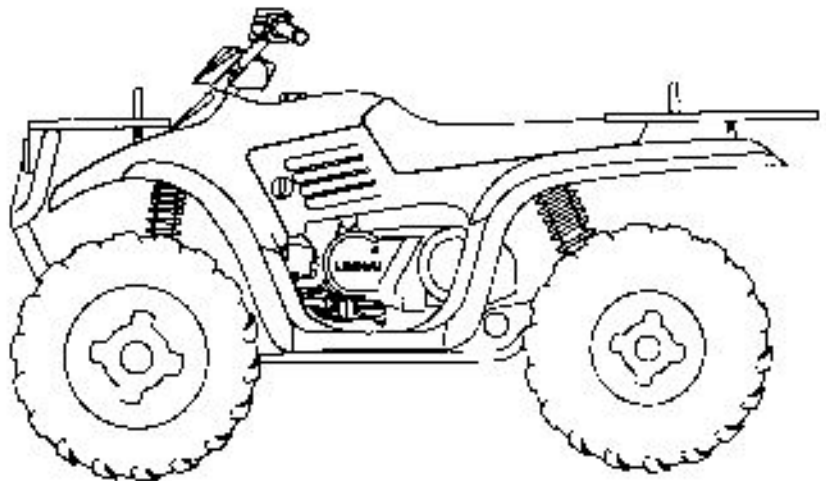




# ***SERVICE MANUAL***

*Model No.8260*



PN82693

## Foreword

This manual is designed primarily for use by the ATV factory certified service technicians in a properly equipped shop. Persons using this manual should have a sound knowledge of mechanical theory, tool use, and shop procedures in order to perform the work safely and correctly. The technician should read the text and be familiar with service procedures before starting the work. Certain procedures require the use of special tools. Use only the proper tools, as specified. Cleanliness of parts and tools as well as the work area is of primary importance.

All references to left and right side of the vehicle are from the operator's perspective when seated in a normal riding position.

This manual includes procedures for maintenance operations, component identification and unit repair, along with service specifications for these ATVs. Keep this manual available for reference in the shop area.

At the time of publication all information contained in this manual was technically correct. However, all materials and specifications are subject to change without notice.



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## MAINTENANCE



Due to the nature of the adjustments marked with a [D] on the following chart, it is recommended that service be performed by an authorized dealer.

▲ More often under severe use, such as dirty or wet conditions to purge water or dirt contamination from grease fittings and other critical components.

### Periodic Maintenance Schedule

Careful periodic maintenance will help keep your vehicle in the safest, most reliable condition. Inspection, adjustment and lubrication intervals of important components are explained in the following chart on the following pages.

Maintenance intervals are based upon average riding conditions and an average vehicle speed of approximately 10 miles per hour. Vehicles subjected to severe use, such as operation in wet or dusty areas, should be inspected and serviced more frequently.

Inspect, clean, lubricate, adjust or replace parts as necessary.

**NOTE:** Inspection may reveal the need for replacement parts. Always use genuine parts available from your dealer.

Service and adjustments are critical. If you are not familiar with safe service and adjustment procedures, have a qualified dealer perform these operations.

Item	Hours	When	Remarks
Brake System	Pre-ride	Pre-ride	Pre-ride inspection item
Auxiliary Brake	Pre-ride	Pre-ride	Pre-ride inspection item
Tires	Pre-ride	Pre-ride	Inspect daily, pre-ride inspection item
Wheels	Pre-ride	Pre-ride	Pre-ride inspection item
Frame nuts, bolts fasteners	Pre-ride	Pre-ride	Pre-ride inspection item
▲ Air Filter-pre-Cleaner	Daily	Daily	Inspect-Clean
Coolant/Level Inspection	Daily	Daily	Replace engine coolant annually
▲ Air Box Sediment Tube	Daily	Daily	Drain deposits whenever visible
Headlamp Inspection	Daily	Daily	Check operation daily; apply dielectric grease to connector when replaced
Tail lamp inspection	Daily	Daily	Check operation daily; apply dielectric grease to socket when replaced
▲ Air Filter-Main Element	Weekly	Weekly	Inspect-Replace if necessary
▲ Transmission Oil Level	20 hrs	Monthly	Inspect monthly; change annually
Battery	20 hrs	Monthly	Check/clean Terminals; check fluid level

	Item	Hours	When	Remove
☐	Brake pad wear	10 hrs	Monthly	Inspect periodically
▲	Rear Gearcase Oil	100 hrs	Monthly	Check monthly and change annually
	Engine Cylinder Head and Cylinder Base Fasteners	25 hrs	3 months	Inspect (re-torque required at first service only)
▲	General Lubrication	50 hrs	3 months	Lubricate all fittings, pivots, cables, etc.

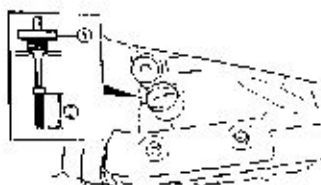
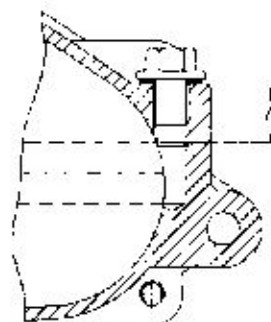
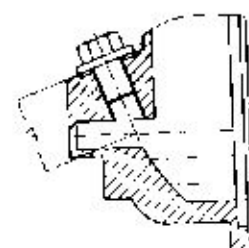
	Item	Hours	When	Remarks
▲	Engine Oil—Level/Change	30 hrs	3 months	Check Level Daily; Break in Service at 1 month. Change oil more often in cold weather use.
▲	Oil Filter	50 hrs	6 months	Inspect—clean
	Engine breather hose	100 hrs	6 months	Inspect
	Carburetor Float Bowl	50 hrs	6 months	Drain bowl periodically and prior to storage
☐	Throttle Cable	50 hrs	6 months	Inspect—adjust, lubricate, replace if necessary; pre-ride inspection item
	Coolant strength	100 hrs	6 months	Inspect strength seasonally
	Shift linkage	50 hrs	6 months	Inspect, adjust
☐	Drive bell	50 hrs	6 months	Inspect, replace if necessary
▲	Steering	50 hrs	6 Months	Inspect daily, lubricate
▲	Rear Axle	50 hrs	6 Months	Inspect bearings, Lube

# MAINTENANCE

	Item	Hours	When	Remove
▲	Front Suspension	50 hrs	6 months	Inspect-lubricate, tighten fasteners
▲	Rear Suspension	50 hrs	6 months	Inspect, tighten fasteners
	Spark Plug	100 hrs	12 months	Inspect-replace if necessary
Ⓛ	Ignition Timing	100 hrs	12 months	Inspect and adjust as needed
Ⓛ	Fuel System	100 hours	12 months	Check for leaks at tank cap, lines, fuel valve, filter, and carburetor. Replace lines every one year.
Ⓛ	Fuel Filter	100 hrs	12 months	Replace annually
	Radiator	100 hrs	12 months	Inspect/clean external surface
	Cooling System hoses	50 hrs	6 months	Inspect/replace if necessary
	Spark arrestor	10 hrs	monthly	Clean out-replace if necessary
Ⓛ	Clutches (drive and driven)	25 hrs	3 months	Inspect, clean
	Engine Mounts	25 hrs	3 months	Inspect
Ⓛ	Valve Clearance	100 hrs	12 months	Inspect/Adjust
Ⓛ	Shift selector box (H/L/R/N)	200 hrs	24 months	Change grease every two years
Ⓛ	Brake fluid	200 hrs	24 months	Change every two years
	Idle Speed	As Required	As Required	Adjust
Ⓛ	Toe adjustment	As required	As required	Periodic inspection, adjust when parts are replaced
	Headlight Aim	As required	As required	Adjust if necessary

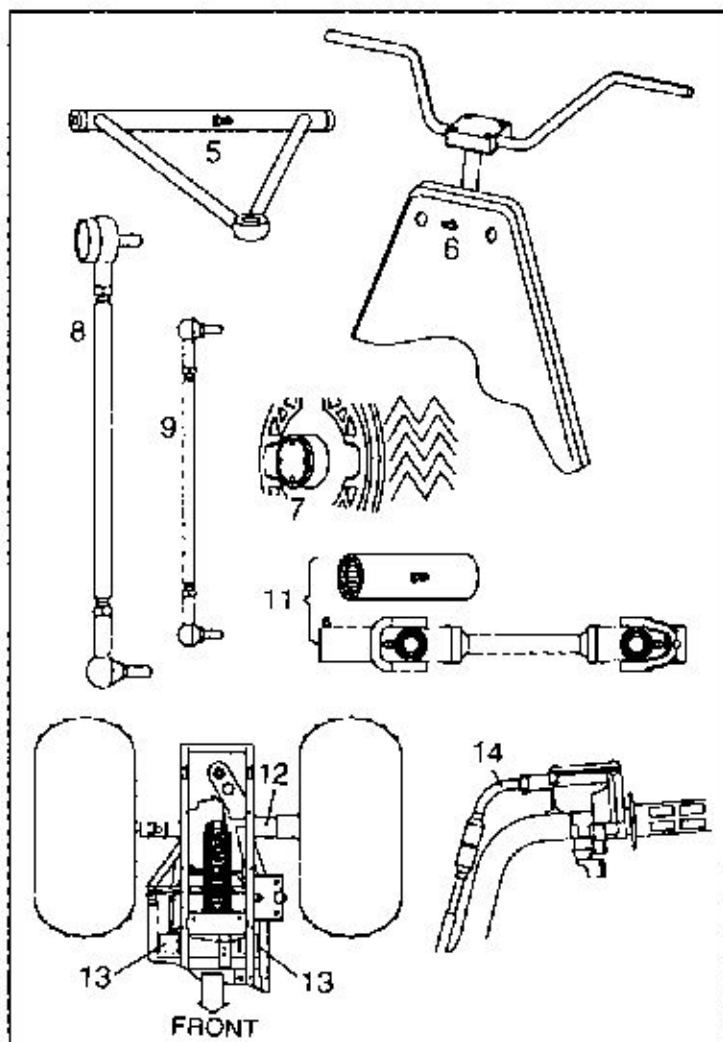
**Lubrication Recommendations**

	Item	Lube Rec	Method	Frequency
	1.Engine Oil	SAE 15W/40 SG	Add to proper level on dipstick.	Check level daily.
	2.Brake Fluid	DOT 3 Only	Maintain level between fill lines. See "7.CONTROL ....."	As required; change every two years or 200 hours
	3. Transmis- sion Oil	SAE 80W/90 GL5	See " 16.MAINTENANCE/TRANSMIS- SION LUB....."	Chage annually or at 100 hours
	4.Rear Gearcase oil	SAE 80W/90 GL5	See " 16.MAINTENANCE/Rear Gearcase Lubrication....."	Chage annually or at 100 hours
▲	5. Front A- Arm pivot Shaft	Grease	Locate fitting on pivot shaft and grease with grease gun	Every 3 months or 50 hours
▲	6. Steering Post Bushings	Grease	Locate fitting on steering rest and grease with grease gun	Every 3 months or 50 hours
▲	7. Front Wheel bearings	Grease	Inspect and replace bearings if necessary	Semi-annually
	8. Tie rods	Grease	Locate fittings and Grease	Semi-annually
	9. Shift Linkages	Grease	Locate fittings and Grease	Semi-annually
▲	10. Ball Joints	Inspect	Inspect and Replace it if necessary	Semi-annually
▲	11. Prop Shaft & Shaft Yoke	Grease	Locate fitting and Grease	Semi-annually

**1**

**3**

 $A = \frac{3}{4}'' (19\text{mm})$ 
**5**
**4**

 $A = 1 \frac{5}{8}'' (41\text{mm})$

# MAINTENANCE

## Lubrication Recommendations



▲	12. Rear Axle Bearing	Grease	Locate fitting and grease	Every 3 months or 50 hours
▲	13. Swing Arm Bearings	Grease	Locate fitting and grease with grease gun	Monthly or 20 hours
▲	14. Throttle Cable	Grease Ⓜ	Grease, inspect and replace it if necessary	Monthly or 20 hours

### NOTE:

1. More often under severe use, such as wet or dusty conditions.
2. Grease: Light weight lithium-soap grease.
3. Grease Ⓜ: molybdenum disulfide (MoS<sub>2</sub>) grease (water resistant).
- 4.\* When suspension action becomes stiff or after washing.
5. Hours are based on 10 mph (16 km/h) average.

## FUEL SYSTEM

### ⚠ WARNING

*Gasoline is extremely flammable and explosive under certain conditions.*

- ⚠ Always stop the engine and refuel outdoors or in a well ventilated area.
- ⚠ Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.
- ⚠ Do not overfill the tank. Do not fill the tank neck.
- ⚠ If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.
- ⚠ If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.
- ⚠ Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.
- ⚠ Never drain the float bowl when the engine is hot. Severe burns may result.

## FUEL LINES

1. Check fuel lines for signs of wear, deterioration, damage or leakage. Replace if necessary.
2. Be sure fuel lines are routed properly and secured with cable ties. **CAUTION:** Make sure lines are not kinked or pinched.
3. Replace all fuel lines every two years.

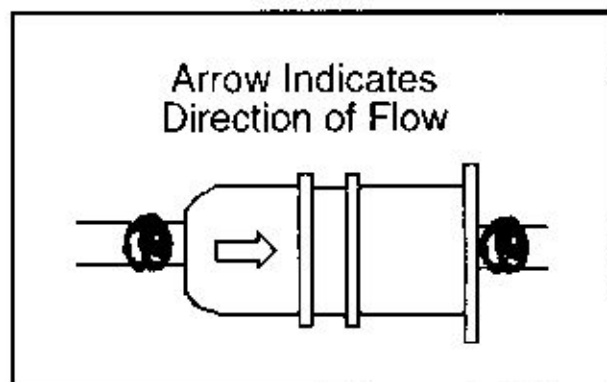
## VENT LINES

1. Check fuel tank, oil tank, carburetor, battery and transmission vent lines for signs of wear, deterioration, damage or leakage. Replace every two years.
2. Be sure vent lines are routed properly and secured with cable ties. **CAUTION:** Make sure lines are not kinked or pinched.

## FUEL FILTER

The fuel filter should be replaced in accordance with the Periodic Maintenance Chart or whenever sediment is visible in the filter.

1. Shut off fuel supply at fuel valve.
2. Remove line clamps at both ends of the filter.
3. Remove fuel lines from filter.
4. Install new filter and clamps onto fuel lines with arrow pointed in direction of fuel flow.
5. Install clamps on fuel line.
6. Turn fuel valve ON.
7. Start engine and inspect for leaks.
8. Reinstall fuel tank.



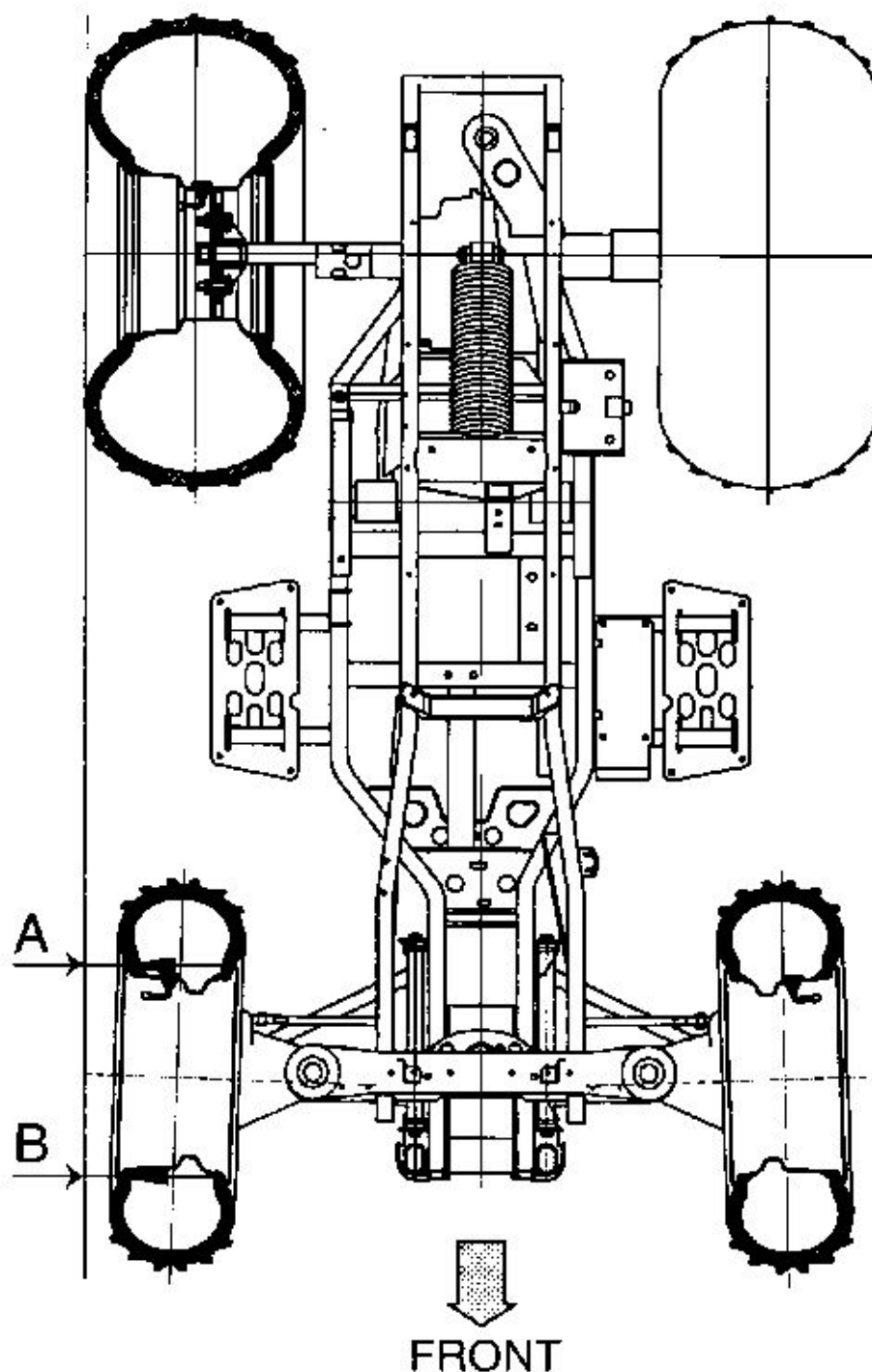
## MAINTENANCE

### TOE ALIGNMENT-METHOD : STRAIGHTEDGE OR STRING

Be sure to keep handlebars centered. See note below.

**NOTE:** String should just touch side surface of rear tire on each side of machine.

Measure from string to rim at front and rear of rim.  
Rear rim measurement (A) should be  $\frac{1}{16}$ " to  $\frac{1}{8}$ " (.2 to .3 cm) more than front rim measurement (B).



**NOTE:** The steering post arm (frog) can be used as an indicator of whether the handlebars are straight. The frog should always point straight back from the steering post when handlebars are straight.



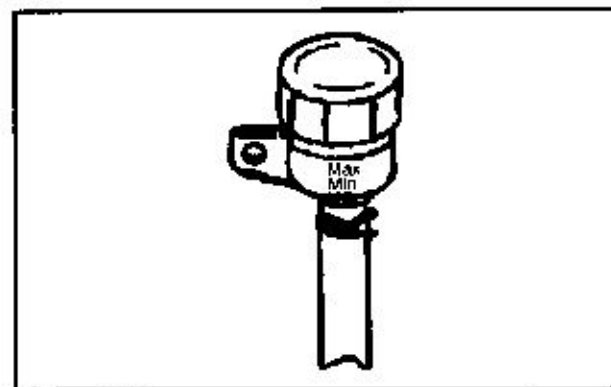
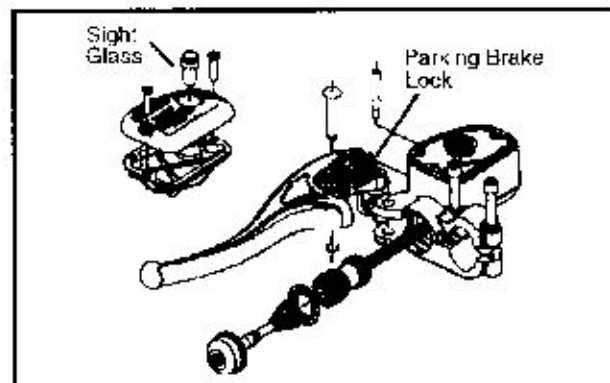
## **BRAKING SYSTEM INSPECTION**

The following checks are recommended to keep the braking system in good operating condition. Service life of braking system components depends on operating conditions. Inspect brakes in accordance with the maintenance schedule and before each ride.

- Keep fluid level in the master cylinder reservoir to the indicated level inside reservoir.
- Use DOT 3 brake fluid.

**NOTE:** Use new brake fluid or brake fluid from a sealed container to avoid contamination to system.

- Check brake system for fluid leaks.
- Check brake for excessive travel or spongy feel.
- Check friction pads for wear, damage and looseness.
- Check surface condition of the disc.
- Inspect thickness of brake pad friction material.

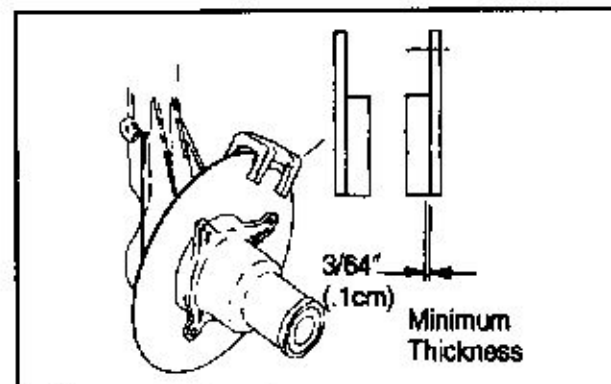


## **BRAKE PAD INSPECTION**

- Pads should be changed when friction material is worn to 3/64" (.1mm).

## **HOSE/FITTING INSPECTION**

Check braking system hoses and fittings for cracks, deterioration, abrasion, and leaks. Tighten any loose fittings and replace any worn or damaged parts.



## MAINTENANCE

### AUXILIARY BRAKE ADJUSTMENT (HYDRAULIC)

Use the following procedure to inspect the hydraulic auxiliary (foot) brake system and adjust or bleed if necessary.

1. First check foot brake effectiveness by applying a 50 lb. (approx) downward force on the pedal. The top of the pedal should be at least 1, (25.4mm) above the surface of the footrest.

**If less than one inch, two things must be examined:**

#### Free Play:

Free play of the brake pedal should be  $\frac{1}{8}$ – $\frac{1}{4}$  inch (3.2–6.35mm).

If free play is excessive, inspect pedal, linkage, and master cylinder for wear or damage and replace any worn parts.

#### Bleeding:

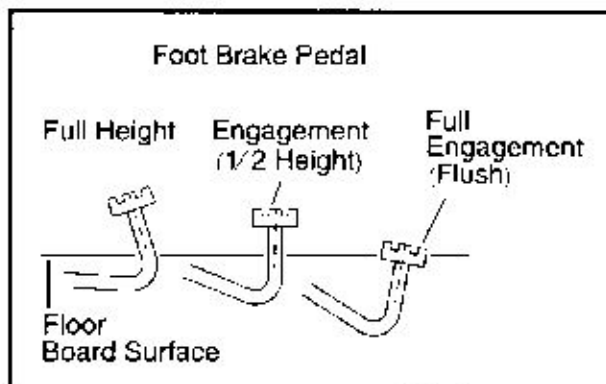
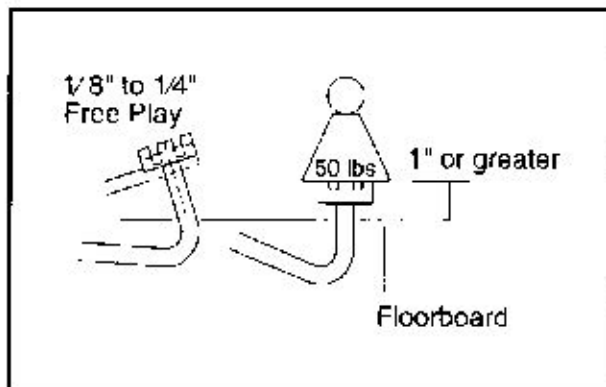
If free play is correct and brake pedal travel is still excessive, air may be trapped somewhere in the system. Bleed the hydraulic auxiliary brake system in a conventional manner, following the procedure outlined in the Brake chapter.

### AUXILIARY BRAKE TESTING

The auxiliary brake should be checked for proper adjustment.

Support the rear wheels off the ground.

While turning the rear wheels by hand, apply the auxiliary footbrake. This brake should not stop the wheels from turning until the lever is half way between its rest position and bottoming on the footrest.



## SUSPENSION SPRING PRELOAD ADJUSTMENT

Operator weight and vehicle loading affect suspension spring preload requirements. Adjust as necessary.

### FRONT SUSPENSION

Compress and release front suspension. Damping should be smooth throughout the range of travel.

Check all front suspension components for wear or damage.

Inspect front strut cartridges for leakage.

### REAR SUSPENSION

Compress and release rear suspension. Damping should be smooth throughout the range of travel.

Check all rear suspension components for wear or damage.

Inspect shock for leakage.

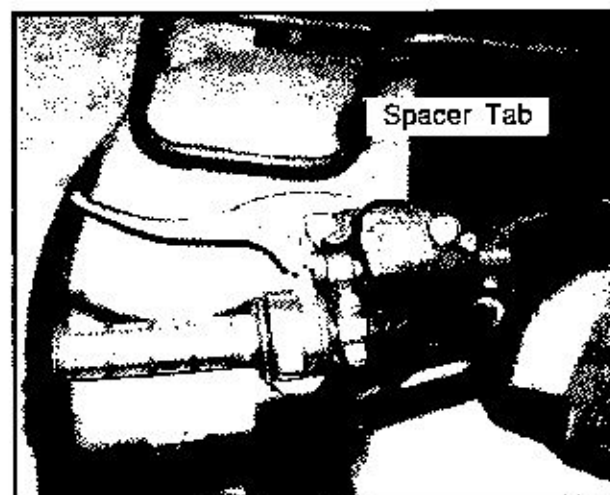
Shock spring preload can be adjusted using the shock spanner wrench.

Operator weight and loading affect spring preload requirements. Adjust as necessary.

### CONTROLS

Check controls for proper operation, positioning and adjustment.

Brake control and switch must be positioned to allow brake lever to travel throughout entire range without contacting switch body.



## MAINTENANCE

### WHEELS

Inspect all wheels for runout or damage.  
Check wheel nuts and ensure they are tight.  
Do not over tighten the wheel nuts.

### WHEEL, HUB, AND SPINDLE TORQUE TABLE

Item	Specification
Front Wheel Nuts	20 Ft.Lbs
Rear Wheel Nuts	50 Ft.Lbs
Front Spindle Nut	Refer to procedure listed in Chapter of Final Drive
Rear Hub Retaining Nut	80 FLLbs

### WHEEL REMOVAL FRONT OR REAR

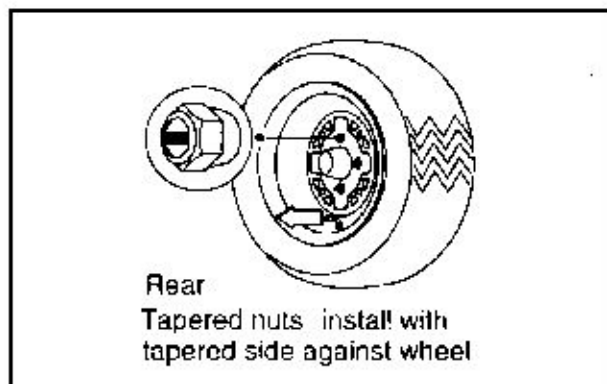
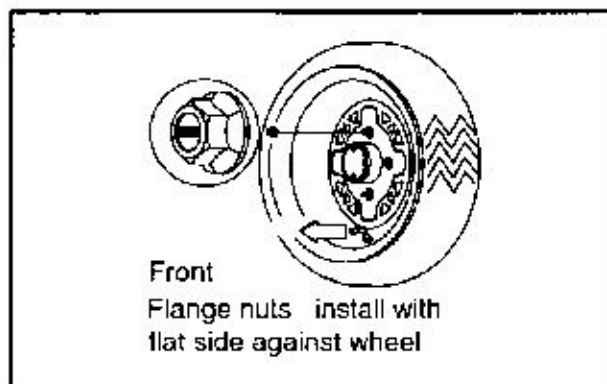
1. Stop the engine, place the transmission in gear and lock the parking brake.
2. Loosen the wheel nuts slightly.
3. Elevate the side of the vehicle by placing a suitable stand under the footrest frame.
4. Remove the wheel nuts and remove the wheel.

### WHEEL INSTALLATION

1. With the transmission in gear and the parking brake locked, place the wheel in the correct position on the wheel hub. Be sure the valve stem is toward the outside and rotation arrows on the tire point toward forward rotation.
2. Attach the wheel nuts and finger tighten them. Install as shown at right for front or rear wheels.
3. Lower the vehicle to the ground.
4. Securely tighten the wheel nuts to the proper torque listed in the table above.

#### CAUTION!

If wheels are improperly installed it could affect vehicle handling and tire wear. On rear wheel nuts, make sure tapered end of nut goes into taper on wheel.



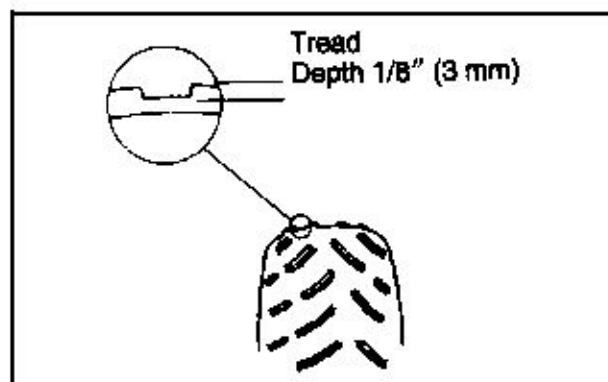
## TIRE PRESSURE

Tire Pressure Inspection	
Front	Rear
4PSI (27±0.5KPa)	3PSI (20.5±0.5KPa)

## TIRE INSPECTION

### **CAUTION:**

- Maintain proper tire pressure. Refer to the warning tire pressure decal applied to the vehicle.
- Improper tire inflation may affect ATV maneuverability.
- When replacing a tire always use original equipment size and type and replace in pairs.
- The use of non-standard size or type tires may affect ATV handling.



## TIRE TREAD DEPTH

Always replace tires when tread depth is worn to 1/8" (3mm) or less.

### **⚠ WARNING**

Operating an ATV with worn tires will increase the possibility of the vehicle skidding easily with possible loss of control.

Worn tires can cause an accident.

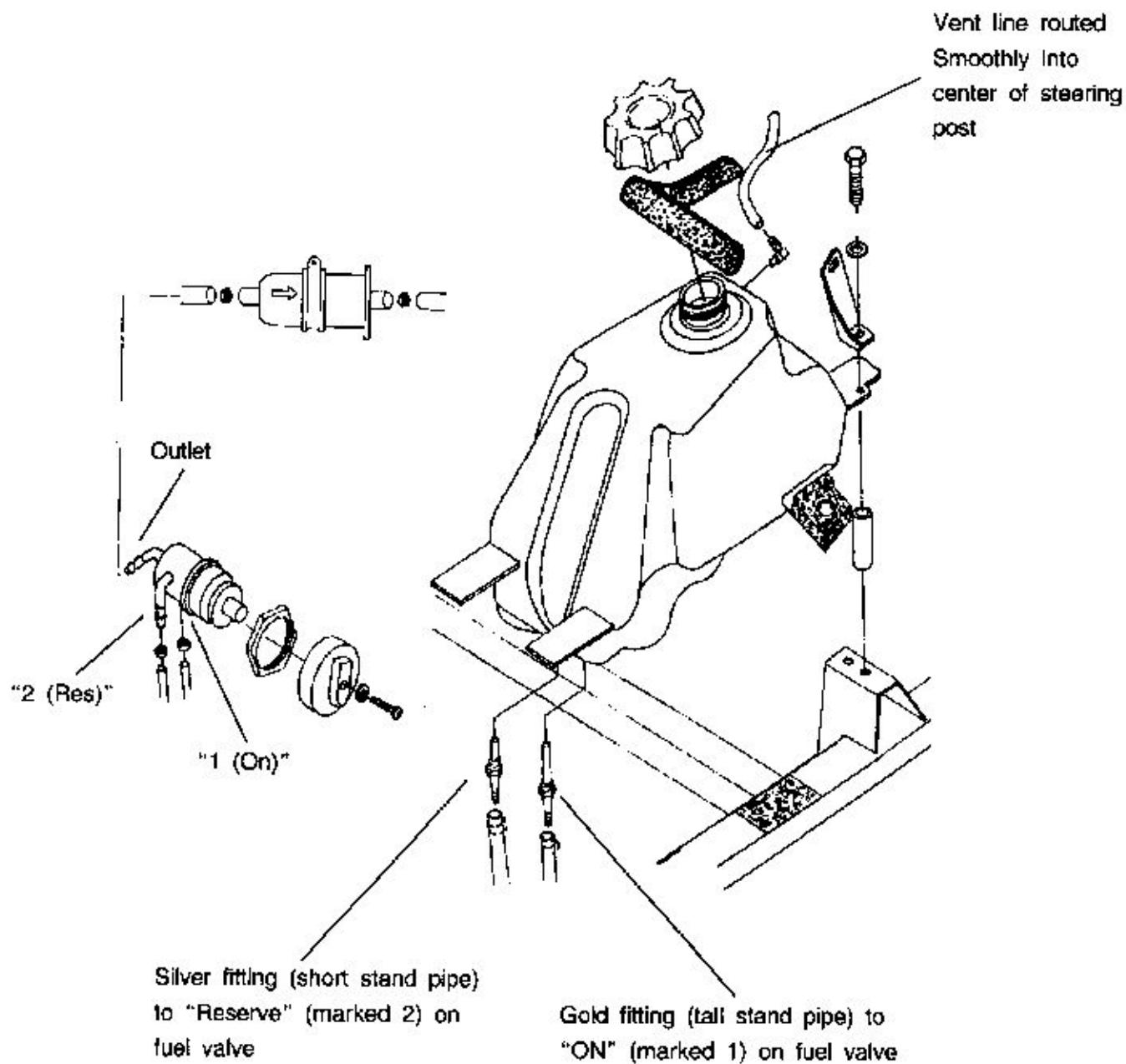
Always replace tires when the tread depth measures 1/8" (3mm) or less.

## FRAME, NUTS, BOLTS, FASTENERS

Periodically inspect the tightness of all fasteners in accordance with the maintenance schedule. Check that all cotter pins are in place. Refer to specific fastener torques listed in each chapter.

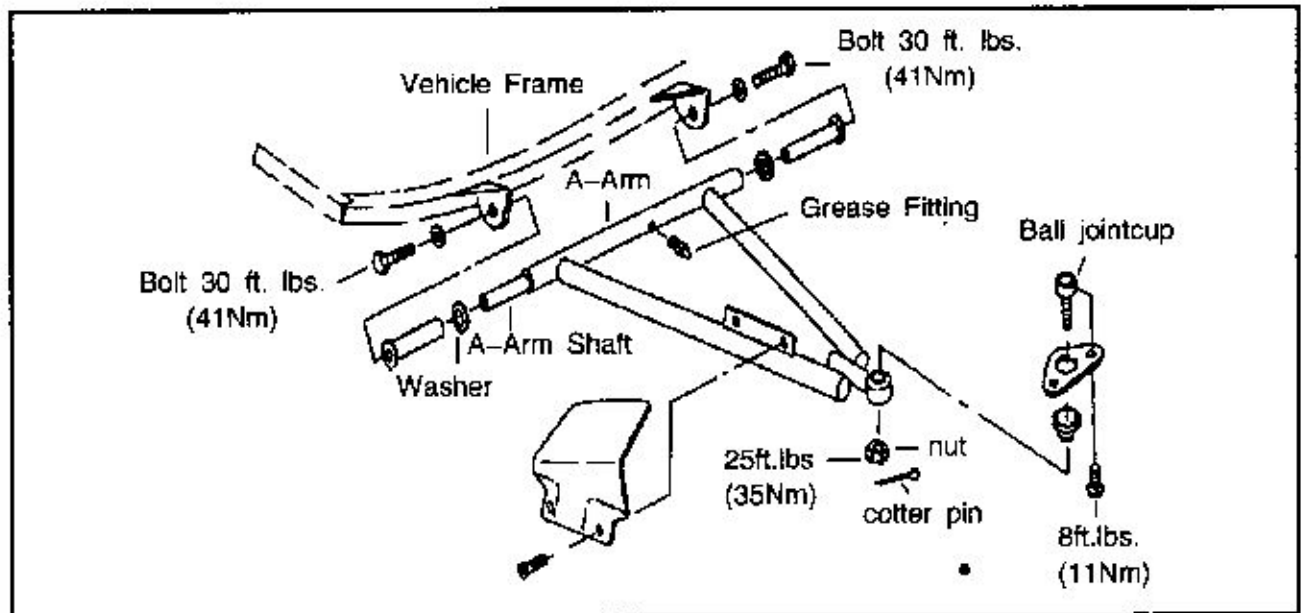
## FUEL SYSTEM

### FUEL TANK ASSEMBLY



## A-ARM REPLACEMENT

1. Elevate and safely support vehicle with weight removed from front wheel (s).
2. Remove cotter pin from ball joint cup at wheel end of A-arm and loosen nut until it is flush with end of cup.
3. Using a soft face hammer, tap nut to loosen A-arm from bolt. Remove nut and A-arm from hub strut assembly.
4. Loosen two bolts on A-arm by alternating each about 1/3 of the way until A-arm can be removed.
5. Examine A-arm shaft. Replace if worn. Discard hardware.
6. Insert A-arm shaft into new A-arm.



7. Install new A-arm assembly onto vehicle frame. Torque new bolts to 30 ft. lbs. (41.4 Nm).

### ⚠ WARNING

The locking features on the existing bolts were destroyed during removal. **DO NOT** reuse old bolts. Serious injury or death could result if fasteners come loose during operation.

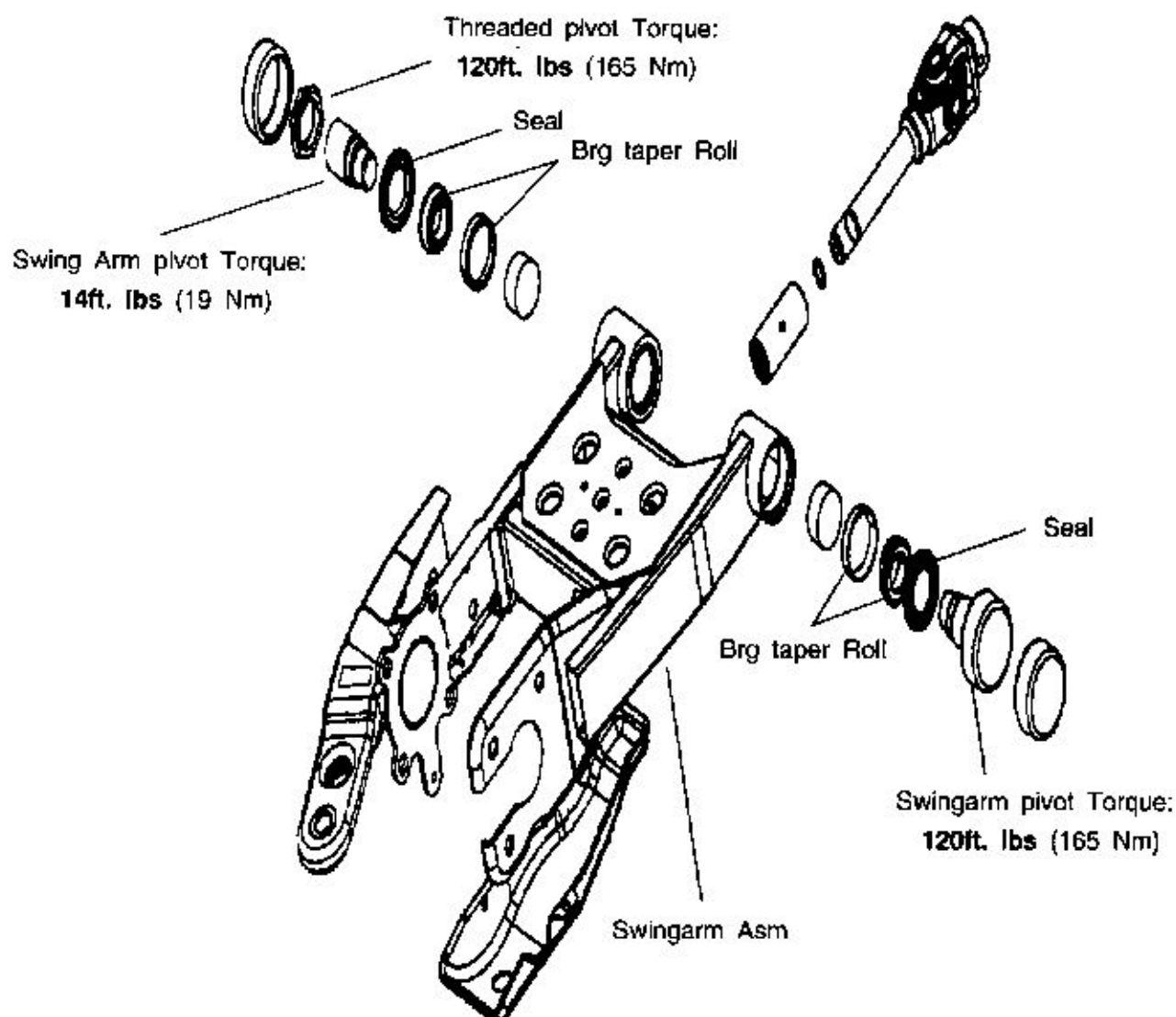
8. Attach A-arm to hub strut assembly. Tighten ball joint nut to 25 ft. lbs. (35 Nm). If cotter pin holes are not aligned, tighten nut slightly to align. Install a new cotter pin with open ends toward rear of machine. Bend both ends in opposite directions around nut.
9. Locate grease fitting in center of A-arm and pump A-arm full of grease.

### ⚠ WARNING

Upon A-arm installation completion, test vehicle at low speeds before putting into regular service.

**A-arm Attaching Bolt Torque:**  
 30 ft. lbs. (41 Nm)  
**Ball Joint Cup Nut Torque:**  
 25 ft. lbs. (35 Nm)

### SHAFT RIDE SWINGARM



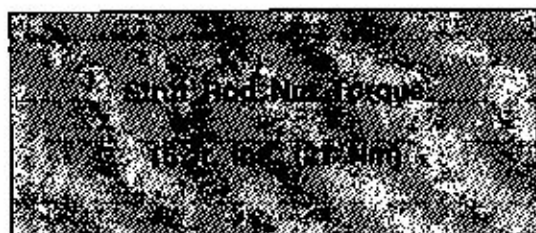
#### Swingarm asm Installation

- Screw swing arm pivots into frame on each side (about 3 turns).
- Install swing arm asm in frame with lubricated brg taper roll, and install seal in each side of swing arm asm.
- Apply Loctite 242 to RH swing arm pivot.
- Tighten swing arm pivot until both are engaged in tapered roll.
- Adjust right side swing arm pivot inward until firmly seated against bearing, torque to 120 ft. lbs. (165 Nm)
- Torque left side swing arm pivot to 14 ft. lbs. (19 Nm)
- Apply Loctite 242 (Blue) to exposed threads of swing arm pivot and threaded pivot.
- Torque threaded pivot to 120 ft. lbs. (165 Nm).



## FRONT STRUT WELDMENT REPLACEMENT

1. Hold strut rod with holder wrench and remove top nut.
2. Compress spring using strut spring compressor tools.
3. Remove upper strut pivot assembly.
4. Remove coil spring and collapse strut cartridge.
5. Remove two pinch bolts from strut casting.
6. Remove strut cartridge.
7. Install cartridge until bottomed in strut casting.
8. Install pinch bolts with wire clamp (s).  
Torque pinch bolts to 15 ft. lbs. (21 Nm).
9. Reassemble spring and top pivot assembly.  
Be sure all parts are installed properly and seated fully.
10. Torque strut rod nut to specification. Do not over torque nut.

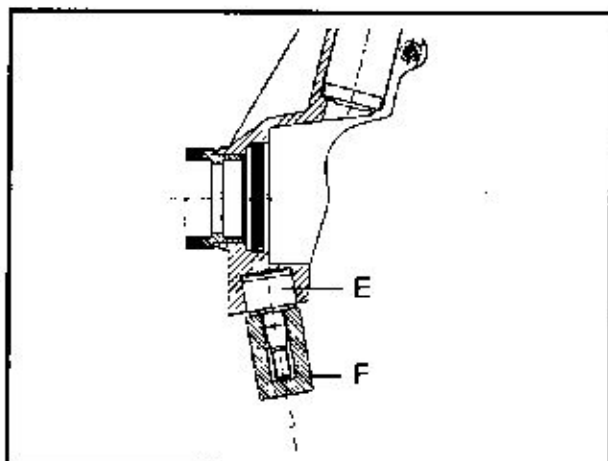
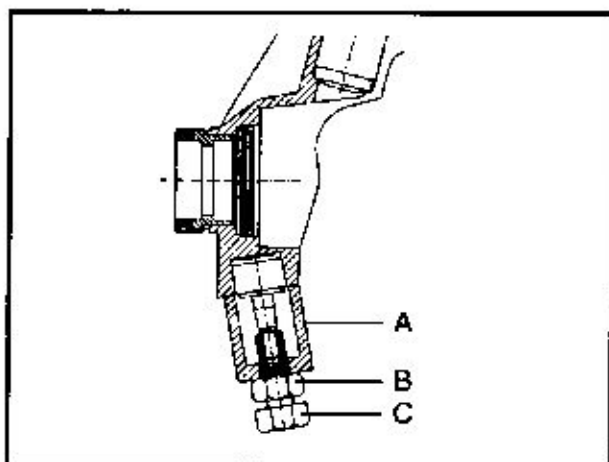
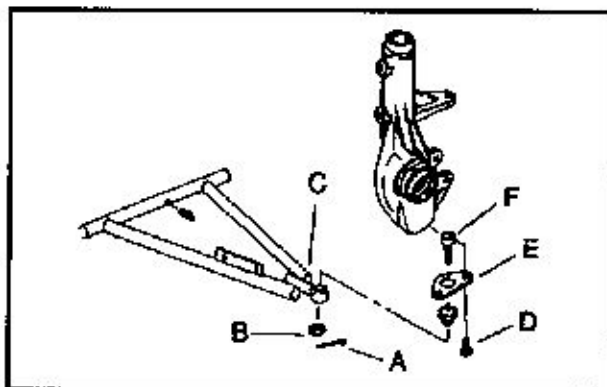


### FRONT STRUT BALL JOINT REPLACEMENT

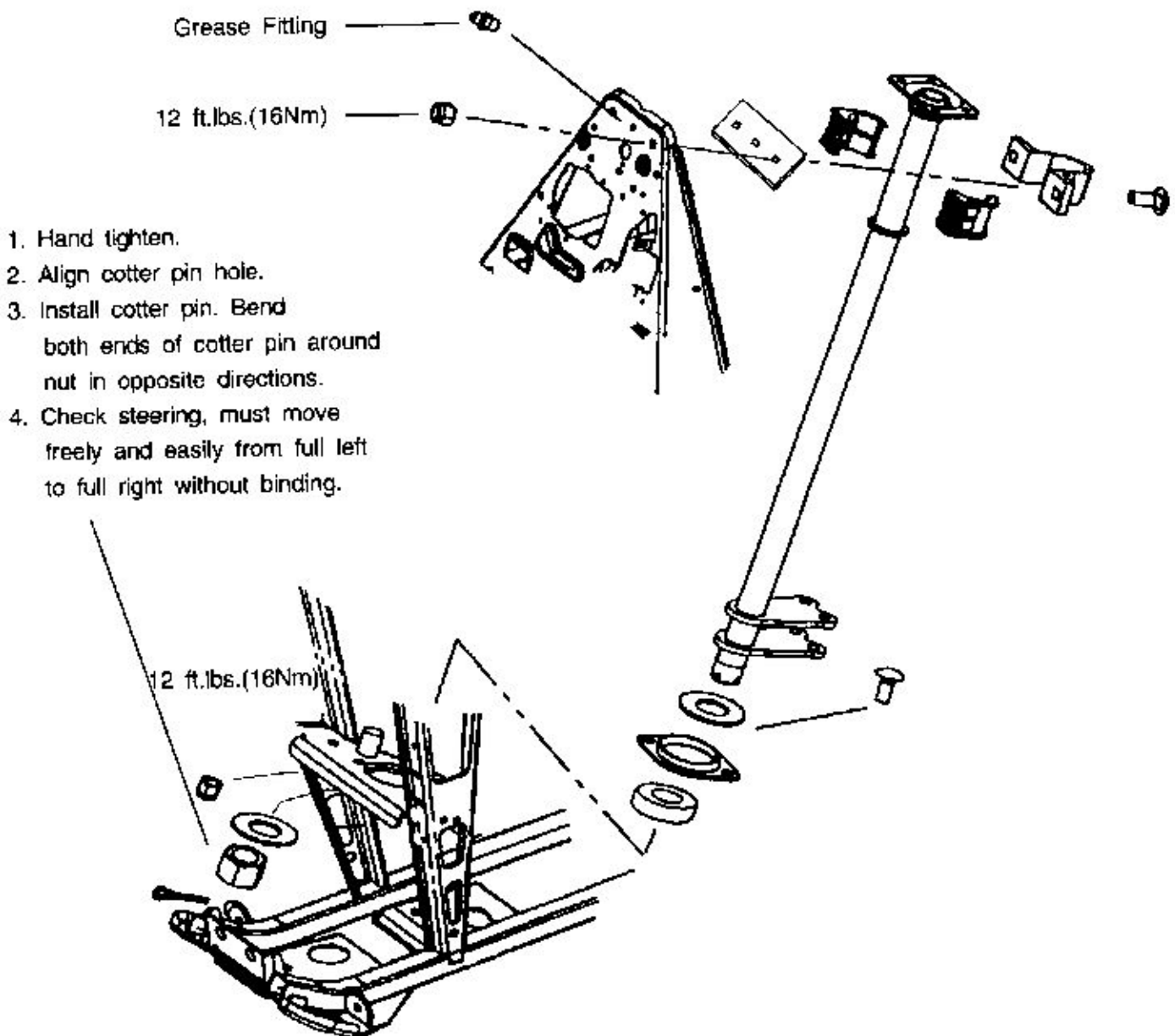
1. Loosen front wheel nuts slightly.
2. Elevate and safely support machine under footrest/frame area.

**CAUTION:** Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure.

3. Remove wheel nuts and wheels.
4. Remove cotter pin (A) from ball joint castle nut.
5. Remove castle nut (B) and separate A-arm (C) from ball joint stud.
6. Remove screws (D) and ball joint mounting bracket (E).
7. Using ball joint cup removal/installation tool kit, remove ball joint cup (F) from strut housing. Refer to photos at right.
  - Install puller guide (A).
  - Thread bolt (C) with nut (B) onto ball joint stud as shown.
  - Hold bolt (C) and turn nut (B) clockwise until ball joint is removed from strut housing.
8. To install new ball joint cup:
  - Insert new ball joint (E) into driver (F).
  - Drive new ball joint cup into strut housing until fully seated.
9. Apply Loctite 242 (blue) to threads of mounting bracket screws or install new screws with pre-applied locking agent. Torque screws to 8 ft.lbs. (11 Nm).
10. Install A-arm on ball joint cup and torque castle nut to 25 ft. lbs. (35 Nm).
11. Reinstall cotter pin with open ends toward rear of machine.



## STEERING POST ASSEMBLY



**WHEEL, HUB, AND SPINDLE TORQUE TABLE<sup>(1)</sup>**

Item	Specification
Front Wheel Nuts	20 Ft.Lbs
Rear Wheel Nuts	50 Ft.Lbs
Front Hub Nut	12 Ft.Lbs
Rear Hub Retaining Nut	80 Ft.Lbs

<sup>(1)</sup> Refer to exploded views and text for torque values of other fasteners.

**CAUTION:** Locking nuts, and bolts with pre-applied locking agent should be replaced if removed. The self-locking properties of the nut or bolt are reduced or destroyed during removal.

## FRONT HUB DISASSEMBLY/INSPECTION

1. Elevate front end and safely support machine under footrest/frame area.

**CAUTION:** Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

2. Check bearings for side play by grasping tire/wheel firmly and checking for movement. It should rotate smoothly without binding or rough spots.
3. Remove wheel nuts and wheel.
4. Remove brake caliper.



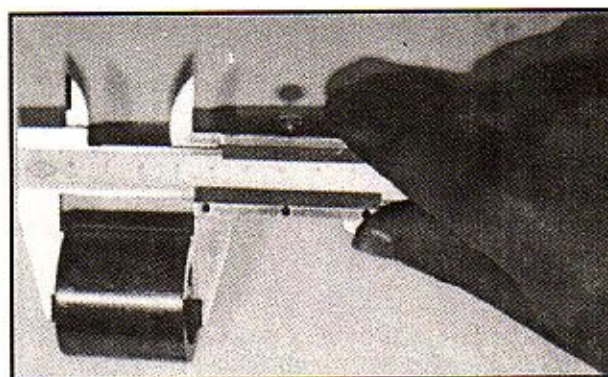
5. Remove hub cap, cotter pin, front spindle nut, and washer.
6. Rotate each bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion. Replace bearing if moisture, dirt, corrosion, or roughness is evident.





### FRONT HUB DISASSEMBLY, CONT.

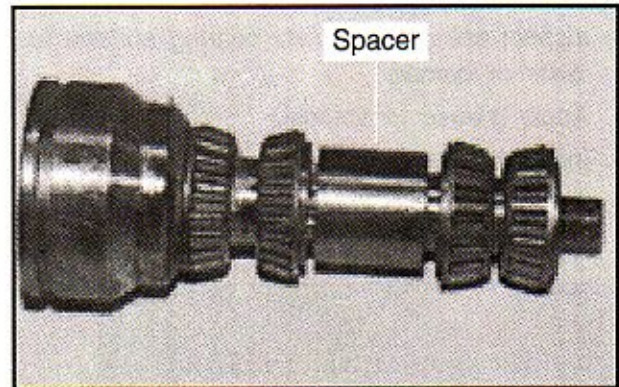
7. Place a shop towel on hub to protect surface. Carefully pry seal out of hub. Do not damage the surface of the seal. Clean the hub.
8. Remove spacer.
9. Inspect spacer for wear or damage. Measure length of spacer and replace if worn beyond service limit or if ends are rounded.
10. Drive bearing out using a drift punch through opposite side of hub and discard.
11. Drive other bearing out and discard.
12. Clean hub and spacer thoroughly.



## FRONT HUB ASSEMBLY

1. Drive or press one new bearing into hub using a bearing driver.

**CAUTION:** Do not drive on the inner race of the bearing. Coat the new bearing with special grease.



2. Drive or press the other bearing into hub until seated against the hub shoulder.



3. Install seal into hub (with numbers facing out) until flush with end of seal bore. Do not damage the surface of the seal.



## FINAL DRIVE

### FRONT HUB INSTALLATION

1. Inspect spindle seal and bearing surface for wear or damage.
2. Apply grease to spindle.
3. Install hub on spindle.
4. Apply grease to washer.
5. Install spindle nut .

**2x4 Spindle Nut Torque:**

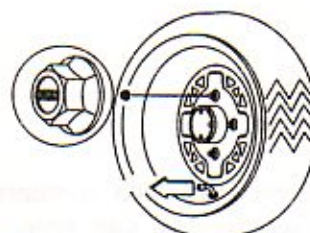
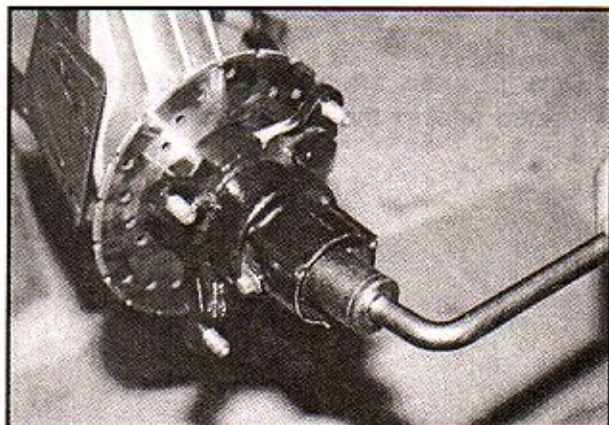
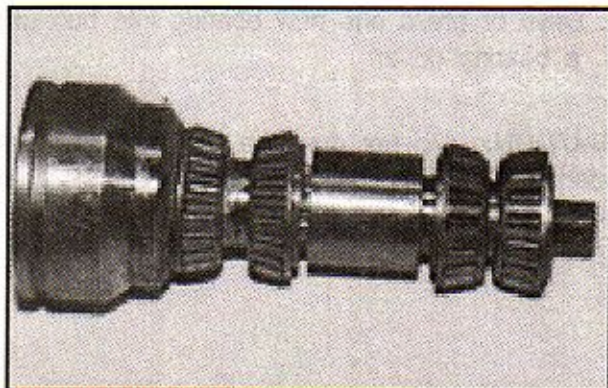
**40 ft.lbs. (55.0 Nm)**

6. Install a new cotter pin. Tighten nut slightly if necessary to align cotter pin holes.
7. Rotate hub and check for smooth operation. Bend both ends of cotter pin around end of spindle in different directions.
8. Lightly grease a new O-ring and install on hub cap.
9. Install hub cap.
10. Rotate hub. It should rotate smoothly without binding or rough spots or side play.
11. Install brake caliper using new bolts. Tighten bolts to specified torque.

**CAUTION:** New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

12. Install wheel and wheel nuts and tighten evenly in a cross pattern to specified torque.

**Front Wheel Nut Torque**  
**20ft. lbs. (27 Nm)**



Flange nuts: install with  
flat side against wheel



## **REAR HUB INSPECTION**

1. Support machine securely with rear wheels elevated.
2. Grasp wheel/hub and check for movement.
3. If movement is detected, inspect hub, hub nut torque and bearing condition and correct as necessary.

## **REAR AXLE REMOVAL**

1. Lock the parking brake. Remove left rear axle cap.
2. Remove cotter pin.
3. Loosen the nut slotted.
4. Loosen-but do not remove-the wheel nuts.
5. Safely support the rear of the ATV.

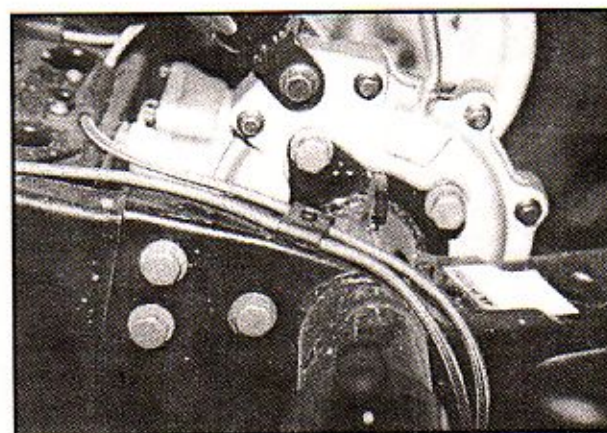
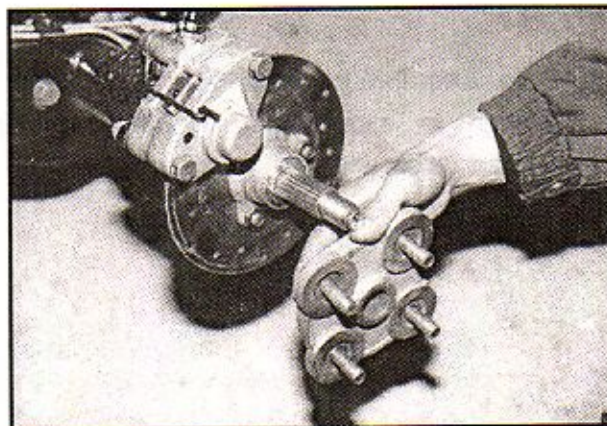
### **CAUTION:**

Serious injury could occur if machine tips or falls.

6. Remove left wheel.
7. Remove hub.

**NOTE:** This ATV requires brake caliper to be removed from brake disc before hub can be removed.

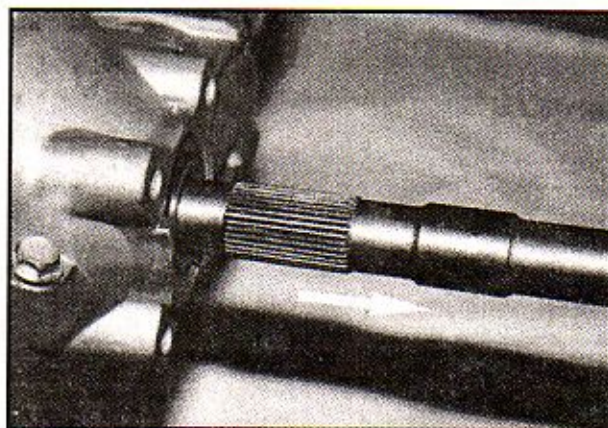
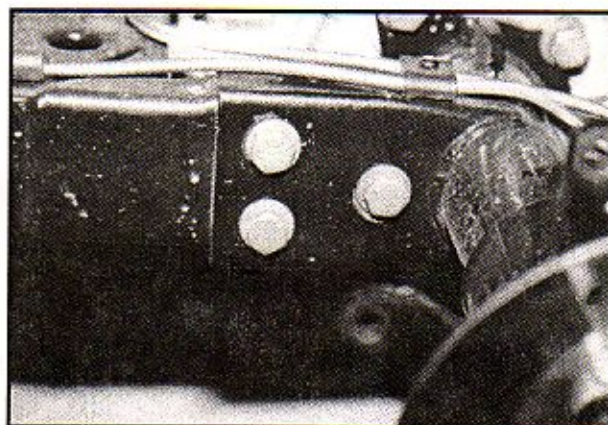
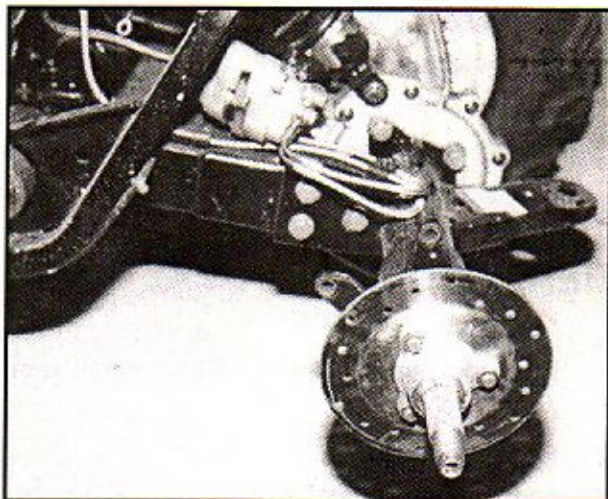
8. Remove brake hose clamp and brake shield.



## FINAL DRIVE

### REAR AXLE REMOVAL, CONT.

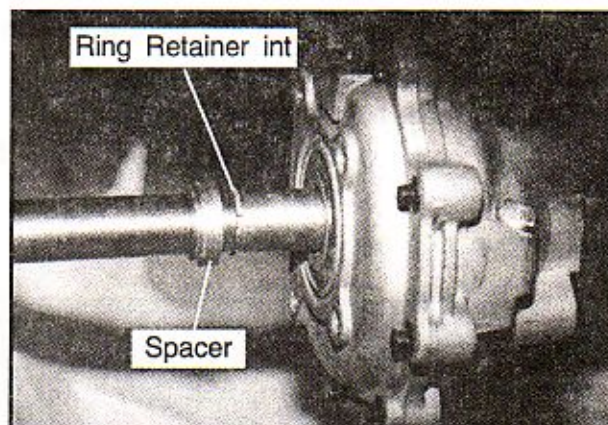
9. Remove rear brake caliper and support it from machine frame.
10. Remove rear brake disc.
11. Remove skid plate.
12. Remove (3) left swing arm asm bolts.
13. Remove (4) axle tube bolts from rear gearcase.
14. Slide axle through rear gearcase to the right enough to allow the axle tube to slip off between axle and swing arm asm.





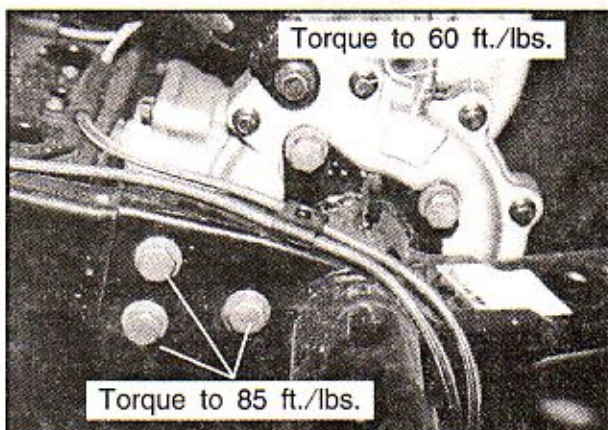
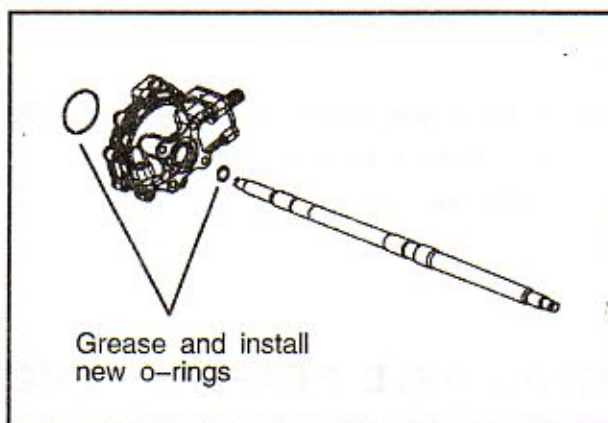
## REAR AXLE REMOVAL, CONT.

15. Remove ring retainer int and spacer from axle.
16. Slide axle through the gearcase and remove from vehicle.
17. Remove o-ring seals from both sides of gearcase and discard.



## REAR AXLE INSTALLATION

1. Grease and install new o-rings on rear gearcase.
2. Slide axle through rear gearcase until ring retainer int groove is accessible to the left of gearcase.
3. Install new ring retainer int and spacer.  
**NOTE:** Spacer should enclose ring retainer int. See previous photo on removal step 15.
4. Slide axle tube assembly over axle shaft until it engages the swing arm asm.
5. Install (4) new axle tube bolts loosely.
6. Install (3) left swing arm asm bolts and torque to 85 ft./lbs.
7. Torque (4) axle tube bolts in a cross pattern to 60 ft./lbs.
8. Re-install skid plate and torque bolts to 25 ft./lbs.
9. Install new greased o-ring on axle and slide brake disc on splines of the axle.
10. Install brake caliper on brake disc and torque bolts to 18 ft./lbs.



## FINAL DRIVE

### REAR AXLE INSTALLATION

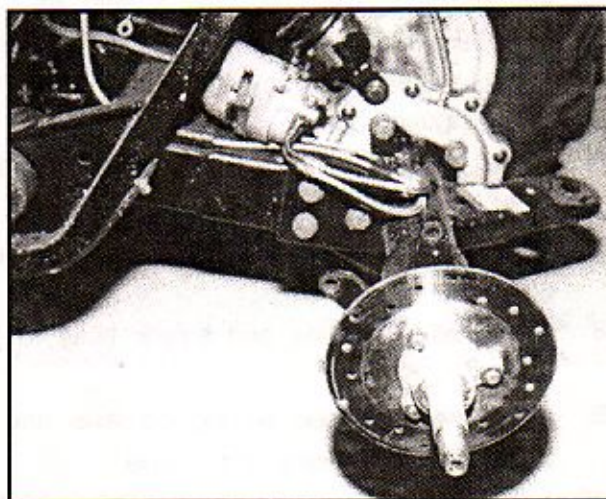
11. Anchor the brake hoses to the swing arm asm using the hold down clamp.
12. Install wheel hub, large flat washer.
13. Install cone washer with domed side facing outward.
14. Torque axle nut and wheel nuts.

**Rear Hub Nut Torque:**  
80 ft. lbs. (110.6 Nm)  
**Rear Wheel Nut Torque:**  
20ft. lbs. (27 Nm)

15. Install a new cotter pin. Tighten nut slightly to align holes if required.
16. Install hub cap.

### REAR AXLE BEARING REMOVAL

1. Remove left wheel and hub. (See page 25 of rear axle removal, steps 1-7)
2. Remove rear brake caliper and support it from machine frame.
3. Remove rear brake disc.

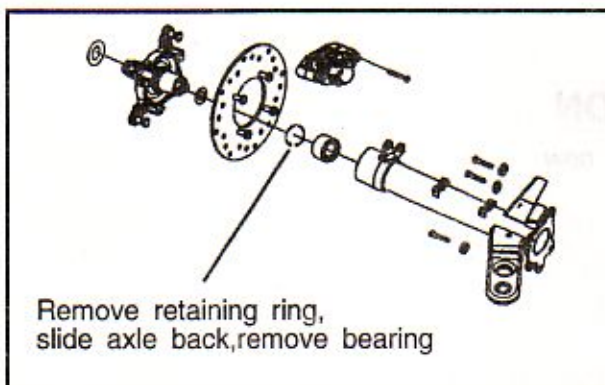




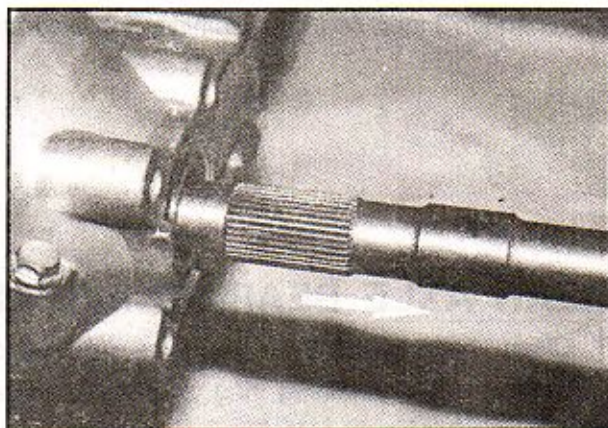
## REAR AXLE BEARING REMOVAL

4. Slide axle through rear gearcase to the right as far as it will go.

**NOTE:** Retaining ring be removed before sliding axle through gearcase.



5. Remove outer axle seal and discard.



6. Remove outer bearing and spacer.



### REAR AXLE BEARING REMOVAL,CONT.

7. Remove inner bearing retaining ring and inner bearing.

### REAR AXLE BEARING INSTALLATION

1. Clean bearing surface on axle tube and install new bearing (s), retaining ring and seals reversing steps 1–8 of rear axle bearing removal.
2. Torque brake caliper, rear hub nut, and rear wheel nuts to specifications.

**Brake Cliper Torque:**

**18 ft. lbs. (24.8 Nm)**

**Rear Hub Nut Tprque:**

**80 ft. lbs. (110.6 Nm)**

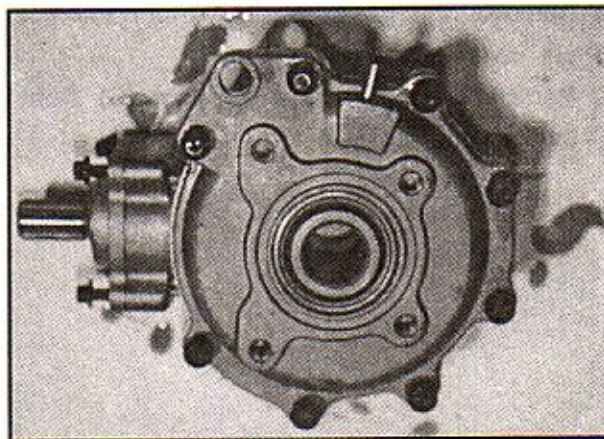
**Rear Wheel Nut Torque:**

**20 ft. lbs. (27 Nm)**



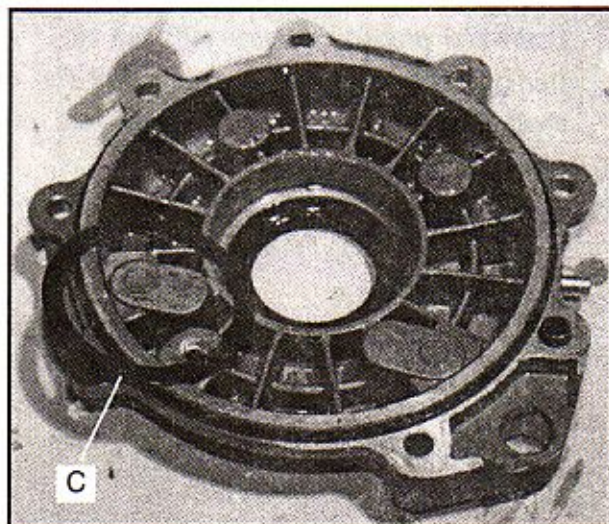
## REAR GEARCASE DISASSEMBLY

1. Drain and properly dispose of used oil.
2. Remove bolts and output shaft cover. The output shaft assembly will typically come out of the gearcase with the cover.

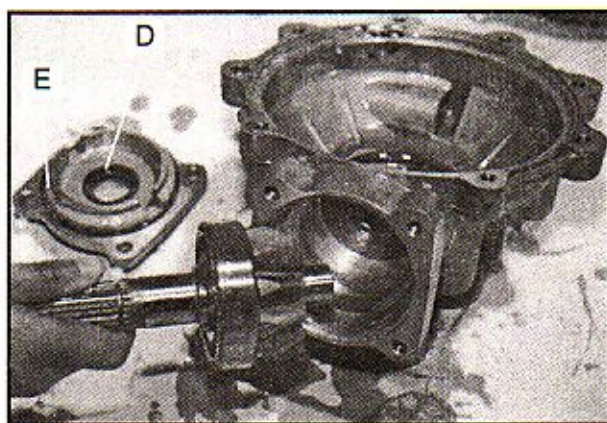


### REAR GEARCASE DISASSEMBLY, CONT.

3. Remove ring gear assembly from the act put cover.
4. Remove ring gear bearing shim (C) from the cover and retain for re-assembly.



5. Remove and discard the output cover seal (D) and O-ring.
6. Remove input cover and O-ring (E).
7. Remove pinion shaft assembly. Inspect pinion gear for chipped, broken or missing teeth. Replace assembly if necessary.





## REAR GEARCASE ASSEMBLY

1. Replace all O-rings, seals, and worn components.
2. Press pinion shaft seal into input cover until flush with sealing surface.
3. Inspect pinion shaft bushing.
4. Inspect bearings on rear axle and pinion shafts.  
To replace, press new bearing on to shaft.

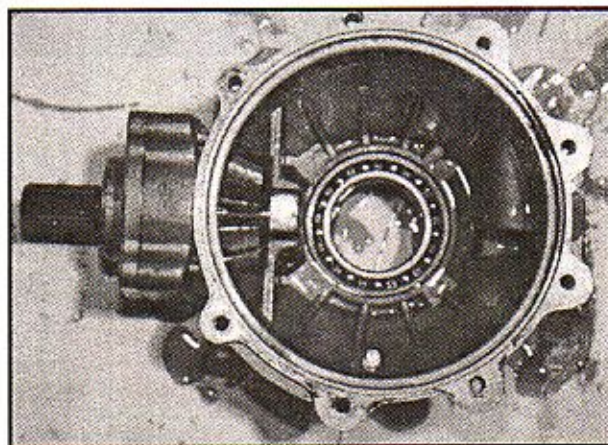
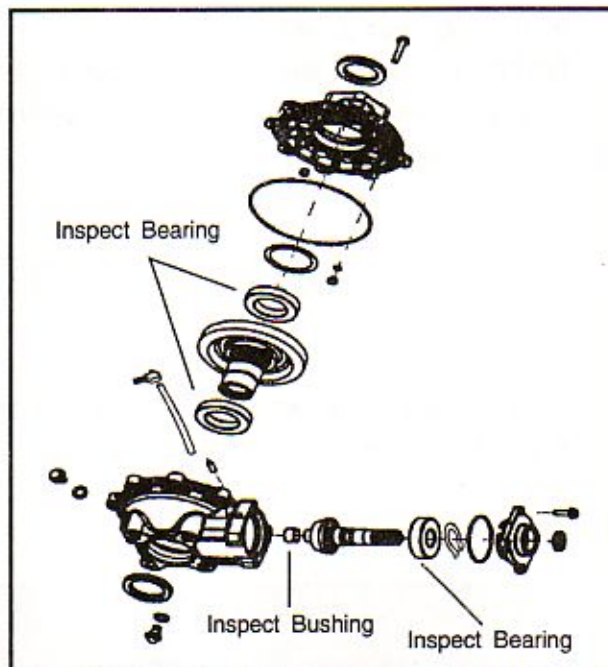
**NOTE:** Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement side to side.

5. Clean pinion shaft and snap ring with PrimerN™ and apply LocTite™ 271 or 272 to threads. Tighten lock nut to specification.

## INSTALL SNAP RING

6. Install pinion shaft and input cover plate with new o-ring and torque bolts to 25 ft. lbs.

**Cover Bolts Torque**  
**25 ft. lbs. (34 Nm)**



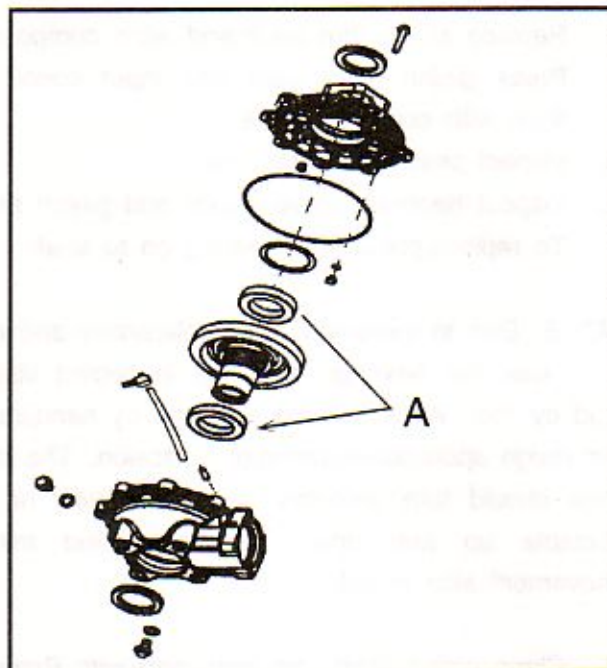
## FINAL DRIVE

### REAR GEARCASE ASSEMBLY, CONT.

7. Install ring gear assembly (A)

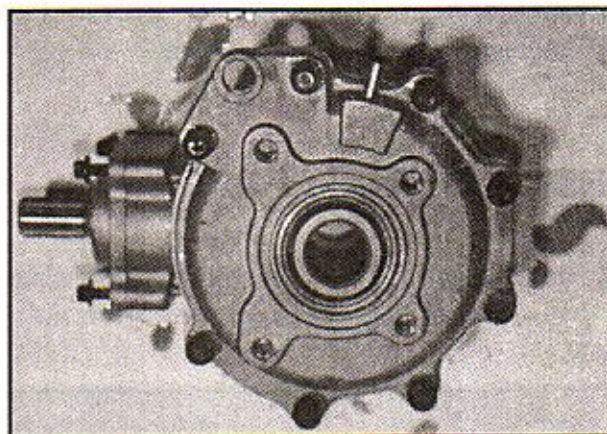
**NOTE:** The same shim thickness placed behind ring gear bearing must also be put behind the cover button.

8. Install output cover with new o-ring and torque bolts to 25 ft. lbs.



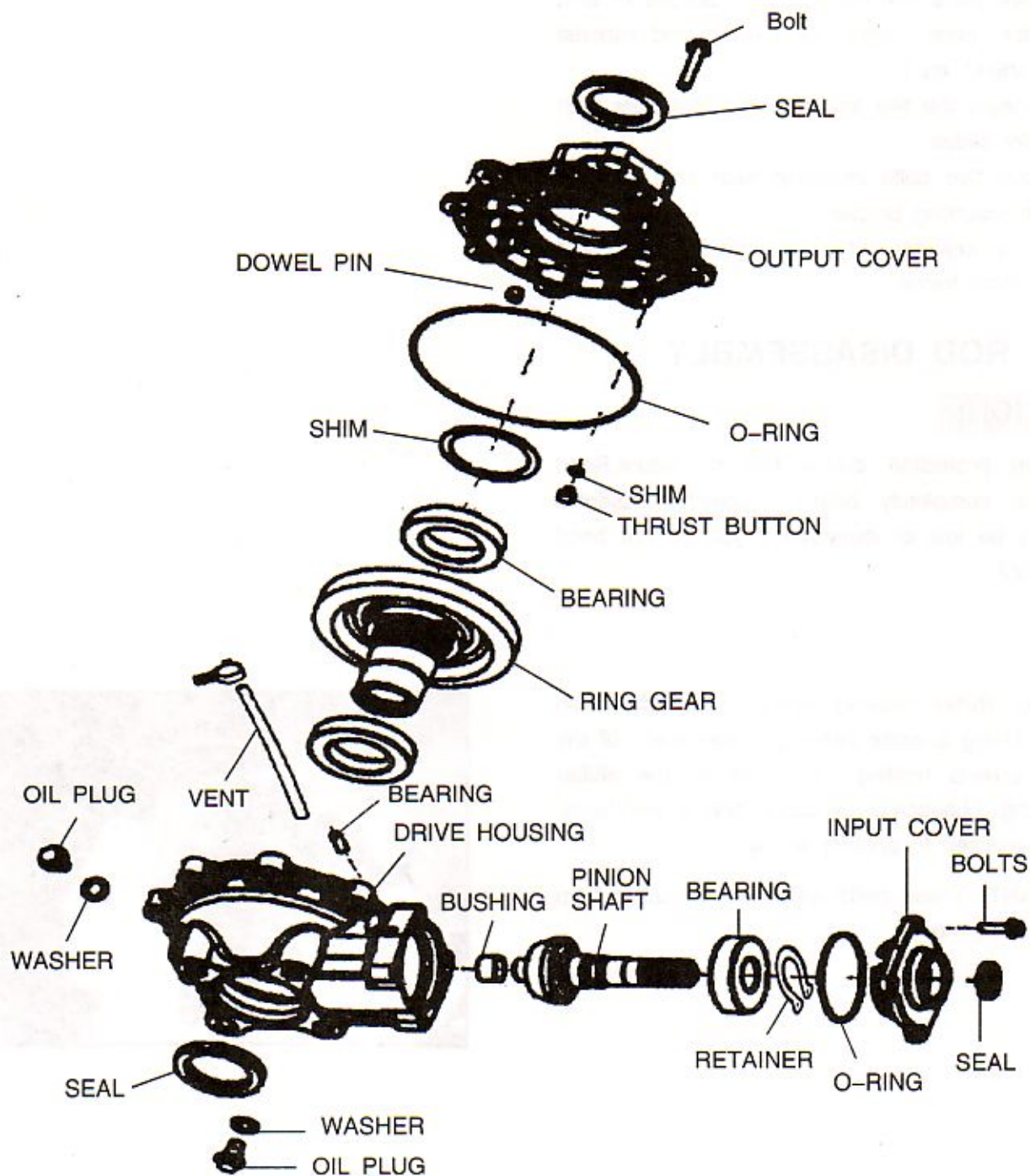
**Cover Bolts Torque**

**25 ft. lbs. (34 Nm)**





# REAR GEARCASE EXPLODED VIEW



REAR DRIVE ASSY COMPLETE

## TRANSMISSION

### SHIFT ROD REMOVAL

**IMPORTANT:** To change fluid, remove selector box assembly, disassemble, clean, and assemble.

1. Remove parts that interfere with access to shift selector (seat, right side panel, and exhaust heat shield, etc.).
2. Disconnect the two linkage rods from gear shift selector slides.
3. Remove five bolts attaching gear shift selector to the mounting bracket.
4. Lift gear selector out of mounting bracket and away from frame.

### SHIFT ROD DISASSEMBLY

#### **CAUTION:**

Wear eye protection during this procedure. Read each step completely before proceeding. Essential parts may be lost or damaged if you do not heed this caution!

1. Clamp shifter housing lightly in a soft jawed vice. Using a cross pattern, loosen each of the four screws holding the cover to the shifter housing. Loosen each screw only a few turns, then proceed to another screw.

**IMPORTANT:** These parts are under pressure from the internal springs.





## SHIFT ROD DISASSEMBLY, CONT.

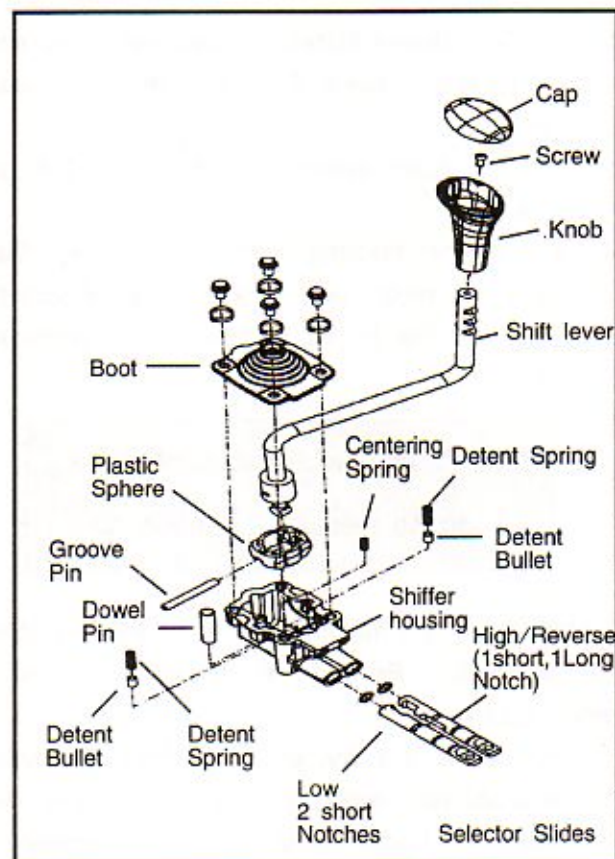
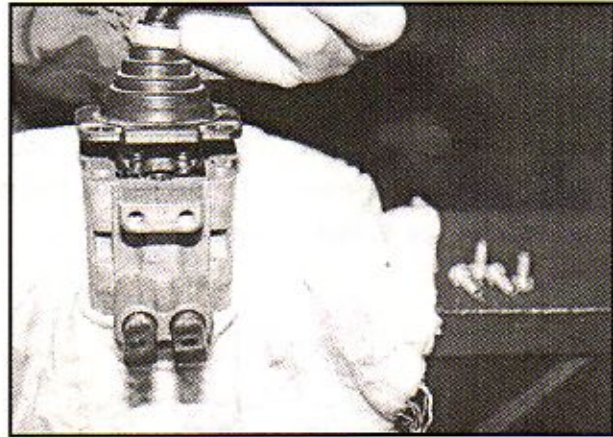
2. Carefully pull the cover and shift lever from the shifter housing.
3. Set the shift cover lever assembly aside.
4. Remove the three springs from shifter housing.
5. Slowly tilt shifter housing sideways to drain oil.

**IMPORTANT:** Do not tip shifter housing upside down or detent bullets and stop pin may fall out. Check for signs of moisture in the shifter housing. Inspect shift boot closely if moisture is present in selector box.

6. Tap shifter housing, top down, against a hard, smooth, flat surface to jar the dowel pin and two detent bullets loose. Pull the detent bullets and the dowel pin out of the shifter housing.
7. Remove the two slides, one at a time.

**IMPORTANT:** The LH (low) slide has two short notches and the RH (high/rev) slide has one short and one long notch. The slides must be replaced in the proper channels.

8. Inspect O-rings for damage. Replace if any damage is found.
9. Flush housing with parts washer fluid or penetrating oil to remove all moisture.
10. Dry all parts and remove any corrosion with a wire brush.





## TRANSMISSION

### SHIFT ROD ASSEMBLY

1. Insert slides into shifter housing, taking care not to cut or tear O-ring in the process.

**IMPORTANT:** The LH slide has two short notches and the RH side has one short and one long notch. The slides must be replaced in the proper channels for the shifter to function properly.

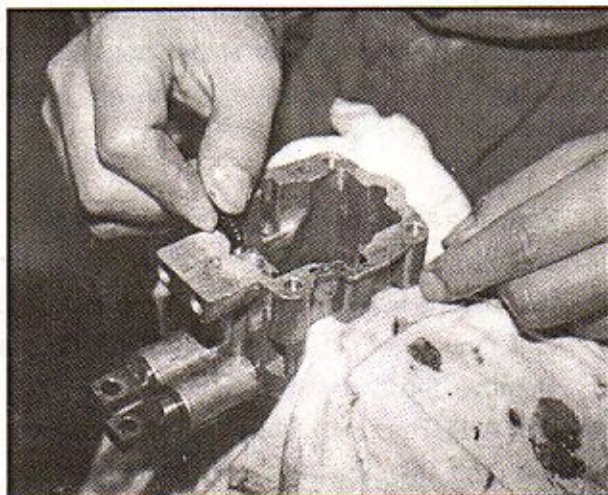
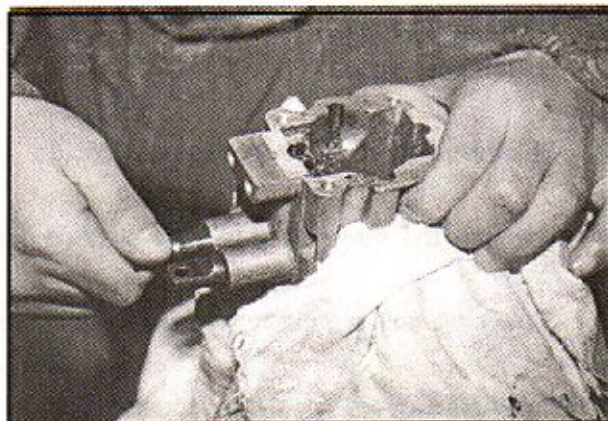
2. Replace detent bullets, dowel pin, and springs by reversing steps 5–7 of shift rod Disassembly.
3. Clamp shifter housing lightly in a soft jawed vise.
4. Fill shifter housing with 0W–40 All Season Synthetic motor oil. The oil level should be at one half the height of the slides (approx. 1 oz.).

**Gear Shift Selector Capacity: 1 oz.**

**0W–40 All Season Synthetic Oil**

**CAUTION:** Too much oil could cause the shift rod to hydrolock. Be sure the selector box is level when adding oil.

5. Wipe shift rod dry, clean surfaces of cover and selector box with Loctite Primer T and place a bead of Loctite 518 Gasket Eliminator or 3 Bond 1215 completely around the edge of the shifter housing.
6. Carefully reattach shift cover lever assembly to shifter housing. Make sure slides are in neutral, or butterfly may be damaged.
7. Torque cover screws to 12 ft. lbs. (1.7 kg-m).





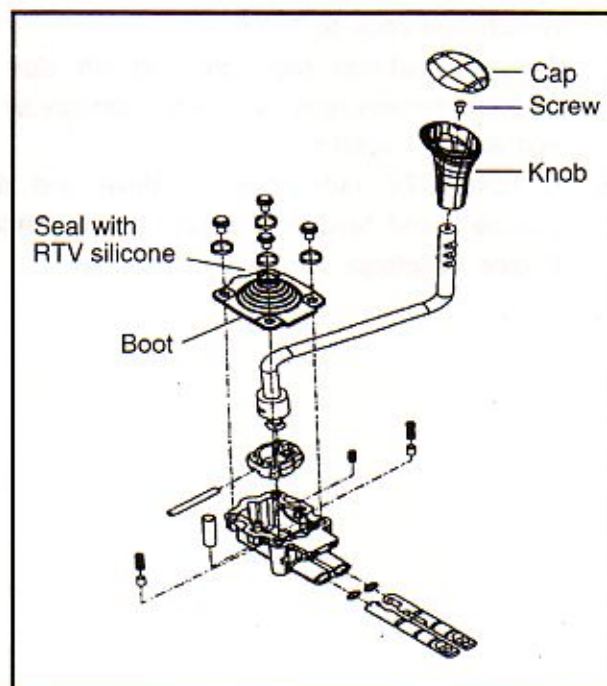
## SHIFT ROD INSTALLATION

1. Place shift rod back into the mounting bracket and replace five bolts.
2. Reconnect linkage rods to shift rod slides. Adjust as required. See linkage adjustment procedures.
3. Replace remaining parts.

## BOOT REPLACEMENT

**NOTE:** If moisture is found in the shift rod the boot should be replaced.

1. Using a slotted screwdriver, remove cap from gear shift knob.
2. Remove torx screw securing knob to shift lever.
3. Pull selector knob off shift lever.
4. Remove band clamp on rubber boot.
5. Slide boot off shift lever and replace with a new one.
6. Apply RTV silicone to shift lever to seal top of boot.
7. Place band clamp in position and tighten using CV boot clamp pliers.
8. Replace shift knob, securing it to shift lever with screw removed in step 2.
9. Push shift knob cover back into place. Allow approximately 12 hours for RTV silicone to cure.

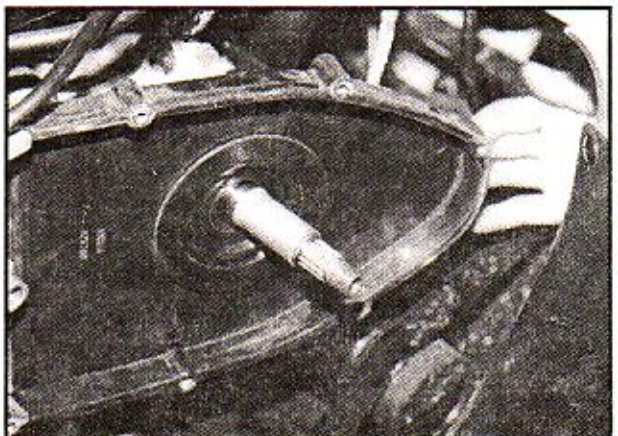
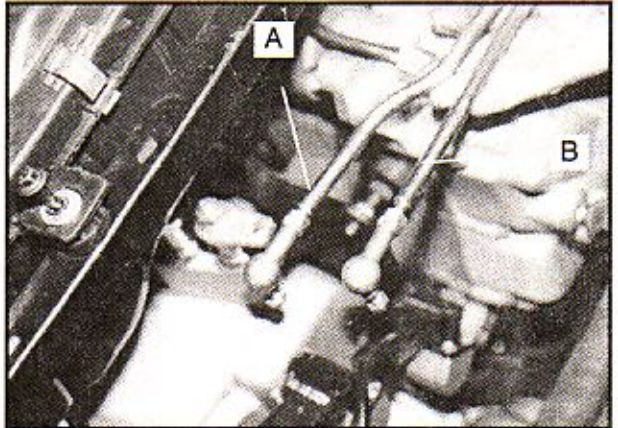
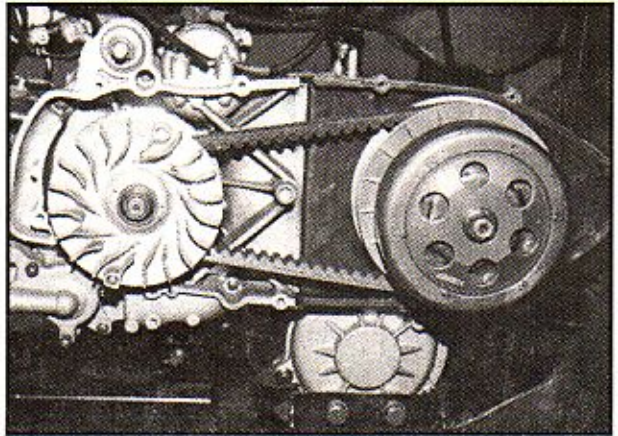
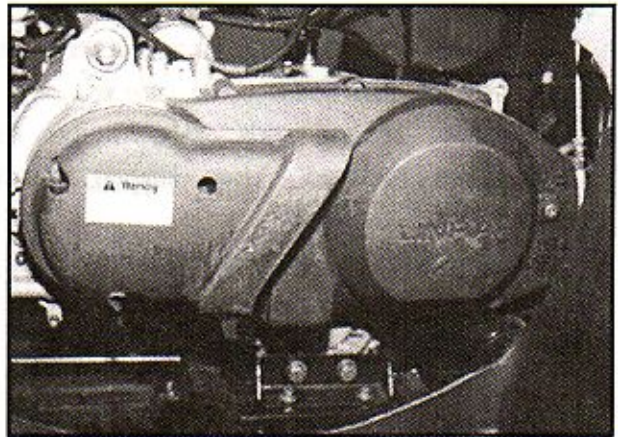




## TRANSMISSION

### ENGINE AND TRANSMISSION REMOVAL

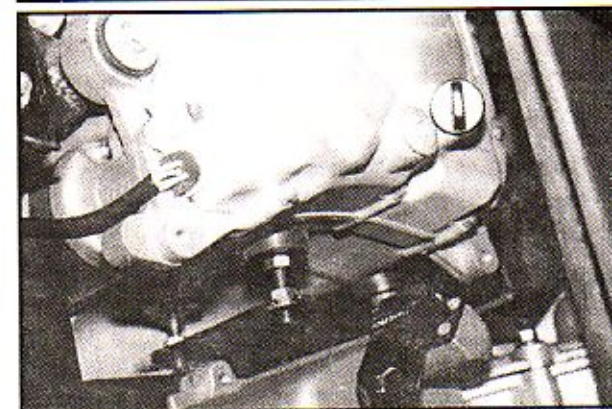
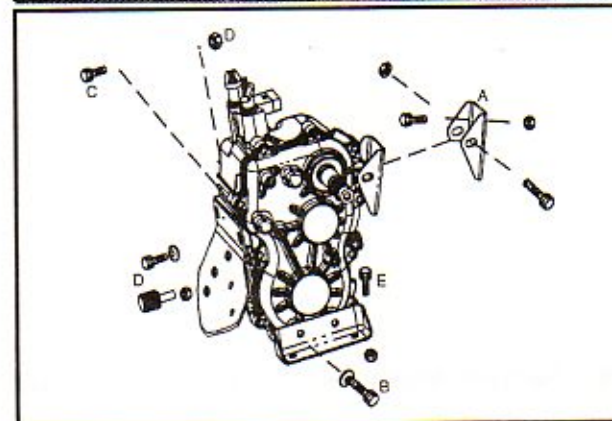
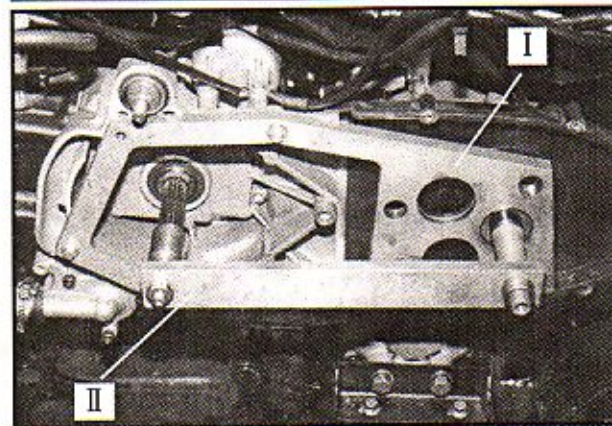
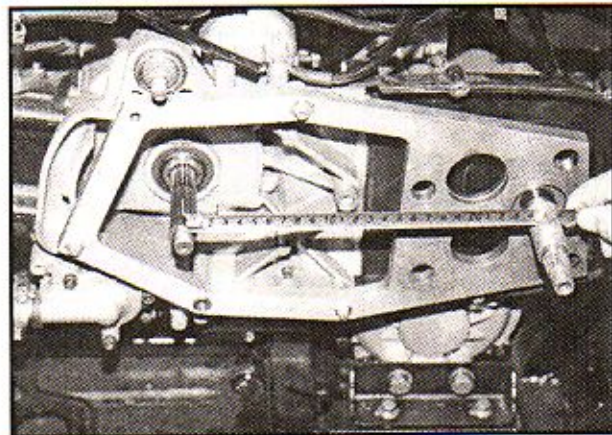
1. Switch fuel cock to "OFF".
2. Remove seat, rear rack, right and left side covers, rear fenders, right and left footrests, air box and exhaust system.
3. Remove CTV outer cover, drive and driven clutches, and feed and return hoses ( refer to Engine chapters).
4. Remove shift rods A and B.
5. Remove throttle cable wire connected to car bu-  
rettor.
6. Disconnect engine from wiring harness com-  
pletely.
7. Disconnect gear position indicator switches.
8. Remove fuel line connected to carburettor and  
drain fuel.
9. Remove bottom bracket bolt (M8×90) of engine.
10. Remove front engine mount brackets and re-  
move engine from frame.
11. Remove rear covers from transmission.
12. Remove roll pin from drive shaft.
13. Remove lower left bracket, rear bracket and  
right mount bolts.(M10×1.25×70)
14. Remove transmission from frame and remove  
drive shaft.
15. Remove support bracket and rubber bumper.





## ENGINE AND TRANSMISSION INSTALLATION

1. Install rubber bumper on support bracket and then install support bracket on transmission. Tighten fasteners.
2. Install right side transmission bracket in right side frame bracket.
3. Install drive shaft on rear output shaft, align it to roll pin hole and install roll pin.
4. Install rear bracket and lower left bracket on frame and then on transmission.
5. Install engine and front engine mount brackets in frame.
6. Install engine on bottom bracket.
7. Install rear inside cover components on transmission.
8. Link engine and transmission together with special tools I and II, making sure center distance of engine shaft and transmission main shaft is 252mm and distance of side surface and shaft shoulder 62.5 mm and CVT works properly.
9. Tighten transmission mounting fasteners in steps from A to E.
10. Tighten engine mounting fasteners in top-to-bottom order.
11. Press rubber bumper against engine and tighten nut.
12. Remove special tools.
13. Install both drive and driven clutches and outer CVT cover.





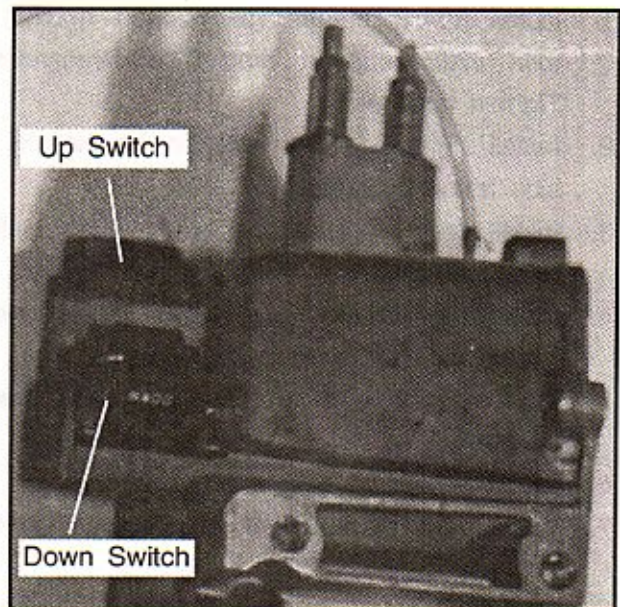
## TRANSMISSION

### TRANSMISSION DISASSEMBLY

1. Place both bellcranks in neutral position.

2. Remove gear indicator switches.

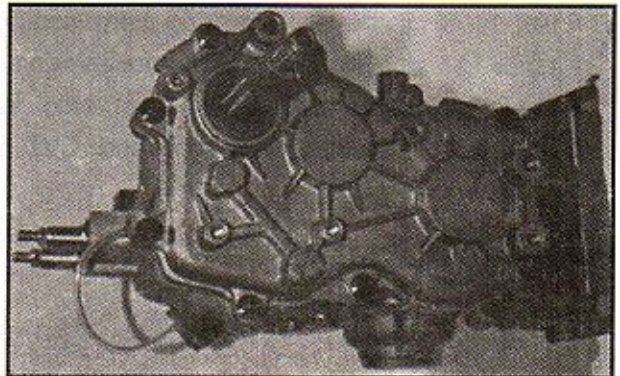
**IMPORTANT:** The gear switches must be removed prior to disassembly.



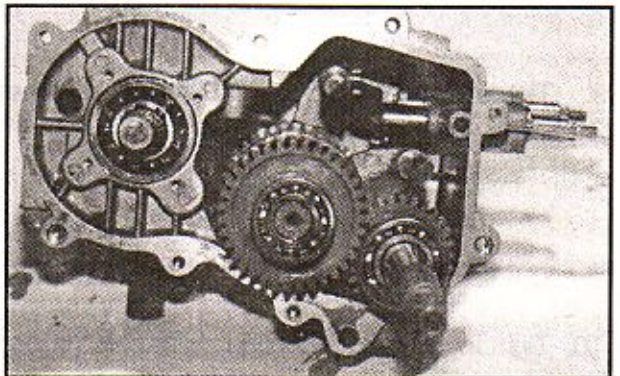
3. Remove case cover screws.

4. Remove the transmission cover bolts.

5. With a soft face hammer tap on the cover bosses and carefully remove the main cover.



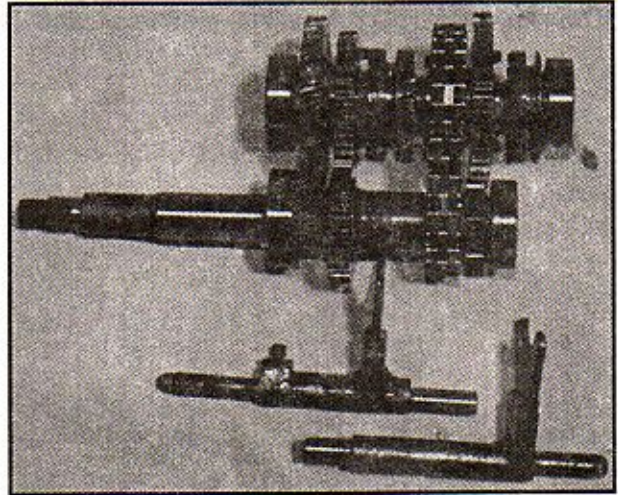
6. Remove bearing and 46 tooth gear helical.



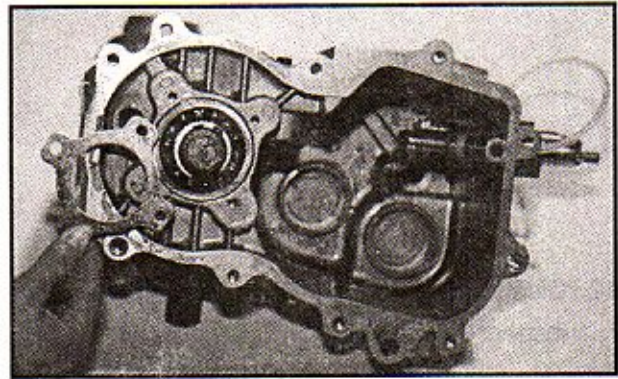


**TRANSMISSION DISASSEMBLY, CONT.**

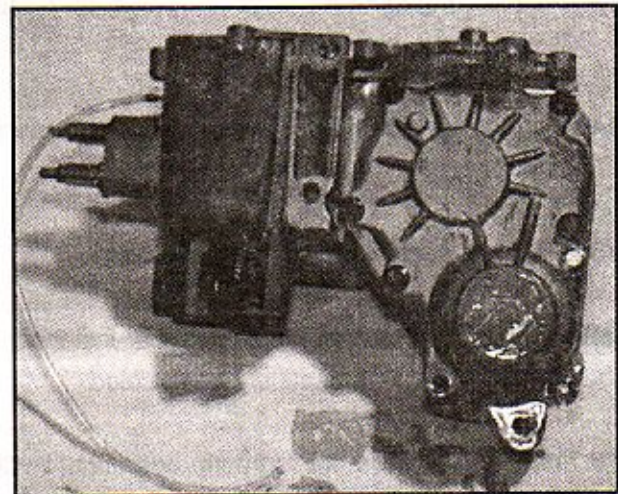
7. Remove input shaft, reverse shaft, and both shift fork shafts as an assembly.



8. Remove pinion shaft retainer plate and pinion shaft. (10T)



9. Remove front cover screws.

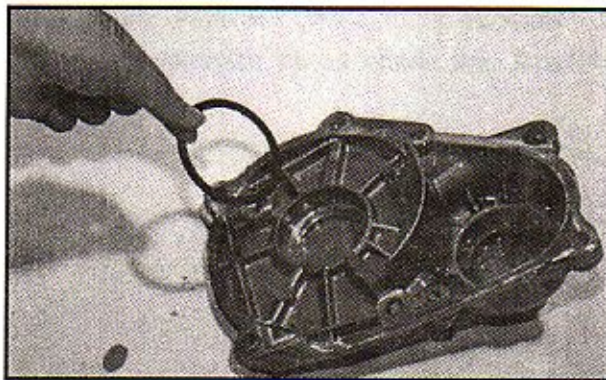




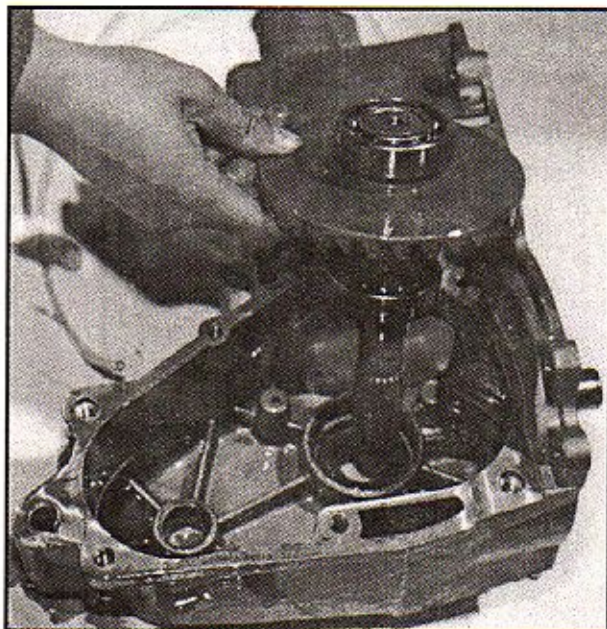
## TRANSMISSION

### TRANSMISSION DISASSEMBLY, CONT.

10. Note position of shim washers and thrust button.



11. Remove shafts as an assembly.



12. Clean all components in a parts washer and inspect for wear.
13. Inspect engagement dogs of gears and replace if edges are rounded.
14. Inspect gear teeth for wear, cracks, chips or broken teeth.

15. Remove seals from transmission case.

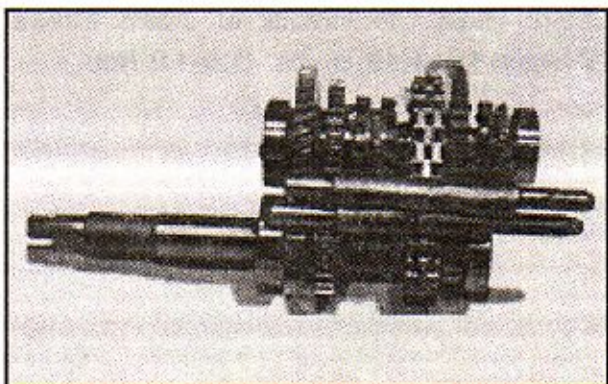
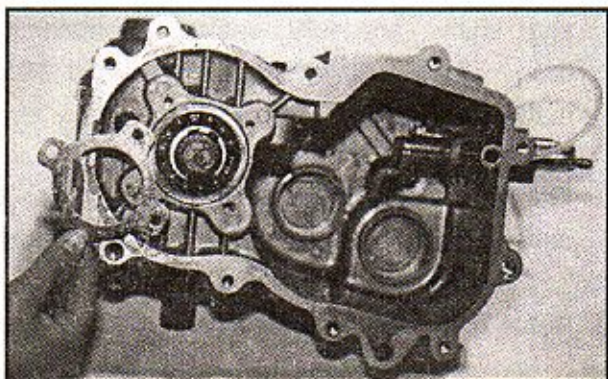
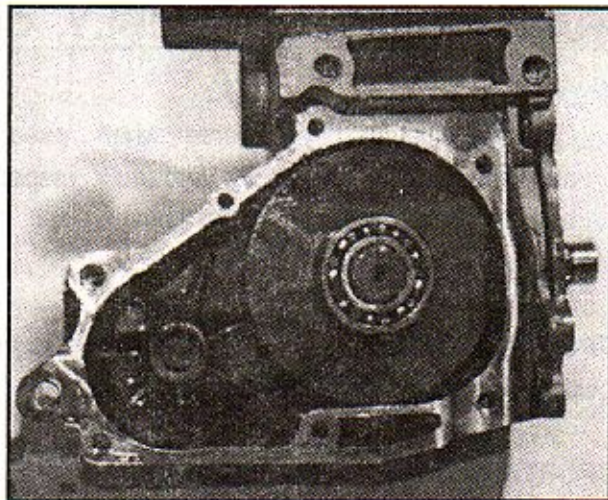
**IMPORTANT:** New seals should be installed after the transmission is completely assembled.

16. Inspect bearings for smooth operation. Check for excessive play between inner and outer race.



## TRANSMISSION ASSEMBLY

1. Install rear output shaft as an assembly.
2. Before installing the cover make sure the sealing surfaces are clean and dry, and shafts are fully seated in the transmission case. Apply Loctite™ 518 or 3-Bond 1215 to mating surfaces.
3. Reinstall cover and torque bolts in a criss-cross pattern in 3 steps to 18 ft. lbs. (25 Nm).
4. Install new rear shaft output seals.
5. Install pinion shaft (10T) with bearing.
6. Install bearing retainer plate with flat side toward bearing.
7. Apply Loctite™ 242 (Blue) to screw threads and torque screws to 18 ft. lbs. (25 Nm)
8. Assemble shafts and shift forks.





## TRANSMISSION

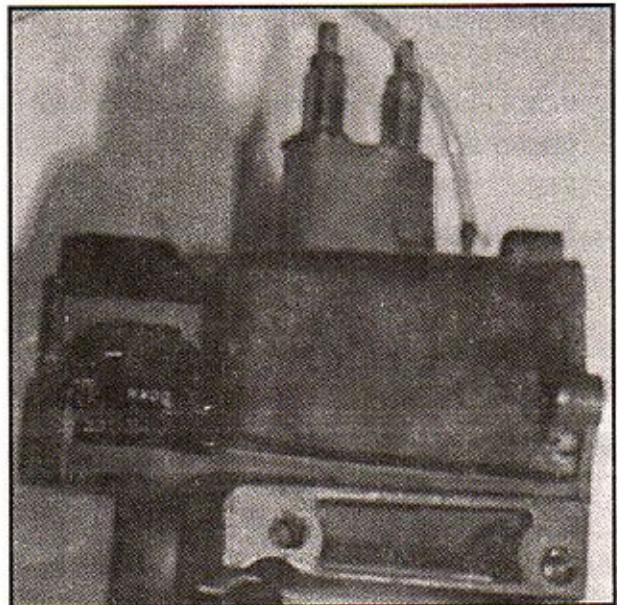
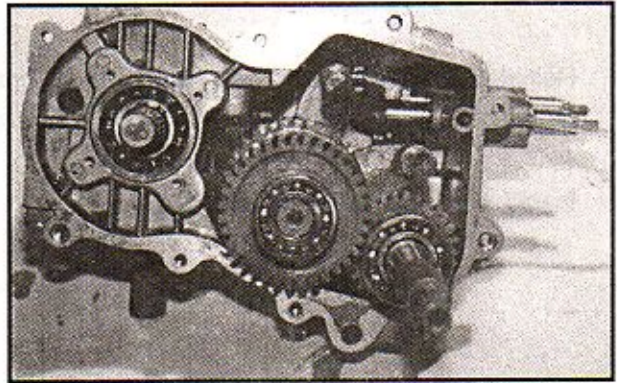
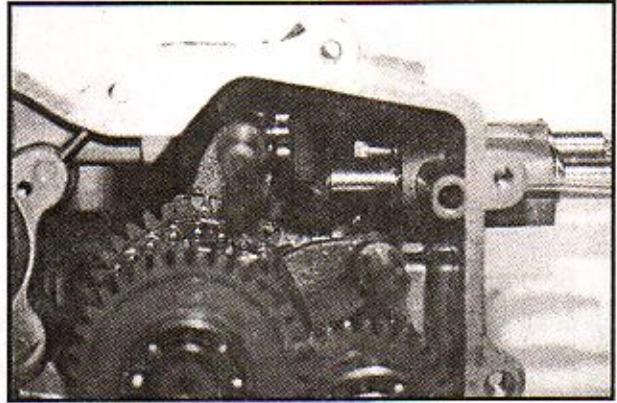
### TRANSMISSION ASSEMBLY, CONT.

9. Carefully install high/reverse shaft assembly and gear cluster as a unit into their respective bearing case areas. Tap with a soft face hammer to seat shaft assemblies.

**IMPORTANT:** Make sure shift shaft pins are properly positioned in the slot on selector arms.

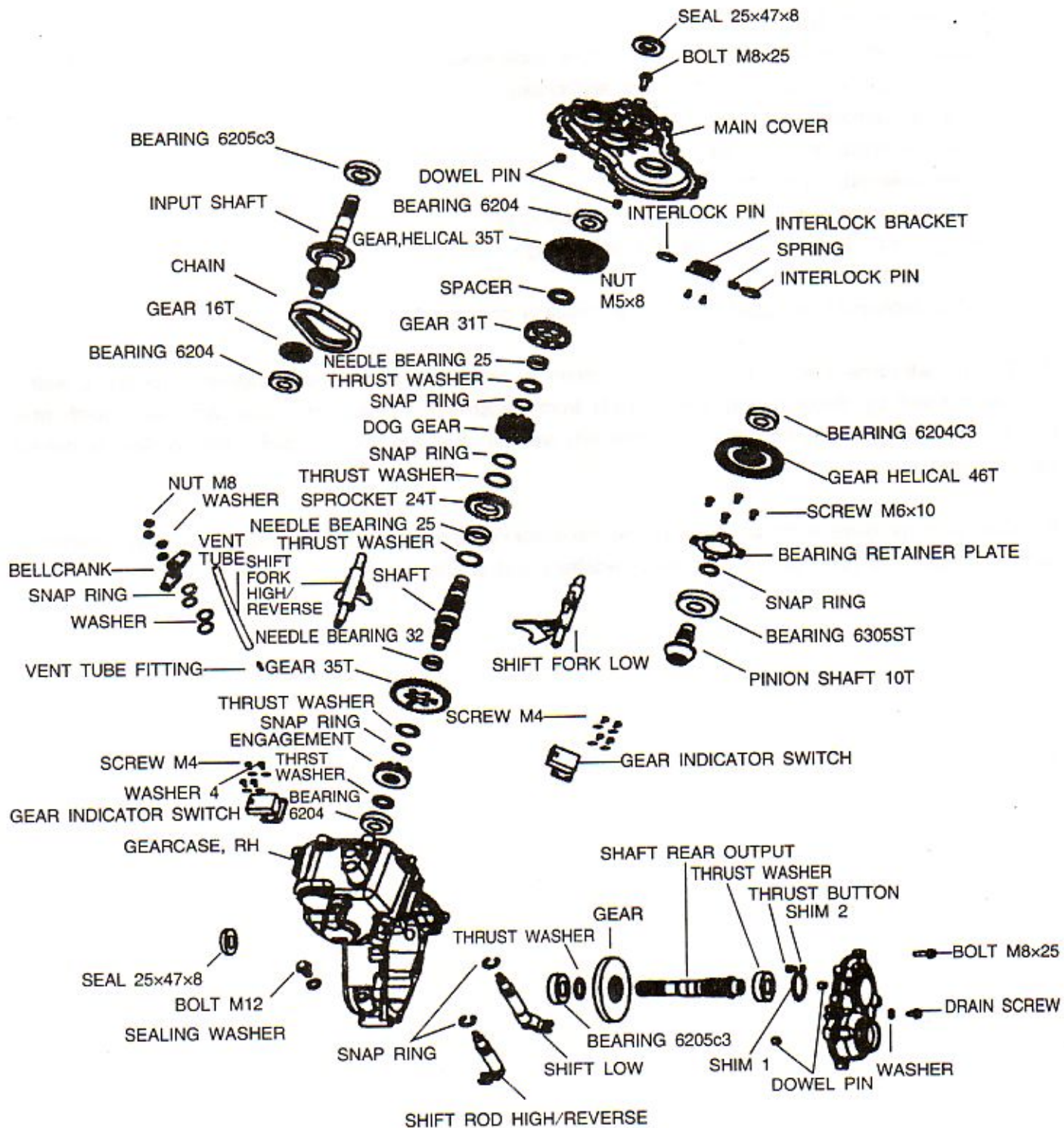
**IMPORTANT:** Be sure gear indicator switch (es) are removed from transmission case before installing shafts.

10. Install output shaft and gear assembly along with sprocket and chain.
11. Prior to reinstalling the main cover make sure the mating cover surfaces are clean and dry, and shafts are fully seated in transmission case. Apply Loctite™ 518 or 3-Bond 1215 to mating surfaces.
12. Reinstall main cover and torque bolts in a cross pattern in 3 step to 18 ft. lbs. (25 Nm)
13. Install new input shaft seal.
14. Install gear indicator switches. Apply Loctite™ 242 (blue) to threads of switch screws and torque to 13–16 in. lbs. (1.5–1.9 Nm).





## TRANSMISSION EXPLODED VIEW



## TRANSMISSION

### TROUBLESHOOTING CHECKLIST

Check the following items when shifting difficulty is encountered

- Idle speed adjustment
- Transmission oil type/quality
- Transmission torque stop adjustment (where applicable)
- Engine torque stop adjustment (where applicable)
- Drive belt deflection
- Loose fasteners on rod ends
- Loose fasteners on selector box
- Worn rod ends, clevis pins, or pivot arm bushings
- Linkage rod adjustment and rod end positioning
- Shift selector rail travel
- \*Worn, broken or damaged internal transmission components

**\*NOTE:** To determine if shifting difficulty or problem is caused by an internal transmission problem, isolate the transmission by disconnecting linkage rods from transmission bellcranks. Manually select each gear range at the transmission bellcrank, and test ride vehicle. If it functions properly, the problem is outside the transmission.

If transmission problem remains, disassemble transmission and inspect all gear dogs for wear (rounding), damage. Inspect all bearings, circlips, thrust washers and shafts for wear.



**SPECIFICATIONS**

Front Brake Caliper		
Item	Standard	Service Limit
Brake Pad Thickness	.275"/7.0mm	.150"/3.81mm
Brake Disc Thickness	.150-.164"/3.810-4.166mm	.140"/3.556mm
Brake Disc Thickness Variance Between Measurements	-	.002"/.051mm
Brake Disc Runout	-	.005"/.127mm

Rear Axle Brake Caliper		
Item	Standard	Service Limit
Brake Pad Thickness	.275"/7.0mm	.150"/3.81mm
Brake Disc Thickness	.177-.187"/4.496-4.750mm	.167"/4.242mm
Brake Disc Thickness Variance Between Measurements	-	.002"/.051mm
Brake Disc Runout	-	.005"/.127mm

Master Cylinder I.D.-Front	.750"
Master Cylinder I.D.-Aux. Rear	.500"

**TORQUE SPECIFICATIONS**

Item	Torque (ft. lbs. except where noted*)	Torque (Nm)
Front Caliper Mounting Bolts	18.0	25
Rear Axle Caliper Mounting Bolts	18.0	25
Master Cylinder Mounting Bolts	*55 in. lbs.	6.0
Master Cylinder Reservoir Cover Bolt	*5 in. lbs.	.6
Hand Brake Hose Bolt	15.0	21
Front Brake Disc	18.0	25
Front Wheel Mounting Nuts	15.0	21

## **BRAKES**

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### **BRAKE SYSTEM SERVICE NOTES**

Disc brake systems are light weight, low maintenance, and perform well in the conditions ATVs routinely encounter. There are a few things to remember when replacing disc brake pads or performing brake system service to ensure proper system function and maximum pad service life.

- Optional pads are available to suit conditions in your area. Select a pad to fit riding style and environment.
- Do not over –fill the master cylinder fluid reservoir.
- Make sure the brake lever and pedal returns freely and completely.
- Adjust stop pin on front caliper after pad service.
- Check and adjust master cylinder reservoir fluid level after pad service.
- Make sure atmospheric vent on reservoir is unobstructed.
- Adjust auxiliary brake after pad service.
- Test for brake drag after any brake system service and investigate cause if brake drag is evident.
- Make sure caliper moves freely on guide pins (where applicable).
- Inspect caliper piston seals for foreign material that could prevent caliper pistons from returning freely.
- Perform a brake burnishing procedure after installing new pads to maximize service life.



## **BRAKE NOISE TROUBLESHOOTING**

Dirt or dust buildup on the brake pads and disc is the most common cause of brake noise (squeal caused by vibration). If cleaning does not reduce the occurrence of brake noise, Disc Brake Quiet (available from most auto parts stores) can be applied to the back of the pads. Follow directions on the package. This will keep pads in contact with caliper piston(s) to reduce the chance of squeaks caused by dirt or dust.

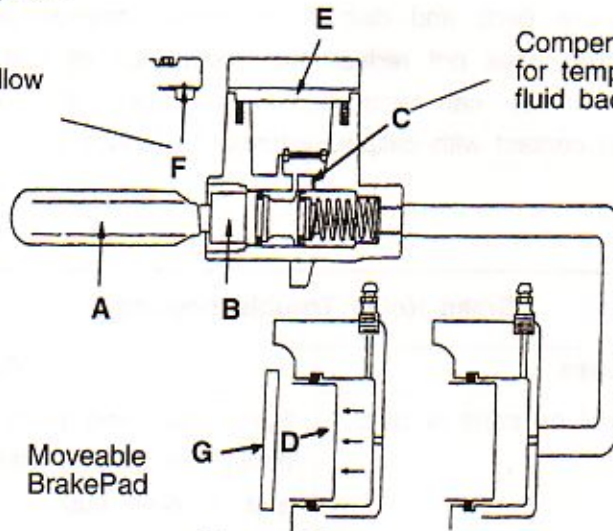
<b>Brake Noise Troubleshooting</b>	
<b>Possible Cause</b>	<b>Remedy</b>
Dirt, dust, or imbedded material on pads or disc	Spray disc and pads with an equivalent non-flammable aerosol brake cleaner. Remove pads and/or disc hub to clean imbedded material from disc or pads.
<u>Pad(s) dragging on disc (noise or premature pad wear)</u> Improper adjustment Insufficient lever or pedal clearance Master cylinder reservoir overfilled Master cylinder compensating port restricted Master cylinder piston not returning completely Caliper piston(s) not returning Operator error (riding the brake / park brake applied)	Adjust pad stop (from calipers) Check position of controls & switches Set to proper level Clean compensating port Inspect. Repair as necessary Clean piston(s) seal Educate operator
Loose wheel hub or bearings	Check wheel and hub for abnormal movement.
Brake disc warped or excessively worn	Replace disc.
Brake disc misaligned or loose	Inspect and repair as necessary.
Noise is from other source (chain, axle, hub, disc or wheel )	If noise does not change when brake is applied check other sources. Inspect and repair as necessary.



## HYDRAULIC BRAKE SYSTEM OPERATION

### Typical Hydraulic Brake System

Must be clear to allow proper diaphragm movement.



The brake system consists of the following components or assemblies: brake lever; master cylinder; hydraulic hose; brake calipers (slave cylinder); brake pads; and brake discs, which are secured to the drive line.

When the hand activated brake lever (A) is applied it contacts a piston (B) within the master cylinder. As the master cylinder piston moves inward it closes a small opening (compensating port) (C) within the cylinder and starts to build pressure within the brake system. As the pressure within the system is increased, the piston (D) located in the brake caliper moves outward and applies pressure to the moveable brake pad. This pad contacts the brake disc and moves the caliper in its floating bracket, pulling the stationary side pad into the brake disc. The resulting friction reduces brake disc and vehicle speed. As the lever pressure is increased, the braking affect is also increased.

The friction applied to the brake pads will cause the pads to wear. As these pads wear, the piston within the caliper moves further outward and becomes self adjusting. Fluid from the reservoir fills the additional area created when the caliper piston moves outward.

Brake fluid level is critical for proper system operation. Too little fluid will allow air to enter the system and cause the brakes to feel spongy. Too much fluid could cause brakes to drag due to fluid expansion.

Located within the master cylinder is the compensating port (C) which is opened and closed by the master cylinder piston assembly. The port is open when the lever is released and the master cylinder piston is outward. As the temperature within the hydraulic system changes, this port compensates for fluid expansion (heated fluid) or contraction (cooled fluid). During system service, be sure this port is open. Due to the high temperatures created within the system during heavy braking, it is very important that the master cylinder reservoir have adequate space to allow for fluid expansion. Never overfill the reservoir! Fill to 1/4"–5/16" (.64–.80 cm) from top of the cylinder.

This system also incorporates a diaphragm (E) as part of the cover gasket; and a vent port (F) located between the gasket and the cover. The combination diaphragm and vent allow for the air above the fluid to equalize pressure as the fluid expands or contracts. Make sure the vent is open and allowed to function. If the reservoir is over filled or the diaphragm vent is plugged the expanding fluid may build pressure in the brake system leading to brake failure.

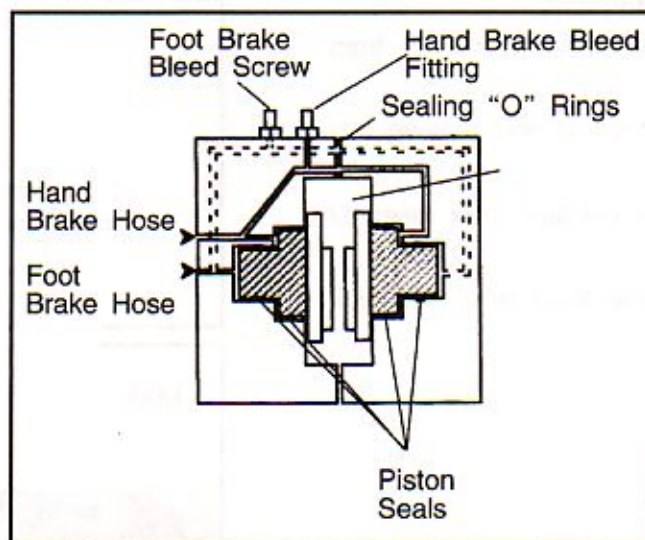
When servicing the ATV brake systems use only DOT 3 high temperature brake fluid. The brake fluid is sold in 5.5 oz. Bottles. **WARNING:** Once a bottle is opened, use what is necessary and discard the rest in accordance with local laws. Do not store or use a partial bottle of brake fluid. Brake fluid is hygroscopic, meaning it rapidly absorbs moisture. This causes the boiling temperature of the brake fluid to drop, which can lead to early brake fade and the possibility of serious injury.



## DUAL HYDRAULIC CALIPER BLEEDING

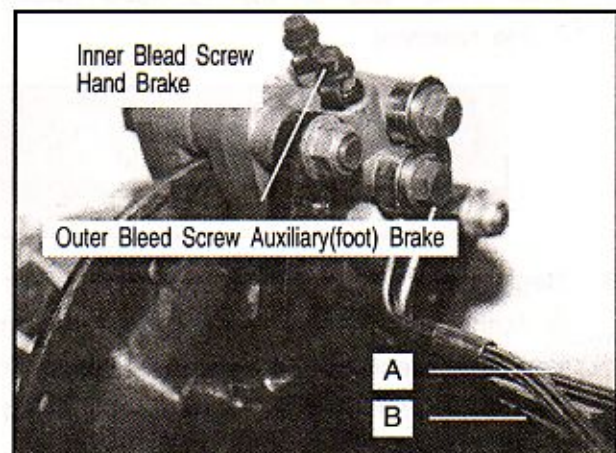
This caliper is a dual opposed piston design, with two independent hydraulic systems contained in the same caliper body (see illustration below). The caliper pistons are T-shaped, which allows both hand and foot brake to use the same caliper piston, but remain separated by seals. The hand brake system applies hydraulic pressure to both front calipers and only the outer diameter of the rear caliper pistons. The auxiliary (foot) brake applies pressure to the inner portion of the rear caliper pistons. Because the hand and foot brake hydraulic systems are separate, there are also two bleed screws—one for the outer fluid chamber (hand brake), and one for the inner fluid chamber (foot brake). The basic procedure for bleeding the brake system is the same as outlined on page 54–55; however, each system must be bled separately.

Hydraulic Auxiliary Brake inspection and adjustment is outlined on page 10.



Uppermost (inner) bleed screw and brake hose (A) is for hand brake system.

Lower (outer) bleed screw and brake hose (B) is for auxiliary (foot) brake system.





# BRAKES

## FLUID REPLACEMENT/BLEEDING PROCEDURE

**NOTE:**When bleeding the brakes or replacing the fluid always start with the caliper farthest from the master cylinder.

### CAUTION:

Always wear safety glasses.

### CAUTION:

Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

## BRAKE BLEEDING-FLUID CHANGE

This procedure should be used to change fluid or bleed brakes during regular maintenance.

1. Clean reservoir cover thoroughly.
2. Remove screws, cover and diaphragm (C) from reservoir.
3. Inspect vent slots (A) in cover and remove any debris or blockage.
4. If changing fluid, remove old fluid from reservoir with similar tool.

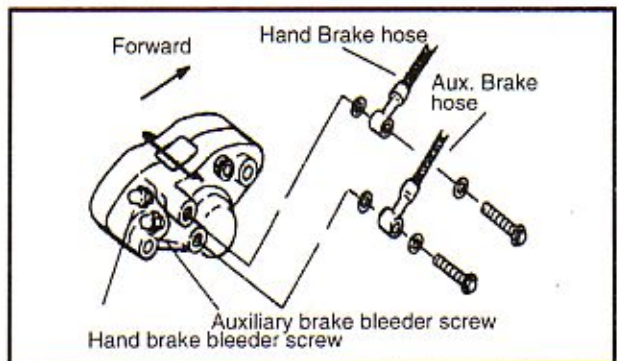
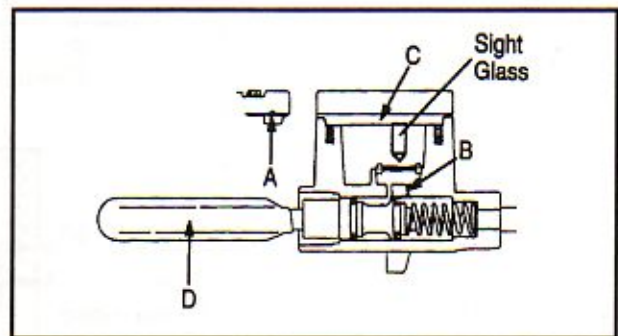
**NOTE:** Do not remove brake lever when reservoir fluid level is low.

5. Add brake fluid to the indicated MAX level inside reservoir.

**DOT 3 Brake Fluid**

6. Begin bleeding procedure with the caliper that is farthest from the master cylinder. Install a box end wrench on the caliper bleeder screw. Attach a clean, clear hose to the fitting and place the other end in a clean container. Be sure the hose fits tightly on the fitting.

**NOTE:** Fluid may be forced from supply port (B) when brake lever is pumped. Place diaphragm (C) in reservoir to prevent spills. Do not install cover.





**BRAKE BLEEDING-FLUID CHANGE CONT.**

7. Slowly pump brake lever (D) until pressure builds and holds.
8. While maintaining lever pressure, open bleeder screw. Close bleeder screw and release brake lever.

**NOTE:** Do not release lever before bleeder screw is tight or air may be drawn into caliper.

9. Repeat procedure until clean fluid appears in bleeder hose and all air has been purged. Add fluid as necessary to maintain level in reservoir.

**CAUTION:**

Maintain at least 1/2" (1.27cm) of brake fluid in the reservoir to prevent air from entering the master cylinder.

10. Tighten bleeder screw securely and remove bleeder hose.
11. Repeat procedure steps 5-9 for the remaining caliper (s).
12. Add brake fluid to MAX level inside reservoir.

**Master Cylinder Fluid Level:**

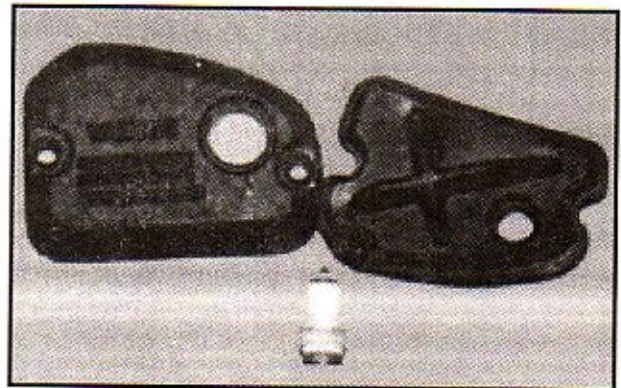
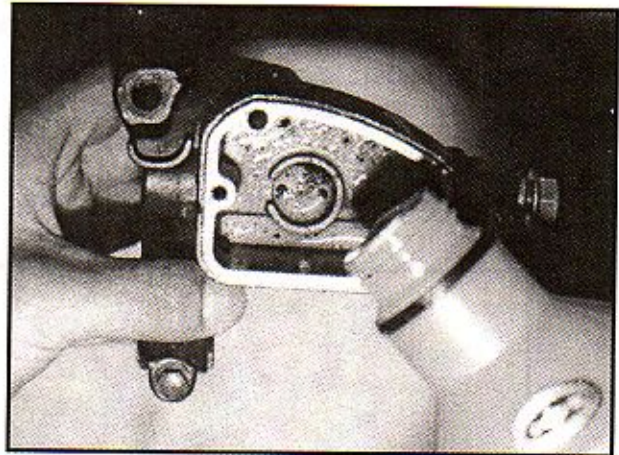
**MAX level inside reservoir**

**Sight glass must look dark, if sight glass is clear, fluid level is too low**

13. Install diaphragm, cover and screws. Tighten screws to specification.

**Reservoir Cover Torque--  
5 in. lbs. (.6 Nm)**

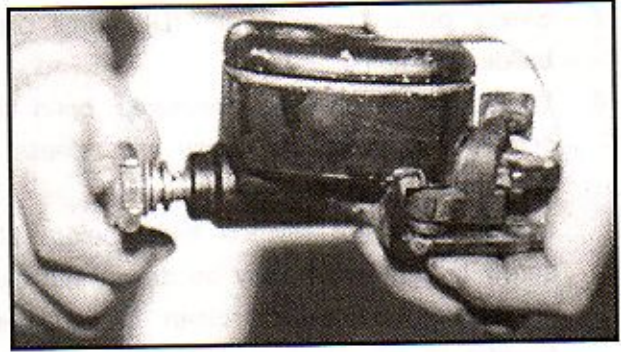
14. Field test machine at low speed before putting into service. Check for proper braking action and lever reserve. With lever firmly applied, lever reserve should be no less than 1/2" (1.3cm) from handlebar.
15. Check brake system for fluid leaks and inspect all hoses and lines for wear or abrasion. Replace hose if wear or abrasion is found.



## BRAKES

### MASTER CYLINDER DISASSEMBLY

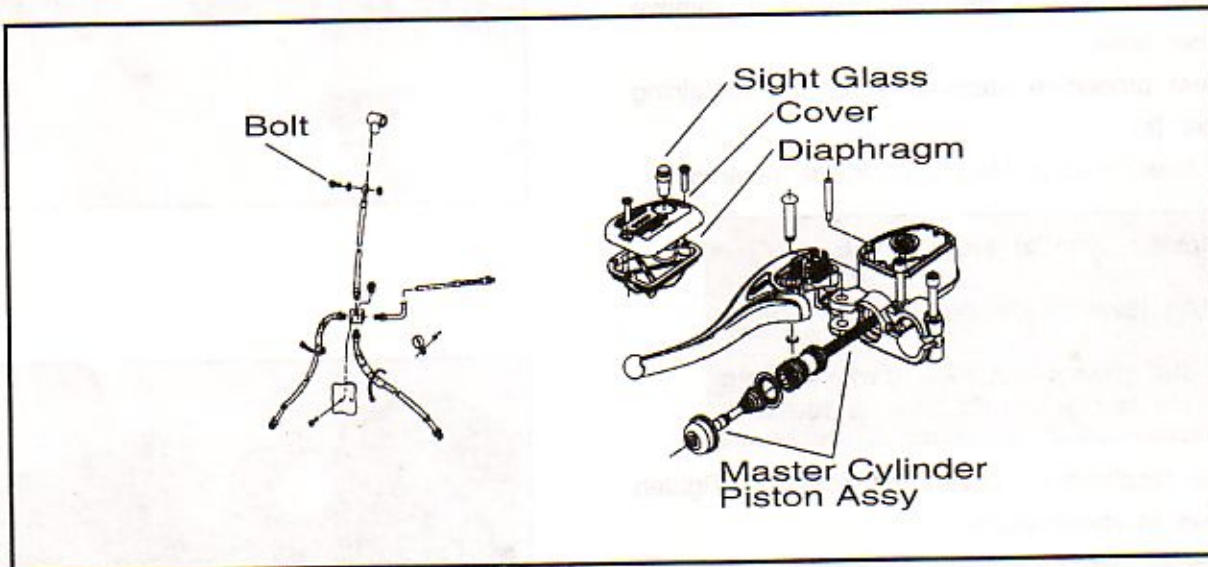
1. Clean master cylinder and reservoir assembly. Make sure you have a clean work area to disassemble brake components.
2. Place a shop towel under brake hose connection at master cylinder. Loosen bolt; remove bolt and sealing washers.



#### CAUTION:

Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

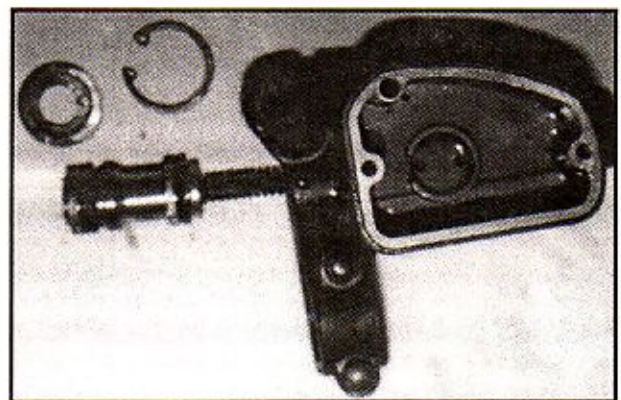
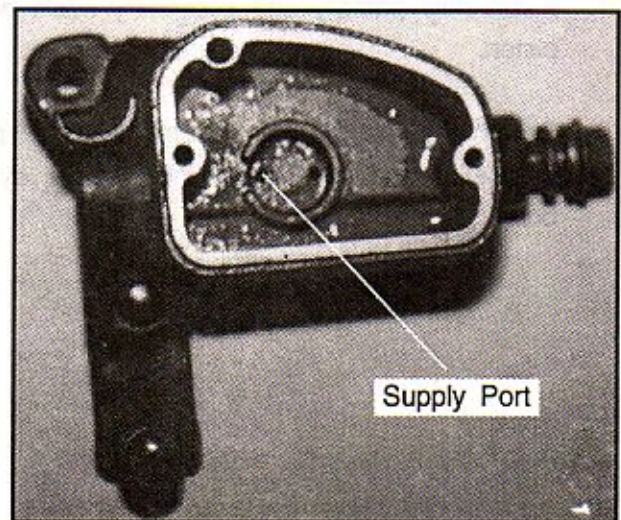
3. Remove master cylinder from handlebars.





## MASTER CYLINDER DISASSEMBLY

1. Remove cover and diaphragm from master cylinder and dispose of the fluid properly.
2. Be sure vents in cover are clean and unobstructed.
3. Remove brake lever.
4. Clean surfaces of the reservoir and master cylinder body. Be sure supply port is clean before reassembly.
5. Remove outer dust seal. Be ready to catch piston assembly. NOTE: The return spring may force piston out when dust seal has been removed.
6. Remove piston assembly and return spring from master cylinder. Replace piston assembly and spring.

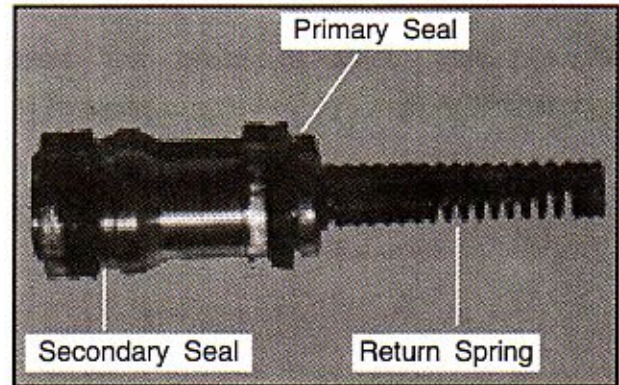




## **BRAKES**

### **MASTER CYLINDER INSPECTION**

1. Clean the master cylinder assembly with clean Dot 3 brake fluid, brake parts cleaner, or denatured alcohol. Dry thoroughly. Inspect the bore for nicks, scratches or wear. Replace if damage is evident or if worn.
2. Inspect parking brake for wear. If teeth or locking cam are worn, replace lever.



### **MASTER CYLINDER ASSEMBLY**

1. Install new primary and secondary seals on the piston.
2. Select the appropriate master cylinder piston installation tool and insert into master cylinder bore.

## **MASTER CYLINDER ASSEMBLY, CONT.**

3. Dip piston in clean DOT 3 brake fluid, attach spring to piston, and install assembly into installation tool.

### **CAUTION:**

Do not attempt to install the piston without the required installation tool. Do not allow the lip of the seals to turn inside out or fold.

4. Push the piston assembly through the installation tool using the plunger handle. Continue pushing until plunger is solid against installation tool.
5. Hold piston assembly inward while removing both tools. Install dust seal plate, spring and plunger. Install a new dust seal. Be sure dust seal is completely seated in the groove.

**NOTE:**The piston assembly should move freely in the bore, and spring back against the seal when released.

6. Apply a light film of grease to the lever pin. Install lever and c-clip.



## BRAKES

### MASTER CYLINDER INSTALLATION

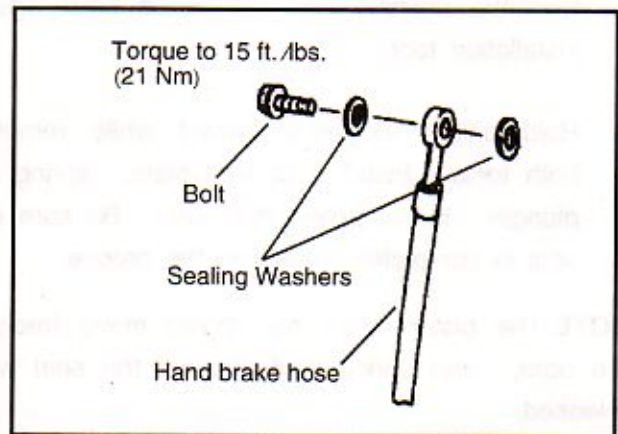
1. Install master cylinder on handlebars. Torque mounting bolts to 55 in. lbs. (6 Nm)

**NOTE:** To speed up the brake bleeding procedure the master cylinder can be purged of air before brake hose is attached. Fill with DOT3 brake fluid and pump lever slowly two to three times with finger over the outlet end to purge master cylinder of air.

2. Place new sealing washers on each side of hand brake hose and torque bolt to specification.

**Master Cylinder Mounting Bolt  
Torque 55 in. lbs. (6 Nm)**

**Bolt Torque  
15 ft. lbs. (21 Nm)**



3. Fill reservoir with DOT 3 fluid.
4. Follow bleeding procedure on pages 54 –55, Check all connections for leaks and repair if necessary.

**DOT 3 Brake Fluid**

## FRONT PAD REMOVAL

1. Elevate and support front of machine.

### CAUTION:

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

2. Remove the front wheel. Loosen pad adjuster screw 2-3 turns.

3. Remove caliper from mounting bracket.

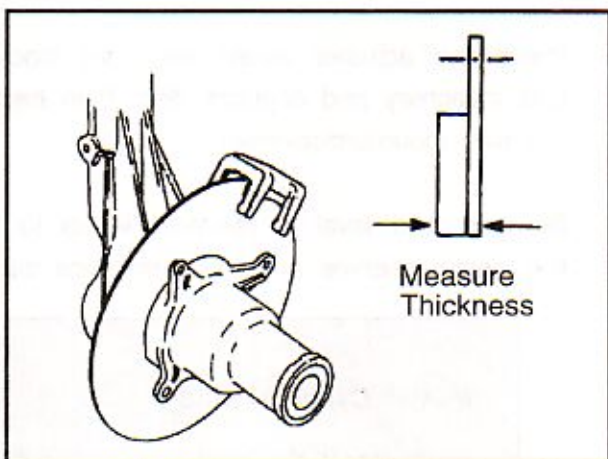
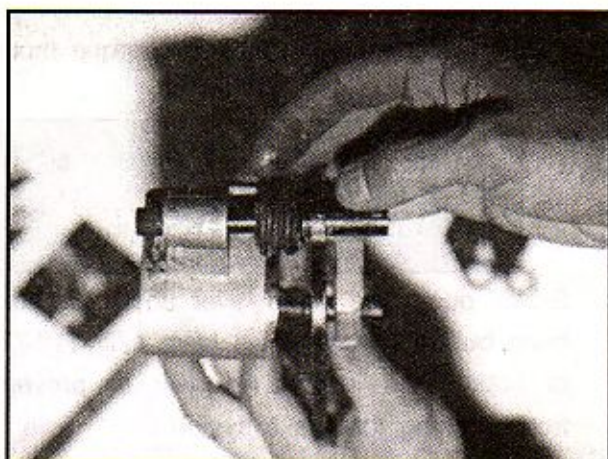
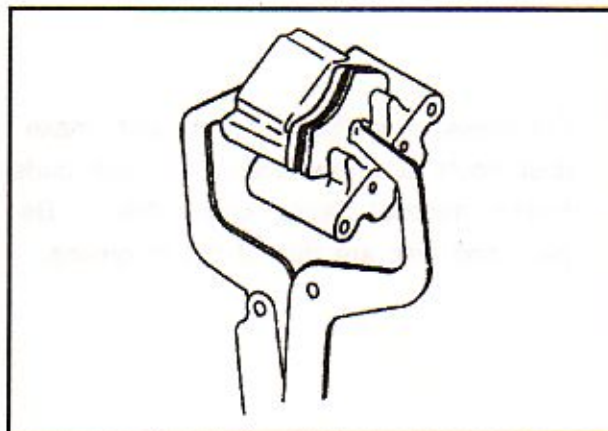
4. Push caliper piston into caliper bore slowly using a C-clamp or locking pliers with pads installed.

**NOTE:** Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

5. Push mounting bracket inward and slip outer brake pad past edge. Remove inner pad.

6. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.

**Front Brake Pad Thickness**  
 New .275"/7.0 mm  
 Service Limit .150"/3.81 mm





# BRAKES

## FRONT PAD ASSEMBLY

1. Lubricate mounting bracket pins with a light film of All Season Grease, and install rubber dust boots.

2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other. Be sure pads and disc are free of dirt or grease.

3. Install caliper on hub strut, and torque mounting bolts.

**Front Caliper Mounting Bolts**

**Torque 18 ft. lbs. (25 Nm)**

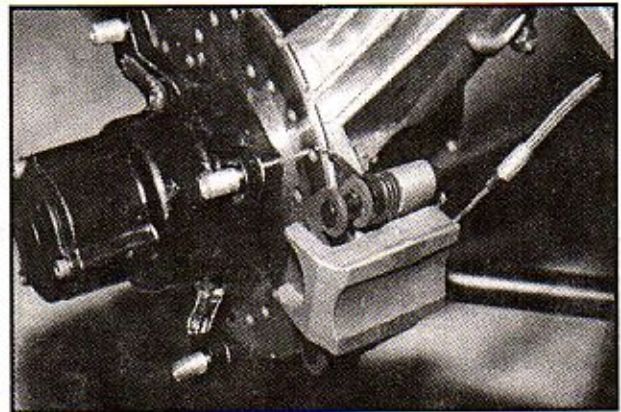
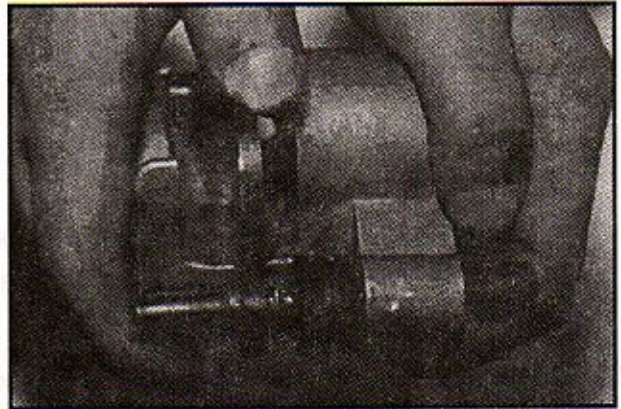
4. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2" (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.

5. Install the adjuster screw and turn clockwise until stationary pad contacts disc, then back off 1/2 turn (counterclockwise).

6. Be sure fluid level in reservoir is up to MAX line inside reservoir and install reservoir cap.

**Master Cylinder Fluid**

**Up to MAX line inside reservoir**





## **FRONT PAD ASSEMBLY, CONT.**

7. Install wheels and torque wheel nuts.
8. It is recommended that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise. Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Repeat procedure 10 times.

**Front Wheel Nut Torque**  
20 ft. lbs. (27 Nm)

## **FRONT DISC INSPECTION**

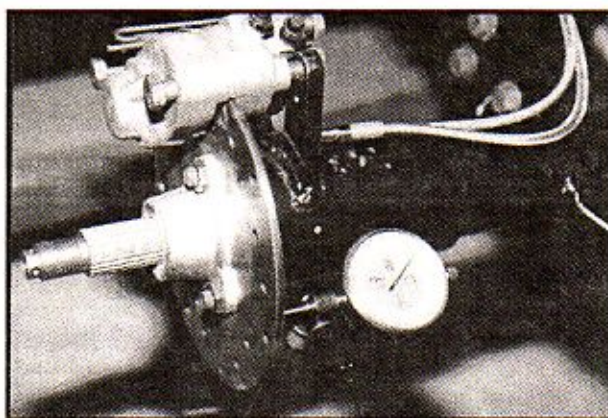
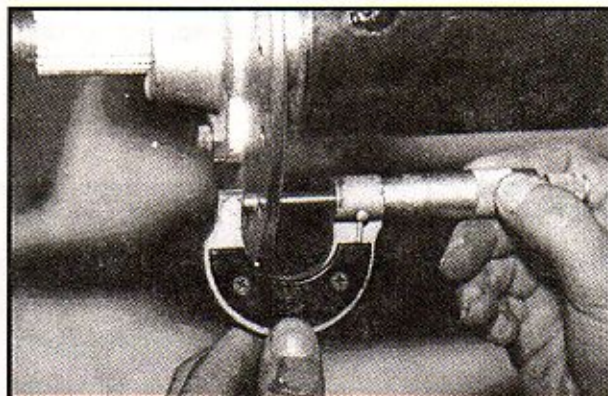
1. Visually inspect the brake disc for nicks, scratches, or damage.
2. Measure the disc thickness at 8 different points around the pad contact surface using a 0–1" micrometer. Replace disc if worn beyond service limit.

**Brake Disc Thickness**  
New .150–.164" (3.810–4.166 mm)  
Service Limit .140"/3.556 mm

**Brake Disc Thickness Variance**  
Service Limit .002" (.051 mm)  
difference between measurements

3. Mount dial indicator as shown to measure disc runout. Slowly rotate the disc and read total runout on the dial indicator. Replace the disc if runout exceeds specifications.

**Brake Disc Runout**  
Service Limit .005" (.127 mm)





## BRAKES

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### FRONT BRAKE DISC REMOVAL /REPLACEMENT

1. Apply heat to the hub in the area of the brake disc mounting bolts to soften the bolt locking agent.
2. Remove bolts and disc.
3. Clean mating surface of disc and hub.
4. Install disc on hub.
5. Install new bolts and tighten to specified torque.

**CAUTION:** Always use new brake disc mounting bolts. The bolts have a pre-applied locking agent which is destroyed upon removal.

**Front Brake Disc Mounting Bolt Torque:**

**18 ft. lbs. (25 Nm)**

## **FRONT CALIPER REMOVAL**

### **CAUTION:**

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

1. Remove brake pads. See page 61.
2. Using a line wrench, loosen and remove hand brake hose to caliper. Place a container under caliper to catch fluid draining from hand brake hose.
3. Remove brake caliper and drain fluid into container.

## **FRONT CALIPER DISASSEMBLY**

1. Remove brake pad adjuster screw.
2. Push upper pad retainer pin inward and slip brake pads past edge.
3. Remove mounting bracket, pin assembly and dust boot.



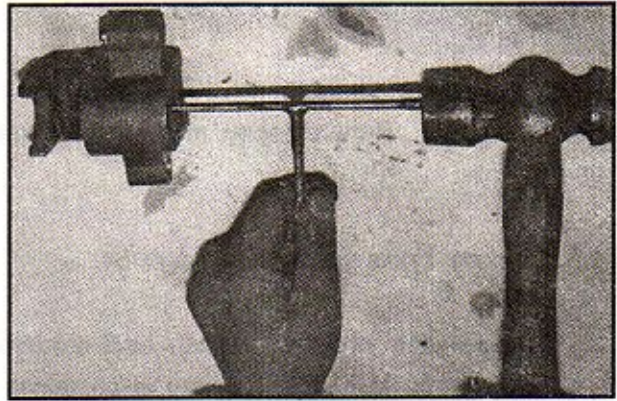


## BRAKES

### FRONT CALIPER DISASSEMBLY, CONT.

4. Remove piston, dust seal and piston seal.
5. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

NOTE: Be sure to clean seal grooves in caliper body.



### FRONT CALIPER INSPECTION

1. Inspect caliper body for nicks, scratches or wear. Measure bore size. Replace if damage is evident or if worn beyond service limit.

#### Front Caliper Piston Bore I.D.

Std. 1.191–1.192" (30.25–30.28 mm)

Service Limit 1.193" (30.30mm)

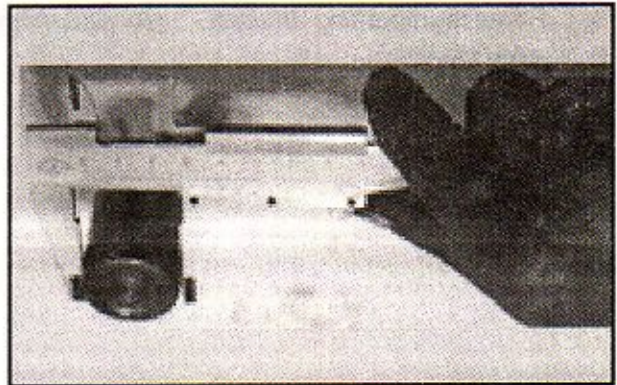
2. Inspect piston for nicks, scratches, wear or damage. Measure diameter and replace if damaged or worn beyond service limit.

#### Front Caliper Piston O.D.

Std. 1.186–1.1875" (30.13–30.16mm)

Service Limit 1.1855" (30.11mm)

3. Inspect the brake disc and pads as outlined for brake pad replacement this section. See page 63.



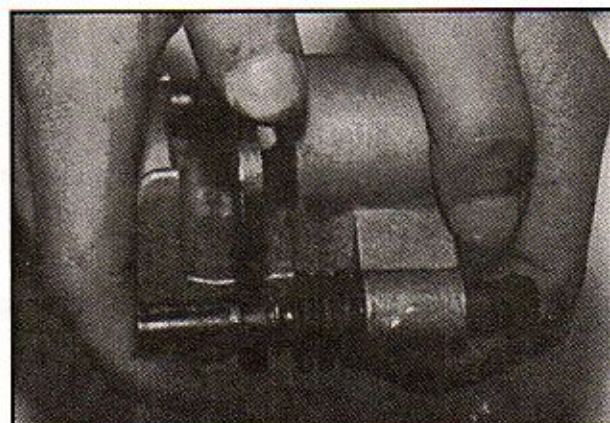
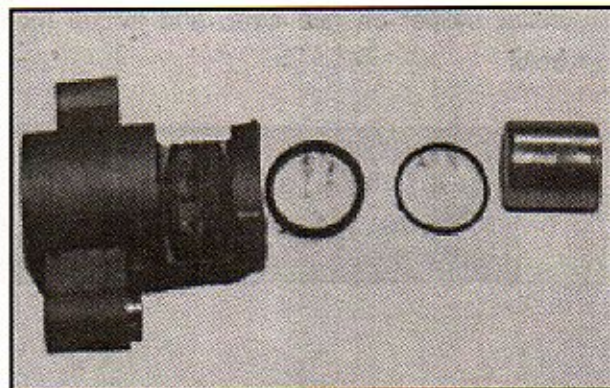


## FRONT CALIPER ASSEMBLY

1. Install new O-rings in the caliper body. Be sure groove is clean and free of residue or brakes may drag.
2. Coat piston with clean DOT 3 brake fluid. Install piston with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly, with light resistance.
3. Lubricate the mounting bracket pins with Premium All Season Grease, and install the rubber dust seal boots.

**Premium All Season Grease**

4. Compress the mounting bracket and make sure the dust seats are fully seated. Install the pads as shown on page 62. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.



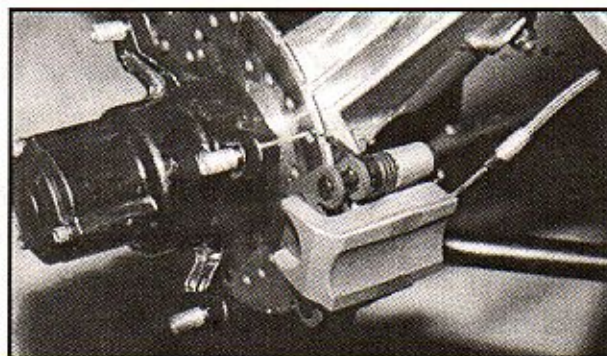


## BRAKES

### FRONT CALIPER INSTALLATION

1. Install caliper on hub strut, and torque mounting bolts.

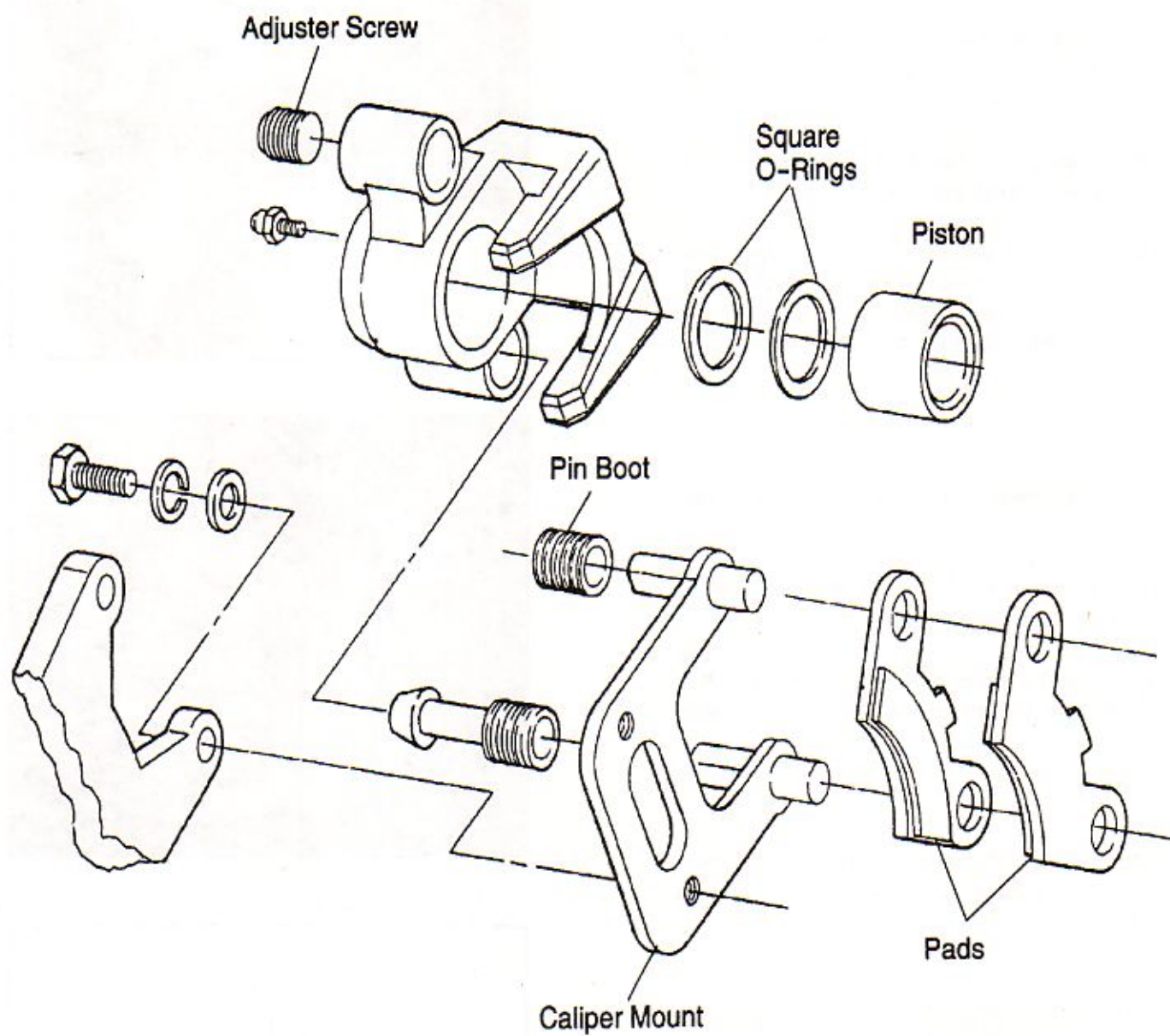
**Front Caliper Mounting Bolt Torque**  
**18 ft. lbs. (25 Nm)**



2. Install brake hose and tighten securely with a line wrench.
3. Install the adjuster screw and turn until stationary pad contacts disc, then back off 1/2 turn.
4. Follow brake bleeding procedure outlined on pages 54–55.
5. Install wheels and torque wheel nuts to specification.

**Front Wheel Nut Torque**  
**20 ft. lbs. (27 Nm)**

**NOTE:** If new brake pads are installed, it is recommended that a burnishing procedure be performed to extend pad service life and reduce noise. Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Repeat procedure 10 times.

**FRONT BRAKE CALIPER EXPLODED VIEW**



## BRAKES

### REAR BRAKE PAD REMOVAL

1. Remove caliper mounting bolts and lift caliper off of disc.

**NOTE:** When removing caliper, be careful not to damage brake hose. Support caliper so as not to kink or bend brake hose.

2. Push caliper pistons into caliper bore slowly with pads installed.

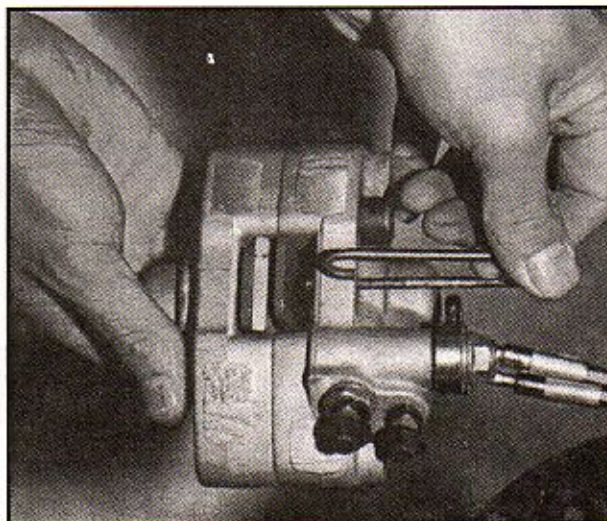
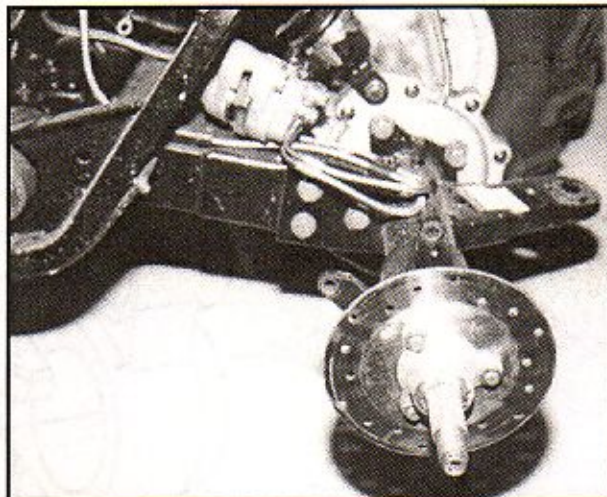
**NOTE:** Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

3. Remove brake pad retaining pin, and pad spacer.

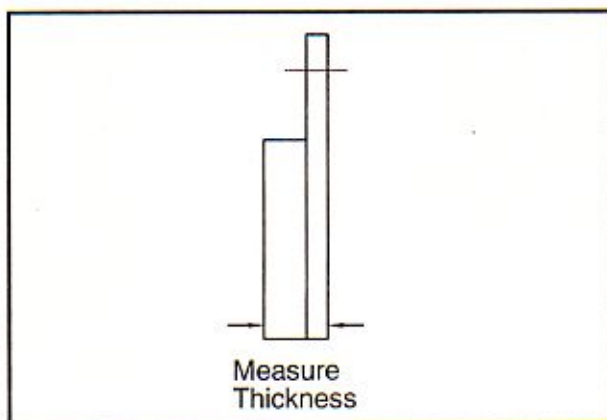
**NOTE:** This is a spring pin, do not spread apart farther than necessary to remove it.

4. Clean pad retainer pin with a wire brush.
5. Clean the caliper w/brake cleaner or alcohol.

6. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



**Rear Brake Pad Thickness**  
New .275" (7.0 mm)  
Service Limit .150" (3.81 mm)



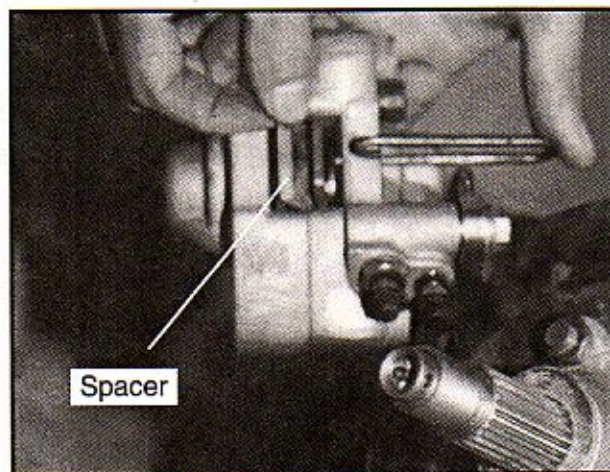


## REAR BRAKE PAD INSTALLATION

1. Install new pads in caliper body. Be sure to put aluminum spacer between pads.
2. Install caliper and torque mounting bolts.

**DH Brake Caliper**

**Torque 18 ft. lbs. (25 Nm)**



3. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2" (12.7 mm) of brake fluid in the reservoir to prevent air from entering the master cylinder.

**Auxiliary Brake Master Cylinder  
Fluid Level**

**Between MIN and MAX lines**

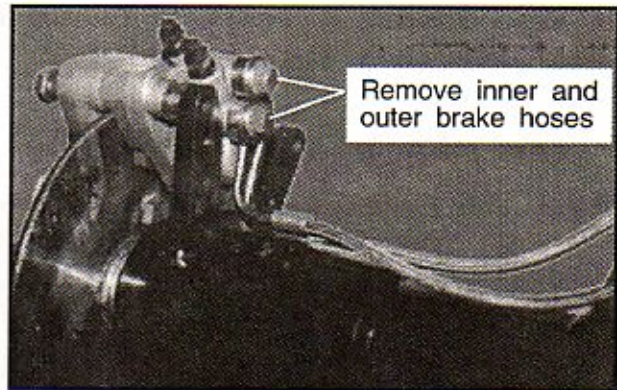
4. It is recommended that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise. Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Repeat procedure 10 times.



## BRAKES

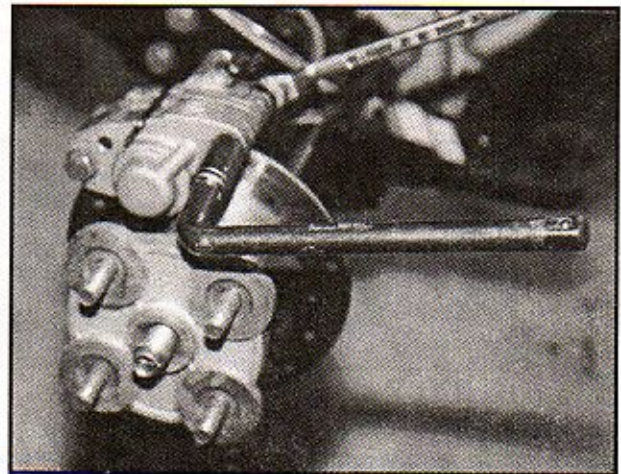
### REAR CALIPER REMOVAL/INSPECTION

1. Clean caliper area before removal.
2. Using a flare nut wrench, remove hand brake (inner) and foot brake (outer) hose. Place a container to catch brake fluid draining from brake hose.
3. Remove caliper.

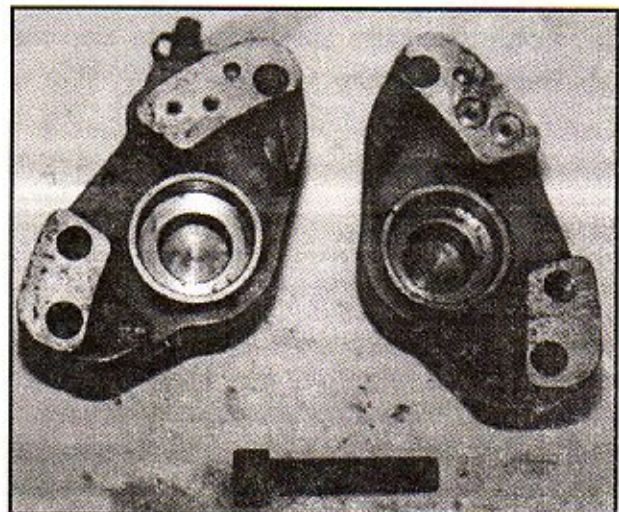


4. Remove brake pad retaining pin pads, and pad spacer.

**NOTE:** This is a spring pin. Do not spread apart farther than necessary to remove it.



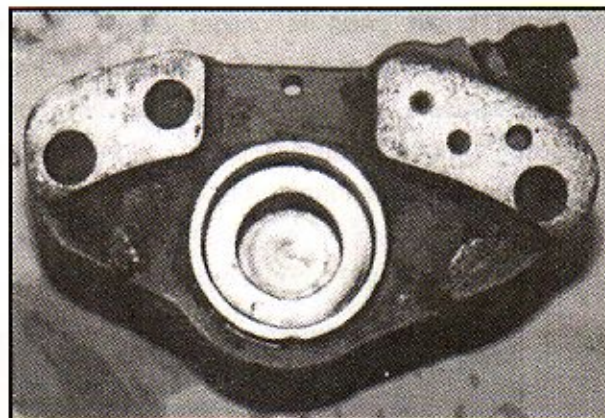
5. Remove screw and separate caliper halves and remove pistons with piston pliers.
6. Remove O-ring and clean O-ring grooves.
7. Clean disc, caliper body, and pistons with brake cleaner or alcohol.





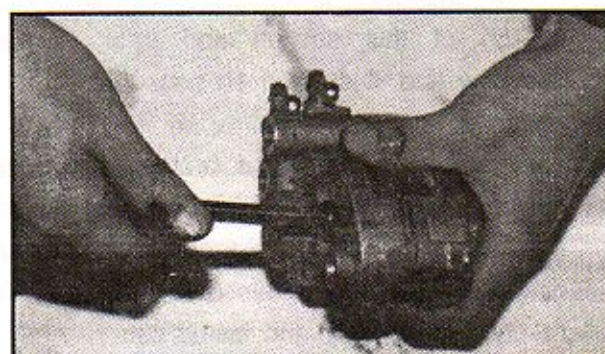
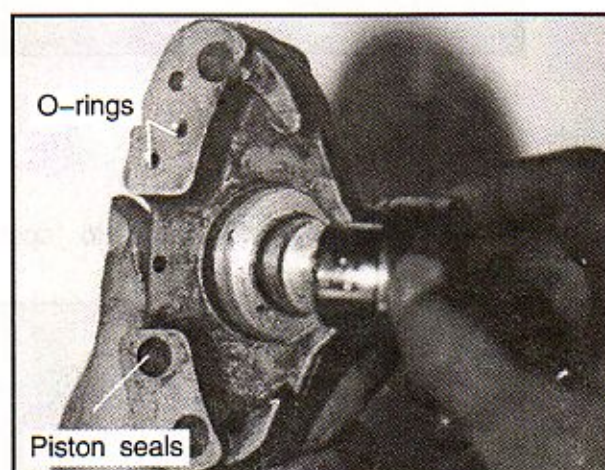
## REAR CALIPER REMOVAL/INSPECTION, CONT.

8. Inspect caliper piston bore for scratches, severe corrosion, or galling and replace if necessary.
9. Inspect surface of caliper piston for nicks, scratches or damage and replace if necessary.



## REAR CALIPER ASSEMBLY

1. Install new O-rings in caliper body (2 piston seals per caliper half). Be sure O-ring grooves are thoroughly cleaned of all residue, or piston may bind in bore. Apply brake fluid to pistons and install carefully with a twisting motion to ease assembly until fully seated.
2. Install new O-rings between caliper halves.
3. Carefully assemble caliper body, making sure O-rings are properly positioned in groove. Torque body screw evenly to 18 ft. lbs.



**Caliper Body Torque**

**18 ft. lbs. (25 Nm)**



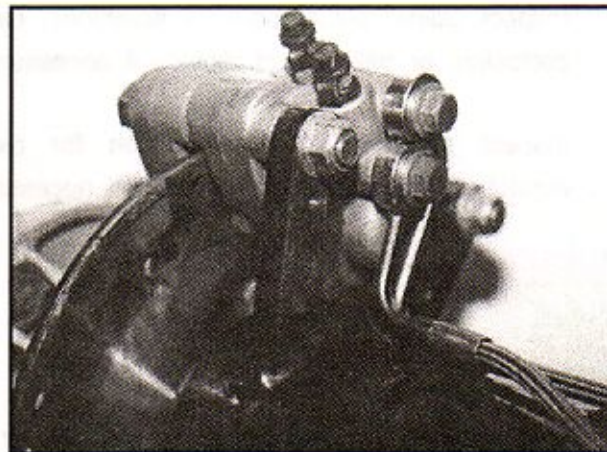
## BRAKES

### REAR CALIPER ASSEMBLY, CONT.

4. Install brake pads in caliper body with friction material facing each other. If equipped with a pad spacer, install the spacer between the pads. Install retaining pin through outer pad, pad spacer and inner pad.
5. Install caliper and torque mounting bolts.

#### Caliper Mounting Bolt Torque

18 ft. lbs. (25 Nm)

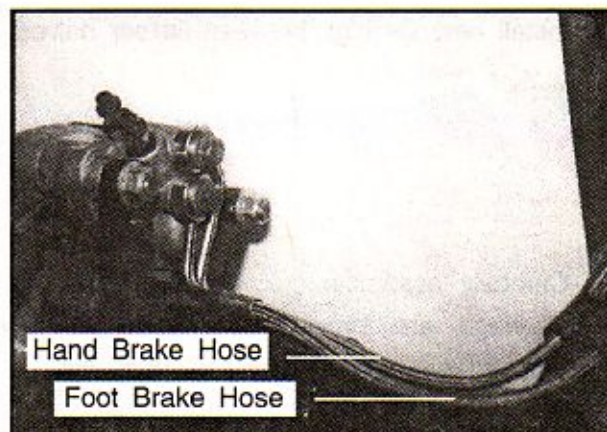


6. Install brake hose and tighten to specified torque.

#### Bolt Torque

15 ft. lbs. (21 Nm)

7. Follow bleeding procedure outlined on page 54 –55 of this section and refer to system overview and illustration on page 53.
8. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when lever is released. If the brake drags, re-check assembly and installation.



## REAR BRAKE DISC INSPECTION

1. Visually inspect disc for scoring, scratches, or gouges. Replace the disc if any deep scratches are evident.
2. Use a 0 –1" micrometer and measure disc thickness at 8 different points around perimeter of disc. Replace disc if worn beyond service limit.

### Brake Disc Thickness

New .177–.187" (4.496–4.750 mm)

Service Limit .167" (4.242 mm)

### Brake Disc Thickness Variance

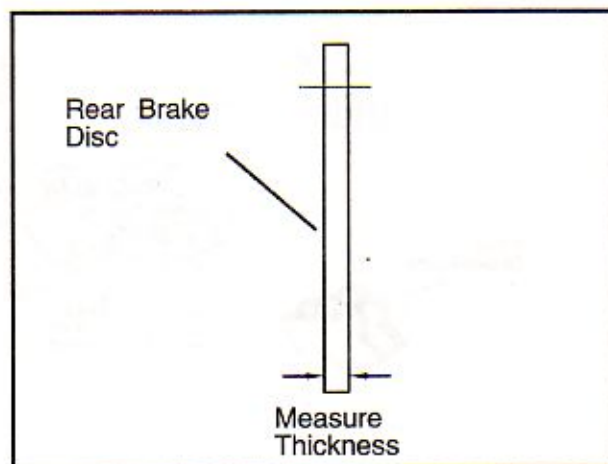
Service Limit .002" (.051 mm)

Difference between measurements

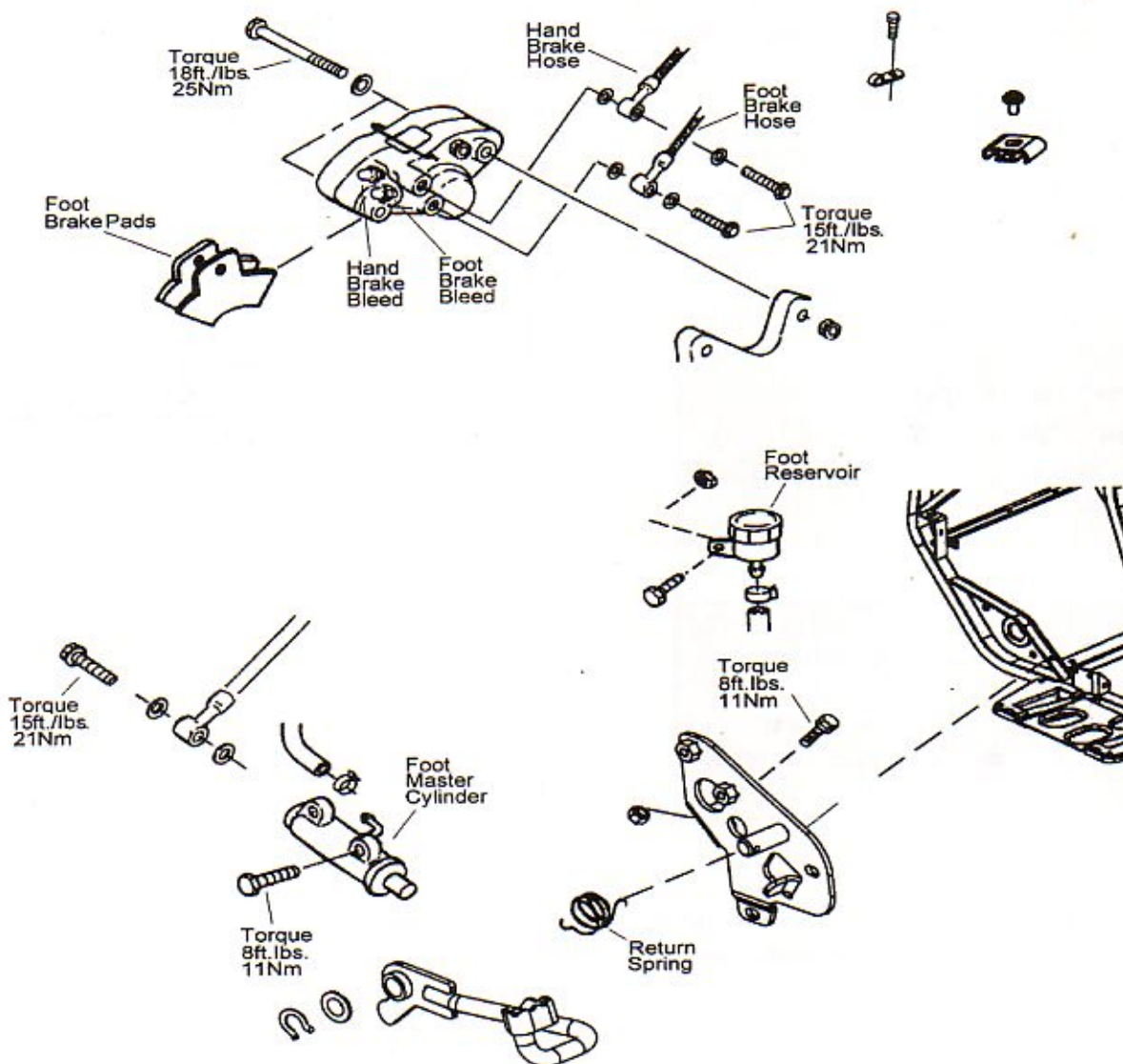
3. Mount dial indicator and measure disc runout. Replace the disc if runout exceeds specifications.

### Brake Disc Runout

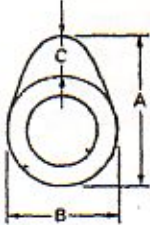

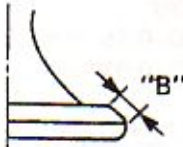
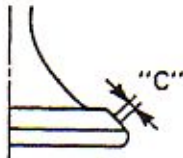
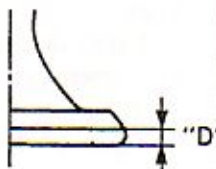
Service Limit .005" (.127 mm)



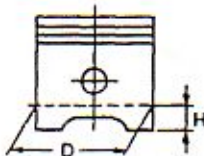
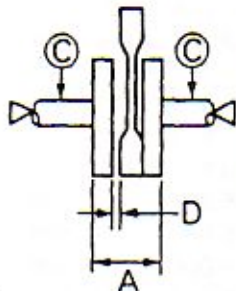




# MAINTENANCE SPECIFICATIONS ENGINE

Item	Standard	Limit
Cylinder head: Warp limit	...	0.03 mm
Cylinder: Bore size Out of round limit	70.000–70.005 mm ...	70.1 mm 0.03 mm
Camshaft: Cam dimensions Intake "A" "B" "C" Exhaust "A" "B" "C" Camshaft runout limit	 36.545–36.645 mm 30.021–30.121 mm 6.524 mm 36.547–36.647 mm 30.067–30.167 mm 6.48 mm ...	 36.54 mm 29.92 mm ... 36.45 mm 29.97 mm ... 0.03 mm
Cam chain Cam chain type/No. of links	DID SC-A-0404A SDH/104	...
Rocker arm/rocker armshaft: Rocker arm inside diameter Rocker shaft outside diameter Rocker arm-to-rocker armshaft clearance	 12.000–12.018 mm 11.981–11.9991 mm 0.009–0.012 mm	 12.03 mm 11.995 mm ...
Valve, Valve seat, Valve guide: Valve clearance (cold) Valve dimensions	 IN EX 0.08–0.12 mm 0.16–0.20 mm	 ... ...
 "A" head diameter  Face Width IN EX  "C" seat width IN EX  "D" margin thickness IN EX Stem outside diameter IN EX Guide inside diameter IN EX	 33.9–34.1 mm 28.4–28.6 mm 3.394–3.960 mm 3.394–3.960 mm 0.9–1.1 mm 0.9–1.1 mm 0.8–1.2 mm 0.8–1.2 mm 5.975–5.990 mm 5.960–5.975 mm 6.000–6.012 mm 6.000–6.012 mm	 ... ... ... ... ... ... ... ... 5.94 mm 5.92 mm 6.05 mm 6.05 mm



Item			Standard	Limit
Stem-to-guide clearance	IN EX		0.010–0.037 mm 0.025–0.052 mm ...	0.08 mm 0.1 mm 0.01 mm
Stem runout limit	IN		0.9–1.1 mm	1.6 mm
Valve seat width	EX		0.9–1.1 mm	1.6 mm
Valve spring:				
Free length (Inner)	IN/EX		38.1 mm	36.1 mm
(Outer)	IN/EX		36.93 mm	35.0 mm
Set length (valve closed)	(Inner) IN/EX		30.1 mm	...
	(Outer) IN/EX		31.6 mm	...
Compressed pressure	(Inner) IN/EX		7.8–9.0 kg	...
	(Outer) IN/EX		37.22–42.83 kg	...
Tilt limit (Inner)	IN/EX		...	2.5°/1.7mm
(Outer)	IN/EX		...	2.5°/1.7mm
Piston:				
Piston to cylinder clearance			0.02–0.04 mm	0.15mm
Piston size "D"			69.965–69.980 mm	...
Measuring point "H"			5 mm	...
Piston pin bore inside diameter			17.004–17.015 mm	17.045 mm
Piston pin outside diameter			16.991–17.000 mm	16.975 mm
Piston rings:				
Top ring:				
Type			Barrel	...
End gap (installed)			0.15–0.30 mm	0.45 mm
Side clearance (installed)			0.04–0.08 mm	0.12 mm
2nd ring:				
Type			Taper	...
End gap (installed)			0.30–0.45 mm	0.7 mm
Side clearance			0.03–0.07 mm	0.12 mm
Oil ring:				
End gap (installed)			0.2–0.7 mm	...
Crankshaft:				
				
Crank width "A"			59.95–60.00 mm	...
Runout limit "C"			0.03 mm	...
Big end side clearance "D"			0.35–0.85 mm	...

Item	Standard	Limit
Automatic centrifugal clutch:		
Clutch shoe thickness	3.0 mm	2.0 mm
Clutch housing inside diameter	135 mm	135.5 mm
Clutch shoe spring free length	28.1 mm	...
Weight outside diameter	20 mm	19.5 mm
Clutch-in revolution	2,100–2,700 r/min	...
V-belt:		
V-belt width	22.6 mm	21.0 mm
Carburetor:		
Type	CVK 1000-L06-0000	
I.D. mark	THV-052 <span style="border: 1px solid black; padding: 0 2px;">A</span>	...
Ventury outside diameter	Ø30	...
Main jet (M.J)	#128	...
Jet needle (M.A.J)	N425-7AD01	...
Throttle valve size (J.N)	10°	...
Pilot air jet (Th.V)	Ø1.2	...
Needle jet (P.A.J.1)	Ø2.1	...
Pilot outlet (N.J)	Ø0.9	...
Pilot jet (P.O)	#40	...
Bypass (B.P)	Ø0.7x4	...
Pilot screw (P.S)	1*3/8 ± 3/4	...
Valve seat size (V.S)	Ø1.2	...
Starter jet 1 (G.S.1)	#42	...
Starter jet 2 (G.S.2)	Ø0.9	...
Float height (F.H)	>3.0	...
Engine idle speed	1,450–1,550 r/min	...
Intake vacuum	220–260 mmHg	...
Oil pump:		
Type	Trochoid type	
Tip clearance	0.1–0.34 mm	0.4 mm
Side clearance	0.013–0.036 mm	0.15 mm
Housing and rotor clearance	0.04–0.09 mm	0.15 mm



## ENGINE





Item	Standard	Limit
Radiator:		
Type	Cooling fin with electric fan	...
Width/height/thickness	140/238/24 mm	...
Radiator cap opening pressure	110–140kPa (1.1–1.4kg/cm <sup>2</sup> , 1.1–1.4bar)	...
Radiator capacity	1.4 L	...
Reservoir tank capacity	0.35 L	...
Thermostatic valve:		
Valve opening temperature	80.5–83.5°C	
Valve full open temperature	95°C	
Valve full open lift	3 mm	

# TIGHTENING TORQUES ENGINE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m·kg	
Oil check bolt	—	M6	1	7	0.7	
Exhaust pipe stud bolt	—	M8	2	13	1.3	
Spark plug	—	M12	1	18	1.8	
Cam sprocket cover	Bolt	M6	2	10	1.0	
Cylinder head and cylinder	Nut	M8	4	22	2.2	
Cylinder head and cylinder (Cam chain side)	Bolt	M6	2	10	1.0	
Valve cover	Bolt	M6	5	10	1.0	
Rotor	Nut	M16	1	80	8.0	
Valve adjuster locknut	Nut	M6	2	14	1.4	
Cam shaft bearing stopper	Bolt	M6	2	8	0.8	
Cam sprocket	Bolt	M10	1	60	6.0	
Cam chain tensioner (Body)	Bolt	M6	2	10	1.0	
(Plug)	Bolt	M8	1	8	0.8	
Guide stopper 2	Bolt	M6	1	10	1.0	
Water pump housing cover	Bolt	M6	3	10	1.0	
Hose joint	—	M6	2	7	0.7	
Thermostatic valve cover	Bolt	M6	2	10	1.0	
Filler neck supporting	Bolt	M5	1	5	0.5	
Oil pump	Screw	M6	2	7	0.7	
Oil pump cover	Bolt	M3	1	1	0.1	
Drain plug	Bolt	M35	1	32	3.2	
Carburetor joint	Bolt	M6	2	10	1.0	
Carburetor joint and carburetor	Nut	M6	2	10	1.0	
Fuel pump	—	M6	2	10	1.0	
Exhaust pipe assembly	Nut	M8	2	20	2.0	
Crankcase (left and right)	Bolt	M6	9	10	1.0	
Drain bolt	Bolt	M8	1	22	2.2	
Oil filler	Bolt	M14	1	3	0.3	
Crankcase cover (left)	Bolt	M6	11	10	1.0	
Crankcase filter cover	—	M6	3	7	0.7	
Crankcase cover protector	Bolt	M6	2	7	0.7	
Magnet cover	—	M6	10	10	1.0	

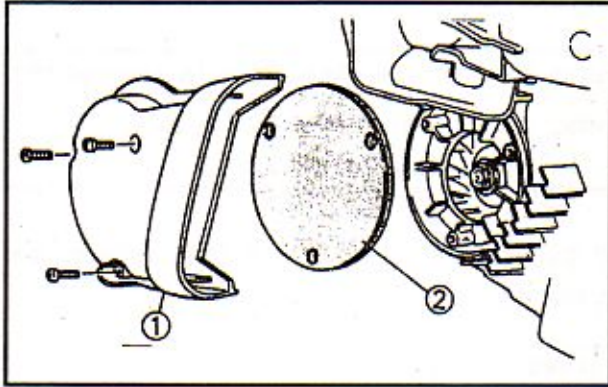


# ENGINE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m.kg	
Cover (oil pump)	Bolt	M6	2	12	1.2	
Timing check plug	Plug	M16	1	8	0.8	
One way clutch	—	M8	3	30	3.0	
Clutch housing	Bolt	M14	1	60	6.0	
Grease stopper (Primary sheave)	—	M4	4	3	0.3	 
Primary fixed sheave	—	M14	1	60	6.0	
Clutch carrier assembly	—	M36	1	90	9.0	
Stator	—	M5	3	7	0.7	
Pick up coil	—	M5	2	7	0.7	
Starter motor	Bolt	M6	2	10	1.0	
Thermo switch	—	M16	1	23	2.3	
Thermo unit	—	Pt1/8	1	8	0.8	

**ENGINE****VALVE CLEARANCE ADJUSTMENT****NOTE:**

Valve clearance adjustment should be made with the engine cool, at room temperature. When the valve clearance is to be measured or adjusted, the piston must be at Top Dead Center (T.D.C.) on the compression stroke.

**1.Remove:**

- Side panels
- Tail cover
- Fuel tank

**2.Remove:**

- Crankcase filter cover①
- Crankcase filter cover seal
- Crankcase filter element②

**3.Remove:**

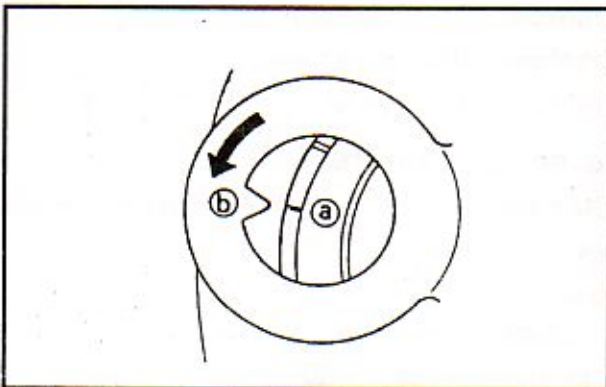
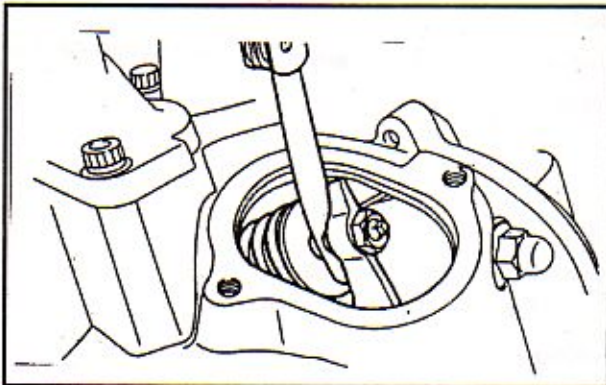
- Spark plug
- Valve cover (intake side)
- Valve cover (exhaust side)

**4.Remove:**

- Timing check plug

**5.Measure:**

- Valve clearance
- Out of specification → Adjust.



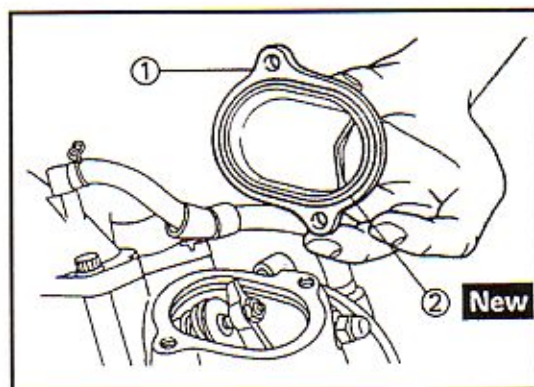
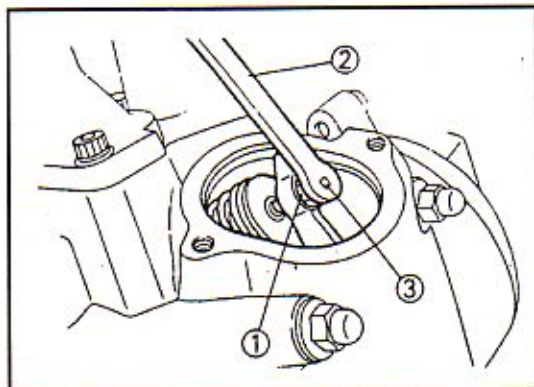
**Valve clearance (cold):**  
 Intake valve 0.08–0.12mm  
 Exhaust valve 0.16–0.20mm

**Measurement steps:**

- Rotate the primary fixed sheave counter-clockwise to align the slit ① on the rotor with the stationary pointer ② on the crankcover 1 when the piston is Top Dead Center (TDC).
- Measure the valve clearance by using a feeler gauge.

Out of specification → Adjust clearance.





## 6. Adjust

- Valve clearance

\*\*\*\*\*


### Adjustment steps:

- Loosen the locknut ①.
- Turn the adjuster ③ in or out with the valve adjusting tool ② until specified clearance is obtained.

**Turning in → Valve clearance is decreased.**

**Turning out → Valve clearance is increased.**

- Hold the adjuster to prevent it from moving and tighten the locknut.


 14Nm(1.4m·kg)

- Measure the valve clearance.
- If the clearance is incorrect, repeat above steps until specified clearance is obtained.

\*\*\*\*\*


## 7. Install:

- Valve cover (intake side) ①
- O-ring ②

 10Nm(1.0m·kg)

## 8. Install:

- Valve cover (exhaust side)

 10Nm(1.0m·kg)

- O-ring


- Spark plug

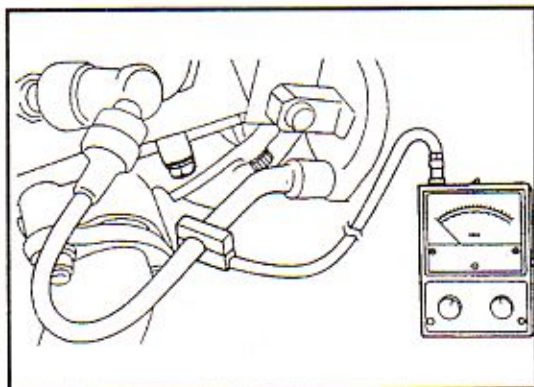
 18Nm(1.8m·kg)

- Timing check window screw.

- Crankcase filter clemetnt

- Crankcase filter cover seal

- Crankcase filter cover  7Nm(0.7m·kg)

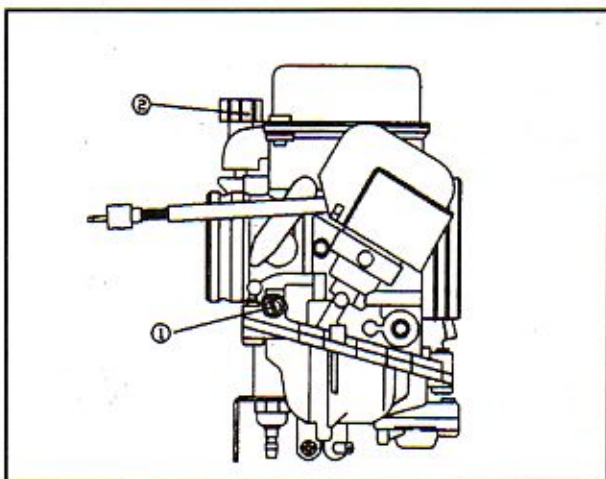


## IDLING SPEED ADJUSTMENT

1. Start the engine and let it warm up for several minutes.

### 2. Attach:

- Inductive tachometer to the spark plug lead.



## 3. Check:

- Engine idling speed  
Out of specification → Adjust.



**Engine idling speed:**  
1,450–1,550 r/min

## 4. Adjust:

- Engine idle speed

**Adjustment steps:**

- Turn the pilot screw ① until it is lightly seated.
- Turn the pilot screw out by the specified number of turns.



**Pilot screw:**  
 $1\frac{3}{8}$  turn out

- Turn the throttle stop screw ② in or out until the specified idling speed is obtained.

**Turning in → Idling speed is increased.**

**Turning out → Idling speed is decreased.**

## 5. Adjust:

- Throttle cable free play

Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.



## SPARK PLUG INSPECTION

### 1. Remove:

- Spark plug cap
- Spark plug

### CAUTION:

Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinder.

### 1. Check:

- Spark plug type  
Incorrect → Replace.



**Standard spark plug:**  
**DR8EA (NGK)**

### 2. Inspect:

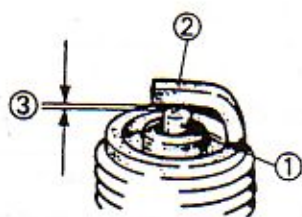
- Electrode ①  
Wear/damage → Replace.
- Insulator ②  
Abnormal color → Replace.  
Normal color is a medium-to-light tan color.

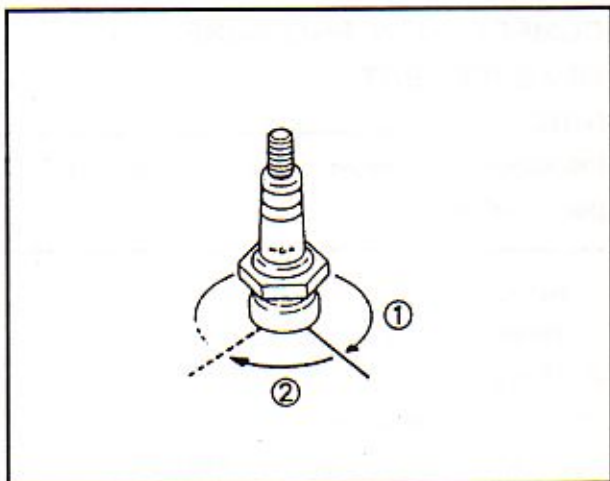
### 2. Clean:

- Spark plug  
(with spark plug cleaner or wire brush)

### 3. Measure:

- Spark plug gap ③  
(with a wire gauge)  
Out of specification → Adjust gap.





**Sprak plug gap:**  
**0.6–0.7 mm**

6. Install:

• Spark plug

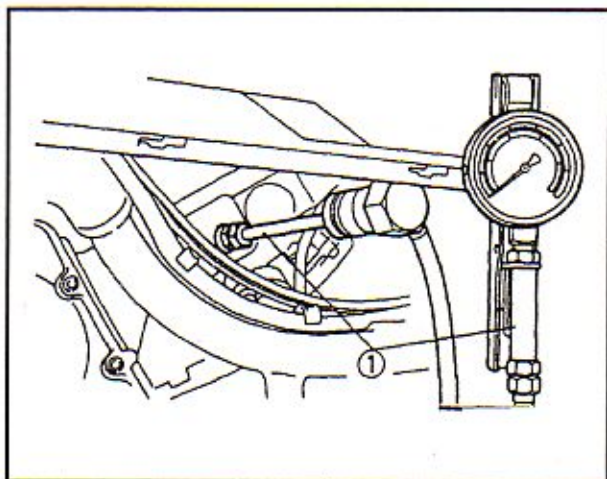


**18Nm(1.8m·kg)**

**NOTE:**

Before installing a spark plug, clean the gasket surface and plug surface.





## COMPRESSION PRESSURE MEASUREMENT

### NOTE:

Insufficient compression pressure will result in performance loss.


1. Remove:
  - Relate to ATV.
2. Check:
  - Valve clearance
  - Out of specification → Adjust.Refer to "VALVE CLEARANCE ADJUSTMENT" section.
3. Start the engine and let it warm up for several minutes.
4. Turn off the engine.
5. Remove:
  - Spark plug

### CAUTION:

Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

6. Attach:
  - Compression gauge ①
7. Measure
  - Compression pressure
  - If it exceeds the maximum pressure allowed → Inspect the cylinder head, valve surfaces and piston crown for carbon deposits.
  - If it is below the minimum pressure → Squirt a few drops of oil into the affected cylinder and measure again.
  - Follow the table below.

Compression pressure (With oil applied into cylinder)	
Reading	Diagnosis
Higher than without oil	Worn or damaged pistons
Same as without oil	Possible defective ring(s), valves, cylinder head gasket or piston → Repair.

	Compression pressure (at sea level):
	Standard:
	1,400 kPa (14Kg/cm <sup>2</sup> , 14 bar)
	Minimum:
	1,120 kPa (11.2 kg/cm <sup>2</sup> , 11.2 bar)

#### Measurement steps:

- Crank the engine with the throttle wide open until reading on the compression gauge stabilizes.

#### WARNING

Before cranking the engine, ground all spark plug leads to prevent sparking.

#### 8. Install:

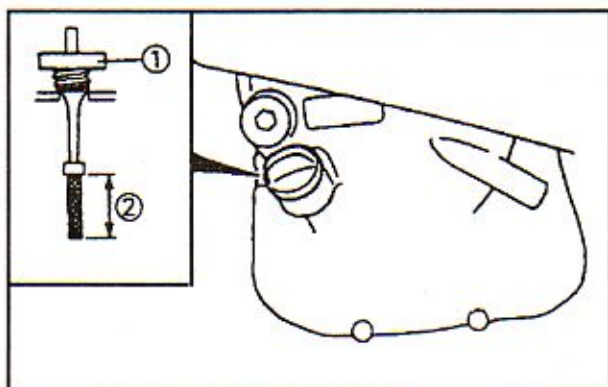
- Spark plug  18Nm(1.8m·kg)

#### 9. Install:

- Side panels  
Relate to ATV

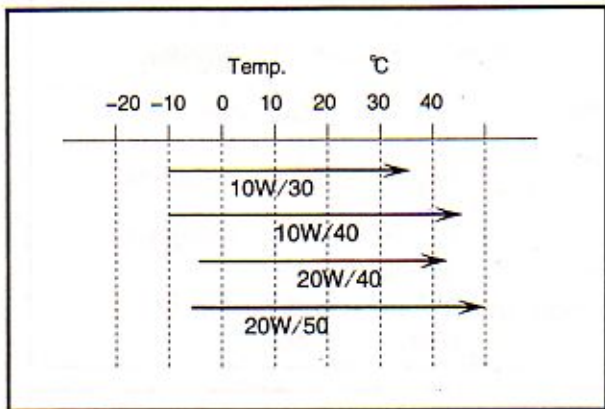
### ENGINE OIL LEVEL INSPECTION

1. Relate to ATV
2. Start the engine and let it warm up for a few minutes.
3. Turn off the engine.
4. Inspect: (Do not thread dipstick in)
  - Engine oil level  
Oil level should be between maximum ① and minimum ② marks.  
Oil level is below the minimum mark → Add oil up to the proper level.





# ENGINE



## RECOMMENDED ENGINE OIL

Refer to the chart for selection of the oils suited to the atmospheric temperature.



**API STANDARD:**  
API SG or higher grade

### CAUTION:

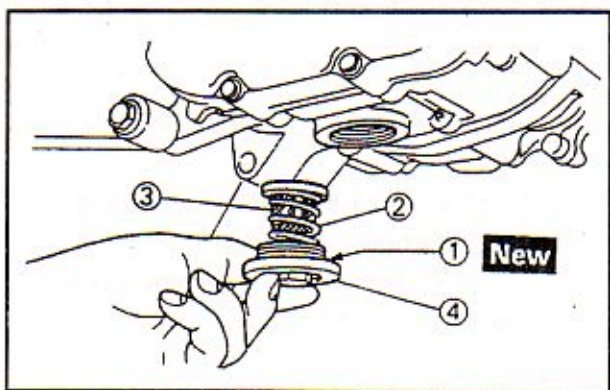
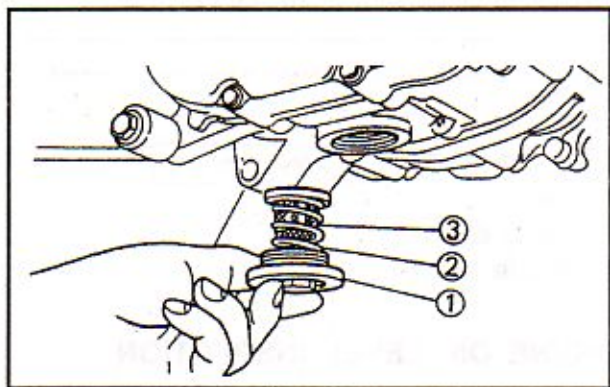
- Do not put in any chemical additives or use oils with a grade of CD or higher.
- Be sure not to use oils labeled "ENERGY CONSERVING II" or higher. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Be sure no foreign material enters the crankcase.

5. Start the engine and let it warm up for a few minutes.

6. Turn off the engine.

### NOTE:

Wait a few minutes until the oil settles before inspecting the oil level.




## ENGINE OIL REPLACEMENT

1. Start the engine and let it warm up for several minutes.

2. Turn off the engine and place an oil pan under the engine.

3. Remove:

- Oil filler plug
- Drain plug ①  32Nm(3.2m·kg)
- Compression spring ②
- Oil strainer ③
- O-ring

Drain the crankcase of its oil.

4. Install:

- O-ring ① **NEW**
- Compression spring ②
- Oil strainer ③
- Drain plug ④
- Oil filler plug

### NOTE:

Check the drain plug O-ring. If damaged, replace it with a new one.

## 5. Fill:

- Crankcase



Oil quantity:

1.4L

## 6. Check:

- Engine oil level

Refer to "ENGINE OIL LEVEL

INSPECTION" section.

**ENGINE OIL PRESSURE INSPECTION**

## 1. Relate to ATV

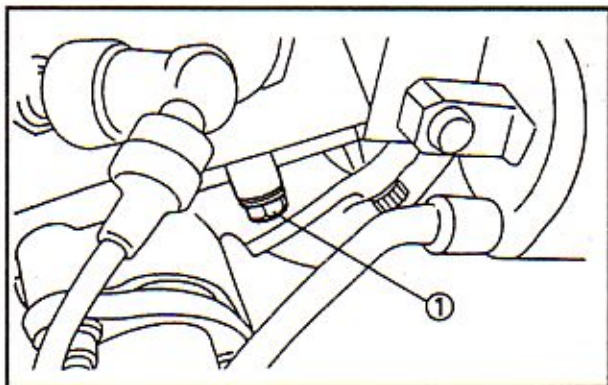
## 2. Inspect:

- Oil pressure

\*\*\*\*\*


**Inspection steps:**

- Slightly loosen the oil check bolt ①.
- Start the engine and keep it idling until the oil begins to seep from the oil check bolt. If no oil comes out after one minute, turn the engine off so it will not seize.
- Check oil passages and oil pump for damage or leakage.





- Start the engine after solving the problem(s), and recheck the oil pressure.
- Tighten the oil check bolt to specification.

 10Nm(1.0m·kg)

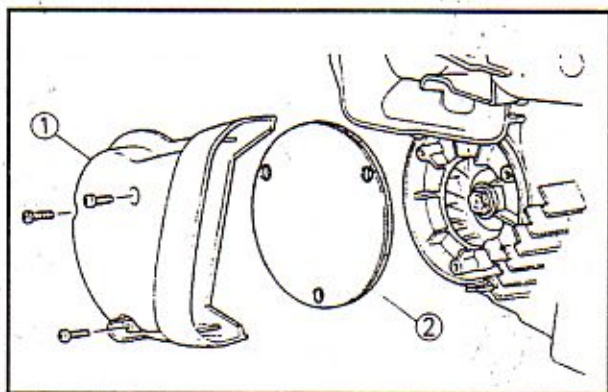
## **CAUTION:**

- Start the engine and check the oil pressure with the oil check bolt loosened.
- Do not apply at high speeds more than specified when checking the pressure.

## **NOTE:**

Wipe any spilled oil off the engine.

\*\*\*\*\*



## CRANKCASE FILTER CLEANING

### 1.Remove:

- Crankcase filter cover ①
- Crankcase filter cover seal
- Crankcase filter element ②

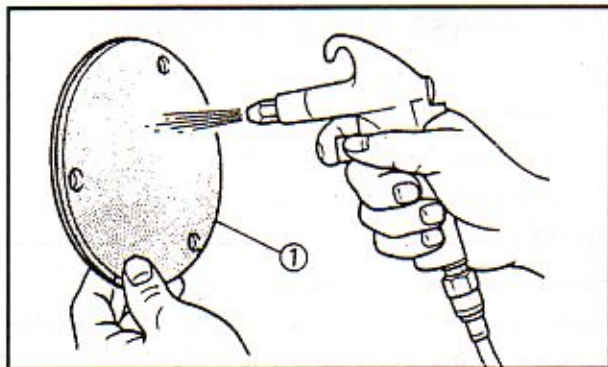
### NOTE:

When installing the element in its case, be sure its sealing surface matches the sealing surface of the case so there is no air leak.

### 2.Inspect:

- Crankcase filter element
- Damaged → Replace.





### CAUTION:

This element is a dry type.

Be careful not to stain with grease or water.


#### 3.Clean:

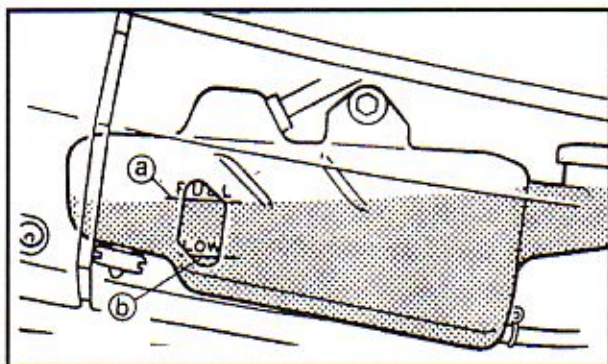
- Crankcase filter element ①

Blow out the dust in the element from the outer surface using compressed air.

#### 4.Install:

- Crankcase filter element
- Crankcase filter cover seal
- Crankcase filter cover

 7Nm(0.7m·kg)



## COOLANT LEVEL INSPECTION

#### 1.Relate to ATV.

#### 2.Inspect:

- Coolant level

Coolant level should be between the maximum (a) and minimum (b) marks.

Coolant level is below the "LOWER" level line  
→ Add soft water (tap water) up to the proper level.

### CAUTION:

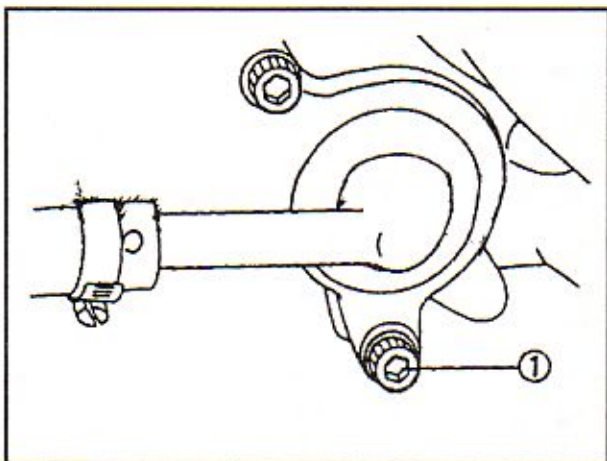
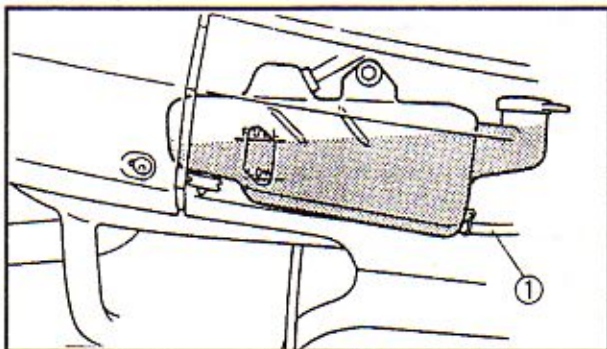
Hard water or salt water is harmful to engine parts. Use only distilled water if soft water is not available. If you use tap water, make sure it is soft water.

3.Start the engine and let it warm up for several minutes.

4.Turn off the engine and inspect the coolant level again.

### NOTE:

Wait a few minutes until the coolant settles before inspecting the coolant level.



## COOLANT REPLACEMENT

### 1.Remove:

Relate to ATV

### 2.Remove:

·Hose ① (reservoir tank)

Drain the reservoir tank of its coolant.

### 3.Remove:

·Drain bolt ①

·Radiator cap

Open the front trunk, remove the cover, slowly loosen to remove the radiator cap and drain the coolant.

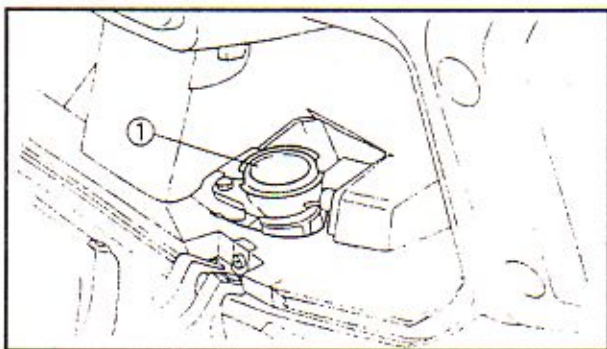
## ⚠ WARNING

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

Place a thick rag or a towel over the radiator cap. Slowly rotate the cap counterclockwise toward the detent. This allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

## NOTE:

·Remove the radiator cap after removing the drain bolt.

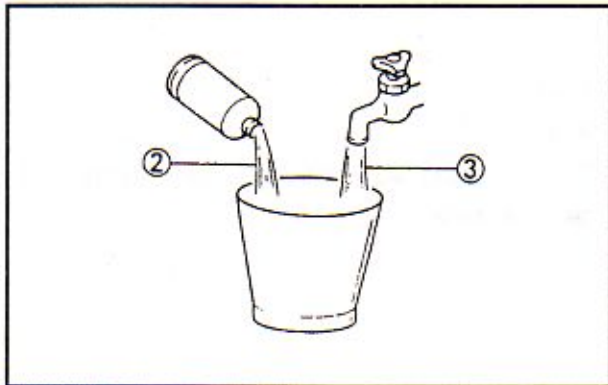
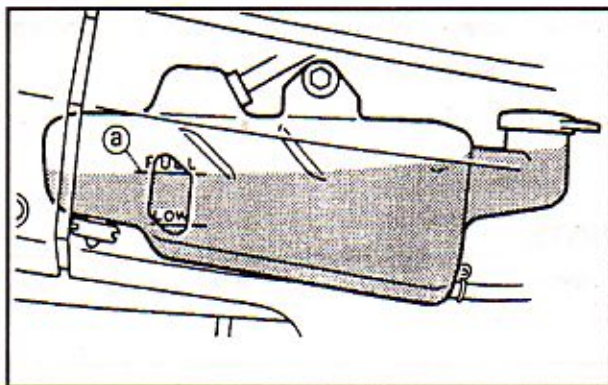
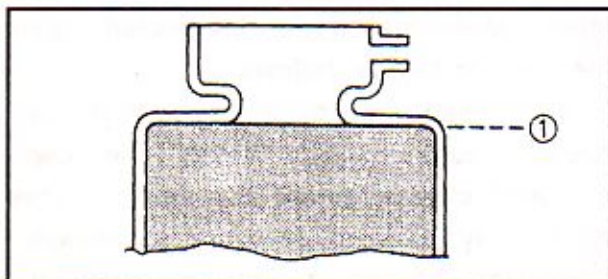
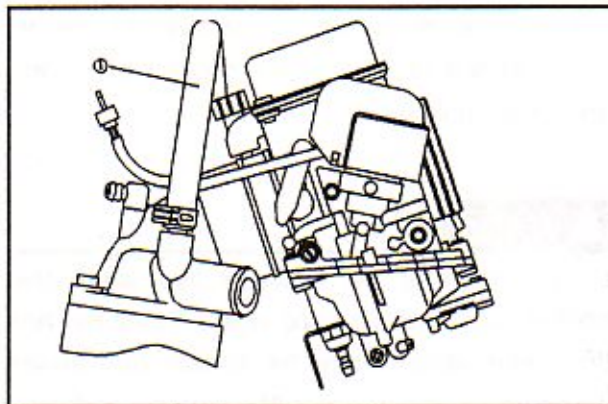
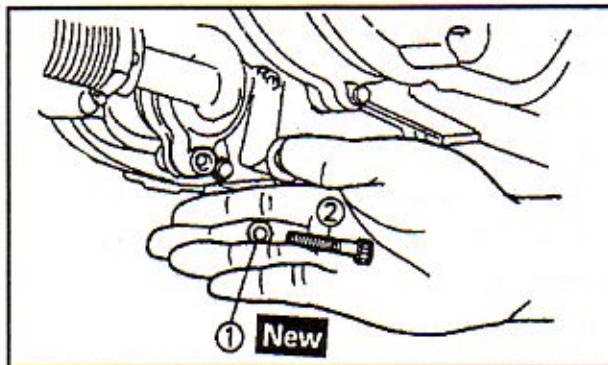


### 4.Clean:

·Radiator

Fill soft water into the filler neck support ① (reservoir tank).





## 5.Install:

- Gasket ① **NEW**
- Drain bolt ②  10Nm(1.0m·kg)

## 6.Loosen:

- Hose ①

## 7.Connect:

- Hose (reservoir tank)

## 8.Fill:

- Radiator  
(to specified level ①)  
Fill the coolant slowly, until the coolant comes out from the head hose.
- Reservoir tank  
(to maximum level ②)



Recommended coolant:  
High quality ethylene glycol  
anti-freeze containing  
corrosion inhibitors for  
aluminium engine.



Coolant ② and water ③  
(soft water):  
Mixed ratio: 50%/50%  
Total amount:  
1.4L  
Reservoir tank capacity:  
0.35L

\*\*\*\*\*

## Handling notes for coolant:

Coolant is potentially harmful and should be handled with special care.

**⚠ WARNING**

- If coolant splashes in your eyes:  
thoroughly wash your eyes with water and consult a doctor.
- If coolant splashes on your clothes:  
quickly wash it away with water and then with soap and water.
- If coolant is swallowed:  
vomit immediately and see a physician.

---

**CAUTION:**

- Hard water or salt water is harmful to engine parts. Use only distilled water if soft water is not available.
- If you use tap water, make sure it is soft water.
- Do not use water containing impurities or oil.
- Take care that no coolant splashes onto painted surfaces. If it does, wash them immediately with water.
- Do not mix different types of ethylene glycol antifreeze containing corrosion inhibitors for aluminium engines.

**9.Tighten:**

- Hose

Fill the coolant slowly to the specified level.

**10.Install:**

- Radiator cap

11.Start the engine and let it warm up for several minutes.

12.Stop the engine and inspect the level.

Refer to "COOLANT LEVEL INSPECTION" section.

**NOTE:**

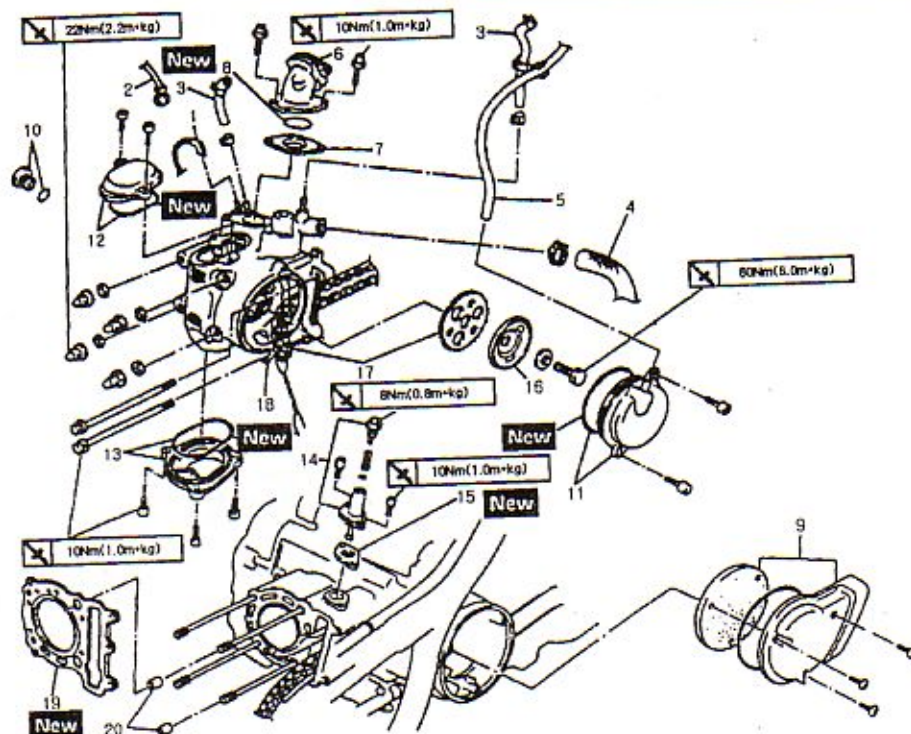
Wait a few minutes until the coolant settles before inspecting the coolant level.

**13.Install:**

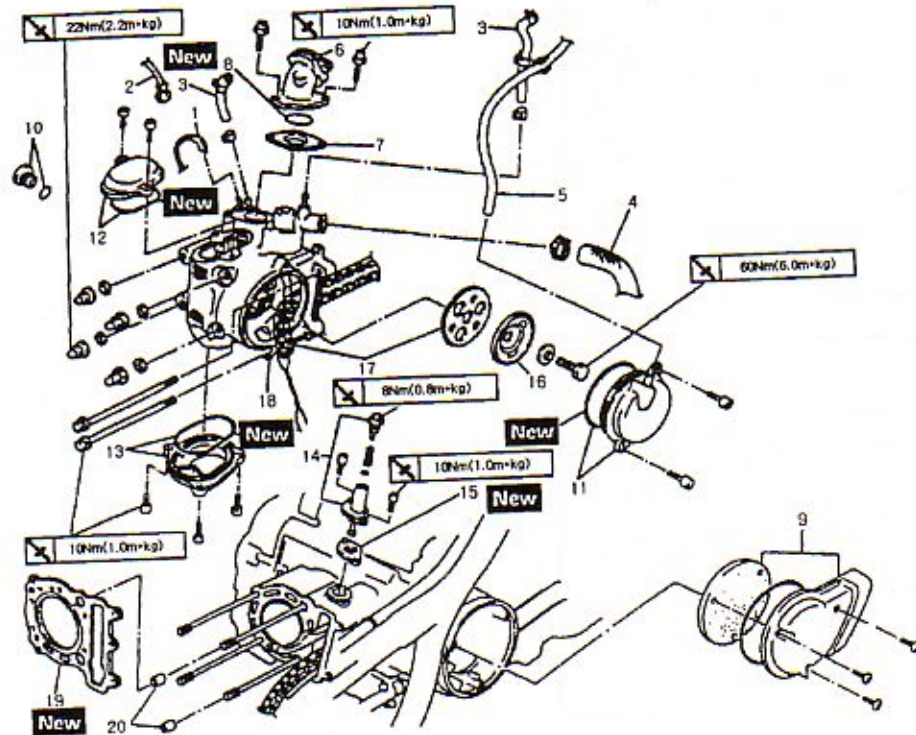
RELATE TO ATV



## CYLINDER HEAD

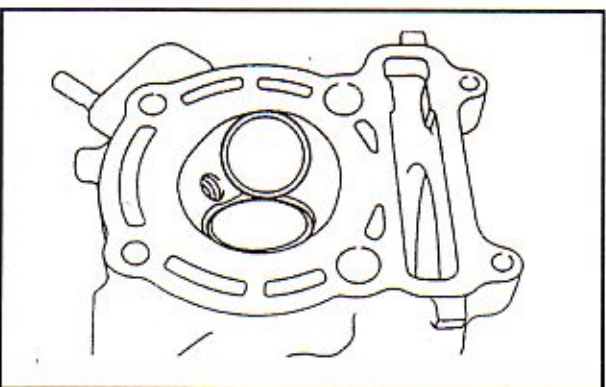
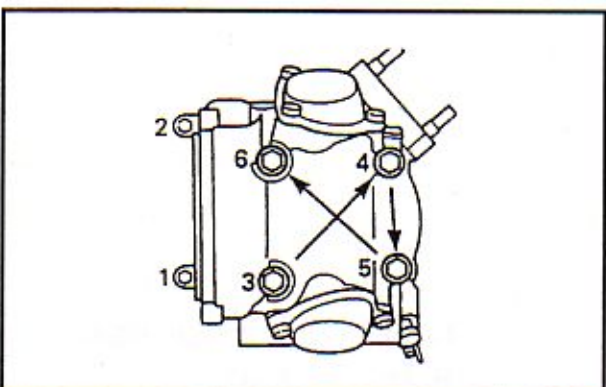
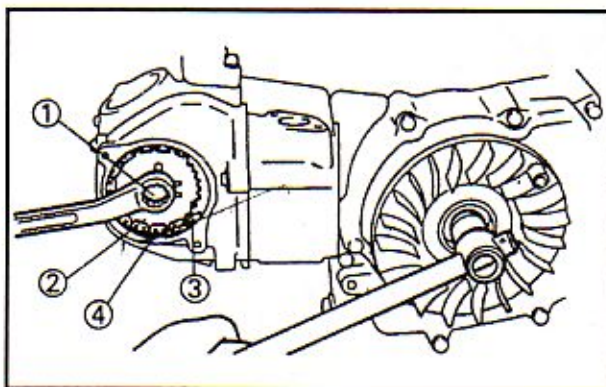
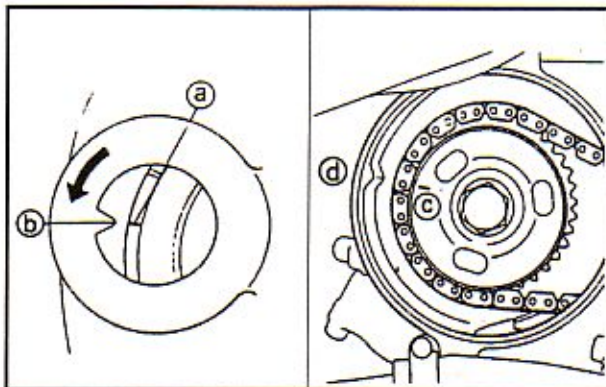


Order	Job name/Part name	Q'ty	Remarks
	Cylinder head removal		Remove the parts in order.
	Drain the coolant.		
	Side panel		Refer to the "COVER AND PANELS" section.
	Footrest board		
	Fuel tank		
	Carburetor		
1	Thermo unit lead	1	Refer to "CARBURETOR" section.
2	Plug cap	1	
3	Crankcase breather hose	2	
4	Outlet hose (cylinder head)	1	
5	Breather hose (crankcase)	1	
6	Carburetor joint	1	
7	Joint	1	
8	O-ring	2	



Order	Job name/Part name	Q'ty	Remarks
9	Crankcase filter cover/seal/element	1/1/1	Refer to "CYLINDER HEAD REMOVAL AND INSTALLATION" section.
10	Plug/O-ring	1/1	
11	Cam sprocket cover/O-ring	1/1	
12	Valve cover (intake side)/O-ring	1/1	
13	Valve cover (exhaust side)/O-ring	1/1	
14	Timing chain tensioner assembly	1	
15	Timing chain tensioner gasket	1	
16	Breather plate	1	
17	Cam sprocket/Timing chain	1/1	
18	Cylinder head	1	
19	Cylinder head gasket	1	
20	Dowel pin	2	
			Reverse the removal procedure for installation.





## CYLINDER HEAD REMOVAL

### 1. Align:

- "I" mark (a) on the rotor

(with stationary pointer (b) on the crankcase cover)

### NOTE:

Turn the primary sheave counterclockwise with a wrench and align the "I" mark (c) with the cylinder head match mark (d) when the piston is at TDC on the compression stroke.

### 2. Loosen:

- Bolt (1)

### 3. Remove:

- Timing chain tensioner assembly
- Timing chain tensioner gasket

### 4. Remove:

- Breather plate (2)
- Cam sprocket (3)
- Timing chain (4)

### NOTE:

- Fasten a safety wire to the timing chain to prevent it from falling into the crankcase.
- Remove the bolt (1) while holding the rotor mounting bolt with a wrench.

### 5. Remove:

- Cylinder head

### NOTE:

- Loosen the nuts in their proper loosening sequence.
- Start by loosening each nut 1/2 turn until all are loose.

## CYLINDER HEAD INSPECTION:

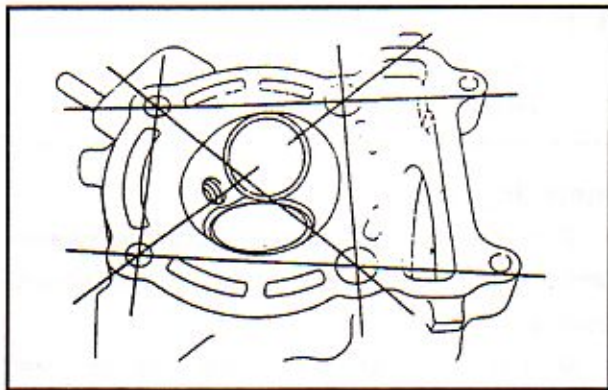
### 1. Eliminate:

- Carbon deposits  
(from combustion chambers)  
Use a rounded scraper.

### NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug threads
- Valve seats



## 2. Inspect:

- Cylinder head
- Scratches/damage → Replace.

## 3. Measure:

- Cylinder head warpage
- Out of specification → Resurface.



**Cylinder head warpage:**  
Less than 0.03 mm

### Warpage measurement and resurfacement steps:

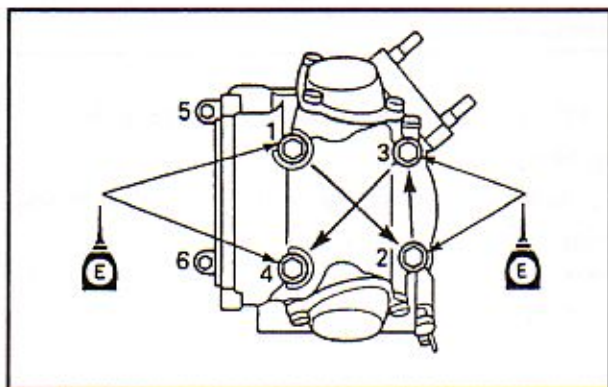
- Place a straight edge and a feeler gauge across the cylinder head.
- Measure the warpage.

If the warpage is out of specification, resurface the cylinder head.

- Place a 400 ~ 600 grit wet abrasive paper on the surface plate, and resurface the head using a figure eight sanding pattern.

**NOTE:**

Rotate the cylinder head several times for an even resurfacement.



### CYLINDER HEAD INSTALLATION

## 1. Install:

- Gasket (cylinder head)
- Dowel pins
- Cylinder head

**NEW**

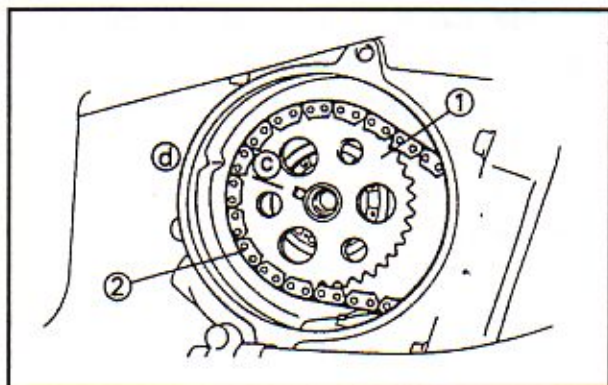
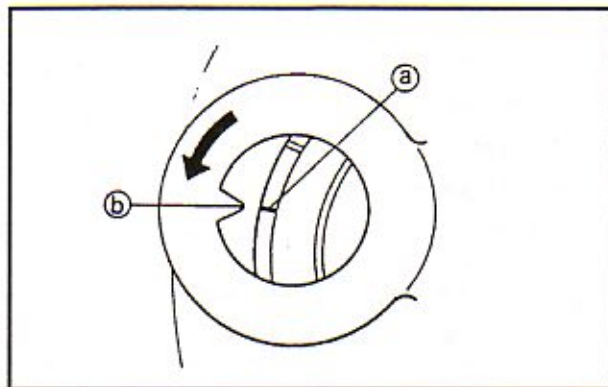
**NOTE:**

- Apply engine oil onto the nut threads.
- Tighten the nuts in a crisscross pattern.

## 2. Tighten:

- Nuts (cylinder head) 22Nm(2.2m·kg)
- Bolts (cylinder) 10Nm(1.0m·kg)





## 3. Install:

- Cam sprocket ①
- Timing chain ②

## Installing steps:

- Turn the primary sheave counterclockwise until the TDC mark ① matches the stationary pointer ②.
- Align the "I" mark ③ on the cam sprocket with the stationary pointer ④ on the cylinder head.
- Fit the timing chain onto the cam sprocket and install the cam sprocket on the camshaft.

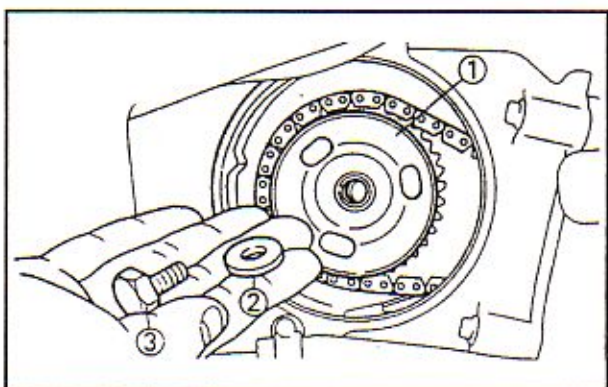
## NOTE:

- When installing the cam sprocket, keep the timing chain as tense as possible on the exhaust side.
- Align the match mark ③ on the cam sprocket with the stationary pointer ④ on the cylinder head.
- Align the pin on the camshaft with the slot in the cam sprocket.

## CAUTION:

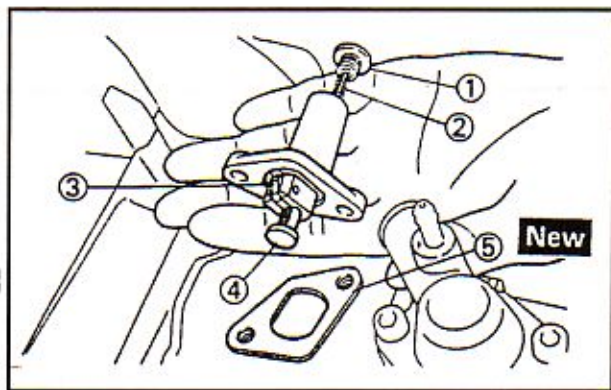
Do not turn the crankshaft during installation of the camshaft. Damage or improper valve timing will result.

- While holding the camshaft, temporarily tighten the bolts.
- Remove the safety wire from the timing chain.



## 4. Install:

- Breather plate ①
- Plane washer ②




## 5. Install:


- Timing chain tensioner

**Installing steps:**

- Remove the tensioner cap bolt ① and springs ②.
- Release the timing chain tensioner one-way cam ③ and push the tensioner rod ④ all the way in.
- Install the tensioner with a new gasket ⑤ onto the cylinder.
- Install the springs ② and cap bolt ①.
- Tighten the bolt (with gasket) to the specified torque.


Bolt (chain tensioner)  10Nm(1.0m·kg)

Cap bolt (timing chain tensioner)

 8Nm(0.8m·kg)

## 6. Tighten:

- Bolt (cam sprocket)

 60Nm(6.0m·kg)

## 7. Check:

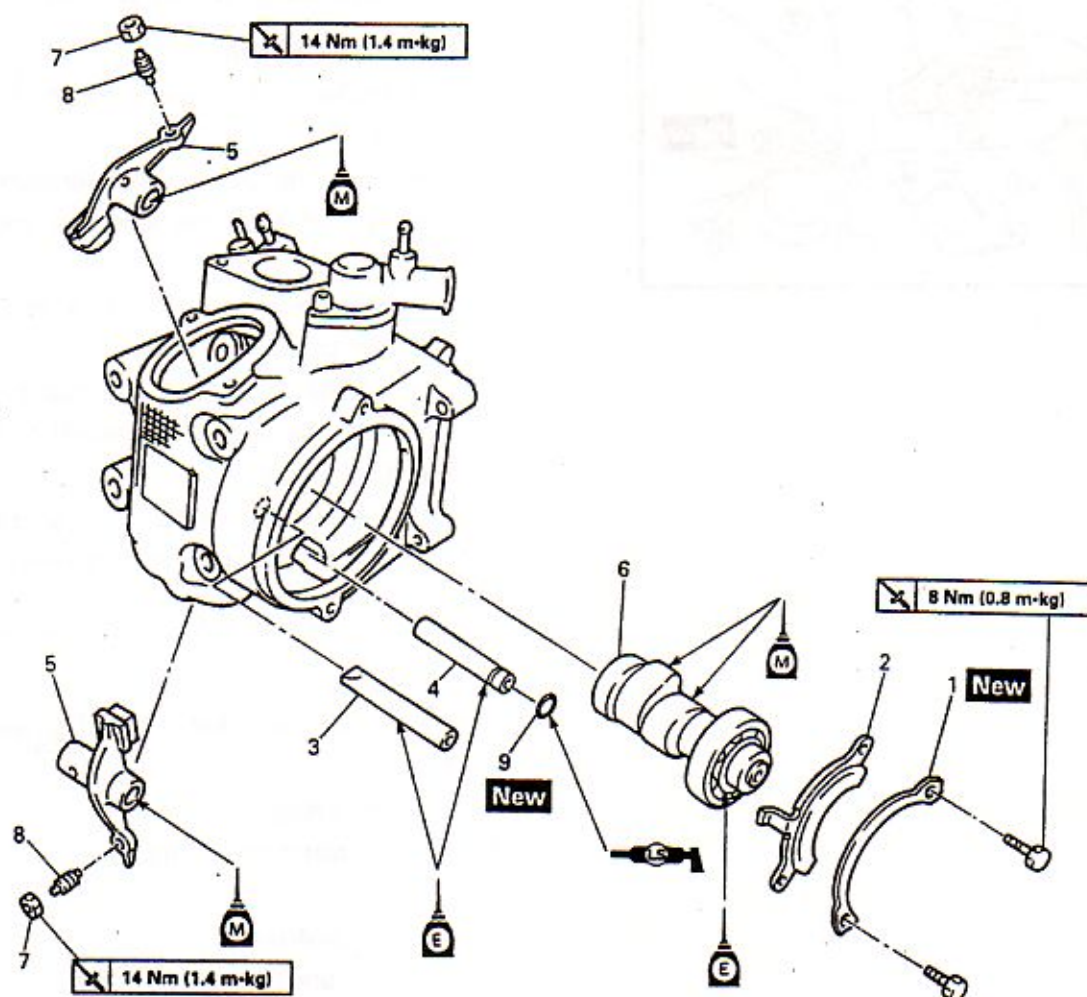
- Valve timing
- Out of alignment → Adjust.

## 8. Check:

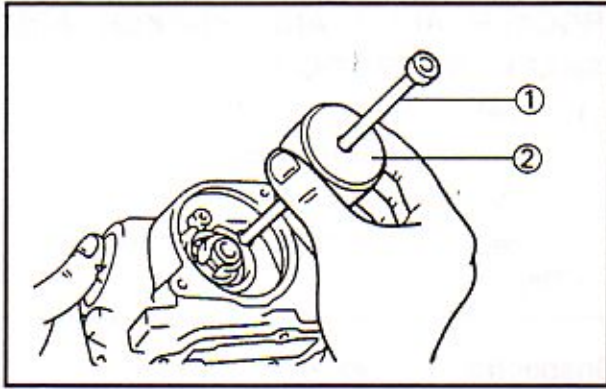
- Valve clearance
- Out of specification → Adjust.
- Refer to the "VALVE CLEARANCE ADJUSTMENT" section.



## CAMSHAFT AND ROCKER ARMS



Order	Job name/Part name	Q'ty	Remarks
	Camshaft and rocker arms removal		Remove the parts in order.
	Cylinder head		Refer to "CYLINDER HEAD" section.
1	Lock washer	1	Refer to "ROCKER ARM AND ROCKER SHAFT REMOVAL AND INSTALLATION" section..
2	Plate	1	
3	Rocker arm shaft (intake)	1	
4	Rocker arm shaft (exhaust)	1	
5	Rocker arm	2	Refer to "CAMSHAFT INSTALLATION" section.
6	Camshaft	1	
7	Locknut	2	
8	Adjuster	2	
9	O-ring	1	Reverse the removal procedure for installation



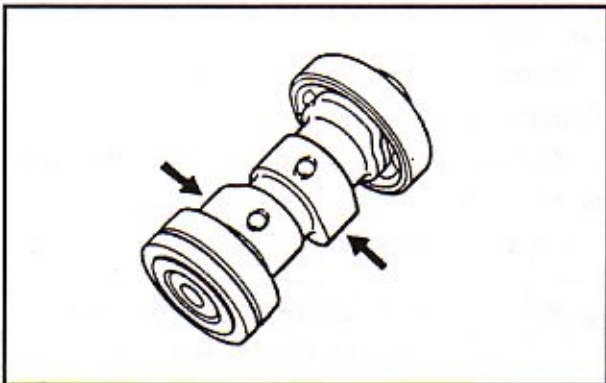
## ROCKER ARM AND ROCKER ARM SHAFT REMOVAL

### 1. Remove:

- Rocker arm shaft (intake)
- Rocker arm shaft (exhaust)

### NOTE:

Attach a rocker arm shaft puller bolt ① and weight ② to the rocker arm shaft and slide out the shaft.



## CAMSHAFT INSPECTION

### 1. Inspect:

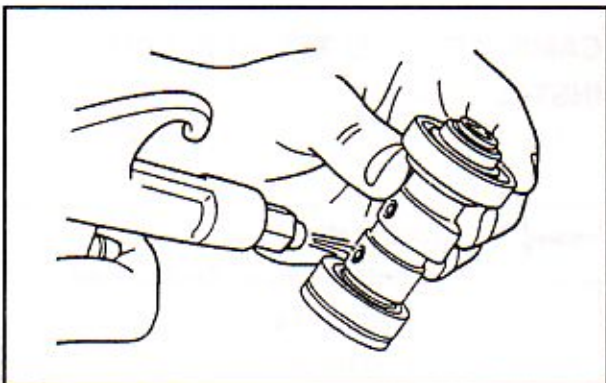
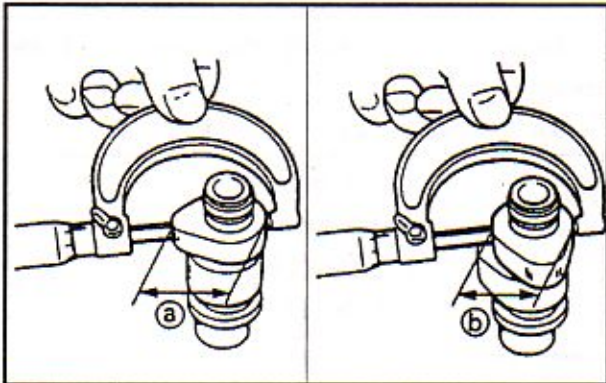
- Cam lobes

Pitting/Scratches/Blue discoloration → Replace.

### 2. Measure:

- Cam lobes length (a) and (b).

Out of specification → Replace.



### Cam lobes length:

#### Intake:

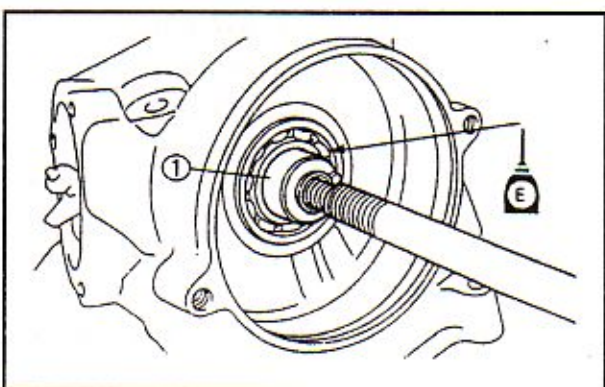
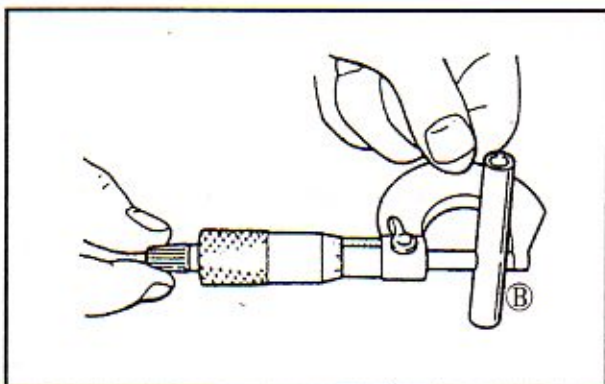
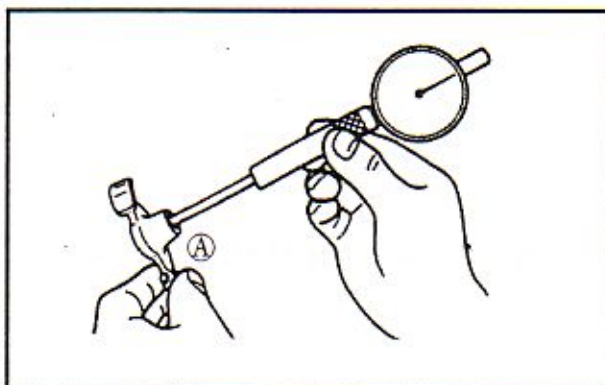
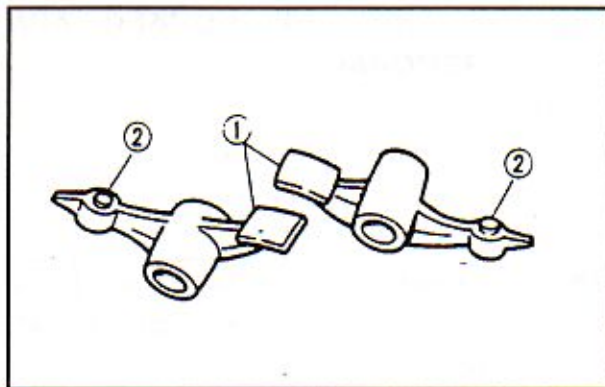
- ① 36.545–36.645 mm  
<Limit: 36.45 mm>
- ② 30.021–30.121 mm  
<Limit: 29.92 mm>
- ③ 36.547–36.647 mm  
<Limit: 36.45 mm>
- ④ 30.067–30.167 mm  
<Limit: 29.17 mm>

### 3. Inspect:

- Camshaft oil passage

Stuffed → Blow out oil passage with compressed air.





## ROCKER ARMS AND ROCKER ARM SHAFTS INSPECTION

### 1. Inspect:

- Cam lobe contact surface ①
- Adjuster surface ②

Wear/Pitting/Scratches/Blue discoloration

→ Replace.

\*\*\*\*\*

### Inspection steps:

- Inspect the two contact areas on the rocker arms for signs of unusual wear.

- Rocker arm shaft hole.

- Cam-lobe contact surface.

Excessive wear → Replace.

- Inspect the surface condition of the rocker arm shafts.

Pitting/scratches/blue discoloration →

Replace or check lubrication.

- Measure the inside diameter A of the rocker arm holes.

Out of specification → Replace.



**Inside diameter (rocker arm:**

**12.000–12.018 mm**

**<Limit: 12.030 mm>**

- Measure the outside diameter B of the rocker arm shafts.

Out of specification → Replace.



**Outside diameter**

**(rocker arm shaft):**

**11.981–11.991 mm**

**<Limit: 11.991 mm>**

\*\*\*\*\*

## CAMSHAFT AND ROCKER ARM INSTALLATION

### 1. lubricate:

- Camshaft ①

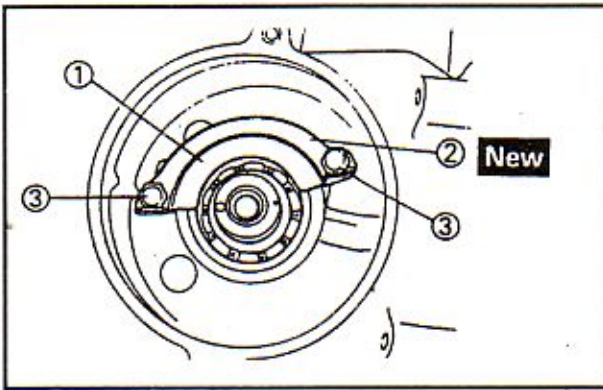


**Camshaft:**

**Molybdenum disulfide oil**

**Camshaft bearing:**

**Engine oil**



## 2. Install:

- Plate ①
- Lockwasher ②
- Bolt ③

**NEW**

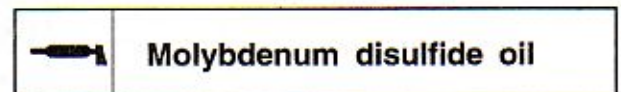
8Nm(0.8m·kg)

**NOTE:**

Bend the lockwasher tabs along the bolt ③ flats.

## 3. Apply:

- Molybdenum disulfide oil onto the rocker arm and rocker arm shaft



## 4. Install:

- Rocker arm ①
- Rocker arm shaft ② (exhaust)

**NOTE:**

Exhaust:

Install the rocker arm shaft (exhaust) completely pushed in.

## 5. Install:

- Rocker arm ①
- Rocker arm shaft ② (intake)

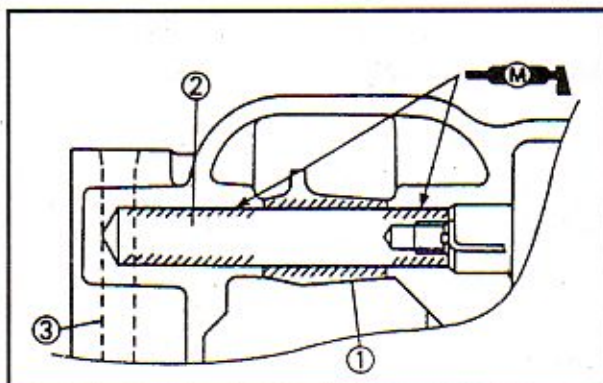
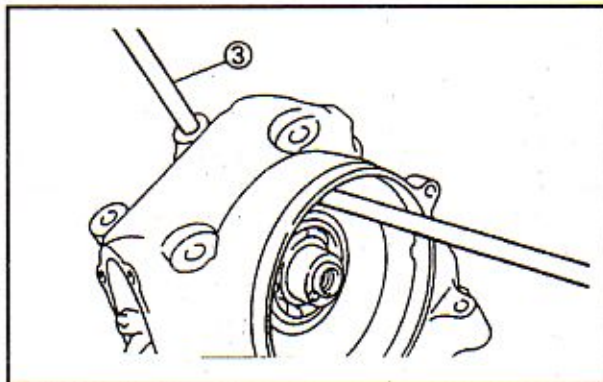
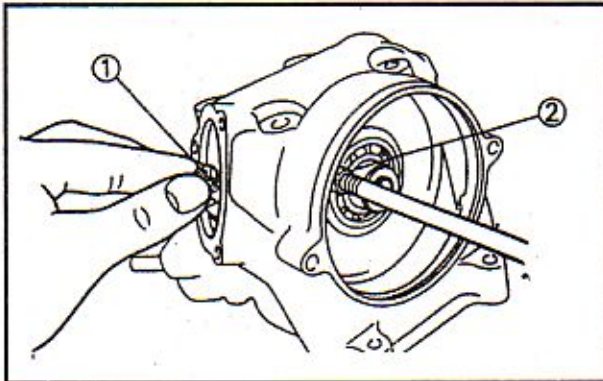
**NOTE:**

Intake:

Insert the guide shaft (8 mm) ③ into the stud bolt hole in the cylinder head to the rocker arm shaft (intake).

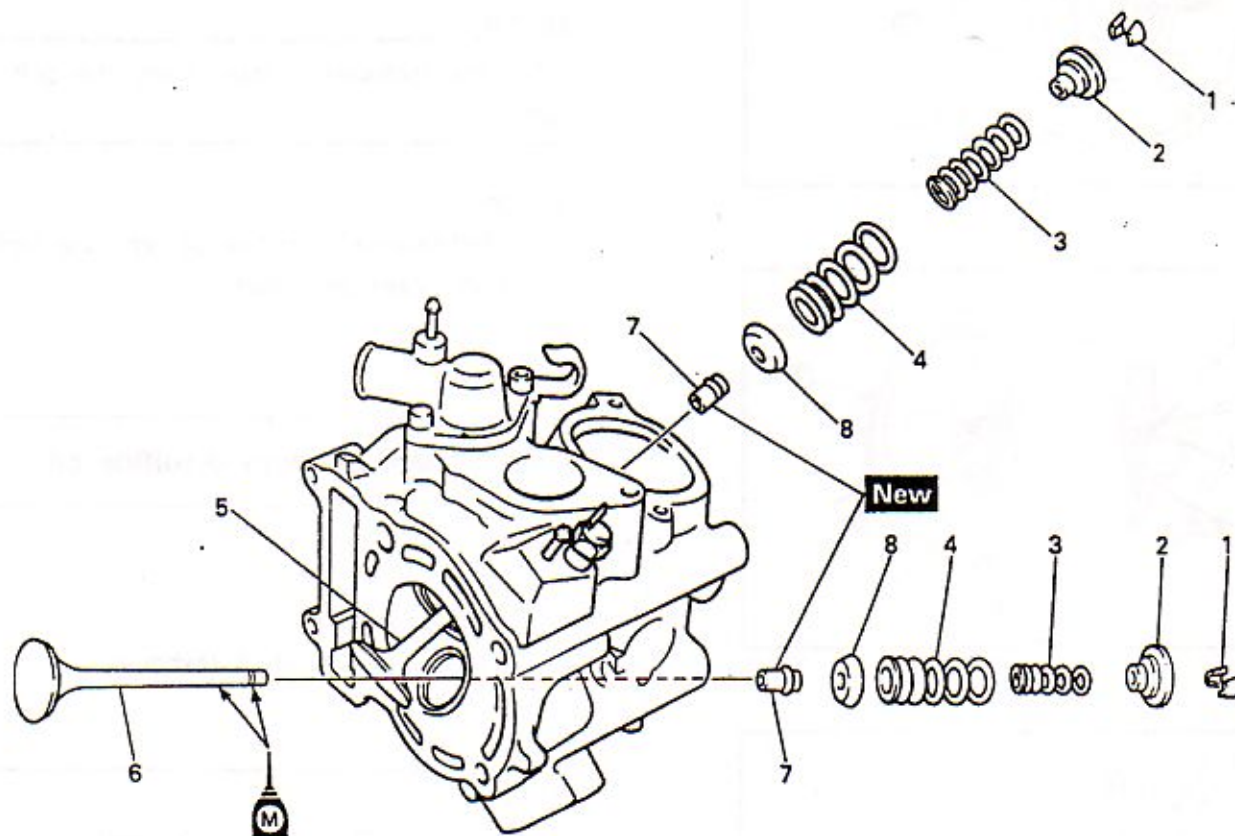
**CAUTION:**

Do not confuse the installation direction of rocker arm shaft. Be sure to install the threaded part facing outward.

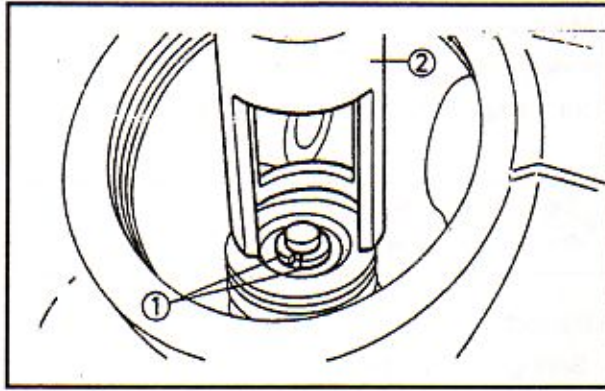




## VALVES AND VALVE SPRINGS



Order	Job name/Part name	Q'ty	Remarks
	Valves and valve springs removal Cylinder head Rocker arm, rocker arm shaft		Remove the parts in order. Refer to "CYLINDER HEAD" section. Refer to "ROCKER ARM SHAFT AND ROCKER ARMS" section.
1	Valve cotters	4	Refer to "VALVES AND VALVE SPRINGS REMOVAL/INSTALLATION" section.
2	Spring retainer	2	Refer to "VALVES AND VALVE SPRINGS INSTALLATION" section
3	Valve spring (inner)	2	
4	Valve spring (Outer)	2	
5	Valve (intake)	1	
6	Valve (exhaust)	1	
7	Valve guide	2	Reverse the removal procedure for installation
8	Spring seat	2	



## VALVES AND VALVE SPRINGS REMOVAL

1. Remove:
  - Valve cotters ①

### NOTE:

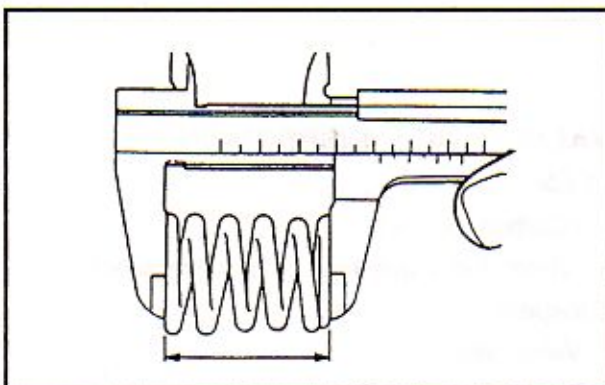
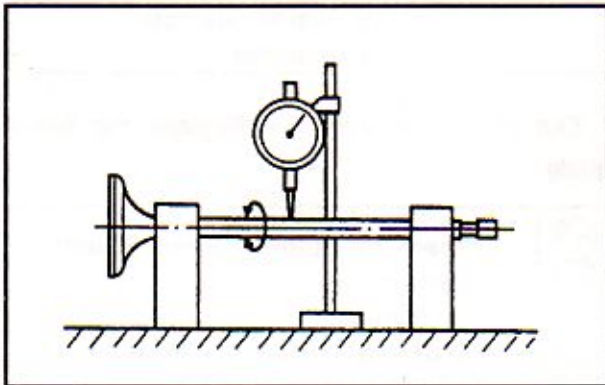
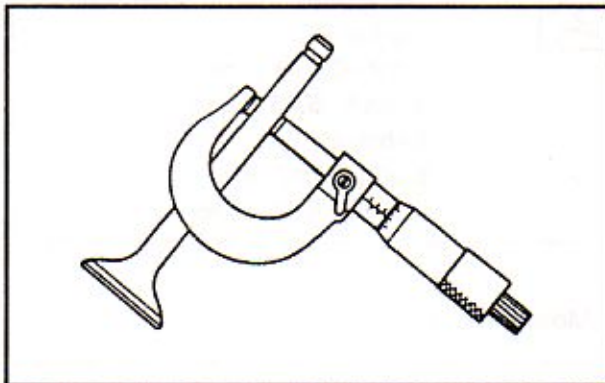
Attach a valve spring compressor and attachment ② between the valve spring retainer and cylinder head to remove the valve cotters.

### CAUTION:

Do not compress so much as to avoid damage to the valve spring.

## VALVE AND VALVE SPRINGS INSPECTION

1. Measure:
  - Valve stem diameter
 Out of specification → Replace.



### Valve stem diameter:

#### Intake:

5.975–5.990 mm

<Limit: 5.94 mm>

#### Exhaust:

5.960–5.975 mm

<Limit: 5.92 mm>

2. Measure:
  - Runout (valve stem)
 Out of specification → Replace.



### Runout limit:

0.01 mm

3. Measure:
  - Free length (valve spring)
 Out of specification → Replace.



### Valve spring free length:

#### Inner spring:

38.1 mm

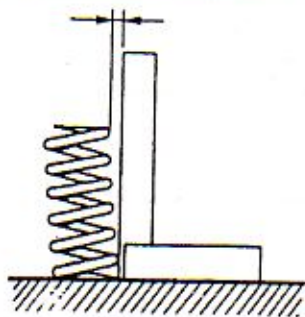
<Limit: 36.1 mm>

#### Outer spring:

36.93 mm

<Limit: 35.0 mm>





4.Measure:

Spring tilt

Out of specification → Replace.



**Spring tilt limit:**

**1.7mm(2.5°)**

5.Inspect:

•Spring contact face

Wear/Pitting/Scratches → Replace.

6.Measure:

•Valve guide inside diameter

Out of specification → Replace.



**Valve guide inside diameter:**

**Intake:**

**6.000–6.012 mm**

**<Limit: 6.05 mm>**

**Exhaust:**

**6.000–6.012 mm**

**<Limit: 6.05 mm>**

7.Measure:

**Stem-to guide clearance=**

**Valve guide inside diameter–**

**Valve stem diameter**

Out of specification → Replace the valve guide.



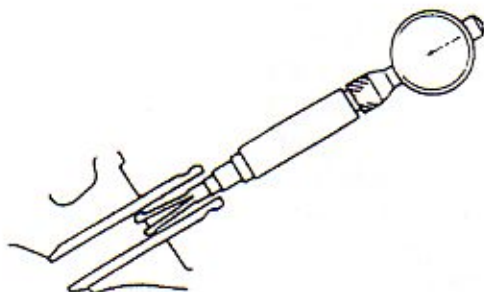
**Stem-to-guide clearance limit:**

**Intake:**

**0.08mm**

**Exhaust:**

**0.01mm**



## VALVE SEATS INSPECTION

1.Eliminate:

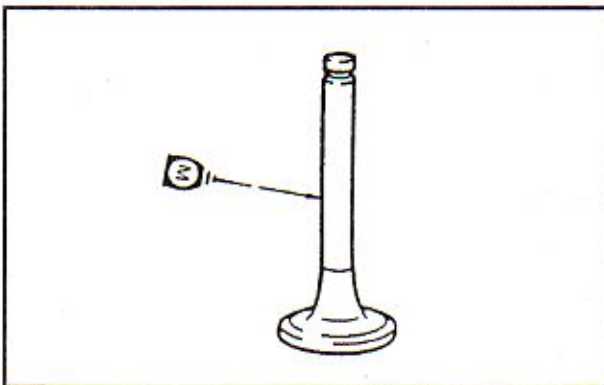
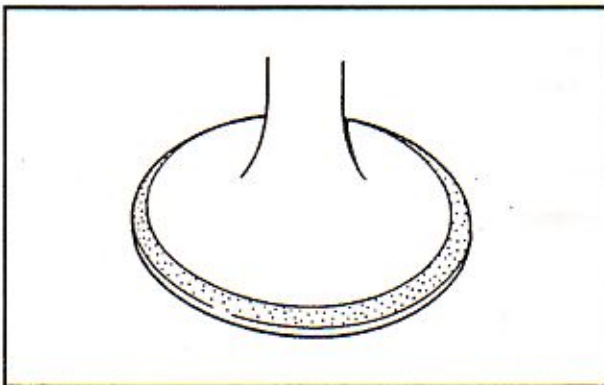
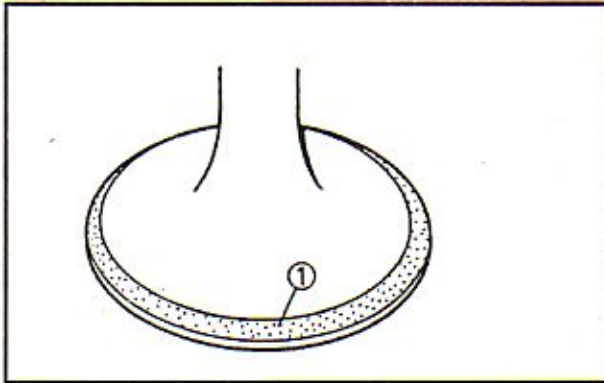
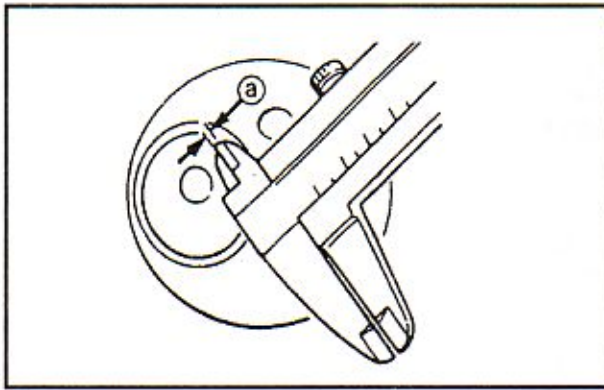
•Carbon deposits

(from the valve face and valve seat)

2.Inspect:

•Valve seats

Pitting/wear → Reface the valve seat.



### 3.Measure:

- Valve seat width (a)

Out of specification → Reface the valve seat.



#### Valve seat width:

##### Intake:

0.9–1.1mm

<Limit:1.6mm>

##### Exhaust:

0.9–1.1mm

<Limit:1.6mm>

### Measurement step:

- Apply Mechanic's blueing dye (Dykem) ① to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width. Where the valve seat and valve face made contact, blueing will have been removed.
- If the valve seat is too wide, too narrow, or the seat is not centered, the valve seat must be replaced.

### 4.Lap:

- Valve face
- Valve seat

#### NOTE:

After replacing the valve seat, valve and valve guide, the valve seat and valve face should be lapped.

### Lapping steps:

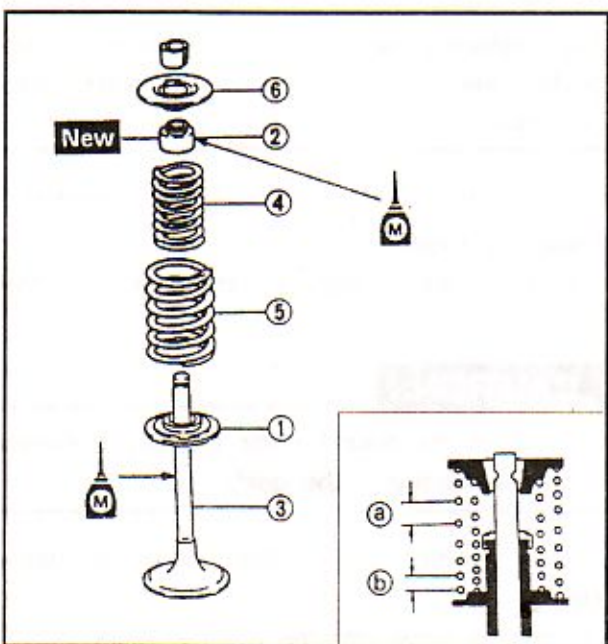
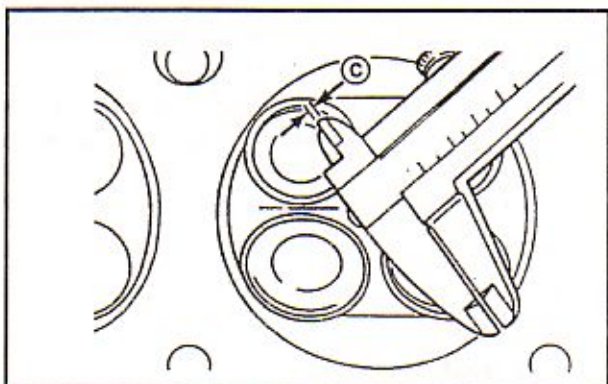
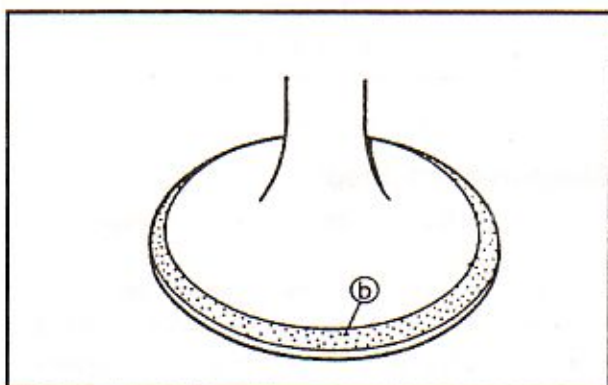
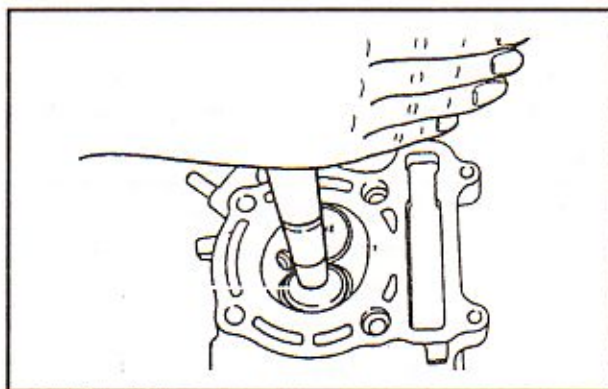
- Apply a coarse lapping compound (a) to the valve face.

#### CAUTION:

Do not let compound enter the gap between the valve stem and the guide.

- Apply molybdenum disulfide oil to the valve stem.
- Install the valve into the cylinder head.





• Turn the valve until the valve face and valve seat are evenly polished, then clean off all compound.

## NOTE:

For best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.

• Apply a fine lapping compound to the valve face and repeat the above steps.

## NOTE:

Make sure to clean off all compound from the valve face and valve seat after every lapping operation.

• Apply Mechanic's blueing dye (Dykem) **(b)** to the valve face.

• Install the valve into the cylinder head.

• Press the valve through the valve guide and onto the valve seat to make a clear pattern.

• Measure the valve seat with **(c)** again.

## VALVES AND VALVE SPRINGS INSTALLATION

### 1. Deburr:

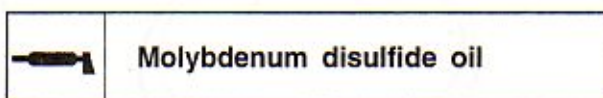
• Valve stem end

Use an oil stone to smooth the stem end.

### 2. Apply:

• Molybdenum disulfide oil

(onto the valve stem **(3)** and oil seal **(2)**)



### 3. Install:

• Valve spring seat **(1)**

• Valve stem seal **(2)**

• Valve **(3)**

(into the cylinder head)

• Valve spring (under) **(4)**

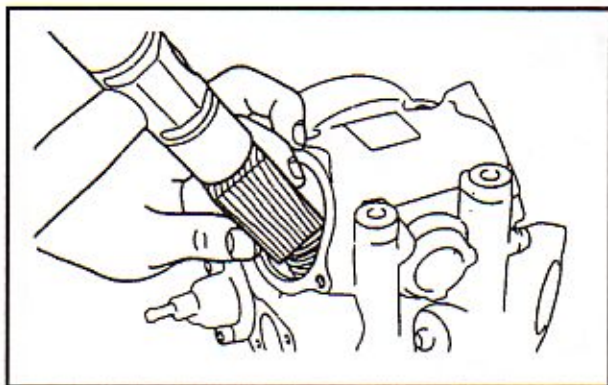
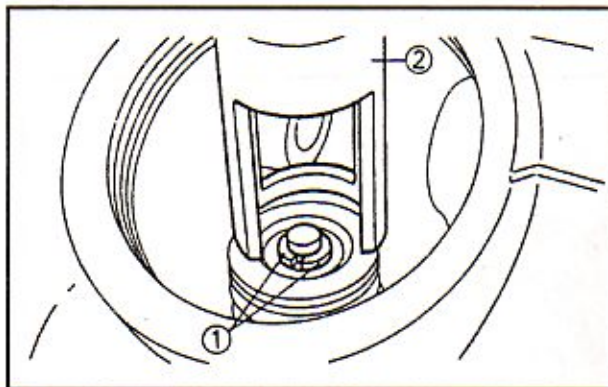
• Valve spring (outer) **(5)**

• Spring retainer **(6)**

## NOTE:

Install the valve spring with the larger pitch **(a)** facing upwards.

**(b)** Smaller pitch



4. Install:

·Valve cotters ①

**NOTE:**

Install the valve cotters while compressing the valve spring with a valve spring compressor and attachment ②.

5. Secure the valve cotters onto the valve stem by tapping lightly with a piece of wood.

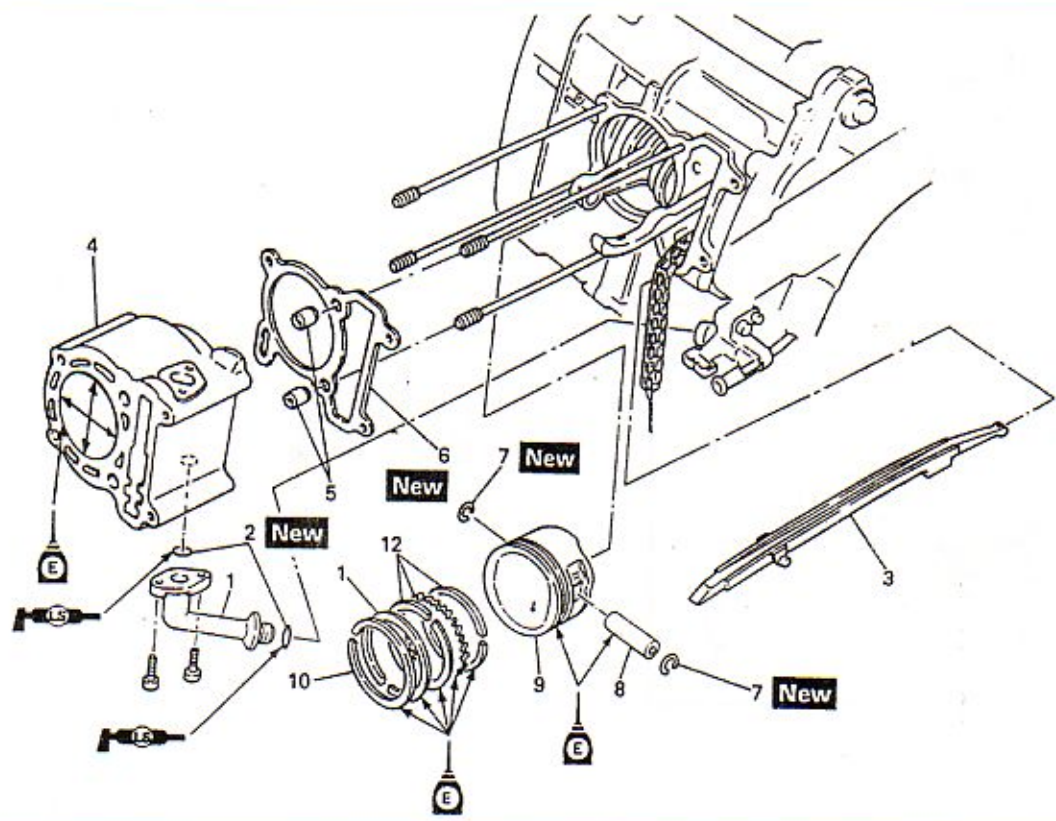
**CAUTION:**

Do not hit so much as to damage the valve.

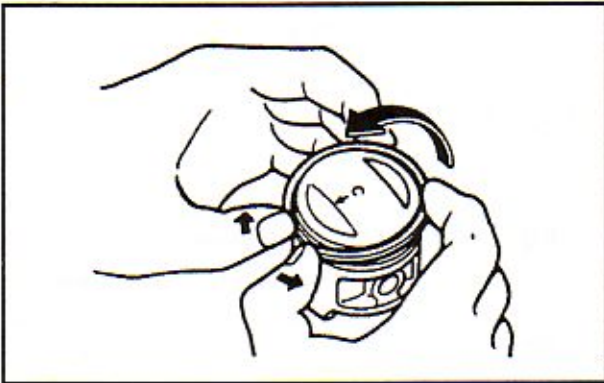
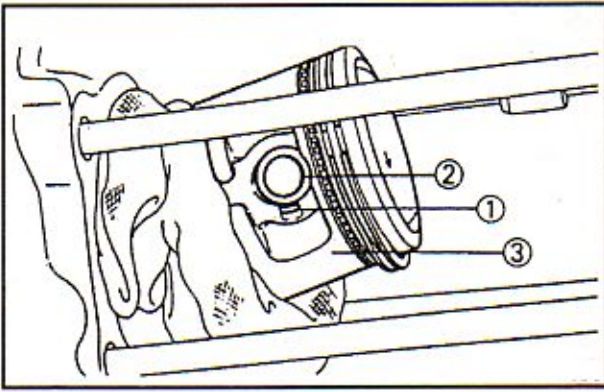


ENGINE

CYLINDER AND PISTON



Order	Job name/Part name	Q'ty	Remarks
	Cylinder and piston removal		Remove the parts in order.
	Cylinder head		Refer to "CYLINDER HEAD" section.
1	Joint	1	
2	O-ring	2	
3	Timing chain guide (exhaust side)	1	Refer to "PISTON RINGS, PISTON AND CYLINDER INSTALLATION" section.
4	Cylinder	1	
5	Dowel pin	2	
6	Cylinder gasket	1	
7	Piston pin circlip	2	Refer to "PISTON AND PISTON RINGS REMOVAL" section.
8	Piston pin	1	
9	Piston	1	
10	Piston ring (top)	1	Refer to "PISTON RINGS, PISTON AND CYLINDER INSTALLATION" section.
11	Piston ring (2nd)	1	
12	Side rail/Spacer	2/1	
			Reverse the removal procedure for installation.



## PISTON AND PISTON RINGS REMOVAL

### 1.Remove:

- Piston pin circlip ①
- Piston pin ②
- Piston ③

### NOTE:

Before removing the piston pin circlip, cover the crankcase opening with a clean towel or rag to prevent the circlip from falling into the crankcase cavity.

### 2.Remove:

- Top ring
- 2nd ring
- Oil ring

### NOTE:

When removing the piston ring, open the end gap of the ring by fingers, and push up the other side of the ring.

## CYLINDER INSPECTION

### 1.Measure:

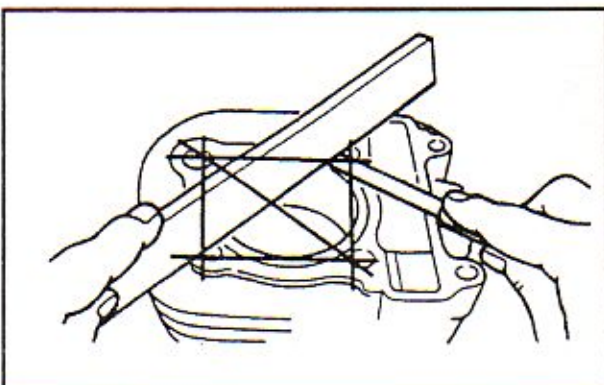
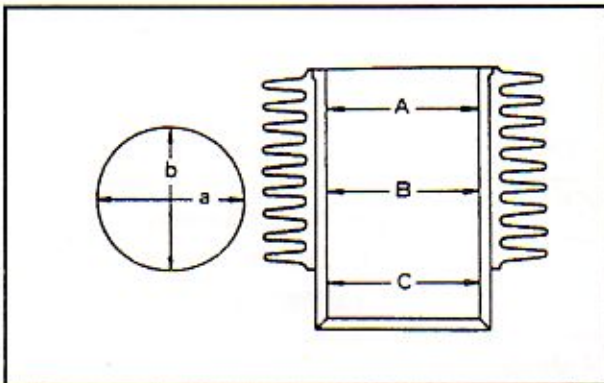
- Cylinder bore

Out of specification → Rebore or replace

### NOTE:

•Measure the cylinder bore with a cylinder bore gauge.

•Measure the cylinder bore in parallel to and at right angle to the crankshaft. Then, find the average of the measurements.



Cylinder bore:  
70.000–70.01mm  
<Limit:70.1mm>  
<Defferance limit between A,B  
and C:0.03mm>

### 2.Measure:

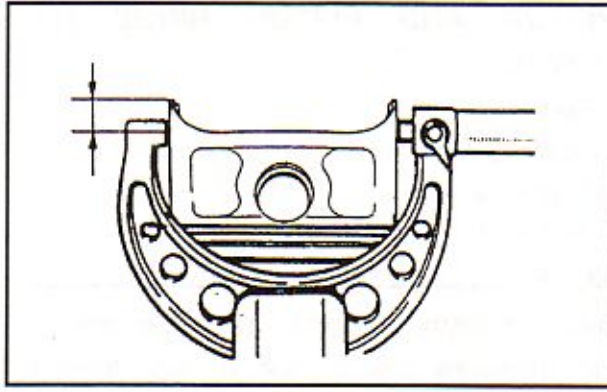
- Warpage

Out of specification → Replace.



Cylinder warpage limit:  
0.03mm





## PISTON AND PISTON PIN INSPECTION

### 1.Measure:

- Piston skirt diameter

Out of specification → Replace.

Ⓐ 5.0mm from the piston bottom edge



**Valve skirt diameter:**  
69.965–69.980 mm  
**Oversize (2)**  
69.5mm  
**Oversize (4)**  
70.0mm

### 2.Calculate:

- Piston-to-cylinder clearance

**Piston-to-cylinder clearance=**  
**Cylinder bore-Piston skirt diameter**

Refer to "CYLINDER" section for cylinder bore measurement.

Out of specification → Replace the piston and piston rings as a set.



**Piston-to-cylinder clearance:**  
0.02–0.04mm

### 3.Measure:

- Piston pin bore diameter

Out of specification → Replace.



**Piston pin bore diameter:**  
17.004–17.015mm  
<Limit:17.045mm>

### 4.Measure:

- Piston pin outside diameter

Out of specification → Replace.

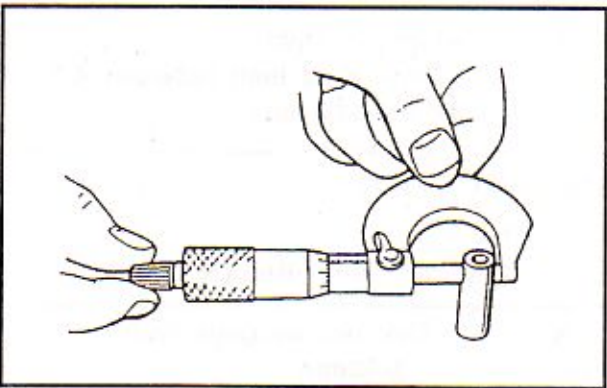
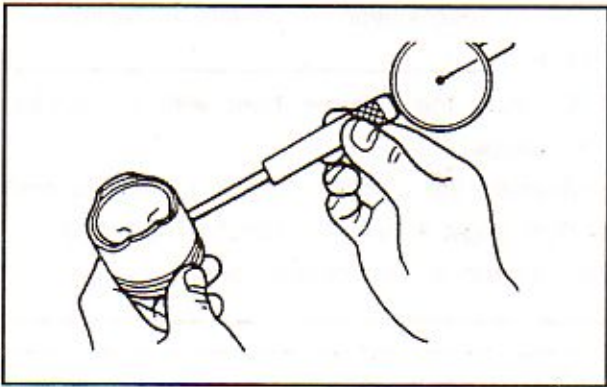


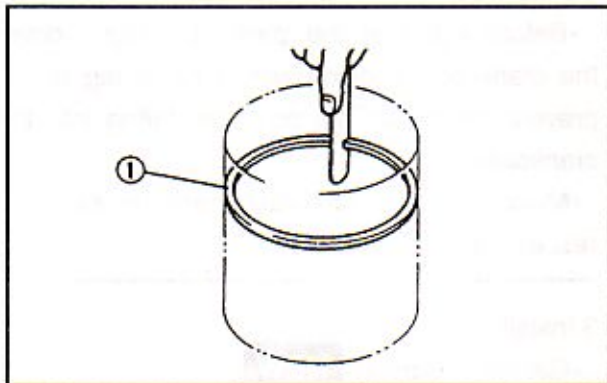
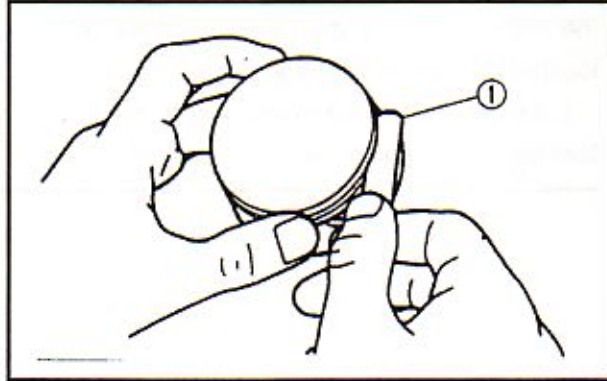
**Piston pin bore diameter:**  
16.991–17.000mm  
<Limit:16.975mm>

### 5. Inspect:

- Piston pin

Blue discoloration/groove → Clean or replace.





## PISTON RINGS INSPECTION

### 1.Measure:

- Side clearance

Out of specification → Replace the piston and the piston rings as a set.

### NOTE:

Eliminate the carbon deposits from the piston ring grooves and rings before measuring the side clearance.



#### Side clearance (piston ring):

##### Top ring:

0.04–0.08mm

<Limit:0.12mm>

##### 2nd ring:

0.03–0.07mm

<Limit:0.12mm>

### 2.Position:

- Piston ring into the cylinder

### NOTE:

Push the ring with the piston crown so that the ring will be at a right angle to the cylinder bore.

Ⓐ5.0mm

### 3.Measure:

- End gap
- Out of specification → Replace.

### NOTE:

You cannot measure the end gap on the expander spacer of the oil ring. If the oil ring rails show excessive gap, replace all three rings.



#### End gap:

##### Top ring:

0.15–0.30mm

<Limit:0.45mm>

##### 2nd ring:

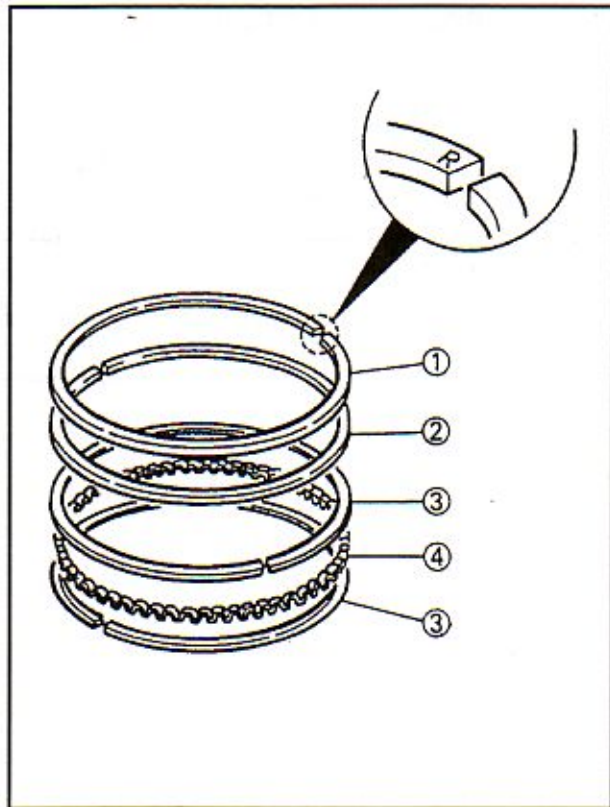
0.30–0.45mm

<Limit:0.70mm>

##### Oil ring:

0.20–0.70mm





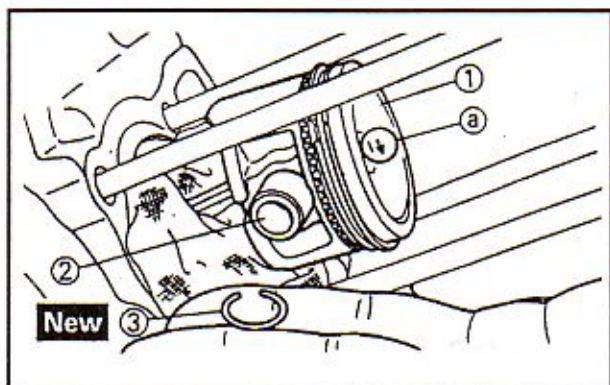
## PISTON RINGS, PISTON AND CYLINDER INSTALLATION

### 1.Install:

- Top ring ①
- 2nd ring ②
- Side rails (oil ring) ③
- Expander spacer (oil ring) ④

### NOTE:

- Make sure to install the piston rings so that the manufacturer's marks or numbers are located on the upper side of the rings.
- Lubricate the pistons and piston rings liberally with engine oil.



### 2.Install:

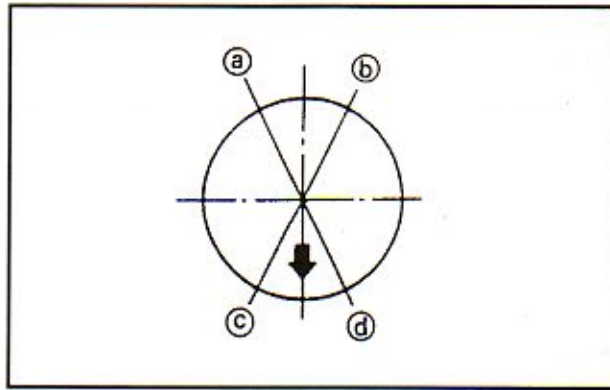
- Piston ①
- Piston pin ②
- Piston pin clip ③ **NEW**

### NOTE:

- Apply engine oil to the piston pins.
- The "→" mark ⑧ on the piston must face the exhaust side of the cylinder.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- Make sure to install each piston in its respective cylinder.

### 3.Install:

- Gasket (cylinder) **NEW**
- Dowel pins



## 4.Position:

- Piston rings

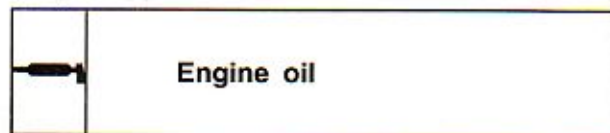
**NOTE:**

Offset the piston ring end gaps as shown.

- (a) Top ring end
- (b) Oil ring end (lower)
- (c) Oil ring end (upper)
- (d) 2nd ring end

## 5.Lubricate:

- Piston outer surface
- Piston ring
- Cylinder inner surface



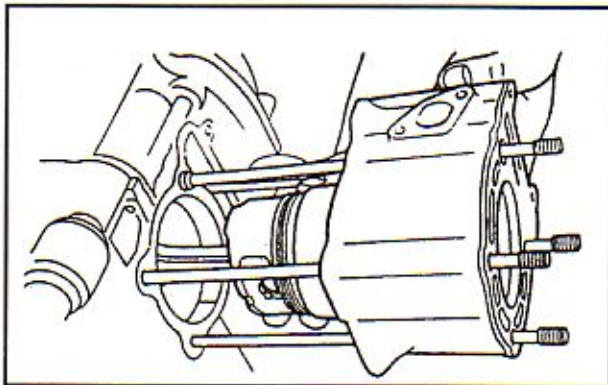
## 6.Install:

- Cylinder

**NOTE:**

•Install the cylinder with one hand while compressing the piston rings with the other hand.

•Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

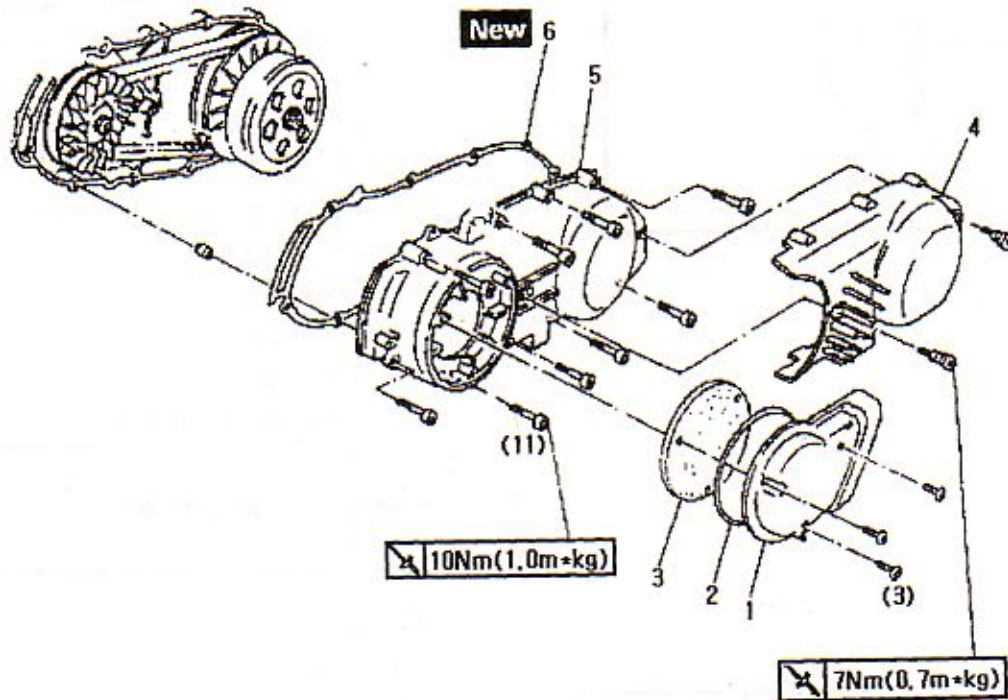




## ENGINE

### V-BELT, CLUTCH AND SECONDARY/PRIMARY SHEAVE

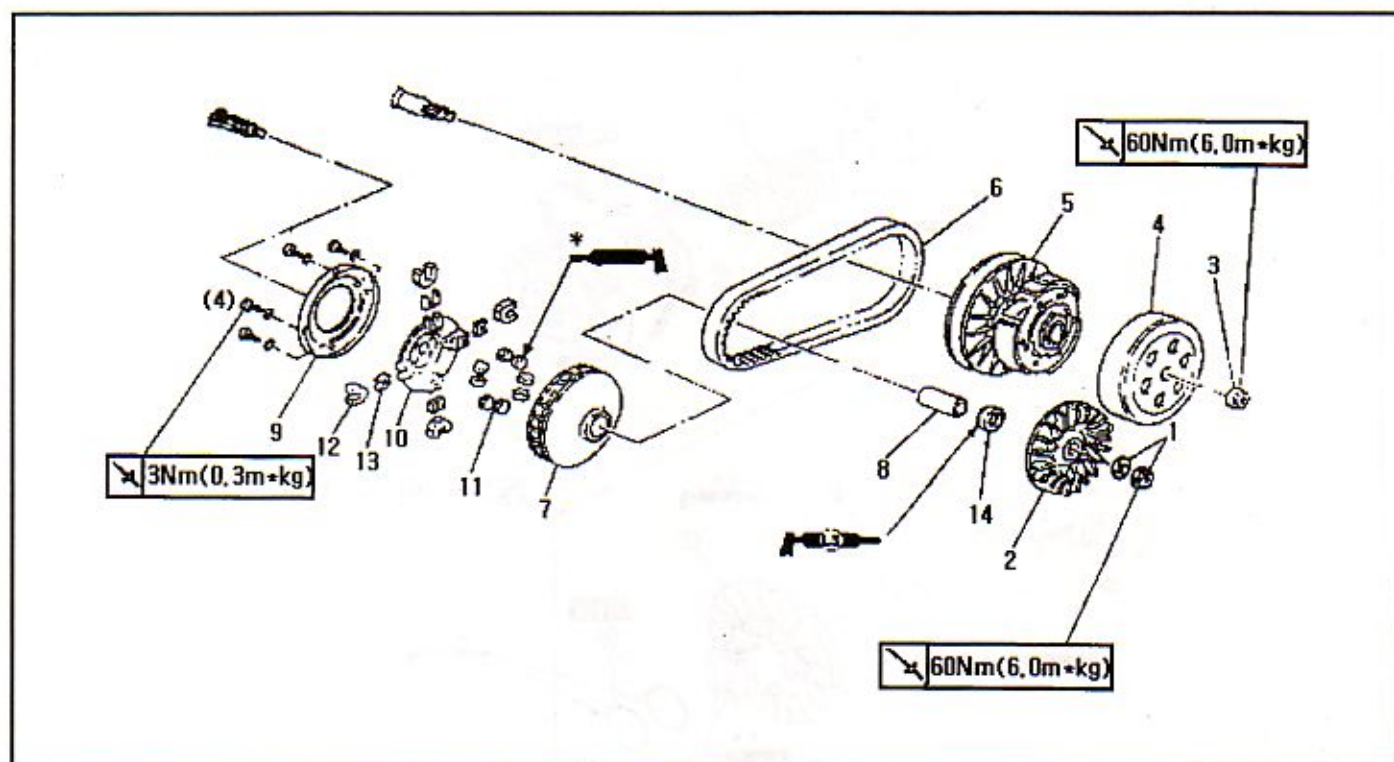
#### CRANKCASE FILTER COVER AND CRANKCASE COVER (LEFT)



Order	Job name/Part name	Q'ty	Remarks
	<b>Crankcase filter cover and crankcase cover (left) removal</b>		Remove the parts in order.
	Side panel		Refer to "COVER AND PANEL" section.
1	Crankcase filter cover	1	
2	Crankcase filter cover seal	1	
3	Crankcase filter element	1	
4	Crankcase cover protector	1	
5	Crankcase cover (left)	1	
6	Crankcase cover gasket	1	
			Reverse the removal procedure for installation.

## V-BELT, CLUTCH AND SECONDARY/PRIMARY SHEAVE

\*Shell BT grease

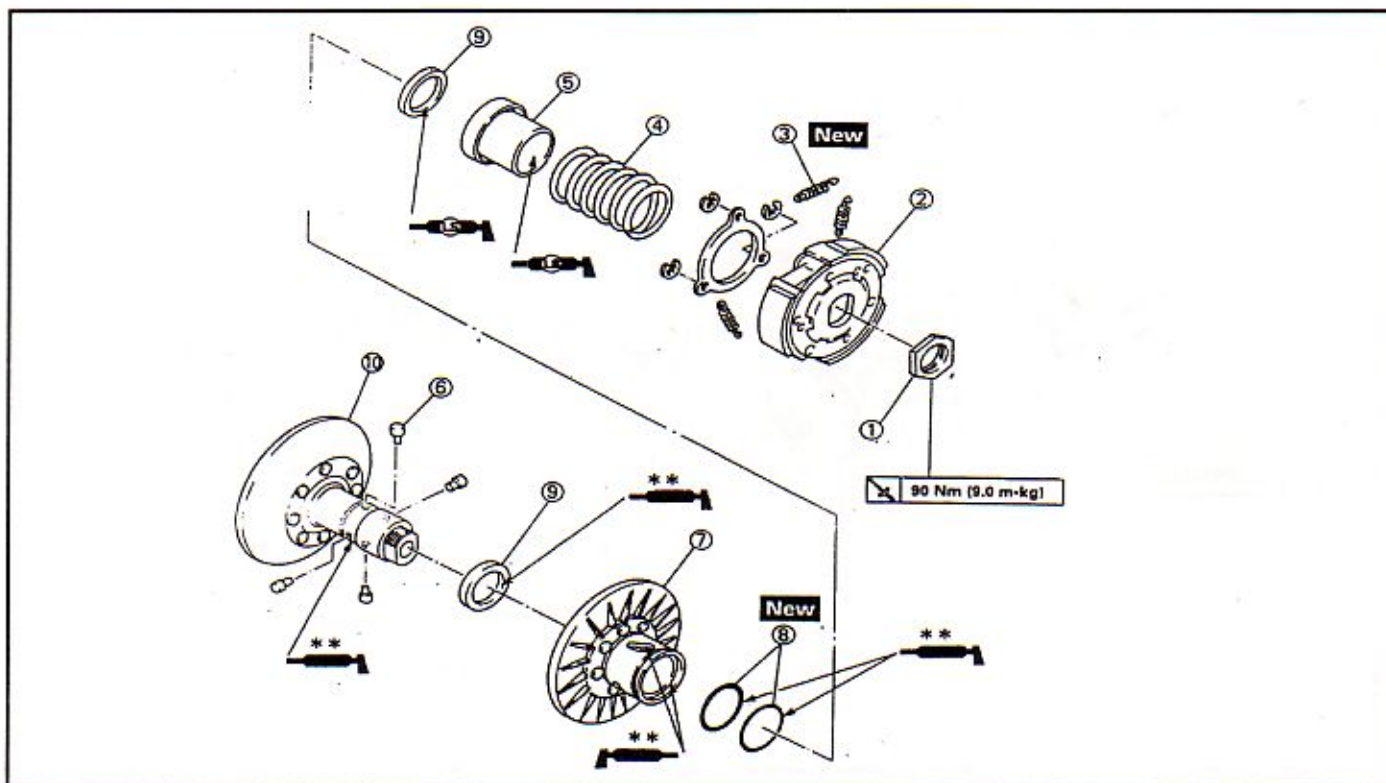


Order	Job name/Part name	Q'ty	Remarks
	V-belt, clutch and secondary/ primary sheave removal		Remove the parts in order.
1	Nut/Plain washer	1/1	Refer to "PRIMARY SHEAVE REMOVAL" section.
2	Primary fixed sheave	1	Refer to "SECONDARY SHEAVE AND V-BELT REMOVAL" section.
3	Nut	1	Refer to "SECONDARY SHEAVE INSTALLATION" section.
4	Clutch housing	1	
5	Clutch assembly	1	
6	V-belt	1	
7	Primary sliding sheave	1	
8	Collar	1	Refer to "PRIMARY SHEAVE ASSEMBLY" section.
9	Primary sheave cap	1	
10	Cam	1	
11	Weight	8	Refer to "PRIMARY SHEAVE ASSEMBLY" section.
12	Slider	4	
13	Spacer	4	
14	Oil seal	1	Reverse the removal procedure for installation.

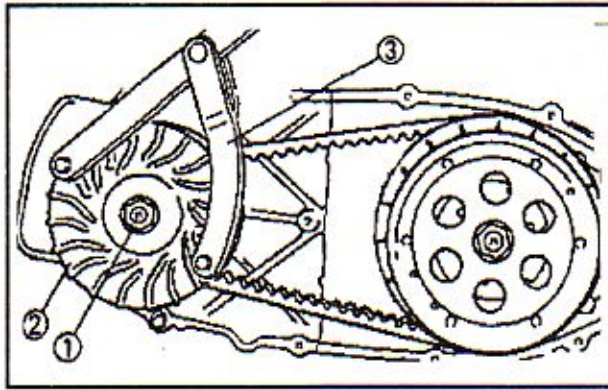


## SECONDARY SHEAVE

\*\*Apply BEL-RAY assembly lube\*



Order	Job name/Part name	Q'ty	Remarks
	Secondary sheave disassembly		Disassemble the parts in order.
1	Nut	1	
2	Clutch carrier	1	Refer to "SECONDARY SHEAVE DISASSEMBLY" section.
3	Clutch shoe spring	3	
4	Compression spring	1	
5	Spring seat	1	Refer to "SECONDARY SHEAVE INSTALLATION" section.
6	Guide pin	4	
7	Secondary sliding sheave	1	
8	O-ring	2	Refer to "SECONDARY SHEAVE INSTALLATION" section.
9	Oil seal	2	
10	Secondary fixed sheave	1	
			Reverse the disassembly procedure for assembly.



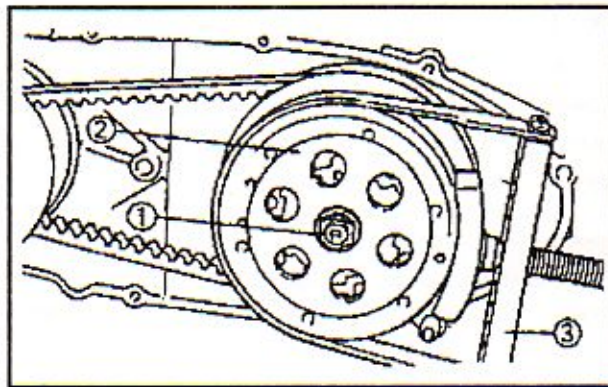
### PRIMARY SHEAVE REMOVAL

1.Remove:

- Nut ① (primary sheave)
- Plate washer
- Primary fixed sheave ②

#### NOTE:

Loosen the nut (primary fixed sheave) while holding the primary fixed sheave with the rotor holder ③.



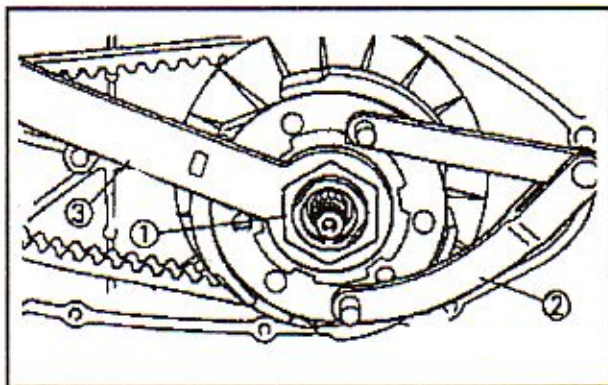
### SECONDARY SHEAVE AND V-BELT REMOVAL

1.Remove:

- Nut ① (secondary sheave)
- Clutch housing ②

#### NOTE:

Loosen the nut (secondary sheave) while holding the clutch housing with the sheave holder ③.



2.Remove:

- Nut ① (clutch carrier)

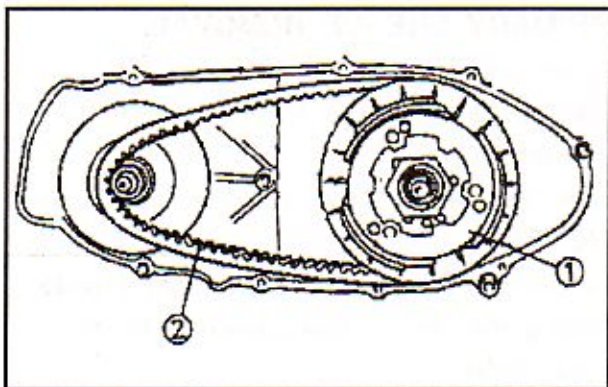
### CAUTION:

Do not remove the nut (clutch carrier) yet.

#### NOTE:

Loosen the nut (clutch carrier) one turn using the locknut wrench ③ while holding the clutch carrier with the rotor holder ②.



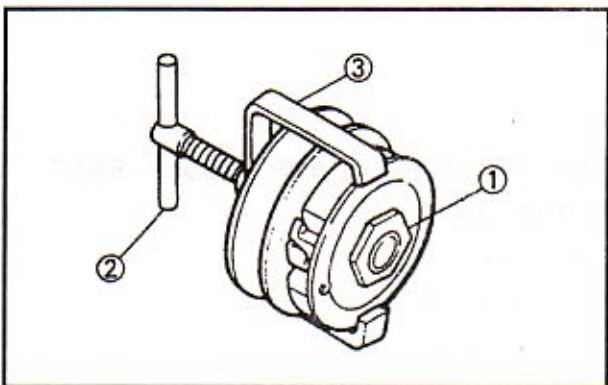


3.Remove:

- Clutch assembly ①
- V-belt ②

## NOTE:

Remove the V-belt from the primary sheave side with clutch assembly.



## SECONDARY SHEAVE DISASSEMBLY

1.Remove:

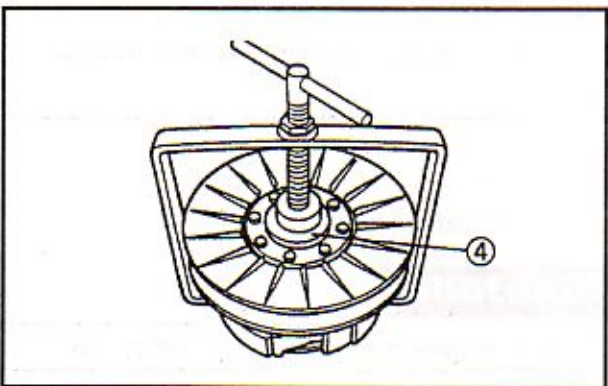
- Nut ① (secondary sheave)

## NOTE:

Loosen the nut ① while attaching the clutch spring compressor ② and clutch spring holder arm ③ and release the compressed spring after removing the nut.

## CAUTION:

Use the spacer ④ (Ø30mm thickness: 2-3mm).



## CLUTCH INSPECTION

1.Measure:

- Clutch shoe thickness
- Scratches→Glaze using coarse sandpaper.
- Wear/Damage→Replace



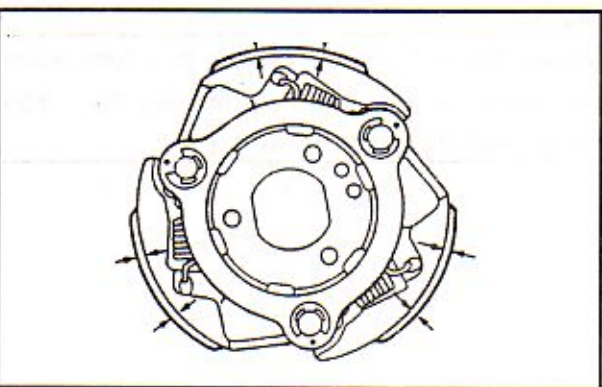
**Clutch shoe thickness:**

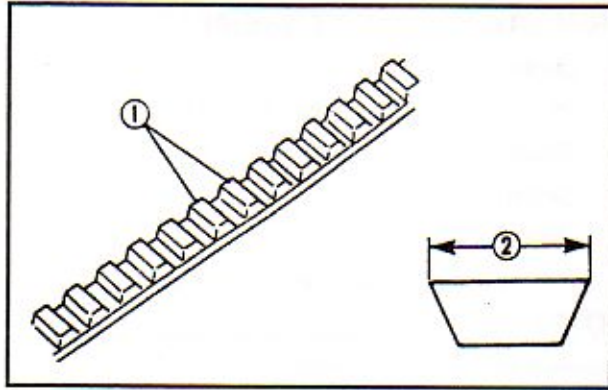
**3.0mm**

**<Limit:2.0mm>**

## NOTE:

- After using the sandpaper, clean off the polished particles.
- Inspect the other clutch shoes.
- Replace all three as a set.





## V-BELT INSPECTION

### 1. Inspect:

#### • V-belt ①

Cracks/Wear/Scaling/Chipping →  
Replace.

Oil/Grease → Check primary sheave and secondary sheave.

### 2. Measure:

#### • V-belt width ②

Out of specification → Replace



**V-belt width:**

**22.6 mm**

**<Limit: 2.10 mm>**

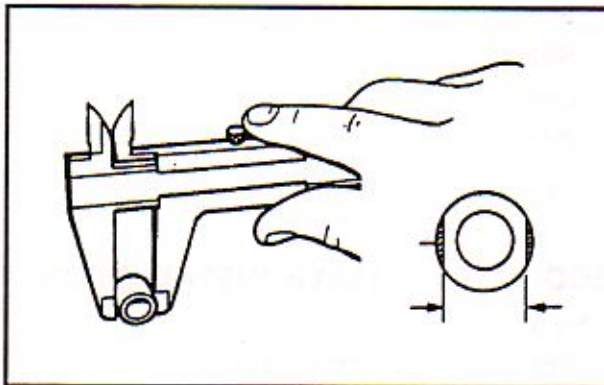
## WEIGHT INSPECTION

### 1. Inspect:

#### • Weight minimum outside diameter

Cracks/Wear/Scaling/Chipping →  
Replace.

Out of specification → Replace.



**Weight out side diameter:**

**20.0 mm**

**<Limit: 19.5 mm>**

## SECONDARY SHEAVE INSPECTION

### 1. Inspect:

#### • Secondary fixed sheave smooth operation

#### • Secondary sliding sheave smooth

operation

### 2. Inspect:

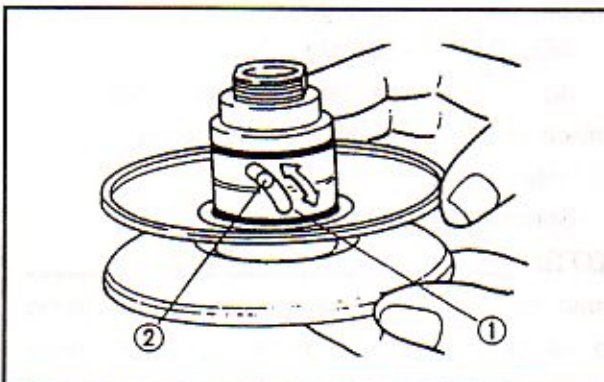
#### • Torque cam groove ①

Wear/Damage → Replace.

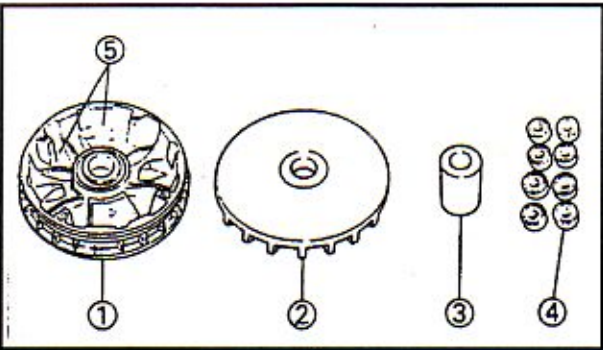
### 3. Inspect:

#### • Guide pin ②

Wear/Damage → Replace.





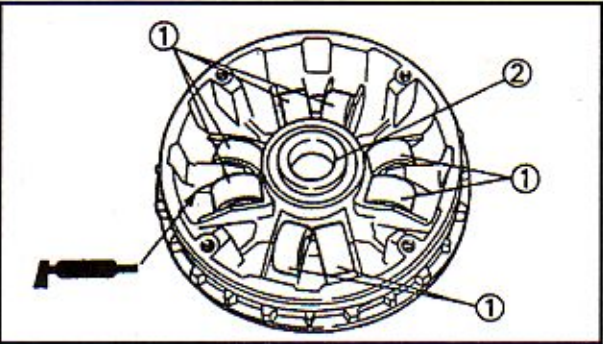


**PRIMARY SHEAVE ASSEMBLY**

1. Clean:
- Primary sliding sheave face ①
  - Primary fixed sheave face ②
  - Collar ③
  - Weight ④
  - Primary sliding sheave cam face ⑤

**NOTE:**

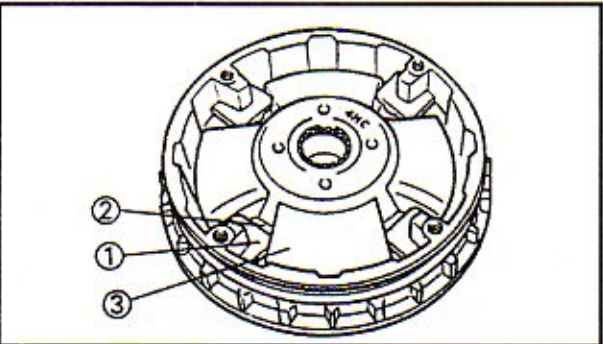
Remove any excess grease.



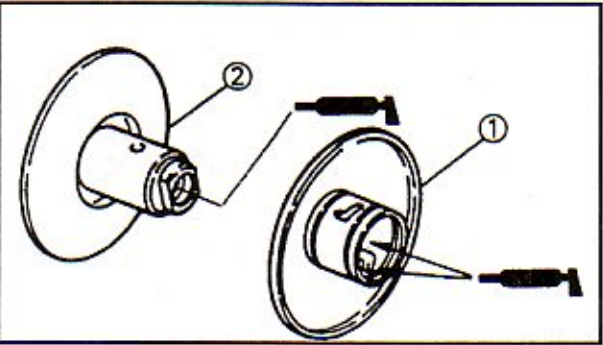
2. Install:
- Weight ①
  - Collar ②

**NOTE:**

•Apply Shell BT grease NO.3 (90890-69927) to all of the outside of the weight and install.



•Apply Shell BT grease NO.3 (90890-69927) to the inside of the collar.



3. Install:
- Spacer ①
  - Slider ②
  - Cam ③
  - Primary sliding sheave cap.

3Nm(0.3m·kg)

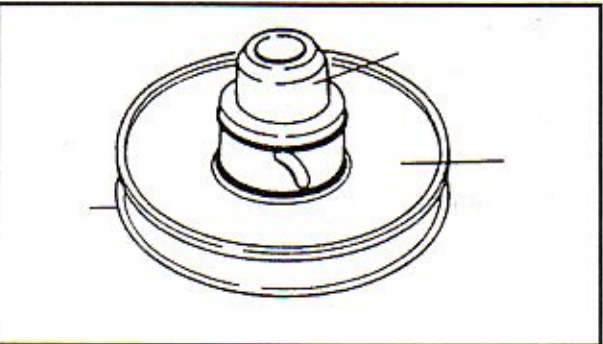
**SECONDARY SHEAVE INSTALLATION**

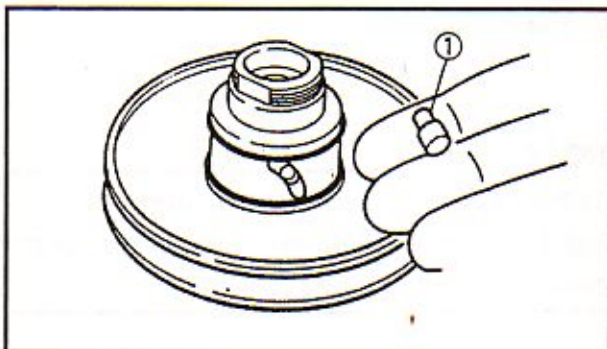
1. Apply:
- BEL-RAY® assembly lube  
(to the secondary sliding sheave ① inner surface, grease nipple groove, and oil seals)
  - BEL-RAY® assembly lube  
(to the bearings, oil seals and inner surface of the secondary fixed sheave ②)

2. Install:
- Secondary sliding sheave ①

**NOTE:**

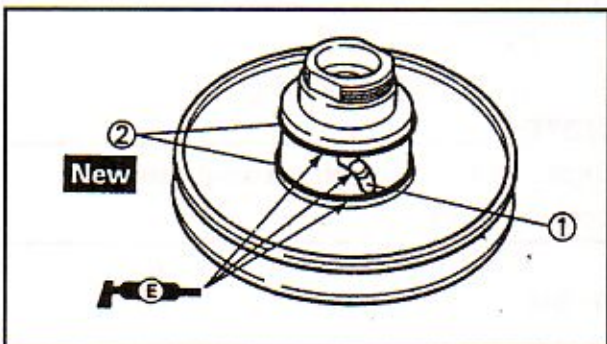
Install the secondary sliding sheave ① using the oil seal guide ② to the secondary fixed sheave ③.





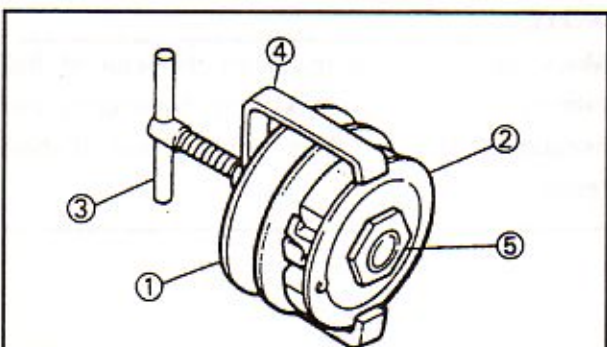
## 3. Install:

- Guide pin ①



## 4. Apply:

- BEL-RAY® assembly lube  
(to the guide pin sliding groove ①, and  
and oil seal ② **NEW** )



## 5. Install:

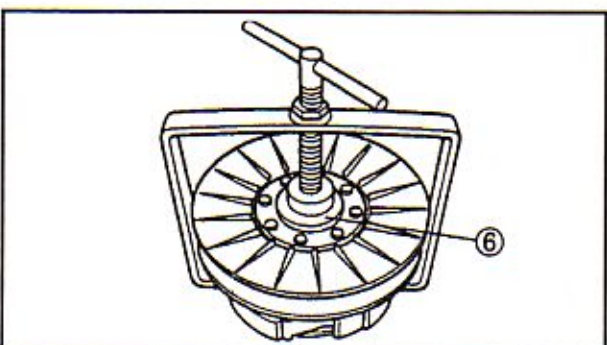
- Secondary sheave complete ①
- Compression spring
- Clutch carrier ②

**NOTE:**

Temporarily tighten the nut ⑤ while attaching the clutch spring holder ③ and clutch spring holder arm ④ and compress the spring.

**CAUTION:**

Use the spacer ⑥ (ø30mm, thickness: 2–3 mm).



## 6. Install:

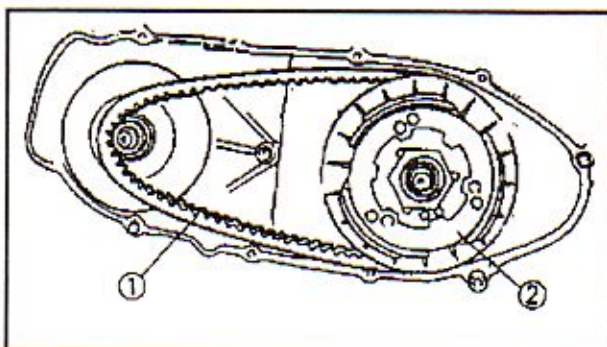
- V-belt ①
- Clutch assembly ②

**NOTE:**

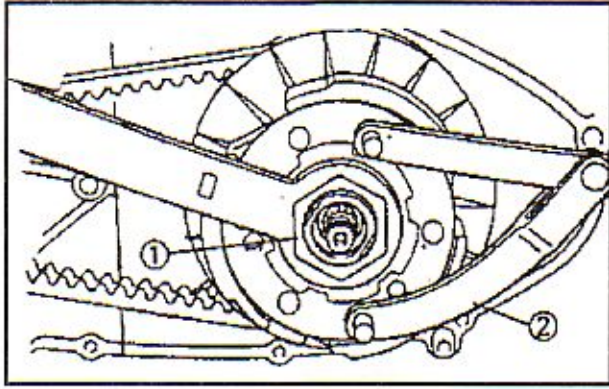
Install the V-belt with clutch assembly to the primary sheave side.

**CAUTION:**

Never smear grease to the V-belt, secondary sheave and clutch.





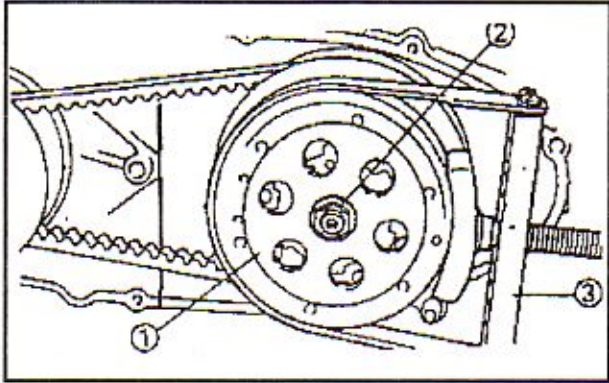


7. Install:

- Nut ① (clutch carrier)

**NOTE:**

Tighten the nut (clutch carrier), using the locknut wrench ③ while holding the clutch carrier with the rotor holder ②.

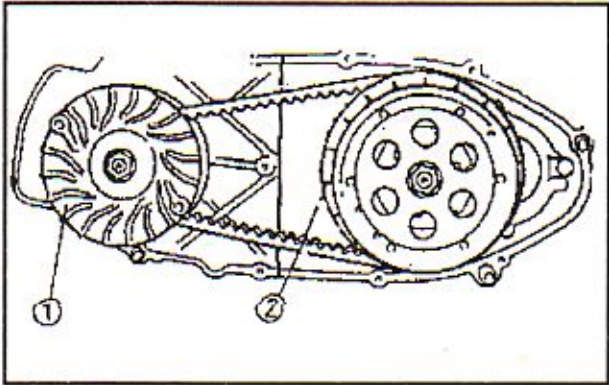


8. Install:

- Clutch housing ①
- Nut ② (clutch housing)

**NOTE:**

Tighten the nut (clutch housing), using the sheave holder ③).



9. Set:

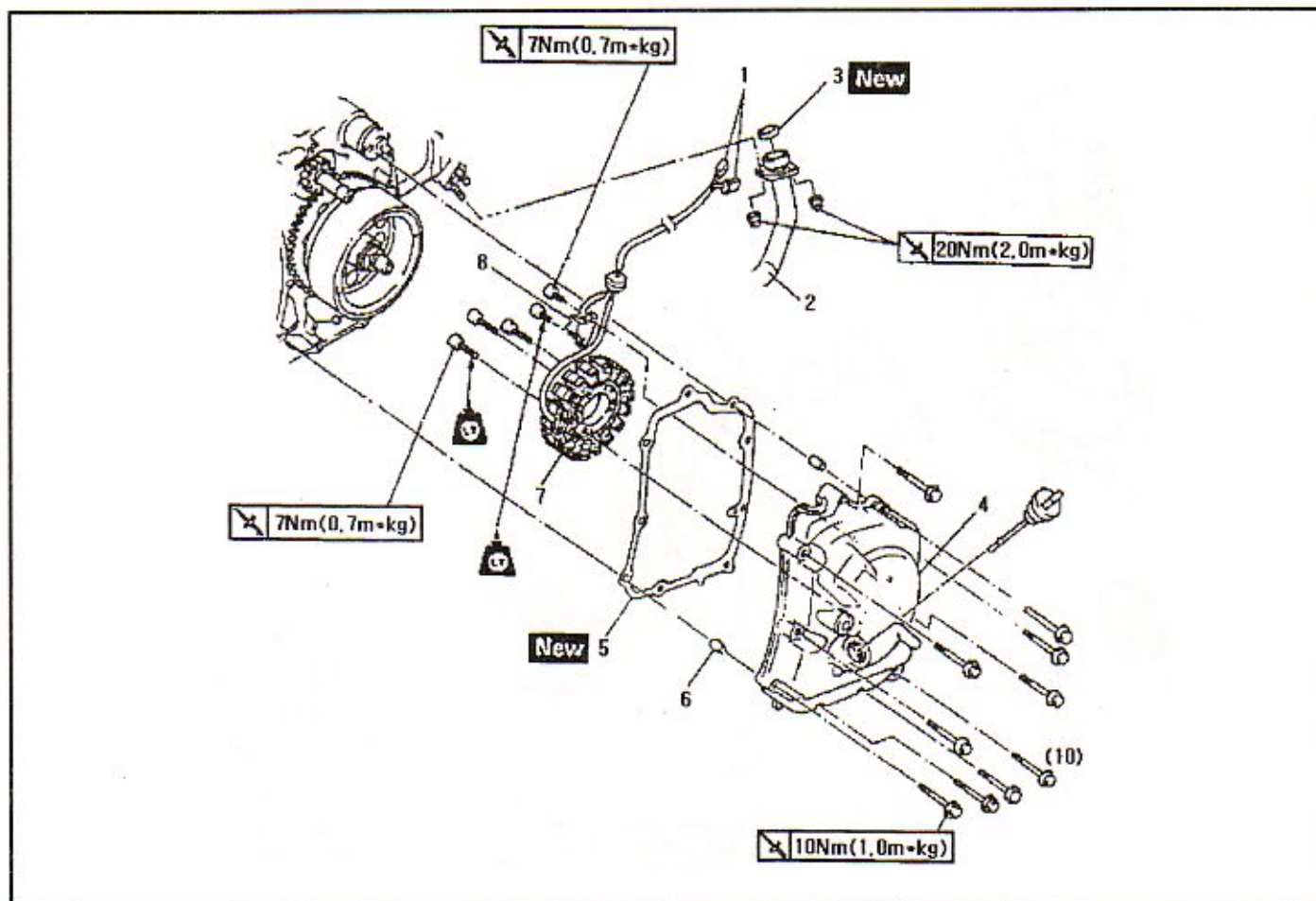
- V-belt ①

**NOTE:**

Move the V-belt to minimum diameter of the primary sheave ①, maximum diameter of the secondary sheave ② and make the V-belt tense.

## A.C. MAGNETO AND STARTER CLUTCH

### MAGNETO COVER AND STATOR COIL

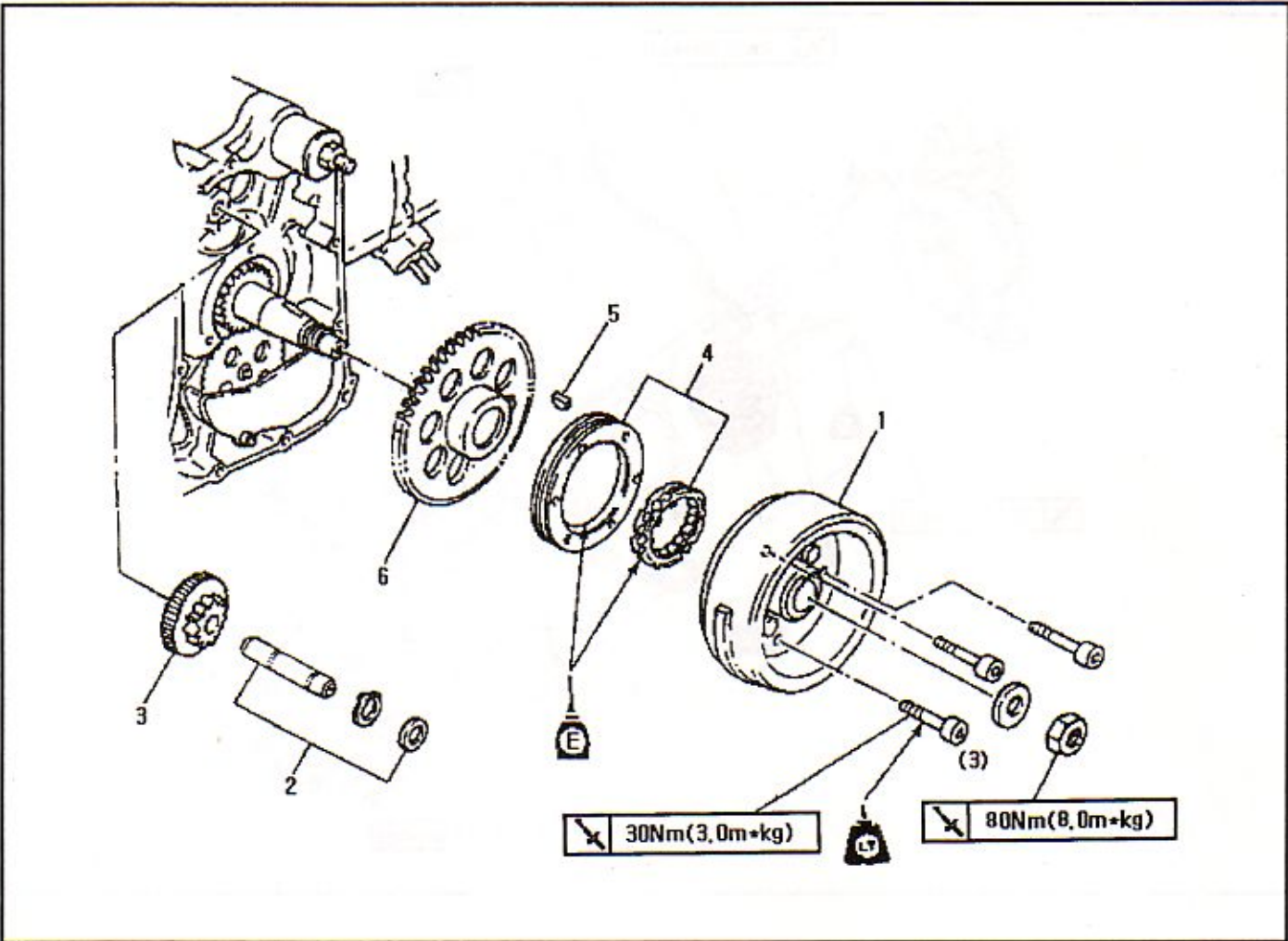


Order	Job name/Part name	Q'ty	Remarks
	<b>Magneto cover and stator coil removal</b> Drain the engine oil.		Remove the parts in order.  Refer to "ENGINE OIL REPLACEMENT" section. Refer to "COVER AND PANEL" section. <b>NOTE:</b> _____ _____
1	Couplers (A.C. magneto lead)	2	Disconnect the couplers.
2	Exhaust pipe	1	
3	Exhaust pipe gasket	1	
4	Magneto cover	1	
5	Gasket (magneto cover)	1	
6	Dowel pins	2	
7	Stator coil	1	
8	Pick up coil	1	
			Reverse the removal procedure for installation.

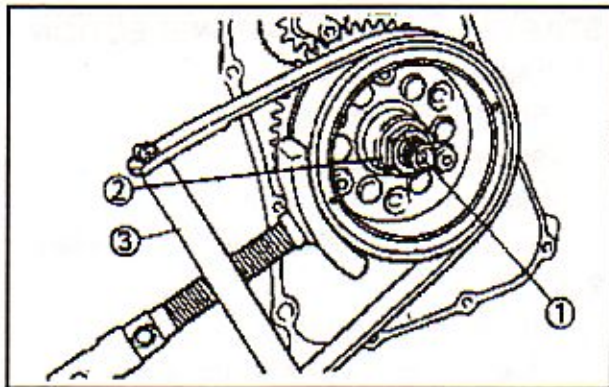


ENGINE

A.C. MAGNETO AND STARTER CLUTCH



Order	Job name/Part name	Q'ty	Remarks
	<b>A.C. magneto and starter clutch removal</b>		
1	Rotor	1	Remove the parts in order.  Refer to "A.C. MAGNETO ROTOR REMOVAL/INSTALLATION" section.
2	Shaft (idle gear)	1	
3	Idler gear	1	
4	Starter one way clutch assembly	1	
5	Woodruff key	1	Refer to "ROTOR INSTALLATION" section.
6	Starter wheel gear	1	
			Reverse the removal procedure for installation.



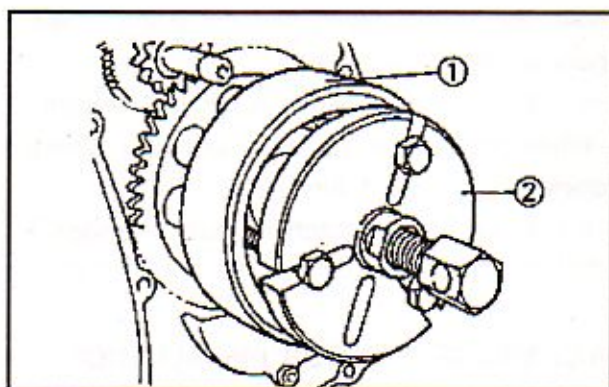
### A.C. MAGNETO ROTOR REMOVAL

#### 1. Remove:

- Nut ① (rotor)
- Plain washer ②

#### NOTE:

- Loosen the nut (rotor) ① while holding the rotor with a sheave holder ③.
- Do not allow the sheave holder to touch the projection on the rotor.



#### 2. Remove:

- Rotor ①
- Woodruff key

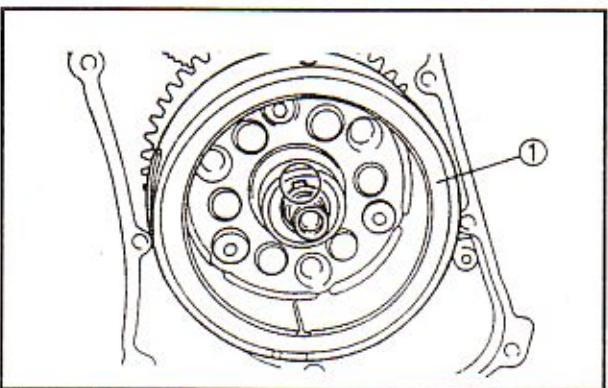
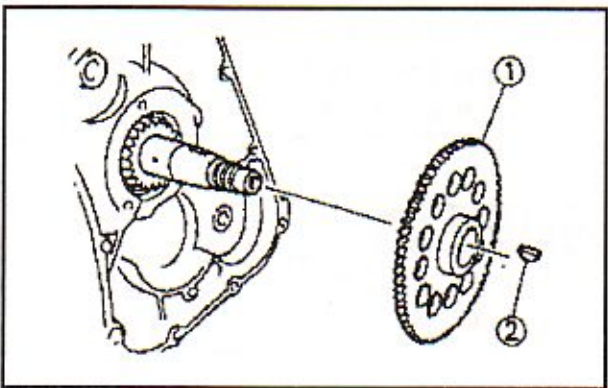
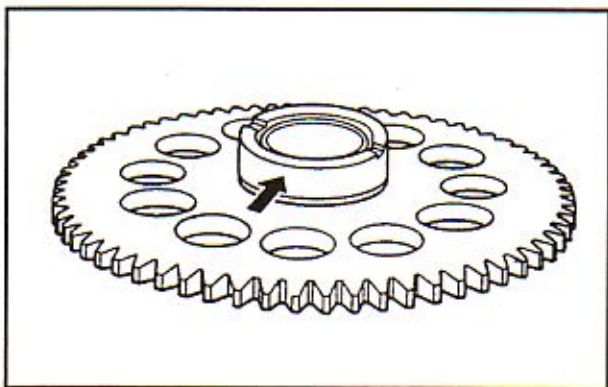
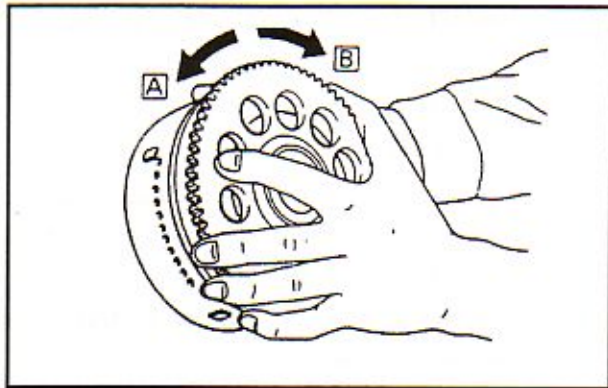
#### NOTE:

- Remove the rotor ② using the flywheel puller.
  - Center the flywheel puller over the rotor.
- Make sure after installing the holding bolts that the clearance between the flywheel puller and the rotor is the same everywhere. If necessary, one holding bolt may be turned out slightly to adjust the flywheel puller's position.

### CAUTION:

Cover the crankshaft end with the box wrench for protection.





## STARTER DRIVE GEAR INSPECTION

### 1. Inspect:

- Starter idle gear teeth
  - Starter drive gear teeth
  - Starter wheel gear teeth
- Burrs/chips/roughness/wear → Replace.

### 2. Check:

- Starter clutch operation

Push the dowel pins to the arrow direction.

Unsmooth operation → Replace.

\*\*\*\*\*

### Checking steps:

- Hold the starter clutch.
- When turning the starter wheel gear clockwise, the starter clutch and the starter wheel gear should be engaged.
- If not, the starter clutch is faulty. Replace it.
- When turning the starter wheel gear counter-clockwise, it should turn freely.
- If not, the starter clutch is faulty. Replace it.

\*\*\*\*\*

## A.C. MAGNETO ROTOR INSTALLATION

### 1. Install:

- Starter wheel gear ①
- Woodruff key ②

### NOTE:

Install the starter wheel gear ①, then install the woodruff key ②.

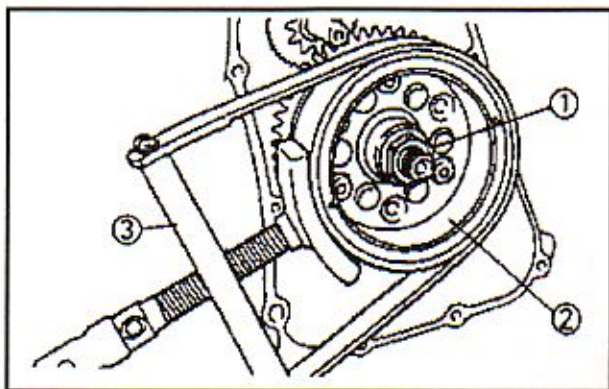
### 2. Install:

- Plain washer
- Rotor ①

### NOTE:


• Clean the tapered portion of the crankshaft and the rotor hub.

• When installing the magneto rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.



## 3. Tighten:

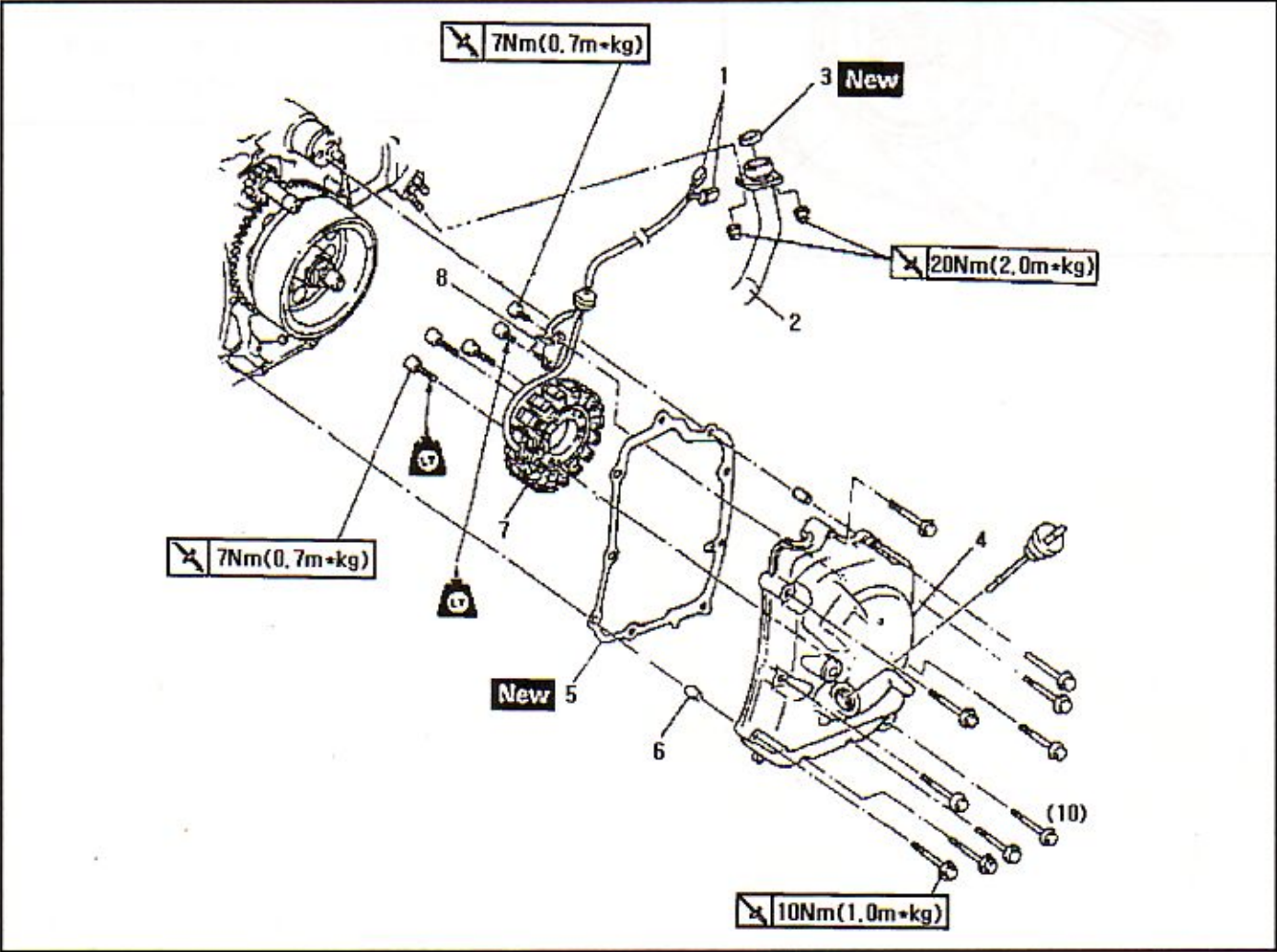
· Nut (rotor) ①

 80Nm(8.0m·kg)**NOTE:**

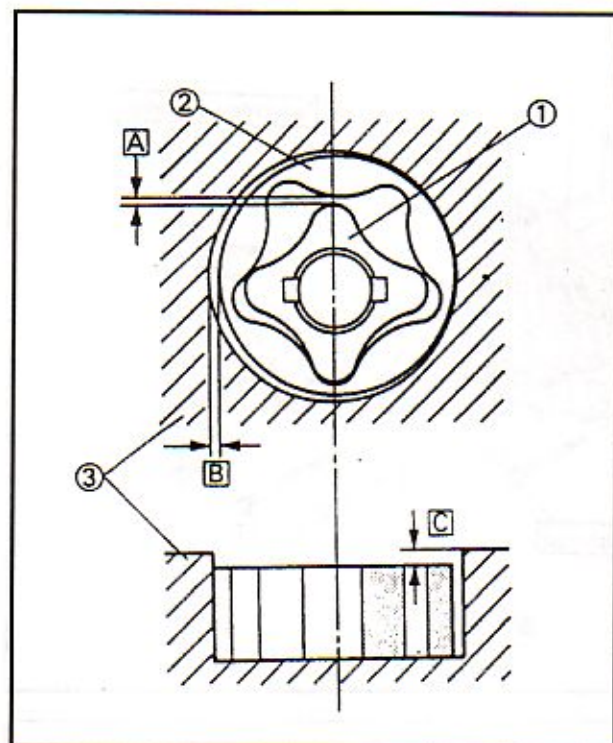
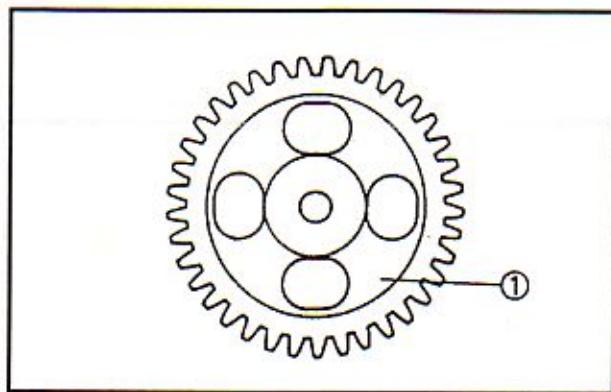
Tighten the nut (rotor) ① while holding the magneto rotor ② with a sheave holder ③.



OIL PUMP



Order	Job name/Part name	Q'ty	Remarks
	<b>Oil pump removal</b>		
	<b>A.C. magneto</b>		Remove the parts in order. Refer to "A.C. MAGNETO AND STARTER CLUTCH" section.
1	Cover	1	
2	Pump driven gear	1	
3	Dowel pin	1	
4	Oil pump assembly	1	
5	Gasket	1	
6	Impeller shaft gear	1	
7	Dowel Pin	1	
8	Shaft	1	
			Reverse the removal procedure for installation.



## OIL PUMP INSPECTION

### 1. Inspect:

- Drive gear (oil pump)
- Drive gear (oil pump) ①
- Pump housing
- Pump housing cover
- Wear/cracks/damage → Replace.

### 2. Measure:

- Tip clearance  
(between the inner rotor ① and the outer rotor ②)
- Side clearance  
(between the outer rotor ② and the pump housing ③)
- Housing and rotor clearance  
(between the pump housing ③ and the rotors ① ②)

Out of specification → Replace the oil pump assembly.



#### Tip clearance [A]:

0.10–0.34 mm <Limit: 0.40 mm>

#### Side clearance [B]:

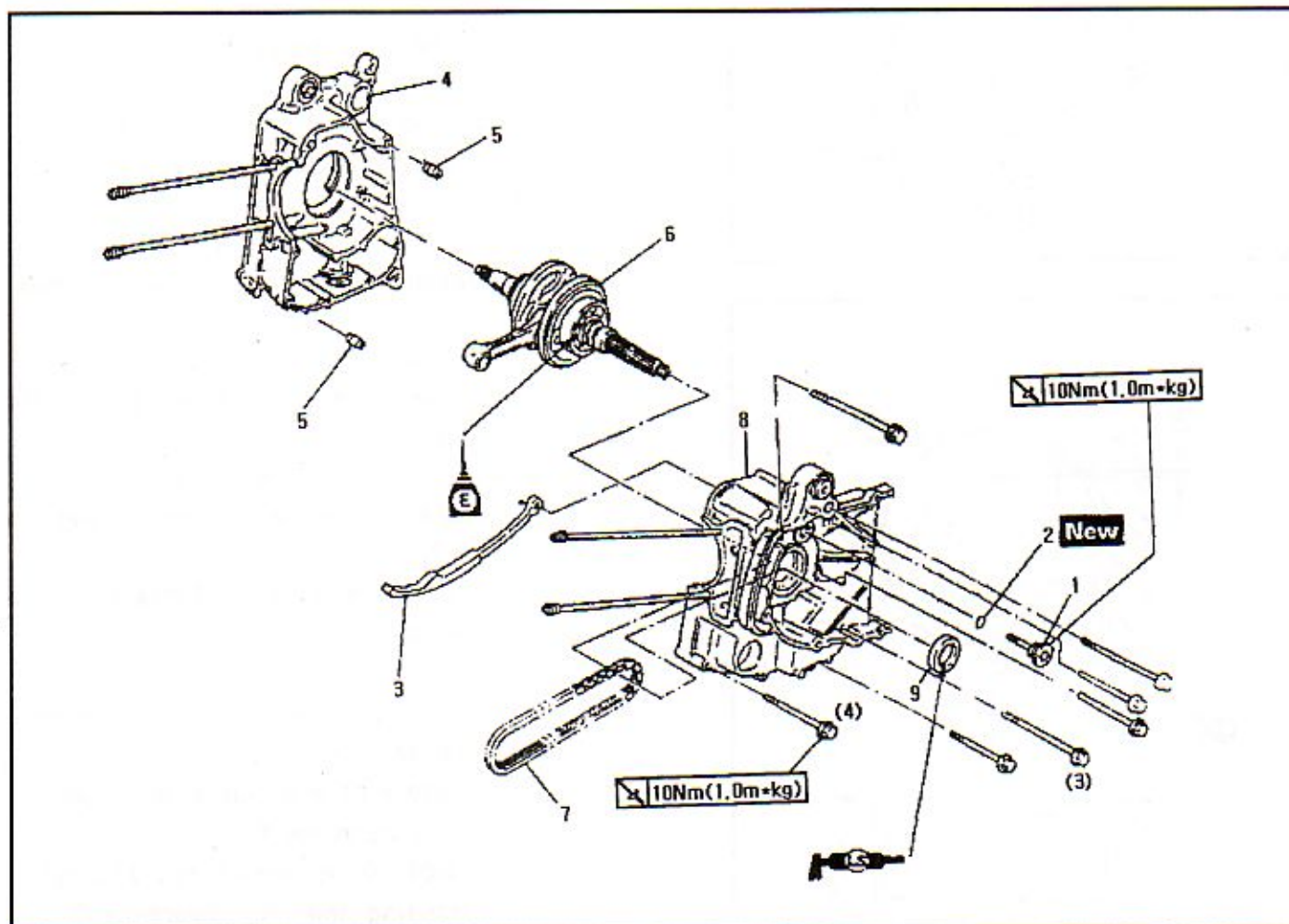
0.013–0.036 mm <Limit: 0.15 mm>

#### Housing and rotor clearance [C]:

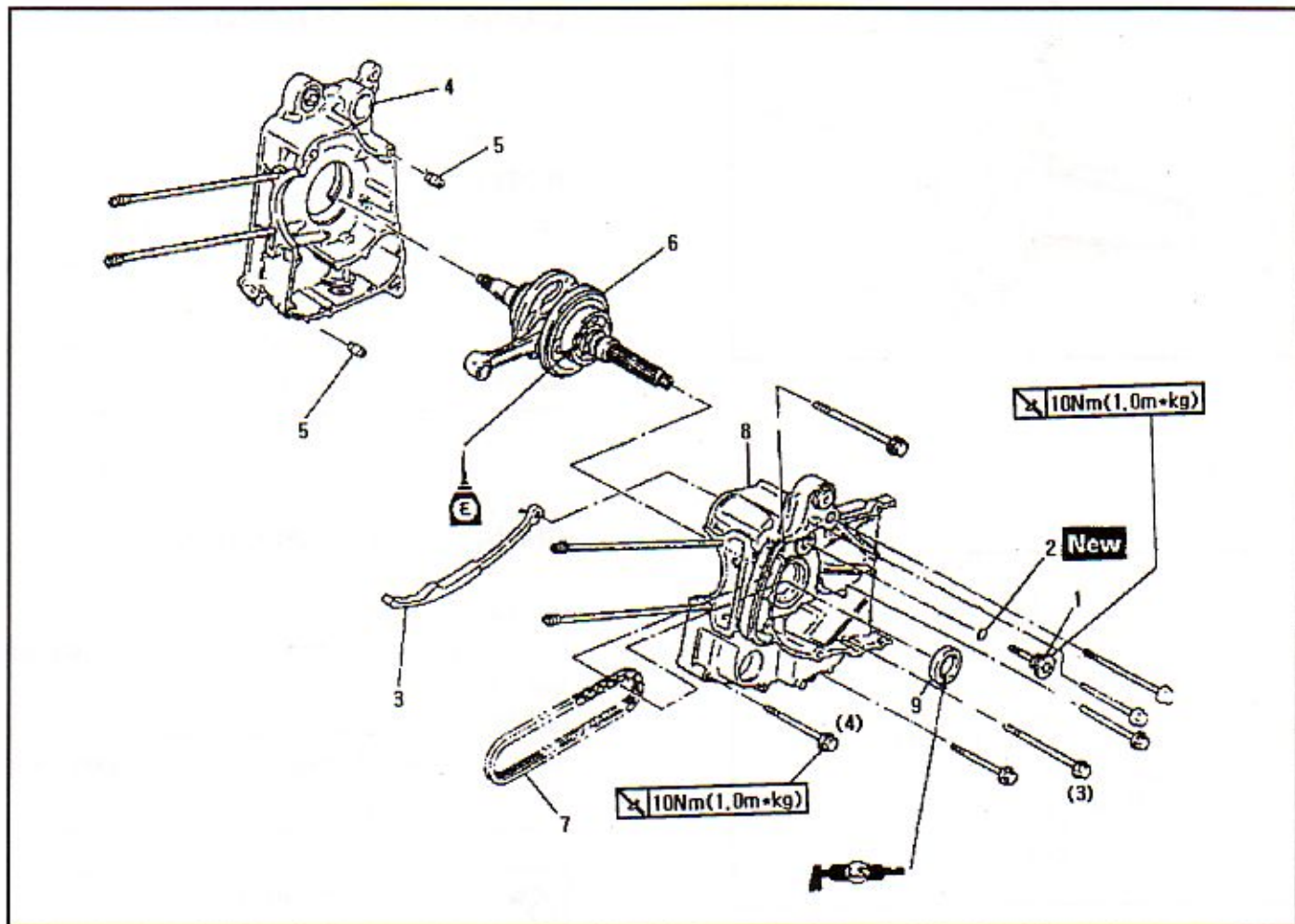
0.04–0.09 mm <Limit: 0.15 mm>



## CRANKCASE AND CRANKSHAFT

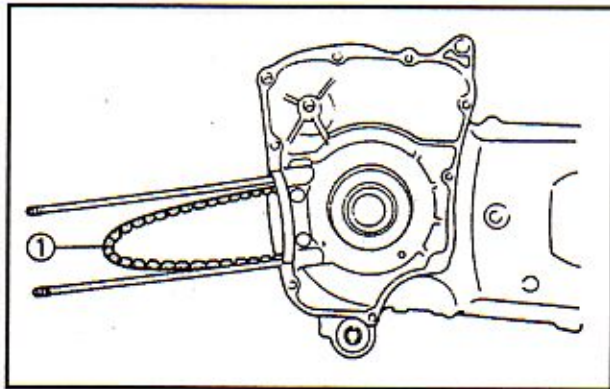


Order	Job name/Part name	Q'ty	Remarks
	<b>Crankcase and crankshaft removal</b>		Remove the parts in the order.
	Engine removal		Refer to "ENGINE REMOVAL" section.
	Cylinder head		Refer to "CYLINDER HEAD" section.
	Cylinder, and piston		Refer to "CYLINDER AND PISTON" section.
	V-belt, clutch, secondary/primary sheave		Refer to "V-BELT, CLUTCH AND SECONDARY/PRIMARY SHEAVE" section.
	A.C. magneto and starter clutch		Refer to "A.C. MAGNETO AND STARTER CLUTCH" section.
	Oil pump		Refer to "OIL PUMP" section.
	Water pump		Refer to "WATER PUMP" section.
	Rear wheel		Refer to "REAR WHEEL AND REAR BRAKE" section.
1	Bolt	1	
2	O-ring	1	



Order	Job name/Part name	Q'ty	Remarks
3	Timing chain guide (intake)	1	Refer to "CRANKSHAFT INSTALLATION" section.
4	Crankcase (right)	1	
5	Dowel pin	2	Refer to "CRANKSHAFT REMOVAL/INSTALLATION" section.
6	Crankshaft assembly	1	
7	Timing chain	1	
8	Crankcase (left)	1	
9	Oil seal	1	Reverse the removal procedure for installation.



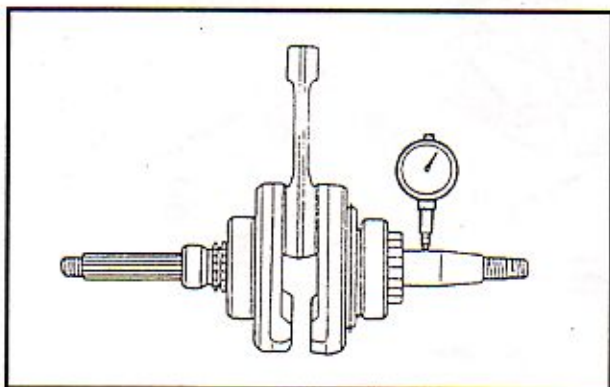


## CRANKSHAFT REMOVAL

1. Remove:
  - Crankshaft assembly
  - Timing chain ①

### NOTE:

- Before removing the crankshaft assembly, remove the timing chain from the crankshaft sprocket.
- If the timing chain hooks to the crankshaft sprocket, the crankshaft cannot be removed.



## CRANKSHAFT INSPECTION

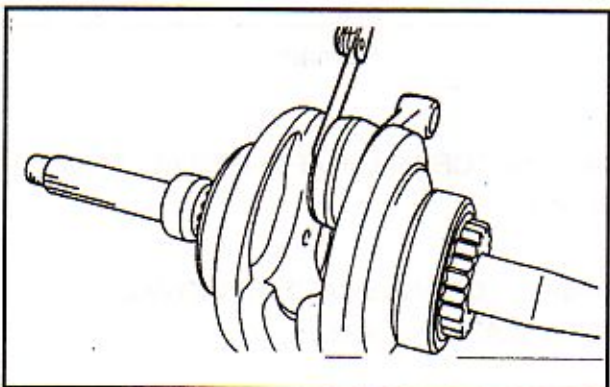
1. Measure:
  - Crankshaft runout
 Out of specification → Replace crankshaft and/or bearing.

### NOTE:

Measure the crankshaft runout with the crankshaft assembly running slowly.



**Runout limit:**  
**0.03 mm**



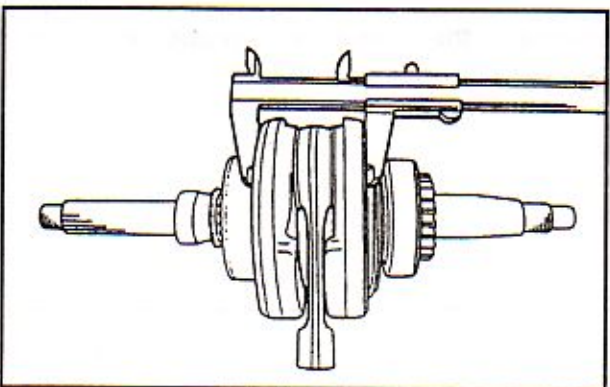
2. Measure:

- Big end side clearance

Out of specification → Replace big end bearing, crank pin and/or connecting rod.



**Big end side clearance:**  
**0.35–0.85 mm**



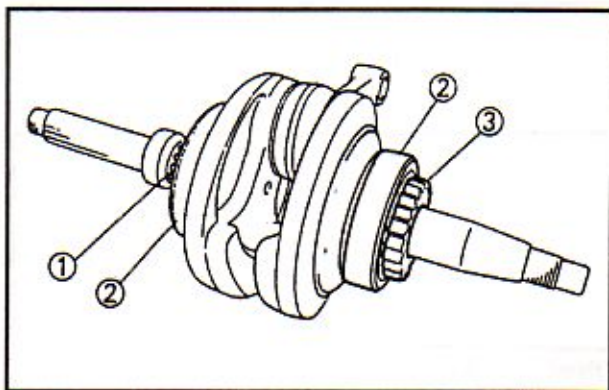
3. Measure:

- Crank width

Out of specification → Replace crankshaft.

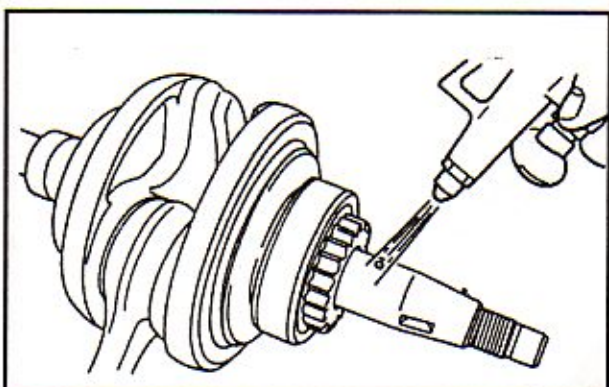


**Crank width:**  
**59.95–60.00 mm**



## 4. Inspect:

- Crankshaft sprocket ①  
Wear/Damage → Replace crankshaft.
- Bearing ②  
Wear/Crack/Damage → Replace crankshaft.
- Pump drive gear ③  
Wear/Damage → Replace crankshaft.



## 5. Inspect:

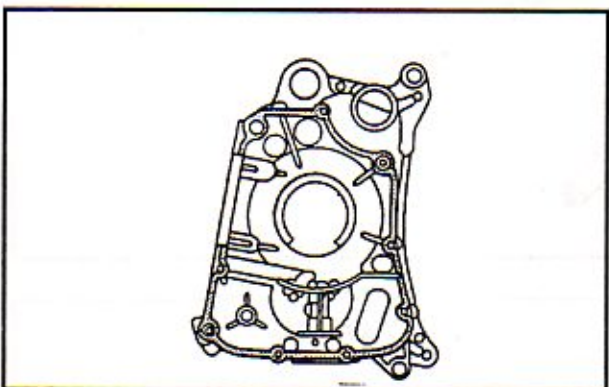
- Crankshaft journal  
Clogged → Blow out the journal with compressed air.

**CRANKCASE INSTALLATION**

1. Clean all the gasket mating surface and crankcase mating surface thoroughly.
2. Apply:
  - Sealant  
(onto the crankcase mating surfaces)

**NOTE:**

DO NOT ALLOW any sealant to come into contact with the oil gallery.

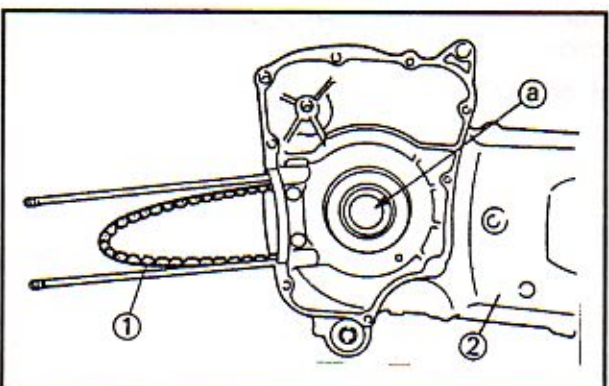


## 3. Install:

- Dowel pins
- Timing chain ①

**NOTE:**

Install the timing chain not to be seen through the crankshaft hole (a) on the crankcase (left) ②.

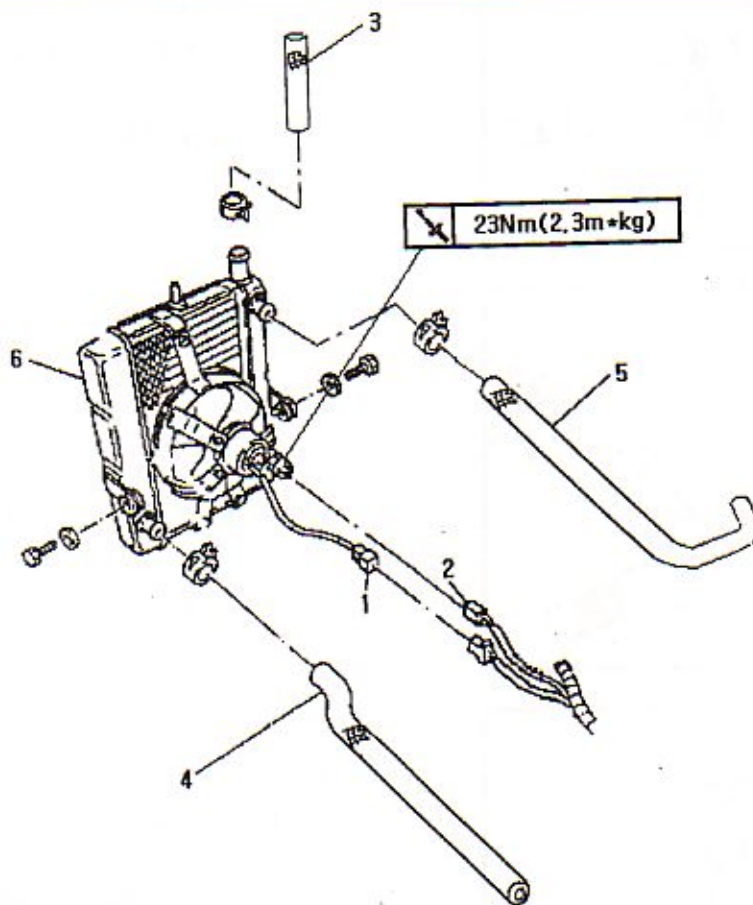




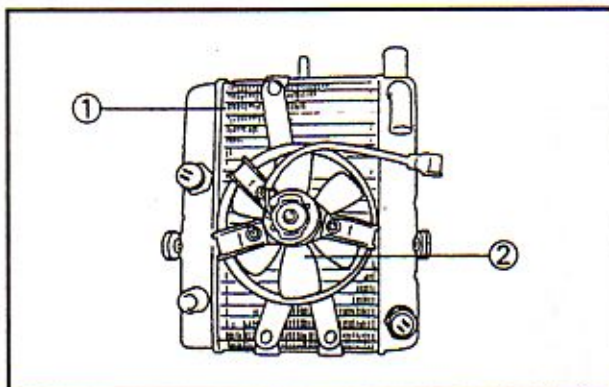
## ENGINE

### COOLING SYSTEM

#### RADIATOR



Order	Job name/Part name	Q'ty	Remarks
	<b>Radiator removal</b> Drain the coolant.		Remove the parts in order. Refer to "COOLANT REPLACEMENT" section. Not on ATV
1	Fan motor leads	1	
2	Thermo switch leads	2	
3	Filler hose (radiator)	1	
4	Outlet hose (radiator)	1	
5	Inlet hose (radiator)	1	
6	Radiator	1	
			Reverse the removal procedure for installation.



## INSPECTION

### 1. Inspect:

- Radiator ①

Obstruction → Blow out with compressed air through the rear of the radiator.

Flattened fins → Repair or replace.

If flattened over the 20% of radiator fin, repair or replace the radiator.

## CAUTION:

Use only specified adhesive to repair the radiator.

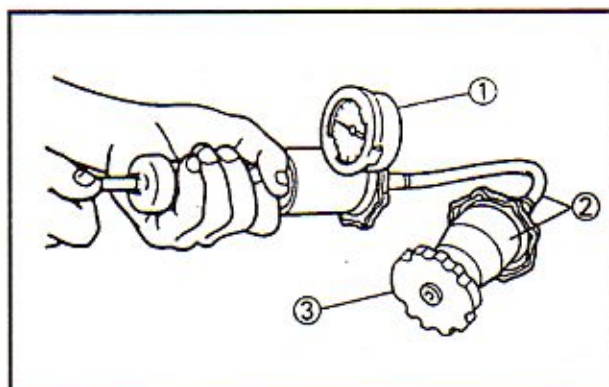
### 2. Inspect:

- Radiator hoses
- Radiator pipes

Cracks/damage → Replace.

### 3. Measure:

- Radiator cap opening pressure
- Radiator cap opens at a pressure below the specified pressure → Replace.



**Radiator cap opening pressure:**  
**110–140kPa**  
**(1.1–1.4 kg/cm<sup>2</sup>, 1.1–1.4 bar)**

### Measurement steps:

- Attach the radiator cap tester ① and adapter ② to the radiator cap ③.
- Apply the specified pressure for 10 seconds, and make sure there is no pressure drop.

### 4. Inspect:

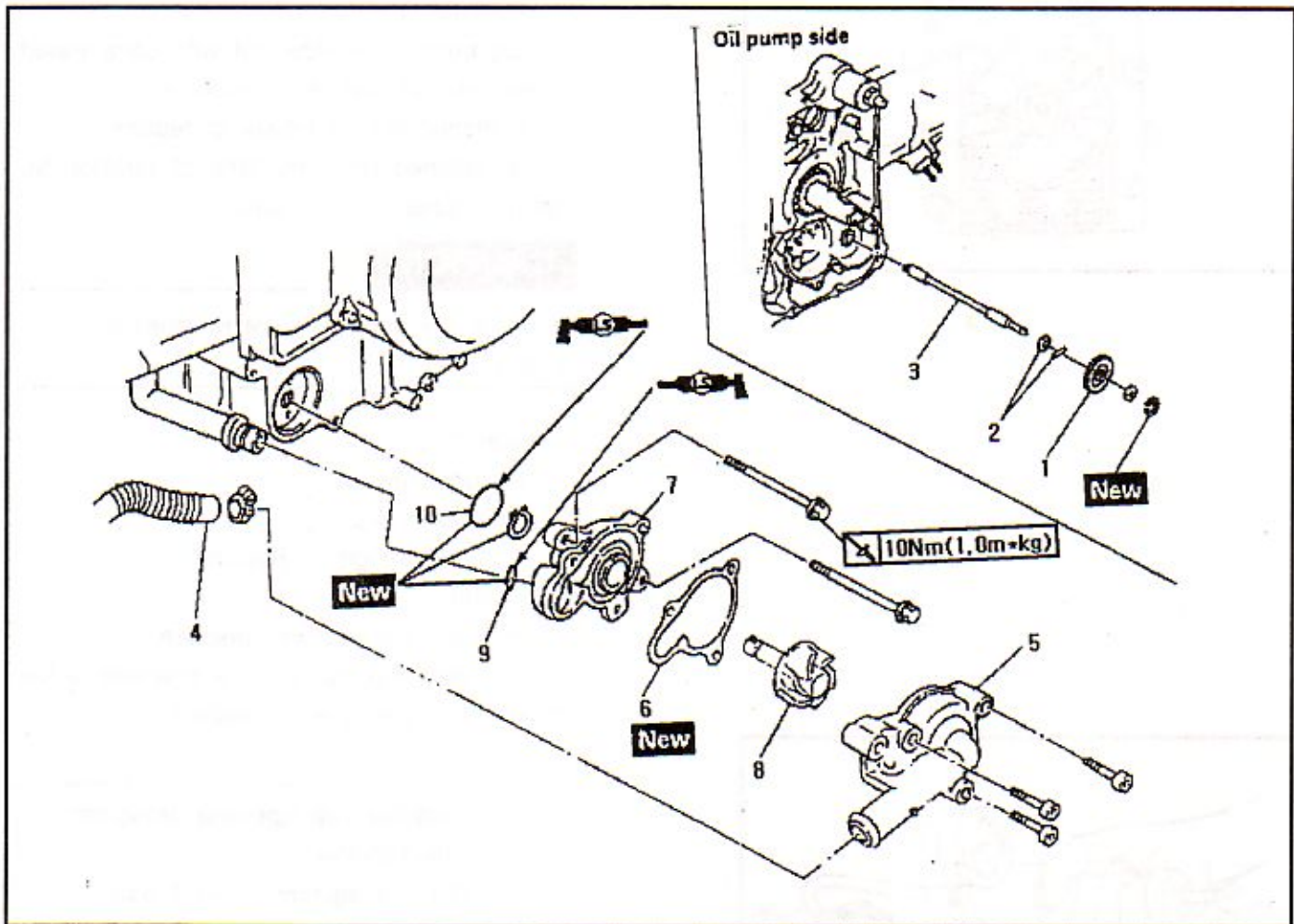
- Fan motor assembly
- Damage → Replace
- Malfunction → Check and repair.
- Refer to "COOLING SYSTEM".

### 5. Inspect:

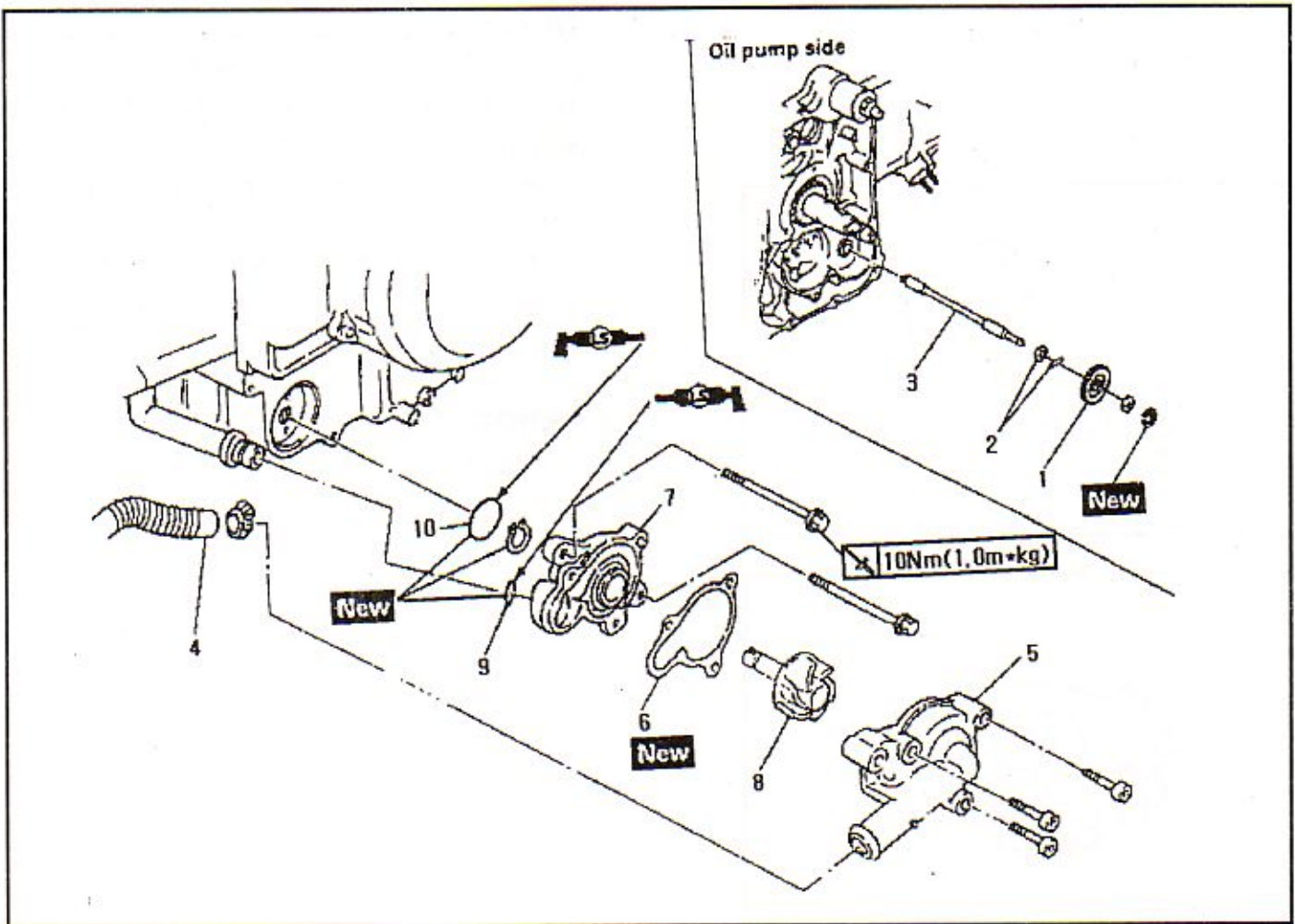
- Pipes
- Cracks/damage → Replace.



## WATER PUMP

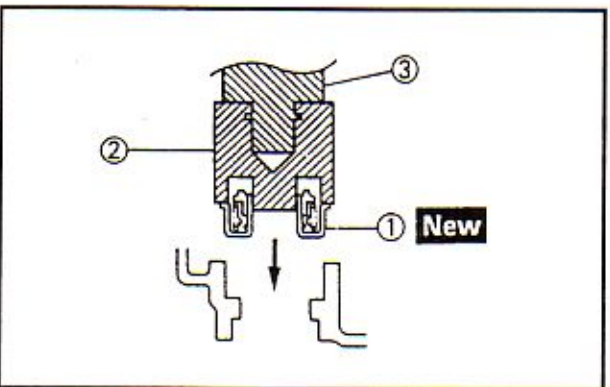
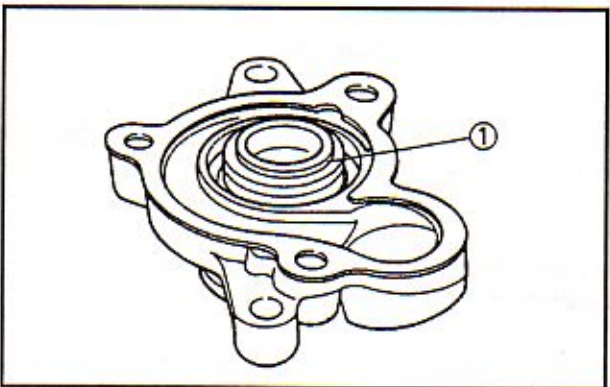
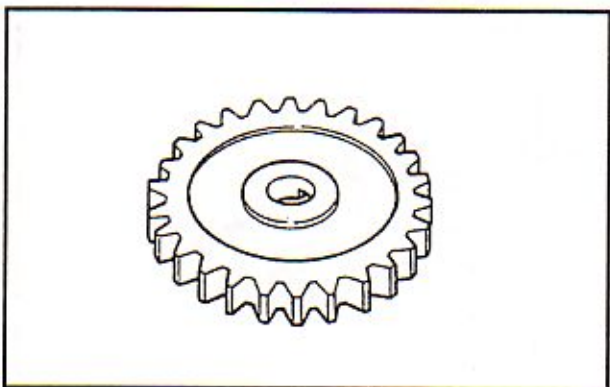
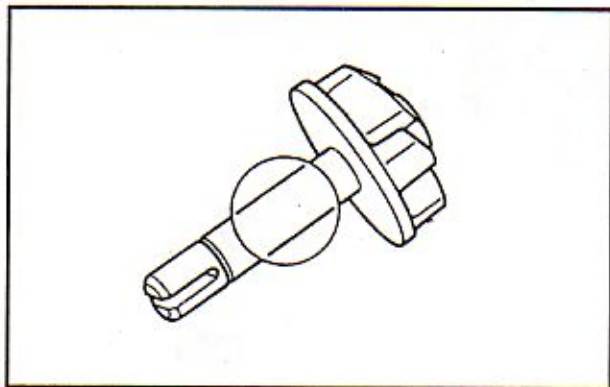


Order	Job name/Part name	Q'ty	Remarks
	<b>Water pump removal</b> Drain the coolant.  A.C. magneto		Remove the parts in order. Refer to "COOLANT REPLACEMENT" section. Refer to "A.C. MAGNETO AND STARTER CLUTCH" section.
1	Impeller shaft gear	1	
2	Dowel pin/plain washer	1/1	
3	Shaft	1	Refer to "WATER PUMP INSTALLATION" section.
4	Inlet hose (water pump)	1	
5	Housing cover	1	
6	Housing cover gasket	1	
7	Water pump housing	1	



Order	Job name/Part name	Q'ty	Remarks
8	Impeller shaft	1	Refer to "WATER PUMP INSTALLATION" section.
9	O-ring	1	
10	O-ring	1	
			Reverse the removal procedure for installation.





## NOTE:

- It is not necessary to disassemble the water pump, unless there is an abnormality such as excessive change in coolant temperature and/or level, dissoloration of coolant, or milky transmission oil.
- If necessary, replace water pump as an assembly.

## INSPECTION

1. Inspect:
  - Impeller shaft
  - Wear/damage → Replace.
  - Fur deposits → Clean.
2. Inspect:
  - Impeller shaft gear
  - Wear/damage → Replace.
3. Inspect:
  - Mechanical seal ①
  - Damage/worn/wear → Replace.

## WATER PUMP INSTALLATION

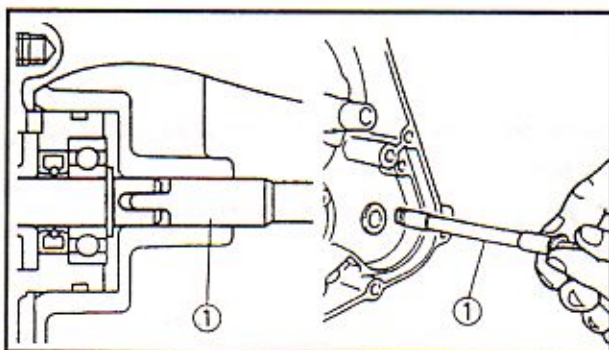
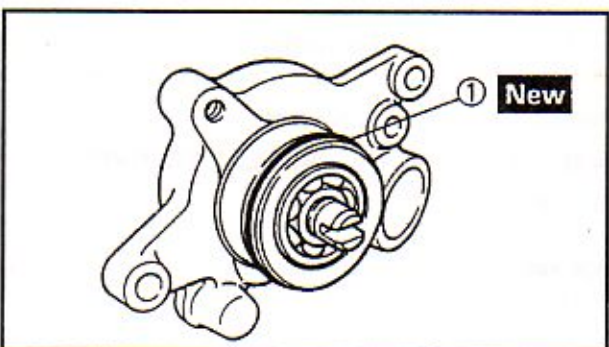
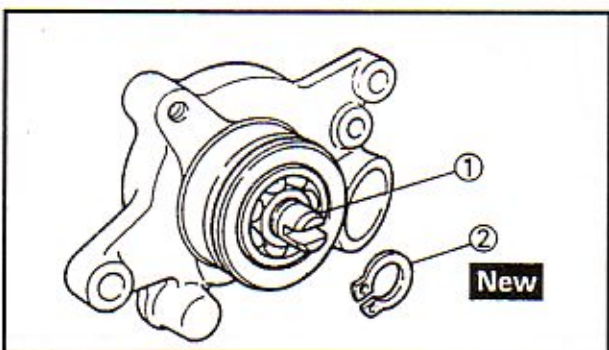
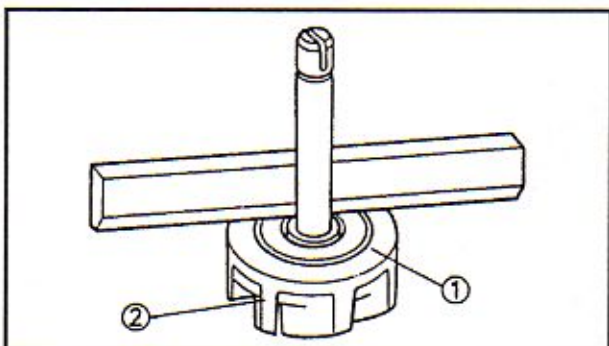
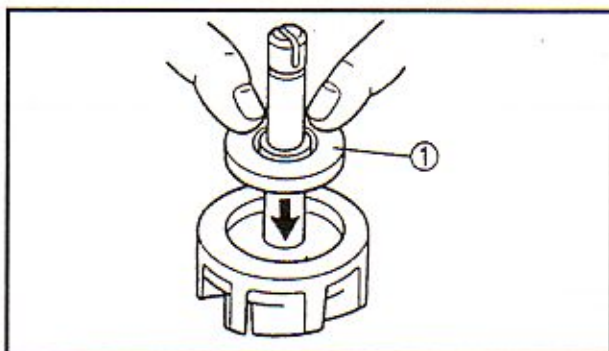
1. Install:
  - Mechanical seal ① **NEW**

\*\*\*\*\*

### Installation steps:

- Apply the bond to the outside of the mechanical seal.
- Install the mechanical seal by using the mechanical seal installer ② and middle shaft bearing driver ③.

\*\*\*\*\*



## 2. Install:

- Mechanical seal ① **NEW**

Apply coolant to the outside of the mechanical seal before installing.

**NOTE:**

Do not smear any oils or grease on the ring side of the mechanical seal.

## 3. Inspect:

- Mechanical seal, slip ring side ①

Inspect the slip ring side of the mechanical seal and the impeller ② for level installation.

Incorrect level → Reinstall.

## 4. Install:

- Impeller shaft ①

- Circlip ② **NEW**

**Installation steps:**

• Apply a small amount of grease to the impeller shaft tip.

• Install the impeller shaft while turning it.

Use care so that the oil seal is not damaged or the spring does not slip off its position.

**NOTE:**

After installing the impeller shaft, check it for smooth rotation.

## 5. Install:

- O-ring ① **NEW**

## 6. Install:

- Water pump housing

- Housing cover  10Nm(1.0m·kg)

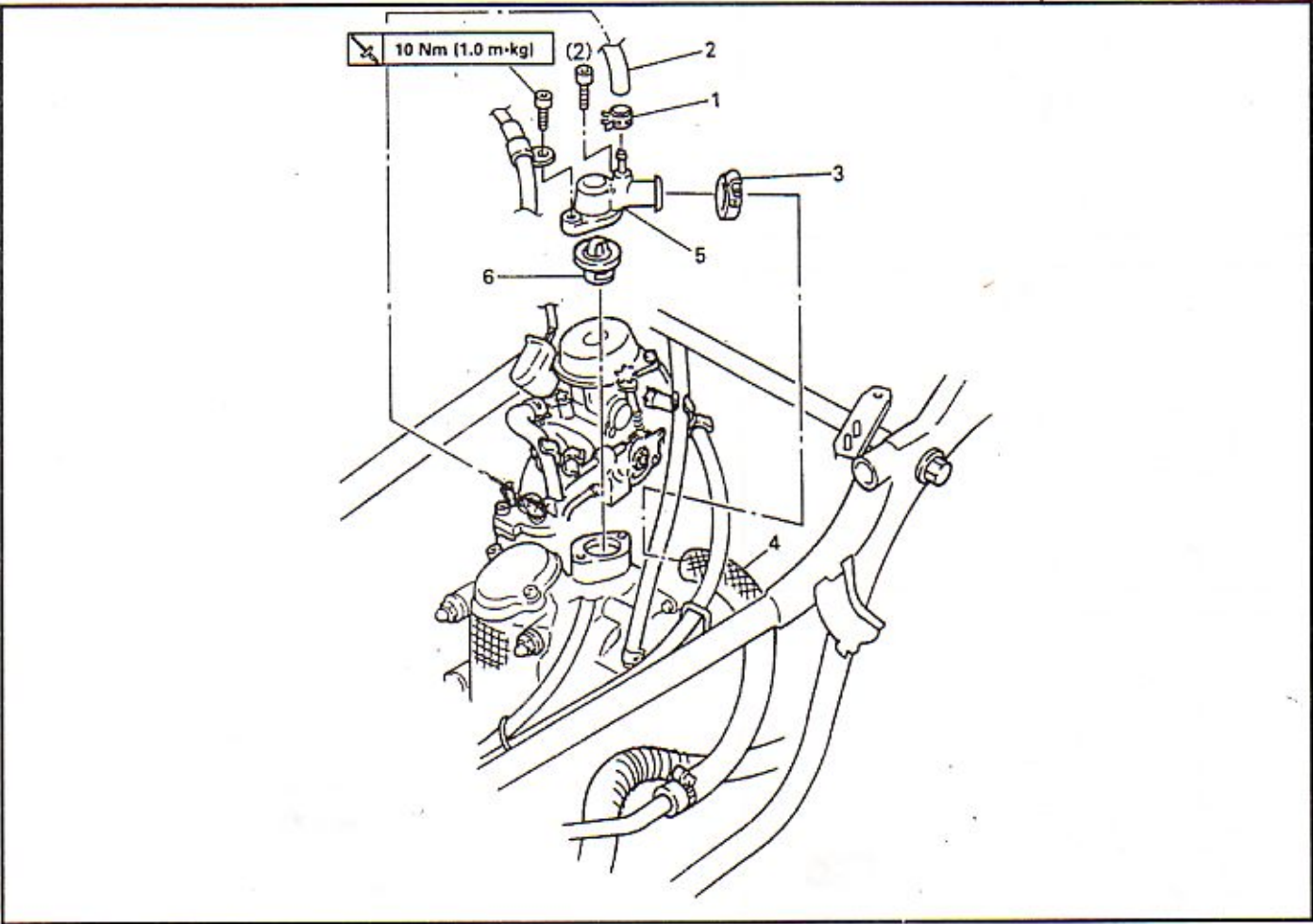
## 7. Install:

- Shaft ①

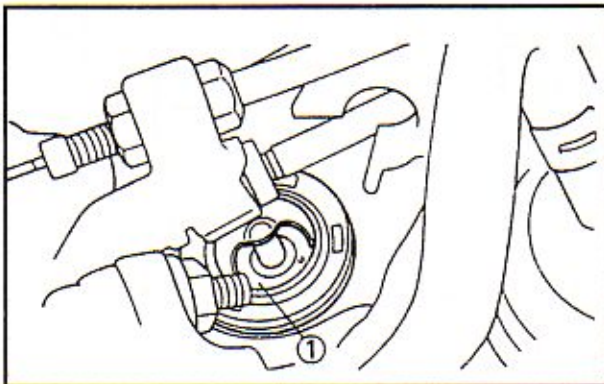
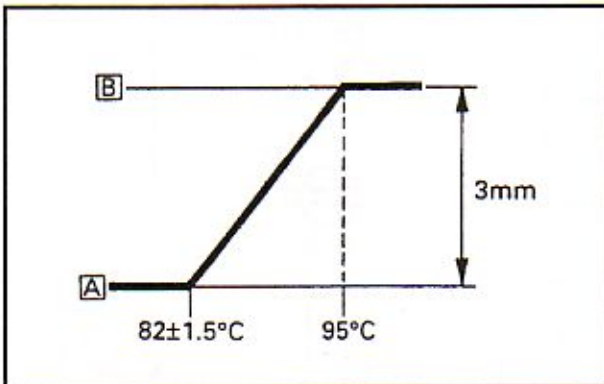
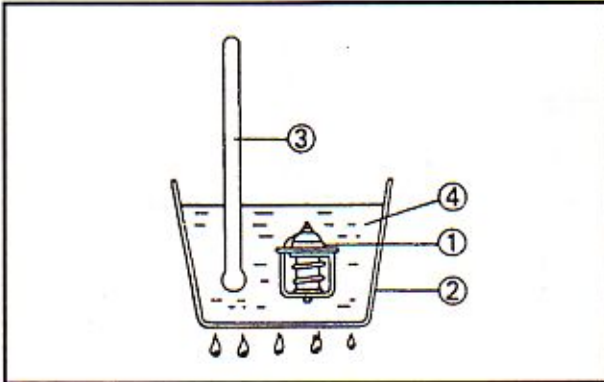
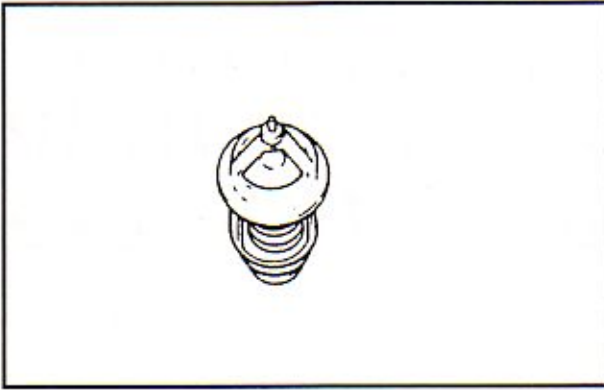
Align the slot on the impeller shaft with the projection on the shaft when installing.



THERMOSTAT



Order	Job name/Part name	Q'ty	Remarks
	<b>Thermostat removal</b>		
	Drain the coolant		Remove the parts in order. Refer to "COOLANT REPLACEMENT" section.
	Side panel		Not on ATV
	Fuel tank		
1	Clip	1	
2	Hose	1	
3	Hose clamp	1	
4	Outlet hose (thermostat)	1	
5	Thermostatic cover	1	Refer to "THERMOSTAT INSTALLATION" section.
6	Thermostatic valve	1	Reverse the removal procedure for installation.



## INSPECTION

### 1. Inspect:

- Thermostatic valve

Valve does not open at 80.5–83.5°C → Replace.

\*\*\*\*\*

### Inspection steps:

- Suspend the thermostatic valve in a vessel.
- Place a reliable thermometer in water.
- Observe the thermometer, while continually stirring the water.

\*\*\*\*\*

① Thermostatic valve

② Vessel

③ Thermometer

④ Water

A CLOSE

B OPEN

### NOTE: \_\_\_\_\_

The thermostatic valve is sealed and its setting requires specialized work. If its accuracy is in doubt, replace. A faulty unit could cause serious over-heating or over-cooling.

### 2. Inspect:

- Thermostatic cover

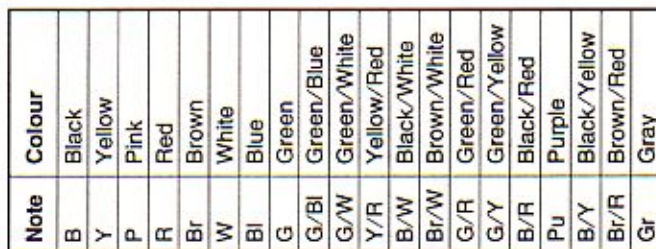
Cracks/damage → Replace.

## INSTALLATION

### 1. Install:

- Thermostatic valve ①
- Thermostatic cover





## HIGH BEAM HEADLIGHT LAMP REPLACEMENT

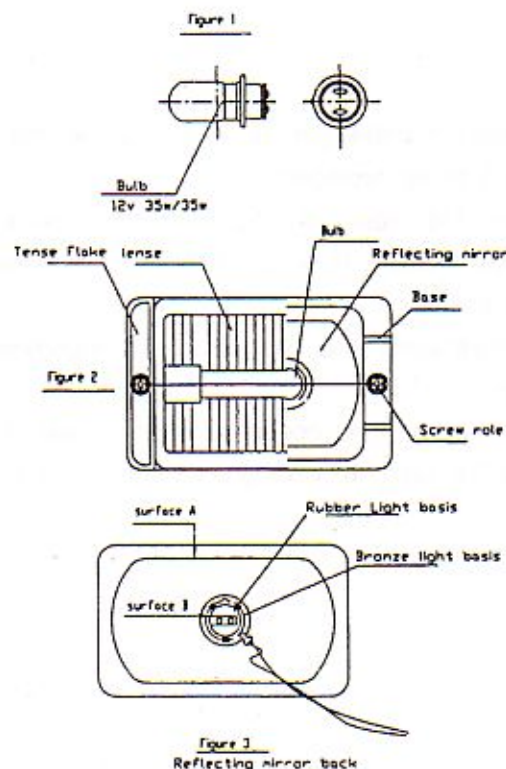
### CAUTION:

#### Lamp Replacement

#### Headlight Lamp Replacement

1. Use bulb 12V 35W (see figure 1) 35W/35W.
2. Turn the screw of the tense flake and remove it (see figure 2).
3. Remove the lens together with the reflecting mirror.
4. Take off the rubber light basis.
5. Change the bulb.
6. Fix the replacing bulb 12V 35W/35W into the bronze light basis of the reflecting mirror, and make sure the bulb's Points fit the light basis's inside roles.

7. Fix the rubber light basis into the bronze light basis of the reflecting mirror, and the 3 points of rubber light basis must be fixed into the 3 openings of bronze light basis, Then turn it so that its channel parallels the length side of reflecting mirror ( i. e. surface A/B). Moreover the rubber light basis opening turns left (see figure 3).
8. Fix the whole reflecting mirror into lens.
9. Fix the fasten flake and the screw.

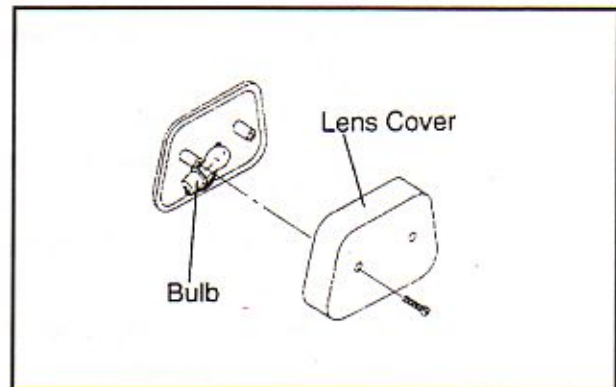




### TAILLIGHT/BRAKELIGHT LAMP REPLACEMENT

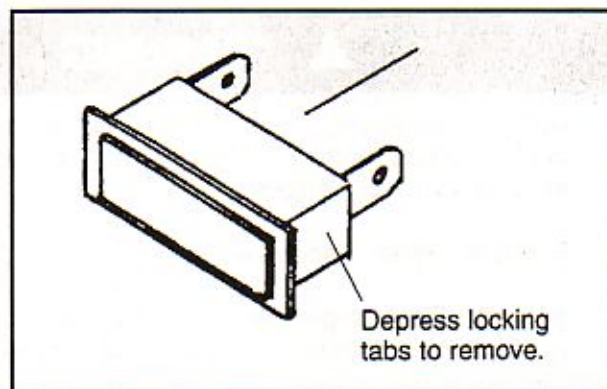
If the taillight/brakelight dose not work the lamp may need to be replaced.

1. From the rear of the taillight remove two screws holding lens cover in place and remove lens cover.
2. Remove lamp and replace it with recommended lamp.
3. Reinstall the lens cover removed in step 1.
4. Test the taillight/brakelight to see that it's working.



## INDICATOR LAMP REPLACEMENT

1. Disconnect light from harness, depress locking tabs and remove from pod.
2. Install new light and reassemble pod.





### INITIAL BATTERY SERVICE

#### WARNING

Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with skin, eyes or clothing. Antidote:

**External:** Flush with water.

**Internal:** Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.

**Eyes:** Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in an enclosed space. Always shield eyes when working near batteries. **KEEP OUT OF REACH OF CHILDREN.**

**WARNING:** The gases given off by a battery are explosive. Any spark or open flame near a battery can cause an explosion which will spray battery acid on anyone close to it. If battery acid gets on anyone, wash the affected area with large quantities of cool water and seek immediate medical attention.

To ensure maximum service life and performance from a new battery, perform the following steps. **NOTE:** Do not service the battery unless it will be put into regular service within 30 days. After initial service, add only distilled water to the battery. Never add electrolyte after a battery has been in service.

**NOTE: New Battery:** Battery must be fully charged before use or battery life will be significantly reduced 10–30% of battery's full potential.

1. Remove vent plug from vent fitting.
2. Fill battery with electrolyte to upper level marks on case.
3. Set battery aside and allow it to cool and stabilize for 30 minutes.
4. Add electrolyte to bring level back to upper level mark on case. **NOTE:** This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.
5. Charge battery at 1/10 of its amp/hour rating. Examples: 1/10 of 9 amp battery = .9 amp; 1/10 of 14 amp battery = 1.4 amp; 1/10 of 18 amp battery = 1.8 amp (recommended charging rates).
6. Check specific gravity of each cell with a hydrometer to assure each has a reading of 1.270 or higher.

### BATTERY TERMINALS/TERMINAL BOLTS

Use Polaris corrosion resistant Nyogel™ grease (PN 2871329) on battery bolts. See Battery Installation on page 153.



## BATTERY INSPECTION/REMOVAL

The battery is located under the left rear fender.


Inspect the battery fluid level. When the battery fluid nears the lower level, the battery should be removed and distilled water should be added to the upper level line. To remove the battery:


1. Disconnect holder strap and remove cover.
2. Disconnect battery negative (-) (black) cable first, followed by the positive (+) (red) cable.

### CAUTION

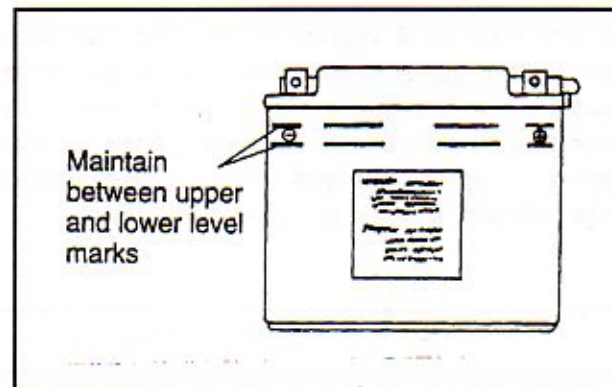
Whenever removing or reinstalling the battery, disconnect the negative (black) cable first and reinstall the negative cable last!

3. Disconnect the vent hose.
4. Remove the battery.
5. Remove the filler caps and add *distilled water only* as needed to bring each cell to the proper level. Do not overfill the battery.

 To refill use only distilled water. Tap water contains minerals which are harmful to a battery.


 Do not allow cleaning solution or tap water to enter the battery. It will shorten the life of the battery.

6. Reinstall the battery caps.



## BATTERY INSTALLATION

1. Clean battery cables and terminals with a stiff wire brush. Corrosion can be removed using a solution of one cup water and one tablespoon baking soda. Rinse with clean water and dry thoroughly.
2. Reinstall battery, attaching positive (+) (red) cable first and then the negative (-) (black) cable. Coat terminals and bolt threads with Nyogel™ grease PN 2871329.
3. Install clear battery vent tube from vehicle to battery vent. **WARNING:** Vent tube must be free from obstructions and kinks and securely installed. If not, battery gases could accumulate and cause an explosion. Vent should be routed away from frame and body to prevent contact with electrolyte. Avoid skin contact with battery electrolyte, severe burns could result. If electrolyte contacts the vehicle frame, corrosion will occur.
4. Route cables so they are tucked away in front and behind battery.
5. Reinstall battery cover and holder strap.

 Do not start the engine with the battery disconnected. Vehicle lamps will burn out if battery is disconnected during vehicle operation. Also, the reverse speed limiter can be damaged.

## BATTERY TESTING

Whenever a service complaint is related to either the starting or charging systems, the battery should be checked first.

Following are three tests which can easily be made on a battery to determine its condition: OCV Test, Specific Gravity Test and Load Test.

### OCV-OPEN CIRCUIT VOLTAGE TEST

Battery voltage should be checked with a digital multimeter. Readings of 12.6 or less require further battery testing and charging. See charts and Load Test on page 154.

**NOTE:** Lead-acid batteries should be kept at or near a full charge as possible. Electrolyte level should be kept between the low and full marks. If the battery is stored or used in a partially charged condition, or with low electrolyte levels, hard crystal sulfation will form on the plates, reducing the efficiency and service life of the battery.



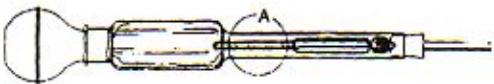
SPECIFIC GRAVITY TEST

A tool such as a Battery Hydrometer can be used to measure electrolyte strength or specific gravity. As the battery goes through the charge/discharge cycle, the electrolyte goes from a heavy (more acidic) state at full charge to a light (more water) state when discharged. The hydrometer can measure state of charge and differences between cells in a multi-cell battery. Readings of 1.270 or greater should be observed in a fully charged battery. Differences of more than .025 between the lowest and highest cell readings indicate a need to replace the battery.

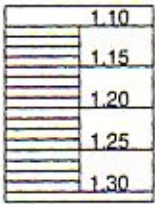
OPEN CIRCUIT VOLTAGE		
State of charge	Conventional Lead-acid	YnMicron™ Type
100% Charged	12.60V	12.70V
75% Charged	12.40V	12.50V
50% Charged	12.10V	12.20V
25% Charged	11.90V	12.0V
0% Charged	less than 11.80V	less than 11.9V

SPECIFIC GRAVITY		
State of charge*	Conventional Lead-acid	YnMicron™ Type
100% Charged	1.265	1.275
75% Charged	1.210	1.225
50% Charged	1.160	1.175
25% Charged	1.120	1.135
0% Charged	less than 1.100	less than 1.115

\*At 80°F  
NOTE: Subtract .01 from the specific gravity reading at 40°F.



Detail A



LOAD TEST

**CAUTION:** Remove spark plug high tension leads and connect securely to engine ground before proceeding.

**NOTE:** This test can only be performed on machines with electric starters. This test cannot be performed with an engine or starting system that is not working properly. A battery may indicate a full charge condition in the OCV test and the specific gravity test, but still may not have the storage capacity necessary to properly function in the electrical system. For this reason, a battery capacity or load test should be conducted whenever poor battery performance is encountered. To perform this test, hook a multimeter to the battery in the same manner as was done in the OCV test. The reading should be 12.6 volts or greater. Engage the electric starter and view the registered battery voltage while cranking the engine. Continue the test for 15 seconds. During this cranking period, the observed voltage should not drop below 9.5 volts. If the beginning voltage is 12.6 or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

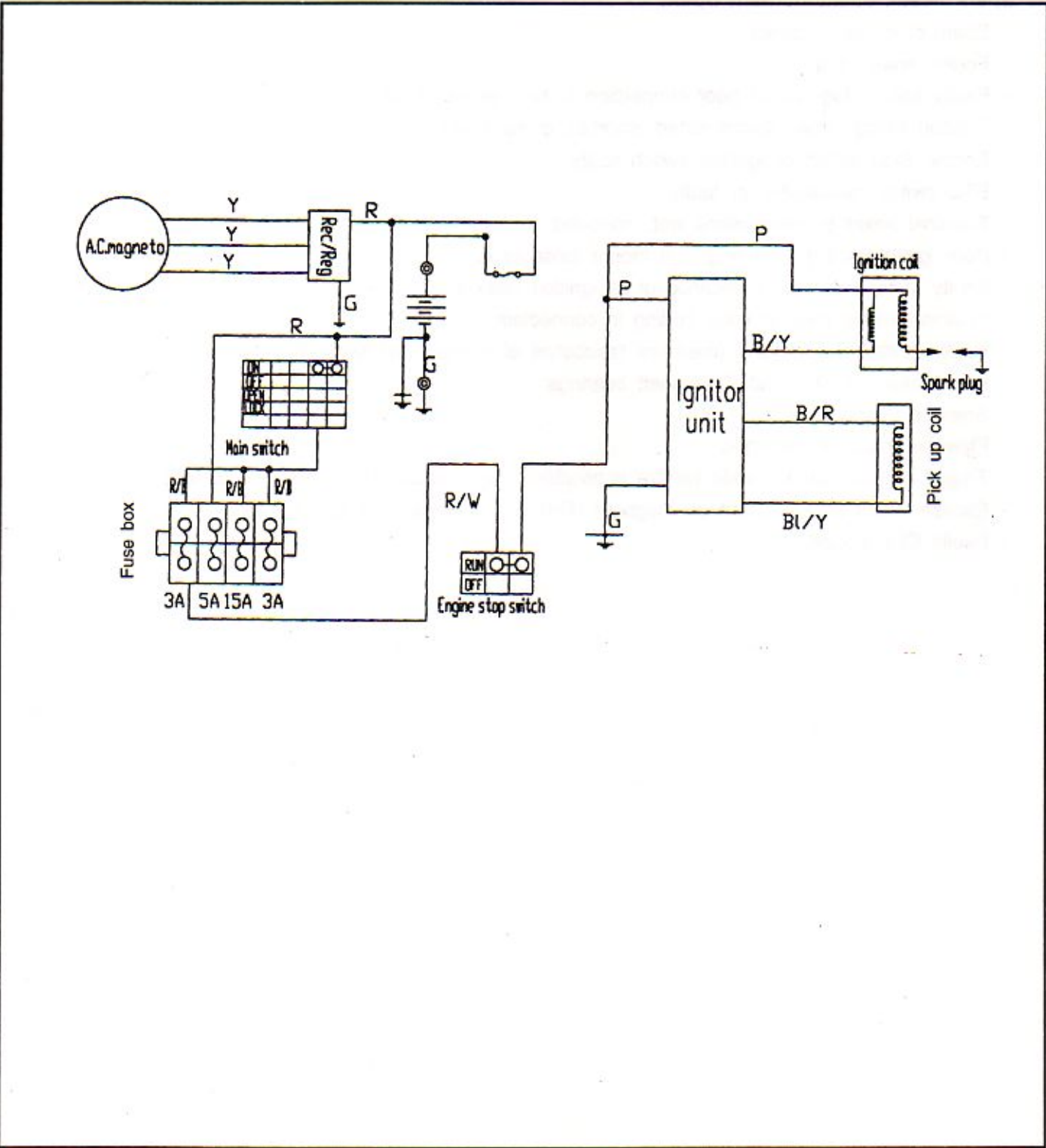
## IGNITION SYSTEM TROUBLESHOOTING

### **No Spark, Weak or Intermittent Spark**

- Spark plug gap incorrect
- Fouled spark plug
- Faulty spark plug cap or poor connection to high tension lead
- Related wiring loose, disconnected, shorted, or corroded
- Engine Stop switch or ignition switch faulty
- ETC switch misadjusted or faulty
- Terminal board or connections wet, corroded
- Poor ignition coil ground (e.g. coil mount loose or corroded)
- Faulty stator (measure resistance of all ignition related windings)
- Incorrect wiring (inspect color coding in connectors etc)
- Faulty ignition coil winding (measure resistance of primary and secondary)
- Worn magneto (RH) end Crankshaft bearings
- Sheared flywheel key
- Flywheel loose or damaged
- Trigger coil air gap too wide (where applicable) – should be .016–.030" (.4–.75 mm)
- Excessive crankshaft runout on magneto (RH) end – should not exceed .005"
- Faulty CDI module



IGNITION SYSTEM  
CIRCUIT DIAGRAM



## TROUBLESHOOTING

**IF THE IGNITION SYSTEM  
FAILS TO OPERATE.  
(NO SPARK OR INTERMITTENT SPARK)**

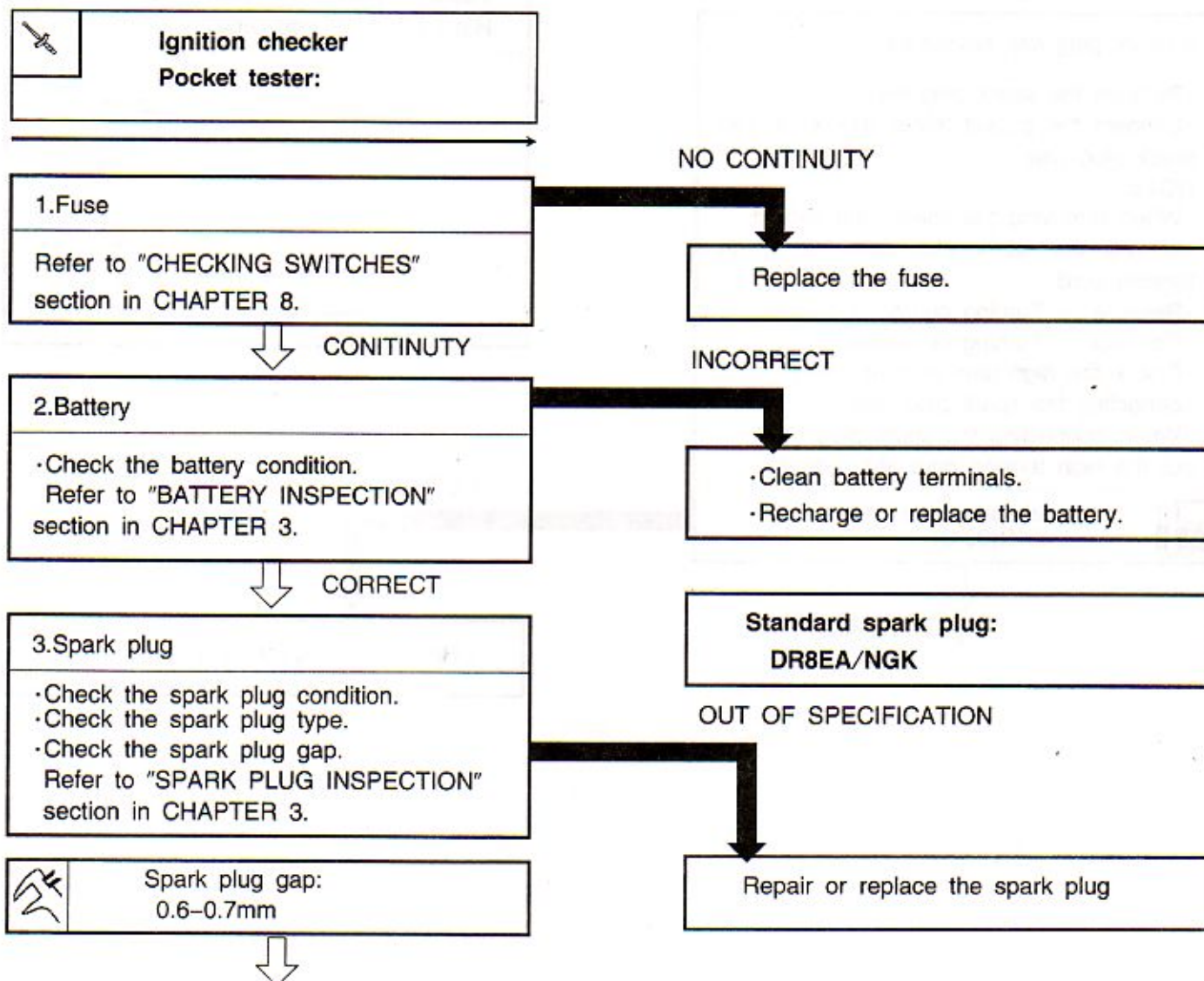
**Procedure**

Check:

- |                             |                          |
|-----------------------------|--------------------------|
| 1.Fuse (Main)               | 7.Pickup coil resistance |
| 2.Battery                   | 8.Main switch            |
| 3.Spark plug                | 9.Engine stop switch     |
| 4.Ignition spark gap        | 10.Sidestand switch      |
| 5.Spark plug cap resistance | 11.Wiring connection     |
| 6.Ignition coil             | (entire ignition system) |

**NOTE:**

- Remove the following parts before troubleshooting.
  - 1) Not on ATV
  - 2) Cowling body
- Use the special tools specified in the trouble shooting section.





# IGNITION SYSTEM

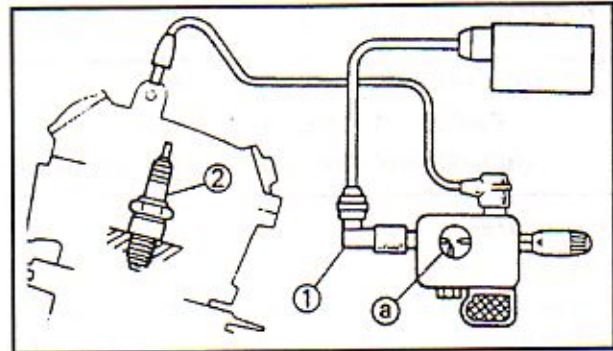


## 4. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition tester ① as shown.
- ② Spark plug
- Turn the main switch to "ON".
- Check the ignition spark gap ③.
- Check the spark by pushing the starter switch, and increase the spark gap until a misfire occurs.

**Minimum spark gap:**  
6mm (0.24 in)

OUT OF SPECIFICATION OR  
NO SPARK



MEETS SPECIFICATION

The ignition system is not faulty.

## 5. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the spark plug cap.

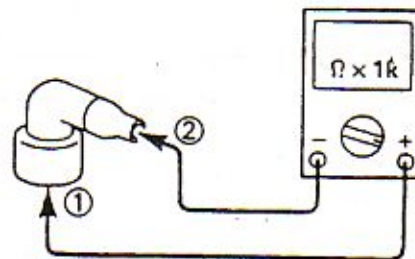
### NOTE:

- When removing the spark plug cap, do not pull the spark plug cap from high tension cord.
- Remove → Turning counterclockwise.
- Connect → Turning clockwise.
- Check the high tension cord when connecting the spark plug cap.
- When connecting the spark plug cap, cut the high tension cord about 5mm.

**Spark plug cap resistance:**  
5K $\Omega$ (20°C)

\* CORRECT

Tester (+) lead →  
Spark plug side ①  
Tester (-) lead →  
High tension cord side ②



OUT OF SPECIFICATION

Replace the spark plug cap.



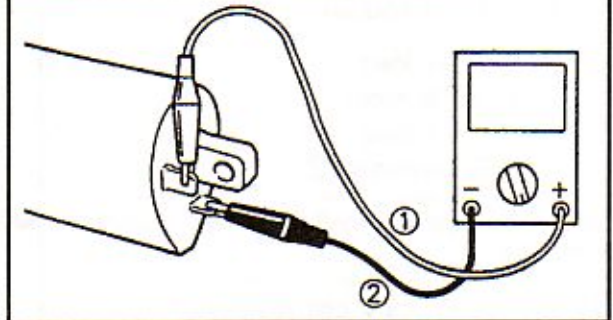
## 6. Ignition coil resistance

- Disconnect the ignition coil connector from the wireharness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil.
- Check if the primary coil has the specified resistance.

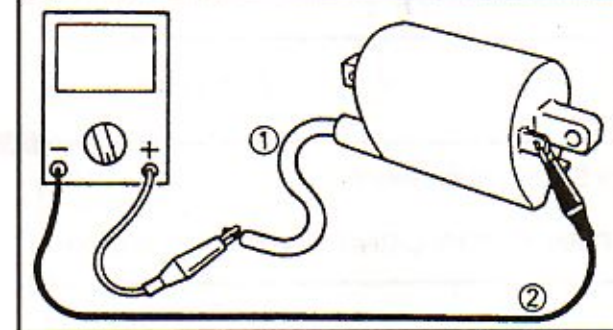


**Primary coil resistance:**  
3.6–4.8 $\Omega$ (20°C)

Tester (+) lead →  
Pink Terminal ①  
Tester (–) lead →  
B/Y Terminal ②



Tester (+) lead →  
Spark plug lead ①  
Tester (–) lead →  
Pink Terminal ②



- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil.
- Check the secondary has the specified resistance.



**Secondary coil resistance:**  
0.7–14.5k $\Omega$ (20°C)



BOTH MEET  
SPECIFICATION

OUT OF SPECIFICATION

Replace the ignition coil.



# IGNITION SYSTEM




7. Pickup coil resistance

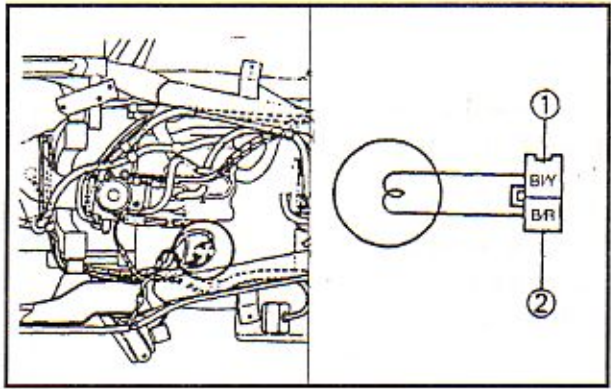
- Disconnect the pickup coil coupler from the wireharness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the pickup coil coupler.

Tester (+) lead →  
BI/Y Terminal ①

Tester (-) lead →  
B/R Terminal ②

- Check the pickup coil has the specified resistance.

 Primary coil resistance:  
3.6–4.8 $\Omega$ (20°C)



OUT OF SPECIFICATION

Replace the pickup coil.

8. Main switch

Refer to "CHECKING SWITCHES" section in the CHAPTER 8.

NO CONTINUITY

Replace the main switch.

9. Engine stop switch

Refer to "CHECKING SWITCHES" section

NO CONTINUITY

Replace the right handlebar switch.

10. Sidestand switch

Refer to "CHECKING SWITCHES" section

NO CONTINUITY

Replace the sidestand switch.

11. Wiring connection

- Check the connection of the entire ignition system

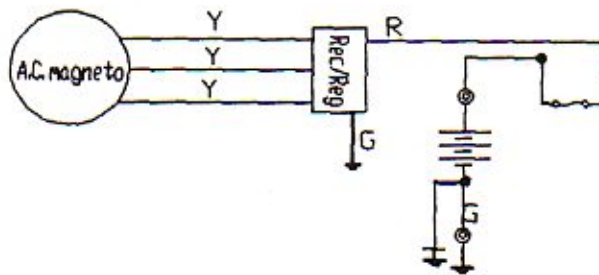
Refer to "CIRCUIT DIAGRAM".

POOR CONNECTIONS

Correct.

Replace the ignitor unit.

# CHARGING SYSTEM CIRCUIT DIAGRAM





# CHARGING SYSTEM

## TROUBLESHOOTING

### IF THE BATTERY IS NOT CHARGED

#### Procedure

##### Check:

- 1.Fuse (Main)
- 2.Battery
- 3.Charging voltage

#### NOTE:

•Remove the following parts before troubleshooting.

- 1)Side panels
- 2)Tail cover

•Use the special tools specified in the troubleshooting section.

4.Stator coil resistance

5.Wiring system (entire charging system)



Engine tachometer  
Pocket tester;

1.Fuse

Refer to "CHECKING SWITCHES" section.

NO CONTINUITY

Replace the fuse.

2.Battery

•Check the battery condition.  
Refer to "BATTERY INSPECTION"  
section in CHAPTER 3.

INCORRECT

•Clean battery terminals.  
•Recharge or replace the battery.

CONTINUITY

CORRECT

\*

**3.Charging voltage**

- Connect the engine tachometer to the spark plug lead ①.
- Connect the pocket tester (DC20V) to the battery.

Tester (+) lead →  
Battery (+) terminal ①  
Tester (-) lead →  
Battery (-) terminal ②

- Measure the battery terminal voltage.
- Start the engine and accelerate to about 5,000rpm.
- Check the terminal voltage.



**Charge voltage=**  
**measured voltage-terminal**  
**voltage:**  
**0.2-2.5V up**

**NOTE:**

Use a fully charged battery.

MEETS SPECIFICATION

The charging circuit is not faulty.  
Replace the battery.

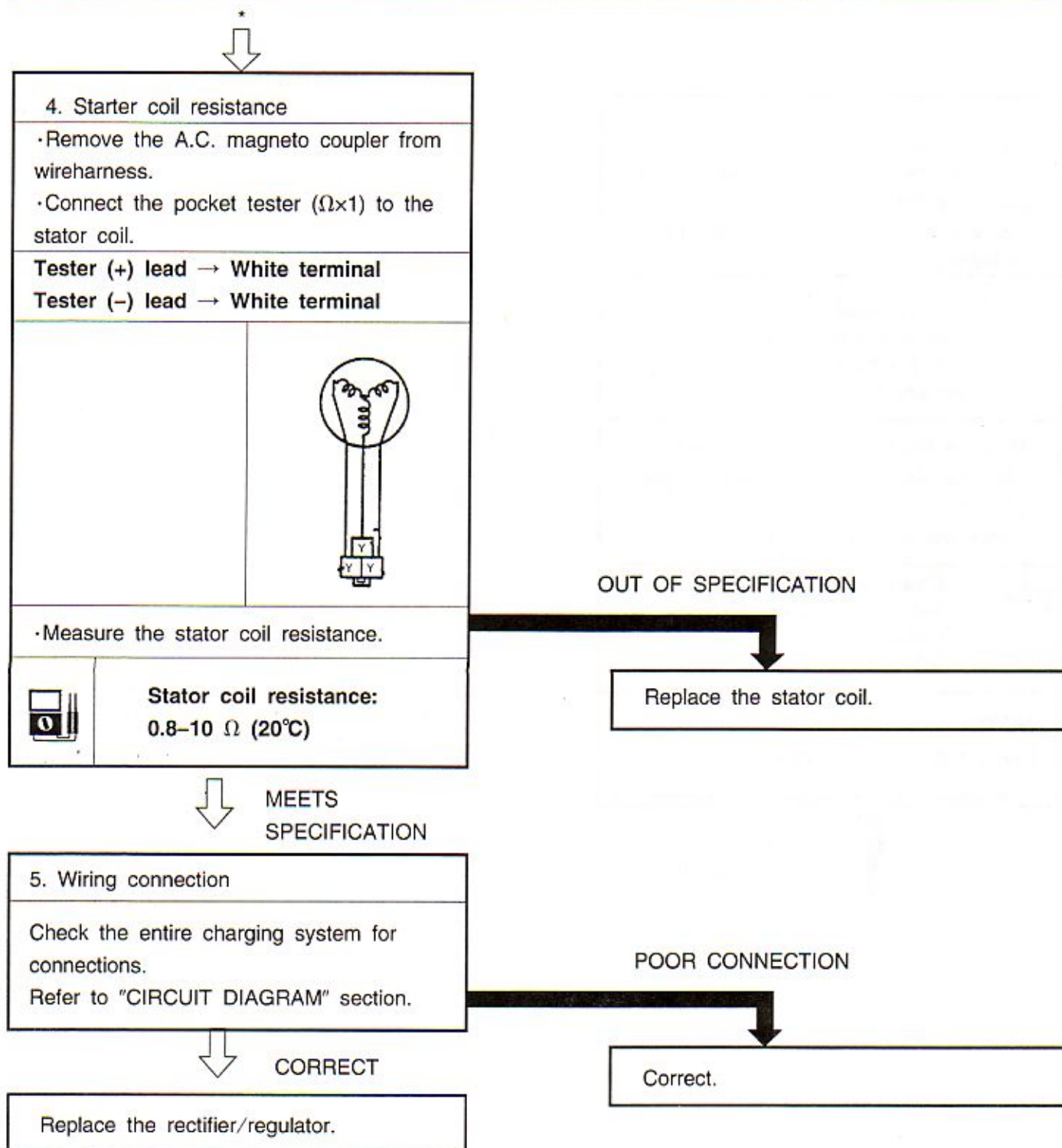


OUT OF  
SPECIFICATION

\*



## CHARGING SYSTEM

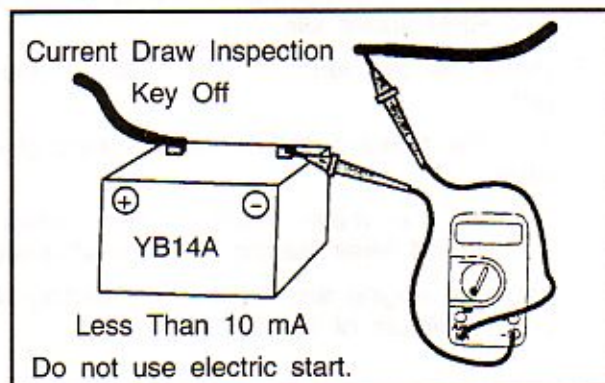


## CURRENT DRAW-KEY OFF

**CAUTION:** Do not connect or disconnect the battery cable or ammeter with the engine running. Damage will occur to light bulbs and speed limiter.

Connect an ammeter in series with the negative battery cable. Check for current draw with the key off, if the draw is excessive, loads should be disconnected from the system one by one until the draw is eliminated. Check component wiring as well as the component for partial shorts to ground to eliminate the draw.

**Current Draw – Key Off:**  
**Maximum of .01 DCA (10 mA)**



## CHARGING SYSTEM “BREAK EVEN” TEST

**CAUTION:** Do not connect or disconnect the battery cable or ammeter with the engine running.

**CAUTION:** Never use the electric starter with the ammeter connected, or damage to the meter or meter fuse may result. Do not run test for extended period of time. Do not run test with high amperage accessories.

The “break even” point of the charging system is the point at which the alternator overcomes all system loads (lights, etc.) and begins to charge the battery. Depending on battery condition and system load, the break even point may vary slightly. The battery should be fully charged before performing this test.

- Connect an ammeter (set to DC amps) in series between the negative battery cable and terminal.
- Connect a tachometer according to manufacturer’s instructions.
- With engine off and the key and kill switch in the ON position, the ammeter should read negative amps (battery discharge). Reverse meter leads if a positive reading is indicated.
- Engine has no recoil.
- Increase engine RPM while observing ammeter and tachometer.
- Note RPM at which the battery starts to charge (ammeter indication is positive).
- With lights and other electrical load off, this should occur at approximately 1500 RPM or lower.
- Turn the lights on and lock parking brake to keep brake light on.
- Repeat test, observing ammeter and tachometer. With lights on, charging should occur at or below 2000 RPM.



### ALTERNATOR OUTPUT TEST (AC AMP)

This test measures AC amperage from the alternator.

- Maximum alternator output will be indicated on the meter. It is not necessary to increase engine RPM above idle.
- Place the red lead on the tester in the 10A jack.
- Turn the selector dial to the AC amps (A~) position.
- Connect the meter leads to the Yellow and Yellow/Red wires leading from the alternator.
- Start the engine and let it idle. Reading should be a minimum of 7A at idle.

**CAUTION:** This test simulates a "full load" on the alternator. Do not perform this test longer than required to obtain a reading or the alternator stator windings may overheat. 3–5 seconds is acceptable.

**Alternator Current Output:  
Minimum of 7 AC Amps**

#### To Calculate Available Alternator Output

$$I = \frac{P}{E} \quad \frac{200W}{12V} = 16.7 \text{ Amps}$$

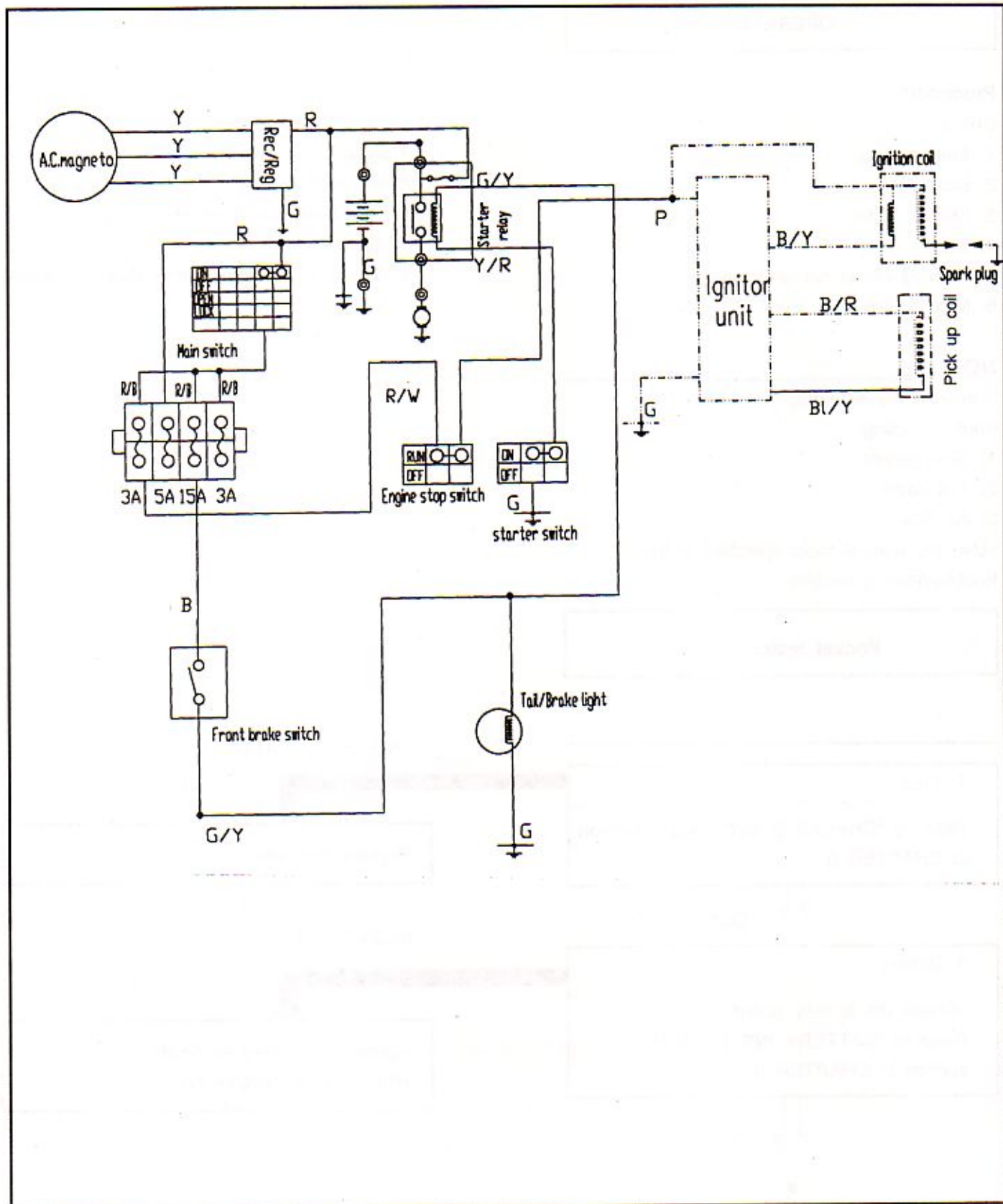
$$\frac{250W}{12V} = 20.8 \text{ Amps}$$

I = Current in Amps

P = Power in Watts

E = Electromotive Force (Volts)

# ELECTRIC STARTING SYSTEM DIAGRAM





# ELECTRIC STARTING SYSTEM

## TROUBLESHOOTING

IF THE STARTER MOTOR FAILS TO OPERATE.

### Procedure

Check:

1. Fuse (Main)
2. Battery
3. Starter motor
4. Starter relay
5. Starting circuit cut-off relay
6. Main switch
7. Engine stop switch
8. Sidestand switch
9. Front/Rear brake switch
10. Starter switch
11. Wiring connection (entire starting system)

### NOTE:

·Remove the following parts before troubleshooting.

- 1) Side panels
- 2) Tail cover
- 3) Air Box

·Use the special tools specified in the troubleshooting section.



Pocket tester:

1. Fuse

Refer to "CHECKING SWITCHES" section in CHAPTER 8.

NO CONTINUITY

Replace the fuse.

CONTINUITY

2. Battery

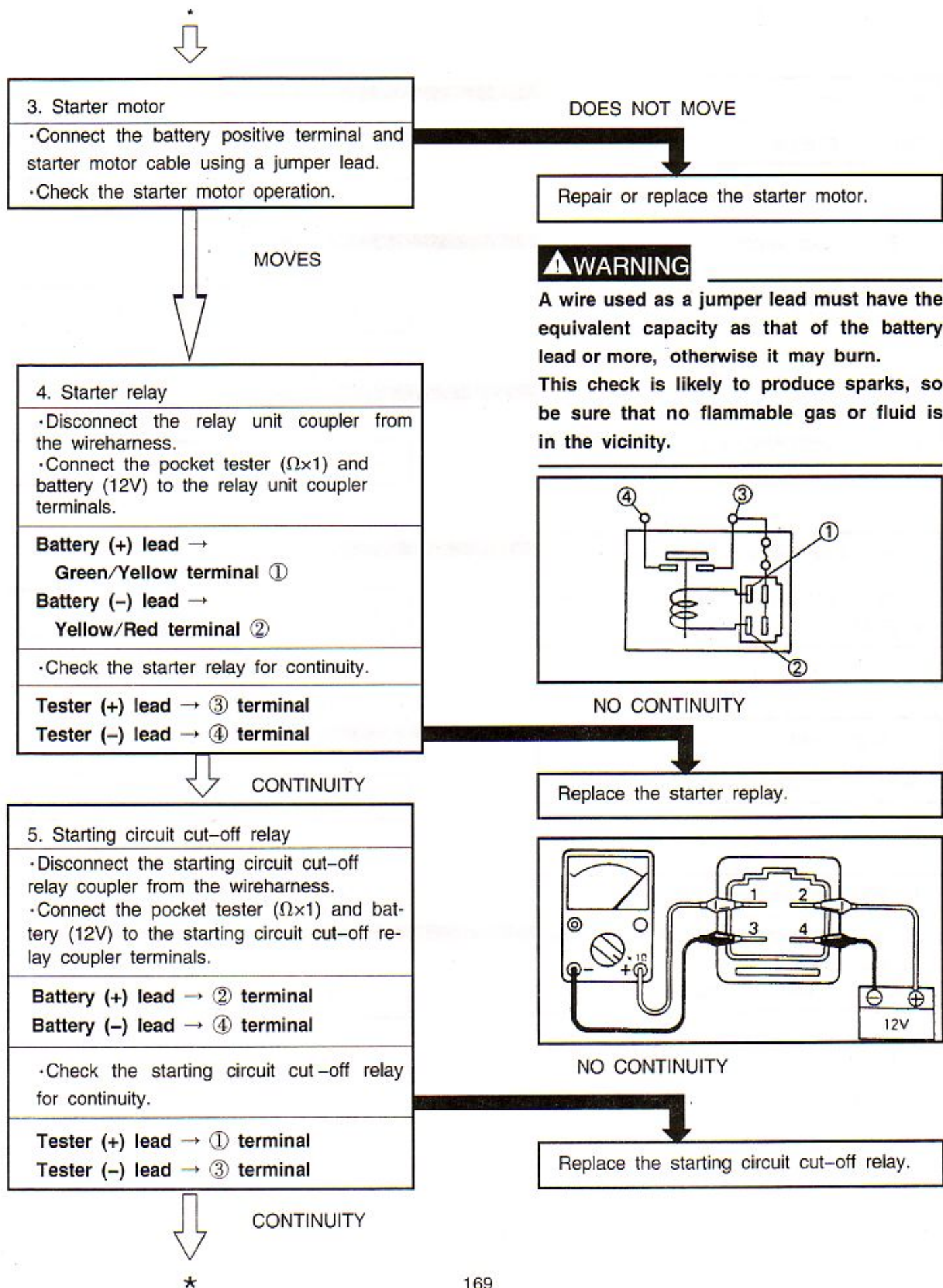
·Check the battery condition.  
Refer to "BATTERY INSPECTION" section in CHAPTER 3.

INCORRECT

·Clean the battery terminals.  
·Recharge or replace battery.

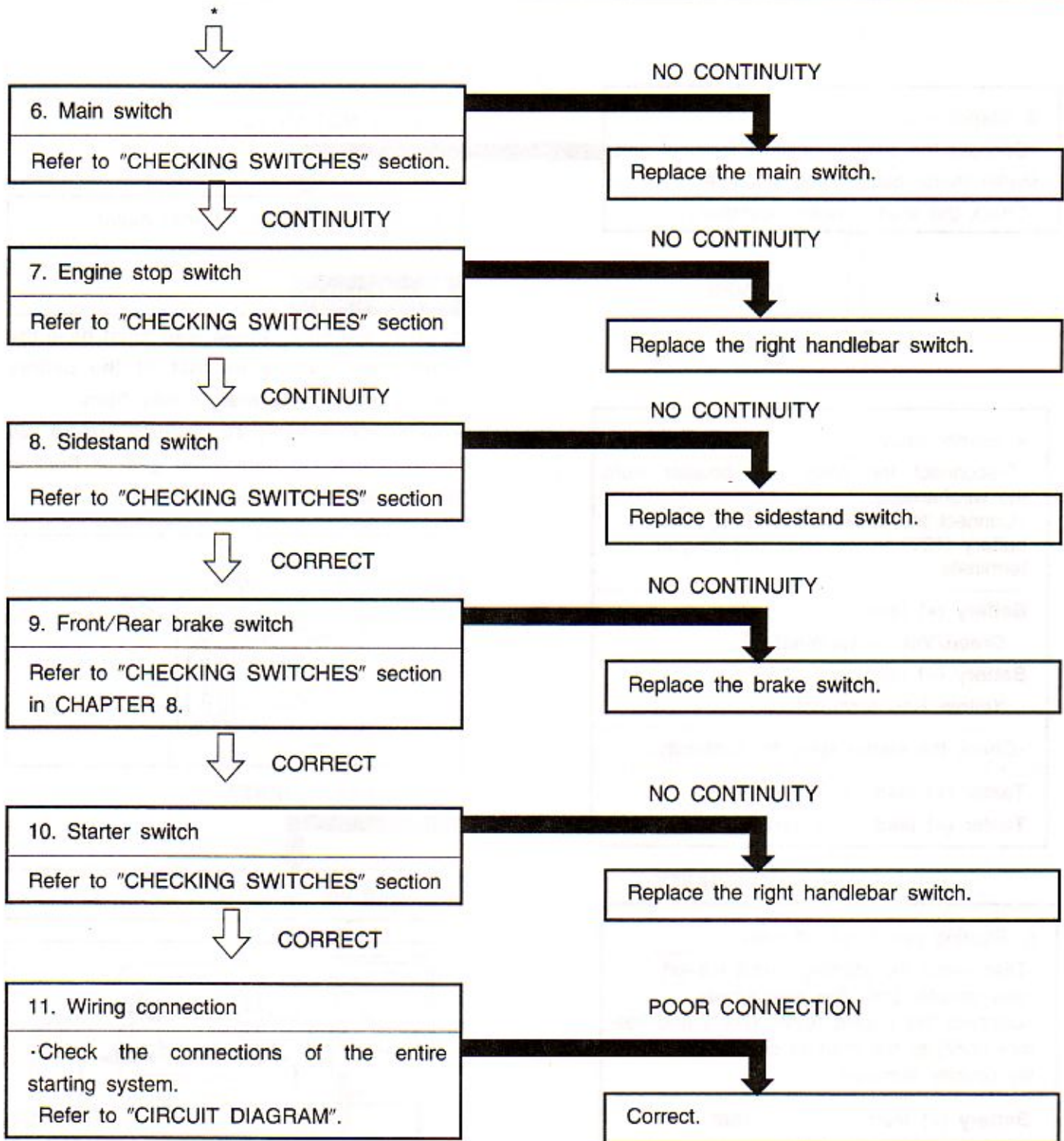
CORRECT

\*

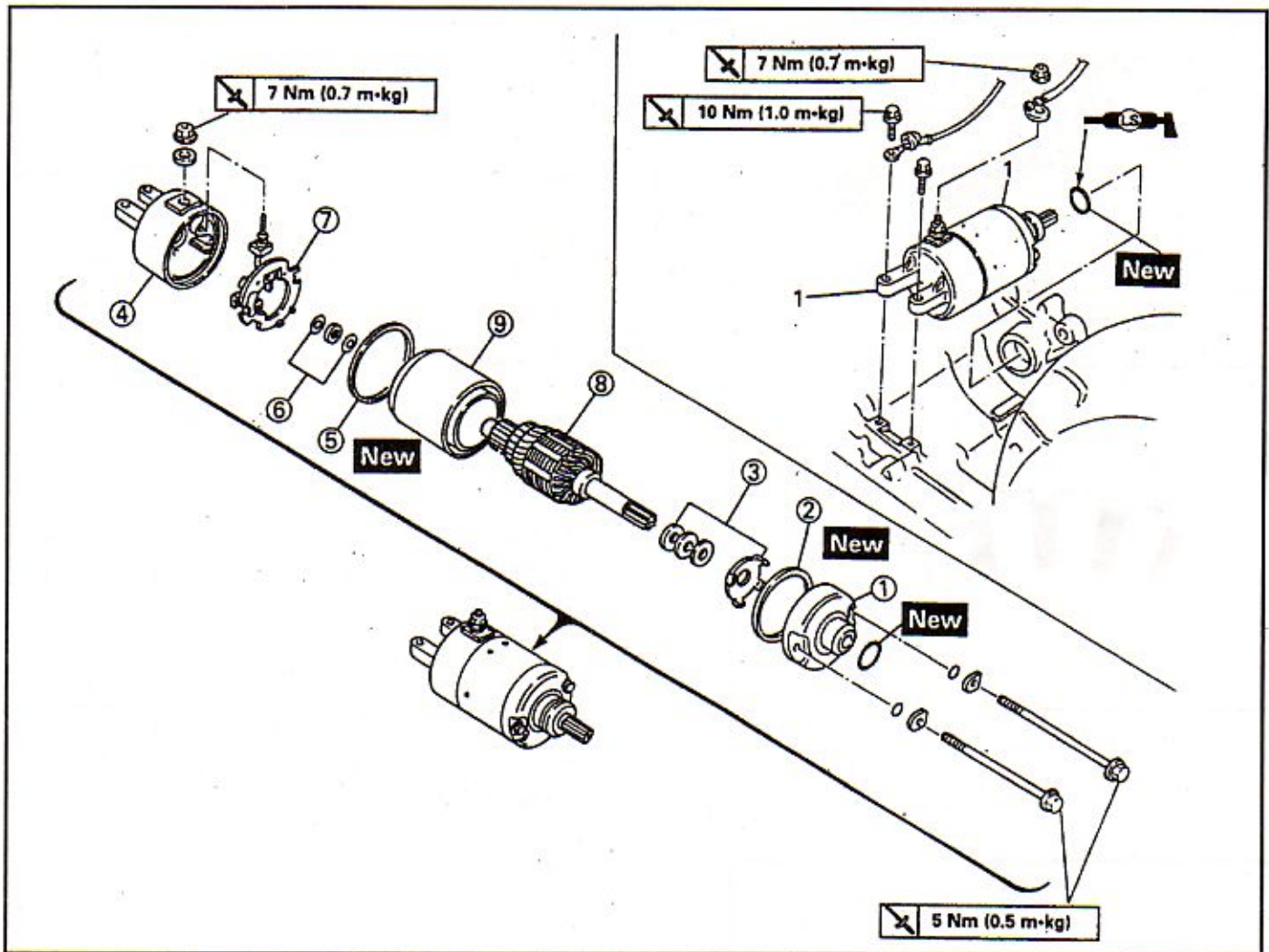




## ELECTRIC STARTING SYSTEM

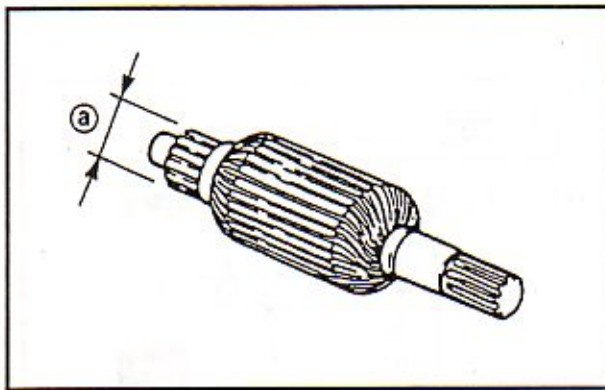


## STARTING MOTOR



Order	Job name/Part name	Q'ty	Remarks
	<b>Starter motor removal</b>		
	Air cleaner case		Remove the parts in order. Refer to "ENGINE REMOVAL AND INSTALLATION" section in CHAPTER 4.
1	Starter motor	1	Reverse the removal procedure for installation.
	<b>Starter motor disassembly</b>		
①	Front bracket	1	Disassembly the parts in order.  Refer to "Starter motor assembly"  Reverse the disassembly procedure for assembly.
②	Ring	1	
③	Shims	1	
④	Rear bracket	1	
⑤	Ring	1	
⑥	Shims	1	
⑦	Brush holder set	1	
⑧	Armature assembly	1	
⑨	Stator assembly	1	





## Inspection and repair

### 1. Inspect:

- Commutator

Dirt → Clean it with #600 grit sandpaper.

### 2. Measure:

- Commutator diameter (a)



**Commutator wear limit:**

**27 mm**

Out of specification → Replace the starter motor

### 3. Measure:

- Mica undercut (a)



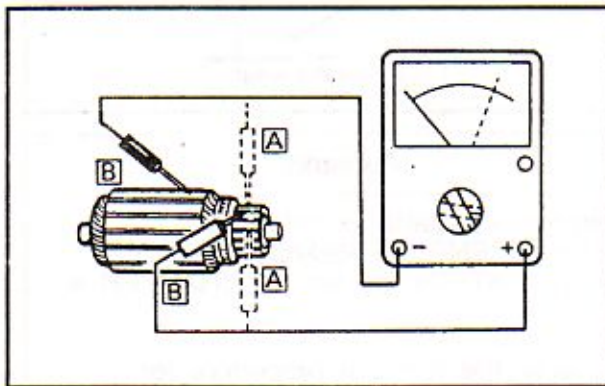
**Mica undercut:**

**0.7 mm**

Out of specification → Scrape the mica to the proper value (a hacksaw blade can be ground to fit).

## NOTE:

The mica insulation of the commutator must be undercut to ensure proper operation of commutator.



### 4. Inspect:

- Armature coil resistances (installation/continuity)

Defects → Replace the starter motor.

If commutator is dirty, clean it with sandpaper.

	Good condition	Bad condition		
A	○	×	○	×
B	×	×	○	○

○: Continuity

×: No continuity

Bad condition → Replace.

### 5. Measure:

- Brush length (a)

Out of specification → Replace.



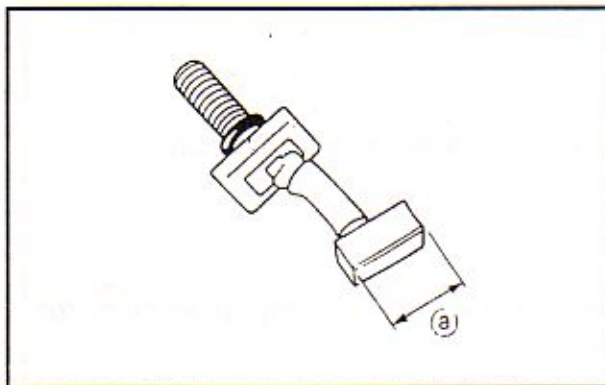
**Brush length wear limit:**

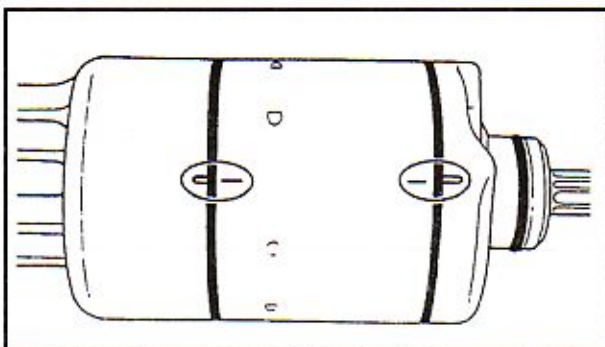
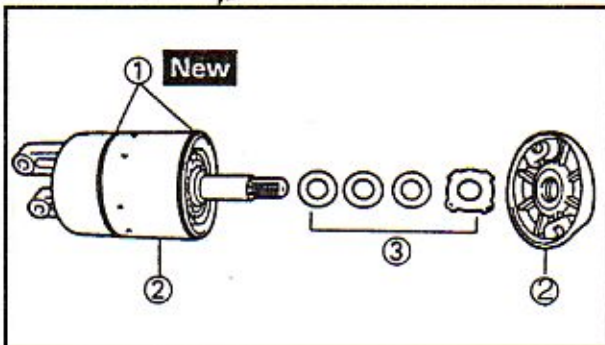
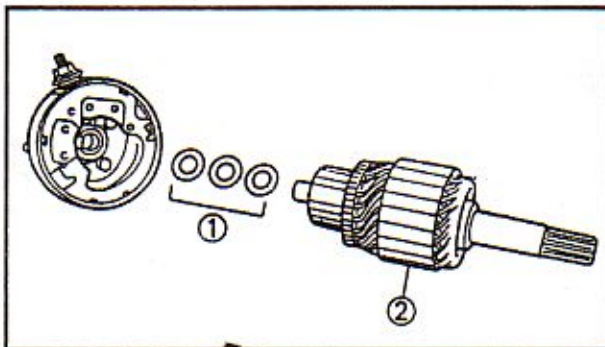
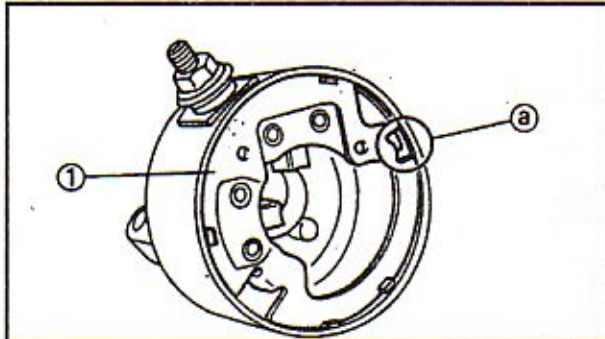
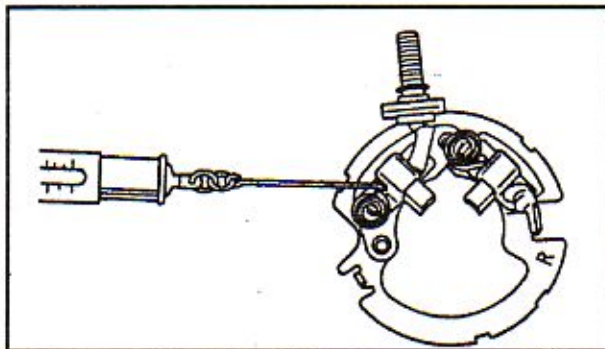
**4.0 mm**

### 6. Measure:

- Brush spring force

Fatigue/out of specification → Replace as a set.





Brush spring force:  
570–920 g

## 7. Inspect:

- Bearing
- Oil seal
- Wear/damage → Replace.

## Assembly

Reverse the "Removal" procedure.  
Note the following points.

## 1. Install:

- Brush holder ①

## NOTE:

Align the projection ① on the brush seat with the slot ② on the housing.

## 2. Install:

- Shims ①
- Armature coil ②

## 3. Install:

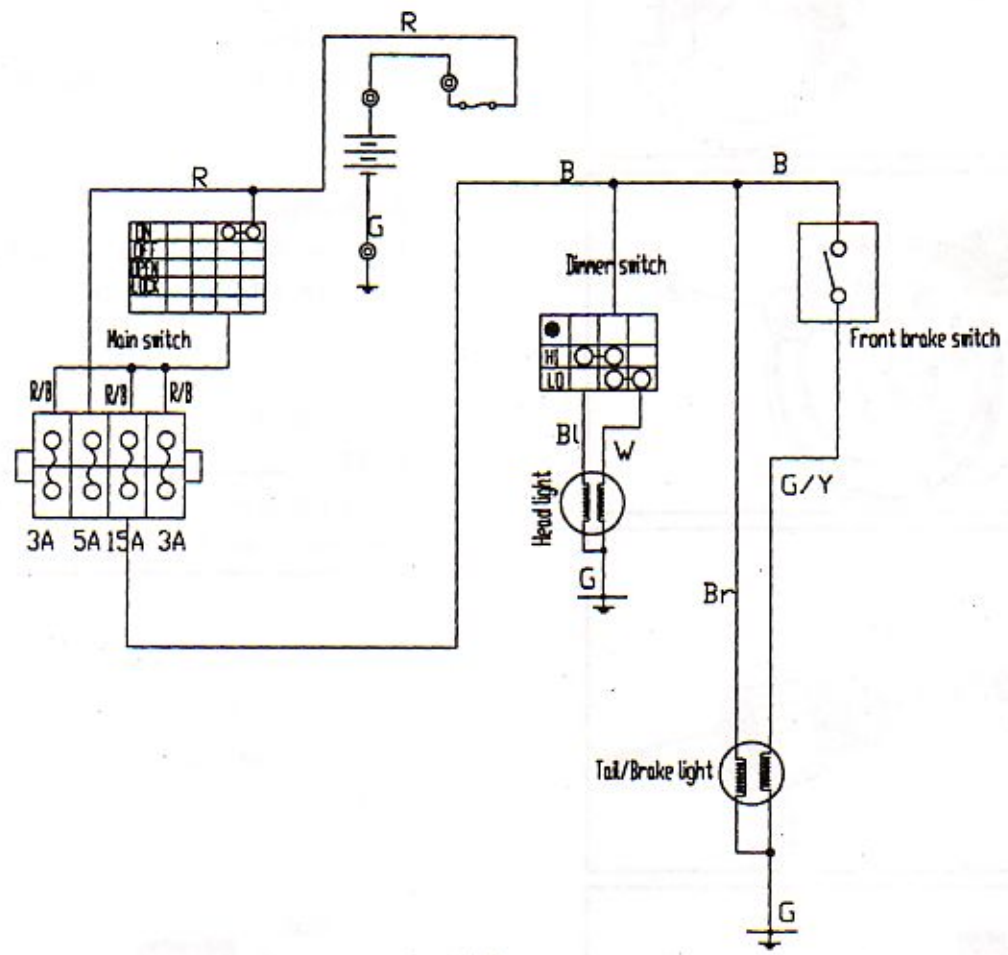
- Ring ① **NEW**
- Shims ③
- Front bracket ④

5Nm(0.5m·kg)

## NOTE:

- Apply molybdenum grease lightly on to the bearings of the starter motor.
- Align the match marks on the yoke with the match marks on the brackets.





## TROUBLESHOOTING

### Procedure

Check:

1. Fuse (Main)
2. Battery
3. Main switch

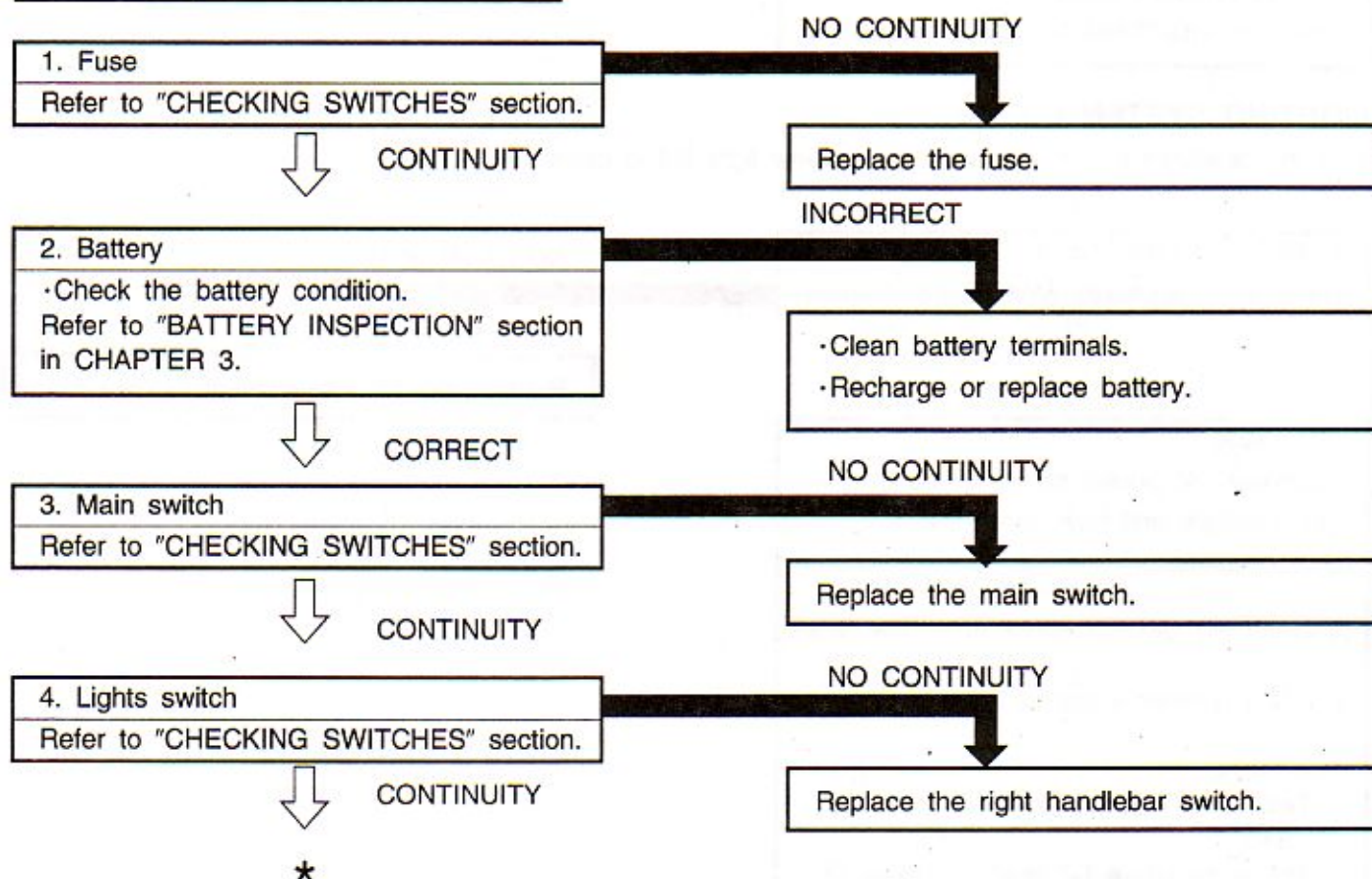
4. Lights switch
5. Dimmer switch
6. Wiring connection (entire lighting system)

### NOTE:

• Remove the following parts before troubleshooting.

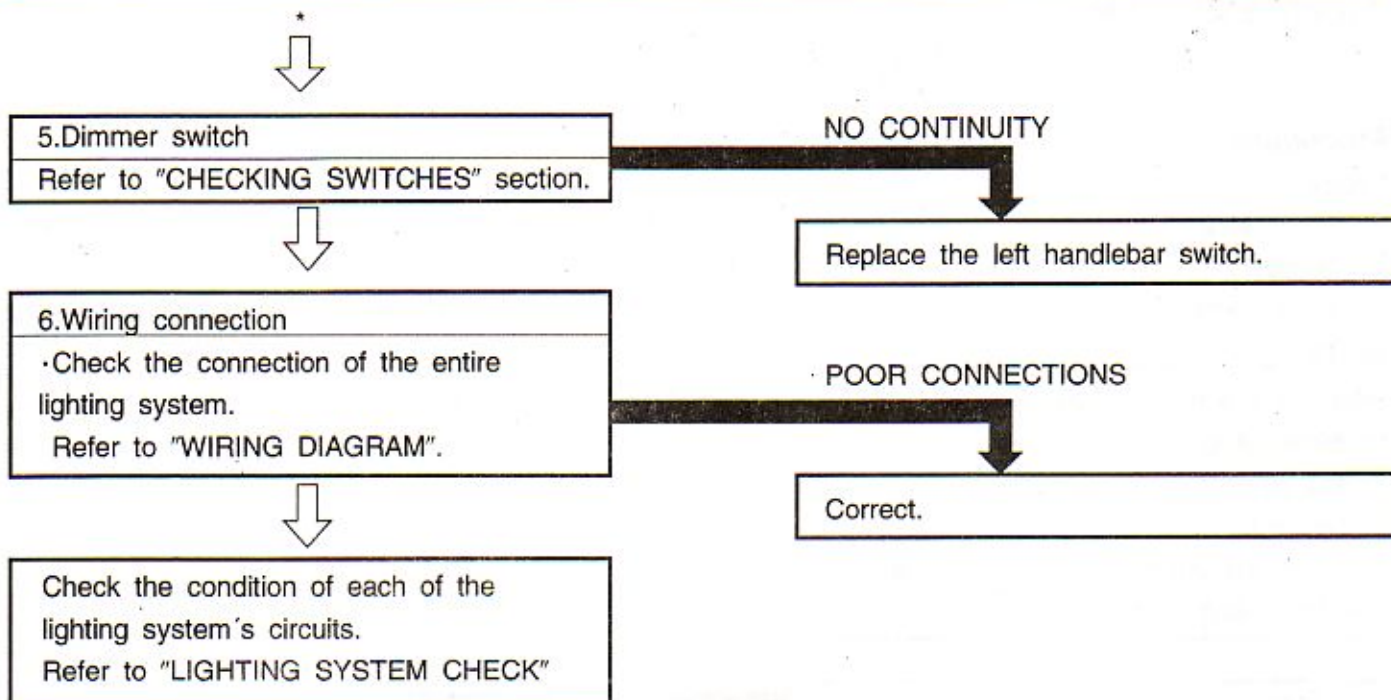
- 1) Tail cover
- 2) Cowling body

• Use the special tools specified in the troubleshooting section.



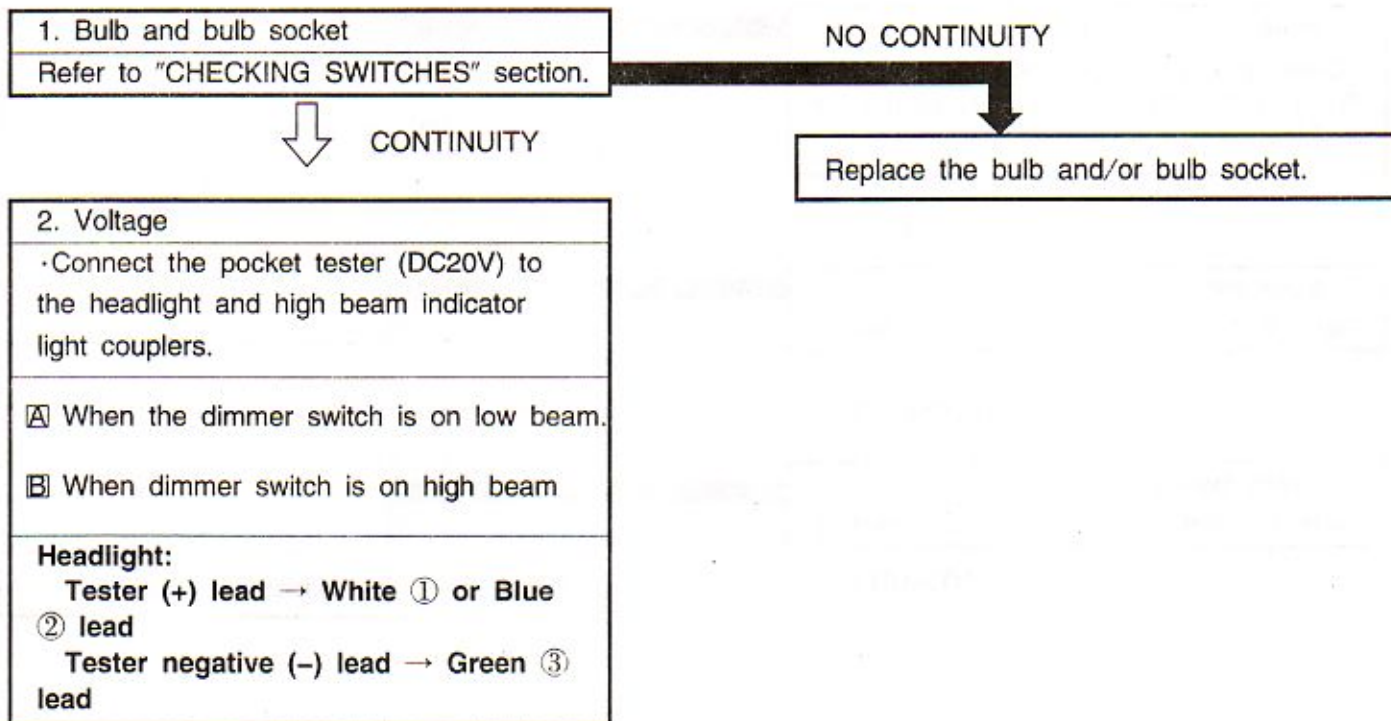


## LIGHTING SYSTEM



### LIGHTING SYSTEM CHECK

1. If the headlight and the high beam indicator light fail to come on.



\*

- Turn the main switch to on.
- Turn the light switch to on position.
- Turn the dimmer switch to low beam or high beam.
- Check for voltage (12V) on the lead at bulb socket connectors.



**MEETS  
SPECIFICATION**

This circuit is not faulty.

**OUT OF SPECIFICATION**

The wiring circuit from the main switch to bulb socket connector is faulty. Repair.

2. The taillight fails to come on.

1. Bulb and bulb socket

Refer to "CHECKING SWITCHES" section.



**CONTINUITY**

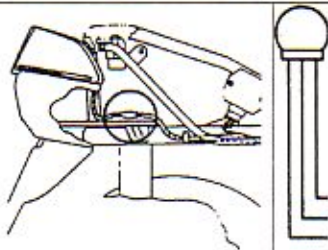
**NO CONTINUITY**

Replace the bulb and/or bulb socket.

2. Voltage

- Connect the pocket tester (DC20V) to the bulb socket connector.

**Tester (+) lead →**  
**Brown terminal ①**  
**Tester (-) lead →**  
**Green terminal ②**



- Turn the main switch to on.
- Turn the lights switch to on or pilot position.
- Check the voltage (12V) on the bulb socket connector.



**MEETS  
SPECIFICATION**

This circuit is not faulty.

**OUT OF SPECIFICATION**

The wiring circuit from main switch to bulb connector is faulty. Repair.





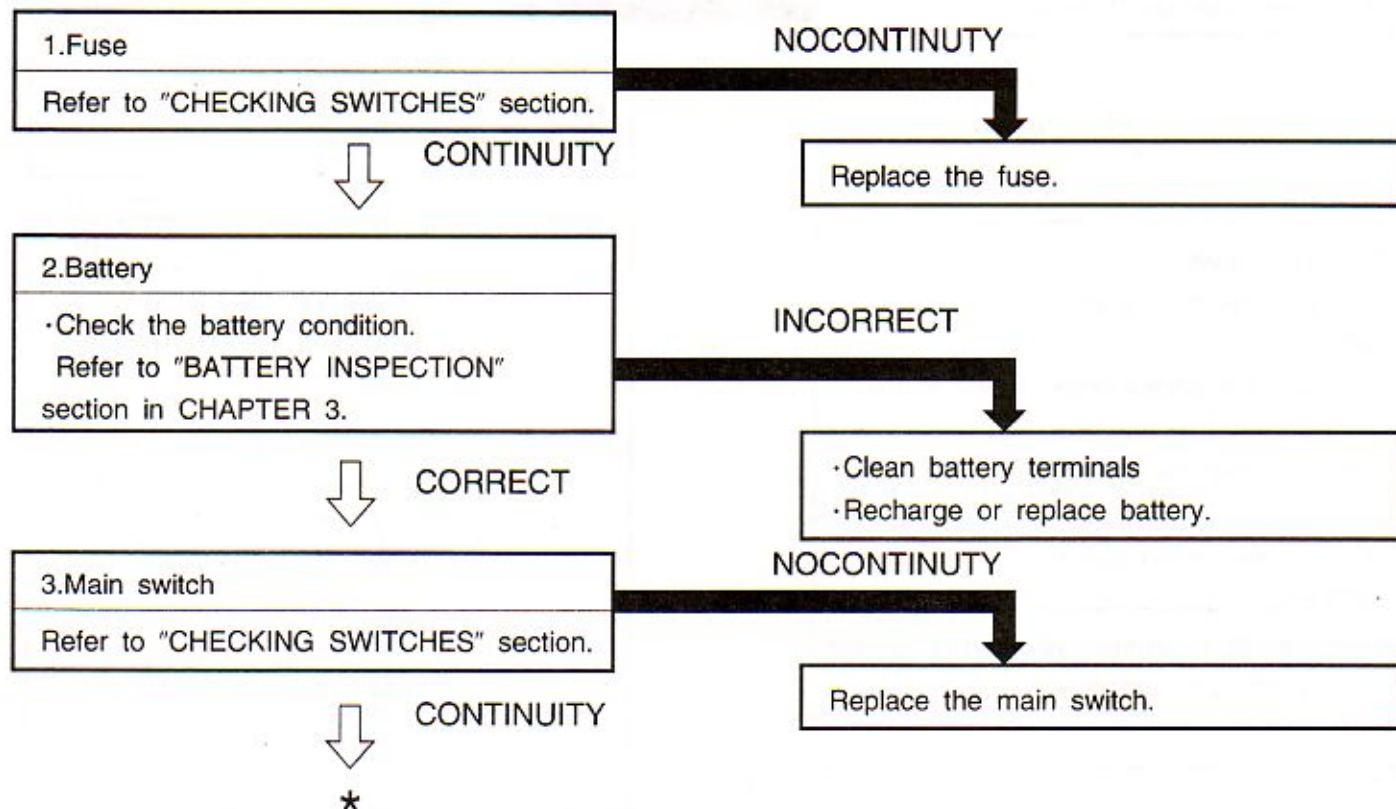
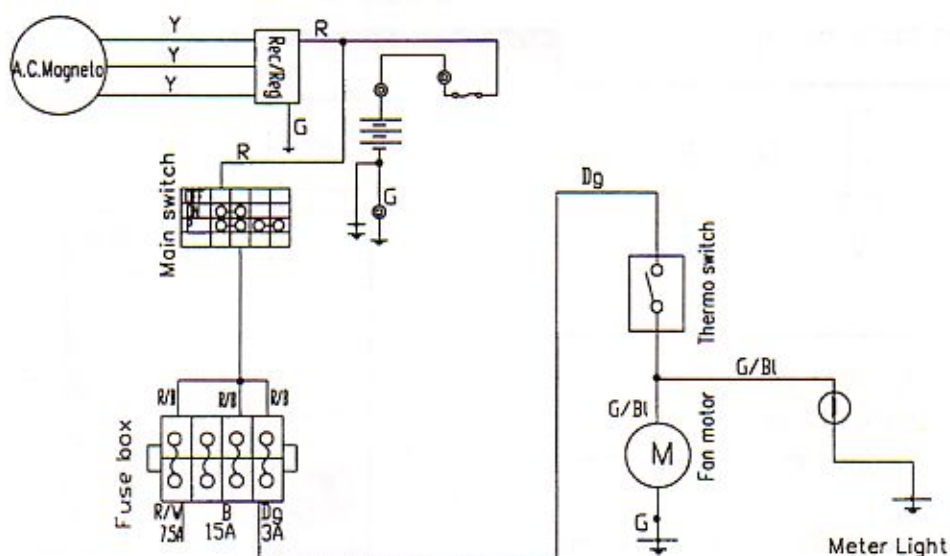
## TROUBLESHOOTING

## IF THE FAN MOTOR FAILS TO TURN.

## Procedure

Check:

1. Fuse (Main, Fan)
2. Battery
3. Fan motor (inspection)
4. Thermo switch
5. Wiring connection (entire cooling system)





COOLING SYSTEM



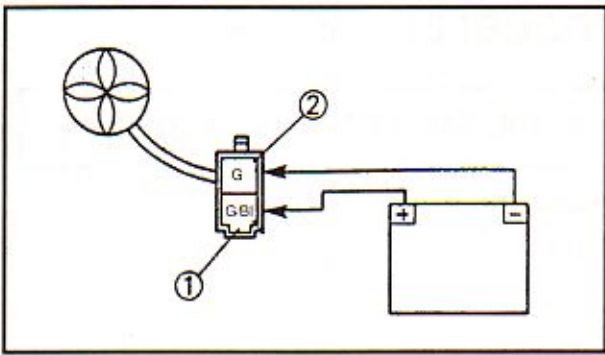
4.Fan motor (inspection 1)

- Disconnect the fan motor couplers.
- Connect the battery as shown.

Tester (+) lead → Green/Blue terminal ①

Tester (-) lead → Green ground ②

- Check the fan motor operation.



DOES NOT MOVE

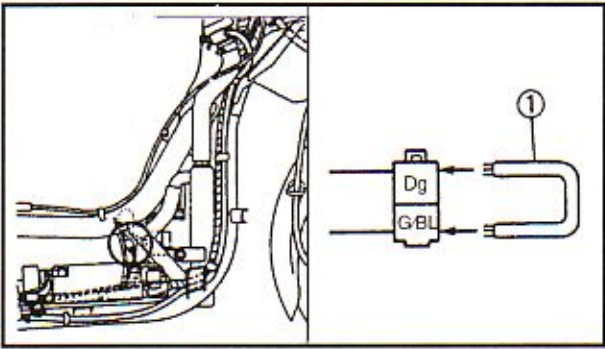
Replace fan motor.



MOVES

5. Fan motor (inspection 2)

- Turn the main switch to on.
- Remove the thermo switch lead from thermo switch.
- Connect jumper lead ① to thermo switch leads.
- Turn the main switch to on.



DOES NOT MOVE

The wiring circuit from battery to fan motor is faulty. Repair.



MOVES

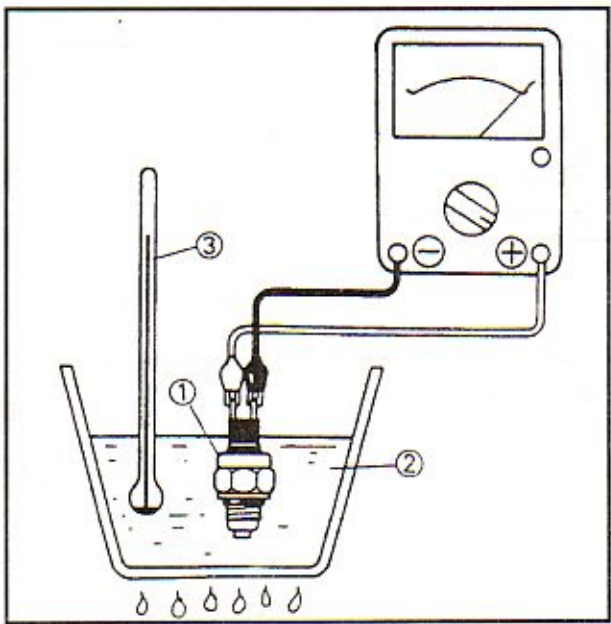
6. Thermo switch

- Remove the thermo switch from the radiator.
- Connect the pocket tester ( $\Omega \times 1$ ) to the thermo switch ①.
- Immerse the thermo switch in the water ②.
- Check the thermo switch for continuity.

NOTE: \_\_\_\_\_

Measure temperatures while heating the coolant with the temperature gauge ③.

\_\_\_\_\_

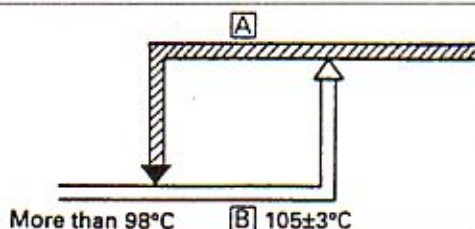


**⚠ WARNING**

• Handle the thermo switch with special care.

Never subject it to strong shocks or allow it to be dropped. Should it be dropped, it must be replaced.

• Do not touch the thermo switch to the bottom of the heated vessel.



[A] Thermo switch "ON".

[B] Thermo switch "OFF".

OUT OF SPECIFICATION

Replace the thermo switch.

CORRECT

**7. Wiring connection**

• Check the connection of the entire cooling system.  
Refer to "CIRCUIT DIAGRAM" section.

UPPER CONNECTION

Correct



# COOLING SYSTEM

## TROUBLESHOOTING

### IF THE WATER TEMPERATURE METER FAILS TO MOVE WHEN ENGINE WARM

#### Procedure

Check:

1. Fuse (Main, Fan)
2. Battery
3. Main switch

4. Thermo unit

5. Voltage

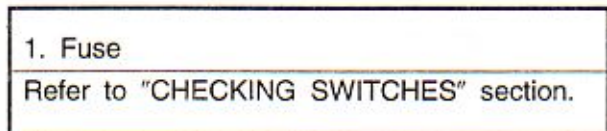
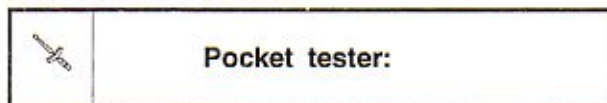
6. Wiring connection (entire cooling system)

#### NOTE:

• Remove the following parts before troubleshooting.

Front Trunk

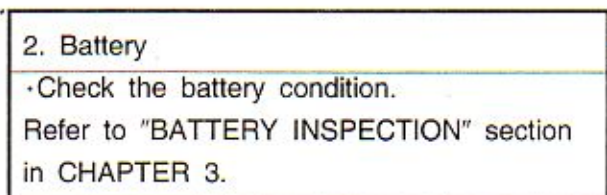
• Use the special tools specified in the troubleshooting section.



NO CONTINUITY

Replace the fuse.

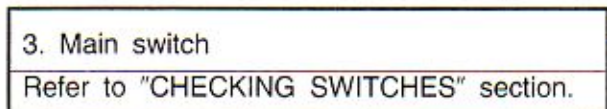
↓ CONTINUITY



INCORRECT

• Clean battery terminals.  
• Recharge or replace battery.

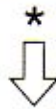
↓ CORRECT



NO CONTINUITY

Replace the main switch.

↓ \* CONTINUITY

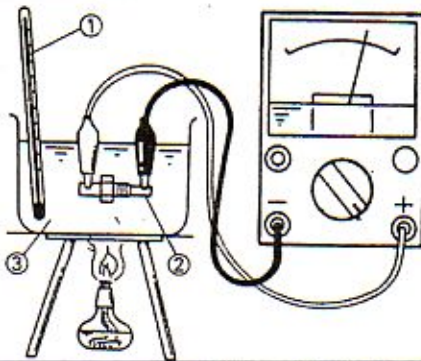


#### 4. Thermo unit

• Drain the coolant and remove the thermo unit from the radiator.

• Immerse the thermo unit ② in the coolant ③.

① Thermometer.



Coolant temperature	Resistance
80°C	47.5~56.8 Ω
100°C	26.2~29.3 Ω



MEETS  
SPECIFICATION

#### 5. Voltage

• Connect the pocket (DC20V) to the temperature gauge coupler.

**Tester (+) lead → Green/Red terminal ①**

**Tester (-) lead → Frame ground**

• Turn the main switch to on.

• Check for voltage (12V) on the temperature gauge lead.



CORRECT

• Handle the thermo unit with special care. Never subject it to strong shocks or allow it to be dropped. Should it be dropped, it must be replaced.

• Do not touch the thermo unit to the bottom of the heated vessel.

OUT OF SPECIFICATION

Replace the thermo unit.



OUT OF SPECIFICATION

The wiring circuit from main switch to temperature gauge is faulty. Repair.



# COOLING SYSTEM



6. Wiring connection

- Check the connections of the entire cooling system.

Refer to "CIRCUIT DIAGRAM" section.

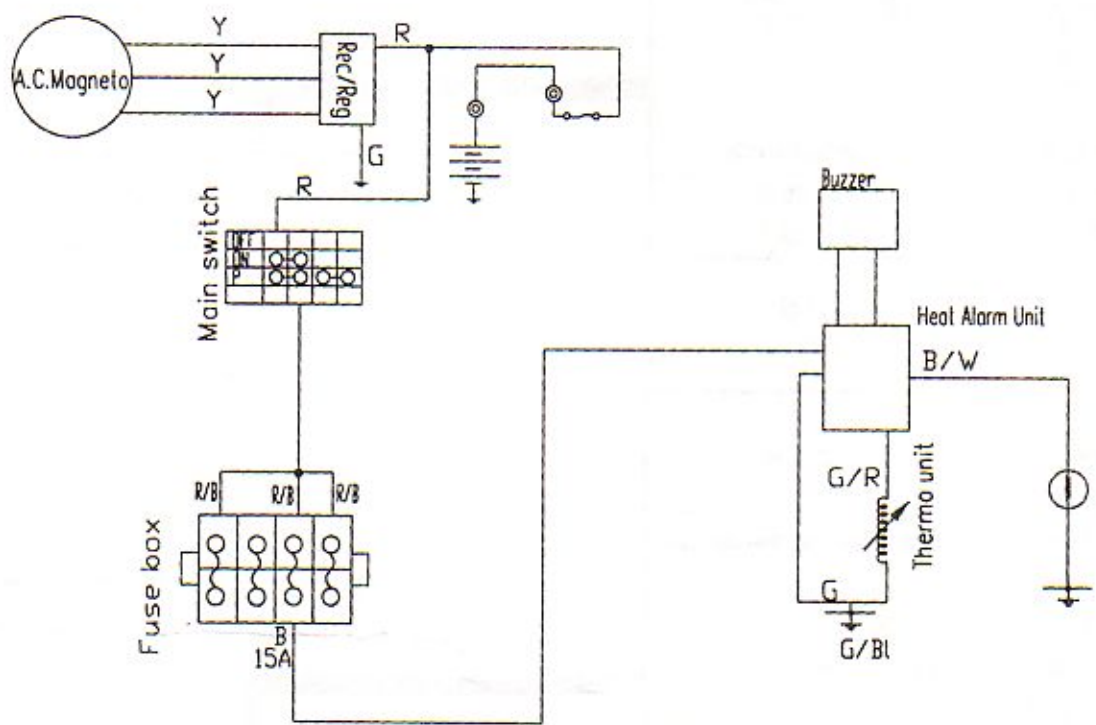
POOR CONNECTION

Correct.



CORRECT

Replace the temperature gauge.

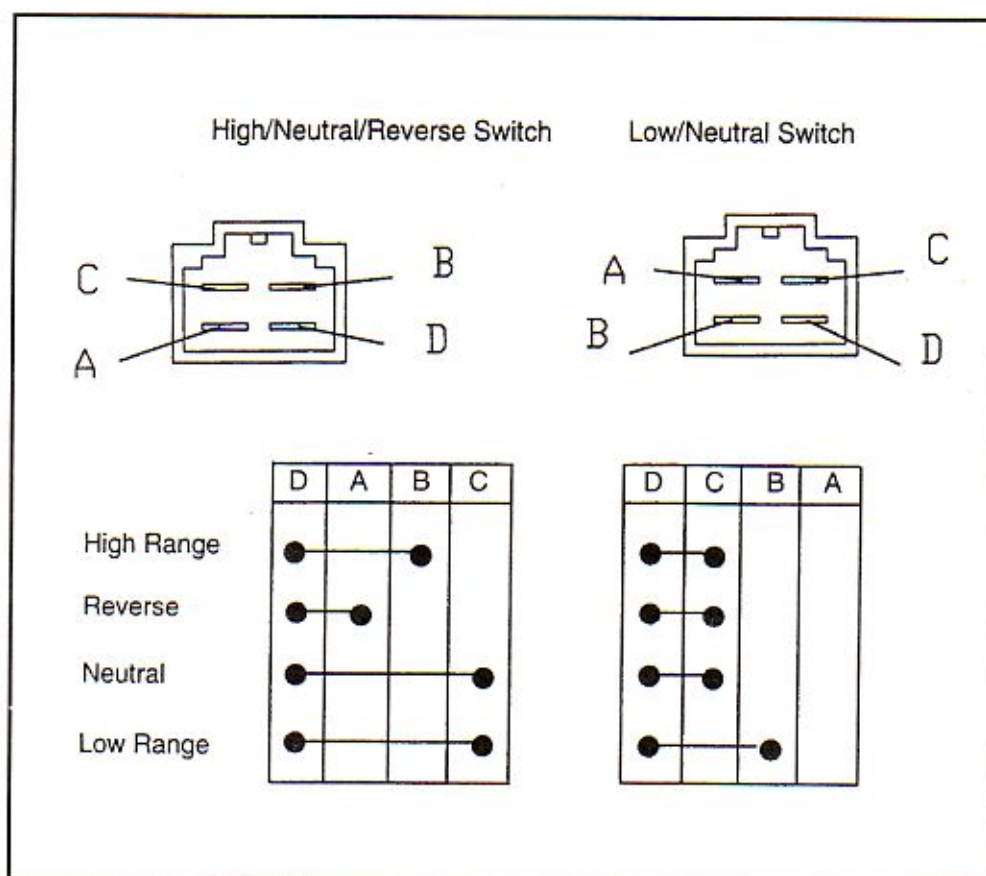


## Heat Alarm Unit

When the main switch is turned on, the temperature of the engine begins to go up. As it comes to  $98 \pm 2^\circ\text{C}$ , the thermostat is connected and the fan starts to work, cooling the coolant, if the thermostat or the fan, fails to work; the coolant temperature will keep rising. The heat alarm unit operates the moment the temperature reaches  $115 \pm 5^\circ\text{C}$  with the buzzer sounding and the signal flashing. Stop the engine now to have the circuit fixed.

# GEAR POSITION INDICATOR SWITCH TEST

## Switch Continuity Table



## Switch Schematic

