SECTION 10

Thermactor Systems (Secondary Air Injection)

Contents

Thermactor Systems (Secondary Air Injection)

Thermactor Air Injection System

Description

The Thermactor (air injection) Exhaust Emission Control System reduces the hydrocarbon and carbon monoxide content of exhaust gases by continuing the combustion of unburned gases after they leave the combustion chamber by injecting fresh air into the hot exhaust stream leaving the exhaust ports. At this point, the fresh air mixes with hot exhaust gases to promote further oxidation of both the hydrocarbons and carbon monoxide, thereby reducing their concentration and converting some of them into harmless carbon dioxide and water.

During some modes of operation (Hwy Cruise/WOT), the thermactor air is dumped to atmosphere to prevent overheating in the exhaust system.

A typical Air Injection System consists of:

- Air Supply Pump and Centrifugal Filter
- Air Bypass Valve
- Check Valve
- Air Manifold
- Air Hoses
- Air Control Valve

Diagnosis

1. Inspect the belt drive system and the air distribution system to ensure that they are in place and operating. Refer to Noise Test and Belt Adjustment in this Section.
2. Check out individual components, refer to Section 3.

Thermactor Air Strategy		
Thermactor Air States	**TAB Solenoid**	**TAD Solenoid**
Upstream	On	On
Downstream	On	Off
Bypass	Off	Off
TAB - Thermactor Air Bypass TAD - Thermactor Air Diverter		

Thermactor Systems (Secondary Air Injection)

Managed Air Thermactor System

The managed Thermactor Air System is utilized in several electronic and non-electronic control systems to divert thermactor air either upstream to the exhaust manifold check valve or downstream to the rear section check valve and dual bed catalyst. The system will also dump thermactor air to atmosphere during some operating modes.

Air control valve (9F491) is used to direct the air either upstream or downstream. An air bypass valve is used (9B289) to dump air to atmosphere (Figure 1). In some applications, the two valves are combined into a single air bypass/control valve (9F491) as shown in Figure 2.

Examples of other Managed Thermactor Air Systems are shown in Figures 3, 4 and 5.

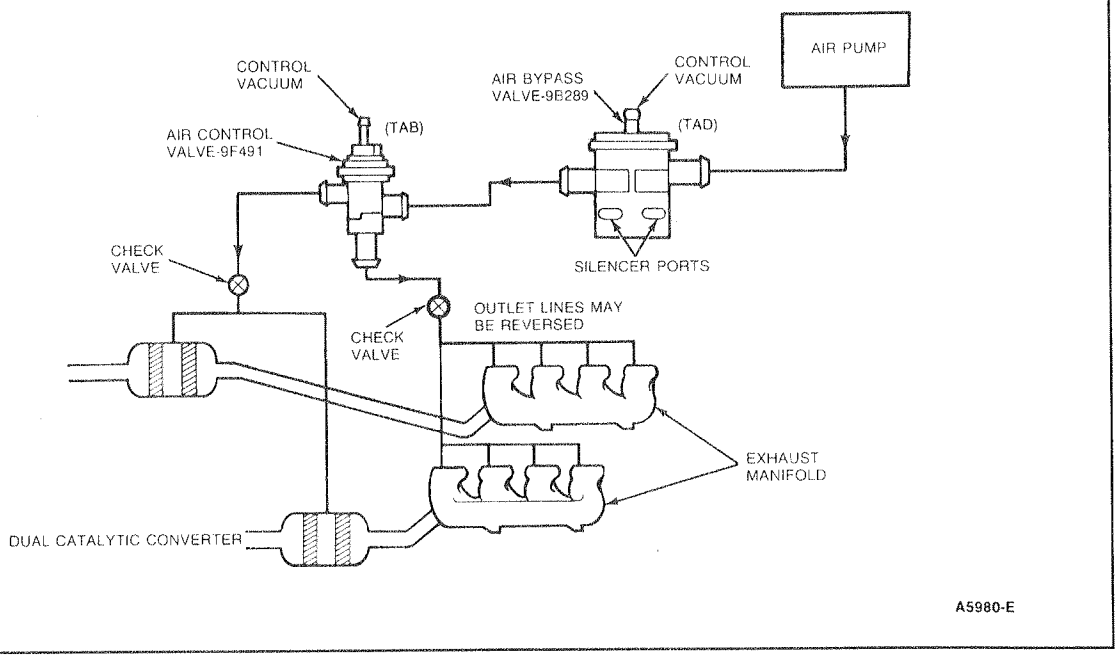

Figure 1 Typical Managed Air Thermactor System

Thermactor Systems (Second

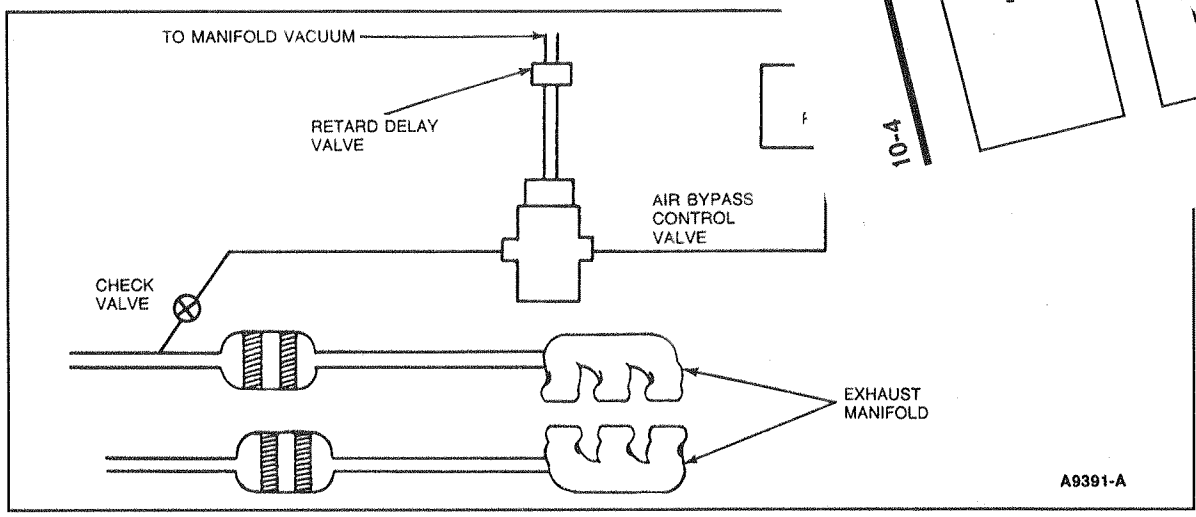

Figure 2 3.8L Thermactor Air System — Vacuum Controlled

ıactor Systems (Secondary Air Injection)

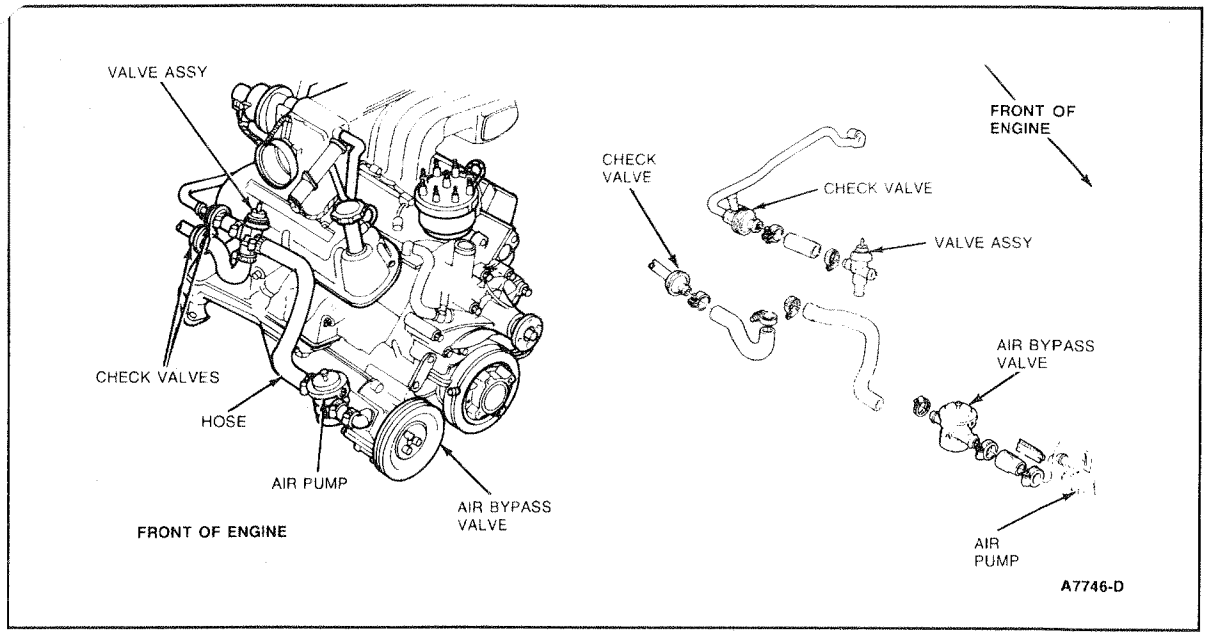

Figure 3 Locations of Thermactor Valves — 5.0L Engine (Passenger Car)

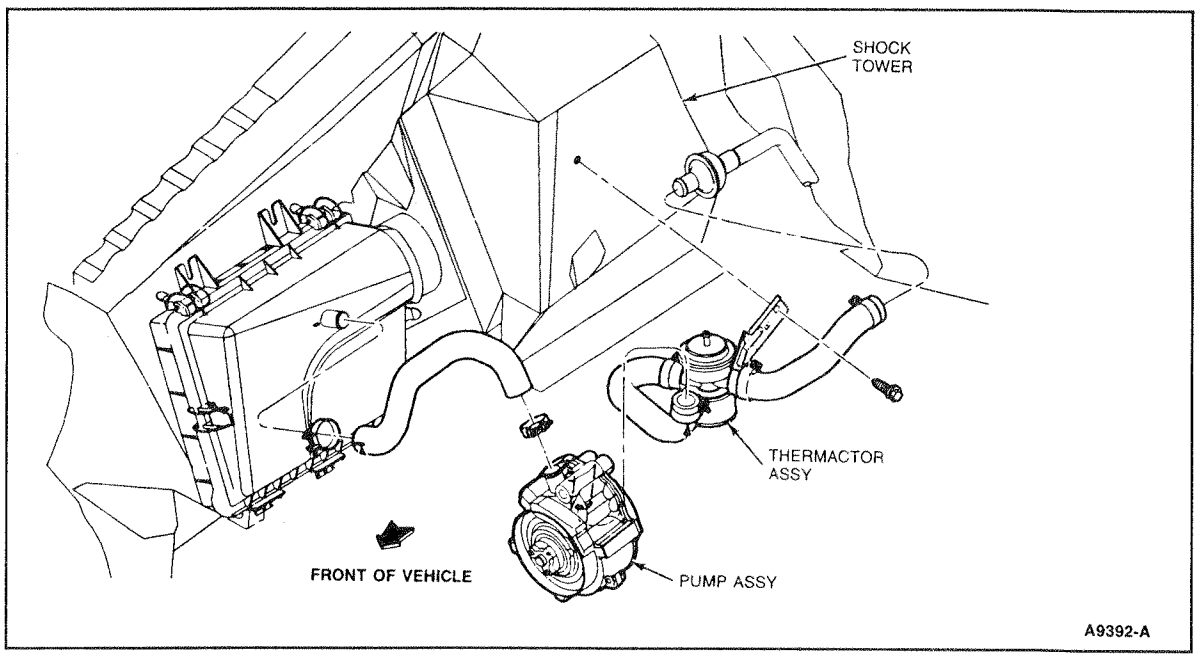

Figure 4 3.8L Engine (EFI Only) Thunderbird/Cougar, Taurus/Sable, Continental

Thermactor Systems (Secondary Air Injection)

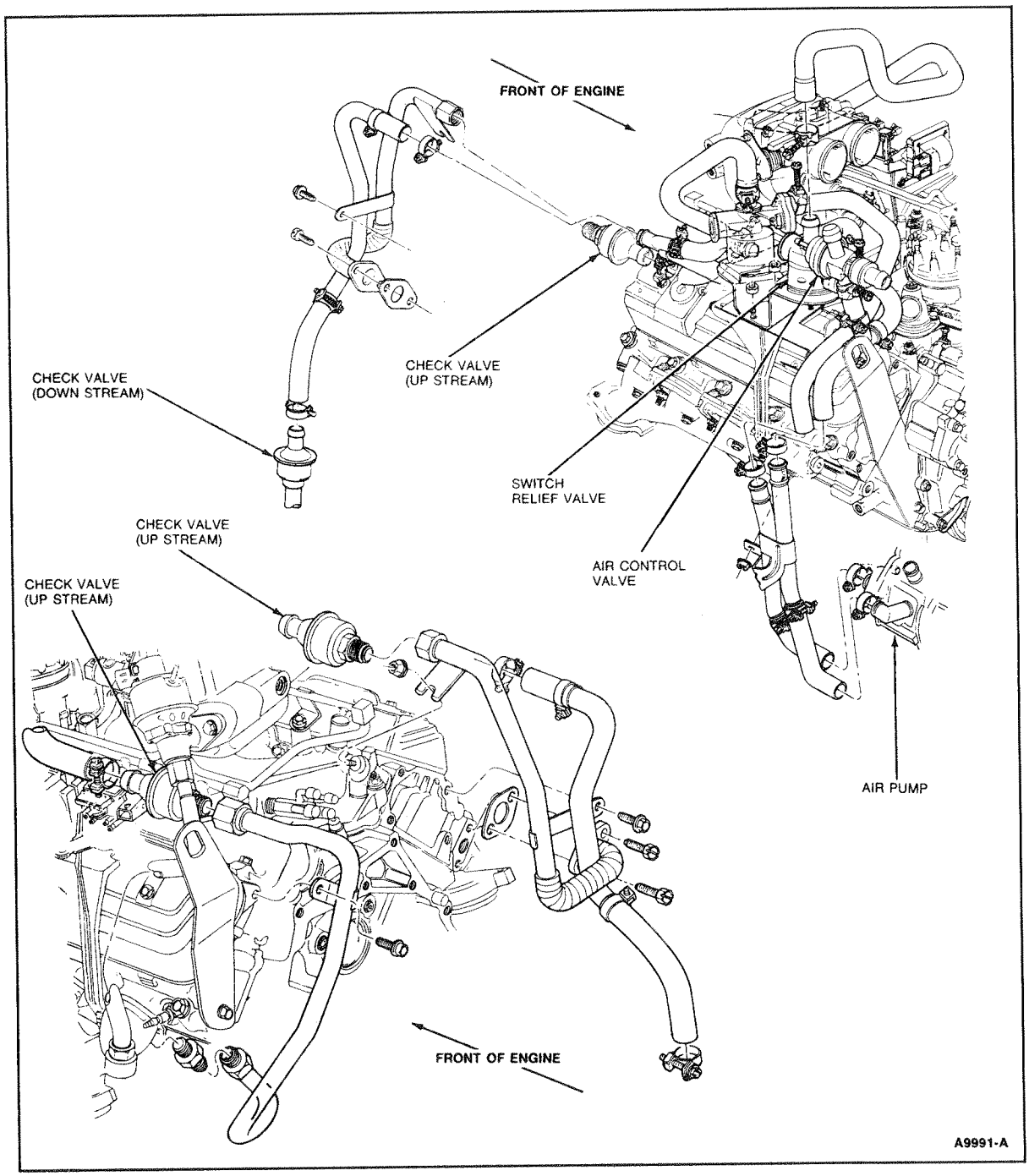

Figure 5 Dual Outlet Air Pump System — 7.5L EFI 0/8500 GVW E-Series

Thermactor Systems (Secondary Air Injection)

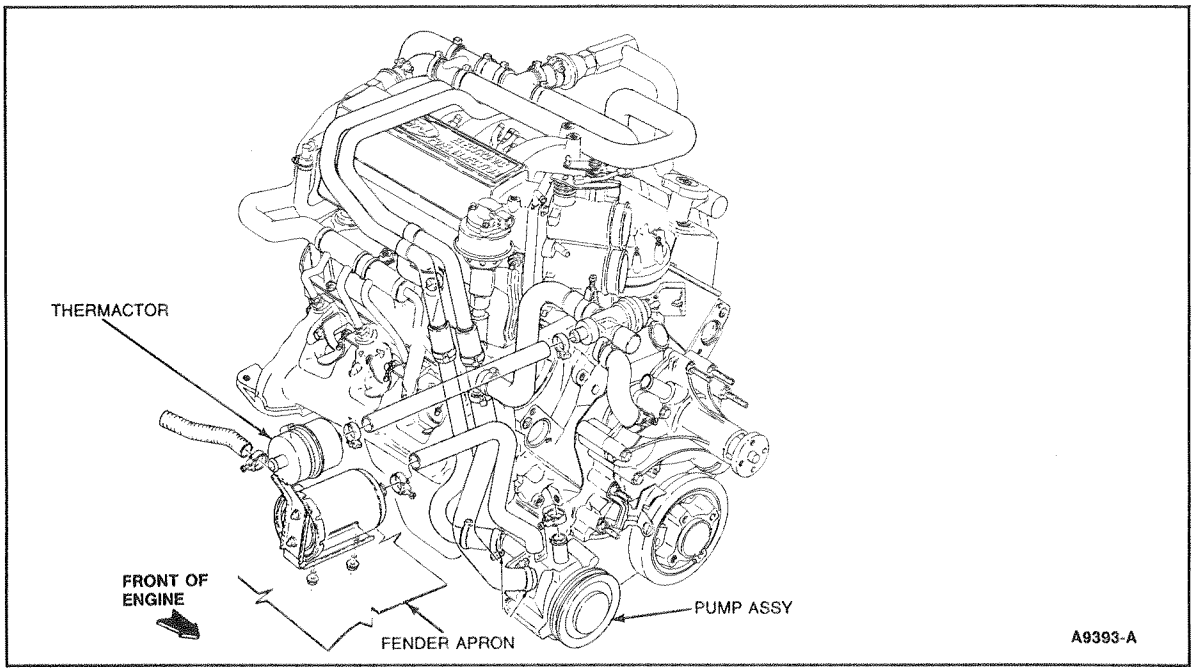

Figure 6 5.8L EFI 0/8500 GVW F-Series

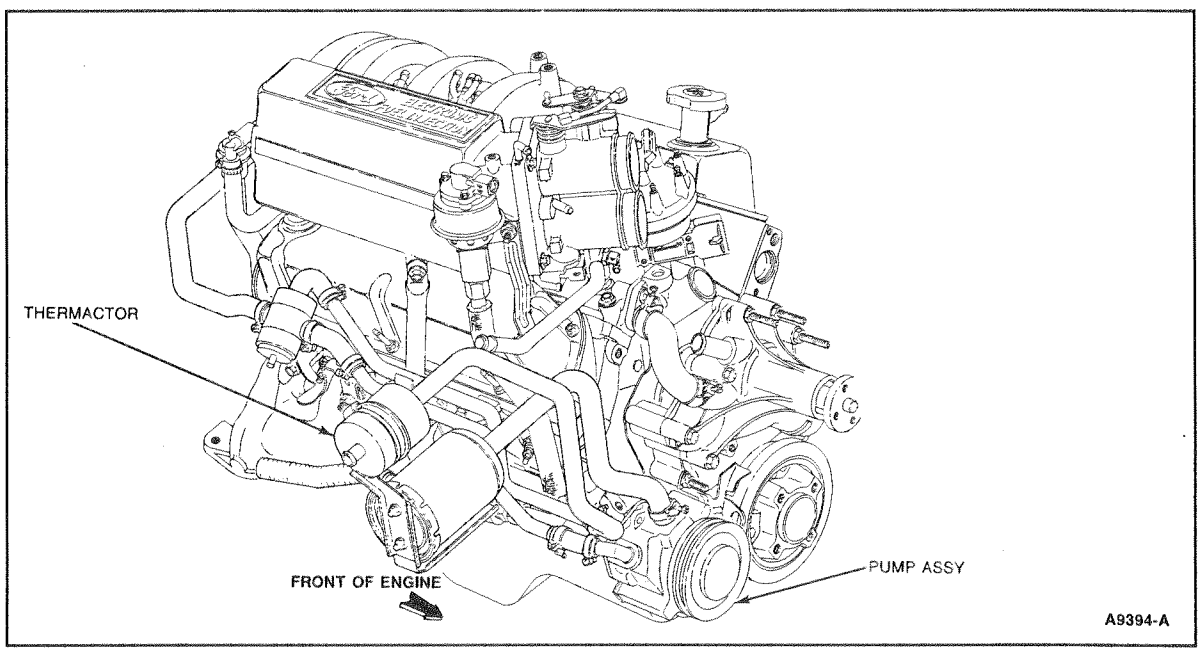

Figure 7 5.8L EFI U/8500 GVW F-Series

Thermactor Systems (Secondary Air Injection)

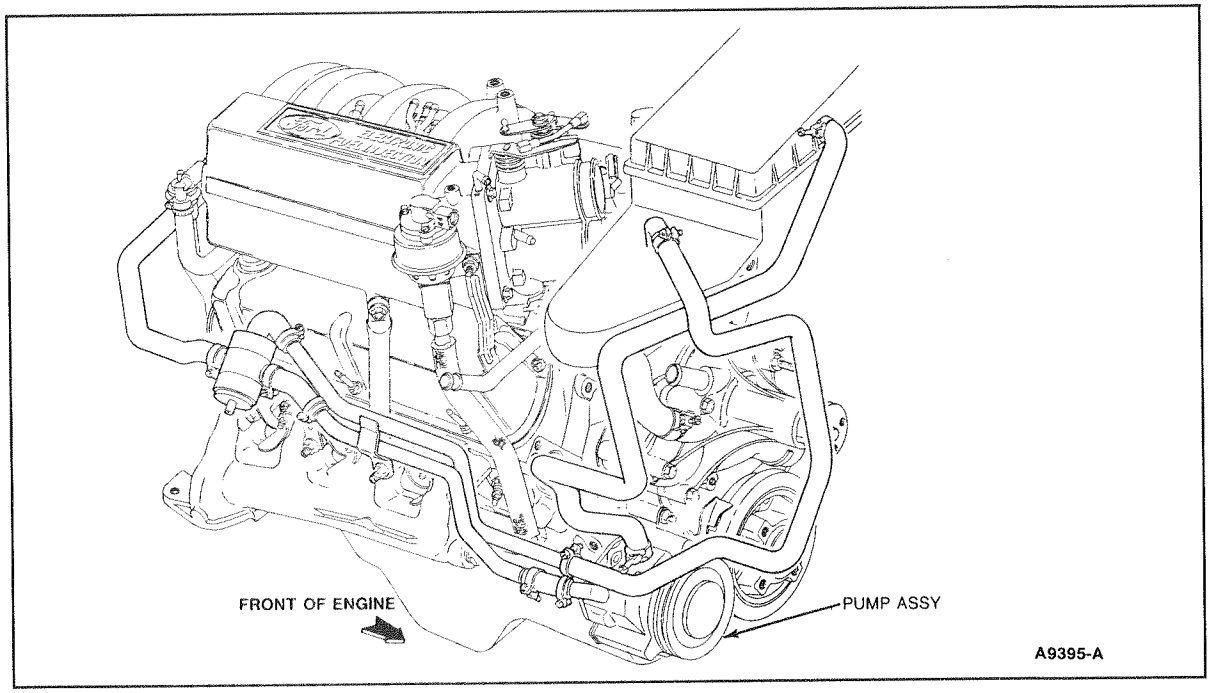

Figure 8 5.8L EFI U/8500 GVW E-Series

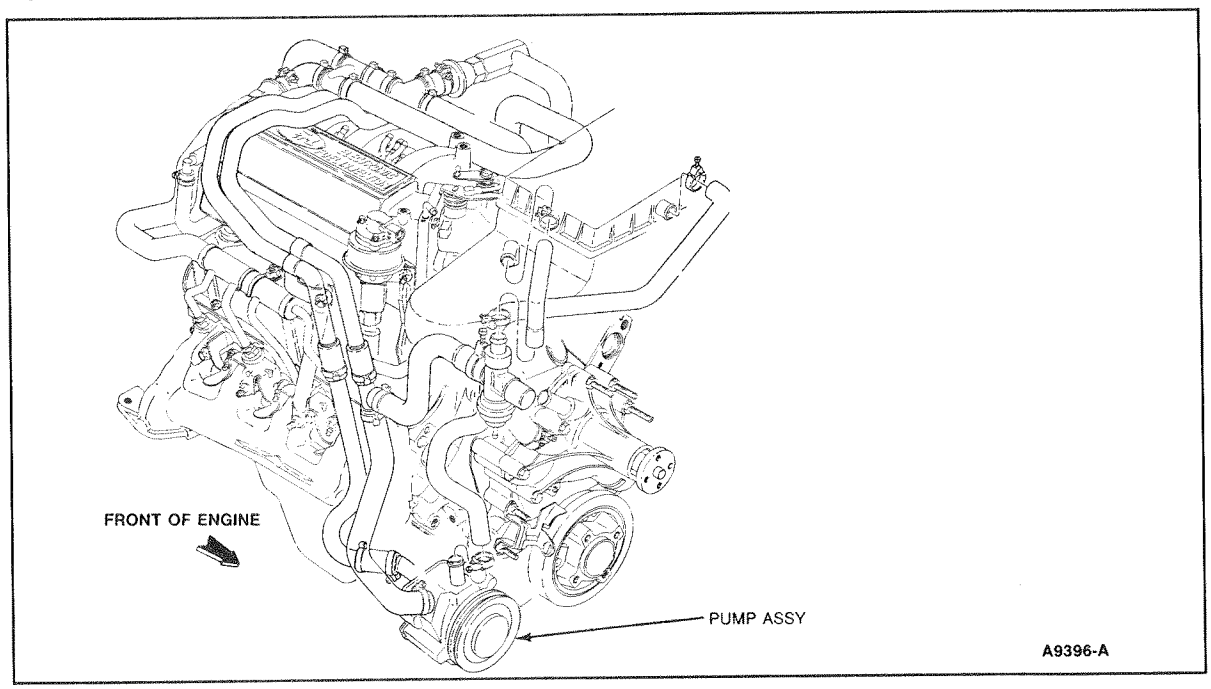

Figure 9 5.8L EFI 0/8500 GVW E-Series

Thermactor Systems (Secondary Air Injection)

Dual Air Pump System

Heavy Duty Trucks

The Thermactor system for V-8 heavy duty trucks utilizes two air pumps and two bypass valves to direct air simultaneously to the cylinder head check valve, and to the left and right hand exhaust manifold check valves. The system will also dump air to the air cleaner during decel modes and at high speed, high back pressure modes (Figure 10).

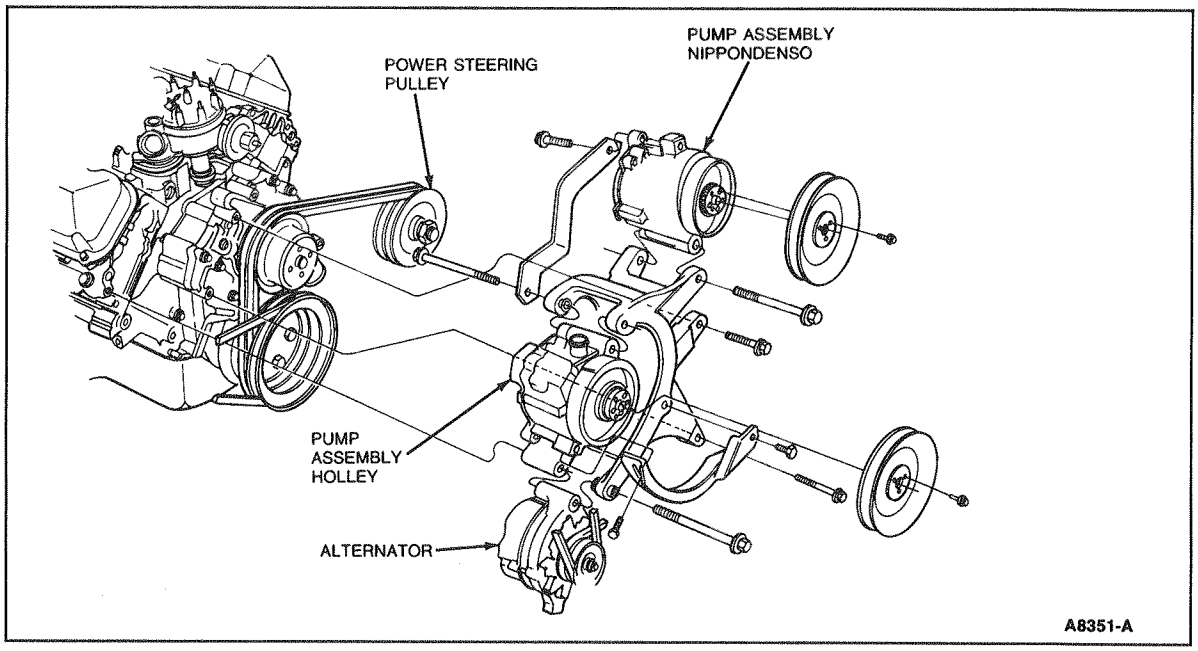

Figure 10 Dual Air Pump System — 49S, 5.8L and 7.5L-4V Engines (Heavy Duty Trucks)

Diagnosis

1. Inspect the belt drive system and air distribution system to ensure that they are in place and operating. Refer to Noise Test and Belt Adjustment in this Section.
2. Check out individual components, refer to Section 3.

Thermactor Systems (Secondary Air Injection)

Thermactor System Noise Test

NOTE: Do not service vehicle for noise condition unless pump has had 804.5 km (500 miles) in service for break-in.

CAUTION: Do not use a pry bar to move the air pump for belt adjustment.

NOTE: The thermactor system is not completely noiseless. Under normal conditions, noise rises in pitch as engine speed increases. To determine if noise is the fault of the air injection system, disconnect the belt drive (only after verifying that belt tension is correct), and operate the engine. If the noise disappears, proceed with the following diagnosis.

Diagnosis

CONDITION	POSSIBLE SOURCE	ACTION
• Excessive Belt Noise	• Loose belt	• Tighten to specification using Tool T75L-9480-A or equivalent to hold belt tension and Belt Tension Gauge T63L-8620-A or equivalent. **CAUTION: Do not use a pry bar to move air pump.**
	• Seized pump	• Replace pump.
	• Loose pulley	• Replace pulley and/or pump if damaged. Tighten bolts to 13.6-17.0 N•m (120-150 lb-in).
	• Loose or broken mounting brackets or bolts	• Replace parts as required and tighten bolts to specification.
• Excessive Mechanical Clicking	• Overtightened mounting bolt	• Tighten to 34 N•m (25 lb-ft).
	• Overtightened drive belt	• Same as loose belt.
	• Excessive flash on the air pump adjusting arm boss	• Remove flash from the boss.
	• Distorted adjusting arm	• Replace adjusting arm.

Thermactor Systems (Secondary Air Injection)

CONDTION	POSSIBLE SOURCE	ACTION
• Excessive Thermactor System Noise (Putt-Putt, Whirling or Hissing)	• Leak in hose	• Locate source of leak using soap solution, and replace hoses as necessary.
	• Loose, pinched or kinked hose	• Reassemble, straighten, or replace hose and clamps as required.
	• Hose touching other engine parts	• Adjust hose to prevent contact with other engine parts.
	• Bypass valve inoperative	• Test the valve.
	• Check valve inoperative	• Test the valve.
	• Pump or pulley mounting fasteners loose	• Tighten fasteners to specification.
	• Restricted or bent pump outlet fitting	• Inspect fitting, and remove any flash blocking the air passage way. Replace bent fittings.
	• Air dumping through bypass valve (at idle only)	• On many vehicles, the thermactor system has been designed to dump air at idle to prevent overheating the catalyst. This condition is normal. Determine that the noise persists at higher speeds before proceeding.
	• Air dump through bypass valve (decel and idle dump)	• On many vehicles, the thermactor air is dumped in air cleaner or in remote silencer. Make sure hoses are connected and not cracked.
• Excessive Pump Noise (Chirps, Squeaks and Ticks)	• Insufficient break-in or worn or damaged pump	• Check the thermactor system for wear or damage and make necessary corrections. If pump is not damaged and has less than 804.5 Km (500 miles) in service, do NOT replace pump. A 804.5 Km (500 mile) break-in is required.

Thermactor Air Pump Drive Belt Adjustment

1. Check all air pump pulleys and mounting bolts, and tighten to specification, if required.
2. Install the belt tension gauge (Tool T63L-8620-A or equivalent) on the drive belt, and check the tension. Compare the belt tension to the specified belt tension and adjust as necessary.
3. If adjustment is necessary, loosen the air pump mounting and adjusting arm bolts, move the air pump toward or away from the engine until the correct tension is obtained. Use air pump belt tensioning tool (Tool T75L-9480-A or equivalent) to hold belt tension while tightening the mounting bolts. Install the tension gauge and check the belt tension.

CAUTION: Do not use a pry bar.