1974-79 EXHAUST EMISSION SYSTEMS
Mazda Deceleration Control System

Piston Engines

DESCRIPTION

System is designed to reduce hydrocarbon (HC) emissions which could build up during vehicle deceleration. The system maintain the throttle blades open during deceleration so that enough air is present to maintain proper air/fuel ratio. System may consist of an anti-afterburn valve, a throttle opener system, a throttle positioner system, a coasting richer system, an air by-pass valve, a dashpot, a 3-way solenoid valve, and an engine speed switch.

OPERATION

ANTI-AFTERBURN VALVE

On 1977-78 models, the anti-afterburn valve is located on right side of engine (near carburetor). The valve is connected by tubing to air cleaner, intake manifold and, on some models, to air pump and air control valve. Air is drawn from air cleaner, through anti-afterburn valve, into intake manifold in varying amounts depending on engine requirements. When throttle valve closes, manifold vacuum increases and draws air from anti-afterburn valve directly into intake, by-passing carburetor. This extra induction of air balances the air/fuel mixture and reduces HC emissions.

On 1979 models, the anti-afterburn valve is located between air cleaner and intake manifold, this valve adds fresh air directly to intake manifold from air cleaner to balance air/fuel mixture.

AIR BY-PASS VALVE

On 1978 Federal B1800, the air by-pass valve is designed to cut off air flow for a few seconds when deceleration mode is first encountered. When throttle drops quickly into a closed position, the by-pass valve will momentarily dump air flow to atmosphere.

On 1979 B2000, the air pump system air passes through by-pass valve to exhaust ports during normal operation. On deceleration, large amount of unburned air/fuel mixture reaches exhaust port area. When by-pass valve manifold connection senses high vacuum level, by-pass valve momentarily diverts part of air pump air back to inlet side of air pump while part is directed into intake manifold to help balance air/fuel mixture during deceleration.

COASTING RICHER SYSTEM

The coasting richer system is used on 1975 models and 1976-77 Federal 1600cc, manual transmission equipped models. System consist of accelerator pedal switch, vehicle speed switch, and carburetor modifications. During coasting or deceleration, throttle valve in carburetor is closed, creating a leaner air/fuel mixture. To prevent misfire and high combustion temperatures, the coasting richer system injects fuel through coasting richer jet, reducing oxides of nitrogen (NOx) and hydrocarbon (HC) emissions.

THROTTLE OPENER SYSTEM

Used in 1974 models and some 1976-78 models, this system opens carburetor throttle a slight amount during deceleration. It maintains balanced air/fuel mixture and reduces hydrocarbon (HC) emissions. System consists of servo diaphragm (mounted on carburetor), vacuum control valve, and connecting tubes and hoses. *See Fig. 1.* Servo diaphragm is adjustable and operates on vacuum from vacuum control valve.

THROTTLE POSITIONER SYSTEM

Used in 1979 models, this system will lean out mixture after initial rich setting when carburetor throttle blades close during deceleration. This system holds throttle blades slightly open to maintain balanced air/fuel mixture. Throttle blades will be held open when decelerating over 1000 RPM. Component operation is described below.

Servo Diaphragm - Mechanically linked to throttle plate, servo diaphragm is positioned in response to vacuum signal through 3-way solenoid. *See Fig. 2.* In turn, diaphragm positions throttle plate.

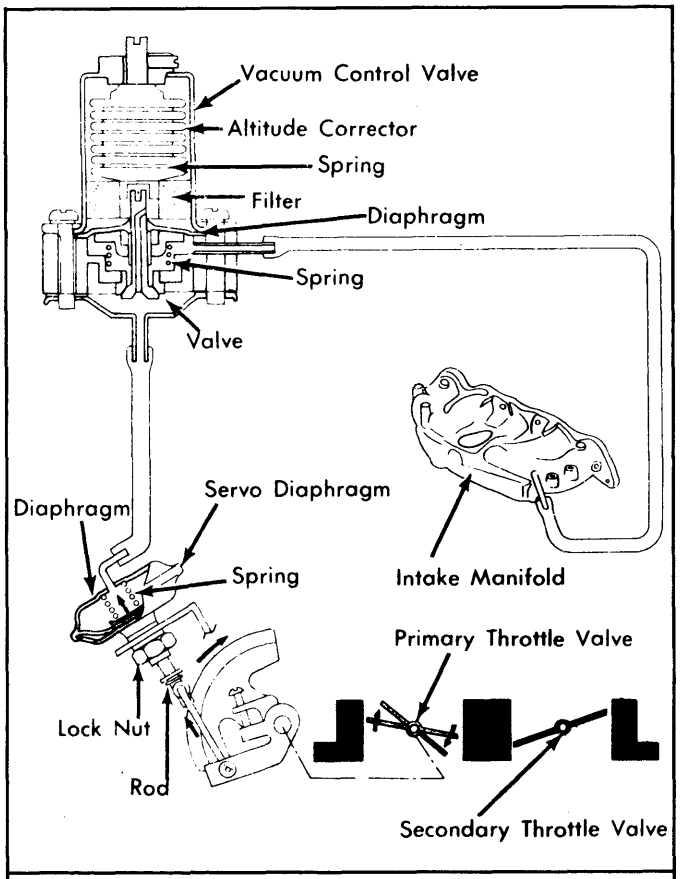

Fig. 1: 1974 Throttle Opener System

3-Way Solenoid - This electro-vacuum valve has connection from intake manifold vacuum and to servo diaphragm. Solenoid portion is energized and de-energized by electrical connections to engine speed switch (air conditioning relay on models so equipped) and ignition switch. As engine speed switch determines that engine speed is over 1000 RPM (1100 RPM for Calif.), it will open 3-way solenoid to allow passage of intake manifold vacuum which positions servo diaphragm. This causes throttle plate to open slightly.

Engine Speed Switch - Switch determines engine RPM and completes electrical circuit to 3-way solenoid when more than 1000 RPM (Federal) or 1100 RPM (Calif.) is sensed.

NOTE: On models with air conditioning, the air conditioning relay is in-line ahead of engine speed switch. Whenever A/C is in on position, this relay will activate throttle positioner system, allowing slightly higher idle speeds.

DASHPOT

A dashpot is used on some 1977-78 models. The purpose of the dashpot is to prevent the carburetor throttle valve from closing too rapidly. Dashpot is mounted to act on carburetor linkage to maintain a slightly open position upon rapid deceleration.

TESTING

ANTI-AFTERBURN VALVE

1979 Models - Disconnect air hose at air cleaner from anti-afterburn valve. Start engine and idle. Block off hose opening with finger. Engine RPM should NOT change. Cycle throttle to increase engine RPM and quickly release throttle. Suction should be felt at open end of anti-afterburn valve hose. If no suction is present, or excessive suction lasts for more than 3 seconds, replace valve.

1974-79 EXHAUST EMISSION SYSTEMS
Mazda Deceleration Control System (Cont.)

COASTING RICHER SYSTEM

1975 Models & 1976-77 Federal 1600cc Man. Trans. Equipped Models (System Test) - 1) Start and run engine at idle. Unplug coasting richer valve connector. Connect coasting richer valve lead directly to positive battery terminal. Engine speed should increase to 1050-1300 RPM.
2) Stop engine. Connect voltmeter to coasting richer valve connector terminals. Block front wheels, raise rear of vehicle, and support with safety stands. Start engine and accelerate to 15 MPH. No current should flow to terminals when accelerator pedal is released.
3) Accelerate engine to 18-20 MPH and release accelerator pedal. Current should flow to terminals when accelerator pedal is released and stop flowing when vehicle speed decreases to 17-11 MPH.
1975 Models & 1976-77 Federal 1600cc Man. Trans. Equipped Models (Accelerator Switch Test) - 1) Unplug accelerator switch connector. Connect ohmmeter to switch connector terminals and check continuity.
2) With pedal released, continuity should exist (switch is on). With pedal depressed, no continuity should exist (switch is off). To adjust accelerator switch, ensure throttle valve is fully closed.
3) Loosen switch adjusting screw completely. Now slowly tighten screw until continuity is made. Tighten screw and additional 1 1/2 turns. On GLC, models continuity should no longer exists past 3/4 depression of accelerator pedal.
1975 Models & 1976-77 Federal 1600cc Man. Trans. Equipped Models (Vehicle Speed Switch Test) - 1) Unplug vehicle speed switch connector. Insert jumper wire between accelerator switch connector terminals.
2) Block front wheels, raise rear of vehicle, and support with safety stands. Start engine and accelerate to 20 MPH. With voltmeter connected, current should start to flow between 16-20 MPH and continue to flow at higher speeds.
3) Slowly decrease vehicle speed. Current should stop within 3 MPH of initial current speed. If not, replace speed switch (in speedometer).

THROTTLE OPENER SYSTEM

1974 Models - 1) Connect tachometer to engine. Start and warm engine to normal operating temperature. Stop engine and remove air cleaner. Disconnect vacuum sensing tube between servo diaphragm and vacuum control valve (at servo diaphragm).
2) Remove intake manifold plug and connect servo diaphragm directly to intake manifold. Start engine and note engine speed. Engine speed should be 1300-1500 RPM (1100-1300 RPM on 808 models). If not, turn throttle opener adjusting screw.
3) Stop engine, reconnect vacuum hoses to original locations, and attach vacuum gauge to intake manifold. Start and raise engine speed to 3000 RPM. Release throttle and allow RPM to drop suddenly.
4) Turn vacuum control valve adjusting screw so that engine speed decreases from 3000 RPM to 1000 RPM above 22 in. Hg. Vacuum gauge should remain stationary for a few seconds at 1000 RPM and then fall to normal idle vacuum.
5) To test vacuum switch, disconnect sensing tube from vacuum switch. Using a "T" fitting, connect a vacuum gauge in vacuum line. Connect one end of tube to vacuum source and increase vacuum to at least 6 in. Hg. Allow vacuum to drop. If switch does not "click" at about 3 in. Hg, replace vacuum switch.
1976 1300cc & Calif. 1600cc Equipped Models (Servo Diaphragm Test) - 1) Connect tachometer to engine. Start and warm engine to normal operating temperature. Stop engine and remove air cleaner.
2) Disconnect vacuum hose from servo diaphragm. On 1300cc engine, disconnect vacuum hose from vacuum control valve and connect to servo diaphragm. On 1600cc engine, connect vacuum hose from air cleaner thermo sensor to servo diaphragm.
3) On all models, disconnect vacuum hose to distributor. Start engine and note engine speed. Engine speed should be 1300-1500 RPM. If not, turn throttle opener adjusting screw. If unable to obtain correct RPM, replace servo diaphragm.
1977-78 Models (Servo Diaphragm Test) - 1) Connect tachometer to engine. Start and warm engine to normal operating temperature. Stop engine and remove air cleaner. Disconnect tube between servo diaphragm and vacuum control valve at servo diaphragm.
2) Disconnect vacuum tube at manifold, between vacuum control valve and intake manifold. Run tube directly from intake manifold to servo diaphragm in order to apply manifold vacuum to diaphragm. *See Fig. 3.*
3) Disconnect and plug distributor vacuum advance hose at distributor. Start engine. Engine speed should increase to 1300-1500 RPM. If not, turn throttle opener adjusting screw. If correct RPM cannot be reached, replace servo diaphragm.
1976 1300cc & Calif. 1600cc Equipped Models (Vacuum Control Valve Test) - 1) Remove air cleaner. Disconnect intake manifold vacuum hose going to vacuum control valve. Connect vacuum gauge to system. On California 1300cc engine, disconnect and plug vacuum hose from anti-afterburn valve.
2) On all models, start engine. Increase engine speed to 3000 RPM and quickly release throttle. Vacuum gauge highest reading should be obtained immediately after releasing throttle, drop to 22-23 in. Hg, and then slowly drop to idle vacuum.

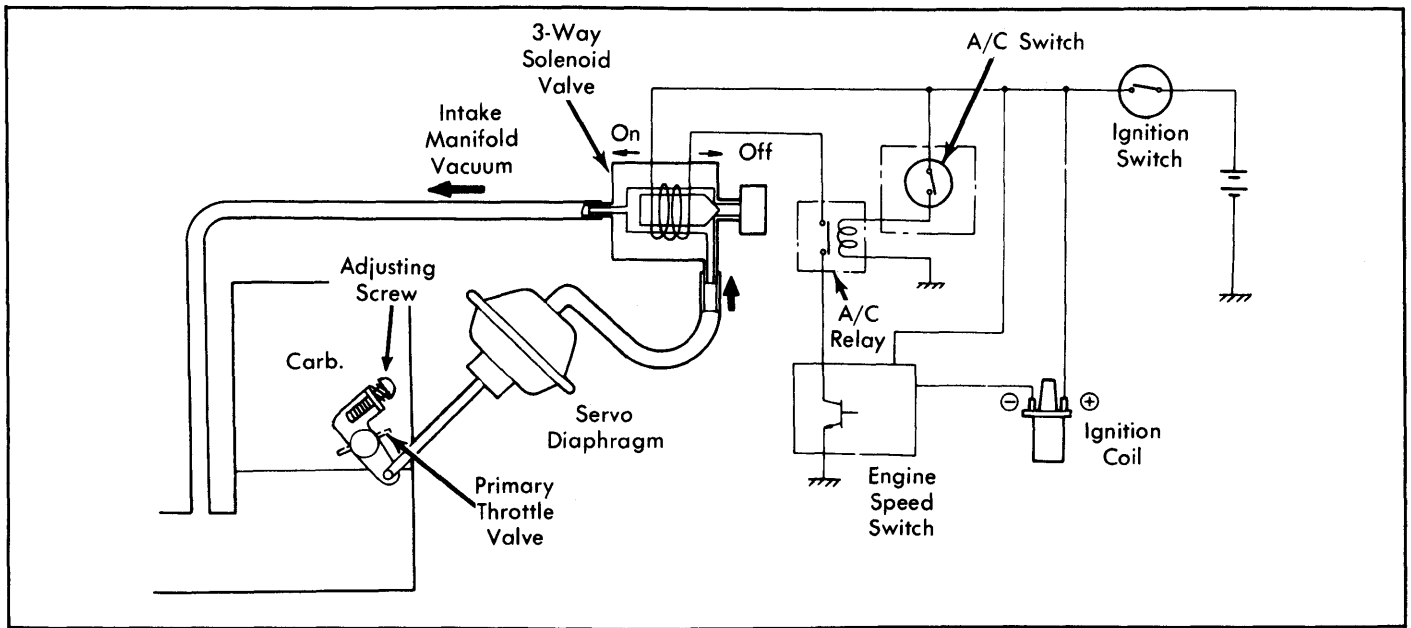

Fig. 2: 1979 Throttle Positioner System

Mazda Deceleration Control System (Cont.)

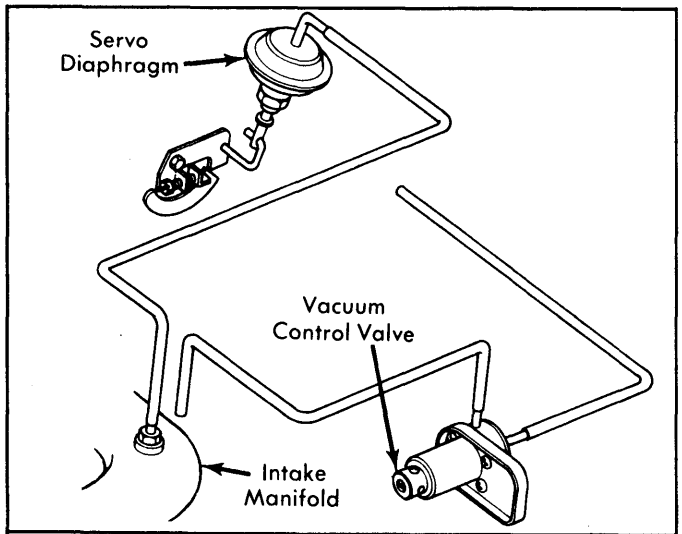

Fig. 3: 1977-78 Servo Diaphragm Test

3) If vacuum reading is incorrect, turn adjusting screw in vacuum control valve. Decrease vacuum reading by turning screw clockwise; increase by turning screw counterclockwise.

1977 Models (Vacuum Control Valve Test) - 1) Connect tachometer to engine. Start and warm engine to normal operating temperature. Stop engine and remove air cleaner. Disconnect and plug vacuum hose from anti-afterburn valve. Connect vacuum gauge to intake manifold. *See Fig. 4.*

2) Start engine. Increase engine speed to 3000 RPM and quickly release throttle. Vacuum gauge highest reading should be obtained immediately after releasing throttle, drop to 22-23 in. Hg, and then slowly drop to idle vacuum.

3) If vacuum reading is incorrect, turn adjusting screw in vacuum control valve. Decrease vacuum reading by turning screw clockwise; increase by turning screw counterclockwise.

1978 Models (Vacuum Control Valve Test) - 1) Connect tachometer to engine. Start and warm engine to normal operating temperature. Stop engine and remove air cleaner.

2) On GLC, disconnect and plug vacuum hose from anti-afterburn valve. Disconnect vacuum tube going from vacuum control valve to intake manifold, at manifold, and connect a vacuum gauge to it. *See Fig. 5.*

3) On Federal B1800, disconnect vacuum hose going from air by-pass valve to intake manifold (at manifold). On California B1800, disconnect vacuum hose going from anti-afterburn valve to intake manifold (at manifold). On all B1800 models, connect vacuum gauge to intake manifold. *See Fig. 5.*

4) On all models, start engine. Increase engine speed to 3000 RPM and quickly release throttle. Vacuum gauge highest reading should be obtained immediately after releasing throttle, drop to 22-23 in. Hg, and then slowly drop to idle vacuum.

5) If vacuum reading is incorrect, turn adjusting screw in vacuum control valve. Decrease vacuum reading by turning screw clockwise; increase by turning screw counterclockwise.

NOTE: When checking/adjusting vacuum, be sure to correct for altitude. Vacuum gauge readings will be about 1 in. Hg less for every 1000 feet of altitude.

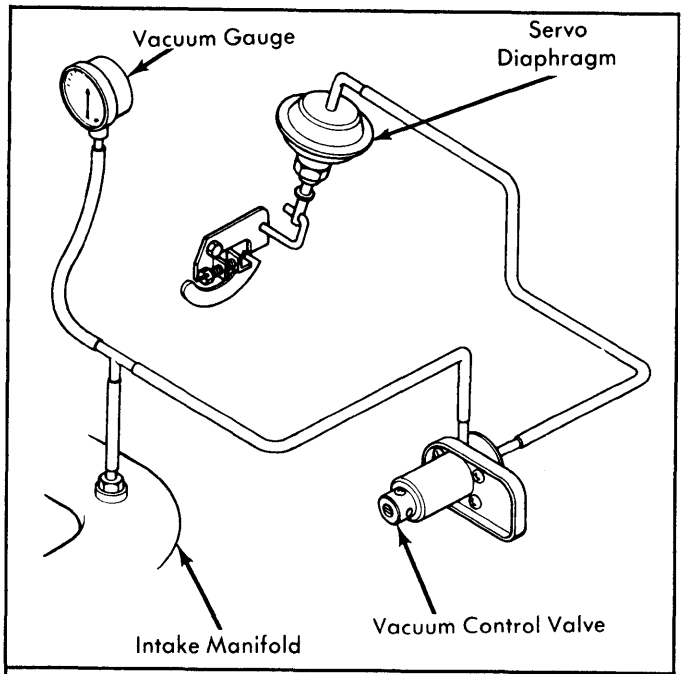

Fig. 4: 1977 Vacuum Control Valve Test

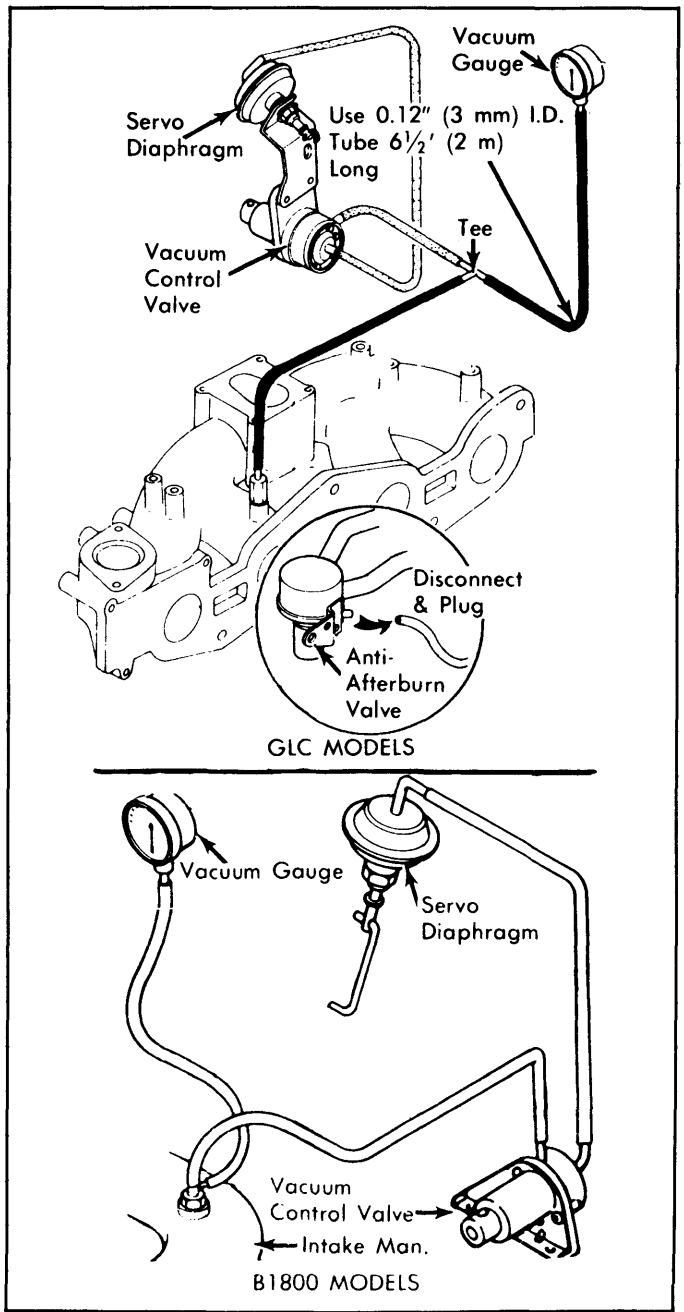

Fig. 5: 1978 Vacuum Control Valve Test

1974-79 EXHAUST EMISSION SYSTEMS
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THROTTLE POSITIONER SYSTEM

1979 Models (Servo Diaphragm Test) - 1) Connect tachometer to engine. Start and warm engine to normal operating temperature. Stop engine and remove air cleaner.

2) Detach intake manifold vacuum hose from 3-way solenoid and detach 3-way solenoid vacuum hose from servo diaphragm. Connect intake manifold vacuum hose directly to servo diaphragm.

3) On 626, detach and plug distributor-to-carburetor vacuum tube at distributor. On all models, start engine. Increase engine speed and allow speed then decrease to idle.

4) With servo diaphragm hooked directly to intake manifold, engine should idle at 1000-1100 RPM. If vehicle is equipped with air conditioning, it will idle at approximately 1200 RPM.

5) If speed is not to specifications, turn throttle positioner adjusting screw located on linkage near end of servo diaphragm link on carburetor. If setting cannot be obtained, replace servo diaphragm.

1979 Models (3-Way Solenoid Test) - 1) Remove vacuum sensing tube from servo diaphragm. Remove intake manifold vacuum tube from 3-way solenoid. Detach wire from 3-way solenoid which comes from engine speed switch. Ground 3-way solenoid at disconnected terminal using jumper wire.

2) Turn ignition on (engine off). Blow air through vacuum hose disconnected from servo diaphragm and note that air should come out of 3-way solenoid filter (cap can be removed for easier checking). *See Fig. 6.*

3) Turn ignition off. Blow air into same vacuum tube and note that air should now come from nipple which normally connects to intake manifold. If valve does not function in this manner, replace 3-way solenoid.

AIR BY-PASS VALVE

1978 Federal B1800 - 1) Disconnect air hose from by-pass valve (coming from check valve). Start and run engine at idle. Place finger over by-pass valve outlet. Air should be flowing out of valve.

2) Quickly open throttle and release it. Air should stop flowing from valve outlet for about 3 seconds, then resume flowing. If air flow does react as described, replace air by-pass valve.

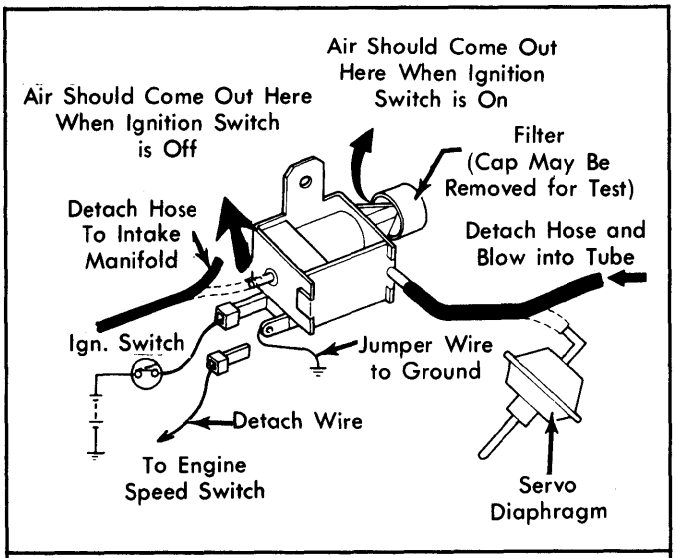

Fig. 6: Testing 3-Way Solenoid

DASHPOT

1977 Calif. Man. Trans. 1600cc & 1978 Federal B1800 - 1) Remove air cleaner. Connect tachometer to engine. Cycle throttle to ensure dashpot rod comes out quickly, then release throttle. Dashpot should allow throttle lever to return slowly to idle position after coming in contact with lever.

2) Start engine. Slowly increase engine speed and check RPM at point when throttle lever just releases from dashpot. Engine speed should be 1900-2100 RPM (2400-2600 RPM on B1800).

3) If not, increase engine speed to 2000 RPM (2500 RPM on B1800). Loosen dashpot lock nut and turn dashpot until rod just contacts throttle lever. Tighten lock nut and repeat test procedure. Replace dashpot if it cannot be adjusted within specifications.