

LEFT CRANKCASE COVER INSTALLATION

Install the dowel pin and a new gasket.

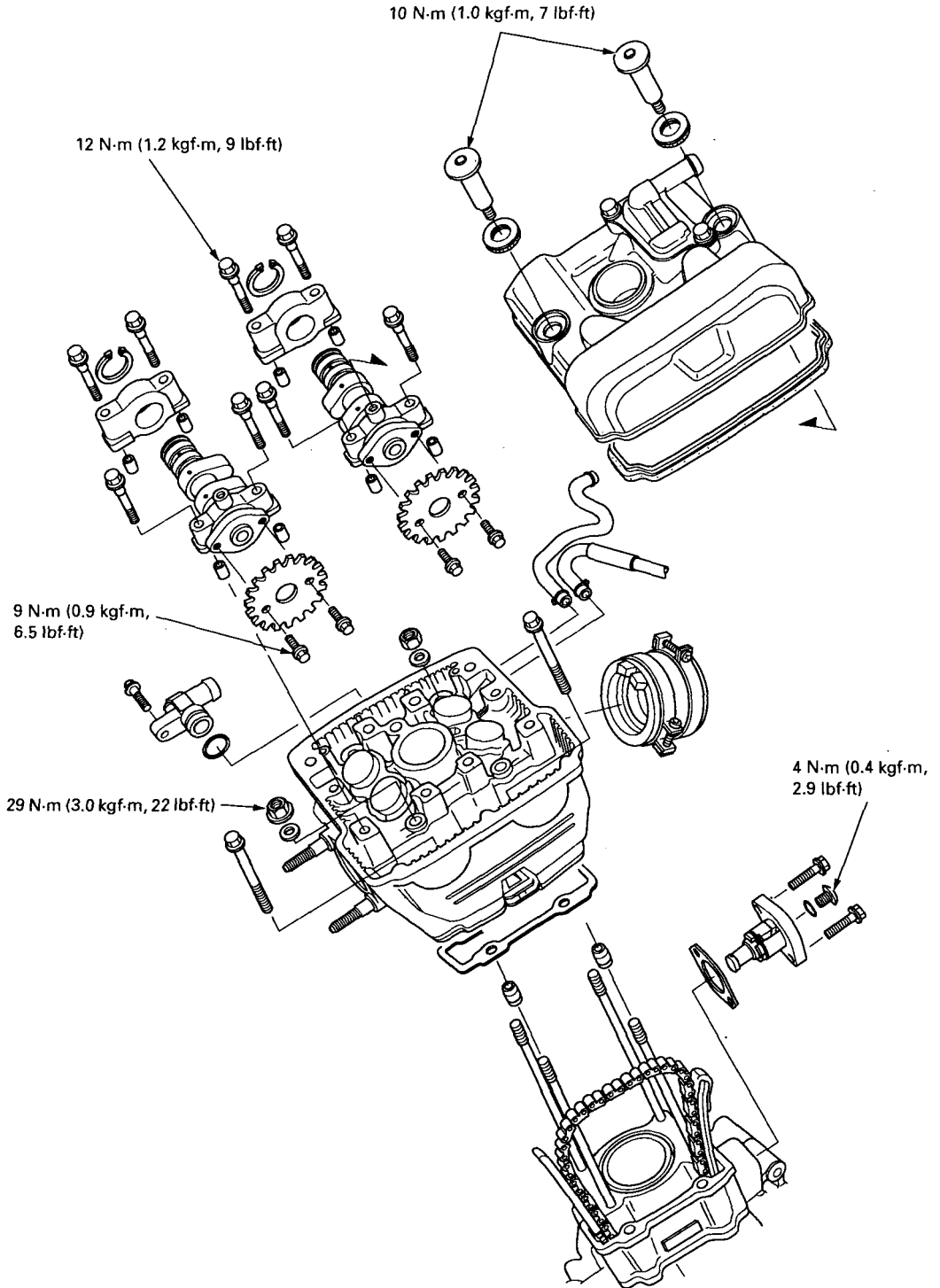


Install the left crankcase cover.
Install the washer and bolts, and tighten them securely.

Install the drive sprocket cover (page 7-6).
Connect the alternator 4P connector (page 17-7).



CYLINDER HEAD/VALVES



10. CYLINDER HEAD/VALVES

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SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, valves.
- The cylinder head and valves services can be done with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder compression		1,370 kpa (13.9 kgf/cm ² , 197.7 psi) at 680 min ⁻¹ (rpm)	—	
Cylinder head warpage		—	0.05 (0.002)	
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	
		EX	0.25 ± 0.03 (0.010 ± 0.001)	
	Valve stem O.D.	IN	3.775 – 3.790 (0.1486 – 0.1492)	3.7 (0.15)
		EX	3.765 – 3.780 (0.1482 – 0.1488)	3.7 (0.15)
	Valve guide I.D.	IN/EX	3.800 – 3.812 (0.1496 – 0.1501)	3.89 (0.153)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0029)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	15.5 (0.61)	—
EX		13.1 (0.52)	—	
Valve seat width	IN/EX	1.2 – 1.6 (0.05 – 0.06)	1.9 (0.07)	
Valve spring free length		IN/EX	39.7 (1.56)	38.5 (1.52)
Valve lifter	O.D.	22.478 – 22.493 (0.8850 – 0.8855)		22.47 (0.885)
	Bore I.D.	21.1 – 21.3 (0.83 – 0.84)		22.5 (0.89)
Camshaft	Cam lobe height	IN	35.12 – 35.20 (1.383 – 1.386)	35.073 (1.3808)
		EX	34.71 – 34.79 (1.367 – 1.370)	34.662 (1.3646)
	Runout	—		0.02 (0.001)
	Camshaft holder I.D.	IN/EX	17.000 – 17.018 (0.6693 – 0.6700)	17.027 (0.6703)
	Camshaft O.D.	IN/EX	16.966 – 16.984 (0.6680 – 0.6687)	16.960 (0.6677)
	Camshaft-to-camshaft holder clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)	0.067 (0.0026)

CYLINDER HEAD/VALVES

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Cam sprocket bolt	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft) Apply a locking agent to the threads
Cam chain tensioner plug	4.2 N·m (0.43 kgf·m, 3.1 lbf·ft)
Camshaft holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply oil to the threads and seating surface
Cylinder head nut	30 N·m (3.1 kgf·m, 22 lbf·ft) Apply oil to the threads and seating surface

TOOLS

Valve spring compressor	07757 – 0010000
Attachment	07JME – KY20100
Valve guide driver, 3.8 mm	07GMD – KT70100
Valve guide reamer	07JMH – KY20100
Valve seat cutter	
Seat cutter, 24 mm (45° EX)	07780 – 0010600
Seat cutter, 27.5 mm (45° IN)	07780 – 0010200
Flat cutter, 24 mm (32° EX)	07780 – 0012500
Flat cutter, 27 mm (32° IN)	07780 – 0013300
Interior cutter, 26 mm (60° IN)	07780 – 0014500
Interior cutter, 30 mm (60° EX)	07780 – 0014000
Cutter holder, 3.8 mm	07JMH – KY20200
Tapet hole protector	07JMG – KY20100

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These can be diagnosed by a compression or leak down test, or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring (section 11).

Compression too low, hard starting or poor performance at low speed

- Valves
 - Incorrect valve adjustment
 - Burned or bent valves
 - Incorrect valve timing
 - Broken valve spring
 - Weak valve spring
- Cylinder head
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head

Compression too high, overheating or knocking

- Excessive carbon build-up in cylinder head or on top of piston

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Faulty cylinder, piston or piston rings (section 11)

Excessive noise

- Cylinder Head
 - Incorrect valve clearance
 - Sticking valve or broken valve spring
- Faulty cylinder or piston (section 11)

Rough idle

- Low cylinder compression
- Intake air leak

CYLINDER COMPRESSION

▲ WARNING

- *If the engine must be running to do some work, make sure that the area is well-ventilated. Never run the engine in an enclosed area.*
- *The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.*

Warm up the engine to normal operating temperature.
Stop the engine.

Remove the spark plug (page 3-6).

Install the compression gauge into the spark plug hole.
Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.

STANDARD: 1,370 kPa (13.9 kgf/cm², 197.7) at 680 rpm

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

If compression is low, pour 3 – 5 cc (0.1 – 0.2 oz) of clean engine oil into the cylinder through the spark plug hole and recheck the compression.

If the compression increases from the previous value, check the cylinder, piston and piston rings.

- Leaking cylinder head gasket
- Worn piston ring
- Worn cylinder and piston

If compression is the same as the previous value, check the valves for leakage.



CYLINDER HEAD REMOVAL

CYLINDER HEAD COVER REMOVAL

Remove the following:

- right and left middle cowl (page 2-4)
- fuel tank (page 5-3)

Remove the two bolts and radiator with water hoses installed.

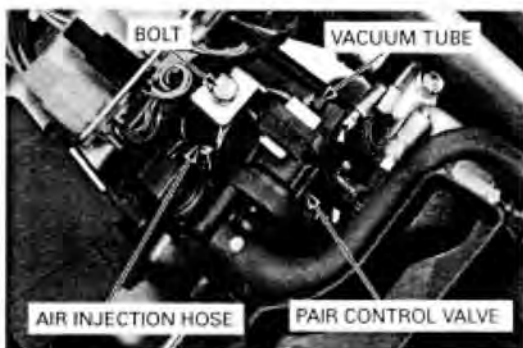
Disconnect the upper radiator hose from the cylinder head.



Disconnect the vacuum tube.

Remove the bolt and PAIR control valve.

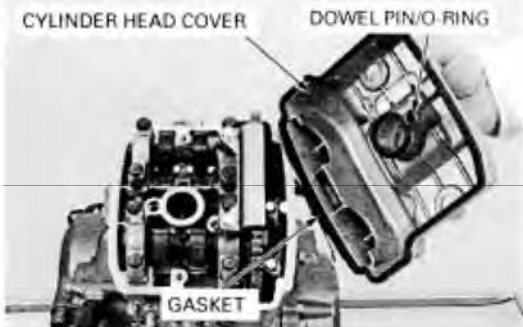
Disconnect the air injection hose from the PAIR check valve cover.



Remove the two bolts and rubber washers.



Remove the cylinder head cover, gasket, dowel pin and O-ring.



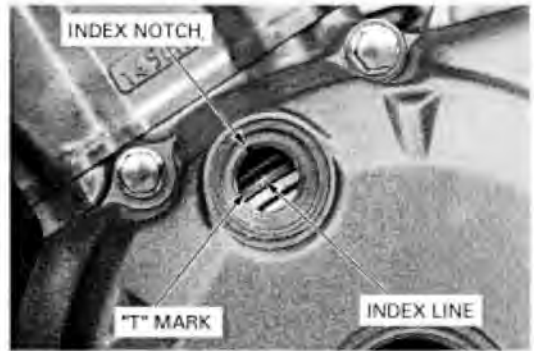
CAMSHAFT REMOVAL

Remove the following:

- under cowl (page 2-3)
- cylinder head cover (page 10-4)

Remove the timing hole cap and crankshaft hole cap.

Turn the crankshaft counterclockwise and align the index line of the "T" mark on the flywheel with the index notch on the left crankcase cover.



The index lines on the cam sprockets must be flush with the cylinder head surface as shown.

Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

If the piston is at TDC on the exhaust stroke, rotate the crankshaft counterclockwise 360° (1 full turn) and align the "T" mark with index notch.



Remove the cam chain tensioner lifter plug.

Turn the tensioner shaft clockwise with the stopper tool (page 10-8) to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position.



Remove the cam sprocket bolts.

NOTE:

Be careful not to let the sprocket bolts fall into the crankcase.

