NOTE: Ford does not provide a procedure to align the timing components without the OE tools specified.

1. Compress the tensioner plunger, using an edge of a vise. **CAUTION:** Timing chain procedures must be followed exactly or damage to valves and pistons will result. Do not compress the ratchet assembly. This will damage the ratchet assembly.

2. Use a small screwdriver or pick to push back and hold the ratchet mechanism.
3. While holding the ratchet mechanism, push the ratchet arm back into the tensioner housing.

4. Install a paper clip into the hole in the tensioner housing to hold the ratchet assembly and plunger in during installation.
5. Remove the tensioner from the vise.
6. Check the illustrated components for part number orientation.
7. If the copper links are not visible, mark two links on one end and one link on the other end, and use as timing marks.

8. Loosely install the Camshaft Holding Tools on both camshafts.
9. Install the timing chain guides.

10. Rotate the LH camshaft with the Camshaft Positioning Tool until the timing mark is approximately at 12 o'clock. Rotate the RH camshaft with the Camshaft Positioning Tool until the timing mark is approximately at 11 o'clock. Tighten the Camshaft
11. Position the crankshaft with the Crankshaft Holding Tool. **CAUTION:** Unless otherwise instructed, at no time when the timing chains are removed and the cylinder heads are installed is the crankshaft or camshaft to be rotated. Severe piston and valve damage will occur. Rotate the crankshaft counterclockwise only. Do not rotate past position shown or severe piston and/or valve damage can occur.

12. Remove the Crankshaft Holding Tool.
13. Position the inner crankshaft sprocket with the long hub facing outward.

14. Install the LH timing chain onto the crankshaft sprocket, aligning the one copper link on the timing chain with the slot on the crankshaft sprocket.
15. Position the timing chain on the camshaft sprocket with the two copper chain links and the camshaft sprocket timing mark aligned. **NOTE:** Make sure the upper half of the chain is below the tensioner guide dowel. If necessary, use the Camshaft Positioning Tool to adjust. If necessary, adjust the camshaft sprocket slightly to obtain timing mark alignment.
16. Position the outer camshaft sprocket and the RH timing chain with the long hub of the sprocket facing inward. **CAUTION:** The camshaft sprocket can jump time if the Camshaft Holding Tool is not secured. **NOTE:** Be sure the copper chain link and crankshaft sprocket timing mark are aligned. The lower half of the timing chain must be positioned above the dowel.

17. Position the RH timing chain on the camshaft sprocket. Make sure the two copper-colored links align with the camshaft sprocket timing mark. **NOTE:** If necessary, adjust the camshaft sprocket slightly to obtain timing mark alignment.
18. As a post-check, verify proper alignment of all timing marks.

19. Position the LH and RH timing chain tensioner guides on the dowel pins. Position the timing chain tensioner assemblies, and install the timing chain tensioner bolts.

20. Remove both the RH and LH retaining pins from the timing chain tensioner assembly.
21. Remove the **Camshaft** Holding Tools from the camshafts.

22. Position the crankshaft sensor ring on the **crankshaft**.
23. Install the engine front cover.