

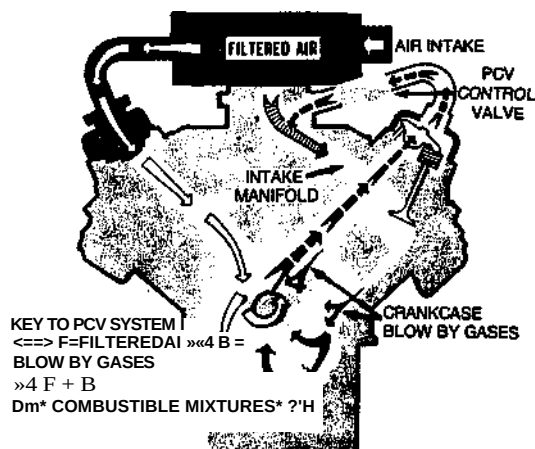
Emission Controls and Fuel System



EMISSION CONTROLS

Positive Crankcase Ventilation (PCV)

In this system, crankcase vapors are drawn into the intake manifold to be burned in the combustion chambers; instead of merely venting the crankcase vapors into the atmosphere. An added benefit to engines equipped with this system is that the engine oil will tend to stay cleaner for a longer period of time; therefore, if you notice the oil in your engine becomes dirty very easily, check the functioning of the PCV valve. The valve should rattle when shaken, indicating that sludge has not stopped operation of the valve, and the PCV line to the carburetor or the intake manifold must be clear. Engines which use a PCV system are calibrated to run richer, to compensate for the added air which accompanies the crankcase vapors to the combustion chambers. If the PCV valve or line is clogged,



Schematic of the PCV system

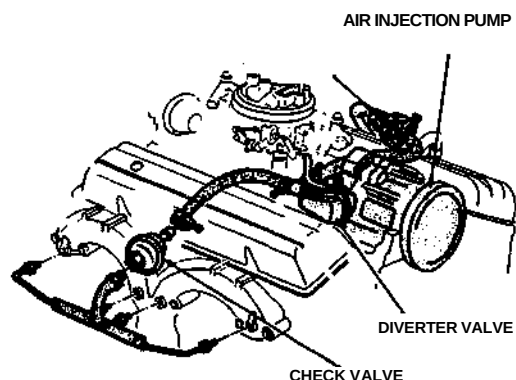
the engine idle will tend to be rough due to the excessively rich mixture. Maintenance is covered in Chapter 1.

Air Injection Reactor (AIR)

Two different systems of air injection have been used on the Corvette. The system used up to and including 1980 (except 1980 Calif.) consists basically of the following components:

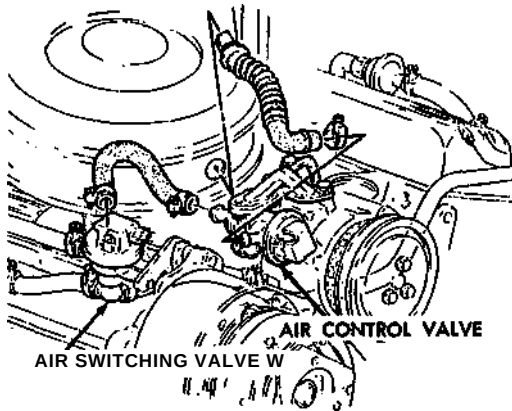
a. Air injection pump—Draws fresh, outside air into the pump, pressurizes the air, then delivers the air to the remaining system components.

b. Diverter valve (sometimes called an anti-backfire valve)—Receives pressurized air from the air injection pump. The diverter valve is controlled by manifold vacuum. During deceleration, manifold vacuum increases sharply. This vacuum increase causes the diverter valve to divert the air from the air injection pump to the atmosphere, thereby preventing backfiring through the exhaust system. If vacuum is evident at the diverter



Typical 350 cu in. engine A.I.R. system components

CHECK VALVE



Typical 1980 and later AIR system control and switching valves

valve vacuum hose at idle yet the engine still backfires only during deceleration, replace the valve. Replacement is a simple matter of disconnecting the vacuum line from the valve and unbolting the valve from the injection pump.

c. Check valves — These valves (one per side of the engine) prevent the entrance of hot exhaust gasses into the AIR system. If AIR pump and hose life is short due to overheating, one or both of the check valves is probably defective. To check or replace the valve, disconnect the hose from the valve and unscrew the valve from the injection manifold assembly. Blow into each side of the valve: air should pass only in one direction; if air passes through the valve in both directions, replace the valve. Check each valve in the same manner.

d. Air injection manifold — The manifold directs the injected air to each of the cylinders. To replace the injection manifold, remove the check valve from the injection manifold and unbolt the injection manifold from the exhaust manifold.

e. Air injection nozzles — The injection nozzles are located behind each tube of the injection manifold. The purpose of the nozzles is to pinpoint the air injection to the exhaust valves which maximizes the effect of the air injection. The nozzles can be simply withdrawn from the exhaust manifold after the injection manifold has been removed. In addition to the aforementioned items, various hoses, clamps, and tubes are used.

The AIR system used on 1980 California and 1981-84 engines serves the same function as the previous system, but is slightly different in construction and operation. Instead of using a diverter valve, this system

uses both an air control valve and an air switching valve. Both the control and switching valves are controlled by the Electronic Control Module (ECM) of the computer controlled emissions system. When the engine is cold, the ECM energizes an air control solenoid, which allows air to flow to the air switching valve. The air switching valve is then energized which directs the air injection to the exhaust manifolds. When the engine warms, the ECM de-energizes the air switching valve, which changes the point of air injection from the exhaust manifolds to the catalytic converter. The extra air at the converter permits the converter to more effectively decrease exhaust emission levels. During deceleration and wide open throttle operation, air is directed to the air cleaner.

Operation of the air pump, check valves, and manifolds remains the same as the 1979 and earlier system.

REMOVAL AND INSTALLATION

Air Pump

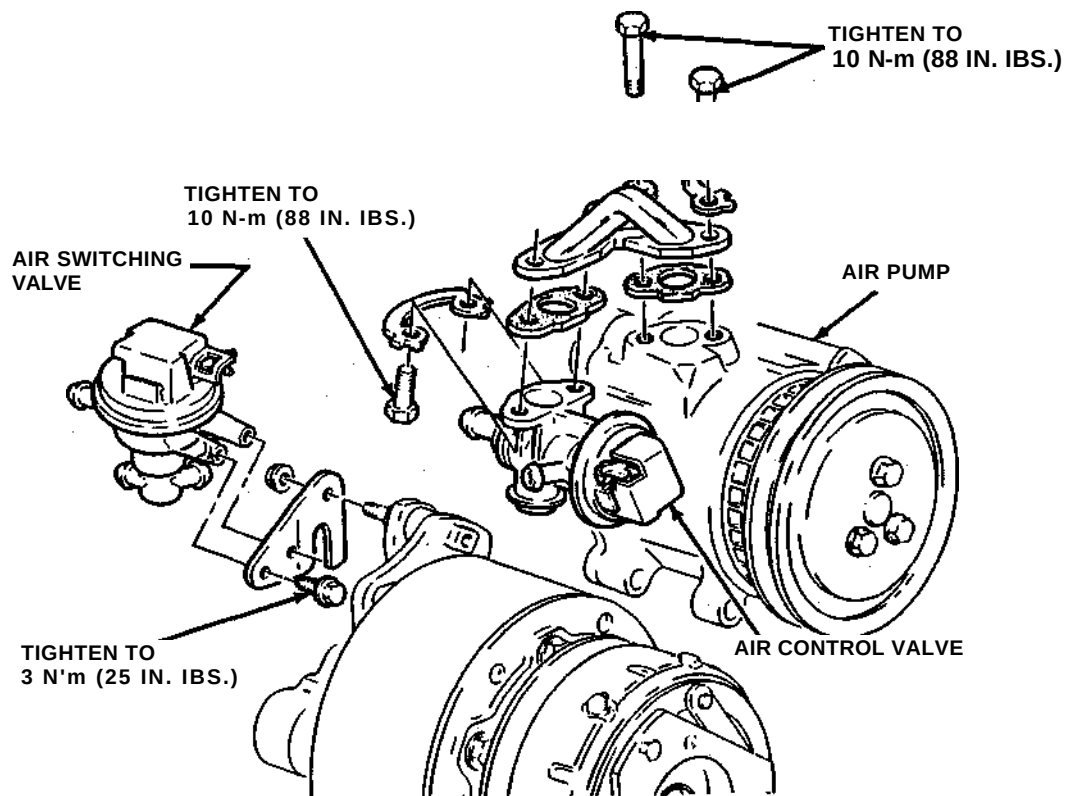
1. Remove the valves and/or adapter at the air pump.
2. Loosen the air pump adjustment bolt and remove the drive belt.
3. Unscrew the three mounting bolts and then remove the pump pulley.
4. Unscrew the pump mounting bolts and then remove the pump.
5. Installation is in the reverse order of removal. Be sure to adjust the drive belt tension after installing it.

Air Control Valve (1980 Calif, and 1981-82)

1. Disconnect the negative battery cable.
2. Tag and disconnect the vacuum hose(s) from the valve.
3. Tag and disconnect the air outlet hoses from the valve.
4. Bend back the lock tabs and then remove the bolts holding the elbow to the valve.
5. Tag and disconnect any electrical connections at the valve and then remove the valve from the elbow.
6. Installation is in the reverse order of removal.

Air Switching Valve (1980 Calif, and 1981-84)

The switching valve is replaced in basically the same manner as the control valve, except



Mounting of the AIR control and switching valves

that it is mounted to a bracket on the A/C compressor.

Thermostatic Air Cleaner (THERMAC or TAC)

NOTE: *High performance engines equipped with open-element air cleaners do not employ this system.*

This system is designed to improve driveability and exhaust emissions when the engine is cold. Components added to the basic air cleaner assembly include a temperature sensor (connected to a manifold vacuum source), vacuum diaphragm motor (connected to the temperature sensor), and an inlet damper door (installed in the air cleaner inlet snorkel). Additional components of the system include an exhaust manifold-mounted heat stove and a hot air duct running from the heat stove to the underside of the air cleaner snorkel.

When the engine is cold, the temperature sensor allows vacuum to pass through to the vacuum diaphragm motor. The vacuum acting on the vacuum motor causes the motor to close the damper door, which prohibits the

introduction of cold, outside air to the air cleaner. The intake vacuum then pulls hot air, generated by the exhaust manifold, through the hot air duct and into the air cleaner. This heated air supply helps to more effectively vaporize the fuel mixture entering the engine. As the engine warms, the temperature sensor bleeds off vacuum to the vacuum motor, allowing the damper door to gradually open.

The usual problems with this system are leaking vacuum lines (which prevent proper operation of the sensor and/or motor); torn or rusted-through hot air ducts and/or rusted-through heat stoves (either condition will allow the introduction of too much cold air to the air cleaner). Visually check and replace these items as necessary. Should the system still fail to operate properly, disconnect the vacuum line from the vacuum motor and apply at least 7 in. Hg. of vacuum directly to the motor from an outside vacuum source; the damper door should close. If the door does not close, either the vacuum motor is defective or the damper door and/or linkage is binding. If the door closes, but then gradually opens (with a steady vacuum source), the vacuum motor is defective.

REMOVAL AND INSTALLATION**Vacuum Motor**

1. Remove the air cleaner.
2. Disconnect the vacuum hose from the motor.
3. Drill out the spot welds with a $\frac{1}{8}$ " hole, then enlarge as necessary to remove the retaining strap.
4. Remove the retaining strap.
5. Lift up the motor and cock it to one side to unhook the motor linkage at the control damper assembly.

Install the new vacuum motor as follows:

6. Drill a $\frac{7}{64}$ " hole in the snorkel tube at the center of the vacuum motor retaining strap.
7. Insert the vacuum motor linkage into the control damper assembly.
8. Use the motor retaining strap and a sheet metal screw to secure the retaining strap and motor to the snorkel tube.

NOTE: Make sure the screw does not interfere with the operation of the damper assembly. Shorten the screw if necessary.

Temperature Sensor

1. Remove the air cleaner.
2. Disconnect the hoses at the air cleaner.
3. Pry up the tabs on the sensor retaining clip and remove the clip and sensor from the air cleaner.
4. Installation is the reverse of removal.

Evaporative Emission Control (EEC)**1970-1981**

Introduced on California cars in 1970, and nationwide in 1971, this system reduces the amount of escaping gasoline vapors. Float bowl emissions are controlled by internal carburetor modifications. Redesigned bowl vents, reduced bowl capacity, heat shields, and improved intake manifold-to-carburetor insulation serve to reduce vapor loss into the atmosphere. The venting of fuel tank vapors into the air has been stopped. Fuel vapors are now directed through fines to a canister containing an activated charcoal filter. Unburned vapors are trapped here until the engine is started. When the engine is running, the canister is purged by air drawn in by manifold vacuum. The air and fuel vapors are then directed into the engine to be burned. This system is designed to reduce fuel vapor

emission. The canister filter should be replaced every 12 months or 12,000 miles on Models 1970-74, on Models 1975-81 the interval was extended to 24 months or 30,000 miles. To replace the filter, proceed as follows:

The filter is located in the bottom of the canister. Pull out the old filter and work the new filter into place. It may be necessary to remove the bottom of the canister for access.

1982-84

The EEC system for 1982 and later performs the same function as the earlier system, but uses a purge control solenoid which is installed in the vacuum line between the charcoal canister and the PCV valve (mounted on the driver's-side fender, under the hood). The ECM of the computerized emissions system controls the action of the purge control solenoid. Depending upon various conditions of operation, the ECM will either energize or de-energize the solenoid. When the solenoid is energized, vacuum is not available to draw fuel vapors from the canister; when de-energized, vacuum draws the canister vapors into the intake tract of the engine. The solenoid is mounted on the driver's-side fender, inside the engine compartment. Replacement of the solenoid is simply a matter of tagging/disconnecting the hoses and wiring from the solenoid, and unbolting the solenoid.

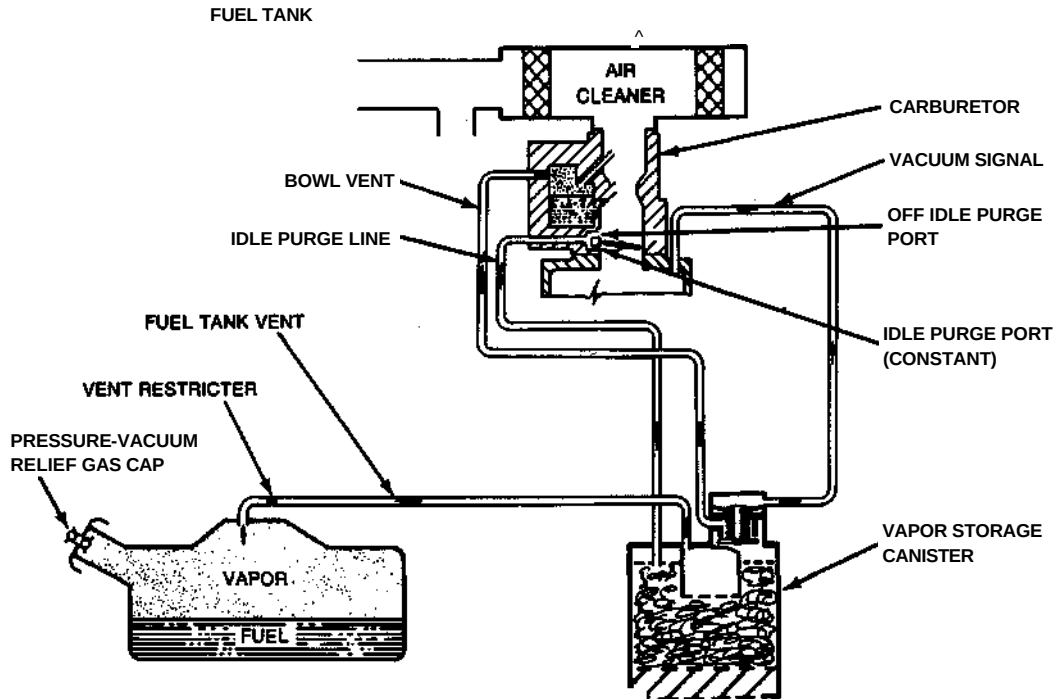
Anti-Dieseling Solenoid

Some 1968—76 models may have an idle speed solenoid on the carburetor. All 1972—74 models have idle solenoids. Due to the leaner carburetor settings required for emission control, the engine may have a tendency to "diesel" or "run-on" after the ignition is turned off. The carburetor solenoid, energized when the ignition is on, maintains the normal idle speed. When the ignition is turned off, the solenoid is de-energized and permits the throttle valves to fully close, thus preventing run-on.

The solenoid used on most 1977-81 models is NOT an anti-dieseling solenoid; on these models, the solenoid is used to increase the idle speed when the air conditioning compressor is engaged.

For adjustment of carburetors with idle solenoids see Carburetor Adjustments.

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PURGE AIR Schematic of the
evaporative emissions system (open)—1980; most models similar

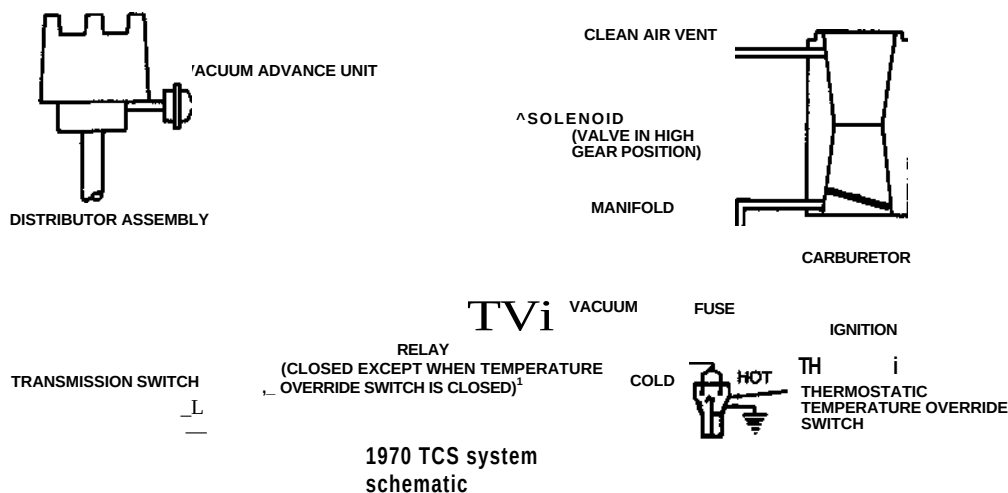
Transmission Controlled Spark (TCS)

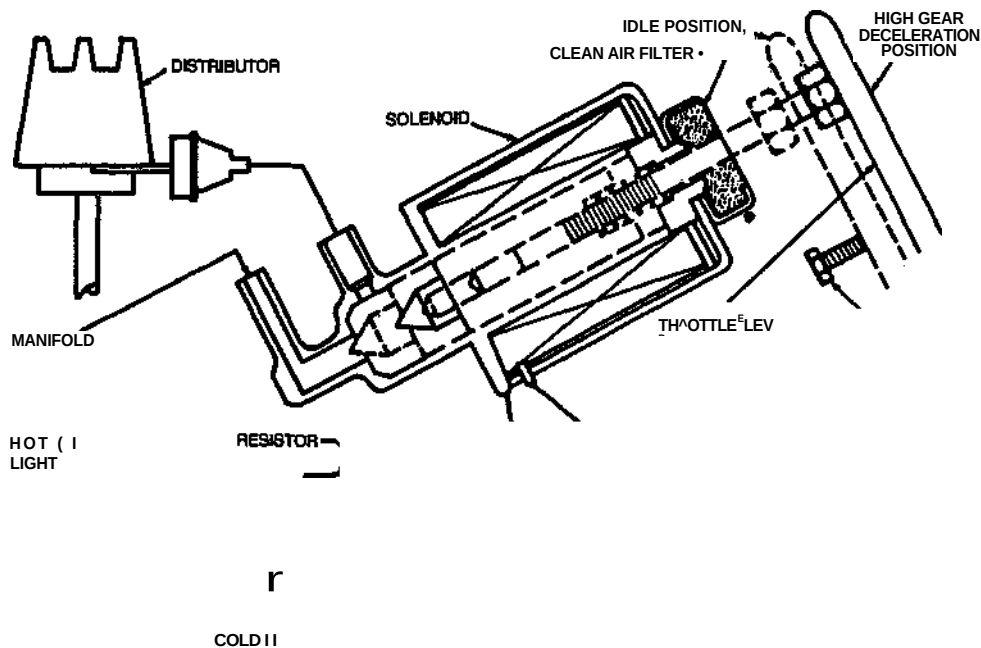
Introduced in 1970, this system controls exhaust emissions by eliminating vacuum advance in the lower forward gears.

1970

The 1970 system consists of a transmission switch, solenoid vacuum switch, time delay relay, and a thermostatic water temperature switch. The solenoid vacuum switch is energized in the lower gears via the transmission switch and closes off distributor vacuum. The

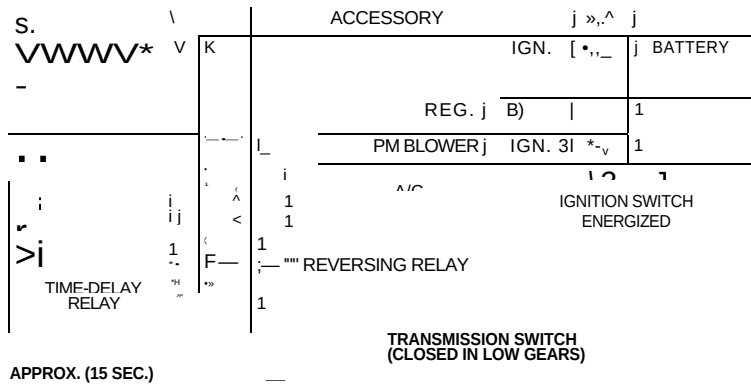
two-way transmission switch is activated by the shifter shaft on manual transmissions, and by oil pressure on automatic transmissions. The switch deenergizes the solenoid in high gear, the plunger extends and uncovers the vacuum port, and the distributor receives full vacuum. The temperature switch overrides the system when engine temperature is below 63° or above 232°. This allows vacuum advance in all gears. A time delay relay opens 15 seconds after the ignition is switched on. Full vacuum advance during this delay eliminates the possibility of stalling.





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WATER
TEMP.
SWITCH



1971 TCS system schematic

1971

The 1971 system is similar, except that the vacuum solenoid (now called a Combination Emissions Control solenoid) serves two functions. One function is to control distributor vacuum; the added function is to act as a deceleration throttle stop in high gear. This cuts down on emissions when the vehicle is coming to a stop in high gear. The CEC solenoid is controlled by a temperature switch, a transmission switch, and a 20 second time delay relay. This system also contain^ a reversing relay, which energizes the solenoid

when the transmission switch, temperature switch or time delay completes the CEC circuit to ground. This system is directly opposite the 1970 system in operation. The 1970 vacuum solenoid was normally open to allow vacuum advance and when energized, closed to block vacuum. The 1971 system is normally closed blocking vacuum advance and when energized, opens to allow vacuum advance. The temperature switch completes the CEC circuit to ground when engine temperature is below 82°. Corvettes also have a high temperature terminal on the switch to com-

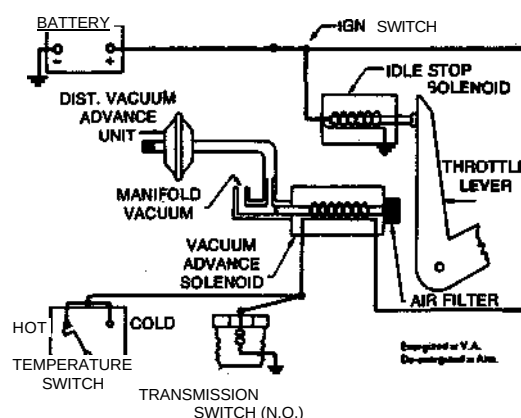
plete the CEC circuit when coolant temperature reaches 232°. The time delay relay allows vacuum advance (and raised idle speed) for 20 seconds after the ignition key is turned to the "on" position. Models with an automatic transmission and air conditioning also have a solid state timing device which engages the air conditioning compressor for three seconds after the ignition key is turned to the "off" position to prevent the engine from running-on. Two throttle settings are necessary; one for curb idle and one for emission control on coast. Both settings are described in the Tune-Up chapter.

1972-74

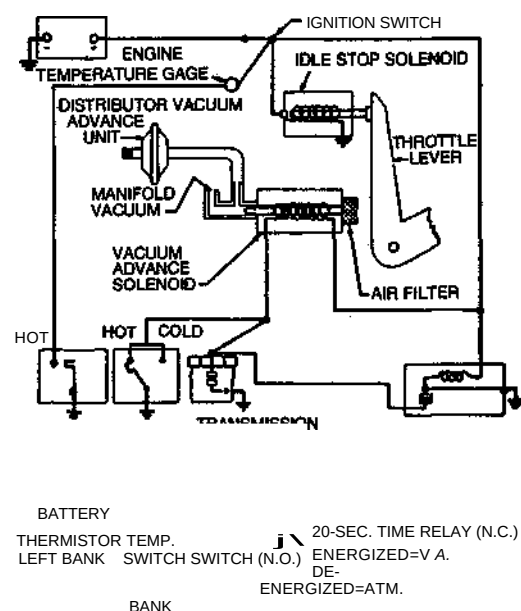
A vacuum advance solenoid similar to that used in 1970 is used. The CEC valve is not used. This relay is normally closed to block vacuum and opens when energized to allow vacuum advance. The solenoid controls distributor vacuum advance and performs no throttle positioning function. The 1973-74 TCS system differs from the 1972 system in three ways. The 23 second uplift delay has been replaced by a 20 second starting relay.

This relay closes to complete the TCS circuit and open the TCS solenoid, allowing vacuum advance, for 20 seconds after the key is turned to the "on" position. The operating temperature of the temperature override switch has been raised to 93°, and the switch that was used to engage the A/C compressor when the key was turned "off" has been eliminated. All models are equipped with an electric throttle control solenoid to prevent run-on. The 1974 TCS system is used only on manual transmission models. System components remain unchanged from 1973. The vacuum advance solenoid is located on the coil bracket.

All 1973-74 Corvette models are equipped with a Thermo-Override system instead of the normal TCS system. This system consists of a three-position temperature switch, which is mounted in the right cylinder head and a two-position vacuum advance solenoid. Three vacuum lines are connected to the solenoid, a ported vacuum line from the carburetor, a vacuum line from the intake manifold, and a vacuum line that runs to the distributor vacuum advance unit. When the engine temperature is between 92°F and 232°F, the temperature switch contacts are open and the vacuum solenoid is deenergized. This causes carburetor-ported vacuum to control the operation of the distributor vacuum advance unit. When the engine temperature is below 93°F or above 232°F, the temperature switch contacts are closed and the vacuum solenoid is energized. This moves the plunger in the solenoid to block the ported vacuum opening and connect manifold vacuum to the distributor. When the engine reaches normal temperature, the temperature switch contacts open and ported vacuum is restored to the



1972 454 TCS system—hot override on

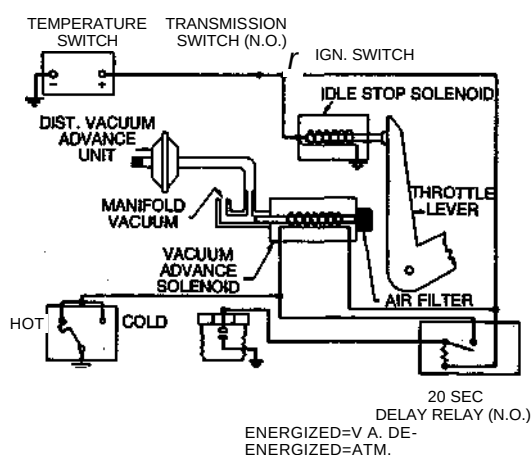


1973 4-speed TCS system

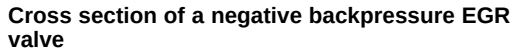
distributor. TCS is not used on 1975 and later models.

Exhaust Gas Recirculation (EGR)

All 1973-84 engines are equipped with exhaust gas recirculation (EGR). This system consists of a metering valve, a vacuum line to the carburetor, and cast-in exhaust gas passages in the intake manifold. The EGR valve is controlled by carburetor vacuum, and accordingly opens and closes to admit exhaust gases into the fuel/air mixture. The exhaust gases lower the combustion temperature, and reduce the amount of oxides of nitrogen (NO_x) produced. The valve is closed at idle between the two extreme throttle positions. In most installations, vacuum to the EGR



1972 350 TCS system—hot override on



As the car accelerates, the carburetor throttle plate uncovers the vacuum port for the EGR valve. At 3-5 in. Hg, the EGR valve opens and then some of the exhaust gases are allowed to flow into the air/fuel mixture to



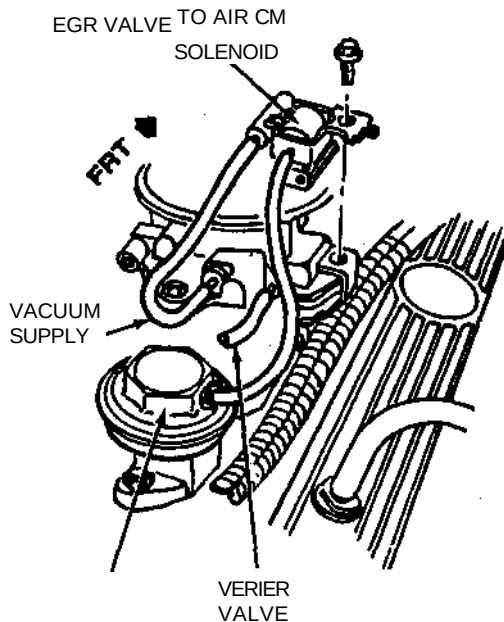
Some California engines are equipped with a dual diaphragm EGR valve. This valve further limits the exhaust gas opening (compared to the single diaphragm EGR valve) during high intake manifold vacuum periods, such as high-speed cruising, and provides more exhaust gas recirculation during acceleration when manifold vacuum is low. In addition to the hose running to the thermal vacuum switch, a second hose is connected directly to the intake manifold.

1979 and later models have a ported signal vacuum EGR valve. The valve opening is controlled by the amount of vacuum obtained from a ported vacuum source on the carburetor and the amount of backpressure in the exhaust system.

On 1982 and later models, the EGR valve vacuum is controlled by the ECM of the computer emissions system.

EGR VALVE REMOVAL AND INSTALLATION

1. Detach the vacuum lines from the EGR valve.
2. Unfasten the two bolts or bolt and clamp which attach the valve to the manifold. With draw the valve.
3. Installation is the reverse of removal. Always use a new gasket between the valve and the manifold. On dual diaphragm valves, attach carburetor vacuum line to tube at top of valve, manifold vacuum line to tube at center of valve.



EGR valve and solenoid used with most computer emissions systems—1982 shown (© Chevrolet Motor Division)

TVS SWITCH REMOVAL AND INSTALLATION

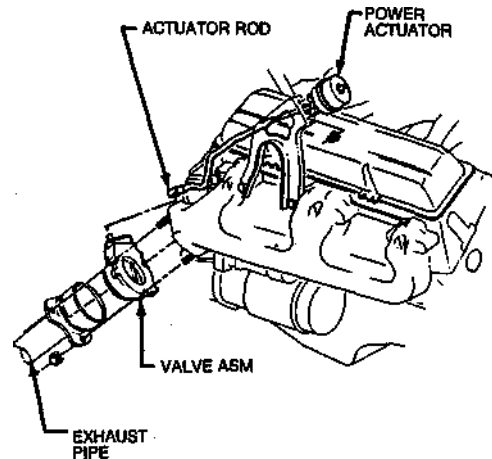
1. Drain the radiator.
1. Disconnect the vacuum lines from the switch, noting their locations. Remove the switch.
1. Apply sealer to the threaded portion of the new switch, and install it, torque to 15 ft lbs.
1. Rotate the head of the switch to a position that will permit easy hookup of vacuum hoses. Attach the vacuum hoses to the proper connectors.

Early Fuel Evaporation (EFE)

The 1975-81 EFE system is used to reduce engine warm-up time, improve driveability, and reduce emissions. The system consists of a vacuum controlled heat valve assembly (EFE valve) and a thermostatic vacuum switch (TVS) installed in the coolant thermostat housing of the engine.

The TVS controls the action of the EFE valve. One port of the TVS is connected to a manifold vacuum source; the other port to the EFE valve. When the engine is cold (as sensed by the TVS), the passage within the TVS is open to allow vacuum to act upon the EFE valve. The EFE valve closes, which blocks the exhaust flow from the right side cylinder bank. Because of the blockage, the exhaust gas is forced through passages in the right side cylinder head and the intake manifold. The heat from the exhaust warms the carburetor which improves the vaporization characteristics of the fuel. The exhaust gas exits through the left side exhaust pipe until the EFE valve closes. As the coolant temperature increases, the TVS shuts off the vacuum to the EFE valve. The valve then opens, allowing the exhaust gas to follow its normal route through the right side exhaust pipe.

1982 and later models do not use the EFE system, due to the superior fuel handling capabilities of the Throttle Body (fuel) Injection system.



Typical EFE valve and related components

TESTING THE EFE SYSTEM

After the vehicle has sat overnight, open the hood and note the position of the EFE valve control rod. Start the engine and check that

the position of the control rod changes (valve closes). If the valve did not close, disconnect the vacuum line from the EFE valve. If vacuum is felt at this line, either the EFE valve is defective or the linkage is binding. If no vacuum is felt, check the condition of both vacuum lines. If the lines are in good condition, the TVS is defective. If the valve does not open as the engine warms, again check for vacuum at the line attached to the EFE valve. If vacuum is present, the TVS is defective; if no vacuum is present, either the EFE valve is defective or the linkage is binding. **NOTE:** // the TVS must be replaced, follow the procedure listed for the TVS used with the EGR system.

EFE VALVE REMOVAL AND INSTALLATION

NOTE: Perform this operation only when the engine is cold.

1. Disconnect the battery cables at the battery.
2. Raise the front of the vehicle and support it safely with jackstands.
3. Disconnect the exhaust crossover pipe from the exhaust manifolds and lower the pipe away from the manifolds.

NOTE: On some models, it may be necessary to completely remove the crossover pipe to allow enough clearance for the EFE valve to slide off the manifold studs.

4. Disconnect the vacuum line from the EFE valve and remove the valve assembly.
5. Installation is the reverse of the previous steps. If gaskets are used at the pipe or valve connections, replace the gaskets.

6. Check for proper operation of the EFE valve.

Catalytic Converter

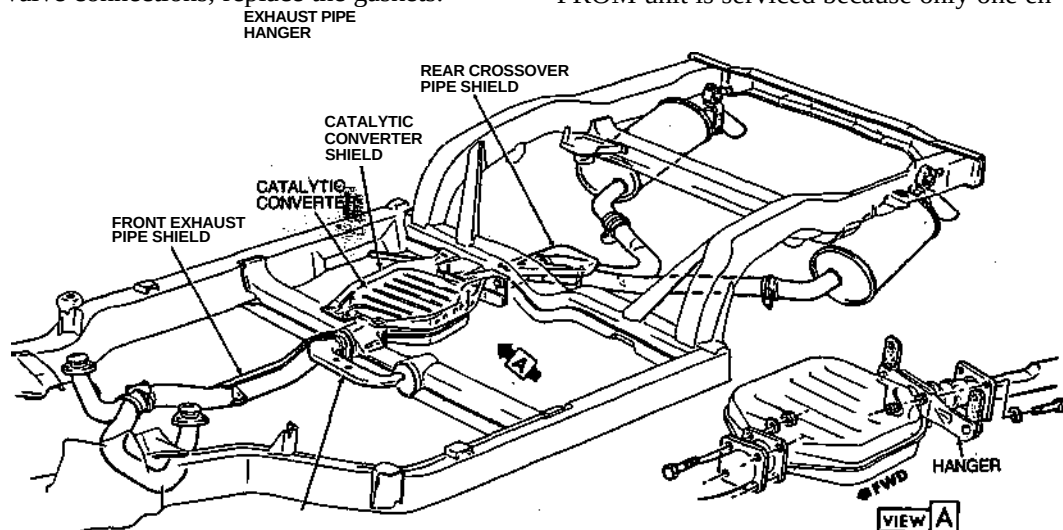
All 1975 and later models are equipped with a catalytic converter. The converter is located midway in the exhaust system. Stainless steel exhaust pipes are used ahead of the converter. The converter is stainless steel with an aluminized steel cover and a ceramic felt blanket to insulate the converter from the floorpan. The catalyst pellet bed(s) inside the converter consists of noble metals which cause a reaction that converts hydrocarbons and carbon monoxide into water and carbon dioxide.

Computer Emissions Systems

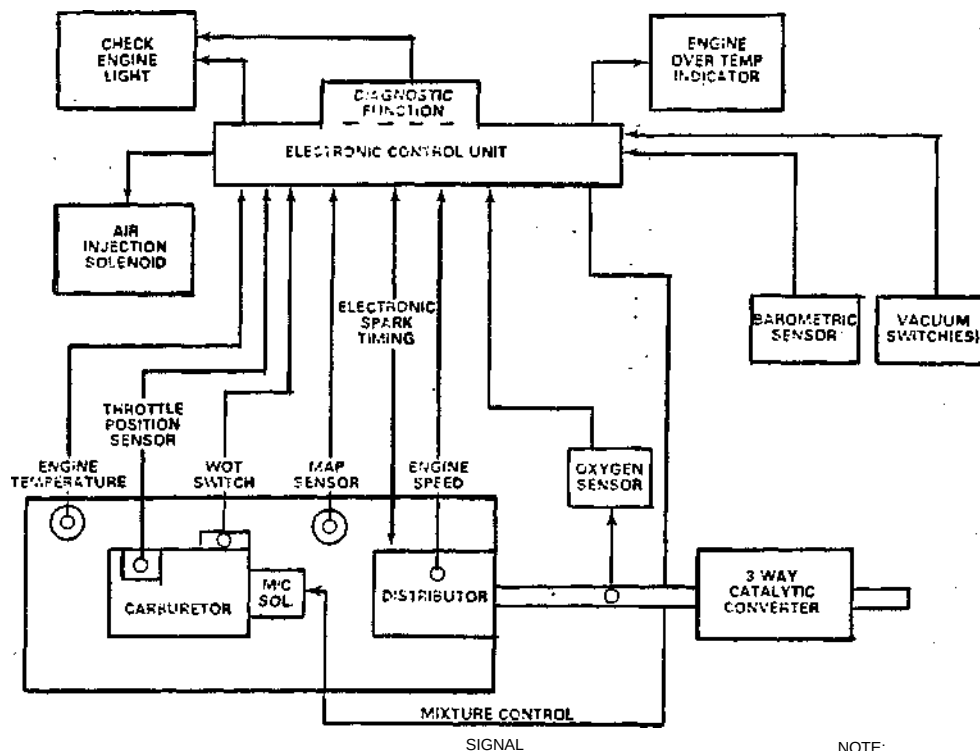
COMPUTER CONTROLLED CATALYTIC CONVERTER (C-4) SYSTEM

The C-4 system is used on 1980 California vehicles having the 305 engine. The "system" was introduced because of increasing governmental pressures to meet more stringent fuel economy and emissions requirements.

The main components of the C-4 system and brief descriptions of each item follow. **Electronic Control Module (ECM)**—The ECM is the actual computer "brain" which monitors and controls the C-4 system. **PROM Calibrator**—The PROM (Programmable Read-Only Memory) unit "tailors" the functions of the ECM to a particular vehicle. In the case of the 1980 Corvette, only one PROM unit is serviced because only one en-



1975 Corvette exhaust system showing catalytic converter



NOTE:
ALL COMPONENTS SHOWN
NOT ON ALL ENGINES.

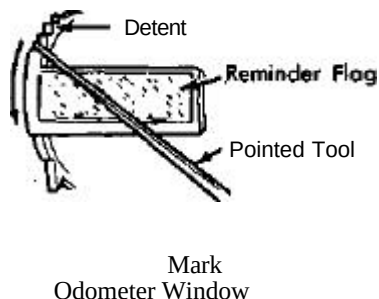
C-4 system schematic

engine/transmission combination was available in Corvettes sold in California. In later years, many different PROM units are used for the same model, according to vehicle weight, drivetrain combinations, and emission requirements of where the vehicle is sold (e.g.—Federal/49 state, California, Canada, etc.). Oxygen Sensor—The oxygen sensor constantly monitors the amount of oxygen in the engine exhaust. The sensor reads a high oxygen content as a lean mixture; low oxygen

content as a rich mixture. The data from the oxygen sensor is processed by the ECM, causing the ECM to vary other system functions accordingly. A "sensor" flag on the instrument panel indicates when the oxygen sensor must be replaced.

NOTE: To reset the "Emission" flag on the speedometer face, remove the instrument cluster lens. Insert a long, pointed instrument diagonally into the detents on the upper left side of the "Emission" wheel. Rotate the wheel downward until an alignment mark is visible in the left side of the odometer window.

Engine Coolant Temperature Sensor—This sensor monitors and signals the ECM concerning the engine coolant temperature. The sensor is mounted on the intake manifold and modifies the ECM output signal to compensate for a cold engine condition which improves the cold driveability of the engine. Vacuum Control Switches—Various vacuum switches are used to monitor engine load, enabling the ECM to adjust the C-4 system accordingly. High vacuum indicates (to the ECM) that the engine is either idling or cruising and low vacuum indicates engine operation at or near wide-open throttle.



Resetting emission odometer flag—1980 models only

Throttle Position Sensor (IPS)—Monitors the degree of throttle opening, allowing the ECM to alter the air/fuel mixture according to engine operating conditions. The TPS is mounted inside the carburetor. Carburetor Model E4ME—This model of carburetor is used only with computer emissions systems. The E4ME plays a key role in the control of exhaust emissions, in that it is a "solenoid controlled" carburetor. The solenoid used in the E4ME is termed a mixture control (MC) solenoid. After the ECM "digests" information from the various monitoring devices, it signals the MC solenoid to alter the air/fuel mixture to compensate for the operating conditions of the engine. The MC solenoid is actually a combination fuel flow valve and air bleed valve, as the metering of fuel or air can be controlled independently. The solenoid acts to supplement the idle and main metering systems of the carburetor.

COMPUTER COMMAND CONTROL (CCC) SYSTEM

The CCC system is used on all 1981-84 models. Basically, the CCC system is an improved version of the C-4 system. The capabilities of the CCC system are greatly ex-

tended (compared to the C-4 system) through the use of additional sensors and increased control capacities of the ECM and PROM units.

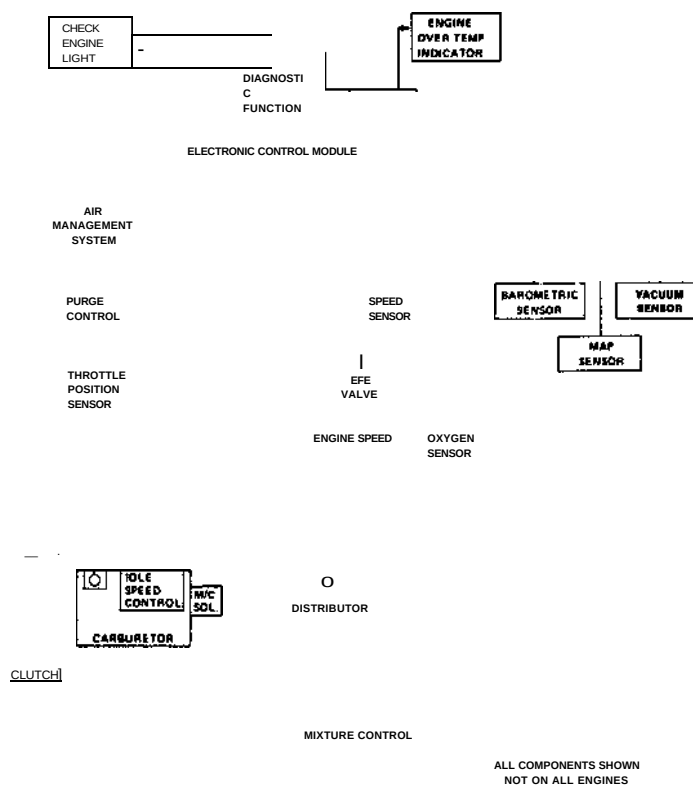
In addition to the functions of the C-4 system, the CCC system also controls the AIR, EGR, Electronic Spark Timing (EST) and Torque Converter Clutch (TCC) systems. On 1982-84 models, the fresh air induction and fuel injection systems are also controlled by the CCC.

Due to the complexity of either computer emission system and increasing federal emission regulations, service, testing, or repair of the system should be performed only by a qualified, professional technician.

Electronic Spark Timing (EST) System

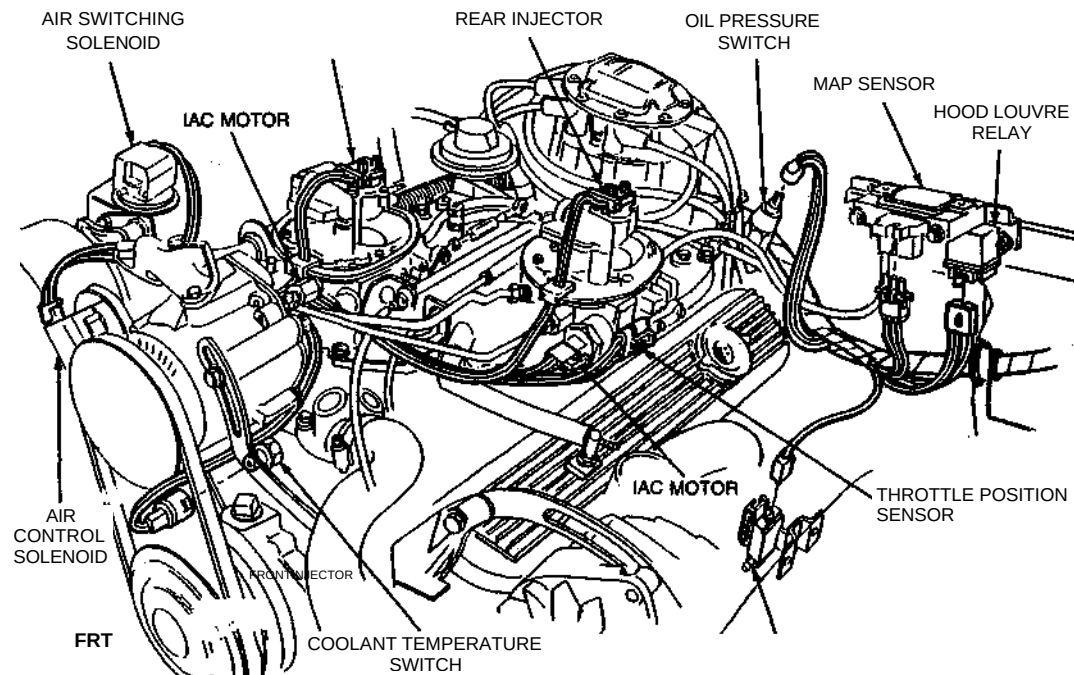
The EST system is used on 1981-84 Corvettes. The ignition distributor of engines using the EST system does not have vacuum or mechanical spark advance mechanisms, as these functions are controlled electronically by the distributor module assembly and the ECM of the computer emissions system.

The purpose of the EST system is to precisely adjust the spark timing according to



CCC system schematic

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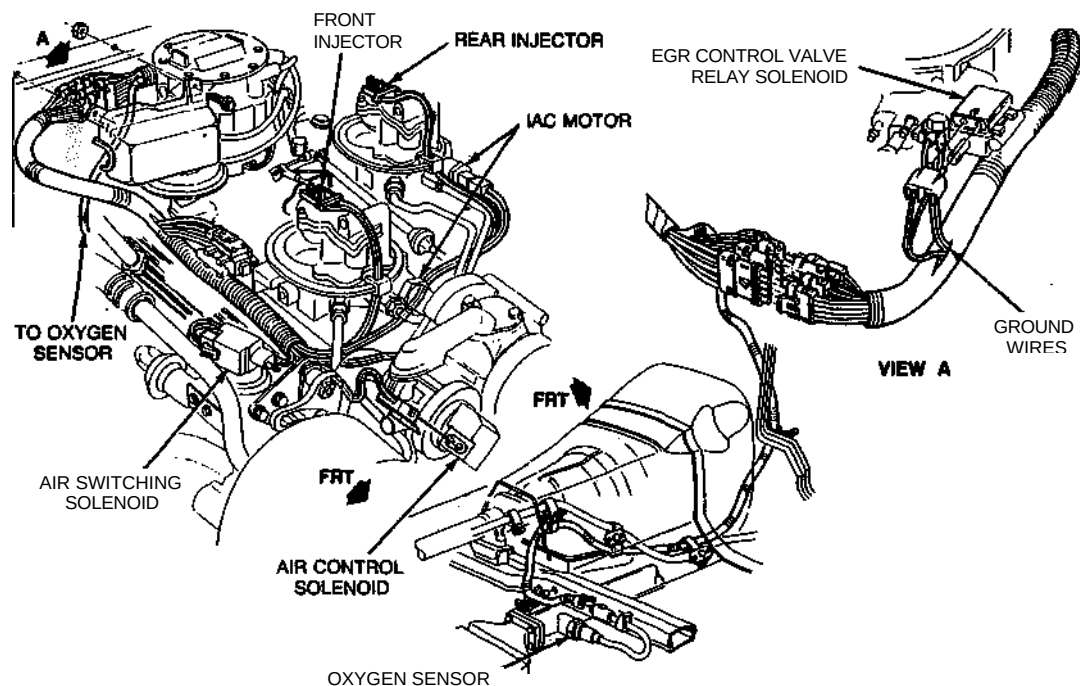
FUEL VAPOR SOLENOID

Typical CCC system component locations—left side view (1982 shown)

specific engine operating conditions, as sensed by the various monitoring devices of the computer emissions system.

The 1982-84 EST system is slightly different than the 1981 system, in that it uses a detonation sensor, mounted on the right side of the cylinder block in front of the starter.

The purpose of the sensor is to "tell" the ECM when the engine begins to "ping," allowing the ECM to signal the distributor module to retard the spark timing just enough to keep the engine on the verge of detonation, without causing engine damage. If severe detonation occurs on engines equipped with the



Typical CCC system component locations—right side view (1982 shown)

detonation sensor, the entire computer emissions system should be professionally tested. Because both types of EST systems are directly tied into the computer emissions system, service, testing, and repair should be performed by a qualified, professional technician.

FUEL SYSTEM

Mechanical Fuel Pump

The 1963-81 Corvette fuel pump is a mechanically operated diaphragm-type pump. The camshaft of the engine has an eccentric (similar to a cam lobe, but more rounded) cast as part of the camshaft. As the camshaft rotates, the eccentric actuates a pushrod which pushes the fuel pump rocker arm to activate the pump.

The fuel pump is attached to the right front of the cylinder block. On small-block engines, a fuel pump mounting plate is used, with two gaskets; one between the pump and the plate; the other between the plate and the block. Pumps on big-block engines attach directly to the block and use only one gasket.

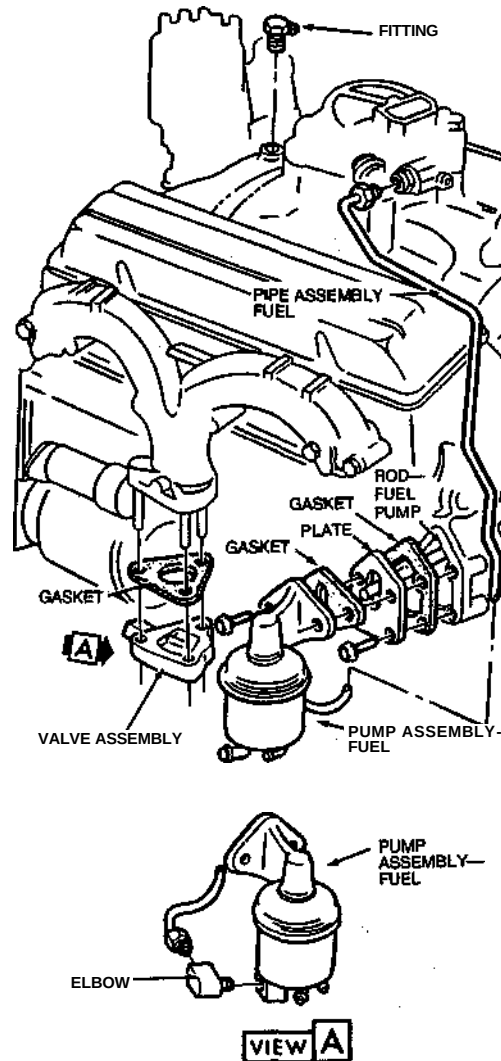
The inlet, or suction line of the pump, draws fuel from the tank. The outlet, or pressure line of the pump, supplies pressurized fuel to the carburetor (or fuel injection unit, in early Corvettes). Some models use a third line, which is a vapor return. The purpose of the vapor return is to route the hot fuel and fuel vapor from the pump back to the fuel tank, which considerably reduces the chance of vapor lock.

For all intents and purposes, the fuel pump is not rebuildable. Some '60s Corvettes used a rebuildable pump, though parts for these pumps are no longer available from Chevrolet.

REMOVAL AND INSTALLATION

1. Disconnect the fuel inlet, outlet, and vapor return (if equipped) lines from the pump.

2. On small-block engines, remove the bolt from the front right face of the engine block which is almost opposite the forward pump mounting bolt. Insert a longer bolt (5/16x2 in.) in this hole and snug down the bolt. This will hold the fuel pump pushrod in place. On big-block engines, the pushrod can be retained with heavy grease or mechanical fingers during installation.



Typical 1963-81 mechanical fuel pump mounting (1974 350 shown)

3. Remove the fuel pump mounting bolts and remove the fuel pump.

4. Installation of the pump is the reverse of the previous steps. Replace the fuel pump gasket(s) during installation. Start the engine and check the pump for proper operation, and check for leaks.

TESTING

If the engine exhibits a tendency to "starve-out", never assume that the fuel pump is defective until you test the pump. In most cases, a "starve-out" condition is caused by a weak ignition system, plugged fuel filter, or restricted fuel line. 1. Disconnect the fuel line from the car-

buretor. While this line is disconnected, check the fuel filter.

2. Run a piece of fuel-resistant rubber hose from the line to a graduated container.

3. On engines with standard ignition systems, ground the secondary coil wire. On engines with the HEI distributor, disconnect the BAT connector from the coil terminal.

4. Crank the engine. Fuel should be pumped into the container at a rate of 1 pint in 30 seconds.

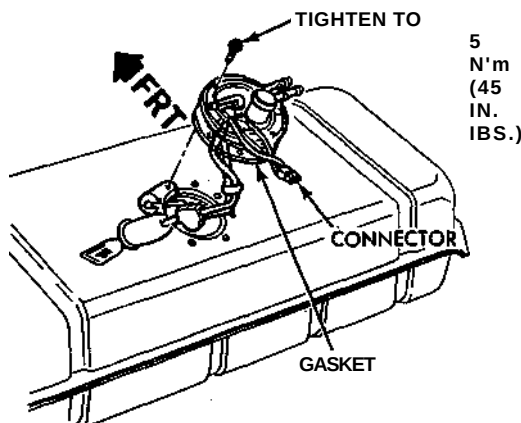
5. Remove the added hose and container and connect a fuel pressure gauge to the fuel line. Crank the engine and read the highest pressure obtained on the gauge. See the Tune-Up Specifications chart in the Tune-Up chapter for the proper fuel pump pressure range.

If the pump failed the tests of either step 4 or 5, replace the pump as previously outlined. If the pump checked okay, remove the pressure gauge and reconnect the fuel line to the carburetor. Reconnect the ignition wiring as originally connected.

Electric Fuel Pump

An electric, impeller-type fuel pump is used on all 1982-84 Corvettes. The pump is designed to deliver a constant flow of fuel to the throttle body fuel injection units. The fuel pressure is regulated at the pressure regulator and compensator units, both of which are integrated with the throttle body injection units.

The pump is mounted inside the fuel tank as part of the fuel gauge sending unit. The pump can be replaced independently of the sending unit.



Electric fuel pump and gauge sender assembly-1982

REMOVAL AND INSTALLATION

1. Disconnect the battery cables at the battery.

2. Remove the fuel filler door and bezel.

3. Remove the fuel filler neck seal and drain hose.

4. Disconnect the lines and electrical connectors from the sending unit/pump assembly, and remove the screws which retain the assembly.

5. Remove the sending unit/pump assembly and the gasket.

6. Separate the pump from the sending unit.

7. Installation is the reverse of the previous steps. DO NOT connect the battery until all other steps have been completed.

TESTING

NOTE: A special fuel pressure gauge (Kent-Moore J-29658) is required to safely perform this test.

1. Remove the air cleaner assembly and plug the vacuum connection(s) at the TBI unit.

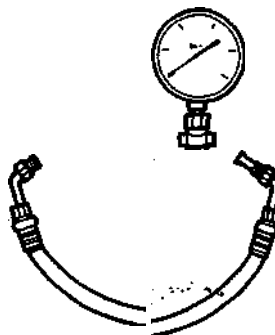
2. Remove the fuel tube which connects between both TBI units.

NOTE: Use two line wrenches of the appropriate sizes to disconnect each fitting; one wrench to hold the large fitting, the other to loosen the smaller fitting. **CAUTION:** A small amount of fuel will be released from the connections.

3. Install the fuel pressure gauge between the two TBI units.

4. Turn the ignition switch ON and check for fuel leakage at the gauge arrangement. If leakage is noted, turn the ignition switch OFF and correct the leak.

5. Start the engine and read the fuel pres-



Fuel pressure gauge used to test the fuel pressure on 1982, TBI models

sure on the gauge. Fuel pressure should be 9-13 psi. Turn the engine OFF. Replace the fuel pump if the pressure is not within this range.

6. Remove the fuel pressure gauge, install the fuel tube assembly, and check for leaks.

7. Reinstall the air cleaner and connect the vacuum lines as originally connected.

Carburetor Overhaul and Adjustments—AH Types

Efficient carburetor depends greatly on careful cleaning and inspection during overhaul, since dirt, gum, varnish, water in or on the carburetor parts are mainly responsible for poor performance.

Carburetor overhaul should be performed in a clean, dust-free area. Carefully disassemble the carburetor, keeping look-alike parts segregated. Note all jet sizes.

NOTE: The carburetor Specifications Chart at the end of the chapter gives the various carburetor applications. Determine which carburetor you are dealing with and refer to the following sections. The sections are divided by carburetor type. Once the carburetor is disassembled, wash all parts

(except diaphragms, electric choke units, pump plunger and any other plastic, leather or fiber parts) in clean carburetor solvent. Do

not leave the parts in solvent any longer than necessary to sufficiently loosen the deposits. Excessive cleaning may remove the special finish from the float bowl and choke valve bodies, leaving them unfit for service. Rinse all parts in clean solvent and blow dry with compressed air. Wipe all plastic, leather or fiber parts with a clean, lint-free cloth.

Blow out all passages and jets with compressed air and be sure there are no restrictions or blockages. Never use wire to clean jets, fuel passages or air bleeds.

Check all parts for wear or damage. If wear or damage is found, replace the complete assembly. Especially check the following:

1. Check the float and needle seat for wear. If any is found, replace the assembly.

2. Check the float hinge pin for wear and the floats for distortion or dents. Replace the float if it has leaked into it.

3. Check the throttle and choke shaft bores for out-of-round. Damage or wear to the throttle arm, shaft or shaft bore will often require replacement of the throttle body. These

parts require close tolerances and an air leak here can cause poor starting and idling.

4. Inspect the idle mixture adjusting needles for burrs or grooves. Burrs or grooves will usually require replacement of the needles since a satisfactory idle cannot be obtained.

5. Test the accelerator pump check valves. They should pass air one way only. Test for proper seating by blowing and sucking on the valve. If the valve is satisfactory, wash the valve again to remove breath moisture.

6. Check the bowl cover for warping with a straightedge.

7. Closely inspect the valves and seats for wear or damage, replacing as necessary.

8. After the carburetor is assembled, check the choke valve for freedom of operation.

Carburetor overhaul kits are recommended for each overhaul. These kits contain all gaskets and new parts to replace those that deteriorate most rapidly. Failure to replace all parts supplied with the kit (especially gaskets) can result in poor performance later.

Overhaul kits contain specific procedures for the model carburetor the kit applies to. Some carburetor manufacturers supply overhaul kits of three types—minor repair, major repair and gasket kits. They basically consist of Minor Repair Kits:

- All gaskets
- Float needle valve
- Volume control screw
- All diaphragms
- Pump diaphragm spring

Major Repair Kits:

- All jets and gaskets
- All diaphragms
- Float needle valve
- Volume control screw
- Pump ball valve
- Main jet carrier
- Float
- Complete intermediate rod
- Intermediate pump lever
- Complete injector tube
- Assorted screws and washers

Gasket Kits:

- All gaskets.

After cleaning and checking all components, reassemble the carburetor using new parts, using the exploded views in the car sections, if necessary. Make sure that all screws and jets are tight in their seats, but do not overtighten needle valves into their seats

150 EMISSION CONTROLS AND FUEL SYSTEM

or uneven jetting will result. Always use new gaskets and adjust the float.

THROTTLE LINKAGE/CABLE ADJUSTMENT

Four Barrel Carburetors 1963-67

Adjust the length of the throttle linkage to ensure full opening of the throttle plates. Turn the threaded swivel at the throttle so that with the accelerator pedal fully depressed and the carburetor throttle valve fully open, the threaded swivel will freely enter into the throttle lever. The lever should then be turned two full turns to lengthen the control rod.

1968-72

Loosen the accelerator cable clamp bolt at the carburetor bracket. Block the accelerator pedal in the fully depressed position. Open the carburetor throttle fully and tighten the cable clamp bolt to 45 in. lbs.

1973-84 (Including TBI)

Throttle cable adjustments are not possible on these models.

Three, Two Barrel Carburetors 1967-69

Loosen the cable clamp, then fully depress the accelerator pedal and fully open the throttle plate of the primary carburetor. Torque the cable clamp bolt to 45 in. lbs.

Bring the engine to operating temperature, set the idle to specifications, and turn it off. Bottom the clevis pin in the throttle slot of the primary carburetor and adjust the secondary closing rod of the rear carburetor so that it lacks $\frac{1}{2}$ a rod diameter of being long

enough to freely enter the rear secondary throttle hole. Connect the rod. Adjust the forward secondary rod so that it barely enters the throttle lever hole. Connect the rod and check the linkage operation to be sure the plates close completely.

Carter WCFB Carburetor

The Carter WCFB is the standard carburetor on 1963-1965 Corvettes.

Functionally, it is two, dual carburetors mounted in a single housing and is comprised of four basic components: choke housing, top cover, main body, and throttle flange. The metering rods, accelerator pump, and choke are located in the primary side of the carburetor body. It has the five conventional systems: float, low speed, high speed, accelerator pump, and choke.

IDLE SPEED AND MIXTURE ADJUSTMENTS

Idle speed and mixture adjustments are best accomplished using a tachometer and vacuum gauge. Make this adjustment with the air cleaner installed.

Bring the engine to operating temperature, check to see that the choke is fully off, and adjust the idle-speed adjustment screw to give 475 rpm (450 on automatic transmissions in Drive range). Adjust the idle-mixture adjustment screws separately until peak vacuum and rpm are indicated on the vacuum gauge and tachometer.

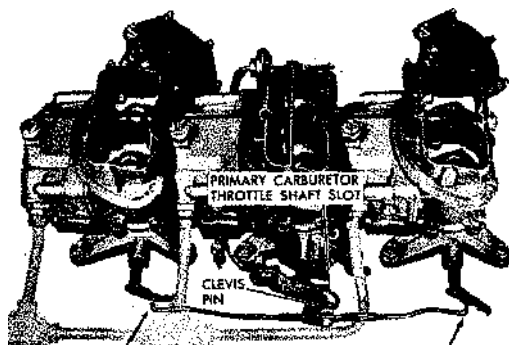
An alternative method is to set the idle-mixture screws lean to a beginning, rough idle, then back screws out (enrichen) $\frac{1}{2}$ turn. Never bottom the idle-mixture adjustment screws or possible damage to the needle seat may result.

AUTOMATIC CHOKE ADJUSTMENT

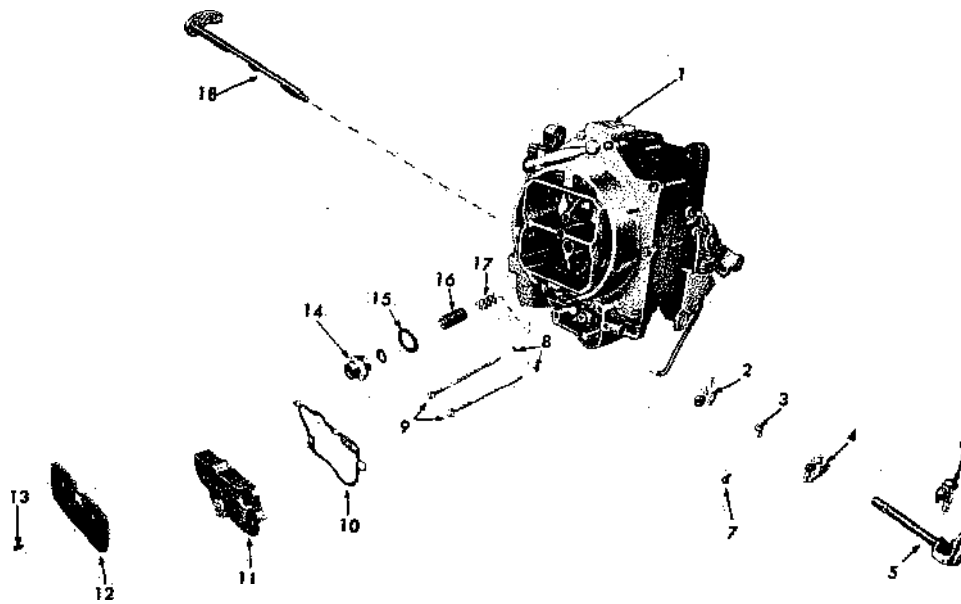
The choke is correctly set when the index mark on the plastic cover aligns with the corresponding mark on the choke housing. The introduction of dirt, gum, water or carbon into the choke housing or vacuum passage can detrimentally affect engine performance. Check this system periodically and clean if necessary.

INTERMEDIATE CHOKE ROD ADJUSTMENT

The intermediate choke rod adjustment requires the removal of the choke coil housing assembly, gasket, and baffle plate. Open the



Three, two-barrel carburetor linkage adjustment



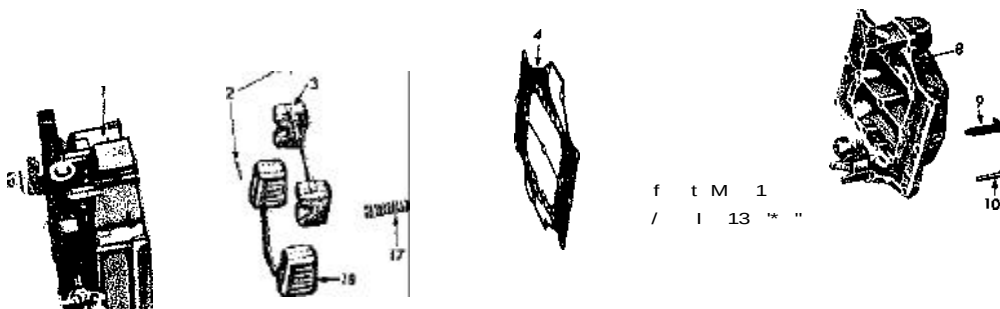
- | | | |
|--------------------------------|-----------------------|-----------------------|
| 1. Bowl cover | 6. Choke shaft lever | 13. Choke valve screw |
| 2. Metering rod arm | 7. Vent arm screw | 14. Inlet fitting nut |
| 3. Vent arm | 8. Metering rod discs | 15. Filter gaskets |
| 4. Pump operating arm and link | 9. Metering rods | 16. Filter |
| 5. Pump countershaft assembly | 10. Dust cover gasket | 17. Filter spring |
| | 11. Dust cover | 18. Choke valve shaft |
| | 12. Choke valve | |

WCFB bowl cover upper parts

choke valve and position a 0.026 in. wire gauge between the bottom of the slot in the piston and the top of the slot in the choke piston housing. Seat the choke piston on the gauge. The measurement between the top of the choke valve and the air horn divider should be 0.096 in. Adjustment is made by bending the intermediate choke rod.

FLOAT ADJUSTMENT

To make the float adjustment, remove the top cover then disassemble and reassemble the floats without the cover gasket. Make the lateral adjustment by placing the $\frac{1}{16}$ in. float gauge (supplied in the carburetor overhaul kit) under the center of the secondary float so that



- | | |
|--------------------------------|--------------------------------|
| 1. Carburetor body | 8. Bowl cover |
| 2. Float hinge pins | 9. Vacuum piston link |
| 3. Secondary float | 10. Bowl cover attaching screw |
| 4. Bowl cover gasket | 11. Needle seat gasket |
| 5. Secondary float needle | 12. Primary float needle seat |
| 6. Secondary float needle seat | 13. Primary float needle |
| 7. Needle seat gasket | |

WCFB lower bowl cover parts

14. Vacuum piston
15. Vacuum piston spring
16. Pump plunger assembly
17. Pump plunger return
spring
18. Primary float

the notched portion of the gauge fits over the edge of the casting. Bend the floats until their sides just clear the vertical uprights of the gauge. Repeat the adjustment on the primary float using either the V& in. float gauge or a Vs in. drill bit.

The vertical adjustment is correct when the floats just clear the horizontal bar of the gauges when the gauges are positioned as described above. The required clearance between the top of the floats and the bowl cover is $\frac{5}{16}$ in. on the primary floats and $\frac{1}{4}$ in. on the secondary floats.

Float drop measurement must be made with the top cover gasket removed. Measure between the lowest point of the floats and the bottom of the top cover. This should be 2 in. for both primary and secondary floats. Adjust the accelerator pump by backing off the idle-speed adjustment screw and positioning the float-drop adjustment gauge (supplied in rebuilding kits) on the dust cover boot. Bend the top flat of the pump arm so that it is parallel to the gauge.

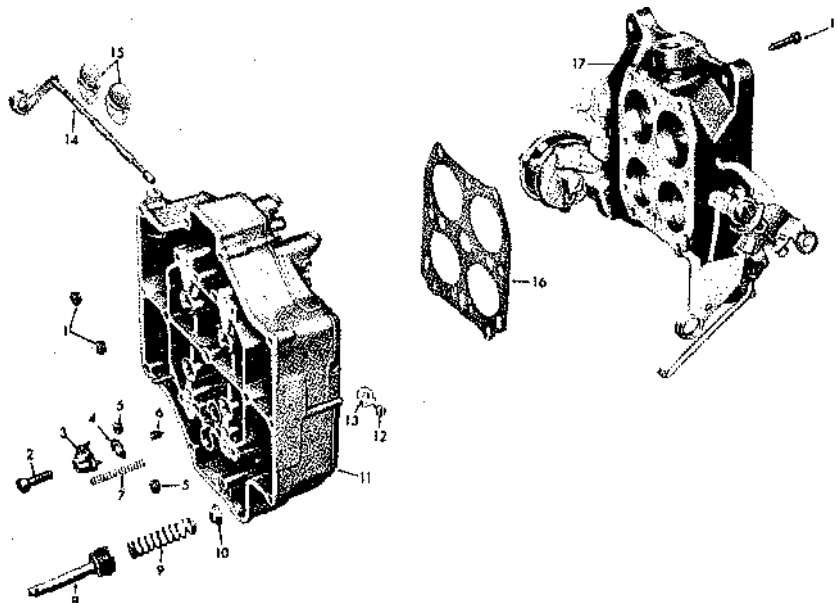
METERING ROD ADJUSTMENT

To adjust the metering rods, back off the idle-speed adjusting screw until the throttle valves are fully seated, then loosen the screw in the metering arm. Depress the metering rod arm upward until it just touches the hanger. Secure the arm with the set screw.

UNLOADER AND SECONDARY THROTTLE LEVER ADJUSTMENT

Make the unloader adjustment with the throttle valves wide open. Measure between the inboard edge of the choke valve and the center wall of the top cover. Bend the unloader tang to obtain a $\frac{3}{16}$ in. clearance.

Turn the carburetor upside down to adjust the secondary throttle lever. With the primary valves wide open, the secondary valves should be within 4° to 7° of the wide open position. Bend the connector rod at its upper angle until actuation of the throttle linkage fully opens the primary valves. Bend the tang on the secondary throttle dog so that with the



1. Secondary jets
2. Pump jet cluster attaching screw
3. Pump jet cluster
4. Cluster gasket
5. Metering rod jets
6. Pump discharge needle
7. Vacuum piston spring
8. Pump plunger assembly

9. Pump plunger return spring
10. Pump inlet ball retainer
11. Carburetor body
12. Screw
13. Auxiliary throttle valve cam
14. Auxiliary throttle valve shaft and weight assembly

15. Auxiliary throttle valves
16. Carburetor body basket
17. Throttle flange
18. Throttle flange attaching screw

WCFB throttle body parts

primary throttle valves open, the secondary throttle-to-bore angle will be SVZ^0 . There should be 0.017 in.-0.022 in. clearance between the positive closing shoes on the primary and secondary throttle levers with the throttle valves closed.

DISASSEMBLY AND ASSEMBLY

1. Remove the carburetor from the engine but do not drain the fuel in the bowl. Tap the filter nut lightly with a hammer then remove the inlet nut and gasket and lift out the filter.

2. Disconnect the choke connector rod, intermediate choke rod, and throttle rod. Remove the metering-rod dust cover and vapor vent arm. Loosen the pump operating arm and metering-rod arm securing screws, and withdraw the countershaft.

3. Remove the metering rod arm and link. Turn each metering rod 180° and lift them from the anger. Do not lose the two, metering rod discs.

4. Remove the top cover, lifting straight up so as to avoid damaging the floats, vacuum piston, or plunger assembly. Be sure the cover gasket is free of the bowl before lifting the cover. Mark the floats before removing them from the cover, to avoid unnecessary bending during assembly adjustments.

5. Remove the secondary float needle, seat, and gasket, and group together. Remove the pump plunger assembly and spring and soak the leather pump plunger in gasoline or kerosene to prevent it from drying out. Turn the vacuum piston Vt turn to disconnect and remove the piston link.

6. At this time, check the fuel in the bowl for contamination. Sweep the bottom of the bowl with a magnet while the fuel is still present. This will pick up iron oxide dust or metallic particles. Water contamination will appear as milky globules at the bottom of the bowl.

7. Invert the carburetor body and remove the pump jet cluster and gasket. Tap out the pump discharge needle. Attach a $5/16$ in. six-point socket to a six-inch extension and pry the pump inlet ball retainer and check ball from the bottom of the pump cylinder well.

8. Remove the primary metering rod jets from the pump side of the carburetor. Remove the secondary main jets but do not mix them as their orifices are not the same size. Check the low speed jets to see that they are angled slightly on installation. The antiper-

colator plugs and bushings and main discharge nozzles are a press fit and should not be removed.

9. Separate the throttle flange and carburetor body. Remove the idle-mixture screws and springs, throttle-lever adjusting screw, washer, and spring. Remove the fast-idle cam assembly and lockout arm. Remove the primary/secondary throttle valve connector rod. Back out the primary throttle shaft screw and washer and remove the throttle levers. Dislodge the secondary throttle return spring. Remove the primary and secondary-throttle valves and shafts. It will be necessary to file the staked ends of the throttle valve securing screws before they can be removed. Remove the choke housing and baffle.

10. Clean and inspect the disassembled components. Use a carburetor cleaning solution to wash everything but the coil housing assembly and pump plunger. Clean the choke housing assembly in gasoline. Reassembly is the reverse of this procedure.

Carter AFB Carburetor

The Carter AFB (aluminum four-barrel) carburetor is a high performance option found on the 327 cubic inch Corvette engine from 1963-1965. It is a four-throat downdraft type and offers improved flow rates over the standard carburetor. A clean air system reduces contamination of the choke vacuum circuit and linkage, and subsequent malfunctioning.

IDLE SPEED AND MIXTURE ADJUSTMENT

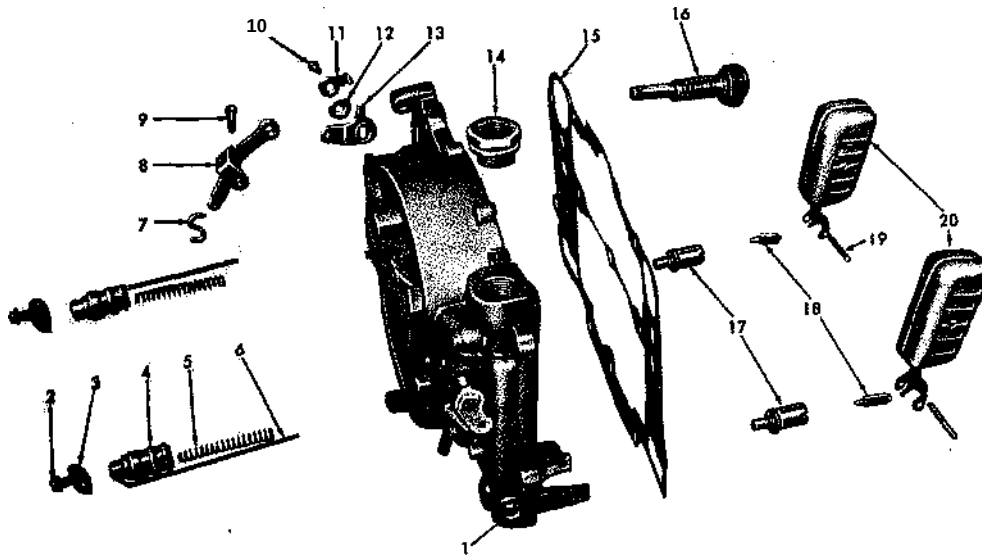
Idle speed and mixture are adjusted with the engine thoroughly warmed and idling and with the aid of a tachometer and vacuum gauge attached to the engine. With the choke fully off, adjust the idle-speed adjustment screw to give 475 rpm (450 for automatic transmission models in Drive). Adjust each idle-mixture screw until peak steady vacuum is achieved at the specified rpm.

AUTOMATIC CHOKE ADJUSTMENT

The automatic choke is correctly adjusted when the scribe mark on the coil housing is aligned with the center notch in the choke housing for Powerglide models and one notch lean with synchromesh.

FLOAT ADJUSTMENTS

Remove the metering rods and the bowl cover. Align the float by sighting down its side

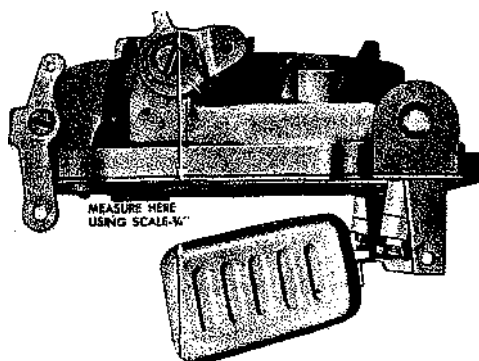


- | | | |
|------------------------|-----------------------------|---------------------------|
| 1. Bowl cover assembly | 8. Pump lever | 15. Cover gasket |
| 2. Screw | 9. Pump lever pivot screw | 16. Pump plunger assembly |
| 3. Piston cover plate | 10. Screw | 17. Float needle seat |
| 4. Power piston | 11. Choke shaft outer lever | 18. Float needle |
| 5. Spring | 12. Washer (spacer) | 19. Float hinge |
| 6. Metering rod | 13. Choke shaft kick lever | 20. Float |
| 7. Pump link | 14. Fuel inlet fitting | |

AFB bowl cover parts

to determine if it is parallel with the outer edge of the air horn. Bend to adjust. The float level is adjusted with the air horn inverted and the air horn gasket in place. Clearance between each float (at the outer end) and the air horn gasket should be $\frac{5}{16}$ in. Bend to adjust.

The float drop is adjusted by holding the air horn in the upright position and bending the float arm until the vertical distance from the air horn gasket to the outer end of each float measures $\frac{3}{16}$ in.



AFB float drop adjustment

INTERMEDIATE CHOKE ROD ADJUSTMENT

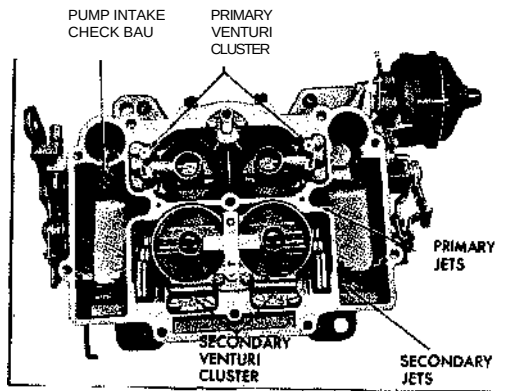
The intermediate choke rod adjustment begins with the removal of the choke coil housing assembly, gasket and baffle plate. Position a 0.026 in. wire gauge between the bottom of the slot in the piston and the top of the slot in the choke piston housing. Close the choke piston against the gauge and secure it with a rubber band. Now bend the intermediate choke rod so that the distance between the top edge of the choke valve and the air horn divider measures 0.070 in.

ACCELERATOR PUMP ADJUSTMENT

The first step in adjusting the accelerator pump is to push aside the fast-idle cam and seat the throttle valves firmly. Bend the pump rod at the lower angle to obtain a $\frac{1}{16}$ in. measurement between the air horn and the top of the plunger shaft.

UNLOADER, CLOSING SHOE, AND SECONDARY THROTTLE ADJUSTMENT

To adjust the unloader, hold the throttle wide open and bend the unloader tang to obtain a $\frac{3}{16}$ in. clearance between the upper edge of the choke valve and inner wall of the air horn.



AFB main body components

Clearance between the positive closing shoes on the primary and secondary throttle valves is checked with the valves closed. Bend the secondary closing as required to obtain a clearance of 0.20 in.

The secondary throttle opening is governed by the pick-up lever on the primary throttle shaft. It has two points of contact with the loose lever on the primary shaft. If the contact points do not simultaneously engage, bend the pick-up lever to obtain proper engagement. The primary and secondary throttle valve opening must be synchronized.

DISASSEMBLY AND ASSEMBLY

1. Remove the pump rod and intermediate choke rod. Remove the outer lever and washer from the choke shaft, then remove the inner lever and fast-idle rod as an assembly. Remove the step-up position cover plates, piston, and step-up rod and spring. Lightly tap the fuel inlet fitting. Before removing it, remove its gasket and strainer then carefully lift the top cover to protect the floats and pump plunger from damage.

2. Remove the float lever pins, floats, float needles, seats, and gaskets. Keep separate to avoid unnecessary adjustment. Remove the pump plunger lever, S link, plunger, and cover gasket.

3. Do not remove the choke valve and shaft(s) unless there is obvious shaft binding or damage to the valve.

4. Remove the accelerator-pump lower spring and, after checking the fuel for contamination, drain the bowl. Sweep a magnet around the bottom of the bowl while fuel is still present to capture iron oxide dust or metal particles which may damage the needle seats. Water contamination will appear as milky globules at the bottom of the fuel bowl.

5. Remove the choke housing cover, gasket, and baffle. Remove the O-ring seal from the vacuum opening in the mounting boss. Remove the choke piston, levers, pump cluster and gasket, and pump discharge needle. Remove the venturi cluster. The venturi assemblies are dissimilar and cannot be assembled in the wrong location. Primary venturi gaskets differ from secondary.

6. Remove the secondary auxiliary valves, idle-mixture screws and springs, and all four metering jets. Metering rods are used in the primary metering jets and these jets are visibly larger than their secondary counterparts. Remove the pump intake check valve and seat assembly.

7. Wash all parts except the choke coil housing and the pump plunger in carburetor cleaning solution. Clean the choke housing in gasoline.

8. Reassembly is the reversal of this procedure.

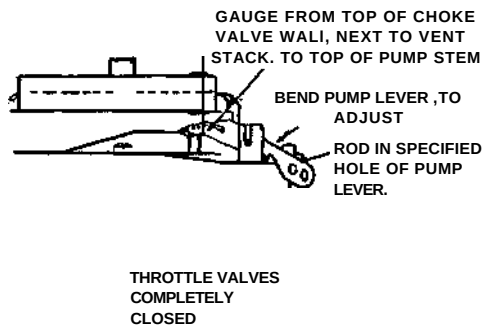
Rochester 4MC, 4MV, M4MC, and E4ME Carburetors

The Rochester Quadrajets® carburetor is a two stage, four-barrel downdraft carburetor. The designation MC or MV refers to the type of choke system the carburetor is designed for. The MV model is equipped with a manifold mounted thermostatic choke coil. The MC model has a choke housing and coil mounted on the side of the float bowl.

The primary side of the carburetor is equipped with 1½ in. diameter bores and a triple venturi with plain tube nozzles. During off idle and part throttle operation, the fuel is metered through tapered metering rods operating in specially designed jets positioned by a manifold vacuum responsive piston.

The secondary side of the carburetor contains two 2¼ in. bores. An air valve is used on the secondary side for metering control and supplements the primary bores.

The secondary valve operates tapered metering rods which regulate the fuel in constant proportion to the air being supplied. E4ME carburetors are used only on 1980—81 engines equipped with computer controlled emissions systems. *NOTE: E4ME carburetors should be serviced only by professional service technicians.*



Quadrajet® accelerator pump adjustment (except E4ME's)

ACCELERATOR PUMP ADJUSTMENT

1. Close the primary throttle valves by backing out the slow idle screw and making sure that the fast idle cam follower is off the steps of the fast idle cam.
2. Bend the secondary throttle closing tang away from the primary throttle lever.
3. With the pump in the appropriate hole in the pump lever, measure from the top of the choke valve wall to the top of the pump stem.
4. To adjust, bend the pump lever while supporting it with a screwdriver.
5. After adjusting, readjust the secondary throttle tang and the slow idle screw.

IDLE VENT ADJUSTMENT

Remove the idle vent valve cover from the air horn, if so equipped. Close the vent valve and open the primary throttle until the vent valve arm touches the bi-metallic strip next to the valve. Measure the distance between the top of the choke valve wall and the top of the pump stem. Bend to adjust.

FLOAT LEVEL ADJUSTMENT

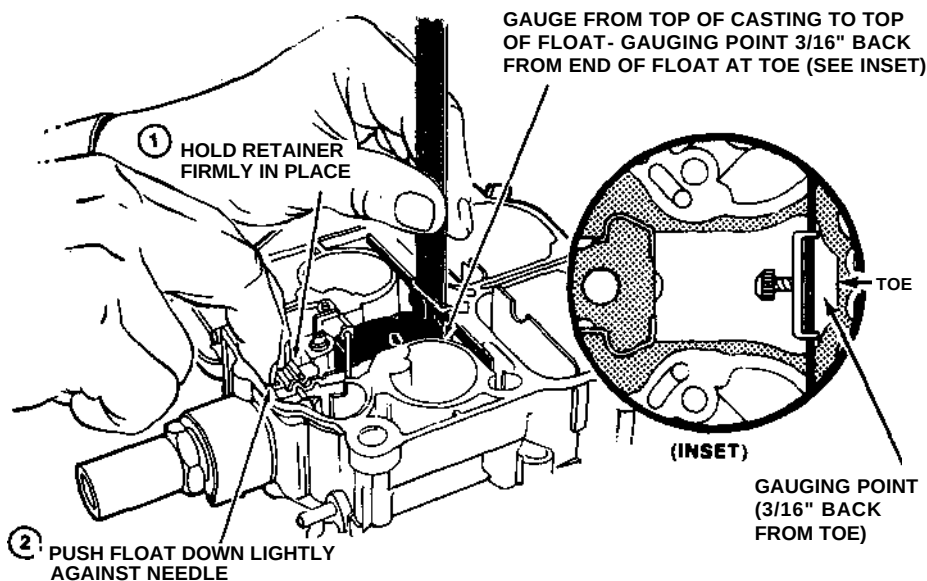
Remove the top cover and gasket, and use an adjustable T-scale to measure the distance from the top of the float bowl gasket surface to the top of the float at a point $\frac{3}{16}$ in. back from the toe of the float. While gauging the clearance, push down on the float retainer and press lightly on the float tab to seat the float needle. Bend the float tang to specifications.

FAST IDLE ADJUSTMENT

Close the primary throttles and position the cam follower above the high step of the fast-idle cam. Turn the fast-idle screw clockwise until it touches the lever then turn it down three full turns. Readjust the last idle rpm with the engine cold and running (choke closed).

CHOICE ROD ADJUSTMENT

NOTE: This procedure applies only to models having the choke thermostat mounted on the intake manifold.



Quadrajet® float level adjustment

FUEL ECONOMY & TUNE-UP TIPS

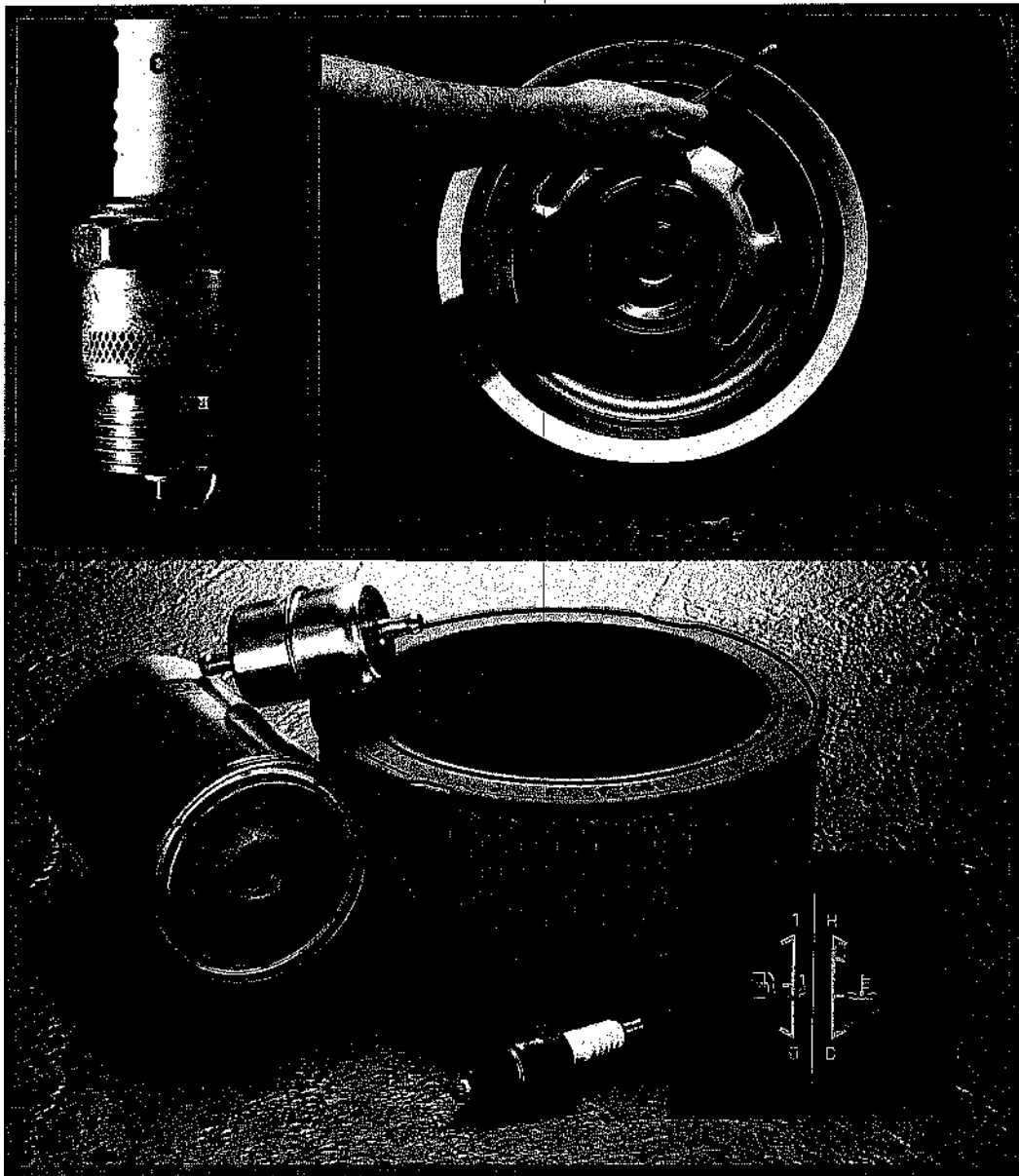
CHILTON'S

5 WAYS
TO IMPROVE
FUEL ECONOMY

Tune-up • Spark Plug Diagnosis * Emission Controls

Fuel System « Cooling System * Tires and Wheels

General Maintenance



CHILTON'S FUEL ECONOMY & TUNE-UP TIPS

Fuel economy is important to everyone, no matter what kind of vehicle you drive. The maintenance-minded motorist can save both money and fuel using these tips and the periodic maintenance and tune-up procedures in this Repair and Tune-Up Guide.

There are more than 130,000,000 cars and trucks registered for private use in the United States. Each travels an average of 10-12,000 miles per year, and, in total they consume close to 70 billion gallons of fuel each year. This represents nearly $\frac{2}{3}$ of the oil imported by the United States each year. The Federal government's goal is to reduce consumption 10% by 1985. A variety of methods are either already in use or under serious consideration, and they all affect you driving and the cars you will drive. In addition to "down-sizing", the auto industry is using or investigating the use of electronic fuel

delivery, electronic engine controls and alternative engines for use in smaller and lighter vehicles, among other alternatives to meet the federally mandated Corporate Average Fuel Economy (CAFE) of 27.5 mpg by 1985. The government, for its part, is considering rationing, mandatory driving curtailments and tax increases on motor vehicle fuel in an effort to reduce consumption. The government's goal of a 10% reduction could be realized — and further government regulation avoided — if every private vehicle could use just 1 less gallon of fuel per week.

How Much Can You Save?

Tests have proven that almost anyone can make at least a 10% reduction in fuel consumption through regular maintenance and tune-ups. When a major manufacturer of spark plugs sur-

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ecoriomyA,tune-U'p vyll.be wasted on an engine
in ROflrmechanical.conclitqnr.; j, , , ^., 2l
'Replace spark pjugs regularly; New spark
plugs;alone'cah increase; fuel; economy 3%.. ,
3; Secure the.sparV-pJugs are, the .correct
type (heat rajige) ifqr xoir vehicle. See the Tune-
Up Spfecifications. yH , v ; , " : ." "< -

conduct heat away from the firing end! It must conduct the heat away in an even pattern to avoid becoming a source of pre-ignition, yet it must also operate hot enough to burn off conductive deposits that could cause firing. The heat range is usually indicated by a number on the spark plug, part of the manufacturer's designation for each individual spark plug. The numbers in (bold-face) indicate the heat range in each manufacturer's identification system.

Manufacturer • **Designation**

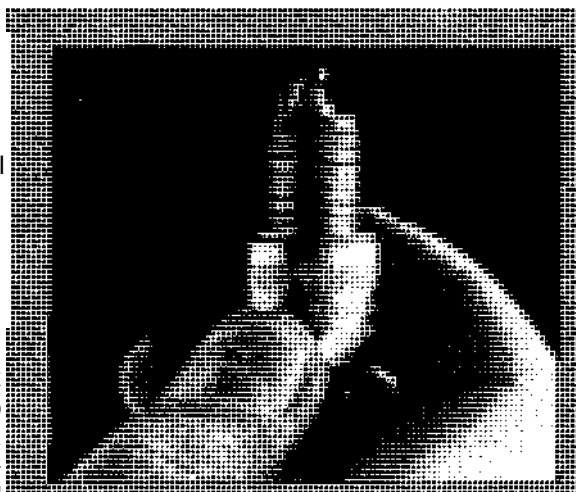
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Periodically check the spark plugs to be sure they are firing efficiently. They are excellent indicators of the internal condition of your engine.

On AC, Bosch (new), Champion, Fram/Autolite, Mopar, Moto,rcraft: and Prestolite, a higher number indicates a hotter plug. On Bosch (old), NGK and Nippondenso, a higher number indicates a colder¹ plug. 4: Make sure the spark plugs are properly gapped. See the Tune-Up Specifications in this

specifications. Tests, showing that almost all cars have incorrect ignition timing by more than 2°.

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9. Check the/outing ofte plug

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SPARK PLUG DIAGNOSIS

Normal

APPEARANCE: This plug is typical of one operating normally. The insulator nose varies from a light tan to grayish color with slight, electric blue wear. The presence of slight deposits is normal on used plugs and will have no adverse effect on engine performance. The spark plug heat range is correct for the engine and the engine is running normally.

CAUSE: Properly running engine.

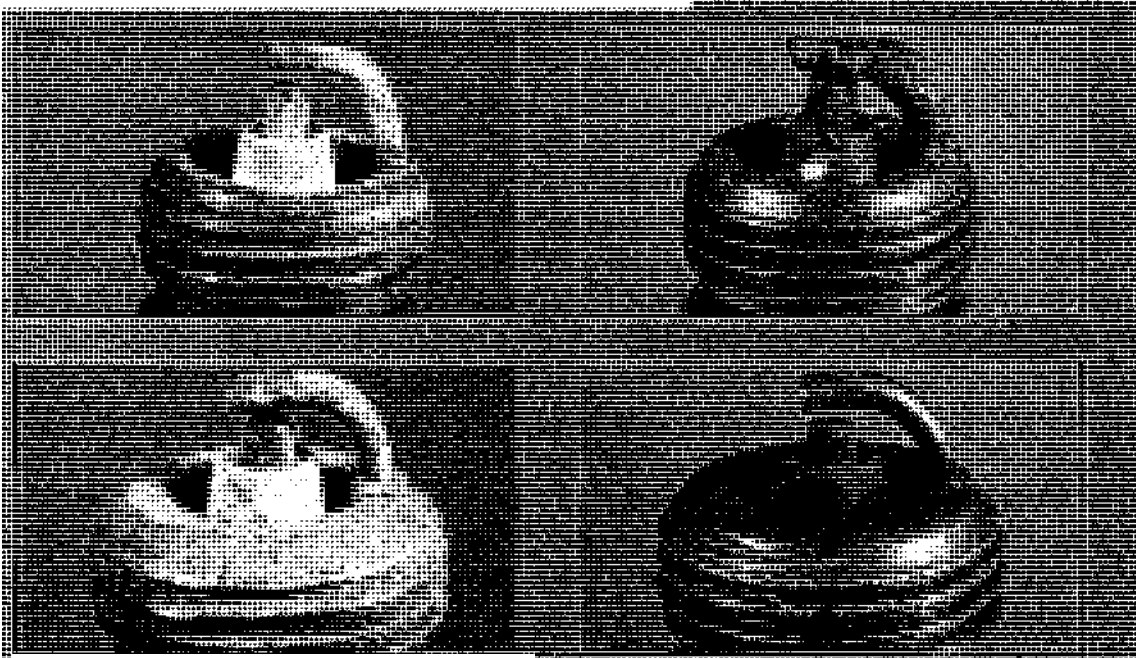
RECOMMENDATION: Before reinstalling this plug, the electrodes should be cleaned and filed square. Set the gap to specifications. If the plug has been in service for more than 10,000 miles, the entire set should preferably be replaced with a fresh set of the same heat range.

Oil Deposits

APPEARANCE: The firing end of the plug is covered with a wet, oily coating.

CAUSE: The problem is poor oil control. On high mileage engines, oil is leaking past the rings or valve guides into the combustion chamber. A common cause is also a plugged PCV valve, and a ruptured fuel pump diaphragm, cap also cause this condition. C3 oil fouled plugs such as these are often found in new or recently overhauled engines, before normal oil control is achieved, and can be cleaned and reinstalled.

RECOMMENDATION: A hotter spark plug may temporarily relieve the problem, but the engine probably will need work.



Incorrect Heat Range

APPEARANCE: The effects of high temperature on a spark plug are indicated by a clean white, often blistered, tabular. This can also be accompanied by excessive wear of the electrode, and the absence of deposits.

CAUSE: Check for the correct spark plug heat range. A plug which is too hot for the engine can result in overheating. A car operated mostly at high speeds can require a colder plug. Also check ignition timing, cooling system level, fuel mixture and leaking intake manifold.

RECOMMENDATION: If all ignition and engine adjustments are known to be correct and no other malfunction exists, install a spark plug one heat range colder.

Carbon Deposits

APPEARANCE: Carbon fouling is easily identified by the presence of dry, soft, black deposits.

CAUSE: Changing the heat range can often lead to carbon fouling, especially if the heat range is too rich. A rich fuel mixture, sticking valves, clogged air filter, weak breaker points, retarded timing, low compression, or only one or two plugs are carbon fouled, check for corroded or worn valves of the affected plugs. Also look for cracks in the distributor cap between the towers, or affected cylinders.

RECOMMENDATION: After the problem is corrected, the plugs can be

Photos Courtesy of Fram Corporation.

stalled it not worn severely.

EMISSION CONTROLS

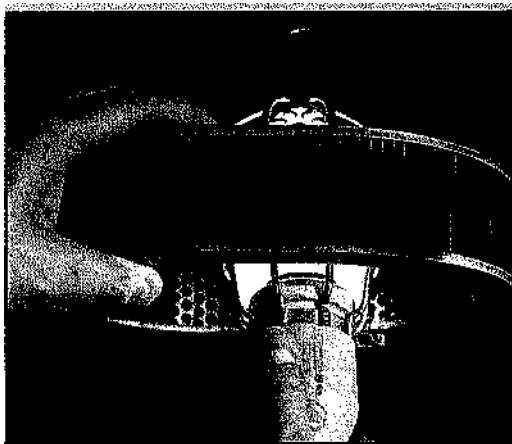
13. Be aware of the general condition of the emission control system: It contributes to reduced pollution and should be serviced regularly to maintain efficient engine operation.

14. Check all vacuum lines for dried, cracked

or brittle conditions. Something as simple as a leaking vacuum hose can cause poor performance and loss of economy.

15. Avoid tampering with the emission control system. Attempting to improve fuel econ-

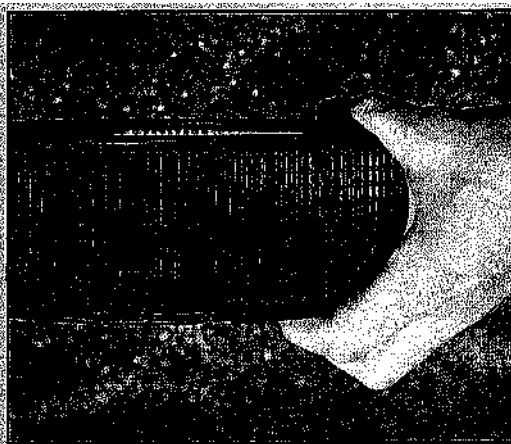
FUEL SYSTEM



Check the air filter with a light behind it. If you can see light through the filter it can be reused.

18. Replace the air filter regularly. A dirty air filter richens the air/fuel mixture and can increase fuel consumption as much as 10%. Tests show that 14 of all vehicles have air filters in need of replacement.

19. Replace the fuel filter at least as often as recommended.

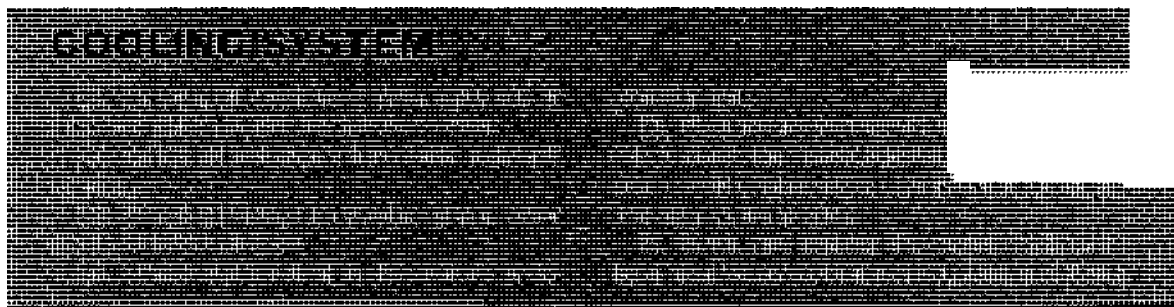


Extremely clogged filters should be discarded and replaced with a new one.

20. Set the idle speed and carburetor mixture to specifications.

21. Check the automatic choke. A sticking or malfunctioning choke wastes gas.

22. During the summer months, adjust the automatic choke for a leaner mixture which will produce faster engine warm-ups.



TIRES & WHEELS

38. Check the tire pressure often with a pencil type gauge. Tests by a major tire manufacturer show that 90% of all vehicles have at least 1 tire improperly inflated. Better mileage can be achieved by over-inflating tires, but never exceed the maximum inflation pressure on the side of the tire.

39. If possible, install radial tires. Radial tires

deliver as much as $\frac{1}{2}$ mpg more than bias belted tires.

40. Avoid installing super-wide tires. They only create extra rolling resistance and decrease fuel mileage. Stick to the manufacturer's recommendations.

41. Have the wheels properly balanced.

omy by tampering with emission controls is more likely to worsen fuel economy than improve it. Emission control-changes oh modern engines are not readily reversible. 16. Clean (or replace) the EGR valve and

lines as recommended.

17. Besure that all vacuum lines and hoses are reconnected properly after working under the hood. An unconnected or misrouted vacuum line can .wreak havoc with engine performance.

23. Check for fuel leaks at the carburetor, fuel pump, fuel lines and fuel tank. Be sure all lines and connections are tight.

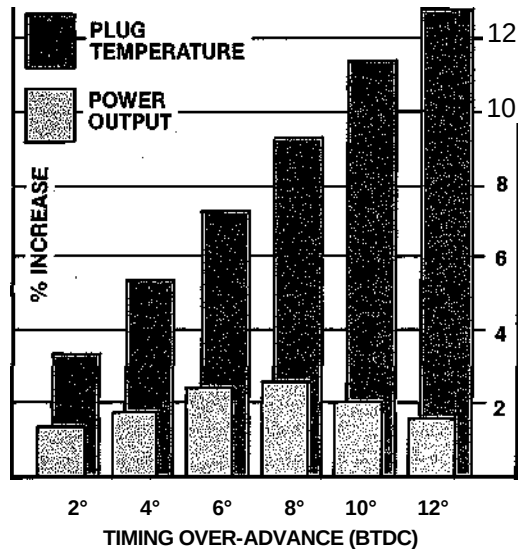
24. Periodically check the tightness ,of the carburetor and intake manifold attaching nuts and bolts. These are a common place for vacuum leaks to occur.

25. Clean the carburetor periodically and lubricate the linkage.

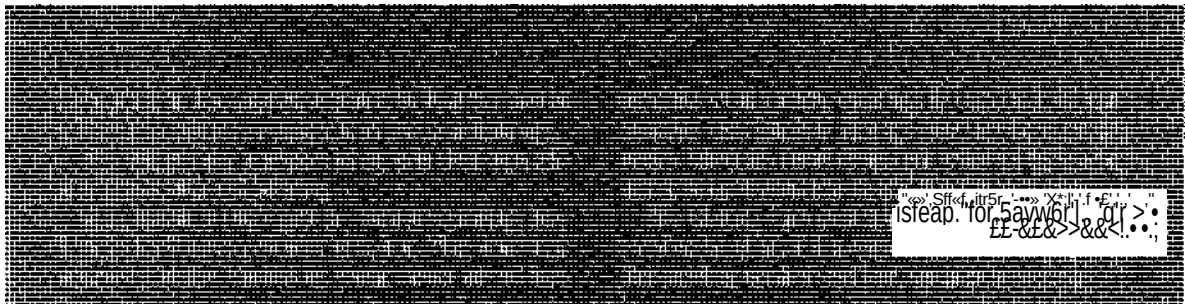
26. The condition of the tailpipe can be an excellent indicator of proper engine combustion. After a long drive at highway speeds, the inside of the tailpipe should be a light grey in color. Black or soot on the insides indicates an overly rich mixture.

27. Check the fuel pump pressure. The fuel pump may be supplying more fuel than the engine needs.

28. Use the proper grade of gasoline for your engine. Don't try to compensate for knocking or "pinging" by advancing the ignition timing. This practice will only increase plug temperature and the chances of detonation or pre-ignition with relatively little performance gain.



Increasing ignition timing past the specified setting results in a drastic increase in spark plug temperature with Increased chance of detonation orpreignition. Performance increase is considerably less. (Photo courtesy Champion Spark Plug Co.)



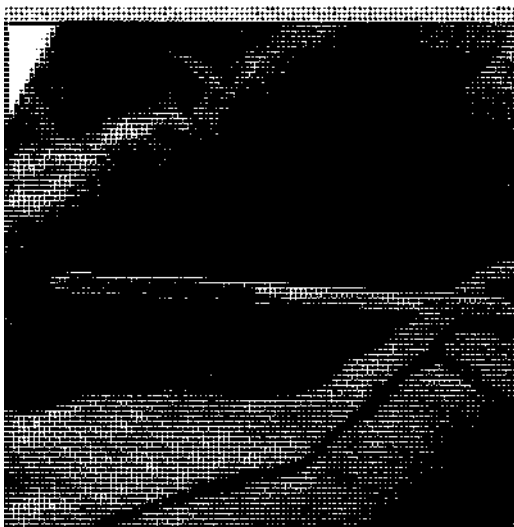
42. Be sure the front end is correctly aligned. A misaligned front end actually has wheels going in differed directions. The increased drag can reduce fuel economy by .3 mpg.

43. Correctly adjust the wheel bearings. Wheel bearings that are adjusted too tight in crease rolling resistance.

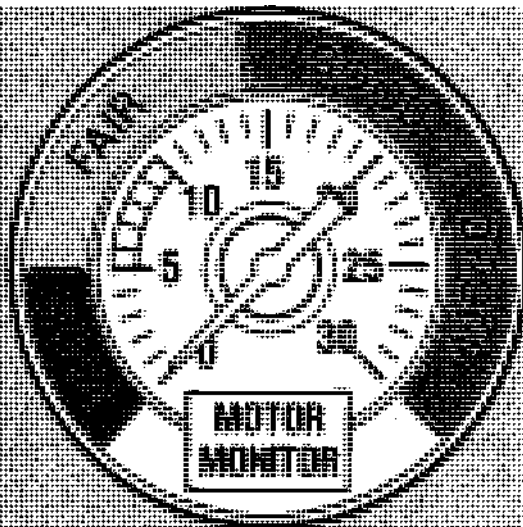


Check tire pressures regularly with a reliable pocket type gauge. Be sure to check the pressure on a cold tire.

GENERAL MAINTENANCE



Check the fluid levels (particularly engine oil) on a regular basis. Be sure to check the oil for grit, water or other contamination.



A vacuum gauge is another excellent indicator of internal engine condition and can also be installed in the dash as a mileage indicator.

44. Periodically check the fluid levels in the engine, power steering pump, master cylinder, automatic transmission and drive axle.

45. Change the oil at the recommended interval and change the filter at every oil change. Dirty oil is thick and causes extra friction between moving parts, cutting efficiency and increasing wear. A worn engine requires more frequent tune-ups and gets progressively worse fuel economy. In general, use the lightest viscosity oil for the driving conditions you will encounter.

46. Use the recommended viscosity fluids in the transmission and axle.

47. Be sure the battery is fully charged for fast starts. A slow starting engine wastes fuel.

48. Be sure battery terminals are clean and tight.

49. Check the battery electrolyte level and add distilled water if necessary.

50. Check the exhaust system for crushed pipes, blockages and leaks.

51. Adjust the brakes. Dragging brakes or brakes that are not releasing create increased drag on the engine.

52. Install a vacuum gauge or miles-per-gallon gauge. These gauges visually indicate engine vacuum, in the intake manifold. High vacuum = good mileage and low vacuum = poorer mileage. The gauge can also be an excellent indicator of internal engine conditions.

53. Be sure the clutch is properly adjusted. A slipping clutch wastes fuel.

54. Check and periodically lubricate the heat control valve in the exhaust manifold. A sticking or inoperative valve prevents engine warm-up and wastes gas.

55. Keep accurate records to check fuel economy over a period of time. A sudden drop in fuel economy may signal a need for tune-up or other maintenance.

Position the cam follower on the second step of the fast-idle cam, touching the high step. Close the choke valve and gauge the clearance between the lower edge of the valve and the body. Bend choke rod to obtain the specified clearance.

CHOKE COIL LEVER ADJUSTMENT

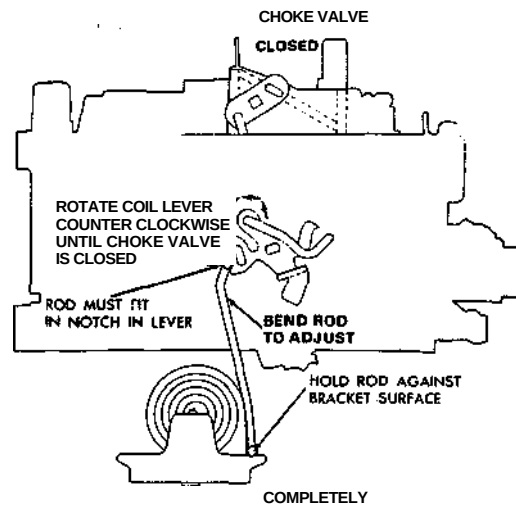
Refer to the accompanying illustration to perform this adjustment.

AIR VALVE ROD ADJUSTMENT

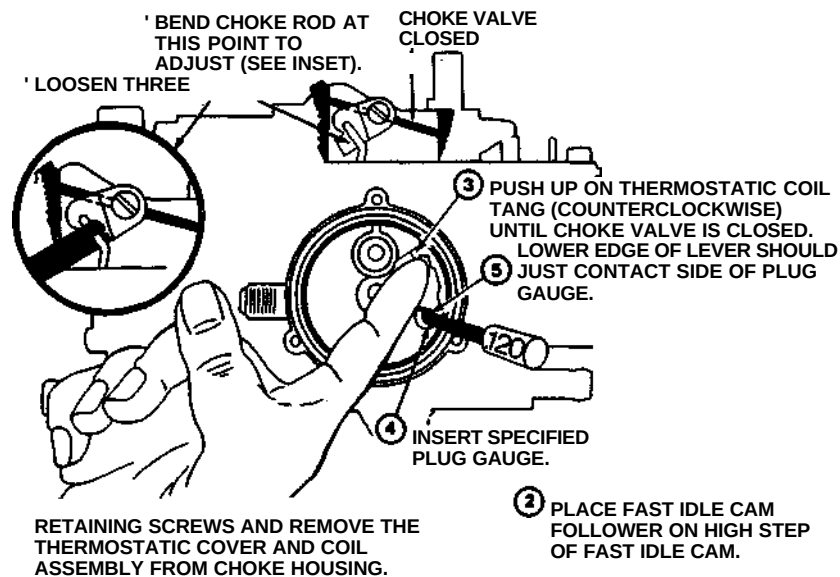
Refer to the accompanying illustration to perform this adjustment.

FRONT VACUUM BREAK ADJUSTMENT

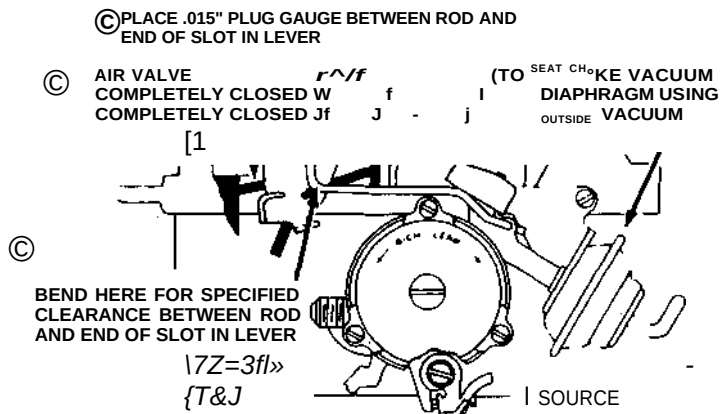
Refer to the accompanying illustrations to perform this adjustment.



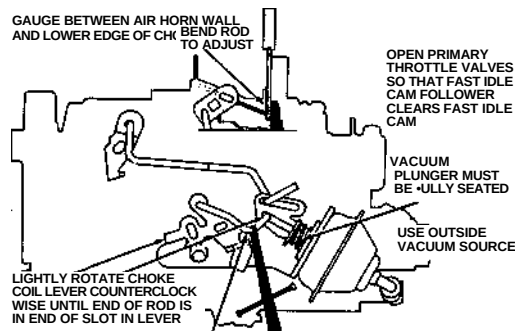
Quadrajet® choke rod adjustment



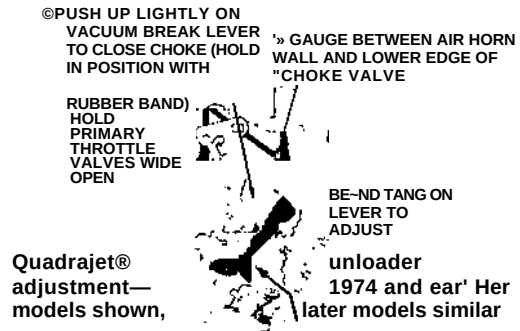
Quadrajet® choke coil lever adjustment



Quadrajet¹⁸¹ air valve rod adjustment



Quadrajets¹⁸ front vacuum break adjustment—early models without an adjusting screw

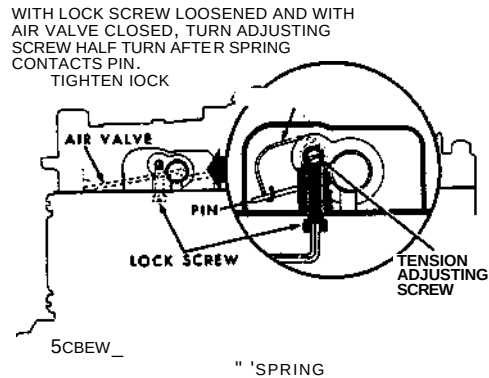


CHOKE UNLOADER ADJUSTMENT

Close the choke valve and secure it with a rubber band hooked to the vacuum break lever. Open the primary throttles all the way. Then measure the distance between the air horn and edge of the choke butterfly. On models up to and including 1976, use the bottom side of the butterfly for this measurement; on 1977 and later models, use the top side. Bend the fast idle lever tang to achieve the proper opening of the choke.

AIR VALVE SPRING ADJUSTMENT

NOTE: Loosening and tightening the locking screw to adjust the air valve spring re-



Quadrajets® air valve spring adjustment
FIGURE 1.

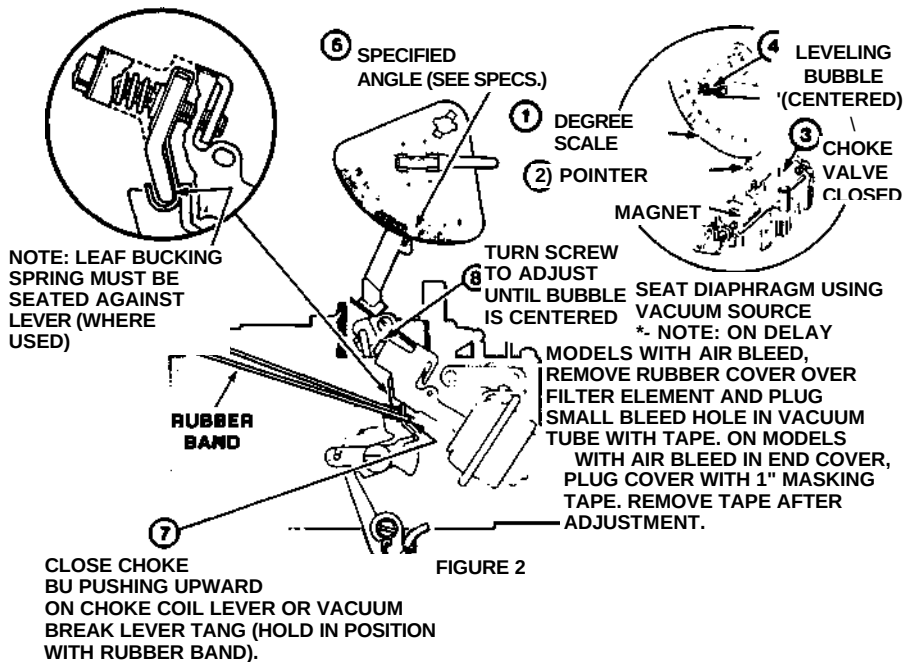


FIGURE 2

Quadrajets⁸¹ front vacuum break adjustment—late models with an adjusting screw

quires a hex wrench on 1977 and later model carburetors.

Remove all spring tension by loosening the locking screw and backing out the adjusting screw. Close the air valve and turn the adjusting screw in until the torsion spring touches the pin on the shaft, and then turn it the additional number of turns specified. Secure the locking screw.

DISASSEMBLY AND ASSEMBLY

NOTE: *Due to the many minor design changes in the Quadrajets®, some steps may not apply to your carburetor. E4ME carburetors should be serviced only by qualified, professional technicians. CAUTION: NEVER immerse any plastic or rubber carburetor part in carburetor cleaner. Also, use extreme caution when handling the carburetor to prevent damaging the throttle shaft or valves.*

1. Remove the solenoid and bracket from the float bowl, if so equipped. Disconnect the upper choke rod and lever from the choke shaft (one screw). Rotate the lever to remove it from the rod. Remove the choke rod by holding the lower lever outward and twisting the rod counter-clockwise.

2. Remove the secondary metering rods and the hanger by removing the small screw from the hanger. Using a narrow drift punch, tap the accelerator pump lever pivot pin inward, just enough to release the lever. Grasp the lever and pump rod (together) and rotate to remove from the throttle linkage.

3. Remove the air horn-to-float bowl screws (nine).

NOTE: *Be sure to remove the two screws located within the primary venturi area. You may not notice these screws at first glance.*

Remove the air horn assembly by lifting it straight up, off of the float bowl.

CAUTION: *Use care to avoid damaging the small brass tubes protruding from the air horn—these tubes are permanently pressed into the air horn.*

4. Remove the vacuum line from the vacuum break unit. Remove the vacuum break assembly and disconnect the rod from the secondary air valve lever.

CAUTION: *Further disassembly of the air horn is not required. DO NOT remove any plugs which are located on the air horn.*

5. Remove the air horn gasket from the float bowl. Use care to withdraw the gasket

from beneath the primary metering rod hanger. Remove the accelerator pump plunger from the pump well.

6. Remove the power piston and metering rods by pushing downward on the piston and allowing the assembly to snap back (upward). This may have to be repeated several times to free the plastic power piston retainer ring.

CAUTION: *Do not pry or pull the power piston from the piston well. Remove the power piston spring from the well.*

7. Remove the plastic filler block from the float bowl. Remove the float, float retainer, and needle from the float bowl. Using a large, flat-bladed screwdriver, remove the needle seat and gasket.

8. Remove the plastic aneroid cavity insert from the float bowl. If desired, unscrew and remove the primary main metering jets from the float bowl.

CAUTION: *DO NOT attempt to remove the secondary main metering jets from the float bowl, as these jets are permanently fixed to the bowl.*

9. Remove the accelerator pump discharge ball and retainer (appears as a screw next to the pump well). Remove the secondary air baffle, if it is to be replaced.

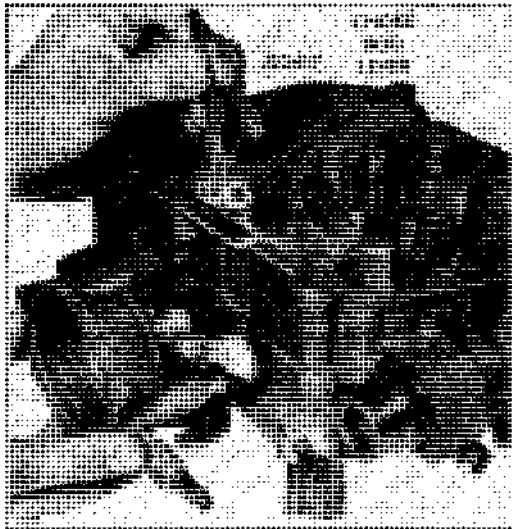
NOTE: *On models using an intake manifold mounted choke thermostat, disassembly of the choke mechanism is not required to clean the carburetor. On models using a hot air, carburetor mounted choke assembly, it is not necessary to disassemble the choke mechanism if you plan to spray carburetor cleaner on the carburetor passages only—if you plan to immerse the carburetor, follow the next two steps to remove the choke assembly from the float bowl.*

10. Remove the choke thermostat cover from the choke housing (three screws). Remove the choke housing retaining screw from inside the choke housing. Remove the complete choke housing assembly from the fuel bowl by sliding it outward.

11. Remove the secondary lock-out lever from the float bowl. Remove the lower choke lever from inside the float bowl by inverting the float bowl.

CAUTION: *Do not immerse the choke housing assembly in carburetor cleaner.*

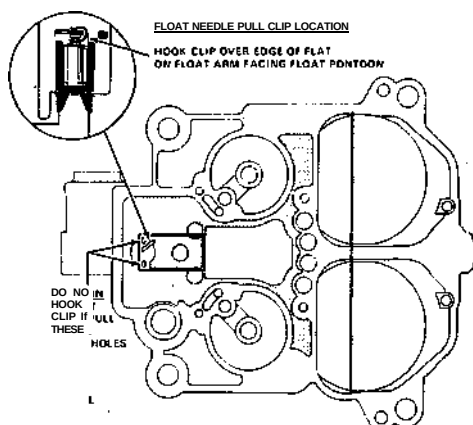
12. Remove the fuel inlet nut, gasket, and filter. Remove the throttle body-to-fuel bowl screws then remove the throttle body assembly and the gasket.



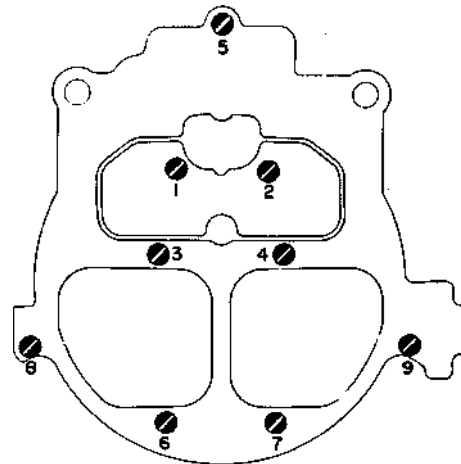
Installing the lower choke rod lever—Quadrajets® typical

Assembly is the reverse of the previous steps. Note the following points during assembly:

- Install the lower choke rod lever as shown in the accompanying illustration.
- When installing the float and needle, **DO NOT** put the needle clip into either of the float bracket holes. The clip must be installed as shown in the accompanying illustration.
- Install the plastic filler block **BEFORE** the metering rods and hanger. When installing the primary metering rods, make sure the rod tips are positioned in the primary jets, then lower the power piston. To seat the plastic power piston retainer, evenly push it into the top of the piston bore with a small screwdriver.



Correct positioning of the float needle clip—**DO NOT** put the clip into either of the float bracket holes—Quadrajets®



Quadrajets® air horn screw torque sequence

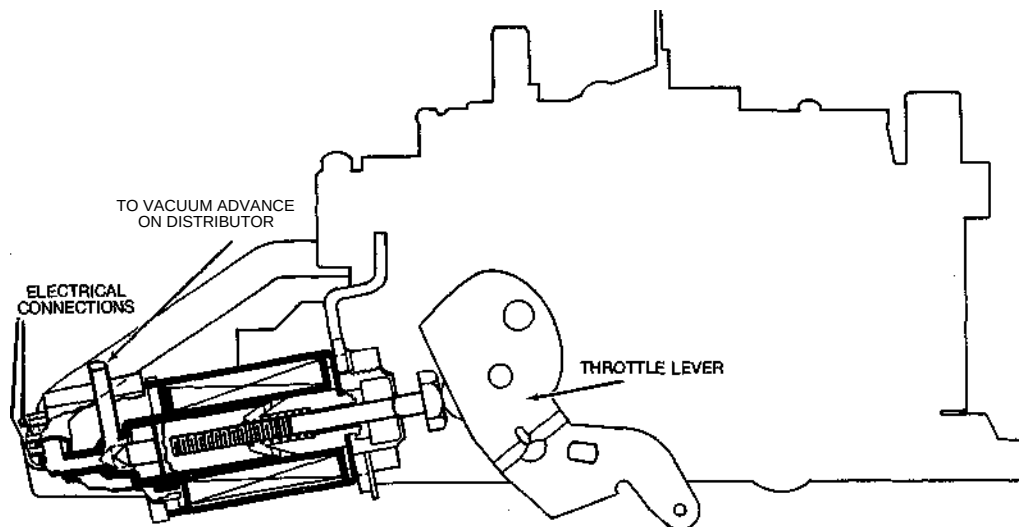
d. When installing the air horn assembly, be sure to follow the accompanying torque sequence diagram for the air horn screws.

e. When installing the accelerator pump lever and rod, engage the lower end of the rod into the throttle linkage, and align the lever pivot hole with the pivot pin. Push the pin through by carefully prying it with a screwdriver (between the pin and the choke plate wall).

C.E.C. VALVE MAINTENANCE—1971 QUADRAJET ONLY

The Rochester 4MV Quadrajets has a number of revisions for 1971 which include: calibration changes, greater capacity accelerator pump, increase in the size of the vacuum break diaphragm restriction to 0.020 in., a beefed-up, choke-closing assist spring, removal of the wide open kick lever from the choke unloader mechanism and its replacement with a tang on the fast-idle lever that contacts the fast-idle cam and forces the choke valve to admit more air under flooded engine conditions, and the adaption of a combination emission control valve (C.E.C. valve). This valve increases the idle speed during high gear overrun and helps to control normally unburned hydrocarbons. The mixture is set at the factory and the idle-mixture screws are capped to prevent adjustment in the field.

When disassembling the carburetor, remove the C.E.C. valve from the carburetor but leave the valve bracket attached to the carburetor. Do not immerse the C.E.C. valve in carburetor cleaner. Disassembly practices differ in the 1971 4MV due to calibration



Quadrajets CEC valve

changes. Of primary importance is the revised procedure for removing the power piston. Do not use pliers but press the piston down and release it. Do not remove the idle mixture screws.

If it should be necessary to replace the idle-mixture adjustment screws, carefully bottom the old screws and count the turns so that the replacement screws will retain the same mixture.

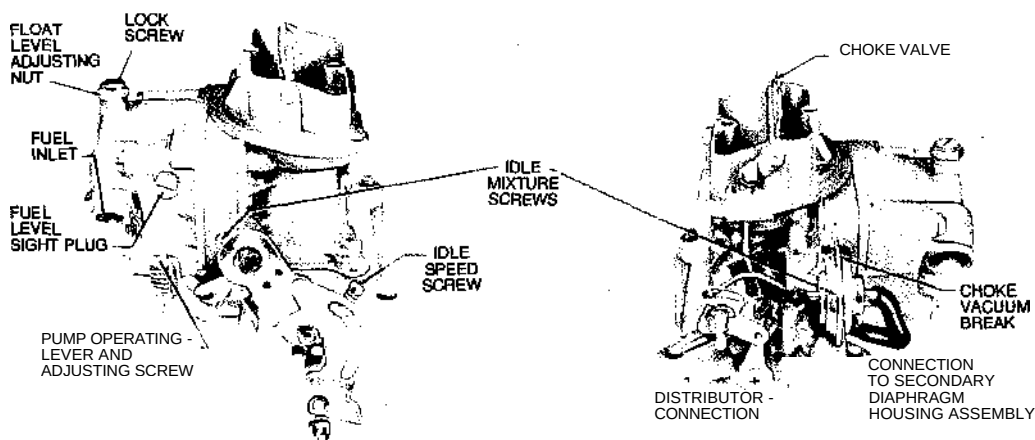
If the throttle body is replaced it will be necessary to adjust the idle-mixture screws. Before making the adjustment, read and follow the instructions on the inner fender tune-up sticker on each 1971 and later Corvette. Lightly bottom the mixture screws and back out four turns. Set the idle-speed adjusting screw to obtain the specified initial idle speed, then make equal adjustments to the mixture

screws until the required carbon monoxide level is reached in the exhaust gas. Adjust the idle-speed screw until the final idle setting is achieved. Install the idle-mixture screws' limiter caps and reconnect the distributor vacuum hose and the fuel tank vapor hose.

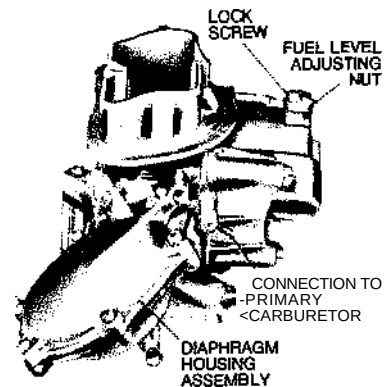
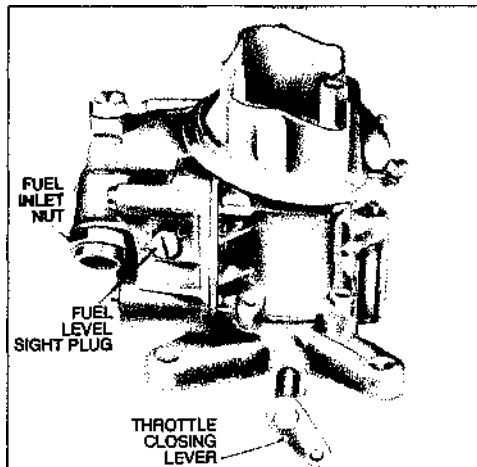
An alternate method is available if access to exhaust gas analyzing equipment is not practical. Follow the same procedure until the mixture adjustment stage. Adjust the mixture screws equally leaner until the final idle speed is achieved. Install the limiter cap, vacuum hose, and tank vapor hose.

Holley 2300 and 2300C Carburetors

The Holley 2300 and 2300C are used as the three, two-barrel high performance option on



Holley 2300C primary carburetor



Holley 2300 secondary carburetor

the 427 engine from 1967 through 1969. This configuration uses one 2300C as the primary carburetor and two 2300 models as the two secondary units. The two models differ in that the C model contains the choke, power, and accelerator pump systems while the straight 2300 does not. The C model is operated through conventional linkage while the two secondaries are vacuum actuated.

IDLE ADJUSTMENT

Adjust the idle-speed screw until it touches the throttle lever. Add one and 1/2 turns to obtain the preliminary adjustment.

Fast-idle adjustment on the primary carburetor is made as follows: crack the throttle, and with the choke closed, place the fast-idle lever against the top step of the fast-idle cam. Bend the fast-idle lever so that the specified opening of the throttle plate on the idle transfer slot of the carburetor is achieved.

FLOAT LEVEL ADJUSTMENT

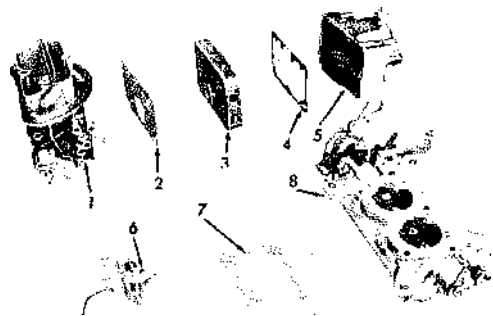
Position the car on a flat, level surface and start the engine. Remove the sight plugs and check to see that the fuel level reaches the bottom threads of the sight plug port. A plus or minus tolerance of 1/4 in. is acceptable. To change the level, loosen the fuel inlet-needle locking screw and adjust the nut. Clockwise lowers the fuel level and counter-clockwise raises it. Turn the nut 1/16 of a turn for each 1/16 in. desired change. Open the primary throttle slightly to assure a stabilized adjusting condition on the secondaries. There is no required float drop adjustment.

ACCELERATOR PUMP ADJUSTMENT-PRIMARY CARB

Secure the throttle plate fully open and depress the pump lever, fully. Gauge the distance between the pump lever arm and the spring adjusting nut. Turn the nut or screw to adjust. The slightest movement of the throttle lever will actuate the correctly adjusted pump lever.

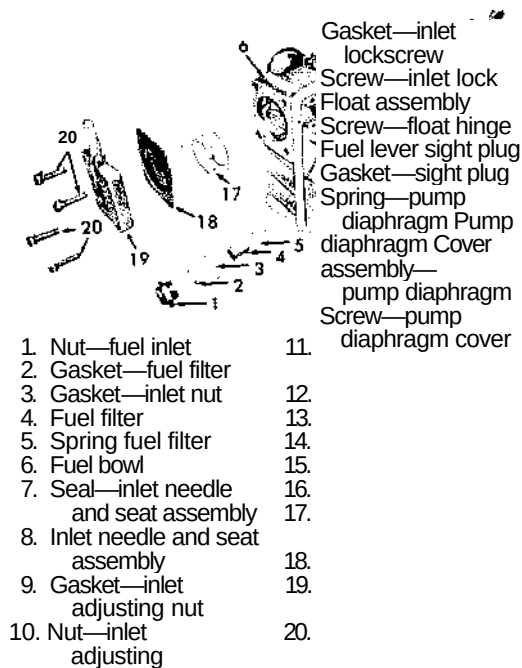
VACUUM BREAK ADJUSTMENT-PRIMARY CARB

Secure the choke valve closed and restrain the vacuum break against its stop. Bend the break rod to achieve the specified measurement between the lower edge of the choke valve and the body.



- | | |
|-------------------------|-------------------------|
| 1. Carburetor body | 5. Fuel bowl assembly |
| 2. Metering body gasket | 6. Vacuum break |
| 3. Metering body | 7. Throttle body gasket |
| 4. Fuel bowl gasket | 8. Throttle body |

Primary carburetor components



Primary carburetor float bowl; secondary has no accelerator pump

CHOKE UNLOADER ADJUSTMENT-PRIMARY CARB

Fully open the throttle valve and secure it. Close the choke valve against the throttle shaft unloader tang and bend the choke rod to obtain the specified measurement between the lower edge of the choke valve and the body.

DISASSEMBLY AND ASSEMBLY

Primary Carburetor

1. Remove the fuel bowl, metering body, and splash shield. Disconnect the vacuum break hose, remove the throttle body attachment screws, and separate the throttle body from the primary carburetor body.
2. Remove the fuel inlet baffle, float hinge screws, and the brass float. Remove the needle and seat assembly lock screw, then back out the adjusting nut and remove the seat assembly.
3. Remove the sight plug and gasket, fuel inlet fitting, filter, spring and gasket. Remove the accelerator pump cover, diaphragm, and spring.
4. Check the accelerator pump inlet ball. If damage is evident, replace the bowl assembly.
5. Remove the main metering jets, power valve, vacuum fitting, and the idle-mixture needles and screws.

6. Remove the choke vacuum break, choke lever and fast-idle cam. Remove the accelerator pump discharge nozzle and its check valve.

7. Reverse the above procedure to assemble.

Secondary Carburetors

1. Remove the fuel bowl and metering block. Disconnect the secondary diaphragm housing from the throttle lever and separate the housing from the carburetor body.

2. Remove the throttle body attaching screws and separate the throttle body from the main body. Remove the fuel inlet baffle hinge screws and plastic float.

3. Remove the needle and seat assembly, sight plug, fuel inlet fitting, filter, and spring. Remove the metering body plate and gaskets. Remove the diaphragm cover and diaphragm.

4. Reverse this procedure to reassemble.

Holley 4150, 4160 Series Carburetors

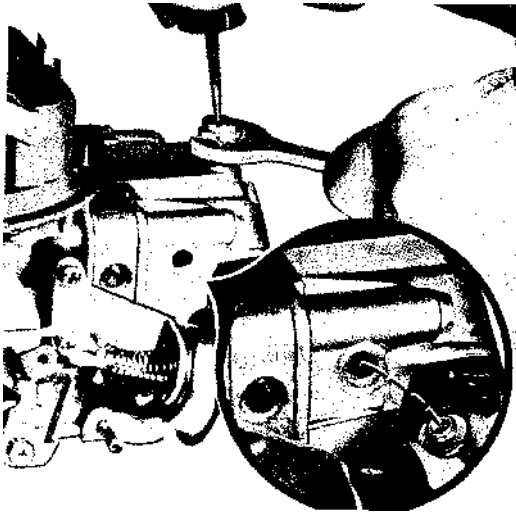
Holley four-barrel carburetors first appeared on the Corvette in 1964. The 4160 used is an end-inlet carburetor, while the 4150 carburetors used have been both end and center-inlet designs. The secondary metering body on the 4150 carburetor is similar to the primary metering body. The 4160 secondary metering body is a cast body and a plate attached to the main body by six screws. The center-inlet 4150 has been utilized on the higher performance versions of the Corvette. In 1971, the Holley carburetor has revised calibration and a C.E.C. valve. Holley part numbers are located on the carburetor air horn.

CHOKE ADJUSTMENT

The early model 4150 uses a bi-metallic choke mounted on the carburetor. It is correctly set when the cover scribe mark aligns with the specified notch mark. The later model 4150 and 4160 employ a remotely located choke. To adjust, disconnect the choke rod at the choke lever and secure the choke lever closed. Bend the rod so that when the rod is depressed to the contact stop, the top is even with the bottom of the hole in the choke lever.

FLOAT LEVEL ADJUSTMENT

Position the car on a flat, level surface and start the engine. Remove the sight plugs and



Holley float level adjustment

check to see that the fuel level reaches the bottom threads of the sight plug port. A plus or minus tolerance of ± 2 in. is acceptable. To change the level, loosen the fuel-inlet needle locking screw and adjust the nut. Clockwise lowers the fuel level and counter-clockwise raises it. Turn the nut $\frac{1}{16}$ of a turn for each $\frac{1}{16}$ in. desired change. Open the primary throttle slightly to assure a stabilized adjusting condition on the secondaries. There is no required float drop adjustment.

FAST-IDLE ADJUSTMENT

Early 4150

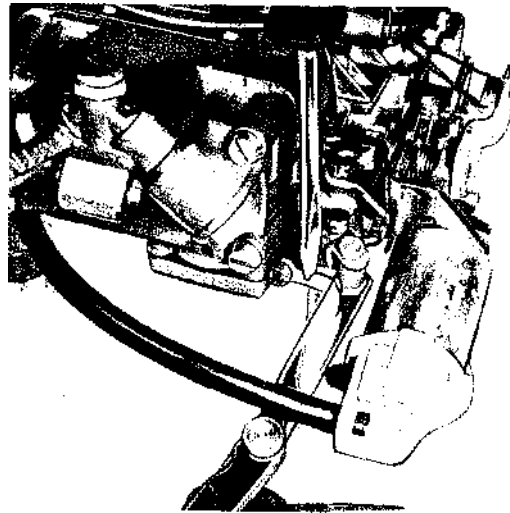
Bring the engine to normal operating temperature with the air cleaner off. Open the throttle. Place the fast-idle cam on its high step and close the throttle. Adjust the fast-idle screw to reach the specified idle speed.

Late Model 4150 and 4160

Open the throttle and place the choke plate fast-idle lever against the top step of the fast-idle cam. Bend the fast-idle lever to achieve the specified throttle plate opening.

CHOKE UNLOADER ADJUSTMENT

Adjustment should be made with the engine not running. Fully open and secure the throttle plate. Force the choke valve toward a closed position, so that contact is made with the unloader tang. Bend the choke rod to gain the specified clearance between the main body and the lower edge of the choke valve.



Holley accelerator pump adjustment

ACCELERATOR PUMP ADJUSTMENT

Turn off the engine. Block open the throttle and push down the pump lever. Clearance between the pump lever arm and the spring adjusting nut should be 0.015 in. minimum. Turn the screw or nut to adjust this clearance.

SECONDARY THROTTLE VALVE ADJUSTMENT

Late Model 4150 and 4160

Close the throttle plates then turn the adjustment screw until it contacts the throttle lever. Advance the screw $\frac{1}{8}$ turn more.

AIR VENT VALVE ADJUSTMENT

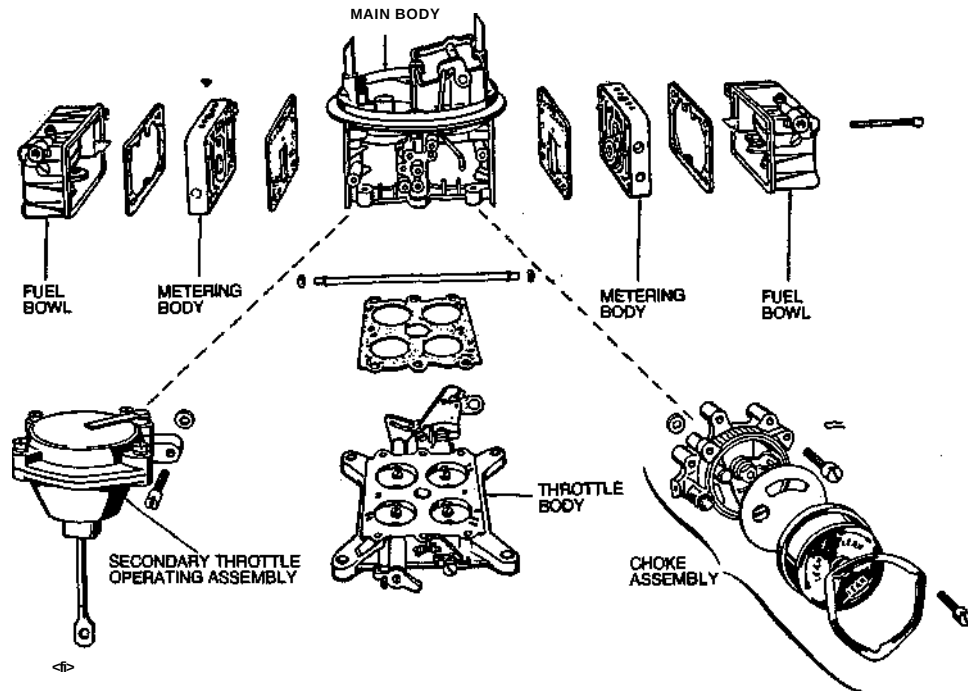
Late Model 4150 and 4160

Close the throttle valve and open the choke valve so that the throttle arm is free of the idle screw. Bend the air vent valve rod to obtain the specified clearance between the choke valve and seat. Advance the idle-speed screw until it touches the throttle lever then advance it $\frac{1}{4}$ turns.

VACUUM BREAK ADJUSTMENT

Late Model 4150 and 4160 Holley

Secure the choke valve closed and the vacuum break against the stop. Bend the vacuum break link to gain the specified clearance between the main body and the lower edge of the choke valve.



Exploded view
of Holley 4150

C.E.C. VALVE ADJUSTMENT

1971 4150 Holley

This adjustment is made only when it has been necessary to remove the throttle plate, overhaul the carburetor, or replace the solenoid. To adjust, warm the engine and place the transmission in Neutral for manual transmissions or Drive for automatic transmissions. If so equipped, turn off the air conditioner. Disconnect the vapor-canister fuel tank hose and remove and plug the distributor vacuum hose. Extend the C.E.C. valve plunger until it touches the throttle lever and then adjust its length until the specified idle speed is reached.

DISASSEMBLY AND ASSEMBLY

Disassembly and assembly are similar for the 4150 and 4160 series carburetors although there are minor differences from model to model. The following is a generalized disassembly and assembly procedure for all Corvette, four-barrel Holley carburetors.

1. Remove the primary and secondary fuel bowls, metering bodies, plates, splash shields, and fuel tubes.

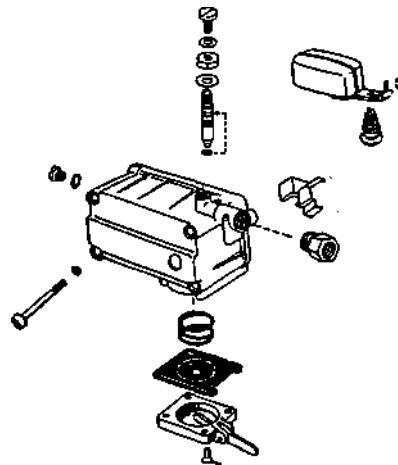
2. Disconnect the secondary throttle-operating rod from the throttle lever. Remove the secondary throttle-operating assembly and gasket from the main body of the carburetor.

3. Remove the float hinge pin retainer and remove the float and spring from the bowl. If so equipped, remove the inlet baffle.

4. Loosen the inlet needle and seat lock screw and remove the assembly. Remove the sight plug and gasket.

5. Remove the inlet fitting(s), gaskets, fuel filter, and spring.

6. On the primary bowl: remove the air vent assembly (except early 4150); remove the pump diaphragm screws and lift the pump housing, diaphragm, and spring from the fuel bowl; check that the pump inlet ball can move



Exploded view of Holley 4150 bowl

freely. Replace the bowl assembly if ball movement is restricted or if either the ball or passage are damaged.

7. To disassemble the metering body (all except 4160 secondary): remove the main metering jets.

CAUTION: Use a jet wrench or very wide screwdriver to prevent damaging the jets. Use a one-inch, twelve-point socket to remove the power valves. On the primary side, remove the idle mixture screws and seals.

8. On the 4160 secondary: remove the plate and gasket from the metering body dowel pins.

9. On the early model 4150: remove the choke housing, retainer, and gasket. Remove the choke housing shaft, fast-idle cam, and choke piston.

10. On kte model 4150 and 4160 carburetors: remove the choke vacuum break dis connecting link, fast-idle cam, and choke lever.

11. Remove the discharge nozzle, invert the carburetor, and shake the discharge needle out.

12. Replace gaskets, seals, and small parts with those provided in the rebuilding kit. Reverse the disassembly procedure to assemble the carburetor.

Fuel Injection—1963-65

The Rochester fuel injection system was a performance option on 1963 through 1965 327 cubic inch engines. It delivers a constantly regulated air/fuel flow regardless of the engine requirements and eliminates carburetion difficulties caused by cornering or braking. While the fuel injection system is more complex than the ordinary carburetor, it is not beyond the repair capabilities of that average owner/mechanic—provided he adheres to procedure and specification recommendations.

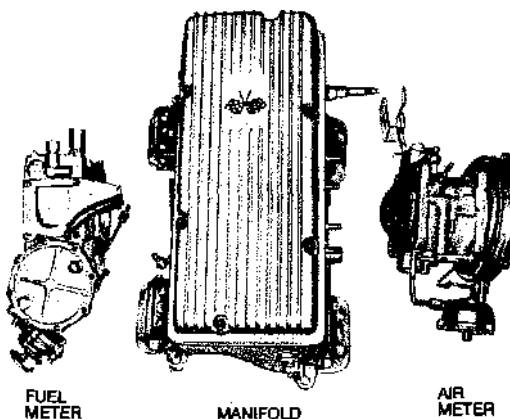
The first hurdle is understanding the design of the fuel injector and this is best done by thinking of the unit as three separate systems, interlocked to accomplish a common function. The first system is the air meter and this simultaneously furnishes the fuel meter with an assessment of the load demands of the engine and feeds air to the intake manifold. The intake manifold is designed to ram charge the air as it distributes it to the cylinders. The fuel meter evaluates the air meter signal and furnishes the correct amount of fuel

to the nozzles where it is injected into the engine.

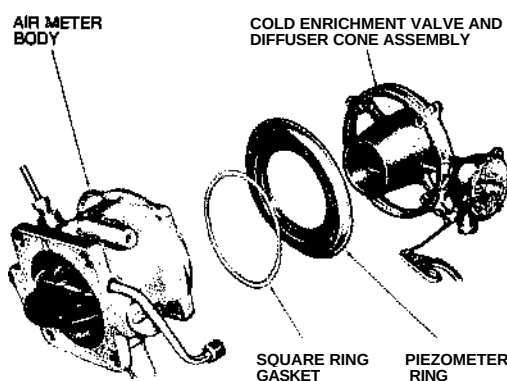
DESCRIPTION AND OPERATION

Air Meter

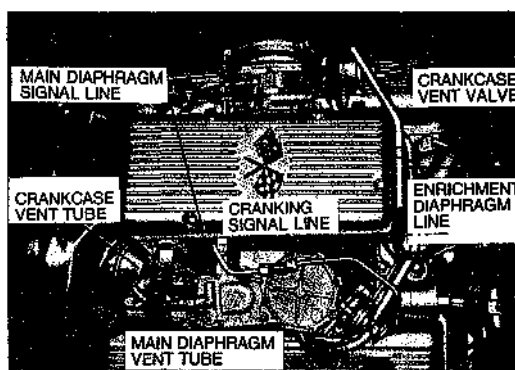
The 1963-1964 air meter consists of three sub-components: the throttle valve, cold enrichment valve and diffuser cone assembly, and the die meter housing. The 1965 air meter



Three major components of the fuel injection system



Exploded view of the air meter



Fuel injection lines

was modified to the extent that a choke piston was added and the choke valve stop was relocated in the diffuser cone. This allows an initial choke opening of 10° which increases to 30° after an initial cold start. The throttle valve regulates the flow of air into the manifold and is mechanically actuated by the accelerator pedal. The diffuser cone, suspended in the bore of the air meter inlet, functions as an annular venturi and accelerates the air flow between the cone and the meter housing. The air meter houses the previously mentioned components plus the idle and main venturi signal systems.

The main venturi vacuum signals are generated at the venturi as the incoming air rushes over an annular opening formed between the air meter body and piezometer ring. They are then transmitted through a tube to the main control diaphragm in the fuel meter. The venturi vacuum signal measures the flow of air into the engine and automatically controls the air/fuel ratio. The one exception to this is at idle speeds.

Idle air requirements are handled differently by the fuel injection method. Approximately 40% of the idle-speed air flow enters the engine through the nozzle block air connections tapped into the air meter body. Part of the remaining 60% flows past the throttle valve which is pre-set against a fixed stop. The remainder enters through the idle air, by-pass passage that is controlled by the large, idle-speed adjusting screw. Idle speed is adjusted by turning this screw in or out.

Fuel Meter

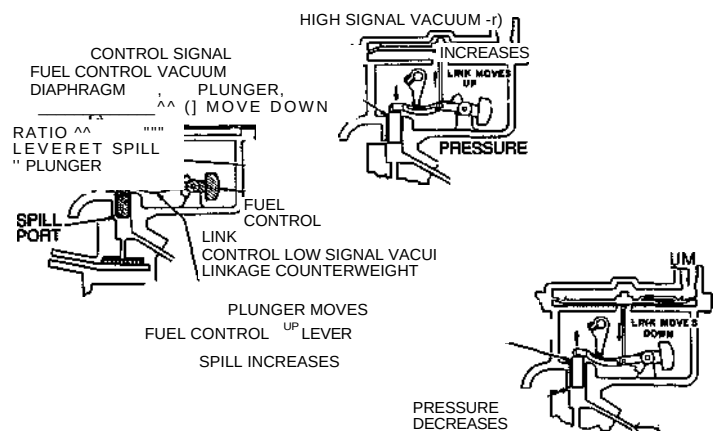
The fuel meter's float-controlled fuel reservoir is basically the same as that found in conventional carburetion. The fuel meter receives fuel from the regular engine fuel pump. The incoming fuel is routed through a 10 micron filter before entering the main reservoir of the fuel meter, where the high pressure gear pump picks it up. This, high pressure, spur-gear type pump is completely submerged in the lower part of the fuel meter main reservoir. A distributor-powered, flexible shaft drives the pump at engine speed. Fuel pressures span a range of near zero to 200 psi, according to engine speed. Fuel not used by the engine reenters the fuel meter through a fuel control system. The 1965 fuel meter contains a vent screen and baffle which helps to stabilize the air/fuel mixture.

Fuel Control System

A fuel control system regulates fuel pressure (flow) from the fuel pump to the nozzles. This flow is controlled by the amount of fuel that is spilled or recirculated from the high pressure pump, through the nozzle block, back to the fuel meter spill ports. This is accomplished by a three-piece spill plunger or disc that is located between the gear pump and the nozzles.

When high fuel flow is required, it moves downward, closing the spill ports to the fuel meter reservoir and concentrating the flow to the nozzle circuits. Correspondingly, the spill plunger or disc must be raised to allow the spill ports to be exposed when a low fuel flow is required. This causes the main output of the gear pump to by-pass the nozzle circuits and reenter the meter reservoir through the now-opened spill ports.

The spill plunger is not mechanically controlled by the accelerator pedal. Fuel control is accomplished by a precisely counterbalanced linkage system sensitive to fuel pressure and diaphragm vacuum. Thus the slightest change in venturi vacuum signal on the main control diaphragm will activate the linkage. One end of the fuel control lever rests against the spill plunger head while the other end connects by a link to the main control diaphragm. The control lever pivots on the roller end of an arm called the ratio lever. When the increased vacuum above the diaphragm forces the control lever upward, the lever pivots on the ratio lever's roller and pushes the spill plunger or disc downward. This closes the spill ports and steps up fuel flow to the nozzles. When decreased vacuum above the diaphragm reverses the pivot action, fuel pressure forces the spill plunger



Fuel control linkage

upward and permits the spill ports to by-pass fuel into the reservoir, thus fuel flow to the nozzles is reduced.

The diaphragm vacuum-to-fuel pressure ratio, and subsequent fuel/air ratio, is regulated by the position of the ratio lever. As the ratio lever changes position, the mechanical advantage of the linkage system also changes, thus providing the correct fuel/air ratio for each driving condition. As long as engine manifold vacuum exceeds 8 in. Hg (mercury), the ratio lever remains at the economy stop and fuel flow follows the dictates of the main control diaphragm vacuum. A sudden decrease in manifold vacuum moves the ratio lever to the power stop. The resulting increase in the mechanical advantage of the linkage system closes the spill ports and increases full flow to the nozzles.

Starting System

Cold engine starting conditions require richer fuel/air mixtures to compensate for poor fuel evaporation. The absence of an accelerator pump prevents the driver from providing extra fuel by pumping the accelerator pedal. The correct method is to depress the pedal once and then release. This pre-sets the throttle for starting by the fast-idle cam. The vacuum signal generated at cranking rpm is very low and must be boosted. This boost is provided by a spring-loaded, open-cranking signal valve located at the enrichment diaphragm housing. This open valve allows the manifold cranking vacuum to react directly on, and lift, the main control diaphragm. This closes the spill valve. In addition, the spring-loaded enrichment diaphragm holds the ratio lever at the rich or power stop, thus providing maximum fuel flow to the nozzles. As soon as the engine starts, manifold vacuum overcomes the springs in the cranking signal valve and enrichment diaphragm, and the regular idle system is brought into operation.

The vacuum-controlled, cranking-signal valve circuit was eliminated on 1965 model injectors and replaced by a solenoid-controlled, by-pass fuel circuit. This system delivers the entire output engine fuel pump to the fuel distributor via a by-pass line. The fuel is then routed through a check valve and finally arrives at the individual nozzles. The control solenoid is energized when the ignition switch is held in the start position and the accelerator pedal is depressed less than V_s of its travel. Depressing the accelerator pedal further trips a micro-switch on the

dirotde linkage and stops fuel delivery to the by-pass circuit.

Idle System

Correct injector operation at idle speed is highly dependent upon the generation of a strong venturi signal and its subsequent transmittal to the control diaphragm. To ensure this signal during cold engine idle, the fast-idle cam holds the throttle valve cracked open. This increases the velocity of air flowing through the venturi which in turn strengthens the venturi vacuum signal being transported to the main control diaphragm. The electrically heated choke valve remains closed during initial cold engine operation, and this requires the entire air flow to pass through the venturi. This rerouting of the air flow generates a usable venturi signal even at relatively low engine speeds. Intake manifold vacuum acts directly on the enrichment diaphragm. The diaphragm's response movement adjusts the ratio lever to the economy stop as soon as manifold vacuum is sufficient to overcome the diaphragm spring. As the electric heating element senses a rise in engine temperature, it relaxes the thermostat and permits the choke valve to open. Air flow through the venturi decreases and the signal generated here drops. The idle signal system now becomes the more dominant signal.

Fuel control during warm engine idle is a result of main control diaphragm response to the idle circuit signal. With the ratio lever already positioned at the economy stop, air now enters through the idle air circuit and the nozzle blocks.

Acceleration

Acceleration is instantaneous at normal driving speeds. Opening the throttle valve increases both air flow and the venturi signal at the main diaphragm. The momentary drop in manifold vacuum causes the ratio lever to move to the power stop position. A calibrated restriction in the main control signal circuit stabilizes the idle signal and adds this to the total signal as long as it is present.

Ratio Lever—Power Stop

The air/fuel ratio requirements for power are basically the same as those necessary for acceleration. The drop in manifold vacuum, caused by a wide-open throttle condition, moves the ratio lever to the power stop. The open throttle also provides a stronger venturi signal through the increased air flow.

Hot Starting/Unloading

Rich mixtures must be prevented during hot starting/unloading situations. Depressing the accelerator pedal to fully open the throttle valve during starting will prevent high vacuum from reaching the cranking signal valve and will facilitate starting.

Hot Idle Compensator

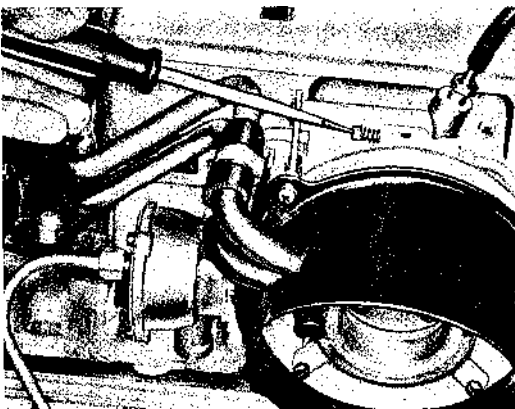
Extremely hot operation conditions can cause rich mixture conditions that detrimentally affect engine smoothness and idling. To remedy this, a thermostatically controlled valve on the top side of the air meter throttle valve allows additional air to bleed into the manifold and restore the idle mixture to a correct ratio.

Idle Speed and Fuel Adjustments

Idle speed and fuel adjustments require pre-setting of the idle-speed and idle-fuel adjusting screws $\frac{1}{2}$ turns out from their fully closed position. Start the engine and adjust the idle-



Idle speed adjustment



Idle mixture adjustment

speed screw until 800-850 rpm is obtained. Adjust the idle-fuel screw until the smoothest engine idle is attained. Should the two idle-adjusting screws become completely out of phase, purge the system or stop the engine and repeat the entire preceding procedure.

Fast Idle-Speed and Cold Enrichment Adjustments

Adjust the fast idle-speed by bending the enrichment linkage until clearance between the fast-idle cam and the adjusting screw resembles the illustration. With the engine stopped, crack the throttle valve and manually close the cold enrichment valve. Release the throttle linkage and check to see that the fast-idle is now positioned for cold engine operation. Release the cold enrichment valve, warm the engine, and adjust the fast-idle screw to obtain 2200 rpm. Make the cold enrichment adjustment by setting the cold enrichment cover to 3 notches lean. Be sure that the valve linkage operates freely.

Ratio Lever Stop Settings

This series of adjustments requires the use of a manometer. Attach the manometer in a convenient place on the vehicle and use the two-position bracket so that the most vertical position may be obtained. After the unit has been leveled by means of the leveling vial, open both water manometer valves and see if a zero reading exists. If not, adjust the oil leveling screw. If this fails to zero the indicator, add red oil (specific gravity 0.826). Back off the leveling screw for this procedure.

Remove both hose adapters on the mercury (Hg) manometer and plugs located in the adapters. Install the tee fitting in the most easily accessible fuel nozzle circuit. Attach the fuel pressure line to the tee fitting and the mercury manometer. Check the fuel trap inlet to see that it is properly positioned in the line. Clamp the venturi signal line to the cranking signal valve line and the water manometer. Check the clamp to be sure it is tightly closed on the line. If it isn't, high vacuum during engine cranking will cause the red oil to be lost. Replace the main diaphragm vent tube with the large rubber tube. Adjust the scale of the mercury manometer to read zero inches. Recheck the manometer leveling vial and make any necessary adjustments. This completes the installation.

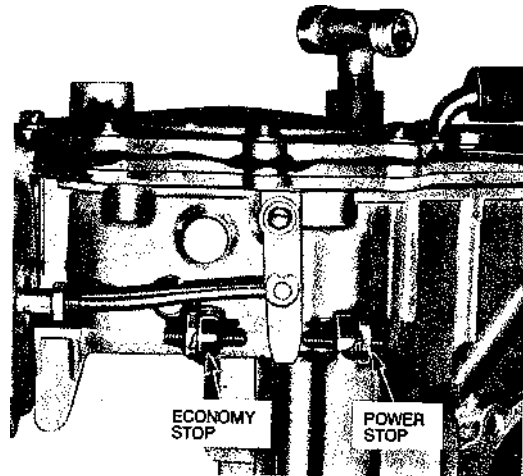
The economy stop adjustment procedure begins with a visual check of the unit for physical defects. With the engine warmed up,

check to see that the unit is operating on the economy stop. Some injectors may be difficult to start with the cranking-signal valve line disconnected. The line may be reconnected during the initial starting procedure.

Increase engine rpm until a 0.5 in. signal is registered on the water manometer. Check the mercury manometer and record its reading. Decrease the engine rpm and repeat the above procedure. Average three readings for best accuracy. To adjust, loosen the locknut and turn the economy stop screw in or out until the mercury manometer reads 0.8 in. (± 0.1 in.) when the water manometer reads 0.5 in.

The power stop readings are obtained with the manometer hooked up as in the previous procedure. Disconnect and plug the vacuum line going to the enrichment diaphragm and the injection unit will operate only on the power stop. Do not prolong this operation or spark plug fouling will result.

Increase the engine rpm until a 0.5 in. signal is reached on the water manometer and check and record the mercury manometer reading. Reduce engine speed and repeat the above operation. Average three readings for the best results. Check the enrichment diaphragm to see that it is not bottoming in the housing. To adjust the power stop, loosen the

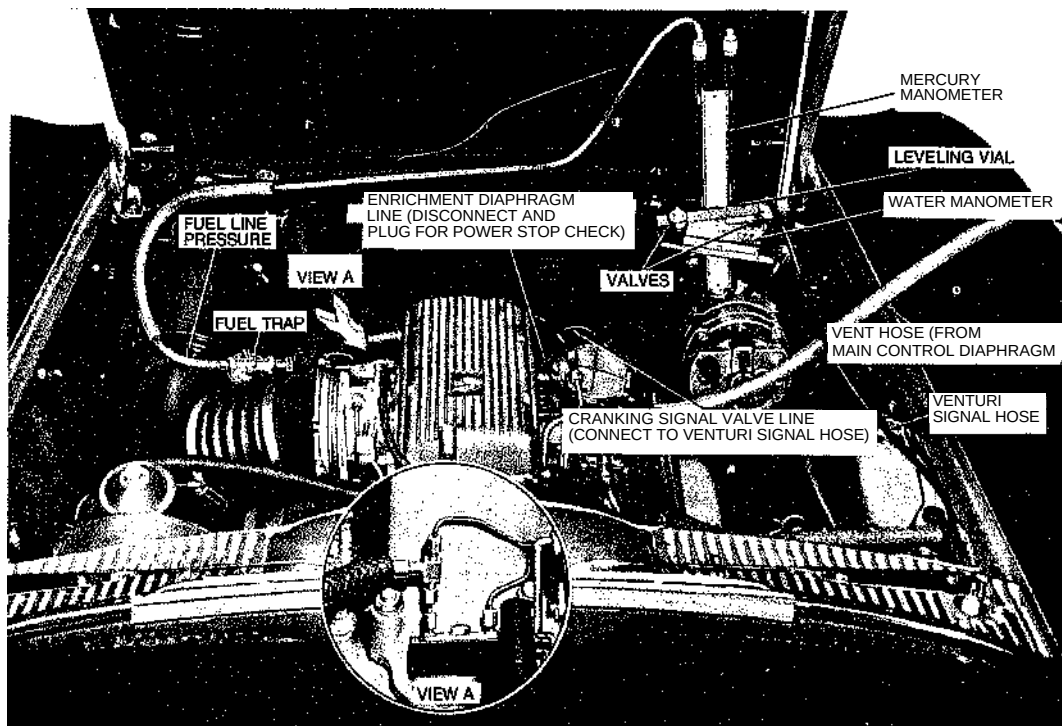


Economy and power stop adjusting screws

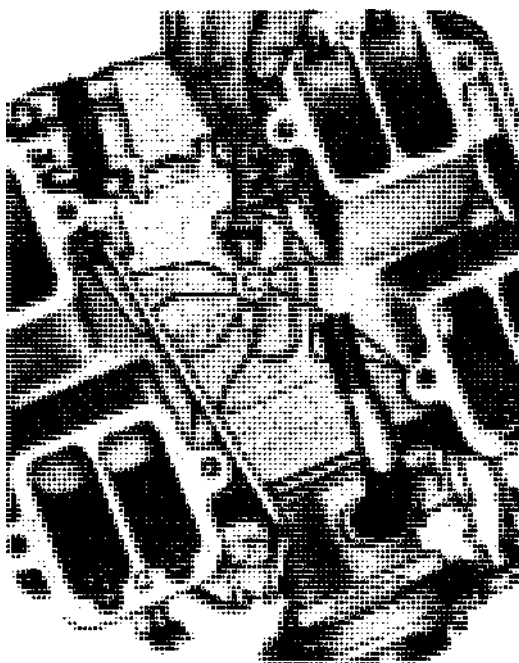
locknut and turn the adjusting screw until a reading of 1.2 in. (± 0.1 in.) is reached on the mercury manometer when the water manometer reads 0.5 in.

REMOVAL AND INSTALLATION

1. Disconnect the washer vacuum line, accelerator linkage, electric choke lead wire, and the bellcrank return spring.
2. Loosen the flexible hose clamp and slide the hose from the air meter adapter.



Manometer installation



Removing fuel pressure lines

3. Disconnect the fuel line at the filter and the drive cable coupling at the distributor by sliding the cable into the pump housing to disengage it from the distributor, and then pulling it clear. Don't lose the fiber washer on the end of the cable.

4. Remove the engine/manifold adapter-plate retaining nuts and lift the assembly from the engine.

5. Install a $\frac{1}{2}$ in. x 2 in. bolt and nut in each manifold outer mounting-hole to allow the unit to be placed upright on a workbench without damaging the nozzles.

6. Reverse the above procedure to install.

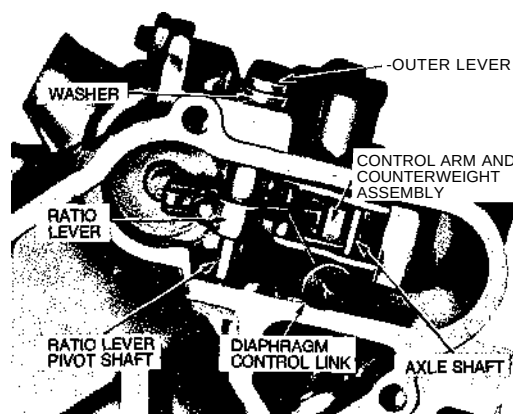
DISASSEMBLY AND ASSEMBLY

1. The first step in disassembly is to separate the fuel injection unit into its three main components: fuel meter, air meter, and manifold.

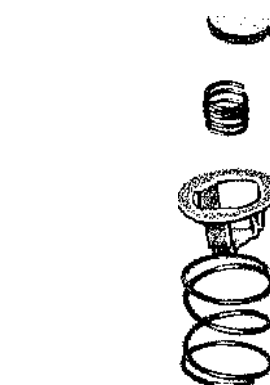
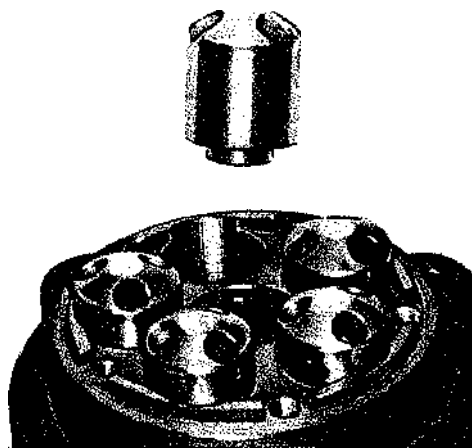
2. Separate the air meter from the injector unit by disconnecting the bellcrank from the pivot shaft and leaving it attached to the air meter. Disconnect the main control signal tube at both ends and remove. Remove the retaining nuts and washers and carefully lift the air meter while simultaneously disconnecting the rubber, nozzle balance tube elbow at the air meter.

3. Disconnect the enrichment diaphragm tube at both ends, disengaging the tube at the manifold end first. Disconnect the

main control diaphragm vent tube at both ends. Invert the injector and drain the fuel reservoir through the cover vent, then disconnect the fuel pressure lines. Remove the lower retaining screws, the single upper bolt, and the short vent tube. Discard the rubber



Ratio lever control linkage



Fuel pump piston and valve assembly

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O-ring at the fuel meter end of the fuel line. Remove the fuel meter from the injector unit.

4. Disassemble the air meter by removing the air cleaner adapter, fast-idle cam pivot screw, diffuser cone assembly, and piezometer ring from the air meter.

5. Remove the idle-speed and idle-fuel adjusting screws. The throttle valve need not be removed unless shaft binding exists.

6. Disassemble the fuel meter by removing the diaphragm cover and shield. Carefully remove the diaphragm retaining nut and diaphragm from the control link. The control link must be kept from rotating to prevent damaging the control link.

7. Remove the nylon splash shield, the fuel bowl cover attaching screws and carefully lift the cover, upper support bracket, and gasket from the meter body. Do not bend the control link. Start the link into the slot, then pry the opposite side upward and turn the shield over the link.

8. Remove the fuel pump, enrichment housing, and cranking signal valve. Remove the spill plunger cover and filter, spill plunger and sleeve assembly from the fuel meter bore. If the spill plunger separates from the sleeve, use a hooked wire to pull the sleeve out.

9. Remove the ratio lever and shaft. Rotate the control arm and counterweights on the axle and remove the axle. Remove the control arm and counterweight assembly from the meter body. This will also remove the lead sealing ball on the outer end of the axle shaft.

10. The fuel pump is secured to the fuel meter by 5 screws. Remove these, noting that the shortest screw is positioned in the 9 o'clock position. With pump separated from the fuel meter, scribe reassembly marks on the pump housing.

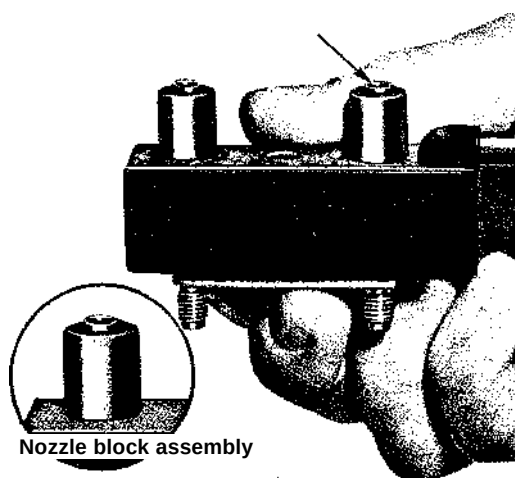
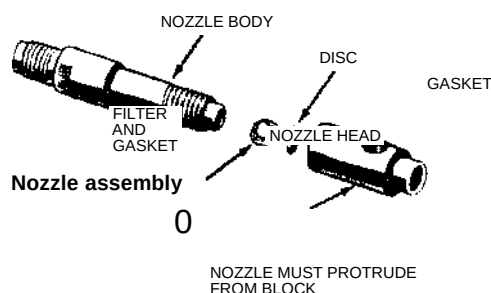
11. Remove the cover attaching screws and the cover. Hand pressure is sufficient to pull the drive shaft from the pump drive gear and housing. Use a suitable driver to remove the drive shaft seal from the pump housing. Bear in mind, the fuel meter contains 48 parts in addition to screws. Be careful. Reassembly is the reverse of this procedure.

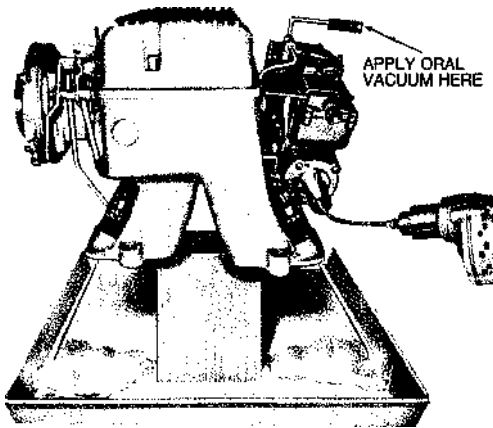
12. Nozzles may be disassembled for cleaning but care should be taken to ensure correct reassembly. Never clean nozzle orifices with wire. If a nozzle is dirty, replace it. Should more than one nozzle be found exceptionally dirty, replace the fuel meter filter. Replace nozzles only as complete assemblies and according to the following chart:

13.

Nozzle Code	Part Number
W17or18	7017323
X18or19	7017324
Y19or20	7017325

13. Begin disassembly by carefully disconnecting and lifting the fuel lines out of the way. Disconnect either the throttle bell crank or fuel pump drive cable when removing nozzles in their vicinity. Remove the nozzles and nozzle blocks as complete assemblies. Invert the blocks and remove the individual nozzles. Carefully remove the old nozzle gaskets. Disassemble the unit by securing the nozzle body and inserting a drift punch in the head to turn it. Avoid damaging, losing, or mixing parts. Remember: the nozzle orifice discs are assembled with the bright side toward the engine. After cleaning or replacing nozzle assemblies, reinstall them in the nozzle block, using new gaskets. Check to see that the nozzle gaskets remain in position during reinstallation and that the nozzles are properly placed in the nozzle shields. Reassembly is the reversal of this procedure.



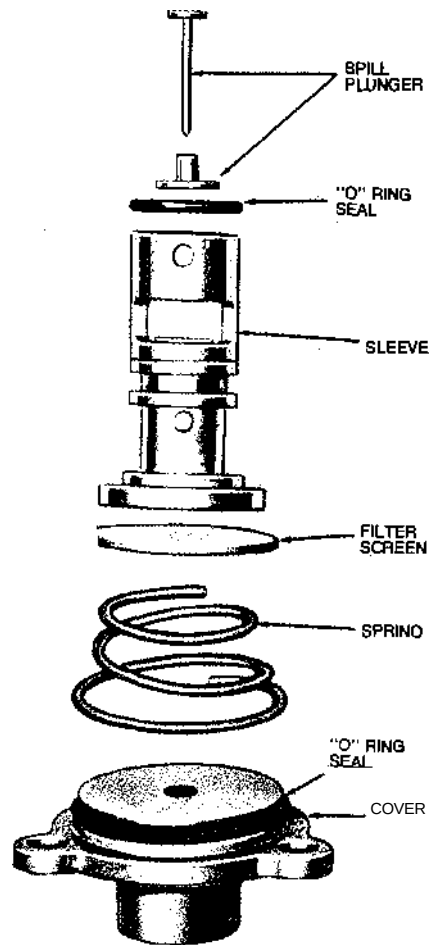


Checking spray pattern

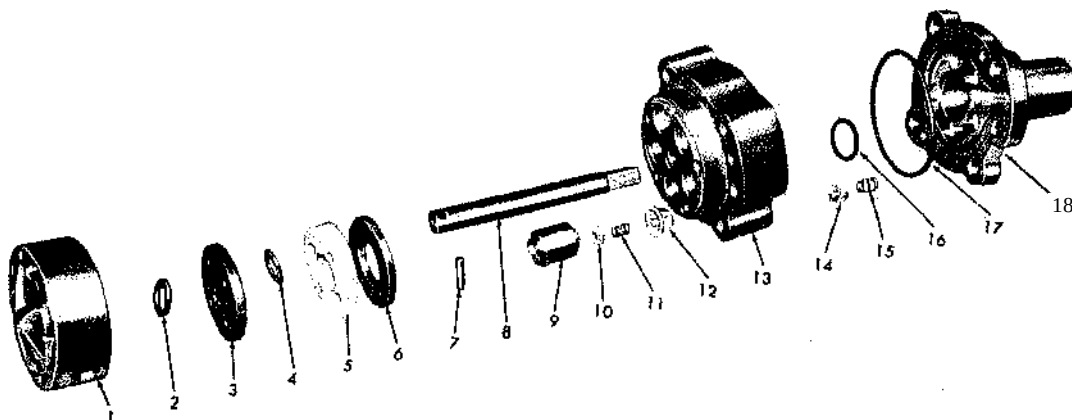
14. A fuel nozzle spray-pattern check should be made whenever a complete nozzle cleaning is made. Drive the gear pump with an electric drill while applying oral vacuum at the main control diaphragm. The latter ensures that all fuel is routed through the nozzle circuit. The spray pattern is correct when each bank of nozzles appears as a single spray when viewed from the end of the assembly.

15. Spill plunger assemblies are basically the same for all fuel injection units. After removing the assembly from the fuel meter, lubricate with fuel, and check the valve action. Clean or replace the assembly as required.

16. Reassembly of the air meter is the reversal of the disassembly procedure. At this



Spill plunger assembly

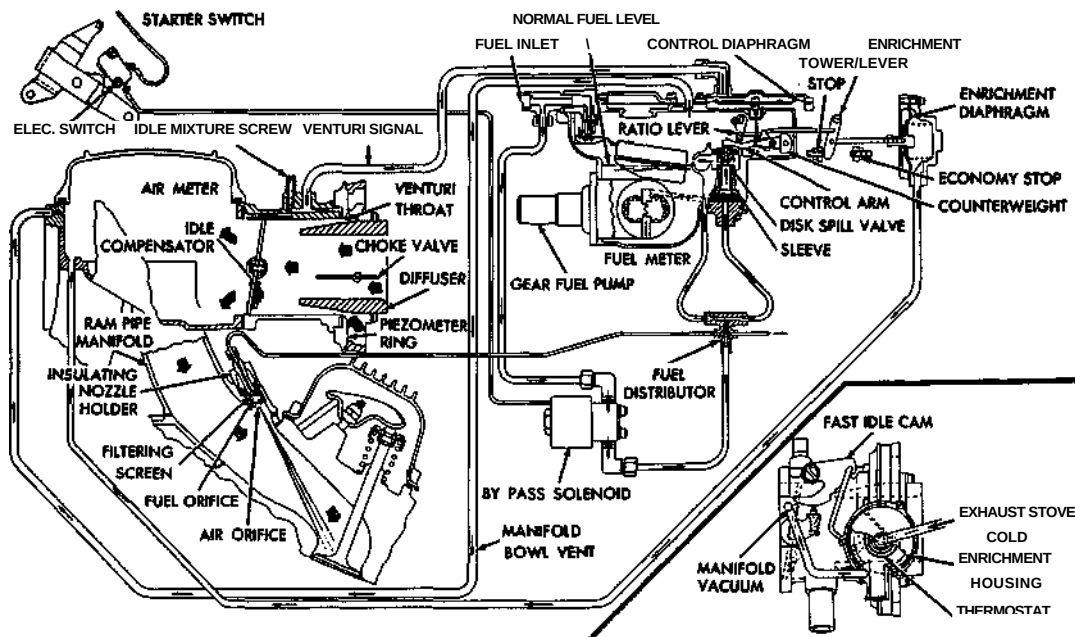


1. Inlet housing cover
2. Thrust washer
3. Drive plate
4. Thrust washer
5. Wobble plate
6. Bearing plate

7. Drive pin
8. Driveshaft
9. Inlet piston (5)
10. Inlet valve (5)
11. Valve spring (5)
12. Valve retainer (5)

13. Main housing
14. Discharge valve (5)
15. Valve spring (5)
16. O-ring seal
17. O-ring seal
18. Discharge housing

Fuel injection pump



Fuel injection system diagram

time, check for throttle shaft binding. If such a condition exists, attempt to remedy by soaking in solvent. If the throttle shaft still binds, disconnect the throttle shaft from the linkage, remove the throttle plate screws, and file the burrs on the shaft. Remove the shaft, clean, rebush and then reassemble. During reassembly, preset the idle-speed and idle-fuel adjusting screws $1/2$ turns out from the bottom.

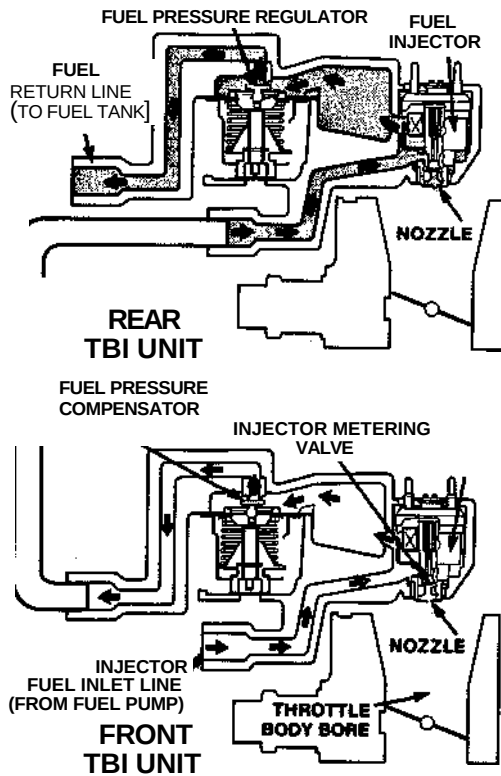
17. Fuel meter reassembly is the reversal of the disassembly procedure. When installing the main control diaphragm, keep in mind that the slots in the diaphragm should readily align with the cover attaching screw holes located in the bowl cover. Repeat the reassembly steps until the diaphragm holes line up naturally. Do not force this alignment. If the diaphragm seemed tight when removed, it is defective. The replacement diaphragm should not be installed in the same condition. At this time check the clearance between the housing and the enrichment diaphragm. A minimum of 0.040 in. is required to prevent interference during power stop operation. Adjust the diaphragm shaft length to gain proper clearance.

Check the fuel reservoir float settings before replacing the top cover. Float level should be $2\frac{9}{32}$ in. while float drop should be $2\frac{27}{32}$ in. Bend to adjust.

Twin Throttle Body Injection (TBI) System (Marketed as Cross-Fire Injection®)

The TBI system, introduced as standard equipment on the 1982 Corvette, is a completely electronic system which meters and delivers precise amounts of fuel and air to the engine, according to the exact engine operating requirements at any given time. The system is controlled by the same on-board computer (ECM) used with the emissions system (CCC). Through the monitoring of various sensors, the ECM determines the optimum air/fuel ratio and signals the TBI units to adjust the ratio accordingly. TBI is designed to offer the owner trouble-free starting, immediate throttle response, and maximum fuel efficiency; regardless of weather conditions, engine rpm, temperature or load.

Trouble diagnosis of the injection system is nearly impossible for the novice mechanic to perform, because of the interaction between the injection, emissions, and ignition systems; all of which are controlled by the ECM. Should you encounter any type of engine performance problem, have a complete CCC system test performed by a qualified, professional technician. If the fault lies in the injection system, you can use the following pro-



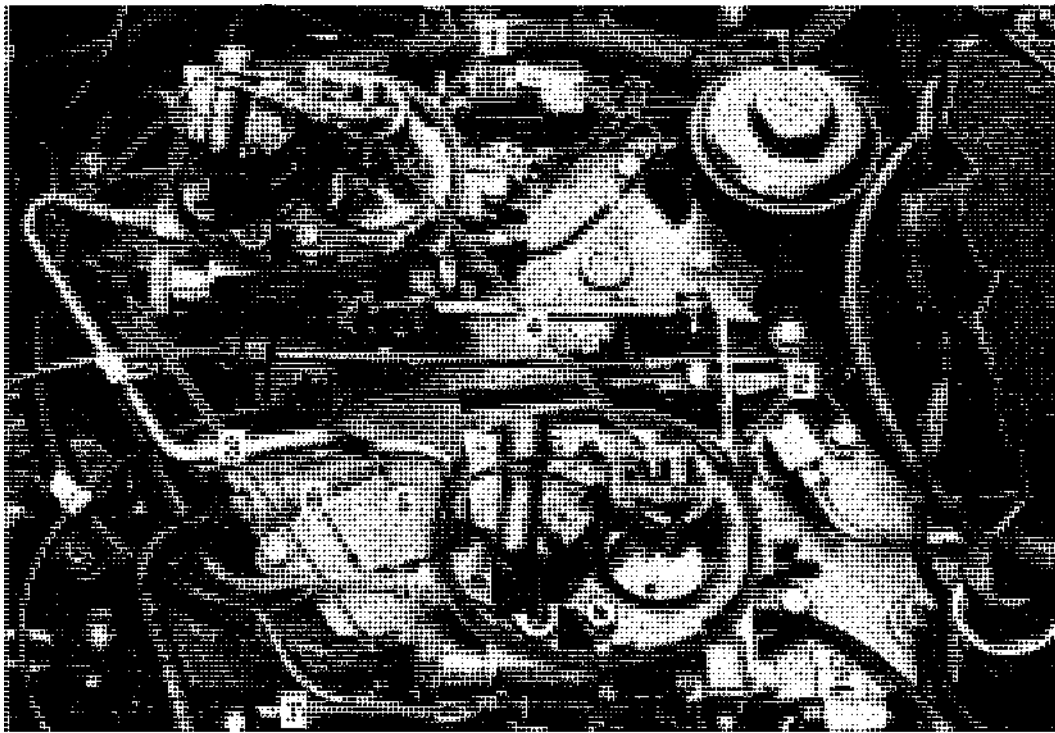
TBI fuel flow schematic

cedures to remove the TBI unites) and replace the defective components).

REMOVAL AND INSTALLATION

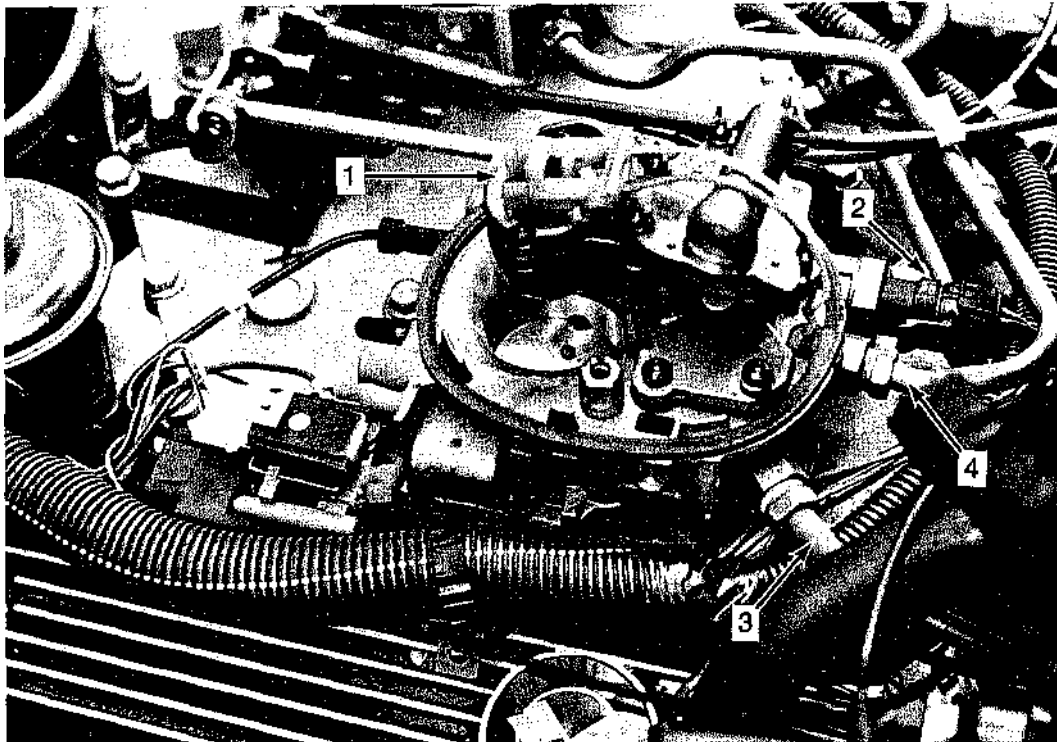
Front TBI Unit

1. Disconnect the battery cables at the battery.
2. Remove the air cleaner assembly, noting the connection points of the vacuum lines.
3. Disconnect the electrical connectors at the injector and the idle air control motor.
4. Disconnect the vacuum lines from the TBI unit, noting the connection points. During installation, refer to the underhood emission control information decal for vacuum line routing information.
5. Disconnect the transmission detent cable from the TBI unit.
6. Disconnect the fuel inlet (feed) and fuel balance line connections at the front TBI unit.
7. Disconnect the throttle control rod between the two TBI units.
8. Unbolt and remove the TBI unit.
9. Installation is the reverse of the previous steps. Torque the TBI bolts to 120-168 inch lbs. during installation.



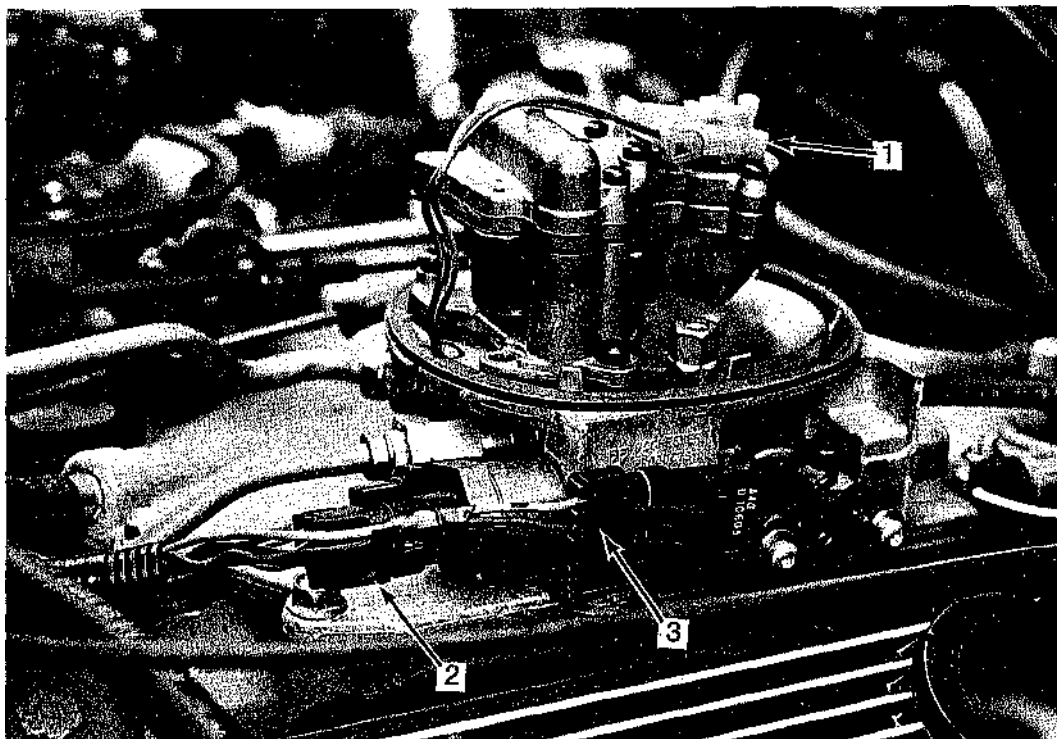
- | | |
|----------------------------------|----------------------|
| 1. Front TBI unit | 4. Fuel injectors |
| 2. Rear TBI unit | 5. Fuel balance line |
| 3. Idle air control (IAC) motors | 6. Fuel return line |

Throttle Body Injection (TBI) system nomenclature



- | | |
|--|----------------------|
| 1. Fuel injector electrical connection | 3. Fuel inlet line |
| 2. IAC motor electrical connection | 4. Fuel balance line |

Electrical and fuel line connections at the front TBI unit



- | | | |
|------------------|--------------|-----------------------------------|
| 1. Fuel injector | 2. IAC motor | 3. Throttle position sensor (IPS) |
|------------------|--------------|-----------------------------------|

Electrical connections at the rear TBI unit

Rear TBI Unit

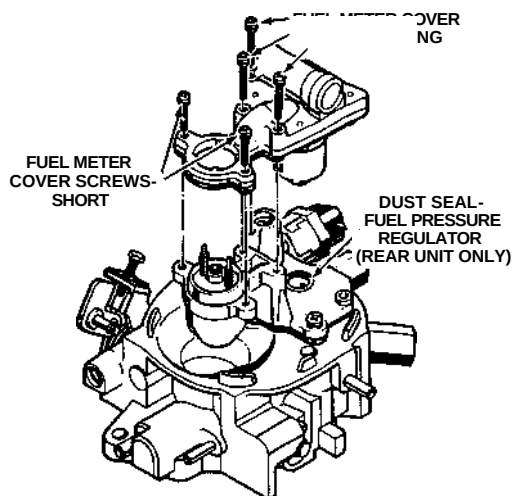
1. Disconnect the battery cables at the battery.
2. Remove the air cleaner assembly, noting the connection points of the vacuum lines.
3. Disconnect the electrical connectors at the injector, idle air control motor, and throttle position sensor.
4. Disconnect the vacuum lines from the TBI unit, noting the connection points. During installation, refer to the underhood emission control information decal for vacuum line routing information.
5. Disconnect the throttle and cruise control (if so equipped) cables at the TBI unit.
6. Disconnect the fuel return and balance line connections from the rear TBI unit.
7. Disconnect the throttle control rod between the two units.
8. Unbolt and remove the TBI unit.
9. Installation is the reverse of the previous steps. Torque the TBI bolts to 120-168 inch lbs. during installation.

DISASSEMBLY

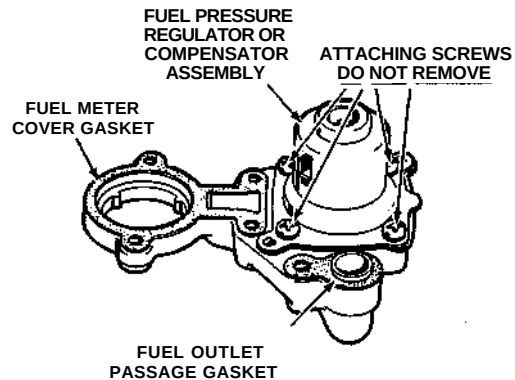
CAUTION: Use extreme care when handling the TBI unit to avoid damage to the swirl plates located beneath the throttle valve.

NOTE: If both TBI units are to be disassembled, DO NOT mix parts between either unit.

1. Remove the fuel meter cover assembly (five screws). Remove the gaskets after the cover has been removed. The fuel meter cover assembly is serviced only as a unit. If necessary, the entire unit must be replaced.



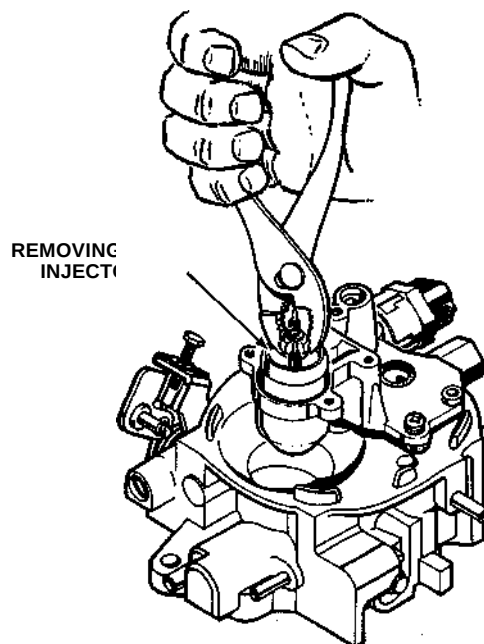
TBI fuel meter cover screws (five)

**Bottom view of the fuel meter cover assembly—DO NOT remove the four screws indicated**

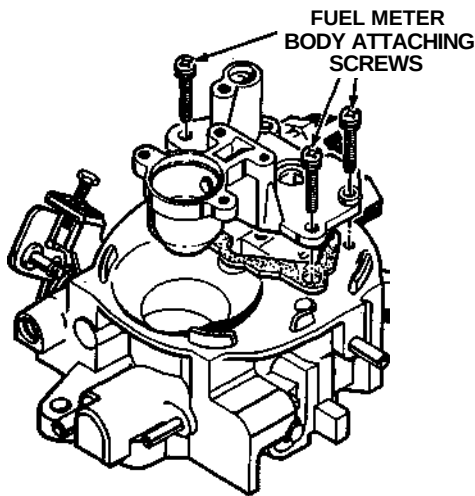
CAUTION: DO NOT remove the four screws which retain the pressure regulator (rear unit) or pressure compensator (front unit). There is a spring beneath the cover which is under great pressure. If the cover is accidentally released, personal injury could result.

Do not immerse the fuel meter cover in any type of cleaning solvent.

2. Remove the foam dust seal from the meter body of the rear unit.
2. Remove the fuel injector using a pair of small pliers as follows:
 - a. Grasp the injector collar, between the electrical terminals.
 - b. Carefully pull the injector upward, in a twisting motion.



Removing the fuel injector



Fuel meter body attaching screws

- c. If the injectors are to be removed from both TBI units, mark them so that they may be reinstalled in their original units.
4. Remove the filter from the base of the injector by rotating it back and forth.
5. Remove the O-ring and the steel washer from the top of the fuel meter body, then remove the small O-ring from the bottom of the injector cavity.
6. Remove the fuel inlet and outlet nuts (and gaskets) from the fuel meter body.
7. Remove the fuel meter body assembly and the gasket from the throttle body assembly (three screws).
8. For the rear TBI unit only: Remove the throttle position sensor (TPS) from the throttle body (two screws). If necessary, remove the screw which holds the TPS actuator lever to the end of the throttle shaft.
9. Remove the idle air control motor from the throttle body.

CAUTION: Because the TPS and idle air control motors are electrical units, they must not be immersed in any type of cleaning solvent.

ASSEMBLY

NOTE: During assembly, replace the gaskets, injector washer, O-rings, and pressure regulator dust seal with new equivalents.

1. Install the idle air control motor in the throttle body, using a new gasket. Torque the retaining screws to 13 ft. lbs.

NOTE: DO NOT overtighten the screws.

2. For the rear TBI unit only: If removed, install the TPS actuator lever by

aligning the flats of the lever and the shaft. Install and tighten the retaining screw.

3. Install the fuel meter body on the throttle body, using a new gasket. Also, apply thread locking compound to the three fuel meter body screws according to the chemical manufacturers instructions. Torque the screws to 35 inch lbs.

4. Install the fuel inlet and outlet nuts, using new gaskets. Torque the nuts to 260 inch lbs.

5. Carefully twist the fuel filter onto the injector base.

6. Lubricate the new O-rings with lithium grease.

7. Install the small O-ring onto the injector, pressing it up against the fuel filter.

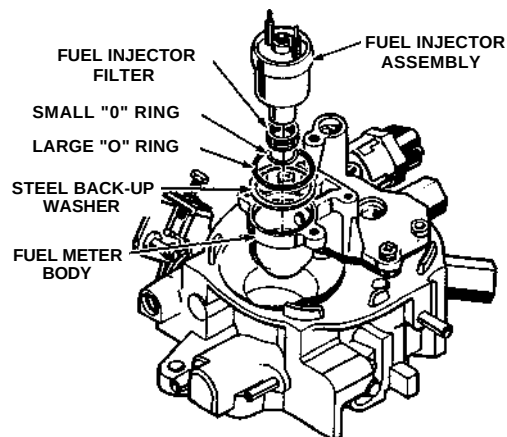
8. Install the steel washer into the injector cavity recess of the fuel meter body. Install the large O-ring above the steel washer, in the cavity recess. The O-ring must be flush with the fuel meter body surface.

9. Using a pushing/twisting motion, carefully install the injector. Center the nozzle O-ring in the bottom of the injector cavity and align the raised lug on the injector base with the die notch in the fuel meter body cavity. Make sure the injector is seated fully in the cavity. The electrical connections should be parallel to the throttle shaft of the throttle body.

10. For the rear TBI unit only: Install the new pressure regulator dust seal into the fuel meter body recess.

11. Install the new fuel meter cover and fuel outlet passage gaskets on the fuel meter cover.

12. Install the fuel meter cover assembly, using thread locking compound on the five retaining screws. Torque the screws to 28 inch lbs. Note that the two short screws must be



Fuel injector installation

installed alongside the fuel injector (one screw each side).

13. For the rear TBI unit only: With the throttle valve in the closed (idle) position, install the TPS but do not tighten the attaching screws. The TPS lever must be located ABOVE the tang on the throttle actuator lever.

14. Install the TBI unit(s) as previously outlined and adjust the throttle position sensor.

ADJUSTMENTS

No internal adjustments of the TBI units are possible. Any time the TPS is removed, it must be readjusted according to the following procedure.

Throttle Position Sensor (TPS) Adjustment

NOTE: An accurate digital voltmeter is needed to perform this adjustment.

1. Remove the TPS attaching screws and apply thread locking compound to the screws. Reinstall the screws loosely.

2. Install three jumper wires between the TPS and the TPS wiring terminal connections, as shown in the accompanying illustration.

3. Turn the ignition ON and measure the voltage between the A and B terminals of the TPS. Rotate the TPS to obtain a voltmeter reading of $.525 \pm .075$ volts. Tighten the screws.

4. Turn the ignition OFF, remove the jumpers, and connect the TPS wiring to the TPS.

1982-84 THROTTLE BODY INJECTION

Minimum (Idle) and Throttle Valve Synchronizing

The throttle position of each throttle body must be balanced so that the throttle plates are synchronized and open simultaneously. Adjustment should be performed only when a manifold cover, TBI unit or throttle body has been replaced.

1. Remove the air cleaner and plug the vacuum port on the rear TBI unit for the thermostatic air cleaner.

2. Remove the tamper resistant plugs covering both unit throttle stop screws. Make sure both throttle valves are slightly open to allow fuel to bypass them.

3. Block the drive wheels and apply the parking brake.

4. Connect a tachometer to measure rpm.

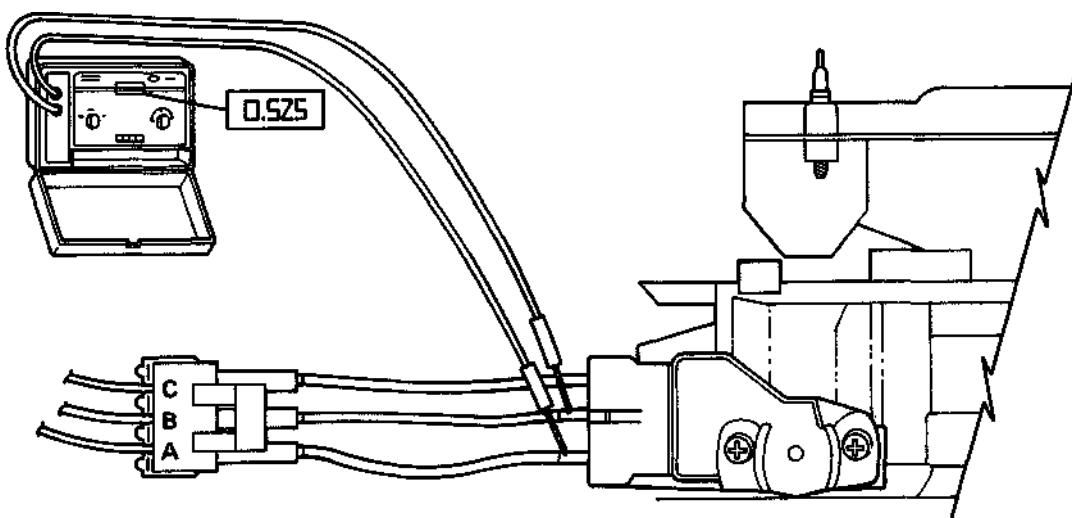
5. Disconnect the idle air control (IAC) valve electrical connectors.

6. Plug the idle air passages of each throttle body with plugs (J-33047 or equivalent). Make sure the plugs are seated fully in the passage so that no air leaks exist.

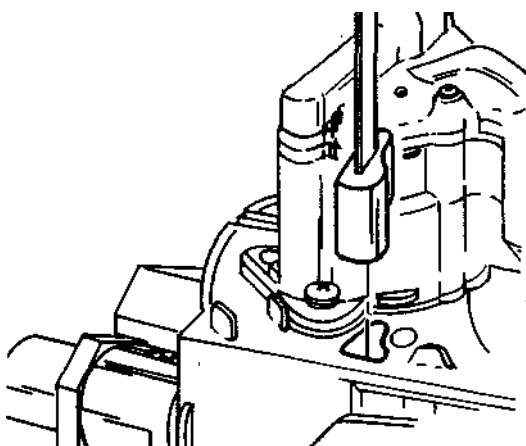
CAUTION: To prevent the engine from running at high rpm, be sure the ignition switch is OFF and transmission is in NEUTRAL before connecting IAC valves or removing or installing idle air passage plugs. Failure to do this may result in vehicle movement and possible personal injury.

7. Start the engine and allow the engine rpm to stabilize at normal operating temperature.

8. Place the transmission in DRIVE while



Throttle position sensor adjustment—see text



Plug the idle air passages of each throttle body as shown

holding the brake pedal to prevent vehicle movement. The engine rpm should decrease below curb idle speed. If the engine rpm does not decrease, check for a vacuum leak.

9. Remove the cap from the ported tube on the rear TBI unit and connect a vacuum gauge or water manometer.

10. Adjust the rear unit throttle stop screw to obtain approximately $\frac{1}{2}$ in. of mercury as read on the vacuum gauge, or 6 in. of water as read on the manometer. If not able to adjust to this level, check that the front unit throttle stop is not limiting throttle travel.

11. Remove the vacuum gauge or manometer from the rear unit and install the cap on the ported vacuum tube.

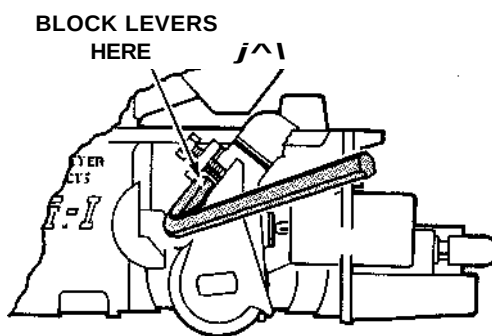
12. Remove the cap from the ported vacuum tube on the front TBI unit and install the gauge or manometer as before. If the reading is not the same as the rear unit, proceed as follows:

a. Locate the throttle synchronizing screw and collar on the front TBI unit. The screw retaining collar is welded to the throttle lever to discourage tampering with this adjustment.

b. If the collar is in place, grind off the weld from the screw collar and throttle lever.

c. Block possible movement of the throttle lever as illustrated, relieving the force of the heavy spring against the throttle synchronizing screw, to prevent the levers from coming into contact.

NOTE: If the lever is not blocked before the throttle synchronizing screw is removed, the screw may be damaged and reinstallation will be done only with great difficulty.



Block throttle lever movement as shown

d. Remove the screw and collar and discard the collar.

e. Reinstall the throttle synchronizing screw, using thread locking compound.

f. Adjust the screw to obtain $\frac{1}{2}$ in. of mercury on the vacuum gauge, or 6 in. of water on the manometer.

13. Remove the gauge or manometer from the ported tube and reinstall the cap.

14. Adjust the rear throttle stop screw to obtain 475 rpm, with the transmission in DRIVE and the parking brake applied. On manual transmission models, leave the gear selector in NEUTRAL.

15. Turn the ignition OFF and place automatic transmission in NEUTRAL.

16. Adjust the front throttle stop screw to obtain .005 in. clearance between the front throttle stop screw and the throttle lever tang.

17. Remove idle air passage plugs and reconnect LAC valves.

18. Start the engine. It may run at a high rpm but the engine speed should decrease when the idle air control valves close the air passages. Stop the engine when the rpm decreases.

19. The throttle position sensor (TPS) voltage should be checked and adjusted, if necessary. See "TPS Adjustment" for procedures.

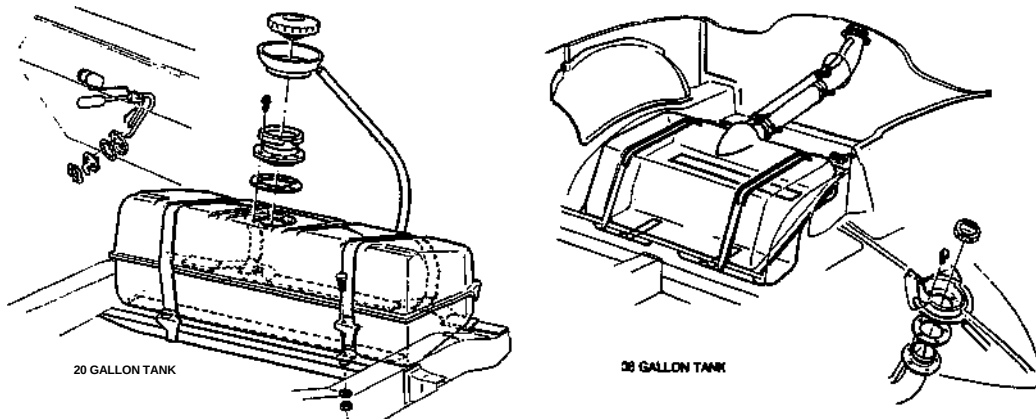
20. Install the air cleaner gasket, connect the vacuum line to the TBI unit and install the air cleaner.

21. Reset the idle speed control motors by driving the vehicle to 30 mph.

Fuel Tank

REMOVAL AND INSTALLATION

CAUTION: Exercise extreme caution while servicing the fuel tank. Service the tank only in a well ventilated area. DO NOT smoke



Fuel tank assembly—1963-67 (20 gal.), 1966-67 (optional 36 gal.)

or use any type of drop tight in the service area.

NOTE: It is best to run the tank as low on fuel as possible prior to removing the tank.

1974 and Earlier Models

1. Disconnect the battery cables at the battery.
2. Remove the gas cap and the filler neck boot from the top of the tank. Disconnect the drain tube.
3. Raise the vehicle and support it safely with jackstands.
4. Remove the spare tire compartment (if applicable), spare tire, and spare tire carrier.
5. Loosen the U-clamps and separate the

exhaust systems at the transmission cross-member. Disconnect the muffler support brackets and slide the exhaust system rearward.

6. Remove the fuel tank strap bolts and disconnect the gauge unit wiring.

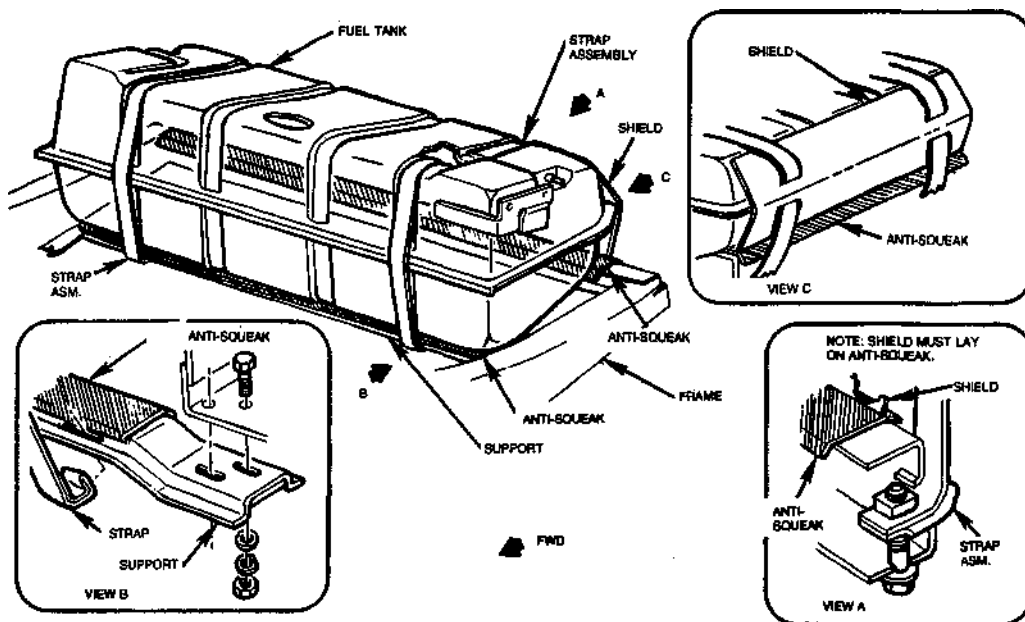
7. Disconnect the fuel lines and allow the fuel to drain into a clean container.

8. Unbolt and remove the tank support. Lower the tank, rotating it toward the front of the vehicle to remove it.

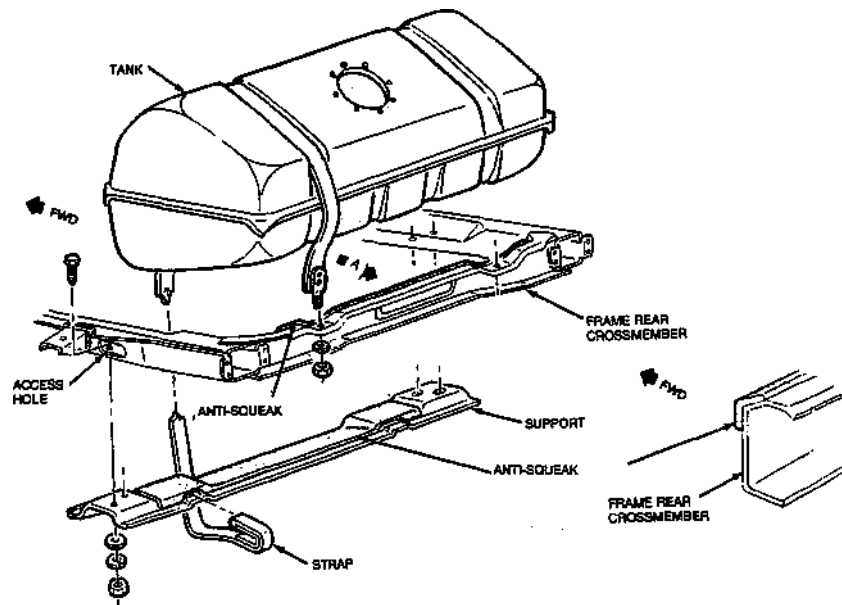
9. Installation is the reverse of the previous steps.

1975-82 Models

1. Disconnect the battery cables at the battery.



Fuel tank assembly—1968-77



Fuel tank mounting—1978-82

2. Remove the gas cap and siphon the remaining fuel from the tank.

3. Remove the filler neck seal and the drain tube.

4. Disconnect the fuel lines and electrical connectors from the inlet and meter assembly.

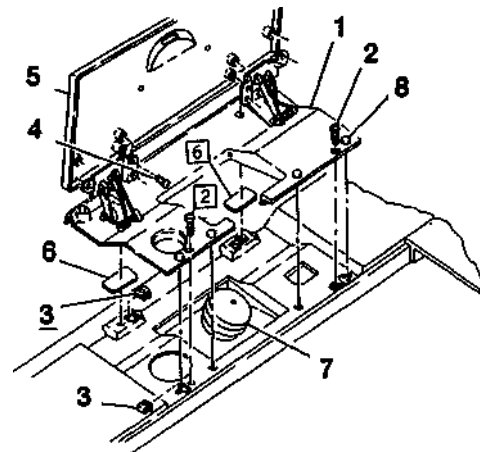
5. Raise the vehicle and support it safely with jackstands.

6. Remove the spare tire and carrier.

7. Loosen the U-clamps and separate the exhaust system at the transmission crossmember. Disconnect the muffler support brackets and slide the exhaust system rearward.

8. Remove the fuel tank strap bolts and lower the tank from the vehicle.

9. Installation is the reverse of the previous steps.



- | | |
|----------------------|----------------------|
| 1. Filler door bezel | 5. Filler door |
| 2. Screw | 6. Sealing strip (2) |
| 3. U-nut | 7. Fuel tank strap |

Fuel filler door assembly—1984 and later

1984 and Later Models

NOTE: If the filler cap requires replacement, only a cap with the same features should be used. Failure to use the correct cap can result in a serious malfunction of the system. Allow the fuel level to fall below ¼ tank for this procedure. The fuel tank consists of a tough, pliable polyethylene liner inside a steel container.

1. Remove battery ground cable.

2. Drain fuel from the tank into a suitable safety can.

3. Remove fuel tank filler door as an assembly.

4. Remove fuel tank filler neck housing and drain hose. Use clean rags to catch any fuel left in the lines.

5. Disconnect fuel feed hose, fuel return hose, vapor hose and electrical connector from fuel meter and pump assembly. The fuel pump may now be removed, if servicing is necessary.

6. Remove license plate to gain access for fascia to impact bar bolts.

7. Remove two carriage bolts securing fascia to impact bar.

4. Screw

8. Bumper

8. Raise vehicle and support it safely.
9. Remove spare tire and tire carrier.
10. Disconnect oxygen sensor electrical connector, located in the exhaust manifold.
11. Remove exhaust system as a complete unit by disconnecting from the front cross over pipe at the exhaust manifold.
12. Remove both inner fender braces.
13. Remove both rear inner fender panels.
14. Disconnect antenna ground strap.
15. Remove bolt securing fuel vapor pipe to the left hand fuel tank strap.
16. Disconnect fuel tank cables from rear right and left hand stabilizer shaft brackets.
17. Remove all rear lamps (side marker, tail, backup, license plate and spare tire).
18. Remove screws securing bottom edge of fascia to energy absorber pad.
19. Remove nuts securing each side of fascia to horizontal body retainer.
20. Remove nuts from right and left vertical retainers securing fascia to body.
21. Remove frame extension bolts (2 each side).
22. Loosen, but do not remove the remaining frame extension bolts.
23. With the aid of an assistant, remove remaining bolts and pull fuel tank and frame assembly rearward pushing cover outward. Tilt assembly down to remove and clear cover.
24. Remove tank straps and remove tank. If fuel tank is being replaced transfer cables, fuel meter and pump, and fuel vapor connector to new tank.
25. Installation is the reverse of removal. Make sure all connections are tight.

NOTE: A woven plastic filter is located on the lower end of the fuel pickup pipe in the fuel tank. This filter prevents dirt from entering the fuel line and also stops water unless the filter becomes completely submerged in water. This filter is self cleaning and normally requires no maintenance. Fuel stoppage at this point indicates that the fuel tank contains an abnormal amount of sediment or water; the tank should therefore be thoroughly cleaned. If trouble is due to contaminated fuel or foreign material that has been put into the tank, it can usually be cleaned.

CLEANING THE FUEL SYSTEM

CAUTION: *This procedure will not remove fuel vapor. Do not attempt any repair on tank or filler neck where heat or flame is required.*

1. Disconnect the negative battery cable, if not already done.
2. Remove in-line fuel filter and inspect for dirt, rust, or contamination. If filter is plugged, replace but do not install until fuel lines are cleared.
3. Drain the tank into a suitable safety can.
4. Remove fuel meter/fuel pump, located under the filler door.
5. Using a wet sponge, wipe inside liner clean of all foreign material. Rinse out sponge often when wiping liner. Wipe dry. Do not use harsh chemicals when cleaning.
6. Inspect strainer on fuel tank meter/fuel pump. If dirty or clogged, replace with new strainer.
7. Disconnect inlet fuel line at TBI assembly and apply air pressure in direction of fuel flow from filter to TBI.
8. Apply air pressure in direction of fuel flow from fuel tank to filter.
9. Disconnect return fuel line at TBI assembly and apply air pressure from TBI to fuel tank.
10. Connect all fuel lines and install fuel filter. If lines are damaged, see below.
11. Install fuel tank meter/fuel pump with new gasket.
12. Connect fuel lines, fuel vapor pipe and electrical connector. Make sure all connections are tight.
13. Connect negative battery cable and add fuel. Do not reuse contaminated fuel.
14. Start engine and check for fuel leaks. Dispose of contaminated fuel properly.

Fuel feed, return and emission pipes or hoses are secured to the underbody with clamp and screw assemblies. Flexible hoses are located at fuel tank, fuel vapor and return lines. The pipes should be inspected occasionally for leaks, kinks or dents. Replace any excessively corroded lines.

NOTE: Fuel and vapor hoses are specially manufactured. If replacement becomes necessary, it is important to use only replacement hoses meeting manufacturer's specifications. Hoses not meeting minimum specifications could cause early part failure or failure to meet emission standards. Do

not use copper or aluminum tubing to replace steel tubing. Those materials do not have satisfactory durability to withstand normal vehicle vibrations. Do not use rubber hose within 4 in. of any part of the exhaust system or within 10 in. of the catalytic converter. When making repairs, cut a piece of fuel hose about 4 in. longer than portion of the line re-

184 EMISSION CONTROLS AND FUEL SYSTEM

moved. If more than a 6 in. length of pipe is removed, use a combination of steel pipe and hose so that hose lengths will not be more than 10 in.

Follow the same routing as the original pipe, and always use screw type hose clamps. Slide

hose clamps over replacement part and push the hose an equal amount onto each portion of fuel pipe. Tighten clamps on each side of repair, but do not overtighten. Pipes must be properly secured to the frame to prevent chafing, which could wear a hole in the line.

1963-65 Fuel Injection Specifications

		1963	Early 1964®	Late 1964©	1965
Fuel pressure @ 0.5 H ₂ O(±Hg)	Power Stop	1.2	1.9	1.9	1.9
	Economy Stop	0.8	1.0	1.0	1.0
Fast idle speed (rpm-engine hot)		2000	2200	2200	2600
Float level (in.)		2 ³ / ₂	2 ³ / ₂	2 ³ / ₂	2 ³ / ₂
Float drop (in.)		2 ² / ₉ 2	2 ² / ₉ 2	2 ² / ₉ 2	2 ² / ₉ 2
Vacuum to apply — Enrichment Diaphragm (in. Hg)	Economy Stop	9	6	6	6
	Travel Center	NA	4	4	4
	Power Stop	3	2	2	2
Minimum Enrichment Diaphragm Clearance (in.)		0.040	0.010	0.010	0.010
Cold Enrichment Setting		Index	3 notches lean	3 notches lean	Index
Maximum vacuum to apply — Cranking signal valve (in. Hg)		1	1	—	—
Vacuum to apply — Main signal diaphragm (in. H ₂ O)		¹ / ₂	Va	Vfe	¹ / ₂

® Part No. 701 7375-R @ Part No. 701 7380

Holley

Model 2100 & 2300

Engine Horse-power	Identification No.®	Year	Float Level	Accelerator Pump Lever Adjustment	Choke Unloader Clearance	Vacuum Break (in.)	Fast Idle RPM	Choke Setting
1967	400, 435	R3660A (Prim.)	©	.015	.275	.250	2,200	®
		R3659A (Sec.)	©	.015	—	—	2,200	®
		R3888A (Prim.)	©	.015	.275	.250	2,200	®
1968	400, 435	R4055A (Prim.)	.350	.015	.275	.250	2,200	®
		R4056A (Sec.)	.50	.015	—	—	2,200	®
		R3659A (Prim.)	.350	.015	.275	.250	2,200	©
1969	400, 435	R40551A (Prim.)	.350	.015	.250	.275	2,200	®
		R36591A (Sec.)	.50	.015	—	—	2,200	®
		R40561A (Prim.)	.350	.015	.250	.250	2,200	®

® Located on tag attached to carburetor

© Bottom of sight plug port plus or minus Vsz'

® Hold the choke valve closed and push downward on the coil rod to the end of travel. The top of the rod should be even with the top of the hole in the choke lever. Bend the rod to adjust. © Hold the choke valve closed and pull upward on the coil rod to the end of travel. The bottom of the rod end which slides into the hole should be even with the top of the hole. Bend the rod to adjust.

Holley 4150 and 4160 Specifications

Year	Identification No.®	Engine Horsepower	Pump Level Choke (Dry) Setting (in.)	Accelerator Float Lever Adjustment (In.)	Choke Unloader Clearance (in.)	Fast Idle On Car (ipm)	Choke Vacuum Break (in.)
1966	R3367A	300, 350	®	.015	®	.260	2,200 .170
	R3416A®	300, 350	®	.015	®	.260	2,200 .170
	R3370A	390	©	.015	©	.260	2,000 .180
	R3433A©	390	®	.015	©	.260	2,000 .180
	R3247A	425	©	.015	©	.350	2,000 .350
1967	R3810A	300, 350	®	.015	©	.265	2,000 .190
	R3814A©	300, 350	©	.015	©	.265	2,000 .175
	R3811A	390	©	.015	©	.265	2,200 .175
	R3815A©	390	©	.015	©	.265	2,200 .175
	R3418A	430	©	.015	©	.350	2,200 .350
1968	R4054A	430	©	.015	®	.350	2,200 .300
1969	R4296A	430	©	.015	®	.350	2,200 .350
1970	R4346	370	©	.015	©	.350	2,200 .300
	R4296A	430	©	.015	®	.350	2,200 .350
1971	R4801A®	330	®	.015	©	.350	2,200 .350
	R4800A®	330	®	.015	©	.350	2,200 .350
	R4803A®	425	®	.015	®	.350	2,200 .350
	R4802A®	425	®	.015	©	.350	2,200 .350
1972	R6239A®	255	®	.015	©	.350	2,350 .350
	R6238A®	255	®	.015	©	.350	2,350 .350

® Located on the tag attached to the carburetor, or on the casting or choke plate

© A.I.R.—Air Injector Reactor System

©Prim.—.170", Sec.—.300"

® Hold the choke valve closed and push downward on the coil rod to the end of travel. The top of the rod should be even with the top of the hole in the choke lever. Bend the rod to adjust. ® Hold the choke valve closed. Pull upward on the coil rod to the end of travel. The bottom of the rod end which slides

into the hole in the choke lever should be in line with the notch. Bend the rod to adjust. ® Prim.—.350", Sec.—.450"

©Prim.—.350", Sec.—.500" ® Man. Trans. ® Auto. Trans. ® Float centered in bowl ©Hold the choke valve open.

Pull downward on the coil rod to the end of travel. The bottom of the rod end which slides into the hole in the choke lever should be in line with the notch. Bend the rod to adjust.

Carter WCFB & AFB

Year	Application	Identification No.	Float Level (In.)	Float Drop (in.)	Pump Rod (in.)	Choke Setting	Main Metering Jet (In.)		Metering Rod (in.)		Throttle Bom (In.)		Fast Idle (ipm)
							Prim	Sec	Prim	Sec	Prim	Sec	
1963-65	250 hp	3501 S (M.T.) 3500S (A.T.)	¾2©	¾4	1/2	index	0.086	0.0635	0.042	0.067	1 1/16	1 1/16	1750
	300,340 hp	3461S(M.T.) 3460S (AT.)	%a	%	1/2	1 lean	0.104	0.0689	0.060	0.069	1 9/16	1 11/16	1750

© %" for secondary

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Rochester Quadrajet® Carburetor Specifications (cont.)

Year	Engine Horse-power	Carburetor Identification®	Float Level (in.)	Air Valve Spring	Pump Rod (in.)	Idle Vent (in.)	Vacuum Break (in.)	Choke Setting	Choke Rod (in.)	Choke Unloader (in.)	Fast Idle Speed (rpm)
1978	185®	17058202	¹⁵ / ₃₂	%	%a	—	.179	2NL	.314	.277	©
	185@®	17058502	¹⁵ / ₃₂	%	%a	—	.187	2NL	.314	.277	©
	220®	17058211	¹⁵ / ₃₂	®	-%a	—	.203	2NL	.314	.277	©
	220®	17058210	¹⁵ / ₃₂	®	%a	—	.203	2NL	.314	.277	©
1979	195©	17059203	¹ / ₂	%	¹ / ₄ ®	—	.157©	2NL	—	.243©	©
	195®	17059216/17	¹⁵ / ₃₂	⁷ / ₈	¹ / ₄ ®	—	.157©	1NL	—	.243©	©
	195@®	17059502/04	¹⁵ / ₃₂	⁷ / ₈	¹ / ₄ ®	—	.164©	2NL	—	.243©	©
	195 @®	17059582/84	¹⁵ / ₃₂	⁷ / ₈	¹¹ / ₃₂	—	.203©	1NL	—	.314®	©
	225®	17059211	¹⁵ / ₃₂	1	%2®	—	.157®	2NL	—	.243®	©
	225®	17059210/28	¹⁵ / ₃₂	1	%2®	—	.157©	1NL	—	.243©	©
1980-81	180	Uses E4ME carburetor- -computer controlled									©

c m

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190®	17080207	⁷ / ₁₆	%	y.®	—	.157	—	—	.243®	©
190®	17080204	⁷ / ₁₆	%	y«®	—	.157	—	—	.243©	©
230	17080228	⁷ / ₁₆	%	% ₂ ®	—	.179	—	—	.243©	©

©The carburetor identification number is stamped on the float bowl, near the secondary throttle lever.

® Man. Trans.

® Auto. Trans.

©Inner hole

© Hold the choke valve closed. Pull upward on the coil rod to the end of travel. The bottom of the rod end which slides into the hole in the choke lever should be even with the top of the hole. Bend the coil rod to adjust. ® Hold the choke valve closed and push downward on the coil rod to the end of travel. The top of the rod should be even with the top of the hole in the choke lever. Bend the rod to adjust.

© California

® Hold the choke valve open. Pull downward on the coil rod to the end of travel. The bottom of the rod end which slides into the hole in the choke lever should be in line with the notch. Bend the rod to adjust.

® Hold the choke valve closed. Pull upward on the coil rod to the end of travel. The bottom of the rod end which slides into the hole in the choke lever should be in line with the notch. Bend the rod to adjust.

® Without vacuum advance

©With vacuum advance, without EGR signal

©Front—0.180, rear—0.170

©High altitude

© Not specified by the manufacturer. See the specifications supplied with the carburetor rebuild kit.

© See the underhood specification decal.

© Measured between the top of the choke valve and the choke wall.

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