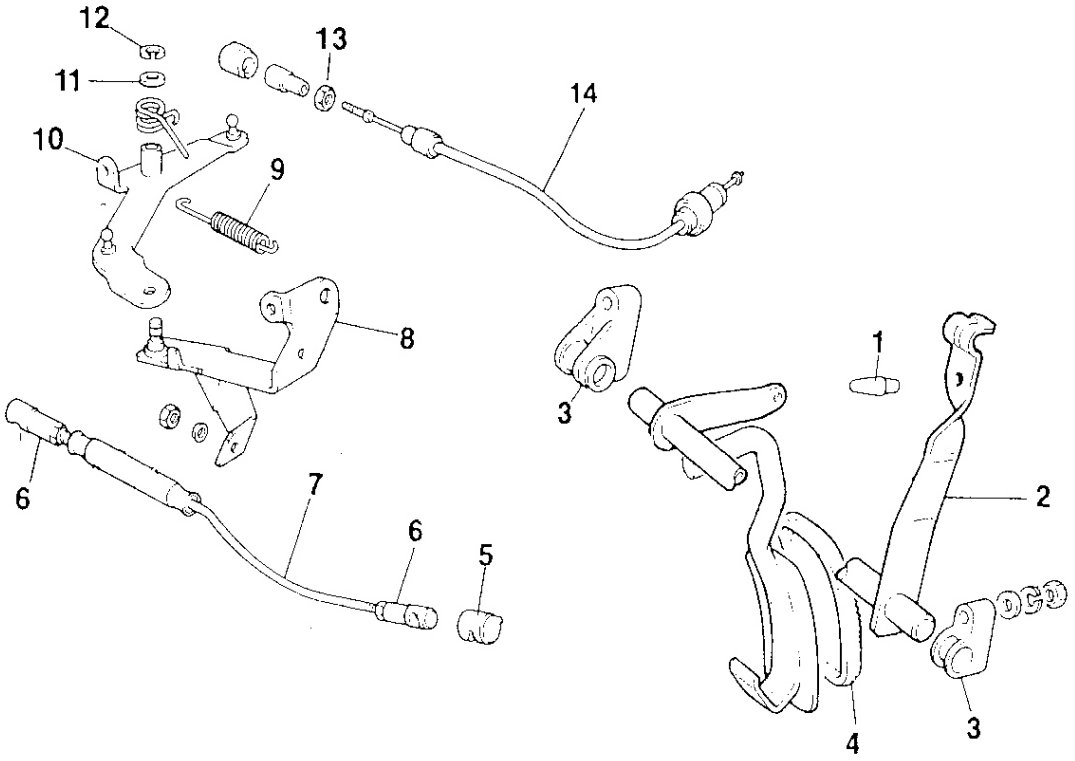
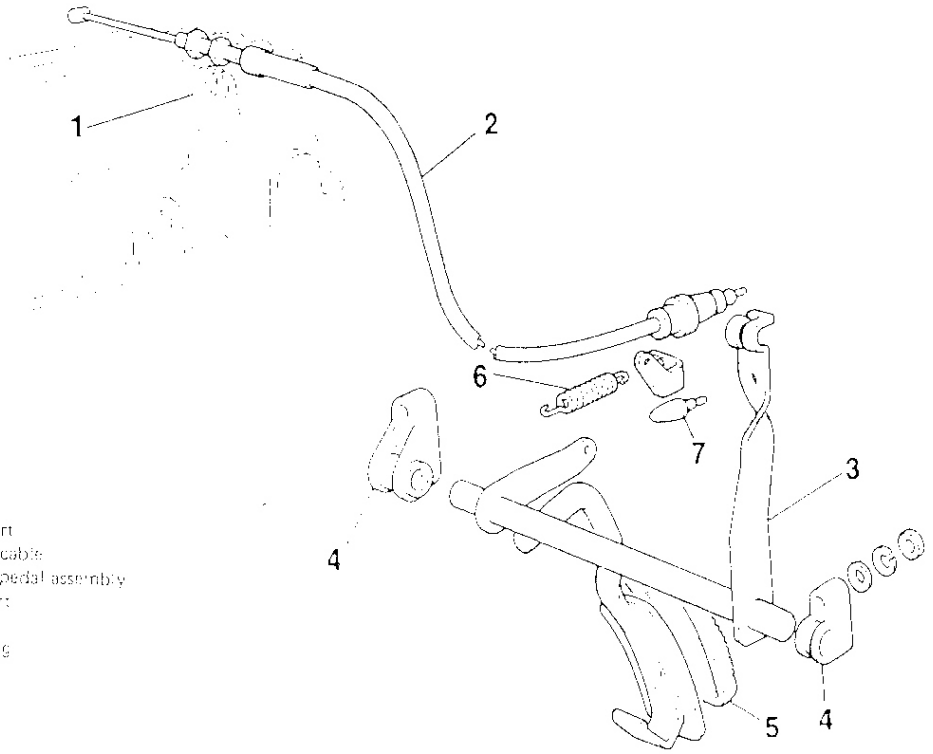


1. Stop
2. Accelerator pedal assembly
3. Pedal support
4. Pedal pad
5. Clip
6. Cable end
7. Throttle rod
8. Bellcrank support
9. Return spring
10. Bellcrank
11. Spring
12. Snap ring
13. Adjustment nut
14. Accelerator cable

CARBURETOR ACCELERATOR LINKAGE



1. Cable support
2. Accelerator cable
3. Accelerator pedal assembly
4. Pedal support
5. Pedal pad
6. Return spring
7. Stop

FUEL INJECTION ACCELERATOR LINKAGE

ACCELERATOR AND KICK-DOWN CABLE ADJUSTMENT

Make sure engine idle speed is set correctly.

Accelerator Cable

Pull back slightly on cable housing (5) until just prior to moving throttle lever (3).

Check for approximately 1 mm of clearance between adjustment nuts (6) and support (4).

If necessary, adjust nuts (6) to obtain clearance.

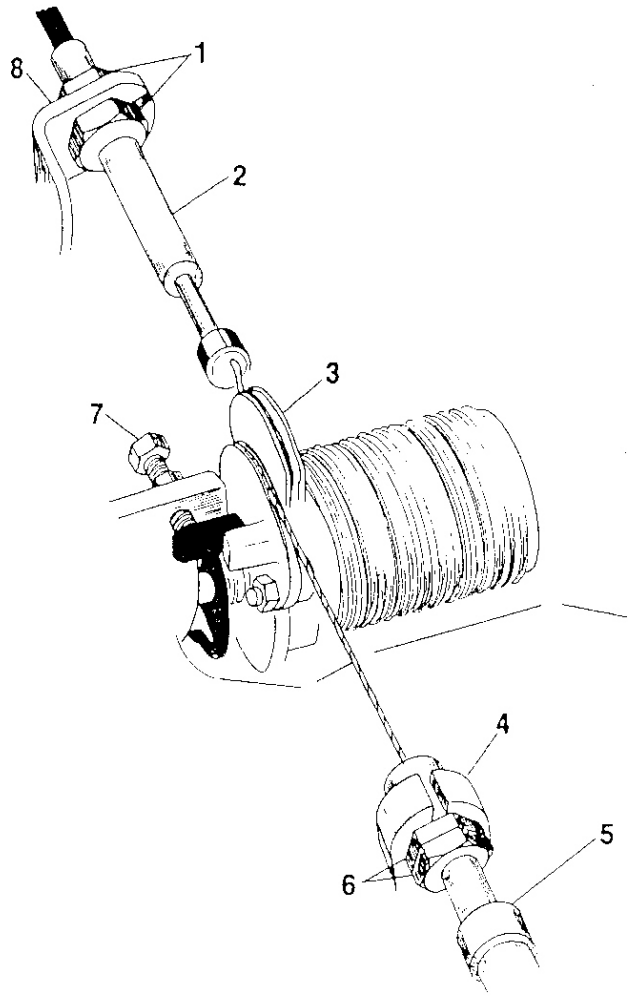
Kick-Down Cable

Depress accelerator until throttle lever (3) contacts maximum opening stop (7).

Check that kick-down cable (2) starts to pull at this point.

Fully depress accelerator. Check that kick-down cable (2) extends 0.35 to 0.43 in. (9 to 11 mm).

If necessary, adjust nuts (1) on housing (8) to obtain correct extension of cable.

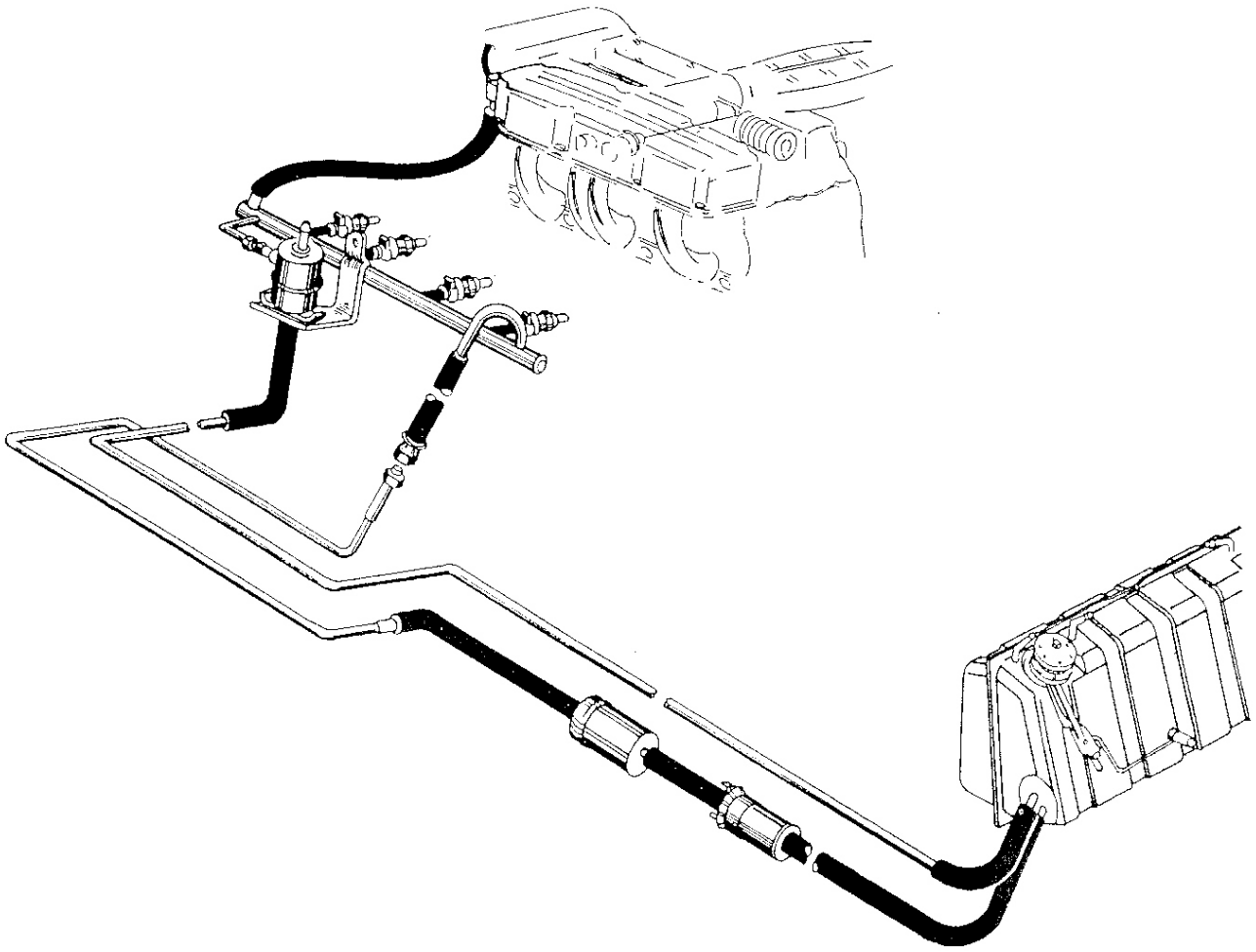


1. Adjustment nuts 2. Kick-down cable 3. Throttle lever 4. Support 5. Accelerator cable 6. Adjustment nuts 7. Maximum opening stop 8. Housing

FUEL SYSTEM

The fuel system consists of:

- Fuel tank
- Fuel pump
- Fuel filter
- Fuel manifold
- Pressure regulator
- Injectors
- Cold start valve



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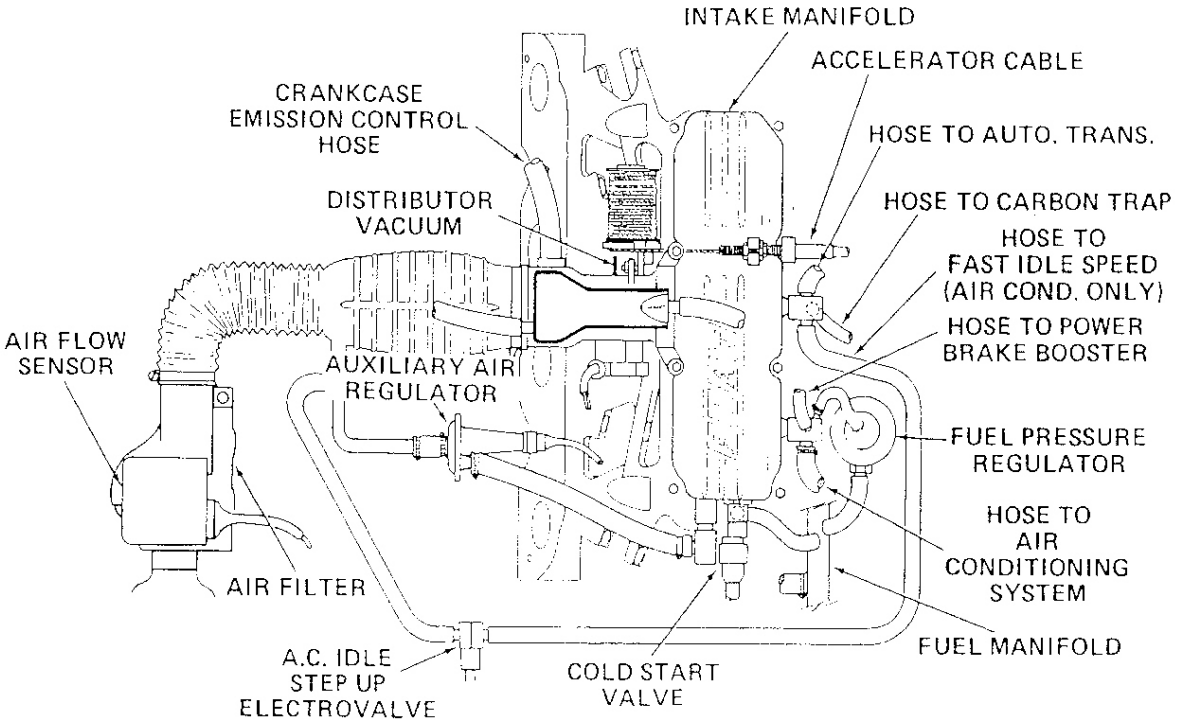
AIR INTAKE SYSTEM

The air intake system consists of:

- Air filter
- Air flow sensor
- Auxiliary air regulator
- Vacuum signal for fuel pressure regulator
- Bypass channel for air conditioning



NOTE: Air leaking into the system after the air flow sensor will not be sensed. This will result in a wrong fuel/air mixture and will affect engine operation.

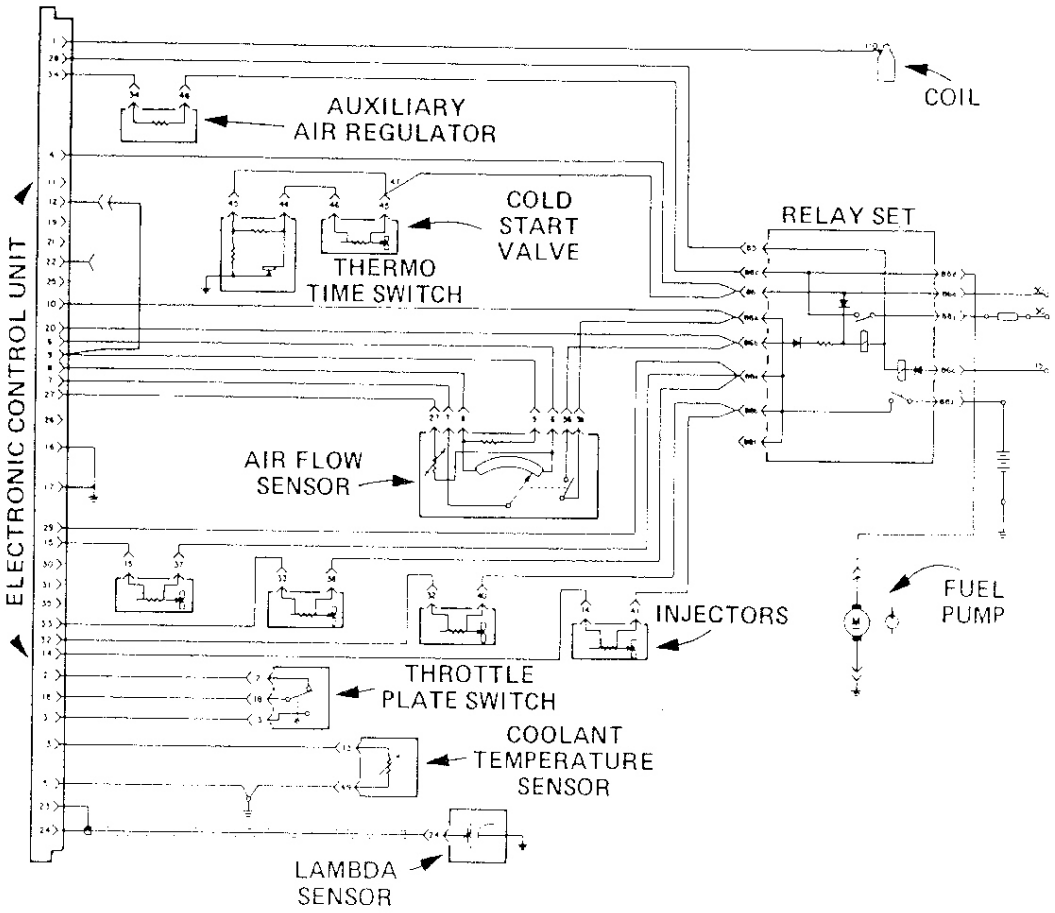
ELECTRICAL SYSTEM

The electrical system consists of:

- Relay set
- Electronic control unit
- Air flow sensor
- Cold start valve and thermo time switch circuit
- Throttle plate switch
- Air temperature sensor
- Coolant temperature sensor

In addition to the fuel injection electrical system, the following items are used:

- Battery
- Ignition coil
- Ignition switch cranking position
- Inline fuse

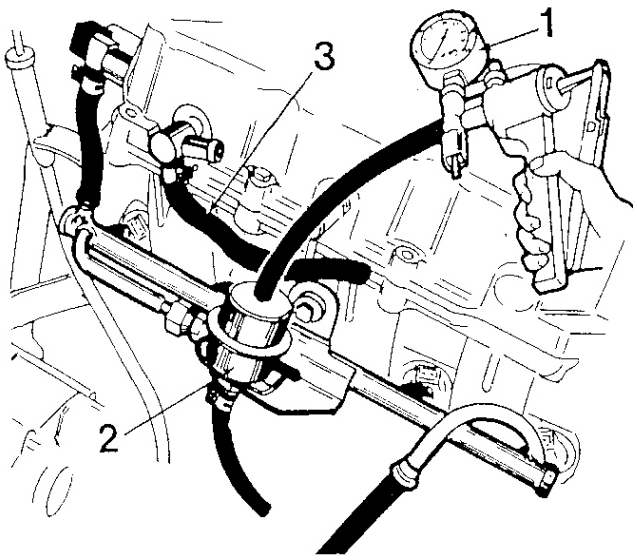


RELIEVING FUEL PRESSURE

CAUTION: Relieve fuel system pressure before disconnecting fuel lines.

Remove vacuum hose (3) from fuel pressure regulator (2).

Connect vacuum pump (1) to regulator (2). Pump vacuum up to 20 inches.



1. Vacuum pump 2. Pressure regulator 3. Vacuum hose

FUEL PRESSURE CHECK

NOTE: Use this check to determine if fuel pump is operating properly and to check for restrictions in fuel lines.

Relieve fuel system pressure as directed in above procedure.

Provide a container to catch any fuel. Use caution to prevent any dirt from entering system.

Loosen clamp holding fuel hose to cold start valve. Pull hose off valve.

CAUTION: Use care in pulling hose off valve. Valve body is plastic.

Connect "Y" fitting on gauge assembly to fuel hose. Secure hose with clamp.

Connect hose on gauge tool A.958754 to cold start valve. Secure hose with clamp.

Disconnect vacuum hose from fuel pressure regulator. Disconnect hose from air flow sensor.

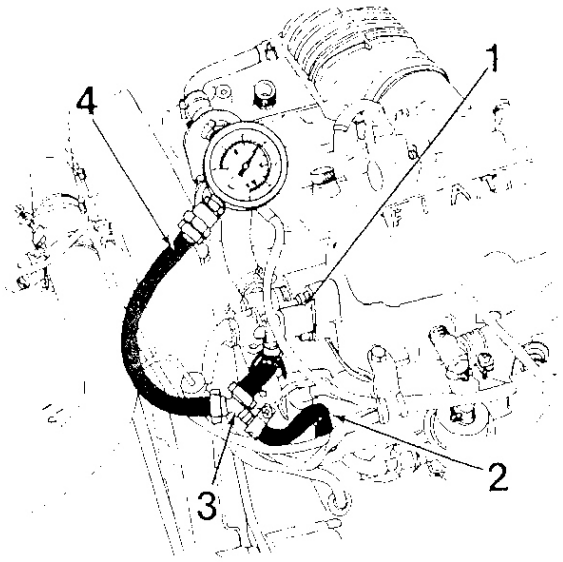
With ignition key switched to "MAR" (on) position, move air flow sensor until fuel pump is energized. Check pressure reading. Pressure should be 33 to 39 psi (2.3 to 2.7 bar).

Start engine and operate at idle.

Connect vacuum hose to pressure regulator. Check pressure reading. Pressure should be approximately 28 psi (2 bar).

Releive fuel system pressure. Remove gauge assembly and reconnect hoses.

NOTE: Fuel pump output pressure is 39-45 psi (2.7 to 3.2 bar). To check pressure, connect gauge directly to fuel supply line. Leave remainder of system disconnected.



1. Cold start valve 2. Fuel hose 3. "Y" fitting 4. Gauge assembly

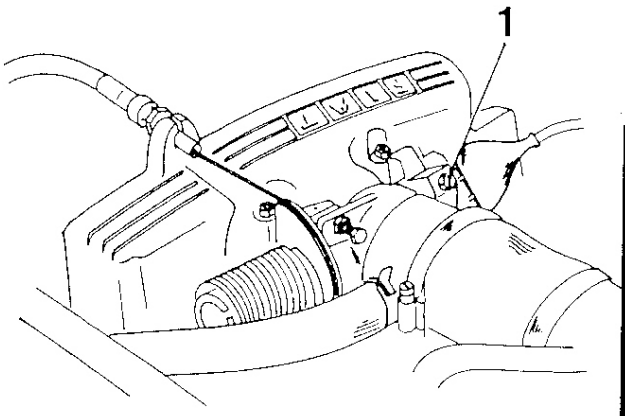
IDLE SPEED ADJUSTMENT

NOTE: Engine must be at normal operating temperature with cooling fan off when adjusting idle speed.

Connect tachometer. Run engine until it reaches normal operating temperature.

Adjust idle speed adjustment screw (1) to obtain 800 to 900 rpm.

1. Idle speed adjustment screw



MIXTURE CHECKING AND ADJUSTMENT

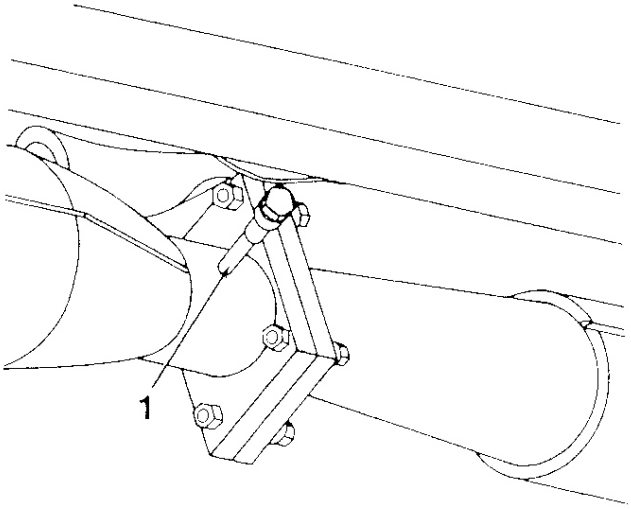
To check mixture, first connect test equipment as follows.

Remove plug (1) from CO pickup fitting. Install adapter probe (tool 4467) in pickup. Connect hose from CO analyzer to probe. Turn analyzer on to allow for proper warmup of equipment.

Start engine and allow it to reach normal operating temperature.

NOTE: Engine is at normal operating temperature when cooling fan has been on twice.

1. Plug

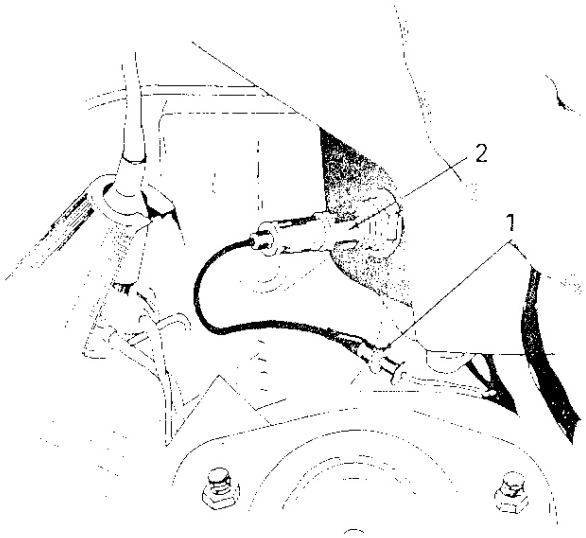


Zero analyzer according to manufacturer's instructions.

Disconnect harness connector (1) from Lambda sensor connector, making sure that wire cannot ground out.

Check CO reading. Reading should be 0.5% to 0.9%.

1. Lambda sensor connector 2. Lambda sensor



To adjust mixture, proceed as follows:

NOTE: On 1981 and later models, Federal law prohibits routine adjustment of mixture. Adjust mixture only if major engine repairs have been performed or main fuel injection components have been replaced.

If mixture screw is concealed by a plastic plug, remove plug.

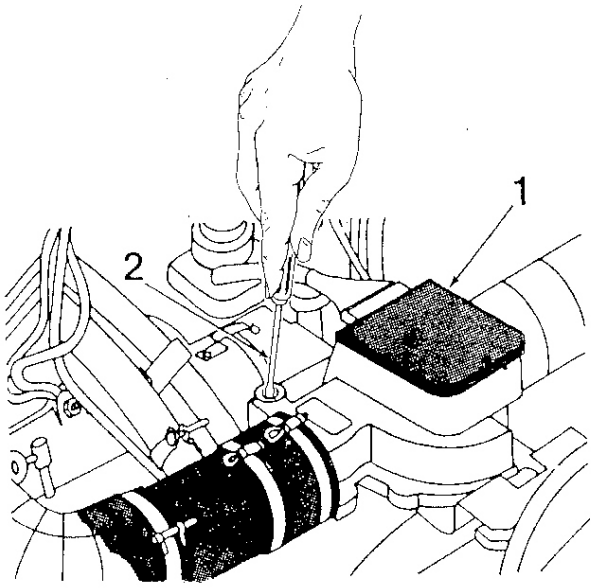
If mixture screw is concealed by an aluminum plug, refer to MIXTURE ADJUSTMENT SCREW PLUG REMOVAL AND INSTALLATION before performing this procedure.

Turn adjustment screw clockwise to increase CO level, and counterclockwise to decrease CO level.

Install plug in air flow sensor (1).

WARNING: In the next step, be very careful in removing probe and installing plug. Exhaust pipe could be very hot.

Remove CO analyzer and probe. Install plug in exhaust pickup.



1. Air flow sensor 2. Screwdriver

MIXTURE ADJUSTMENT SCREW PLUG

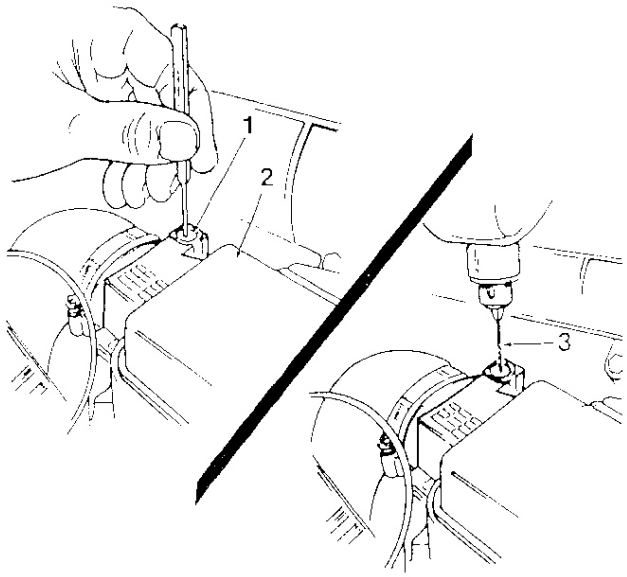
REMOVAL

NOTE: On 1981 and later models, Federal law prohibits routine adjustment of mixture. Remove aluminum adjustment screw plug to adjust mixture only if major engine repairs have been performed or main fuel injection components have been replaced.

Center punch aluminum plug (1) sealing mixture adjustment screw in the air flow sensor (2).

Drill a 3/32 in. (2.5 mm) hole, approximately 9/64 to 5/32 in. (3.5 to 4 mm) deep, in the center of plug.

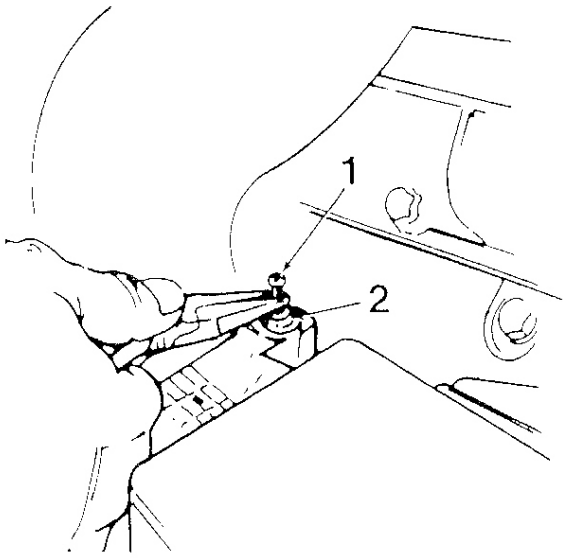
NOTE: Clean all metal shavings from around area.



1. Aluminum plug 2. Air flow sensor 3. 3/32 in. (2.5 mm) drill

Screw a 1/8 in. (3 mm) sheet metal screw (1) into drilled hole.

Grasp the screw with a pair of pliers and lift screw and aluminum plug (2) out from air flow sensor.



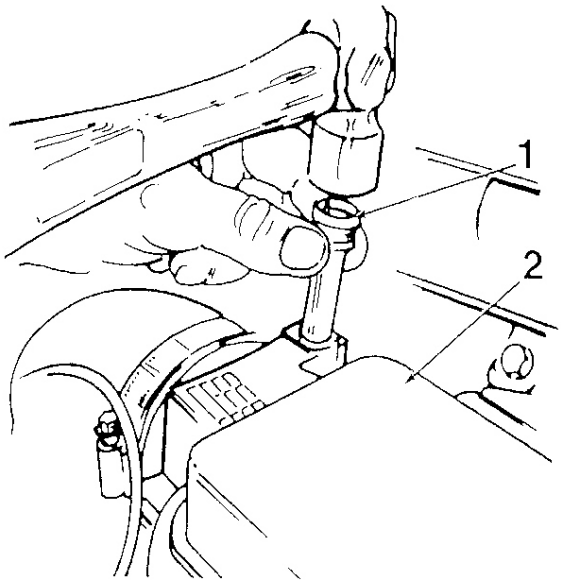
1. 1/8 in. (3 mm) screw 2. Aluminum plug

INSTALLATION

NOTE: To comply with Federal law, replacement plug must be installed after mixture adjustment.

Seat new replacement plug (1) in recess of air flow sensor (2). Use a hammer to drive plug in flush with unit.

1. Plug 2. Air flow sensor



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ELECTRONIC CONTROL UNIT

REMOVAL AND INSTALLATION

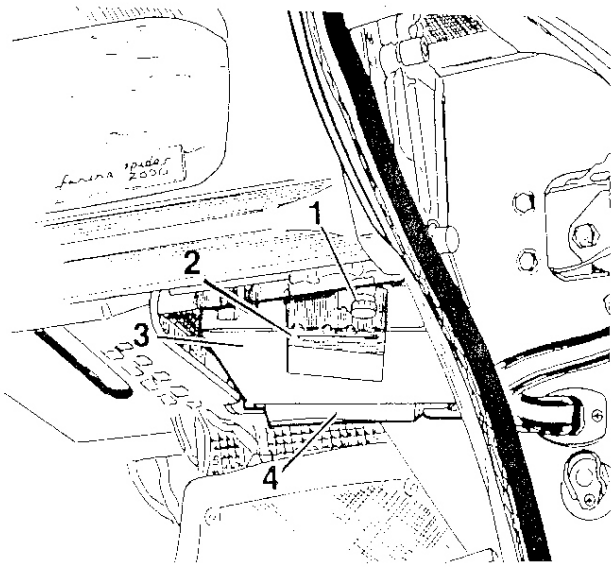
On vehicles with A.C., remove front nut holding evaporator under dashboard. Swing evaporator forward and down to gain access to control unit.

Loosen and remove plastic nut (1) holding bracket (1) in car. Lower control unit (3) and pull it back free of front bracket (4).

Release spring slip holding connector to control unit. Remove control unit.

Install in reverse order.

1. Plastic nut 2. Mounting bracket 3. Electronic control unit
4. Front bracket



LAMBDA SENSOR

REMOVAL AND INSTALLATION

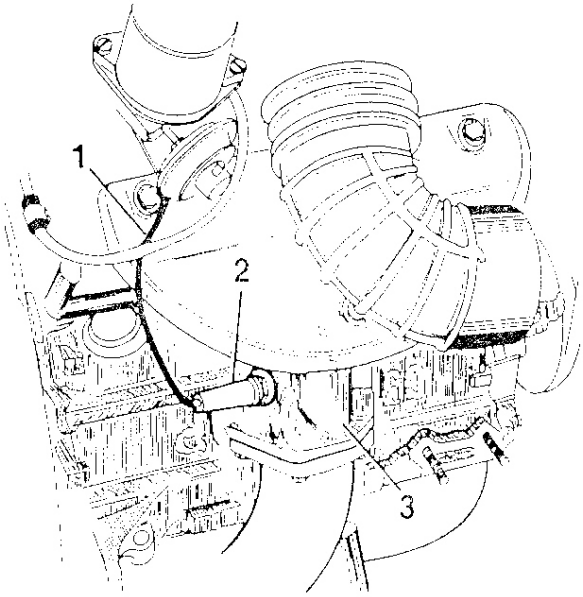
NOTE: The Lambda sensor must be replaced every 30,000 miles.

Allow exhaust system to cool.

On vehicles without turbo, disconnect cable (1) for sensor (2) from connector.

Remove sensor from exhaust manifold (3).

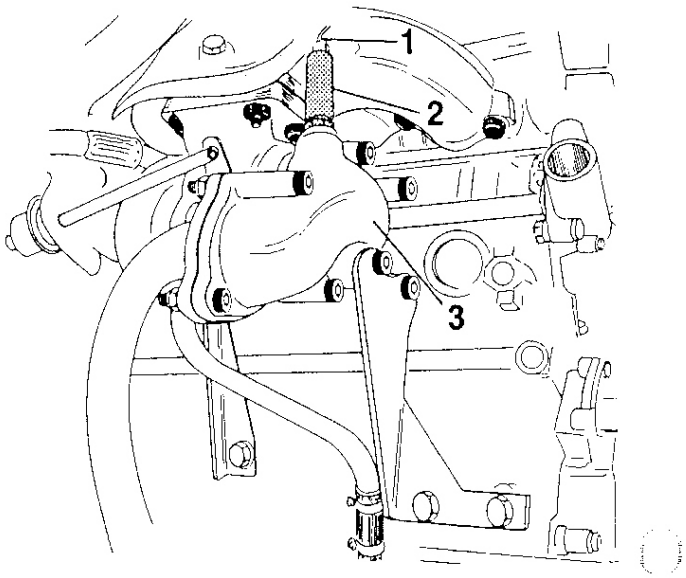
1. Cable 2. Lambda sensor 3. Exhaust manifold



On vehicles with turbo, disconnect cable (1) from sensor (2).

Remove sensor from exhaust outlet elbow (3).

1. Cable 2. Lambda sensor 3. Exhaust outlet elbow

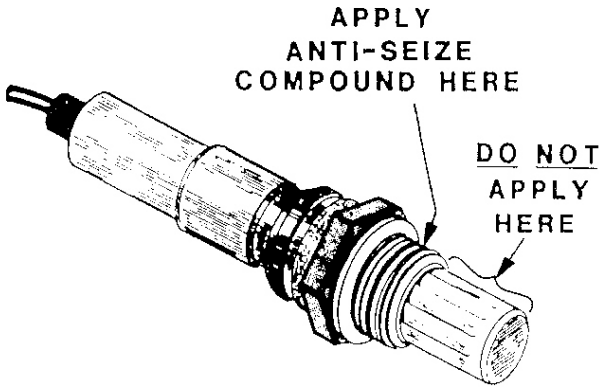


Coat threads of new Lambda sensor with anti-seize, anti-rust grease.

CAUTION: Do not allow grease to get on sensor surface. This will contaminate sensor and require replacement.

Thread sensor into exhaust pipe (non-turbo) or exhaust outlet elbow (turbo). Torque sensor to 30 to 36 ft lbs (4.2 to 5.0 mkg).

Connect cable to sensor.



INDICATOR RESET

NOTE: Lambda sensor indicator comes on at 30,000 miles to indicate replacement of sensor. To turn indicator off, the switch unit must be reset.

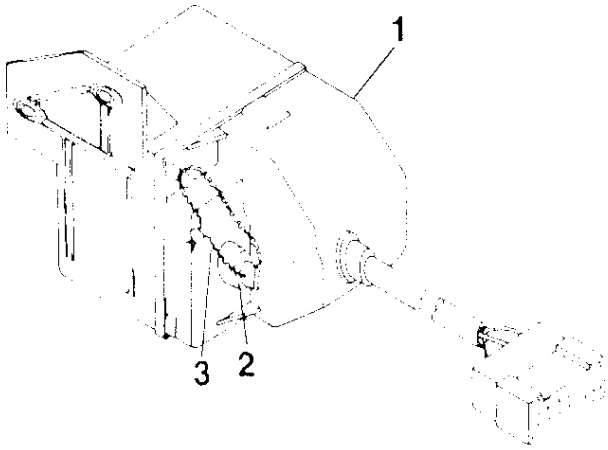
Switch unit is located under dashboard to the right of steering column.

Remove wire (3) securing cap screw (2). Remove cap screw.

Insert a small screwdriver through housing and press on switch contact. Contact will reset to high point on wheel.

Install cap screw (2). Secure screw with new wire (3).

1. Switch unit 2. Cap screw 3. Wire



THROTTLE PLATE SWITCH

REMOVAL AND INSTALLATION

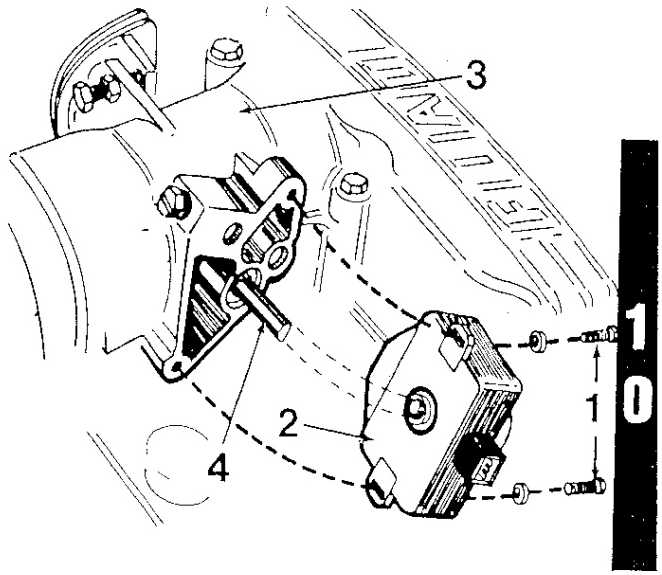
Disconnect throttle plate switch.

Remove two screws (1) and washers holding switch (2) to throttle housing (3).

Remove switch by slowly pulling switch out from housing.

Install in reverse order. Make sure switch is properly aligned with throttle shaft (4).

1. Screws 2. Switch 3. Throttle housing 4. Throttle shaft

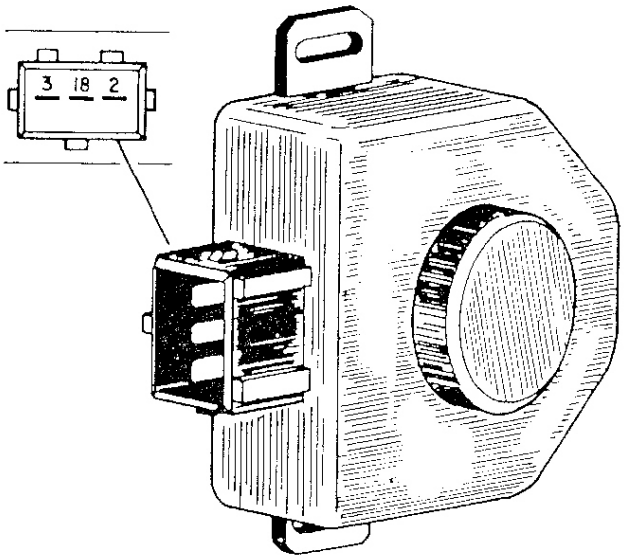


ADJUSTMENT

Make sure idle speed is correct.

Disconnect electrical connector from throttle plate switch.

Connect an ohmmeter between terminals 2 and 18 of the throttle plate switch.



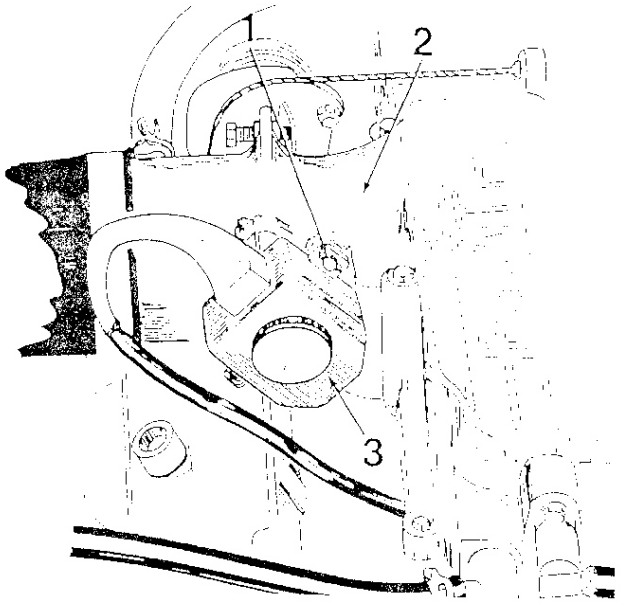
Loosen two screws (1) holding throttle plate switch (3) to throttle housing (2).

With engine off, rotate switch clockwise until ohmmeter indicates a closed circuit.

At the exact point the ohmmeter indicates a closed circuit, tighten the two screws holding switch.

Recheck the adjustment and replace the connector to the throttle plate switch.

1. Screws 2. Throttle housing 3. Throttle plate switch



FUEL PRESSURE REGULATOR

REMOVAL AND INSTALLATION

Relieve fuel pressure as directed under RELIEVING FUEL PRESSURE.

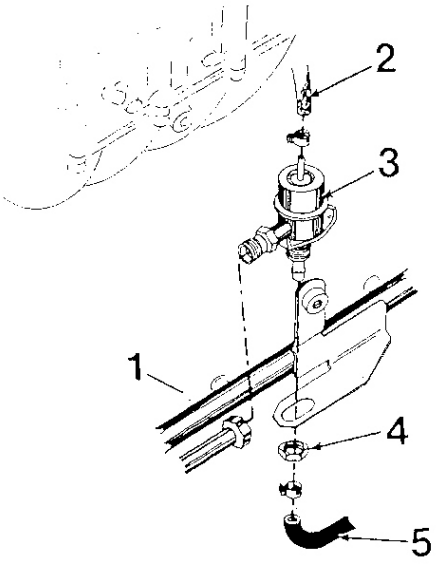
Provide a container to catch any fuel. Use care to prevent any dirt from entering system.

Disconnect vacuum hose (2) and fuel return hose (5) from pressure regulator (3).

Disconnect fuel manifold (1) connection from pressure regulator (3).

Remove nut (4) holding regulator to fuel manifold. Remove pressure regulator.

Install in reverse order. Check all fuel connections for leaks.



1. Fuel manifold 2. Vacuum hose 3. Pressure regulator 4. Nut
5. Fuel return hose

COLD START VALVE

REMOVAL AND INSTALLATION

Relieve fuel pressure as directed under RELIEVING FUEL PRESSURE.

Provide a container to catch any fuel. Use care to prevent any dirt from entering system.

Disconnect electrical connector (7) from cold start valve (2).

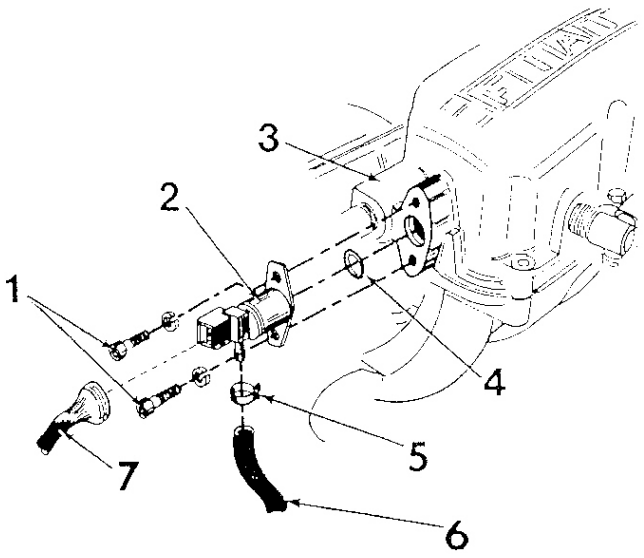
Remove clamp (5) holding fuel line (6) on valve. Pull fuel hose off valve.

CAUTION: Use care in pulling fuel hose off valve. Valve body is plastic.

Using 5 mm Allen wrench, remove two screws (1) and washers holding valve in intake manifold (3). Remove valve and "O" ring (4).

Install in reverse order. Make sure fuel hose is completely installed on valve and hose clamp is tight.

Check fuel connections for leaks.



1. Allen screw 2. Cold start valve 3. Intake manifold 4. "O" ring
5. Clamp 6. Fuel hose 7. Electrical connector

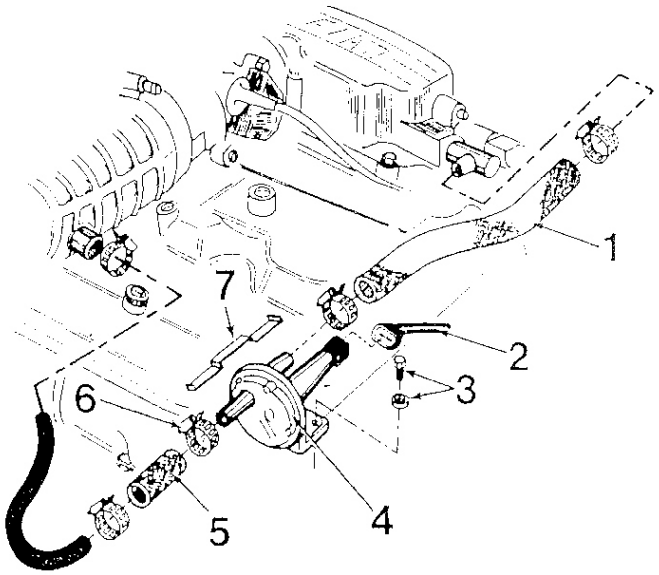
AUXILIARY AIR REGULATOR

REMOVAL AND INSTALLATION

Disconnect air hoses (1 and 5) from regulator (4). Disconnect electrical connector (2).

Remove two 10 mm bolts (3) and washers holding regulator to cylinder head.

Install in reverse order. Make sure air hose connections are tight. Make sure clip (7) is installed under clamps (6) on regulator.



1. Air hose 2. Electrical connector 3. Bolt 4. Auxiliary air regulator 5. Air hose 6. Clamp 7. Clip

AIR FLOW SENSOR

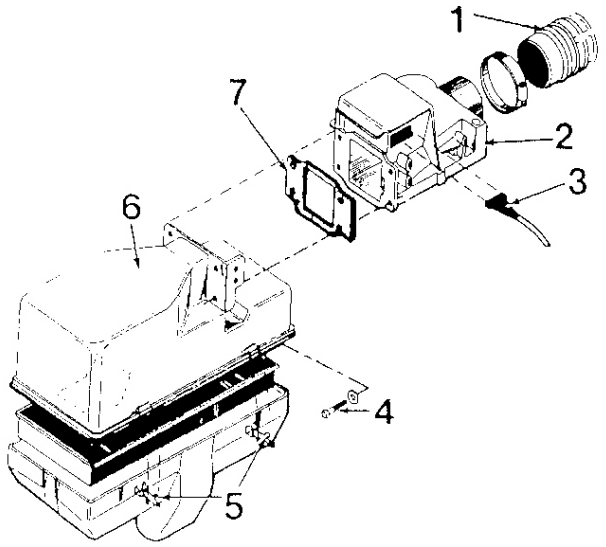
REMOVAL AND INSTALLATION

Disconnect air hose (1) from air flow sensor (2). Disconnect electrical connector (3).

Remove air cleaner cover (6) by releasing four clips (5).

Remove four bolts (4) and washers holding air flow sensor (2) to air cleaner cover (6). Remove air flow sensor (2) and gasket (7).

Install in reverse order, making sure air hose connection is tight.



1. Air hose 2. Air flow sensor 3. Electrical connector 4. Bolt 5. Clip 6. Air cleaner cover 7. Gasket

FUEL INJECTORS

REMOVAL

Relieve fuel system pressure as directed under RELIEVING FUEL PRESSURE.

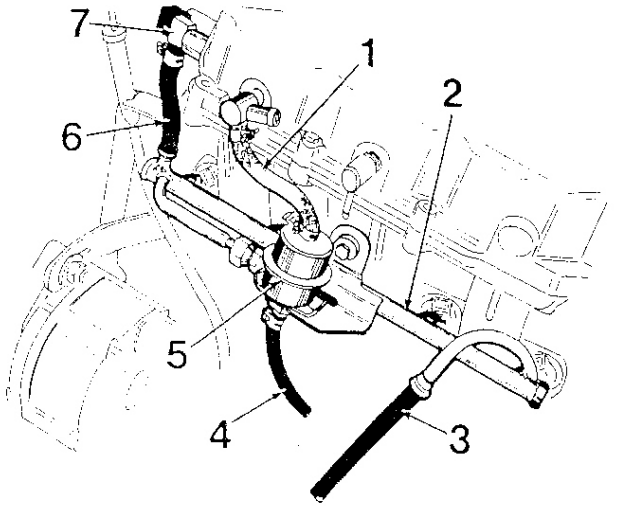
Provide a container to catch any fuel. Use care to prevent any dirt from entering system.

NOTE: Before disconnecting any fuel hoses, place a rag beneath them to catch any spilled fuel.

Disconnect the following:

- electrical connectors from injectors,
- fuel supply hose (3) from pipe. Use a 12 mm wrench to hold fuel line and a 17 mm wrench to turn fuel hose connection.
- fuel return hose (4) from pressure regulator (5),
- vacuum hose (1) from regulator (5),
- fuel hose (6) from cold start valve (7).

CAUTION: Use care in pulling fuel hose off valve. Valve body is plastic.



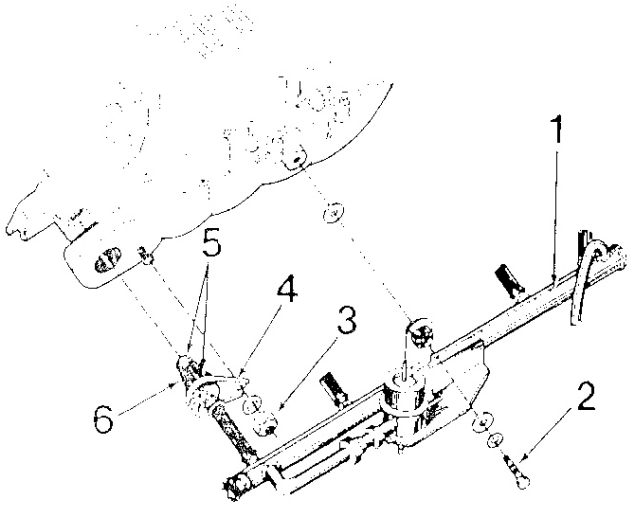
1. Vacuum hose 2. Fuel manifold 3. Fuel supply hose 4. Fuel return hose 5. Pressure regulator 6. Fuel hose 7. Cold start valve

Remove 10 mm bolt (2) holding fuel manifold (1) to intake manifold.

Remove four 10 mm nuts (3) and washers holding injector retainers (4) to intake manifold.

Remove fuel manifold (1) complete with injectors (6) and regulator. Be careful of rubber bushings (5) in intake manifold. They may fall out.

Remove four small and four large rubber bushings (5) and retainers (4) from injectors. Inspect bushings for cracks and damage.



1. Fuel manifold 2. Bolt 3. Nut 4. Retainer 5. Bushing 6. Fuel injector

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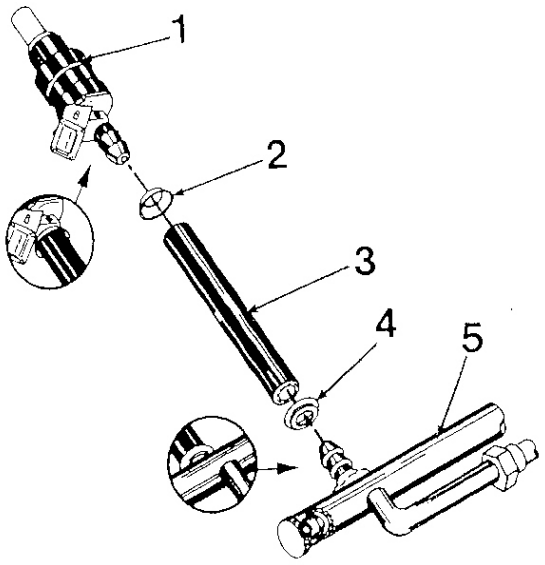
NOTE: When replacing a defective injector, replace injector and hose.

To replace injector, pull hose (3) off fuel manifold (5). Use a twisting, rocking motion while pulling on hose.

To replace a damaged hose from a good injector, cut hose at both ends and remove it.

When installing the new hose or injector, place collars (2 and 4) over shoulder of injector (1) and manifold (5).

Push hose (3) on injector (1) and manifold (5) until hose end is inside collars (2 and 4) and collars are tight against shoulder.



1. Fuel injector 2. Collar 3. Hose 4. Collar 5. Fuel manifold

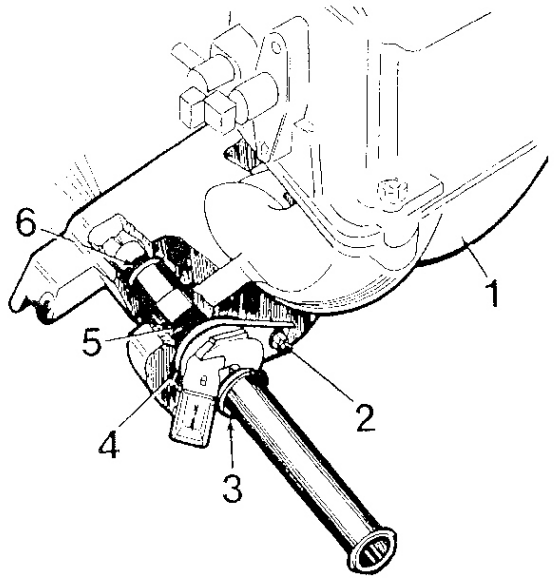
INSTALLATION

Place retainers (4) on injectors (3). Slide large bushing (5) on injector until seated in groove in injectors. Place small bushings (6) on tip of injectors.

Reinstall injectors and fuel manifold in reverse order, making sure:

- all components are clean
- rubber bushings are not damaged
- rubber bushings are installed in intake manifold properly
- injectors are installed in small bushings airtight
- retainers holding nuts are tight

Check all fuel connections for leaks.



1. Intake manifold 2. Nut 3. Fuel injector 4. Retainer 5. Large bushing 6. Small bushing

THROTTLE PLATE

REMOVAL AND INSTALLATION

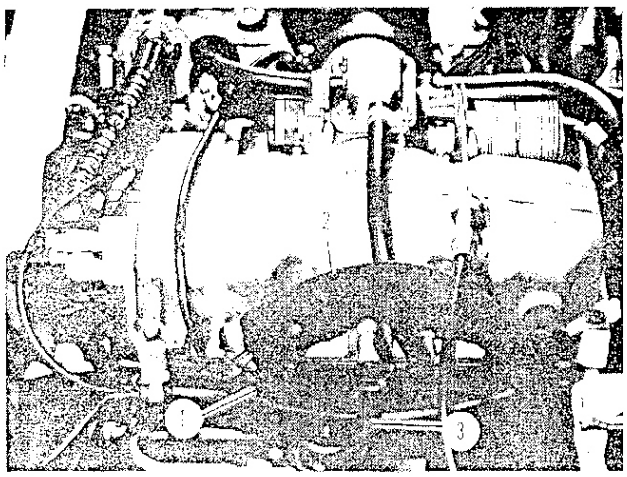
NOTE: The upper air intake should be removed for ease of access to throttle plate.

Mark lines, hoses, and wires prior to removal to identify them for installation.

Relieve fuel pressure as directed under RELIEVING FUEL PRESSURE.

Disconnect from intake manifold ( ) vacuum hoses for:

- automatic transmission
- fuel pressure regulator (1)
- brake booster (2)
- charcoal trap (3)
- boost switches (turbocharger only)



1. Fuel pressure regulator hose 2. Brake booster hose
3. Charcoal trap hose

Disconnect electrical connectors from cold start valve (4) and throttle plate switch (3).

Disconnect auxiliary air regulator air hose (5) from intake manifold (1). Loosen clamp and disconnect air hose (6) from throttle housing.

On vehicles without turbocharger, disconnect crankcase emission hose (7) from throttle housing.

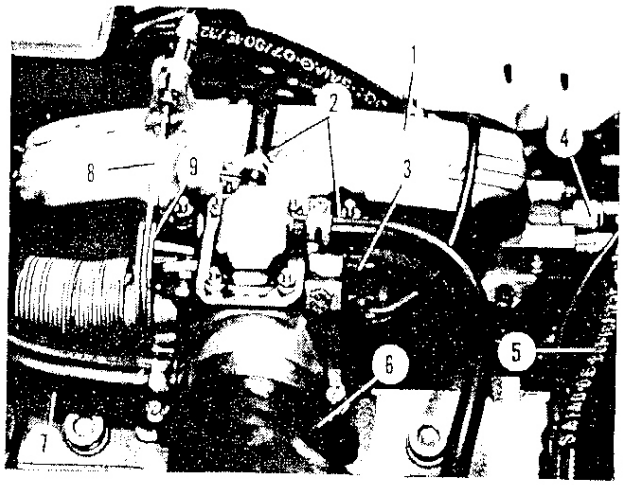
Disconnect distributor vacuum hose from throttle housing.

Disconnect accelerator cable (8) from throttle lever (9). Remove cable from support on intake manifold.

Disconnect fuel hose from cold start valve (4).

CAUTION: Use care in pulling fuel hose off valve. Valve body is plastic.

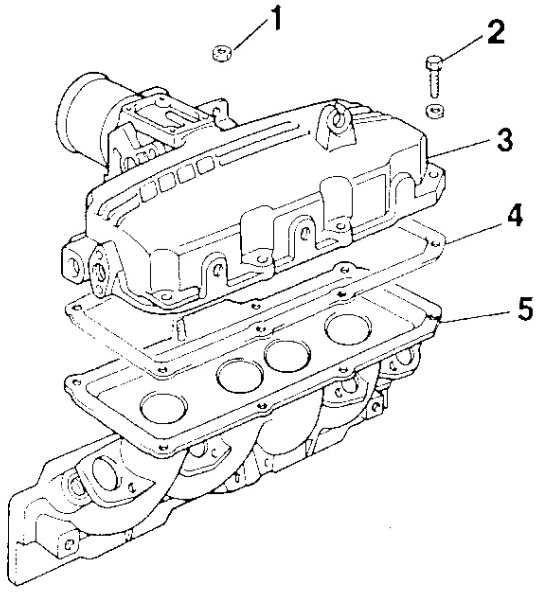
Disconnect two water hoses (2) from throttle plate heater.



1. Intake manifold 2. Water hose 3. Throttle plate switch
4. Cold start valve 5. Auxiliary air regulator hose 6. Main air hose
7. Crankcase emission hose 8. Accelerator cable 9. Throttle lever

Remove the six bolts (2) and two nuts (1) holding upper section (3) to lower section (5) of intake manifold.

Carefully lift upper section off.



1. Nut 2. Bolt 3. Upper section 4. Gasket 5. Lower section

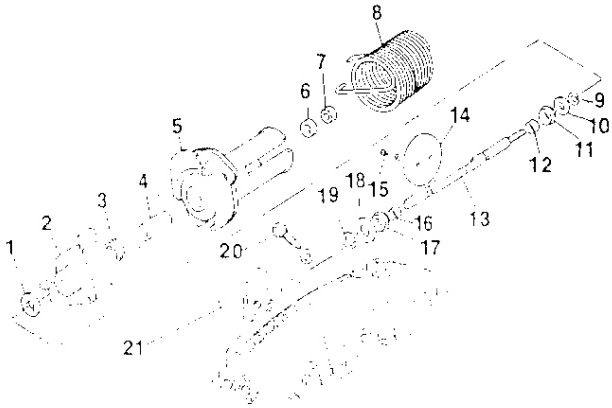
Remove two screws and washers and remove throttle plate switch.

Working through throttle housing, remove two screws (15) and washers holding throttle plate (14) to throttle shaft (13). Remove throttle plate.

If necessary to remove throttle shaft, remove snap ring (19). Pull shaft out of housing.

Assemble and install in reverse order.

Check all air and fuel connections for leaks.



1. Washer 2. Plate 3. Spring 4. Spacer 5. Throttle lever
6. Washer 7. Nut 8. Spring 9. Snap ring 10. Washer 11. Seal
12. Bushing 13. Throttle shaft 14. Throttle plate 15. Screw
16. Bushing 17. Seal 18. Washer 19. Snap ring 20. Idle speed adjustment screw 21. Intake manifold

After installation, adjust throttle plate as follows:

NOTE: Engine must be at normal operating temperature and cooling fan off when adjusting idle speed.

Connect tachometer. Run engine until it reaches normal operating temperature.

On cars with automatic transmission, apply hand brake and place gearshift lever in "D".

Turn idle speed adjustment screw (2) in all the way.

Adjust stop screw (1) to obtain:

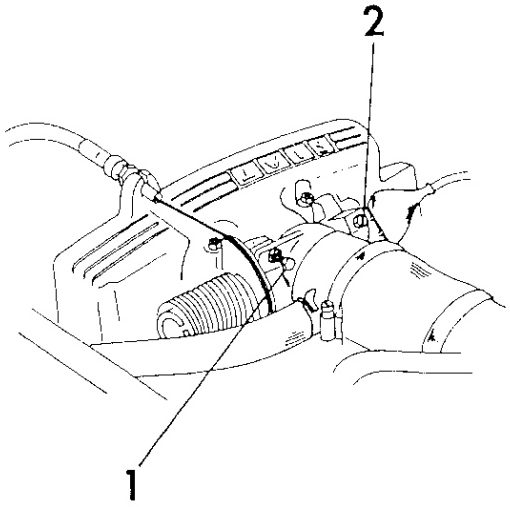
- Manual Transmission – 700 to 800 rpm
- Automatic Transmission – 600 to 700 rpm

Hold stop screw (1) and tighten locknut.

Adjust idle speed adjustment screw (2) to obtain:

- Manual Transmission – 800 to 900 rpm
- Automatic Transmission – 700 to 800 rpm

Check that throttle plate switch is adjusted properly as directed under THROTTLE PLATE SWITCH ADJUSTMENT.



1. Throttle stop screw 2. Idle speed adjustment screw

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CATALYTIC CONVERTER

REMOVAL AND INSTALLATION

WARNING: Make sure catalytic converter (4) has cooled down before working on it.

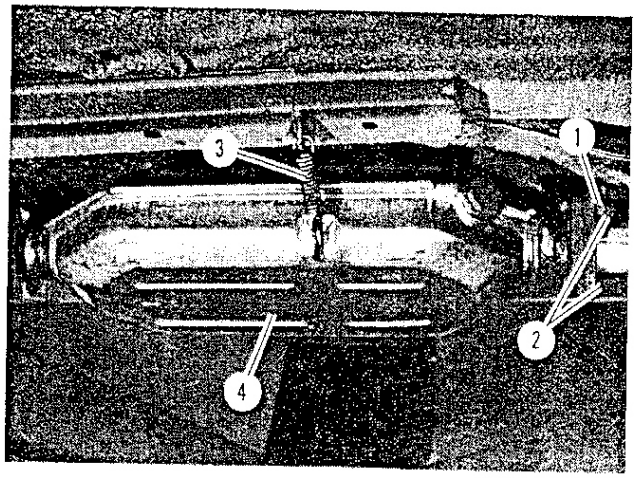
On 1975 to 1978 vehicles, remove thermocouple from catalytic converter.

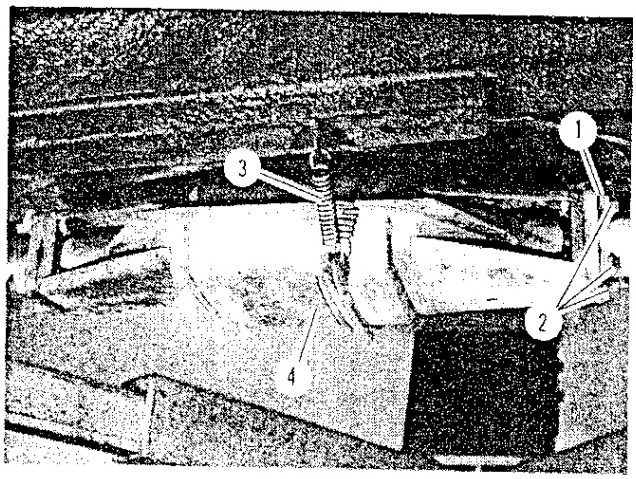
Bend locking rings (1) clear of nuts (2) securing converter to exhaust pipes.

Disconnect spring hangers (2) from converter. Remove converter.

Installation is reverse of removal.

1. Locking ring 2. Nut 3. Spring hanger 4. Catalytic converter





AIR PUMP (1975 to 1978)

REMOVAL AND INSTALLATION

Remove timing belt cover (1). Remove pump drive belt.

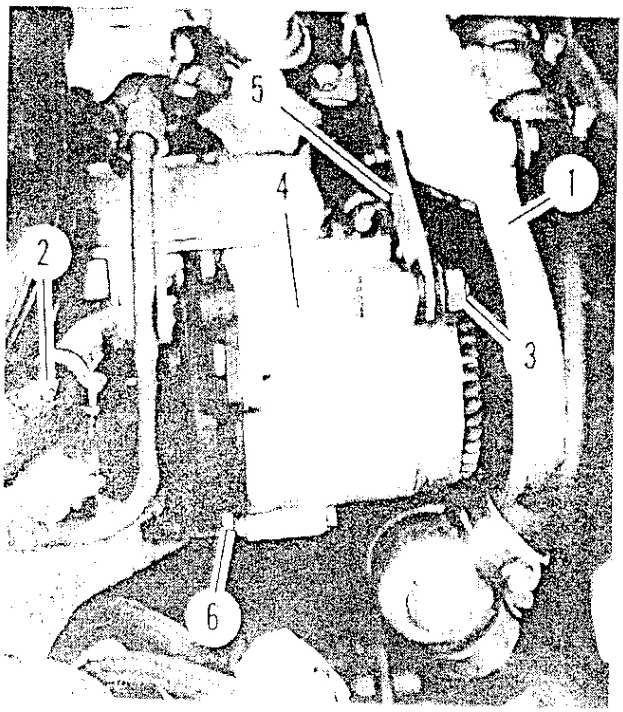
Loosen clamp and disconnect hose (2) from air pump (4).

Remove tensioner nut (3) and washers holding pump to bracket (5). Remove bolt (6), nut, washer and shield holding pump to cylinder head. Remove pump.

When installing pump, make sure to install shield on back side of mounting lugs.

Adjust belt tension.

1. Timing belt cover 2. Air outlet hose 3. Tensioner nut
4. Air pump 5. Bracket 6. Mounting bolt



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AIR PUMP (1979 and 1980 carburetored)

REMOVAL AND INSTALLATION

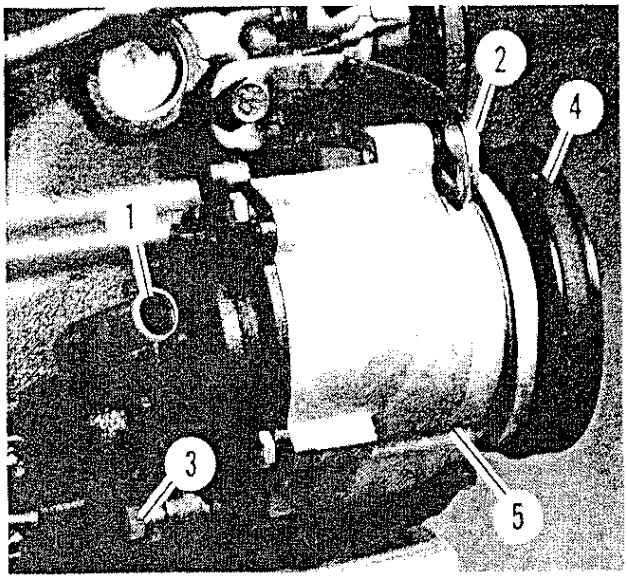
Loosen clamp and remove air hose from pump outlet (1).

Loosen tensioner bolt (2) and mounting bolt (3) to remove belt (4). Then remove bolts to remove pump (5).

Install in reverse order.

Adjust belt tension.

1. Air pump outlet 2. Tensioner bolt 3. Mounting bolt
4. Drive belt 5. Air pump



AIR MANIFOLD (1975 to 1978)

REMOVAL AND INSTALLATION

Remove air cleaner.

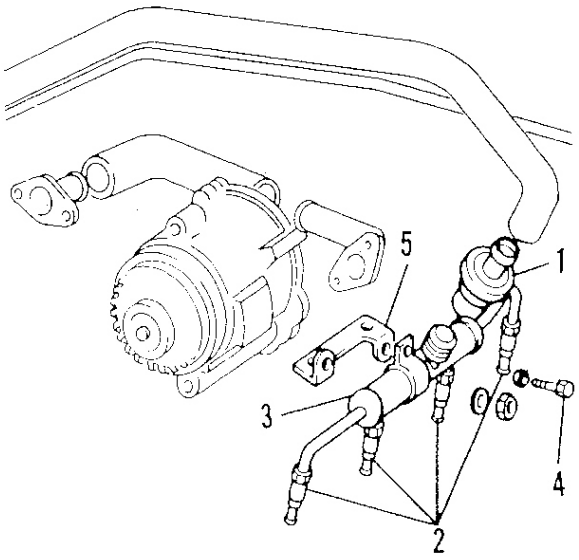
Disconnect hose to check valve (1).

Remove bolt (4), washer, and nut holding air manifold (3) to bracket (5).

Using tool A.5016, disconnect tubes (2) from cylinder head. Remove air manifold.

Install in reverse order.

1. Check valve 2. Tube 3. Air manifold 4. Bolt 5. Bracket



AIR PUMP CHECK VALVE (1979 and 1980 carburetored)

REMOVAL AND INSTALLATION

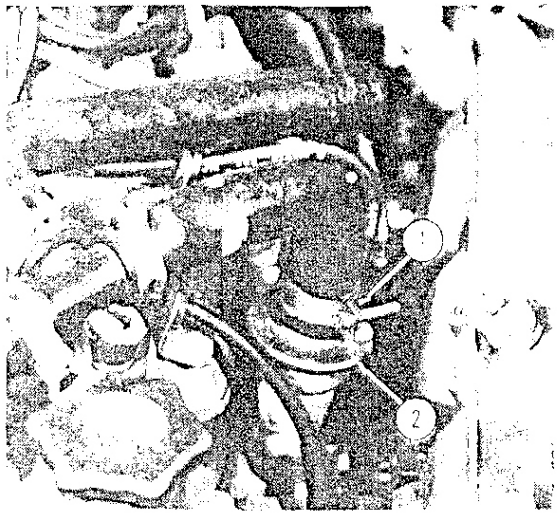
Remove air cleaner.

Loosen clamp (1) and remove hose from check valve.

Using wrench, remove check valve from cylinder head.

Install in reverse order.

1. Clamp 2. Check valve



EGR VALVE (1975 to 1978)

REMOVAL AND INSTALLATION

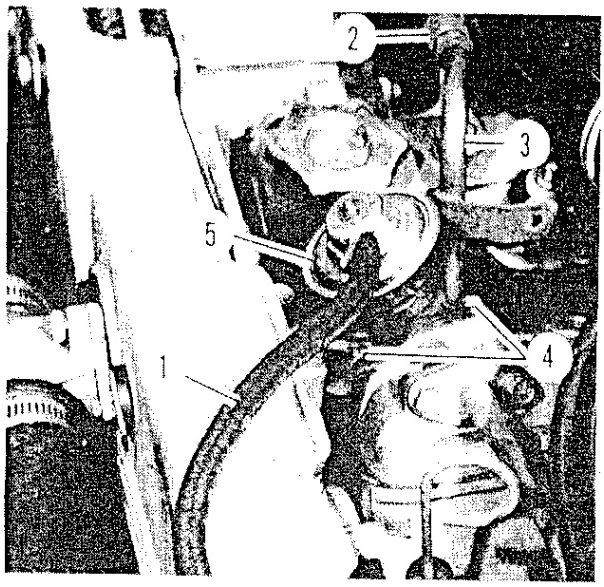
Loosen clamp and disconnect vacuum line (1).

Disconnect line fitting (2) from line attached to valve. Remove bolt, nut and washer holding line (3) to bracket on cam cover.

Remove two bolts (4) and washers holding EGR valve (5) to cam cover. Remove valve.

Install in reverse order.

1. Vacuum line 2. Line fitting 3. Valve line 4. Bolt 5. EGR valve



EGR VALVE (1979 and 1980 carburetored)

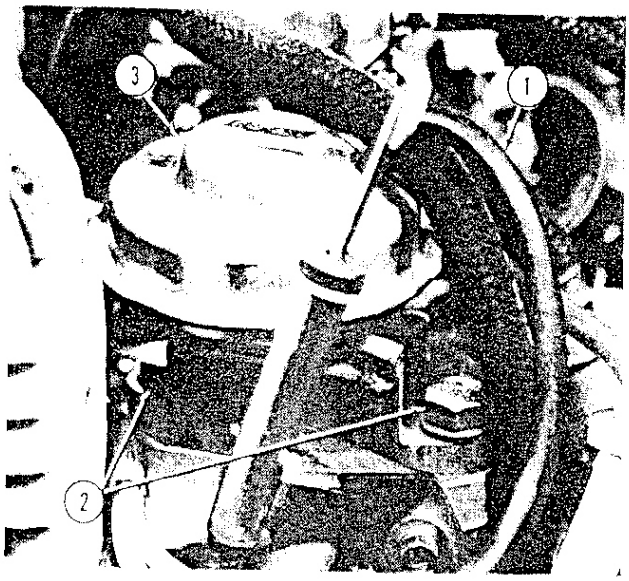
REMOVAL AND INSTALLATION

Disconnect vacuum hose (1) from EGR valve (3).

Remove two bolts (2) and washers, then remove EGR valve and gasket from intake manifold.

Install in reverse order. Use a new gasket.

1. Vacuum hose 2. Bolts 3. EGR valve



REED VALVES (1979)

REMOVAL AND INSTALLATION

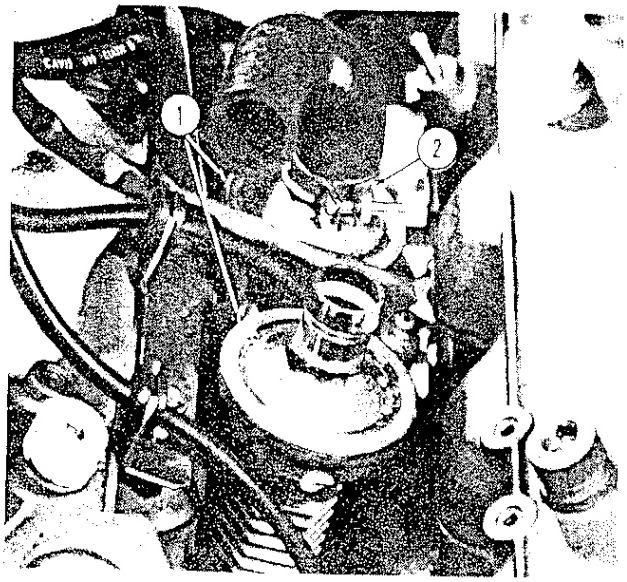
Remove air cleaner.

Loosen clamp (2) and remove hose from reed valve (1).

Using wrench, remove reed valves from cylinder head.

Install in reverse order.

1. Reed valves 2. Clamp



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REED VALVE FILTER (1979)

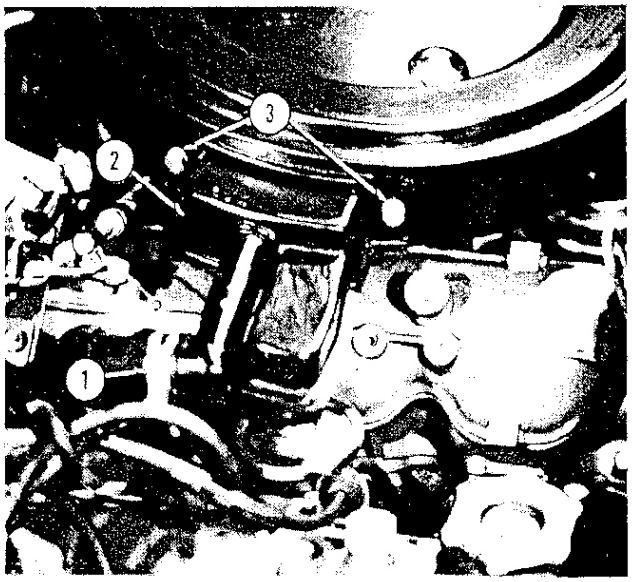
REMOVAL AND INSTALLATION

Loosen clamp (1) and remove hose from air induction filter housing (2).

Remove two bolts (3) and washers and remove air induction filter housing from air cleaner. Remove filter.

Install in reverse order.

1. Clamp 2. Air induction filter housing 3. Bolts



PCV CONTROL VALVE (Carburetored engines)

REMOVAL AND INSTALLATION

Remove carburetor (refer to Carburetor section).

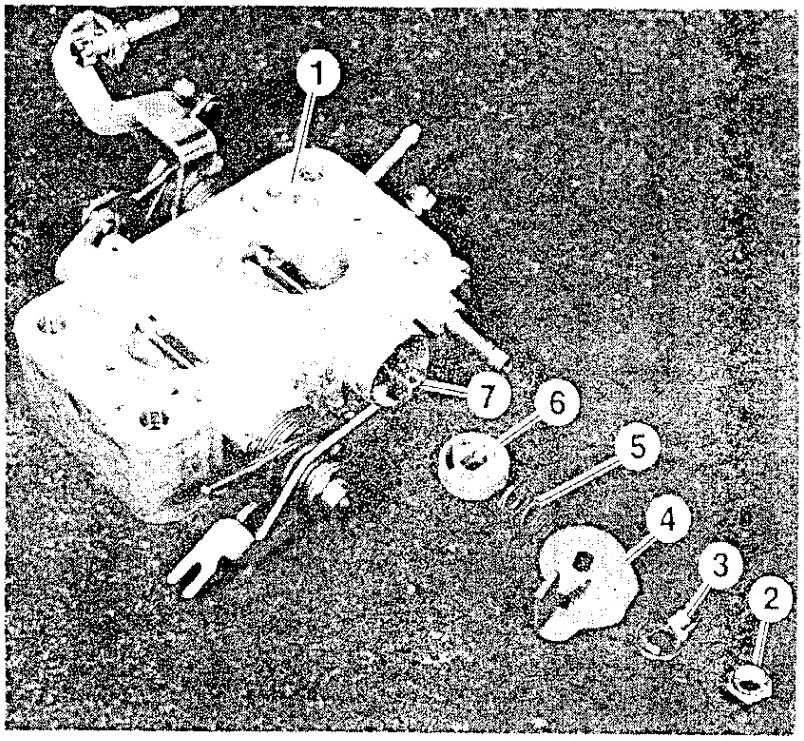
Separate throttle base (1) from carburetor body.

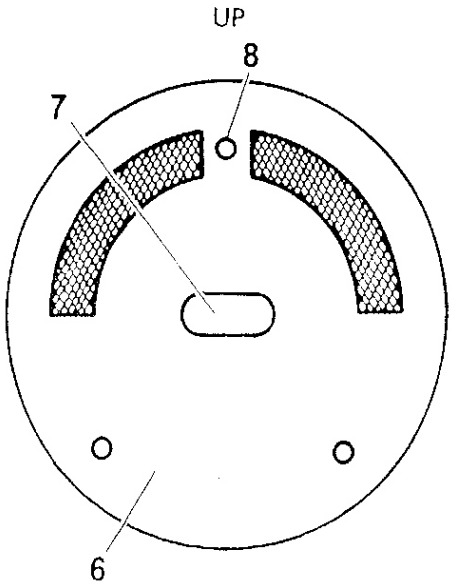
Remove nut (2), washer (3), cam (4), retainer spring (5) and valve (6) from slotted shaft (7).

Install in reverse order.

CAUTION: Valve is slotted to fit easily on shaft if installed correctly, but it can be forced on incorrectly, resulting in crankcase pressurization and high oil consumption. There are three raised knobs on the valve. When installed correctly, they face out and a single knob (8) will be up, as shown.

1. Throttle base 2. Nut 3. Washer 4. Cam 5. Retainer spring 6. PCV valve 7. Throttle shaft 8. Raised knob





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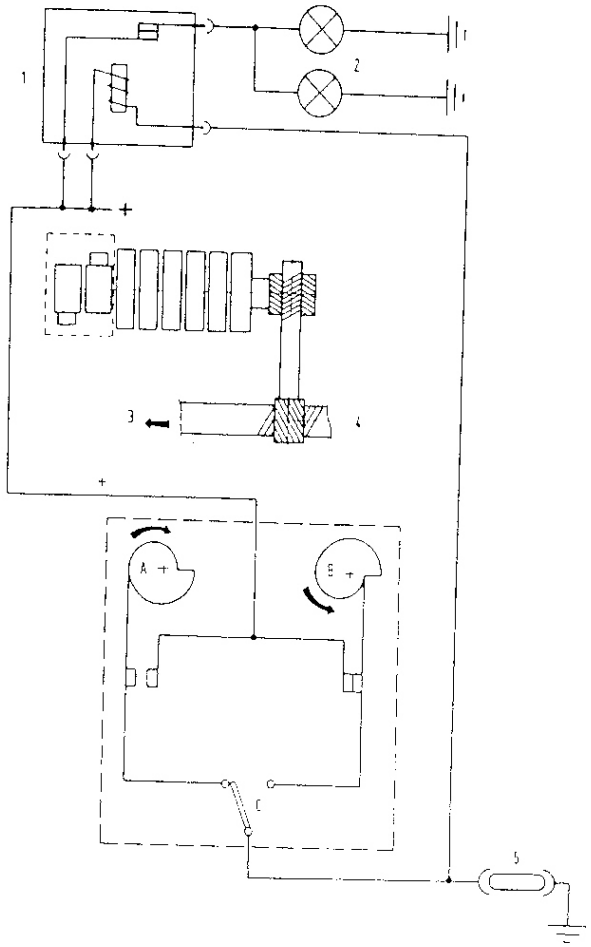
"EGR" AND "CATALYST" MAINTENANCE REMINDER SYSTEM (1975 and 1976)

The maintenance reminder system is controlled by relay (1). With proper power and ground the relay is energized.

This opens the circuit to the lights. Cam drums A and B in odometer switch are driven by the speedometer cable and are set to close their contacts at 25,000 ± 1 miles. Closing the contact applies power to fuse (5) causing fuse to blow. This removes ground from relay (1) causing lights to come on.

The maintenance reminder system is no longer necessary. If servicing is required, the system should be eliminated.

1. Normally closed relay 2. "EGR" and "Catalyst" indicator lights
3. To speedometer 4. To transmission 5. Fuse A and B cam drums
C. Resetting switch



ODOMETER SWITCH (1975 and 1976)

Odometer switch operation (part of the maintenance reminder system) is no longer necessary. If servicing is required, the switch should be deactivated. The odometer switch (1) is located on the front right side of drivers footwell.

CATALYTIC TEMPERATURE WARNING CONTROL UNIT (1975 and 1976)

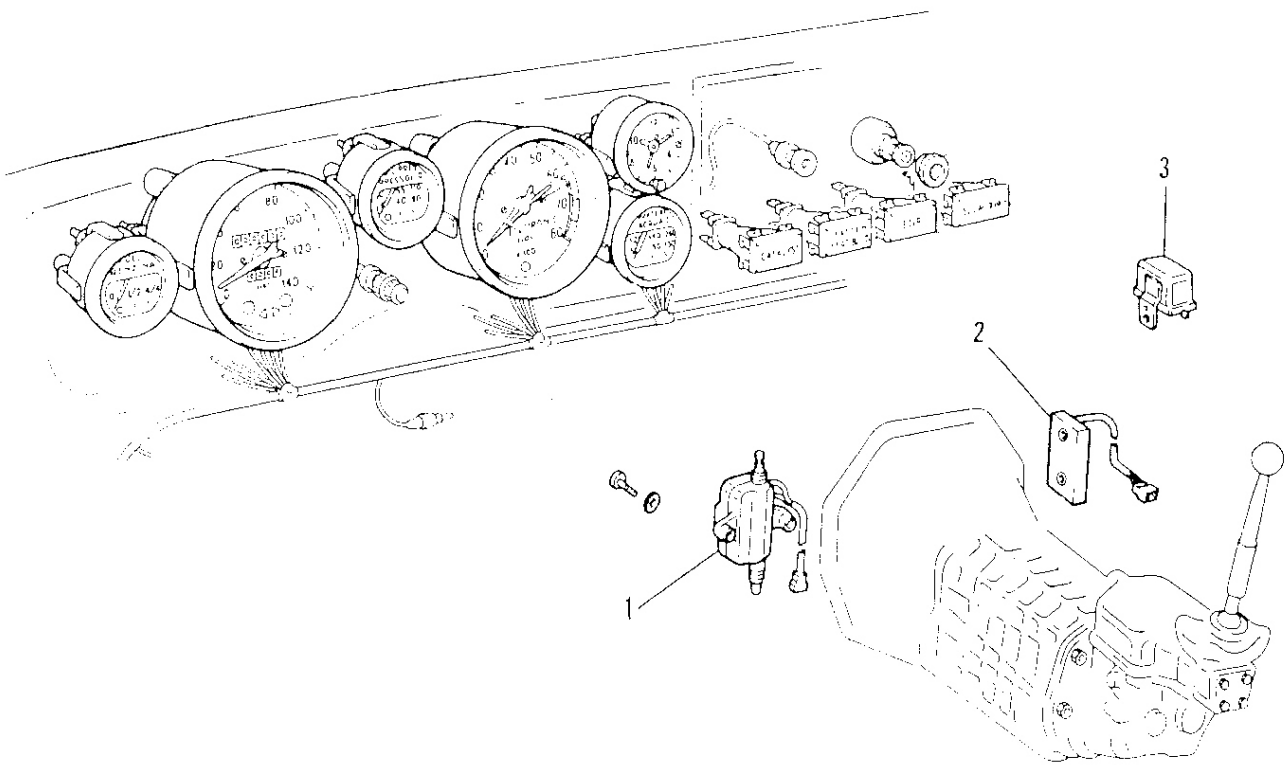
The control unit senses the temperature of the converter by means of a thermocouple. When converter temperature reaches 982 ± °50° C (1800 ± °50° F), the control unit causes the "SLOW DOWN" warning light to flash. If the temperature continues to increase, the frequency of the light increases.

The control unit (2) is located under the glove box.

CATALYTIC TEMPERATURE PROTECTION TACHYMETRIC SWITCH (1975 and 1976)

To prevent excessive temperatures in the converter, the fuel is shut off from the carburetor during decelerations. The tachymetric switch senses engine speed from the coil. With the throttle closed during decelerations above 2650 ± 50 rpm, the switch energies the idle shutoff solenoid. This shuts off idle fuel flow inside the carburetor. The tachymetric switch (3) is located under the glove box.

1. 25,000 mile control switch 2. Catalytic temperature control unit 3. Tachymetric switch



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THERMOVALVES (1979 and 1980 carburetored)

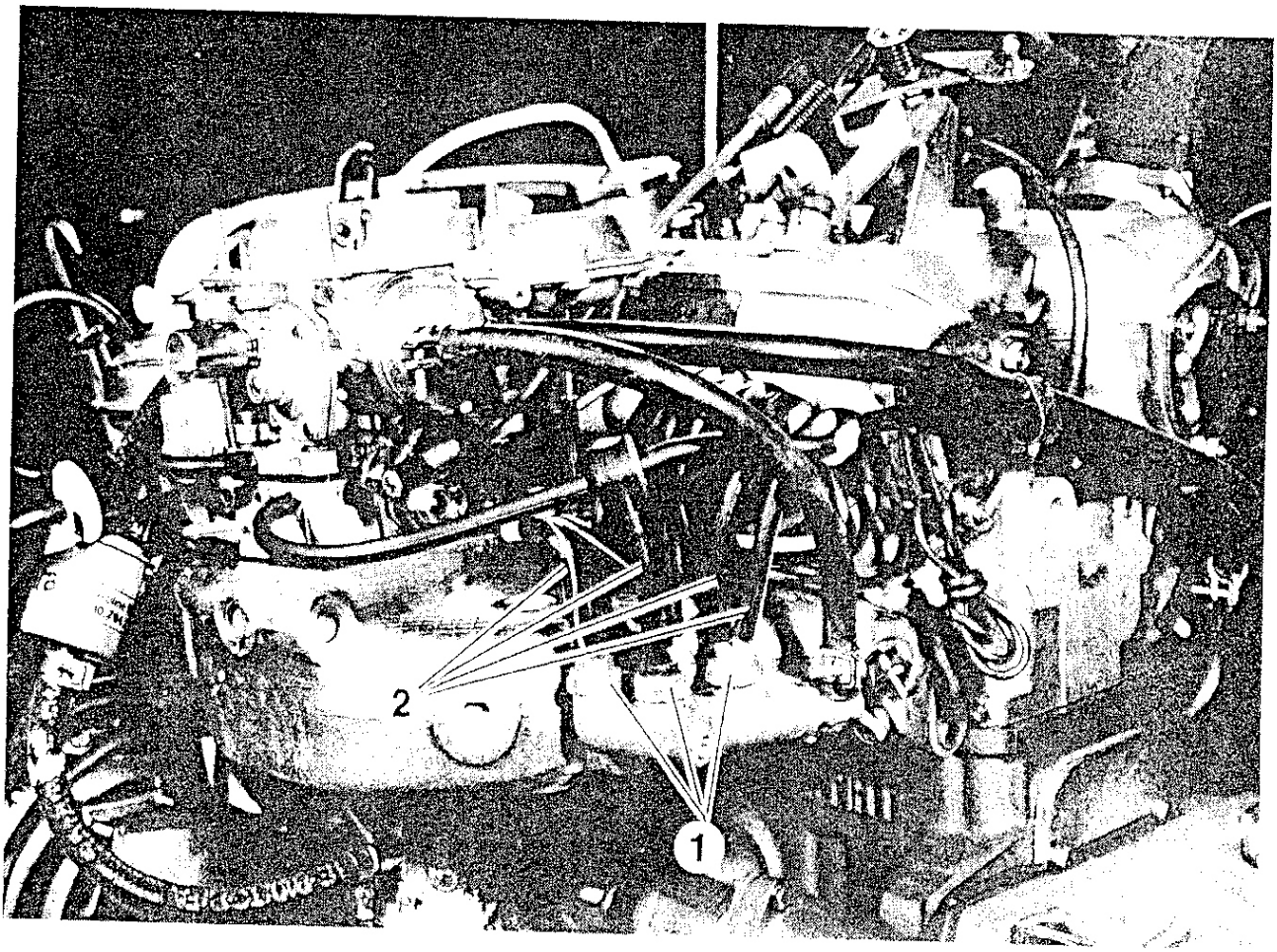
REMOVAL AND INSTALLATION

Drain cooling system to a level below thermovalves (1).

Remove vacuum lines (2) from thermovalve to be removed, noting that lines and valve are color coded. Remove thermovalve.

Install in reverse order. Refill and bleed cooling system (refer to Radiator section).

1. Thermovalves 2. Vacuum lines



GULP VALVE AND ELECTRO VALVE (1979 and 1980 carburetored)

REMOVAL AND INSTALLATION

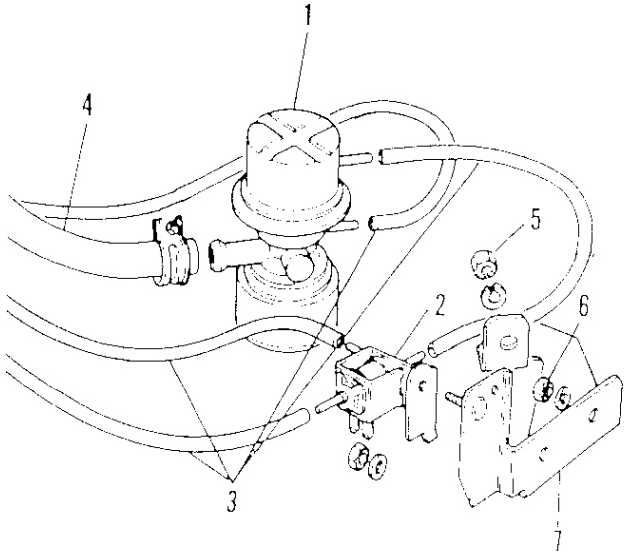
Gulp valve (1) and electro valve (2) are located together in the engine compartment mounted on the left fender shield.

Disconnect vacuum lines (3), air line (4) and electrical connector on valves.

Remove one nut (5) and washer to remove gulp valve.

Remove one nut (6) and washer to remove electro valve.

Install in reverse order.



1. Gulp valve 2. Electro valve 3. Vacuum lines 4. Air line 5. Nut 6. Nut 7. Mounting bracket

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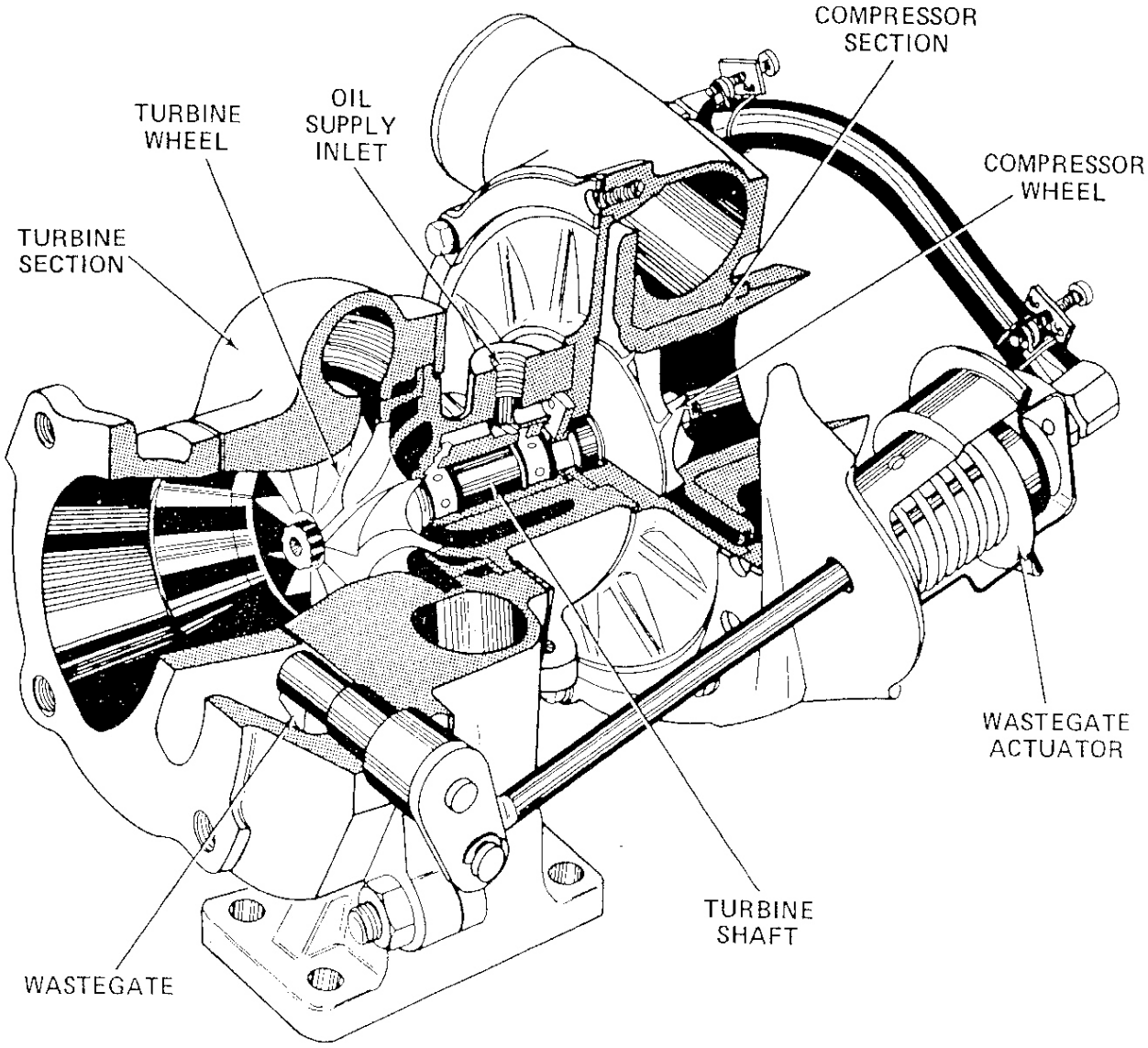
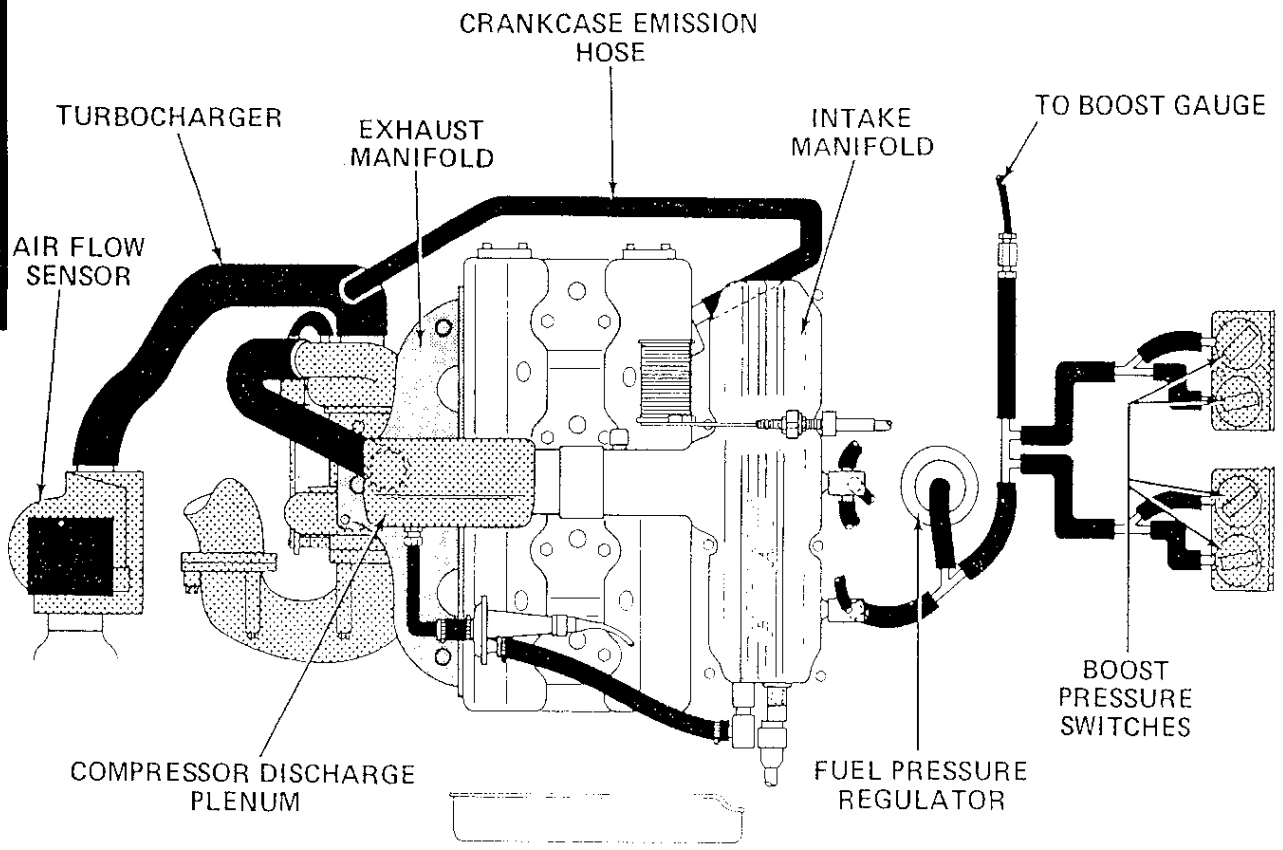


TURBOCHARGER WARNER-ISHI (RHB6)

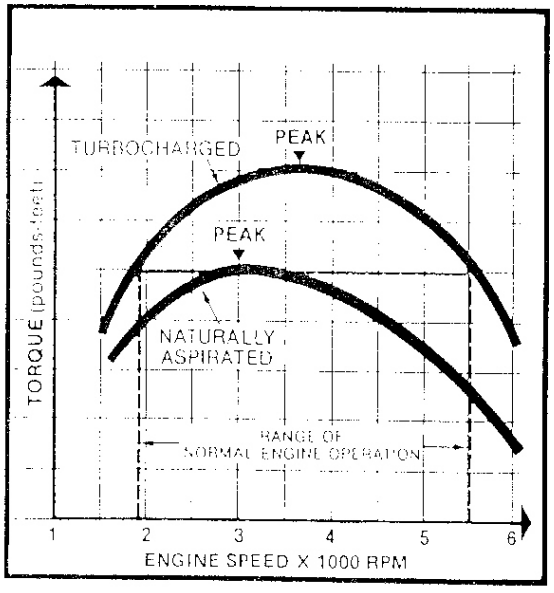
GENERAL

The turbocharger installed as an option on 1981 and up Spiders is a light weight unit with a low inertia turbine wheel. This provides quick response and minimal turbo lag. It is bolted to the exhaust manifold so that all exhaust gases flow thru the unit. Inlet air is routed from the air flow sensor to the turbocharger where it is compressed. The compressed air is then routed to the discharge plenum and intake manifold. The compressed air increases the charge of air/fuel mixture which results in a significant increase in power output and engine torque.



TOP VIEW OF TURBOCHARGER

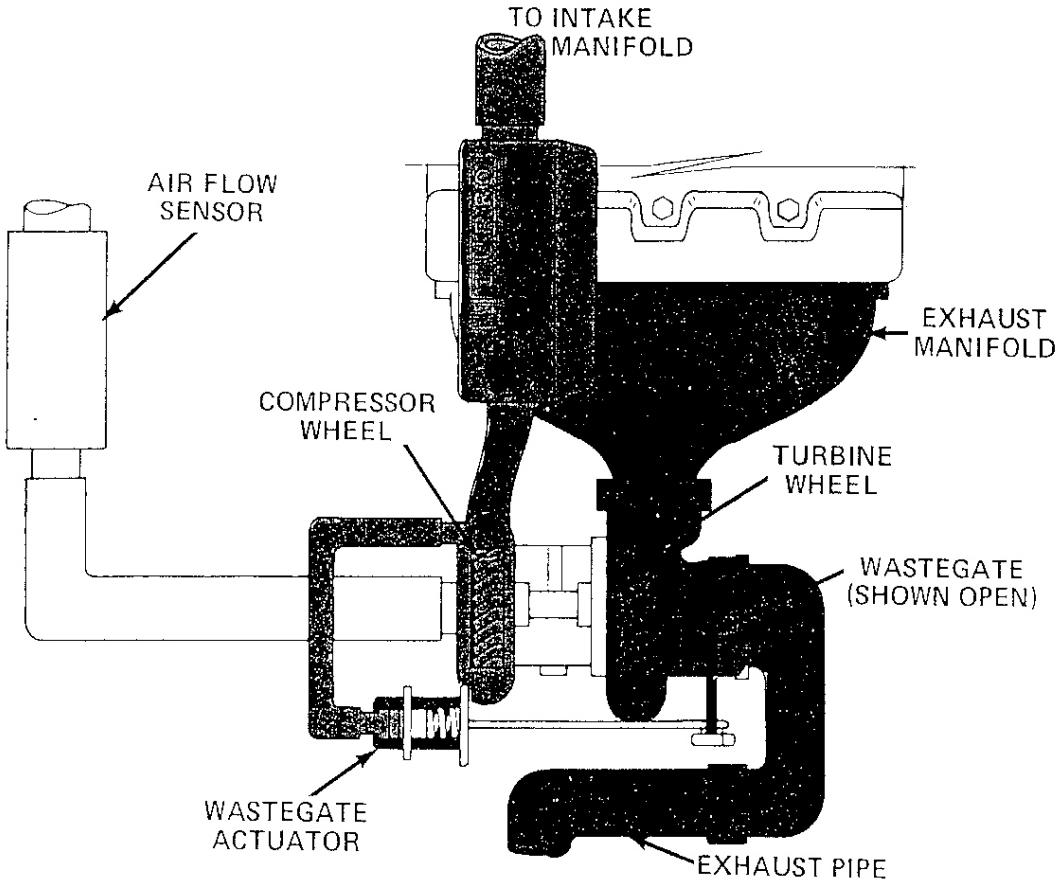
The low inertia turbine wheel is designed to provide boost at relatively low engine speed which produces a broad torque curve. This results in more torque in the normal driving range of the engine without undue sacrifice of fuel economy, emissions, or durability.



OPERATION

TURBOCHARGER

Since the turbine wheel is driven by exhaust gases, the speed of the turbine wheel as well as the boost pressure will increase in proportion to the speed and load of the engine. Depending on the amount of exhaust gas flow, the turbine wheel will spin at up to 100,000 rpm. In order to prevent overboost which would damage the engine, a wastegate (charge boost pressure regulator) is incorporated in the turbocharger. The wastegate actuator contains a diaphragm and return spring. The upper chamber of the actuator is connected to the compressor outlet. The boost pressure in the compressor outlet is applied to the diaphragm. At 6 p.s.i., the boost pressure starts to overcome the spring pressure. This opens the wastegate which allows some exhaust gas to by-pass the turbine wheel. Any increase in exhaust gas flow will result in an increase in the bypass flow which will maintain the maximum boost pressure at 6 p.s.i.



CONTROL SWITCHES

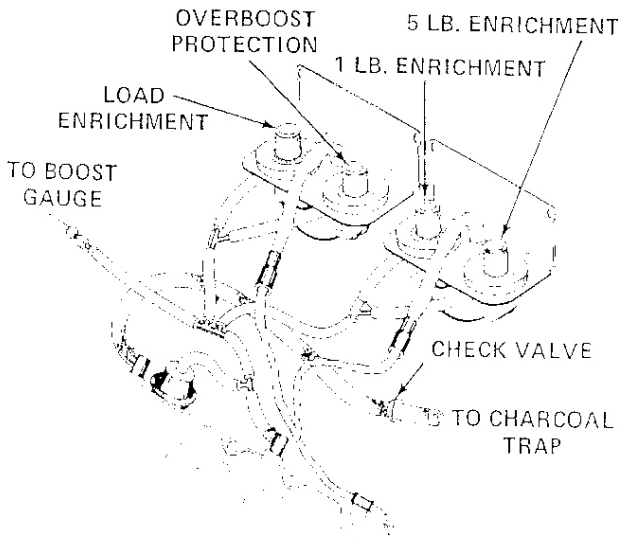
The turbocharger system is equipped with four boost pressure switches. The switches are mounted on the left fender well and are connected to the intake manifold. The switches are color coded as follows:

Load Enrichment - Blue
Overboost Protection – Black
1 lb. Enrichment – Yellow
5 lb. Enrichment – Green

A boost gauge in the instrument cluster is also connected to the intake manifold. This gauge indicates:

White Zone – Manifold vacuum, no boost
Green Zone – Normal turbo boost
Red Zone – Dangerous overboost and system malfunction

A check valve is installed in the hose to the charcoal trap. This prevents boost pressure from pressurizing the charcoal trap.



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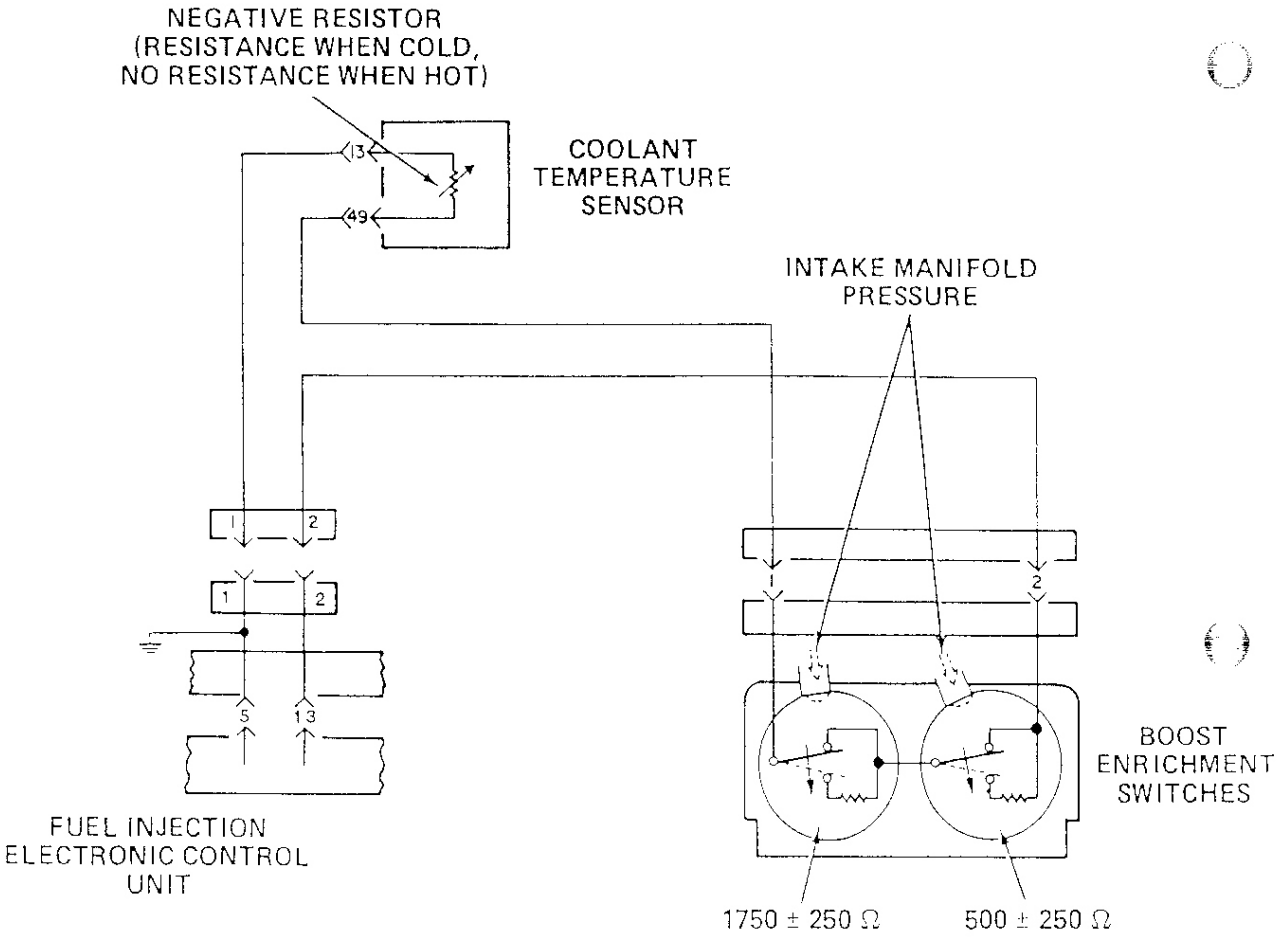
Boost Enrichment Switches

The boost enrichment switches are wired in series with the coolant temperature sensor of the fuel injection system. This circuit ensures that the proper fuel/air mixture is supplied by the fuel injection system whenever the turbocharger is providing boost (positive intake manifold pressure).

Each switch is a single pole, two position switch. The circuit through the normally closed contacts contain no resistance. The circuit through the normally open contacts contain resistors. When the switch is deactivated, the signal through it is unchanged. When the switch is activated the signal passes through the resistors.

When operating without boost the coolant temperature sensor provides a signal to the electronic control unit (ECU) for extra fuel during the warmup. When boost pressure increases to 1 ± 0.5 psi the first switch is activated. This opens the switch contact and causes the signal to pass through a resistor of 1750 ± 250 ohms. This increase in resistance signals the ECU for additional fuel. When boost pressure increases to 5 ± 0.5 psi the second switch is activated and an additional 500 ± 250 ohms is added. This signals for an additional increase in fuel flow.



Load Enrichment/Overboost Protection Switches

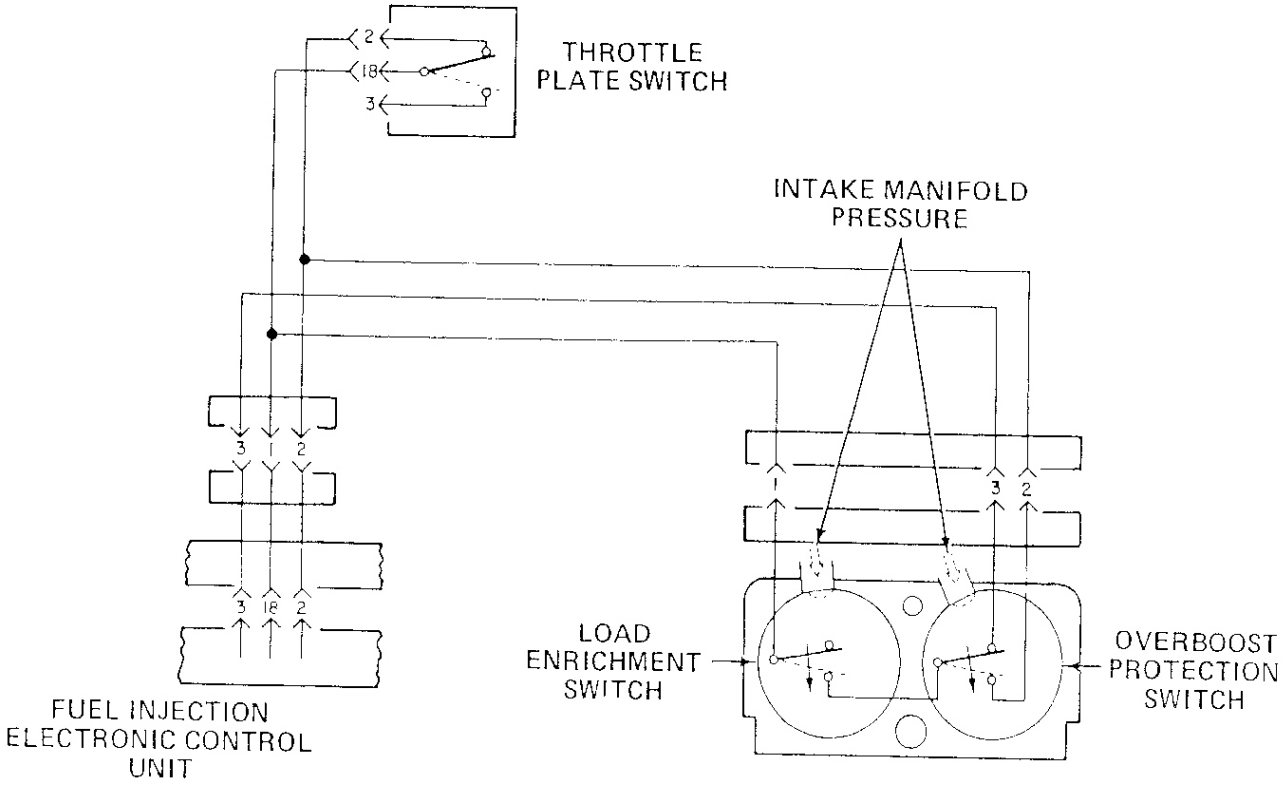
The load enrichment and overboost protection pressure switches are wired into the throttle plate switch circuit of the fuel injection electrical system. The load enrichment switch is a single pole, single position switch. The overboost protection switch is a single pole, two position switch.

Load Enrichment

When the throttle plate is in idle position, the throttle plate switch provides the normal signal to the ECU. When boost pressure increases to about 1 psi, the throttle plate switch is open and not providing any signal to the ECU. The load enrichment switch is closed. This connects the "full throttle" signal circuit from terminal 3 of the ECU through the normally closed contacts of the overboost switch, the closed contacts of the load enrichment switch to terminal 18 of the ECU. This signal provides additional fuel for operation with boost.

Overboost Protection

If boost pressure should exceed 9 psi (wastegate failure), the overboost protection switch would be activated. This switches the signal for the ECU from "full throttle" to "idle" signal. When the ECU receives an "idle" signal and a high rpm signal, it closes the fuel injectors. This causes the engine to slow down thereby reducing boost pressure.



TURBOCHARGER

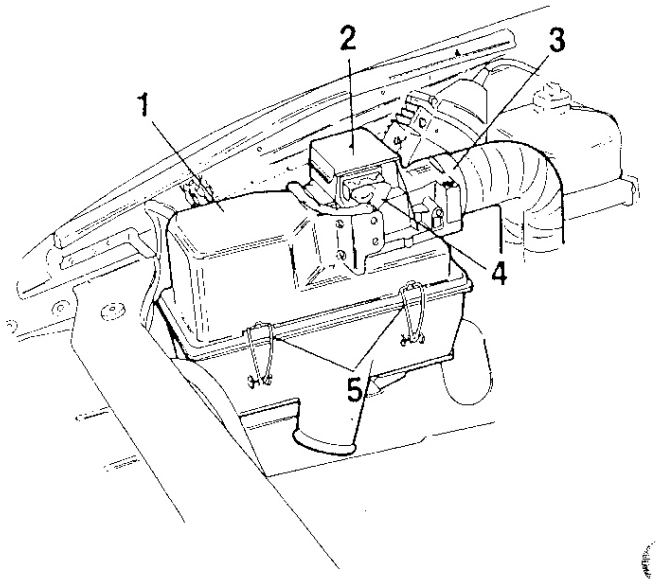
REMOVAL AND INSTALLATION

CAUTION: The exhaust manifold and turbocharger must be removed as a unit. Do not attempt to remove turbocharger from exhaust manifold on vehicle. The turbocharger bolts must be properly torqued and this can only be accomplished off the vehicle.

Remove front splash pan and drain cooling system by opening engine drain.

Loosen hose clamp (3). Disconnect electrical connector (4) from air flow sensor (2).

Release four clips (5) holding air cleaner cover (1). Remove cover with air flow sensor and remove air filter. Remove 3 nuts in air cleaner and lift air cleaner out.



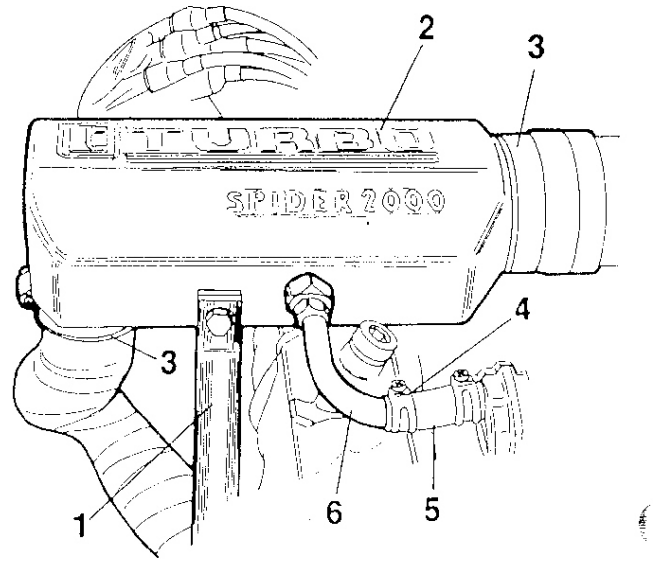
1. Air cleaner cover 2. Air flow sensor 3. Clamp 4. Electrical connector 5. Clip

Remove bolt and nut securing support bracket (1) for air plenum (2) to exhaust manifold heat shield.

Loosen clamp (4) and disconnect auxiliary regulator air hose (5) from tube (6).

Loosen air hose clamps (3) and lift plenum off air hoses.

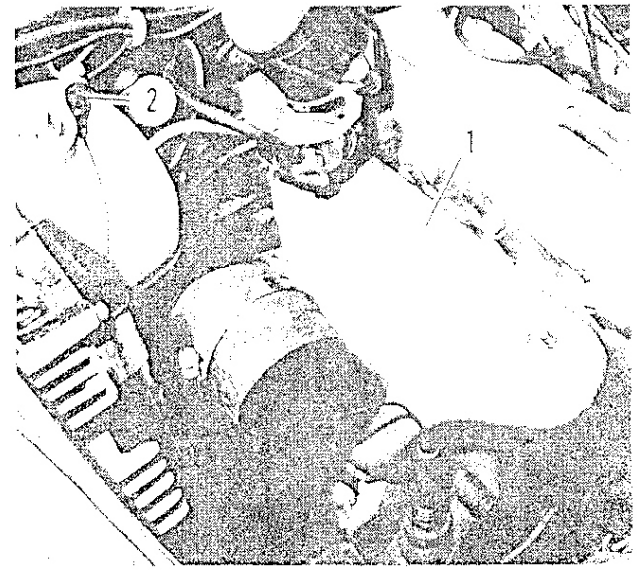
CAUTION: Cap off all turbocharger ports and oil supply and return orifices which may be exposed during removal.



1. Support bracket 2. Air plenum 3. Clamp 4. Clamp 5. Auxiliary air regulator hose 6. Tube

Remove two remaining nuts and washers holding heat shield (1) to exhaust manifold. Remove shield.

Disconnect Lambda sensor electrical connector (2).



1. Heat shield 2. Lambda sensor electrical connector

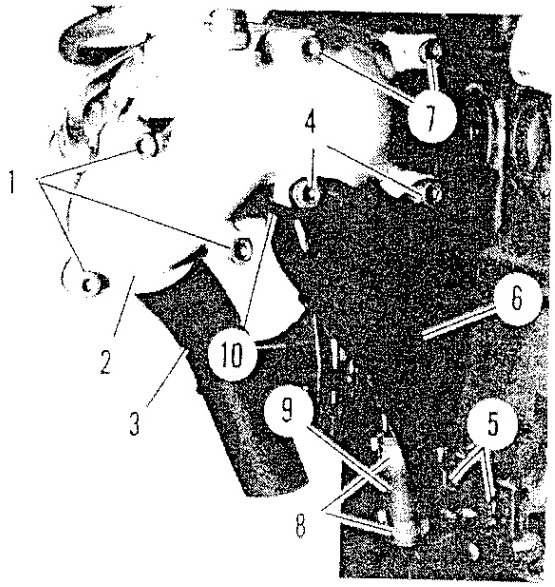
Remove three Allen head bolts (1) holding turbine outlet elbow (2) to exhaust pipe (3). Remove gasket and discard.

Remove two Allen head bolts (4) and two self-locking nuts (5) or two bolts (A.C. vehicles) to remove exhaust elbow bracket (6).

Remove two remaining Allen head bolts (7) on exhaust elbow and remove elbow. Remove gasket and discard.

Loosen two clamps (8) on turbo oil drain line hose (9) at oil sump connection. Push hose down to clear drain line.

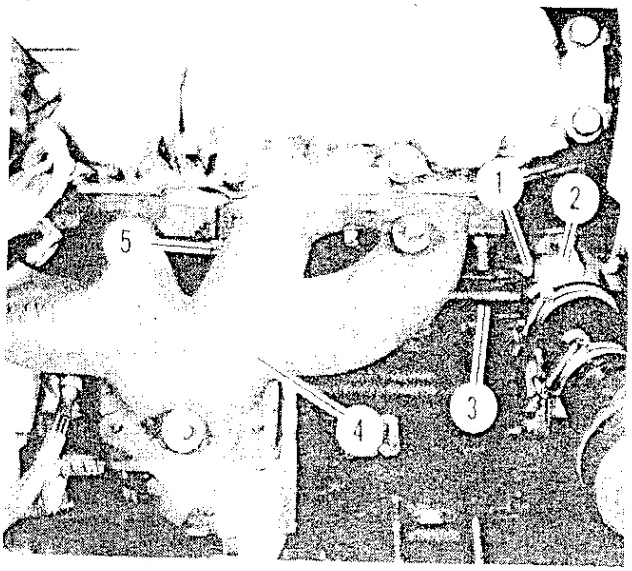
From under vehicle remove turbo support bracket nut at oil drain line flange (10).



1. Allen head bolt 2. Turbine outlet elbow 3. Exhaust pipe
4. Allen head bolt 5. Self-locking nut 6. Exhaust elbow bracket
7. Allen head bolt 8. Clamp 9. Oil drain hose 10. Oil drain line flange

Remove two nuts (1) holding heater return line (3) to water pump (2).

Remove nut (5) holding bracket on heater return line to exhaust manifold (4). Move return line away from manifold.



1. Nut 2. Water pump 3. Heater return line 4. Exhaust manifold
5. Nut

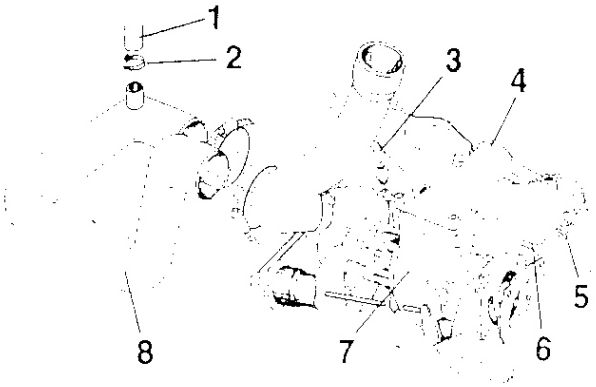
Loosen clamp (2) holding crankcase hose (1) to inlet hose (8). Disconnect hose (1). Leave inlet hose in place.

Disconnect oil hose (3) from turbocharger (7). Move hose to one side.

Remove five nuts (5) and washers securing exhaust manifold (4) to engine. Carefully remove exhaust manifold/turbocharger assembly.

Remove four bolts (6) holding turbocharger to exhaust manifold.

NOTE: Early production turbochargers had a gasket between manifold and turbocharger. If installed, remove and discard gasket. Do not install a gasket.



1. Crankcase hose 2. Clamp 3. Oil hose 4. Exhaust manifold
5. Nut 6. Bolt 7. Turbocharger 8. Air hose

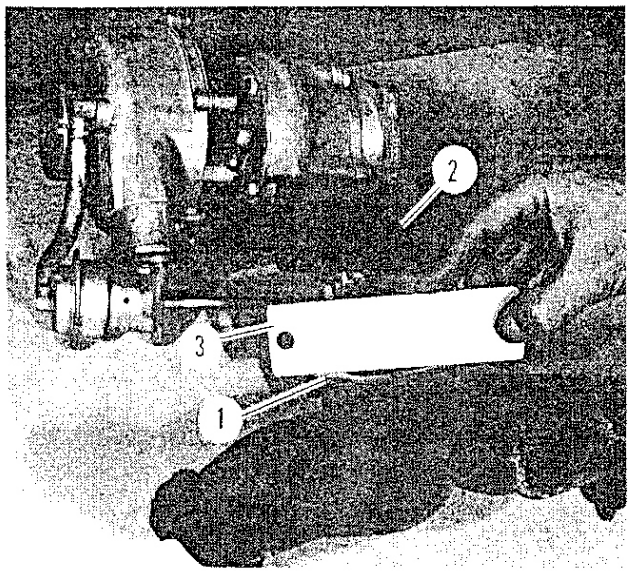
10

INSTALLATION

Installation is reverse of removal with particular attention to the following steps and precautions.

NOTE: High quality hardware is used throughout the turbo system. Whenever replacement is required, be sure to use hardware of same quality. Torque all hardware, refer to torque chart on following page. Apply a light application of anti-seize compound to all threads and both sides of each stainless steel gasket.

Using straightedge (3), check flatness of exhaust manifold flange (1) and turbocharger flange (2) as shown. Surfaces must be perfectly flat. If not, they must be machined. Remove only enough metal to return level finish to surface.



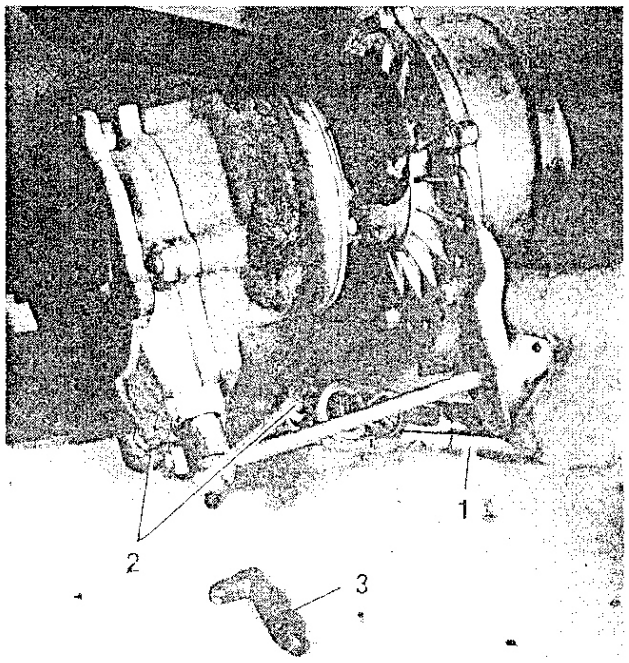
1. Exhaust manifold flange 2. Turbocharger flange 3. Straightedge

Using new bolts (2), (must be same type of high strength bolts as was removed), torque turbocharger and exhaust manifold flanges together (20 ft. lbs.).

Due to limited clearance, this can be accomplished with "crows foot" wrench extension on torque wrench (1) as shown.

NOTE: Crows foot extension will not add a significant amount of torque above 20 ft. lbs.

Reinstall oil supply line fitting (3).



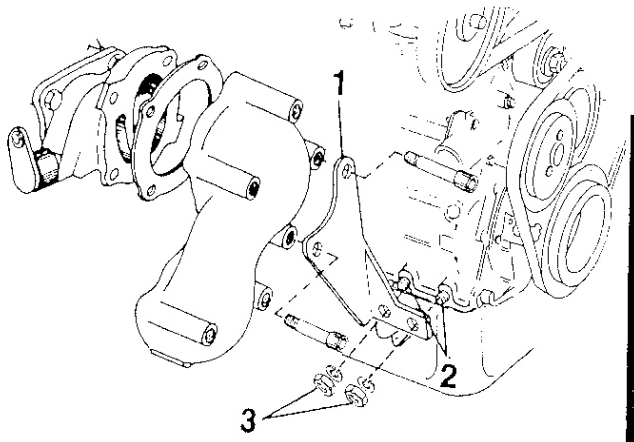
1. Torque wrench 2. Bolt 3. Oil supply line fitting

CAUTION: All intake hoses, wires, etc, must be kept clear of turbocharger, exhaust manifold and heat shield. Be certain to secure all hose clamps to prevent them from coming off during positive boost pressure.

When installing elbow support bracket (1), insure that holes in leg of bracket line up with studs (2) and/or tapped holes (A.C. vehicles) in engine block before securing bracket to elbow.

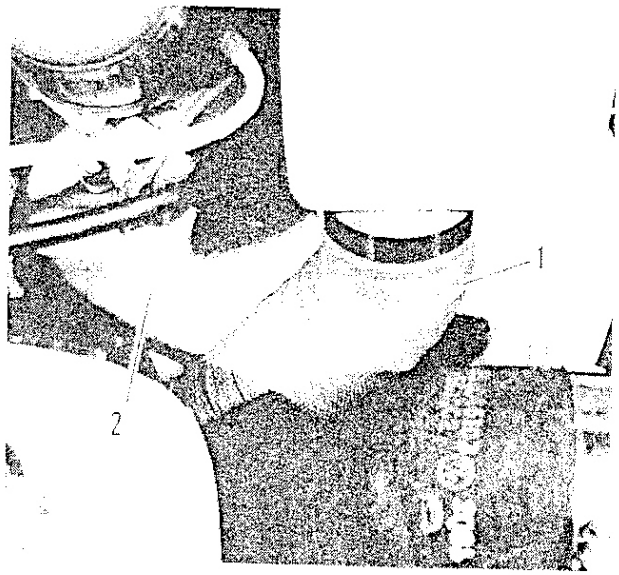
The leg of elbow support bracket should be parallel and flush to engine block. If it is not, take up slack with washer shims rather than drawing leg flush with mounting nuts (4).

1. Elbow support bracket 2. Mounting studs 3. Self-locking nuts



The orange compressor outlet hose (1) must be adjusted for a clearance of at least 5 mm from exhaust manifold heat shield (2). This can be accomplished by sliding hose up or down on compressor outlet port of turbocharger.

1. Compressor outlet hose 2. Heat shield



CAUTION: The stainless steel braided oil supply line can be extremely abrasive to anything it comes into contact with. Make sure the protective sheathing around this line is in good condition and positioned correctly to avoid contact with any components.

Refill and bleed cooling system. Refer to bleeding procedures in Radiator section.

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TESTING

Preparation

Disconnect vacuum hoses from "Y" fittings. Connect pressure tester J33076 to "Y" fitting.

CAUTION: When operating tester with line pressure connected, make sure air pressure to switches does not exceed 12 psi.

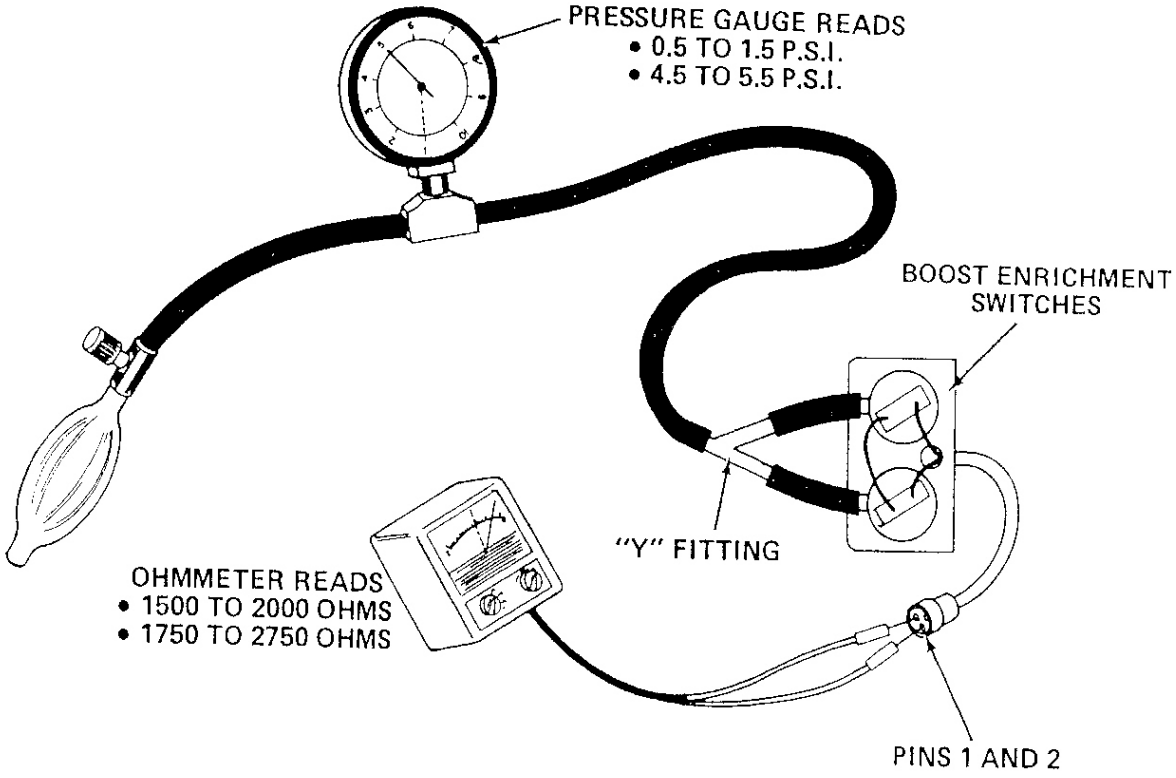
Disconnect connectors for switches from fuel injection wire harness.

Boost Enrichment Switches

Connect an ohmmeter to pins 1 and 2 of connector for boost enrichment switches.

Slowly apply pressure to switches. Check that switch operates (a slightly audible click may be heard) at 0.5 to 1.5 psi. Check that ohmmeter reads between 1500 and 2000 ohms.

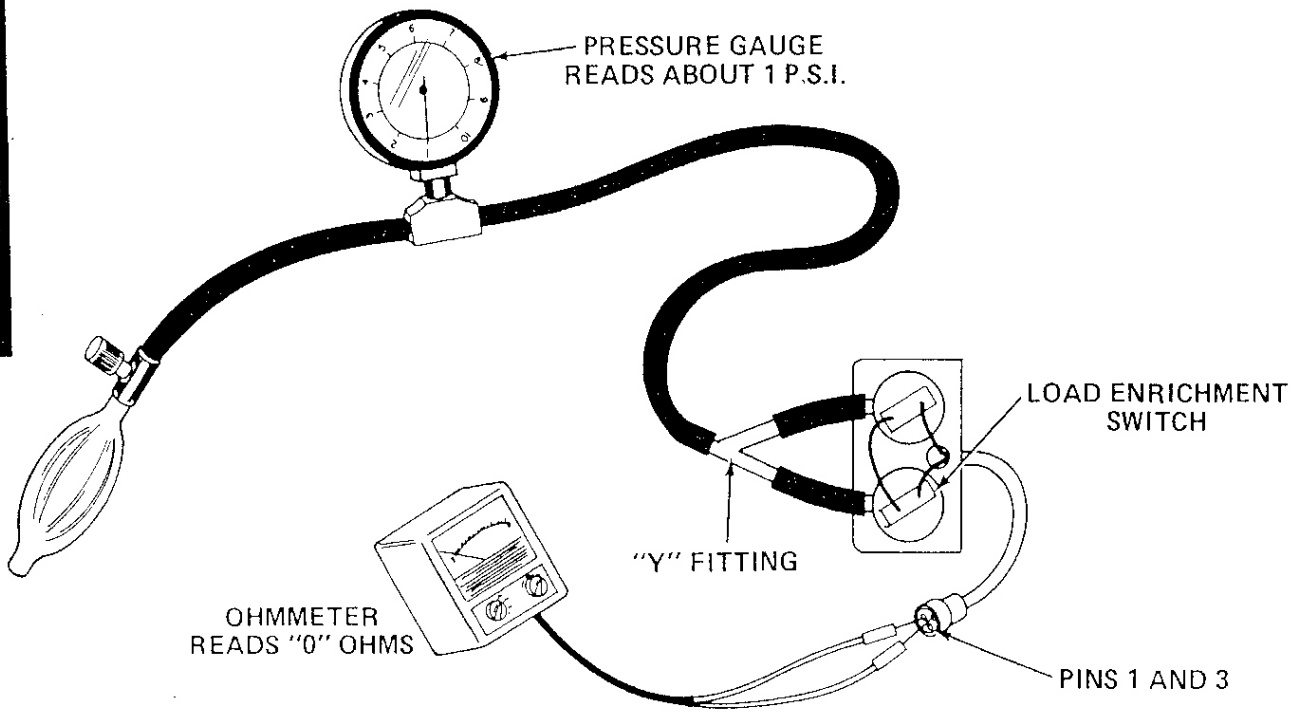
Slowly increase pressure. Check that other switch operates at 4.5 to 5.5 psi. Check that ohmmeter reads between 1750 and 2750.



Load Enrichment Switch

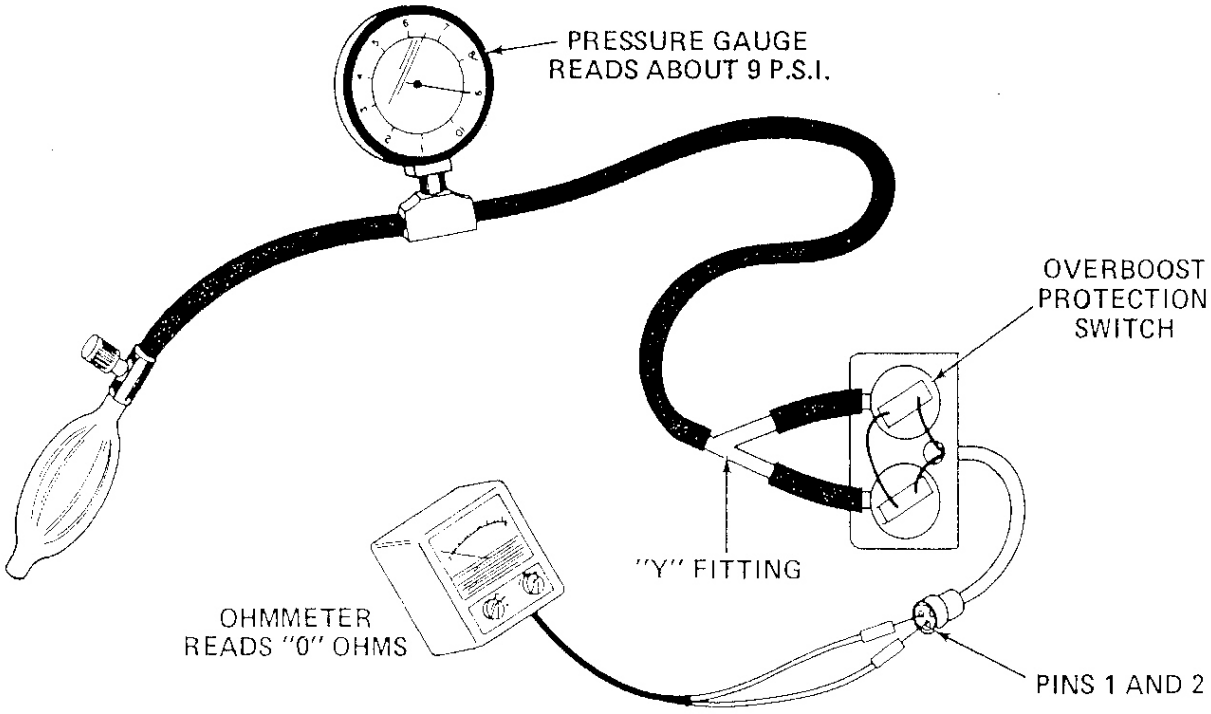
Connect pressure tester to "Y" fitting for load enrichment switch. Connect ohmmeter to pins 1 and 3 of connector for load enrichment/overboost switches. Zero ohmmeter.

Check that ohmmeter reads infinity. Slowly apply pressure to switch. Check that load switch operates (a slightly audible click may be heard) at about 1 psi. Check that ohmmeter reads 0 ohms.



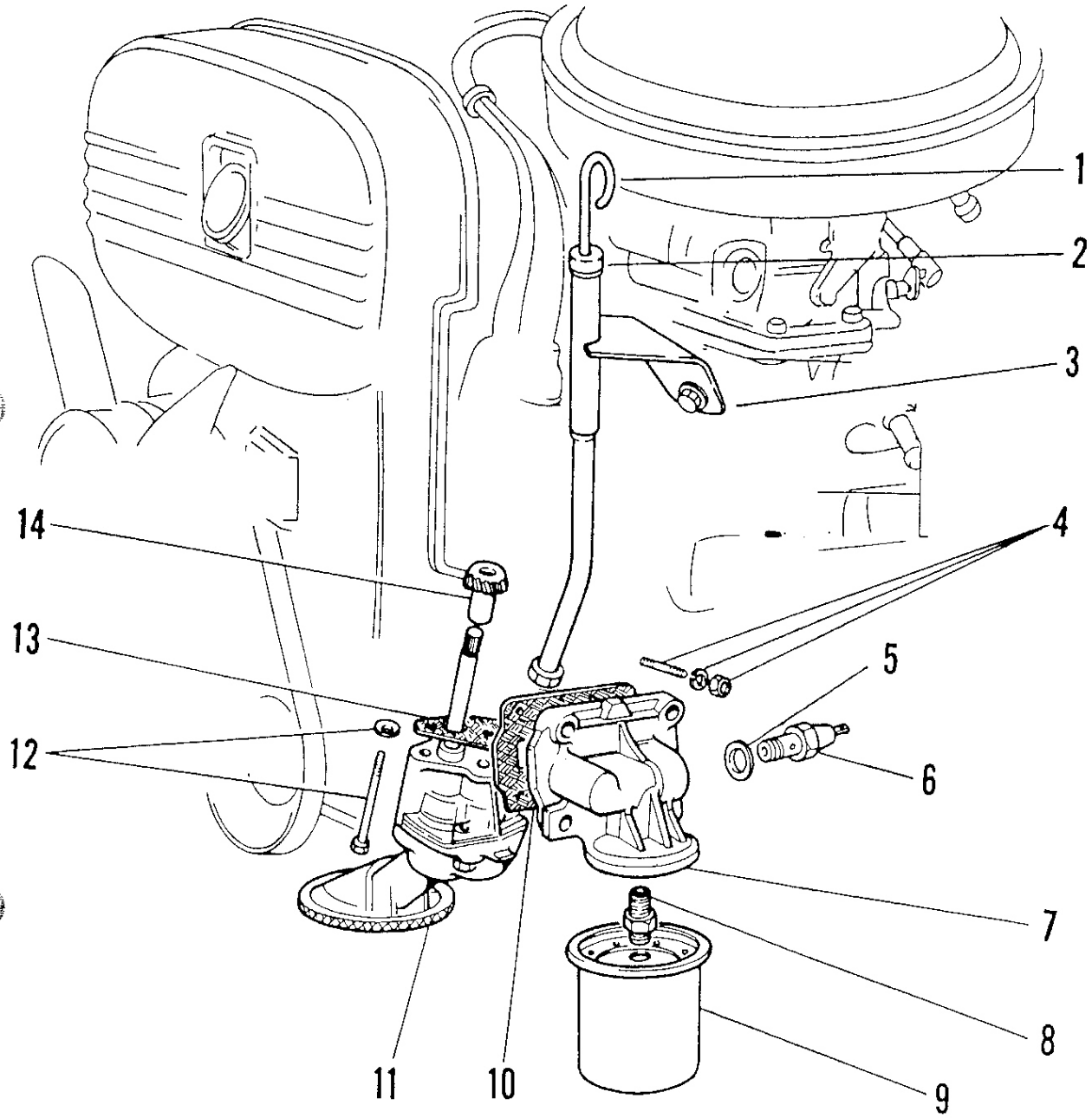
Overboost Protection Switch

Connect ohmmeter to pins 1 and 2 of connector. Check that ohmmeter reads infinity. Slowly increase pressure. Check that overboost switch operates at about 9 psi. Check that ohmmeter reads 0 ohms.



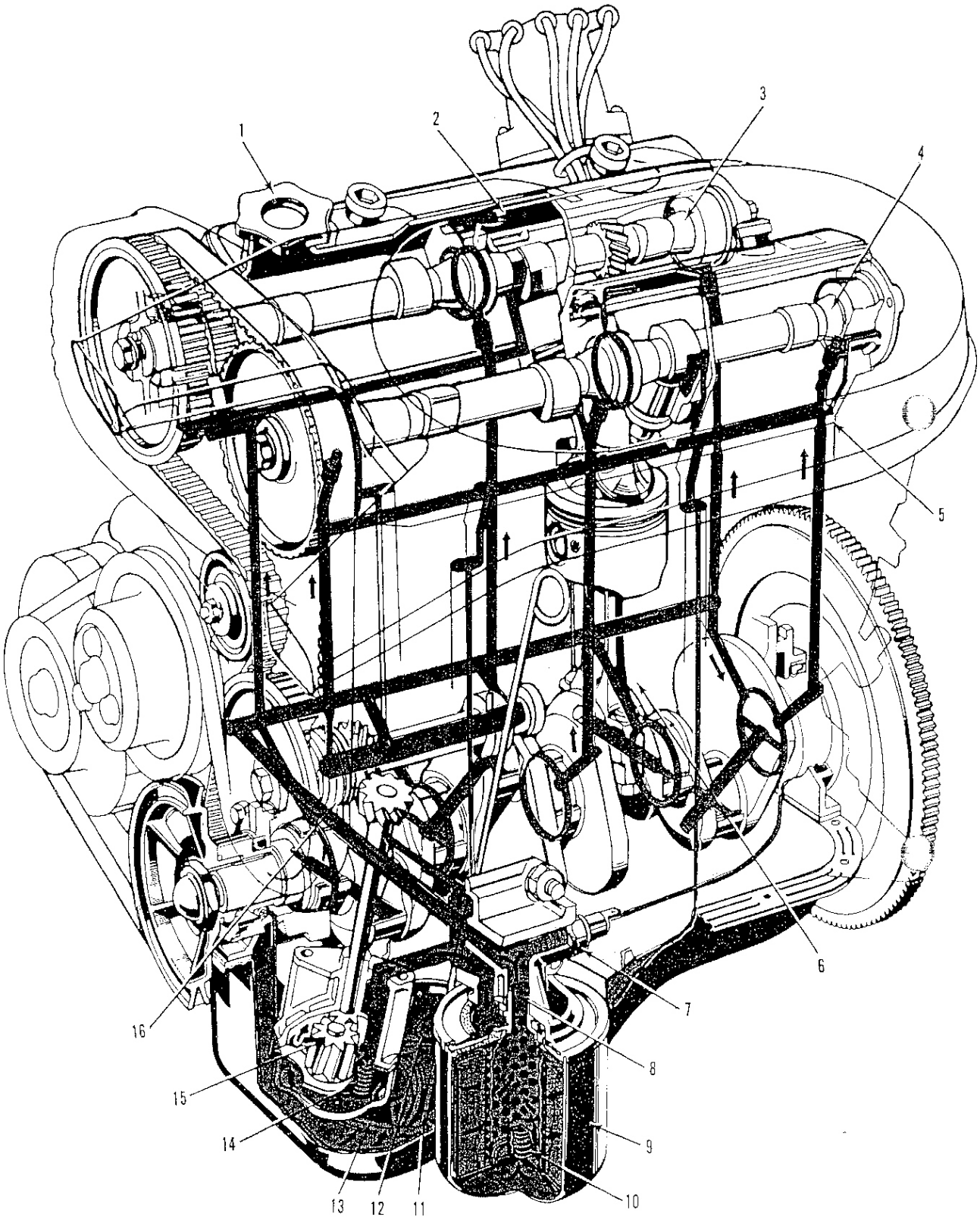
TROUBLESHOOTING

SYMPTOM OR COMPLAINT	POSSIBLE CAUSES
No Boost	Boost gauge inoperative Wastegate stuck open Turbo unit inoperative, seized Turbine impeller coked up
Lack of power	Engine low compression incorrect valve timing and clearance incorrect ignition timing Clogged air cleaner element Insufficient fuel supply restriction low fuel pressure fuel enrichment system not working
Detonation w/no boost	Low grade fuel Ignition timing advanced too far Rough edge or foreign object in cylinder
w/normal boost	Low grade fuel Ignition timing advanced too far Insufficient fuel supply restriction low fuel pressure fuel enrichment system not working
w/excessive boost	Wastegate actuator signal line leaking Actuator tampered with Wastegate or actuator damaged
Excessive fuel consumption (black exhaust smoke)	Engine out of tune Intake air flow restricted filter clogged air delivery hoses kinked or collapsed Cold start valve or injectors leaking Fuel enrichment system working all the time
Excessive oil consumption (blue, gray, or white exhaust smoke)	Incorrect type or grade of oil Extended oil change intervals Clogged air cleaner element Engine wear (piston rings, valve guides) Crankcase emission check valve stuck open or installed backwards Internal leakage at seals in turbo unit
Noise or vibration at turbo unit	Loose mount or brackets Internal wear – excessive shaft play Internal damage – out of balance



1. Dipstick
2. Dipstick seal
3. Support
4. Stud, lockwasher and nut
5. Gasket
6. Oil pressure indicator switch
7. Oil filter support
8. Connector, oil filter to support
9. Full-flow, cartridge type oil filter
10. Oil filter support gasket
11. Oil pump
12. Bolt and spring washer
13. Oil pump gasket
14. Oil pump drive gear

ENGINE LUBRICATION SYSTEM COMPONENTS



1. Oil filter cap
2. Oil spurt for camshaft and tappet
3. Exhaust camshaft
4. Intake camshaft
5. Oil return from tappets
6. Oil spurt for cylinder walls
7. Low oil sending unit
8. Oil delivery-filter to engine components
9. Oil filter
10. Filter by-pass valve
11. Dipstick
12. Oil sump drain plug
13. Oil pump suction intake
14. Relief valve
15. Oil pump
16. Duct for oil pump drive gears

ENGINE LUBRICATION DIAGRAM

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OIL PUMP

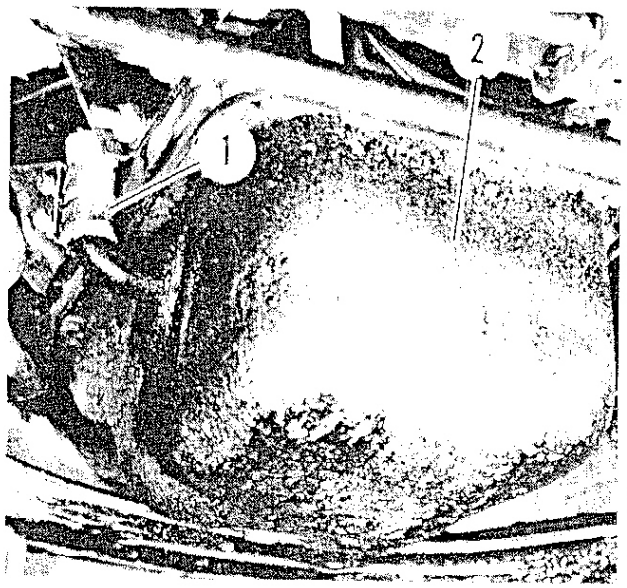
REMOVAL AND INSTALLATION (Engine in Vehicle)

Drain engine oil.

Remove front protection shield.

Remove flywheel protection cover.

On turbocharged engines, loosen clamps on return hose (1) and push hose up to clear drain fitting.



1. Turbocharger oil return hose 2. Oil sump

NOTE: Engine must be raised and crossmember under engine must be lowered for clearance when removing oil sump.

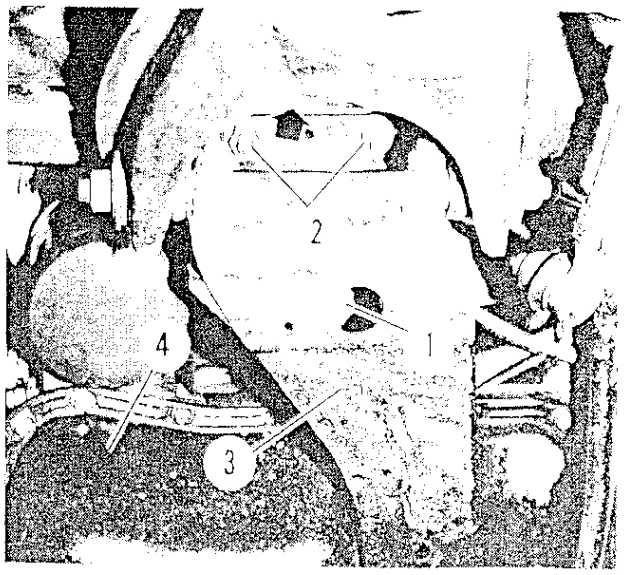
Remove engine mount nut (1) thru hole in crossmember (3).

Remove upper crossmember bolt (arrow). Back-off on two crossmember nuts (2) until about two threads are left showing at bottom of stud. Repeat for other side.

Move crossmember down.

Place jack under transmission and raise engine until clearance is obtained for sump removal.

Remove bolts securing sump to engine. Remove sump (4) and gasket.

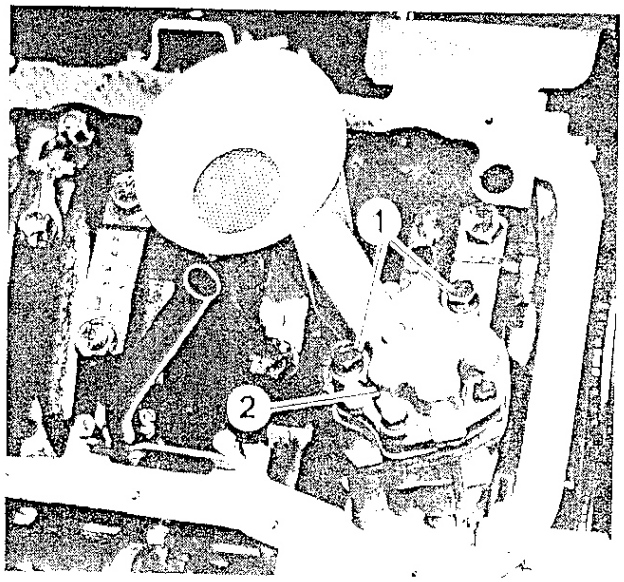


1. Bolt 2. Nut 3. Crossmember 4. Oil sump

Remove two bolts (1) and washers holding oil pump (2). Remove pump and gasket.

Installation is reverse of removal.

Make sure pump is seated before tightening bolts. Torque bolts to 14 ft. lbs. (2 kgm).



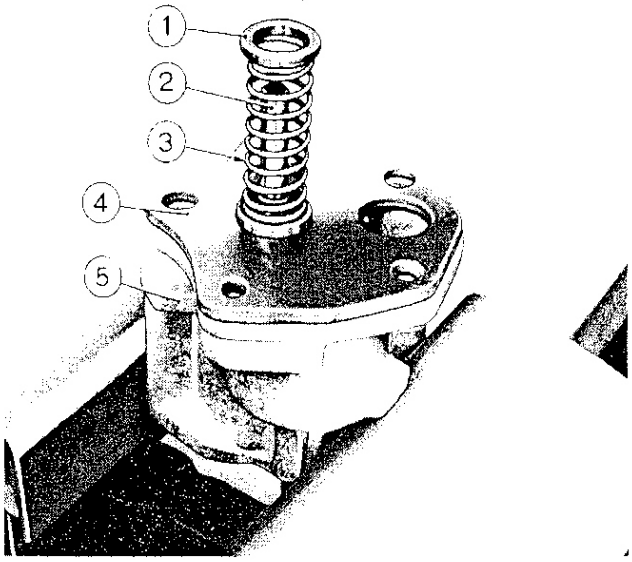
1. Bolt 2. Oil pump

INSPECTION

Clean all parts. Blow parts dry with compressed air.

Check housing (5) and cover (4) for cracks. Check suction pipe and oil duct for clogging. Blow clear with compressed air. Make sure dirt and residues are removed between relief valve (2) and housing (3).

Check relief valve spring for cracks and loss of elasticity. Check spring load.

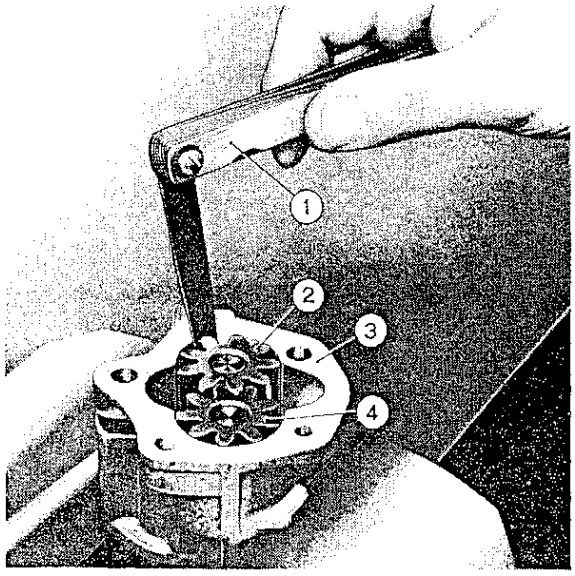


1. Washer 2. Relief valve 3. Spring 4. Cover 5. Housing

Check gears for wear.

Check gears for tooth to housing clearance. Clearance should be 0.0043 to 0.0070 inch (0.110 to 0.180 mm).

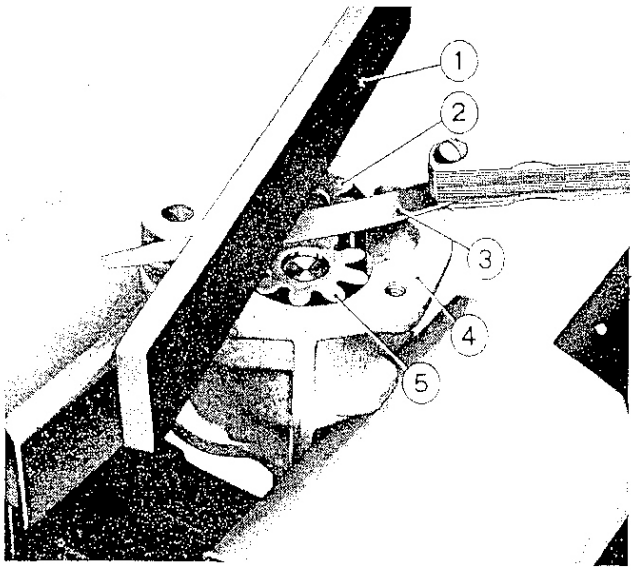
If clearance fails to meet specifications, replace gears and housing, if necessary.



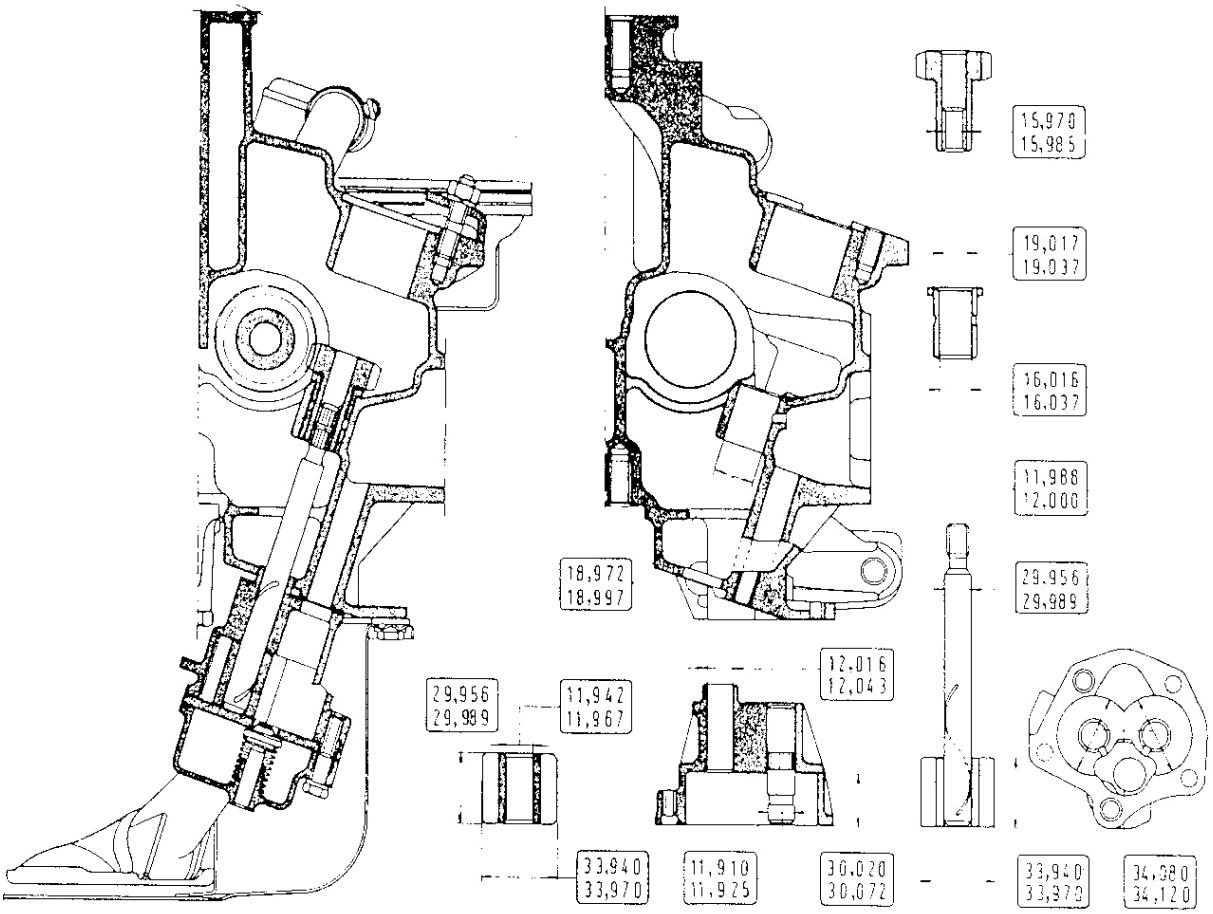
1. Feeler gauge 2. Drive gear 3. Housing 4. Driven gear

Check clearance between gears and cover mating face. Clearance should be 0.0010 to 0.0051 in. (0.026 to 0.131 mm). Use a straight edge and a feeler gauge.

If clearance fails to meet specifications, replace gears or housing.



1. Straight edge 2. Drive gear 3. Feeler gauge 4. Housing
5. Driven gear



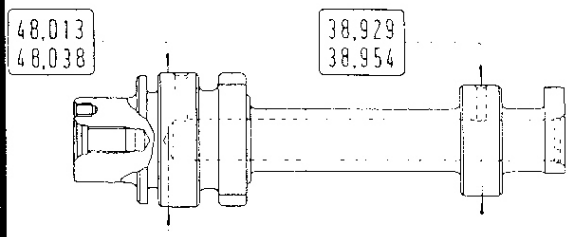
29.956 mm = 1.1793 in
29.989 mm = 1.1806 in
18.972 mm = .7469 in
18.997 mm = .7479 in
11.942 mm = .4701 in
11.967 mm = .4711 in

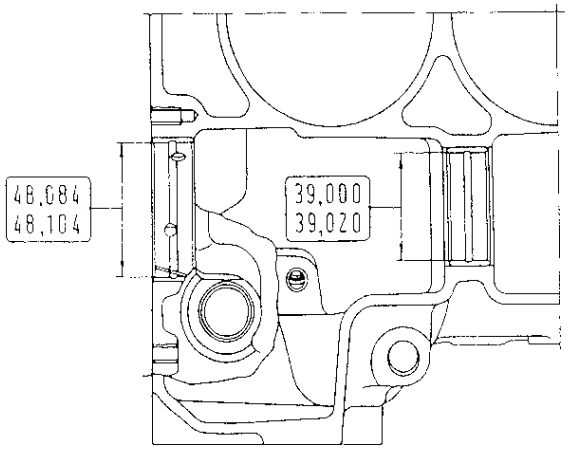
33.940 mm = 1.3362 in
33.970 mm = 1.3374 in
11.918 mm = .4692 in
11.925 mm = .4695 in
12.016 mm = .4730 in
12.043 mm = .4741 in

30.020 mm = 1.1819 in
30.072 mm = 1.1839 in
15.970 mm = .6287 in
15.985 mm = .6293 in
19.017 mm = .7487 in
19.037 mm = .7495 in

16.016 mm = .6305 in
16.037 mm = .6314 in
11.988 mm = .4719 in
12.000 mm = .4724 in
34.080 mm = 1.3418 in
34.120 mm = 1.3433 in

CROSS SECTION THRU OIL PUMP AND MAIN DATA OF OIL PUMP AND DRIVE COMPONENTS





MAIN DATA OF AUXILIARY SHAFT AND BUSHINGS

REMOVAL AND INSTALLATION

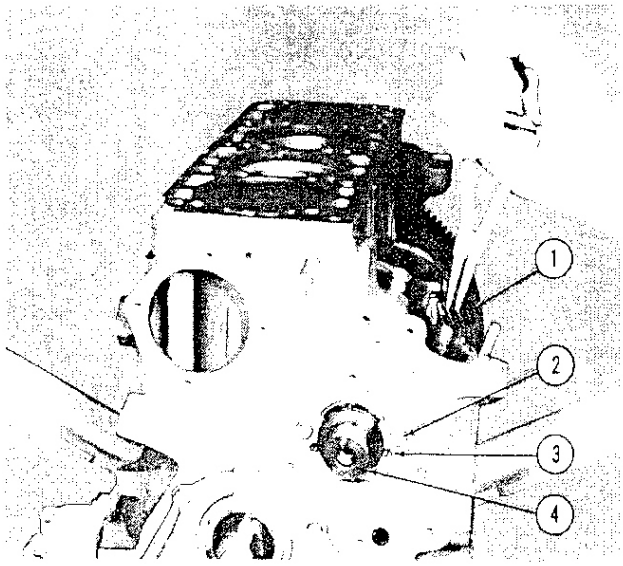
Remove nut, washer, and clamp holding spacer for oil pump in crankcase. Turn auxiliary shaft to raise oil pump gear. Using thin pliers, remove gear. Remove two bolts and washers holding retainer for auxiliary shaft.

Pull shaft out of crankcase.

Inspect shaft journals for scuffing or scoring. If shaft cannot be dressed, replace it.

Fit clearance between journals and bushings should be 0.0018 to 0.0036 in. (0.046 to 0.091 mm).

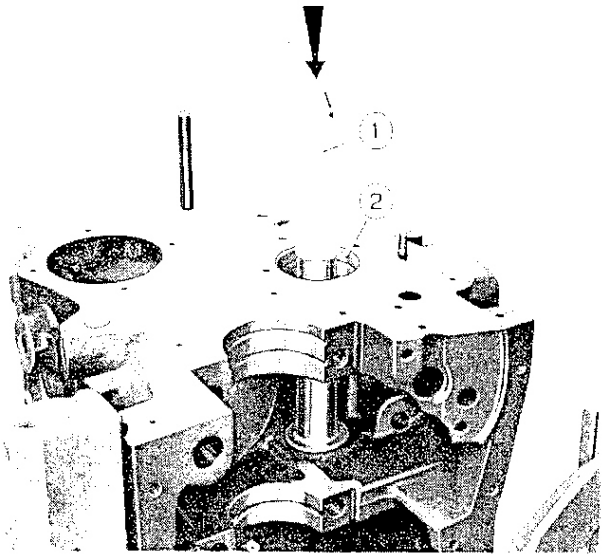
1. Gear 2. Bolts 3. Retainer 4. Auxiliary shaft



REPLACING AND REAMING AUXILIARY SHAFT BUSHINGS

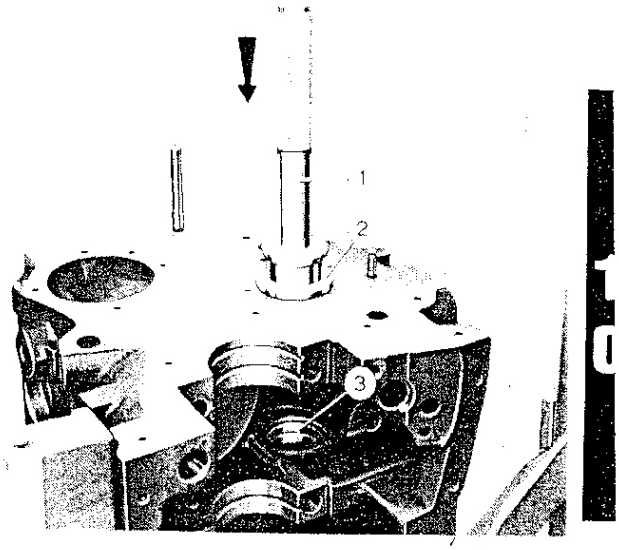
Press out front and rear bushings. Use tool A.60321/1 for rear bushing and tool A.60321/1/2 for front bushing.

1. Remover and installer 2. Front bushing



When installing new bushings, make sure oil holes in bushing are in line with oil holes in crankcase.

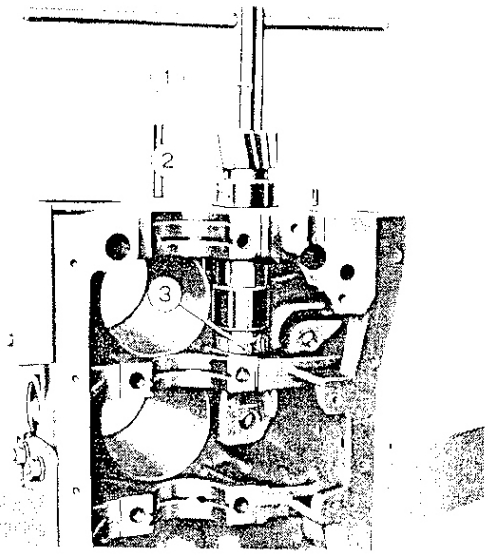
1. Remover and installer 2. Adapter 3. Rear bushing



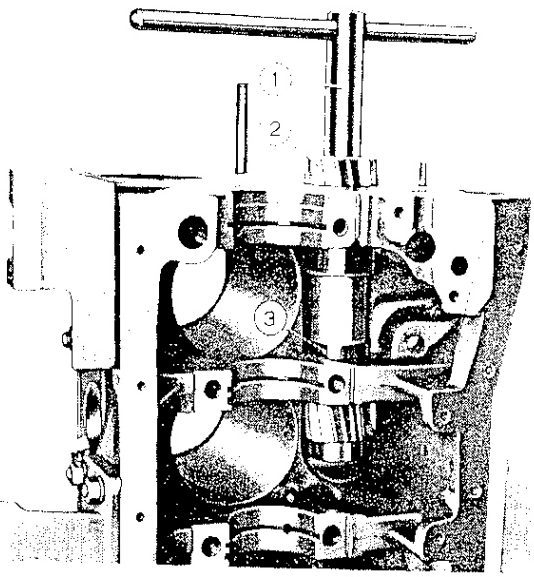
After press fitting bushings, ream bushings to finish size. Refer to Specifications.

Use care to make sure bushings are reamed with correct alignment and squareness of shaft axes.

1. Tool 2. Pilot on front bushing 3. Reamer on rear bushing



1. Tool 2. Reamer on front bushing 3. Pilot on rear bushing



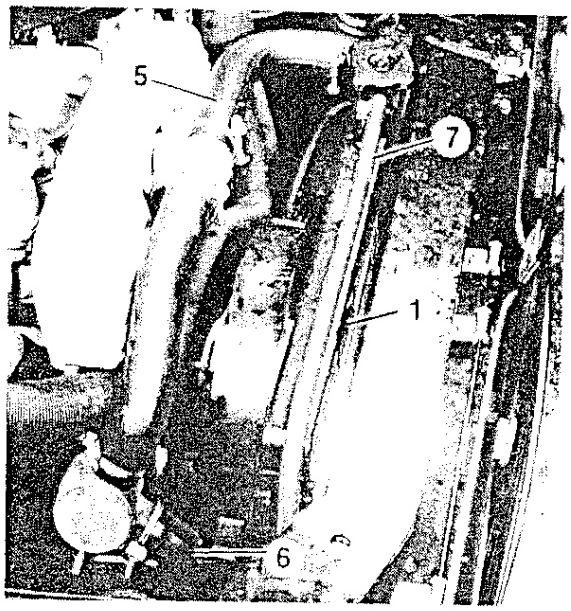
RADIATOR

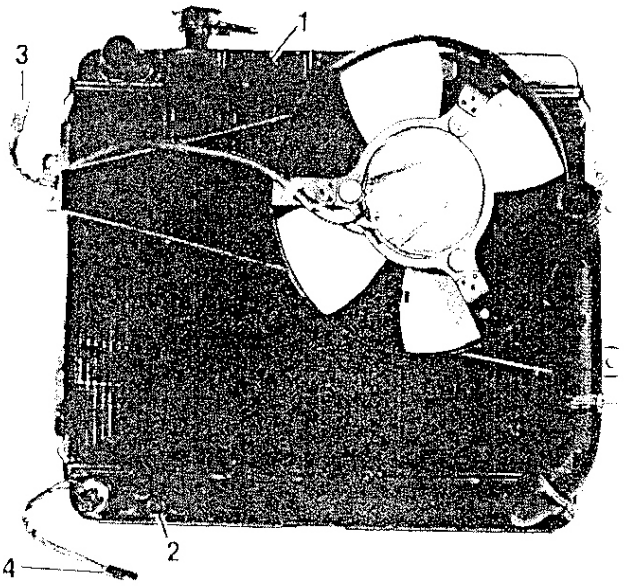
REMOVAL AND INSTALLATION

From underneath vehicle, remove splash shield. Drain radiator (1) thru plug (2) on lower left side. Disconnect radiator fan connector (3). Disconnect fan thermo switch connector (4). Loosen clamps and disconnect upper (5) and lower (6) radiator hoses. Loosen clamp and disconnect radiator overflow hose (7). On vehicles with automatic transmission disconnect two oil cooling lines at radiator. Remove two nuts, one on each side (arrows), securing radiator to body. Carefully lift radiator/fan assembly out.

NOTE: On vehicles with turbocharger and A.C. the fan assembly has been repositioned on the radiator by using spacers. Also the fan shroud has been trimmed to clear radiator. When installing a new radiator be sure to use the spacers to position the fan properly.

1. Radiator 2. Drain plug 3. Connector 4. Connector 5. Upper hose 6. Lower hose 7. Overflow hose





TESTING

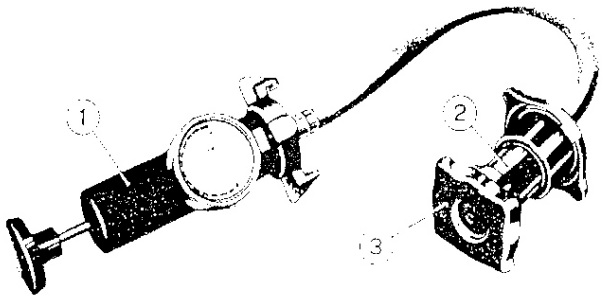
Fill radiator with water.

Attach tester to radiator filler.

Pump in air until pressure of 14 psi is built up. If pressure decreases check for leaks.

Test radiator cap (3) by applying pressure with tester (1) as shown. Check that vent valve opens at 11 psi.

1. Tester 2. Union 3. Radiator cap



BLEEDING COOLING SYSTEM

NOTE: Whenever cooling system has been drained and refilled, the system must be bled. Since the radiator height is lower than the engine, an air pocket will form in the engine cooling jacket.

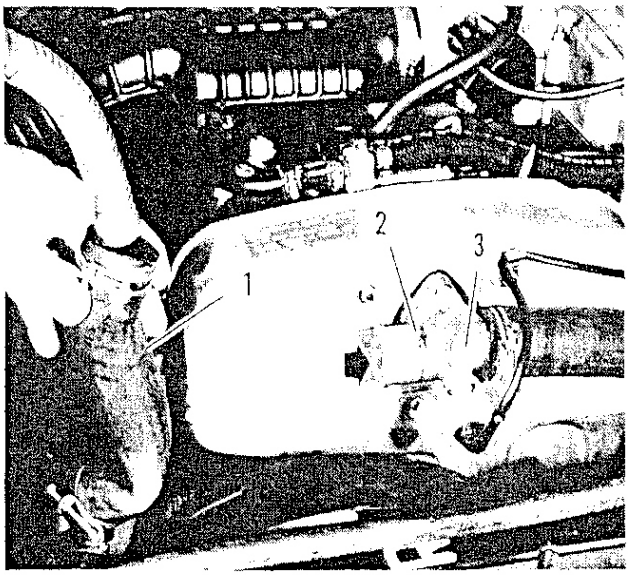
Open heater valve. Fill radiator and install radiator cap.

Disconnect water hose (1) from engine "T" housing (2).

Slowly pour coolant into hose (1) until it starts to flow out of housing (arrow). Reconnect hose to housing.

Remove bleed plug (3). Pour coolant into housing (2) until it overflows. Install bleed plug.

Fill expansion tank to "MAX" level and install cap.

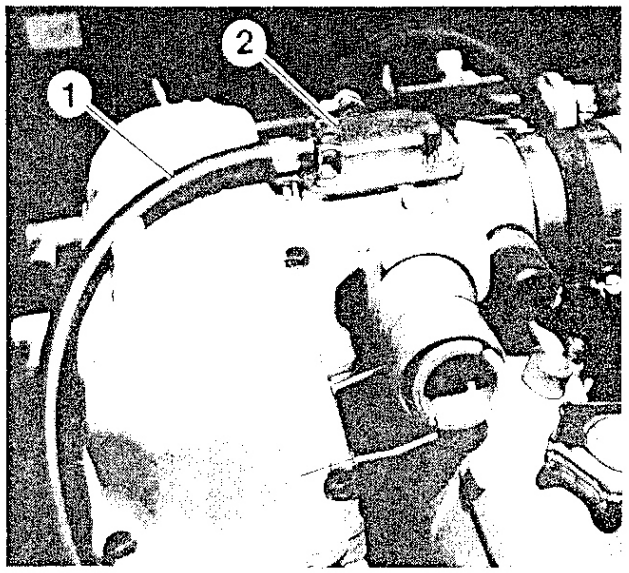


1. Water hose 2. Engine "T" housing 3. Bleed plug

Disconnect hose (1) from throttle plate heater (2). Pour coolant into hose until heater overflows. Reconnect hose.

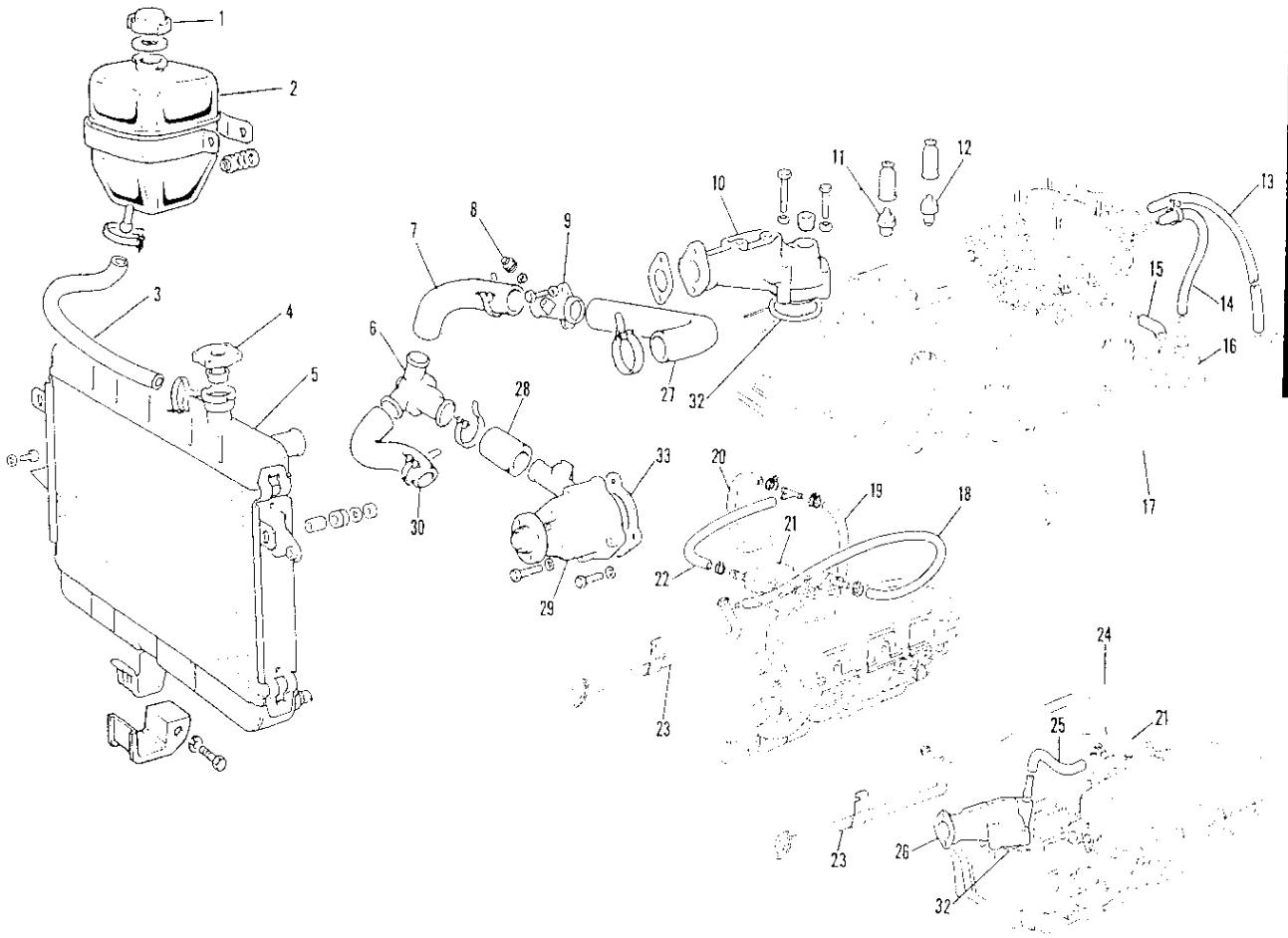
Start and run engine in neutral. If system is completely bled, temperature gauge will rise slowly to operating temperature and radiator will heat up. After passing operating temperature fan will operate. Allow this to occur for at least two fan operating cycles.

NOTE: If system is not completely bled, gauge will rise rapidly, radiator will be cool, and fan will not operate even though temperature is above normal. If this occurs, shut engine off and bleed system again.



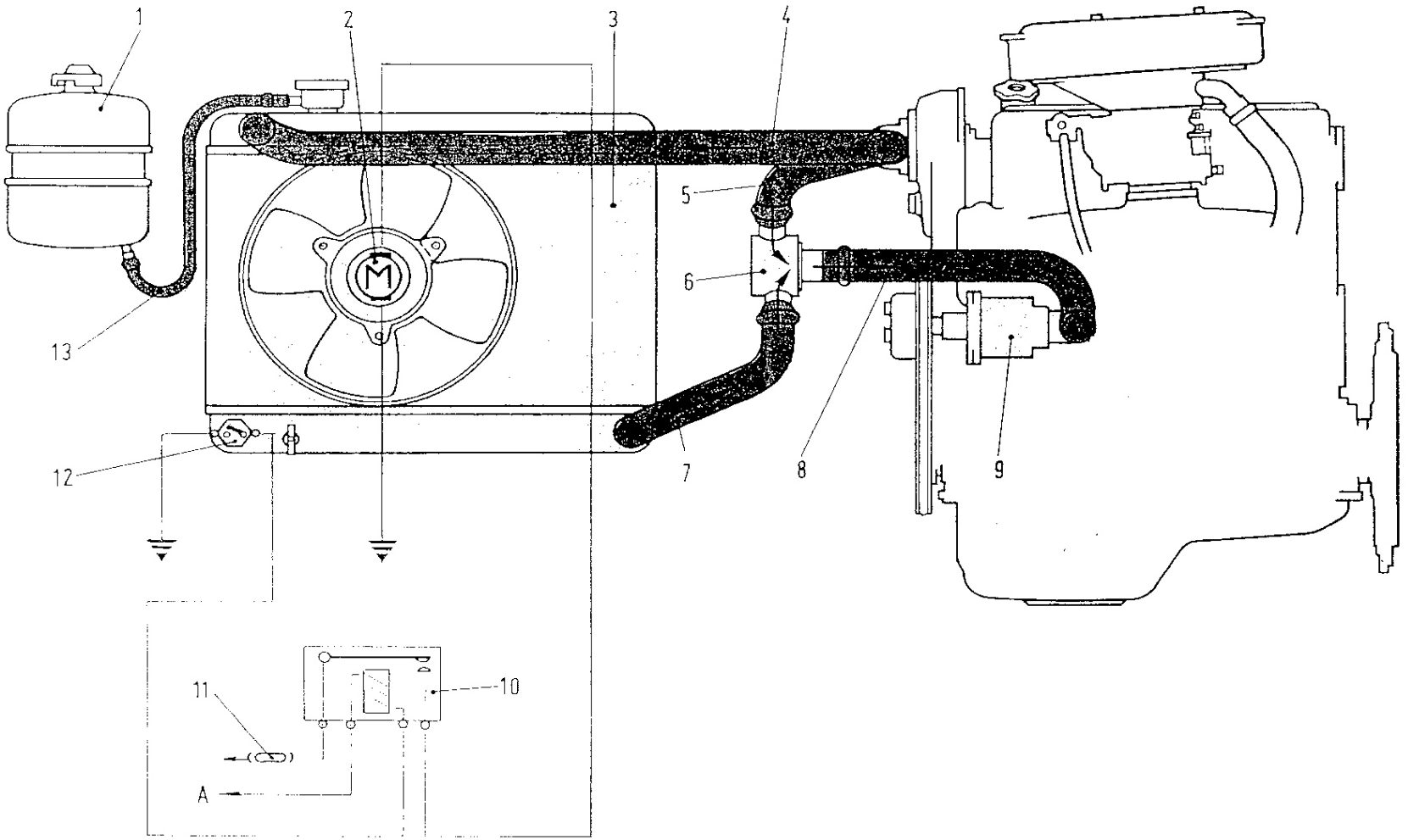
1. Hose 2. Throttle plate heater

WATER PUMP AND DUCTS



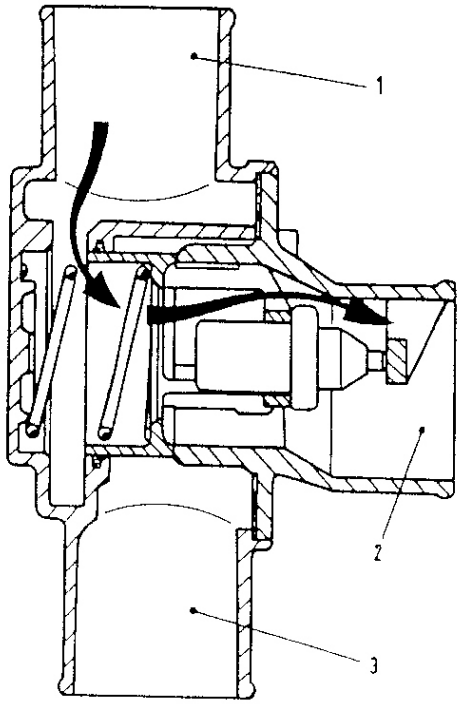
1. Expansion tank cap
2. Expansion tank
3. Overflow hose
4. Radiator cap
5. Radiator
6. Controlled by-pass thermostat
7. Water hose, cylinder head outlet to thermostat
8. Bleed plug
9. Union
10. Water outlet from cylinder head (carburetor version)
11. Temperature sending unit
12. Temperature sending unit
13. Water hose, automatic choke to heater return line
14. Water hose, automatic choke to thermovalve housing
15. Water hose, engine to thermovalve housing
16. Thermovalve housing
17. Heater return line
18. Water hose, throttle plate heater to heater return line
19. Water hose, heater supply line
20. Water hose, heater supply line
21. Throttle plate heater
22. Water hose, throttle plate heater to heater supply line
23. Heater return line
24. Water hose, throttle plate heater to heater return line
25. Water hose, engine to throttle plate heater
26. Water outlet from cylinder head (fuel injection version)
27. Water hose, union to radiator
28. Water hose, water pump to thermostat
29. Water pump
30. Water hose, thermostat to radiator
31. Cooling fan thermoswitch
32. Gasket
33. Gasket

ENGINE COOLING SYSTEM COMPONENTS

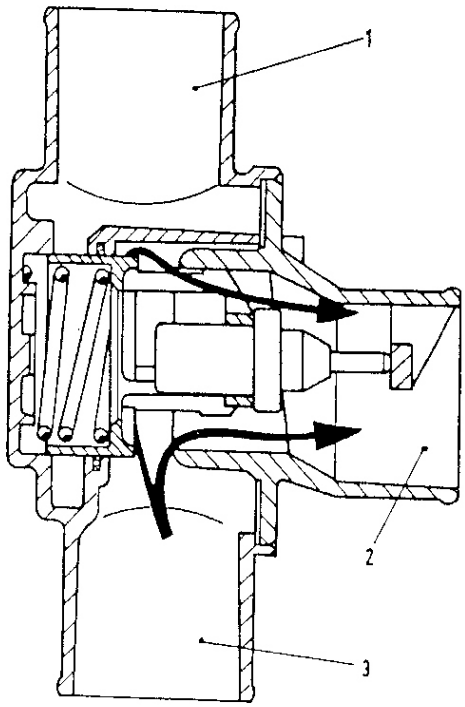


1. Expansion tank
2. Electrofan motor
3. Radiator
4. Water hose from engine to radiator
5. Water hose from engine to thermostat
6. Controlled-by-pass thermostat
7. Water hose from radiator to thermostat
8. Water hose from thermostat to water pump
9. Water pump
10. Electrofan motor relay
11. Fuse
12. Electrofan motor thermal switch
13. Radiator to expansion tank hose

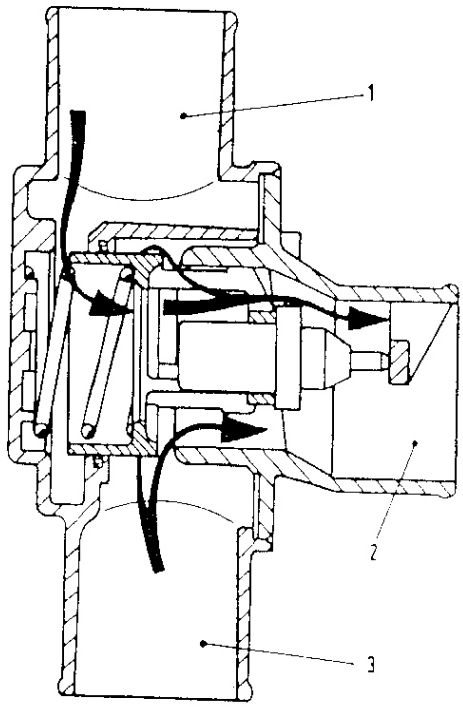
COOLING SYSTEM OPERATIONAL DIAGRAM



CLOSED



FULLY OPEN



PART OPEN

Operational diagrams of controlled-by-pass thermostat for mixing coolant.

1. Thermostat water inlet from engine.
2. Thermostat water outlet to pump.
3. Thermostat water inlet from radiator.

The thermostat must be working properly for good engine performance.

Thermostat should begin opening at 172° to 180°F (78° to 82°C).

Thermostat should be fully open at 198°F (92°C).

Thermostat valve stroke at 198°F (92°C) is 0.29 in. (7.5 mm).

CONTROLLED-BY-PASS THERMOSTAT FOR MIXING COOLANT

WATER PUMP

REMOVAL AND INSTALLATION

Drain cooling system thru radiator and engine block plug. Plug is located on right side of engine.

Loosen two bolts securing alternator (1). Remove drive belt (2).

Remove three water pump pulley bolts (3) to remove pulley.

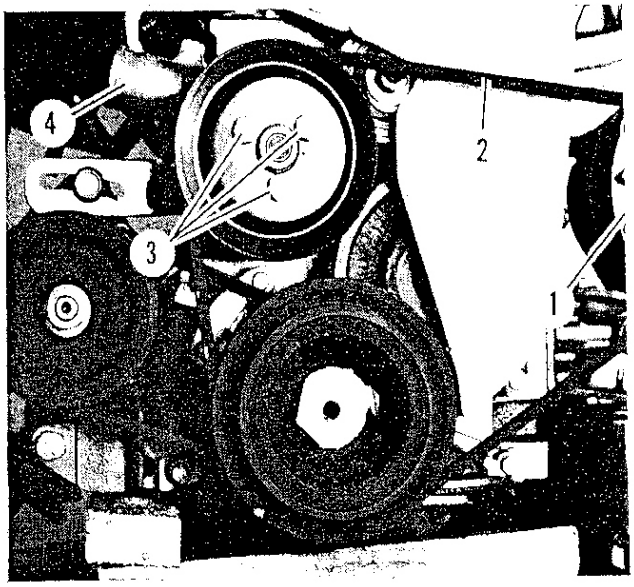
Loosen clamp and remove hose from water pump inlet (4). Remove four bolts to remove pump and gasket.

Remove two nuts and washers securing heater return tube to rear of water pump.

Install in reverse order. Torque water pump bolts to 14 ft. lbs. (2 kgm).

Adjust belt tension.

Refill and bleed cooling system (refer to Radiator section for bleeding procedure).

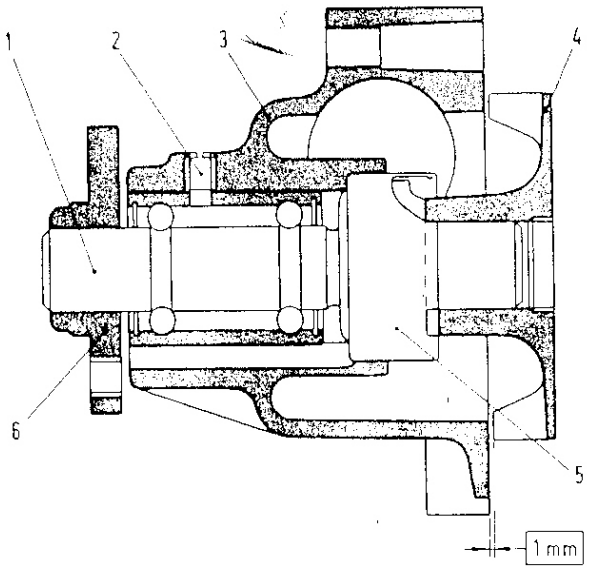


1. Alternator 2. Drive belt 3. Pulley 4. Pump inlet

Longitudinal Section of Water Pump

1. Drive shaft and bearing
2. Bearing lock screw on pump housing
3. Pump housing
4. Impeller
5. Packing
6. Pump drive shaft hub

1 mm = 0.04 in. – fit clearance between impeller and pump housing.



CYLINDER HEAD WATER OUTLET HOUSING

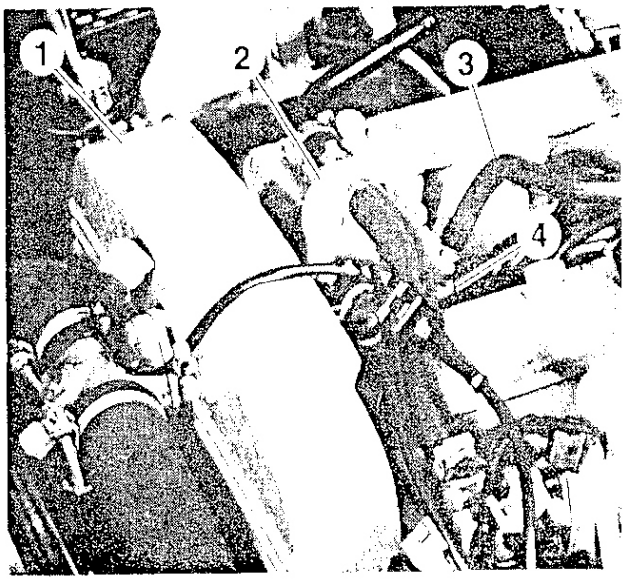
REMOVAL AND INSTALLATION

Drain cooling system through engine block plug until level is below top of radiator.

On fuel injected vehicles, remove auxiliary air regulator (2) from housing (4).

Remove clamp holding throttle plate heater hose (3) (if installed), and disconnect hose from housing.

Remove timing belt cover (1). Refer to REPLACING TIMING BELT.



1. Timing belt cover 2. Auxiliary air regulator 3. Heater hose
4. Water outlet housing

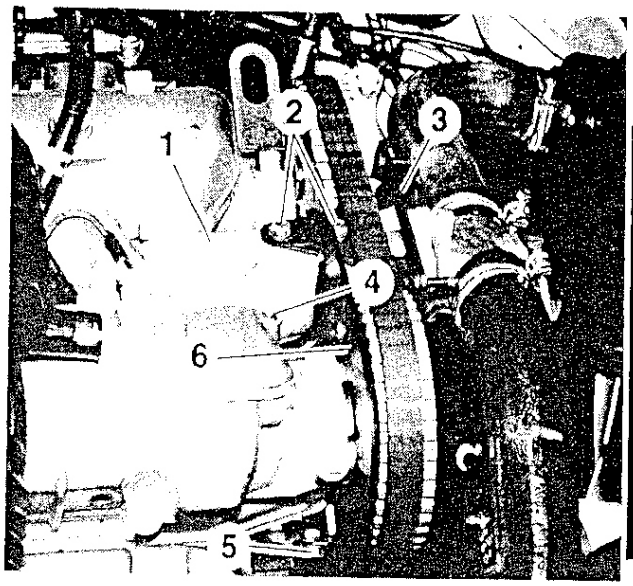
Remove bolt ( ) and washer holding timing belt rear shield ( ) on right side of engine.

Remove two bolts ( ) and washers holding cam timing bracket ( ) and rear shield ( ) to housing ( ).

Remove four bolts ( ) and washers holding housing ( ) to cylinder head. Remove housing and gasket.

Install in reverse order. Use new gaskets.

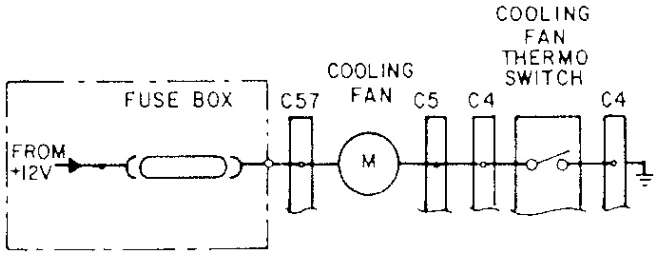
Refill and bleed cooling system. Refer to RADIATOR section.

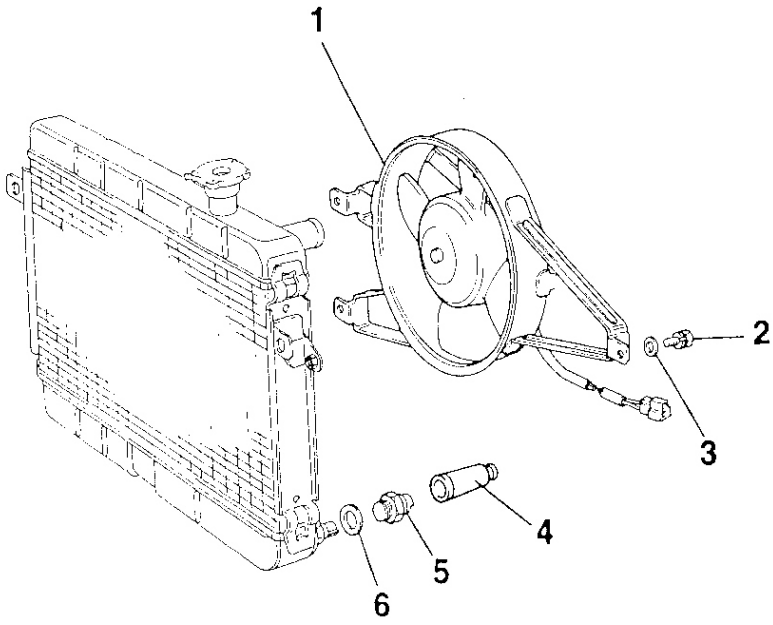


ELECTRIC FAN OPERATION

When water temperature is 194°F (90°C) or above, the thermostatic switch closes and electric fan operates. The fan continues to run until the temperature drops below 185°F (85°C).

CAUTION: Cooling fan can operate with ignition switch in "OFF".





1. Fan motor and support
2. Bolt and lockwasher
3. Washer
4. Boot
5. Thermostatic switch
6. Gasket

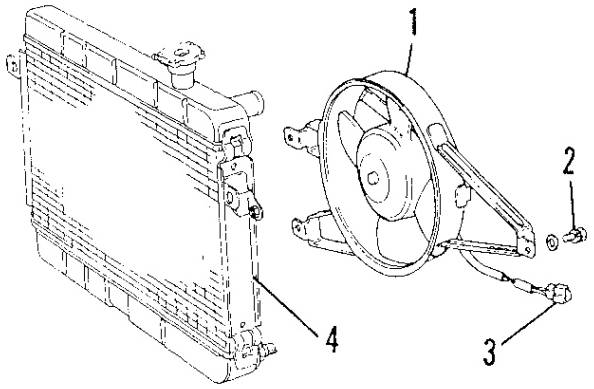
EXPLODED VIEW OF FAN

FAN ASSEMBLY

REMOVAL AND INSTALLATION

Disconnect electrical connector (3) located near lower left side of radiator ( ).

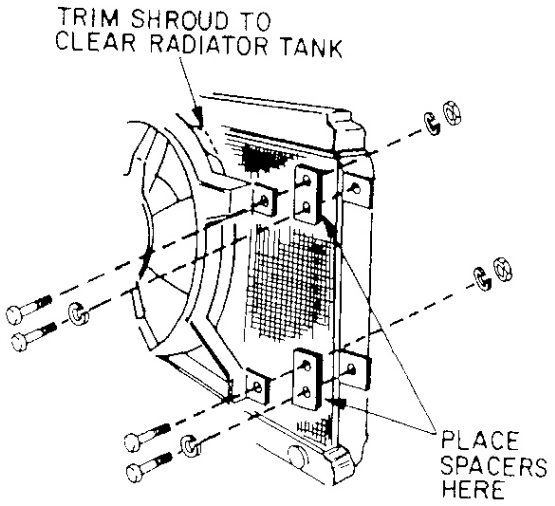
Remove three bolts (2) and washers securing fan assembly (1) to radiator (4).



1. Fan assembly 2. Bolt and lockwasher 3. Electrical connector
4. Radiator

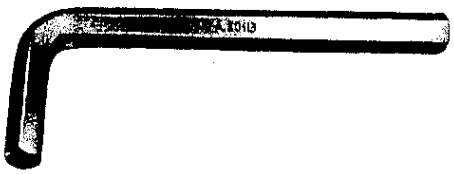
NOTE: On vehicles with turbocharger and A.C., fan assembly is attached to two spacers on right side of radiator.

When installing a new fan assembly on a vehicle with turbocharger and A.C., trim shroud to clear top of radiator as shown.

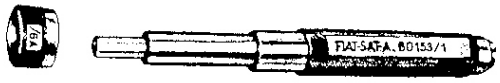


NOTE: Number given in parentheses is Kent-Moore catalogue number.

A.50113 (J28152) Wrench, oil sump drain plug

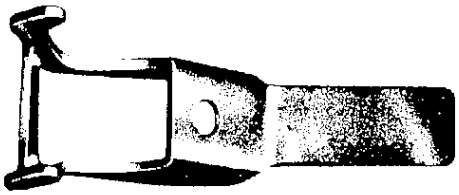


A.60395 (J28078) Remover and installer, valve guide



A.60313/1/2 (J28069) Installer, valve guide oil seal

A.60594 (J28229) Tool, holding tappets while removing plates and timing levers

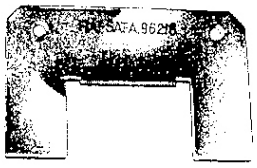


A.60443 (J28080) Lever, pressing down tappets while timing valves

A.60446 (J28081) Tool, holding camshaft sprocket while tightening bolt

A.87001 (J28151) Remove tappet plates

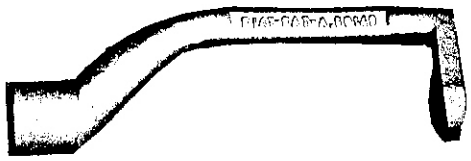
A.96218 (J28203) Gauge, valve stem height check after seat reconditioning



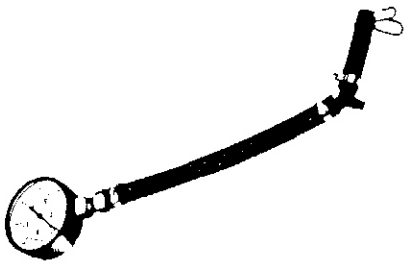
A.96229 (J28256) Depth gauge, combustion chamber

10

A.50149 (J28036) Wrench, cylinder head bolt (17mm)

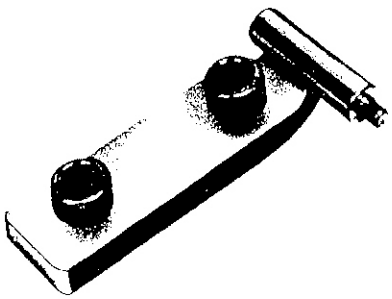


A.95874 (J29821) Fuel pressure gauge (fuel injected engines)



A.33076 (J33076) Turbocharger pressure switches test pump

A.60645 (J28291) Intake cam sprocket holder (1978 and 1980 carburetored engines)



A.4467 (J29820) Exhaust gas analyzer adapter (fuel injected engines)