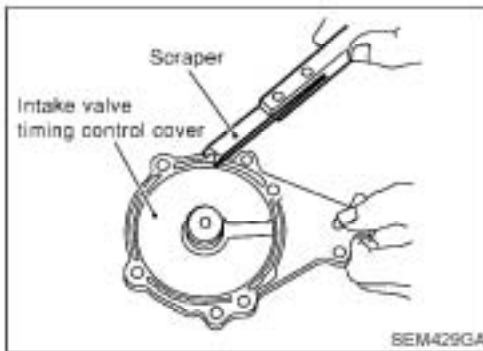
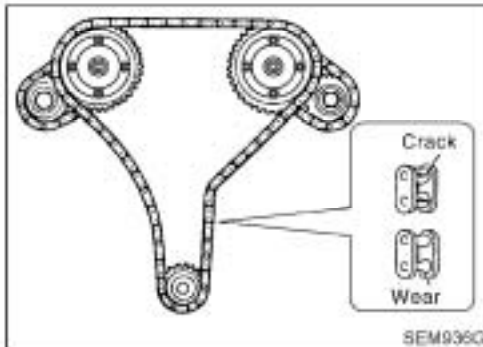


TIMING CHAIN

Removal (Cont'd)

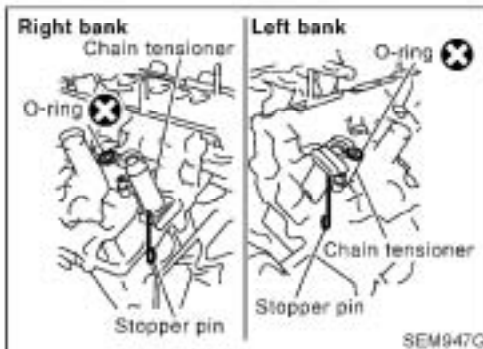


45. Use a scraper to remove all traces of liquid gasket from intake valve timing control cover, water pump cover and chain tensioner cover.



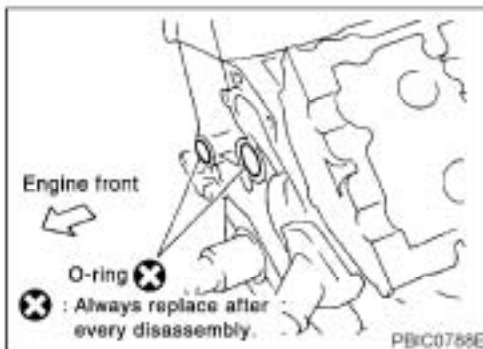
Inspection

Check for cracks and excessive wear at roller links. Replace chain if necessary. WAGM0013

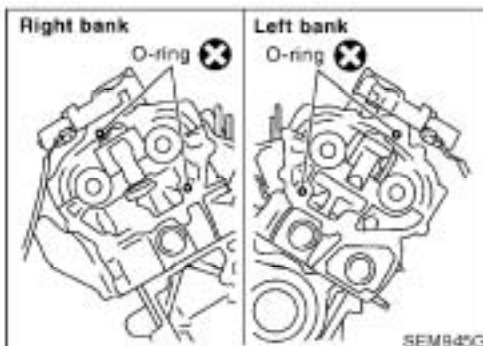


Installation

1. Install RH and LH camshaft chain tensioners to cylinder head as follows if removed. WAGM0014
- Install chain tensioners with stopper pin attached and new O-ring.
 - Install No. 1 camshaft brackets.



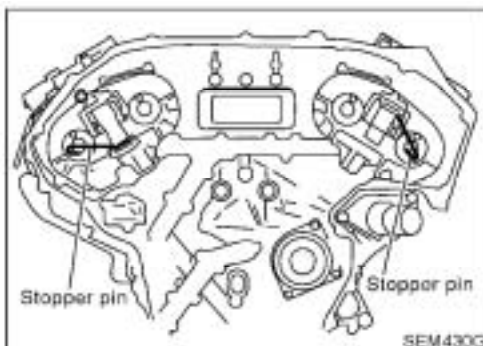
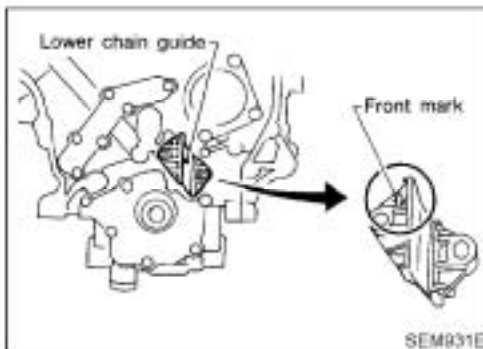
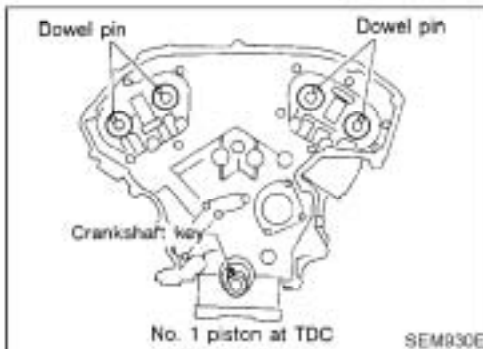
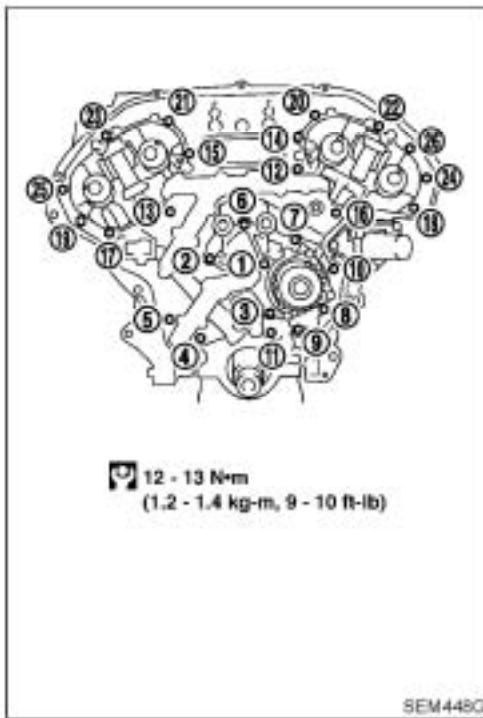
2. Install new O-rings to cylinder block if rear timing chain case is removed.



3. Install new O-rings to cylinder head if rear timing chain case is removed.
4. Apply liquid gasket to rear timing chain case. Refer to EM-25, "POSITION FOR APPLYING LIQUID GASKET".

TIMING CHAIN

Installation (Cont'd)



5. Align rear timing chain case, if removed, with dowel pins (RH and LH) on cylinder block. Then install it.

- Do not allow O-ring to drop.
- a. Tighten mounting bolts in order as shown in the figure.
- Install two types of mounting bolts, referring to the following instructions and figure.

Bolt length:

20 mm (0.79 in) (1, 2, 3, 6, 7, 8, 9, and 10 in the figure)

16 mm (0.63 in) (other than the above)

- b. After all bolts are temporarily tightened, retighten them to specified torque in order shown in the figure.
6. After installing rear timing chain case, check surface height difference between following parts on oil pan mounting surface.

Standard

Rear timing chain case to cylinder block:
-0.24 to 0.14 mm (-0.0094 to 0.0055 in)

- If not within standard, repeat above installation procedure.

7. Make sure that camshaft and crankshaft are at TDC position of No. 1 cylinder.

- Make sure that dowel pin and crankshaft key are located as shown in the figure.
Camshaft dowel pin: At cylinder head upper face side in each bank
Crankshaft key: At cylinder head side of RH bank

NOTE:

Though camshafts are not stopped at the positions as shown in the figure for the cam nose locations, it is appropriate in this step that camshafts are stopped at the basically same direction of the figure.

8. Install lower chain guide on dowel pin, with front mark on the guide facing upside.

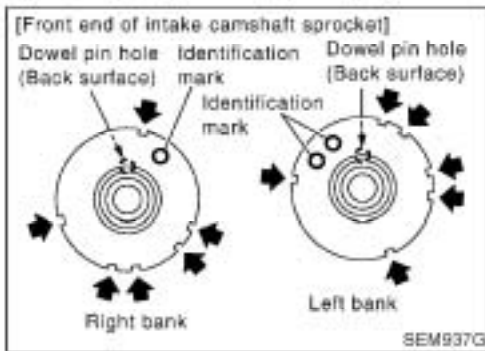
9. Install secondary timing chain and camshaft sprockets.

- a. Press and shrink the secondary chain tensioner sleeve, and fix it using stopper pins.
- Lubricate threads and seat surfaces of camshaft sprocket bolts with new engine oil.

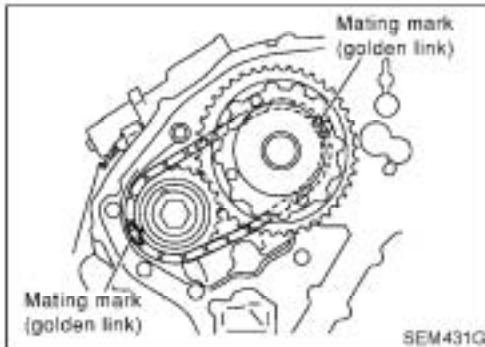
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TIMING CHAIN

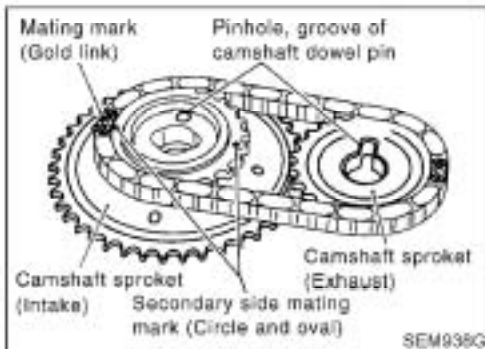
Installation (Cont'd)



- b. Identify intake camshaft sprocket of the right and left bank.
- Identify by front identification mark [10 mm (0.39 in) dia. recess] number and cutout position difference for signal detection of front end circumference.
 - Exhaust camshaft sprocket is a common part for both banks.



- c. Install secondary timing chain and sprocket.
- Align mating marks (golden links) on secondary timing chain with those (punched marks) on the intake and exhaust sprockets.
 - Align camshaft dowel pins with the sprocket groove and hole.
 - Because camshaft sprocket mounting bolts are tightened in step 10, perform manual tightening to the extent necessary to keep camshaft dowel pin from dislocating.

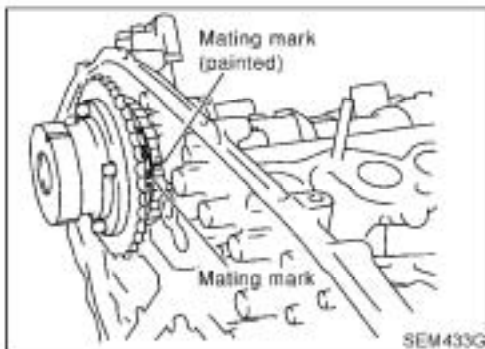


- Mating marks of the intake sprocket are on the back side of the secondary sprockets. There are two types of the marks; circle and oval types, which should be used for right and left banks respectively.

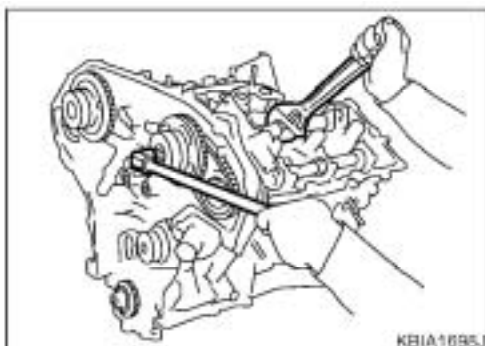
Right bank: Circle

Left bank: Oval

- In cases that positions of each mating mark and each dowel pin are not fit on mating parts, make fine adjustment to the position holding the hexagonal head of camshaft with a spanner or equivalent.



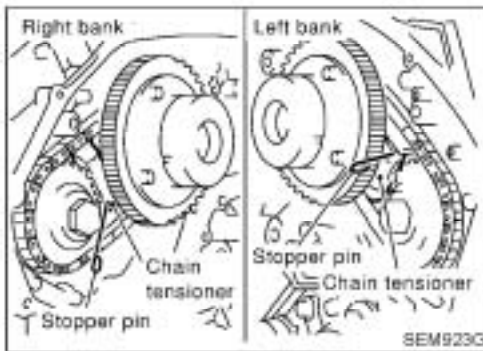
- It may be difficult to visually check the dislocation of mating marks during and after installation. To make the matching easier, make a mating mark on top of the sprocket teeth and its extended line in advance with paint.



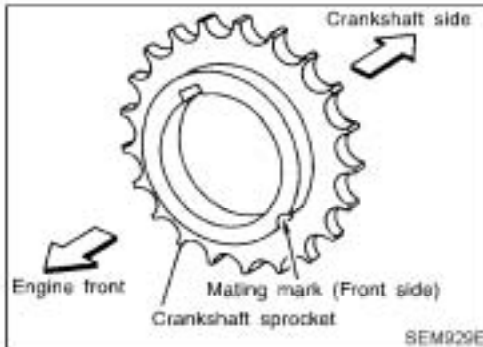
10. After confirming the mating marks are aligned, tighten the camshaft sprocket mounting bolts.
- Secure the camshaft hexagonal head using a spanner to tighten mounting bolts.

TIMING CHAIN

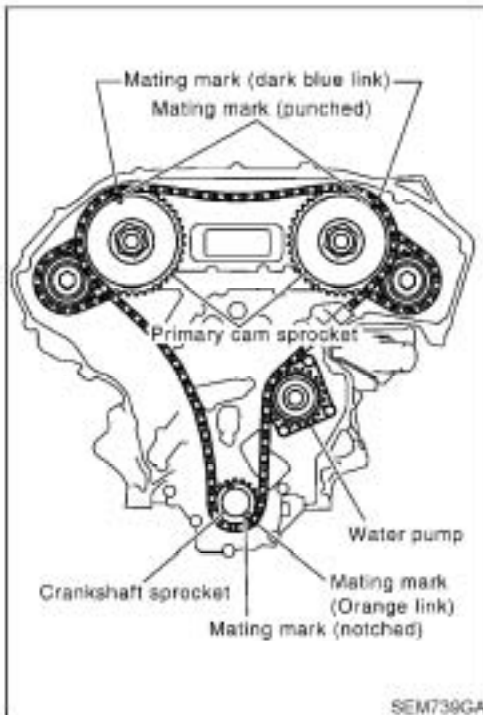
Installation (Cont'd)



11. Pull out the stopper pin from the secondary timing chain tensioner.
12. Install primary timing chain.



- Install crankshaft sprocket, with mating mark to timing chain facing front of engine.



- Install primary timing chain so that mating mark (punched) on camshaft sprocket is aligned with that (dark blue link) on the timing chain, and mating mark (notched) on crankshaft sprocket is aligned with that (orange link) on the timing chain, respectively.
- When it is difficult to align mating marks of the primary timing chain with each sprocket, gradually turn the camshaft hexagonal head using a spanner so it is aligned with the mating mark.
- During alignment, be careful to prevent dislocation of mating marks on the secondary timing chain.

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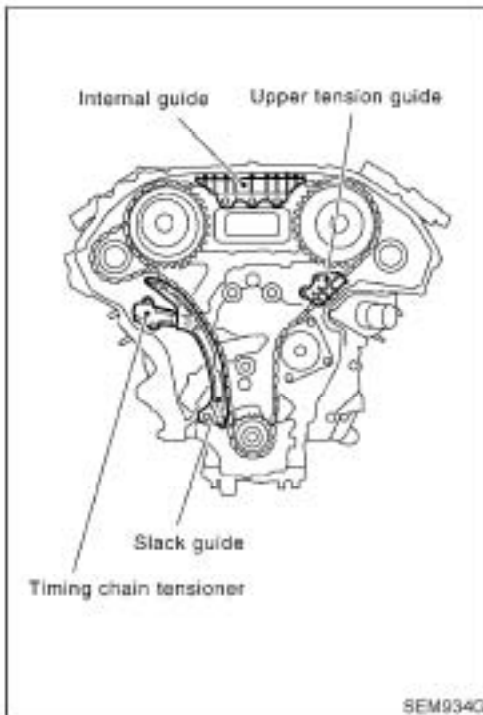
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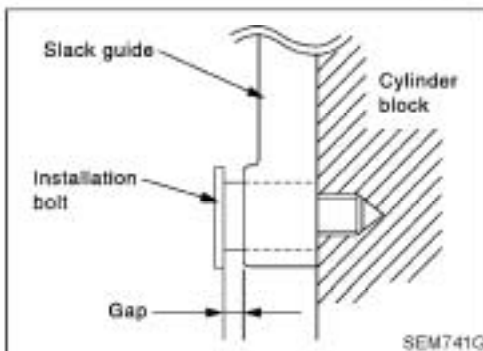
IDX

TIMING CHAIN

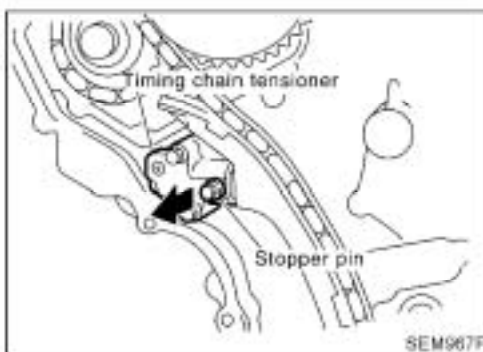
Installation (Cont'd)



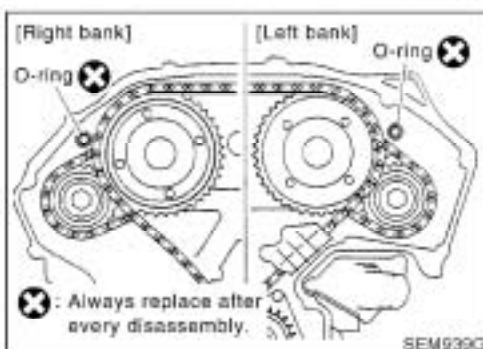
13. Install internal guide.
14. Install upper tension guide and slack guide.



- Do not overtighten the slack guide mounting bolts. It is normal for a gap to exist under the bolt seats when the mounting bolts are tightened to specification.



15. Install timing chain tensioner, then remove the stopper pin.
- **When installing the timing chain tensioner, engine oil should be applied to the oil hole and tensioner.**



16. Install O-rings on rear timing chain case.