1974-79 EXHAUST EMISSION SYSTEMS
Mazda Deceleration Control System

Rotary Engines

DESCRIPTION

System is designed to maintain a balanced air/fuel mixture during deceleration. System may consist of control unit, anti-afterburn valve, coasting valve, dashpot with delay valve, idle switch, evaporation compensator valve, or altitude compensator valve. *See Fig. 1.*

OPERATION

ANTI-AFTERBURN VALVE

The anti-afterburn valve supplies additional air from the air cleaner to intake manifold to prevent afterburning of fuel vapors during sudden deceleration. The coasting valve serves the same purpose while vehicle is coasting or slowly decelerating at speeds above 1150 RPM. Both units also operate immediately after ignition switch is turned off. Improper operation of these components will cause backfiring, rough idling or poor engine braking during deceleration.

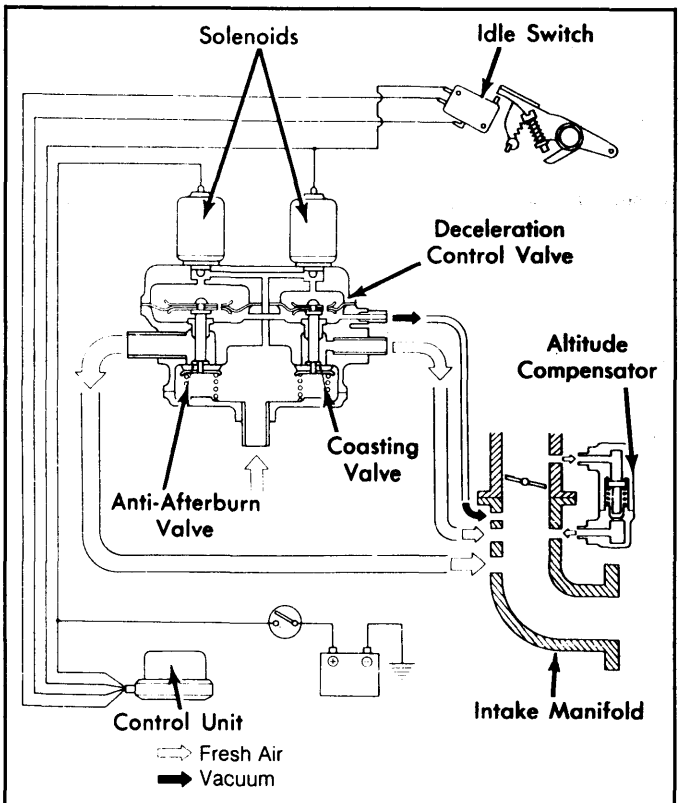

Fig. 1: 1974 Deceleration Control System

ALTITUDE COMPENSATOR VALVE

The altitude compensator valve adjusts air/fuel mixture according to atmospheric pressure. With engine running, vacuum pulls valve down and closes passage to intake manifold. As atmospheric pressure decreases (high altitude), spring pressure overrides vacuum and pushes valve up, opening passage to intake manifold. This keeps air/fuel mixture at correct ratio for reduced emissions.

EVAPORATION COMPENSATOR VALVE

The evaporation compensator valve supplies air to intake manifold to prevent an overly rich air/fuel mixture. A rich mixture is caused by pressure in fuel evaporation lines mixing with air/fuel mixture through PCV valve. Pressure on compensator diaphragm operates valve to let proportional amount of air into intake manifold.

TESTING

DECELERATION CONTROL VALVE

1974 Models - 1) Disconnect hose from air cleaner-to-deceleration control valve (at valve). *See Fig. 2.* With engine at idle, ensure there is no vacuum at control valve port. Stop engine.
2) Disconnect hose from air cleaner-to-coasting valve and plug vacuum port of deceleration control valve. With engine at idle, disconnect solenoid wire from anti-afterburn valve. Hold hand over suction hose of anti-afterburn valve, no suction should be felt.
3) Stop engine. Reconnect solenoid wire and hose to deceleration control valve. Disconnect hose from intake manifold at anti-afterburn valve and plug air suction port.
4) With engine at idle, disconnect wire from coasting valve solenoid. Hold hand over opening of air suction hose of deceleration control valve. Vacuum should be felt. Reconnect all hose and wires.

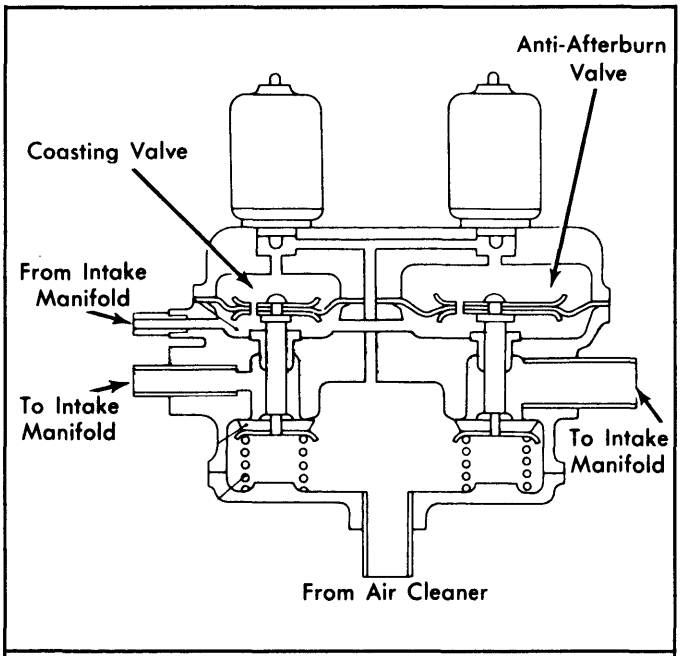

Fig. 2: 1974 Deceleration Control Valve

1975 Models - 1) Turn ignition on. Unplug connector at both solenoids. A "clicking" sound should be heard from both solenoids when disconnected. If not, replace solenoid(s).
2) Connect tachometer to engine. Start and run engine at idle. Disconnect air hose from deceleration control valve at air cleaner. Block air hose opening with hand. *See Fig. 3.* Engine speed should not change noticeably.
3) Block air hose opening with hand. Rapidly accelerate engine to 4000 RPM and quickly release throttle. Vacuum should be felt at end of hose for 1-1 1/2 seconds, tapering off until engine reaches 1150 RPM.

NOTE: On manual transmission equipped vehicles, only a small amount of vacuum may be noted.

4) On manual transmission equipped vehicles, disconnect coasting valve solenoid and apply 12 volts to terminal. Disconnect idle switch and connect a voltmeter to power lead of coasting valve solenoid.
5) Slowly decrease engine speed from 2000 RPM and record RPM at which current starts to flow. Current should start to flow at 1050-1250 RPM and continue to flow until idle speed is reached. Slowly increase engine speed and record RPM at which current stops flowing. Speed should be within 80-220 RPM of current flow RPM.

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1976 Models - 1) Turn ignition on. Unplug connector at both solenoids. A "clicking" sound should be heard from both solenoids when disconnected. If not, replace solenoid(s).
2) Connect tachometer to engine. Start and run engine at idle. Disconnect air hose from deceleration control valve at air cleaner. Block air hose opening with hand. *See Fig. 3.* Engine speed should not change noticeably.
3) With hose still disconnected, disconnect coasting valve solenoid. Vacuum should be felt at end of hose. With anti-afterburn solenoid disconnected, vacuum should be felt at end of hose.
4) Reconnect both solenoids. Disconnect coasting valve-to-intake manifold hose at deceleration control valve. Plug end of hose and open end of air outlet hose. Increase engine speed to 4000 RPM, then quickly release accelerator. Vacuum should be felt at air hose opening. If not, replace deceleration control valve.
5) On manual transmission equipped vehicles, disconnect idle switch and coasting valve solenoid lead to battery. Connect a voltmeter to lead from control unit. Start engine and slowly increase engine speed to 2000 RPM.
6) Slowly decrease engine speed and record RPM at which current starts to flow. Current should start to flow at 1050-1250 RPM and continue to flow until idle speed is reached.
7) Slowly increase engine speed and record RPM at which current stops flowing. Speed should be within 80-220 RPM of current flow RPM. Reconnect idle switch. Increase engine speed to 2000 RPM. Push idle switch lever toward idle position. Current flow should stop.

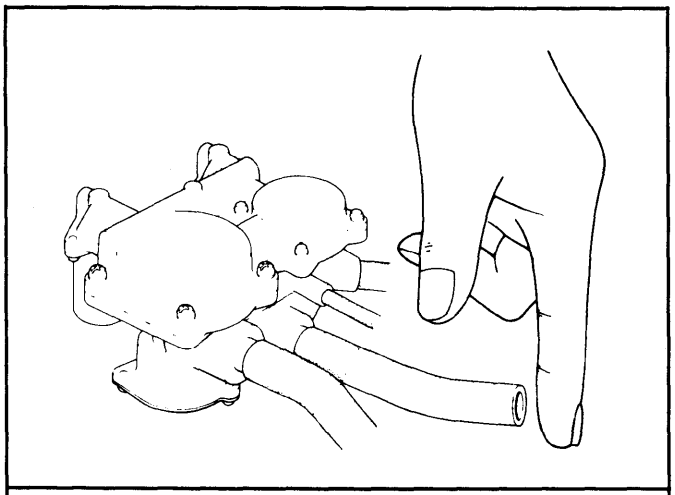

Fig. 3: Deceleration Control Valve Test

1977 Models - 1) Turn ignition on. Unplug connector at anti-afterburn valve solenoid. *See Fig. 4.* A "clicking" sound should be heard from solenoid when disconnected. If not, replace solenoid.
2) Connect tachometer to engine. Start and run engine at idle. Disconnect air hose from deceleration control valve at air cleaner. Block air hose opening with hand. Engine speed should not change noticeably.
3) On manual transmission equipped vehicles, plug hose opening with hand and disconnect coasting valve solenoid wire. Suction should now be felt at air hose opening.
4) On Federal models, push choke knob fully in. Suction should now be felt at disconnected vacuum tube. On California models, suction should be felt 104-156 seconds after starting engine.

1978 Models (Except RX7) - 1) Turn ignition on. Unplug connector at anti-afterburn valve solenoid. *See Fig. 4.* A "clicking" sound should be heard from solenoid when disconnected. If not, replace solenoid.
2) Connect tachometer to engine. Start and run engine at idle. Disconnect air hose from deceleration control valve at air cleaner. Block air hose opening with hand. Engine speed should not change noticeably.
3) On manual transmission equipped vehicles, plug hose opening with hand and disconnect coasting valve solenoid wire. Suction should now be felt at air hose opening.
4) Reconnect coasting valve solenoid wire. Block hose opening with hand and disconnect anti-afterburn valve solenoid wire. Suction should be felt at air hose opening. Reconnect wire.

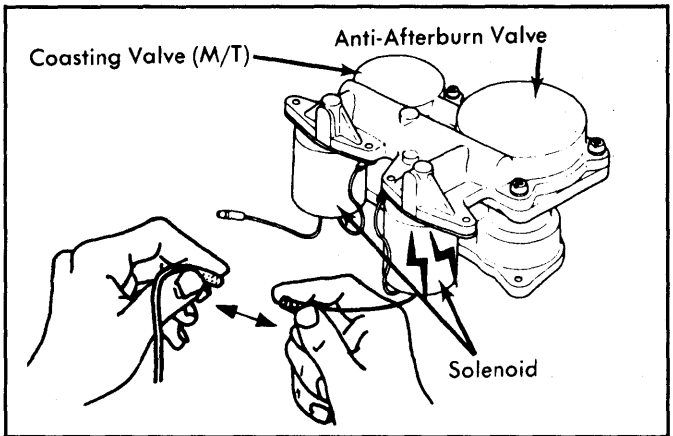

Fig. 4: Disconnecting Anti-Afterburn Valve Solenoid

5) On manual transmission equipped vehicles, disconnect coasting valve-to-intake manifold air hose (at valve). Block hose and valve air outlet. Increase engine speed to 4000 RPM. Quickly release accelerator. Air should be sucked into air hose. If not, replace control valve.
6) On manual transmission equipped vehicles, unplug idle switch connector. Disconnect coasting solenoid wire and connect wire to battery positive terminal. Connect voltmeter to coating valve lead from control unit. Increase engine speed to 2000 RPM.
7) Slowly decrease engine speed and note RPM when current flows. Current should flow at 1050-1250 RPM and continue to flow until idle speed is reached. Slowly increase engine speed and note RPM when current stops. Speed should be within 80-220 RPM of current flow RPM.
8) Reconnect idle switch. Increase engine speed to 2000 RPM. Push idle switch lever completely to idle position. Current flow should stop.

ANTI-AFTERBURN VALVE

1978-79 RX7 - 1) Ensure hoses are in good condition and properly connected. Remove air control valve to air cleaner hose from air cleaner. Disconnect vacuum sensing tube from relief solenoid valve.
2) Start and run engine at idle. Place finger over open end of hose detached from air cleaner. No suction should be felt. Disconnect anti-afterburn solenoid. Suction should now be felt.

ANTI-AFTERBURN SOLENOID

1979 RX7 - Remove air filter from anti-afterburn valve solenoid and connect a tube to nipple as shown. *See Fig. 6.* Disconnect vacuum tube from solenoid valve. Blow through tube. Air should come out opposite port of solenoid. Disconnect relief solenoid valve. Connect battery power to terminals on valve. Blow through tube again. Air should come out of side port.

COASTING VALVE

1979 RX7 - 1) Connect tachometer to engine. Start and warm engine to normal operating temperature. Detach electrical coupler from coasting valve. Attach voltmeter to terminal as shown. *See Fig. 7.*
2) Disconnect vacuum hose from dashpot diaphragm. Start engine and set speed at 3000 RPM with throttle. Quickly release throttle and check point when current stops flowing to terminal. It should be 1050-1250 RPM. Restore all connections to original location.
3) Detach electrical coupler from coasting valve solenoid. Remove coasting valve-to-air cleaner hose from air cleaner. With engine running, hold finger over end of hose. No air suction should be felt.
4) Apply battery power to disconnected coupler. Air suction should now be felt at hose. If coasting valve does not respond as indicated, replace it.

DASHPOT

1978-79 RX7 (Man. Trans.) - 1) Remove air cleaner. Checking all vacuum sensing tubes for proper condition and connections. Check that dashpot rod does not bind throttle lever movement. Start engine and connect tachometer.

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2) Quickly operate throttle lever fully and make sure dashpot rod extends quickly. Release throttle lever and make sure that throttle lever returns slowly to idle position after it has touched dashpot rod.
3) Disconnect vacuum sensing tube from dashpot diaphragm and operate throttle lever until it is away from dashpot rod. Close vacuum inlet to dashpot diaphragm with finger.
4) Release throttle lever and check engine speed at which dashpot rod stops moving after it has been pushed in by throttle lever. It should be 1650-1850 RPM. If not, loosen lock nut and turn dashpot diaphragm to adjust.

DASHPOT DELAY VALVE

1978-79 RX7 (Man. Trans.) - Disconnect idle switch and connect ohmmeter to terminals. *See Fig. 8.* Start engine. Operate throttle lever until it is away from dashpot rod and keep lever in that position for 2-3 seconds. Release throttle lever and check that continuity exists between terminals after 1-2 seconds.

IDLE SWITCH

1974 Models - 1) Disconnect idle switch. Check continuity between ignition switch terminal "A" and control unit terminal "C". Continuity should exist.
2) Check continuity between ignition switch terminal "A" and costing valve solenoid terminal "B" when external force is applied to switch knob (primary throttle valve in idle position). No continuity should exist.
3) If there is no continuity between ignition switch and control unit and continuity between ignition switch and coasting valve solenoid, idle switch is operating properly.
4) If necessary, adjust switch with engine warm. Set engine speed to idle speed by turning by-pass adjusting screw. Using accelerator pedal, increase and decrease engine speed making sure switch comes on and off. Switch cycles from on to off at 1000-1100 RPM (1100-1250 RPM with auto. trans.).
5) If switch does not change at specified RPM, adjust by turning adjusting screw of idle switch lever. Turning screw counterclockwise lowers RPM. Turning screw clockwise increases RPM.
1975-78 Models - 1) Disconnect idle switch. Check continuity between switch terminals. Continuity should be as specified in IDLE SWITCH CONTINUITY table.
2) If not, remove limiter cap on switch. Connect tachometer to engine. Connect ohmmeter to switch terminals No. 1 and 3. *See Fig. 9.* With automatic transmission in Neutral, start engine.

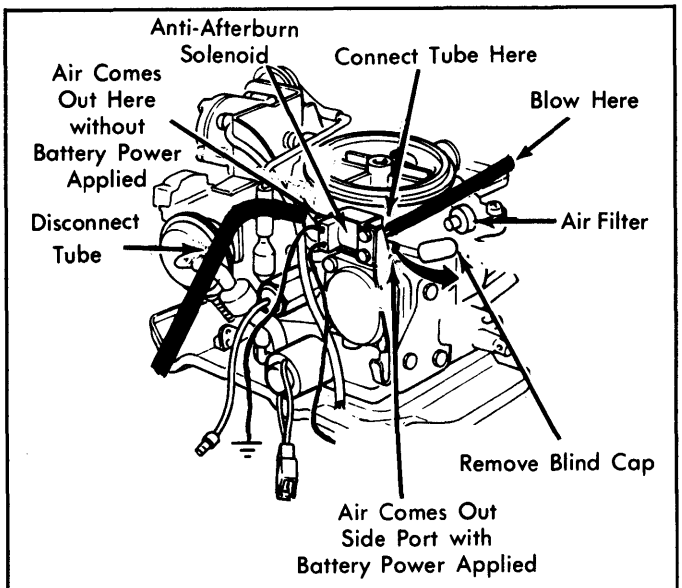

Fig. 6: 1979 Anti-Afterburn Solenoid Test

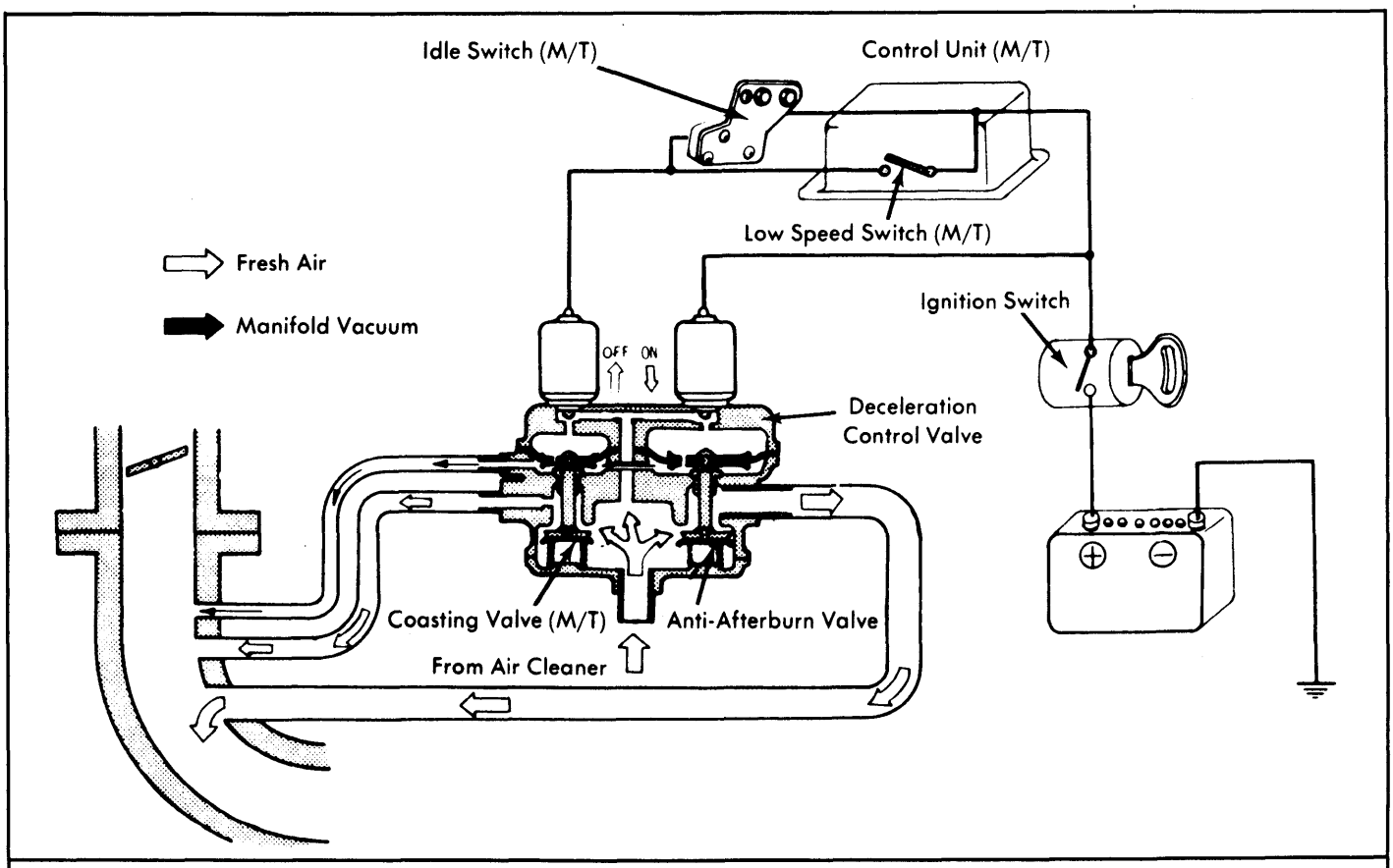

Fig. 5: 1977-78 Deceleration Control System

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3) Slowly increase engine speed. Turn adjusting screw until continuity is broken between terminals No. 1 and 3 at RPM specified in IDLE SWITCH CONTINUITY table. Replace switch if it does not operate within specifications.

IDLE SWITCH CONTINUITY

Engine RPM	Continuity Between Terminals	No Continuity Between Terminals
Idle	1 & 3	1 & 2
950-1050 (Man. Trans.)	1 & 2	1 & 3
1150-1250 (Auto. Trans.)	1 & 2	1 & 3

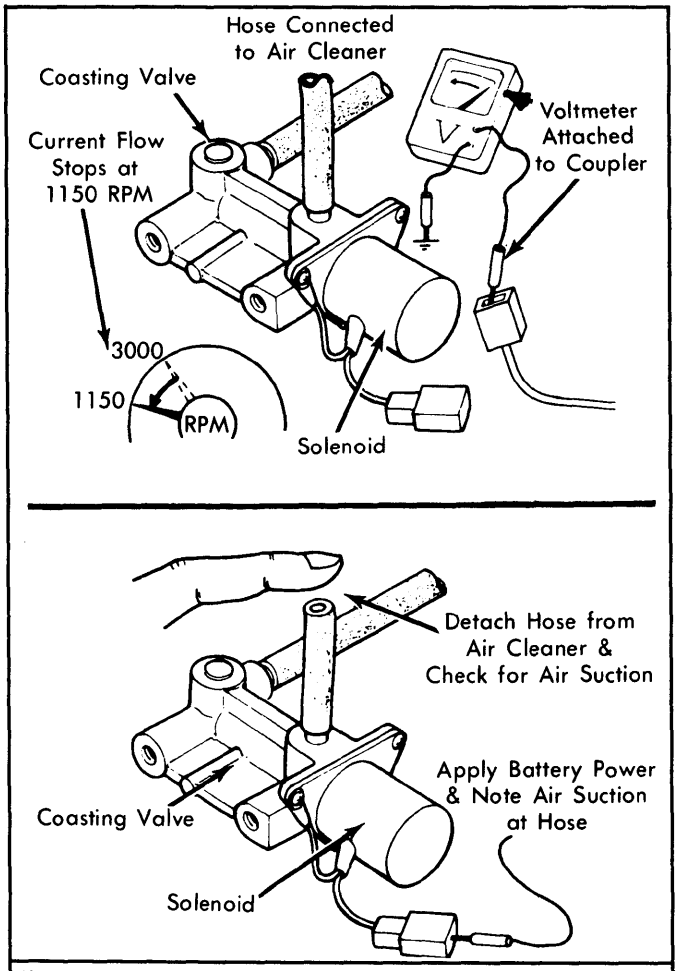

Fig. 7: 1979 Coasting Valve Test

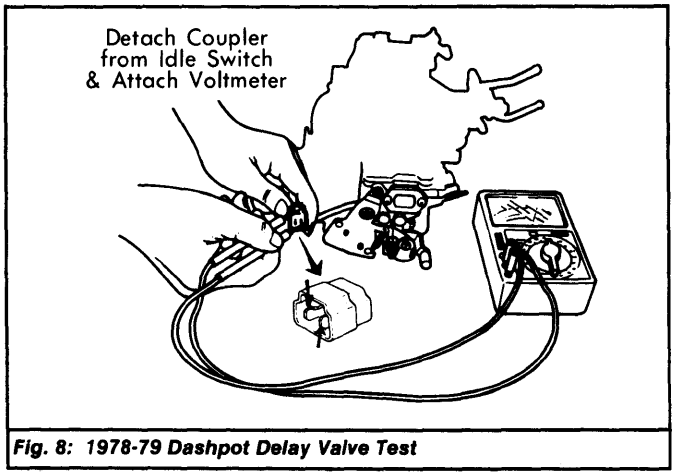

Fig. 8: 1978-79 Dashpot Delay Valve Test

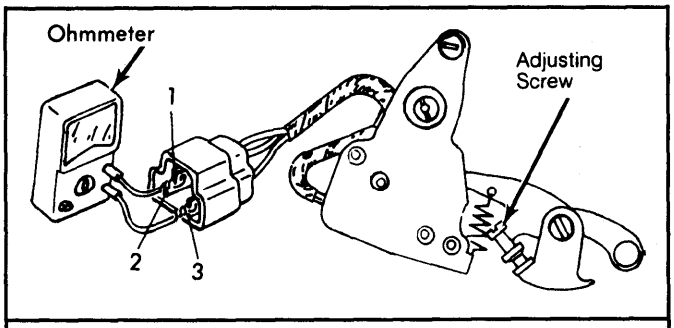

Fig. 9: Idle Switch Continuity Test

RELAYS

1975-78 Models - 1) Disconnect wiring from relay. Connect battery positive lead to terminal No. 2 and negative lead to terminal No. 6. *See Fig. 10.* Continuity should exist between terminals No. 1 and 4. No continuity should exist between terminals No. 3 and 4.

2) Connect battery positive lead to terminal No. 5 and negative lead to terminal No. 6. Continuity should exist between terminals No. 3 and 4. No continuity should exist between terminals No. 1 and 4. If relay does not test as described, replace it.

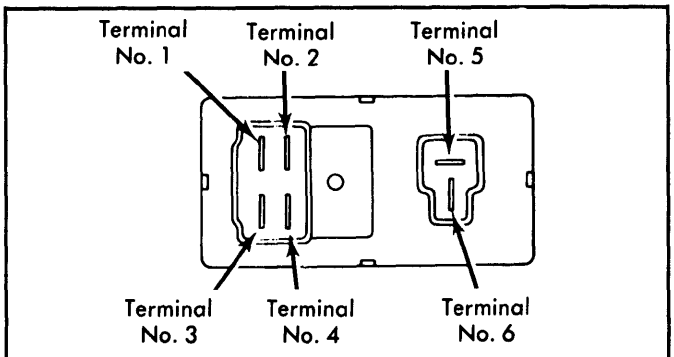

Fig. 10: Relay Terminal Identification

EVAPORATION COMPENSATOR VALVE

1975 Models - 1) Disconnect altitude compensator valve-to-evaporation compensator valve hose from evaporation compensator valve. Disconnect pressure sensing hose from evaporation compensator valve at "T" fitting.

2) Start and run engine at idle. Close inlet to evaporation compensator valve. Engine speed should not change noticeably. Connect hose at "A" and apply air pressure to sensing hose. *See Fig. 11.* There should be no increase in engine speed.

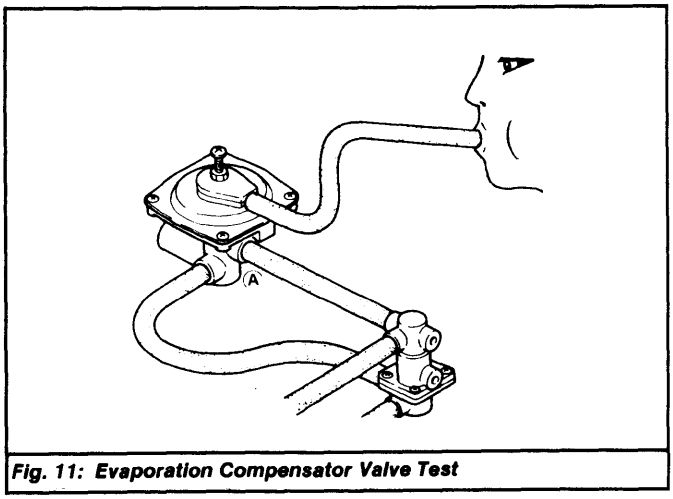

Fig. 11: Evaporation Compensator Valve Test

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ALTITUDE COMPENSATOR VALVE

1974 Models - Disconnect air inlet hose from altitude compensator valve. With engine at idle, place finger over altitude compensator inlet. Engine RPM should decrease by a small amount. If not, replace altitude compensator valve.

1975 Models - Disconnect hoses between carburetor-to-altitude compensator and evaporation compensator valve-to-altitude compensator valve at altitude compensator valve. Start and run engine at idle. With fingers, close both sides of altitude compensator valve. *See Fig. 12.* If altitude compensator valve is working properly, engine speed will drop.

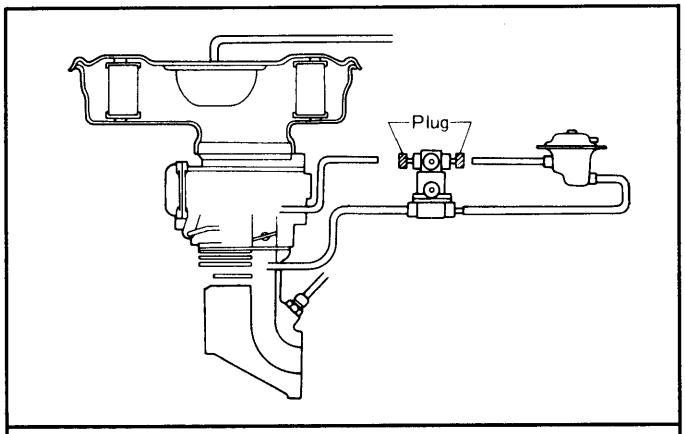

Fig. 12: Altitude Compensator Valve Test

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