MAZDA AIR INJECTION SYSTEM (PISTON ENGINES)

Mazda 1200 (1971)
Mazda 616 (1971)
Mazda 1800 (1971)

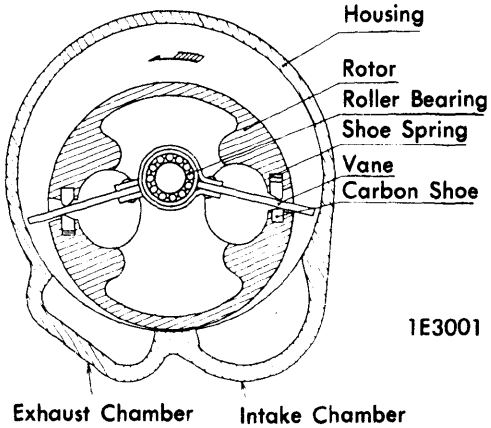
DESCRIPTION

Mazda Air Injection System consists of an air pump, an anti-afterburn valve, a check valve, an air distribution manifold with a nozzle for each cylinder exhaust port, a vacuum sensing hose, and air supply hoses connecting the system. 1800 models have a separate air cleaner for the air pump, while all other models use the carburetor air cleaner. 616 models also use an air by-pass valve in the air injection system. Other items are also used for emission control as follows; an air cut valve is used on all models, 1200 & 616 models use a coasting richer device. Dual point distributors are also used on all models except non-California 616 models and California 616 manual transmission models.

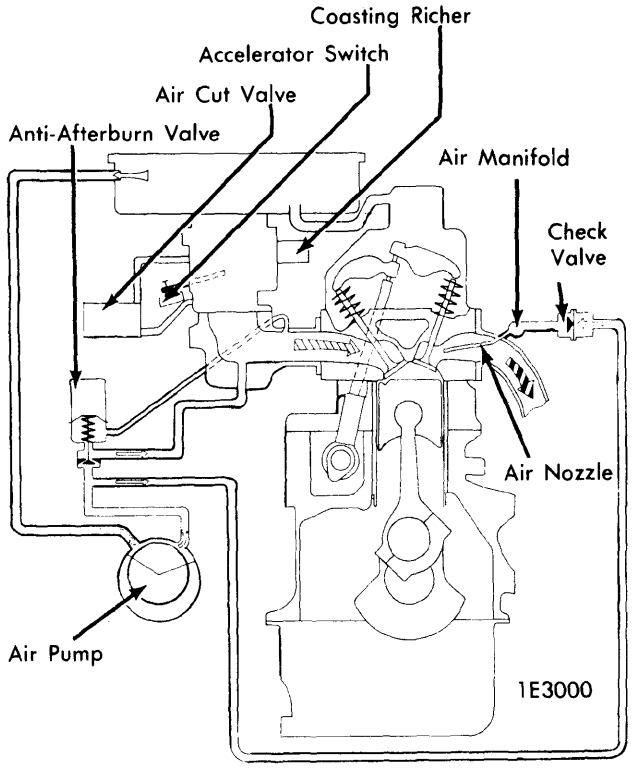
OPERATION

Air, under pressure from air pump, flows through anti-afterburn valve, through air by-pass valve on 616 models, to check valve. From check valve, air flows to air distribution manifold and enters exhaust manifold through air injection nozzles. During periods of deceleration, air is diverted to intake manifold by anti-afterburn valve to prevent engine popping. Air by-pass valve diverts air to air cleaner, when choke is in operation, to prevent exhaust system overheating on 616 models only. Check valve prevents a back flow of exhaust gases from entering air pump. Air cut valve closes off flow of air/fuel mixture to engine when ignition is switched off to prevent engine run on. Coasting richer device enriches fuel mixture during deceleration to provide a combustible mixture to ensure emission reduction. Dual point distributor is equipped with a retard and an advance point set to provide a fine degree of ignition timing control to reduce emissions. Operation of dual points is controlled by various combinations of control switches. Operation of individual components is as follows:

Air Pump – Pump is a dual vane unit which is driven from crankshaft pulley by means of a V-belt. A relief valve, installed on pump housing, relieves excess air pressure created by air pump to prevent damage to system.

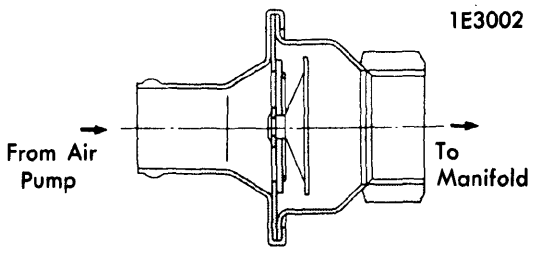


AIR PUMP



MAZDA AIR INJECTION SYSTEM

Check Valve – Valve is provided in system to prevent exhaust gases from flowing back into air pump. When pressure of air, from air pump, is greater than that of exhaust gases, valve opens and air is injected into exhaust manifold. If exhaust gas pressure should exceed air pump pressure, valve closes, preventing gas from entering system.



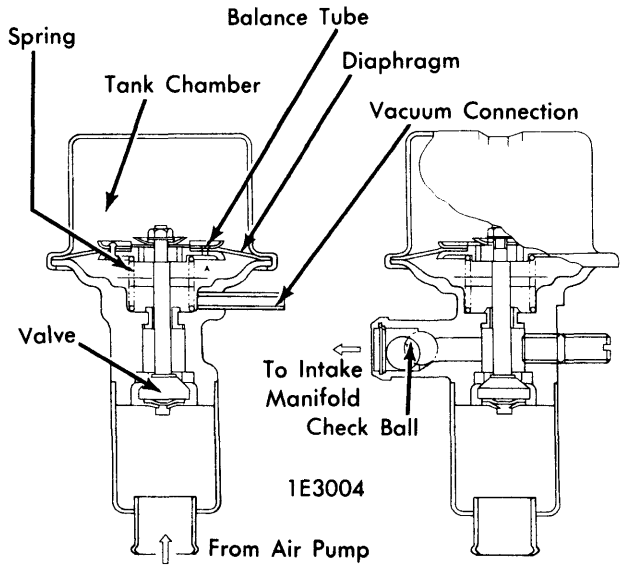
CHECK VALVE

Air Injection Manifold & Nozzles – Manifold and nozzle assembly allows even distribution of air into exhaust port of each cylinder.

Anti-Afterburn Valve – Valve is of gulp type design, and is a control device which provides a suitable air/fuel mixture during deceleration, by injecting additional fresh air into intake manifold to prevent mixture from becoming too rich to burn in engine. This unburned mixture, when discharged into exhaust manifold, could cause a backfire when mixed with air from air injection system. Valve is controlled by intake

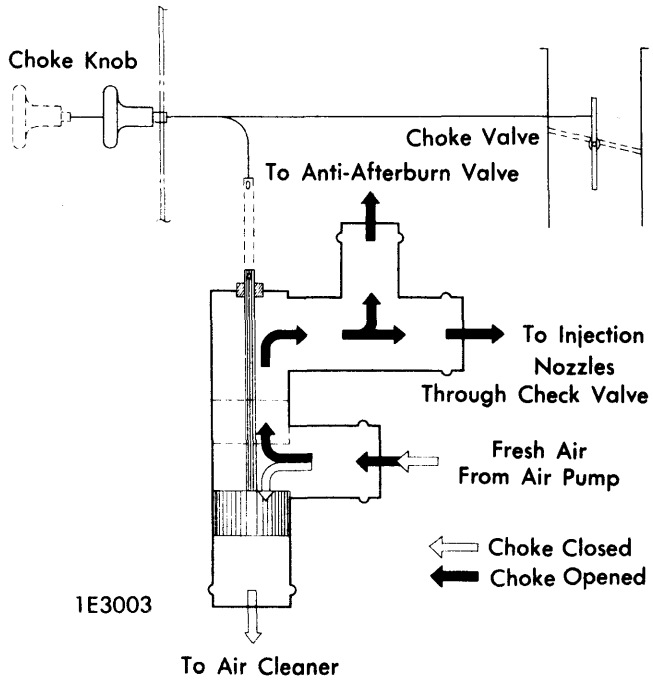
MAZDA AIR INJECTION SYSTEM (PISTON ENGINES) (Cont.)

manifold vacuum so that when vacuum is high (during deceleration or shifting), valve opens allowing air pump output to be diverted into intake manifold.



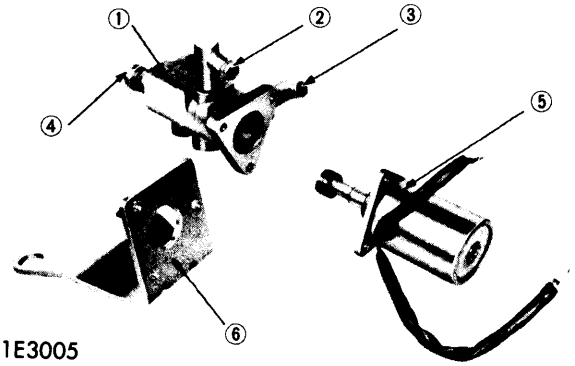
ANTI-AFTERBURN VALVE

Air By-Pass Valve – On 616 models, air by-pass valve is located in air hose between air pump and check valve. When choke is not in use, by-pass valve delivers air in a normal manner to check valve. However, when choke is operated, valve directs air pump output away from air injection nozzles and into air cleaner. This prevents burning of unburned gases in the exhaust system.



AIR BY-PASS VALVE

Air Cut Valve – As throttle valve opening angle is adjusted to less than 1°, air/fuel mixture for idle is supplied mainly through air cut valve. When ignition switch is turned off, solenoid valve closes air/fuel passage in air cut valve which instantly stops engine.



① Valve Body
② Outlet Port
③ Inlet Port
④ Air Flow Adj. Screw
⑤ Solenoid
⑥ Mounting Plate

AIR CUT VALVE

Coasting Richer Device – With carburetors used on 1200 and 616 models, when decelerating, mixture will be too lean to burn and air injection system will not reduce these unburned hydrocarbons. As a result, this device supplies additional fuel only when decelerating. Coasting richer device is controlled by a combination of a speed switch, accelerator switch and on manual transmission cars only, and a clutch switch. When all switches are ON, by-pass passage is opened, allowing a richer mixture to be produced. Device only operates when accelerator pedal is released above a certain speed and on models so equipped, when clutch is engaged.

Dual Point Distributor – Selection of retarded or advanced point set is made as follows. During idle, accelerator switch is ON and retard point set operates. During acceleration and high-speed running, accelerator switch is OFF and advance point set operates. When decelerating, speed switch and accelerator switch are ON, which operates retard point set. 1800 models and 616 California models with automatic transmission, also incorporate a vacuum switch to control retard point set. Whenever manifold vacuum rises to 2.7 in. Hg. or more, vacuum switch is turned ON which operates retard point set.

SERVICE PROCEDURES

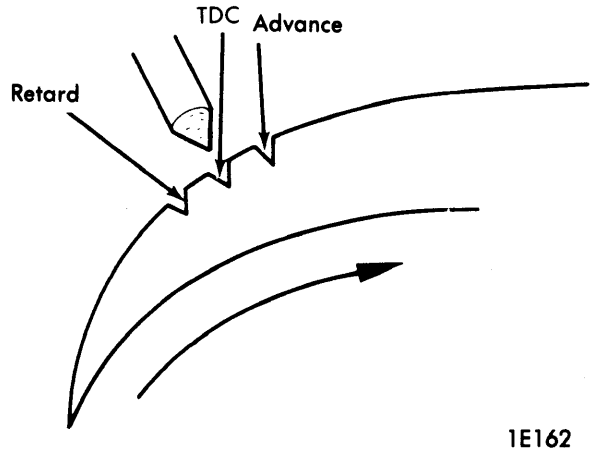
At 12,000 mile intervals, entire system should be checked for proper operation, and any necessary cleaning or replacement of component parts should be done. Condition of engine tune-up should be checked whenever air injection system is not operating properly. Particular care should be taken in checking items that affect air/fuel mixture.

ADJUSTMENTS

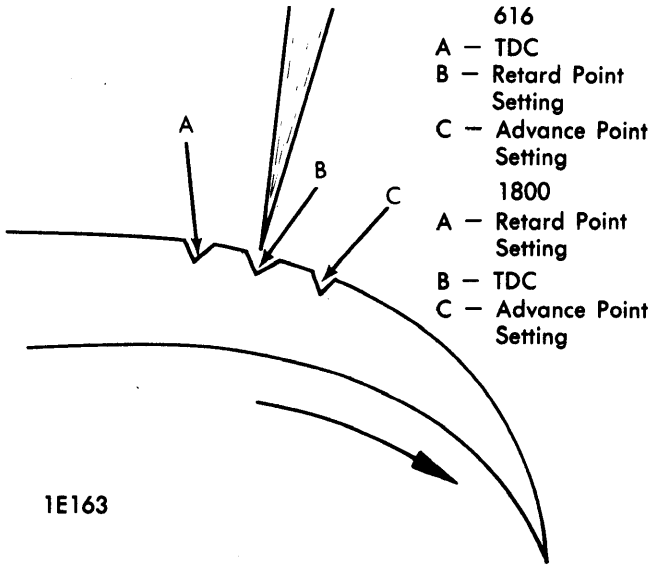
Ignition Timing – *See Tune-Up Chart for specifications.* Set timing with engine at idle speed and at normal operating temperature. On models with dual point distributors, disconnect retard points primary lead. Set timing in normal

MAZDA AIR INJECTION SYSTEM (PISTON ENGINES) (Cont.)

manner. Reconnect retard contact points, check that idle speed has not changed and check timing of retard points. If timing is not correct, stop engine, remove distributor cap and adjust timing by moving contact points.*NOTE — Do not adjust retarded timing by rotating distributor.* Start engine and recheck retarded timing.



TIMING MARKS (1200)



616
A — TDC
B — Retard Point Setting
C — Advance Point Setting

1800
A — Retard Point Setting
B — TDC
C — Advance Point Setting

TIMING MARKS (616 & 1800)

Carburetor Idle Speed & Mixture Adjustment — *See Tune-Up Chart for idle speed specifications.* Set idle with engine at normal operating temperature. Set idle speed with air flow adjusting screw on air cut valve. *NOTE — Do not adjust idle speed with screw on throttle lever.* Adjust idle adjusting screw (1200 & 616) or idle adjusting nut (1800) to obtain CO value specified below:

Model	Idle CO% Man. Trans.	Auto. Trans.
1200	1.0-2.5	1.5-3.0
616	1.0-1.5	1.0-1.5
1800	2.0-3.0	1.5-2.5

Air Pump Drive Belt Adjustment — With finger pressure applied midway between pulleys, belt should flex .8 in. (20 mm) on 1200 & 1800 models, .6-.7 in. (15-18 mm) on 616 models with a used belt or .45-.55 in. (11-14 mm) with a new belt. Adjust tension by moving air pump.

INSPECTION & TESTING

Air Pump — Check delivery pressure of air pump as follows: Disconnect air supply hose at intake side of check valve and plug check valve. Connect pressure gauge to outlet of air pump and run engine at 1500 RPM. Delivery pressure should be more than 2 psi (.15 kg/sq. cm). If pressure does not reach this value, disconnect air supply hose at anti-afterburn valve and repeat test. If air pressure still does not rise, air pump or relief valve could be defective. Finally, run engine at 3000 RPM. If no air flows out of relief valve it is defective and should be replaced. *For pump disassembly, refer to Mazda Air Injection Pump in EMISSION Section.*

Check Valve — Disconnect air supply hose at check valve and run engine at 1500 RPM. Place hand near check valve and check for backflow of exhaust gases. *NOTE — Do not confuse backflow with pulsations of air intake at low engine speeds.* Also check valve for carbon deposists, damage or deterioration. Replace valve if defective.

Anti-Afterburn Valve — Disconnect air supply hose at anti-afterburn valve and plug hose. Connect vacuum gauge to air pump inlet. Start engine and read vacuum gauge. Reading should be zero. Rapidly open and close throttle, vacuum should rise rapidly and decline slowly. If valve malfunctions, replace valve.

Air Cut Valve — Connect valve wiring to battery and listen for valve operation. Replace if defective.

Accelerator Switch — Connect circuit tester to retard contact point set and switch on ignition. Tester should indicate current flow with accelerator pedal released, and no flow with pedal depressed. Adjust switch if necessary.

Clutch Switch — Test in same manner as accelerator switch.

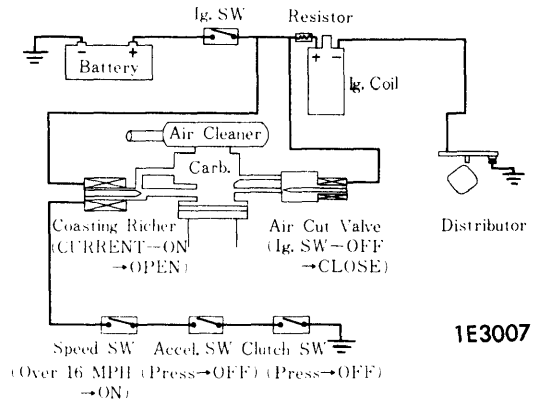
Speed Switch — Switch is located on back of speedometer. To test, jack up rear of vehicle, start engine and engage low gear. Check by circuit tester that speed switch is ON when speedometer reads 10 MPH or more. Replace switch if defective.

Vacuum Switch — Apply vacuum to switch and connect circuit tester. Switch should be ON when vacuum is 2.7 in. Hg. or more and OFF when vacuum is 0 to 2.7 in. Hg.

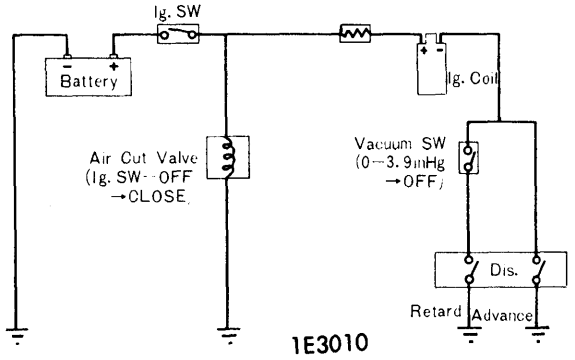
NOTE — If accelerator, speed, clutch or vacuum switch is defective this would cause irregular ignition timing and a rough idle.

Coasting Richer Device — Connect device wiring to battery and listen for solenoid operation. Replace if defective.

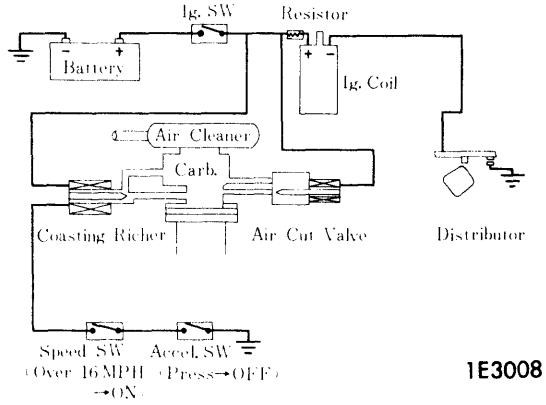
MAZDA AIR INJECTION SYSTEM (PISTON ENGINES) (Cont.)



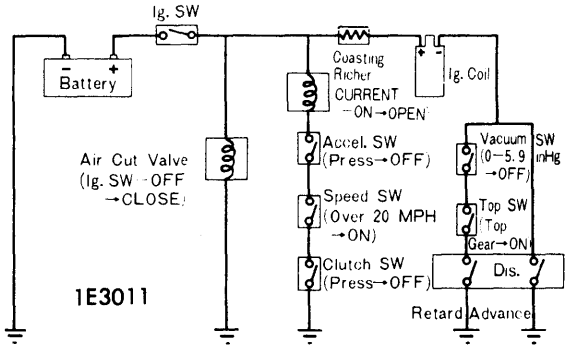
616 MAN. TRANS. WIRING



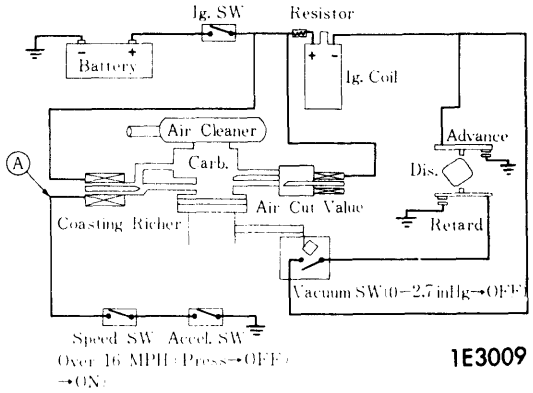
1800 NON-CALIF. WIRING



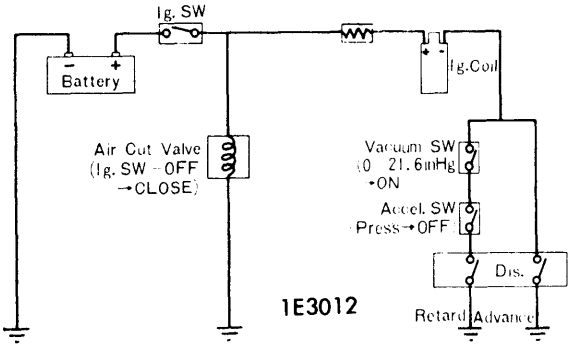
616 NON-CALIF. AUTO. TRANS. WIRING



1800 CALIF. MAN. TRANS. WIRING



616 CALIF. AUTO. TRANS. WIRING



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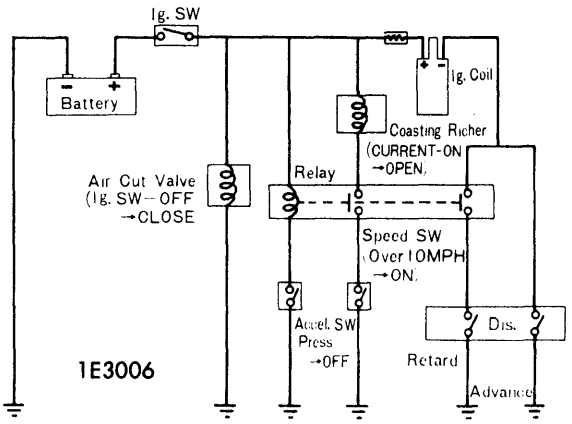

1200 WIRING