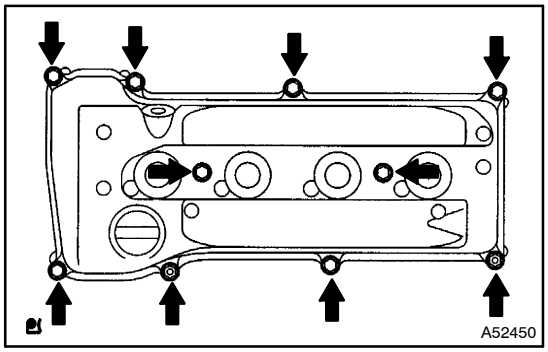
# CAMSHAFT (1AZ–FE)

## REPLACEMENT

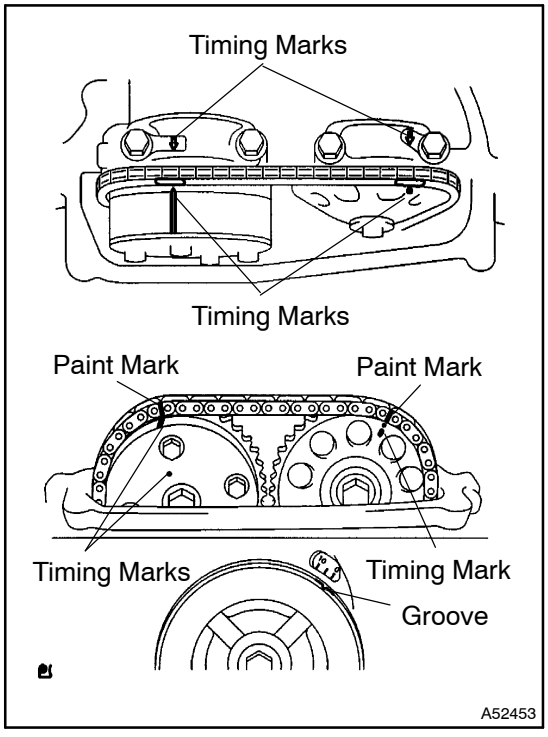
140IV–01

1. REMOVE FRONT WHEEL RH
2. REMOVE FRONT FENDER APRON SEAL RH
3. REMOVE ENGINE COVER SUB–ASSY NO.1
4. REMOVE IGNITION COIL ASSY
5. DISCONNECT VENTILATION HOSE
6. DISCONNECT VENTILATION HOSE NO.2
7. DISCONNECT ENGINE WIRE



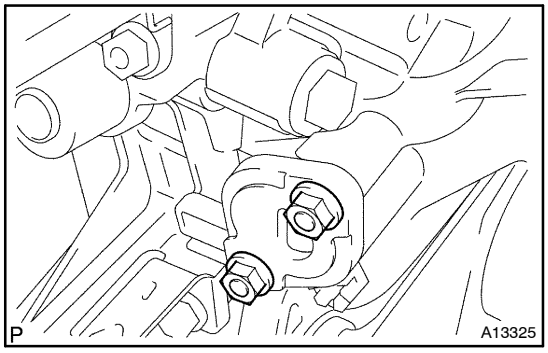

**8. REMOVE CYLINDER HEAD COVER SUB–ASSY**

(a) Remove the bolt and disconnect the engine wire harness clamp.
(b) Remove the bolts, 2 nuts, cylinder head cover and gasket.




**9. SET NO.1 CYLINDER TO TDC/COMPRESSION**

(a) Turn the crankshaft pulley, and align its groove with the timing mark ”0” of the timing chain cover.
(b) Check that the timing marks of the camshaft timing sprockets are aligned with the timing marks of the bearing cap as shown in the illustration.
(c) Place match marks on the timing chain and camshaft timing sprocket.

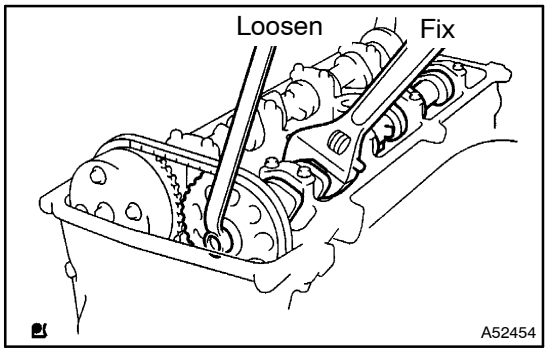



**10. REMOVE CHAIN TENSIONER ASSY NO.1**

(a) Remove the 2 nuts,timing chain tensioner and gasket.

**NOTICE:**

**Be sure not to revolve the crankshaft without the chain tensioner.**

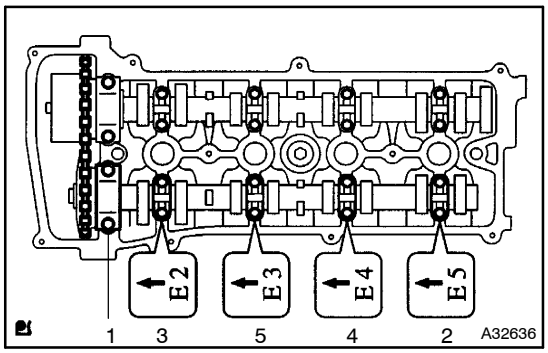



**11. REMOVE NO.2 CAMSHAFT**

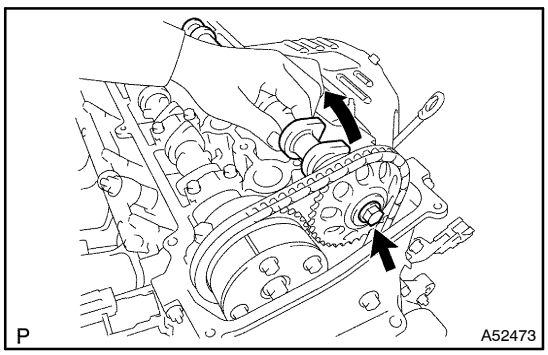
(a) Fix the camshaft with a wrench and so on, then loosen the camshaft timing gear set blot.

**NOTICE:**

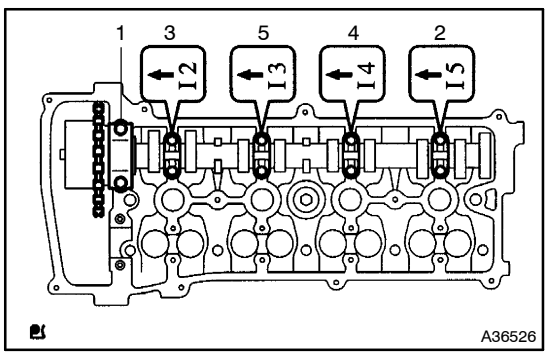
**Be careful not to damage the valve lifter.**




(b) Loosen the camshaft bearing cap bolts on No.2 camshaft in the sequence shown in the illustration in several passes, and remove the caps.

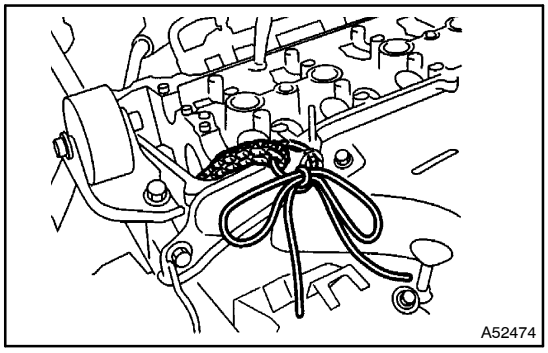



(c) Raising the camshaft, remove the set bolt.
(d) Remove the camshaft timing gear from the camshaft with timing chain.
(e) Remove the camshaft timing gear from the timing chain.




**12. REMOVE CAMSHAFT**

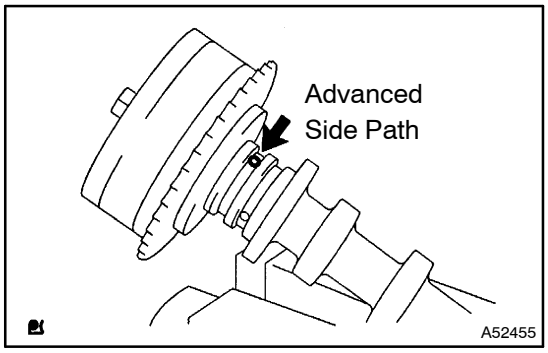
(a) Loosen the camshaft bearing cap bolts on camshaft in the sequence shown in the illustration in several passes, and remove the caps.
(b) Remove the intake camshaft.




(c) Tie the timing chain with a string.

**NOTICE:**

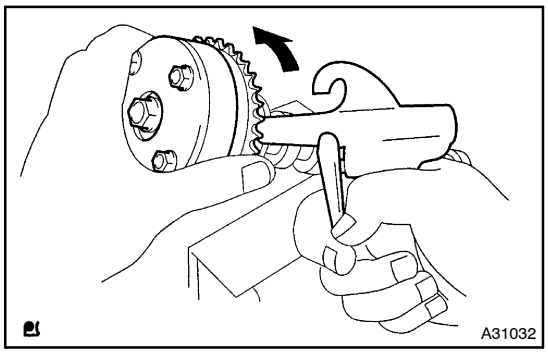
**Be careful not to drop anything inside the timing chain cover.**




**13. REMOVE CAMSHAFT TIMING GEAR ASSY**

(a) Fix the No. 1 camshaft with a vise, and make sure the camshaft timing gear assembly does not rotate.

(b) Cover all the paths with vinyl tape except an advanced side path shown in the illustration.



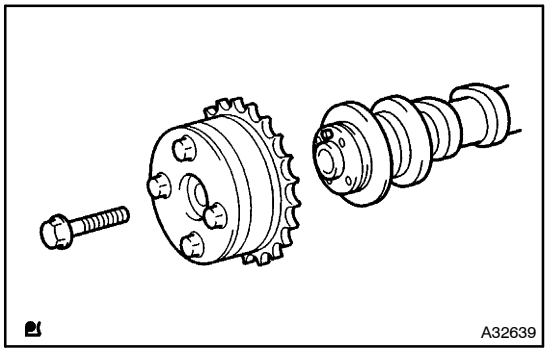

(c) Put air pressure into the oil path with 150 kpa (1.5 kgf/cm$^2$ 21 psi), and turn the camshaft timing gear assembly to the advance direction (counterclockwise) by force.

**CAUTION:**

**Cover the paths with shop rag to avoid oil splashing.**

HINT:

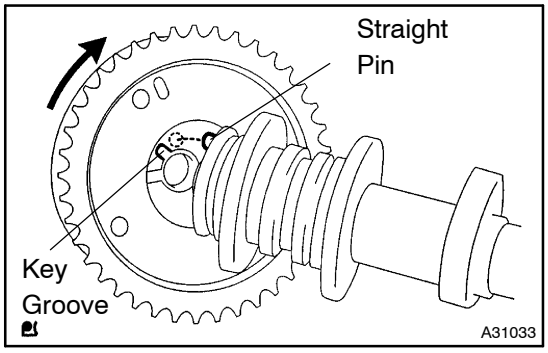
Depending on the air pressure, the VVT timing sprocket will turn to the advance angle side without applying force by hand. Also, under the condition that the pressure can be hardly applied because of the air leakage from the port, there may be the case that the lock pin could be hardly released.




(d) Remove a fringe bolt of camshaft timing gear assembly.

**NOTICE:**

- **Be sure not to remove the other 4 bolts.**
- **In case of reusing the camshaft timing gear assembly, release the straight pin lock first, and then install the gear.**




## 14. INSTALL CAMSHAFT TIMING GEAR ASSY

(a) Put the camshaft timing gear assembly and the a camshaft together with the straight pin off the key groove.

(b) Turn the camshaft timing gear assembly to the left direction (as shown in the illustration) with pushing it lightly against the camshaft. Push further at the position where the pin gets into the groove.

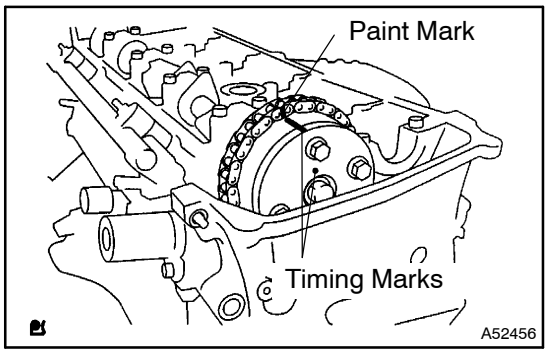
**NOTICE:**

**Be sure not to turn the camshaft timing gear to the retard angle side (to the right direction).**

(c) Check that there is no clearance between the gear's fringe and the camshaft.

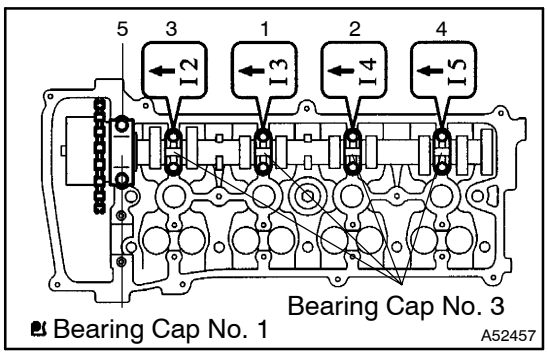
(d) Tighten the fringe bolt with the camshaft timing gear fixed.
**Torque: 54 N·m (551 kgf·cm, 40 ft·lbf)**

(e) Check that the camshaft timing gear assembly can move to the retard angle side (to the right direction), and is locked at the most retarded position.

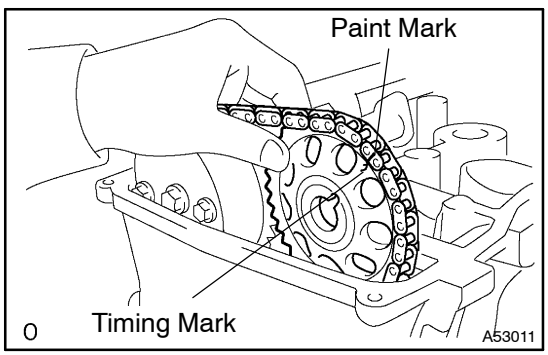



## 15. INSTALL CAMSHAFT

(a) Install the timing chain on the camshaft timing gear, with the painted links aligned with the timing marks on the camshaft timing sprockets.

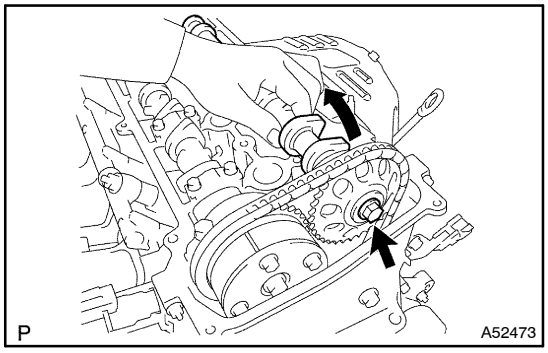



(b) Examine the front marks and numbers and tighten the bolts in the order shown in the illustration.
**Torque:**
**Bearing cap No. 1 30 N·m (301 kgf·cm, 22 ft·lbf)**
**Bearing cap No. 3 9.0 N·m (92 kgf·cm, 80 in.·lbf)**

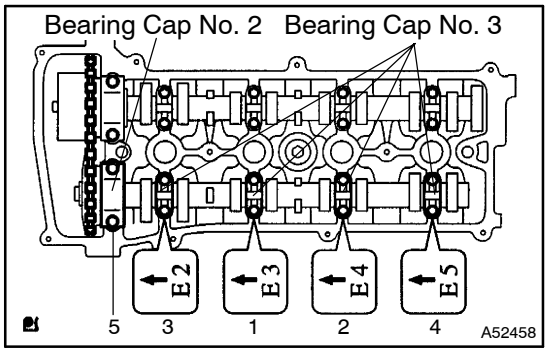



## 16. INSTALL NO.2 CAMSHAFT

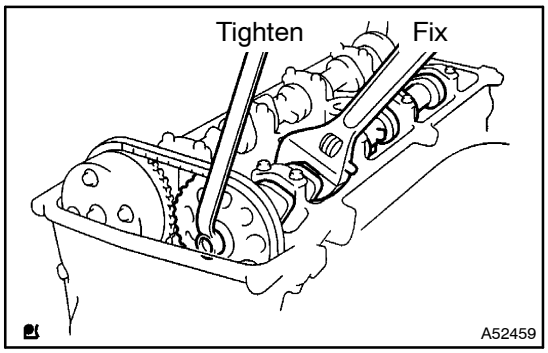
(a) Put the camshaft No.2 on the cylinder head with the painted links of chain aligned with the timing mark on the camshaft timing sprockets.




(b) Raising the camshaft, tighten the set bolt temporarily.

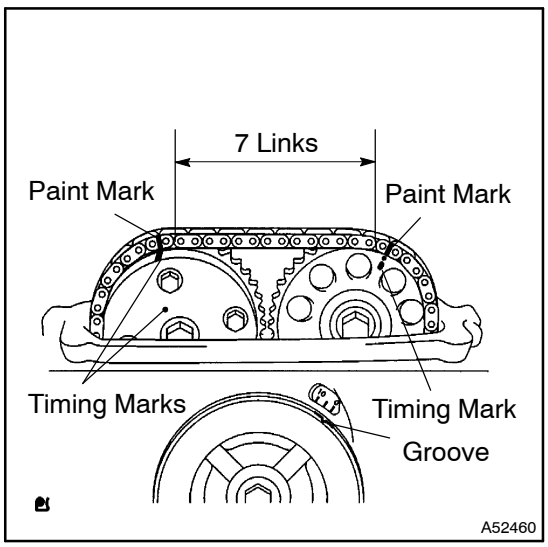



(c) Examine the from marks and numbers and tighten the bolts in the sequence shown in the illustration.
**Torque:**
**Bearing cap No. 2 30 N·m (301 kgf·cm, 22 ft·lbf)**
**Bearing cap No. 3 9.0 N·m (92 kgf·cm, 80 in.·lbf)**

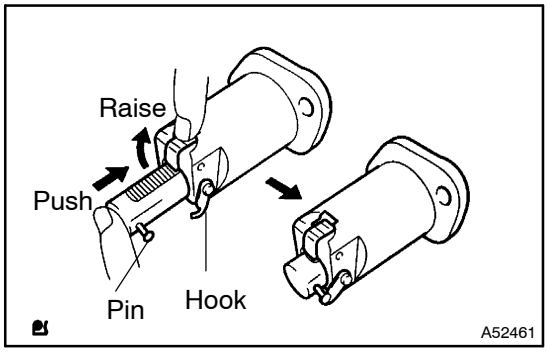



(d) Fix the camshaft with a spanner and so on, then tighten the camshaft timing gear set bolt.
**Torque: 54 N·m (551 kgf·cm, 40 ft·lbf)**

**NOTICE:**
**Be careful not to damage the valve lifter.**

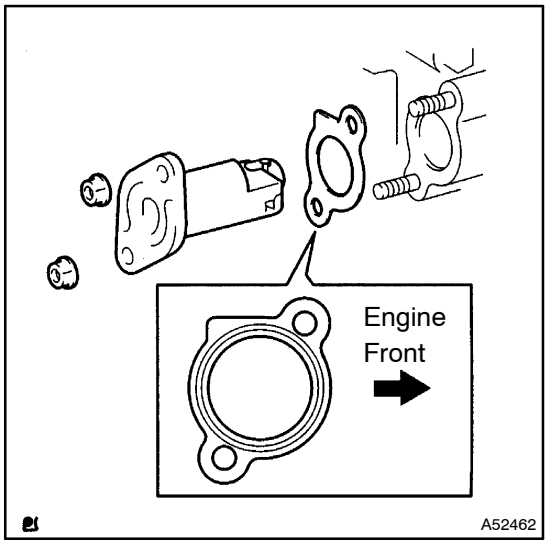



(e) As shown in the illustration, check the match marks on the timing chain and camshaft timing sprockets and the alignment of the pulley groove with timing mark of the chain cover.



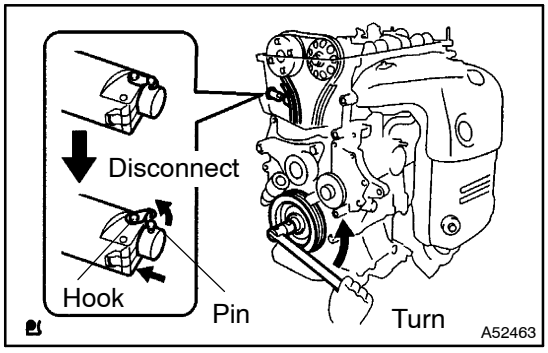

## 17. INSTALL CHAIN TENSIONER ASSY NO.1

(a) Release the ratchet pawl, fully push in the plunger and apply the hook to the pin so that the plunger cannot spring out.

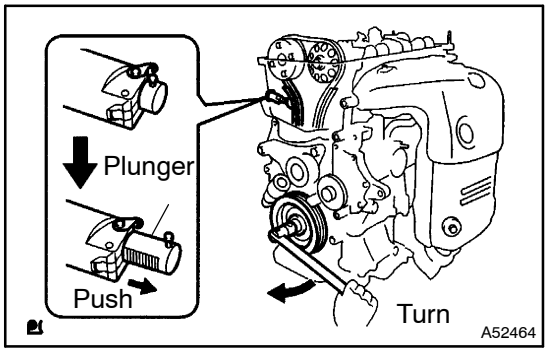



(b) Install a new gasket and chain tensioner with the 2 nuts.
**Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)**

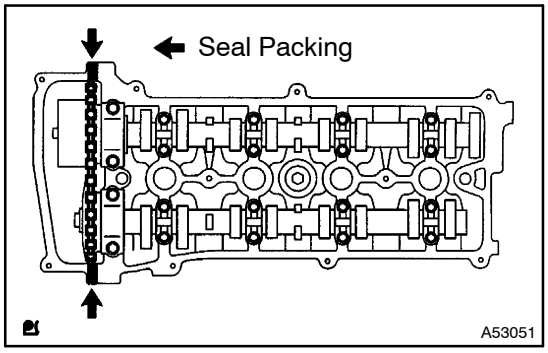
**NOTICE:**
**When installing the tensioner, set the hook again if the hook releases the plunger.**




(c) Turn the crankshaft counterclockwise, and disconnect the plunger knock pin from the hook.



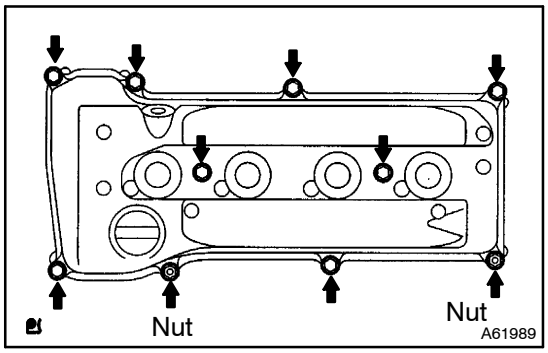

(d) Turn the crankshaft clockwise, and check that the slipper is pushed by the plunger.




**18. INSTALL CYLINDER HEAD COVER SUB–ASSY**

(a) Remove any old packing (FIPG) material.
(b) Apply seal packing to 2 locations as shown in the illustration.
**Seal packing: Part No. 08826–00080 or equivalent**

**NOTICE:**
- **Remove any oil the contact surface.**
- **Install the cylinder head cover within 5 minutes after applying seal packing.**
- **Do not put into engine oil 2 hours after installing.**




(c) Install the cylinder head cover with the 8 bolts and 2 nuts.
**Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)**

**19. CONNECT ENGINE WIRE**

**20. INSTALL IGNITION COIL ASSY**

**Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)**

**21. INSTALL FRONT WHEEL RH**
**Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)**

**22. INSPECT OIL LEAK**