


**Camshaft Timing Chains and Tensioners****SPECIAL SERVICE TOOL(S) REQUIRED**

Description	Tool Number
Cam Positioning Tool	T91P-6256-A
Cam Positioning Tool Adapters	T92P-6256-A
Crankshaft Holding Tool	T93P-6303-A

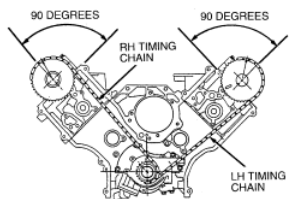
**Removal**

-  **CAUTION:** At no time, when the timing chain(s) are removed and the cylinder heads (6049) are installed, may the crankshaft (6303) and/or camshafts (6250) be rotated. Failure to follow these directions will result in valve and/or piston damage.

**NOTE:** Because this is not a free-wheeling engine, and it jumps time, there will be damage to the valves and/or pistons (6108) and will require the removal of the cylinder heads. The camshaft sprockets (6256) should only be disassembled from the camshafts when one of the components is to be replaced.

Remove valve covers (6582) and engine front cover (6019) as described.

- Remove crankshaft position sensor pulse wheel.
- Rotate engine to No. 1 top dead center (TDC).

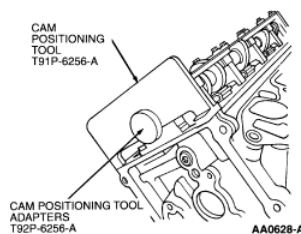


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- NOTE:** This will prevent accidental rotation of the camshafts.

**NOTE:** Cam Positioning Tool Adapters T92P-6256-A and Cam Positioning Tool T91P-6256-A must be installed on camshaft to prevent camshaft from rotating.

Install Cam Positioning Tool Adapters T92P-6256-A and Cam Positioning Tool T91P-6256-A on flats of camshaft.



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- Remove two bolts retaining RH timing chain tensioner (6L266) to cylinder head and remove timing chain tensioner.
- Remove RH timing chain tensioner arm (6L253).
- Remove two bolts retaining RH timing chain guide (6K297) to cylinder head and remove timing chain guide.
- Remove RH timing chain from camshaft sprocket and crankshaft sprocket (6306).
- NOTE:** Cam Positioning Tool Adapters T92P-6256-A and Cam Positioning Tool T91P-6256-A must be installed on camshaft to prevent camshaft from rotating.

Remove two bolts retaining LH timing chain tensioner to cylinder head and remove timing chain tensioner.

- Remove LH timing chain tensioner arm.
- Remove two bolts retaining LH timing chain guide to cylinder head and remove timing chain guide.
- Remove LH timing chain from camshaft sprocket and crankshaft sprocket.
- If necessary, remove camshaft sprockets and crankshaft sprockets as described.
-  **CAUTION:** Do not rotate crankshaft and/or camshafts or possible engine damage may occur.

Inspect the plastic running face on timing chain tensioner arms and timing chain guides. If worn or damaged, remove and clean oil pan (6675) and oil pump screen cover and tube (6622).

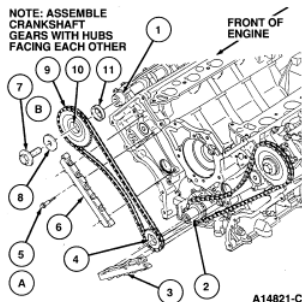
**Installation**

- NOTE: If engine has jumped time, make sure that all repairs to engine components and/or valve train have been made. Then rotate engine counterclockwise 45 degrees. This will position all pistons below top of deck face. Install cylinder heads as described.**

**NOTE: Cam Positioning Tool Adapters T92P-6256-A and Cam Positioning Tool T91P-6256-A must be installed on camshaft to prevent camshafts from rotating.**

Install timing chain guides (both sides). Install timing chain guide retaining bolts. Tighten to 8-12 Nm (71-106 lb-in).

- If removed, position LH camshaft sprocket spacer (6265) and camshaft sprocket on camshaft.
- Install washer and camshaft sprocket retaining bolt. Do not tighten at this time.
- If removed, position RH camshaft sprocket spacer and camshaft sprocket on camshaft.
- Install washer and camshaft sprocket retaining bolt. Do not tighten at this time.

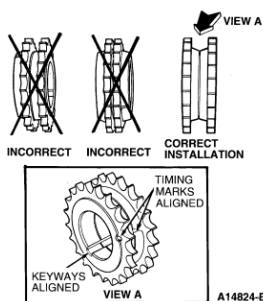


Item	Part Number	Description
1	6250	Camshaft
2	6303	Crankshaft
3	6K297	Timing Chain Guide (LH)
4	6306	Crankshaft Sprocket (2 Req'd)
5	N804958	Bolt (2 Req'd Each Side)
6	6K297	Timing Chain Guide (RH)
7	N806139-S2	Bolt (1 Req'd Each Side)
8	N806164-S	Washer (1 Req'd Each Side)
9	6268	Timing Chain (RH)
10	6256	Camshaft Sprocket
11	6265	Camshaft Sprocket Spacer (1 Req'd Each Side)
A	—	Tighten to 8-12 Nm (71-106 Lb-In)
B	—	Tighten to 110-130 Nm (82-95 Lb-Ft)

- NOTE: Crankshaft sprockets are identical. They may only be installed one way. Refer to the following illustration for proper crankshaft sprocket installation.**

**NOTE:** Make sure tapered part of crankshaft sprocket faces away from cylinder blocks (6010).

If, removed, install LH crankshaft sprocket.



- NOTE: If copper links of timing chain are not visible, split both timing chains in half and mark the two opposing links as shown.**

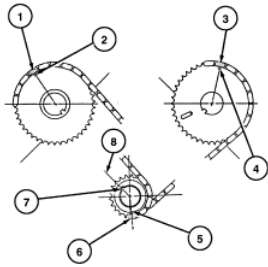
Install LH timing chain on camshaft sprocket. Make sure copper link of timing chain lines up with timing mark of camshaft sprocket.



NOTE: WITH EITHER CHAIN POSITIONED AS SHOWN, MARK EACH END AND USE MARKS AS TIMING MARKS

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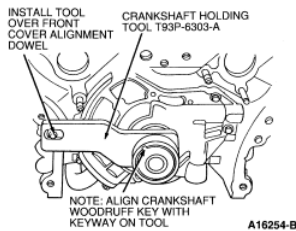
8. Install LH timing chain on crankshaft sprocket. Make sure copper link of timing chain lines up with timing mark of crankshaft sprocket.
9. **NOTE: Make sure tapered part of crankshaft sprocket faces toward cylinder blocks.**  
If removed, install RH crankshaft sprocket.
10. Install RH timing chain on camshaft sprocket. Make sure copper link of timing chain lines up with timing mark of camshaft sprocket.
11. Install RH timing chain on crankshaft sprocket. Make sure copper link of timing chain lines up with timing mark of crankshaft sprocket.



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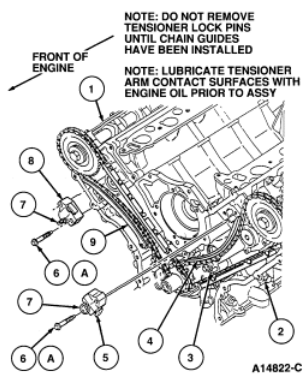
Item	Part Number	Description
1	—	RH Camshaft Timing Chain Mark
2	—	RH Camshaft Sprocket Mark
3	—	LH Camshaft Timing Chain Mark
4	—	RH Camshaft Sprocket Mark
5	—	Crankshaft Sprocket Mark
6	—	Crankshaft Timing Chain Mark
7	6306	Crankshaft Sprocket
8	—	Crankshaft Keyway Center Line

12. Install RH and LH timing chain tensioner and secure with two bolts on each. Tighten bolts to 20-30 Nm (15-22 lb-ft).
13. Install Crankshaft Holding Tool T93P-6303-A over crankshaft and engine front cover alignment dowel to position crankshaft.



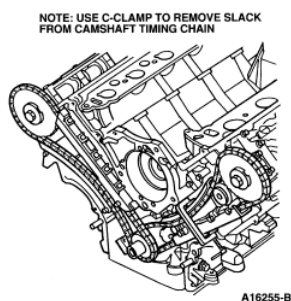
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14. Lubricate timing chain tensioner arm contact surfaces with clean engine oil meeting Ford specification WSS-M2C153-F and install RH and LH timing chain tensioner arms on their dowels.



Item	Part Number	Description
1	6049	Cylinder Head (RH)
2	6049	Cylinder Head (LH)
3	N806007	Dowel
4	6L253	Timing Chain Tensioner Arm (LH)
5	6L266	Timing Chain Tensioner (LH)
6	N606543-S2	Bolt (2 Req'd)
7	—	Lock Pin (Part of 6L266)
8	6L266	Timing Chain Tensioner (RH)
9	6L253	Timing Chain Tensioner Arm (RH)
A	—	Tighten to 20-30 Nm (15-22 Lb-Ft)

15. With a suitable C-clamp around the timing chain tensioner arm and timing chain guide, remove all slack from timing chain while using caution not to bend the timing chain guide.
16. Remove lock pins from timing chain tensioners and make sure all timing marks are aligned.



17. Using Cam Positioning Tool Adapters T92P-6256-A and Cam Positioning Tool T91P-6256-A to align camshaft, tighten camshaft sprocket bolt to 110-130 Nm (82-95 lb-ft).
18. **NOTE: If not at maximum lift, loosen camshaft sprocket bolt and repeat Steps 12-15.**  
Install Tool-4201-C Dial Indicator with Bracketry or equivalent in cylinder 1 spark plug hole. Check that camshaft is at maximum lift for the intake valve (6507) at 114 degrees after top dead center (TDC).
19. Remove Cam Positioning Tool Adapters T92P-6256-A, Cam Positioning Tool T91P-6256-A and Crankshaft Positioning Tool T93P-6256-A.
20. Install engine front cover and valve covers as described.
21. Start engine and check for leaks and proper operation.

