



Audi Coupe Quattro with 20 Valve Engine

Service Training

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Introduction

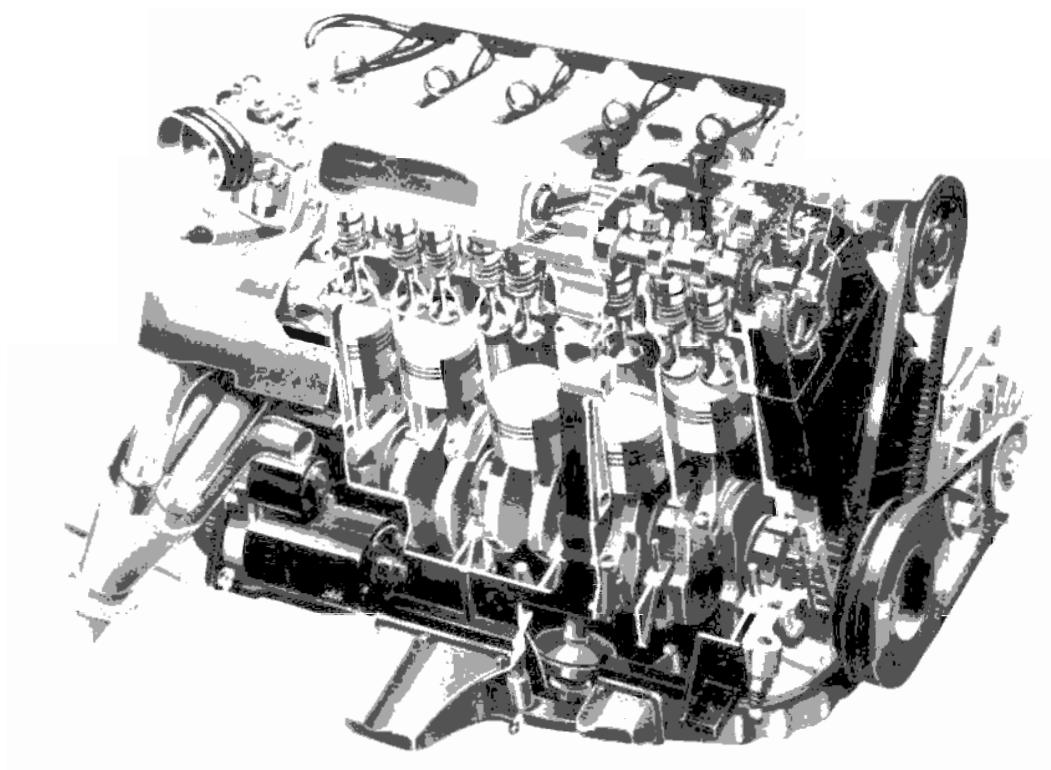
Audi Coupe Quattro



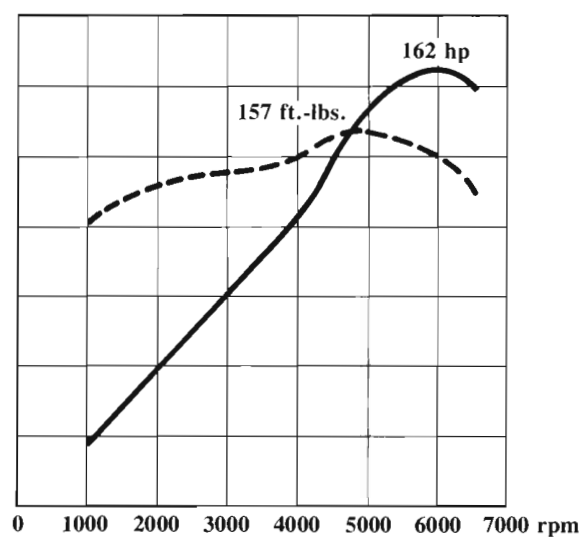
- New 2 door Coupe body
- 2.3 liter 162 hp 20 valve 5-cylinder engine
- Quattro drive train with Torsen center differential
- Sports-type suspension tuning with gas pressurized shocks
- 15 inch speedline wheels with 205/15 VR tires
- Frameless door windows
- New generation sunroof
- ABS, Climate control and leather interior standard equipment.
- Split-fold rear seats with relocated fuel tank.

Introduction

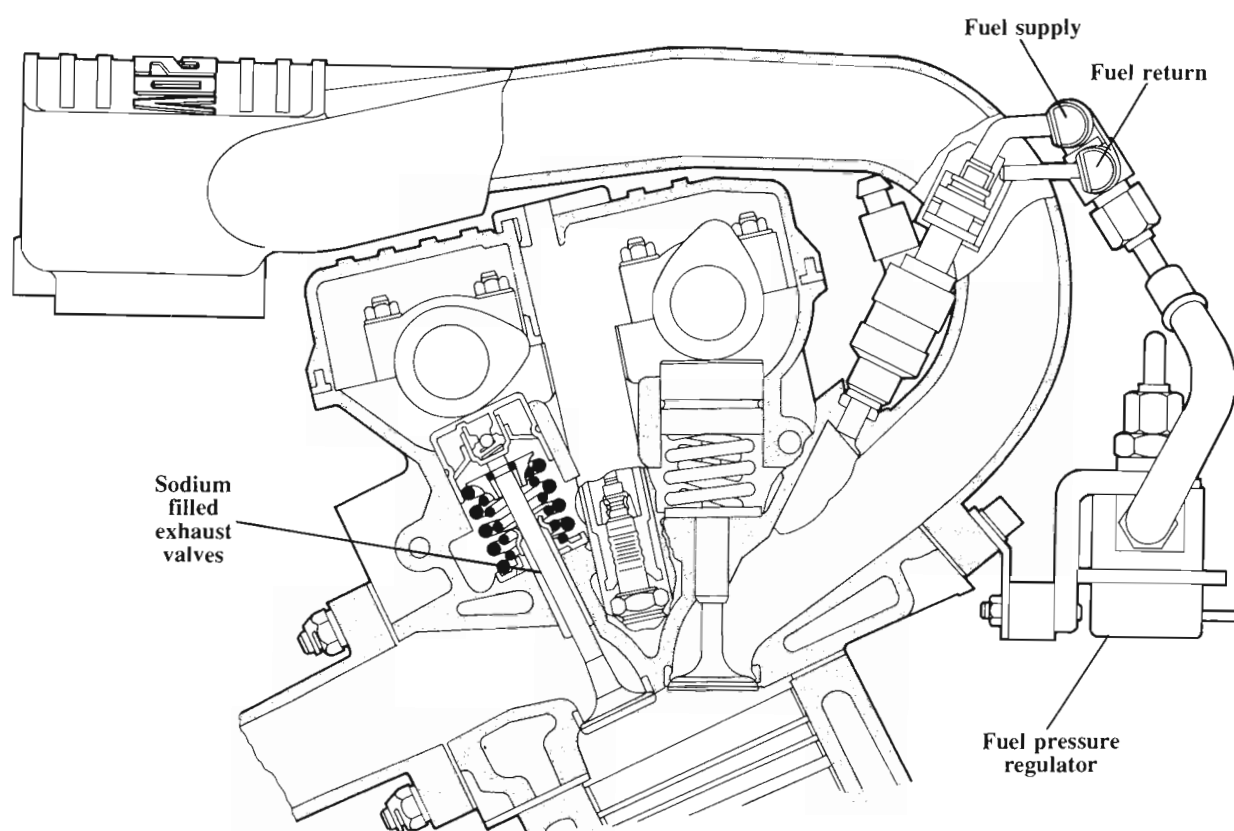
20 Valve Engine



- 4 valve per cylinder design with 25% increase in intake air charge flow
- Sodium-filled exhaust valves
- 10.3:1 compression ratio
- 162 hp @ 6000 rpm
- M.P.I. engine management system with:
 - air mass sensor
 - double-knock sensors
 - dual ignition maps
 - cylinder selective knock control
 - new type ball valve fuel injectors



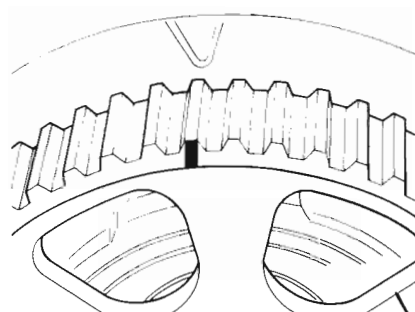
Engine



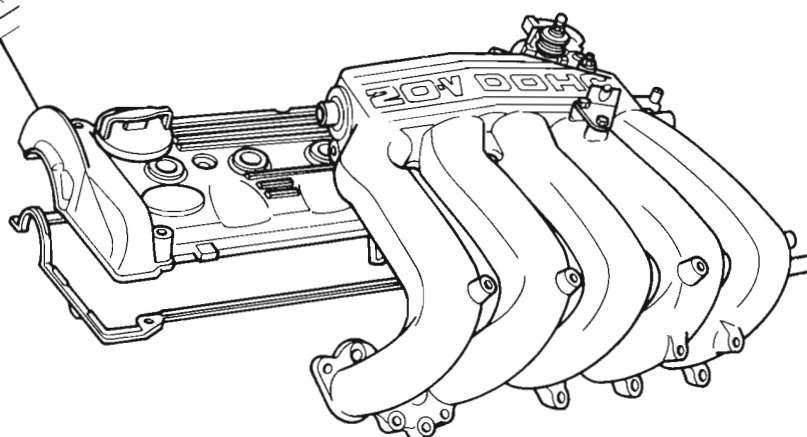
The cylinder head is now a crossflow design with the intake valves arranged at a 25° angle to the engine's center line. This results in a compact combustion chamber. The spark plug is located in the center of the chamber which leads to good combustion characteristics and less potential for detonation.

The exhaust valves are sodium-filled which helps to transfer heat from the valve head to the valve stem. New pistons are used to achieve the 10.3:1 compression ratio.

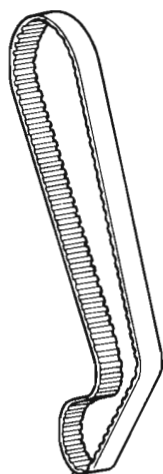
The camshafts are driven by a new toothed belt that has a deeper tooth pitch. The belt drives the exhaust camshaft. The exhaust camshaft then drives the intake camshaft through a single roller chain and sprockets which are attached to the front of each camshaft.



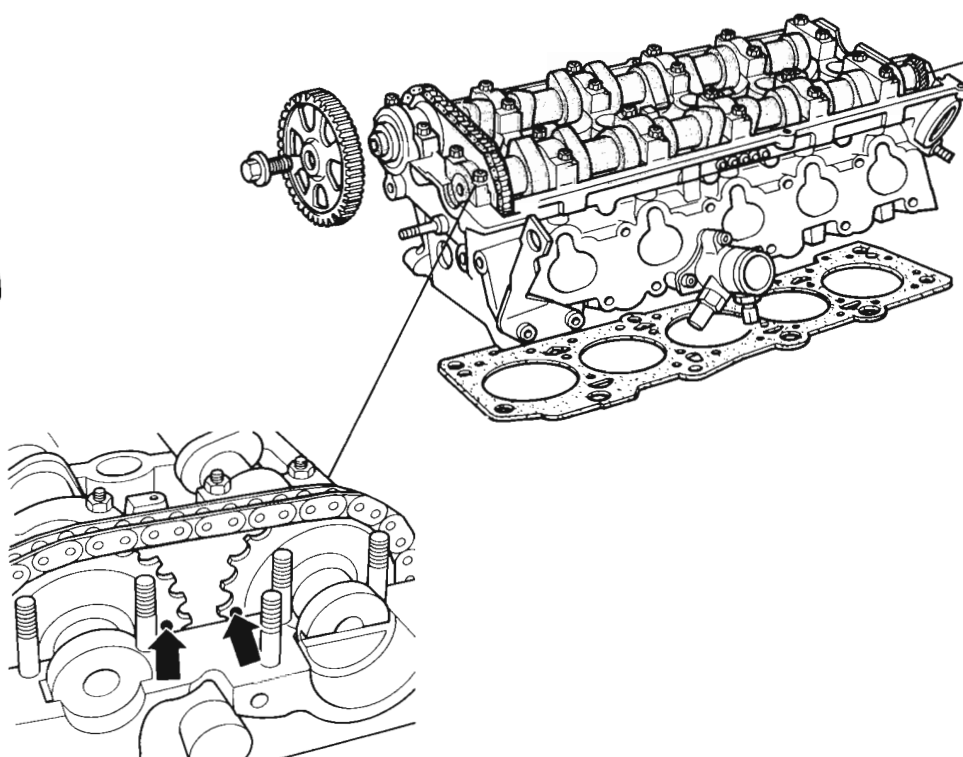
Marking for TDC of camshaft drive gear



Distributor drive



Drive belt



Marking for TDC of camshaft sprockets

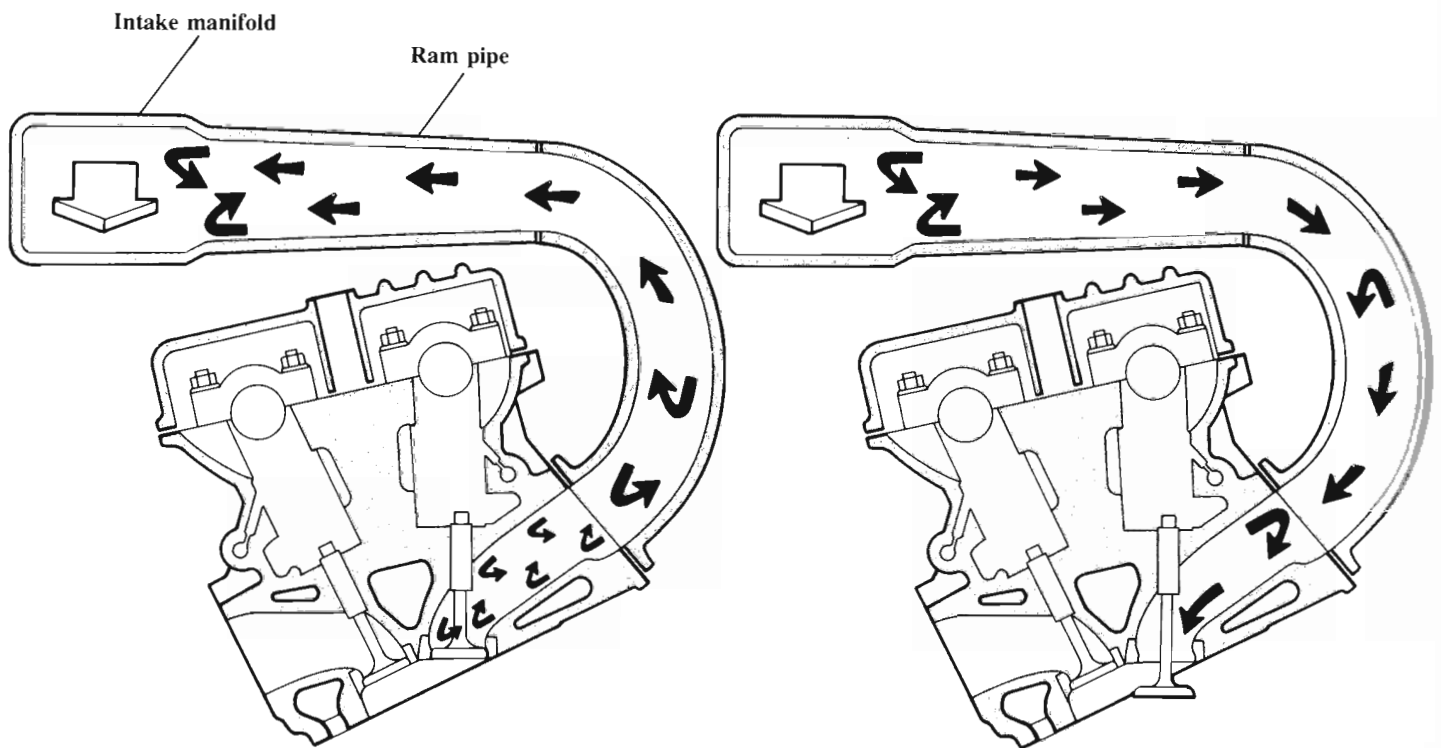
Engine

Intake Manifold

The shape of the intake manifold and the length of the intake tracts were designed to provide good engine performance through improved cylinder filling.

As the intake air moves through the manifold, it oscillates (moves back and forth at a high rate of

speed every time an intake valve closes). By carefully designing the length and diameter of the intake tracts, this movement of the intake air can be used as a ram effect to push more air into the combustion chamber at certain engine speeds.

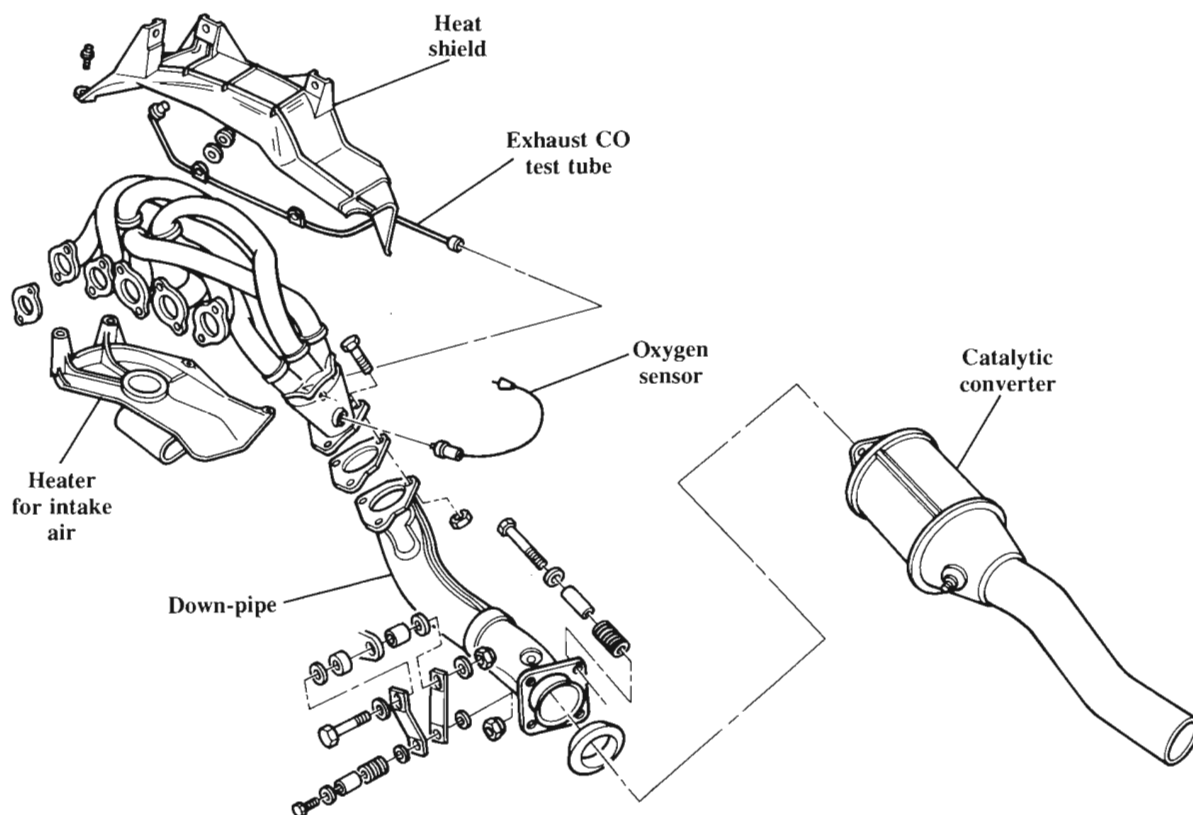
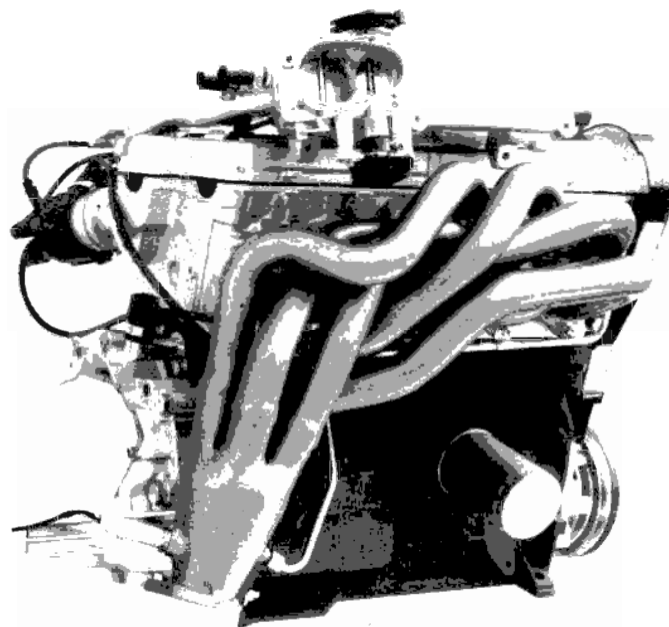


Exhaust Manifold

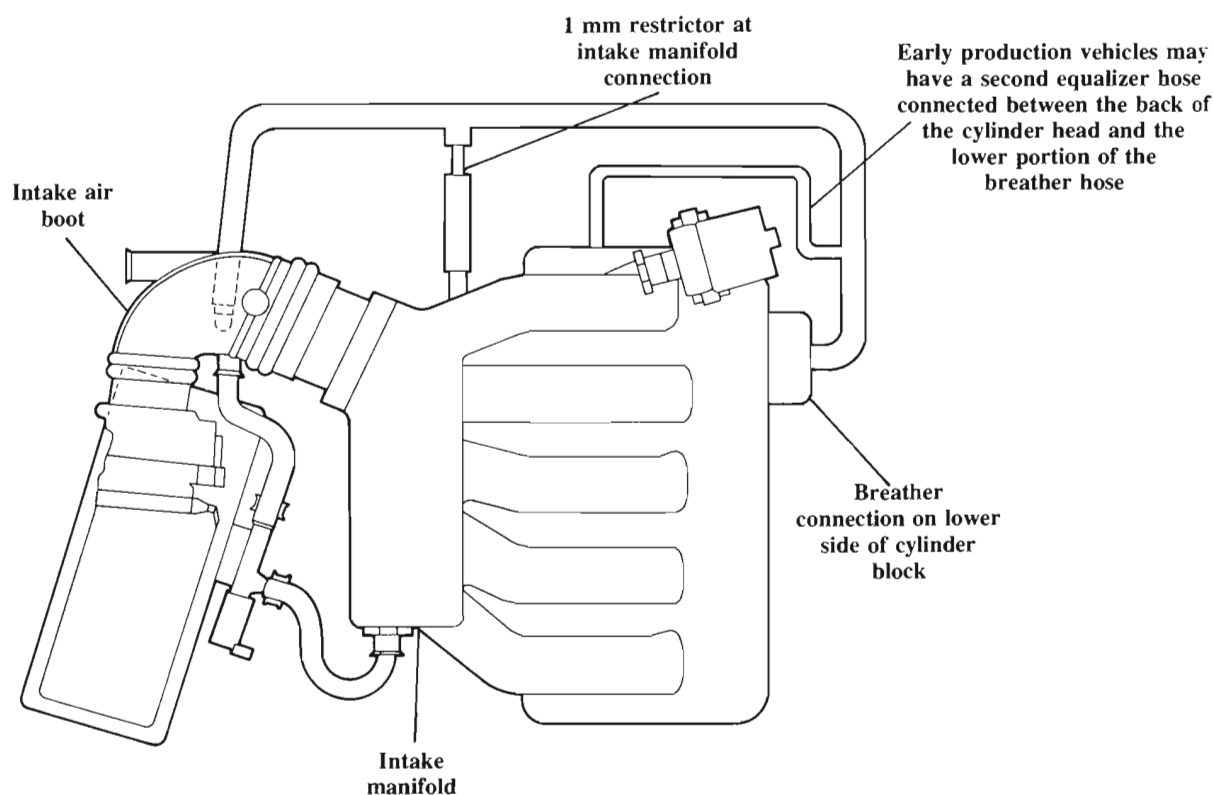
The length and diameter of the exhaust manifold pipes were designed to produce good gas flow and reduce exhaust gas back pressure.

The exhaust manifold consists of five equal length pipes which are 800 mm long and 40 mm in diameter. The pipes merge at a common flange before being connected to the down-pipe. The oxygen sensor is located in this flange.

A heat shield covers the exhaust manifold and is bolted to the intake manifold.



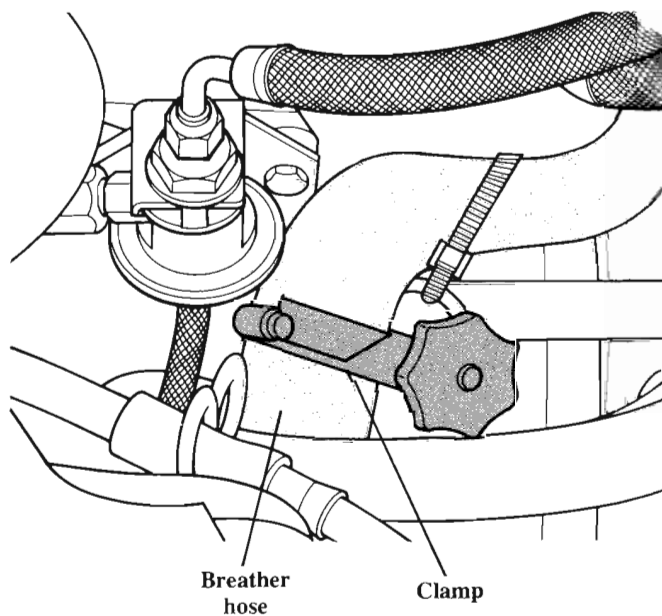
Crankcase Breather



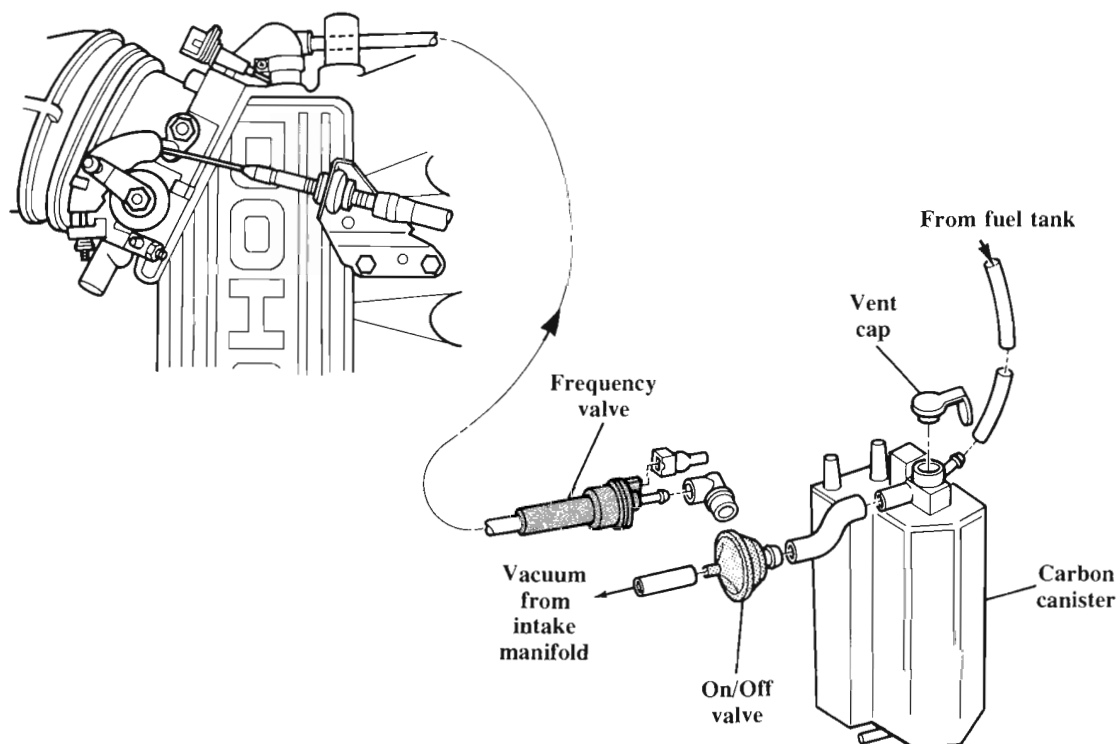
A single vent is used for the crankcase breather and is located on the lower left side of the cylinder block. From there, the crankcase is vented to the engine's intake through a connection at the intake manifold and a second connection at the intake air boot.

At idle or other periods of high manifold vacuum, most of the crankcase fumes are drawn into the intake through the connection at the manifold which has a 1 mm restrictor. When the throttle is opened, crankcase fumes will also be drawn in through the intake air boot.

When checking or adjusting the engine CO%, the breather hose should be pinched shut where it connects to the cylinder block. The oil dipstick should also be removed to allow the crankcase to vent to atmosphere.



Fuel Tank Ventilation

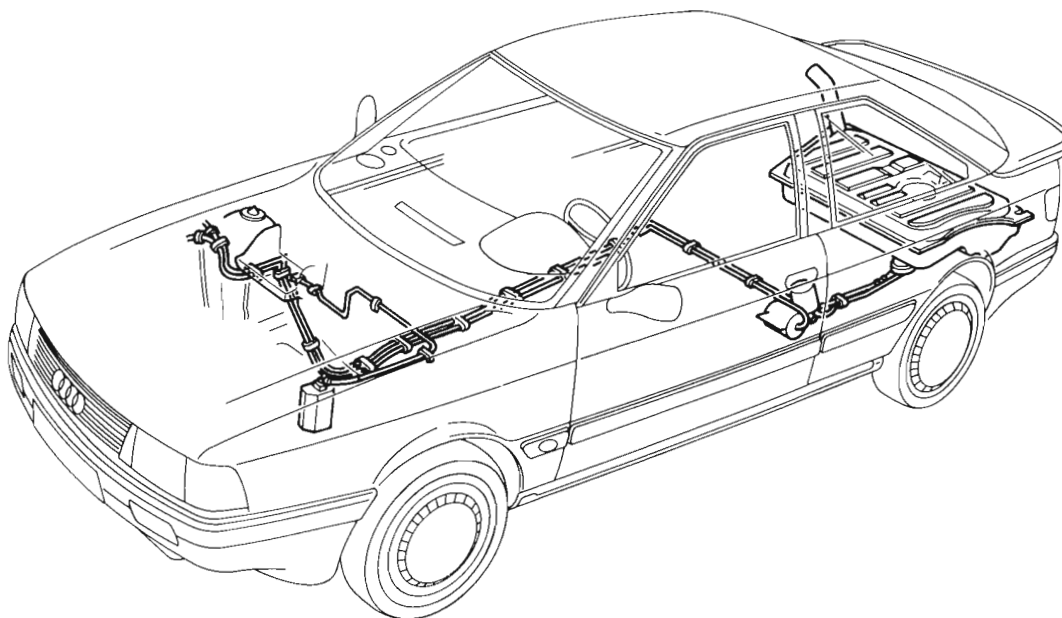


Vapors from the fuel tank are collected in the carbon canister. An on/off valve is connected to the intake manifold vacuum and opens when the engine is running. This allows fuel vapors in the canister to be drawn into the intake manifold through a frequency valve.

The frequency valve is operated by the M.P.I. control unit. It regulates the flow of fuel vapors from the carbon canister. The frequency valve's duty cycle will vary depending on engine temperature, load and speed.

The vent cap on the canister should be removed when checking or adjusting the engine CO%. This allows the engine to draw in fresh air instead of fuel vapors from the canister.

Fuel Supply



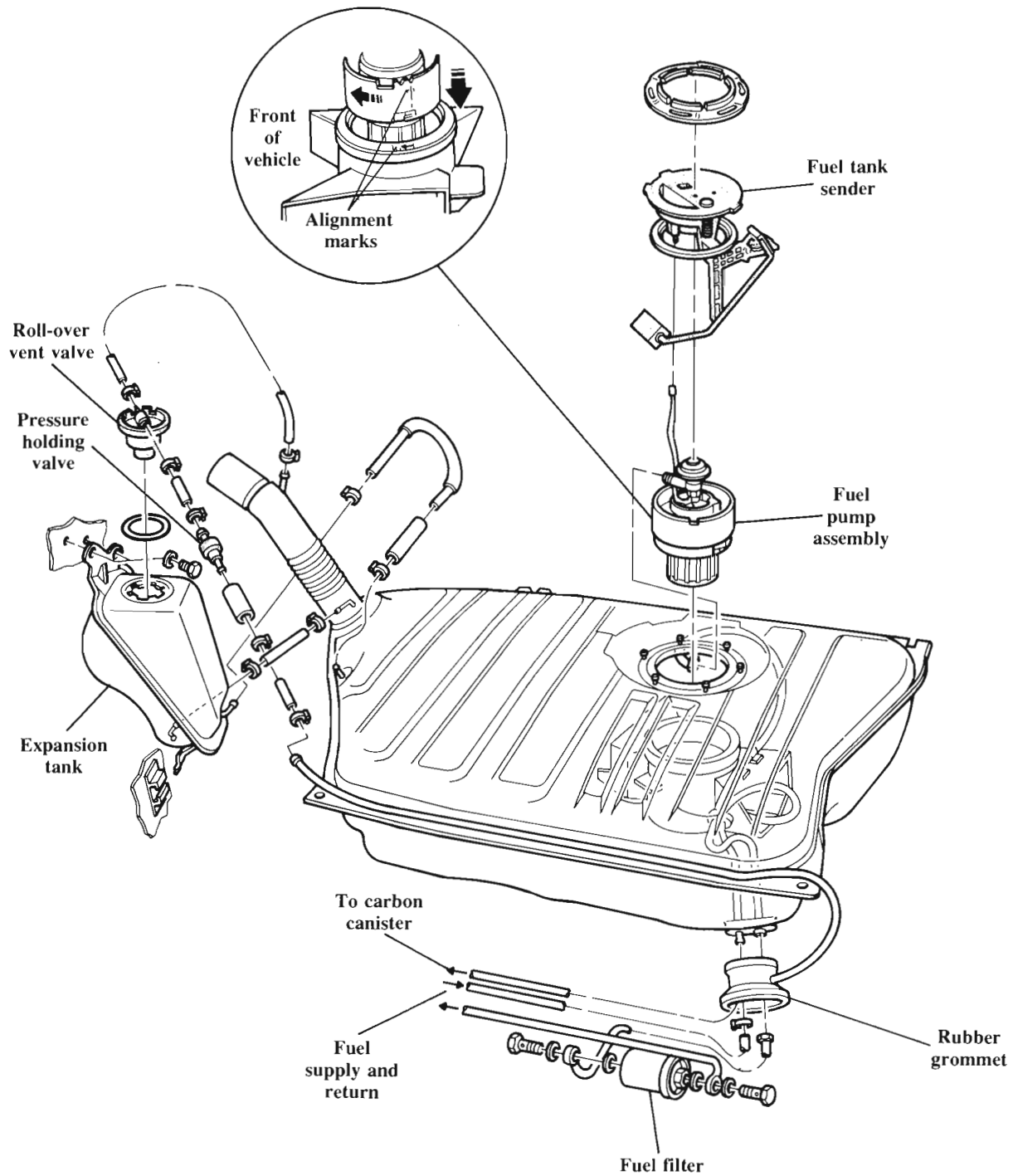
The fuel tank for the new Coupe Quattro lays flat in the rear between the rear bumper supports. The fuel tank assembly is removed and installed from inside the vehicle.

Because of the shape of the fuel tank, a separate expansion tank is used. The tank is bolted to the body next to the filler neck.

The roll-over vent valve is located in the top of this expansion tank. A pressure holding valve is used to regulate the flow of fuel vapors from the expansion tank to the carbon canister.

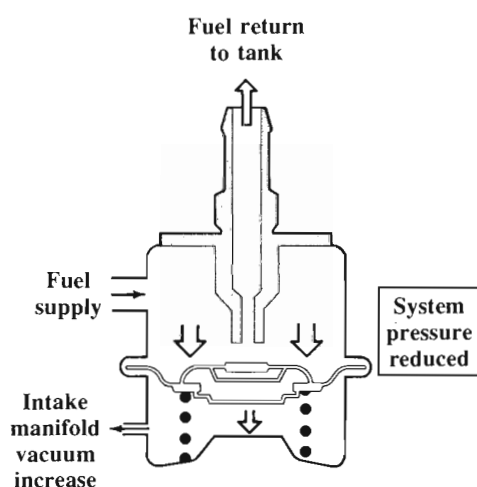
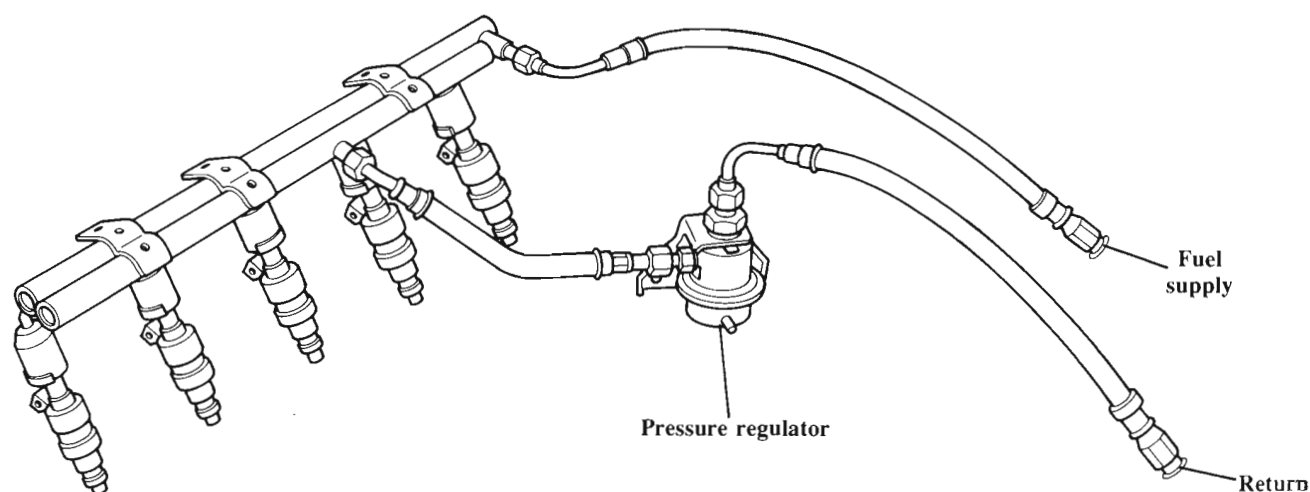
The fuel pump assembly is locked in place inside the fuel tank by lining the assembly up with two locking tabs and turning the housing clockwise approximately 15 mm.

Fuel Tank



Fuel Supply

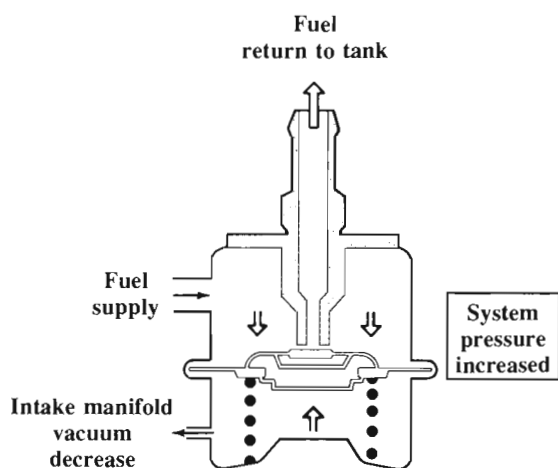
Pressure Regulator



Fuel is supplied from the pump through the fuel filter to the fuel rails on the cylinder head. Two fuel rails are connected to the fuel injectors. One is for fuel supply to the injectors and the other is for fuel return.

This design gives a relatively large supply of fuel flow through each injector which helps to lower their operating temperatures for better starting and running characteristics.

Fuel pressure is regulated by a diaphragm-type pressure regulator between 3.8 to 4.2 bar (55 to 61 psi). The pressure regulator is connected to the intake manifold vacuum and regulates the amount of fuel returned to the fuel tank.

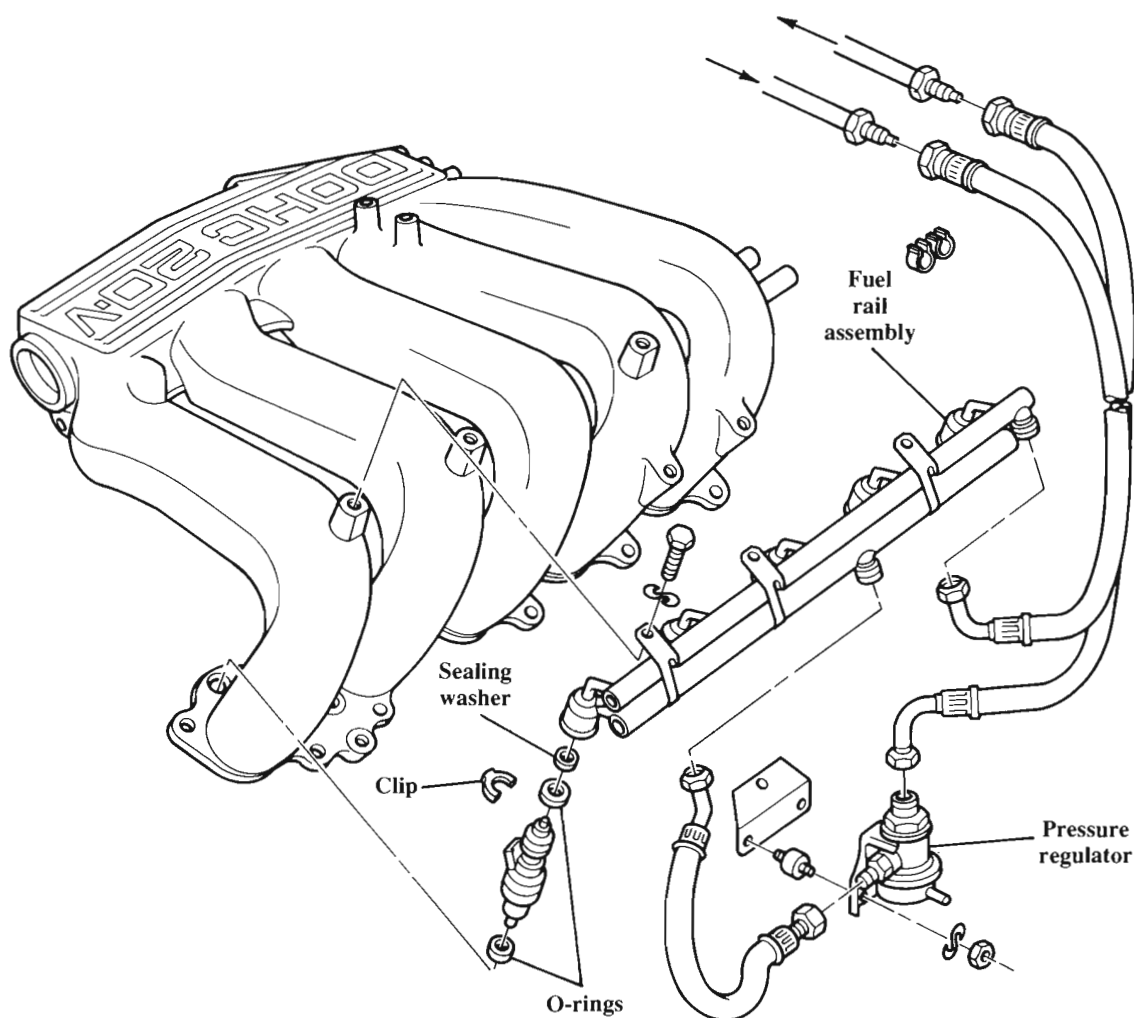


As the intake manifold pressure changes, the pressure regulator will increase or decrease the system fuel pressure. This maintains a constant difference between the intake manifold pressure and fuel pressure.

Fuel Rails

The fuel rail assembly and pressure regulator are bolted to the intake manifold. The fuel injectors are pushed into the fuel rails, sealed with an O-ring and secured with a clip.

The injectors are also pushed into the intake manifold and sealed with another O-ring. The injectors are held in place by the fuel rail which is bolted to the top of the intake manifold.

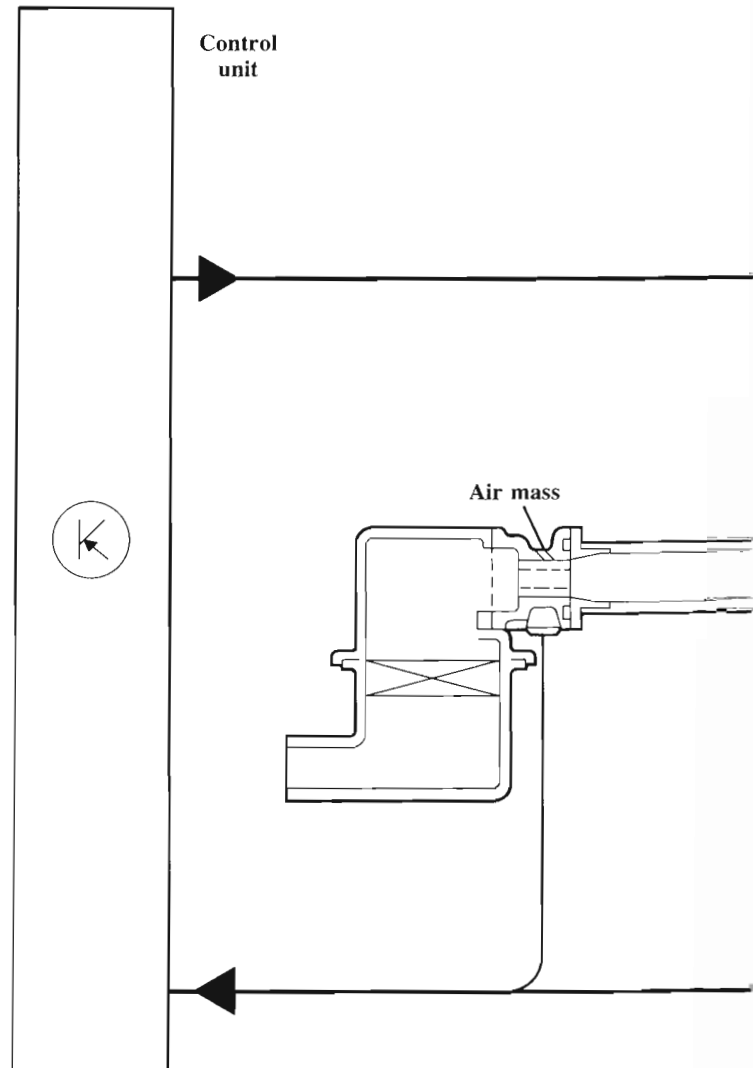


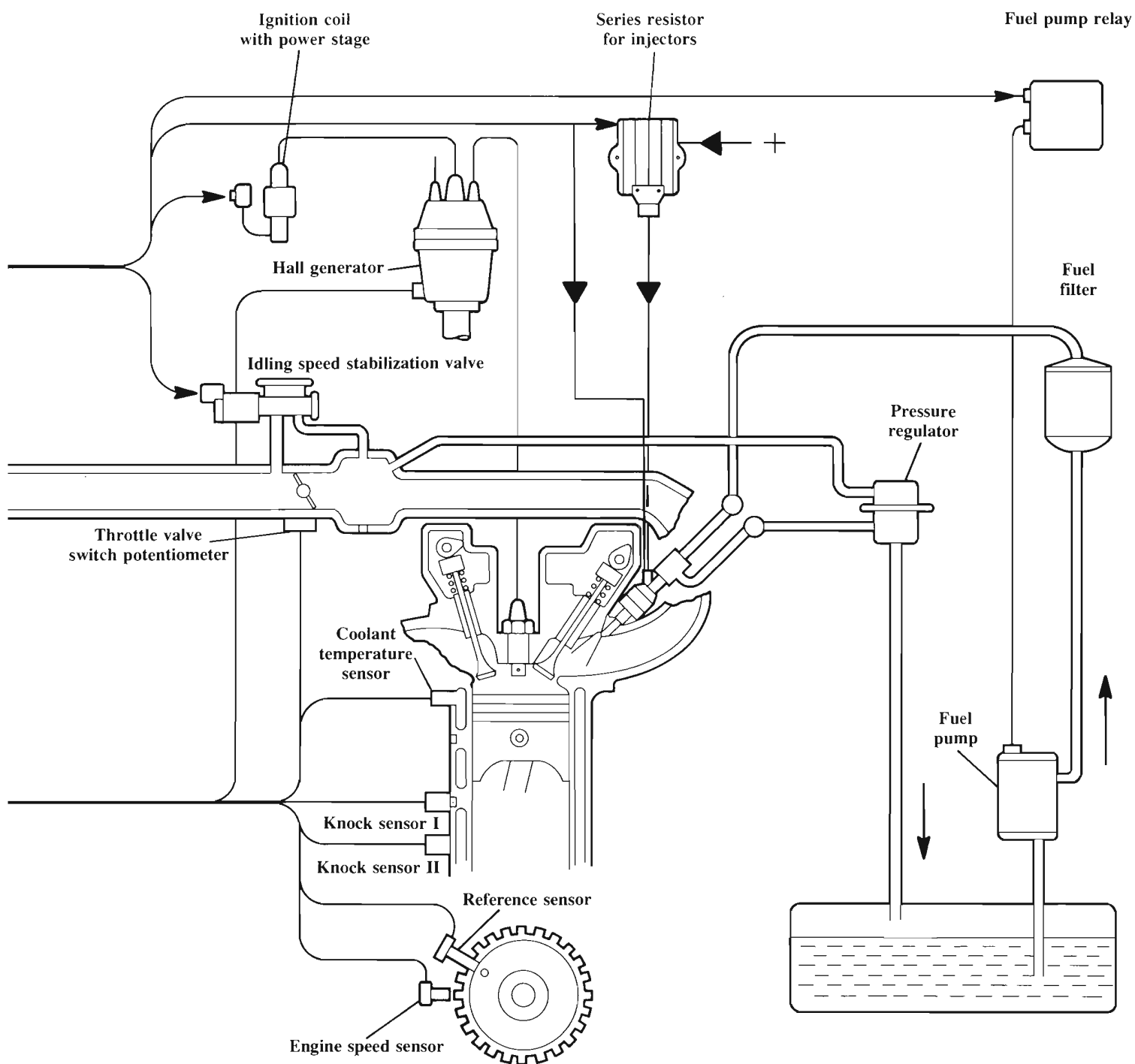
M.P.I.

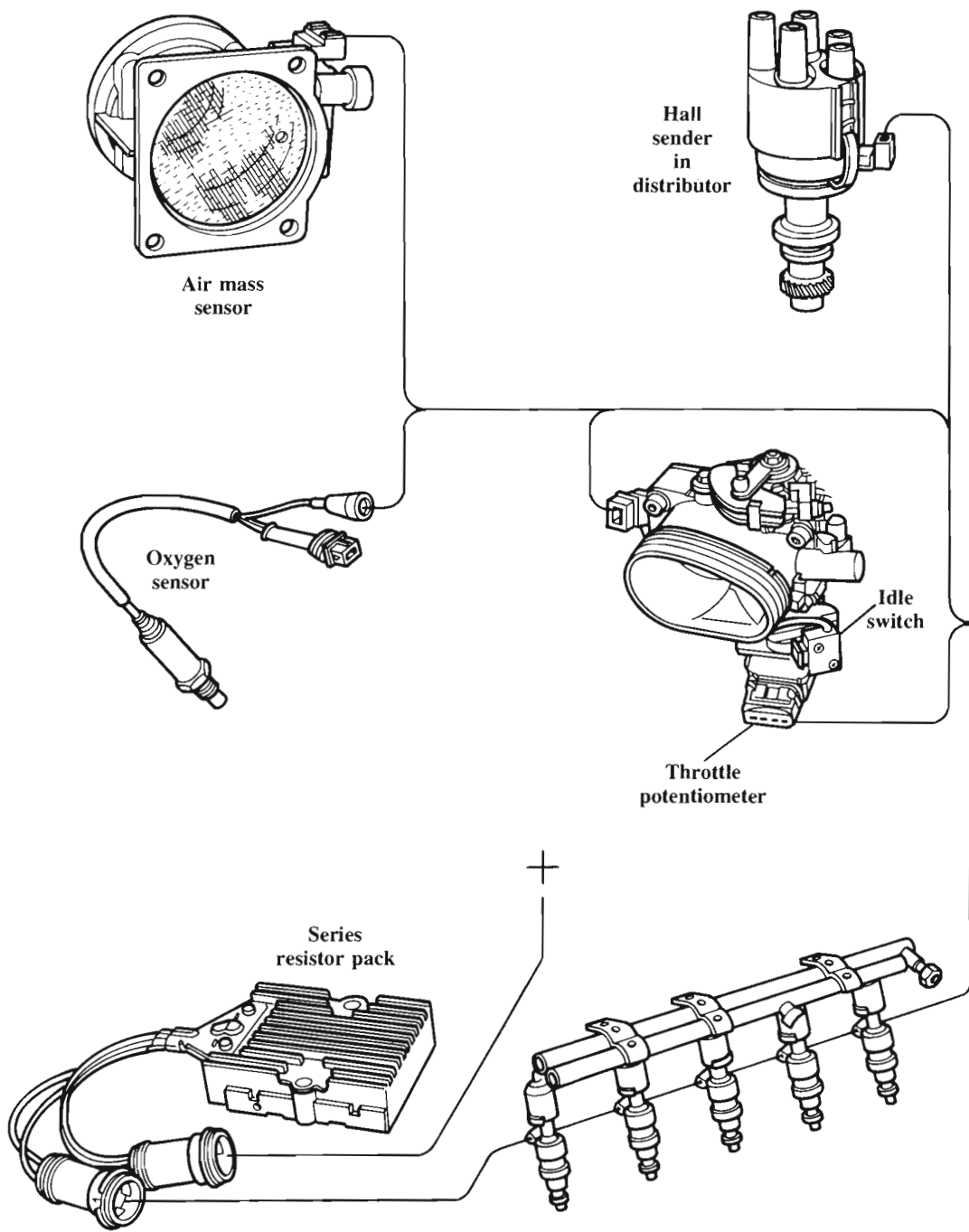
The Coupe Quattro 20 valve engine uses a new M.P.I. engine control system. This system uses an air mass sensor with no moving parts and two knock sensors. This system also uses electromagnetically operated fuel injectors which are triggered sequentially.

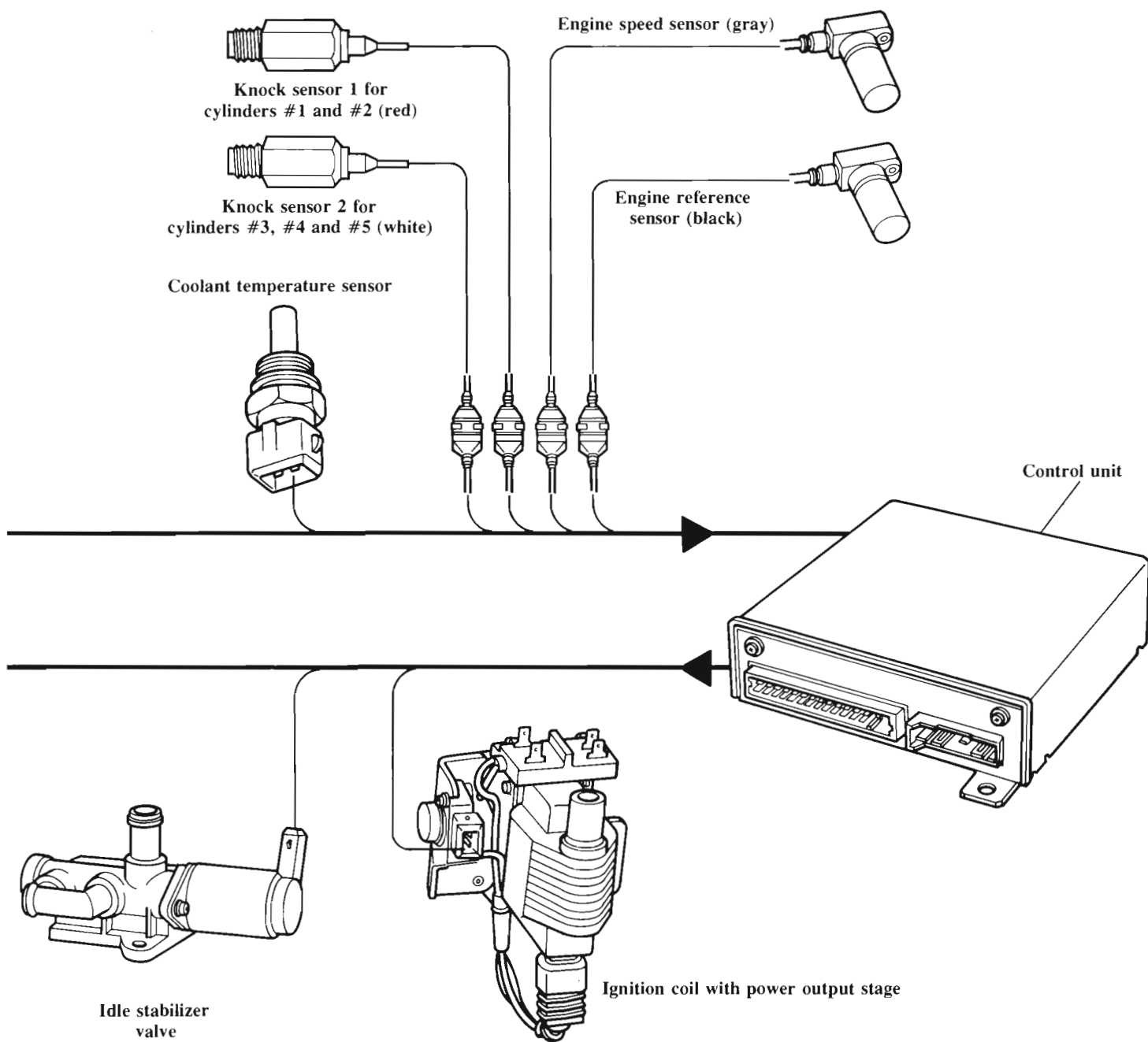
Some of the system's operating features are:

- Sequentially operated ball valve fuel injectors
- Ignition maps for both regular and high octane fuel
- Cylinder selective knock control
- Permanent fault memory

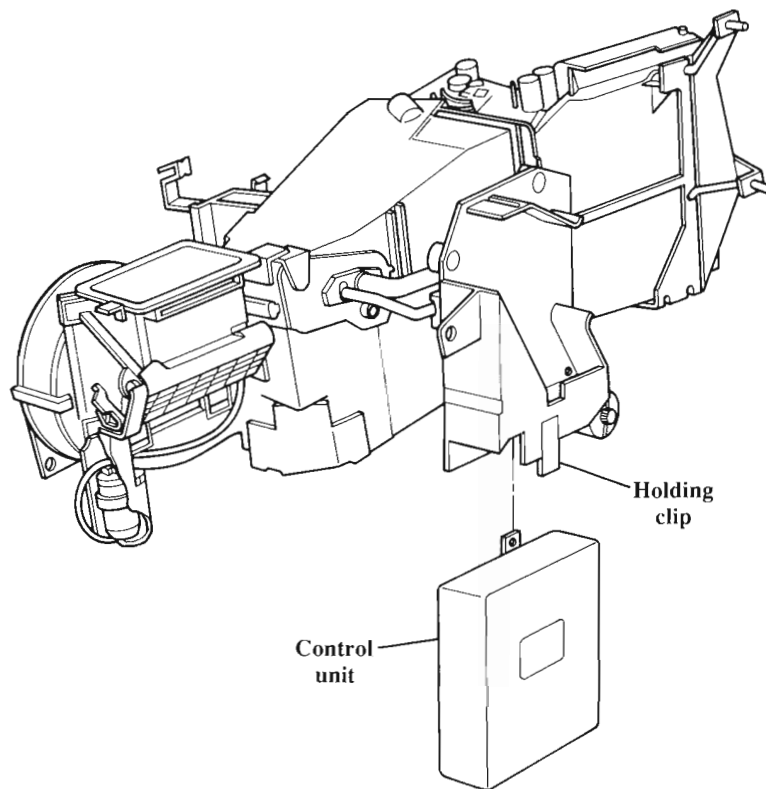




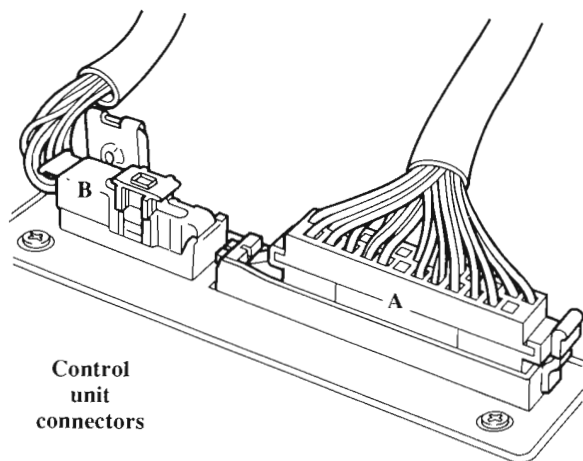
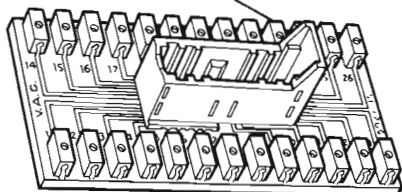




Control Unit



V.A.G. 1594/16



The M.P.I. control unit is located behind the A/C evaporator above the right side footwell. The control unit can be removed by depressing the holding clip and lowering the control unit out of its carrier.

The control unit has two electrical connectors — a 25 pin connector and a 26 pin connector. The 26 pin connector uses the small round pin terminals like those used on instrument clusters. Special tool # 1594/16 can be used to make any electrical tests at this connector.

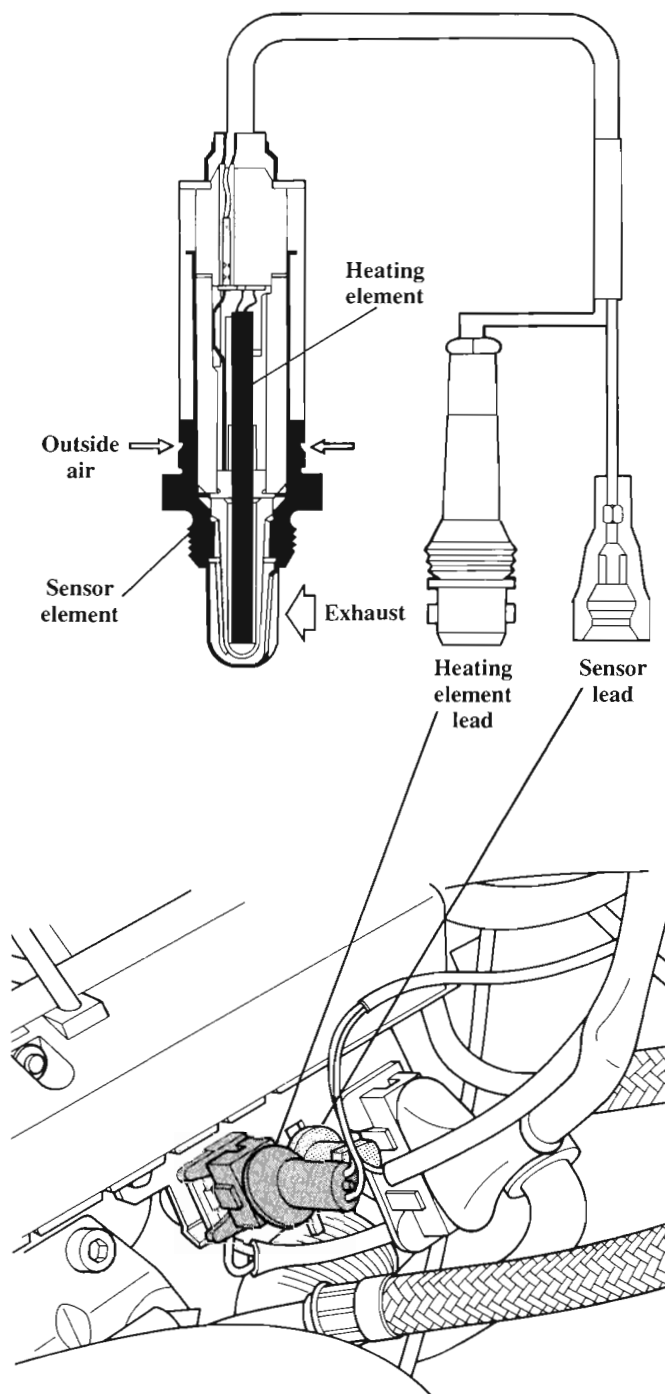
Oxygen Sensor

The oxygen sensor is located in the exhaust manifold just before the down-pipe connection. The sensor has a heating element to provide more uniform sensor output signals. The M.P.I. control unit uses this signal to determine the fuel mixture by measuring the oxygen content of the exhaust gas.

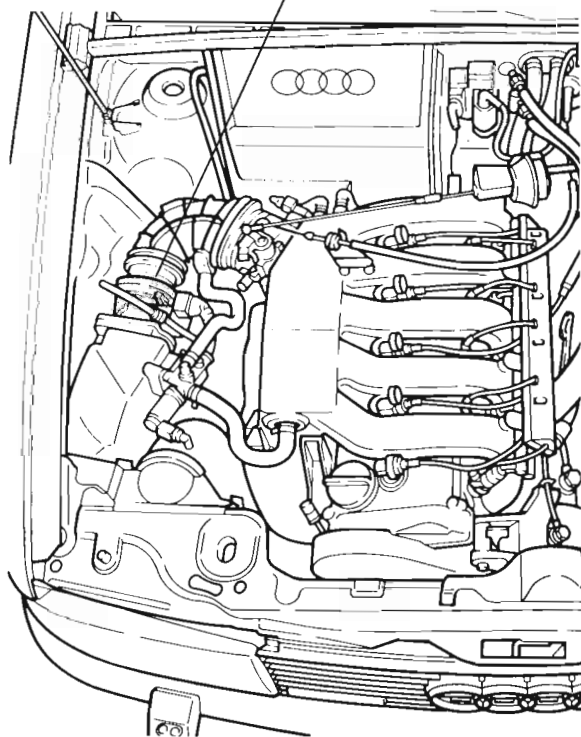
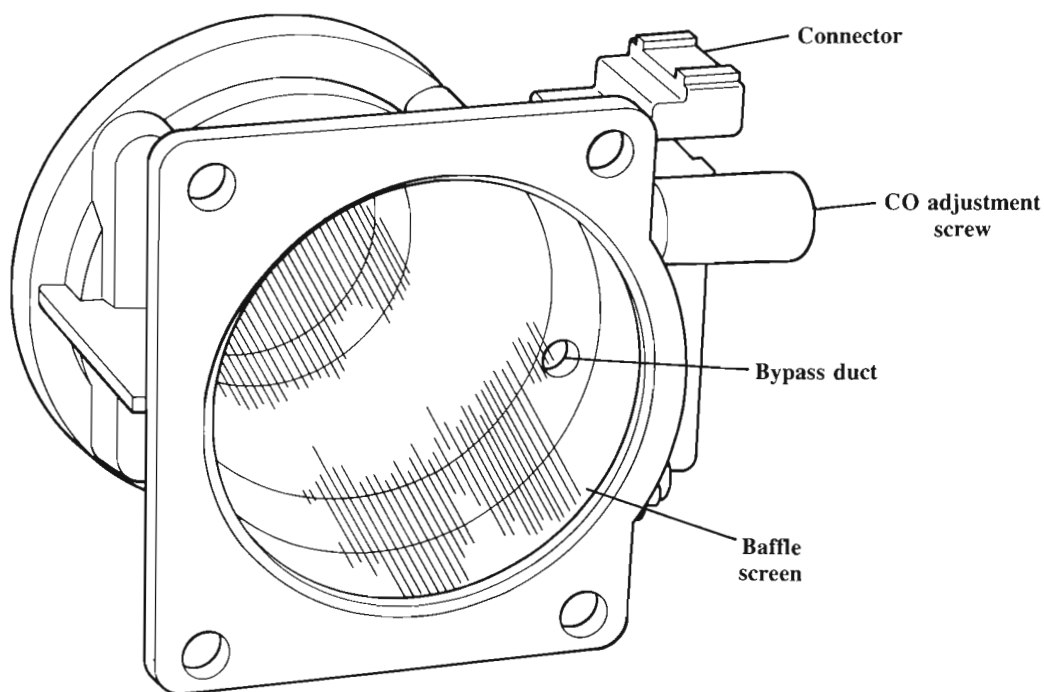
The M.P.I. control unit will then increase or shorten the injector opening time to regulate the fuel mixture at the desired ratio.

The sensor replacement interval is 60,000 miles.

The connections for the sensor are located on the left rear side of the cylinder head.



Air Mass Sensor

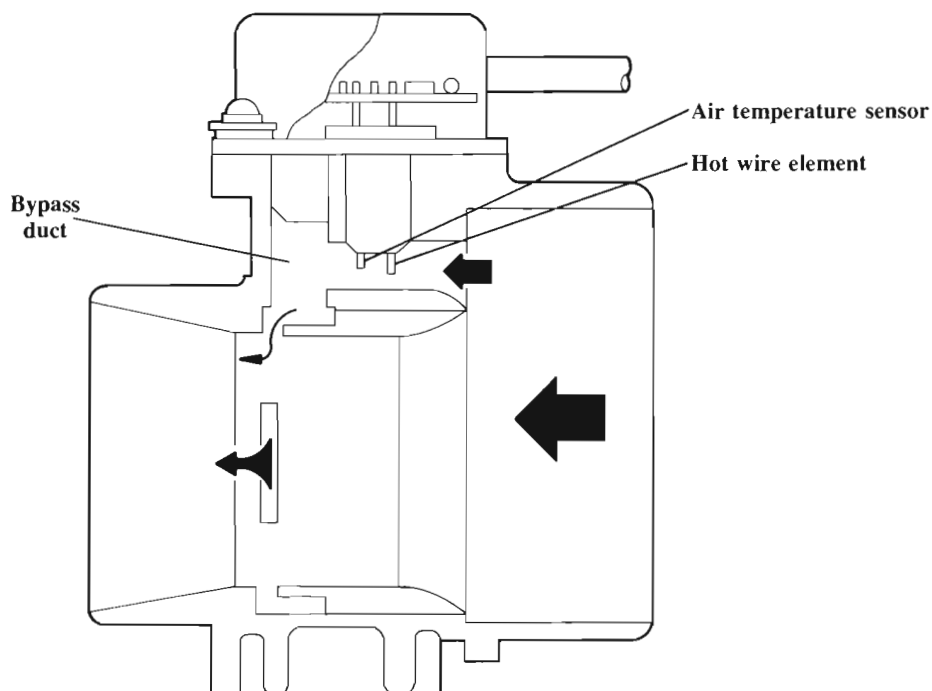


A hot wire air mass sensor is used to measure air flow into the engine. The sensor uses a heated platinum wire to measure the air flow and contains no moving parts.

A platinum wire inside the sensor housing is heated electrically. An air temperature sensor is used to determine the amount of current needed to heat this wire. As the air flows over it, the wire is cooled, which changes the wire's resistance. The M.P.I. control unit measures this change in resistance and uses this to calculate air flow volume and density.

In this way, the actual volume of the air is calculated by its weight or mass. This measurement will not require any additional corrections because it already accounts for any possible changes in air temperature and/or air pressure.

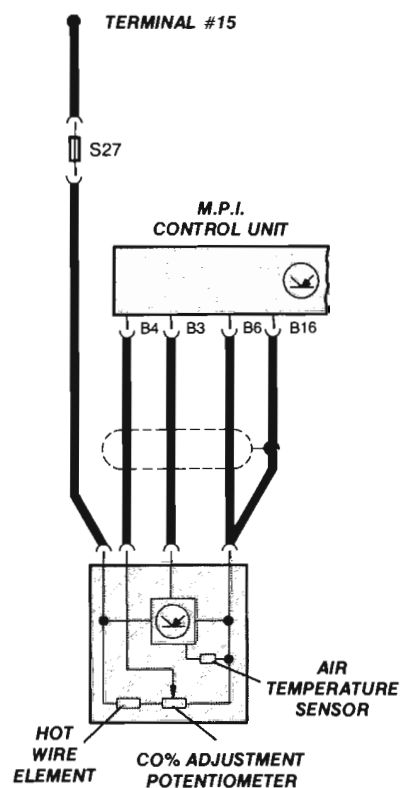
Air Mass Sensor



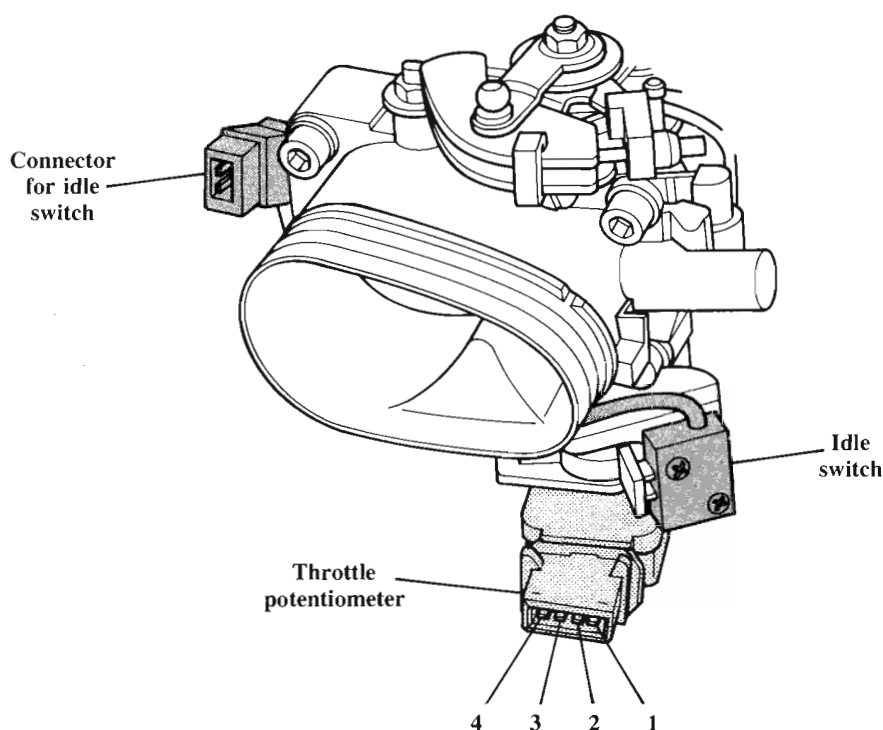
The hot wire element receives vehicle voltage from terminal #15. It is coated with glass and located in a bypass duct within the housing. The flow conditions in the bypass duct are proportional to the main housing, however, the air speed in the bypass is higher. Changes in the air flow are measured more accurately as a result. This also results in the sensor being less susceptible to any dirt in the air flow.

The sensor assembly is bolted to the air filter housing and contains a baffle screen to reduce air pulsations and air turbulence inside the sensor housing. It also has a potentiometer that can be used to adjust the CO%. The CO% adjustment screw is covered by a tamper-proof plug that must be removed to gain access to the screw.

No repairs can be performed to the air mass sensor.



Throttle Potentiometer And Idle Switch



An idle switch and a potentiometer are used on the throttle assembly. The idle switch closes at about 1.5° before the throttle plates close. When the switch is closed, this signal is used to activate the following functions:

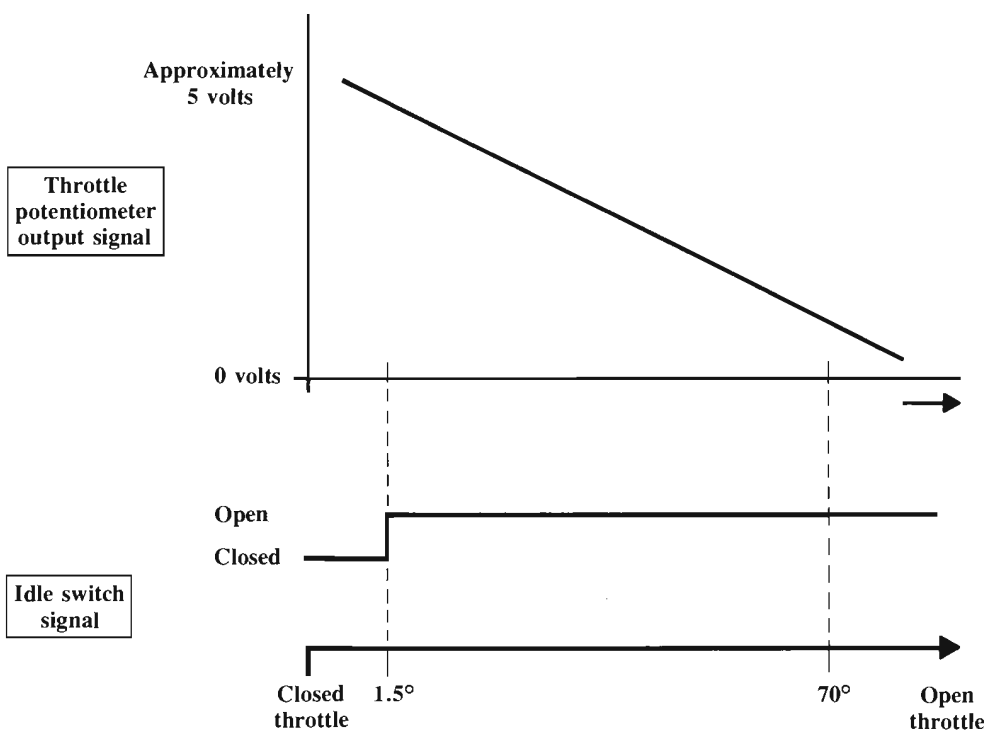
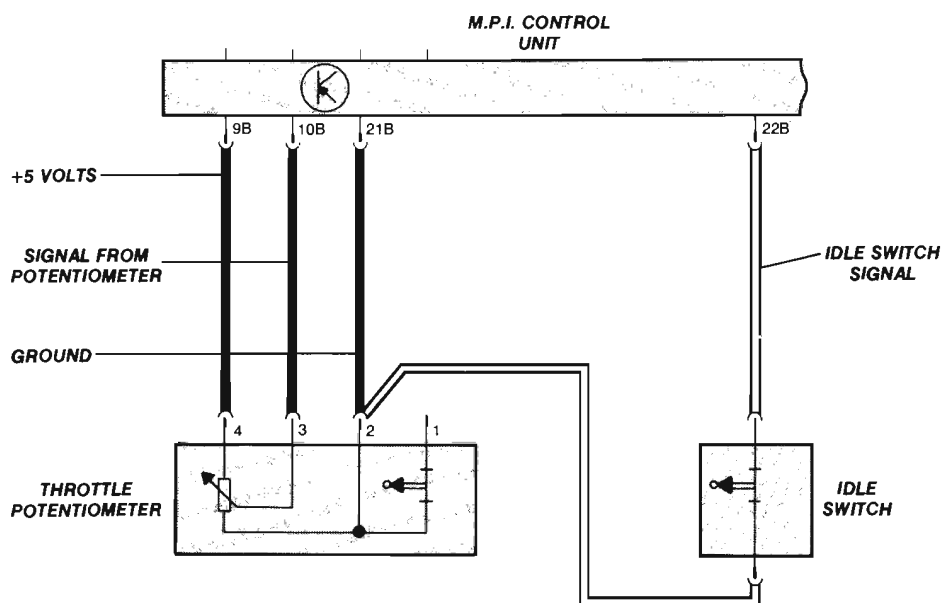
- Idle stabilization
- Deceleration fuel shut-off with engine warm and above 1500 rpm. Fuel supply is reactivated when the engine speed falls below 1200 rpm.
- Special ignition map for deceleration

The throttle potentiometer is connected to the throttle shaft and is supplied with 5 volts. The

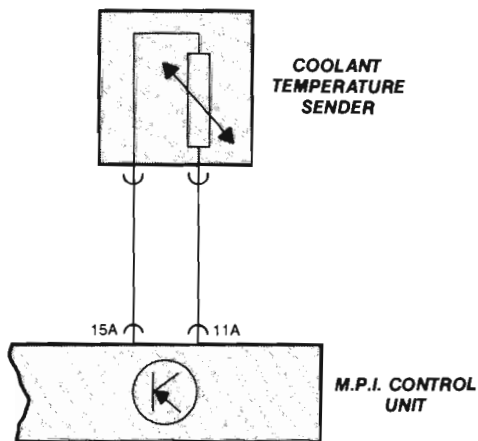
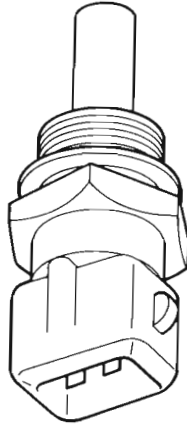
signal it provides is used to determine the position of the throttle plates and the speed of throttle movement. This information is used for:

- Full throttle enrichment
- Acceleration enrichment

The throttle potentiometer also has a switch which is not connected. This switch can be used to check the adjustment of the potentiometer. The potentiometer assembly should be positioned so that its switch closes between 2.5° to 1.5° before the throttle closes.



Coolant Temperature Sensor

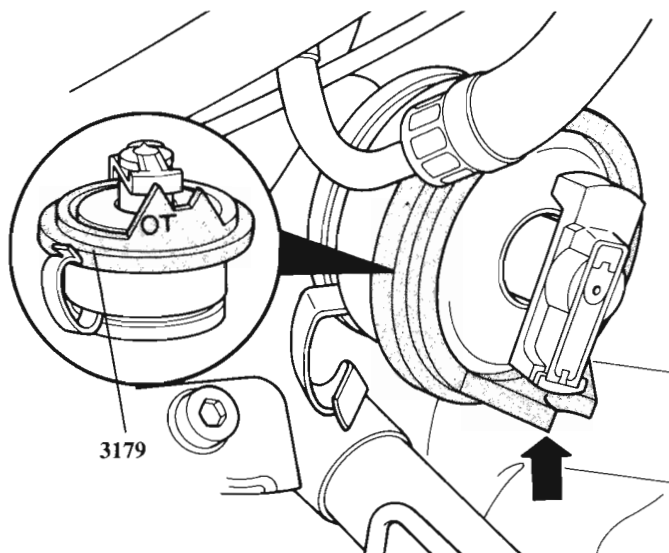
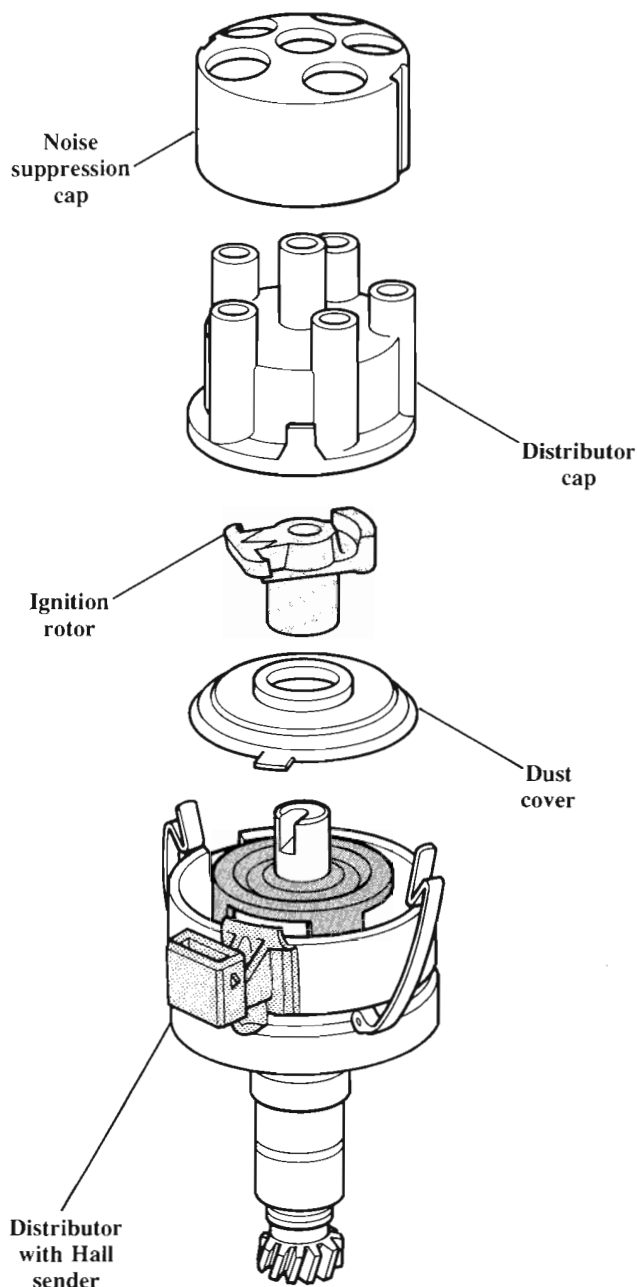


An NTC temperature sensor is threaded into the back of the cylinder head. This sender provides a resistance signal to the M.P.I. control unit based on the engine's coolant temperature. This information is used for:

- Cold fuel enrichment
- Idle speed control
- Correction to ignition timing for a cold engine
- Operating range for deceleration fuel shut-off

If the control unit detects a fault in the coolant temperature sender, it assumes a temperature of 68° F (20° C) when the engine is first started then gradually increases to 185° F (85° C).

Distributor With Hall Sender



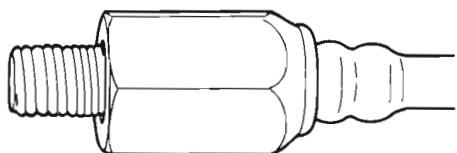
A Hall sender and trigger wheel are located in the ignition distributor. The trigger wheel has one aperture or opening. The Hall sender will generate one signal to the M.P.I. control unit at 60° before TDC for #1 cylinder. This is so the control unit can identify #1 cylinder in the firing order for the beginning of the ignition timing process and also the beginning of the sequential fuel injection.

Because the timing mark for #1 cylinder on the distributor is difficult to see when the distributor is installed, special tool #3179 can be used to help line up the ignition rotor for proper installation. This tool fits on top of the distributor and has an extension for the timing mark on the distributor body.

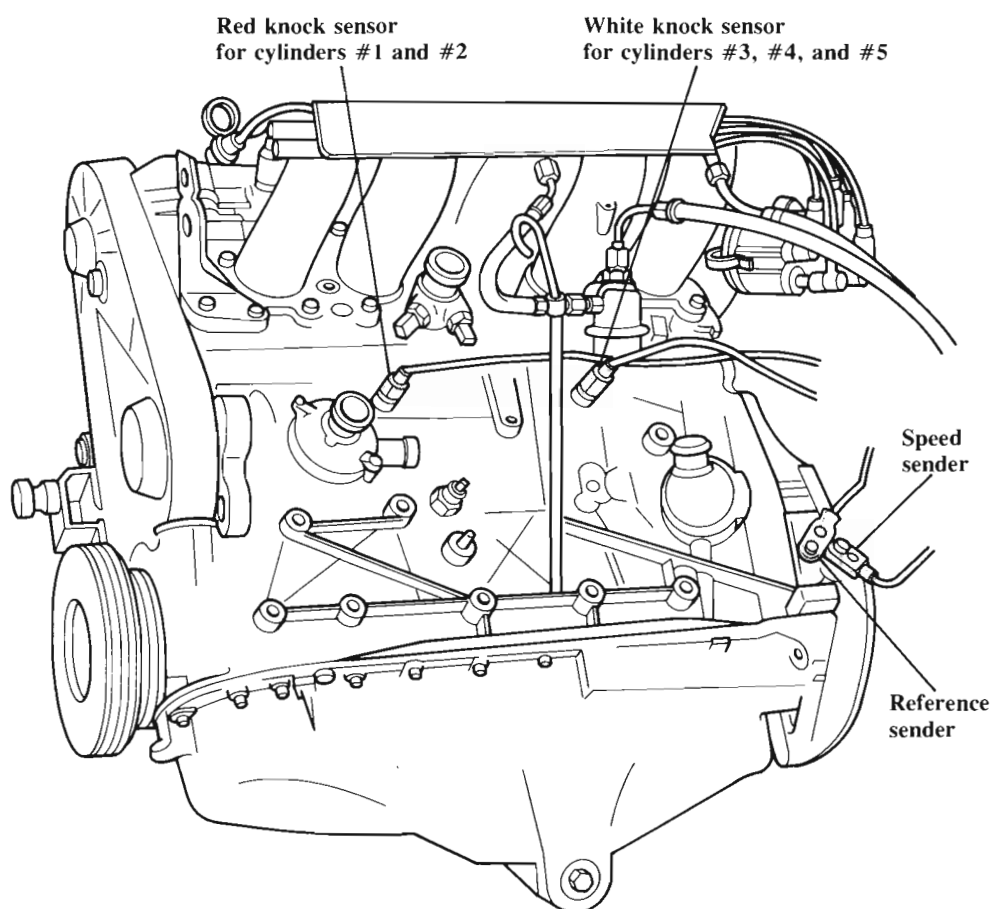
The ignition rotor is glued onto the distributor shaft and cannot be removed without destroying it. The rotor can be removed by crushing it with a pair of pliers. After removing any adhesive residue, the new rotor can be reglued onto the shaft using adhesive AMV 185 100 01 or its equivalent.

Knock Sensors

The 20 valve M.P.I. system uses two knock sensors. The red colored knock sensor is bolted to the cylinder block next to cylinder #2 and is used for cylinders #1 and #2. The white colored knock sensor is located next to cylinder #4 and is used for cylinders #3, #4 and #5.



A knock sensor works like a microphone to "listen" for spark knock or detonation. The use of two sensors makes it possible for the system to "hear" better and be more sensitive to use even more efficient ignition timing maps.

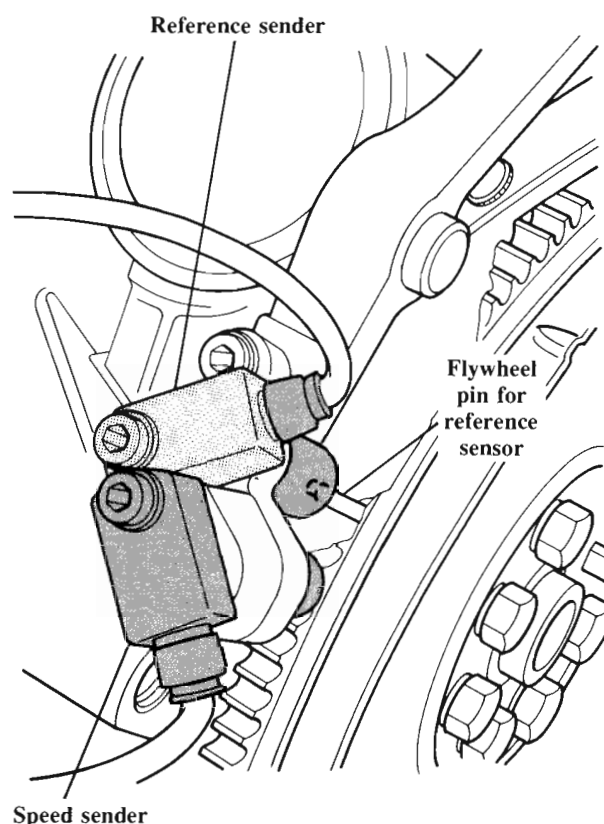


Reference/Speed Senders

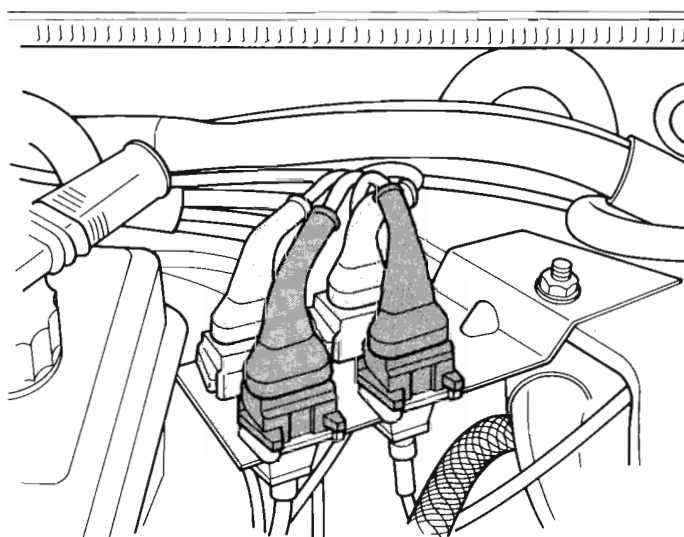
Two flywheel senders are also used. A speed sender generates an AC voltage signal from movement of the teeth on the flywheel. This signal is used by the M.P.I. control unit to measure engine speed and crankshaft position.

A reference sender generates one signal per crankshaft revolution through a reference pin that is inserted in the front of the flywheel. This signal is generated at 60° before TDC for #1 cylinder.

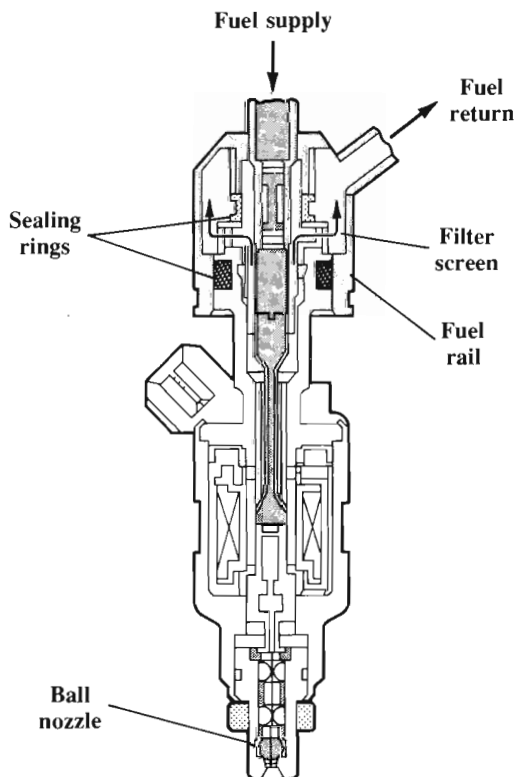
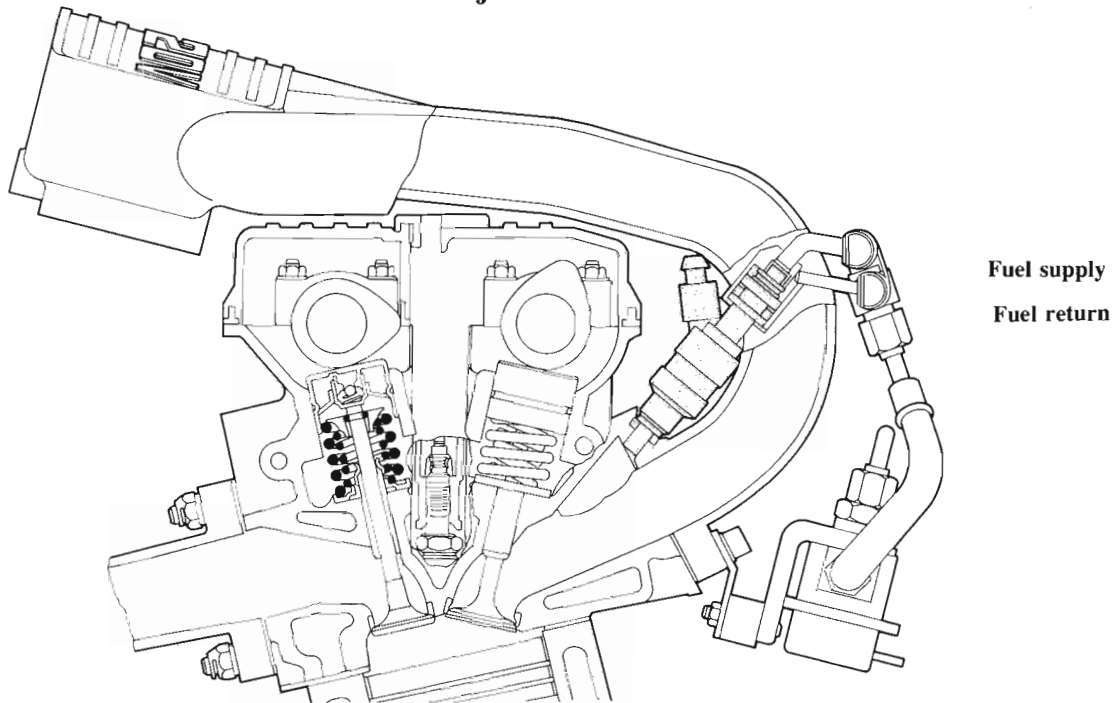
The connectors for the knock sensors and reference and speed senders are located on a bracket next to the brake master cylinder.



- Gray = Speed sender
- Black = Reference sender
- Red = Knock sensor for cylinders #1 + #2
- White = Knock sensor for cylinders #3, 4, + 5



Fuel Injectors



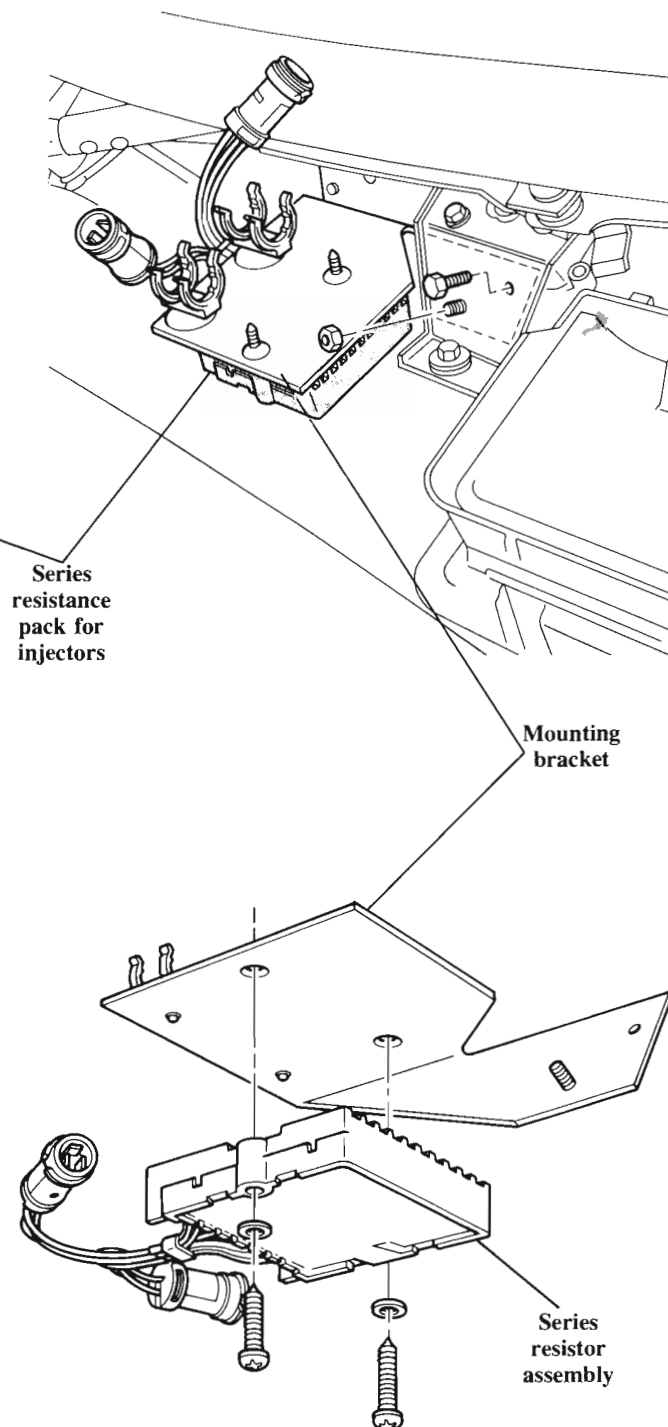
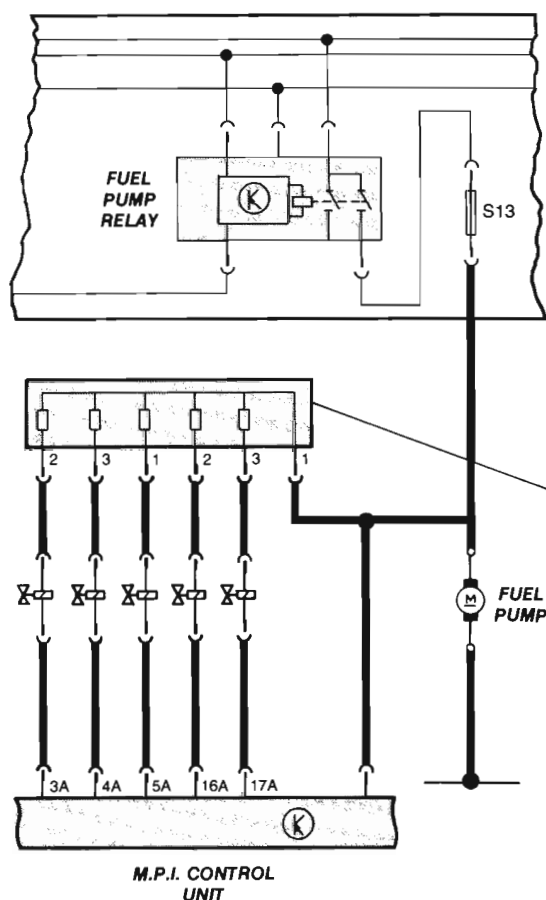
The fuel injectors for the M.P.I. system are a new full flow design with ball-type nozzles. The injectors are designed so that a large amount of fresh fuel flows close to the nozzle of the injector. This tends to cool the injectors and reduce the tendency for the fuel to percolate at high engine temperatures. The results are good hot starting and running characteristics.

A ball-type nozzle is used to provide good fuel atomization. This design is affected less by deposit built-up from such things as carbon or varnish.

The M.P.I. control unit triggers the fuel injectors sequentially in the firing order of the engine. Each injector is triggered 360° before the cylinder ignition point.

The control unit operates the injectors by completing a ground circuit. The fuel mixture is determined by the duration or length that the injectors are held open.

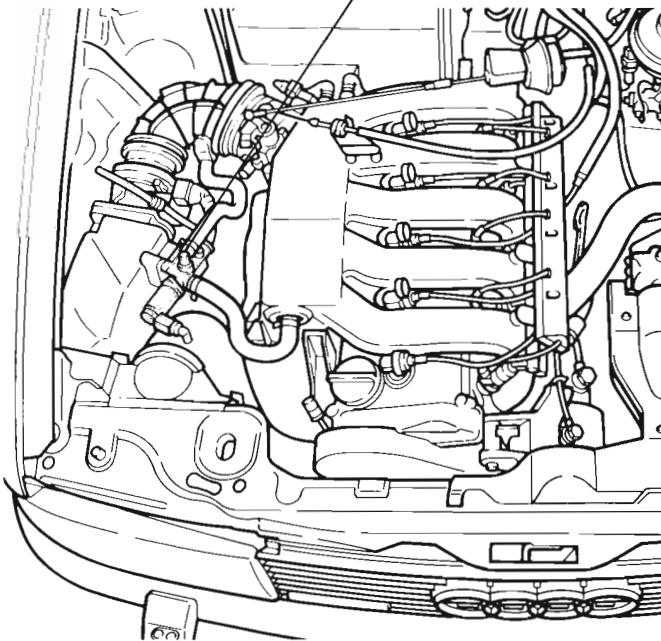
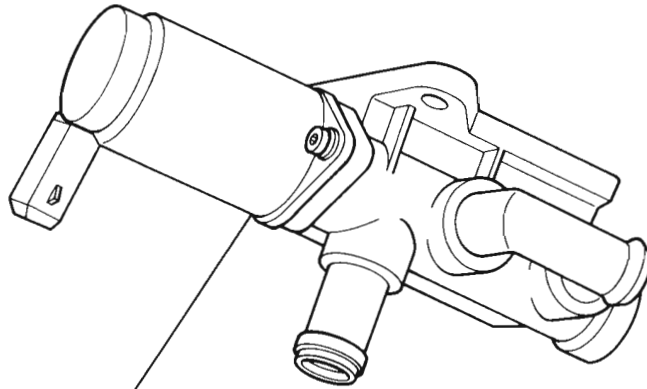
Series Resistance



The fuel injectors are supplied with electrical power from the fuel pump relay. The electrical power passes first through a series resistor assembly. These resistors are 5 to 7 ohms each and limit the current supplied to the injectors. This allows the use of an injector with a lower internal resistance, which results in shorter response time. The lower operating current also helps to protect the power output stages in the M.P.I. control unit.

The series resistor assembly is located on a mounting plate next to the wiper motor in the plenum chamber.

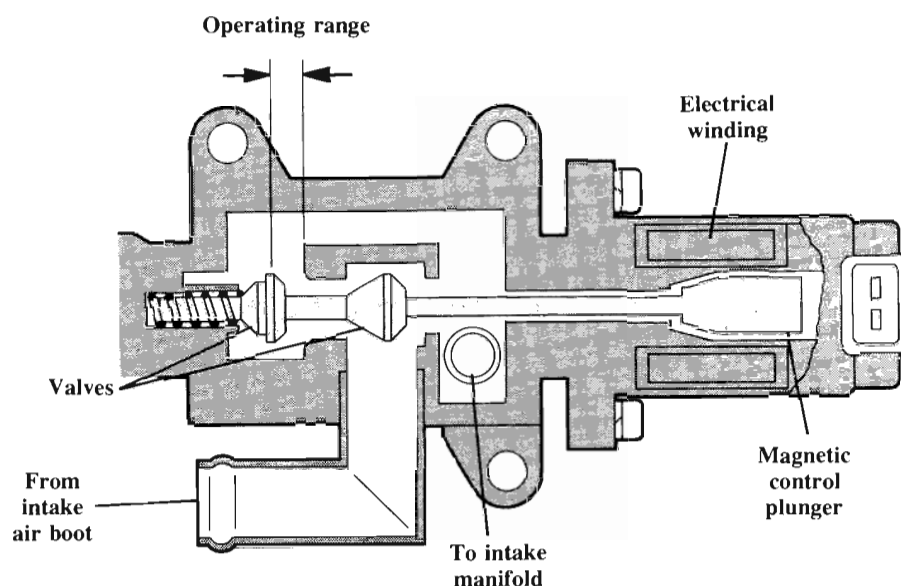
Idle Stabilization



The M.P.I. system uses an idle stabilizer valve to control the idle speed. The idle valve is mounted on the air filter housing and regulates the flow of air to the engine when the throttle plates and idle switch are closed.

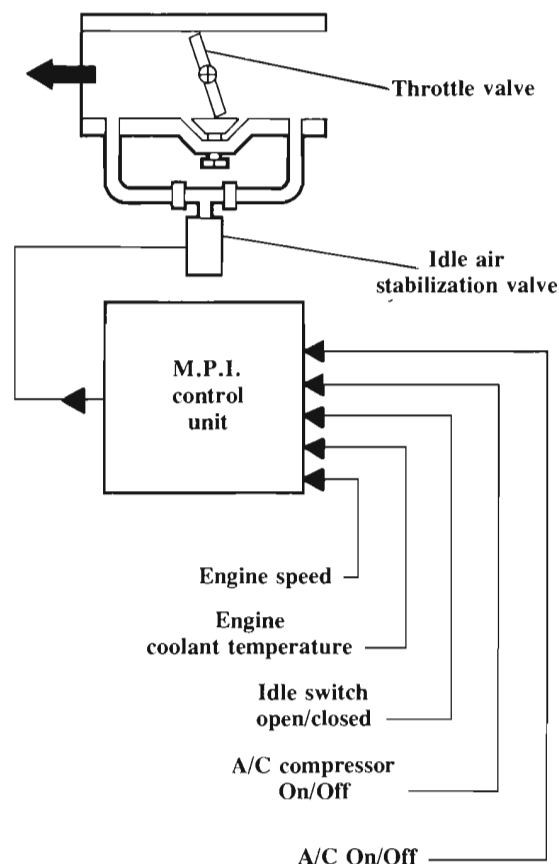
The idle stabilizer valve is controlled by the M.P.I. control unit. The system regulates the idle speed with a warm engine at 800 ± 50 rpm. The system will also regulate the idle at a higher speed for a cold engine and also when the A/C is turned on.

Idle Stabilization

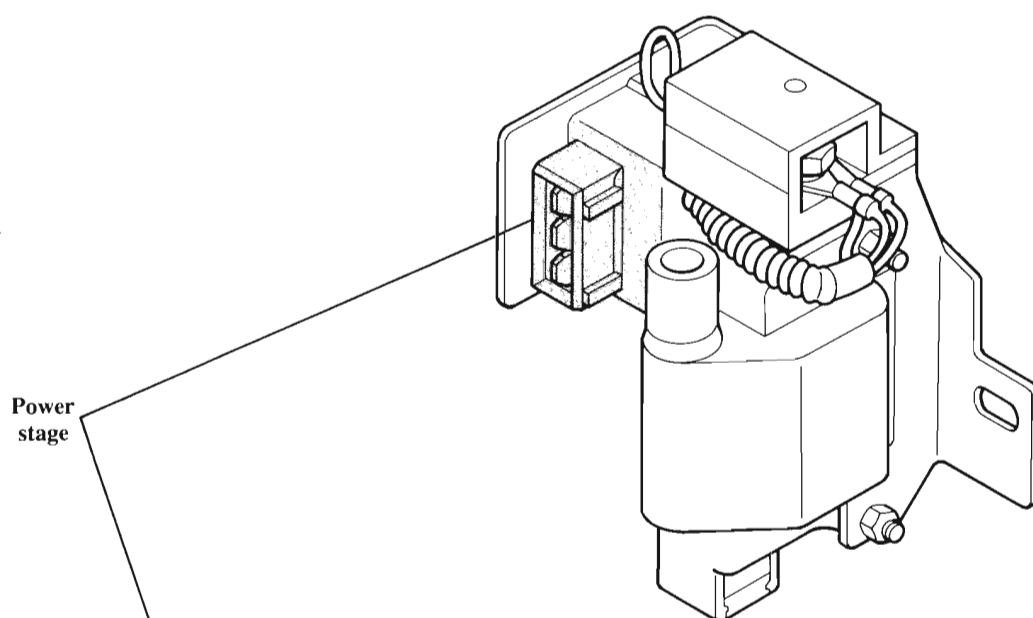


The valve consists of two poppet valves which are attached to a control plunger. The position of the control plunger and valves is regulated by an electric winding and a spring inside the valve housing. The winding receives a square wave voltage signal or duty cycle. The M.P.I. control unit can change the position of the valves by changing this duty cycle.

When the idle switch opens, the idle stabilizer valve will be supplied a steady duty cycle and go to a fixed position. This fixed position is slightly larger than the position it works in during idle speed regulation. This position will be increased slightly again when the A/C compressor clutch is engaged. Both of these functions are to give a smooth transition to idle speed during engine deceleration and are effective only when the idle switch is open.

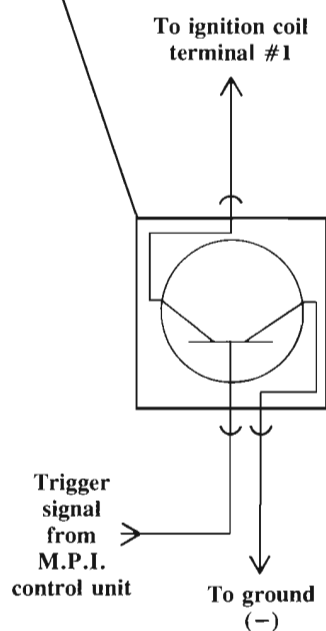


Ignition Coil

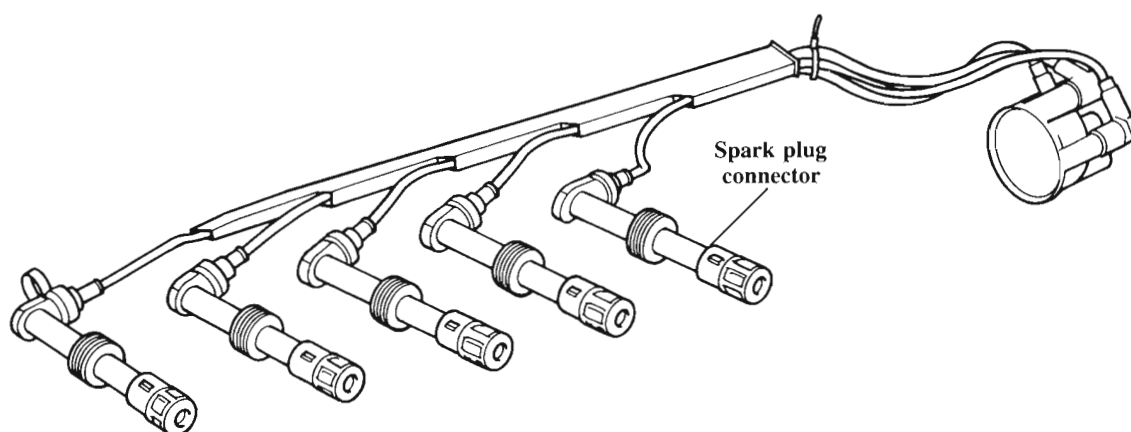


An ignition coil with a separate power stage is used with the M.P.I. system. The power stage is a Darlington type of transistor which switches the primary current for the ignition coil on and off.

The power stage completes a ground circuit for terminal #1 of the ignition coil when it receives a voltage signal from the M.P.I. control unit.



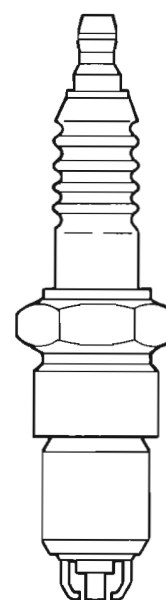
Spark Plugs/Connectors



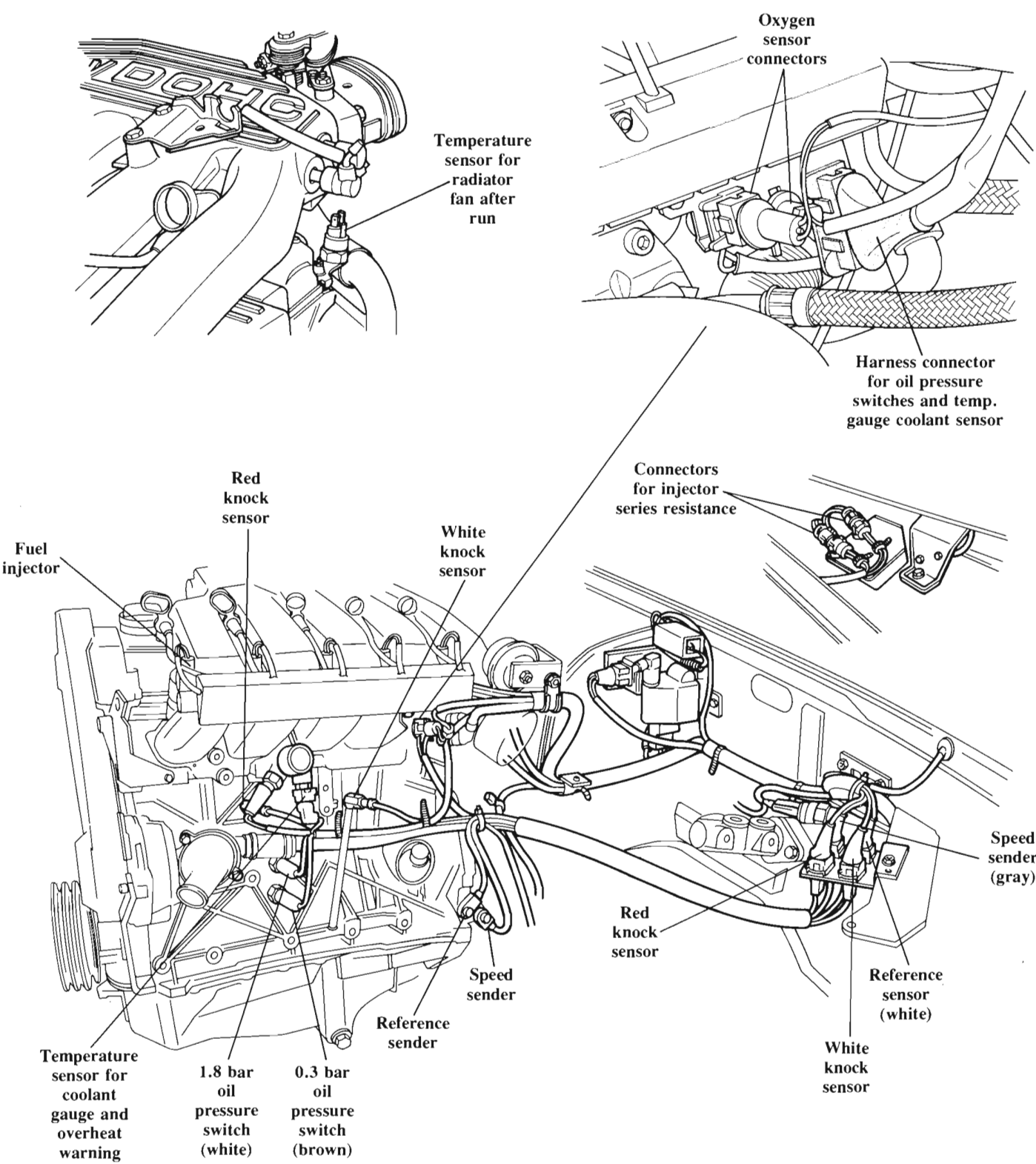
The spark plug connectors use sealing grommets to prevent foreign objects from entering the spark plug bores in the cylinder head. The grommets should be carefully inserted when installing the connectors.

A pull loop is located on #1 spark plug connector and can be used to remove each spark plug connector.

The spark plugs are multiple ground with nickel chromium electrodes and a copper core. The spark plug hex head is the smaller 16 mm (5/8 in.) instead of the familiar 21 mm (13/16 in.).



Connector/Component Location



Control Unit Connector

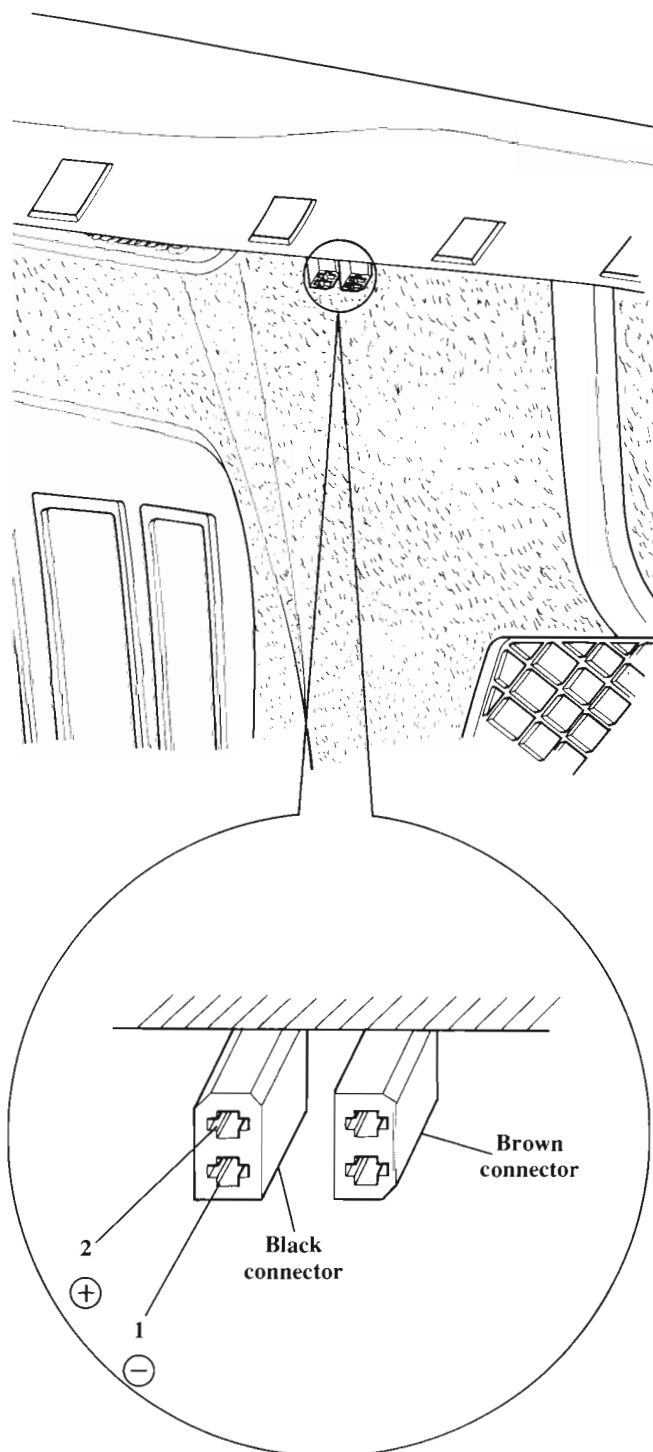
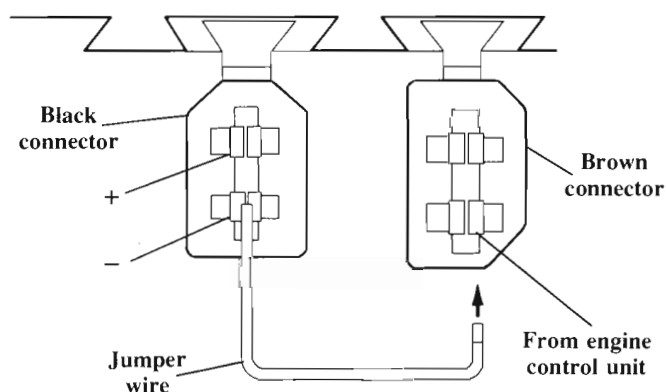
The connectors for the M.P.I. control unit's fault memory are located in the driver's side footwell just above the pedal cluster. The black connector contains a power (battery voltage) and ground connection.

The brown connector contains two wires from the M.P.I. control unit. This connector can be used with the VAG 1551 tester to read the system's fault memory and also make the engine's basic settings.

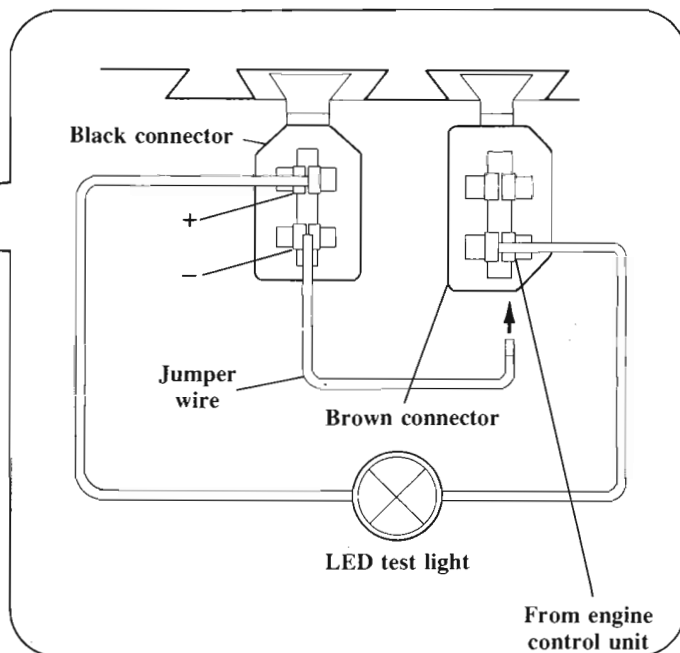
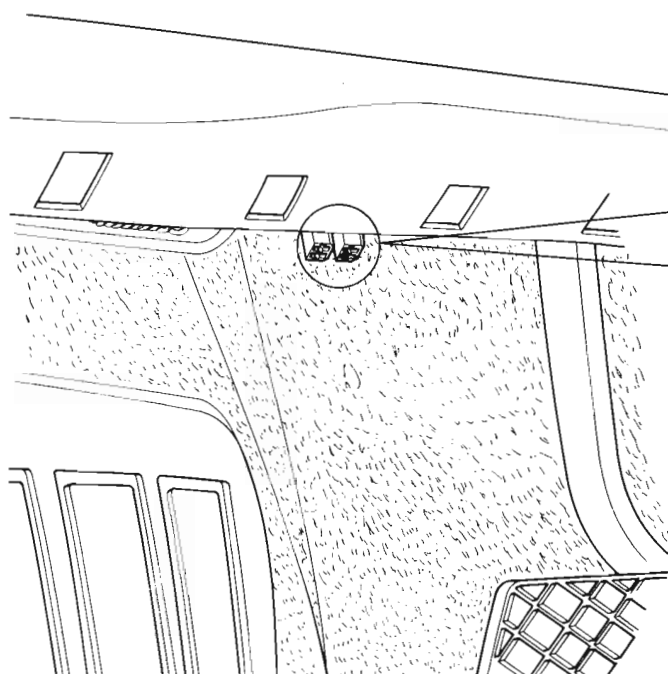
If the VAG 1551 is not used, a jumper wire must be connected between the two connectors as shown when checking or adjusting the basic engine settings. By connecting this jumper wire as shown, the following happens:

- Idle stabilizer in constant position
- Carbon canister valve closed
- Oxygen sensor signal disabled
- Ignition timing stabilized
- Coolant temperature sensor signal disabled

The basic engine settings can now be checked and/or adjusted.



Fault Memory



The M.P.I. system has a permanent fault memory. To activate the memory's fault display, special tool VAG 1551 can be connected to the diagnostic connectors in the driver's footwell.

If the VAG 1551 is not used, the memory's fault display can be activated manually by connecting a jumper wire and an LED test light to the connectors as shown.

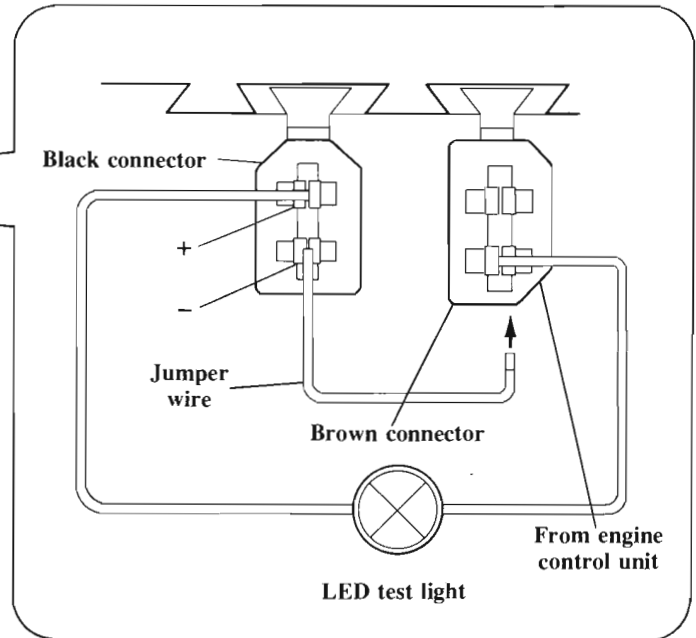
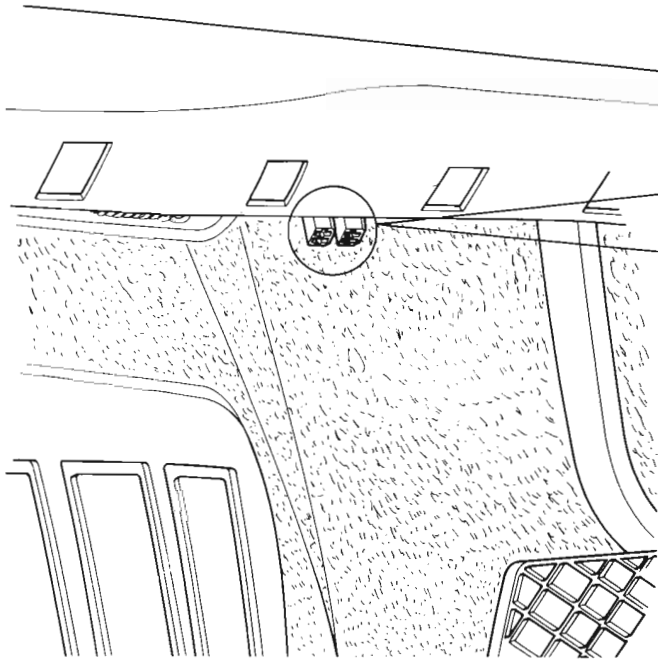
The ignition must be on or the engine running when the jumper wire is connected. After about 4 seconds, the wire can be removed and the LED test light will begin to flash its first code. To switch to the next step and display more codes, the jumper wire must be reinserted again for 4 seconds.

Code	Location of fault	Cause
4444	No faults have been recorded	
0000	End of diagnosis	
1111	Control unit	Defective memory circuits in control unit
1231	Speedometer sender on transmission	Control unit not receiving signal
2111	Speed sender	Control unit not receiving signal
2112	Reference sender	Control unit not receiving signal

Fault Codes

2113	Hall sender	Control unit not receiving signal
2114	Ignition distributor	Hall signal out of phase with reference sender. Check distributor adjustment
2121	Idling switch	Switch stuck open or closed or faulty wiring from switch
2141	Knock regulation for cylinders #1+2	Engine knock or pinging causing timing to be retarded
2142	Knock sensor (red) for cylinders #1+2	Control unit not receiving signal
2143	Knock regulation for cylinders #3, 4 + 5	Same as above
2144	Knock sensor (white) for cylinders #3, 4+5	Same as above
2212	Throttle valve potentiometer	Output signal voltage too high or low
2232	Air mass sensor	Output signal voltage too high or too low compared to engine speed
2233	Air mass sensor	Reference voltage too high
2234	Control unit supply voltage	Voltage supply for control unit too low
2242	CO% potentiometer in air mass sensor	Output signal voltage too high
2312	Coolant temperature sensor	Control unit not receiving signal
2342	Oxygen sensor	Control unit not receiving signal
4431	Idle stabilizer	Open or short circuit to idle stabilizer valve

Fault Memory Output Checks

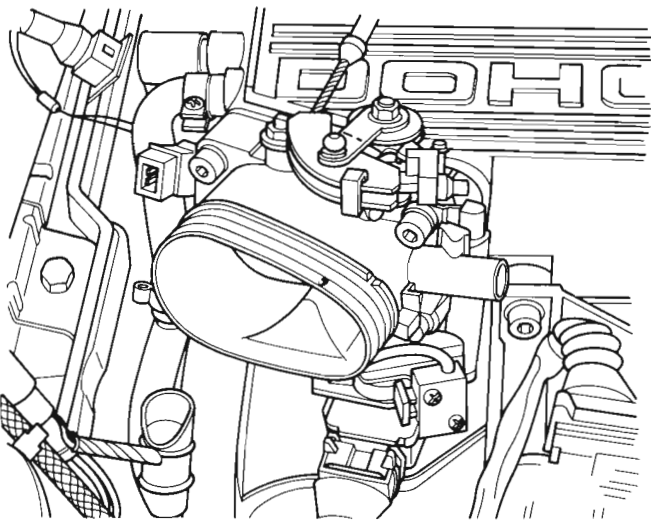


The M.P.I. control unit can also generate output signals to check the operation of certain components. These checks can also be performed with the VAG 1551.

If the VAG 1551 is not used, the output checks can be done by connecting a jumper wire and an LED test light to the diagnosis connectors as shown. The jumper wire must be connected with the ignition off. The output check sequence will begin about 4 seconds after the ignition is switched on.

When the output checks have been completed and the code 0000 has been displayed, the permanent fault memory will be erased by reconnecting the jumper wire again.

During the output checks, each fuel injector can be tested. During this part of the procedure, the injector will click on/off five times when the throttle is opened fully.

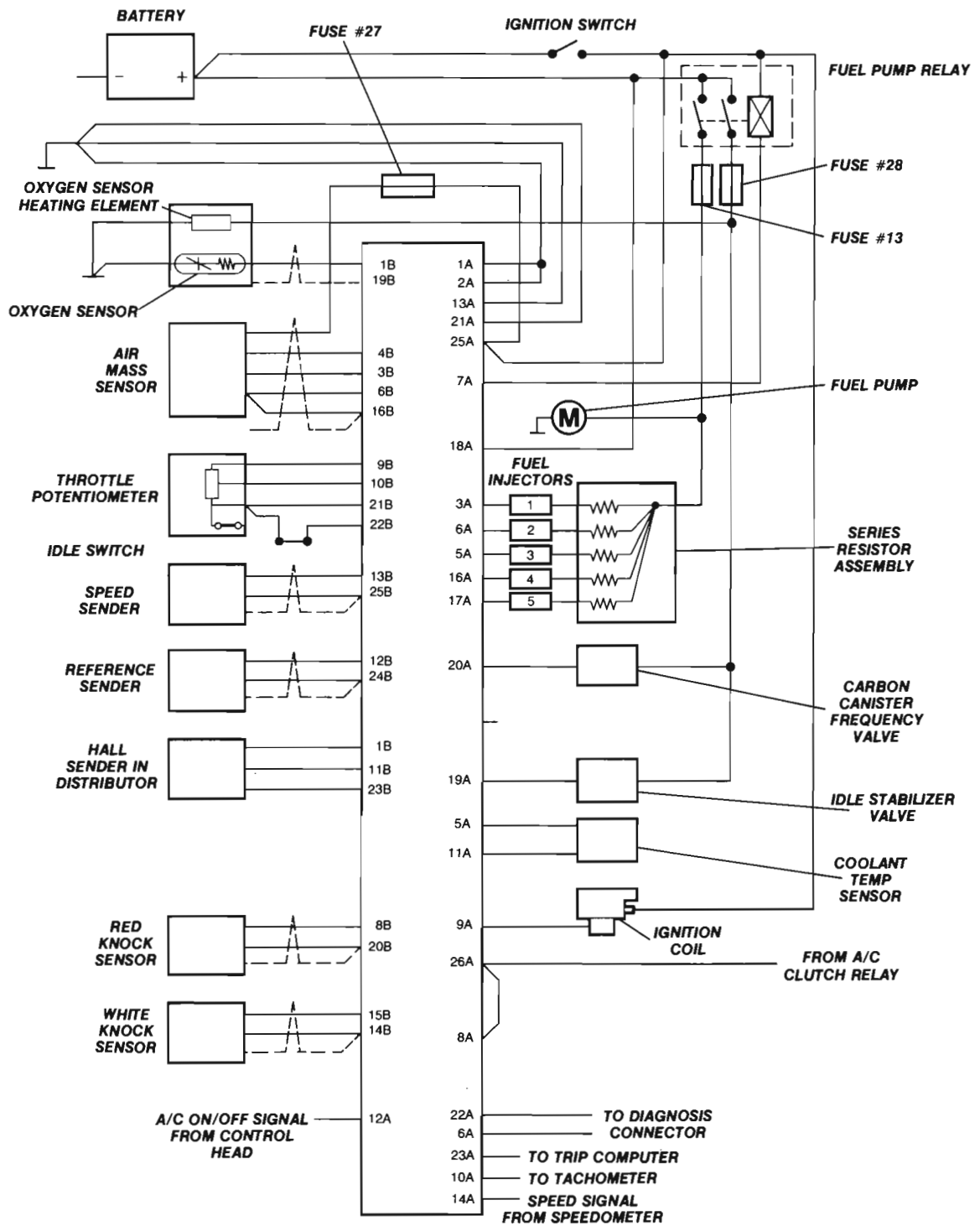


Fault Memory Output Check

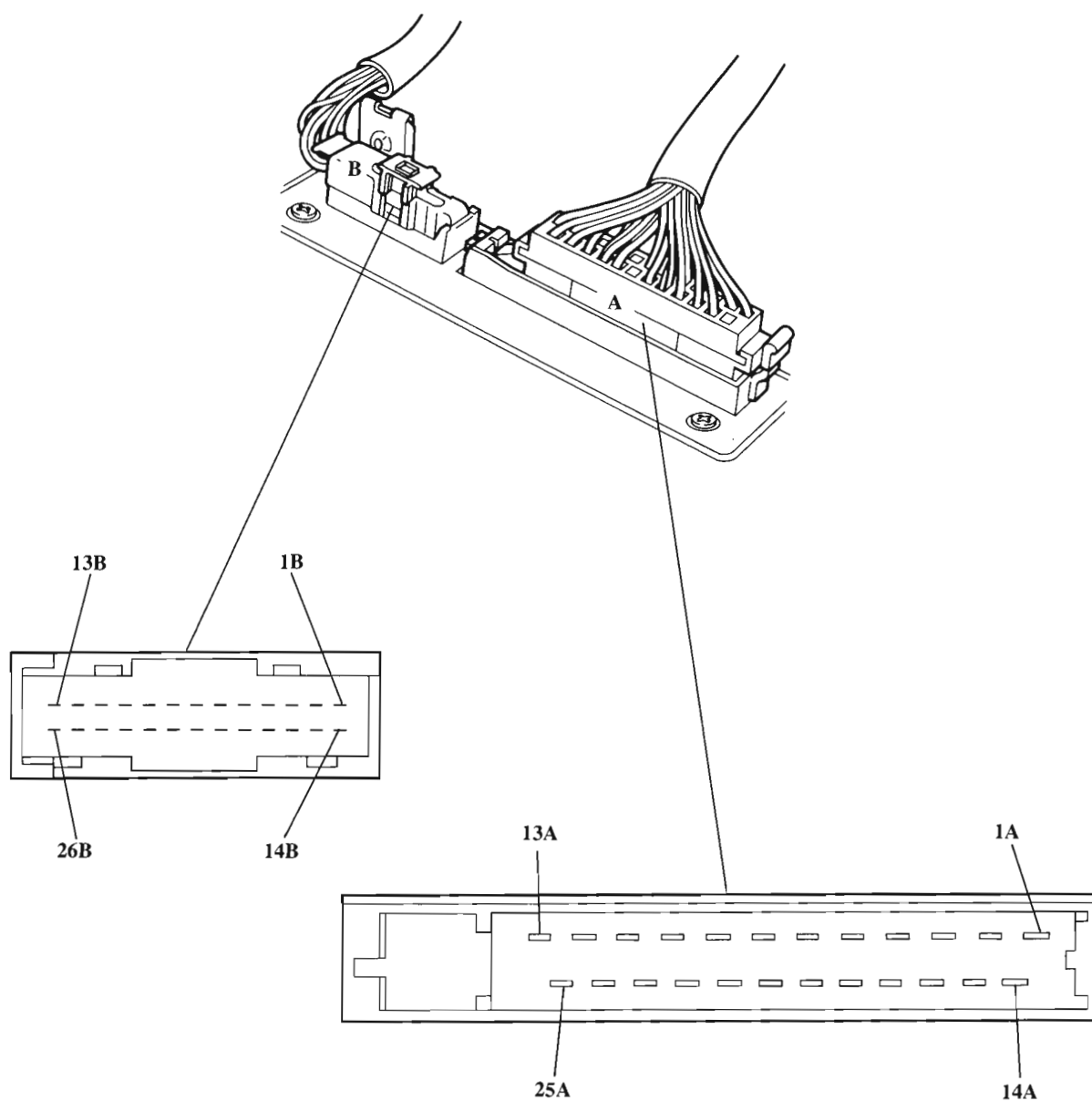
To activate the output checks:

- Insert the jumper wire as shown with the ignition off
- Turn ignition on
- Remove the jumper wire after 4 seconds
 - Code 4433 is displayed and the fuel pump runs
- Insert the jumper wire for 4 seconds
- Remove the jumper
 - Code 4411 is displayed
- Open the throttle fully
 - Fuel injector for #1 cylinder clicks on/off 5 times
- Repeat this procedure 4 times to test the injectors for cylinders #2, 3, 4+5. The flash codes are listed in the following chart.
- The throttle does not have to be opened to check the idle stabilizer valve or carbon canister valve.
- After testing the carbon canister valve, reinsert the jumper wire for 4 seconds
 - Code 0000 is displayed
- Reinsert the jumper wire for 4 seconds and remove
 - The permanent fault memory is erased if the LED test light **does not** flash

Component	Code	Operation cycle
Fuel pump	4433	Pump runs
Injector for #1 cylinder	4411	Clicks 5 times when throttle opened fully
Injector for #2 cylinder	4412	Clicks 5 times when throttle opened fully
Injector for #3 cylinder	4413	Clicks 5 times when throttle opened fully
Injector for #4 cylinder	4414	Clicks 5 times when throttle opened fully
Injector for #5 cylinder	4421	Clicks 5 times when throttle opened fully
Idle stabilizer valve	4431	Valve clicks
Carbon canister valve	4343	Valve clicks
	0000	End of procedure. Permanent memory is erased after wire is reinserted for 4 seconds.

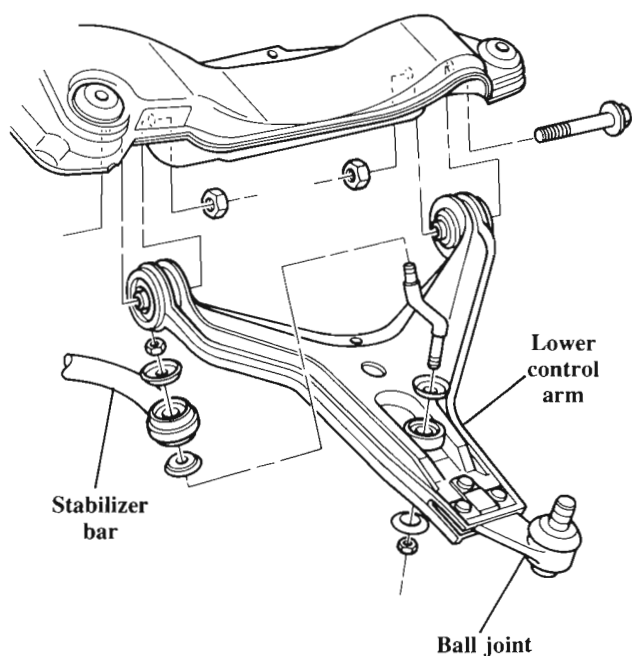
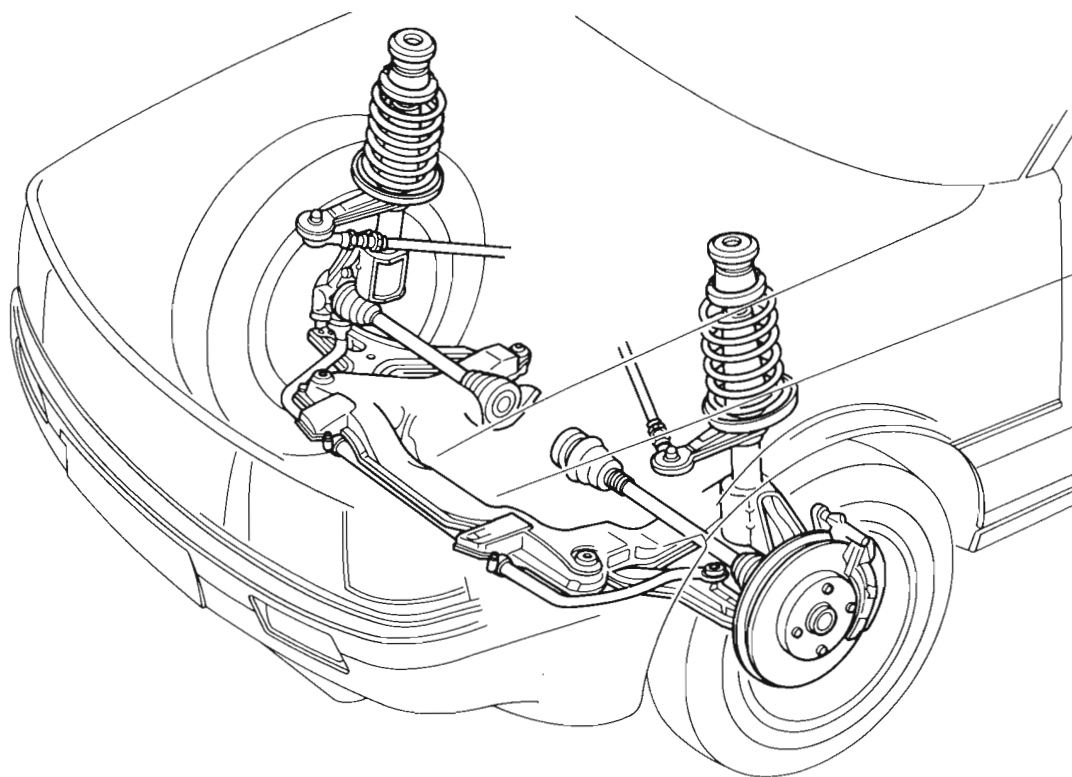


Control Unit Connectors



Chassis

Front Suspension



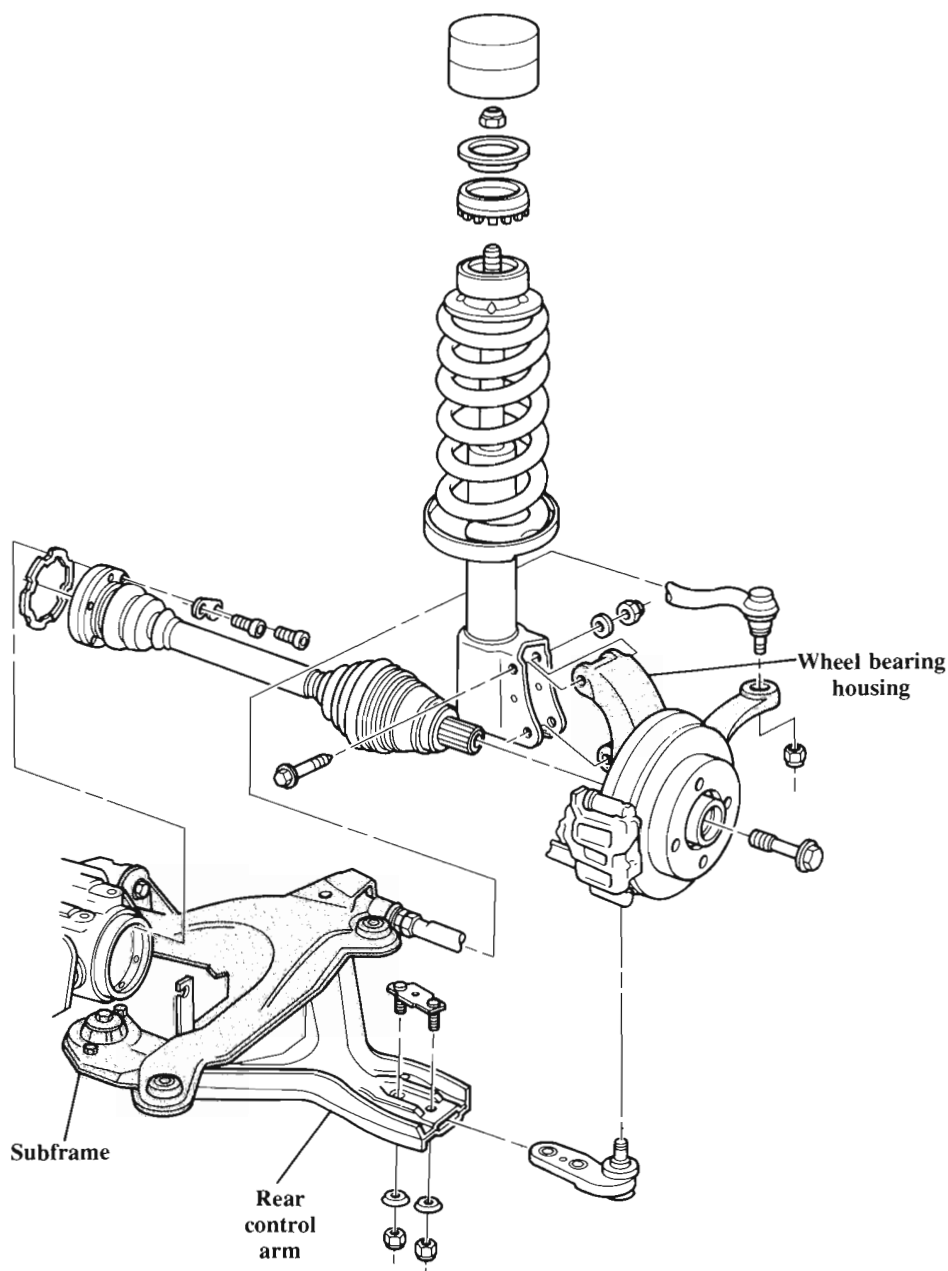
The front and rear suspensions of the new Coupe Quattro have been revised significantly when compared with the 1989 Audi 90 Quattro. The wheel base of the new Coupe is 11 mm longer, the front track is 42 mm wider and the rear track is 7 mm wider.

The front lower control arms are a triangular design and are now made from stainless steel. The ball joints are larger and are attached to the control arm with three bolts. The front caster has been increased from $1^{\circ} 15'$ to $2^{\circ} 15'$ to provide good stability. All other wheel alignment specifications are the same as the Audi 90 Quattro.

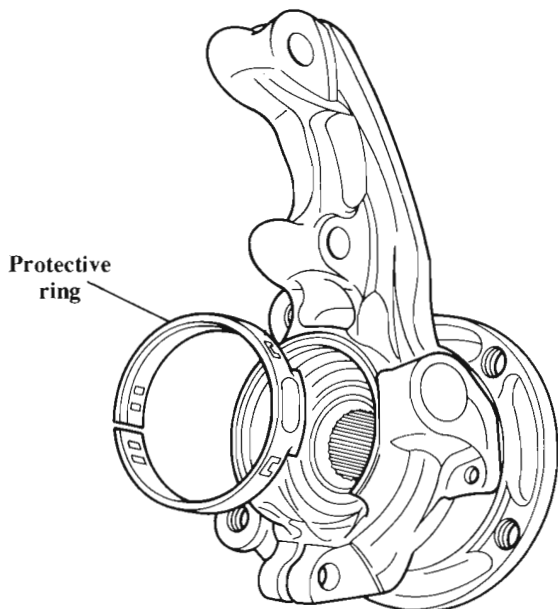
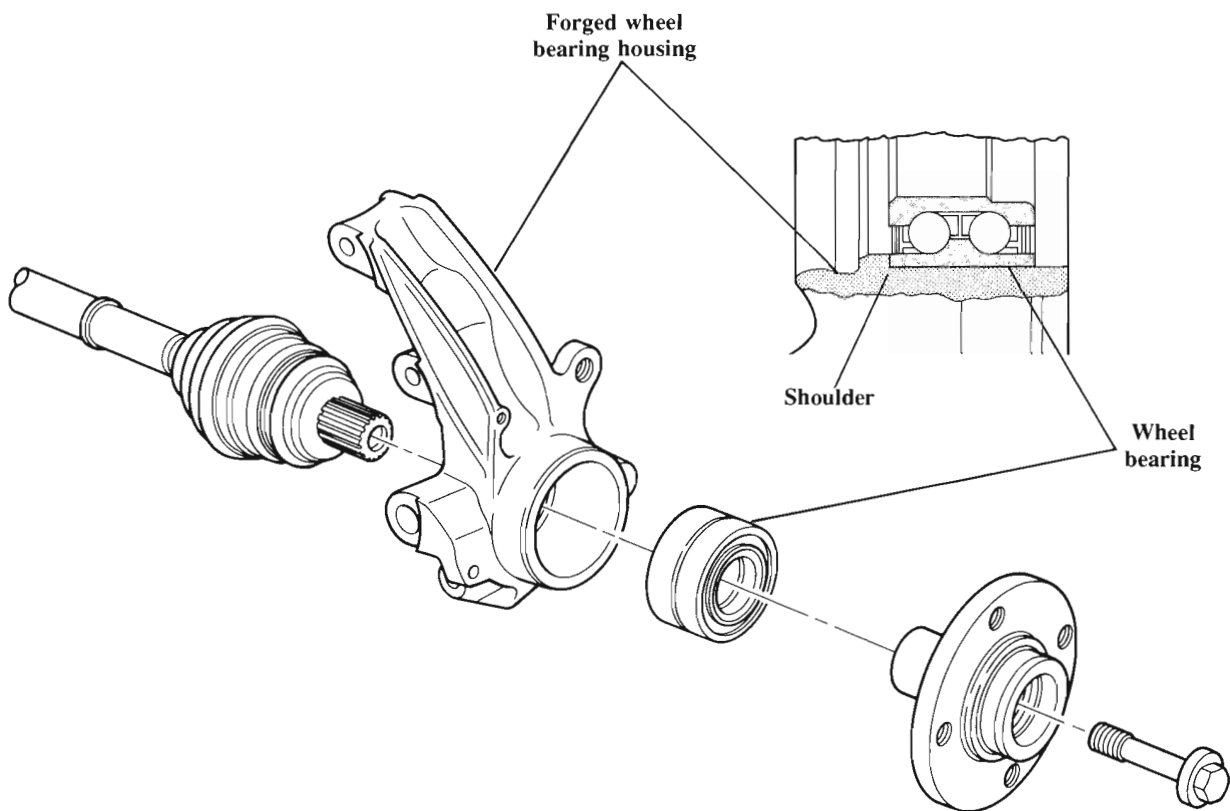
Rear Suspension

The suspension is tuned for a more firm or sporty ride. The front and rear springs have a higher spring rate, and gas pressure shock absorbers are also used which also have a more firm valving.

Both the front and rear suspension assemblies now use forged wheel bearing housings that are bolted to the strut housings.



Wheel Bearings



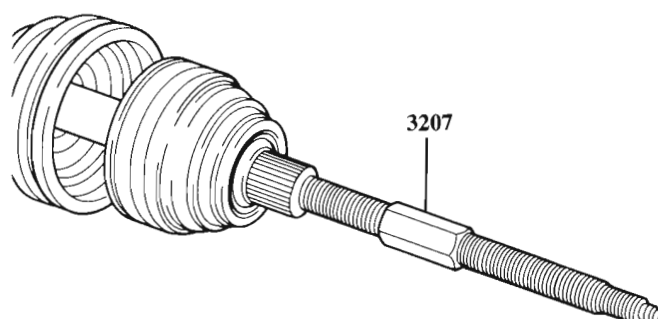
The wheel bearing housings are the latest type without a circlip for holding the wheel bearing in place. The CV joints and the wheel hubs are also new. The wheel bearing seats against a shoulder on the forged housing. The wheel hub is then pressed into the bearing housing.

The bearing is held in place by the CV joint, which contacts the inner race on the side of the bearing that faces the transmission and the wheel hub which is bolted to the CV joint.

A protective ring is now fitted into the inner side of the wheel bearing housing to protect against dirt and other foreign objects damaging the wheel bearing.

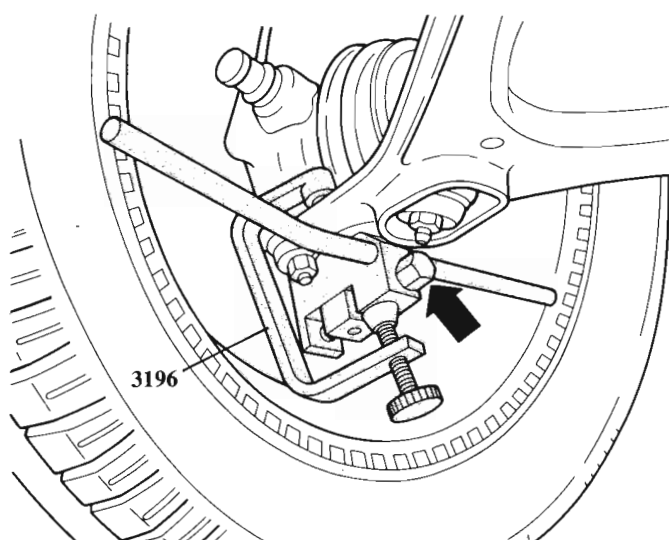
Special Tools

Special tool #3207 can be used to remove the CV joint from the axle shaft. The tool has a 16 mm threaded portion that can be threaded into the inside of the CV joint. This will push the axle off the joint.

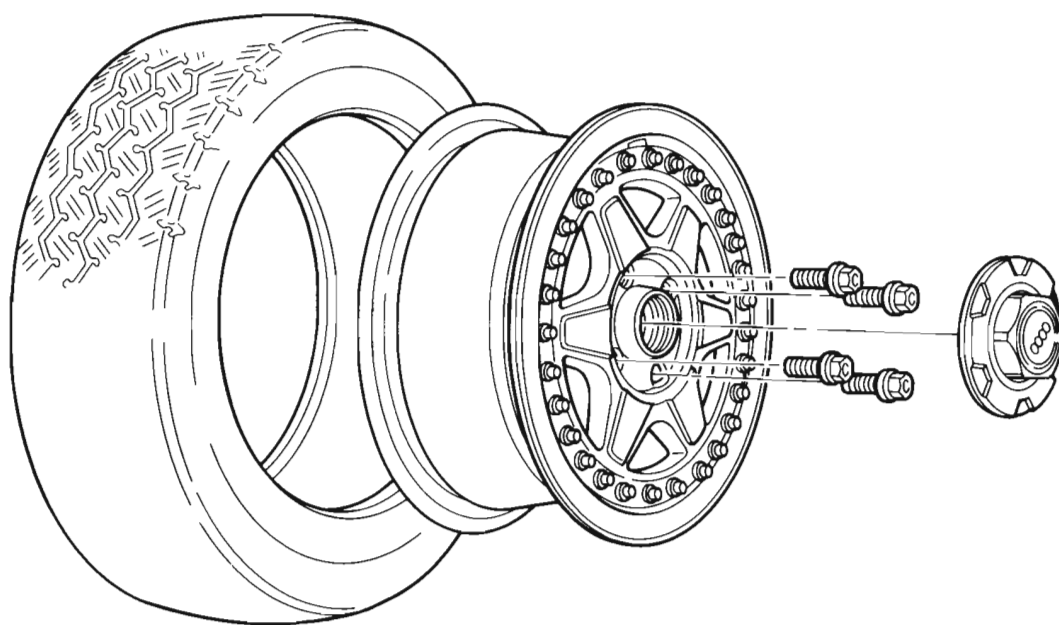


Special tool #3196 can be used to adjust the wheel camber on the front suspension with the three bolt ball joint.

The tool attaches to the center bolt of the ball joint and to the top part of the control arm. With the ball joint bolts loosened, the ball joint can be moved inward or outward on the control arm by turning the hex head on the special tool.



Wheels



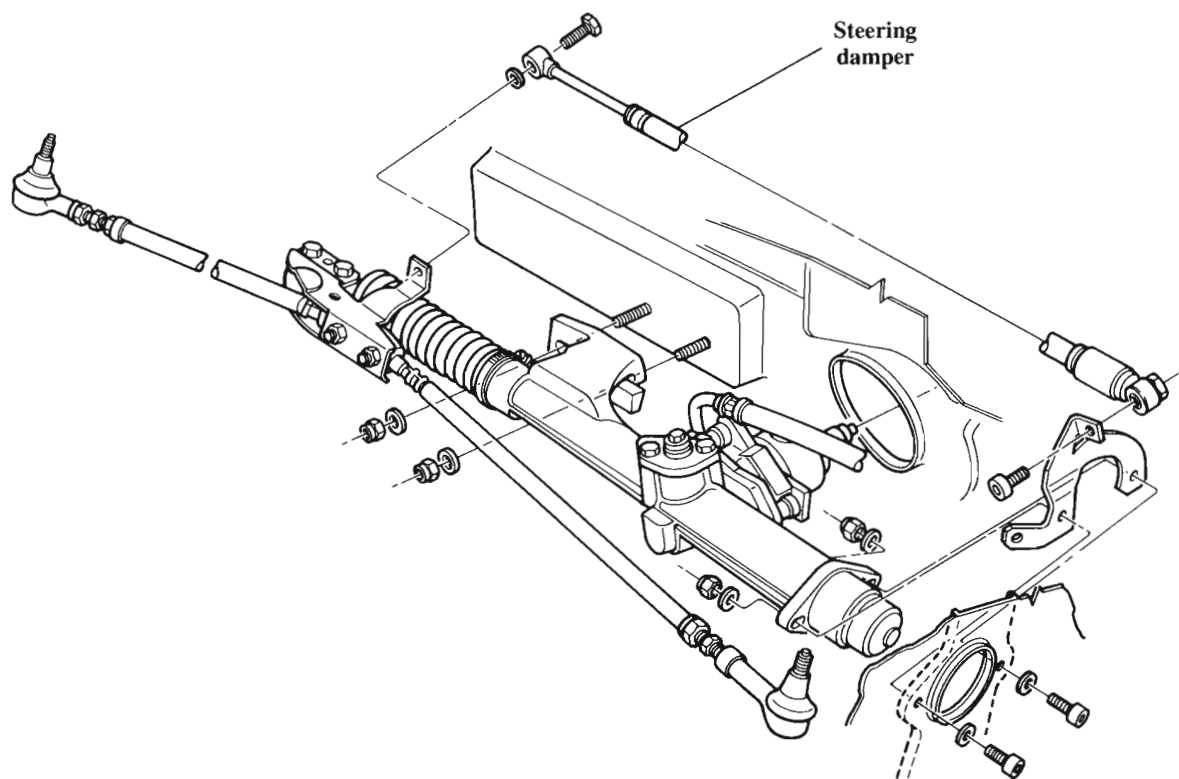
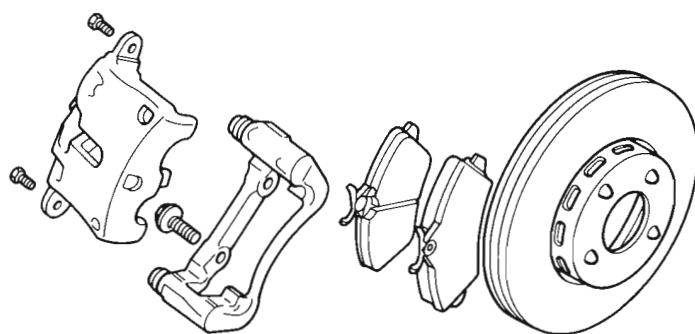
The Coupe Quattro is equipped with Speedline alloy wheels. These wheels are 7 inches wide by 15 inches in diameter. These wheels have a 37 mm offset from center (other Audi models use 40 mm and 45 mm offset wheels) and should not be used on other models.

Brakes/Steering

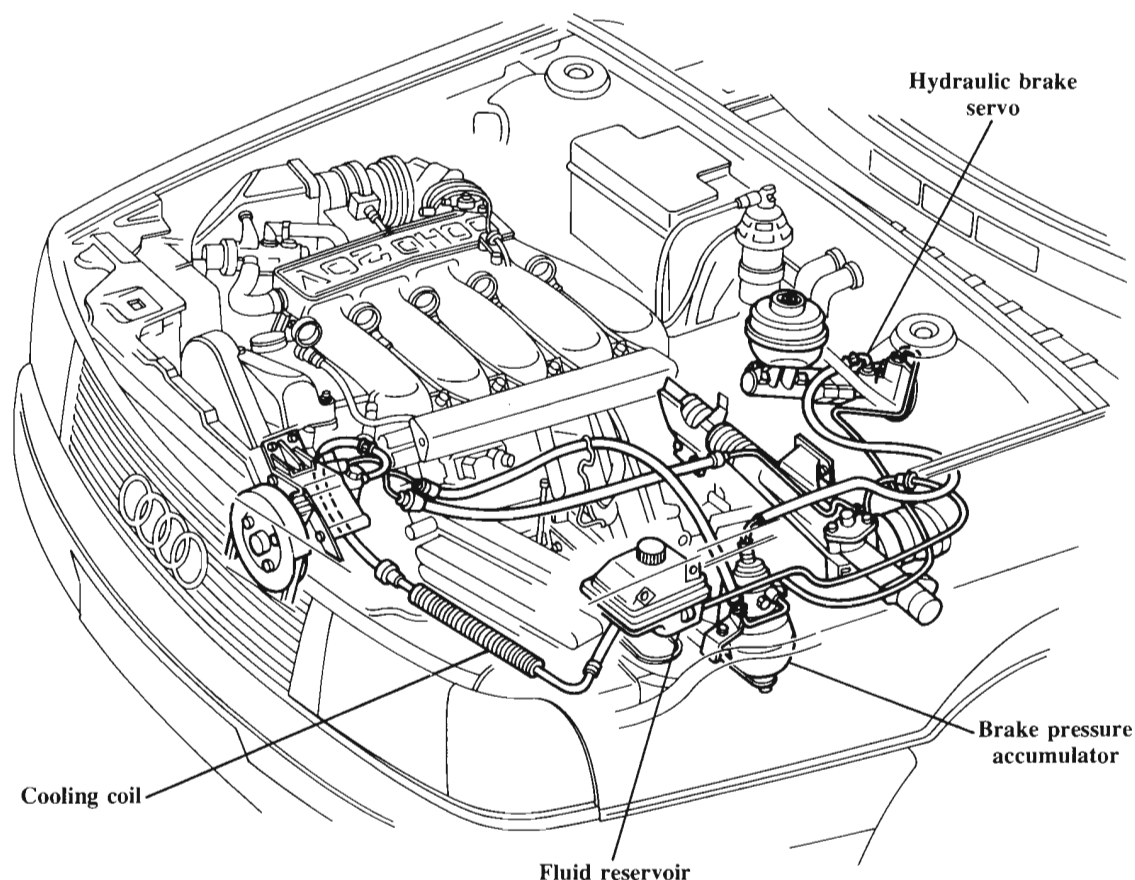
The front brakes are similar to the larger type used on the Audi 200 models. The ventilated front rotors are 276 mm in diameter and 25 mm wide (versus 256 mm and 22 mm on the Audi 90). The larger twin piston brake calipers are also used.

The rear brakes are the same as on the Audi 90 Quattro.

The steering gear assembly has been modified to include a steering damper.



Central Hydraulics



The Coupe Quattro will also be equipped with a central-type hydraulic system. This system supplies hydraulic boost for both the steering and brake servo. The advantages of using a hydraulic brake servo are that it takes less space than a vacuum unit, has a shorter reaction time and provides a more firm pedal feel.

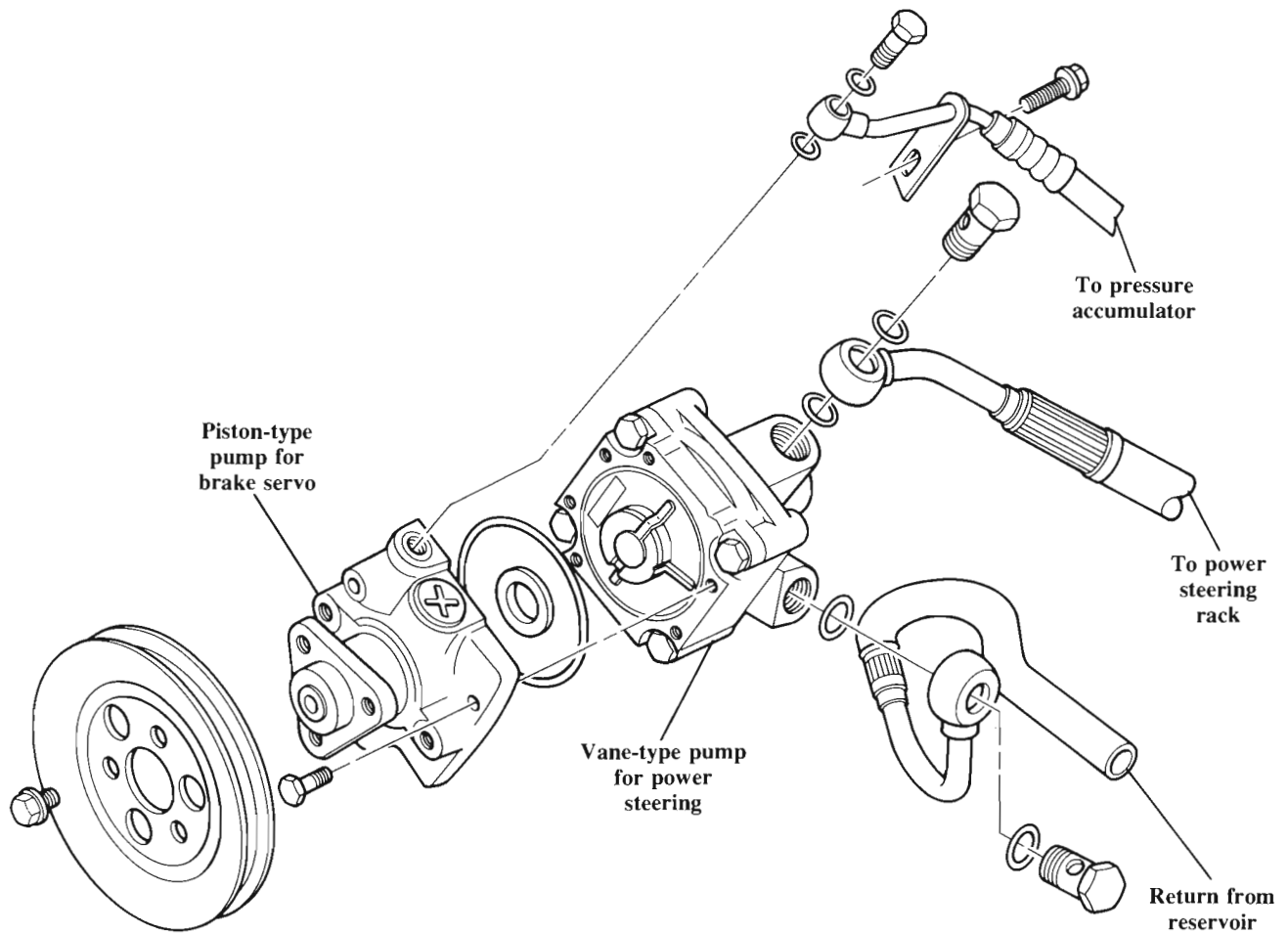
The system is filled with 1.9 liters (2.0 U.S. quarts) of G 002 000 hydraulic fluid. To check the

fluid level, let the engine idle for 2 minutes. Then shut the engine off and immediately check the fluid level in the reservoir.

A cooling coil is in the fluid supply line from the reservoir to the hydraulic pump and is located in front of the radiator.

Central Hydraulic

Pump



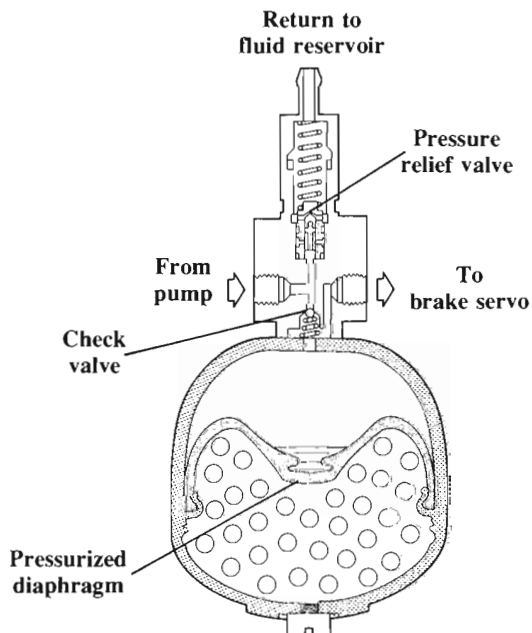
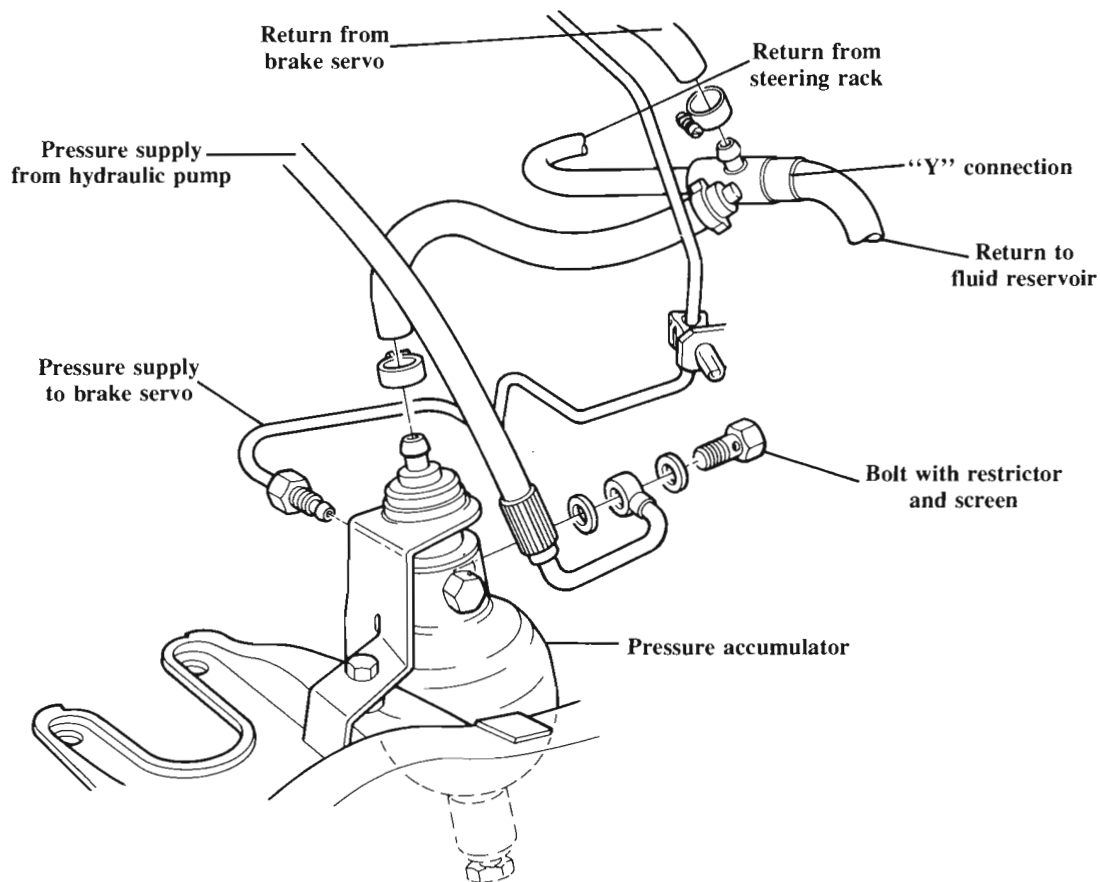
A tandem hydraulic pump is used on the system. The pump consists of a radial 2 piston pump for the brake servo and a vane-type impeller pump for the steering gear.

The radial portion of the pump uses two pistons that are operated by a cam or eccentric on the pump driveshaft. The pistons supply the hydraulic brake servo with about 0.3 liters per min. at idle and 140 bar of system pressure.

The vane-type portion operates like the vane pump on Audi 80/90 models. The pump has a flow limiting valve, which will reduce the pressure supplied to the steering gear as engine speed increases. This is to improve road feel at higher vehicle speeds.

The vane portion can supply up to 110 bar of pressure at idle to the steering gear if needed.

Pressure Accumulator



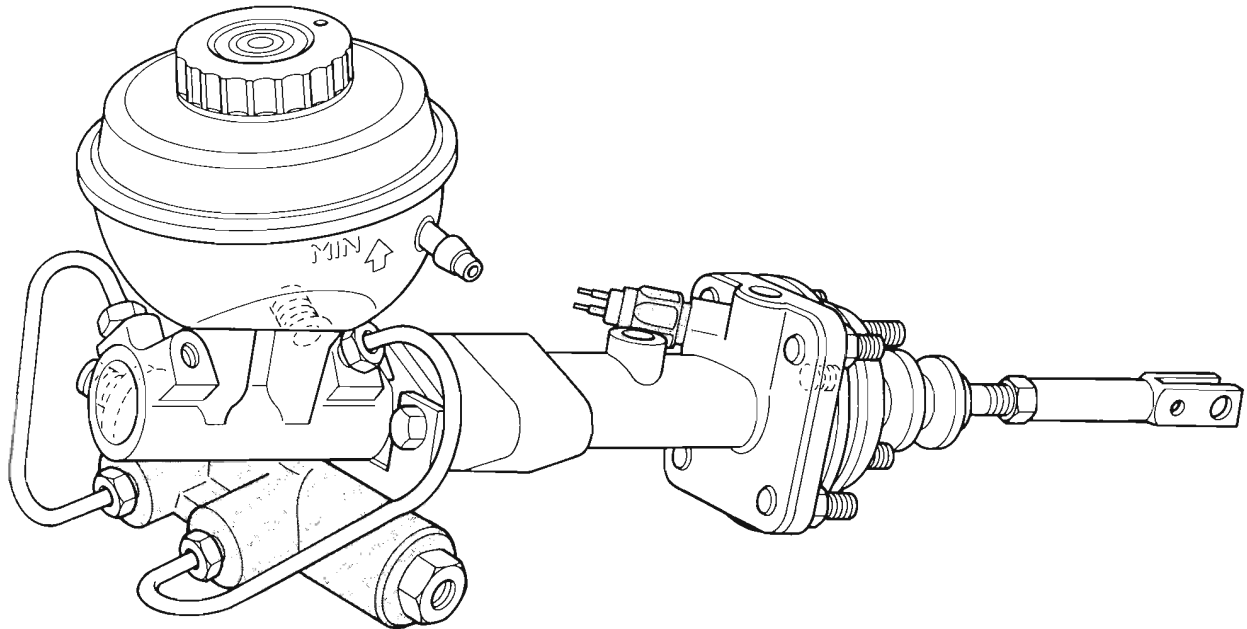
A pressure accumulator is used to retain pressure for the hydraulic brake servo. The accumulator has a diaphragm which is filled with a gas pressure of about 90 bar. This pressurized fluid is available for a few brake pedal applications in the event that the engine is not running and the brakes need to be applied.

The hydraulic pressure in the accumulator should be released before working on the system. This can be done by pressing the brake pedal about 20 times with the engine off or until the brake pedal becomes hard.

The accumulator also has a pressure relief valve which opens at about 140 bar to let excess pressure return back to the reservoir.

Central Hydraulics

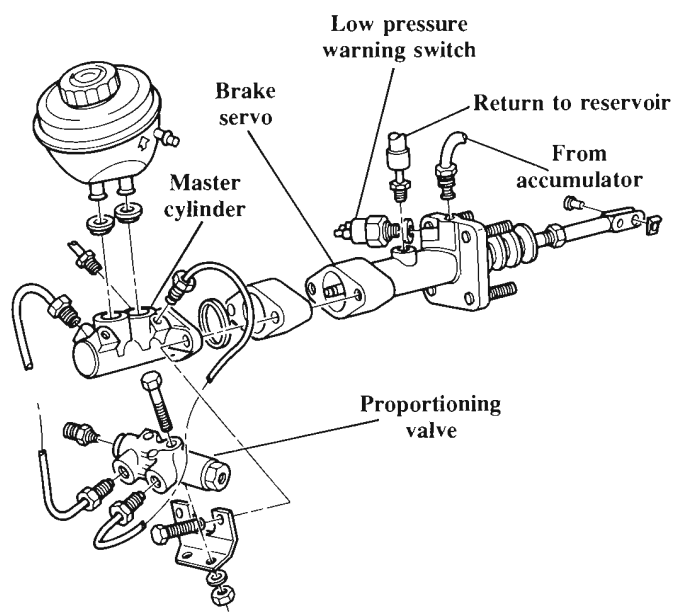
Brake Servo/Master Cylinder



The hydraulic brake servo is located behind and bolted to the brake master cylinder. The servo uses pressure from the hydraulic pump to increase pedal pressure on the brake master cylinder. The amount of assist will always be proportional to the amount of force the driver applies to the brake pedal.

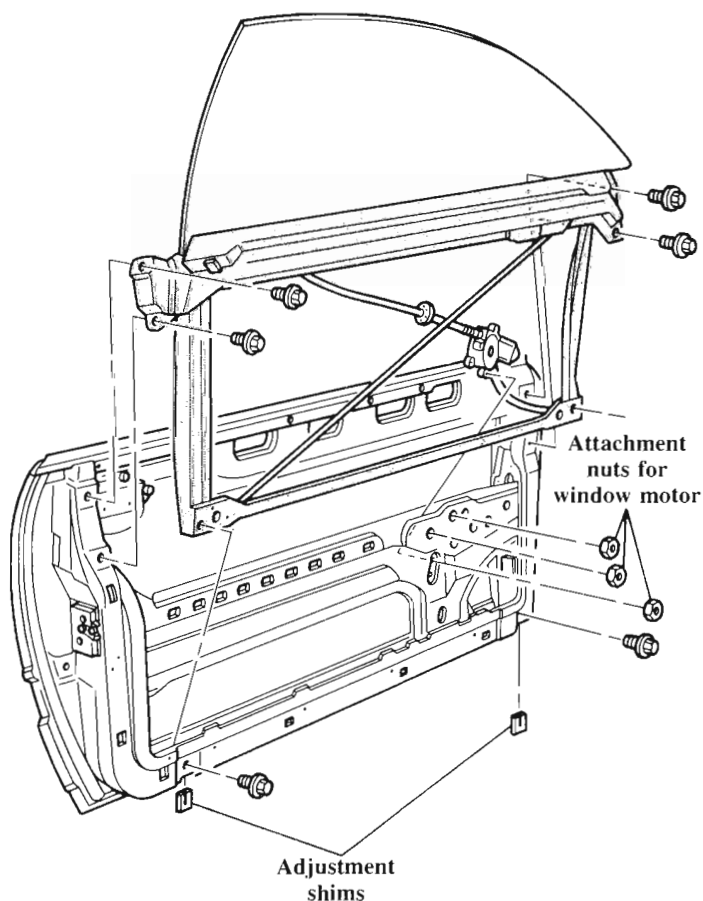
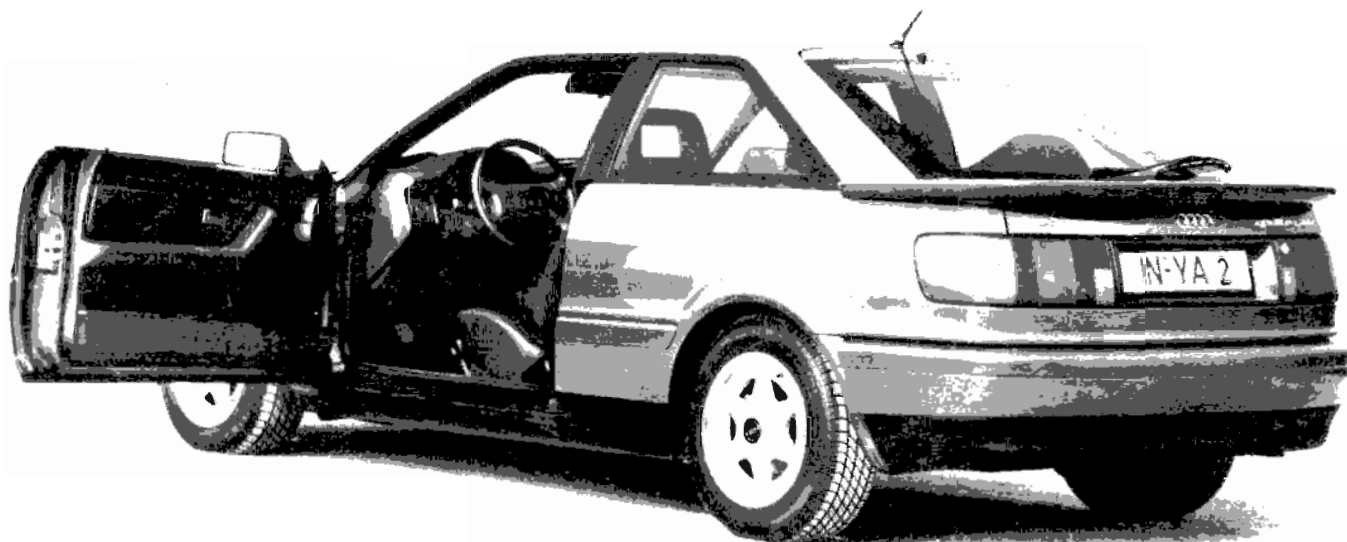
A low pressure warning switch is threaded into the brake servo. The switch will close and switch on the brake warning light in the instrument cluster if the system's hydraulic pressure falls below the point where the system can safely operate.

A fixed ratio load proportioning valve for the rear brakes is mounted below the brake master cylinder. This proportioning valve is similar to the valve used on the Audi 90 Quattro.



Body Assembly

Front Doors



The Audi Coupe Quattro has a new frameless door/window design. The window seals directly against the body instead of a separate frame.

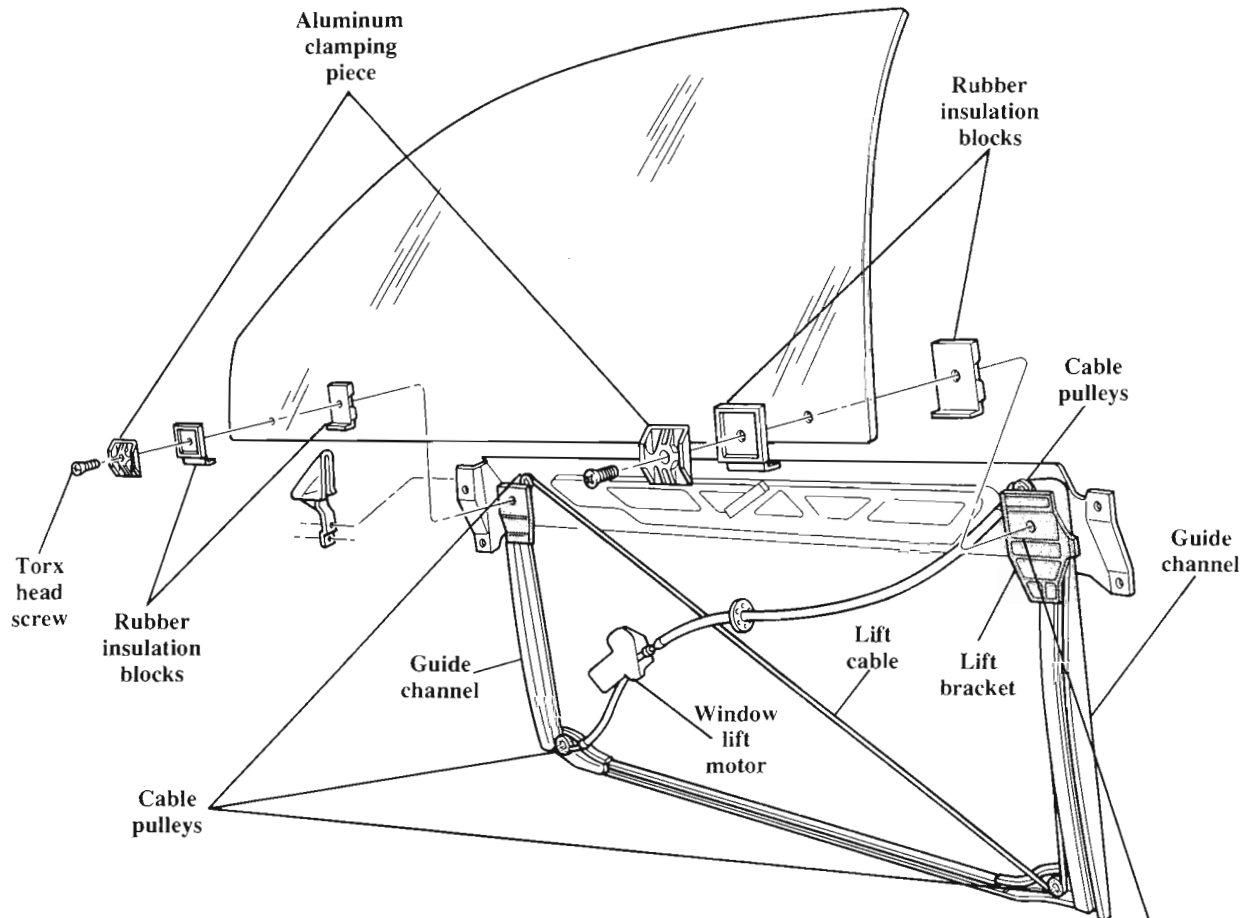
The window regulator assembly is bolted to the door with six bolts and is adjustable. The bolt holes are larger than normal to allow the regulator and window to be adjusted back and forth and up or down. Two adjustment shims are used at the bottom portion of the frame to tilt the regulator assembly and window in or out against the body.

In this way, the position of the window relative to the body opening can be changed to allow any necessary adjustments to be performed.

On some vehicles, adjustment shims may be used in additional locations. Before removing the attachment bolts for the window regulator, note the installation location of all adjustment shims.

Body Assembly

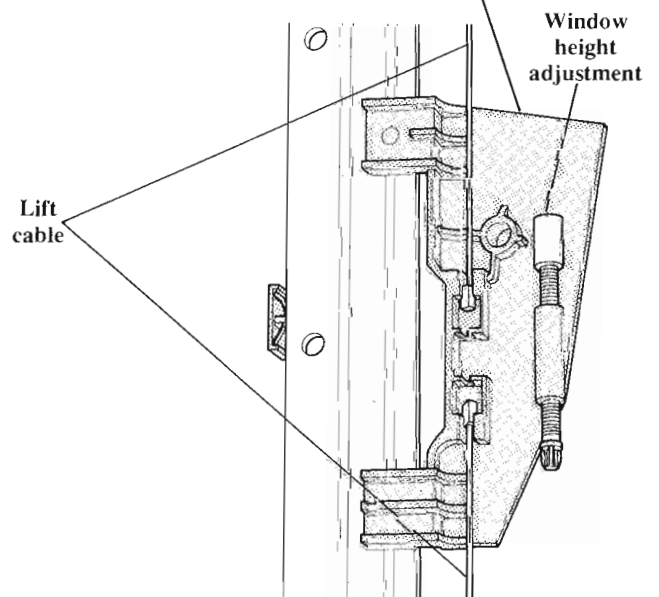
Window Regulator



The window regulator is a new type with parallel window lift brackets and guide channels. This design is necessary because of the length of the door.

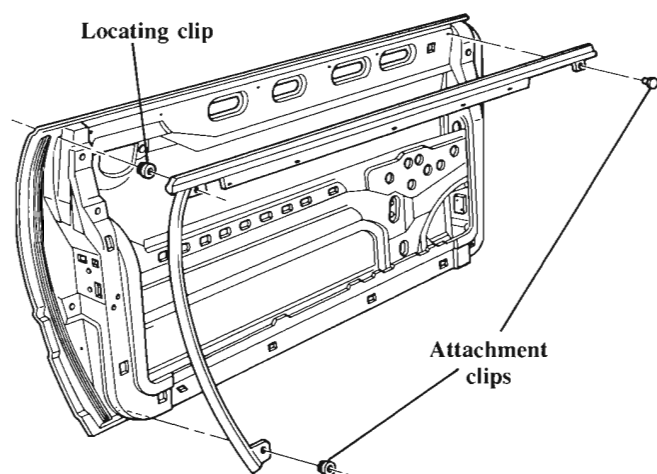
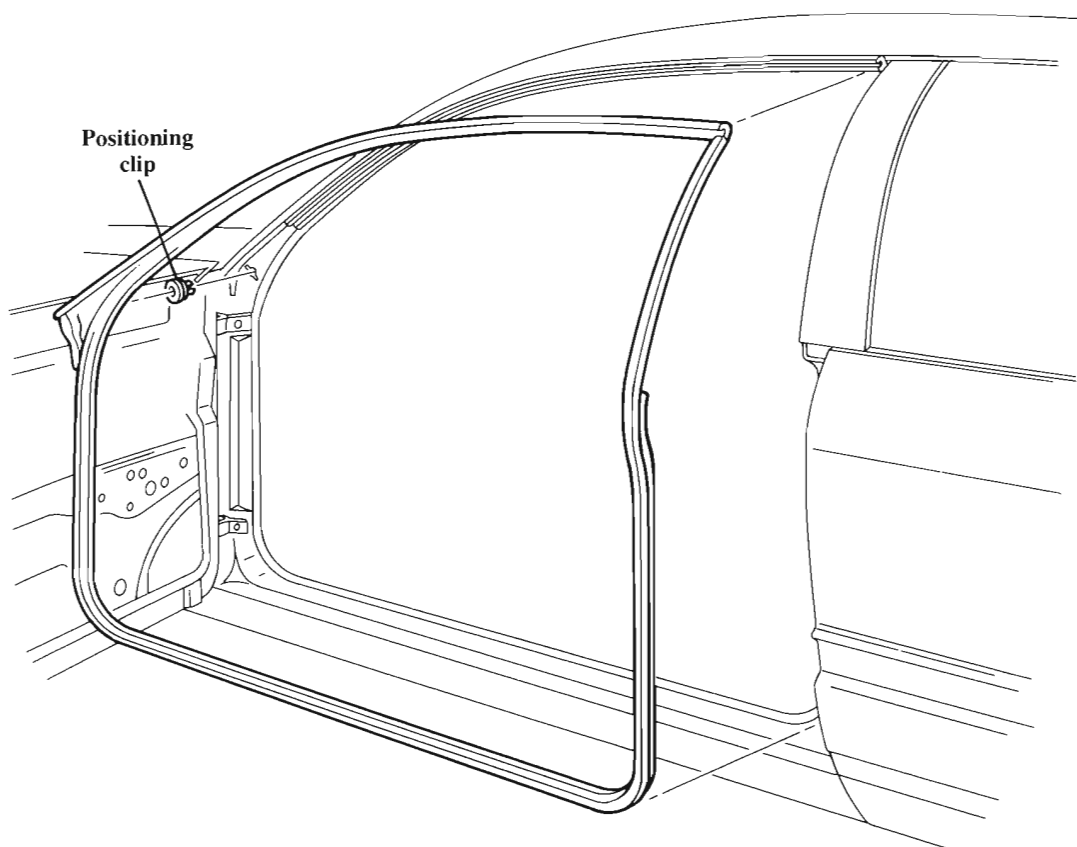
A cable is routed around four pulleys and connected to both window lift brackets. The cable is attached to an electric window lift motor that is bolted to the door frame with three 6 mm nuts.

The window is bolted to each lift bracket with a counter-sunk Torx head screw. The window mounting is "sandwiched" between two rubber insulators and an aluminum clamping piece.



Body Assembly

Door Seal

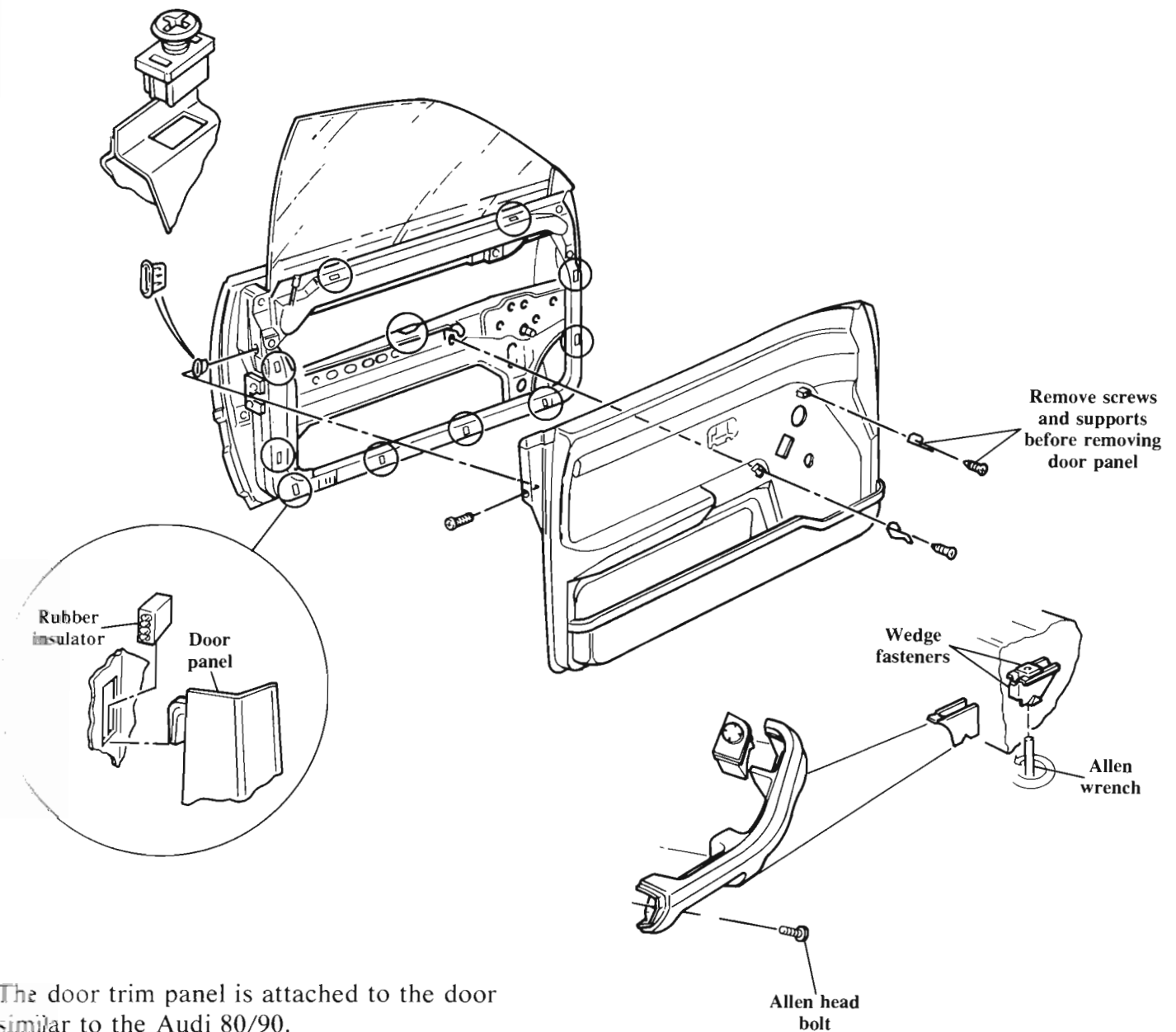


A one piece door seal is used. This seal is fitted to the body around the door opening. One clip is used to position and locate the seal properly because the seal has several different profiles on the top, sides and bottom of the door opening.

A second seal is also installed on the top and side of the door shell.

Body Assembly

Door Trim Panel

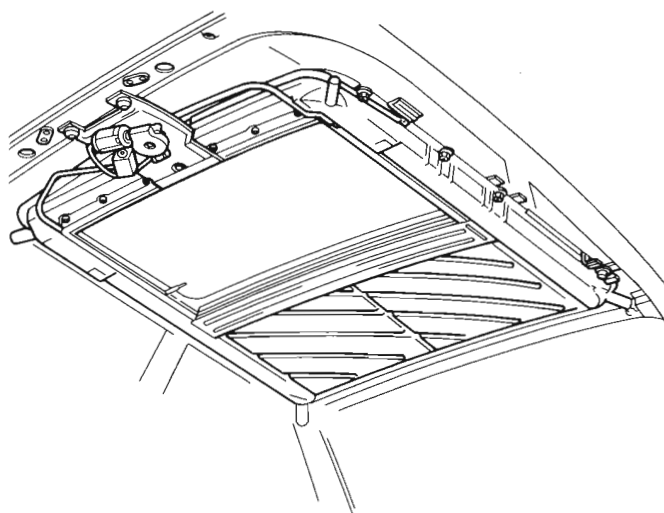
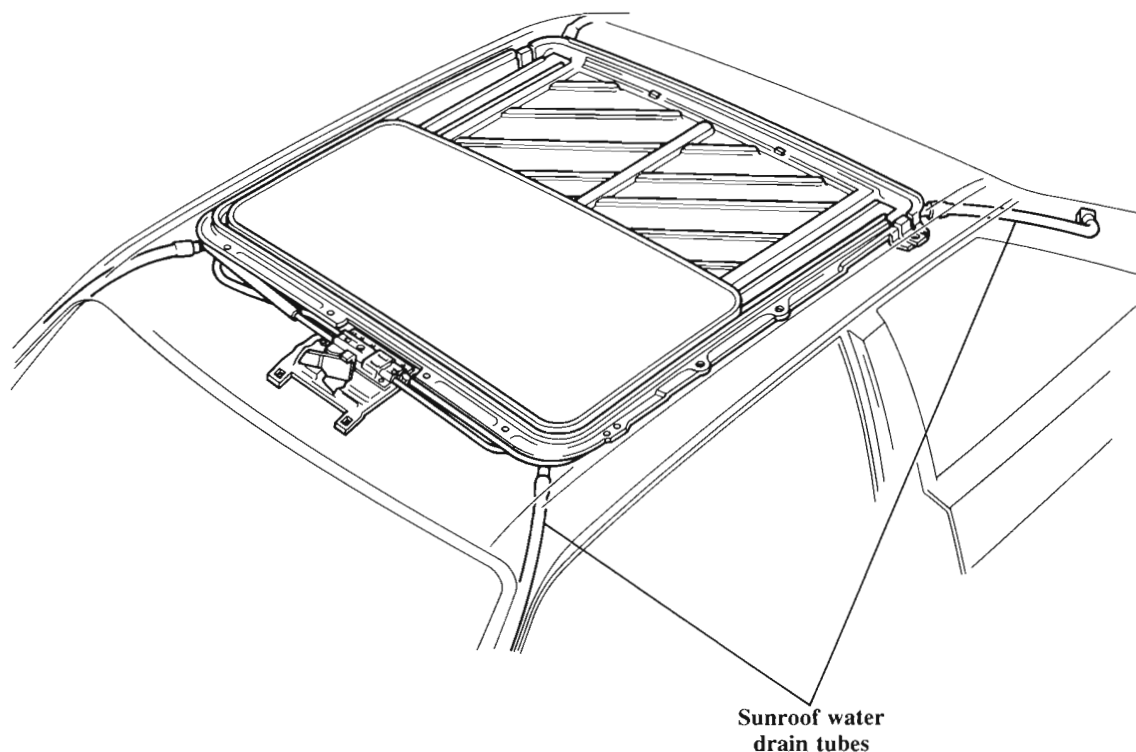


The door trim panel is attached to the door similar to the Audi 80/90.

Angled retainers are molded into the door panel and fit with rubber insulators into the door. The panel must be lifted up before being removed.

Body Assembly

Sunroof



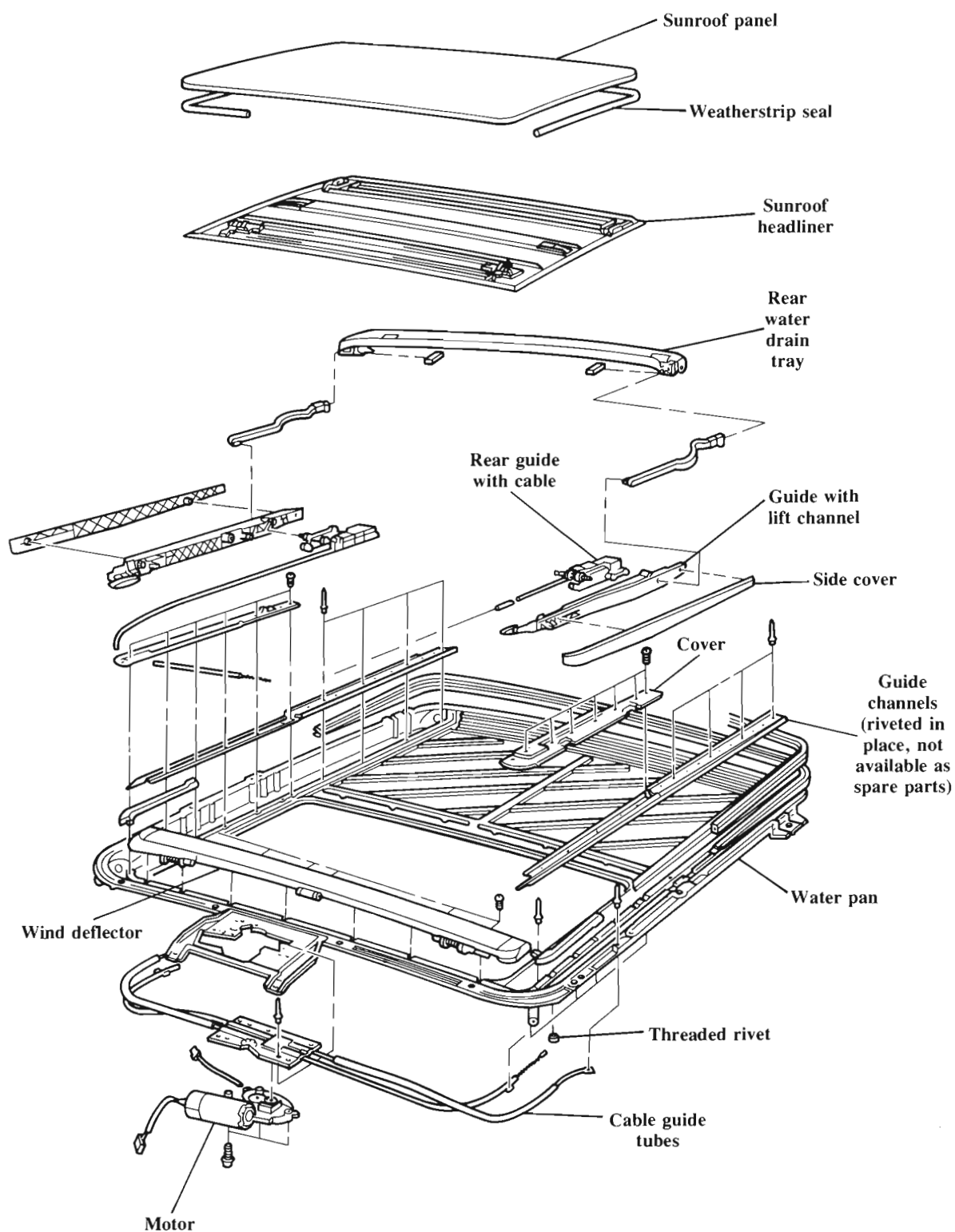
The Coupe Quattro is the first Audi to use the new generation sunroof. This sunroof is a modular assembly that is installed into the car as a complete unit. In production, the sunroof components are assembled in the water pan, then bolted to the vehicle's roof from inside before the headliner is installed.

In service, all of the sunroof components, except the water pan, can be removed and adjustments performed through the sunroof opening.

This sunroof will eventually be installed in other Audi models in the future.

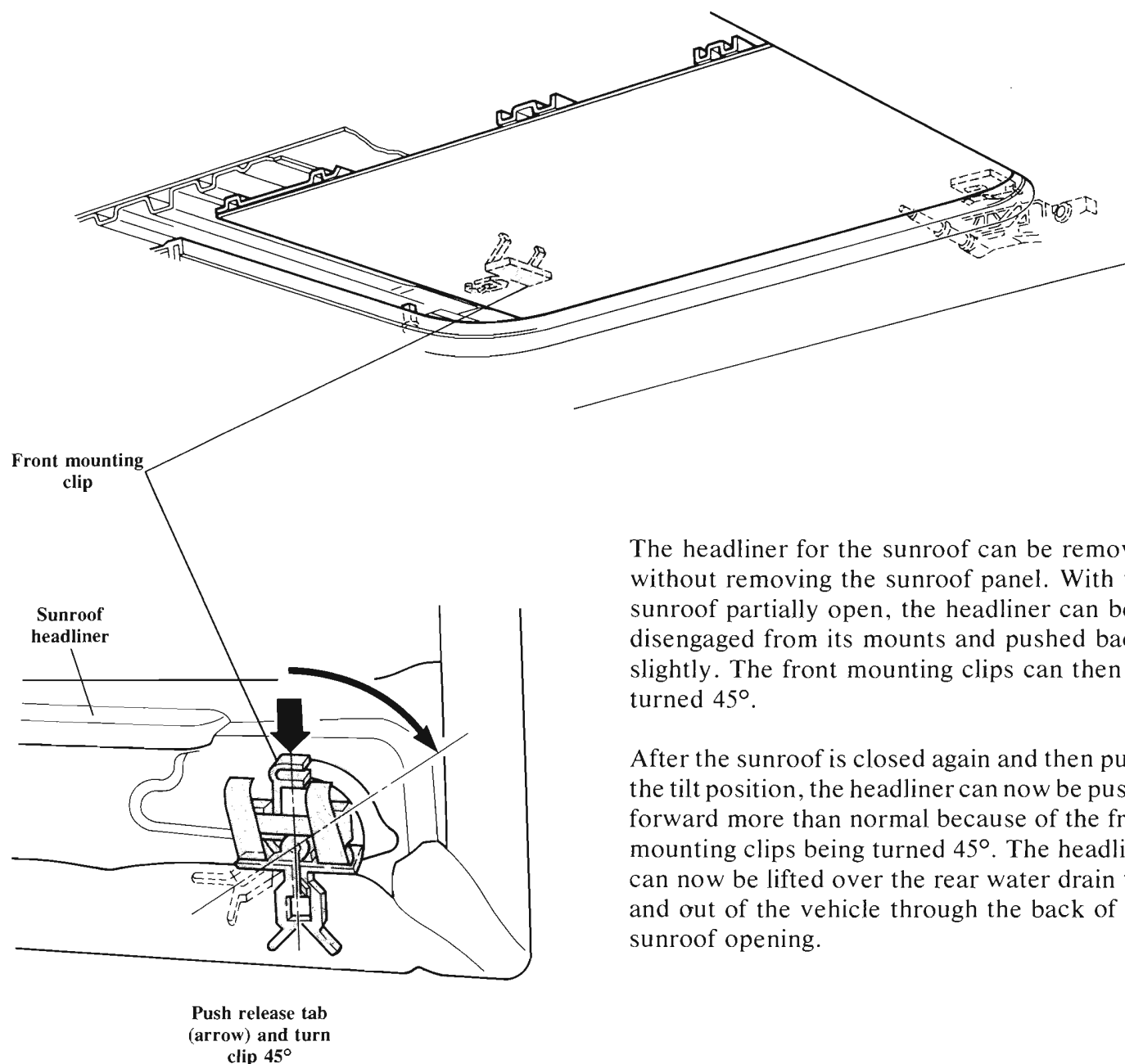
Body Assembly

Sunroof



Body Assembly

Sunroof Headliner

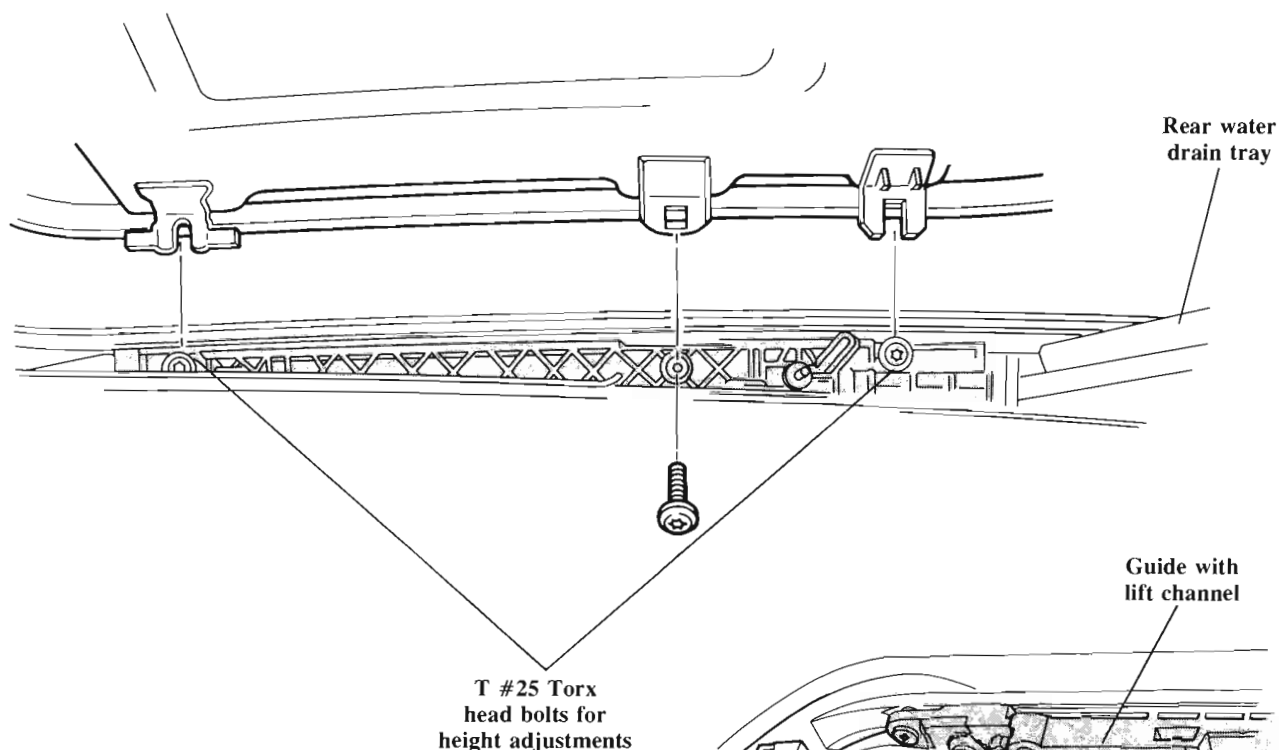


The headliner for the sunroof can be removed without removing the sunroof panel. With the sunroof partially open, the headliner can be disengaged from its mounts and pushed back slightly. The front mounting clips can then be turned 45°.

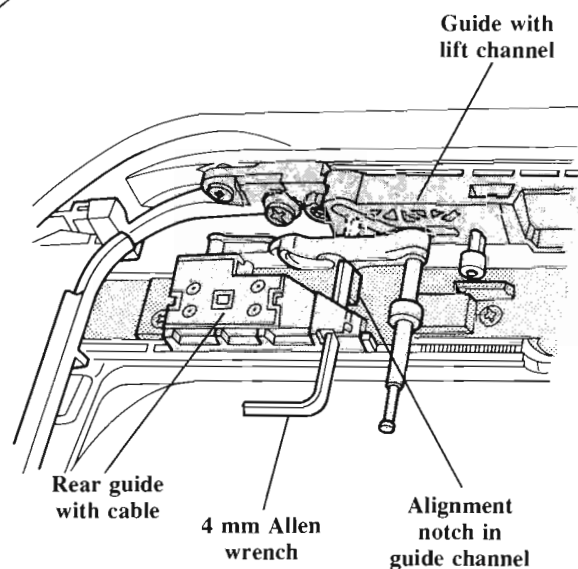
After the sunroof is closed again and then put in the tilt position, the headliner can now be pushed forward more than normal because of the front mounting clips being turned 45°. The headliner can now be lifted over the rear water drain tray and out of the vehicle through the back of the sunroof opening.

Body Assembly

Sunroof Adjustments

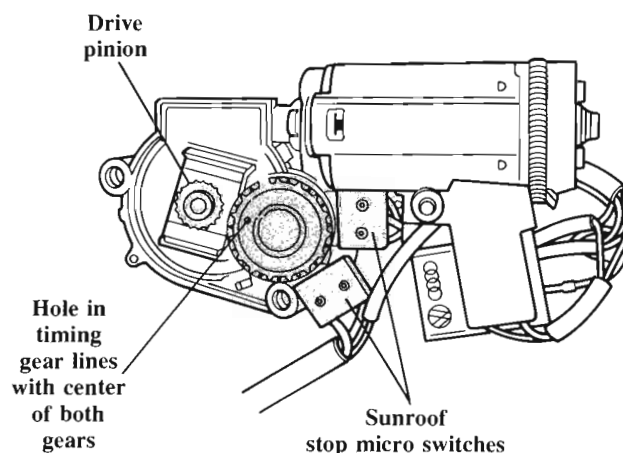


The sunroof panel can be removed by loosening the two outer screws on each side and removing each center screw. The screws have a #25 Torx head drive. These screws are also used to adjust the sunroof height.



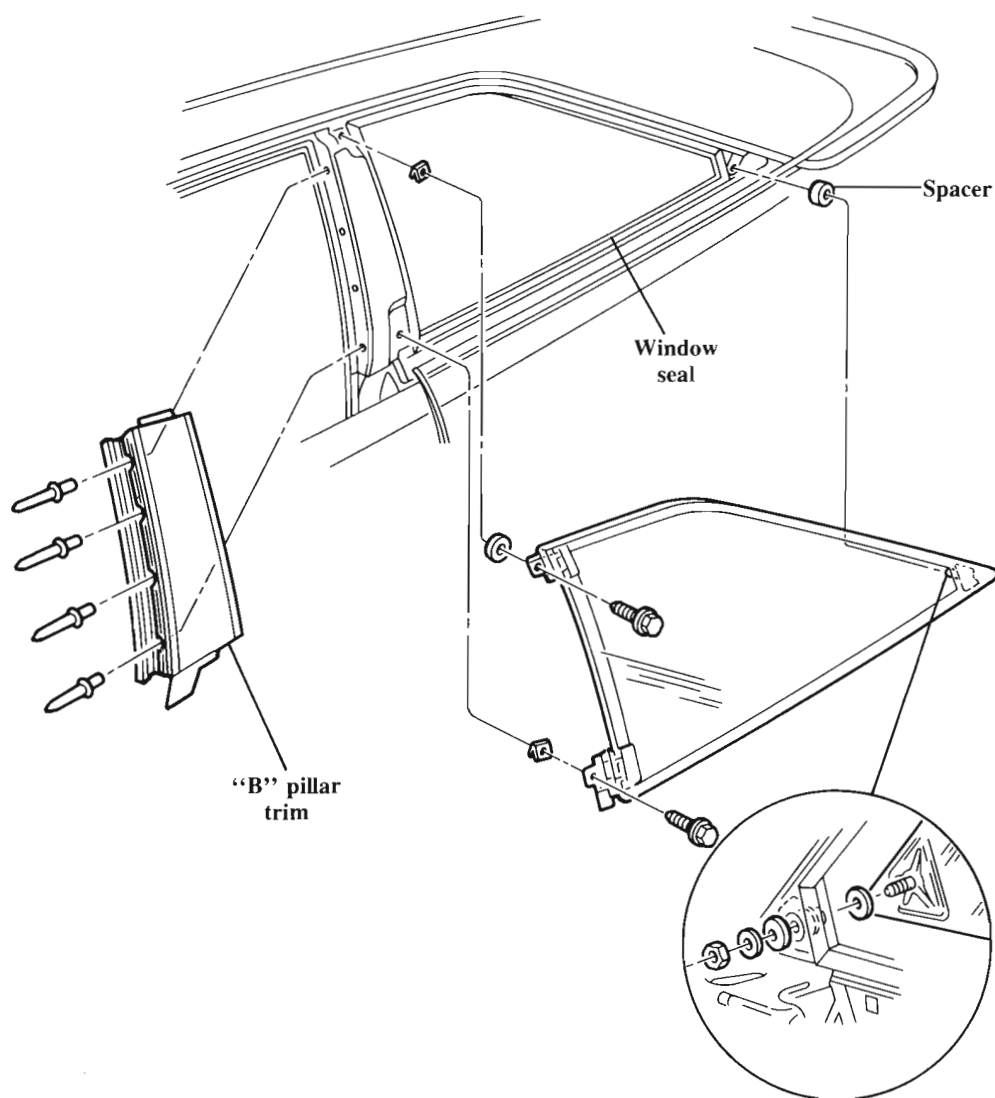
To adjust the parallelism of the cables, the rear guides with the cables and also the guides with the lift channel are positioned so a 4 mm Allen wrench can be inserted through both guides and the alignment notches in the guide channel.

The sunroof motor can now be positioned so the hole in the timing gear lines up with the center of both the drive pinion and timing cam and then bolted in place.



Body Assembly

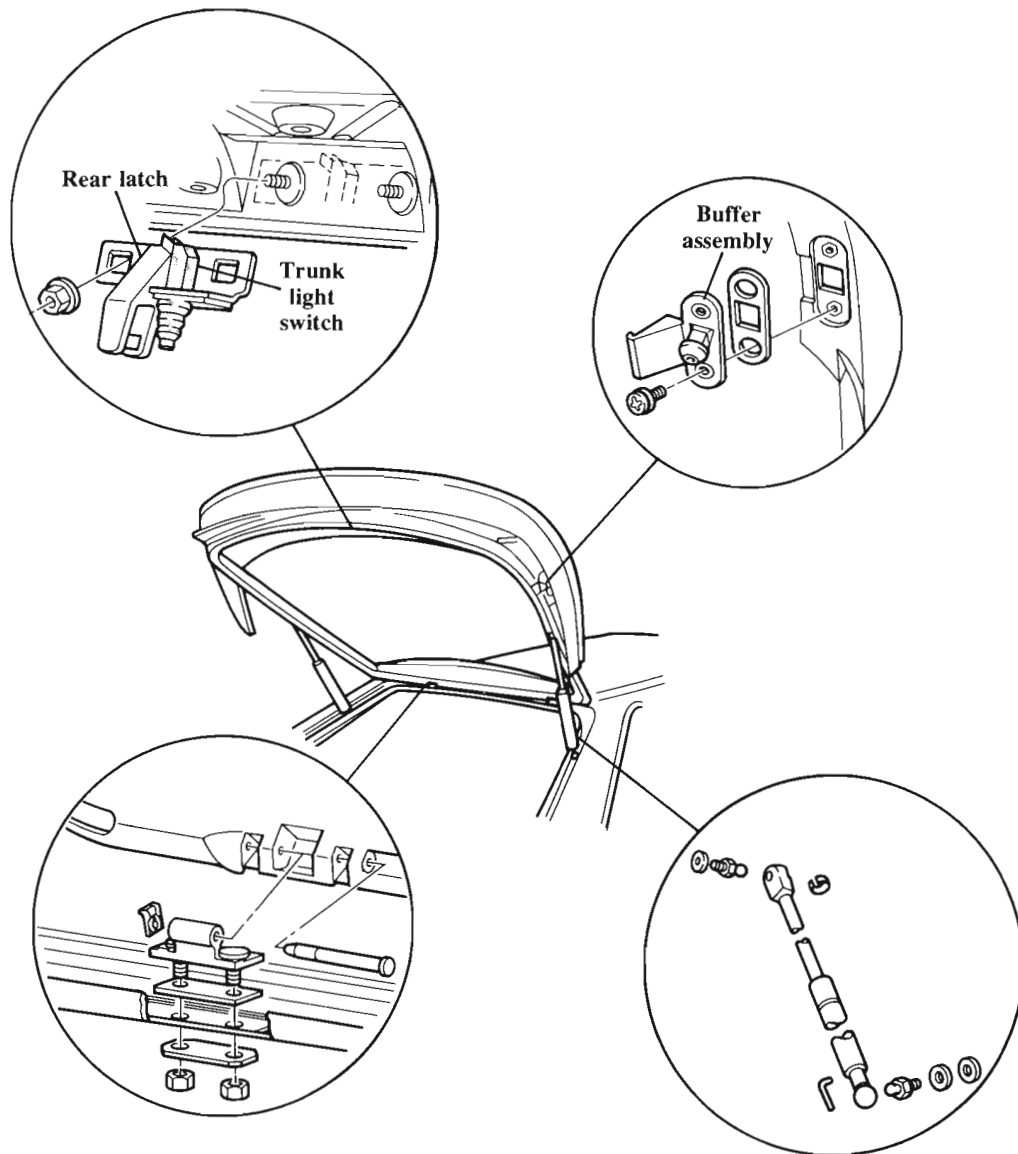
Rear Window



The rear quarter windows on the Coupe Quattro are bolted in place. The window is sealed with a rubber seal which is attached to the body. The front two bolts can be removed by first removing the "B" pillar trim which is riveted in place.

Body Assembly

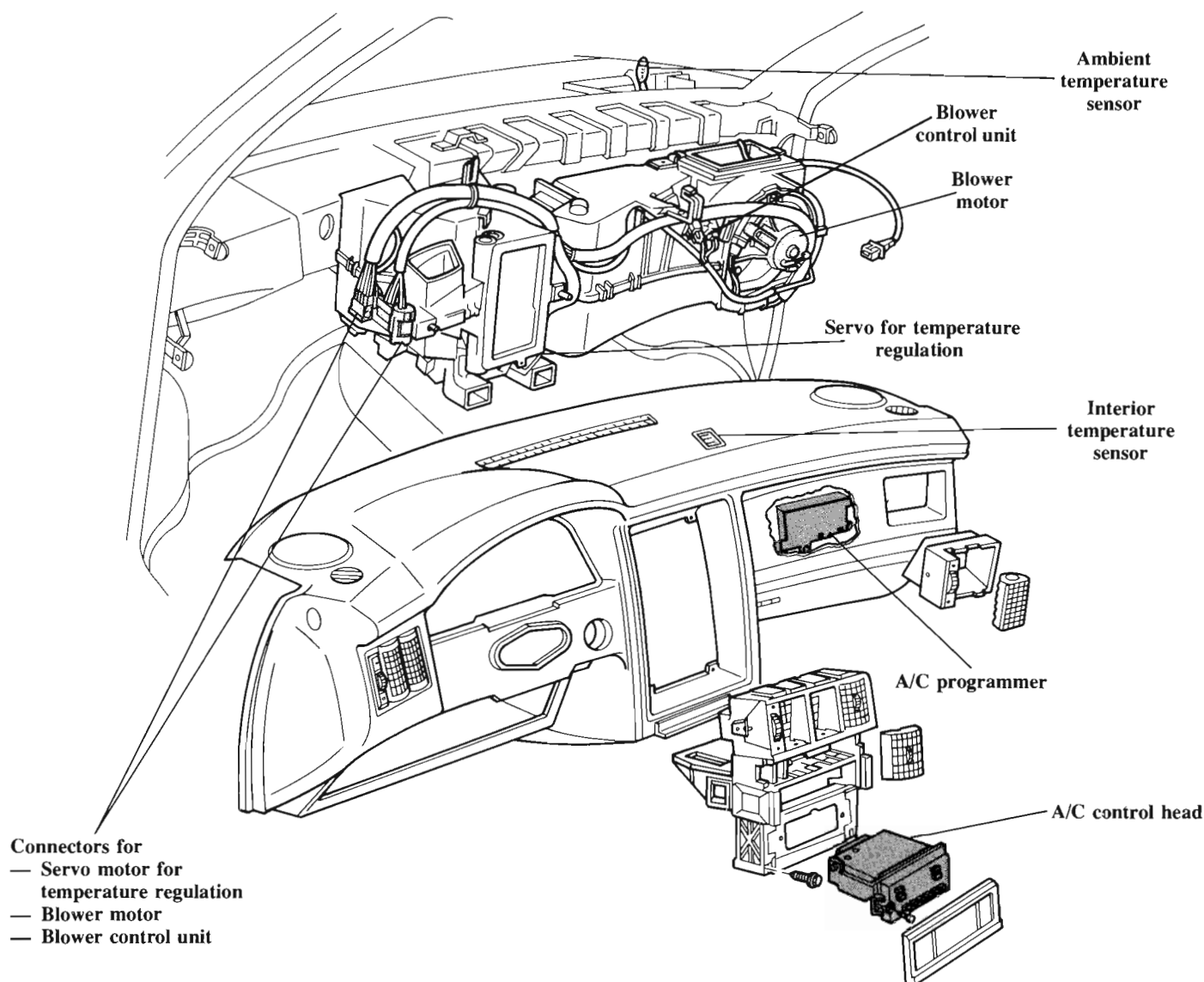
Rear Deck Lid



The rear hatch assembly is made from plastic composite sections that are then bonded together with adhesive. The use of the plastic composites saves weight and production costs.

Climate Control

Digital Climate Control



A digital climate control system is now available on the Audi Coupe Quattro. This system is similar to that used on the Audi 100/200. The refrigeration system basically remains the same as Audi 90 models without climate control.

As with the previous climate control systems, features such as fully digital electronic circuitry, self-diagnosis capability, bi-level mode and blower speed control are included.

Climate Control

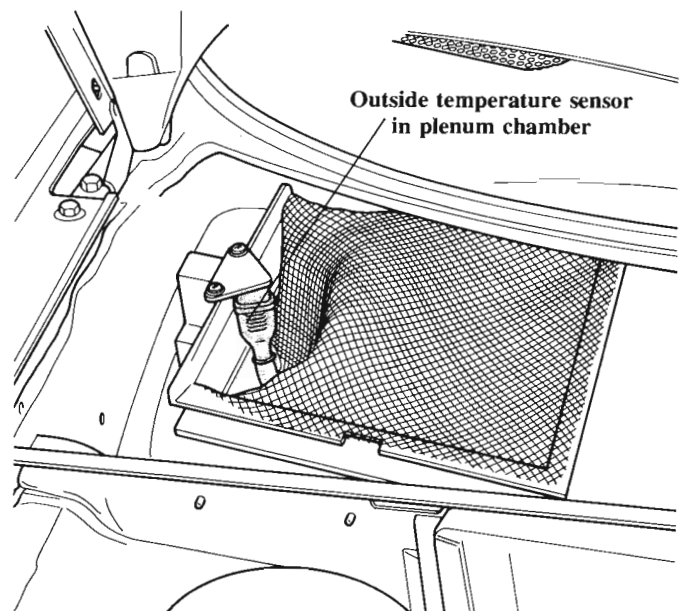
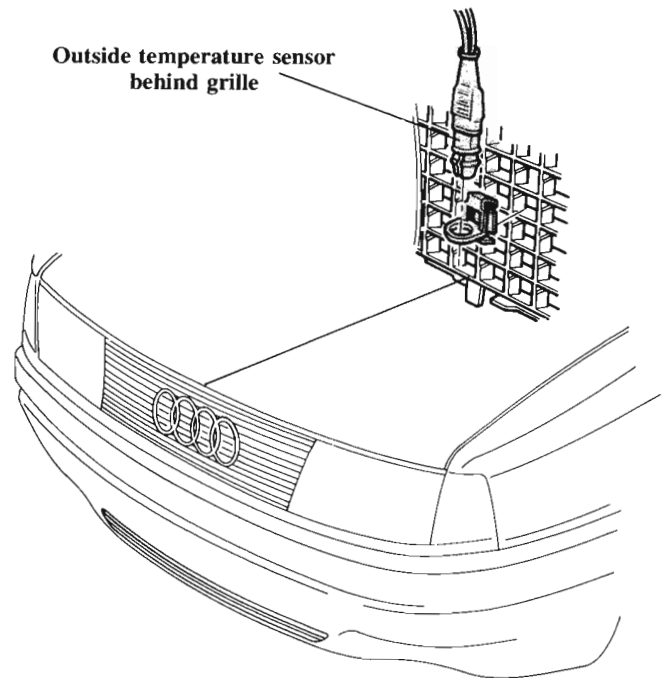
Outside Temperature Sensors

Two identical sensors are also used to measure outside ambient temperature. One sensor is located in front of the radiator and the other on the evaporator in the plenum chamber.

The control head measures both sensors and uses the lowest value to calculate outside ambient temperature. This information is then used to make small adjustments to interior temperature regulation, air distribution and blower speed.

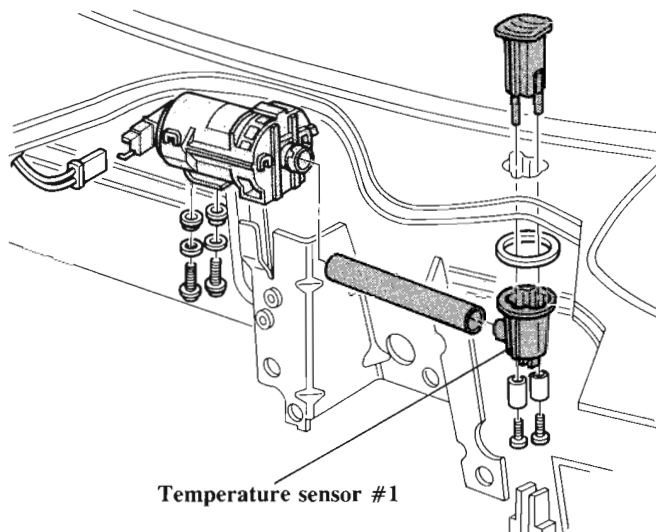
The values received from these sensors are also used for the outside temperature display and compressor clutch operation. The A/C compressor clutch will not operate when outside ambient temperature falls below 38° to 33° F (1° to 3° C).

The outside ambient temperature switch that was previously located on the evaporator is no longer used on cars with electronic climate control.



Climate Control

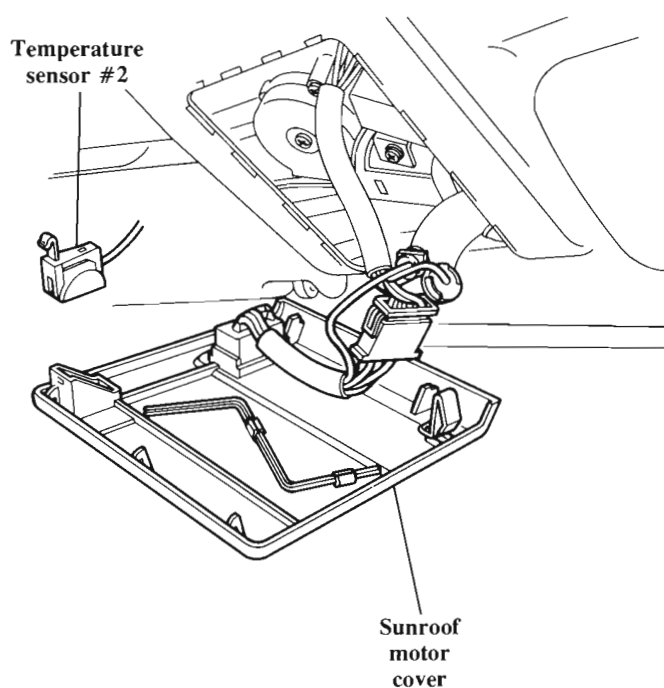
Interior Temperature Sensor #1



The climate control system uses two interior temperature sensors. Temperature sensor #1 is located in the dashboard and is the same as that used on the Audi 100/200 system.

A small suction fan is used to draw interior air over the sensor to ensure accurate measurement. The fan operates when the ignition is turned on.

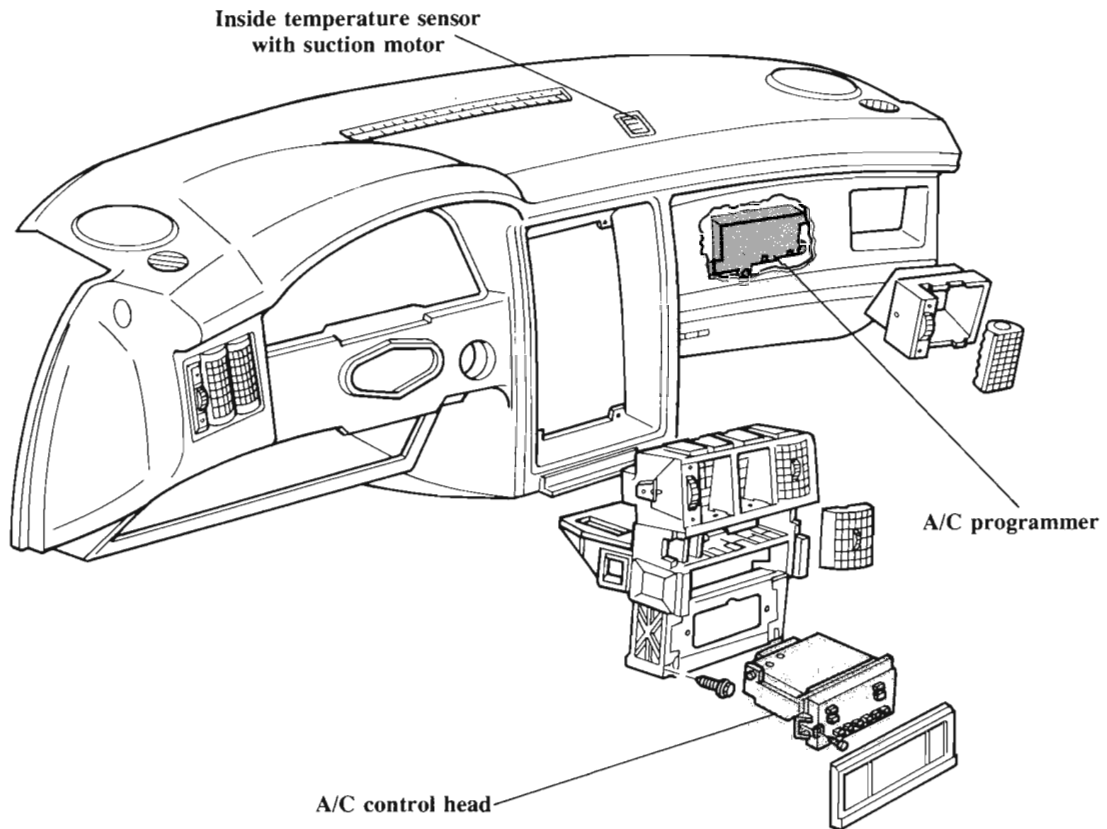
Interior Temperature Sensor #2



A second interior temperature sensor is mounted next to the front interior dome light. This sensor has the same resistance values as the sensor in the dashboard.

The control head receives the signals from both sensors and uses the mean value to calculate the interior temperature.

Climate Control



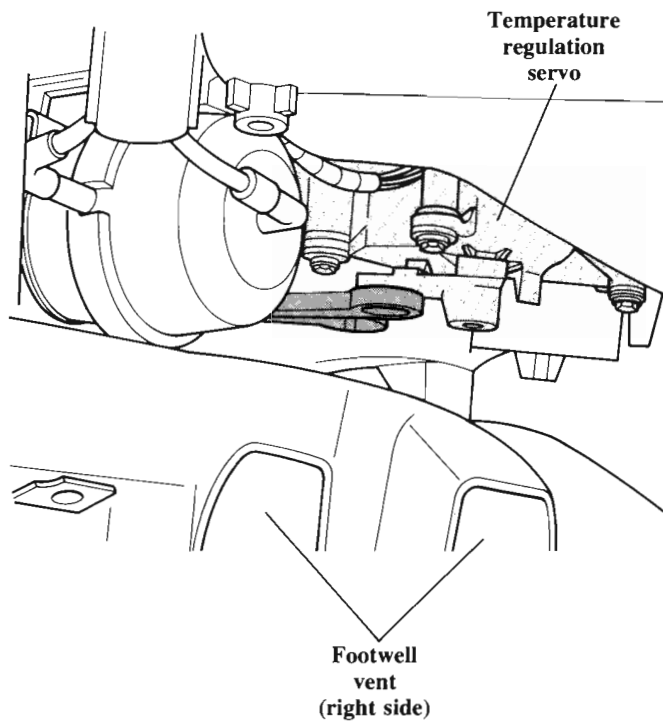
The A/C programmer is located on a mounting bracket behind the right side of the glove box.

The programmer contains five solenoids that operate the vacuum servos for air distribution and the heater valve.

Based on input signals it receives, the programmer also switches on the A/C compressor, radiator fan 1st speed and controls the servo motor for temperature regulation.

Climate Control

Servo Motor For Temperature Regulation



The servo motor for temperature regulation is located above the transmission tunnel.

The servo motor contains an electric motor which operates the temperature flaps through a gear reduction set.

The servo motor also contains an adjustable potentiometer for feedback of the motor's position. This adjustment must be checked whenever any repair work is done to the heat exchanger housing or servo motor.

For further details concerning adjustment of the potentiometer, consult the Repair Manual Microfiche.

Climate Control

Fault Memory

A fault memory in the A/C control head monitors the system components. If a problem or fault develops, the memory will store that information and take corrective action, if necessary.

If a fault occurs that will affect the interior temperature regulation, the outside temperature display light will flash for about 60 seconds. This will happen when the fault first occurs and each time the ignition is switched on.

Other faults will not cause the light to flash but will be stored in the memory. The memory is not completely permanent. Most intermittent faults will be erased when the ignition is switched off.

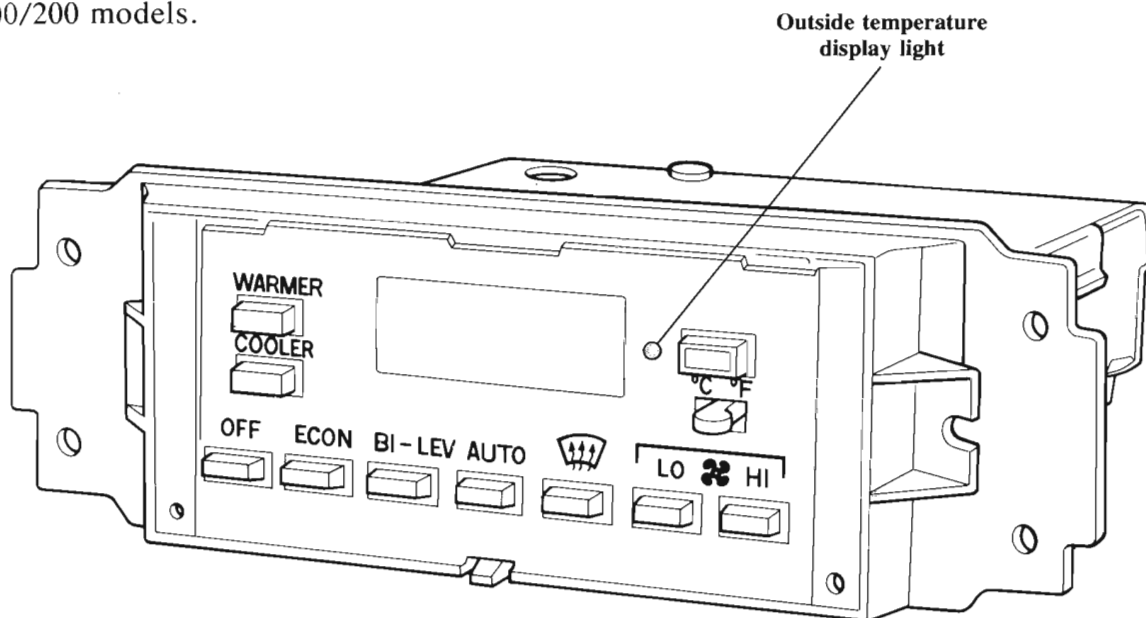
Information stored in the fault memory can be displayed on the control head panel. The fault memory codes are accessed the same as on the Audi 100/200 models.

The Coupe Quattro digital climate control has 22 channels available for storing information. These are the same as the Audi 100/200 models with the addition of channel 22.

On the Audi Coupe Quattro:

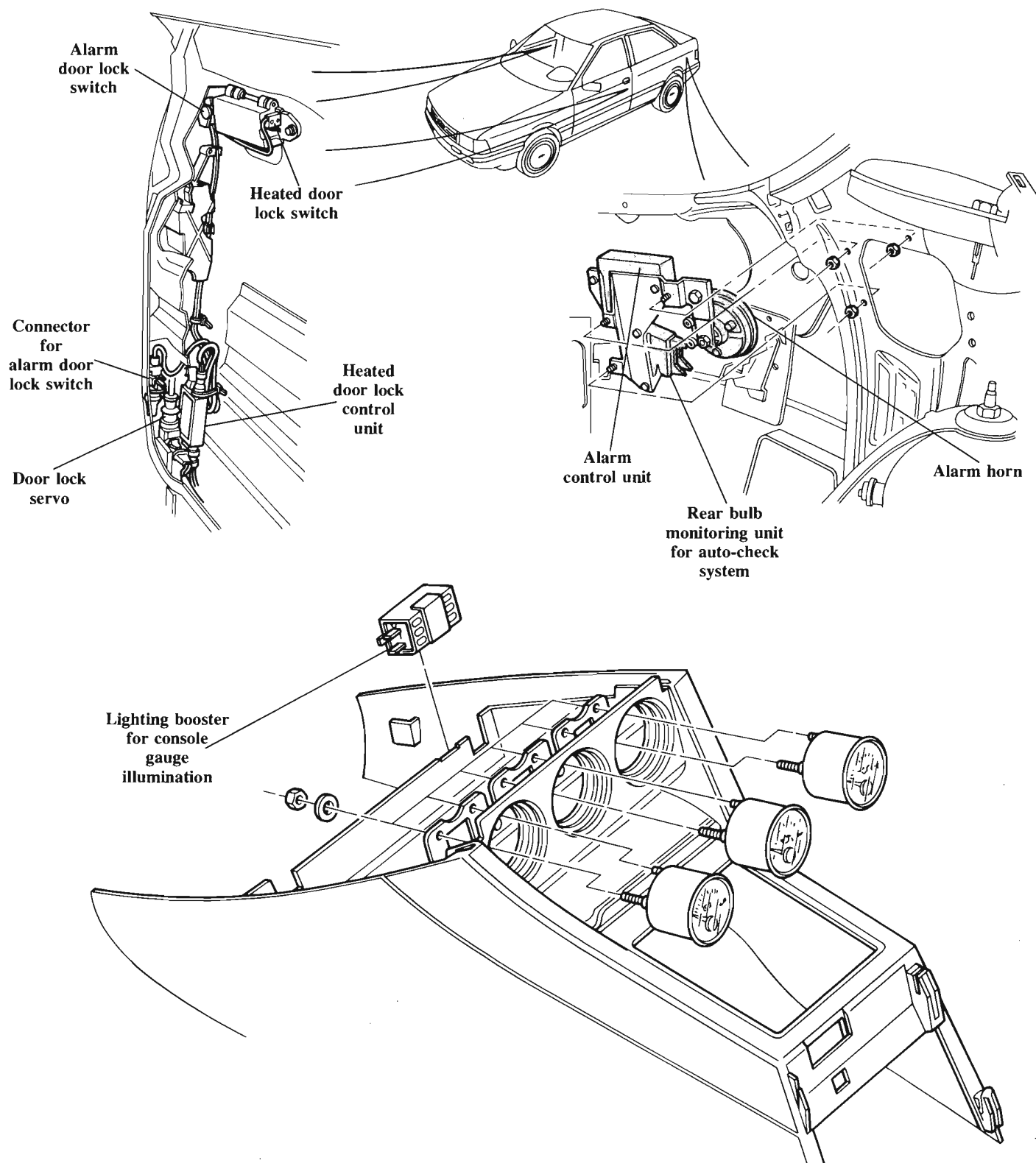
Channel 22 - displays a value for vehicle speed (not actual speed) for blower control regulation.

Refer to **The New Audi 100 and Audi 200** Service Training booklet or the Repair Manual Microfiche for the memory channel descriptions.



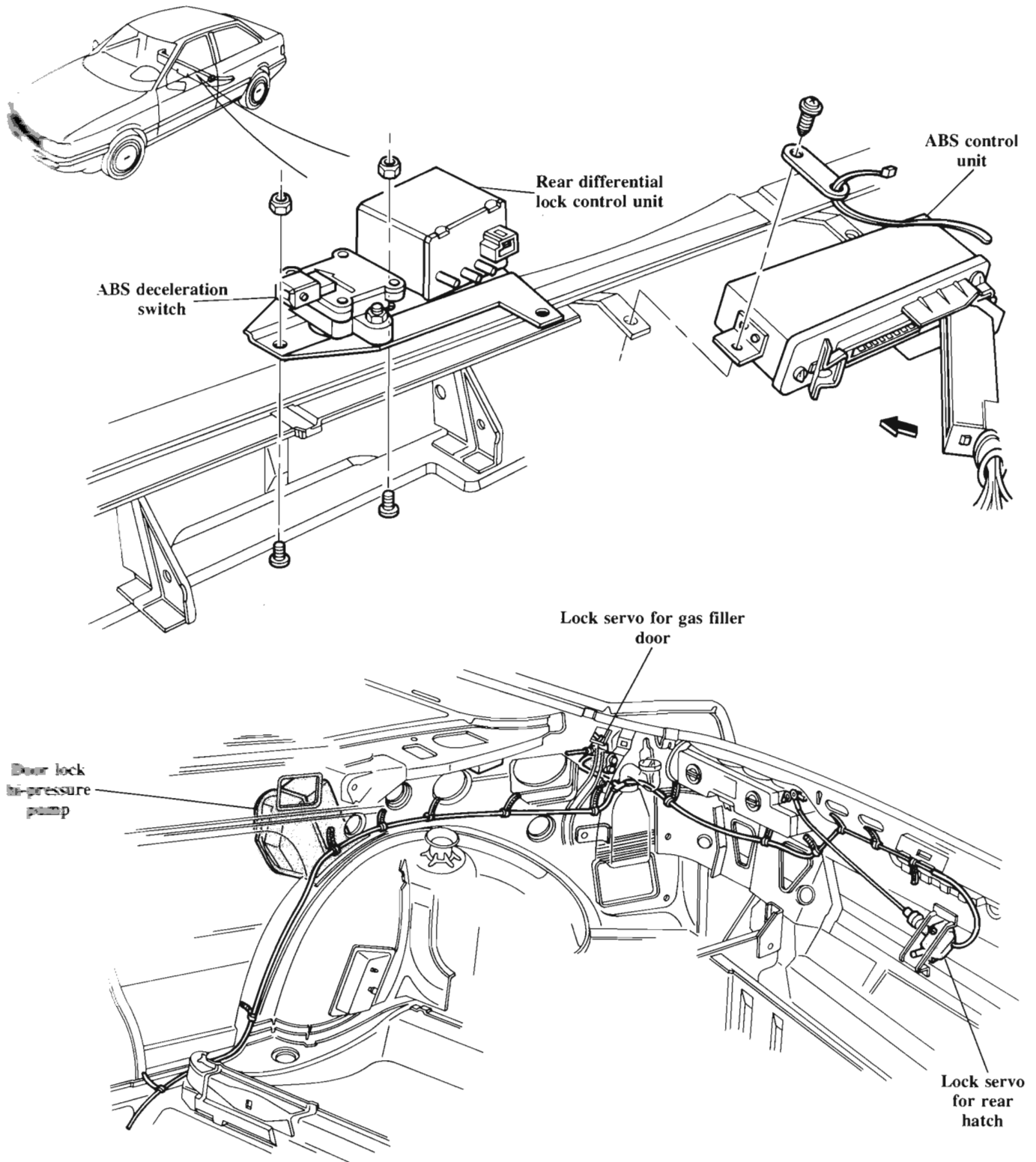
Electrical System

Component Location



Electrical System

Component Location





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