

GENERAL MOTORS PULSE AIR INJECTION

4.1L 6-Cyl. Engine

DESCRIPTION

Pulse Air Injection Reaction (Pair) system is used on General Motors models with 4.1L 6-cylinder engines. It is a non-pump type air injection system, which uses engine exhaust pulses to draw fresh air into exhaust system. This helps to lower HC and CO emissions. System consists of a grouping of check valves in 2 plenum chambers (located on valve covers) and related tubing.

OPERATION

Each of the check valves in the plenum chambers is connected to an exhaust port. Firing of the engine creates a pulsating flow of exhaust gases. When positive exhaust pressure is felt, check valve will be forced closed.

No exhaust gas will flow past valve into fresh air supply line. With negative exhaust pressure (vacuum), check valve will open. Fresh air will be drawn and mixed with exhaust gases. During high engine RPM, such as under heavy acceleration, check valve will remain closed.

TESTING

FUNCTIONAL TEST

1) Remove air cleaner-to-plenum pipe hose from plenum pipe. Slide a length of tight-fitting 3/4" (19 mm) hose onto plenum pipe. Using an adapter, connect a hand vacuum pump to hose.

2) Apply 17 in. Hg vacuum. Note time required for vacuum level to drop from 17 in. Hg to 6 in. Hg. If less than 2 seconds, remove check valves and test individually. Replace check valve(s) which fail leak-down test.

NOTE: If system fails leak-down test, ensure that failure is not due to a leaking test hose or connection.

TROUBLE SHOOTING

FAILURE DIAGNOSIS

Short Hissing Noise

May indicate a defective check valve or improper torque at manifold. Inspect check valves.

Surge or Poor Performance

May be caused by failure of 1 or more check valves. Exhaust gas will enter carburetor through air cleaner and cause poor driveability.

Excessive Heat;

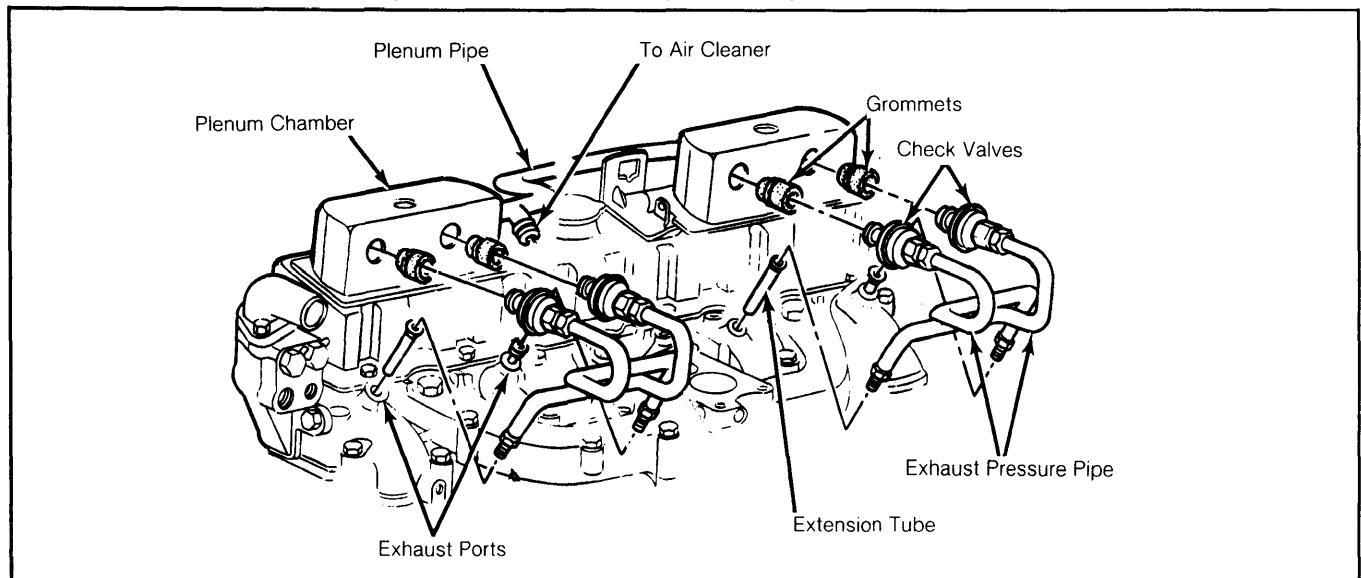
Paint Burned Off of Valve

Exhaust gas passing through pulse air valve, sending heat to valve body. Rubber hose will also be damaged. A short hissing noise may also be noticed. Repair plenum chamber-to-valve cover seals, and replace grommets and hose as required.

Poor Driveability

Rubber hose deteriorated. Hose particles entering carburetor causing poor driveability. Clean carburetor, and remove particles from plenum chambers and connecting pipe.

Fig. 1: General Motors Pulse Air Injection Reactor (PAIR) System Components



System functions without need of a mechanical pump.