SYSTEM DESCRIPTION

Following are brief general descriptions of the emission control system used by imported automobile manufacturers. It should be noted that in addition to the systems listed for each vehicle, all models also have modified distributor curves and modified carburetors for emission control.

Air Injection Reactor (A.I.R.) – This system uses an air pump to inject fresh air into the exhaust port area. This introduction of fresh air into a high temperature area causes further burning in the exhaust manifold to further reduce exhaust emissions. Various control valves are also used with this system to prevent backfiring on deceleration.

Coasting Richer Valve (CRV) – This device supplies additional fuel to the mixture during deceleration to promote more complete combustion and thus reduce exhaust emissions. These valves are usually controlled by intake manifold vacuum or by electrical signals supplied by various sensors.

Dashpot (DP) – This device acts as a damper to prevent a too rapid throttle closure. This device can be used to either prevent stalling or to reduce emissions by reducing the momentary rich condition caused when a throttle is closed rapidly.

Decel Valve (DV) – This device provides additional air/fuel mixture to the engine during deceleration to promote more complete combustion and reduce exhaust emissions. On some models this device is an add on valve connected by hoses, while on other models the valve may be built into the carburetor.

Distributor Deceleration Valve (DDV) – This valve senses a deceleration condition by means of intake manifold vacuum. When this occurs, valve switches vacuum advance source from carburetor port to intake manifold source. This advances ignition timing to provide more complete combustion and reduce exhaust emissions.

Dual Diaphragm Distributor (DDD) – These are distributors equipped with both a vacuum advance and retard mechanism. On some units, two vacuum diaphragms are used, one for advance and the other for retard. On other units, both functions are combined in one diaphragm. These units have a vacuum connection on both sides of diaphragm. Various control units are used in conjunction with these distributors to control when advance or retard function is selected.

Dual Distributors (DD) – As the name implies, these models are equipped with two distributors. At present, the Mazda rotary engines are the models so equipped, and these engines have, in effect, dual ignition with two distributors, two coils, and two spark plugs per rotor. One distributor is timed later than the other and this permits different timings depending on conditions sensed by various control units. Under certain conditions, both distributors operate at the same time to promote more complete combustion and reduce emissions.

Dual Manifold System – System consists of a dual intake manifold controlled by secondary throttles. During normal operation, the air/fuel mixture is routed from the carburetor, to the exhaust manifold where it is heated, and then into the engine. This preheating of the mixture assures a more complete combustion to reduce exhaust emissions. During high output operation (full throttle) secondary throttles open and allow mixture to pass directly into engine to improve driveability and performance.

Dual Point Distributor (DPD) – On most vehicles, the dual points are used to provide both a retarded and advanced timing point. Various control units select either the retarded or advanced points, depending on operating conditions, to reduce exhaust emissions. On some models, the dual points operate at the same time and are used solely to extend the dwell period to promote more complete combustion and reduce exhaust emissions.

Electric Assist Choke (EAC) – This device has an electrically heated element which causes a thermostatic type choke to open sooner after a cold engine start. This reduces emissions by reducing the time that a rich mixture is supplied to the engine.

Electronic Fuel Injection (EFI) – This electronically controlled fuel injection system provides a very precise air/fuel mixture to the engine under all operating conditions. By achieving this highly accurate metering of fuel, exhaust emissions as well as fuel consumption can be reduced.

Exhaust Gas Recirculation (EGR) – Oxides of Nitrogen (NOx) are formed under high temperature and pressure conditions. By allowing a controlled amount of exhaust gases to mix with the incoming air/fuel mixture, combustion temperatures are reduced which allows a reduction in NOx emissions. The EGR system provides this controlled amount of exhaust gas to the intake manifold. Generally, EGR is eliminated during idle as NOx formation is low at this time and EGR can cause a rough idle.

Fuel Cut-Off (FCO) – This valve, generally electrically controlled, cuts off the fuel flow from the carburetor when certain conditions occur. Some models cut-off fuel flow during periods of deceleration to reduce emissions which normally are very high during this period. On other models, this device cuts off fuel flow when ignition is turned off to prevent run-on caused by the higher idle speeds used to control exhaust emissions.

Fuel Evaporation Emission Control System – This system traps the evaporated fuel vapors from the gas tank and carburetor float bowl and prevents them from being expelled into the atmosphere. These vapors are stored either in the engine crankcase (case) or a charcoal cannister (can.) when the engine is not running. When engine is started, these trapped fumes are drawn into the engine and burned.

Idle Stop Solenoid (ISS) – This electrically operated solenoid holds the throttle open at curb idle speed while ignition is on. When ignition is turned off, solenoid allows throttle to close beyond normal idle setting. This prevents run-on caused by the higher idle speeds used to control exhaust emissions.

Mixture Control Valve (MCV) – This valve, generally controlled by intake manifold vacuum, allows additional air to enter intake manifold during periods of deceleration to lean out the rich mixture and promote more complete combustion and reduce exhaust emissions.

Mechanical Fuel Injection (MFI) – This mechanically controlled fuel injection system provides a very precise air/fuel mixture to the engine under all operating conditions. By achieving this highly accurate metering of fuel, exhaust emissions as well as fuel consumption can be reduced.

Positive Crankcase Ventilation (PCV) – This system prevents blowby gases, which contain harmful emissions, from entering the atmosphere. These blowby gases are drawn from the crankcase and into the engine where they are burned.

Speed Controlled Spark (SCS) – This device allows either ignition advance or retard depending on vehicle speed. Generally, this system reduces advance during low speed operation but allows full advance at higher vehicle speeds. On some vehicles this system operates on the vacuum advance and/or retard unit, while on other vehicles the system may select the retard or advance points of a dual point distributor.

Thermal Override (TO) – Many different forms of thermal override are provided for in various emission control systems. The most common one either restores full vacuum advance or provides additional vacuum advance in the event of an engine overheating condition. Other thermal overrides either allow an emission control system to function or not to function if ambient or engine temperature is below a certain level.

Thermal Reactor – This system is a modification of the basic air injection system. This system uses an air pump to inject fresh air into the exhaust ports, just as with an air injection system, however, the exhaust manifold is a device which allows the exhaust gases to maintain a very high temperature. This promotes even greater combustion to occur than in a conventional exhaust manifold and reduces exhaust emissions greatly.

Thermostatic Air Cleaner (TAC) – This device regulates the temperature of the air entering the carburetor. The air cleaner draws air from a shroud around the exhaust manifold and from the engine compartment. Depending on air temperature, the air cleaner then allows either heated air, cooler air, or a blend of the two to enter the carburetor. Due to leaner mixtures used to achieve emission control, this heated air is necessary to permit good cold engine operation on the models so equipped. Some thermostatic air cleaners are vacuum operated to permit cool air to enter the carburetor during full throttle operation for maximum performance.

Throttle Poppet Valve (TPV) – This device is a simple spring loaded valve located in the throttle plate of the carburetors so equipped. During periods of high intake manifold vacuum, such as deceleration, this valve opens allowing additional air into the engine. This leans the overly rich mixture and promotes more complete combustion to reduce exhaust emissions.

Throttle Positioner (TP) – This device holds the throttle slightly open during deceleration to provide a combustable mixture to the engine and thus reduce emissions. An additional control device is generally provided to allow throttle to close to normal idle position after a certain length of time or when vehicle speed decreases to a certain point. These devices are either operated electrically or by vacuum.

Transmission Controlled Spark (TCS) – This system allows either ignition advance or retard depending on transmission gear position. Generally, this system provides for retarded timing in the lower gear positions but allows full advance in high gear. On some models this system operates on the vacuum advance and/or retard unit, while on other models system may select either retard or advance points of a dual diaphragm distributor.

Vacuum Retard (VR) – Some models use a vacuum retard diaphragm in place of a vacuum advance unit. This device may be connected to manifold vacuum to provide retarded timing during deceleration or it may be part of another system such as a TCS or SCS system.

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Mfg. & Model	PCV	A.I.R.	TAC	Engine Modifications ①
Austin America	X	X	---	-----
Austin-Healey Sprite	X	X	---	-----
BMW	X	X	---	-----
Citroen	X	X	---	-----
Cortina	X	X	---	-----
Datsun				
All Exc. Pickup	X	X	---	-----
Pickup	X	---	---	FCO
Fiat				
850 ②	X	---	---	-----
124	X	---	---	TP
Jaguar	X	---	---	DMS
Lotus	X	---	---	DMS
Mercedes-Benz				
220 Models	X	---	---	TP, VR, TO
Fuel Inj. Models	X	---	---	MFI
All Others Models	X	X	---	-----
MG	X	X	---	-----
Opel	X	X	---	-----
Peugeot	X	---	---	TP
Porsche	X	X	---	TP