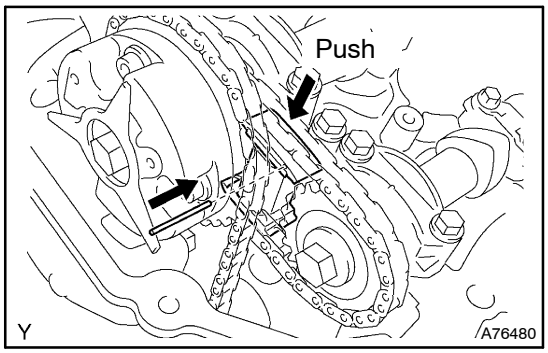
14160–02

REPLACEMENT

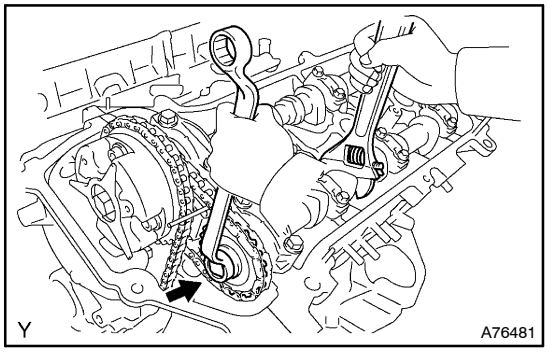
1. DRAIN ENGINE COOLANT (See page 16–5)
2. REMOVE V–BANK COVER (See page 10–7)
3. DISCONNECT VENTILATION HOSE NO.2 (See page 10–7)
4. REMOVE AIR CLEANER ASSY (See page 10–7)
5. REMOVE INTAKE AIR SURGE TANK (See page 14–58)
6. REMOVE IGNITION COIL ASSY
7. REMOVE CYLINDER HEAD COVER SUB–ASSY RH (See page 14–58)
8. REMOVE CYLINDER HEAD COVER SUB–ASSY LH (See page 14–58)
9. SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page 14–58)
10. REMOVE CHAIN TENSIONER ASSY NO.1 (See page 14–58)
11. **REMOVE NO.4 CAMSHAFT SUB–ASSY**

NOTICE:

As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which are received the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



(a) While pushing down the chain tensioner No. 3, insert a pin of ϕ 1.0 mm (0.039 in.) into the hole to fix it.

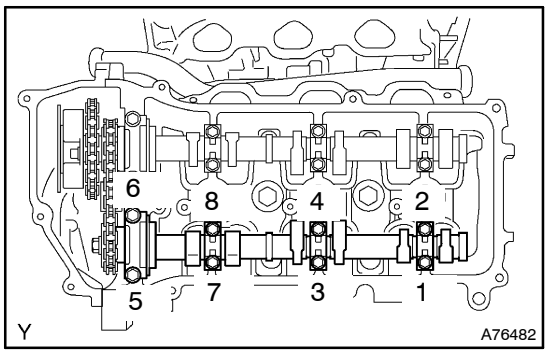


(b) Hold the hexagonal portion of the No. 4 camshaft with a wrench, and remove the camshaft timing gear set bolt.

NOTICE:

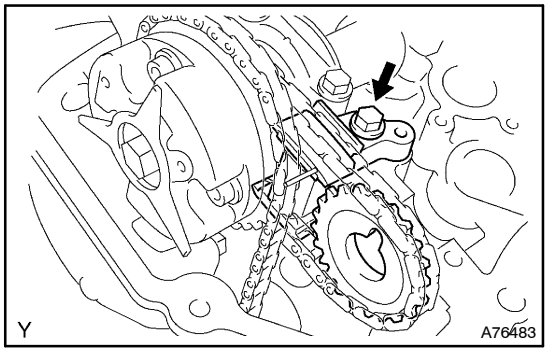
Be careful not to damage the cylinder head and valve lifter with the wrench.

(c) Separate the camshaft timing gear from the No. 4 camshaft.



(d) Using several steps, loosen and remove the 8 bearing cap bolts uniformly in the sequence as shown in the illustration.

(e) Remove the 4 bearing caps and No. 4 camshaft.



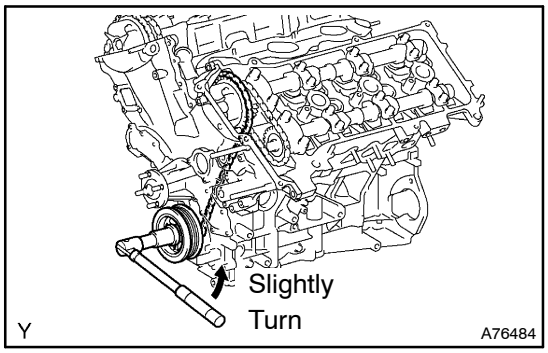
12. REMOVE CHAIN TENSIONER ASSY NO.3

(a) Remove the chain tensioner No. 3 bolt, and then remove the chain tensioner No. 3 and camshaft timing gear.

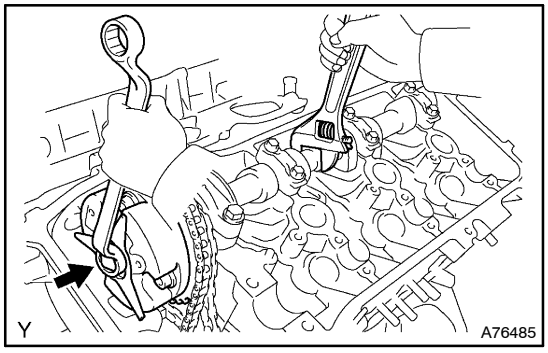
13. REMOVE NO.3 CAMSHAFT SUB–ASSY

NOTICE:

As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which are received the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



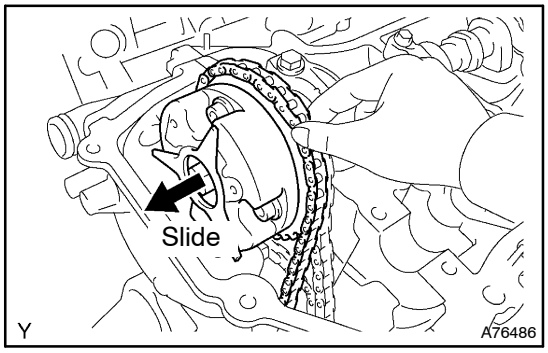
(a) Release the chain tension between the camshaft timing gear (LH bank) and crankshaft timing gear by turning the crankshaft pulley counterclockwise slightly.



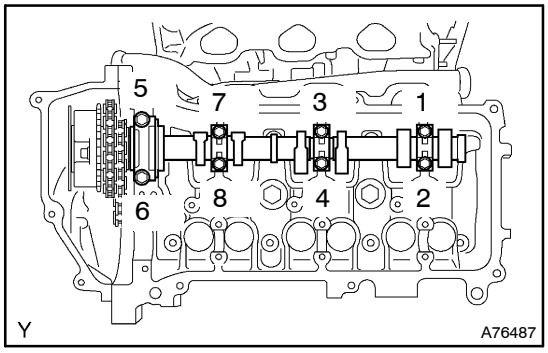
(b) Hold the hexagonal portion of the No. 3 camshaft with a wrench, and loosen the camshaft timing gear set bolt.

NOTICE:

- **Be careful not to damage the cylinder head and valve lifter with the wrench.**
- **Do not disassemble the camshaft timing gear assembly.**

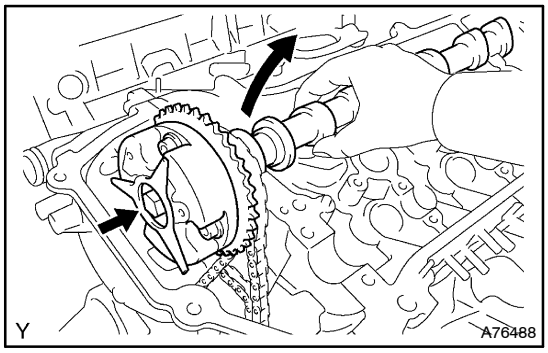


(c) Slide the camshaft timing gear and separate the No. 1 chain from the camshaft timing gear.

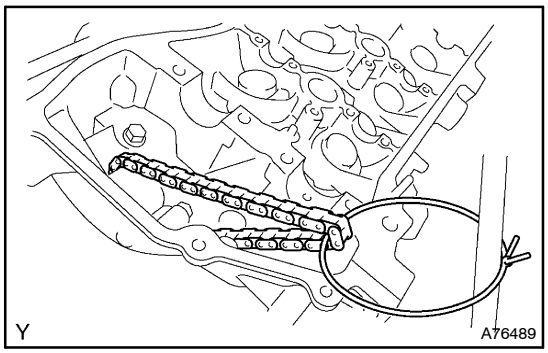


(d) Using several steps, loosen and remove the 8 bearing cap bolts uniformly in the sequence as shown in the illustration.

(e) Remove the 4 bearing caps.



(f) Remove the camshaft timing gear set bolt with the No. 3 camshaft is lifted up, and then remove the No. 3 camshaft and camshaft timing gear w/ No. 2 chain.



(g) Tie the No. 1 chain with a string as shown in the illustration.

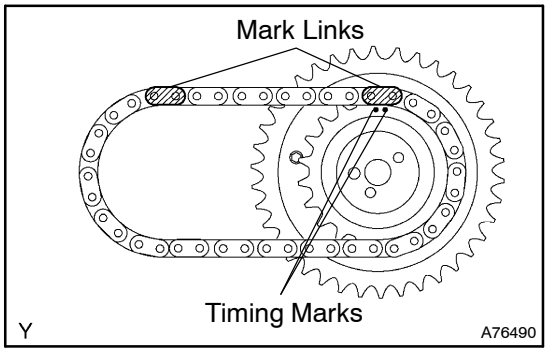
NOTICE:

Be careful not to drop anything inside the timing chain cover.

14. INSTALL NO.3 CAMSHAFT SUB–ASSY

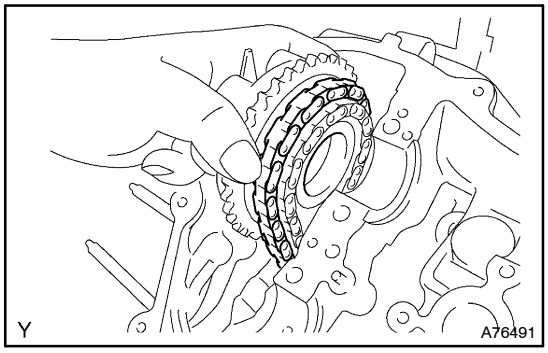
NOTICE:

As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head which are received the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.

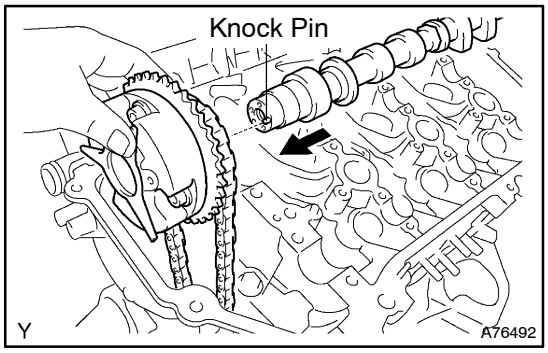


(a) Align the mark link (yellow) with the timing mark (2 dot marks) of the camshaft timing gear as shown in the illustration.

(b) Apply new engine oil to the thrust portion and journal of the camshafts.

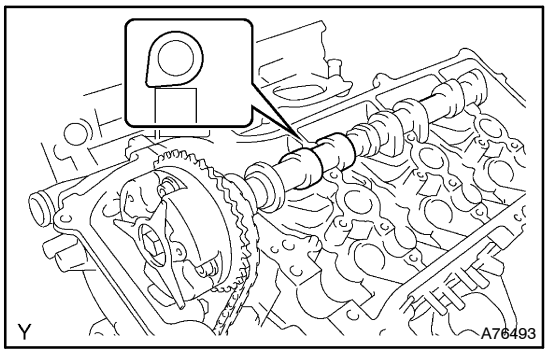


(c) Temporarily put the No. 1 chain on the No. 2 chain of the camshaft timing gear.

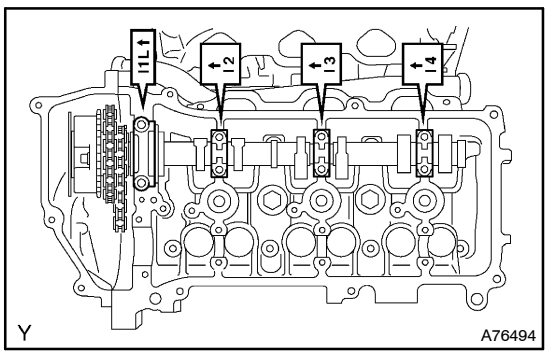


(d) Align the knock pin hole in the camshaft timing gear with the knock pin of the No. 3 camshaft, and insert the No. 3 camshaft into the camshaft timing gear.

(e) Temporarily install the camshaft timing gear set bolt.

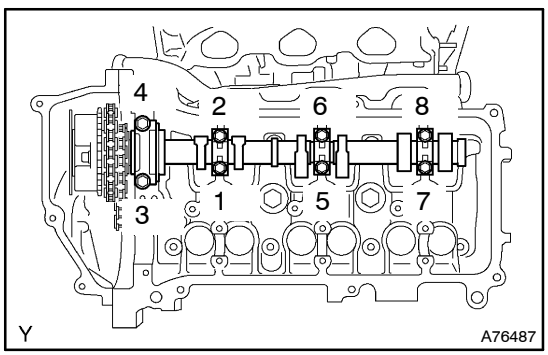


(f) Set the No. 3 camshaft onto the LH cylinder head with the cam lobes of the No. 2 cylinder faced downward as shown in the illustration.



(g) Install the 4 bearing caps in their proper locations.

(h) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.

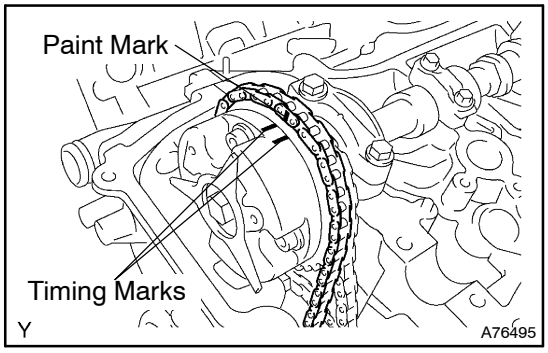


(i) Using several steps, install and tighten the 8 bearing cap bolts uniformly in the sequence as shown in the illustration.

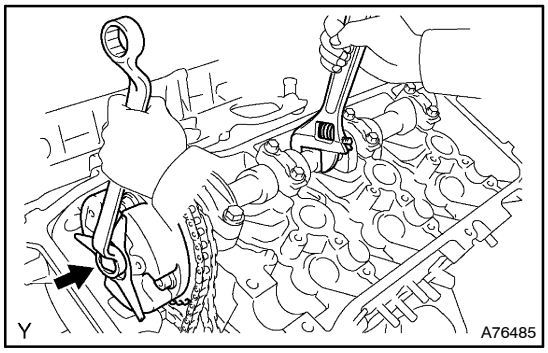
Torque:

9.0 N·m (92 kgf·cm, 80 in.·lbf) for 10 mm (0.39 in.) head

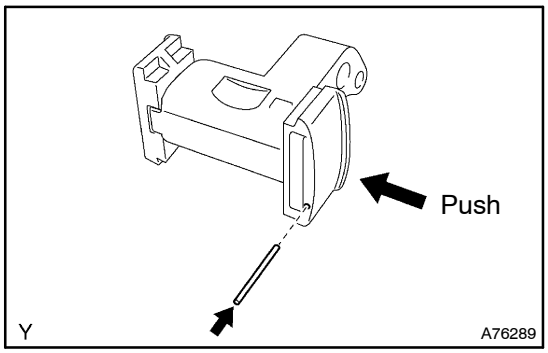
24 N·m (245 kgf·cm, 18 ft·lbf) for 12 mm (0.47 in.) head



(j) Align the paint mark of the No. 1 chain with the timing marks of the camshaft timing gear.

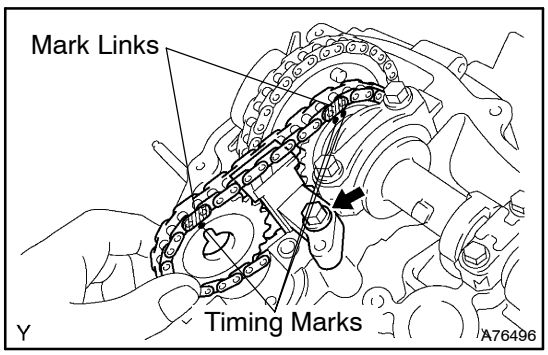


(k) Hold the hexagonal portion of the No. 3 camshaft with a wrench, and tighten the camshaft timing gear set bolt.
Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)



15. INSTALL CHAIN TENSIONER ASSY NO.3

(a) While pushing in the tensioner, insert a pin of ϕ 1.0 mm (0.039 in.) into the hole to hold it.



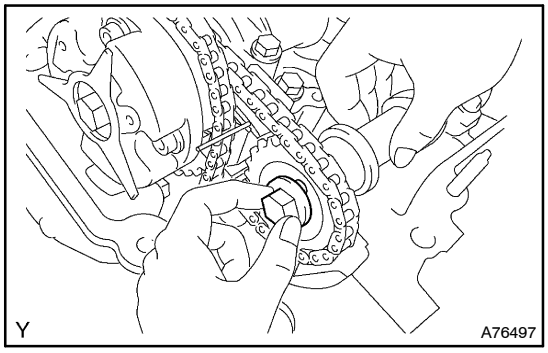
(b) Temporarily install the camshaft timing gear and chain tensioner No. 3 and align the mark links (yellow) with the timing marks (1 dot mark and 2 dot marks) of the camshaft timing gears.

(c) Tighten the chain tensioner No. 3 bolt.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

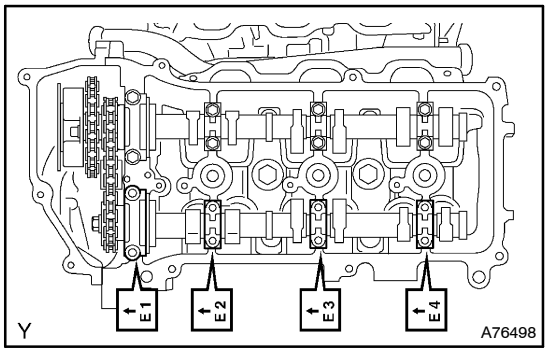
16. INSTALL NO.4 CAMSHAFT SUB–ASSY

NOTICE:

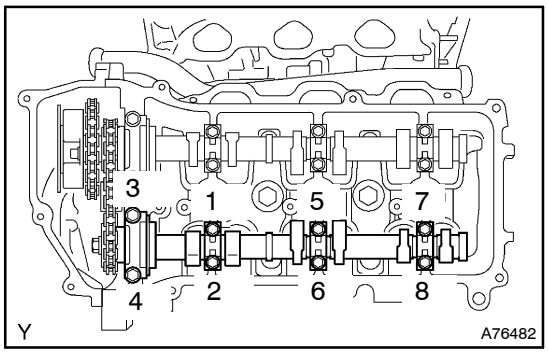
As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head which are received the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



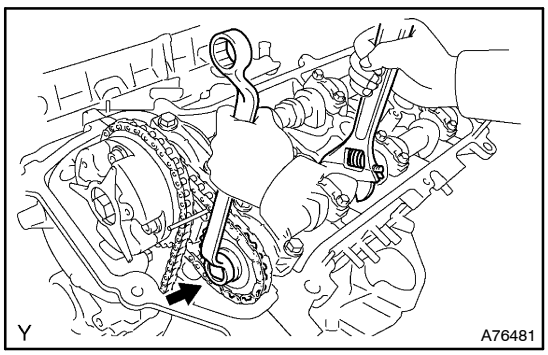
(a) Align the knock pin hole in the camshaft timing gear with the knock pin of he No. 4 camshaft, and insert the No. 4 camshaft into the camshaft timing gear.
(b) Temporarily install the camshaft timing gear set bolt.



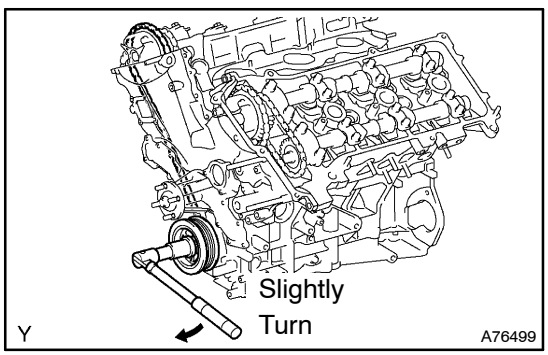
(c) Install the 4 bearing caps in their proper locations.
(d) Apply a light coat of engine oil on the threads of the bearing cap bolts.



(e) Using several steps, install and tighten the 8 bearing cap bolts uniformly in the sequence as shown in the illustration.
Torque:
9.0 N·m (92 kgf·cm, 80 in.·lbf) for 10 mm (0.39 in.) head
24 N·m (245 kgf·cm, 18 ft·lbf) for 12 mm (0.47 in.) head



(f) Hold the hexagonal portion of the No. 4 camshaft with a wrench, and tighten the camshaft timing gear set bolt.
Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)
(g) Remove the pin from the chain tensioner No. 3.



(h) Release the chain tension between the camshaft timing gear (RH bank) and crankshaft timing gear by turning the crankshaft pulley clockwise slightly.

17. INSTALL CHAIN TENSIONER ASSY NO.1 (See page 14–58)
18. SET NO.1 CYLINDER TO TDC/COMPRESSION (See page 14–7)
19. INSPECT VALVE CLEARANCE (See page 14–7)
20. ADJUST VALVE CLEARANCE (See page 14–7)
21. INSTALL CYLINDER HEAD COVER SUB–ASSY LH (See page 14–58)
22. INSTALL CYLINDER HEAD COVER SUB–ASSY RH (See page 14–58)
23. INSTALL IGNITION COIL ASSY
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)
24. INSTALL INTAKE AIR SURGE TANK (See page 14–58)
25. INSTALL AIR CLEANER ASSY (See page 10–7)
26. CONNECT VENTILATION HOSE NO.2
27. ADD ENGINE COOLANT (See page 16–5)
28. CHECK FOR ENGINE COOLANT LEAKS (See page 16–1)
29. INSTALL V–BANK COVER
(a) Install the V–bank cover with the 2 nuts.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)
30. INSPECT IGNITION TIMING (See page 14–1)
SST 09843–18040