HONDA

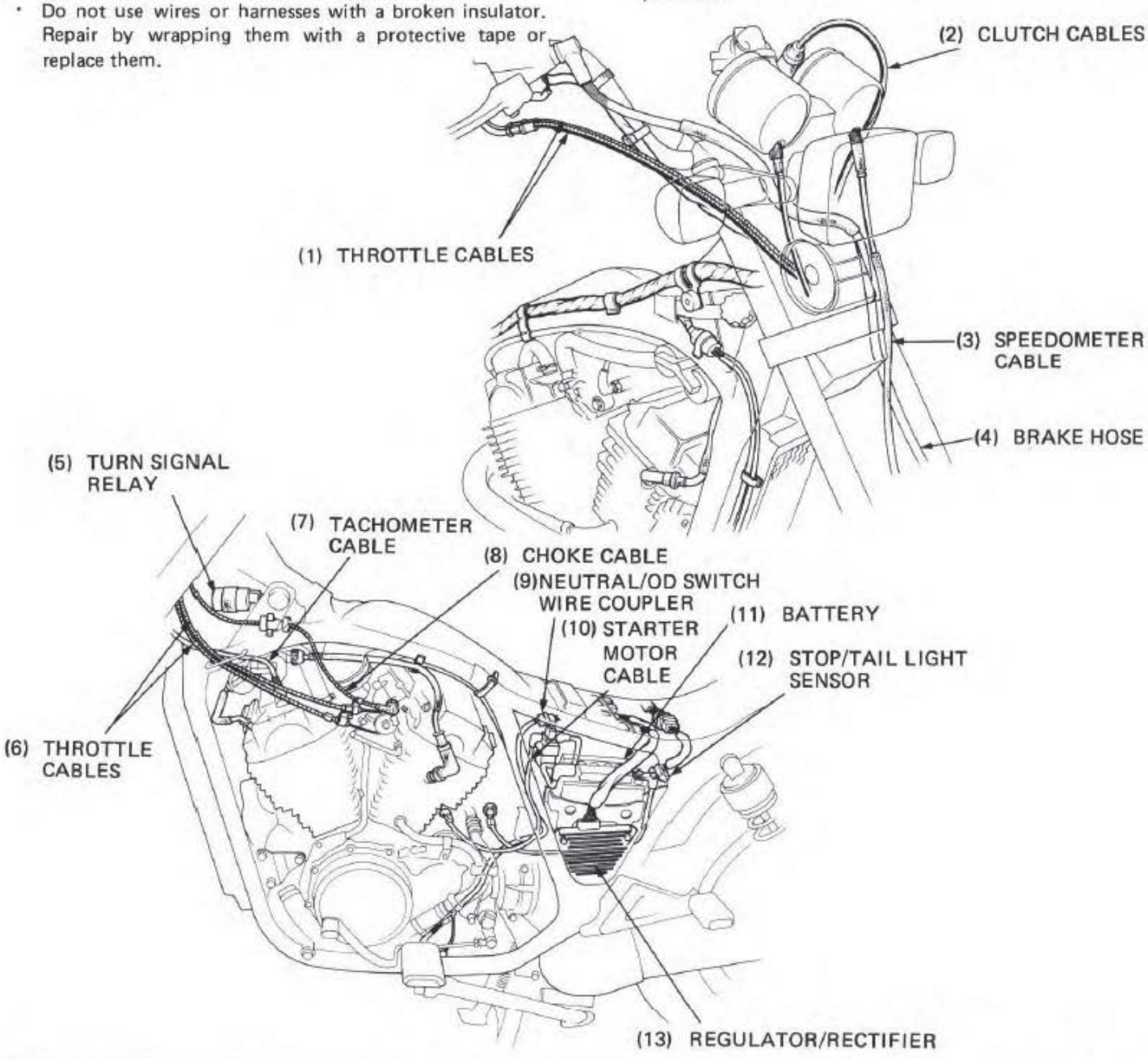
VT500 CUSTOM

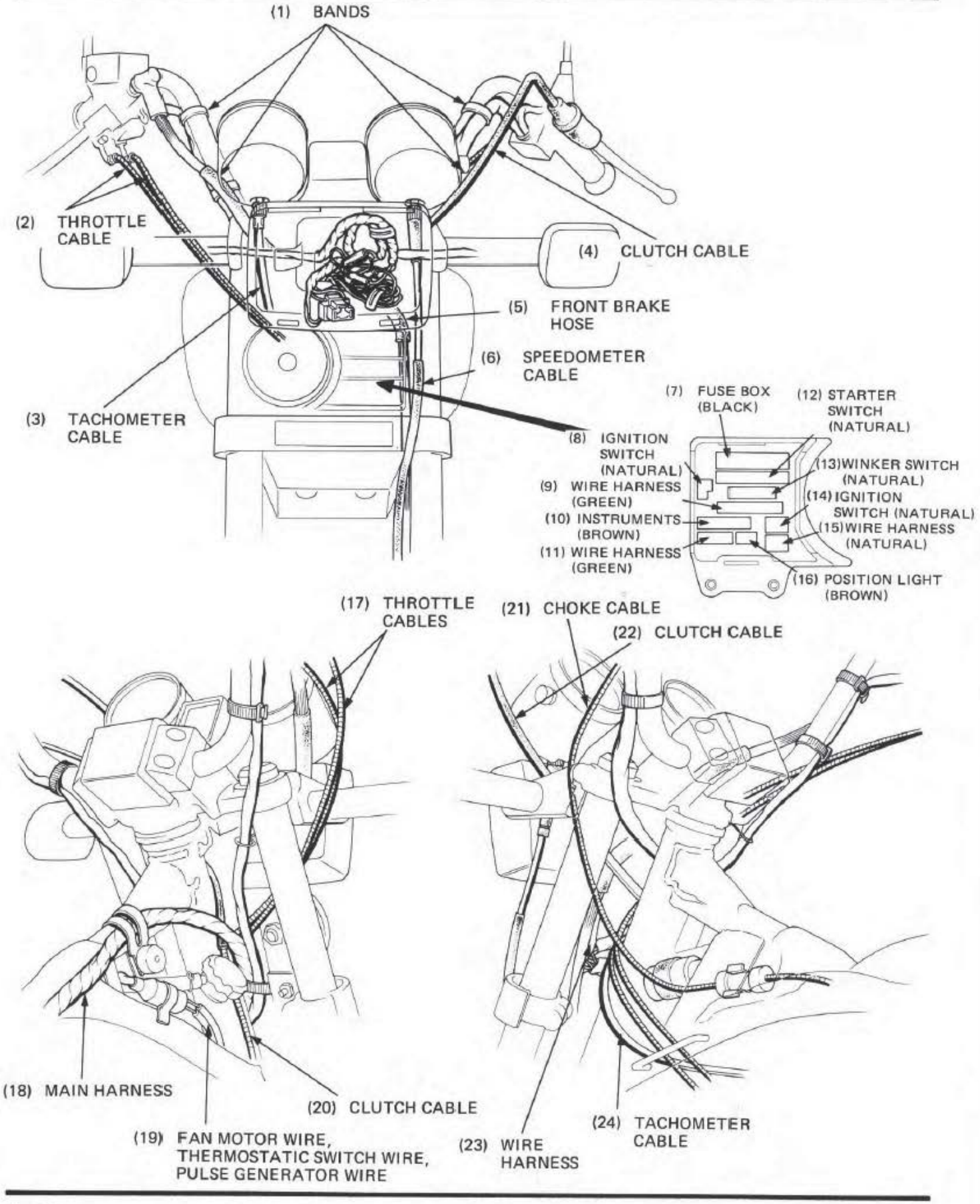
SHOP MANUAL
MANUEL D'ATELIER
WERKSTATT-HANDBUCH

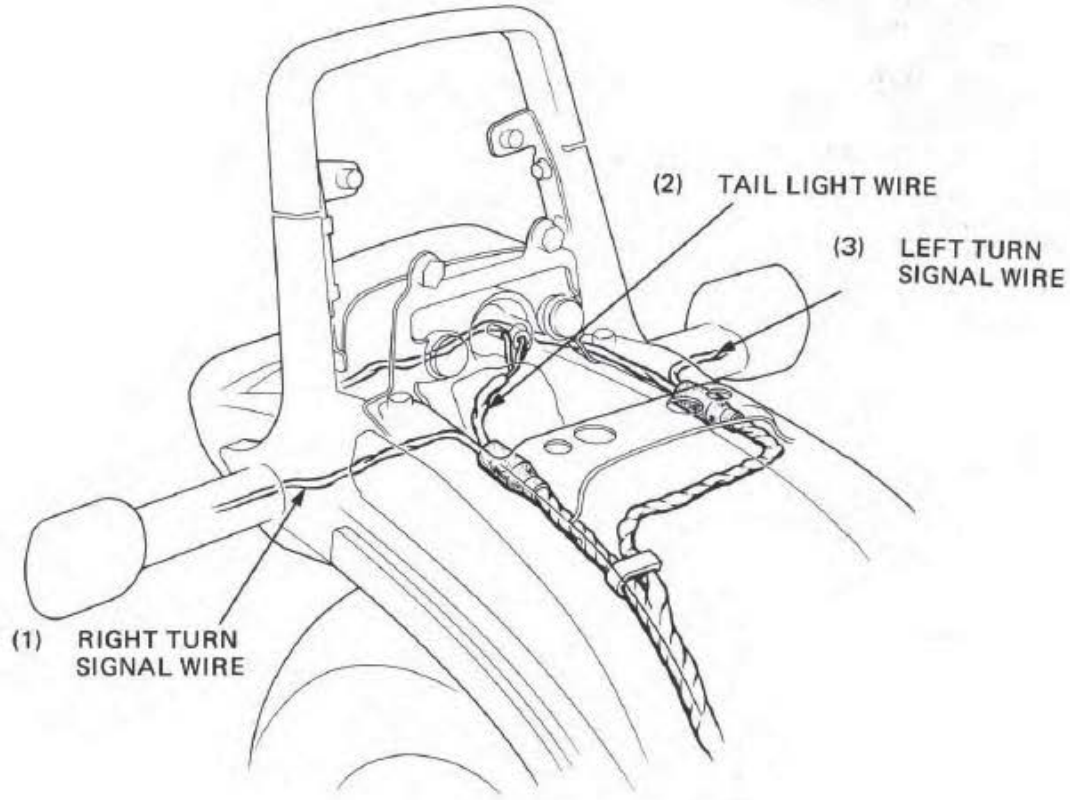
CABLE & HARNESS ROUTING

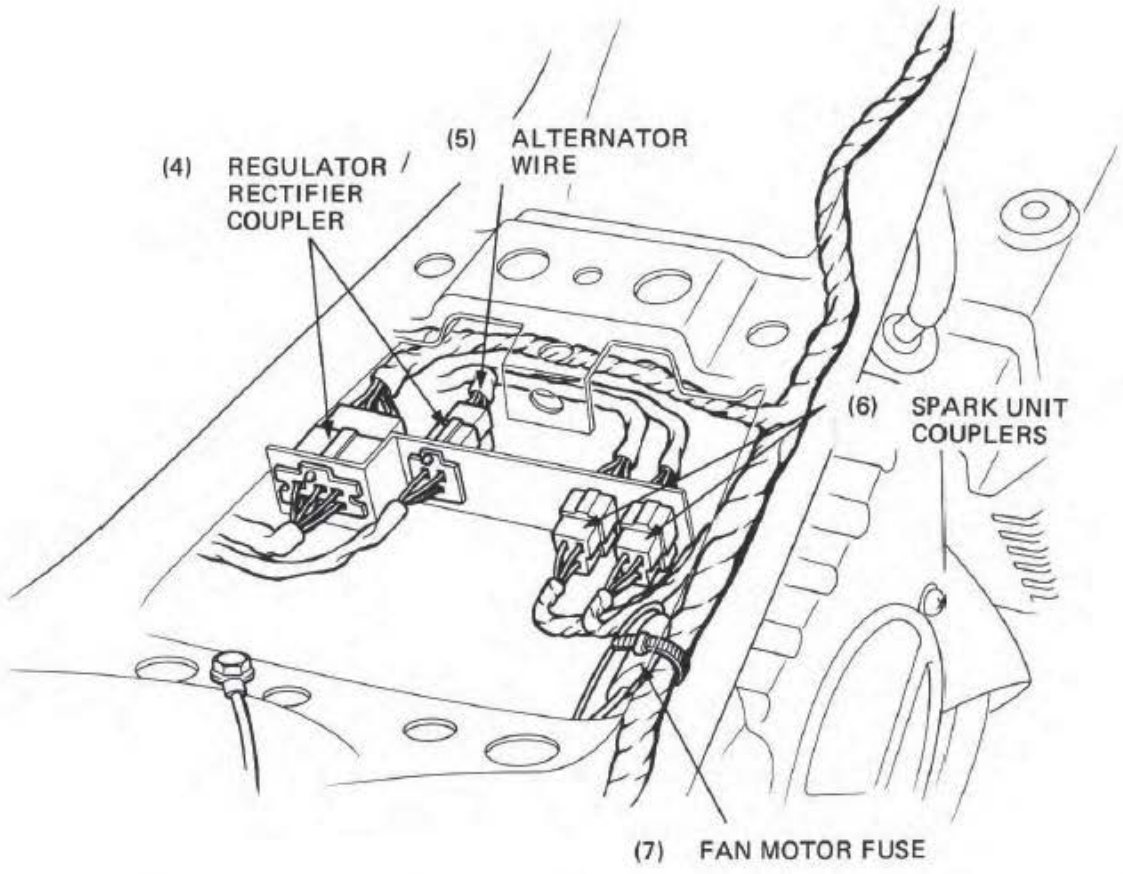
Note the following when routing cables and wire harnesses.

- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against the weld or end of its clamp when a weld-on clamp is used.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so that they are not pulled or have excessive slack.
- Protect wires and harnesses with electrical tape or tube if they are in contact with a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use wires or harnesses with a broken insulator. Repair by wrapping them with a protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners.
- Also avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other hot parts.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handle bars should not be pulled taut, have excessive slack, be pinched, or interfere with adjacent or surrounding parts in all steering positions.




(1) BANDS
(2) THROTTLE CABLE
(3) TACHOMETER CABLE
(4) CLUTCH CABLE
(5) FRONT BRAKE HOSE
(6) SPEEDOMETER CABLE
(7) FUSE BOX (BLACK)
(8) IGNITION SWITCH (NATURAL)
(9) WIRE HARNESS (GREEN)
(10) INSTRUMENTS (BROWN)
(11) WIRE HARNESS (GREEN)
(12) STARTER SWITCH (NATURAL)
(13) WINKER SWITCH (NATURAL)
(14) IGNITION SWITCH (NATURAL)
(15) WIRE HARNESS (NATURAL)
(16) POSITION LIGHT (BROWN)
(17) THROTTLE CABLES
(18) MAIN HARNESS
(19) FAN MOTOR WIRE, THERMOSTATIC SWITCH WIRE, PULSE GENERATOR WIRE
(20) CLUTCH CABLE
(21) CHOKE CABLE
(22) CLUTCH CABLE
(23) WIRE HARNESS
(24) TACHOMETER CABLE

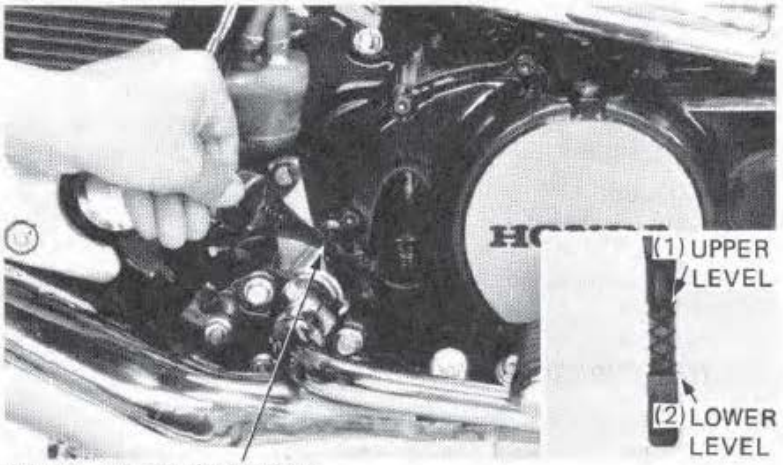

(2) TAIL LIGHT WIRE
(3) LEFT TURN SIGNAL WIRE
(1) RIGHT TURN SIGNAL WIRE


(5) ALTERNATOR WIRE
(4) REGULATOR / RECTIFIER COUPLER
(6) SPARK UNIT COUPLERS
(7) FAN MOTOR FUSE

ENGINE OIL LEVEL

Place the motorcycle on its center stand.
Check the oil level with the filler cap/dipstick.
Do not screw it in when making this check.

If the oil level is below or near the lower level mark on the dipstick, add the recommended oil (page 2-1) up to the upper level line.



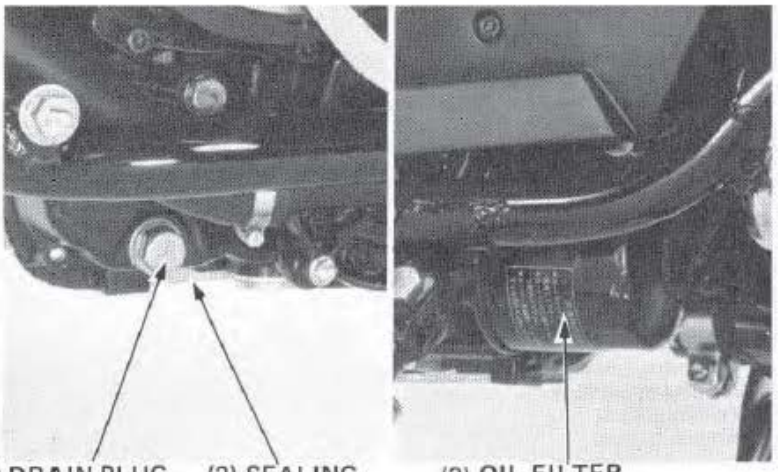
ENGINE OIL & FILTER CHANGE

NOTE

Change engine oil with the engine warm and the motorcycle on its center stand to assure complete and rapid draining.

Remove the oil filler cap, and drain plug and drain the oil. Remove the oil filter with a filter wrench. Discard the oil filter.
Check that the sealing washer on the drain plug is in good condition and install it.

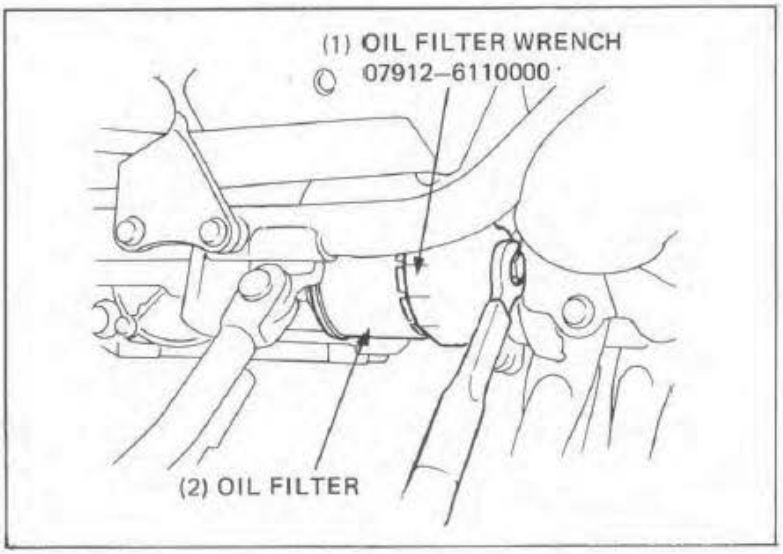
TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)



Apply oil to a new oil filter O-ring and install a new oil filter.

Torque the place motor cycle on its side stand oil filter with a filter wrench.

TORQUE: 15–20 N·m
(1.5–2.0 kg-m, 11–14 ft-lb)



After tightening the oil filter, place the motorcycle back on its center stand.

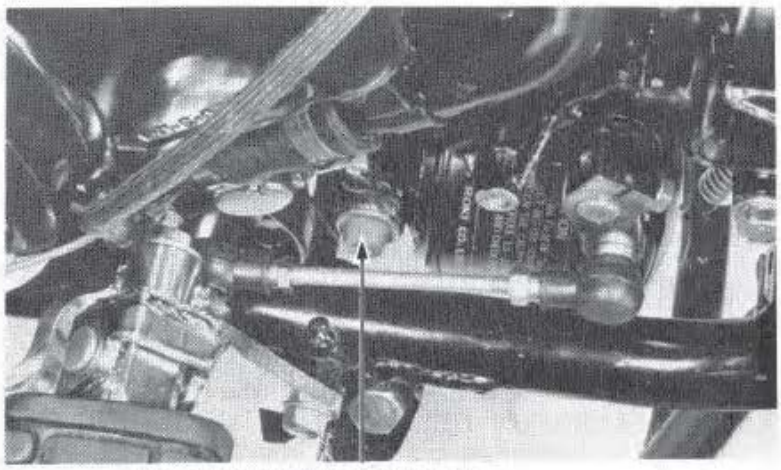
Fill the crankcase with 2.5 liters (2.6 US qt, 2.2 Imp. qt.) of the recommended oil (page 2-1).

Install the oil filler cap/dipstick.

Start the engine and let it idle for 2–3 minutes. Stop the engine and check that the oil level is at the upper level mark on the dipstick. Make sure there are no oil leaks.

OIL PRESSURE CHECK

Warm the engine up to normal operating temperature (approximately 80°C/176°F).
Stop the engine and disconnect the oil pressure switch wire.
Remove the oil pressure switch and connector an oil pressure gauge to the pressure switch hole.
Check the oil level.

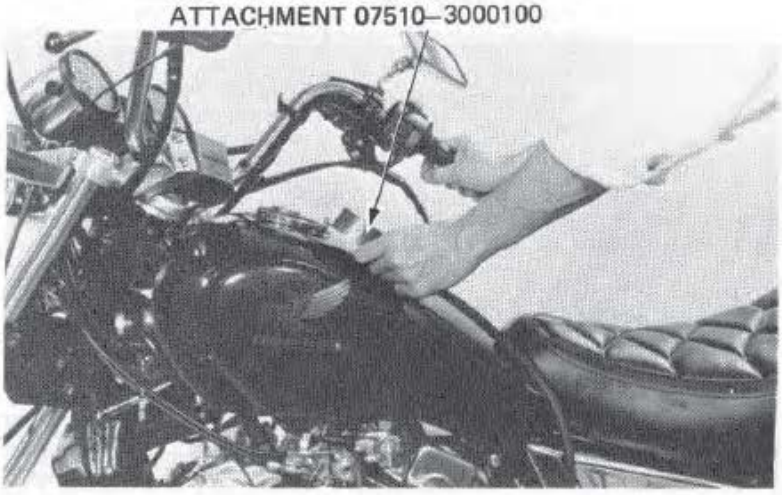


(1) OIL PRESSURE SWITCH

(1) OIL PRESSURE GAUGE
07506–3000000
OIL PRESSURE GAUGE
ATTACHMENT 07510–3000100

Start the engine
Check the oil pressure at 6,000 min^{-1} (rpm).

OIL PRESSURE:
5.4 ± 0.7 kg/cm^2 (62.6 ± 9.9 psi)
at 6,000 min^{-1} (rpm) (80°C/176°F)



Stop the engine.
Apply 3-BOND® sealant or equivalent to the pressure switch threads and install.

TORQUE: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

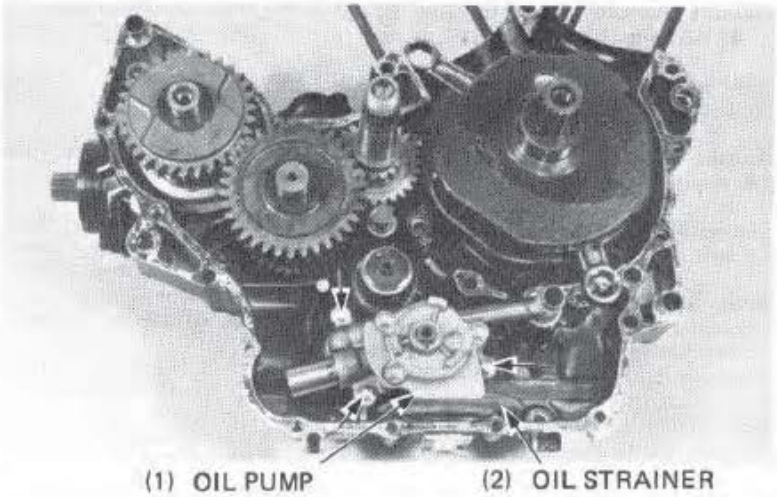
Connect the oil pressure switch wire.
Start the engine

Check the oil pressure warning indicator goes out after one or two seconds.
If the oil pressure warning indicator stays on, stop the engine immediately and determine the cause.

OIL STRAINER & OIL PUMP

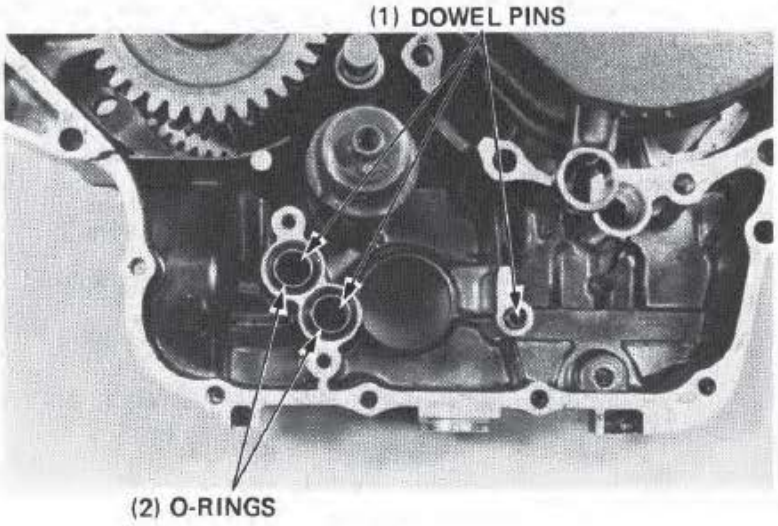
REMOVAL

Separate the crankcase (page 12-2).
Remove the oil pump by removing the mounting bolts.



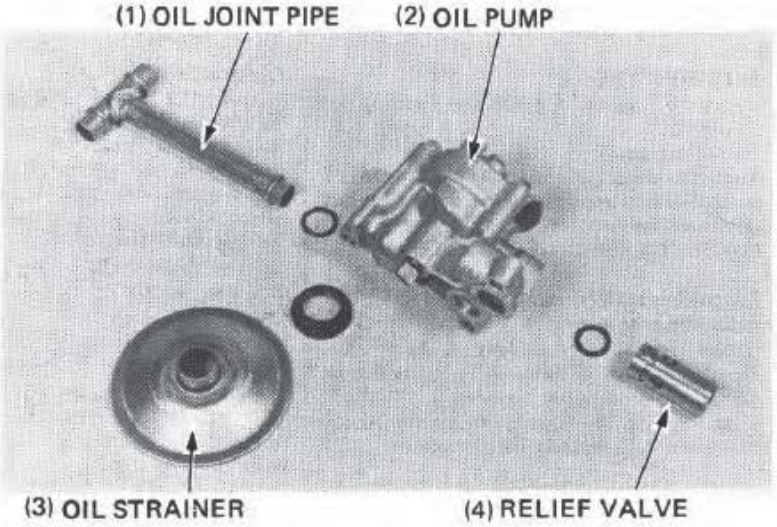
(1) OIL PUMP (2) OIL STRAINER

Remove the O-rings and dowel pins.



Remove the oil strainer and oil joint pipe.
Remove the relief valve.

Clean the oil strainer with non-flammable solvent.

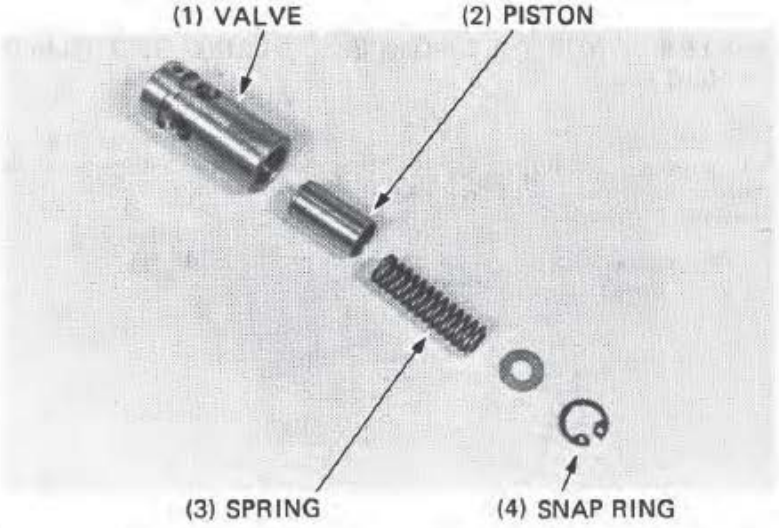


RELIEF VALVE CHECK

Remove the relief valve snap ring and disassemble the relief valve.

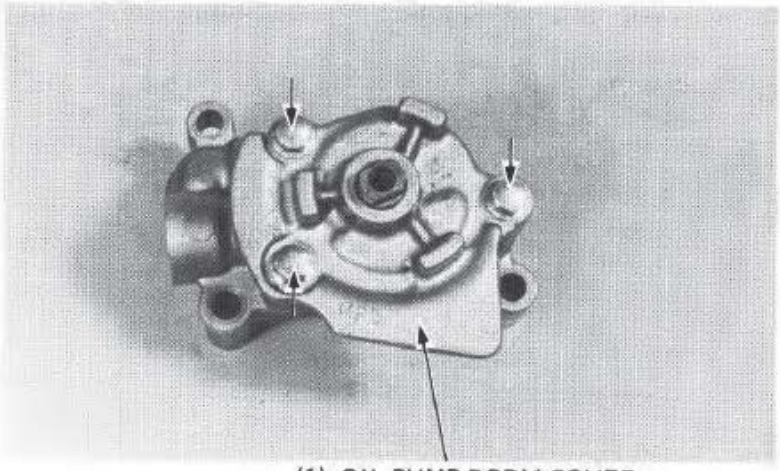
Check the spring and piston for wear or damage.
Check the valve for clogging or damage.

Assemble the parts in the reverse order of disassembly.



OIL PUMP DISASSEMBLY

Remove the oil pump body cover and remove the dowel pin.

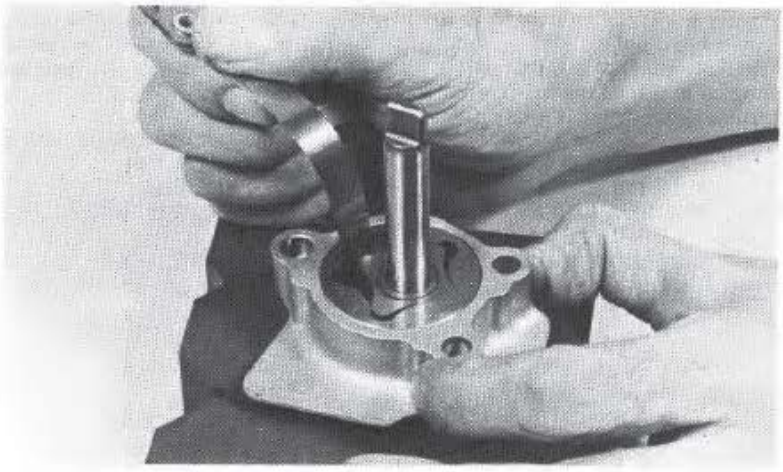


(1) OIL PUMP BODY COVER

Measure the rotor tip clearance.

STANDARD: 0.15 mm (0.006 in)

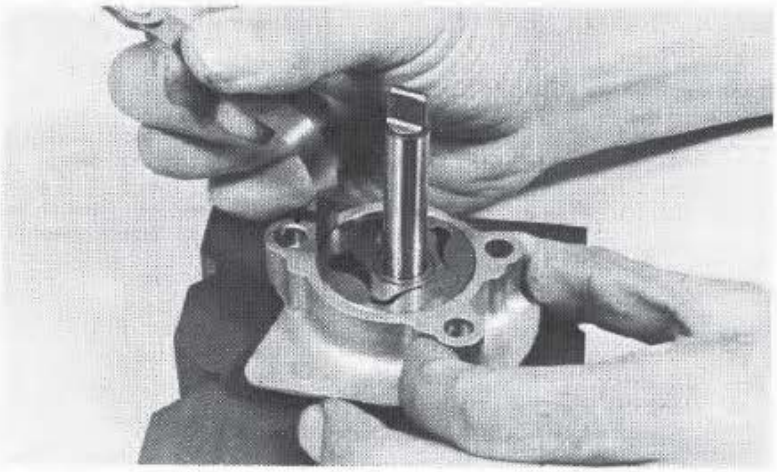
SERVICE LIMIT: 0.20 mm (0.008 in)



Measure the pump outer rotor-to-body clearance.

STANDARD: 0.15–0.22 mm (0.006–0.009 in)

SERVICE LIMIT: 0.35 mm (0.014 in)

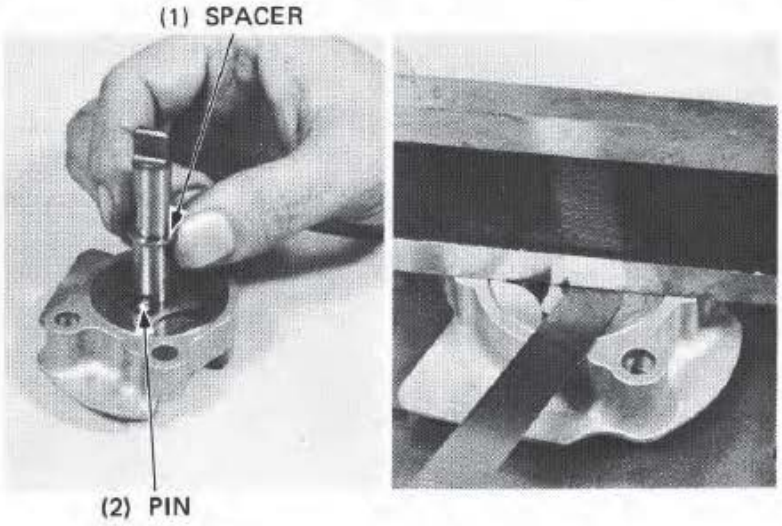


Remove the spacer and drive pin from the rotor shaft.

Remove the rotor shaft and measure the pump end clearance.

STANDARD: 0.02–0.07 mm (0.001–0.003 in)

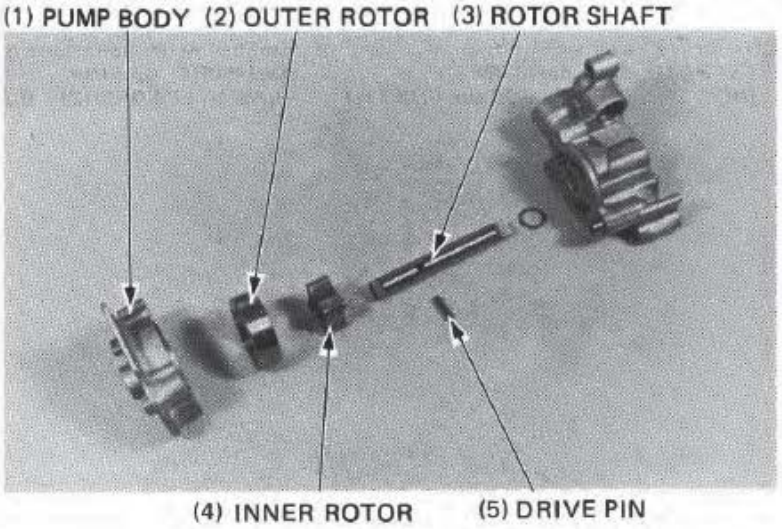
SERVICE LIMIT: 0.10 mm (0.004 in)



ASSEMBLY

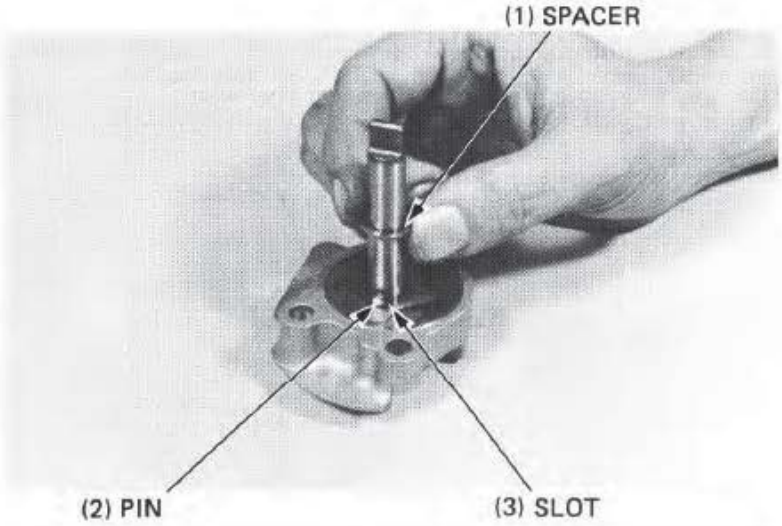
Install the outer and inner rotors into the body and insert the rotor shaft.

Insert the drive pin into the rotor shaft.



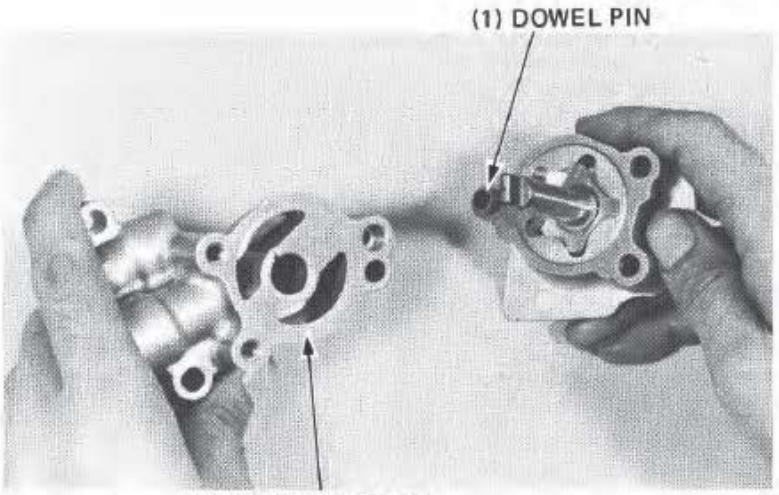
Align the slots in the inner rotor with the drive pin.

Place the spacer into the inner rotor groove.



Install the dowel pin and oil pump body cover.

Make sure the rotor shaft is rotaing smoothly.



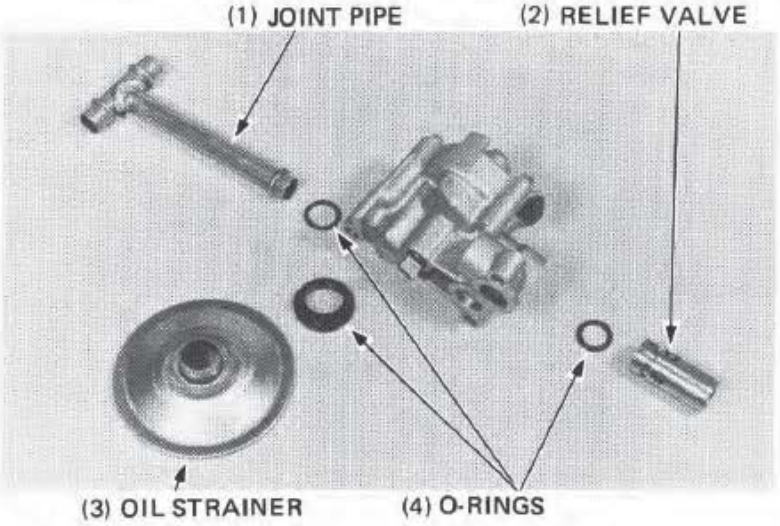
INSTALLATION

Install the relief valve with a new O-ring into the oil pump body.

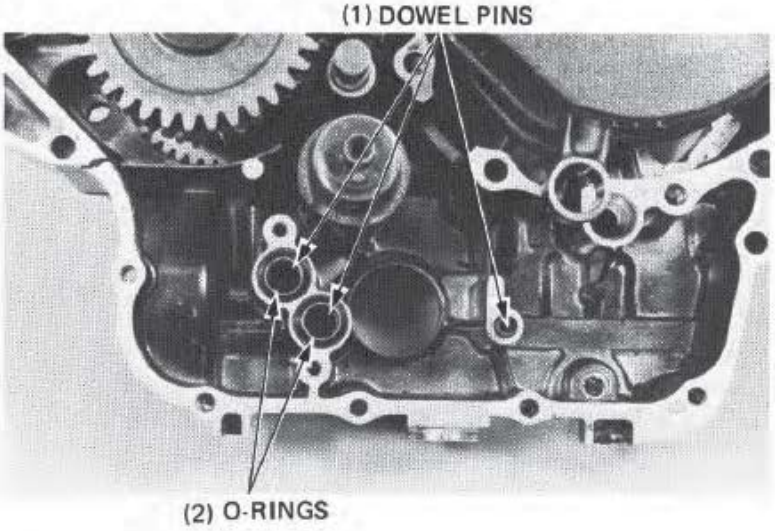
Install a new O-ring into the oil strainer hole.

Install the oil strainer into the oil pump body.

Install the joint pipe into the oil pump body.



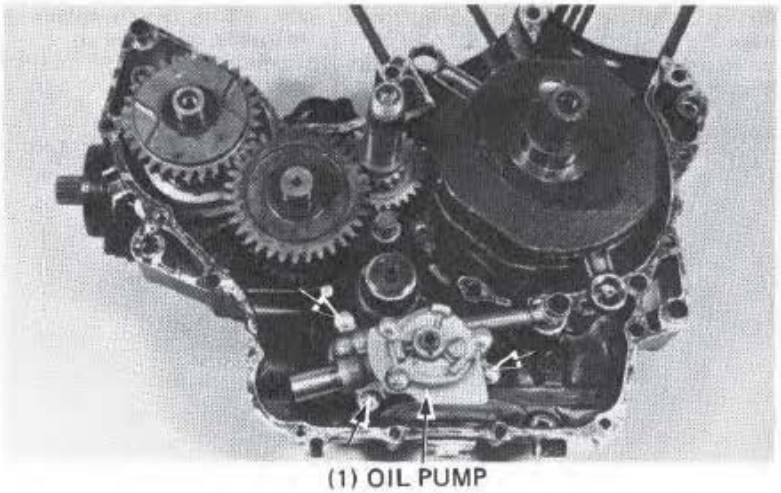
Install the dowel pins and new O-rings.



Install the oil pump and tighten the bolts.

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

Assemble the crankcase (page 12-4).



(1) OIL PUMP

FINAL DRIVE OIL

CHECK

Place the motorcycle on its center stand. id on level ground.

Remove the oil filler cap.

Check that the oil level reaches the lower edge of the oil filler cap hole.

Check for leaks, if the level is low. Pour fresh oil through the oil filler hole until it reaches the lower edge.

CHANGE

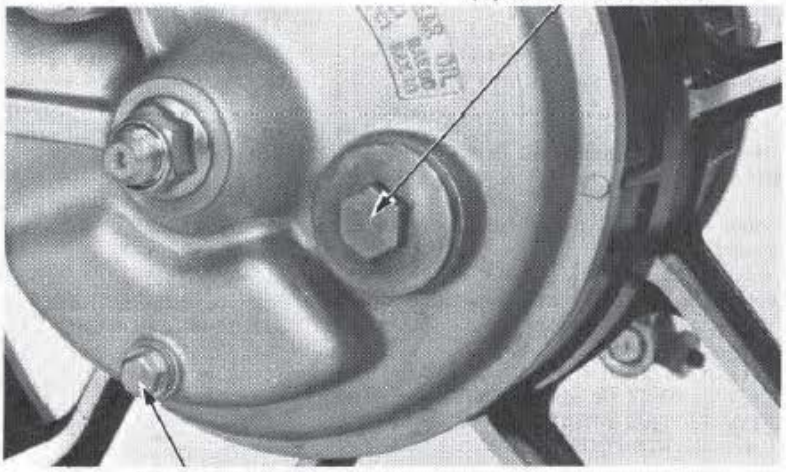
Remove the oil filler cap.
Remove the drain bolt to drain all oil from the final gear case.

Install the drain bolt securely.

Fill the gear case with the recommended oil up to the correct level see above check.

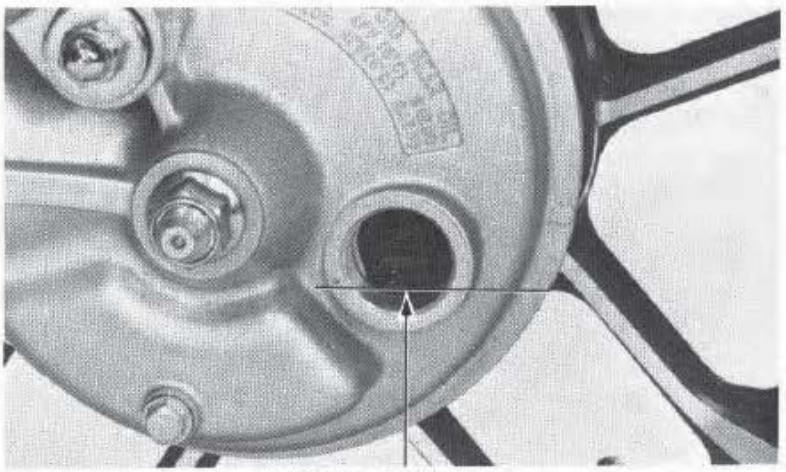
OIL CAPACITY: 120 cc (4.1 oz)

RECOMMENDED OIL: HYPOID GEAR OIL
API, GL–5 SAE #90 (Above 5°C/41°F)
SAE #80 (Below 5°C/41°F)



(1) OIL FILLER CAP

(2) OIL DRAIN PLUG

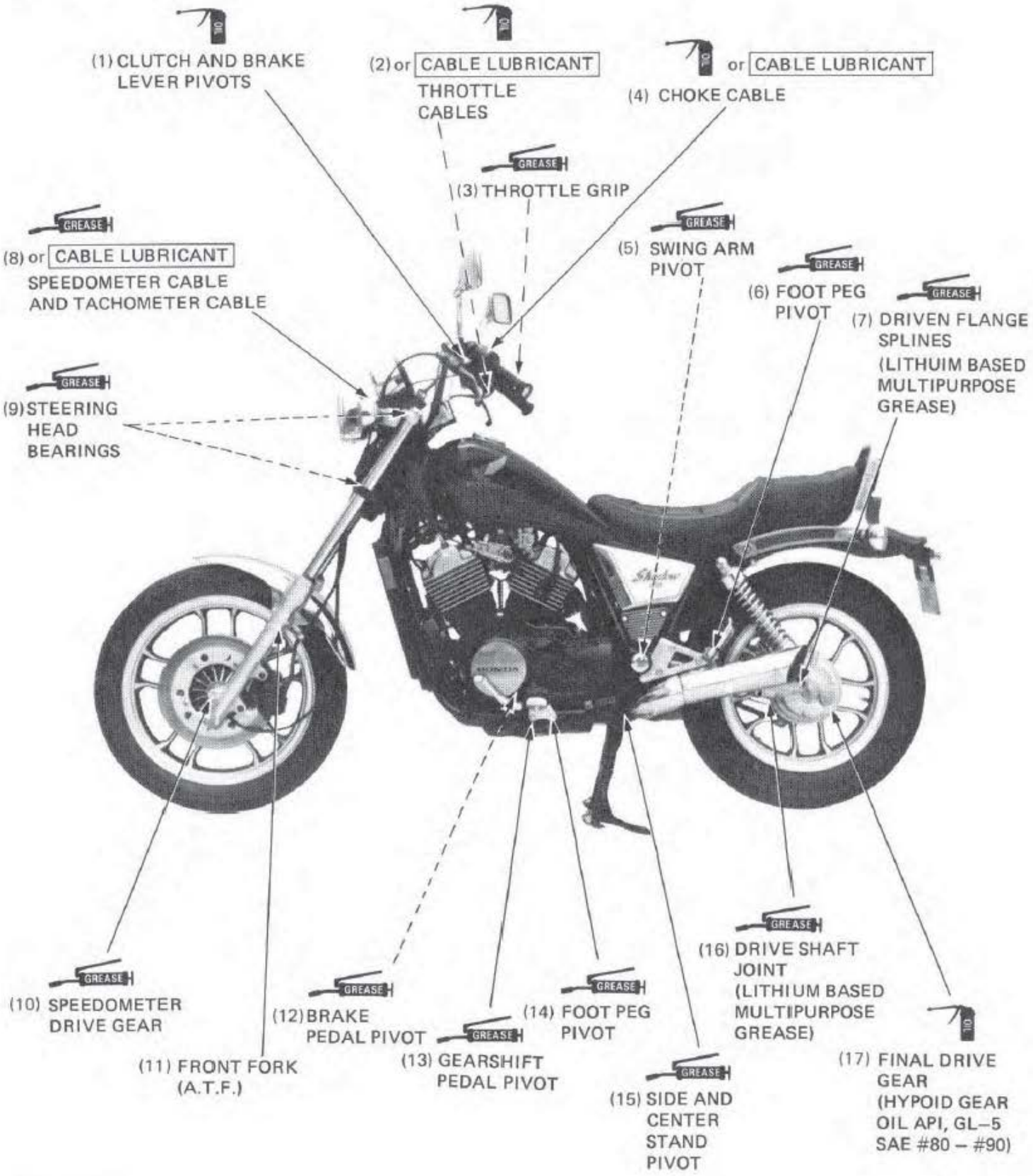


(3) OIL LEVEL

CONTROL CABLE LUBRICATION

Periodically, disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

LUBRICATION POINTS



MAINTENANCE SCHEDULE

Perform the pre-Ride Inspection in the Owner's Manual at each scheduled maintenance period.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE, OR REMPLACE IF NECESSARY.
C: CLEAN, R: REPLACE, A: ADJUST L: LUBRICATE

		(4) ITEM / (1) FREQUENCY	(2) WHICHEVER COMES FIRST ➡ / (5) EVERY ⬇	(3) ODOMETER READING (NOTE 3) 600 mi (1,000 km)	4,000 mi (6,400 km)	8,000 mi (12,800 km)	12,000 mi (19,200 km)	16,000 mi (25,600 km)	20,000 mi (32,000 km)	24,000 mi (38,400 km)	(6) Refer to page
EMISSION RELATED ITEMS	*	(7) FUEL LINES				I		I		I	3-4
	*	(8) FUEL STRAINER		C	C	C	C	C	C	C	3-4
	*	(9) THROTTLE OPERATION		I		I		I		I	3-5
	*	(10) CARBURETOR-CHOKE				I		I		I	3-6
		(11) AIR CLEANER	(36) NOTE 1		C	C	C	C	C	C	3-7
		(12) CRANKCASE BREATHER	(37) NOTE 2		C	C	C	C	C	C	3-7
		(13) SPARK PLUGS			R	R	R	R	R	R	3-8
	*	(14) VALVE CLEARANCE		I		I		I		I	3-8
		(15) ENGINE OIL	(38) YEAR	R		R		R		R	2-3
		(16) ENGINE OIL FILTER	(39) YEAR	R		R		R		R	2-3
	*	(17) CARBURETOR-SYNCHRONIZATION		I		I		I		I	3-10
	*	(18) CARBURETOR-IDLE SPEED		I	I	I	I	I	I	I	3-11
		(19) RADIATOR COOLANT				I		I		*R	3-11
	*	(20) RADIATOR CORE				I		I		I	3-11
	*	(21) COOLING SYSTEM HOSES & CONNECTIONS		I		I		I		I	3-12
NON-EMISSION RELATED ITEMS		(22) FINAL DRIVE OIL				I		I		R	2-9
	*	(23) FINAL DRIVE SPLINES				L		L		L	2-10
		(24) BATTERY	(40) MONTH	I	I	I	I	I	I	I	3-13
		(25) BRAKE FLUID (FRONT)	(41) MONTH I 2 YEARS*R	I	I	I	I	I	I	*R	3-13
		(26) BRAKE SHOE/PAD WEAR			I	I	I	I	I	I	3-14
		(27) BRAKE SYSTEM		I		I		I		I	3-14
	*	(28) BRAKE LIGHT SWITCH		I		I		I		I	3-16
	*	(29) HEADLIGHT AIM		I		I		I		I	3-16
		(30) CLUTCH		I		I		I		I	3-16
		(31) SIDE STAND				I		I		I	3-17
	*	(32) SUSPENSION		I		I		I		I	3-18
	*	(33) NUTS, BOLTS, FASTENERS		I		I		I		I	3-19
	**	(34) WHEELS		I		I		I		I	3-18
	**	(35) STEERING HEAD BEARINGS		I		I		I		I	3-19

* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanical qualified.

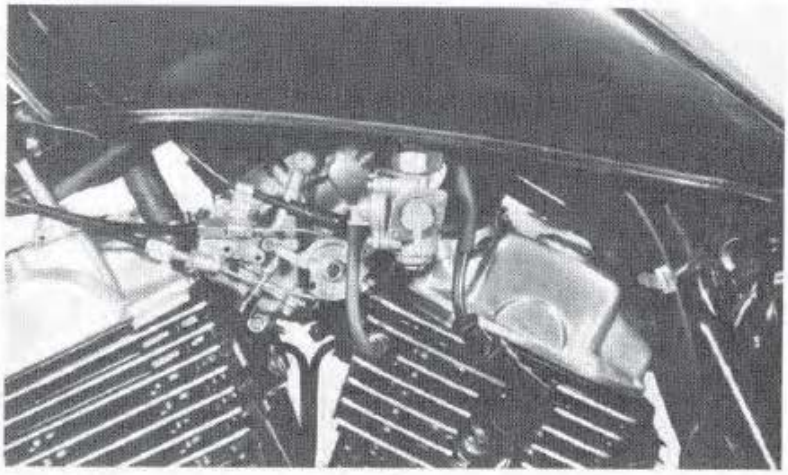
** In the interest of safety, we recommend these items be serviced only by an authorized Honda dealer.

Note: 1. Service more frequently when riding in dusty areas.
2. Service more frequently when riding in rain or at full throttle.
3. For higher odometer reading, repeat at the frequency interval established here.

FUEL LINES

Check the fuel lines for deterioration, damage, or leakage.

Replace if necessary.



FUEL STRAINER

Turn the fuel valve OFF.

Remove the fuel cup, O-ring and filter screen and drain the gasoline into a suitable container.

WARNING

Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks near the equipment while draining fuel.

Wash the cup and filter screen in clean non-flammable or high flash point solvent.

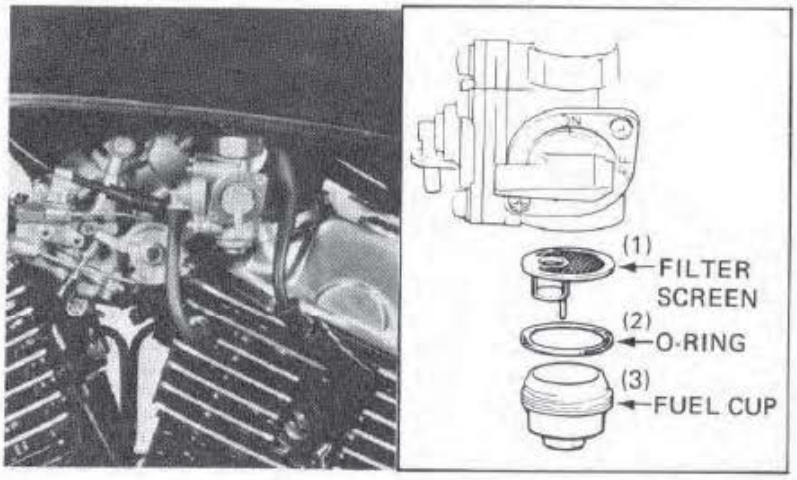
Reinstall the screen, aligning the index marks on the fuel valve body and filter screen. Install a new O-ring into the fuel valve body. Reinstall the fuel cup, making sure the new O-ring is in place.
Hand tighten the fuel cup and torque to specification.

TORQUE: 3–5 N·m
(0.3–0.5 kg-m, 2–4 ft-lb)

NOTE

Do not over tighten the fuel cup.

After installing and refilling the tank, turn the fuel valve ON, start the engine and check that there are no leaks.



THROTTLE OPERATION

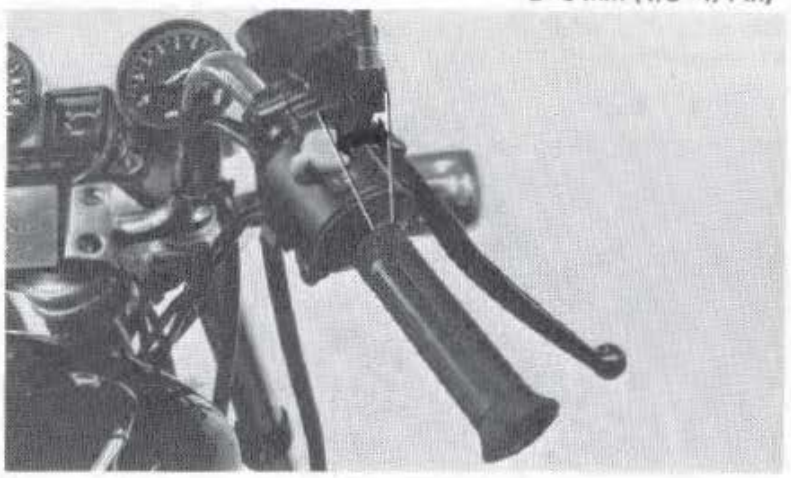
Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Make sure there is no deterioration, damage, or kinking in the throttle cables. Replace any damaged parts.
Lubricate the throttle cables (page 2-10), if throttle operation is not smooth.

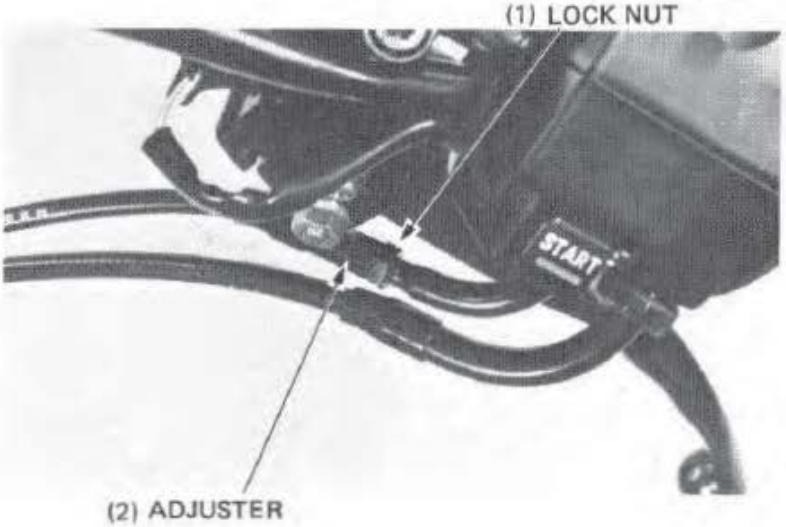
Measure throttle grip free play at the throttle grip flange.

FREE PLAY: 2–6 mm (1/8–1/4 in)

FREE PLAY:
2–6 mm (1/8–1/4 in)

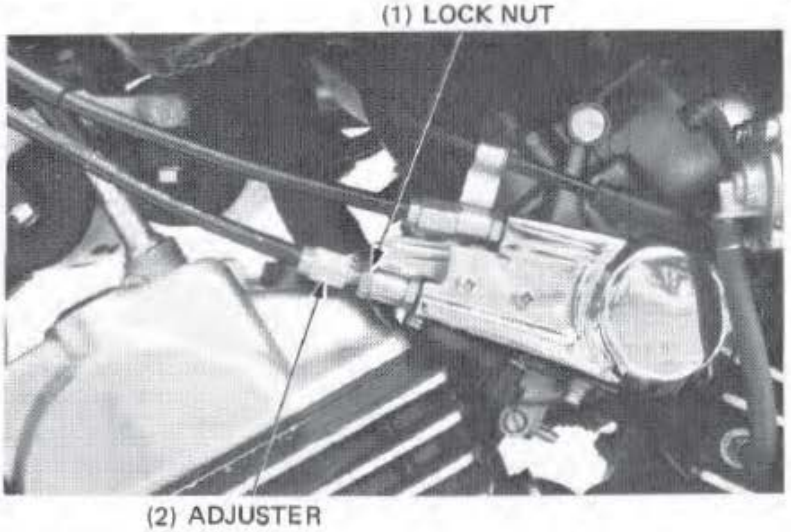


Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustments are made with the upper adjuster.



Major adjustments are made with the lower adjuster on the carburetor.

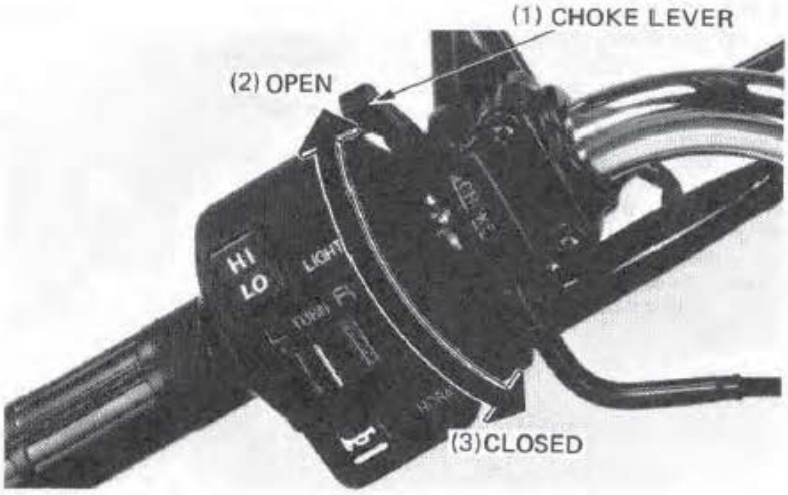
Adjust free play by loosening the lock nut and turning the adjuster. Then tighten the lock nut and recheck throttle operation.



CARBURETOR CHOKE

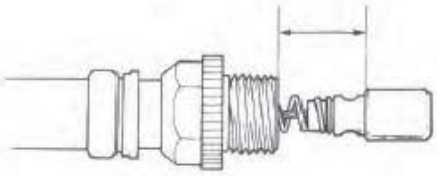
The VT500C choke system uses a fuel enrichening circuit controlled by a bystarter valve. The bystarter valve opens the enrichening circuit via a cable when the choke lever on the handlebar is pushed up.

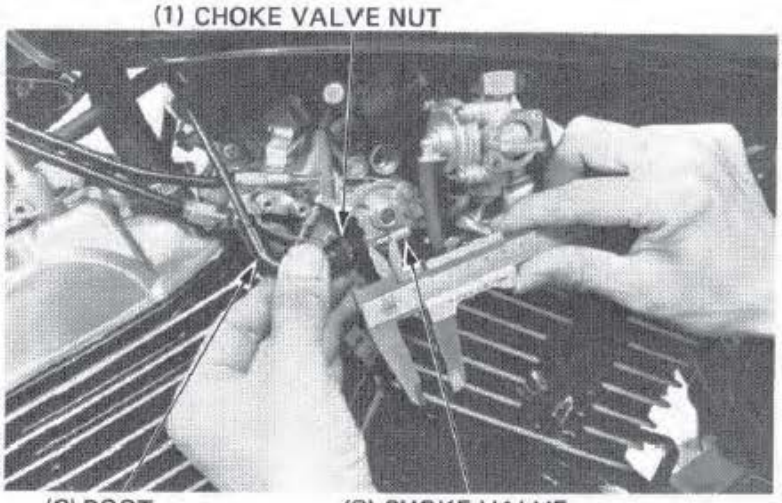
Check for smooth upper choke lever operation. Lubricate the choke cable if the operation is not smooth.



Remove the throttle link cover.
Remove the choke cable boots and loosen the choke valve nuts on the carburetors.
Remove the bystarter valves (the choke valves) from the carburetors.

Push the choke lever on the handlebar all the way down to fully closed and make sure the distance between the tip of the threads and the step on the valve is 10–11 mm (0.39–0.43 in).

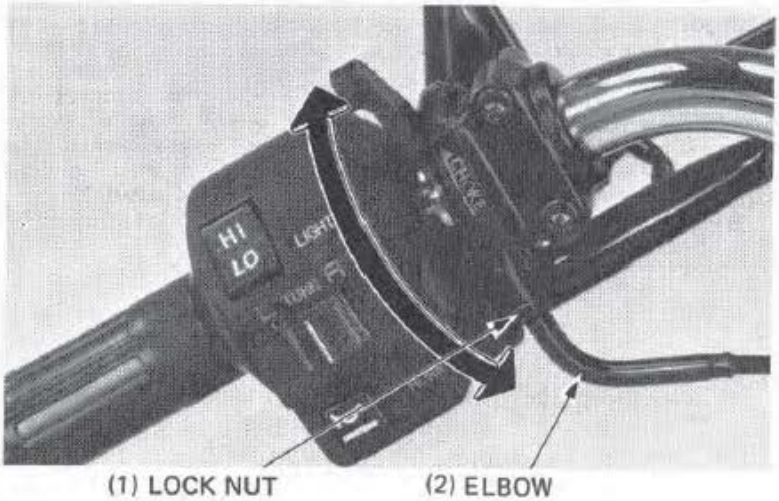




Adjust to within specifications by loosening the lock nut and turning the round joint at the handlebar choke lever housing. Tighten the lock nut and recheck the distance.

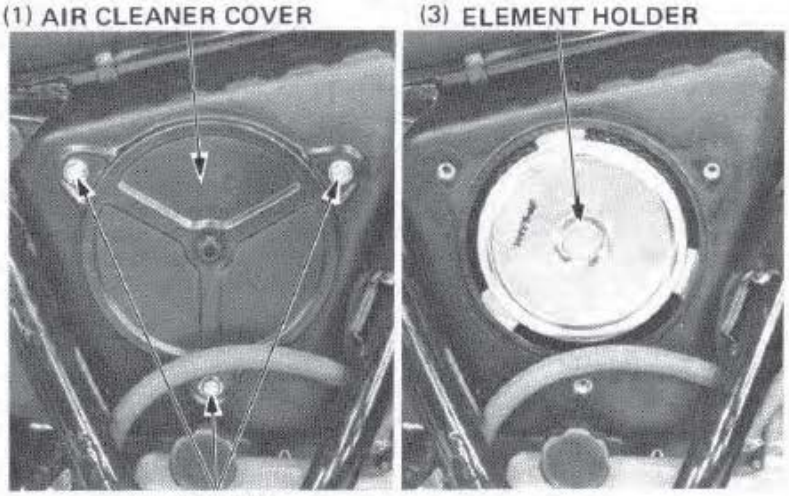
Thread the choke valve in by hand and then tighten the choke valve nut 1/4 turn with a 14 mm wrench. Install the throttle link cover.

Reinstall the removed parts in the reverse order of disassembly.



AIR CLEANER

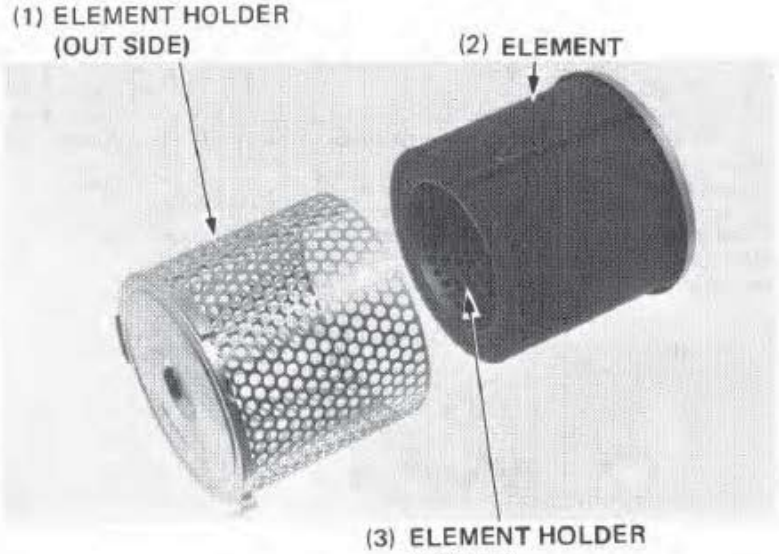
Remove the frame right side cover.
Remove the air cleaner cover screws and cover.
Pull the air cleaner element holder out of the air cleaner case.



Wash the element in non-flammable or high flash point solvent, squeeze out and let it dry.

Soak the element in gear oil (SAE #80—#90) and squeeze out the excess.

Install the removed parts in the reverse order of diassembly.



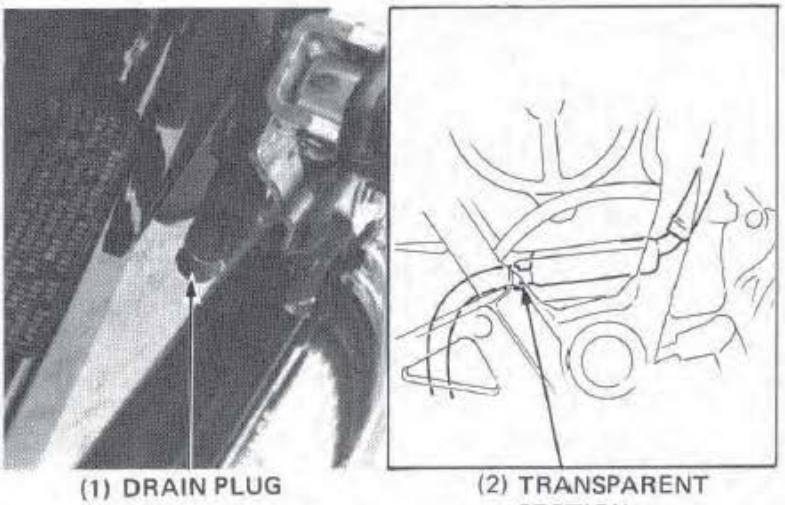
CRANKCACE BREATHER

Remove the plug from the drain tube to empty any deposits.

Reinstall the drain plug.

NOTE

Service more frequently when riding in rain, or at full throttle, or if the deposit level can be seen in the transparent section of the drain tube.



SPARK PLUGS

RECOMMENDED SPARK PLUGS

	NGK	ND
Standard	DPR8EA-9	X24EPR-U9
For cold climate (Below 5°C, 41°F)	DPR7EA-9	X22EPR-U9
For extended high speed riding	DPR9EA-9	X27EPR-U9

Disconnect the spark plug caps and clean any dirt from around the spark plug bases.

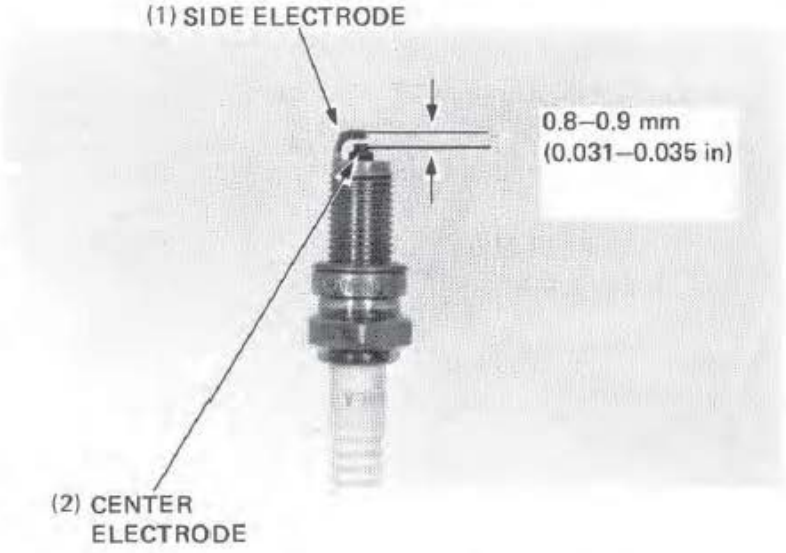
Remove and discard the spark plugs.

Measure the new spark plug gaps using a wire-type feeler gauge.

SPARK PLUG GAP:
0.8–0.9 mm (0.031–0.035 in)

Adjust by bending the side electrode carefully.

With the plug washer attached, thread each spark plug in by hand to prevent crossthreading. Tighten the spark plugs another 1/2 turn with a spark plug wrench to compress the plug washer. Connect the spark plug caps.



VALVE CLEARANCE

NOTE

Inspect and adjust valve clearance while the engine is cold (Below 35°C/95°F).

Remove the frame side covers and the seat.

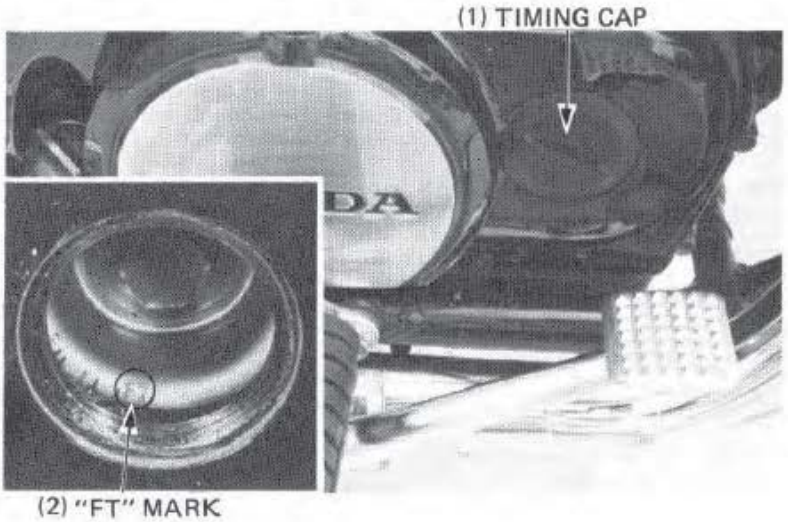
Turn the fuel valve OFF, disconnect the fuel line and remove the tank (page 4-14).

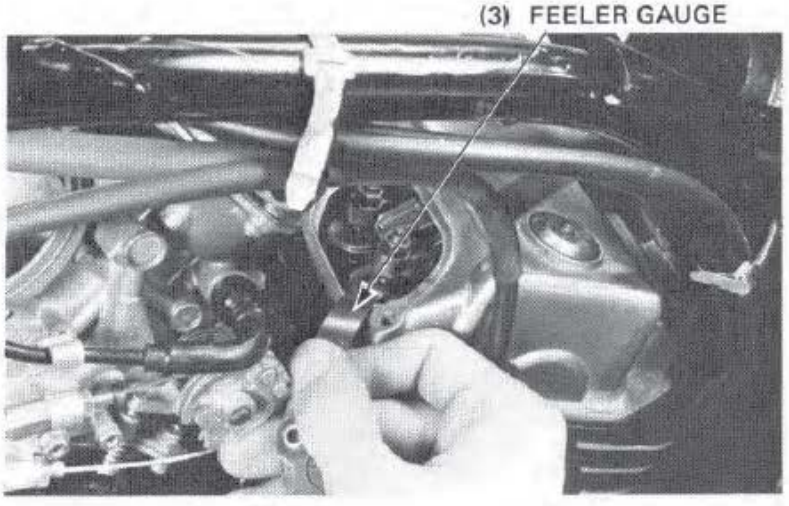
Remove the timing cap from the right crankcase cover.

Remove the valve adjusting hole covers and caps.

For front valve clearance adjustment, rotate the crankshaft clockwise to align the "FT" mark with the index mark.

For rear valve clearance adjustment, rotate crankshaft clockwise to align the "RT" mark with the index mark.





Make sure the piston is at TDC on the compression stroke; rocker arms should be loose.
Check the clearance of both valves by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCES:
INTAKE: 0.10 mm (0.004 in)
EXHAUST: 0.10 mm (0.004 in)

Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge. Hold the adjusting screw and tighten the lock nut.

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

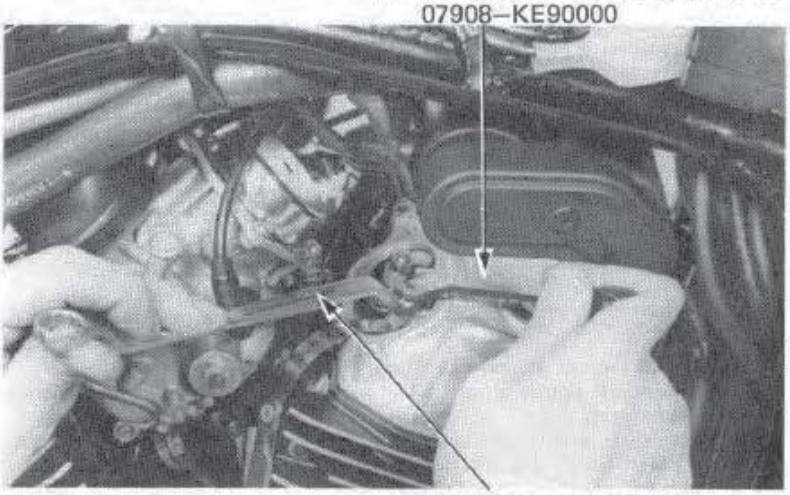
NOTE

For intake valve clearance adjustment, use the two feeler gauge and adjust intake valve clearance at the same time.

Recheck the valve clearance.

Install the removed parts in the reverse order of disassembly.

(1) VALVE ADJUSTING WRENCH
07908–KE90000



(2) TAPPET ADJUSTING WRENCH 10 x 12 mm
07708–0030200

IGNITION SYSTEM

NOTE

The ignition system is transistorized and cannot be adjusted. If the ignition timing is incorrect, check the spark unit and pulse generator and replace any faulty parts (Section 19).

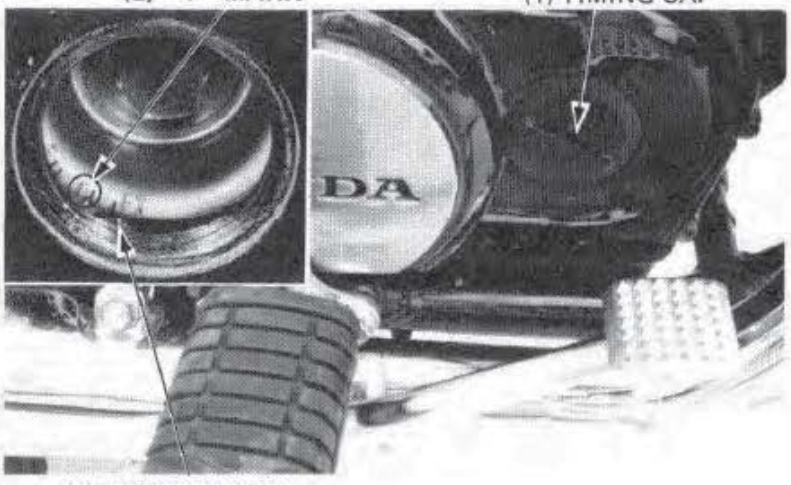
Warm up the engine
Remove the timing inspection hole cap on the right crankcase cover.

Connect the timing light and check the timing.

The timing is correct if the "F" mark aligns with the index mark on the right crankcase cover at 1,100 ± 100 rpm for each cylinder.

(2) "F" MARK

(1) TIMING CAP



(3) INDEX MARK

CARBURETOR SYNCHRONIZATION

NOTE

Perform this maintenance with the engine at normal operating temperature, transmission in neutral, and motorcycle on its center stand.

Remove both frame side covers and seat.
Start the engine and adjust the idle speed to 1,100 ± 100 min^{-1} (rpm). Pinch the fuel valve vacuum line, then stop the engine.
Turn the fuel valve OFF and remove the fuel line and fuel tank.

Prepare a longer fuel line and connect it between the fuel tank and carburetor.
Position the fuel tank higher than normal. Turn the fuel valve on.

Remove the plugs from the cylinder head intake ports and install the vacuum gauge adapters.
Connect the vacuum gauges.

Warm up the engine and adjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)

Check that the difference in vacuum readings is between 0 and 50 mm (2.0 in) Hg.

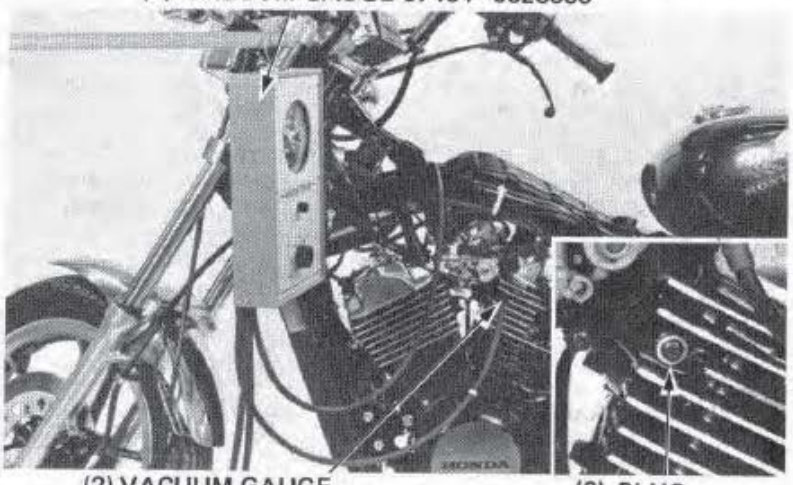
Adjust within specifications by turning the adjusting screw, if necessary.
The No. 1 carburetor cannot be adjusted.
It is the base.

Recheck the idle speed and synchronization.

Disconnect the gauges and remove the gauge adapter from the port.

Install the removed parts in the reverse order of disassembly.

(1) VACUUM GAUGE 07404–0020000

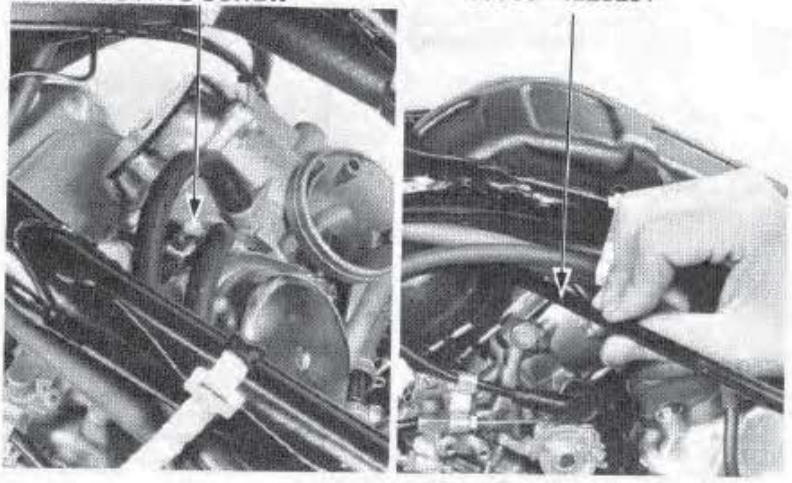


(2) VACUUM GAUGE ATTACHMENT 07510–3000100

(3) PLUG

(4) ADJUSTING SCREW

(5) CARBURETOR ADJUSTER WRENCH 07908–4220201



CARBURETOR IDLE SPEED

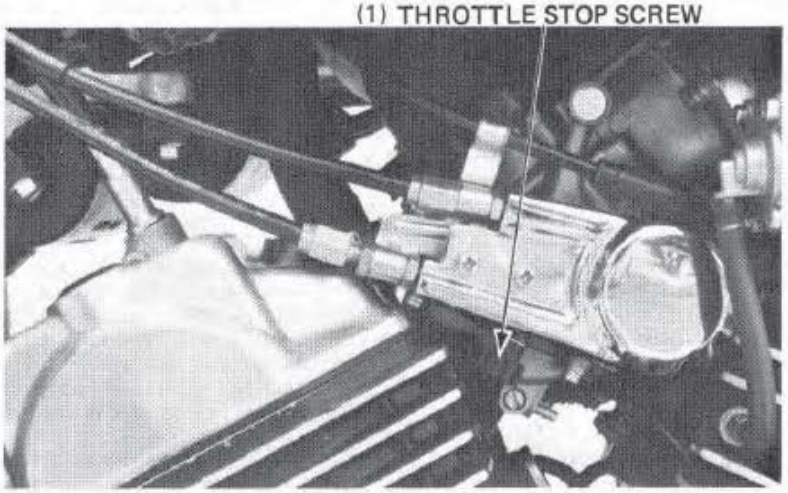
NOTE

- Inspect and adjust idle speed after all other engine adjustments are within specifications.
- The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine, shift to neutral, and place the motorcycle on its center stand. Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)

(1) THROTTLE STOP SCREW



RADIATOR COOLANT

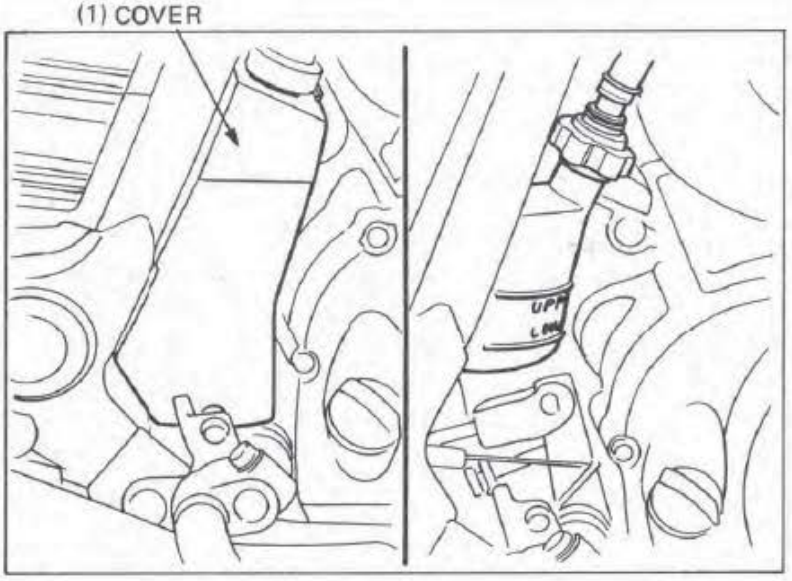
Remove the frame right side cover and reserve tank cover.

Check the coolant level of the reserve tank with the engine runing at normal operating temperature. The level should be between the "UPPER" and "LOW" level lines.

If necessary, remove the reserve tank cap and fill to the "UPPER" level line with a 50/50 mixture of distilled water and anti-freeze.

Reinstall the cap, reserve tank cover and frame side cover.

(1) COVER

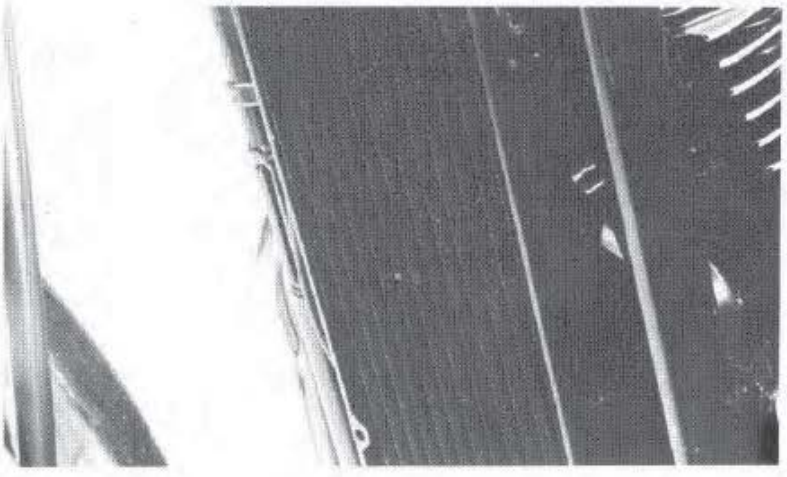


RADIATOR CORE

Check the air passages for clogging or damage. Straighten bent fins or collapsed core tubes.

Remove insects, mud or any obstructions with compressed air or low water pressure.

Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

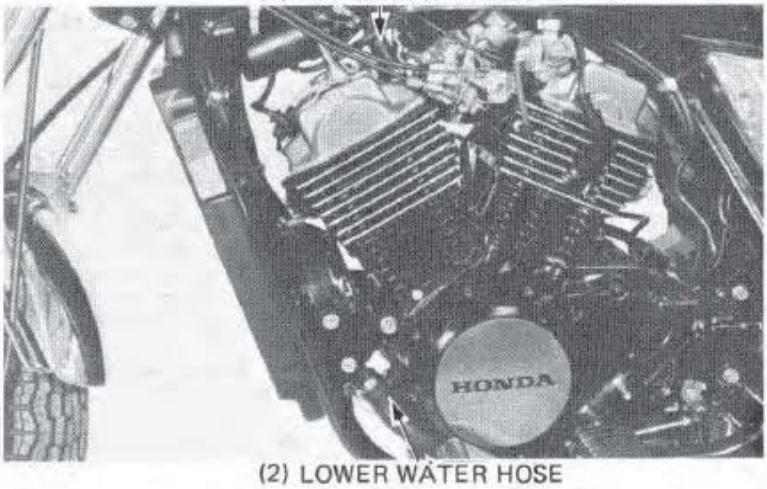


COOLING SYSTEM HOSES & CONNECTIONS

Make sure the hoses are in good condition; they should not have any signs of deterioration. Replace any hose that does.

Check that all hose clamps are tight.

(1) UPPER WATER HOSE



(2) LOWER WATER HOSE

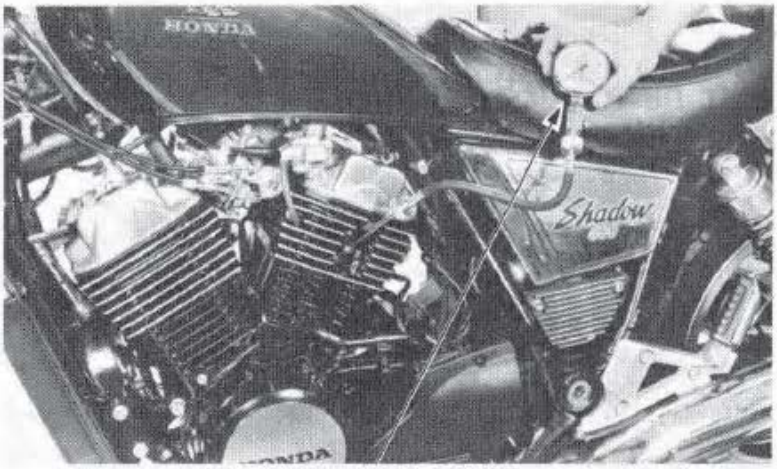
CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.
Stop the engine, disconnect both spark plug caps and remove one spark plug from each cylinder.
Insert the compression gauge. Open the throttle all the way and crank the engine with the starter motor. Crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

COMPRESSION PRESSURE:
1,176 ± 196 kPa (12 ± 2 kg/cm², 171 ± 28 psi)

If compression is low, check for the following:
- Leaky valves; poor valve seating, or needs adjustment
- Leaking cylinder head gasket
- Worn piston/ring/cylinder

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



(1) COMPRESSION GAUGE

BATTERY

Remove the left side cover and inspect the battery fluid level. When the fluid level near the lower level, remove the battery and add distilled water to the upper level line as follows:
Remove the left side cover and seat. Disconnect the voltage regulator connectors.
Remove the nut and battery holder with the regulator attached.
Disconnect the negative terminal lead from the battery first, then disconnect the positive terminal lead.
Disconnect the battery breather tube and pull out the battery. Remove the battery filler caps. Carefully add distilled water to the upper level mark, using a small syringe or plastic funnel.

NOTE

Add only distilled water. Tap water will shorten the service life of the battery.

WARNING

The battery electrolyte contains sulphuric acid. Protect your eyes, skin, and clothing. If electrolyte gets in your eyes; flush them thoroughly with water and get prompt medical attention.

(1) POSITIVE TERMINAL (2) NEGATIVE TERMINAL (3) NUT

(4) UPPER LEVEL (5) BATTERY HOLDER (6) LOWER LEVEL

BRAKE FLUID

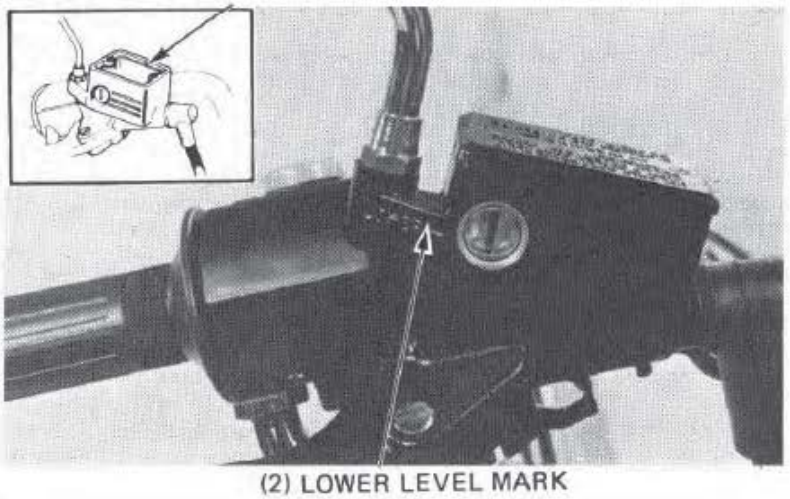
Check the front brake fluid reservoir level. If the level nears the lower level mark remove the cover and diaphram. Fill the reservoir with DOT-3 Brake Fluid to the upper level mark located inside the reservoir.
Check the entire system for leaks, if the level is low.

CAUTION

- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Avoid operating the brake lever with the cap removed. Brake fluid will squirt out if the lever is pulled.*
- *Do not mix different types of fluid, as they are not compatible with each other.*

Refer to section 17 for brake bleeding procedures.

(1) UPPER LEVEL MARK



(2) LOWER LEVEL MARK

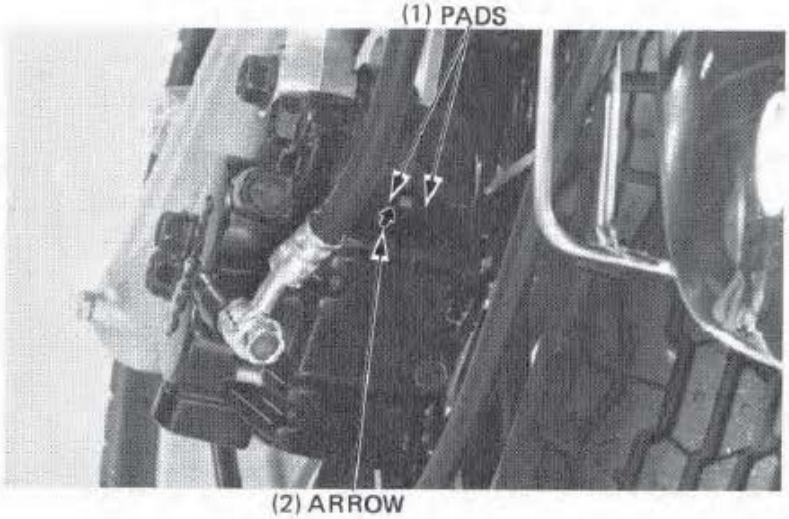
BRAKE SHOE/PAD WEAR

BRAKE PAD WEAR

Check the brake pads for wear by looking through the slot indicated by the arrow cast on the caliper assembly. Replace the brake pads if the wear line on the pads reaches the edge of the brake disc (page 17-5).

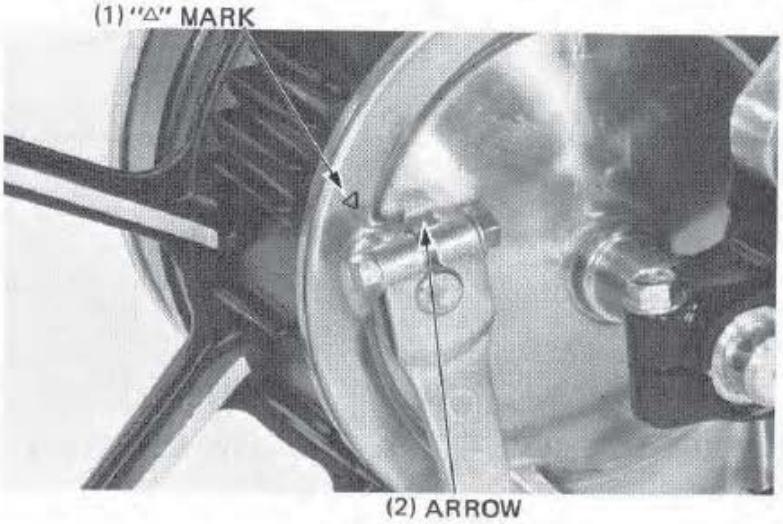
CAUTION

Always replace the brake pads as a set to assure even disc pressure.



BRAKE SHOE WEAR

Replace the brake shoes if the arrow on the brake arm aligns with the reference mark "△" on full application of the rear brake pedal (page 16-8).



BRAKE SYSTEM

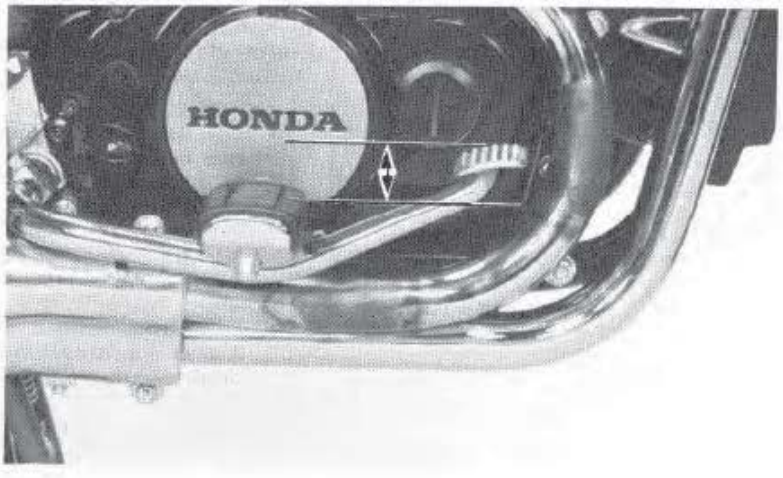
Inspect the brake hoses and fittings for deterioration, cracks and signs of leakage. Tighten any loose fittings.
Replace hoses and fittings as required.

BRAKE PEDAL HEIGHT

Adjust brake pedal height so the pedal is 25 mm (0.98 in) above the top of the foot peg.

CAUTION

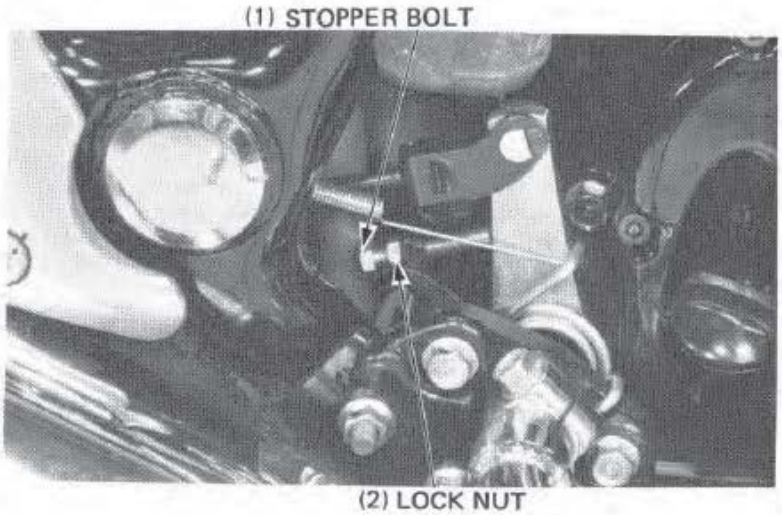
Incorrect brake pedal height can cause brake drag.



To Adjust:
Loosen the stopper bolt lock nut and turn the stopper bolt. Retighten the lock nut.

NOTE

After adjusting the brake pedal height, check the rear brake light switch and brake pedal free play and adjust if necessary.



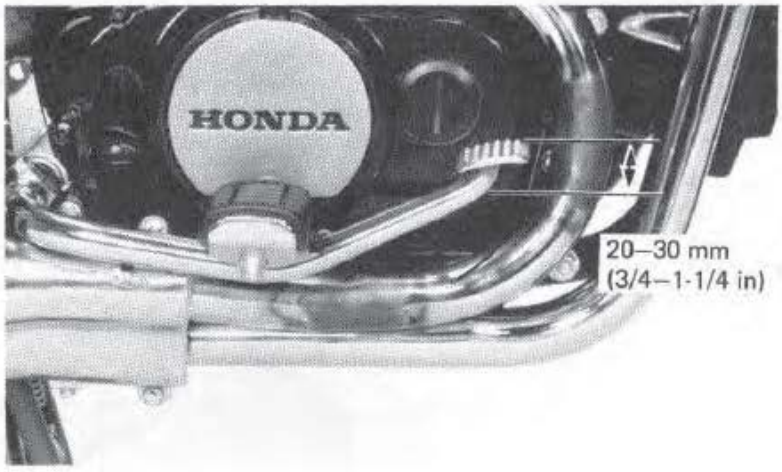
BRAKE PEDAL FREE PLAY

NOTE

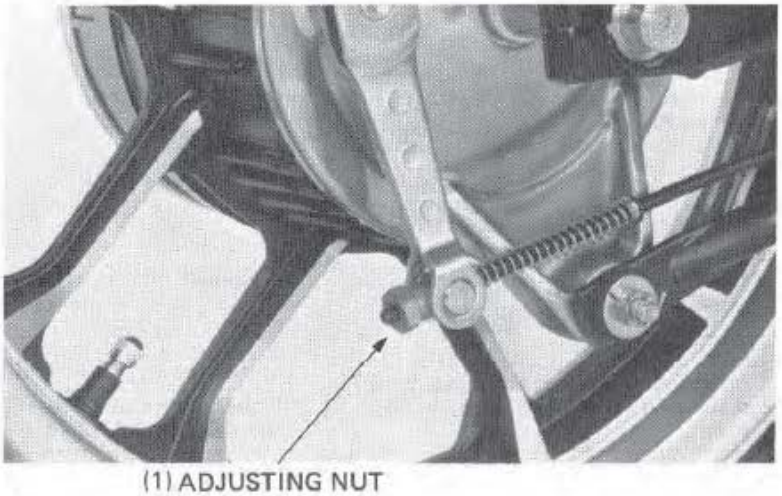
Perform brake pedal free play adjustment after adjusting brake pedal height.

Check the brake pedal free play.

FREE PLAY: 20–30 mm (3/4–1-1/4 in)



If adjustment is necessary, turn the rear brake adjusting nut.



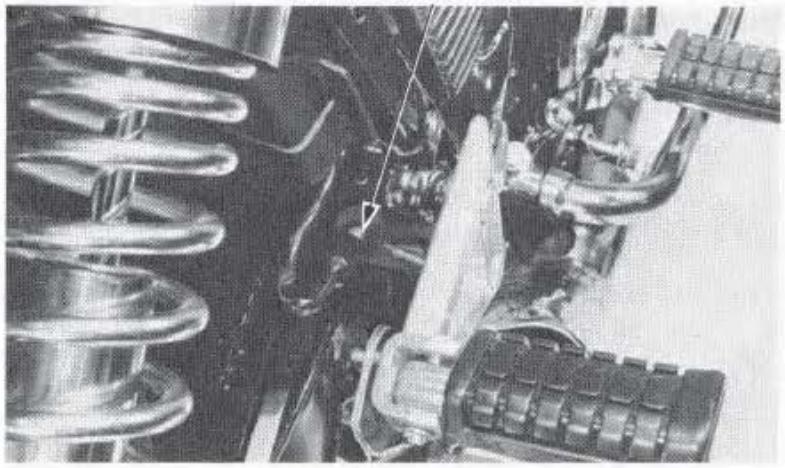
BRAKE LIGHT SWITCH

NOTE

- Perform rear brake light switch adjustment after adjusting the brake pedal play and height.
- The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light will come on when the brake pedal is depressed 20 mm (3/4 in), and brake engagement begins. Hold the switch body and turn the adjusting nut. Do not turn the switch body.

(1) ADJUSTING NUT



HEADLIGHT AIM

Adjust vertically by loosening both headlight case mounting bolts.
Adjust horizontally by loosening both adjusting bolts.

NOTE

Adjust the headlight beam as specified by local laws and regulations.

WARNING

An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.

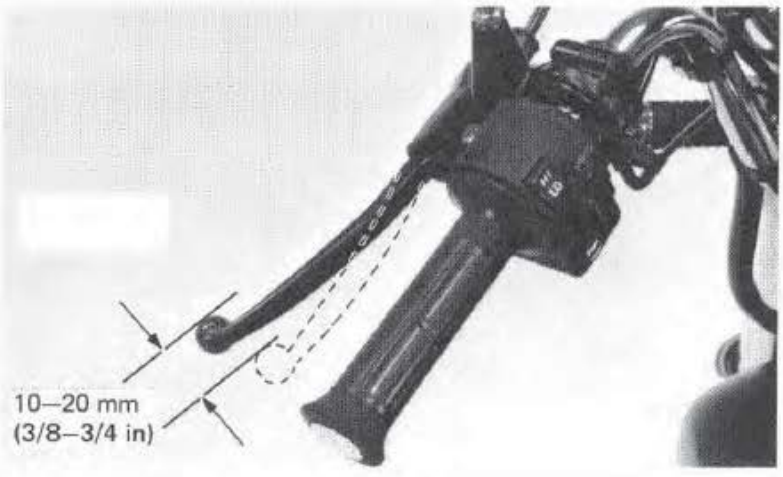
(1) HORIZONTAL ADJUSTING BOLT

(2) MOUNTING BOLT

CLUTCH

Inspect the clutch lever free play at the end of the lever.

FREE PLAY: **10–20 mm (3/8–3/4 in)**

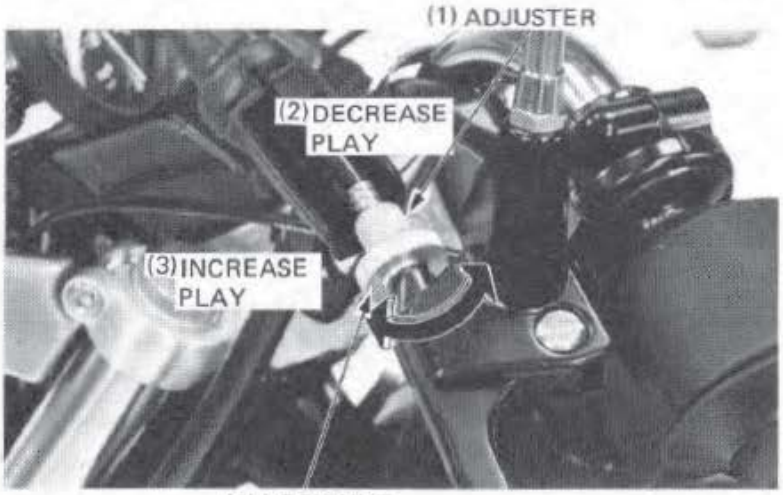


Minor adjustments are made with the upper adjuster.

Pull the lever cover back, loosen the lock nut and turn the adjuster to obtain the specified free play.

Tighten the lock nut and install the cover.

Check clutch operation.

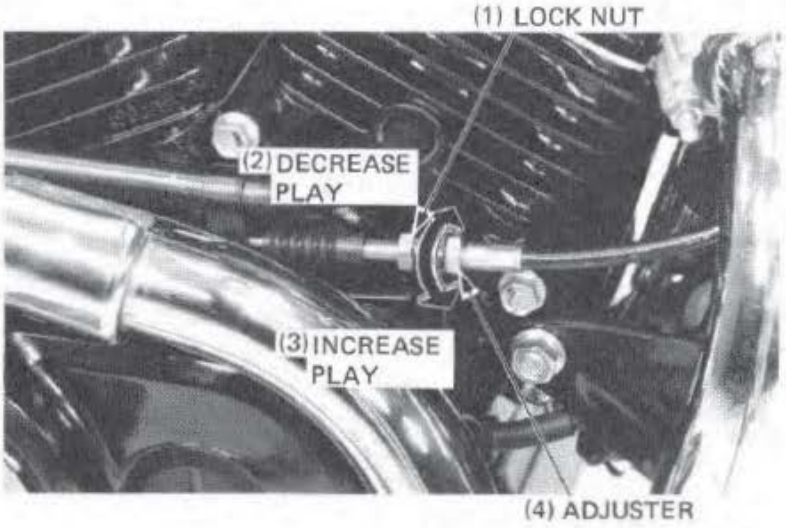


Major adjustments are made with the lower adjuster.

Turn the upper adjuster in all the way and then back it out 1 turn.

Loosen the lower lock nut and turn the lower adjuster to obtain the specified free play.

Tighten the lock nuts and check clutch operation.



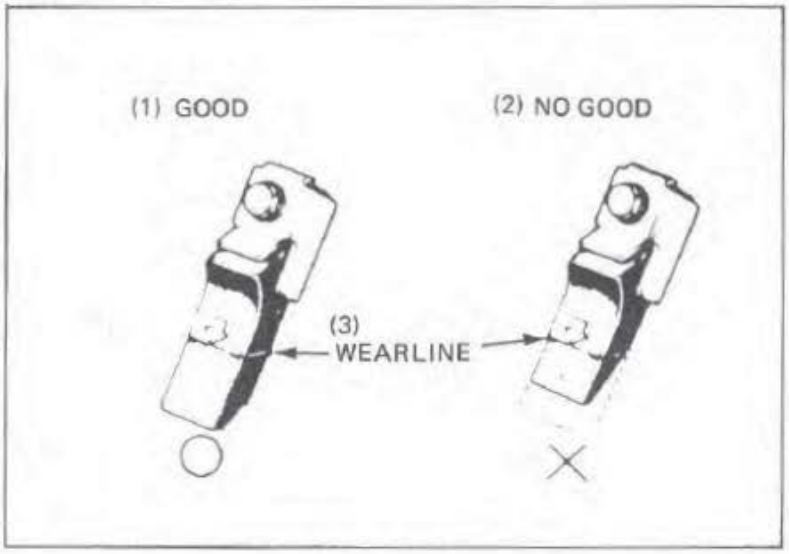
SIDE STAND

Check the rubber pad for deterioration or wear. Replace if any wear extends to the wear line as shown.

Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement. Make sure the side stand is not bent.

NOTE

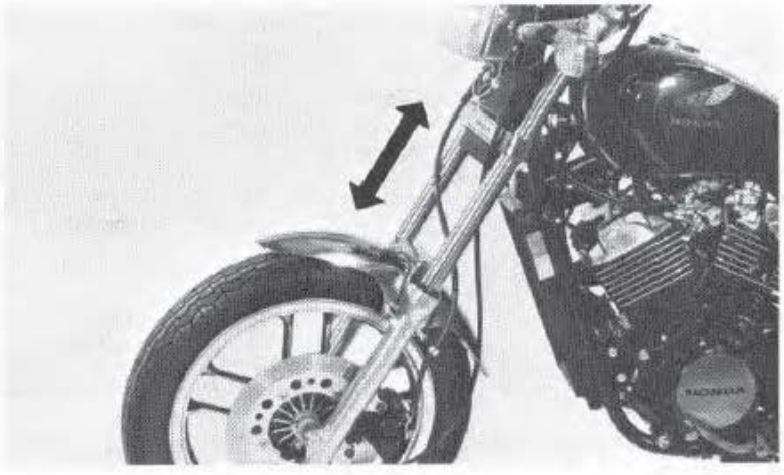
- When replacing, use a rubber pad with the mark "Over 260 lbs ONLY".
- Spring tension is correct if the measurements fall within 2–3 kg (4.4–6.6 lb) when pulling the side stand lower end with a spring scale.



SUSPENSION

WARNING

Do not ride a vehicle with faulty suspension. Loose, worn or damaged suspension parts impair vehicle stability and control.



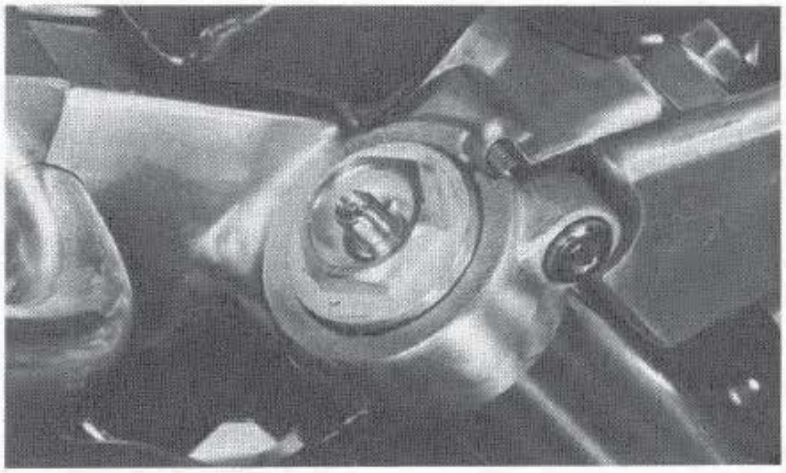
FRONT

Check the action of the front forks by compressing them several times.
Check the entire fork assembly for leaks or damage. Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.
Check the front fork air pressure when the forks are cold.
Place the vehicle on its center stand.
Remove each air valve cap and measure the air pressure.

AIR PRESSURE:
0–40 kPa (0–0.4 kg/cm², 0–6 psi)

REAR

Place the motorcycle on its center stand.
Move the rear wheel sideways with force to see if the swing arm bearings are worn. Replace the bearings if there is any looseness (page 16-14).
Check the shock absorbers for leaks or damage.
Tighten all rear suspension nuts and bolts.



WHEELS

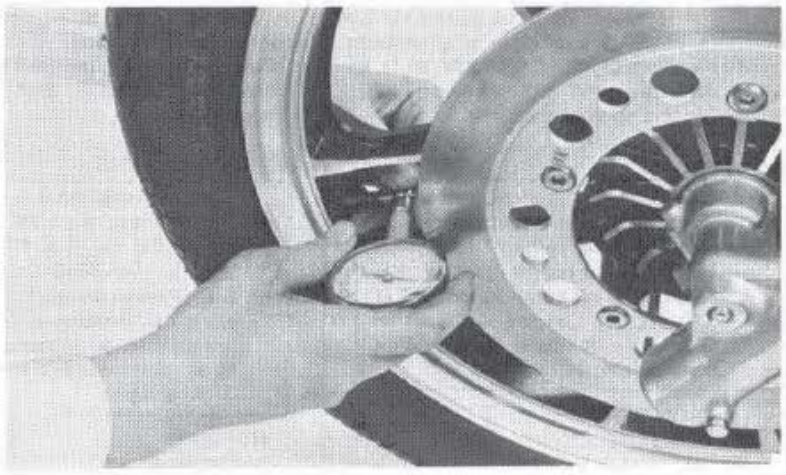
NOTE

Tire pressure should be checked when tires are COLD.

Check the tires for cuts, imbedded nails, or other sharp objects,

RECOMMENDED TIRES AND PRESSURES:

		Front	Rear
Tire size		3.50S-18-4PR	130/90-16 67S
Cold tire pressures kPa (kg/cm², psi)	Up to 90 kg (200 lbs) load	200 (2.00, 28)	200 (2.00, 28)
	90 kg (200 lbs) load to vehicle capacity load	200 (2.00, 28)	250 (2.50, 36)
Tire brand TUBELESS ONLY BRIDGESTONE DUNLOP		BRIDGESTONE L303 DUNLOP E11	BRIDGESTONE G508 DUNLOP K627



Check the front and rear wheels for trueness (page 15-17 and 16-5).
Measure the tread depth at the center of the tires.
Replace the tires if the tread depth reaches the following limits:

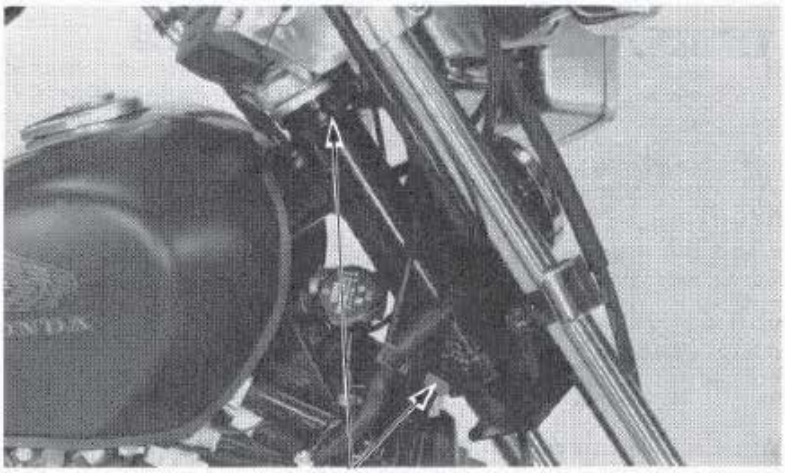
MINIMUM TREAD DEPTH:
Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (3/32 in)

STEERING HEAD BEARINGS

NOTE

Check that the control cables do not interfere with handlebar rotation.

Raise the front wheel off the ground and check that the handlebar rotates freely. If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 15-32).

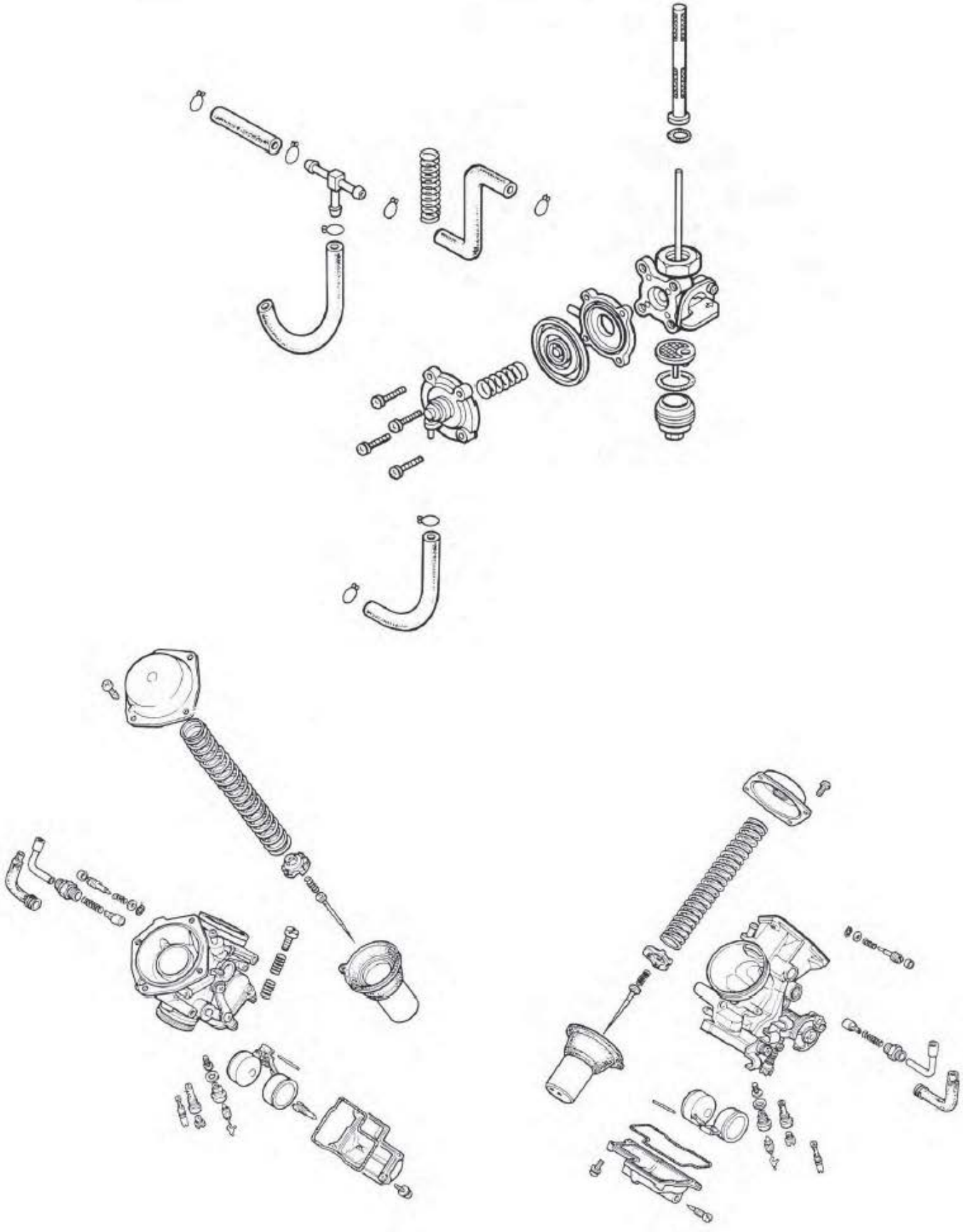


(1) BEARINGS

NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (Section 1) at the intervals shown in the Maintenance Schedule (Page 3-3).

Check all cotter pins, safety clips, hose clamps and cable stays.



CARBURETOR REMOVAL

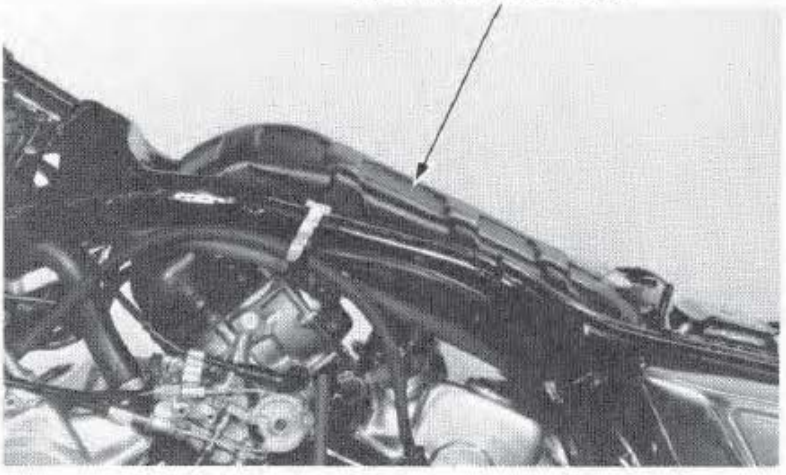
Turn the fuel valve OFF.
Disconnect the fuel line and vacuum tube from the fuel valve.

WARNING

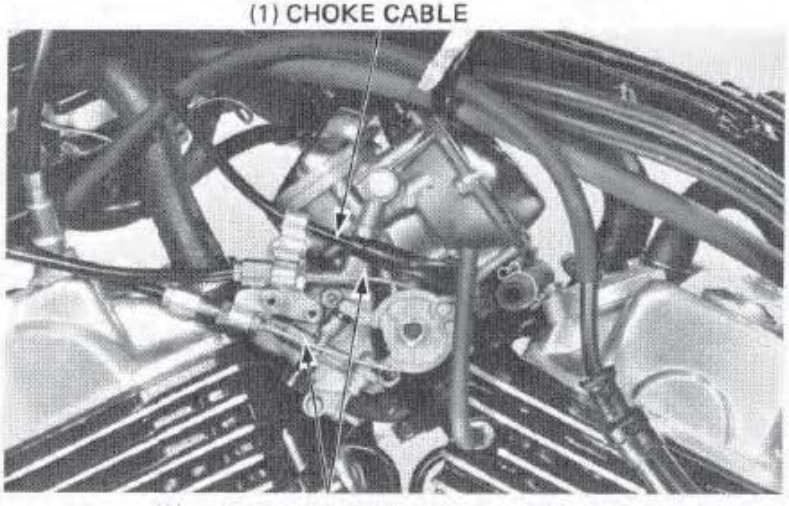
Do not allow flames or sparks near gasoline. Wipe up spilled gasoline at once.

Remove the seat and fuel tank (page 4-13).

Loosen the air cleaner connecting tube bands and remove the connecting tube.

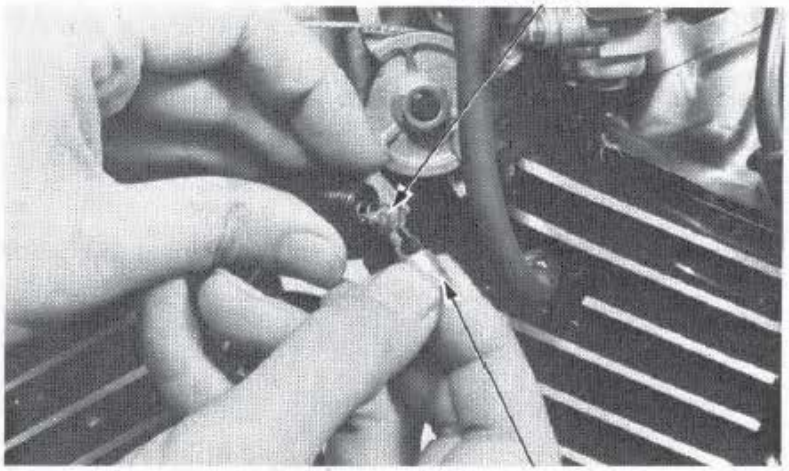


Remove the screws and throttle linkage cover.
Disconnect the throttle cables from the carburetor.
Remove the choke cables from the carburetor by loosening the choke cable end nut.

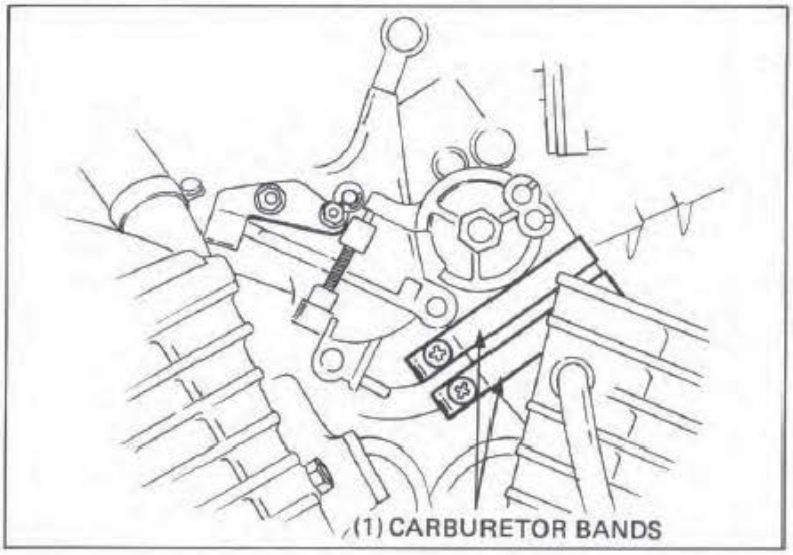


Remove the choke valve and spring from the choke cable.

Check the choke valve and spring for nicks, grooves, or other damage.



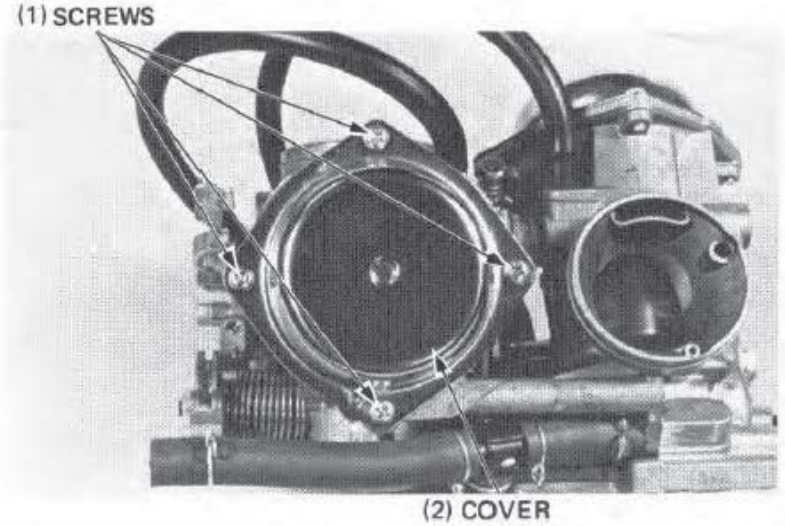
Loosen the carburetor bands and remove the carburetors from the left side.



VACUUM CHAMBER

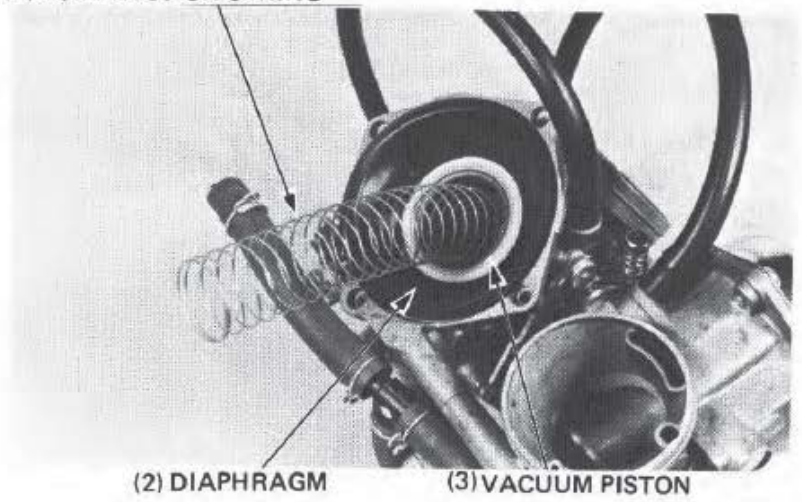
REMOVAL

Remove the four vacuum chamber cover screws and cover.



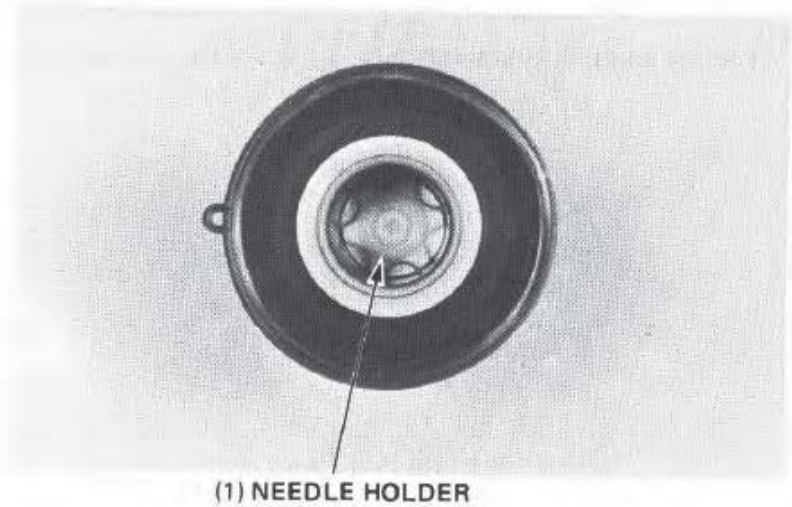
Remove the compression spring, diaphragm and vacuum piston.

Inspect the vacuum piston for wear, nicks, scratches or other damage. Make sure the piston moves up and down freely in the chamber.



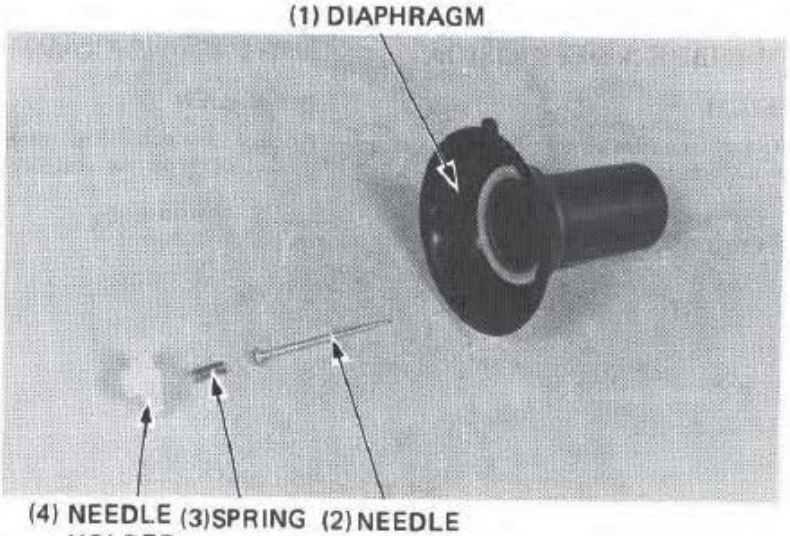
Push the needle holder in and turn it 60 degrees with an 8 mm socket. Then remove the needle holder, spring and needle from the piston.

Remove the plastic washer from the piston.



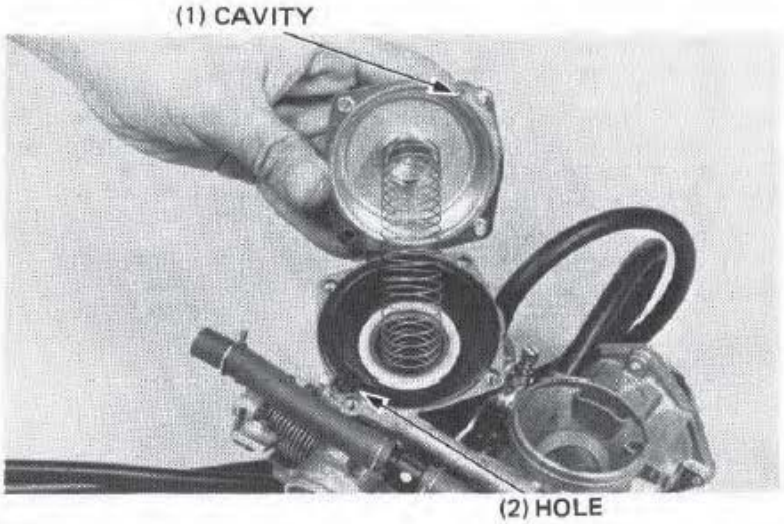
Inspect the needle for excessive wear at the tip and for bending, or other damage.

Check the diaphragm for deterioration and tears.



INSTALLATION

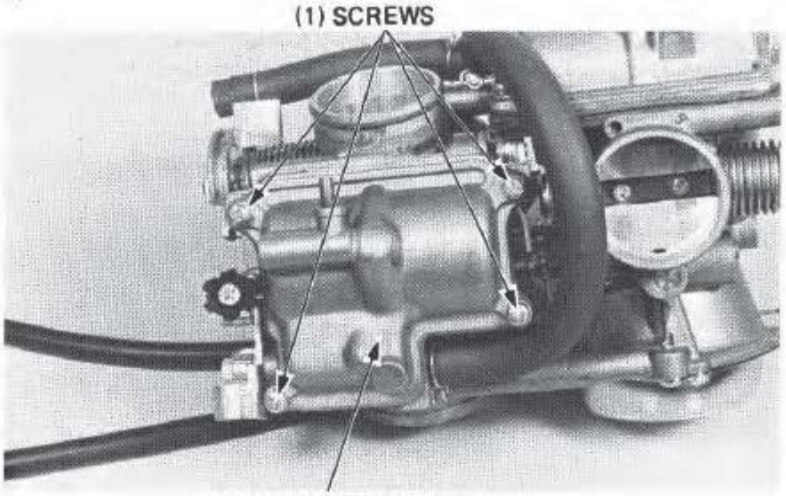
Installation is essentially the reverse of removal. Install the chamber cover so that its cavity aligns with the hole in the diaphragm.



FLOAT CHAMBER

REMOVAL

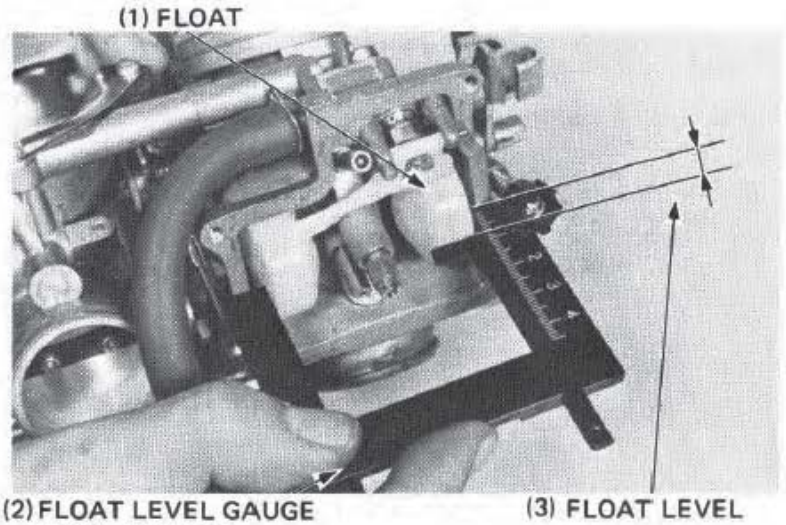
Remove the four float chamber screws and the float chamber.



FLOAT LEVEL

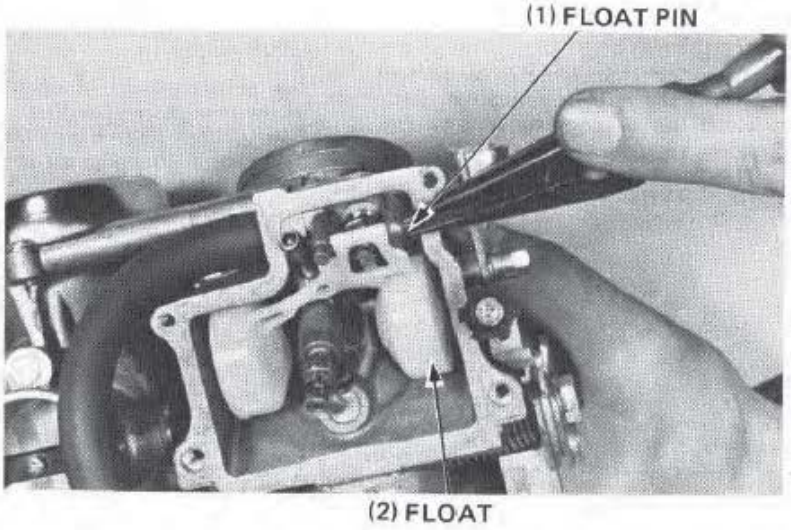
Measure the float level with the carburetor inclined 15°–45° from vertical and the float tang just contacing the float valve.

SPECIFICATION: 6.8 mm (0.27 in)



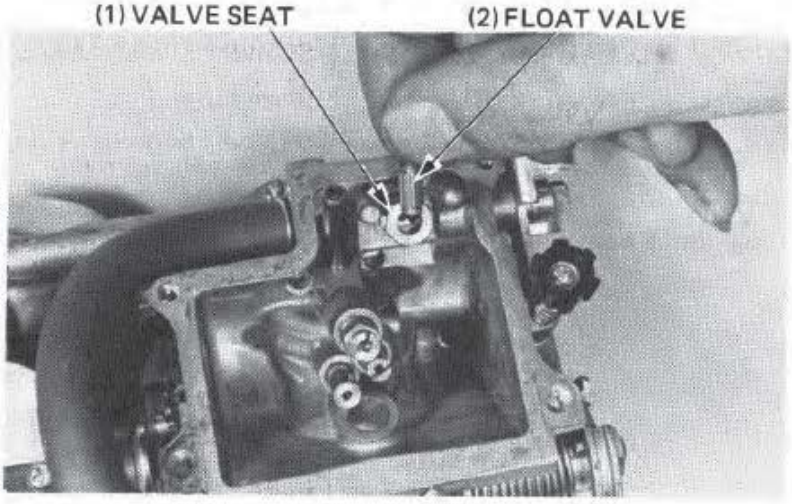
FLOAT AND JETS

Remove the float pin, float and float valve.



Inspect the float valve for grooves and nicks.

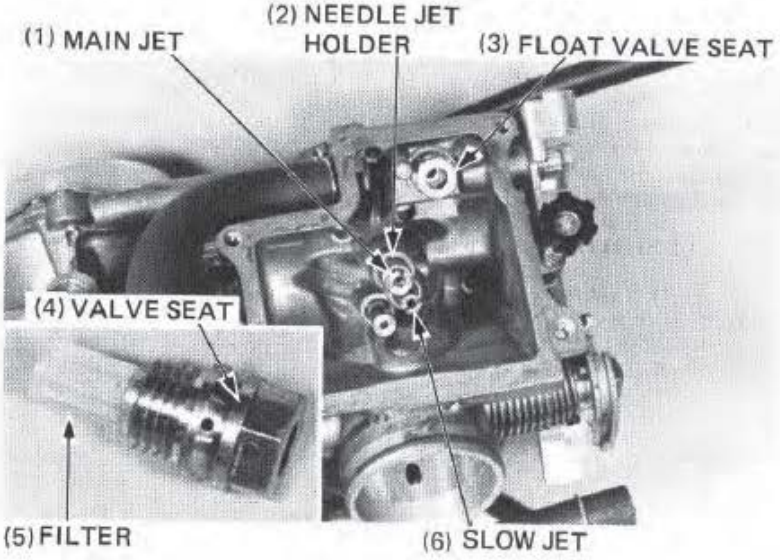
Inspect the operation of the float valve.



Remove the main jet, needle jet holder and slow jet.

Remove the float valve seat and filter.

Inspect the float valve seat and filter for grooves, nicks or deposits.



ASSEMBLY

Assemble the float chamber components in the reverse order of disassembly.

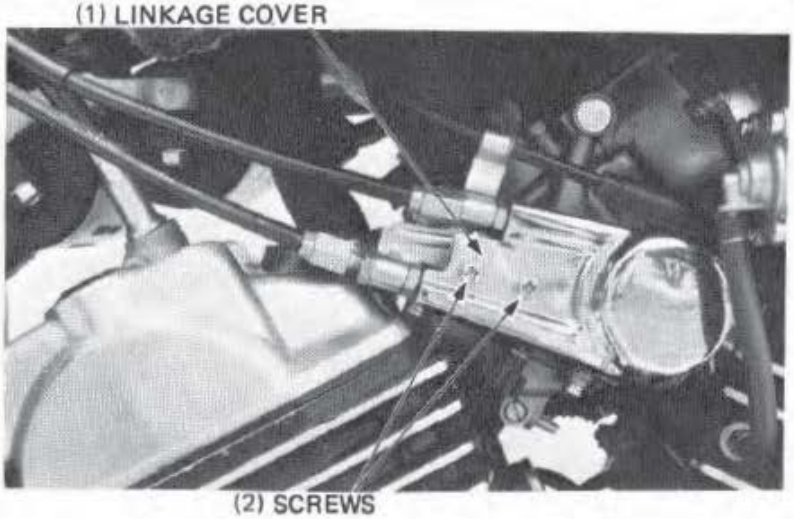
PILOT SCREW

REMOVAL

NOTE

- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.

Remove the two screws and throttle linkage cover.

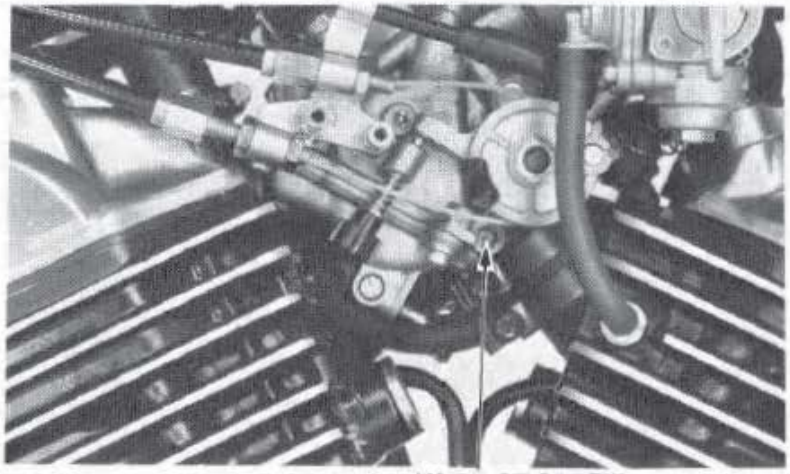


Turn each pilot screw in and carefully count the number of turns before it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screws.

CAUTION

Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

Remove the pilot screws and inspect them. Replace them if they are worn or damaged (page 4-12).

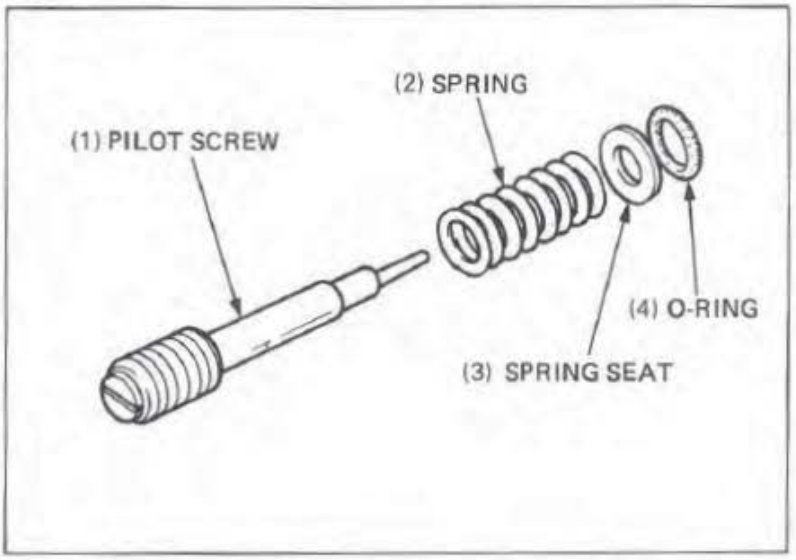


INSTALLATION

Install the pilot screws and return them to their original position as noted during removal. Perform pilot screw adjustment if new pilot screws are installed (page 4-12).

NOTE

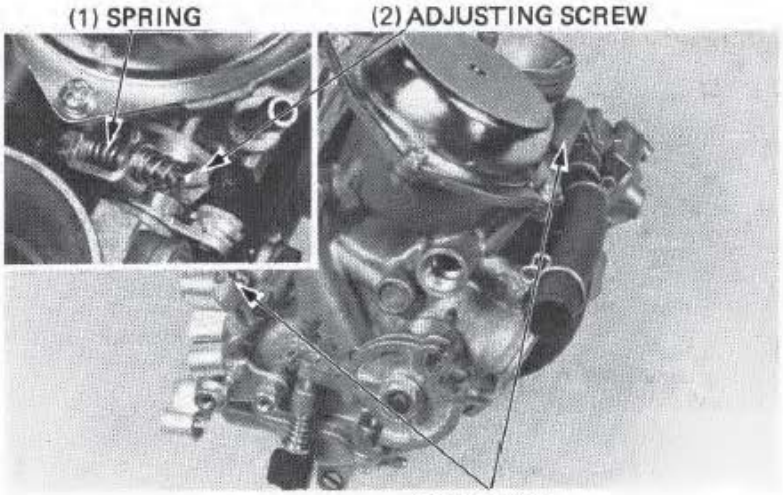
- If you replace the pilot screw in one carburetor, you must replace the pilot screw in the other carburetor for proper pilot screw adjustment.



CARBURETOR SEPARATION

Loosen the synchronization adjusting screw and remove the spring.

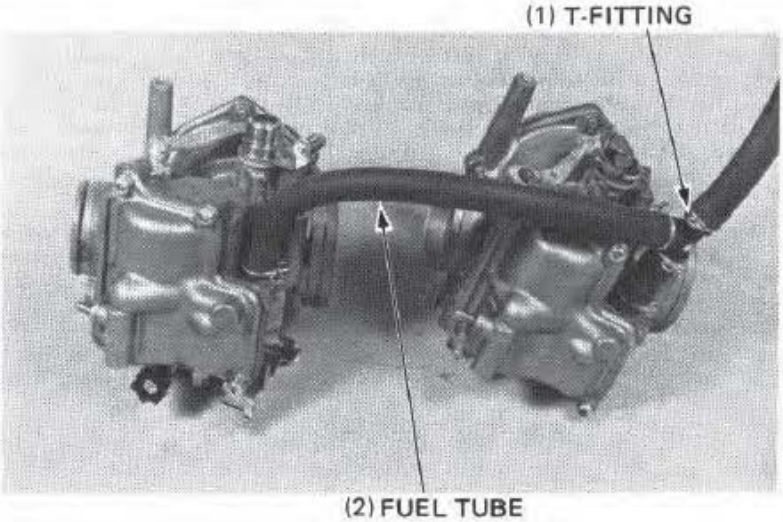
Remove the screws attaching the carburetors together.



Carefully separate the No. 1 and No. 2 carburetors.

Remove the throttle link thrust spring.

Remove the fuel tubes and T-fitting.



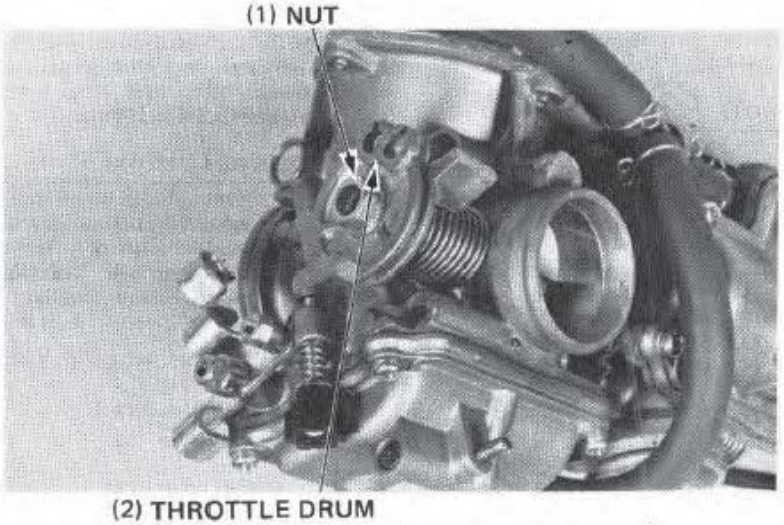
Loosen the throttle stop screw.

Remove the nut attaching the throttle drum and remove the throttle drum and return spring.

CARBURETOR ASSEMBLY

Install the throttle return spring, throttle drum and nut.

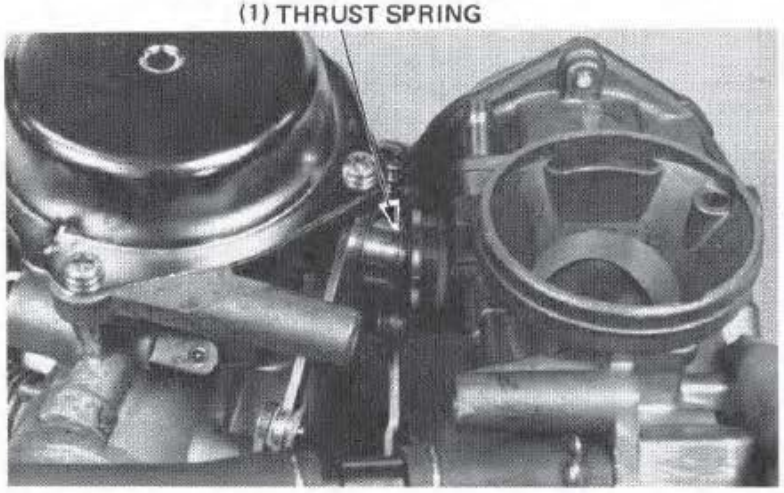
Tighten the nut securely.



Connect the fuel line.

Install the thrust spring and engage the throttle links of the No. 1 and No. 2 carburetors.

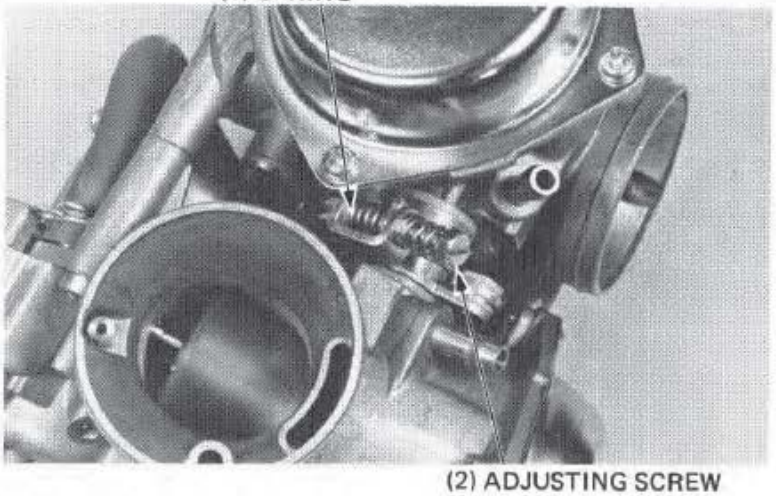
(1) THRUST SPRING



Loosen the synchronization adjusting screw until there is no tension.

Install the synchronization spring.

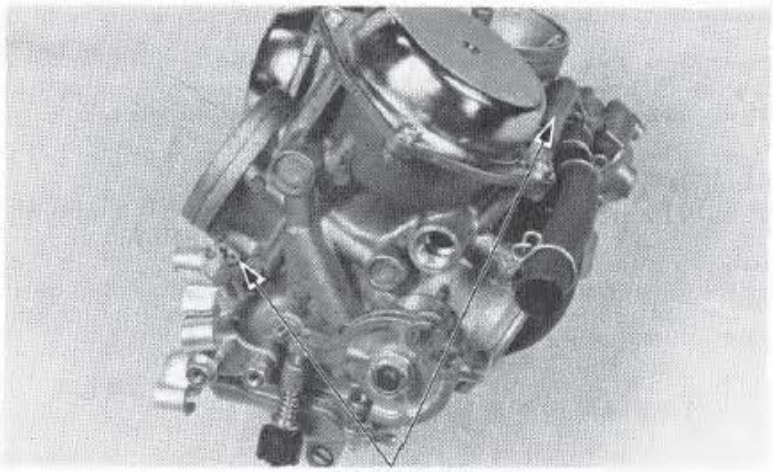
(1) SPRING



(2) ADJUSTING SCREW

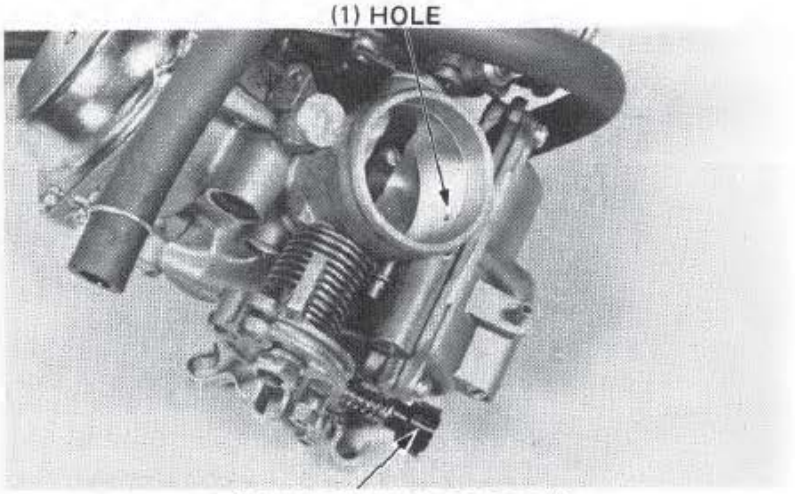
Secure the carburetors together with the two attaching screws.

Install the carburetor air vent tubes.



(1) SCREWS

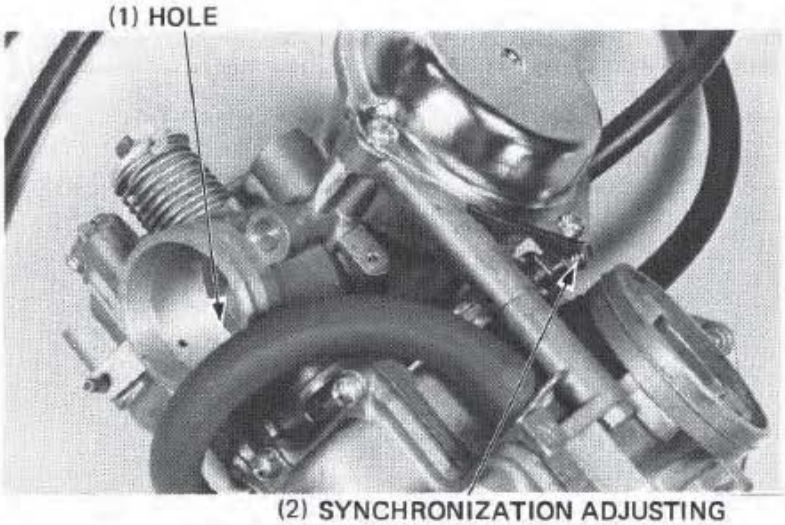
Turn the throttle stop screw to align the No. 1 throttle valve with the edge of the by-pass hole.



Align the No. 2 throttle valve with the by-pass hole edge by turning the synchronization adjusting screw.

Inspect throttle operation as described below:
- Open the throttle slightly by pressing on the throttle linkage. Then release the throttle.
- Make sure that it returns smoothly.
- Make sure that there is no drag when opening and closing the throttle.

(1) HOLE
(2) SYNCHRONIZATION ADJUSTING SCREW



CARBURETOR INSTALLATION

Installation is essentially the reverse of removal.

NOTE

Route the throttle and choke cables properly (page 1-9 to 1-11).

Perform the following inspections and adjustments.
- Throttle operation (page 3-5).
- Carburetor choke (page 3-6).
- Carburetor synchronization (page 3-10).
- Carburetor idle speed (page 3-10).

PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

NOTE

- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced (page 4-8).
- Use a tachometer with graduations of 50 min^{-1} (rpm) or smaller that will accurately indicate a 50 min^{-1} (rpm)

1. Turn each pilot screw clockwise until it seats lightly and back it out to the specification given. This is an initial setting prior to the final pilot screw adjustment.

INITIAL OPENING:
No. 1 (Rear) 2-1/4 turns out
No. 2 (Front) 2-1/4 turns out

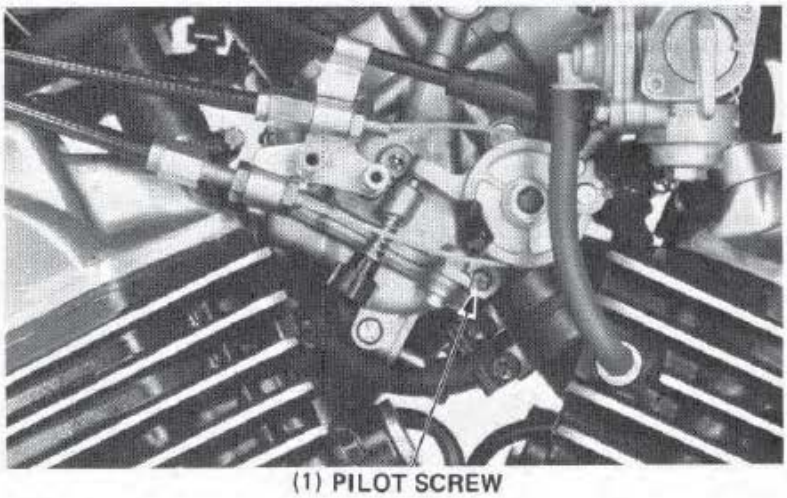
CAUTION

Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Attach a tachometer according to the manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,100 min^{-1} (rpm)

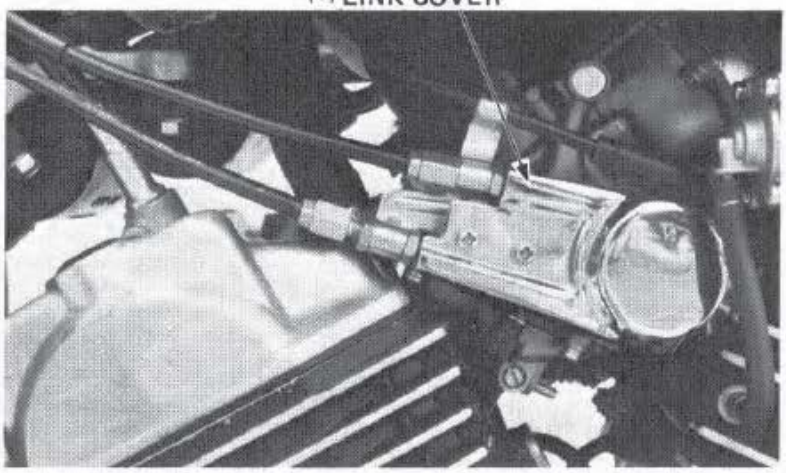
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by a continual 1/2 turn until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in step 8.



(1) PILOT SCREW

10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2 carburetor pilot screw.
12. Install the throttle linkage cover.

(1) LINK COVER



FUEL TANK

WARNING

Do not allow flames or sparks near gasoline. Wipe up spilled gasoline at once.

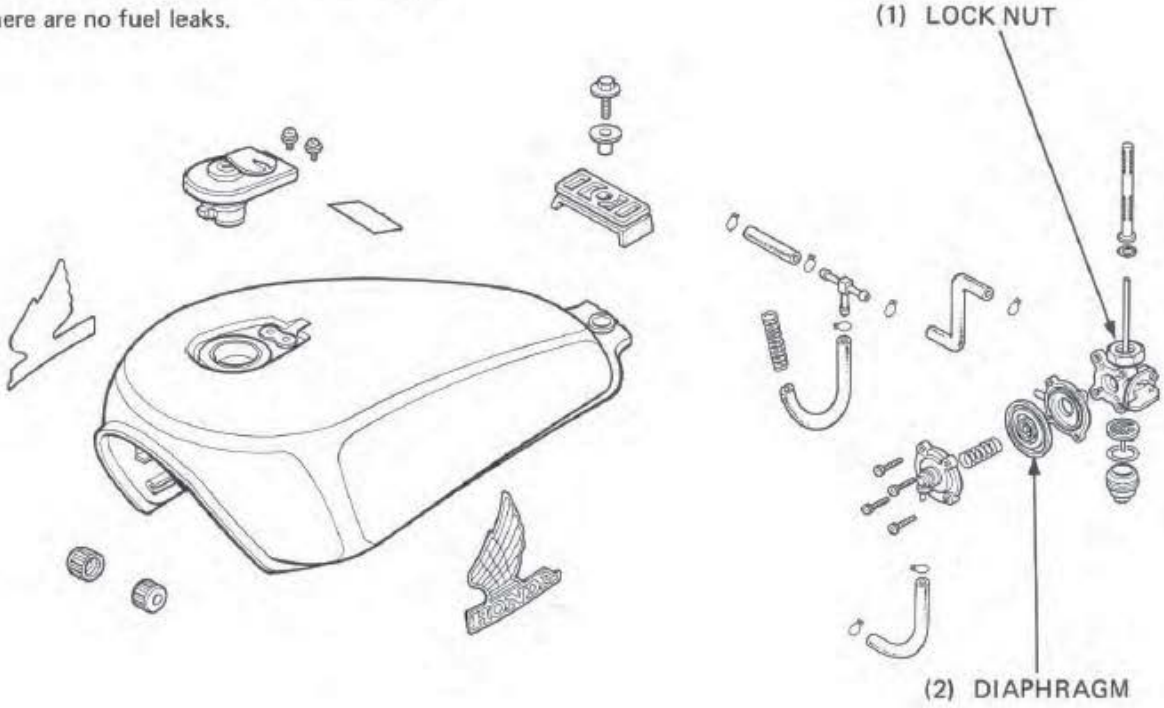
Check the vent hole of the filler cap for blockage.

Check that fuel is flowing out of the fuel valve using a vacuum pump. If fuel flow is restricted, clean the fuel strainer.

NOTE

Do not overtighten the fuel valve lock nut.

Make sure there are no fuel leaks.

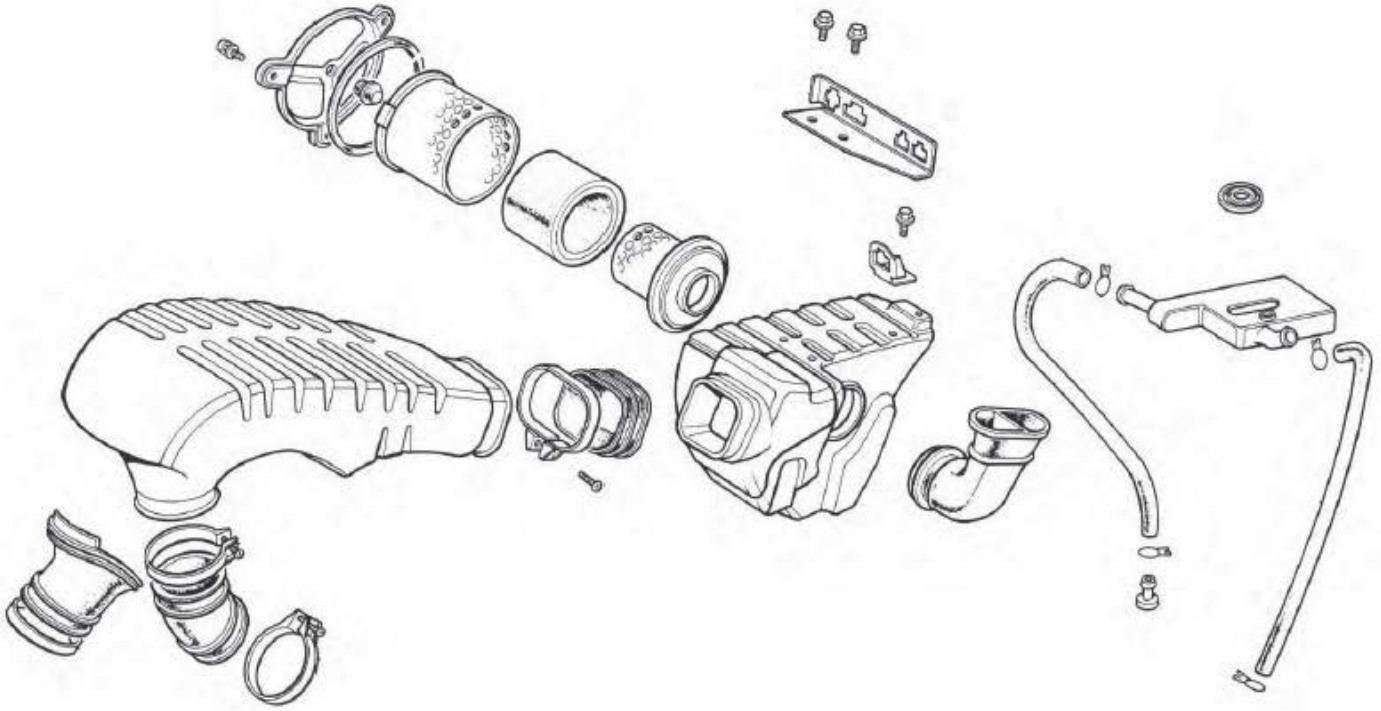


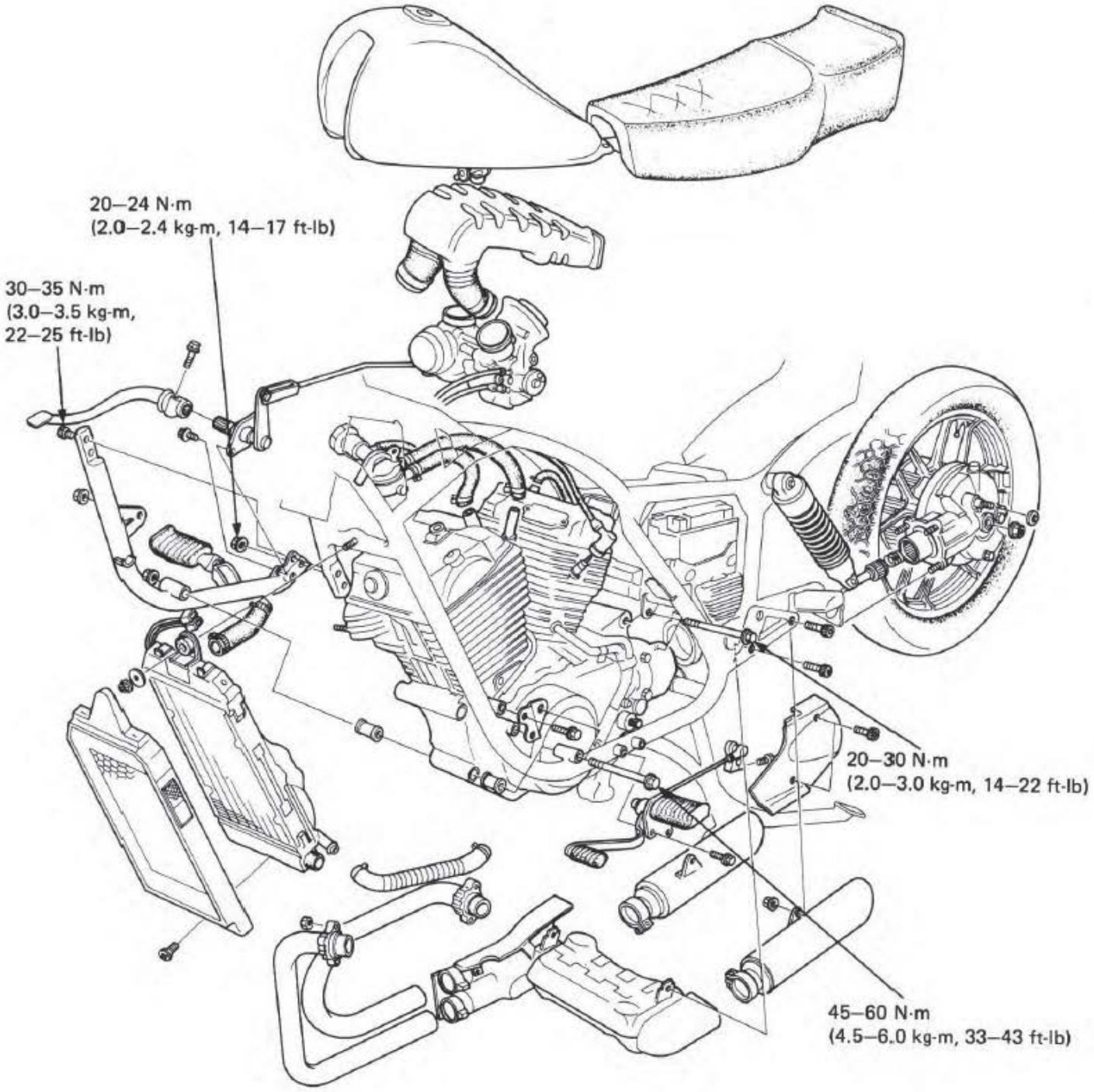
AIR CLEANER CASE

Check the air cleaner case for deterioration. Replace it if it has any signs of deterioration.

CRANKCASE VENTILATION SYSTEM

Check that the breather tube is not restricted.




20–24 N·m
(2.0–2.4 kg-m, 14–17 ft-lb)
30–35 N·m
(3.0–3.5 kg-m,
22–25 ft-lb)
20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)
45–60 N·m
(4.5–6.0 kg-m, 33–43 ft-lb)

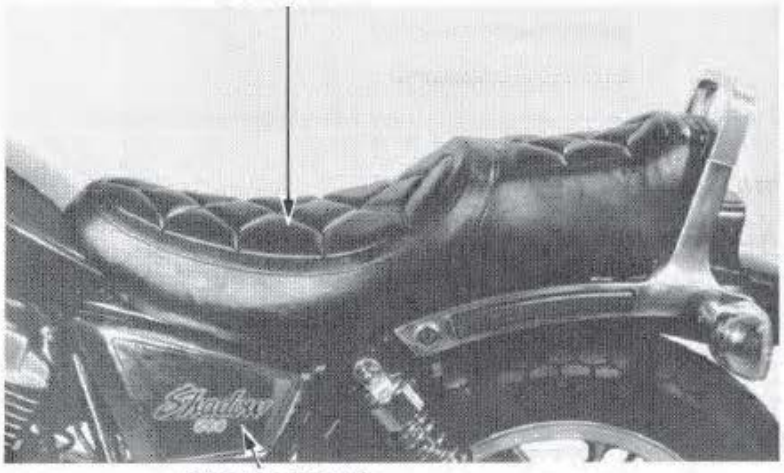
ENGINE REMOVAL

Place the motorcycle on its center stand.

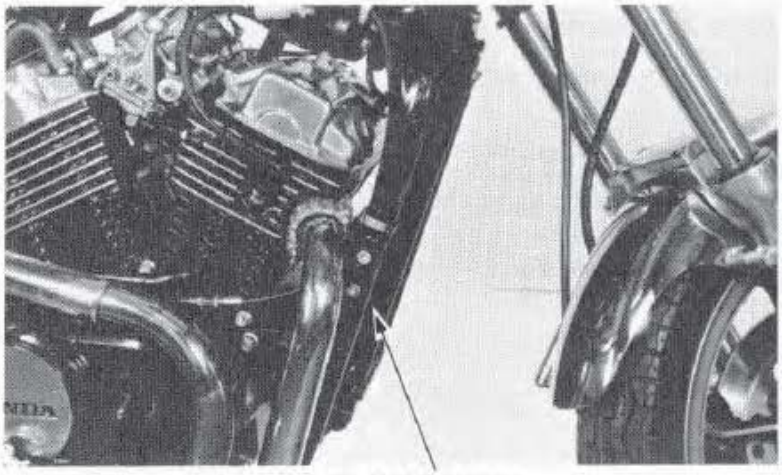
Remove the seat and fuel tank.

Remove the left and right frame side covers.

Drain the engine oil (page 2-3) and the coolant (page 6-3).



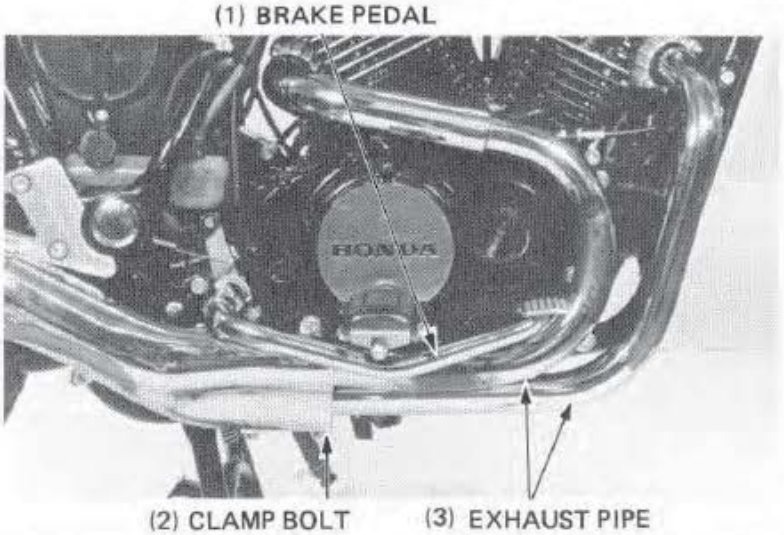
Remove the radiator (page 6-6).



Remove the rear brake pedal.

Remove the exhaust pipe flange nuts.

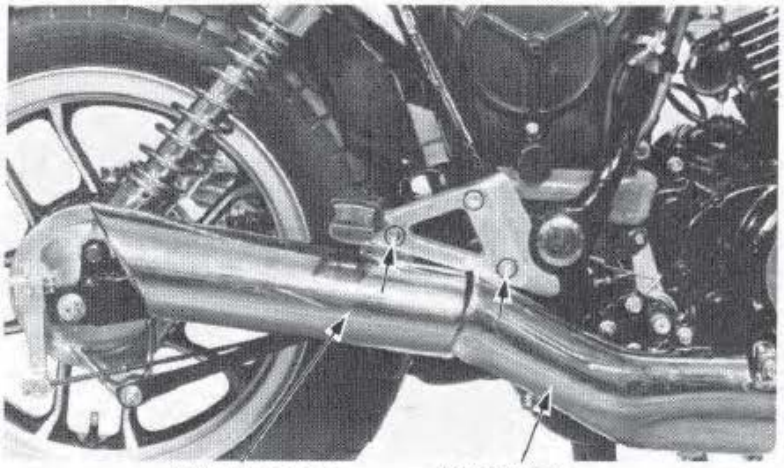
Loosen the exhaust pipe clamp bolts and remove the exhaust pipes.



Loosen the muffler clamp bolts and remove the muffler mount bolts.

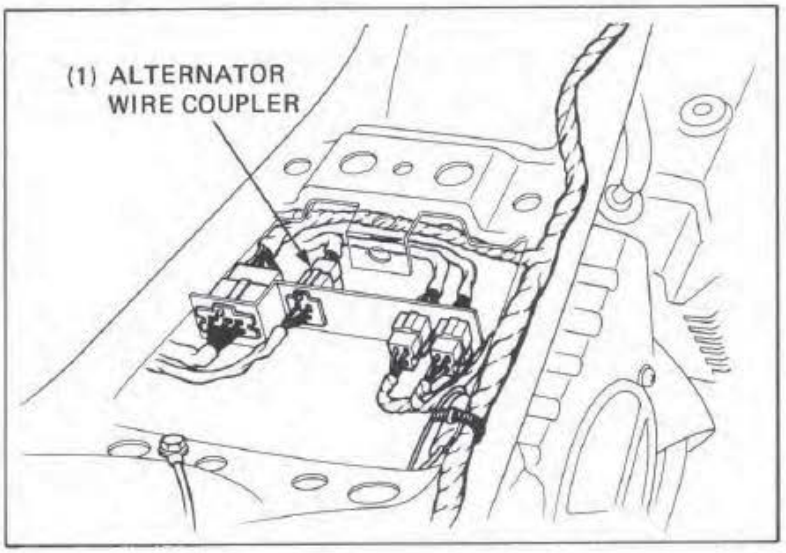
Remove the mufflers.

Remove the power chamber mounting bolts and power chamber.



(1) MUFFLER (2) POWER CHAMBER

Disconnect the alternator and neutral/OD switch wire coupler (page 1-10).

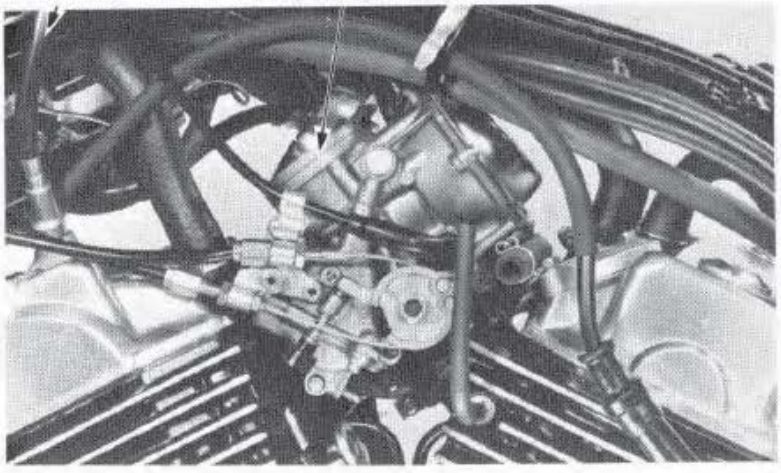


Remove the air cleaner connecting tube and carburetor (page 4-3).

Disconnect the tachometer cable from the engine.

Remove the spark plug caps.

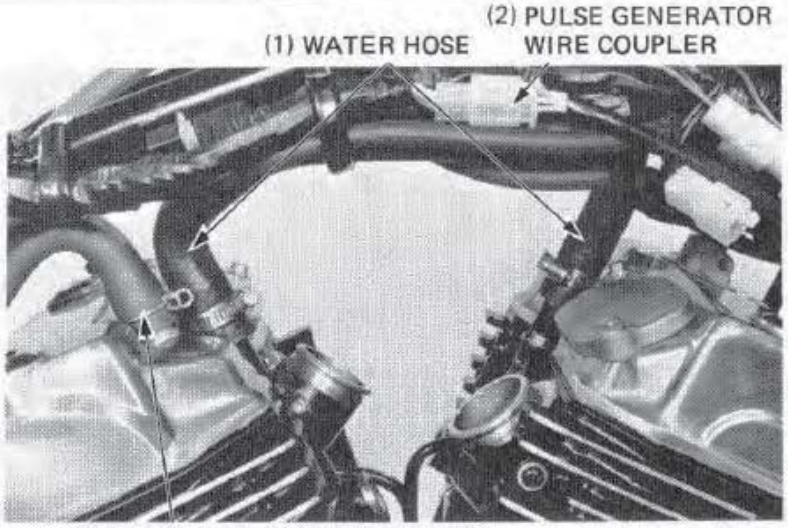
(1) TACHOMETER CABLE (2) CARBURETOR



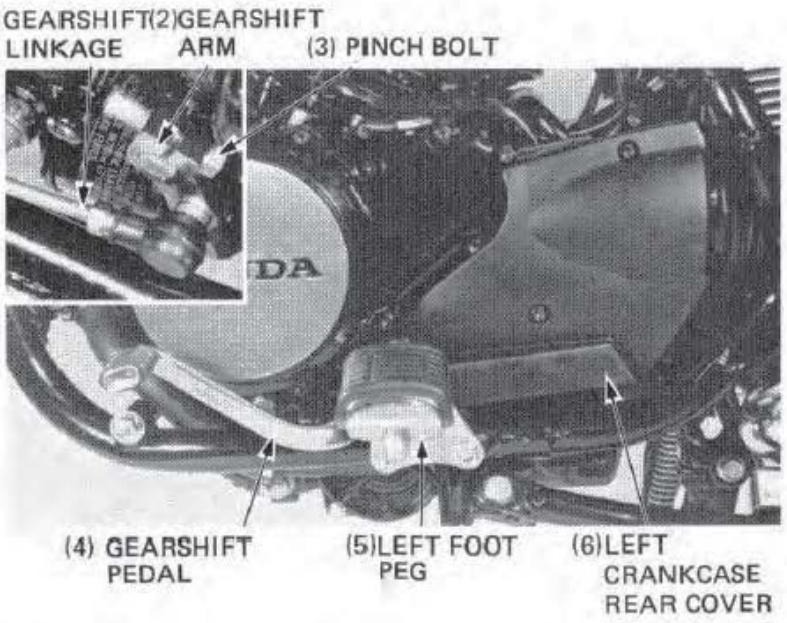
Disconnect the water hoses from the cylinder head.

Disconnect the crankcase breather tube.

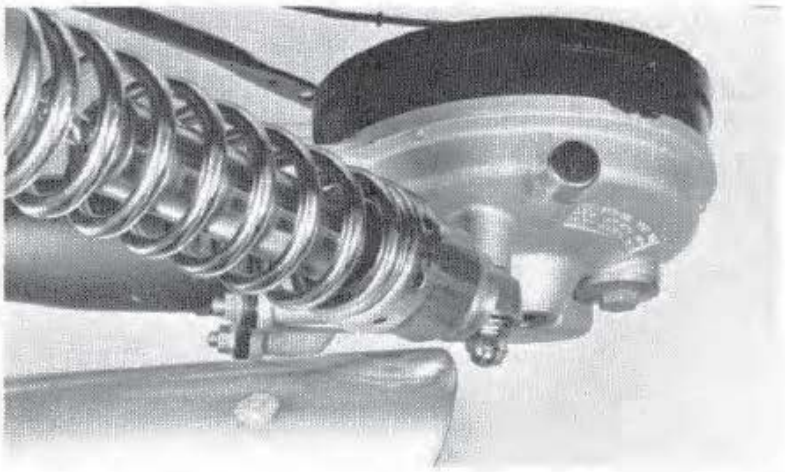
Disconnect the pulse generator wire coupler.



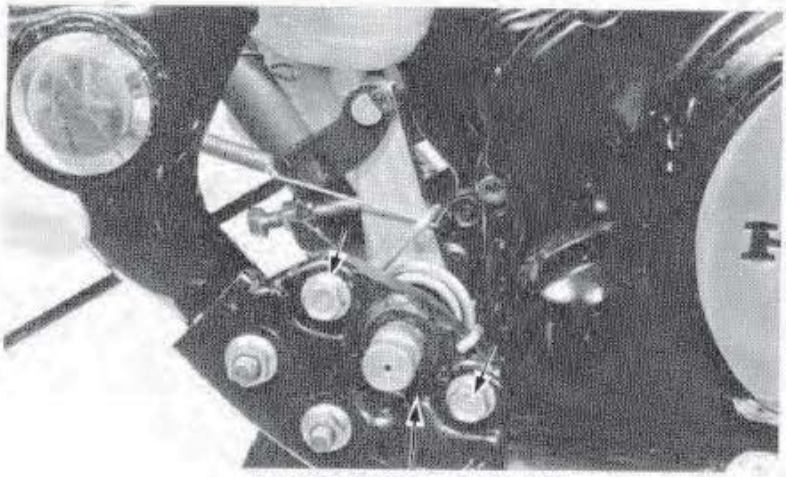
Remove the left crankcase rear cover.
Remove the gear shift arm pinch bolt.
Remove the left footpeg mounting bolts.
Remove the left footpeg and gearshift linkage as a set.



Remove the rear wheel (page 16-3).
Remove the final gear case (page 14-3).



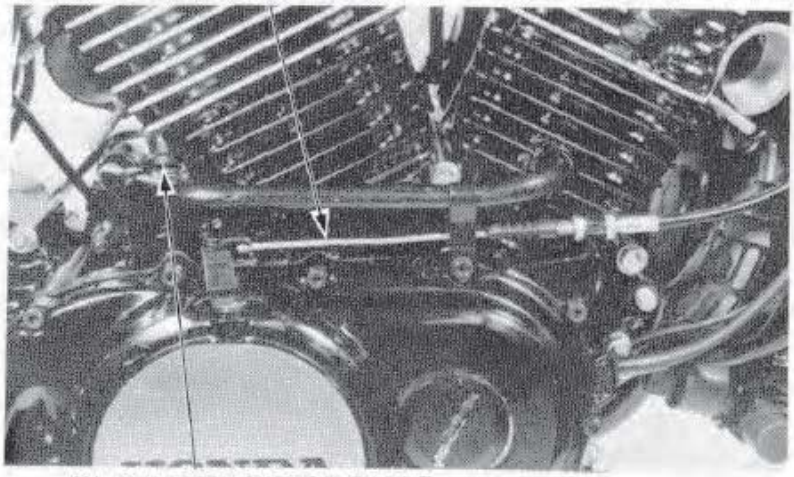
Remove the brake pedal pivot.



(1) BRAKE PEDAL PIVOT

(1) CLUTCH CABLE

Disconnect the clutch cable by loosening the handlebar adjuster.
Disconnect the starter motor cable.



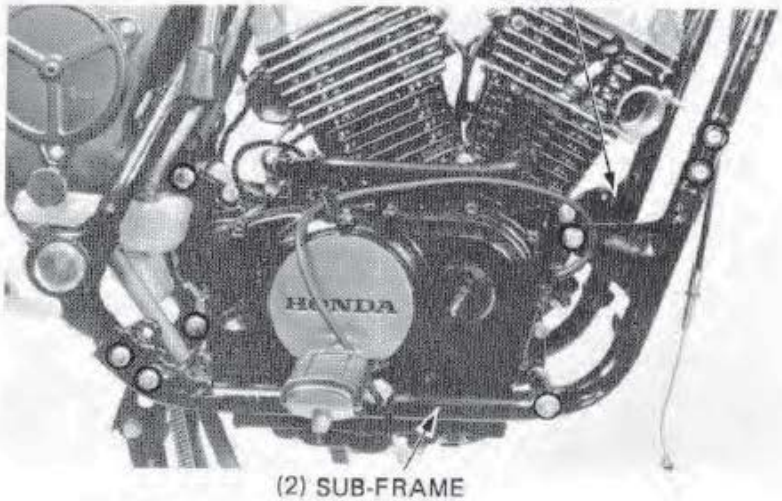
(2) STARTER MOTOR CABLE

(1) ENGINE HANGER BRACKET

Place a floor jack or other adjustable support under the engine.

NOTE

The jack height must be continuously adjusted so that the mounting bolts can be removed, and so stress is relieved from other bolts until they are removed.



Remove the right sub-frame.

Remove the engine hanger bracket.

Remove the engine mounting bolts.

Remove the engine from the right side while disconnecting the drive shaft universal joint from the engine.

(2) SUB-FRAME

ENGINE INSTALLATION

Engine installation is essentially the reverse of removal. Use a floor jack or other adjustable support to carefully manuever the engine into place.

CAUTION

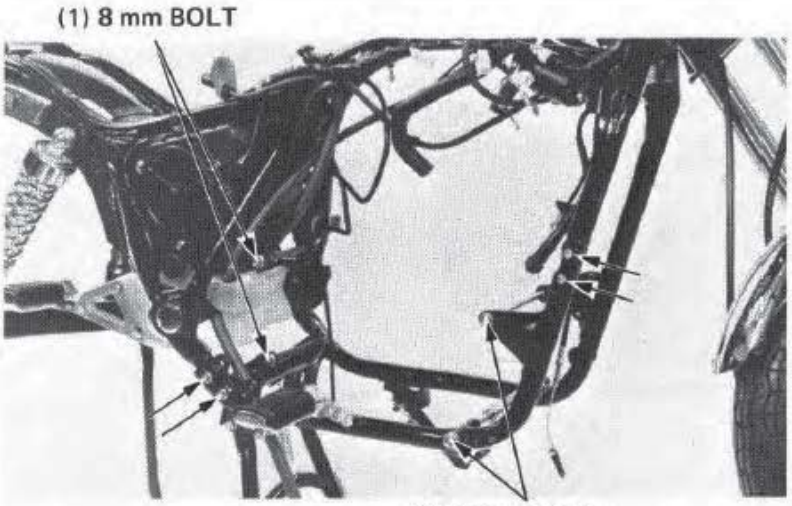
Carefully align mounting points with the jack to prevent damage to mounting bolt threads, wire harness and cables.

Tighten the all fasteners to the specified torque:

ENGINE MOUNT BOLTS:
8 mm BOLT: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
10 mm BOLT: 45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)
SUB-FRAME MOUNT BOLT AND NUT:
SOCKET BOLT: 30–35 N·m (3.0–3.5 kg-m, 22–25 ft-lb)
FLANGE NUT: 20–24 N·m (2.0–2.4 kg-m, 14–17 ft-lb)

NOTE

- Route the wires and cables properly (page 1-9).
- Fill the crankcase to the proper level with the recommended oil (page 2-1).
- Fill the cooling system (page 6-3).
- Perform the following inspection and adjustments:
  Throttle operation (page 3-5).
  Clutch (page 3-16).



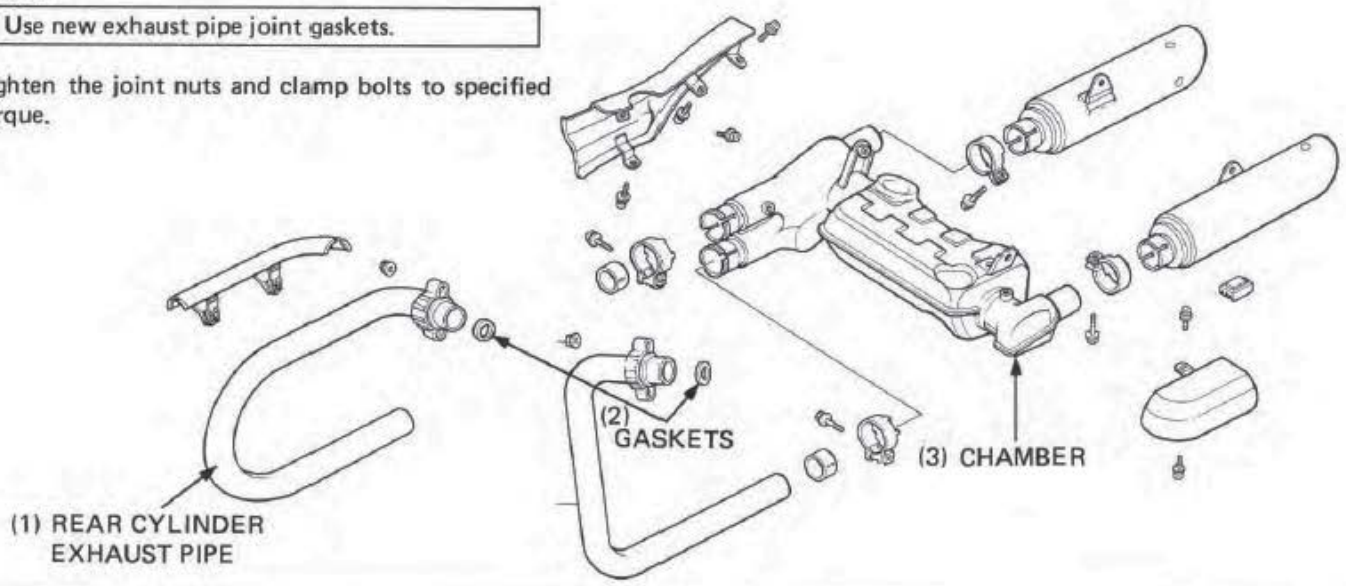
Install the rear cylinder exhaust pipe to the chamber bolt loosely. Install them to the flame.
Install the remaining exhaust pipe and mufflers.

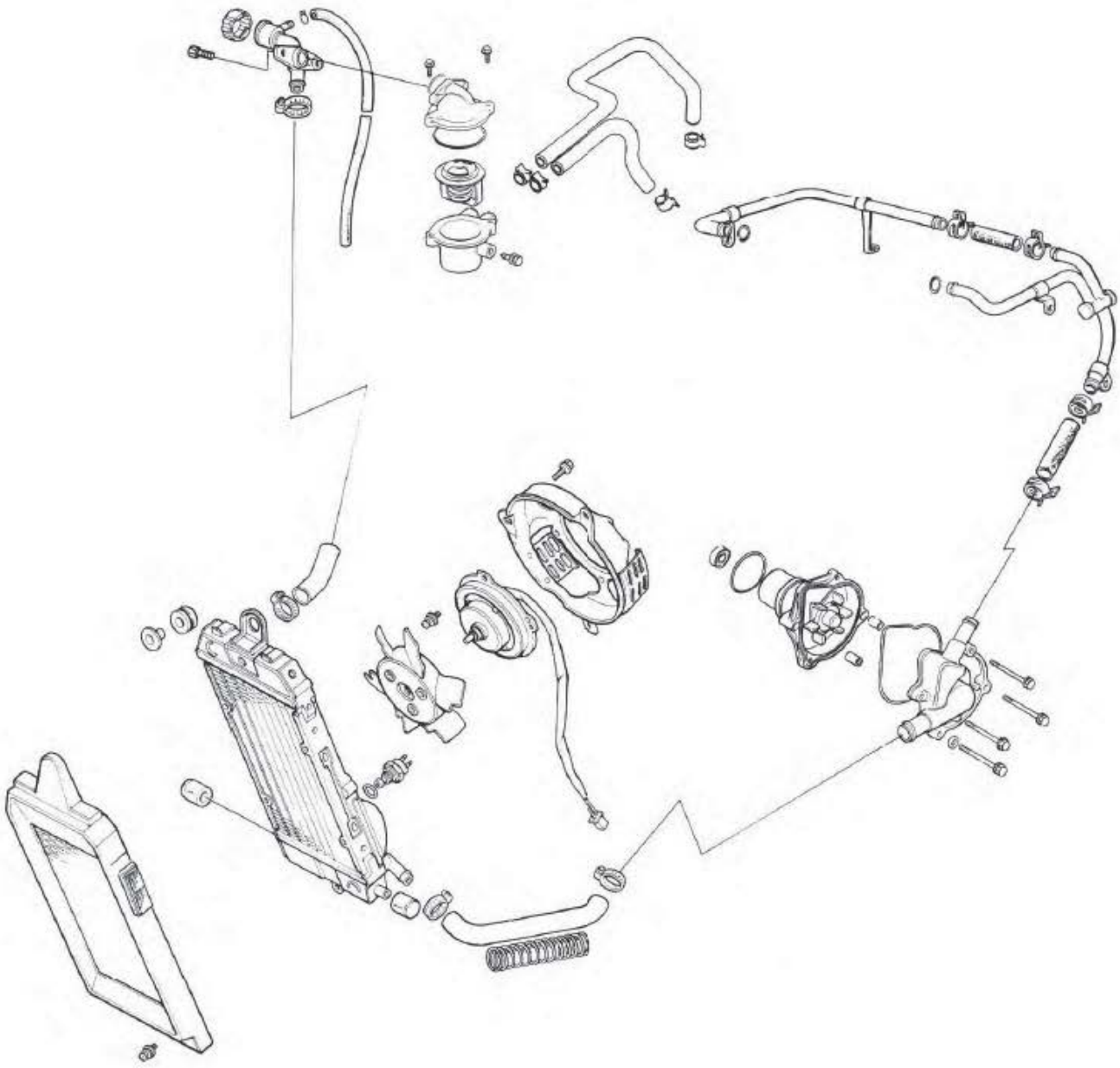
NOTE

Use new exhaust pipe joint gaskets.

Tighten the joint nuts and clamp bolts to specified torque.

EXHAUST PIPE JOINT NUT:
8–14 N·m (0.8–1.4 kg-m, 6–10 ft-lb)
EXHAUST PIPE CLAMP BOLT:
20–28 N·m (2.0–2.8 kg-m, 14–20 ft-lb)
MUFFLER CLAMP BOLT:
20–28 N·m (2.0–2.8 kg-m, 14–20 ft-lb)

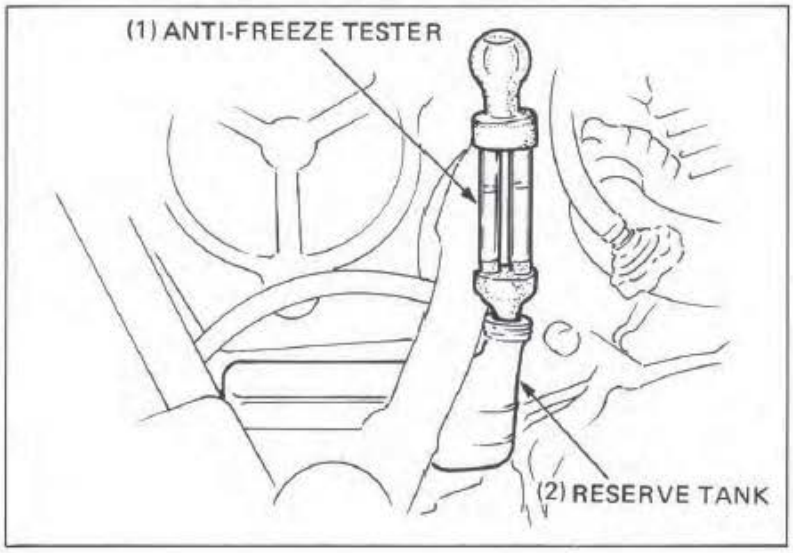




SYSTEM TESTING

COOLANT

Test the coolant mixture with an anti-freeze tester. For maximum corrosion protection, a 50–50% solution of ethylene glycol and distilled water is recommended.



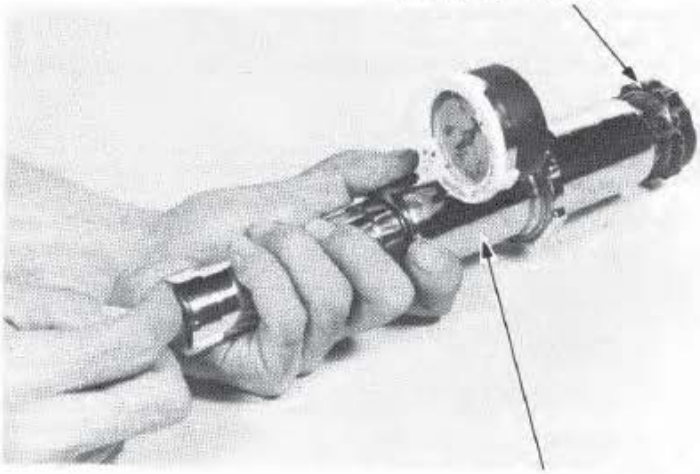
RADIATOR CAP INSPECTION

Pressure test the radiator cap. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

NOTE

Before installing the cap on the tester, apply water to the sealing surfaces.

RADIATOR CAP RELIEF PRESSURE:
73.5–103.0 kPa (0.75–1.05 kg/cm², 10.7–14.9 psi)

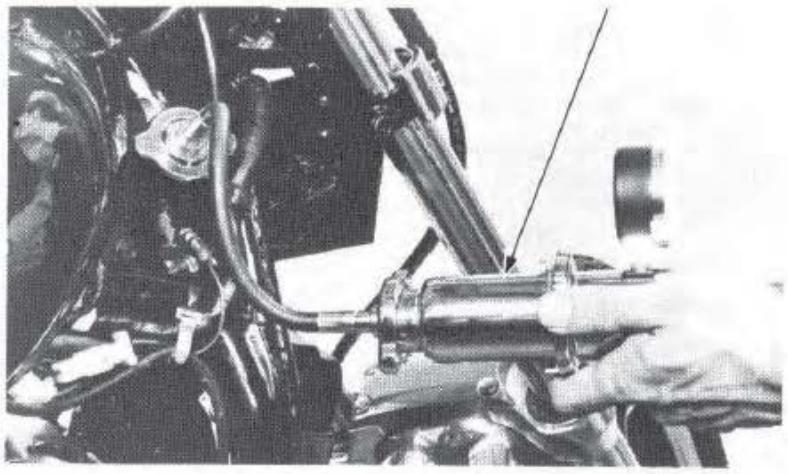


Pressurize the radiator, engine and hoses, and check for leaks.

CAUTION

Excessive pressure can damage the radiator. Do not exceed 103.0 kPa (1.05 kg/cm², 14.9 psi).

Repair or replace components if the system will not hold specified pressure for at least six seconds.



COOLANT REPLACEMENT

CAUTION

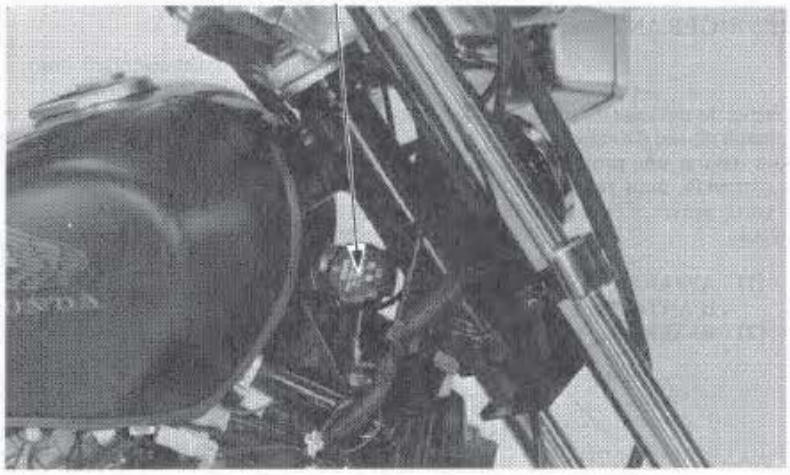
The engine must be cool before servicing the cooling system, or severe scalding may result.

Remove the fuel tank rear mounting bolt and raise the front of the fuel tank.

Remove the steering stem cover.

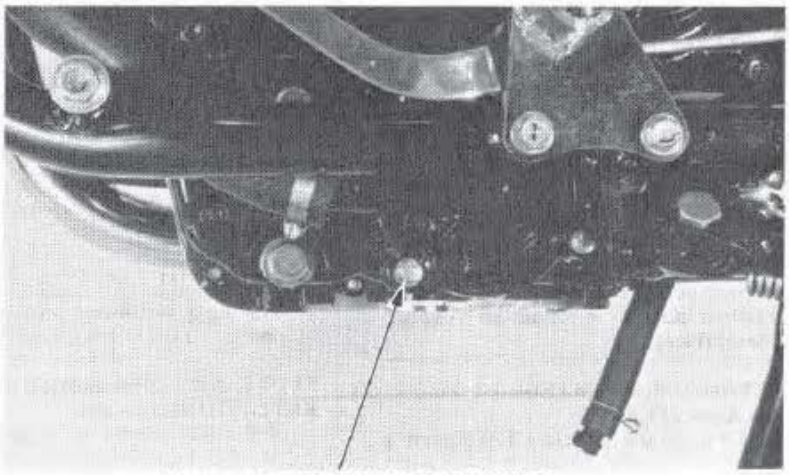
Remove the radiator filler cap.

(1) RADIATOR FILLER CAP



Remove the drain bolt located at the water pump and drain the system coolant.

Reinstall the sealing washer and bolt.



(1) DRAIN BOLT WITH SEALING WASHER

Loosen the air bleed bolt located at the left of the thermostat housing.

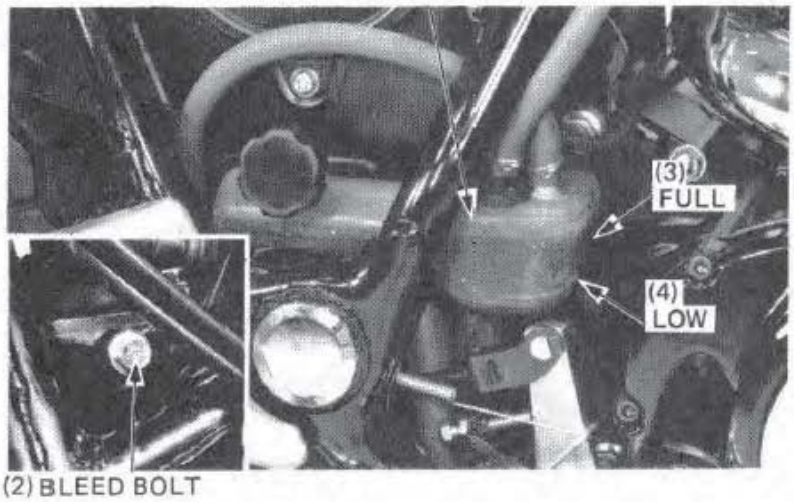
Fill the system with a 50–50 mixture of distilled water and ethylene glycol.

Retighten the bleed bolt.

Bleed air from the radiator.

- Start the engine and let it run until there are no air bubbles in the coolant, and the level stabilizes.
- Stop the engine and add coolant up to the proper level if necessary.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and fill to the correct level if it is low.

(1) RESERVE TANK



(2) BLEED BOLT

THERMOSTAT

REMOVAL

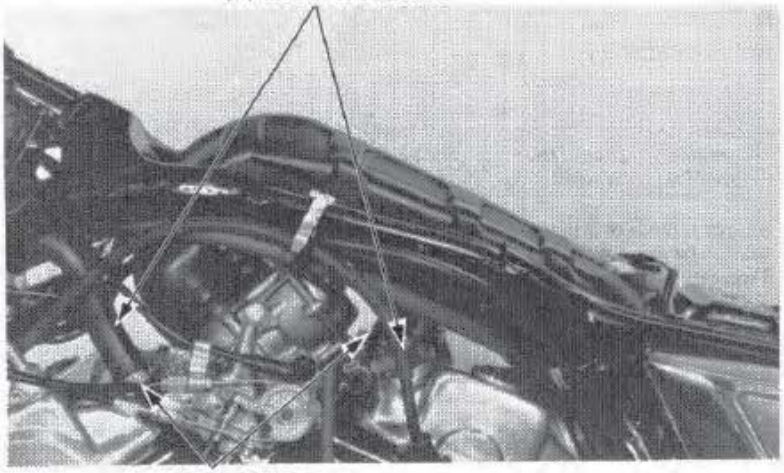
Turn the fuel valve OFF.

Remove the seat and fuel tank.

Remove the coolant drain bolt, and drain the coolant (page 6-3).

Loosen the water hose clamps.

Remove the air cleaner connecting tube.



Remove the steering stem covers.

Remove the turn signal relay.

Disconnect the temperature sensor wire.

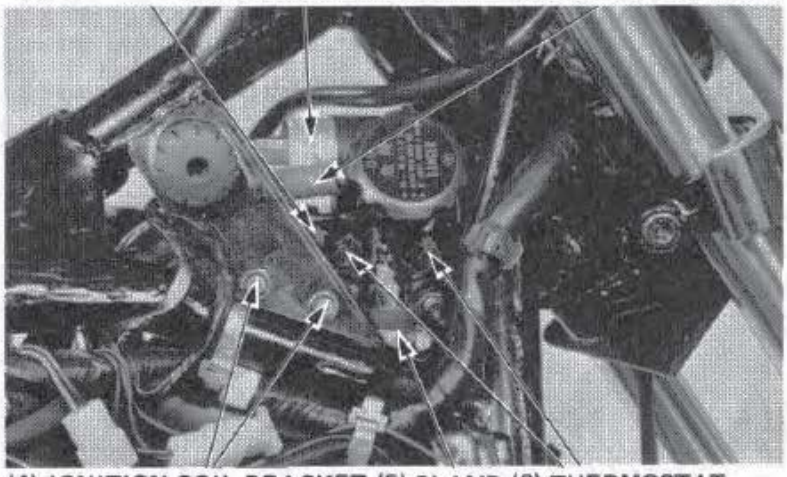
Disconnect the overflow tube from the radiator filler neck.

Loosen the ignition coil bracket mounting bolts.

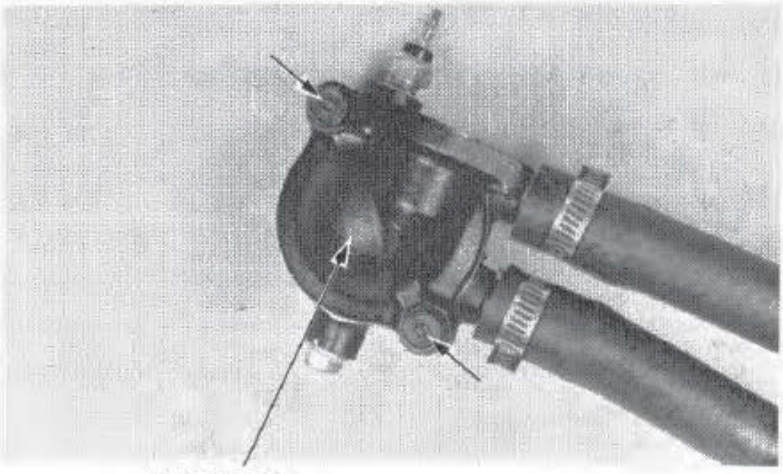
Loosen the radiator hose clamp.

Remove the bolt attaching the thermostat housing and filler neck.

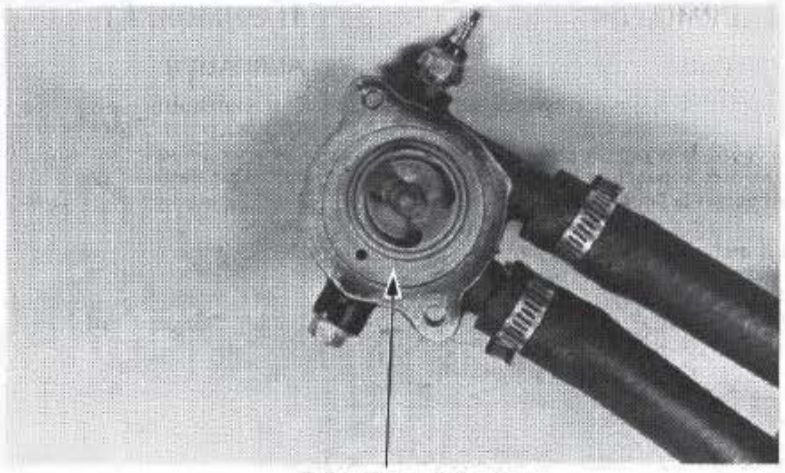
Remove the thermostat housing and filler neck.



Remove the two bolts and thermostat cover.



Remove the thermostat from the housing.



(1) THERMOSTAT

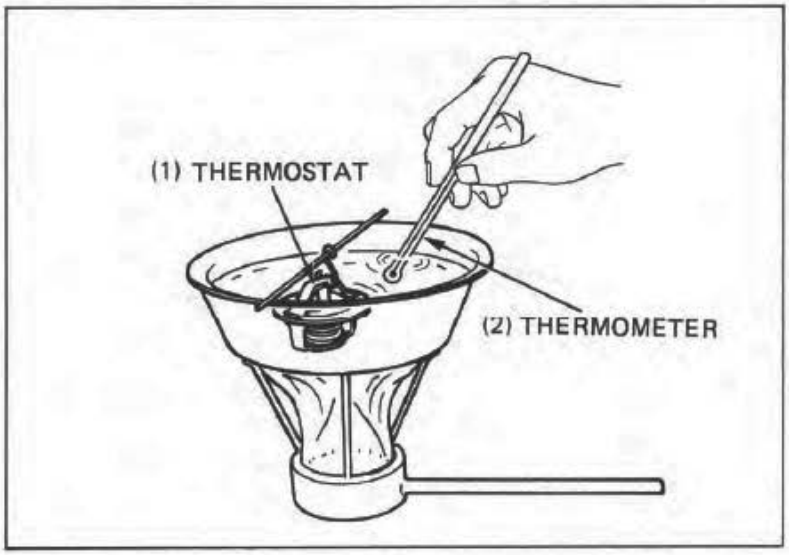
INSPECTION

Visually inspect the thermostat for damage. Suspend the thermostat in heated water to check its operation. Do not let the thermostat or thermometer touch the pan or false readings will result.

Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

Technical Data

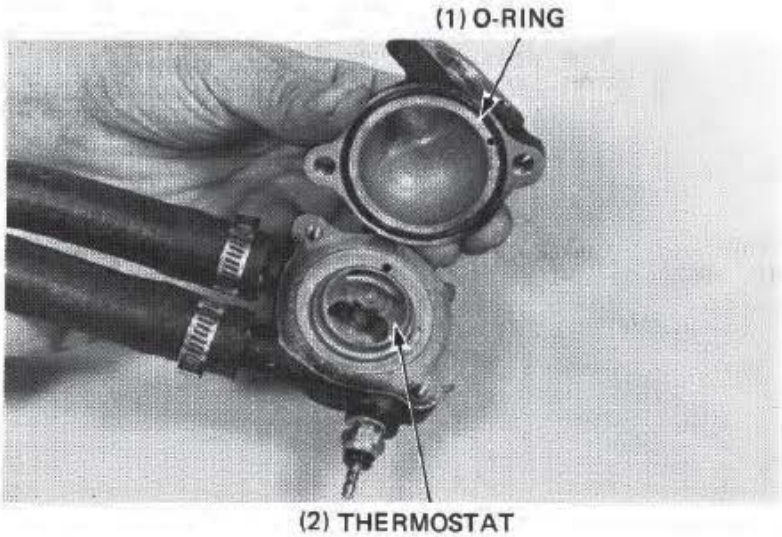
Starts to open	80° to 84°C (176° to 183°F)
Valve lift	8 mm minimum (0.31 in) when heated to 95°C (203°F) for five minutes.



INSTALLATION

Install the thermostat in the housing.

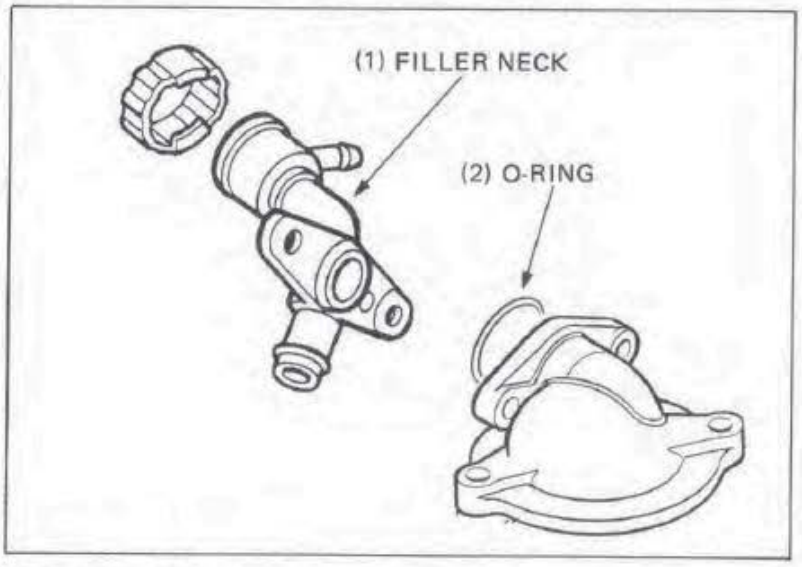
Install a new O-ring onto the cover, place the cover onto the housing and tighten the bolts.



Install a new O-ring onto the filler neck.

Install the thermostat housing in the frame and install the filler neck.

Loosely, tighten the thermostat housing mounting bolts.



(1) FILLER NECK MOUNTING BOLT (2) TURN SIGNAL RELAY (3) OVER FLOW TUBE

Tighten the filler neck mounting bolt securely to the ignition coil bracket.

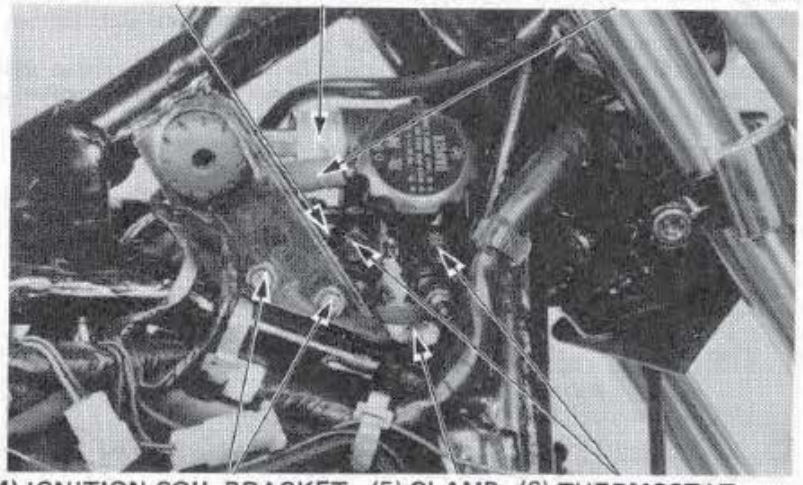
Tighten the ignition coil bracket bolts.

Tighten the water hose clamp bolts.

Connect the temperature sensor wire to the temperature sensor.

Add coolant in the system (page 6-3).

Install the air cleaner connecting tube and fuel tank.
Install the steering stem cover.



(4) IGNITION COIL BRACKET MOUNTING BOLTS (5) CLAMP (6) THERMOSTAT HOUSING MOUNTING BOLTS

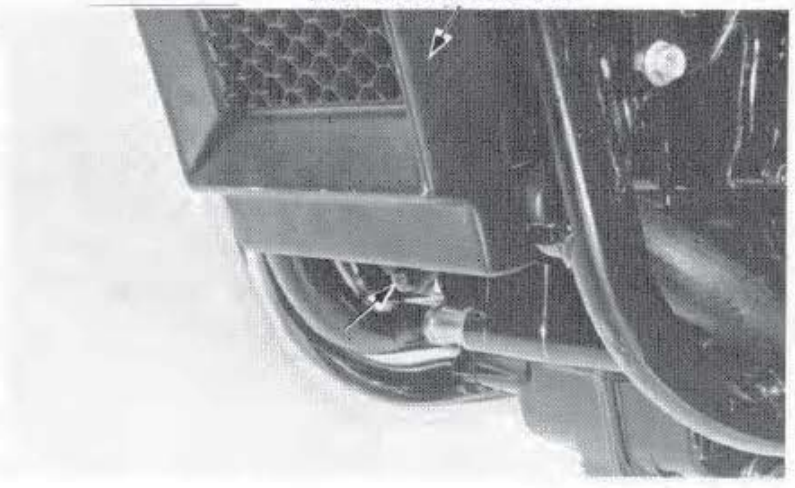
RADIATOR/COOLING FAN

REMOVAL

Remove the drain bolt and drain the coolant (page 6-3).

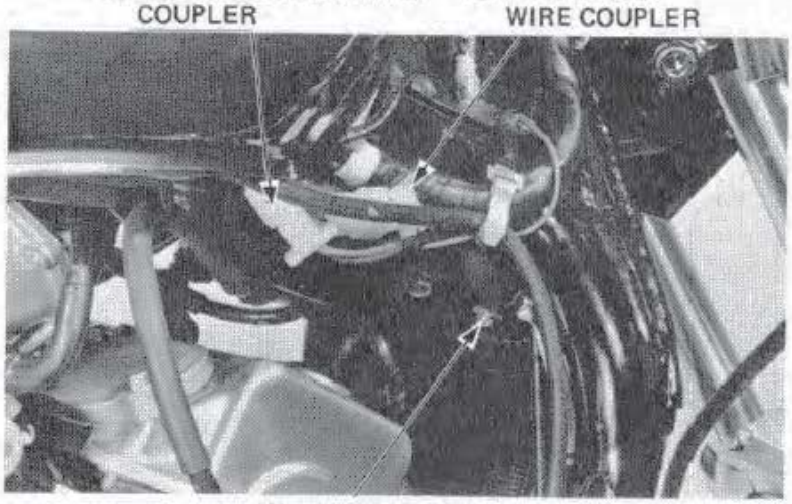
Remove the radiator cover.

(1) RADIATOR COVER



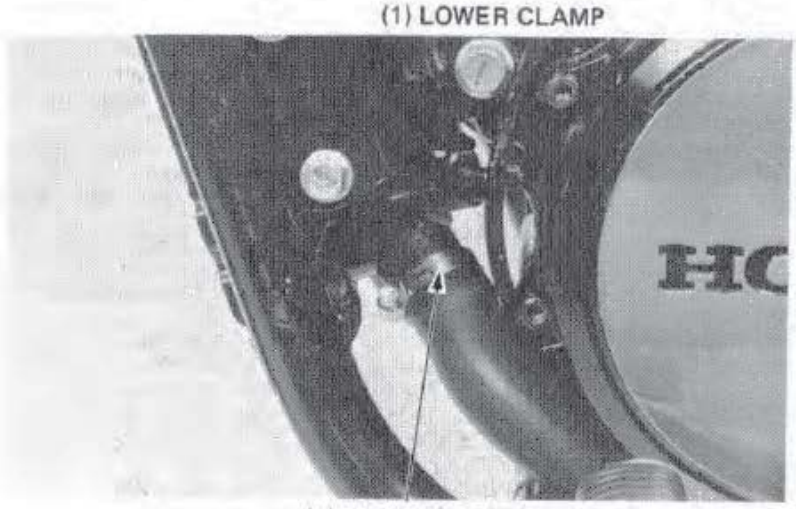
Disconnect the thermoswitch and fan motor wire couplers.

Loosen the upper radiator hose clamp.



Loosen the lower radiator hose clamp.

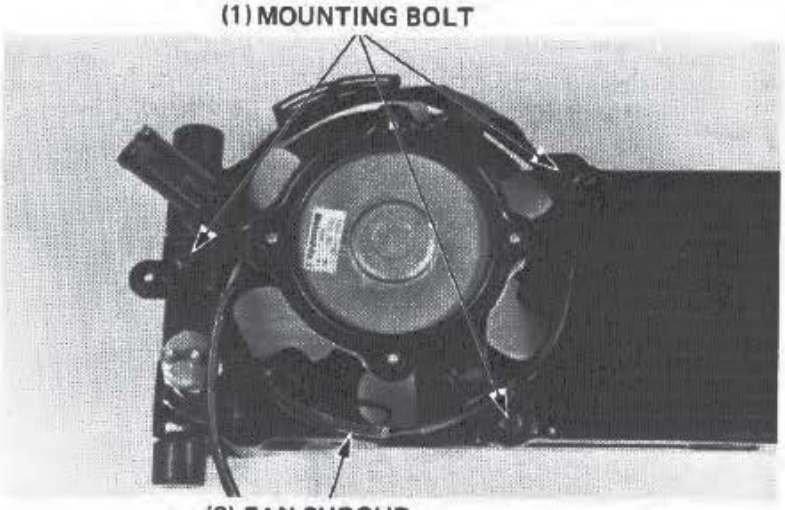
Disconnect the radiator hoses from the radiator.



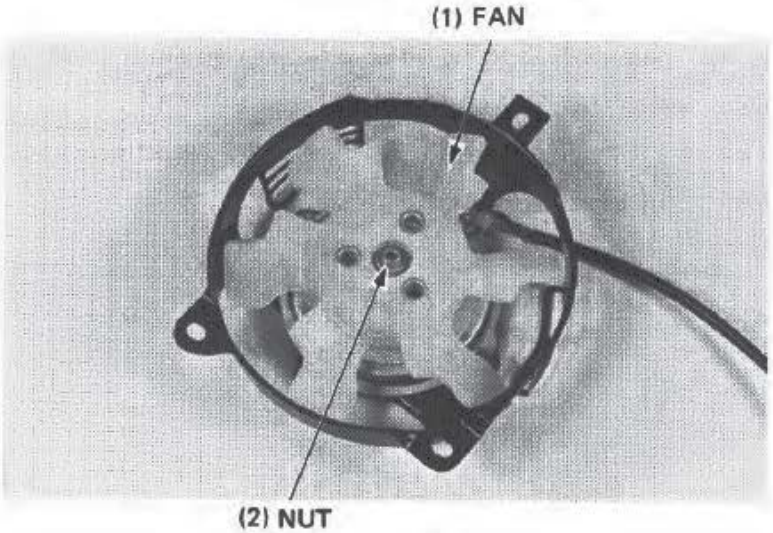
Remove the radiator mounting bolt and push the radiator up until the fitting tabs are free from the frame.
Then remove the radiator.

DISASSEMBLY

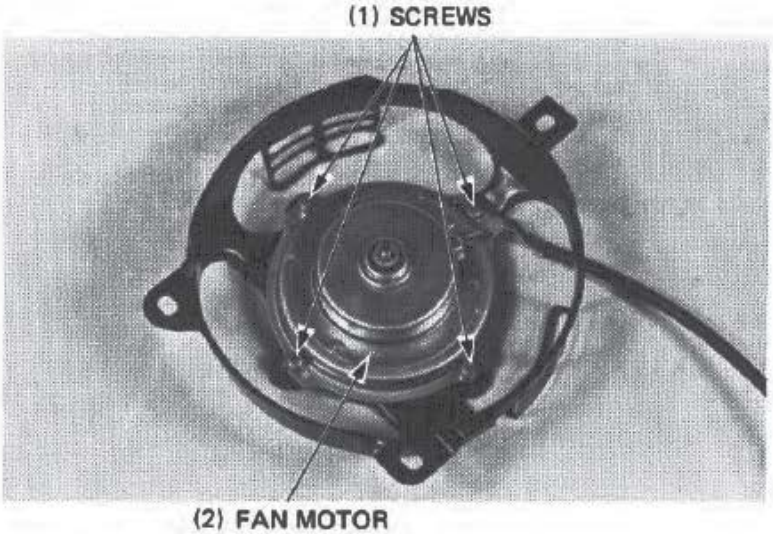
Disconnect the thermoswitch wire.
Remove the fan shroud with the cooling fan by removing the three bolts.



Remove the fan attaching nut and pull the fan off the fan motor.



Remove the four fan motor attaching screws and remove the fan motor from the shroud.

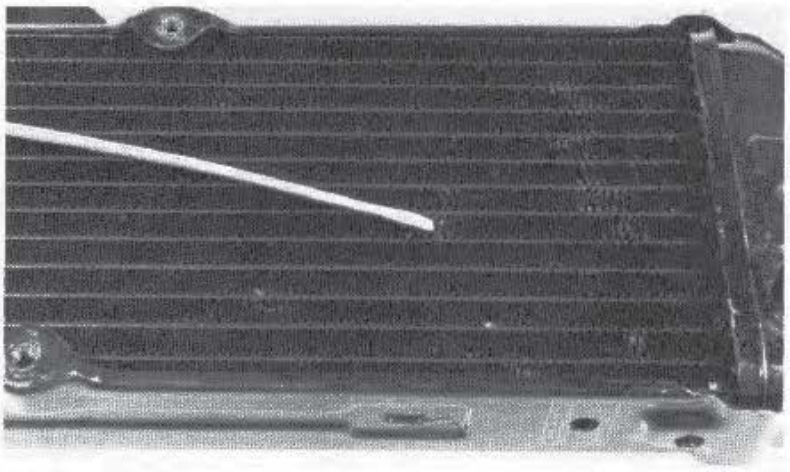


RADIATOR INSPECTION

Inspect the radiator soldered joints and seams for leaks.

Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.

Carefully straighten any bent fins or collapsed core tuber.



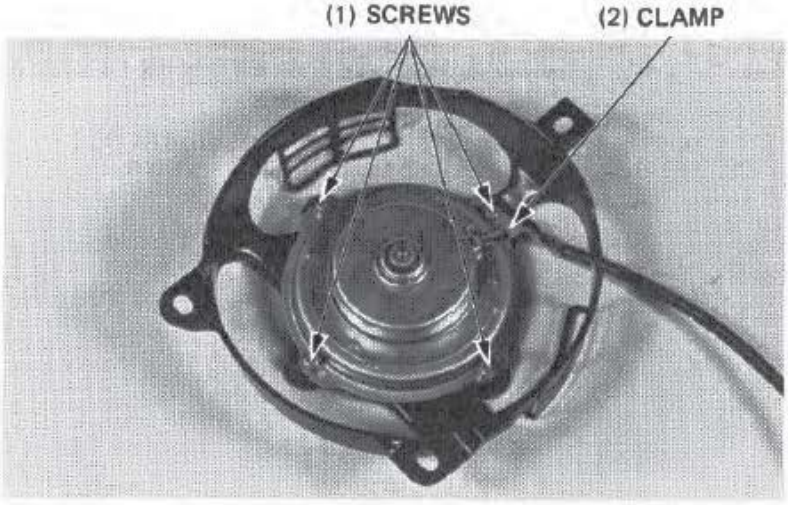
INSTALLATION

Install the fan motor on the fan shroud.

Tighten the screws.

NOTE

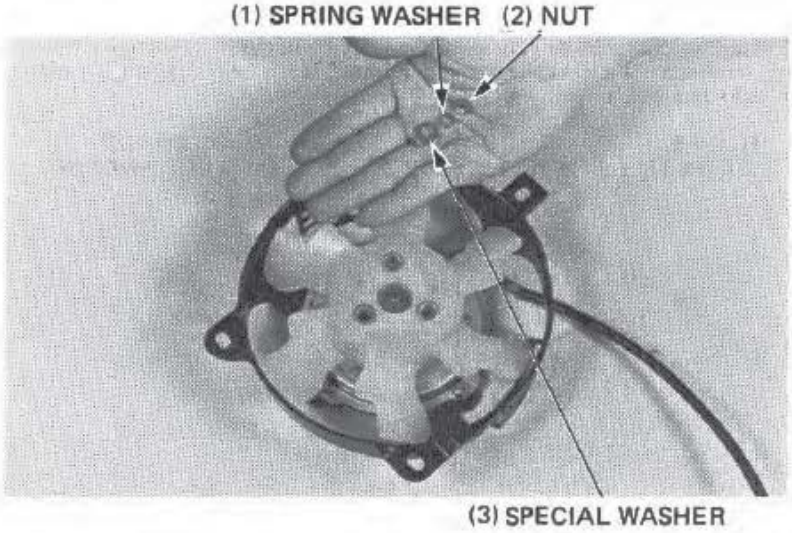
Tighten the fan motor wire clamp with a motor mounting screw as shown.



Install the cooling fan onto the fan motor.

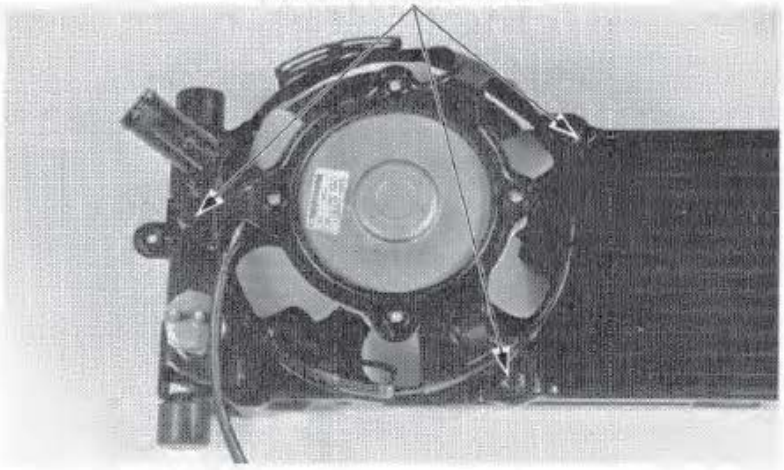
Install the special washer onto the fan by aligning the groove with the fan motor shaft cut-out.

Install the spring washer and tighten the nut securely.



Install the fan shroud onto the radiator and tighten the mounting bolts.

(1) MOUNTING BOLTS



INSTALLATION

Install the radiator in the reverse order of removal.

Fasten the fan motor wire, thermoswitch wire and pulse generator wire with the clip on the radiator right side sequrely.

Fill the cooling system (page 6-3).

Fit the grooves of the radiator cover to the tabs of the radiator top, then tighten the cover mounting screw.

(1) RADIATOR COVER (2) FIT

(3) SCREW

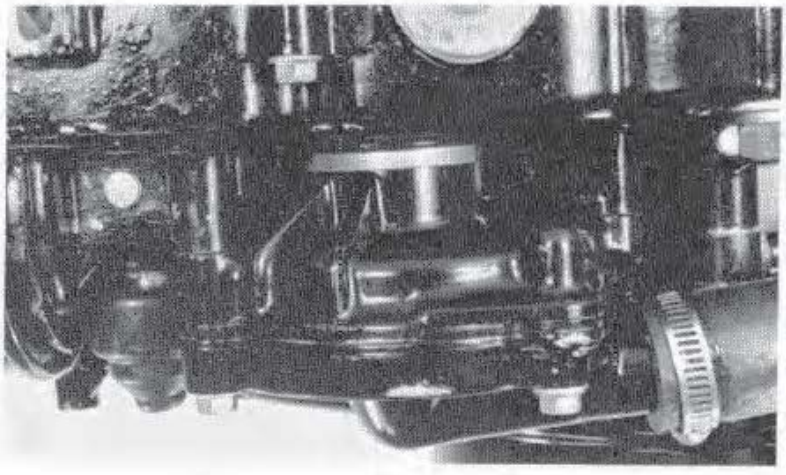
WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the crankcase left rear cover.

Inspect the telltale hole for signs of mechanical seal coolant leakage.

Replace the water pump as an assembly if the mechanical seal is leaking.



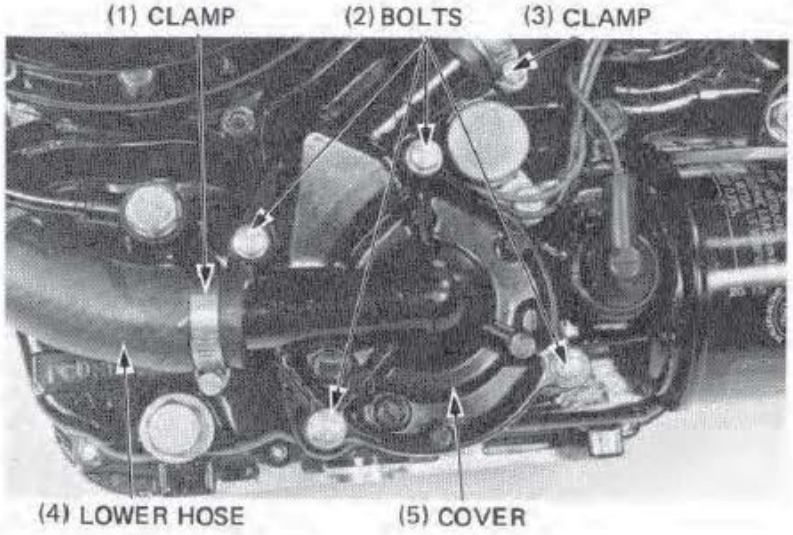
REMOVAL

Remove the engine from the frame (page 5-2).

Loosen the lower radiator hose clamp and disconnect the radiator hose from the water pump.

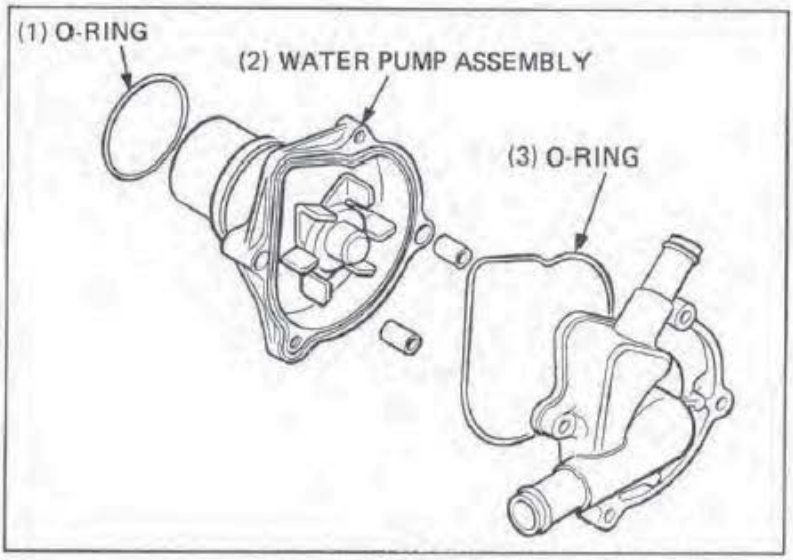
Remove the water pump cover bolts and cover.

Pull the water pump off the crankcase.



INSPECTION

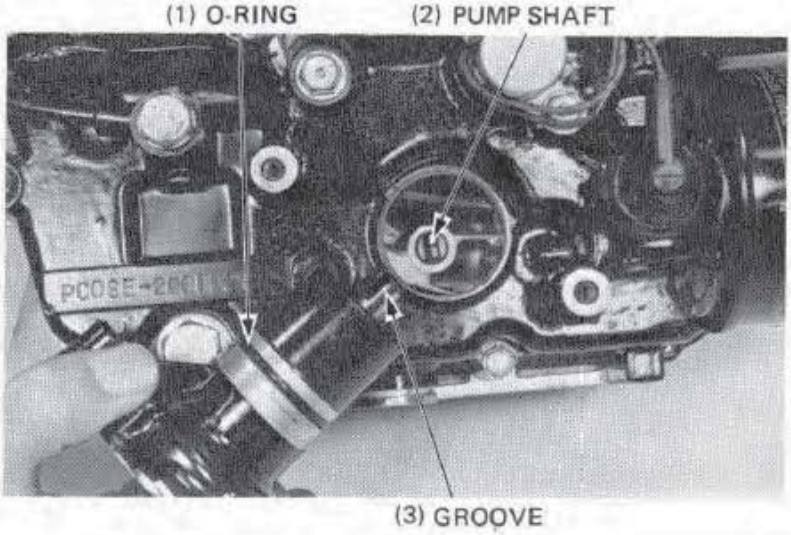
Check the water pump for mechanical seal leakage and bearing deterioration. Replace the water pump as an assembly if necessary.



INSTALLATION

Apply a coat of clean engine oil to a new O-ring and install it in the water pump shaft housing groove.

Align the water pump shaft groove with the oil pump shaft and insert the water pump into the crankcase.



Install a new O-ring onto the water pump housing.

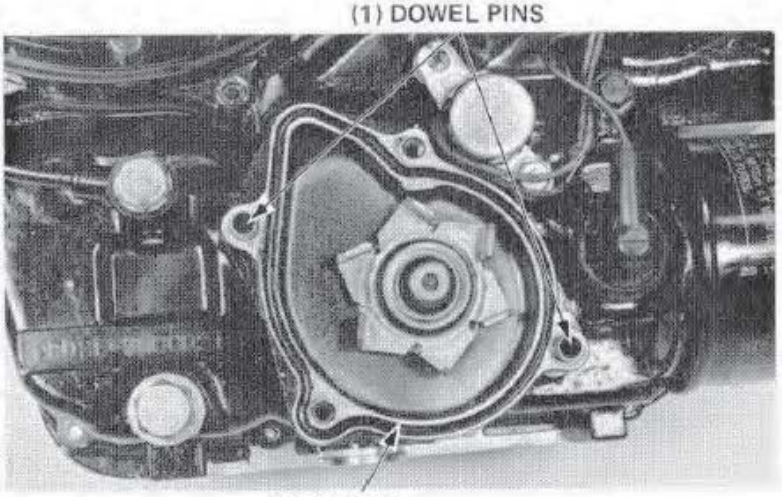
Install the two dowel pins.

Install the water pump cover.

Tighten the cover bolts, with sealing washers.
Tighten the drain bolt.

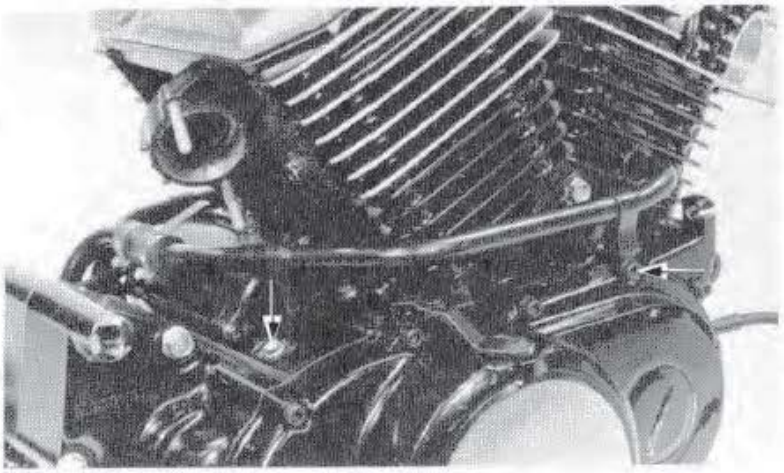
Connect the lower radiator hose.

Tighten the radiator hose clamp.



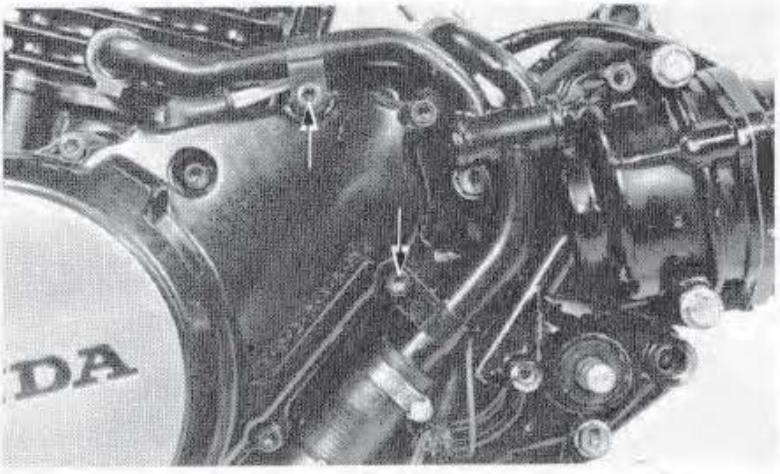
WATER PIPE REMOVAL

Loosen the water hose clamps.
Remove the right crankcase cover bolts and starter motor mount bolt.
Remove the right water pipe.



Loosen the hose clamp and remove the left crankcase cover bolts.

Remove the left water pipe.

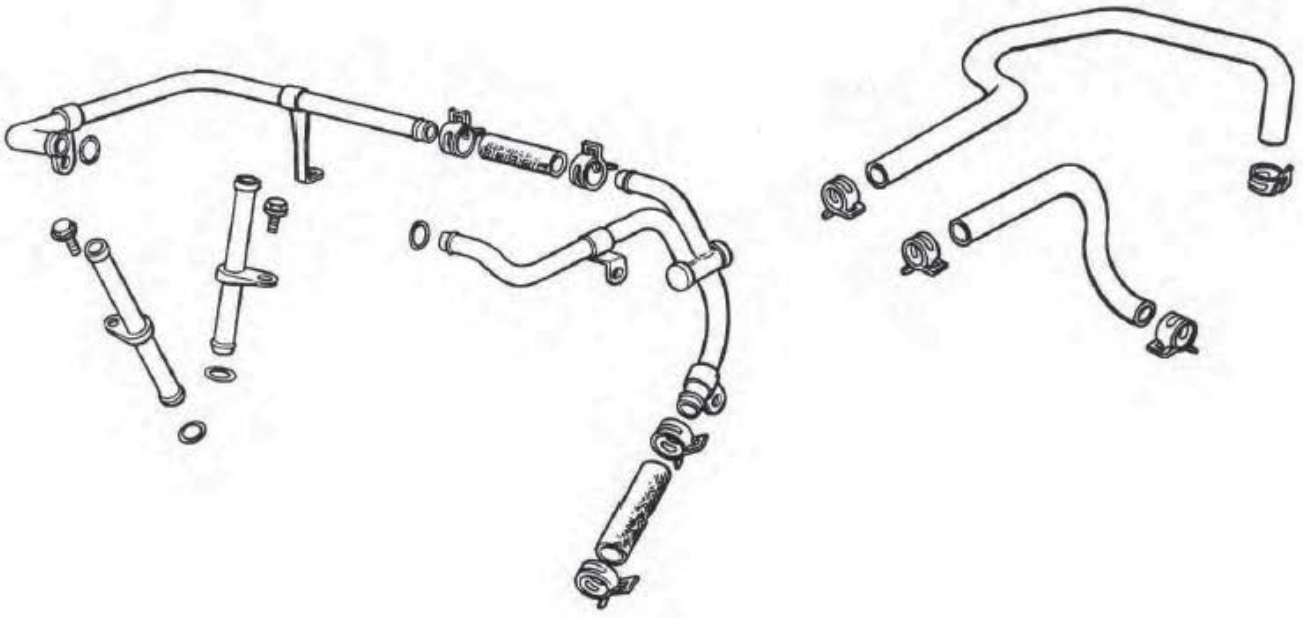


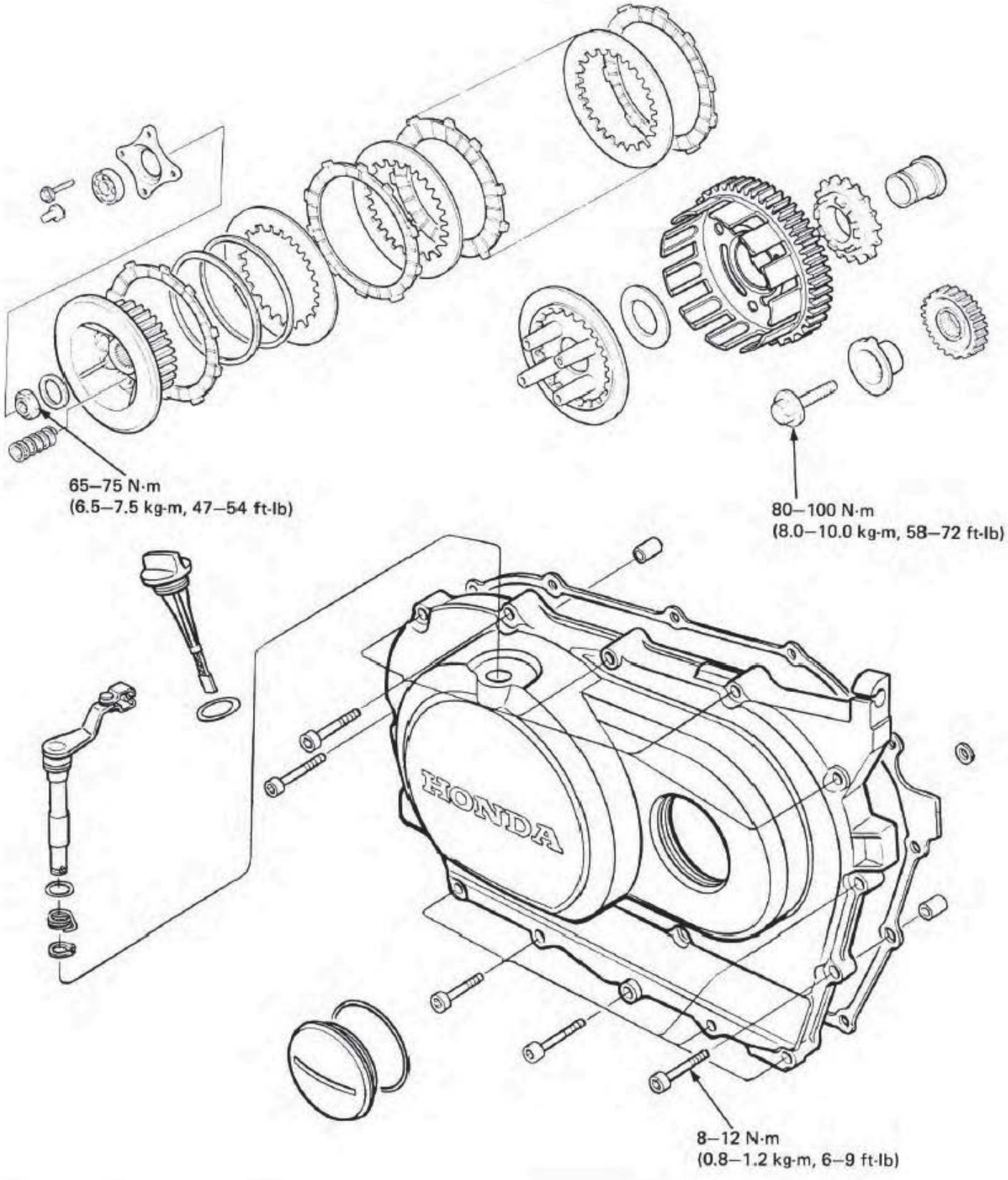
WATER PIPE INSTALLATION

Install new O-rings onto the water pipes and set the water pipes in place.

Tighten the pipe holder with the crankcase cover bolts and starter mountings bolt.

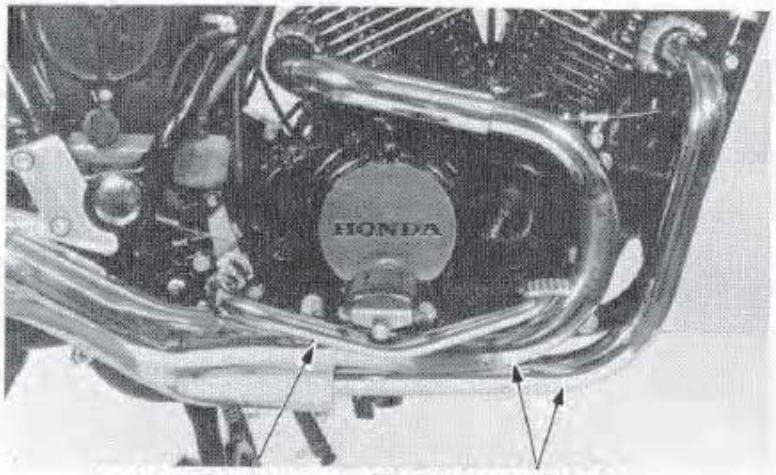
Then tighten the hose clamps.




65–75 N·m
(6.5–7.5 kg-m, 47–54 ft-lb)
80–100 N·m
(8.0–10.0 kg-m, 58–72 ft-lb)
HONDA
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

RIGHT CRANKCASE COVER REMOVAL

Drain oil from the engine (page 2-3).
Remove the exhaust pipe and brake pedal (page 5-2).
Remove the brake pedal shaft bracket.



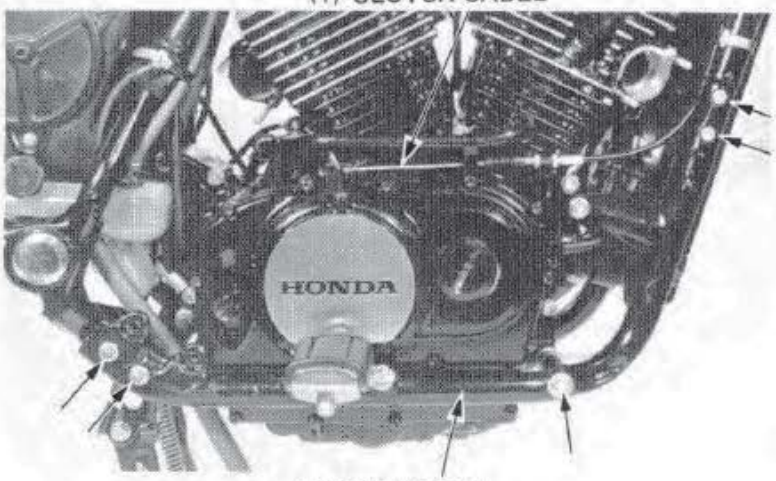
(1) BRAKE PEDAL (2) EXHAUST PIPES

Place a jack or other adjustable support under the engine to support it.

Remove the right sub-frame.

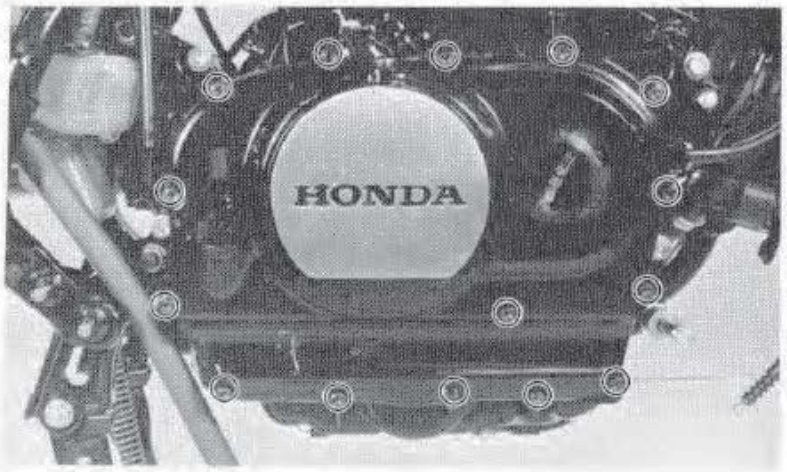
Disconnect the clutch cable.

(1) CLUTCH CABLE



(2) SUB-FRAME

Remove the right crankcase cover, gasket and dowel pins.



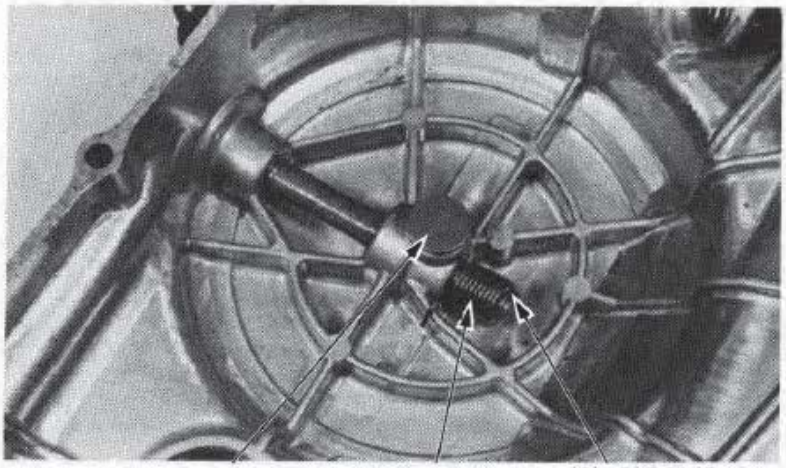
CLUTCH LIFTER ARM DISASSEMBLY

Remove the lifter rod and circlip.

Remove the lifter arm and return spring.

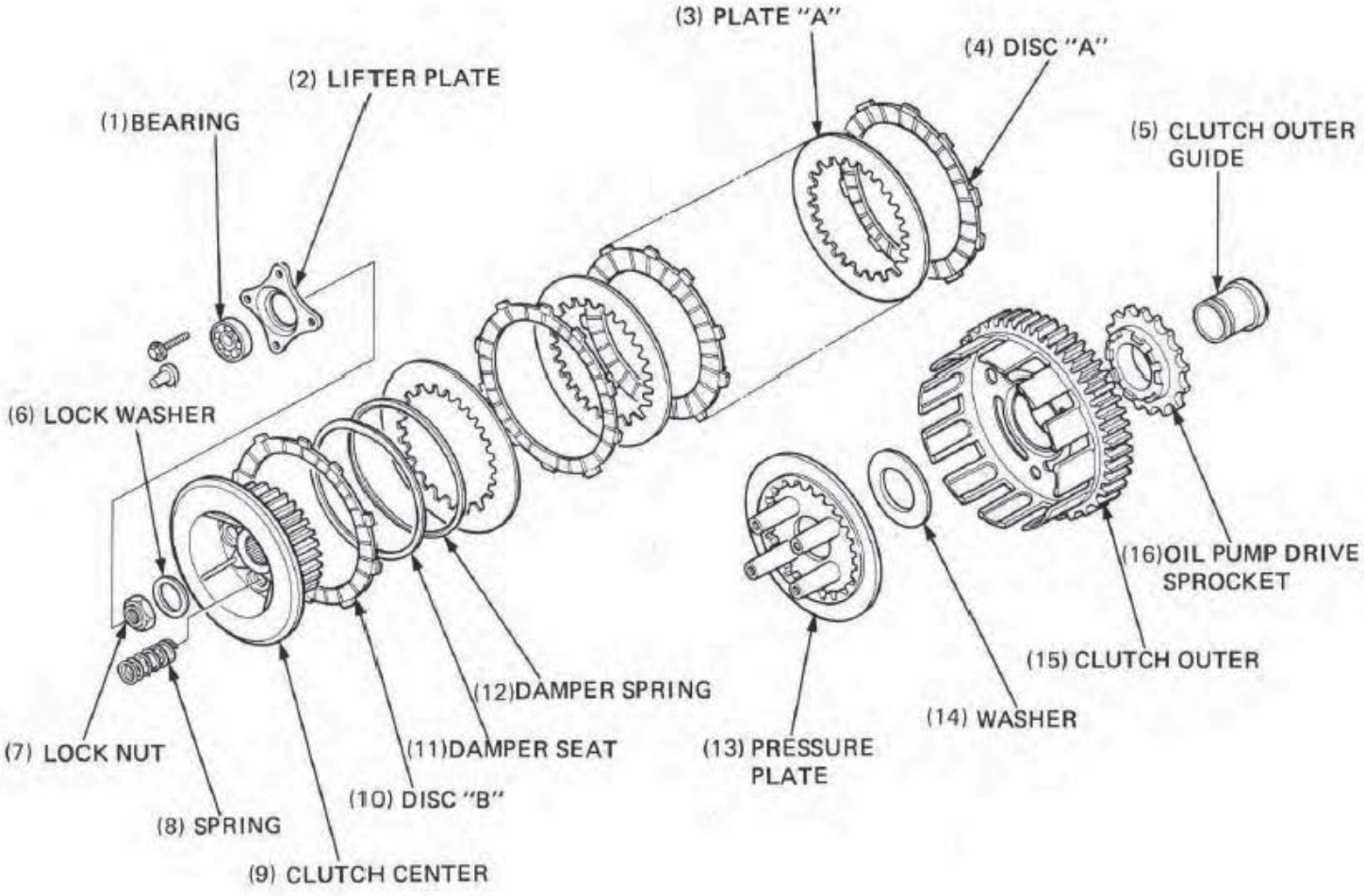
NOTE

Install the return spring as shown.



(1) LIFTER ROD (2) SPRING (3) CIRCLIP

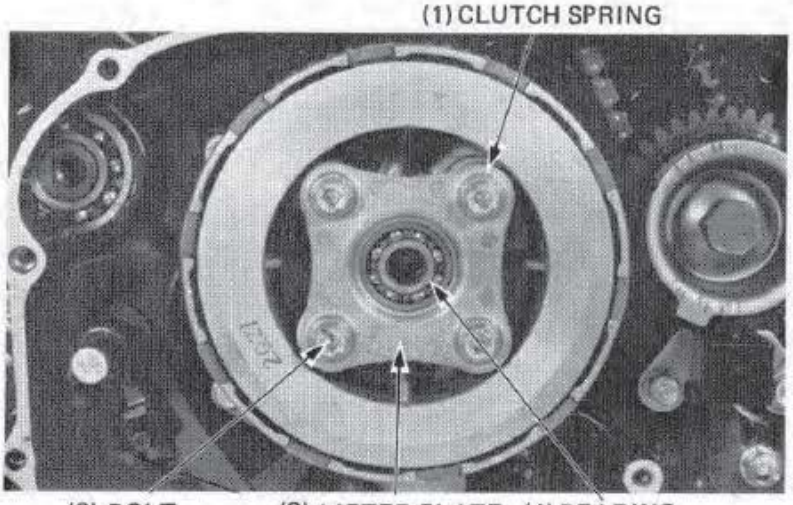
CLUTCH



CLUTCH REMOVAL

Remove the lifter plate bearing.
Remove the four bolts in a crisscross pattern in 2–3 steps.

Remove the clutch lifter plate and clutch springs.

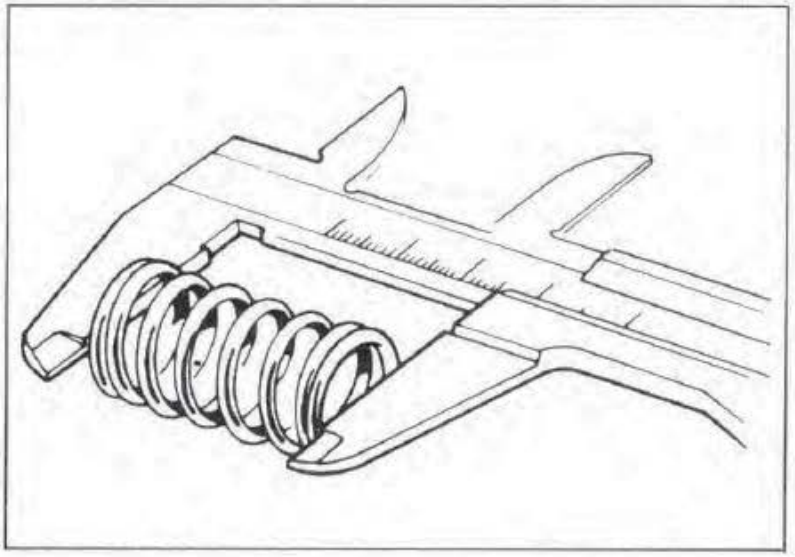


CLUTCH SPRING INSPECTION

Measure the clutch spring free length.

SERVICE LIMIT: 39 mm (1.53 in)

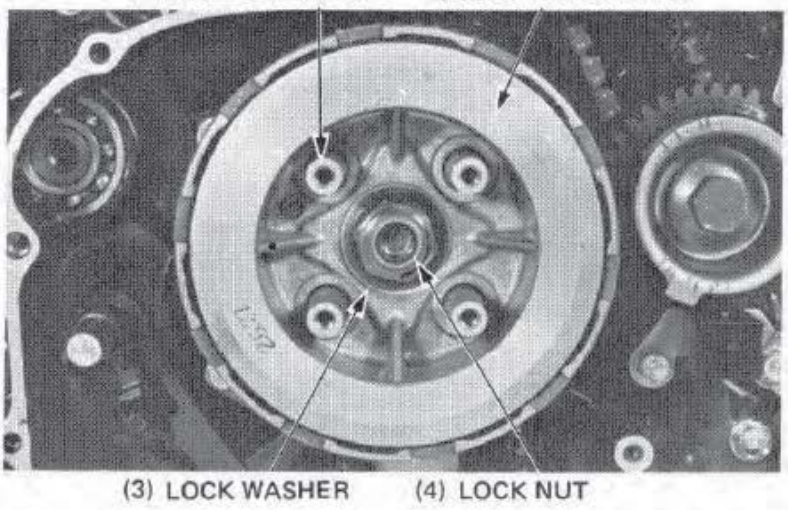
Replace any spring that is shorter than the service limit.



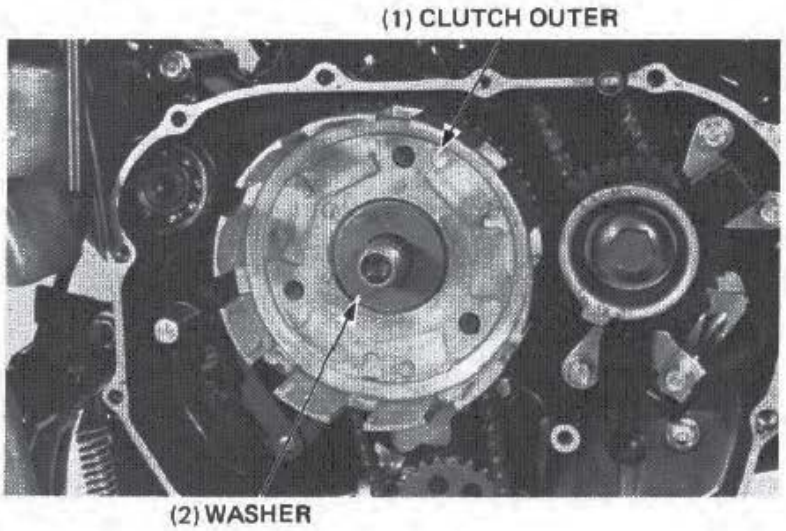
Hold the clutch center with the Clutch Center Holder (07923–KE10000).

Remove the lock nut and lock washer.

Remove the clutch center, damper seat, damper spring, clutch discs and plates and pressure plate as a unit.



Remove the washer and clutch outer.



CLUTCH DISC INSPECTION

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

Measure the disc thickness.

SERVICE LIMITS:
DISC A: 2.30 mm (0.090 in)
DISC B: 2.60 mm (0.102 in)

Replace the discs if they are thinner than the service limits.

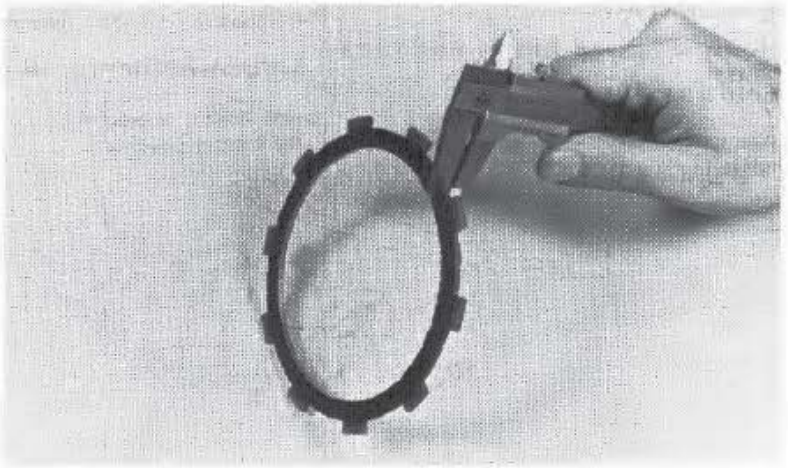
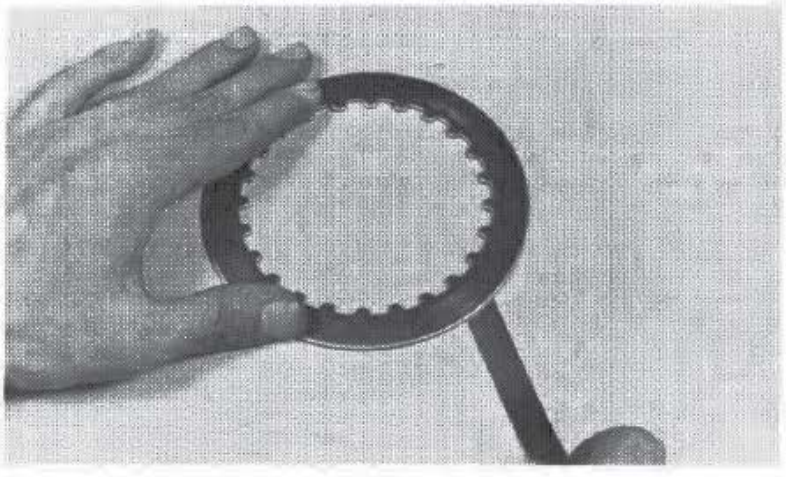


PLATE INSPECTION

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

SERVICE LIMIT: 0.30 mm (0.012 in)



INSPECTION

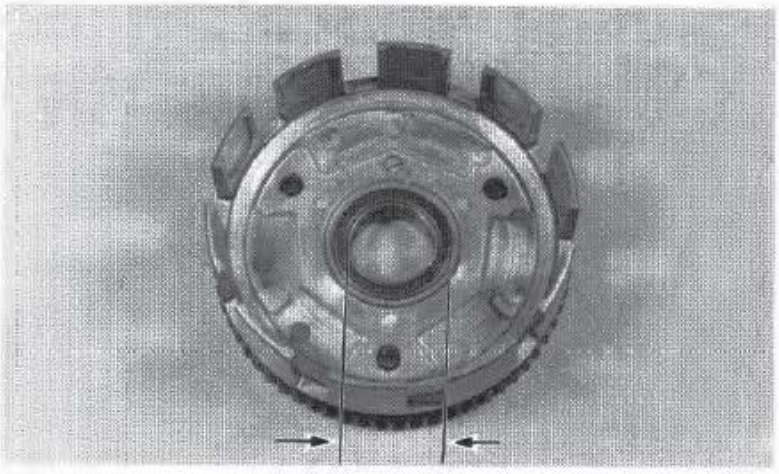
CLUTCH OUTER

Check the slots in the clutch outer for nicks, cuts or indentations made by the friction discs.

Measure the clutch outer I.D.

SERVICE LIMIT: 32.10 mm (1.263 in)

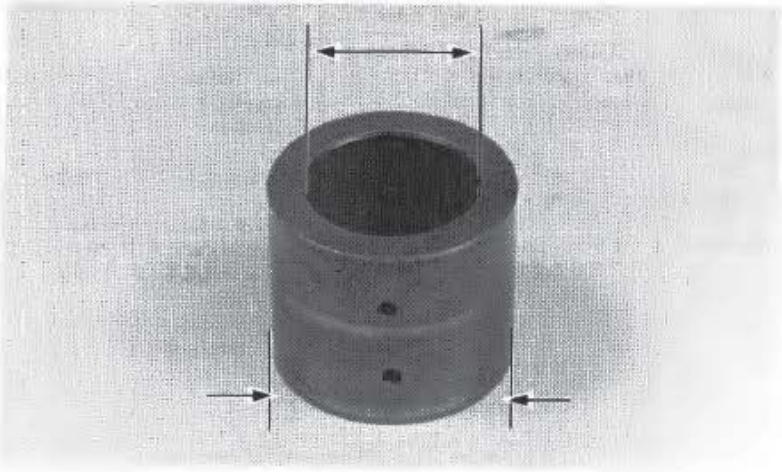
Check the clutch outer bushing for score marks or other damage.



CLUTCH OUTER GUIDE

Measure the I.D. and O.D. of the clutch outer guide.

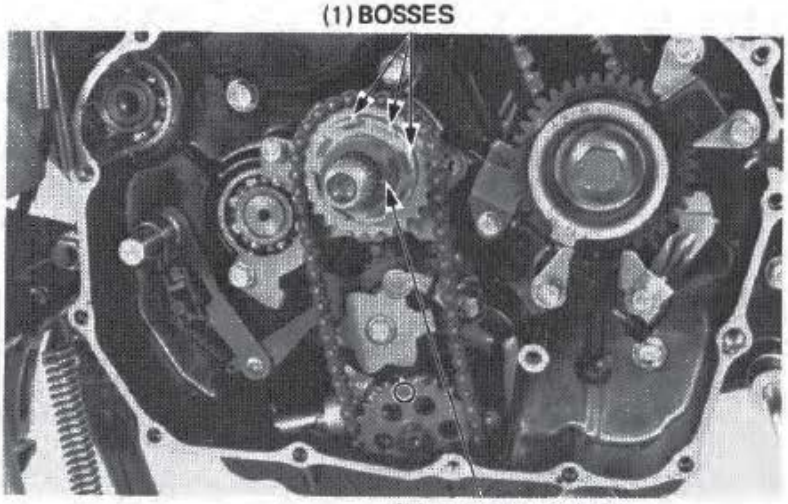
SERVICE LIMIT:
I.D. 22.09 mm (0.869 in)
O.D. 31.98 mm (1.259 in)



CLUTCH ASSEMBLY

Install the clutch outer guide over the mainshaft.

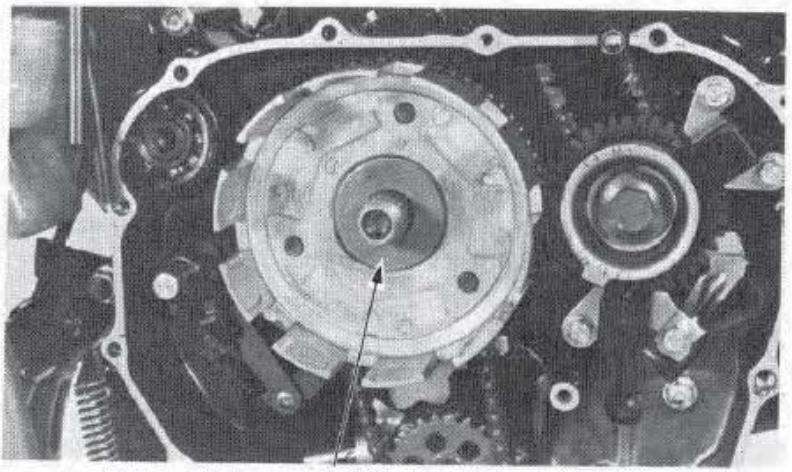
Align the grooves in the clutch outer with the boss on the oil pump drive sprocket while turning the sprocket with the chain and pushing the clutch outer.



(1) BOSSES

(2) CLUTCH OUTER GUIDE

Install the washer over the mainshaft.



(1) WASHER

Install the damper spring and seat, and clutch plate B in the clutch center.

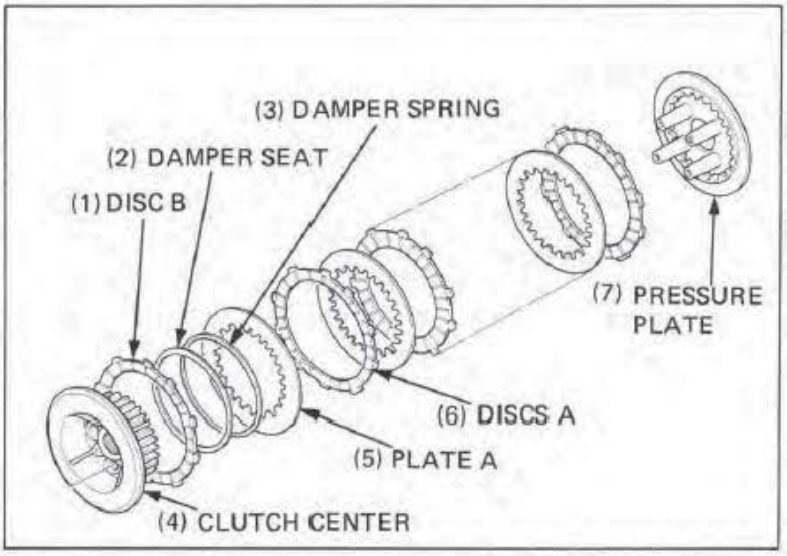
NOTE

Note direction of the spring seat, spring and plate B.

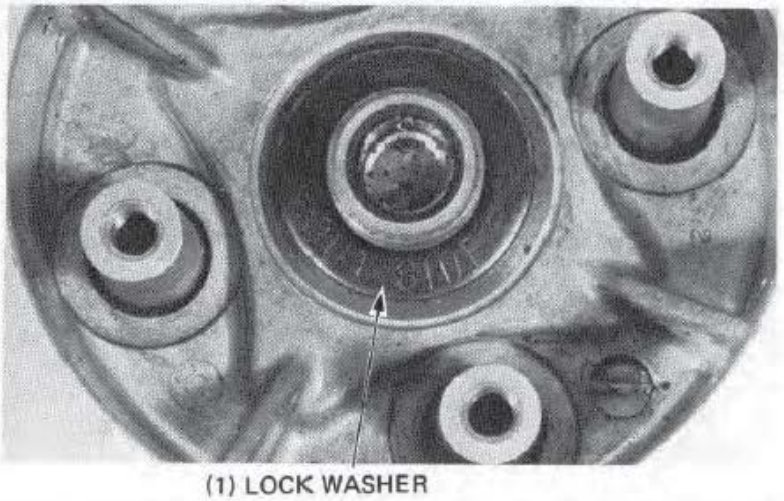
Install the clutch discs, clutch plates and pressure plate on the clutch center and install them on the clutch outer together.

NOTE

- Stack the discs and plates alternately as shown.
- Coat new clutch discs with engine oil.



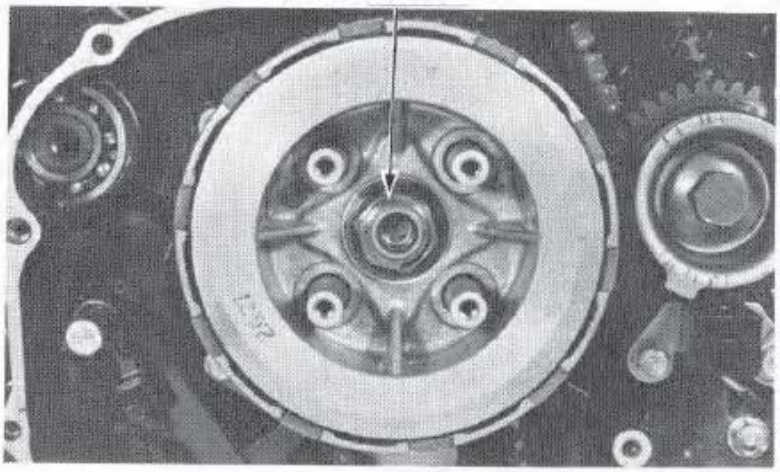
Install the lock washer making sure the "OUT SIDE" mark faces out.



(1) LOCK WASHER

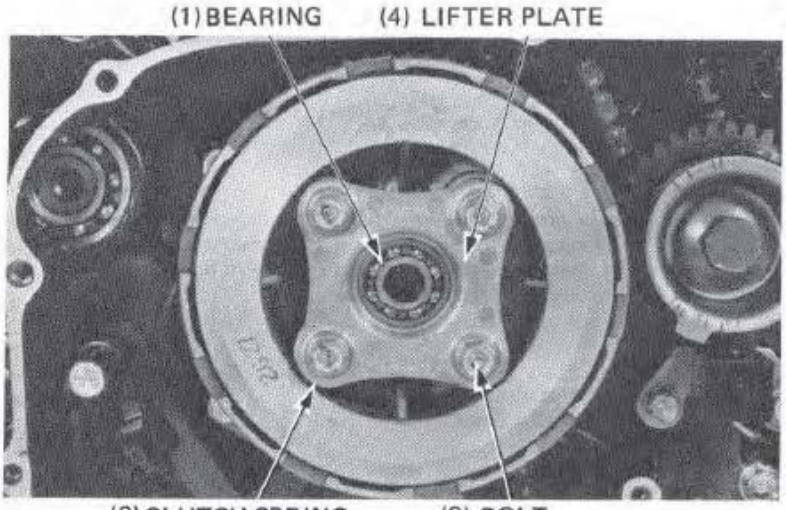
Hold the clutch center with the Clutch Center Holder (07923–KE10000).
Tighten the lock nut.

TORQUE: 65–75 N·m
(6.5–7.5 kg-m, 47–54 ft-lb)



Install the clutch springs, lifter plate and lifter plate bolts. Tighten the bolts in a crisscross pattern in 2–3 steps.

Install the bearing into the lifter plate.

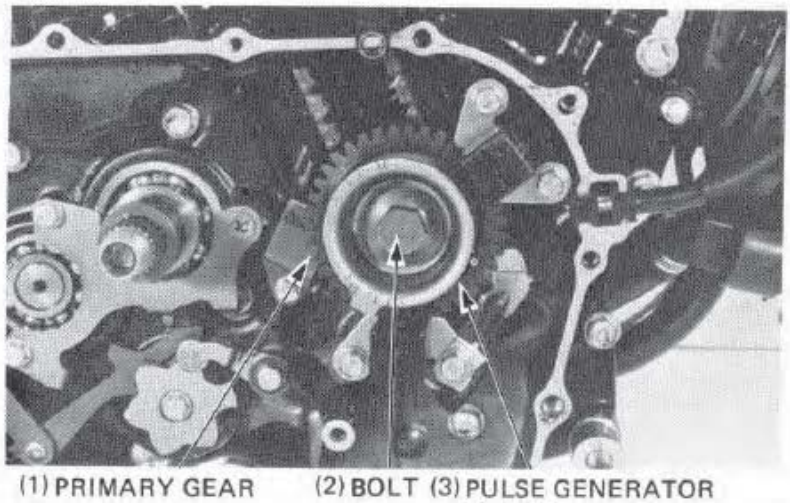


PRIMARY GEAR

REMOVAL

Remove the right crankcase cover (page 7-3).
Remove the clutch (page 7-5).
Remove the top and bottom pulse generator pick up.
Hold the primary gear with the gear holder (07923–ME90000) and remove the bolt.

Remove the pulse generator plate and primary gear from the crankshaft.



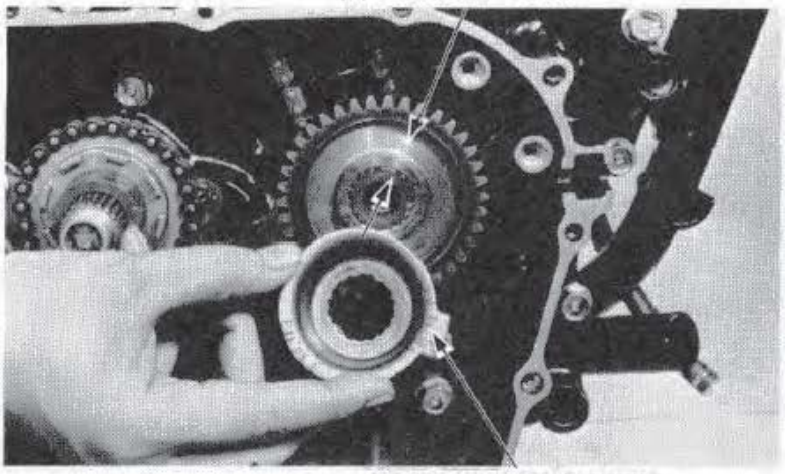
INSTALLATION

Install the primary gear.

Align the center of two pulse generator plate teeth with the flat of the crankshaft serrations and install the plate.

Measure the pulse coil air gap and adjust if necessary (page 19-4).

AIR GAP: 0.3–0.9 mm (0.01–0.04 in)

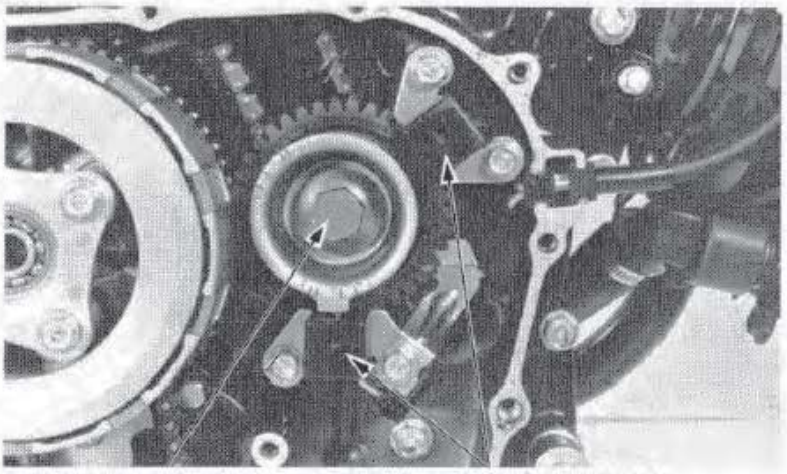


Install the primary gear holder (07923–ME90000).

Tighten the primary gear bolt.

TORQUE: 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

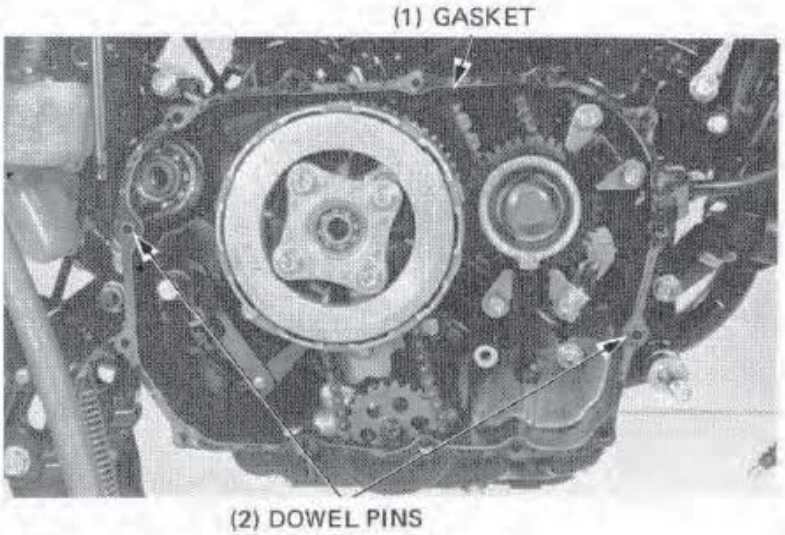
Remove the gear holder and install the pulse generators and clutch.



RIGHT CRANKCASE COVER INSTALLATION

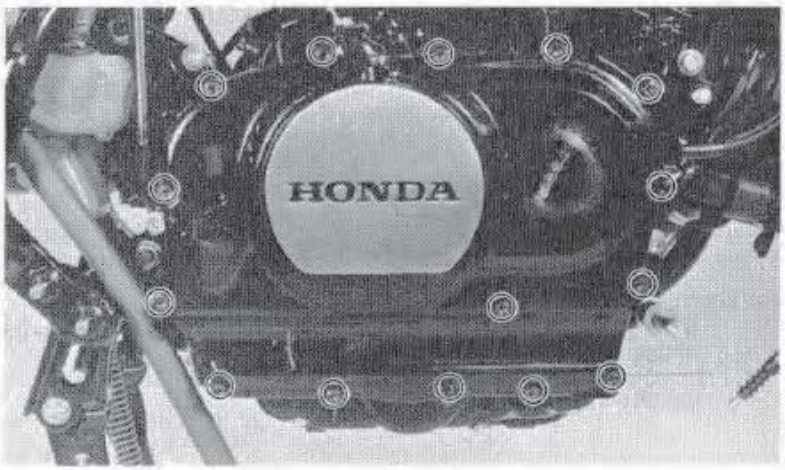
Remove the gear holder tool and install the clutch.

Install the dowel pins and a new gasket.



Install the right crankcase cover and tighten the cover bolts.

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

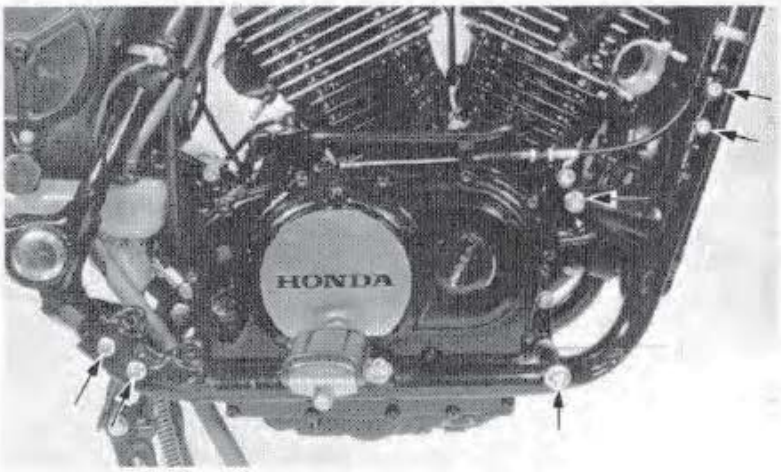


Install the sub-frame and tighten the bolts.

TORQUE:
Upper: 30–35 N·m
(3.0–3.5 kg-m, 22–25 ft-lb)
Lower: 20–24 N·m
(2.0–2.4 kg-m, 14–17 ft-lb)

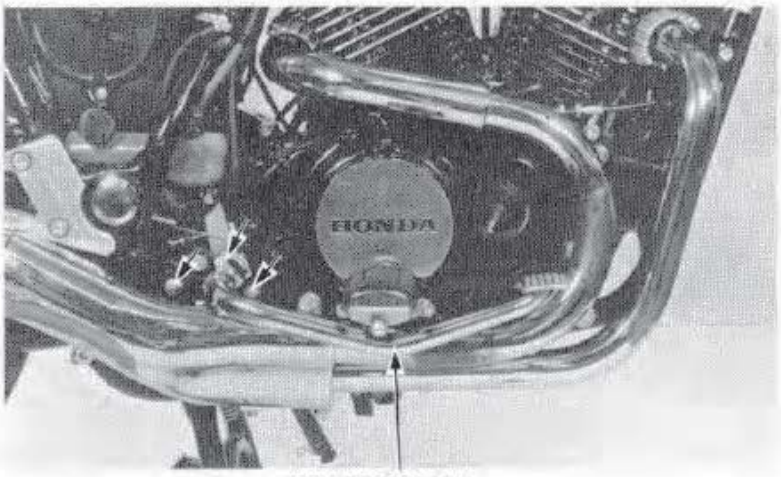
Install and torque the engine mount nuts.

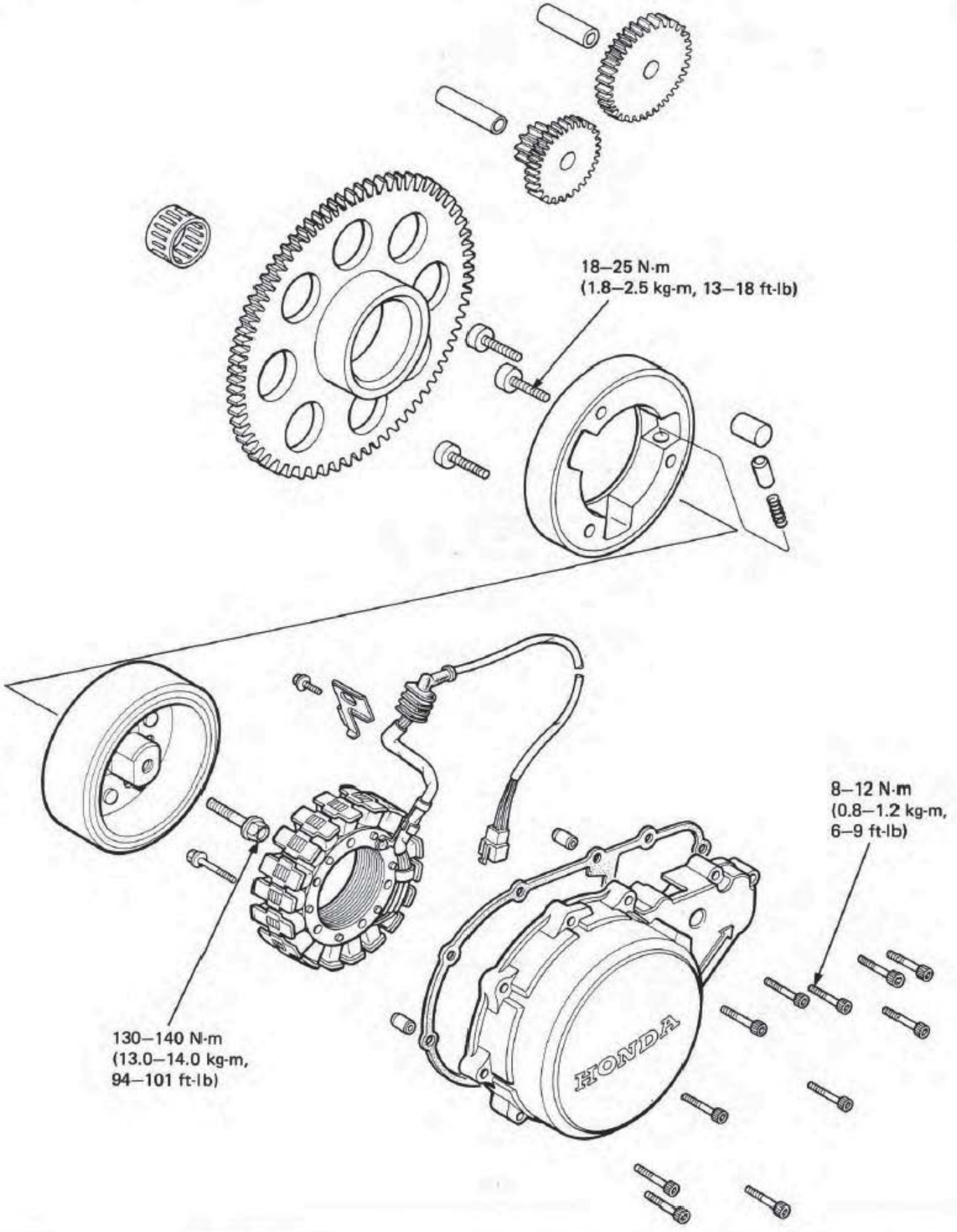
TORQUE: 45–60 N·m
(4.5–6.0 kg-m, 33–43 ft-lb)



Install the exhaust pipe (page 5-6).
Install the brake pedal shaft bracket.
Install the brake pedal.

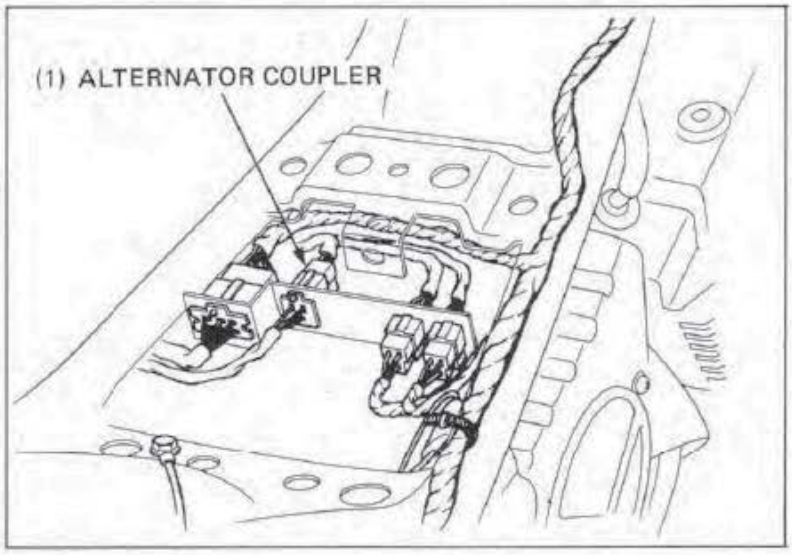
Fill the crankcase with oil (page 2-3).



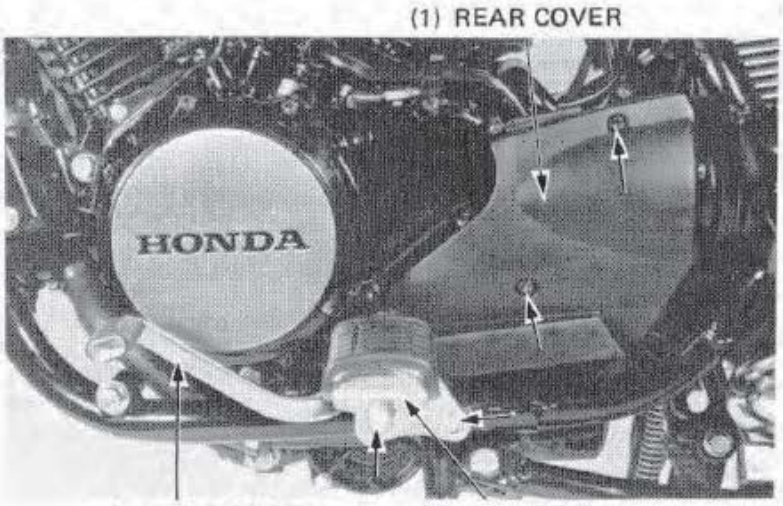

18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)
8–12 N·m
(0.8–1.2 kg-m,
6–9 ft-lb)
130–140 N·m
(13.0–14.0 kg-m,
94–101 ft-lb)
HONDA

STARTOR REMOVAL

Remove the seat.
Disconnect the alternator coupler.



Remove the rear cover.
Remove the left foot peg and gear shift pedal.

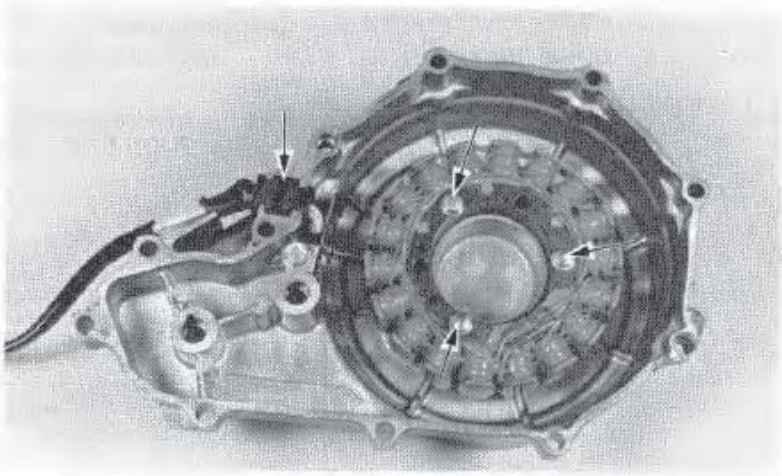


Remove the alternator cover bolts and cover.

Remove the gasket and dowel pins.

Remove the bolt attaching the alternator wire clamp and clamp.

Remove the stator mounting bolts and stator from the alternator cover.



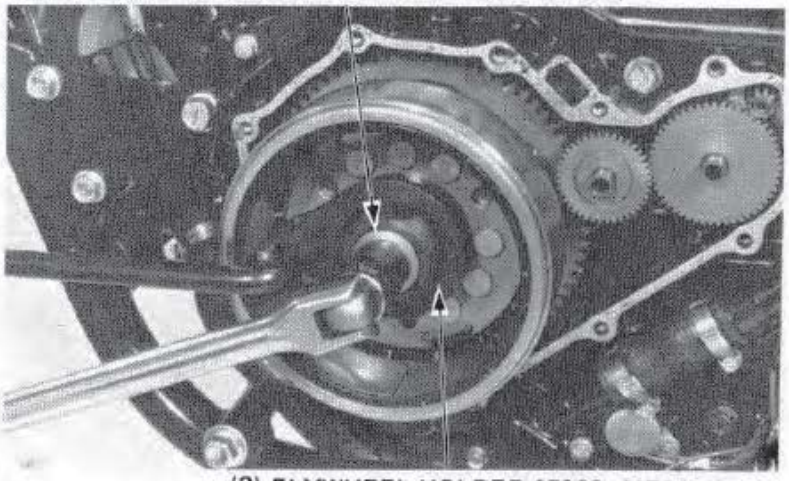
FLYWHEEL REMOVAL

Hold the flywheel with the flywheel holder and remove the flywheel bolt.

NOTE

The flywheel bolt has left-hand threads.

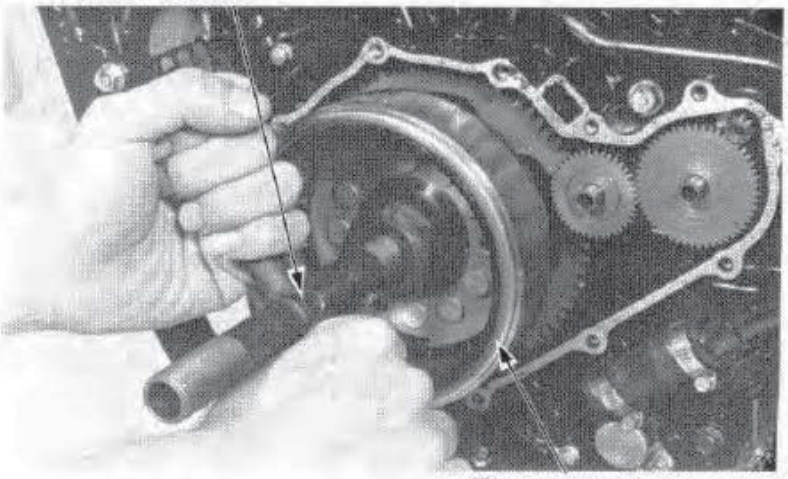
(1) FLYWHEEL BOLT (LEFT-HAND THREADS)



(2) FLYWHEEL HOLDER 07923–ME90000

Remove the flywheel with the rotor puller.

(1) ROTOR PULLER
07733–0020001



(2) FLYWHEEL

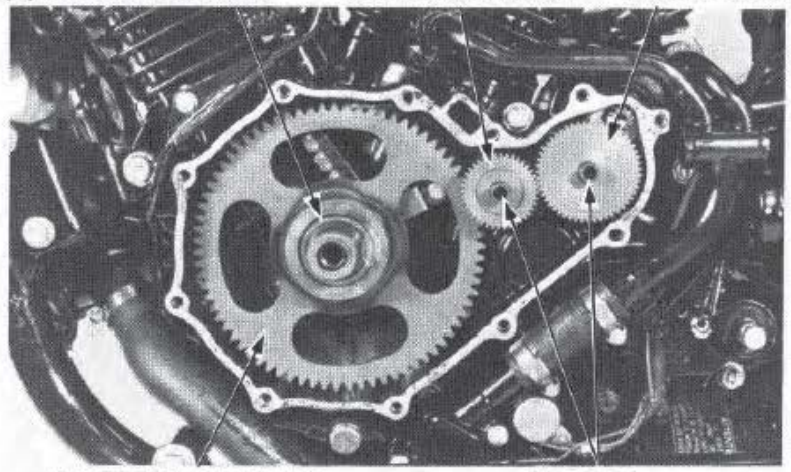
STARTER CLUTCH DISASSEMBLY

Remove the flywheel (page 8-3).

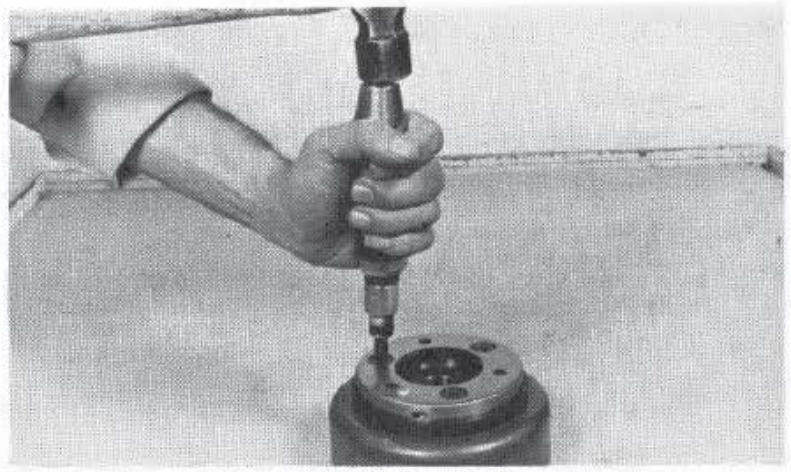
Remove the starter drive and reduction gears, and gear shafts.

Pull the starter driven gear toward you until it stops. Then remove the needle bearing from the gear.

Remove the driven gear.



Remove the three torx bolts attaching the starter clutch to the flywheel and remove the starter clutch and clutch outer.



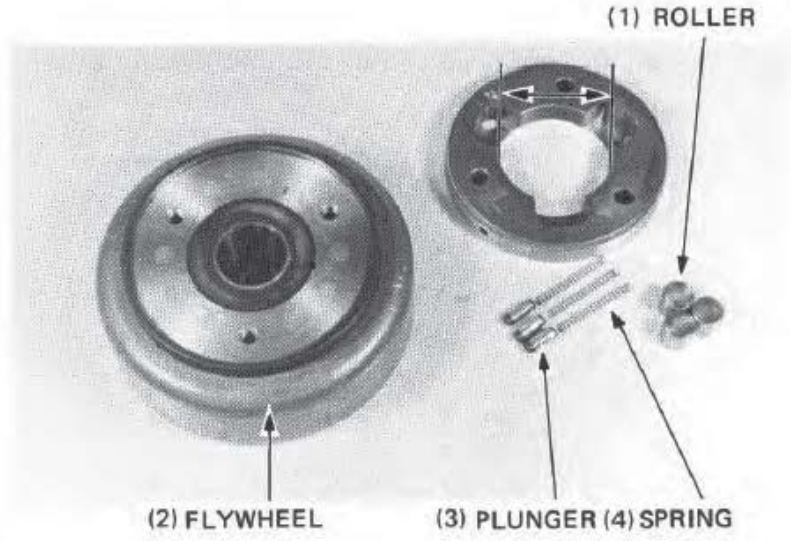
STARTER CLUTCH INSPECTION

Inspect the starter clutch for smooth operation.

Check the rollers for excessive wear.

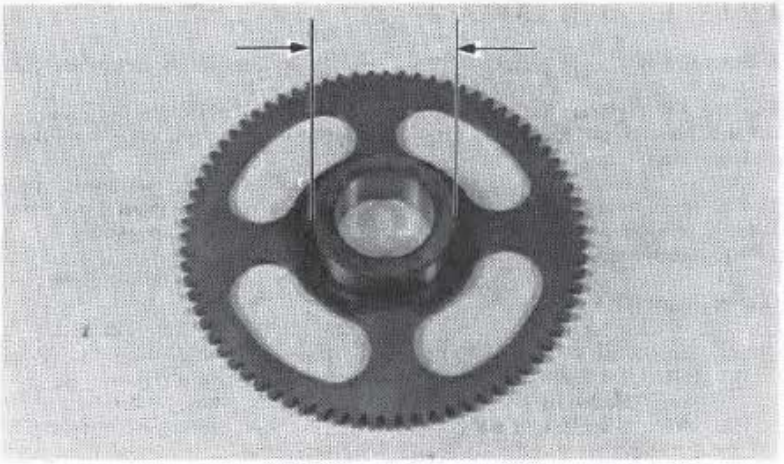
Measure the starter clutch outer I.D.

SERVICE LIMIT: 70.96 mm (2.794 in)



Measure the driven gear O.D.

SERVICE LIMIT: 54.06 mm (2.128 in)

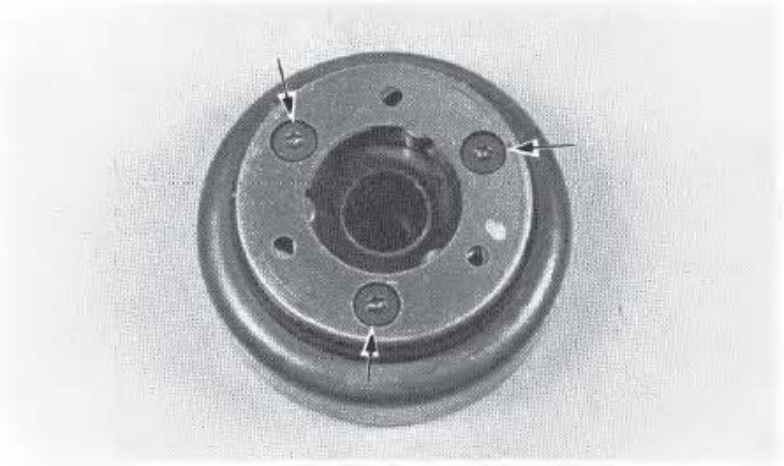


STARTER CLULCH ASSEMBLY

Install the starter clutch and clutch outer onto the flywheel.

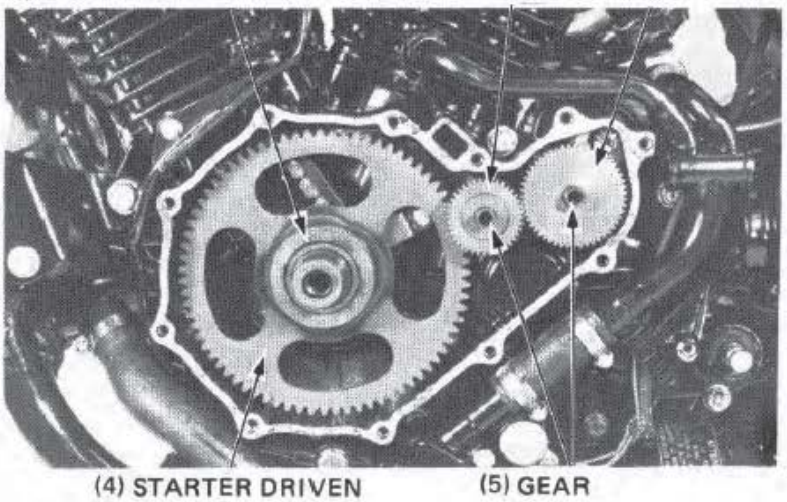
Apply a locking agent to the three torx bolt threads and tighten the bolts using a Torx bit.

TORQUE: 18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)



Install the starter driven gear and needle bearing over the crankshaft.

Install the starter reduction gear, drive gear and shafts.



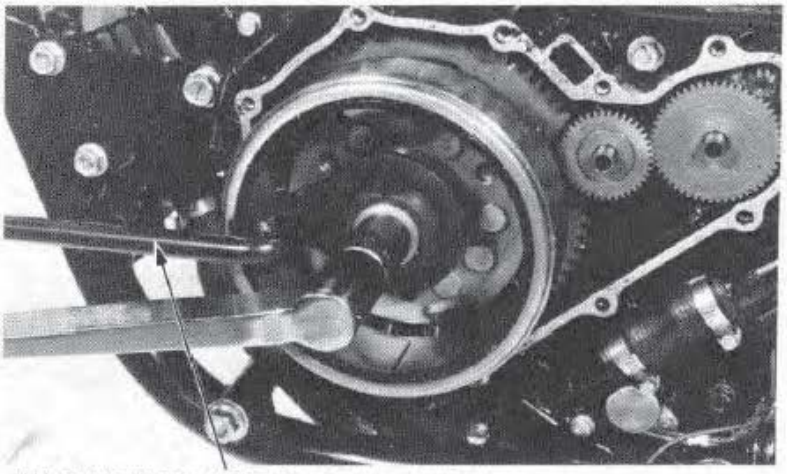
FLYWHEEL INSTALLATION

Install the flywheel on the crankshaft while turning it counterclockwise.

Apply LOCTITE® or equivalent to the bolt threads.

Hold the flywheel with the flywheel holder and torque the flywheel bolt.

TORQUE: 130–140 N·m
(13.0–14.0 kg-m, 94–101 ft-lb)

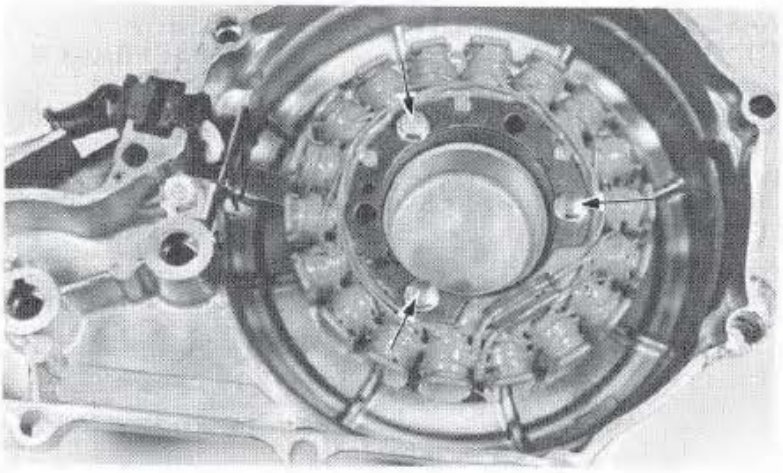


(1) FLYWHEEL HOLDER 07925–ME90000

STATOR INSTALLATION

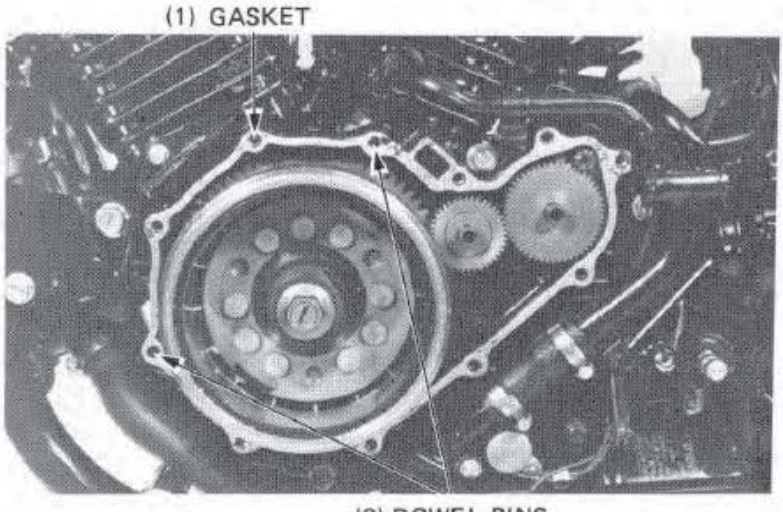
Install the stator on the alternator cover and tighten the three bolts.

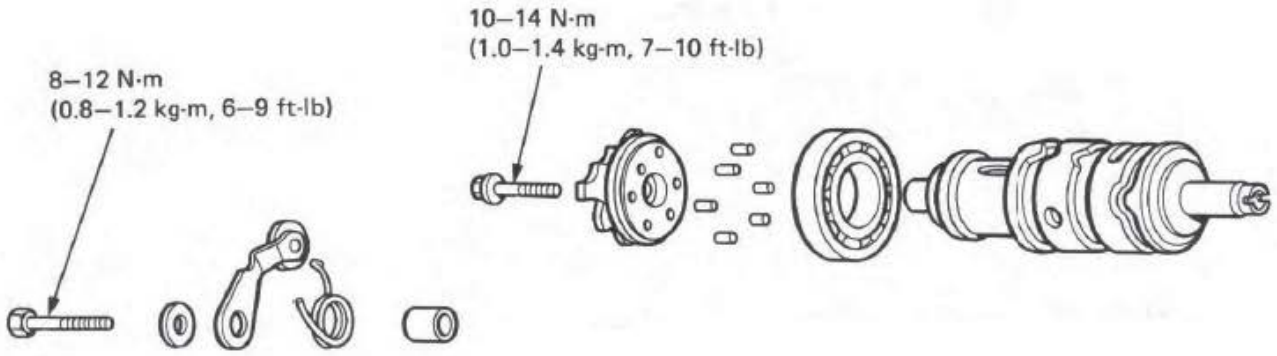
Install the alternator wire clamp with the bolt.

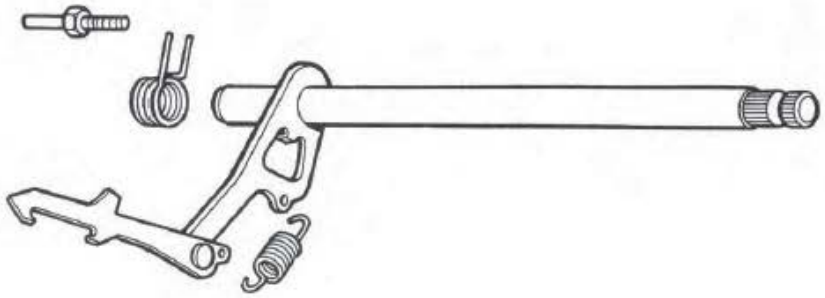


Install the gasket and dowel pins.

Install the alternator cover in the reverse order of removal.




10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)



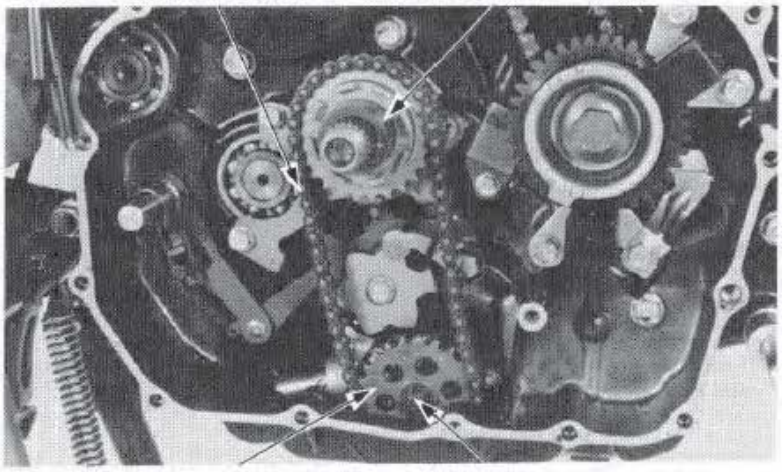
GEARSHIFT LINKAGE REMOVAL

Remove the right crankcase cover and clutch assembly (Section 7).

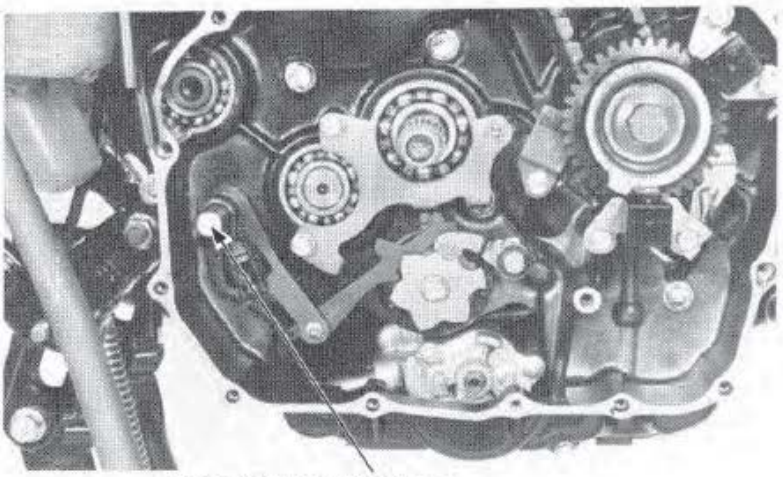
Remove the oil pump driven sprocket bolt.

Remove the oil pump drive chain, drive and driven sprockets.

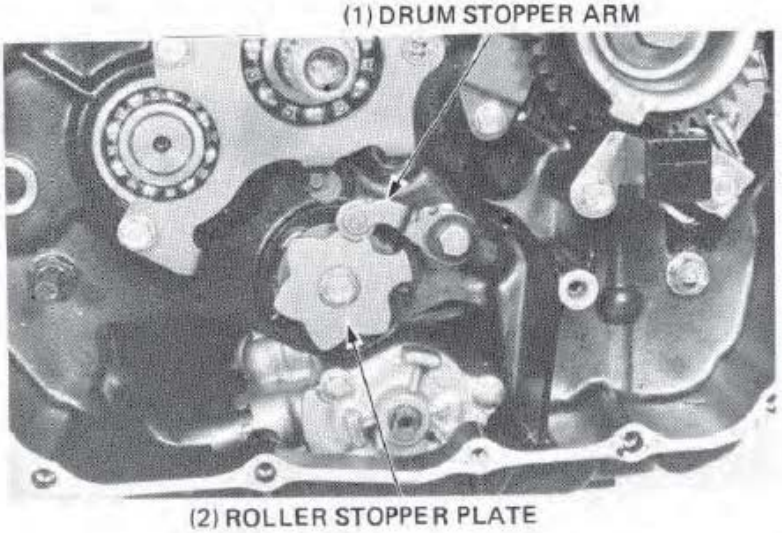
Remove the outer guide and collar.



Pull the gearshift spindle assembly out.



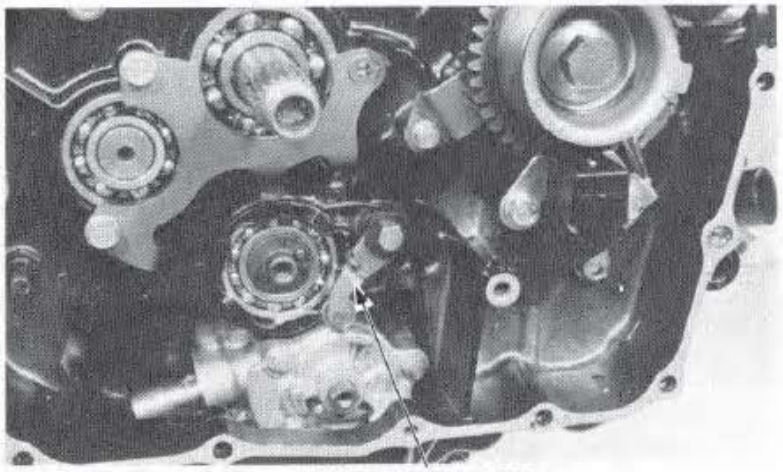
Remove the drum stopper arm bolt, arm and spring.
Remove the roller stopper plate bolt and plate.



GEARSHIFT LINKAGE INSTALLATION

Install the drum stopper arm, bolt and return spring. Tighten the bolt.

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

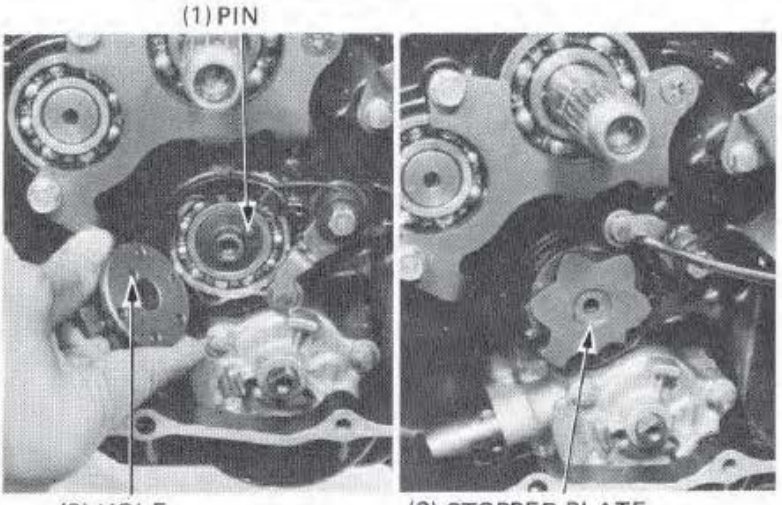


(1) STOPPER ARM

Align the hole in the stopper plate base plate with the pin on the shift drum.

Set the stopper plate by lifting the stopper arm with a screw driver and tightening the stopper plate bolt.

TORQUE: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

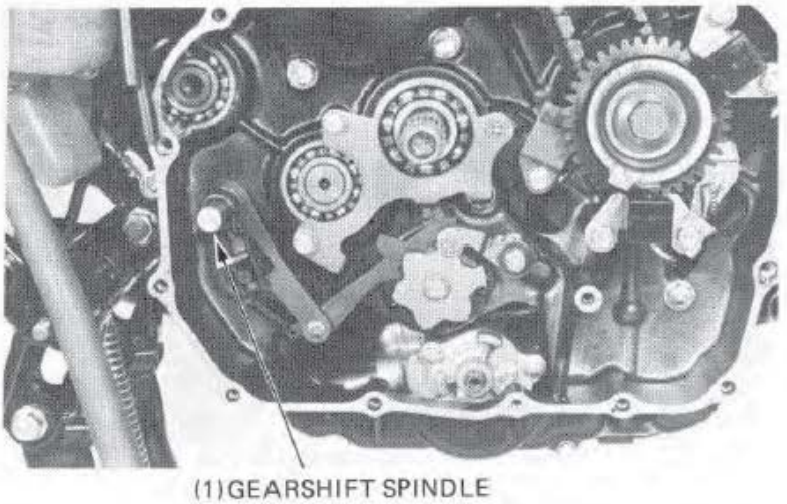


(1) PIN

(2) HOLE

(3) STOPPER PLATE

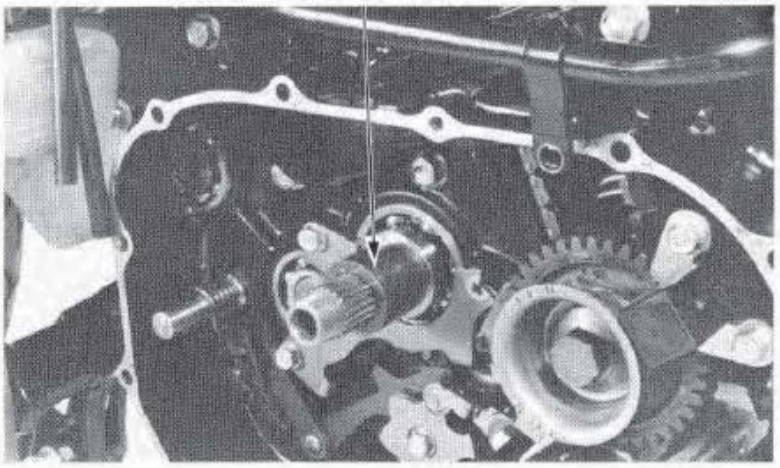
Install the gear shift spindle as shown.
Rotate the gear shift spindle and check the linkage for smooth operation.



(1) GEARSHIFT SPINDLE

Install the clutch outer guide over the main shaft.

(1) CLUTCH OUTER GUIDE

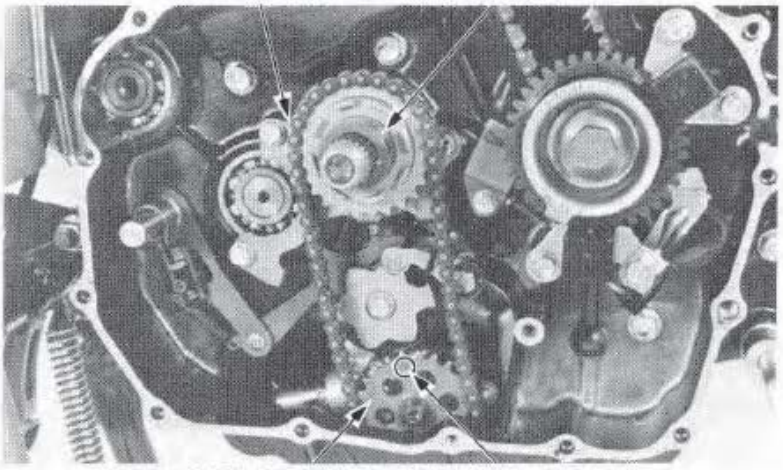


Install the oil pump drive and driven sprockets with drive chain and tighten the driven sprocket bolt. The driven sprocket "IN" mark must face the crankcase.

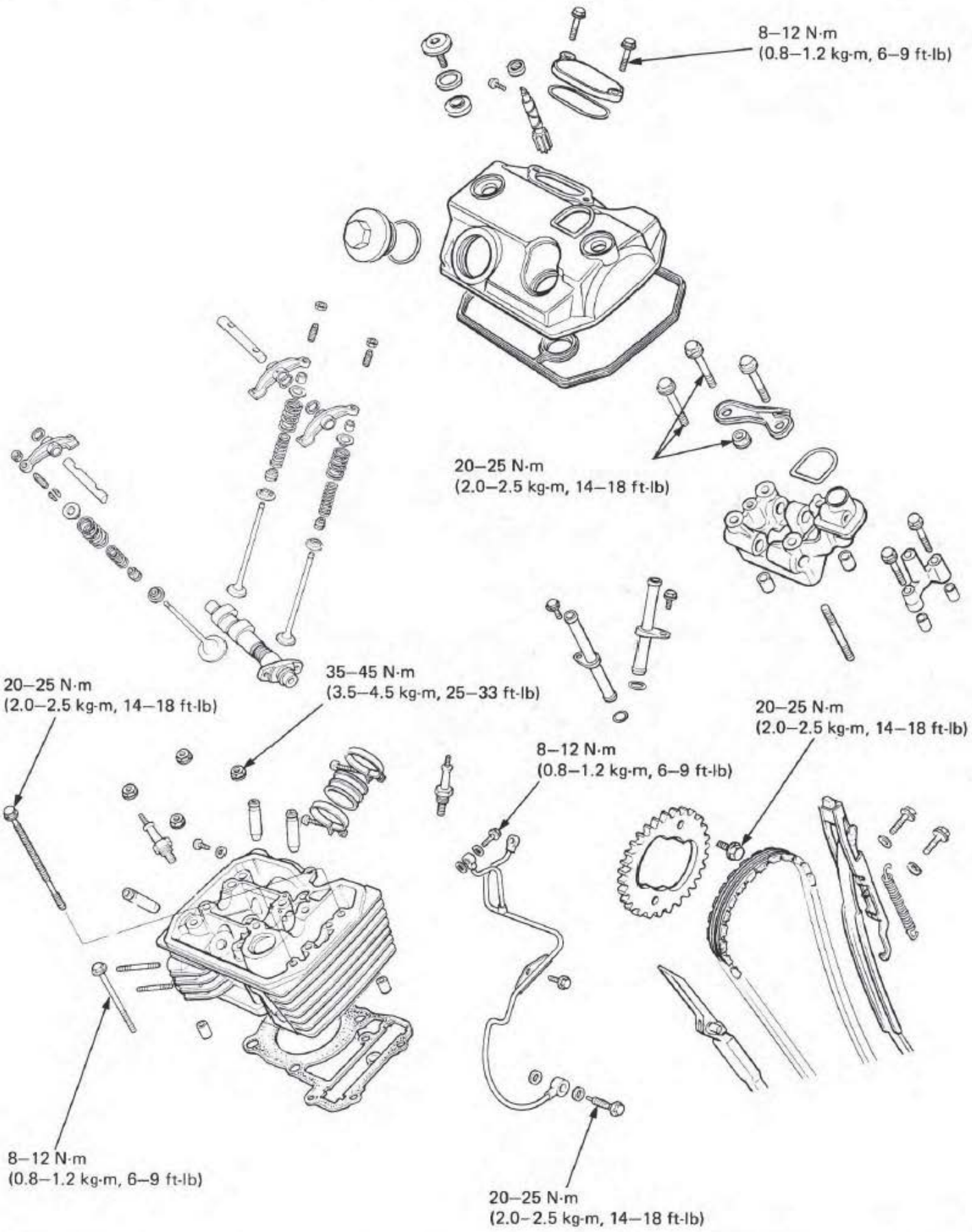
TORQUE: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

Install the clutch assembly and right crankcase cover (Section 7).

(1) OIL PUMP DRIVE CHAIN (2) DRIVE SPROCKET



(3) DRIVEN SPROCKET BOLT (4) "IN" MARK

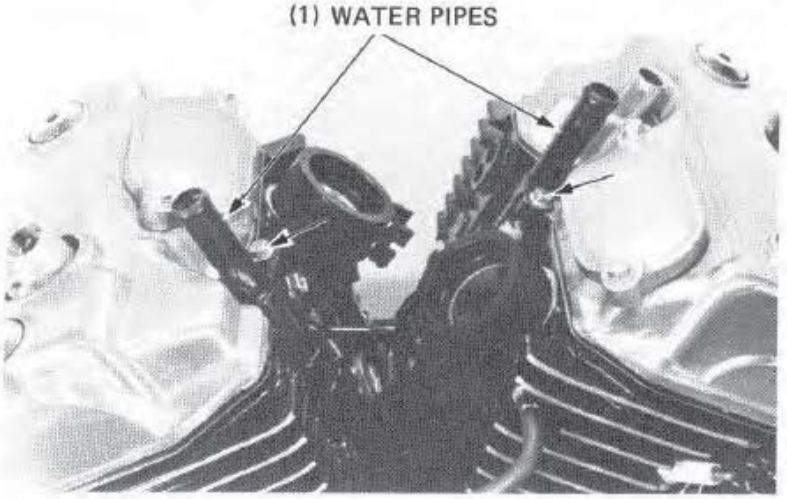

8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)

CYLINDER HEAD COVER REMOVAL

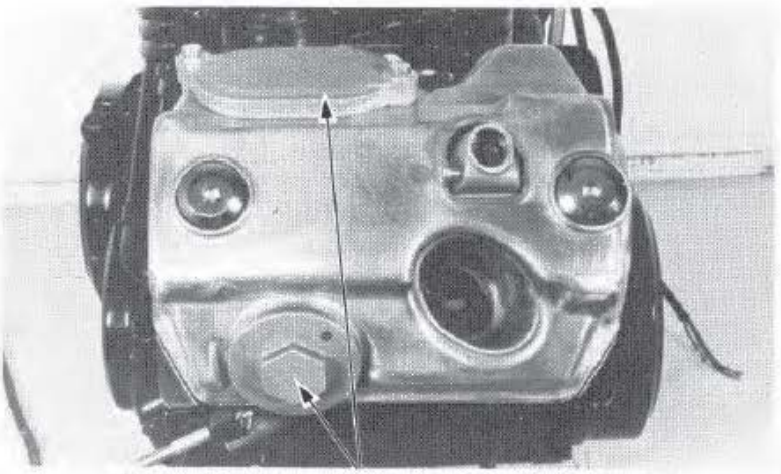
Remove the engine from the frame (page 5-2).

Remove the water pipes from the front and rear cylinder heads.

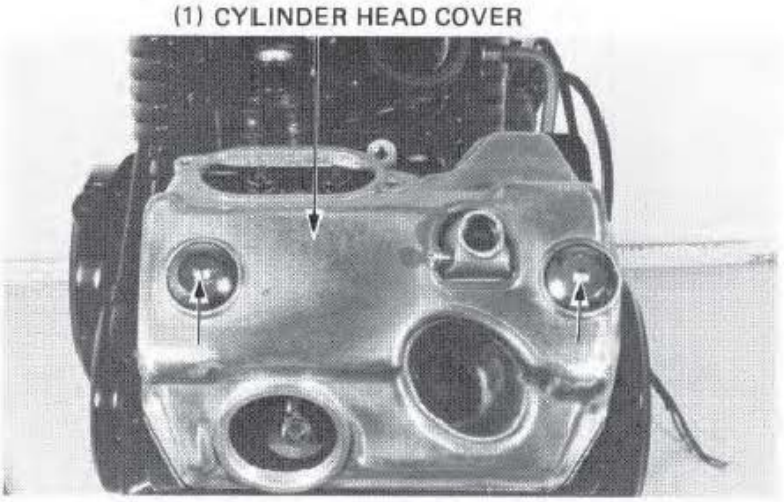
Remove the O-rings from the water pipes.



Remove the valve adjuster caps and covers.

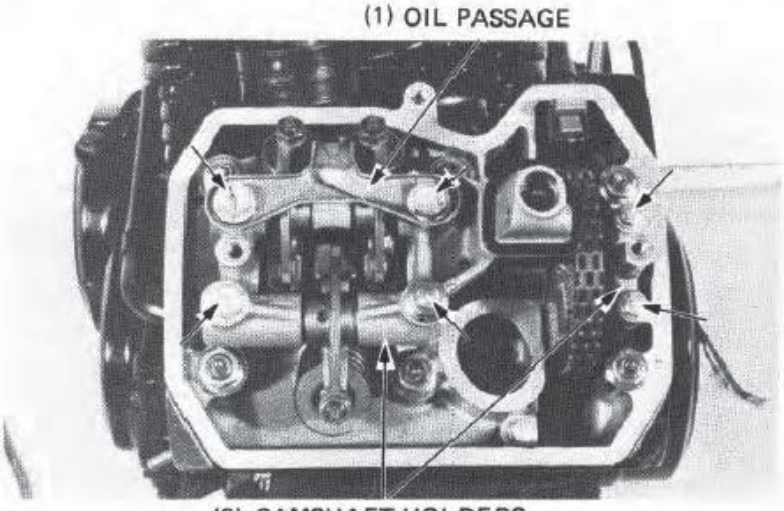

(1) VALVE ADJUSTER CAP AND COVER

Remove the cylinder head cover bolts and cover.

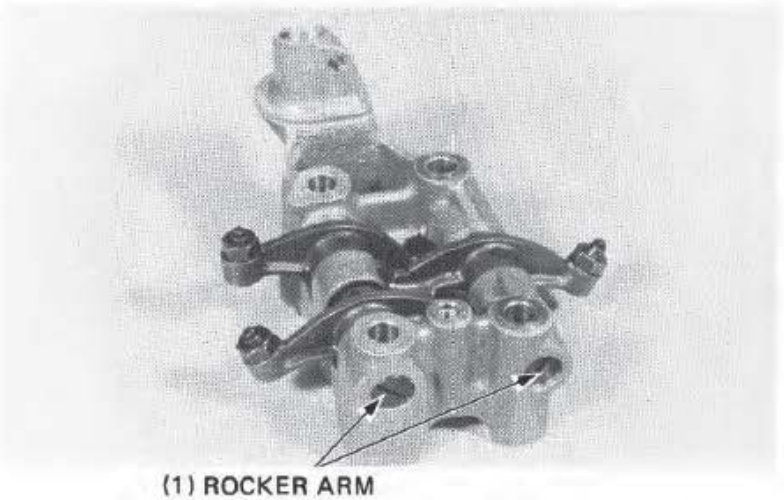


CAMSHAFT HOLDER REMOVAL

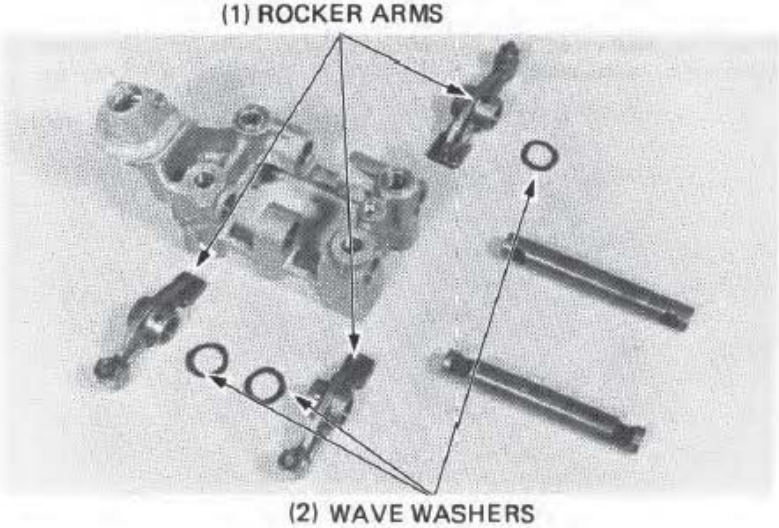
Remove the two bolts and oil passage.
Remove the camshaft holders.



Remove the rocker arm shafts by tapping the holder with a plastic hammer.



Remove the rocker arm and wave washers from the shafts.



ROCKER ARM INSPECTION

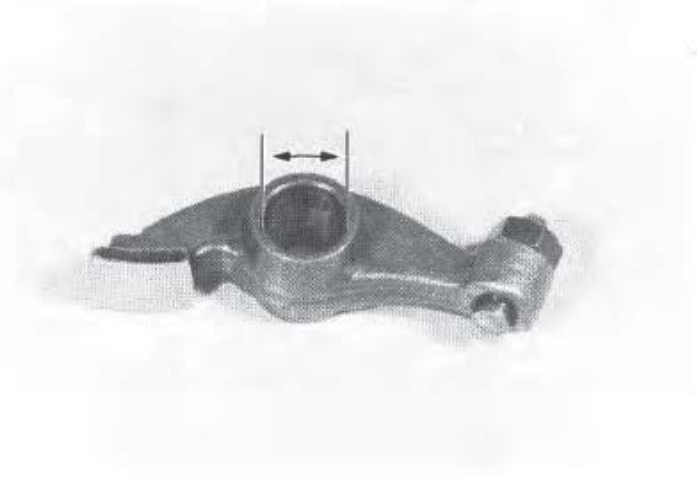
Inspect the rocker arms for damage, wear or clogged oil holes.

NOTE

If any rocker arm requires servicing or replacement, inspect the corresponding cam lobe for scoring, chipping or flat spots.

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)



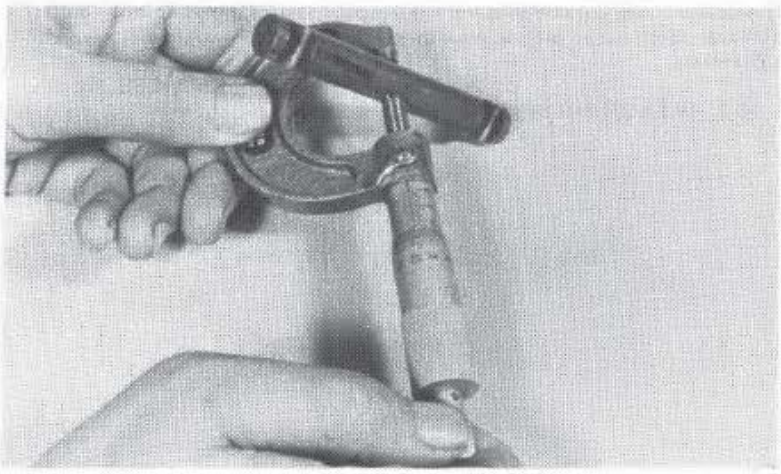
ROCKER ARM SHAFT INSPECTION

Inspect rocker arm shafts for wear or damage and measure the O.D.

SERVICE LIMIT: 11.83 mm (0.466 in)

Calculate the rocker arm-to-shaft clearance.

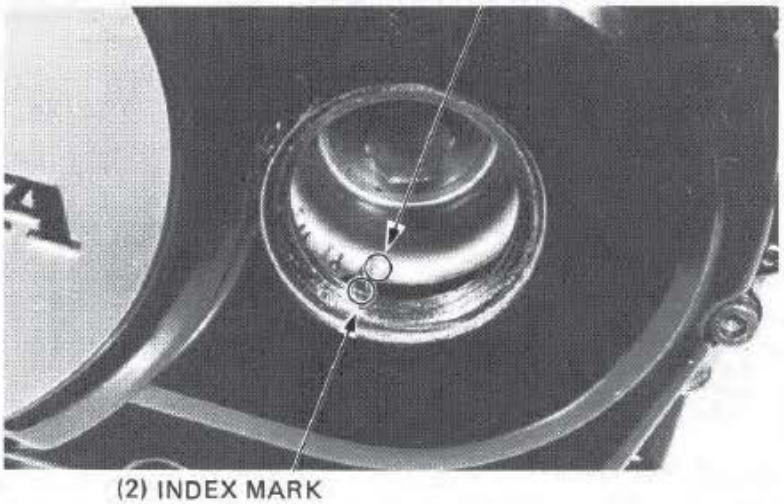
SERVICE LIMIT: 0.22 mm (0.009 in)



CAMSHAFT REMOVAL

Remove the timing hole cap from the right crankcase cover. Turn the crankshaft clockwise and align the timing mark on the rotor with the index mark on the crankcase cover.

Cylinder	Rotor timing mark
Front	F.T.
Rear	R.T.

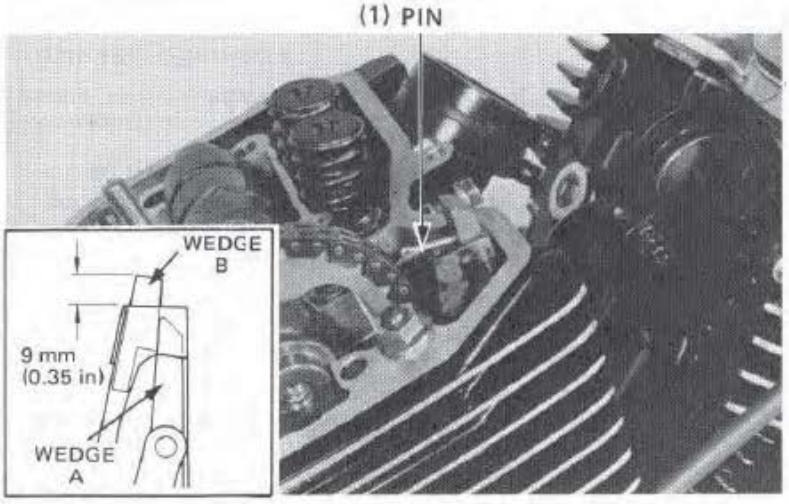


Measure the amount of the cam chain tensioner projects as shown. Replace the cam chain with a new one if the projection exceeds 9.0 mm (0.35 in).

To replace the cam chain, drain the oil from the engine and remove the following parts:

Front cylinder	Rear cylinder
· Left crankcase cover · Alternator flywheel	· Right crankcase cover · Primary drive gear

Pull wedge A straight up while holding wedge B down. Secure wedge A with a 2 mm pin as shown.

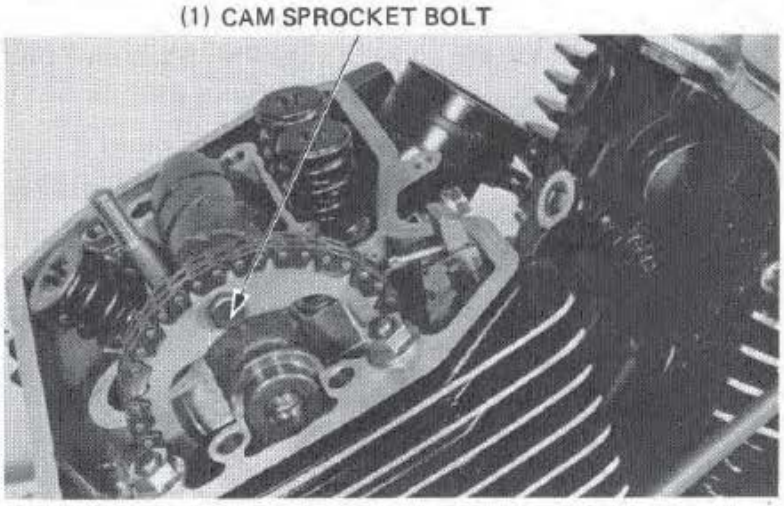


Remove the cam sprocket bolts.
Rotate the crankshaft clockwise one turn (360°) and remove the other cam sprocket bolts.

NOTE

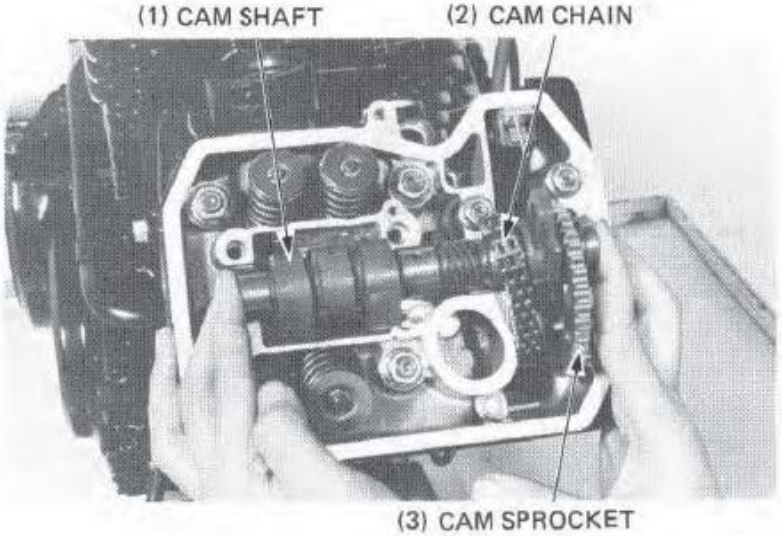
Be careful not to let the cam sprocket bolts fall into the crankcase.

Remove the cam sprocket from the camshaft flange with the cam chain. Rotate the crankshaft clockwise half a turn (180°) and remove the cam chain from the sprocket.



Hang the cam chain on the camshaft behind the camshaft flange. Remove the cam sprocket while lifting the camshaft out.

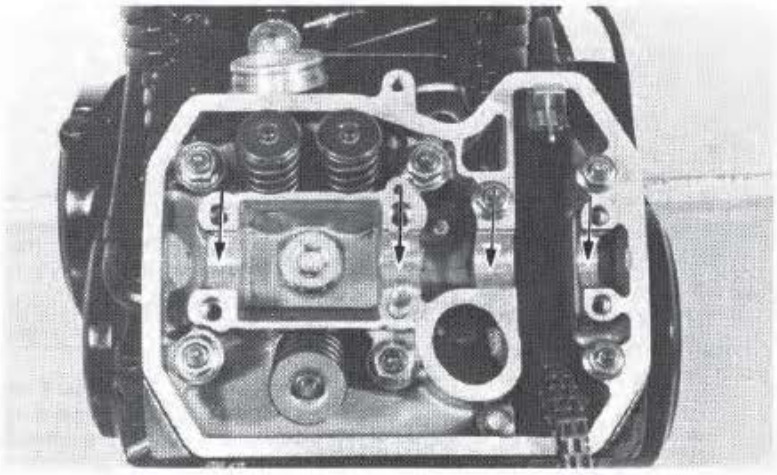
Attach a piece of wire to the cam chain to prevent it from being dropped into the crankcase.

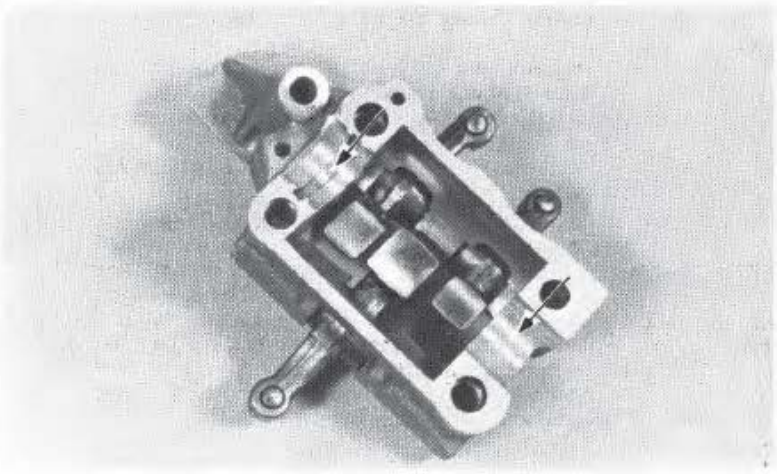


INSPECTION

CAMSHAFT HOLDER/CYLINDER HEAD

Inspect the camshaft holder and cylinder head journal surfaces for scoring, scratches, or evidence of insufficient lubrication.

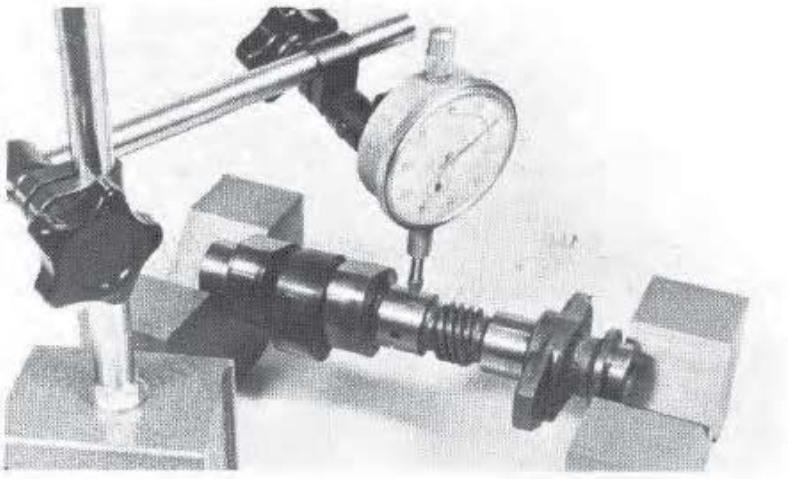




CAMSHAFT RUNOUT

Check camshaft runout with a dial indicator. Support both ends of the camshaft with V-blocks. Use 1/2 of the total indicator reading to determine runout.

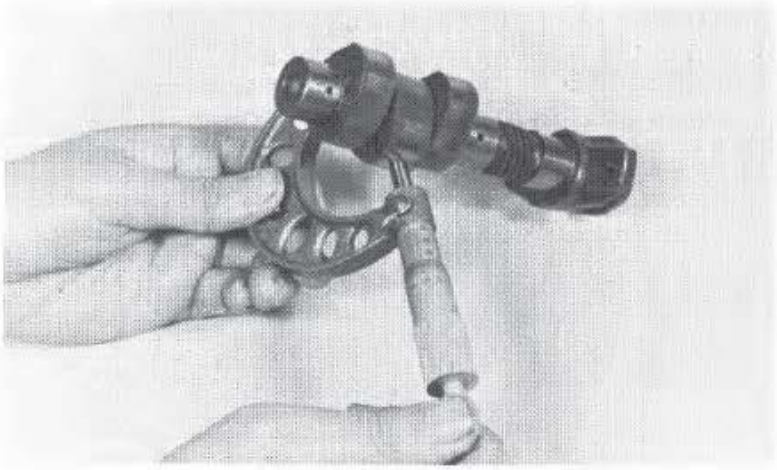
SERVICE LIMIT: 0.05 mm (0.002 in)



CAM LOBE HEIGHT

Using a micrometer, measure the height of each cam lobe.

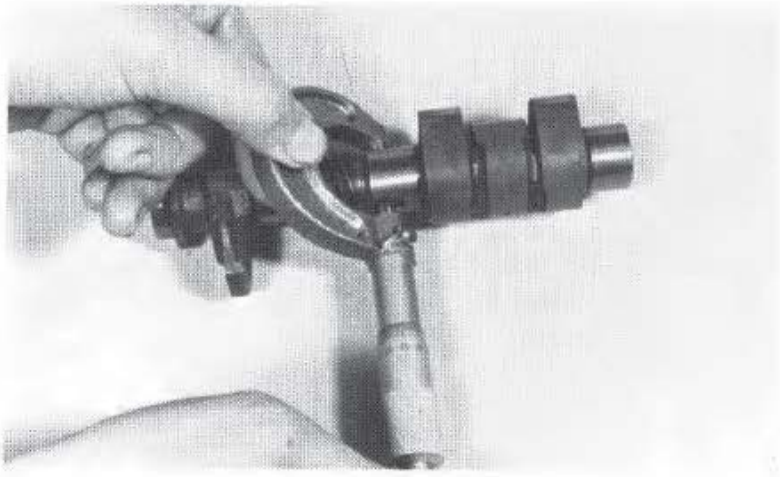
SERVICE LIMITS:
IN: 38.00 mm (1.496 in)
EX: 37.90 mm (1.492 in)



CAMSHAFT INSPECTION

Check the camshaft journals for wear or damage. Measure the O.D. of each journal.

SERVICE LIMITS: 21.826 mm (0.859 in)



Wipe any oil from the journals. Lay a strip of plastigauge lengthwise on top of each camshaft journal.

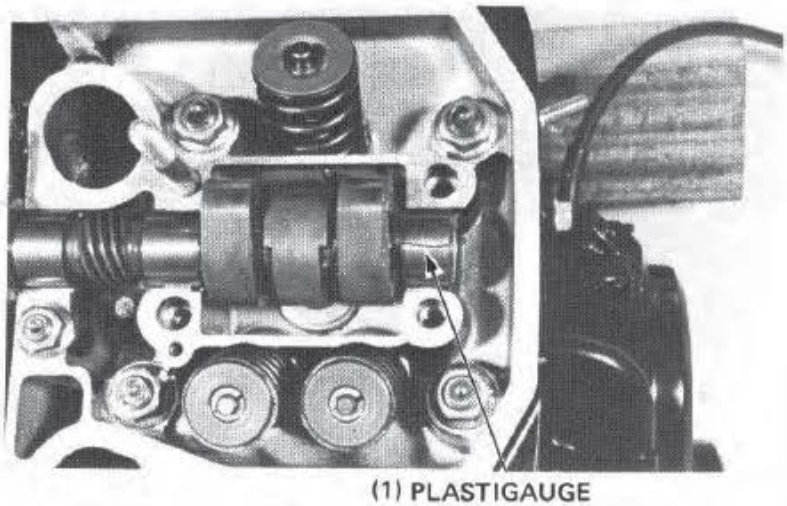
NOTE

Avoid placing plastigauge over the oil hole in the cam holder.

Hook the cam chain suspension wire against the cam chain guide.

NOTE

Do not hook the wire against the head cover mating surface.



(1) PLASTIGAUGE

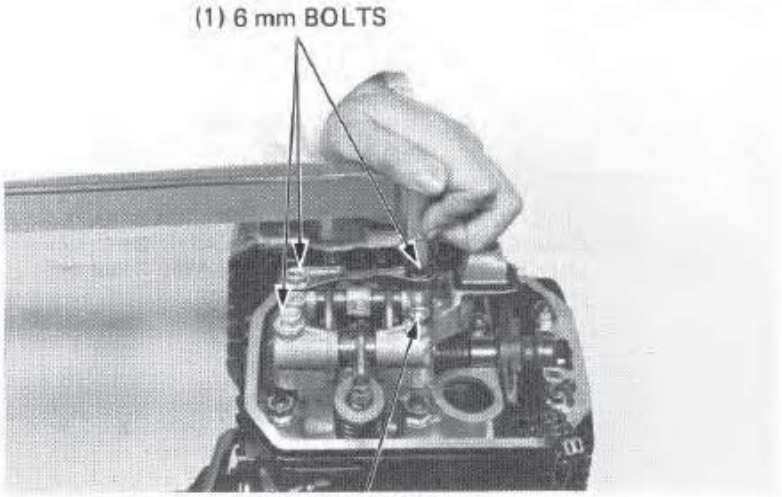
Install the camshaft holders and tighten in a criss-cross pattern in 2–3 steps.

NOTE

Do not rotate the camshaft when using plastigauge.

TORQUES:

6 mm bolt/nut:	**20–25 N·m**
(LEFT)	**(2.0–2.5 kg-m, 14–18 ft-lb)**
6 mm SH bolt:	**8–12 N·m**
(RIGHT)	**(0.8–1.2 kg-m, 6–9 ft-lb)**

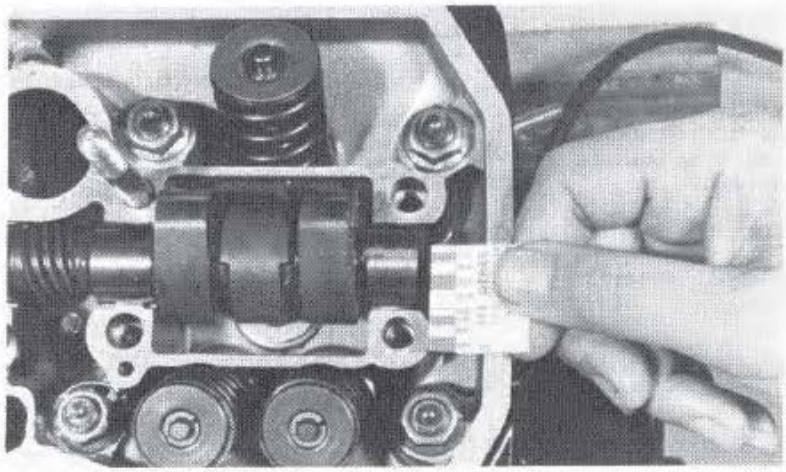


Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.23 mm (0.009 in)

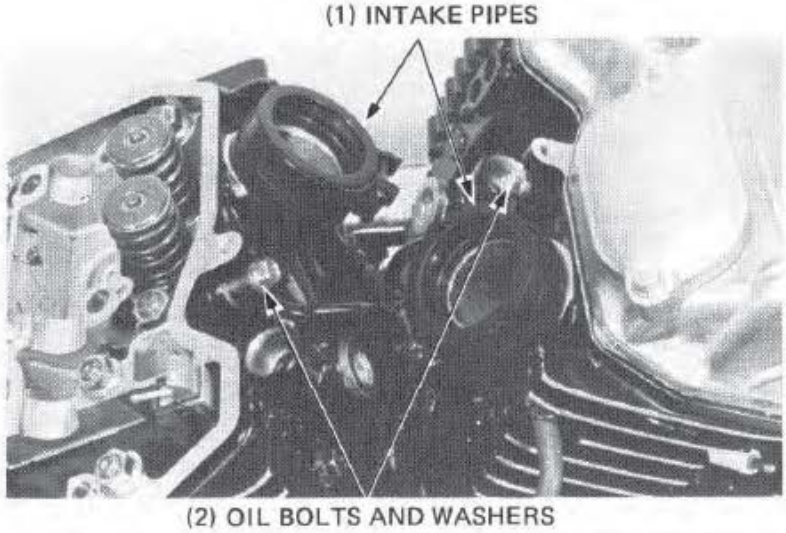
When the service limits are exceeded, replace the camshaft and recheck the oil clearance.

Replace the camshaft holders if the clearance still exceeds the service limits.

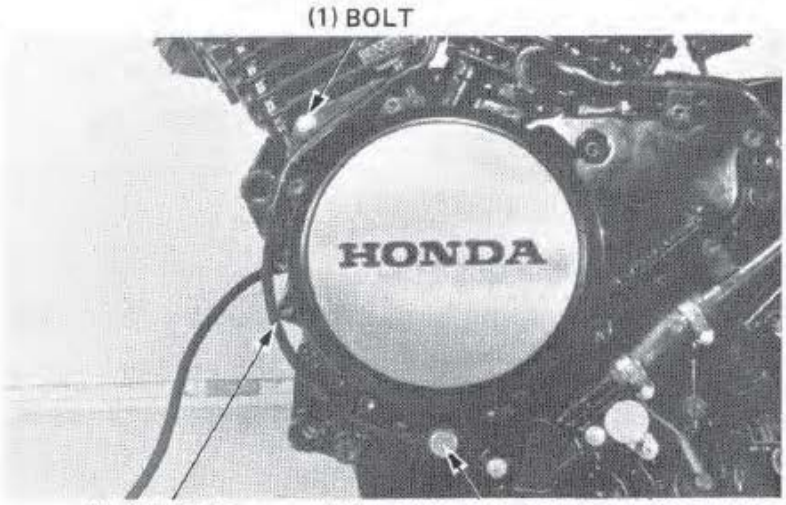


CYLINDER HEAD REMOVAL

Remove the carburetor intake pipes.
Remove the oil bolts from the front and rear cylinder heads.

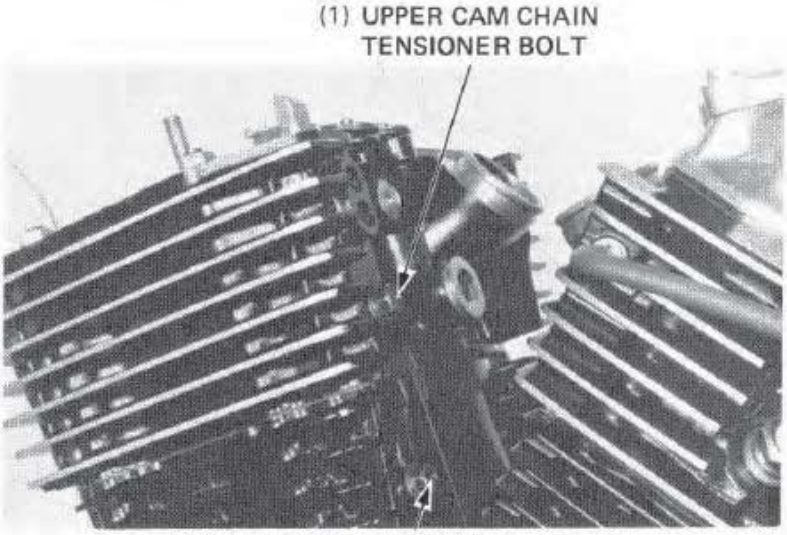


Remove the oil pipe holding bolt and lower oil bolt.
Remove the oil pipe.

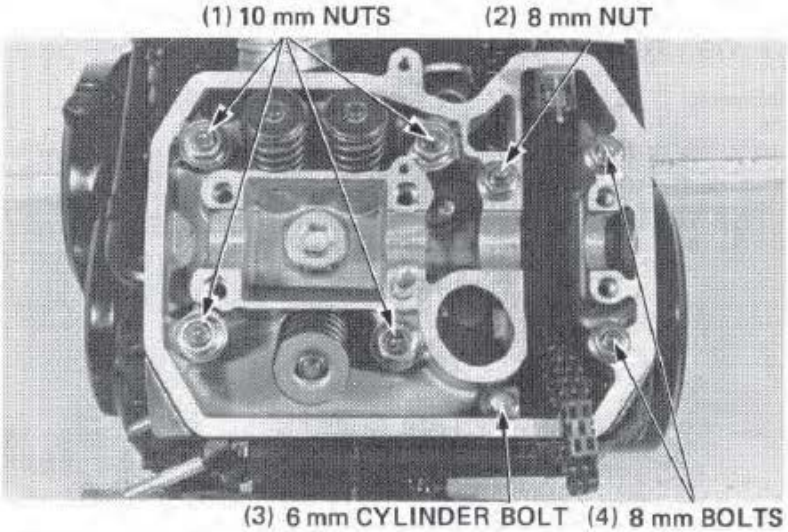


Remove the upper cam chain tensioner bolt and copper washer.

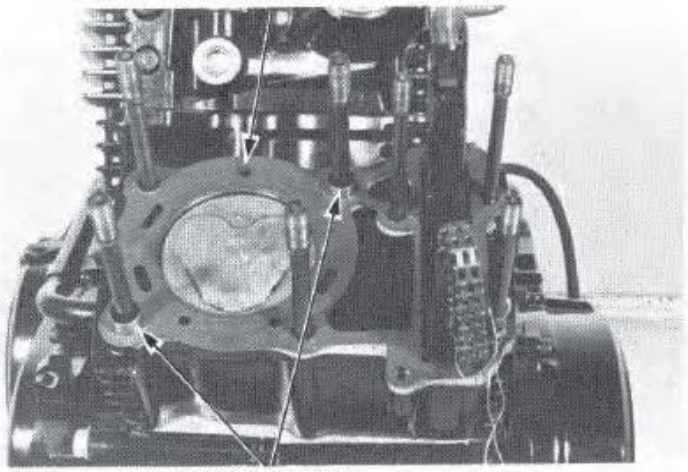
Loosen the lower cam chain tensioner bolt.



Remove the 10 mm nuts, 8 mm nuts, 8 mm bolt and 6 mm cylinder bolt.
Remove the cylinder head.



Remove the cylinder head gasket and dowel pins.



CYLINDER HEAD DISASSEMBLY

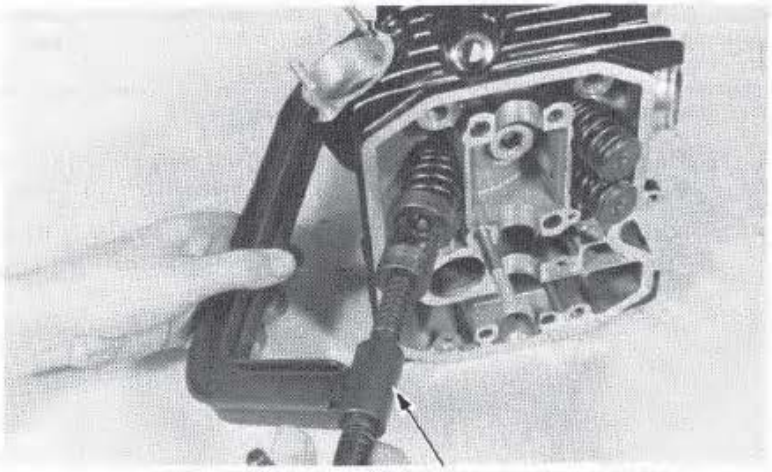
Remove the valve spring cotters, retainers, springs and valves with the Valve Spring Compressor.

CAUTION

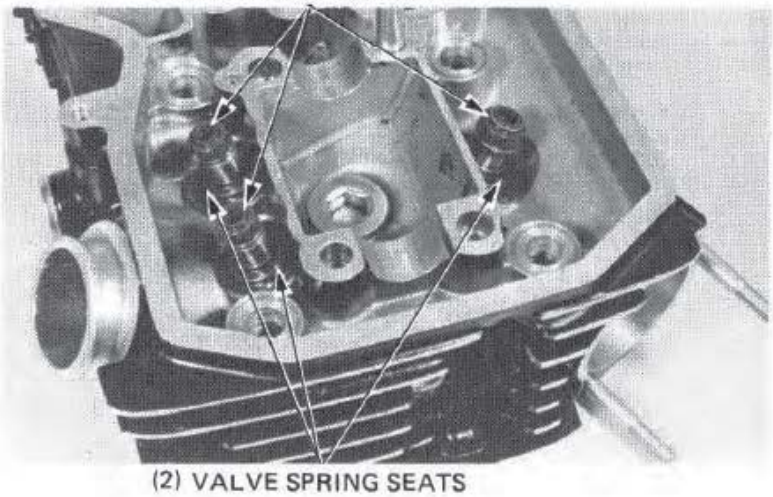
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

NOTE

Mark all parts during disassembly so they can be reinstalled in the same location they were removed from.



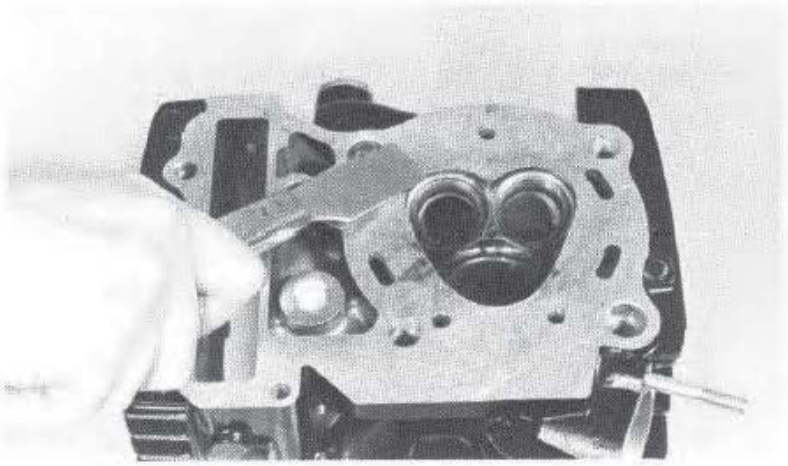
Remove the valve stem seals and valve spring seats.



Remove carbon deposits from the combustion chamber and clean off the head gasket surfaces.

NOTE

- Avoid damaging the gasket surfaces.
- Gaskets will come off easier if they are soaked in solvent.



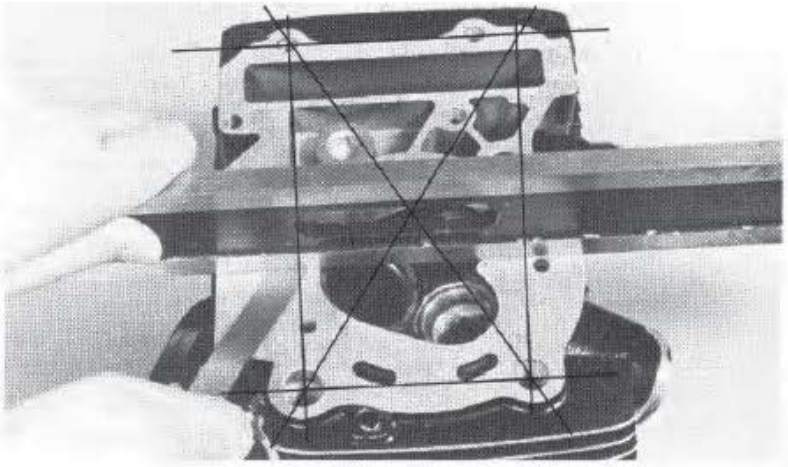
INSPECTION

CYLINDER HEAD

Check the spark plug hole and valve areas for cracks.

Check the cylinder head for warpage with a straight edge and feeler gauge as indicated.

SERVICE LIMIT: 0.10 mm (0.004 in)



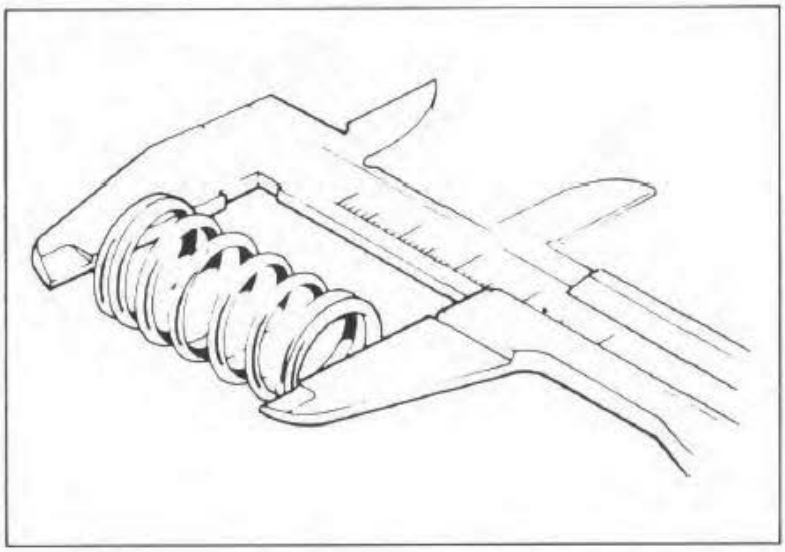
INSPECTION

VALVE SPRINGS

Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:
INNER (IN): 35.58 mm (1.4008 in)
(EX): 43.32 mm (1.666 in)
OUTER (IN): 44.3 mm (1.744 in)
(EX): 44.29 mm (1.744 in)

Replace the springs if they are shorter than the service limits.



VALVE STEM-TO-GUIDE CLEARANCE

Inspect each valve for trueness, burning, scratches or abnormal stem wear.

Check valve movement in the guide and measure and record each valve stem O.D.

SERVICE LIMITS:
IN: 5.45 mm (0.215 in)
EX: 6.55 mm (0.258 in)

NOTE

Ream the guides to remove any carbon deposits before checking clearances.

Measure and record each valve guide I.D.

SERVICE LIMIT:
IN: 5.56 mm (0.219 in)
EX: 6.65 mm (0.262 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem to guide clearance.

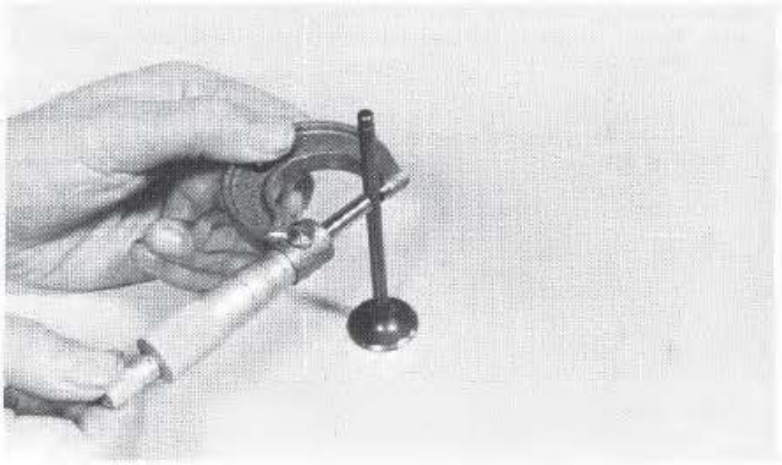
SERVICE LIMITS:
IN: 0.10 mm (0.004 in)
EX: 0.11 mm (0.004 in)

If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions (page 10-1) would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.

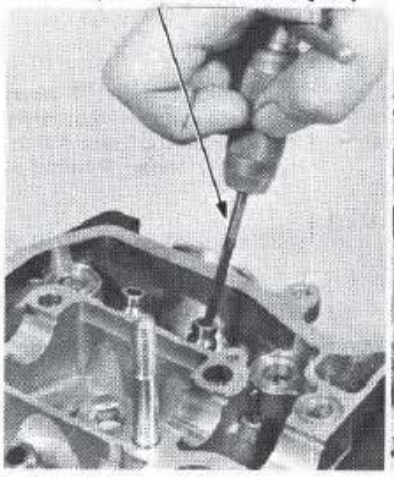
If the stem-to-guide clearance exceeds the service limits with new guides, also replace the valves.

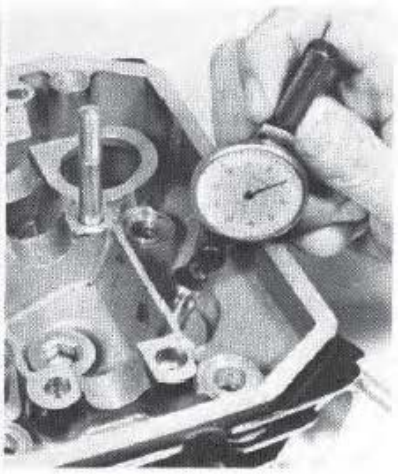
NOTE

Reface the valve seats whenever the valve guides are replaced.



(1)
VALVE GUIDE REAMER
5.5 mm, 07984–2000000 (IN)
6.5 mm, 07984–6570100 (EX)





VALVE GUIDE REPLACEMENT

Heat the cylinder head to 100°C (212°F) with a hot plate or oven.

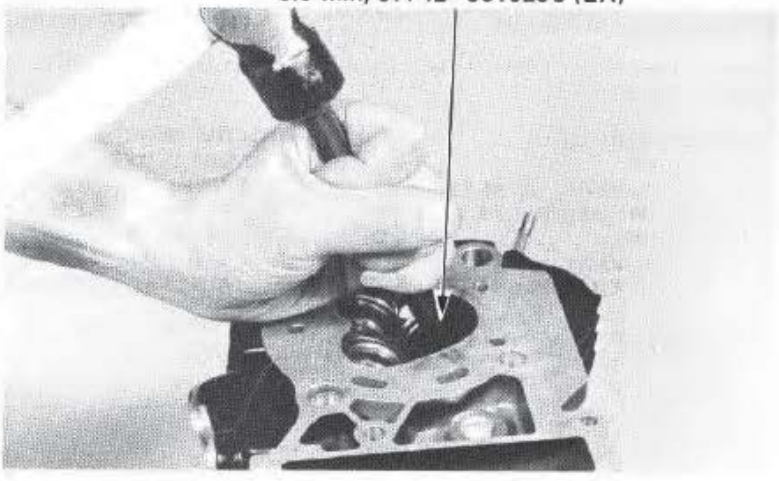
WARNING

To avoid burns, wear heavy gloves when handling the heated cylinder head.

CAUTION

Do not use a torch to heat the cylinder head; it may cause warping.

(1) VALVE GUIDE REMOVER
5.5 mm, 07742–0010100 (IN)
6.6 mm, 07742–0010200 (EX)



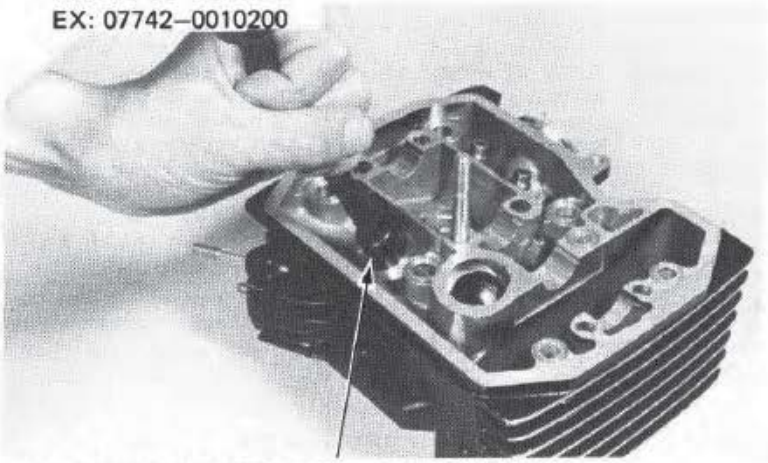
Support the cylinder head and drive out the old guides from the combustion chamber side of the cylinder head.

NOTE

Avoid damaging the cylinder head.

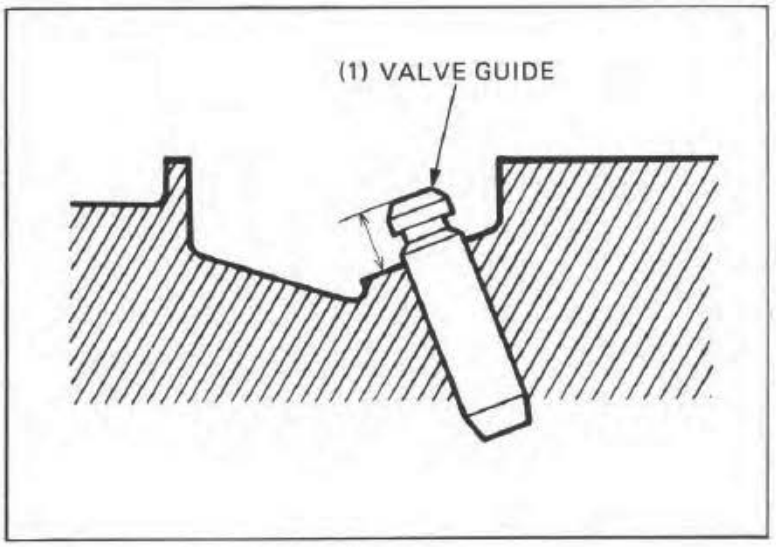
Drive new guides in from the rocker arm side of the cylinder head.

(1) VALVE GUIDE DRIVER
IN: 07742–0010100
EX: 07742–0010200



(2) VALVE GUIDE DRIVER ATTACHMENT
IN: 07943–MF50100
EX: 07943–MF50200

VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:
IN: 19.5 ± 0.1 mm (0.768 ± 0.004 in)
EX: 18.0 ± 0.1 mm (0.719 ± 0.004 in)



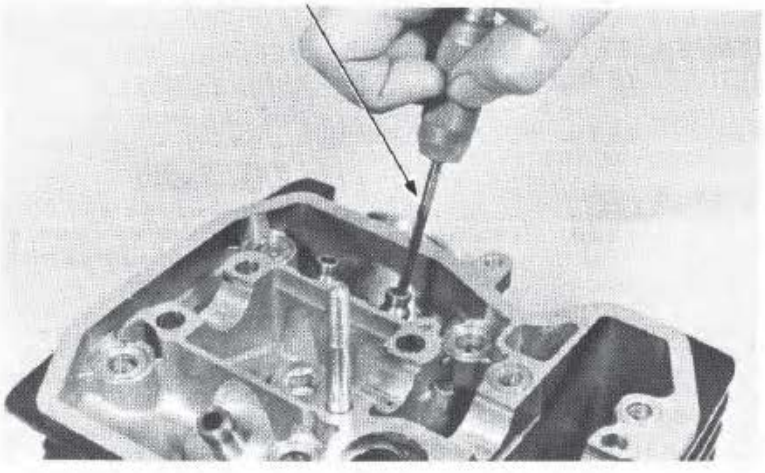
(1) VALVE GUIDE REAMER
IN: 07984–2000000
EX: 07984–6570100

Ream the new valve guides after installation.

NOTE

- Use cutting oil on the reamer during this operation.
- It is important that the reamer always be rotated in the cutting direction when it is inserted or removed.

Clean the head thoroughly after reaming the valve guides.

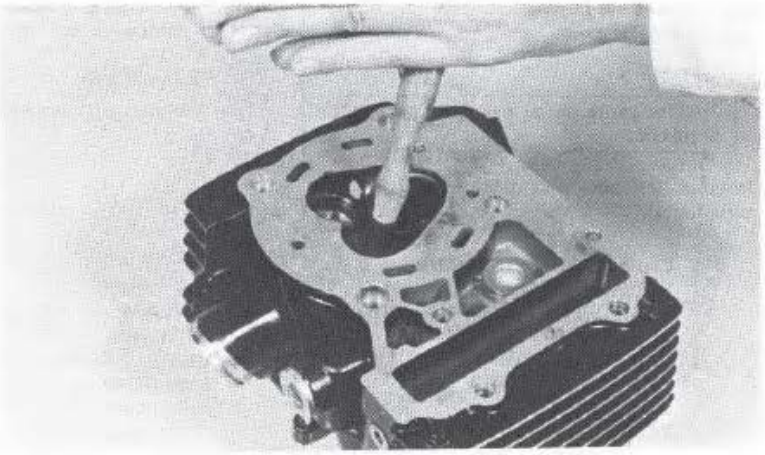


VALVE SEAT INSPECTION/REFACING

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to each valve seat. Lap each valve and seat using a rubber hose or other hand-lapping tool.

Remove and inspect each valve.



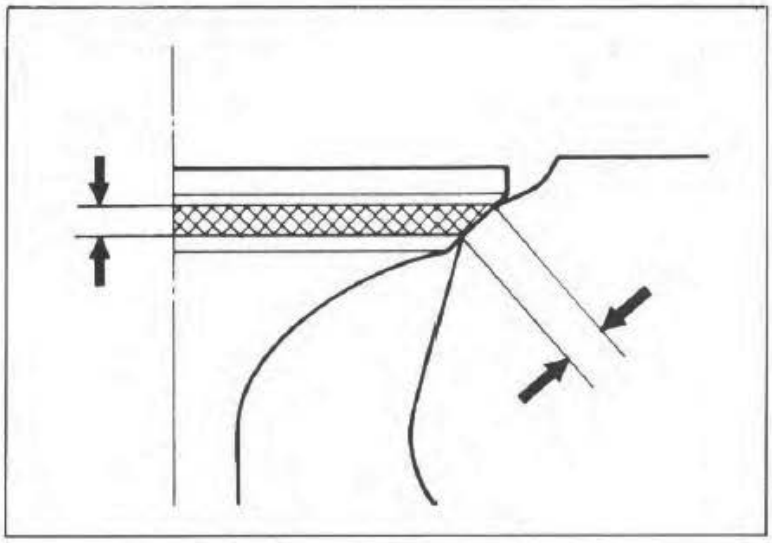
CAUTION

The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Inspect the width of each valve seat.

STANDARD: 0.9–1.1 mm (0.0354–0.0433 in)
SERVICE LIMIT: 1.50 mm (0.0591 in)

If the seat is too wide, too narrow or has low spots, the seat must be ground.

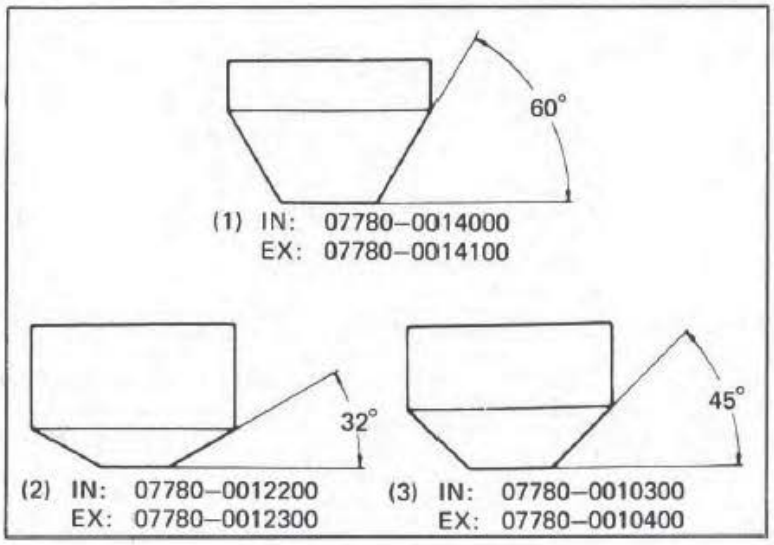


VALVE SEAT CUTTERS

Honda Valve Seat Cutters, grinder or equivalent valve seat refacing equipment are recommended to correct a worn valve seat.

NOTE

Follow the refacer manufacturer's operating instructions.



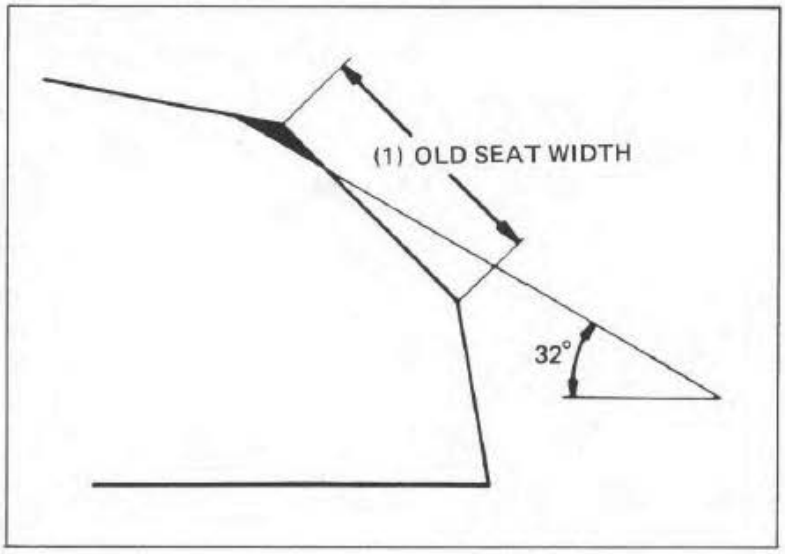
VALVE SEAT REFACING

Use a 45 degree cutter to remove any roughness or irregularities from the seat.

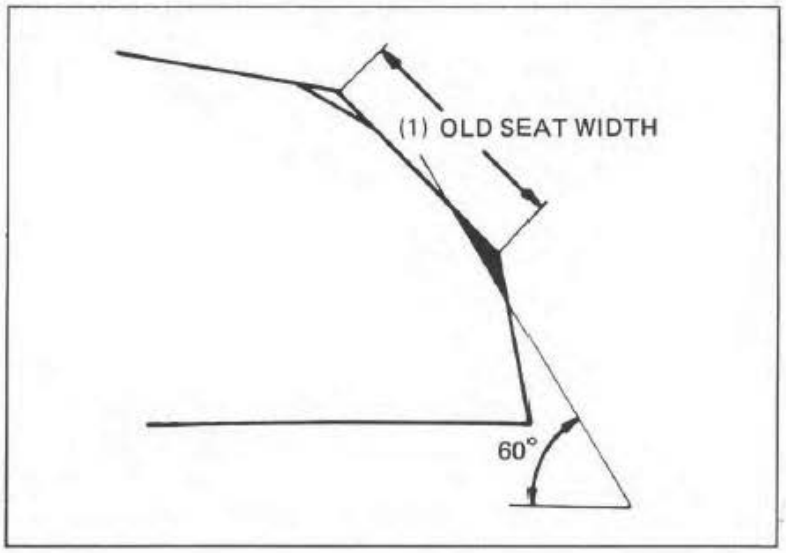
NOTE

Reface the seat with a 45 degree cutter when a valve guide is replaced.

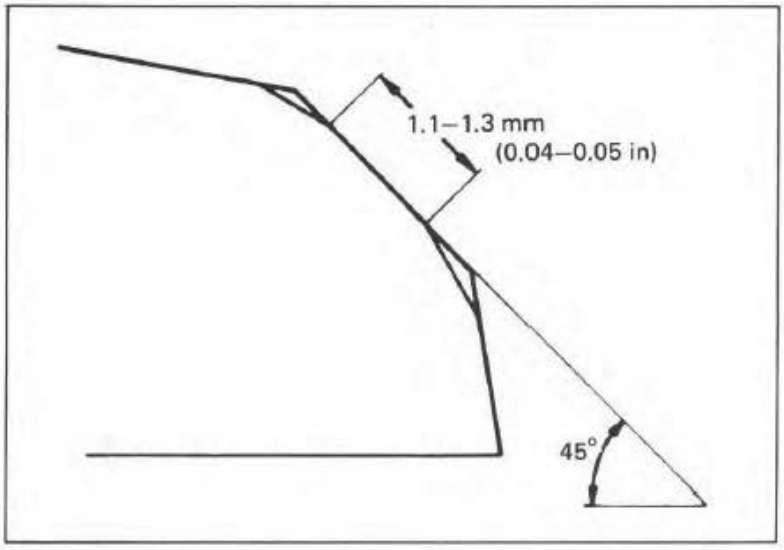
Use a 32 degree cutter to remove the top 1/4 of the existing valve seat material.



Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have refaced.



Use a 45 degree finish cutter and cut the seat to the proper width. Make sure that all pitting and irregularities are removed. Refinish if necessary.

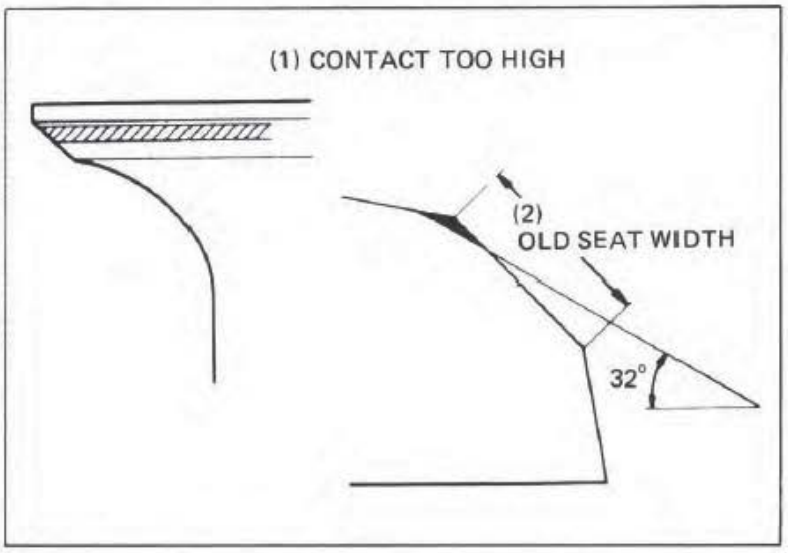


Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

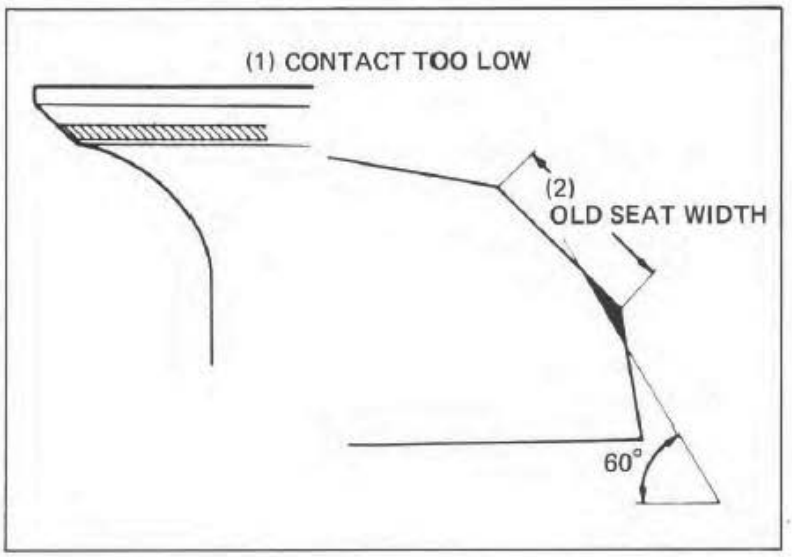
NOTE

The location of the valve seat in relation to the valve face is very important for good sealing.

If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.



If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.

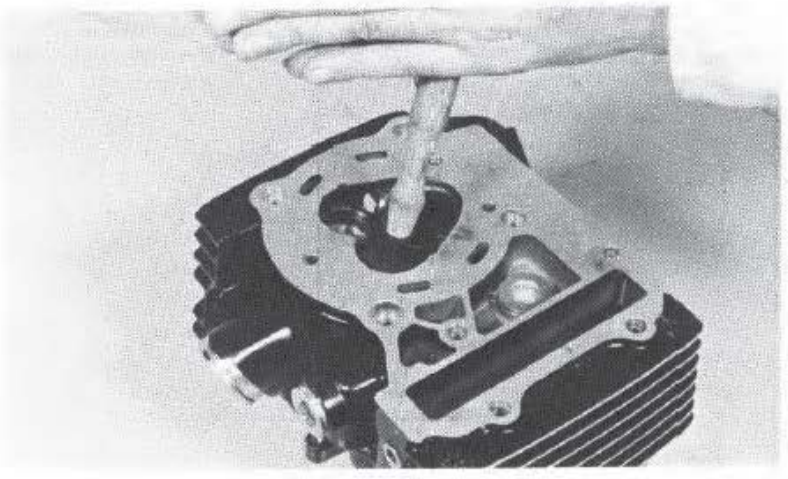


Refinish the seat to specifications, using a 45 degree finish cutter.

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure. After lapping, wash all residual compound off the cylinder head and valve.

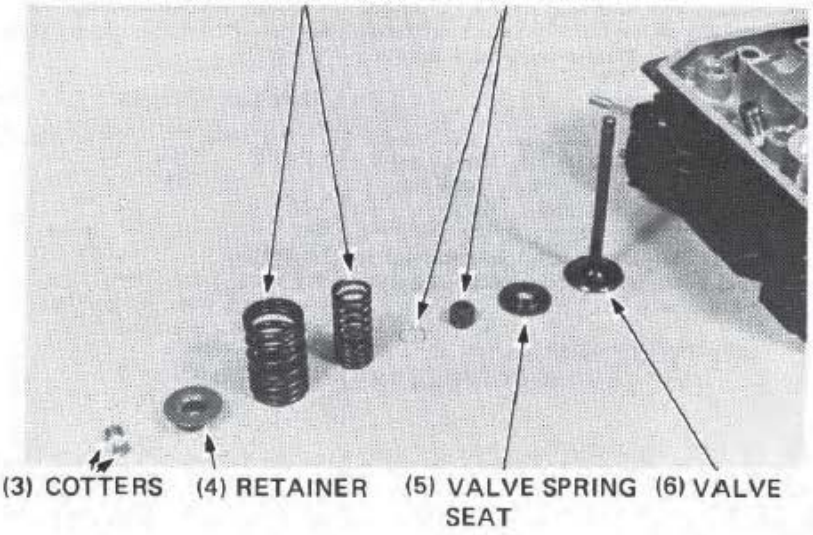
NOTE

Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

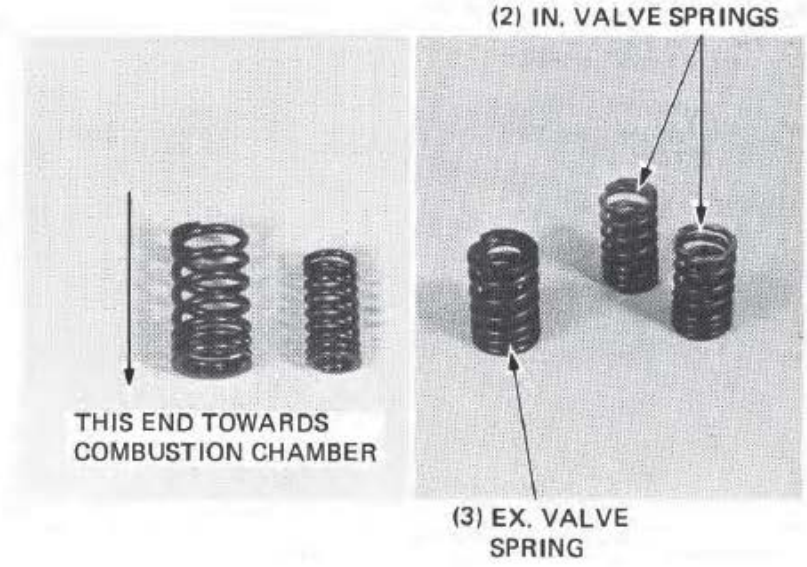
Install the valve spring seat and a new stem seal. Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide. To avoid damage to the stem seal, turn the valve slowly when inserting.



Install the valve springs and retainers. The springs tightly wound coils should face in toward the combustion chamber.

NOTE

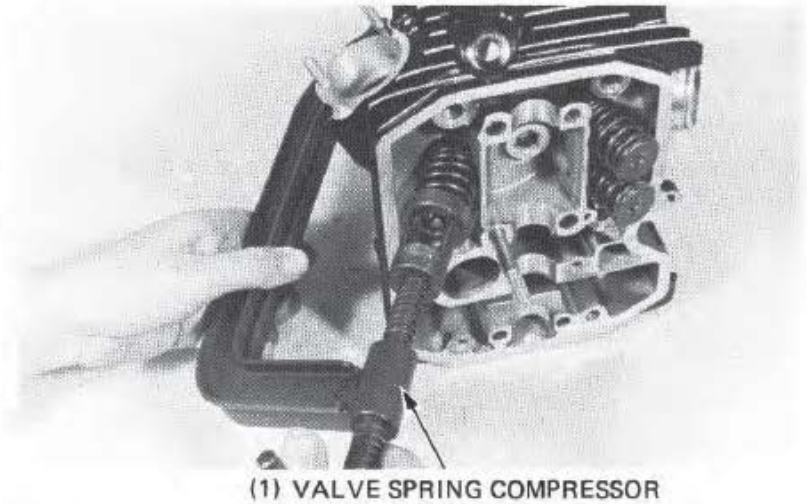
Springs with green paint are exhaust valve springs.



Install the valve cotters.

CAUTION

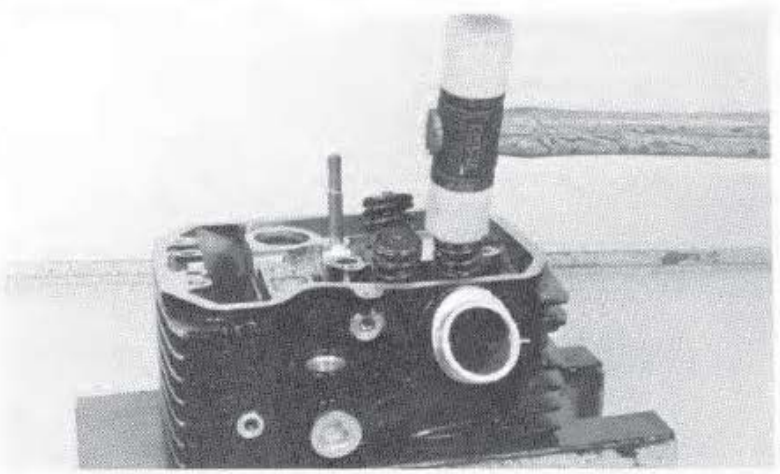
To prevent loss of tension, do not compress the valve springs more than necessary to install the valve keepers.



Tap the valve stems gently with a soft hammer to firmly seat the cotters.

NOTE

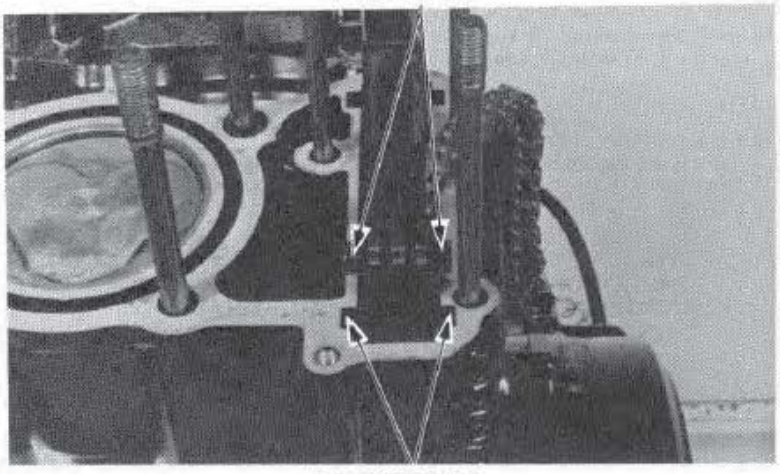
Support the cylinder head above the work bench surface to prevent possible valve damage.



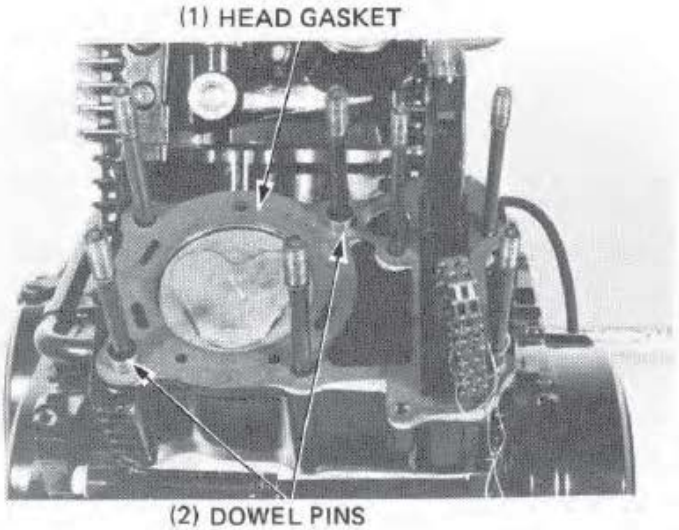
CYLINDER HEAD INSTALLATION

Make sure that the cam chain guide bosses are in the grooves of the cylinder.

Clean the cylinder head surface of any gasket material.



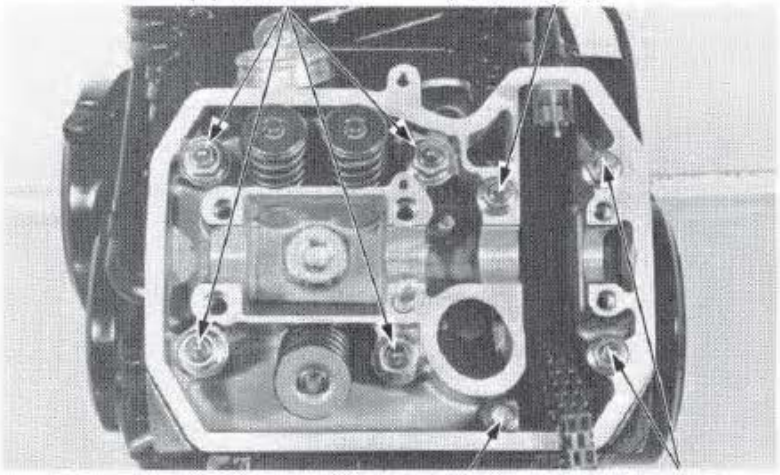
Install the dowel pins and a new head gasket.



Install the cylinder head.
Install and tighten the 10 and 8 mm flange nuts and cylinder bolt to the specified torque.

TORQUE:

10 mm nut:	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
8 mm nut:	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
8 mm bolt:	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
6 mm bolt:	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

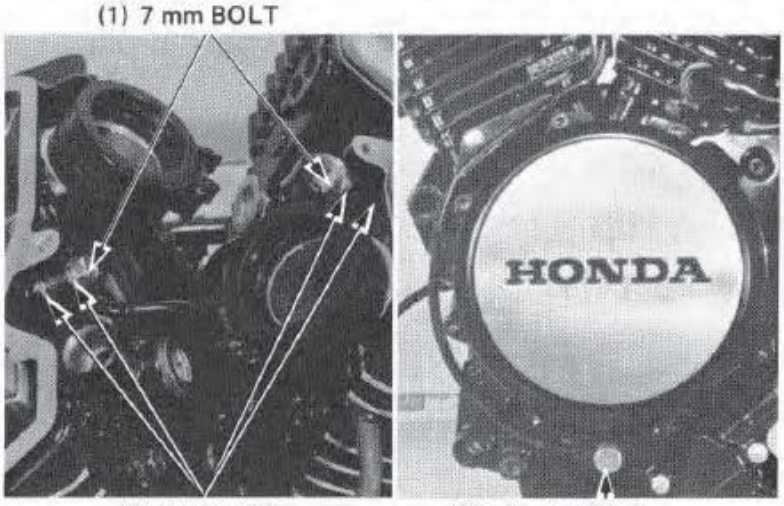


Install the oil pipe and tighten the bolts.

TORQUE:

7 mm bolt:	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
10 mm bolt:	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

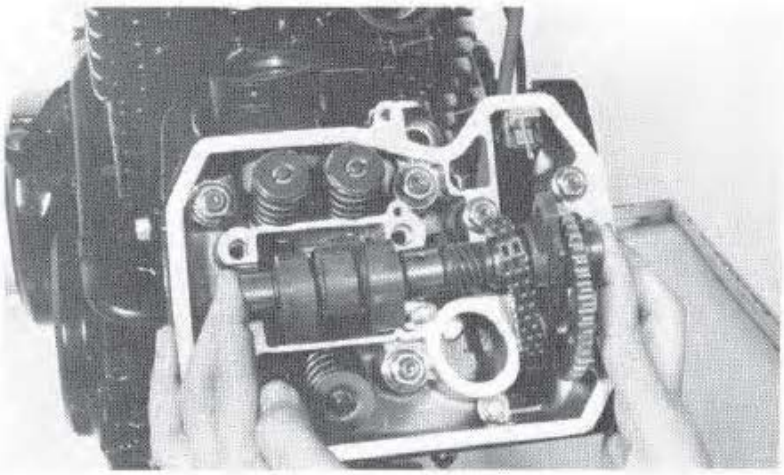
Tighten the cam chain tensioner bolts.
Install the carburetor intake pipes.



CAMSHAFT INSTALLATION

Lubricate the camshaft journal surface of the cylinder head with molybdenum disulfide grease.

Run the camshaft through the cam chain and install the cam sprocket on the shaft flange.



Place the camshaft into its correct positions.

Camshaft with tachometer gear ⟶ F. cylinder
Camshaft without tachometer gear ⟶ R. cylinder

Put each camshaft on the cylinder head with its lobe facing down.
Install the front cylinder camshaft first as shown below.

While lifting the cam chain, rotate the crankshaft clockwise and align the timing mark on the rotor with the index mark on the right crankcase.

Front cylinder ..... "F.T"
Rear cylinder ..... "R.T"

Align the timing marks on the cam sprocket with the top of the cylinder head and place the cam chain on the sprocket.

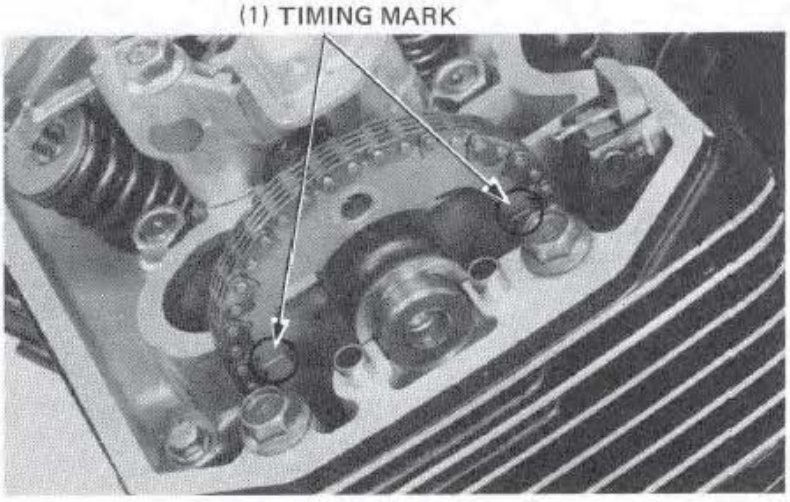
Position the cam sprocket on the camshaft flange.

NOTE

After installing, check that the timing marks on the cam sprocket align with the top of the cylinder head.

CAUTION

After installing the front cylinder, turn the crankshaft clockwise 232° and then install the rear cylinder.



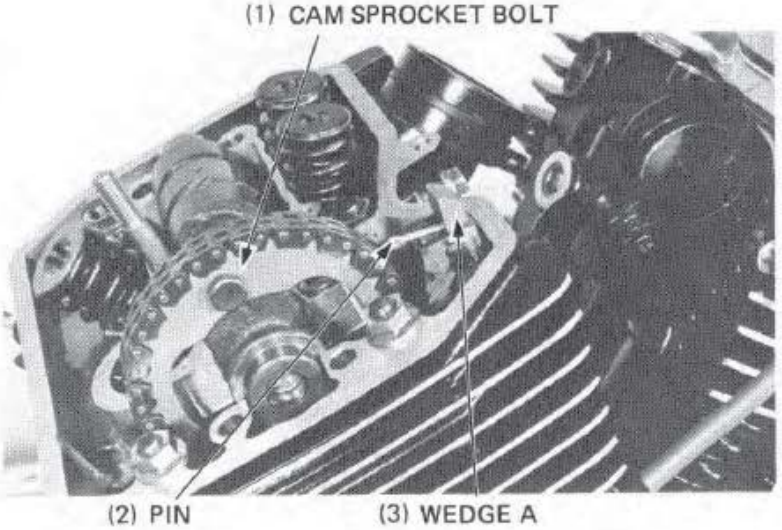
Apply a locking agent to the threads and underside of the head of the cam sprocket bolt. Install the bolt, but do not tighten at this time.

Turn the crankshaft clockwise one turn (360°).
Apply a locking agent to the other cam sprocket bolt and install it. Tighten the bolt to the specified torque.

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

Turn the crankshaft clockwise one more turn and torque the remaining bolt to the same value.

Remove the 2 mm pin holding camshaft tensioner wedge A.

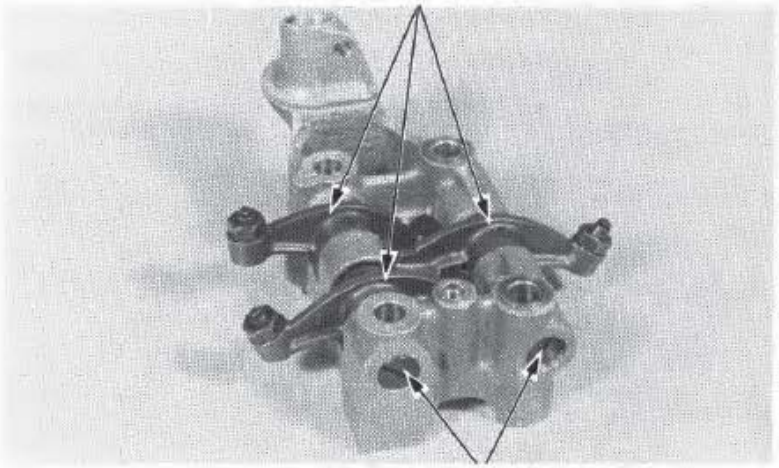


CAMSHAFT HOLDER INSTALLATION

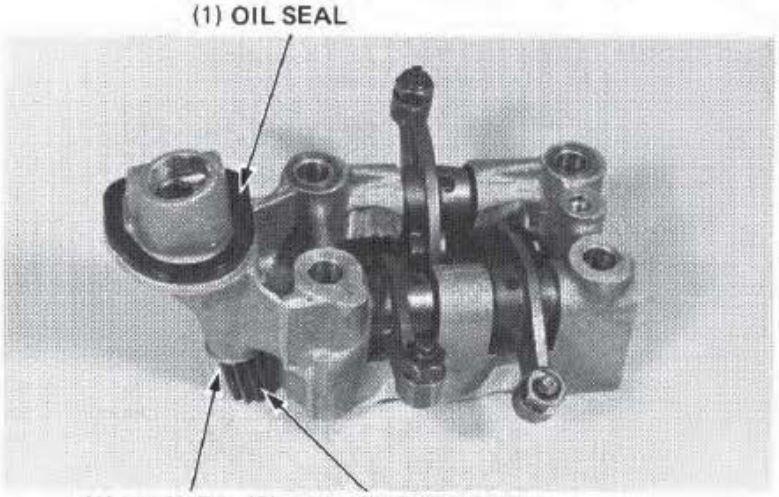
Install the rocker arms, rocker arm shafts and wave washers.

NOTE

Align the cut-out in the rocker arm shaft with the bolt hole.



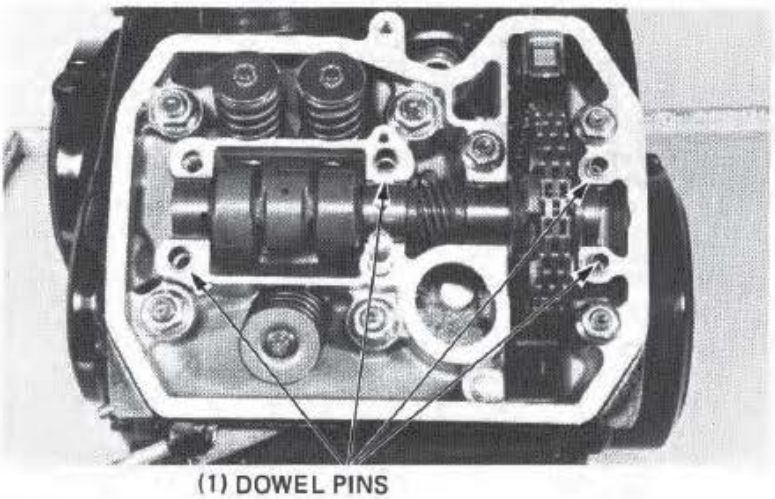
On the front camshaft holder; install the tachometer gear, washer and seal.



Install the dowel pins.
Pour clean engine oil into the oil pockets in the head so that the cam lobes are submerged.

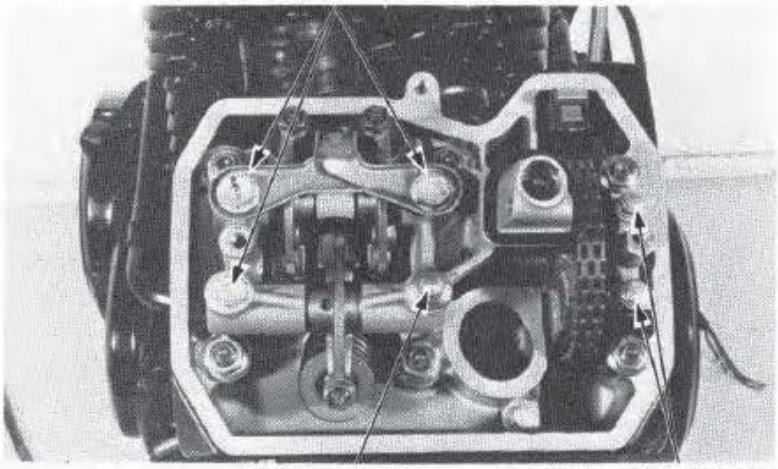
NOTE

Make sure that the cam lobes are submerged in oil.



Install and tighten the camshaft holders to the specified torque.

TORQUE:
6 mm bolt/nut: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
6 mm SH bolt: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

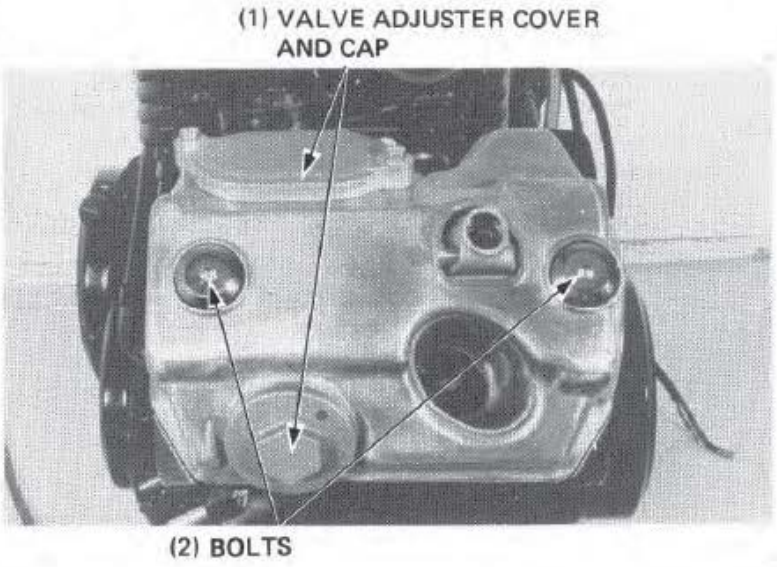


CYLINDER HEAD COVER INSTALLATION

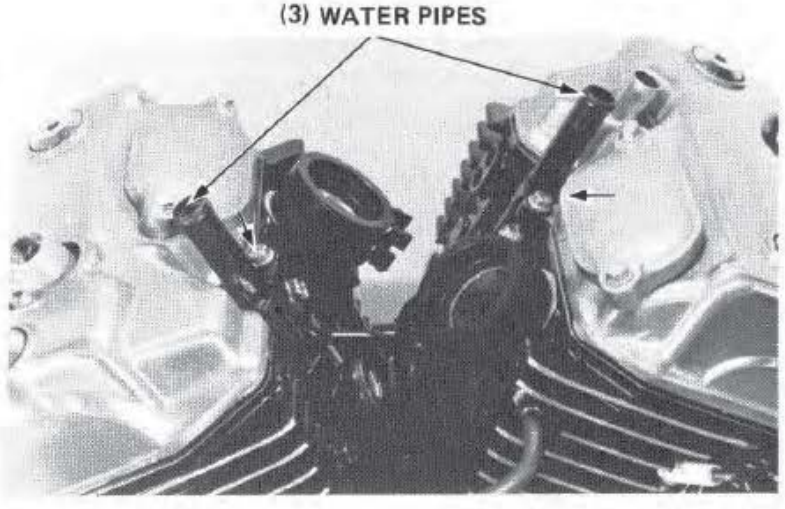
Install the cylinder head cover and tighten the bolts.

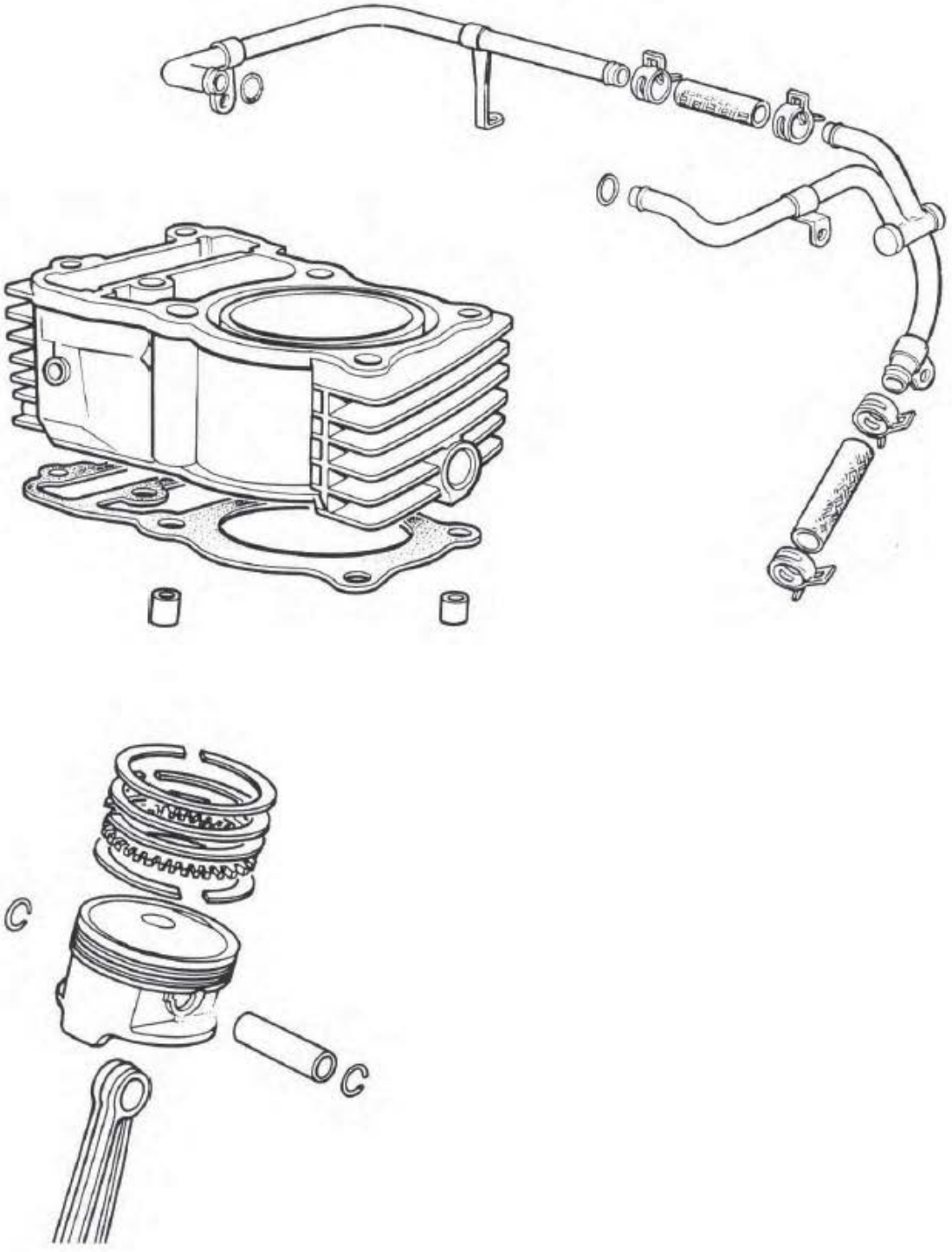
TORQUE: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

Install the valve adjuster cap and cover onto the cylinder head.



Install the O-rings to the water pipes and install the water pipes into the cylinder heads.

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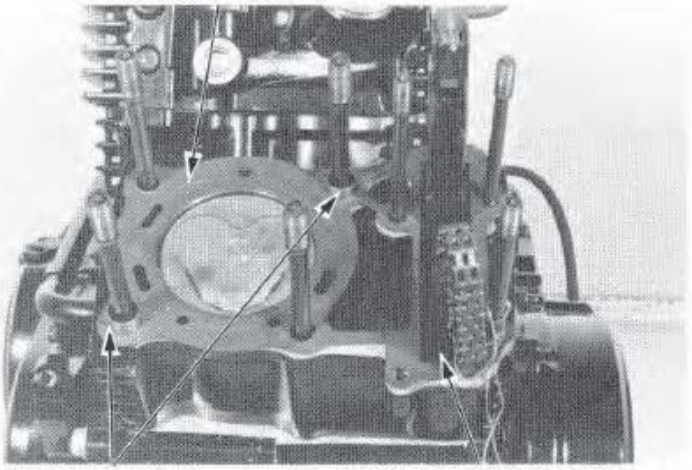
CYLINDER REMOVAL

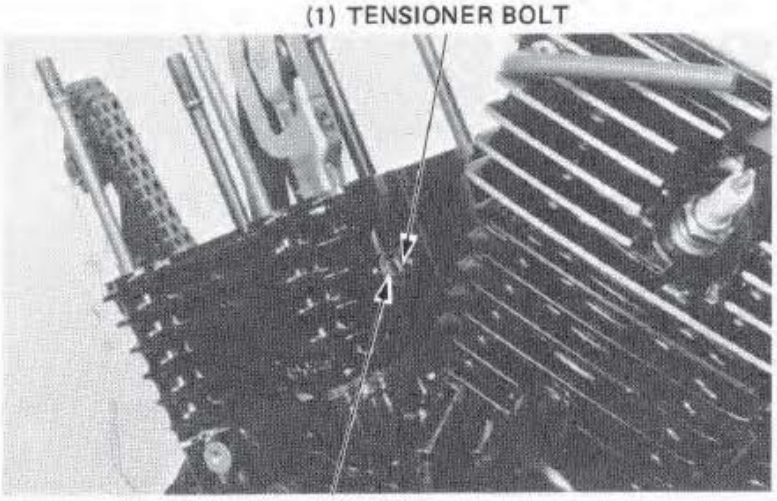
Remove the cylinder heads (Section 10).

Remove the gaskets and dowel pins and the cam chain guide.

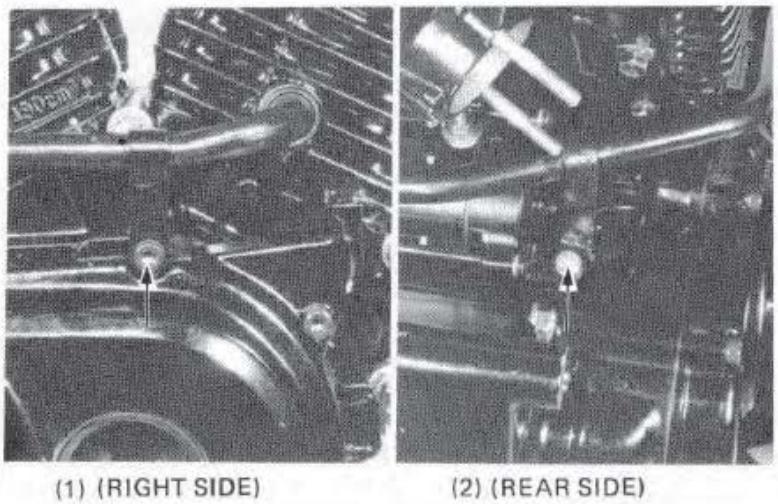


Remove the cam chain tensioner bolt and sealing washer.

Remove the cam chain tensioner.



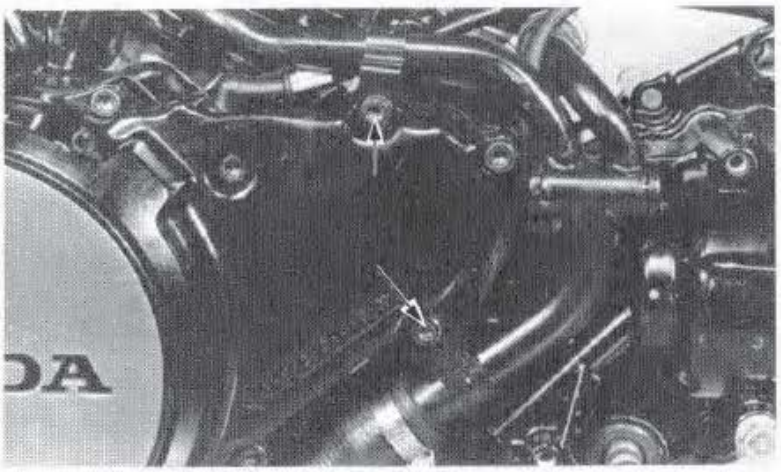
Remove the water pipe bracket bolts.



Remove the water pipe bracket bolts.
Remove the right and left water pipes from the cylinders by pulling them out by hand.

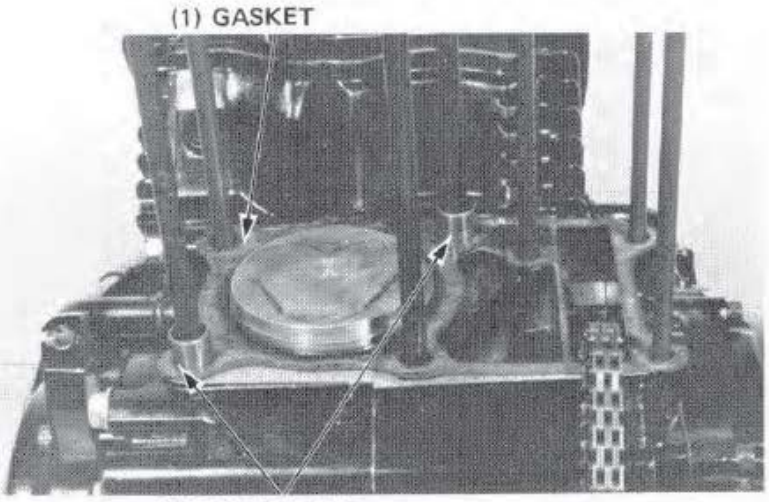
Remove the O-rings from the water pipes.

Remove the cylinders.



(1) (LEFT SIDE)

Remove the gaskets and dowel pins.



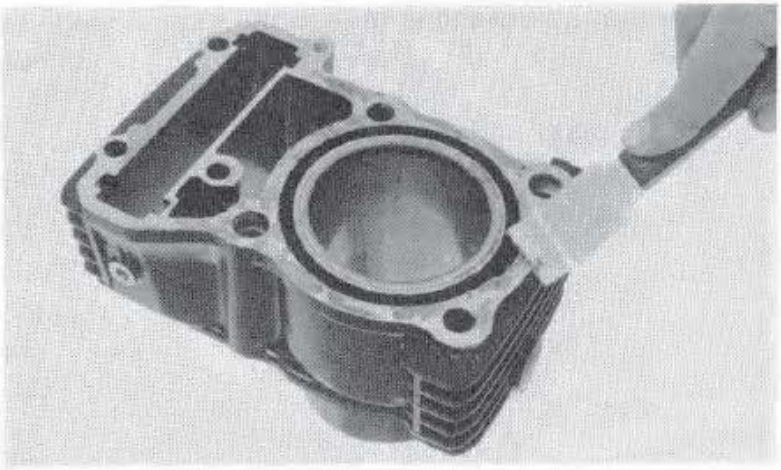
(1) GASKET

(2) DOWEL PINS

Clean the top of each cylinder thoroughly with a gasket scraper.

NOTE

- Avoid damaging the gasket surface.
- The gasket will come off easier if it is soaked in solvent.



CYLINDER INSPECTION

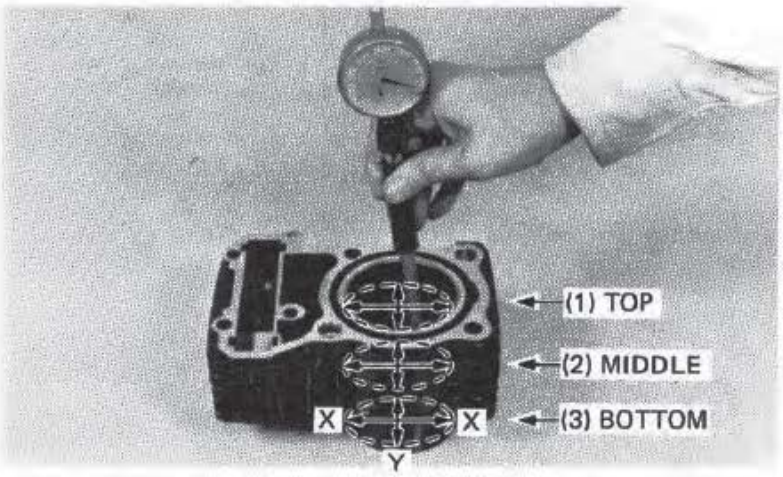
Inspect the cylinder bores for wear or damage.

Measure the cylinder I.D. at three levels in the X and Y axis.

SERVICE LIMIT: 71.17 mm (2.802 in)

Calculate the taper and out of round.

SERVICE LIMITS:
Taper: 0.05 mm (0.002 in)
Out of round: 0.05 mm (0.002 in)

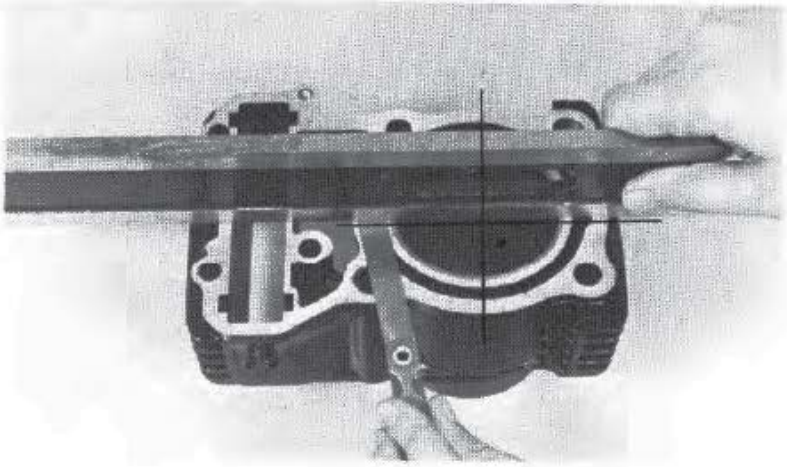


Inspect the cylinders for transverse warpage across the top.

NOTE

Measure warpage using a straight edge and feeler gauge in the directions shown.

SERVICE LIMIT: 0.10 mm (0.004 in)



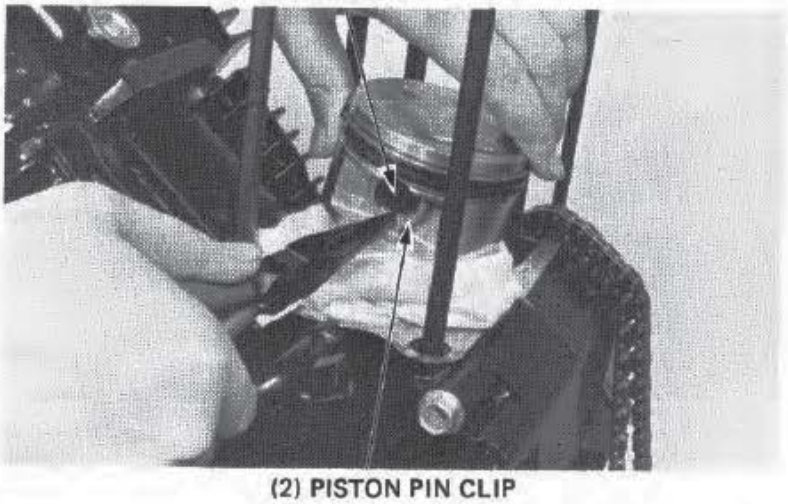
PISTON REMOVAL

Place a shop towel into the crankcase and remove the piston pin clips.

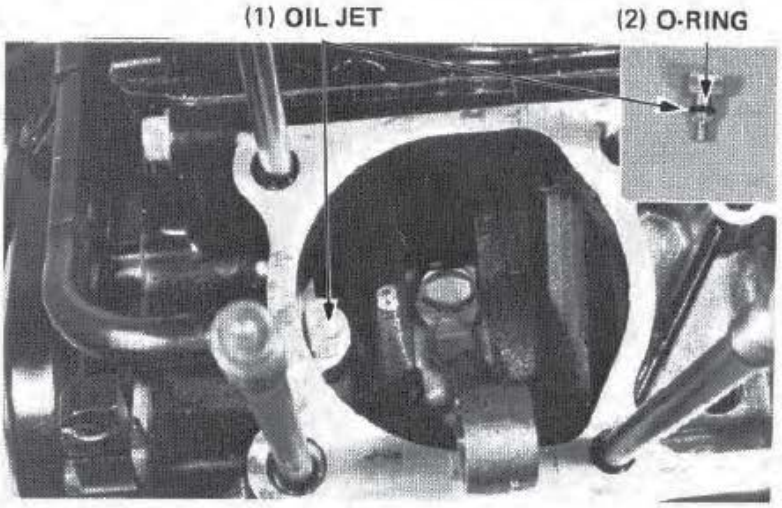
NOTE

Do not let the clips fall into the crankcase.

Push the piston pin out and remove the piston.



Remove the oil jet and check for clogging.
Check the O-ring for damage or deterioration.



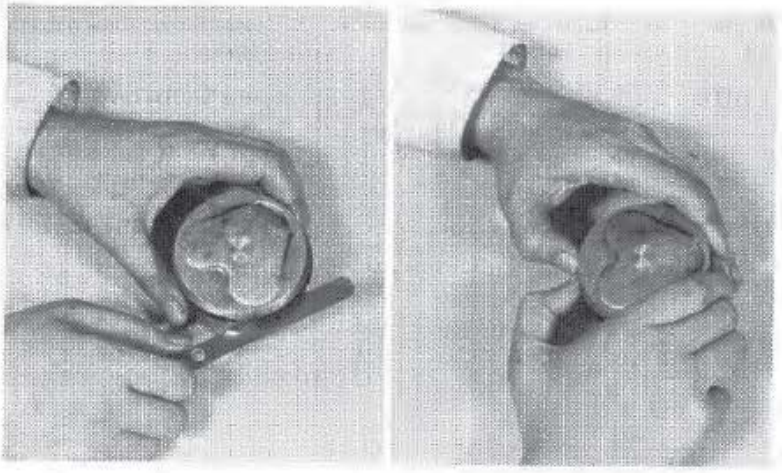
PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMIT:
Top/Second: 0.10 mm (0.004 in)

Remove the piston rings and mark them to indicate the correct cylinder and piston position for re-assembly.

Inspect the piston for cracks or other damage and the ring grooves for excessive wear or carbon build-up.

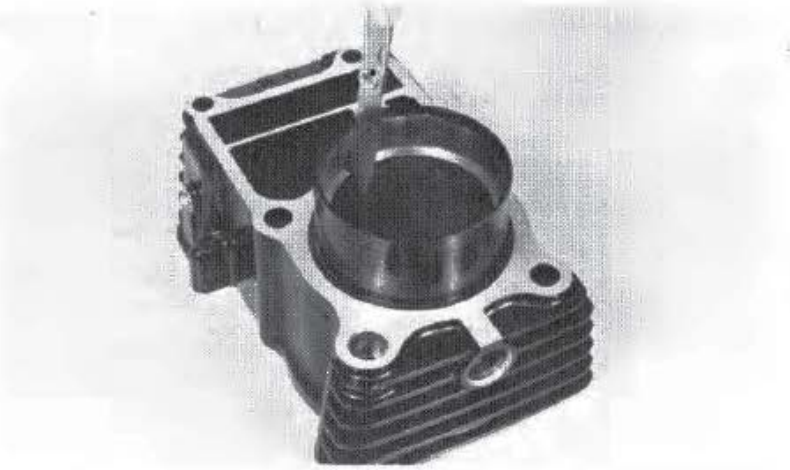


NOTE

Be careful not to damage the piston rings when removing them.

Measure the top and second piston ring end gaps; using a piston, push the ring into the cylinder squarely and make the measurement.

SERVICE LIMIT:
Top/Second: 0.50 mm (0.020 in)
Oil (side rail): 1.10 mm (0.043 in)

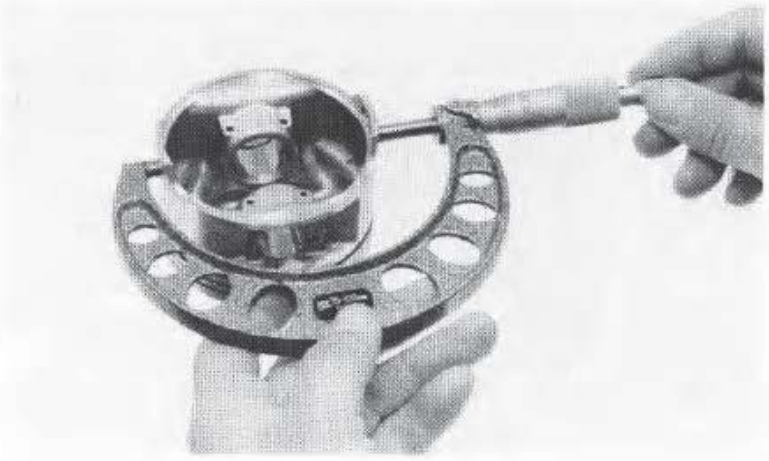


Measure the piston O.D.

NOTE

Take measurements 10 mm (0.4 in) from the bottom, and 90° to the piston pin hole.

SERVICE LIMIT: 70.84 mm (2.789 in)

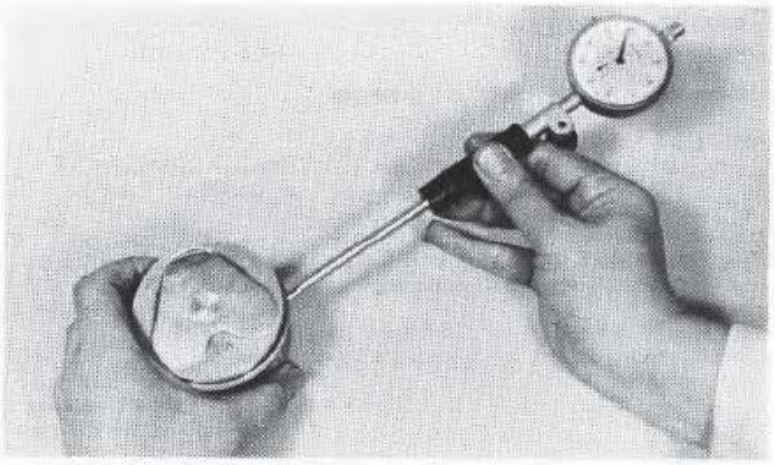


Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.32 mm (0.013 in)

Measure each piston pin hole I.D.

SERVICE LIMIT: 18.05 mm (0.711 in)

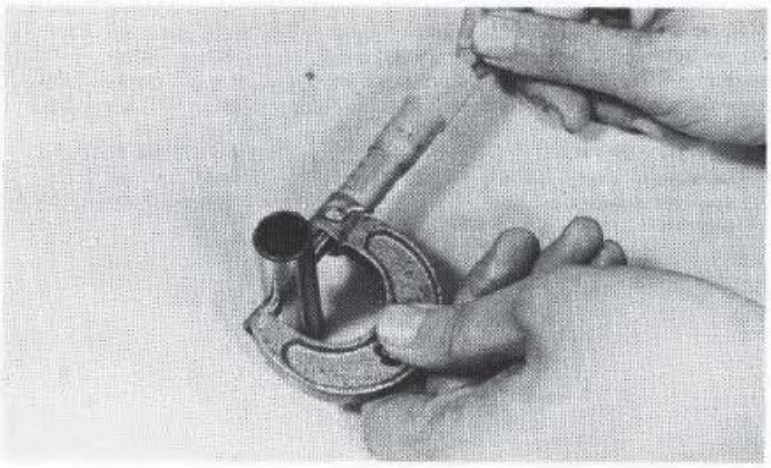


Measure each piston pin O.D.

SERVICE LIMIT: 17.80 mm (0.701 in)

Calculate the piston pin to piston clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)



PISTON RING INSTALLATION

Clean the piston domes, ring lands, and skirts.

NOTE

Insert the outside surface of the ring into the proper ring groove and roll it around in the groove to make sure that the ring has a free fit around the piston's circumference.

Carefully install the piston rings onto the piston with the markings facing up.

NOTE

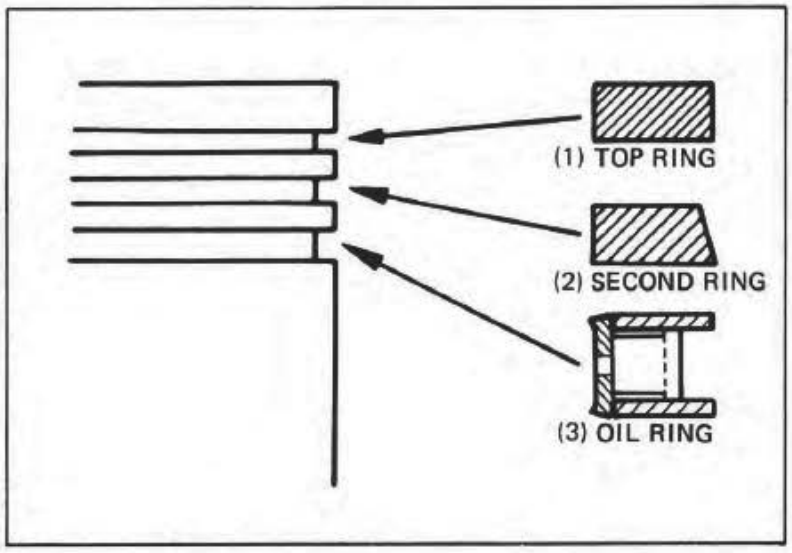
Be careful not to damage the piston and piston rings during assembly.

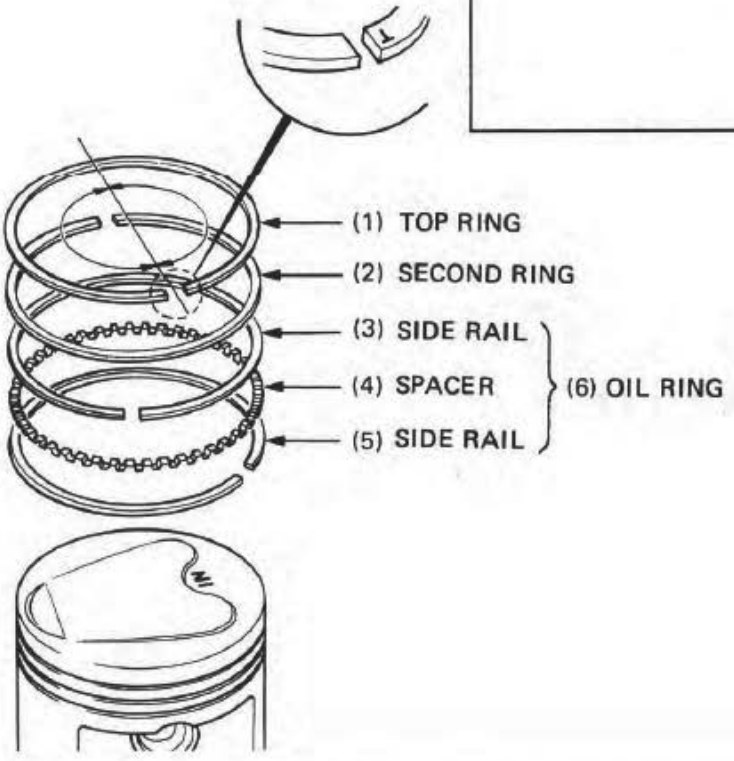
Stagger the ring end gaps 180° apart from each other as shown.

NOTE

To install the oil ring, install the spacer first, then install the side rails.

After installing the rings, check that they rotate freely in their grooves without sticking.



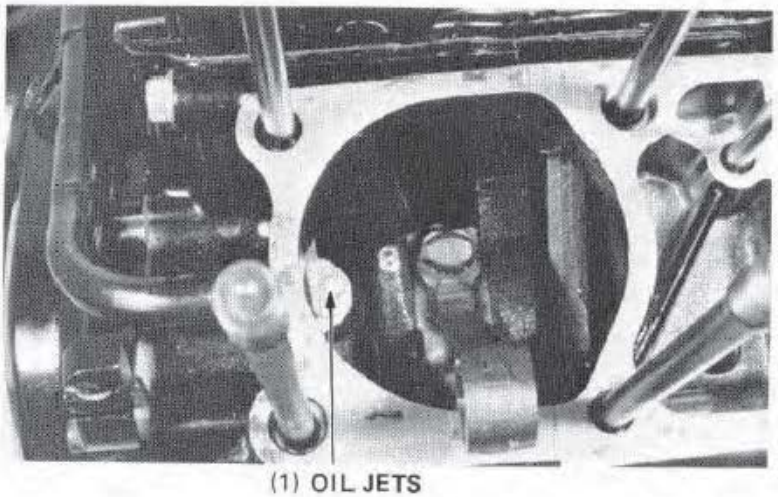


PISTON INSTALLATION

Install the oil jets.

NOTE

Before installing the oil jets, make sure that the O-rings are installed on the jets.

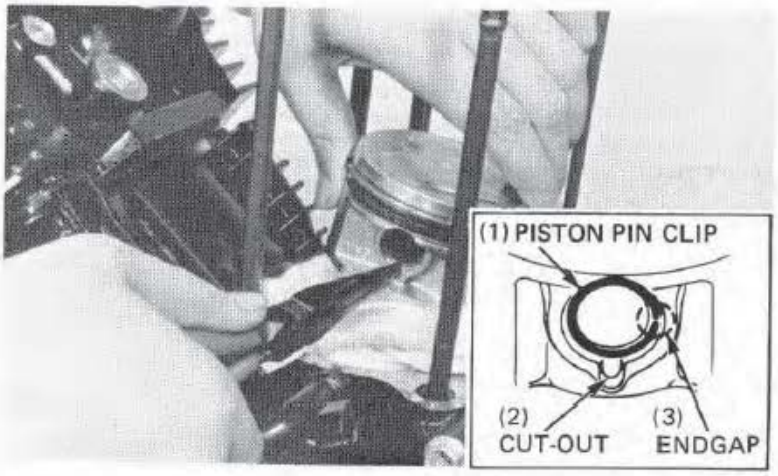


(1) OIL JETS

Coat the rod small end with molybdenum disulfide grease. Assemble the piston and connecting rod with the piston and piston pin clips as shown.

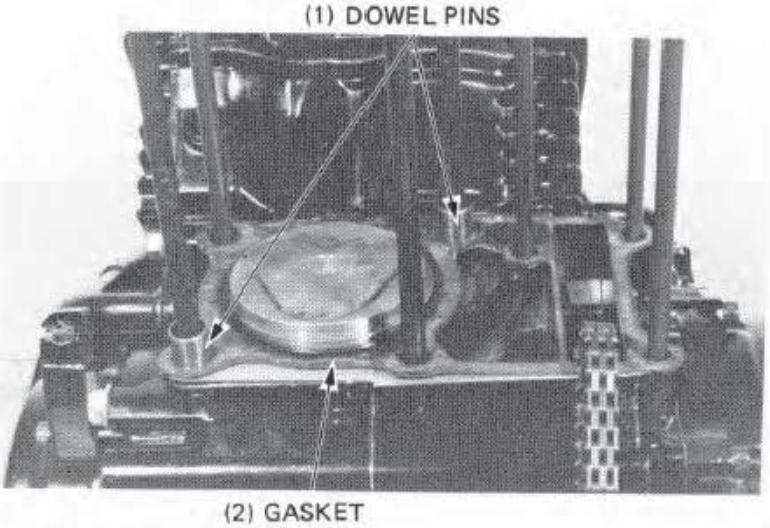
NOTE

- Install the pistons with the marking "IN" facing towards the inlet side.
- After installing the piston pin clips, make sure that they are seated properly and not aligned with the cutout in the piston.
- Do not let the piston pin clips fall into the crankcase.



CYLINDER INSTALLATION

Install the gasket and dowel pins.

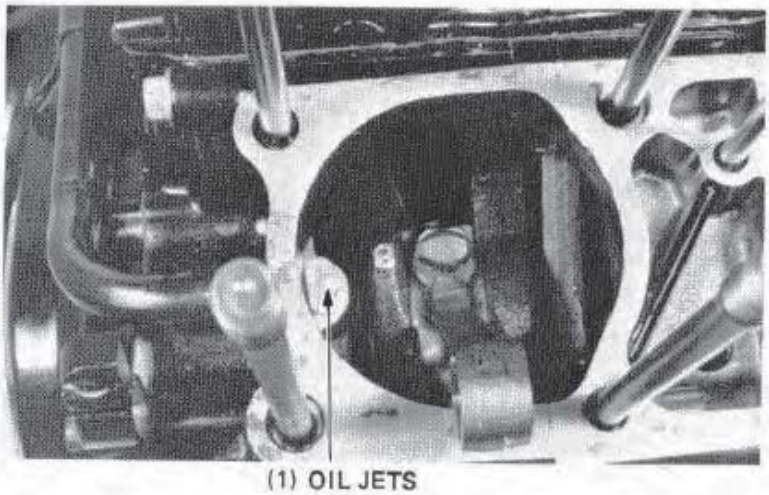


PISTON INSTALLATION

Install the oil jets.

NOTE

Before installing the oil jets, make sure that the O-rings are installed on the jets.



(1) OIL JETS

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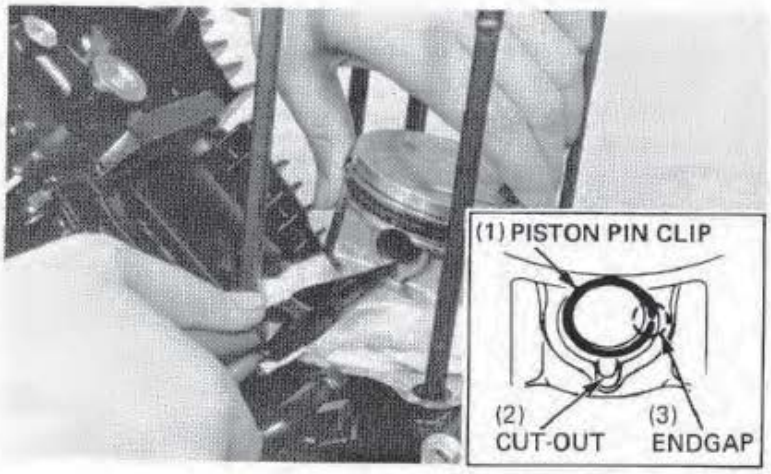
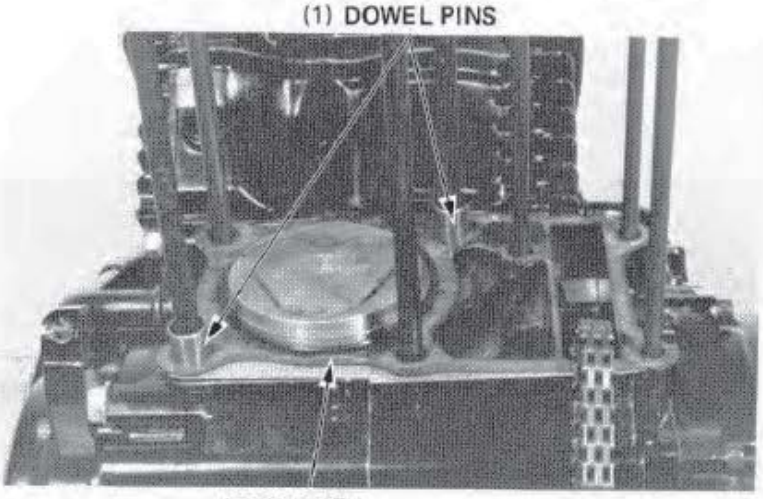
NOTE

- Install the pistons with the marking "IN" facing towards the inlet side.
- After installing the piston pin clips, make sure that they are seated properly and not aligned with the cutout in the piston.
- Do not let the piston pin clips fall into the crankcase.

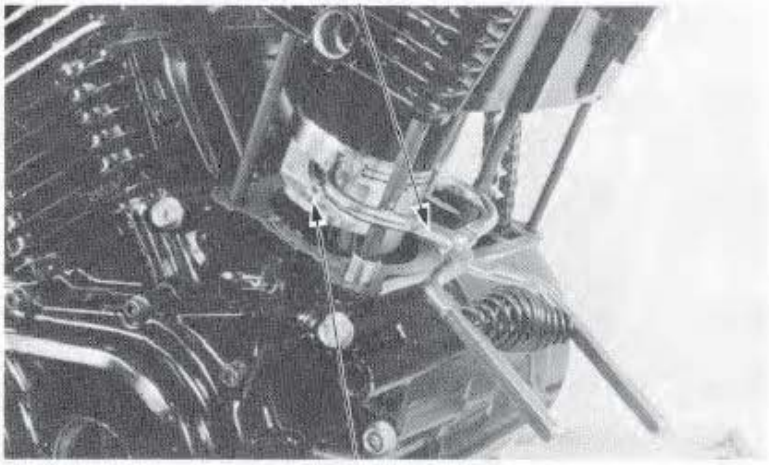


CYLINDER INSTALLATION

Install the gasket and dowel pins.



(1) PISTON RING COMPRESSOR
07954–2830000



(2) PISTON

Coat the cylinders, piston rings/grooves and pistons with oil.

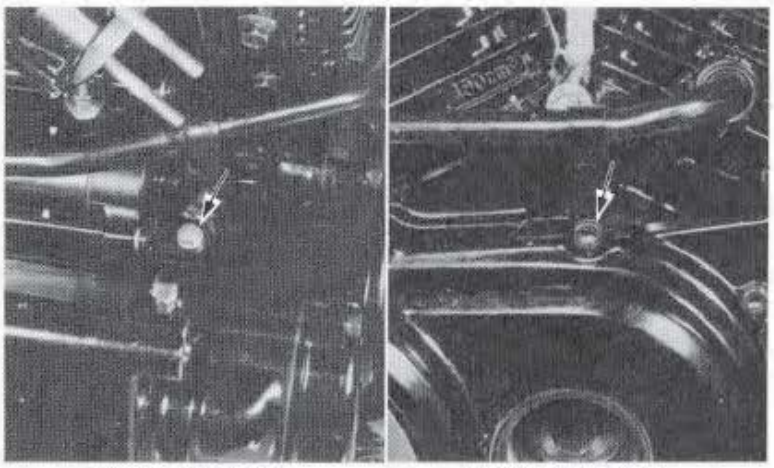
Install the cylinder over the piston while compressing the piston rings.

Be sure each assembly is returned to its original position as noted during removal.

NOTE

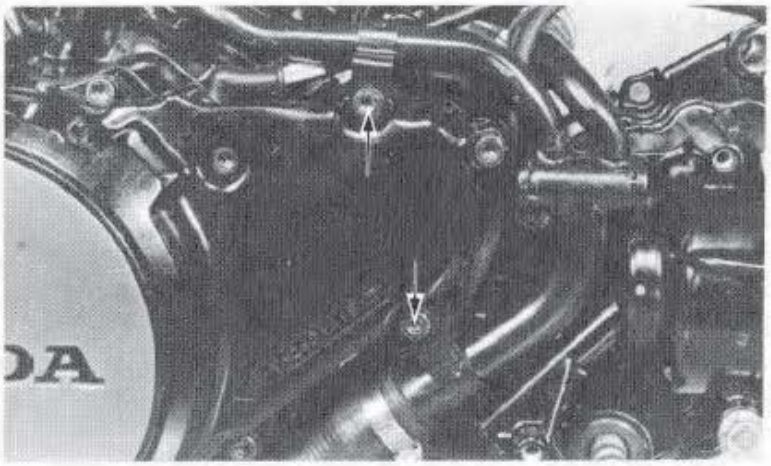
Be careful not to damage the piston rings during assembly.

Apply oil to new water pipe O-rings and place them on the water pipes.
Connect the water pipes to the cylinders.



(1) (REAR SIDE) (2) (RIGHT SIDE)

Install the water pipe clamp bolts, tightening them securely.

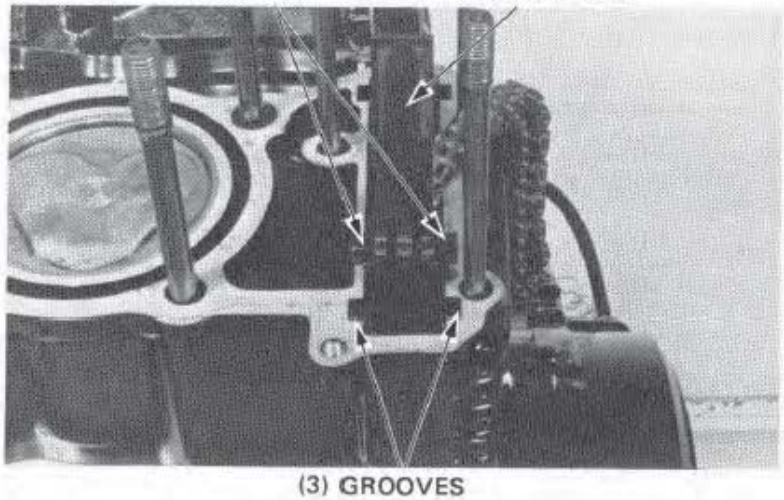


Install the cam chain guides.

NOTE

- Align the guide bosses with the grooves in the cylinders.
- Make sure that the end of the guide is inserted into place in the crankcase.

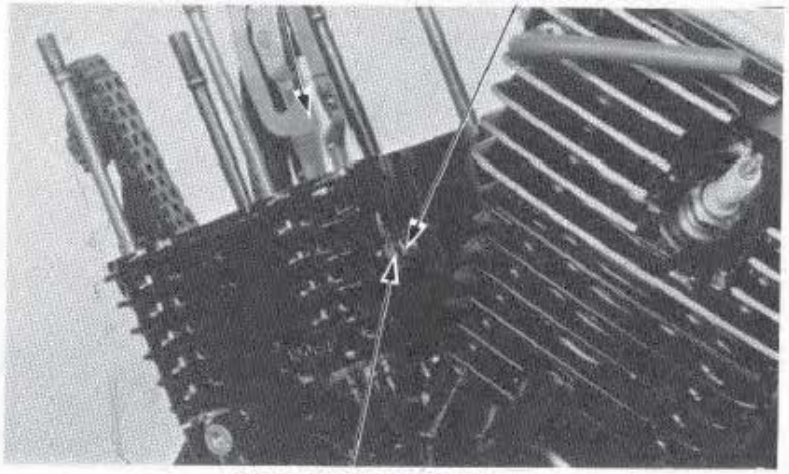
(1) BOSSES (2) CAM CHAIN GUIDE



(3) GROOVES

Install the tensioner bolts and sealing washers while pulling up on the tensioners.

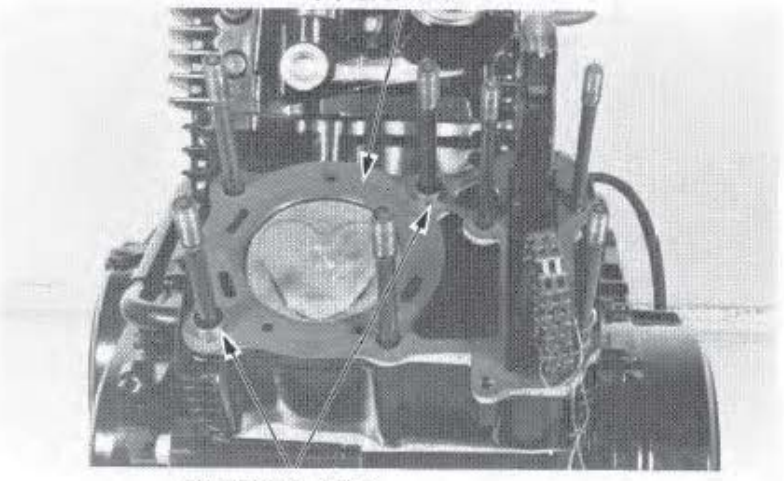
(1) TENSIONER (2) TENSIONER BOLT



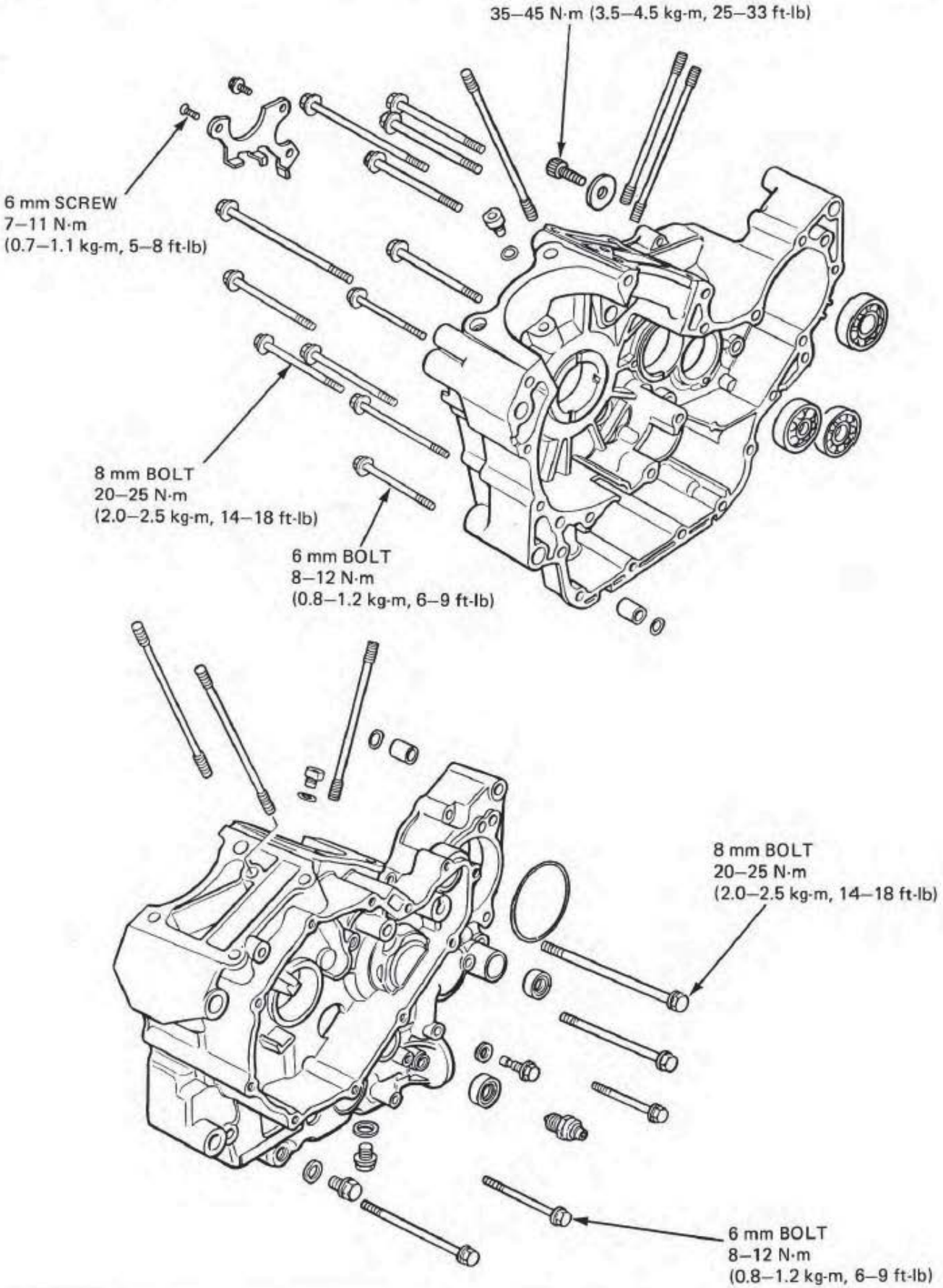
(3) SEALING WASHER

Install the dowel pins and a new gasket.
Clean the cylinder contacting faces of the cylinder heads of gasket material and carbon deposits.
Install the cylinder heads (Page 10-18).

(1) GASKET



(2) DOWEL PINS

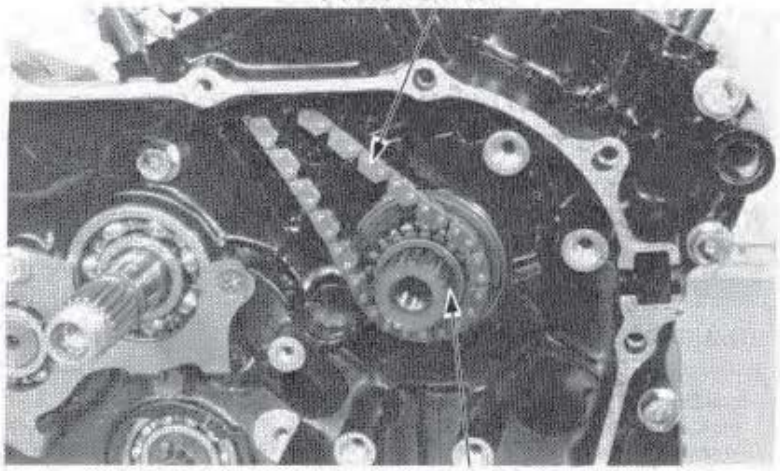

35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
6 mm SCREW
7–11 N·m
(0.7–1.1 kg-m, 5–8 ft-lb)
8 mm BOLT
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
6 mm BOLT
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
8 mm BOLT
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
6 mm BOLT
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

CRANKCASE SEPARATION

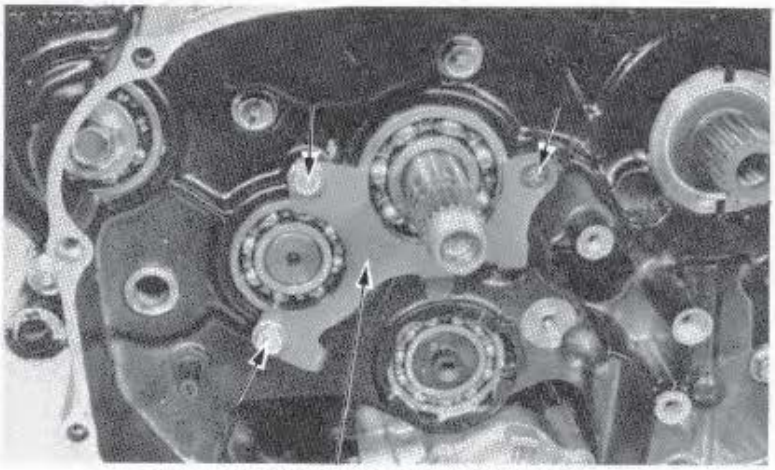
The following parts must be removed before disassembling the crankcase.

- Water pump and water pipes (Refer to section 6)
- Clutch (Refer to section 7)
- Gearshift linkage (Refer to section 9)
- Alternator rotor/starter clutch (Refer to section 8)
- Cylinder heads (Refer to section 10)
- Cylinders/pistons (Refer to section 11)
- Starter motor (Refer to section 20)

Remove the front and rear cam chain and camchain timing sprocket.

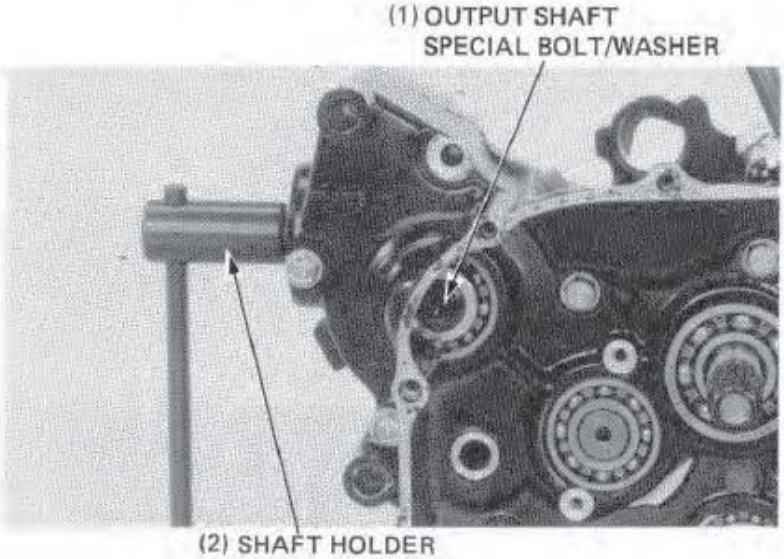


Remove the countershaft and mainshaft bearing holder, the screw and two bolts.



Install the Shaft Holder on the output gear shaft.

Remove the special bolt and washer holding the final drive shaft.

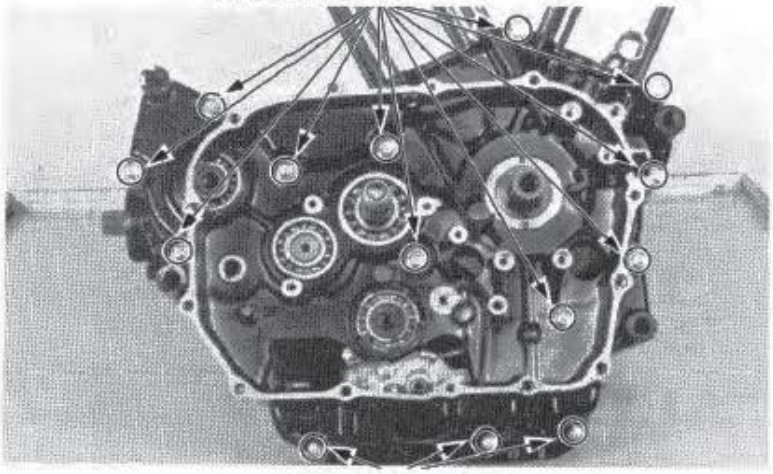


Remove the right crankcase 8 mm and 6 mm bolts.

NOTE

To prevent a distorted crankcase, loosen the bolts in a crisscross pattern in 2–3 steps.

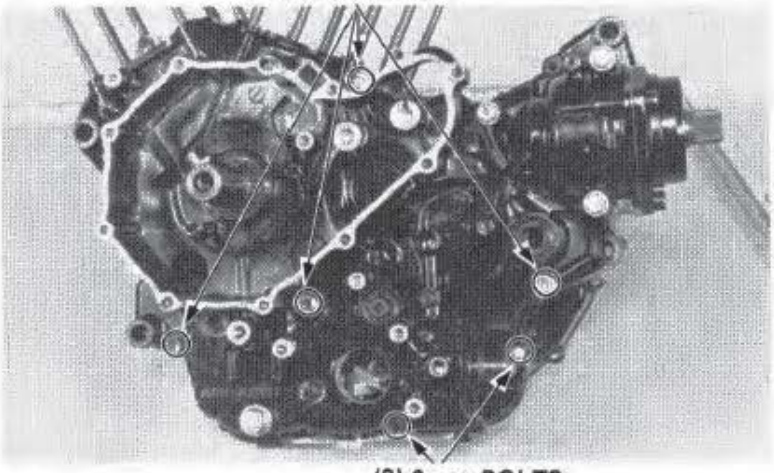
(1) 8 mm BOLTS



(2) 6 mm BOLTS

Remove the left crankcase 8 mm and 6 mm bolts.

(1) 8 mm BOLTS

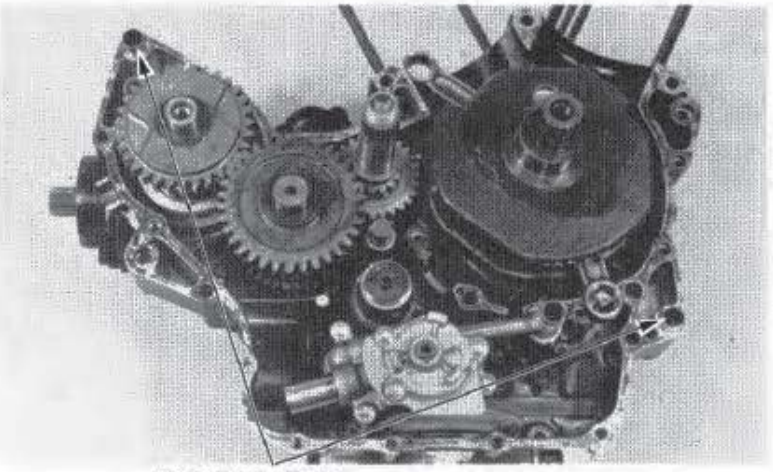


(2) 6 mm BOLTS

Separate the crankcase. Remove the dowel pins.

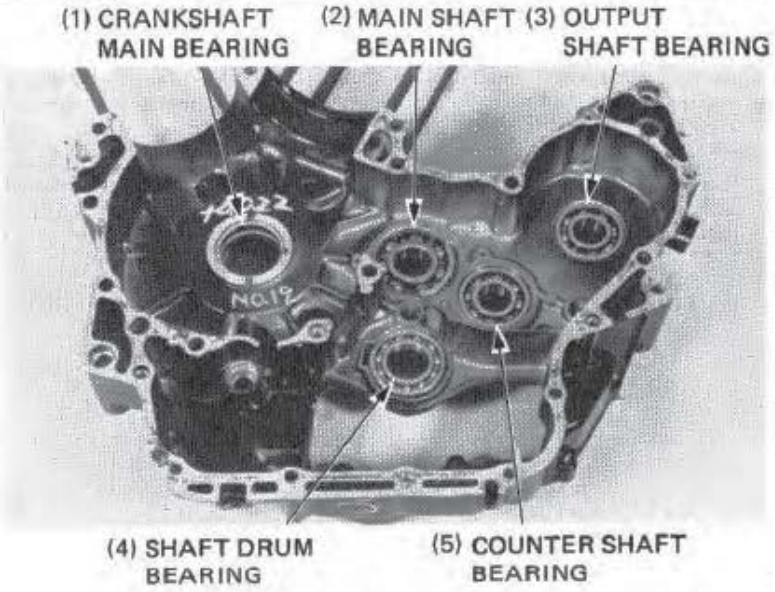
Remove the following parts:

- Oil pump (Section 2)
- Oil jets (Section 11)
- Crankshaft/connecting rods (Section 13)
- Shift forks/drum (Section 13)
- Transmission (Section 13)
- Output gear assembly (Section 13)



(1) DOWEL PINS

Refer to section 13 for crankcase bearing inspection and replacement.



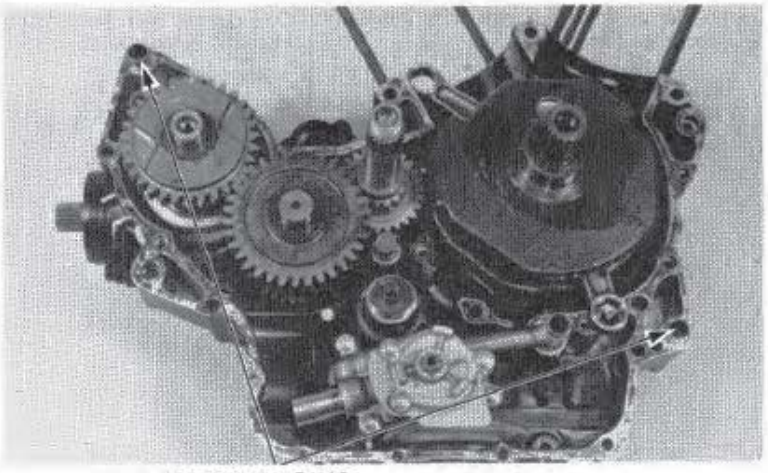
CRANKCASE ASSEMBLY

Remove all traces of gasket material from the crankcase halves mating surfaces.

Apply liquid sealant to the mating surfaces.

Install the dowel pins in the left crankcase half.

Assemble the crankcase halves.

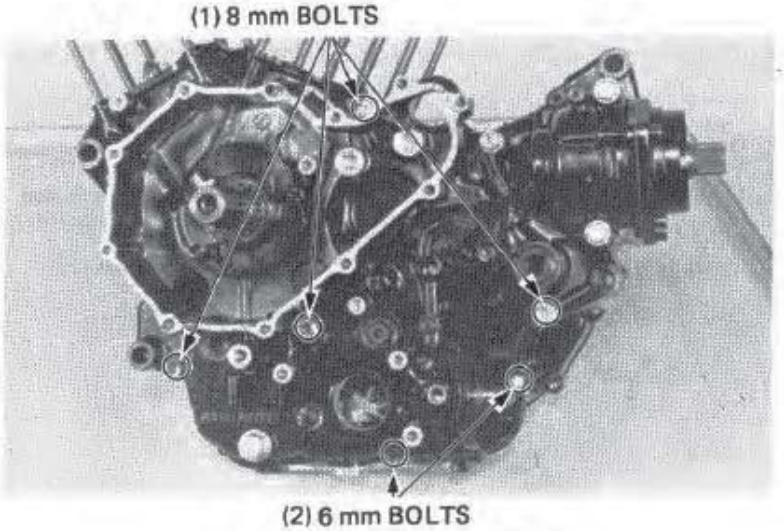


Tighten the left crankcase 8 mm bolts diagonally in 2–3 steps, to the specified torque.

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

Tighten the 6 mm bolts in 2–3 steps to the specified torque.

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

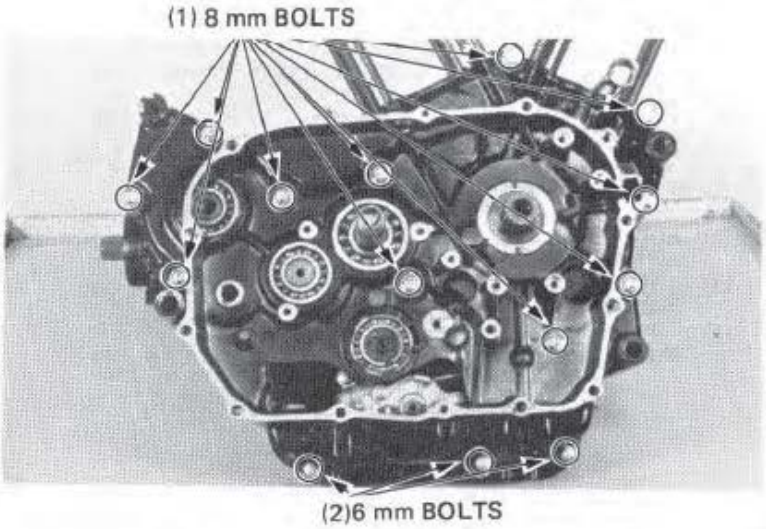


Tighten the right crankcase 8 mm bolts diagonally in 2–3 steps, to the specified torque.

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

Tighten the 6 mm bolts in 2–3 steps to the specified torque.

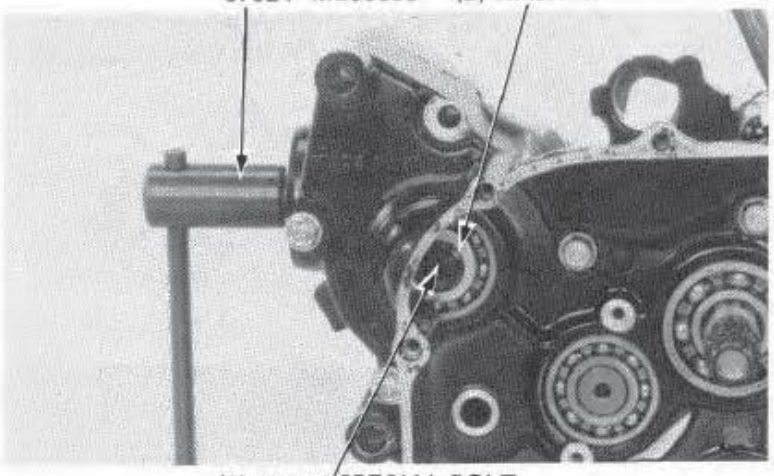
TORQUE: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)



Install the Shaft Holder on the output gear shaft.

Install the washer and 10 mm special bolt on the output shaft. Tighten the bolts.

TORQUE: 35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)



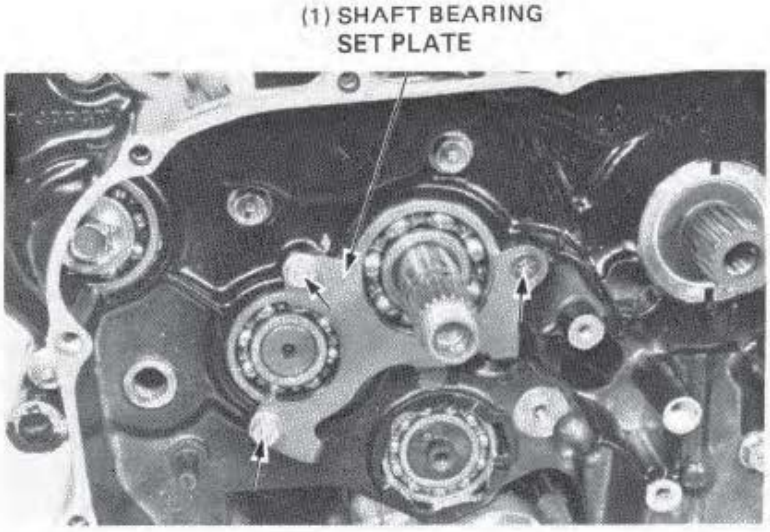
Install the bearing holder with the 6 mm screw and bolts.

Tighten the 6 mm screw to the specified torque.

TORQUE: 7–11 N·m
(0.7–1.1 kg-m, 5–8 ft-lb)

NOTE

Apply Loctite® to the threads of the 6 mm screws.



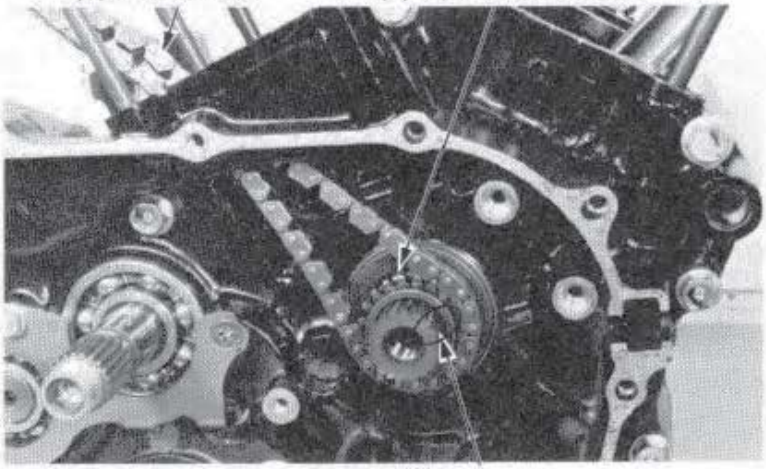
Install the timing sprocket on the crankshaft left side with the flat on the sprocket aligned with the flat on the crankshaft splines.

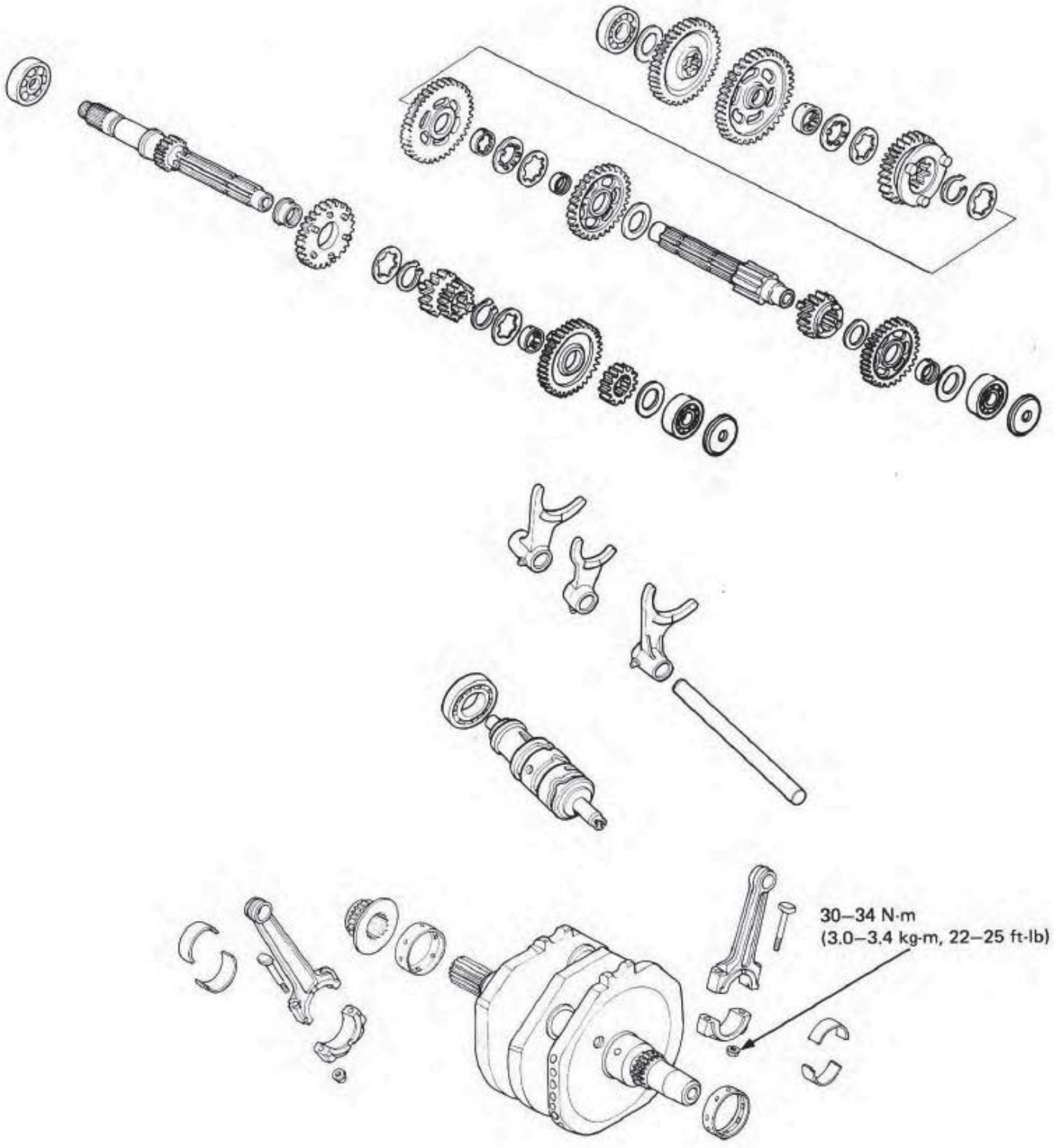
Install the cam chain over the timing sprockets.

Install the cam chain tensioner set plates.

Install the following parts:

- Starter motor (Section 20)
- Cyliners/pistons (Section 11)
- Cylinder heads (Section 10)
- Gearshift linkage (Section 9)
- Water pump/water pipes (Section 6)
- Clutch (Section 7)
- Starter clutch/alternator (Section 8)

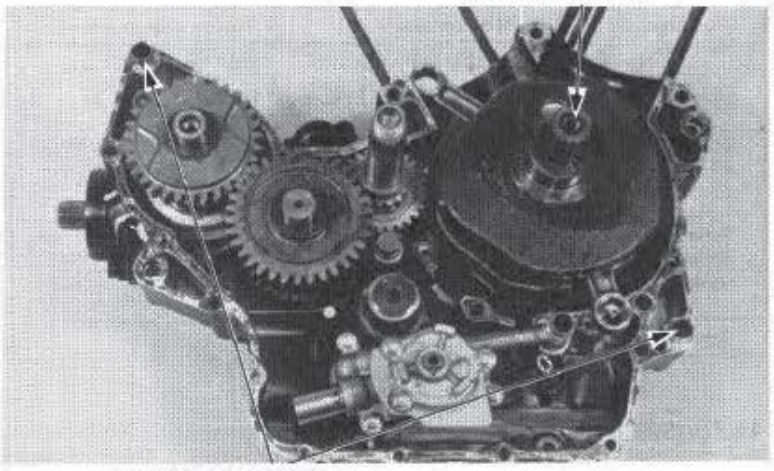



30–34 N·m
(3.0–3.4 kg-m, 22–25 ft-lb)

CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

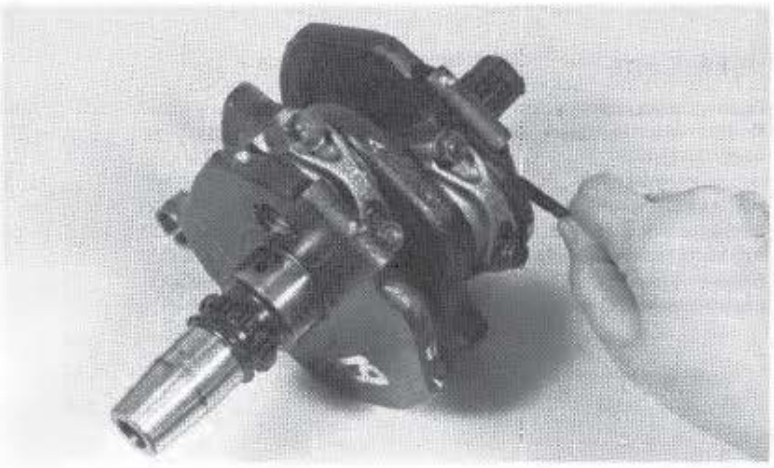
Separate the crankcase (page 12-2) and remove the dowel pins.
Remove the crankshaft.



CONNECTING ROD REMOVAL

Check the connecting rod side clearance.

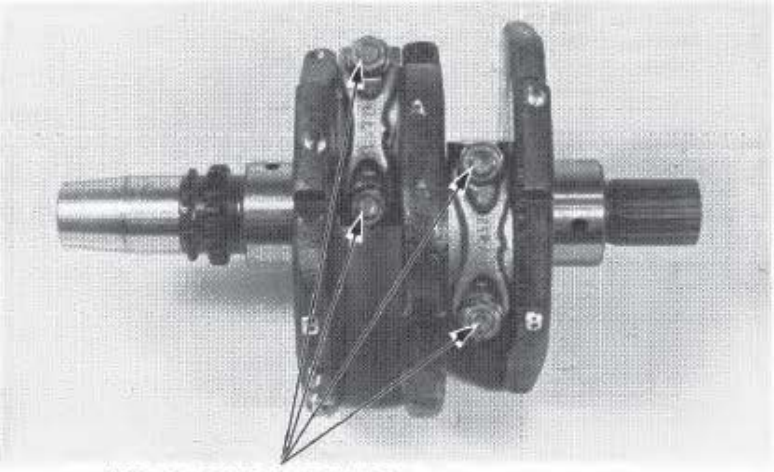
SERVICE LIMIT: 0.40 mm (0.016 in)



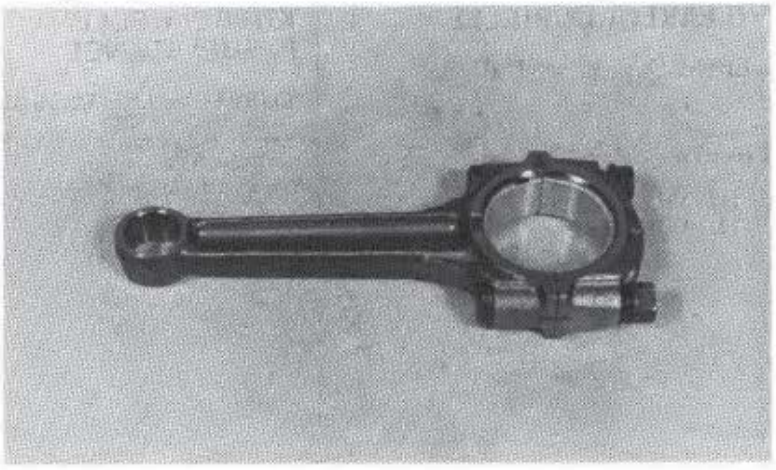
Remove the connecting rod bearing caps and note their locations.

NOTE

Tap the side of the cap lightly if it is hard to remove.

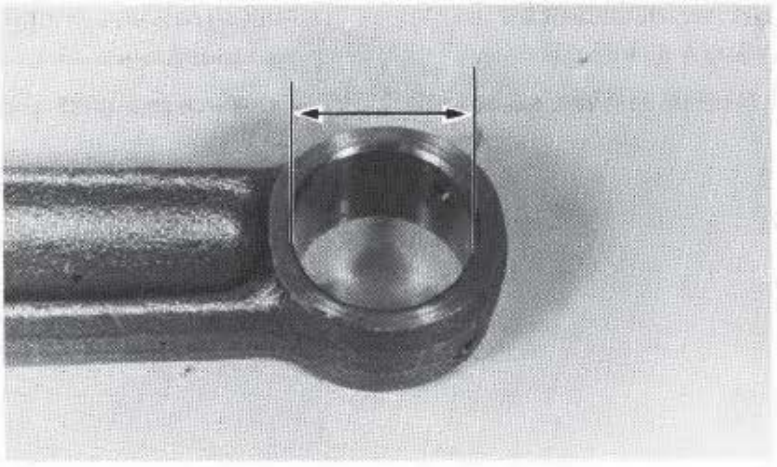


Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.



Measure the connecting rod small end I.D.

SERVICE LIMIT: 18.09 mm (0.712 in)

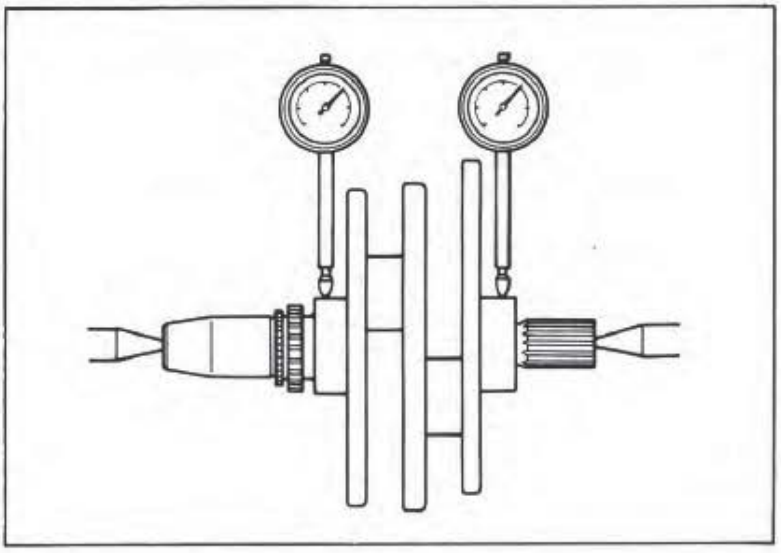


CRANKSHAFT INSPECTION

Place the crankshaft on a stand or Vee blocks.
Set a dial indicator on the main journals. Rotate the crankshaft two revolutions and read the runout.

The actual runout is 1/2 of the total indicator reading.

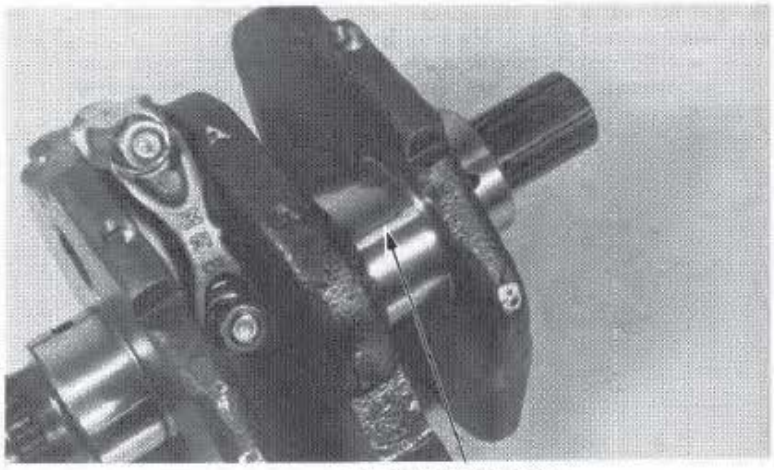
SERVICE LIMIT: 0.05 mm (0.002 in)



BEARING INSPECTION

CONNECTING ROD

Inspect the bearing inserts for damage or separation. Clean all oil from the bearing inserts and crankpins. Put a piece of plastigauge on each crankpin avoiding the oil hole.



(1) PLASTIGAUGE

Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

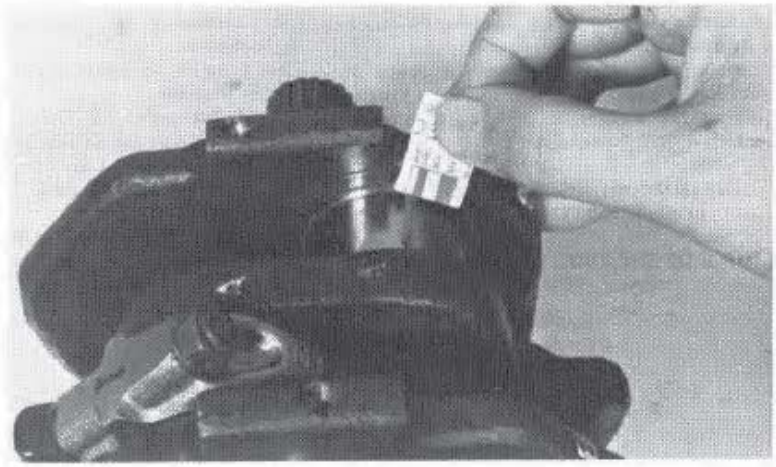
TORQUE: 30–34 N·m
(3.0–3.4 kg-m, 22–25 ft-lb)

NOTE

Do not rotate the crankshaft during inspection.

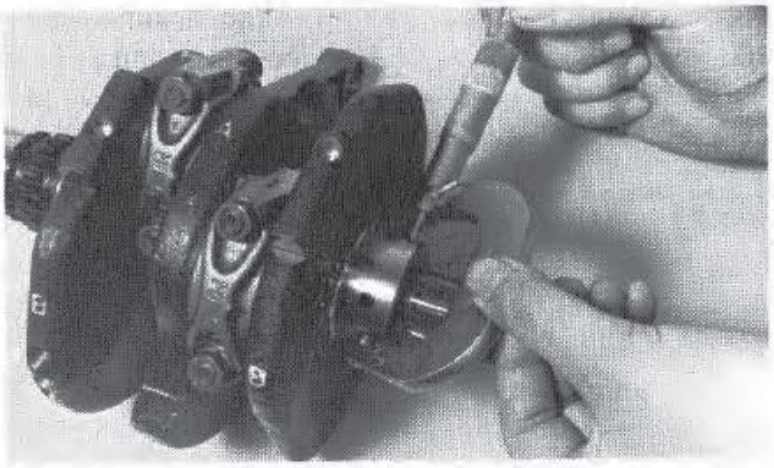
Remove the caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)



MAIN BEARINGS

Measure the main journal O.D. and record it.



Measure the main journal bearing I.D. in the crankcase and record it.
Calculate the clearance between the main journal and the main bearing.

SERVICE LIMIT: 0.06 mm (0.002 in)

BEARING SELECTION

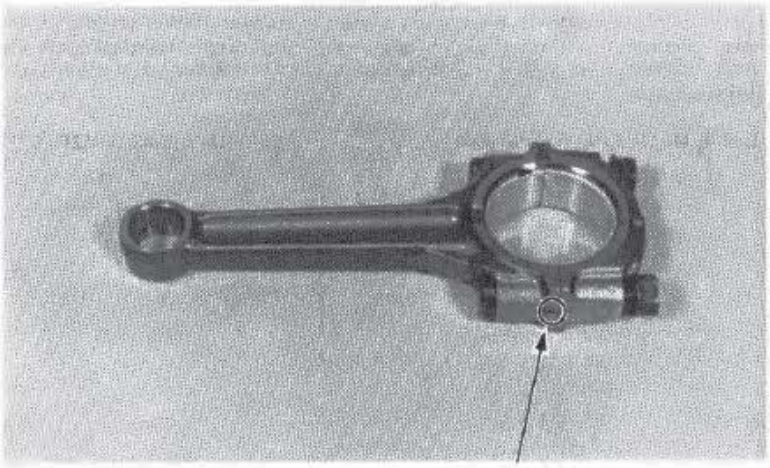
If oil clearance is beyond tolerance, select replacement bearings as follows:

CONNECTING ROD BEARING INSERTS

Determine and record the corresponding rod I.D. code number.

NOTE

Numbers 1 or 2 on the connecting rods are the codes for the connecting rod I.D.

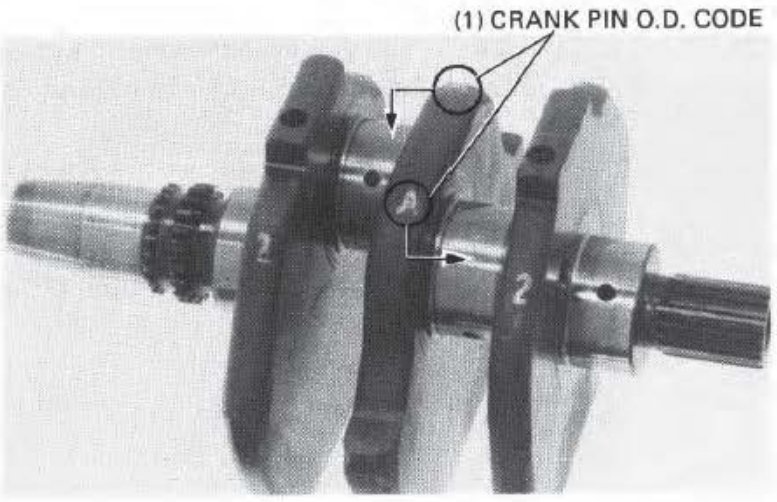


(1) I.D. CODE

Determine and record the corresponding crankpin O.D. code number (or measure the crankpin O.D.).

NOTE

Letters A or B on crank weight are the codes used for crank pin O.D. from left side.

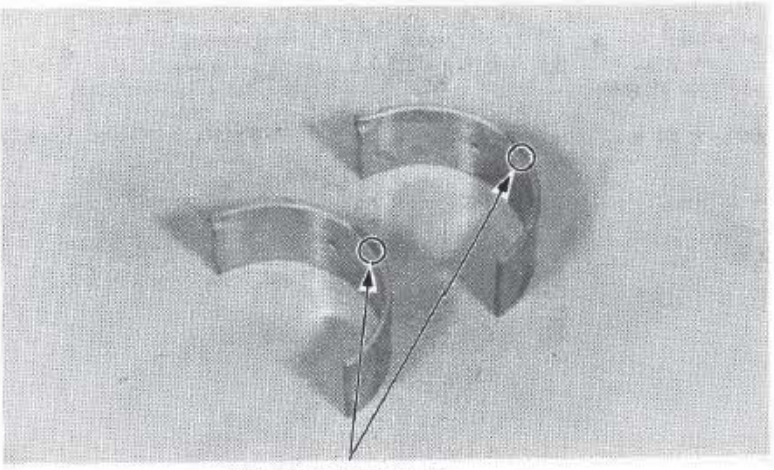


Cross reference the crankpin and rod codes to determine the replacement bearing color.

			CONNECTING ROD I.D. CODE NO.	
			1	2
			43.000–43.008 mm	43.008–43.016 mm
CRANK PIN O.D. CODE	A	39.982–39.990 mm	Brown	Black
	B	39.974–39.982 mm	Black	Blue

BEARING INSERT THICKNESS

Blue: 1.495–1.499 mm (0.0589–0.0590 in)
Black: 1.491–1.495 mm (0.0578–0.0589 in)
Brown: 1.487–1.491 mm (0.0585–0.0587 in)

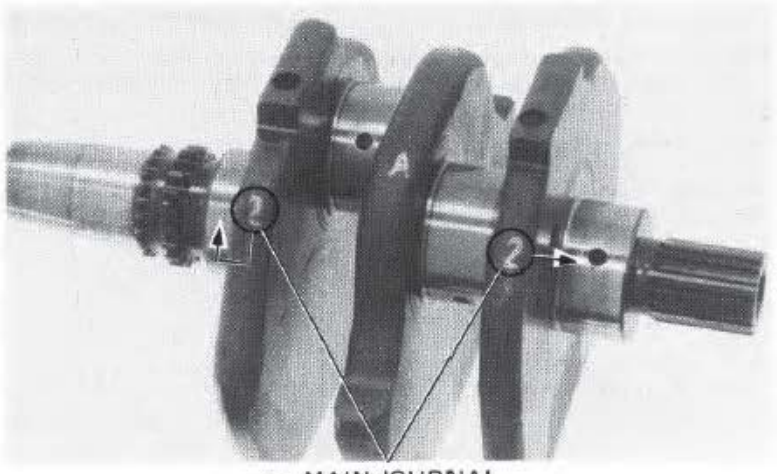

(1) COLOR CODE

MAIN BEARING INSERTS

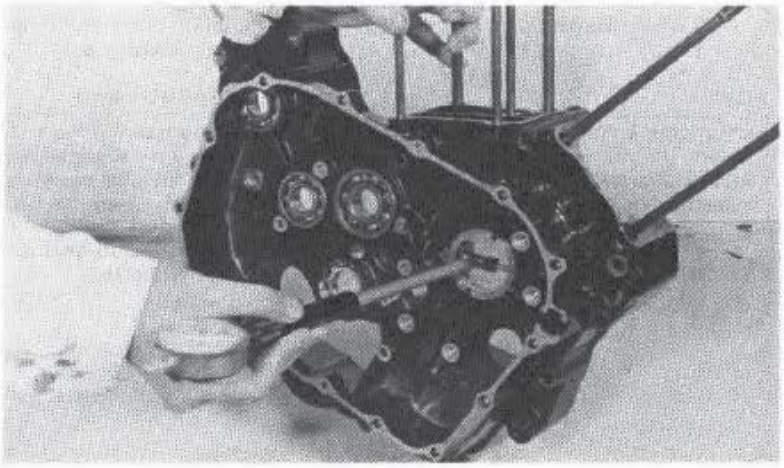
Determine and record the corresponding main journal O.D. codes, (or measure the main journal O.D.).

NOTE

Letters 1 or 2 on crank weight are the codes used for each main journal O.D. from left side.

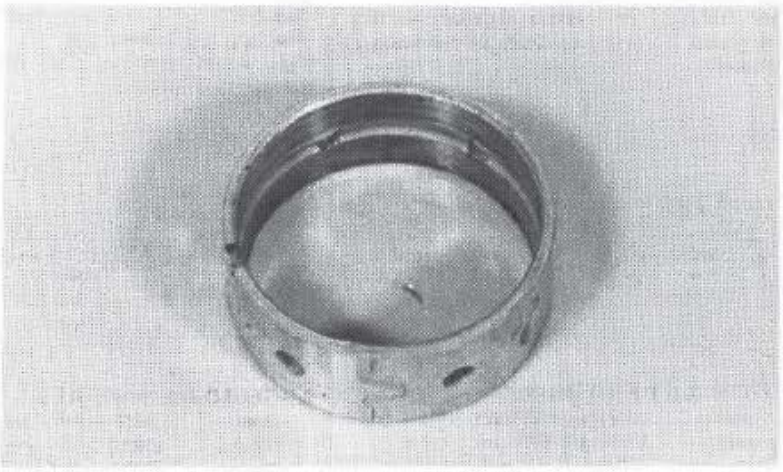

(1) MAIN JOURNAL O.D. CODE

Measure the crankcase main journal I.D. and record it.



Cross reference the case I.D. and journal code to determine the replacement bearing.

		MAIN JOURNAL O.D. CODE	
		1	2
		39.992–40.000 mm (1.5744–0.1575 in)	39.984–39.992 mm (1.5741–1.5744 in)
CRANK-CASE I.D.	44.010–44.020 mm (1.7326–1.7331 in)	BROWN	BLACK
	44.000–44.010 mm (1.7322–1.7326 in)	BLACK	BLUE



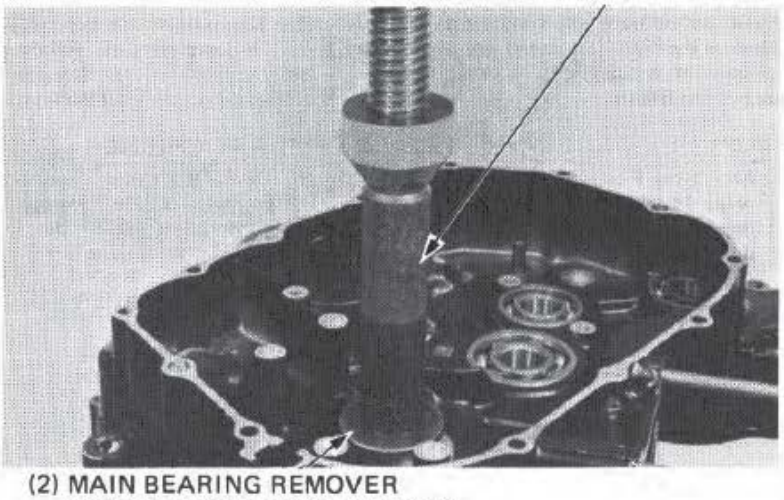
MAIN BEARING INSERT THICKNESS:

BROWN (MARK C): 1.989–1.999 mm (0.0783–0.0787 in)
BLACK (MARK B): 1.994–2.004 mm (0.0785–0.7798 in)
BLUE (MARK A): 1.999–2.009 mm (0.0787–0.0791 in)

MAIN JOURNAL BEARING REMOVAL

Remove the main bearings from the crankcase.

(1) DRIVER A 07749–0010000



(2) MAIN BEARING REMOVER ATTACHMENT 07946–MF50100

MAIN BEARING INSTALLATION

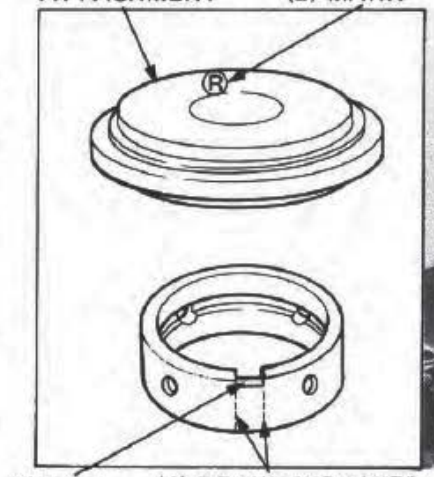
Apply molybdenum disulfide grease to the outer surface of the main bearings.
Align the tab on the bearing with the groove in the crankcase and press the bearing into the crankcase.

NOTE

Scribe two lines on the outside of the bearings that align with the bearing tabs, to aid installation.

CAUTION

Be careful not to damage the bearings.

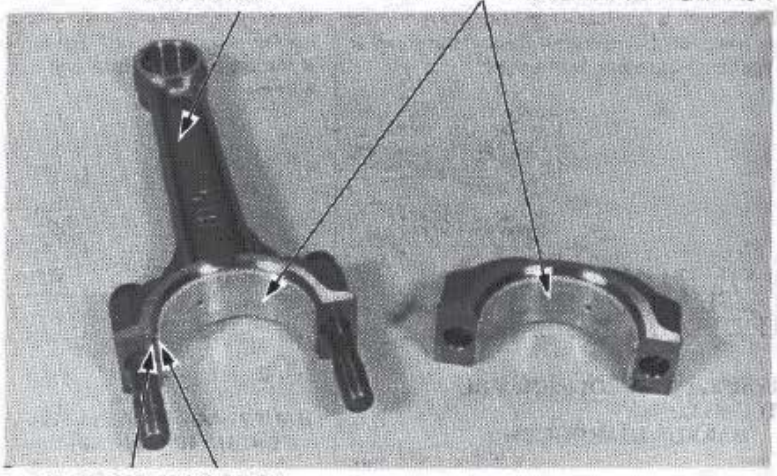


CONNECTING ROD INSTALLATION

Install the bearing inserts on the rods and caps.

NOTE

- Align the boss on the bearing with the groove in the rod or cap.
- Apply molybdenum disulfide grease to the bearings.

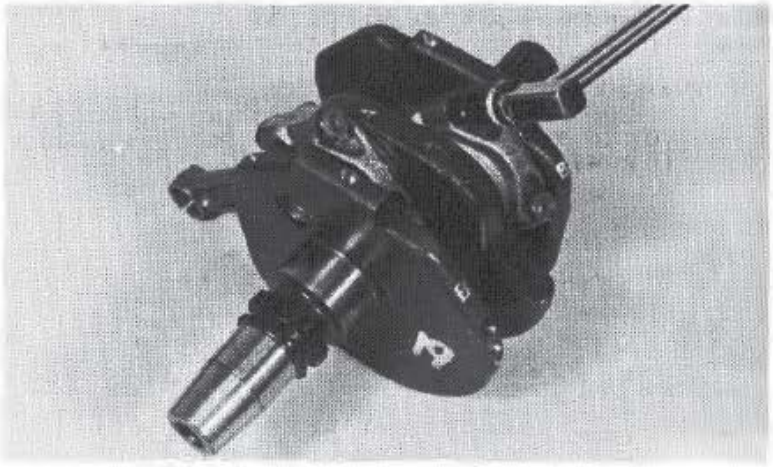


Install the rods and caps on the crankshaft. Be sure each part is installed in its original position, as noted during removal.
Tighten the cap nuts.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

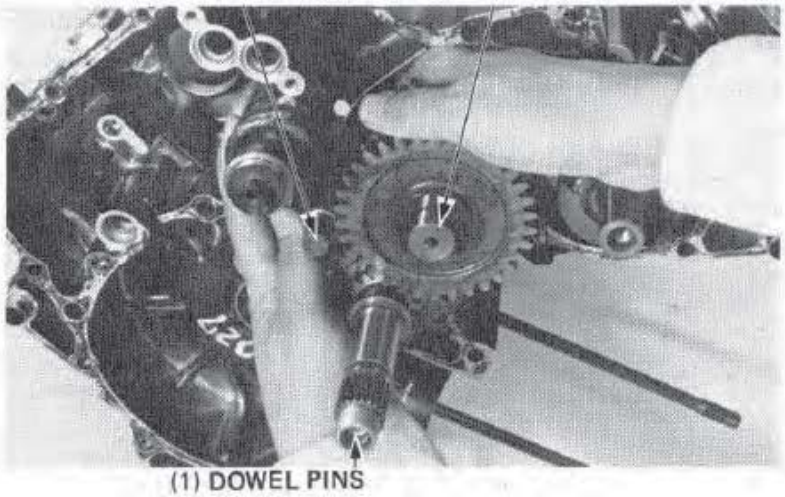
NOTE

- Align the I.D. code on the cap and rod.
- Tighten the nuts in two or more steps.
- After tightening the nuts, check that the rods move freely without binding.



CRANKSHAFT INSTALLATION

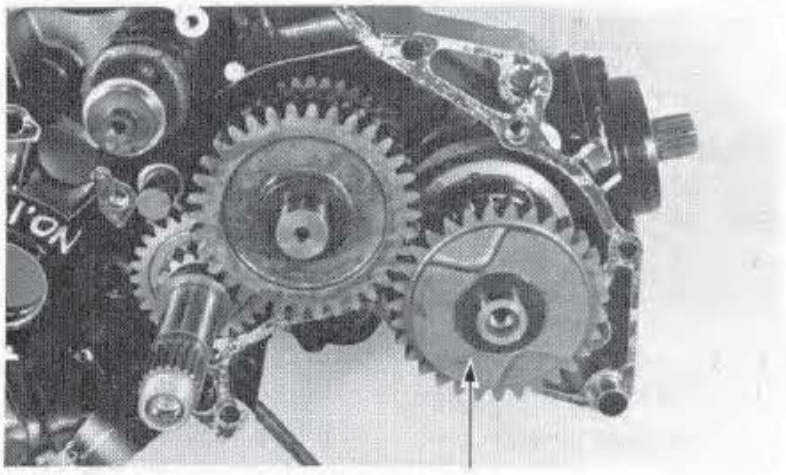
Install the crankshaft onto the left crankcase.
Install the dowel pins and assemble the crankcase (page 12-4).



(1) DOWEL PINS

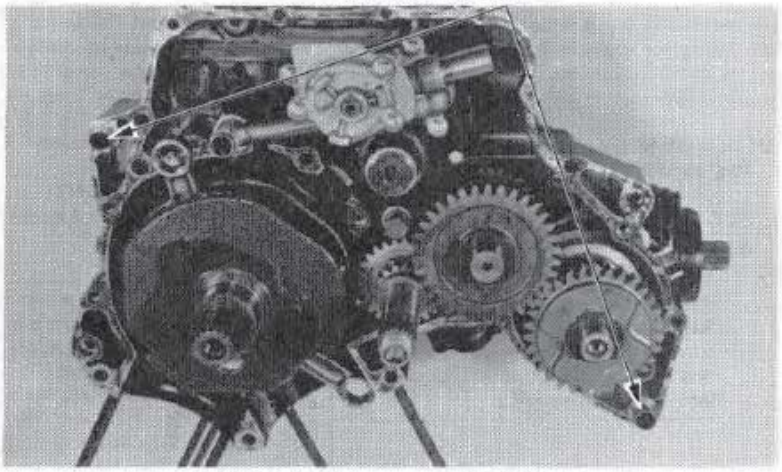
TRANSMISSION REMOVAL

Separate the crankcase (page 12-2).
Place the left crankcase down on its outer surface.
Remove the crankshaft (page 13-4).
Remove the final gear.



Remove the mainshaft, counter shaft, and shift fork together as an assembly.

(1) MAINSHAFT

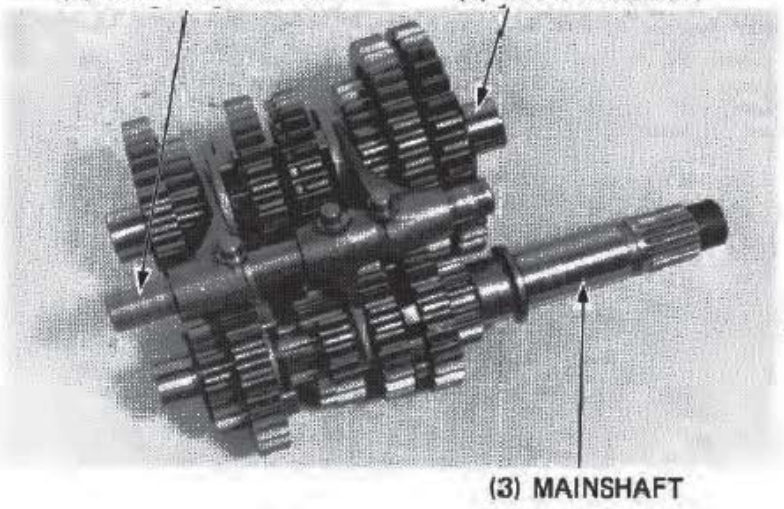


(2) COUNTER SHAFT

(3) SHIFT FORK

TRANSMISSION DISASSEMBLY

Separate the shift forks, shaft, mainshaft and countershaft assemblies from each other.

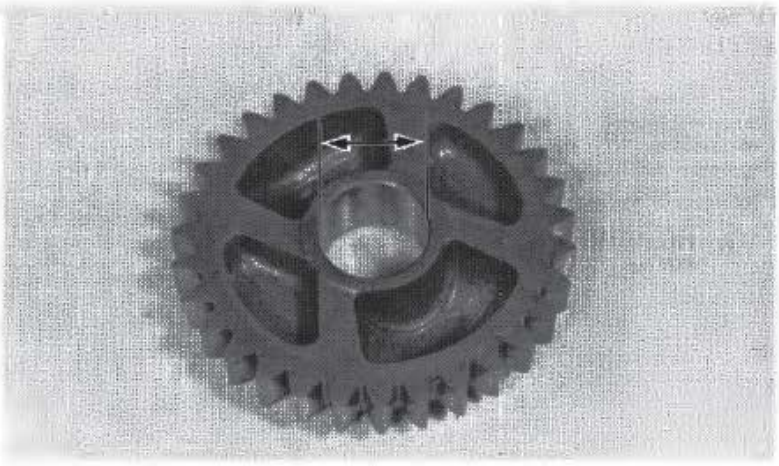


TRANSMISSION INSPECTION

Check the gear dogs, holes and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.
Measure the I.D. of each gear.

SERVICE LIMITS

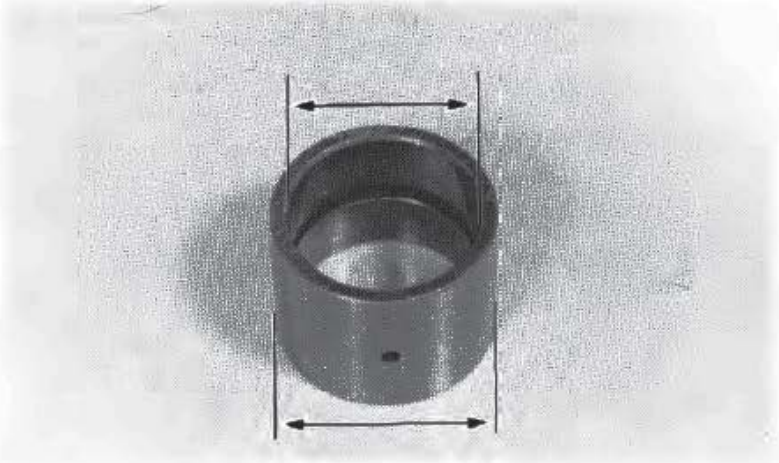
M5 gears:	**29.06 mm (1.144 in)**
M6 gears:	**28.06 mm (1.105 in)**
C1, C2, C3, C4 gears:	**28.04 mm (1.104 in)**



Measure the I.D. and O.D. of each gear bushing.

SERVICE LIMITS:

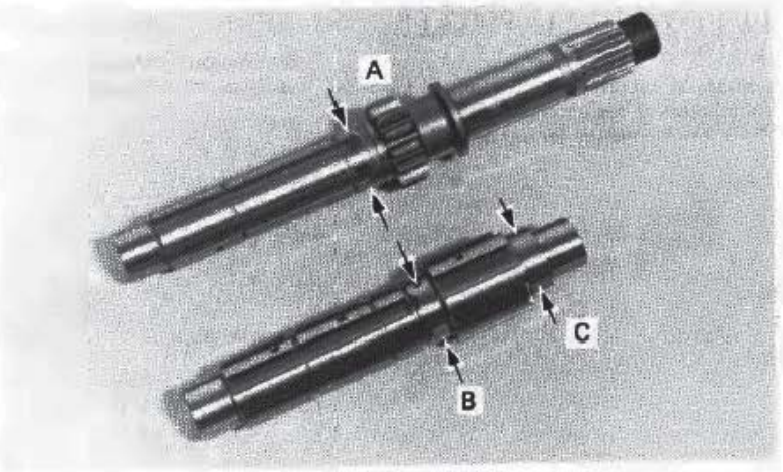
M5 bushing O.D.:	**28.94 mm (1.139 in)**
M6 bushing O.D.:	**27.94 mm (1.100 in)**
C1, C2, C3, C4 bushing O.D.:	**27.94 mm (1.100 in)**
M5 bushing I.D.:	**25.06 mm (0.987 in)**
C2, C4 bushing I.D.:	**25.04 mm (0.986 in)**



Measure the O.D. of the mainshaft and countershaft.

SERVICE LIMITS:

A (at M5 bushing):	24.90 mm (0.980 in)
B (at C2 bushing):	24.90 mm (0.980 in)
C (at C4 bushing):	24.90 mm (0.980 in)



Calculate the clearance between the gear and gear shaft or bushing.

SERVICE LIMITS:

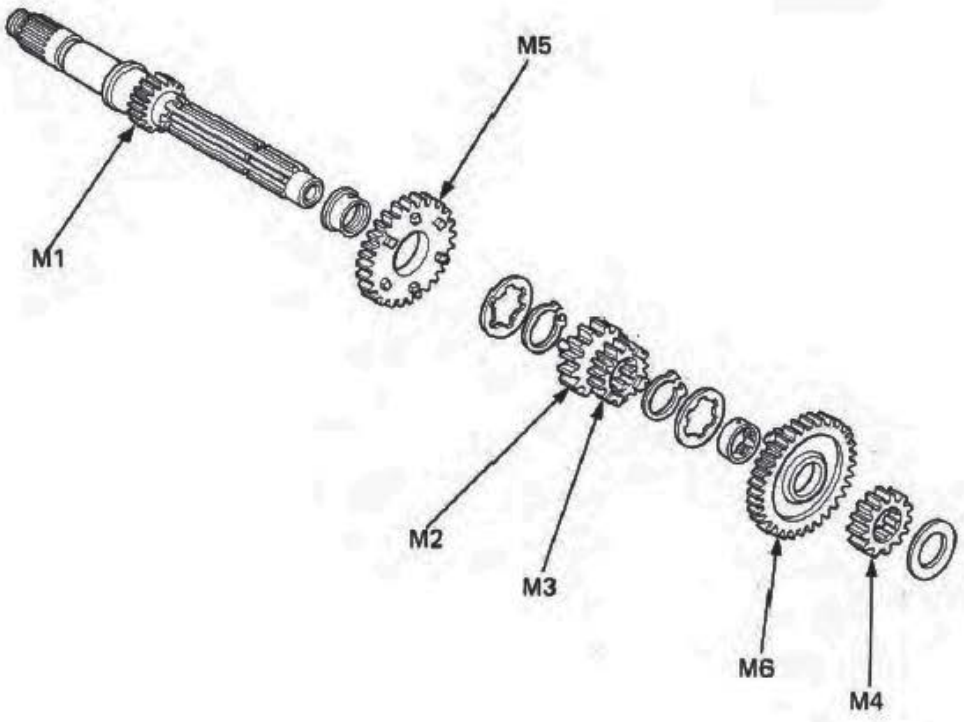
M5, 6 gear to M5, 6 bushing:	0.10 mm (0.004 in)
M5 bushing to shaft:	0.06 mm (0.002 in)
C1 gear to C1 bushing:	0.10 mm (0.004 in)
C1 bushing to shaft:	0.10 mm (0.004 in)
C2 gear to C2 bushing:	0.10 mm (0.004 in)
C3 gear to C3 bushing:	0.10 mm (0.004 in)
C4 gear to C4 bushing:	0.10 mm (0.004 in)
C2, C4 bushing to shaft:	0.06 mm (0.002 in)

TRANSMISSION ASSEMBLY

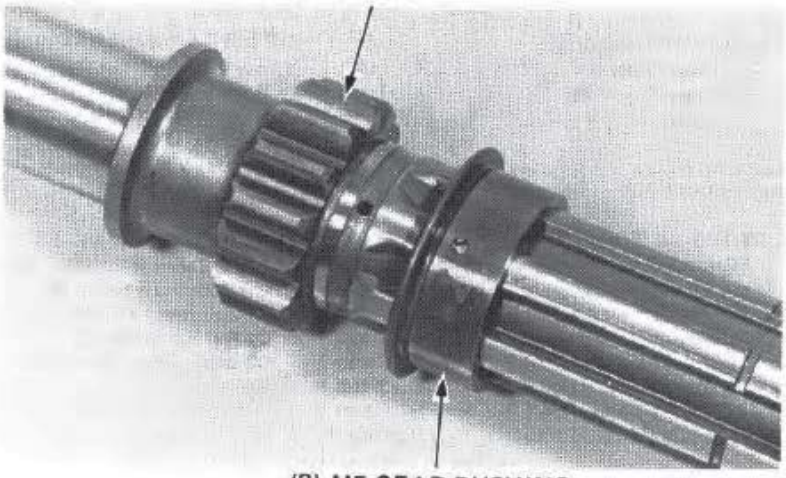
Mainshaft

Check the gears for freedom of movement of rotation on the shaft.

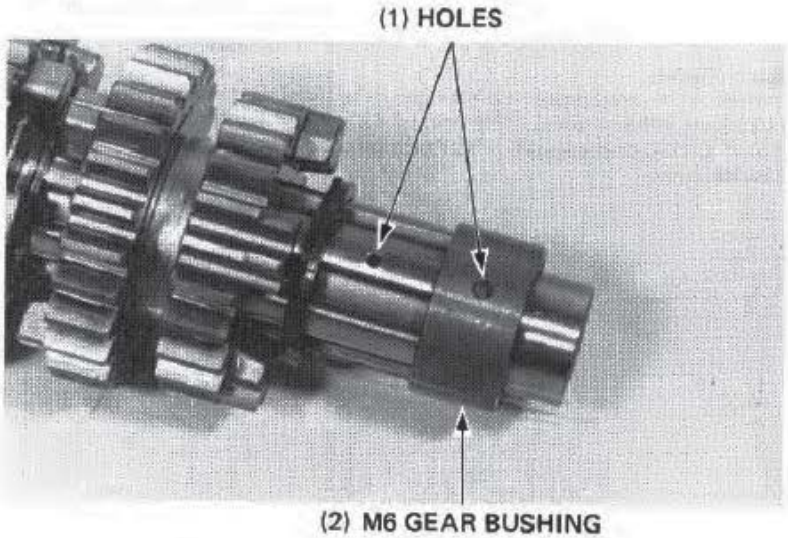
Check the snap rings are seated in the grooves.



Install the M5 gear bushing with its flange toward M1 gear.

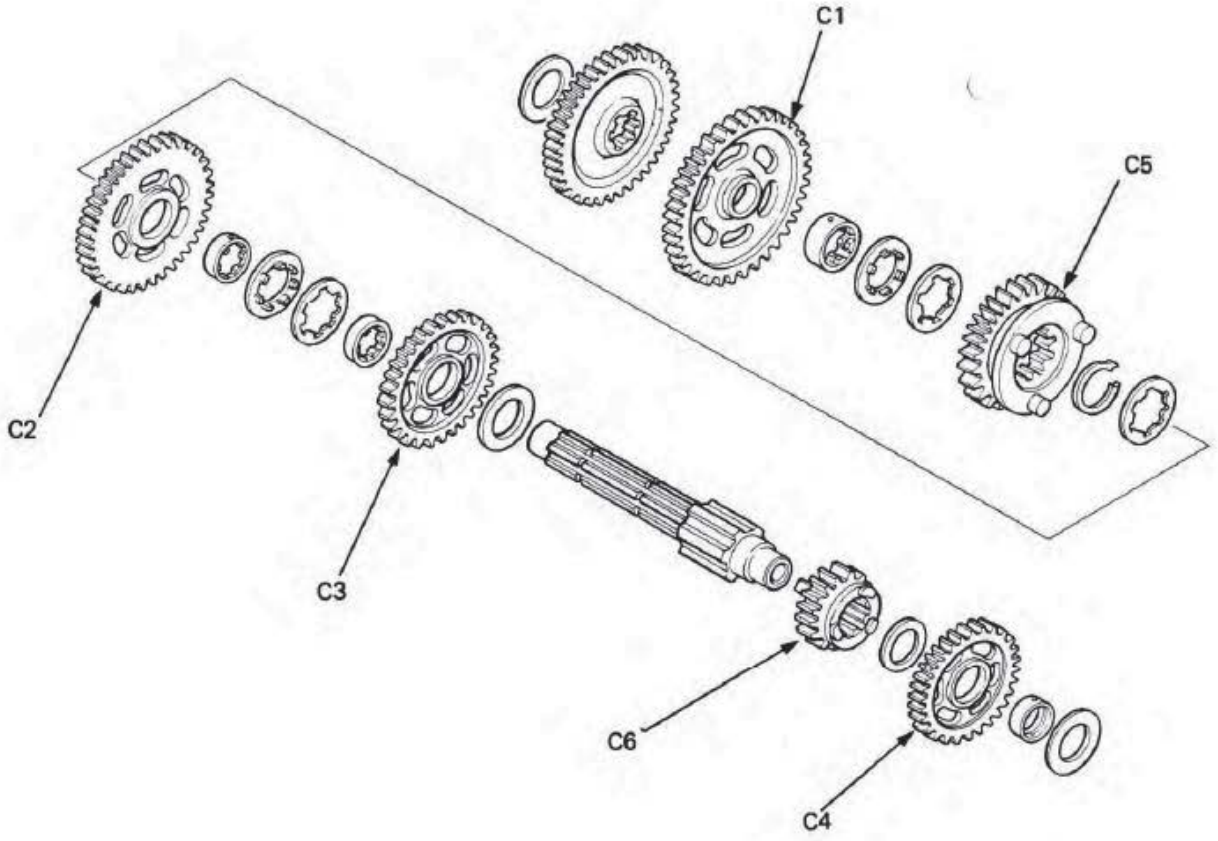


Align the hole in the M6 gear bushing with the hole in the mainshaft when installing.



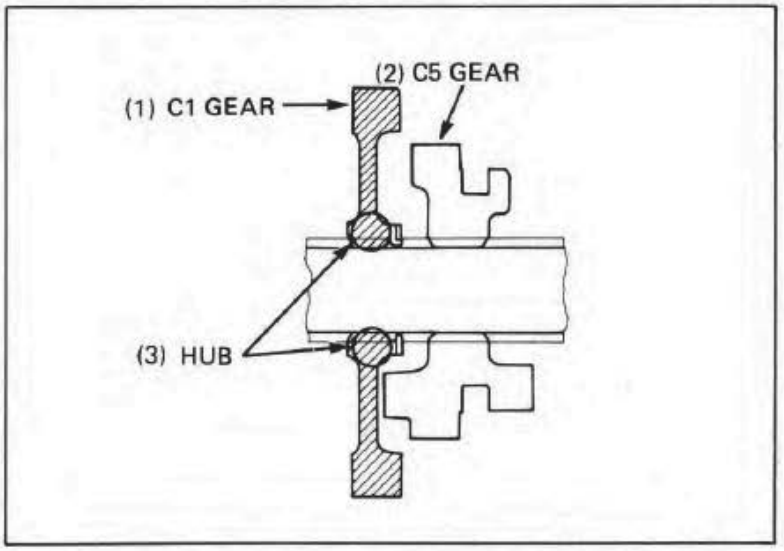
Countershaft
Check the gears for freedom of movement or rotation on the shaft.

Check that the snap rings are seated in the grooves.

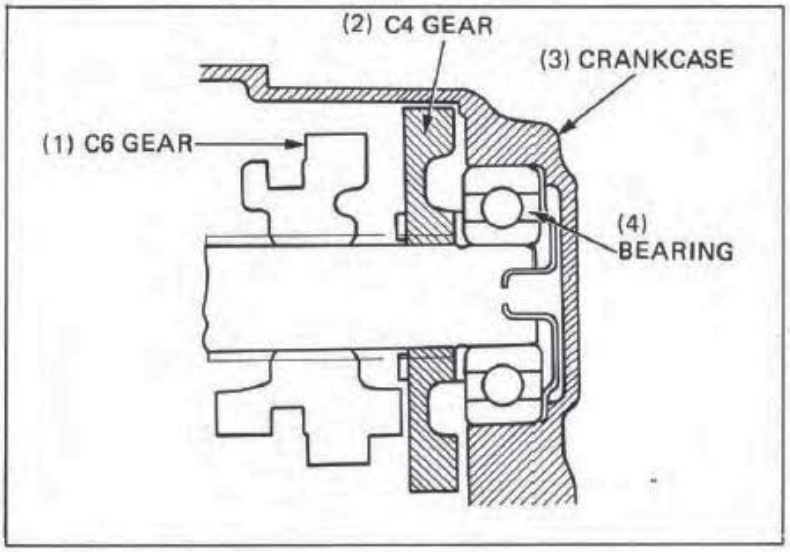


Install the C1 gear hub facing the C5 gear.

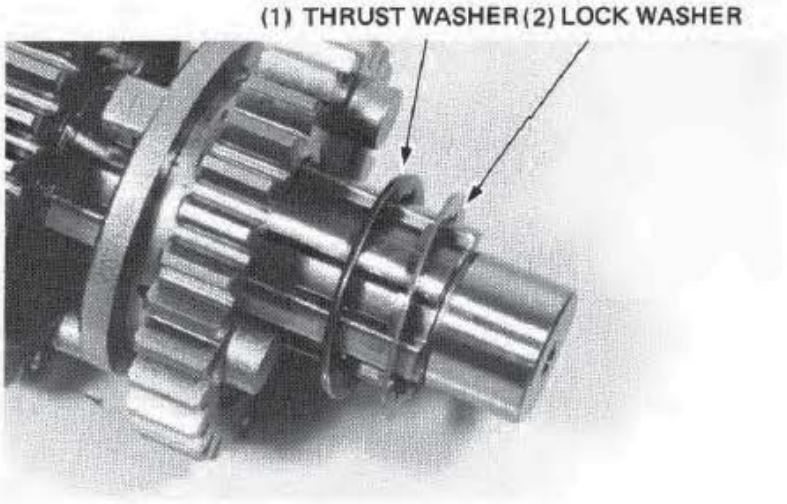
Install the wide side of the C1 gear hub facing the C5 gear.



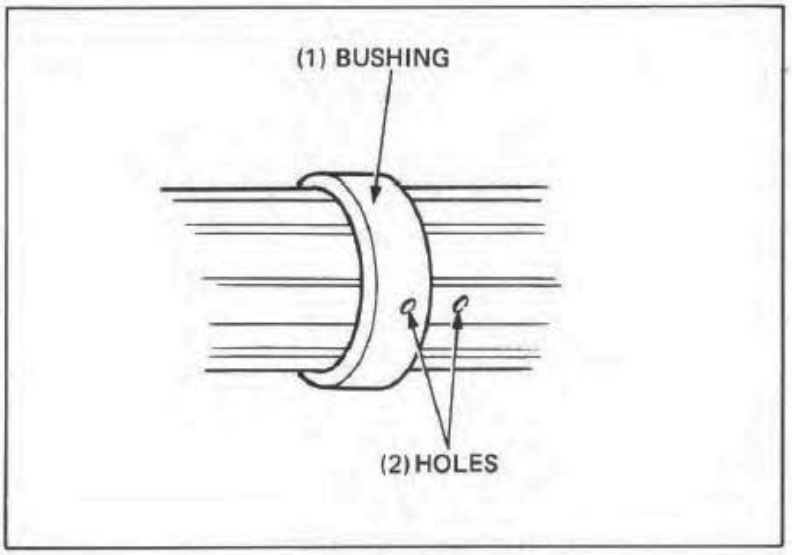
Install the C4 gear recess facing the crankcase bearing, not the C6 gear.



Align the lock washer tab into the thrust washer groove between the C5 and C1 gears, and the C2 and C3 gears.

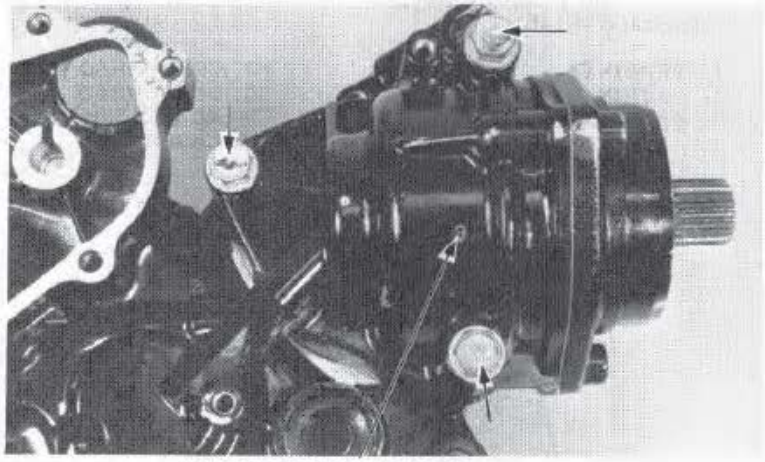


Align the oil holes in the C1, C2 and C3 gear bushings with the holes in the countershaft.



OUTPUT GEAR CASE REMOVAL

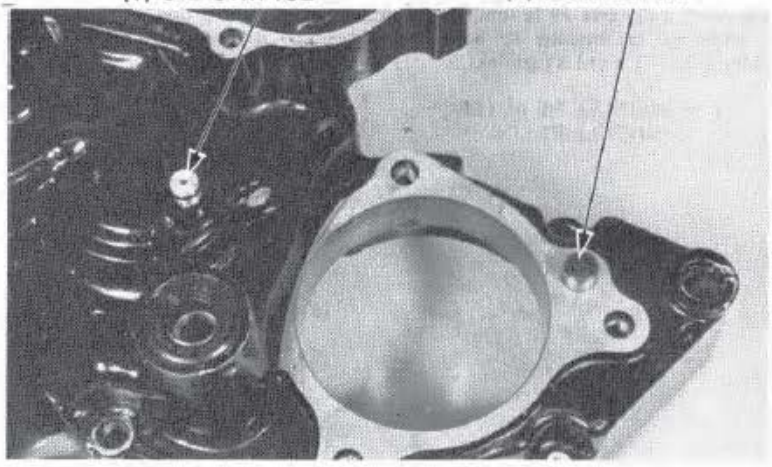
Remove the three bolts and output gear case from the crankcase.



(1) OUTPUT GEAR CASE

Remove the dowel pin and oil orifice.
Clean the oil orifice with compressed air.

(1) OIL ORIFICE (2) DOWEL PIN



OUTPUT GEAR

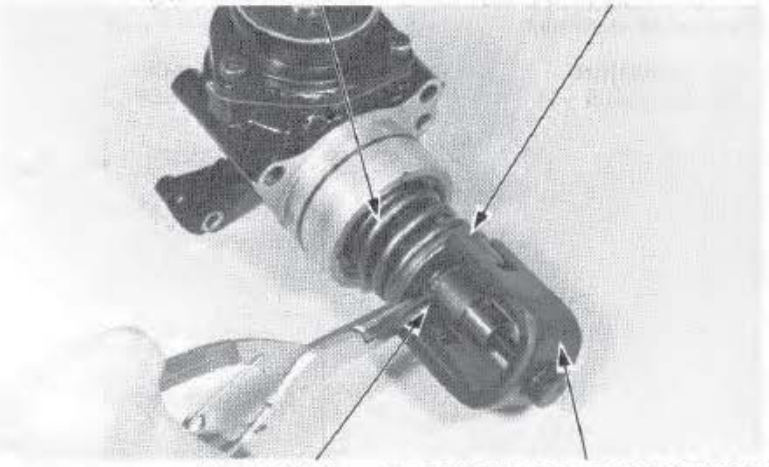
OUTPUT DRIVE GEAR DAMPER ASSEMBLY REMOVAL

Attach the special tool onto the output gear shaft and compress the damper spring.

Remove the circlip from the shaft.
Loosen the special tool slowly to remove it.

Remove the damper cam and spring.
Check the damper cam for wear or damage.

(1) DAMPER SPRING (2) DAMPER CAM



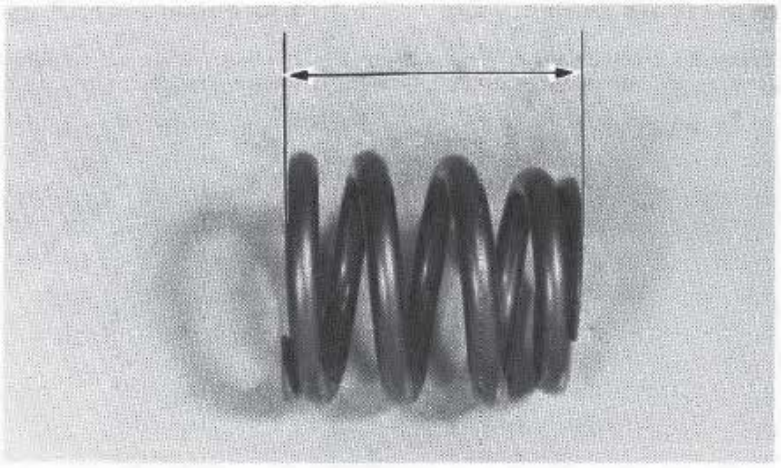
(3) CIRCLIP (4) DAMPER CAM COMPRESSOR 07964–ME90000

SPRING FREE LENGTH

Measure the damper spring free length.

SERVICE LIMIT: 59.1 mm (2.327 in)

Replace it if it is shorter than the service limit.



BACKLASH INSPECTION

Place the output gear case in a vise with soft jaws or a shop towel.

Set a horizontal type dial indicator on the final drive shaft as shown. Hold the driven gear with the shaft holder and rotate the drive shaft until gear slack is taken up.

Turn the drive shaft back and forth to read backlash.

STANDARD: 0.08–0.23 mm (0.003–0.009 in)
SERVICE LIMIT: 0.40 mm (0.016 in)

Remove the dial indicator. Turn the output drive shaft 120° and measure backlash. Repeat this procedure once more.

Compare the differences of the three measurements.

DIFFERENCE OF MEASUREMENTS
SERVICE LIMIT: 0.10 mm (0.004 in)

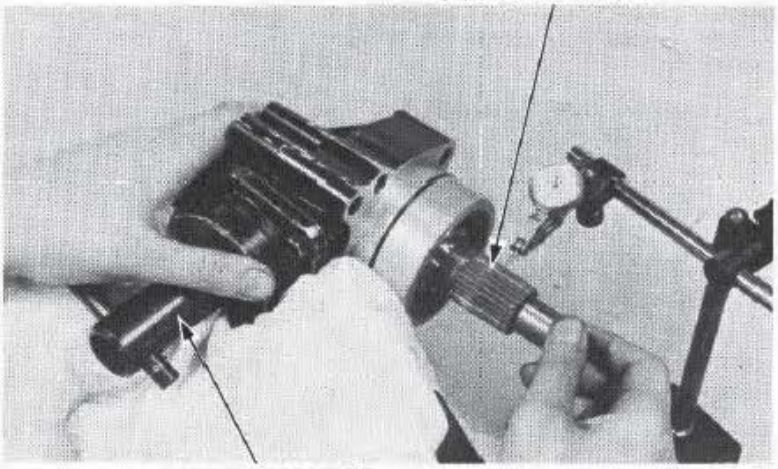
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

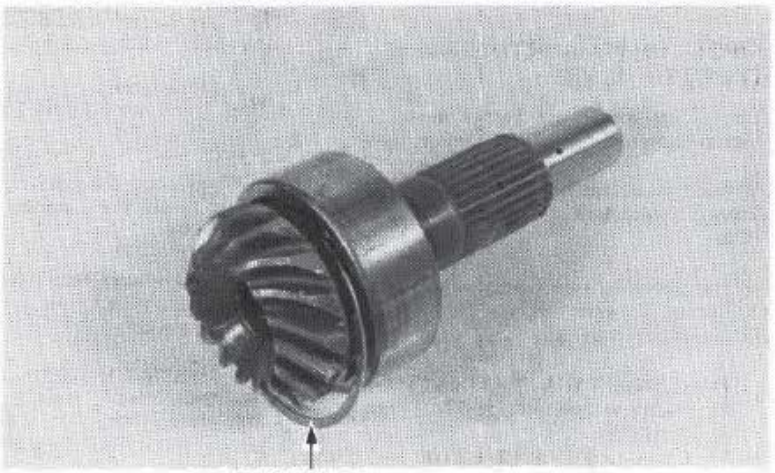
If backlash is excessive, replace the drive shaft adjustment shim with a thinner one. If the backlash is too small, replace the drive shaft adjustment shim with a thicker one.

Backlash is changed by about 0.06–0.07 mm (0.002–0.003 in) when thickness of the shim is changed by 0.10 mm (0.004 in).

COUNTERSHAFT/OUTPUT DRIVE GEAR ADJUSTMENT SHIMS:

A:	0.8 mm (0.031 in)	
B:	0.85 mm (0.033 in)	
C:	0.9 mm (0.035 in)	
D:	0.95 mm (0.037 in)	
E:	1.0 mm (0.039 in)	STANDARD
F:	1.05 mm (0.041 in)	
G:	1.10 mm (0.043 in)	





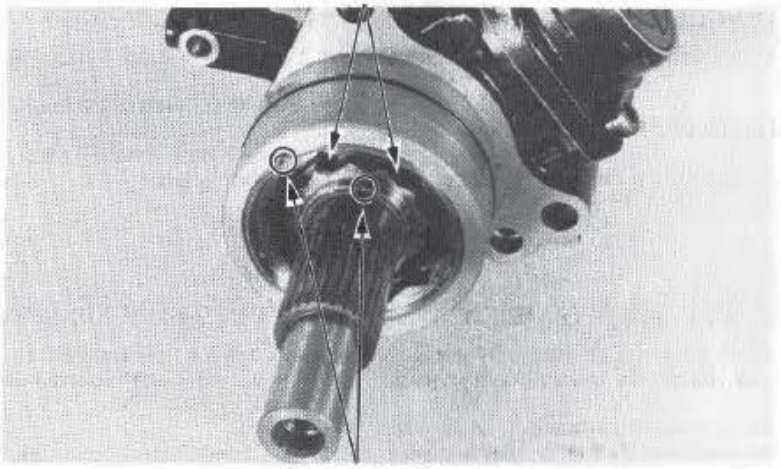
OUTPUT DRIVE GEAR REMOVAL

Place the output gear case in a vise with soft jaws, being careful not to distort it.

Place the shaft holder tool on the driven gear shaft wedging it against the vise to lock the shaft.

Unstake the inner bearing race lock nut and outer race lock nut with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.

(1) LOCK NUTS

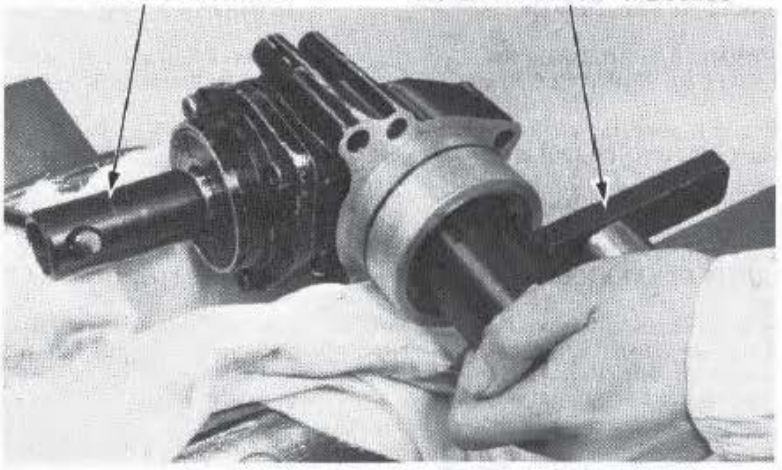


(2) UNSTAKE

Remove the inner bearing race lock nuts and discard them.

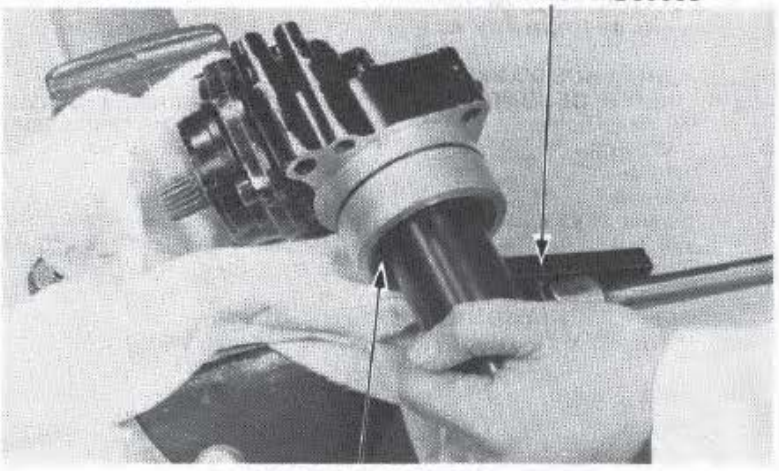
(1) SHAFT HOLDER
07924–ME50000

(2) LOCK NUT WRENCH
36/48 mm 07916–MB00000



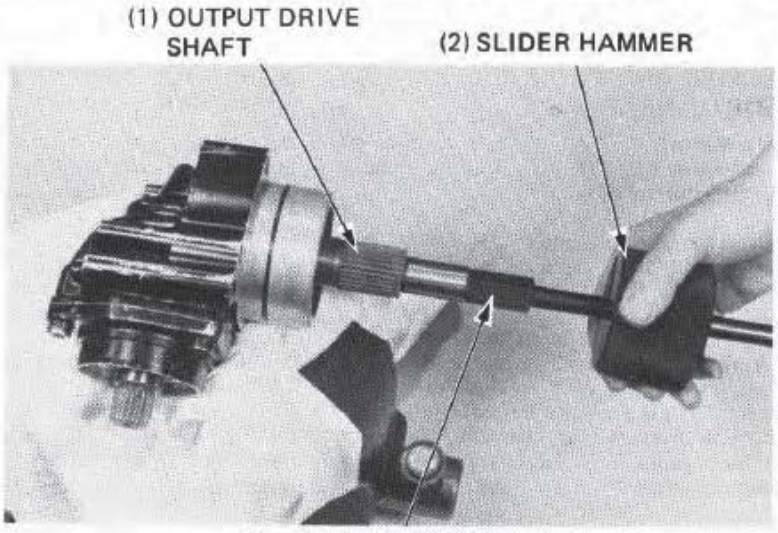
Remove the bearing outer race lock nut.

(1) LOCK NUT WRENCH
36 x 48 mm 07916–MB00000



(2) BEARING OUTER
RACE LOCK NUT.

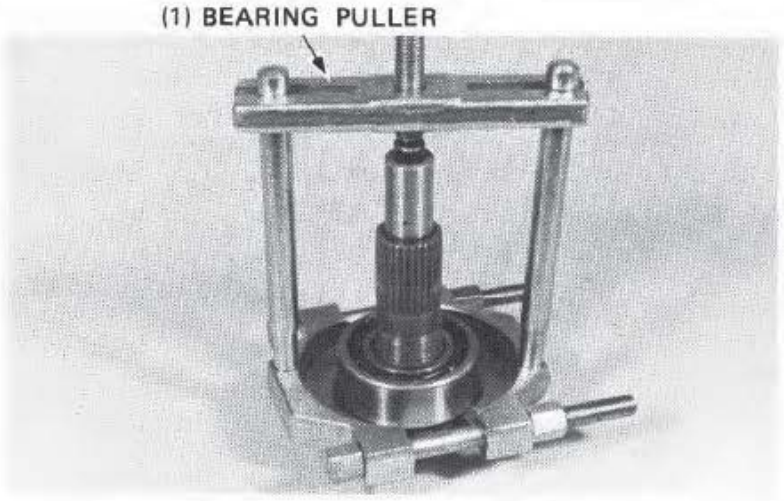
Remove the lock washer.
Remove the output drive shaft.



(3) BEARING REMOVER
07936–8890001

OUTPUT DRIVE SHAFT BEARING REPLACEMENT

Remove the output drive shaft bearing from the output drive shaft with the bearing puller.



Place the adjustment shim between the bearing and drive shaft gear (Page 13-18).
Hold the bearing inner race with attachment.

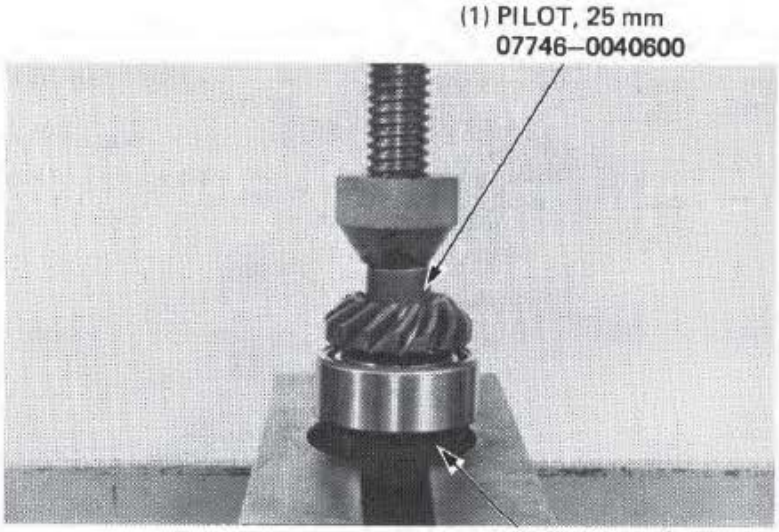
Press the output drive shaft into the bearing.

NOTE

Place the pilot's threaded end into the final drive shaft.

COUNTER SHAFT/OUTPUT DRIVE GEAR ADJUSTMENT SHIMS:

A:	0.8 mm (0.031 in)	
B:	0.85 mm (0.033 in)	
C:	0.9 mm (0.035 in)	
D:	0.95 mm (0.037 in)	
E:	1.0 mm (0.039 in)	STANDARD
F:	1.05 mm (0.041 in)	
G:	1.1 mm (0.043 in)	

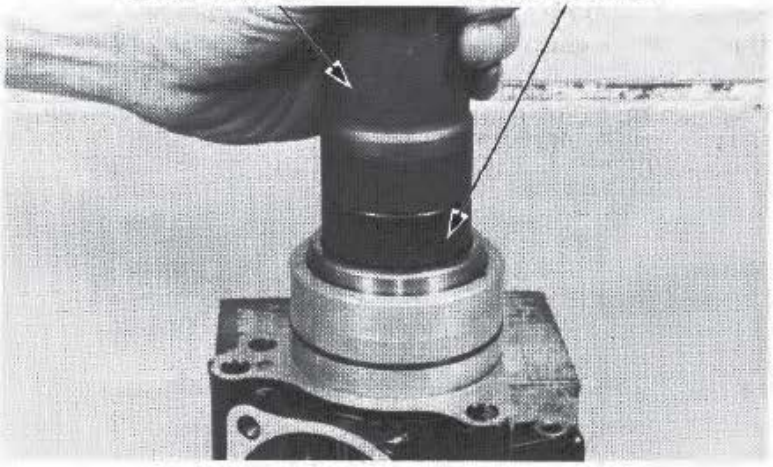


OUTPUT DRIVE GEAR INSTALLATION

Press the output drive shaft assembly into the output gear case.

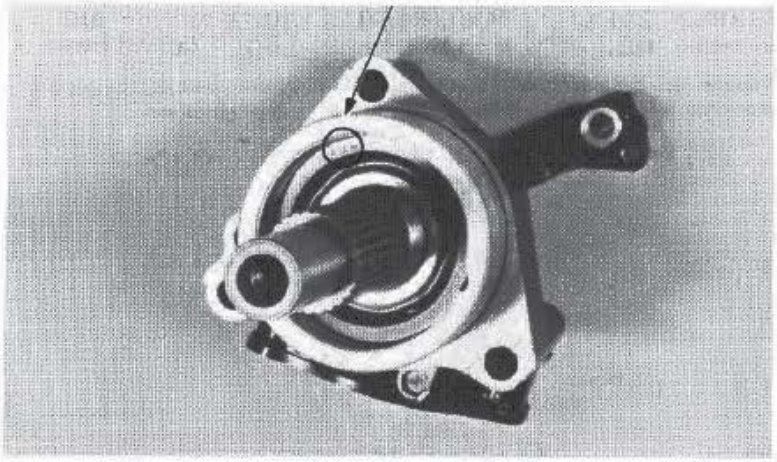
(1) DRIVER C
07746–0020100

(2) ATTACHMENT, 30 mm
07746–0030300



Install the lock washer into the case with its "NUT" mark facing nut.

(1) "NUT" MARK

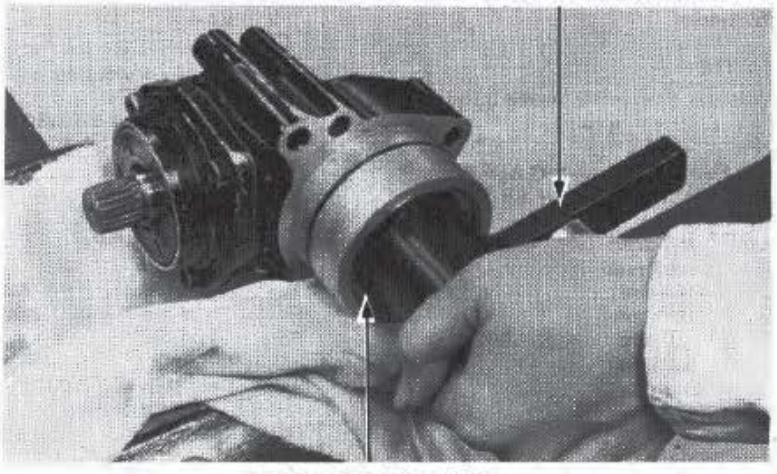


Clean the bearing outer race lock nut threads throughly.
Place the case into a vice with soft jaws.

Install and tighten a new bearing outer race lock nut. The drive shaft assembly will also be installed at the same time.

TORQUE WRENCH SCALE READING:
80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
ACTUAL TORQUE APPLIED:
90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)

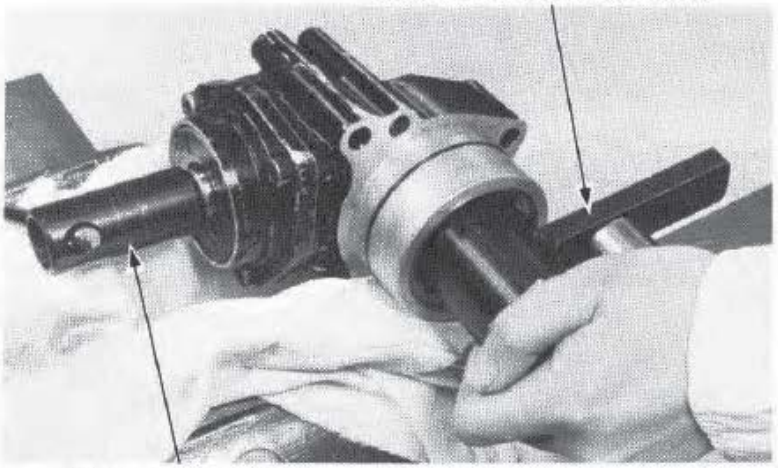
(1) LOCK NUT WRENCH
30/64 mm 07916–MB00000



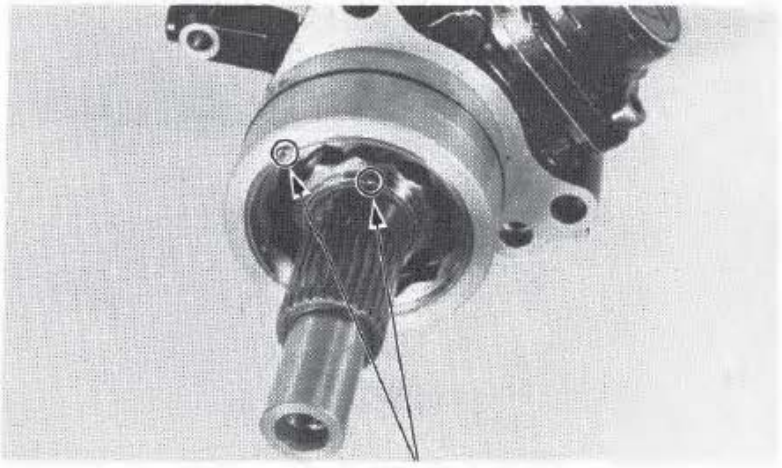
(2) BEARING OUTER
RACE LOCK NUT

Install and tighten a new inner race lock nut to the specified torque.

TORQUE WRENCH SCALE READING:
64–73 N·m (6.4–7.3 kg-m, 46–53 ft-lb)
ACTUAL TORQUE APPLIED:
70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)



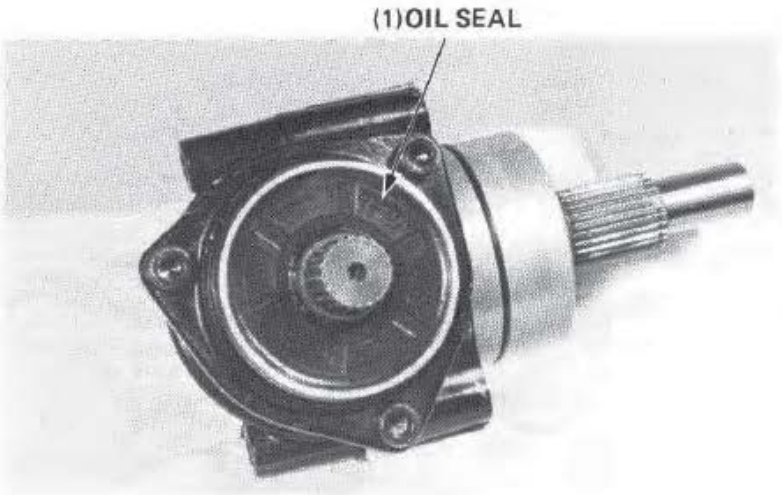
Stake the inner and outer lock nuts.



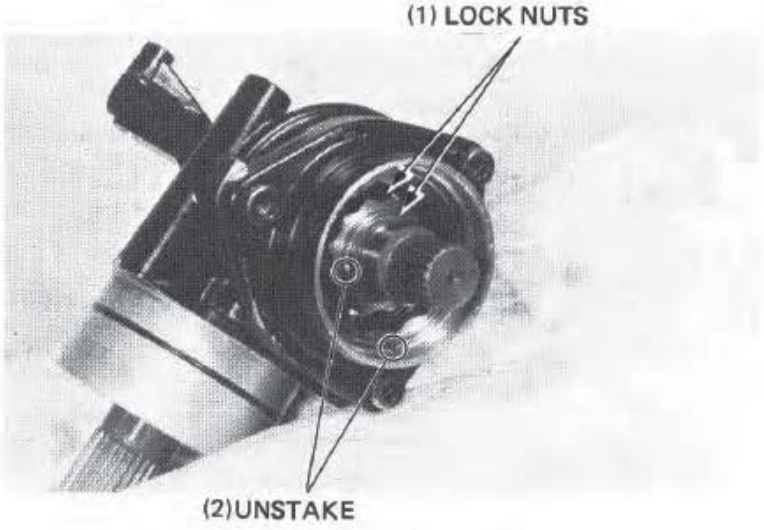
OUTPUT DRIVEN GEAR REMOVAL

Remove the driven gear oil seal from the output driven gear case.

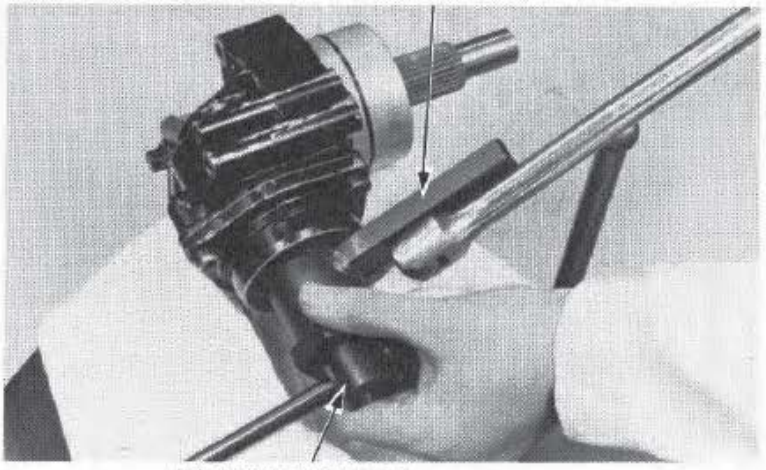
Place the output driven gear case into a vise.



Unstake the inner bearing race lock nut and the outer bearing race lock nut with a drill or grinder.

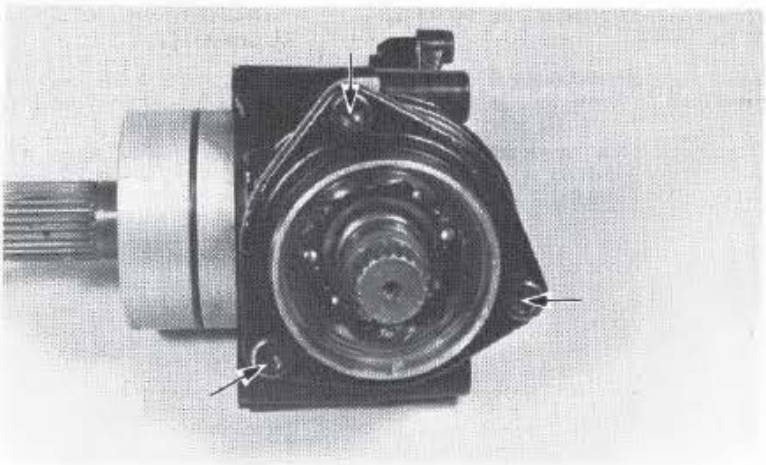


Remove the output driven gear bearing inner race lock nut.



Remove the driven gear bearing holder mounting bolts and remove the shim, gear and holder from the case.

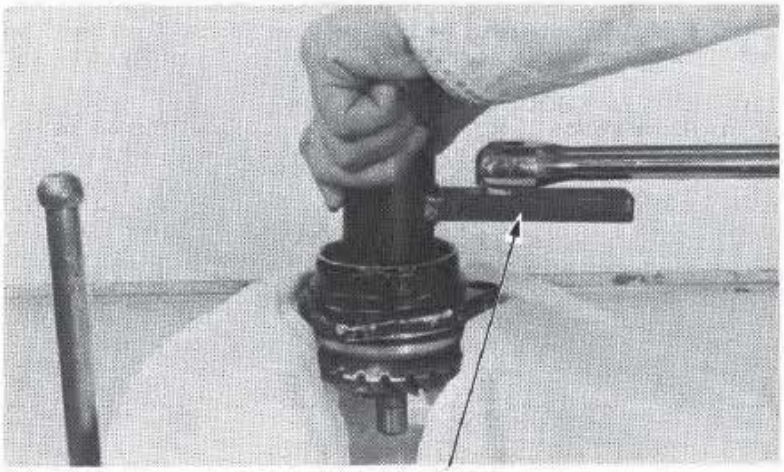
Remove the O-ring.



OUTPUT DRIVEN GEAR BEARING REPLACEMENT

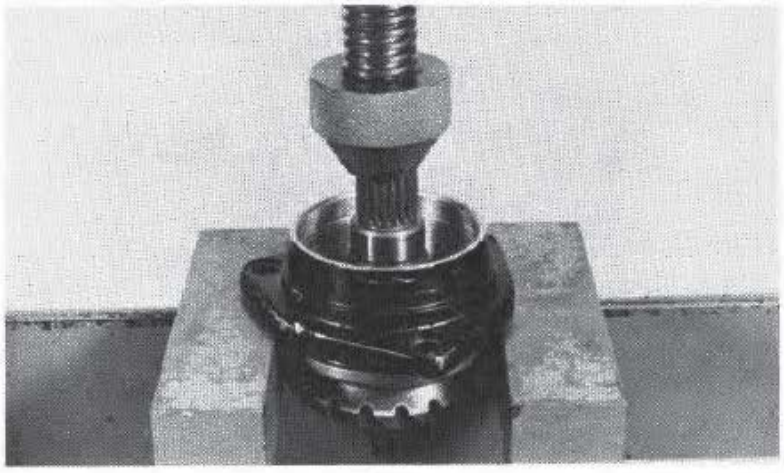
Place the output driven gear bearing holder into a vise with soft jaws. Remove the output driven gear bearing outer race lock nut from the holder.

Remove the lock washer.



(1) LOCK NUT WRENCH
34/44 mm, 07916–ME50000

Press the output driven gear shaft from the holder.

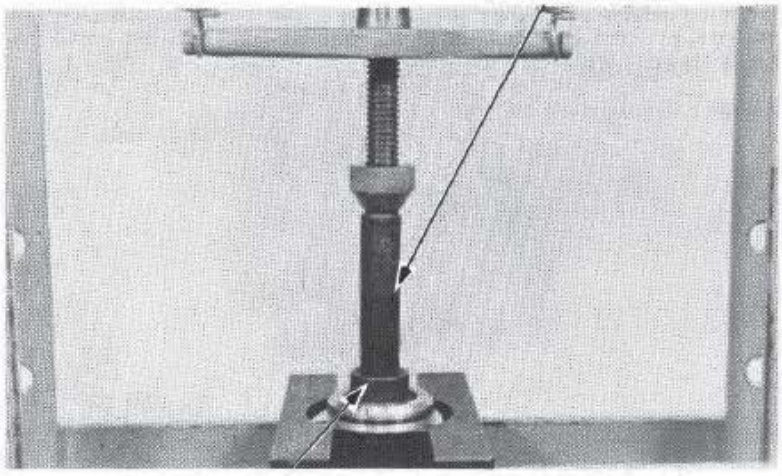


Press the bearing out of the holder.

NOTE

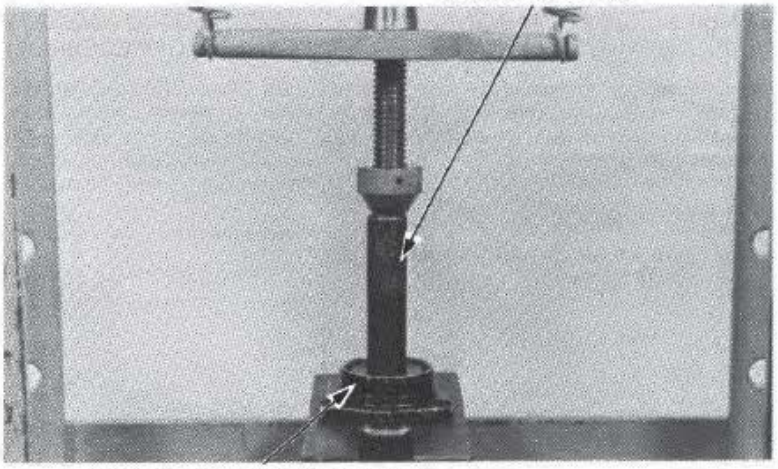
Be careful not to damage the bearing holder gear case mating surface.

(1) DRIVER A
07749–0010000



(2) ATTACHMENT 52 x 55 mm 07746–0010400
(3) PILOT 30 mm 07746–0040700

Press in a new bearing and make sure it rotates freely after installation.

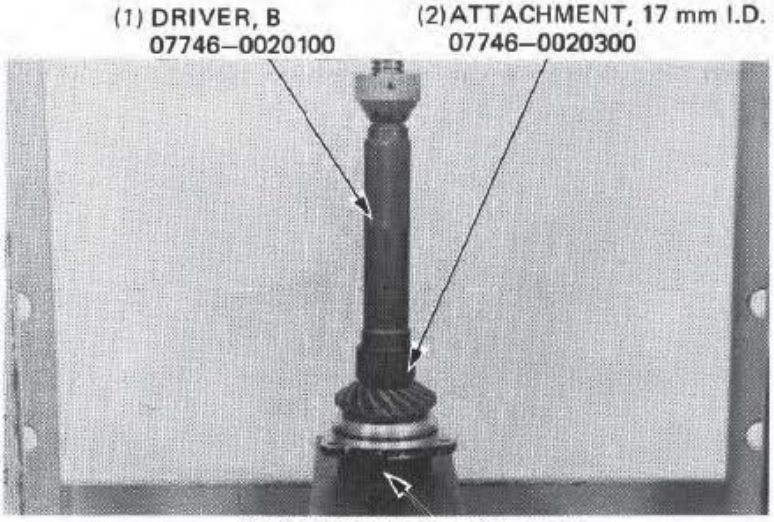


NOTE

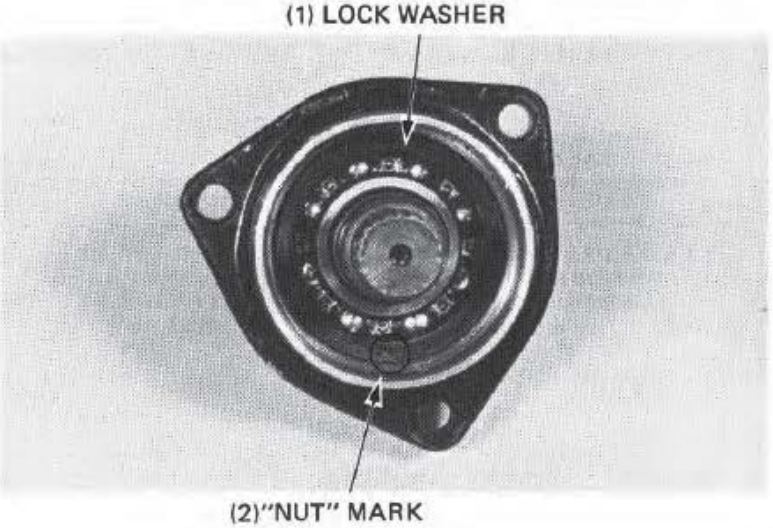
- Remove the center guide from the dis/assembly tool before using.
- When the gear set, driven gear bearing and/or gear case has been replaced, use a shim 0.30 mm (0.012 in) thick for initial reference.

Place the output driven gear bearing holder into a press.
Then press in the output driven gear.
Support the inner bearing race using the special tools.

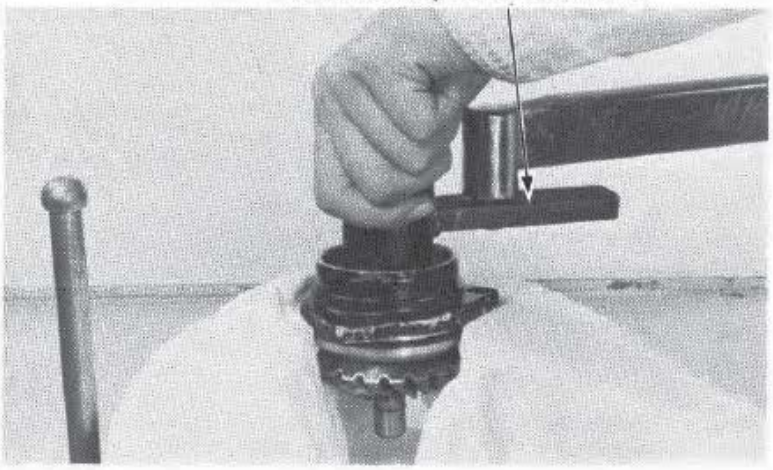
Install the O-ring and correct shim.



Install the lock washer with its "NUT" mark facing the lock nut.

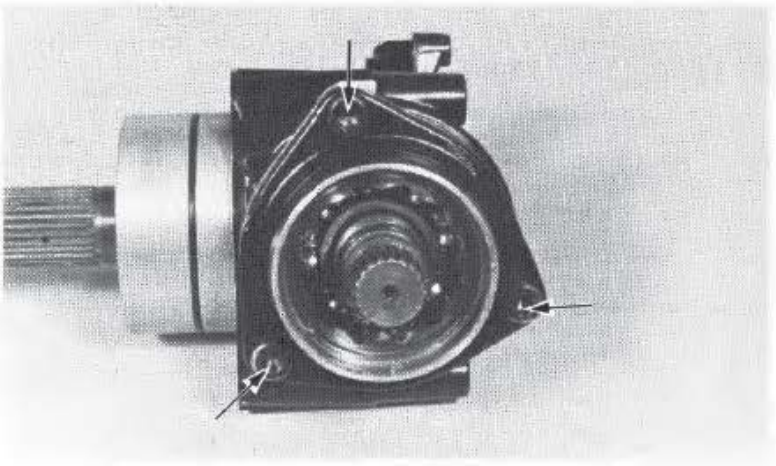


(1) LOCK NUT WRENCH
34 x 44 mm, 07916–ME50000



Place the bearing holder into a vise with soft jaws. Install and tighten a new bearing outer race lock nut to the specified torque value.

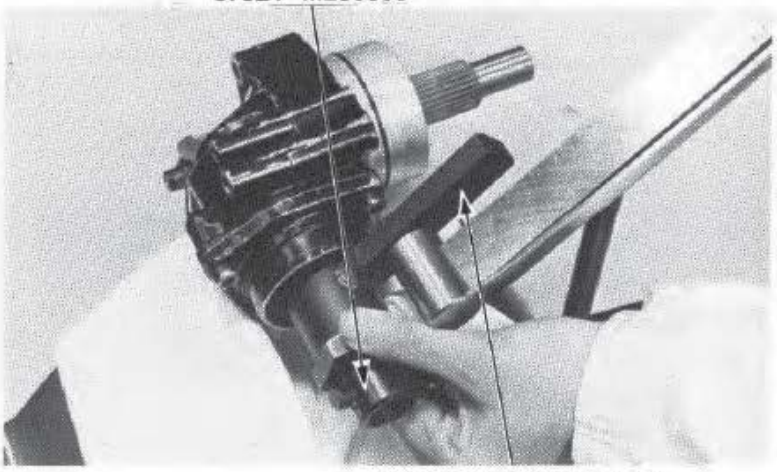
TORQUE WRENCH SCALE READING:
80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
ACTUAL TORQUE APPLIED:
90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)



Attach the bearing holder onto the gear case with the three hex bolts. Tighten the bolts in a crisscross pattern in two or more steps.

TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

(1) SHAFT HOLDER
07924–ME50000

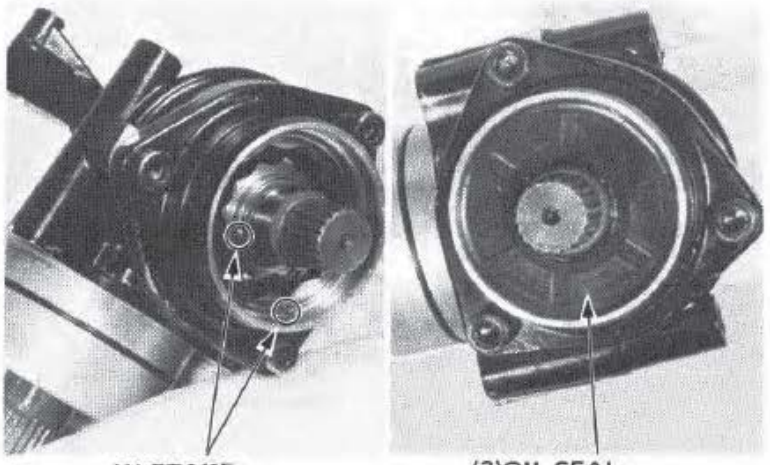


Install a new bearing inner race lock nut and tighten it to the specified torque.

TORQUE WRENCH SCALE READING:
64–73 N·m (6.4–7.3 kg-m, 46–53 ft-lb)
ACTUAL TORQUE APPLIED:
70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)

(2) LOCK NUT WRENCH,
34/44 mm 07916–ME50000

Stake both new lock nuts and install a new oil seal.



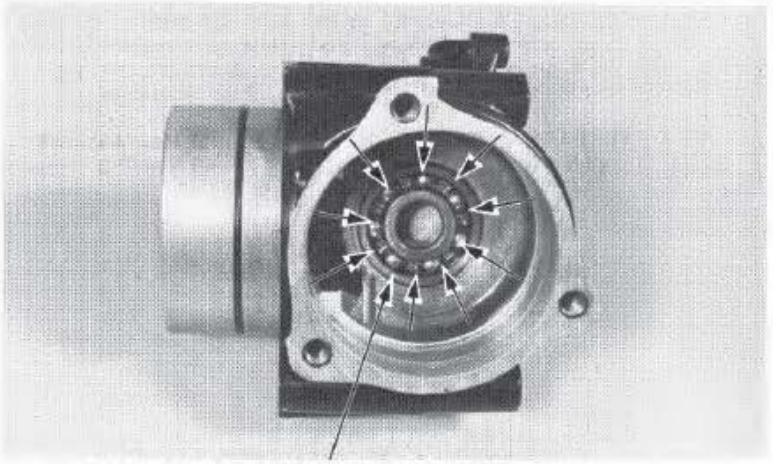
(1) STAKE (2)OIL SEAL

OUTPUT DRIVEN GEAR CASE BEARING REPLACEMENT

Heat the output gear case around the driven shaft bearing to 80°C (176°F) and tap it out with a soft faced hammer.

CAUTION

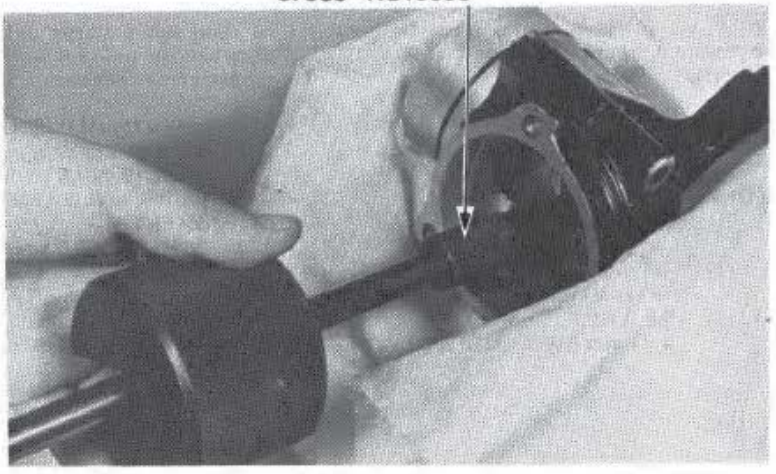
Always wear gloves when handling a heated gear case.



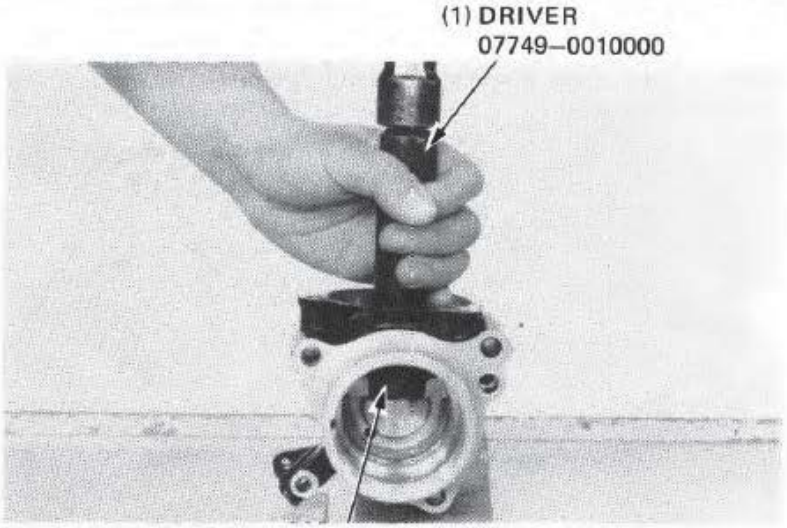
(1) FINAL DRIVEN SHAFT BEARING

(1) BEARING REMOVER, 15 mm
07936–KC10000

Remove the bearing with the bearing remover, if the bearing can not be removed by heating the case.



Drive a new bearing into the output gear case.



GEAR TOOTH CONTACT PATTERN CHECK

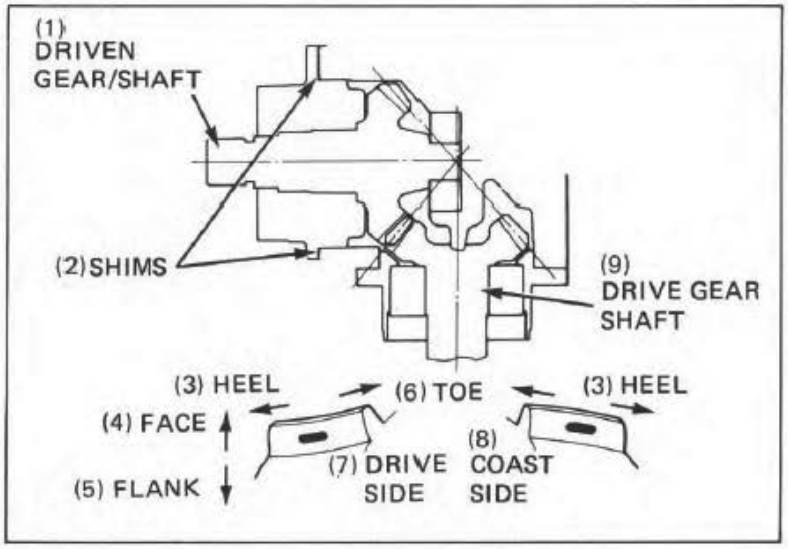
Remove the drive and driven gears (pages 13-19, 13-22).

Apply Prussian Blue to the driven gear teeth.

Install the drive and driven gears with the standard shims.

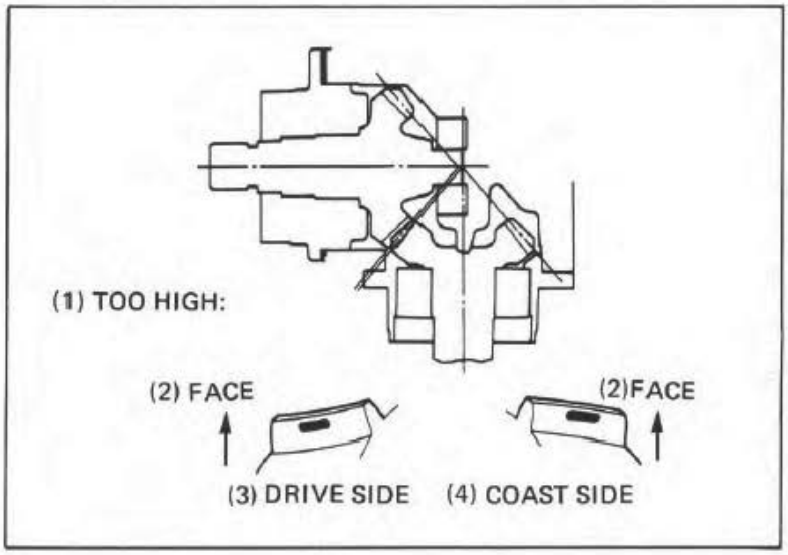
Rotate the drive gear several times in the normal direction of rotation.

Check the gear tooth contact pattern after removing the drive gear. Contact is normal if Prussian Blue is transferred to the approximate center of each tooth and slightly to the side.



If the pattern is not correct, remove and replace the driven gear adjustment shim.

Replace the shim with a thinner one if the contact pattern is too high.



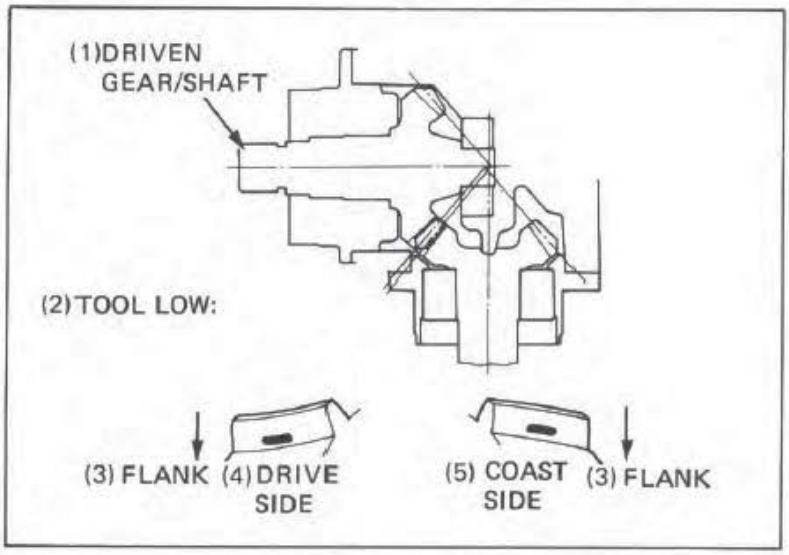
Replace the driven gear adjustment shim with a thicker one if the contact is too low.

The pattern will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the shim is changed by 0.10 mm (0.04 in).

OUTPUT DRIVEN GEAR ADJUSTMENT SHIM:

A:	**0.4 mm**	**(0.016 in)**
B:	**0.45 mm**	**(0.018 in)**
C:	**0.5 mm**	**(0.019 in)**
D:	**0.55 mm**	**(0.021 in)**
E:	**0.6 mm**	**(0.024 in)**

Check the backlash (See page 13-18).



OUTPUT DRIVE GEAR DAMPER ASSEMBLY INSTALLATION

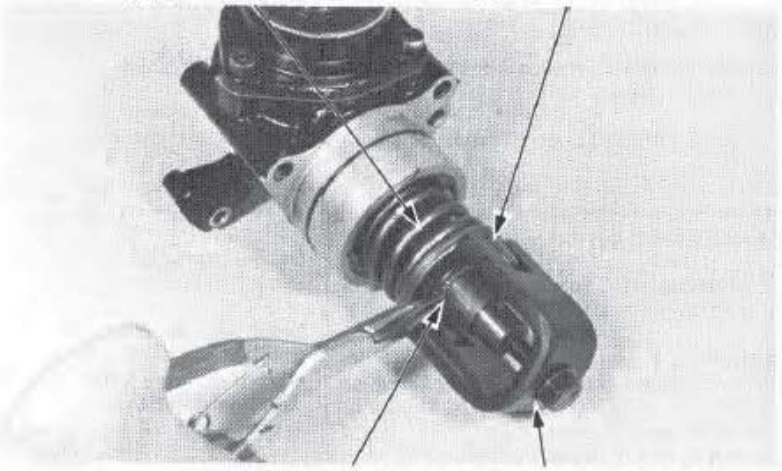
Install the damper spring and damper cam onto the output drive shaft.

NOTE

Seat the damper spring against the bearing lock nut.

Attach the spring compressor in the output drive shaft threads. Compress the damper cam with the special tool.

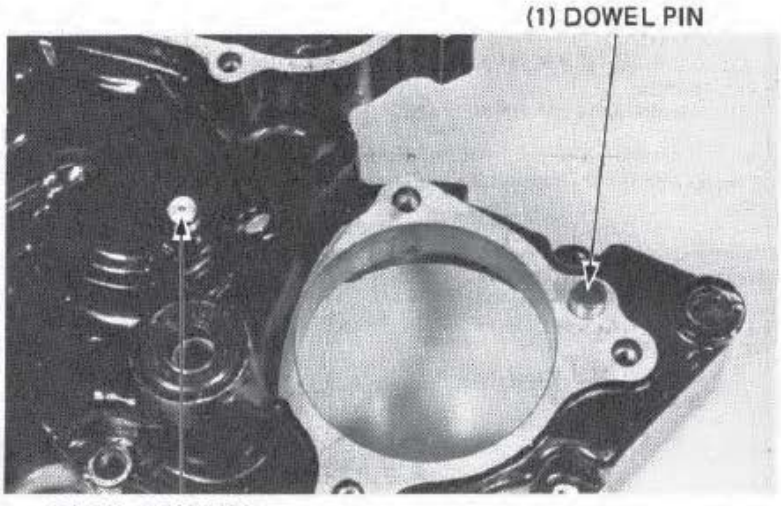
Install the circlip onto the shaft, being sure it seats in its groove.
Loosen and remove the special tool from the shaft.



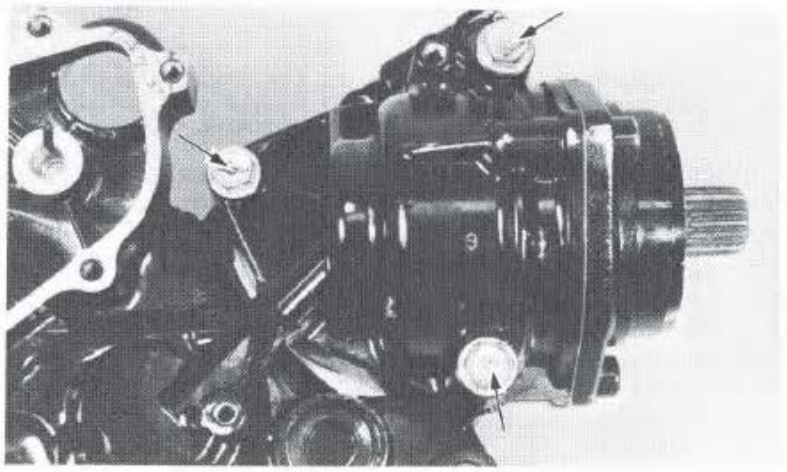
OUTPUT GEAR CASE INSTALLATION

OUTPUT CASE INSTALLATION

Install the oil orifice and dowel pins.



Install the output gear case.
Tighten the three bolts.



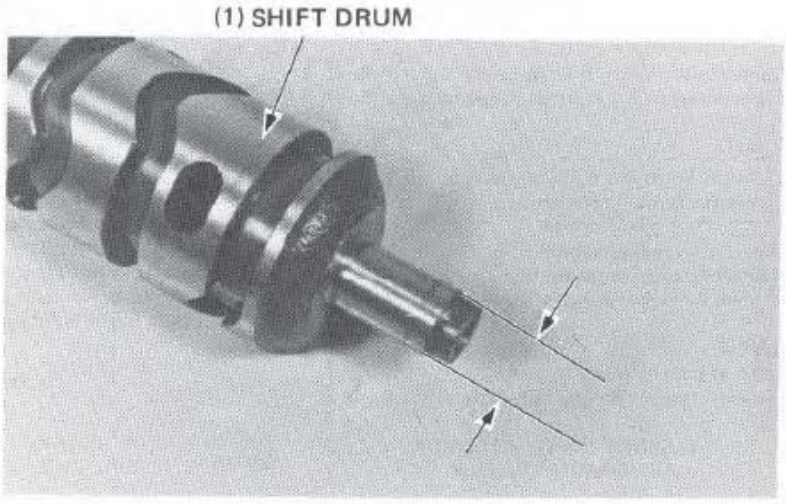
SHIFT FORK/SHIFT DRUM

GEAR SHIFT DRUM AND SHIFT FORK INSPECTION

Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication. Check the shift drum grooves for damage.

Measure the shift drum O.D.

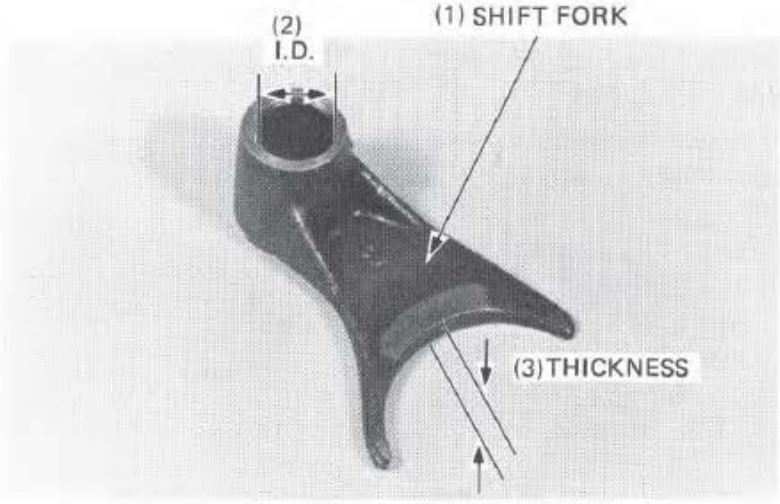
SERVICE LIMIT: 13.90 mm (0.547 in)



Measure the right, center and left shift fork I.D. and the shift fork claw thickness.

SERVICE LIMITS:

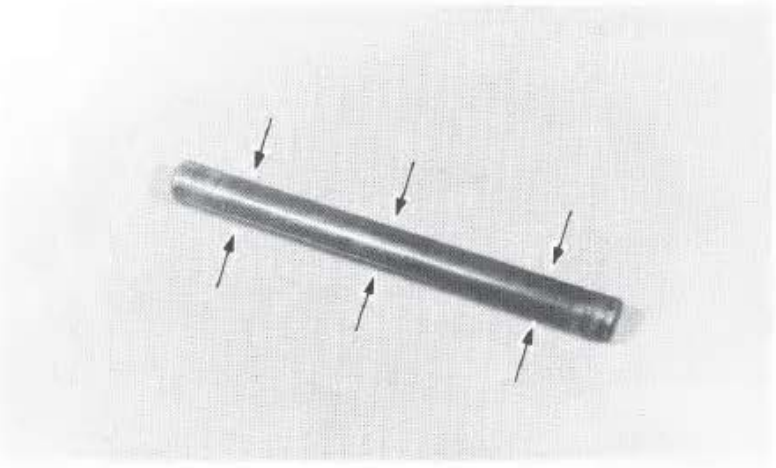
I.D.:	13.037 mm (0.5133 in)
CLAW THICKNESS:	4.63 mm (0.182 in)



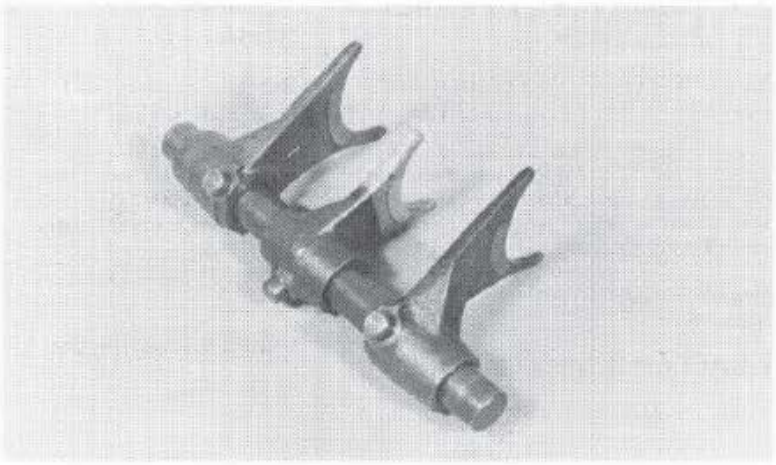
Check for scratches, scoring or evidence of insufficient lubrication on the shift fork shaft.

Measure the shift fork shaft O.D. at the right, center and left shift fork surfaces.

SERVICE LIMIT: 12.90 mm (0.508 in)



Install the R.L. forks facing as shown against the center shift fork.



CRANKCASE BEARINGS REPLACEMENT

LEFT CRANKCASE BEARINGS

Heat the left crankcase around the mainshaft and countershaft bearings to 80°C (176°F).

CAUTION

Always wear gloves when handling a heated crankcase.

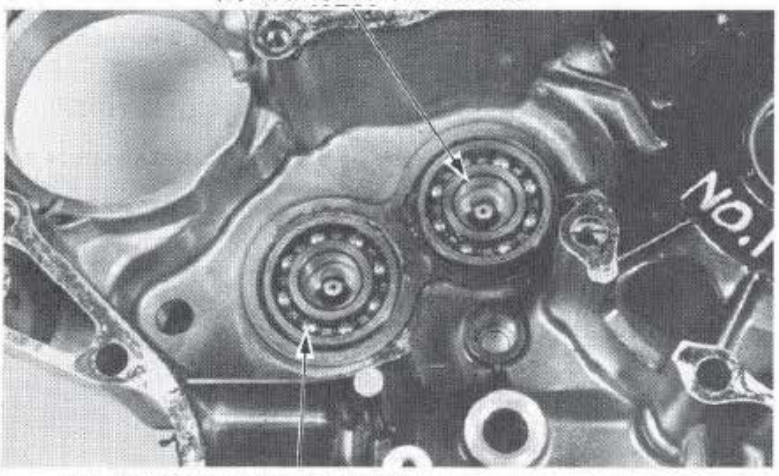
Remove the main and countershaft bearings with the following tools.

Bearing remover, 20 mm 07936–3710001

Drive a new bearing into the left crankcase with the following tools:

Driver A 07749–0010000
Attachment, 42 x 47 mm 07746–0010300

(1) MAINSHAFT BEARING



(2)COUNTERSHAFT BEARING

RIGHT CRANKCASE BEARINGS

Heat the right crankcase around the mainshaft, countershaft, output drive shaft and shift drum bearings to 80°C (176°F).

CAUTION

Always wear gloves when handling a heated crankcase.

Remove the mainshaft and countershaft bearings with the following tools:

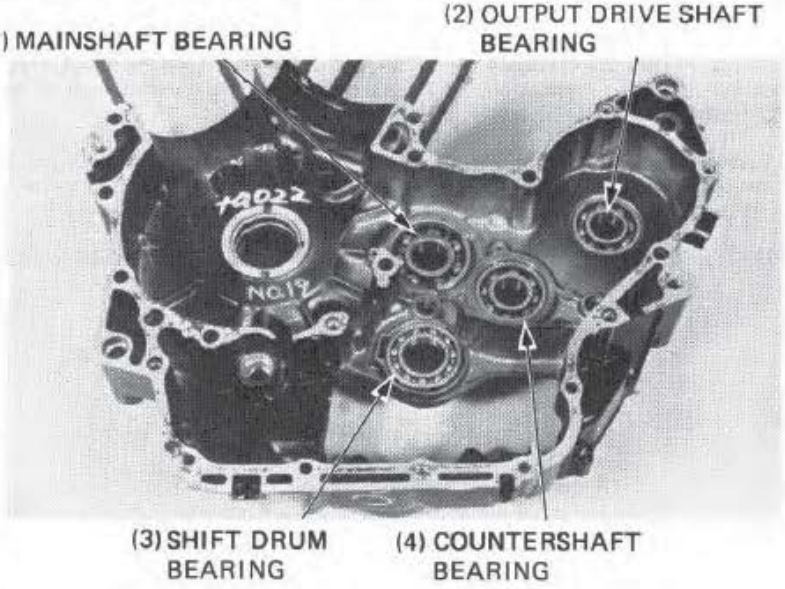
Bearing remover, 20 mm	07936–3710001

Remove the output drive shaft bearings with the following tools:

Driver A	07749–0010000
Attachment, 42 x 47 mm	07746–0010300

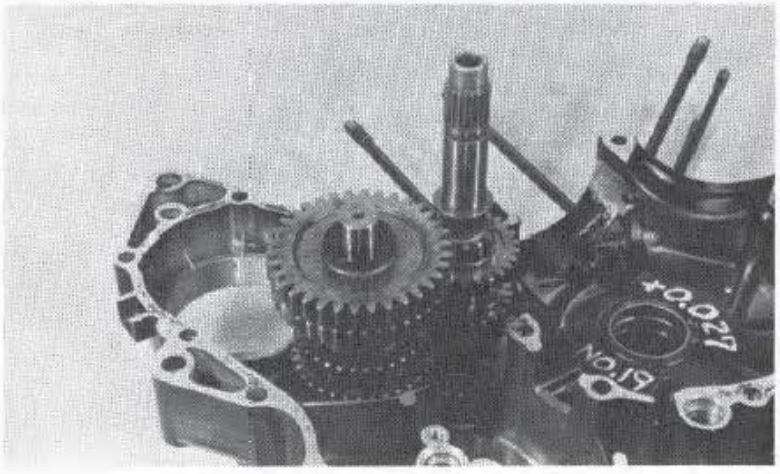
Drive the new bearings into the right crankcase with the following tools:

Main shaft:	
Attachment, 52 x 55 mm	07746–0010400
Pilot, 22 mm	07746–0041000
Driver A	07749–0010000
Countershaft/output drive shaft:	
Driver A	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 20 mm	07746–0040500

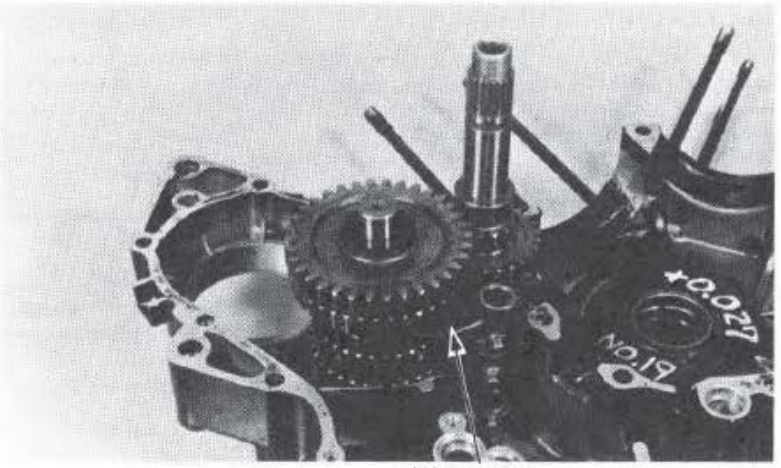


TRANSMISSION INSTALLATION

Install the mainshaft and countershaft assembly on the crankcase.



Install the shift forks with their marks facing toward the right crankcase.

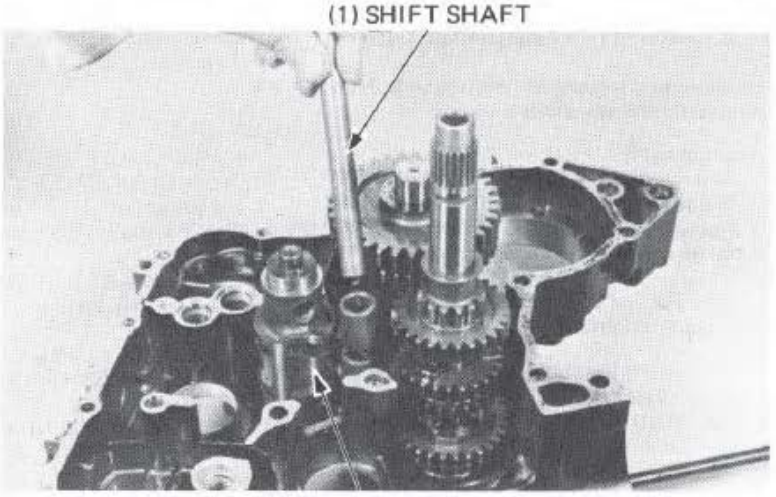


(1) MARK

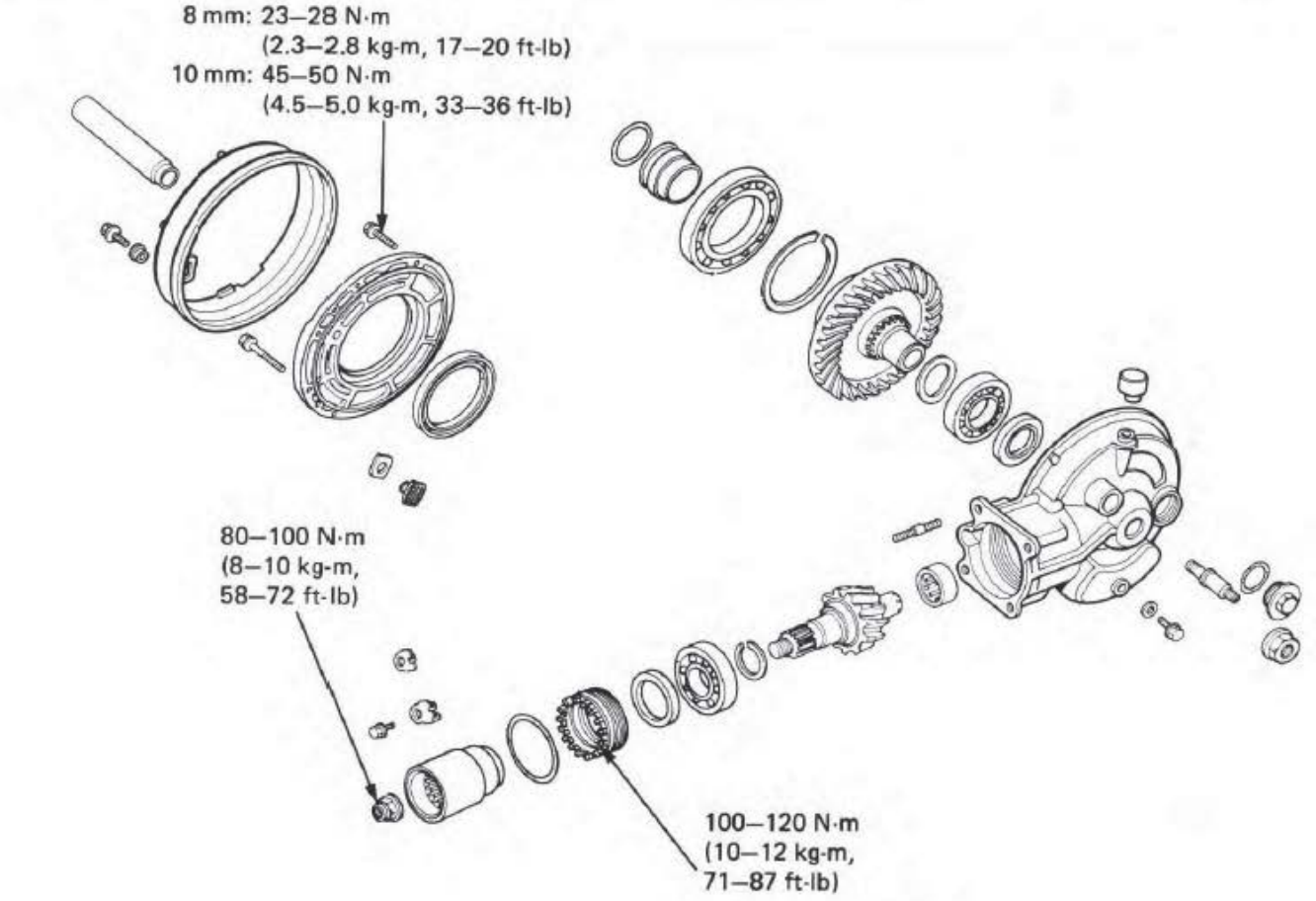
Install the shift drum and slide the shift fork shaft throught the shift forks.

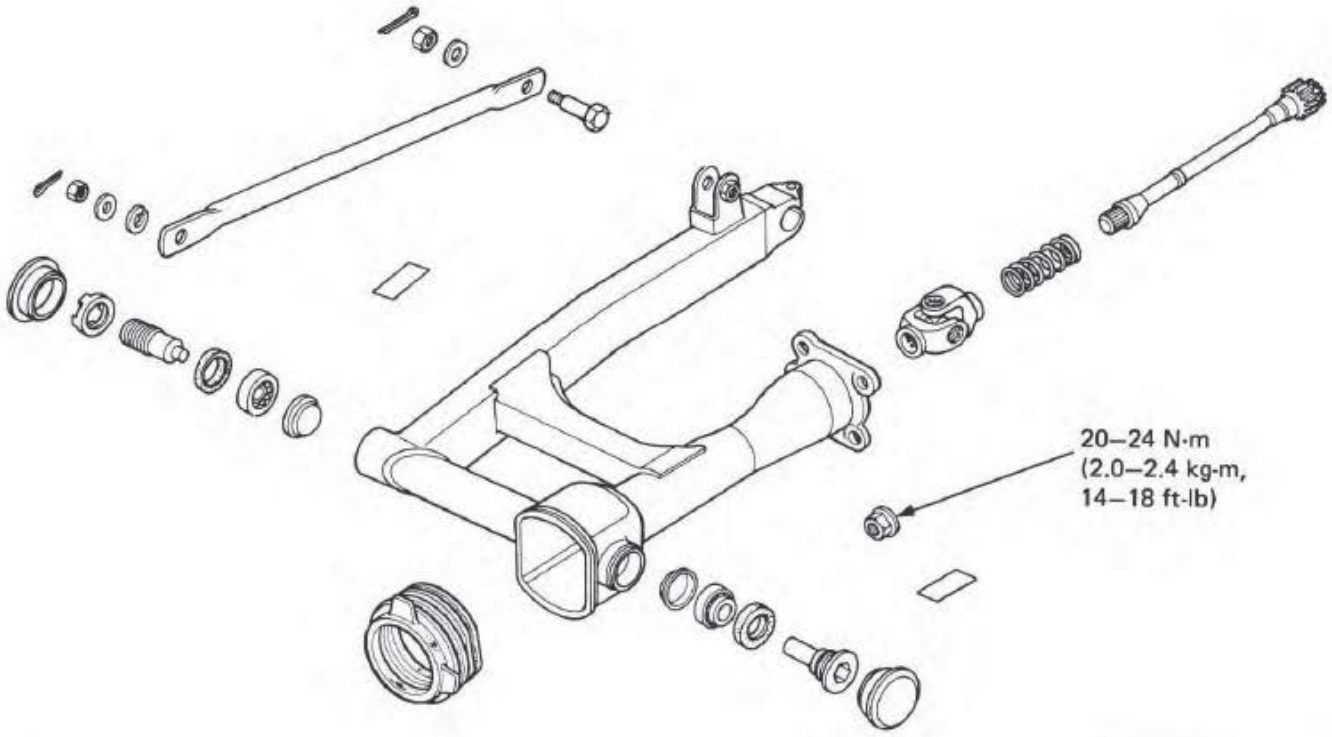
Assemble the crankcase (page 12-4).

(1) SHIFT SHAFT



(2) SHIFT DRUM


8 mm: 23–28 N·m
(2.3–2.8 kg-m, 17–20 ft-lb)
10 mm: 45–50 N·m
(4.5–5.0 kg-m, 33–36 ft-lb)
80–100 N·m
(8–10 kg-m,
58–72 ft-lb)
100–120 N·m
(10–12 kg-m,
71–87 ft-lb)

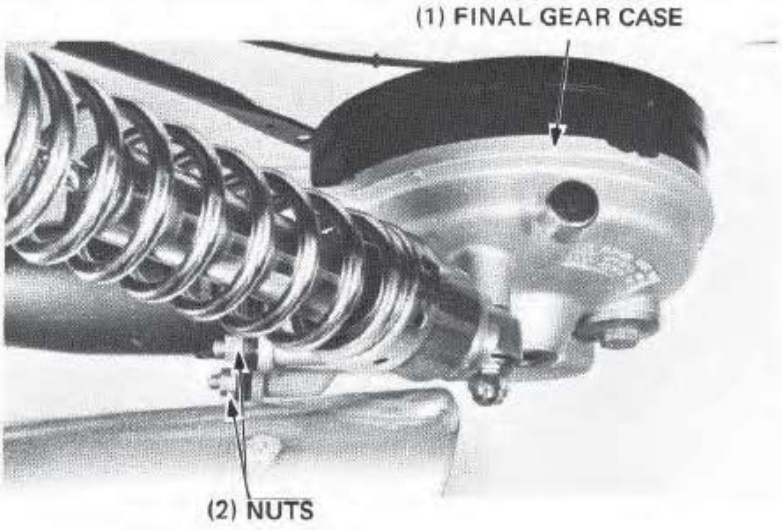

20–24 N·m
(2.0–2.4 kg-m,
14–18 ft-lb)

FINAL DRIVE REMOVAL

Place the motorcycle on its center stand. Drain the final gear oil (page 2-9) and remove the rear wheel (page 16-3).

Remove the left shock absorber (page 16–10).

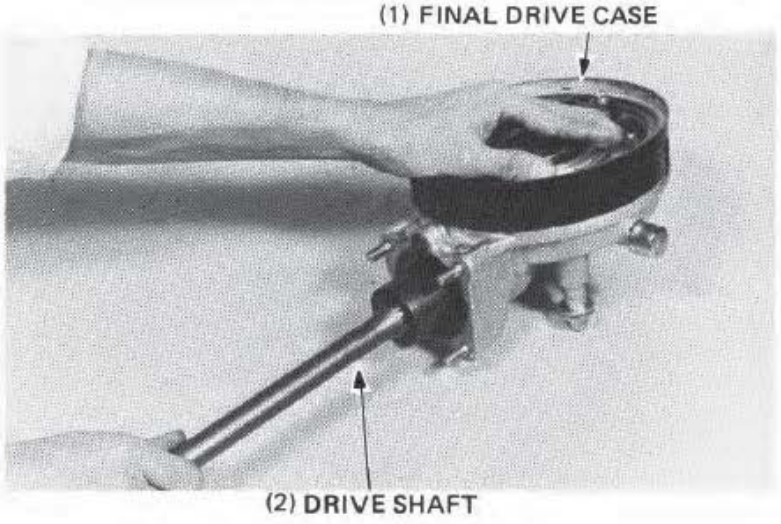
Remove the final gear case attaching nuts and remove the gear case from the swingarm.



DRIVE SHAFT

REMOVAL

Separate the drive shaft from the gear case by gently revolving the shaft in a circular motion while tugging it slightly.



DISASSEMBLY

Remove the spring, oil seal and stop ring from the drive shaft.

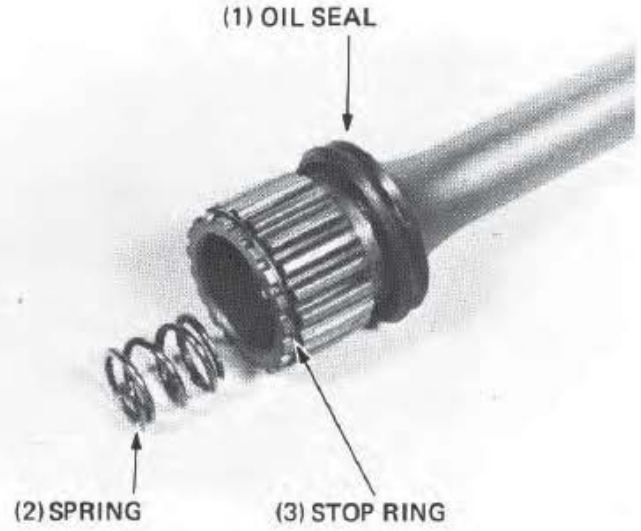
NOTE

Replace the oil seal with a new one if it is removed.

ASSEMBLY

Place a new oil seal over the drive shaft.

Install the damper spring and a new stop ring.



UNIVERSAL JOINT

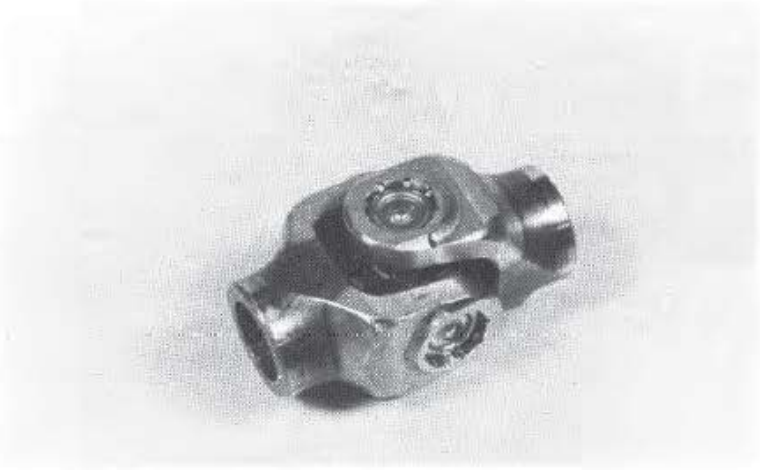
REMOVAL/INSTALLATION

Remove the swingarm (page 16-13).

Remove the universal joint from the engine output shaft.

Inspect the universal joint bearings for excessive play or damage.

Apply grease to the splines and reinstall the universal joint.

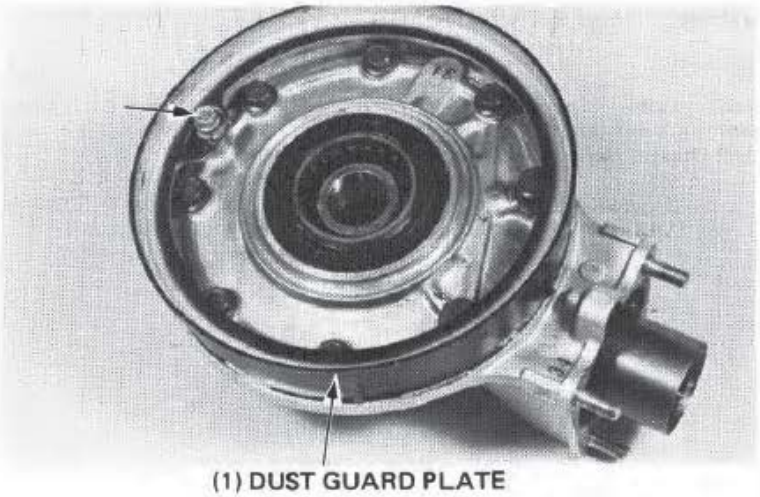


FINAL DRIVE GEAR/CASE

RING GEAR REMOVAL

Remove the distance collar.

Remove the dust guard plate bolts. Remove the dust guard plate by turning it clockwise.



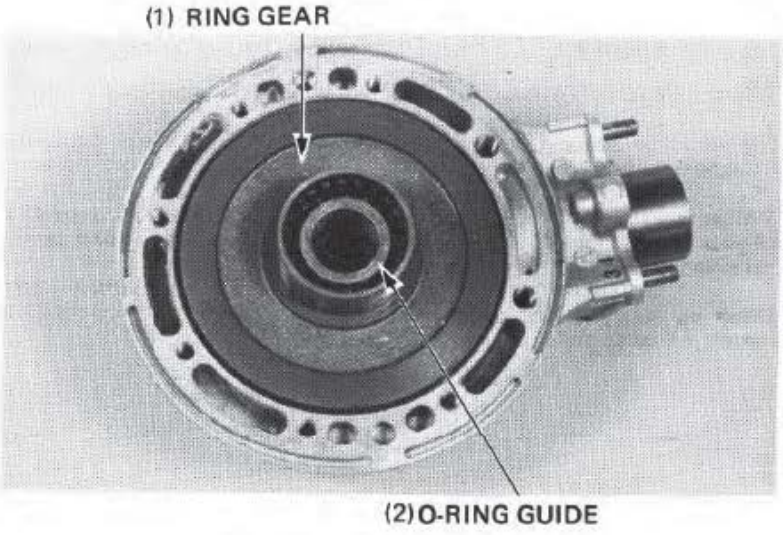
(1) DUST GUARD PLATE

Remove the eight case cover bolts and cover. If the ring gear stays in the cover, do the following:
Place the cover in a press with the ring gear down. Make sure the cover is securely supported.
Press the ring gear out of the cover with driver 07749–0010000 and attachment 07746–0010100 while holding the ring gear.

(1) CASE COVER

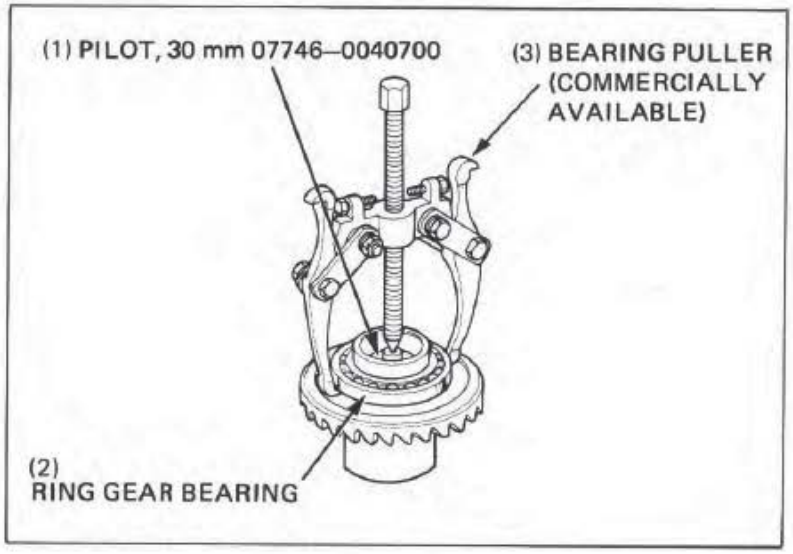
Remove the ring gear from the final drive case.

Remove the O-ring guide by tapping it from the opposite side.



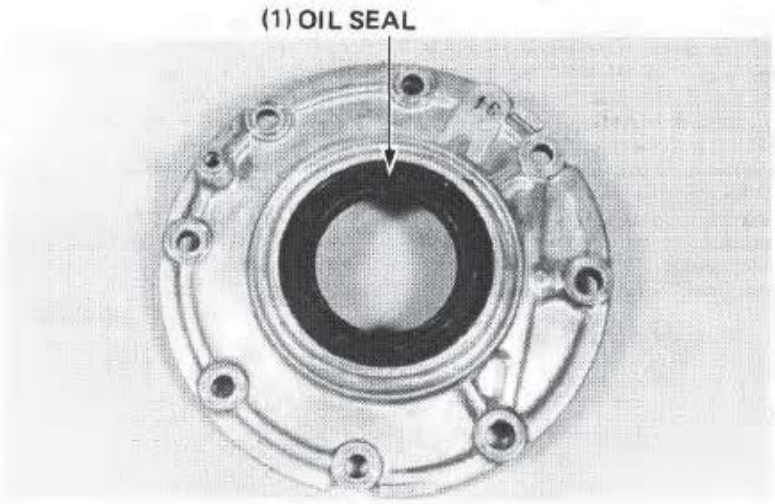
RING GEAR BEARING REMOVAL

Remove the ring gear bearing and gear adjusting spacer.



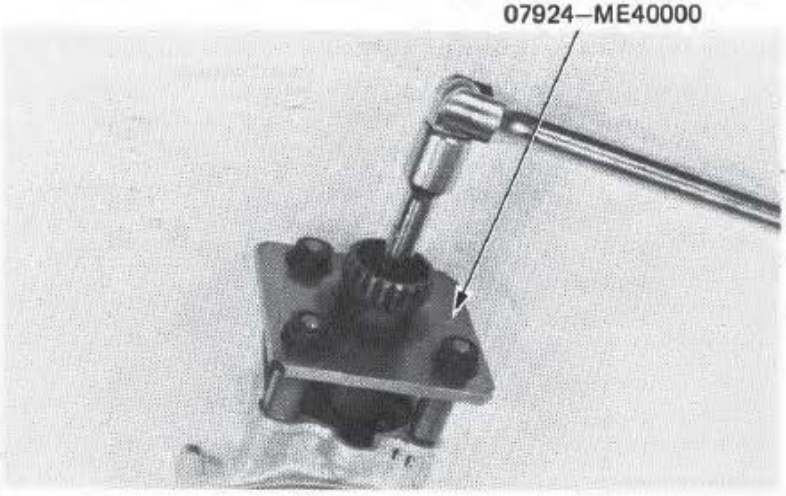
CASE COVER OIL SEAL REPLACEMENT

Remove the oil seal from the case cover and press in a new oil seal.

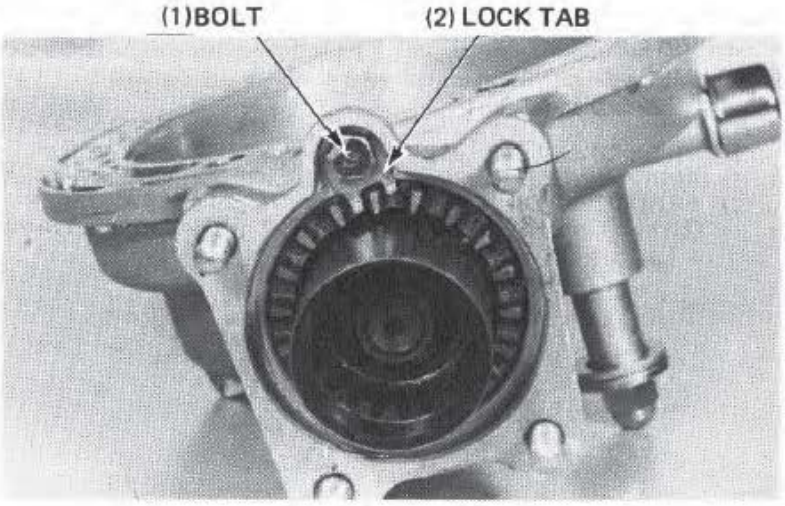


PINION GEAR REMOVAL

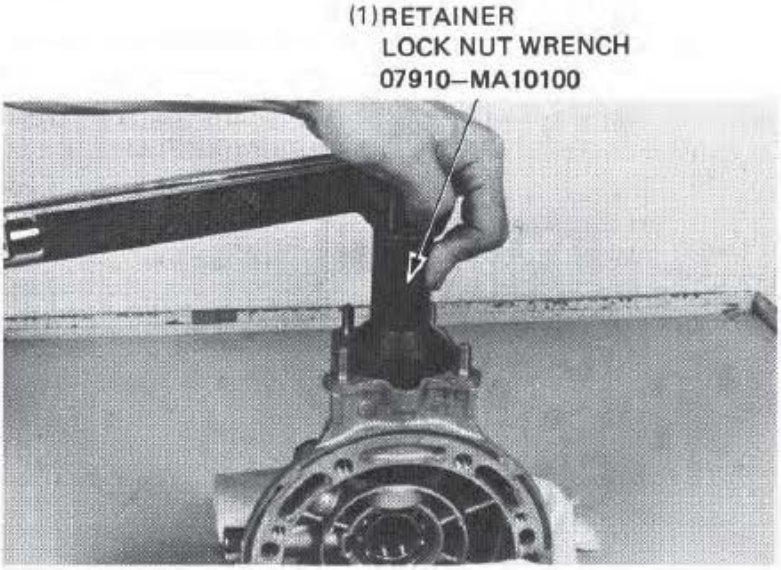
Set the pinion holder onto the pinion joint.
Remove the pinion shaft nut.
Remove the tool and pinion joint.



Remove the retainer bolt lock tab.



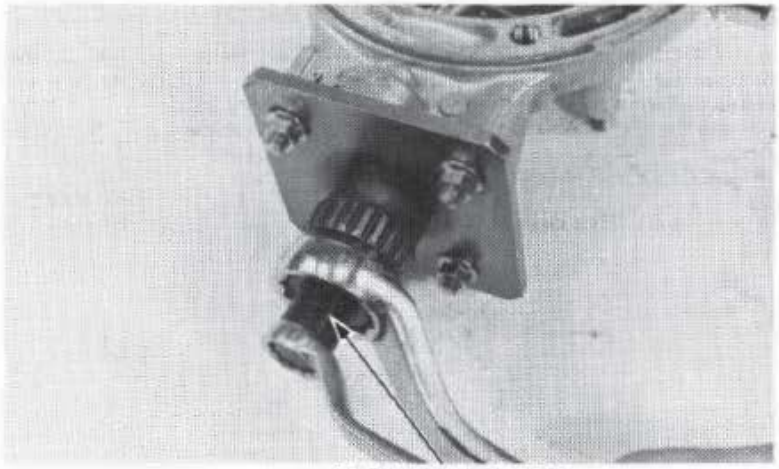
Remove the pinion retainer with the pinion retainer wrench.



Install the pinion holder plate onto the final gear case with the final gear case mounting nuts.

Screw in the pinion puller to the pinion shaft.

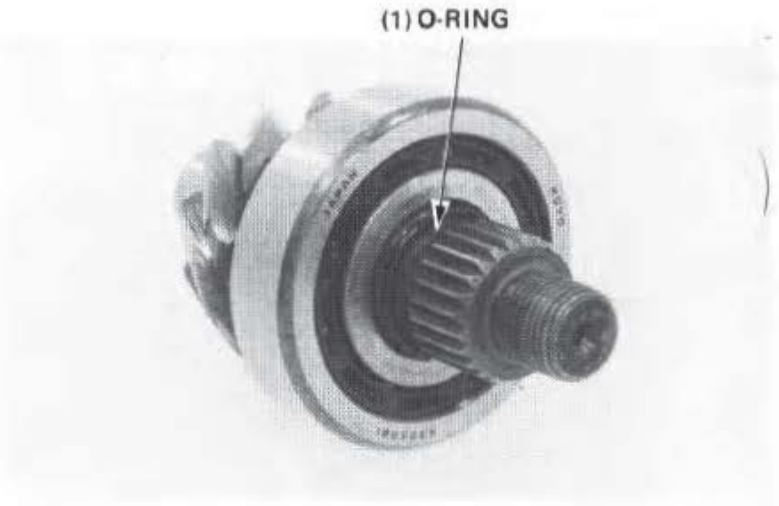
Remove the pinion by turning the pinion puller shaft.



(1) PINION PULLER

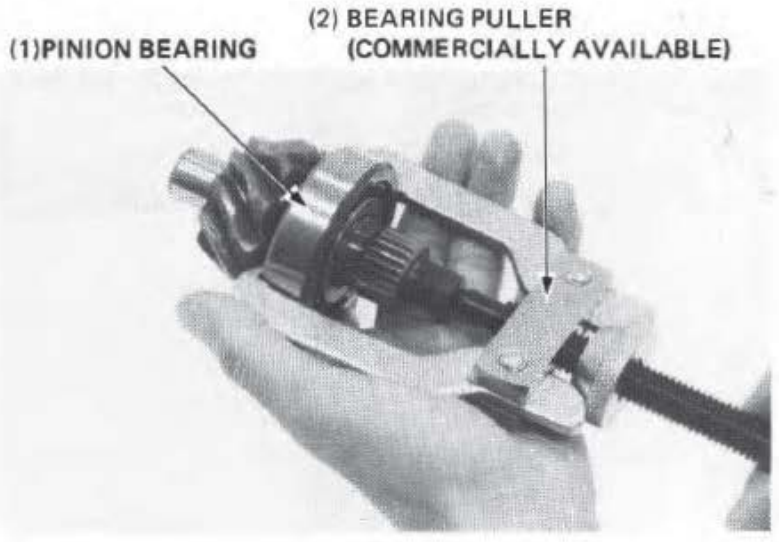
PINION BEARING REMOVAL

Remove the O-ring from the pinion shaft.



Pull the bearing off the shaft with the bearing puller.

Remove the pinion adjustment spacer.

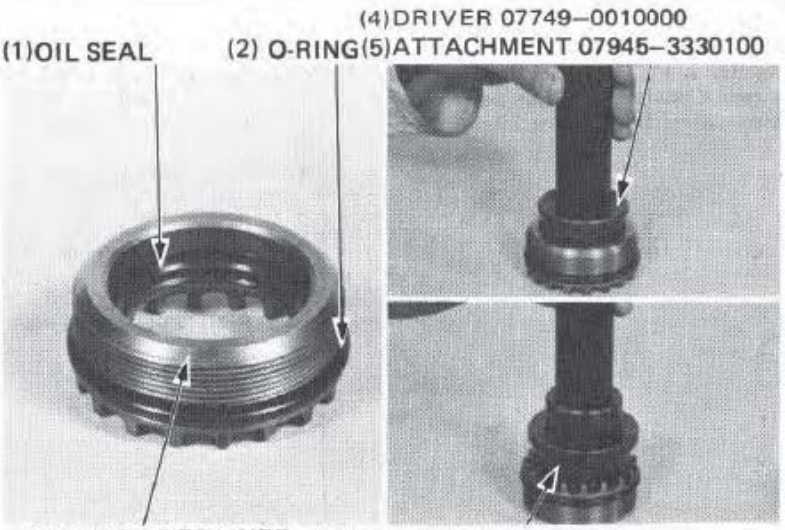


PINION RETAINER OIL SEAL REPLACEMENT

Remove the O-ring and oil seal from the pinion retainer.

Drive a new oil seal into the retainer.

Coat a new O-ring with oil and install it onto the retainer.



CASE BEARING AND OIL SEAL REPLACEMENT

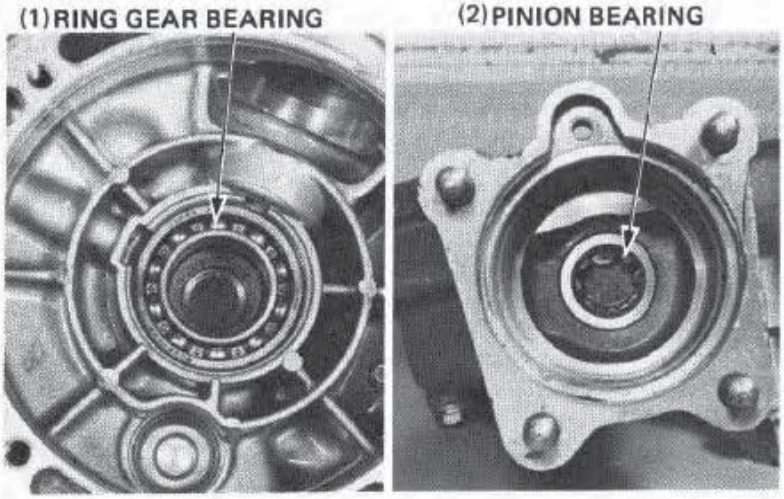
Heat the gear case to 80°C (176°F). Tap the gear case with a plastic hammer and remove the ring gear and pinion bearings.

WARNING

Always wear gloves when handling the gear case after it has been heated.

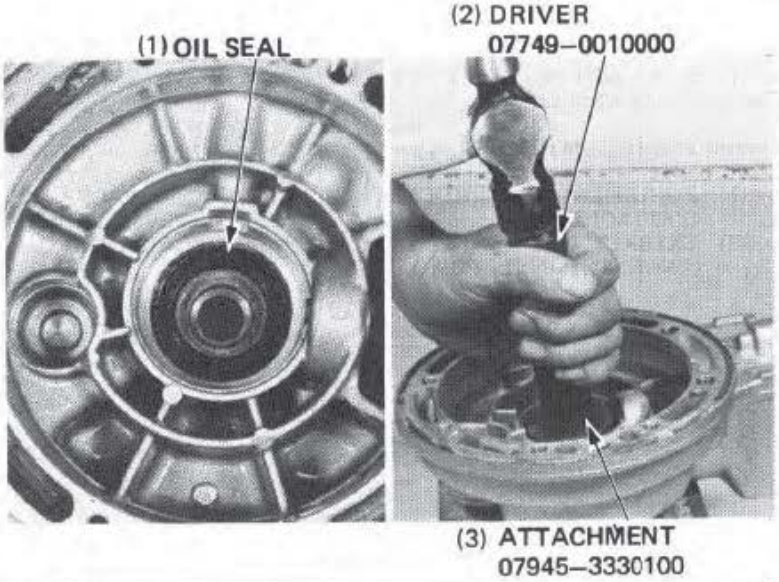
NOTE

The ring gear bearing may be removed using bearing remover, 30 mm 07936–8890100.

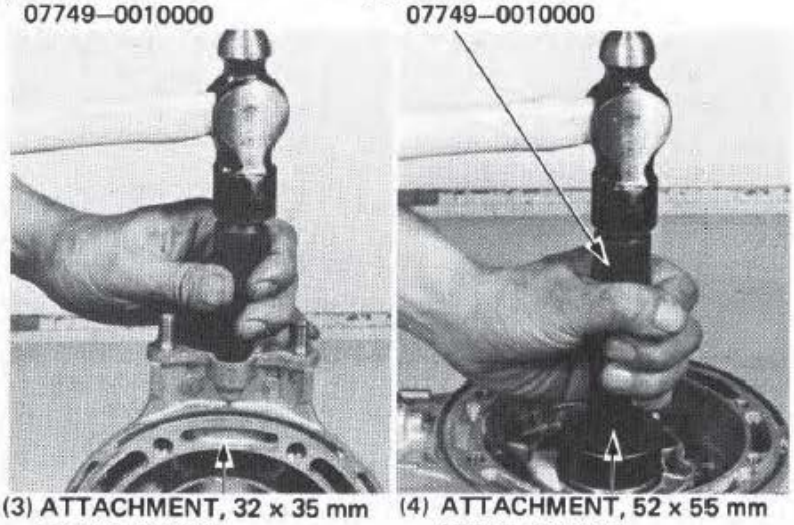


Remove the ring gear shaft oil seal.

Drive a new oil seal into the case, using the special tools.

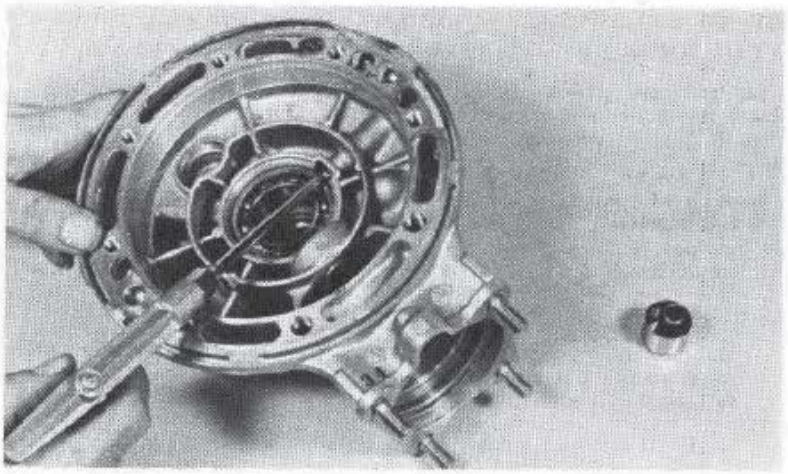


Drive new pinion and ring gear bearings into the case.



BREATHER HOLE CLEANING

Remove the breather hole cap and blow through the breather hole with compressed air.

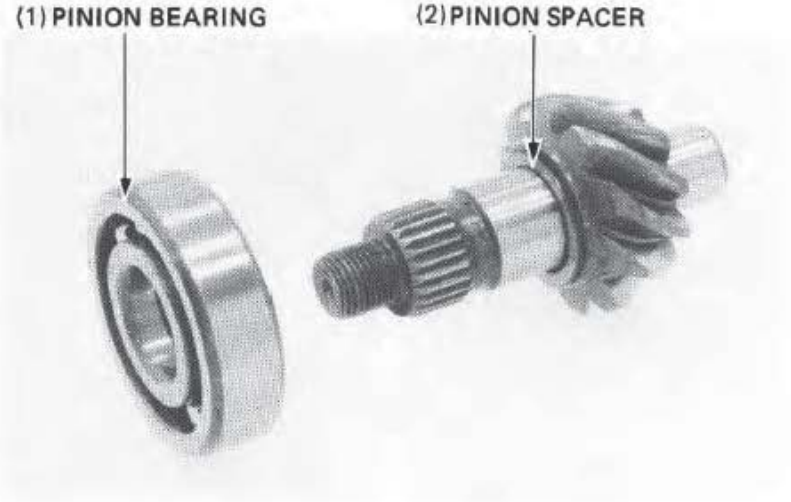


PINION GEAR ASSEMBLY

Install the original pinion gear spacer.

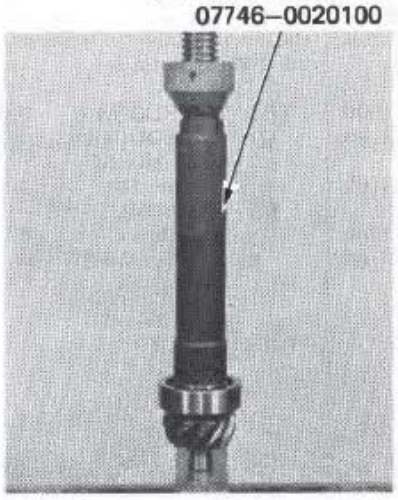
NOTE

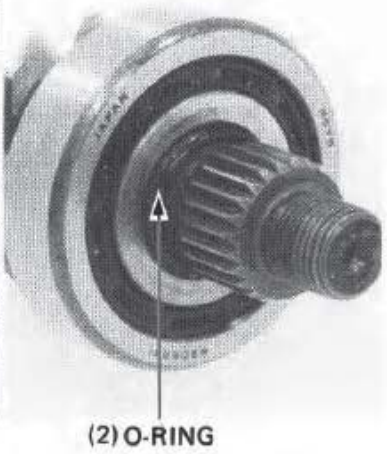
When the gear set, pinion bearing and/or gear case has been replaced, use a 2.0 mm thick spacer.



Press the bearing onto the pinion gear shaft with the tool as shown.

Install a new O-ring over the pinion shaft.

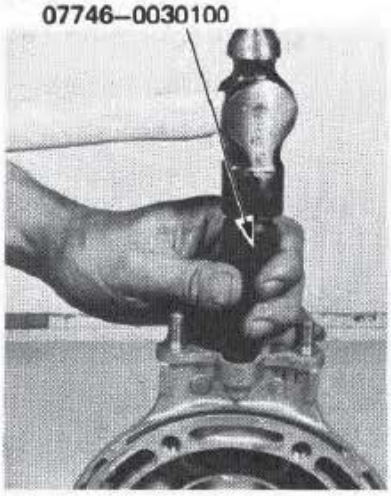


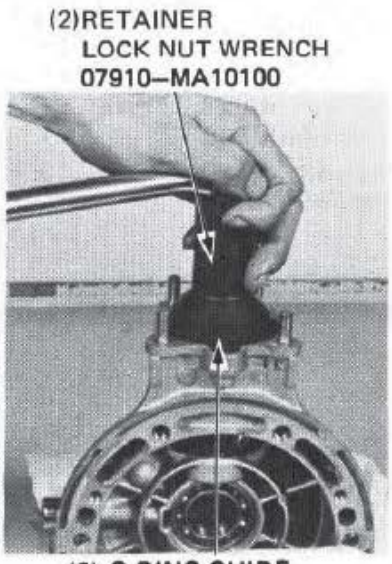


Place the pinion assembly into the gear housing. Drive the pinion assembly into the gear case until the pinion retainer threads can engage with the case threads.
Apply gear oil to the O-ring and threads on the pinion retainer. Install the O-ring guide tool.

Screw in the pinion retainer to press the pinion bearing in place, then tighten it to the specified torque.

TORQUE: 100–120 N·m
(10–12 kg-m, 72–87 ft-lb)





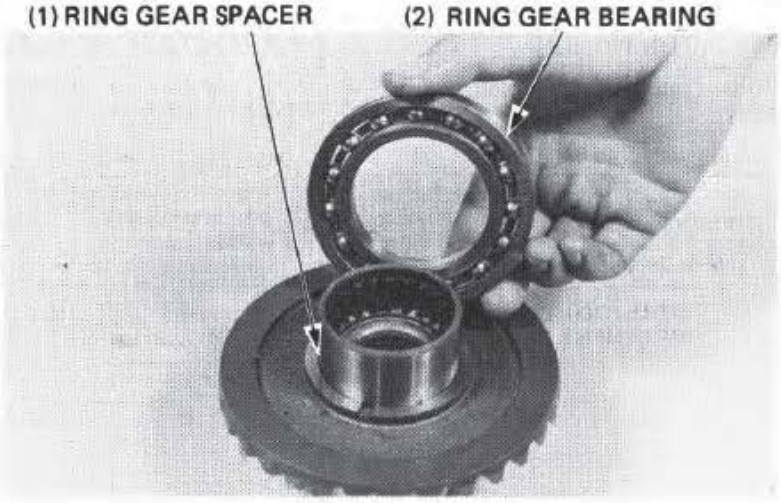
RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

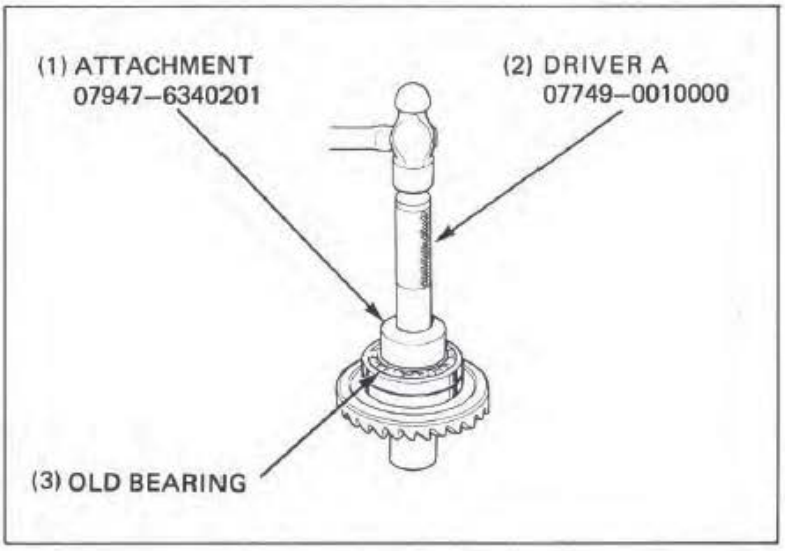
NOTE

If the gear set, pinion bearing, ring gear bearing and/or gear case is replaced, install a 2.0 mm thick spacer.

Place the ring gear bearing over the ring gear shaft.

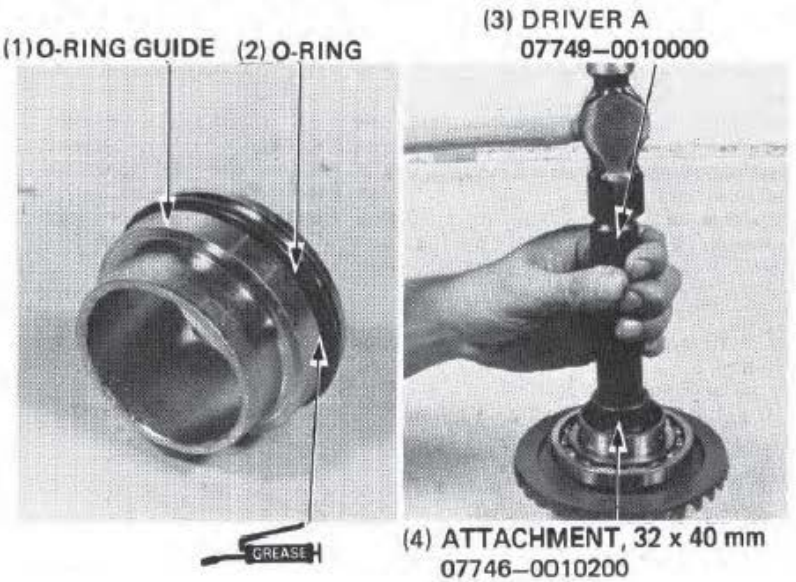


Place a new ring gear bearing on the ring gear shaft. Place the old bearing on top of it. Then, drive the new bearing onto the shaft with the old bearing and attachment. Then remove the old bearing.



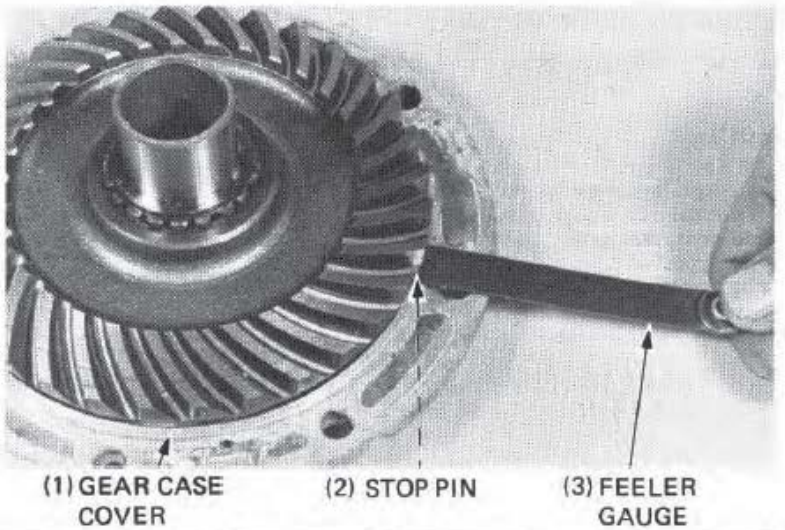
Install a new O-ring onto the O-ring guide.

Apply grease to the O-ring and drive the O-ring guide onto the ring gear shaft.



Install the ring gear into the gear case cover. Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

CLEARANCE: 0.30–0.60 mm (0.012–0.024 in)



Remove the ring gear. If the clearance exceeds the service limit, heat the gear case cover to approximately 80°C (176°F). Remove the stop pin by turning the cover over and tapping it lightly with a plastic hammer.

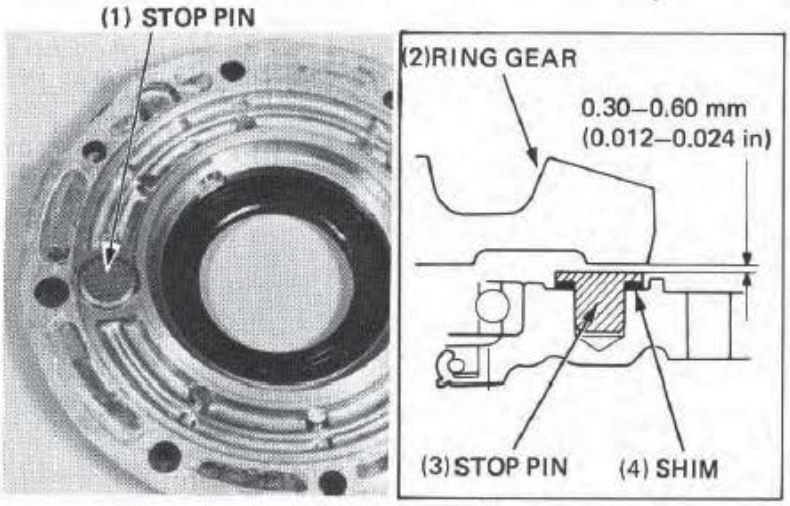
CAUTION

Always wear gloves when handling the gear case after it has been heated.

Install a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the case cover.

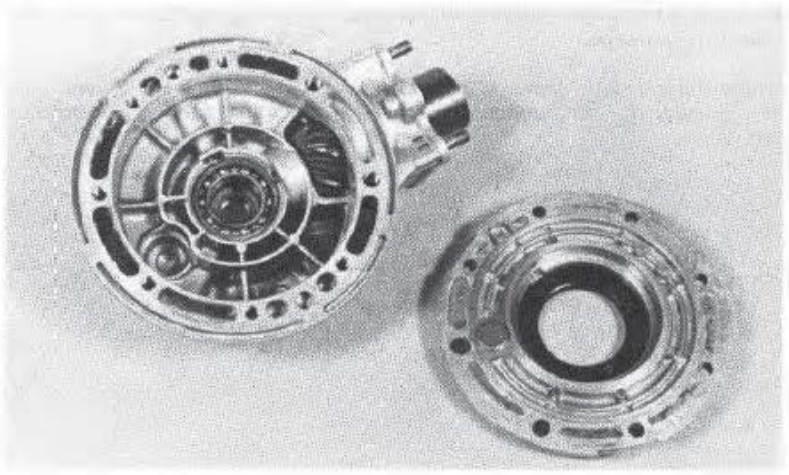


Clean all sealing material off the mating surfaces of the gear case and cover.

NOTE

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces of the case and cover.

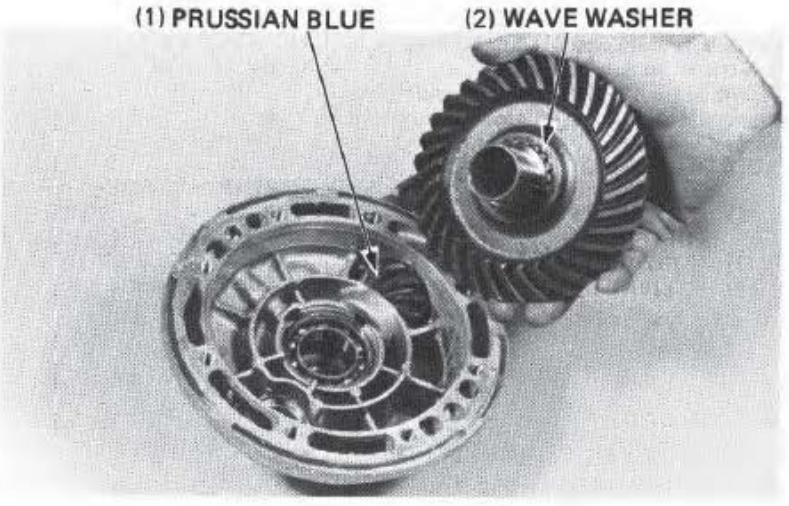
Apply liquid sealant to the mating surface of the gear case cover.



GEAR TOOTH CONTACT PATTERN CHECK

Apply a thin coat of Prussian Blue to the pinion gear teeth for a gear tooth contact pattern check. Place the wave washer and ring gear into the gear case.

Apply gear oil to the lip of the oil seal on the gear case cover and install the gear case cover.

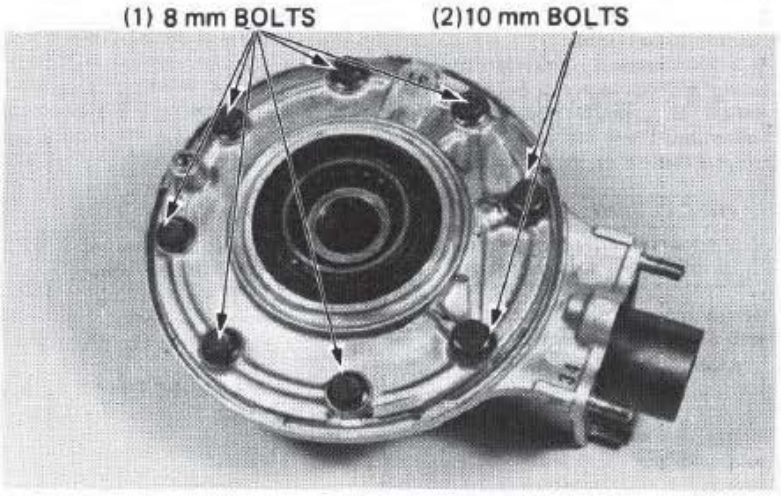


Tighten the cover bolts in 2—3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.

TORQUE: 23—28 N·m
(2.3—2.8 kg-m, 17—20 ft-lb)

Then tighten the 10 mm bolts.

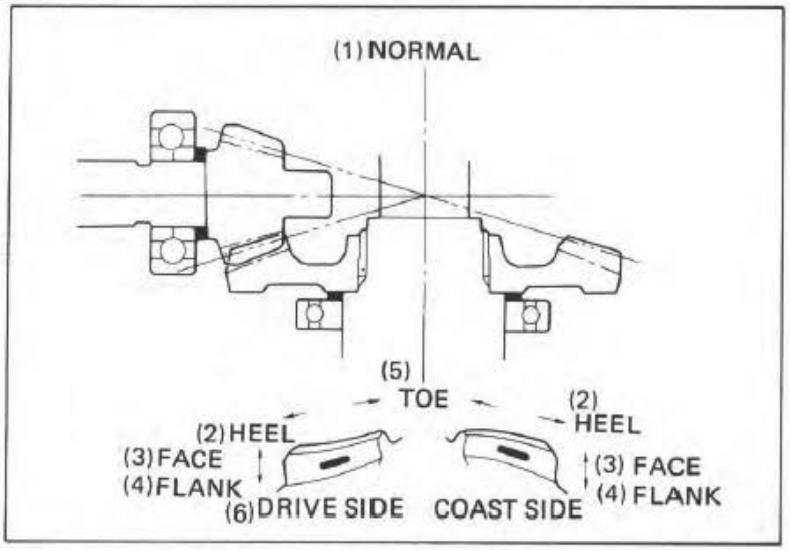
TORQUE: 40—50 N·m
(4.5—5.0 kg-m, 33—36 ft-lb)



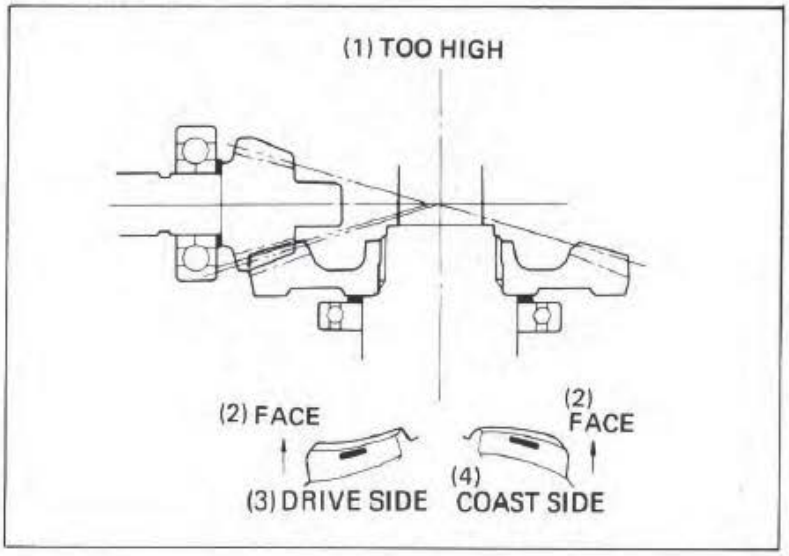
Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in the normal direction of rotation. Check the gear tooth contact pattern through the oil filler hole. The pattern is indicated by the Prussian Blue applied to the pinion before assembly.

Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly to the flank side.



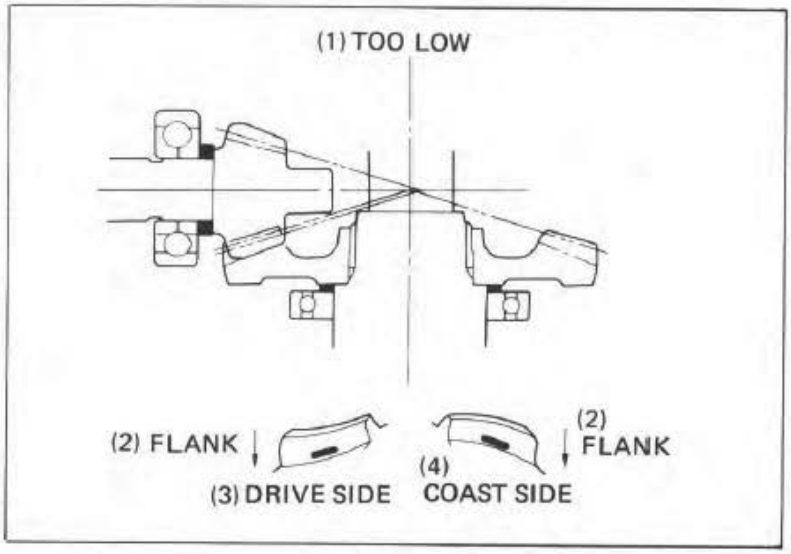
If the patterns are not correct, remove and replace the pinion spacer. Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.



Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side. The patterns will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

PINION SPACER:

A	1.32 mm (0.052 in)
B	1.38 mm (0.054 in)
C	1.44 mm (0.057 in)
D	1.50 mm (0.059 in)
E	1.56 mm (0.061 in)
F	1.62 mm (0.063 in)
G	1.68 mm (0.066 in)

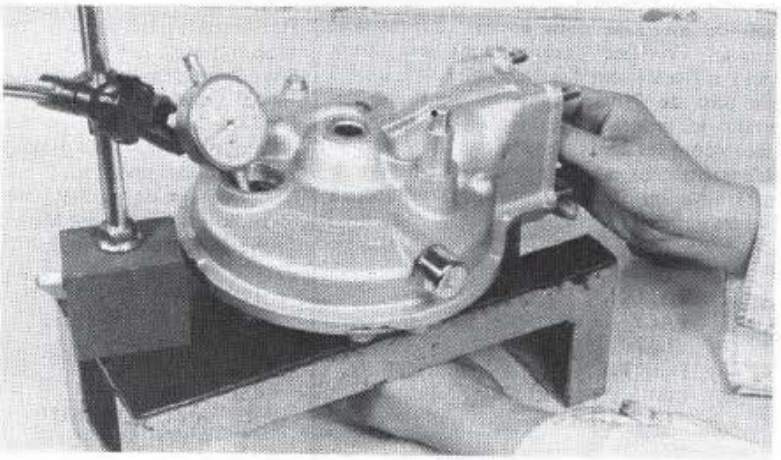


BACKLASH INSPECTION

Remove the oil filler cap.

Set the final gear assembly into a jig or stand to hold it steady. Set a horizontal type dial indicator on the ring gear, through the oil filler hole.
Hold the pinion gear spline by hand. Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read backlash.

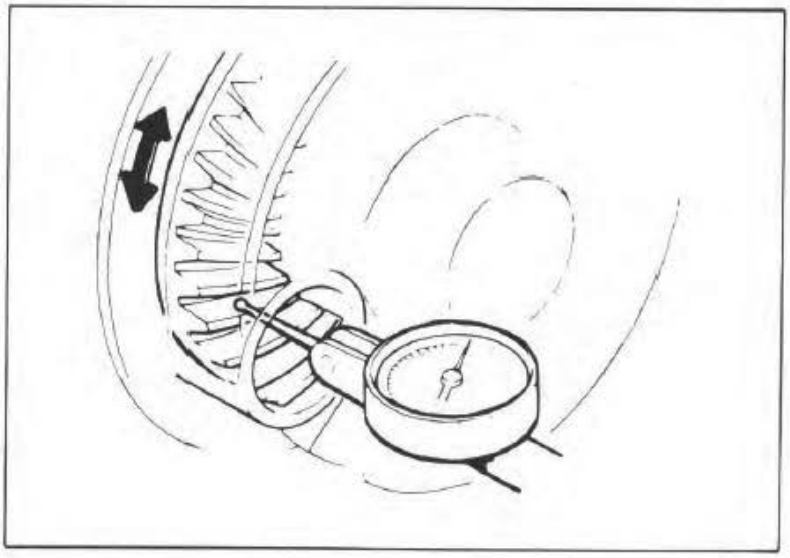
STANDARD: 0.08–0.18 mm (0.003–0.007 in)
SERVICE LIMIT: 0.30 mm (0.02 in)



Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the differences of the three measurements.

DIFFERENCE OF MEASUREMENT
SERVICE LIMIT: 0.10 mm (0.004 in)



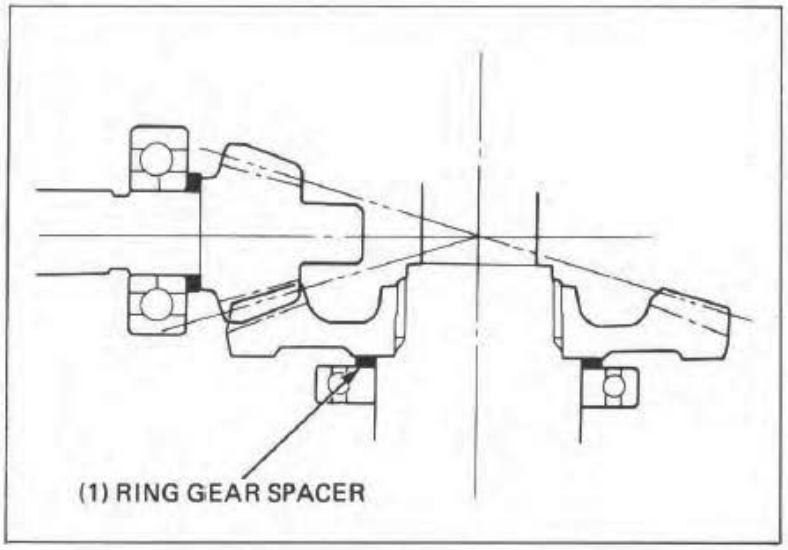
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is too small, replace the ring gear spacer with a thinner one.

Backlash is changed by about 0.06–0.07 mm (0.002–0.003 in) when thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACER

- **A 1.32 mm (0.052 in)**
- **B 1.38 mm (0.054 in)**
- **C 1.44 mm (0.057 in)**
- **D 1.50 mm (0.059 in)**
- **E 1.56 mm (0.061 in)**
- **F 1.62 mm (0.063 in)**
- **G 1.68 mm (0.066 in)**

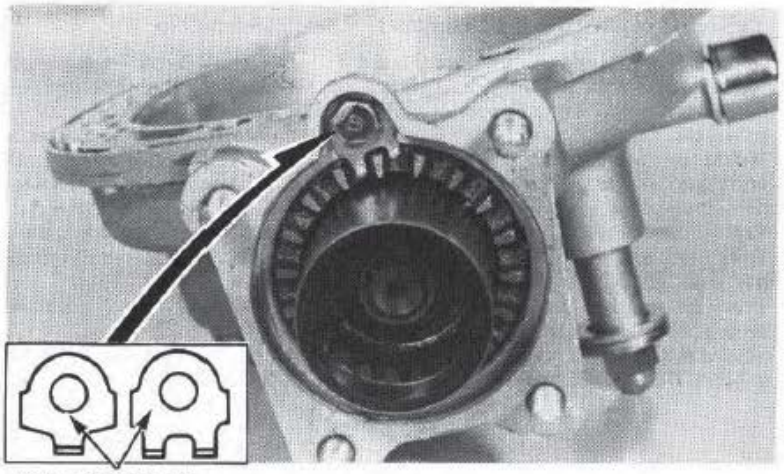


PINION JOINT INSTALLATION

Install the appropriate pinion retainer lock tab.

NOTE

There are two types of lock tabs as shown.

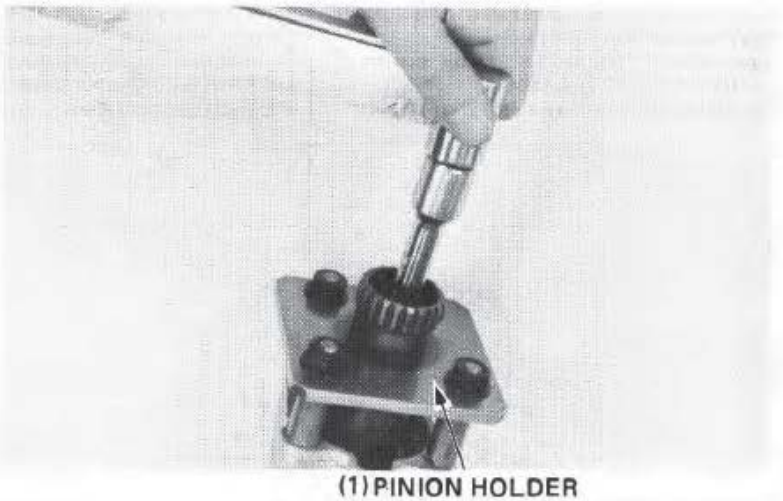


Apply gear oil to the oil seal lip contact surface of the pinion joint and install the pinion joint.

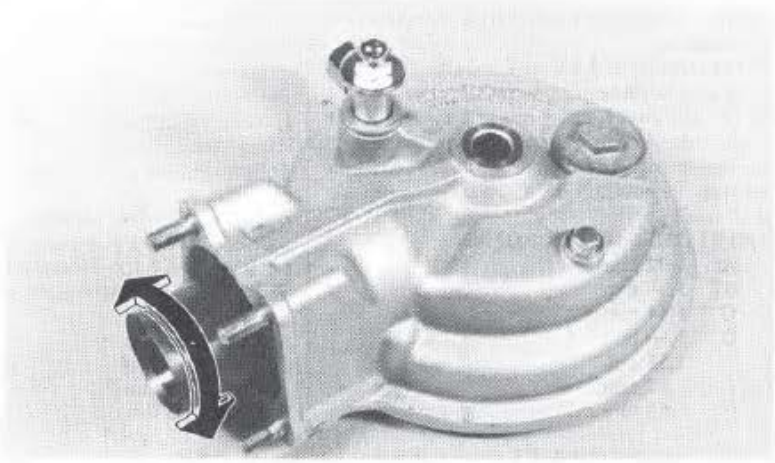
Install the pinion joint holder tool and tighten the pinion nut.

TORQUE: 80–100 N·m
(8–10 kg-m, 58–72 ft-lb)

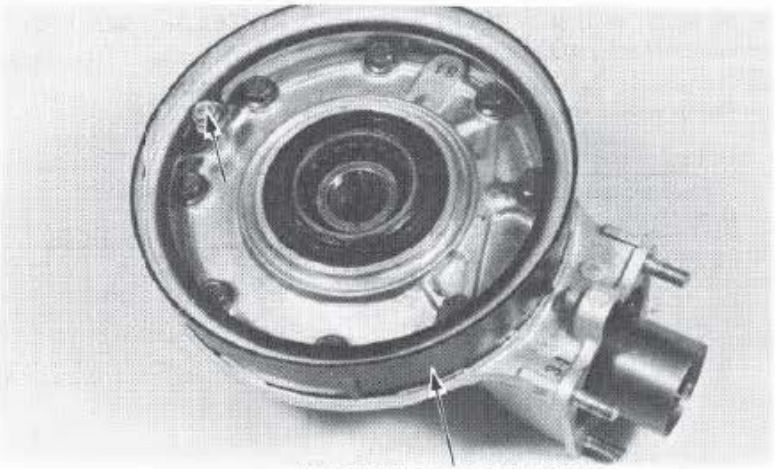
Remove the pinion joint holder tool.



Make sure that the gear assembly rotates smoothly without binding by turning the pinion joint.



Install the dust guard plate and tighten the bolt.



(1) DUST GUARD PLATE

FINAL DRIVE INSTALLATION

Apply multipurpose grease to the pinion joint splines and drive shaft oil seal.

Insert the drive shaft into the swingarm and align its splines with the universal joint.

(1) STOP RING (2) OIL SEAL

Install the gear case and drive shaft into the swing arm.

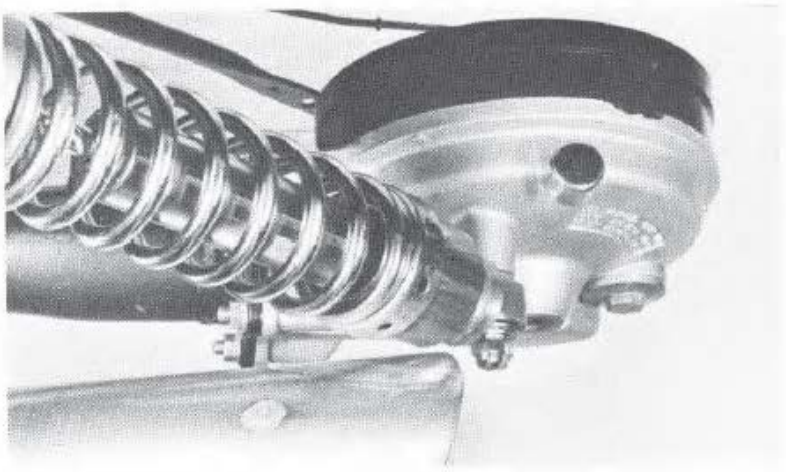
NOTE

- Make sure that the stop ring is seated properly by pulling on the drive shaft lightly.
- Be careful not to damage the drive shaft oil seal.

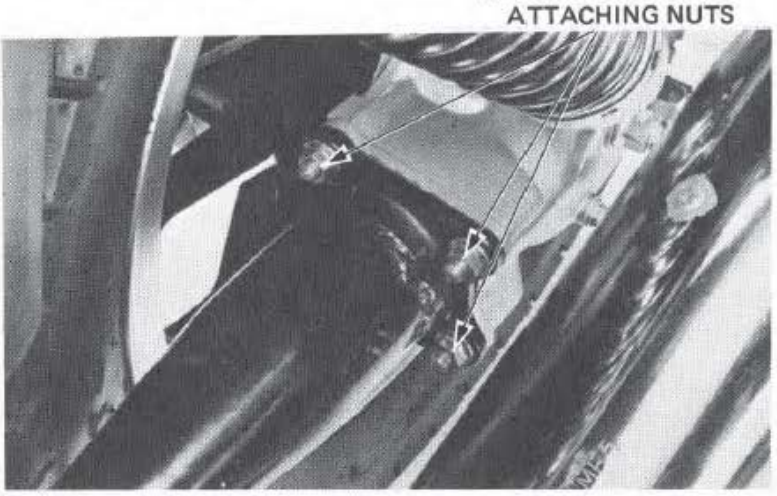
Attach the gear case onto the swingarm loosely.

NOTE

To ease axle installation, do not tighten the gear case nuts until after the axle is installed.



(1) FINAL GEAR CASE ATTACHING NUTS



Install the rear wheel (page 16-7).

Tighten the axle nut.

TORQUE: 50–80 N·m
(5.0–8.0 kg-m, 36–58 ft-lb)

Tighten the axle pinch bolt.

TORQUE: 20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)

Tighten the four final gear case attaching nuts.

TORQUE: 20–24 N·m
(2.0–2.4 kg-m, 14–18 ft-lb)

Install the left shock absorber (page 16-12).

Place the motorcycle on its center stand.

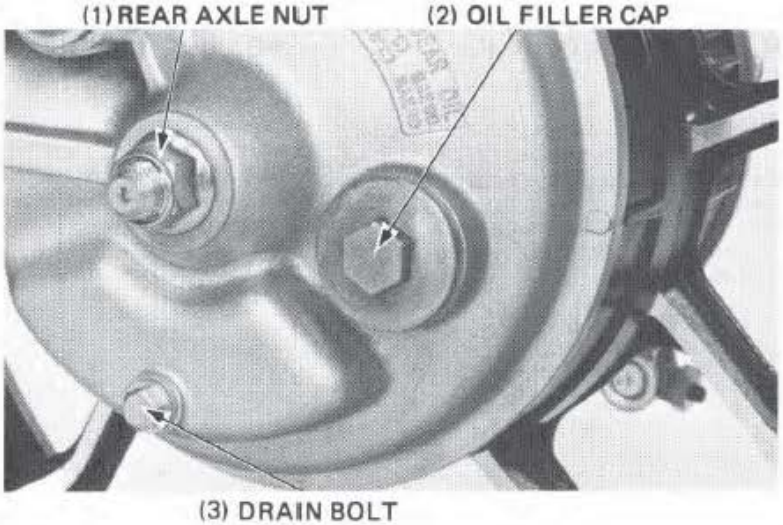
Make sure that the drain bolt is tightened.

Remove the oil filler cap and pour the specified amount of recommended oil up to the filler neck.

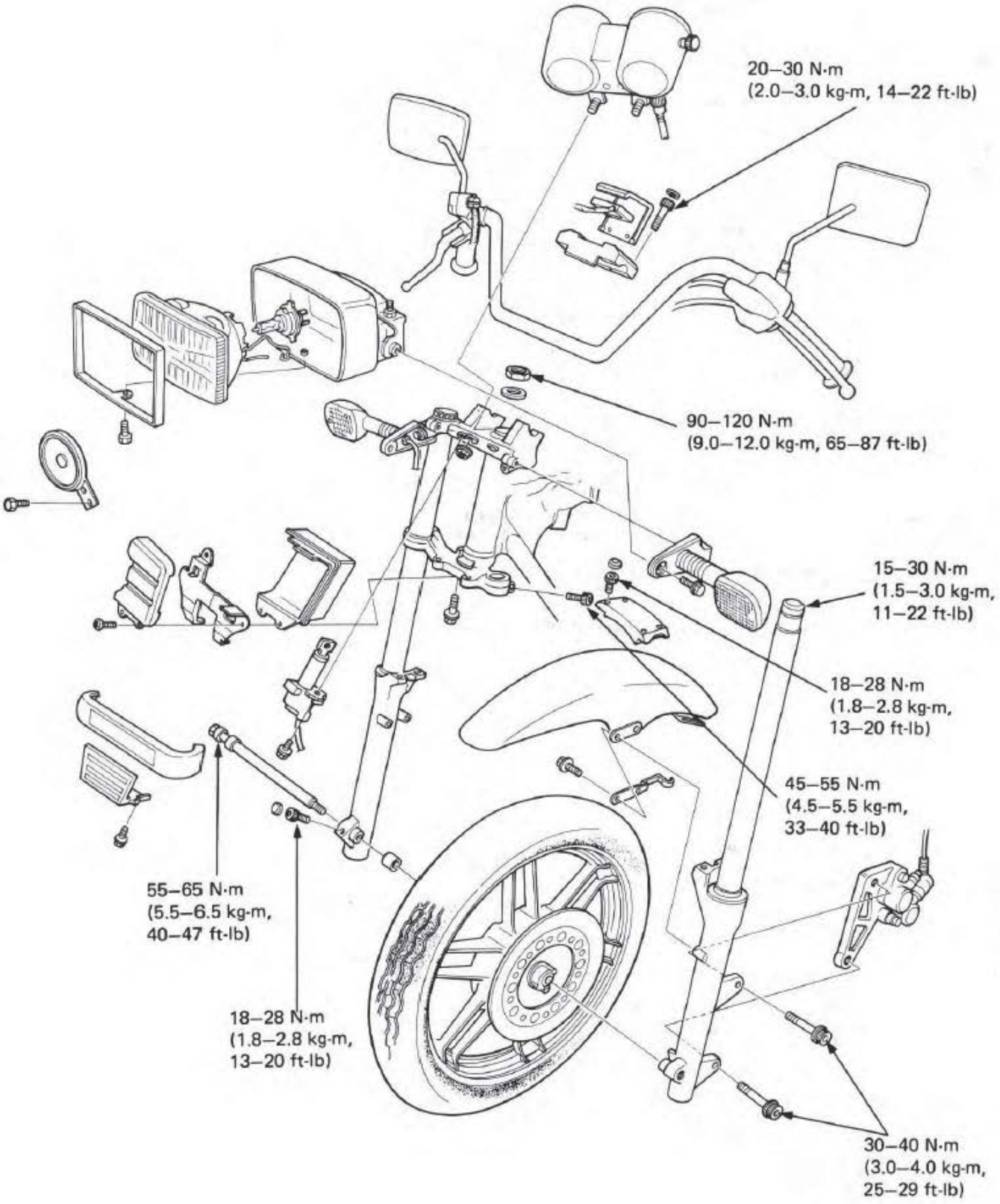
RECOMMENDED OIL: HYPOID GEAR OIL
Over 5°C: SAE 90
Below 5°C: SAE 80

OIL CAPACITY: 150 cc (5.1 oz)

(1) REAR AXLE NUT (2) OIL FILLER CAP



(3) DRAIN BOLT

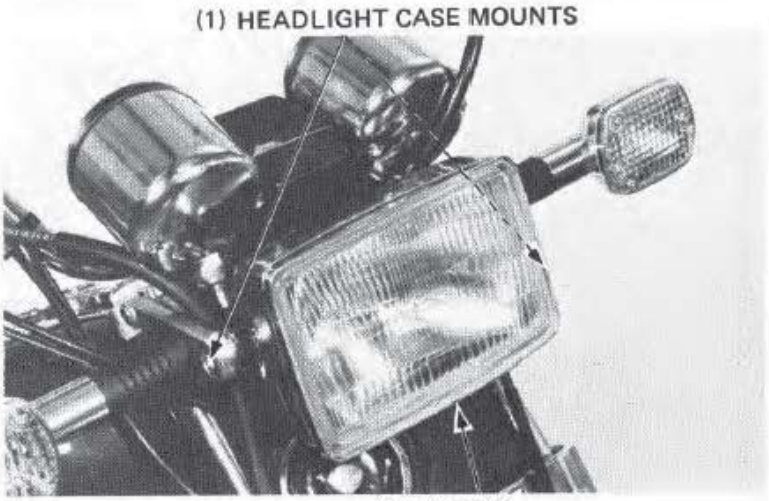

20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)
90–120 N·m
(9.0–12.0 kg-m, 65–87 ft-lb)
15–30 N·m
(1.5–3.0 kg-m,
11–22 ft-lb)
18–28 N·m
(1.8–2.8 kg-m,
13–20 ft-lb)
45–55 N·m
(4.5–5.5 kg-m,
33–40 ft-lb)
55–65 N·m
(5.5–6.5 kg-m,
40–47 ft-lb)
18–28 N·m
(1.8–2.8 kg-m,
13–20 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
25–29 ft-lb)

HEADLIGHT

CASE REMOVAL

Remove the headlight mounting screw.
Disconnect the wire coupler and remove the headlight.

To remove the headlight case, unscrew the headlight case mounts.



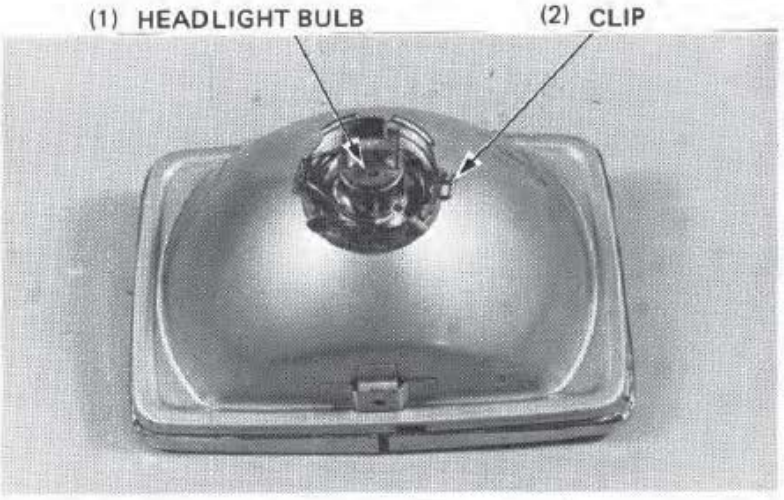
BULB REPLACEMENT

Remove the clip and headlight bulb.

Install a new headlight bulb and install the clip.

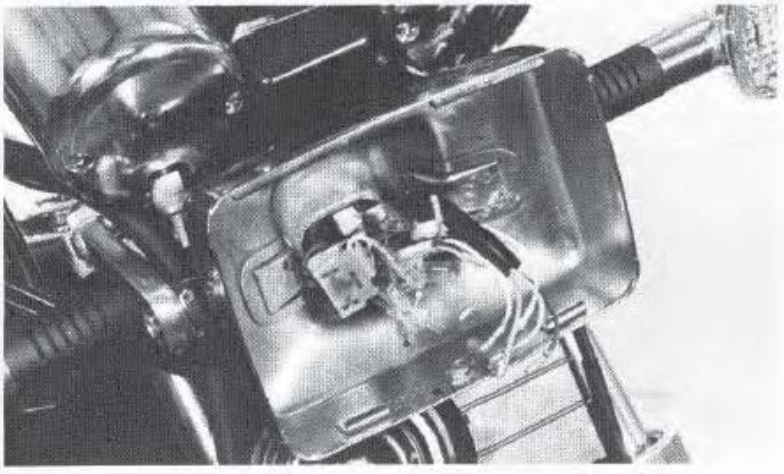
CAUTION

Do not leave fingerprints on the bulb, they may create hot spots. Wear clean gloves when installing the halogen bulb. If you do touch the bulb with bare hands, clean it with an alcohol-moistened cloth before installing it in the case.



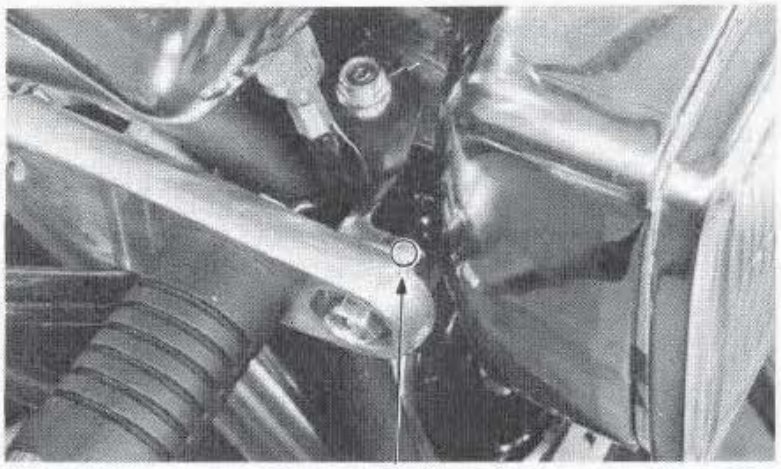
WIRING CONNECTIONS IN HEADLIGHT CASE

Route the wires into the headlight case through the headlight case hole.
Connect the color-coded wires and couplers.



CASE INSTALLATION

Align the index marks on the headlight case stays with the index marks on the brackets.

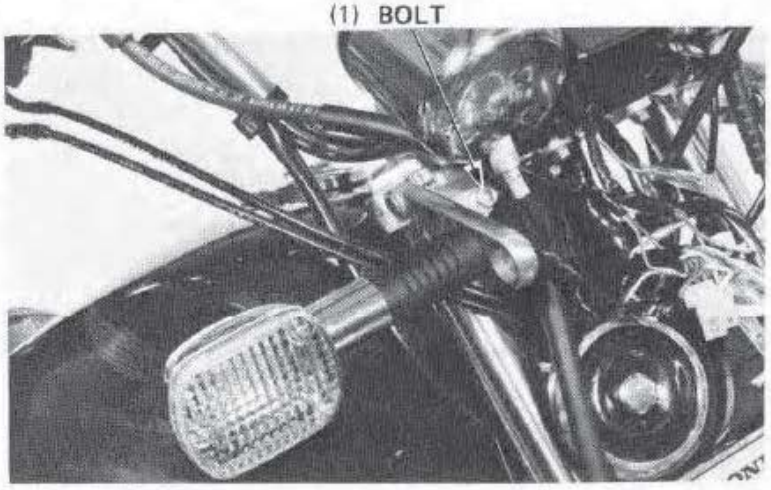


(1) INDEX MARKS

BRACKET REMOVAL/INSTALLATION

Remove the headlight case.
Remove the headlight bracket bolts and bracket/turn signal assembly.

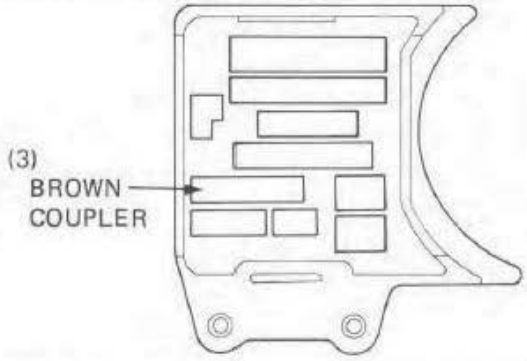
Install the headlight bracket in the reverse order of removal.



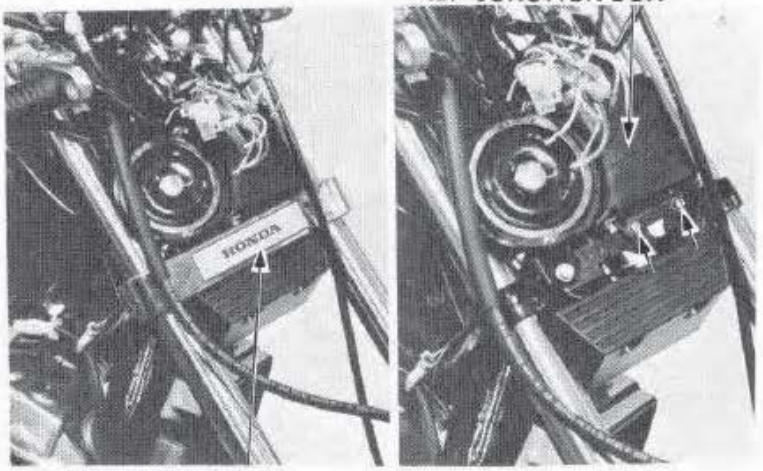
(1) BOLT

INSTRUMENTS

Remove the headlight case.
Remove the fork cover and electrical junction box from the steering stem.
Remove the brown coupler from the junction box.



(3) BROWN COUPLER

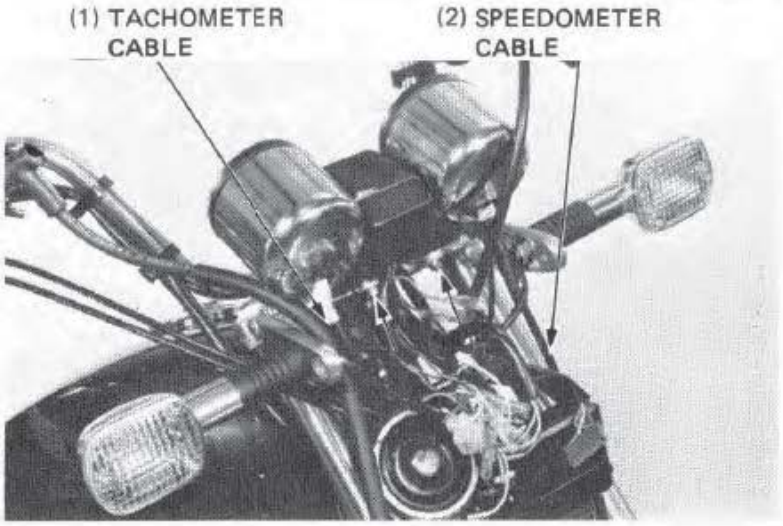


(2) JUNCTION BOX

(1) FORK COVER

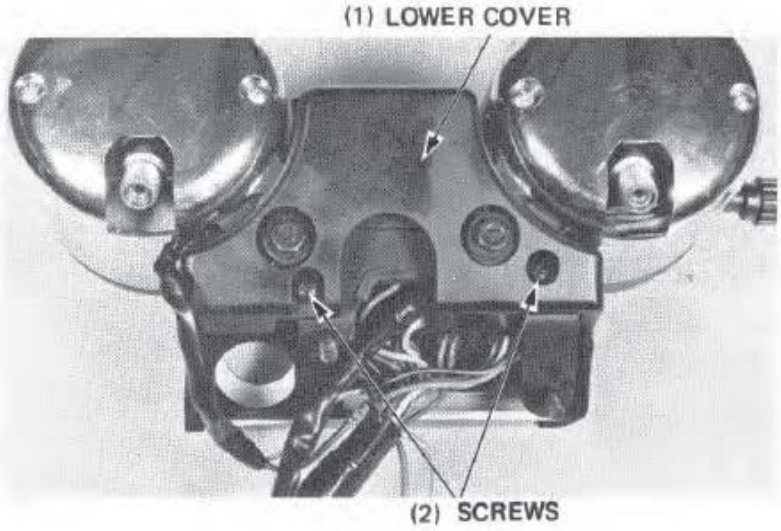
Remove the speedometer and tachometer cables from the instruments.

Remove the instrument mounting nuts and instruments.

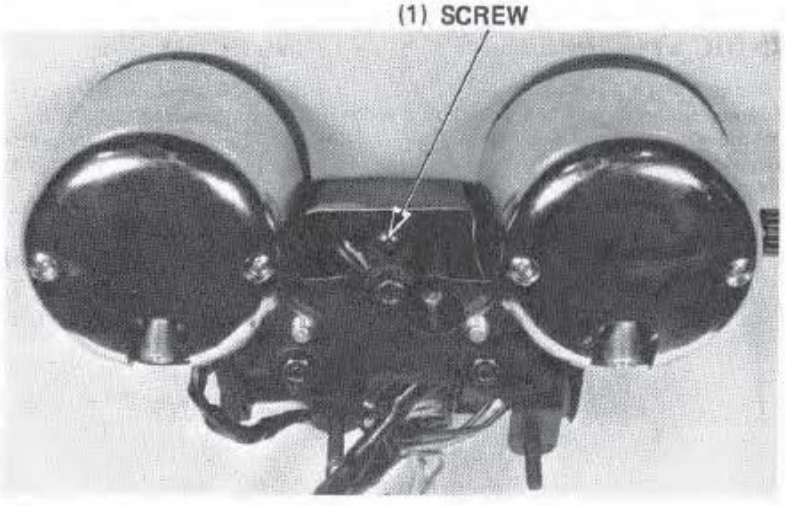


DISASSEMBLY

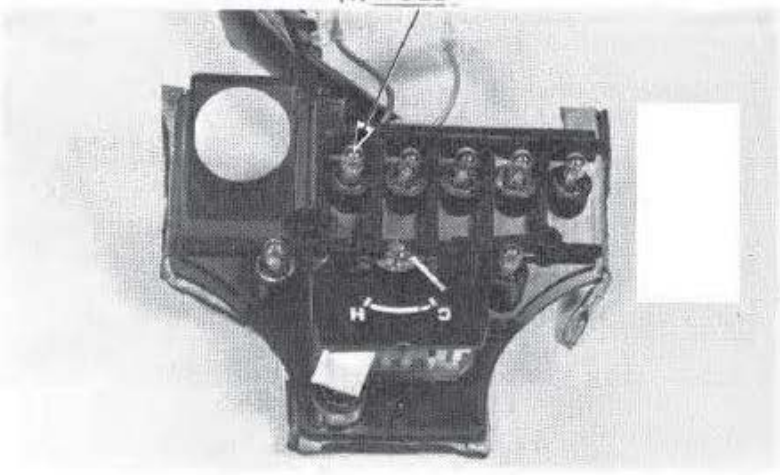
Remove the instrument lower cover mounting screws and lower cover.



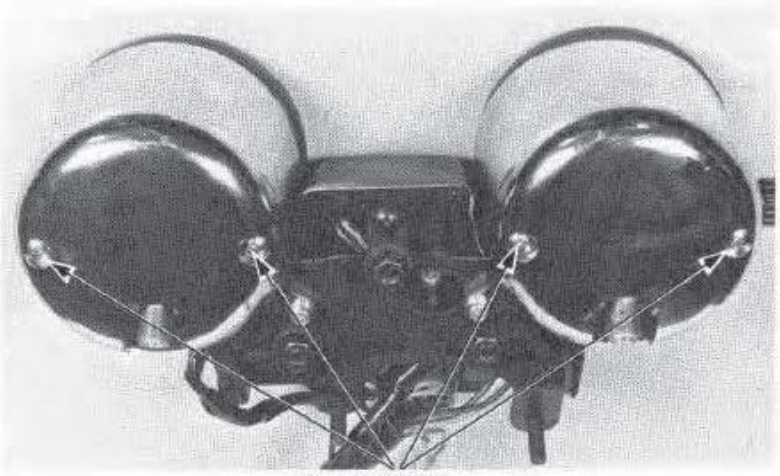
Remove the instrument bracket mounting screw and bracket.



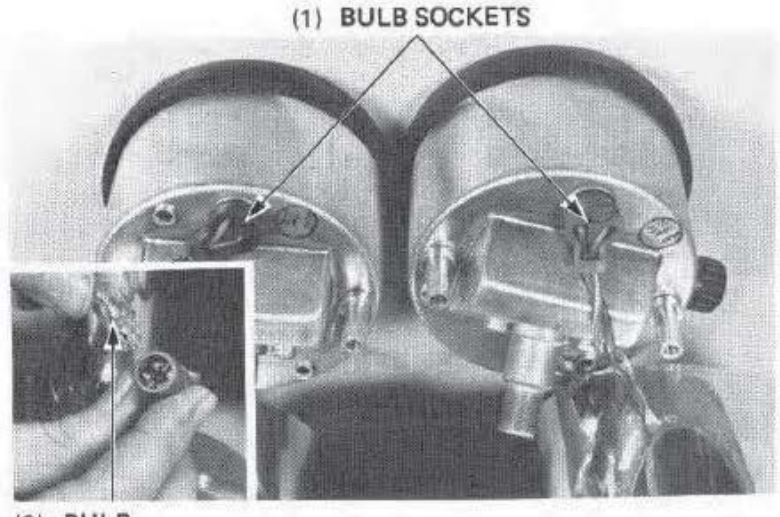
Remove the instrument bulbs and replace any burnt out bulbs.
After installing a new bulb, check to be sure it lights.
If the bulb doesn't light, inspect the wiring for an open or short circuit.



Remove the meter setting screws and meter.



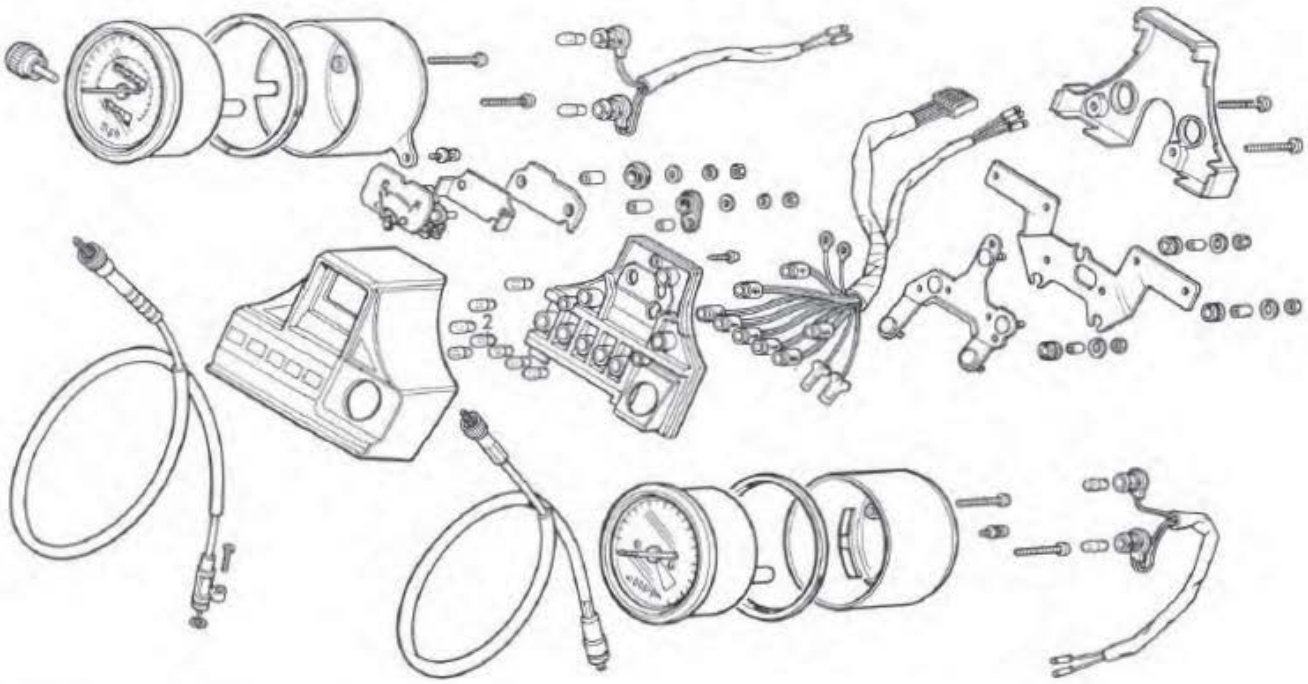
Replace the bulb.
If a replacement bulb does not light, check the wiring for an open circuit or loose connections.



ASSEMBLY/INSTALLATION

Lubricate the speedometer and tachometer cables before reconnecting.

Reassemble and install in the reverse order of removal and disassembly.



HANDLEBAR SWITCH REPLACEMENT

NOTE

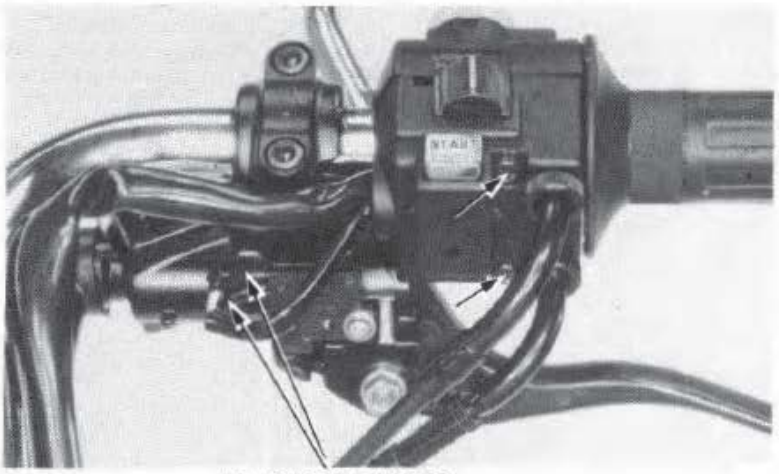
This procedure is for either right or left handlebar switch replacement. The procedures for the right switch are discried here.

Remove the handlebar switch mounting screws and throttle cables.

Disconnect the switch wires from the switch.

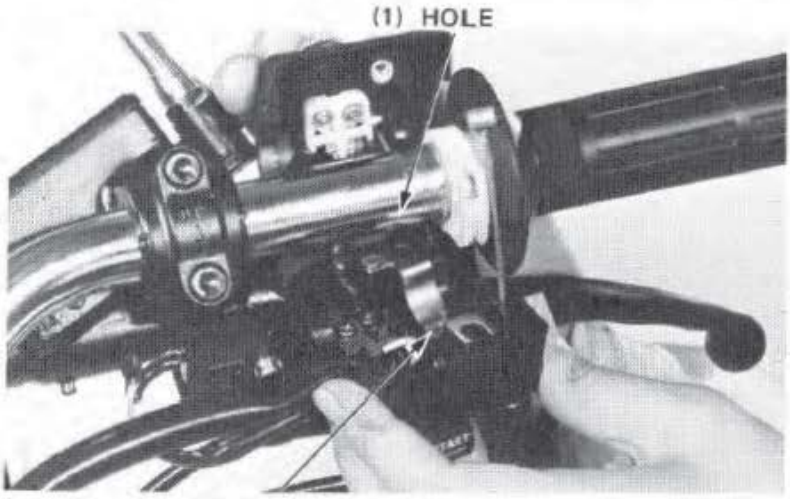
Remove the headlight case, fork-cover and junction box.

Disconnect the right handlebar switch coupler (Natural) from the junction box and remove the switch.



(1) SWITCH WIRES

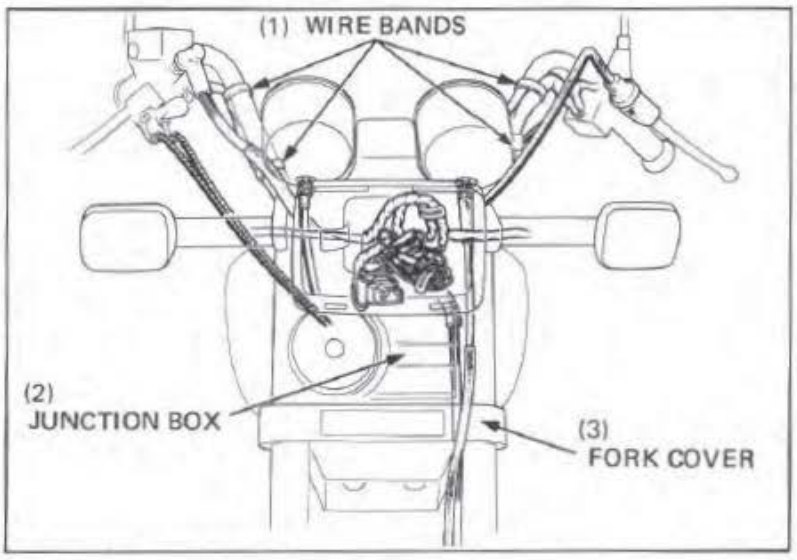
Install a new switch aligning the switch pin with the hole in the handlebar. Tighten the forward screw first, then tighten the rear screw. Check the operation of the switch.
After installing, adjust throttle cable free play (page 3-5).



HANDLEBARS

REMOVAL

Remove the harness wire bands.
Remove the headlight case (page 15-3), fork cover and junction box (page 15-4).



Disconnect the brake light switch wires and remove the two screws on the switch housing.

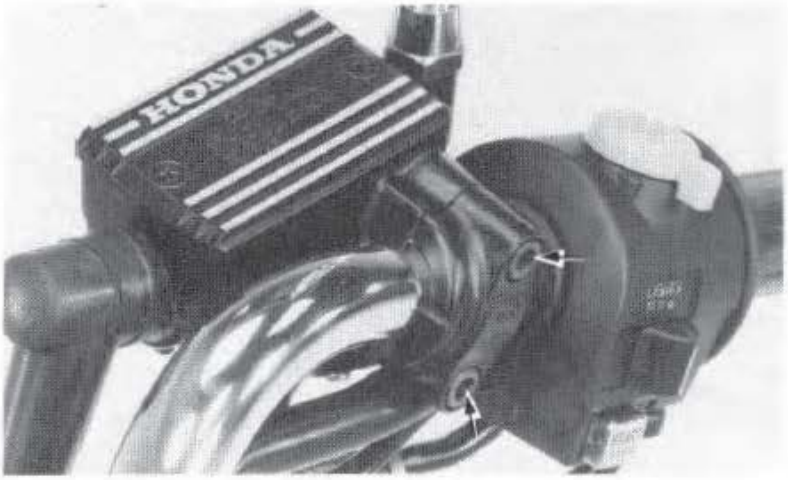
Remove the brake master cylinder.

CAUTION

Secure the brake cylinder in an upright position to prevent the fluid from leaking and damaging the paint and to prevent air from entering the brake system.

NOTE

Do not loosen the brake hose unless necessary.

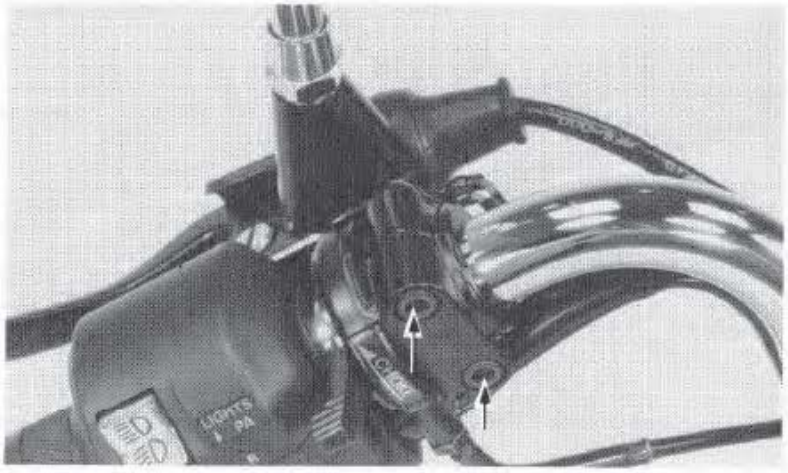


Disconnect the clutch switch wires and remove the two screws on the switch housing.

Remove the choke lever holder and disconnect the choke cable from the chock lever.

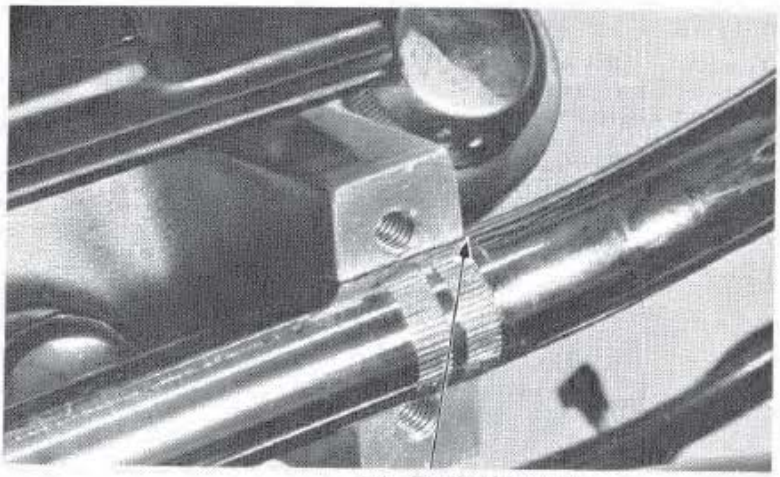
Remove the four caps and handlebar holder mounting bolts.

Remove the handlebar holders and handlebar.



INSTALLATION

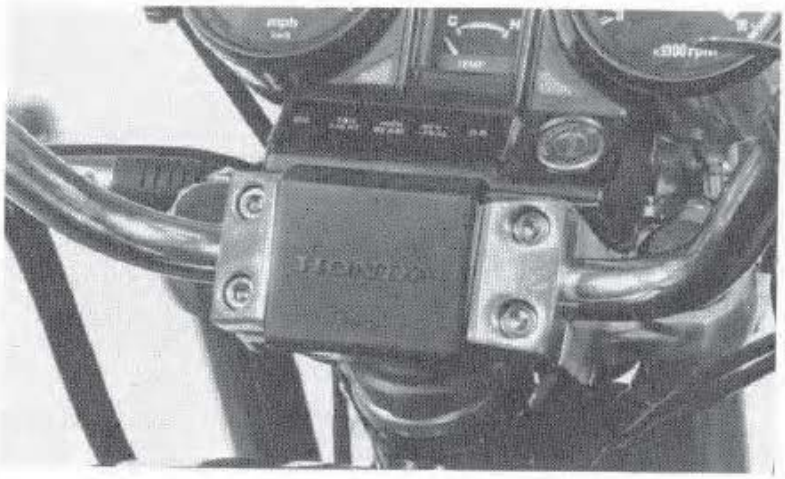
Place the handlebar on to the lower holder aligning the punch mark with the outside face of the lower holder.



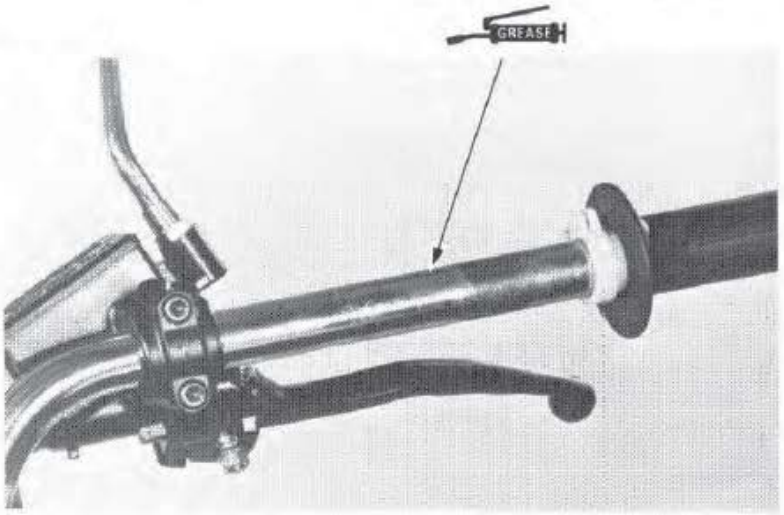
(1) PUNCH MARK

Install the upper holder and tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)

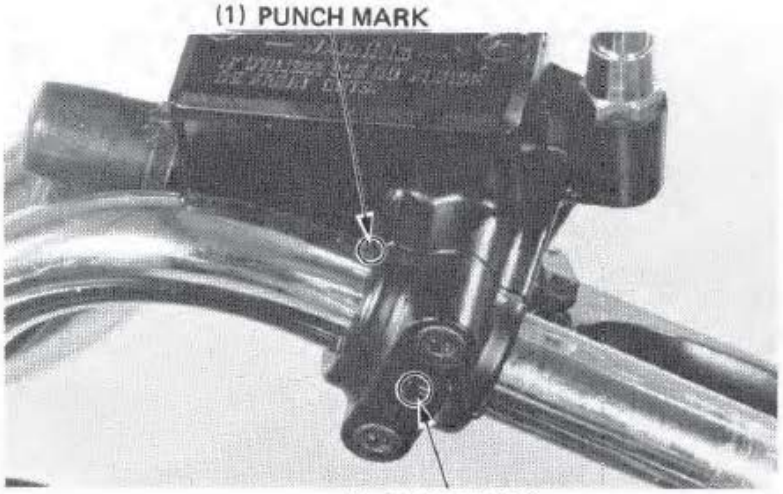


Apply grease to the throttle grip sliding surface and slide the throttle grip over the handlebar.



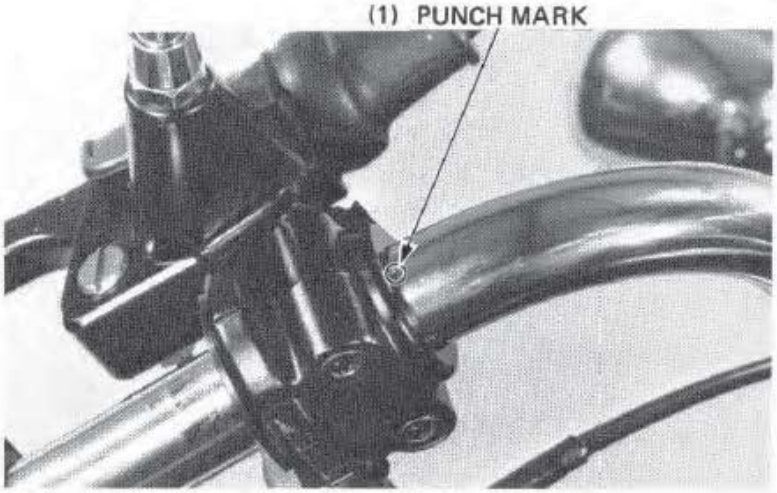
Install the front brake master cylinder with the 'UP' mark on the holder facing up. Align the end of the holder with the handlebar punch mark. Tighten the upper bolt first, then the lower bolt.

Install the right handlebar switch and connect the brake light switch wires (page 15-7).



Connect the choke cable to the choke lever and install the clutch master cylinder. Align the end of the holder with the punch mark on the handlebar.

Tighten the upper bolt first, then the lower bolt. Install the left handlebar switch and connect the clutch switch wires (page 15-8).

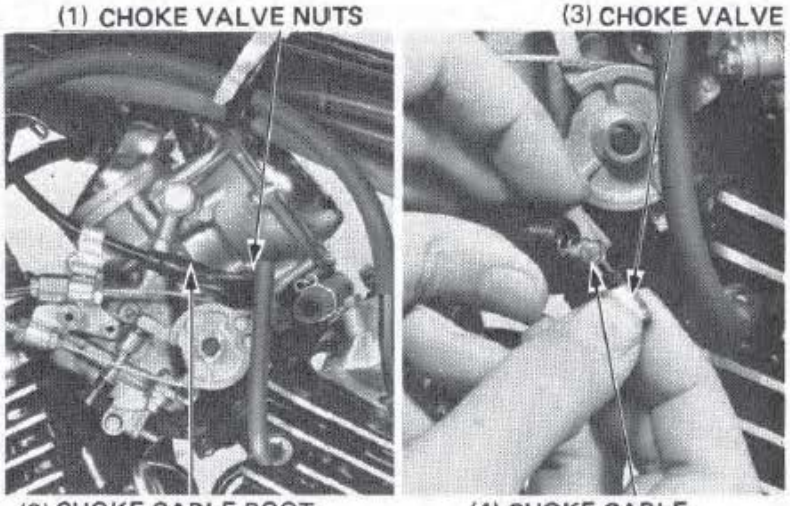


CHOKE CABLE REPLACEMENT

Remove the choke lever holder and disconnect the choke cable from the choke lever.

Remove the fuel tank (page 4-14).
Remove the choke cable boots and loosen the choke valve nuts on the carburetors.
Remove the choke valve from the carburetor.
Remove the choke cable from the choke valve.

Lubricate the new choke cable.



THROTTLE CABLE REPLACEMENT

Remove the right handlebar switch housing (page 15-7).
Remove the throttle cables from the throttle grip.

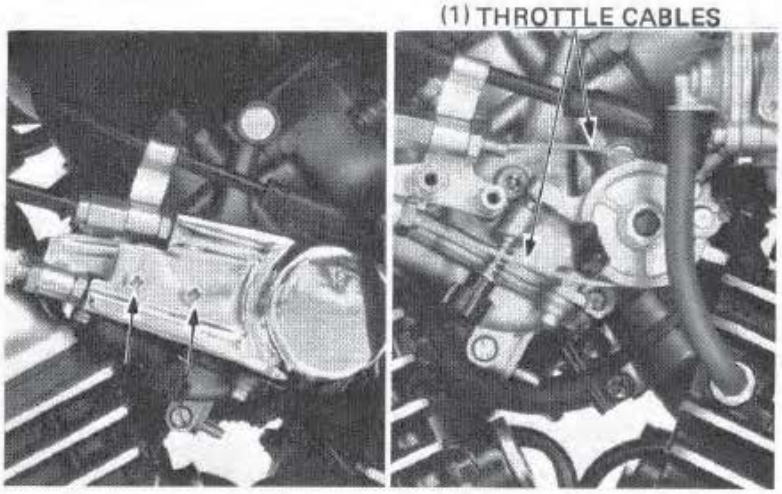
Remove the throttle linkage cover.
Remove the throttle cables from the carburetor throttle pulley.

Attach new cables to the throttle pulley.

Reinstall the throttle linkage cover.

Route the new cables correctly (page 1-9). Attach the cables to the throttle grip.
Reinstall the switch housing (page 15-8).
Adjust the throttle free play (page 3-5).

(1) THROTTLE CABLES



IGNITION SWITCH

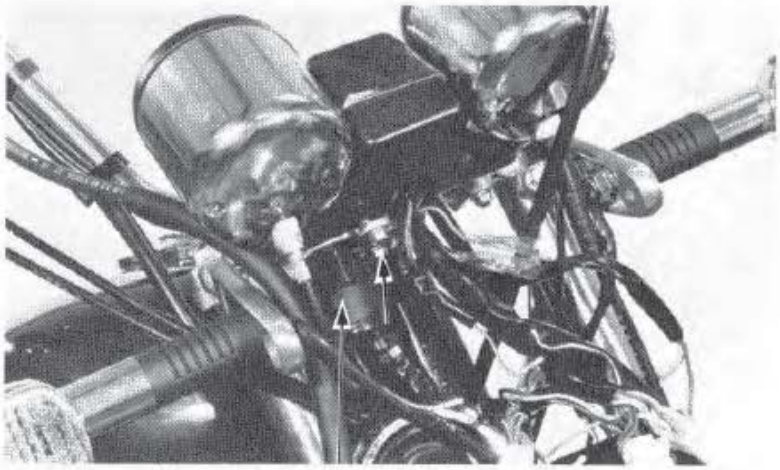
REMOVAL/INSTALLATION

Remove the headlight and headlight case.

Remove the fork cover junction box and two white couplers from the junction box (page 1-11).

Remove the ignition switch mounting bolts, and ignition switch.

Install the ignition switch in the reverse order of removal.

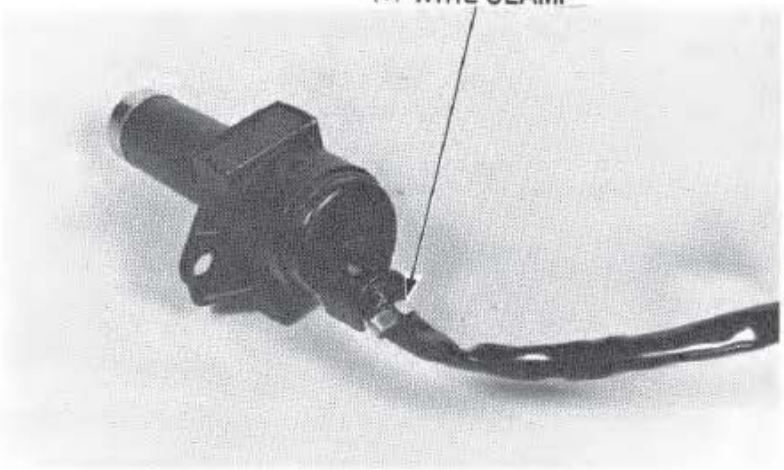


(1) IGNITION SWITCH

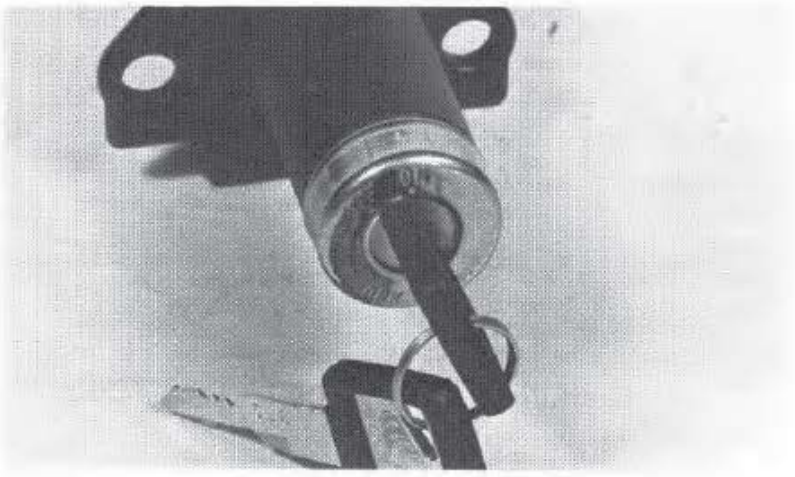
DISASSEMBLY/ASSEMBLY

Bend the wire clamp tongue up.

(1) WIRE CLAMP

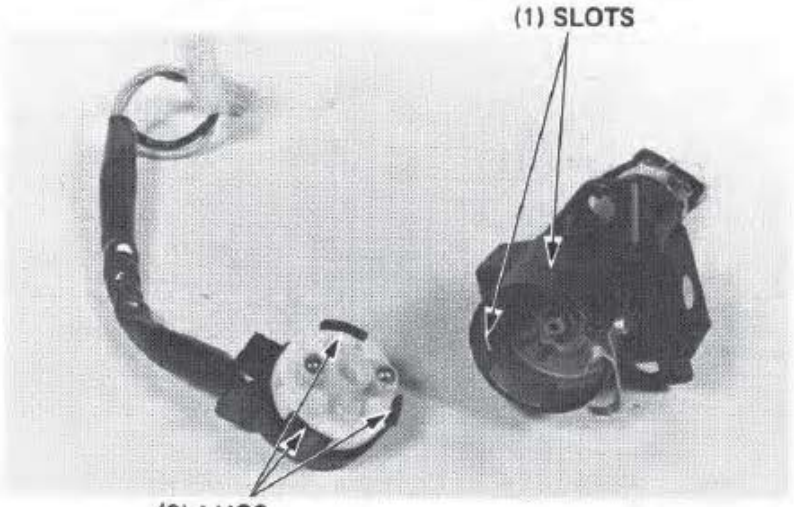


Insert the ignition key and turn it to between the ON and OFF detent positions.



Push in the lugs in the slots and pull the contact base from the switch.

Assemble the ignition switch in the reverse order of disassembly.

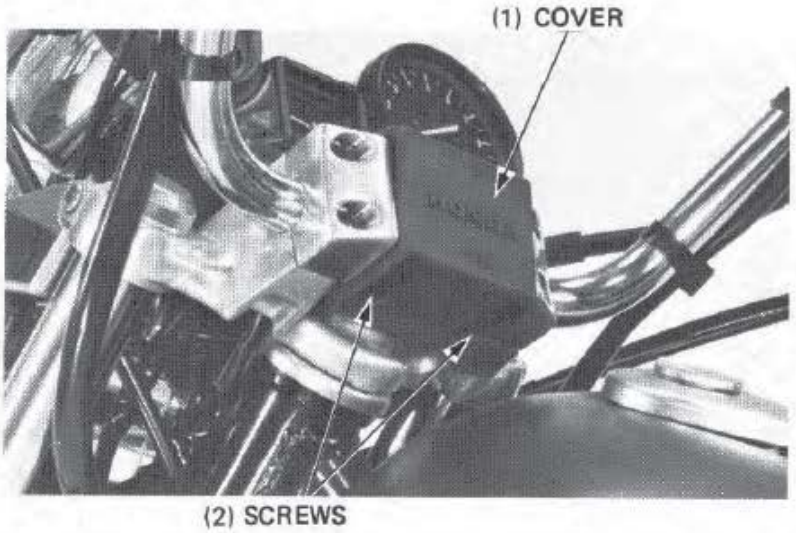


FUSE HOLDER

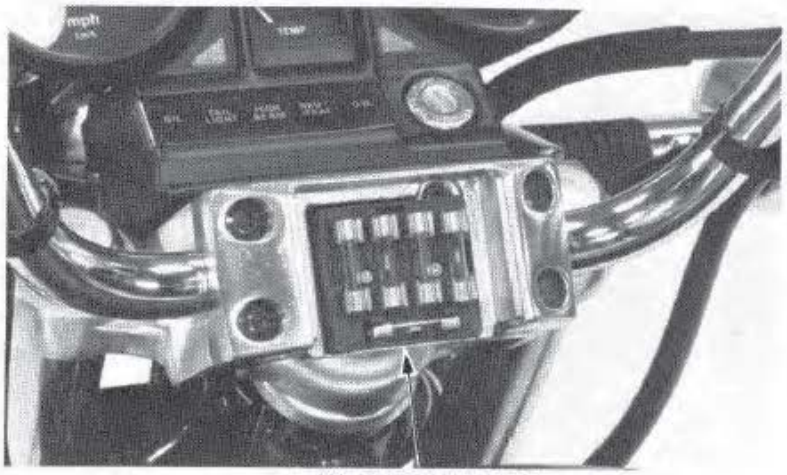
REMOVAL/INSTALLATION

Remove the headlight and headlight case.
Remove the fork cover and junction box from the steering steem. Disconnect the fuse holder coupler from the junction box (page 1-11).

Remove the fuse holder cover mounting screws and the cover.



Remove the fuse holder from the handle bar upper holder.
Install a new holder, route the wire harness and attach it to the junction box.
Reinstall the removed parts.



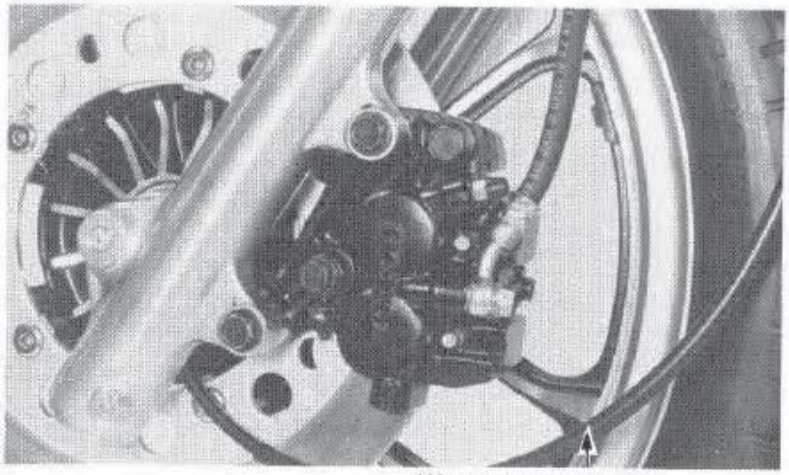
(1) FUSE HOLDER

FRONT WHEEL

REMOVAL

Raise the front wheel off the ground by placing a support block under the engine.

Disconnect the speedometer cable by removing the speedometer cable set screw.



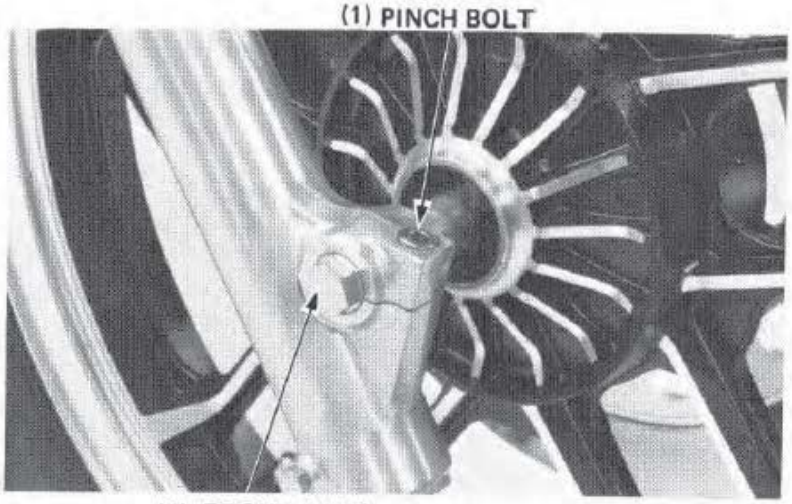
(1) SPEEDOMETER CABLE

Remove the axle pinch bolt.
Loosen and remove the front axle and remove the front wheel.

NOTE

Do not operate the front brake lever after removing the caliper. To do so will cause difficulty in fitting the bake disc between the brake pads.

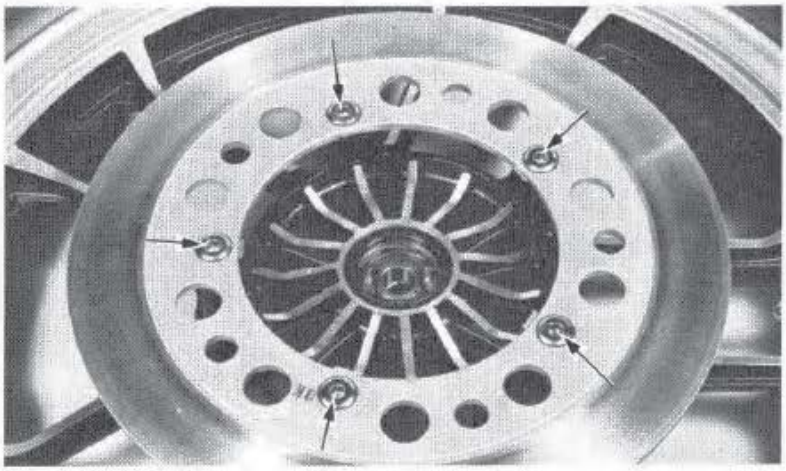
(1) PINCH BOLT



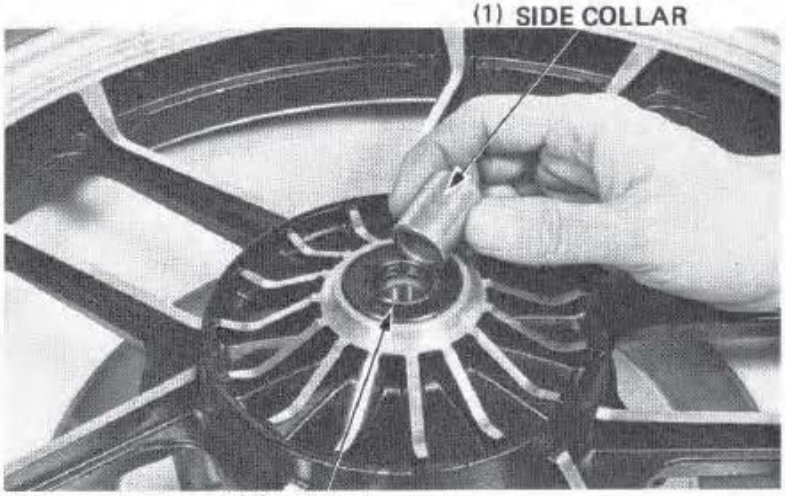
(2) FRONT AXLE

DISASSEMBLY

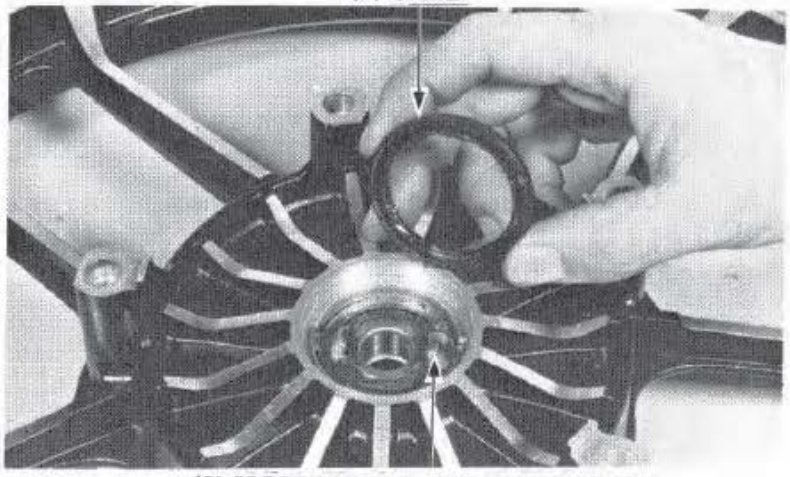
Remove the brake disc mounting bolts and discs.



Remove the side collar and right seal.



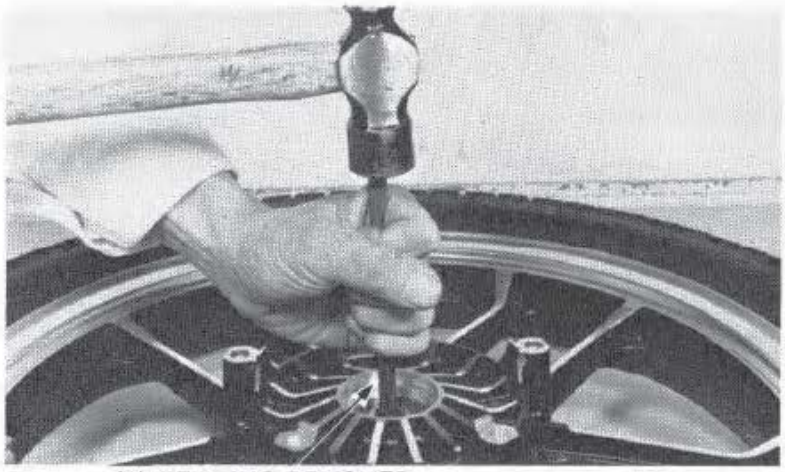
Remove the left seal and speedometer gear retainer.



(1) BEARING REMOVER COLLET, 15 mm
07746–0050400

Install the bearing remover collet, 15 mm into the bearing.

Drive the bearing remover expander into the collet from the other side of the bearing.

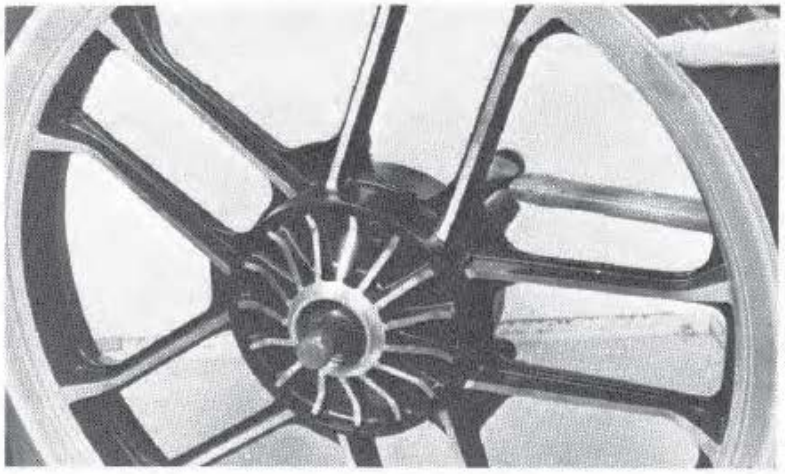


(1) BEARING REMOVER
EXPANDER
07746–0050100

Stand the wheel up and drive out the bearing from the hub.

NOTE

If the bearings are removed, they should be replaced with new ones. See inspection on the next page.

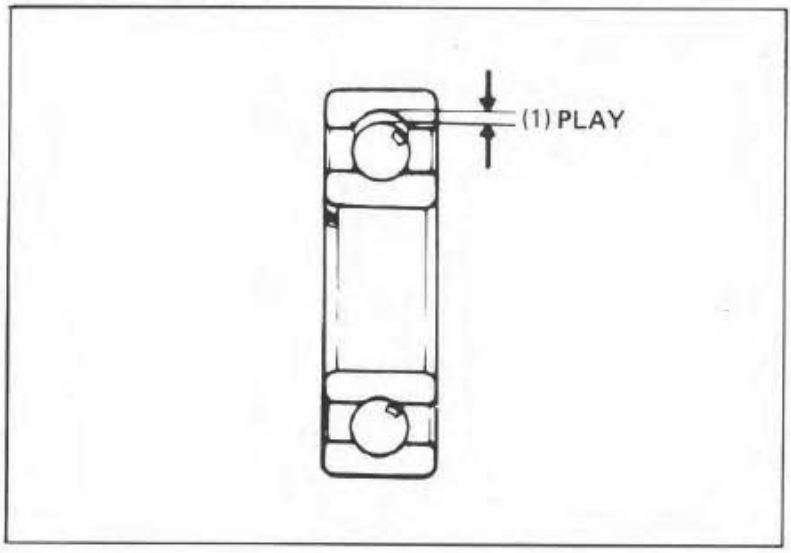


INSPECTION
WHEEL BEARING

Check wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand.

Replace the bearings if they are noisy or have excessive play.

SERVICE LIMIT: 0.03 mm (0.001 in)

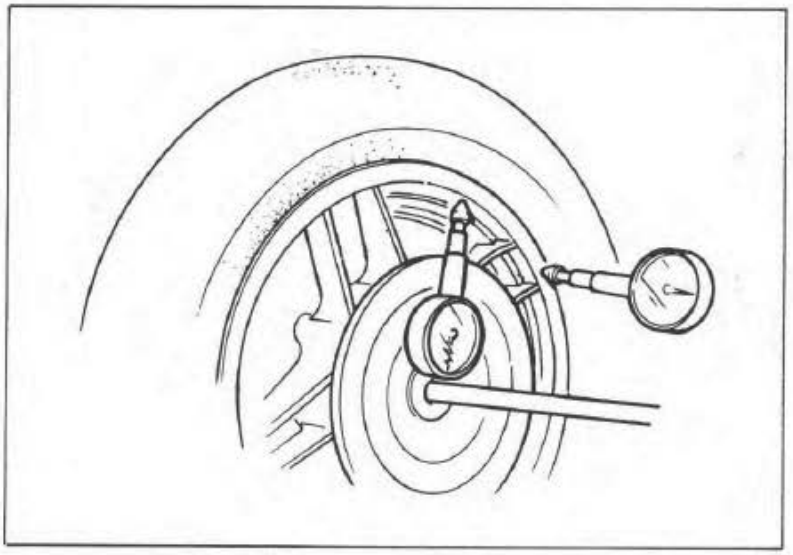


WHEEL

Check the rim runout by placing the wheel in a truing stand. Spin the wheel slowly and read the runout using a dial indicator.

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

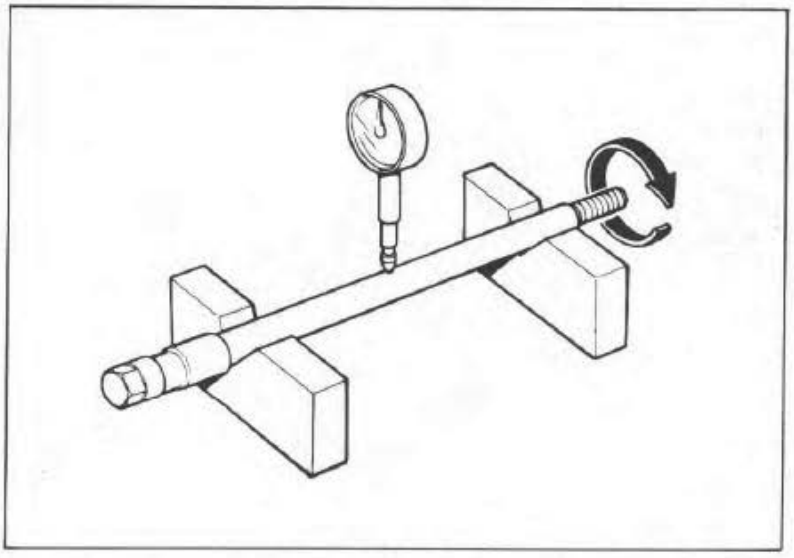
The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



AXLE

Set the axle in V blocks and measure the runout. The actual runout is 1/2 of the total indicator reading.

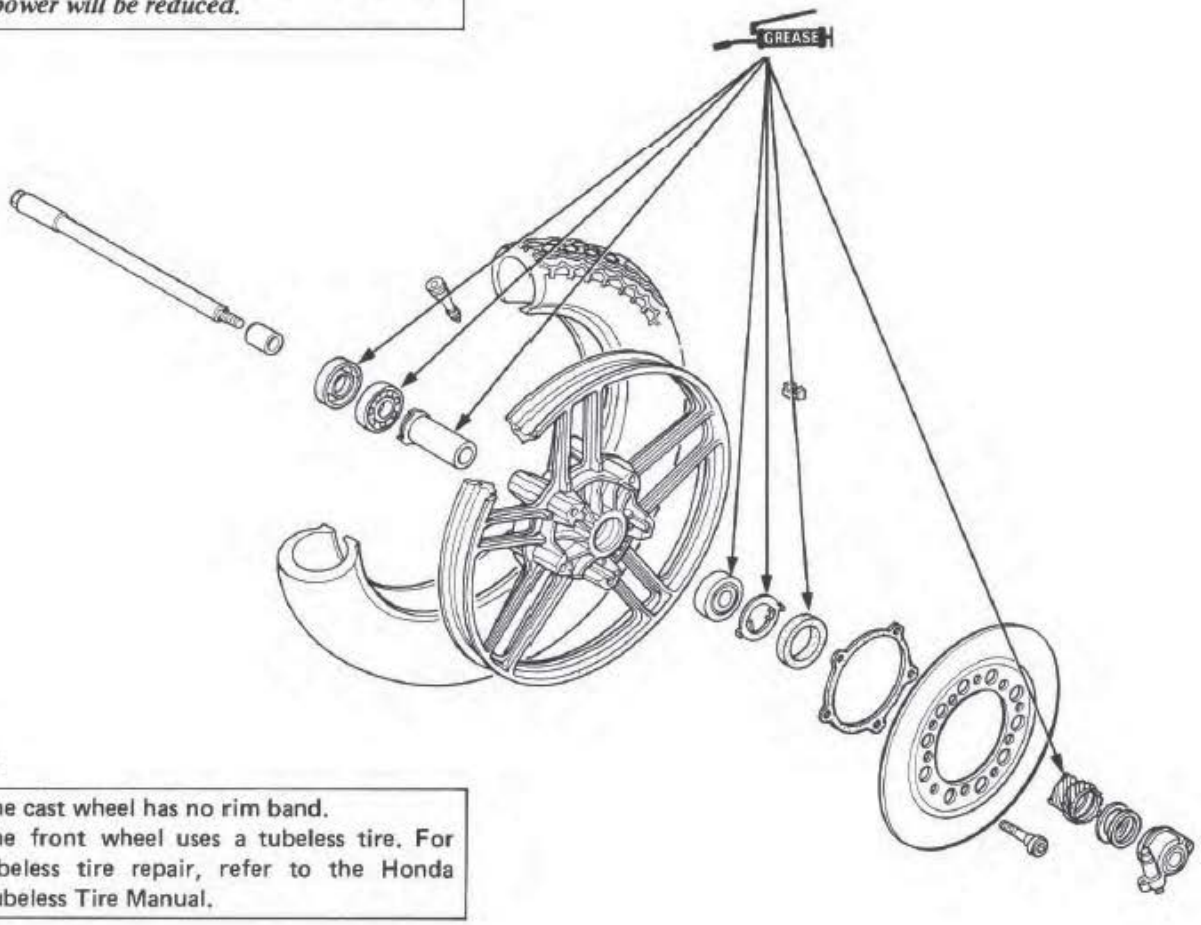
SERVICE LIMIT: 0.2 mm (0.01 in)



ASSEMBLY

WARNING

Do not get grease on the brake disc or stopping power will be reduced.



NOTE

- The cast wheel has no rim band.
- The front wheel uses a tubeless tire. For tubeless tire repair, refer to the Honda Tubeless Tire Manual.

Drive in the right bearing first and press the distance collar into place.

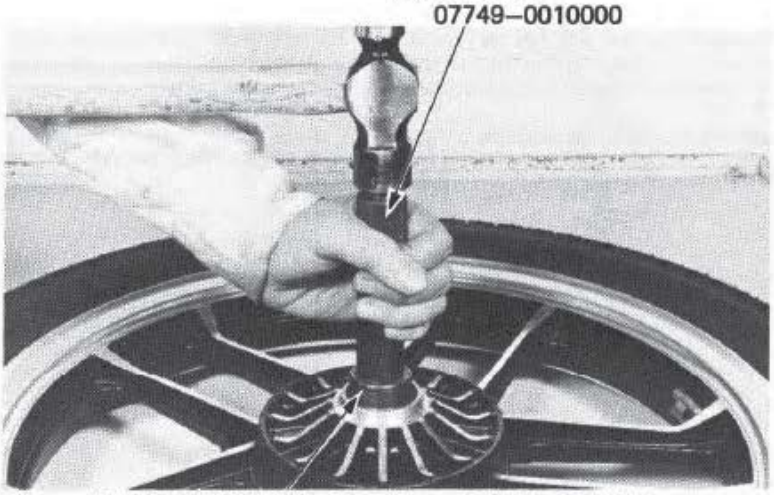
NOTE

Be certain the distance collar is in position before installing the right bearing.

Drive in the left bearing squarely.

NOTE

Drive the bearing into position, making sure that it is fully seated and that the sealed side is facing out.

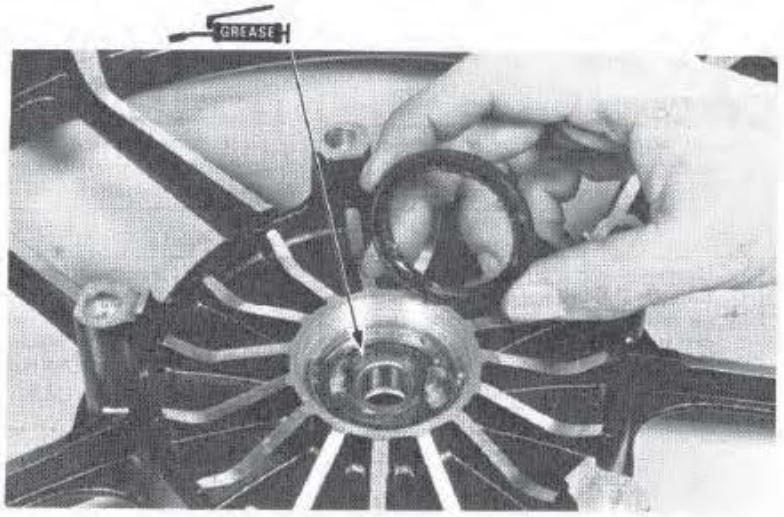


(1) DRIVER
07749–0010000

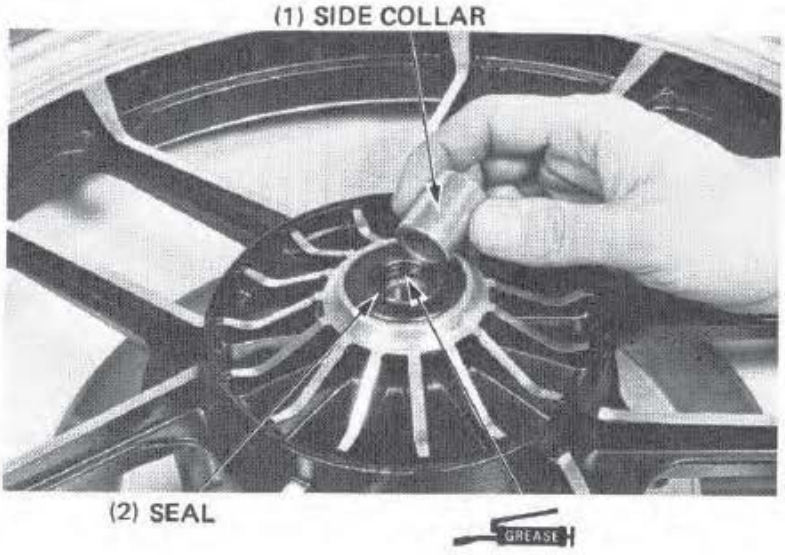
(2) ATTACHMENT, 42 x 47 mm 07746–0010300
PILOT, 15 mm 07746–0040300

Install the speedometer gear retainer into the wheel hub, aligning the tangs with the slots.

Install the left seal.

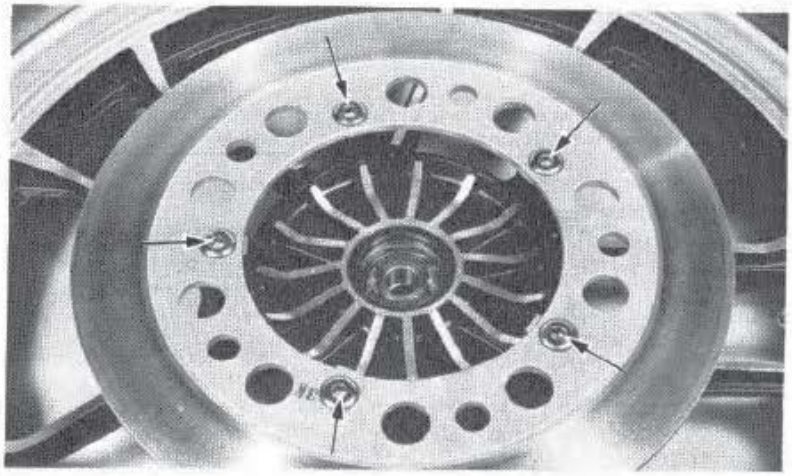


Install the right seal and side collar.



Apply oil to the brake disc bolt threads.
Install the brake disc and tighten the bolts to the specified torque value.

TORQUE: 35–40 N·m
(3.5–4.0 kg-m, 25–29 ft-lb)

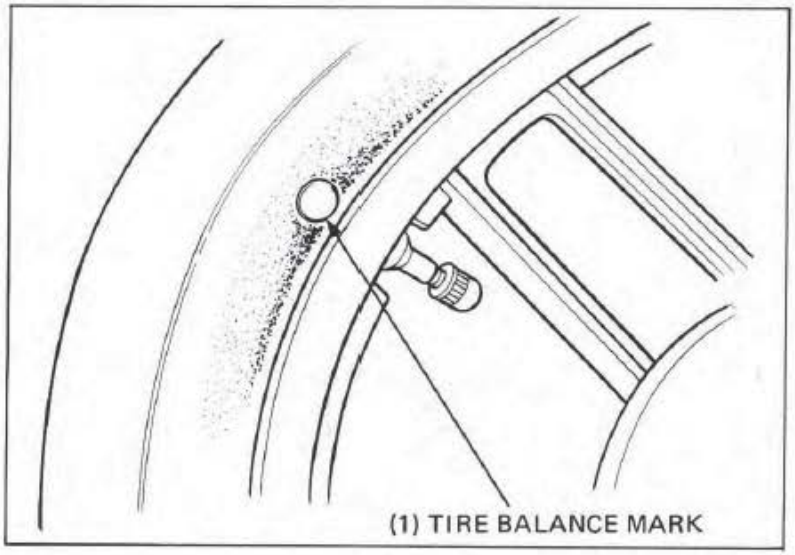


CAUTION:

Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.

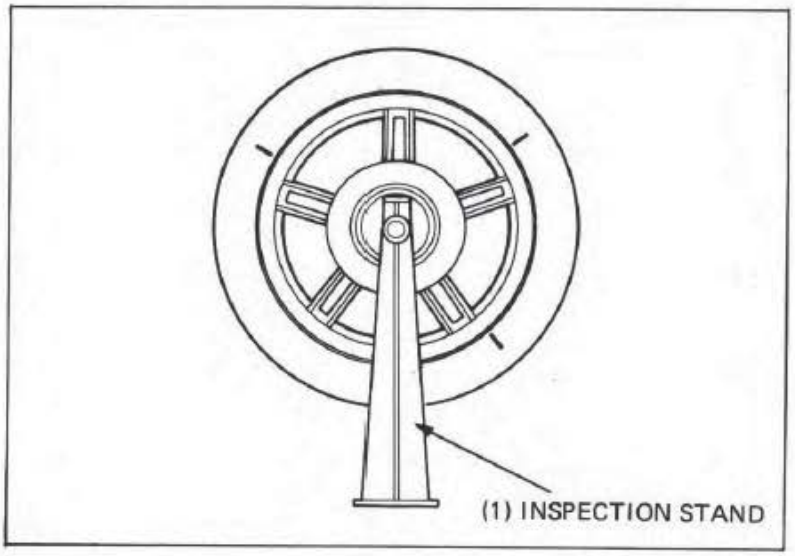
NOTE

For optimum balance, the tire balance mark (a paint dot on the sidewall) must be located next to the valve stem. Remount the tire if necessary.

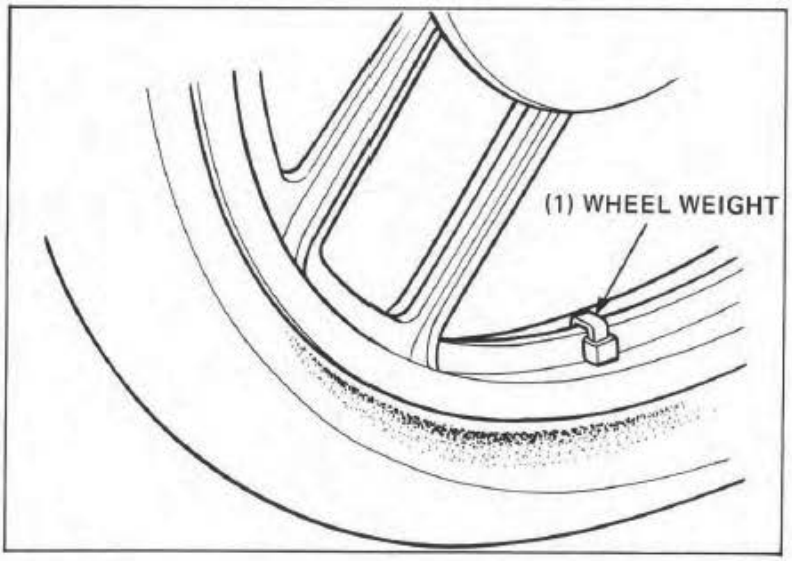


Remove the dust seal and speedometer gear box from the wheel.
Mount the wheel, tire and brake disc assembly in an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk. Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.



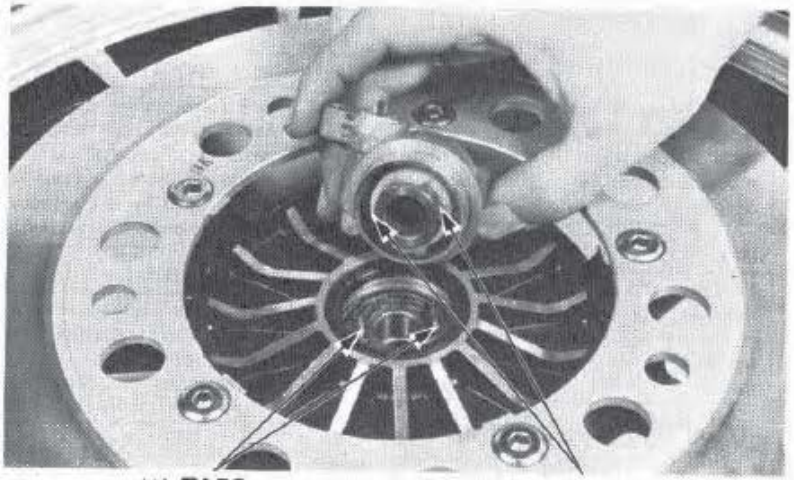
To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just nough weight so the wheel will no longer stop in the same position when it's spun. Do not add more than 60 grams.



INSTALLATION

Install the speedometer gearbox in the wheel hub, aligning the tabs with the slots.

Clean the brake discs with a high quality degreasing agent.

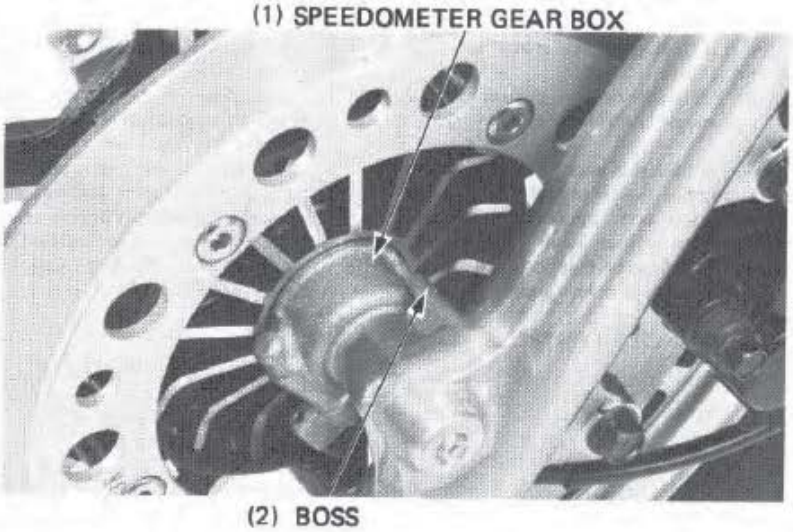


(1) TABS (2) SLOTS

Place the wheel between the fork legs. Fit the disc carefully between the brake pads.

Align the speedometer gearbox with the boss on the left fork leg as shown.

Install the axle and collar. Remove the support block from under the engine.



(1) SPEEDOMETER GEAR BOX

(2) BOSS

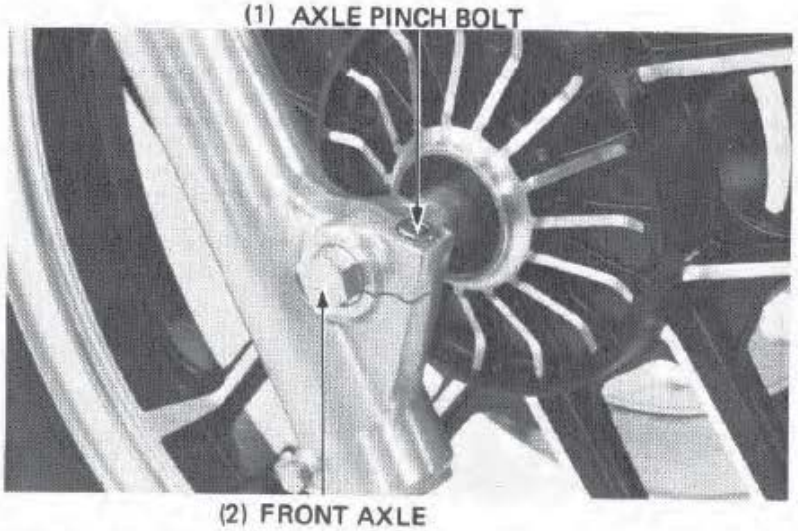
Tighten the axle to the specified torque.

TORQUE: 55–65 N·m
(5.5–6.5 kg-m, 40–47 ft-lb)

Tighten the axle pinch bolt to the specified torque.

TORQUE: 18–28 N·m
(1.8–2.8 kg-m, 13–20 ft-lb)

Install the speedometer cable and set screw.

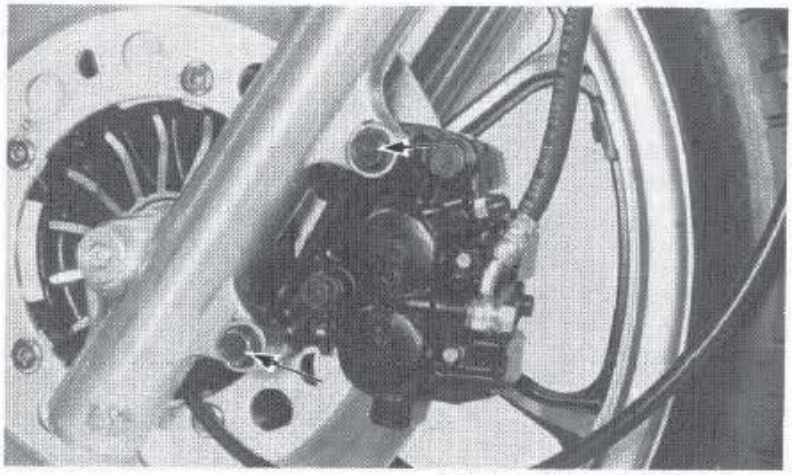


(1) AXLE PINCH BOLT

(2) FRONT AXLE

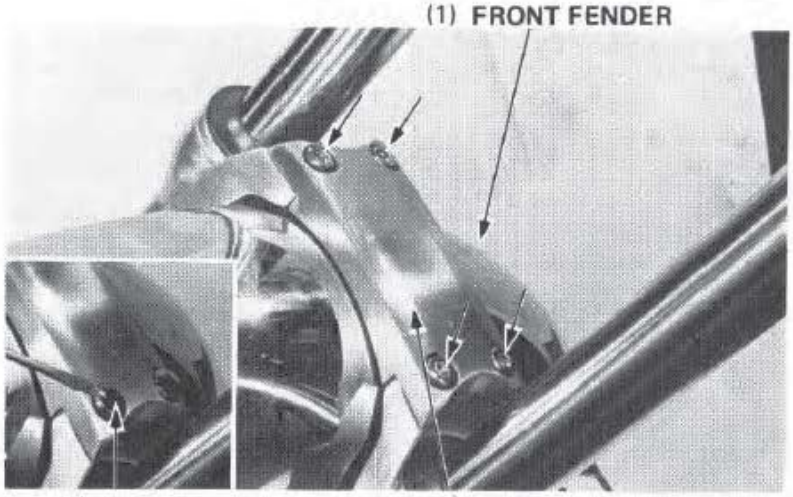
FRONT FORKS

Remove the front wheel (page 15-14).
Remove the brake caliper bracket.



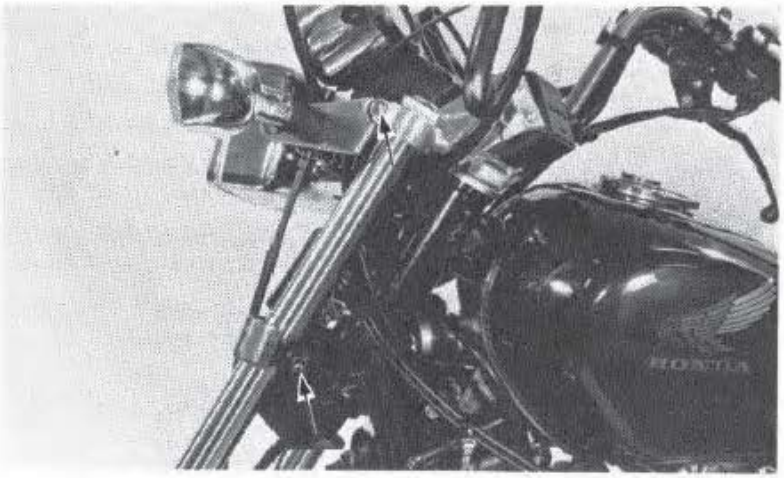
(1) BRAKE CALIPER BOLTS

Remove the front fender and fork brace.



(1) FRONT FENDER
(2) CAP
(3) FORK BRACE

Loosen the fork upper and lower pinch bolts.
Pull the fork tubes down and out while twisting to remove them.

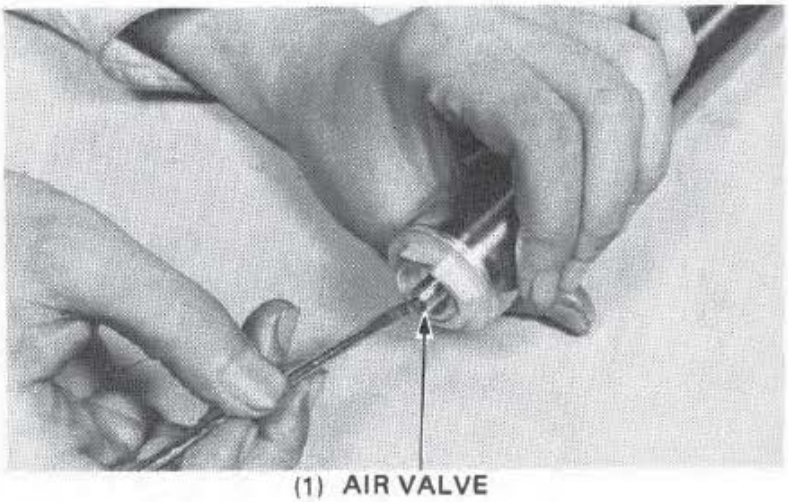


DISASSEMBLY

Depress the air valve and release front fork air pressure.

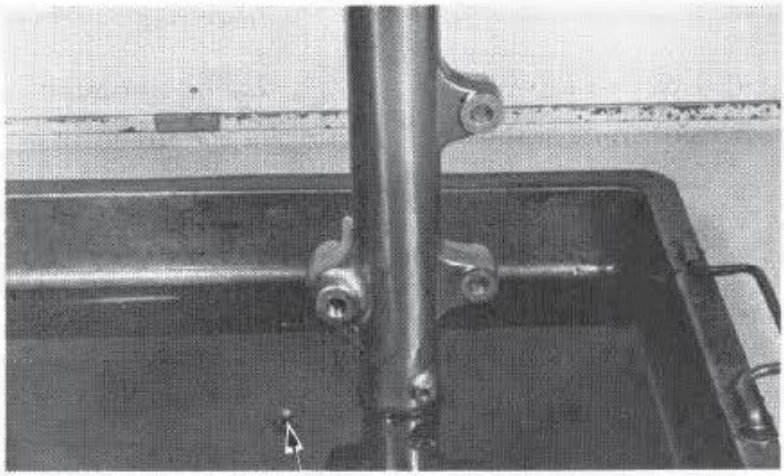
CAUTION

- *If air pressure is not released before disassembling, the fork cap may become a projectile.*
- *The cap is also under spring pressure. Use care when removing and wear eye and face protection.*



(1) AIR VALVE

Drain the fork oil by removing the drain plug.

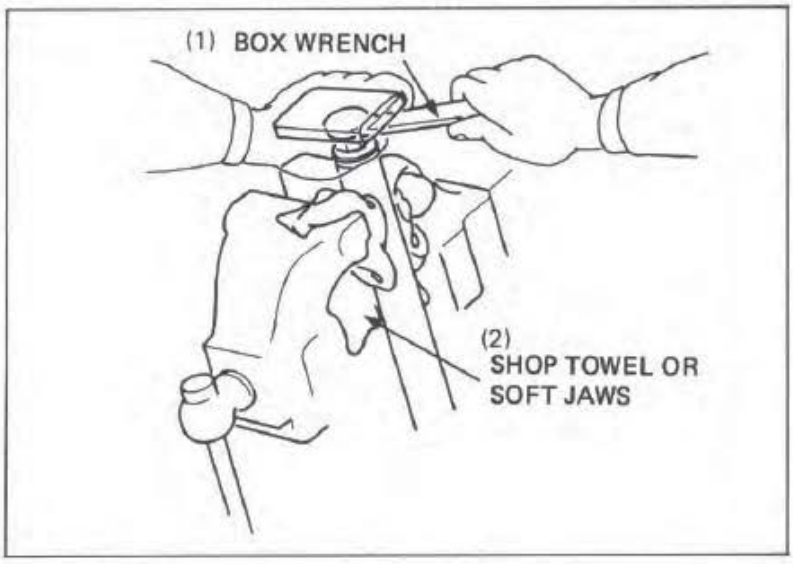


(1) DRAIN PLUG

Hold the fork tube in a vise with soft jaws or a shop towel and remove the fork tube cap.

CAUTION

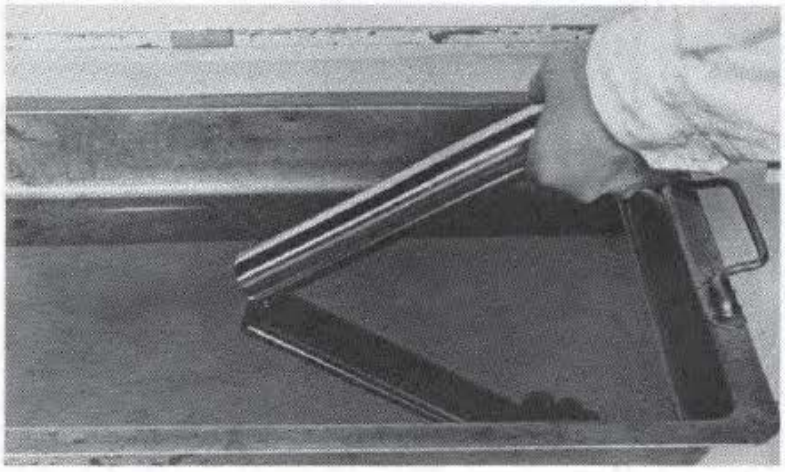
Do not damage the sliding surface.



Remove the collar, washer and fork spring.

Pour the fork fluid out.

Pour the remaining fork fluid out by pumping the fork tube several times.

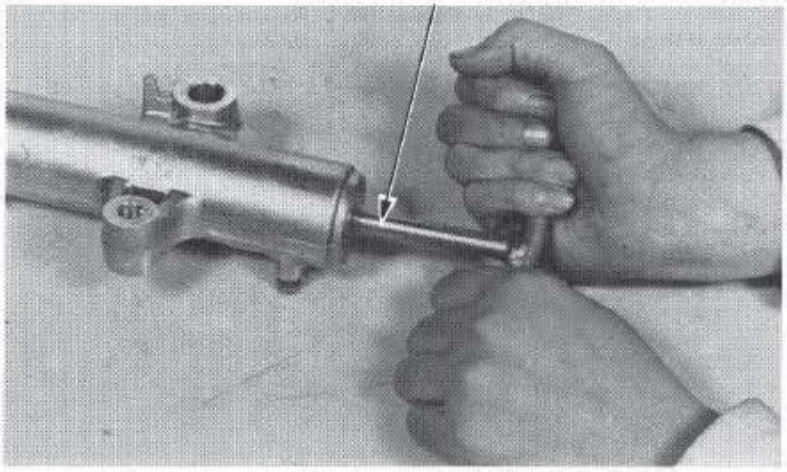


Hold the fork slider in a vise with soft jaws or a shop towel. Remove the socket bolt with a hex wrench.

NOTE

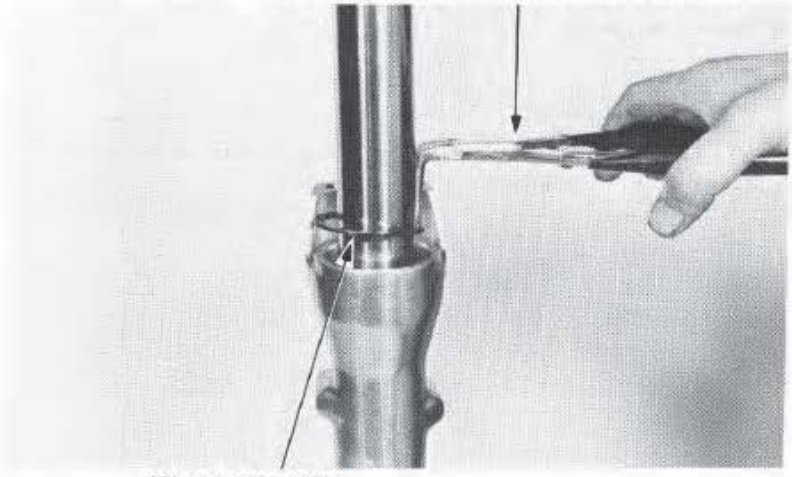
Temporarily install the spring and fork cap if the bolt is difficult to remove.

(1) HEX WRENCH, 6 mm 07917–3230000



Remove the dust seal, foam washer, plastic washer and snap ring.

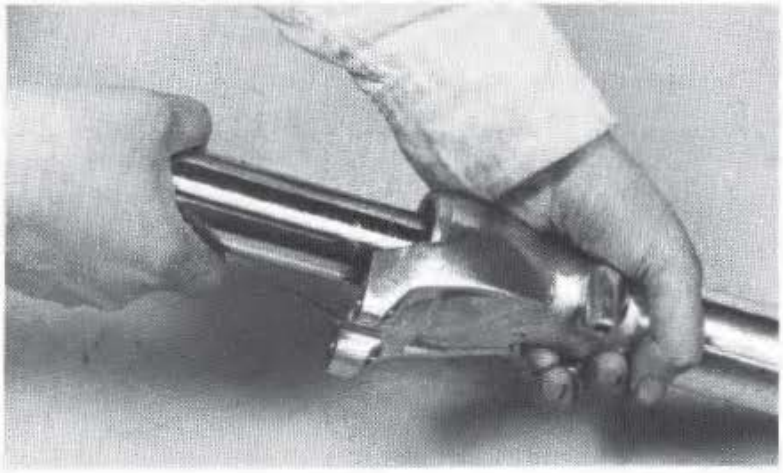
(1) SNAP RING PLIERS 07914–3230001



(2) SNAP RING

Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the slider. The slider bushing will be forced out by the fork tube bushing.

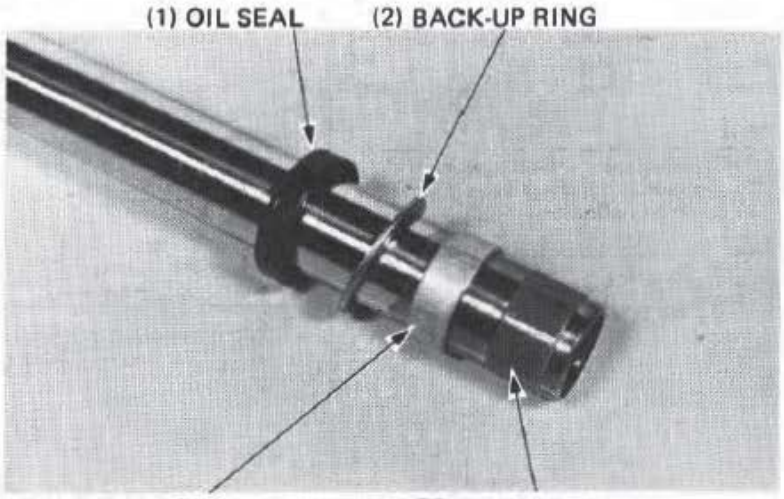
Remove the oil lock piece from inside the slider.



Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE

Do not remove the fork tube bushing unless it is necessary to replace it with a new one. See inspection on page 15-26.



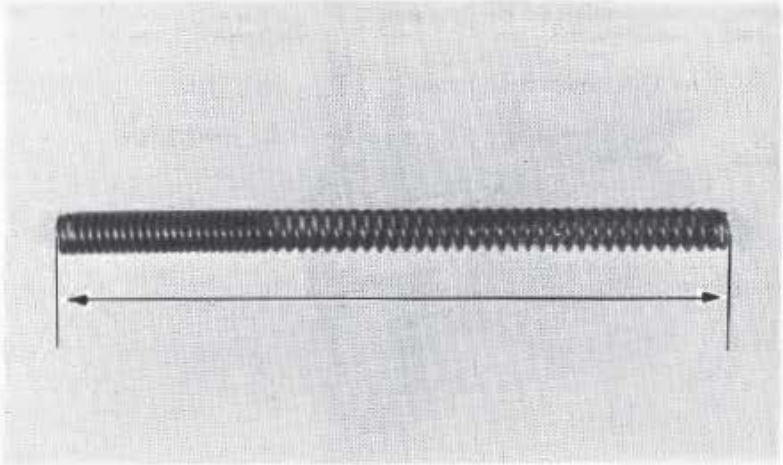
INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length.

SERVICE LIMIT: 447 mm (17.6 in)

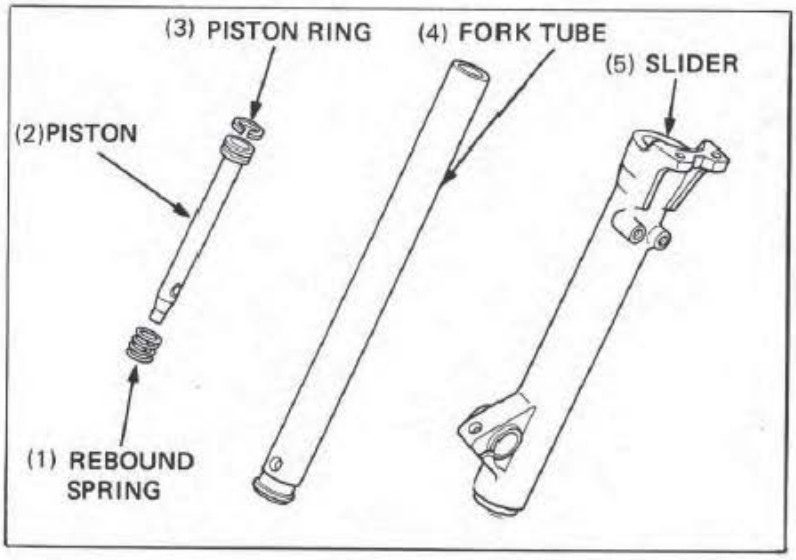
Replace the spring if it is shorter than the service limit.



Check the fork tube, fork slider and piston for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

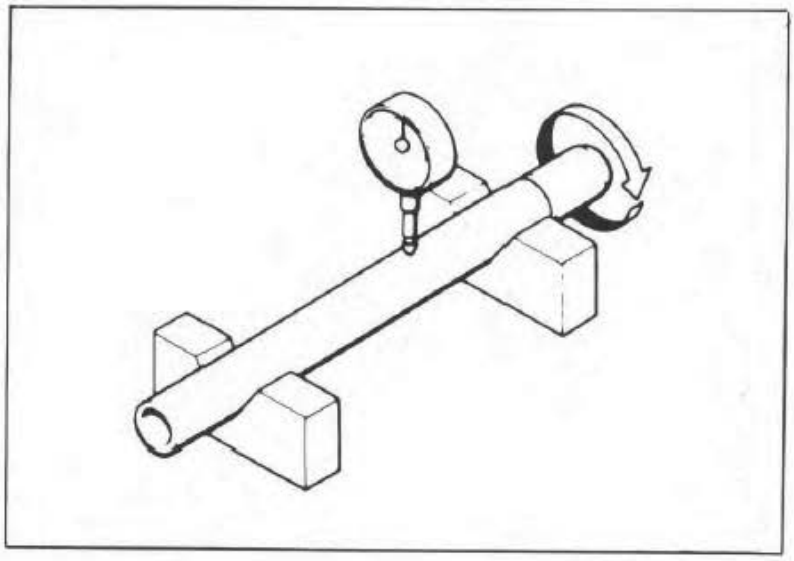
Check the fork piston ring for wear or damage.

Check the rebound spring for fatigue or damage.



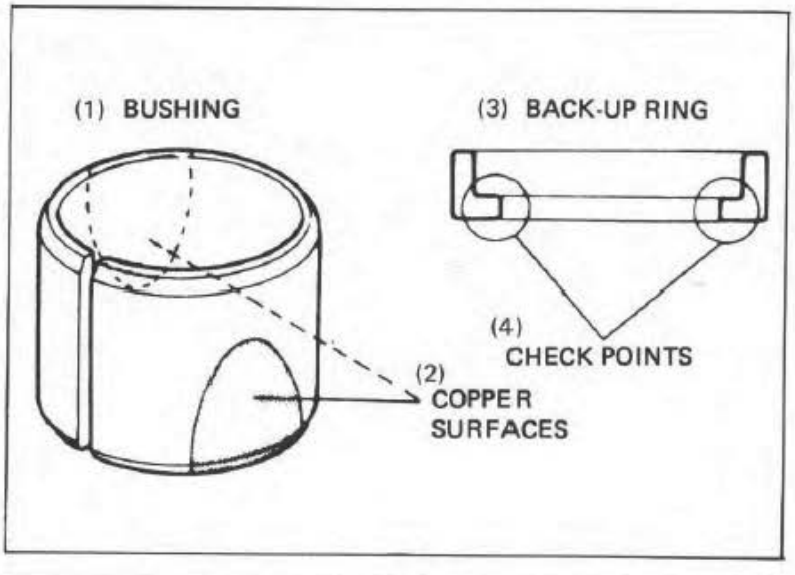
Set the fork tube in V blocks and read the runout. Use 1/2 the total indicator reading to determine the actual runout.

SERVICE LIMIT: 0.2 mm (0.01 in)



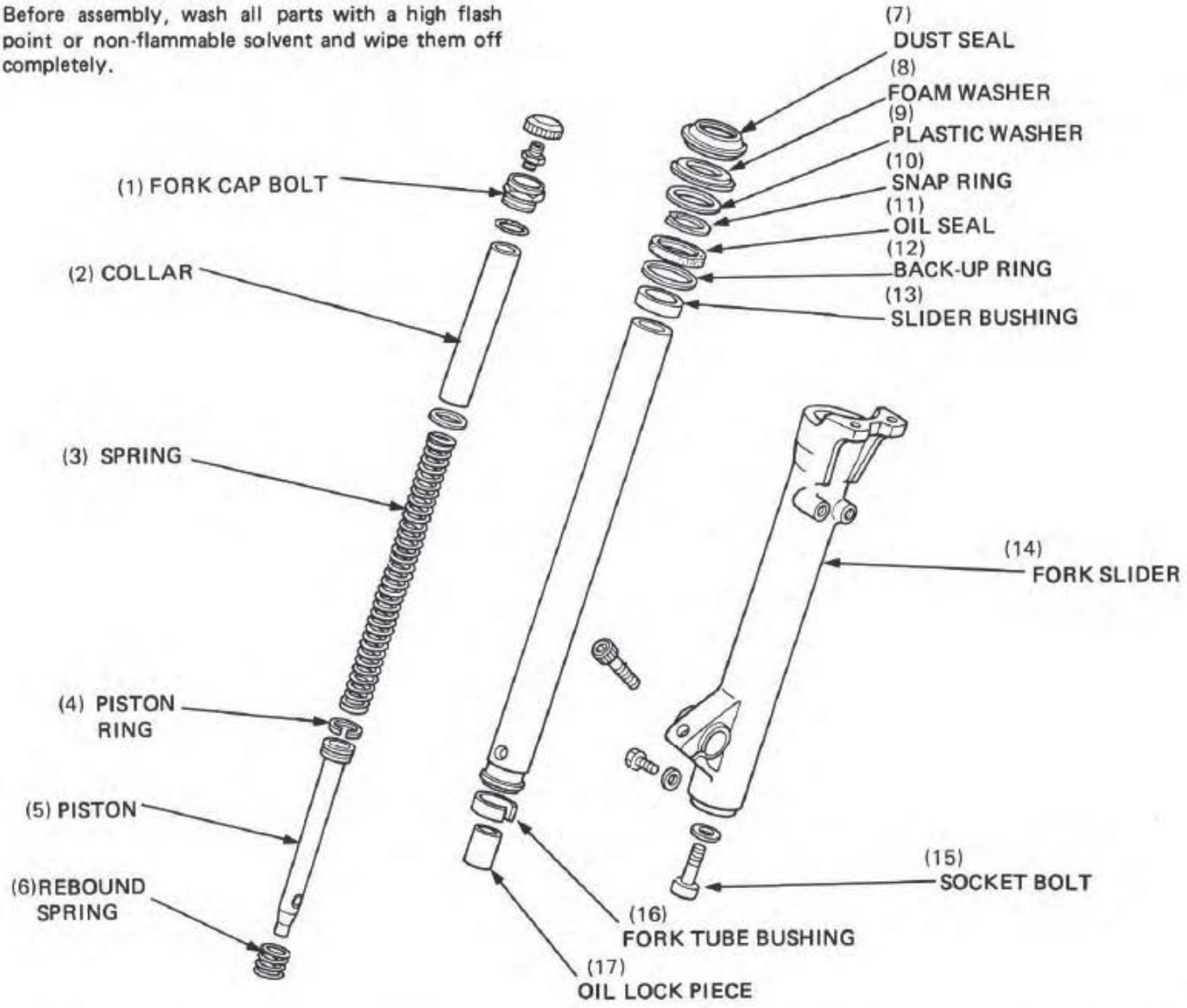
Visually inspect the slider and fork tube bushings. Replace the bushing if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring. Replace it if there is any distortion at the points shown.



ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Clean all disassembled parts with non-flammable or high flash point solvent.

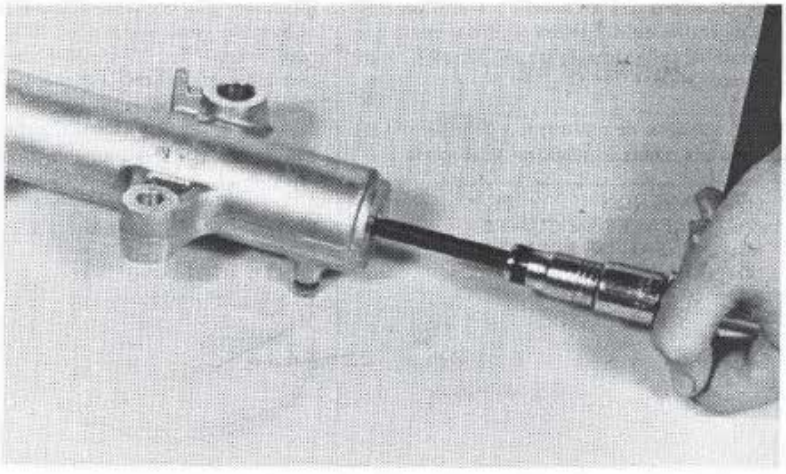
Install the bushing onto the inner tube.

Install the piston, rebound spring and oil lock piece into the fork tube.
Apply a locking agent to the bolt threads and underside of the bolt, then tighten the bolt.

TORQUE: 15–25 N·m
(1.5–2.5 kg-m, 11–18 ft-lb)

CAUTION

Do not place the fork slider in a vise.



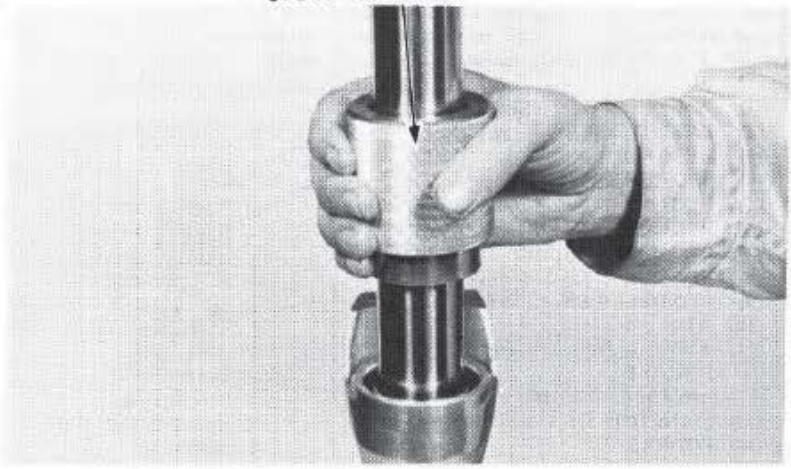
Place the slider bushing over the fork tube and rest it on the slider.

Put the back-up ring and an old bushing or equivalent tool on top.

Drive the new bushing into place with the seal driver and remove the old bushing or equivalent tool.

Coat a new oil seal with ATF and install it with the seal markings facing up. Drive the seal in with the seal driver.

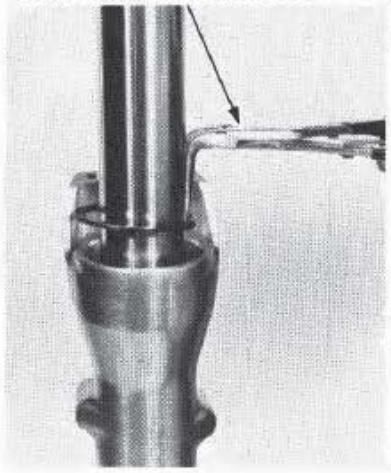
(1) FORK SEAL DRIVER
07947–3710101

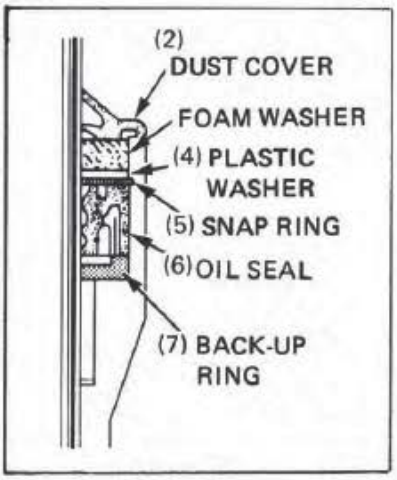


Install the snap ring with its radiused edge facing down.

Install the plastic washer, foam washer and dust cover.

(1)
SNAP RING PLIERS 07914–3230001





Pour in the specified amount of ATF.

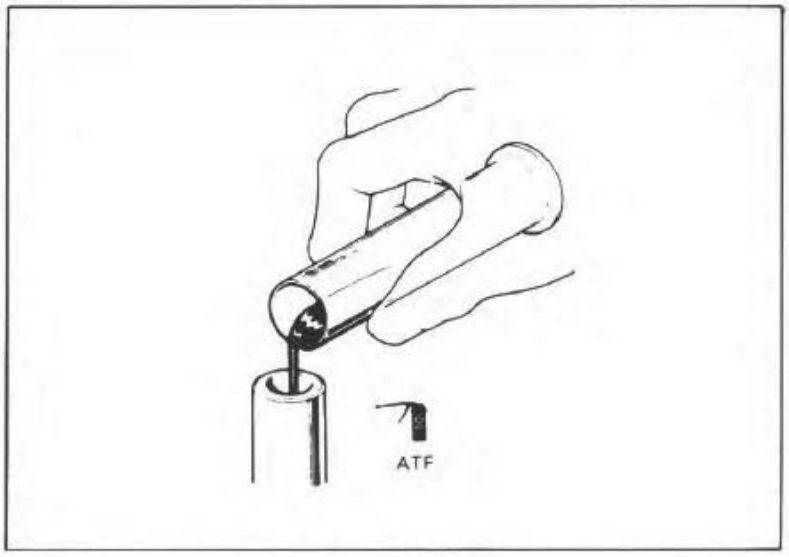
SPECIFIED FLUID: ATF
CAPACITY: 390 ± 2.5 cc
(23.8 ± 0.15 cu in)

NOTE

Do not overfill or the suspension will be too stiff.

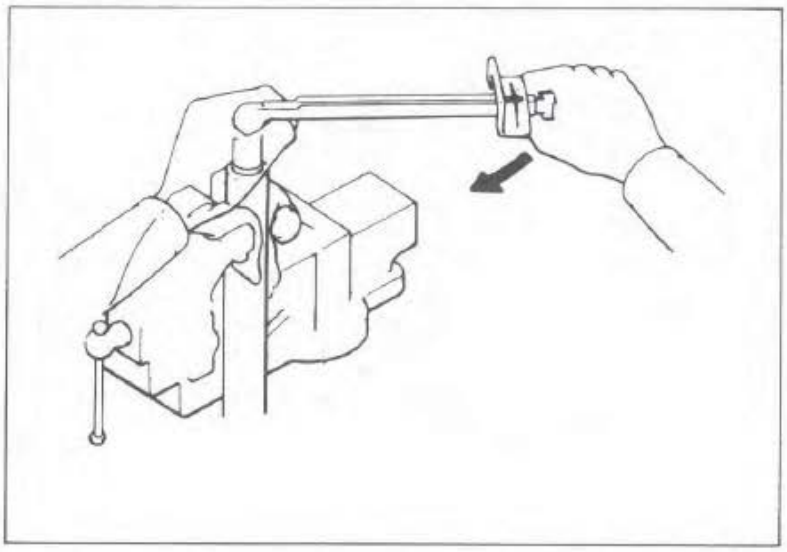
Insert the fork spring into the fork to be with the narrow (tight) windings towards the top.

Place the washer and collar on top of the fork spring.



Install and torque the fork tube cap.

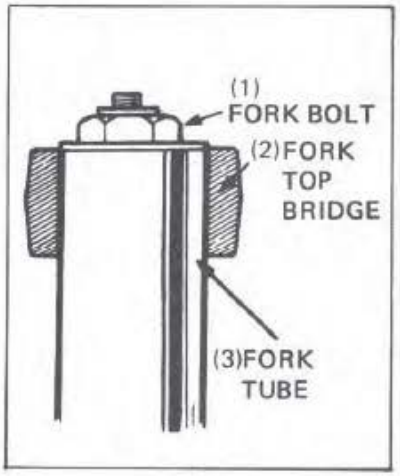
TORQUE: 15–30 N·m
(1.5–3.0 kg-m, 11–22 ft-lb)



Install the fork tubes into the steering stem and fork bridge while rotating them by hand.

NOTE

Be sure that the top of each tube is flush with the top of the fork bridge.



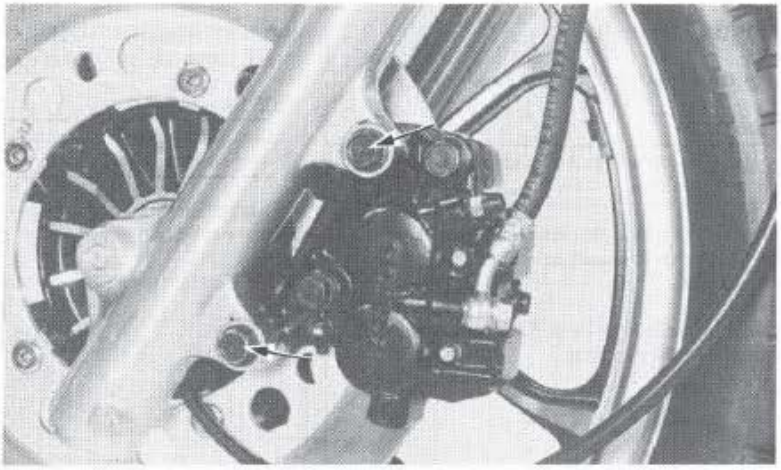
Tighten the fork bridge and steering stem pinch bolts on one side.

TORQUE VALUES:
Fork bridge: 9–13 N·m
(0.9–1.3 kg-m, 7–9 ft-lb)
Steering stem: 45–55 N·m
(4.5–5.5 kg-m, 33–40 ft-lb)

Install the fork brace hex bolts loosely.
Tighten the fork bridge and steering stem pinch bolt on the other side to the specific torque.

NOTE

Do not tighten the fork brace at this time.



Install the front fender and brake caliper bracket.
Tighten the caliper bracket mount bolt.

TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

Install the front wheel (page 15-20).
Tighten the fork brace hex bolts to the specified torque.

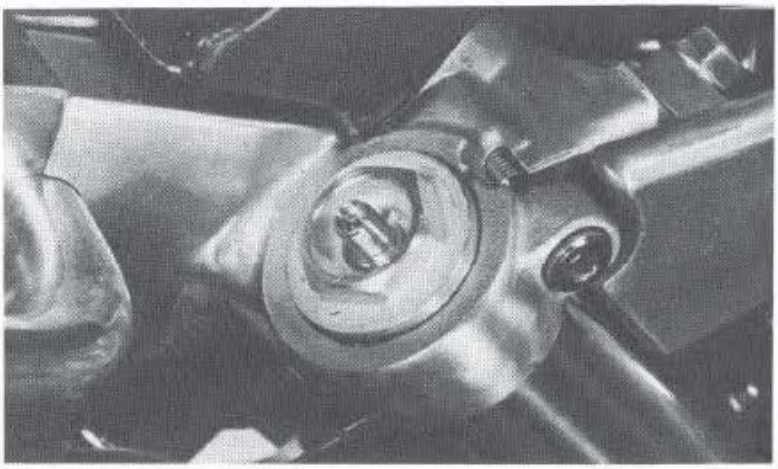
TORQUE: 18–28 N·m
(1.8–2.8 kg-m, 13–20 ft-lb)

Fill the fork tubes with air to 0–40 kPa (0–0.4 kg/cm^2, 0–6 psi), with the motorcycle on its center stand.

CAUTION

- *Use only a hand operated air pump to fill the fork tubes. Do not use compressed air.*
- *Maximum pressure is 300 kPa (3 kg/cm^2, 43 psi). Do not exceed this or fork tube component damage may occur.*

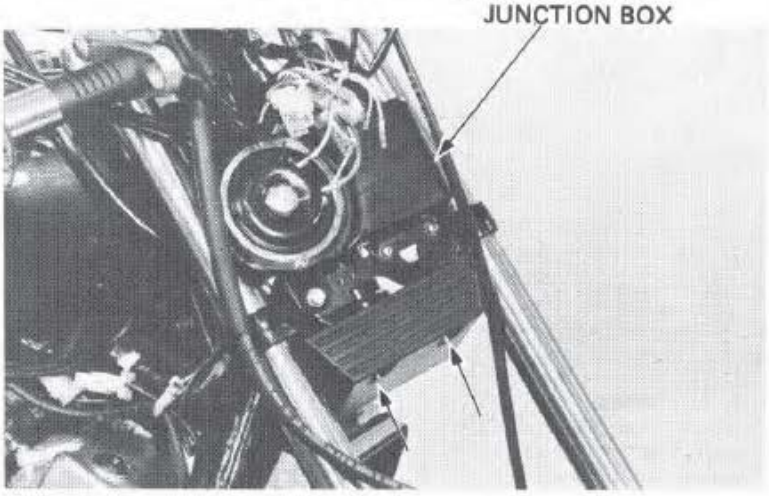
With the front brake applied, pump the front forks up and down several times. Place the motorcycle on its center stand. Check the air pressure and adjust if necessary.



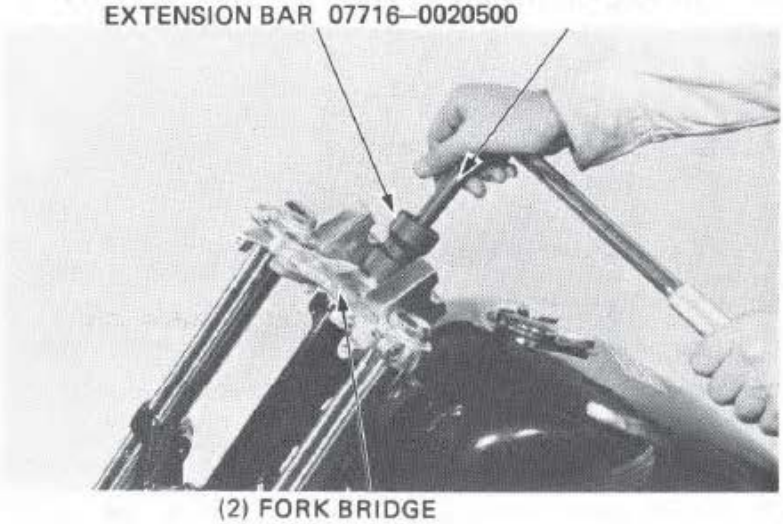
STEERING STEM

REMOVAL

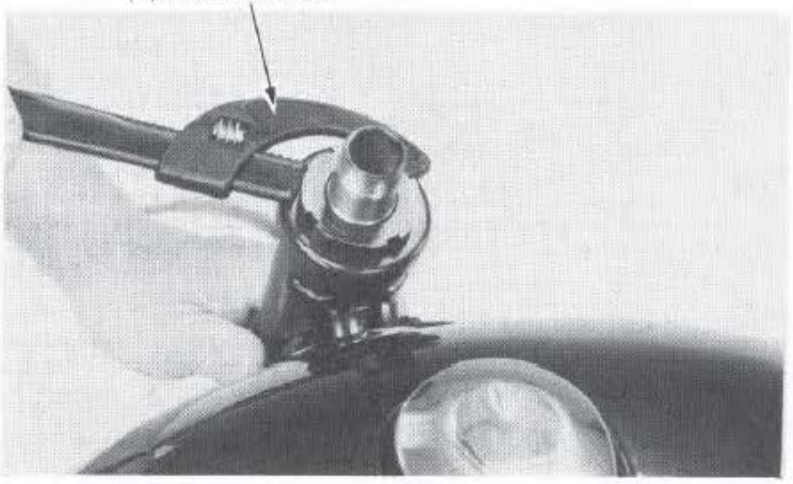
Remove the following parts:
- headlight, headlight case and bracket (page 15-3).
- instruments (page 15-4).
- handlebar (page 15-8).
- front wheel (page 15-14).
- caliper bracket (page 17-13).
- horn bracket.
- electrical junction box (page 15-4).



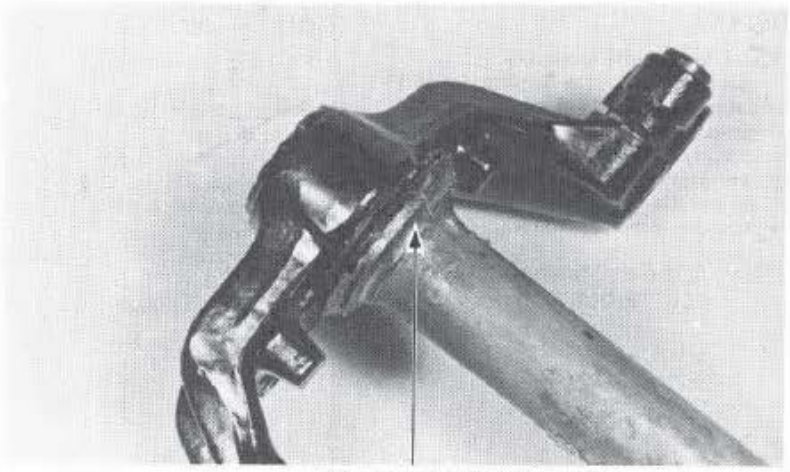
Remove the steering stem/bridge nut.
Remove the front forks (page 15-21).
Remove the fork bridge.



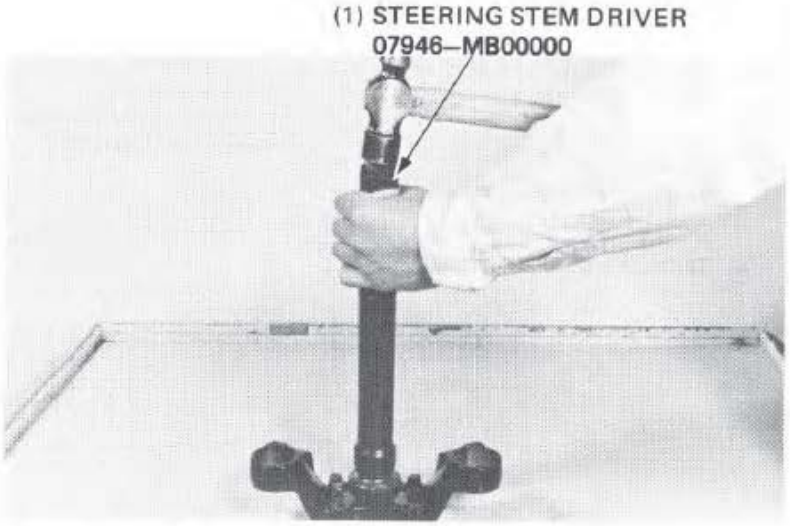
Remove the steering stem adjusting nut, steering stem and steel balls.



Remove the lower cone race and dust seal.



Install a dust seal and drive the lower cone race on with the steering stem driver (No. 07946–MB00000 or 07946–3710601 and 07964–MB00200).



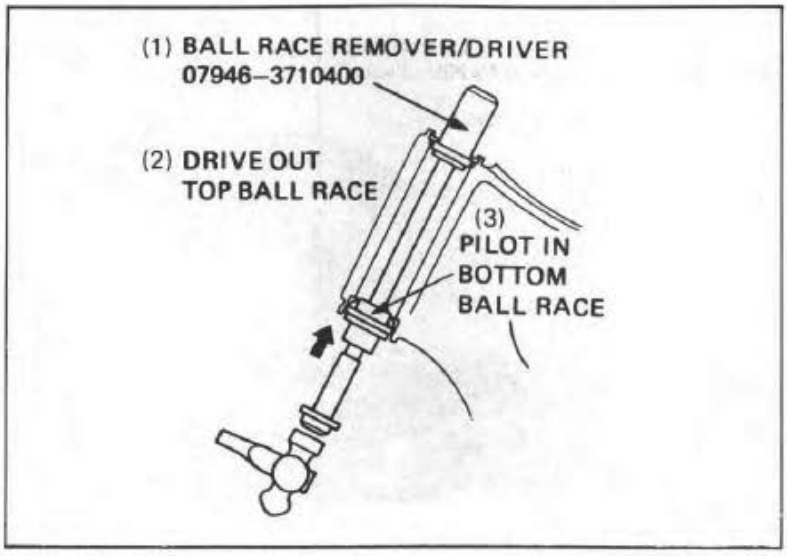
BALL RACE REPLACEMENT

Inspect the top and bottom ball races and replace if worn or damaged.

Remove the upper ball race with the special tool.

NOTE

Remove the sliding guide from the bearing race remover.

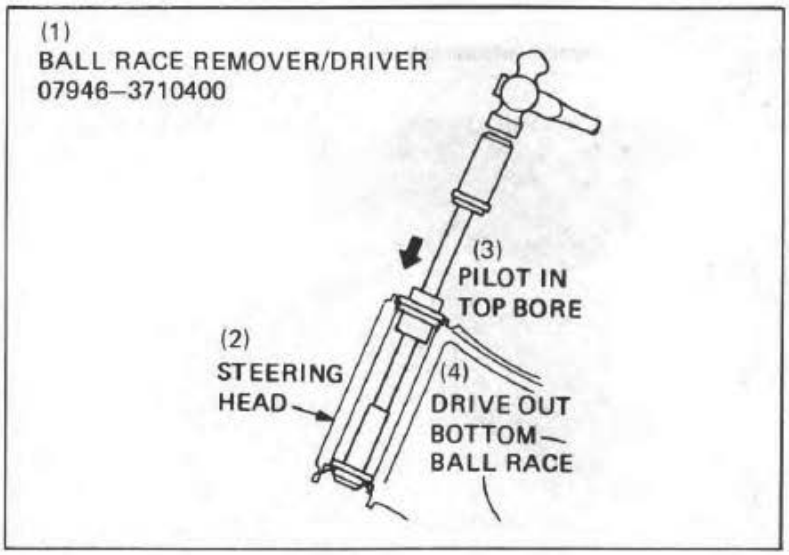


Reinstall the sliding guide onto the race remover.

Remove the lower ball race.

NOTE

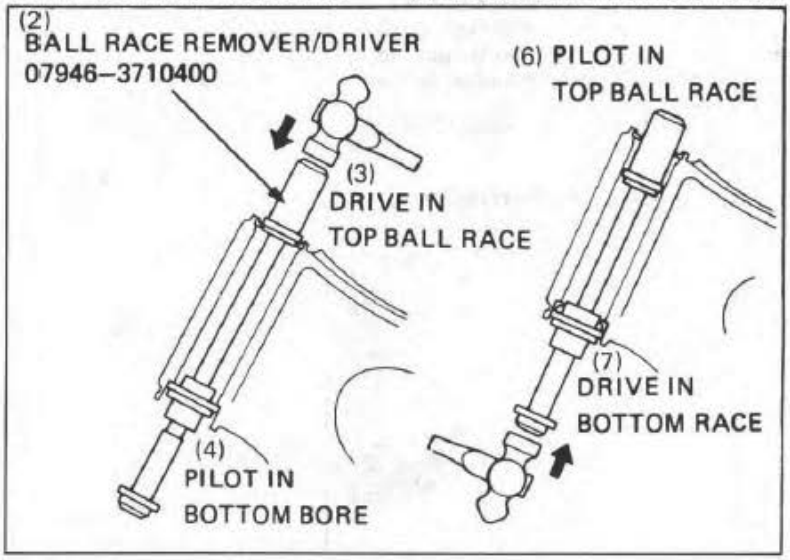
If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.



Drive the upper ball race into the head pipe with the special tools.

Drive the lower ball race into the head pipe with the special tool.

(1) (Top ball race installation) (5) (Bottom ball race installation)

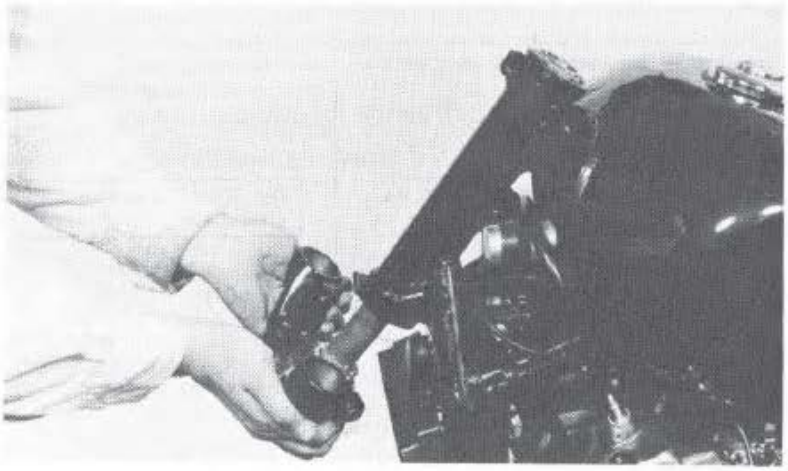


INSTALLATION

Apply grease to the top ball race and install 18 ball bearings.

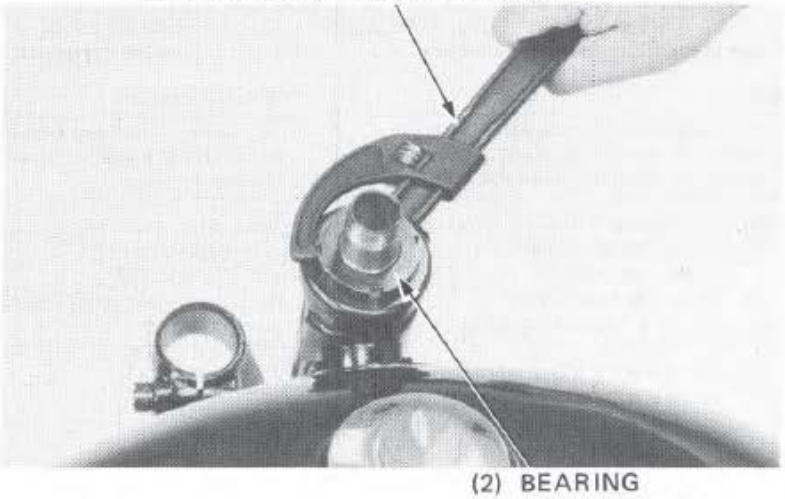
Apply grease to the bottom ball race and install 19 ball bearings.

Insert the steering stem into the steering head pipe and install the top cone race.



Install the bearing adjustment nut and tighten it snug against the top cone race. Then, back it off 1/8 turn. Make sure that there is no vertical movement and that the stem rotates freely.

(1) PIN SPANNER 07702–0020000



(2) BEARING ADJUSTMENT NUT

Install the fork bridge and stem nut.

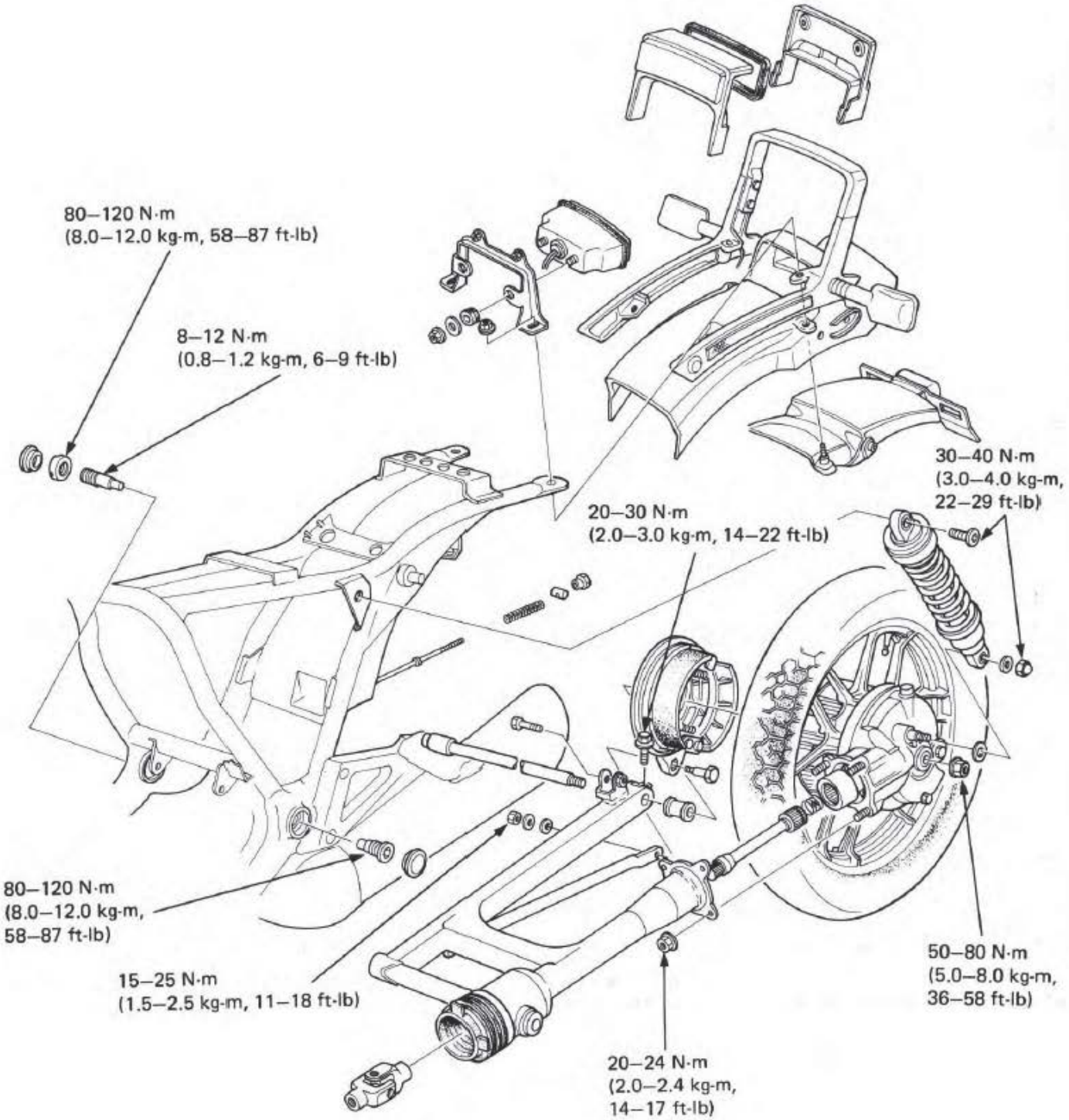
Install the front forks and tighten the stem nut.

TORQUE: 90–120 N·m
(9.0–12.0 kg-m, 65–87 ft-lb)

Install the removed parts in the reverse order of removal.

(1) LOCK NUT WRENCH, 30 x 32 mm

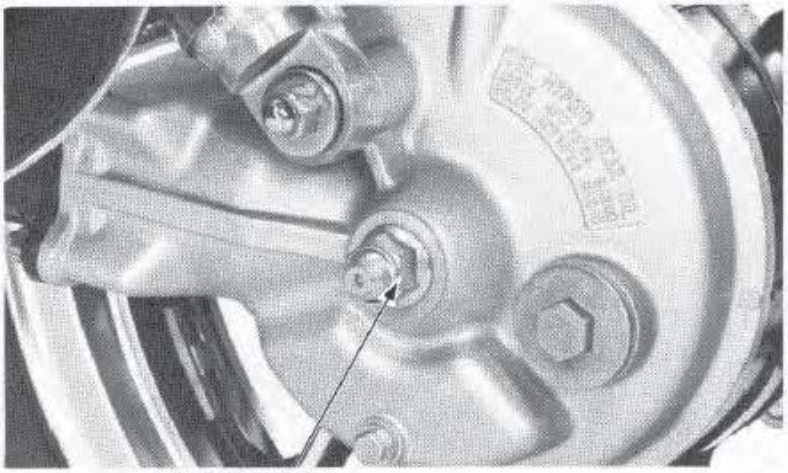
(2) EXTENSION BAR, 07716–0020500


80–120 N·m
(8.0–12.0 kg-m, 58–87 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)
80–120 N·m
(8.0–12.0 kg-m,
58–87 ft-lb)
15–25 N·m
(1.5–2.5 kg-m, 11–18 ft-lb)
50–80 N·m
(5.0–8.0 kg-m,
36–58 ft-lb)
20–24 N·m
(2.0–2.4 kg-m,
14–17 ft-lb)

REAR WHEEL

REMOVAL

Place the motorcycle on its center stand and loosen the axle nut.

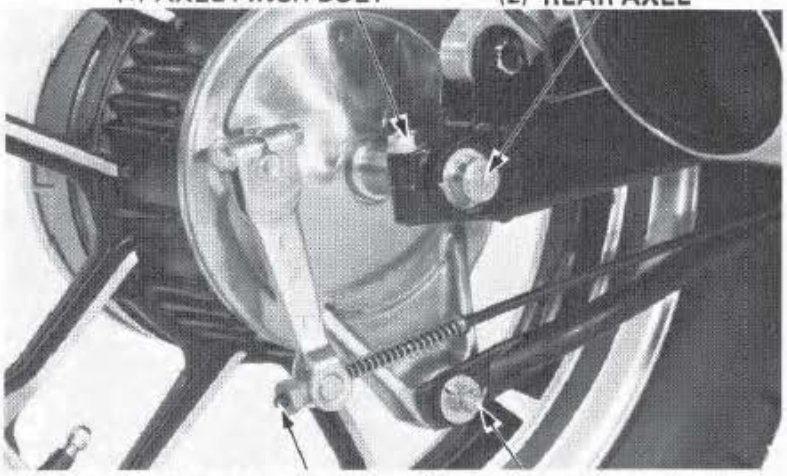


(1) AXLE NUT

Remove the brake torque link bolt and disconnect the torque link.

Remove the brake adjusting nut and the brake rod.

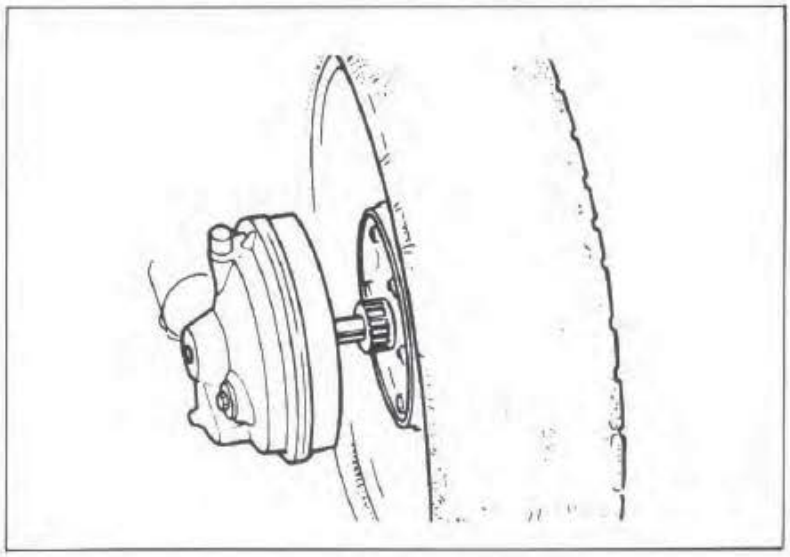
Loosen the axle pinch bolt and remove the rear axle.



(1) AXLE PINCH BOLT (2) REAR AXLE

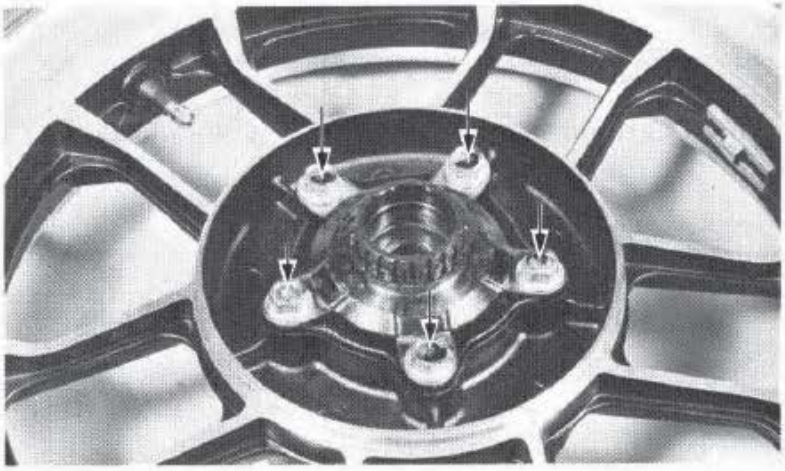
(3) BRAKE ADJUSTING NUT (4) TORQUE LINK BOLT

Move the wheel to the right to separate it from the final drive gear case and remove the rear wheel.



DISASSEMBLY

Remove the final driven flange mount bolts and lift the driven flange out of the hub.



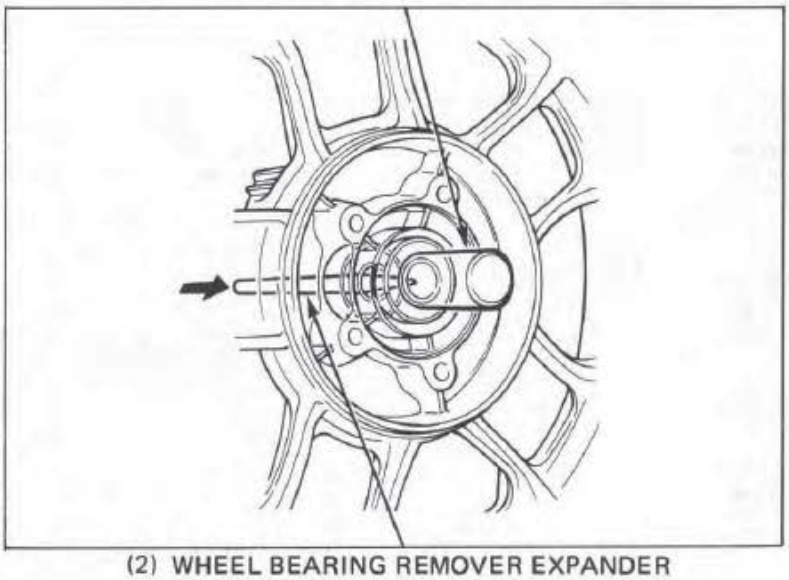
(1) WHEEL BEARING REMOVER COLLET, 17 mm
07746–0050500

Remove the wheel bearings and distance collar with the special tool.

Refer to page 15-16.

NOTE

Replace the wheel bearings with new ones if they are removed. Inspect the bearings before removing them (page 16-5).



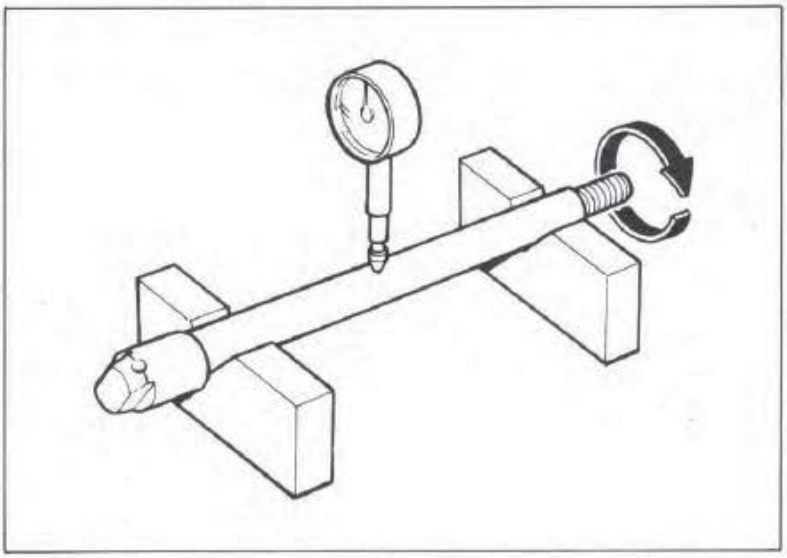
(2) WHEEL BEARING REMOVER EXPANDER
07746–0050100

INSPECTION

AXLE

Set the axle in V blocks and read the axle runout with a dial indicator. The actual axle runout is 1/2 of the total indicator reading.

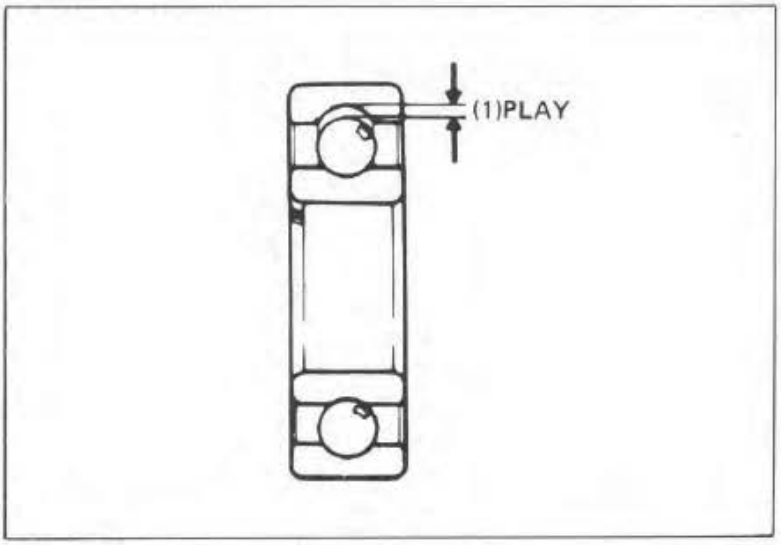
SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL BEARINGS

Place the wheel in a truing stand and check the wheel bearing play by rotating the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.

SERVICE LIMIT: 0.03 mm (0.001 in)

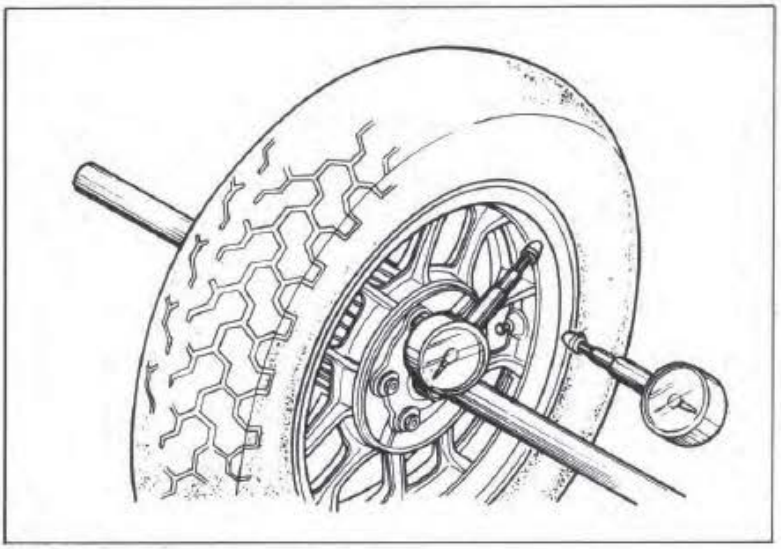


WHEEL RIM RUNOUT

Check the rim for runout by placing the wheel in a truing stand. Spin the wheel slowly, and read the runout using a dial indicator.

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

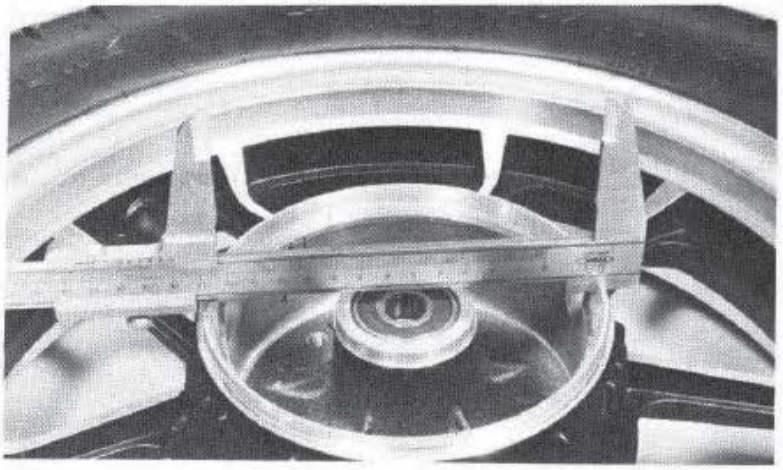
The wheel cannot be serviced and must be replaced if the above limits are exceeded.



BRAKE DRUM I.D.

Measure the brake drum I.D.

SERVICE LIMIT: 161 mm (6.34 in)



ASSEMBLY

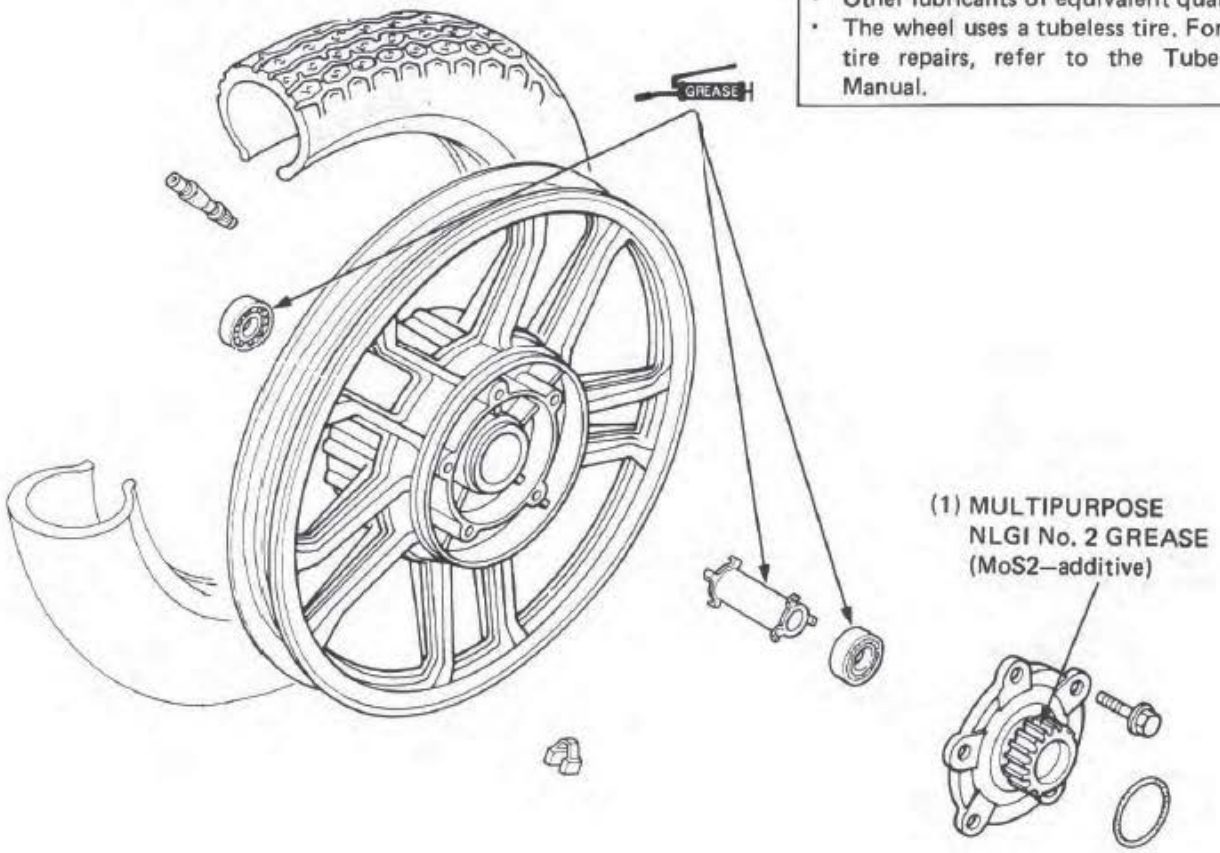
CAUTION

Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim (page 15-20).

NOTE

Use lithium-based Multipurpose grease with MoS2-additive as follows:

- Molykote BR2-S manufactured by Dow Corning, U.S.A.
- Multipurpose M-2 manufactured by Mitsubishi Oil, Japan.
- Sta-Lube NLGI #2.
- Other lubricants of equivalent quality.
- The wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.



Pack all bearing cavities with grease.

Press the distance collar into place from the left side. Drive the left ball bearing in first, then the right ball bearing.

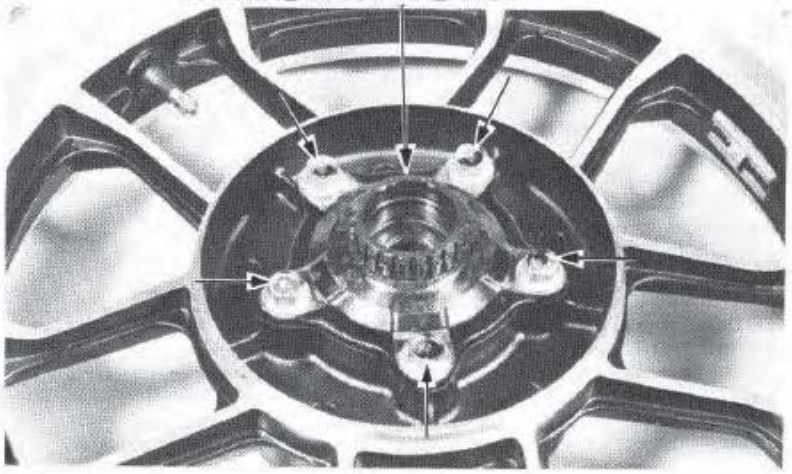
CAUTION

- *Drive the bearings in squarely.*
- *Install the bearings with the sealed end facing out, making sure they are fully seated.*

Install the final driven flange onto the rear wheel and tighten the bolts.

TORQUE: 50–60 N·m
(5.0–6.0 kg-m, 36–43 ft-lb)

(1) FINAL DRIVEN FLANGE



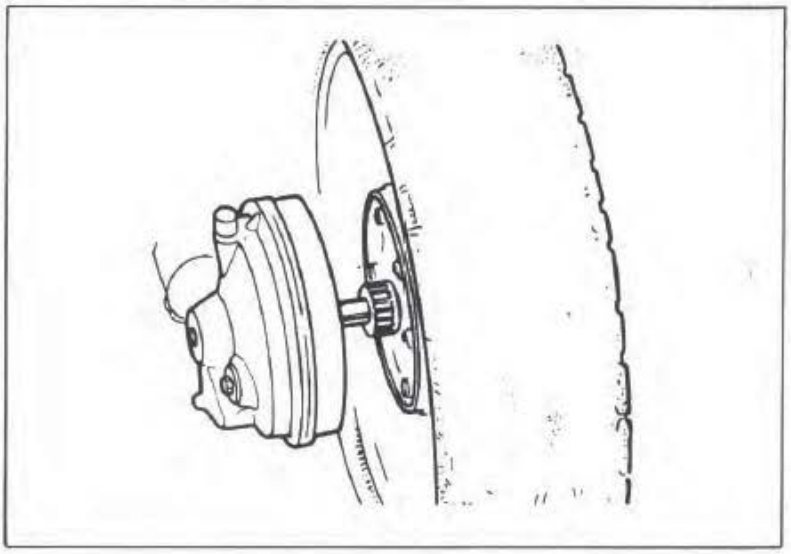
INSTALLATION

Apply Multipurpose NLGI No. 2 grease (MoS2-additive) to the final driven flange and ring gear engagement splines.

Loosen the final gear case attaching nuts to ease axle installation and to assure proper driven flange alignment.

Engage the rear wheel with the final drive case, making sure the splines are correctly aligned.

Wedge a flat screwdriver tip into the pinch bolt slot.

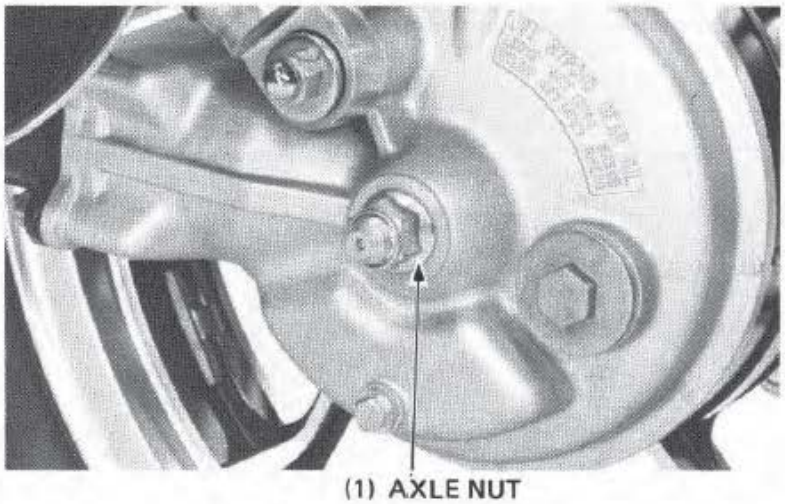


Insert the rear axle through the swing arm, side collar, brake panel, hub and final drive gear. Turn the axle and check that it rotater freely.

Remove the screwdriver from the pinch bolt slot.

Tighten the axle nut to the specified torque.

TORQUE: 50–80 N·m
(5.0–8.0 kg-m, 36–58 ft-lb)



(1) AXLE NUT

Tighten the axle pinch bolt.

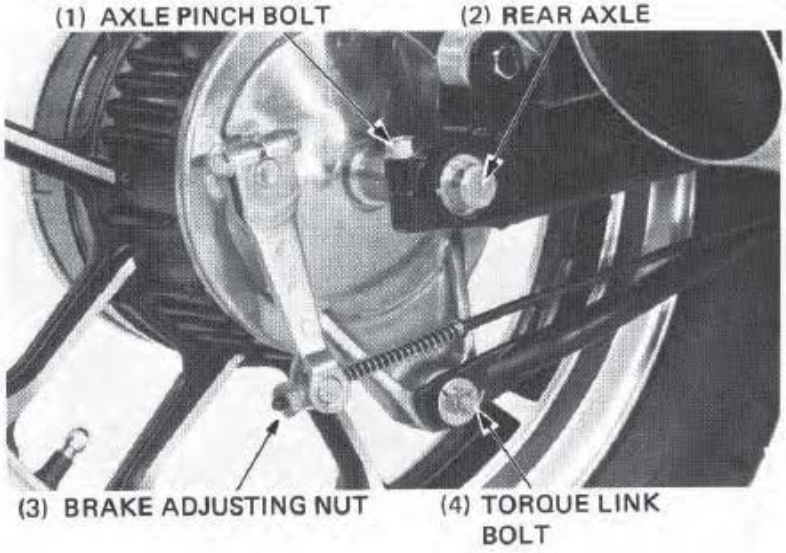
TORQUE: 20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)

Place the brake rod through the brake arm pin and install the brake adjusting nut.

Tighten the brake torque link bolt.

TORQUE: 15–25 N·m
(1.5–2.5 kg-m, 11–18 ft-lb)

Adjust the rear brake (page 3-14).



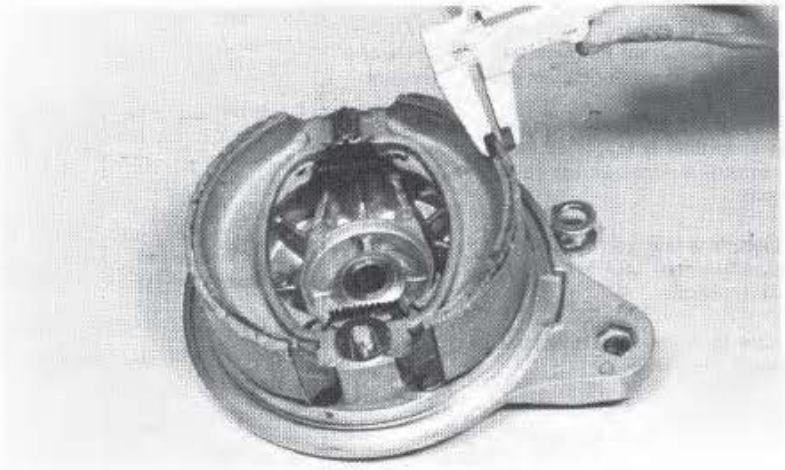
REAR BRAKE PANEL

LINING THICKNESS INSPECTION

Measure the rear brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)

Replace the brake shoes if they are thinner than the service limit.



DISASSEMBLY

Remove the rear brake arm.
Remove the cotter pins and brake shoes.

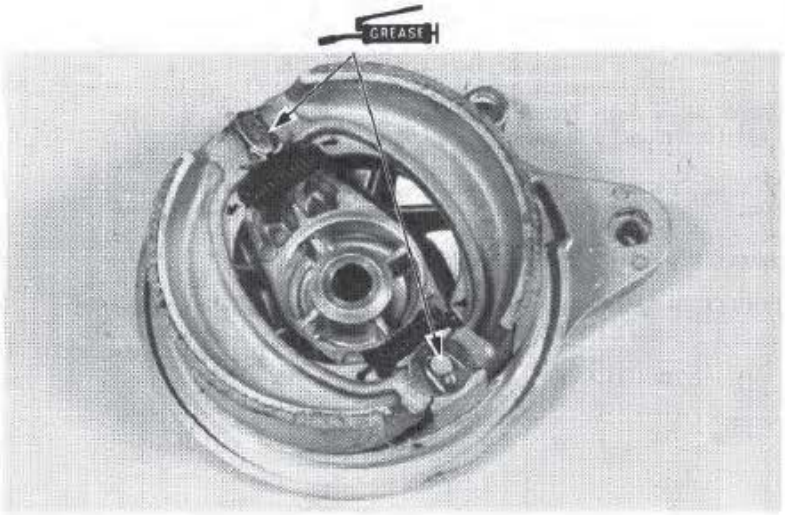
ASSEMBLY

Apply grease to the anchor pins and brake cam.

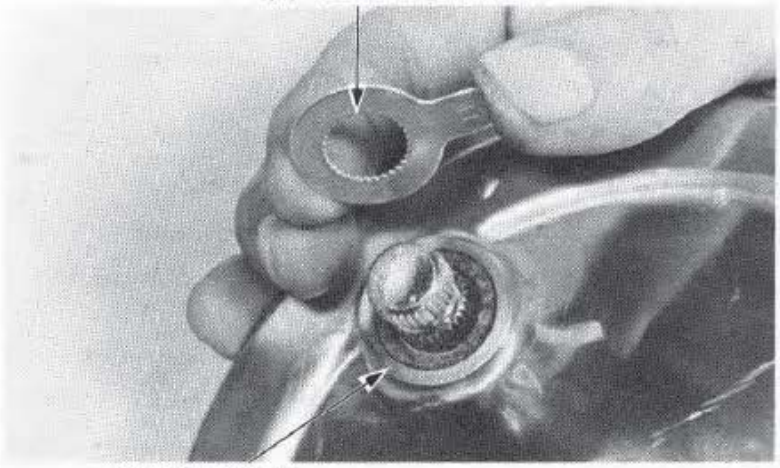
WARNING

Contaminated brake linings reduce stopping power. Keep grease off the brake linings. Wipe any excess grease off the cam.

Install the brake shoes and cotter pins.

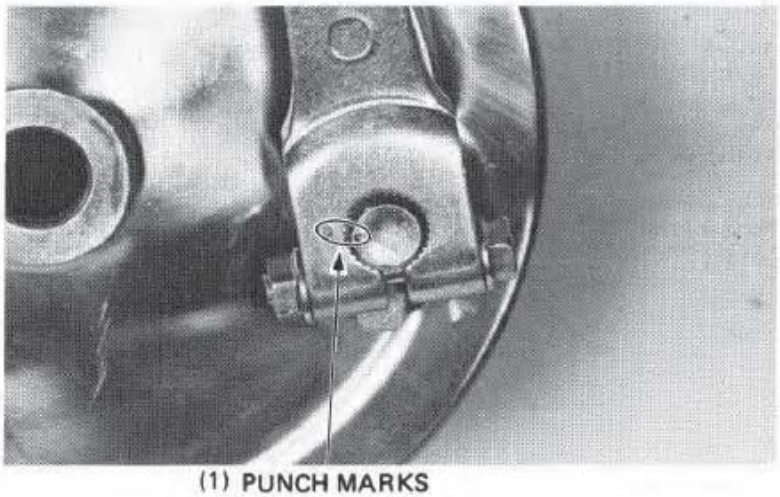


Install the felt seal and wear indicator.



Install the brake arm, aligning the punch marks and tighten the brake arm bolt.

TORQUE: 24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)



SHOCK ABSORBER

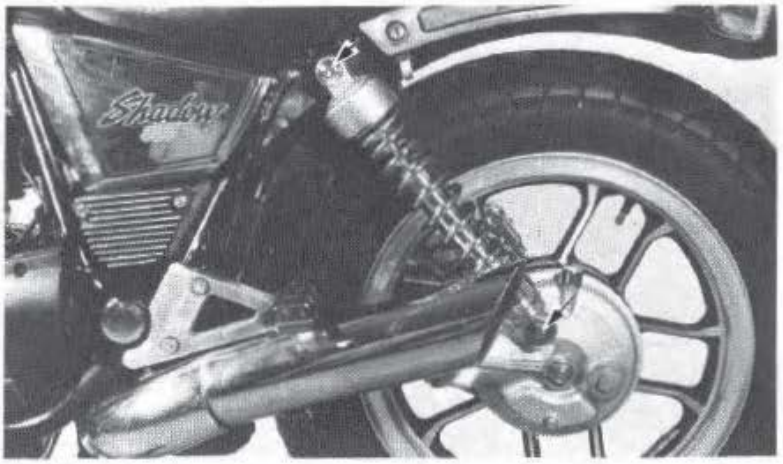
REMOVAL

NOTE

Remove one shock absorber at a time to facilitate removal and installation.

Adjust the shock absorber to the softest position.

Remove the shock absorber upper and lower mounts and remove the shock absorber.



DISASSEMBLY

Replace base and guide of shock compressor, P/N 07959–3290001 with base 07959–MB10000.

NOTE

Use the clevis pin and base supplied with 07959–MB10000 to up date the shock compressor.

Place the collar, 52486–463–0000 or equivalent in the shock's bottom joint before putting the shock in the compressor.

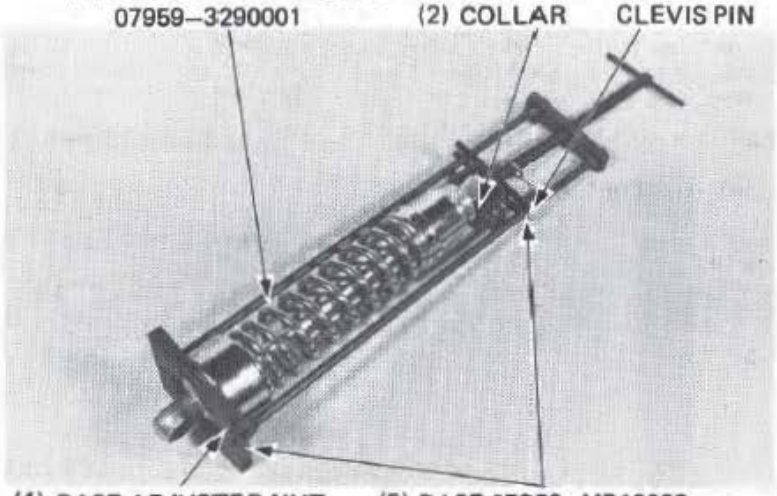
Set the shock in the compressor as shown and compress the spring 30 mm (1 1/4 in) by turning the compressor handle.

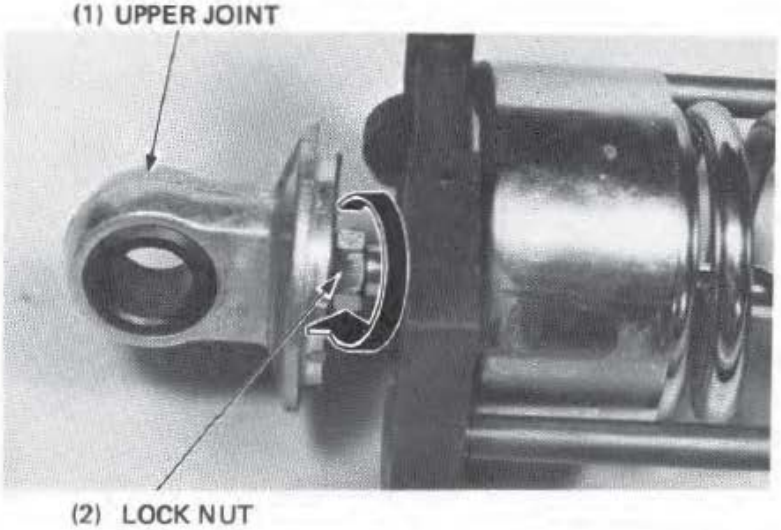
CAUTION

Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.

Place the upper joint in a vise and pull the shock rod out.

Separate the upper joint rotating the lock nut in the direction shown and remove the compressor.

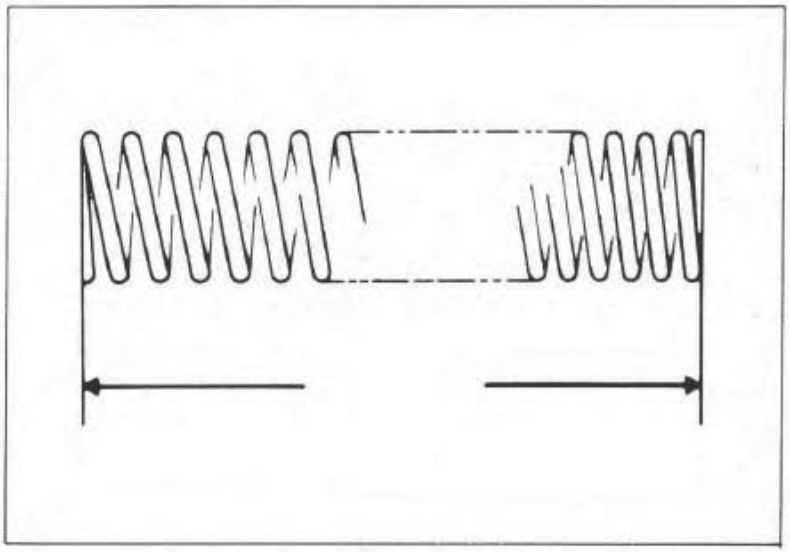




SPRING FREE LENGTH

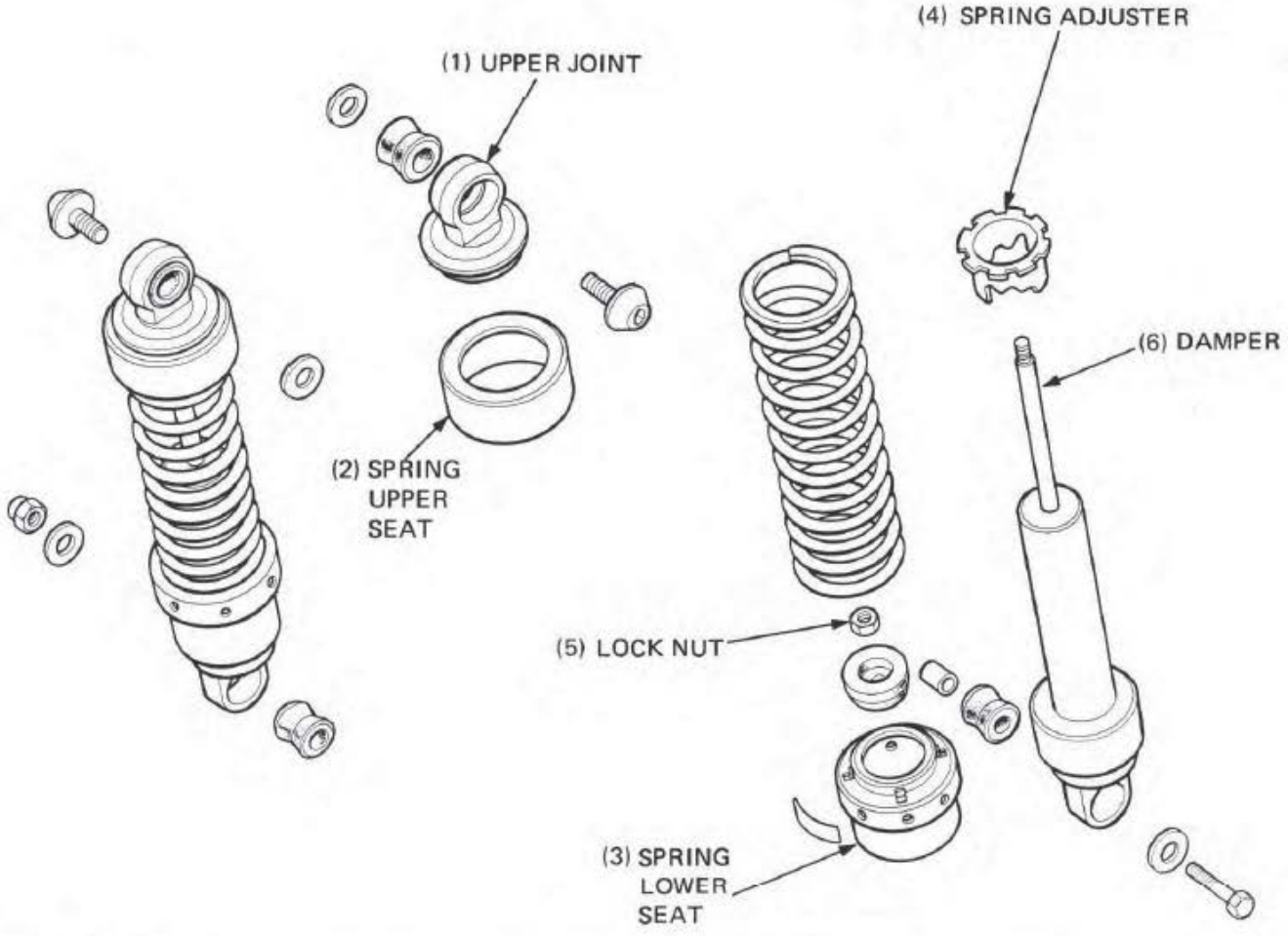
Measure the rear shock absorber spring free length.

SERVICE LIMIT: 237 mm (9.3 in)



ASSEMBLY

Place the spring adjuster, the spring lower seat, spring upper seat and stopper rubber on the damper.



CAUTION

Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.

Apply a locking agent to the rod threads and install the lock nut.

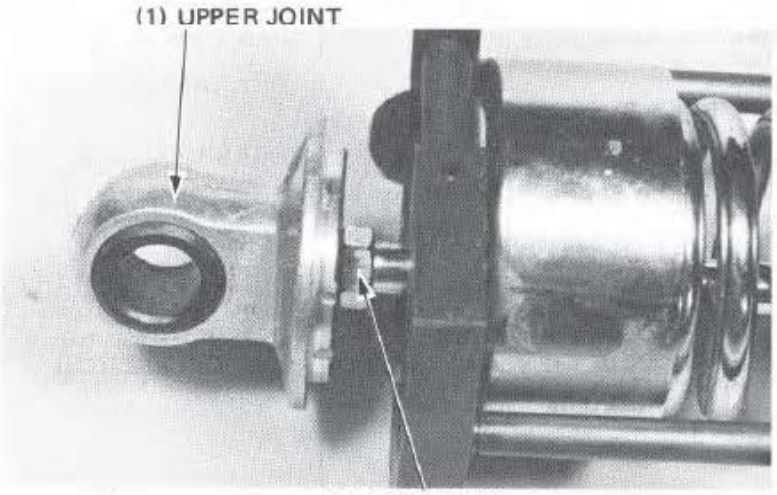
Attach the shock absorber compressor, screwing in the compressor's base adjuster nut.

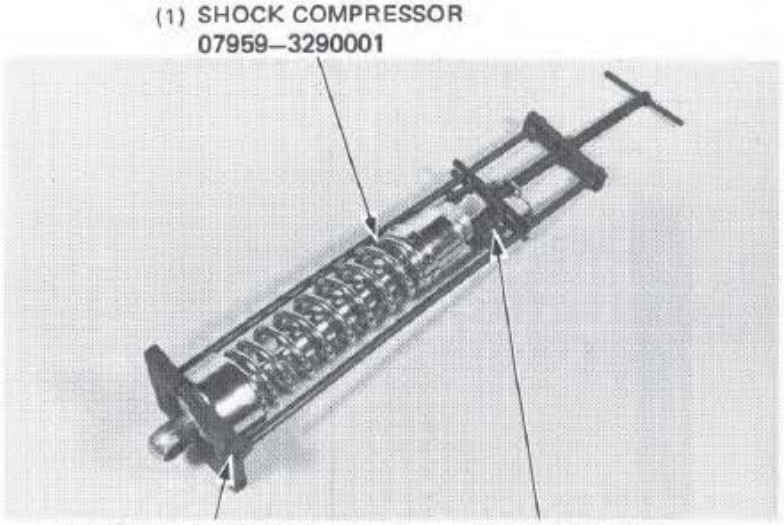
Apply a locking agent to the damper rod threads and screw the upper joint on. Hold the upper joint in a vise and tighten the lock nut securely.

NOTE

Check that the lock nut is seated against the rod's bottom thread.

Align the spring seat with the upper joint while releasing the compressor.

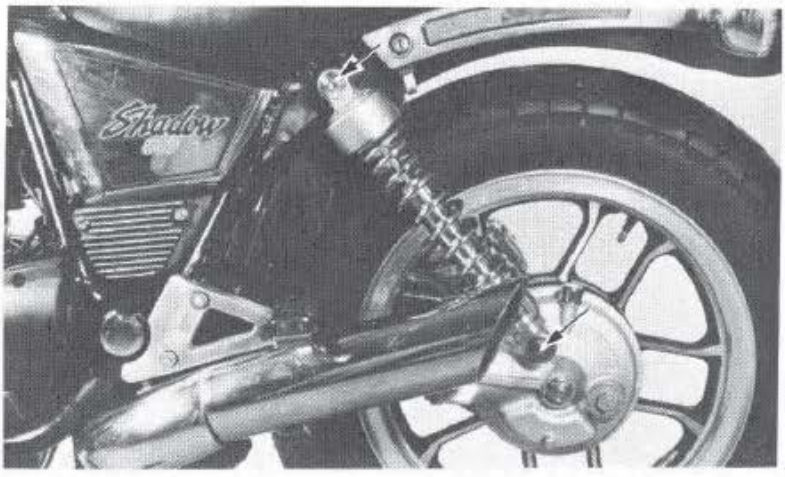




INSTALLATION

Install the shock absorber onto the frame. Tighten the upper and lower mounts.

TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

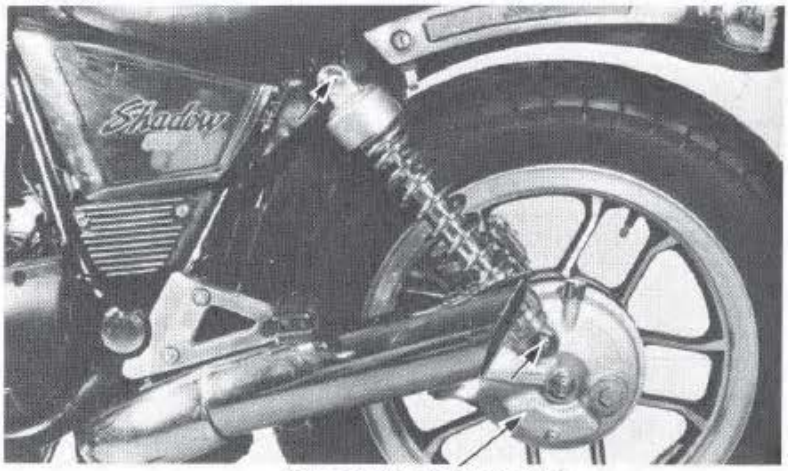


SWING ARM

REMOVAL

Remove the rear wheel (page 16-3) and the final drive gear case (page 14-3).

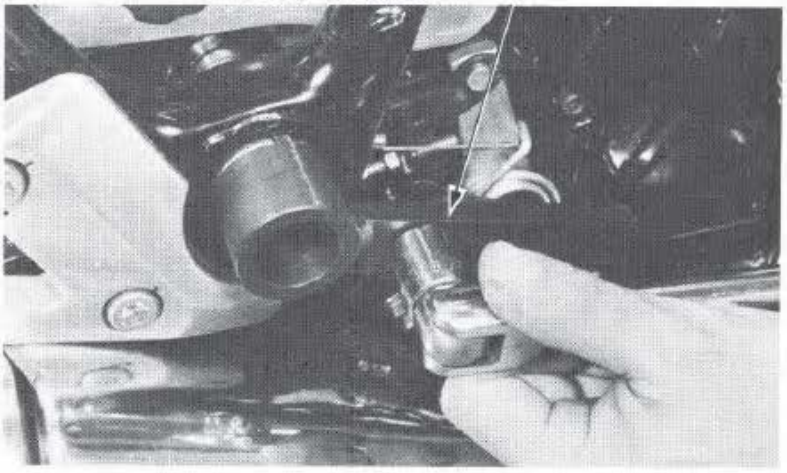
Remove the rear shock absorbers (page 16-10).



(1) FINAL GEAR CASE

(1) SWING ARM PIVOT LOCK NUT WRENCH
07908–ME90000

Remove the swing arm pivot caps and loosen the right pivot bolt lock nut with the lock nut wrench.

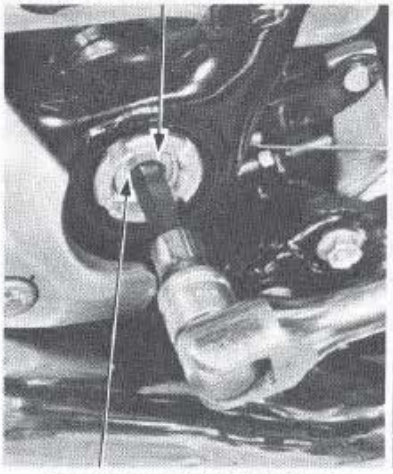


(1) HEX BIT, 10 mm 07917–3710000

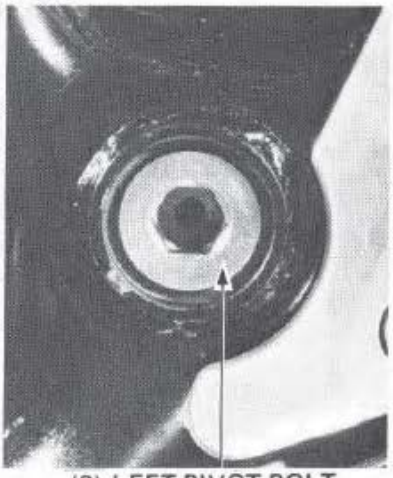
Remove the right pivot bolt with the 10 mm hex bit.

Remove the left pivot bolt and remove the swing arm.

Remove the boot from the swing arm.



(2) RIGHT PIVOT BOLT



(3) LEFT PIVOT BOLT

PIVOT BEARING REPLACEMENT

Punch or drill a 13 mm (1/2 in) hole into each grease retainer.

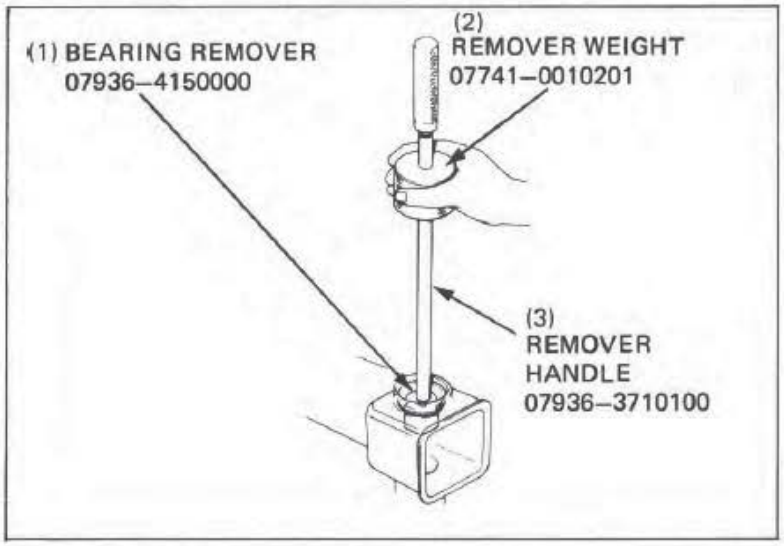
Remove the attachment from the special tool, 07936–3710500. Slide the shaft through the hole and install a 29 mm (O.D.) washer or equivalent any attachment onto the shaft.

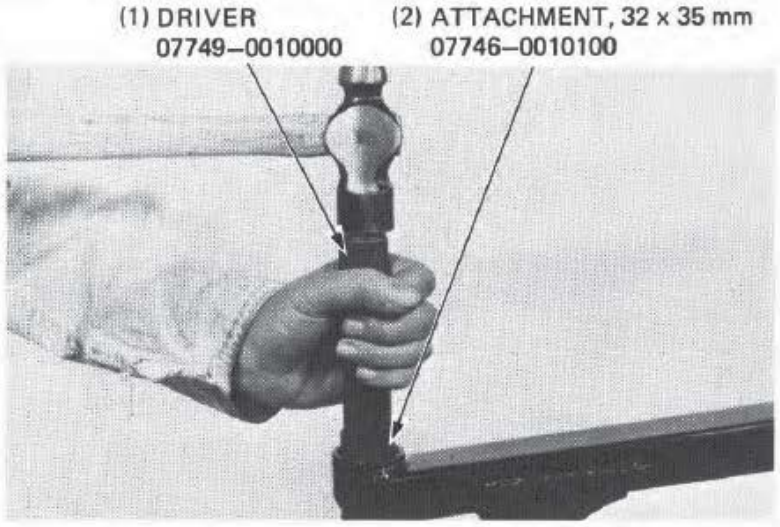
Install the slide hammer and handle remove the race. Repeat for the other side.

NOTE

Replace the bearing inner and outer races as a set. Replace the grease retainer plate whenever it is removed.

Install new grease retainer plates and drive new bearing outer races into the swing arm pivot.



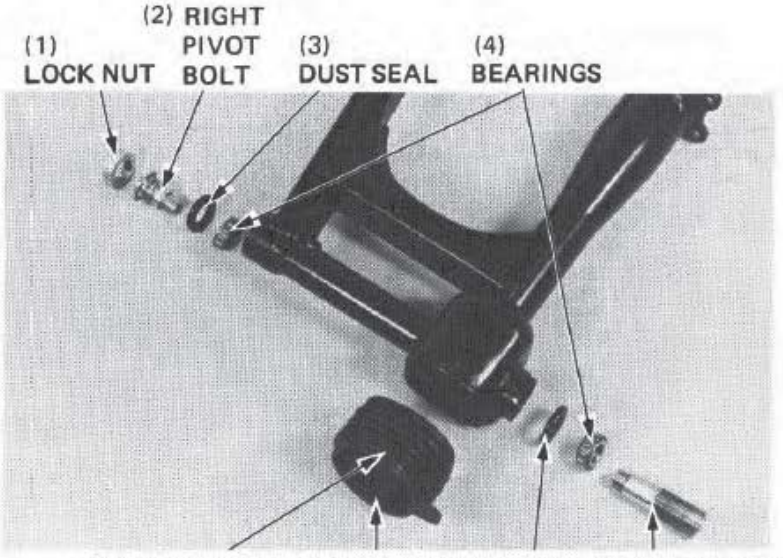


INSTALLATION

Apply grease to the pivot bearing dust seals and pivot bolt tips.

Install the bearings and dust seals.

Install the swing arm boot with its "UP" mark up.

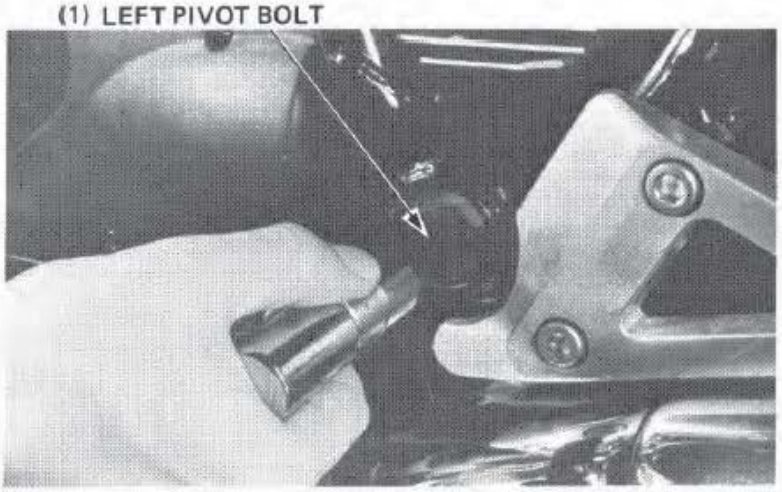


Install the swing arm and pivot bolts.

Tighten the left pivot bolt to the specified torque.

TORQUE: 80–120 N·m
(8.0–12.0 kg-m, 58–87 ft-lb)

(1) LEFT PIVOT BOLT



Tighten the right pivot bolt to 40 N·m (4.0 kg-m, 21 ft-lb) loosen it and retighten to the specified torque.

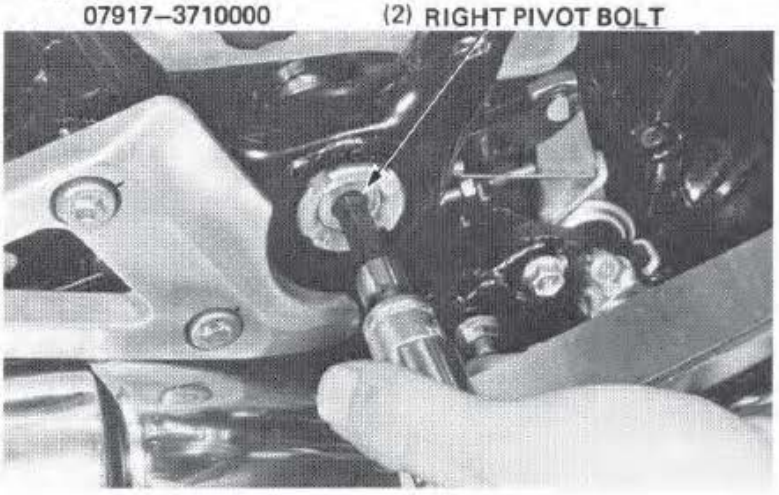
TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

Move the swing arm up and down several times.

Retighten the right pivot bolt to the specified torque.

(1) HEX BIT, 10 mm
07917–3710000

(2) RIGHT PIVOT BOLT



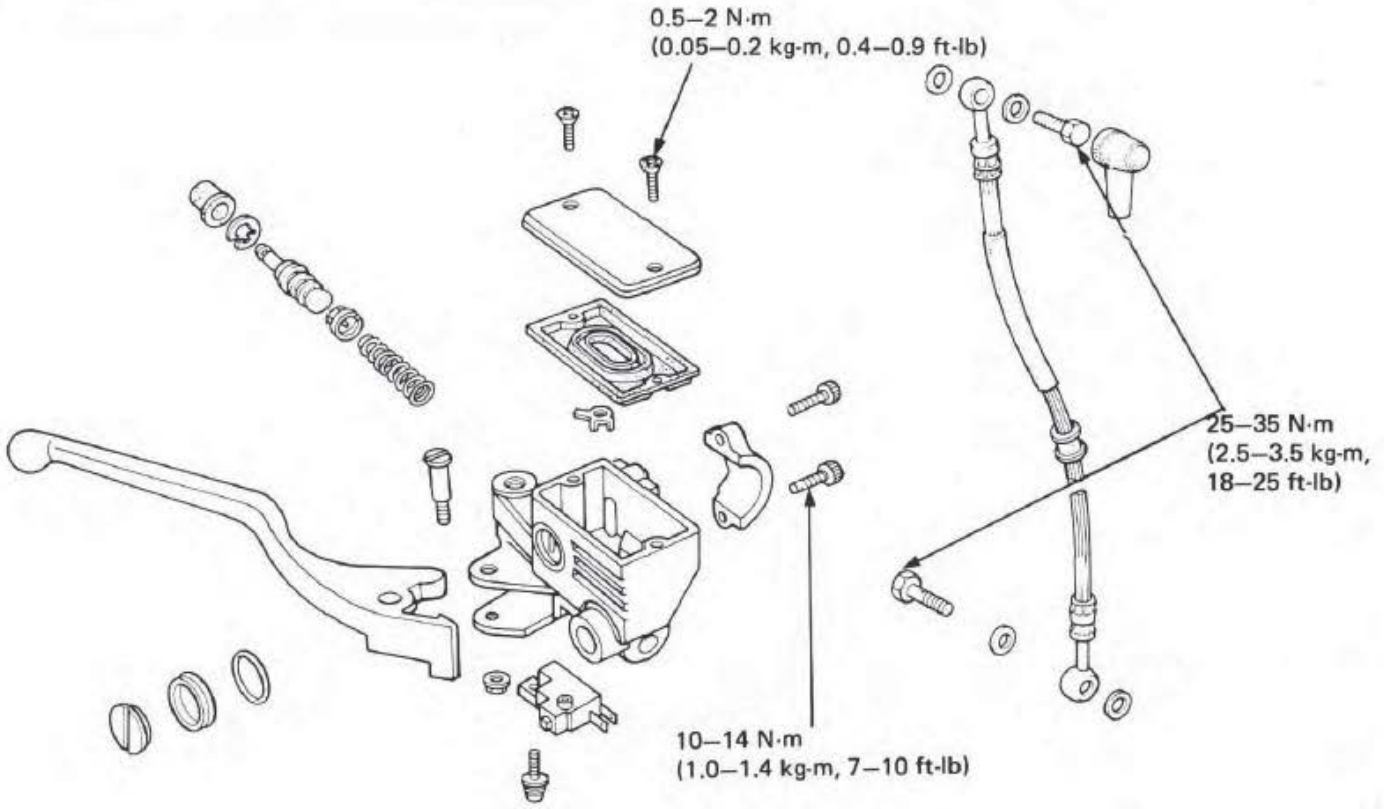
Tighten the lock nut while holding the right pivot bolt.

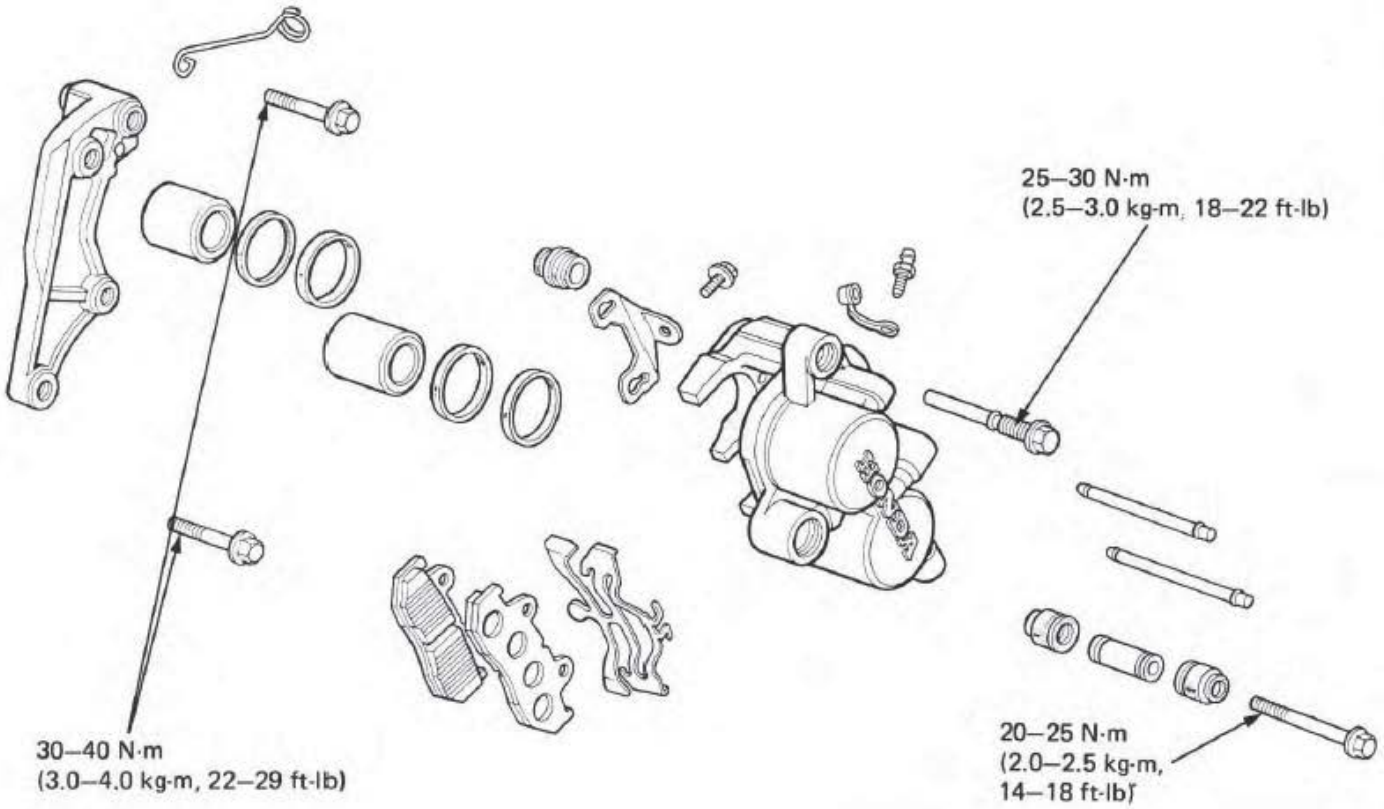
TORQUE: 80–120 N·m
(8.0–12.0 kg-m, 58–87 ft-lb)

Install the final gear case (page 14-16) and rear wheel (page 16-7).

Install the shock absorbers (page 16-12).

(1) SWING ARM LOCK NUT WRENCH
07908–ME90000


0.5–2 N·m
(0.05–0.2 kg-m, 0.4–0.9 ft-lb)
25–35 N·m
(2.5–3.5 kg-m,
18–25 ft-lb)
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

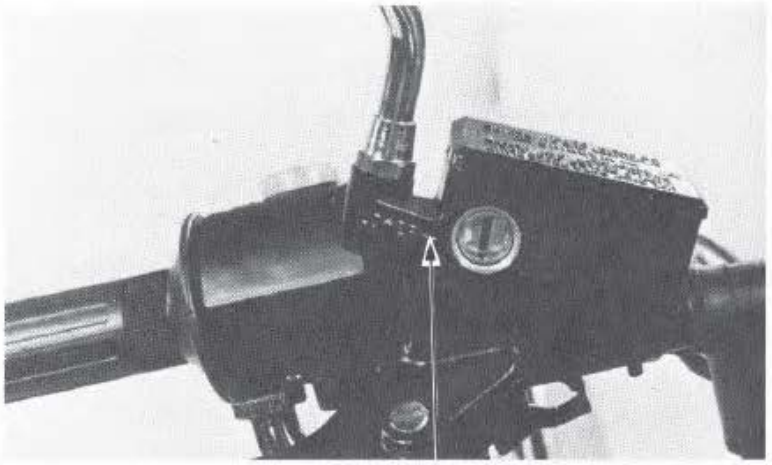

25–30 N·m
(2.5–3.0 kg-m, 18–22 ft-lb)
30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)
20–25 N·m
(2.0–2.5 kg-m,
14–18 ft-lb)

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

Check the fluid level with the fluid resevoir parallel to the ground.

CAUTION

- *Install the diaphragm on the reservoir when operating the brake lever. Failure to do so will allow brake fluid to squirt out of the reservoir during brake operation.*
- *Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.*



(1) LOWER LEVEL

BRAKE FLUID DRAINING

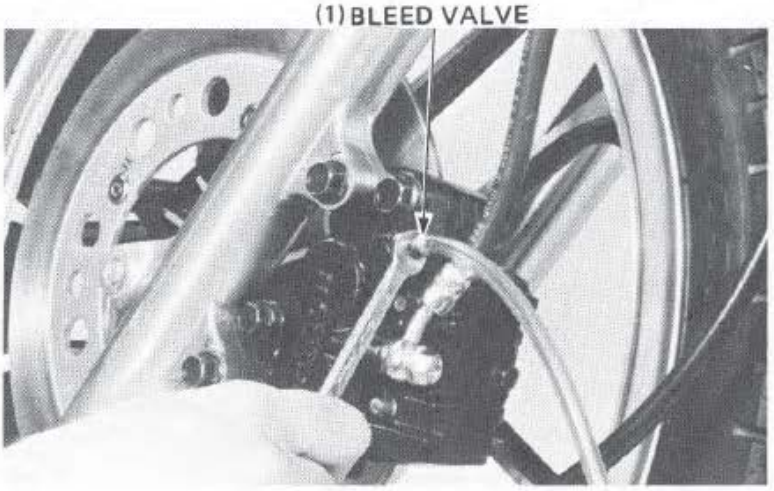
Connect a bleed hose to the bleed valve.

Loosen the caliper bleed valve and pump the brake lever. Stop operating the lever when fluid stops flowing out of the bleed valve.

WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

(1) BLEED VALVE



BRAKE FLUID FILLING

NOTE

Do not mix different types of fluid since they are not compatible.

Close the bleed valve, fill the reservoir, and install the diaphragm.

To prevent piston overtravel and brake fluid seepage, keep a 20 mm (3/4 in) spacer between the handlebar grip and lever when filling and bleeding the front brake system. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.

Bleed the system as per the instruction on the next page.

(1) 20 mm (3/4 IN) SPACER

AIR BLEEDING

NOTE

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- Use only **DOT 3 brake fluid** from a sealed container.
- Do not mix brake fluid types and never reuse the contaminated fluid which has been pumped out during brake bleeding, because that will impair the efficiency of the brake system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Connect a Mityvac Brake Bleeder No. 6860 or equivalent to the bleed valve.
Loosen the bleed valve 1/2 turn and bleed air until bubbles do not appear in the fluid.
Pump the brake lever or pedal to bring the caliper pads in contact with the disc.
Remove the master cylinder cap and fill the reservoir to near full.
Connect the Mityvac Brake Bleeder or equivalent to the bleed valve.
Pump the brank bleeder and loosen the bleeder valve.
Add fluid when the fluid level in the master cylinder reservoir is low.
Repeat the above procedures until air bubbles do not appear, in the plastic hose.

NOTE

If air is entering the bleeder from around the valve threads. Seal the threads with teflon tape.

If a brake bleeder is not available, perform the following procedure.

1) Squeeze the brake lever, open the bleed valve 1/2 turn and then close the valve.

NOTE

Do not release the brake lever until the bleed valve has been closed.

2) Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

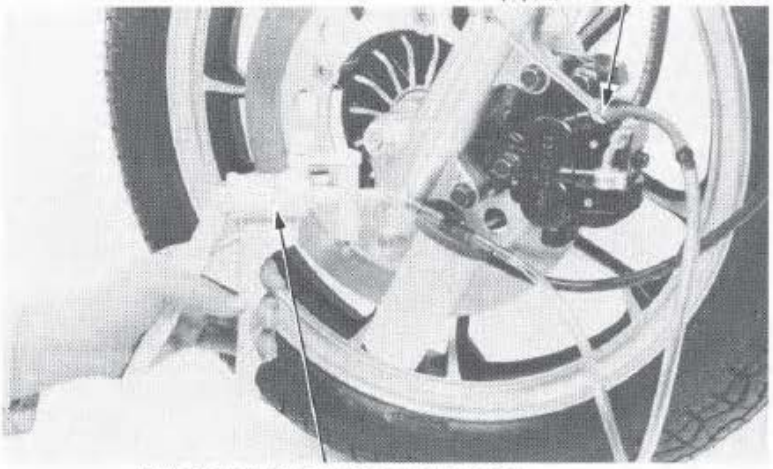
Repeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.

Fill the fluid reservoir to the upper level mark.

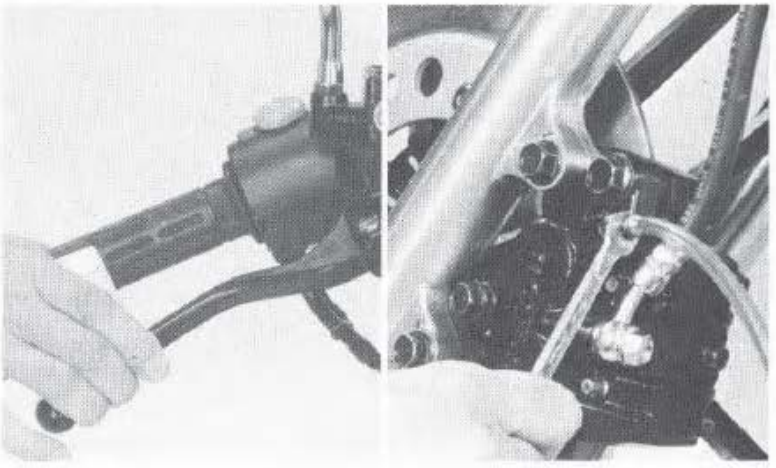
WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

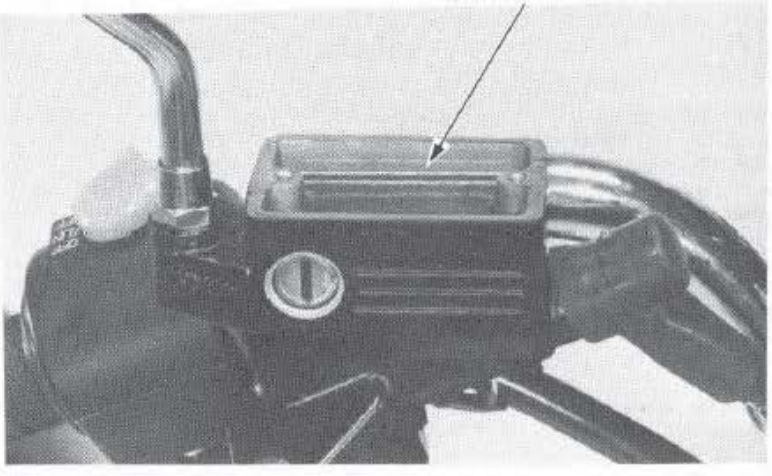
(1) AIR BLEED VALVE



(2) MITYVAC BRAKE BLEEDER
OR EQUIVALENT



(1) UPPER LEVEL



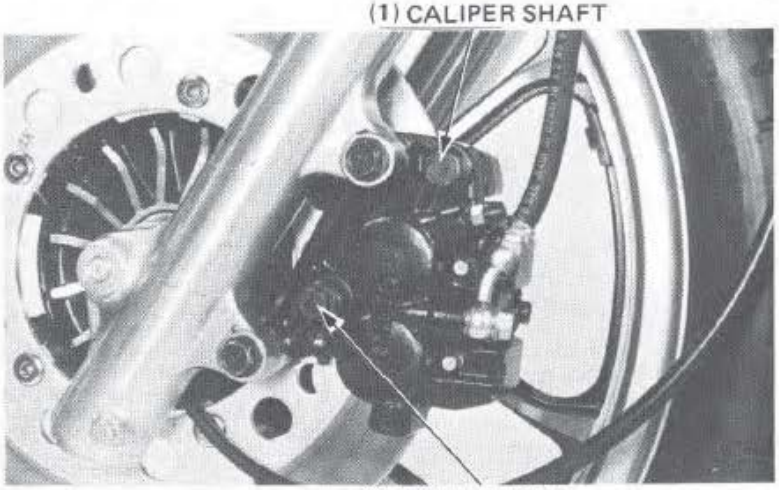
BRAKE PAD/DISC

PAD REPLACEMENT

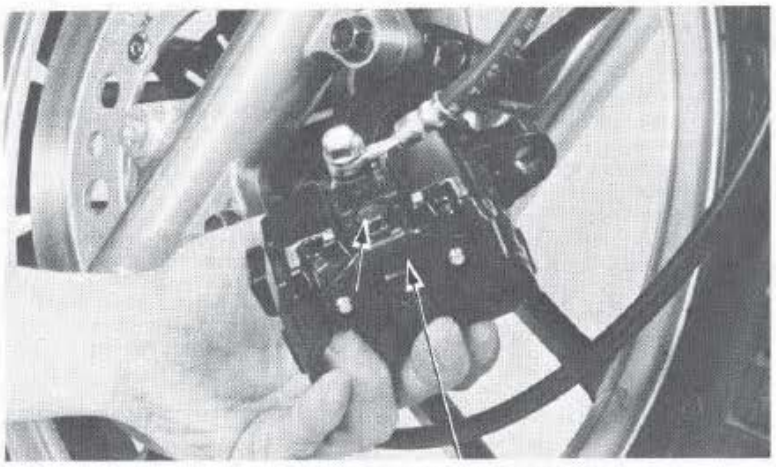
NOTE

Always replace the brake pads in pairs to assure even disc pressure.

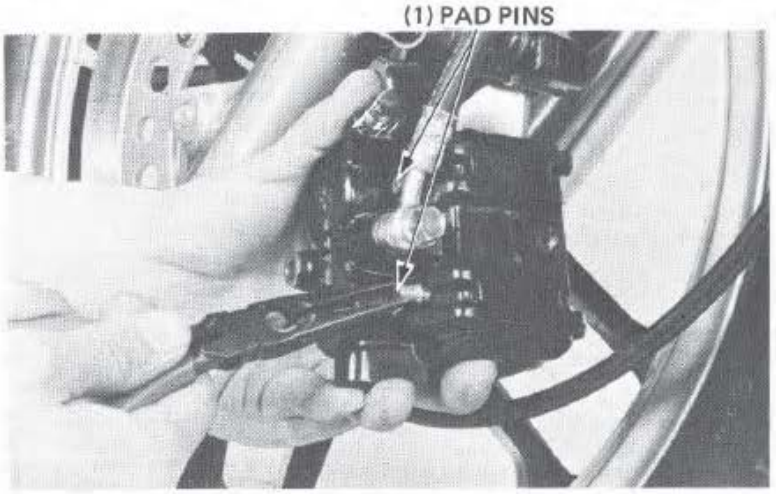
Remove the caliper shaft, mount bolt and caliper.



Remove the pad pin retainer.



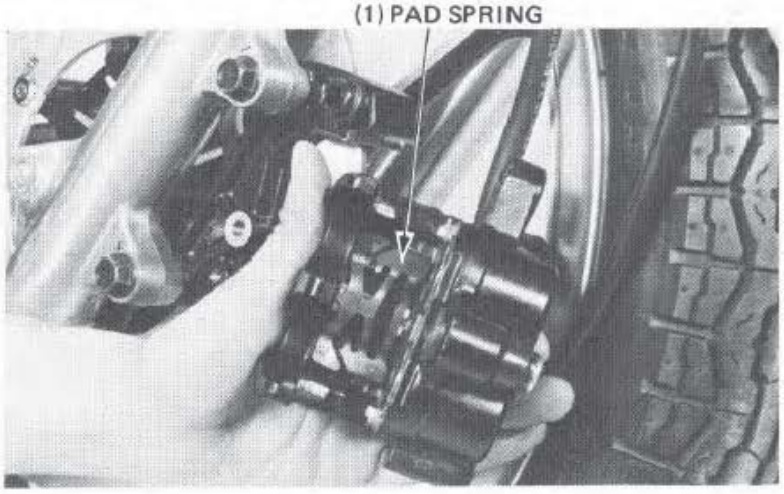
Pull the two retainer pad pins and remove the pads from the caliper.



Position the pad spring in the caliper as shown.

Push the caliper pistons in all the way.

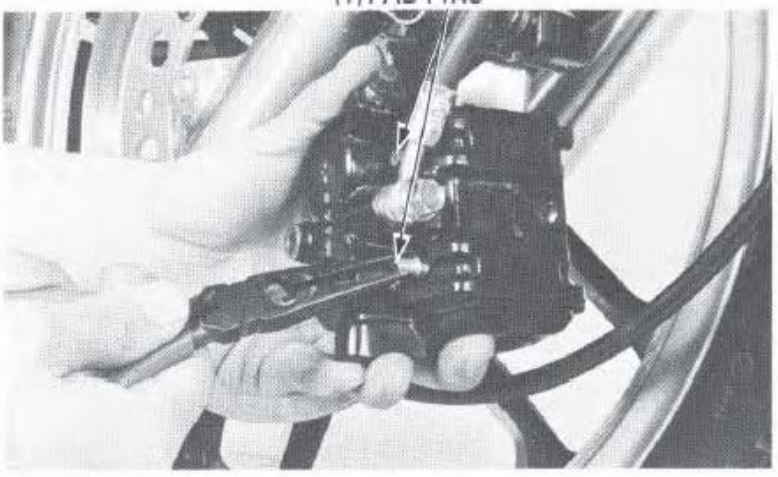
(1) PAD SPRING



Install the new pads in the caliper.

Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.

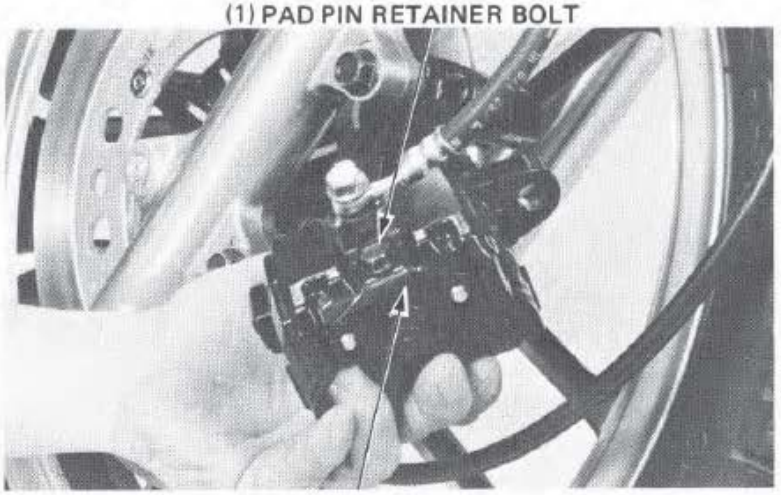
(1) PAD PINS



Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins.

Install the pad pin retainer bolt.

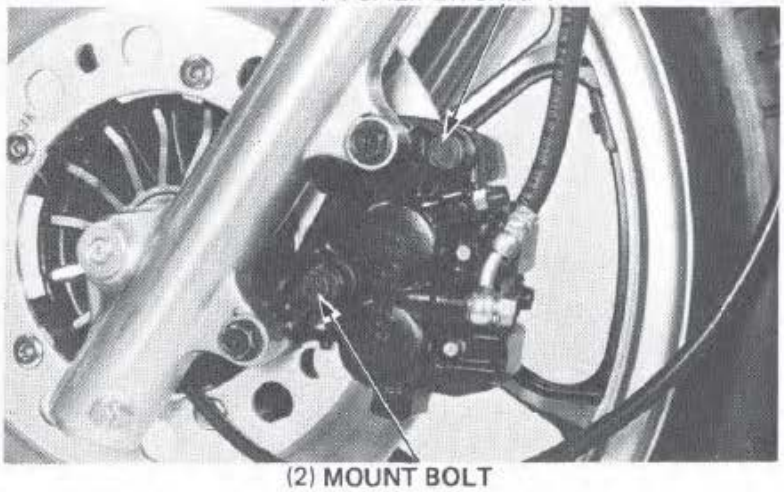
(1) PAD PIN RETAINER BOLT



(2) RETAINER

Install the caliper, shaft and mounting bolt.
Tighten the bolt and shaft.

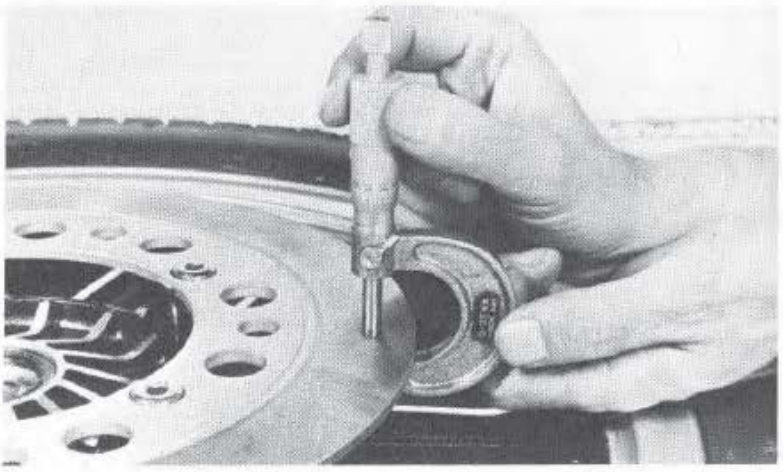
TORQUE:
CALIPER SHAFT: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
MOUNT BOLT: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)



DISC THICKNESS

Measure the thickness of disc.

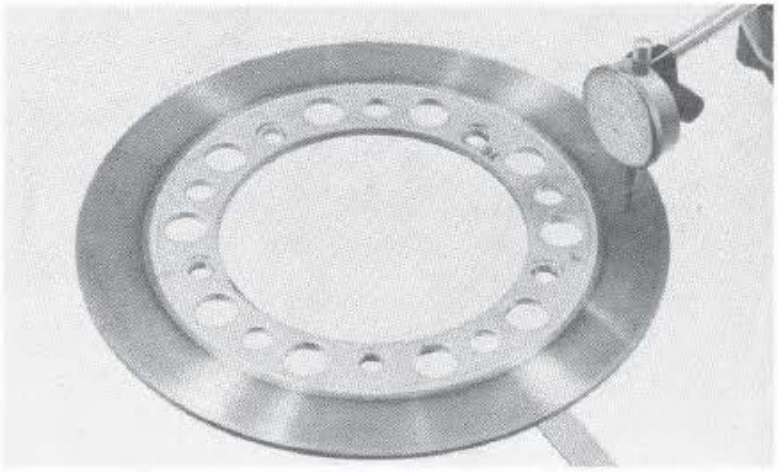
SERVICE LIMIT: 4.0 mm (0.16 in)



BRAKE DISC WARPAGE

Set the brake disc on a surface plate and set up a dial indicator.
Measure the brake disc warpage.

SERVICE LIMIT: 0.30 mm (0.012 in)



MASTER CYLINDER

DISASSEMBLY

Drain brake fluid from the hydraulic system.

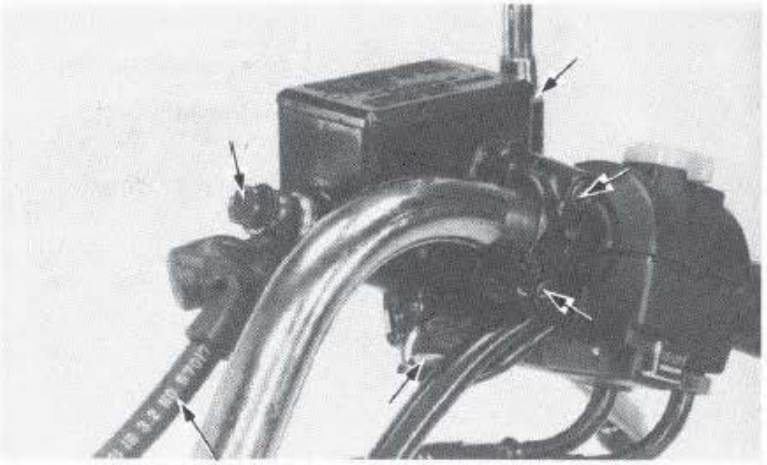
Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

CAUTION

Avoid spilling brake fluid on painted surfaces. Place a rag over the fuel tank whenever the brake system is serviced.

NOTE

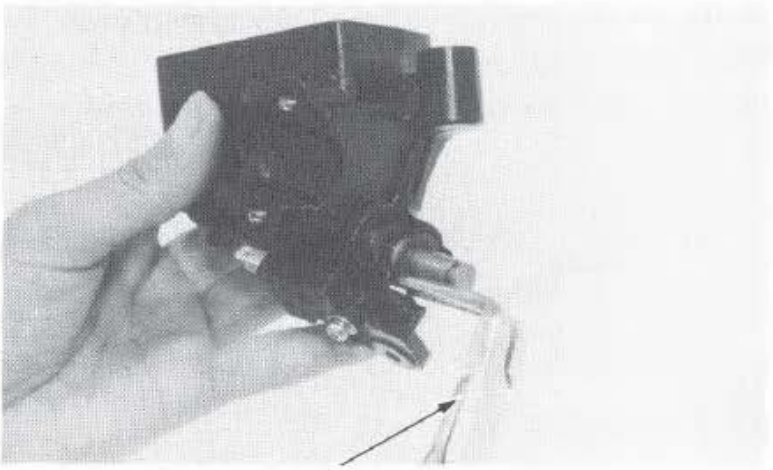
When removing the oil hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.



(1) BRAKE HOSE

Remove the master cylinder.

Remove the piston boot and the circlip from the master cylinder body.

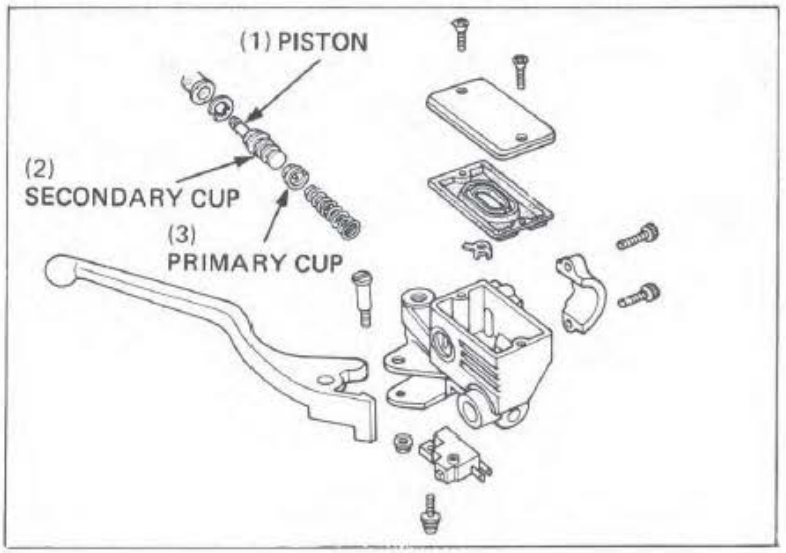


(1) SNAP RING PLIERS
07914–3230001

Remove the secondary cup and piston. Then remove the primary cup and spring.

Remove the brake light switch from the master cylinder body, if necessary.

Clean the inside of the master cylinder and reservoir with brake fluid.

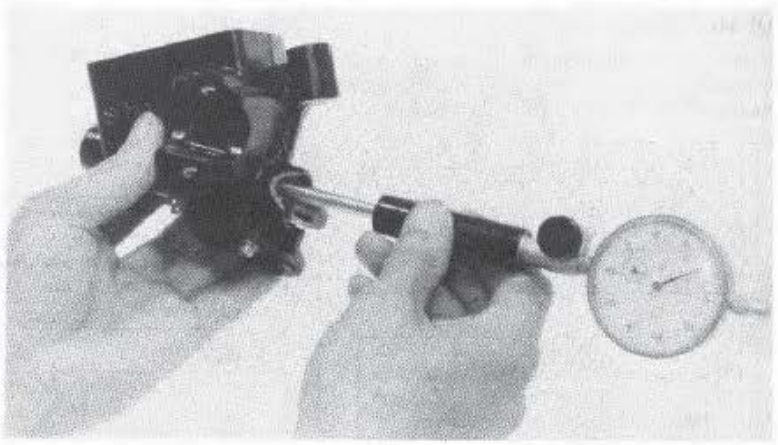


INSPECTION

Measure the master cylinder I.D.

SERVICE LIMIT: 15.93 mm (0.627 in)

Check the master cylinder for scores, scratches or nicks.

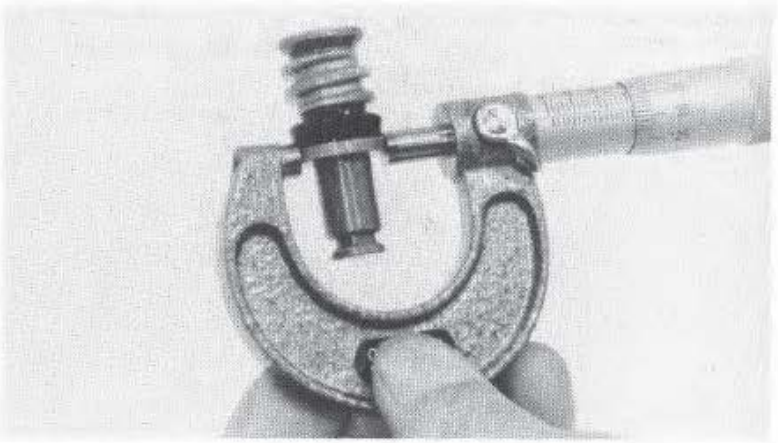


BRAKE CALIPER

Measure the master piston O.D.

SERVICE LIMIT: 15.82 mm (0.623 in)

Check the primary and secondary cups for damage before assembly.



ASSEMBLY

CAUTION

Handle the master cylinder piston, cylinder and spring as a set.

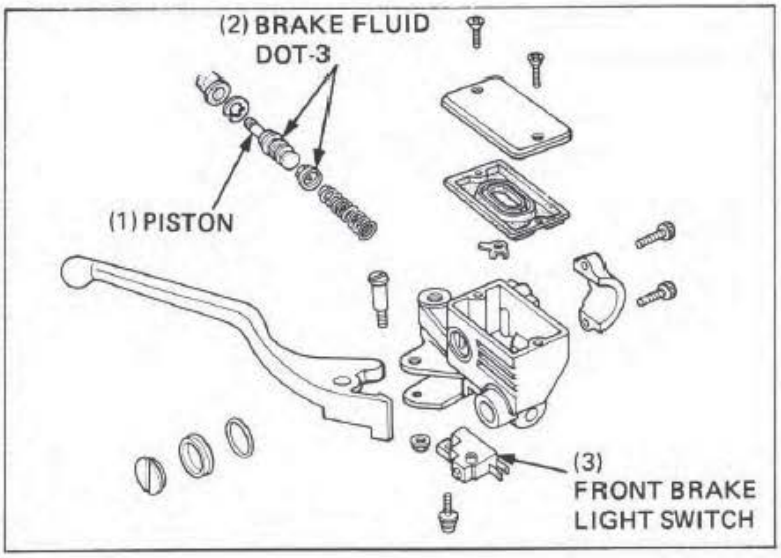
Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Install the spring and primary cup together.

Dip the piston cup in brake fluid before assembly.

CAUTION

When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated firmly in the groove.

Install the piston clip and boot.



Place the master cylinder on the handlebar and install the holder with the two mounting bolts. Tighten the top bolt first. Then the bottom bolt.

TORQUE: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

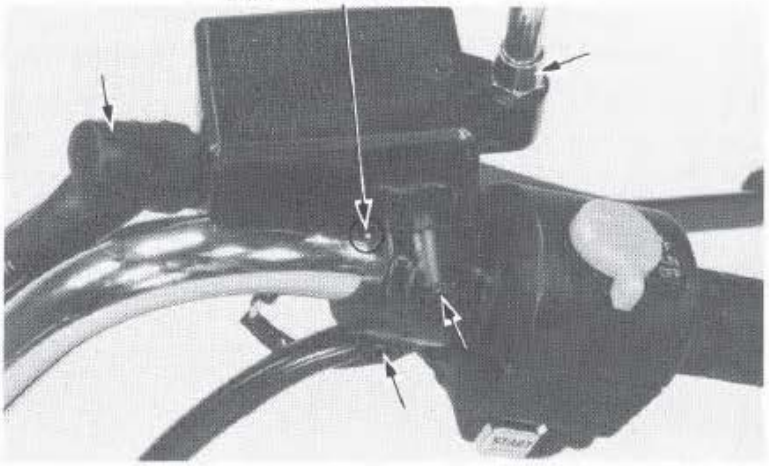
Install the oil hose with the bolt and its two sealing washers. Tighten the bolt.

TORQUE: 25–35 N·m
(2.5–3.5 kg-m, 18–25 ft-lb)

Install the brake lever.

Fill the reservoir to the upper level and bleed the brake system according to page 17-4.

(1) PUNCH MARK



REMOVAL

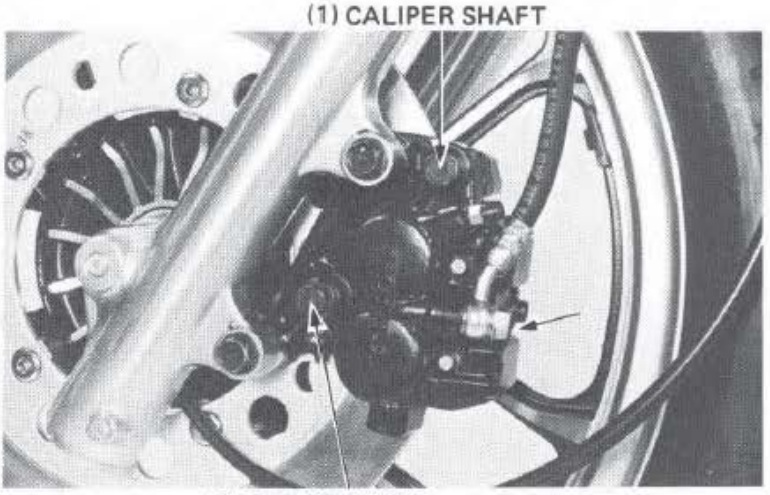
Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION

Avoid spilling brake fluid on painted surfaces.

Remove the caliper shaft, mount bolt and caliper.

(1) CALIPER SHAFT

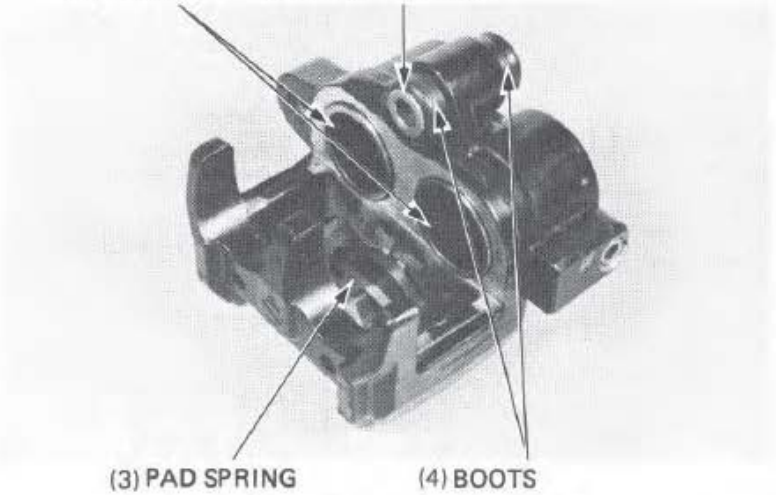


(2) MOUNT BOLT

DISASSEMBLY

Remove the following:
- pads and pad spring.
- caliper pivot collar and boots.
- pistons from the caliper.

(1) PISTONS (2) PIVOT COLLAR



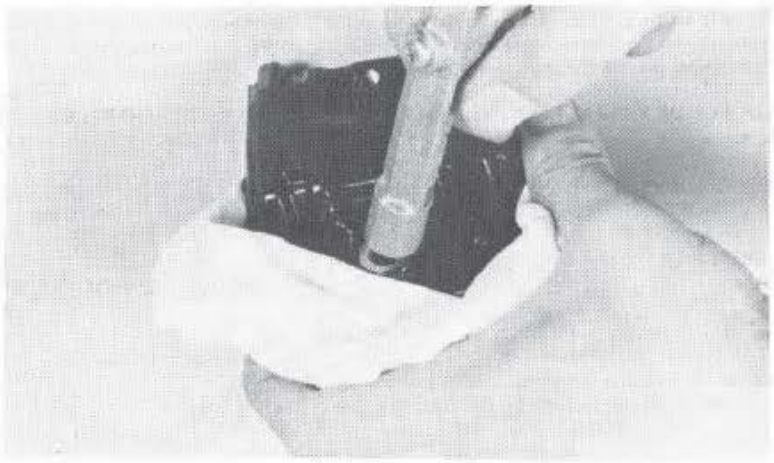
(3) PAD SPRING (4) BOOTS

If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is expelled. Use the air in short spurts.

WARNING

Do not bring the nozzle too close to the inlet.

Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.

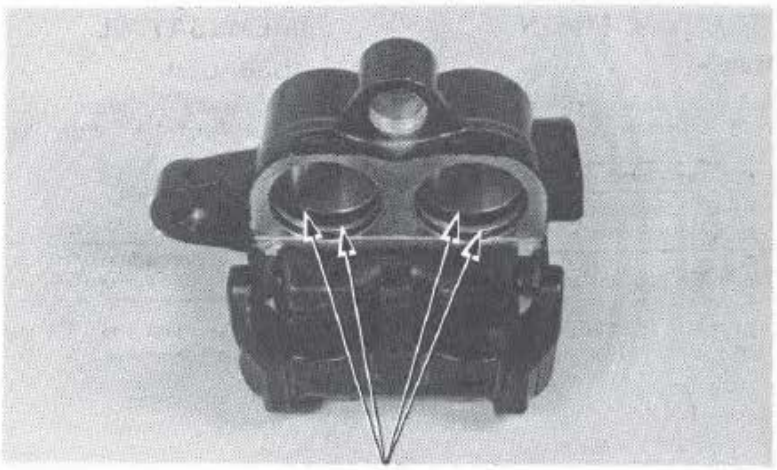


Push the piston seals in, lift them out and discard them.

Clean the oil seal grooves with brake fluid.

CAUTION

Be careful not to damage the piston sliding surfaces when removing the seals.

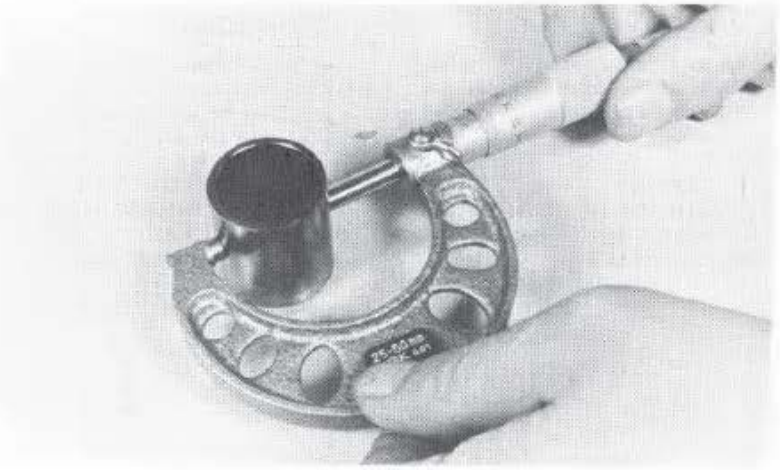


(1) PISTON SEALS

PISTON INSPECTION

Check the pistons for scoring, scratches or other faults. Measure the piston diameter with a micrometer.

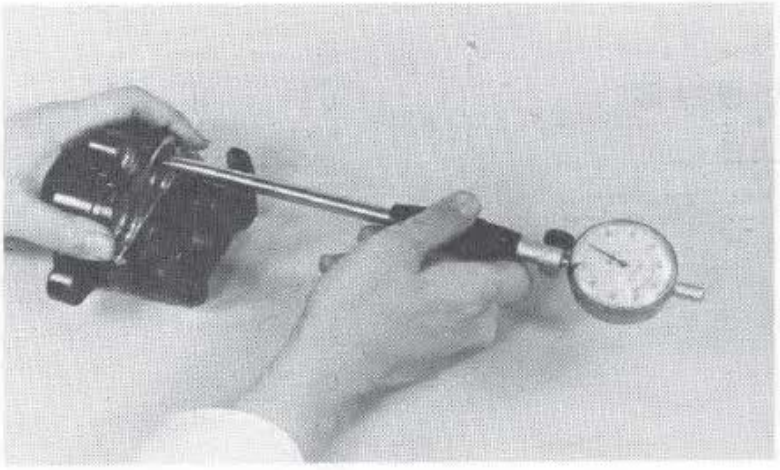
SERVICE LIMIT: 30.14 mm (1.187 in)



CYLINDER INSPECTION

Check the caliper cylinder bore for scoring, scratches or other faults. Measure the caliper cylinder bore.

SERVICE LIMIT: 30.29 mm (1.193 in)



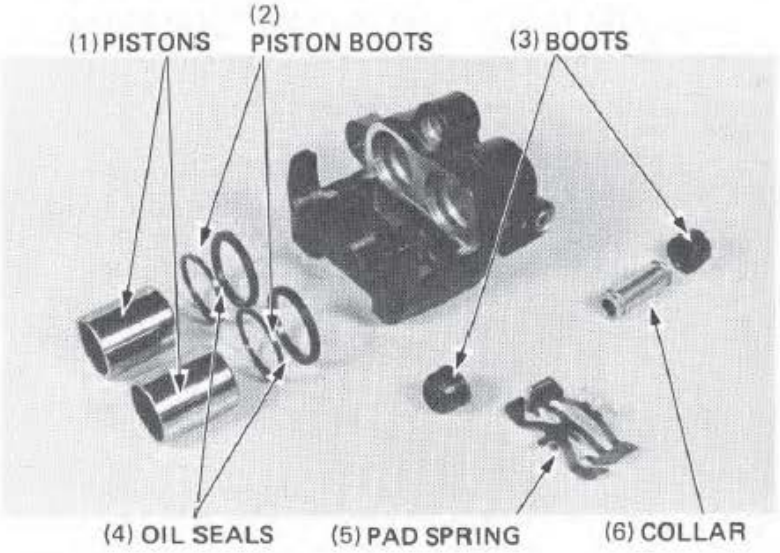
ASSEMBLY

If the piston boots are hardened or deteriorated, replace them with new ones. The piston seals must be replaced with new ones whenever they are removed. Coat the seals with silicone grease or brake fluid before assembly.

Install the pistons with the dished ends toward the pads. Then install the piston boots.

Install the collar boots and collar making sure that the boots are seated in the collar and caliper grooves properly.

Install the pad spring and pads.



INSTALLATION

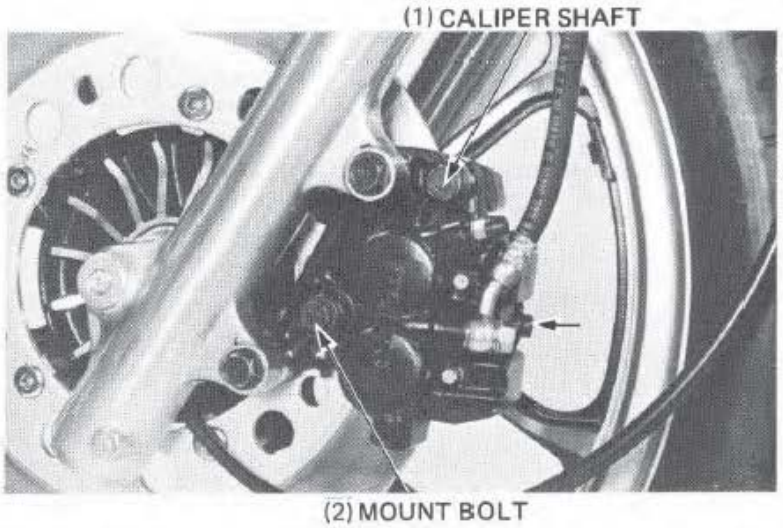
Install the caliper, shaft and mounting bolt. Tighten the shaft and bolt to the specified torque.

TORQUE:
CALIPER SHAFT: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
CALIPER MOUNT: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Install the brake hose with the bolt and sealing washers. Tighten the bolt.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Fill the brake fluid reservoir and bleed the front brake system (page 17-3).



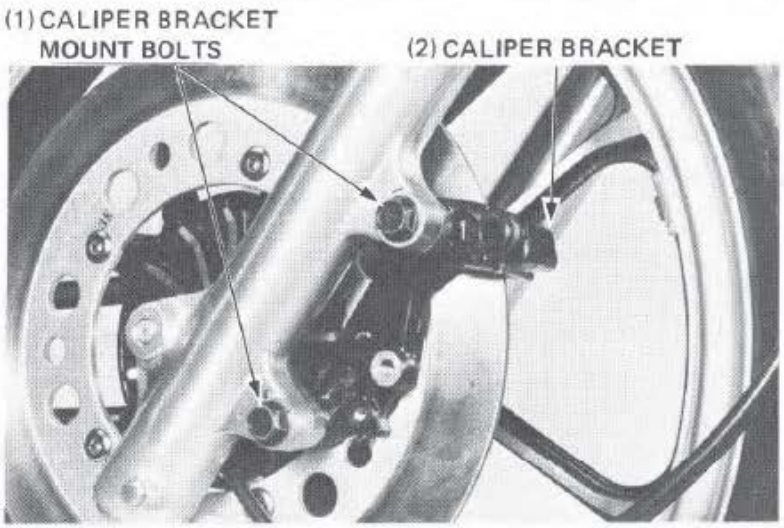
FRONT CALIPER BRACKET DISASSEMBLY

Remove the brake caliper (page 17-5).

Remove the caliper mount bolts and remove the caliper.

Remove the two caliper bracket mount bolts and remove the caliper bracket.

Remove the boot and the pad spring from the caliper bracket, making sure that they are in good condition.



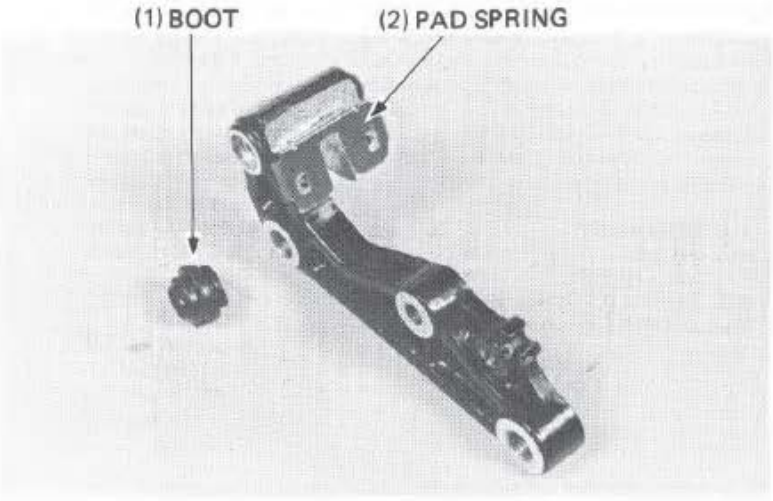
FRONT CALIPER BRACKET ASSEMBLY

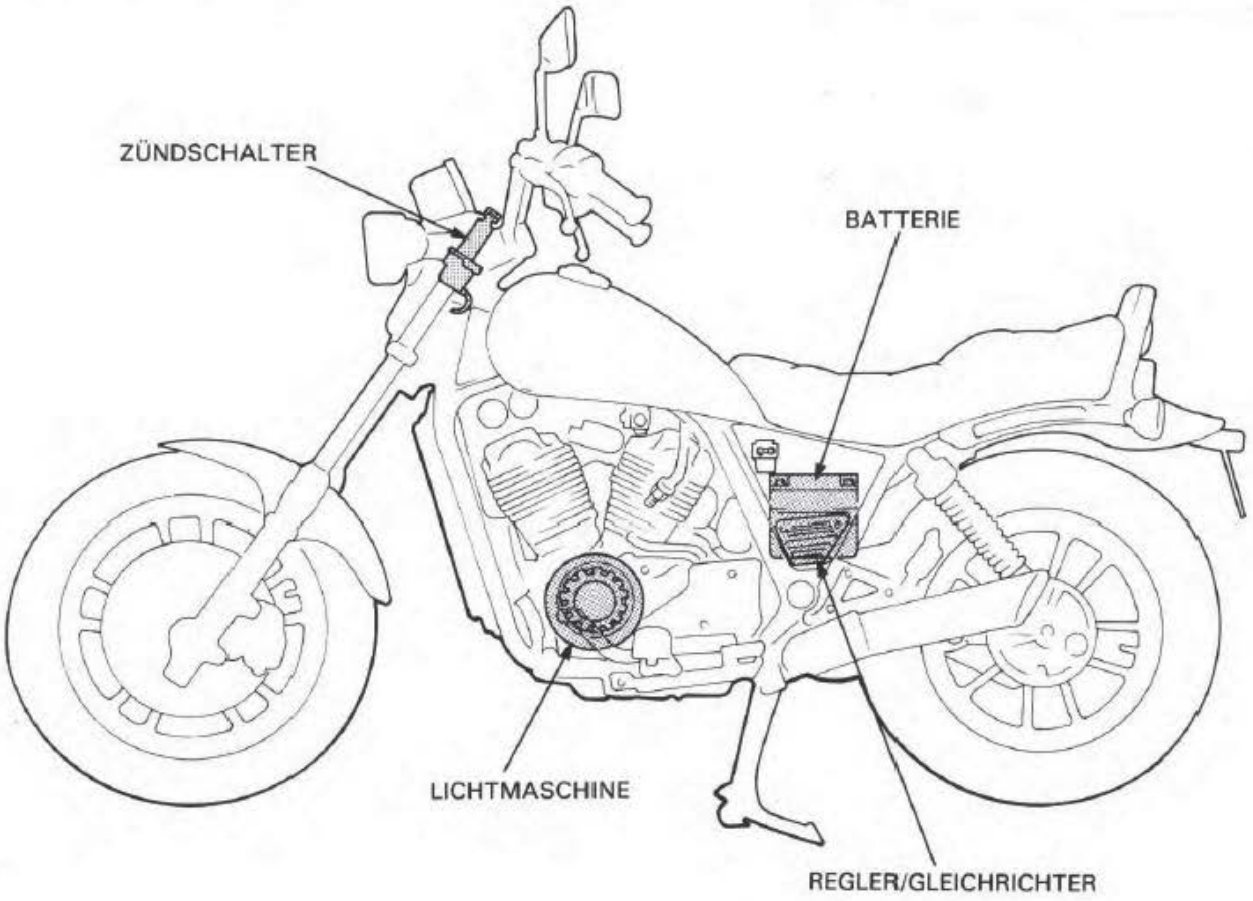
Install the boot and the pad spring.

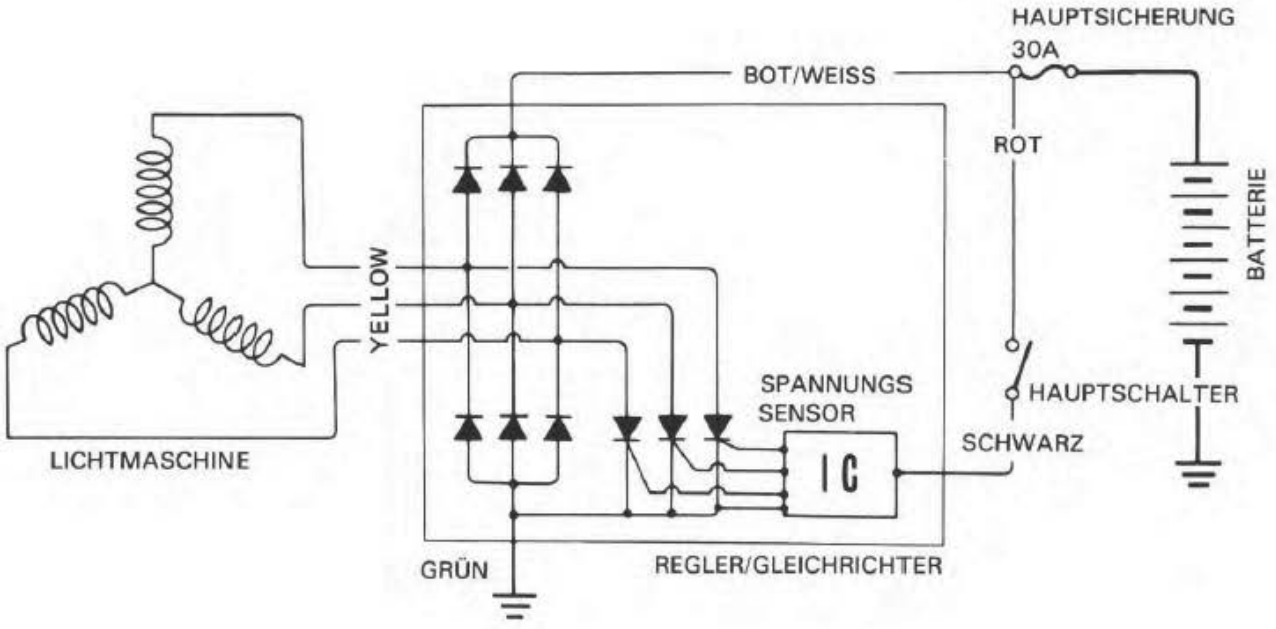
Attach the caliper bracket to the front fork.

TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

Install the front caliper (page 17-12).



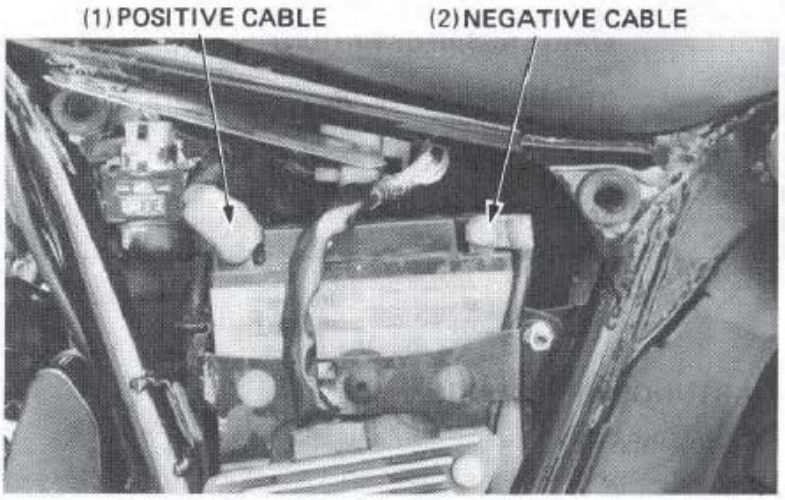

ZÜNDSCHALTER
BATTERIE
LICHTMASCHINE
REGLER/GLEICHRICHTER


HAUPTSICHERUNG
30A
BOT/WEISS
ROT
BATTERIE
YELLOW
SPANNUNGS
SENSOR
HAUPTSCHALTER
SCHWARZ
IC
LICHTMASCHINE
GRÜN
REGLER/GLEICHRICHTER

BATTERY

REMOVAL

Disconnect the negative terminal lead from the battery first, then disconnect the positive terminal lead. Disconnect regulator/rectifier coupler and the battery tube and pull out the battery.



TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

SPECIFIC GRAVITY: 1.270–1.290 at 20°C (68°F)

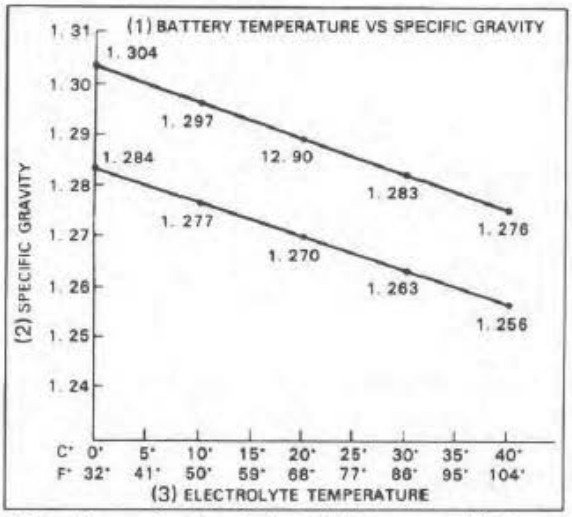
1.270–1.290	Fully charged
Below 1.260	Undercharged

NOTES

- The battery must be recharged if the specific gravity is below 1.230.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident or if the space below the cell plates is filled with sediment.

WARNING

The battery electrolyte contains sufuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.

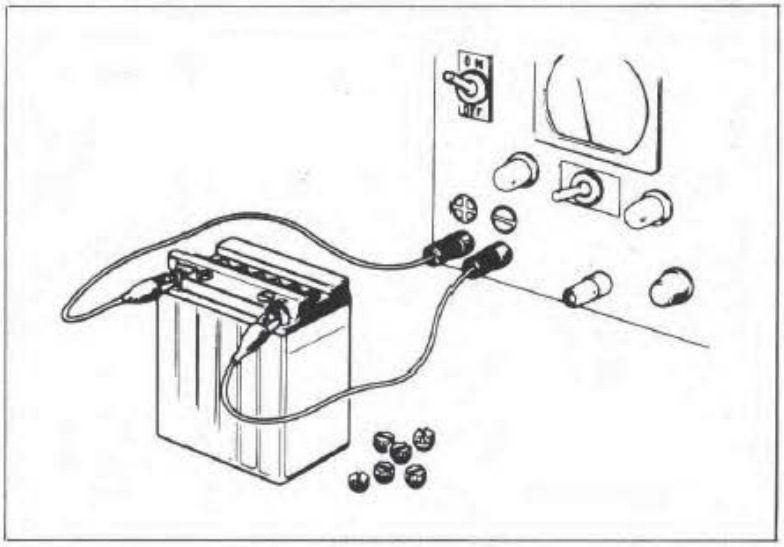


(4) Specific gravity changes by 0.007 for every 10°C.

CHARGING

Remove the battery cell caps. Fill the battery cells with distilled water to the upper level line, if necessary.
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (–) cable to the battery negative (–) terminal.

Charging current: 1.6 amperes max.
Charge the battery until specific gravity is 1.270–1.290 at 20°C (68°F).

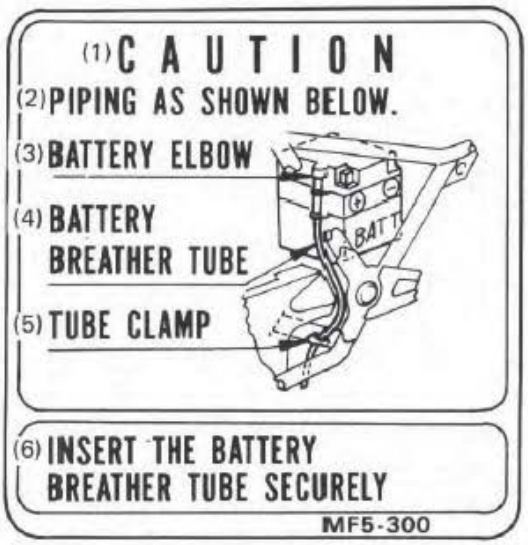


WARNING

- *Before charging a battery, remove the cap from each cell.*
- *Keep flames and sparks away from a battery at all times.*
- *Turn power ON/OFF at the charger, not at the battery terminals, to prevent sparking.*
- *Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).*

CAUTION

- *Quick-charging should only be done in an emergency; slow-charging is preferred.*
- *Route the breather tube as shown on the battery caution label.*



After installing the battery, coat the terminals with clean grease.

CHARGING SYSTEM

CURRENT TEST

NOTE

Be sure the battery is in good condition before performing this test.

Warm up the engine.

Remove the frame left side cover and seat.

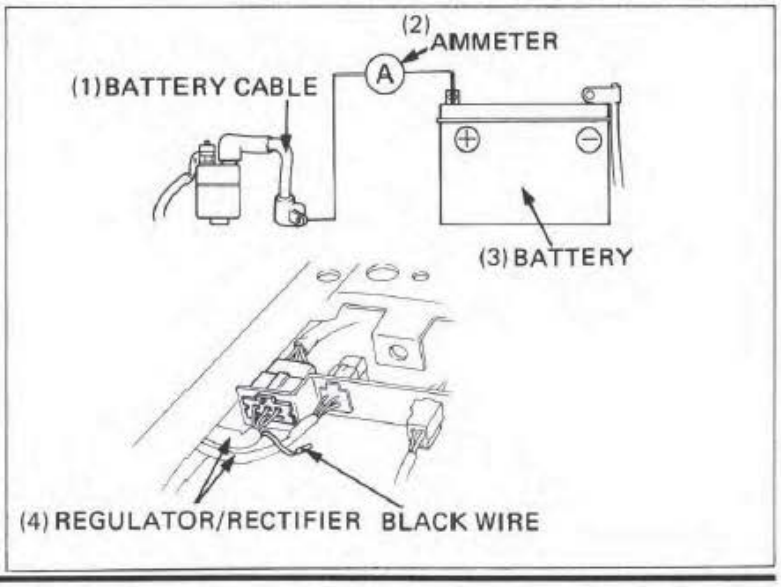
Disconnect the black wire at the regulator/rectifier coupler and disconnect the headlight.

Disconnect the battery positive cable at the battery terminal and connect an ammeter between the battery cable and terminal.

Allow the engine to idle.

Increase engine speed slowly. Charging amperage should be a minimum of 25.0 amperes at 5,000 min^{-1} (rpm).

Check the stator (page 18-5) and then the regulator/rectifier (page 18-5), if the charging specifications are not met.

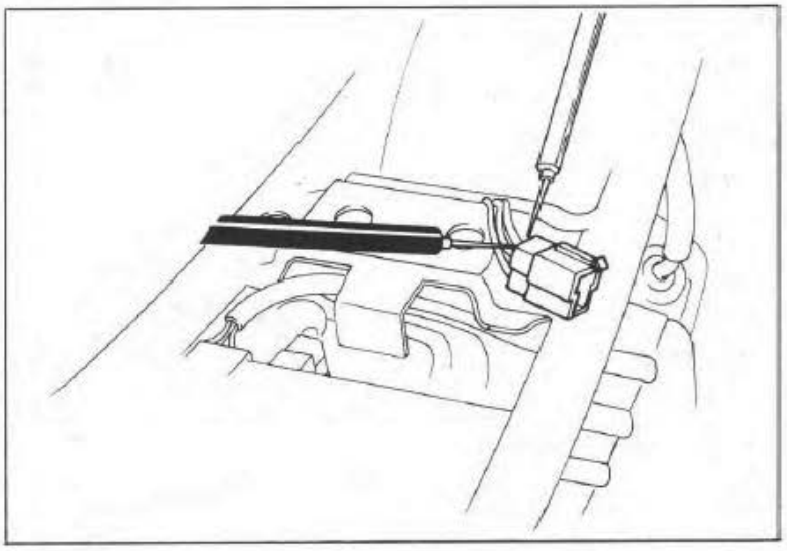


STATOR CONTINUITY TEST

Remove the seat.

Disconnect the alternator coupler.

Check for continuity between the leads, and between the leads and ground. Replace the stator if there is no continuity between the leads, or if there is continuity between the leads and ground.



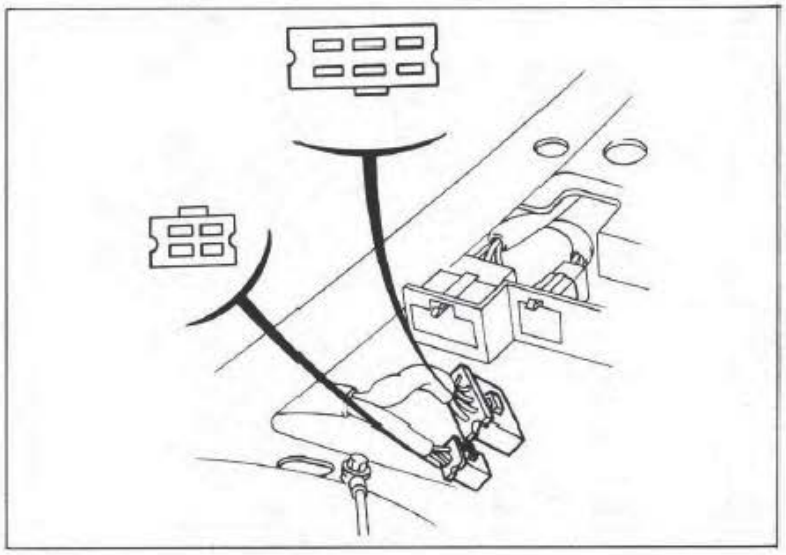
VOLTAGE REGULATOR/RECTIFIER TEST

Remove the seat.
Disconnect the regulator/rectifier couplers.

Check for continuity between the leads with an ohmmeter.

NOTE

The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.

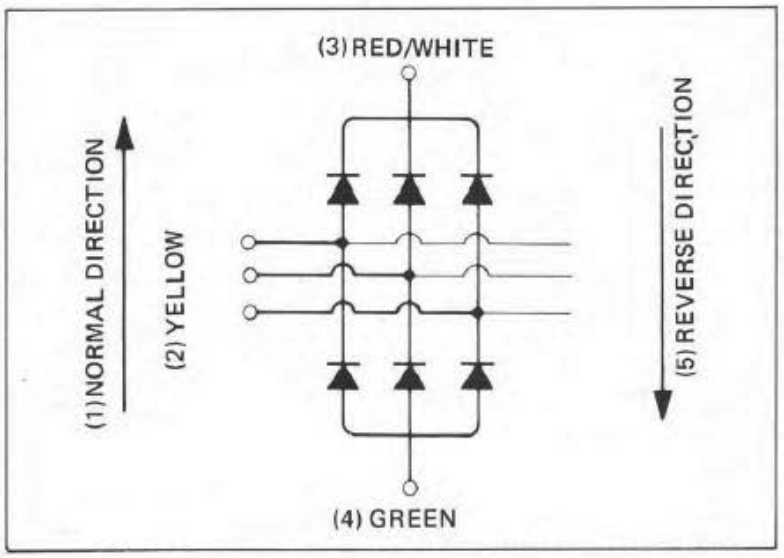


NORMAL DIRECTION: CONTINUITY

	⊕ probe	⊖ probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

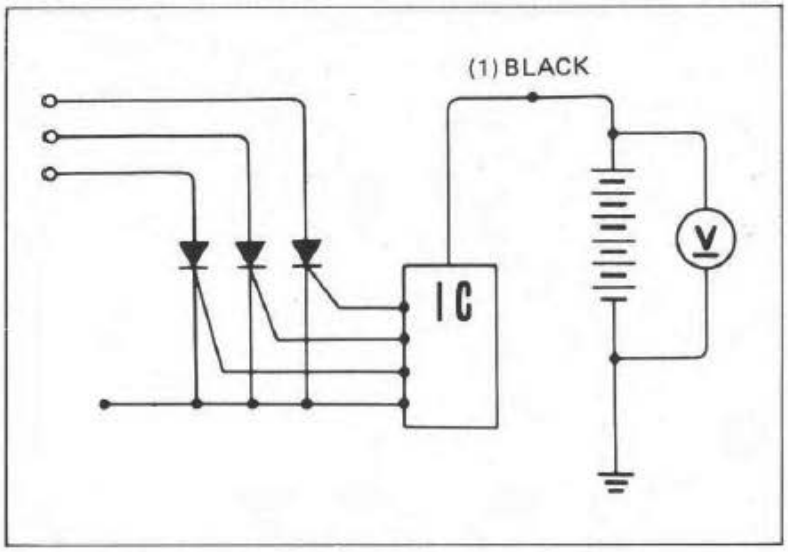
REVERSE DIRECTION: NO CONTINUITY

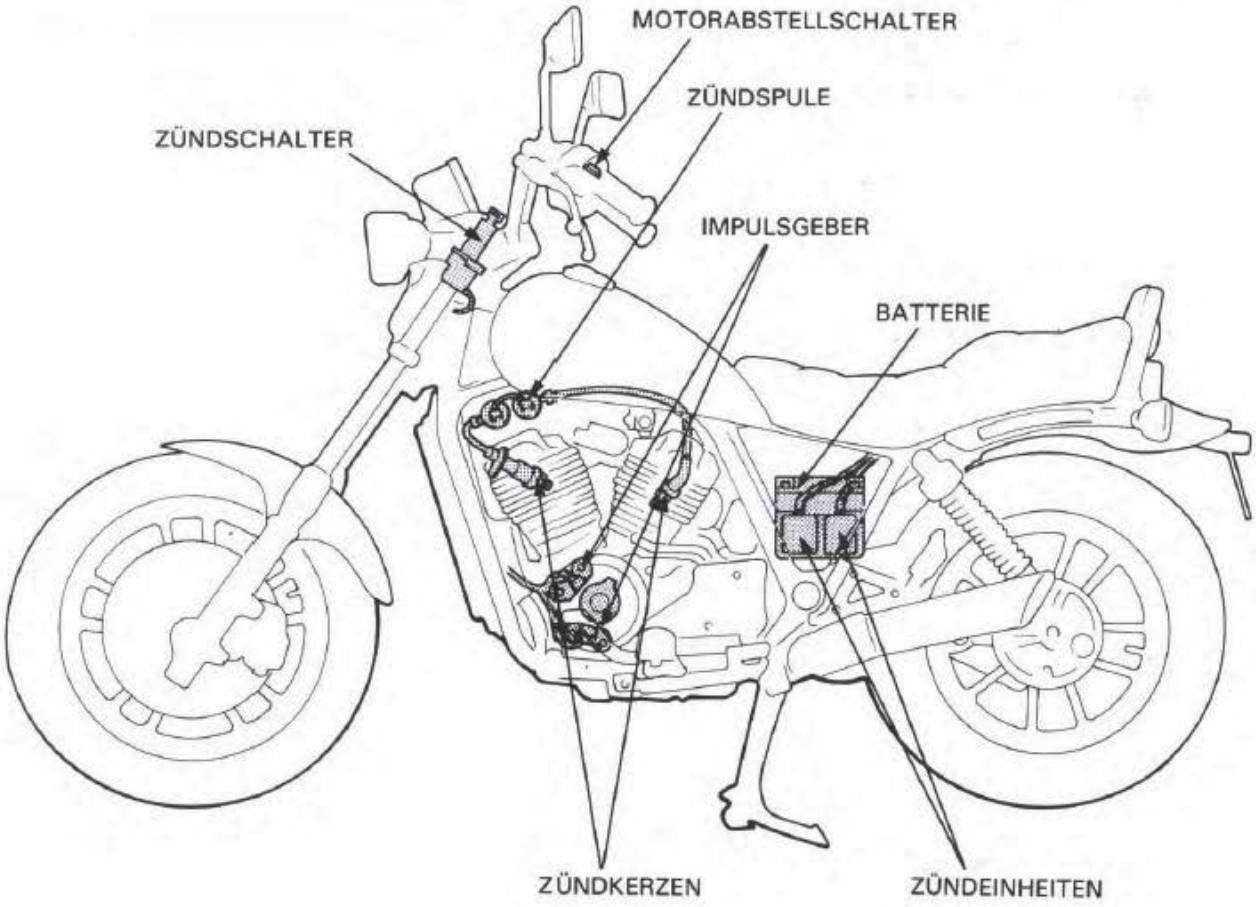
	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE

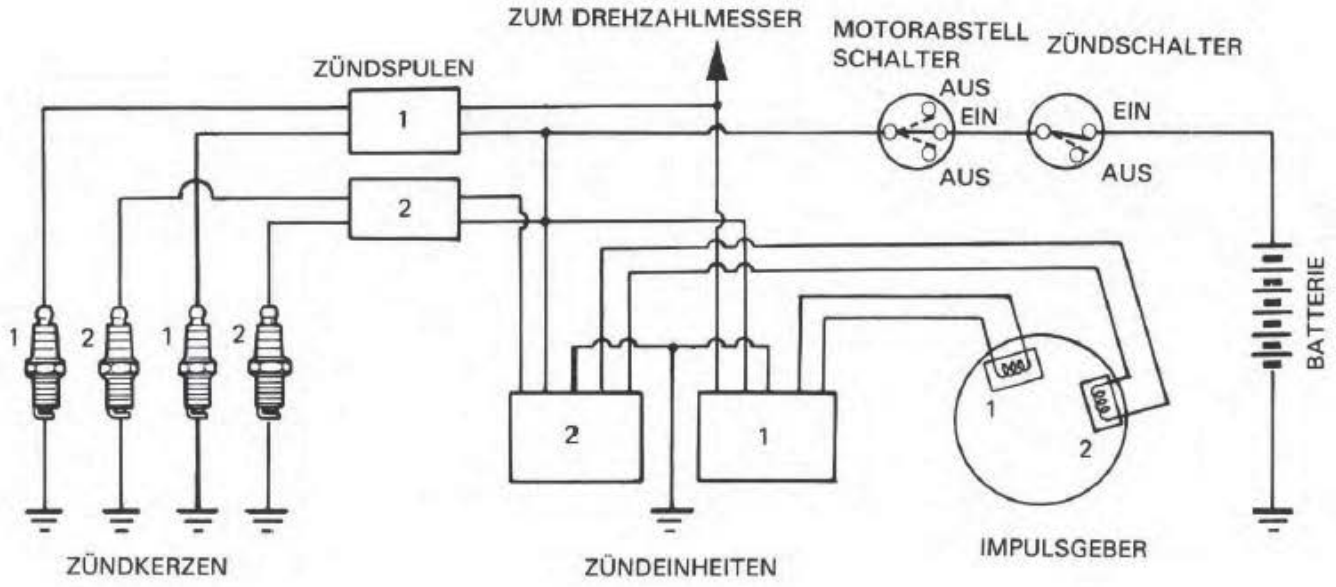


VOLTAGE REGULATOR PERFORMANCE TEST

Connect a voltmeter across the battery.
Check regulator performance with the engine running. The regulator must divert current to ground when battery voltage reaches 14.0 ~ 15.0 V.




MOTORABSTELLSCHALTER
ZÜNDSPULE
ZÜNDSCHALTER
IMPULSGEBER
BATTERIE
ZÜNDKERZEN
ZÜNDEINHEITEN

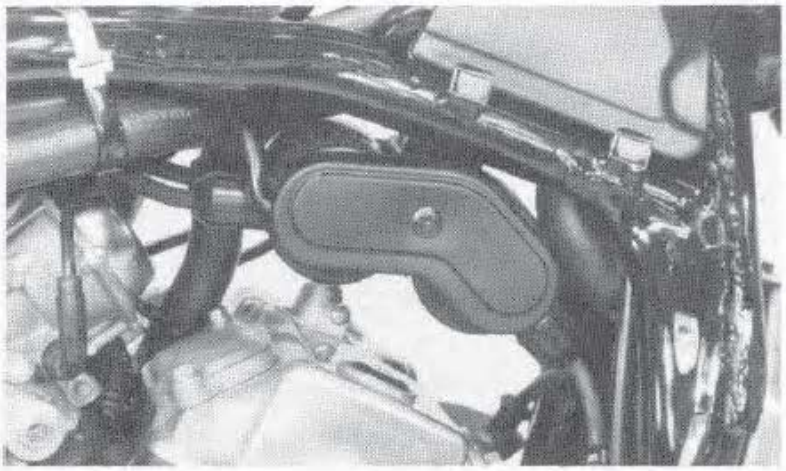

ZUM DREHZAHLMESSER
MOTORABSTELL SCHALTER
ZÜNDSCHALTER
ZÜNDSPULEN
AUS
EIN
AUS
EIN
AUS
1
2
1
2
1
2
1
2
BATTERIE
ZÜNDKERZEN
ZÜNDEINHEITEN
IMPULSGEBER

IGNITION COIL

REMOVAL

Remove the seat and fuel tank and disconnect the ignition coil wire leads.

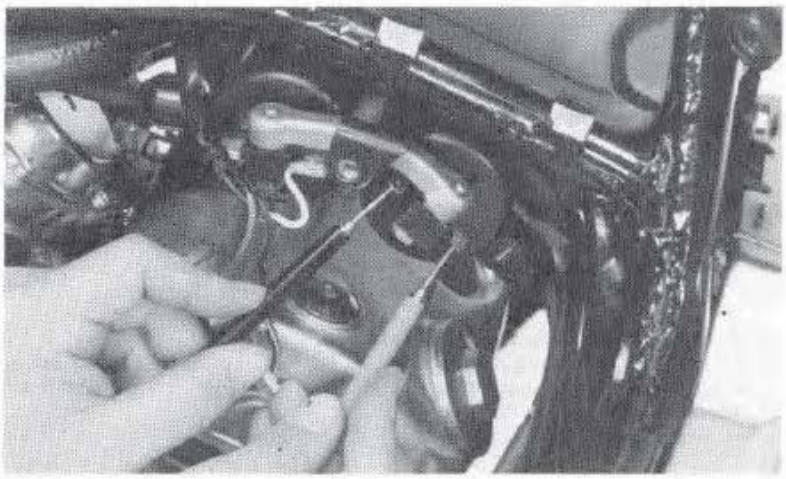
Remove the coils by removing the attaching bolts.



CONTINUITY TEST

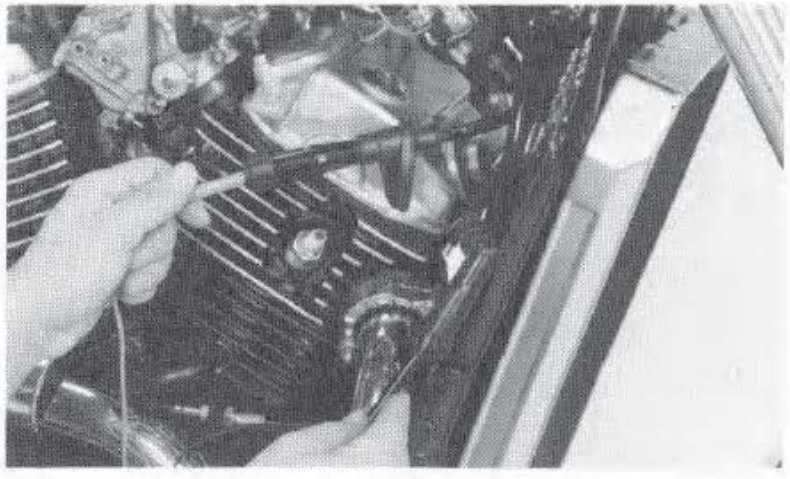
Measure the primary coil resistance.

RESISTANCE: 2.0 ohms



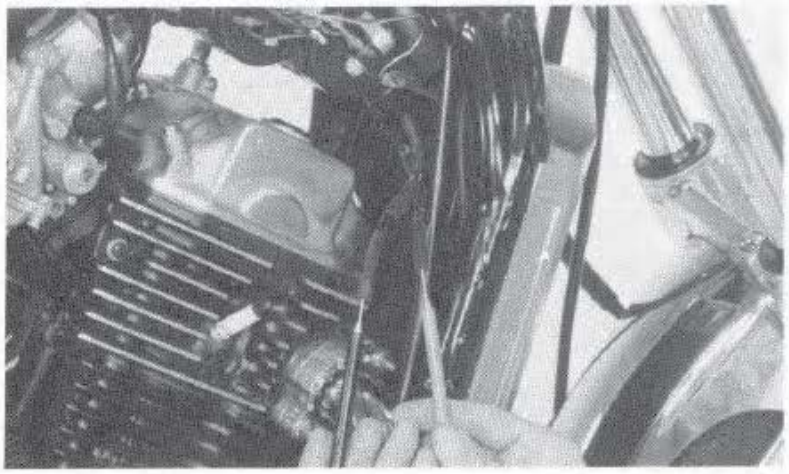
Measure the secondary coil resistance with the spark plug caps in place.

RESISTANCE: 29–40 k ohms



Remove the spark plug caps and measure the secondary coil resistance.

RESISTANCE: 20.6–27.4 k ohms



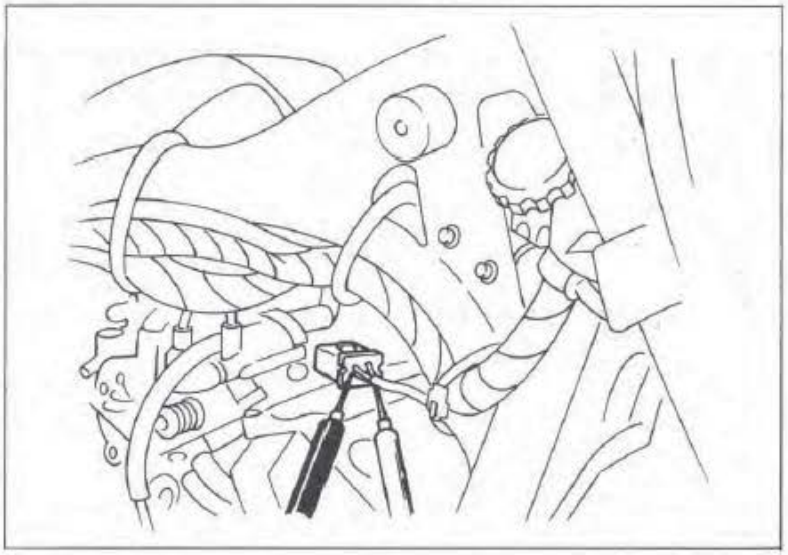
TRANSISTORIZED IGNITION SYSTEM

PULSE GENERATOR TEST

Remove the seat and fuel tank.
Disconnect the pulse generator coupler and measure the coil resistance.

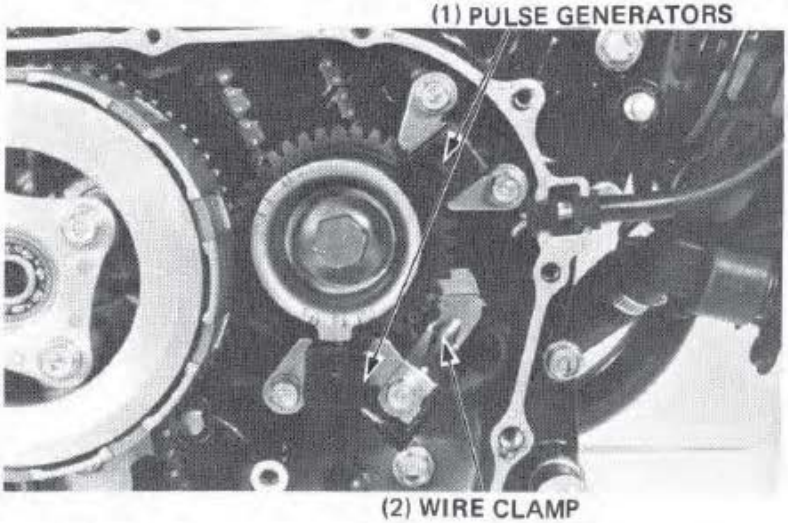
RESISTANCE: 480 ohms ± 10%

– Between white and yellow leads (for No. 1 cylinder)
– Between white and blue leads (for No. 2 cylinder)



PULSE GENERATOR REPLACEMENT

Remove the right crankcase cover (section 7).
Disconnect the pulse generator wire coupler.
Remove the pulse generator mount bolts and wire clamp.
Remove the pulse generators.

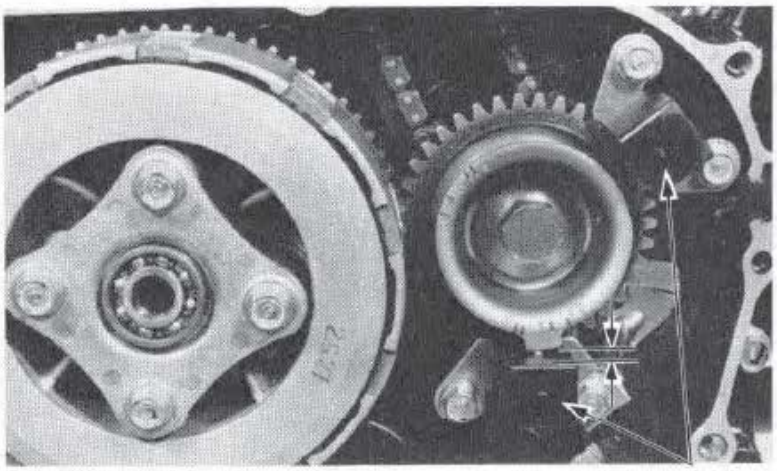


Route the pulse generator wires as shown. Install the wire clamp and tighten the mounting bolts.

Rotate the crankshaft and check the pulse rotor air gap.

AIR GAP: 0.3–0.9 mm (0.012–0.035 in)

Reinstall the right crankcase cover.



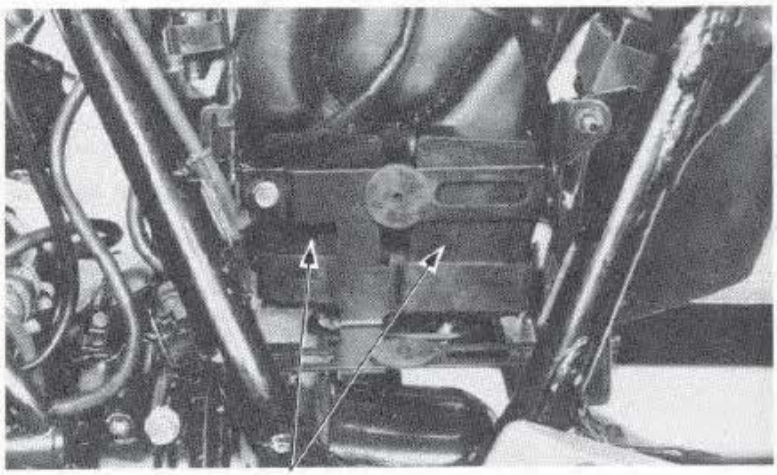
(1) PULSE GENERATOR

SPARK UNIT

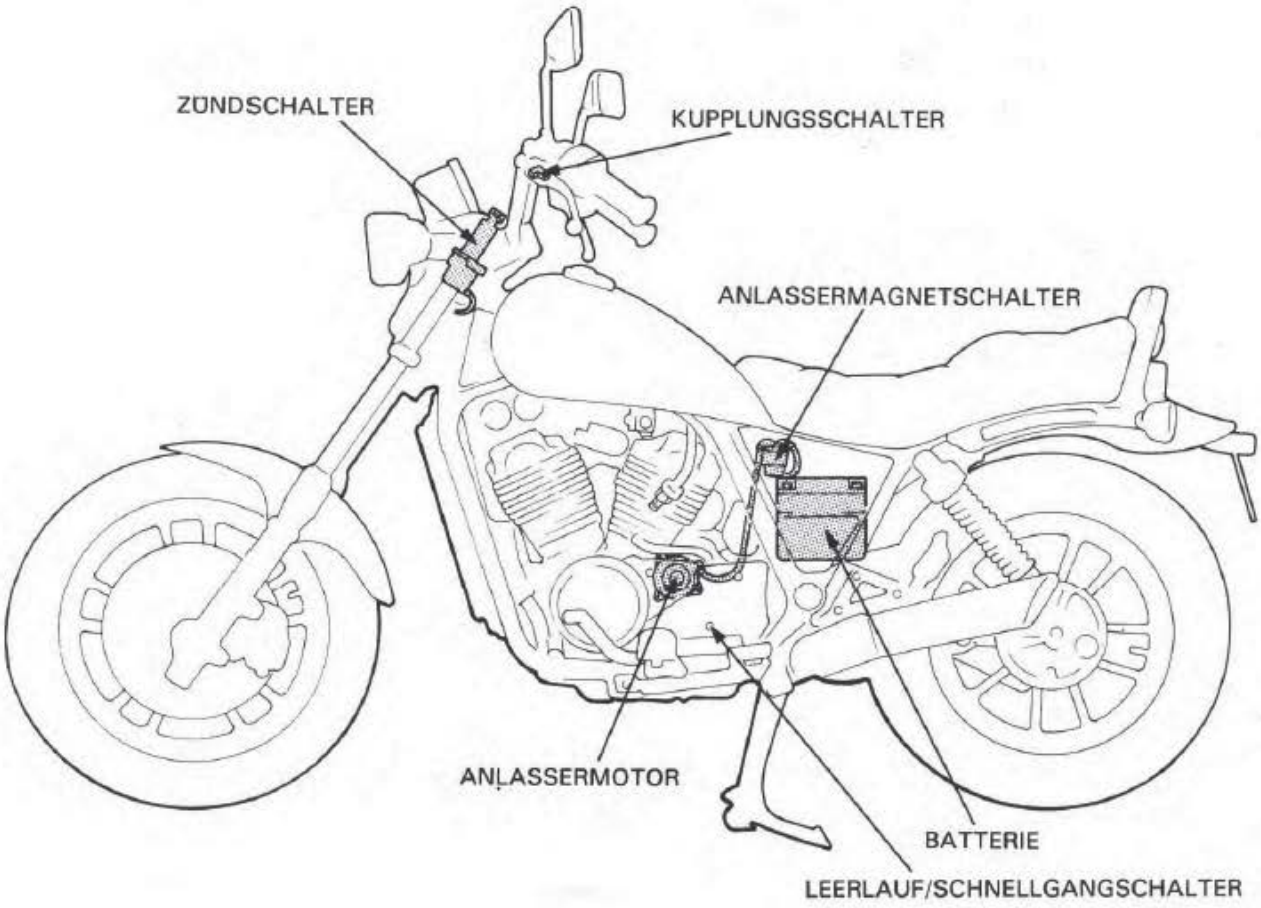
If the pulse generator, ignition coil and wiring are in good condition but the ignition timing is not within specification; replace the spark unit with a new one and recheck the ignition timing.

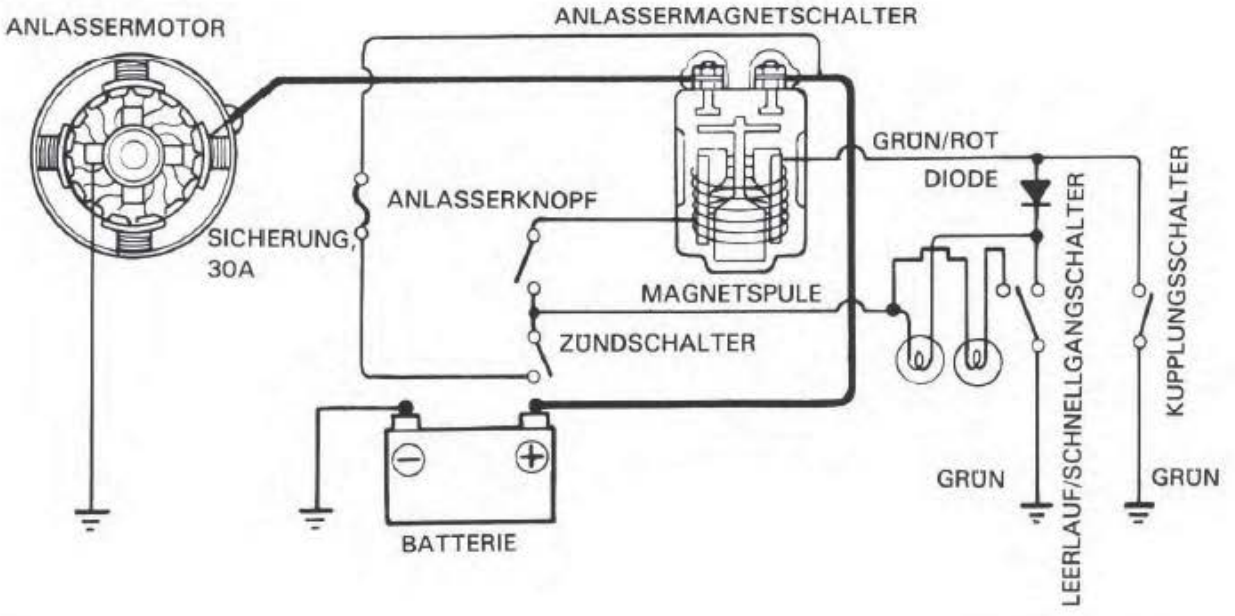
Remove the seat.
Remove the battery (page 18-3).
Disconnect the spark unit coupler and replace the spark unit.

Reinstall the removed parts.



(1) SPARK UNITS


ZÜNDSCHALTER
KUPPLUNGSSCHALTER
ANLASSERMAGNETSCHALTER
ANLASSERMOTOR
BATTERIE
LEERLAUF/SCHNELLGANGSCHALTER


ANLASSERMOTOR
ANLASSERMAGNETSCHALTER
GRÜN/ROT
DIODE
ANLASSERKNOPF
SICHERUNG, 30A
MAGNETSPULE
ZÜNDSCHALTER
KUPPLUNGSSCHALTER
GRÜN
GRÜN
BATTERIE
LEERLAUF/SCHNELLGANGSCHALTER

STARTER MOTOR

REMOVAL

WARNING

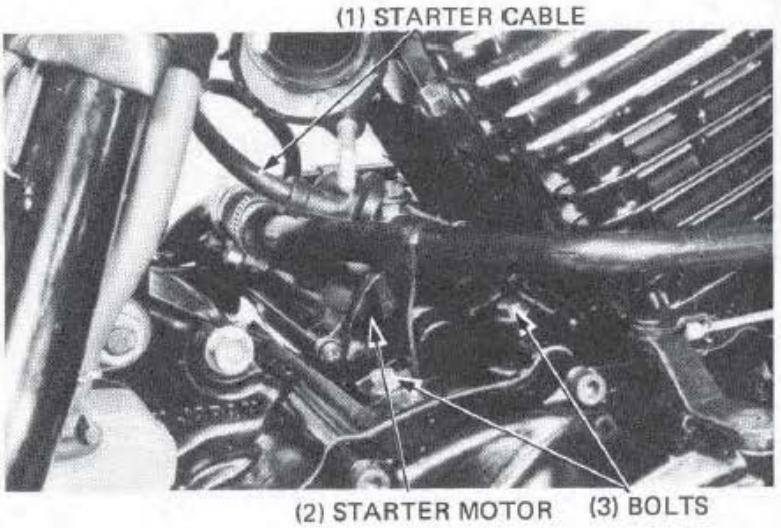
With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Drain the coolant (page 6-3).

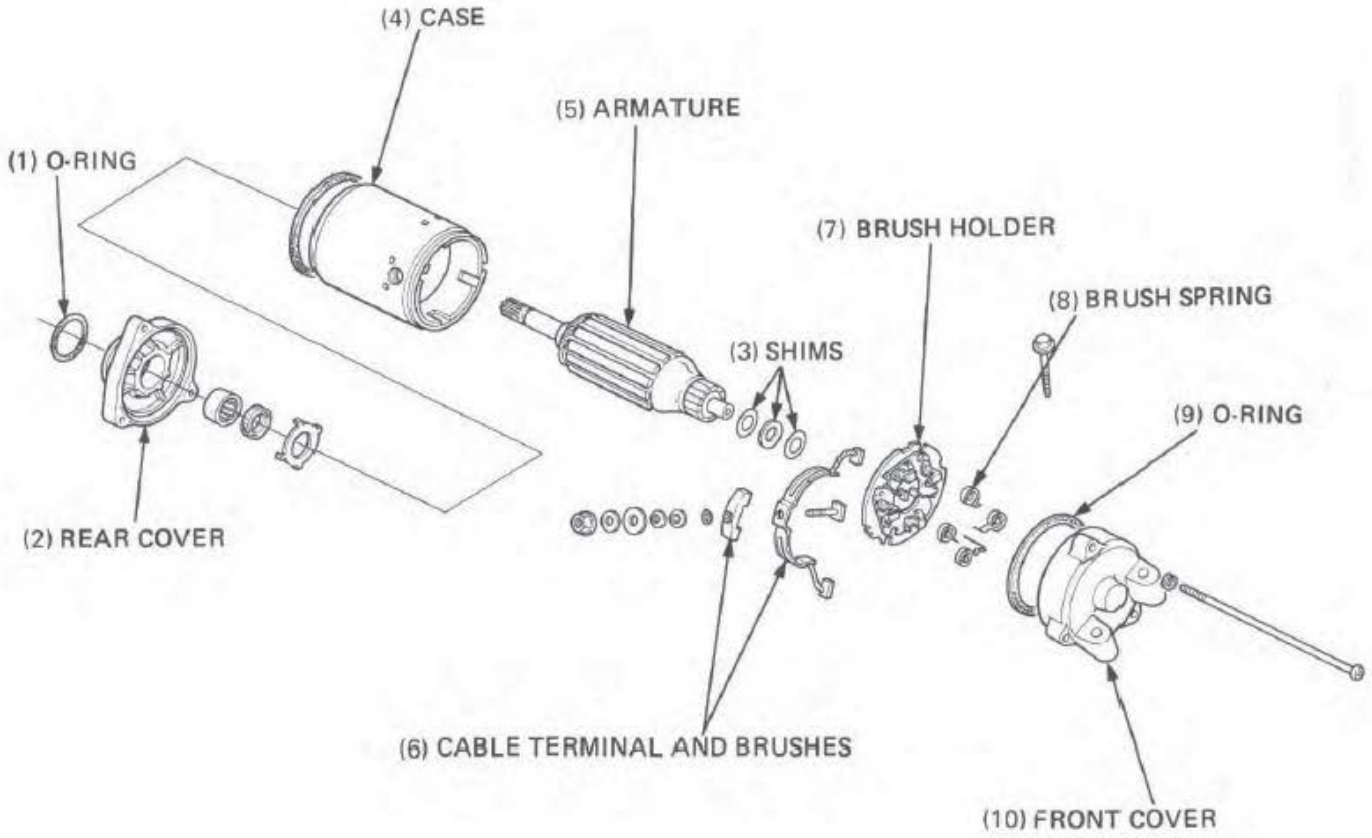
Remove the rear cylinder exhaust pipe (page 5-6).

Remove the right water pipe (page 11-3).

Disconnect the starter motor cable and remove the mounting bolt and starter motor.



DISASSEMBLY



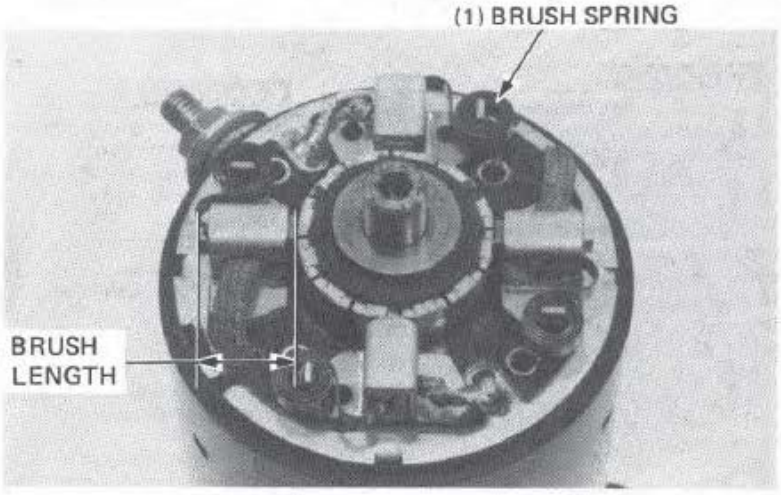
BRUSH INSPECTION

Remove the starter motor case screws.

Inspect the brushes and measure the brush length.

Measure brush spring tension with a spring scale.

SERVICE LIMITS:
Brush length: 6.5 mm (0.26 in)
Brush spring tension: 545 g (19.2 oz)



COMMUTATOR INSPECTION

Remove the starter motor case.

NOTE

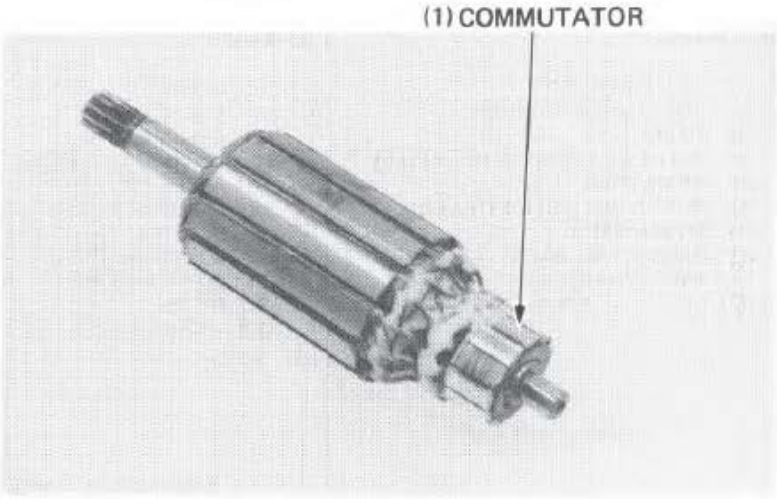
Record the location and number of thrust washers.

Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils.

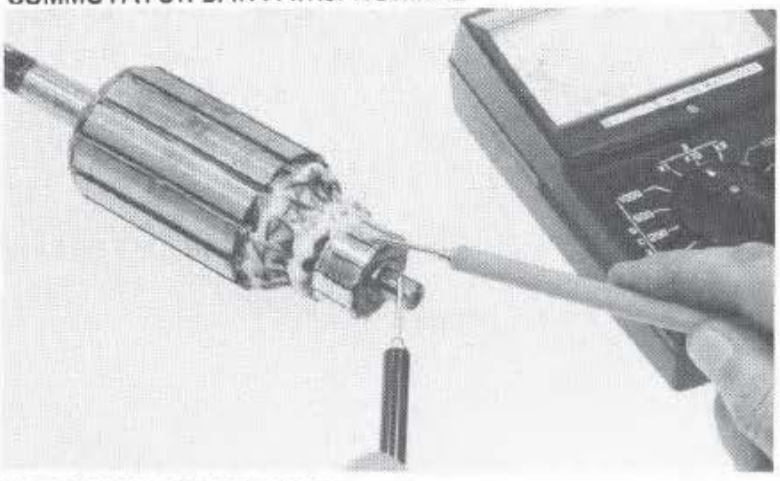
NOTE

Do not use emery or sand paper on the commutator.

Check for continuity between pairs of commutator bars. Also, make a resistance check between individual commutator bars and the armature shaft. There should be no continuity.



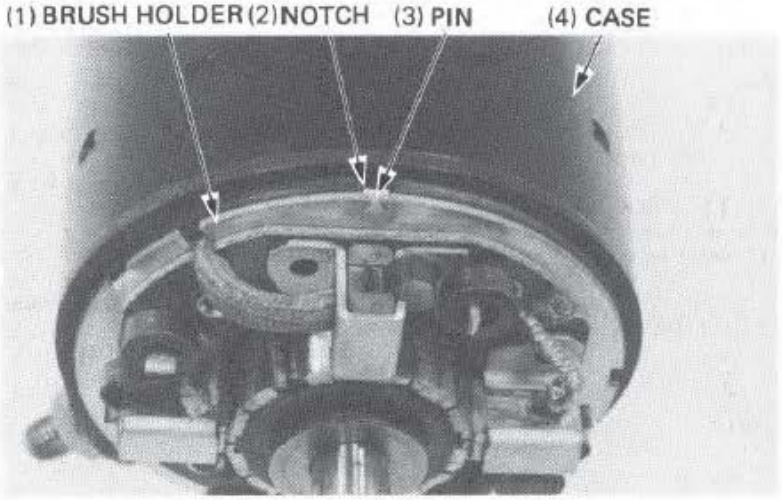
(1) CONTINUITY BETWEEN COMMUTATOR BAR PAIRS: NORMAL



(2) NO CONTINUITY BETWEEN COMMUTATOR BARS AND ARMATURE SHAFT: NORMAL

ASSEMBLY/INSTALLATION

Assemble the starter motor. Align the case notch with the brush holder pin.

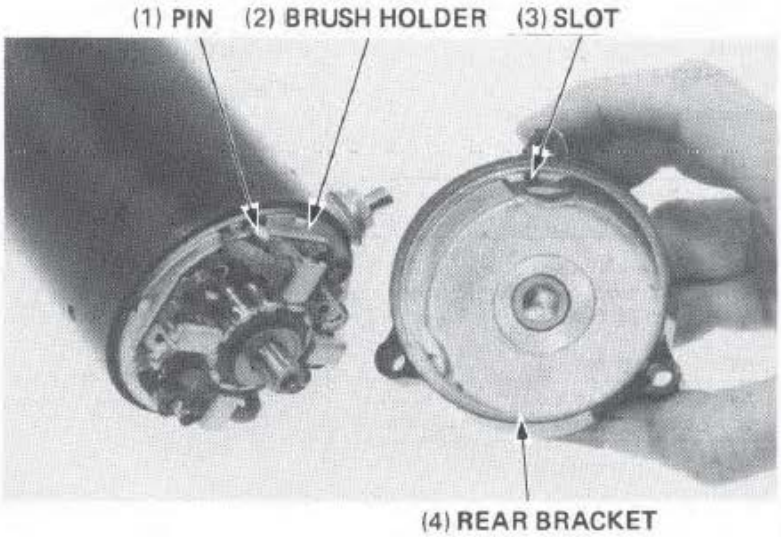


Install the rear cover aligning its slot with the brush holder pin.

Install the starter motor in the reverse order of removal

Connect the water pipe.
Refill the radiator with coolant (page 6-4).

Install the right rear muffler.



STARTER RELAY SWITCH

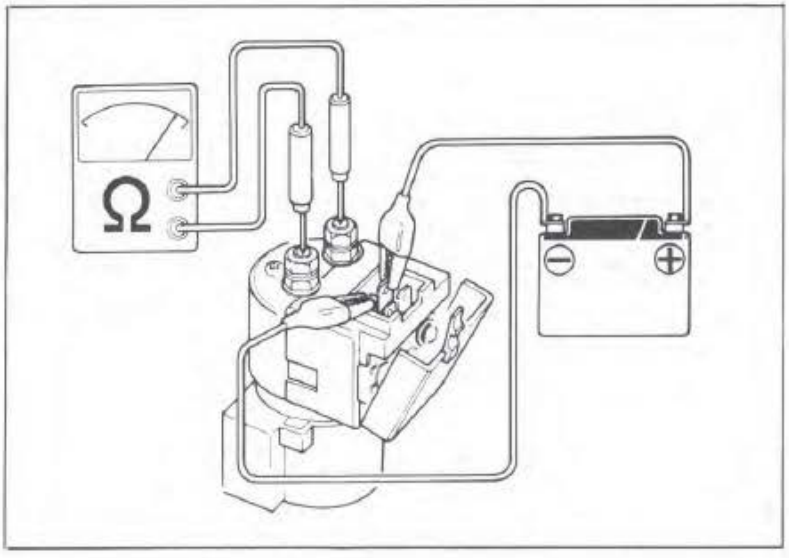
INSPECTION

Depress the starter switch button with the ignition ON. The coil is normal if the starter relay switch clicks.

Connect an ohmmeter to the starter relay switch terminals.

Connect a 12 V battery to the switch cable terminals.

The switch is normal if there is continuity.



CLUTCH DIODE

REMOVAL

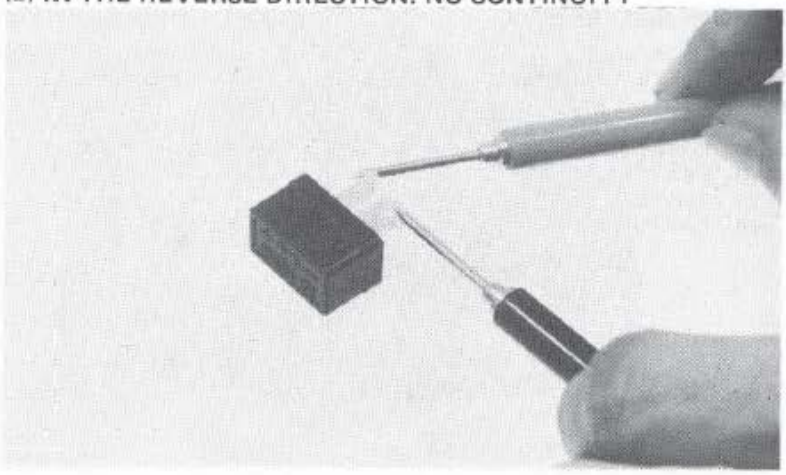
Remove the fuel tank.

Remove the clutch diode from the wire harness.

INSPECTION

Check for continuity with an ohmmeter.

(1) IN ONE DIRECTION: CONTINUITY
(2) IN THE REVERSE DIRECTION: NO CONTINUITY



OIL PRESSURE SWITCH

Drain the engine oil.

Disconnect the oil pressure switch lead and remove the switch.

Check for continuity while applying pressure to the switch.

Replace the switch if necessary.

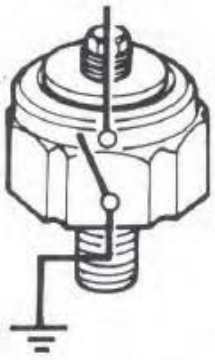
Apply a liquid sealant to the switch threads before installing the switch.
Screw the switch in the crankcase and leave two threads from the bottom. Then tighten it to the specified torque.

TORQUE: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

CAUTION

Do not overtighten the switch or the crankcase will be damaged.

(1) CONTINUITY: BELOW 2.8 psi



(2)

NO CONTINUITY: ABOVE 2.8–5.6 psi

BRAKE LIGHT SWITCH

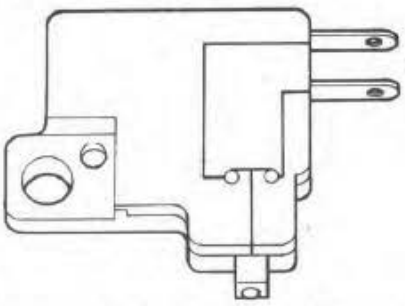
Be sure the rear brake light switch is properly adjusted (page 3-15).

Then check the rear brake light switch for continuity with the rear brake applied.

Check the front brake light switch for continuity with the front brake applied.

Replace either switch if there is no continuity when the corresponding brake is applied.

(1) FRONT



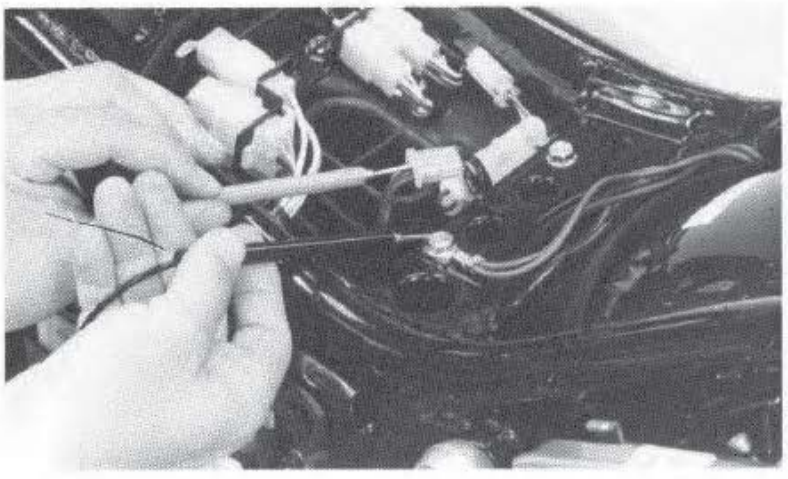
(2) REAR

(3) BRAKE APPLIED : CONTINUITY
(4) BRAKE NOT APPLIED: NO CONTINUITY

NEUTRAL/OD SWITCHES

Remove the seat and fuel tank and disconnect the neutral/OD switch connector.
Check the continuity of the switches with the transmission in each gear position.

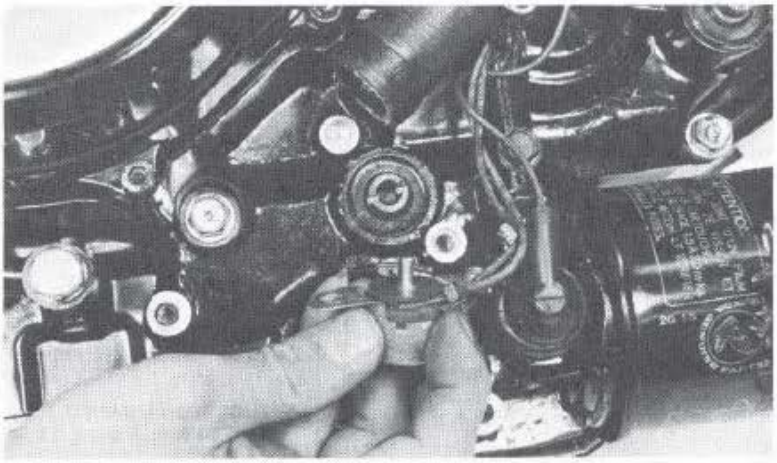
Color code / Position	Lg/R	G/O
1st		
N	○	○
2nd		
3rd		
4th		
5th		
OD		○



REMOVAL

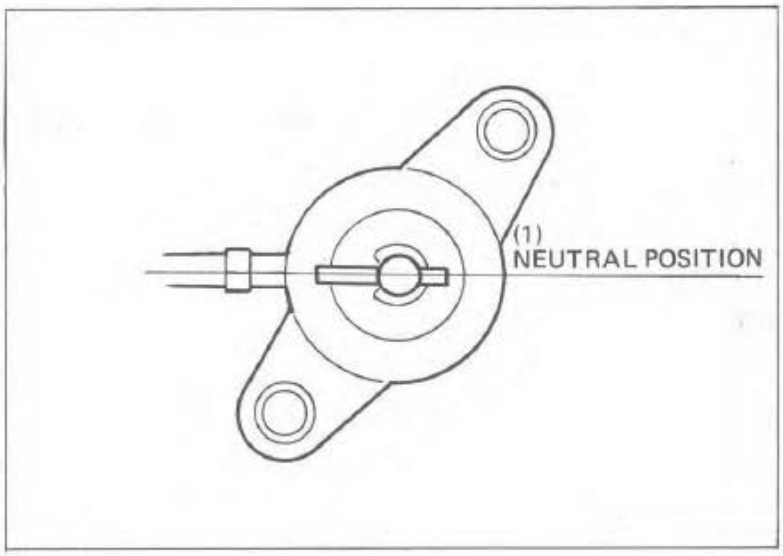
Shift the transmission into neutral.
Remove the left crankcase rear cover and gear shift linkage.

Remove the mounting bolts and switch.



INSTALLATION

Position the switch rotor pin as shown and install the switch by aligning the pin with the groove of the gear shift drum.

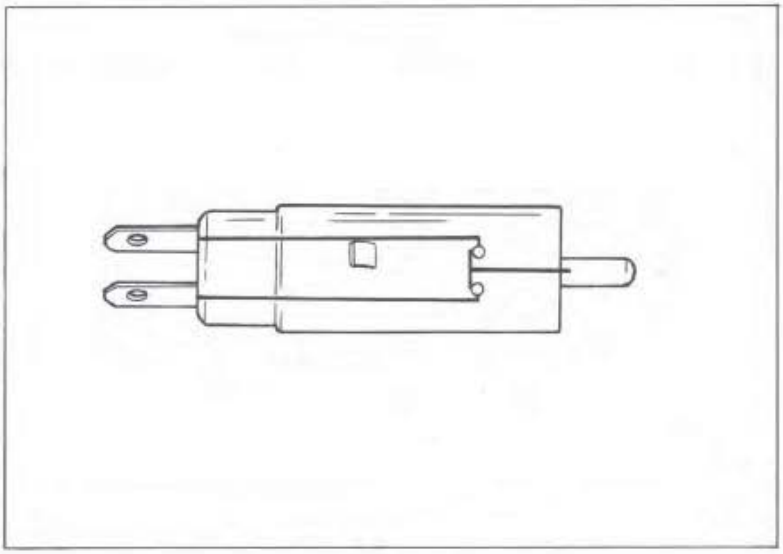


CLUTCH SWITCH

Disconnect the wire leads from the clutch switch.

Check the continuity of the clutch lever (safety) switch with the clutch released and applied. Replace if necessary.

LEVER APPLIED: CONTINUITY
LEVER NOT APPLIED: NO CONTINUITY



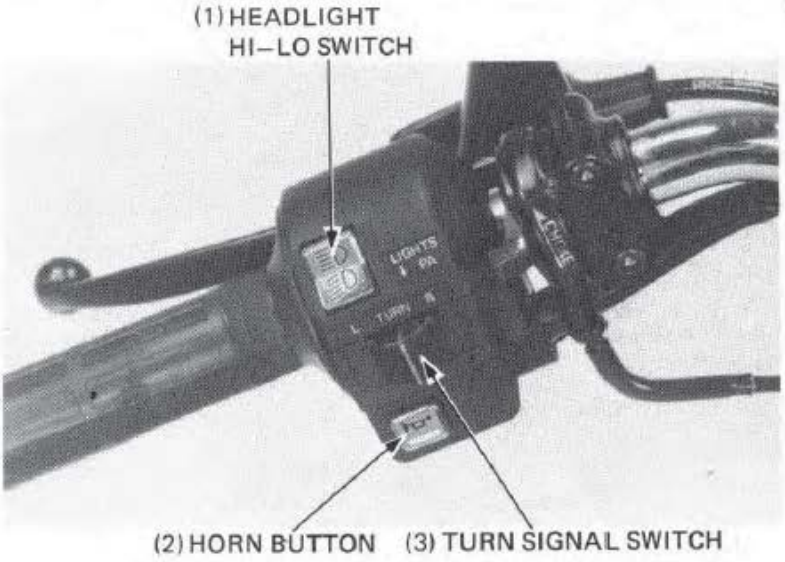
HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn, etc.) must be replaced as assemblies.

Remove the headlight and headlight case.

Continuity tests for the components of the handlebar cluster switches follow:

Continuity should exist between the color coded wires in each chart.



HEADLIGHT HI–LOW SWITCH

HI: B/W to B
MIDDLE (N): B/W to W to B
LO: B/W to W

Headlight Hi–Low Switch

	HL	LO	HI
LO	○——	——○	○
(N)	○——	——○	——○
HI	○——		——○

TURN SIGNAL SWITCH

LEFT: Gr to O
OFF: Br/Bu
RIGHT: Gr to LB

Turn Signal Switch

	W	R	L
L1	○——		——○
L2	○——		——○
N			
R1	○——	——○	
R2	○——	——○	

HORN BUTTON

LG to W/G with button depressed; continuity.
No continuity with button released.

Horn Button

	Ho_1	Ho_2
FREE		
PUSH	○——	——○

STARTER BUTTON

Bk to Y/R with button pushed in; continuity.
Bk to Y/R with button out; no continuity.

Starter Button

	BAT2	ST
FREE		
PUSH	○	○

ENGINE STOP SWITCH

RUN: Bk to Bk/W; continuity.
OFF: No continuity.

Engine Stop Switch

	BAT2	IG
OFF		
RUN	○	○
OFF		

IGNITION SWITCH

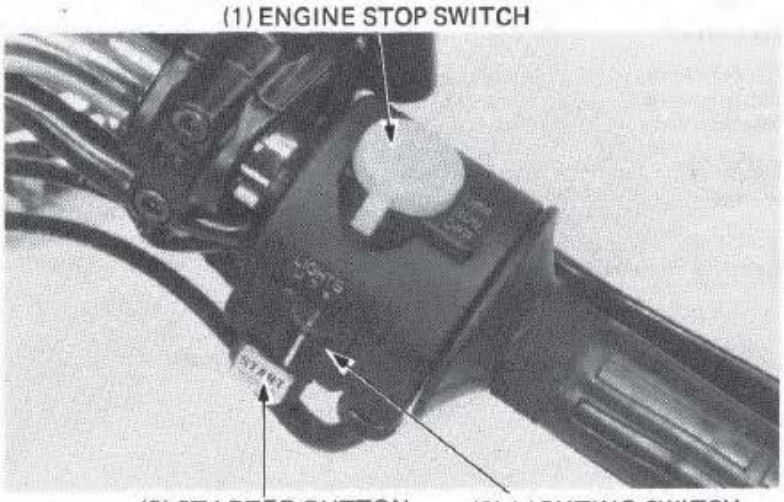
Remove the headlight, headlight case and instrument lower cover and disconnect the ignition switch coupler.

Check continuity of terminals on the ignition switch coupler in each switch position.

SWITCH POSITION

LOCK: No continuity.
OFF: No continuity.
ON: R to Bk, Br/W to Br; continuity.
PARK: Br to R; continuity.

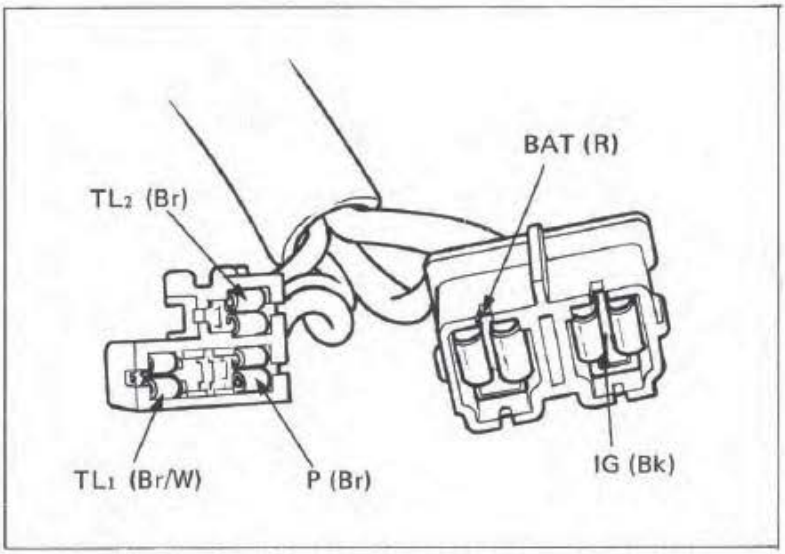
Terminal / Position	BAT	IG	TL1	TL2	P
ON	○	○	○	○	
OFF					
P	○				○
LOCK					



LIGHTING SWITCH

OFF: No continuity
P : Br/B to Br/W; continuity
HL : Br/B to Br/W, B/W to Bk/R; continuity

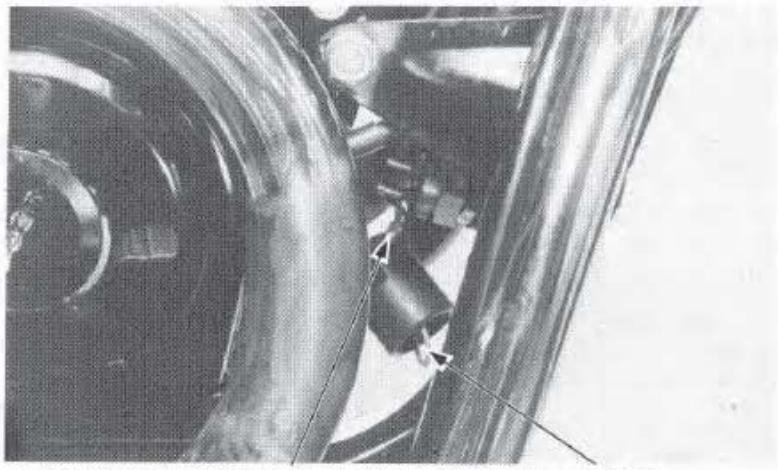
	BAT4	TL	HL	BAT5
OFF				
P	○	○		
H	○	○	○	○



THERMOSTATIC SWITCH

The cooling fan motor is actuated by the thermostatic switch located in the left tank of the radiator.

Run the engine until coolant temperature reaches 80–102°C (176–216°F). The fan motor should start running. The fan motor should stop when the coolant temperature drops to 93–97°C (200–207°F).

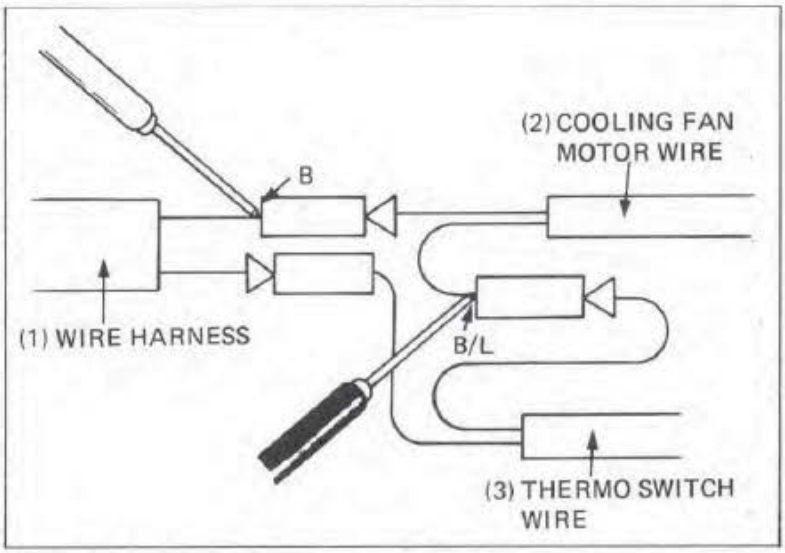


(1) THERMOSTATIC SWITCH LEADS (2) JUMPER WIRE

If the fan motor does not start, disconnect the B/L and G leads from the thermostatic switch and short them together with a jumper wire as shown.

Turn the ignition switch on. The cooling fan motor should start running. If it starts, replace the fan thermostatic switch and retest.

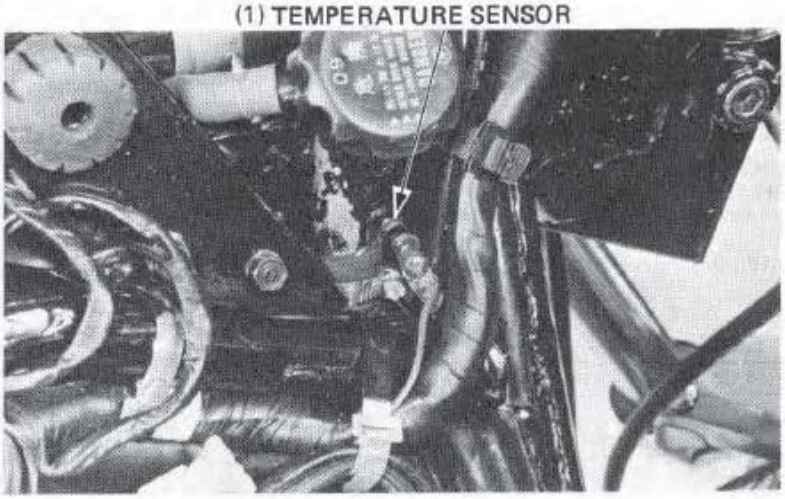
If it does not start, check for battery voltage from the B lead (positive) to the B/L lead (negative) of the fan motor coupler. If there is no voltage, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit.



TEMPERATURE SENSOR

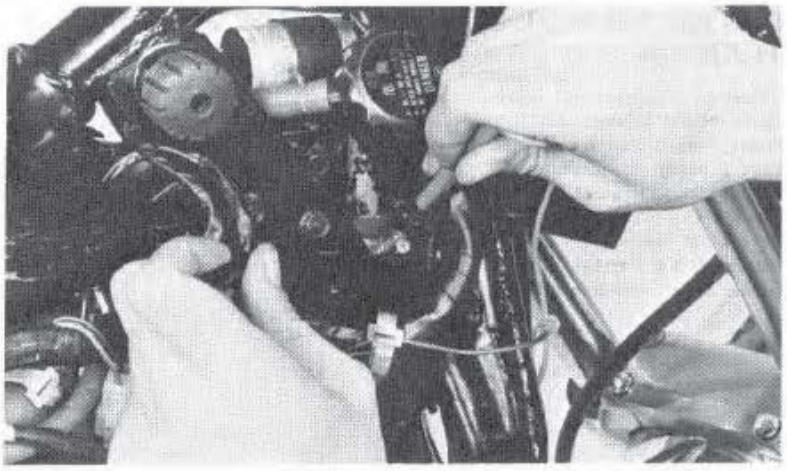
Remove the fuel tank.
Disconnect the G/B wire from the temperature sensor.

(1) TEMPERATURE SENSOR



With the engine cold, use an ohmmeter to measure resistance between the temperature sensor terminal and the engine.

Check the temperature of the coolant.



Run the engine and measure the change in resistance of the sensor with the coolant at the temperatures shown in the chart.

Temperature	60°C (140°F)	85°C (185°F)	110°C (230°F)	120°C (248°F)
Resistance (Ohms)	104.0	43.9	20.3	16.1

Replace the sensor if it is out of specifications by more than 10% at any temperature listed.

TEMPERATURE GAUGE

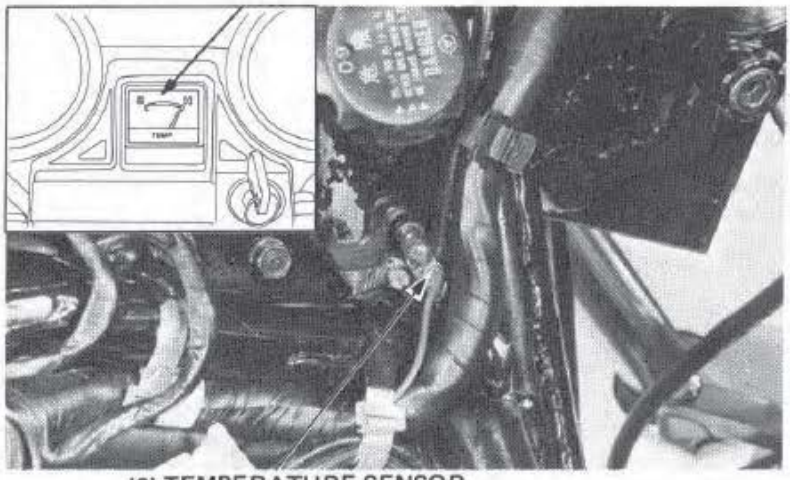
Remove the fuel tank.
Disconnect the wire from the temperature sensor and short it to ground.

Turn the ignition switch to ON. The temperature gauge needle should move all the way to the right.

CAUTION

Do not leave the temperature sensor wire grounded for longer than a few seconds or the temperature gauge will be damaged.

(1) TEMPERATURE GAUGE

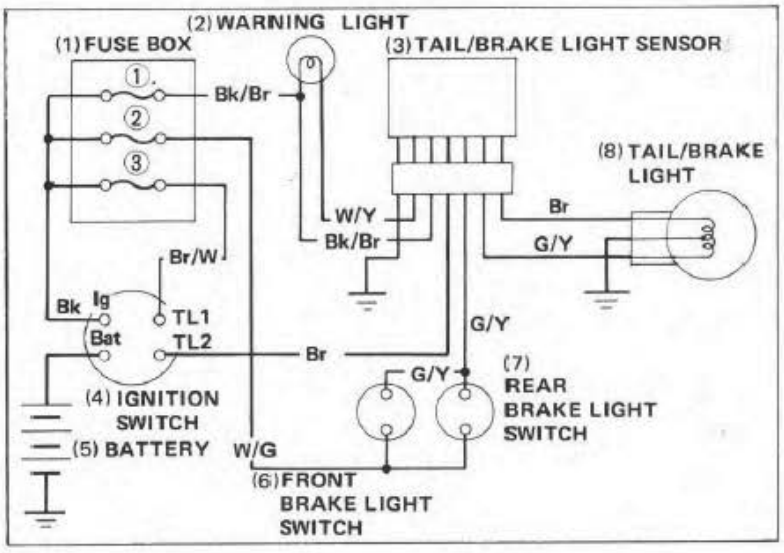


(2) TEMPERATURE SENSOR

BRAKE AND TAIL LIGHT SENSOR

Turn the ignition switch ON. The tail light warning light should light for a few seconds and go out.
If the warning light does not light, check the warning light bulb filament, or wiring for an open or short circuit. If there is no problem in the bulb or wiring, replace the brake and tail light sensor with a new one.

If the warning light does not go out after a few seconds, check the brake/tail light bulb filament and replace if necessary. If the brake/tail light bulb is OK, check the wiring for an open or short circuit. If there is no problem in the wiring, replace the brake and tail light sensor with a new one.

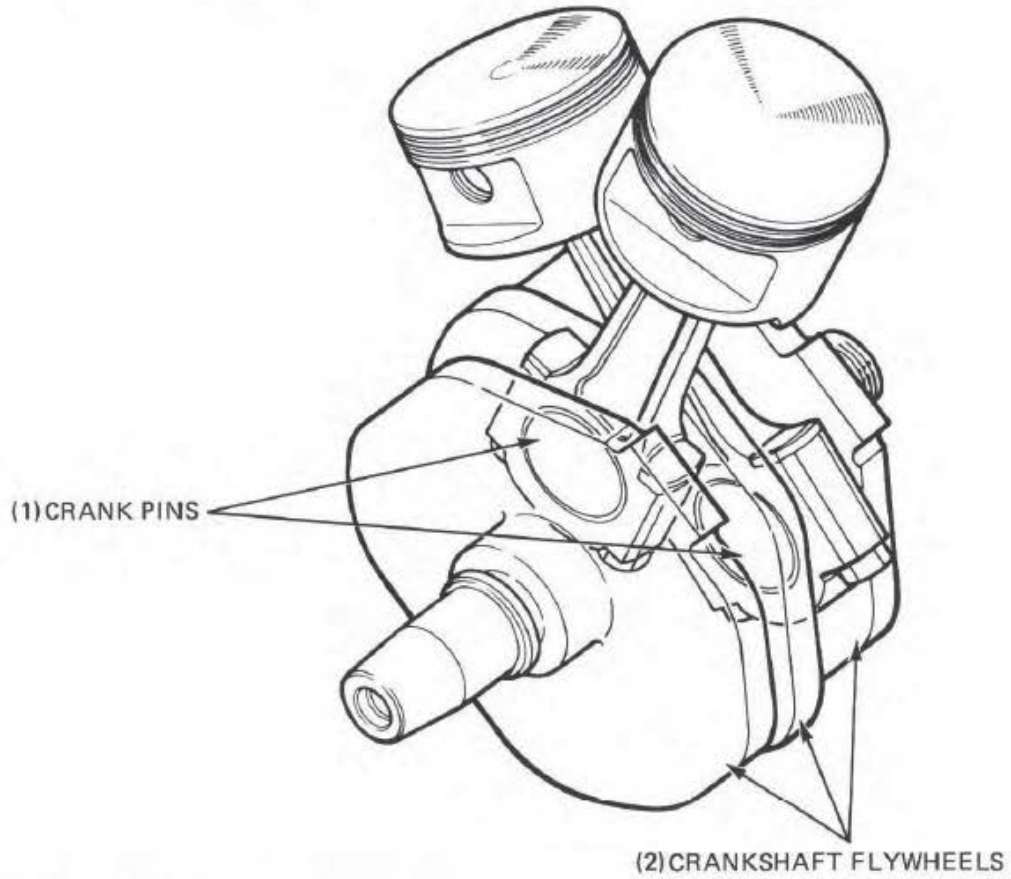


23. TECHNICAL FEATURES

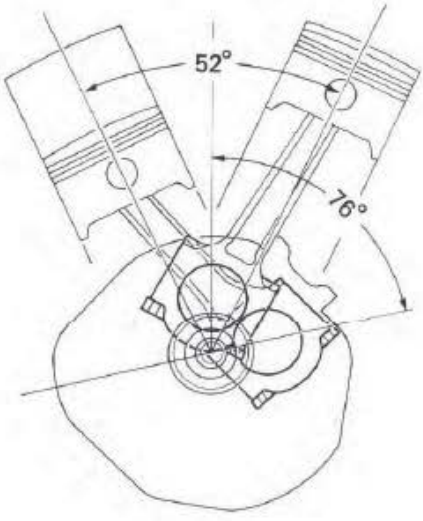
HONDA VT500C

OFF-SET DUAL-PIN CRANKSHAFT

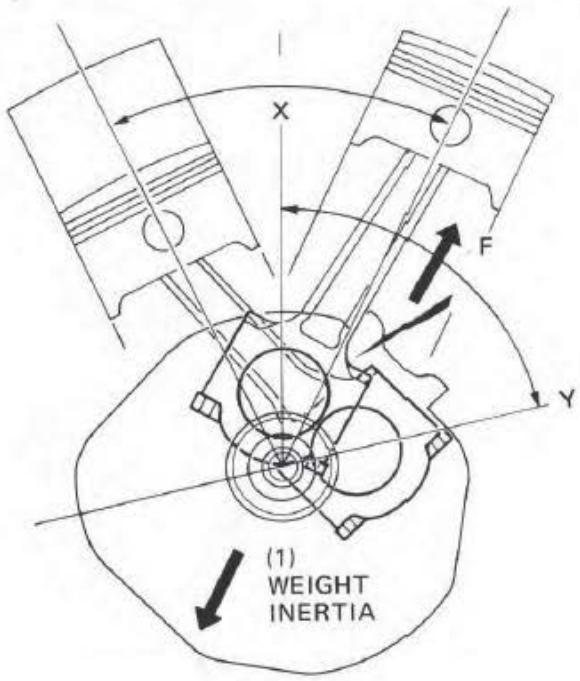
Unless its cylinders are 90° apart, the V-twin engine has an inherent primary imbalance.
The imbalance or resulting vibration can be severe.
Honda engineers wanted the compactness of a narrow V-twin with its cylinders only 52° appart, but without the primary imbalance. They ruled out counter-balancers because they would not contribute to the goal of compactness and light weight. So the engineers decided to try off-setting the crankshaft pins. They sucessfully developed a mathmatical formula to determine the amount of off-set needed for V-twin engines. The amount calculated for the VT500 just happens to be 76°. The off-set will be different for other sizes of Honda V-twins.



The front and rear crank pins are off-set 76° to each other. The connecting rods and pistons are inserted into the front and the rear cylinders which are 52° apart.



The primary force of inertia on a single cylinder engine occurs in the direction of the cylinder.
This causes the vibration that some single cylinder engines are known for. When applied to the V-twin engine the following occurs;
The primary force of inertia in directions X and Y combine to produce vector F. Vector F works in the direction between the front and rear crank pin centers.
To balance vector F, the crankshaft flywheels are precisely weighted in the opposite direction. The primary inertia produced by vector F and that of the flywheels oppose each other and cancel out overall primary vibration.



HONDA

HONDA MOTOR CO., LTD. TOKYO, JAPAN