



SERVICE INFORMATION	7-1	PISTON REMOVAL	7-3
TROUBLESHOOTING	7-1	PISTON INSTALLATION	7-7
CYLINDER REMOVAL	7-2	CYLINDER INSTALLATION	7-7

SERVICE INFORMATION

GENERAL INSTRUCTION

- The engine must be removed to perform cylinder/piston maintenance and inspection.

TOOLS

Special

- Piston Base (2 required) 07958-3000000
- Piston Ring Compressor (2 required) 07954-4220000

SPECIFICATIONS

Cylinder		I.D.		STANDARD	SERVICE LIMIT
		I.D.		64.500-64.510 mm (2.5393-2.5397 in)	64.60 mm (2.543 in)
		Warpage		—————	0.10 mm (0.004 in)
Piston, piston rings and piston pin	Piston ring-to-ring groove clearance	TOP		0.015-0.045 mm (0.0006-0.0018 in)	0.09 mm (0.004 in)
		SECOND		0.015-0.045 mm (0.0006-0.0018 in)	0.09 mm (0.004 in)
	Ring end gap	TOP		0.15-0.30 mm (0.006-0.012 in)	0.5 mm (0.02 in)
		SECOND		0.15-0.30 mm (0.006-0.012 in)	0.5 mm (0.02 in)
		OIL (SIDE RAIL)		0.30-0.90 mm (0.012-0.035 in)	1.1 mm (0.04 in)
		Piston O.D.		64.46-64.49 mm (2.538-2.539 in)	64.40 mm (2.535 in)
		Piston pin bore		15.002-15.008 mm (0.5906-0.5909 in)	15.05 mm (0.593 in)
		Connecting rod small end I.D.		15.016-15.034 mm (0.5912-0.5919 in)	15.076 mm (0.5935 in)
	Piston pin O.D.		14.994-15.000 mm (0.5903-0.5906 in)	14.98 mm (0.590 in)	
	Piston-to-piston pin clearance		0.002-0.014 mm (0.0001-0.0006 in)	0.04 mm (0.002 in)	
	Cylinder-to-piston clearance		0.01-0.05 mm (0.0004-0.002 in)	0.10 mm (0.004 in)	
	Piston pin-to-connecting rod clearance		0.016-0.040 mm (0.0006-0.0016 in)	0.060 mm (0.0024 in)	

TROUBLESHOOTING

Compression low

- Worn cylinder or piston rings

Excessive smoke

- Worn cylinder or piston
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Overheating

- Excessive carbon build-up on the piston or combustion chamber wall.

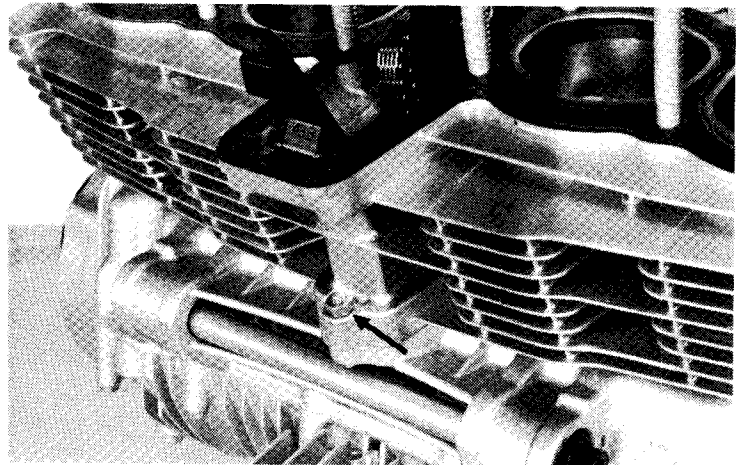
Knocking or abnormal noise

- Worn piston and cylinder
- Excessive carbon build-up

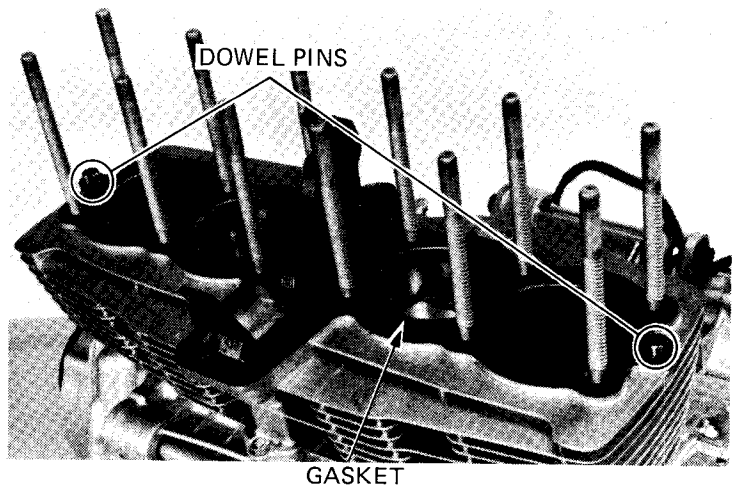


CYLINDER REMOVAL

Remove the cylinder head (Section 6).
Remove the bolt at the lower front cylinder base.
Remove the cylinder.
Remove the cam chain tensioner from the cylinder.



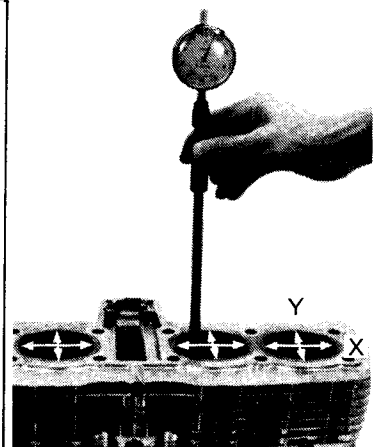
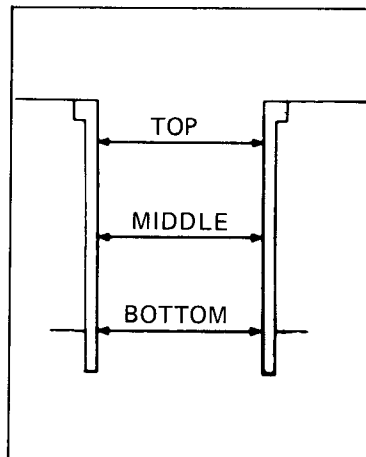
Remove the cylinder gasket and dowel pins.



CYLINDER INSPECTION

Inspect the cylinder bores for wear or damage.
Measure the cylinder I. D. at three levels in X and Y axis.

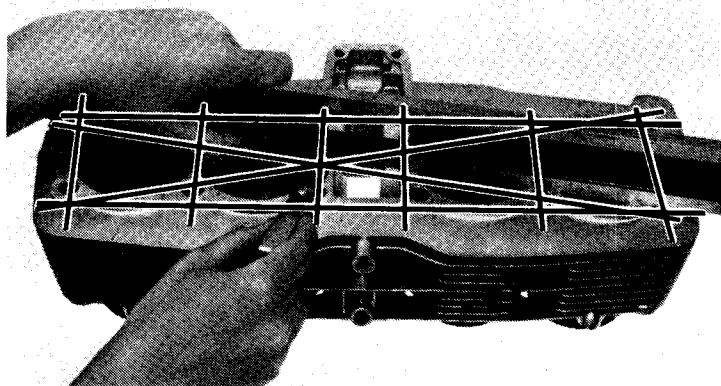
STANDARD: 64.50–64.51 mm
(2.539–2.540 in)
SERVICE LIMIT: 64.60 mm (2.543 in)





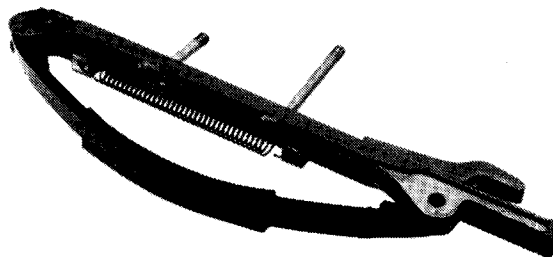
Inspect the top of the cylinder for warpage.
Check in an X pattern as shown.

SERVICE LIMIT:
0.10 mm (0.004 in)



CAM CHAIN TENSIONER INSPECTION

Inspect the slipper of the cam chain tensioner for damage or excessive wear.
Inspect the tension spring for weakness.



PISTON REMOVAL

Remove each piston pin clip with needle nose pliers.

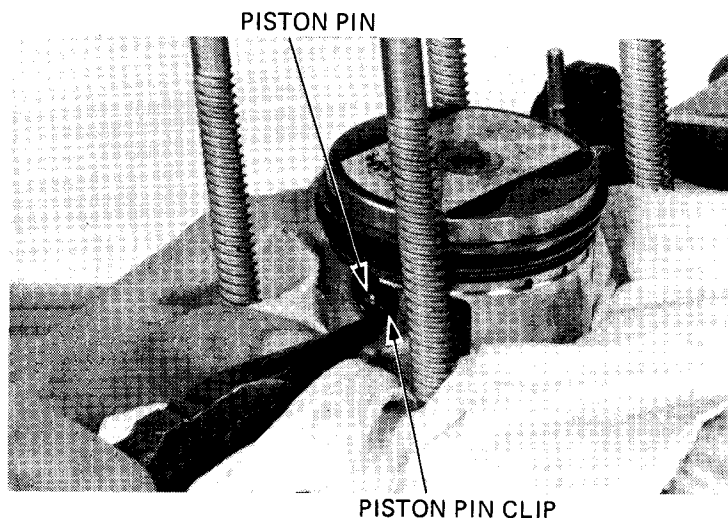
NOTE

Do not allow clips to fall into the crankcase.

Press the piston pin out.

NOTE

Mark the pistons to indicate the cylinder positions.



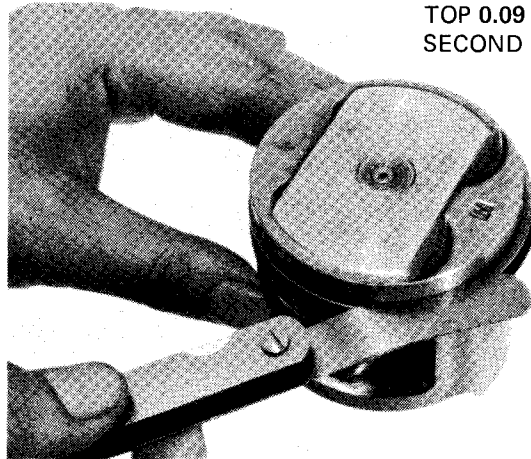

**PISTON/PISTON RING INSPEC-
TION**

Inspect the piston ring-to-groove clearance.

NOTE

Mark the rings so that they can be returned to their original locations.

Inspect the pistons for damage and cracks; ring grooves for wear.


SERVICE LIMIT:

TOP 0.09 mm (0.004 in)

SECOND 0.09 mm (0.004 in)

Insert each piston ring into the cylinder, and inspect the end gap.

SERVICE LIMITS:

TOP: 0.5 mm (0.02 in)

SECOND: 0.5 mm (0.02 in)

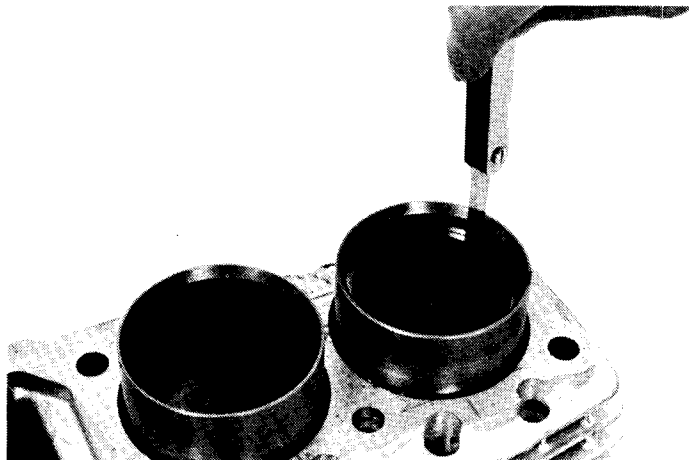
OIL (Side rail): 1.1 mm (0.04 in)

STANDARD END GAPS:

TOP: 0.15–0.30 mm
(0.006–0.012 in)

SECOND: 0.15–0.30 mm
(0.006–0.012 in)

OIL (Side rail): 0.3–0.9 mm
(0.012–0.035 in)



Measure the piston O. D. at the skirt.

NOTE

Measurements should be taken 10 mm (0.4 in) from the bottom.

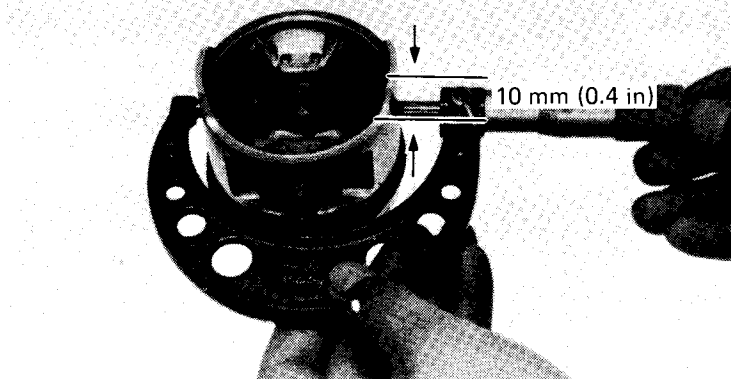
Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

SERVICE LIMIT:

64.40 mm (2.535 in)

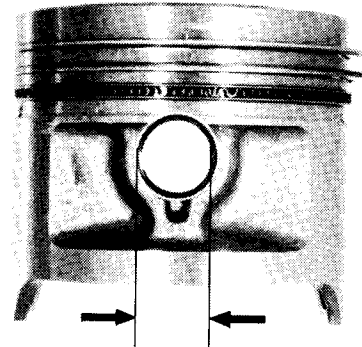
STANDARD: 64.46–64.49 mm (2.538–2.539 in)





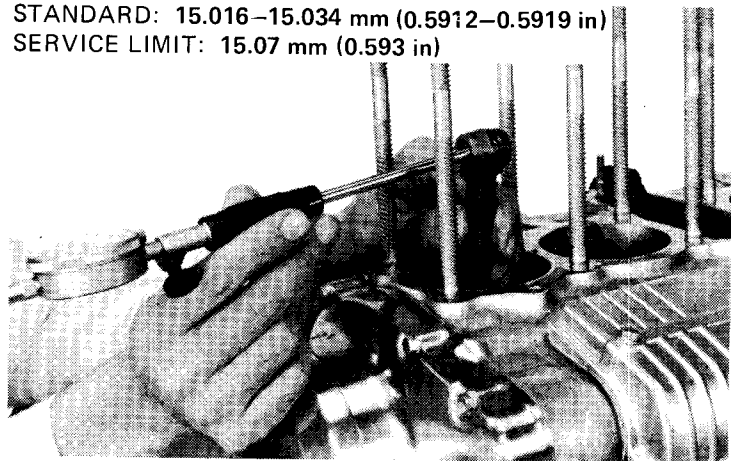
Measure the piston pin hole I. D.

STANDARD: 15.008 mm (0.5906–0.5909 in)
SERVICE LIMIT: 15.05 mm (0.593 in)



Measure the connecting rod small end I. D.
(See Section 12 for replacement procedure)

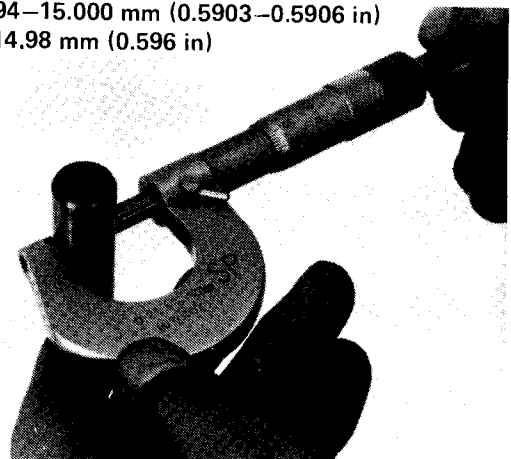
STANDARD: 15.016–15.034 mm (0.5912–0.5919 in)
SERVICE LIMIT: 15.07 mm (0.593 in)



Measure the piston pin O. D.

STANDARD: 14.994–15.000 mm (0.5903–0.5906 in)
SERVICE LIMIT: 14.98 mm (0.596 in)

Determine the piston-to-piston pin clearance.
SERVICE LIMIT: 0.04 mm (0.002 in)





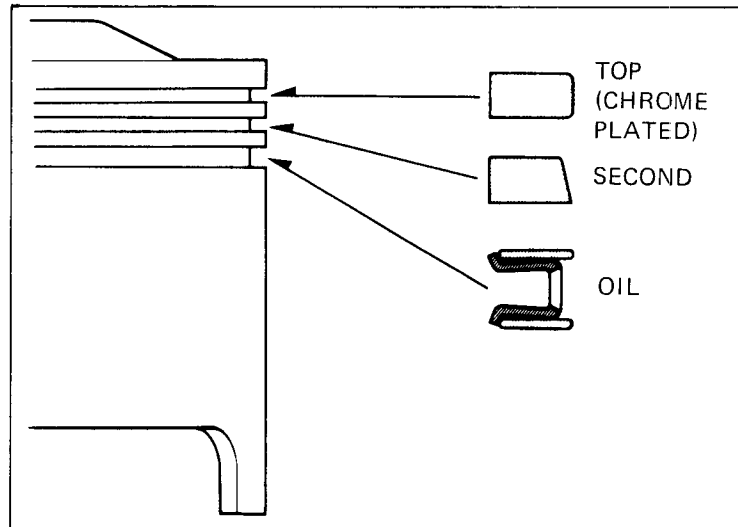
110 CYLINDER/PISTON

PISTON RING INSTALLATION

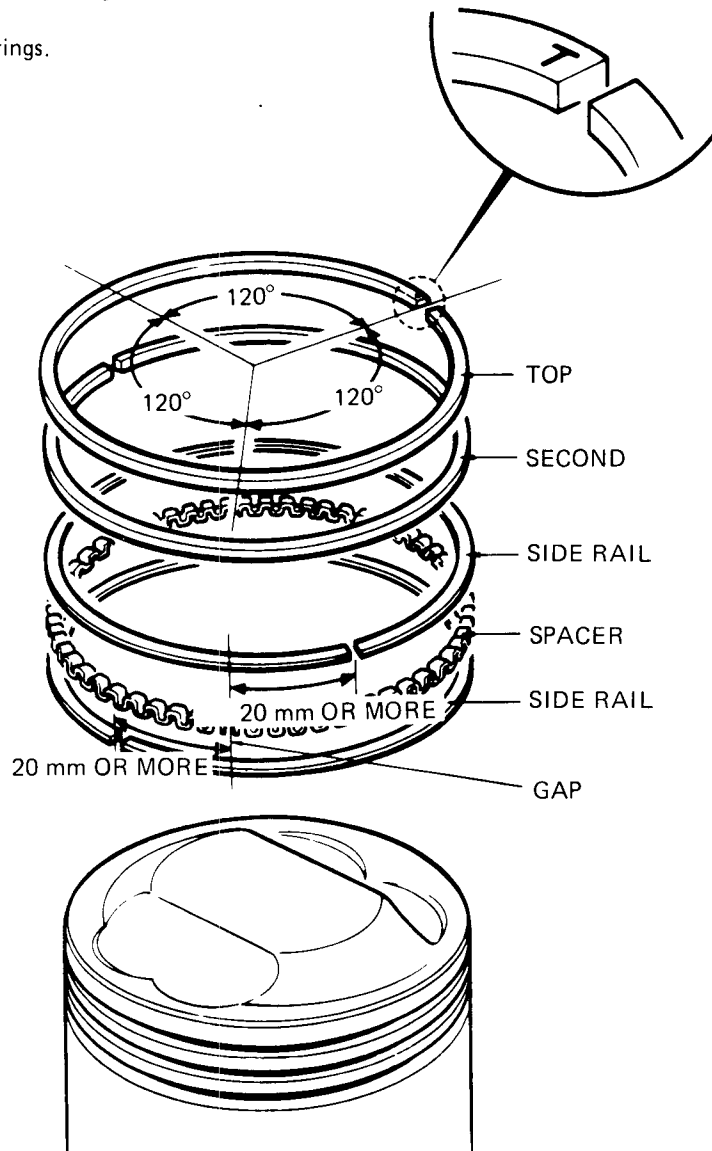
Install the piston rings.

NOTE

- All rings should be installed with the markings facing up.
- After installation, the rings should rotate freely.



Space the piston ring end gaps 120 degrees apart.
Do not align the gaps in the oil rings.



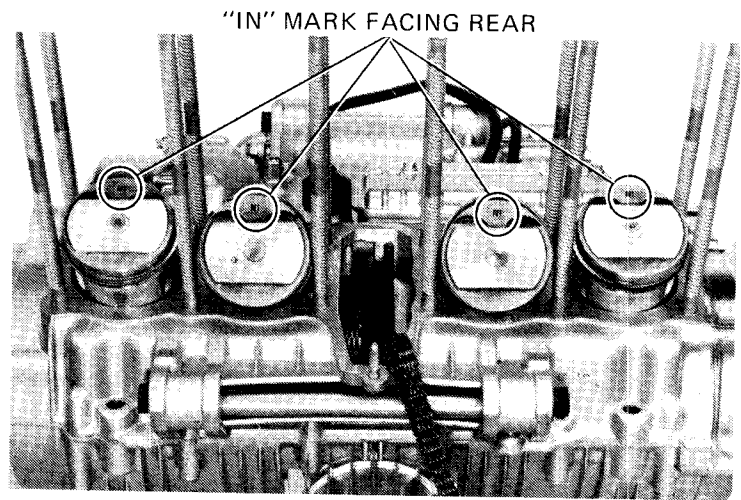


PISTON INSTALLATION

Apply molybdenum disulfide grease to the connecting rod small ends.
Install the pistons, piston pins and clips.

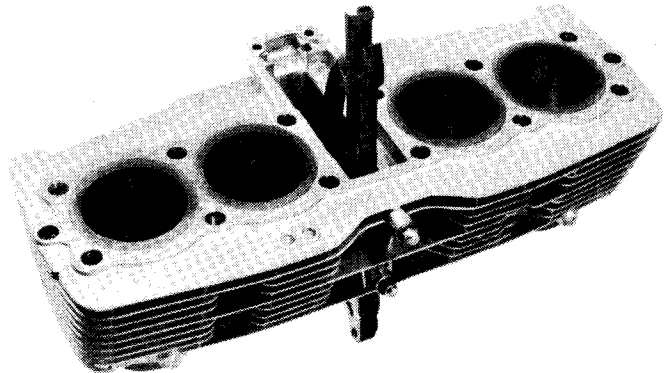
NOTE

- Position the mark "IN" on the piston to the intake side.
- Install the pistons in their original positions.
- Do not allow piston pin clips to fall into the crankcase.

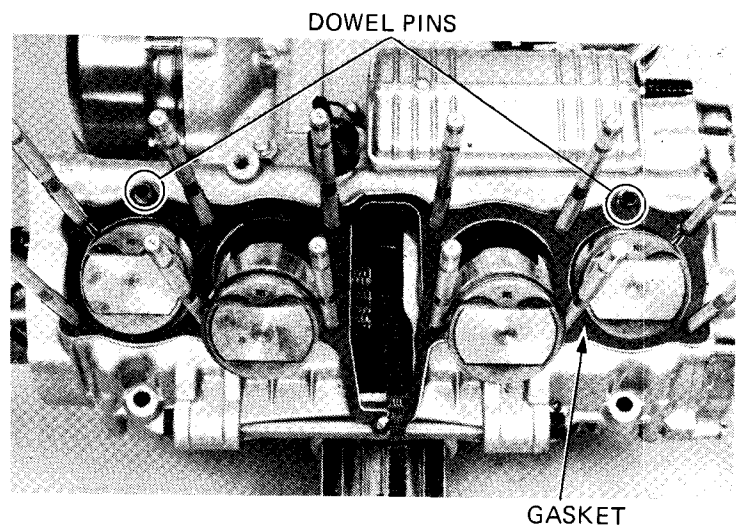


CYLINDER INSTALLATION

Install the cam chain tensioner.



Install the dowel pins and gasket.



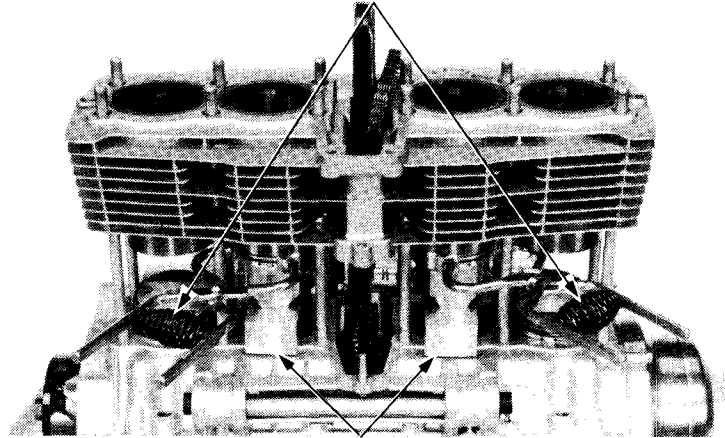


Install the cylinder.

NOTE

Before using the special tools, position the No. 2 and No. 3 pistons at T. D. C. (Top Dead Center).

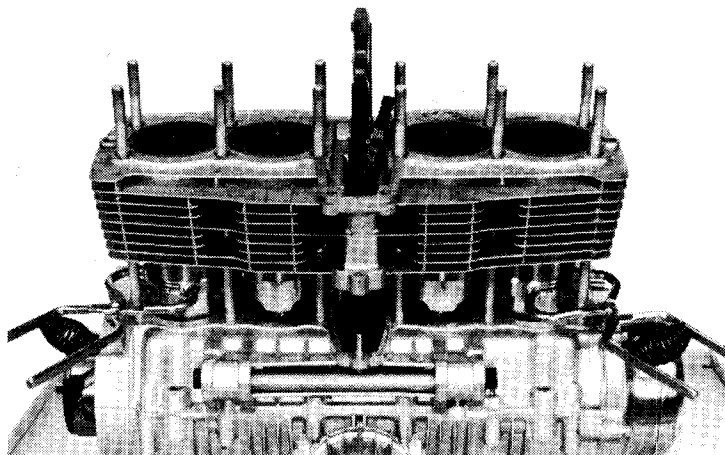
PISTON RING COMPRESSOR
07954-4220000



PISTON BASE
07958-3000000

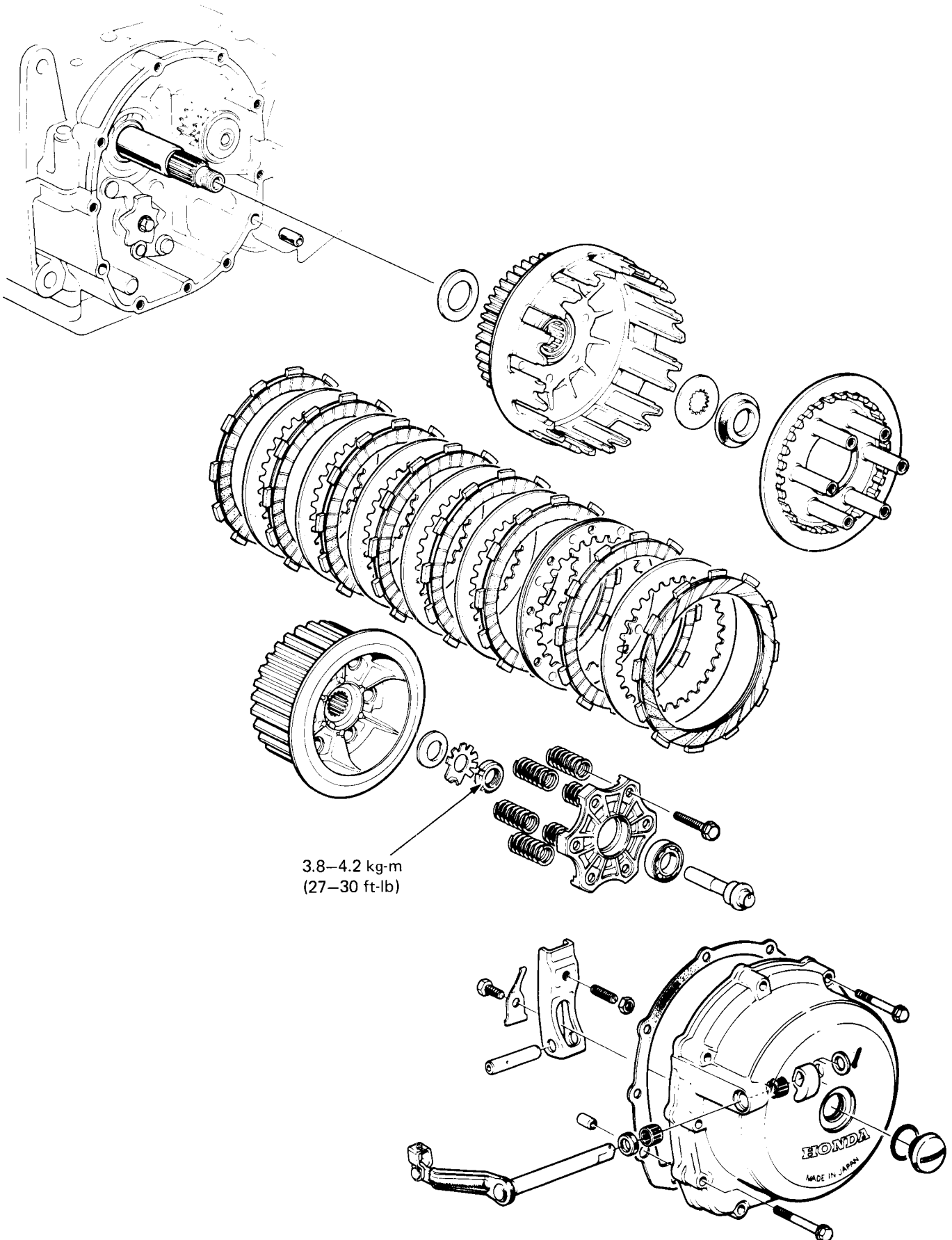
Tighten the cylinder base nut securely after installation.

Install a new cylinder head gasket. Install the dowel pins and cam chain guide.
Install the cylinder head (section 6).





MEMO





SERVICE INFORMATION	8-1	CLUTCH INSTALLATION	8-6
TROUBLESHOOTING	8-2	CLUTCH COVER INSTALLATION	8-8
CLUTCH COVER REMOVAL	8-3	STARTER CLUTCH DISASSEMBLY	8-10
CLUTCH REMOVAL	8-3	STARTER CLUTCH ASSEMBLY	8-12

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- This section covers removal and installation of the clutch and starter clutch.
- Clutch maintenance can be done with the engine in the frame.

TOOLS

Special

- Primary Gear Holder 07924-4250000
- Clutch Center Holder 07923-3710000
- 10 mm Socket Bit 07916-3710000 or Commercially available in U.S.A.

Common

- Lock Nut Wrench 20 x 24 mm Handle 07716-0020100 } or Commercially available in U.S.A.
- 07716-0020500 }

TORQUE VALUES

- Clutch lock nut 3.8- 4.2 kg-m (27-30 ft-lb)
- Primary drive gear lock bolt 8.0-10.0 kg-m (60-72 ft-lb)
- Starter clutch locking bolt 2.6- 3.0 kg-m (19-22 ft-lb)
- Spark advancer bolt 3.3- 3.7 kg-m (24-27 ft-lb)

SPECIFICATIONS

		STANDARD	SERVICE LIMIT	
Clutch	Lever free play (at lever end)	10-20 mm (3/8-3/4 in)	—————	
	Spring free length	35.3 mm (1.39 in)	33.9 mm (1.33 in)	
	Spring preload/length	18.3-20.1 kg/25 mm (40.34-43.31 lbs/0.98 in)	16.8 kg/25 mm (37.0 lbs/0.98 in)	
	Disc thickness	A	3.72-3.88 mm (0.146-0.153 in)	3.4 mm (0.13 in)
		B	3.72-3.88 mm (0.146-0.153 in)	3.4 mm (0.13 in)
Plate warpage	—————	0.30 mm (0.012 in)		
Starter clutch	Drive gear O.D.	42.275-42.300 mm (1.6644-1.6654 in)	42.255 mm (1.6636 in)	
Ignition timing	Refer to Section 3.			



TROUBLESHOOTING

Clutch

Faulty clutch operation can usually be corrected by adjusting the free play.

Clutch slips

1. No free play
2. Discs worn
3. Springs weak

Clutch will not disengage

1. Too much free play
2. Plates warped

Motorcycle creeps with clutch disengaged

1. Too much free play
2. Plates warped

Excessive lever pressure

1. Clutch cable kinked, damaged or dirty
2. Lifter mechanism damaged

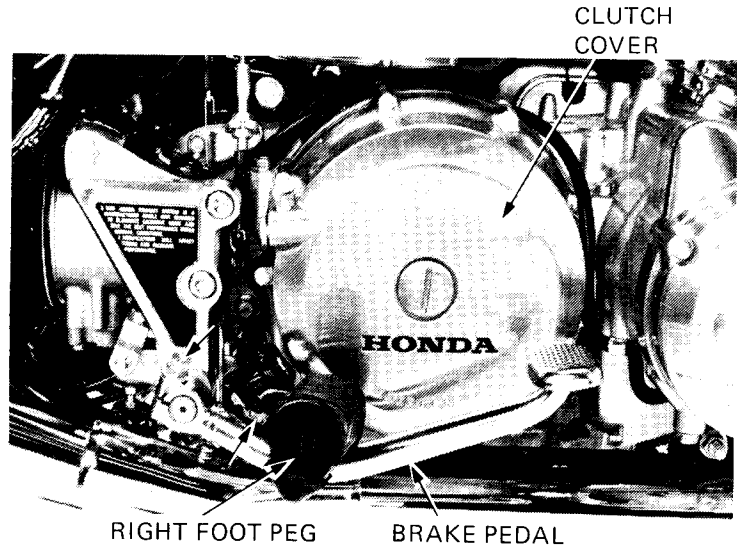
Clutch operation feels rough

1. Outer drum slots rough



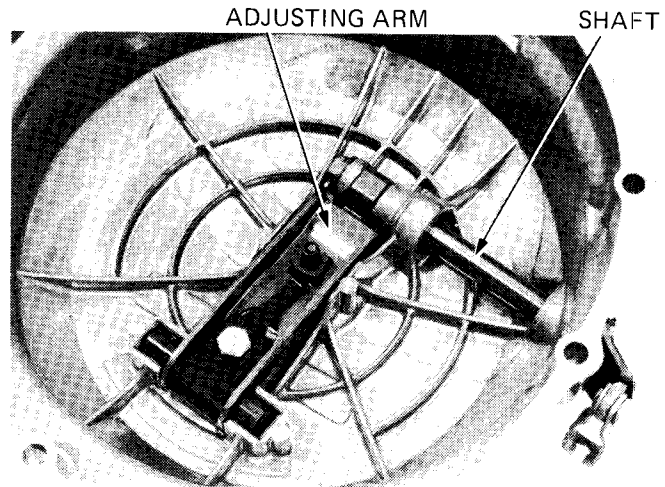
CLUTCH COVER REMOVAL

- Drain the engine oil thoroughly.
- Disconnect the clutch cable at the lower adjuster.
- Remove the rear brake pedal and right foot peg.
- Remove the clutch cover.
- Remove the gasket and dowel pins.



CLUTCH LIFTER REMOVAL

- Remove the clutch lifter shaft and adjusting arm.



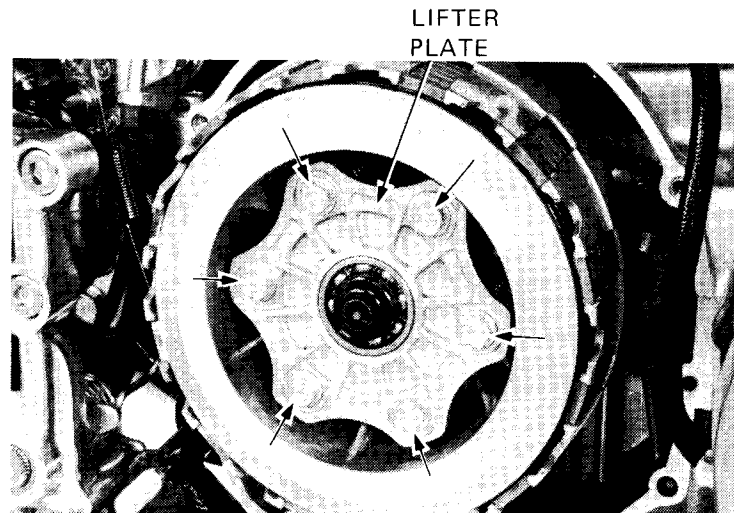
CLUTCH REMOVAL

- Remove the bolts and lifter plate with the clutch lifter guide and release bearing.

NOTE

Loosen the bolts in a crisscross pattern in 2-3 steps.

- Remove the clutch springs.





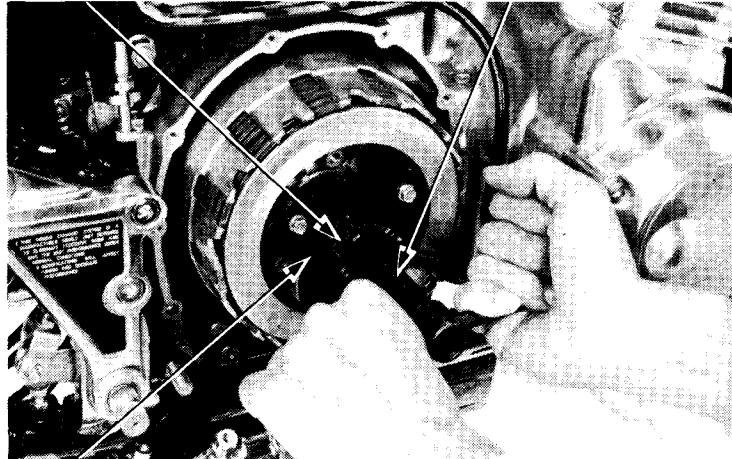
118 CLUTCH

Straighten the lock washer tab.

Install the clutch holder on the clutch center with three, 6 mm bolts.
Remove the lock nut, lock washer and washer.
The clutch can now be removed as a unit.

LOCK NUT WRENCH 20 x 24 mm
07716-0020100

EXTENSION



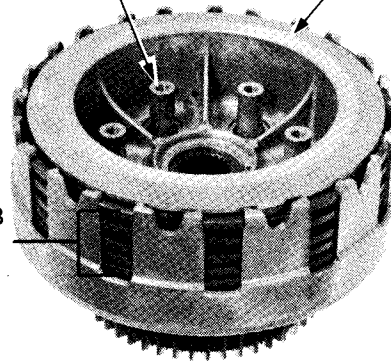
CLUTCH CENTER HOLDER
07923-3710000

Remove the clutch assembly.

PRESSURE
PLATE

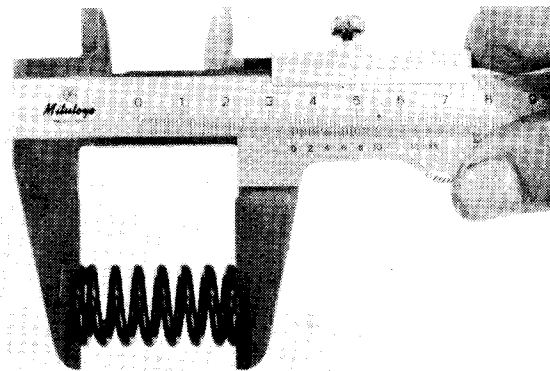
CLUTCH CENTER

PLATE A · B
AND
DISC A · B



CLUTCH SPRING INSPECTION

Check spring free length.

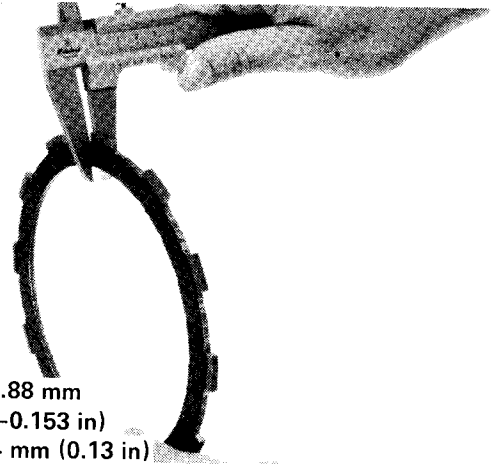


STANDARD: 35.3 mm (1.39 in)
SERVICE LIMIT: 33.9 mm (1.33 in)



CLUTCH DISC INSPECTION

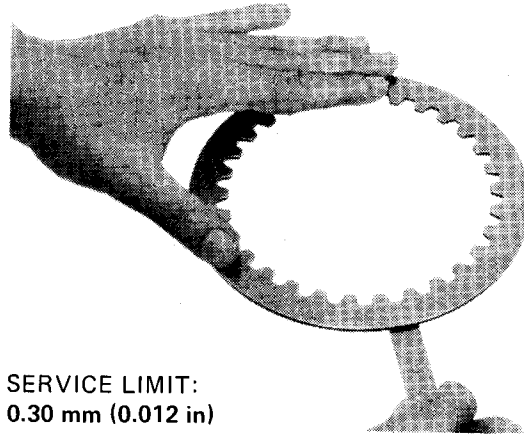
Replace the clutch discs if they show signs of scoring or discoloration.
Measure disc thickness.



STANDARD: 3.72–3.88 mm
(0.146–0.153 in)
SERVICE LIMIT: 3.4 mm (0.13 in)

PLATE INSPECTION

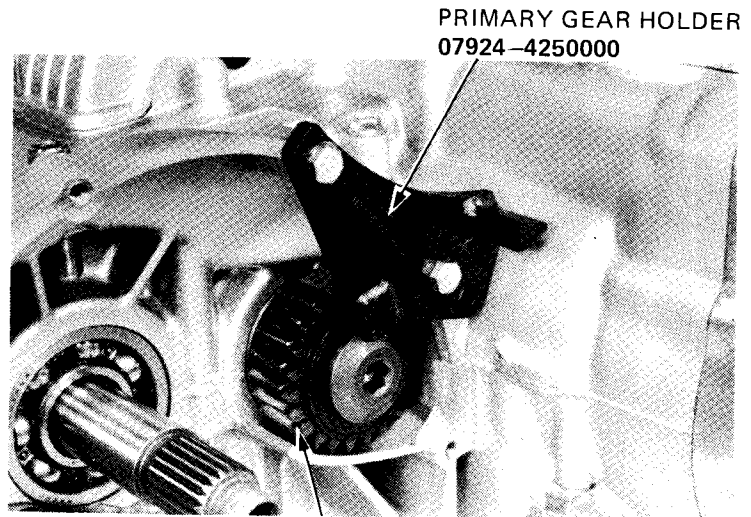
Check for plate warpage on a surface plate, using a feeler gauge.



SERVICE LIMIT:
0.30 mm (0.012 in)

PRIMARY DRIVE GEAR REMOVAL

Hold the primary drive gear with the primary gear holder as shown.
Loosen the lock bolt.



PRIMARY GEAR HOLDER
07924-4250000

PRIMARY
DRIVE GEAR

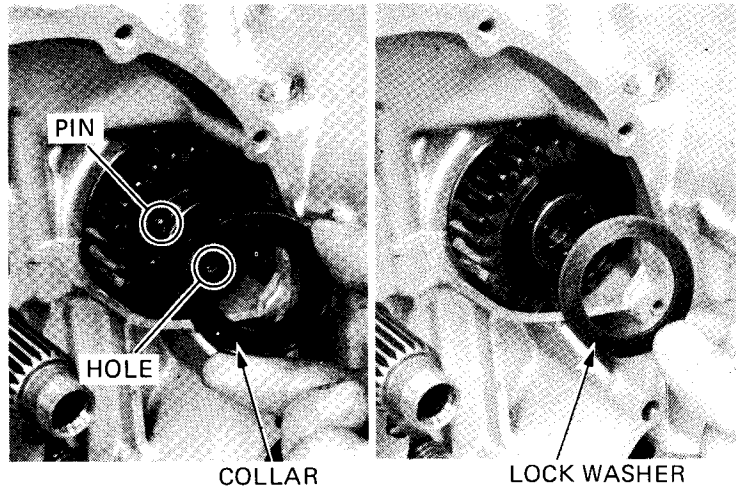


CLUTCH INSTALLATION

Install the primary drive gear.

NOTE

- Position the drive gear with the large gear facing out.
- Position the collar and lock washer as shown.

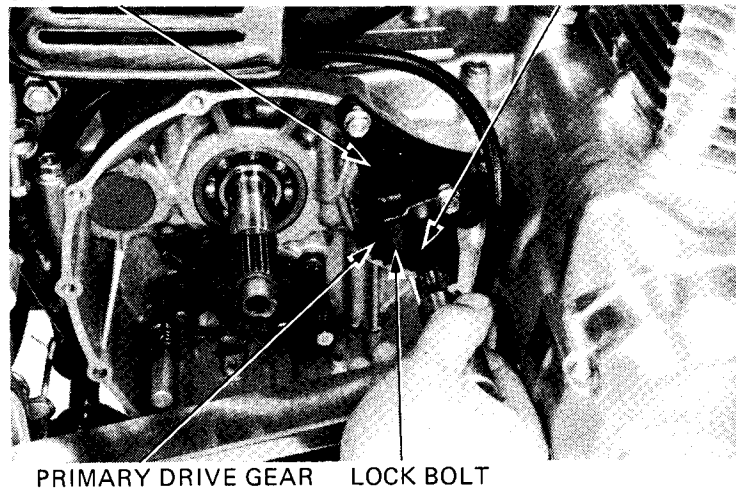


Tighten the lock bolt.

TORQUE: 8.0–10.0 kg-m (60–72 ft-lb)

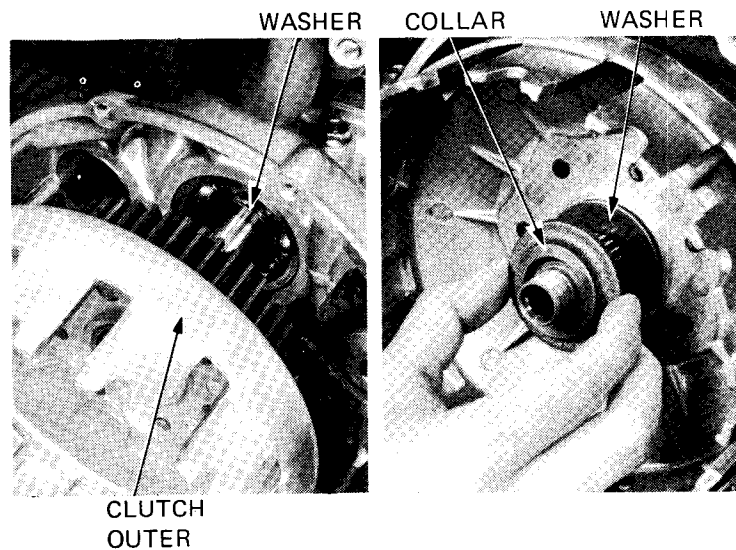
PRIMARY GEAR HOLDER
07924-4250000

10 mm SOCKET BIT
07917-3710000



Install the washer and clutch outer.

Install the washer and collar.

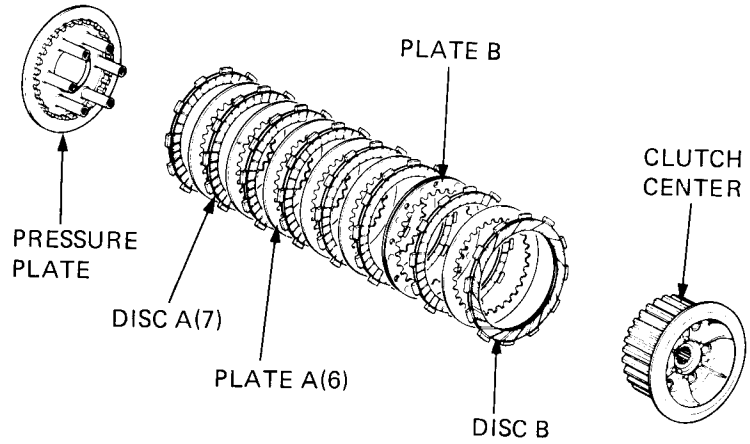
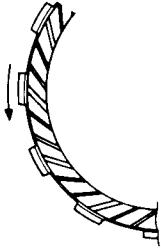




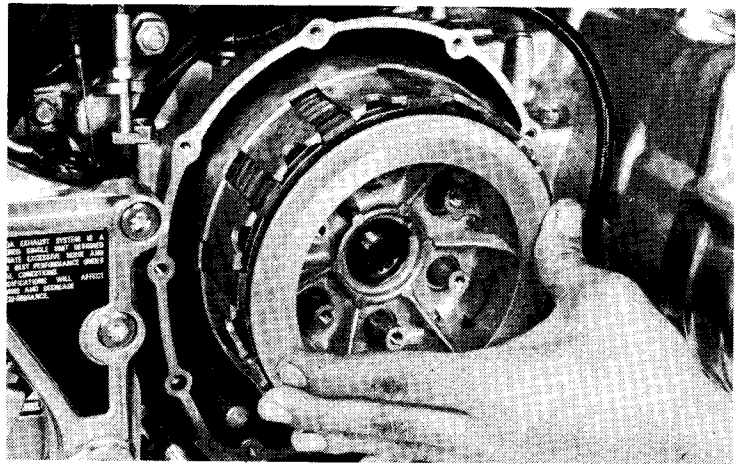
Assemble the clutch discs A and B, plate A and B, clutch pressure plate, and clutch center.

NOTE

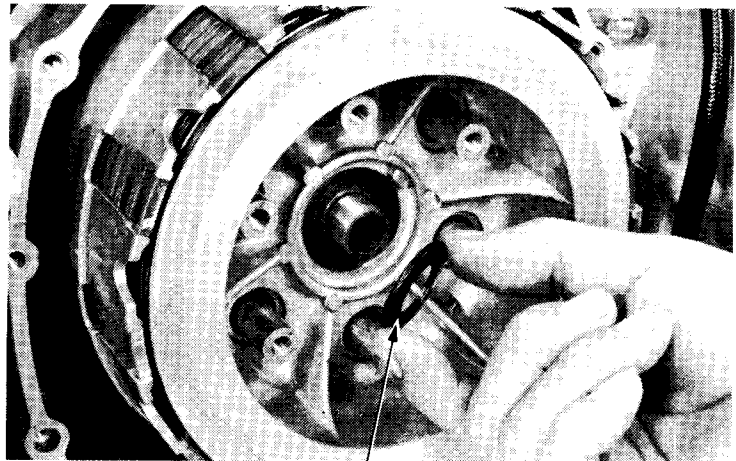
- Before installing the clutch, coat the discs and plates with engine oil.
- Install disc B with the grooves facing in the direction shown.



Install the above assembly, by rotating the clutch center.



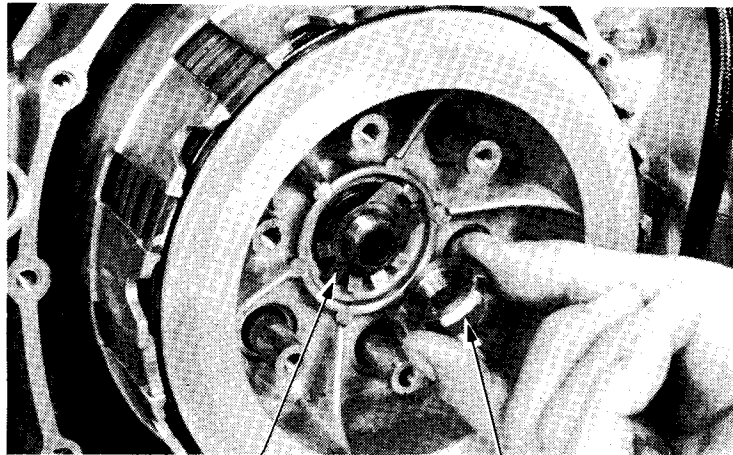
Install the plain washer with the "OUTSIDE" mark facing out.



WASHER



Position the lock washer as shown.
Install the lock nut with the chamfer facing out.



LOCK WASHER LOCK NUT

Install the clutch holder on the clutch center with three, 6 mm bolts.

Tighten the lock nut.

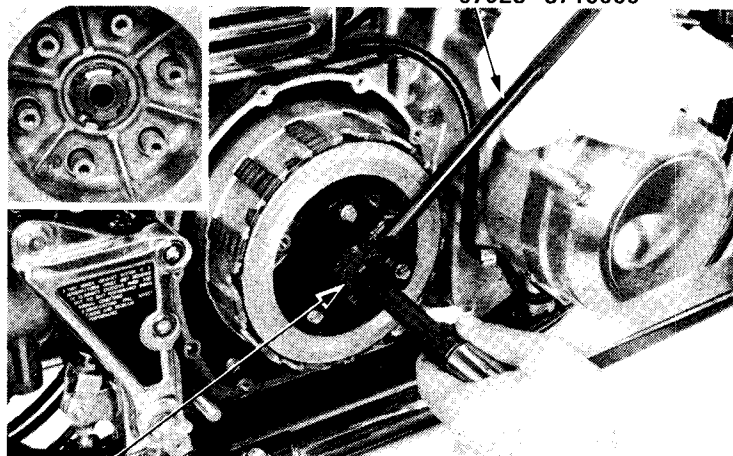
TORQUE: 3.8–4.2 kg-m (27–30 ft-lb)

Bend the lock washer tab as shown.

Install the clutch springs, lifter plate, bearing and lifter guide.

Tighten the bolts.

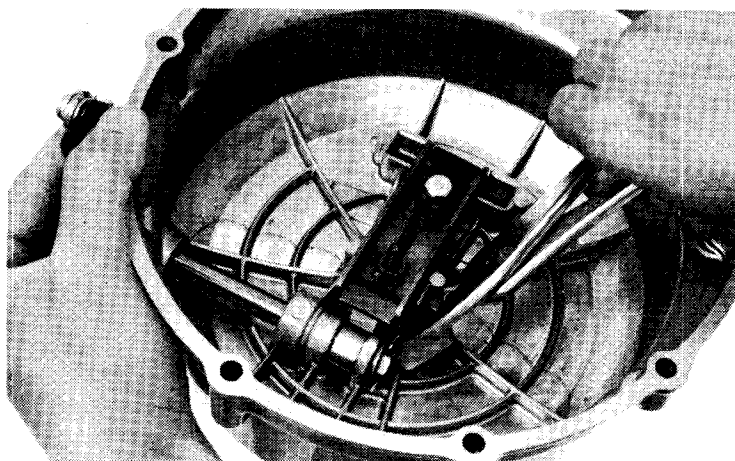
CLUTCH
CENTER HOLDER
07923-3710000



LOCK NUT WRENCH
20 x 24 mm
07716-0020100

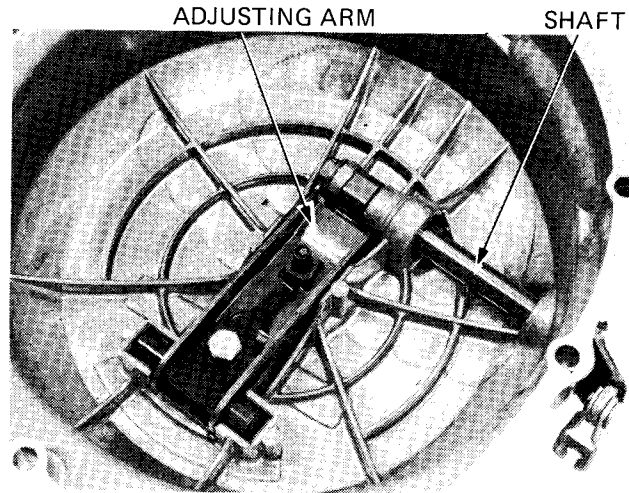
CLUTCH COVER INSTALLATION

Install the clutch lifter cam and shaft washer.
Insert the cotter pin and spread the ends.
Apply molybdenum disulfide grease to the
advancer shaft hole.

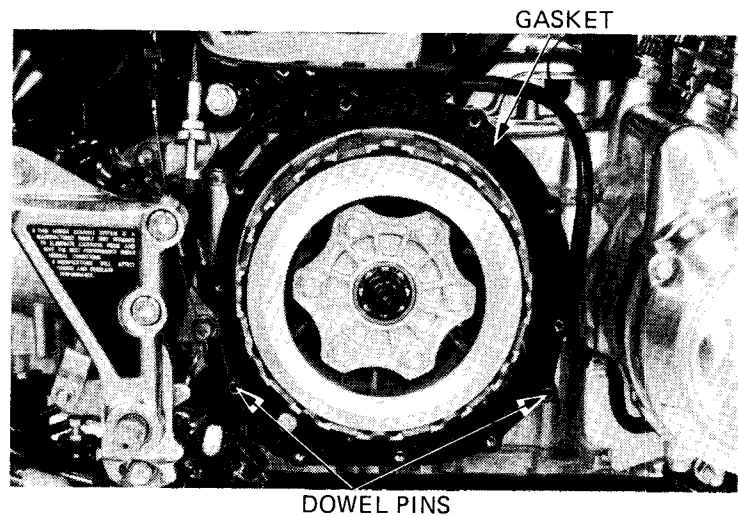




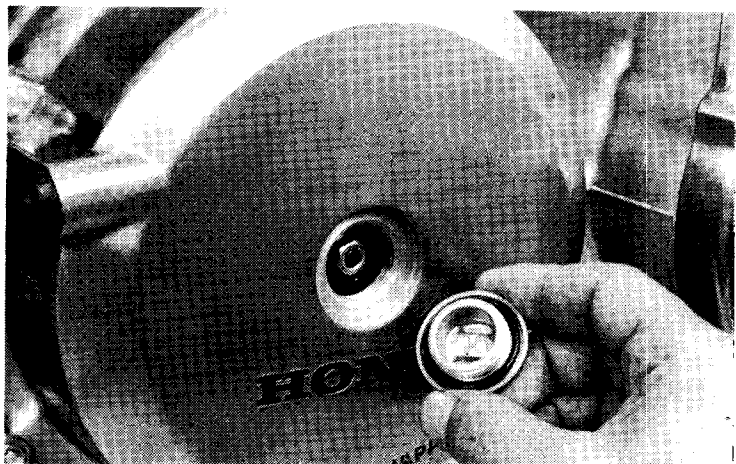
Install the adjusting arm and spring.



Install the dowel pins and gasket, and then install the cover.



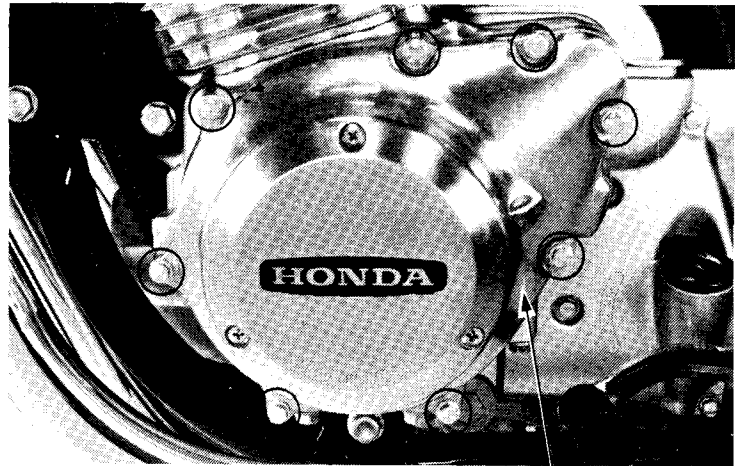
Adjust the clutch (page 3-17).
Apply grease to the adjusting hole cap O-ring
and install.





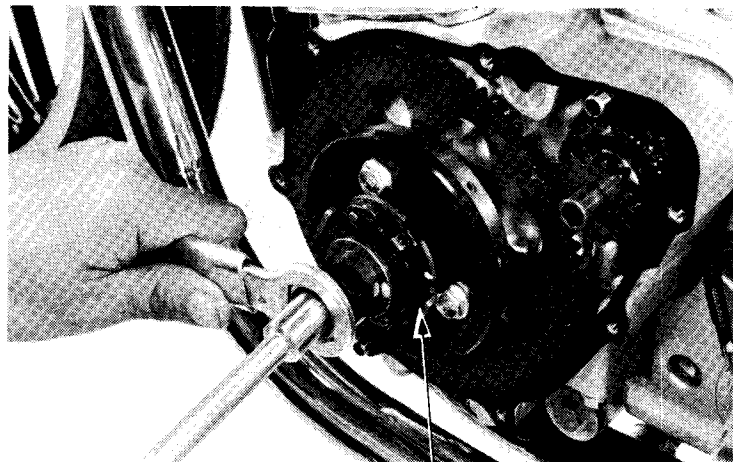
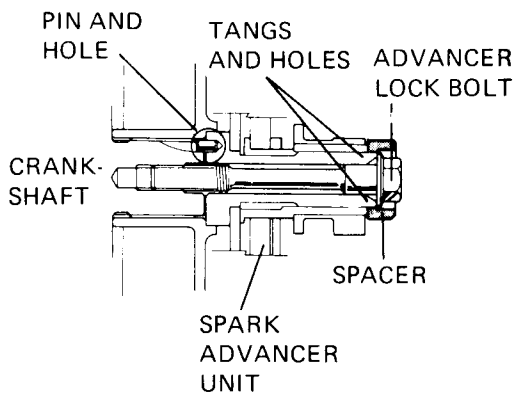
STARTER CLUTCH DISASSEMBLY

Remove the left crankcase cover with the pulser generator assembly.



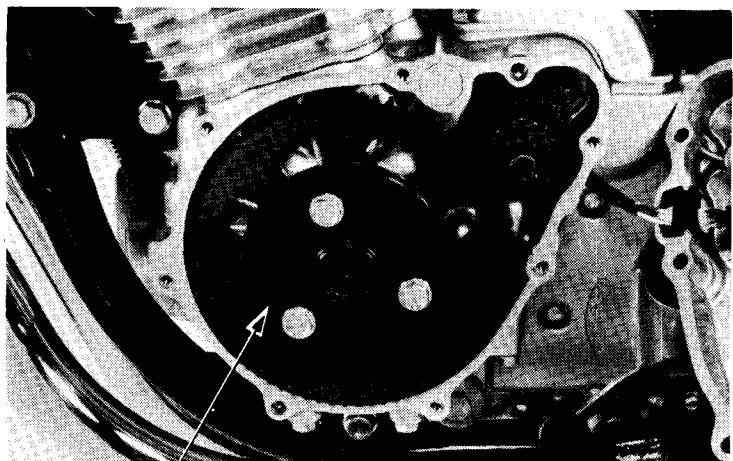
LEFT CRANKCASE COVER

Remove the spark advancer unit.



SPARK ADVANCER

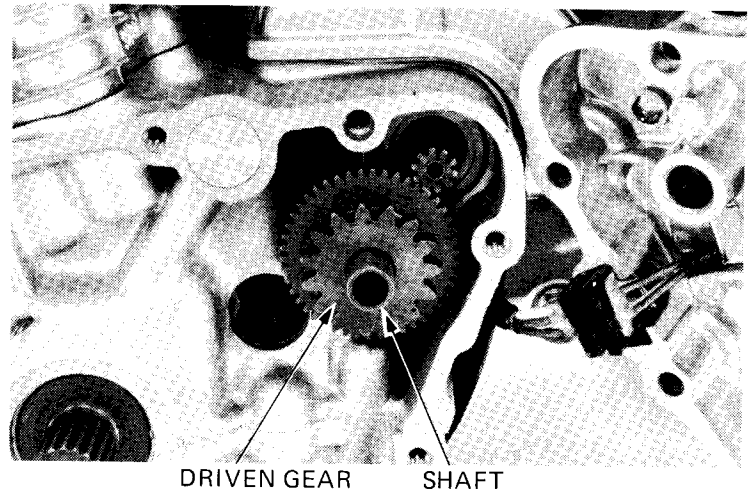
Remove the starter clutch assembly.



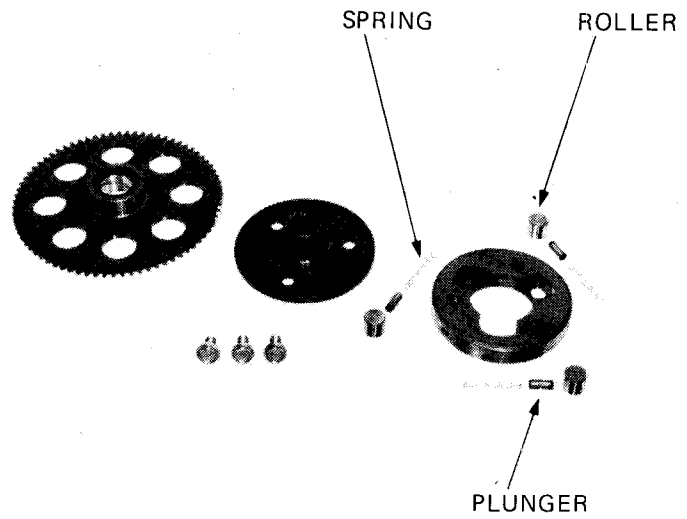
STARTER CLUTCH



Remove the starter driven gear and shaft.



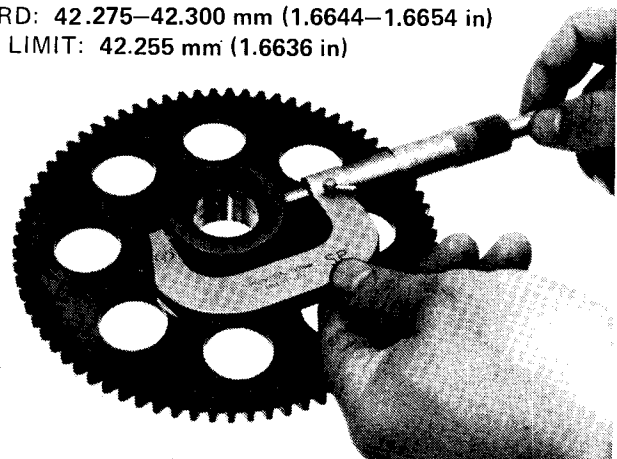
Inspect the rollers for smooth operation.
Remove the rollers and check for excessive wear.
Clean all parts with non-flammable or high flash point solvent.



STARTER DRIVE GEAR INSPECTION

Inspect the drive gear for damage or excessive wear.
Measure the O. D..

STANDARD: 42.275–42.300 mm (1.6644–1.6654 in)
SERVICE LIMIT: 42.255 mm (1.6636 in)





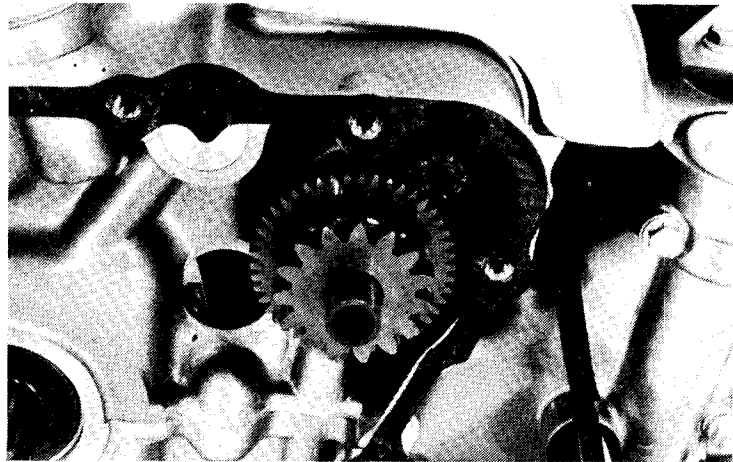
STARTER CLUTCH ASSEMBLY

Install the springs, plungers and rollers.
Tighten the locking bolts to the specified torque.

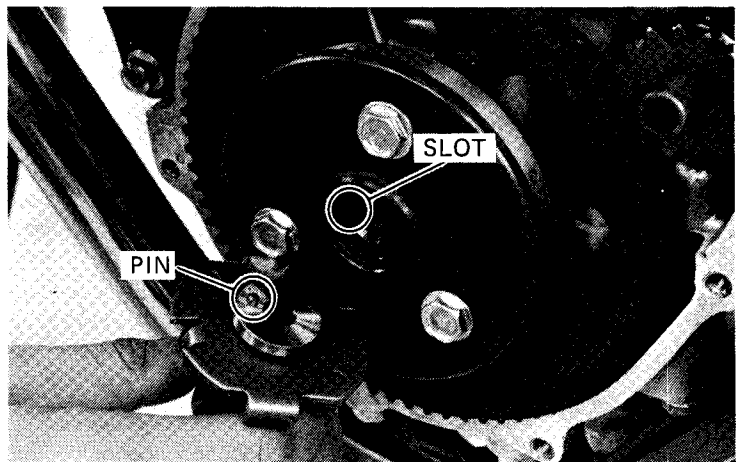
TORQUE: 2.6–3.0 kg-m (19–22 ft-lb)

NOTE

Apply a locking agent to the locking bolt's threads.



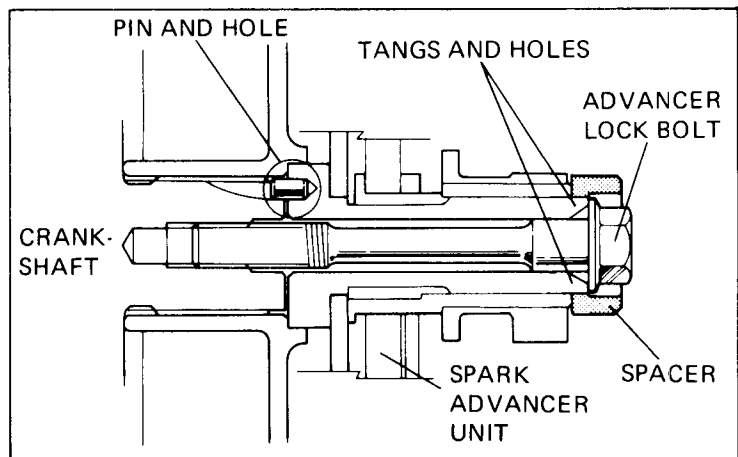
Install the advancer assembly.
Align the pin on the spark advancer unit with the slot on the crankshaft.



Install the spacer aligning the tangs with the holes, and tighten the advancer lock bolt to the specified torque.

TORQUE: 3.3–3.7 kg-m (24–27 ft-lb)

Install the left crankcase cover.





MEMO