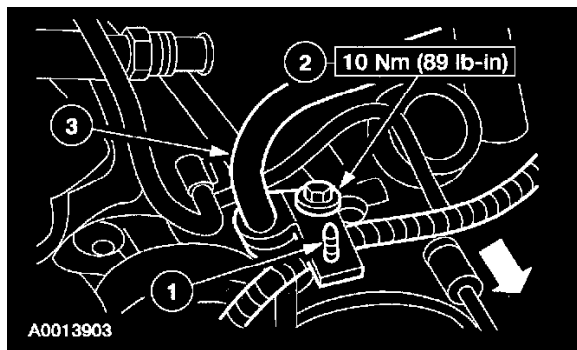


## Camshaft Position Sensor: Service and Repair

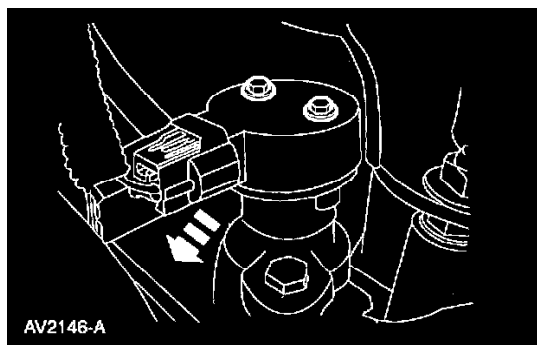
### Camshaft Position Sensor

#### REMOVAL

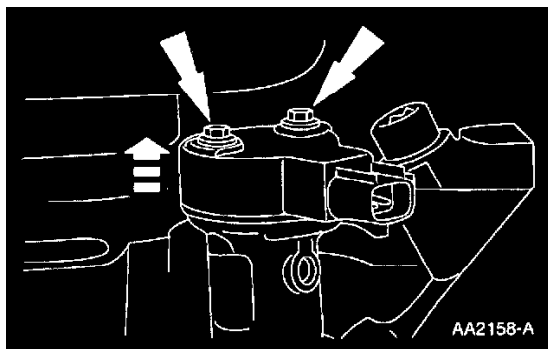
1. Disconnect the battery ground cable.
2. Partially drain the cooling system.
3. Remove the air cleaner assembly.



4. Position the heater water tube aside.
  1. Disconnect the wiring harness.
  2. Remove the bolt.
  3. Position the tube aside.



5. Disconnect the Camshaft Position (CMP) sensor electrical connector.



6. Remove the screws and the CMP sensor.

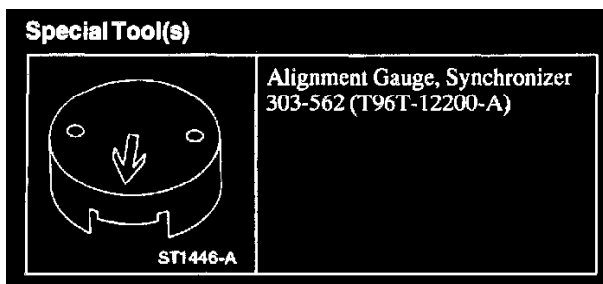
#### INSTALLATION

1. To install, reverse the removal procedure.

## Camshaft Position Sensor: Service and Repair

### Camshaft Synchronizer

**NOTE:** Ford does not provide a TDC (Top Dead Center) mark or determination procedure for this engine in this vehicle. ALLDATA users have reported success using aftermarket tools to determine TDC on this engine.



Alignment Gauge, Synchronizer

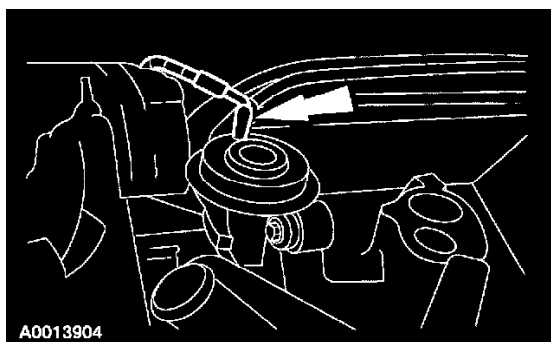
#### SPECIAL TOOL(S)

#### REMOVAL

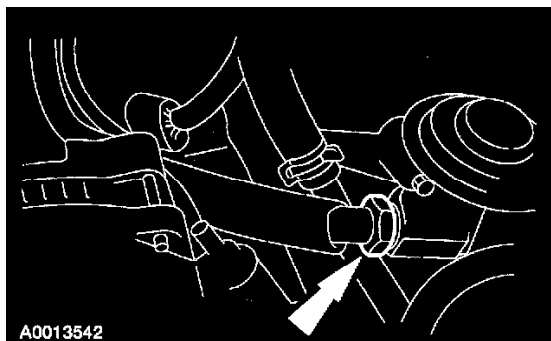
1. Rotate the crankshaft until the No.1 cylinder is at Top Dead Center (**TDC**) of the compression stroke.

**CAUTION:** Do not turn the crankshaft or camshaft during the removal and installation procedure or the fuel system timing will be out of time with the engine and could possibly cause engine damage.

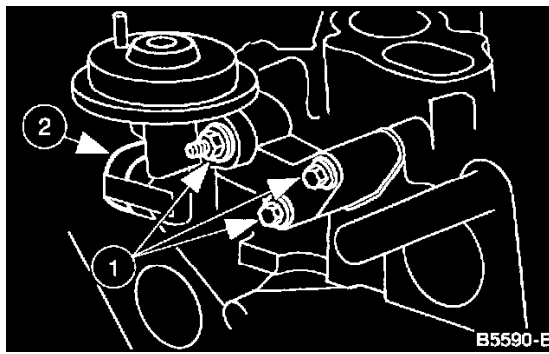
2. Remove the Camshaft Position (**CMP**) sensor.



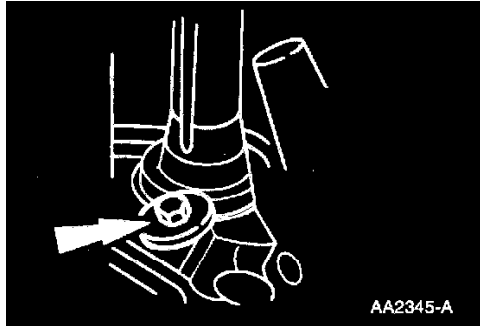
3. Disconnect the Exhaust Gas Recirculation (**EGR**) valve vacuum hose.



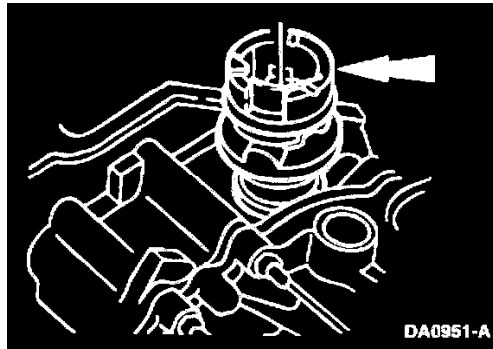
4. Remove the EGR valve tube upper fitting.



5. Remove the EGR valve and adapter.
  - 1 Remove the nut and the bolts.
  - 2 Remove the EGR valve and adapter assembly.



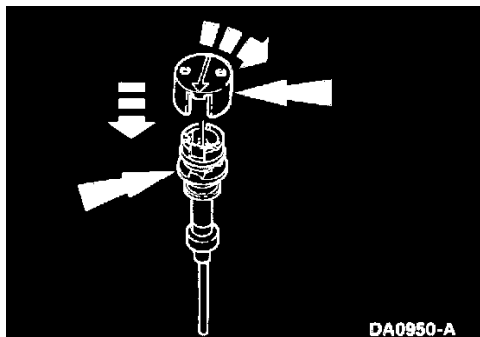
6. Remove the camshaft synchronizer retaining bolt.
7. Disconnect the two coolant hoses from the water outlet tube and position the tube out of the way.



8. Remove the camshaft synchronizer.

**NOTE:** The oil pump driveshaft may come out with the camshaft synchronizer. If so, retrieve the oil pump driveshaft before proceeding.

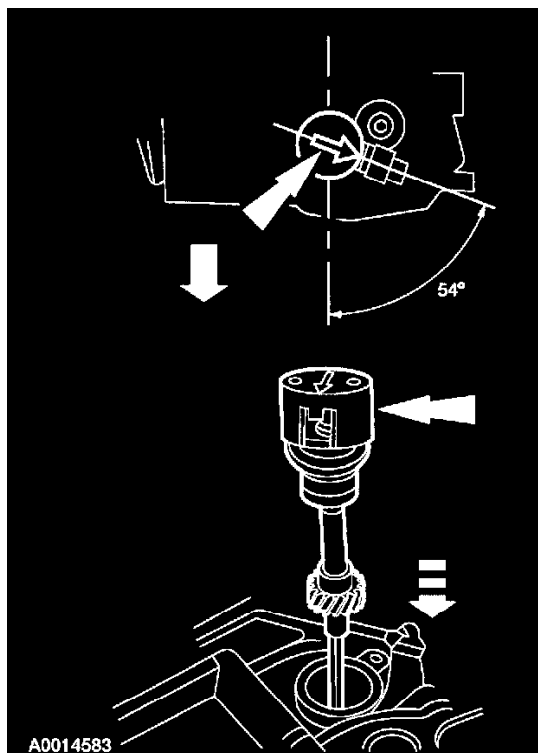
## INSTALLATION



1. Install the Synchronizer Alignment Gauge on the camshaft synchronizer by rotating the tool until it engages the notch in the camshaft synchronizer housing.

**CAUTION:**

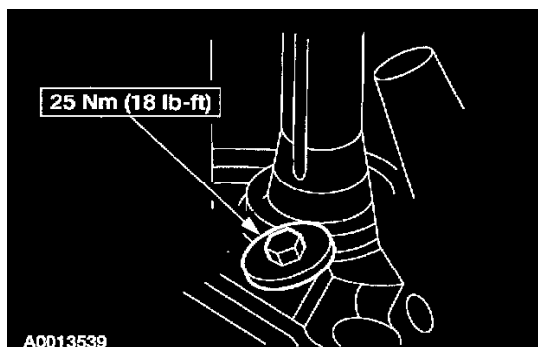
- Do not turn the crankshaft or camshaft during the removal and installation procedure or the fuel system timing will be out of time with the engine and possibly causing engine damage.
- A Synchronizer Alignment Gauge must be used during the installation of the new synchronizer assembly. Failure to follow this procedure will result in the fuel system being out of time with the engine, possibly causing engine damage.



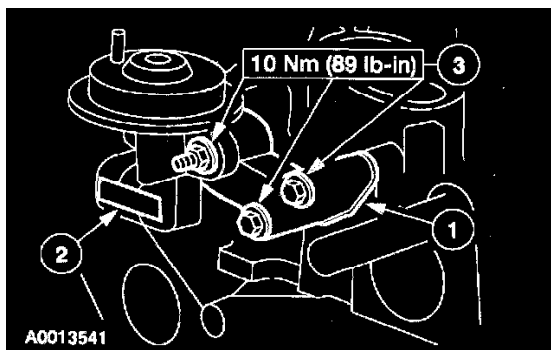
2. Install the camshaft synchronizer housing assembly so the arrow on the synchronizer alignment tool is **54 degrees** from the centerline of the engine.

**NOTE:** During installation, the arrow on the Synchronizer Alignment Gauge will rotate clockwise as the gears engage.

3. Position the water outlet tube and connect the two coolant hoses.

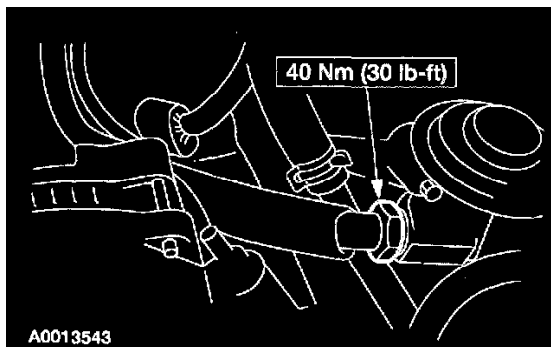


4. Install the camshaft synchronizer retaining bolt.

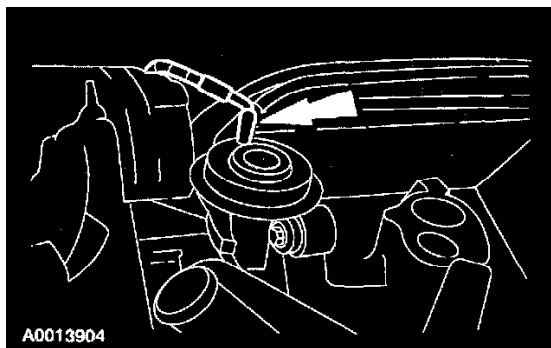


5. Install the EGR valve and adapter assembly.
  - 1 Position the EGR valve adapter gasket.
  - 2 Position the EGR valve.
  - 3 Install the bolts and the nut.

**NOTE:** Reuse the EGR valve adapter gasket.



6. Install the EGR valve tube upper fitting.



7. Connect the EGR valve vacuum hose.
8. Install the camshaft position (CMP) sensor.