DESCRIPTION AND OPERATION

ENGINE

Engine - Upper End

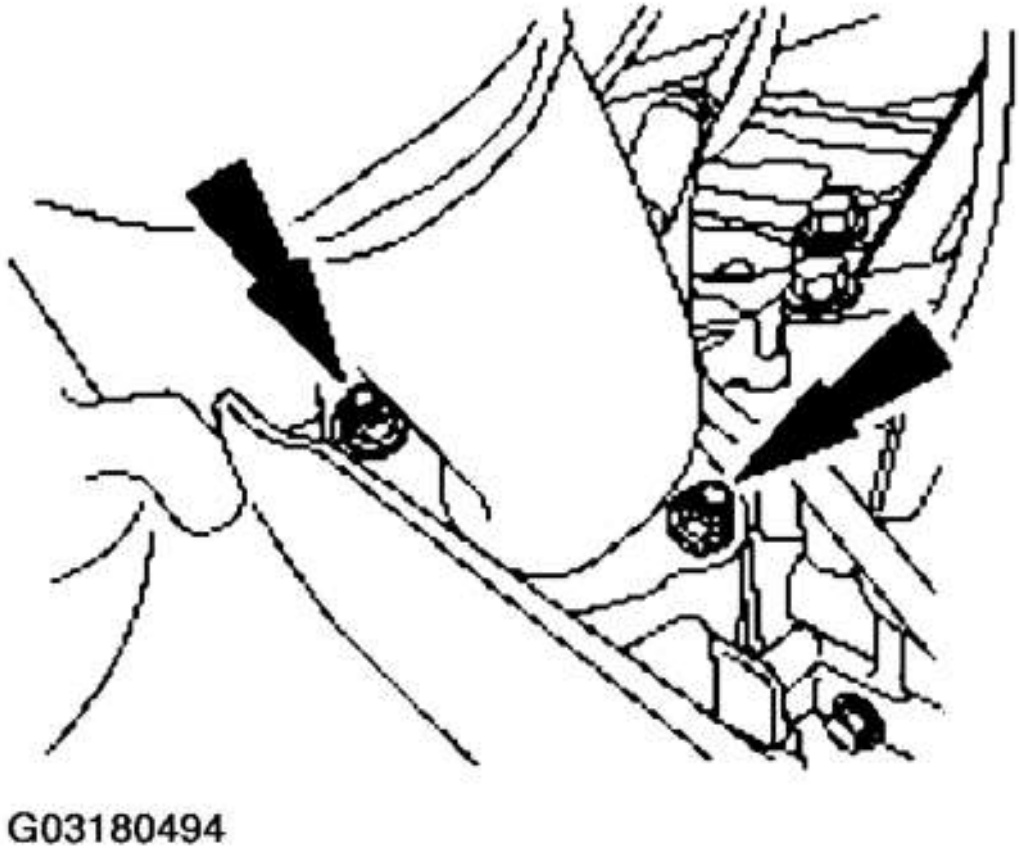

Fig. 1: Exploded View Of Engine - Upper End
Courtesy of FORD MOTOR CO.

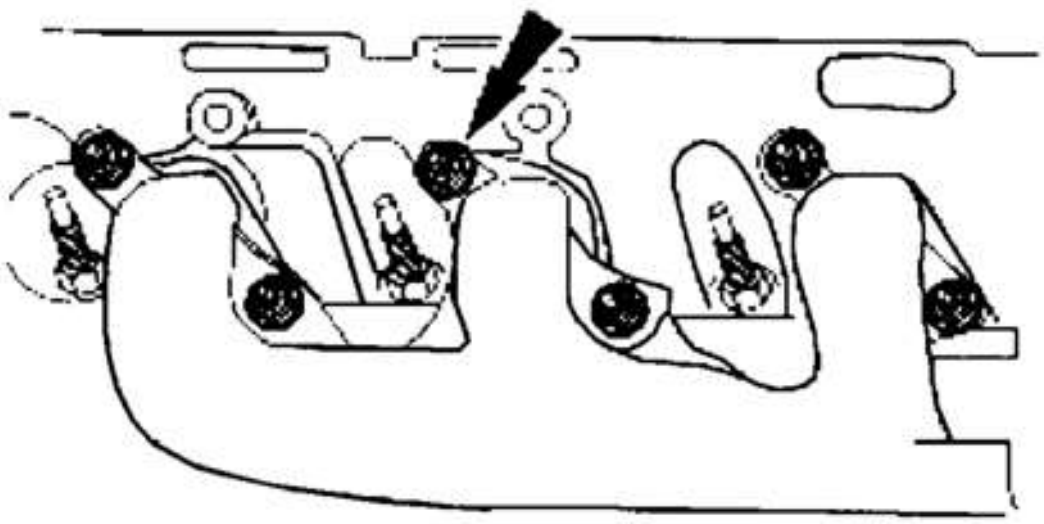

Fig. 2: Exploded View Of Engine - Upper End - Part Identification
Courtesy of FORD MOTOR CO.

Engine Induction System

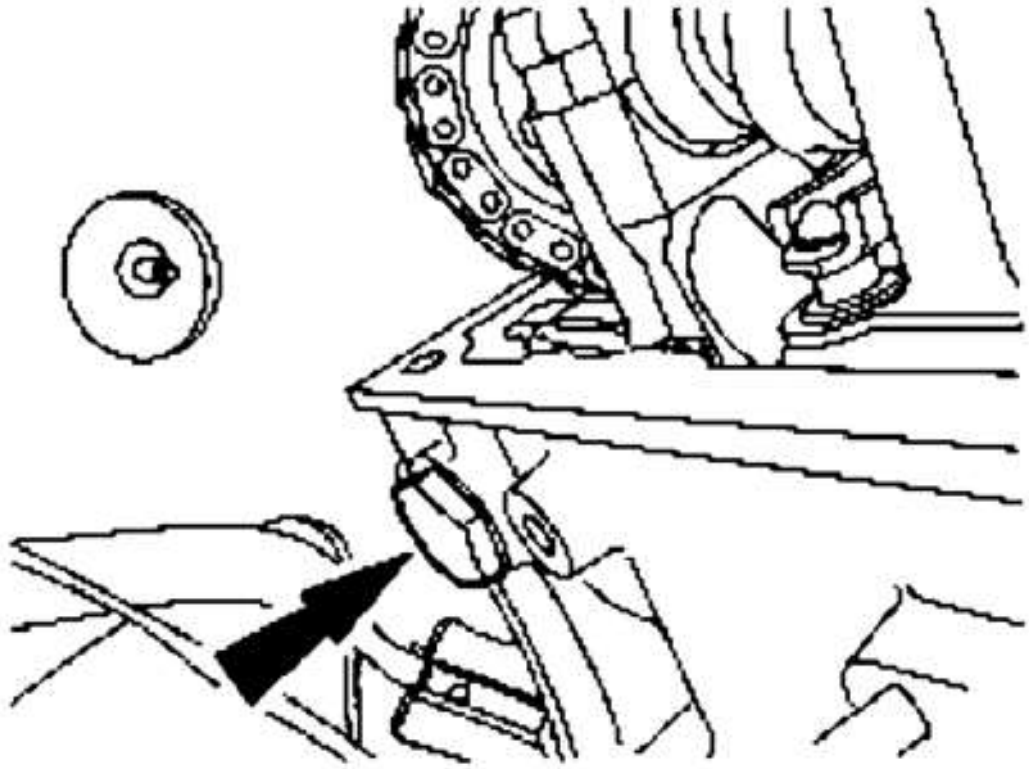

Fig. 3: Identifying Engine Induction System
Courtesy of FORD MOTOR CO.

Engine - Lower End

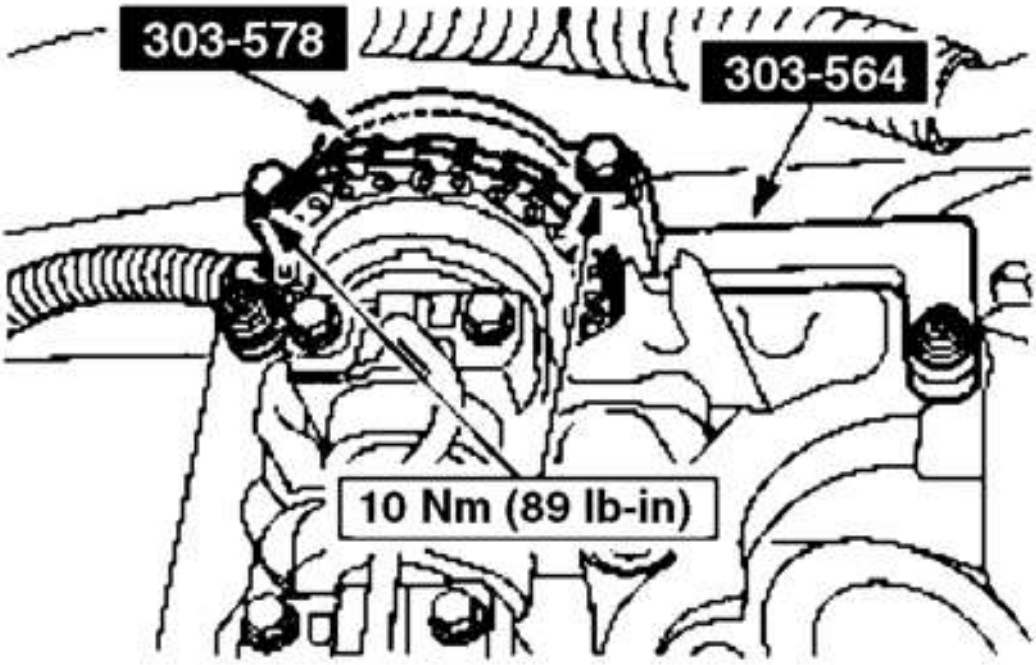

Fig. 4: Exploded View Of Engine - Lower End
Courtesy of FORD MOTOR CO.

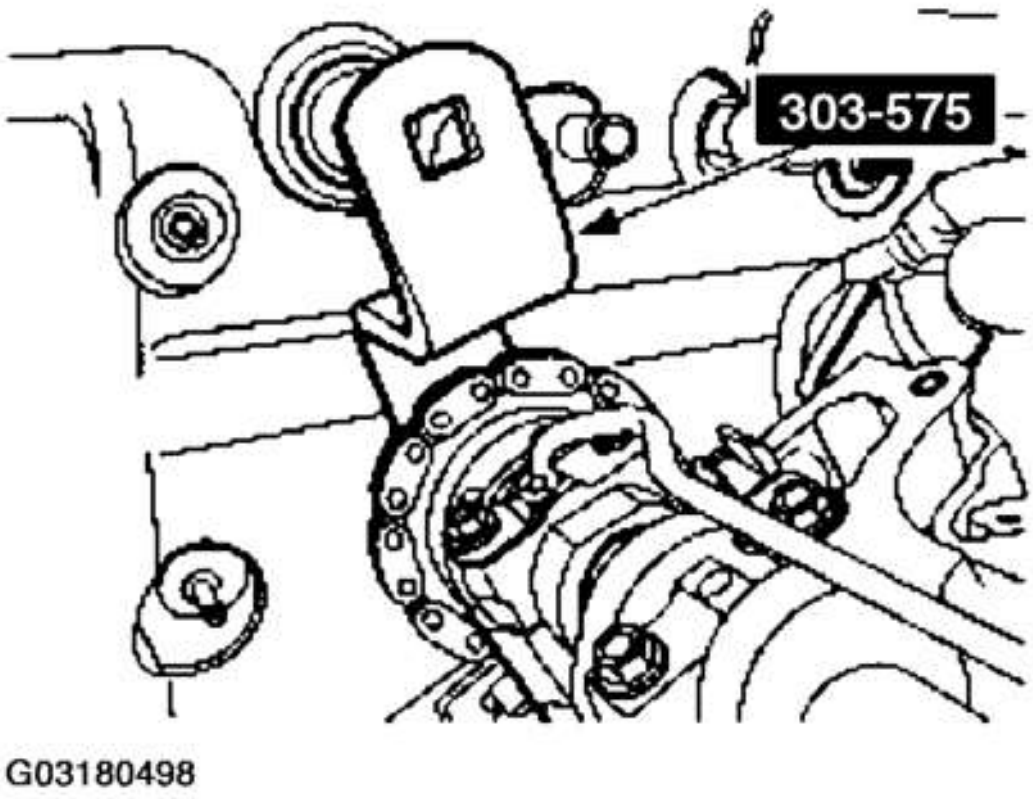

Fig. 5: Exploded View Of Engine - Lower End - Part Identification
Courtesy of FORD MOTOR CO.

Engine - Front End

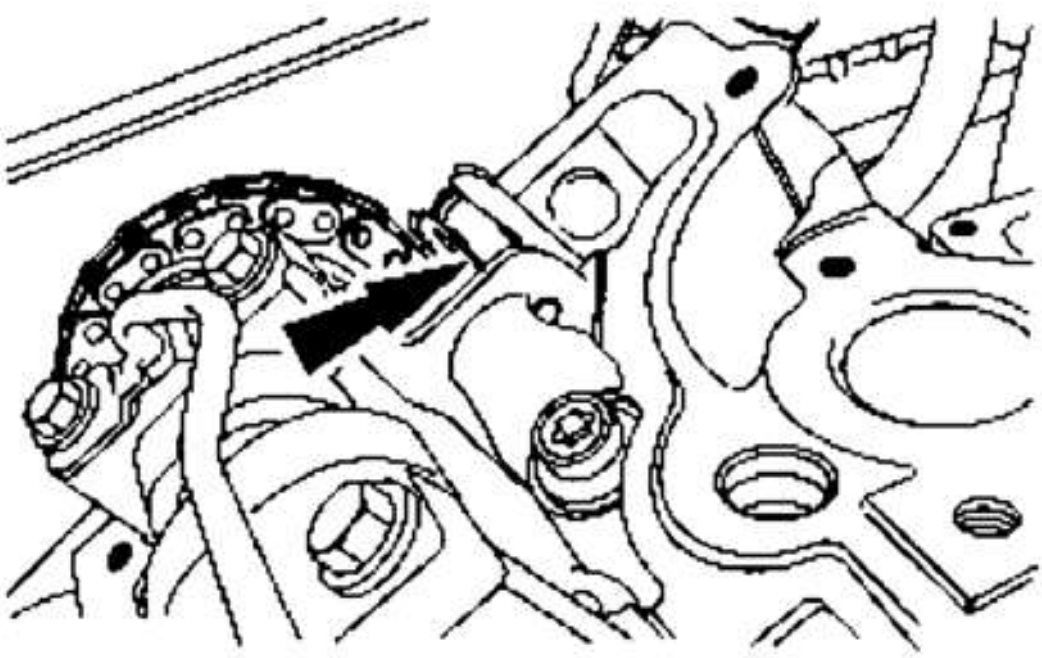

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Fig. 6: Exploded View Of Engine - Front End
Courtesy of FORD MOTOR CO.

WARNING: Do not operate the engine with the hood open until the fan blade has been first examined for possible cracks and separation.

The 4.6L (281 CID) is a V-8 engine with the following features:

- Single overhead camshaft
- Two valves per cylinder
- Sequential multiport fuel injection (SFI)
- Aluminum cylinder heads
- Cast aluminum, 90-degree V-cylinder block
- Individually chain-driven camshafts with a hydraulic timing chain tensioner on each timing chain
- Electronic ignition system with eight ignition coils

Identification

Always refer to these labels when installation of new parts is necessary, or when checking engine calibrations. The engine parts often differ within a CID family. Verification of the identification codes will make sure that the correct parts are obtained. These codes contain all the pertinent information relating to the dates, optional equipment and revisions. The Ford Master Parts Catalog contains a complete listing of the codes and their application.

Code Information

The engine code information label, located on the side of the valve cover and the front side of the valve cover, contains the following:

- Engine build date
- Engine plant code
- Engine code

Exhaust Emission Control System

Operation and necessary maintenance of the exhaust emission control devices used on this engine are covered in **INTRODUCTION - CNG, FLEX-FUEL & GASOLINE** .

Induction System

The sequential multiport fuel injection (SFI) provides the fuel/air mixture needed for combustion in the cylinders. Fuel injectors are solenoid operated and:

- are mounted in the lower intake manifold.
- meter fuel into the air intake stream in accordance with engine demand.
- are positioned so that their tips direct fuel just ahead of the engine intake valves.
- are connected in series with the fuel pressure sensor.
- supply fuel from the fuel tank with a fuel pump mounted in the fuel tank.

A variable fuel pressure is maintained across the fuel injectors by the electronic returnless fuel system.

Valve Train

The valve train operates as follows:

- Ball-tip hydraulic lash adjusters provide automatic lash adjustment.
- Roller followers ride on the camshaft lobe, transferring the up-and-down motion of the camshaft lobes to the valves in the cylinder heads.

Positive Crankcase Ventilation System

All engines are equipped with a closed-type positive crankcase ventilation system recycling the crankcase vapors to the upper intake manifold.

Lubrication System

The engine lubrication system operates as follows:

- Oil is drawn into the oil pump through the oil pump screen cover and tube in the sump of the oil pan.
- Oil is pumped through the oil filter on the left front side of the cylinder block.
- Oil enters the main gallery where it is distributed to the crankshaft main journals and to both cylinder heads.
- From the main journals, the oil is routed through cross-drilled passages in the crankshaft to lubricate

the connecting rod bearings. Controlled leakage through the crankshaft main bearings and connecting rod bearings is slung radially outward to cool and lubricate the cylinder walls as well as the entire connecting rod, piston and piston ring assembly.

- The left cylinder head is fed from a drilling into the supply passage feeding the main gallery at the front of the cylinder block. The right cylinder head is fed from a drilling into the rear of the main gallery. Main gallery pressure is reduced as it enters the cylinder head galleries through fixed serviceable orifices, located at the upper part of the feed passages. It is this reduced pressure in the cylinder head galleries which feeds the camshaft journals, the hydraulic lash adjusters and the primary and secondary timing chain tensioners.
- The camshaft lobe and roller followers are lubricated by splash created through valve train operation.

Oil Pump

The lubrication system of the 4.6L (2V) engine is designed to provide optimum oil flow to critical components of the engine through its entire operating range. The heart of the system is a positive displacement internal gear oil pump using top seal rotors. Generically this design is known as a gerotor pump, which operates as follows:

- The oil pump is mounted on the front face of the cylinder block.
- The inner rotor is piloted on the crankshaft post and is driven through flats on the crankshaft.
- System pressure is limited by an integral, internally-vented relief valve which directs the bypassed oil back to the inlet side of the oil pump.
- Oil pump displacement has been selected to provide adequate volume to make sure of correct oil pressure, both at hot idle and maximum speed.
- The relief valve calibration protects the system from excessive pressure during high viscosity conditions.
- The relief valve is designed to provide adequate connecting rod bearing lubrication under high-temperature and high-speed conditions.

Cooling System

The engine cooling system includes the following:

- Radiator
- Coolant pump
- Mechanical cooling fan belt driven by the crankshaft
- Degas bottle, which aids in maintaining the correct volume of engine coolant
- Thermostat
- Upper radiator hose
- Lower radiator hose
- Heater hoses

Drive Belt System

The 4.6L (2V) engine is equipped with a serpentine drive belt. To make sure of maximum life, install a new drive belt with the same type as originally installed.

- The accessories mounted on the front of the engine are belt-driven by the crankshaft pulley.

ACCESSORY DRIVE

Component Locations 4.6L

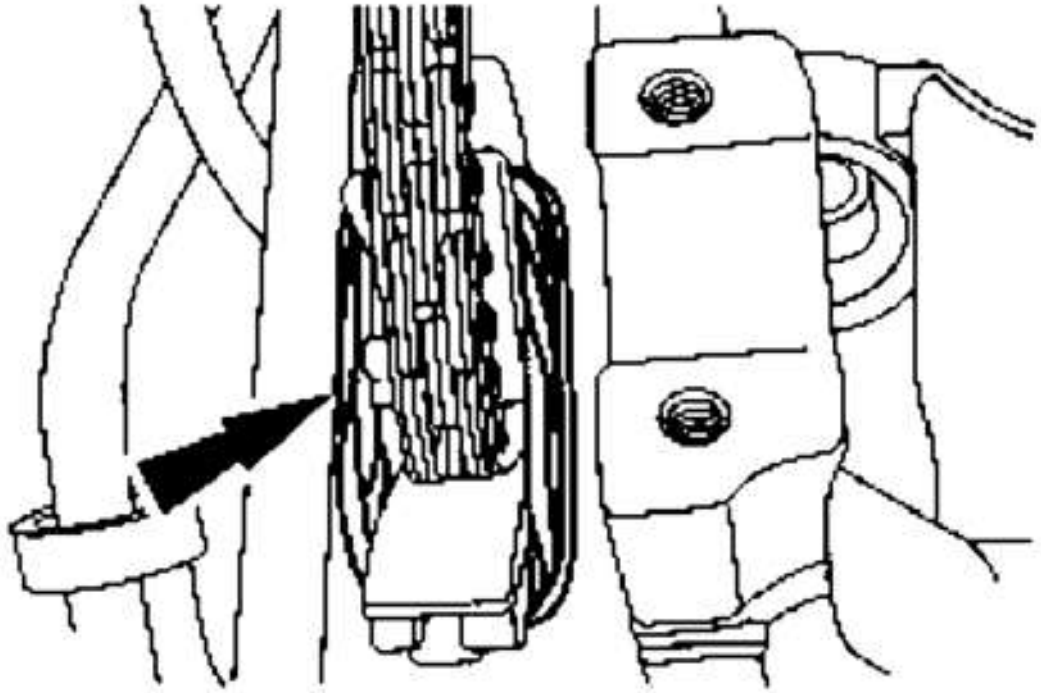

Fig. 7: Identifying Accessory Drive Component Locations 4.6L
Courtesy of FORD MOTOR CO.

The accessory drive:

- has a single serpentine drive belt (six ribs).
- has an automatic tensioner.
- is not adjustable.

ENGINE EMISSION CONTROL

CAUTION: Do not remove any part of the engine emission control system. Operating the engine without the engine emission control system will reduce fuel economy and engine ventilation. This will weaken engine performance and shorten engine life.

The engine emission control system consists of the:

- positive crankcase ventilation (PCV) system.

- exhaust gas recirculation (EGR) system.

Typical Vehicle Emission Control Information (VECI) Decal

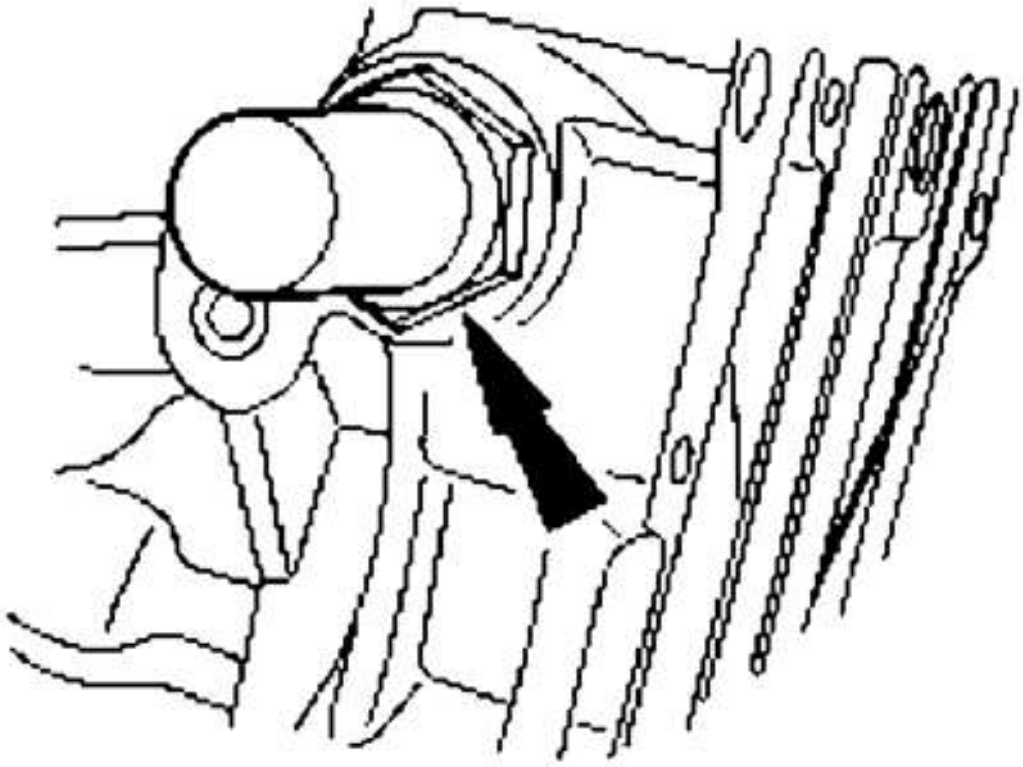

Fig. 8: Identifying Vehicle Emission Control Information (VECI) Decal
Courtesy of FORD MOTOR CO.

- components of the emission control system.
- the correct vacuum hose routing.
- the color stripe of the vacuum hoses.

For additional information, refer to **IDENTIFICATION CODES** .

The PCV system uses intake manifold vacuum to ventilate the crankcase and return the fumes to the intake manifold for combustion.

EGR System Component Diagram

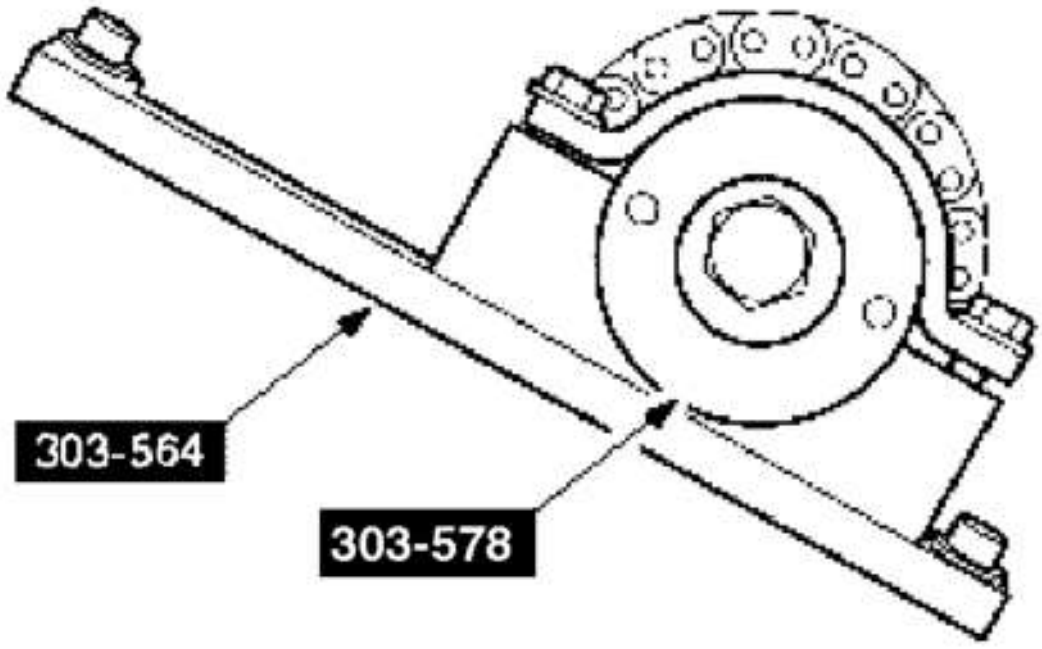

Fig. 9: Identifying EGR System Component Diagram
Courtesy of FORD MOTOR CO.

The EGR system returns a portion of the exhaust gas to the intake manifold to reduce the combustion temperature. This results in lower nitrous oxide formation.

The powertrain control module (PCM) controls the EGR vacuum regulator solenoid. The EGR vacuum regulator solenoid controls the vacuum to the EGR valve. When the EGR valve opens, exhaust gas flows to the intake manifold. The EGR transducer measures the flow through the EGR system module to exhaust manifold tube and sends a signal to the powertrain control module.

The PCV valve:

- controls the amount of ventilating air and blow-by gases going to the intake manifold.
- prevents a backfire from reaching the crankcase.

The EGR tube-to-exhaust manifold:

- connects the exhaust manifold to the EGR system module.

The EGR system module transducer:

- monitors the EGR system module flow rate through the EGR-to-exhaust manifold tube.
- sends an EGR system module flow rate signal to the powertrain control module.

The EGR system module gasket:

- is a gasket and orifice for measuring exhaust flow rate.
- must be installed new whenever the EGR system module is removed.

The EGR vacuum regulator solenoid uses input from the powertrain control module to change the EGR system module operation.