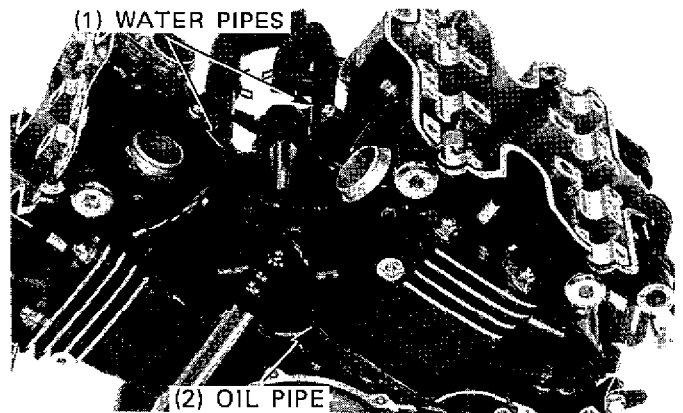


CYLINDER HEAD/VALVE

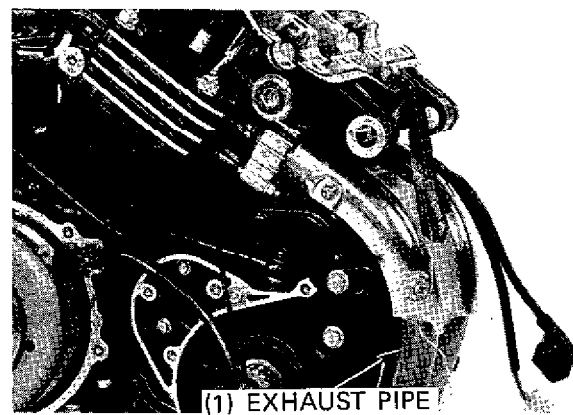
Install the oil pipe with the oil bolts and sealing washers, tighten the oil pipe set bolts and then tighten the oil bolts.

TORQUE: 20–25 N·m (2.0–2.5 kg·m, 14–18 ft·lb)

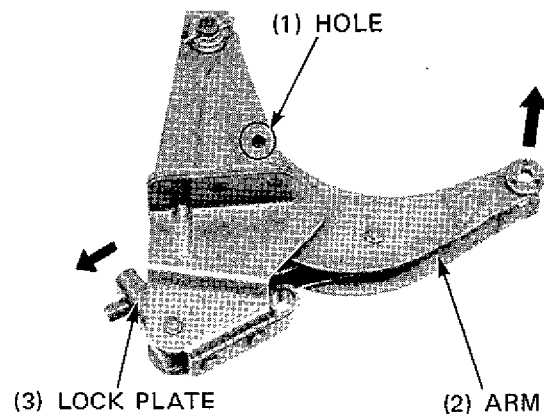
Install new O-rings onto the water pipes and install the water pipes.



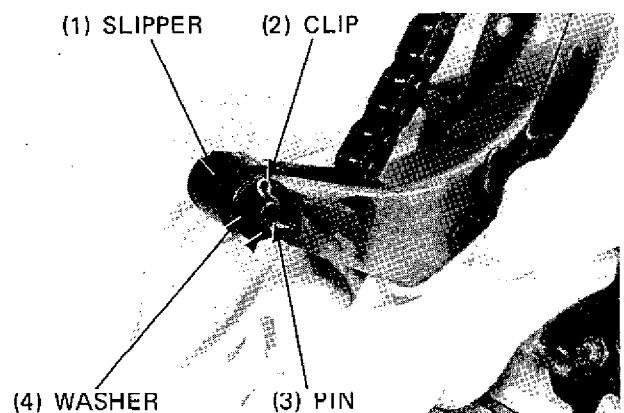
Install the rear cylinder exhaust pipe.



Move the cam chain tensioner in the direction shown while pushing back the tensioner rod lock plate, until the holes in the tensioner base and tensioner align, and insert a pin or piece of wire through the holes.



Pass the cam chain through the cam chain tensioner and install the tensioner slipper with the pin, washer and clip. Fit the lower end of the slipper in the slipper base correctly and place the tensioner base on the cylinder head. Do not install the cam chain tensioner base mounting bolts.



CAMSHAFT INSTALLATION

NOTE

- Check the camshaft marks so that you install each camshaft in its correct location.
- The marks on the camshaft mean:
 - EXR, ER: Rear cylinder exhaust camshaft
 - INR, IR: Rear cylinder intake camshaft
 - EXF, EF: Front cylinder exhaust camshaft
 - INF, IF: Front cylinder intake camshaft
- The camshaft sprockets are interchangeable.

Lubricate the cylinder head camshaft journal bearing surfaces with molybdenum disulfide grease.

REAR CYLINDER CAMSHAFT

Turn the crankshaft counterclockwise and align the T1-3 mark on the flywheel with the rear crankcase mating surface.

CAUTION

- *When turning the crankshaft, make sure the cam chains don't jam at the cam chain tensioners or at the crankshaft.*

Install the intake and exhaust camshafts and sprockets through the rear cylinder cam chain as shown. Turn the camshafts so the camshaft marks face up.

NOTE

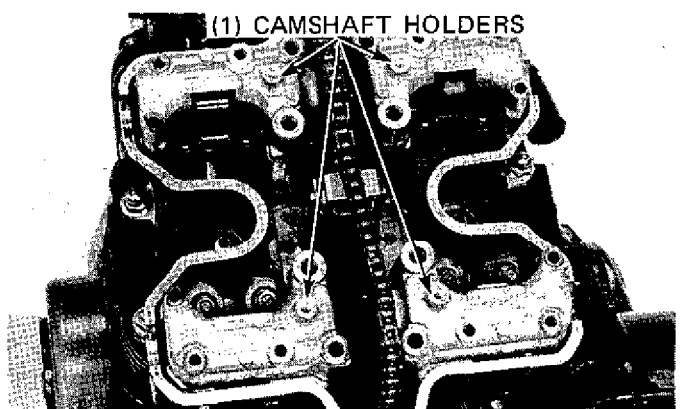
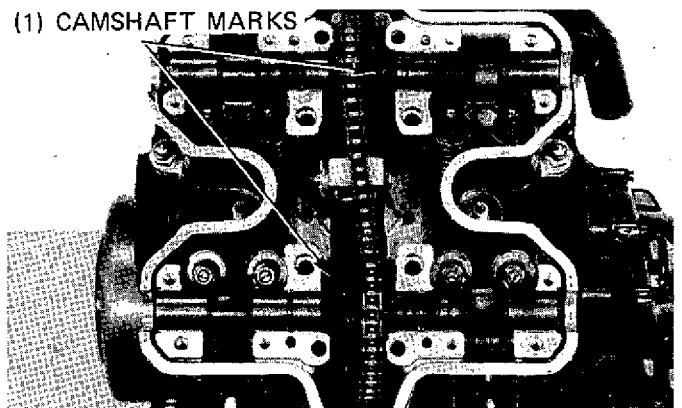
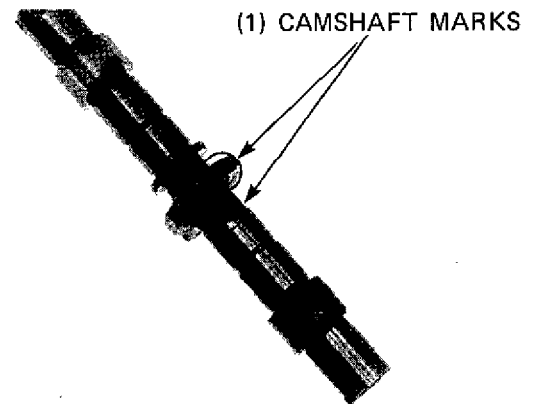
- If the front cylinder camshafts were not removed, check that the front camshaft marks face up. If not, turn the crankshaft counterclockwise 360 degrees (one turn).

If a valve clearance adjuster keeps the camshaft from seating fully in the cylinder head, back the adjuster out all the way.

CAUTION

- *If you force a valve open while installing the camshaft holders, you may damage the holders or the camshaft bearing surfaces.*

Place the camshaft holders in the same locations noted during removal. The groove in the bottom of the holder must align with the camshaft locating ridge.

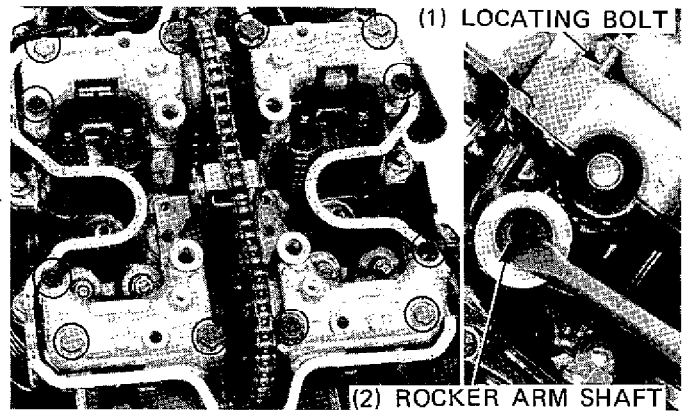


CYLINDER HEAD/VALVE

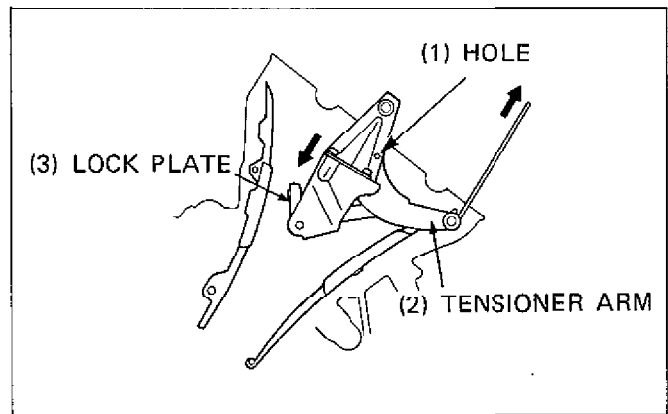
Install the camshaft holder bolts, but do not tighten them yet.

NOTE

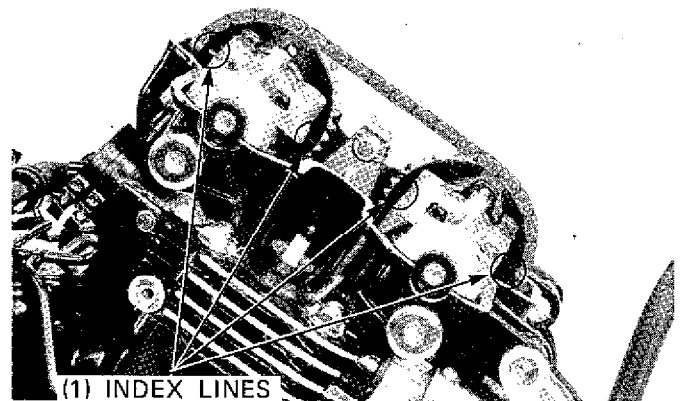
- The camshaft holder bolts in each corner of the cylinder head are the rocker arm shaft locating bolts. If the flat of the rocker arm shaft does not align with the bolt hole, remove the cap bolt and spring, and align the flat with the bolt hole by turning the rocker arm shaft with a screw driver.



If the cam chain tensioner was not removed, lock the cam chain tensioner for minimum tension: pull or pry the tensioner arm up while pushing the lock plate back and hold the arm by inserting a pin through the holes in the tensioner base and arm.



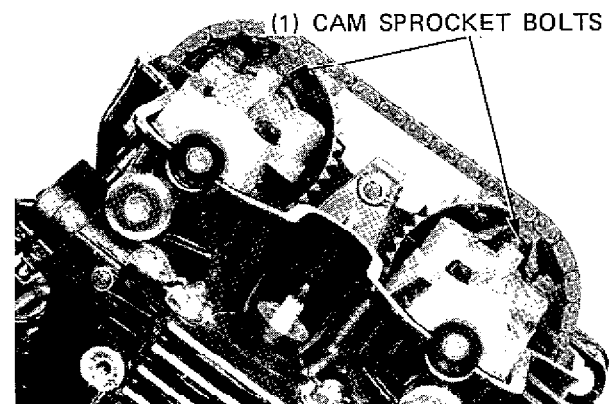
Check the camshaft marks are still facing up, then align the cam sprocket index lines with the top of the cylinder head. Place the cam chain on the sprockets. Slide the cam sprockets onto the camshaft flanges.



Align the cam sprocket bolt holes in the sprockets and camshafts, and install the bolts. Turn the crankshaft counterclockwise 360° and install the remaining sprocket bolts. Tighten the sprocket bolts.

TORQUE: 18–20 N·m (1.8–2.0 kg·m, 13–14 ft·lb)

Align the T1-3 mark with the rear crankcase mating surface and check that the cam sprocket index lines align with the top of the cylinder head.



FRONT CYLINDER CAMSHAFT

NOTE

- If the rear cylinder camshafts were removed, install them first, then install the front cylinder camshafts. If the rear cylinder camshafts were not serviced, remove the rear cylinder head cover to check the timing marks.

Turn the crankshaft counterclockwise and align the T1-3 mark with the rear crankcase mating surface.

Check the rear cylinder camshaft marks are facing up. If not, turn the crankshaft counterclockwise 360° (one turn).

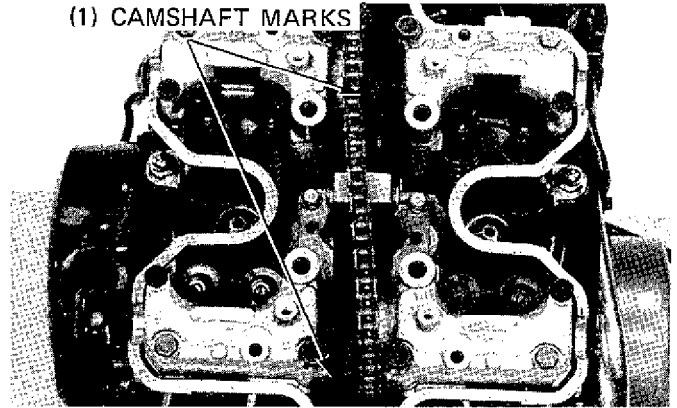
Install the front cylinder camshafts, sprockets and camshaft holders, as described for the rear cylinder (page 10-16).

Check the camshaft marks are facing up, align the cam sprocket index lines with the top of the cylinder head and place the cam chain on the sprockets.

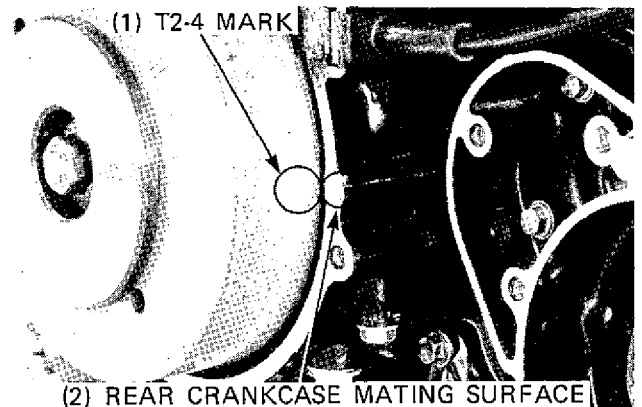
Align the T2-4 mark with the rear crankcase mating surface by turning the crankshaft counterclockwise 90° .

Slide the cam sprockets onto the camshaft flanges and install the cam sprocket bolts.

(1) CAMSHAFT MARKS



(1) T2-4 MARK

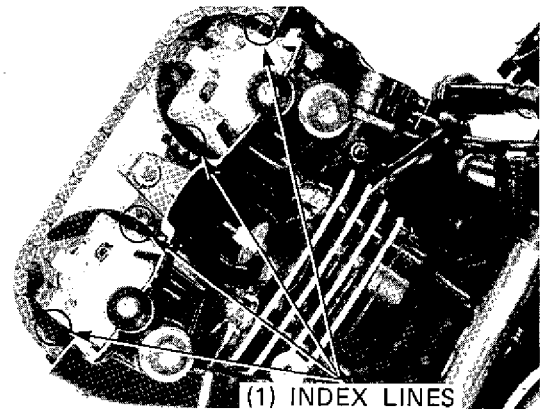


(2) REAR CRANKCASE MATING SURFACE

Turn the crankshaft counterclockwise 270° and align the T1-3 mark with the rear crankcase mating surface.

Check that the cam sprocket index lines align with the top of the cylinder head and install the remaining cam sprocket bolts. Tighten the cam sprocket bolts.

TORQUE: 18–20 N·m (1.8–2.0 kg·m, 13–14 ft·lb)



(1) INDEX LINES

VALVE TIMING INSPECTION

Check the front-to-rear cylinder camshaft timing as follows:

Align the T1-3 mark with the rear crankcase mating surface.

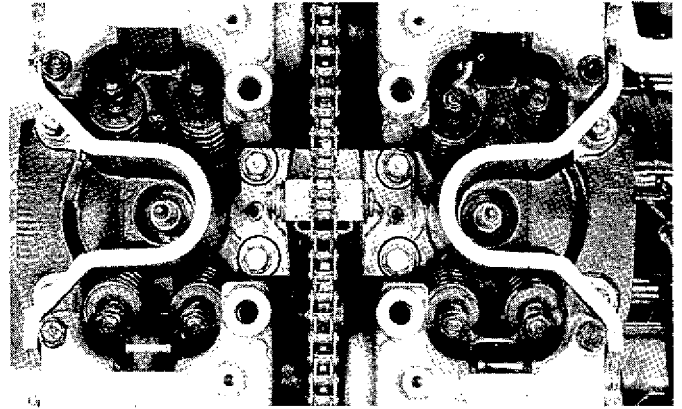
The index lines on all cam sprockets must align with the top of the cylinder heads and all camshaft marks must face either up or down.



(1) INDEX LINES

CYLINDER HEAD/VALVE

Install and tighten the cam chain tensioner mounting bolts.
Unlock the cam chain tensioner by removing the pin.

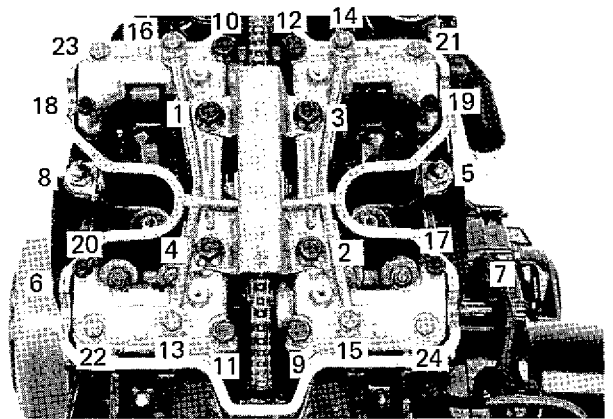


Turn the crankshaft counterclockwise until there is maximum cam chain free play and install the oil pipe under the cam chain.

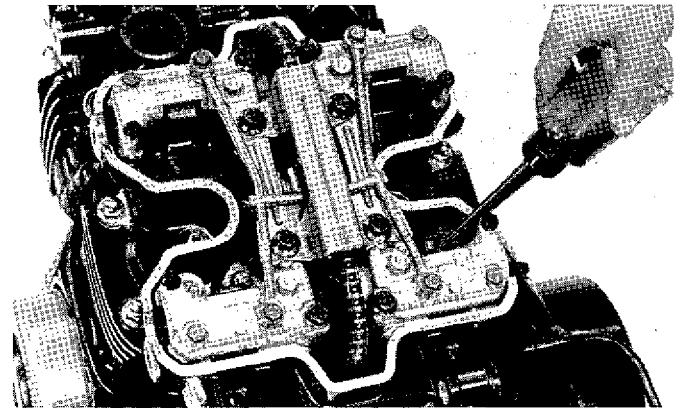
Install the cam chain guide onto the oil pipe base plate.
Tighten the camshaft holder bolts and cylinder head bolts and nuts in a crisscross pattern in 2-3 steps.

TORQUE:

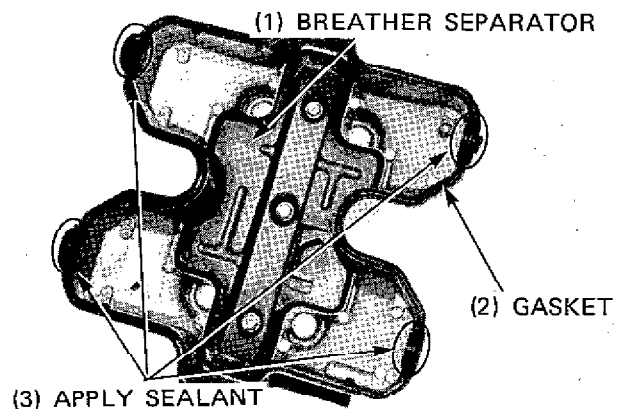
- 9 mm: 43–47 N·m (4.3–4.7 kg·m, 31–34 ft·lb)
- 8 mm: 21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb)
- 6 mm: 10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb)



Lubricate the cam lubes with clean engine oil.



Adjust the valve clearance (page 3-7).
Remove the breather separator from the rear cylinder head cover and clean it.
Clean gasket groove in the cylinder head cover, and install a new gasket onto the cylinder head cover.
Apply sealant to the half moon portion of the cylinder head cover gasket.



Install the cylinder head cover.

NOTE

- Install the front cylinder head cover with its insulator grooves facing up.

Tighten the cylinder head cover bolts.

TORQUE: 8–12 N·m (0.8–1.2 kg·m, 6–9 ft·lb)

Install the removed parts in the reverse order of removal.

