



Engine

NOTE:

Reference to the EGR system is for California vehicles only.

Disassembly

1. Remove flywheel and rear cover plate.
2. Loosen idler pulley nuts.
3. Turn belt adjusting screws counterclockwise to loosen belts.
4. Remove alternator/A/C belt (6 rib) and power steering/water pump belt (4 rib).
5. Remove alternator retaining bolts and remove alternator.
6. Remove alternator bracket.
7. Remove A/C compressor retaining bolts and remove compressor.
8. Remove engine lifting eye retaining bolts and remove lifting eye.
9. Remove A/C compressor bracket.
10. Remove power steering pump retaining bolts and remove power steering pump.
11. Remove power steering pump bracket.
12. Remove retaining bolts from idler pulley brackets and remove.
13. Remove exhaust heat shield retaining bolts and remove heat shield.
14. Disconnect EGR tube from RH exhaust manifold.
15. Remove exhaust manifolds and gaskets.
16. Disconnect electrical connectors and vacuum lines from intake manifold.
17. Disconnect EGR tube from EGR valve.
18. Remove intake manifold bracket bolts and remove brackets.
19. Remove 12 bolts retaining intake manifold to cylinder head.
20. Remove intake manifold assembly.
21. Remove upper timing belt cover retaining bolts and remove upper timing belt cover.
22. Remove spark plug connectors and ignition lead.
23. Remove spark plugs.
24. Remove crankshaft damper pulley using Puller T67L-3600-A or equivalent.
25. Remove lower timing belt cover retaining bolts and remove lower timing belt cover.
26. Remove center timing belt cover retaining bolts and remove center timing belt cover.

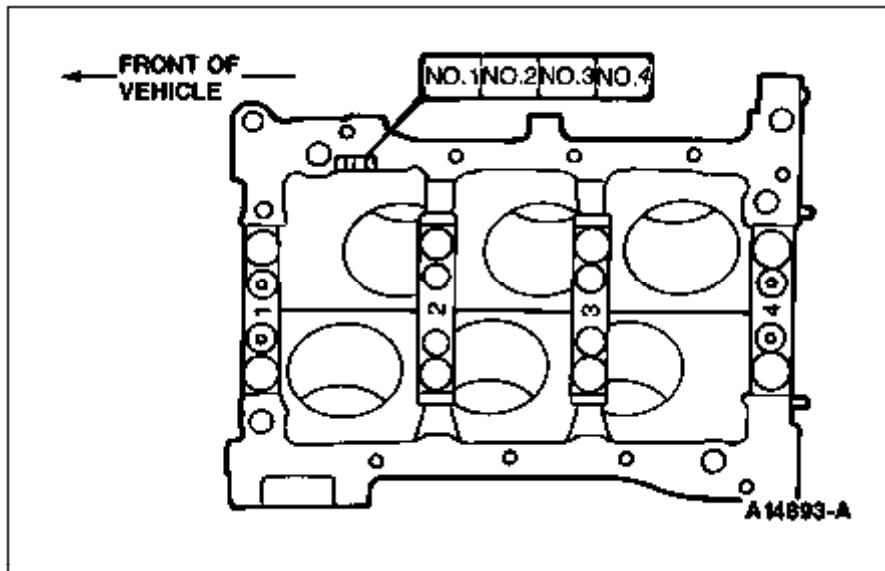
27. Loosen timing belt tensioner nut. Using an Allen wrench, rotate tensioner so that tension is released from timing belt, and tighten nut.
28. Remove timing belt.
29. Remove camshaft timing belt pulleys.
30. Remove upper rear timing belt cover retaining bolts and remove cover.
31. Remove center rear timing belt cover retaining bolts and remove cover.
32. Remove fuel rail retaining bolts and remove fuel rail.
33. Disconnect wiring harness to fuel injectors.
34. Remove six injector insulators from cylinder heads.
35. Remove ignition coil pack retaining screws and remove coil pack.
36. Remove ignition coil pack bracket.
37. Remove water pump retaining bolts and remove water pump.
38. Remove water bypass pipe.
39. Remove water outlet assembly.
40. Remove cylinder head covers and gaskets.
41. Remove oil indicator tube.
42. Disconnect cooler hose from LH head.
43. Remove cylinder head retaining bolts and remove cylinder heads.
44. Disconnect engine oil level sensor.
45. Remove engine oil pan.
46. Remove oil screen assembly.
47. Remove main bearing support beam.
48. Remove oil pump retaining bolts and remove oil pump.
49. Remove oil baffle.
50. Remove connecting rod caps and pistons.
51. Remove crankshaft bearing caps and remove crankshaft.

Assembly

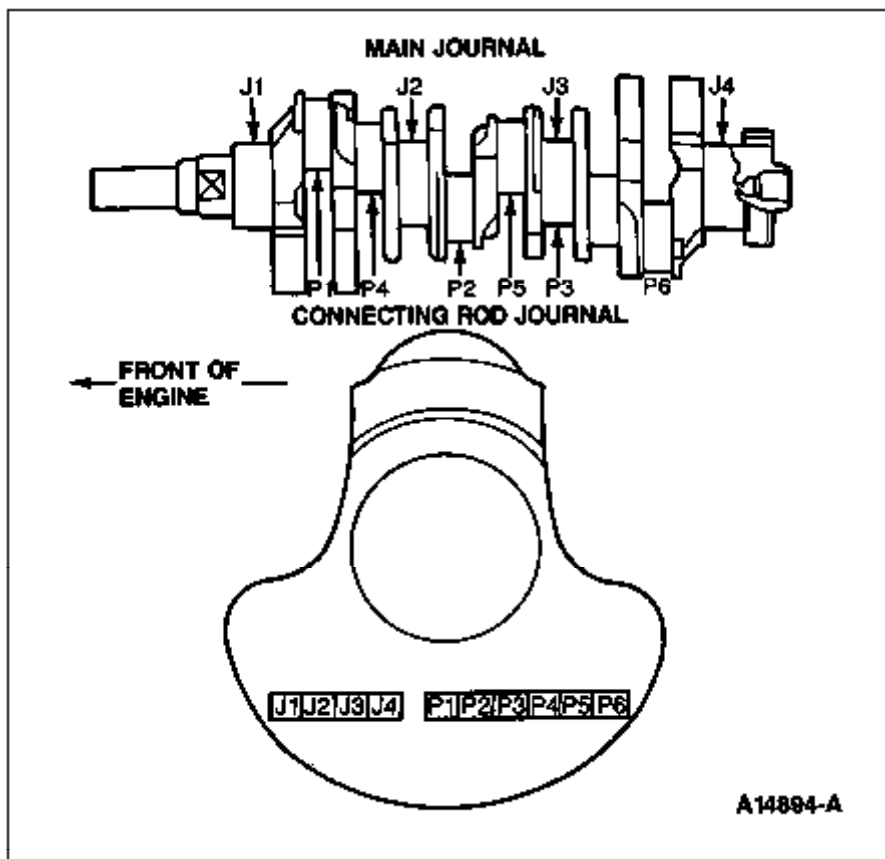
NOTE:

Check for defects and scratches on main bearing inner face before assembly. Thoroughly clean bearing housings and back face of main bearings. Inner face main bearing allow oil adhesion. Check all component specifications before installation.

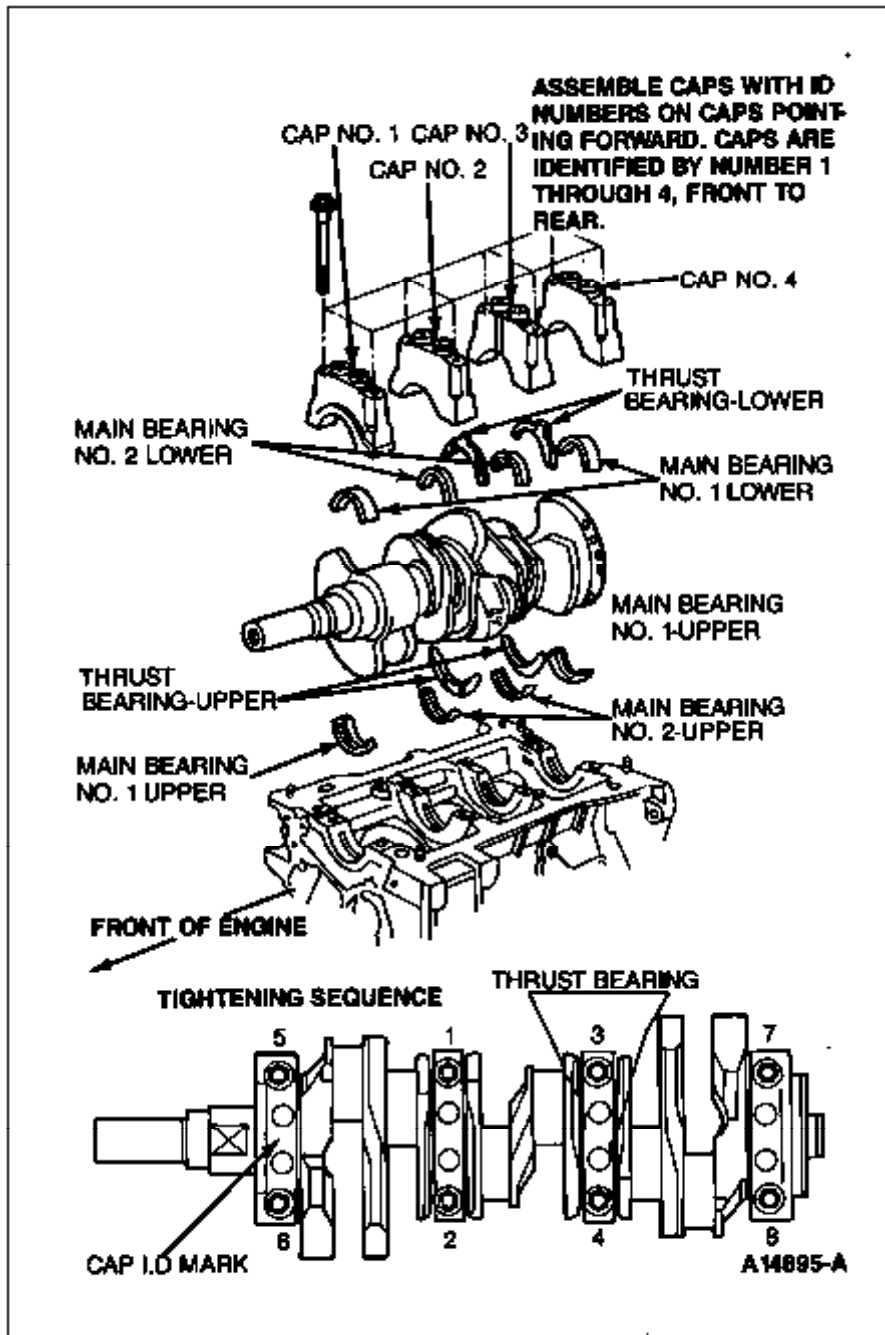
1. Install crankshaft as follows:
 - a. Install upper main bearings on cylinder block.



- b. Apply a coat of engine oil onto bearings.
- c. Carefully lay crankshaft on bearings.



- d. Install upper thrust bearings on front and rear of No. 3 journal by pushing the crankshaft front and rear.



CAUTION:

Make sure oil groove on thrust bearing faces crankshaft.

- e. Oil journals of crankshaft and install bearing caps 1 through 4.

NOTE:

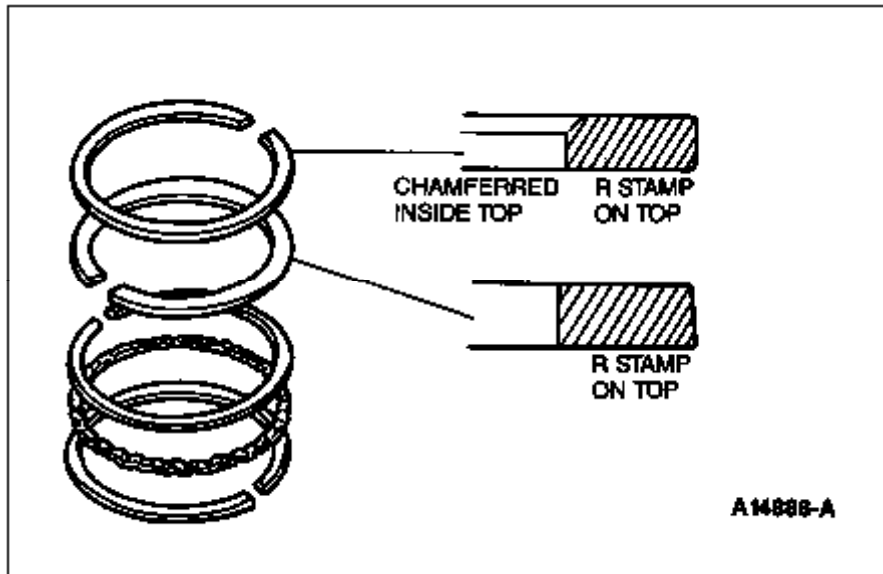
Install bearing cap 3 with lower thrust bearings and check position front and rear.

- f. Apply a coat of Oil Conditioner D9AZ-19579-CA (ESR-M99C80-A) or equivalent to bearing cap bolts and tighten in sequence shown in two steps, first to 46-69 N-m (34-50 lb-ft), then to 78-88 N-m (58-65 lb-ft).
- g. Verify the crankshaft can rotate smoothly and end play is within 0.021-0.221mm. If out of specification, determine if caused by excessive wear on block, crankshaft or both and replace as necessary.

- 2. Install piston as follows:

- a. Install connecting rod bearing to connecting rod and connecting rod cap so the bearing lug can fit in the groove of the connecting rod and rod cap.

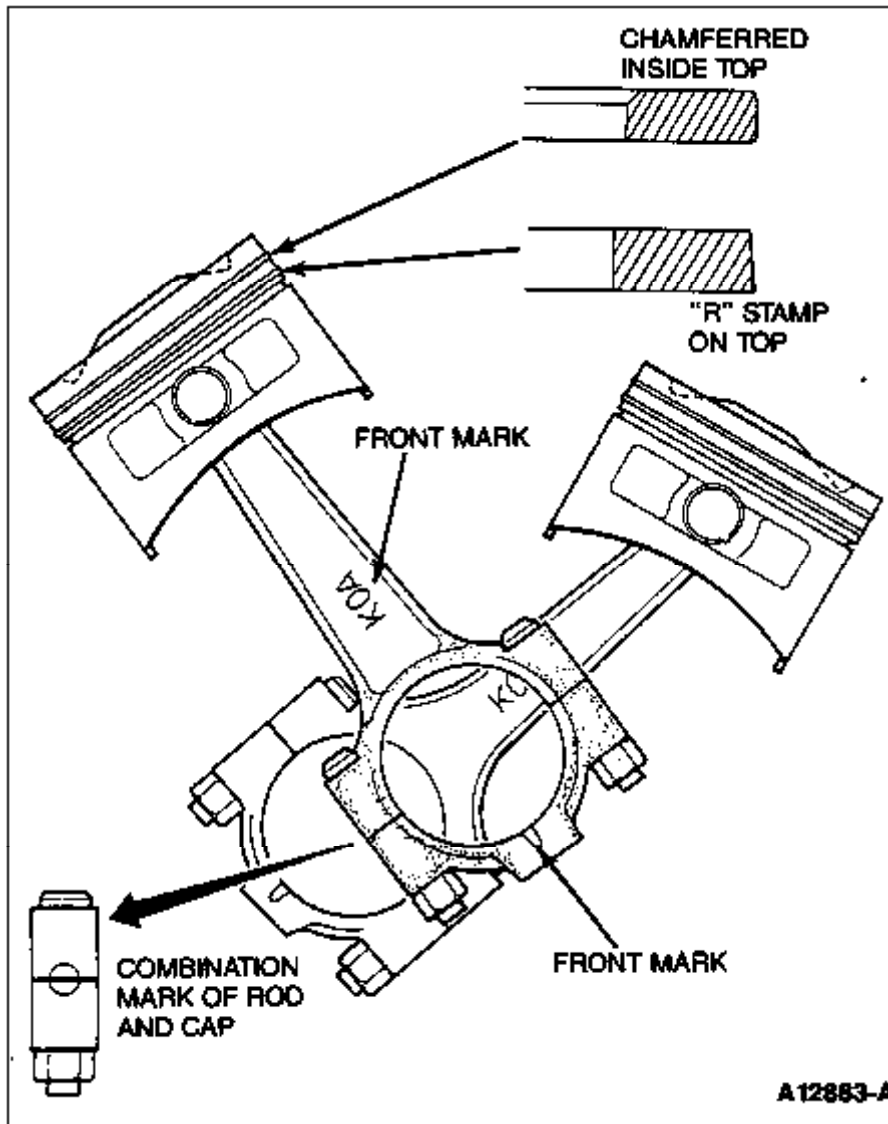
- b. Apply a light coat of Oil Conditioner D9AZ-19579-CA (ESR-M99C80-A) or equivalent on the piston, piston rings, piston pin, connecting rod bearing and inside the cylinder bore.
- c. Position piston ring gaps around the piston so gaps are approximately 120 degrees from each other.



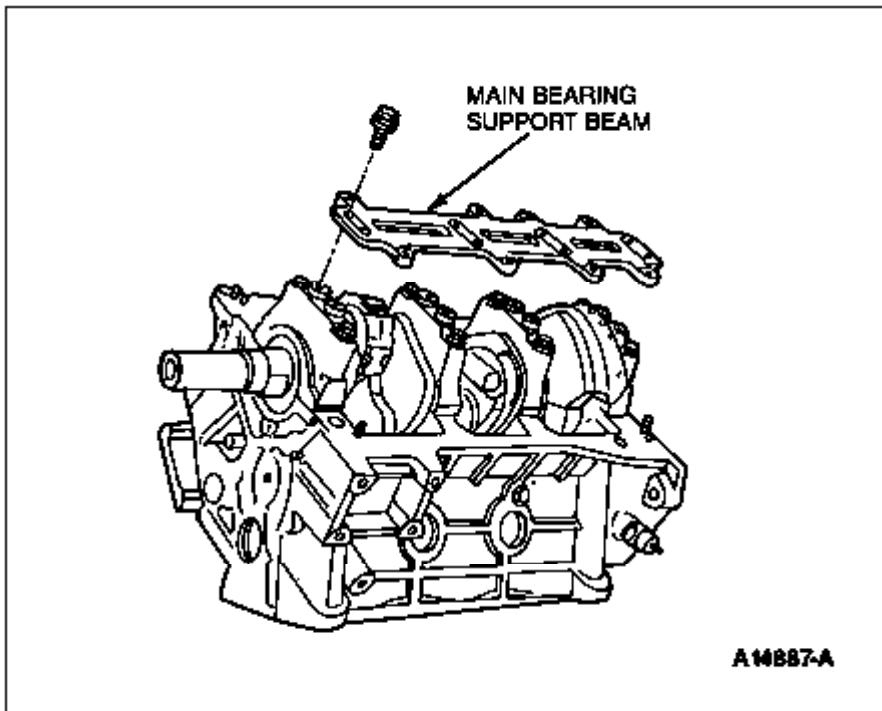
NOTE:

Scratching of the crankshaft journal can be prevented by covering the connecting rod bolts with spark plug boots or rubber hose.

- d. Install pistons using Piston Ring Compressor D81L-6002-C or equivalent. Ensure the marks on the piston and connecting rod face towards the front of the engine.



- e. Lubricate connecting rod bolts and nuts flange with Premium Long-Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent. Install connecting rod caps and retaining nuts. Tighten nuts in two steps, 30-35 N-m (22-26 lb-ft), 45-50 N-m (33-36 lb-ft).
3. Install oil baffle retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
4. Position oil pump and install retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
5. Install main bearing support beam retaining bolts. Tighten to 21-32 N-m (15-24 lb-ft).




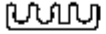




6. Install oil screen retaining bolts. Tighten bolts to 7-11 N-m (6-8 lb-ft).
7. Install engine oil pan retaining bolts. Tighten to 15-23 N-m (11-16 lb-ft).
8. Connect engine oil level sensor.
9. Position cylinder heads and gaskets on block and install retaining bolts. Tighten in sequence in two steps:
 - 49-69 N-m (37-50 lb-ft)
 - 83-93 N-m (62-68 lb-ft)
10. Connect cooler hose to LH cylinder head.
11. Install oil indicator tube.
12. Install cylinder head covers and gaskets. Tighten retaining bolts to 9.8-16 N-m (8-11 lb-ft).
13. Install water outlet assembly. Tighten retaining bolts to 15-23 N-m (11-16 lb-ft).
14. Install water bypass pipe.
15. Install water pump retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
16. Install ignition coil pack bracket retaining bolts. Tighten bolts to 28-42 N-m (21-31 lb-ft).
17. Install ignition coil pack retaining screws. Tighten screws to 4.5-7 N-m (3.3-5.2 lb-ft).
18. Install six injector insulators in cylinder heads.
19. Install fuel rail assembly retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
20. Connect wiring harness at fuel injectors.
21. Install center rear timing belt cover.
22. Install upper rear timing belt cover.
23. Install camshaft timing belt pulley retaining bolts. Tighten bolts to 21-25 N-m (15-18 lb-ft).
24. Install timing belt as outlined.

25. Install center timing belt cover.
26. Install lower timing belt cover.
27. Install crankshaft damper pulley.
28. Install spark plugs. Tighten to 22-27 N-m (17-19 lb-ft).
29. Install spark plug connectors and ignition lead.

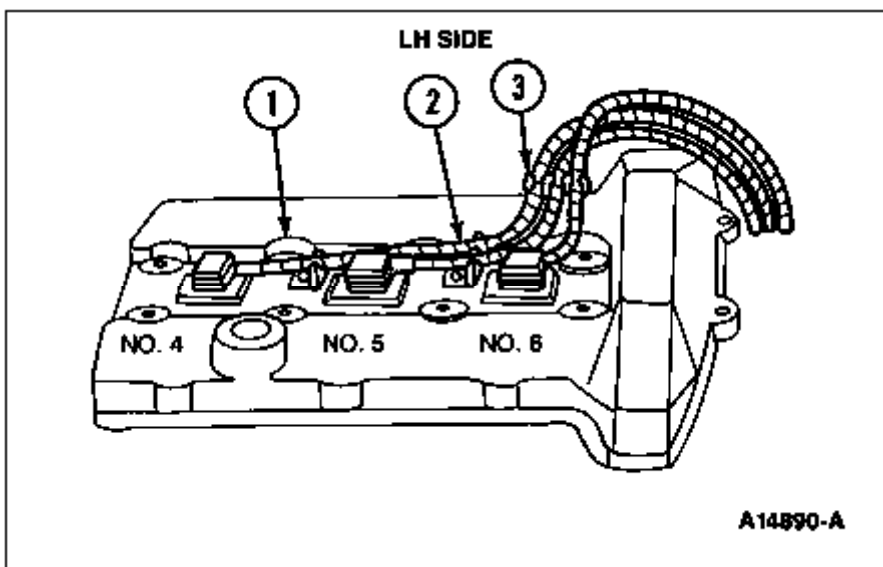
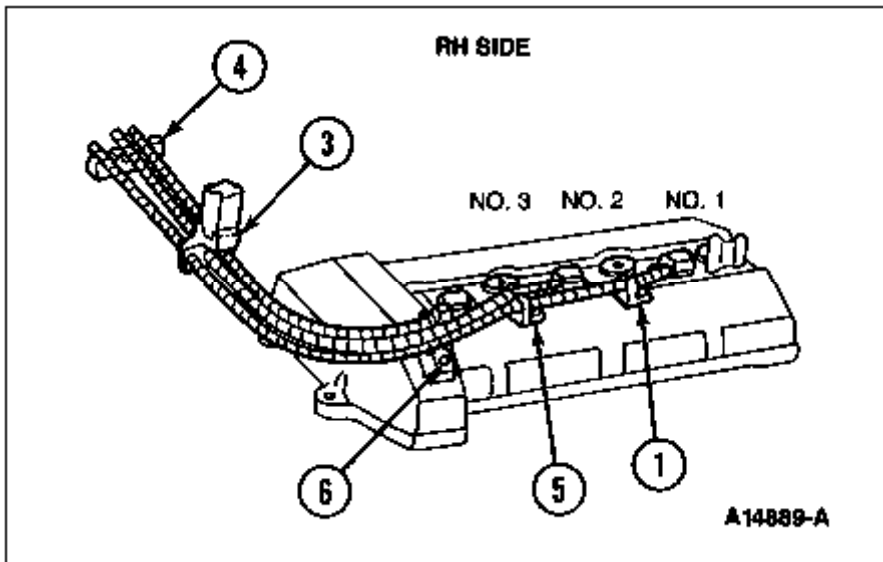
NOTE:

Ensure connectors are located correctly in clips to prevent improper connection.

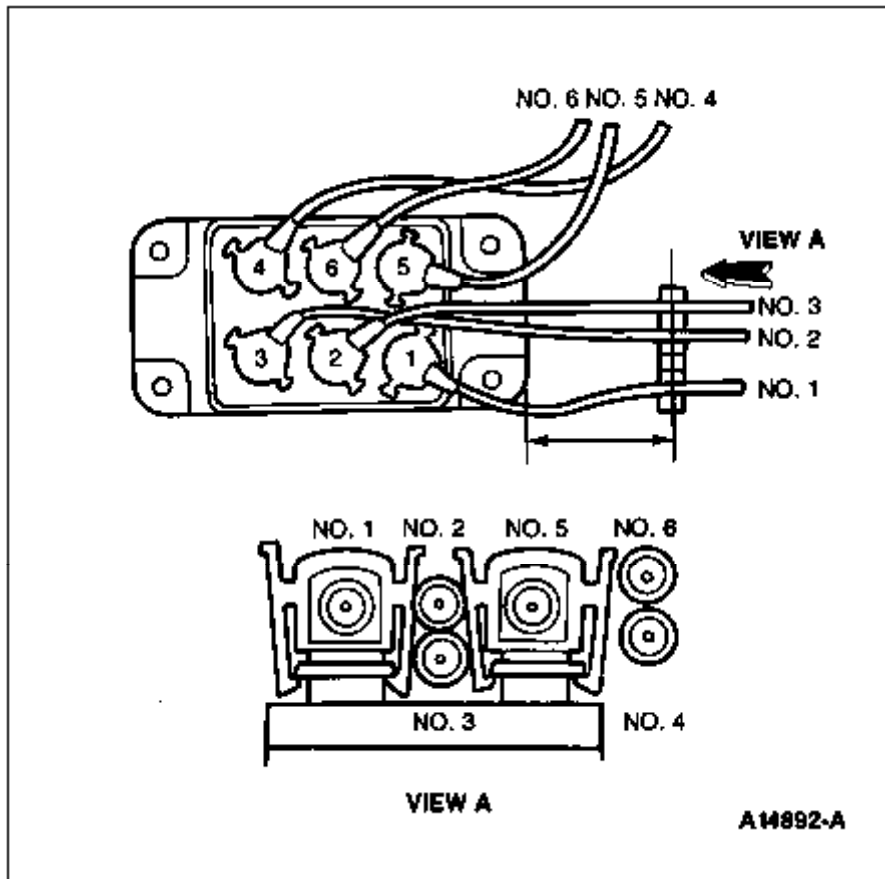
	SHAPE	PART NUMBER/ PART NAME	LOCATION OF INSTALLATION
①		CLAMP, WIRE 1	CYLINDER HEAD COVER
②		CLAMP, WIRE 2	CYLINDER HEAD COVER LH
③		CLAMP, WIRE 3	CYLINDER HEAD COVER RH SURGE TANK RH
④		CLAMP, WIRE 4	
⑤		CLAMP, WIRE 5	CYLINDER HEAD COVER RH
⑥		CLAMP, WIRE 6	CYLINDER HEAD COVER RH

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- a. Install clamp to cylinder head and wire one through six.
- b. Connect plug wires onto spark plug.



c. Adjust wire routing.



30. Install upper timing belt cover.
31. Position intake manifold and new gaskets on cylinder heads and install retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
32. Install intake manifold bracket bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
33. Connect EGR tube to EGR Valve. Tighten to 25-34N-m (19-25 lb-ft).
34. Connect electrical connectors and vacuum lines to intake manifold.
35. Install exhaust manifolds and gaskets. Tighten retaining bolts to 35-52 N-m (26-38 lb-ft).
36. Connect EGR tube to RH exhaust manifold. Tighten to 15-23 N-m (11-16 lb-ft).
37. Install exhaust heat shield retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
38. Install idler pulley bracket retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
39. Install power steering pump bracket retaining bolts. Tighten bolts to 36-55 N-m (27-40 lb-ft).
40. Position power steering pump on bracket and install retaining bolts. Tighten bolts to 20-32 N-m (15-23 lb-ft).
41. Install A/C compressor bracket retaining bolts. Tighten bolts to 36-55 N-m (27-40 lb-ft).
42. Install engine lifting eye retaining bolts. Tighten bolts to 15-23 N-m (11-16 lb-ft).
43. Install A/C compressor to bracket retaining bolts. Tighten bolts to 36-55 N-m (27-40 lb-ft).
44. Install alternator bracket retaining bolts. Tighten bolts to 36-55 N-m (27-40 lb-ft).
45. Install alternator retaining bolts. Tighten bolts to 34-50 N-m (25-36 lb-ft).
46. Install accessory drive belts. Refer to [«Section 03-05»](#).
47. Install rear cover plate and flywheel. Tighten flywheel retaining bolts to 69-78 N-m (51-58 lb-ft).

