1966 - 1967 Corvette: Service Bulletin: Air Injection Reactor System

Subject: Air Injection Reactor System
Model and Year: 1966-67 Chevrolet Vehicles, Except Corvair
Source: Chevrolet Dealer Service Technical Bulletin
Bulletin No: 67-T-42
Section: VIt
Date: June 15, 1967

CHEVROLET MOTOR DIVISION
General Motors Corporation
Chevrolet Service Department

Chevrolet Dealer Service Technical Bulletin

67-T-42
Number:
VIt
Section:
June 15, 1967
Date:

Subject: AIR INJECTION REACTOR SYSTEM - 1966-67 CHEVROLET VEHICLES, EXCEPT CORVAIR

Attn: Service Manager

To: ALL CHEVROLET DEALERS

When properly installed and maintained, the Air Injection Reactor (A.I.R.) System will keep exhaust emissions well below the Federal requirements. However, if any A.I.R. component or any engine component that operates in conjunction with the A.I.R. system should malfunction, the exhaust emissions might be increased.

Before attempting any diagnosis and/or repair of A.I.R. system malfunctions, it is suggested the technician familiarize himself with the system, its components and engine components that operate in conjunction with the system. These are outlined in "Section 6T" of the 1966 and 1967 Chassis Service and Overhaul Manuals.

Because of the relationship between "Exhaust Emission" and "Engine Tune Up", the importance of setting all engine components to "specifications" CANNOT BE OVER EMPHASIZED.

To further aid the technician in maintaining a properly functioning A.I.R. system, this bulletin outlines "A.I.R. System Operation and Diagnosis".

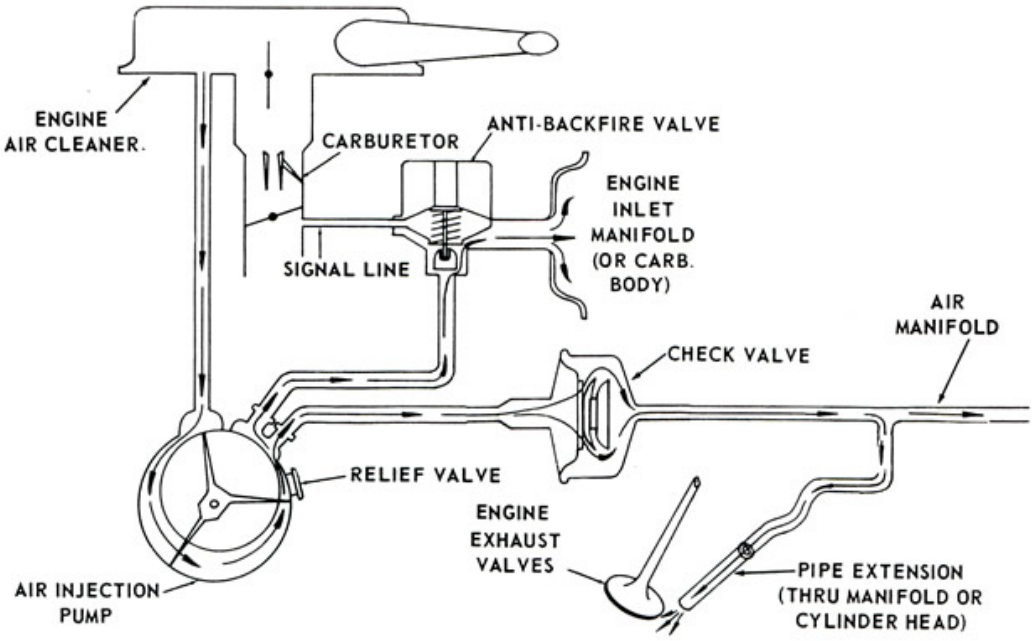
SYSTEM OPERATION

The air injection pump picks up fresh filtered air from the air cleaner, compresses the air and injects it through the air manifolds, hoses and injection tubes into the exhaust system in the area of the exhaust valves. The fresh air ignites and burns the unburned portion of the exhaust gasses, thus minimizing exhaust contamination.

Engine overrun produces a rich air-fuel mixture and sharp rise in engine vacuum from the quick throttle closure. Exhaust backfire is the result of a temporarily over abundance of unburned gas in the exhaust chamber combining explosively with fresh air from the air injector pump. If either the air-fuel mixture is leaned out or the fresh air supply is eliminated during the overrun cycle, no backfire will occur.

The mixture control valve, when triggered by a sharp increase in manifold vacuum, supplies the intake manifold with fresh filtered air to lean out the fuel-air mixture during engine overrun periods, and prevent exhaust system backfire.

The check valve(s) prevent exhaust gases from entering and damaging air injection pump, as back flow can occur even under normal operating conditions.



A.I.R. SYSTEM DIAGNOSIS

Before attempting diagnosis of the A.I.R. system malfunctions, first determine if the engine is properly tuned with all components set to specifications. If a rough idle condition exists after tune up, check operation of the mixture control valve. If any other malfunction exists, perform a visual inspection of the system as outlined below.

1. Inspect air cleaner element; clean or replace, as necessary. A restricted air cleaner will affect air supply causing incorrect fuel/air mixture. Check to see that air cleaner is firmly seated on carburetor.

2. Inspect and correct, as necessary, crankcase ventilation system.

3. Inspect all hoses and attachments, being sure they are secure and not leaking, deteriorated, cracked or kinked.

4. Inspect combustion pipe (air manifold) assemblies to see that attachment is secure to manifold and/or cylinder head, and that tube joint connections are not cracked.

5. Inspect signal line connection to carburetor and mixture control valve. Inspect mixture control valve outlet line to manifold.

6. Inspect air injection pump drive belt for proper tension, cracks, fraying, or wear.

7. If, after completion of tune up and visual inspection, malfunction still exists, refer to Diagnosis Chart, Pages 4 thru 7, for symptom, probable cause, and remedy.

DIAGNOSIS CHART

The following chart is provided to isolate particular malfunctions which may occur in the A.I.R. system.

TROUBLE	PROBABLE CAUSE	REMEDY
A. POPPING IN EXHAUST SYSTEM - (4MV CARB.)		
Hot Idle	Sound similar to muffler hitting floor pan. Caused by rich idle mixture	Adjust idle mixture screws to 1/4 turn out from eng. lean roll (Point of 20 RPM drop from best idle).
Cold Idle (Choke On)	Same as 1 above. Moderate popping is inherent design characteristic of system when cold.	Same as 1 above. Also inspect choke and vacuum break operating and settings.
Acceleration	Popping appears under load from idle. Popping noise level varies with timing (decreases with advance of timing)and carb. accelerator pump shot duration.	Check ignition spark timing. Check accelerator pump rod. adjustment.
B. BACKFIRE IN EXHAUST SYSTEM	Rich Fuel Mixture Caused By:	
	Inoperative choke - misadjusted or sticking closed.	Inspect choke operation - correct as necessary. Refer to TSB 66-6 - DR 66-6.
	Inoperative vacuum break.	Replace vacuum break.
	Use of manual choke (Truck); generally overchoking.	Closer control of choking period.
	Air cleaner element restricted.	Replace element.
	Improper crankcase vent maintenance.	Inspect system. Replace PCV valve. Check fitting at carburetor - may be plugged with crankcase deposits.
	High fuel level.	Adjust float level.
	Percolation in primary wells from insufficient clearance between the well casting on the bowl and throttle body above heat riser.	File throttle body lightly to provide clearance.

TROUBLE	PROBABLE CAUSE	REMEDY
BACKFIRE IN EXHAUST SYSTEM (Cont'd)	Insufficient Air to Inlet Manifold Caused By:	
	Air pump inoperative.	Check pump.
	Obstructed air supply hoses.	Inspect hoses for kinks, obstructions inside hoses from deterioration.
	Fitting at carburetor plugged with crankcase deposits from PCV.	Clean fitting.
	Mixture control valve inoperative (stuck shut).	Check signal and air inlet lines; replace defective valve.

	Lean mixture adjustment requires larger throttle valve opening to maintain idle R.P.M. Increased air flow produces dribbling from nozzle.	Adjust idle mixture to 1/4 turn out from lean roll. (20 RPM drop). Return idle speed to desired value then readjust mixture as required above.
	Fuel leaks from fuel bowl into intake manifold.	Disassemble air horn and throttle body from bowl. Fill bowl with fuel and inspect for leaks. Replace lead ball or bowl as required, if leaking.
	Incorrect carb. heat radiation baffle and gasket.	Install correct gasket with hole for air passage from mixture control valve.
C. BACKFIRE OR POPPING IN INLET MANIFOLD	Leaking inlet manifold.	Check manifold bolts for tightness.
	Incorrect ignition timing.	Check timing and set to specs.
	Mixture control valve leaking.	Check valve - replace defective valve.
TROUBLE	PROBABLE CAUSE	REMEDY
D. OFF IDLE HESITATION & ROUGH IDLE (HOT)	Appears in acceleration period from a standing start to approximately 900 R.P.M. resulting from the following:	
	Vacuum Leak - More noticeable on hot engine. Results from unconnected, split or oversized hoses, in addition to the hot idle compensator not closing or opening prematurely.	Inspect hoses and fitting for leaks. Plug off carb. hot idle compensator port in air horn with cork if cause of complaint or adjust compensator so it will not open.
	Insufficient fuel shot from carb. accelerator pump or fuel leaking past seal during pump travel. (This does not apply to diaphragm type accelerator pumps).	Check accelerator pump adjustment. If rubber seal is hard or falls into cavity by its own weight (with return spring removed) it should be replaced. There should be slight interference between cup and wall.
	Carburetor float level low.	Adjust as required.
	Initial Timing. Advancing the initial timing improves condition, however, detonation could easily be encountered.	Check initial setting to specification. If this does not correct, see "Part Throttle Hesitation."
	327 Cu. In. Engine: Engine timing advance incorrect. Test distributor on distributor test machine.	Replace distributor advance springs as required on 1967 units; On 1966 units, 1111150 distributor with 6° BTDC setting will correct.
E. PART THROTTLE HESITATION	Occurs in transition from primary main metering system to the primary power system prior to secondaries opening (327 Cu. In. Engine with Quadra-jet Carburetor).	Enrichen calibration by installing .045 primary metering rods. TSB 66-67 usage can now be extended to the A.I.R. system.

TROUBLE	PROBABLE CAUSE	REMEDY
F. ROUGH IDLE OR SURGE	Improper carburetor adjustment, idle speed, idle fuel mixture, choke, etc.	Check carburetion and adjust as necessary.
	Improper ignition timing.	Set timing to specs,
	Vacuum leak at signal or inlet line to mixture control valve.	Inspect and correct lines and connections.
	Mixture control valve defective or stuck open.	Check and replace.
G. ENGINE IDLE SPEED HIGH	Throttle linkage sticking or obstructed by hoses.	Inspect linkage and eliminate points of interference.
	Idle speed set incorrectly.	Reset idle speed to specs.
H. IDLE RPM FLARE AFTER STARTING WARM ENGINE	Mixture control valve open too long. Incorrect or defective valve.	Check for proper valve and time delay.
I. ENGINE "DIESELS" - AFTER IGNITION IS TURNED OFF	Idle speed too high.	Reset idle to specs.
	Low octane fuel.	Use higher octane fuel or premium.
J. OVERHEATED EXHAUST SYSTEM	Ignition timing retarded - excessive burning in exhaust system.	Reset timing to specs.
	Incorrect or missing pressure relief valve plug in air pump.	Check for correct plug. Install if missing.
K. AIR PUMP NOISY	Improperly tensioned belt.	Retension belt (55 $\pm$ 5 used, 75 $\pm$ 5 new).
	Seized or binding pump. Bearings worn, etc.	Check pump operation. Overhaul or replace pump.
	Incorrect or missing pressure relief valve plug.	Check for correct or missing plug.
	Bent or misaligned pulleys.	Inspect belt alignment. Replace pulleys.
L. CHARRED, DETERIORATED SUPPLY HOSE	Defective check valves.	Replace check valve.

Online URL:
https://www.corvetteactioncenter.com/tech/knowledgebase/article/1966-1967-

corvette-service-bulletin-air-injection-reactor-system-1174.html