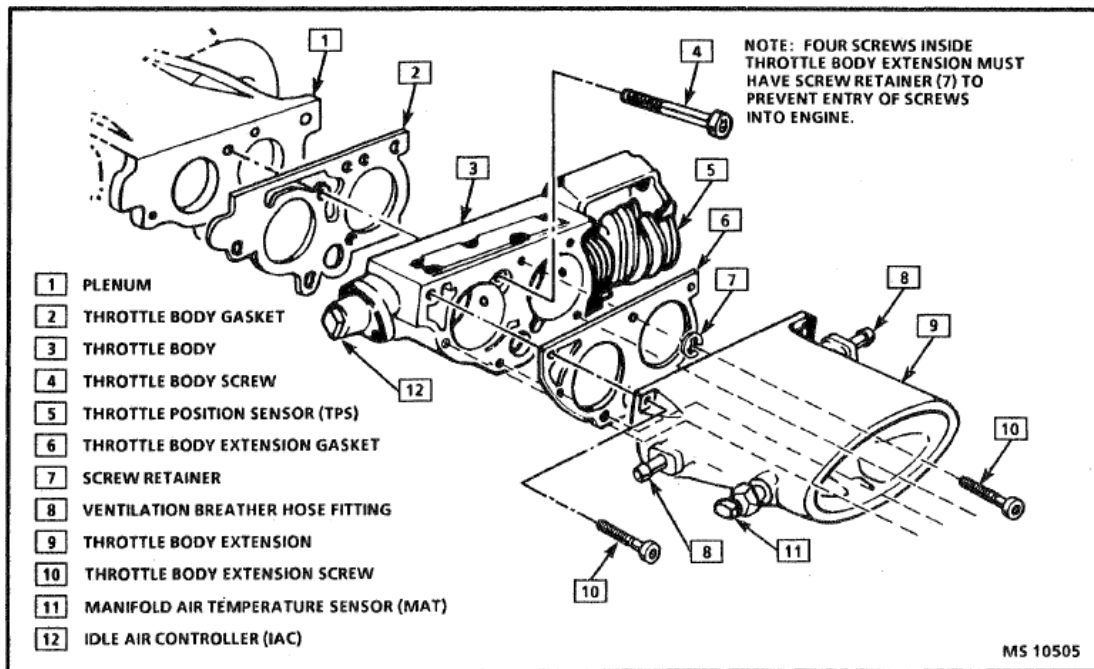
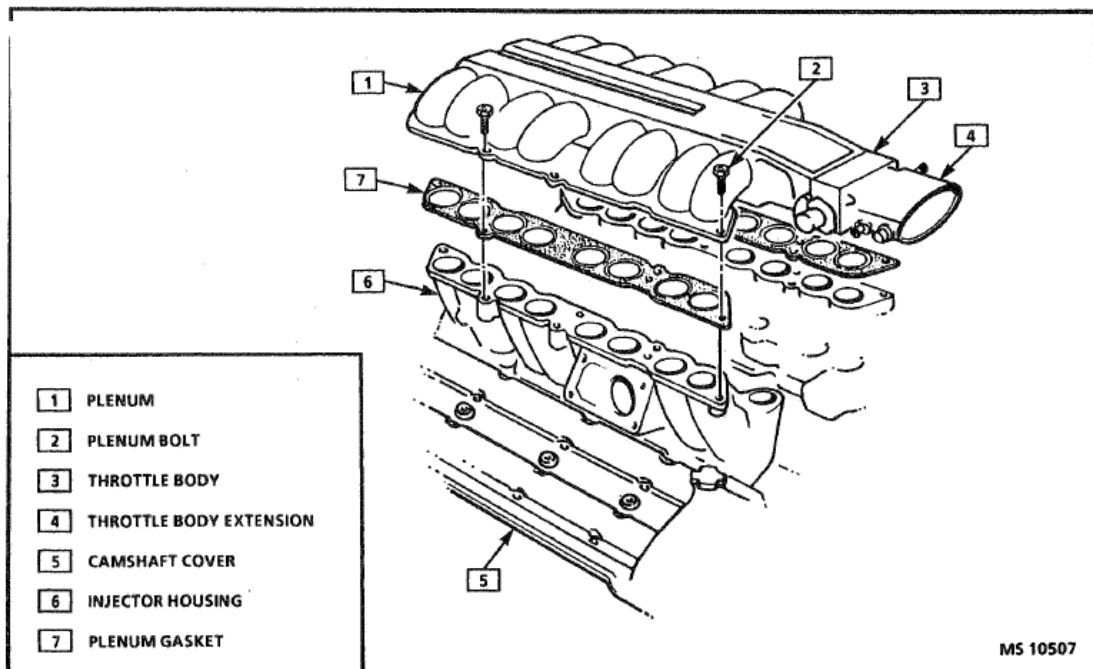


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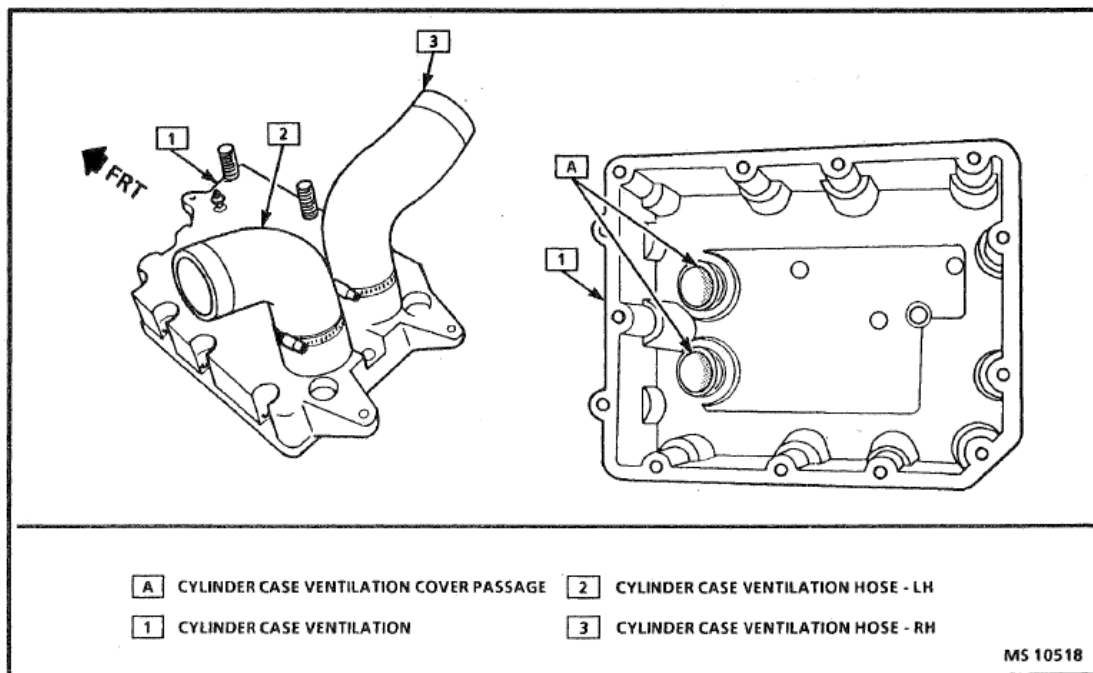
**Fig. 13: Exploded View Of Throttle Body And Extension**



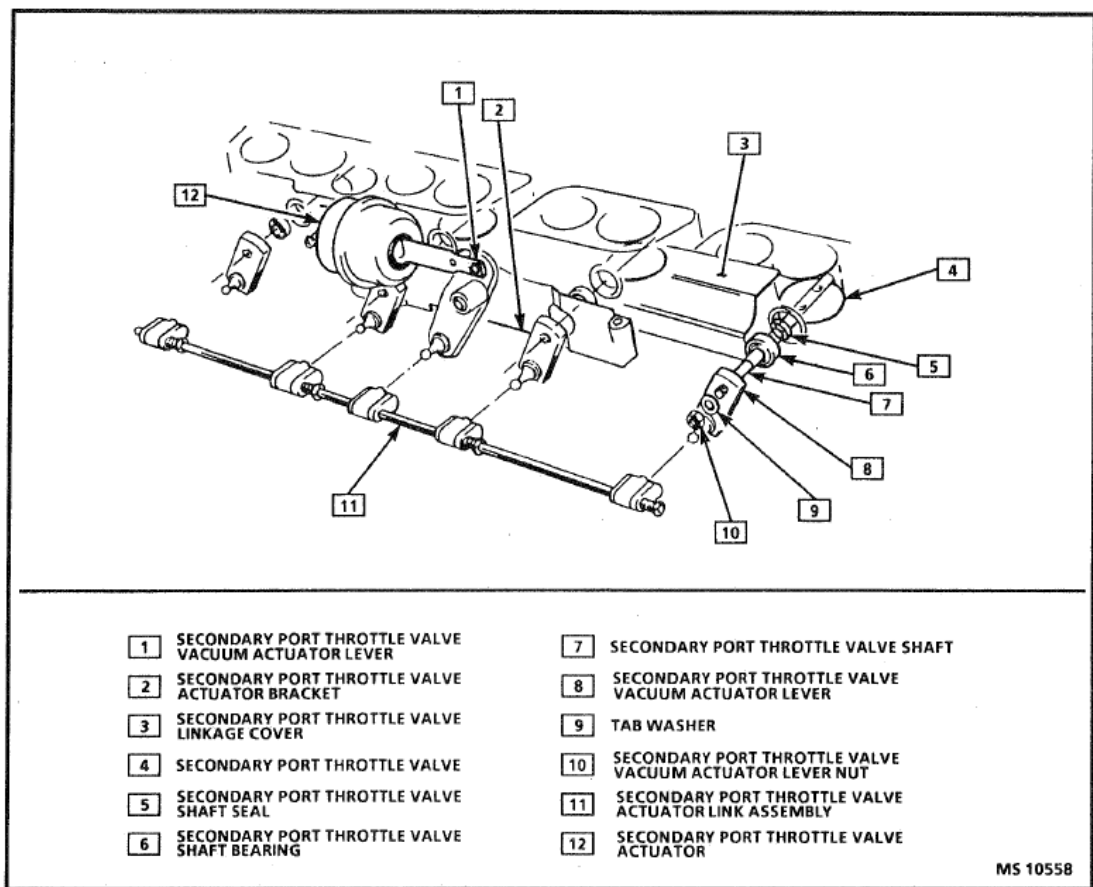
**Fig. 14: Identifying Plenum Components**

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**Fig. 15: Identifying Cylinder Case Ventilation Cover Components**



**Fig. 16: Identifying Secondary Port Throttle Actuation Assembly Components**

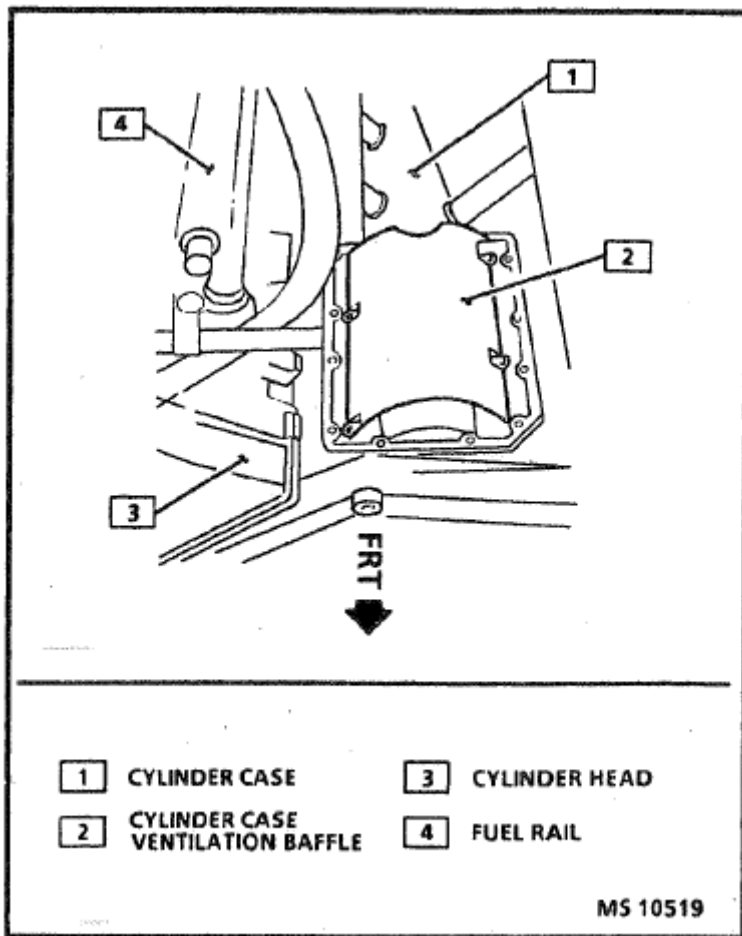
6. Electrical connectors from coil pack: coil pack from vehicle.
7. Vacuum hoses from vacuum reservoir.
8. Nuts and washers retaining vacuum reservoir to ventilation cover: reservoir from engine.
9. Vacuum hoses from vacuum solenoid.
10. Electrical connector from vacuum solenoid.
11. Screw retaining vacuum solenoid to ventilation cover and solenoid from engine.
12. Vacuum hoses from secondary port throttle actuators.
13. Nuts retaining actuators to brackets.
14. Actuator retaining clips and actuators from engine.
15. Screws retaining control assembly covers to actuator brackets: covers from engine.
16. Link assemblies from lever assemblies.
17. Electrical connectors from:
  - Coolant temperature sensor.
  - Cooling fan switch.
18. Coolant temperature sensor and cooling fan switch from injector housing.
19. Cylinder case ventilation hose.
20. Bolts retaining cylinder case ventilation cover to cylinder case.
21. Ventilation cover and gasket from engine.
22. Bolts retaining ventilation baffle to cylinder case; baffle from engine.

#### **INJECTOR HOUSINGS**

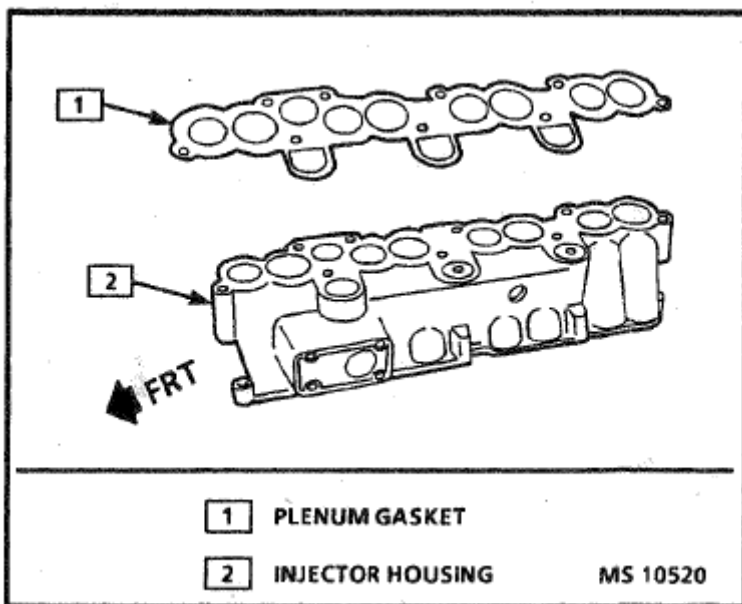
### **Fig. 18**

#### **Remove or Disconnect**

1. Bolts retaining fuel rail assembly to injector housings.
2. Injectors from housings and fuel rail assembly from engine.
3. PCV grommet from right injector housing.



**Fig. 17: Identifying Cylinder Case Ventilation Baffle Components**



**Fig. 18: Identifying Injector Housing**

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4. Bolt retaining generator rear support bracket to generator.
5. Bolt retaining generator rear support bracket and right-side ventilation pipe to injector housing.
6. Bolts retaining right injector housing to cylinder head.
7. Right injector housing and gasket from engine.
8. PCV grommet from left injector housing.
9. Bolts retaining housing to cylinder head.
10. Left injector housing and gasket from engine.

### EXHAUST MANIFOLDS

#### Remove or Disconnect

1. Air hoses from check valves on right and left exhaust manifolds.
2. Outer heat shields from exhaust manifolds.
3. Bolts, nuts and spacers from exhaust manifolds.
4. Exhaust manifolds.

### TORSIONAL DAMPENER

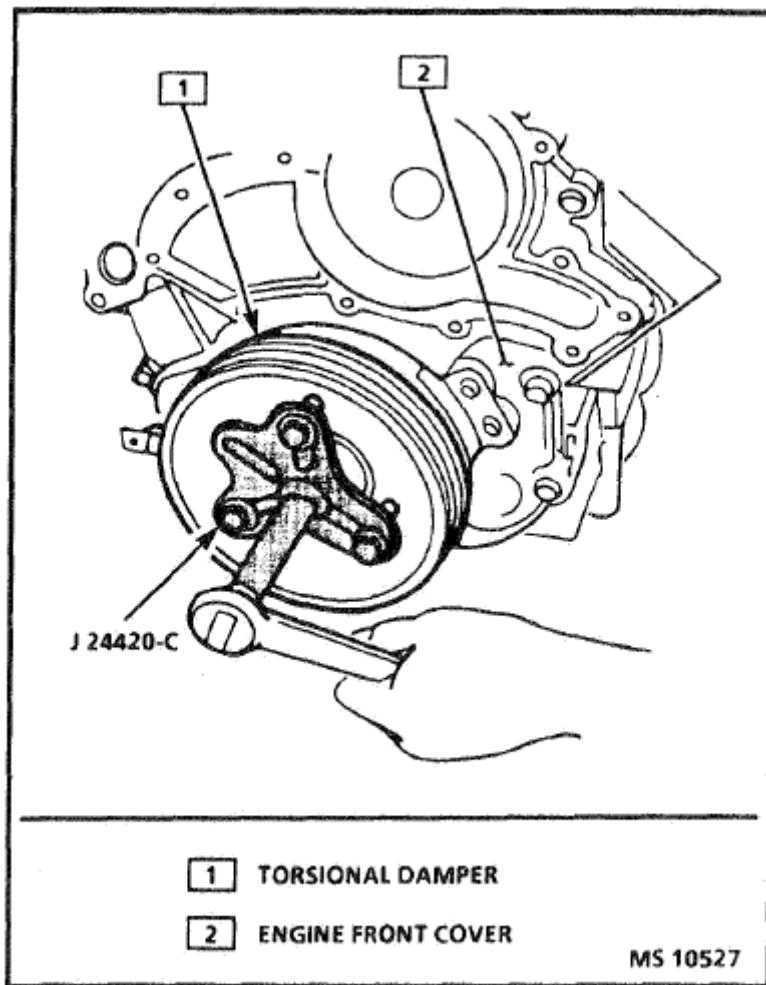
#### *Figure 19*

Tool Required:

J 24420-C Torsional Damper/Crankshaft Sprocket Puller

#### Remove or Disconnect

1. Bolt and washer retaining crankshaft torsional dampener to crankshaft.
2. Torsional dampener using J 24420-C.
3. Key from crankshaft.



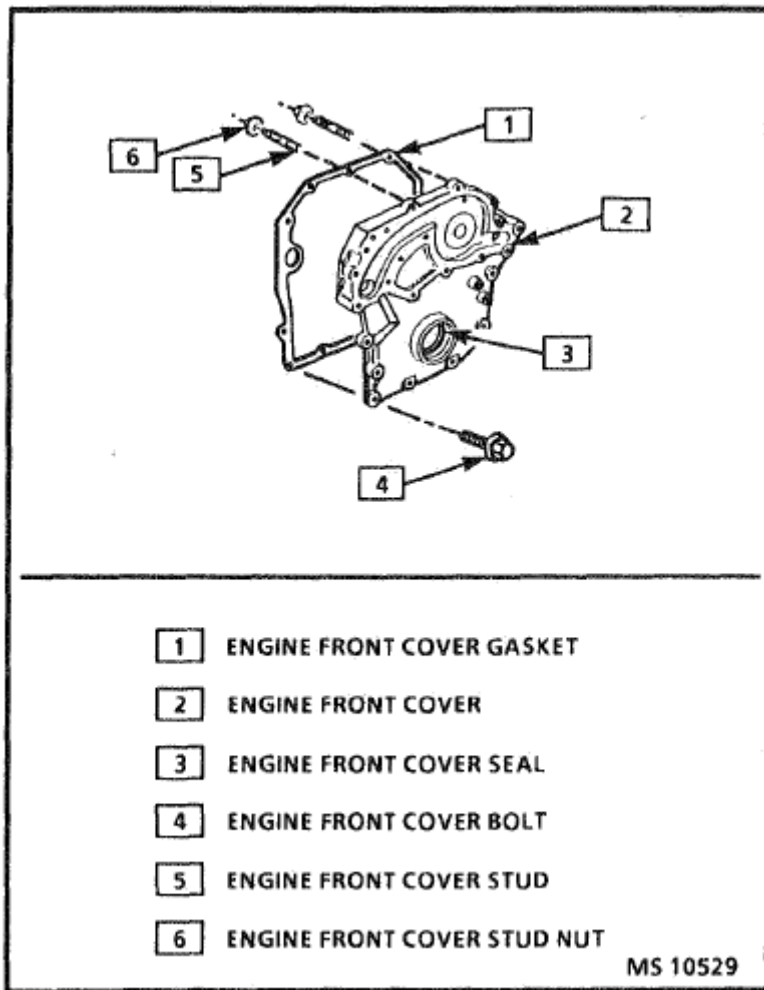
**Fig. 19: Removing Torsional Dampener**

COOLANT PUMP AND ENGINE FRONT COVER

**Figure 20**

Remove or Disconnect

1. Coolant pump pulley bolts.
2. Coolant pump pulley.
3. Drive belt tensioner bolt and tensioner.
4. Generator lower bracket bolts and bracket.
5. Bolts retaining coolant pump to engine front cover.
6. A/C compressor-to-coolant pump bolt.
7. Coolant pump and gasket.
8. Bolts and stud nuts (at top of cylinder case vee) retaining engine front cover: cover and gasket from engine.



**Fig. 20: Identifying Engine Front Cover Components**

**OIL FILTER HOUSING**

**Remove or Disconnect**

1. Oil filter.
2. Electrical connectors from:
  - Generator.
  - Oil pressure sensor.
  - Oil temperature sensor.
  - Low oil pressure switch.
3. Generator bracket and generator and shield from engine. Oil filter pausing bolt and oil filter housing from engine.

**CAMSHAFTS AND LIFTERS**

**Fig. 21, Fig. 22 and Fig. 23**

Tool Required:

J 38098 Crankshaft Timing Slot Locator J 38099 Timing Chain Retainers

**Remove or Disconnect**

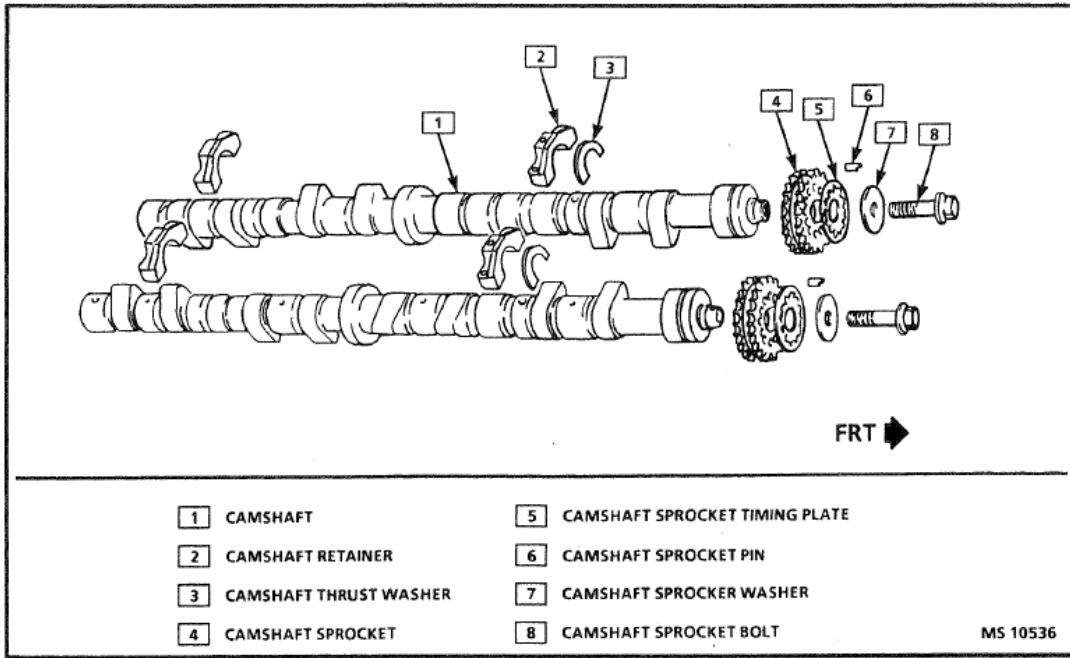
1. Lock crankshaft into position using J 38098.
2. Remove J 38098.
3. Bolts retaining left and right secondary timing chain tensioner housings to cylinder heads: housings, O-rings, and tensioners from cylinder heads.
4. Bolts retaining camshaft sprockets using a backup wrench, washers, pins and timing plates.
5. Rotate camshafts to a neutral position (no valves open) using the cast hex head at the rear of camshafts.
6. Bolts retaining camshaft retainers: retainers and thrust washers from engine.
7. Camshafts and sprockets from engine while installing tools J38099 to retain secondary chain loops.
8. Lifters from bores.

**IMPORTANT:**     • **Make sure lifters are retained in order so that each one is returned to its original bore upon installation.**

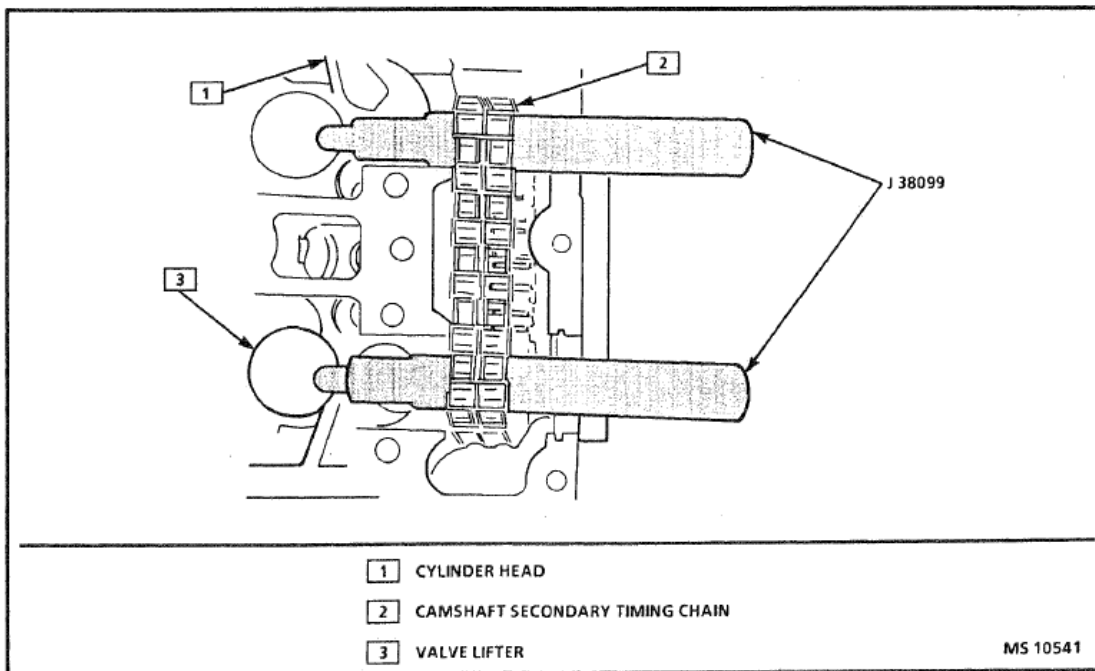


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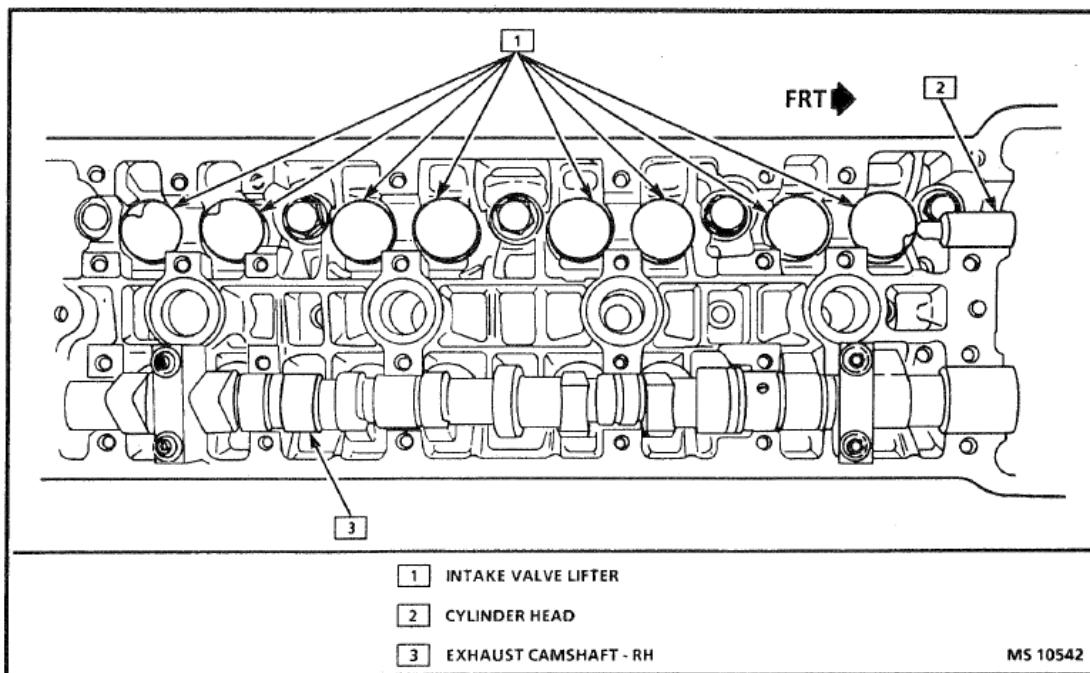
**Fig. 21: Identifying Camshafts Components**



**Fig. 22: Identifying Secondary Timing Chain Retainers Components**

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**Fig. 23: Identifying Valve Lifters Components**

TIMING CHAINS, SPROCKETS AND GUIDES

**Fig. 24, Fig. 25 and Fig. 26**

Tools Required:

J 38099 Timing Chain Retainers

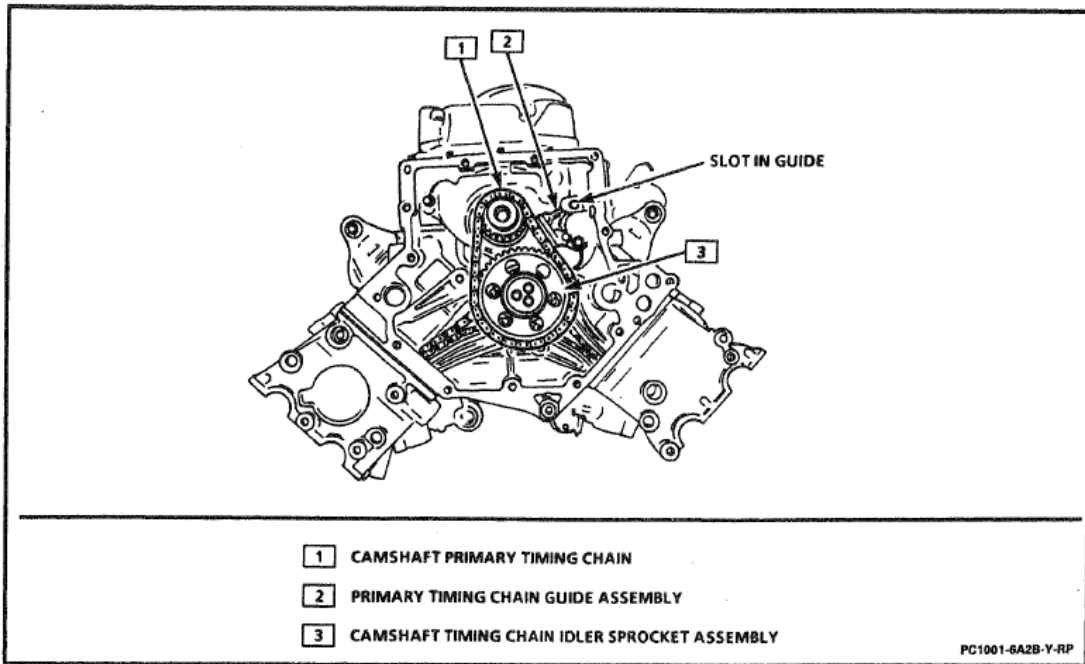
J 38211 Crankshaft Sprocket Remover

Remove or Disconnect

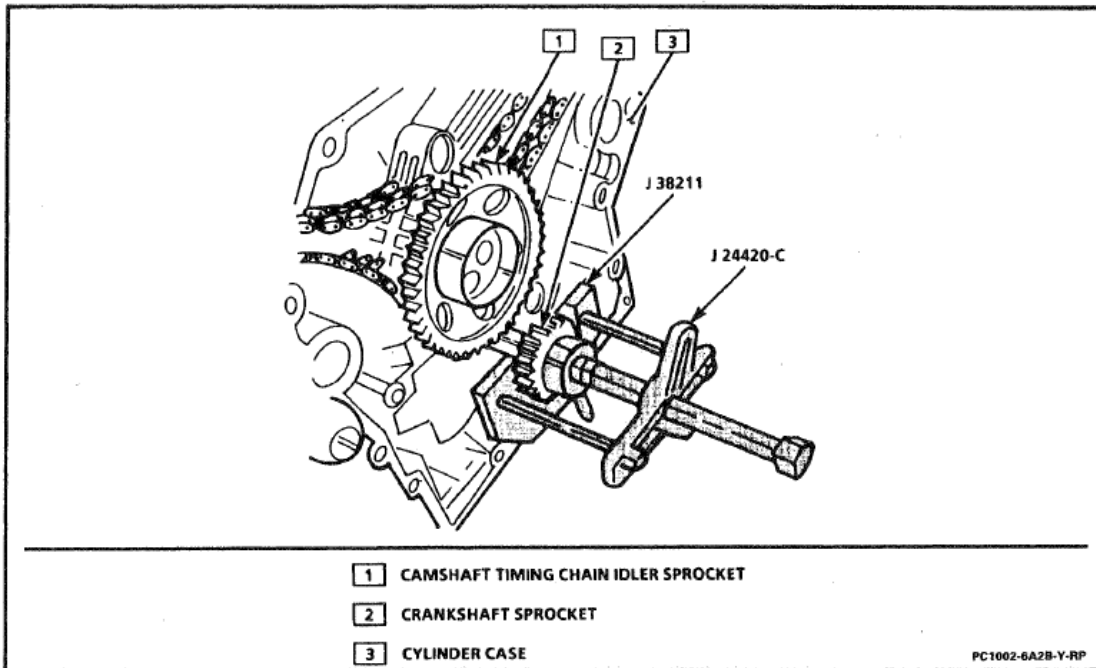
1. Bolts retaining primary chain guide to oil pump: guide from engine.
2. Bolts retaining idler sprocket assembly. Primary chain from idler sprocket and crankshaft sprocket: chain from engine.
3. Disengage right side secondary timing chain from idler sprocket assembly.
4. Tools J 38099.
5. Sprocket assembly and left side chain.
6. Right side chain.
7. Timing chain crankshaft sprocket using J 38211.
8. Bolts retaining fixed and pivot secondary chain guides to cylinder case: guides from engine.

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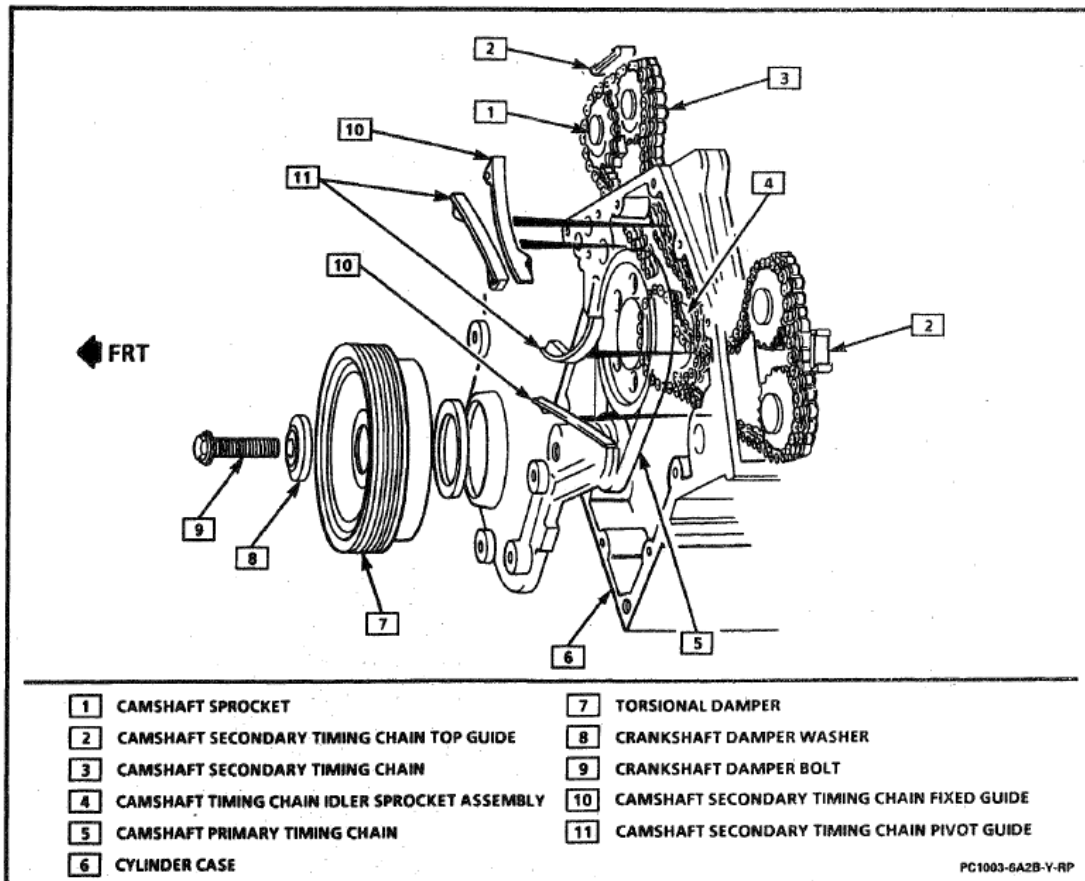
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**Fig. 24: Identifying Primary Timing Chain Guide Assembly Components (Engine Inverted)**



**Fig. 25: Removing Crankshaft Sprocket**



**Fig. 26: Identifying Timing Chain Assembly Components**

#### OIL PUMP

##### Remove or Disconnect

1. Key and oil pump seal seat from crankshaft.
2. Bolts retaining oil pump to cylinder case and pump from engine.
3. O-ring from crankshaft.

#### CYLINDER HEADS

##### Remove or Disconnect

1. Camshaft position sensor electrical connector.
2. Spark plugs.
3. Bolts retaining camshaft position sensor and sensor from left cylinder head.
4. Bolts retaining cylinder heads to cylinder case.
  - Start with end bolts and work towards center of cylinder head.
5. Cylinder heads and gaskets from engine.