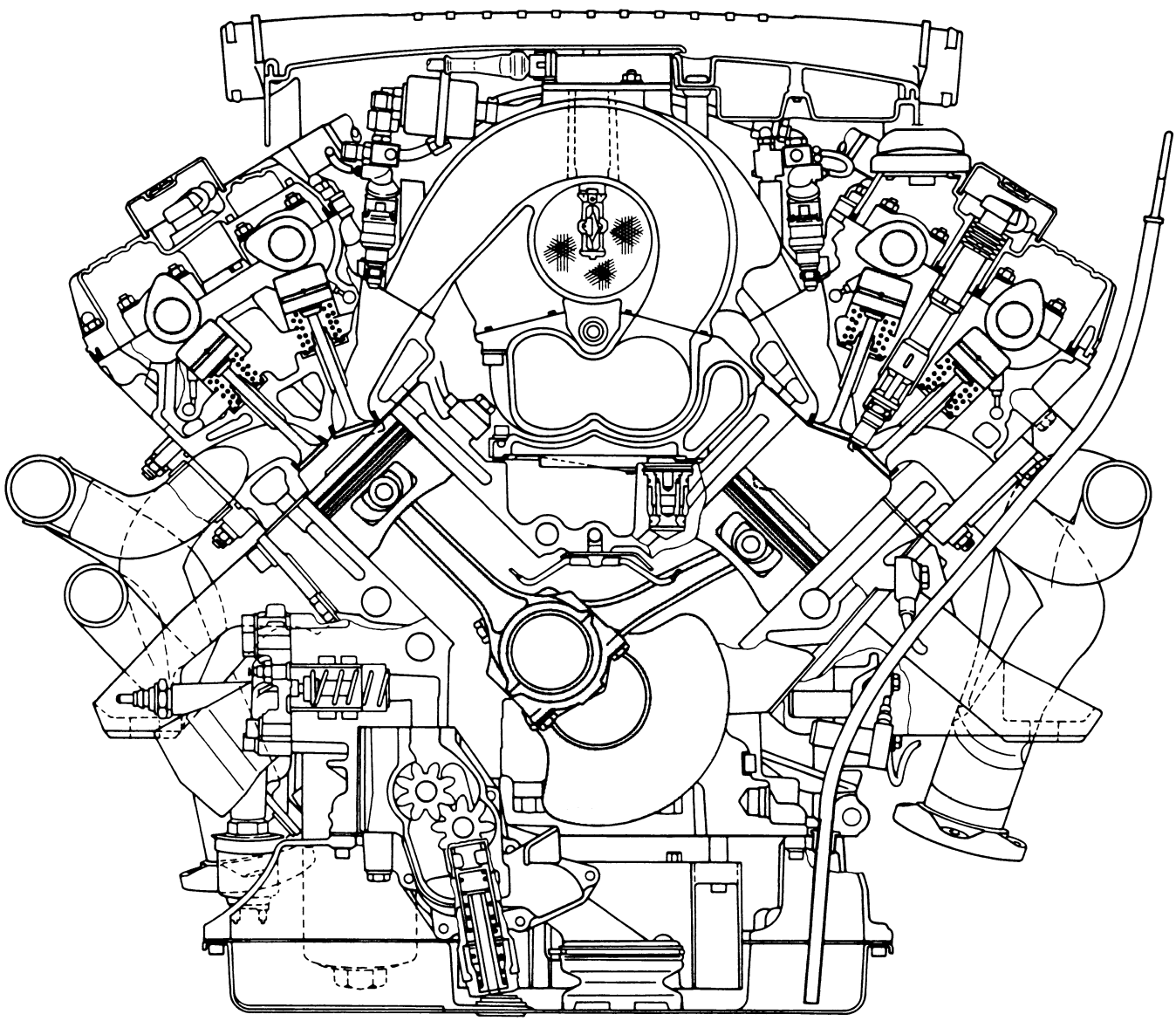
It is also possible to check the output signals of each ECU.



To test the instrument panel, V.A.G. 1551/1 is connected as shown at right.

When testing the instrument cluster, only the flash code diagnosis can be used. It is possible, however, to check the output signals.

For complete details on checking the input and output signals of these control units and components, check the new Repair Group 01 of the Audi V8 Quattro Repair Manual.



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