CORTINA AIR INJECTION

Cortina (1968-69)
Cortina GT (1968-70)

DESCRIPTION

All 1968-69 Cortina models and 1970 Cortina GT models manufactured for sale in the United States are equipped with air injection to reduce hydrocarbon and carbon monoxide emissions. Basic components of system are an air pump, check valve, air distribution manifold, a backfire suppressor valve and various connecting hoses. In addition, a special, leaner calibrated carburetor is used.

OPERATION

System draws fresh air from air cleaner (1968-69), or through a centrifugal filter fan (1970) into air pump. Air pump forces a constant flow of air through hoses and manifolding into each exhaust port near exhaust valve. Exhaust gases, at this point, are above kindling temperature and presence of air will start a burning action.

Pressure Relief Valve – A relief valve is located in exhaust chamber of air pump. It functions to relieve exhaust air flow if pressure exceeds a pre-set value.

Backfire Suppressor Valve – Backfire suppressor valve is controlled by engine intake manifold vacuum acting on a spring-loaded diaphragm. When throttle is closed, manifold vacuum rises causing a corresponding increase in valve vacuum chamber. This vacuum overcomes spring tension causing diaphragm and air valve to move downwards. Passage to air manifold is now closed and air from pump is by-pass to air cleaner (1968-69) or intake manifold (1970). This by-pass action prevents a rich air-fuel mixture which prevents backfires in exhaust system.

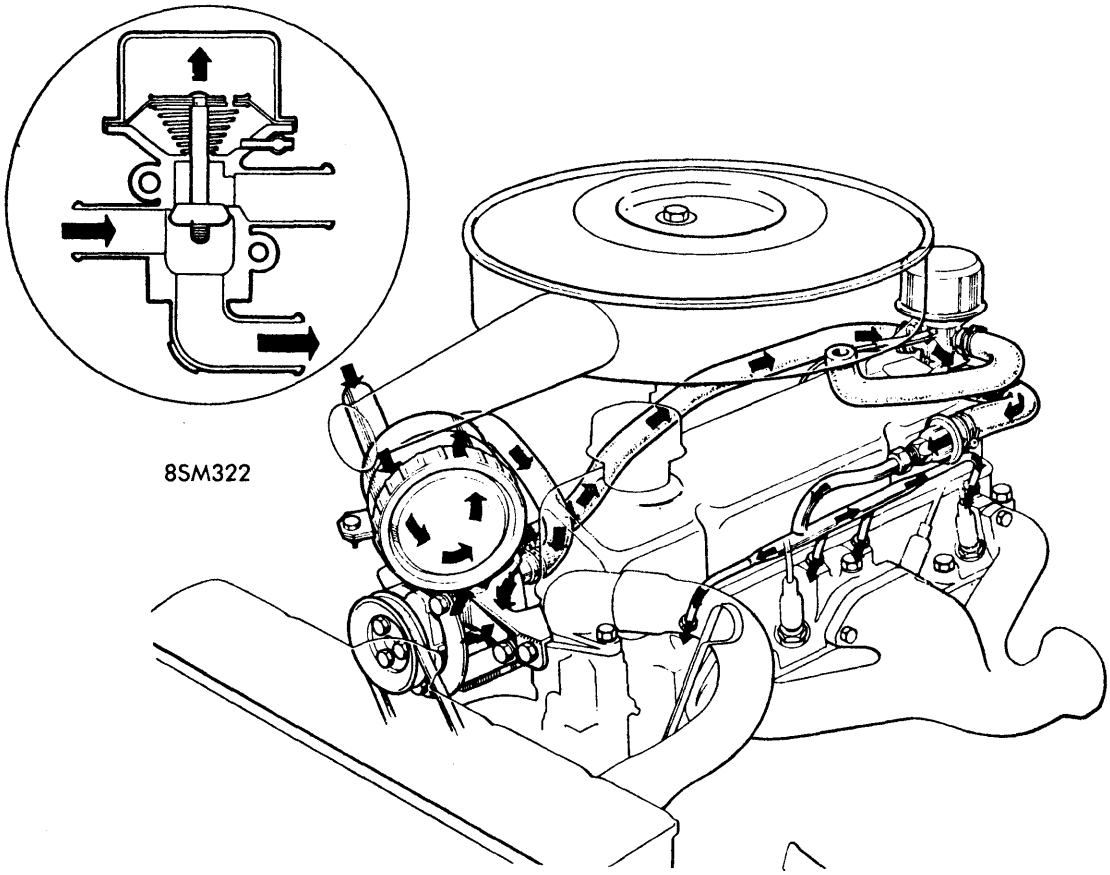
Exhaust Check Valve – Check valve is located in air inlet side of air manifold. This check valve will prevent a back-flow of exhaust gases into air supply pump in the event exhaust pressure is greater than air pump delivery pressure.

MAINTENANCE

Periodic inspection and service of air injection system is recommended to ensure proper engine operation and to maintain proper emission control.

Ignition Timing – *See Tune-Up Chart for proper ignition timing specifications.* Disconnect vacuum pipe and allow engine to idle. Adjust timing to specifications.

1968-69 Idle Speed & Mixture Adjustment – With engine at normal operating temperature, adjust throttle stop screw to obtain a speed of 750 RPM. Adjust mixture screw until engine idle speed is maximum. If necessary, readjust throttle stopscrew to bring idle speed down to 700-750 RPM. Turn mixture screw inward (leaner) until speed reduces and then turn out (richer) until maximum speed is achieved. On GT model and all with automatic transmission leave mixture screw in this position. On standard models with manual transmission, turn screw 1/2 turn outward (richer) and leave in this position. Adjust idle speed to 700-740 RPM. *NOTE – On cars with*



NORMAL OPERATION OF AIR INJECTION SYSTEM (1968-69 SHOWN, 1970 SIMILAR)

CORTINA AIR INJECTION (Cont.)

automatic transmissions place selector lever in "Drive" position with brakes applied and check that idle speed falls to 615 RPM. Readjust if necessary.

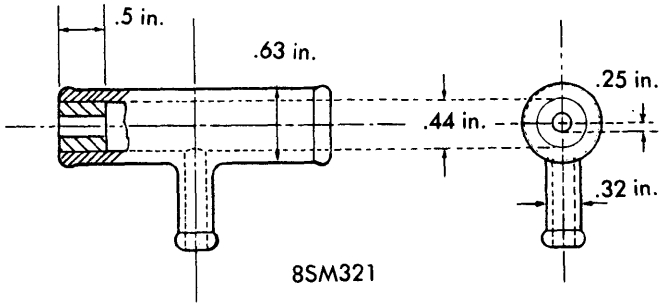
1970 Idle Speed & Mixture Adjustment – With engine at normal operating temperature, set idle mixture screw to give 13.8-14.1 air/fuel ratio. Set throttle adjusting screw to obtain 840-860 RPM. If suitable exhaust gas analyzer is not available, following procedure may be used only to make vehicle safe and mobile. Set engine speed to obtain 870-890 RPM. Adjust mixture screw to obtain maximum RPM and reset idle speed to 870-890 if necessary. Enrich mixture by backing out mixture adjusting screw until engine idle speed falls by 30 RPM.

Belt Adjustment – Check drive belt tension midway between the two pulleys. Air pump belt free travel should be 1/2" with a tension of 30-40 lbs. If adjustment is required, loosen air pump adjusting arm and mounting nuts and bolts. Reposition air pump to obtain correct belt tension and tighten adjusting arm nut and bolt.

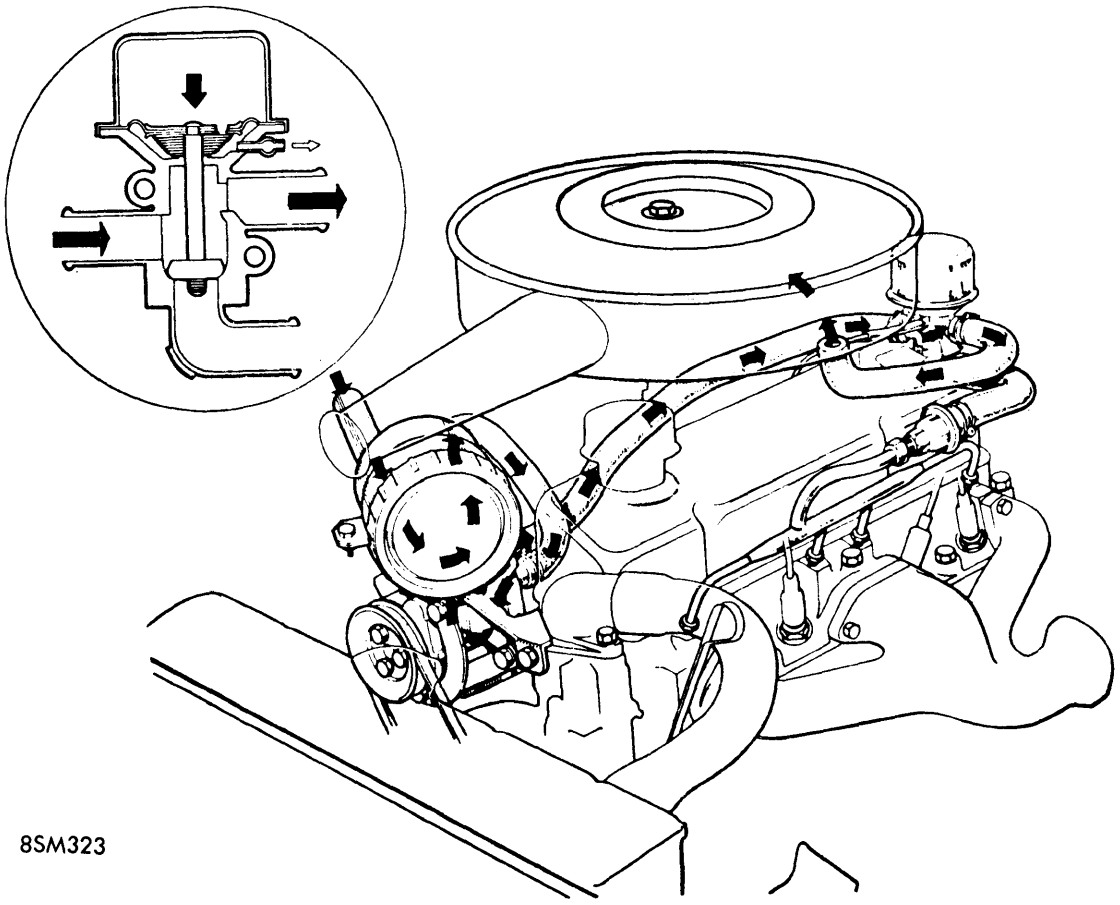
TESTING

The following procedures are recommended for checking or verifying that various system components are operating correctly. Engine and all components must be a normal operating temperature when following tests are performed.

Air Pump Test – To test air pump and backfire suppressor valve a test gauge adaptor must be fabricated and used in conjunction with a 1 to 10 Lb./sq. in. pressure gauge. Test gauge adapter can be fabricated from a standard part No. 111873-ES, or any suitable TEE piece. Securely plug one large diameter arm of TEE with a 1/2" long plug and then drill through to make a 1/4" diameter orifice. *See illustration for adaptor construction.*



CONSTRUCTION OF TEST GAUGE ADAPTOR



OPERATION OF AIR INJECTION SYSTEM DURING DECELERATION (1968-69 SHOWN, 1970 SIMILAR)

CORTINA AIR INJECTION (Cont.)

1) Operate engine until it reaches normal operating temperature. Inspect all hoses and hose connections for leaks and correct connections. Check air pump belt tension and reset if necessary. See *"Belt Adjustment" under MAINTENANCE.*

2) Disconnect air supply hose at backfire suppressor valve. Insert open pipe end of test adaptor in air supply hose. Clamp hose securely to adaptor to prevent it from blowing out. *NOTE — Position adaptor and test gauge so that air blast emitted through orifice will not cause injury or damage.*

3) Install tachometer on engine, start engine and slowly increase engine speed to 1500 RPM and not pressure on pressure gauge. Air pressure reading should be 1 psi or more on all engines. If air pump pressure is not within specifications, install new air pump filter element (if equipped) and repeat pump test. If pressure is still not within specifications., replace air pump.

Backfire Suppressor Valve Test — *NOTE — A test gauge adaptor must be fabricated for this test. See "Air Pump Test" for adaptor fabrication.*

1) Operate engine until normal operating temperature is obtained. Inspect all hoses and hose connections for leaks and correct connections.

2) Disconnect air by-pass hose at air cleaner (1968-69) or intake manifold (1970) . Insert open pipe end of test gauge adapter in air by-pass hose. Clamp hose securely to adaptor to prevent it from blowing out. *NOTE — Position adaptor and test gauge so that air blast emitted through orifice will not cause injury or damage.*

3) Install a tachometer on engine. Start engine and slowly increase engine speed to 1500 RPM. No pressure should be recorded on gauge. If pressure is indicated on gauge or air discharges from orifice, valve is not functioning properly and should be replaced.

4) Open and close throttle rapidly. Pressure gauge indicator should move up scale rapidly and slowly settle back to zero. Repeat this test several times. If gauge fails to respond , valve is not functioning properly and should be replaced.

Exhaust Check Valve Test — 1) Operate engine until it reaches normal operating temperature. Inspect all hoses and hose connections for leaks and correct connections. Disconnect air supply hose at check valve on air manifold.

2) Start engine with hose disconnected and slowly increase engine speed to 1500 RPM. There should be no exhaust leakage at check valve. Replace valve if leak is noted. *NOTE — Valve may flutter or vibrate at idle speed, but this is normal due to exhaust pulsations in manifold.*

TROUBLE SHOOTING

Various trouble symptoms and possible causes listed are associated with exhaust emission control system. The same symptoms may have other causes than those listed. Before performing any extensive diagnosis involving emission control system ignition timing and carburetor idle should be checked and adjusted. Engine components, other than those of exhaust emission control system, must be operating properly. After it has been determined that other engine components are functioning correctly, following trouble shooting guide may be used.

Excessive Backfiring In Exhaust System — Backfire suppressor valve vacuum line damaged, plugged, disconnected or leaking. Defective backfire suppressor valve resulting in insufficient air by-pass or air by-pass not timed to engine requirements.

Air Supply Hose Baked or Burned — Defective exhaust check valve.

Engine Surges At All Speeds — Backfire suppressor valve vacuum sensing hose damaged or disconnected.

Noisy Air Pump Drive Belt — Drive belt improperly adjusted. Seized or failing air pump. Misaligned or defective pulleys.

Rough Engine Idle — Backfire suppressor valve defective or stuck open. Backfire suppressor valve vacuum sensing hose damaged or disconnected. Failed or disconnected air pump.

Difficult Engine Starting — Backfire suppressor valve vacuum sensing hose damaged or disconnected. Backfire suppressor valve defective. Failed or disconnected air pump.