GROUP 25—EMISSION CONTROL

SECTION 0—INDEX

SERVICE BULLETIN REFERENCE

DATE	NUMBER	SUBJECT	CHANGES

SECTION 1—EMISSION CONTROL SYSTEMS

GENERAL INFORMATION

Stringent Emission Control regulations introduced under Australian Design Rule (ADR) 27A, require the control of vehicle emissions which stem from vehicle Exhaust, Crankcase and Fuel Evaporation.

Control of exhaust emissions Hydro Carbons (HC), Carbon Monoxide (CO) and Oxides of Nitrogen (NOx) is accomplished by a combination of engine modifications and the additions of special control components. Modifications to the carburettor, distributor and camshaft form the basic control system. Additional control devices include Heated Inlet Air (HIA) and Exhaust Gas Recirculation (EGR).

NOTE: Complete effectiveness of the system depends on engine idle speed, ignition timing and idle mixture being set according to the specifications listed in this manual and shown on the label in the engine compartment and, required maintenance as indicated in the Lubrication and Maintenance Section (Group 1). Failure to maintain the Emission Control System as specified may result in emission levels higher than legal State limits.

NOTE: Specifications and adjustments printed are correct at the time of publication. If these specifications differ from those of the Vehicle Emission Control Information label, use the specifications on the label.

HEATED INLET AIR SYSTEM (Astron Engine)

General Information

The Heated Inlet Air System (HIAS) is designed to quickly attain high air temperature at the point of carburettor entry. This is achieved by drawing air over the exhaust manifold through ducting and directing it to the air cleaner snorkel. A control valve in the snorkel varies the amount of heated air, the position of the valve being controlled by under hood temperature.

Operation (Early Models — Bi-Metallic Control)

When the under hood air temperature is below 5°C (41°F) the hot air control valve is in the **up** or **heat on** position allowing 100% heated air to flow from the exhaust manifold cowl to the carburettor.

When the under hood temperature is above 42°C (108°F) the control valve moves to the **down** or **heat off** position, allowing the complete supply of air to be drawn through the radiator yoke panel hose.

At temperatures between 5°C to 42°C (41° to 108°F) the position of the control valve will vary between the 'heat on' and 'heat off' position, allowing a mixture of heated and ambient air flow to the air cleaner.

Service Procedure

(1) Cool the air cleaner snorkel to a temperature of 5°C (41°F) or less, the control valve should be in the up or 'heat on' position.

(2) Start the engine and run until an under hood temperature of 41°C (108°F) is achieved, the control valve should be in the down or 'heat off' position.

(3) If the control valve is defective it must be replaced.

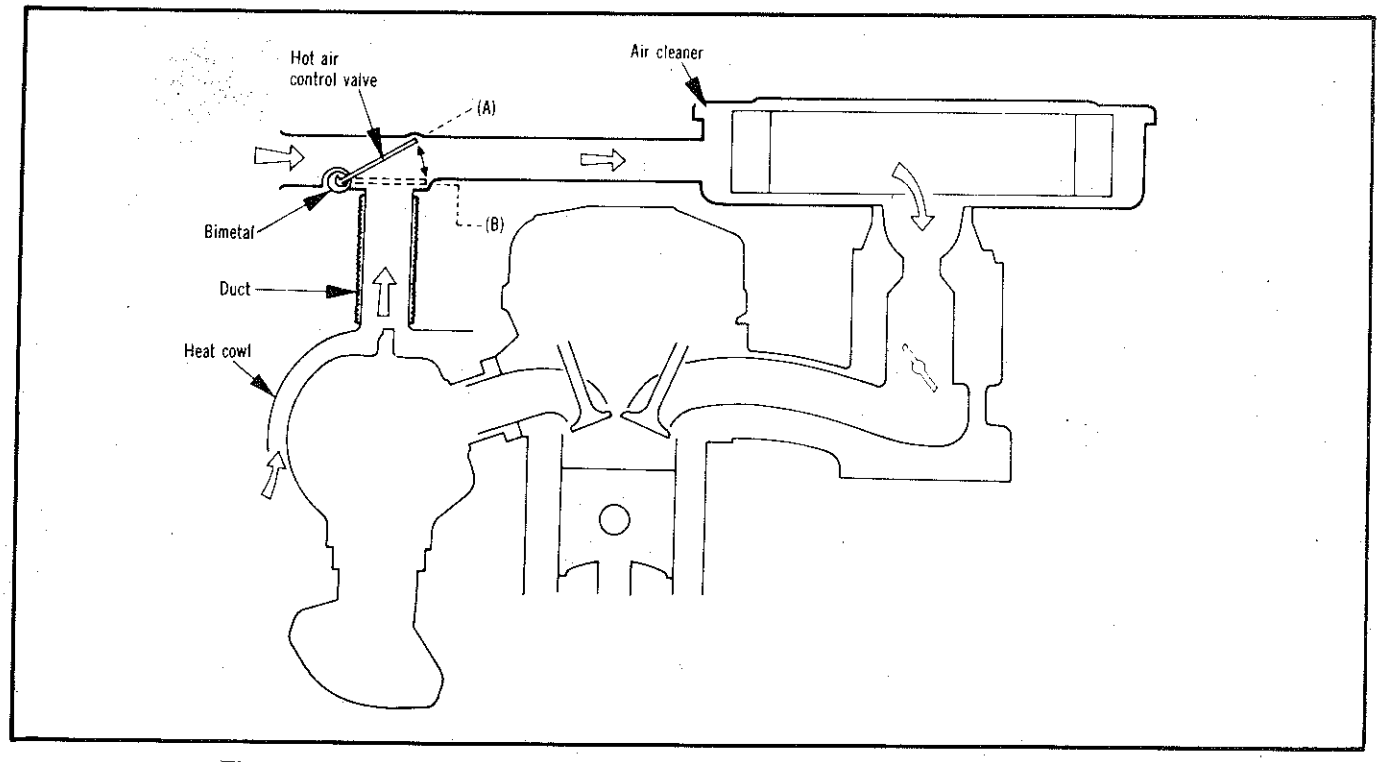

Fig. 1—Heated inlet air system. (Astron engine). (Early model — bi-metallic control)

CRANKCASE EMISSIONS

The crankcase ventilation system is designed to eliminate emission of residual fumes and vapours from the crankcase by directing these fumes back through the combustion chamber.

Operation

When the engine is running at part throttle, blow-by gas from the rocker cover and crankcase are drawn into the intake manifold via a fixed orifice and hose in the side of the rocker cover.

At full thottle operation the blow-by gases are drawn into the carburettor via the hose on the front of the rocker cover.

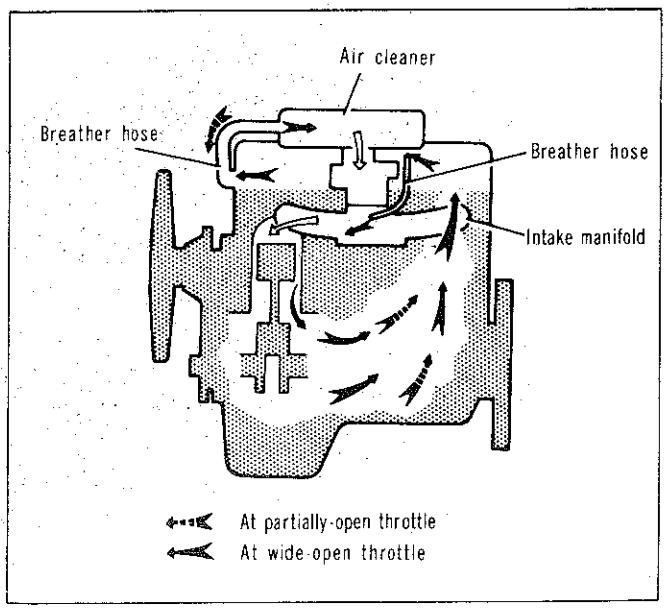

Fig. 7—Closed crankcase ventilation system

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

The EGR system recirculates a metered quantity of exhaust gases and dilutes the air fuel mixture resulting in the lowering of combustion temperature in the cylinder with a subsequent reduction of the oxides of nitrogen (NOx) in the exhaust gases.

The recirculated exhaust gases are fed from No. 2 exhaust port to the intake manifold through a passage built into the cylinder head and intake manifold.

When the engine is cold, oxides of nitrogen are reduced and no exhaust gases are recirculated. When the coolant temperature is below 55± 5°C (131± 9°F) the thermo valve is open and therefore the E.G.R. valve vacuum chamber pressure is at or near atmospheric pressure. In this condition the E.G.R. valve is closed ensuring satisfactory driveability and starting.

When the coolent temperature rises above 55± 5°C (131± 9°F) the thermo valve closes and manifold vacuum acts on the E.G.R. valve, which opens to allow exhaust gases into the intake manifold. When vacuum is low, during idle and wide open throttle the E.G.R. valve is closed.

A vacuum control valve fitted to the side of the E.G.R. valve responds to vehicle load operation by detecting manifold vacuum. When manifold vacuum is below 27 kPa (8" Hg) the control valve is closed allowing the E.G.R. valve to operate normally. When manifold vacuum is at or above 27 kPa (8" Hg) the vacuum control valve opens allowing atmospheric pressure to enter the E.G.R. valve vacuum chamber through an orifice. This provides a decrease in E.G.R. flow under low load conditions thus improving driveability.

NOTE: Calibration of the E.G.R. valve varies between manual and automatic transmission models.

E.G.R. Valve

Construction of the E.G.R. valve is shown in Fig. 7. Vacuum produced in the upper part of the carburettor throttle valve is applied to the vacuum chamber in the upper part of the E.G.R. valve.

When the thermo valve is open, carburettor vacuum is vented allowing the E.G.R. valve diaphragm spring to hold the valve closed. When the thermo valve closes, carburettor vacuum overcomes the diaphragm spring force and opens the E.G.R. valve allowing exhaust gases to recirculate. When the engine is idling or at wide open throttle the vacuum is too low to open the E.G.R. valve.

E.G.R. Valve Inspection

(1) Check the diaphragm for damage and the valve stem for sticking.

(2) Check the vacuum pipe for cracks damage and clogging.

(3) Check the exhaust gas passage for clogging.

Testing E.G.R. Valve

(1) Warm up engine to normal operating temperature and set the engine speed at 3000 to 3200 rpm.

(2) Disconnect the E.G.R. valve vacuum supply hose, the diaphragm should lower.

(3) Reconnect the hose and the diaphragm should rise.

(4) The valve is satisfactory if it operates in the above manner.

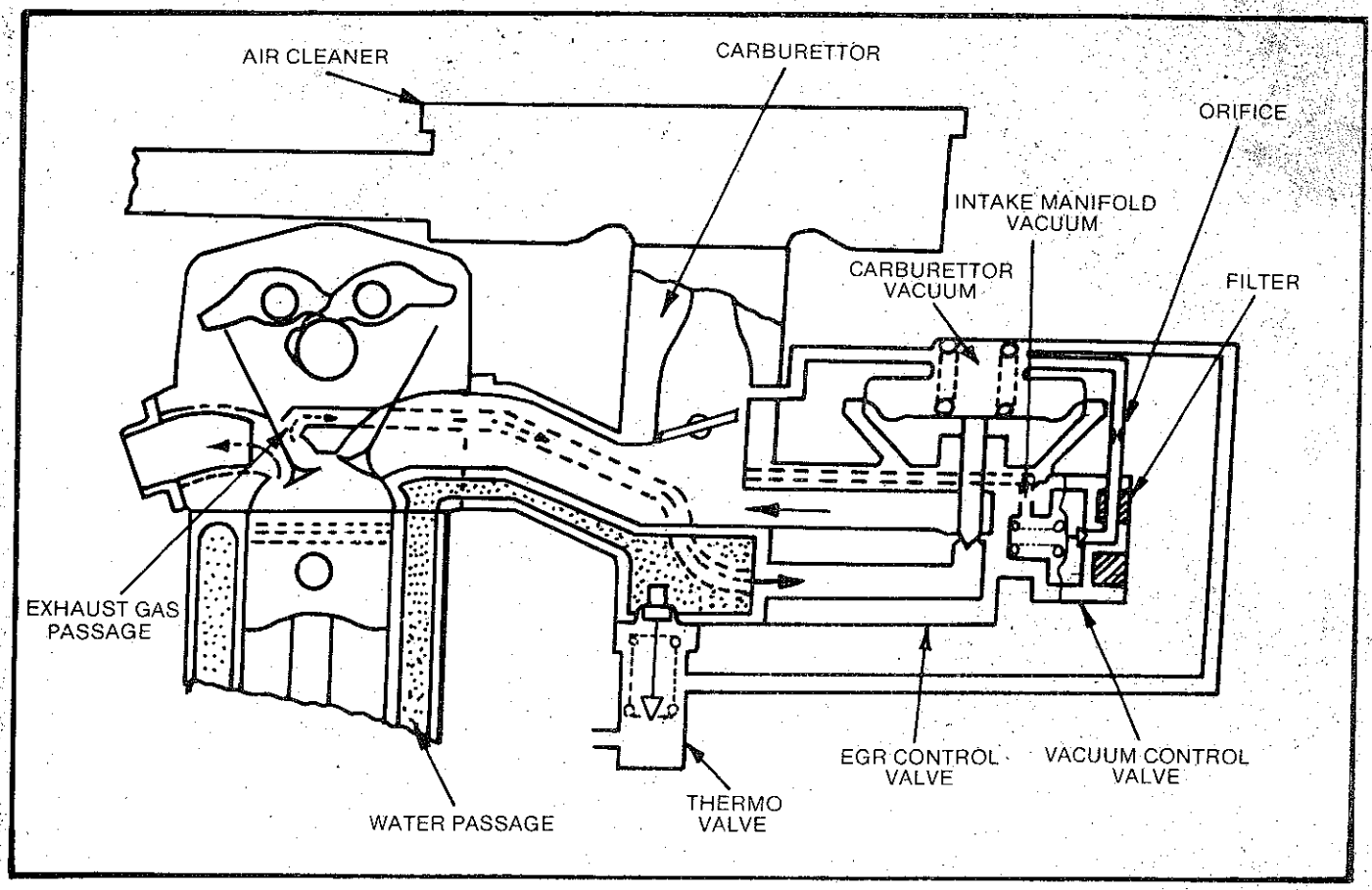

Fig. 8—E.G.R. system

Testing Thermo Valve

Cold Valve Inspection

(1) Remove the thermo valve and allow it to cool to room temperature.

(2) Install a tube to the nipple of the valve and blow through the tube. The valve is satisfactory if it allows air to pass through unrestricted.

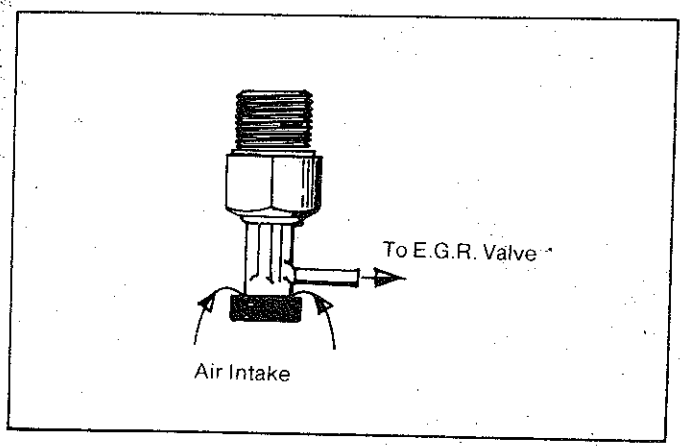

Fig. 9—Thermo valve

Warm Valve Inspection

(1) Immerse the heat sensing area of the thermo valve in water heated at or above 60°C (140°F) for at least 60 seconds.

(2) Blow air through the nipple as desribed in cold valve inspection, the valve should be closed preventing the passage of air.

(3) When installing the thermo valve, apply sealant to the threads.

CARBURETTORS

General Information

All carburettors have lean calibration mixtures and improved mixture distribution. The carburettors have an idle mixture screw with an external adjustment limiting device for better control of idle mixtures.

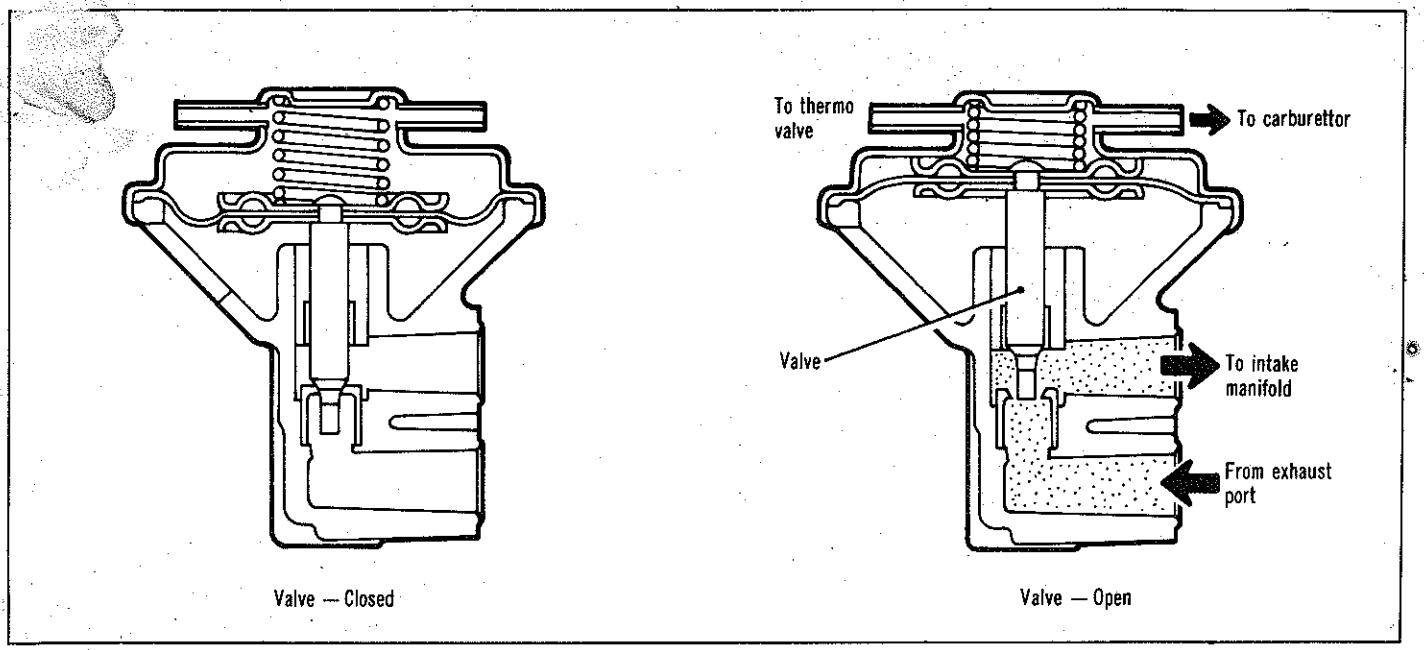

Fig. 10—E.G.R. valve construction

Engine Idle Adjustment

In order to maintain satisfactory engine operation and exhaust emission control, it is required that the idle, spark, timing, r.p.m. and air fuel mixture be adjusted according to specifications shown on the "Vehicle Emission Control Information" label located in the engine compartment. (Also see "Fuel System", Group 14 of this manual.)

IGNITION SYSTEM

The electronic ignition system, where fitted, eliminates the need for breaker points by using a reluctor and magnetic pickup to trigger delivery of electrical energy to the spark plugs. With worn breaker points eliminated as a cause of engine misfiring and increased emissions, better control or exhaust emissions is achieved.

The electronic ignition system can be identified by dual primary wires at the side of the distributor, a control unit and a dual ballast resistor. When the distributor cap is removed, a permanent magnet, pick-up coil and a reluctor can be seen.

For service information and test procedures refer to Group 8, Electrical of this manual.

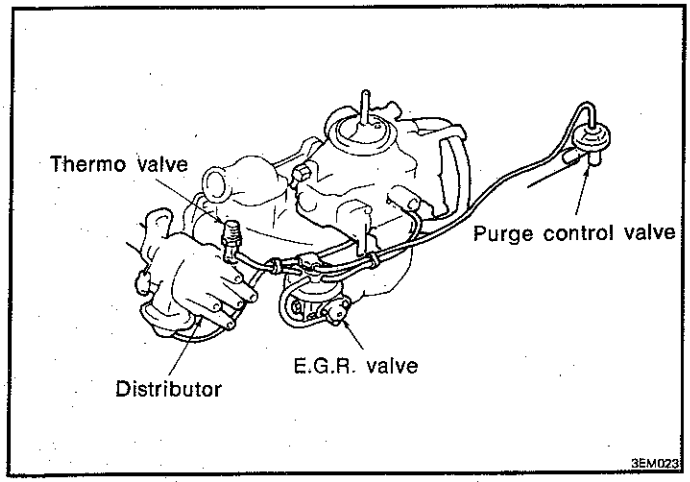

Fig. 11—1,6 litre emission hose routing

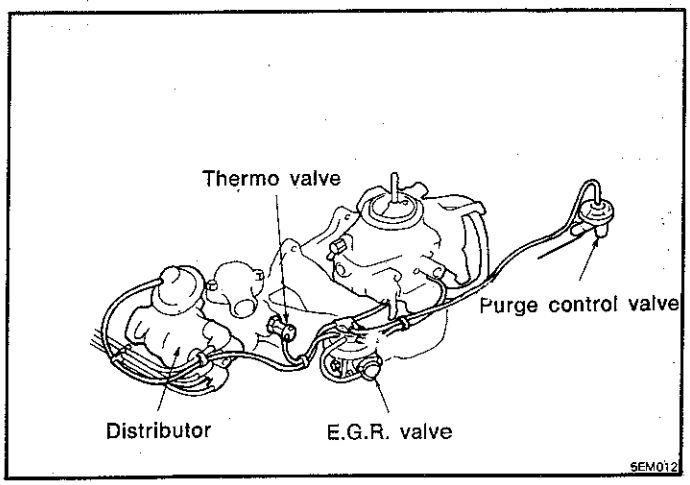

Fig. 12—2,0 litre and 2,6 litre emission hose routing