TOOLS

Special

Bearing remover, 17 mm	07936–3710300
Remover weight	07741–0010201 or 07936–3710200
Remover handle	07936–3710100
Pinion holder	07924–ME50000
Lock nut wrench, 30 x 64 mm	07916–MB00000
Lock nut wrench, 34 x 44 mm	07916–ME50000
Universal bearing puller	07631–00100000 or commercially available in U.S.A.
Attachment, 28 x 30 mm	07946–1870100
Attachment	07946–3290000
Crank assembly kit	07931–KF00000
– Threaded adaptor	07931–KF00200
– Crankshaft assembly collar	07931–KF00100
– Shaft puller	07931–ME40000
Bearing remover, 15 mm	07936–KC10000
– Bearing remover, 15 mm	07936–KC10500
– Remover weight	07741–0010201

Common

Driver	07749–0010000
Attachment, 72 x 75 mm	07746–0010600
Attachment, 37 x 40 mm	07746–0010200
Pilot, 35 mm	07746–0040800
Pilot, 17 mm	07746–0040400
Attachment, 52 x 55 mm	07746–0010400
Pilot, 22 mm	07746–0041000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 20 mm	07746–0040500
Pilot, 25 mm	07746–0040600
Driver	07746–0030100
Attachment, 30 mm I.D.	07746–0030300
Pilot, 15 mm	07746–0040300
Pilot, 28 mm	07746–0041100

TROUBLESHOOTING

Crankshaft noisy
1. Worn connecting rod big end bearing
2. Bent connecting rod
3. Worn crankshaft main journal bearing

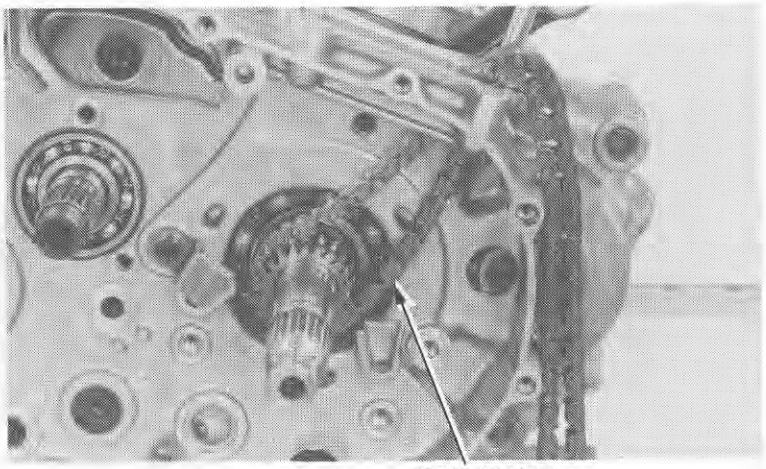
Jumps out of gear
1. Shift fork bent or damaged
2. Shift fork shaft bent
3. Shift claw bent
4. Gear engagement dogs or slots worn
5. Shift drum cam grooves damaged

Hard to shift
1. Incorrect clutch adjustment
2. Shift fork bent or damaged
3. Shift fork shaft bent

Excessive output gear noise
1. Output drive and driven gears worn on damaged
2. Bearing worn or damaged
3. Excessive backlash between output drive and driven gears
4. Improper shim thickness

CRANKCASE SEPARATION

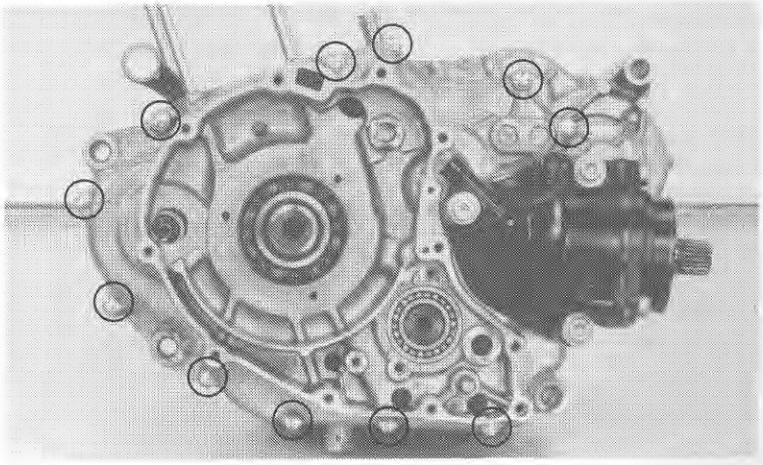
Remove the cam chain.



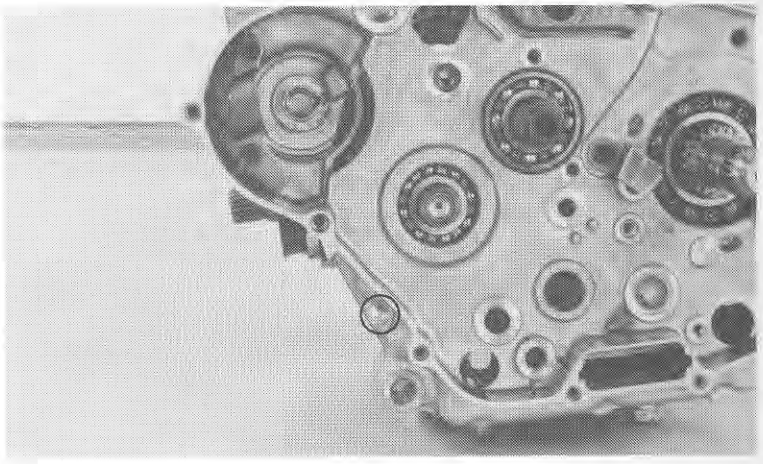
Remove the left crankcase bolts.

NOTE

Loosen the bolts in a crisscross pattern in 2-3 steps to prevent crankcase distortion.



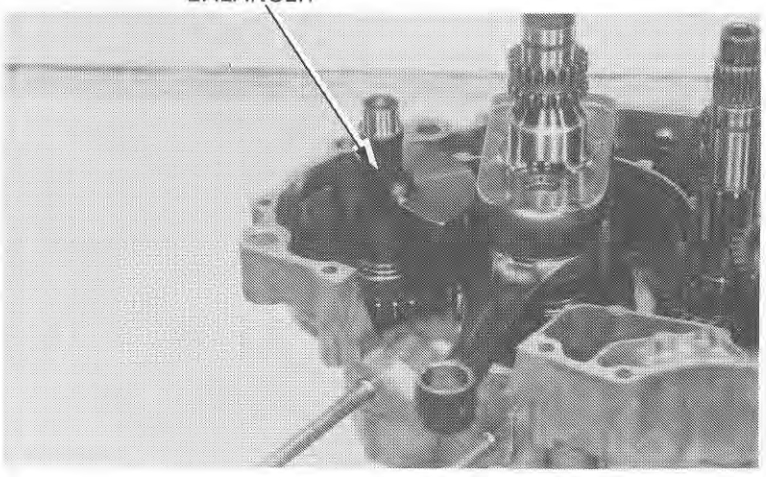
Remove the right crankcase cover bolt. Place the engine with the left crankcase down and remove the right crankcase from the left crankcase.
Remove the dowel pins and gasket.



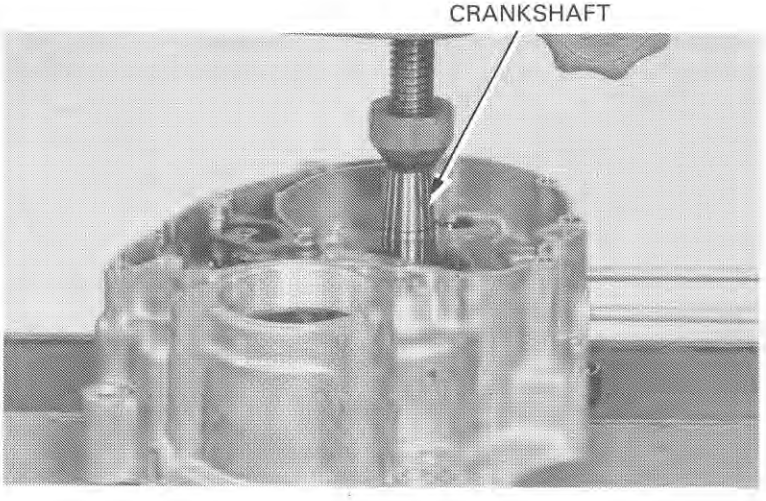
CRANKSHAFT

REMOVAL

Remoe the balancer from the left crankcase.



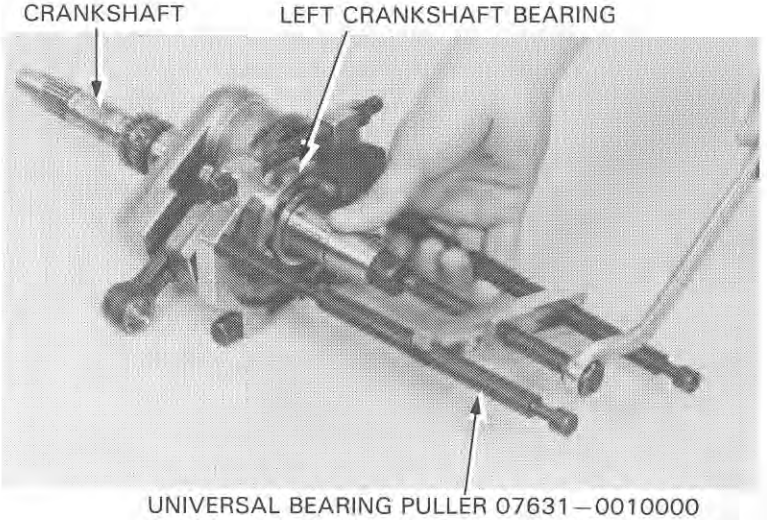
Disassemble the transmission (page 10-9).
Remove the crankshaft from the left crankcase using a hydraulic press.



If the left crankshaft bearing remains on the crankshaft, remove it with a bearing puller.
If the left crankshaft bearing remains in the left crankcase, remove it with driver 07749—0010000 and attachment, 42 x 47 mm 07746—0010300.
Discard the left crankshaft bearing.

NOTE

Always replace the left bearing with a new one whenever the crankshaft is removed from the left crankcase.

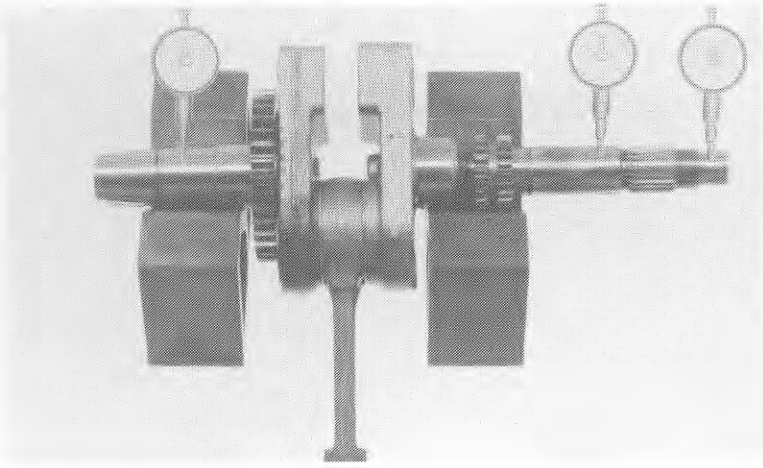


UNIVERSAL BEARING PULLER 07631—0010000
OR COMMERCIALLY AVAILABLE IN U.S.A.

INSPECTION

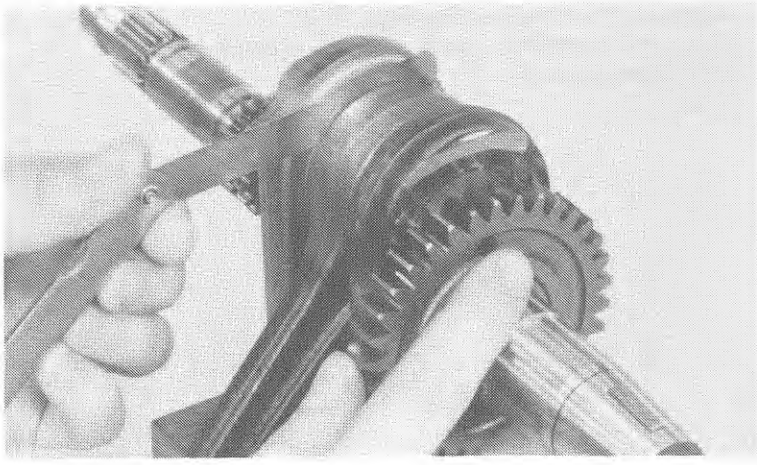
Set the crankshaft on a stand or V-blocks and read the runout using dial indicators.

SERVICE LIMIT: 0.05 mm (0.002 in)



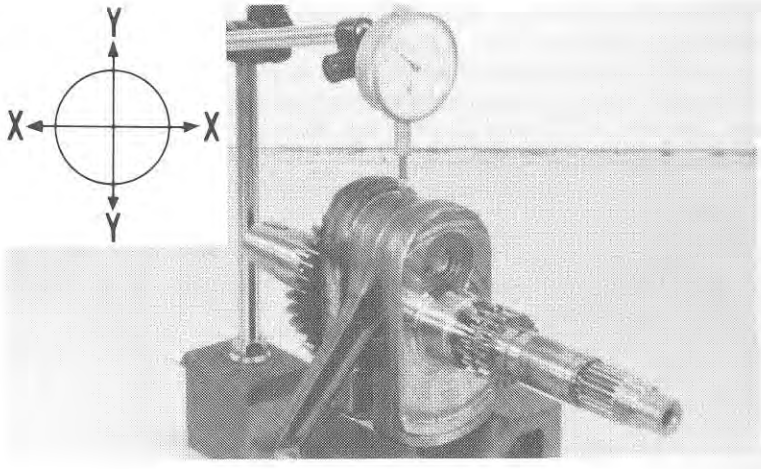
Measure the side clearance between the connecting rod big end and the crankshaft flyweight with a feeler gauge.

SERVICE LIMIT: 0.80 mm (0.031 in)

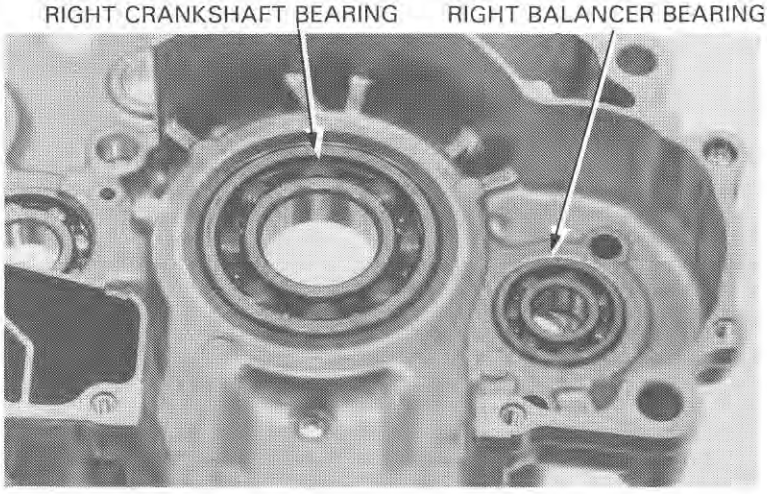


Measure the radial clearance at the connecting rod big end, at two points in the directions indicated by the arrows.

SERVICE LIMIT: 0.05 mm (0.002 in)



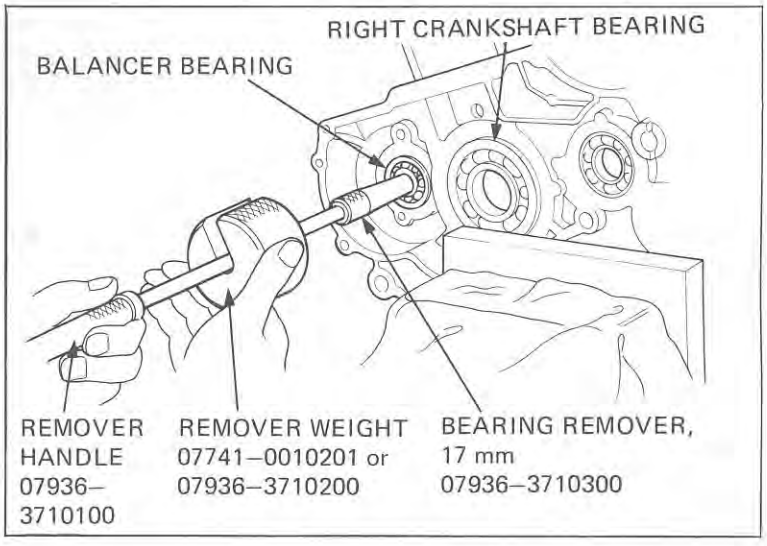
Spin the right crankshaft bearing and balancer bearings by hand and check for play.
The bearings must be replaced if they are noisy or have excessive play.



BEARING REPLACEMENT

Remove the balancer bearings using the bearing remover tool.

Drive the right crankcase bearing out from the outside using driver 07749—0010000 and attachment, 42 x 47 mm 07746—0010300.



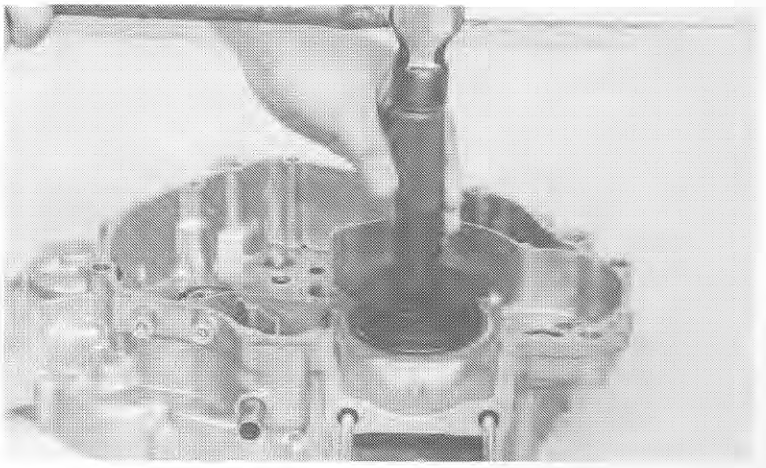
Drive new bearing with the following tools.

Right crankshaft bearing:

· **Driver**	**07749—0010000**
· **Attachment, 72 x 75 mm**	**07746—0010600**
· **Pilot, 35 mm**	**07746—0040800**

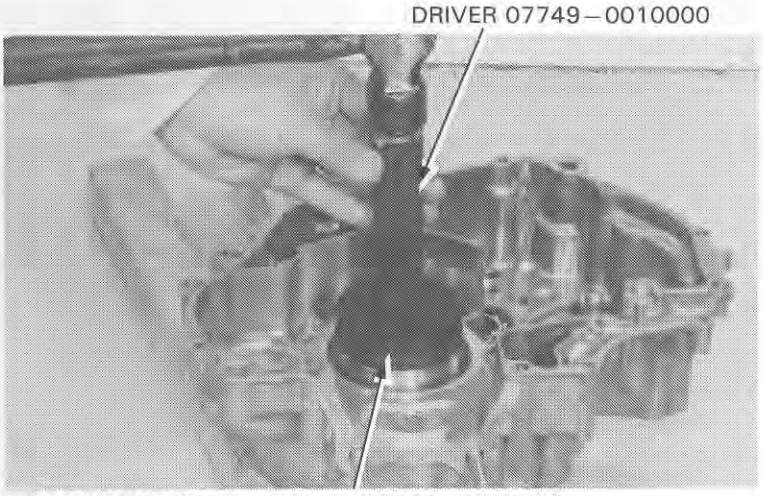
Balancer bearings:

· **Driver**	**07749—0010000**
· **Attachment, 37 x 40 mm**	**07746—0010200**
· **Pilot, 17 mm**	**07746—0040400**

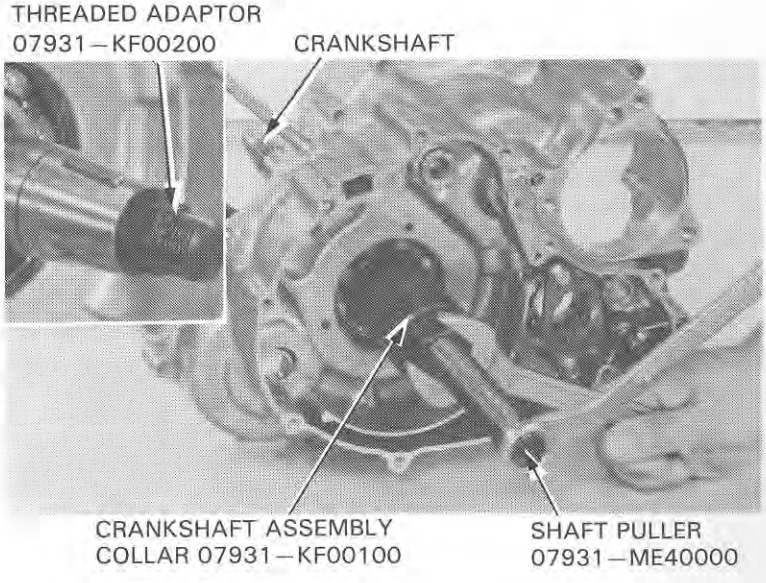


INSTALLATION

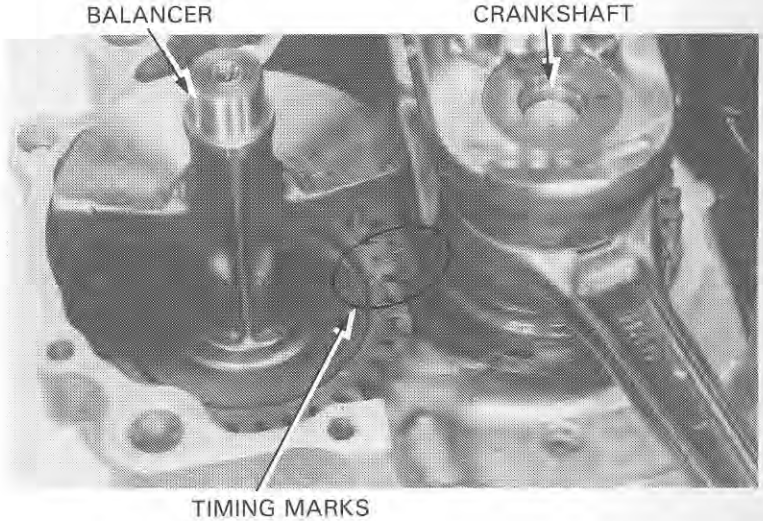
Drive new left crankshaft bearing into the left crankcase.



Draw the crankshaft into the left crankcase using the special tool.



Install the balancer into the left crankcase aligning its timing mark with the timing mark on the crankshaft gear.

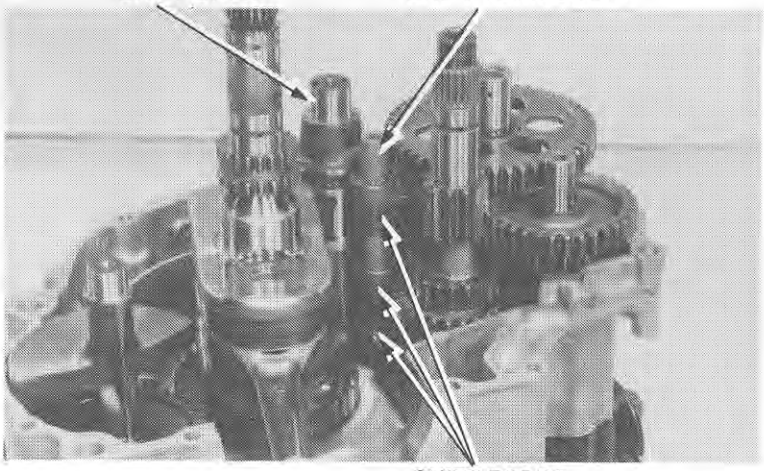


TRANSMISSION

DISASSEMBLY

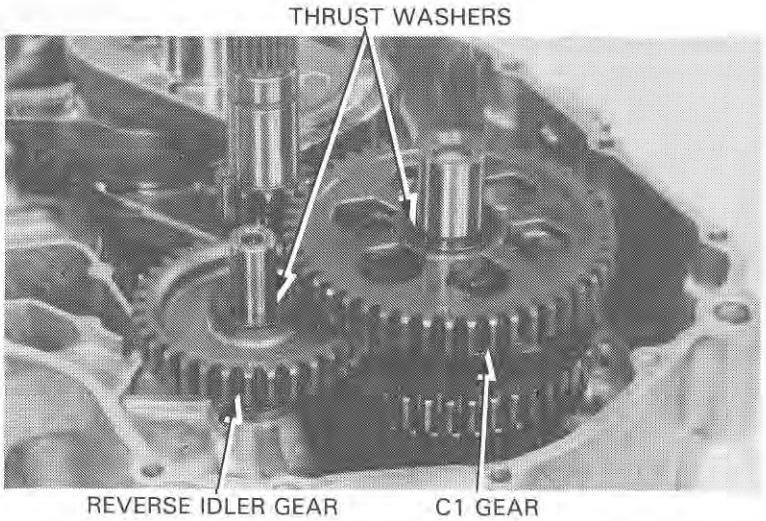
Temporarily install the gearshift drum bearing stopper plates, dowel pins,collars and shifter plate (page 9-10) to prevent the bearing from falling out while disassmbling and assembling the transmission.

Pull the gearshift fork shaft out and remove the shift forks and shift drum.



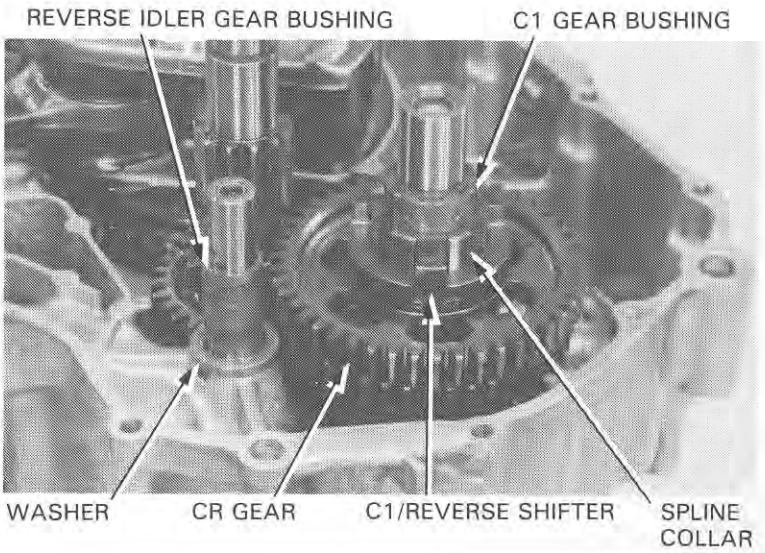
Remove the thrust washer and C1 gear from the countershaft.

Remove the thrust washer and reverse idler gear.



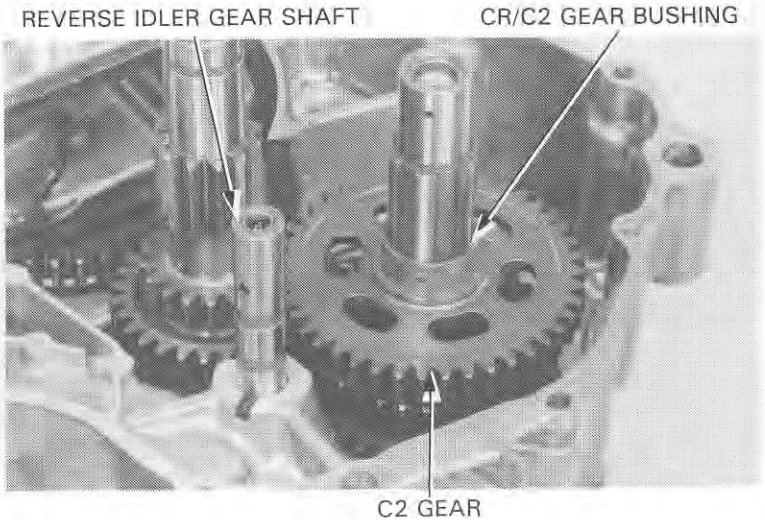
Remove the C1 gear bushing, spline collar, C1/ reverse shifter and CR gear from the countershaft.

Remove the reverse idler gear bushing and washer.

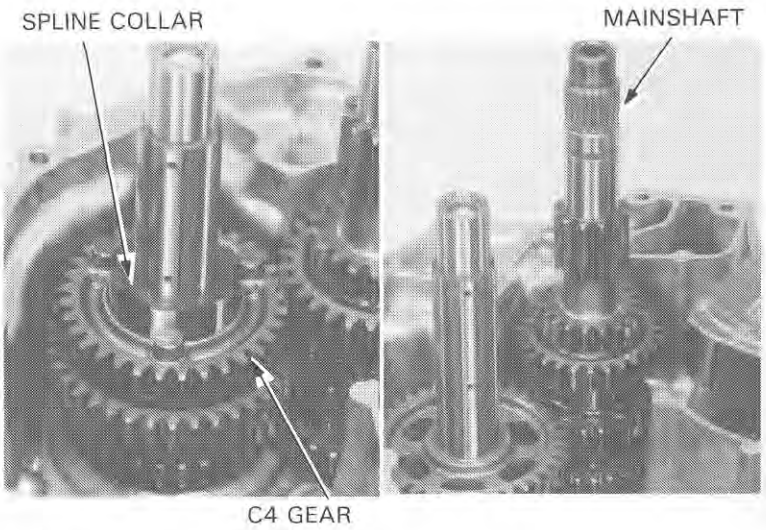


Remove the CR/C2 gear bushing and C2 gear from the countershaft.

Remove the reverse idler gear shaft.

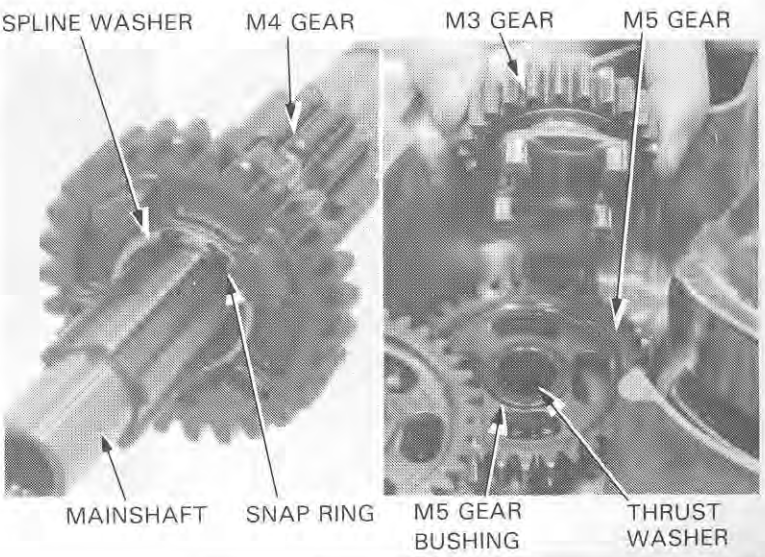


Remove the spline collar and C4 gear from the countershaft and remove the mainshaft.



Remove the snap ring, spline washer, M4 gear and M4 gear bushing from the mainshaft.

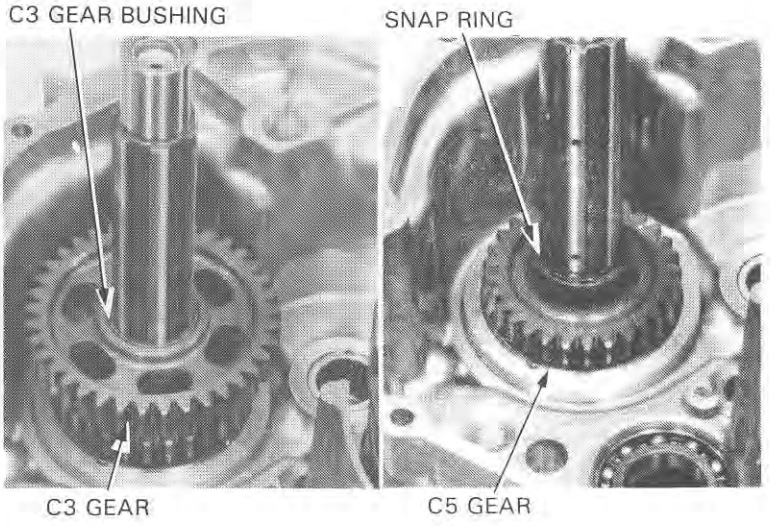
Remove the M3 gear, M5 gear bushing, M5 gear and thrust washer from the left crankcase.



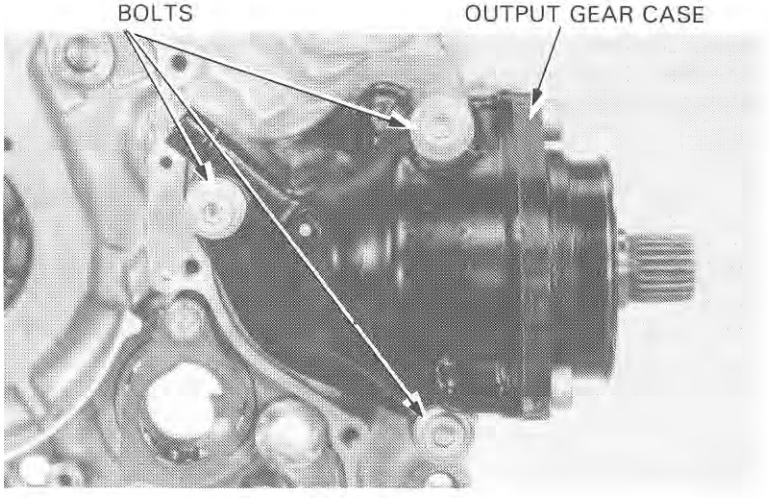
Remove the C3 gear and bushing from the countershaft.

'85:
Remove the snap rings, washers and C5 gear.

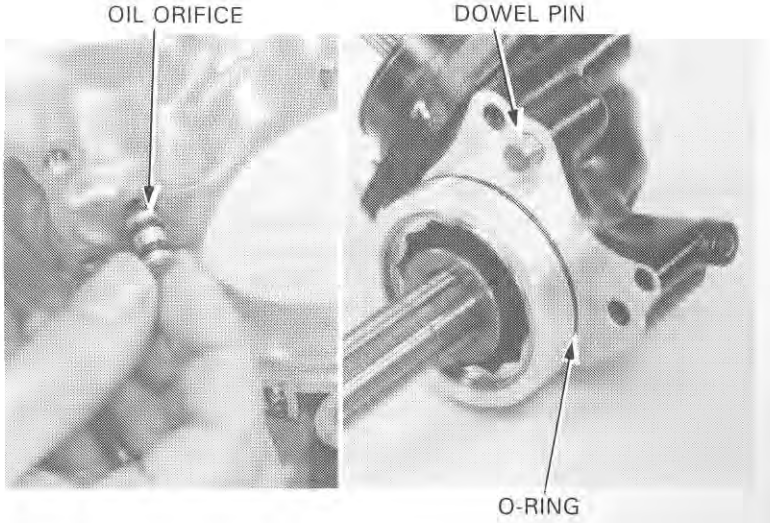
After '85:
Remove the collar and C5 gear.



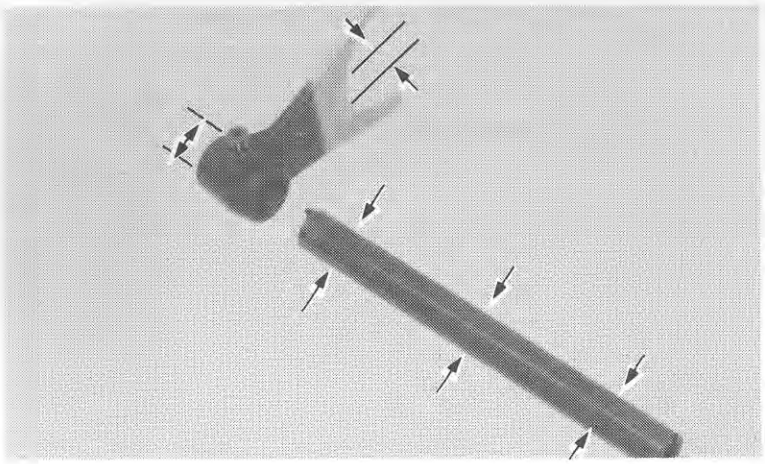
Remove the three output gear case mounting bolts and remove the output gear case.



Remove the oil orifice from the left crankcase.
Remove the O-ring and dowel pin from the output gear case.



INSPECTION



Check the shift fork and shaft for wear or damage.
Measure the I.D. of the shaft hole.

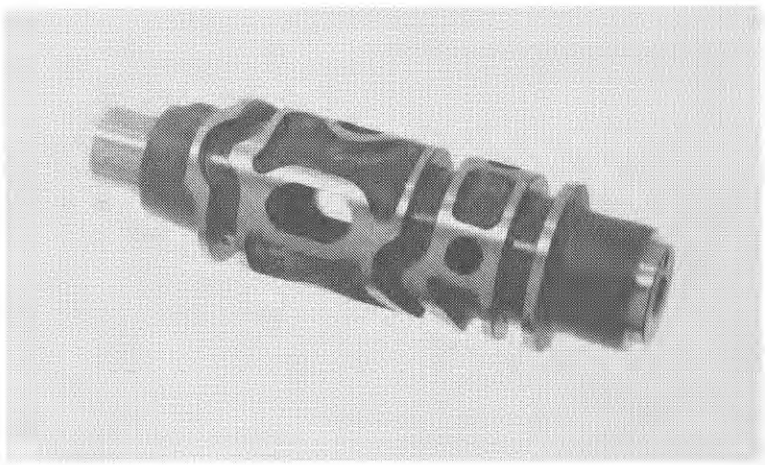
SERVICE LIMIT: 13.04 mm (0.513 in)

Measure the shift fork claw thickness.

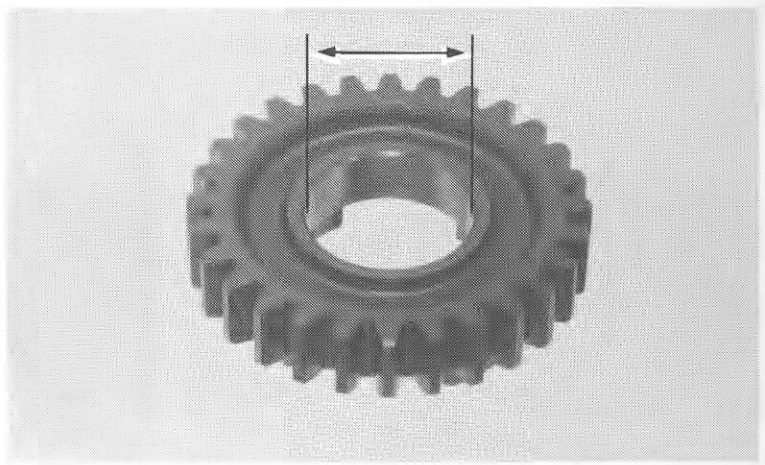
SERVICE LIMIT: 4.50 mm (0.177 in)

Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.96 mm (0.510 in)



Inspect the shift drum right journal for scoring, scratches, or lack of lubrication.
Check the shift drum grooves for damage.



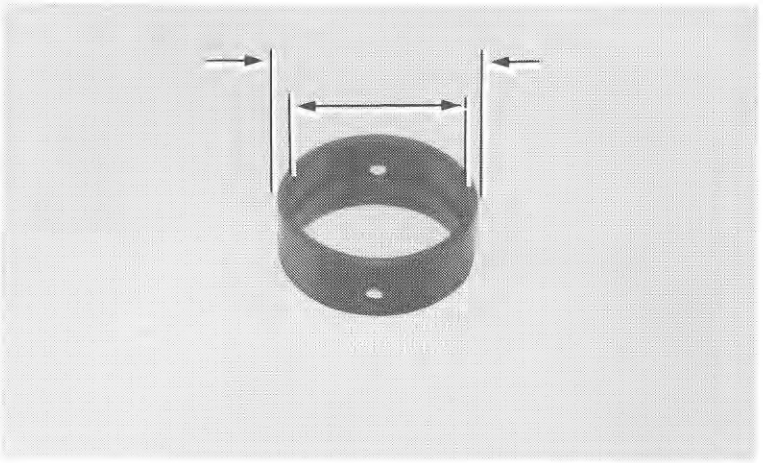
Check the gear dogs, dog holes and teeth for abnormal wear, or lack of lubrication.

Measure the I.D. of each gear.

SERVICE LIMITS:

C1, C2, C3, CR	**28.07 mm (1.105 in)**
M4	**25.05 mm (0.986 in)**
M5	**20.07 mm (0.790 in)**
R idler	**18.05 mm (0.711 in)**

Measure the I.D. of each gear bushing.



SERVICE LIMITS:

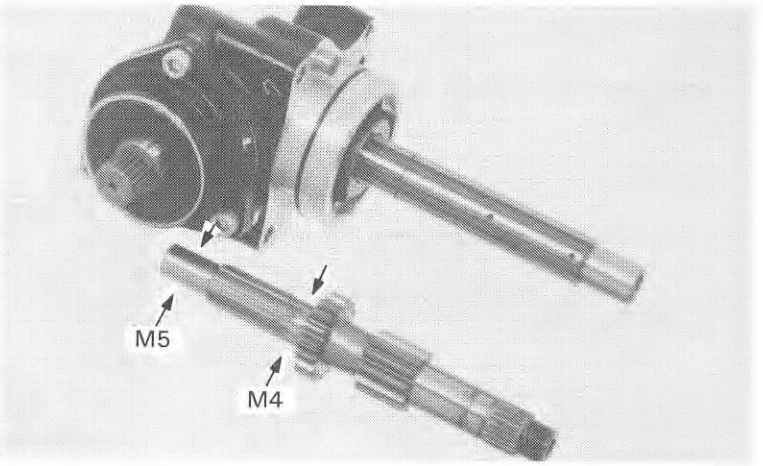
C1, C2, C3, CR O.D.	27.93 mm (1.100 in)
M4 O.D.	24.93 mm (0.981 in)
M4 I.D.	22.05 mm (0.868 in)
M5 O.D.	19.93 mm (0.785 in)
M5 I.D.	17.06 mm (0.672 in)
R O.D.	17.93 mm (0.706 in)
R I.D.	14.05 mm (0.553 in)

Calculate gear-to-bushing clearance.

SERVICE LIMITS:

C1, C2, C3, CR	0.10 mm (0.004 in)
M4	0.10 mm (0.004 in)
M5	0.10 mm (0.004 in)
R	0.10 mm (0.004 in)

Measure the O.D. of the mainshaft, countershaft, and reverse idler shaft.



SERVICE LIMITS:

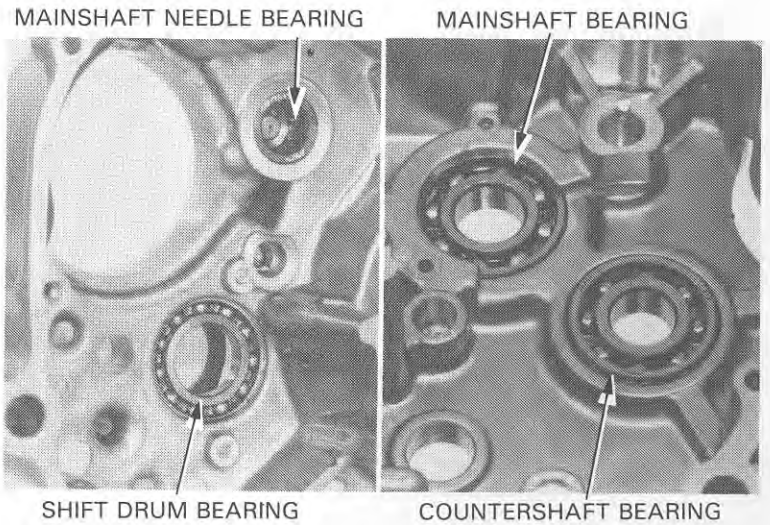
M4	21.93 mm (0.863 in)
M5	16.95 mm (0.667 in)
R	13.93 mm (0.548 in)

Calculate the gear bushing-to-shaft clearance.

SERVICE LIMITS:

M4	0.10 mm (0.004 in)
M5	0.10 mm (0.004 in)
R	0.10 mm (0.004 in)

Check the transmission bearings for excessive play or damage and replace if necessary.



BEARING REPLACEMENT

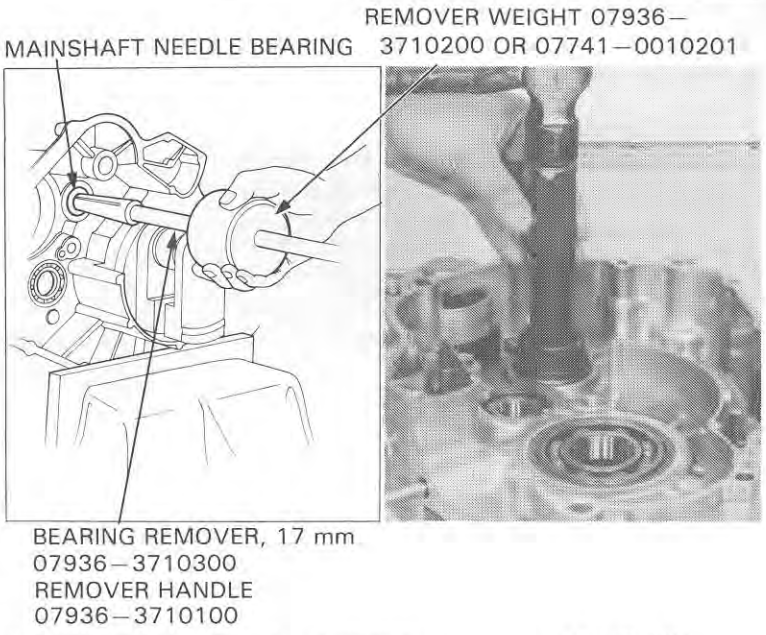
Remove the crankcase bearings.
Remove the mainshaft needle bearing using the bearing remover tool.
Drive new bearings in with the following tools.

LEFT CRANKCASE

Mainshaft needle bearing:	
Driver	**07749–0010000**
Attachment, 28 x 30 mm	**07946–1870100**
Gearshift drum bearing:	
Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 20 mm	**07746–0040500**

RIGHT CRANKCASE

Mainshaft bearing:	
Driver	**07749–0010000**
Attachment, 52 x 55 mm	**07746–0010400**
Pilot, 22 mm	**07746–0041000**
Countershaft bearing:	
Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 20 mm	**07746–0040500**

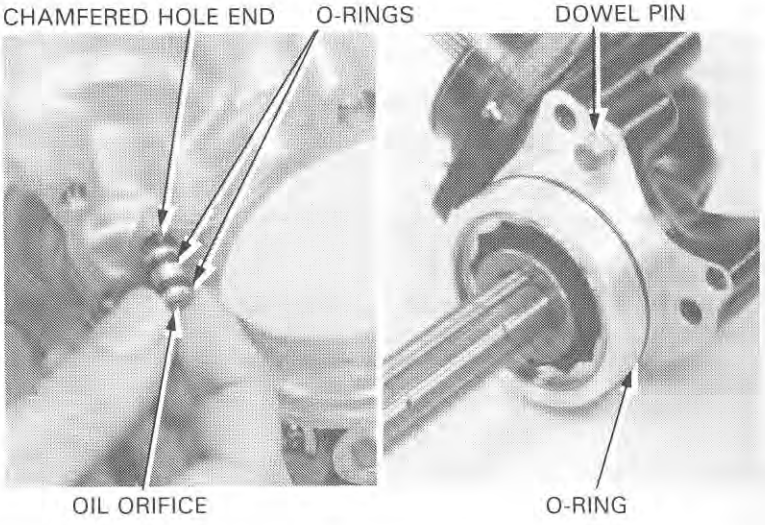


ASSEMBLY

Clean the oil orifice and blow out with compressed air.
Install new O-rings onto the oil orifice and install the orifice into the oil hole.

NOTE

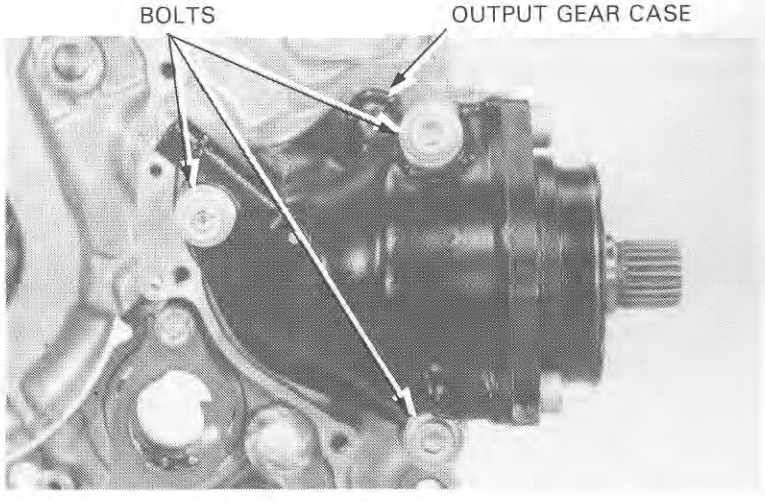
Install the orifice with its chamfered hole end facing in.



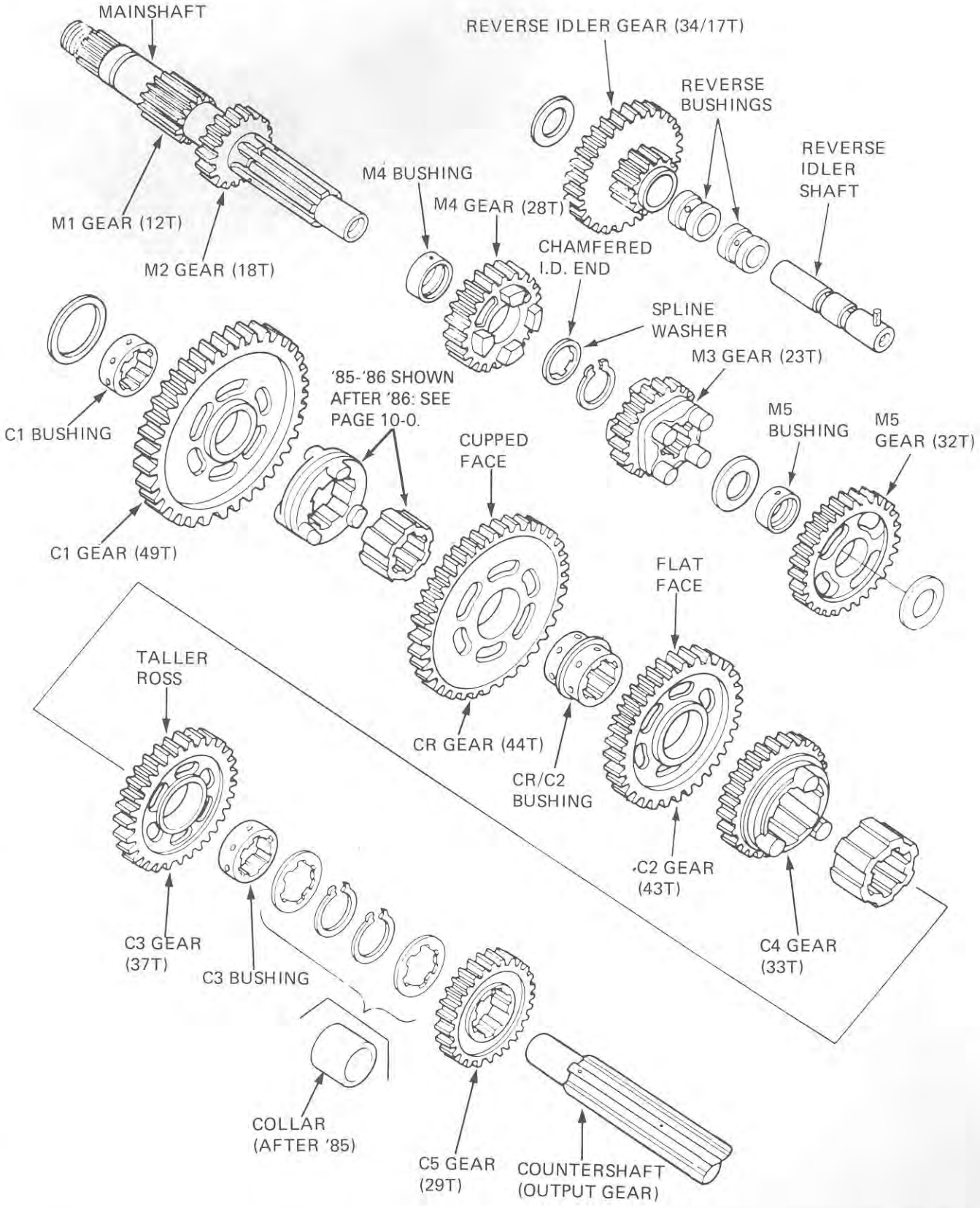
Install the dowel pin and a new O-ring onto the output gear case.

Install the output gear case onto the left crankcase and tighten the three mount bolts.

TORQUE: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
After '85
30–34 N·m
(3.0–3.4 kg-m, 22–25 ft-lb)



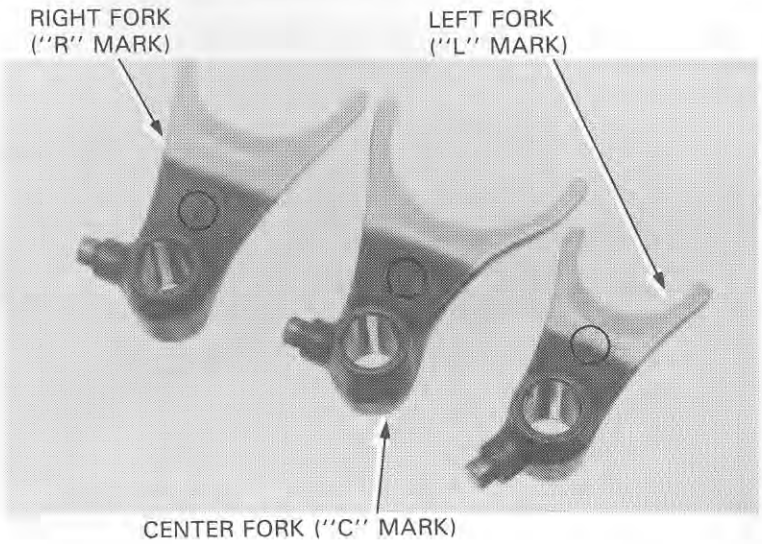
Assemble the mainshaft, countershaft and reverse idler in the reverse order of disassembly.



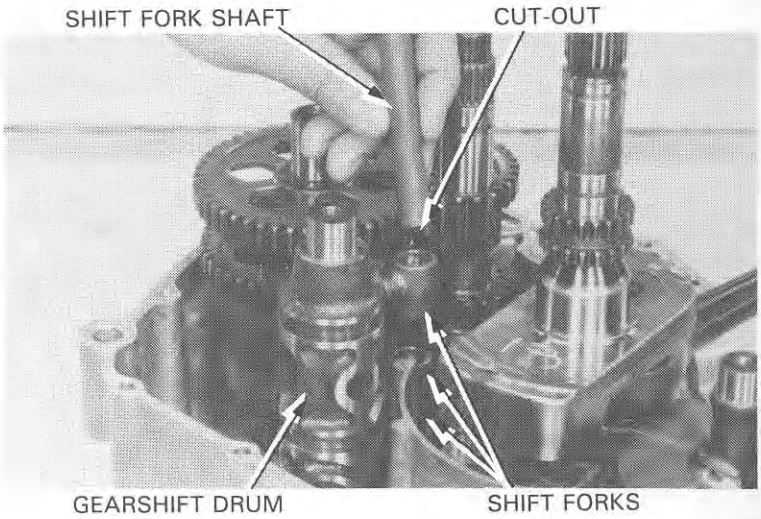
Install the gearshift forks with their marks facing up.

NOTE

The gearshift forks will have marks: L for left, C for center and R for right.



Install the gearshift drum and align each shift fork guide pin with the guide groove in the drum. Insert the shift fork shaft through the shift forks into the hole in the left crankcase and align its cut-out with the shoulder in the hole.



OUTPUT GEAR

BACKLASH INSPECTION

Place the output gear case in a vise.

CAUTION

Use soft jaws to prevent damage to the gear case.

Set a horizontal type dial indicator on the output drive shaft as shown.
Hold the output driven gear shaft and rotate the drive shaft until the gear slack is taken up.
Turn the drive shaft back and forth to read the backlash.

STANDARD: **0.080–0.180 mm (0.0031–0.0071 in)**
SERVICE LIMIT: **0.25 mm (0.010 in)**

Remove the dial indicator. Turn the output drive shaft 120° and measure the backlash. Repeat this procedure once more.
Compare the difference of the three measurements.

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

If the difference in the measurements exceeds the limit, it indicates that the bearing is not installed squarely.
Inspect the bearings and replace if necessary.
If backlash is excessive, replace the driven shaft adjustment shim with a thinner one.
If the backlash is too small, replace the driven shaft adjustment shim with a thicker one.

Backlach is changed by about 0.06 mm (0.002 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).

OUTPUT DRIVEN GEAR SHAFT ADJUSTMENT SHIMS:

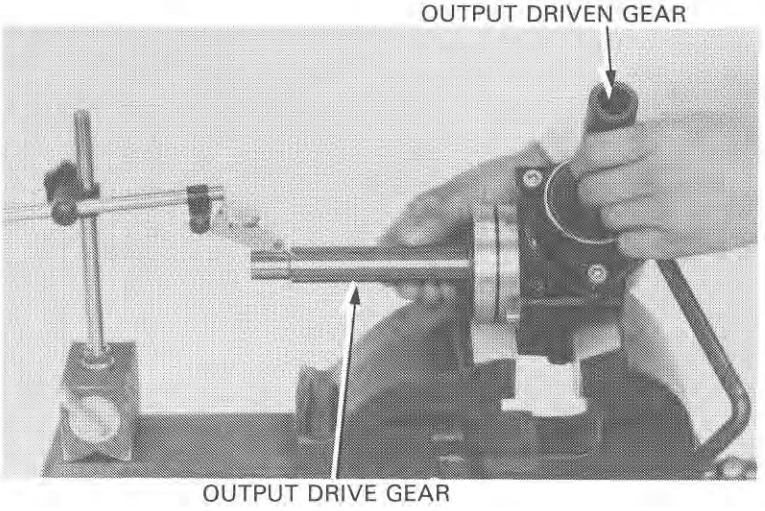
- **A: 0.40 mm (0.016 in)**
- **B: 0.45 mm (0.018 in)**
- **C: 0.50 mm (0.020 in) Standard**
- **D: 0.55 mm (0.022 in)**
- **E: 0.60 mm (0.024 in)**
- **F: 0.30 mm (0.012 in)**
- **G: 0.35 mm (0.014 in)**

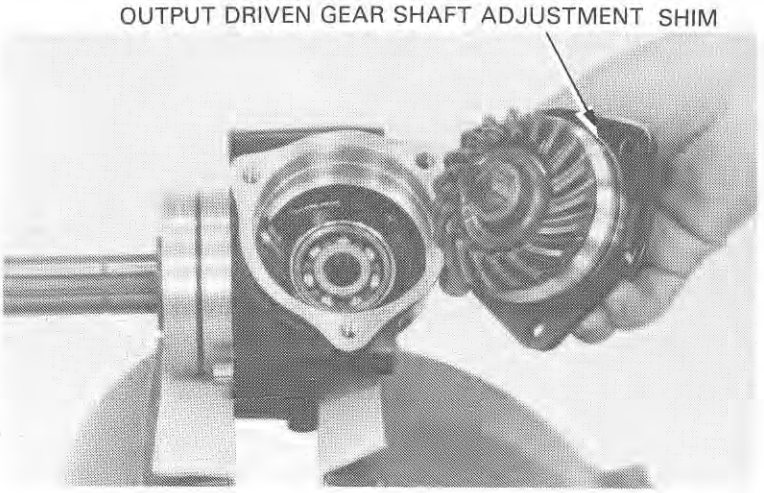
OUTPUT DRIVEN GEAR DISASSEMBLY

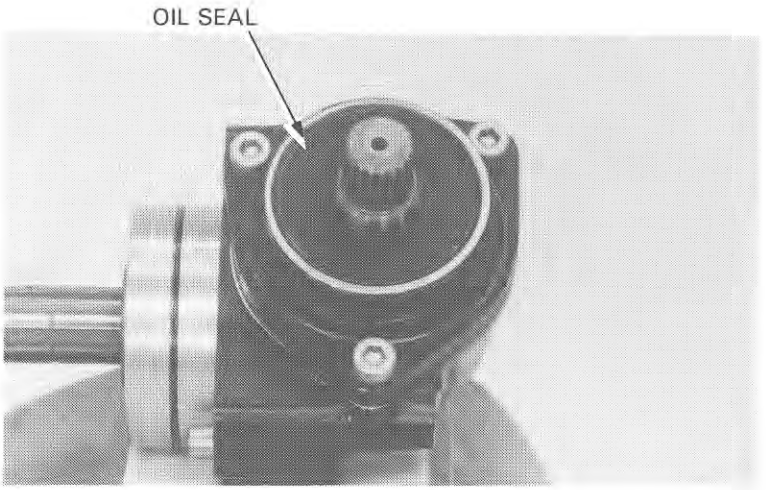
Place the output gear case in a vise, being careful not to distort it and remove the oil seal.

CAUTION

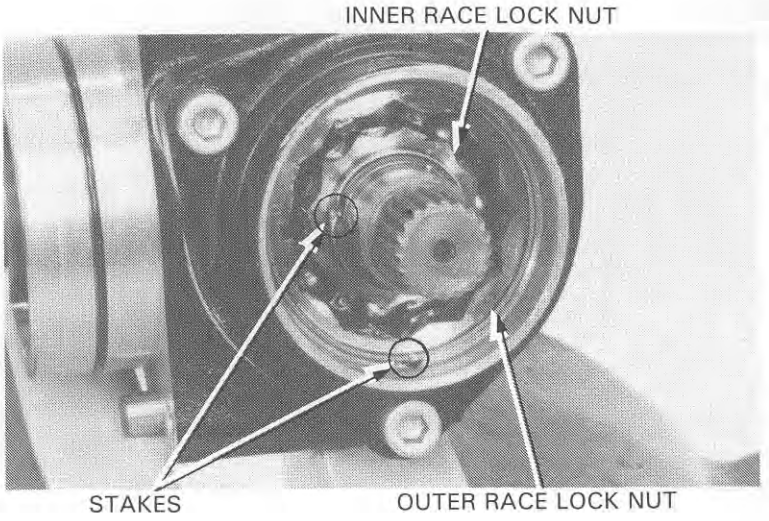
Use soft jaws to prevent damage to the gear case.



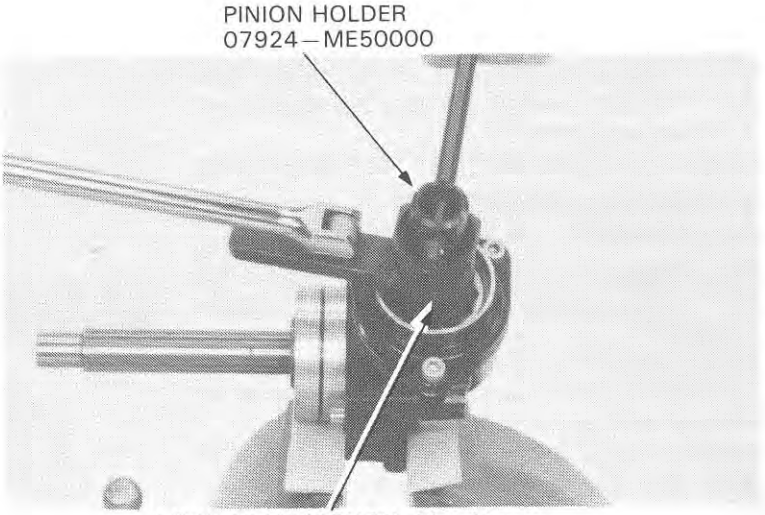




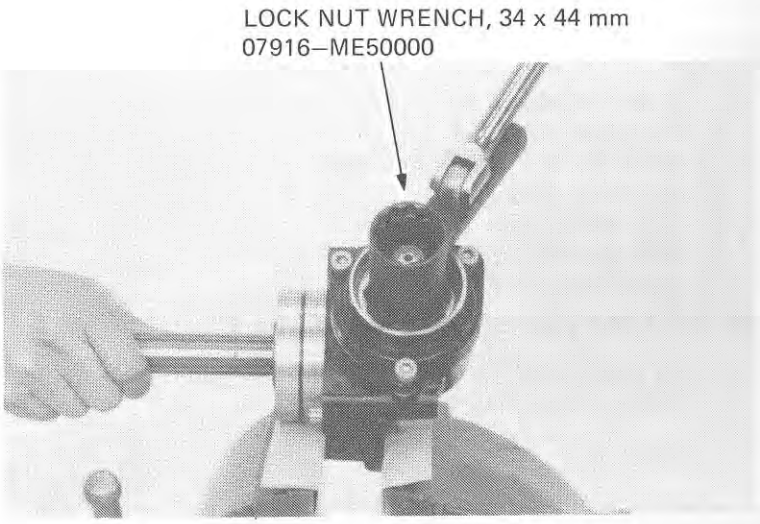
Unstake the driven gear bearing race lock nuts with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.



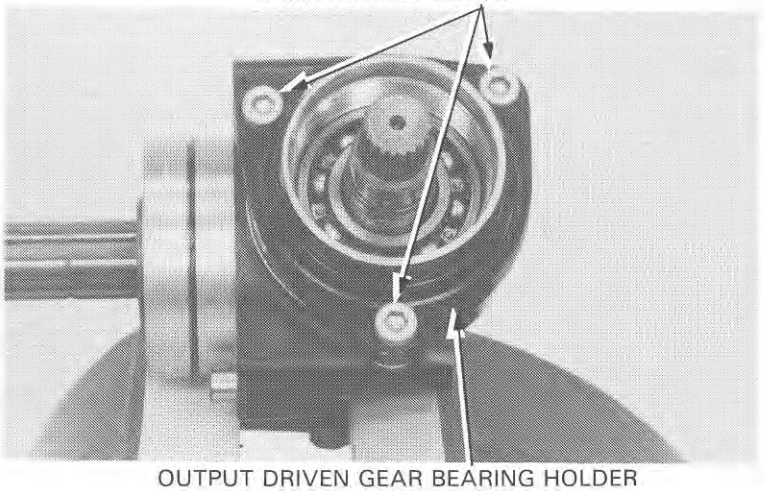
Remove the inner race lock nut and discard it.



Remove the outer race lock nut and lock washer. Discard the outer race lock nut.



Remove the 8 mm socket bolts attaching the output driven gear bearing holder and remove the driven gear assembly.

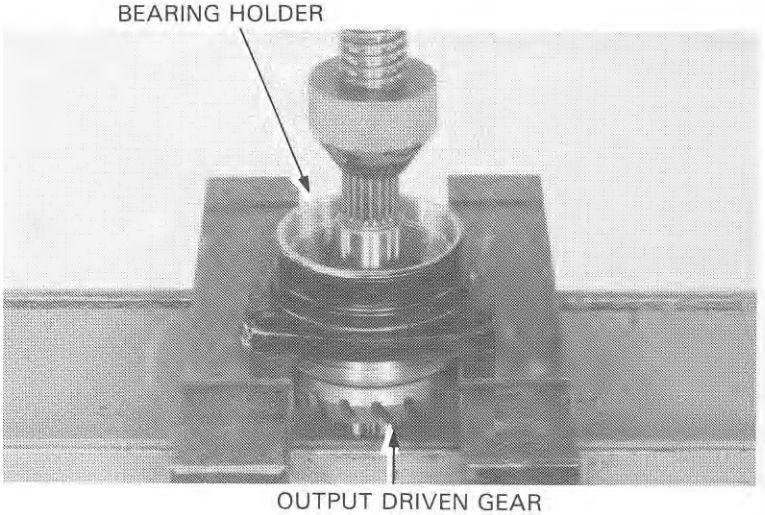


OUTPUT DRIVEN GEAR BEARING REPLACEMENT

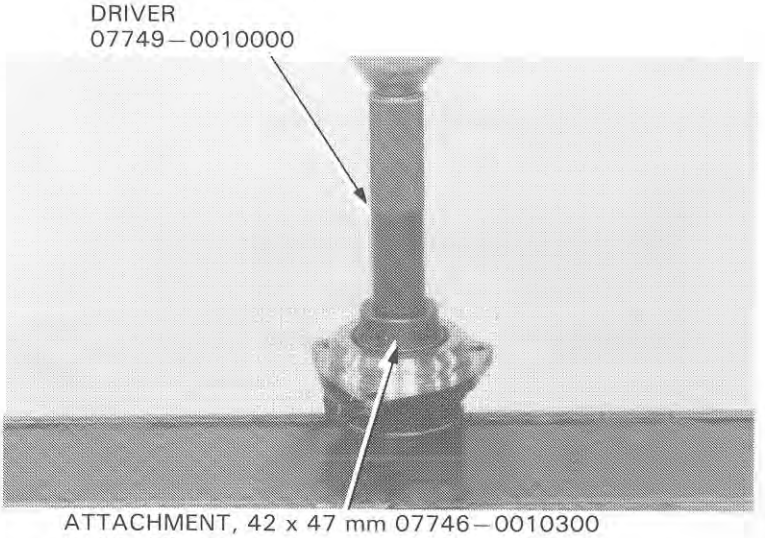
NOTE

> The driven gear must be removed before replacing the bearing.

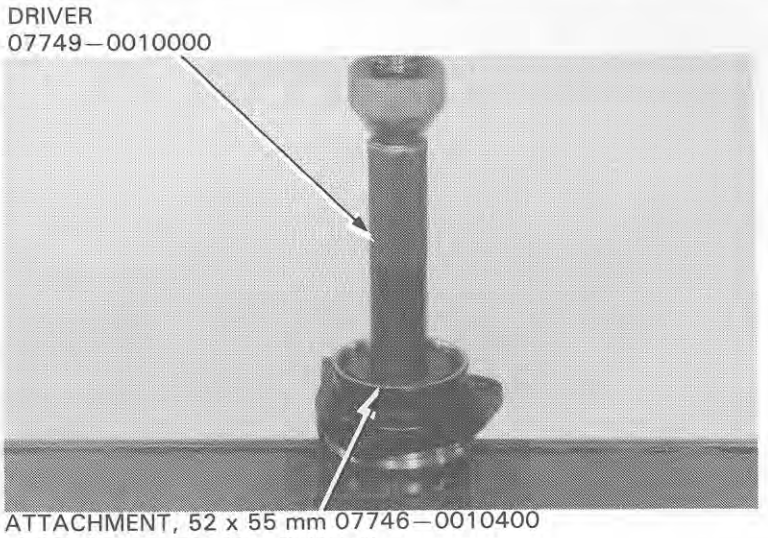
Place the bearing holder in a press and remove the driven gear.



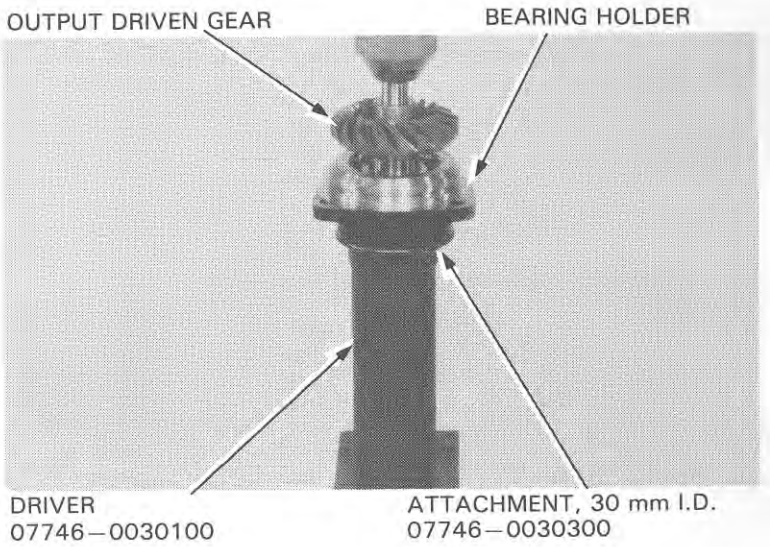
Place the bearing holder in the press and remove the bearing.



Press in a new bearing.



Press the output driven gear into the bearing.



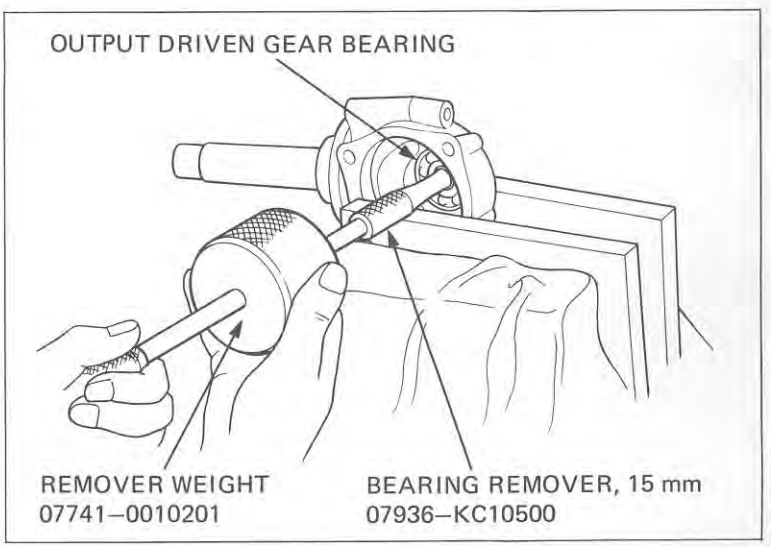
OUTPUT DRIVEN GEAR CASE BEARING REPLACEMENT

Heat the output gear case around the driven shaft bearing to 80°C (176°F).

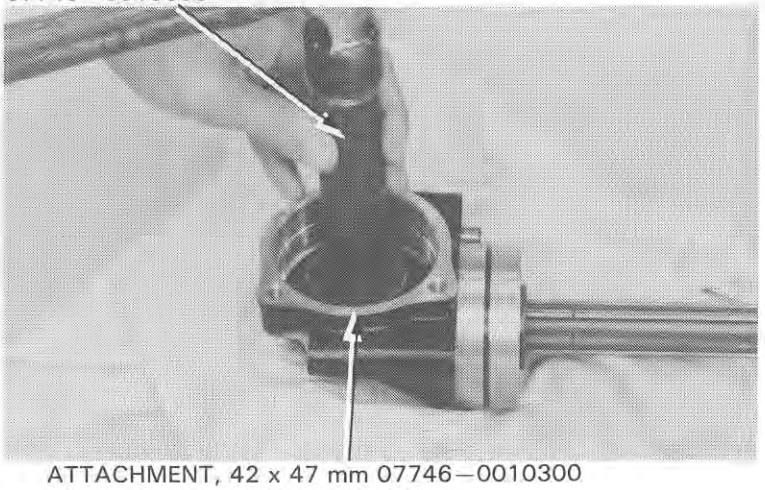
CAUTION

Always wear gloves when handling a heated gear case.

Remove the bearing with the bearing remover.



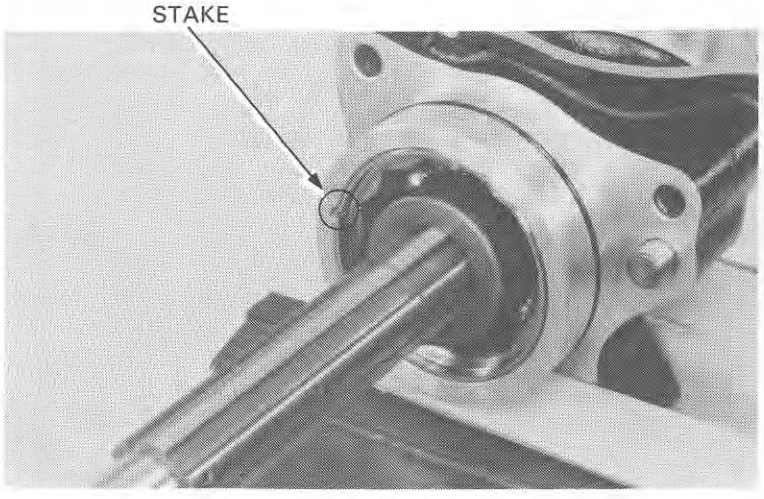
Drive a new bearing into the output gear case.



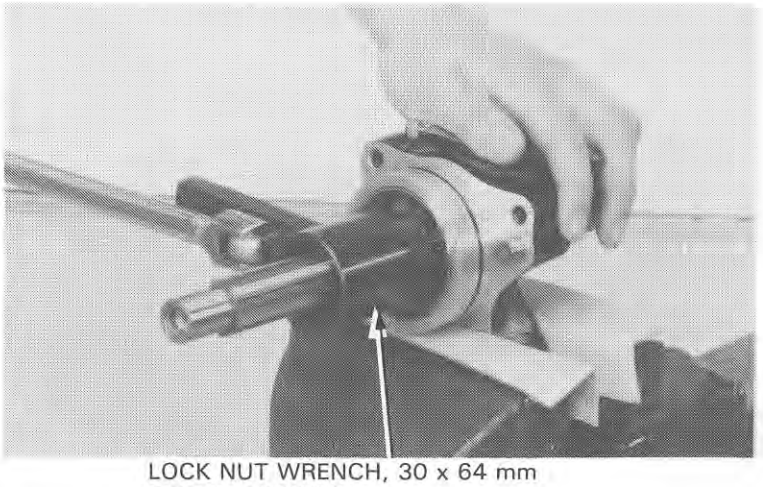
ATTACHMENT, 42 x 47 mm 07746—0010300
PILOT, 15 mm 07746—0040300

OUTPUT DRIVE GEAR DISASSEMBLY

Unstake the outer bearing 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.



Remove the outer bearing race lock nut and lock washer. Discard the lock nut.



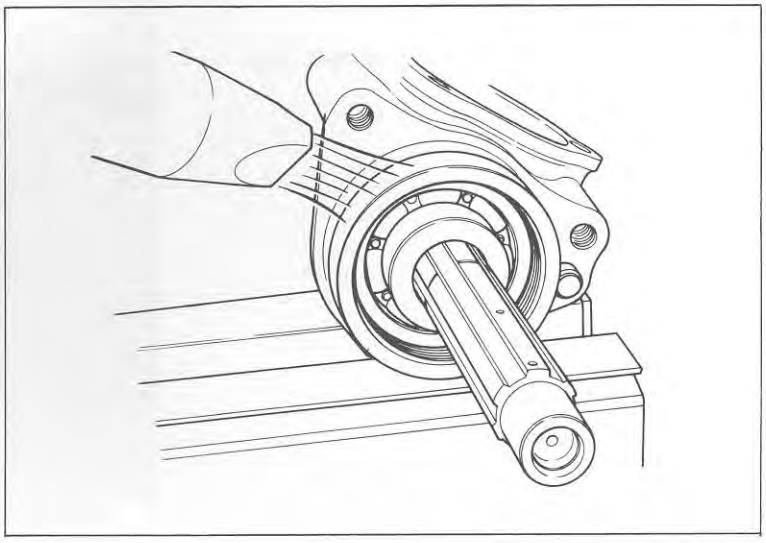
LOCK NUT WRENCH, 30 x 64 mm
07916—MB00000

Heat the output gear case around the drive shaft bearing to 80°C (176°F).

CAUTION

Always wear gloves when handling a heated gear case.

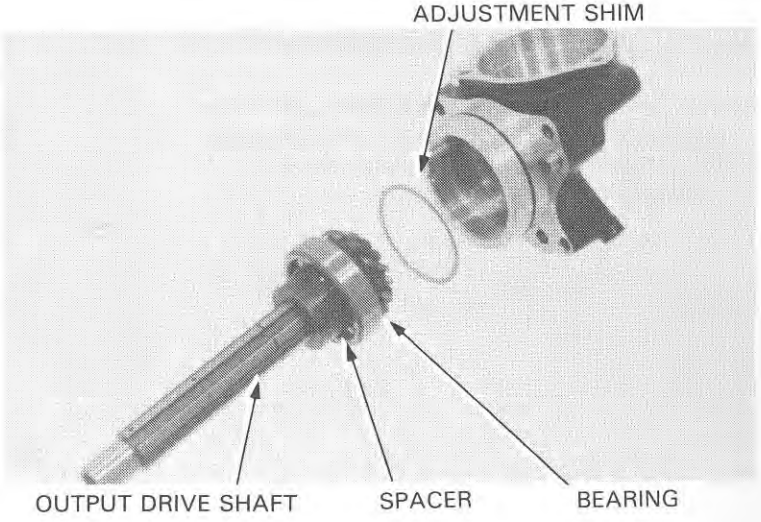
Remove the output drive gear.



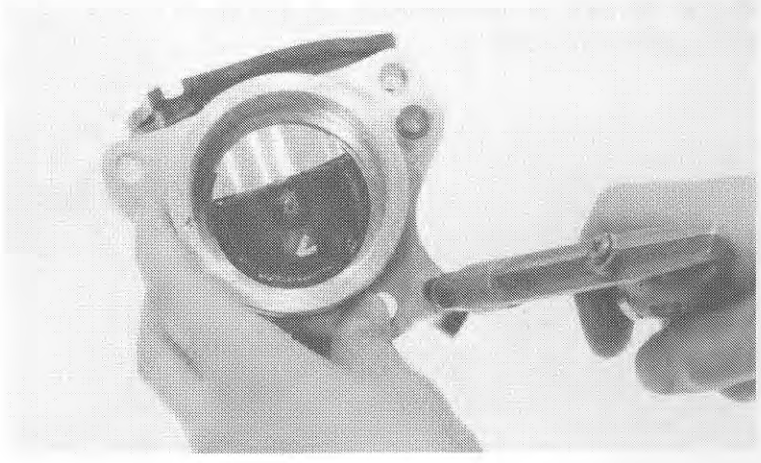
Remove the adjustment shim.

NOTE

Do not try to remove the drive shaft spacer and bearing.



Clean the output gear case in solvent and blow open the oil passage with compressed air.

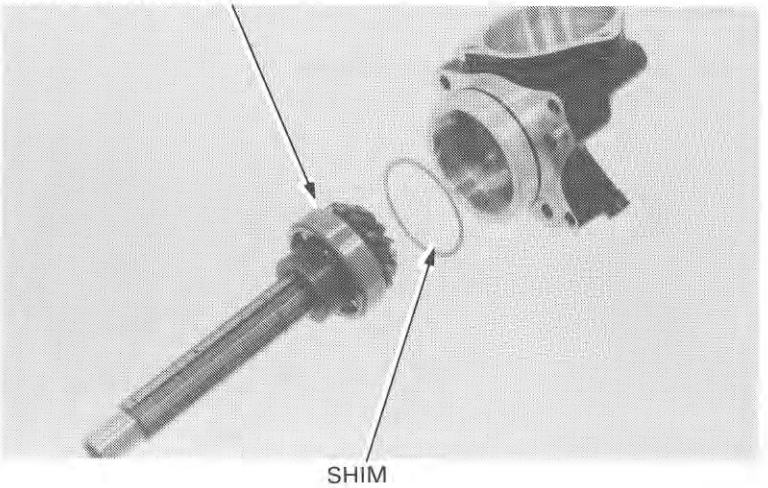


OUTPUT DRIVE GEAR ASSEMBLY

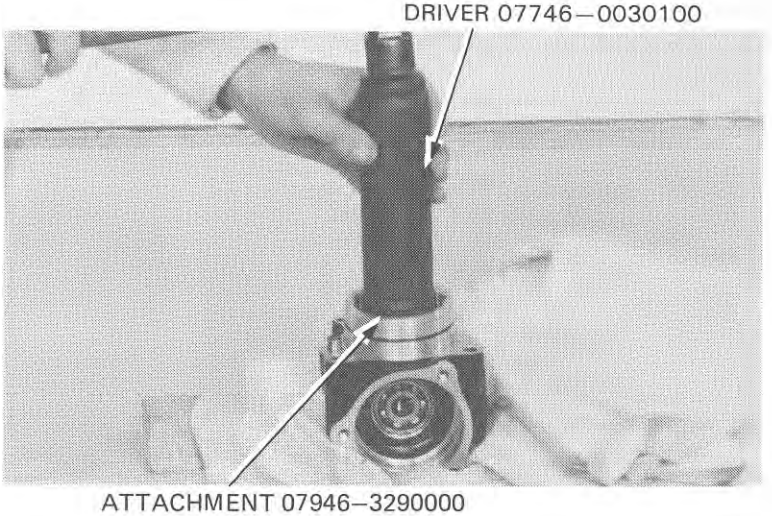
Place the shim and output drive gear into the case.

NOTE

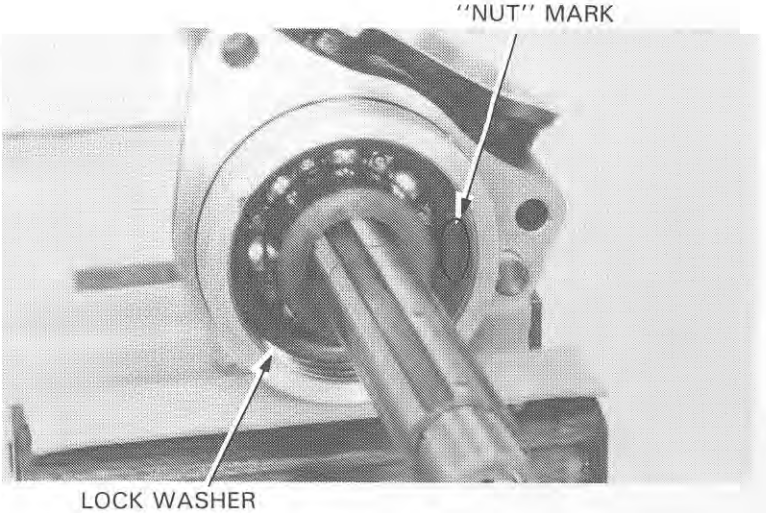
When the gear set, driven gear bearing holder, driven gear bearing and/or gear case has been replaced, use a shim of 1.00 mm (0.039 in) thickness for initial reference.



Drive the output drive gear into the case.

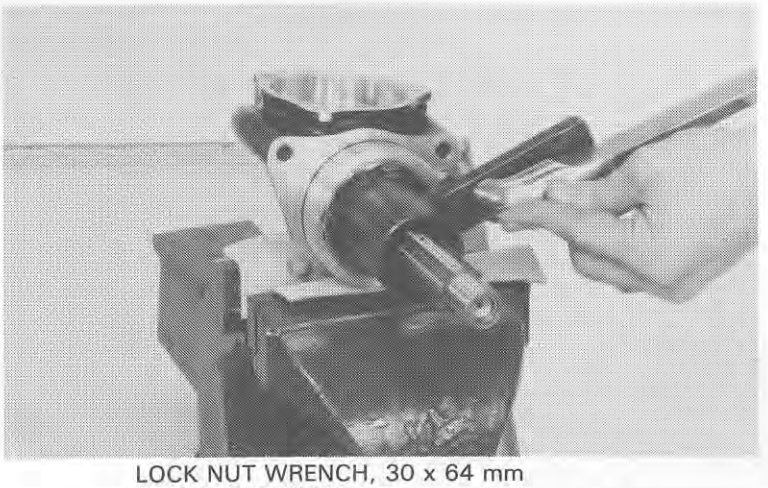


Install the lock washer with its "NUT" mark facing the nut.



Tighten the drive gear bearing outer race lock nut.

TORQUE: 90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)

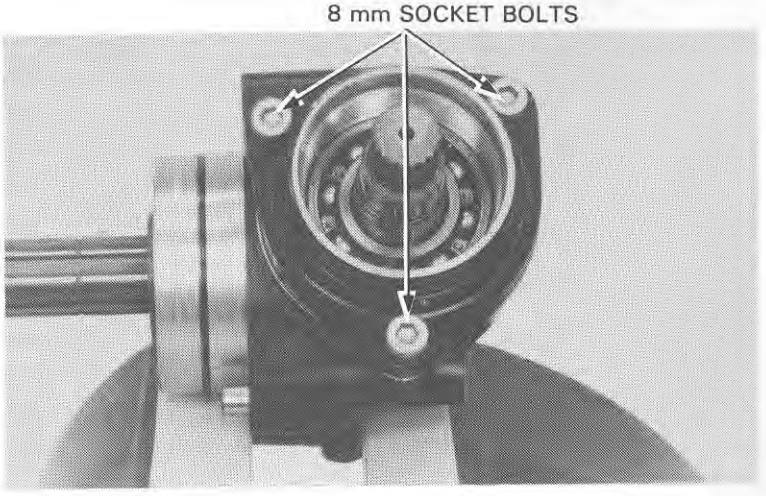


LOCK NUT WRENCH, 30 x 64 mm
07916–MB00000

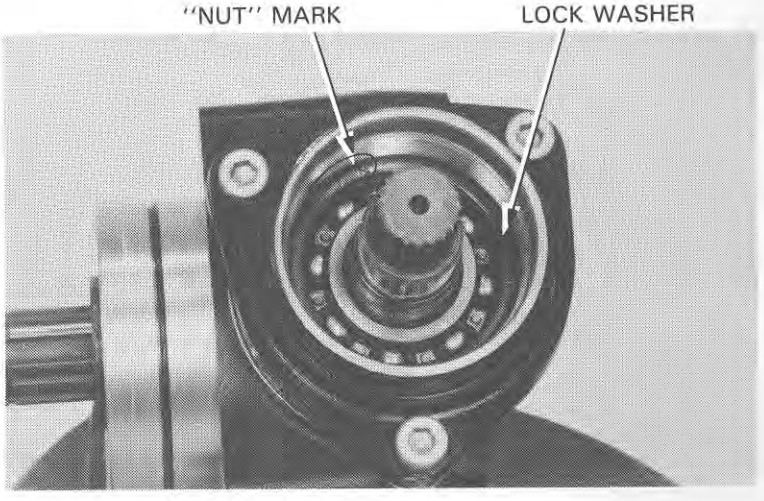
OUTPUT DRIVEN GEAR ASSEMBLY

Install the output driven gear bearing holder with the three 8 mm socket bolts.

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

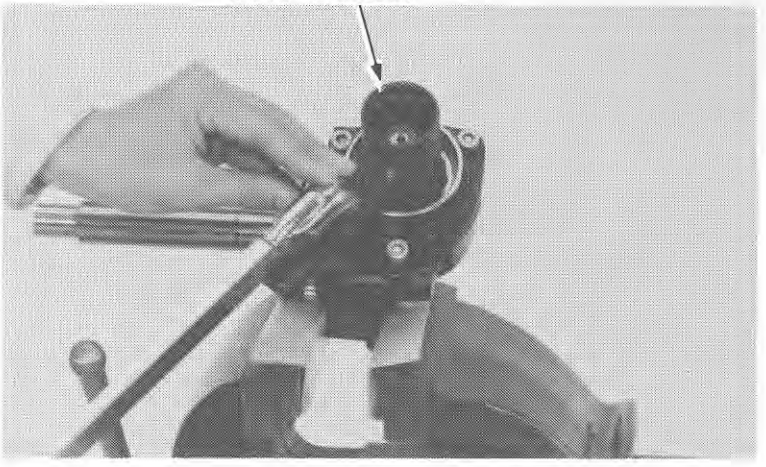


Install the lock washer with its "NUT" mark facing the nut.



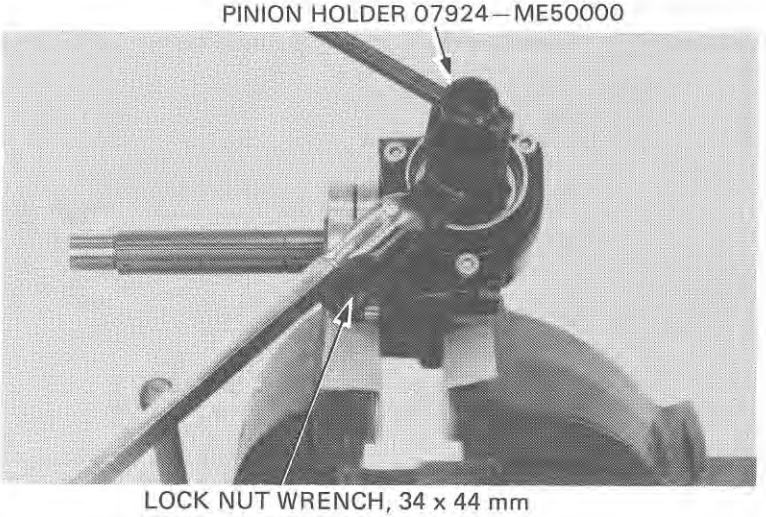
Tighten the driven gear bearing outer race lock nut.

TORQUE: 90–110 N·m
(9.0–11.0 kg-m, 65–80 ft-lb)



Hold the drive shaft with the shaft holder.
Tighten the driven gear bearing inner race lock nut.

TORQUE: 70–80 N·m
(7.0–8.0 kg-m, 51–58 ft-lb)

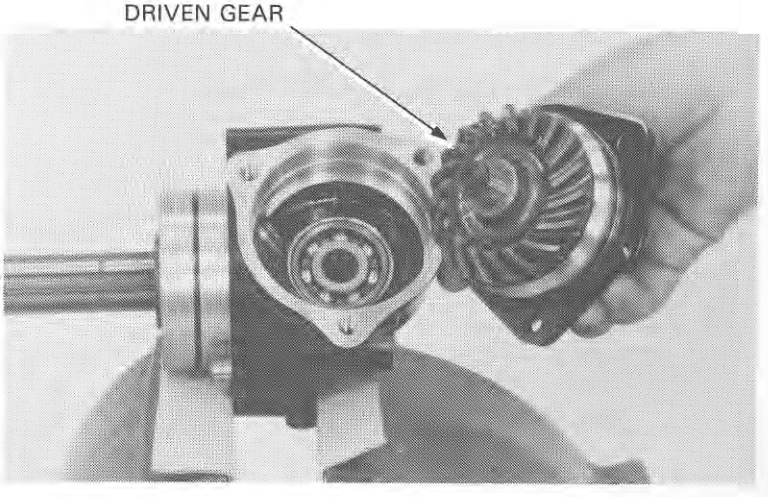


GEAR TOOTH CONTACT PATTERN CHECK

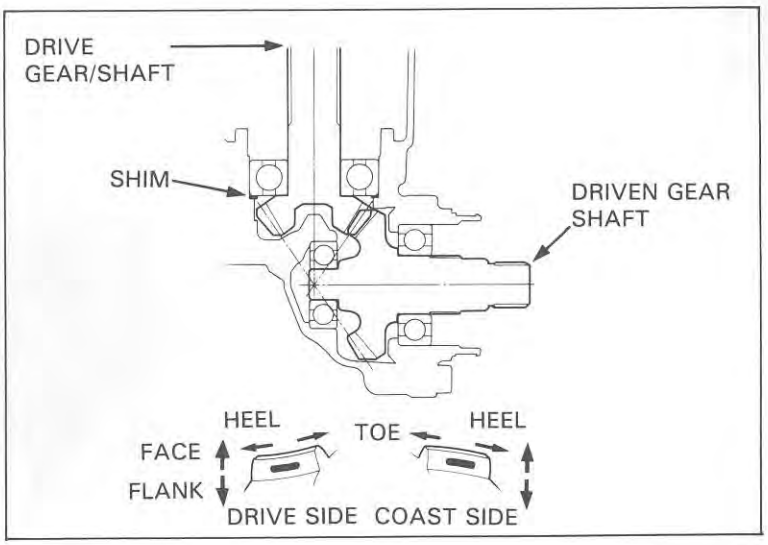
Remove the three 8 mm socket bolts attaching the driven gear holder and the driven gear assembly.

Apply Prussian Blue to the driven gear teeth.
Rotate the drive gear several times in both directions of rotation.

Check the gear tooth contact patern after removing the driven gear.

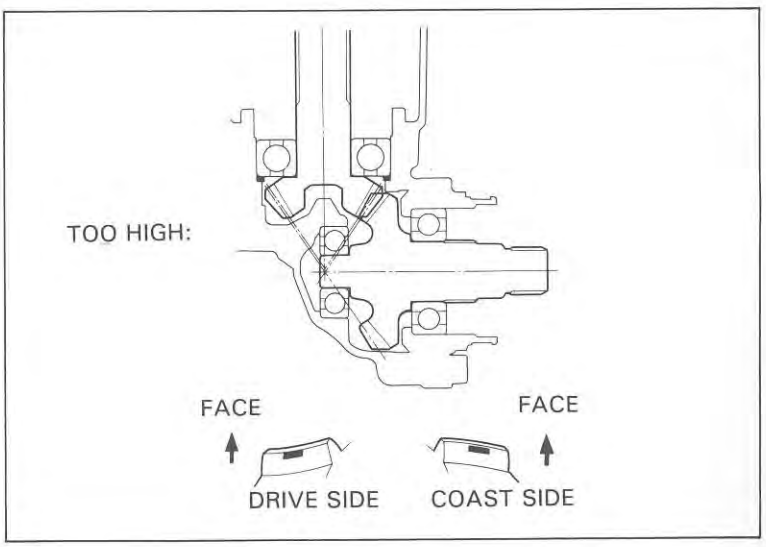


Contact is normal if Prussian Blue is transfered to the approximate center of each tooth and slightly to the side.



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

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



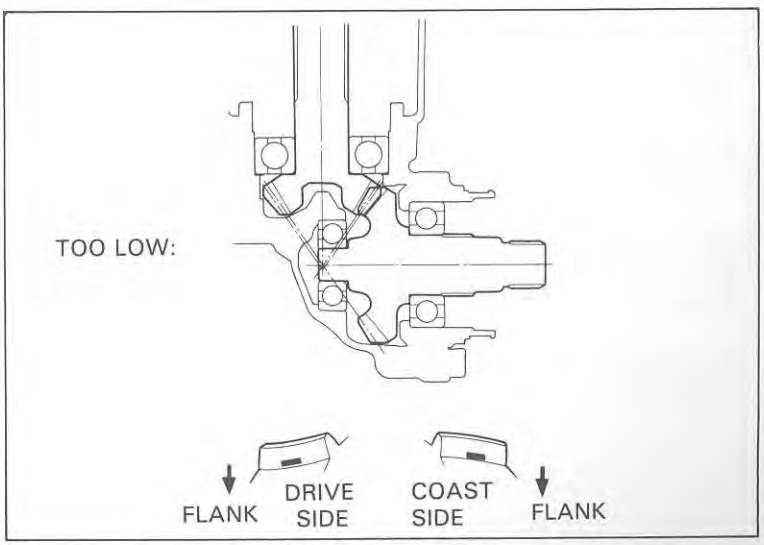
Replace the drive gear adjustment shim with a thicker one if the contact is too low.

The pattern will shift about 1.0 mm (0.04 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).

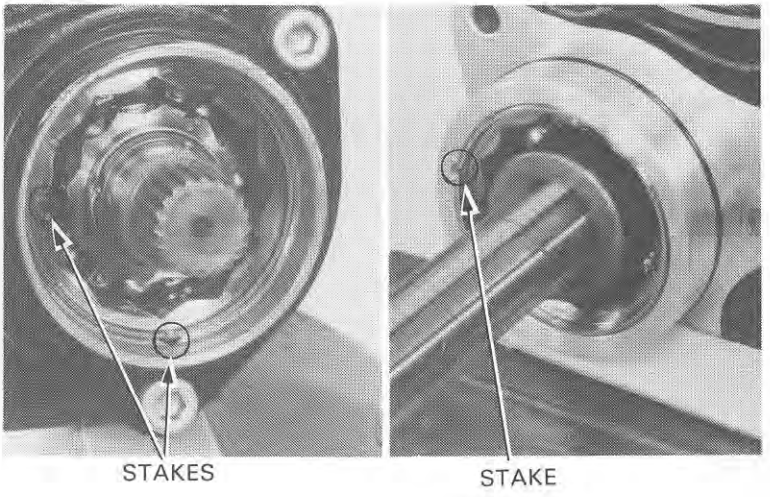
OUTPUT DRIVE GEAR ADJUSTMENT SHIM:

A:	**0.90 mm (0.035 in)**	
B:	**0.95 mm (0.037 in)**	
C:	**1.00 mm (0.039 in)**	**STANDARD**
D:	**1.05 mm (0.041 in)**	
E:	**1.10 mm (0.043 in)**	
F:	**1.15 mm (0.045 in)**	
G:	**1.20 mm (0.047 in)**	

Check the backlash (See page 10-17).



Stake the outer race and inner race lock nuts.



Install a new oil seal.

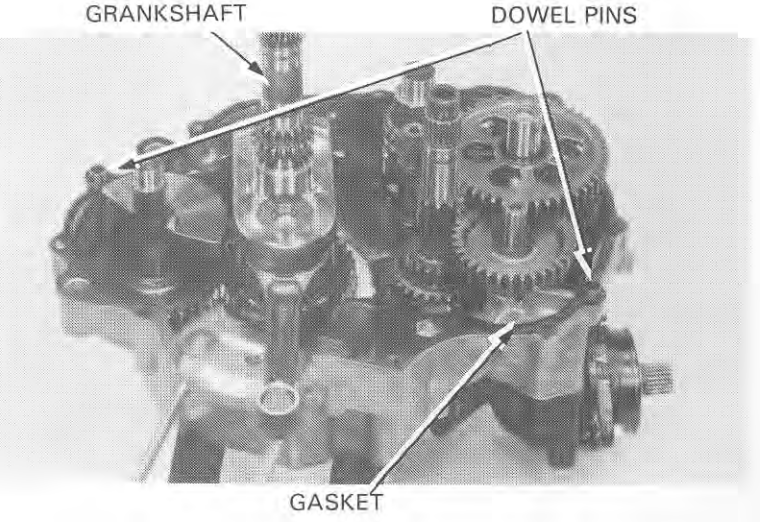
CRANKCASE ASSEMBLY

Install the dowel pins and new gasket.

Install the right crankcase onto the left crankcase.

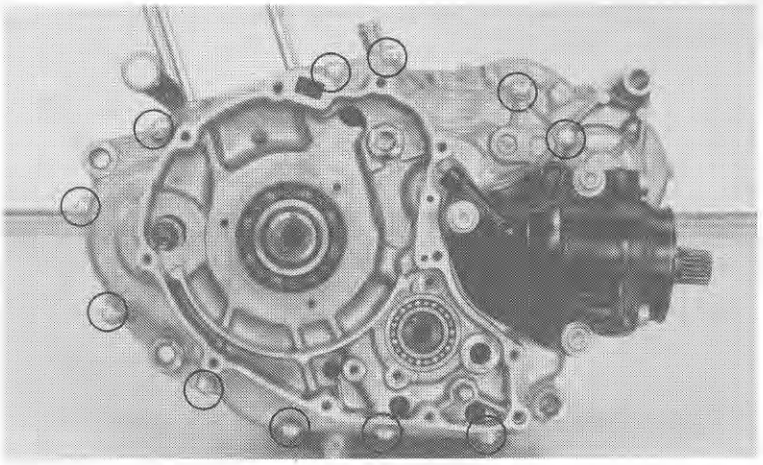
NOTE

Make sure that the gasket stays in place.

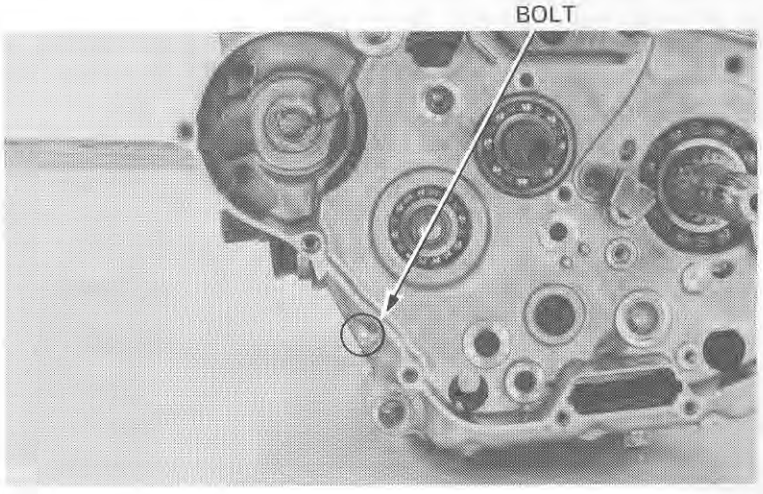


Tighten the left crankcase 6 mm bolts in a crisscross pattern.

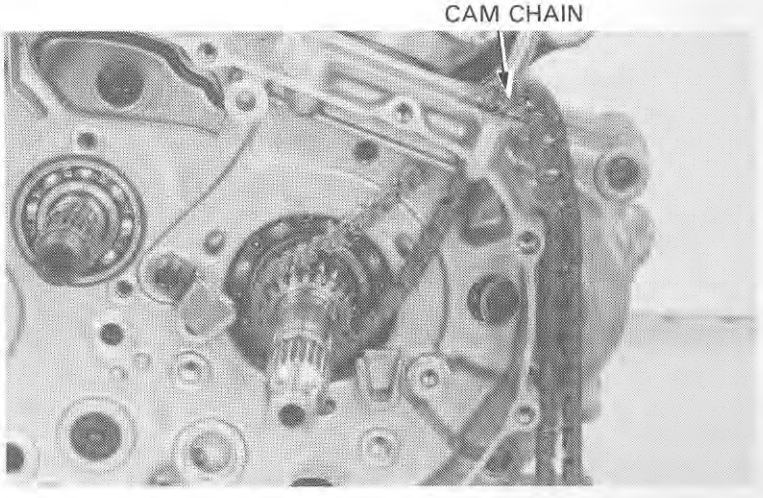
TORQUE: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)



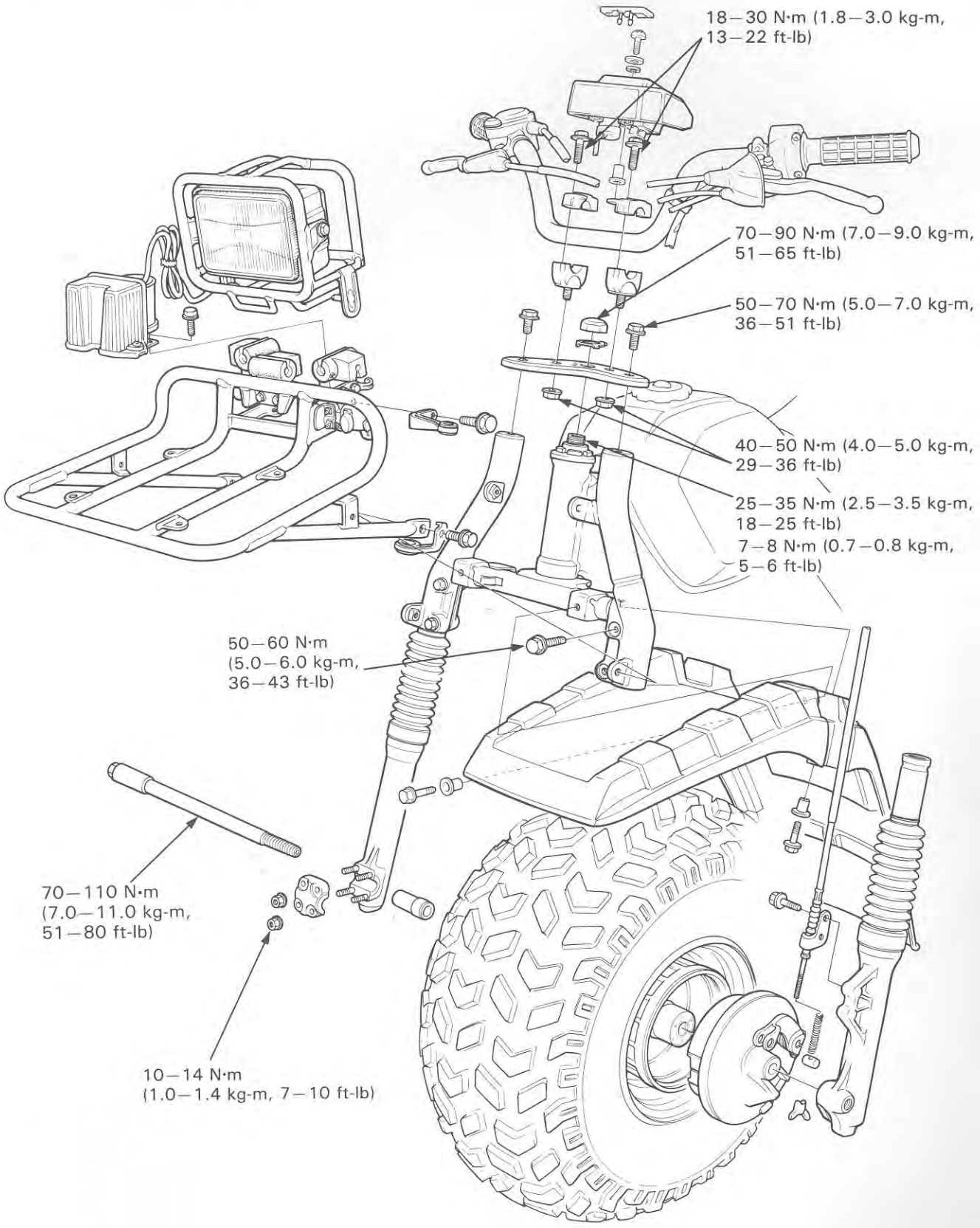
Tighten the right crankcase bolt to the same torque.



Install the cam chain.



MEMO


18—30 N·m (1.8—3.0 kg-m,
13—22 ft-lb)
70—90 N·m (7.0—9.0 kg-m,
51—65 ft-lb)
50—70 N·m (5.0—7.0 kg-m,
36—51 ft-lb)
40—50 N·m (4.0—5.0 kg-m,
29—36 ft-lb)
25—35 N·m (2.5—3.5 kg-m,
18—25 ft-lb)
7—8 N·m (0.7—0.8 kg-m,
5—6 ft-lb)
50—60 N·m
(5.0—6.0 kg-m,
36—43 ft-lb)
70—110 N·m
(7.0—11.0 kg-m,
51—80 ft-lb)
10—14 N·m
(1.0—1.4 kg-m, 7—10 ft-lb)

11. FRONT WHEEL/BRAKE/ SUSPENSION/STEERING

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the front wheel, front fork, front brake and steering system.
- A jack or other support is required to support the ATC.

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Front axle runout	———	0.5 mm (0.02 in)
Front brake drum I.D.	140 mm (5.5 in)	141 mm (5.6 in)
Front brake lining thickness	4 mm (0.2 in)	2 mm (0.1 in)
Front fork spring free length	303.6 mm (11.95 in)	297.5 mm (11.71 in)
Fork tube run out	———	0.20 mm (0.008 in)
Front fork oil capacity	110.5–115.5 cc (3.73–3.91 ozs)	———

TORQUE VALUES

Handlebar upper holder bolt	18—30 N·m (1.8—3.0 kg-m, 13—22 ft-lb)
Handlebar lower holder nut	40—50 N·m (4.0—5.0 kg-m, 29—36 ft-lb)
Fork bridge bolt	50—70 N·m (5.0—7.0 kg-m, 36—51 ft-lb)
Steering stem nut	70—90 N·m (7.0—9.0 kg-m, 51—65 ft-lb)
Steering bearing adjustment nut (Initial)	25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)
(Final)	7—8 N·m (0.7—0.8 kg-m, 5—6 ft-lb)
Front wheel nut	50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)
	after '85: 60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)
Front axle	70—110 N·m (7.0—11.0 kg-m, 51—80 ft-lb)
Front axle holder nuts	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
Front fork pinch bolt	50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)
Front fork socket bolt	18—25 N·m (1.5—2.5 kg-m, 11—18 ft-lb)

TOOLS

Special	
Fork seal driver	07747–0010100 or 07947–3330000
Attachment	07747–0010501 or 07947–3330000
Attachment	07946–3290000
Ball race remover	07953–3330000
Steering stem socket	07916–3710100
Steering stem driver	07946–4300101 or 07946–MB00000 and attachment GN-MT-54 (U.S.A. only)
Universal bead breaker	GN-AH-958-BB1 (U.S.A. only)
Hex wrench, 6 mm	07917–3230000 or commercially available in U.S.A.
Common	
Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 15 mm	07746–0040300
Lock nut wrench, 30 x 32 mm	07716–0020400
Extension bar	07716–0020500 or commercially available in U.S.A.
Tire breaker set	07772–0050000
Breaker arm compressor	07772–0050100
Breaker arm	07772–0050200

TROUBLESHOOTING

Hard steering
1. Steering stem nut too tight
2. Faulty steering stem bearings
3. Damaged steering stem ball race or cone race
4. Insufficient tire pressure
5. Steering bearing adjustment nut too tight

Steers to one side or does not track straight
1. Bent front forks
2. Bent front axle, wheel installed incorrectly

Front wheel wobbling
1. Bent rim
2. Worn front wheel bearing
3. Faulty tire
4. Axle not tightened properly

Improper brake performance
1. Incorrect adjustment of lever
2. Brake shoes worn
3. Brake shoes contaminated
4. Brake cam worn
5. Brake drum worn
6. Brake arm serrations improperly engaged
7. Brake shoes worn at cam contact area

Soft suspension
1. Weak fork spring
2. Insufficient fluid in forks

Hard suspension
1. Incorrect fluid weight in forks
2. Bent fork tubes
3. Clogged fluid passage

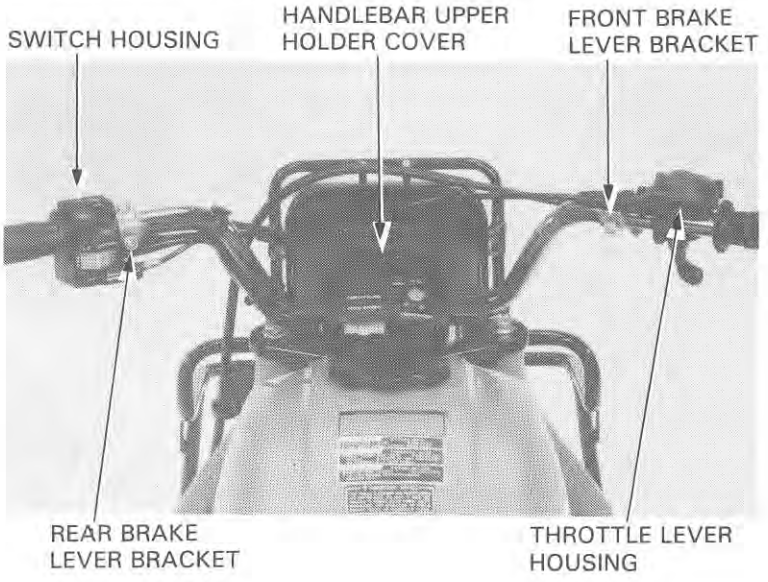
Front suspension noise
1. Loose fork fasteners
2. Insufficient fluid in forks
3. Worn slider bushing.

HANDLEBAR

REMOVAL

Remove the following:
- wire bands.
- front and rear brake lever brackets.
- throttle lever housing.
- switch housing.

- handlebar upper holder cover cap.
- handlebar upper holder cover by removing the two screws.
- handlebar upper holders and the handlebar.



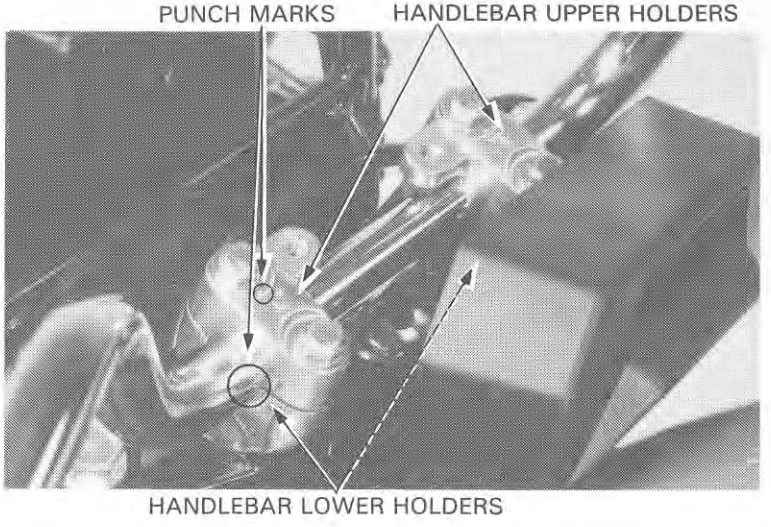
INSTALLATION

Place the handlebar on the lower holders.

Align the punch mark on the handlebar with the top of the lower holders.

Install the upper holders on the handlebar with their punch marks forward.
Tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 18–30 N·m
(1.8–3.0 kg-m, 13–22 ft-lb)

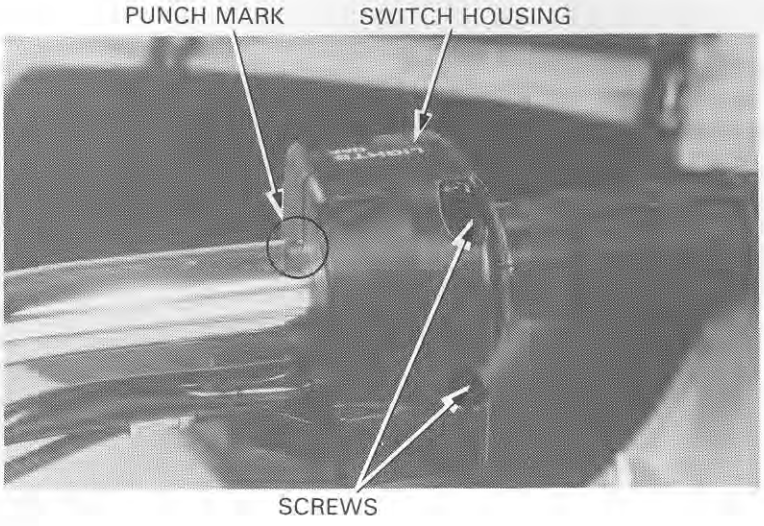


Install the upper holder cover and tighten it with the two screws.

Install the upper holder cover cap.

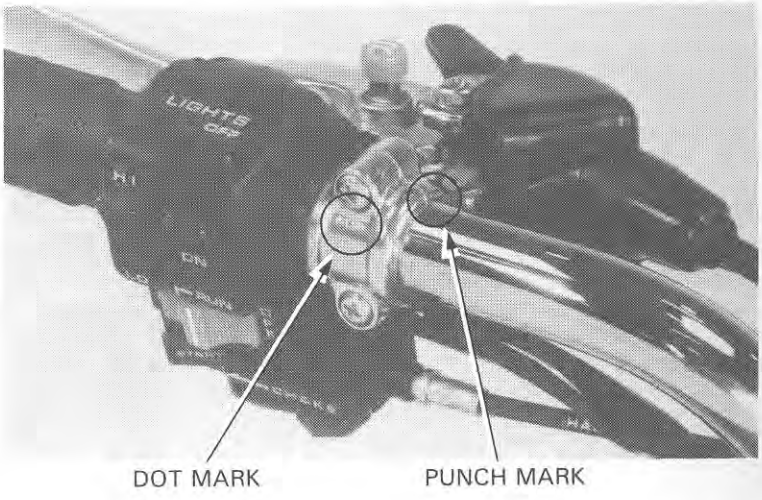
Install the switch housing onto the handlebar aligning its mating surfaces with the punch mark on the handlebar.

Tighten the upper screw first, then tighten the lower screw.



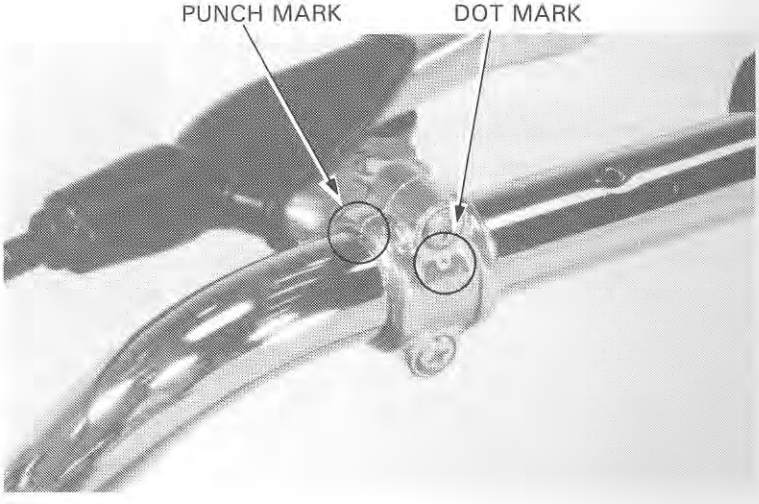
Install the rear brake lever bracket with the dot mark on the holder facing up. Align the end of the holder with the punch mark on the handlebar.

Tighten the upper screw first, then the lower screw.



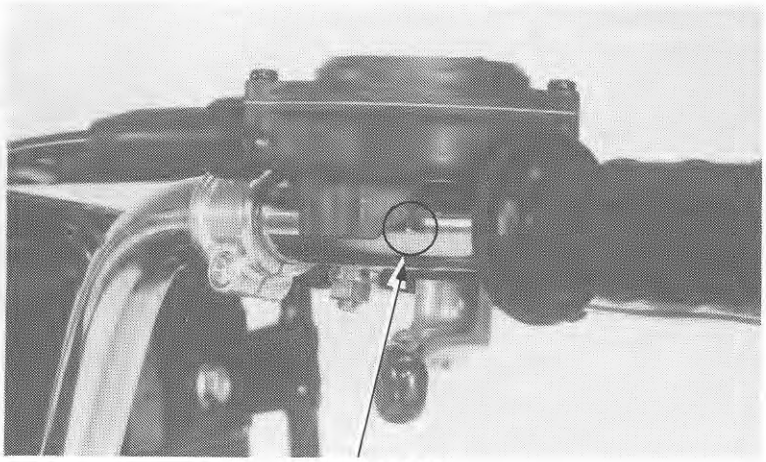
Install the front brake lever bracket with the dot mark on the holder facing up. Align the end of the holder with the handlebar punch mark.

Tighten the upper screw first, then the lower screw.



Install the throttle housing onto the handlebar.

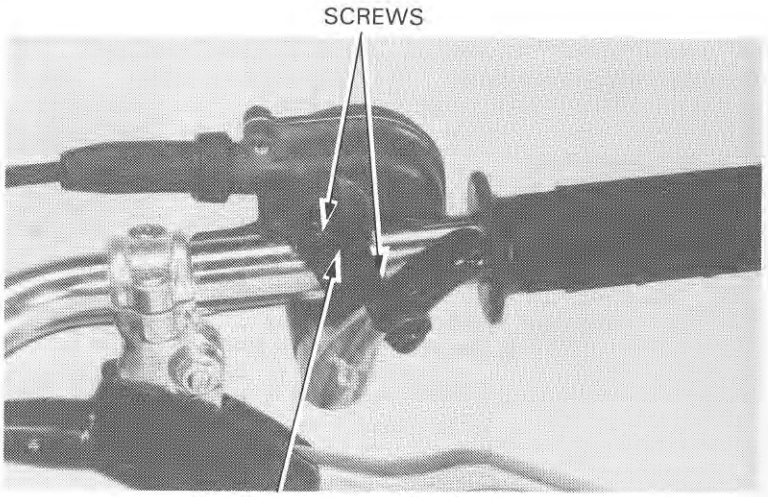
Align the end of the housing with the punch mark on the handlebar.



PUNCH MARK

Install the throttle housing holder and screws.

Tighten the forward screw first, then the rear screw.



THROTTLE HOUSING HOLDER

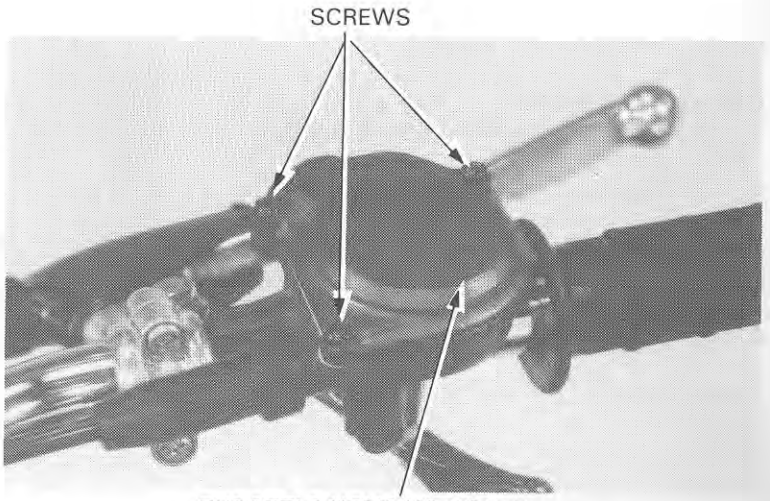
THROTTLE HOUSING

DISASSEMBLY

NOTE

> Do not dis/connect the throttle cable using a tool such as a pair of radio pliers without removing the throttle arm. Damage to the wire occurs if it is bent.

Remove the three throttle housing cover screws and the cover.
Remove the gasket.



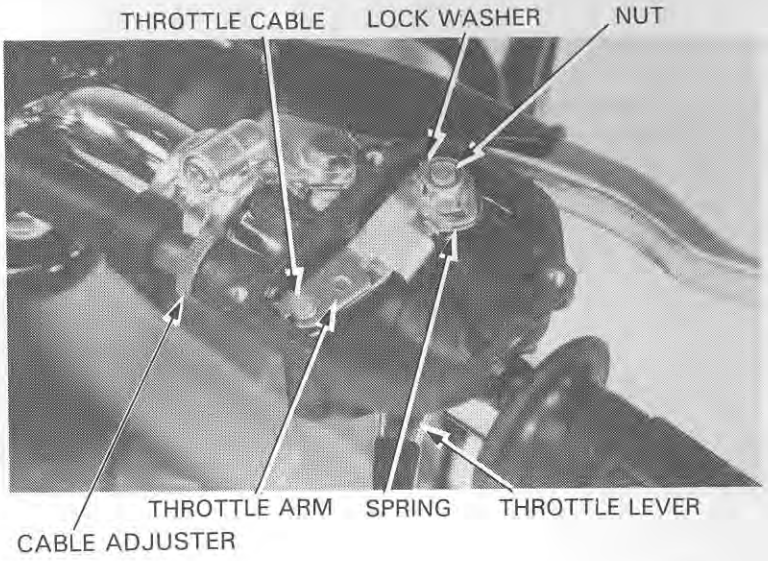
THROTTLE HOUSING COVER

Slide the rubber boot off the cable adjuster.
Loosen the throttle cable adjuster.

Bend down the lock washer tab and remove the nut and lock washer.

Disconnect the throttle cable from the throttle arm.

Remove the throttle arm, spring and throttle lever from the throttle housing.



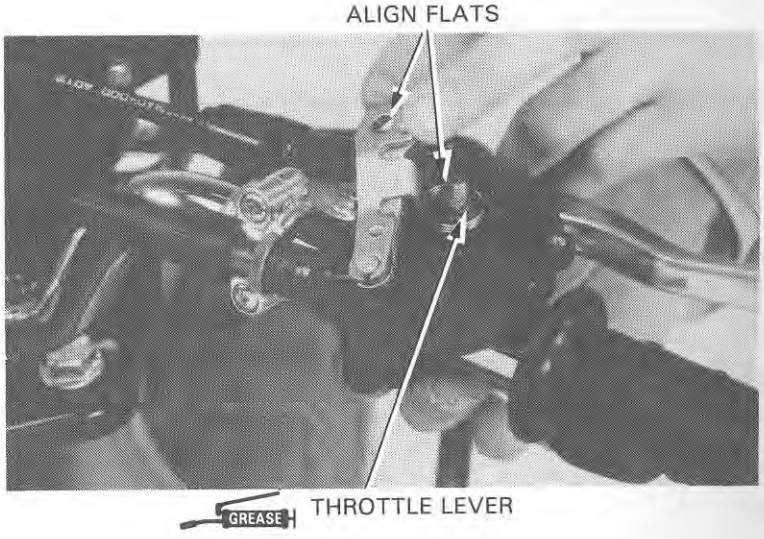
ASSEMBLY

Connect the throttle cable to the throttle arm.
Install a new gasket and the throttle housing cover using the three screws.

Install the throttle arm spring and arm onto the throttle lever aligning their flats.

NOTE

Take care of the throttle arm spring not to bind and check for it.



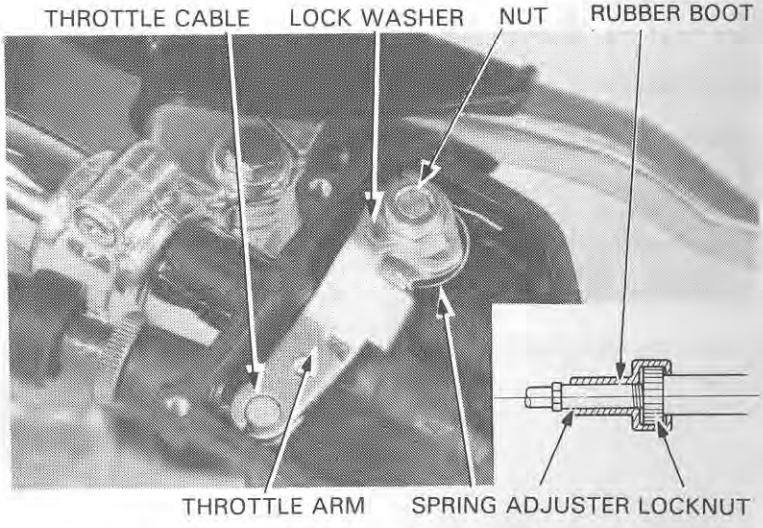
Install a new lock washer and nut.

TORQUE: 3–4 N·m
(0.3–0.4 kg-cm, 2.2–2.9 ft-lb)

Bend up the lock washer tab against the nut.

Securely set the rubber boot till it bottoms as to cover the lock nut. If the rubber boot is set improperly, water might leak into the throttle housing.

Adjust throttle lever free play (page 3-8).

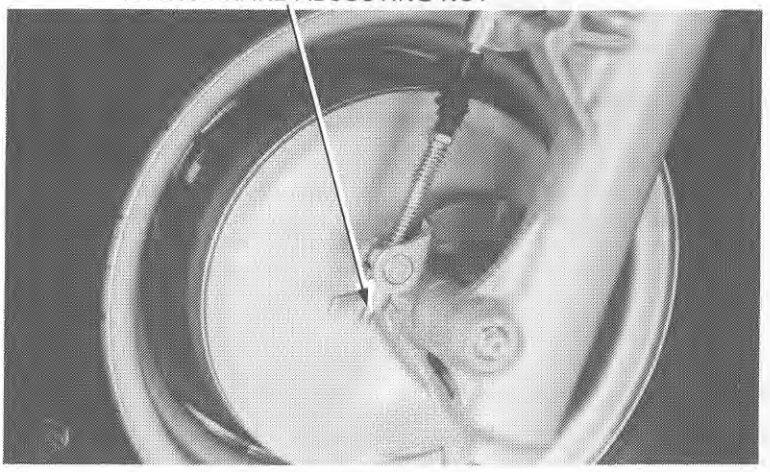


FRONT WHEEL

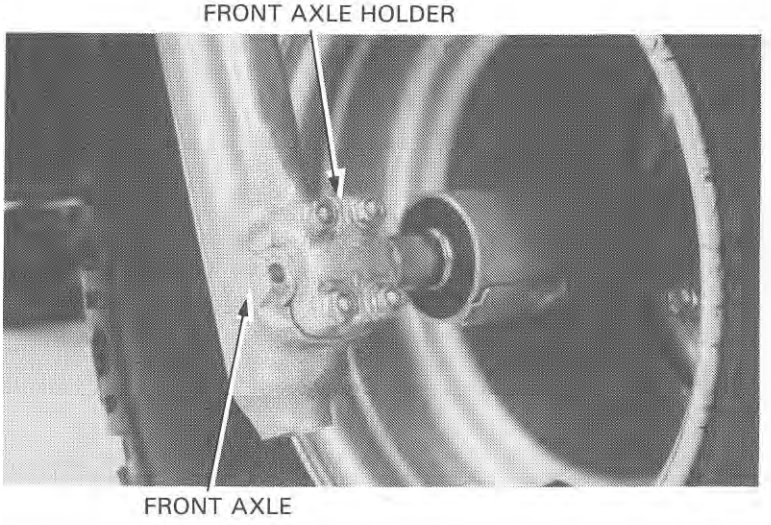
FRONT WHEEL REMOVAL

Raise the front wheel off the ground by placing a block or work stand under the engine.

Remove the front brake adjusting nut and disconnect the front brake cable.



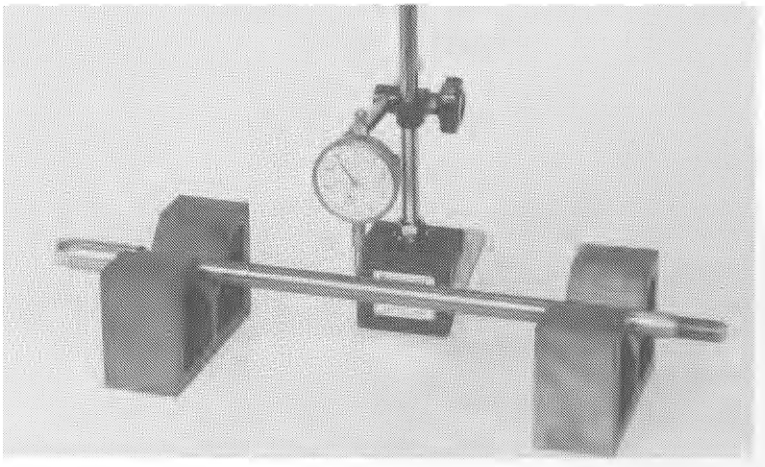
Loosen the axle holder nuts and unthread the front axle.



FRONT AXLE INSPECTION

Set the axle in V-blocks, rotate and measure the runout.

SERVICE LIMIT: 0.5 mm (0.02 in)



BEARING INSPECTION

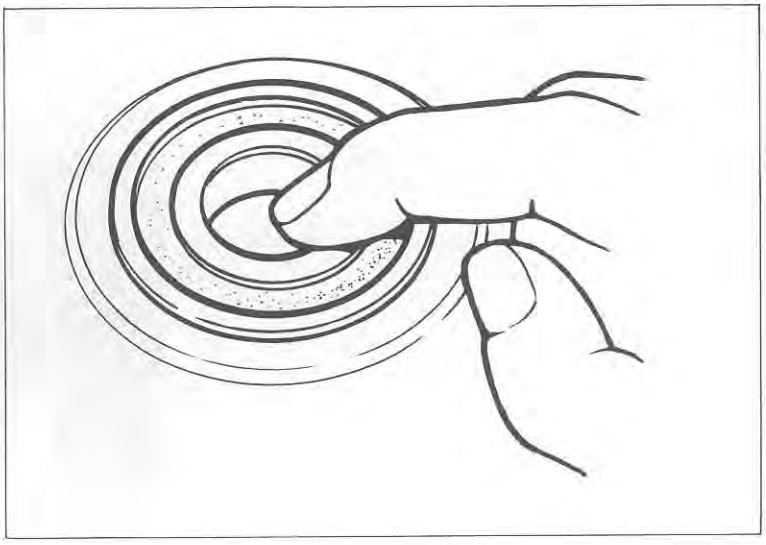
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE:

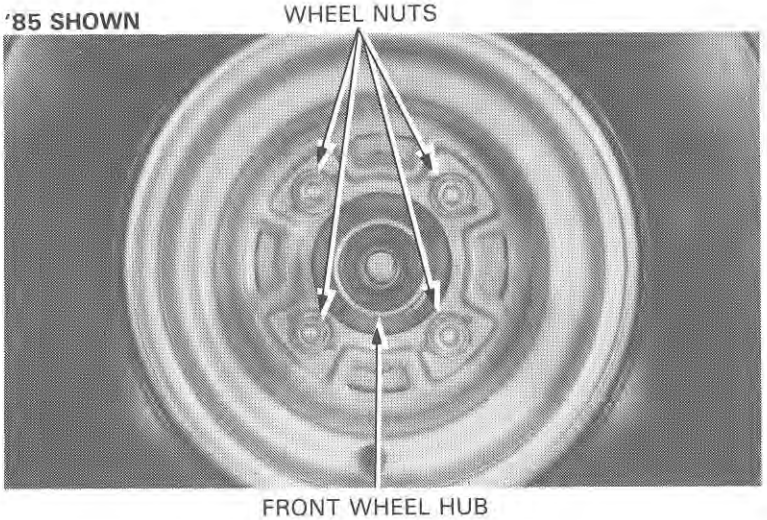
Replace hub bearings in pairs.

For replacement to bearings, see page 11-9 and 11-15.

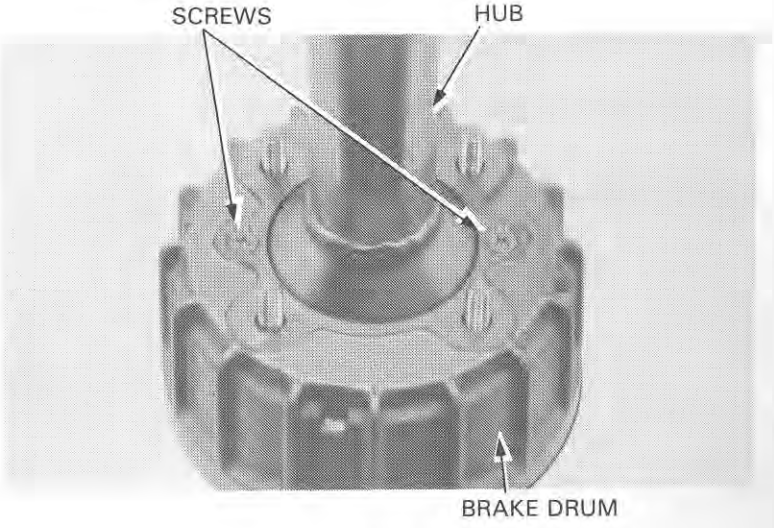


FRONT WHEEL DISASSEMBLY

Remove the front wheel nuts and hub.

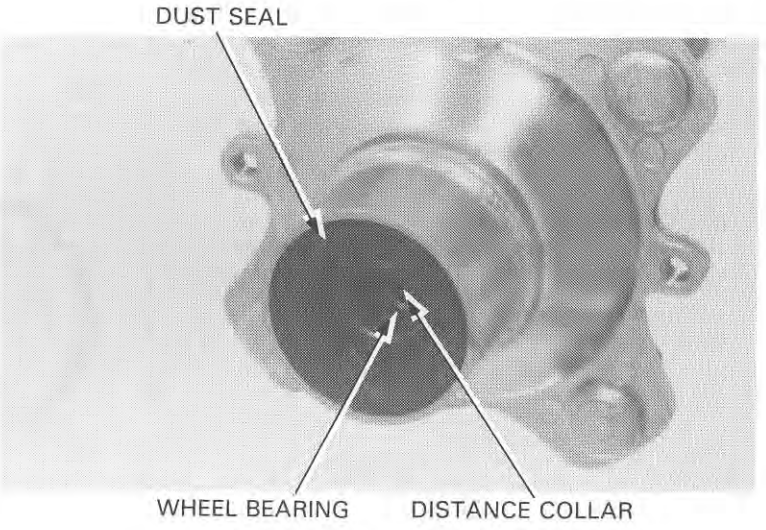


Remove the two screws attaching the brake drum to the wheel hub and the drum from the hub.



Remove the dust seals and spacer from the wheel hub.

Remove the bearings from the hub using commercially available bearing drivers/removers.



TIRE REMOVAL (U.S.A. ONLY)

NOTE

This service requires the Universal Bear Breaker (GN-AH-958-BB1) available in U.S.A. only.

Remove the core from the valve stem.

NOTE

Remove and install tires from the rim side opposite the valve stem.

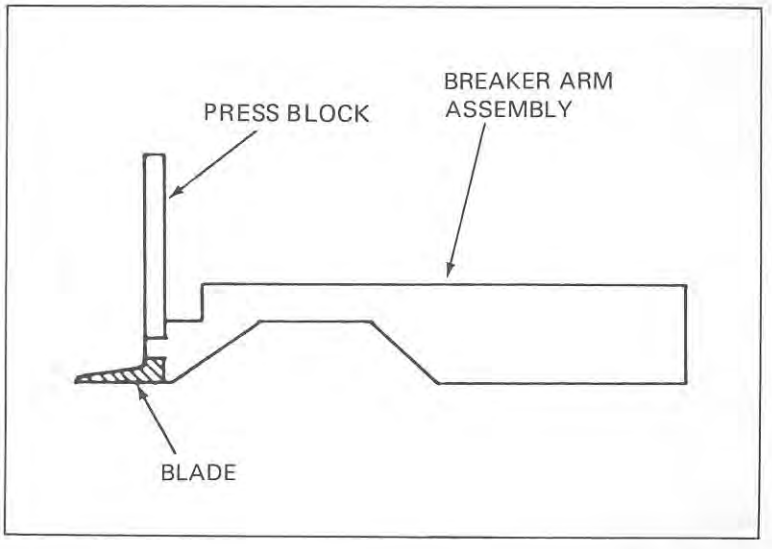
CAUTION

- *Use of the Bead Breaker tool is required for tire removal.*
- *Do not damage the bead seating area of the rin.*
- *Use a Coats 220 Tire Changer or equivalent to remove the tire from the rim. If a tire changer is not available, rim protectors and tire irons may be used.*

Install the blade for 9''/11'' rims onto the breaker arm assembly.

CAUTION

Use of an improper size blade may result in damage to the rim, tire or blade.



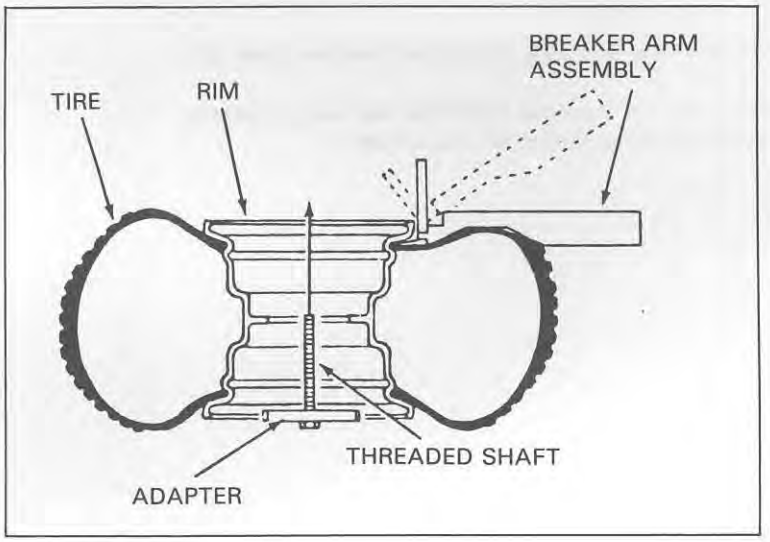
Place the proper size adapter onto the threaded shaft and then put the wheel over the threaded shaft and adapter.

Lube the bead area with rubber lubricant, pressing down on the tire sidewall/bead area in several places, to allow the lubricant to run into and around the bead, Also lube the area where the breaker arm will contact the sidewall or the tire.

While holding the breaker arm assembly at an approximate 45° position, insert the blade of the breaker arm between the tire and rim. Push the breaker arm inward and downward until it is in the horizontal position with its press block in contact with the rim.

NOTE

It may be necessary to tap the breaker arm with a brass hammer to install it the last 3 mm. While doing so, be sure to hold the arm down in the horizontal position.

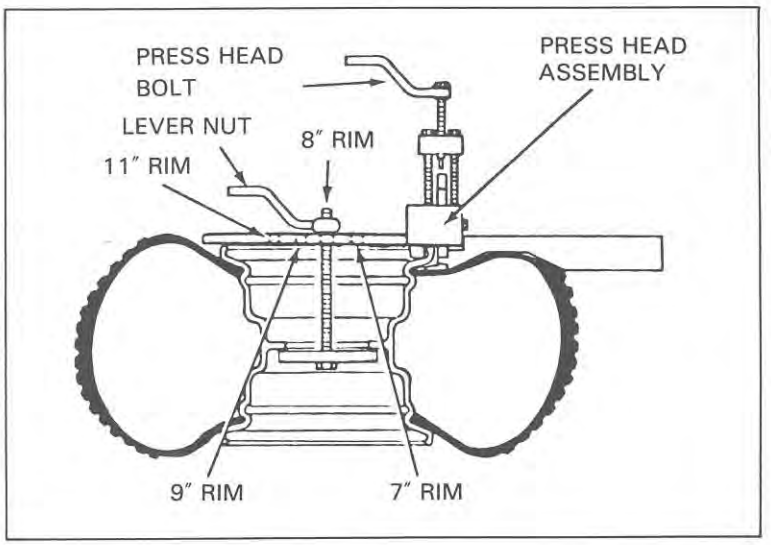


With the breaker arm in the horizontal position, place the breaker press head assembly over the breaker arm press block. Make sure the press head bolt is backed out all the way and then position the nylon buttons on the press head against the inside edge of the rim.

Insert the threaded shaft through the appropriate hole in the breaker press head assembly and then tighten the lever nut until both ends of the breaker press head assembly are in firm contact with the rim.

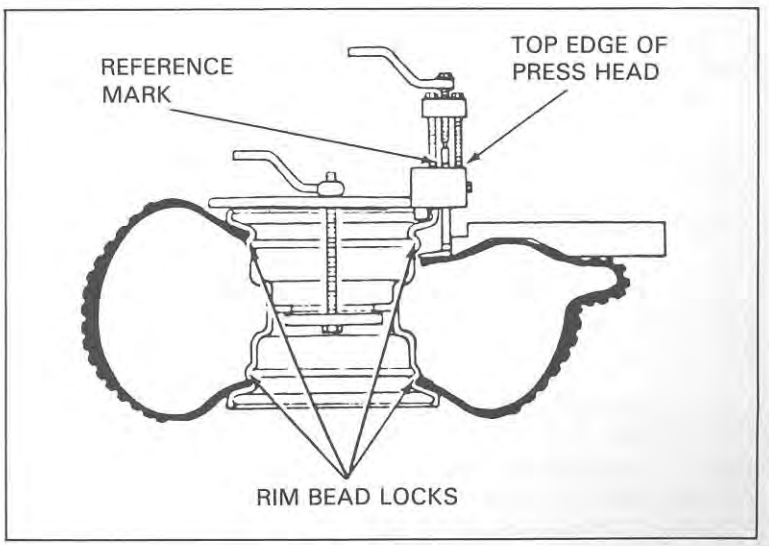
NOTE

Insert bolts throught the holes in the rim hub mounting tabs and the adapter to position the adapter properly.



Tighten the press head bolt until the reference mark on the press block is aligned with the top edge of the press head.

If the rest of the bead cannot be pushed down into the center of the rim by hand, loosen the press head bolt and the lever nut. Rotate the breaker arm assembly and breaker press head assembly 1/8 to 1/4 the circumference of the rim. Tighten the lever nut and then tighten the press head bolt as described.
Repeat this procedure as necessary until the remainder of the bead can be pushed down into the center of the rim.



Assemble the Universal Bead Breaker on the other side of the wheel and break the bead following the same procedures.

Remove the tire from the rim using a tire changer machine or tire irons and rim protectors.

TIRE REMOVAL (EXCEPT U.S.A.)

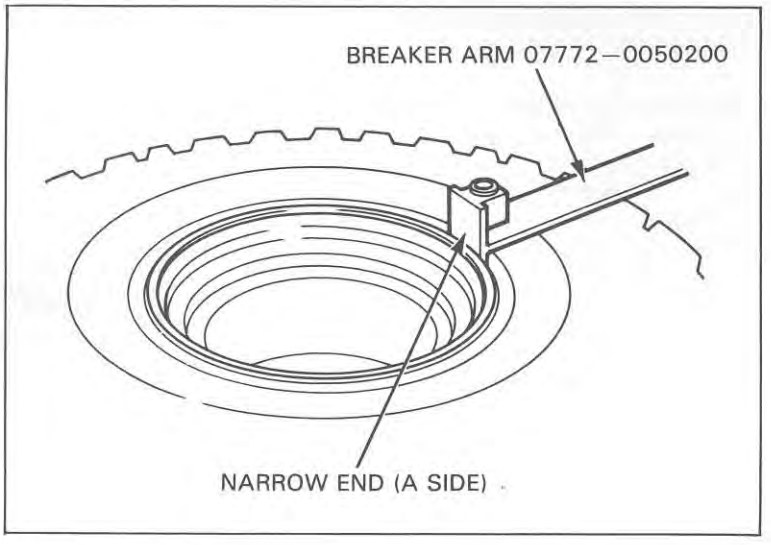
NOTE

This service requires the Tire Bead Breaker Set (07772—0050000).

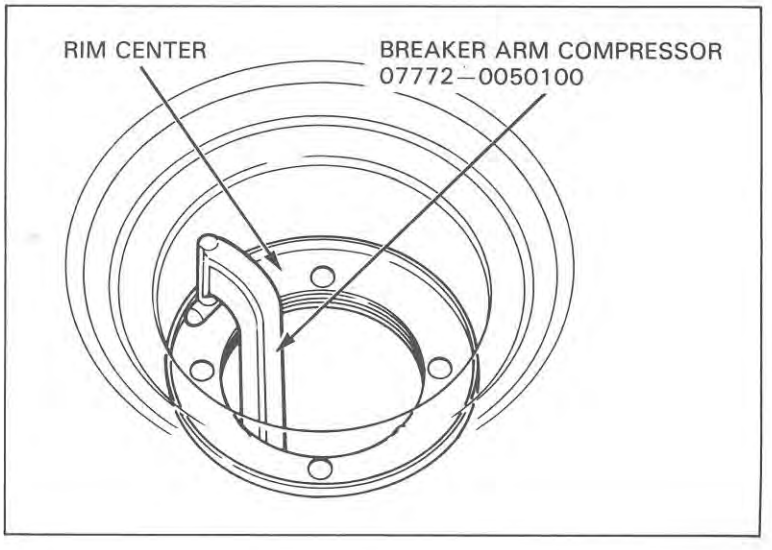
CAUTION

- *Do not apply water, soap water, oil etc. to the tire, rim and tool when removing the tire. The tool breaker arm may slip off the tire and the bead can not be broken off the tire.*
- *Do not damage the bead seating area of the rim.*
- *Follow the breaker manufacturer's instructions.*

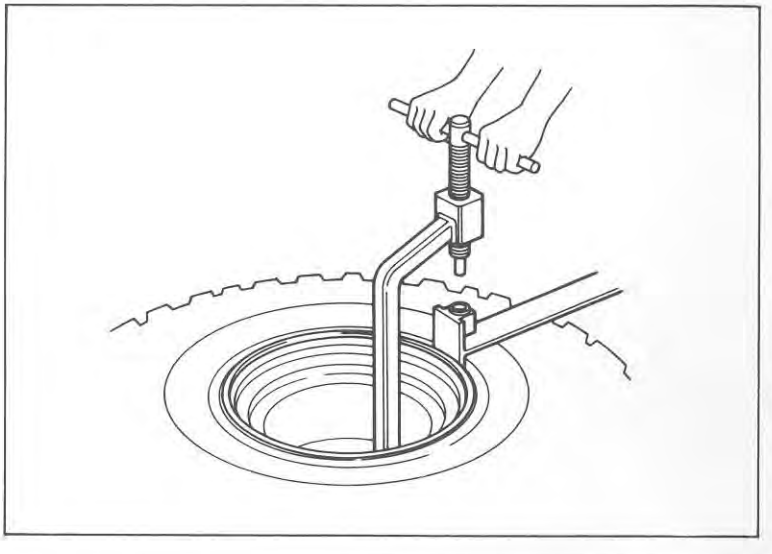
Insert the narrow end (A side) of the breaker arm between the tire and the rim.



Position the breaker arm compressor onto the rim center as shown.

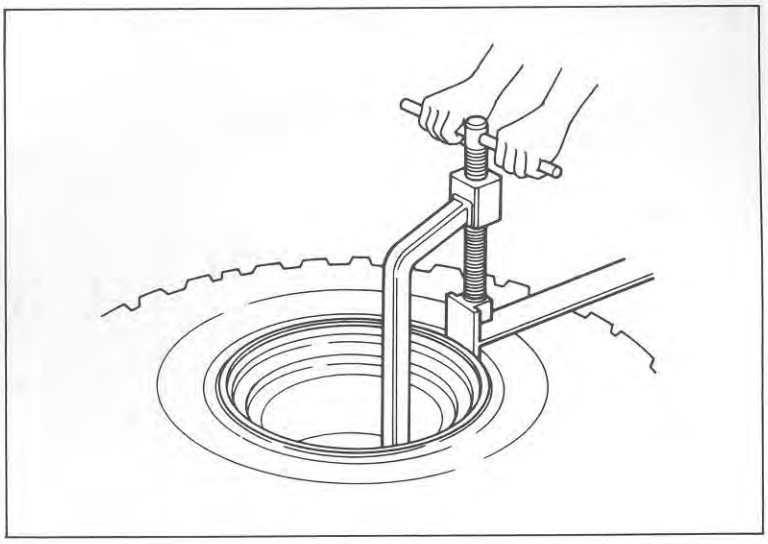


Keep the breaker arm horizontally and align the end of the compressor bolt with the arm hole.

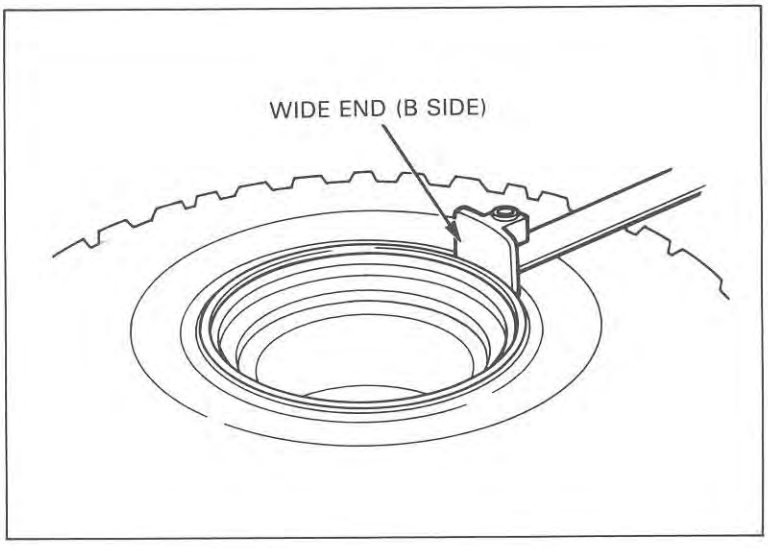


Screw in the breaker arm compressor bolt to break the bead from the tire.

If the rest of the bead cannot be pushed down into the center of the rim, remove and reposition the compressor and arm 1/8 to 1/4 the circumference of the rim. Tighten the compressor bolt to break the bead. Repeat this procedure as necessary until the remainder of the bead can be pushed down into the center of the rim.

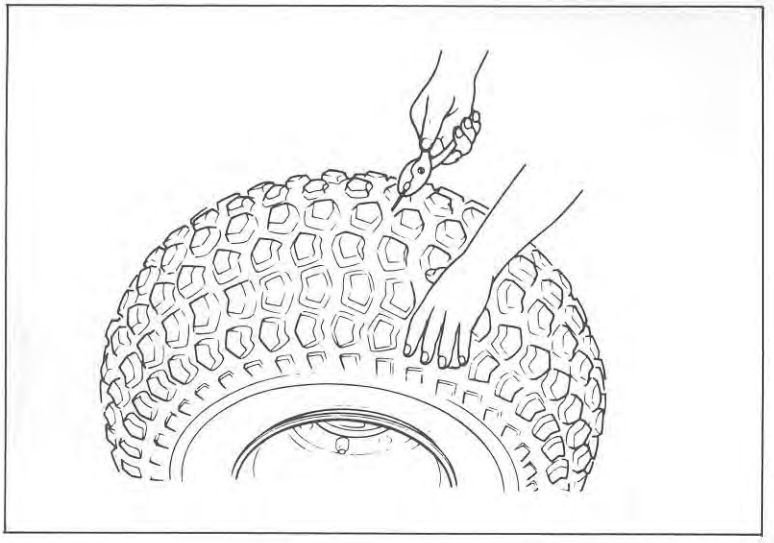


If the bead breaking is dificult with the narrow end (A side) of the breaker arm, use the wide end (B side) of the arm and repeat the procedure above.

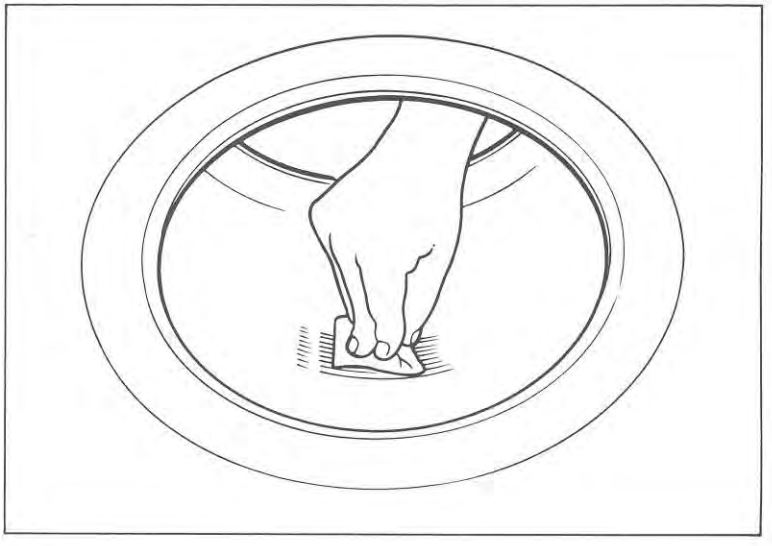


TIRE REPAIR (WITH COLD PATCH)

Check the tire tread for puncturing objects.
Chalk mark the punctured area and remove the puncturing object.



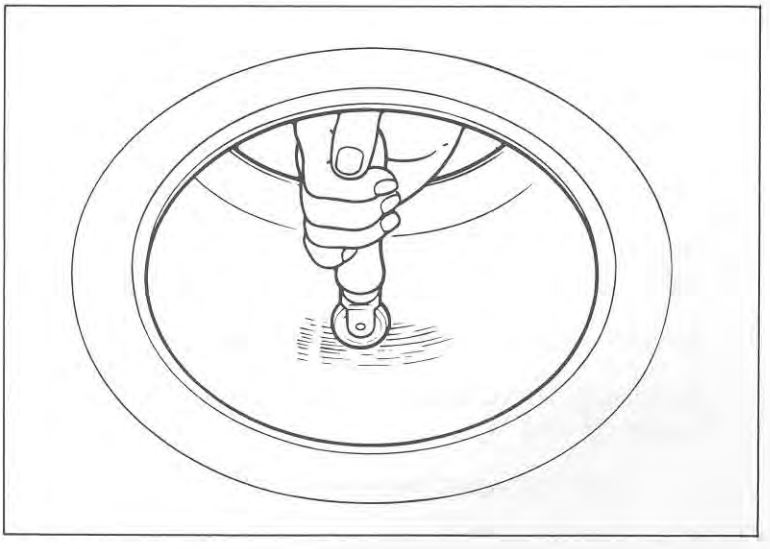
Clean and roughen the punctured area inside the tire with a tire rubber cleaner or a wire brush. Clean the area with non-flammable solvent.



Apply rubber cement around the torn area and allow it to dry. Remove the lining from the patch and center it over the injury. Press the patch against the injury using a special roller.

NOTE

- Allow cement to dry until tacky before applying patch.
- Do not touch cement surfac with dirty or greasy hands.



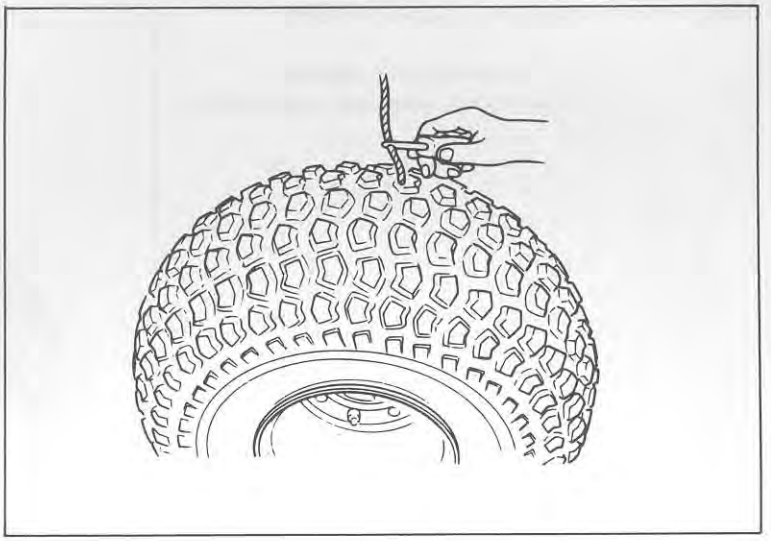
TIRE REPAIR (WITH RUBBER PLUG)

NOTE

> This method is an emergency repair only. Replace the plug at the first opportunity with a cold patch.

Remove the puncturing object.
Insert a rubber plug through the eye of an inserting needle.

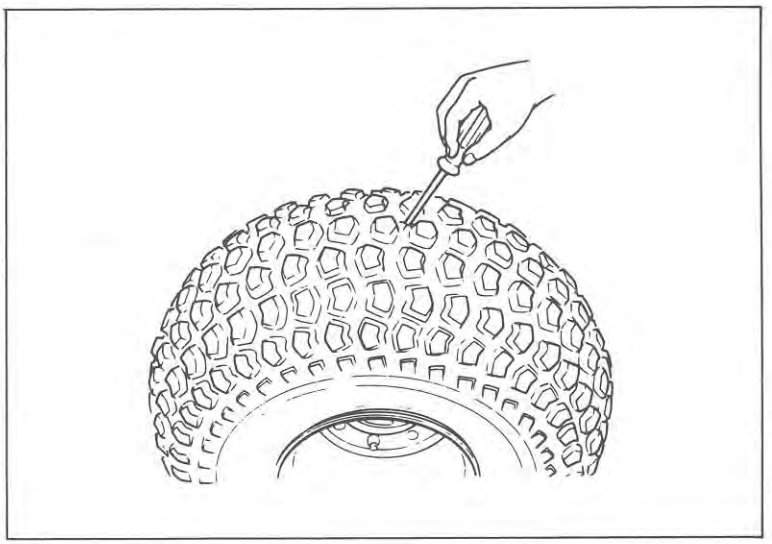
Apply patching cement to the plug.



Center the needle on the plug and insert until the plug is all the way in the tire. Twist the needle several times.

Pull the needle straight out so that the plug is about 10 mm (3/8 in) above the tread surface. Trim the plug 2 mm (1/16 in) above the surface.

Repeat the above procedure if the puncture is large.



TIRE ASSEMBLY

Clean the rim bead seat and flanges.
Apply clean water to the rim flanges, bead seat and base.
Install the valve core in the valve stem.
Inflate the tire to seat the tire bead.

NOTE

> Use tire mounting lubricant or a soap and water solution to help seat the tire bead.

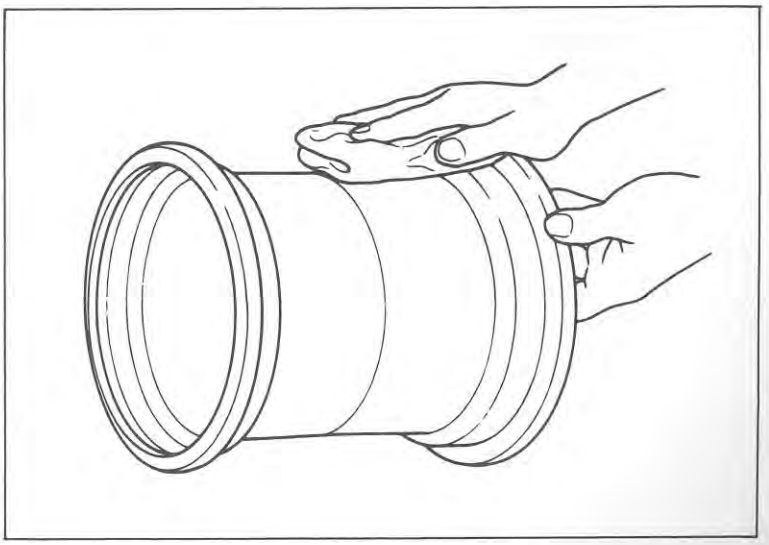
Deflate the tire. Wait 1 hour and inflate the tire to the specified pressure.

TIRE PRESSURE:
2.2 psi (0.15 kg/cm², 15 kPa)

Measure the tire circumference.

STANDARD TIRE CIRCUMFERENCE:
1,915 mm (79.3 in)

Check for air leaks and install the valve cap.



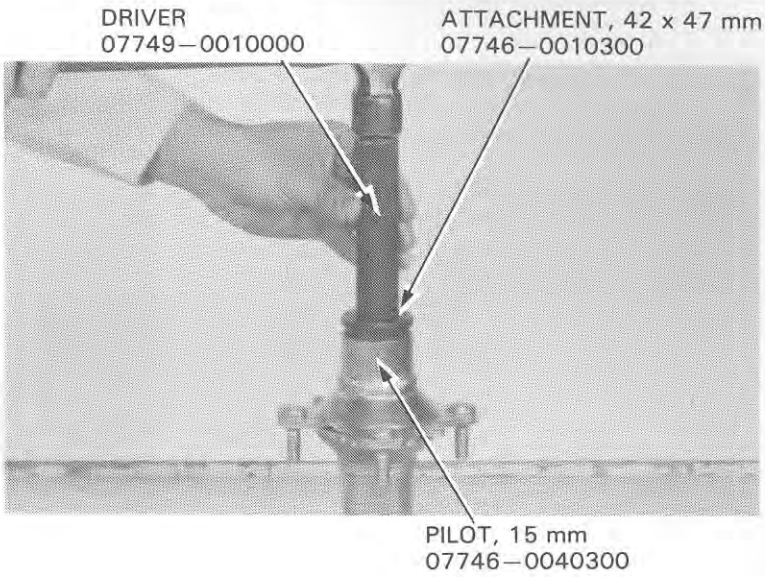
FRONT WHEEL ASSEMBLY

Pack all front wheel bearing cavities with grease.

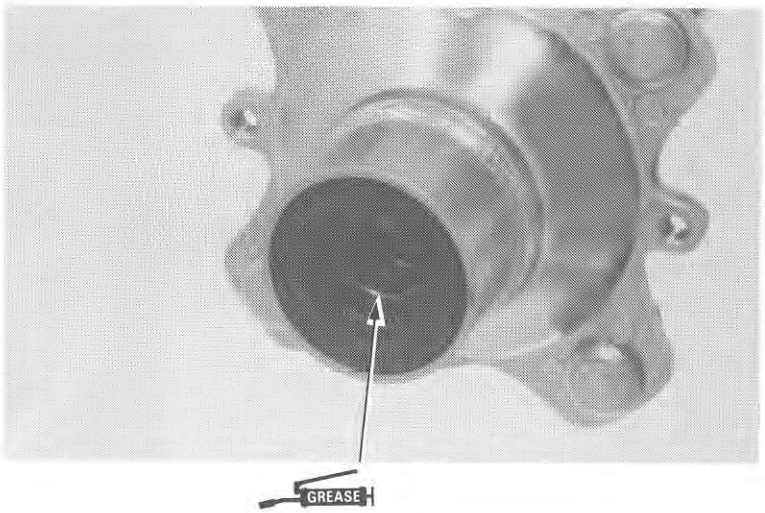
Drive in the left bearing squarely until it seats. Install the center collar and drive in the right bearing squarely until it seats.

NOTE

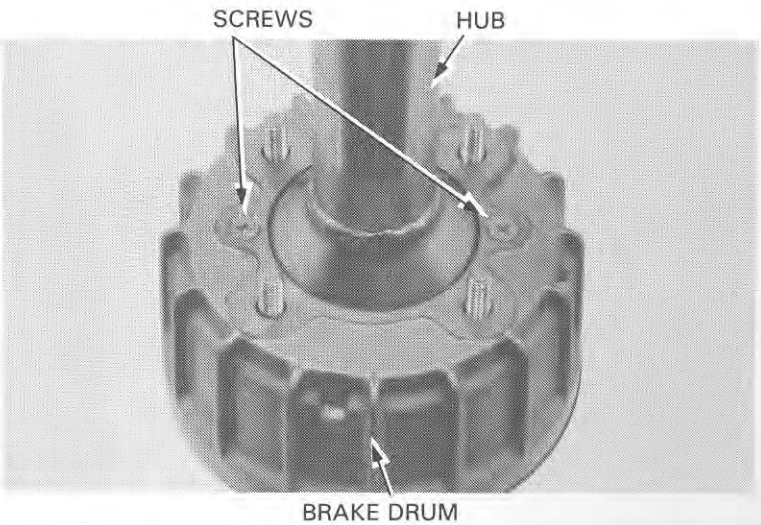
Do not allow the bearings to tilt while driving them in.



Apply grease to the inside of the dust seals and drive them into the wheel hub.



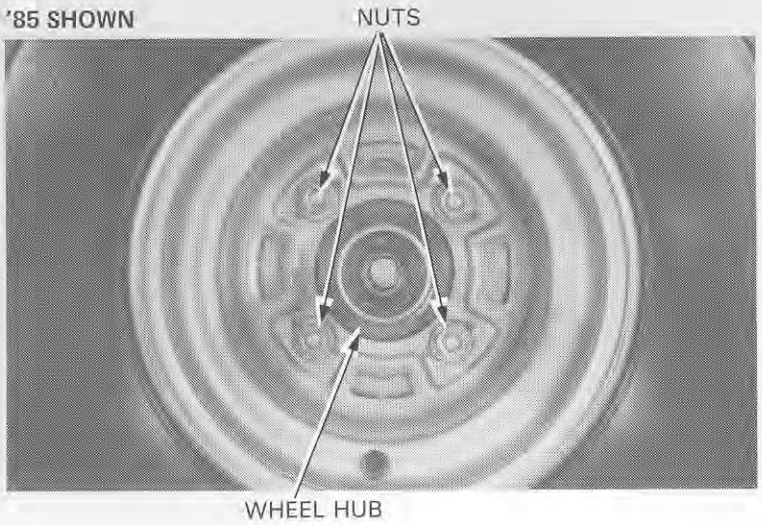
Install the brake drum onto the wheel hub and tighten it with the two screws.



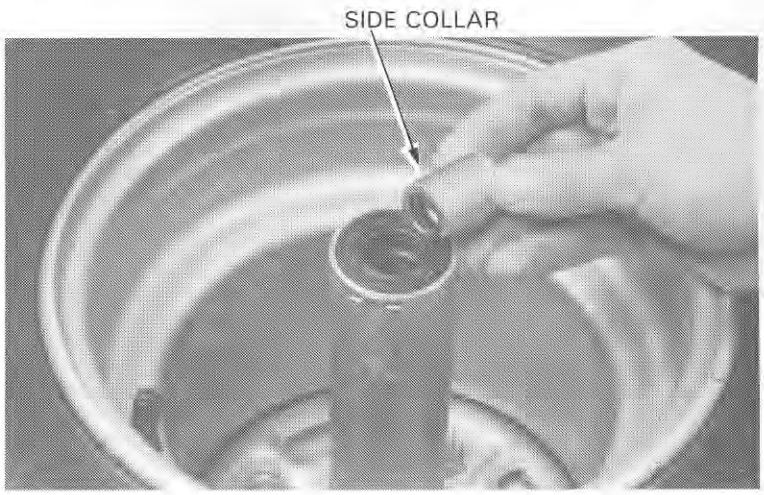
Install the front wheel, making sure the directional arrows on the tire are pointing forward.
Tighten the wheel nuts to the specified torque.

TORQUE: 50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)
AFTER '85: 60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)

'85 SHOWN

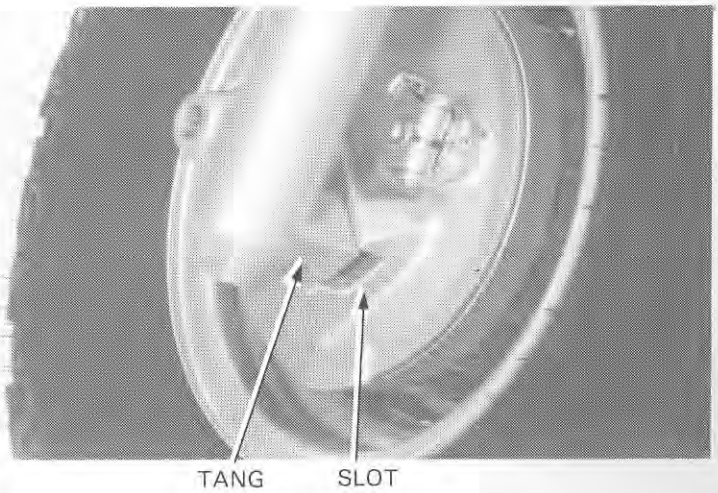


Install the side collar.



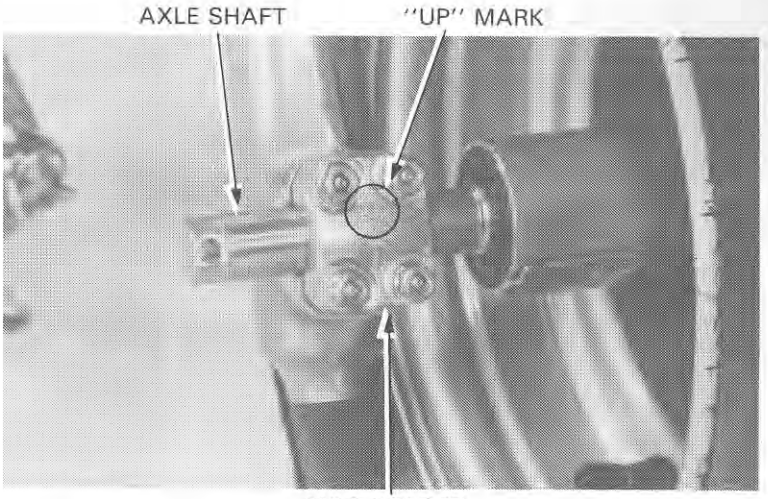
FRONT WHEEL INSTALLATION

Install the front brake panel in the wheel hub and place the front wheel between the fork legs, aligning the tang on the left fork leg with the slot in the brake panel.

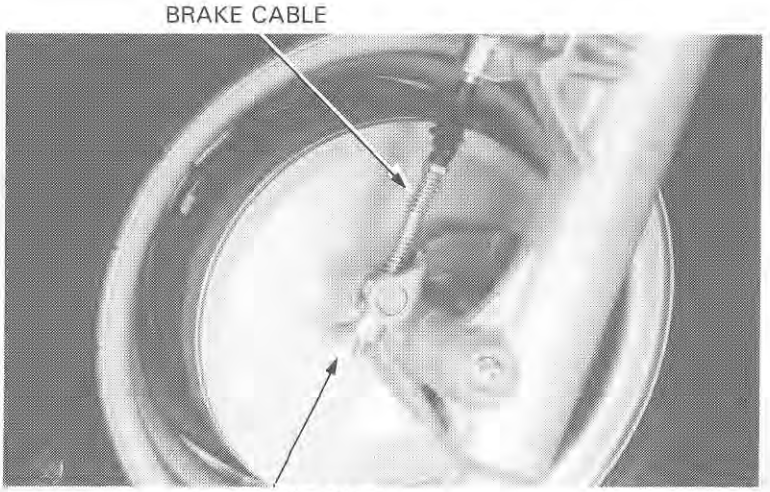


Install the axle holder loosely with its "UP" mark facing up.

Insert the axle shaft through the axle holder and wheel hub and temporarily tighten it.



Connect the front brake cable and adjust the front brake lever free play (page 3-9).



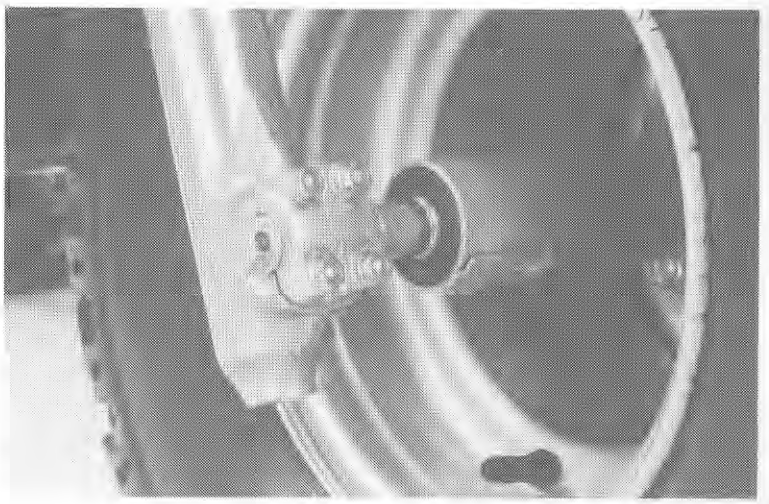
Tighten the axle shaft.

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

With the front brake applied, pump the front forks up and down several times to seat the axle.

Tighten the upper axle holder nuts first, then tighten the lower nuts.

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



FRONT BRAKE

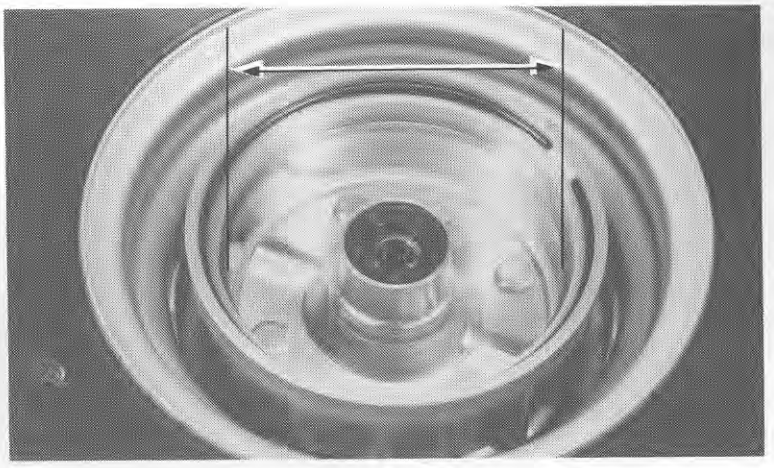
BRAKE PANEL REMOVAL

Remove the front wheel (page 11-7) and the brake panel from the front wheel.

BRAKE DRUM INSPECTION

Measure the I.D. of the brake drum.

SERVICE LIMIT: 141 mm (5.6 in)

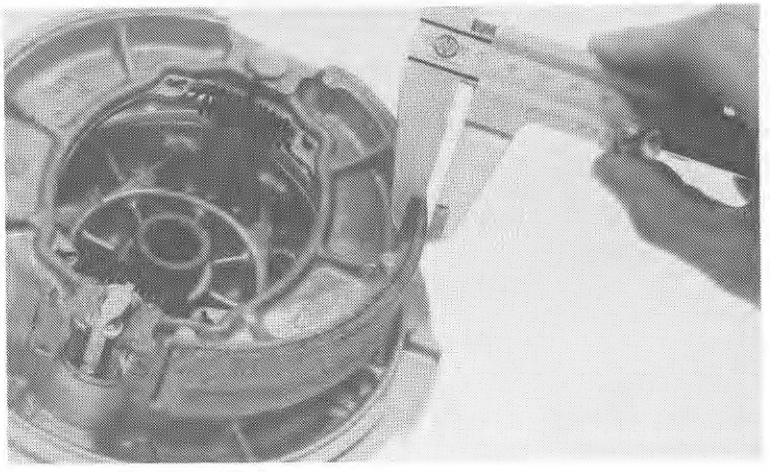


BRAKE LINING INSPECTION

Measure the brake lining thickness.

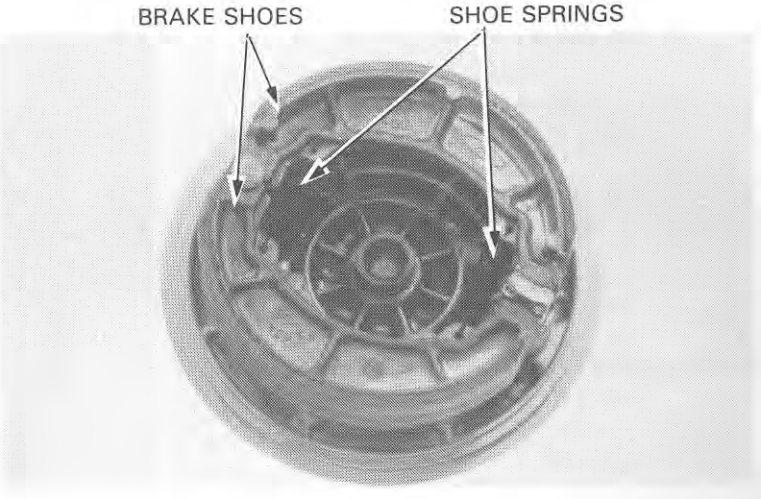
SERVICE LIMIT: 2 mm (0.1 in)

Replace the brake shoes if they are thinner than the service limit.



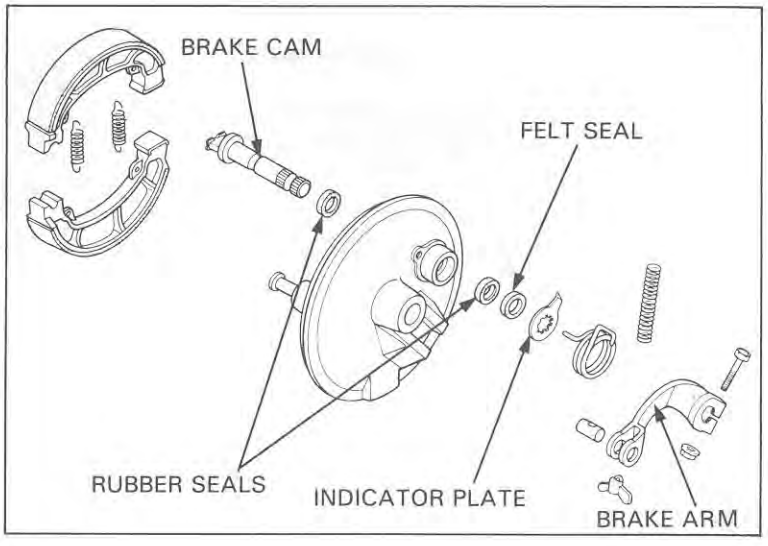
BRAKE PANEL DISASSEMBLY

Expand and remove the brake shoes by hand.



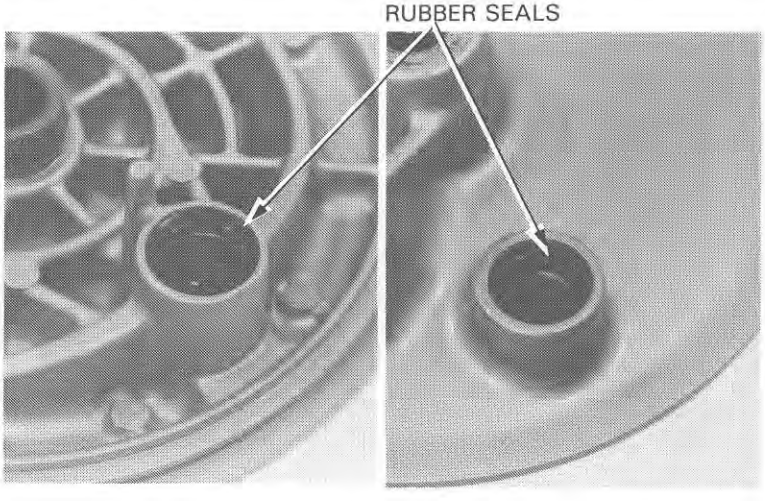
Remove the brake arm bolt, brake arm, indicator plate and spring.
Remove the brake cam and felt seal.

Check the rubber seals for wear or damage and remove if necessary.



BRAKE PANEL ASSEMBLY

Apply grease to new rubber seals and install them into the brake panel.

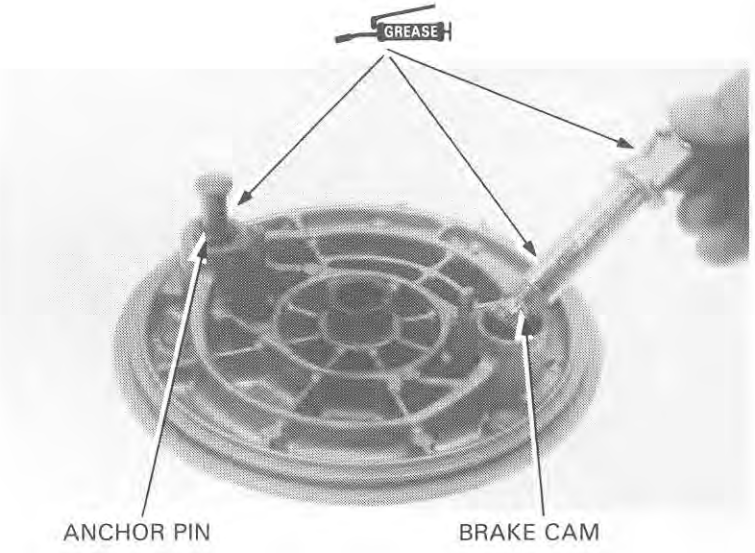


Apply grease to the brake anchor pin and brake cam.

WARNING

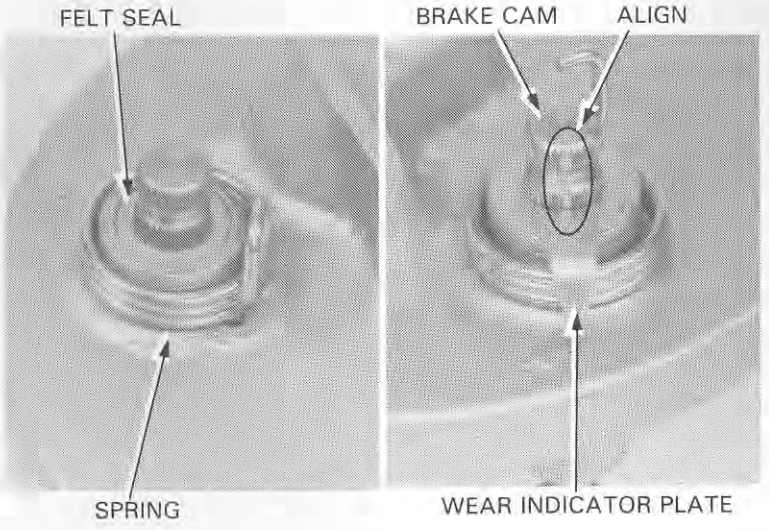
- ***A contaminated brake lining reduces stopping power.***
- ***Keep grease off the linings. Wipe excess grease off the cam.***

Install the brake cam into the brake panel.



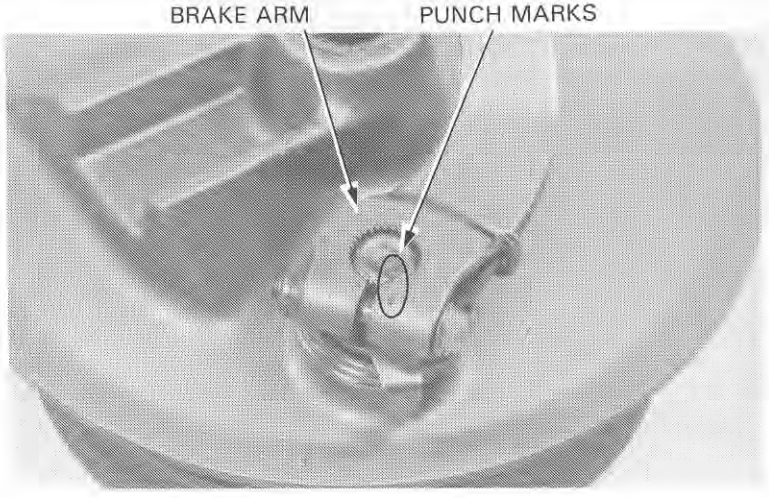
Install the felt seal and brake arm return spring.

Install the indicator plate, aligning the wide tooth on the indicator plate with the wide groove on the brake cam.

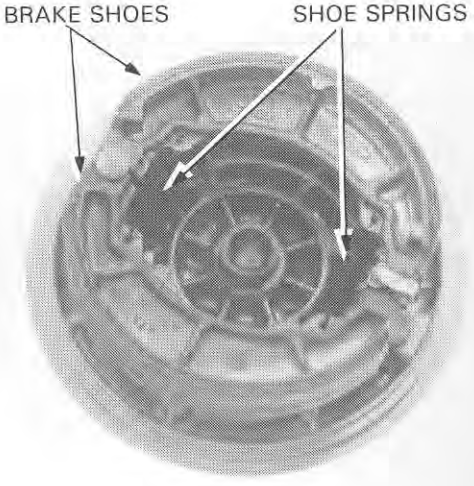


Install the brake arm, aligning the punch marks on the brake cam and arm.

Secure the brake arm using the bolt and nut.



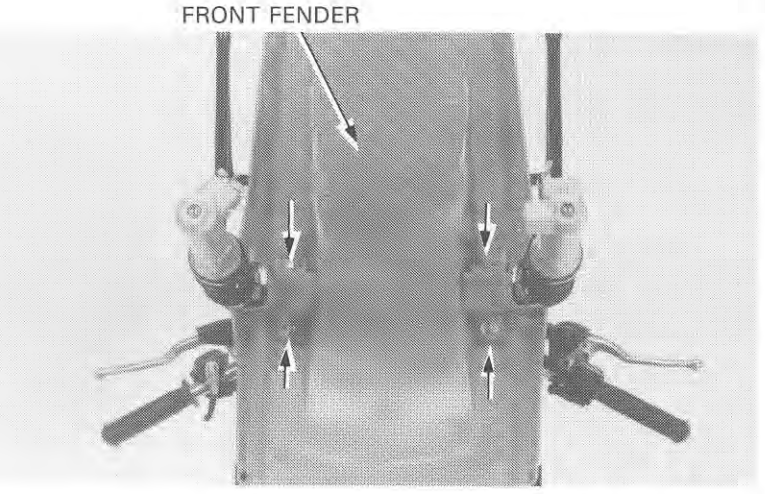
Install the brake shoes and springs onto the brake panel.



FRONT FORK

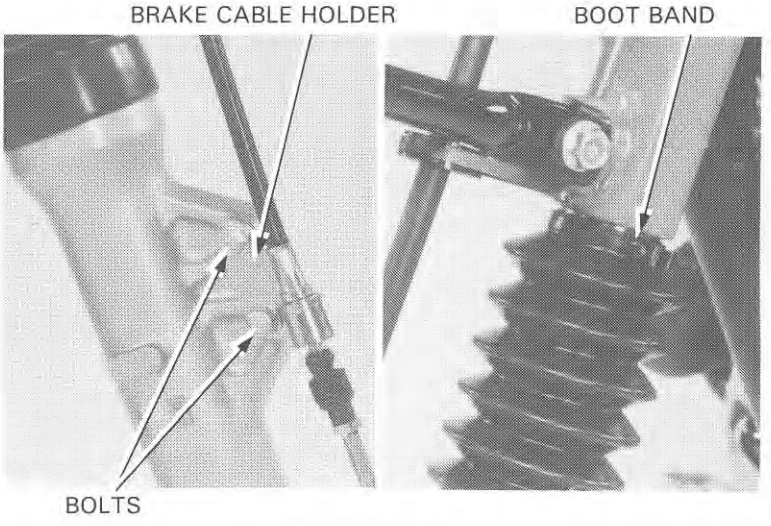
REMOVAL

Remove the front wheel (page 11-7).
Remove the front fender by removing the four mount bolts.

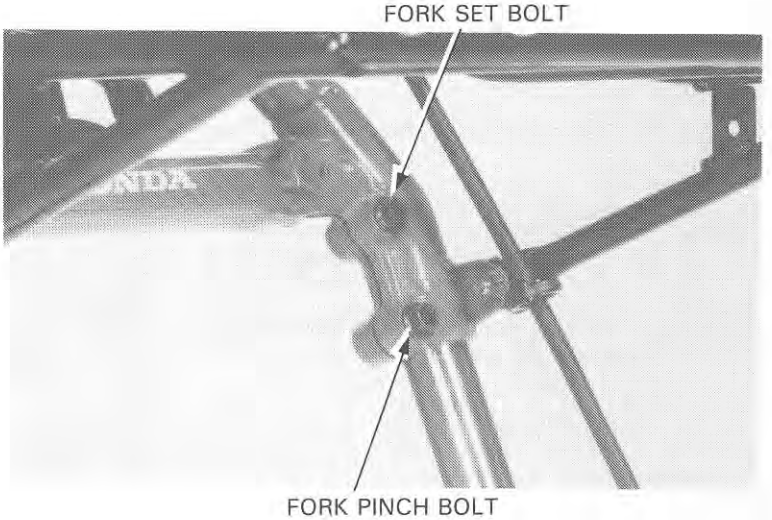


Remove the two bolts attaching the front brake cable holder to the left fork leg.

Loosen the front fork boot bands.



Remove the front fork set bolt, loosen the fork pinch bolt and remove each front fork.



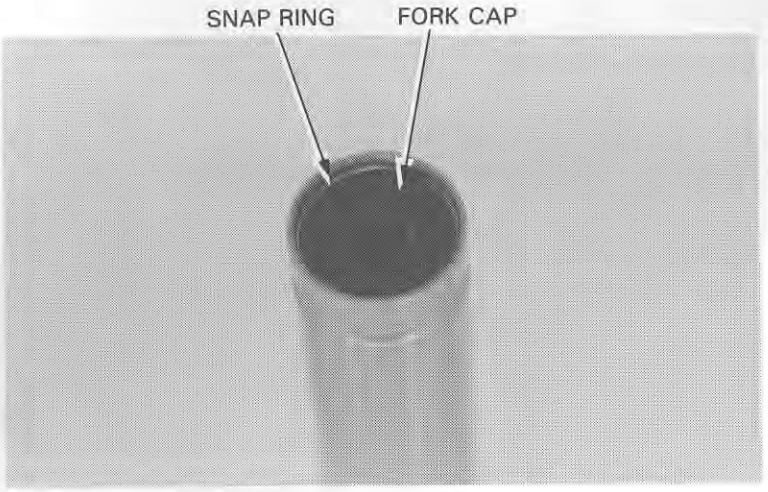
DISASSEMBLY

Remove the fork boot.
Depress the fork cap and remove the snap ring.

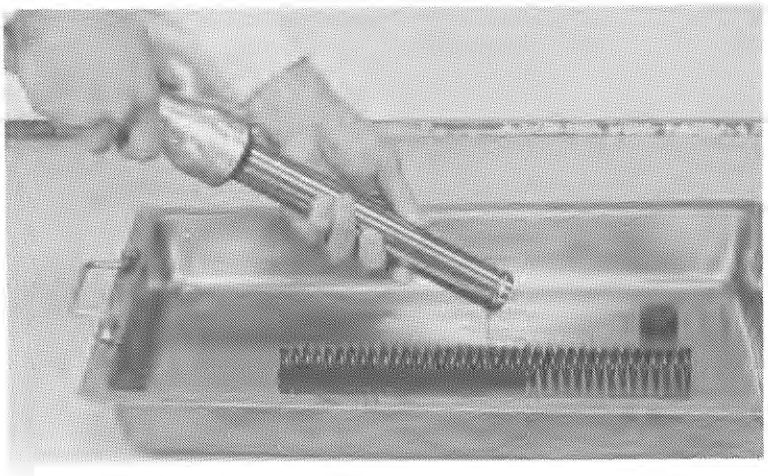
Remove the fork cap and fork spring.

CAUTION

The fork cap is under spring pressure. Use care when removing and wear eye and face protection.



Pour out the fork fluid by pumping the fork up and down several times.



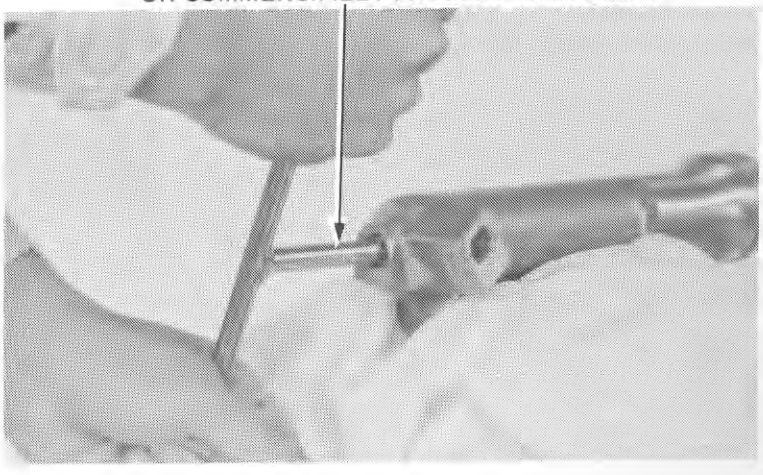
Hold the fork slider in a vise with soft jaws or use a shop towel.

Remove the socket bolt with a hex wrench.

NOTE

Temporarily reinstall the spring, fork cap, and snap ring if the bolt is difficult to remove.

Remove the piston, rebound spring, fork tube and oil lock piece from the fork slider.

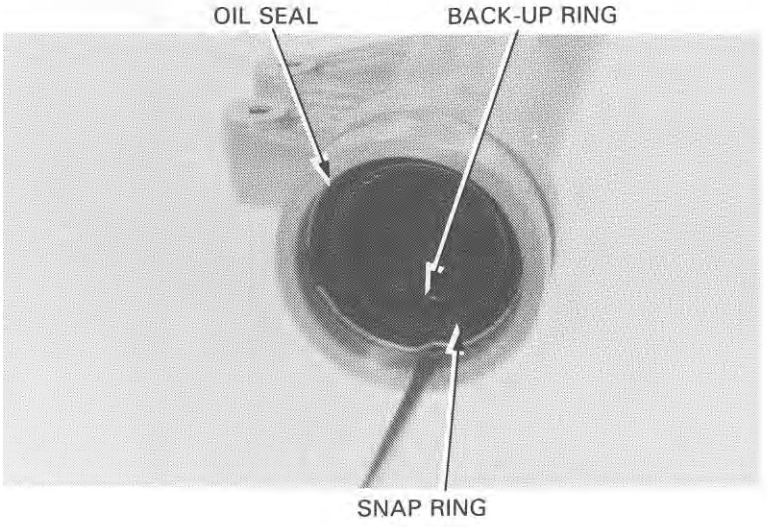


Remove the dust seal and snap ring.

Pry the oil seal and back-up ring out of the fork slider.

CAUTION

- *Be careful not to damage the fork slider when prying out the oil seal and back-up ring.*
- *Replace the oil seal and back-up ring with new ones whenever they are remove.*



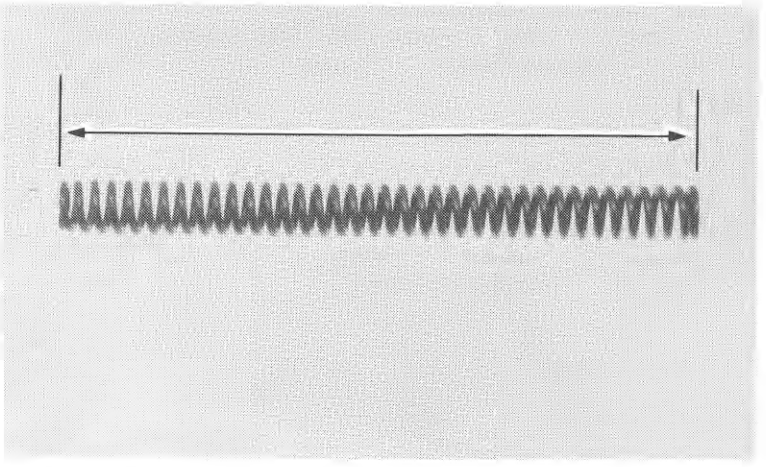
INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length.

SERVICE LIMIT: 297.5 mm (11.71 in)

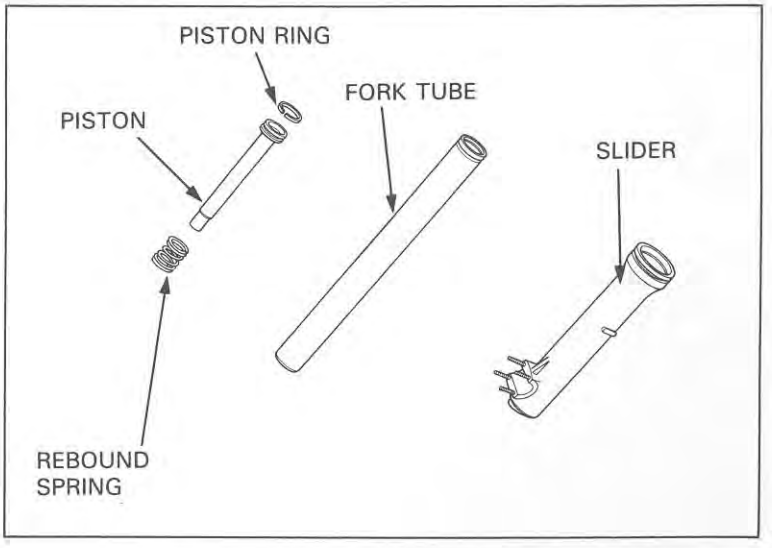
Replace the spring if it is shorter than the service limit.



FORK TUBE/FORK SLIDER/PISTION

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

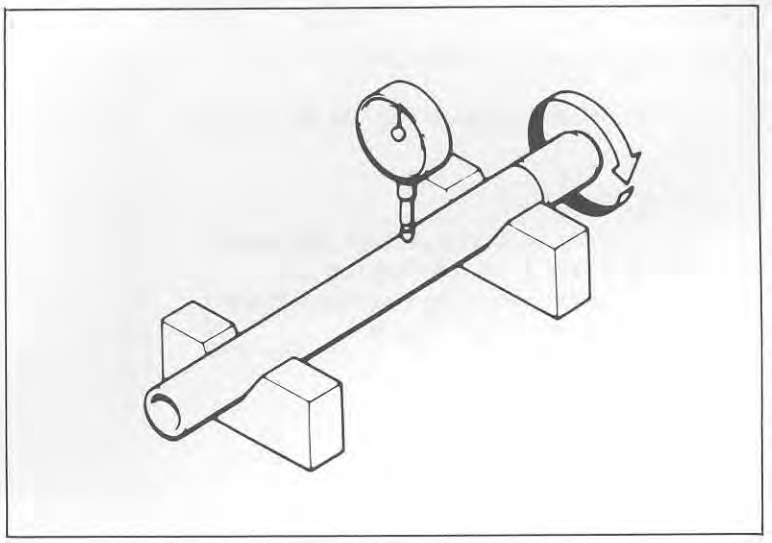
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.



FORK TUBE

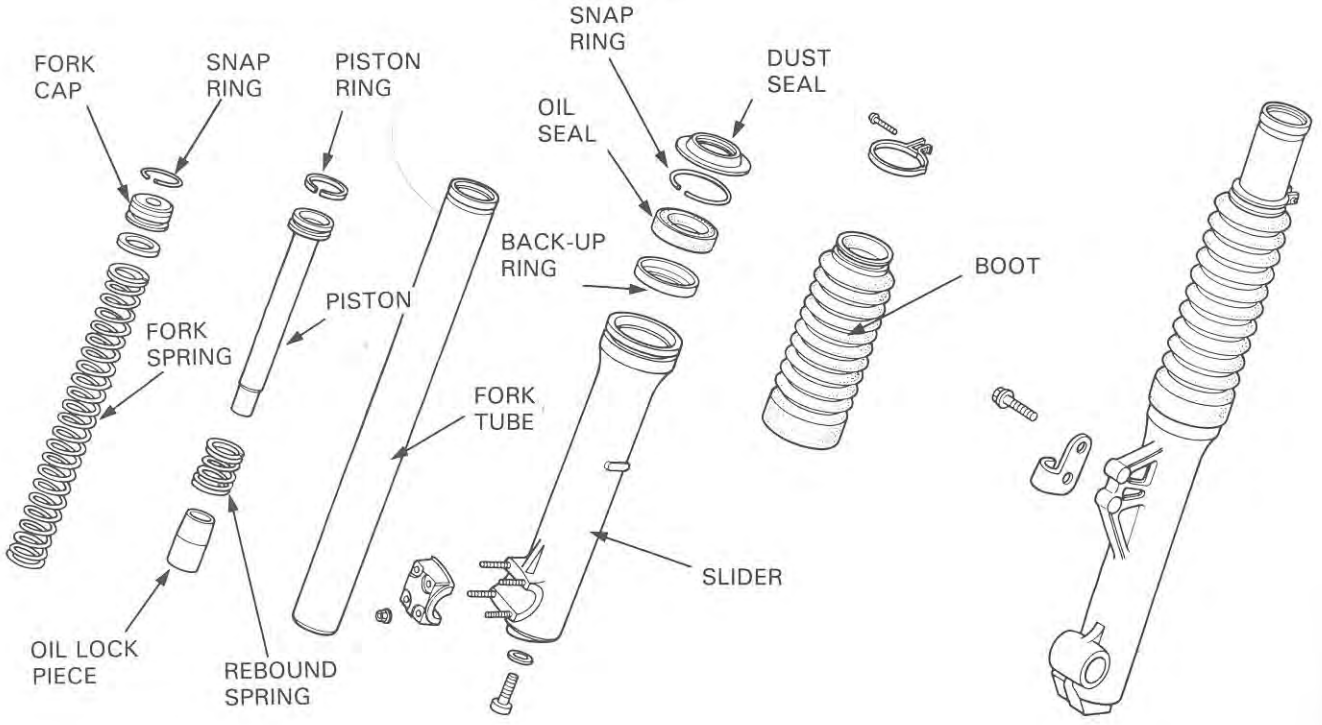
Set the fork tube in V blocks and read the runout.

SERVICE LIMIT: 0.20 mm (0.008 in)



ASSEMBLY

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



Insert the rebound spring and piston into the fork tube.

Place the oil lock piece on the end of the piston and insert the fork tube into the slider.

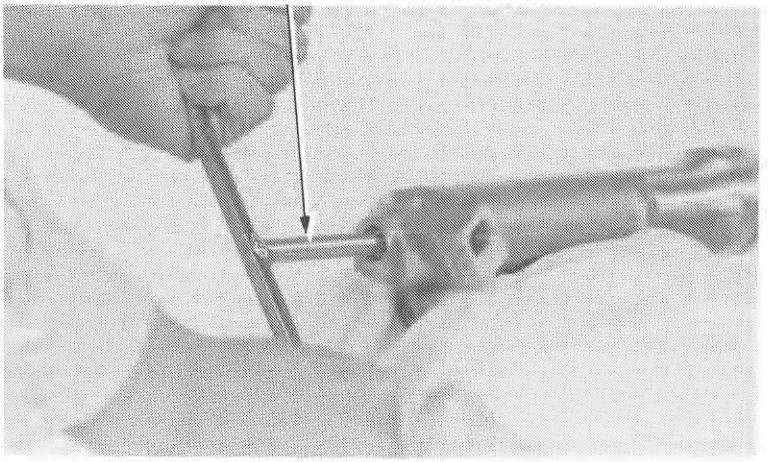
Place the fork slider in a vise with soft jaws or use a shop towel. Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

NOTE

Temporarily install the fork spring, fork cap and snap ring to tighten the socket bolt.

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

HEX WRENCH, 6 mm 07917—3230000
OR COMMERCIALLY AVAILABLE IN U.S.A.

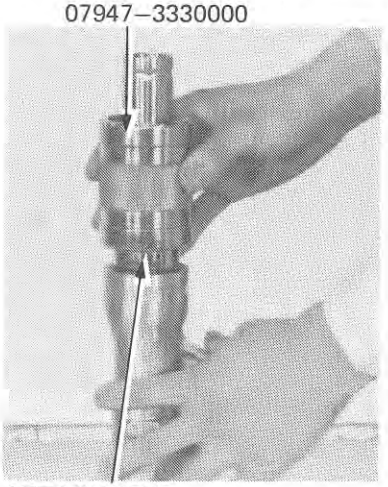


Install the back-up ring.

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

Install the snap ring and dust seal.

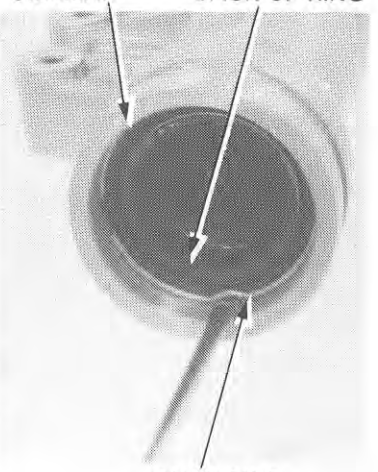
FORK SEAL DRIVER
07747—0010100 OR
07947—3330000



ATTACHMENT
07747—0010501 OR
07947—3330000

OIL SEAL

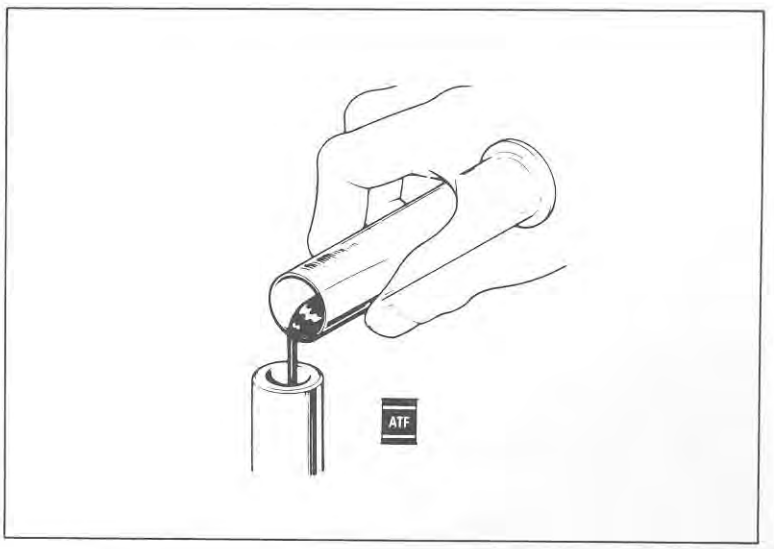
BACK-UP RING



SNAP RING

Pour the specified amount of AFT into the fork tube.

CAPACITY: 110.5—115.5 cc (3.73—3.91 ozs)



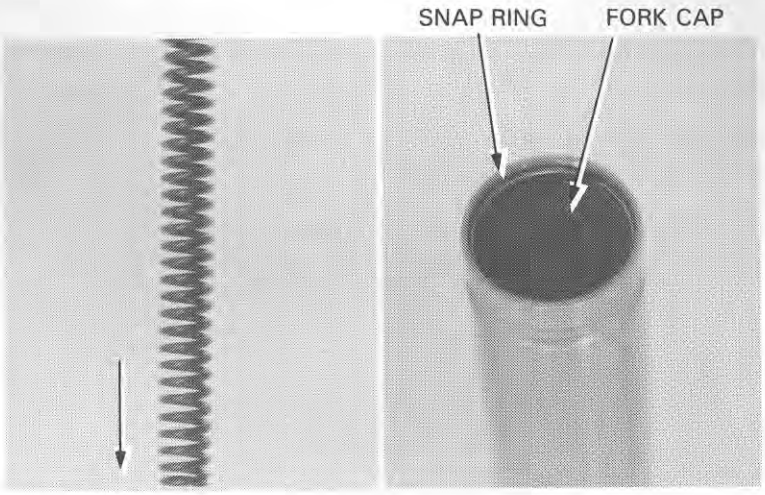
Install the fork spring into the fork tube with its small diameter coil end down.

Install a new O-ring in the groove of the fork cap.

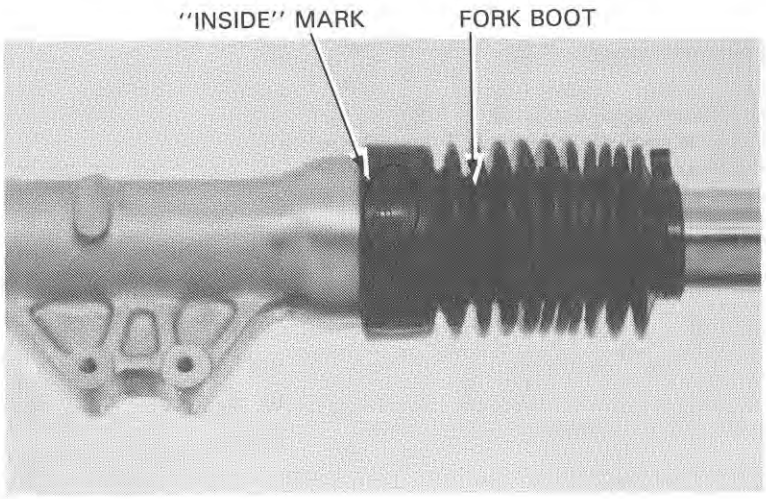
Install the fork cap into the fork tube, press it down and install the snap ring in the groove in the fork tube.

CAUTION

Use eye and face protection when installing the fork cap and snap ring.

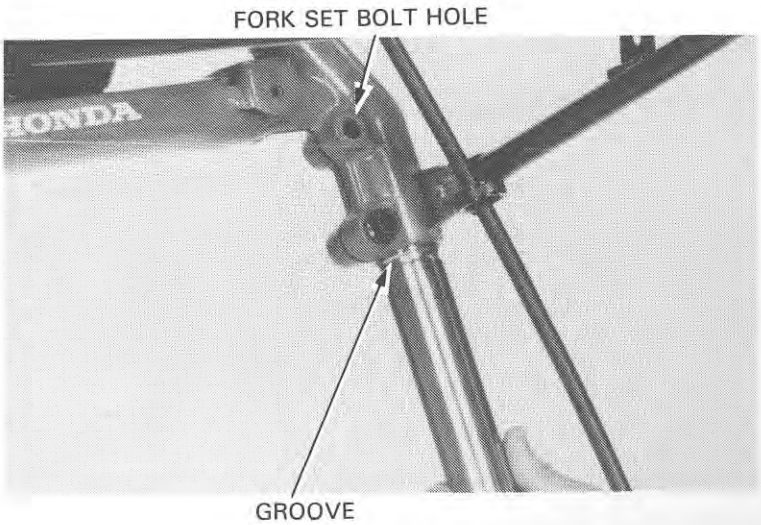


Install the fork boot with its "INSIDE" mark facing in.



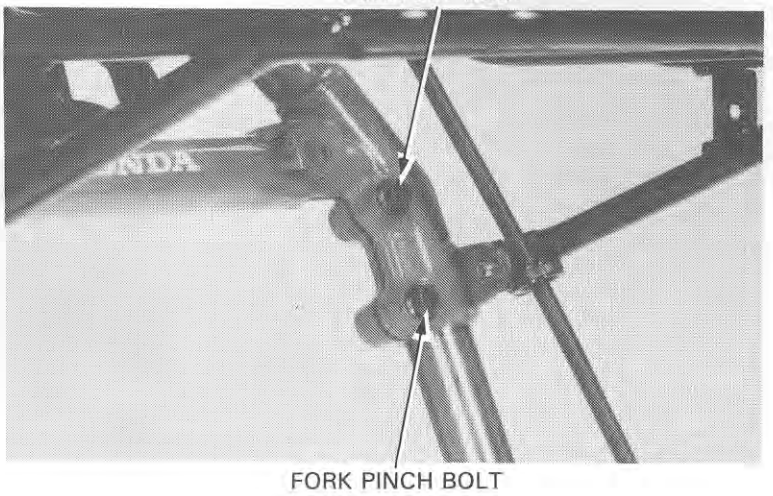
INSTALLATION

Insert the fork tube into the steering stem and align its groove with the fork set bolt hole.



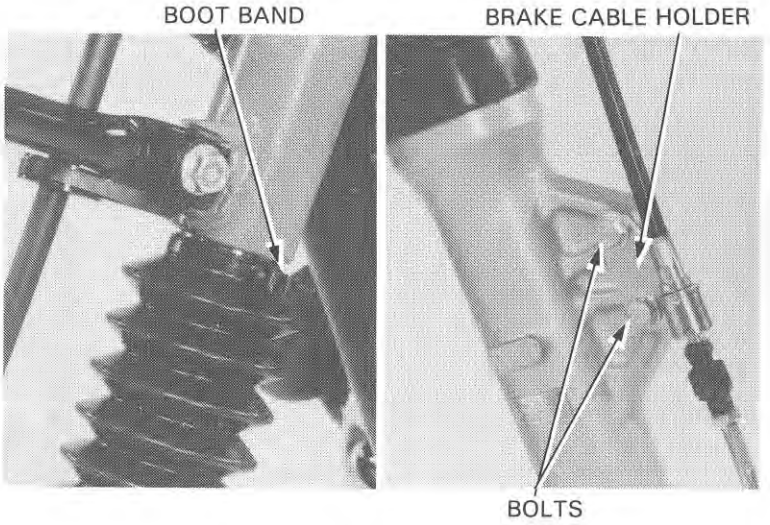
Install the fork set bolt and tighten the fork set and pinch bolts.

TORQUE: 50—60 N·m
(5.0—6.0 kg-m, 36—43 ft-lb)

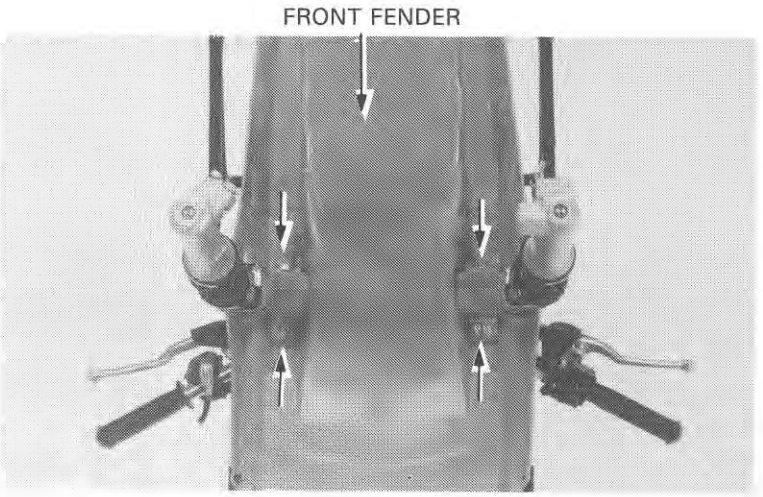


Align the upper end of the fork boot with the lower end of the steering stem and tighten the boot band.

Install the front brake cable holder onto the left fork leg using the two bolts.



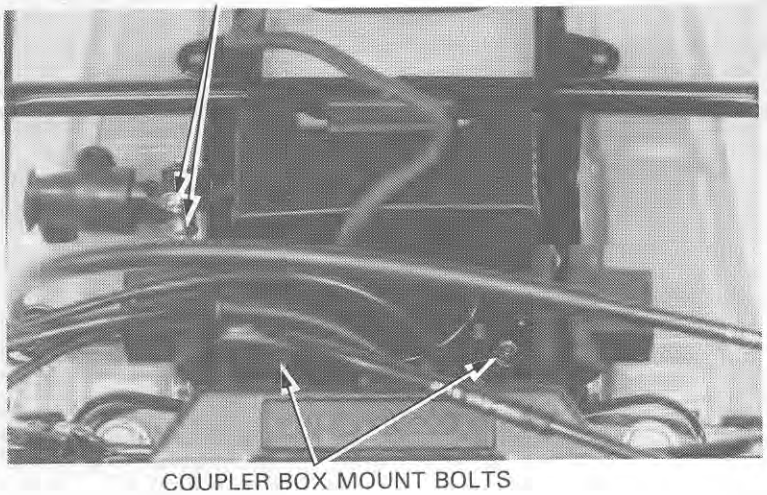
Install the front fender and the front wheel (page 11-16).



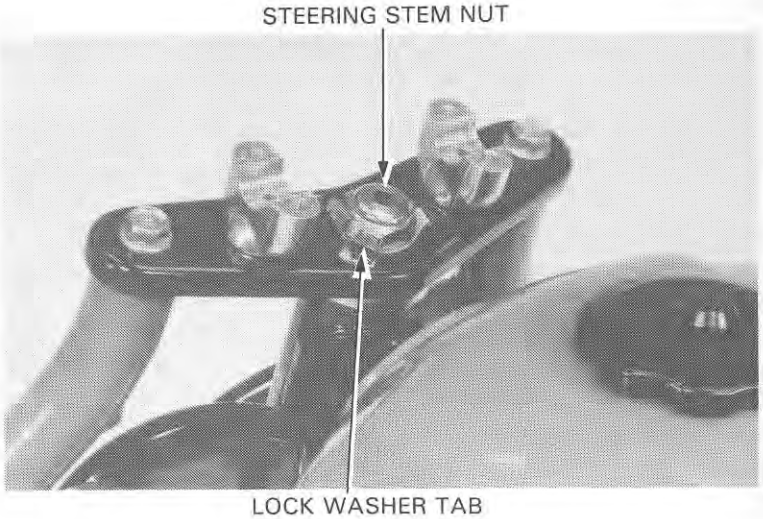
STEERING STEM

REMOVAL

Remove the following:
- front wheel (page 11-7).
- handlebars (page 11-3).
- front forks (page 11-21).
- two coupler box mount bolts
- two receptacle mount bolts
- front carrier.
- front fender.

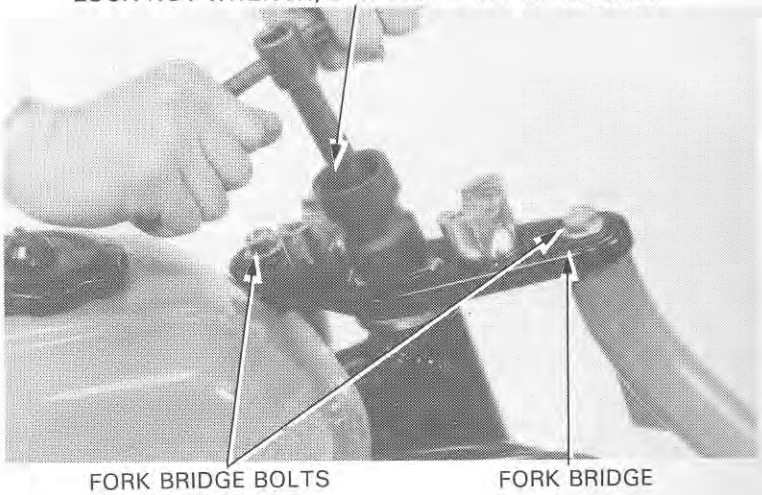


Bend down the steering stem nut lock washer tab.



Remove the steering stem nut, lock washer, fork bridge bolts and fork bridge.

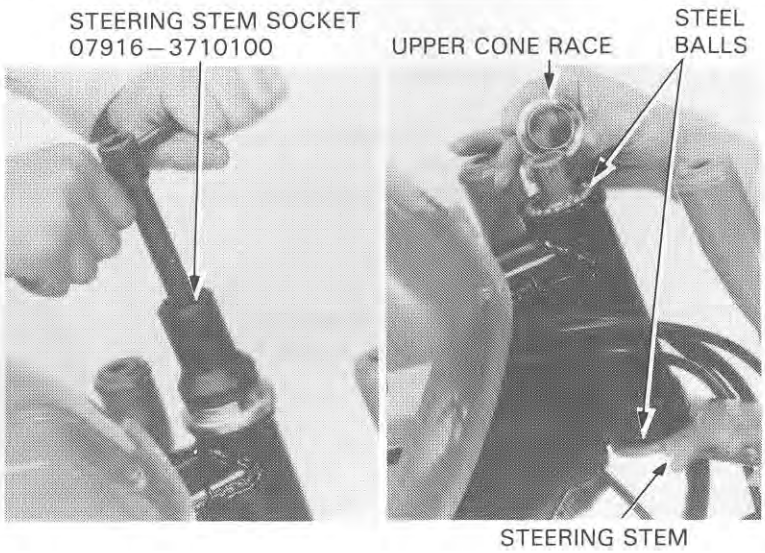
EXTENSION BAR 07716–0020500
OR COMMERCIALLY AVAILABLE IN U.S.A.
LOCK NUT WRENCH, 30 x 32 mm 07716–0020400



Remove the bearing adjustment nut.
Remove the steering stem, upper cone race, dust seal and steel balls.

NOTE

The steel ball bearings are loose and easily dropped. Place shop towels on the floor to catch any that do drop.

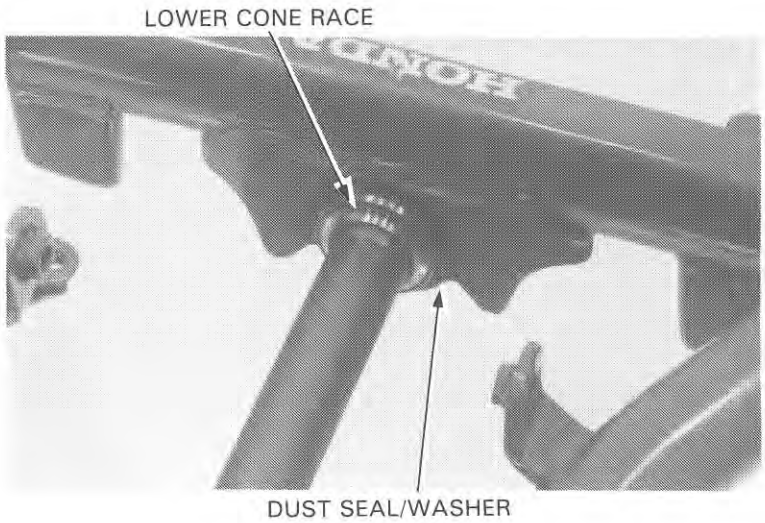


LOWER CONE RACE REPLACEMENT

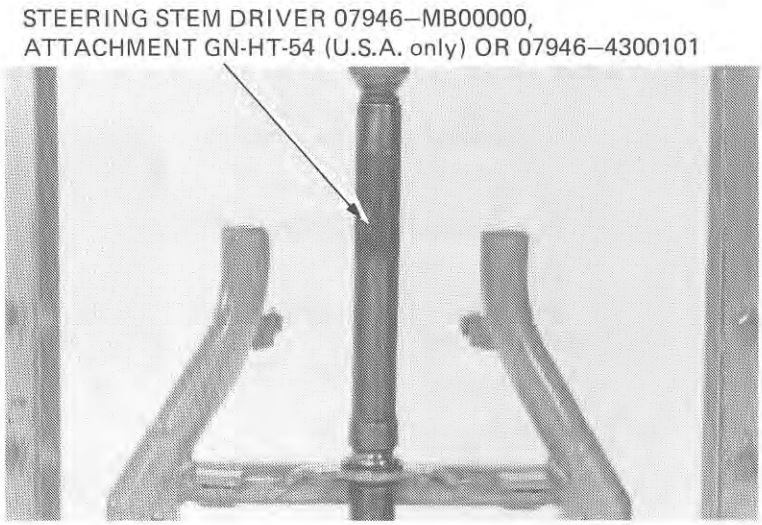
Inspect the lower cone race for wear or damage and replace if necessary.

Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower cone race from the stem.

Remove the race with a chisel, being careful not to damage the stem.
Remove the dust seal and washer.



Install a new washer and dust seal and drive a new cone race into place.



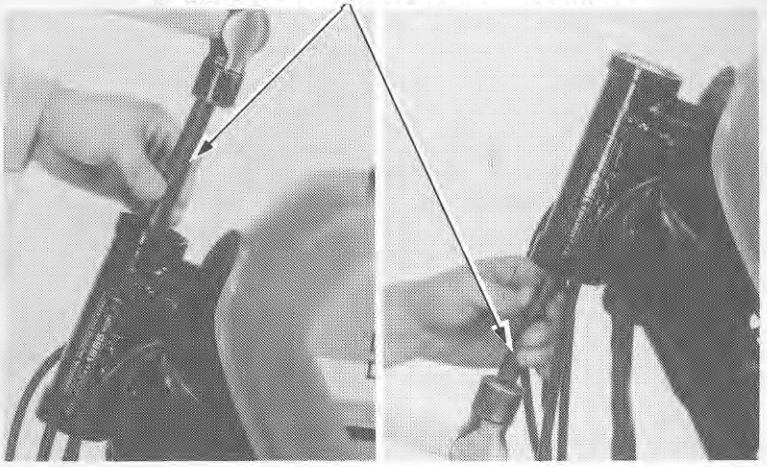
BALL RACE REPLACEMENT

Inspect the upper and lower ball races for wear of damage and replace if necessary.
Remove the upper and lower ball races with the special tool.

NOTE

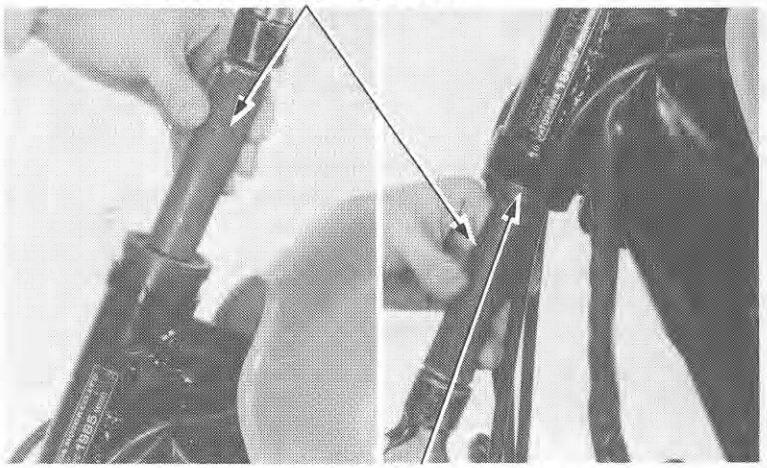
If the ATC has been involved in an accident, examine the area around the steering head for cracks.

BALL RACE REMOVER 07953—3330000



Drive new ball races with the special tools.

DRIVER 07749—0010000



ATTACHMENT 07946—3290000

INSTALLATION

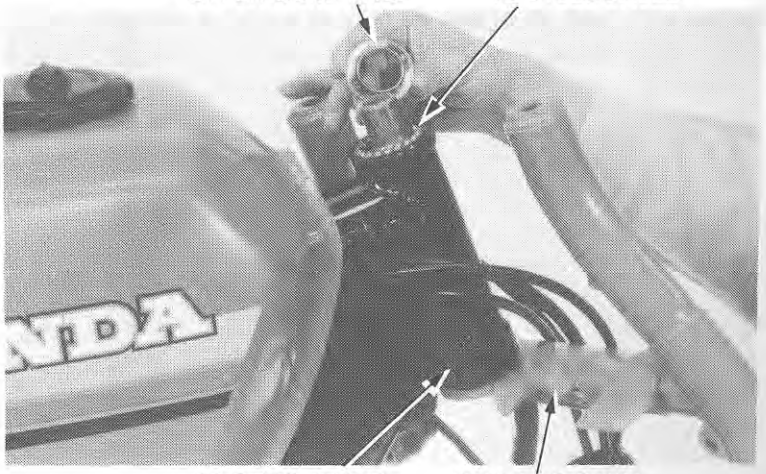
Apply grease to the upper ball race and install 18 steel balls.

Apply grease to the lower ball race and install 18 steel balls.

Insert the steering stem into the steering head pipe and install the upper cone race.

UPPER CONE RACE

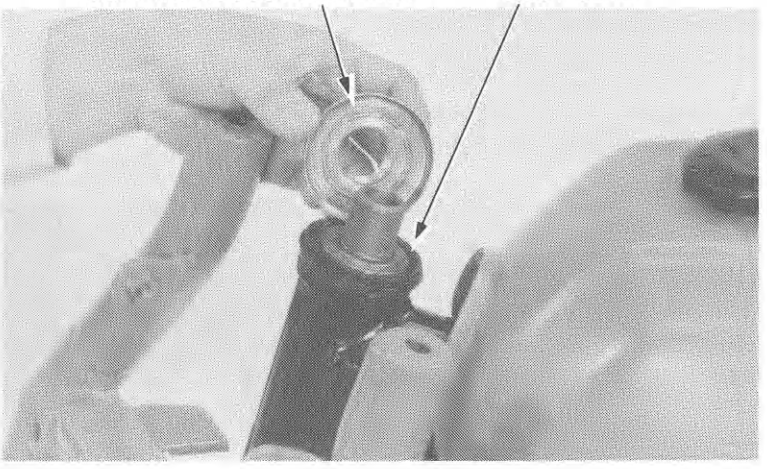
18 STEEL BALLS



18 STEEL BALLS

STEERING STEM

Apply grease to the dust seal and install it onto the steering head pipe.
Install the bearing adjustment nut.



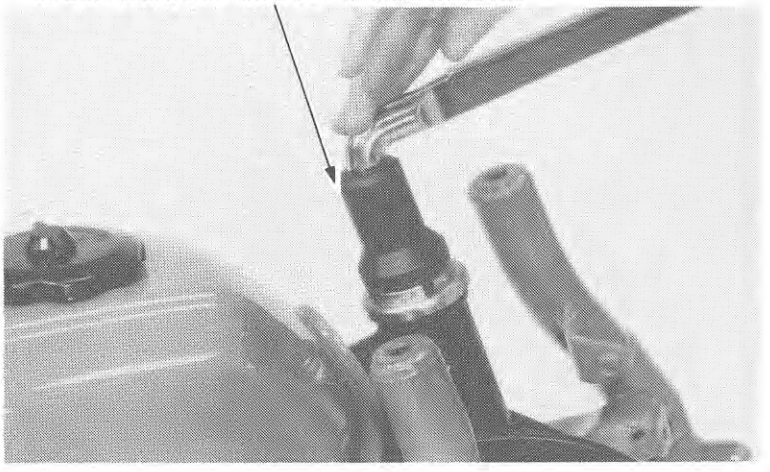
Tighten the bearing adjustment nut to the specified torque.

TORQUE: 25—35 N·m
(2.5—3.5 kg-m, 18—25 ft-lb)

Turn the steering stem lock-to-lock several times to seat the bearings, then loosen the adjustment nut and retighten it to the final torque.

TORQUE: 7—8 N·m
(0.7—0.8 kg-m, 5—6 ft-lb)

STEERING STEM SOCKET 07916—3710100



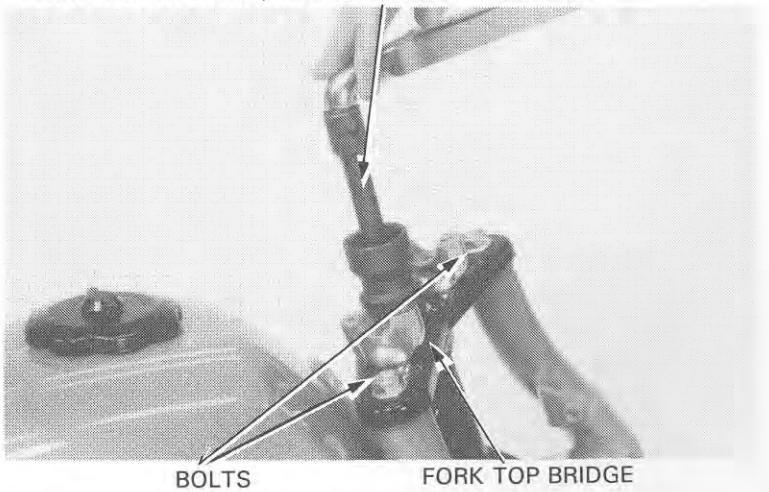
Install the fork bridge and tighten the bridge bolts.

TORQUE: 50—70 N·m
(5.0—7.0 kg-m, 36—51 ft-lb)

Install a new lock washer and tighten the steering stem nut.

TORQUE: 70—90 N·m
(7.0—9.0 kg-m, 51—65 ft-lb)

EXTENSION BAR 07716—0020500
OR COMMERCIALLY ABAILABLE IN U.S.A.
LOCK NUT WRENCH, 30 x 32 mm 07716—0020400



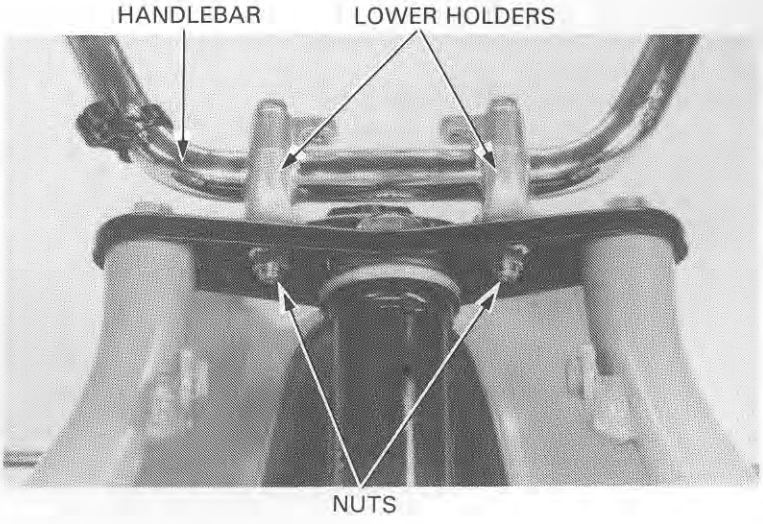
If the handlebar lower holder was removed from the fork bridge, install them loosely.

Temporarily install the handlebar with the upper holders and tighten the upper holder bolts.

Tighten the lower holder nuts to the specified torque.

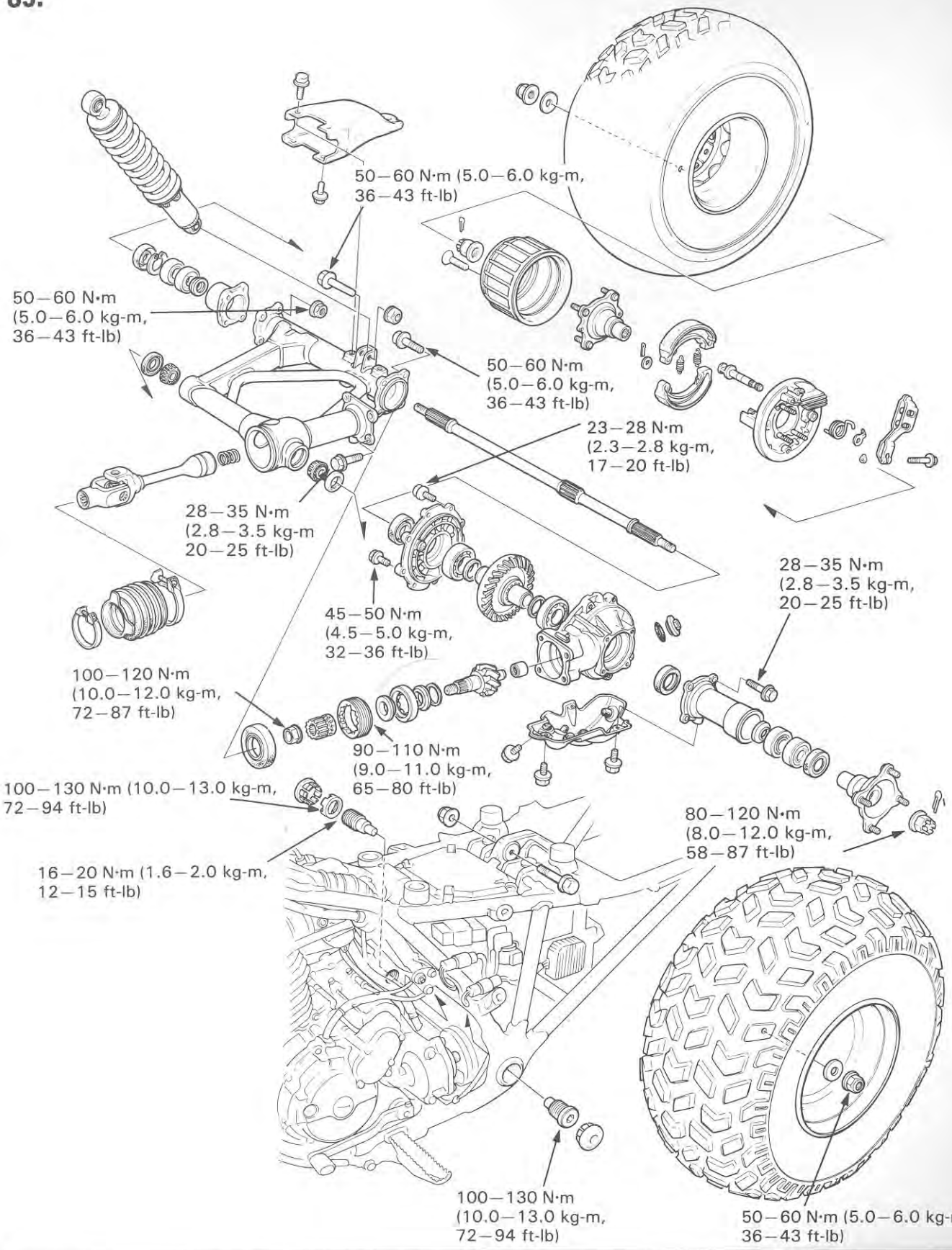
TORQUE: 40—50 N·m
(4.0—5.0 kg-m, 29—36 ft-lb)

Install the parts in the reverse order of removal.

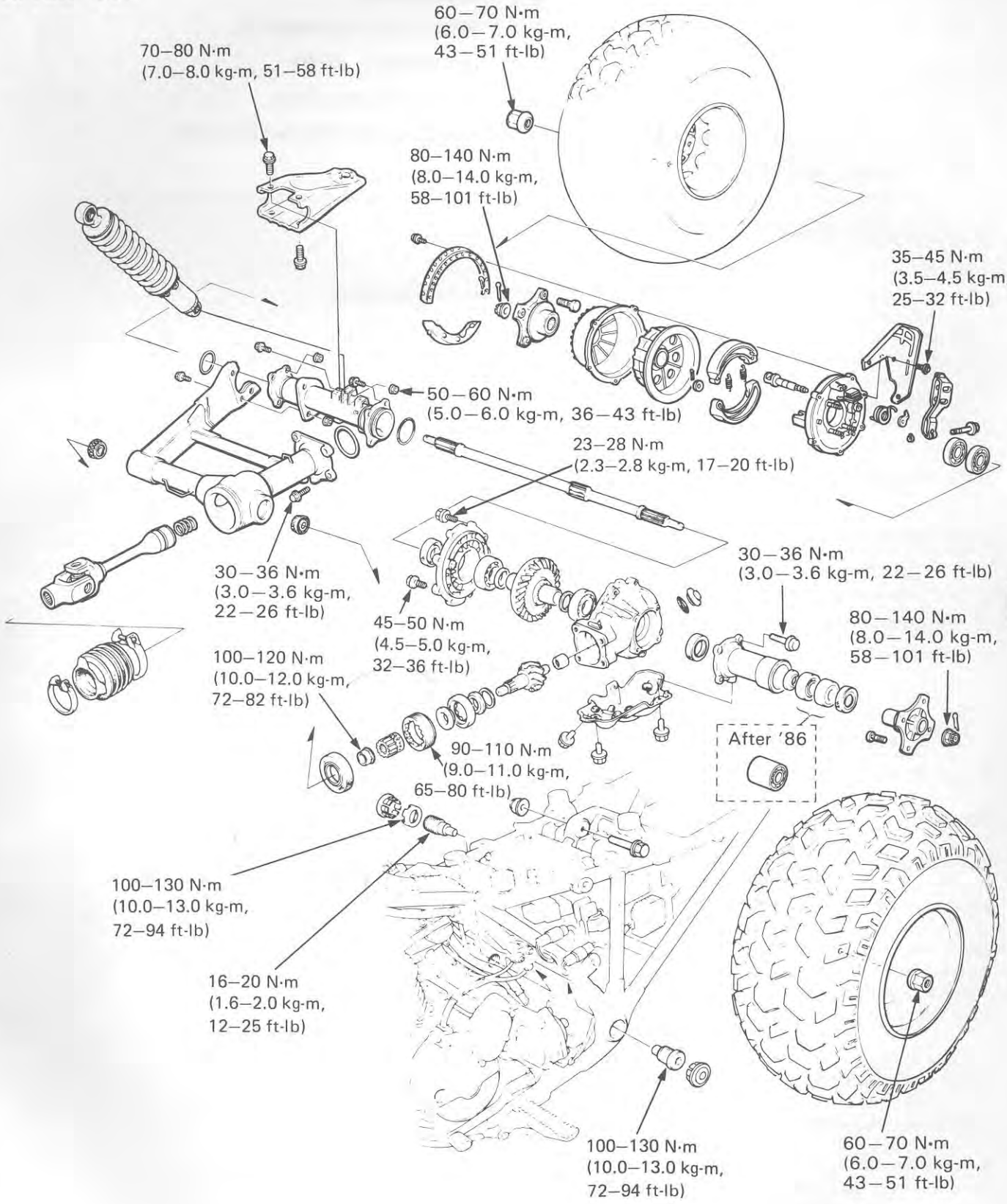


MEMO

'85:


50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)
28–35 N·m (2.8–3.5 kg-m 20–25 ft-lb)
45–50 N·m (4.5–5.0 kg-m, 32–36 ft-lb)
28–35 N·m (2.8–3.5 kg-m, 20–25 ft-lb)
100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)
16–20 N·m (1.6–2.0 kg-m, 12–15 ft-lb)
100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)

AFTER '85:


60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)
70–80 N·m
(7.0–8.0 kg-m, 51–58 ft-lb)
80–140 N·m
(8.0–14.0 kg-m,
58–101 ft-lb)
35–45 N·m
(3.5–4.5 kg-m,
25–32 ft-lb)
50–60 N·m
(5.0–6.0 kg-m, 36–43 ft-lb)
23–28 N·m
(2.3–2.8 kg-m, 17–20 ft-lb)
30–36 N·m
(3.0–3.6 kg-m,
22–26 ft-lb)
45–50 N·m
(4.5–5.0 kg-m,
32–36 ft-lb)
30–36 N·m
(3.0–3.6 kg-m, 22–26 ft-lb)
80–140 N·m
(8.0–14.0 kg-m,
58–101 ft-lb)
100–120 N·m
(10.0–12.0 kg-m,
72–82 ft-lb)
After '86
90–110 N·m
(9.0–11.0 kg-m,
65–80 ft-lb)
100–130 N·m
(10.0–13.0 kg-m,
72–94 ft-lb)
16–20 N·m
(1.6–2.0 kg-m,
12–25 ft-lb)
100–130 N·m
(10.0–13.0 kg-m,
72–94 ft-lb)
60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)

12. REAR WHEEL/BRAKE/ SUSPENSION/FINAL DRIVE

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the rear wheel, suspension and drive mechanism.
- A jack or block is required to support the ATC.
- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Check tooth contact pattern and gear backlash when the bearing, gear set and/or gear case has been replaced.
- Do not remove the output gear case unless the transmission is to be removed.
  If it is removed, the transmission mainshaft will be removed with it and the mainshaft gears will fall into the crankcase. It is possible to reinstall it by aligning the gears, however the right crankcase cover must be removed to place the kick starter idle gear on the mainshaft.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Rear axle runout		———	3.0 mm (0.12 in)
Rear brake drum I.D.		160 mm (6.29 in)	161 mm (6.34 in)
Rear brake lining thickness		4 mm (0.2 in)	2 mm (0.1 in)
Rear shock absorber spring free length		273.8 mm (10.78 in)	269.1 mm (10.59 in)
Final gear oil	Capacity	100 cc (3.38 US oz)	———
	Recommended oil	Hypoid-gear oil SAE #80	———
Gear backlash		0.08–0.18 mm (0.003–0.007 in)	0.25 mm (0.010 in)
Gear assembly preload		0.2–0.4 N·m (2–4 kg-cm, 1.7–3.5 in-lb)	———

TORQUE VALUES

Rear wheel nut		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb) after '85: 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)
Rear axle nut		80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb) after '85: 80–140 N·m (8.0–14.0 kg-m, 58–101 ft-lb)
Rear brake panel nut		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
Rear shock absorber mount bolt		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
Swingarm right pivot bolt		16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)
Swingarm left pivot bolt		100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
Swingarm pivot lock nut		100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
Final gear case mount bolt	(10 mm)	50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
	(8 mm)	28–35 N·m (2.8–3.5 kg-m, 20–25 ft-lb) after '85: 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)
Left bearing housing bolt		28–35 N·m (2.8–3.5 kg-m, 20–25 ft-lb) after '85: 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)
Final gear case cover	(10 mm)	45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)
	(8 mm)	23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)
Pinion joint nut		100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
Pinion bearing lock nut		90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
Brake panel assembly nut		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)

TOOLS

Special

Universal bearing puller	07631–0010000 or commercially available in U.S.A.
Shock absorber compressor base	07959–MB10000
Lock nut wrench	07908–4690001 or KS–HBA–08–469 (U.S.A.)
Socket bit, 17 mm	07703–0020500
Bearing remover	07936–4150000 or 07936–3710500
Remover handle	07936–3710100
Remover weight	07741–0010201 or 07936–3710200
Pinion joint holder	07924–HA00000
Shaft puller	07931–ME40000
Lock nut wrench, 34 x 44 mm	07916–ME50000
Pinion gear driver	07945–HA00000
Water seal driver	07947–HA00000
Attachment	07965–SA00600

Common

Driver	07749–0010000
Attachment, 62 x 68 mm	07746–0010500
Rear shock absorber spring compressor	07959–3290001
Pilot, 35 mm	07746–0040800
Attachment, 20 mm I.D.	07746–0020400
Driver	07746–0020100
Attachment, 52 x 55 mm	07746–0010400
Attachment, 42 x 47 mm	07746–0010300
Pilot, 30 mm	07746–0040700
Attachment, 24 x 26 mm	07746–0010700
Attachment, 37 x 40 mm	07746–0010200

TROUBLESHOOTING

Wobble or vibration in ATC
1. Bent rim
2. Loose wheel bearing
3. Faulty rear axle bearing holder
4. Faulty tire
5. Axle not tightened properly
6. Swingarm bearings worn

Poor brake performance
1. Improper brake adjustment
2. Worn brake shoes
3. Brake linings oily, greasy or dirty
4. Worn brake cam
5. Worn brake drum
6. Brake arm serrations improperly engaged
7. Brake shoes worn at cam contact area

Excessive final drive noise
1. Worn or scored drive pinion and splines
2. Worn pinion and ring gears
3. Excessive backlash between pinion and ring gear
4. Oil level too low

Final drive oil leak
1. Clogged breather
2. Oil level too high
3. Seals damaged

Soft suspension
– Weak spring

Head suspension
– Bent shock absorber

Suspension noise
1. Shock case binding
2. Loose fasteners

REAR WHEEL

REMOVAL

Raise the rear wheels off the ground with a jack and place a block under the engine.

Remove the wheel nuts and wheels.

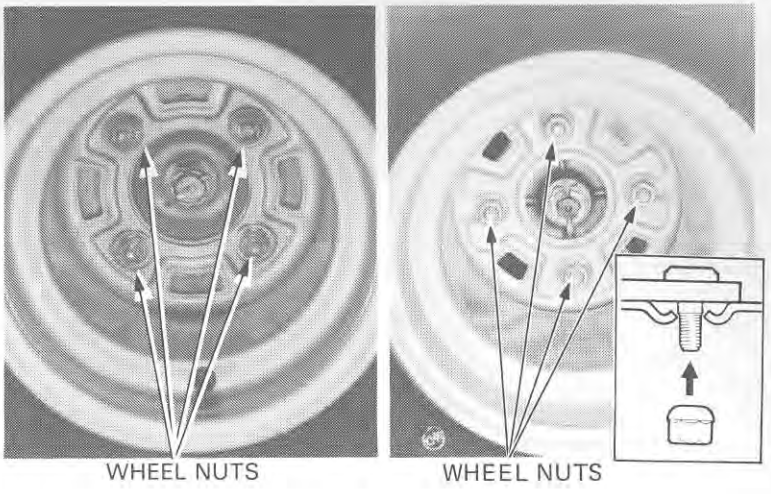
INSTALLATION

Install the rear wheel with the tire valve facing out.

'85: Install the wheel nuts and tighten them.
After '85: Install the wheel nuts with their tapers on the inside and tighten them.

TORQUE: 50–60 N·m
(5.0–6.0 kg-m, 36–43 ft-lb)
AFTER '85:
60–70 N·m (6.0–7.0 kg-m,
43–51 ft-lb)

'85: AFTER '85:



REAR BRAKE

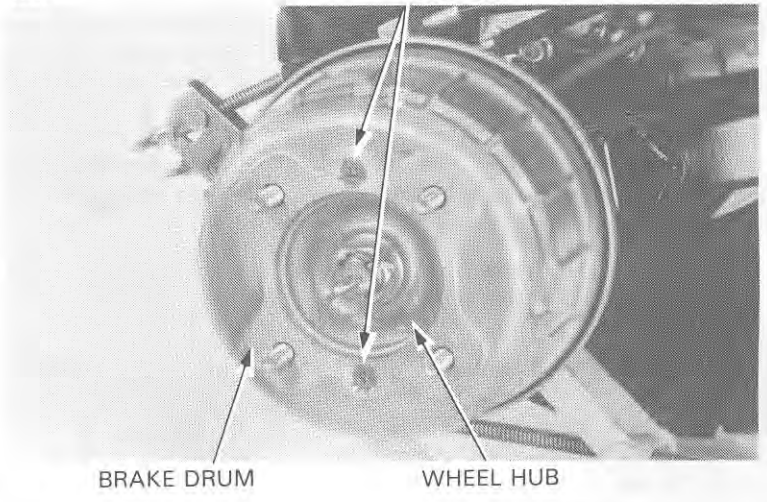
BRAKE DRUM REMOVAL

'85:

Remove the right rear wheel.

Remove the two screws attaching the brake drum and the drum from the wheel hub.

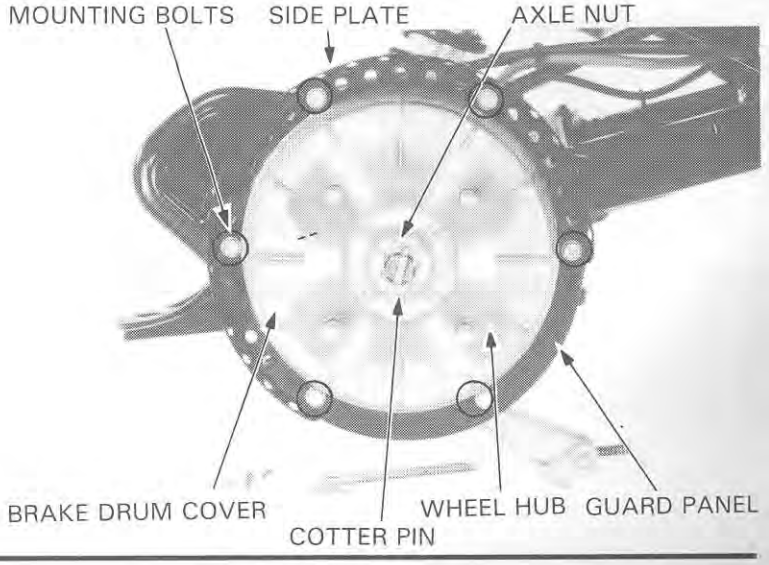
'85:



After '85

Remove the right rear wheel.
Remove the cotter pin and axle nut.
Remove the wheel hub.
Remove the side pleat and guard panel by remove the mounting bolts.

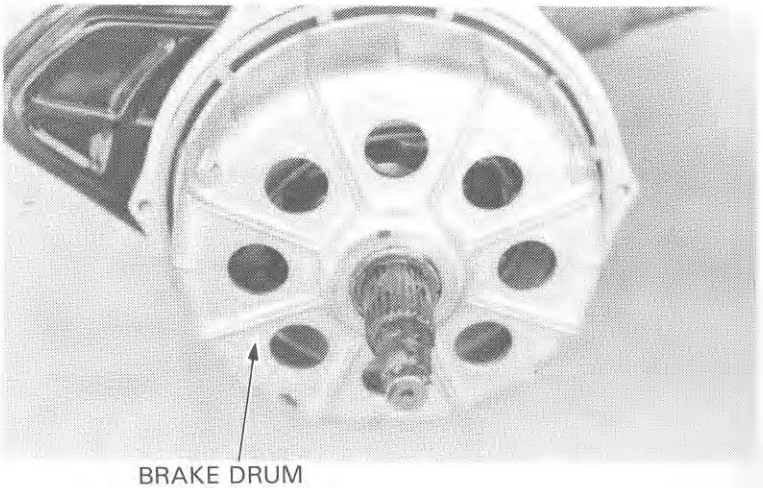
AFTER '85:



Remove the brake drum cover.

BRAKE DRUM COVER

Remove the brake drum.



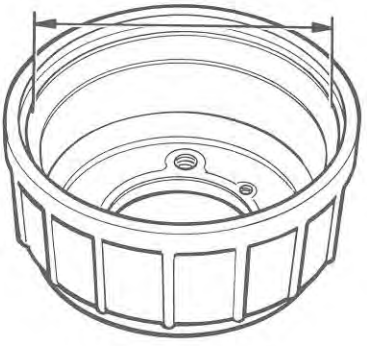
BRAKE DRUM

BRAKE DRUM INSPECTION

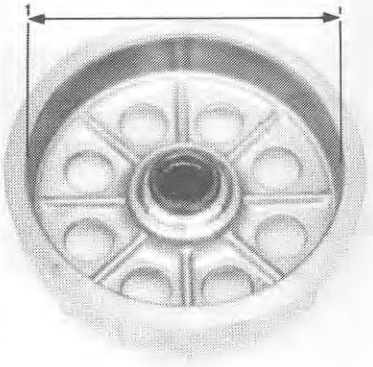
Measure the I.D. of the brake drum.

SERVICE LIMIT: 161 mm (6.34 in)

'85:



AFTER '85:



BRAKE LINING INSPECTION

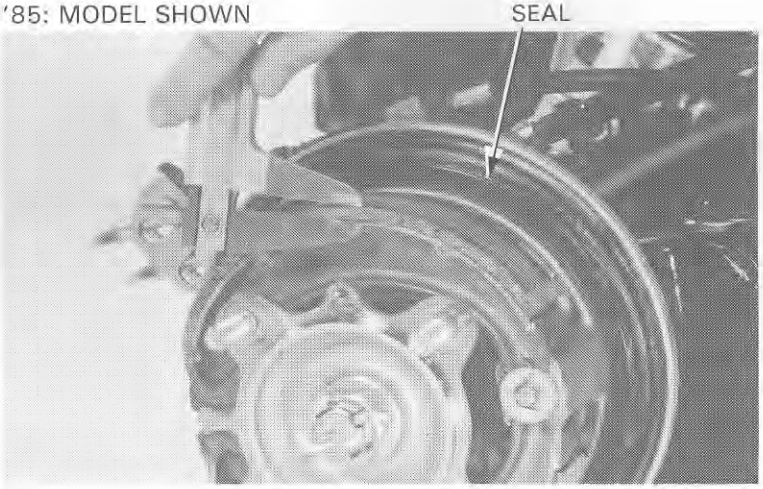
Measure the brake lining thickness.

SERVICE LIMIT: 2 mm (0.1 in)

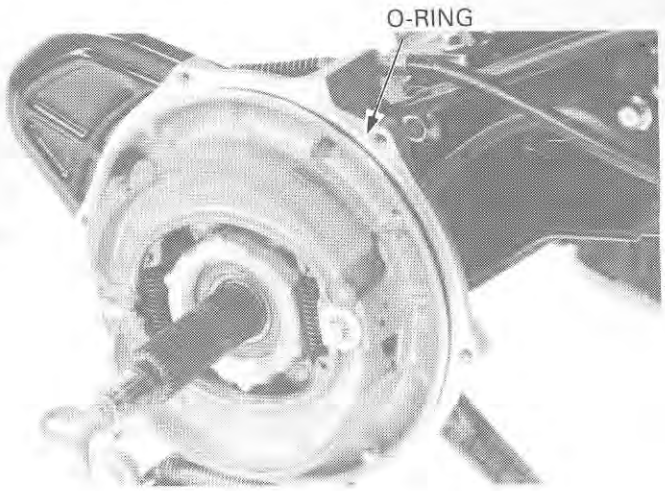
BRAKE DRUM SEAL INSPECTION

'85:
Check the brake drum seal for wear or damage and replace it and the seal ring on the brake drum as a set, if necessary (page 12-9).

'85: MODEL SHOWN

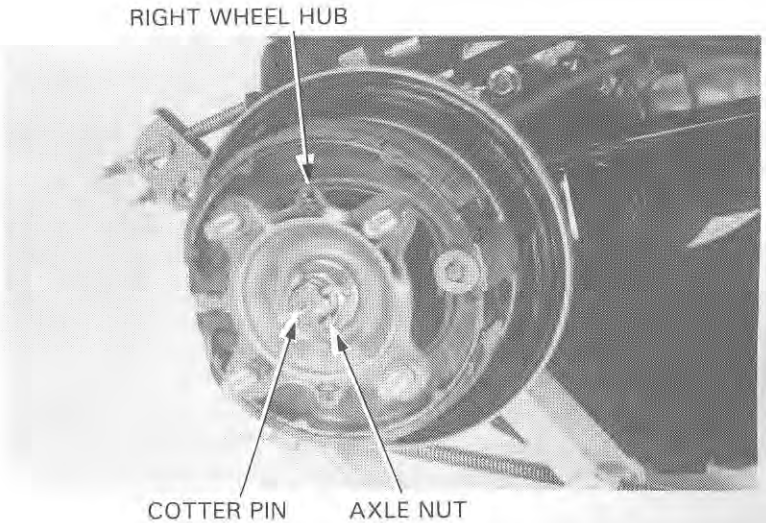


After '85:
Check the rear brake panel O-ring for wear or damage and replace if necessary.

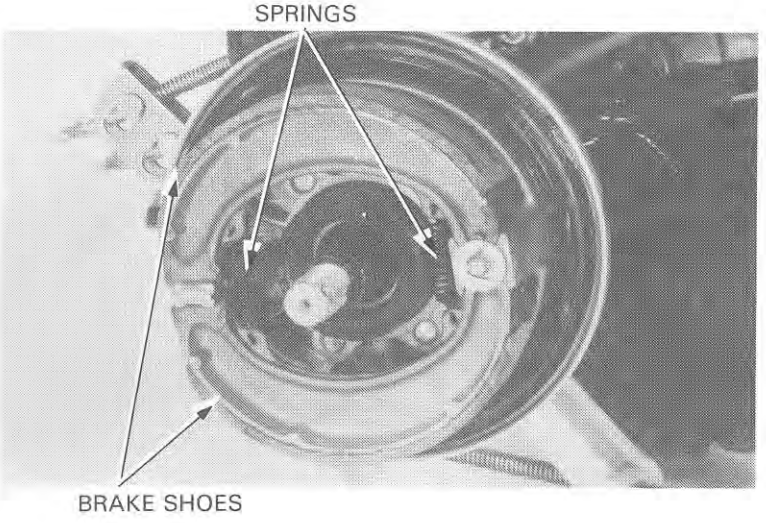


REAR BRAKE DISASSEMBLY

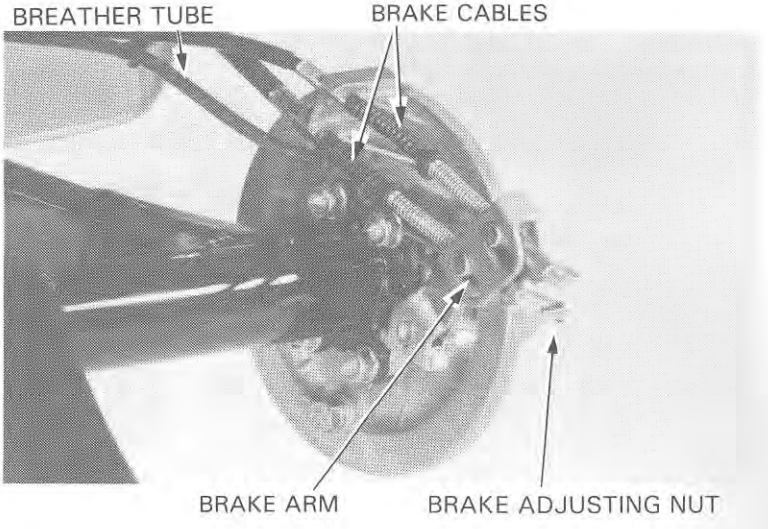
'85:
Remove the brake shoes and springs.



Remove the cotter pin, axle nut and right wheel hub.

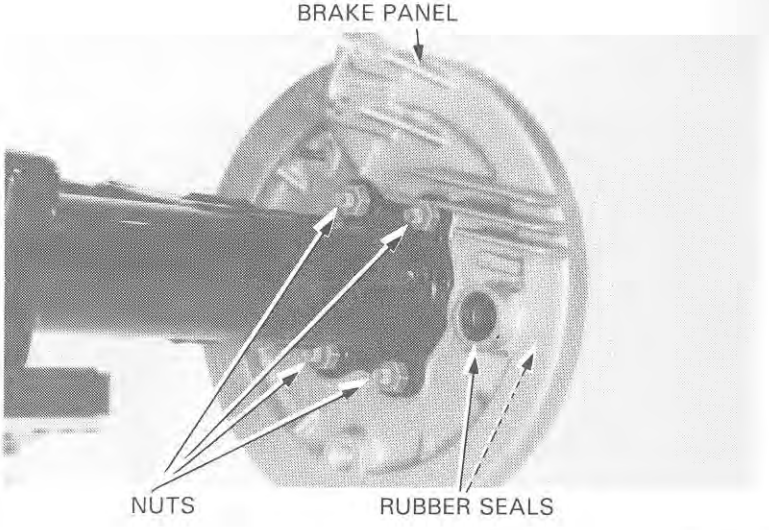


Remove the brake adjusting nut and disconnect the rear brake cables from the brake arm.
Disconnect the breather tube.
Remove the brake arm bolt, nut, brake arm, wear indicator plate, spring, brake cam and felt seal.

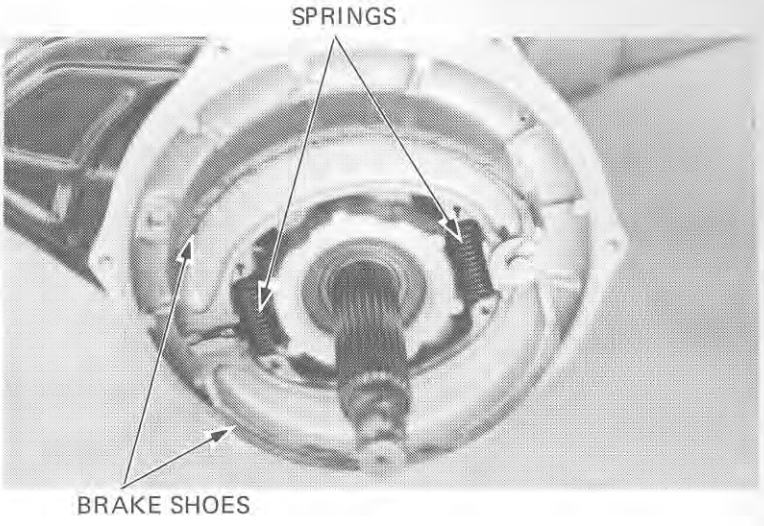


Check the rubber seals for wear or damage and replace if necessary.

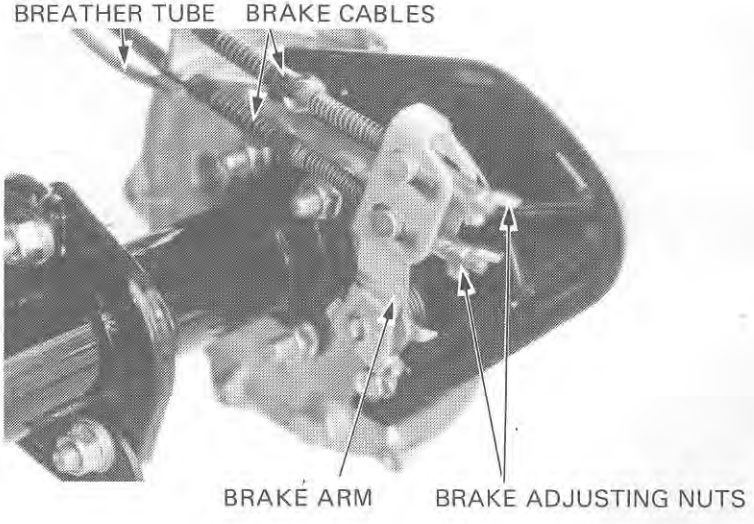
Remove the brake panel mounting nuts and the brake panel.



After '85:
Remove the brake shoes and springs.

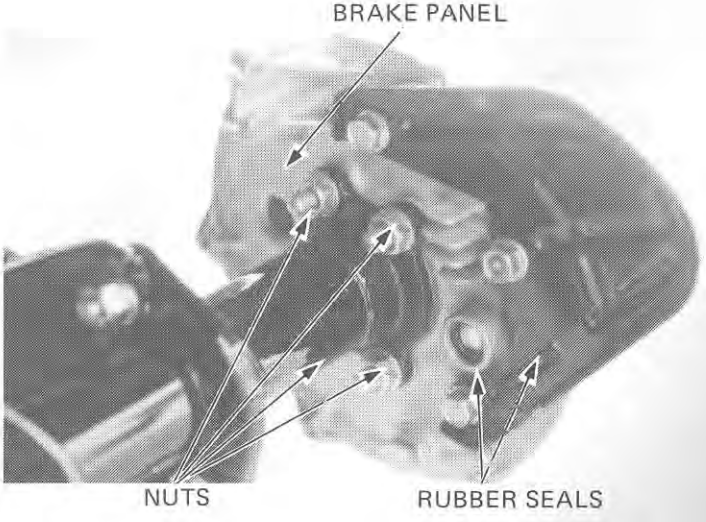


Remove the brake adjusting nut and disconnect the rear brake cables from the brake arm.
Disconnect the breather tube.
Remove the brake arm bolt, nut, brake arm, wear indicator plate, spring, brake cam and felt seal.



Check the rubber seals for wear or damage and replace if necessary.

Remove the brake panel mounting nuts and the brake panel.



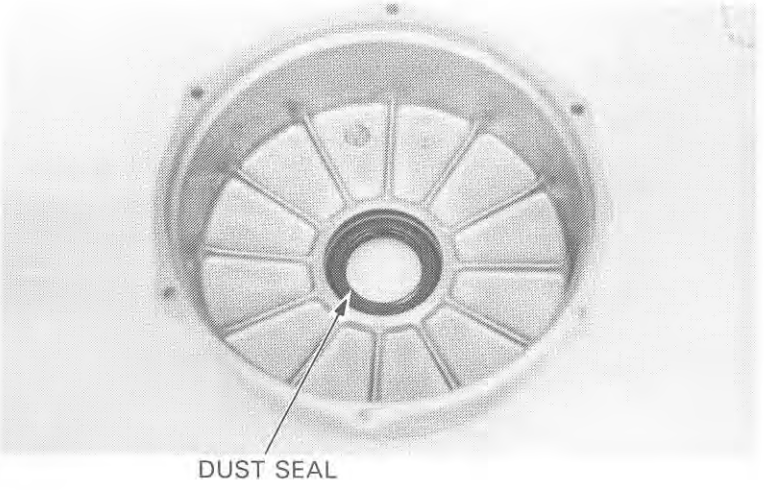
BRAKE DRUM/COVER INSPECTION

AFTER '85:

Check the brake drum cover dust seal for damage and replace, if necessary.
Remove the dust seal from the brake drum cover.
Install the dust seal into the brake drum cover using the attachment and driver.
Apply grease to new dust SEAL lip.

TOOLS

Attachment	**07965–SA00600**
Driver	**07749–0010000**

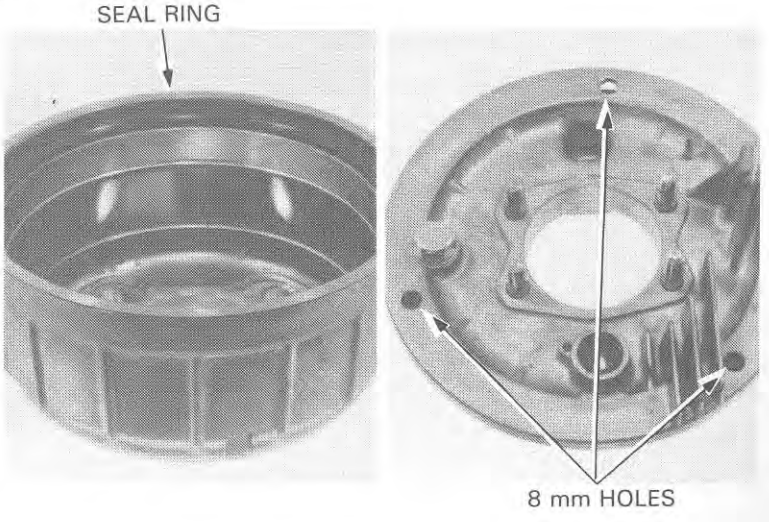


BRAKE DRUM WATER SEAL REPLACEMENT

'85:

Remove the seal ring from the brake drum.

Drive the water seal out through the three 8 mm holes in the brake panel.



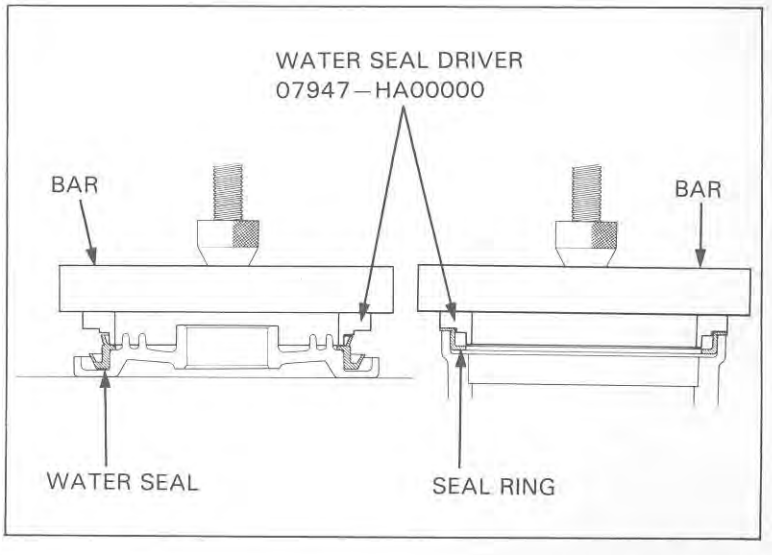
Apply a soap and water solution to the new drum seal and seal ring.

Press the drum seal onto the brake panel using the special tool and a suitable bar until it seats fully.

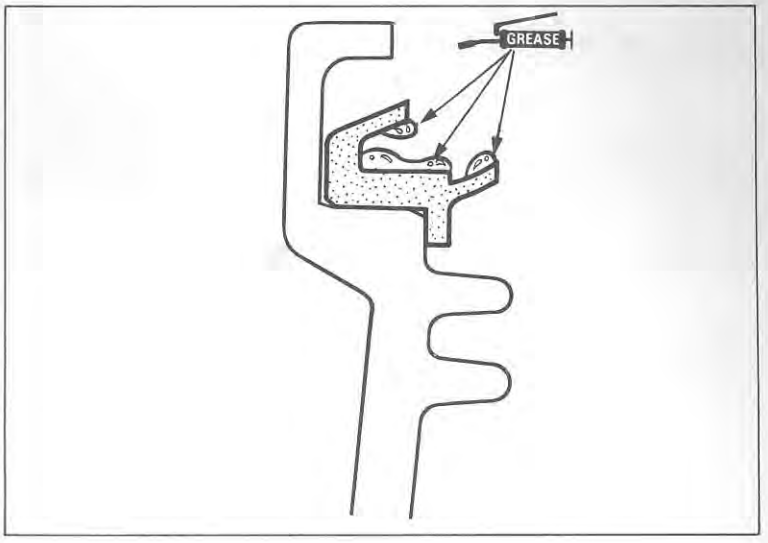
Make sure that there is no clearance between the brake panel and the drum seal .

Press the seal ring onto the brake drum using the same tool until it seats fully.

Make sure that there is no clearance between the drum and the seal ring.



Pack grease in the cavity and lips of the drum seal as shown.

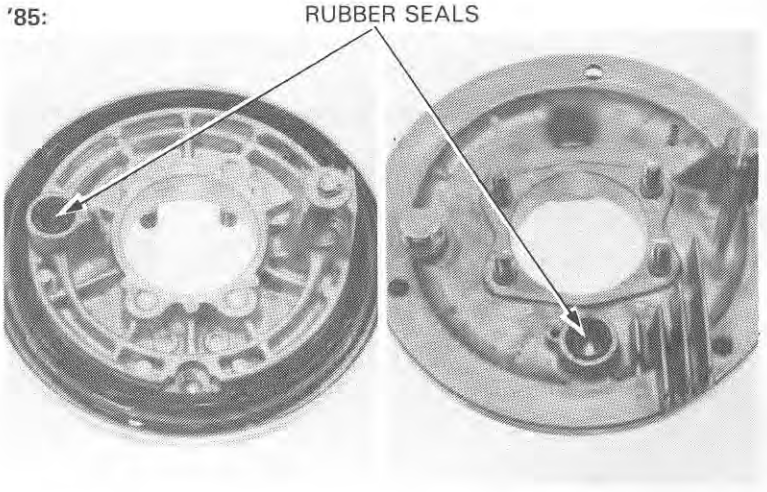


REAR BRAKE ASSEMBLY

'85:

Apply grease to new rubber seal and install them into the brake panel.

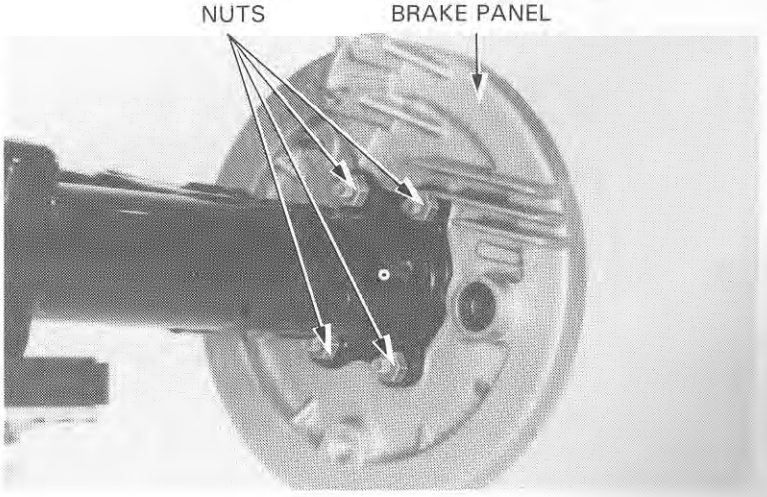
'85:



Clean the mating surfaces between the swingarm, the right bearing housing and the brake panel.
Apply liquid sealant to mating surfaces.

Install the brake panel and right bearing housing onto the swingarm.

TORQUE: 50–60 N·m
(5.0–6.0 kg-m, 36–43 ft-lb)

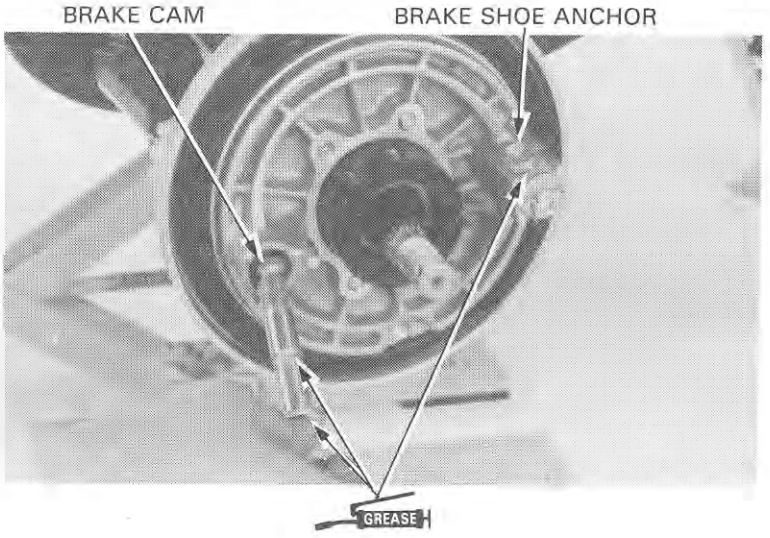


Apply grease to the brake shoe anchor and brake cam.

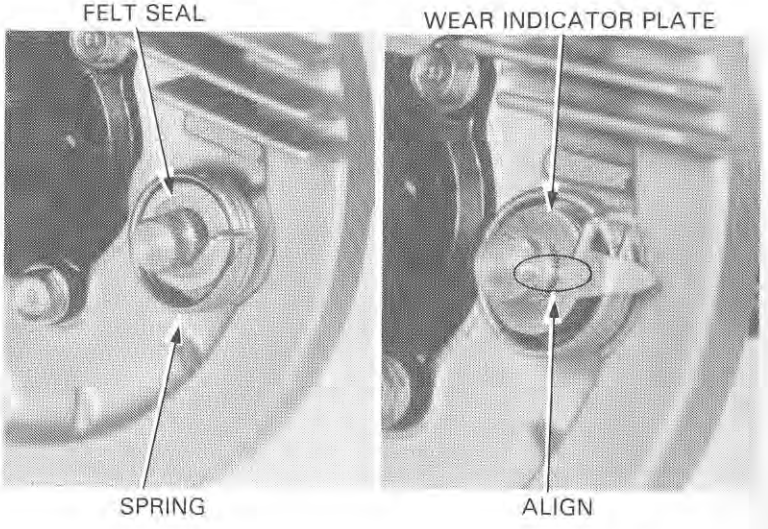
WARNING

Contaminated brake linings reduce stopping power. Keep grease off the linings. Wipe excess grease off the cam.

Install the brake cam.



Install the felt seal, spring and wear indicator plate, aligning its wide tooth with the wide groove on the brake cam.

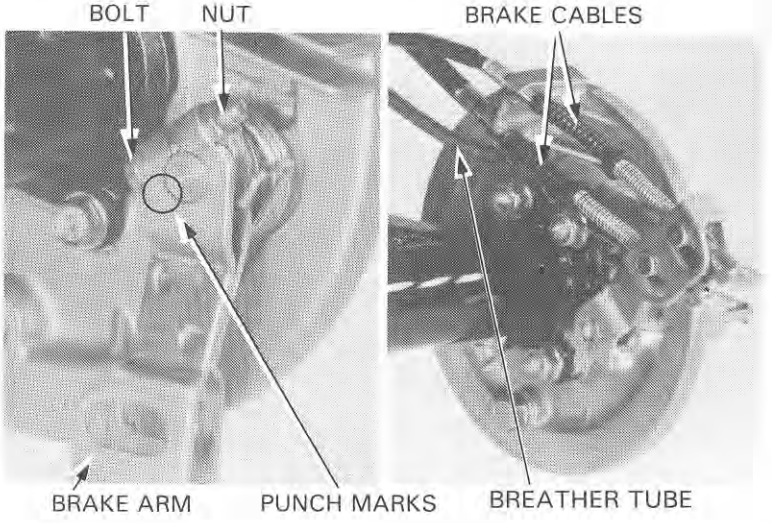


Install the brake arm, aligning the punch marks on the brake cam and arm.

Secure the brake arm using the bolt and nut.

Connect the brake cables to the brake arm.

Connect the breather tube.



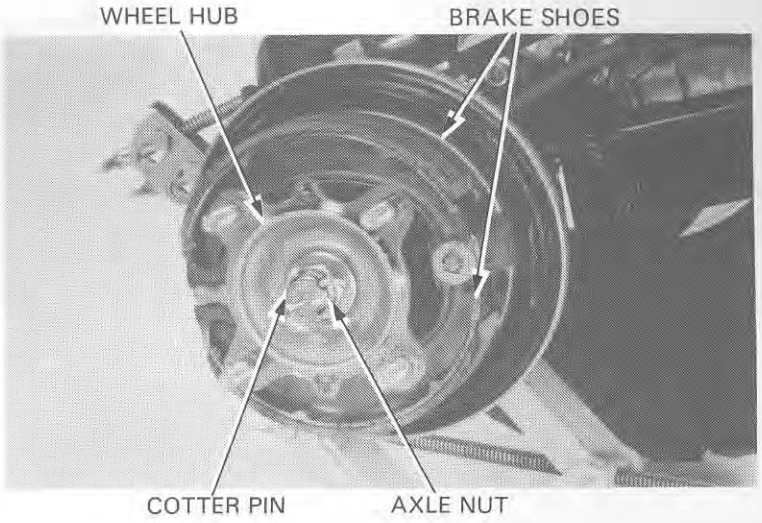
Install the brake shoes and springs.
Install the right wheel hub and axle nut.

TORQUE: 80—120 N·m (8.0—12.0 kg-m, 58—87 ft-lb)

Install a new cotter pin.

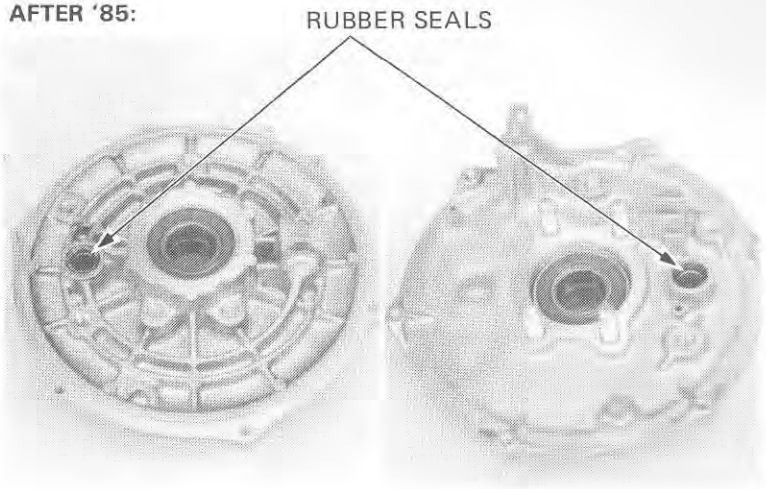
Clean the mating surfaces between the brake drum and the wheel hub and apply liquid sealant to them.

Install the brake drum and two screws.



After '85:
Apply grease to new rubber seals and install them into the brake panel.

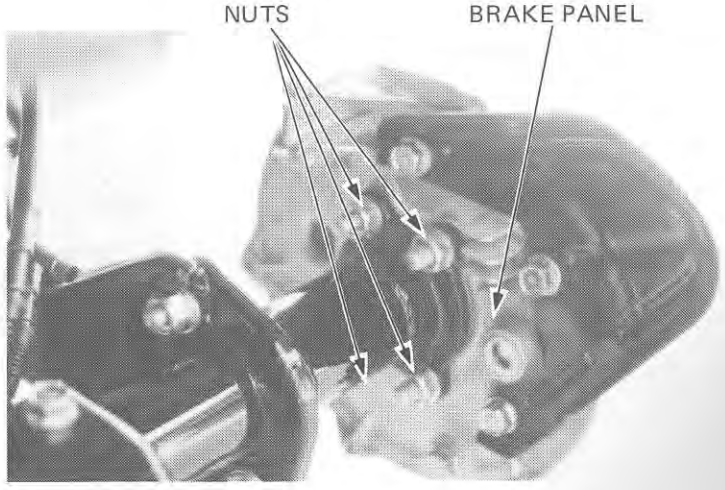
AFTER '85:



Clean the mating surfaces between the swing arm and the brake panel.
Apply liquid sealant to the mating surfaces.

Install the brake panel onto the swingarm.

TORQUE: 50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)

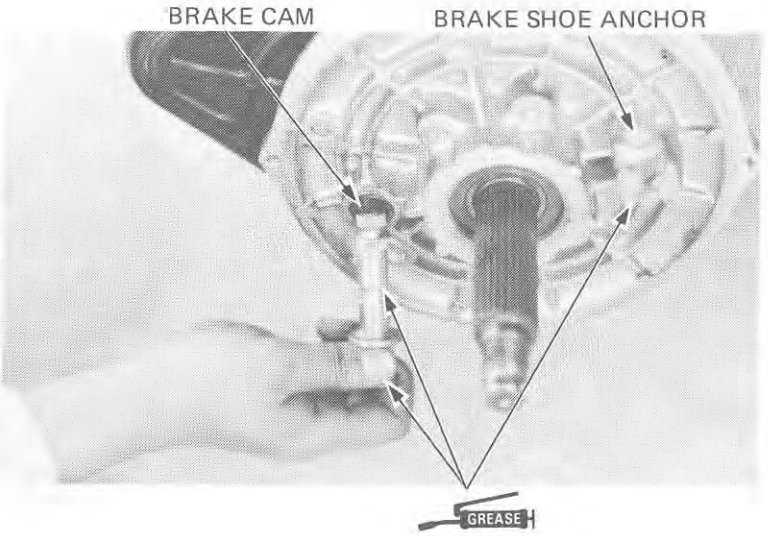


Apply greast to the brake shoe anchor and brake cam.

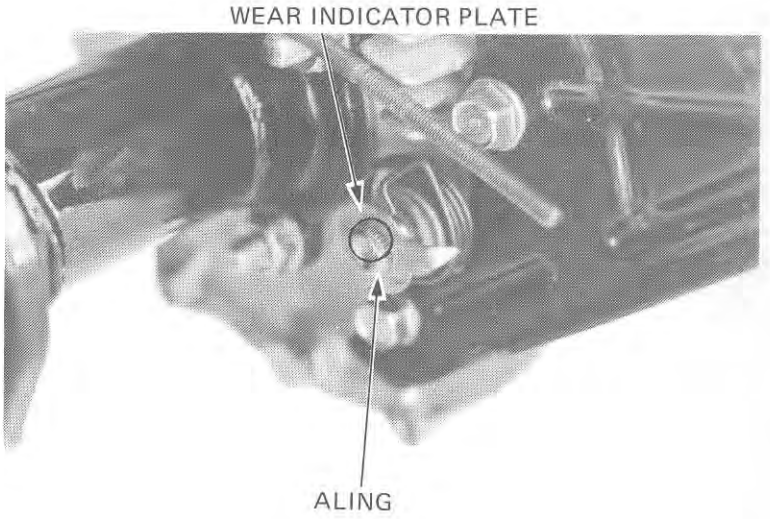
WARNING

Contaminated brake linings reduce stopping power. Keep grease off the linings. Wipe excess grease off the cam.

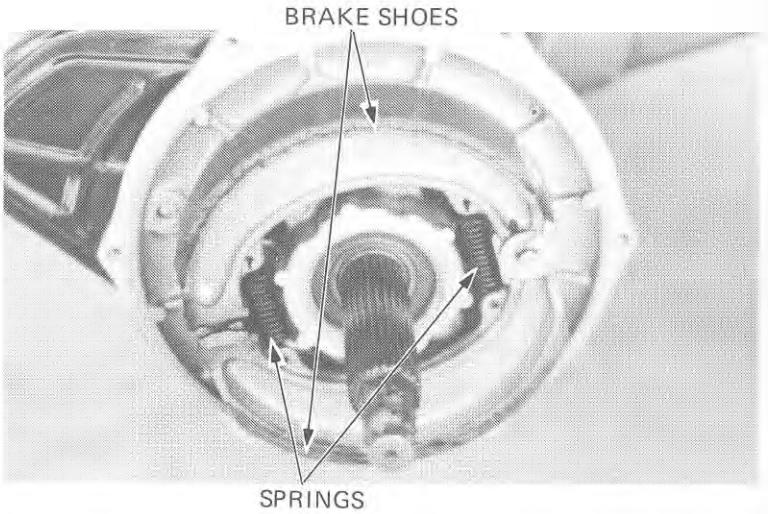
Install the brake cam.



Install the felt seal, spring and wear indicator plate, aligning its wide tooth with the wide groove on the brake cam.



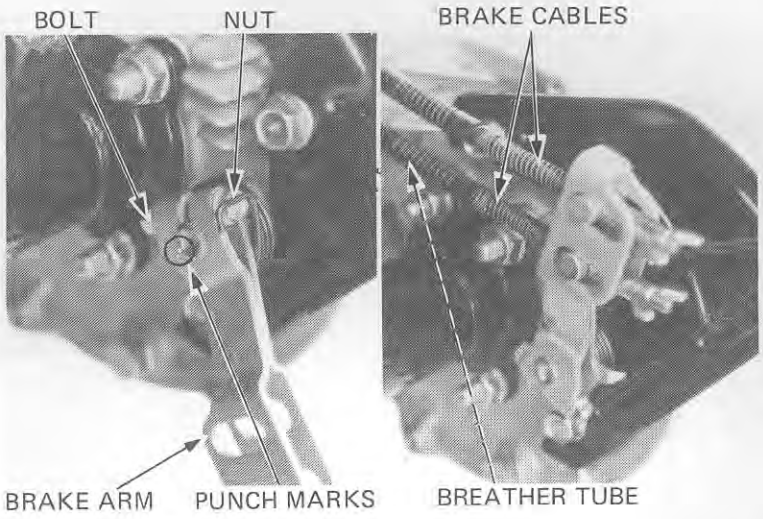
Install the brake shoes and springs.



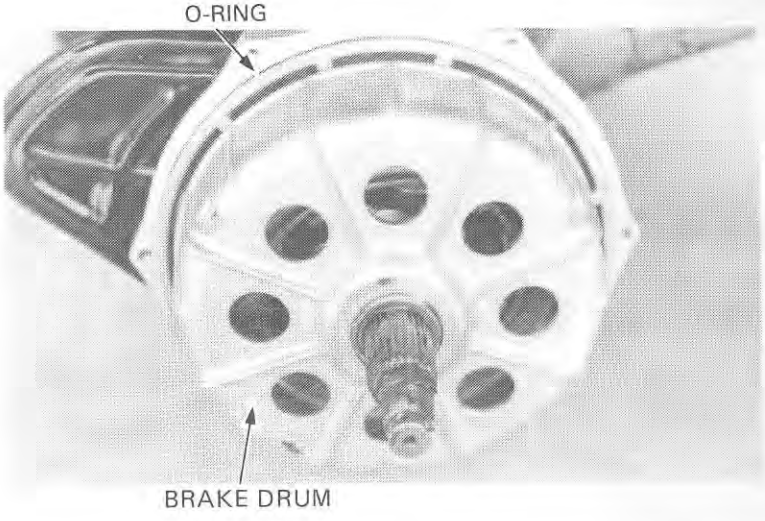
Install the brake arm, aligning the punch marks on the brake cam and arm.

Secure the brake arm using the bolt and nut.

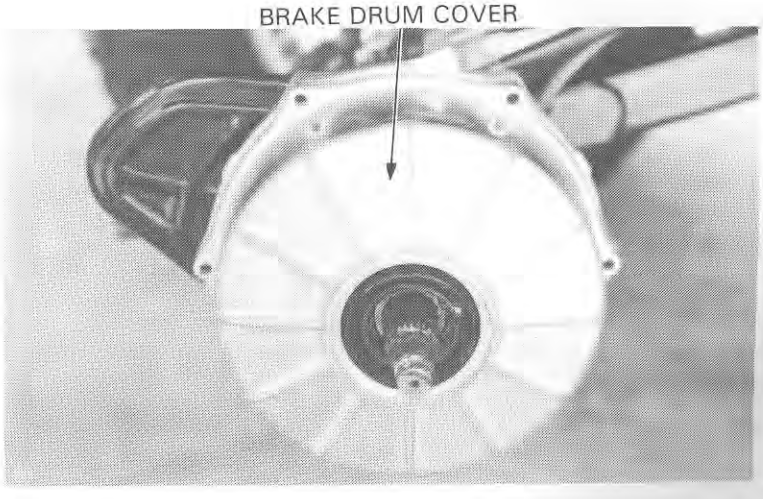
Connect the brake cables to the brake arm.
Connect the breather tube.



Install the O-ring.
Install the brake drum.



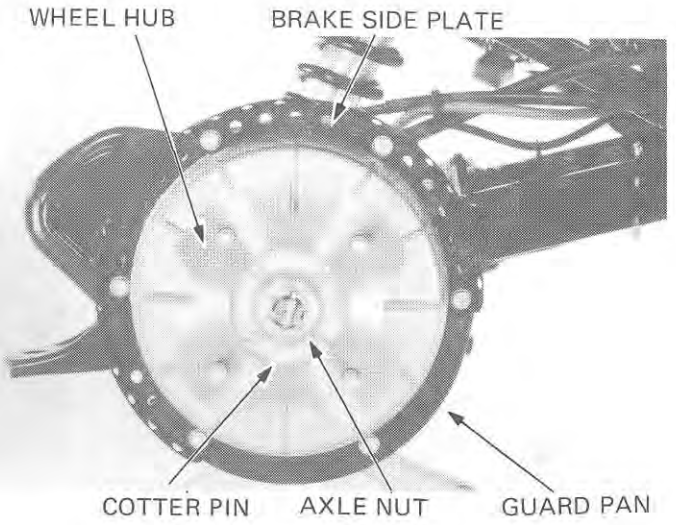
Install the brake drum cover.



Install the brake side plate and guard panel.
Install the right wheel hub and axle nut.

TORQUE: 80–140 N·m
(8.0–14.0 kg-m, 58–101 ft-lb)

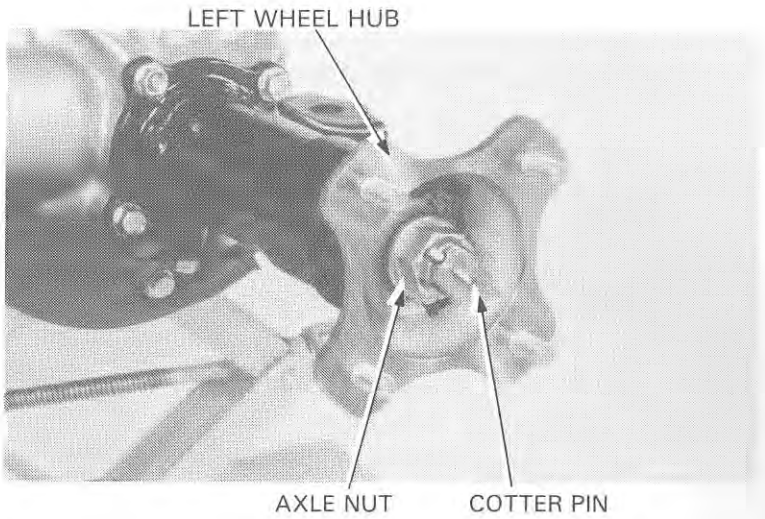
Install a new cotter pin.
Install the wheel.



REAR AXLE/WHEEL BEARINGS

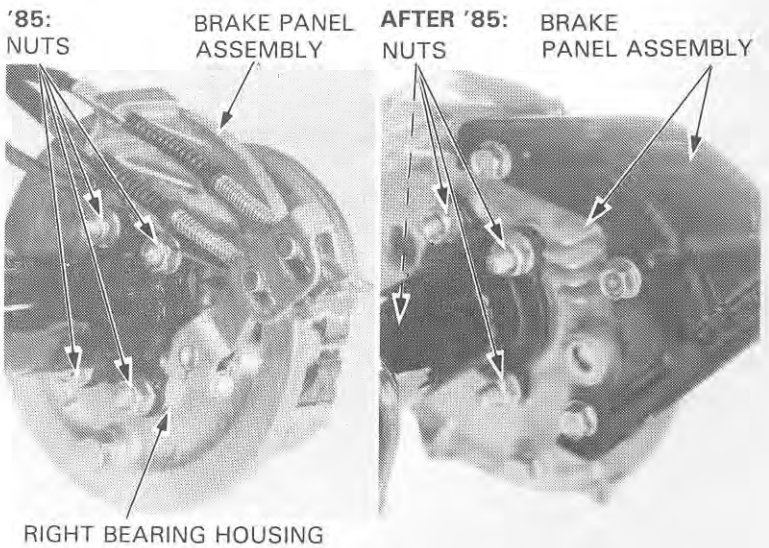
REMOVAL

Remove the following:
- right and left rear wheels (page 12-4).
- brake drum (page 12-4).
- cotter pins, axle nuts and both wheel hubs from the axle shaft.



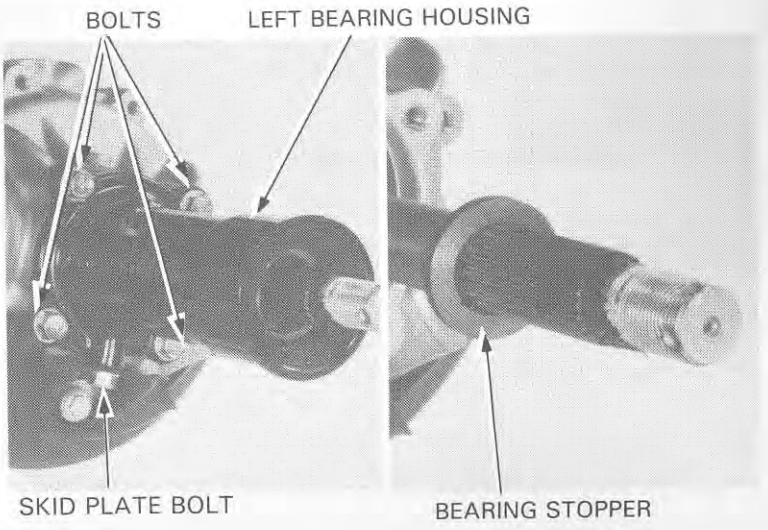
Remove the brake panel mount nuts, brake panel assembly and right bearing housing.

After '85:
Remove the brake panel mount nuts, and the brake panel assembly.



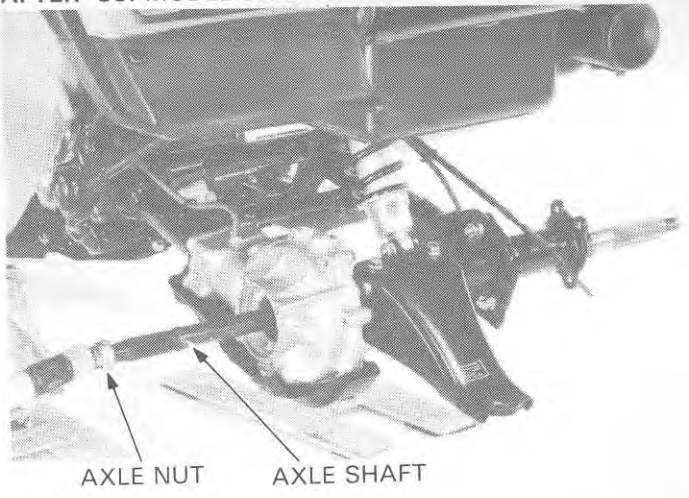
Remove the skid plate bolt, left bearing housing mounting bolts and the bearing housing from the swingarm.

Remove the bearing stopper from the axle shaft.



Install the axle nut on the end of the axle and drive the axle shaft out using a plastic hammmer.

AFTER '85: MODEL SHOWN

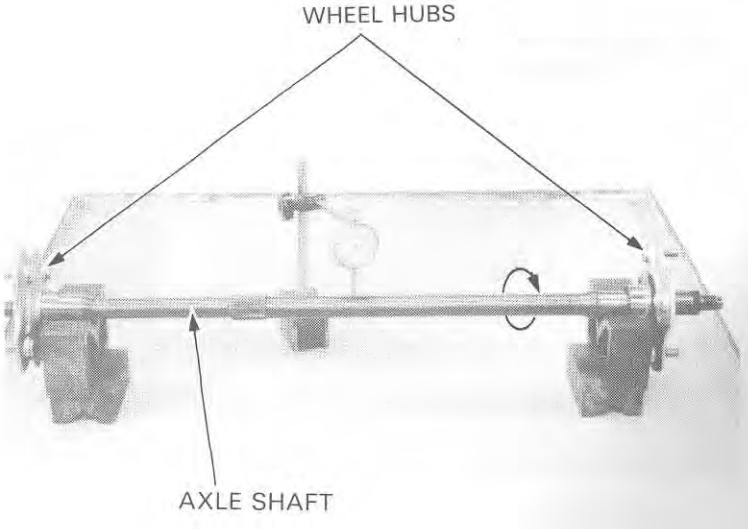


REAR AXLE INSPECTION

Install the wheel hubs onto both ends of the axle.

Place the rear axle in V-blocks and measure the runout.

SERVICE LIMIT: 3.0 mm (0.12 in)



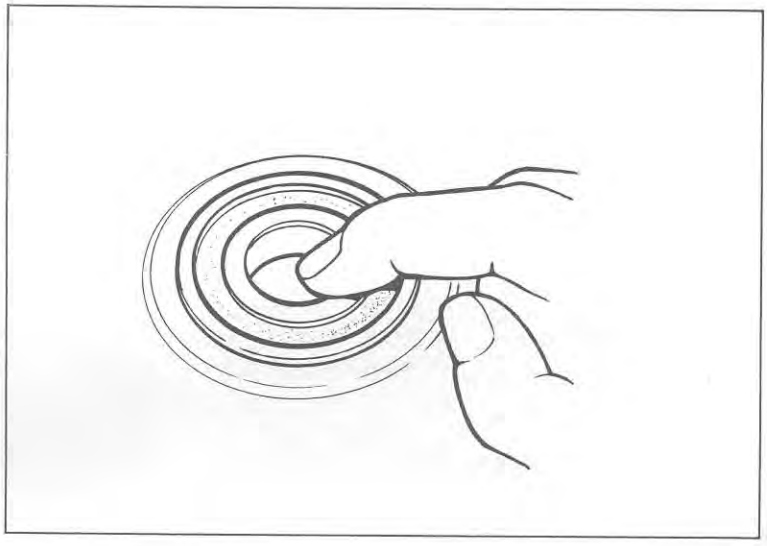
BEARING INSPECTION

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the left and right bearing housings ('85) or brake panel and left bearing housing (After '85).
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the left and right bearing housings ('85) or brake panel and left bearing housing (After'85).

NOTE:

Replace flange bearings in pairs.

For replacement to bearing see page 12-17 and 12-18.



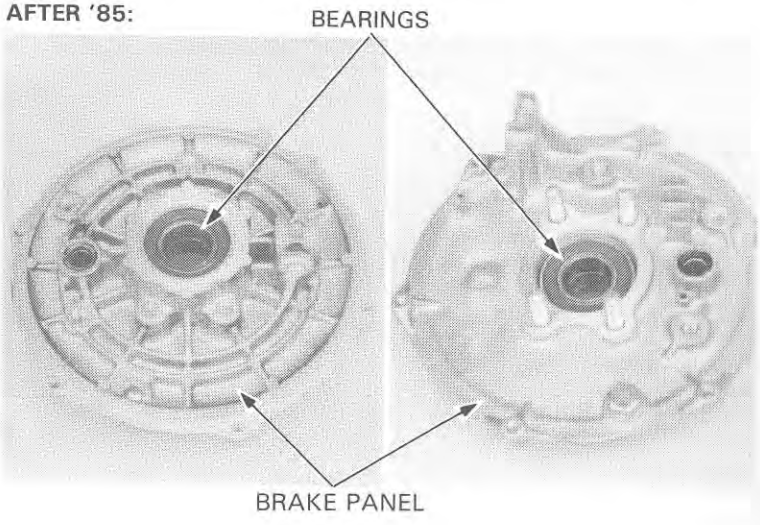
After '85:

Drive the bearings out.
Drive the new bearings into the panel with the sealed side out-ward each other.

TOOLS

Driver	**07749—0010000**
Attachment 52 x 55 mm	**07746—0010400**
Pilot 28 mm	**07746—0041100 or**
Pinion gear driver	**07945—HA00000**

AFTER '85:



REAR WHEEL BEARING REPLACEMENT '85:

Remove the dust seal and drive the bearings out of the left housing with the tools listed below:

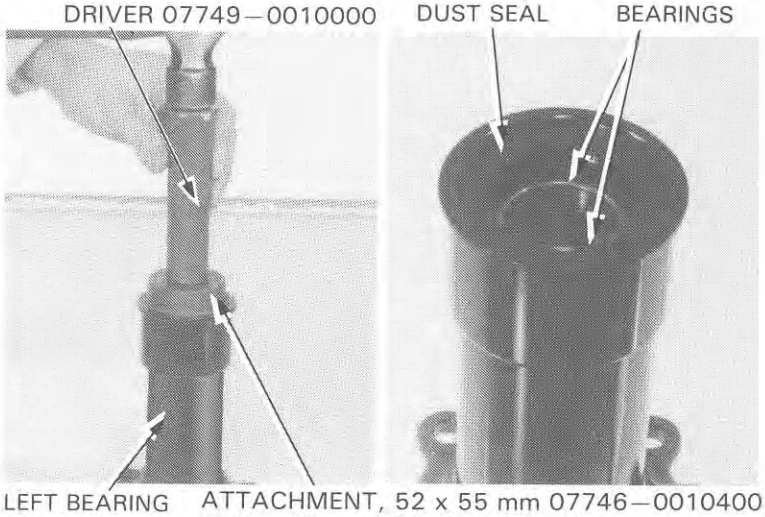
Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**
Pilot 30 mm	**07746—0040700 or**
Pinion gear driver	**07945—HA00000**

NOTE

Use the 30 mm end of the attachment as a pilot.

Drive the new bearings into the housing with the tools shown in the photographs.

Apply grease to the new dust seal and install it.



REAR WHEEL BEARING REPLACEMENT

After '85

Remove the dust seal and drive the bearings out of the left housing using attachment (07746—0010400) and driver (07749—010000).

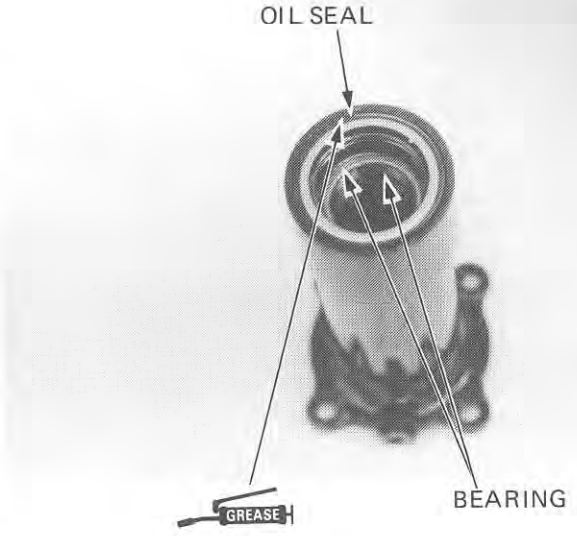
Drive the new bearings into the housing.

TOOLS

Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400 or**
Pinion gear driver	**07945—HA00000**

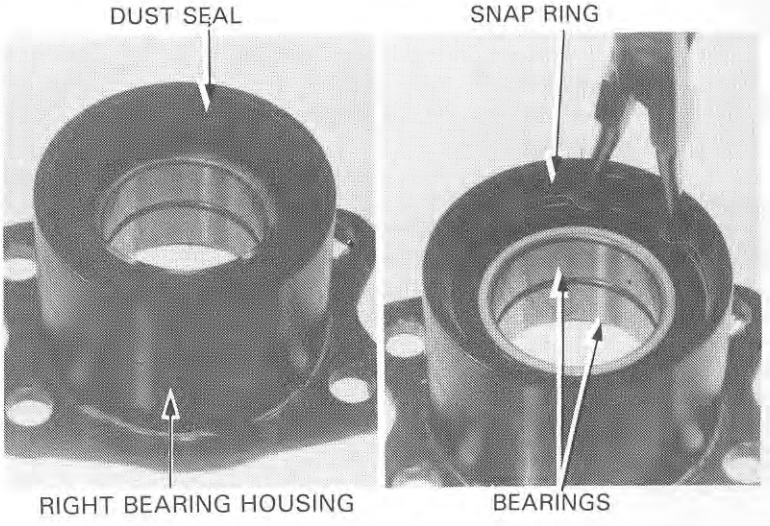
Apply grease to a new dust seal lip.

Install the dust seal until it is flush with the left bearing housing flange.

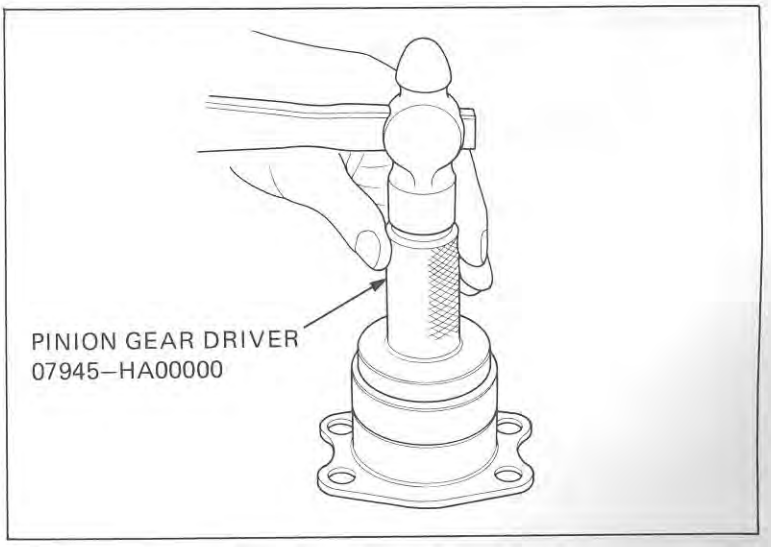


'85:

Remove the dust seal, snap ring and bearings from the right housing.



Dirve new bearings into the housing and install the snap ring. Apply grease to the new dust seal and install it.

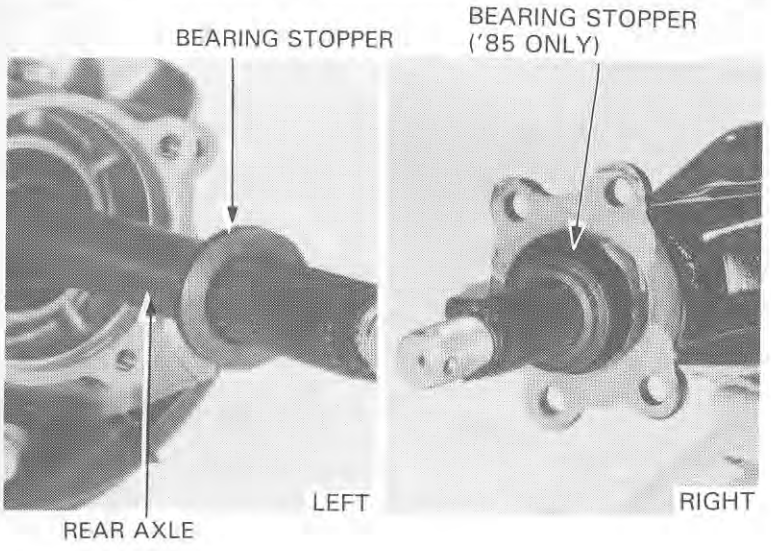


INSTALLATION

Insert the rear axle into the final gear through the swingarm.

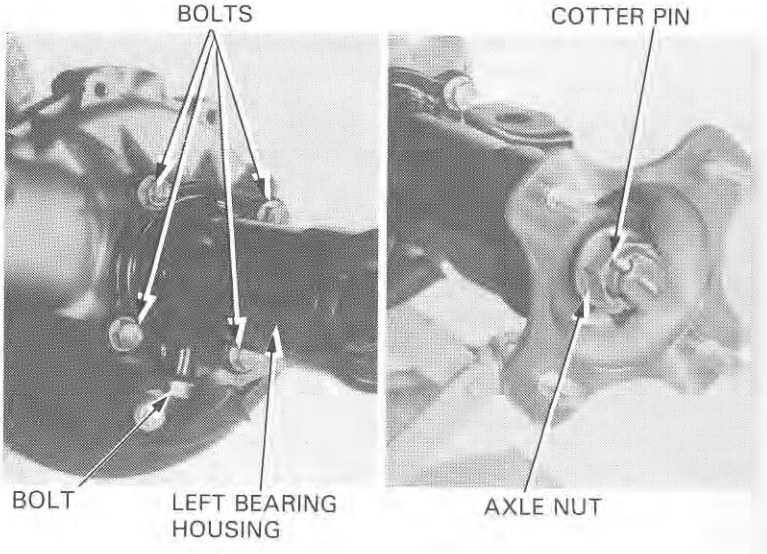
Install the bearing stopper onto the axle with their chamfers facing in.

Clean the mating surfaces of the right and left bearing housing, swingarm, final gear case and brake panel.
Apply liquid sealant to mating surfaces.



Install the following:
— left bearing housing and tighten the bolts.

TORQUE: 28—35 N·m
(2.8—3.5 kg-m, 20—25 ft-lb)
AFTER '85: 30—36 N·m
(3.0—3.6 kg-m, 22—26 ft-lb)
— right bearing housing and brake panel assembly (see pages 12-10 and 12-12).
— wheel hubs and tighten the axle nuts.
TORQUE: 80—100 N·m
(8.0—10.0 kg-m, 58—72 ft-lb)
AFTER '85: 80—140 N·m
(8.0—14.0 kg-m, 58—101 ft-lb)
— new cotter pins.
— brake drum.
— rear wheels (page 12-4).



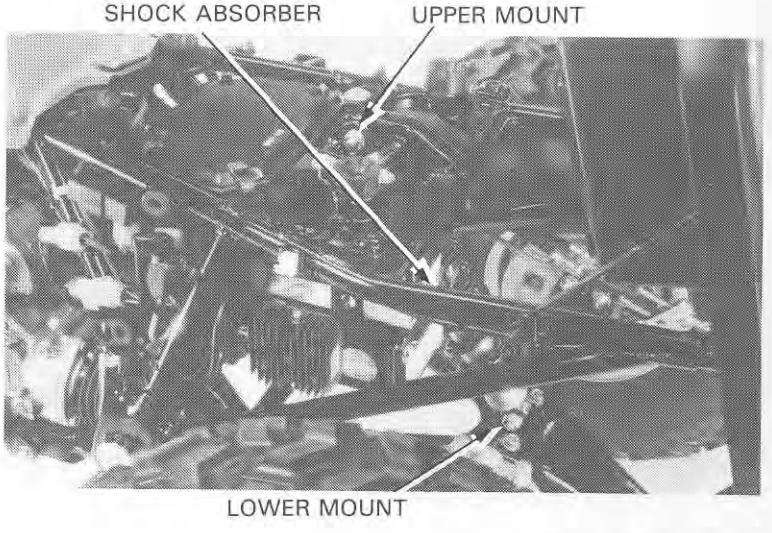
REAR SHOCK ABSORBER

REMOVAL

Raise the rear wheels off the ground with a jack and place a block under the engine.

Raise the rear fender to access the shock absorber.

Remove the rear shock absorber upper and lower mount nuts and bolts and remove the shock absorber.



DISASSEMBLY

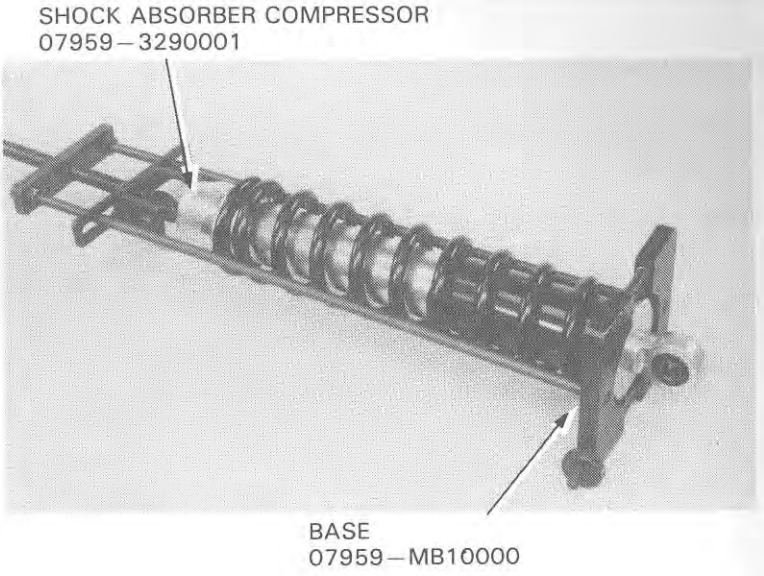
Set the shock absorber in the compressor as shown and compress the spring 20 mm.

CAUTION

Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.

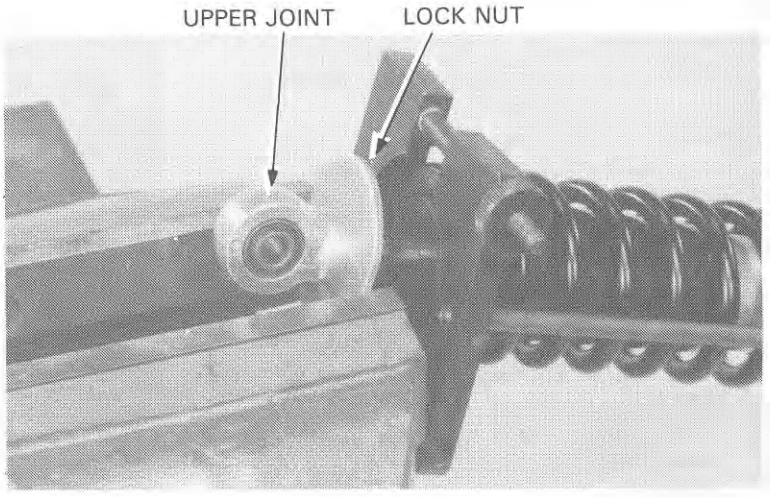
NOTE

Be sure to use base 07959–MB10000 with the compressor.



Place the shock lock nut in a vise and pull the shock rod out.

Loosen and remove the upper joint and lock nut. Remove the compressor and disassemble the rear shock absorber.

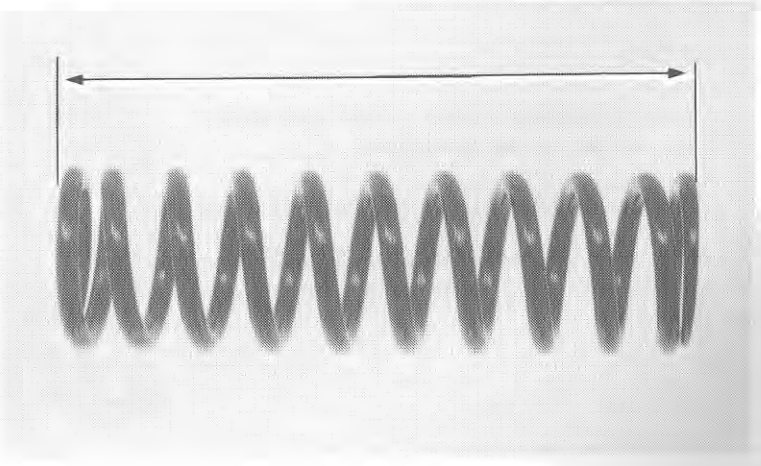


SPRING FREE LENGTH INSPECTION

Measure the rear shock absorber spring free length.

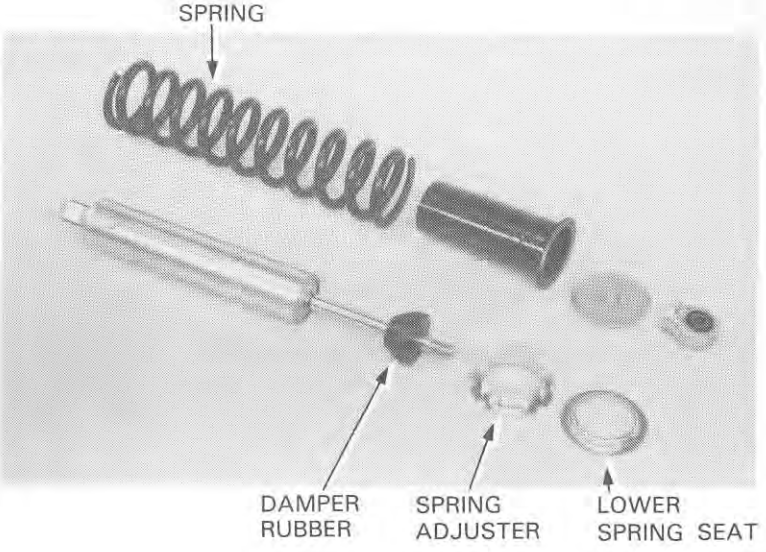
SERVICE: 269.1 mm (10.59 in)

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



ASSEMBLY

Place the spring adjuster, spring lower seat, spring, spring upper seat and damper 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.

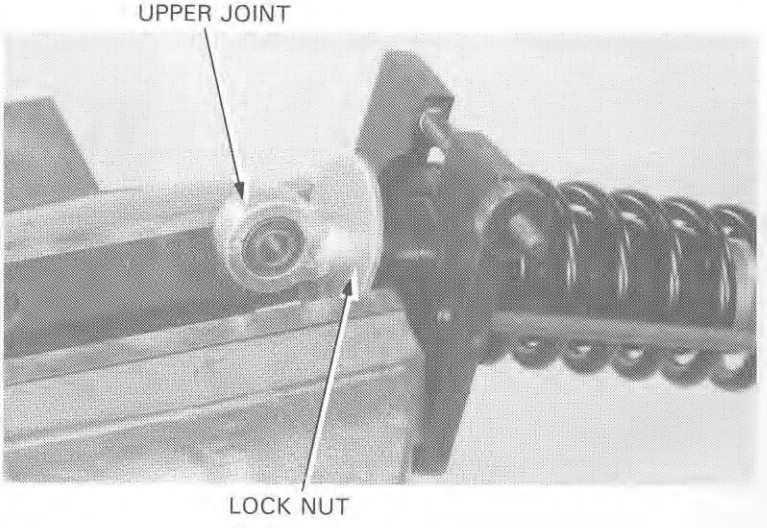
Apply a locking agent to the rod threads and install the lock nut.

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 lock nut in a vise and tighten the upper joint securely.

NOTE

Check that the lock nut is seated against the rod's bottom thread.

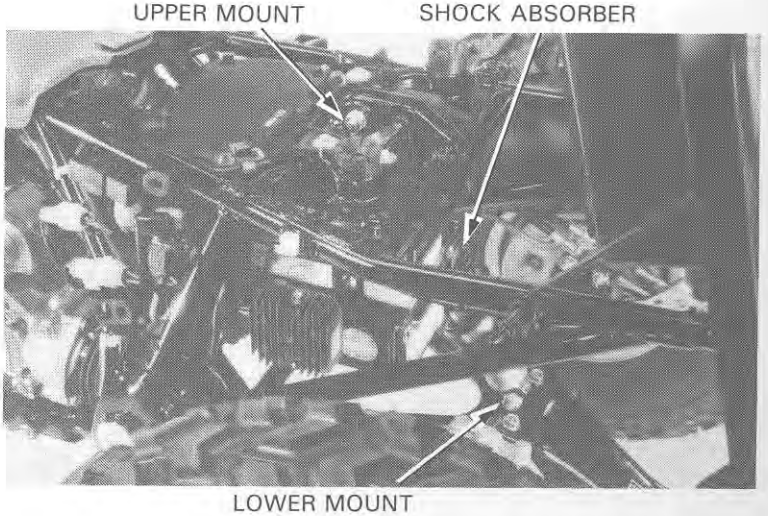


Align the spring seat with the lock nut while releasing the compressor.

INSTALLATION

Install the shock absorber onto the frame and swing arm and tighten the upper and lower mounts.

TORQUE: 50–60 N·m
(5.0–6.0 kg-m, 36–43 ft-lb)

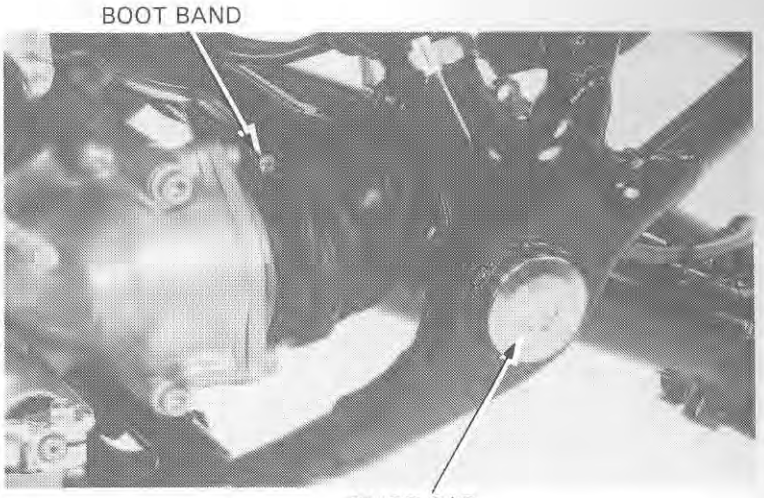


SWINGARM

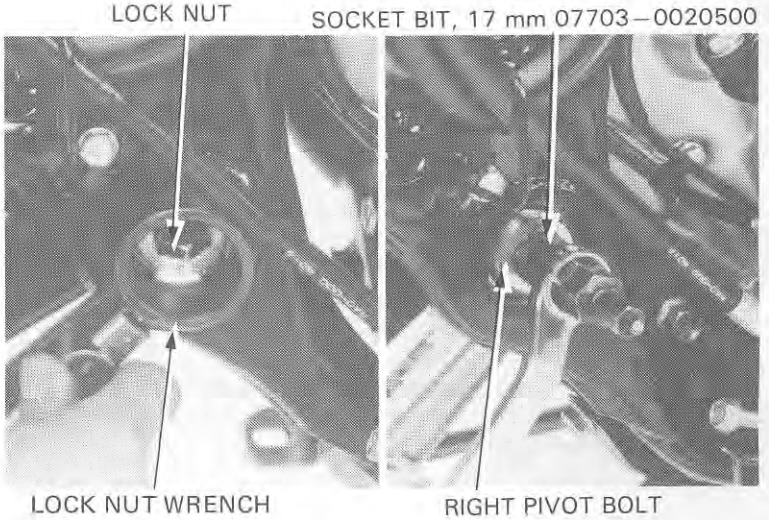
REMOVAL

Remove the following:
- rear wheel (page 12-4).
- rear brake panel assembly (page 12-4).
- rear axle (page 12-15).
- shock absorber (page 12-19).
- final drive case (page 12-25).

Loosen the swingarm boot band and remove the pivot caps.



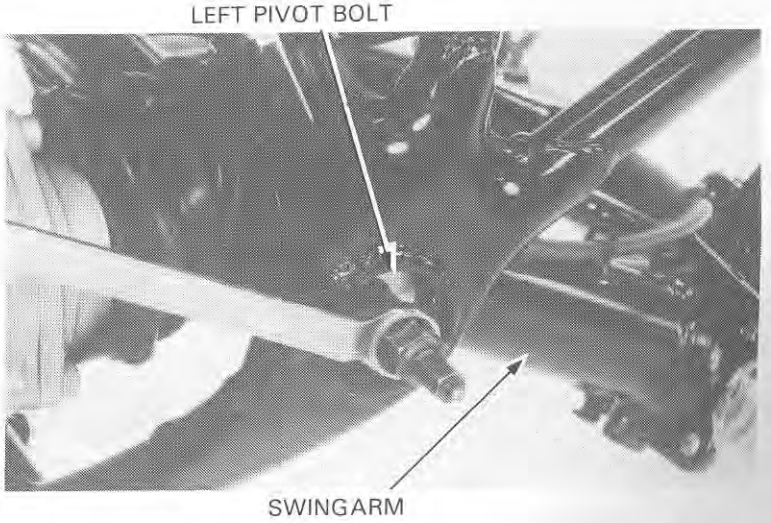
Remove the right pivot lock nut and pivot bolt.



Remove the left pivot bolt.

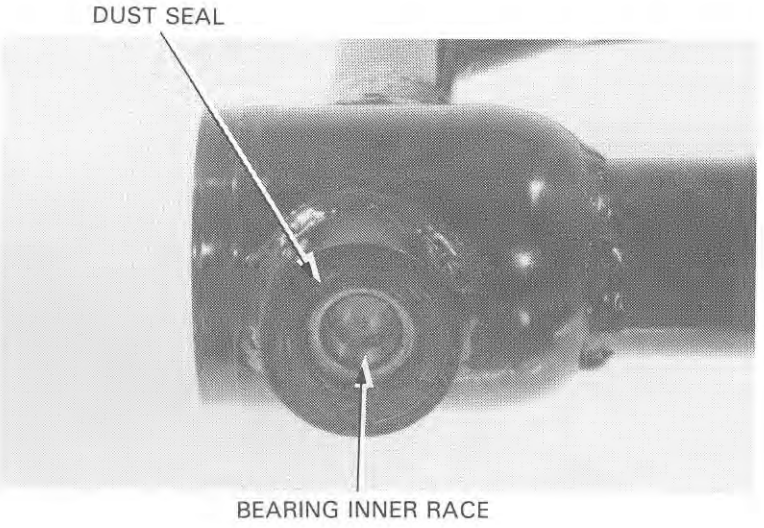
Remove the boot from the swingarm.

Have someone pull the universal joint back and hold it back to disengage the splines from the output gear case, while you remove the swingarm.



PIVOT BEARING REPLACEMENT

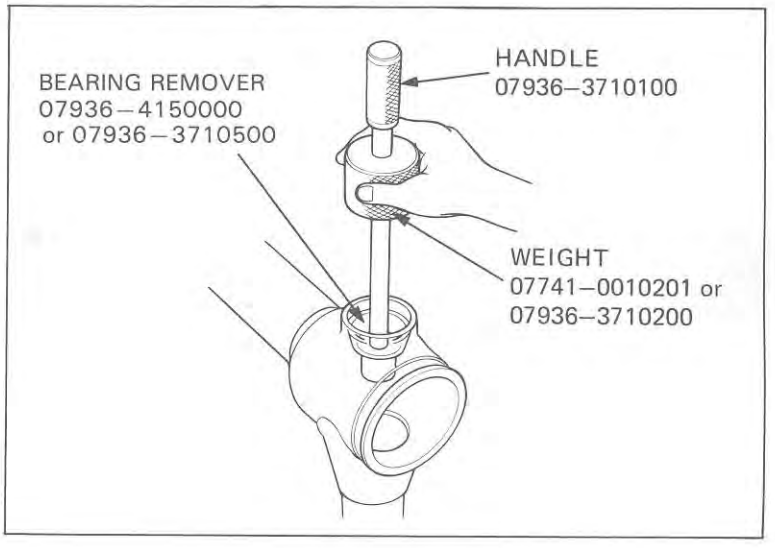
Remove the dust seals and bearing inner races from the swingarm pivot.



Punch or drill a 13 mm (1/2 in) hole into each grease retainer.

LEFT BEARING RACE:

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 attachment onto the shaft.
Install the slide hammer and handle and remove the race.



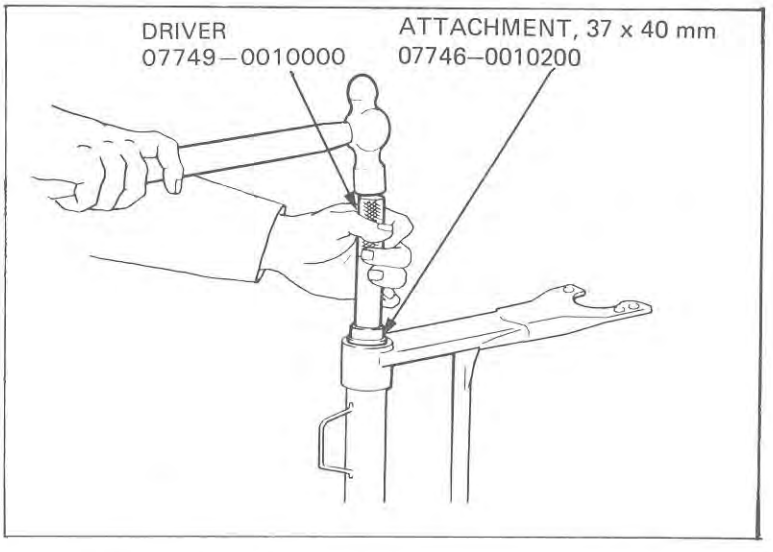
RIGHT BEARING RACE:

Slide the special tool with the attachment into the swingarm through the hole in the grease retainer.
Install the slide hammer weight on the handle and remove the race.

NOTE

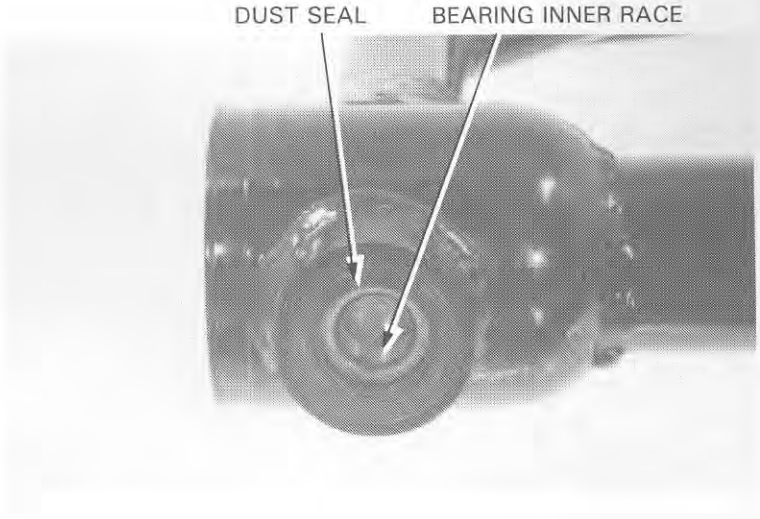
> Replace the bearing inner and outer races as a set. Replace the grease retainer plate whenever it is removed.

Install new grease retainer plates and drive new bearing outer races into the swingarm pivot.



Apply grease to the bearing inner races and dust seals.

Then install them into the swingarm.



INSTALLATION

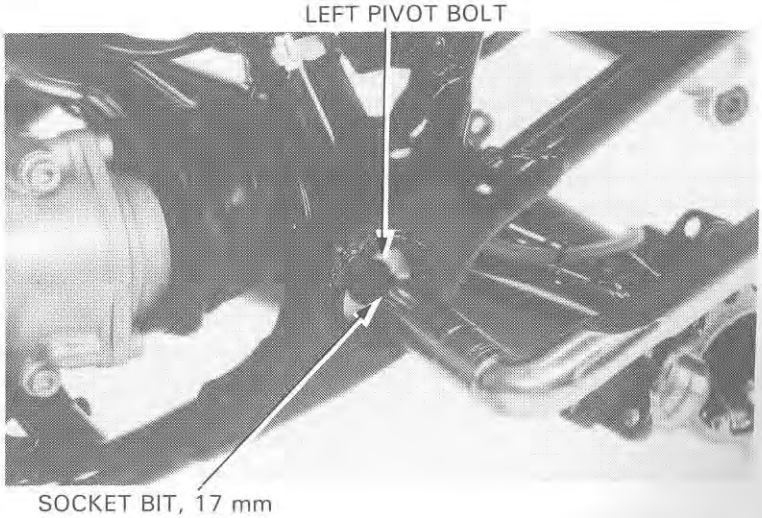
Install the swingarm boot with its "UP" mark up.

Apply grease to the pivot bolt tips.
Install the swingarm; hold the universal joint back to align and engage the splines of the output gear case.

Apply grease to the pivot bolt tips and install the swingarm.

Tighten the left pivot bolt to the specified torque.

TORQUE: 100–130 N·m
(10.0–13.0 kg-m, 72–94 ft-lb)

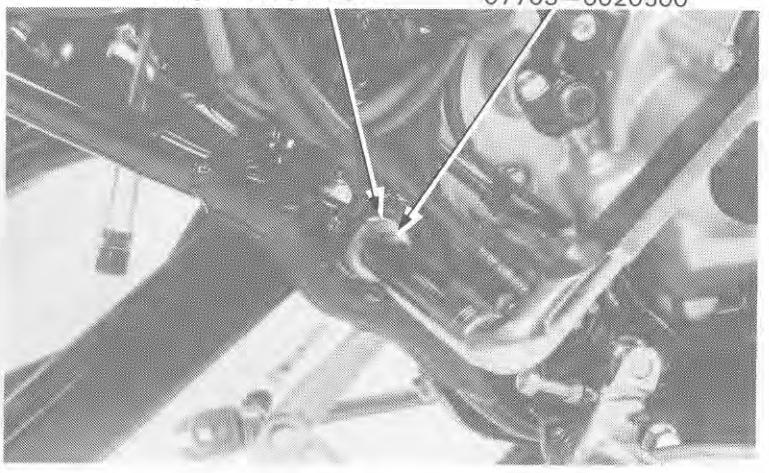


Tighten the right pivot bolt to the specified torque.

TORQUE: 16–20 N·m
(1.6–2.0 kg-m, 12–14 ft-lb)

Move the swingarm up and down several times.

Retighten the right pivot bolt to the same torque.



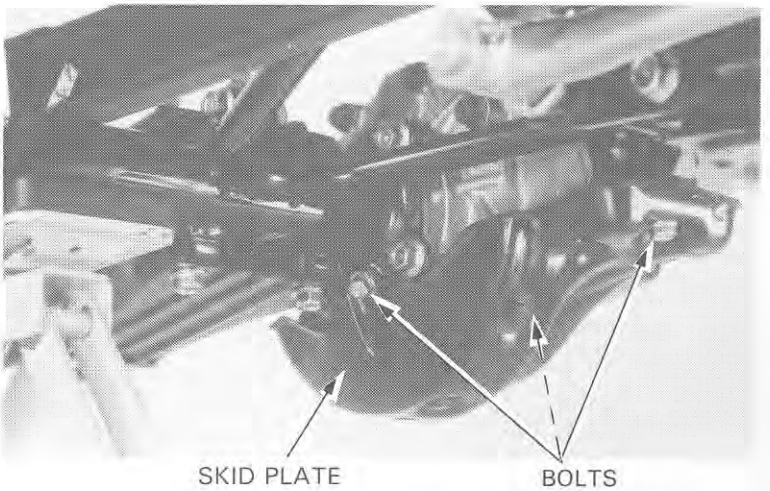
Tighten the lock nut while holding the right pivot bolt.

TORQUE: 100–130 N·m (10.0–13.0 kg-m,
72–94 ft-lb)

Install the following
– final drive (page 12-37)
– shock absorber (page 12-21)
– rear axle (page 12-19)
– rear brake panel (page 12-10)
– rear wheels (page 12-4)

FINAL DRIVE REMOVAL

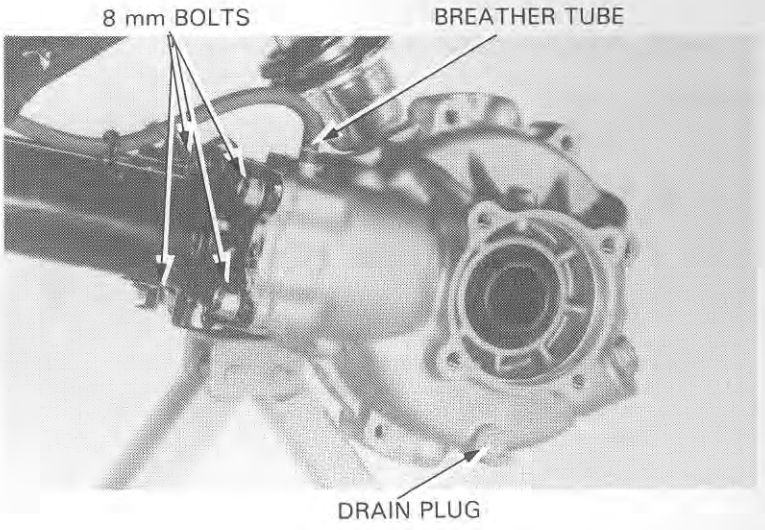
Remove the following:
– rear wheels (page 12-4)
– rear axle (page 12-15)
– three bolts mounting the skid plate.



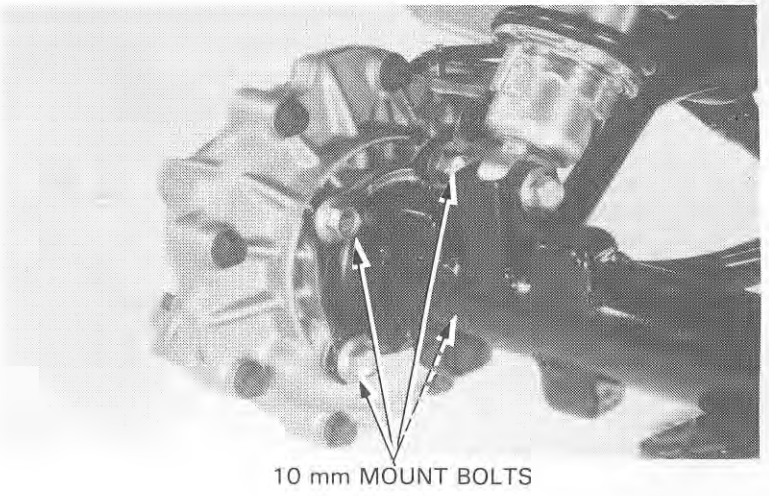
Disconnect the breather tube from the gear case.

Drain the final gear oil (page 2-3).

Remove the gear case 8 mm bolts.

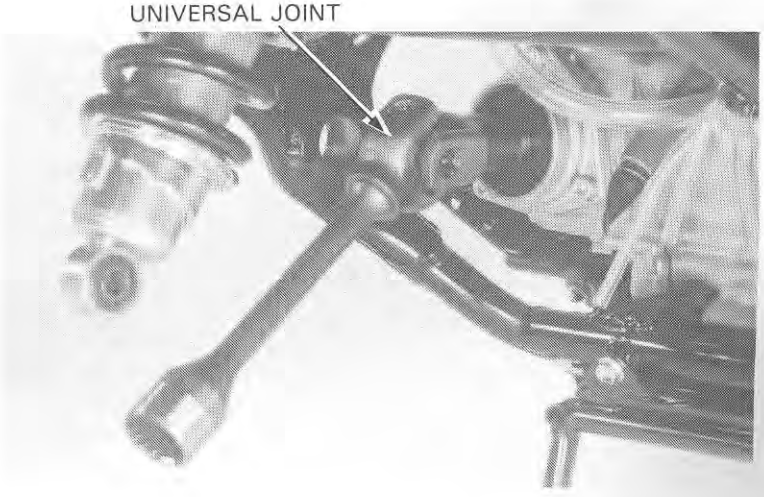


Remove the gear case 10 mm bolts, final gear case, spring and drive shaft from the swingarm.



UNIVERSAL JOINT

Remove the swingarm (page 12-22).
Remove the universal joint drive shaft from the engine output shaft.



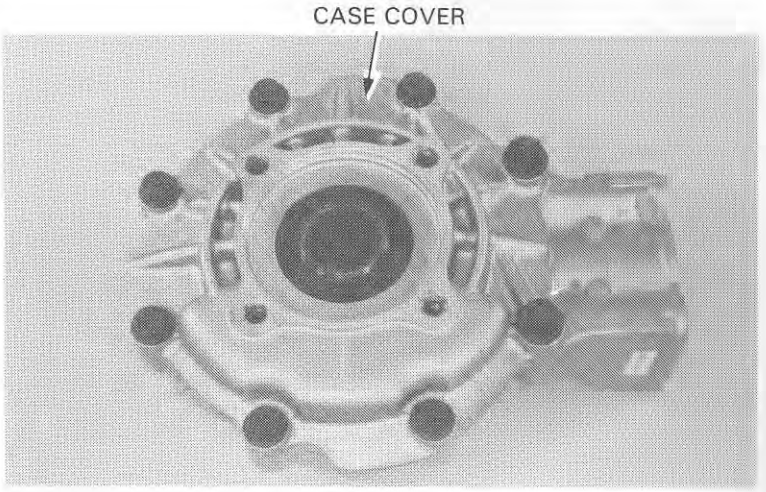
Inspect the universal joint bearings for excessive play or damage.

Apply molybdenum disulfide grease to the splines and install the universal joint.

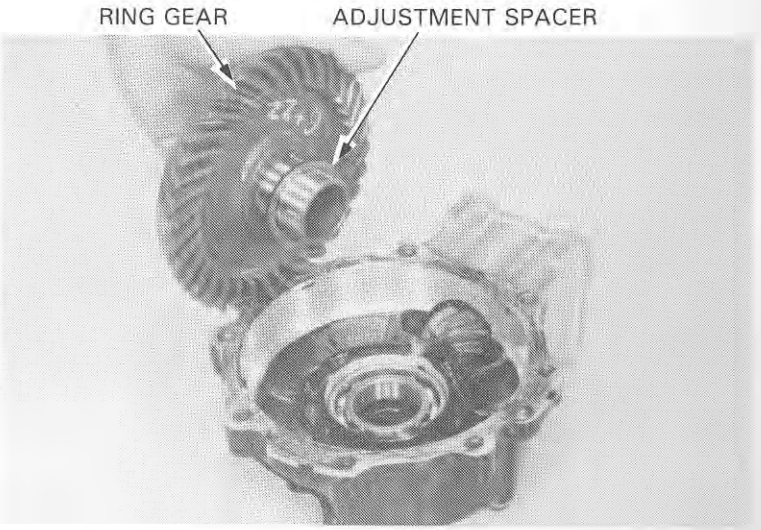
FINAL DRIVE GEAR

RING GEAR REMOVAL

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.



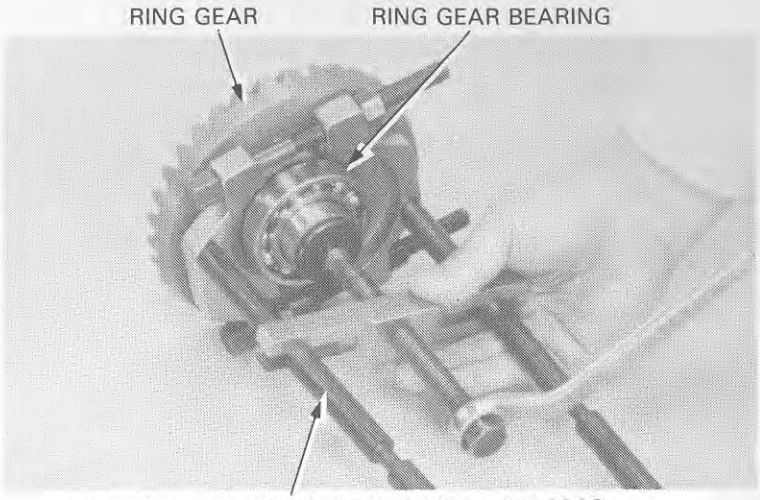
Remove the ring gear and adjustment spacer.



RING GEAR BEARING REMOVAL

Remove the ring gear bearing and adjustment spacer.

If the ring gear bearing stays in the cover, remove it using driver 07749—0010000 and attachment, 42 x 47 mm 07746—0010300.

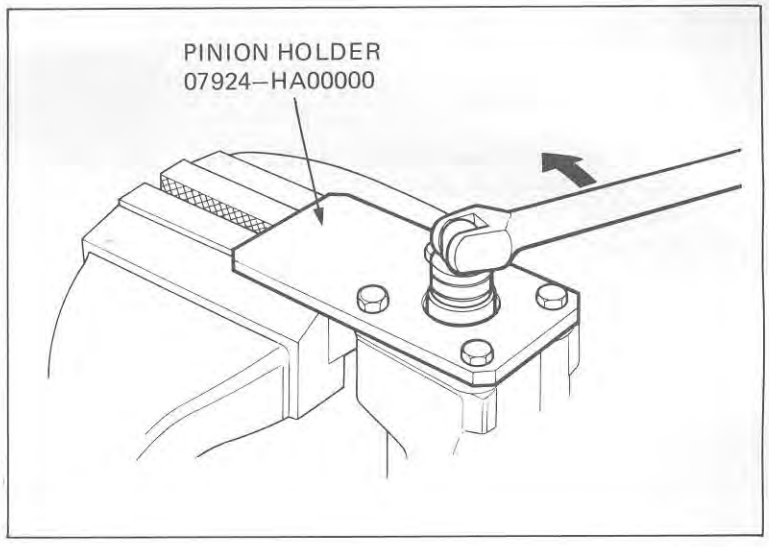


UNIVERSAL BEARING PULLER 07631—0010000
OR COMMERCIALLY AVAILABLE IN U.S.A.

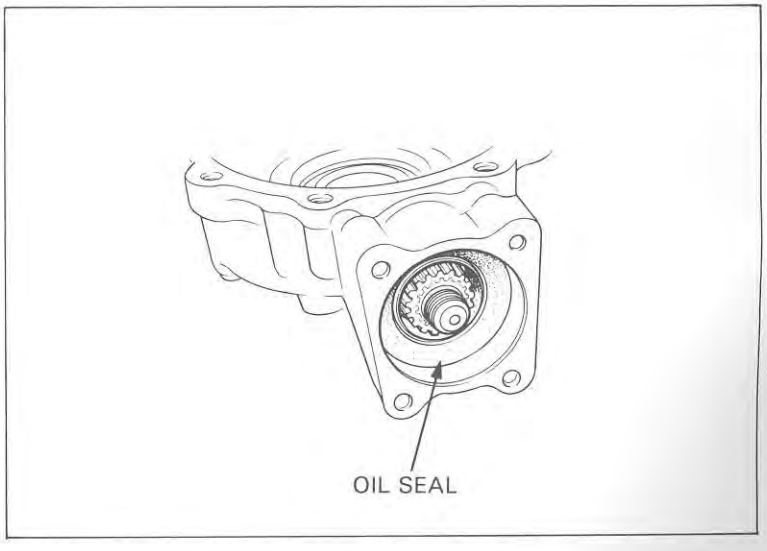
PINION GEAR REMOVAL

Place the pinion holder onto the pinion joint. Align the holes in the pinion holder with the four holes in the final drive gear case and secure to the case with four 8 mm bolts.

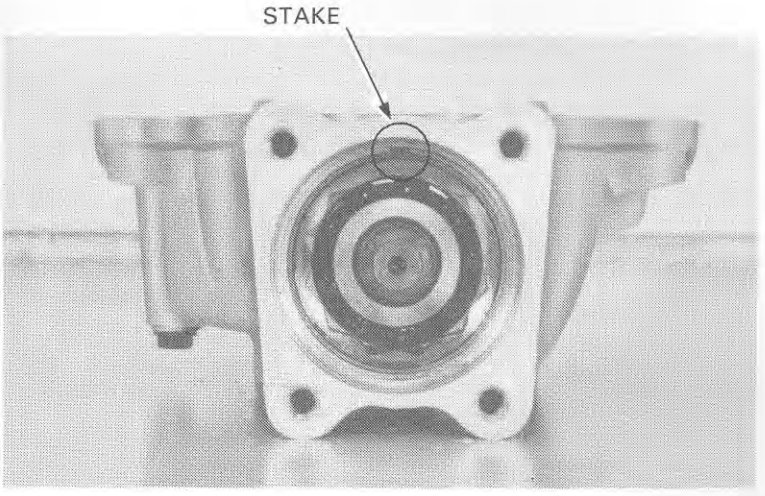
Remove the pinion joint nut.
Remove the pinion holder and pinion joint.



Remove the oil seal.



Unstake the pinion bearing lock nut with a drill or grinder



Remove the pinion bearing lock nut with the lock nut wrench.

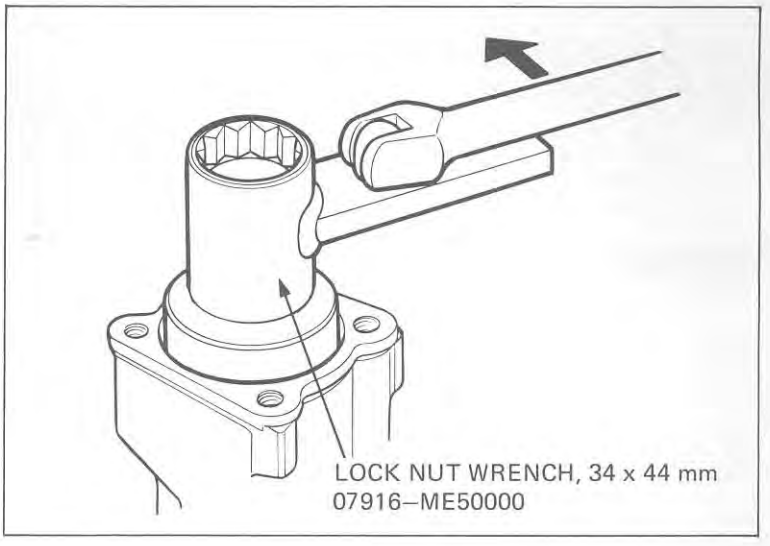
Position the pinion holder on the final gear case. Screw the shaft puller onto the end of the pinion gear shaft.

NOTE

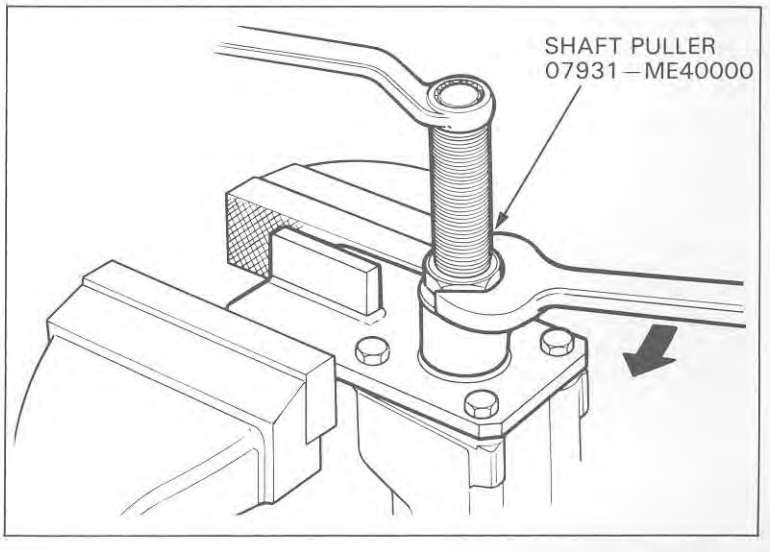
Be sure that the 27 mm special nut is backed off far enough to allow full thread engagement between the puller and the pinion gear shaft.

Screw the 27 mm special nut down until it contacts the pinion holder, and hold it with a 27 mm wrench.

Turn the puller shaft clockwise with a 17 mm wrench to remove the pinion gear from its housing.



Pull the pinion assembly off with the pinion puller.

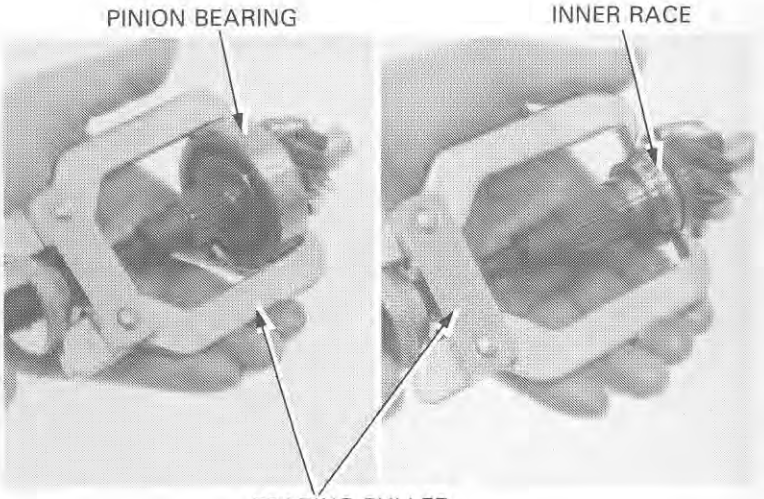


PINION BEARING REMOVAL

Pull the bearing outer and inner races off the shaft with the bearing puller.

Pull the other inner race off with the same tool.

Remove the pinion adjustment spacer.

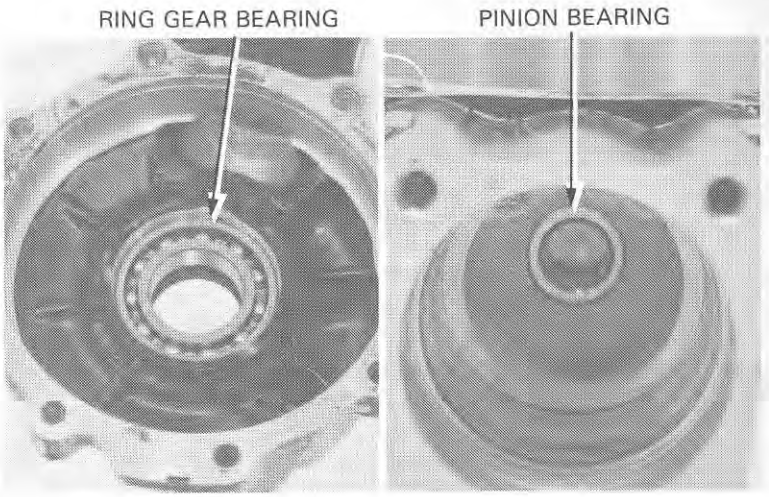


CASE BEARING AND OIL SEAL REPLACEMENT

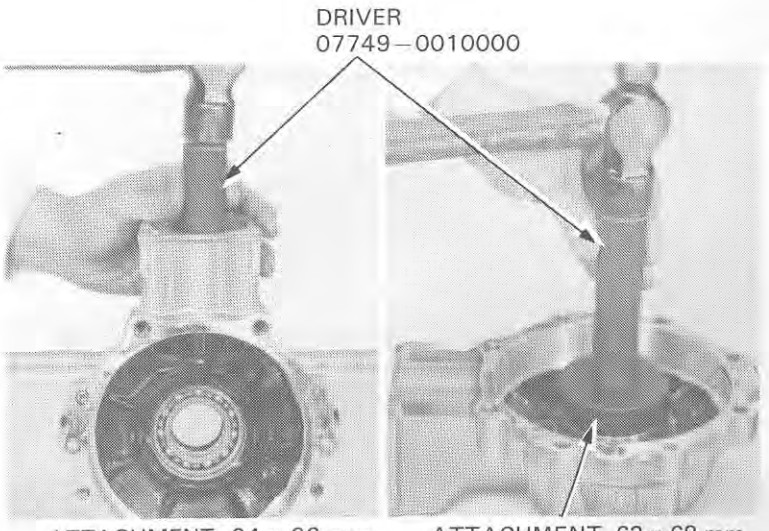
Heat the gear case 80°C (176°F). Tap the gear case with a plastic hammer to remove the ring gear and pinion bearing.

WARNING

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



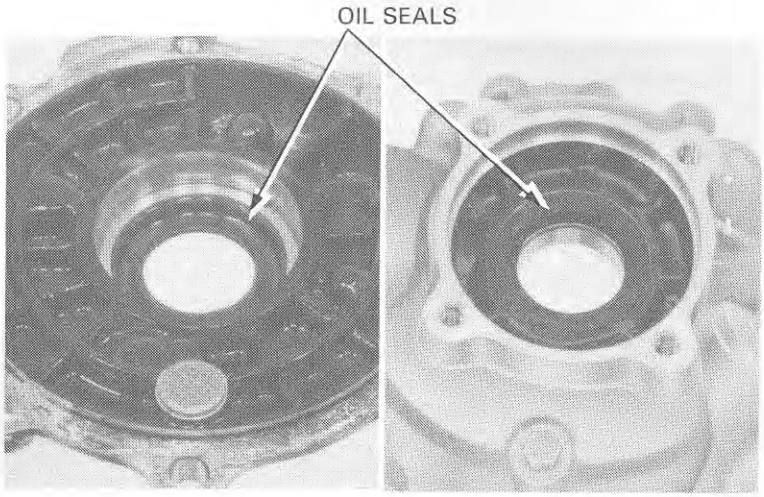
Drive new pinion and ring gear bearings into the case.



CASE AND COVER OIL SEAL REPLACEMENT

Remove the oil seals from the cover and the case.

Drive in new oil seals with the driver, 07749–0010000 and attachments, 07746–0010300 for the case, and 07746–0010400 for the cover.



BREATHER HOLE CLEANING

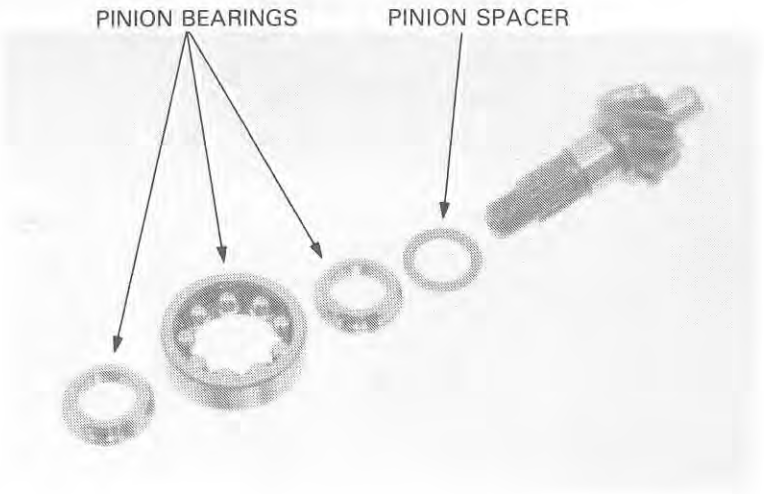
Blow compressed air through the breather hole in the gear case.

PINION GEAR ASSEMBLY

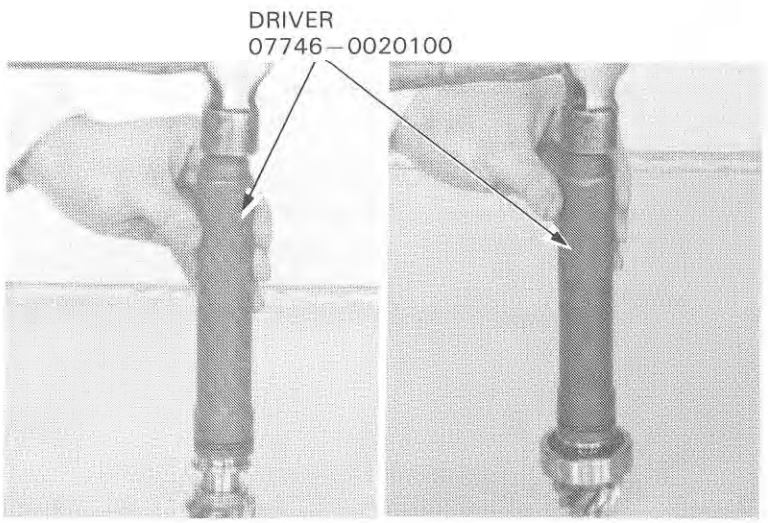
Install the original pinion gear spacer.

NOTE

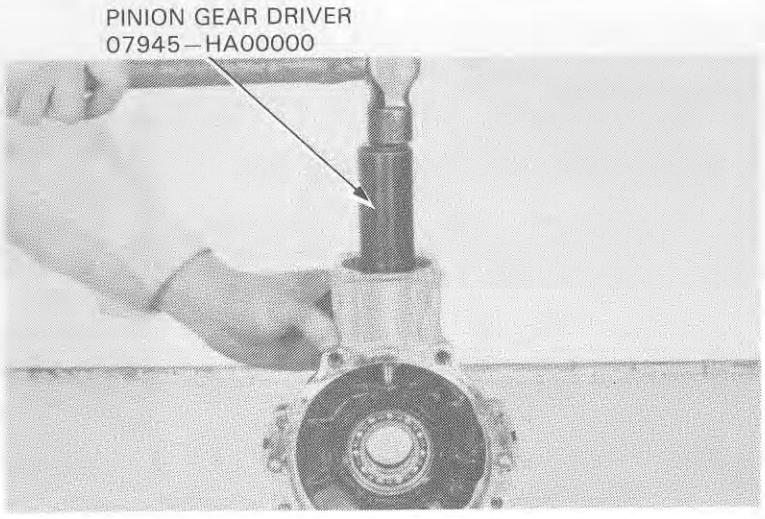
When the gear set, pinion bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thickness spacer.



Drive the bearing onto the pinion gear shaft with the special tools shown.

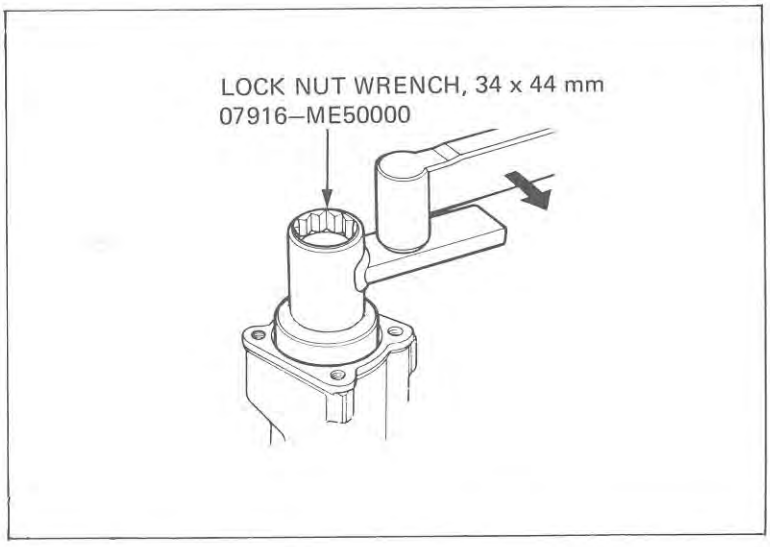


Place the pinion assembly into the gear housing and drive it into the gear case.



Install and tighten the pinion bearing lock nut.

TORQUE: 90—110 N·m
(9.0—11.0 kg-m, 65—80 ft-lb)



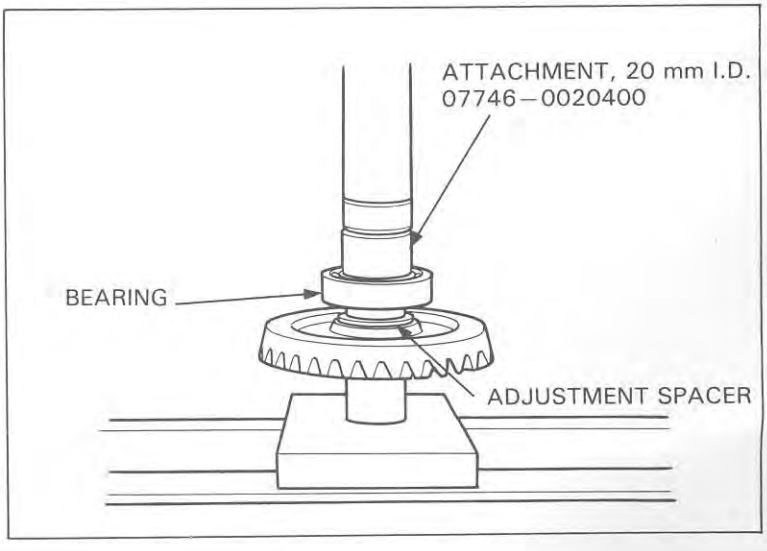
RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

NOTE

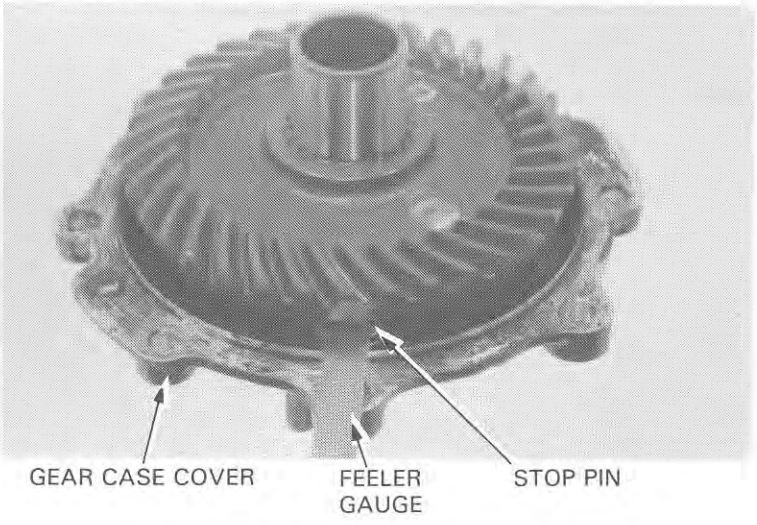
If the gear set, pinion bearing, ring gear bearing and/or gear case is replaced, install a 2.0 mm (0.079 in) thickness spacer.

Press the ring gear bearing 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.

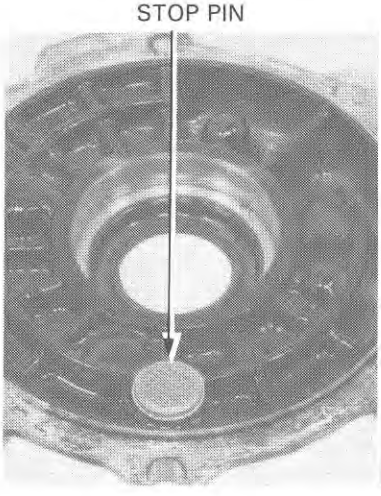
CLEARANCE: 0.30—0.60 mm (0.012—0.024 in)

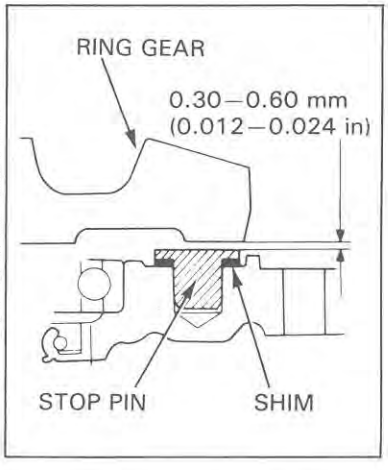


Remove the ring gear. If the clearance exceeds the service limit, heat the gear case cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

WARNING

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.

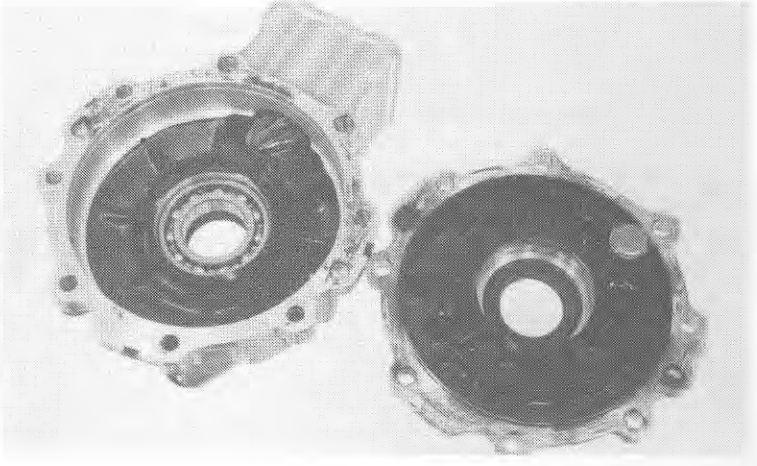
GEAR TOOTH CONTACT PATTERN CHECK

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

NOTE

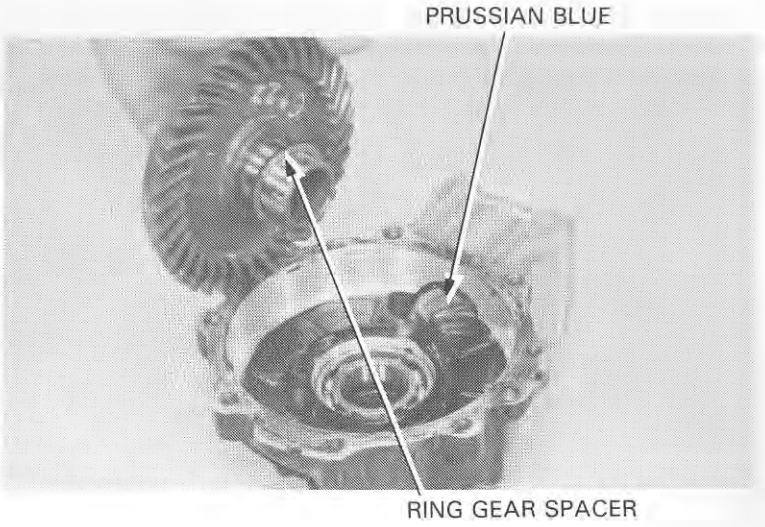
- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

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



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

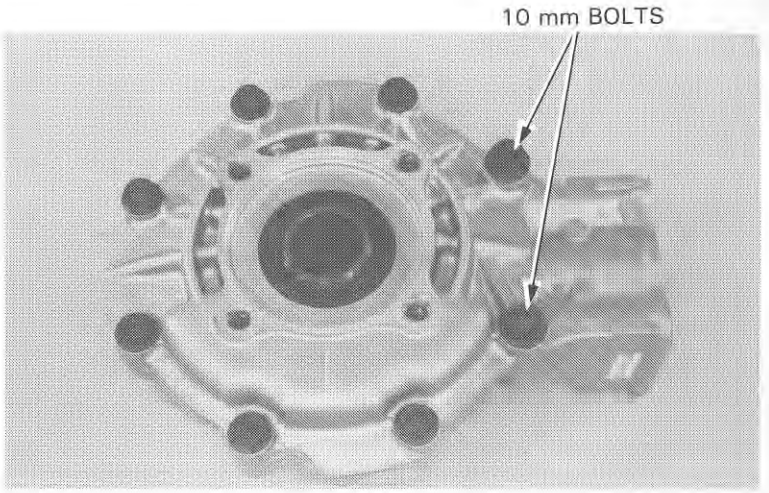
Apply gear oil to the lip of the oil seal on the gear case cover and install the gear case cover.



Apply a thread locking agent to the 10 mm cover bolts.
Tighten the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the bolts to the specified torque in a crisscross pattern in two or more steps.

TORQUE VALUES:

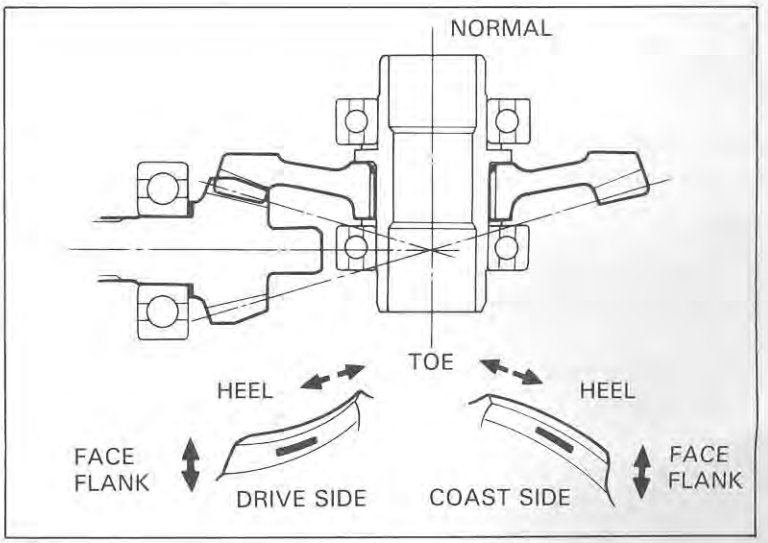
10 mm bolt	**45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)**
8 mm bolt	**23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)**



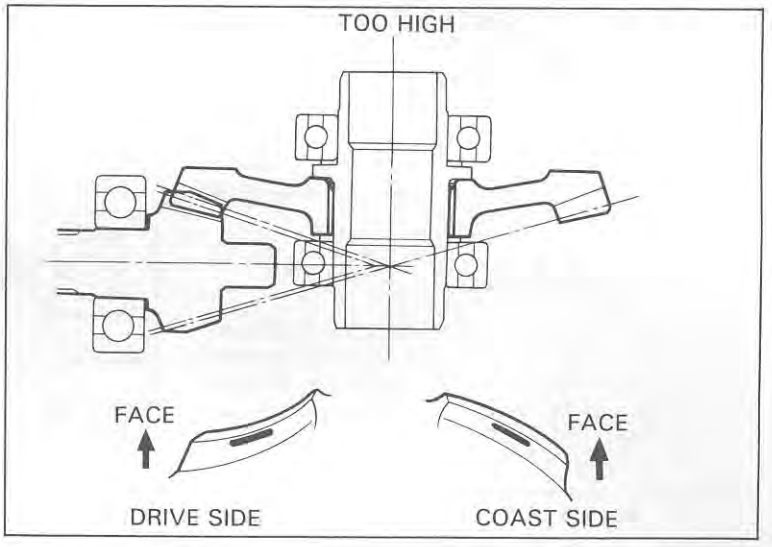
Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in both directions. 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.

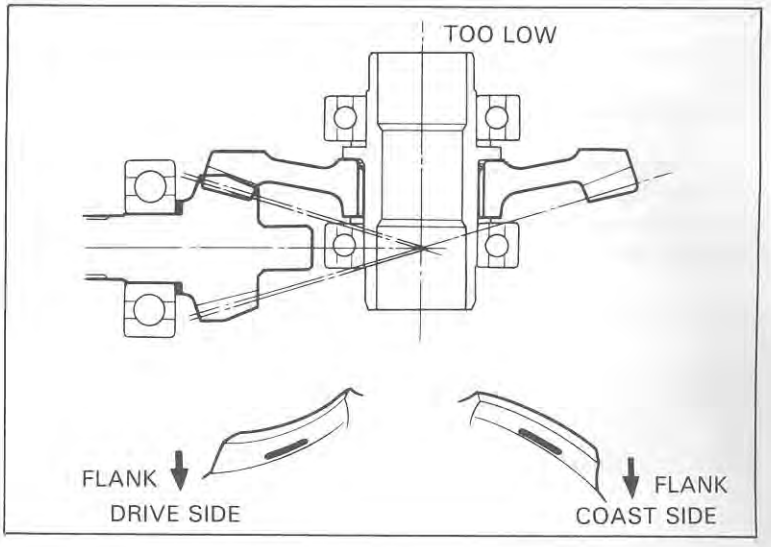
Contact is normal if the Prussian Blue is transfered to the approximate center of each tooth and slightly to the flank side.



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	**:1.82 mm (0.072 in)**	
B	**:1.88 mm (0.074 in)**	
C	**:1.94 mm (0.076 in)**	
D	**:2.00 mm (0.079 in)**	**Standard**
E	**:2.06 mm (0.081 in)**	
F	**:2.12 mm (0.083 in)**	
G	**:2.18 mm (0.086 in)**	

BACKLASH INSPECTION

Remove the oil filler cap.

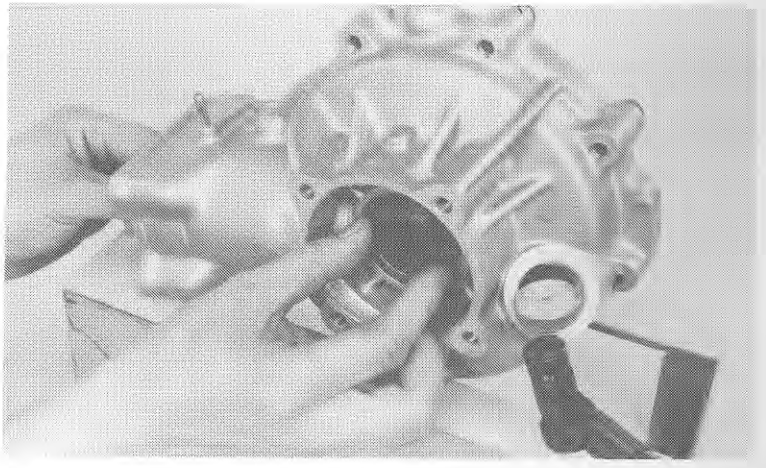
Set the final gear assembly into a jig or stand to hold it steady. Set a horizontal type dial indicator on the ring gear, through the oil filler hole.
Hold the pinion gear spline by hand. Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read backlash.

STANDARD: 0.08—0.18 mm (0.003—0.007 in)
SERVICE LIMIT: 0.25 mm (0.010 in)

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

Compare the differences of the three measurements.

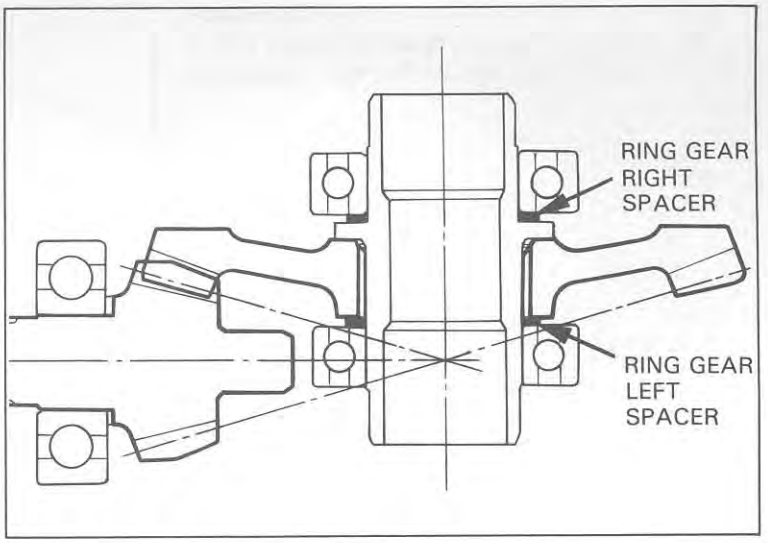
DIFFERENCE OF MEASUREMENTS
SERVICE LIMIT: 0.10 mm (0.004 in)



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 too small, replace the ring gear left side spacer with a thicker one.
Backlash is changed by about 0.06 mm (0.002 in) when thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACER:

A : 1.82 mm (0.072 in)	**F : 2.12 mm (0.083 in)**
B : 1.88 mm (0.074 in)	**G : 2.18 mm (0.086 in)**
C : 1.94 mm (0.076 in)	**H : 2.24 mm (0.088 in)**
D : 2.00 mm (0.079 in)	**I : 2.30 mm (0.091 in)**
E : 2.06 mm (0.081 in)	



Change the right side spacer thickness an opposite amount to what the left side spacer was changed; if the left spacer was replaced with a 0.10 mm (0.004 in) thicker spacer, replace the right spacer with one that is 0.10 mm (0.004 in) thinner.

Install the pinion joint onto the pinion.

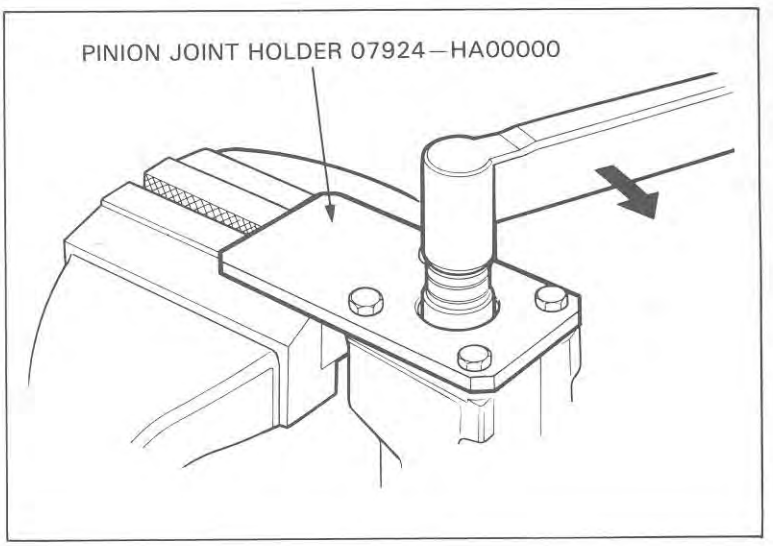
Apply thread locking agent to the pinion threads.

Place the pinion holder onto the pinion joint. Align the holes in the pinion holder with the four (4) holes in the final drive gear case and secure to the case with four (4) 8 mm bolts.

Tighten the pinion joint nut.

TORQUE: 100—120 N·m
(10.0—12.0 kg-m, 72—87 ft-lb)

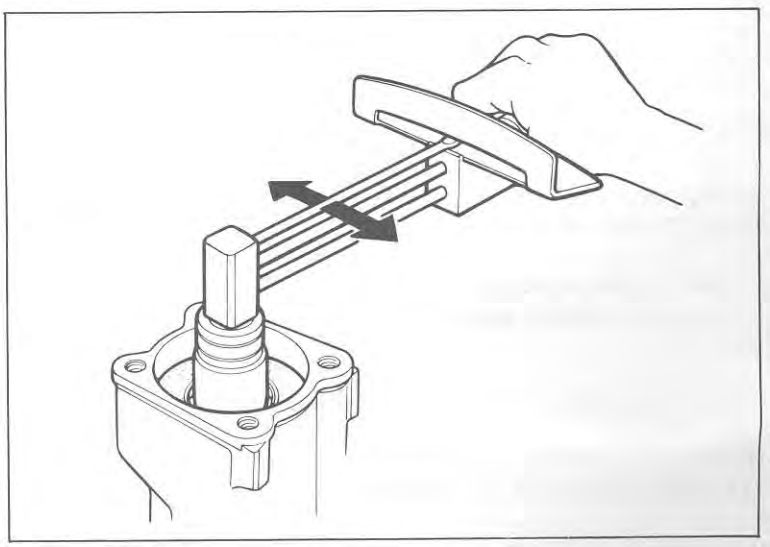
Remove the pinion joint holder.



Make sure the gear assembly rotates smoothly without binding.

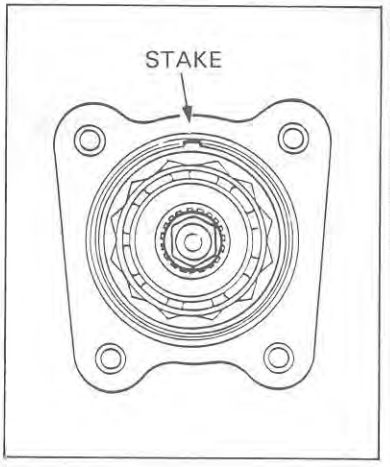
Measure the final gear assembly preload.

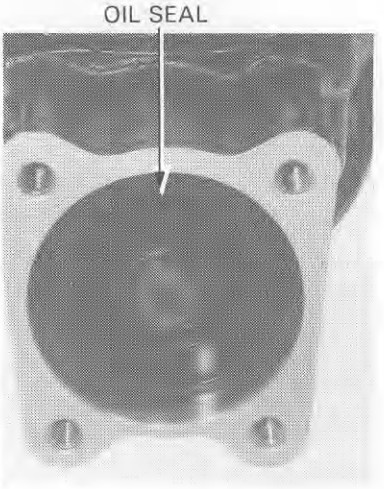
PRELOAD: 0.2—0.4 N·m
(2—4 kg-cm, 1.7—3.5 in-lb)



Stake the pinion bearing lock nut.

Install a new drive shaft oil seal.





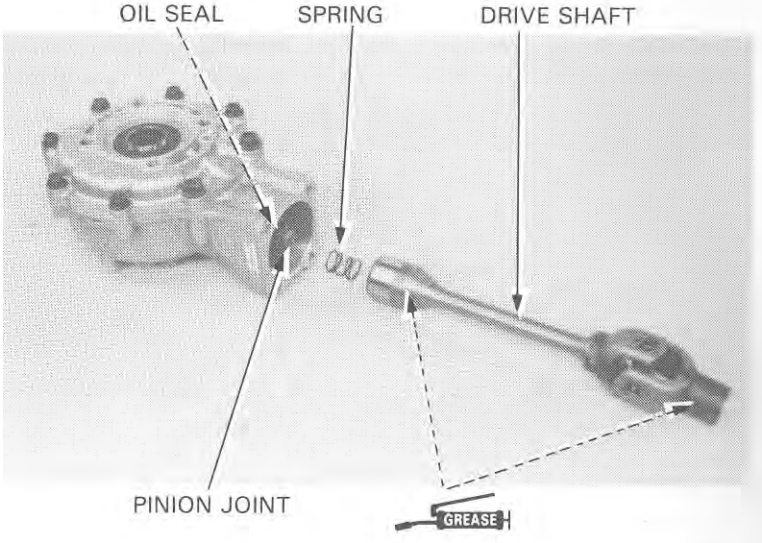
FINAL DRIVE INSTALLATION

Apply molybdenum disulfide grease to the drive shaft oil seal, pinion joint and drive shaft splines.

Install the spring and insert the pinion joint into the drive shaft.

Clean the mating surfaces between the gear case and the swingarm. Apply liquid sealant to the mating surfaces.

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

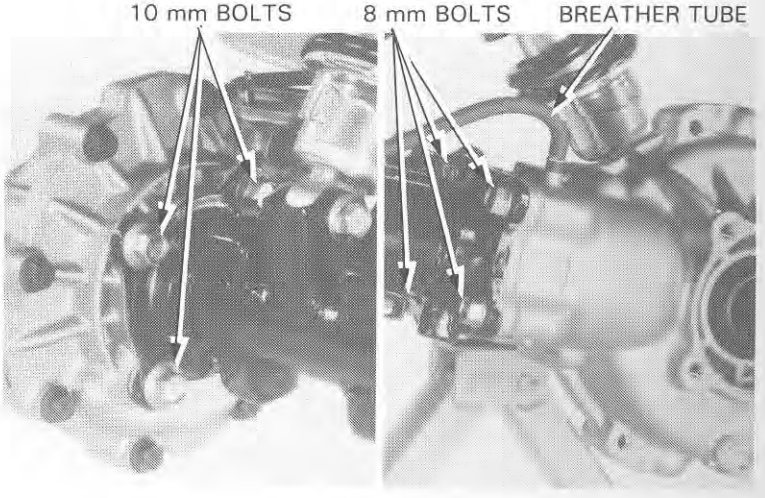


Install the final gear case mount bolts.

Tighten the 10 mm bolts first, then the 8 mm bolts.

TORQUE VALUES:
10 mm bolt 50—60 N·m
(5.0—6.0 kg-m, 36—43 ft-lb)
8 mm bolt 28—35 N·m
(2.8—3.5 kg-m, 20—25 ft-lb)
AFTER '85: 30—36 N·m
(3.0—3.6 kg-m, 22—26 ft-lb)

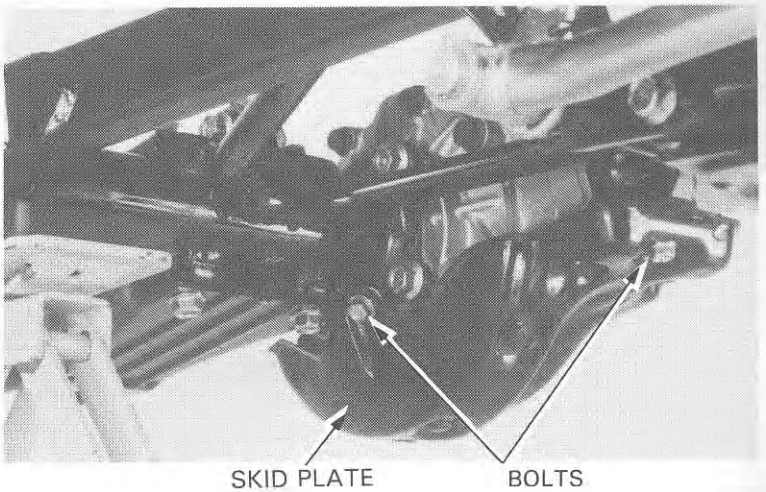
Connect the breather tube to the gear case.



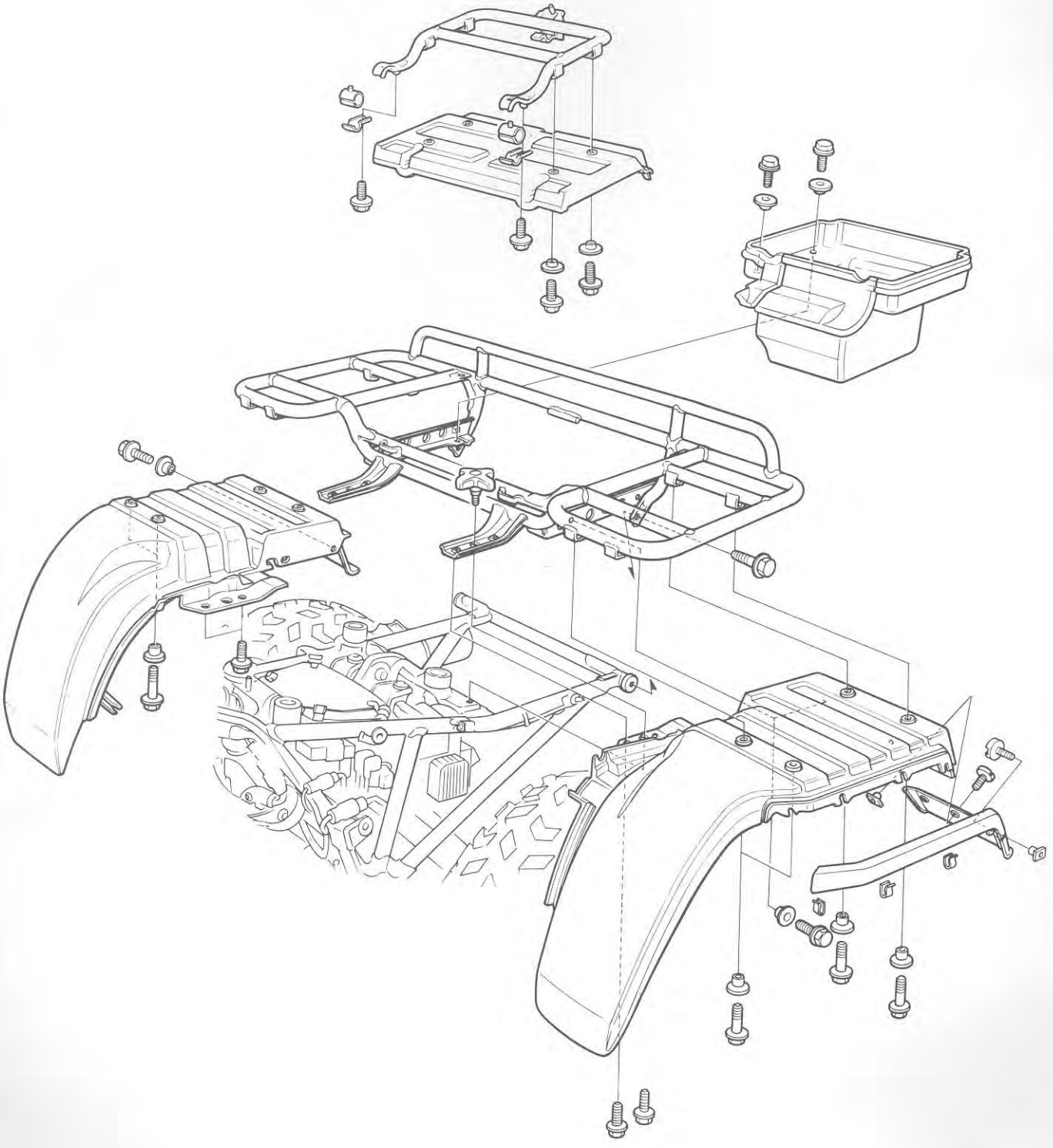
Install the skid plate with the three bolts.

Fill the gear case with the recommended oil (page 2-1)

Install the parts in the reverse order of removal.



MEMO



13. CARRIERS/REAR FENDER/ EXHAUST MUFFLER

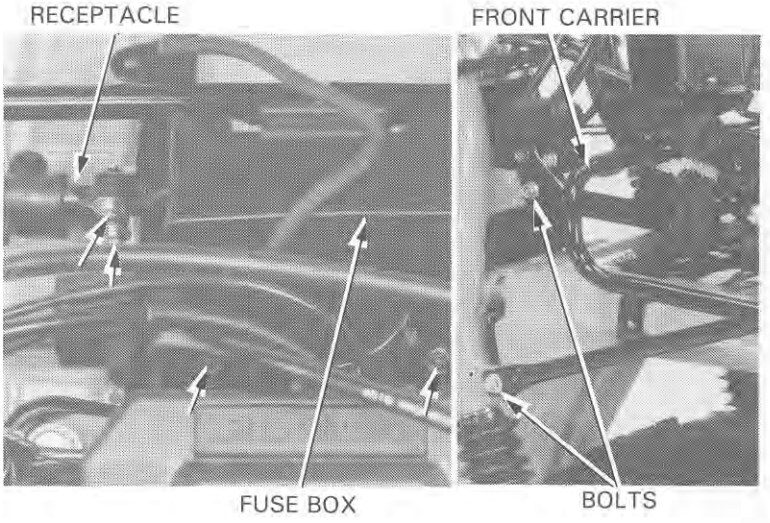
FRONT CARRIER

REMOVAL

Remove the headlight.
Remove the receptacle and fuse box mounting bolts.
Remove the four front carrier mount bolts and the carrier.

INSTALLATION

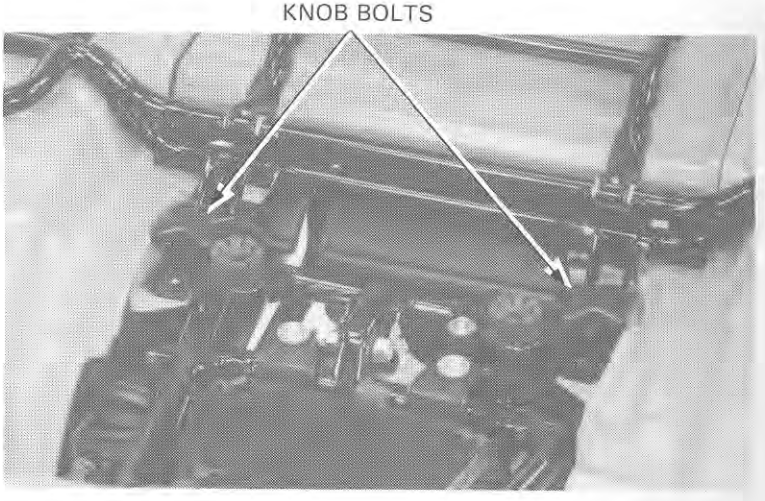
Install the front carrier in the reverse order of removal.



REAR CARRIER/REAR FENDER

REMOVAL

Remove the frame side covers and seat.
Remove the two rear fender mount knob bolts and open the fender.

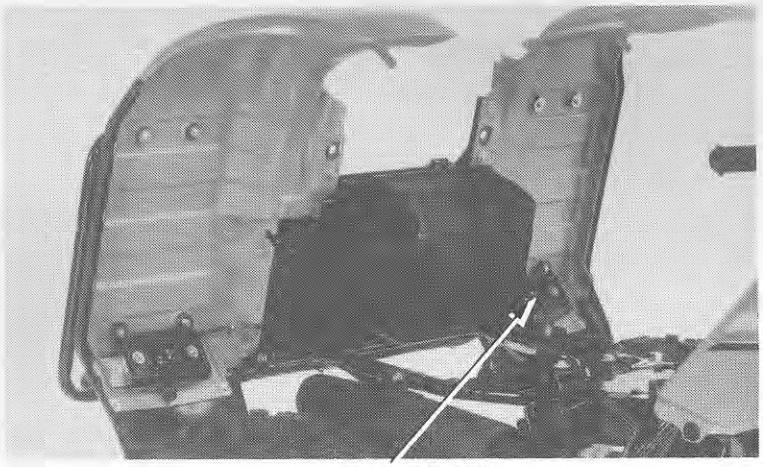


Disconnect the taillight wire connectors.

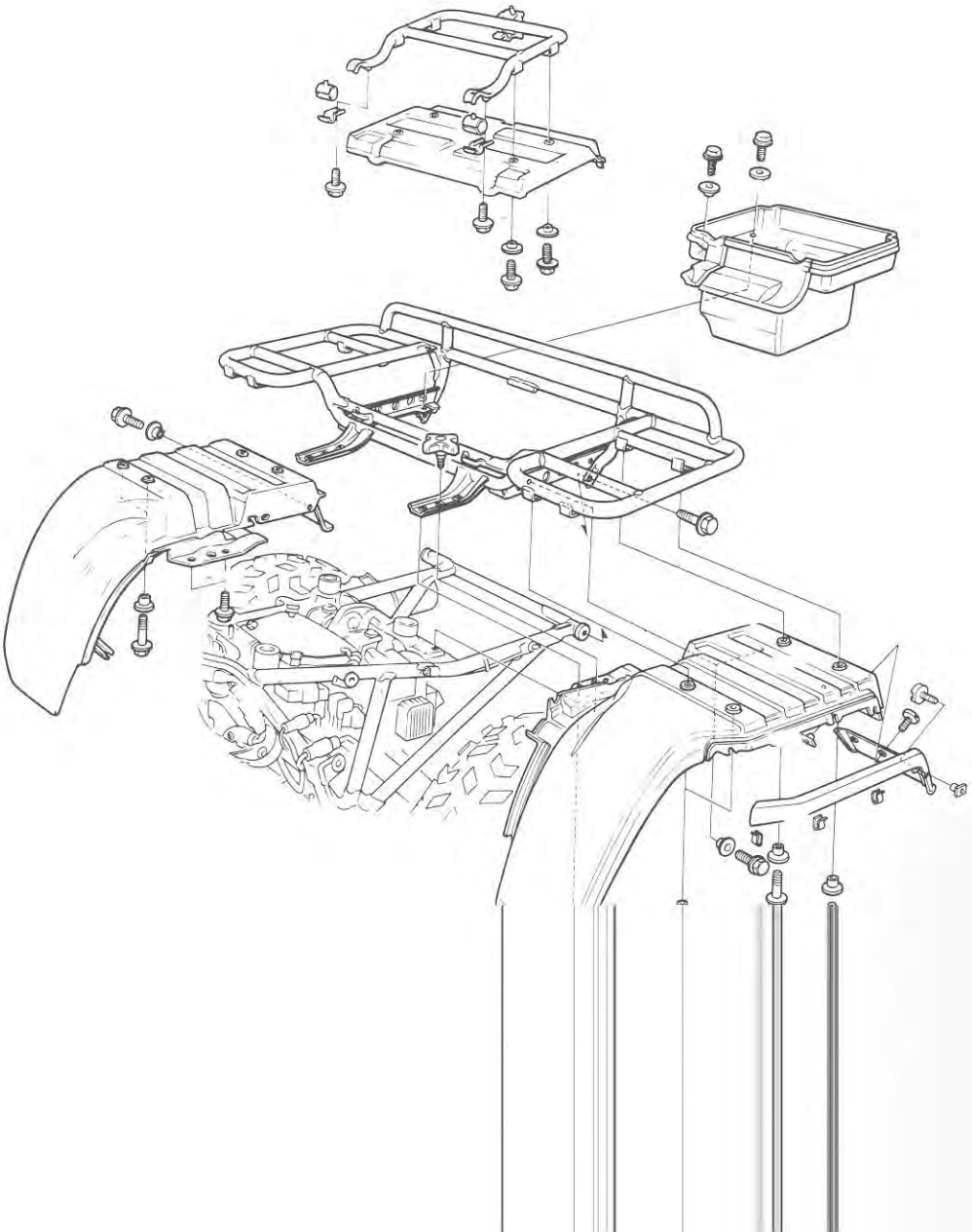
Remove the two rear fender pivot bolts and remove the rear fender.

INSTALLATION

Install the rear fender in the reverse order of removal.



PIVOT BOLT



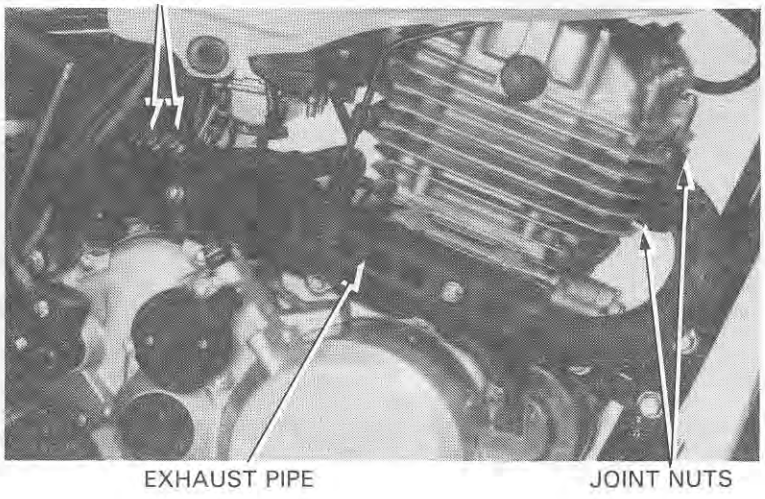
EXHAUST PIPE

WARNING

Do not service the exhaust pipe or muffler when they are hot.

REMOVAL

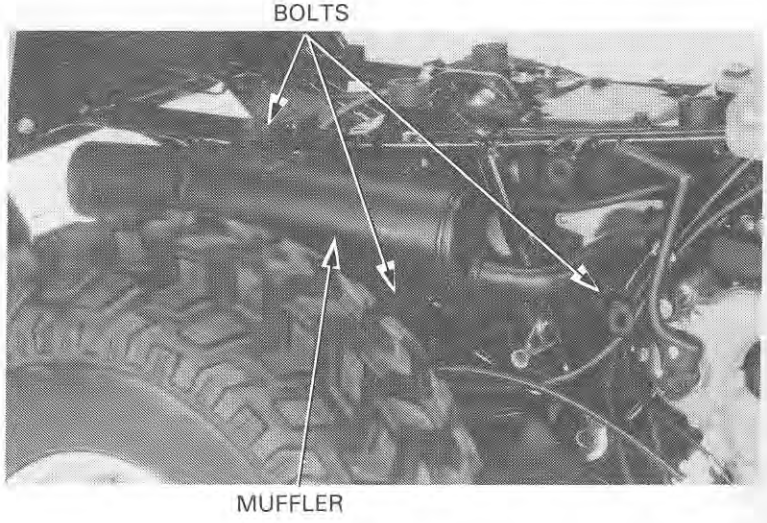
Remove the left side cover and loosen the exhaust pipe clamp bolts.
Remove the exhaust pipe joint nuts and remove the exhaust pipe.



Raise the fender.
Remove the three muffler mounting bolts and the muffler.

NOTE

Check the gasket and pipe seal for wear. Replace them with new ones.

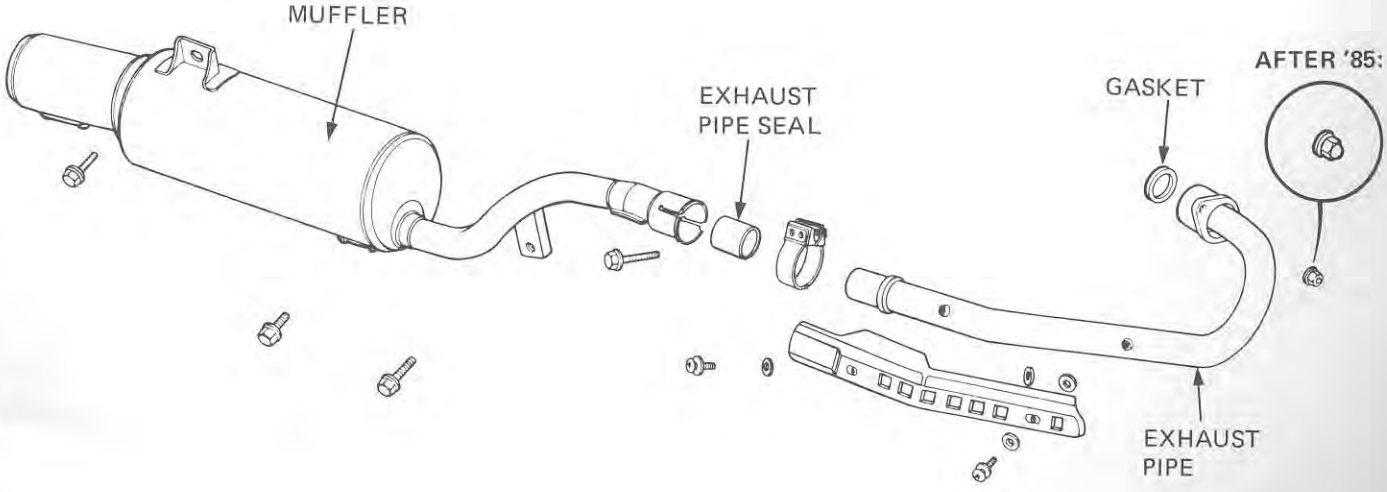


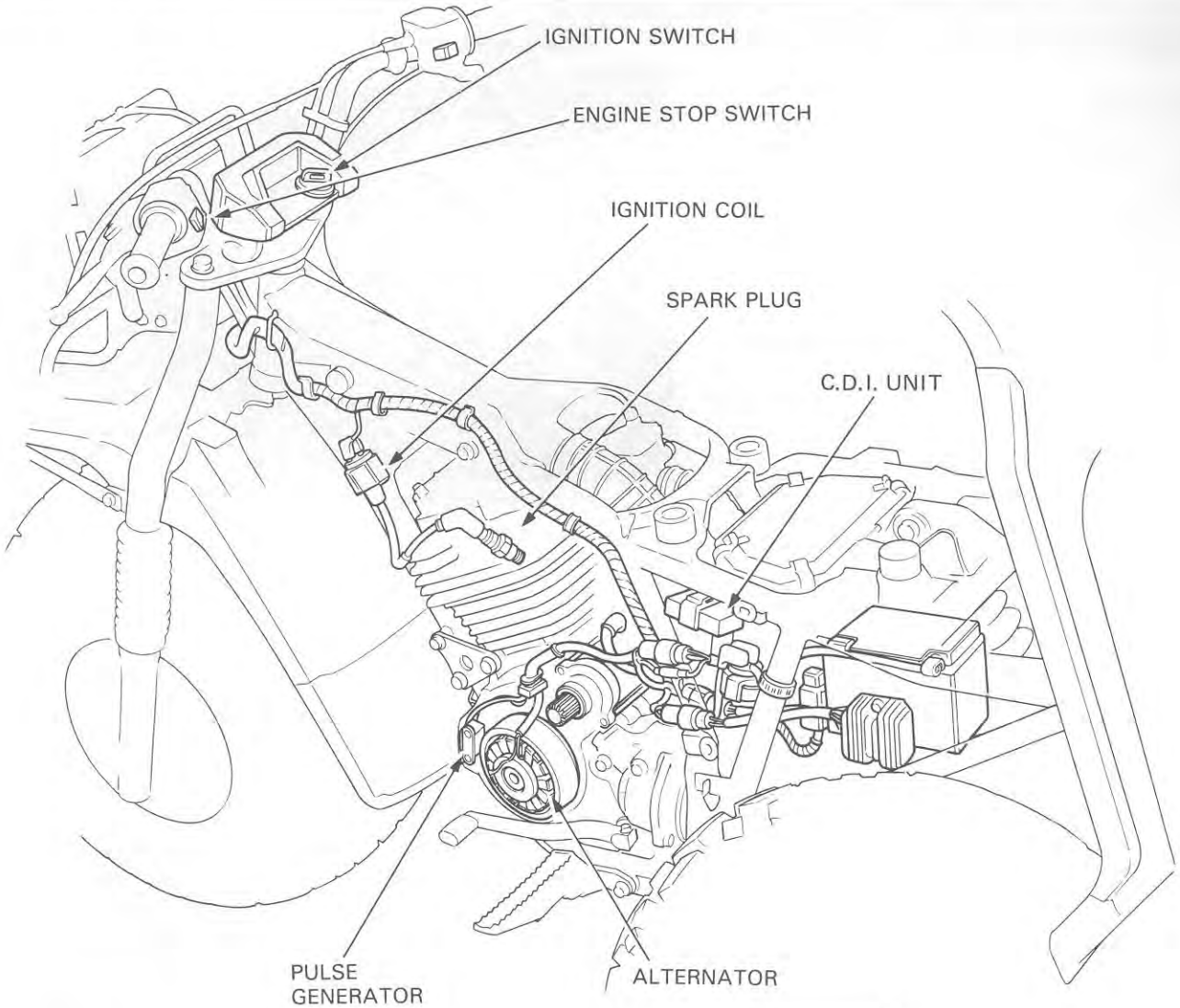
INSTALLATION

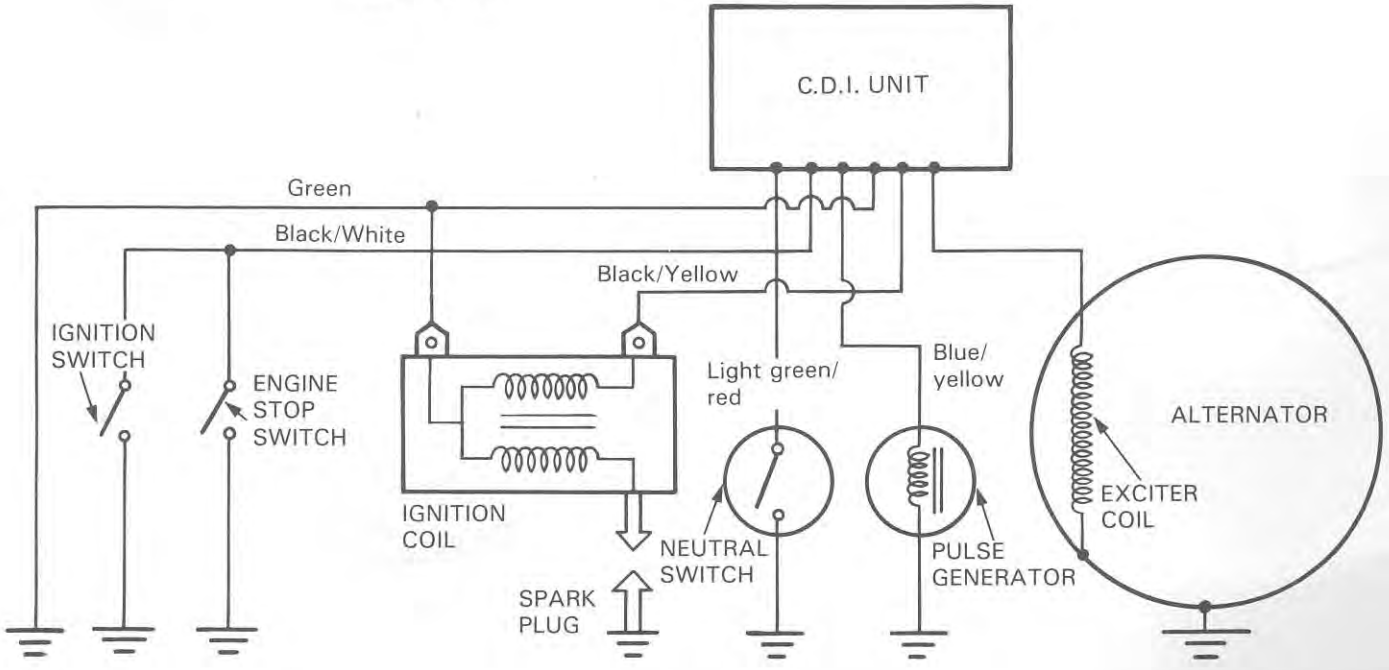
Install the exhaust pipe in the reverse order of removal.

NOTE

Make sure there are no exhaust leaks after installation.




IGNITION SWITCH
ENGINE STOP SWITCH
IGNITION COIL
SPARK PLUG
C.D.I. UNIT
PULSE GENERATOR
ALTERNATOR


C.D.I. UNIT
Green
Black/White
Black/Yellow
IGNITION SWITCH
ENGINE STOP SWITCH
IGNITION COIL
Light green/ red
Blue/ yellow
NEUTRAL SWITCH
PULSE GENERATOR
SPARK PLUG
ALTERNATOR
EXCITER COIL

14. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

- Ignition timing does not normally need to be adjusted since the C.D.I. (Capacitive Discharge Ignition) unit is factory preset.
- For spark plug inspection, refer to page 3-5.
- For pulse generator and exciter coil removal, refer to section 9.

SPECIFICATIONS

Spark plug		DR8ES-L (NGK), X24ESR-U (ND)
Spark plug gap		0.6–0.7 mm (0.024–0.028 in)
Ignition timing	At idle	13° ± 2° BTDC at 1,400 rpm
	Full advance	31° ± 2° BTDC at 3,500 rpm
Ignition coil	Primary coil resistance	0.18 ± 0.018 Ω
	Secondary coil resistance (With spark plug cap)	9.1 ± 1.66 kΩ
	Secondary coil resistance (Without spark plug cap)	4.1 ± 0.41 kΩ
Exciter coil	Resistance	50–200 Ω
Pulse generator	Resistance	325 ± 10% Ω

TOOL

Digital multi-tester — KS-AHM-32-003 (U.S.A. only)

TROUBLESHOOTING

Engine starts but stops

1. No spark at plug
2. Improper ignition timing
3. Faulty spark plug

No spark at plug

1. Engine stop switch "OFF"
2. Poorly connected, broken or shorted wires
3. – Between alternator and C.D.I. unit
   – Between C.D.I. unit and engine stops switch
   – Between C.D.I. unit and ignition coil
   – Between ignition coil and spark plug
   – Between pulse generator and C.D.I. unit
3. Faulty ignition coil
4. Faulty C.D.I. unit
5. Faulty pulse generator
6. Faulty alternator

Engine starts but runs poorly

1. Ignition primary circuit
   – Faulty ignition coil
   – Loose or bare wire
   – Faulty alternator
2. Ignition secondary circuit
   – Faulty plug
   – Faulty C.D.I. unit
   – Faulty pulse generator
   – Faulty spark plug wire
3. Improper ignition timing
   – Faulty pulse generator
   – Faulty C.D.I. unit

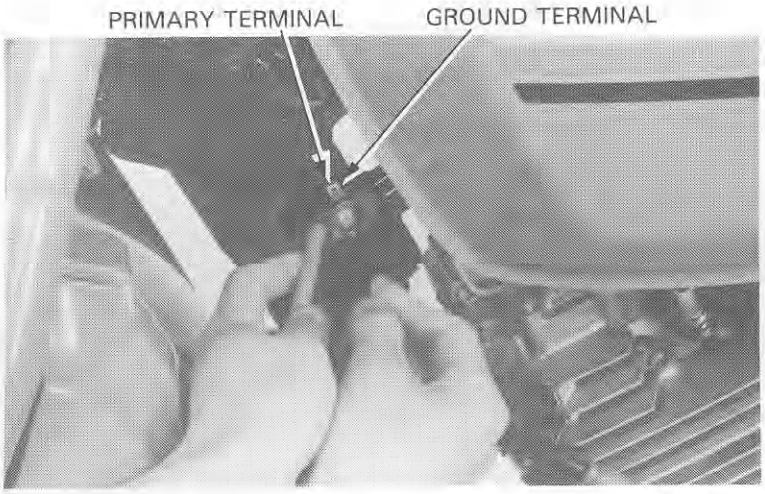
IGNITION COIL

CONTINUITY TEST

Disconnect the primary wire and ground wire from the ignition coil.

Measure the primary coil resistance between the terminals.

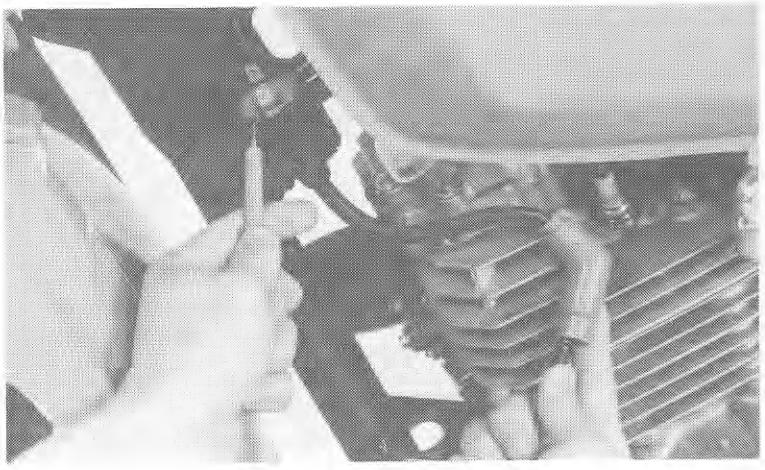
RESISTANCE: 0.18 ±0.018 Ω



Remove the spark plug cap from the spark plug.

Measure the secondary coil resistance between the ground terminal and spark plug cap.

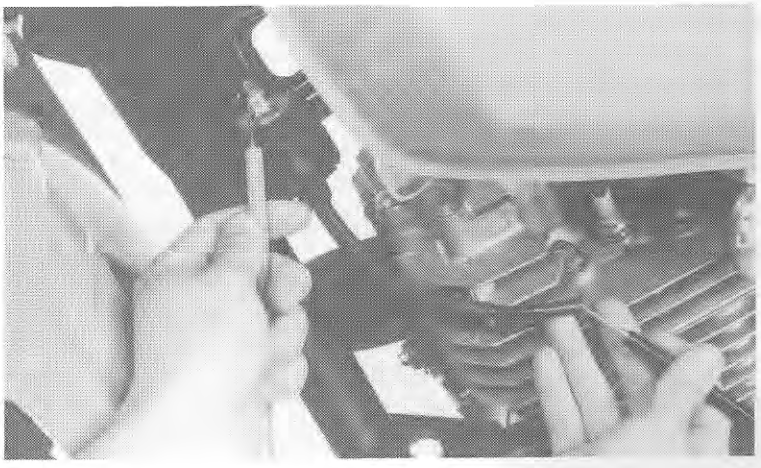
RESISTANCE: 9.1 ±1.66 kΩ



Remove the spark plug cap from the high tension cord.

Measure the secondary coil resistance with the spark plug cap removed.

RESISTANCE: 4.1 ±0.41 kΩ



EXCITER COIL/PULSE GENERATOR

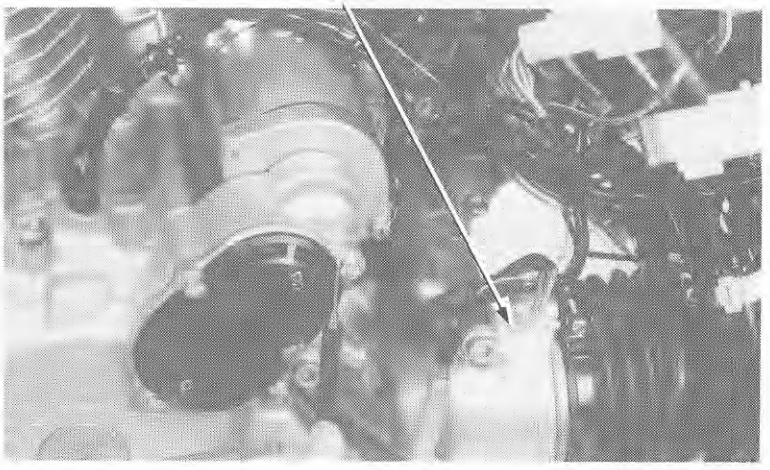
CONTINUITY TEST

NOTE

It is not necessary to remove the exciter coil (stator) and pulse generator to perform this test.

Remove the left frame side cover and disconnect the pulse generator/exciter coil wire coupler.

PULSE GENERATOR/EXCITER COIL WIRE COUPLER



- Exciter coil

Measure the exciter coil resistance between the black/red wire terminal and ground.

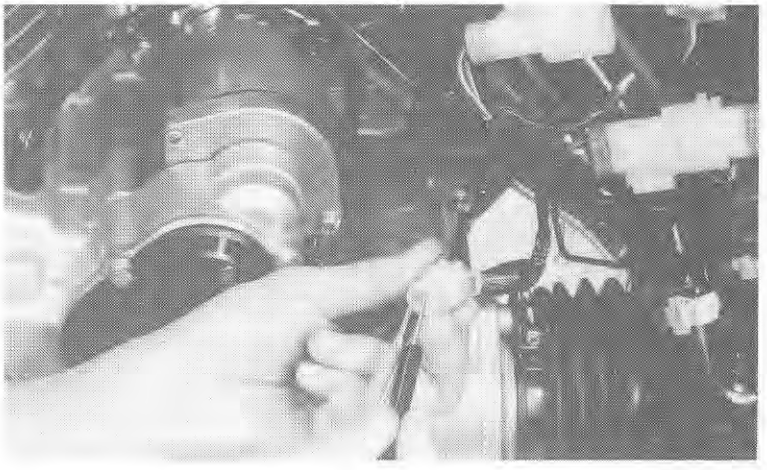
RESISTANCE: 50—200 Ω

- Pulse generator

Measure the pulse generator coil resistance between the blue/yellow and green/white wire terminals.

RESISTANCE: 325 ± 10% Ω

For replacement, see section 9.

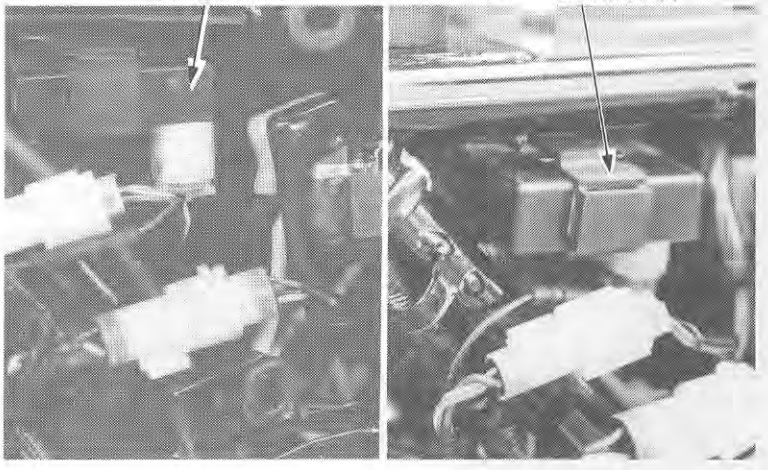


C.D.I. UNIT

Disconnect the C.D.I. unit connector and remove the C.D.I. unit.

'85: C.D.I. UNIT

AFTER '85: C.D.I. UNIT

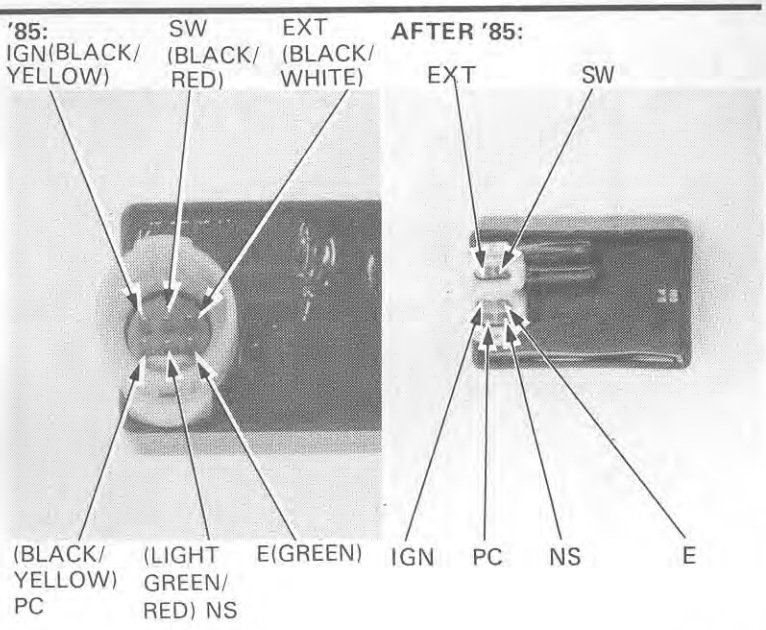


INSPECTION

Replace the C.D.I. unit if the readings are not within the limits shown in the table.

NOTE

- The C.D.I. unit is fully transistorized. For accurate testing, it is necessary to use a specified electrical tester. Use of an improper tester may give false readings.
- Use a SANWA ELECTRIC TESTER (P/N 07308–0020000) or a KOWA DIGITAL MULTI-METER (KS-AHM-32-003) U.S.A. only.



'85:

Set the tester on the R x kΩ.

Unit: KΩ

(+) / (−)	SW (Black/White)	EXT (Black/Red)	PC (Blue/Yellow)	E (Green)	IGN (Black/Yellow)	NS (Lg/R)
SW (Black/White)		∞	∞	∞	∞	∞
EXT (Black/Red)	0.5–50		100–∞	50–500	∞	20–200
PC (Blue/Yellow)	50–500	∞		10–100	∞	50–500
E (Green)	0.5–50	∞	0.5–50		∞	0.5–50
IGN (Black/Yellow)	∞	∞	∞	∞		∞
NS (Lg/R)	∞	∞	∞	∞	∞	

After '85:

Set the tester on the R x kΩ.

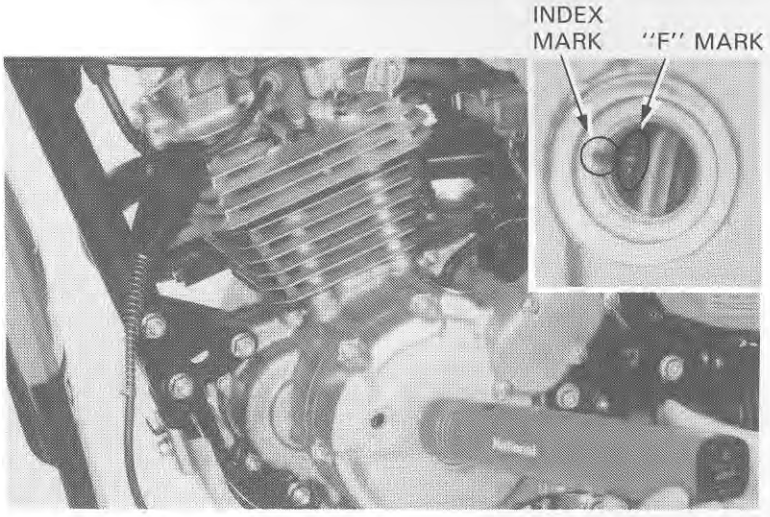
Unit: KΩ

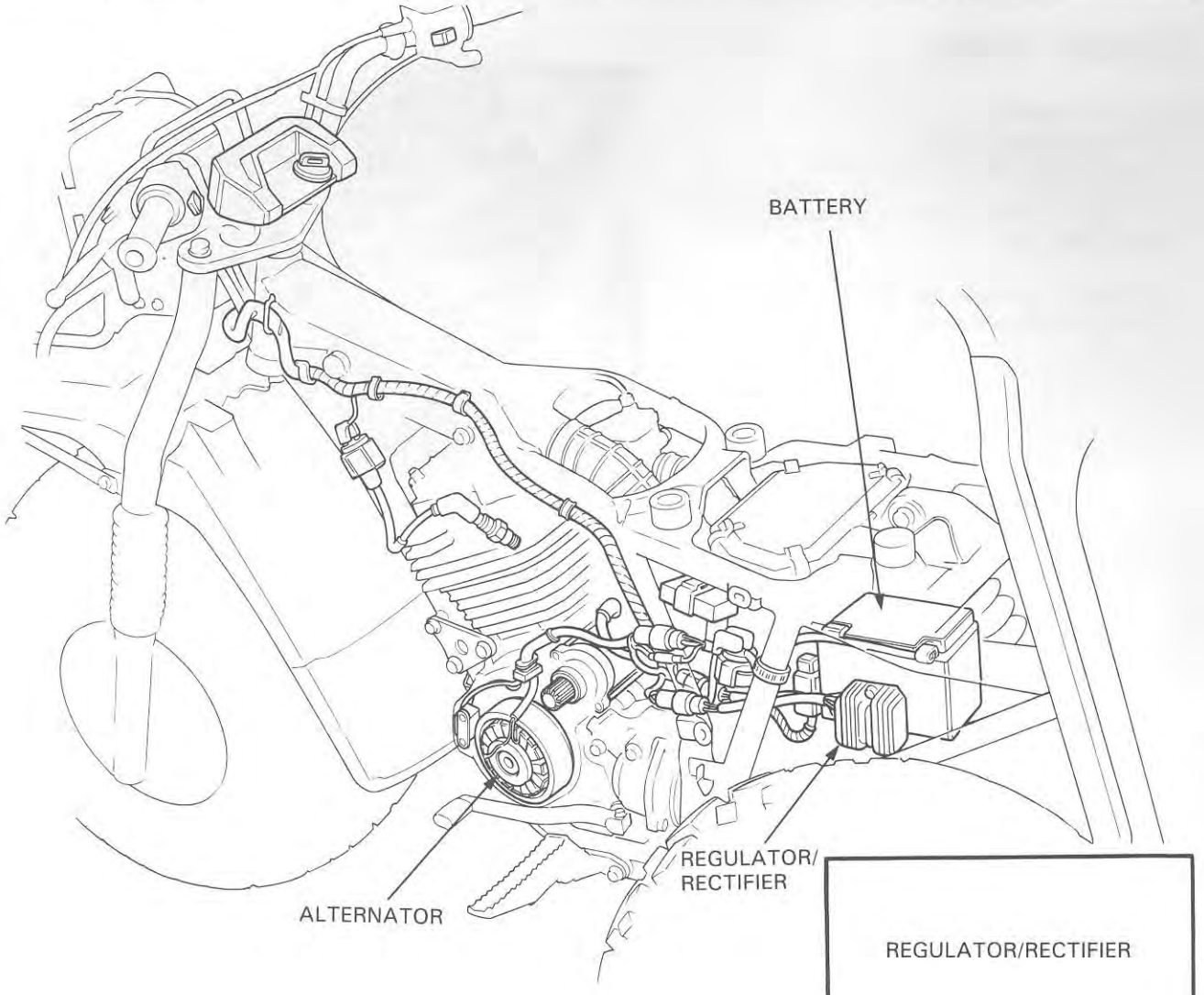
(+) / (−)	SW (Black/White)	EXT (Black/Red)	PC (Blue/Yellow)	E (Green)	IGN (Black/Yellow)	NS (Lg/R)
SW (Black/White)		∞	∞	∞	∞	∞
EXT (Black/Red)	0.5–50		100–∞	50–500	∞	20–200
PC (Blue/Yellow)	50–500	∞		10–100	∞	50–500
E (Green)	0.5–50	∞	0.5–50		∞	0.5–50
IGN (Black/Yellow)	∞	∞	∞	∞		∞
NS (Lg/R)	∞	∞	∞	∞	∞	

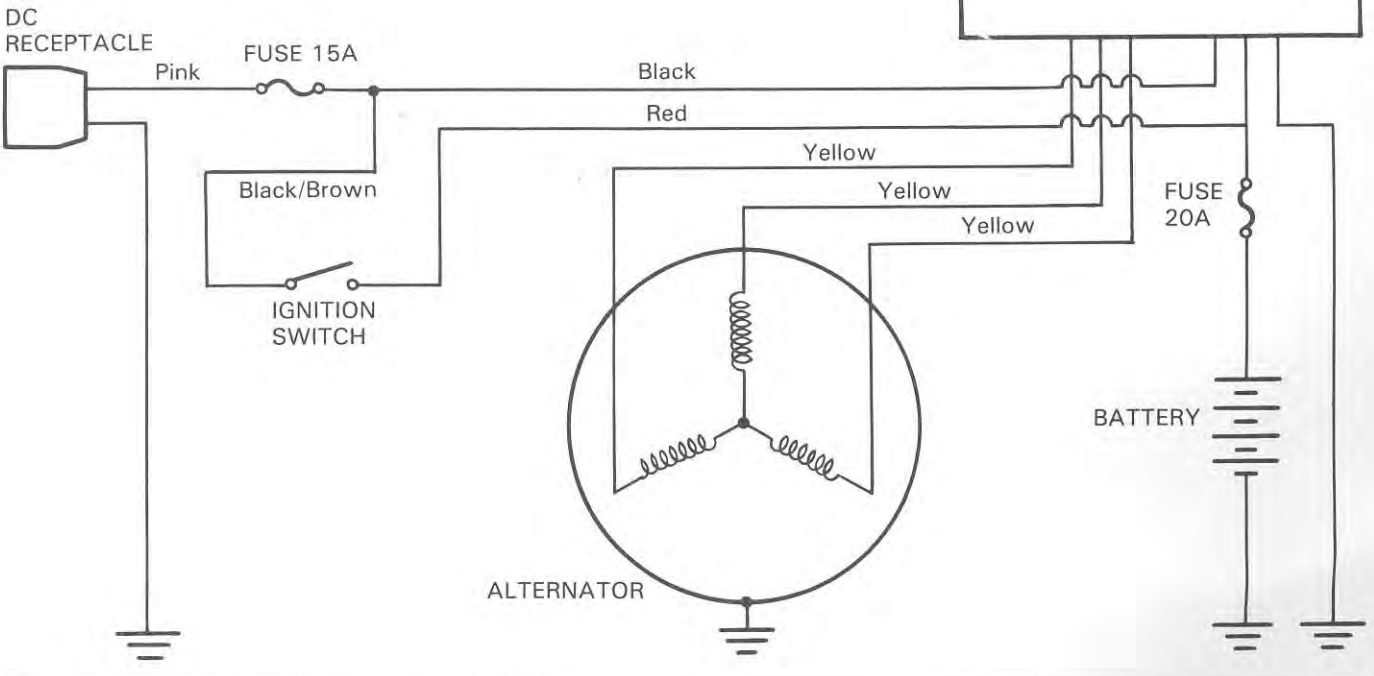
IGNITION TIMING

Warm up the engine.
Remove the timing hole cap.
Connect a timing light and tachometer.
The timing is correct if the "F" mark on the flywheel aligns with the index mark on the left crankcase cover at 1,400 rpm.

If the ignition timing is not correct, inspect the C.D.I. unit and pulse generator.




BATTERY
REGULATOR/
RECTIFIER
ALTERNATOR


REGULATOR/RECTIFIER
DC
RECEPTACLE
Pink
FUSE 15A
Black
Red
Yellow
Yellow
Yellow
Black/Brown
IGNITION
SWITCH
FUSE
20A
BATTERY
ALTERNATOR

15. BATTERY/ CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

- Quick charge a battery, only in an emergency. Slow-charging is preferred.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the ATC, disconnect the battery cables; the negative cable first, then the positive cable.
- The battery on this vehicle is a sealed type. Never remove the filling hole caps, even when the battery is being charged.
- Be sure to charge the battery with the amount of current and for the time indicated on the battery label and or on page 15-3. Charging with excessive current or too fast may cause the battery failure.

WARNING

Do not smoke around a charging battery, and keep sparks away from it. The gas produced by a battery will explode if a flame or spark is brought near.

- Use only a sealed type battery on this vehicle.
- All charging system components can be tested on the vehicle.

SPECIFICATIONS

Battery	Capacity	12 V–10 AH
	Charging current	Standard: 1.0 A, Maximum: 5.0 A
	Charging time	At standard: 5.0 hours, At maximum: 1.0 hour
Alternator capacity		200W/5,000 rpm
Voltage regulator		Transistorized non-adjustable regulator
Voltage	Fully charged	13.1 V
	Under charged	12.8 V
Alternator charging coil resistance		0.2–1 Ω

TOOL

Digital voltmeter 07411–0020000

TROUBLESHOOTING

No power—key turned on
1. Dead battery
2. Disconnected battery cable
3. Main fuse burned out
4. Faulty ignition switch

Low power—key turned on
1. Weak battery
2. Loose battery connection

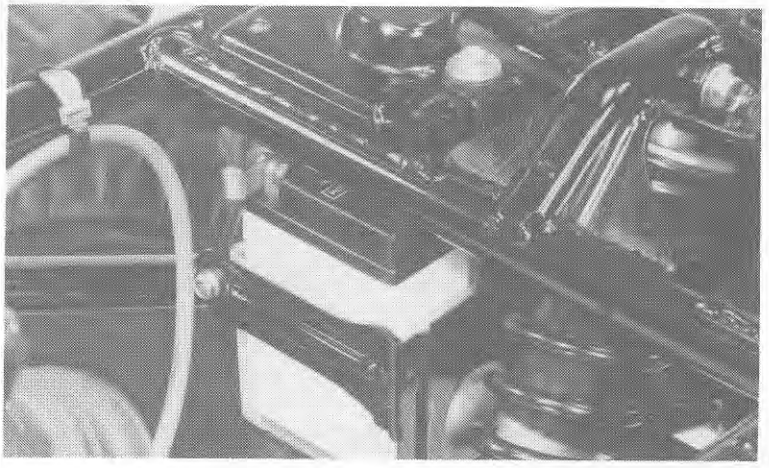
Low power—engine running
1. Battery undercharged
2. Charging system failure
3. Loose connection or short circuit in lighting system

Intermittent power
1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection

Charging system failure
1. Loose, broken, or shorted wire or connection
2. Faulty voltage regulator
3. Faulty alternator

BATTERY

REMOVAL

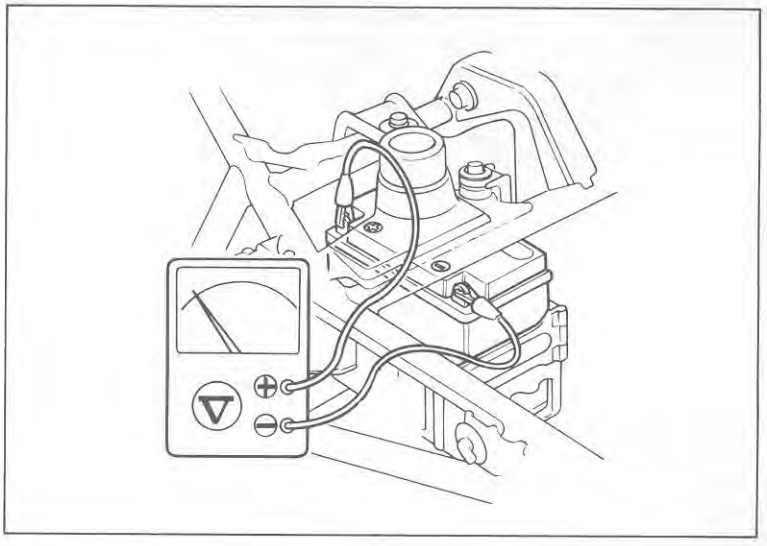


Remove the left and right frame side covers.
Remove the seat.
Raise the rear fender and support it with the stay.
Remove the battery holder bolt.
Disconnect the negative cable, and then the positive cable.
Remove the battery.

VOLTAGE INSPECTION

Measure the battery voltage using a digital voltmeter (07411—0020000).

VOLTAGE: Fully charged: 13.1V
Under charged : 12.8V

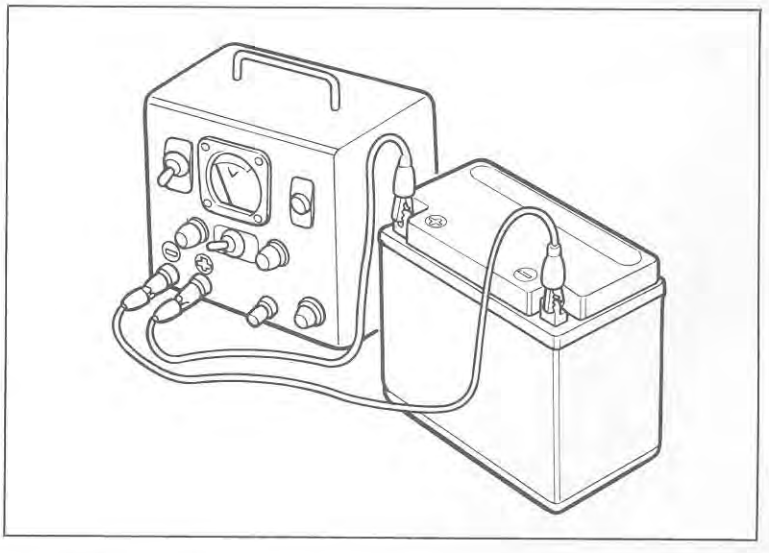


CHARGING

Connect the charger positive(+) cable to the battery positive (+) terminal.

Connect the charger negative (−) cable to the battery negative (−) terminal.

	Standard	Maximum
Charging current	1.0 A	5.0 A
Charging time	5 hours	1 hour



WARNING

- *Keep flames and sparks away from a charging battery.*
- *Turn power ON/OFF at the charger, not at the battery terminals.*

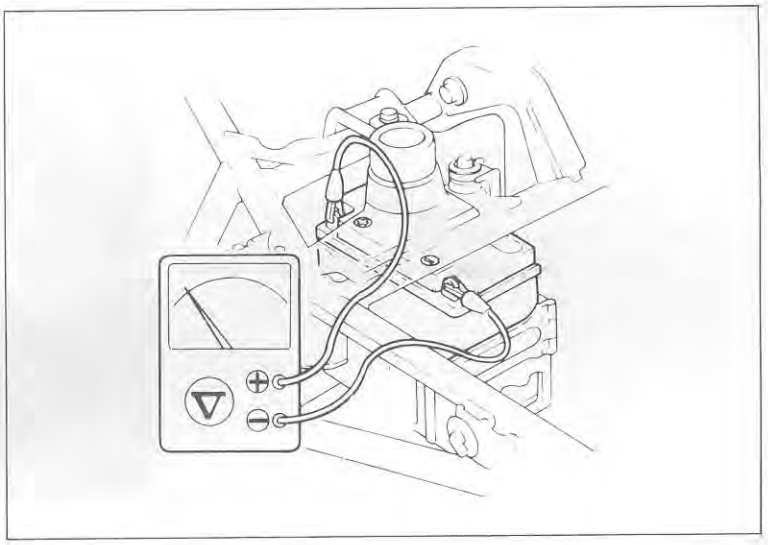
CAUTION

- *Quick-charging should only be done in an emergency; slow-charging is preferred.*
- *Be sure to charge the battry with the correct current and for the time indicated above. Charging with excessive current and or too fast may cause battery failure.*

After installing the battery, coat the terminals with clean grease.

CHARGING SYSTEM

CHARGING OUTPUT TEST



Warm up the engine before testing.
Open the rear fender and support it with the stay.
Connect a voltmeter between the battery positive and negative terminals.
Start the engine turn the headlight on and read the voltmeter.
Gradually increase the engine speed and check that the voltage is regulated.

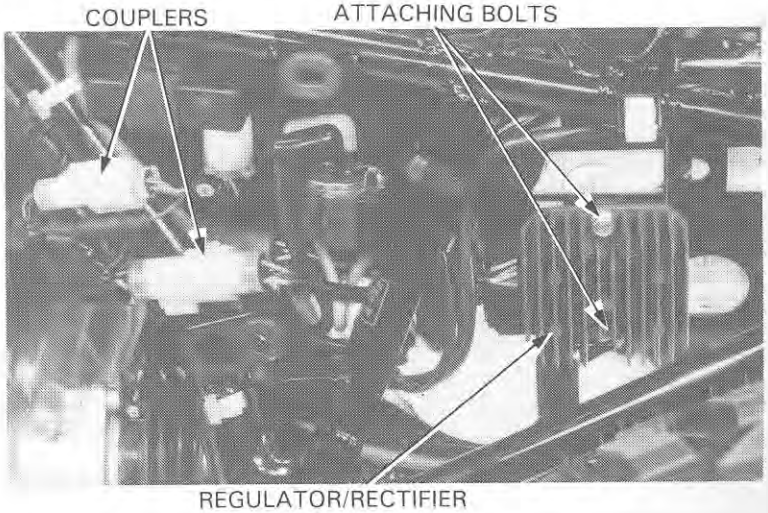
REGULATED VOLTAGE: 14.0–15.0 V

If it exceeds the regulated voltage, make sure that the battery voltage appears between the Black and Green terminals of the regulator/rectifier coupler when the ignition switch is turned ON. Check the Black and Green wires for an open circuit in the wire harness if voltage does not appear with the ignition switch turned ON.
If voltage is OK, replace the regulator/rectifier.
If the voltage does not increase above the previous reading though the engine rpm increases, stop the engine and check the following:

- Check the regulator/rectifier coupler for loose or disconnected terminals.
- Make sure that the battery voltage appears between the Red (+) and Green (–) terminals of the regulator/rectifier couplers. Check the Red and Green wires for open circuit if voltage does not appear.
- Make sure that the battery voltage appears between the Black (+) and Green (–) wires of the regulator/rectifier coupler. Check the Black and Green wires for open circuit if voltage does not appear with ignition switch turned ON.
- Check the charging coil of the alternator as described below.

REGULATOR/RECTIFIER REPLACEMENT

Remove the left frame side cover.
Disconnect the voltage regulator wire couplers.
Remove the two bolts attaching the regulator/rectifier and replace it with a new one.



REGULATOR/RECTIFIER INSPECTION

Check the resistance between the leads with an ohmmeter.

Range: Sanwa: k Ω
Kowa: 100 Ω

⊕ Probe / ⊖ Probe	Yellow	Yellow	Yellow	Red	Green	Black
Yellow		∞	∞	1–20 (100–5 K)	∞	∞
Yellow	∞		∞	1–20 (100–5 K)	∞	∞
Yellow	∞	∞		1–20 (100–5 K)	∞	∞
Red	∞	∞	∞		∞	∞
Green	1–20 (100–5 K)	1–20 (100–5 K)	1–20 (100–5 K)	5–30 (500–8 K)		1–20 (1 K–5 K)
Black	10–80 (10 K–80 K)	10–80 (10 K–80 K)	10–80 (10 K–80 K)	20–200 (50K–∞)	10–50 (10 K–50 K)	

( ) : Kowa tester

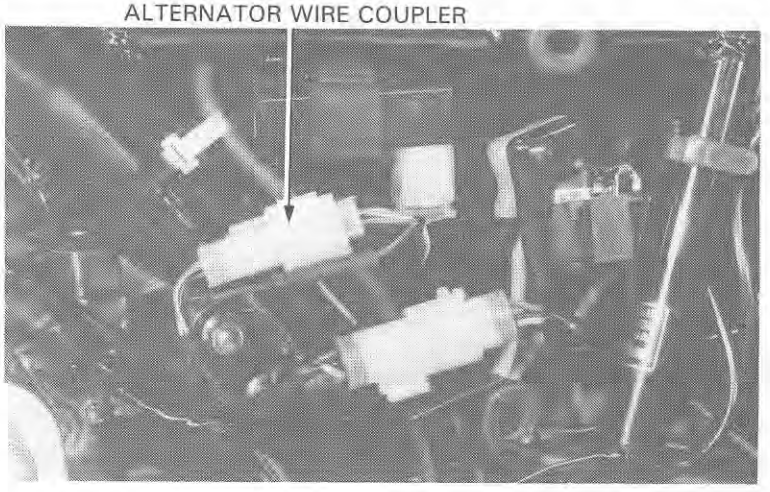
ALTERNATOR CHARGING COIL

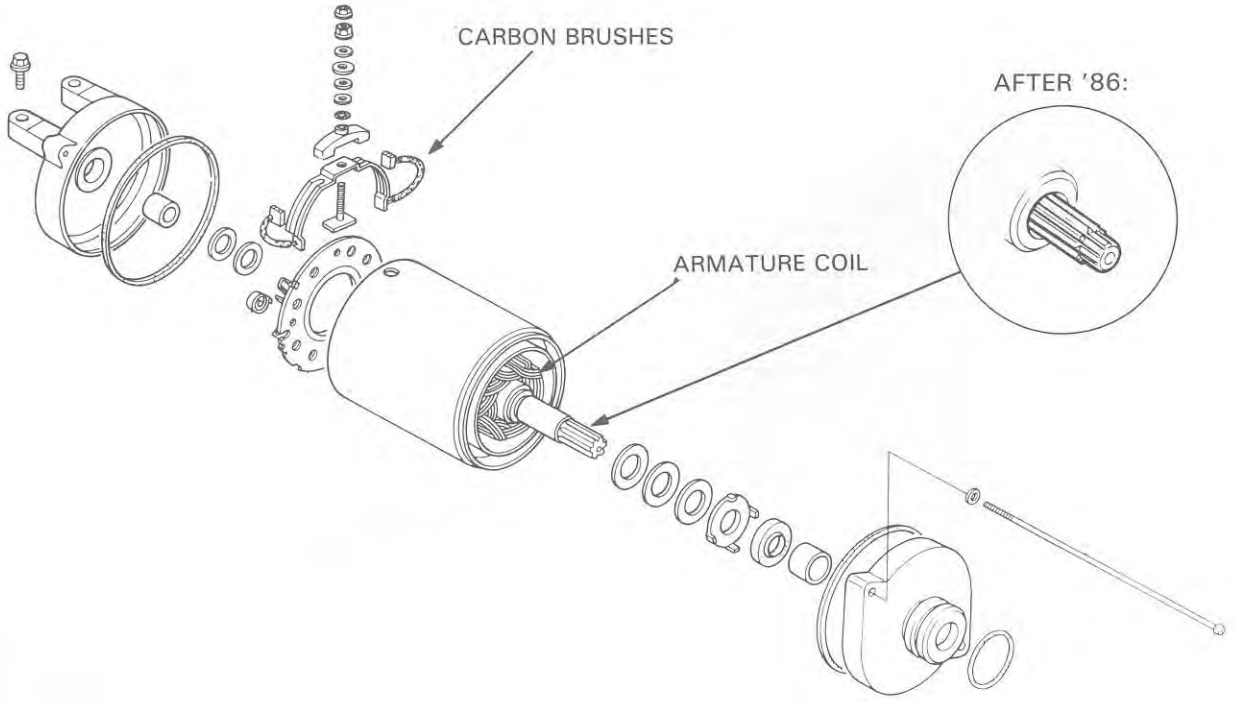
Disconnect the alternator wire coupler.
Check the resistance between the coupler terminals.

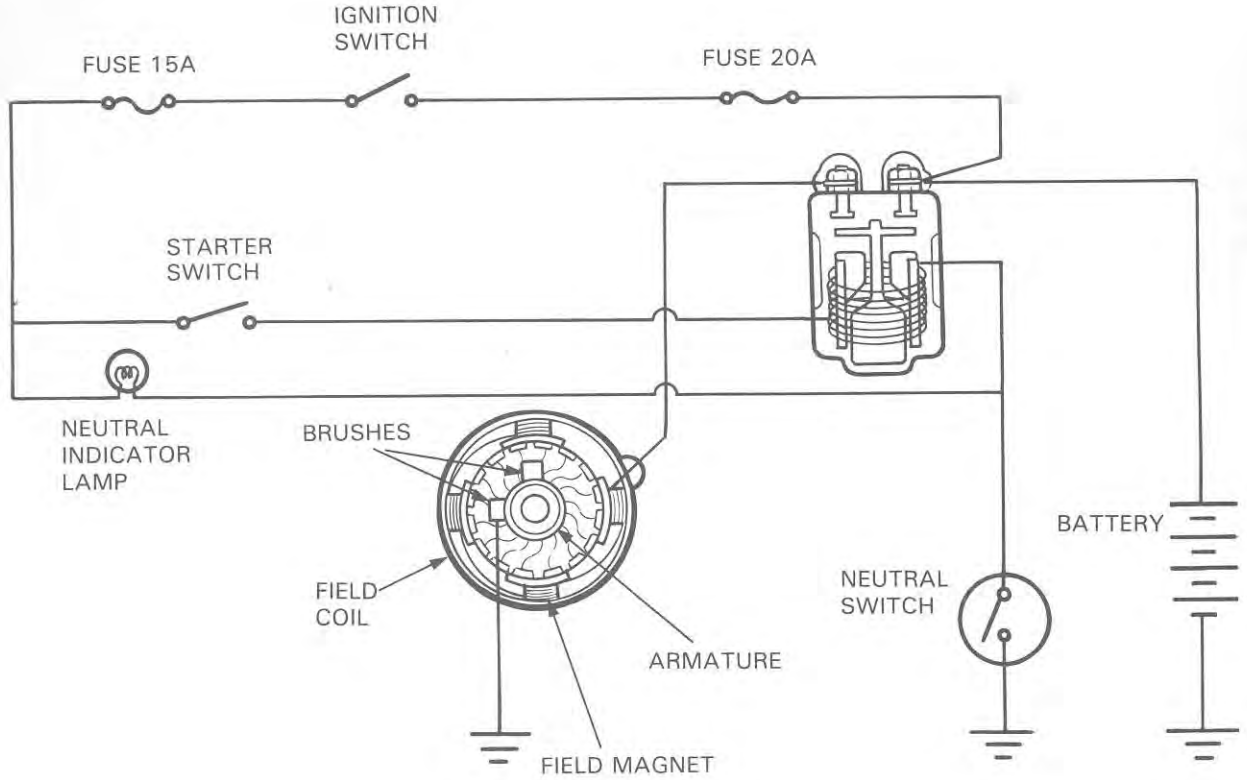
RESISTANCE: 0.2–1 Ω

Check for continuity between the coupler terminal and ground.
Replace the alternator stator if readings are not within the limit or if any lead has continuity to ground.
Refer to section 9 for stator removal.

ALTERNATOR WIRE COUPLER




CARBON BRUSHES
AFTER '86:
ARMATURE COIL


IGNITION SWITCH
FUSE 15A
FUSE 20A
STARTER SWITCH
NEUTRAL INDICATOR LAMP
BRUSHES
FIELD COIL
ARMATURE
FIELD MAGNET
NEUTRAL SWITCH
BATTERY

16. STARTER SYSTEM

SERVICE INFORMATION

GENERAL

The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	Mitsuba	800±120 g (28.2±4.2 oz)	740 g (26 oz)
		ND	970±120 g (34.2±4.2 oz)	
	Brush lengh	Mitsuba	12—12.5 mm (0.47—0.49 in)	5.5 mm (0.22 in)
		ND	11.7—12.3 mm (0.46—0.48 in)	8.5 mm (0.33 in)

TROUBLESHOOTING

Starter motor will not turn
1. Dead battery
2. Faulty ignition switch
3. Faulty starter switch
4. Faulty neutral switch
5. Faulty starter relay switch
6. Loose or disconnected wire or cable

Starter motor turns engine slowly
1. Low battery
2. Excessive resistance in circuit
3. Binding in starter motor

Starter motor turns, but engine does not turn
1. Faulty starter clutch
2. Faulty starter motor gears
3. Faulty starter motor or idle gear

Starter motor and engine turn, but engine does not start
1. Faulty ignition system
2. Engine problems
3. Faulty engine stop switch

STARTER MOTOR

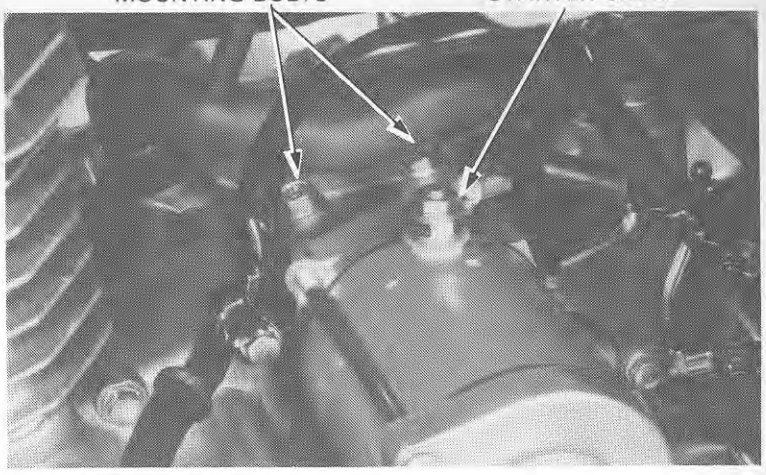
REMOVAL

WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Disconnect the starter cable from the stater motor.

Remove the two mounting bolts and the starter motor.



BRUSH INSPECTION

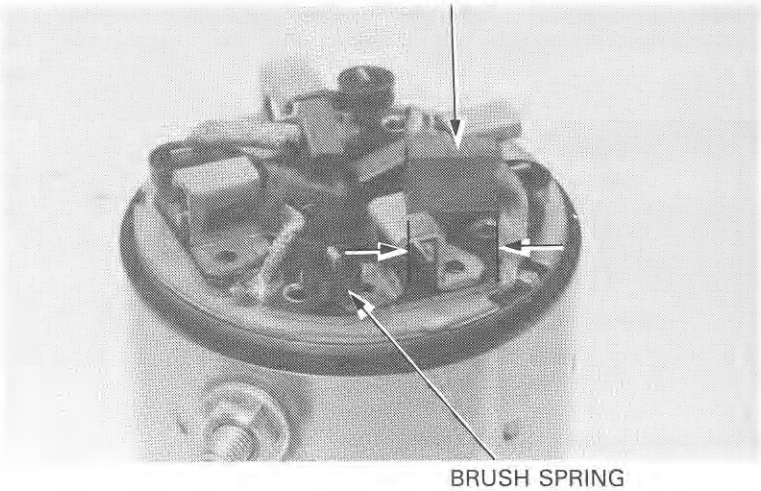
Remove the two starter motor case screws, and front and rear covers.
Remove the armature and the brushes.

Inspect the brushes and measure the brush length.

SERVICE LIMIT: Mitsuba 5.5 mm (0.22 in)
ND 8.5 mm (0.33 in)

Measure brush spring tension with a spring scale.

SERVICE LIMITS: 740 g (26 oz)



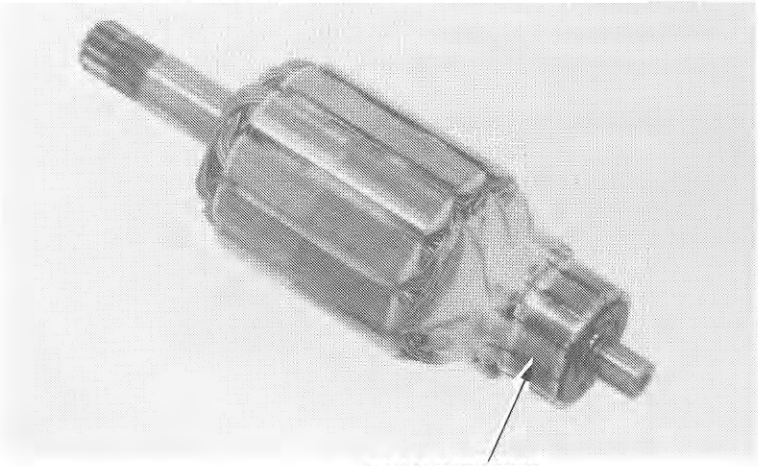
'85, '86 MODEL SHOWN

COMMUTATOR INSPECTION

NOTE

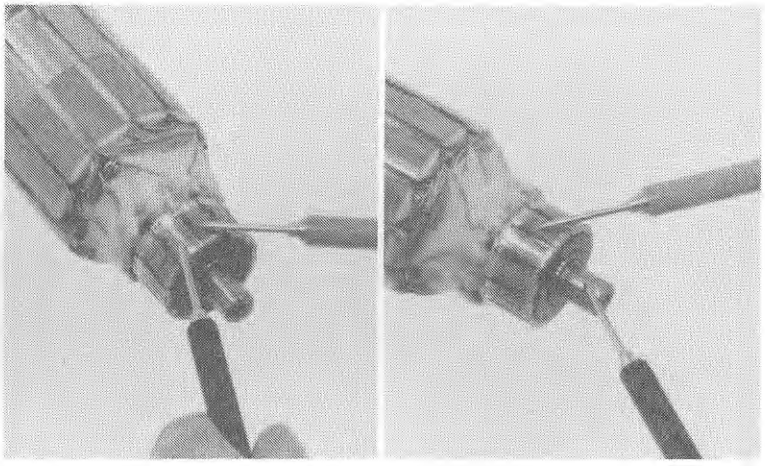
Record the location and number of thrust washers for correct assembly.

Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.



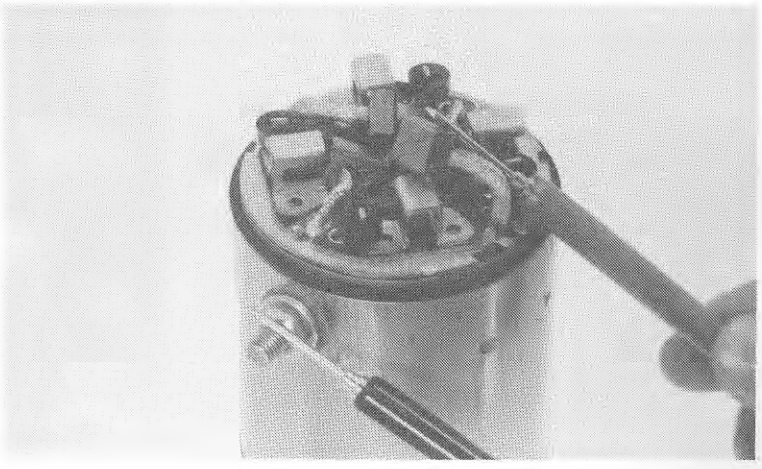
Check for continuity between pairs of commutator bars; there should be continuity.

Also, check for continuity between individual commutator bars and armature shaft; there should be no continuity.



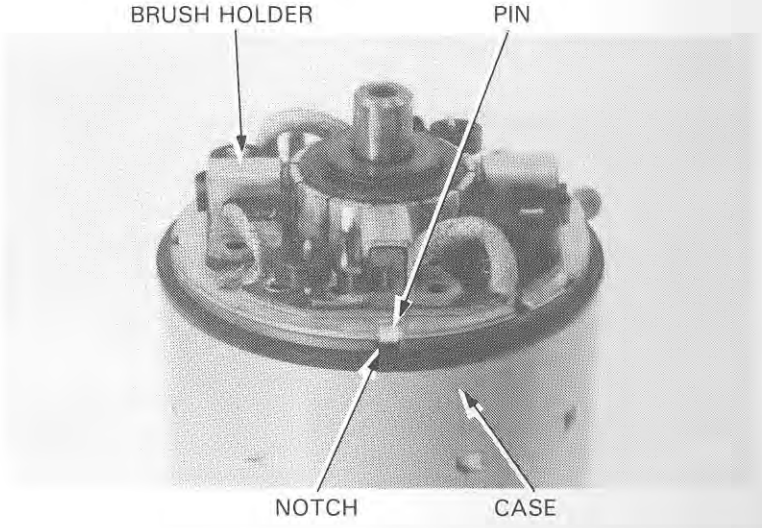
FIELD COIL INSPECTION

Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire. Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.



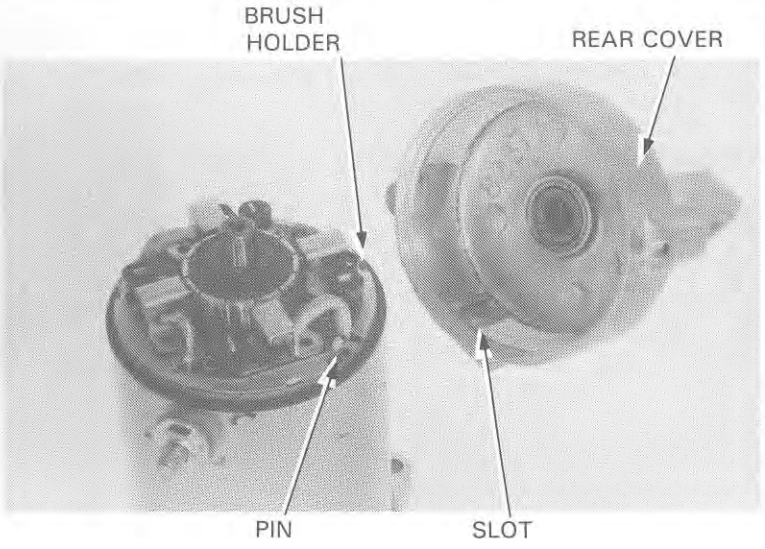
ASSEMBLY/INSTALLATION

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.

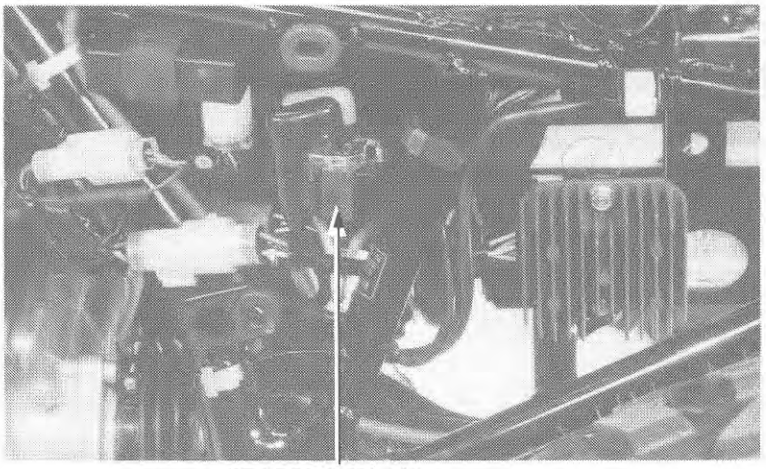
Install the starter motor in the reverse order of removal.



STARTER RELAY SWITCH

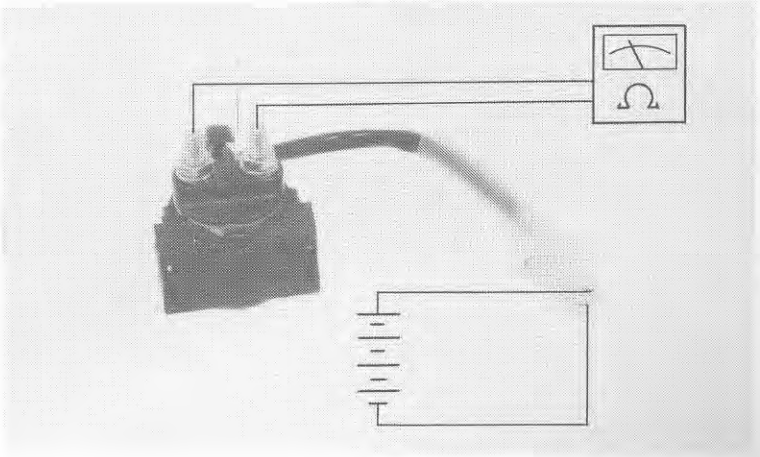
INSPECTION

Raise the rear fender and support it with the stay. 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.



17. LIGHTS/SWITCHES

SERVICE INFORMATION

GENERAL

A continuity check can usually be made without removing the part from the ATC by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals.

Headlight	12V 60W/60W
Taillight	12V 5W x 2
Neutral indicator	12V 3W
Reverse indicator	12V 3W

TROUBLESHOOTING

Light does not come on when light switch is turned on (Engine is running)
1. Bulb burned out
2. Faulty switch
3. Wiring to that component has open circuit

Headlight beams do not shift when hi-lo switch is operated
1. Faulty dimmer switch
2. Bulb burned out
3. Wiring to that component has open circuit

HEADLIGHT

BULB REPLACEMENT

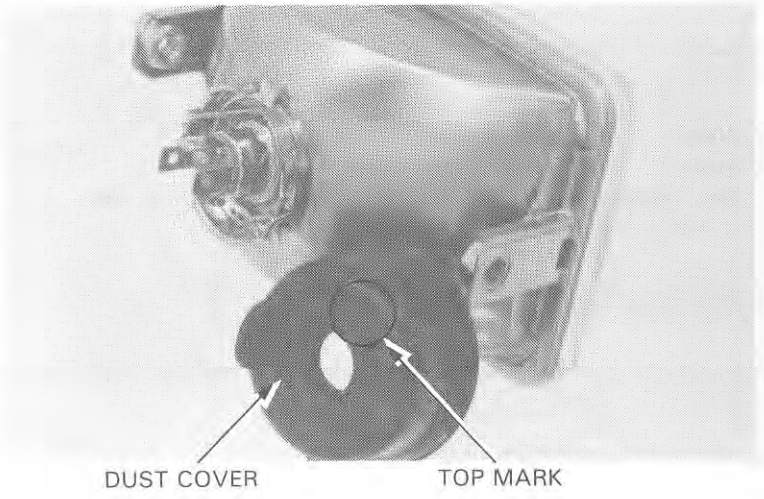
Remove the headlight case mounting bolts and case from the bracket.
Remove the headlight from the case.

Disconnect the headlight coupler.

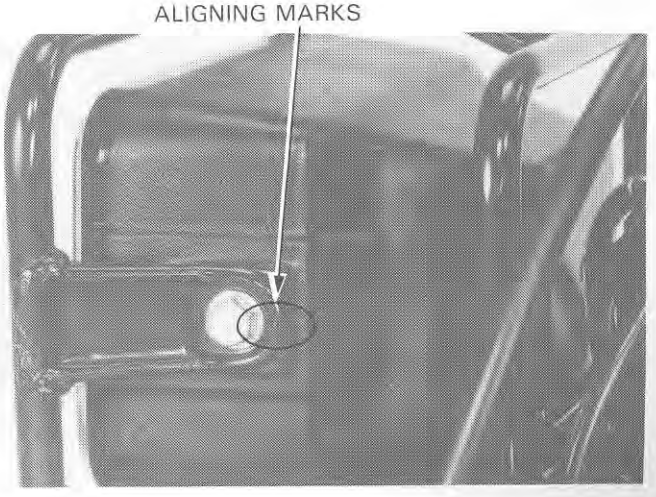
Remove the dust cover.
Remove the retainer clip to replace the headlight bulb.

Install the dust cover with the TOP mark facing up.

Connect the headlight coupler and install the headlight into the case.



Install the headlight case onto the bracket, align the marks on the case and bracket.

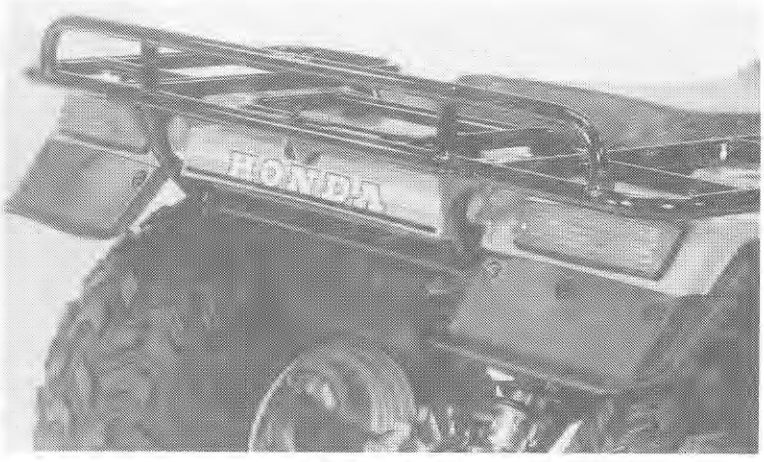


TAILLIGHT

BULB REPLACEMENT

Remove the taillight lens screws.
Disconnect the taillight wires.
Replace the taillight bulb.

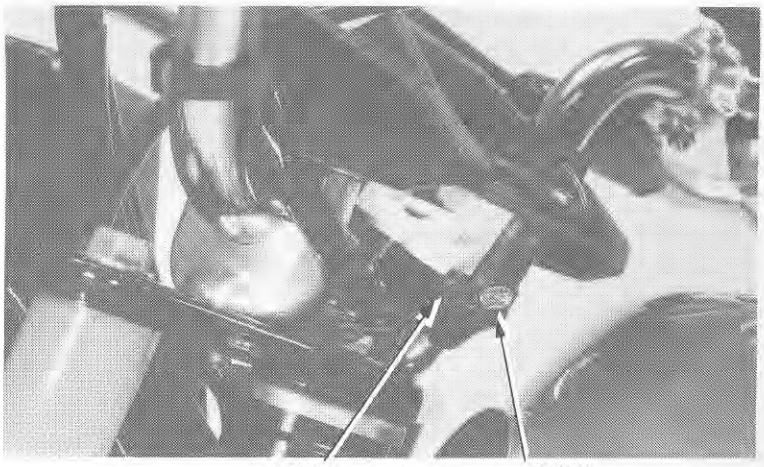
Connect the taillight wires.
Make sure that the lens seal rubber is correctly installed, then install the lens and secure it with screws.



INDICATOR LAMP

BULB REPLACEMENT

Pull the bulb socket out of the indicator lamp housing and remove the bulb.
Install a new bulb and push the socket back into the housing.



NEUTRAL SWITCH/REVERSE SWITCH

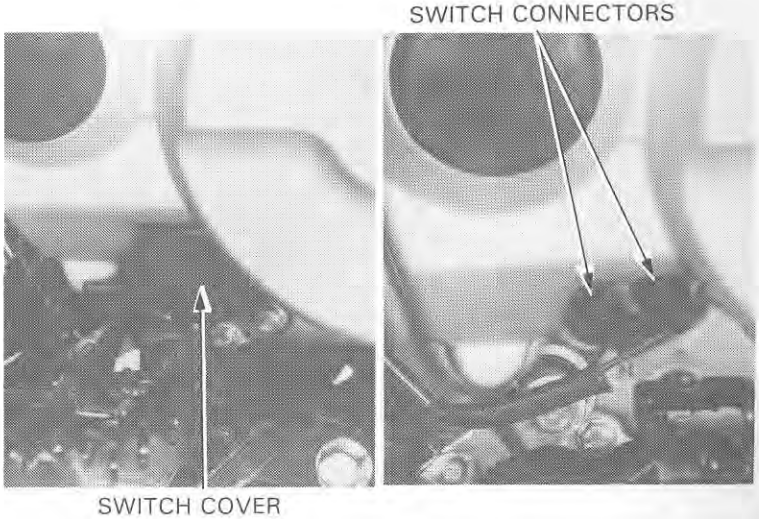
Remove the switch cover and connectors.
Check the continuity between the switch terminal and ground.

The neutral switch is functional if continuity exists with the transmission in neutral.

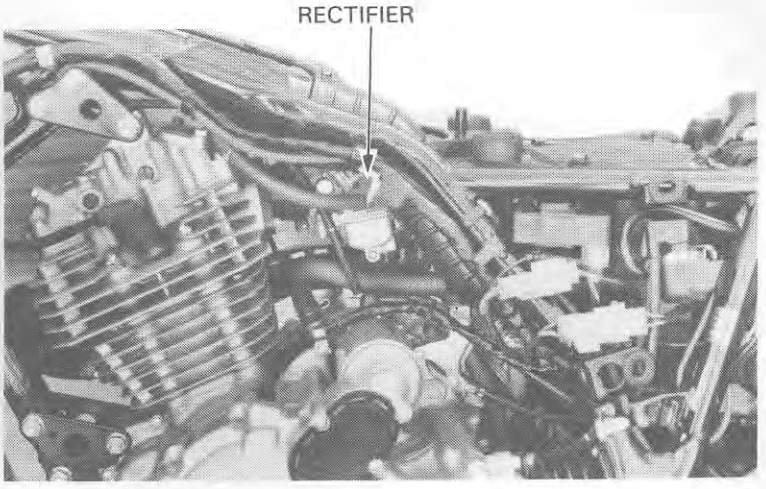
The reverse switch is functional if continuity exists with the transmission in reverse.

WARNING

Connect the neutral (Light green/Red) and reverse (Green) switch wires properly. If the switch wire connections are interchanged, the neutral indicator comes on in the transmission in reverse and the ATC will reverse suddenly.



RECTIFIER



INSPECTION

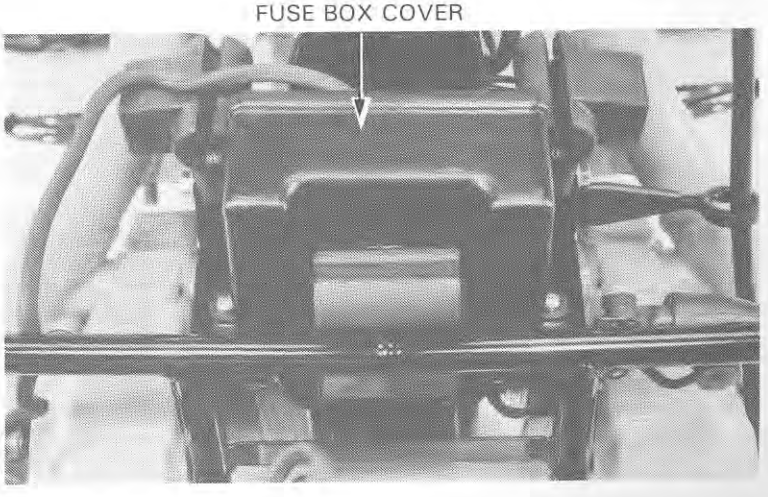
Remove the frame left side cover.
Remove the rectifier from the holder under the battery with the coupler connected.
Disconnect the coupler from the rectifier.

Check for continuity with an ohmmeter.
The rectifier is good if continuity exists in the direction of the arrow.

NOTE:

> The test results shown are for a positive ground ohmmeter and opposite results will be obtained when a negative ground ohmmeter is used.

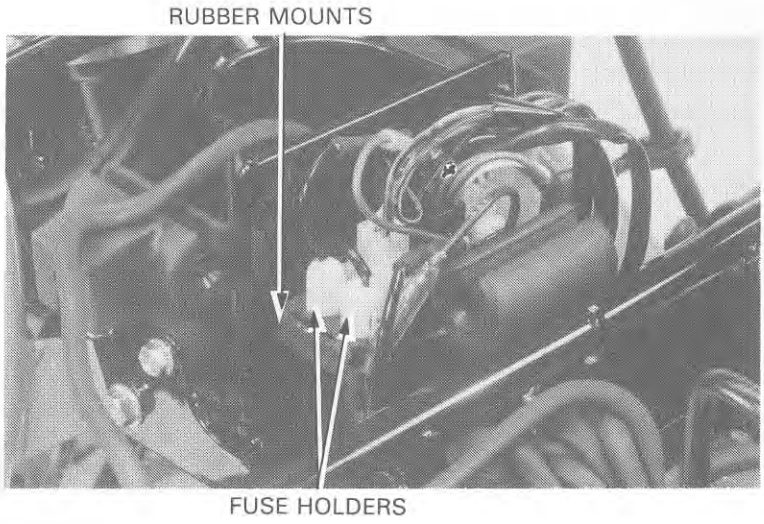
FUSE REPLACEMENT



Remove the front carrier (page 13-1).
Remove the fuse box cover.

Remove the fuse holder from its rubber mounts, loosen the fuse holder cap and remove the cap and fuse.

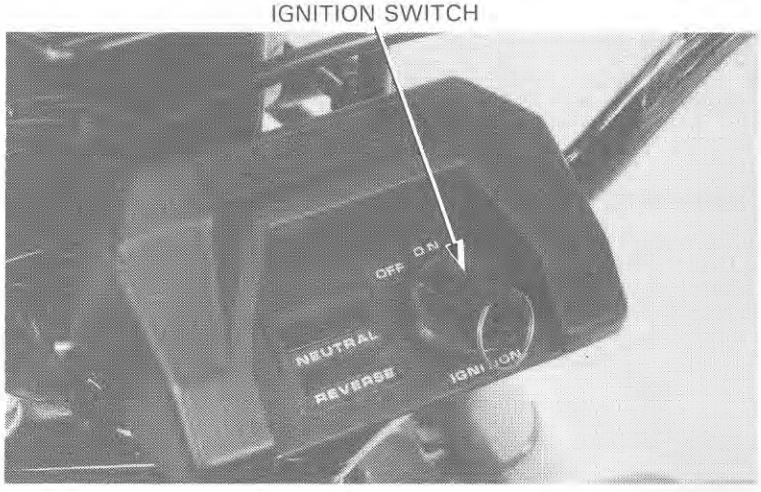
Install the fuse in the reverse order of removal.



IGNITION SWITCH

Remove the fuse/junction cover.
Disconnect the ignition switch wire connectors and coupler.
Check continuity between the terminals in the chart shown below.

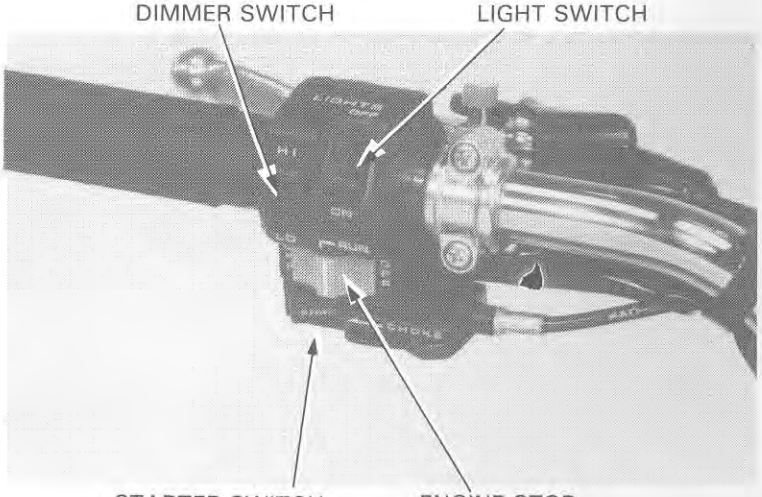
WIRE COLOR / SWITCH POSITION	BLACK/ WHITE	GREEN	RED	BLACK
OFF	○	○		
ON			○	○



HANDLEBAR SWITCH

The handlebar switch (light/dimmer switch, engine stop switch, starter switch) must be replaced as an assembly.
Remove the fuse box cover.
Disconnect the handlebar switch coupler.

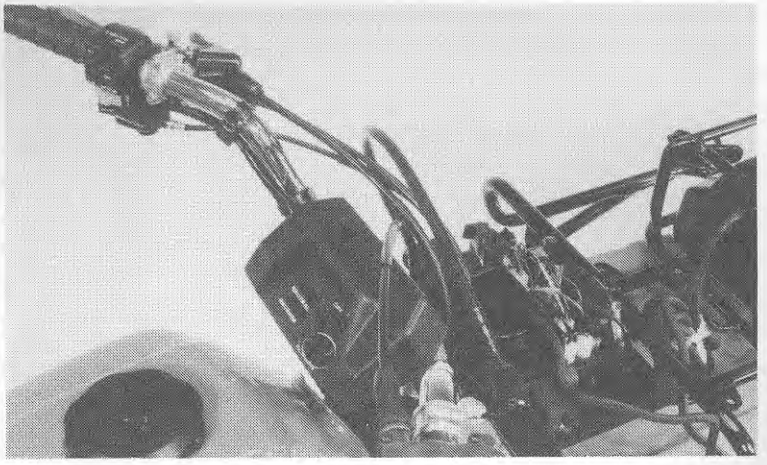
Check continuity between the terminals.
Continuity should exist between the color coded wire terminals in each chart.



'85:

LIGHT/DIMMER SWITCH

WIRE COLOR / SWITCH POSITION	BROWN	BLACK BROWN	WHITE	BLUE
OFF				
LO	○	○	○	
(N)	○	○	○	○
HI	○	○		○



ENGINE STOP SWITCH

WIRE COLOR / SWITCH POSITION	GREEN	BLACK/ WHITE
OFF	○	○
RUN		

STARTER SWITCH

WIRE COLOR / SWITCH POSITION	BLACK/ BROWN	YELLOW/ RED
PUSH	○	○
FREE		

AFTER '85:

IGNITION SWITCH

	IG	E	BAT	HO
OFF	○	○		
ON			○	○
COLOR	BI/W	G	R	BI

ENGINE STOP SWITCH

	E	IG
OFF	○	○
RUN		
COLOR	G	BI/W

LIGHTING SWITCH

	C	TL	(HL)
OFF			
ON	○	○	○
COLOR	BL/Br	Br	●

DIMMER SWITCH

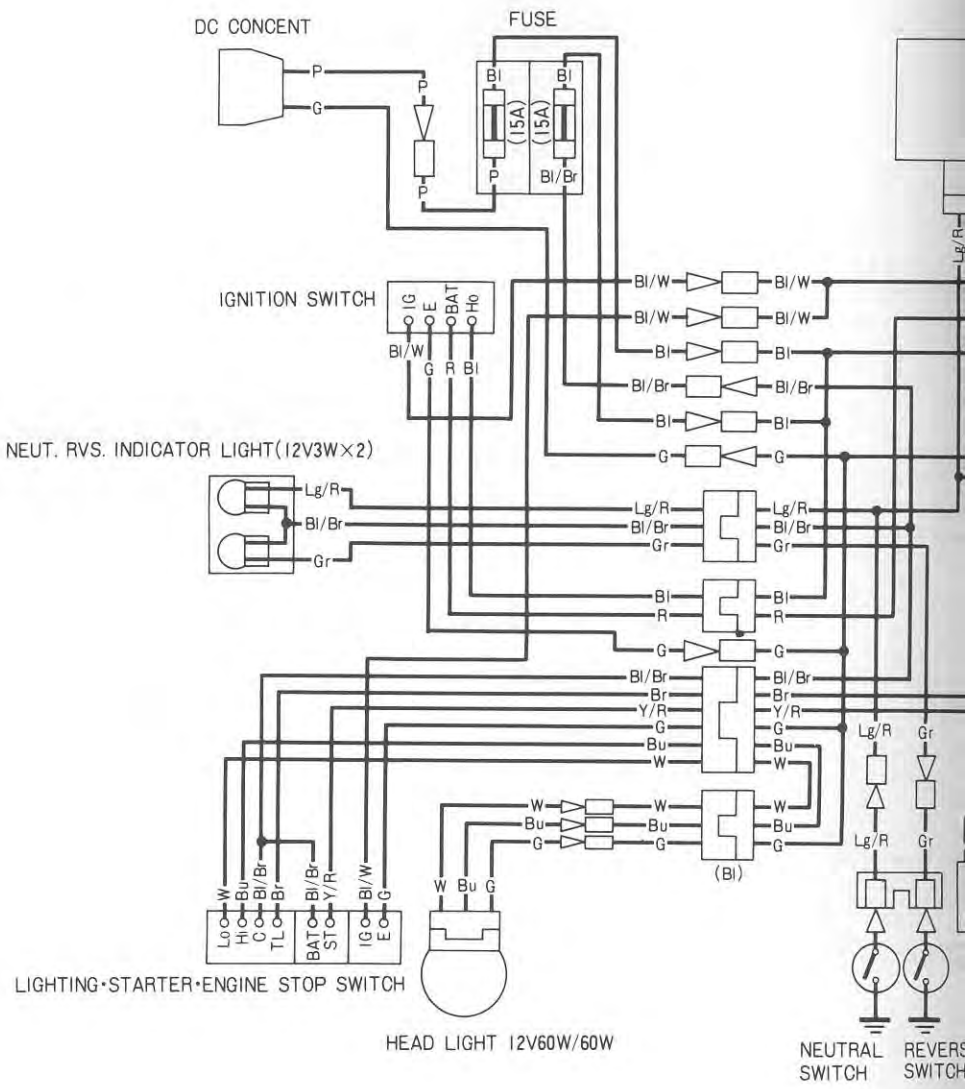
	HI	(HL)	LO
HI	○	○	
(N)	○	○	○
LO		○	○
COLOR	Bu	●	W

STARTER SWITCH

	BAT	ST
PUSH	○	○
FREE		
COLOR	Bl/Br	Y/R

MEMO

'85



SWITCH CONTINUITY

IGNITION SWITCH

	IG	E	BAT	Ho
OFF	○—○			
ON			○—○	
COLOR	Bl/W	G	R	Bl

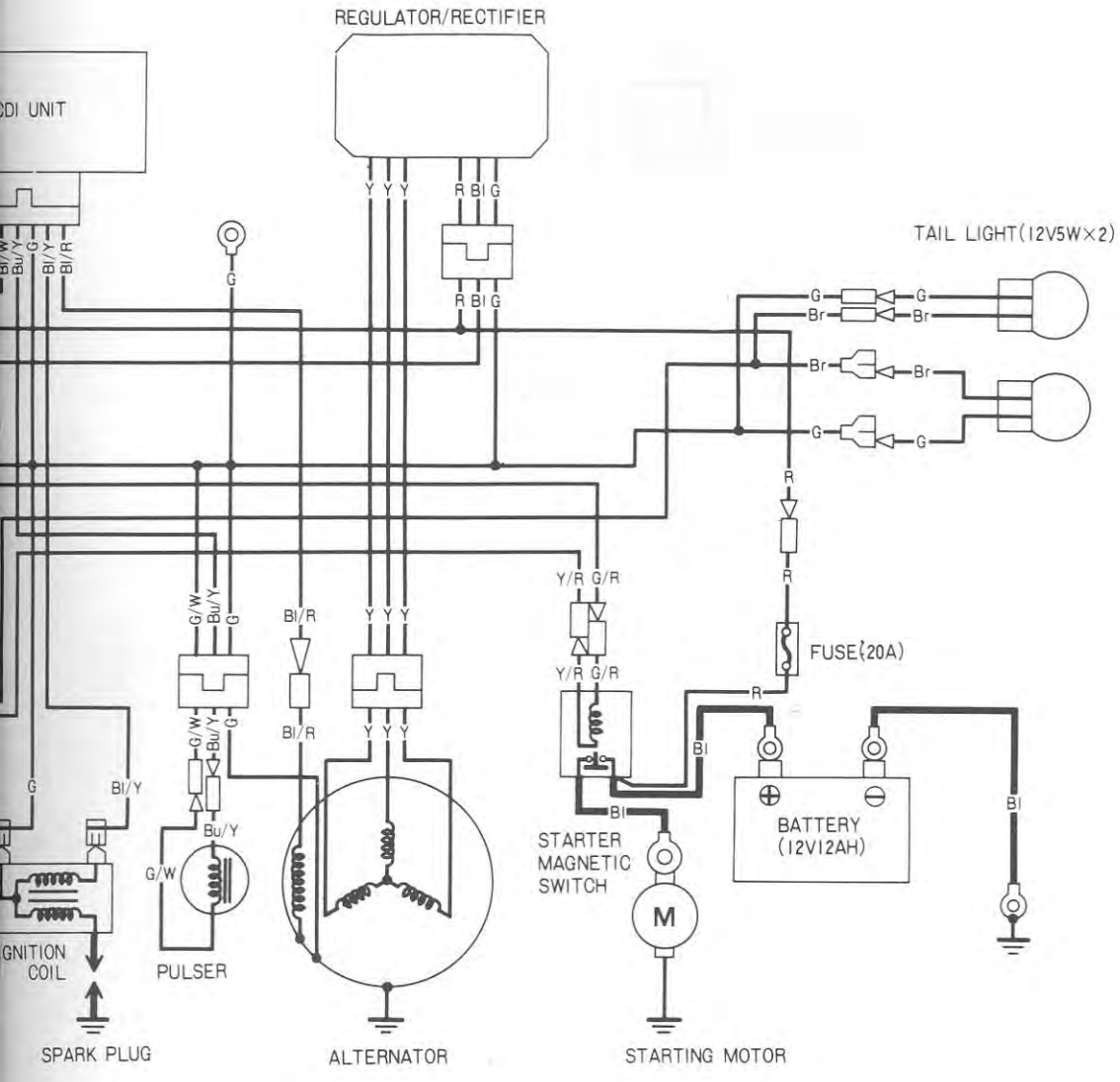
LIGHTING SWITCH

	TL	C	Lo	Hi
OFF				
Lo	○—○	○—○	○—○	
(N)	○—○	○—○	○—○	○—○
Hi	○—○	○—○		○—○
COLOR	Br	Bl/Br	W	Bu

STARTER SWIT

	BAT
PUSH	○
FREE	
COLOR	Bl/Br

18. WIRING DIAGRAMS



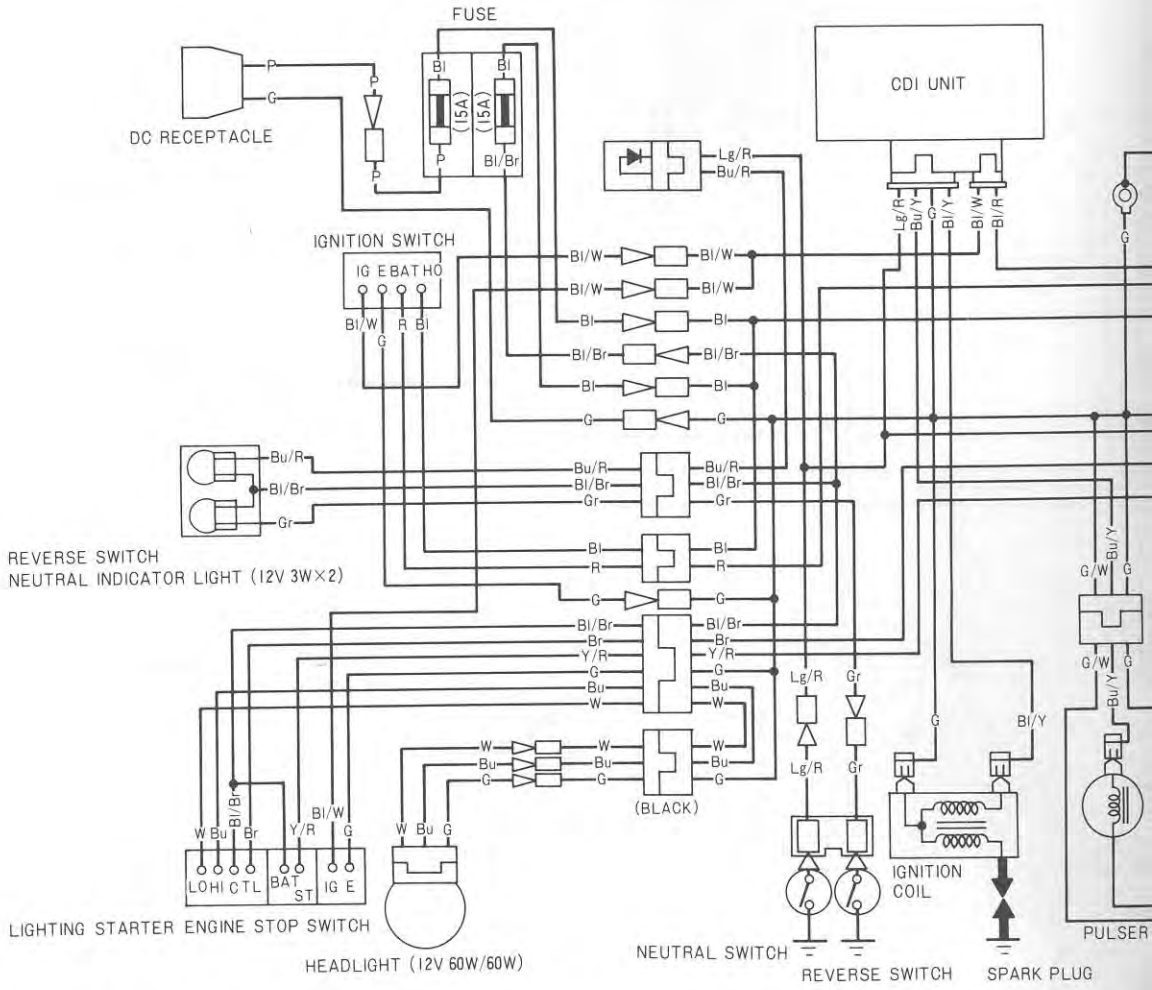
ENGINE STOP SWITCH

	E	IG
OFF	○	○
RUN		
COLOR	G	Bl/W

Bl ·····Black	Br ·····Brown
Y ·····Yellow	O ·····Orange
Bu·····Blue	Lb·····Light Blue
G ·····Green	Lg·····Light Green
R ·····Red	P ·····Pink
W ·····White	Gr·····Grey

0030Z-HA0 -0100-

AFTER '85



SWITCH CONTINUITY

IGNITION SWITCH

	IG	E	BAT	HO
OFF	○	○		
ON			○	○
COLOR	Bl/W	G	R	Bl

LIGHTING SWITCH

	C	TL	(HL)
OFF			
ON	○	○	○
COLOR	Bl/Br	Br	

DIMMER SWITCH

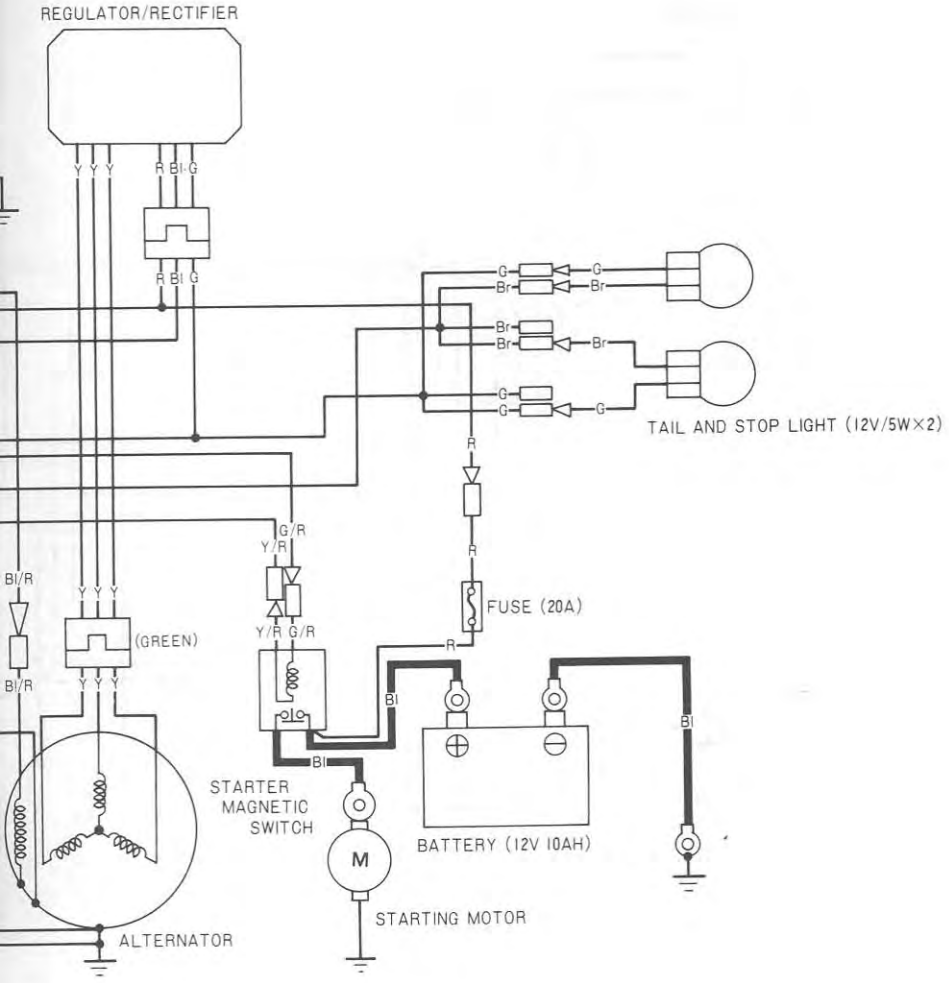
	HI	(HL)	LO
HI	○	○	
(N)	○	○	○
LO			○
COLOR	Bu		W

STARTER SWITCH

	BAT	ST
PUSH	○	○
FREE		
COLOR	Bl/Br	Y/R

ENGINE ST

	E
OFF	○
RUN	
COLOR	G



P SWITCH

IG
Bl/W

Bl ·····Black	Br ·····Brown
Y ·····Yellow	O ·····Orange
Bu·····Blue	Lb·····Light Blue
G ·····Green	Lg·····Light Green
R ·····Red	P ·····Pink
W ·····White	Gr·····Gray

19. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		Probable Cause
1. Check if fuel is getting to carburetor. GETTING TO CARBURETOR ↓	NO FUEL TO CARBURETOR →	(1) No fuel in fuel tank (2) Clogged fuel tube or fuel filter (3) Clogged float valve (4) Clogged fuel tank cap breather tube
2. Try spark test. GOOD SPARK ↓	WEAK OR NO SPARK →	(1) Faulty spark plug (2) Fouled spark plug (3) Faulty CDI unit (4) Broken or shorted spark plug wire (5) Faulty alternator (6) Broken or shorted ignition coil (7) Faulty pulse generator (8) Poorly connected, broken or shorted wires (9) Pulse generator rotor gap incorrect (10) Faulty ignition switch
3. Test cylinder compression. COMPRESSION NORMAL ↓	LOW COMPRESSION →	(1) Low battery charge (2) Valve clearance too small (3) Valve stuck open (4) Worn cylinder and pistion rings (5) Damaged cylinder head gasket (6) Seized valve (7) Improper valve timing
4. Start by following normal starting procedure. ENGINE DOES NOT FIRE ↓	ENGINE FIRES BUT SOON STOPS →	(1) Choke excessively open (2) Choke outer cable out of place (3) Carburetor pilot screw excessively closed (4) Air leaking past carburetor insulator (5) Improper ignition timing (CDI unit or pulse generator faulty)
5. Remove spark plug. DRY ↓	WET PLUG →	(1) Carburetor flooded (2) Carburetor choke excessively open (3) Throttle valve excessively open (4) Air cleaner dirty
6. Start with choke applied		

ENGINE LACKS POWER

		Probable Cause
1. Raise wheels off ground and spin by hand. WHEEL SPINS FREELY	WHEEL DOES NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearing (3) Wheel bearing needs lubrication (4) Faulty final gear
2. Check tire pressure with tire gauge. PRESSURE NORMAL	PRESSURE TOO LOW →	(1) Punctured tire (2) Faulty tire valve
3. Try rapid acceleration from low to second. ENGINE SPEED LOWERED	ENGINE SPEED DOES NOT CHANGE →	(1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate
4. Lightly accelerate engine. ENGINE SPEED INCREASED	ENGINE SPEED NOT INCREASED SUFFICIENTLY →	(1) Carburetor choke opened (2) Clogged air cleaner (3) Restricted fuel flow vent (4) Clogged fuel tank breather hole (5) Clogged muffler
5. Check ignition timing. CORRECT	INCORRECT →	(1) Faulty CDI unit (2) Faulty pulse generator (3) Improper flywheel installation
6. Check valve clearance. CORRECT	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat
7. Test cylinder compression using a compression gauge. NORMAL	TOO LOW →	(1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing
8. Check carburetor for clogging. NOT CLOGGED	CLOGGED →	(1) Carburetor not serviced frequently enough
9. Remove spark plug. NOT FOULED OR DISCOLORED	FOULED OR DISCOLORED →	(1) Plug not serviced frequently enough (2) Use of plug with improper heat range

10. Remove oil level gauge and check oil level. CORRECT ↓	OIL LEVEL INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
11. Remove cylinder head cover and inspect lubrication. VALVE TRAIN LUBRICATED PROPERLY ↓	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil
12. Check if engine overheats. NOT OVERHEATED ↓	OVERHEATED →	(1) Excessive carbon build-up in combustion chamber (2) Use of improper quality of fuel (3) Clutch slipping (4) Fuel-air mixture too lean
13. Accelerate or run at high speed. ENGINE DOES NOT KNOCK	ENGINE KNOCKS →	(1) Worn piston and cylinder (2) Fuel-air mixture too lean (3) Use of improper grade of fuel (4) Excessive carbon build-up in combustion chamber (5) Ignition timing too advanced (Faulty CDI unit or pulse generator)

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		Probable Cause
1. Check ignition timing and valve clearance. CORRECT ↓	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty CDI unit or pulse generator)
2. Check carburetor pilot screw adjustment. CORRECT ↓	INCORRECT →	(1) Fuel-air mixture too lean (2) Fuel-air mixture too rich
3. Check if air is leaking past carburetor insulator. NOT LEAKING ↓	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor
4. Try spark test. GOOD SPARK	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty CDI unit (3) Alternator faulty (4) Faulty ignition coil (5) Faulty pulse generator

POOR PERFORMANCE AT HIGH SPEEDS

		Probable Cause
1. Check ignition timing and valve clearance.	INCORRECT →	(1) Improper valve clearance (2) Faulty CDI unit (3) Faulty pulse generator (4) Improper flywheel installation
CORRECT ↓		
2. Disconnect fuel tube at carburetor.	FUEL FLOW RESTRICTED →	(1) Lack of fuel in tank (2) Clogged fuel line (3) Clogged fuel tank breather hole (4) Clogged fuel valve
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet.	CLOGGED →	Clean
NOT CLOGGED ↓		
4. Check valve timing.	INCORRECT →	Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension.	WEAK →	Faulty spring
NOT WEAKENED		

POOR HANDLING → Check tire pressure

	Probable Cause
1. If steering is heavy →	(1) Steering head adjuster too tight (2) Damaged steering cones or steel balls
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Bent rim (3) Improperly installed wheel hub (4) Bent frame (5) Bent swing arm
3. If the ATC pulls to one side →	(1) Tire air pressure incorrect (2) Bent front fork

20. INDEX

HONDA

HONDA MOTOR CO., LTD. TOKYO, JAPAN

61HA002

IPC500.2001.12
PRINTED IN U.S.A.