

# SECTION 8

## Inlet Air Temperature Systems

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## Inlet Air Temperature Systems

### DESCRIPTION

All passenger cars and light truck engines are equipped with dry-type air cleaners incorporating a replaceable air filter element. Some air inlet systems use air cleaner assemblies with various sensors, switches and vacuum motors to control inlet air temperature. In addition, there are sometimes different sensors present in the air cleaner for other engine control systems.

Some air inlet systems derive the air from a cool air source only, while the rest regulate the air inlet temperature by utilizing air from a cool air source as well as heated air from a heat shroud which is mounted on the exhaust manifold. The duct and valve system which regulates the air flow from these two sources is located either inside the air cleaner, mounted on the air cleaner or in one of the remote mounted inlet tubes. The flow is regulated by means of a door that is operated by a vacuum motor. Operation of the motor is controlled by delay valves, temperature sensors and other vacuum control systems-all vary with each application and engine calibration.

### Diagnostic Check

#### Vacuum Operated Duct Systems

The primary purpose of the duct system is to provide maximum warm air available from the heat shroud to the intake system, and then after vehicle is warm, maintain a temperature in the 70°F to 105°F range by proportioning the warm and fresh air mixture. The functional check of this system should be performed on the vehicle in an ambient temperature of not less than 60°F (15.3°C):

1. Apply parking brake and block wheels.
2. Inspect the heat riser tube for proper installation and/or damage. Service as required.
3. Remove components as necessary to ensure that the duct door is in the open to fresh air position. If door is in the closed to fresh air position, check for binding and sticking. Service or replace as required.
4. Check vacuum source and integrity of vacuum hoses to bimetal sensor, CWM and vacuum motor.
5. Start the engine. If the duct door has moved to the "heat on" position (closed to fresh air) go to Step 6. If door stays in "heat off" position (closed to warm air), place a finger over bleed of bimetal sensor. Duct door must move rapidly to the "heat on" position. If the door does not fully move to "heat on" position, stop engine and replace vacuum motor. Repeat this Step with new vacuum motor.
6. With engine off, cool bimetal sensor and cold weather modulator (CWM) if so equipped, by spraying with liquid from a small can of refrigerant R-12 with an adapter ZRE-6271 or equivalent, for 20 seconds after liquid contact sensor and CWM.

**NOTE:** If vehicle is equipped with a delay valve before the vacuum motor, remove for this test and place double nipple in its place.

**CAUTION:** Do not cool bimetal sensor while the engine is running. If refrigerant R-12 is drawn into the intake system while the engine is running, poisonous phosgene gas will be exhausted into the test area. Perform this test only in a well-ventilated area.

Restart engine. Duct door should move to the "heat on" position. If door does not move or moves only partially, replace sensor. Cool CWM and bimetal sensor.

7. Start and run engine briefly (less than 15 seconds). Duct door should move to "heat on" position.

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8. Shut off engine and observe duct door:

- A. Vehicles without CWM: Valve will return slowly to "heat off" position (10 to 30 seconds).
- B. Vehicles with CWM: Valve will stay in "heat on" position for at least 2 minutes. If less than 2 minutes replace CWM and repeat this Step after cooling CWM and bimetal sensor.

The following are schematic representations of some 1988 Passenger Car and Truck inlet air systems:

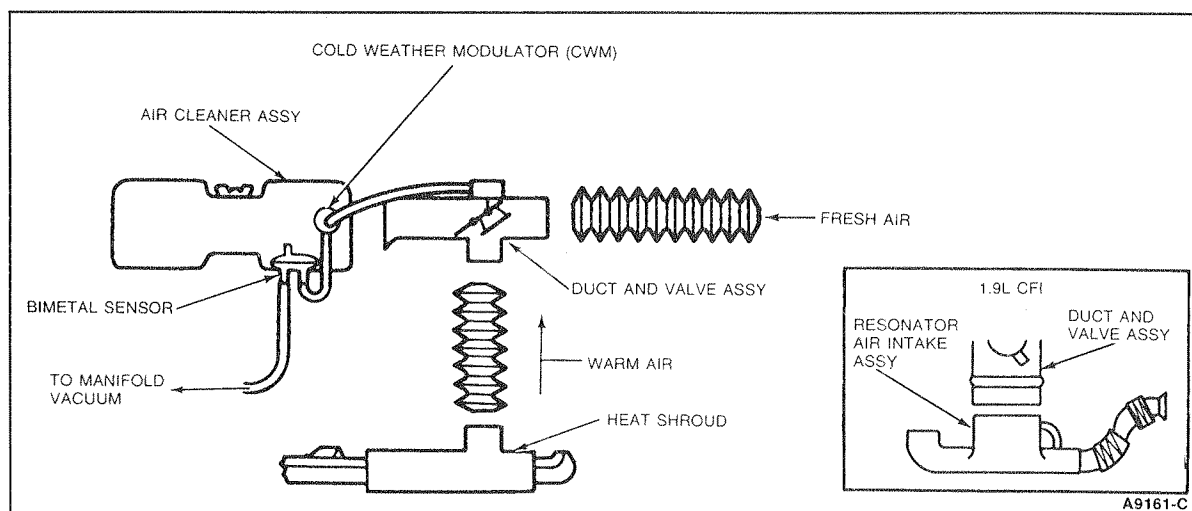


Figure 1 Typical Air Cleaner and Duct System, Carburetor and Throttle Body Applications — 1.9L, CFI, 5.8L (Passenger Car); 2.0L, 5.0L (Light and Heavy Duty Truck)

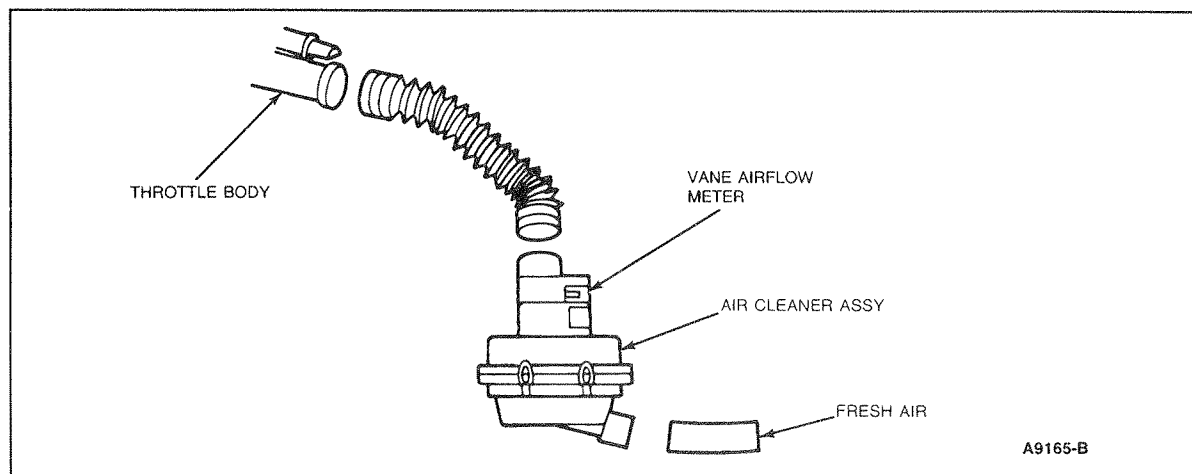


Figure 2 Typical Air Cleaner System — 1.9L EFI (Passenger Car)

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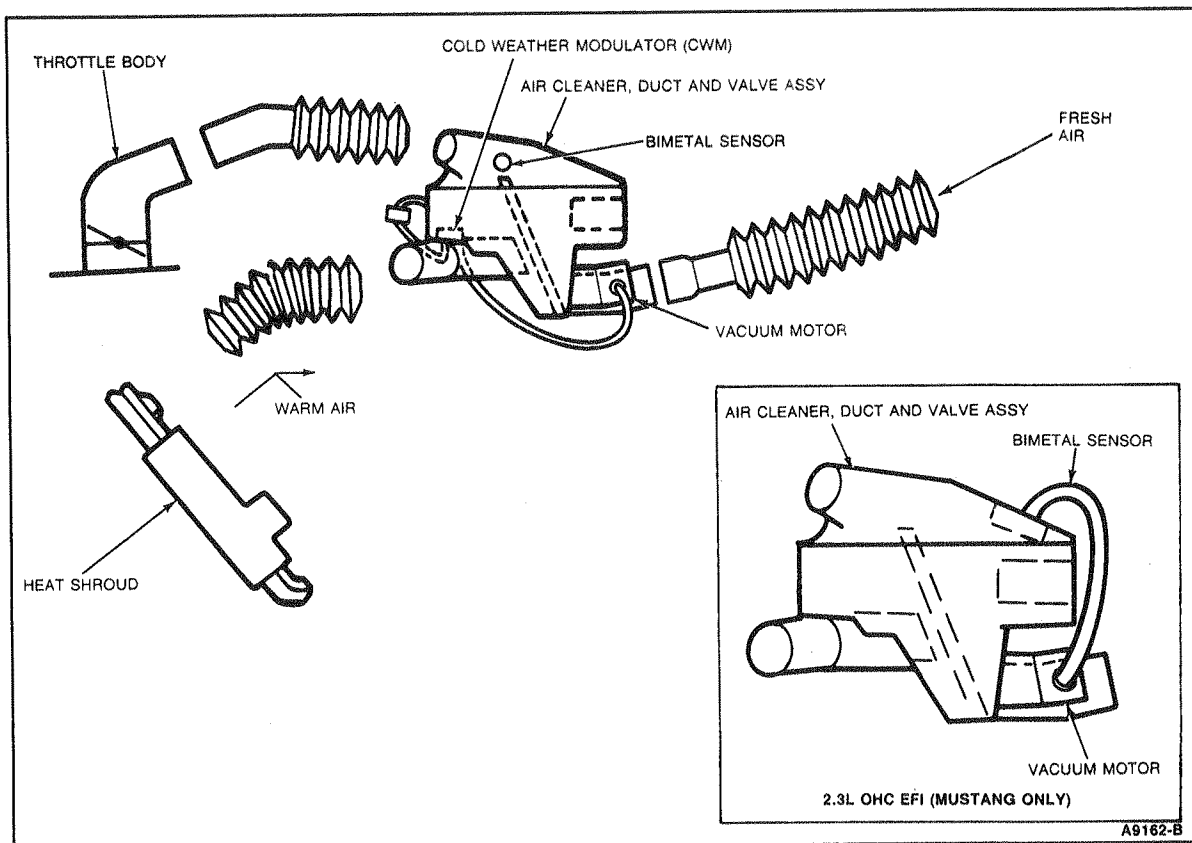


Figure 3 Typical Air Cleaner System — 2.3L EFI HSC (Tempo/Topaz) and 2.3L OHC (Mustang)

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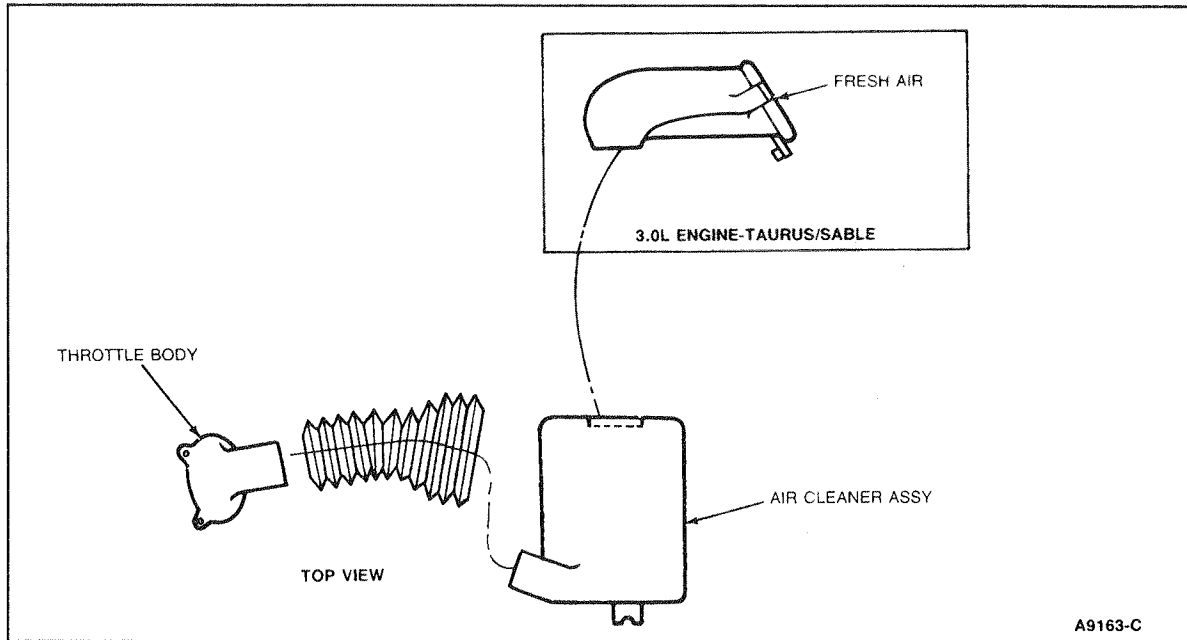


Figure 4 Typical Air Cleaner System — 3.0L EFI (Taurus/Sable)

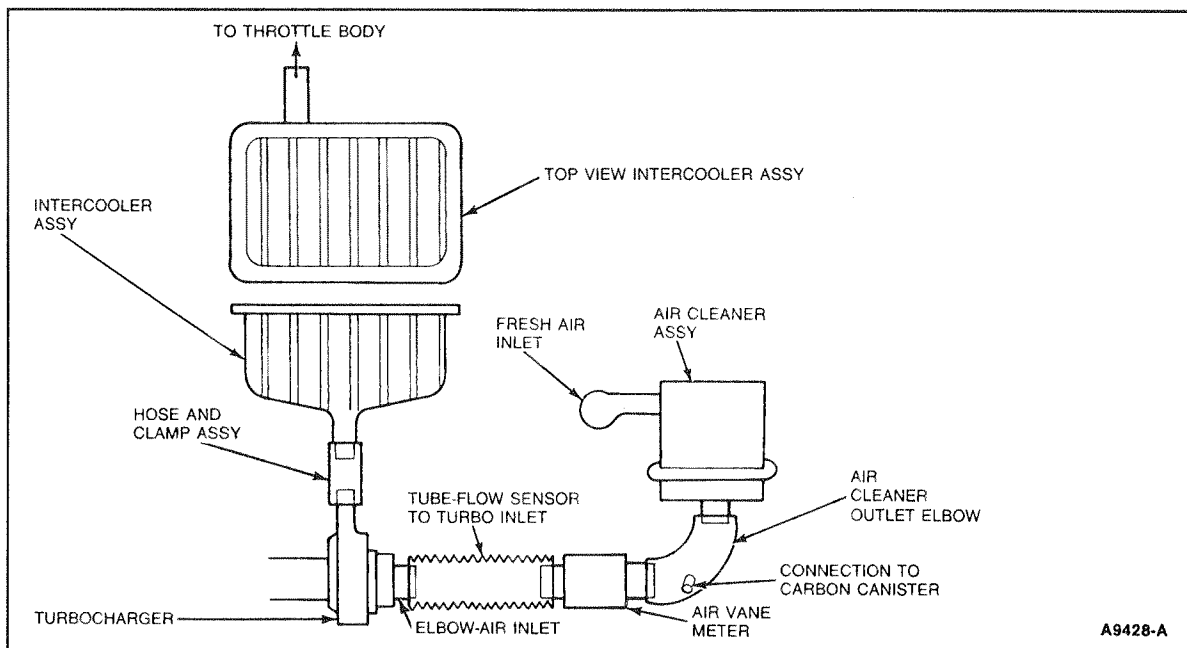


Figure 5 Typical Air Cleaner System — 2.3L EFI OHC Turbo (Thunderbird)

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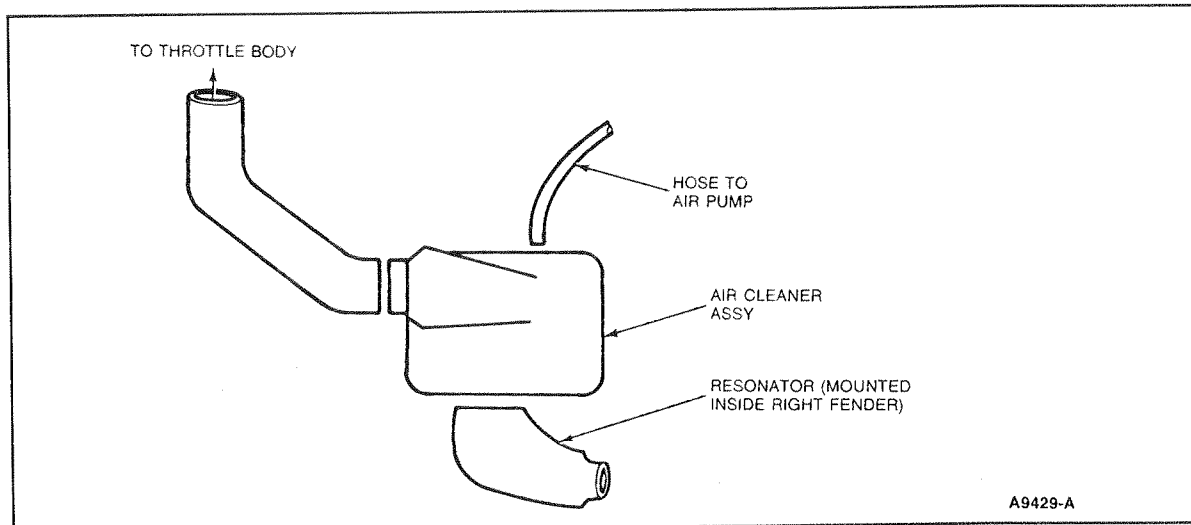


Figure 6 Typical Air Cleaner System — 3.8L EFI (Thunderbird/Cougar)

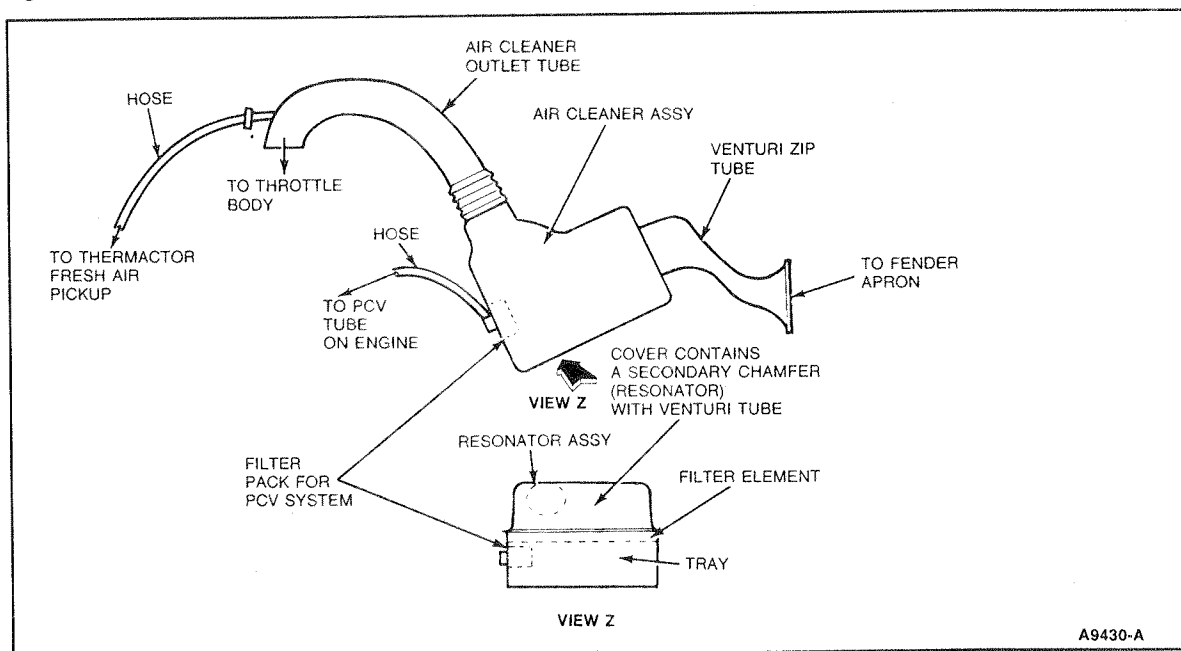


Figure 7 Typical Air Cleaner System — 3.8L EFI (Taurus/Sable, Continental)

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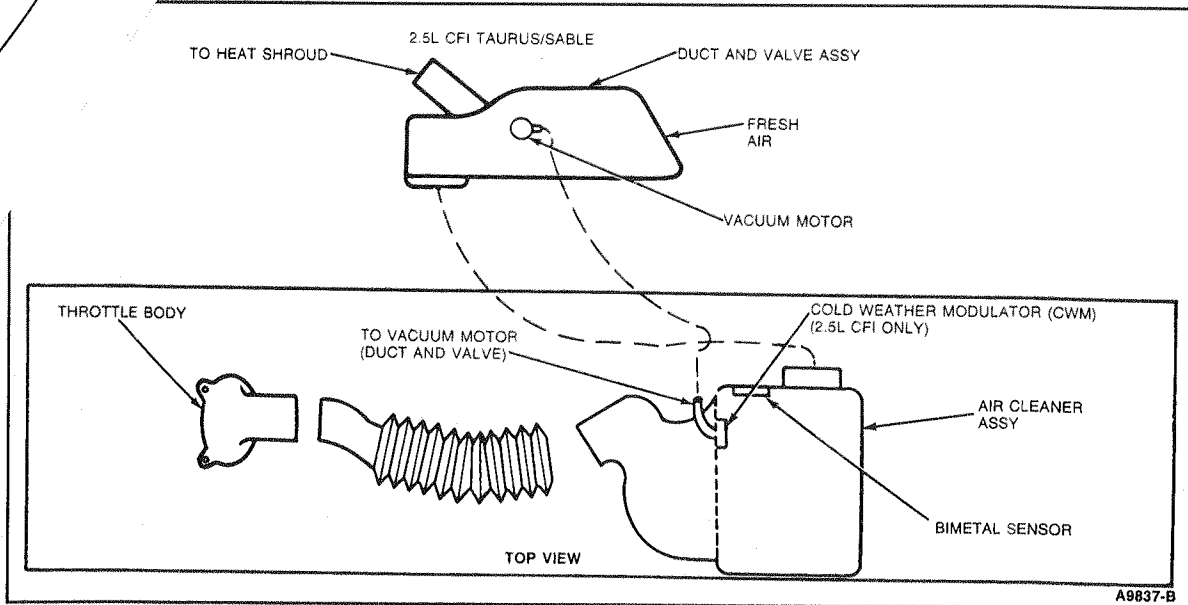


Figure 8 Typical Air Cleaner System — 2.5L CFI (HSC) (Passenger Car)

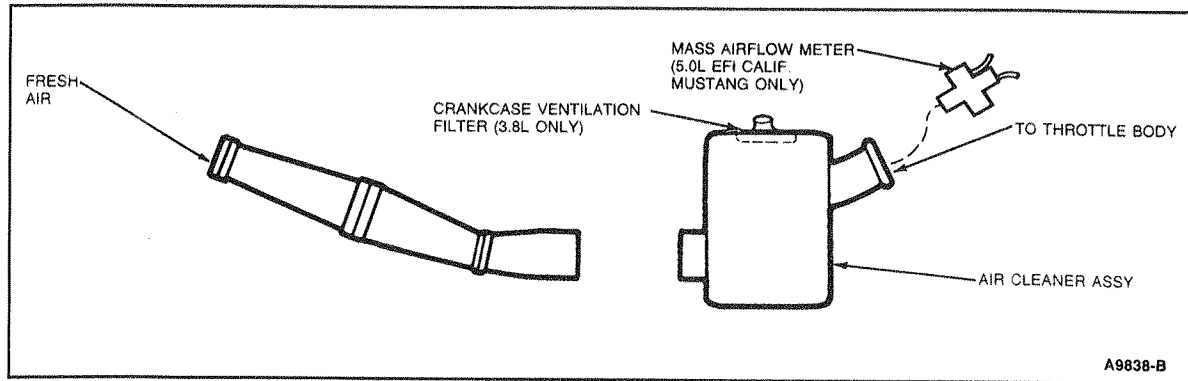


Figure 9 Typical Air Cleaner System — 5.0L SEFI (Mark VII, Mustang, Crown Victoria, Grand Marquis, Lincoln Town Car)

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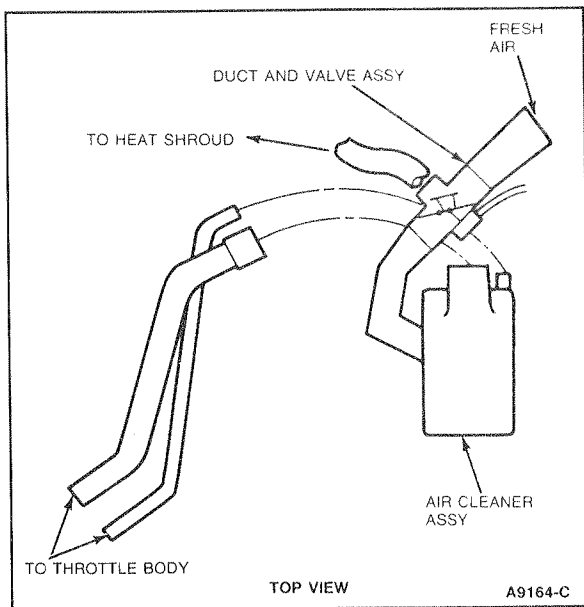


Figure 10 Typical Air Cleaner and Duct System — 2.3L EFI, 2.9L EFI (Light Truck)

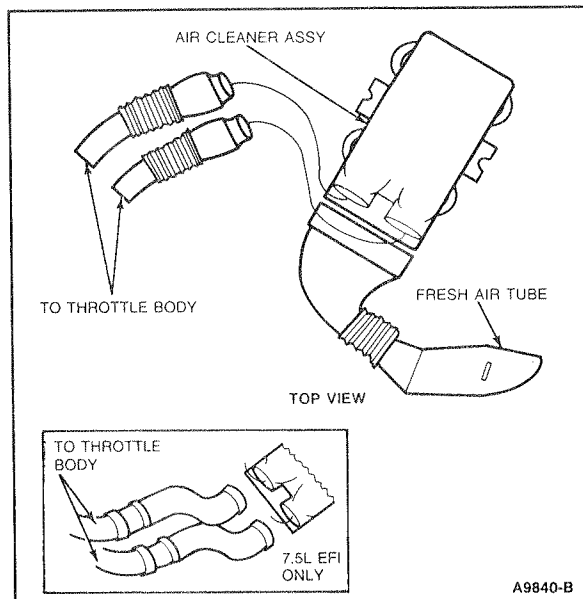


Figure 12 Typical Air Cleaner System — 4.9L EFI, 7.5L EFI (F-Series or Bronco)

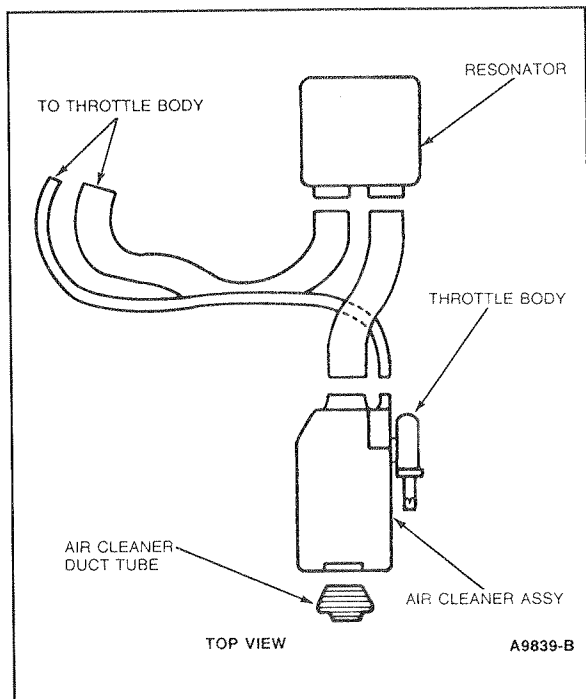


Figure 11 Typical Air Cleaner System — 2.3L EFI (OHC) (Aerostar)

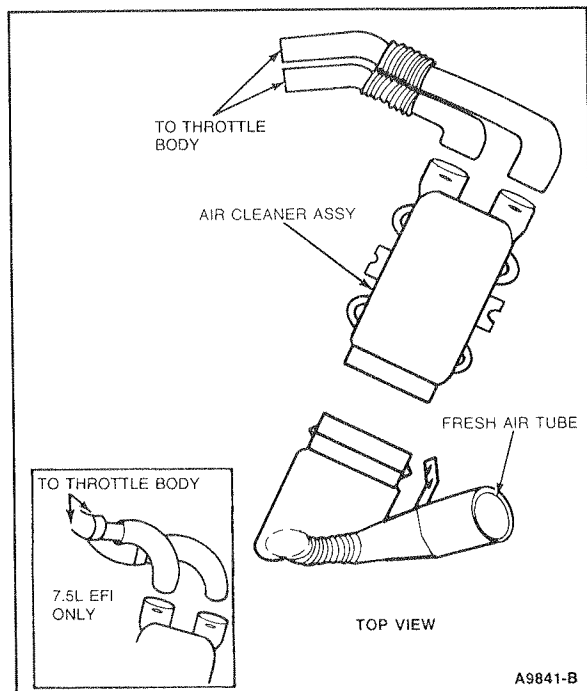


Figure 13 Typical Air Cleaner System — 4.9L EFI, 7.5L EFI (E-Series)