

2009 ATV



# SERVICE MANUAL EUROPE 09.0

PN. F010102A01

- *ATV 260/300*

*Model : 2004*

*2005*

*Special Edition - Anniversary*

*2x4*

*4x4*

- *Mini 50/80/100/150*

- *B-Type 150/200, 2x4*

*260/300, 2x4/ 4x4*

- *ATV520*

- *ATV400-2*

- *ATV400-2B*

- *Attachment: Delphi Small Engine Management System Service Manual*

## **WARNING**

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

※ *General Information*

※ *Maintenance*

※ *Engine*

※ *Chassis*

※ *Final Drive*

※ *Transmission*

※ *Brakes*

※ *Electrical*

## 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.

This manual is divided into sections. Each section covers a specific ATV component or system and, in addition to the standard service procedures. Keep this manual available for reference in the shop area. When using this manual as a guide, the technician should use discretion as to how much disassembly is needed to correct any given condition.

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

At the time of publication all information contained in this manual was technically correct. Some photographs used in this manual are used for clarity purposes only and are not designed to depict actual conditions. We constantly refine and improve its products, all materials and specifications are subject to change without notice.

This ATV's publications and decals display the words **Warning, Caution, Note**, and At This Point to emphasize important information:

### **WARNING**

Indicates a potential hazard which will result in severe injury or death to the operator, bystander or person inspecting or servicing the ATV..

### **CAUTION**

Indicates a potential hazard which may result in personal injury or death or damage to the machine.

### **NOTE**

The word "**NOTE**" in this manual will alert you to key information or instructions.

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Attachment: Delphi Small Engine Management System Service Manual

**WARNING**

Never run an engine in an enclosed area. Carbon monoxide exhaust gas is poisonous and can cause severe injury or death. Always start engines outdoors.

Gasoline is extremely flammable and explosive under certain conditions. Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with skin, eyes or clothing. Always keep alert and wear protection..

Exhaust system components are very hot during and after use of ATV. Never service when the engine is warm or hot. Escaping steam from cooling system or hot oil from the machine can cause severe burns. The engine must be cool before service.

Crate of the ATV and parts in the ATV maybe have sharp edge, always pay attention and wear protection.

# CHAPTER 1 GENERAL INFORMATION

**WARNING**

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

## 1.1 IMPORTANT INFORMATION

## 1.2 V.I.N AND ENGINE SERIAL NUMBER

## 1.3 VEHICLE DIMENSIONS

**1.1 IMPORTANT INFORMATION**

**PREPARATION FOR REMOVAL PROCEDURES**

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment.
3. When disassembling the machine, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated part must always be reused or replaced as an assembly.
4. During machine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

**REPLACEMENT PARTS**

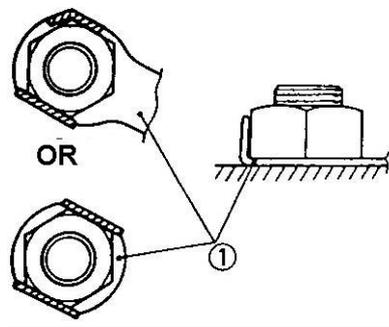
Use only genuine parts for all replacements. Use recommended oil and grease for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

**GASKETS, OIL SEALS AND O-RINGS**

1. Replace all gaskets seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.

**LOCK WASHERS/PLATES AND COTTER PINS**

Replace all lock washers/plates and cotter pins after removal. Bend lock tabs along the bolt or nut flats after the bolt or nut has been tightened to specification.



**BEARINGS AND OIL SEALS**

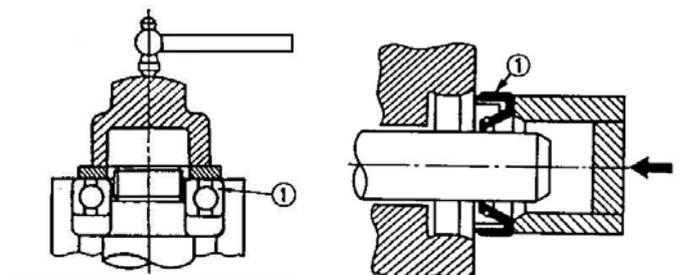
Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips. Oil bearings liberally when installing, if appropriate.

① oil seal

**CAUTION:**

Do not use compressed air to spin the bearings dry. This will damage the bearing surfaces.

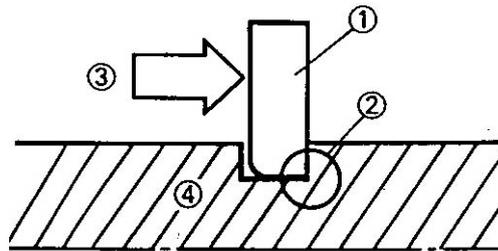
① Bearing



**CIRCLIPS**

1. Check all circlips carefully before reassembly.

Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ it receives. See sectional view.

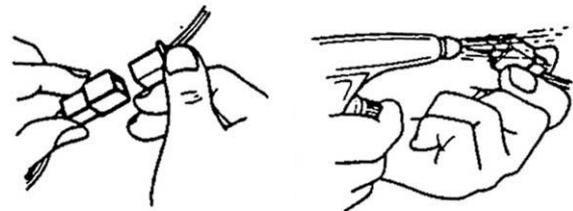


④ Shaft

## CHECKING OF CONNECTIONS

Dealing with stains, rust, moisture, etc. on the connector.

1. Disconnect:
  - Connector
2. Dry each terminal with an air blower.
3. Connect and disconnect the connector two or three.
4. Pull the lead to check that it will not come off.
5. If the terminal comes off, bend up the pin ① and reinsert the terminal into the connector.
6. Connect:
  - Connector



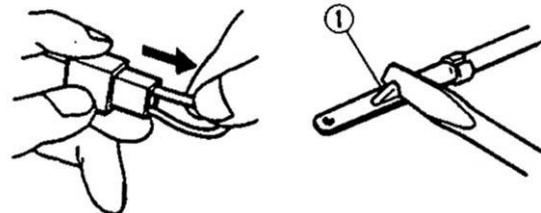
### NOTE:

The two connectors "click" together.

7. Check for continuity with a tester.

### NOTE:

- If there is no continuity, clean the terminals.
- Be sure to perform the steps 1 to 7 listed above when checking the wire harness.
- Use the tester on the connector as shown.



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Crate of the ATV and parts in the ATV maybe have sharp edge, always pay attention and wear protection.

CONVERSION TABLE

How to use the CONVERSION TABLE

Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

METRIC		MULIPLIER		IMP
**mm	x	0.3937	=	**in
**cm	x	0.03937	=	**in

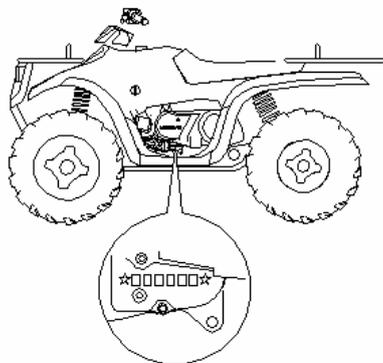
CONVERSION TABLE

METRIC TO IMP			
	Known	Multiplier	Result
Torque	m • kg	7.233	ft • lb
	m • kg	86.794	ln • lb
	cm • kg	0.0723	ft • lb
	cm • kg	0.8679	ln • lb
Weight	kg	2.205	lb
	g	0.03527	oz
Distance	km/h	0.6214	mph
	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3927	in
	mm	0.03927	in
Volume/ Capacity	cc(cm <sup>3</sup> )	0.03527	oz(IMP liq.)
	cc(cm <sup>3</sup> )	0.06102	cu • in
	lit(liter)	0.8799	qt (IMP liq.)
	lit(liter)	0.2199	gal(IMP liq.)
Miscellaneous	kg/mm	55.997	lb/in
	kg/cm <sup>2</sup>	14.2234	psi(lb/in <sup>2</sup> )
	Centigrade	9/5(°C)+32	Fahrenheit(° F)

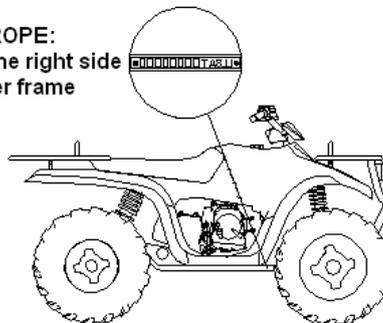
1.2 V.I.N AND ENGINE SERIAL NUMBER

ATV 260 / 300 / 400-2 / 400-2B

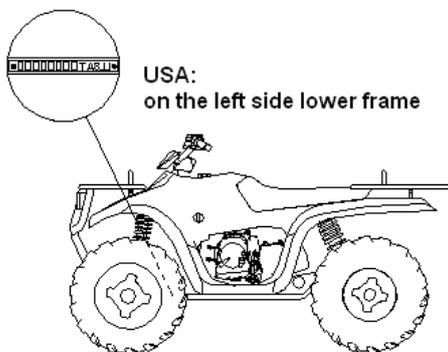
ENGINE SERIAL NUMBER



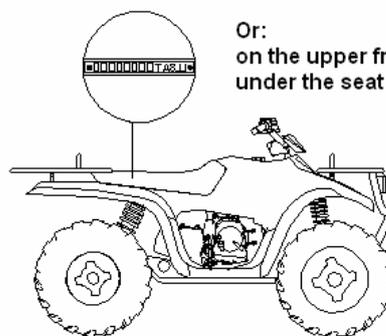
EUROPE:  
on the right side  
lower frame



USA:  
on the left side lower frame

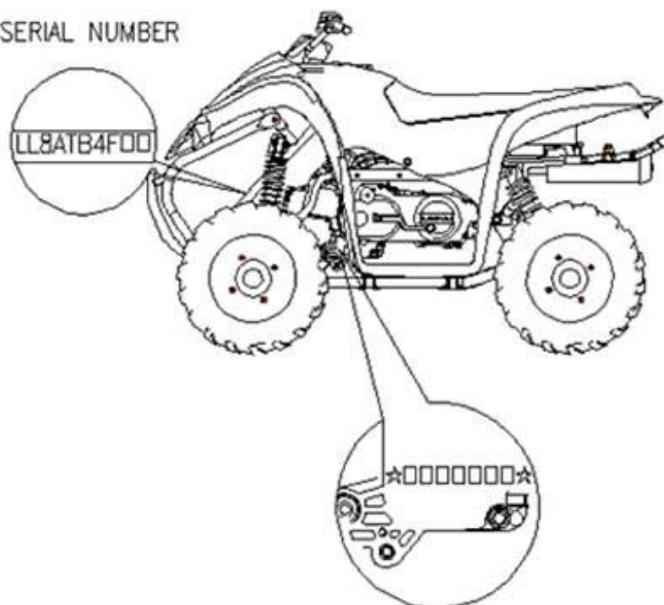


Or:  
on the upper frame  
under the seat



Mini / Youth

V.I.N SERIAL NUMBER



ENGINE SERIAL NUMBER

1.3 VEHICLE DIMENSIONS



2004



2005



*DEMON*



Special Edition - Anniversary



Mini / Youth



B-Type



ATV400-2



ATV400-2B



520ATV

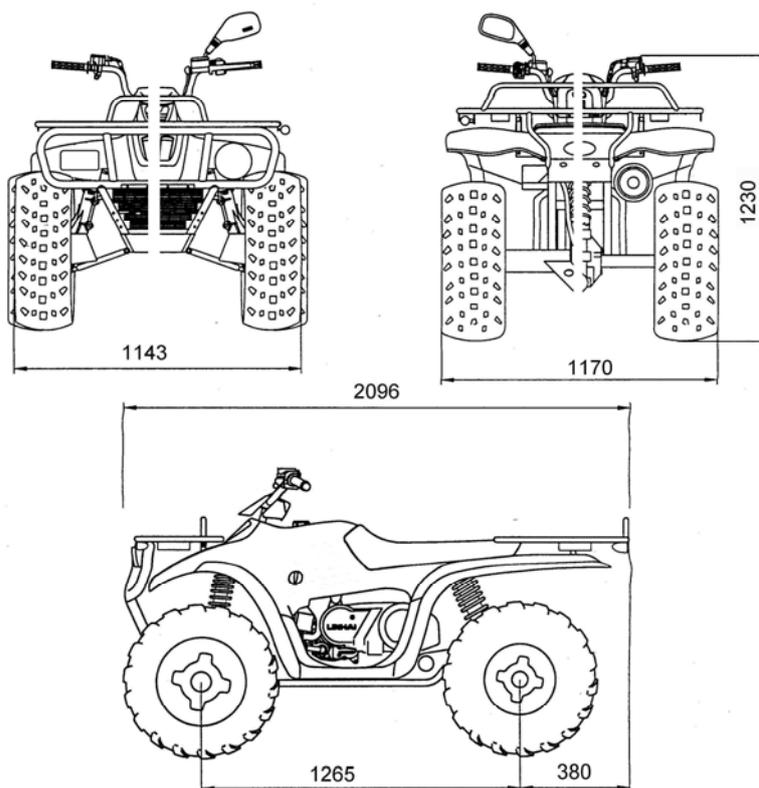


520ATV-B

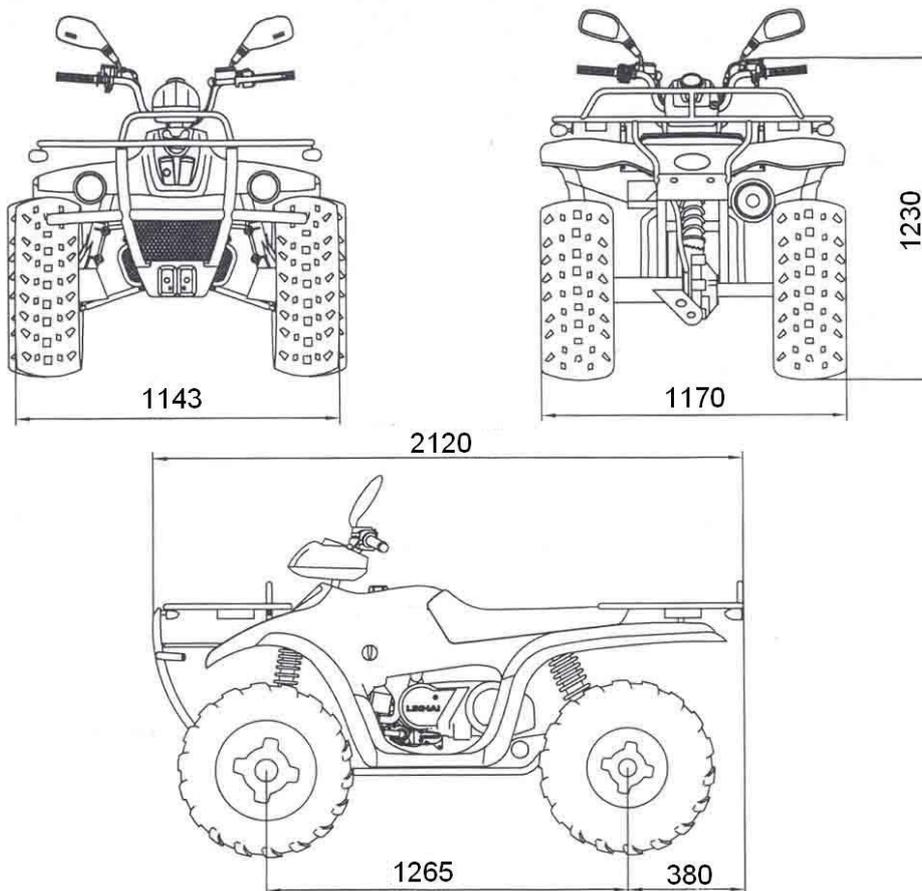
**Note.**

The on-road equipments (rear view mirror, turn lights, etc.) are not Standard Equipment for USA.

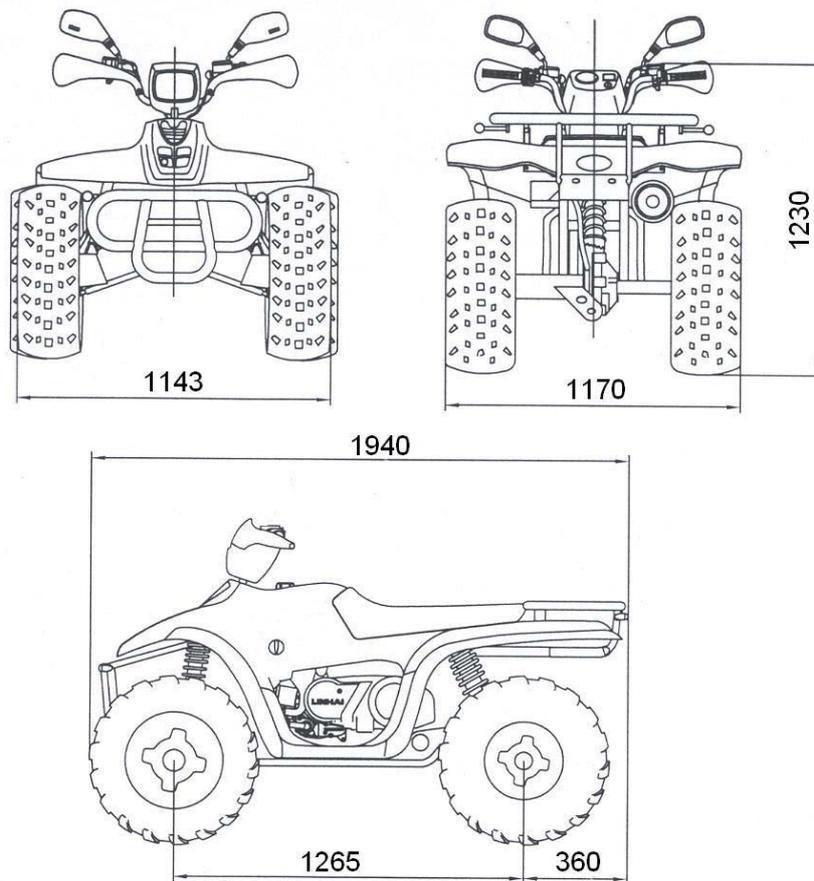
ATV 260 / 300



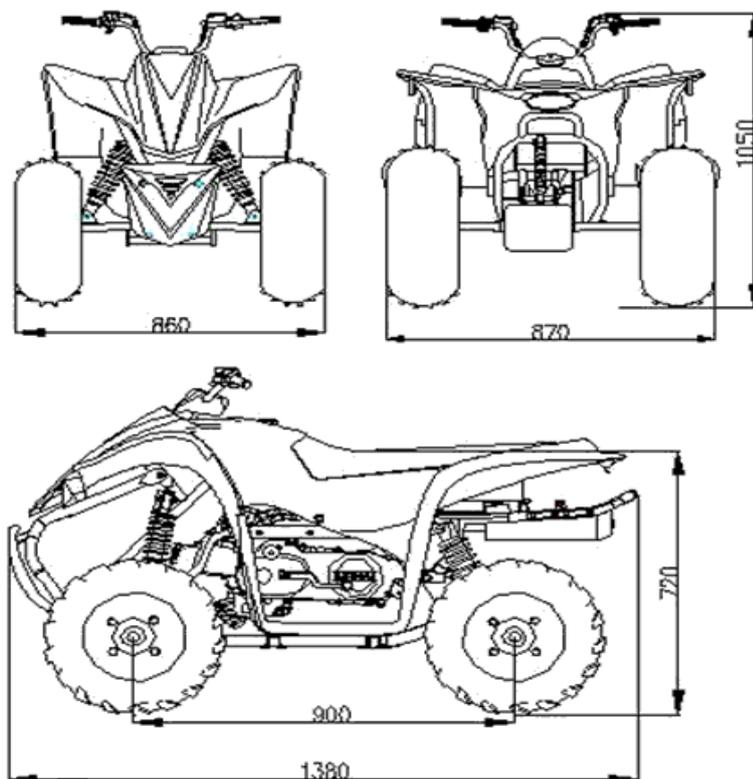
'05 Model ATV 260 / 300



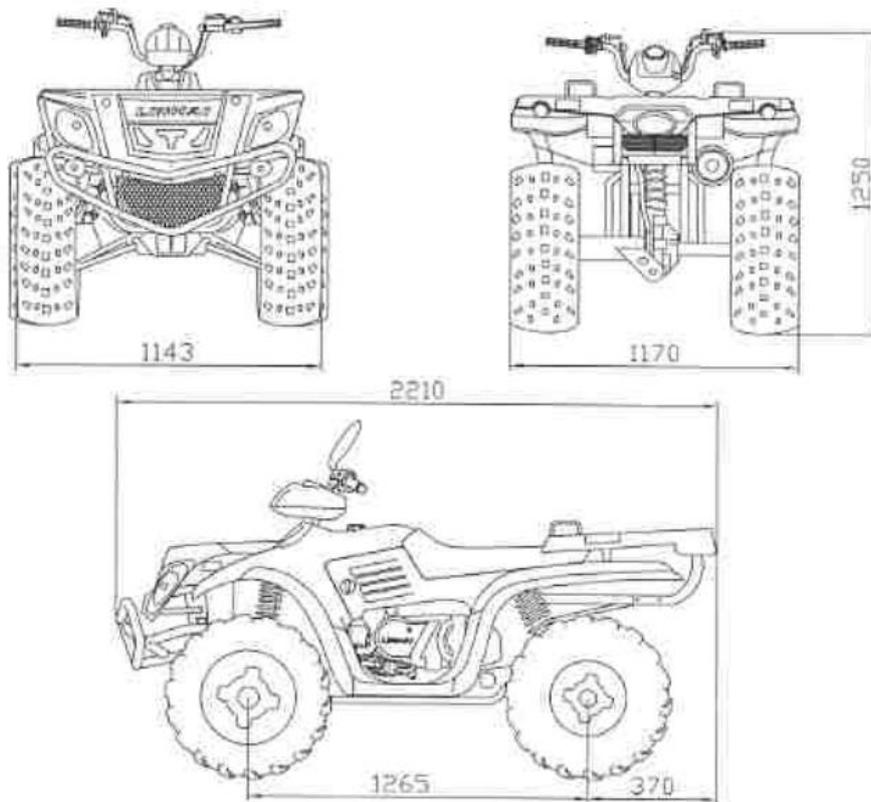
**Demon** ATV 260 / 300 Europe



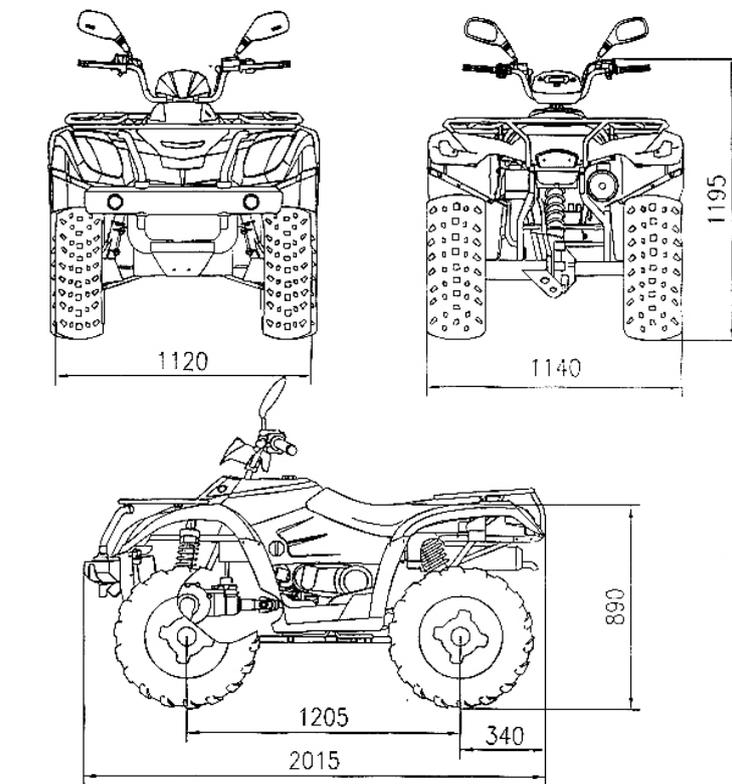
**Mini / Youth**



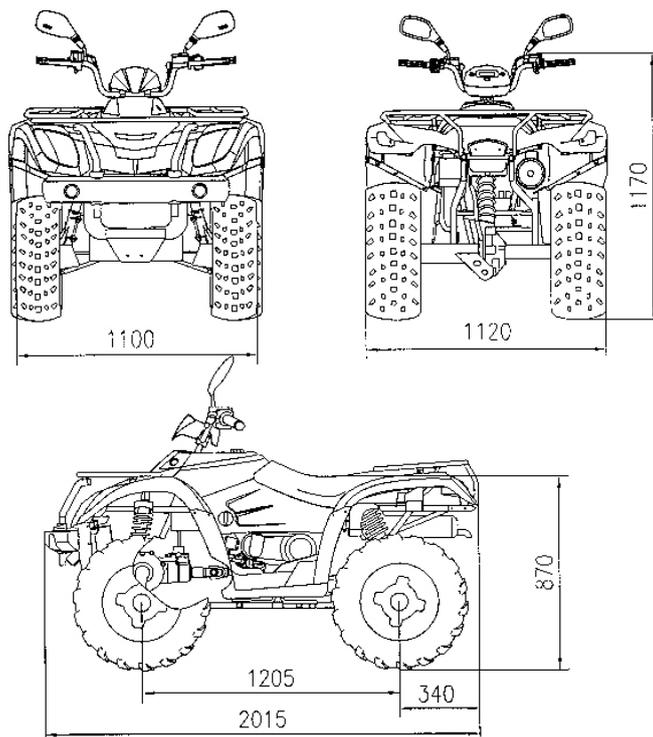
Special Edition - Anniversary



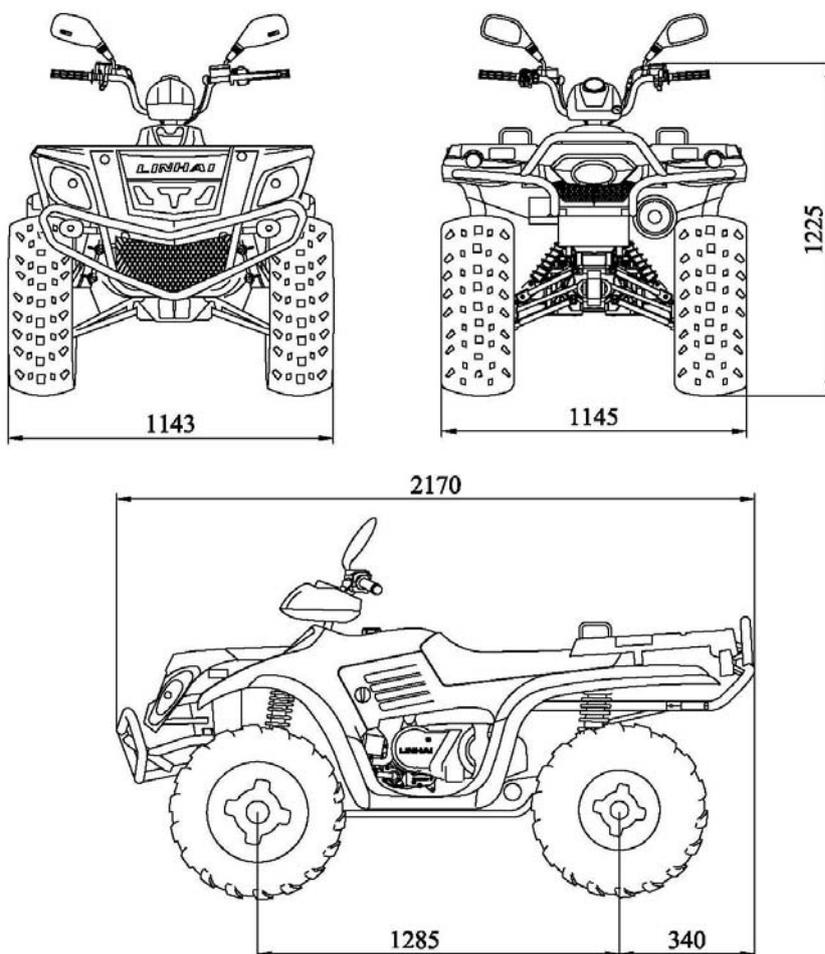
B-Type 260/ 300



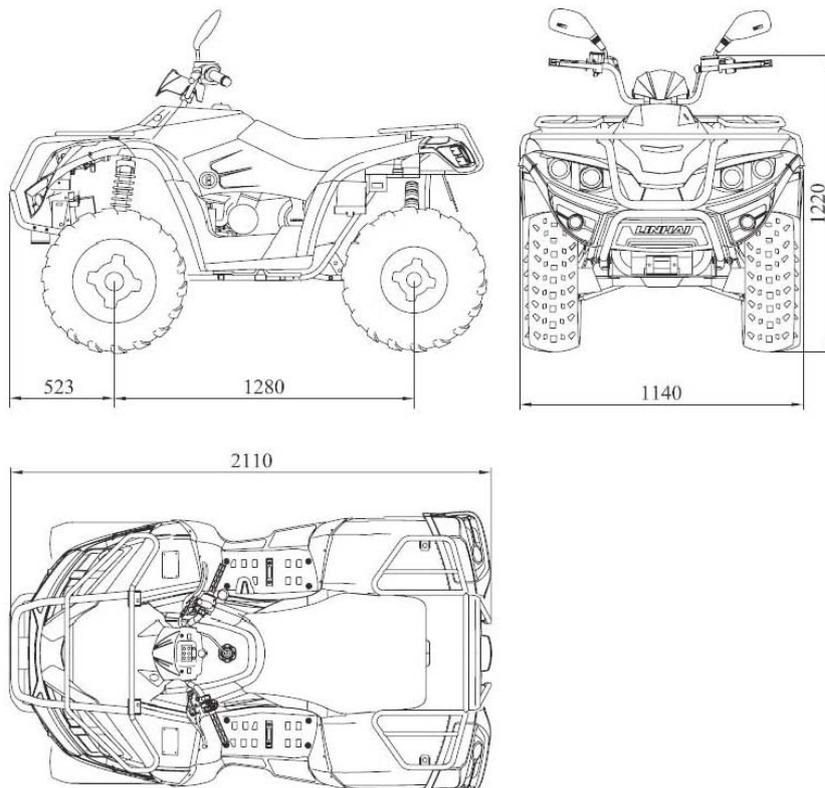
B-Type 150/ 200



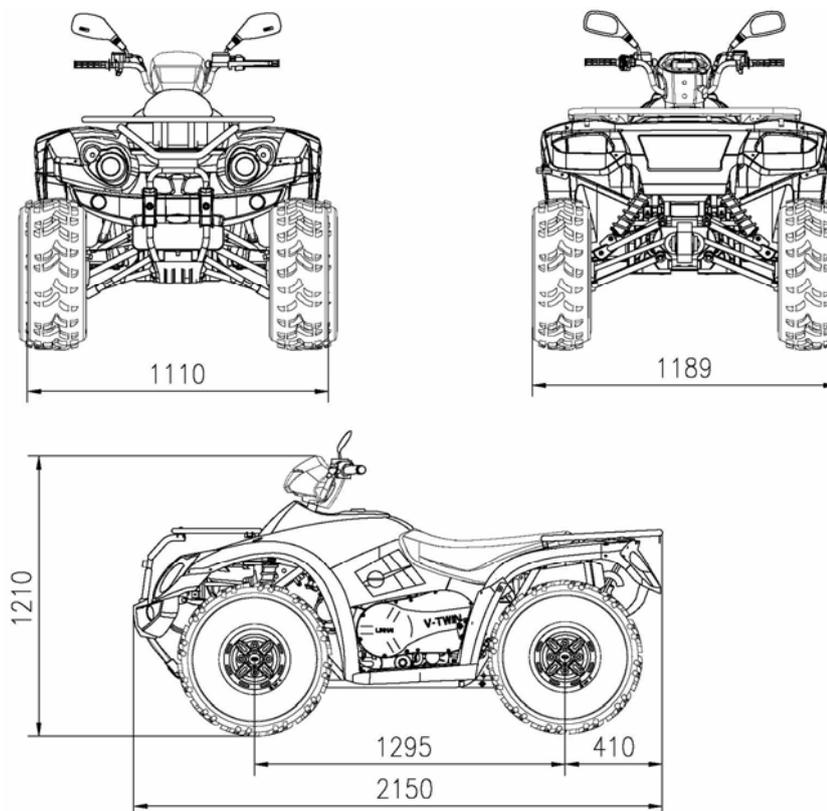
ATV 400-2



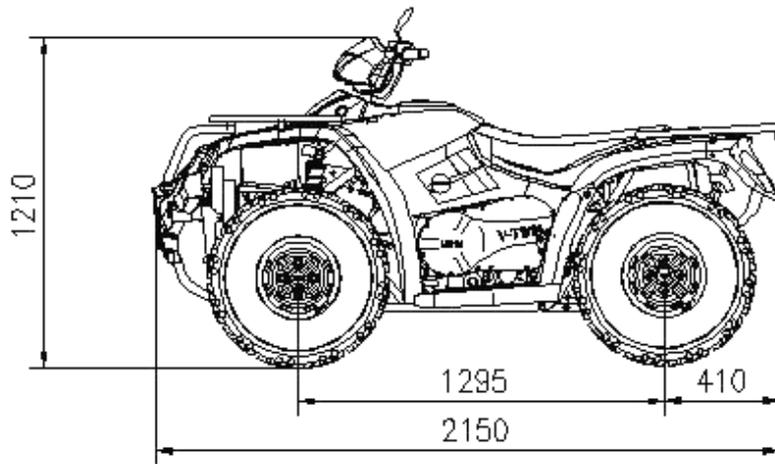
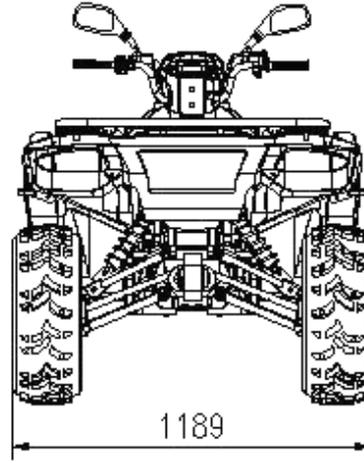
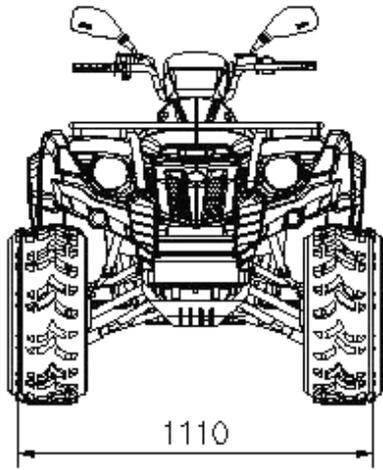
ATV 400-2B



ATV 520



ATV 520-B





# CHAPTER 2 MAINTENANCE

## **WARNING**

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### 2.1 PERIODIC MAINTENANCE

### 2.2 FUEL SYSTEM

### 2.3 TOE ALIGNMENT

### 2.4 BRAKING SYSTEM INSPECTION

### 2.5 SUSPENSION SPRING RPELOAD ADJUSTMENT

### 2.6 WHEELS

### 2.7 TIRE PRESSURE

### 2.8 FRAME, NUTS, BOLTS, FASTENERS

## 2.1 PERIODIC MAINTENANCE

### GENERAL

#### CAUTION

Mark on the following chart

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

**▲** : Service/Inspect more frequently when operating in adverse conditions.

### 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 16km/h (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.

A = Adjust      I = Inspect

C = Clean      L = Lubricate

D = Drain      R = Replace

T = Tighten to Correct Torque

	Item	Hours	When	Remarks
	Service (Main) Brake System	/	Pre-ride	I
	Auxiliary (Secondary) Brake	/	Pre-ride	I
	Parking Brake	/	Pre-ride	I
	Tires	/	Pre-ride	I
	Wheels	/	Pre-ride	I
	Frame nuts, bolts fasteners	/	Pre-ride	I
<b>▲</b>	Air Filter-Pre-Cleaner	/	Daily	I C
	Coolant/Level	/	Daily	I
	Coolant	150	Annually	R

	Coolant strength	25 hrs	3 months	I Inspect strength seasonally
▲	Air Box Sediment Tube	/	Daily	D
	Headlamp Inspection	/	Daily	C apply dielectric grease to connector when replaced
	Tail lamp inspection	/	Daily	C apply dielectric grease to socket when replaced
▲	Air Filter-Main Element	2	Weekly	I C Replace if necessary
▲	Transmission Oil Level	10	Monthly	I change annually
	Battery Terminals	10	Monthly	I C
	Battery fluid level	10	Monthly	I
DL	Brake pad wear	2	Weekly	I
▲	Gear case Oil	10	Monthly	C
		150	annually	R
	Engine Cylinder Head and Cylinder Base Fasteners	25	3 months	I (re-torque required at first service only)
▲	General Lubrication all fittings, pivots, cables, etc.	25	3 months	L
	Engine Oil-Level	/	Daily	I
	Engine Oil Change	30 hrs	3 months	R Break-in Service at 1 month. Change oil more often in cold weather use.
▲	Oil Filter	50 hrs	6 months	I C
▲	Engine breather hose	100 hrs	6 months	I
	Carburetor Float Bowl	50 hrs	6 months	Drain bowl periodically and prior to storage

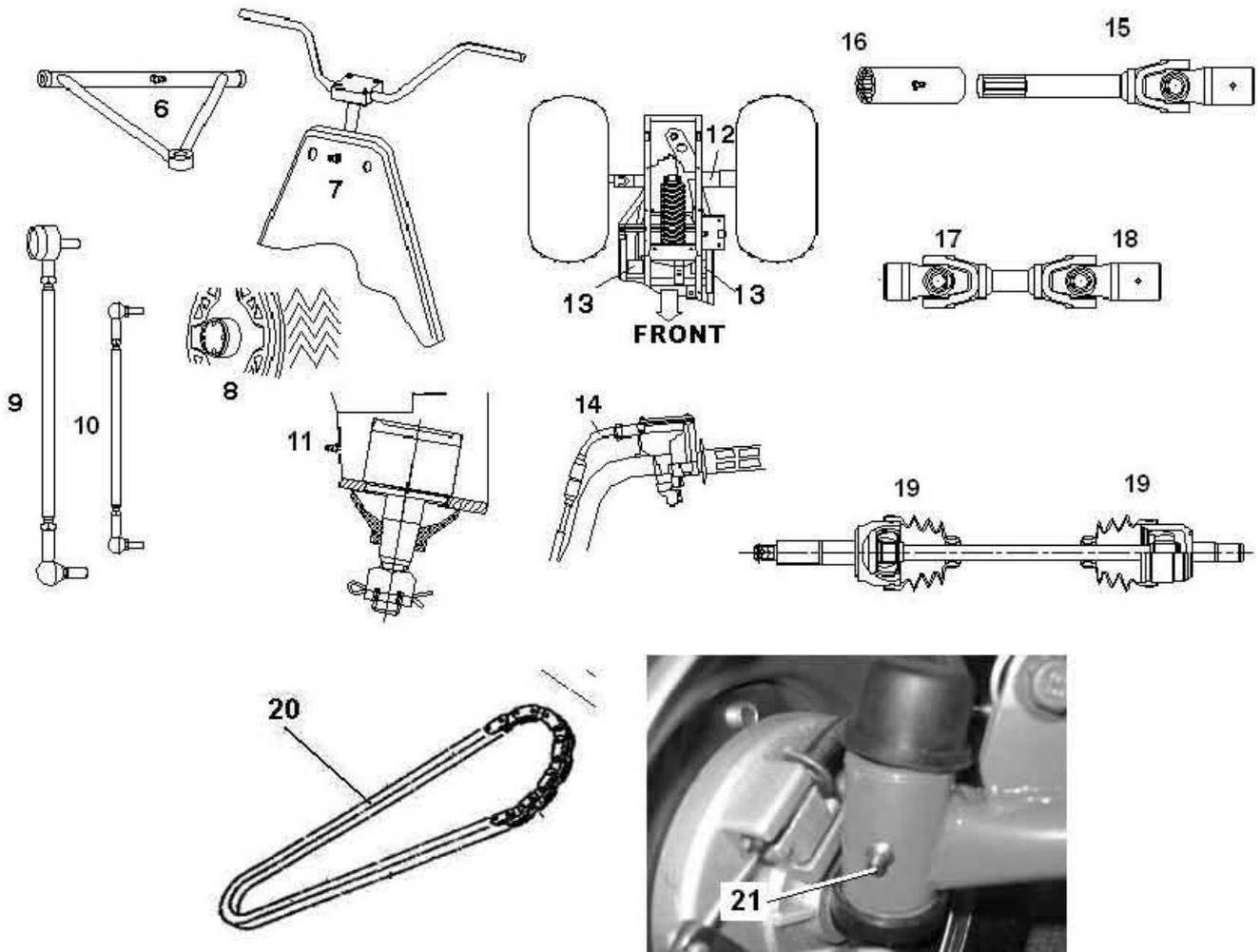
	Throttle Cable	/	Pre-ride	I
DL	Throttle Cable	50 hrs	6 months	A L (Grease M) R if necessary
	Shift linkage	50 hrs	6 months	I A R if necessary
DL	Transmission belt	50 hrs	6 months	I R if necessary
▲	Steering	50 hrs	6 months	I L T if necessary
▲	Rear Axle ( and Bearings)	50 hrs	6 months	I L
▲	Front Suspension	50 hrs	6 months	I L T if necessary
▲	Rear Suspension	50 hrs	6 months	I T if necessary
	Spark Plug	100 hrs	12 months	I R if necessary
DL	Ignition Timing	100 hrs	12 months	I Adjust as needed
DL	Fuel System	100 hrs	12 months	Check for leaks at tank, cap, lines, fuel valve, filter, and carburetor. Replace lines every 2 years.
DL	Fuel Filter	100 hrs	12 months	R
	Radiator	100 hrs	12 months	I R
	Cooling System hoses	50 hrs	6 months	I R if necessary
	Spark arrestor	10 hrs	monthly	C R if necessary
DL	Clutches (drive and Driven)	25 hrs	3 months	I R R if necessary
	Engine mounts	25 hrs	3 months	I T
DL	Valve clearance	100 hrs	12 months	I A
DL	Shift selector box	200 hrs	24 months	Change grease every two years

	(H/L/R/N)			
DL	Brake fluid Level	/	Pre-ride	I
	Brake fluid	200 hrs	24 months	Change every two years
	Idle Speed	/	As Required	A
DL	Toe adjustment	/	As Required	Periodic inspection, adjust when parts are replaced
	Headlight Aim	/	As Required	Adjust if necessary
▲ DL	Front drive chain (and sprockets) in transmission (only 4X4 model);	300 hrs (full time in 4X4), or 1000 hrs ( in 2X4 alternate 4X4 )		I, Replace if necessary
▲ DL	Ball joint (A arm- strut)	10 hrs	monthly	I, (for damage, wear, and play) R. Replace if necessary
▲	drive chain (and sprockets) (chain drive system only)	2	Weekly	I C L Adjust or/ and replace if necessary

**LUBRICANT AND FLUID**

	Item	Lube Rec	Method	Frequency
	1. Engine Oil	SAE 15W/40 SE	Add to proper level on dipstick	Check level daily
	2. Brake Fluid	DOT 3 Only	Maintain level Between fill lines. See "7.CONTROL"	As require; change every two years or 200 hours
	3. Transmission Oil	SEA 80W/90GL5	Add to proper level on dipstick	Change annually or at 100 hours
	4.Rear Gear case oil	SEA 80W/90GL5	Add to proper level	Change annually or at 100 hours
	5. Front Gear case oil ( 4X4)	SEA 80W/90GL5	Add to proper level	Change annually or at 100 hours
▲	6. Front A-arm pivot Shaft	Grease	Locate fitting on pivot shaft and grease with grease gun	Every 3 months or 50 hours ( Except Maintenance-Free A-arm pivot )
▲	7.Steering	Grease	Locate fitting on	Every 3 months or 50

	Post Bushings		pivot shaft and grease with grease gun	hours
▲	8.Front Wheel bearings	Grease (high temperature resist)	Inspect and replace bearings if necessary	Semi-annually
	9.Tie rods	Grease	Locate fittings and grease	Semi-annually
	10.Shift Linkages	Grease	Locate fittings and grease	Semi-annually
▲	11.Ball joints	Inspect	Inspect and replace it if necessary	Semi-annually
▲	12.Rear Axle Bearing	Grease	Locate fittings and grease	Every 3 months or 50 hours
▲	13.Swing Arm Bearing	Grease	Locate fittings and grease	Monthly or 20 hours
▲	14.Throttle Cable	Grease M	Grease, inspect and replace it if necessary	Monthly or 20 hours
	15. Rear prop shaft U-joint	Grease	Locate fittings and grease	Every 3 months or 50 hours
	16. Rear prop shaft yoke	Grease	Locate fittings and grease	Every 3 months or 50 hours
	17. Front prop shaft U-joint ( 4WD)	Grease	Locate fittings and grease	Every 3 months or 50 hours
	18. Front prop shaft yoke ( 4WD)	Grease	Locate fittings and grease	Every 3 months or 50 hours
	19. Inner and outer CV-Joints (4WD)	Grease M	Grease, inspect and replace it if necessary	Every 3 months or 50 hours
▲	20. Drive chain (and sprockets) (chain drive system only)	Lubricate	I C L Adjust or/ and replace if necessary	Weekly
	21. A-arm pivot shaft	Grease	Locate fittings and grease	Every 3 months or 50 hours



**LUBRICATION RECOMMENDATIONS**

**NOTE:**

1. More often under severe use, such as wet or dusty conditions.

2. Grease: Light weight lithium-soap grease.

3. Grease M: 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(16Km/h) average.

**2.2 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.

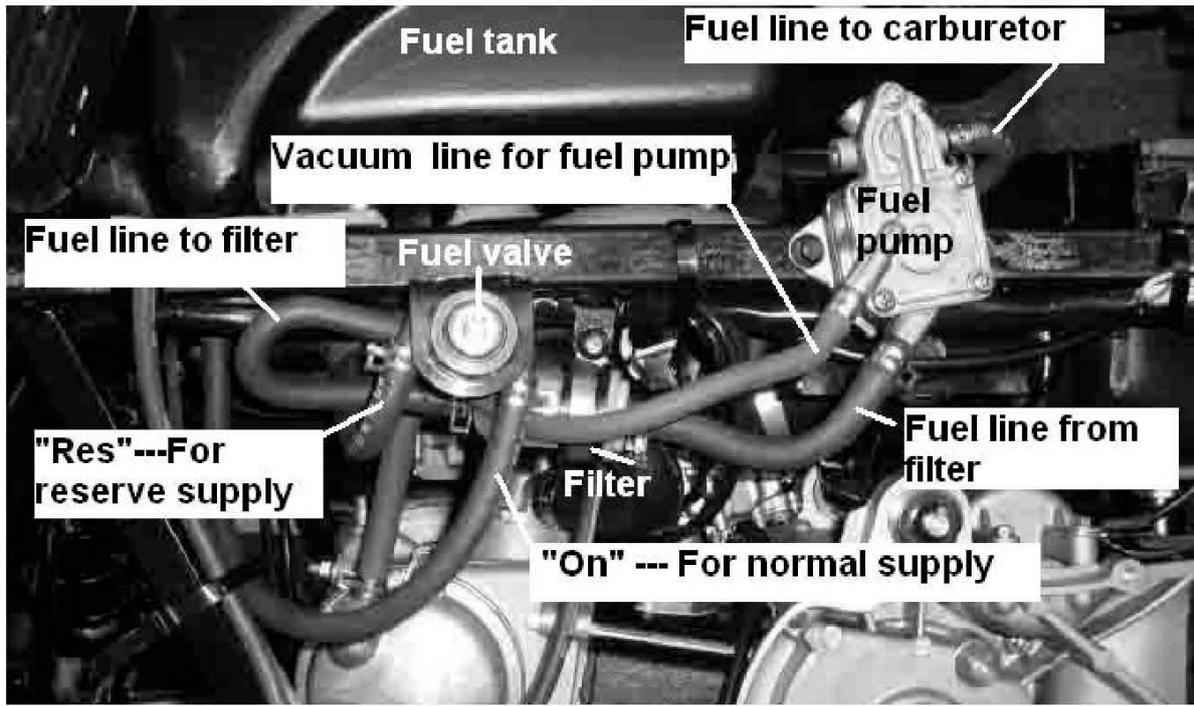
Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

Do not overfill the tank. Do not fill the tank neck.

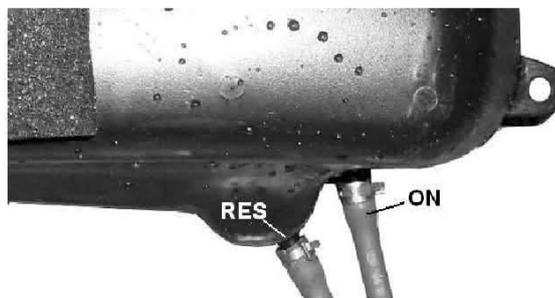
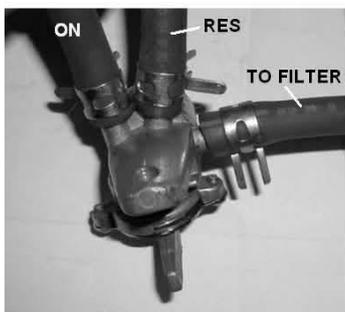
If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.

- ⚠ 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.

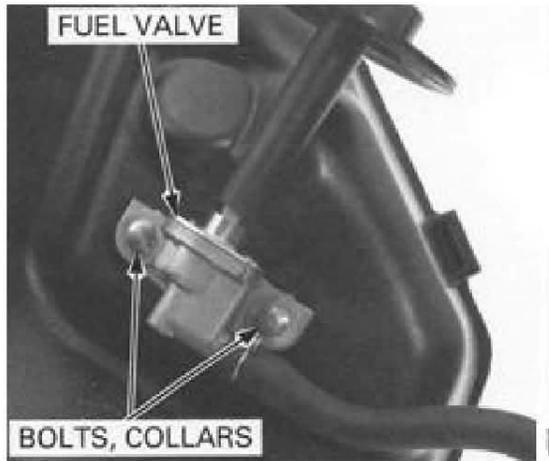
**ATV 260/ 300 / 400-2**



**YOUTH/ MINI ATV**



B-TYPE ATV /ATV400-2B



ATV400-2B:  
to oil filter to carburetor

150/ 200:  
to carburetor

260/ 300  
to fuel pump

**FUEL LINES**

Check fuel lines for signs of wear, deterioration, damage or leakage. Replace if necessary.

Be sure fuel lines are routed properly and secured with cable ties.

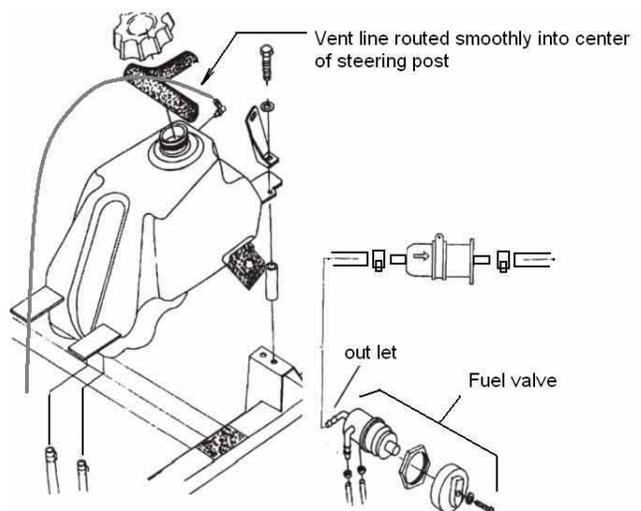
**CAUTION:** Make sure lines are not kinked or pinched.

Replace all fuel lines every two years.

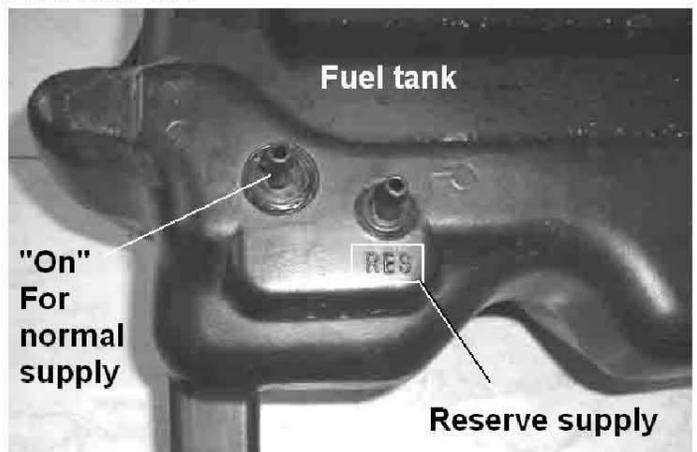
**FUEL FILTER**

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.



ATV 260/ 300



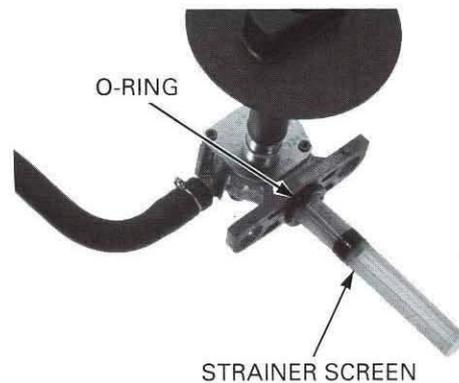
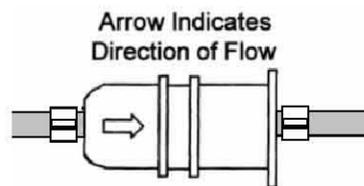
ATV 260/ 300

**FUEL VALVE AND STRAINER SCREEN**

**FOR B-TYPE ATV / ATV400-2B**

Fuel strainer screen cleaning:

1. Remove the fuel tank.
2. Drain the gasoline into an approved fuel container. Remove the two mounting bolts, collars and the fuel valve.
3. Remove the O-ring and fuel strainer screen.
4. Clean the strainer screen with non-flammable or high flash point solvent. Dry the strainer screen thoroughly.
5. Install the strainer screen and a new O-ring onto the valve.
6. Install the fuel valve onto the fuel tank.
7. Install the collars and mounting bolts, and tighten the bolts securely.



**NOTE**

After installing the fuel valve and connecting the fuel line, refill the fuel tank and turn the fuel valve ON and check that there is no fuel leaking.

**WARNING**

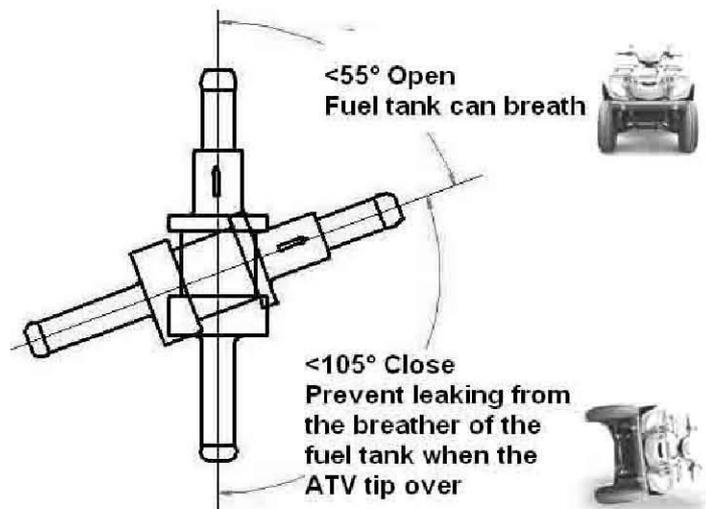
Always pay attention to the fittings of the plastic gas tank during fuel lines service. Don't pull the line from the tank directly for removal. Inspect fittings and tank body for looseness, nicks, and scratches. Replace gas tank if necessary.

**B-TYPE ATV**

**VENT LINES AND ROLL OVER VALVE\***

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 and drain lines are routed properly toward the ground and secured with cable ties. **CAUTION:** Make sure lines are not kinked or pinched

**\*NOTE. On some models, there is a Roll-Over Valve on the end of the gas tank vent line. Make sure the ↑ mark on the R-O Valve is upwards.**



**2.3 TOE ALIGNMENT**

METHOD: STRAIGHTEDGE OR STRING

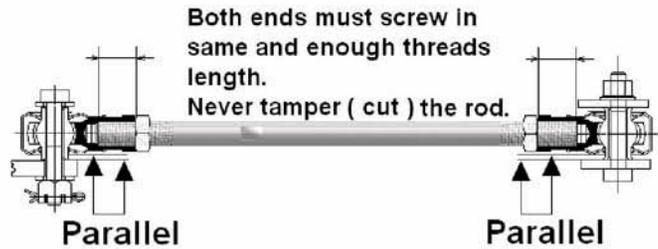
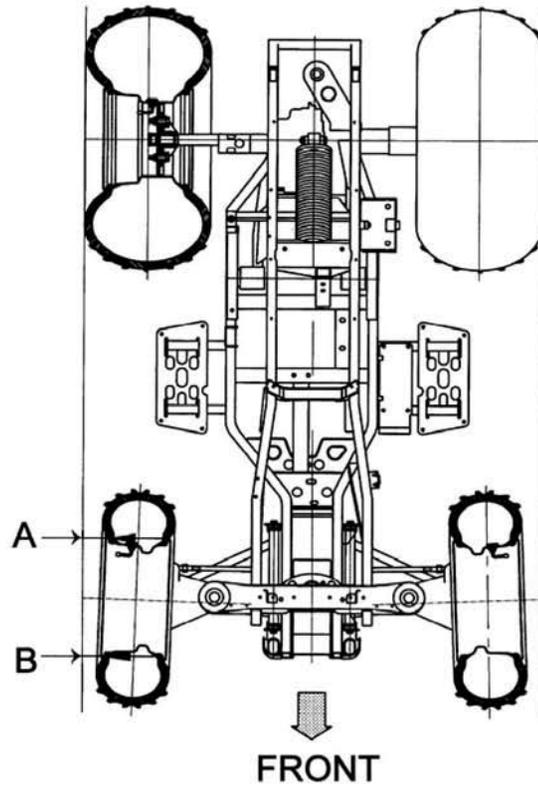
Be sure to keep handlebars centered

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

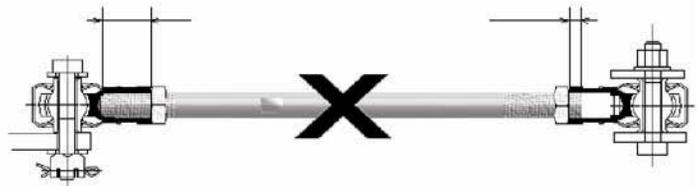
Measure from string to rim at front and rear of rim.

Rear rim measurement (A) should be 1/16" to 1/8" (1.5 to 3 mm) 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.



**WARNING:** Always pay attention to tie rods assembly, Both ends must screw in same and enough threads length.



**2.4 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 on 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.

**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.

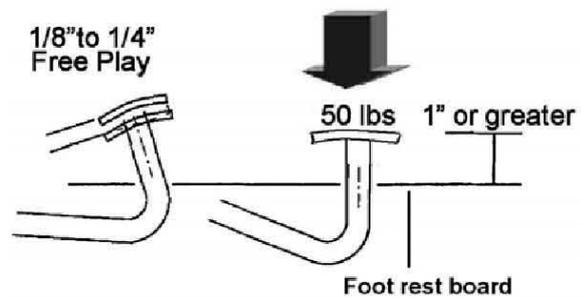
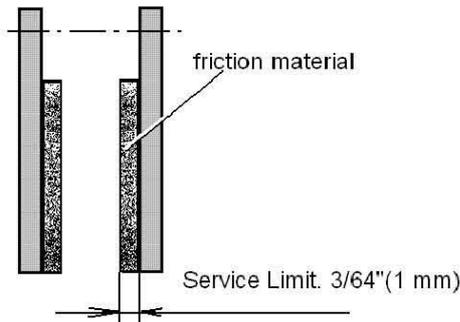
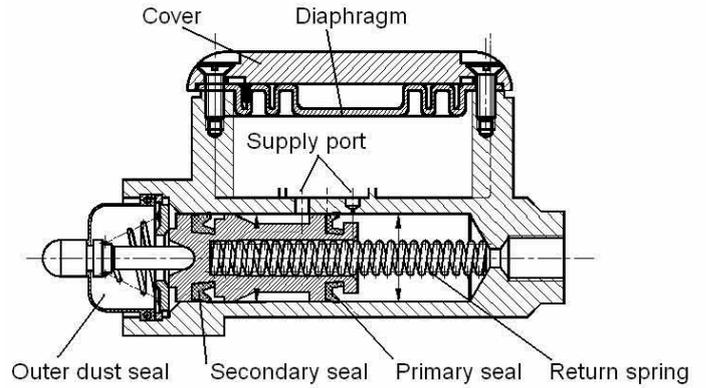
**FOOT BRAKE ADJUSTMENT**

**NOTE**

On USA ATV 260 / 300 and B-type, foot brake is an AUXILIARY brake.

On European ATV 260 / 300 and B-type , foot brake is the SERVICE brake (MAIN brake)

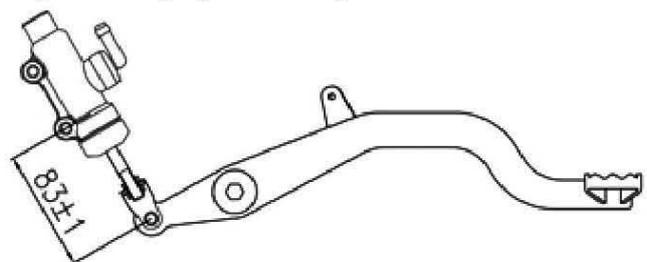
Use the following procedure to inspect the



Foot control brake is only for ATV 260 / 300

**Adjusting brake pedal for B-Type**

If the push rod joint is reinstalled, adjust the push rod length so that the distance between the centers of the master cylinder lower mounting bolt hole and joint pin hole is 83±1mm. After adjustment, tighten the joint nut.



hydraulic foot brake system and adjust or bleed if necessary.

1. First check foot brake effectiveness by applying a 25 kg (50 lb). (Approx) downward force on the pedal.

The top of the pedal should be at least 1 inch, (25 .4m m) 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 1/8-1/4 inch (3-6mm).**

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 some where in the system. Bleed the hydraulic brake system in a conventional manner, following the procedure outlined in the Brake chapter.

**FOOT BRAKE TESTING**

The foot 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.

**MECHANICS PARKING BRAKE FOR EUROPE ATV 260 / 300 / 400-2**

**Checking**

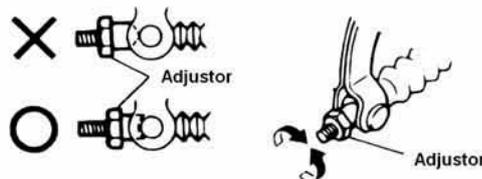
Although the parking brake has been adjusted at the factory, the brake should be checked for proper operation. The mechanical brake must be maintained to be full functional.

**CONTROLS**

Check controls for proper operation, positioning and adjustment.

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

**Note:** burnishing procedure is also applicable for parking brake. See CHAPTER 7 BRAKES.



↑ adjust on the lever      ATV 260/300

1. With the engine off, apply the parking brake lever and attempt to move the ATV.
2. If the rear wheels are locked, it is adjusted properly.
3. If the wheels are not locked, it must be adjusted.

To adjust (set up) the mechanical parking brake, use the following procedure

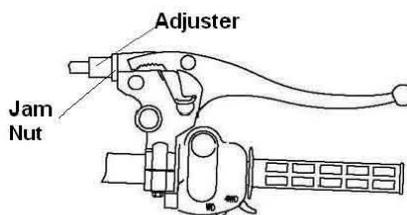
**Note:** The adjusting on the caliper is for the wear out of the pads.

1. With the engine off, loosen the adjustor on the lever.
2. Loosen the jam nut of the adjustor on the caliper.
3. Turn the adjustor (bolt) CW (clockwise) by hand till the pad touch the brake disc, turn the adjustor bolt CCW (counterclockwise) by 1/4 to one turn for 10 to 20mm free play at the end of the parking lever.
4. Tighten the jam nuts securely against the adjusters.
5. Make sure the rear wheels turns freely without dragging.
6. Turn the adjustor (the one on the lever) and apply the lever. While adjusting, it is important you apply the lever back and forth for operation, free play and the locking of the parking position.
7. Make sure the rear wheels turns freely without dragging and parking brake works properly.

**CAUTION** Don't over tighten the adjustor. Free play of the lever: 20mm.

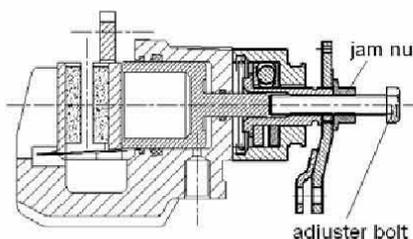
8. Field test for parking. It must be capable of holding the laden ATV stationary on an 18% up and down gradient.

A temporary adjusting can also be done to the brake cable on the parking lever side by turn the adjuster (nut) directly. But the adjust range is limited. Always do the procedure 1 to 8 when necessary.

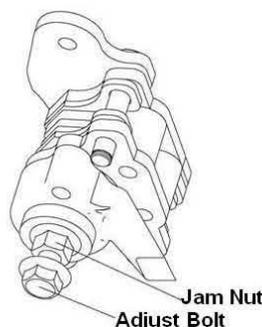


↑ adjust on the lever      B-type ATV  
ATV400-2B

Adjusting can also be done to the brake cable on the parking lever side by turn the adjuster (nut) directly.



↑ adjust on the caliper      ATV 260/300  
ATV400-2  
ATV400-2B



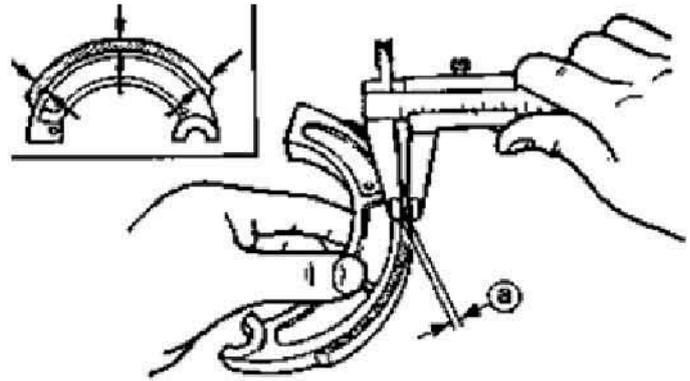
↑ adjust on the caliper      B-type ATV

**DRUM BRAKE FOR ATV 50-150**

The front brakes are located on the right handlebar, and are operated by the right hand. The front brakes are mechanical drum type brakes which are activated by one lever only.

**Brake shoes**

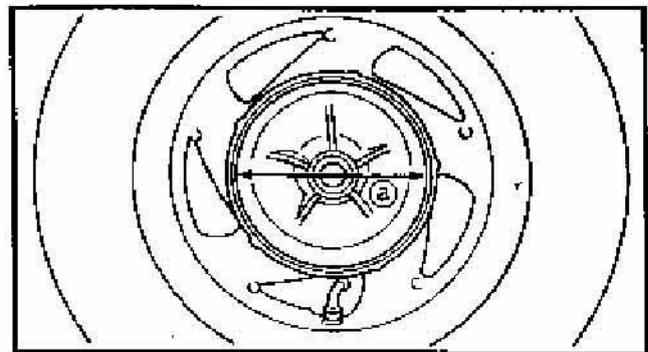
- The standard thickness of lining is 5/32"(4mm)
- Shoes should be changed when friction material (lining) is worn to 2.5 mm.(a)
- Replace the brake shoes as a set if either is worn to the limit.



**NOTE:** Replace the brake shoes as a set either is worn to the limit.

**Brake drum**

- The standard brake drum inside diameter is 110mm, the limit is 110.5mm.
- Measure the brake drum inside diameter(a)



**Drum Brake**

**Checking**

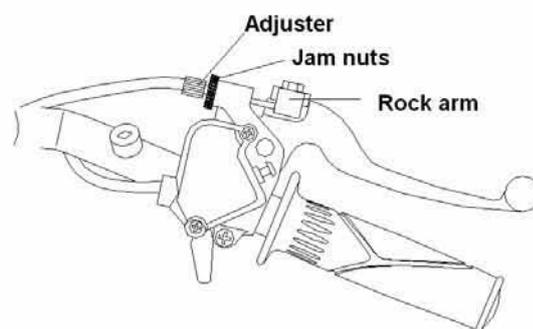
Although the front brake has been adjusted at the factory, the brake should be checked for proper operation. The mechanical brake must be maintained to be fully functional.

1. With the engine off, apply the right hand brake lever and attempt to move the ATV.
2. If the both front wheels are locked, it is adjusted properly.
3. If the wheels or one wheel are/is not locked, it must be adjusted.

**Adjusting**

To adjust (set up) the mechanical drum brake, use the following procedure.

1. Loosen the jam nuts of the adjuster on the right hand of right and left brake cable.
2. Turn the both adjusters keep



the rock arm on the lever balance until 1/8" (2to3mm) free play is achieved at the brake lever.

**NOTE:** While adjusting free play, it is important you apply the lever back and forth.

3. Tighten the jam nuts securely against the adjusters.

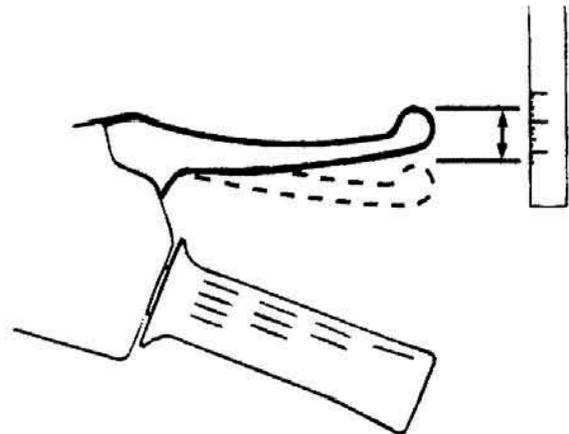
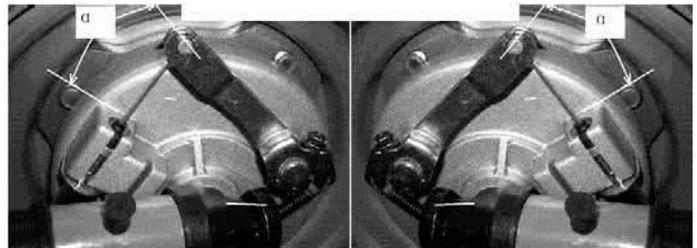
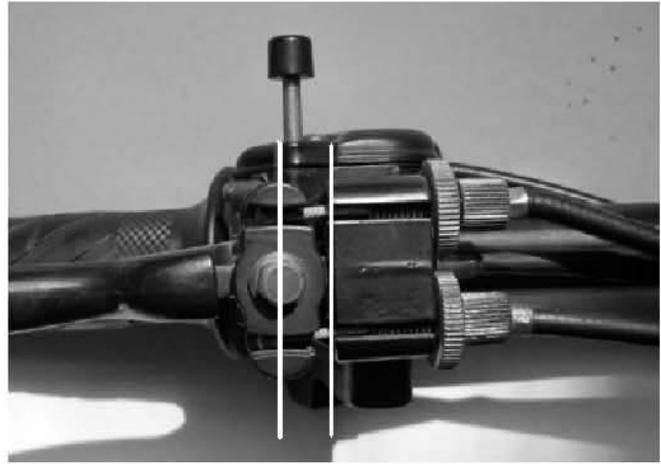
If the right hand adjustment is inadequate to attain the proper brake free-play gap, make adjustment at the middle of the cables adjuster jam nuts.

**NOTE:** Apply the front brake a number of times to ensure the wheels lock and the brake light illuminate properly.

4. Make sure the right and left brake are balance after the adjustment of the front brakes by test at low speed. Contact your dealer for proper diagnosis and repairs.

5. If adjusting the cables does not attain proper brake performance and free-play, the brake shoes must be replaced.

**Note:** After the adjusting, the adjustment distance of the cables and the angle of the drum levers between the right and left brake must be same.



## **2.5 SUSPENSION SPRING RPELOAD 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 from strut cartridges for leakage. Shock spring preload can not be adjusted, replace if necessary.

### **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.

★ This design is not available for all tpye.



**2.6 WHEELS**

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

**WHEEL, HUB TORQUE TABLE**

Item	Specification			
	Youth/ Mini ATV		ATV 260 300 and B-Type	
Front Wheel Nuts	35-40 N.m	26-30 Ft.Lbs	20 Ft.Lbs	27 N.m
Rear Wheel Nuts	35-40 N.m	26-30 Ft.Lbs	50 Ft.Lbs	69 N.m
Front Spindle Nut	45-50 N.m	33-37 Ft.Lbs	Refer to FRONT HUB INSTALLATION	
Rear Hub Retaining Nut	50/ 80 cc	80-85 N.m	60-62 Ft.Lbs	80 Ft.Lbs 110.6 N.m
	100/ 125/ 150 cc	110 N.m	81 Ft.Lbs	

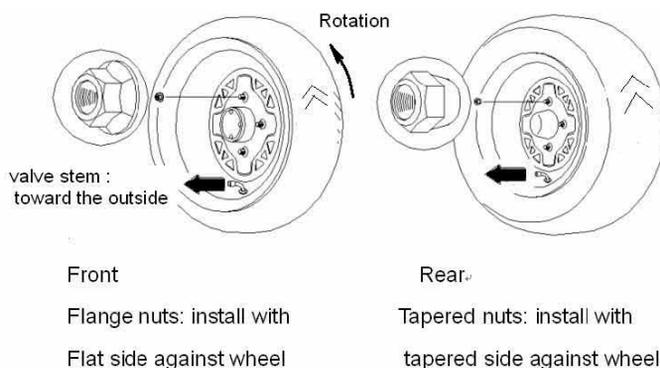
**WHEEL REMOVAL**

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 rotation.
2. Attach the wheel nuts (for ATV 260 / 300 and B-Type) / bolts ( for ATV 50-150) and finger tighten them.  
 Install as shown (for ATV 260 / 300 and B-Type) 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.  
 On rear wheel nuts, Make sure tapered

ATV 260 / 300 and B-Type:



**CAUTION:**

If wheels are improperly installed it could affect Vehicle handling and tire wear.

**2.7 TIRE PRESSURE**

**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, especially in SDX300 model.
- The use of non- standard size or type tires may affect ATV handling and cause machine damage, especially in SDX300 model.

**TIRE TREAD DEPTH**

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

**Tire Pressure Inspection**

	<b>Front</b>	<b>Rear</b>
<b>260/300</b>	4PSI (27±0.5KPa)	4PSI (27 ±0.5KPa)
<b>B-Type 150 / 200</b>	5PSI (35KPa)	5PSI (35KPa)
<b>Youth/ Mini</b>		
<b>400ATV-2 400ATV-2B</b>		

**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.

**2.8 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.

<b>ATV260/300/400/520</b>			
Item	Torque (Ft-Lb)	Torque (Nm)	Remarks
EARLY DESIGN* Handlebar Clamp Nut M6	12	16	Only ATV 260 early model
Handlebar Clamp Nut M8	18	25	
Nut M10X1.25 Attaching Tie Rod to Steering column	26-30	35-41	
Nut M10X1.25 Attaching Tie Rod to Front Absorber Strut body	26-30	35-41	
Tie Rod Jam Nut M12	13	17	

EARLY DESIGN* Bolt M10 Attaching A-Arm and Frame	30	41	LT* Only ATV 260 early model
MANTENANCE-FREE PIVOT DESIGN Bolt M12 Attaching A-Arm and Frame	37-44	50-60	LT*
Nut M10X1.25 Attaching A-Arm to Ball Joint Stud	22-25	30-35	
Screw M6 Attaching Ball Joint Mounting Bracket to Front Absorber Strut body (MacPherson)	8	11	LT*
Swing Arm Pivot Left	14	19	Refer to SWING ARM ASSEMBLY INSTALLATION , 4.2 SWING ARM, CHAPTER 4A CHASSIS
Swing Arm Pivot Right	120	165	
Threaded Pivot Nut (for swing arm)	120	165	
Nut M14X1.5 Attaching Front Absorber to Frame (MacPherson)	15-18	21-25	LT*
Nut M8 Binding Front Absorber and Front Absorber Strut body (MacPherson)	15	21	LT*
Bolt M8 Attaching Front Caliper to Front Absorber Strut body	18	25	LT*
Bolt M8 Attaching Upper Steering Clamp to Frame	12	16	
Nut M8 Attaching Lower Steering Bearing Retainer to Frame	12	16	
Nut M10X1.25 Attaching Front Wheel to Front Wheel Hub	20	27	
Front (Drive) Axle Nut	Refer to FRONT HUB INSTALLATION		
Screw M8 Attaching Front Brake Disc to Front Wheel Hub	18	25	LT*
Nut M10X1.25 Attaching Rear Brake Disc to Rear Brake	22-25	30-35	LT*
Rear Axle Nut M20X2 (for swing arm)	80	110.6	
Rear Hub Retaining Nut M20X1 (for IRS)	101	137	
Nut M10X1.25 Attaching Rear Caliper to Axle Tube	18	25	LT*
Bolt M12x30 Attaching Axle Tube and Swing arm to Rear Gear-box	60	80	
Bolt M12x35 Attaching Axle Tube to Swing arm	60-66	80-90	

LT\*—Apply Loctite™ 242



# CHAPTER 3 A ENGINE

## 260cc / 300 cc /400 cc

### 3.1 MAINTENANCE SPECIFICATIONS

#### 3.1.1 SPECIFICATIONS

#### 3.1.2 TIGHTENING TORQUES

### 3.2 PARTS INSPECTION AND SERVICE

#### 3.2.1 VALVE CLEARANCE ADJUSTMENT

#### 3.2.2 IDLING SPEED ADJUSTMENT

#### 3.2.3 SPARK PLUG INSPECTION

#### 3.2.4 COMPRESSION PRESSURE

#### 3.2.5 ENGINE OIL LEVEL INSPECTION

#### 3.2.6 COOLANT LEVEL INSPECTION

### 3.3 CYLINDER HEAD

### 3.4 CAMSHAFT AND ROCKER ARMS

### 3.5 VALVES AND VALVE SPRINGS

### 3.6 CYLINDER AND PISTON

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

### 3.8 A.C. MAGNETO AND STARTER CLUTCH

### 3.9 OIL PUMP

### 3.10 CRANKCASE AND CRANKSHAFT

### 3.11 COOLING SYSTEM

#### 3.11.1 RADIATOR

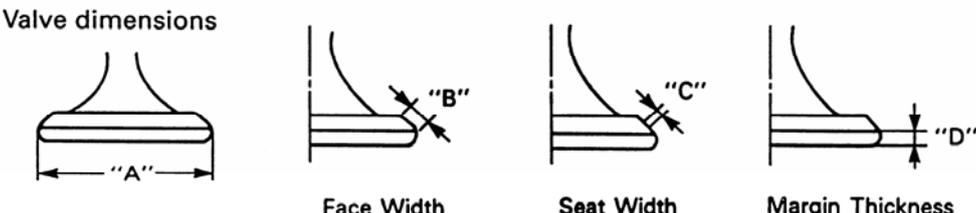
#### 3.11.2 WATER PUMP

#### 3.11.3 THERMOSTAT

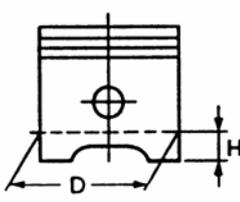
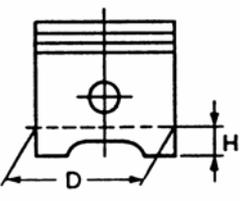
### 3.12 CARBURETOR

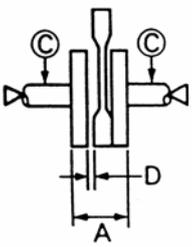
**3.1 MAINTENANCE SPECIFICATIONS**

**3.1.1 SPECIFICATIONS**

Item	Standard	Limit
Cylinder head : Warp limit:		0.03 mm
Cylinder: Bore size	260:70.000- 70.014 mm	260:70.025 mm
	300:72.500- 72.514 mm	300:72.525 mm
	400: 80.000- 80.014 mm	400:80.025mm
Out of round limit		0.03 mm
Camshaft: Cam dimensions		
Intake "A"	36 .545- 36 .645 mm	36 .45 mm
"B"	30.021-30.121 mm	29.92 mm
"C"	6.524 mm	...
Exhaust "A"	36 .547- 36 .647 mm	36 .45 mm
"B"	30 .067- 30.167 mm	29 .97 mm
"C"	6.48 mm	...
Camshaft runout limit	.....	0.03m m
Cam chain: Cam chain type/No. of links	260/300: DID SC.A-0404A SDH/104 400:DID SC.A-0404A SDH/108	...
Rocker arm /rocker armshaft: Rocker arm inside diameter	12 .000- 12 .018 mm	12 .03 mm
Rocker shaft outside diameter	11.981- 11.991 mm	11.95 mm
Rocker arm - to- rocker arm shaft clearance	0.009- 0.012 mm	...
Valve, Valve seat, Valve guide: Valve clearance (cold)	IN 0.08-0.12 mm EX 0.16-0.20 mm	... ...
Valve dimensions		
Valve dimensions		
	Face Width	Seat Width
		Margin Thickness

"A" head diameter	IN	33.9-34.1mm	...
	EX	28.4-28.6mm	...
"B" face width	IN	3.394-3.960mm	...
	EX	3.394-3.960 mm	...
"C " seat width	IN	0.9-1.1mm	...
	EX	0.9-1.1 mm	...
"D" margin thickness	IN	0.8-1.2 mm	...
	EX	0.8-1.2 mm	...
Stem outside diameter	IN	5.975- 5.990 mm	5.94 mm
	EX	5.960-5.975 mm	5.92 mm
Guide inside diameter	IN	6.000- 6.012 mm	6.05 mm
	EX	6.000- 6.012 mm	6.05 mm

Item		Standard	Limit
Stem-to-guide clearance	IN	0.010- 0.037 mm	0.08 mm
	EX	0.025-0.052 mm	0.1 mm
Stem runout limit	IN	...	0.01 mm
	EX	0.9-1.1 mm	1.6 mm
Valve seat width	IN	0.9-1.1 mm	1.6 mm
	EX	0.9-1.1 mm	1.6 mm
Valve spring :			
Free length (Inner)	IN/EX	38.1 mm	361 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	...
Com pressed 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		260 /300:	0.15m m
		0.02 - 0.04 mm	
Piston size "D"		260;69.965-69.980 mm	...
Measuring point "H"		300;72.465-72.480 mm	...
Piston pin bore inside diameter		5mm	
		17.004-17.015 mm	17.045 mm
Piston pin outside diameter		16.991-17.000 mm	16.975 mm
Piston:			
Piston to cylinder clearance		400:	0.15m m
		0.02 - 0.049mm	
Piston size "D"		79.965-79.980 mm	...
Measuring point "H"		...	...
Piston pin bore inside diameter		5mm	
		18.004-18.015 mm	18.045 mm
Piston pin outside diameter		17.991-18.000 mm	17.975 mm

Piston rings : Top ring : Type End gap (installed) Side clearance (installed ) 2nd ring : Type End gap (installed) Side clearance Oil ring : End gap (installed)	260 /300:  Barrel 0.15- 0 .30 mm 0.04- 0.08 mm  Taper 0 .30- 0 .45 mm 0.03 - 0.07 mm  0 .2- 0.7 mm	...  0 .45 mm 0 .12 mm  ...  0.7 mm 0.12 mm  ...
Piston rings : Top ring : Type End gap (installed) Side clearance (installed ) 2nd ring : Type End gap (installed) Side clearance Oil ring : End gap (installed)	400:  Barrel 0.2-0.35 mm 0.03-0.065 mm  Taper 0.28-0.48 mm 0.02-0.052 mm  0. 15-0.4 mm	...  0.5 mm 0.1 mm  ...  0.73 mm 0.1 mm  ...
Crankshaft:    Crank width "A" Runout limit "C "	59.95-60.00 mm	...
Big end side clearance "D"	0.03 mm 0.35- 0.85 mm	... ...

Item	Standard	Limit
Automatic centrifugal clutch: Clutch shoe thickness Clutch hosing inside diameter Clutch shoe spring free length W eight outside diameter Clutch- in revolution	3.0 mm 135 mm 2 8.1 mm 20 mm 2 ,100- 2,700 r/m in	2.0 mm 135 .5 mm ... 19 .5 mm ...
V-belt: V-belt width	22.6 mm	21.0 mm
Carburetor: Type I.D. mark Ventuly outside diameter Main jet (M .J) Jet needle (M .A.J) Throttle valve size (J.N) Pilot air jet (Th .V) Needle jet (P.A.J.1) Pilot outlet (N.J) Pilot jet (P.O) Bypass (B.P) Pilot screw (P.S) Valve seat size (V.S) Starter jet 1 (G.S.1) Starter jet 2 (G.S.2) Float height (F.H) Engine idle speed Intake vacuum	CVK 1000-L06-0000 T VH- 052D φ 30 # 128 N7AJ 10° φ 1.2 φ 2.1 φ 0.95 # 38 φ 0.7x4 1*3/8 φ 1.2 # 42 φ 0 .9 >3.0 1,350-1,650 r/m in 220-260 mmHg	... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
Oil pump: Type Tip clearance Side clearance Housing and rotor clearance	Trochoid type 0.1- 0 .34 mm 0.013- 0.03 6 mm 0 .04- 0.09 mm	0 .4 mm 0 .15 mm 0 .15 mm

Item	Standard	Limit
Radiator: Type Width/height/thickness  Radiator cap opening pressure  Radiator capacity Reservoir tank capacity	Cooling fin with electric fan 260 /300: 288/238/42 mm 400: 360/246/68 m 110-140kPa (1.1-1.4kg/cm <sup>2</sup> , 1.1-1.4bar) 2 L 0 .35 L	... ... ... ... ...
Thermostatic valve: Valve opening temperature Valve full open temperature Valve full open lift	70 .5- 73 .5°C 85 °C 3 mm	

## 3.1.2 TIGHTENING TORQUES

Part to be tightened	Part name	Thread size	Q'ty	Tightening Torque		Remarks
				N.m	m.kg	
Oil check bolt	—	M 6	1	10	1.0	
Exhaust pipe stud bolt	—	M 8	2	13	1.3	
Spark plug	—	M12	1	18	1.8	
Cam sprocket cover	Bolt	M 6	2	10	1.0	
Cylinder head and cylinder	Nut	M 8	4	22	2.2	
Cylinder head and cylinder (Cam chain side)	Bolt	M 6	2	10	1.0	
Valve cover	Bolt	M 6	5	10	1.0	
Rotor	Nut	M16	1	80	8.0	
Valve adjuster locknut	Nut	M 6	2	14	1.4	
Cam shaft bearing stopper	Bolt	M 6	2	8	0.8	
Cam sprocket	Bolt	M10	1	60	6.0	
Cam chain tensioner (Body)	Bolt	M 6	2	10	1.0	
(Plug)	Bolt	M8	1	8	0.8	
Guide stopper 2	Bolt	M 6	1	10	1.0	
Water pump housing cover	Bolt	M 6	3	10	1.0	
Hose joint	—	M 6	2	7	0.7	
Thermostatic valve cover	Bolt	M 6	2	10	1.0	
Filer neck supporting	Bolt	M 5	1	5	0.5	
Oil pump	Screw	M 6	2	7	0.7	
Oil pump cover	Bolt	M 3	1	1	0.1	
Drain plug	Bolt	M 35	1	32	3.2	
Carburetor joint	Bolt	M 6	2	10	1.0	
Carburetor joint and carburetor	Bolt	M 6	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	M 6	9	10	1.0	
Drain bolt	Bolt	M 8	1	22	2.2	
Oil filer	Bolt	M 14	1	3	0.3	
Crankcase cover (left)	Bolt	M 6	10	10	1.0	
Magnet cover	—	M 6	10	10	1.0	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m.kg	
Cover (oil pump)	Bolt	M 6	2	12	1.2	
Timing check plug	P lug	M 16	1	8	0 .8	
One way clutch	—	M 8	3	30	3.0	
Clutch housing	Bolt	M 14	1	60	6.0	
Grease stopper (Primary sheave)	—	M 4	4	3	0 .3	
Primary fixed sheave	—	M 14	1	60	6.0	
Clutch carrier assembly	—	M 36	1	90	9.0	
Stator	—	M 5	3	7	0.7	
Pick up coil	—	M 5	2	7	0.7	
Starter motor	Bolt	M 6	2	10	1.0	
Thermo switch	—	M 16	1	23	2 .3	
Thermo unit	—	P t1/8	1	8	0 .8	

## 3.2 PARTS INSPECTION AND SERVICE

### 3.2.1 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.

1. Remove :

●Crankcase cover

2. Remove :

●Spark plug

● Valve cover (intake side)

●Valve cover (exhaust side)

3. Remove:

●Timing check plug

4.Measure:

●Valve clearance

Out of specification → Adjust.

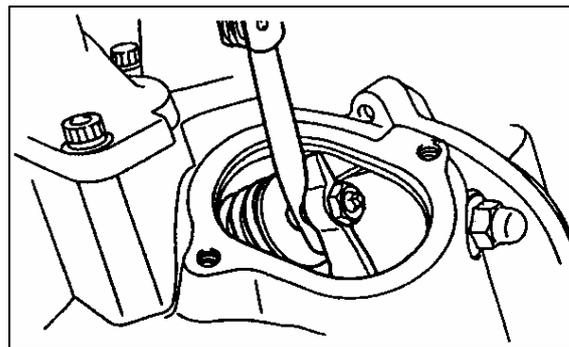
**Valve clearance (cold):**

**260 / 300: Intake valve 0.08- 0.12m m**

**Exhaust valve 0.16- 0 .20mm**

**400: Intake valve 0.08- 0.12m m**

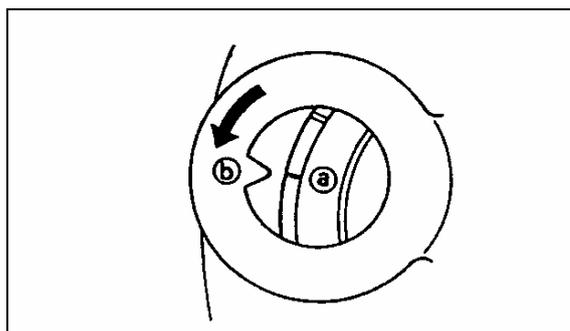
**Exhaust valve 0.13- 0.16mm**



#### Measurement steps:

●Rotate the primary fixed sheave counterclockwise to align the slit "a" on the rotor with the stationary pointer "b" on the crankcover 1 when the piston is Top Dead Center (TDC).

●Measure the valve clearance by using a feeler gauge.

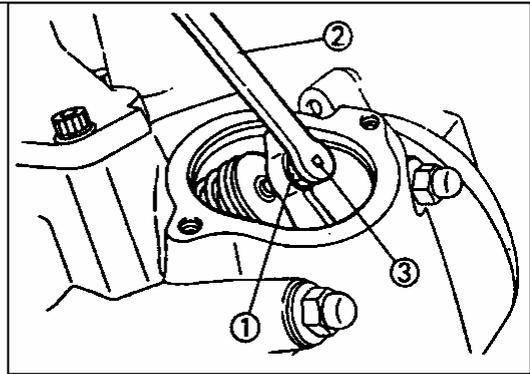


6. Adjust

●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  10Nm(10m·kg)

- O-ring②

8 . Install:

- Valve cover(exhaust side)  10Nm(1.0m·kg)

- O-ring

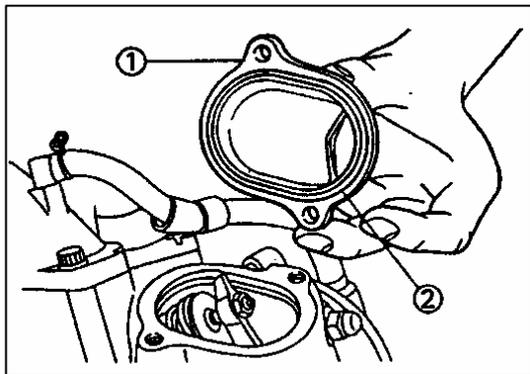
 18Nm(1.8m·kg)

- Spark plug

- Timing check window screw

- Crankcase cover

8N.m( 0.8m.kg)



**3.2.2 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. <b>Engine idling speed:</b> <b>1,350-1,650 r/min</b>
--	---

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.

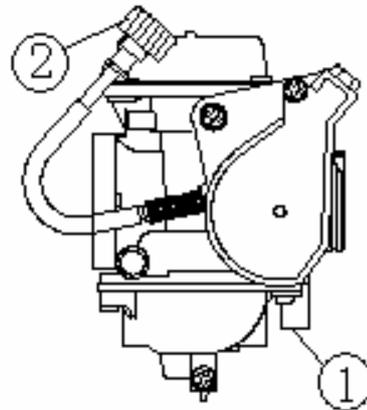


**Pilot screw:**  
1 3/8 turn out

- 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.



**3.2.3 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:

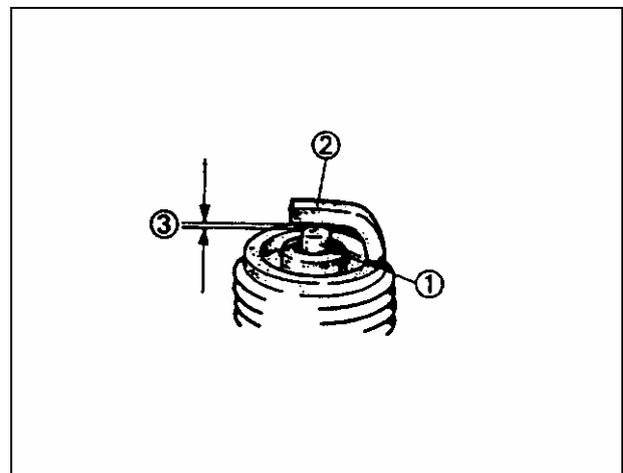
- Electrode ①
- Wear/ damage → Replace.
- Insulator ②
- Abnormal color → Replace.
- Normal color is a medium - to- light tan color.

3. Clean:

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

4. Measure:

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



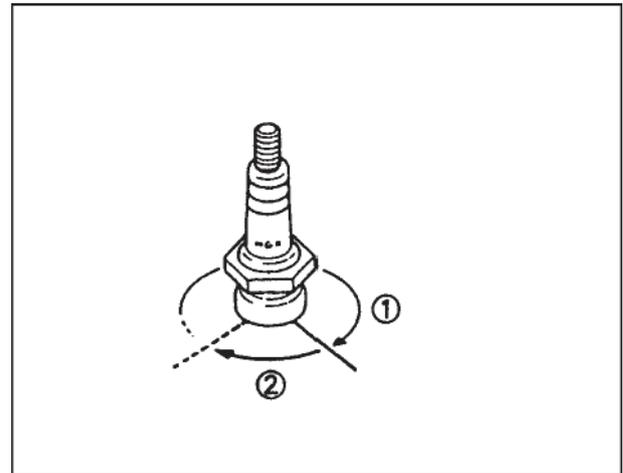
	Spark plug gap : 0.6-0.7 mm
--	--------------------------------

6. Install:

- Spark plug  18Nm(1.8m·kg)

**NOTE:**

**Before installing a spark plug, clean the Gasket surface and plug surface.**



**3.2.4 COMPRESSION PRESSURE MEASUREMENT**

**NOTE :**

Insufficient compression pressure will result in performance loss.

1. Check:

- Valve clearance  
Out of specification → Adjust.  
Refer to “CALCE CLEARANCE ADJUSTMENT” section.

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

3. Turn off the engine.

4. Remove:

- Spark plug

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.

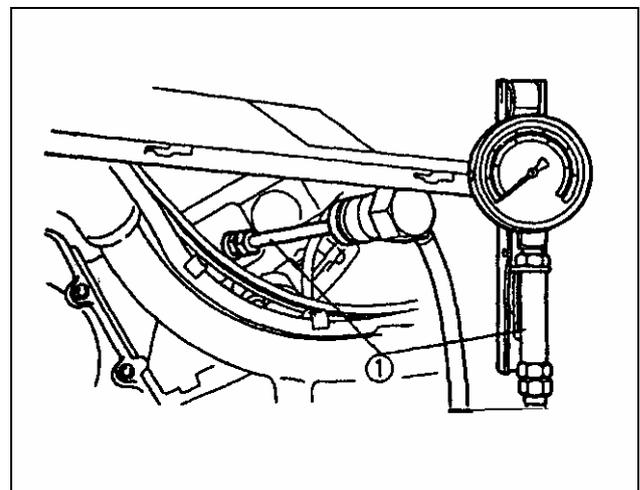
5. Attach:

- Compression gauge ①

6. 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)

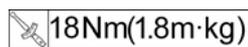
Measurement steps :

- 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

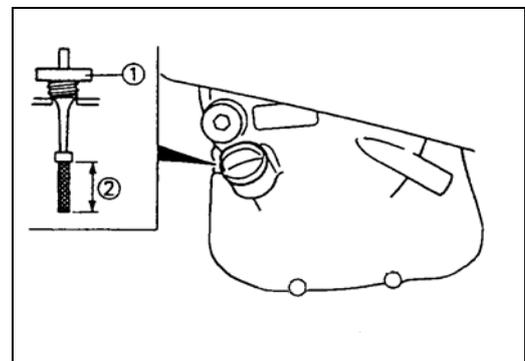
**3.2.5ENGINE OIL LEVEL INSPECTION**

1. Start the engine and let it warm up for a few minutes .
2. Turn off the engine.
3. Inspect: (Do not thread dipstick in)

- Engine oil level

Oil level should be between maximum and minimum marks “2” .

Oil level is below the minimum mark      Add oil up to the proper lever.



**RECOMMENDED ENGINE OIL**

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

	<p><b>API STANDARD:</b> API SE or higher grade</p>
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**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 I" or higher. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Be sure no foreign material enters the crankcase.

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

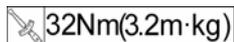
**NOTE:**

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



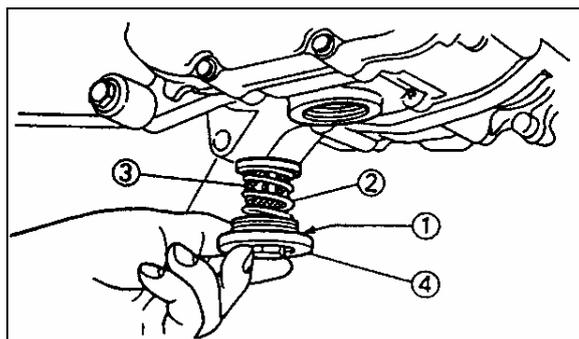
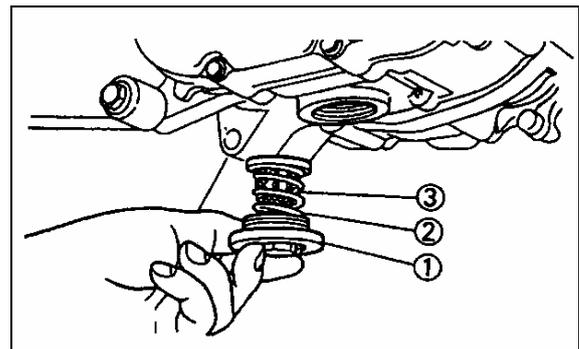
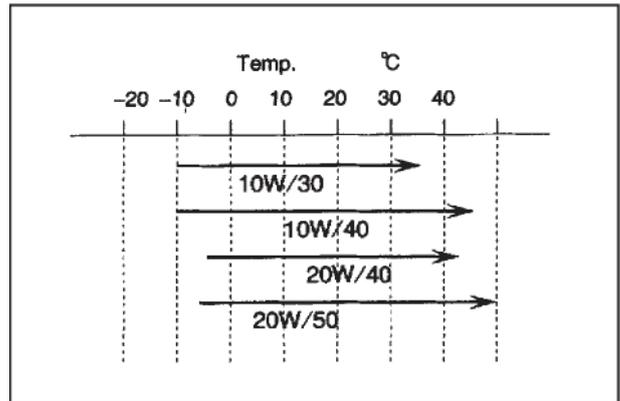
- Drain plug ①
- Compression spring ②
- Oil strainer ③
- O-ring
- Drain the crankcase of its oil.

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

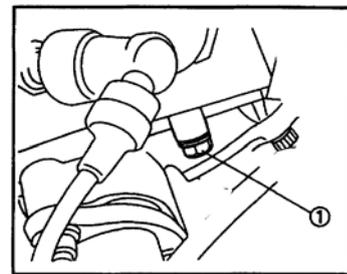
Refer to "ENGINE OIL LEVEL INSPECTION" section

**ENGINE OIL PRESSURE INSPECTION**

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 dam age 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:**

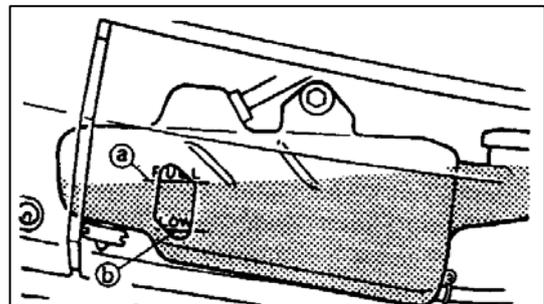
Wipe any spilled oil off the engine.

**3.2.6COOLANT LEVEL INSPECTION**

Inspect:

- Coolant level

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

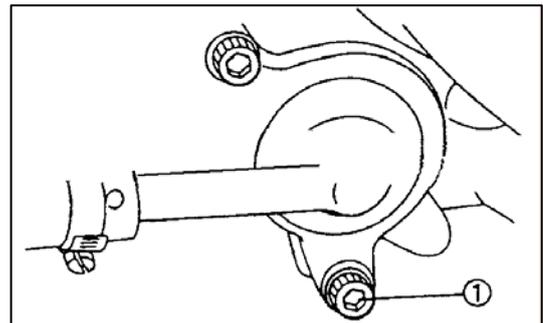
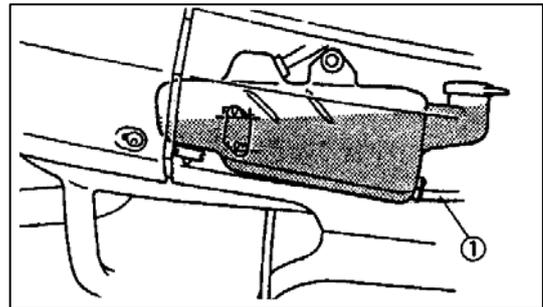
1. Start the engine and let it warm up for several minutes.
2. Turn off the engine and inspect the coolant level again.

**NOTE:**

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

**COOLANTRE PLACE MENT**

1. Remove:
  - Front cover of ATV plastic body work.
  - Seat.
2. Remove:
  - Hose ① (reservoir tank)
 Drain the reservoir tank of its coolant.
3. Remove:
  - Drain bolt ①
  - Radiator cap

**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:

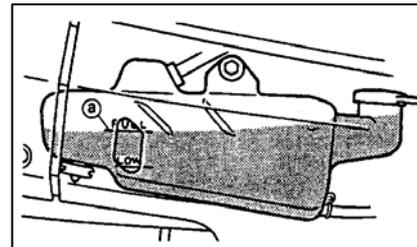
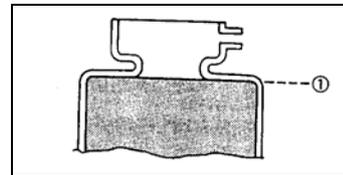
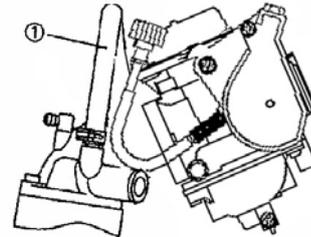
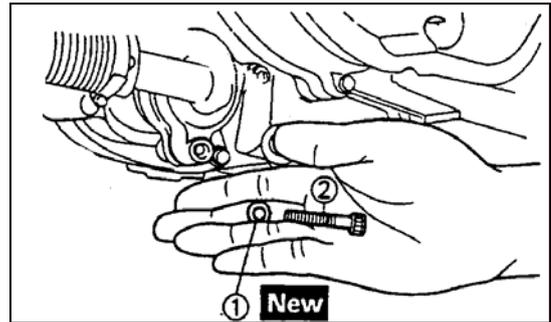
- Gasket ① **NEW**

10Nm(1.0m·kg)

- Drain bolt ②

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 aluminum engine.
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	Coolant ② and water ③ (soft water) : Mixed ratio: min50% /max50% follow the instruction of the coolant Total amount: 2 L Reservoir tank capacity: 0.35L
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Handling notes for coolant:

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

**WARNING:**

splashes in your eyes:

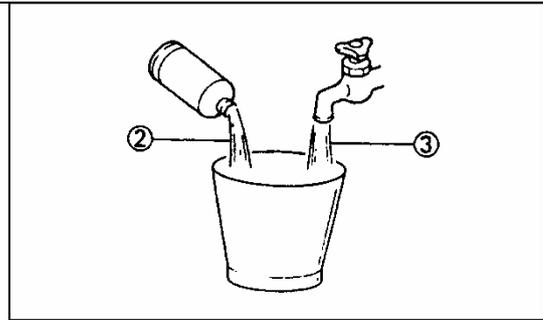
Thoroughly wash your eyes with water and consult a doctor.

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 aluminum 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.

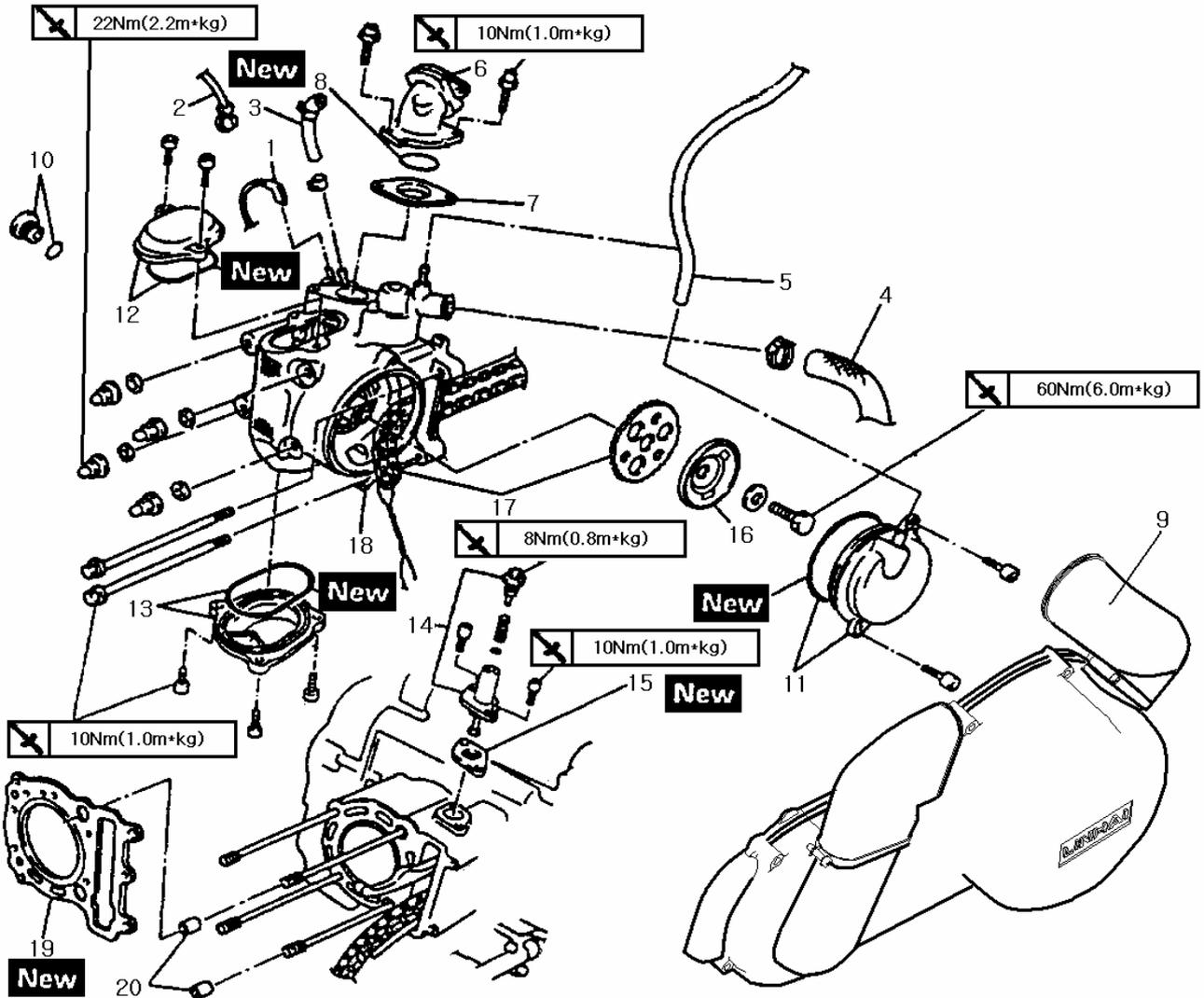
12. Stop the engine and inspect the level.

**NOTE:**

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

13. Install: Remain parts.

**3.3 CYLINDER HEAD**



Order	Job name / Part name	Q 'ty	Remarks
	Cylinder head removal Drain the coolant. Side panel Footrest board Carburetor		Remove the parts in order.
1	Thermo unit lead		Refer to "CARBURETOR" section .
2	Plug cap	1	
3	Crankcase breather hose	1	
4	Outlet hose (cylinder head)	2	
5	Breather hose (crankcase)	1	
6	Carburetor joint	1	
7	Joint	1	
8	O-ring	1	
		2	
9	Crankcase cover	1	Refer to "CYLINDER HEAD REMOVAL AND INSTALLATION" section. Reverse the removal procedure for installation.
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	1/1	
14	side)/O-ring	1	
	Timing chain tensioner assembly	1	
15	Timing chain tensioner gasket	1	
16	Breather plate	1/1	
17	Cam sprocket/Timing chain	1	
18	Cylinder head	1	
19	Cylinder head gasket	2	
20	Dowel pin		

**CYLINDER HEAD REMOVAL**

1. Align:

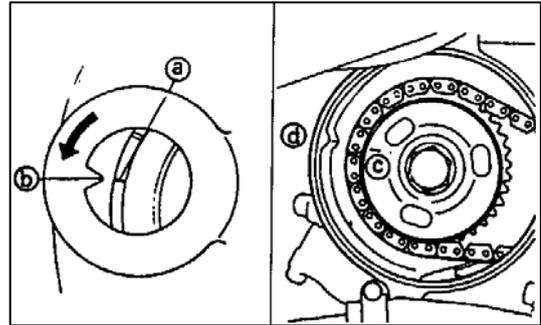
"I" mark ㉑ on the rotor

(with stationary pointer ㉒ on the crankcase cover )

**NOTE:** If any special mark found, contact the ATV manufacture via the agent for the parts and special instruction.

**NOTE:**

Turn the primary sheave counterclockwise with a wrench and align the "I" mark ㉑ with the cylinder head match mark ㉒ when the piston is at TDC on the compression



2. Loosen:

● Bolt ①

3. Remove:

● Timing chain tensioner assembly

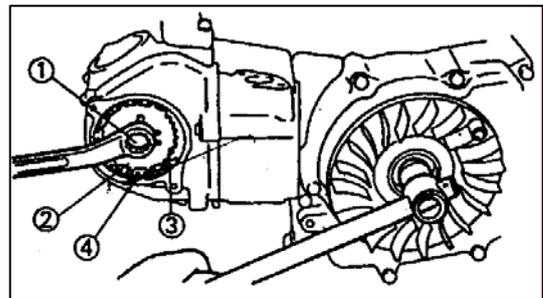
● Timing chain tensioner gasket

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.

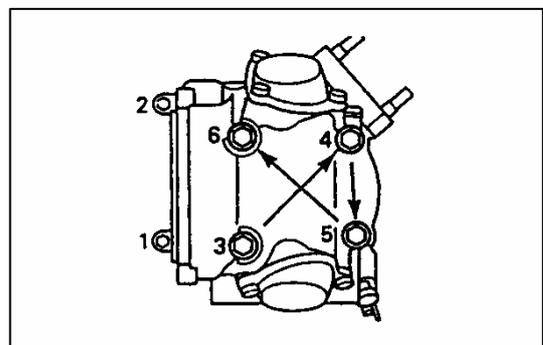
5. Remove:

● 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:

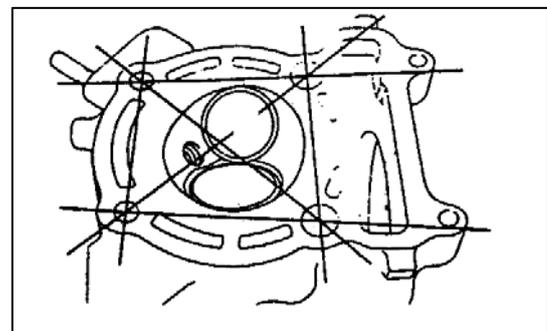
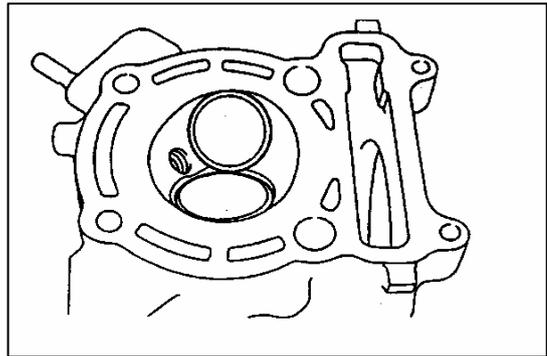
- Spark plug threads
- Valve seats

2. Inspect:

- Cylinder head  
Scratches/damage → Replace.

3. Measure:

- Cylinder head warpage  
Out of specification → Resurface .



	<b>Cylinder head warpage : Less than 0.03 mm</b>
--	--

**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 pape on the surface plate, and resurface the head using a figure eight sanding patten.

**NOTE:**

Rotate the cylinder head several times for an even resurfacement.

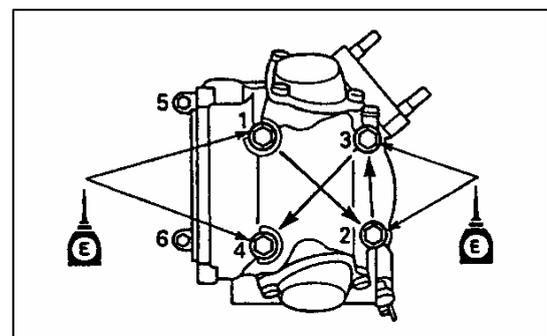
**CYINDER HEAD INSTALLATION**

1. Install:

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

**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.

**NOTE:** If any special mark found, contact the ATV manufacture via the agent for the parts and special instruction.

●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 cam shaft with the slot in the cam sprocket.

**CAUTION:**

Do not turn the crankshaft during installation of the cam shaft. Dam age or improper valve timing will result.

●While holding the camshaft, temporarily tighten the bolts .

●Remove the safety wire from the timing chain.

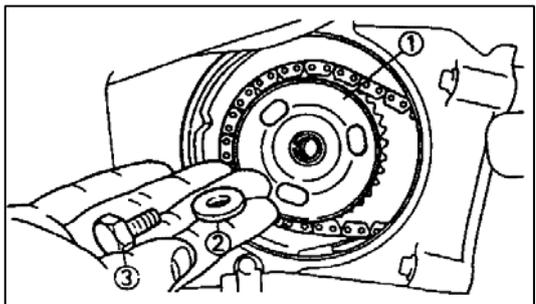
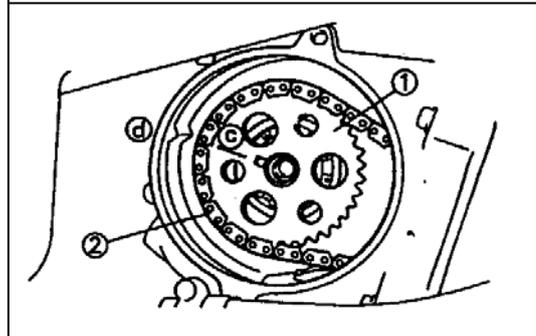
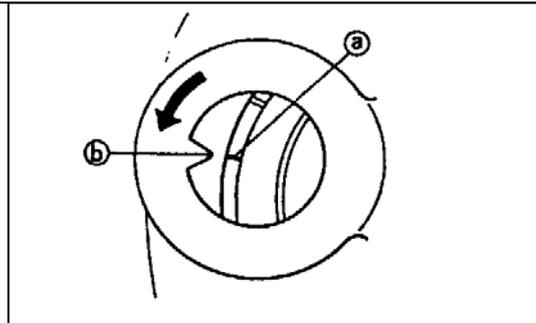
4. Install:

●Breather plate ①

●Plane washer ②

5. Install:

●Timing chain tensioner

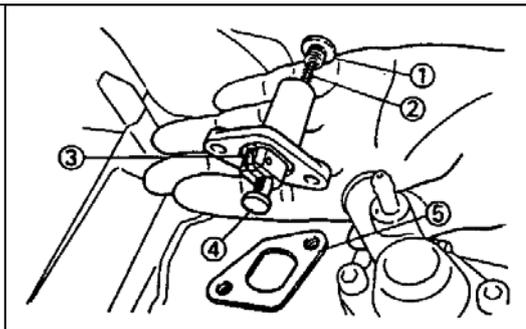


**Installing steps:**

- 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)

## 7. Check:

- Valve timing

Out of alignment → Adjust.

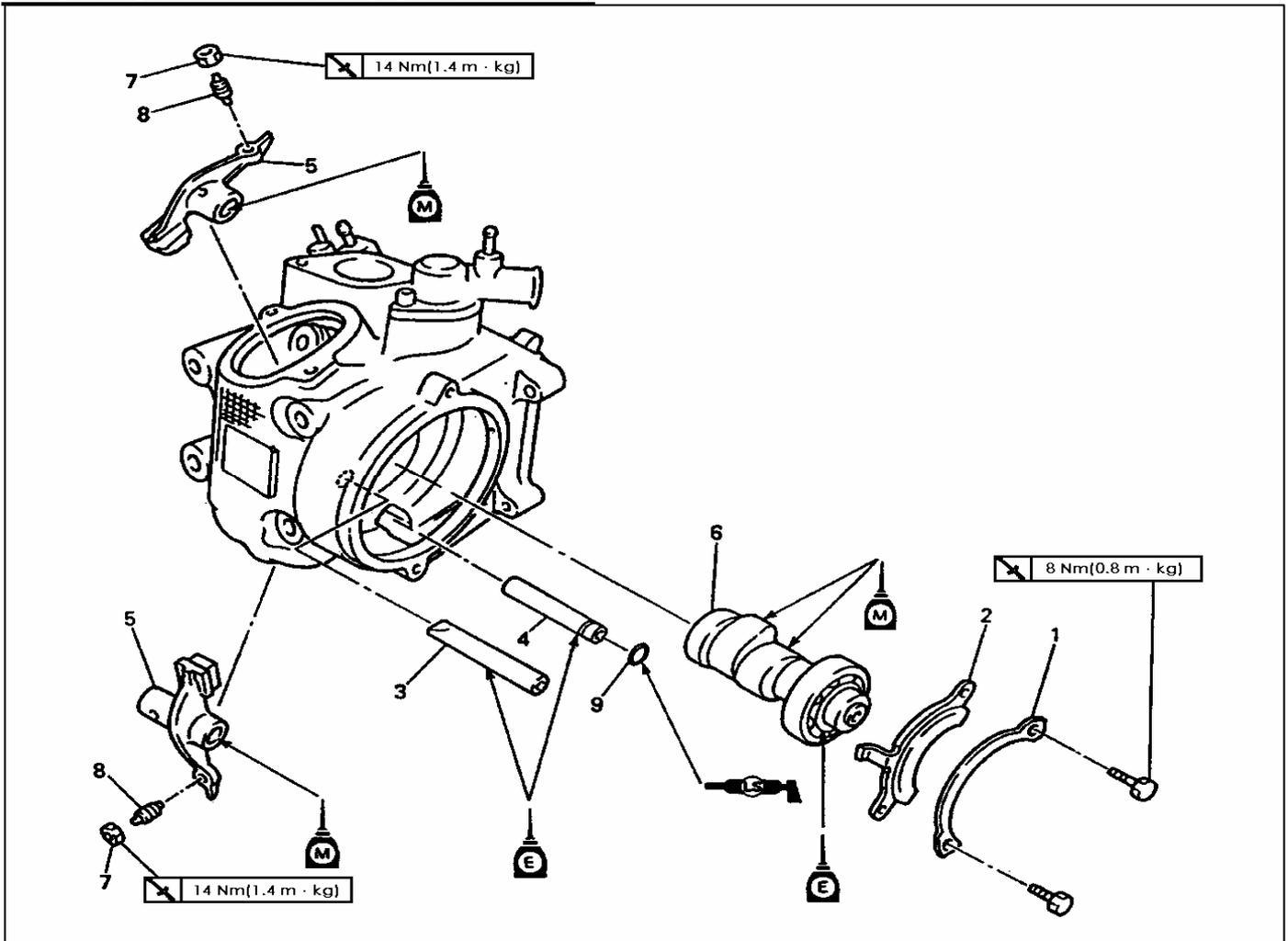
## 8. Check:

- Valve clearance

Out of specification → Adjust.

Refer to the "VALVE CLEARANCE ADJUSTMENT" section.

3.4 CAMSHAFT AND ROCKER ARMS



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

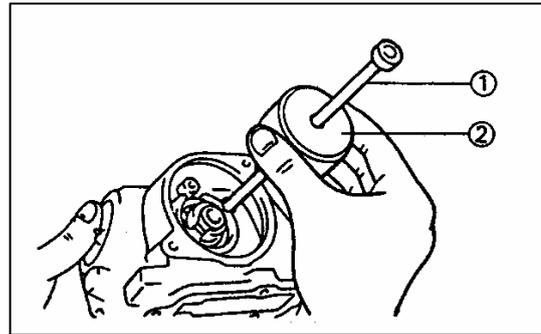
**ROCKER ARM AND ROCKER ARM SHAFTRE MOVAL**

1. Remove:

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

**NOTE:**

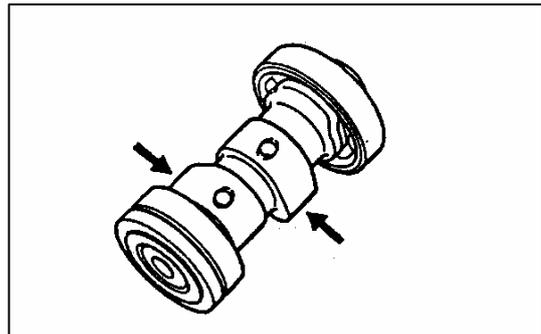
Attach a rocker arm shaft puller bolt ① and weight ② to the rocker arm shaft and slide out the shaft.



**CAM SHAFT INSPECTION**

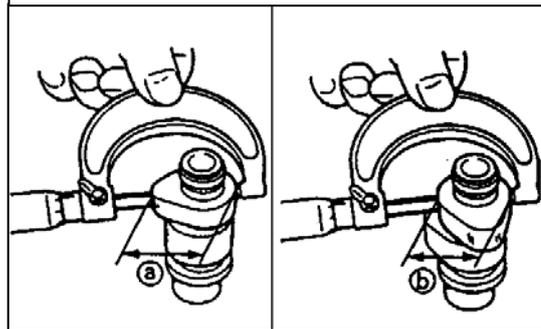
1. Inspect:

- Cam lobes
- Pitting/Scratches/Blue discoloration → Re-  
place .



2. Measure:

- Cam lobes length ① and ②
- Out of specification → Replace.



**Cam lobes length:**

**Intake:**

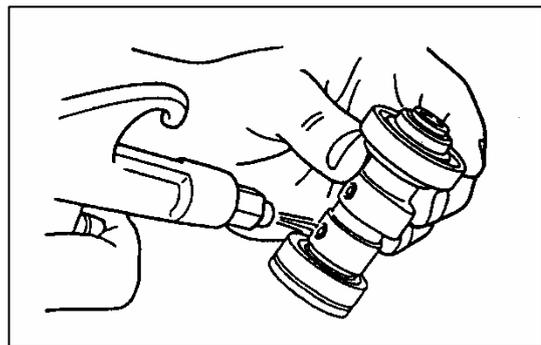
- ① 36 .545- 36 .645 mm  
<Lim it: 36.45 mm>
- ② 30.021-30.121 mm  
<Lim it: 29.92 mm>

**Exhaust:**

- ① 36 .547- 36 .647 mm  
<Lim it: 36.45 mm>
- ② 30.067- 30.167 mm  
<Lim it: 29.97 mm>

3. Inspect:

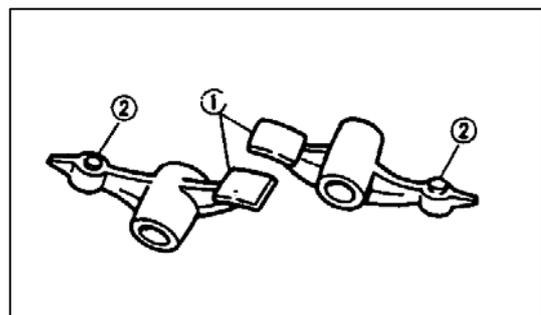
- Cam shaft oil passage
- Stuffed → Blow out oil passage with  
compressed air.



**ROCKER ARMS AND ROCKER ARM SHAFTS INSPECTION**

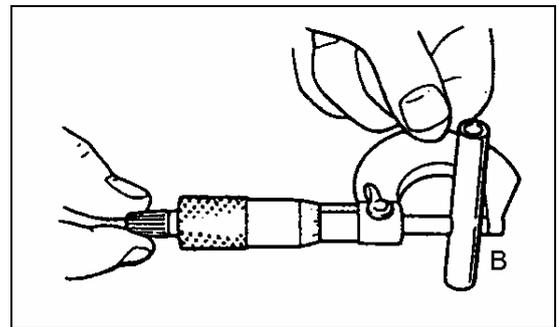
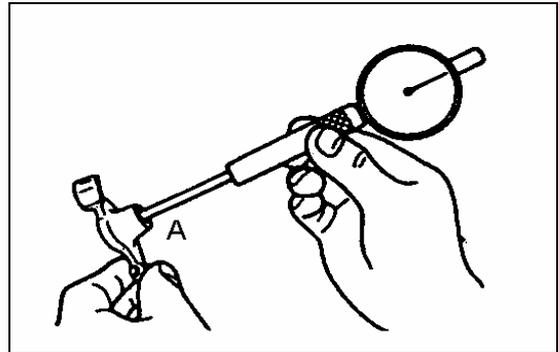
1. Inspect:

- 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.



	<b>Inside diameter (rocker arm ):</b> <b>12.000- 12.018mm</b> <b>&lt; Lim it: 12.030 mm &gt;</b>
--	--

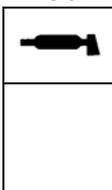
- Measure the outside diameter B of the rocker arm shafts.  
Out of specification → Replace.

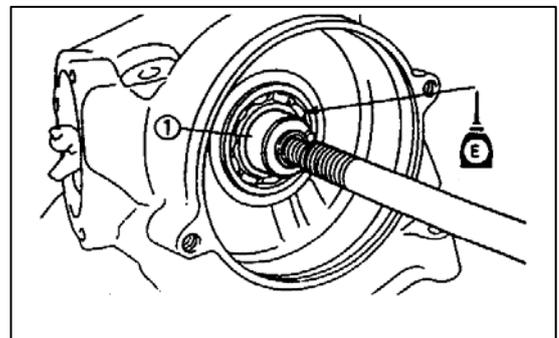
	<b>Outside diameter(rocker arm shaft):</b> <b>11.981-11.991 mm</b> <b>&lt;Limit: 11.95 mm&gt;</b>
---	---

**CAMSHAFT AND ROCKER ARM INSTALLATION**

1. Lubricate:

- Cam shaft ①

	<b>Camshaft:</b> <b>Molybdenum disulfide oil</b> <b>Camshaft bearing:</b> <b>Engine oil</b>
--	--



2. Install:

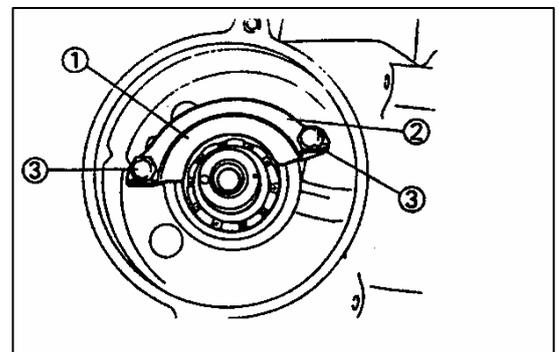
- Plate①
- Lockwasher ② **NEW**
- Bolt ③  8Nm(0.8m·kg)

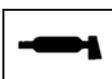
**NOTE:**

Bend the lockwasher tabs along the bolt ③ flats.

3. Apply:

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



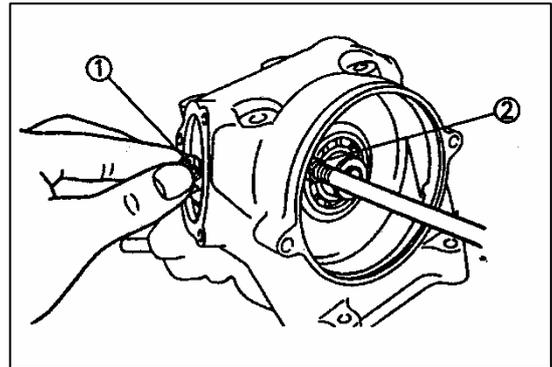
	<b>Molybdenum disulfide oil</b>
--	---------------------------------

4. Install:

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

**NOTE:**

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

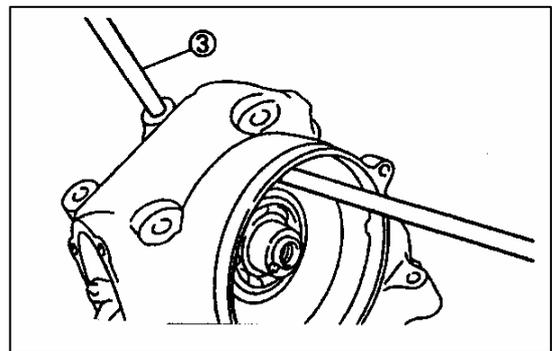


5. Install:

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

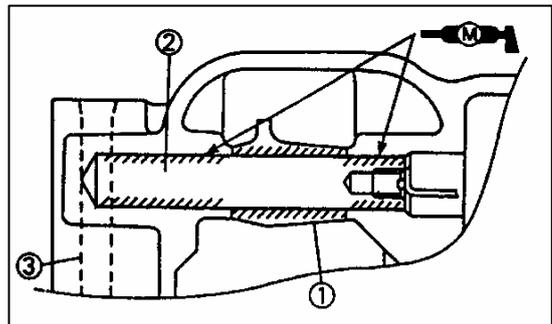
**NOTE:**

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

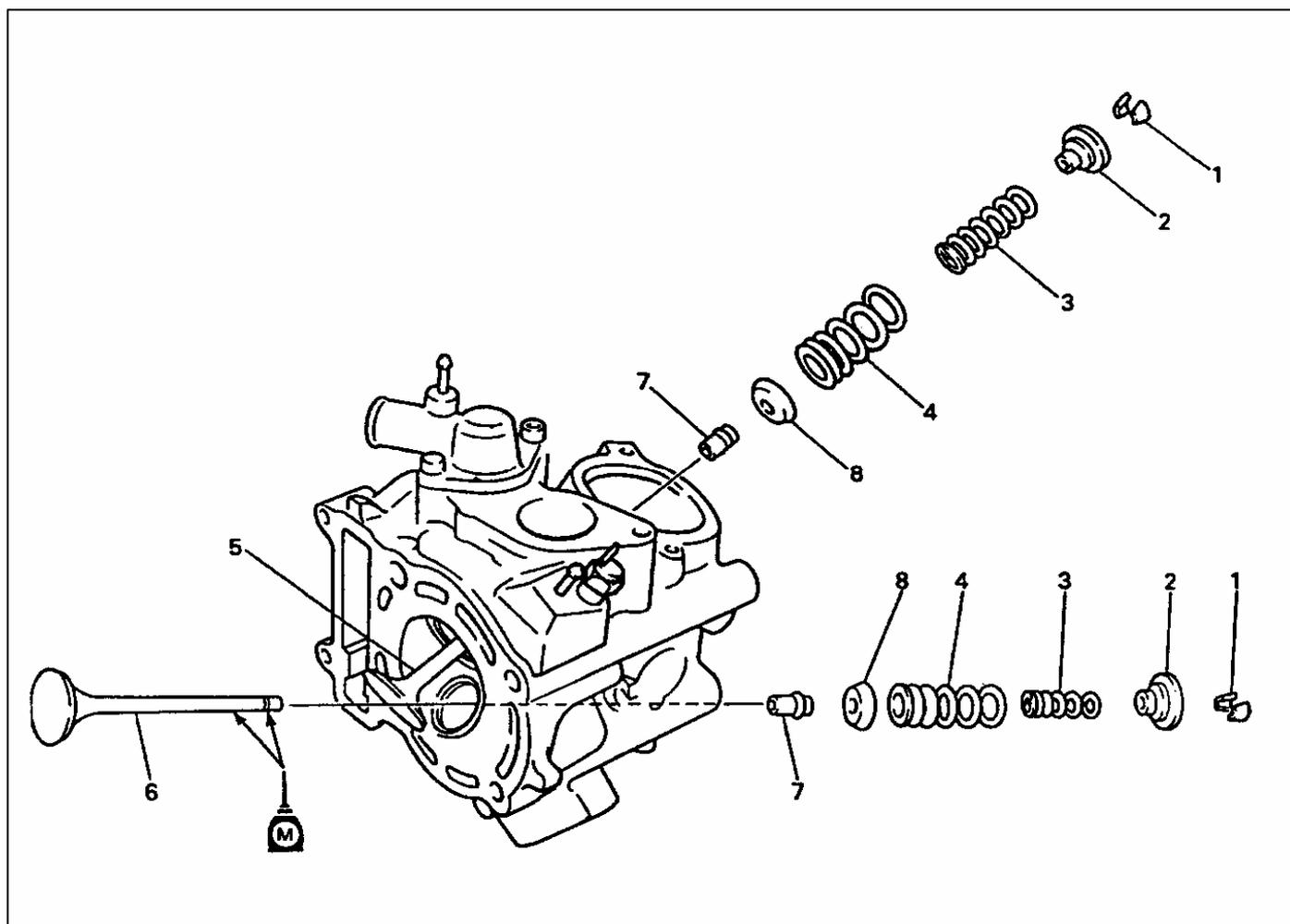


**CAUTION:**

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



**3.5 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	

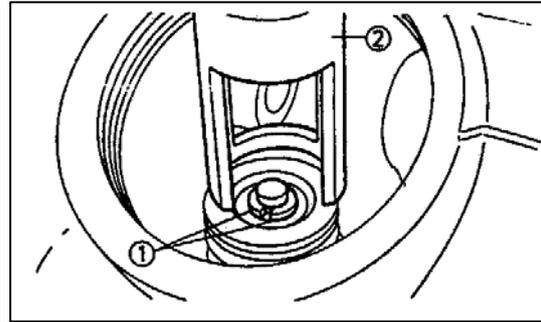
**VALVES AND VALVE SPRINGS REMOVAL**

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:**

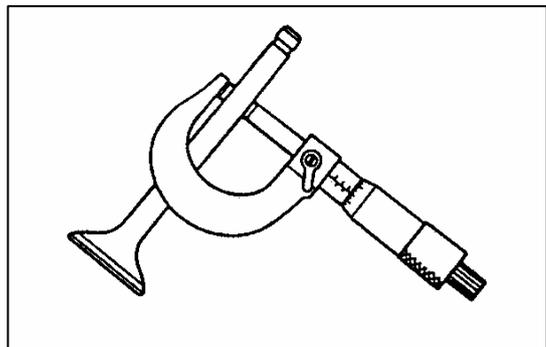
Do not compress so much as to avoid damage to the valve spring.

**VALVE AND VALVE SPRINGS INSPECTION**

1. Measure:

- Valve stem diameter

Out of specification → Replace.

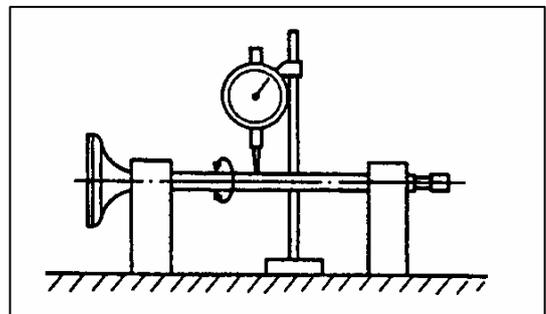


	<p><b>Valve stem diameter:</b>  <b>Intake:</b>                  5.975-5.990mm                  &lt;Limit: 5.94mm&gt;  <b>Exhaust:</b>                  5.960-5.975mm                  &lt;Limit: 5.92mm&gt;</p>
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2. Measure:

- Runout (valve stem )

Out of specification → Replace.

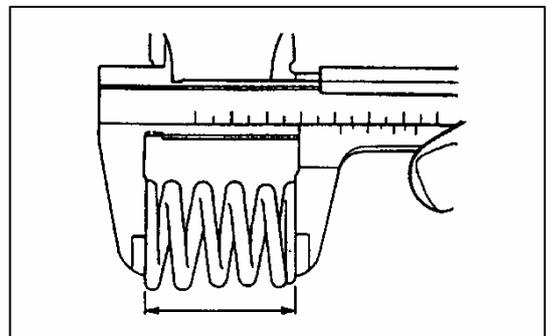


	<p>● <b>Runout limit:</b>                  0.01 mm</p>
--	--

3. Measure:

- Free length (valve spring)

Out of specification → Replace.



	<p><b>Valve spring free length:</b>  <b>Inner spring:</b>                  38.1 mm                  &lt;Limit: 36.1mm&gt;  <b>Outer spring:</b>                  36.93 mm                  &lt;Limit: 35.0mm&gt;</p>
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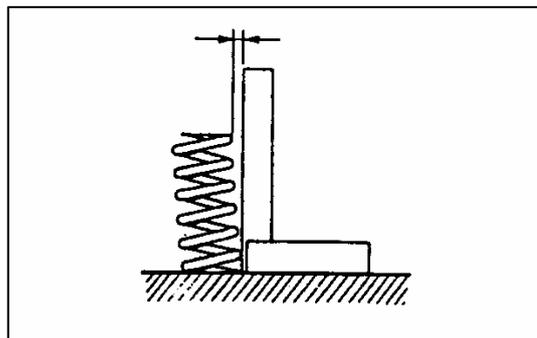
4. Measure:

- Spring tilt

Out of specification → Replace.



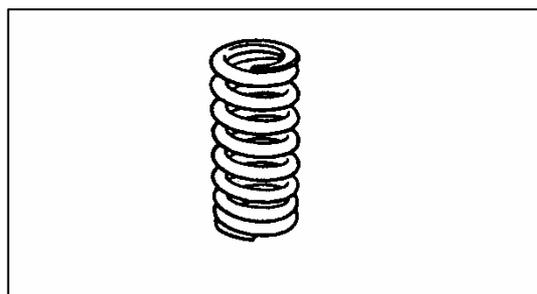
Spring tilt limit:  
1.7mm (2.5°)



5. Inspect:

- Spring contact face

Wear/Pitting/Scratches → Replace.



6. Measure:

- Valve guide inside diameter

Out of specification → Replace.



**Valve guide inside diameter:**

**Intake:**

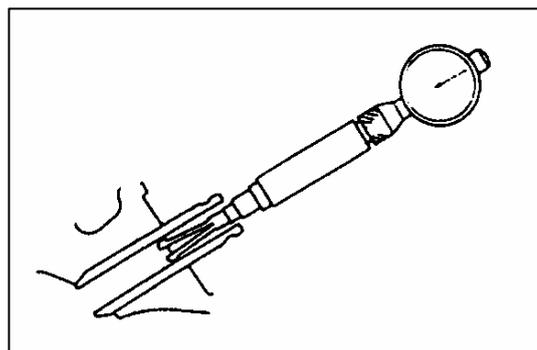
6.000-6.012 mm

<Limit: 6.05mm>

**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:**

0.08 mm

**Exhaust:**

0.10 mm

**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 @

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.

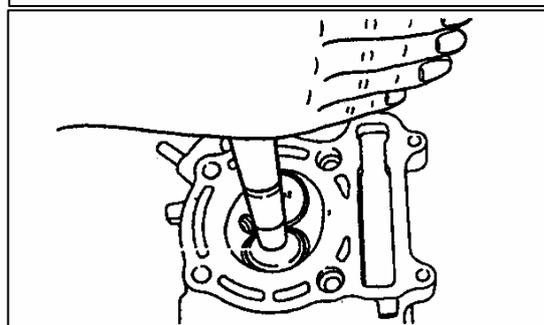
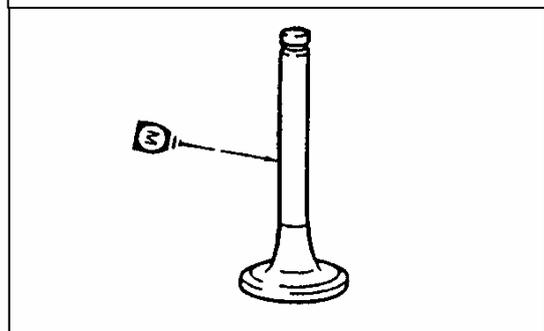
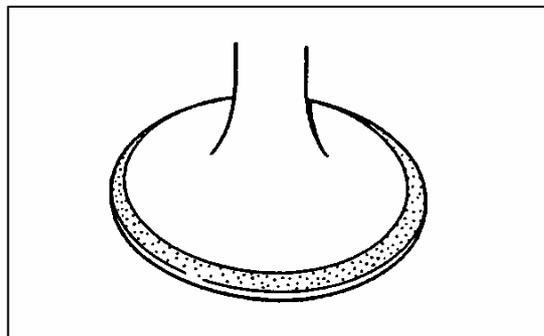
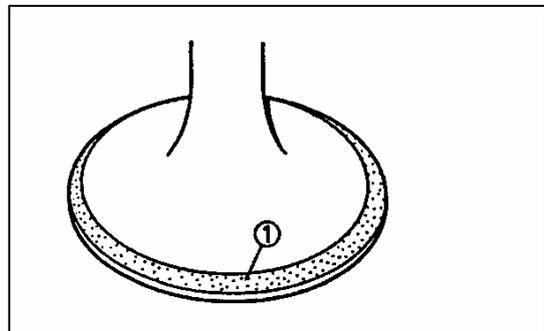
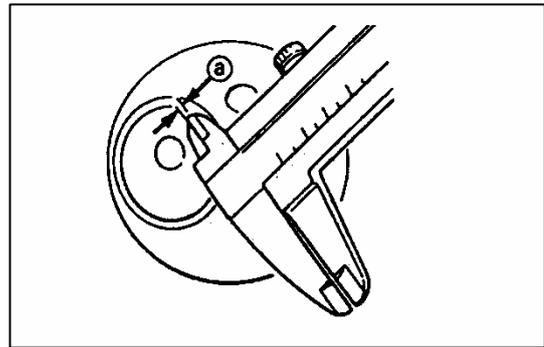
**Lapping steps:**

- Apply a coarse lapping compound @ 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 al compound.



**NOTE:**

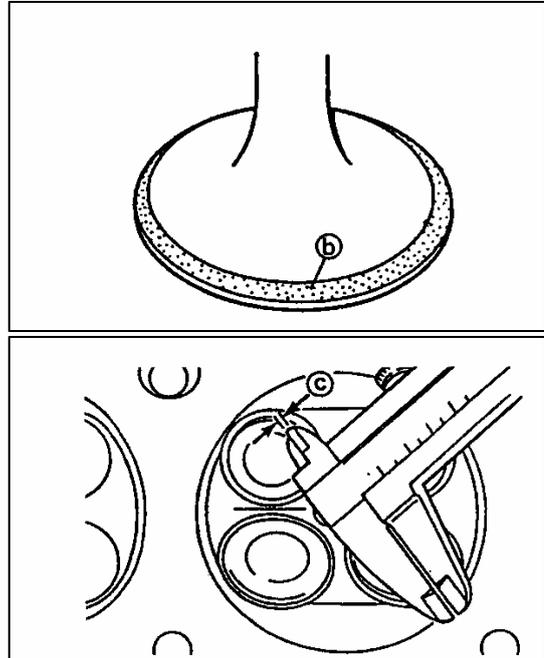
For best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.

- 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) ⑥ 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 ⑦ again.



**VALVES AND VALVE SPRINGS INSTALLATION**

1. Deburr:

- Valve stem end
- Use an oilstone to smooth the stem end.

2. Apply:

- Molybdenum disulfide oil (onto the valve stem③ and oil seal ② )



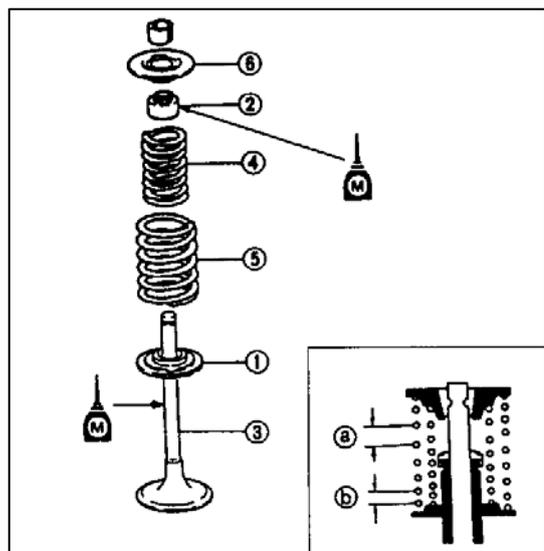
3. Install:

- Valve spring seat ①
- Valve stem seal② **NEW**
- 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 ④ facing upwards.

- ⑥ Smaller pitch

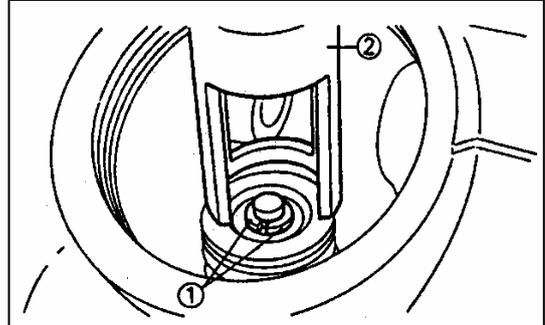


4. Instal:

●Valve cotters ①

**NOTE:**

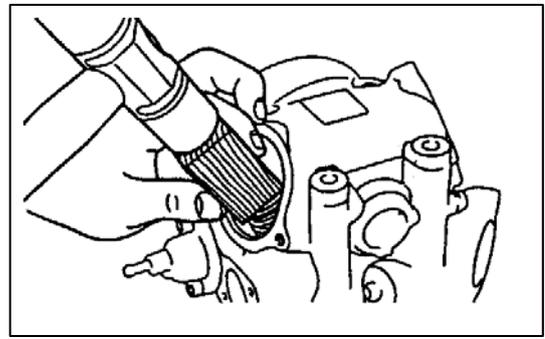
Install the valve cotters while com pressing the valve spring with a valve spring compressor and attachment ②.



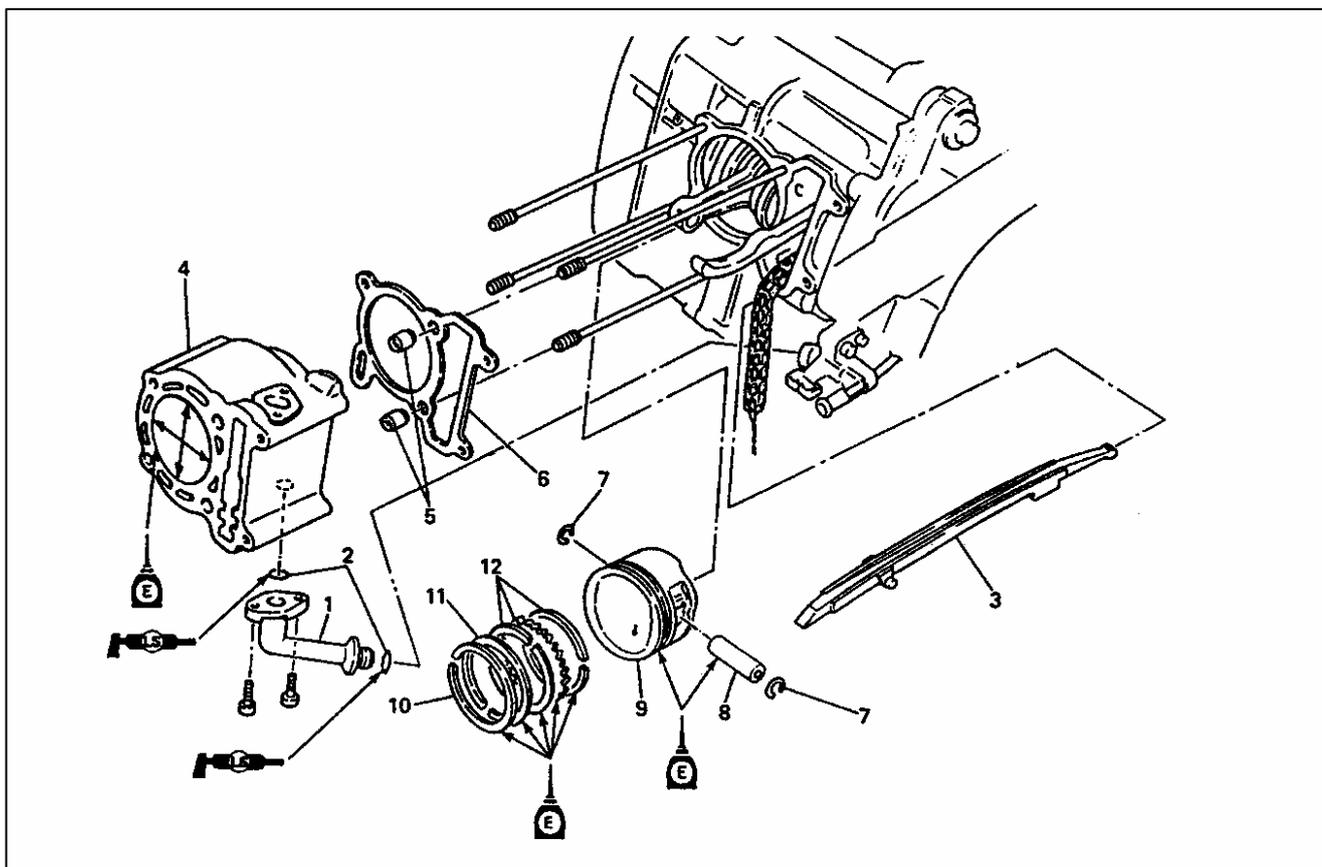
5. Secure the valve cotters onto the valve stem by tapping lightly with a piece of wood.

**CAUTION:**

Do not hit so much as to damage the valve.



**3.6 CYLINDER AND PISTON**



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

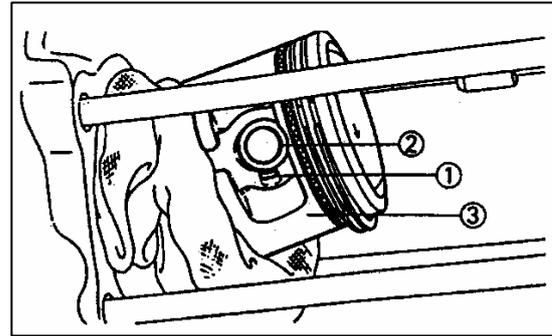
**PISTON AND PISTON RINGS REMOVAL**

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.

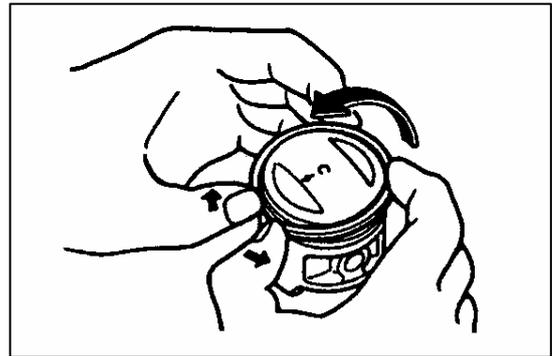


2. Remove:

- 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**

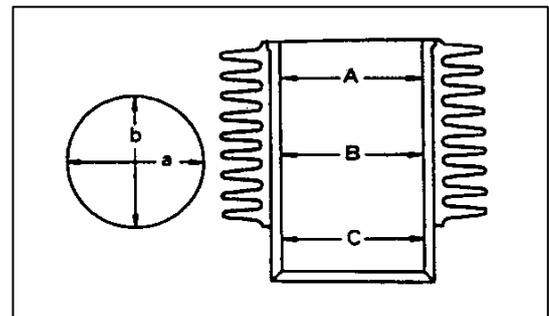
1. Measure:

- 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 a right angle to the crankshaft. Then, find the average of the measurements.

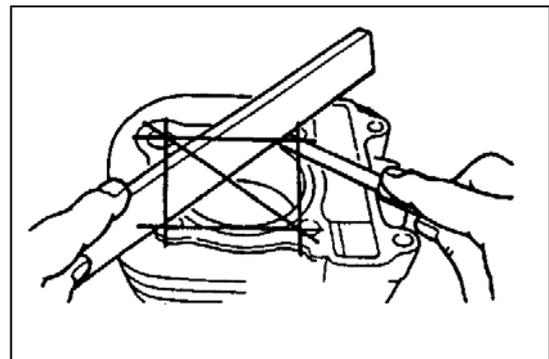


	<p><b>Cylinder bore:</b>                  260;70.000- 70.014mm,                  300;72.500- 72.514mm                  &lt; Limit:260;70.025mm, 300;72.525&gt;                  &lt; Difference limit between A,B and C :0.03mm &gt;</p>
--	--

2. Measure:

- Warpage

Out of specification → Replace.



	<p>Cylinder warpage limit:                  0.03mm</p>
--	--

**PISTON AND PISTON PIN INSPECTION**

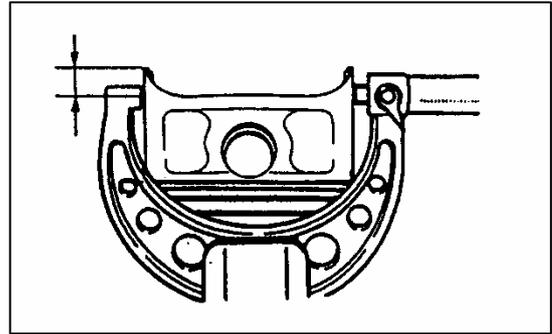
1. Measure:

●Piston skirt diameter

Out of specification → Replace .

ⓐ 5.0mm from the piston bottom edge.

	<b>Valve skirt diameter:</b>
	260; 69.965-69.980 mm
	300; 72.465-72.480 mm
	<b>Oversize (2)</b>
	260; 69.5 mm, 300; 72.0 mm
	<b>Oversize (4)</b>
	260;70.0 mm, 260;72.5 mm



2. Calculate:

●Piston-to-cylinder clearance

<b>Piston-to-cylinder clearance=</b> <b>Cylinder bore-Piston skirt diameter</b>
--

Refer to “CYLINDER” section for cylinder bore measurement.

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

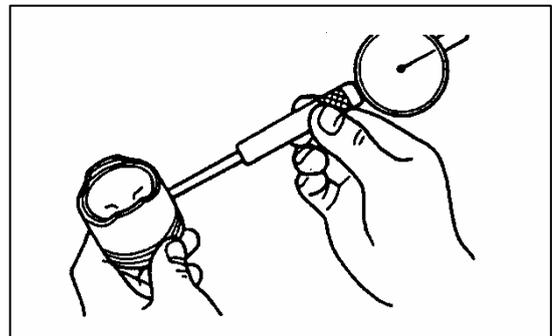
	<b>Piston-to-cylinder clearance:</b>
	<b>0.02-0.04mm</b>

3. Measure:

●Piston pin bore diameter

Out of specification → Replace.

	<b>Piston pin bore diameter:</b>
	17.004-17.015mm
	<b>&lt;Limit:17.045mm&gt;</b>

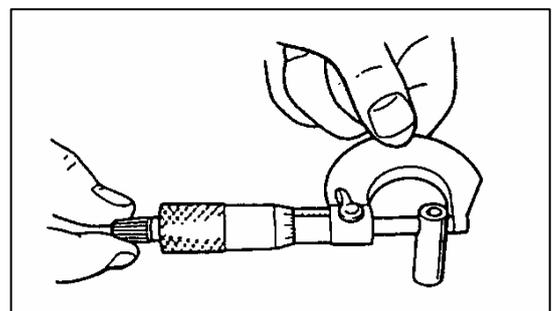


4. Measure:

●Piston pin outside diameter

Out of specification → Replace.

	<b>Piston pin bore diameter:</b>
	16.991-17.000mm
	<b>&lt;Limit:16.975mm&gt;</b>



5. Inspect:

●Piston pin

Blue discoloration/groove → Clean or replace.

**PISTON RINGS INSPECTION**

1. Measure:

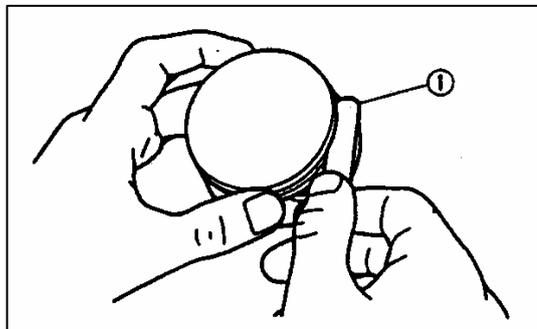
- Side clearance ①

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.

	<p><b>Side clearance (piston ring):</b></p> <p><b>Top ring:</b>                  0.04- 0.08m m                  &lt;Limit: 0.12mm&gt;</p> <p><b>2nd ring:</b>                  0.03 - 0.07mm                  &lt;Limit: 0.12mm&gt;</p>
--	---



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.

- ① 5.0mm

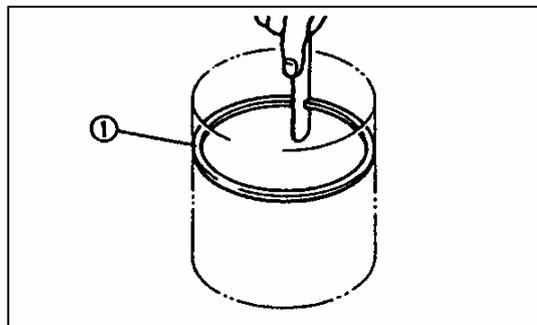
3. Measure:

- 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.

	<p><b>End gap:</b></p> <p><b>Top ring:</b>                  0.15-0.30mm                  &lt;Limit:0.45mm&gt;</p> <p><b>2nd ring:</b>                  0.30-0.45mm                  &lt;Limit:0.70m m&gt;</p> <p><b>Oil ring:</b>                  0.20-0.70mm</p>
--	--



**PISTON RINGS, PISTON AND CYLINDER INSTALLATION**

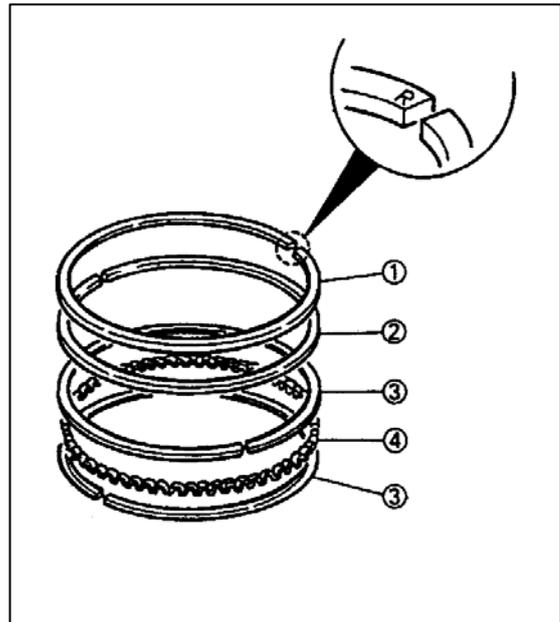
1. Install:

- 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.

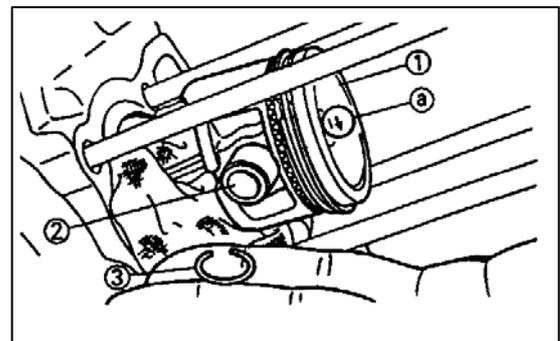


2. Install:

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

**NOTE:**

- Apply engine oil to the piston pins.
- The " → " mark ① 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

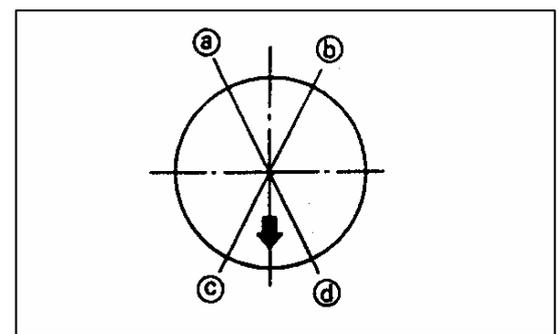
4. Position:

- Piston rings

**NOTE:**

Offset the piston ring end gaps as shown.

- ① Top ring end
- ② Oil ring end (lower)
- ③ Oil ring end (upper)
- ④ 2nd ring end



## 5. Lubricate:

- Piston outer surface
- Piston ring
- Cylinder inner surface

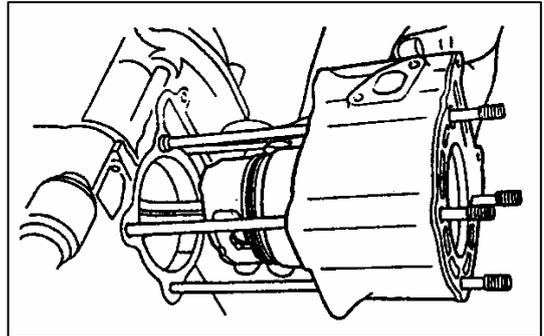
**Engine oil**

## 6. Install:

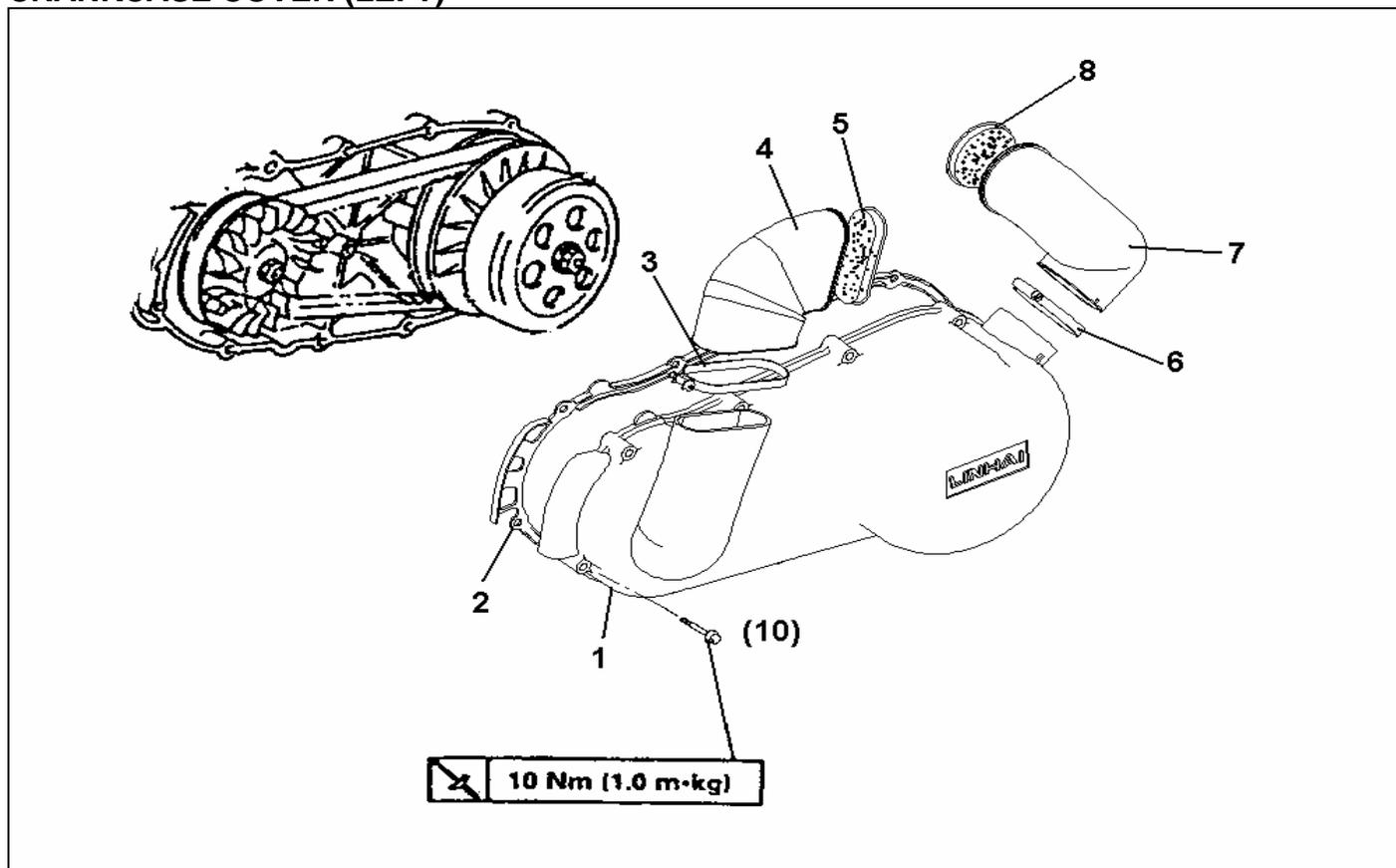
- Cylinder

**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.



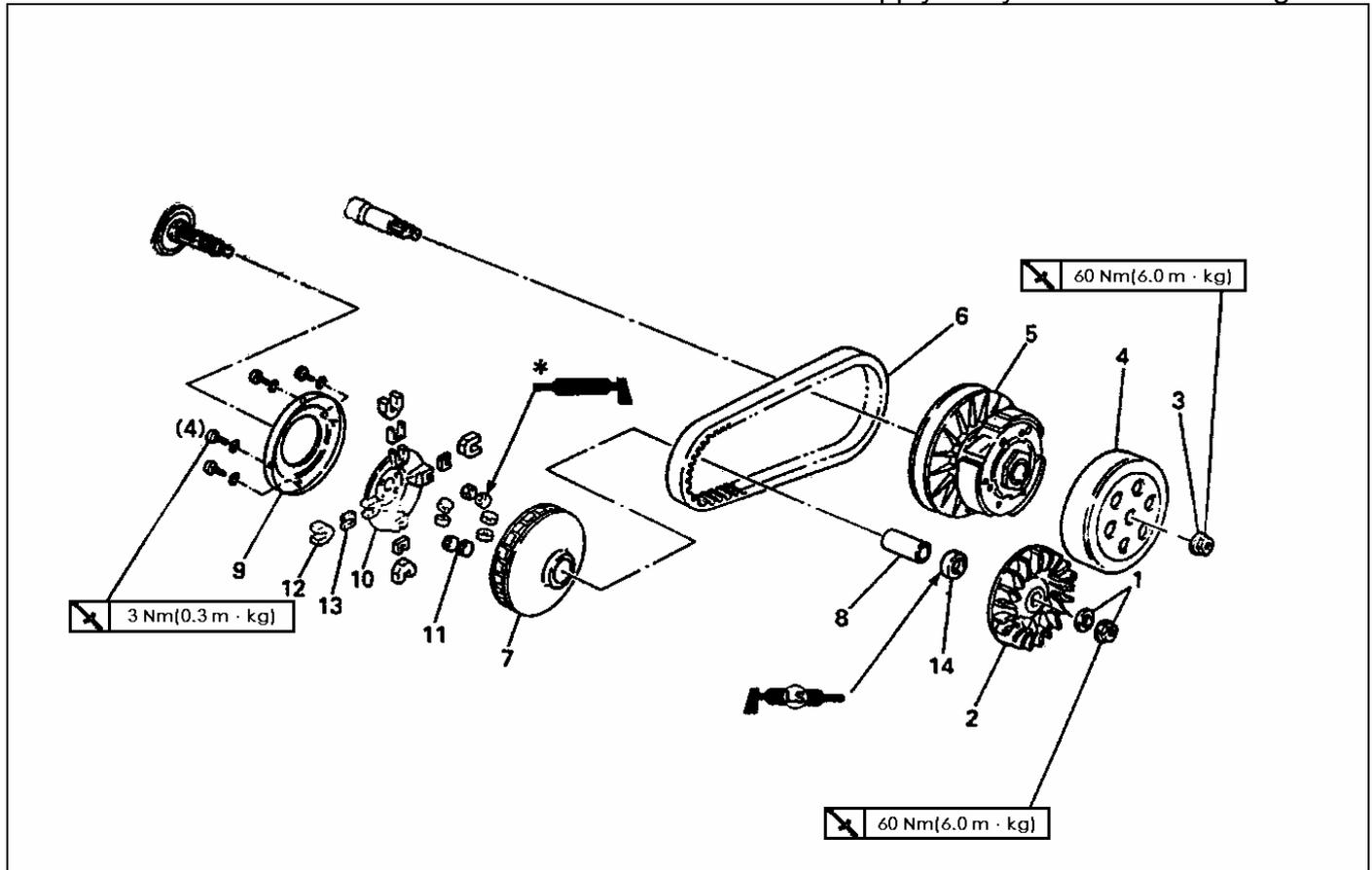
**3.7V-BELT,CLUTCH AND SECONDARY/PRIMARY SHEAVE  
CRANKCASE COVER (LEFT)**



Order	Job name / Part name	Q 'ty	Remarks
	Crankcase cover (left) removal		<b>Remove the parts in order.</b>
1	Crankcase cover (left)	1	
2		1	
3	Hose clamp B	1	
4	Joint B	1	
5	Air strainer B	1	
6	Hose clamp A	1	
7	Joint A	1	
8	Air strainer A	1	Reverse the removal procedure for installation .

PRIMARY SHEAVE

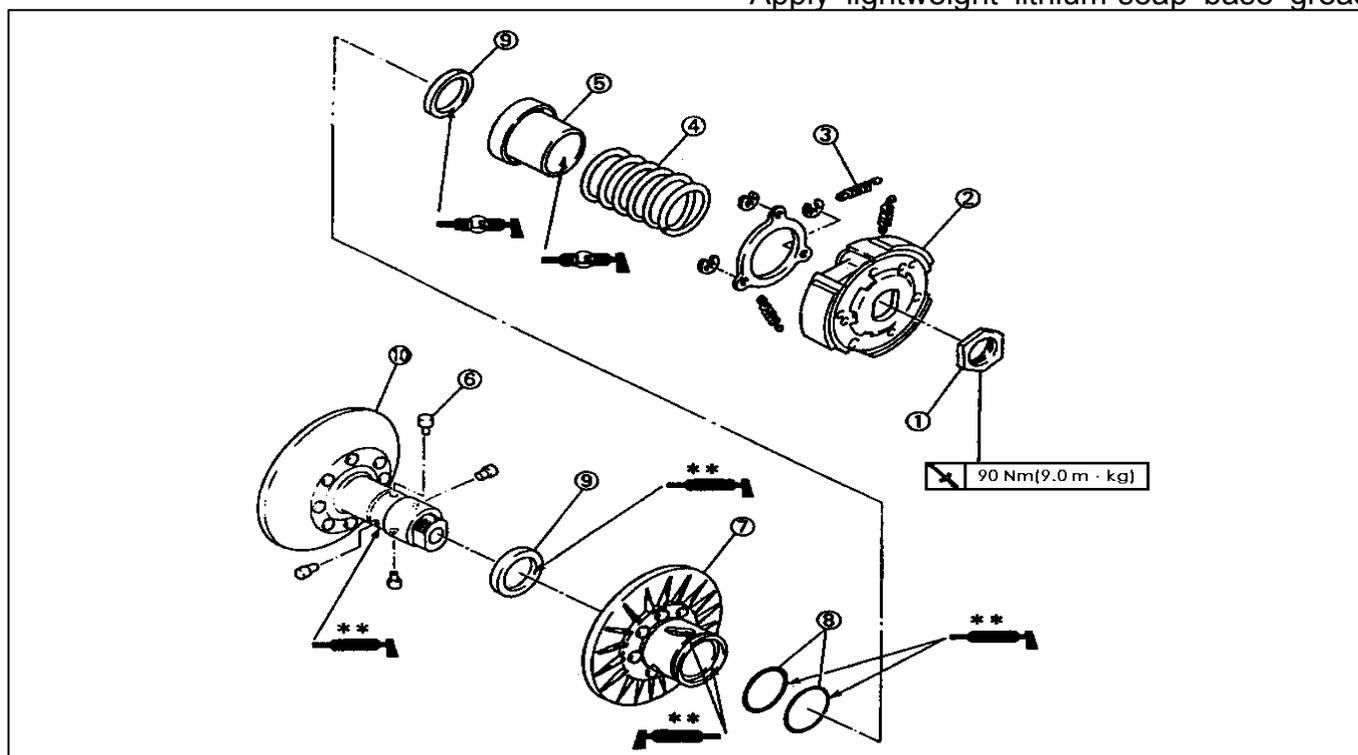
\*Apply molybdenum disulfide grease



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	
3	Nut	1	Refer to "SECONDARY SHEAVE AND V-BELT REMOVAL" section.
4	Clutch housing	1	
5	Clutch assembly	1	Refer to "SECONDARY SHEAVE INSTALLATION" section.
6	V-belt	1	
7	Primary sliding sheave	1	Refer to "PRIMARY SHEAVE ASSEMBLY" section.
8	Collar	1	
9	Primary sheave cap	1	Refer to "PRIMARY SHEAVE ASSEMBLY" section.
10	Cam	1	
11	Weight	8	Refer to "PRIMARY SHEAVE ASSEMBLY" section.
12	Slider	4	
13	Spacer	4	Reverse the removal Procedure for installation.
14	Oil seal	1	

SECONDARY SHEAVE

\*\*Apply lightweight lithium-soap base grease



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.

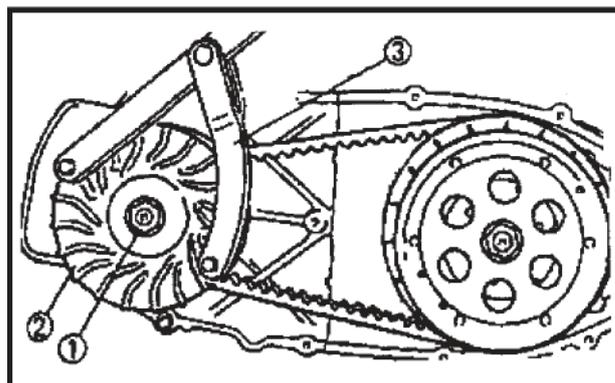
**PRIMARY SHEAVE REMOVAL**

1. Remove:

- Nut ①(primary sheave)
- Plate washer
- Primary fixed sheave②

**NOTE:**

Loosen the nut (primary fixed sheave) while holding the primary fixed sheave with the rotor holder③.

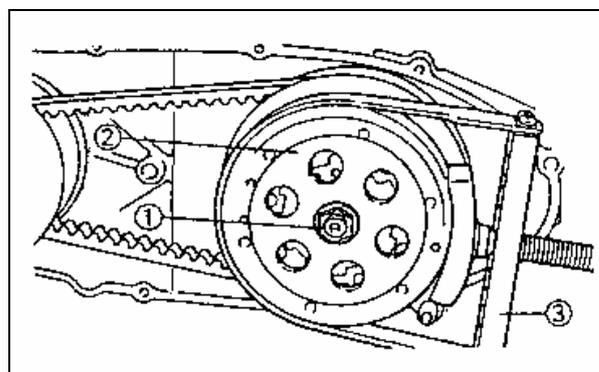
**SECONDARY SHEAVE AND V-BELT REMOVAL**

1. Remove:

- Nut ① (secondary sheave)
- Clutch housing ②

**NOTE:**

Loosen the nut (secondary sheave) while holding the clutch housing with the sheave holder③.



2. Remove:

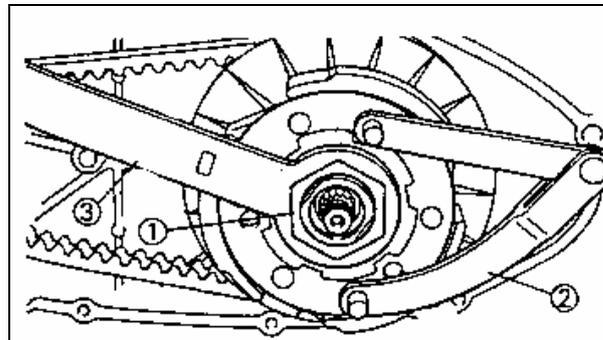
- Nut ① (clutch carrier)

**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 holder②.

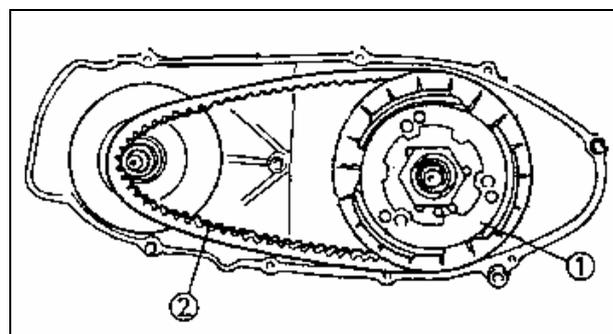


3. Remove:

- 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 (diameter:  $\varnothing$  30mm thickness: 2-3mm).

**CLUTCH INSPECTION**

1. Measure:

- Clutch shoe thickness

Scratches → Glaze using coarse sandpaper.

Wear /Damage → Replace

	<p><b>Clutch shoe thickness:</b>  <b>3.0mm</b>                  &lt;Limit:2.0mm&gt;</p>
---	---

**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.

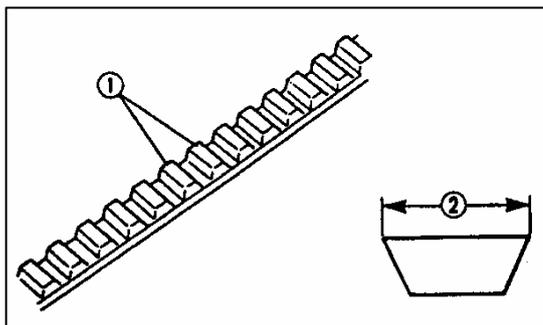
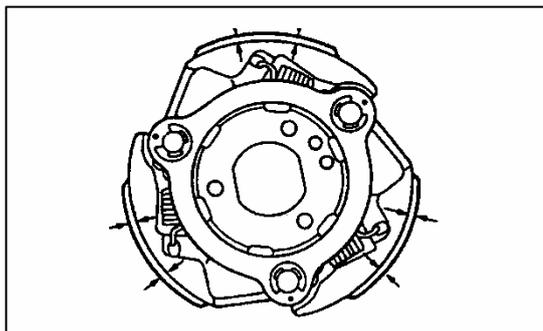
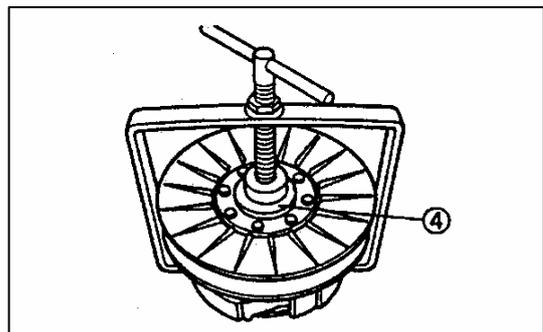
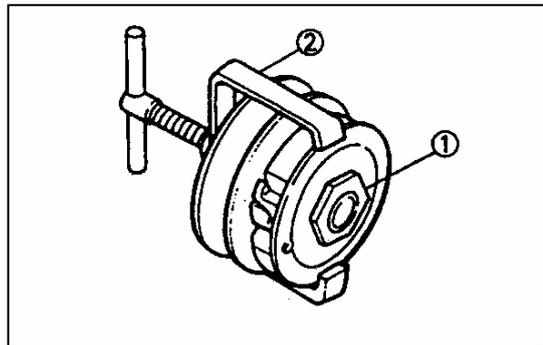
Oil/Grease → Check primary sheave and secondary sheave.

2. Measure:

- V-belt width ②

Out of specification → Replace

	<p><b>V-belt width:</b>  <b>22.6mm</b>                  (Limit:21.0mm)</p>
--	--

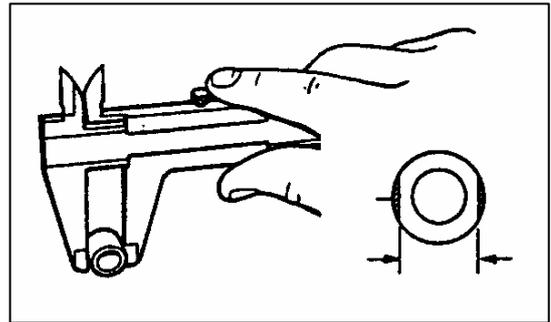


**WEIGHT INSPECTION**

1. Inspect:
- Weight minimum outside diameter
- Cracks/Wear /Scaling /Chipping → Replace.  
 Out of specification → Replace

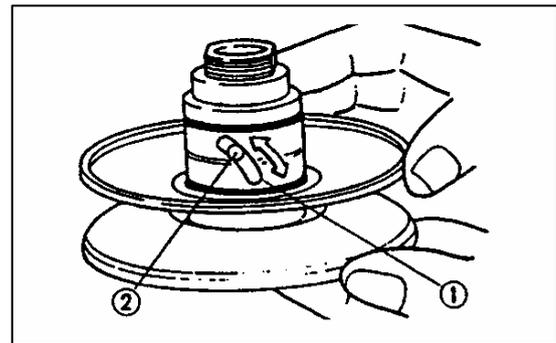


**Weight out side diameter:**  
**20.0 mm**  
**<Limit: 19.5mm>**



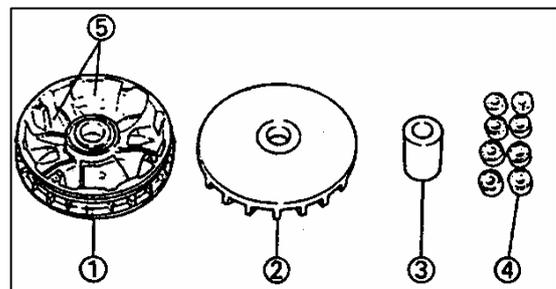
**SECONDARY SHEAVE INSPECTION**

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



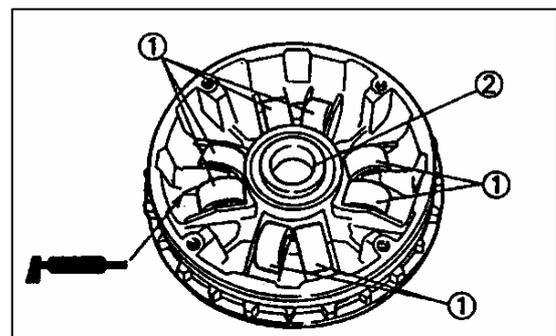
**NOTE:**

Remove any excess grease.

2. Install:
- Weight ①
  - Collar ②

**NOTE:**

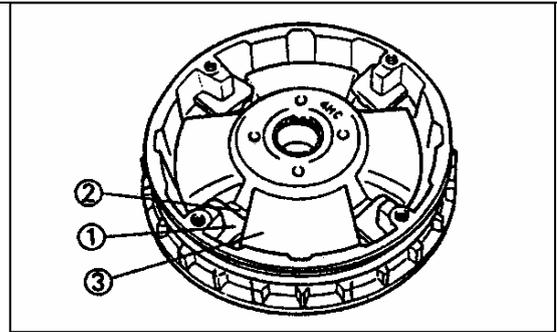
- Apply molybdenum disulfide grease to all of the outside of the weight and install.
- Apply lightweight lithium-soap base grease to the inside of the collar.



3. Install:

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

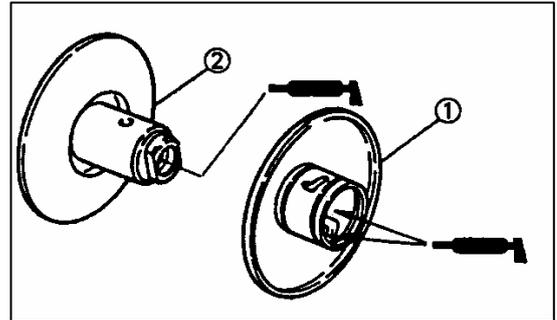
 3Nm(0.3m·kg)



**SECONDARY SHEAVE INSTALLATION**

1. Apply:

- Lightweight lithium-soap base grease (to the secondary sliding sheave ① inner surface, grease nipple groove, and oil seals)
- Lightweight lithium-soap base grease (to the bearings, oil seals and inner surface of the secondary fixed sheave ② )

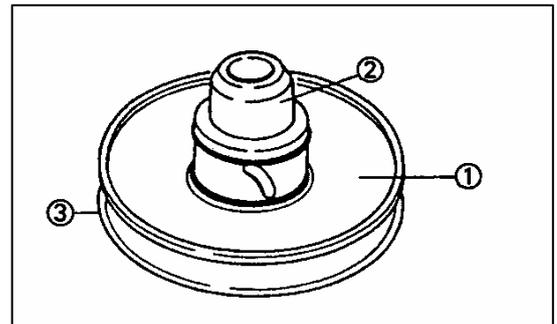


2. Install:

- Secondary sliding sheave ①

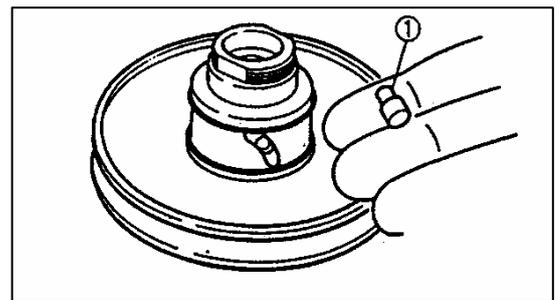
**NOTE:**

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



3. Install:

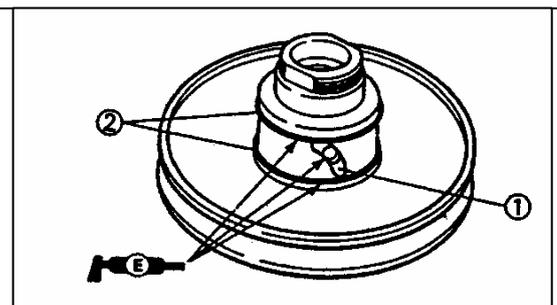
- Guide pin ①



4. Apply:

- Lightweight lithium-soap base grease (to the guide pin sliding groove ①, and oil seal ②

**NEW**)

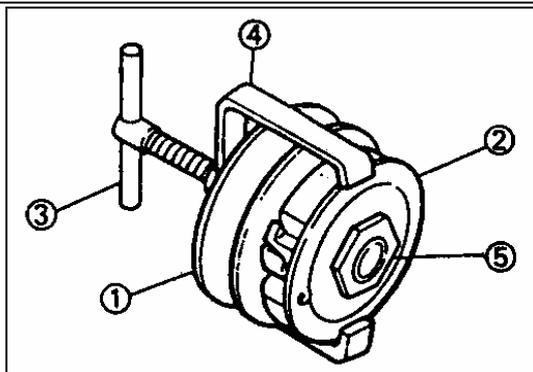


5. Install:

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

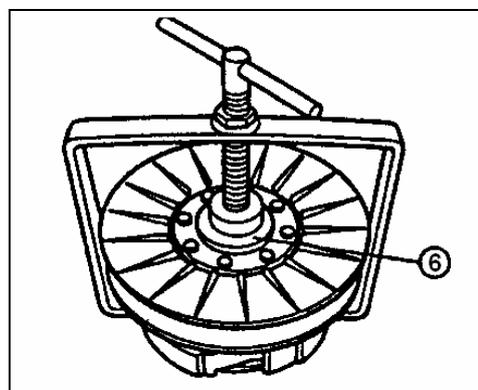
**NOTE:**

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 (30mm, thickness: 2-3mm).



6. Install:

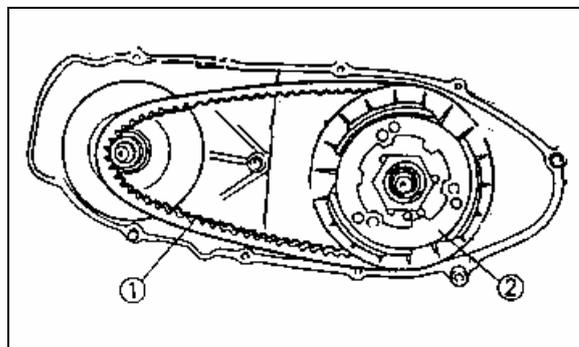
- V-belt ①
- Clutch assembly ②

**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.

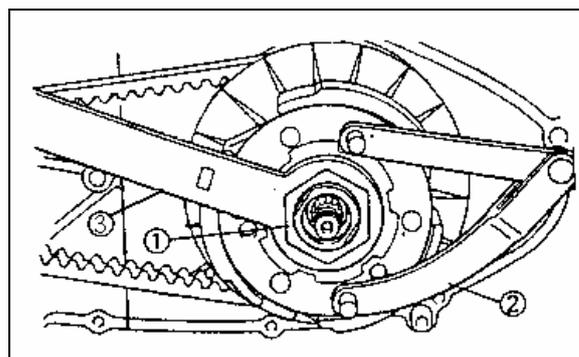


7. Install:

- 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

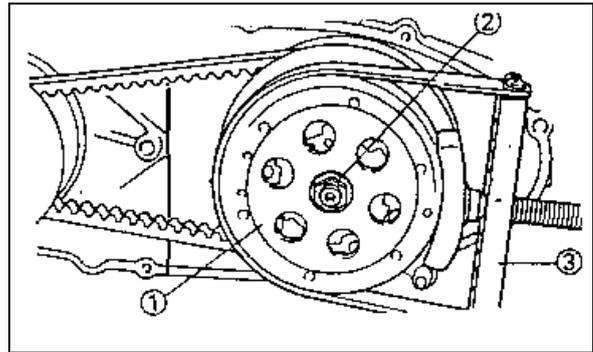


8. Install:

- Clutch housing ①
- Nut (clutch housing) ②

**NOTE:**

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

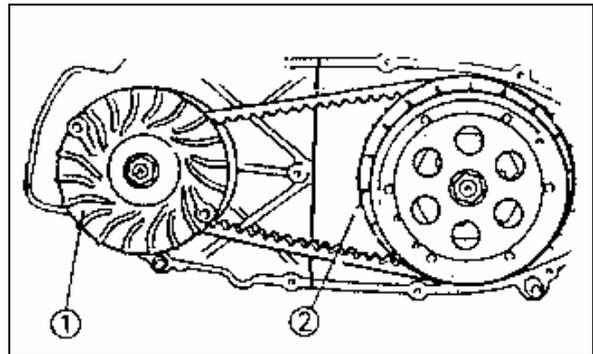


9. Set:

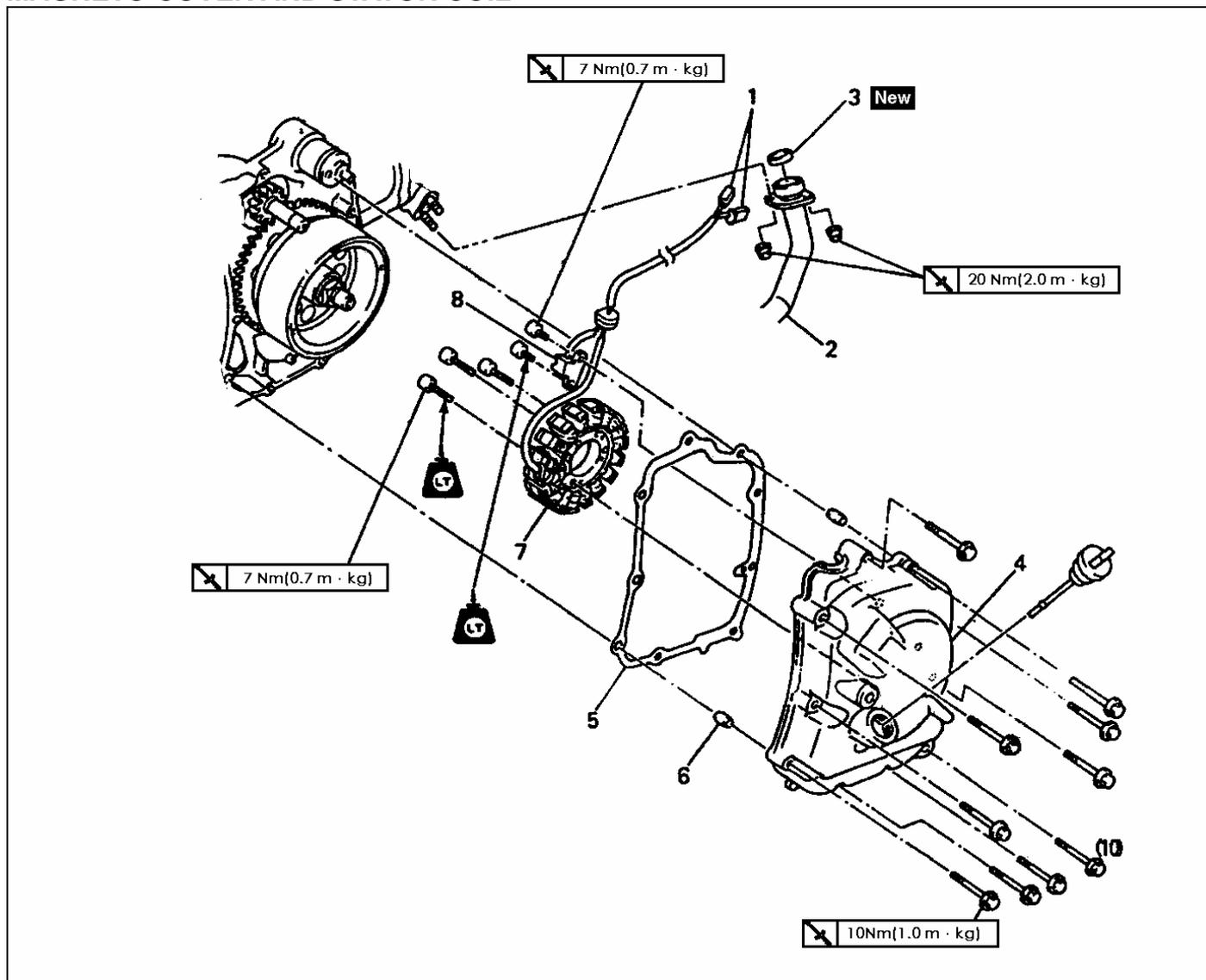
- V- belt ①

**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.

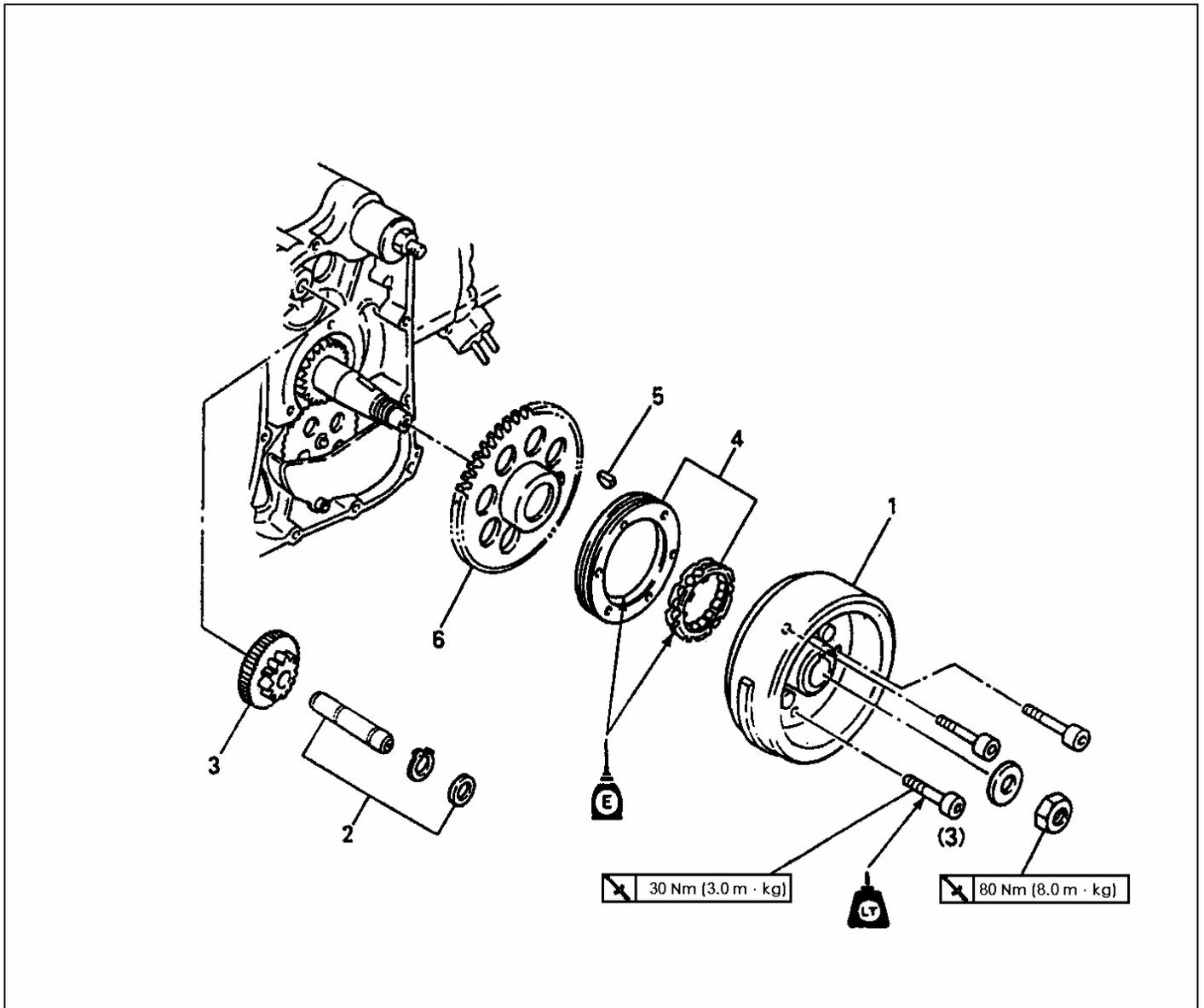


**3.8A.C. MAGNETO AND STARTER CLUTCH**  
**MAGNETO COVER AND STATOR COIL**



Order	Job name/ Part name	Q'ty	Remarks
	<b>Magneto cover and stator coil removal</b>		Remove the parts in order. Refer to "ENGINE OIL REPLACEMENT" section.
	Drain the engine oil.		
1	Couplers (A.C. magneto lead)	2	<b>NOTE:</b> 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.

A. C. MAGNETO AND STARTER CLUTCH



Order	Job name/ Part name	Q'ty	Remarks
	<b>A.C. magneto and starter clutch removal</b>		Remove the parts in order.
1	Rotor	1	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	
6	Starter wheel gear	1	
			Refer to "ROTOR INSTALLATION" section.
			Reverse the removal procedure for installation.

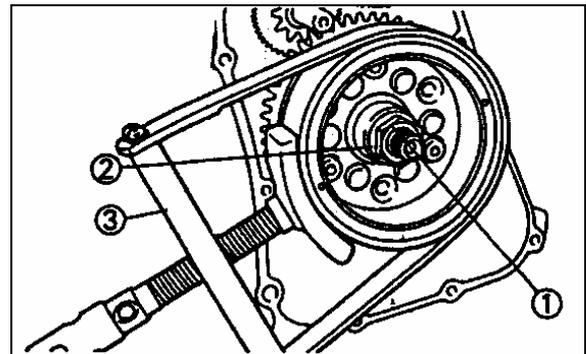
**A.C. MAGNETO ROTOR REMOVAL**

1. Remove:

- Nut ① (rotor)
- Plain washer②

**NOTE:**

- Loosen the nut (rotor) ①while holding the rotor with a sheave holder③ .
- Do not allow sheave the holder touch to the projection on the rotor.

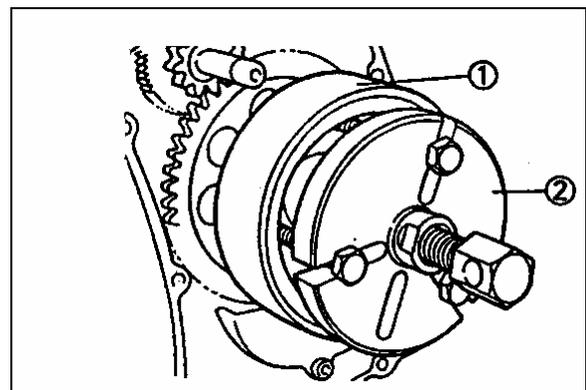


2. Remove:

- Rotor ①
- Woodruff key

**NOTE:**

- Remove the rotor ②using 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

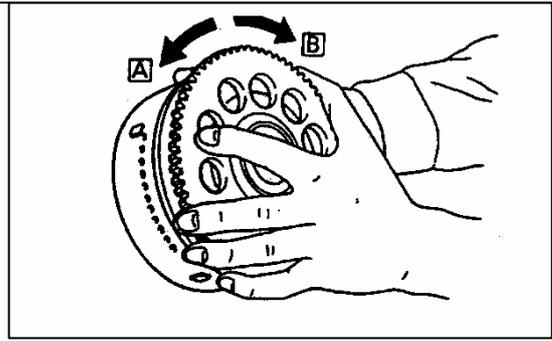
Burrs /chips /roughness /wear → Replace.

2. Check:

- Starter clutch operation

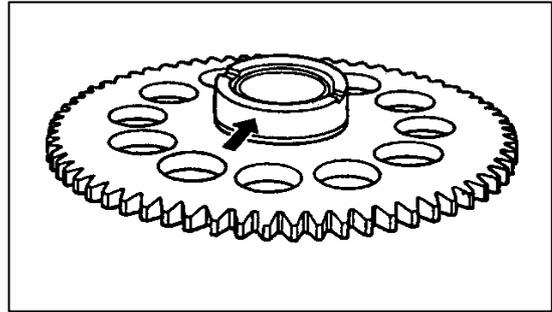
Push the dowel pins to the arrow direction.

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.



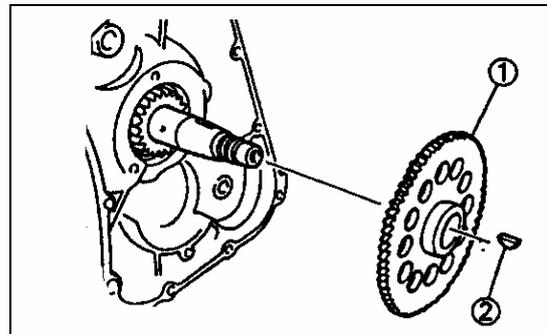
**A.C. MAGNETO ROTOR INSTALLATION**

1. Install:

- Starter wheel gear ①.
- Woodruff key ②

**NOTE:**

Install the starter wheel gear①, then install the woodruff key②.



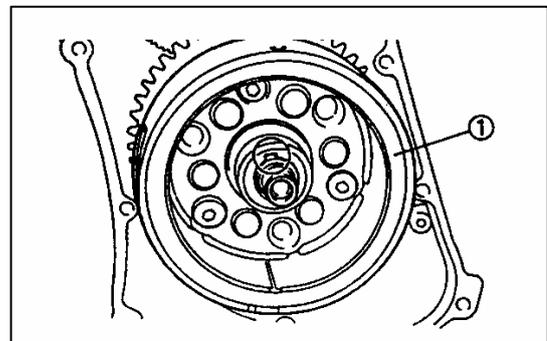
2. Install:

- Rotor ①
- Plain washer

**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.

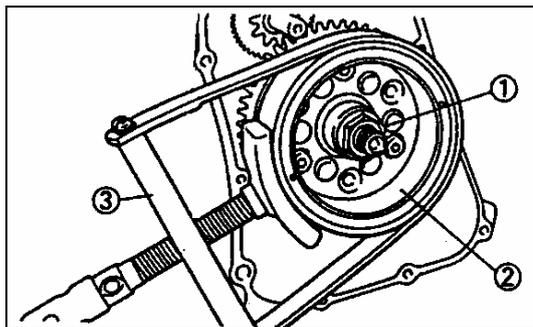


3. Tighten:

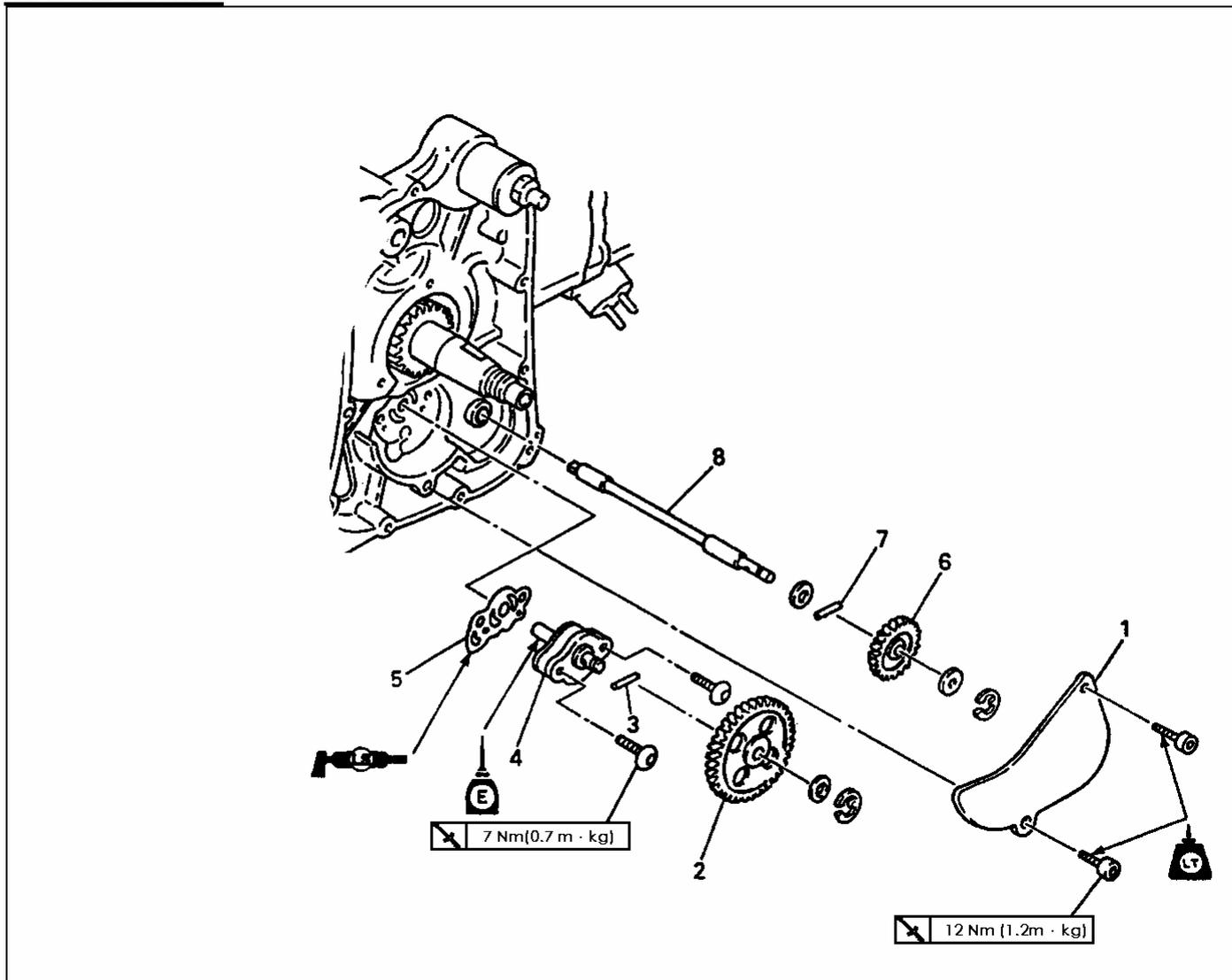
- Nut(rotor)①  80Nm(8.0m·kg)

**NOTE:**

Tighten the nut (rotor)① while holding the magneto rotor② with a sheave holder③.



**3.9 OIL PUMP**



Order	Job name/ Part name	Q'ty	Remarks
	<b>Oil pump removal</b>		
	<b>A.C. magneto</b>		
1	Cover	1	Remove the parts in order. Refer to "A.C. MAGNETO AND STARTER CLUTCH" section.
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**

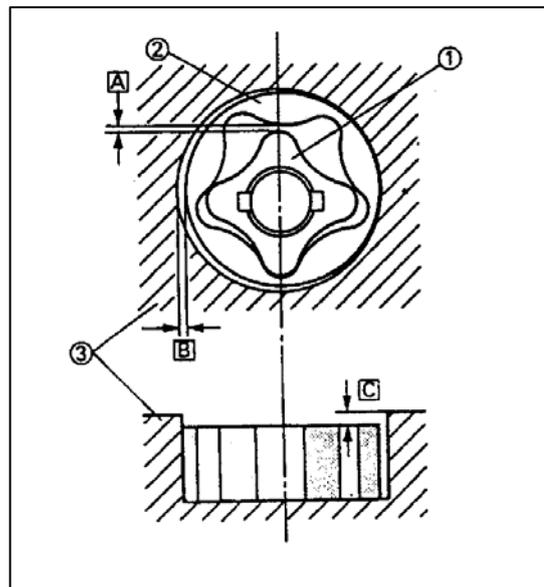
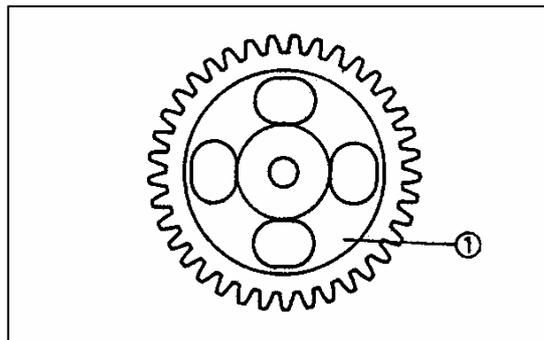
## 1. Inspect:

- Drive gear (oil pump) 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: 0.40mm>**

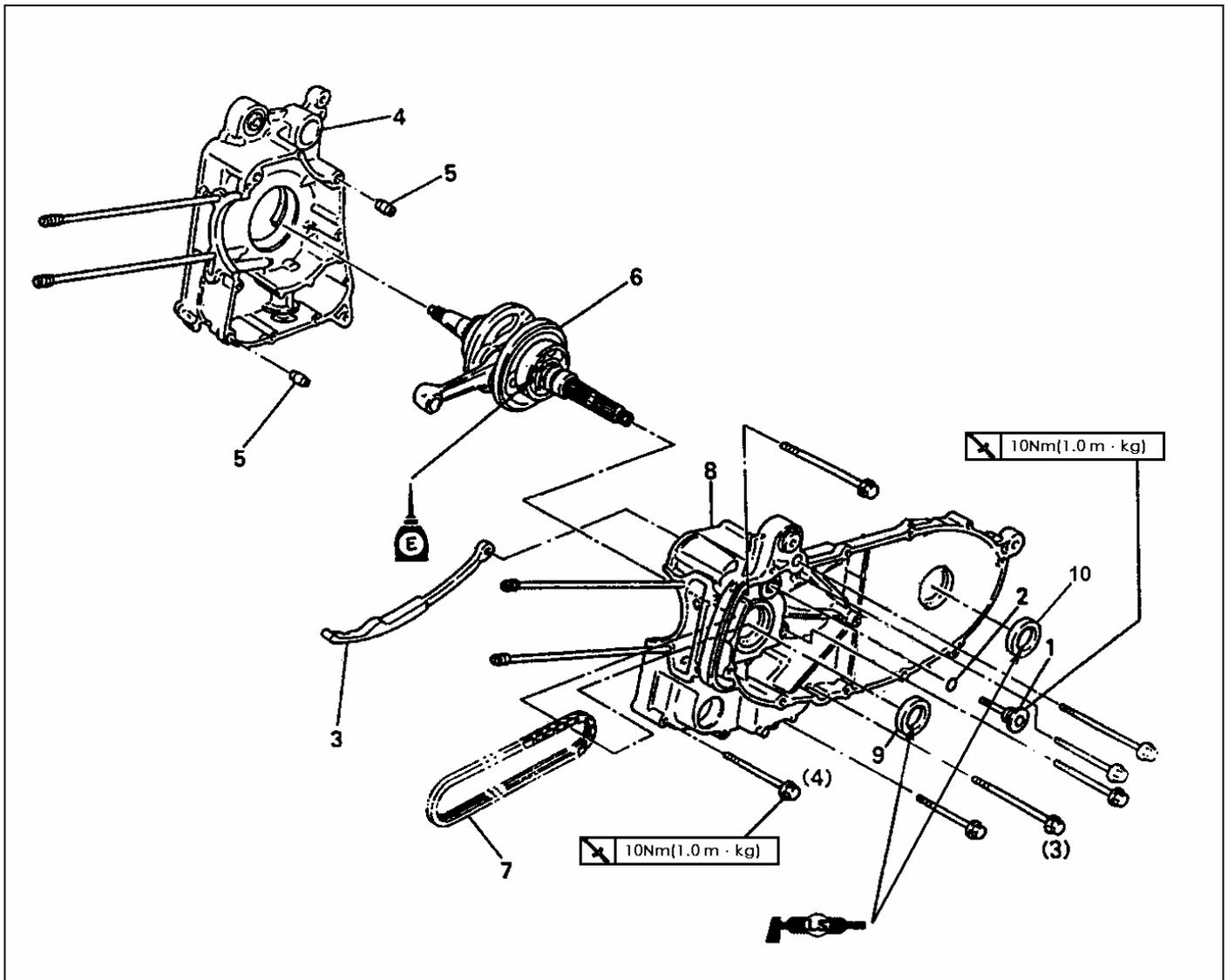
**Side clearance [B]:**

**0.013-0.036mm <Limit:0.15mm>**

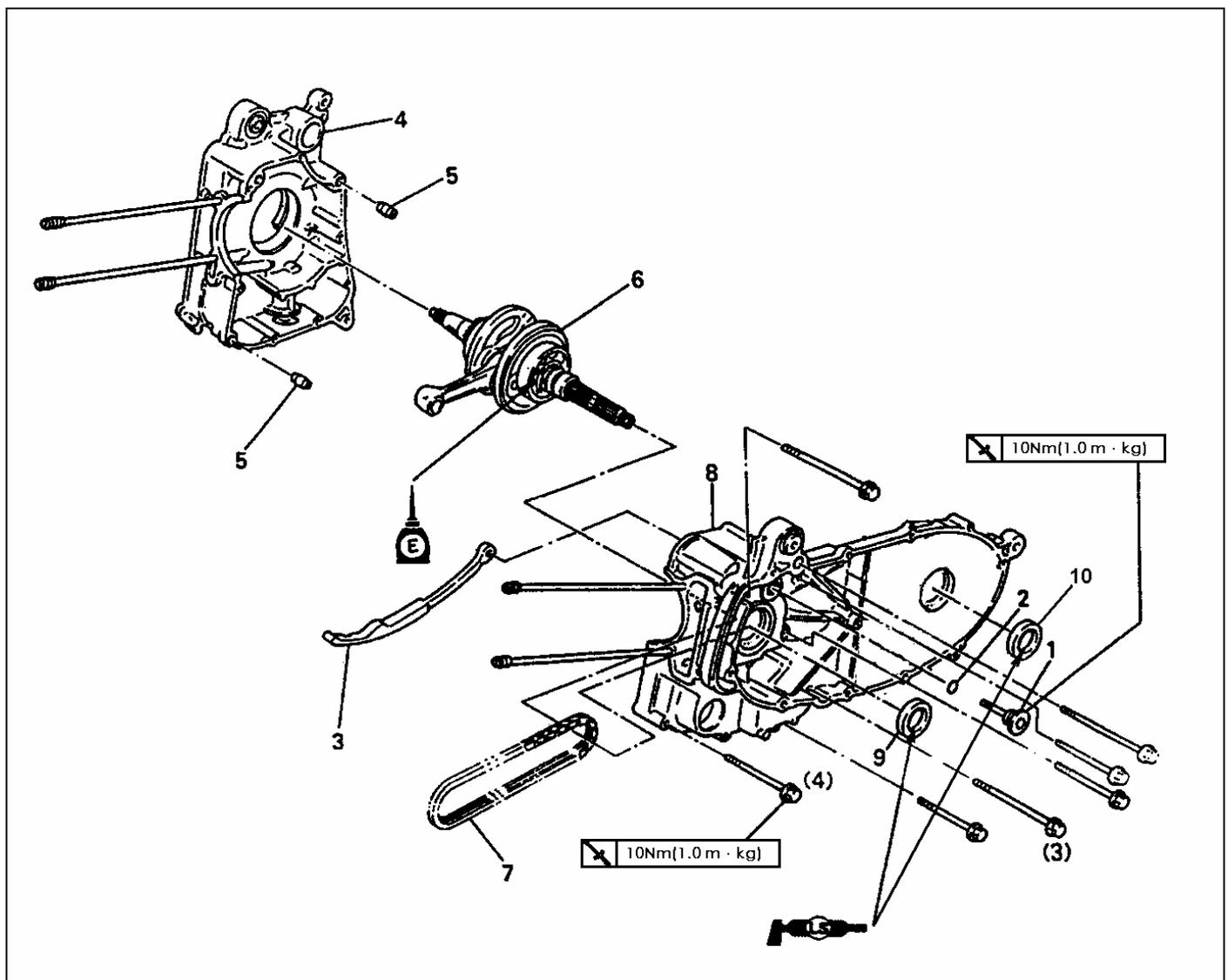
**Housing and rotor clearance [C]:**

**0.04-0.09 mm <Limit: 0.15mm>**

**3.10 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	
4	Crankcase (right)	1	Refer to "CRANKSHAFT INSTALLATION" section.
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	
10	Oil seal		Reverse the removal procedure for installation.

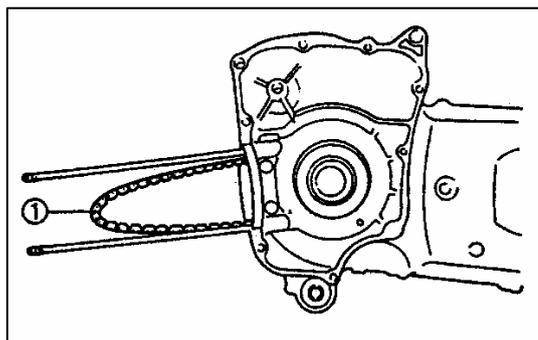
**CRANKSHAFT REMOVAL**

1. Remove:

- Crankshaft assembly
- Timing chain

**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.



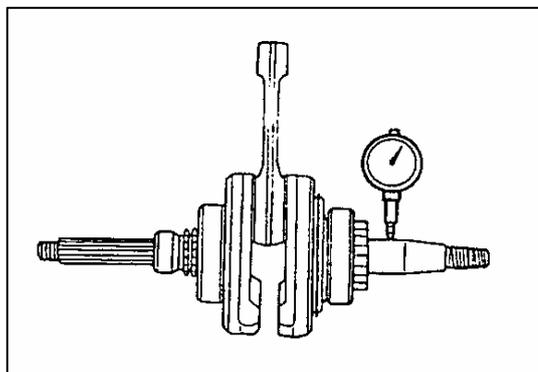
**CRANKSHAFT INSPECTION**

1. Measure:

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

**NOTE:**

Measure the crankshaft runout with the crankshaft assembly running slowly.



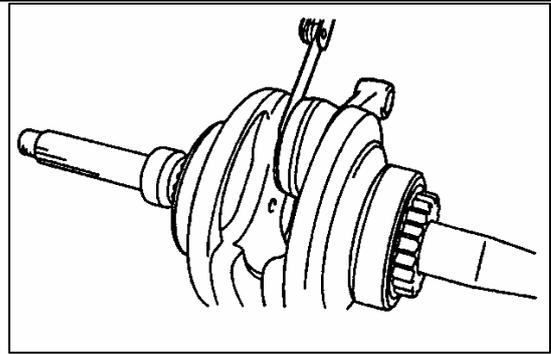
	<b>Runout limit: 0.03 mm</b>
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2. Measure:

- 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**

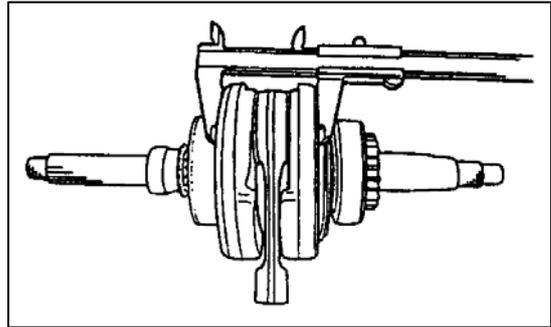


3. Measure:

- Crank width
- Out of specification → Replace crankshaft.

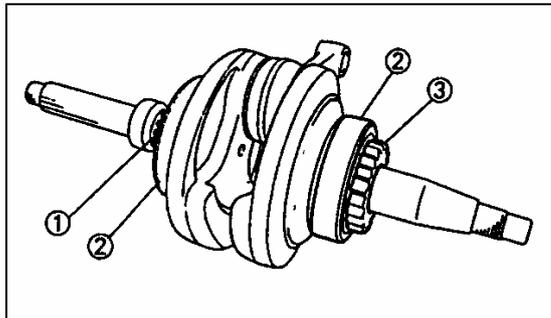


**Crank width:**  
**59.95-60.00 mm**



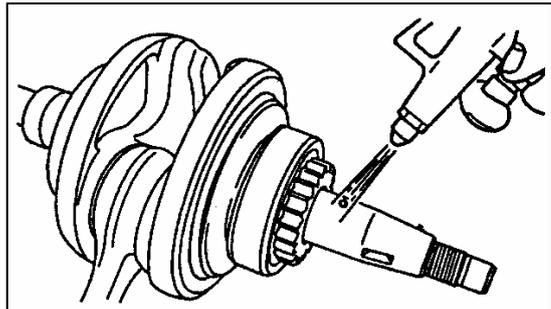
4. Inspect:

- 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.

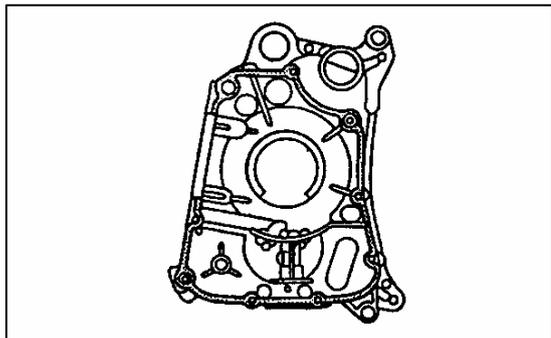


**CRANKCASE INSTALLATION**

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.

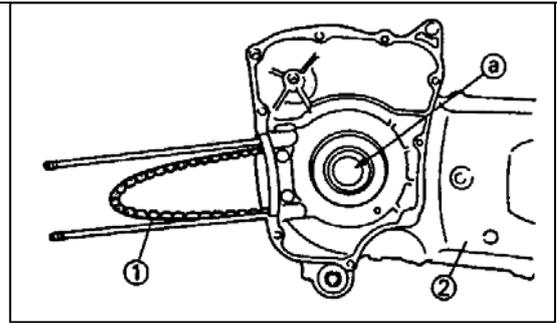


3. Install:

- Dowel pins
- Timing chain ①

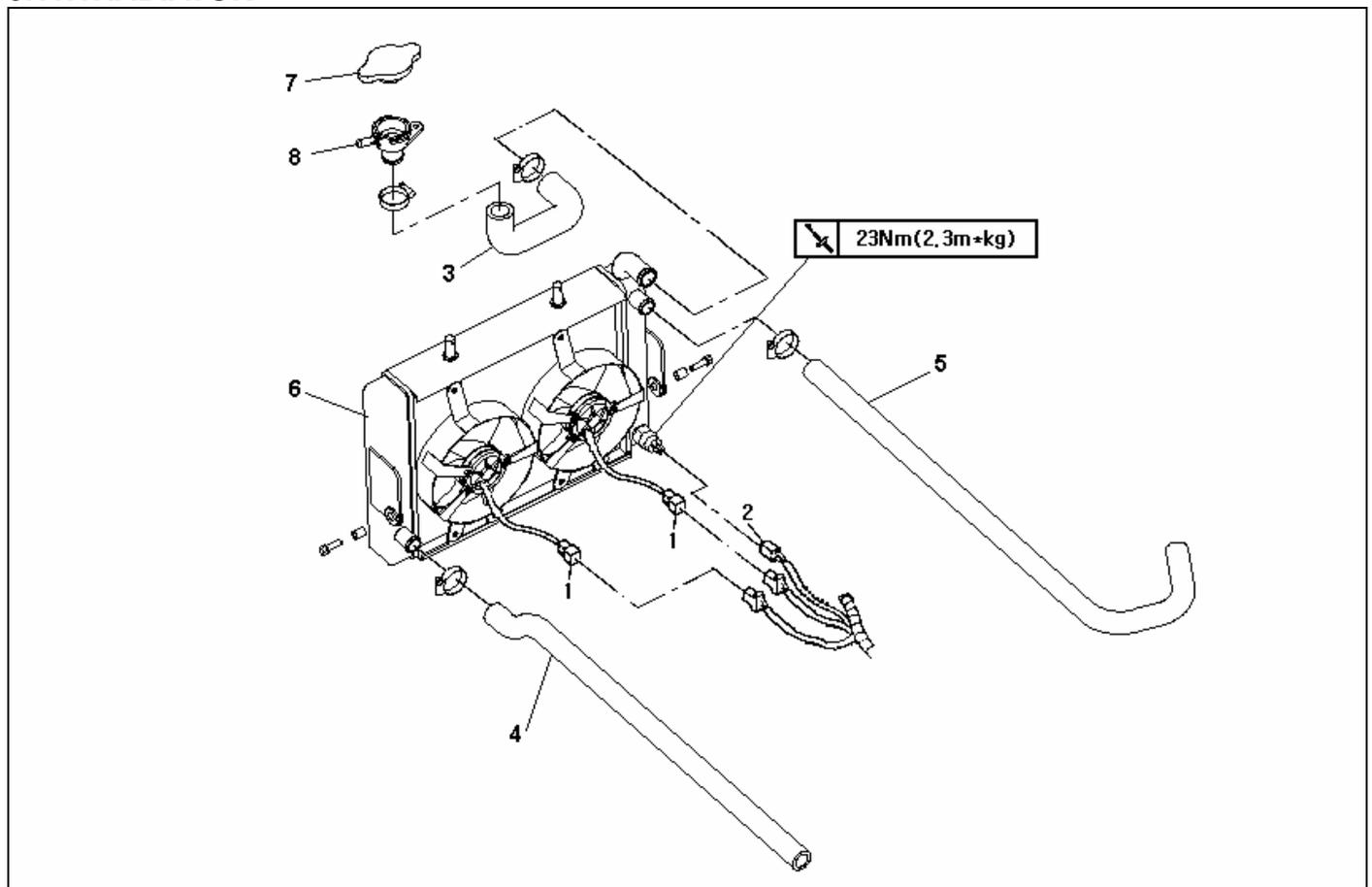
**NOTE:**

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



### 3.11 COOLING SYSTEM

#### 3.11.1 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.
1	Fan motor leads	2	
2	Thermo switch leads	2	
3	hose (radiator)	1	
4	Outlet hose (radiator)	1	
5	Inlet hose (radiator)	1	
6	Radiator	1	
7	Radiator cap	1	
8	Radiator filler neck	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.

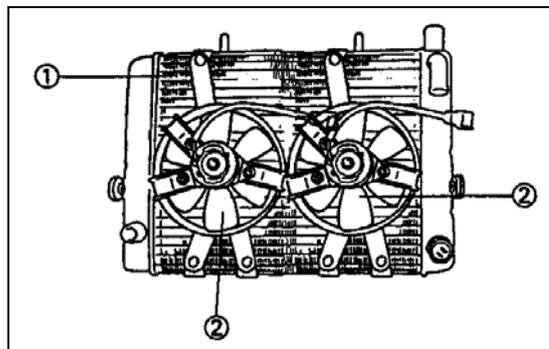
2. Inspect:

- Radiator hoses
- Radiator pipes

Cracks/damage → Replace.

3. Measure:

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




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**Radiator cap opening pressure:**  
**110-140kPa**  
**(1.1-1.4kg/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.

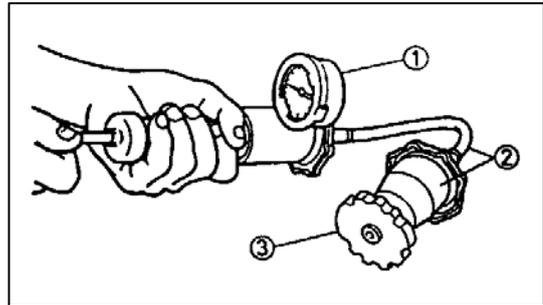
Malfunction → Check and repair.

Refer to "COOLING SYSTEM".

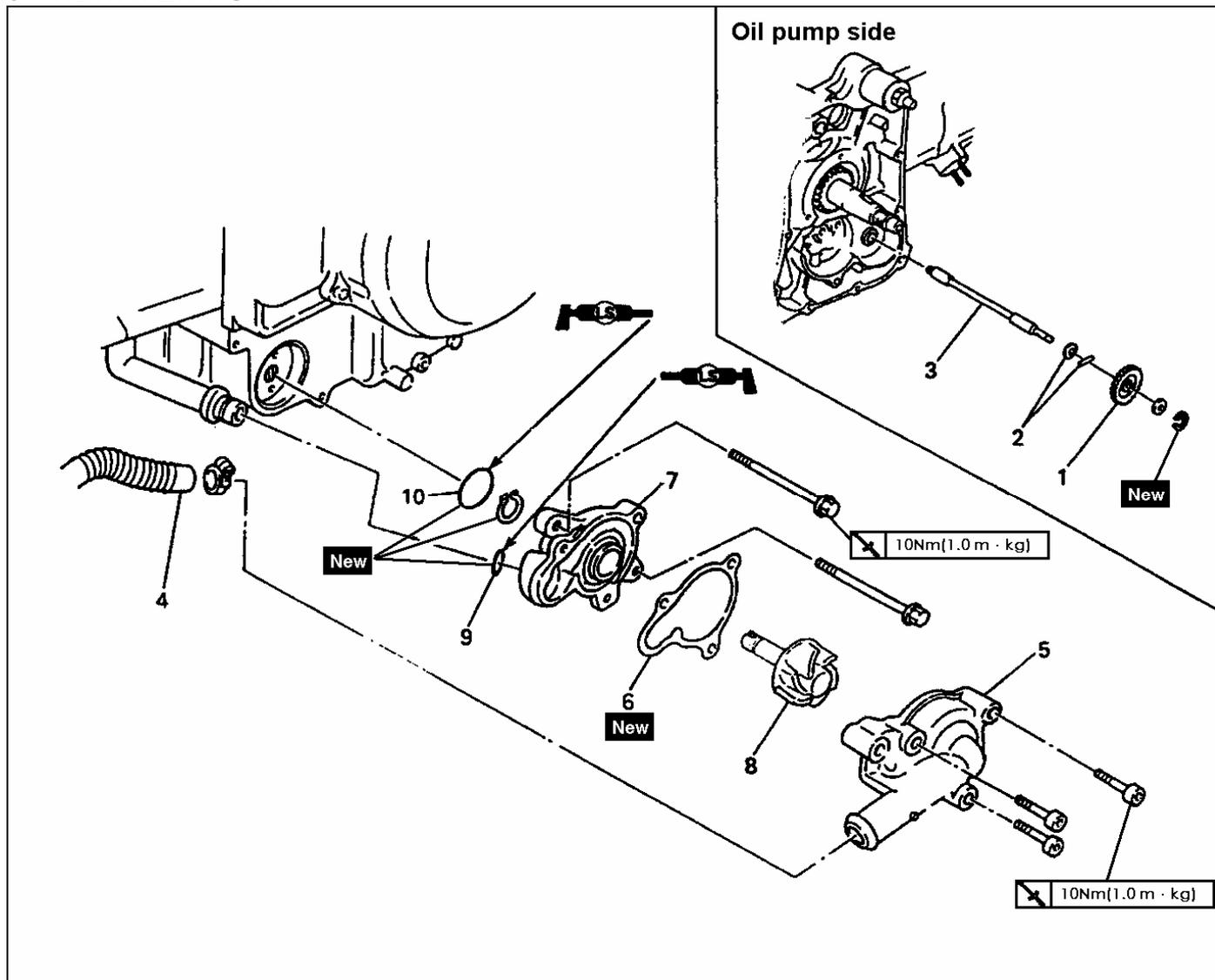
5. Inspect:

- Pipes

Cracks/damage → Replace.



3.11.2 WATER PUMP



Order	Job name/ Part name	Q'ty	Remarks
	Water pump removal Drain the coolant.		Remove the parts in order. Refer to "COOLANT REPLACEMENT" section.
	A.C. magneto		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	Outlet hose (radiator)	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 PUMPINSTALLATION" 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, discoloration 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:

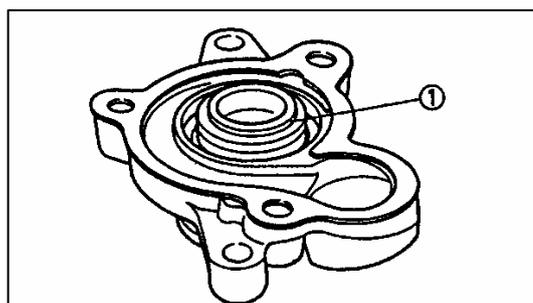
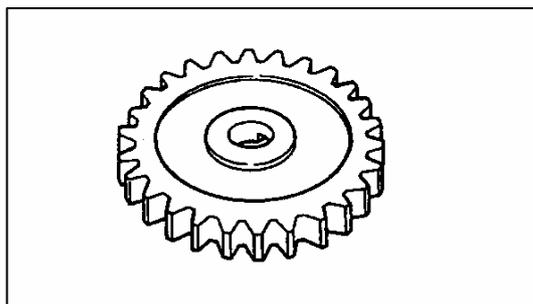
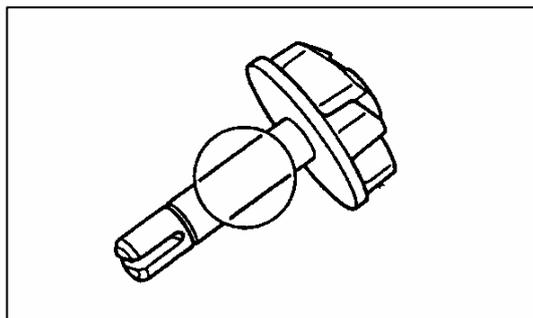
●Impeller shaft gear

Wear/damage → Replace.

3. Inspect:

●Mechanical seal ①

Damage/worn/wear → Replace.



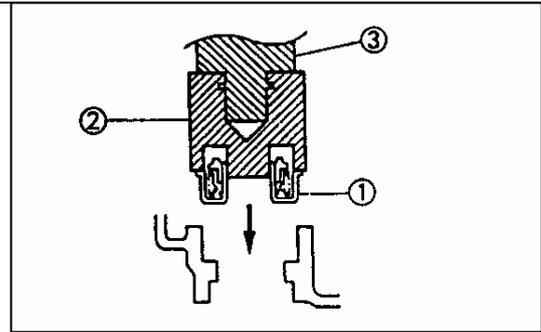
**WATER PUMP INSTALLATION**

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



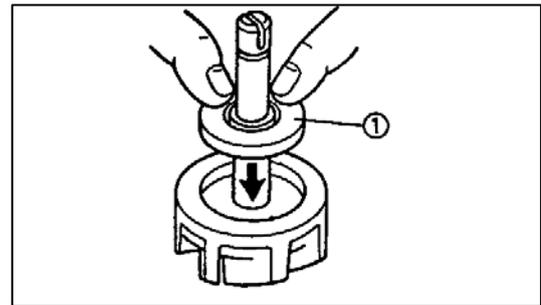
2. Install:

- Mechanical seal ① **NEW**

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

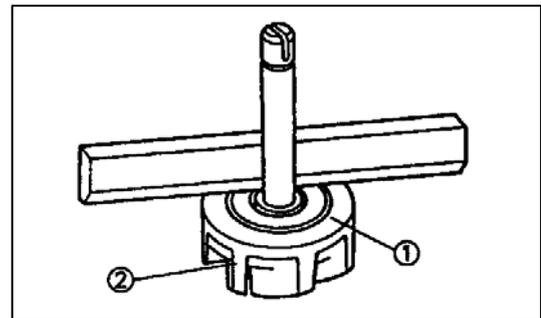
**NOTE:**

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



3. Inspect:

- Mechanical sea , 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:

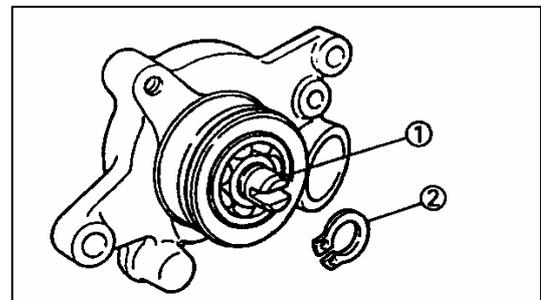
- Impeller shaft①
- Circ lip ② **NEW**

**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.

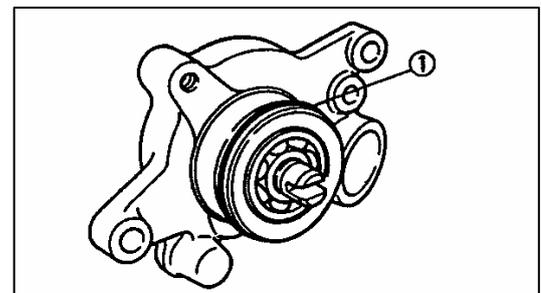
**NOTE:**

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



5. Install:

- O-ring①**NEW**



6. Install:

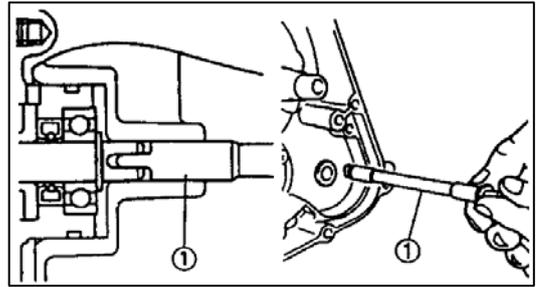
- Water pump housing

●Housing cover  10Nm(1.0m·kg)

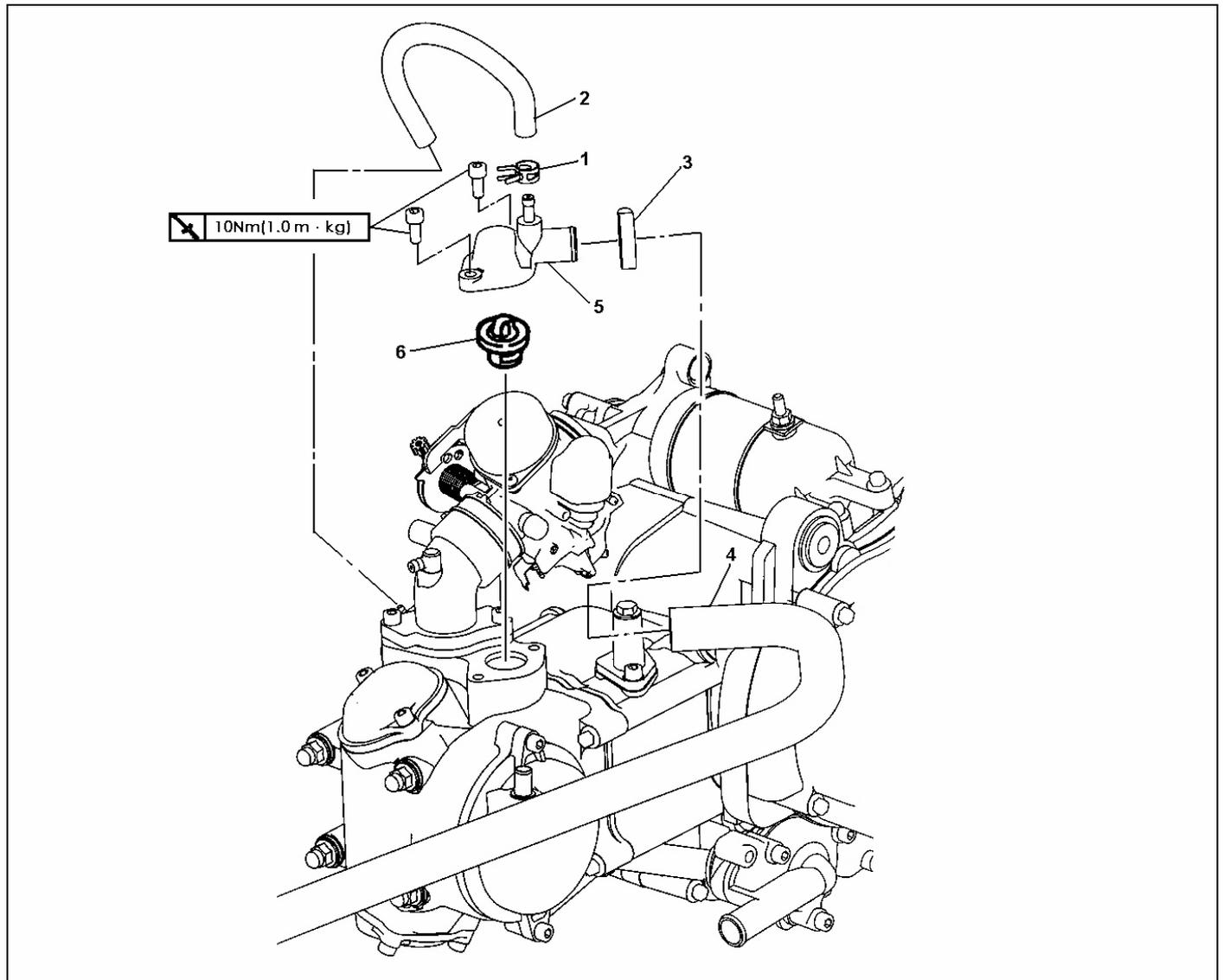
7. Install:

●Shaft①

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



### 3.11.3 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.
1	Clip	1	
2	Hose	1	
3	Hose clamp	1	
4	Inlet hose (radiator)	1	
5	Thermostatic cover	1	Refer to "THERMOSTAT INSTALLATION" section.
6	Thermostatic valve	1	Reverse the removal procedure for installation.

**INSTALLATION**

1. Inspect:

- Thermostatic valve

Valve does not open at 70.5-73.5°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.

- ①Thermostatic valve
- ②Vessel
- ③Thermometer
- ④Water

- A** CLOSE
- B** OPEN

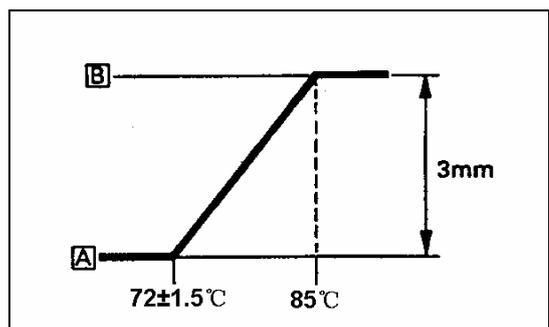
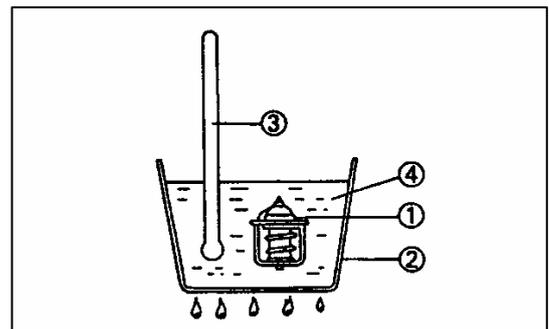
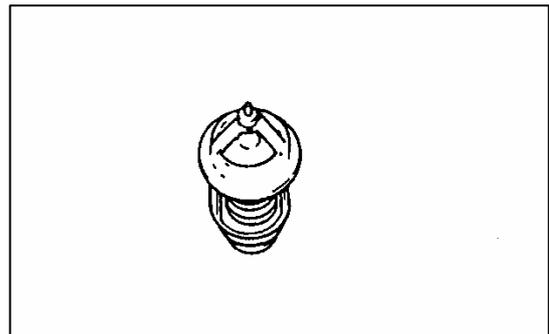
**NOTE:**

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
- Thermostatic cover

**3.12 CARBURETOR (ATV260/300)****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.
- ⚠ 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.

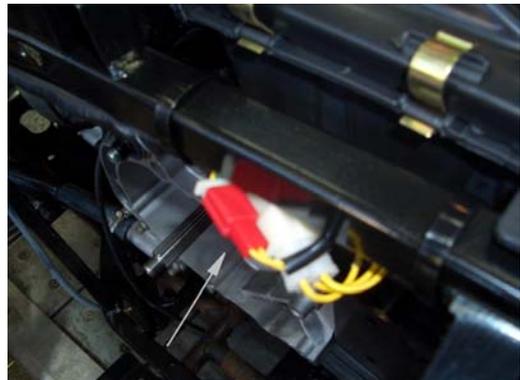
**CARBURETOR REMOVE**

1. Remove:

- Auto choke lead coupler

2. Remove:

- Fuel hose



3. Remove:

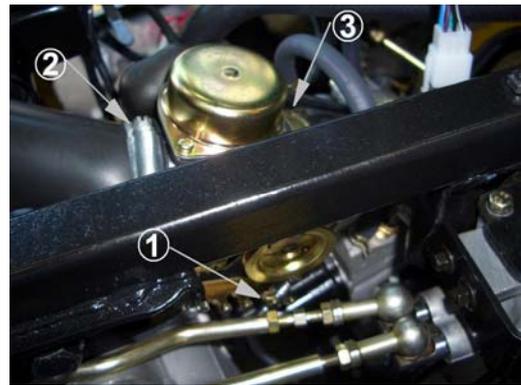
- Nut①
- Throttle cable

4. Losen:

- Bolt②
- Bolt③

5. Remove:

- Carburetor assy



**CARBURETOR DISASSEMBLY/ INSPECTION**

6. Auto choke inspection

(Ambient temperature lower than 45°C)

- Connect auto choke unit leads to the 12V battery for 5 minutes.

- Connect pipe to the starter①, and blow it with the mouth etc.

Possible→Replace auto choke unit.

Impossible→Good condition.

- Remove auto choke unit leads to the 12V battery for 30 minutes.

- Connect pipe to the starter①, and blow it with the mouth etc.

Possible→Good condition.

Impossible→Replace auto choke unit.



7. Remove:

- Blot①
- Auto choke unit②



8. Auto choke unit inspection:

- Piston①
- Jet needle②

Wear→Replace.

9. Install:

- Auto choke unit



## VACUUM CHAMBER

10.Remove:

- Cover①



11.Remove:

- Diaphragm spring①
- Piston valve②



12.Inspection:

- Jet needle

Wear→Replace.

- Piston valve

Wear→Replace.

Check the jet needle for stepped wear.

Check the vacuum piston for wear or damage.

Check the diaphragm for holes, deterioration or damage.

Check the vacuum piston for smooth operation up

and down in the carburetor body.

## FLOAT AND JETS

13.Remove:

- Float chamber①

### WARNING

Never drain the float bowl when the engine and the exhaust system are hot. Severe burns may result.

- Float②

- Needle valve③





14. Inspection:

- Needle valve

Wear → Replace.

Check the float valve and valve seat for scoring scratches, clogging or damage.

check the tip of the float valve, where it contacts the

valve seat, for stepped wear or contamination.

check the operation of the float valve.



15. Remove:

- Pilot jet

Check the pilot jet for wear or damage. Clean the

pilot jet with cleaning solvent and blow this open with compressed air.



16. Remove:

- Main jet

Check the main jet for wear or damage. Clean the

main jet with cleaning solvent and blow this open

with compressed air.



17.Remove:

- Main nozzle

Check the main nozzle for wear or damage.  
Clean

the main nozzle with cleaning solvent and blow this open with compressed air.



18.Remove:

- Pilot screw set

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



## AIR CUT-OFF VALVE

19.Remove:

- Cover①
- Compressing spring②
- Diaphragm③

20.Inspection:

- Compressing spring  
Distortion→Replace.
- Diaphragm  
Wear→Replace.



21. Reverse the removal procedure for installation.

## ACCERERATING PUMP

22.Remove:

- Cover①

Check the vacuum piston for wear or damage.



23. Inspection:

- Compressing spring①

Distortion→Replace.

- Diaphragm②

Wear→Replace.

24. Reverse the removal procedure for installation.



**3.12 CARBURETOR(ATV400-2/ATV400-2B)**

1. Remove:

- Fuel hose

2. Remove:

- Manual enriching starter rope①

3. Remove:

- Nut②
- Throttle cable

4. Loosen:

- Bolt③
- Bolt④



5. Remove:

- Carburetor assy

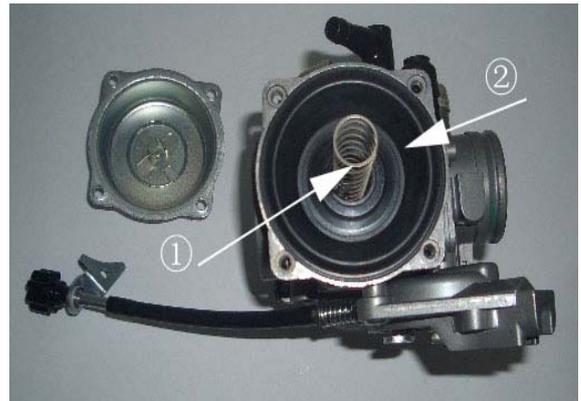
6.Remove:

- Cover①



7.Remove:

- Diaphragm spring①
- Piston valve②



8.Inspect:

- Jet needle  
Wear→Replace.
- Piston valve  
Wear→Replace.



9.Remove:

- Float chamber①
- Float②
- Needle valve③



10. Inspect:

- Needle valve

Wear → Replace.



11. Remove:

- Idling jet



12. Remove:

- Pilot jet



13. Remove:

- Main jet



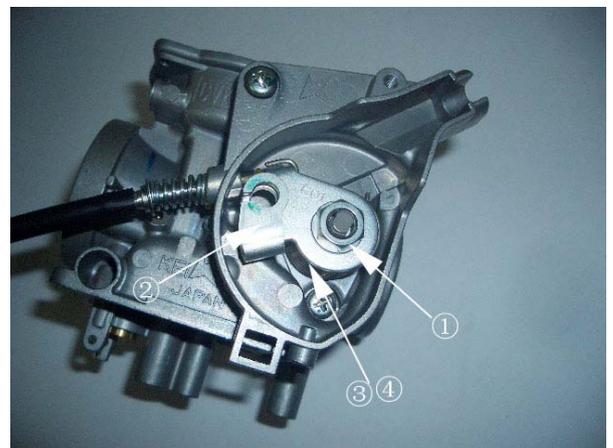
- 14.Remove:  
●Main nozzle



- 15.Remove  
●Mixture adjusting screw



16. Remove  
●Nut①  
●Throttle valve mounting arm②  
●Torsion-bar spring③  
●Gasket④



17.Remove:

- Screws①&②
- Throttle valve mounting bracket③



18. Reverse the removal procedure for installation.



# CHAPTER 3B ENGINE

## 50cc/80cc

### 3.1 Scheduled Maintenance

- 3.1.1 General information
- 3.1.2 Air Filter
- 3.1.3 Spark plug
- 3.1.4 Valve Adjustment
- 3.1.5 Carburetor idle speed
- 3.1.6 Ignition time
- 3.1.7 Cylinder pressure
- 3.1.8 Final reduction gear oil checking
- 3.1.9 Transmission belt

### 3.2 Cylinder head、 Valve

- 3.2.1 Important information
- 3.2.2 Disassembling of camshaft
- 3.2.3 Disassembly of cylinder head
- 3.2.4 Camshaft assembly

### 3.3 The cylinder and the piston

- 3.3.1 Important points
- 3.3.2 Removing the cylinder
- 3.3.3 Removing the piston
- 3.3.4 Assembling the piston
- 3.3.5 Assembling the cylinder

### 3.4 Driving belt device & the starting lever

- 3.4.1 Important points
- 3.4.2 The left crankcase cover detaching
- 3.4.3 Installing the starting assembly
- 3.4.4 The driving belt
- 3.4.5 The driving pulley dismounting
- 3.4.6 Assembling the driving pulley
- 3.4.7 The clutch/transmission pulley

### 3.5 The final transmission assembly

- 3.5.1 Instructions
- 3.5.2 Dismantling the final transmission assembly
- 3.5.3 Detach the final transmission gearbox cover
- 3.5.4 Assembling the final gear set

### 3.6 The crankcase & the crankshaft

- 3.6.1 Important points
- 3.6.2 Dismantling the crankcase
- 3.6.3 The crankshaft
- 3.6.4 Assembling the crankcase

### 3.7 Lubricating system

- 3.7.1 Over all engine requirements
- 3.7.2 Engine oil / filter screen
- 3.7.3 Oil pump

### 3.8 Carburetor

- 3.8.1 General Information:
- 3.8.2 Disassembly of carburetor
- 3.8.3 Assembly of carburetor

### 3.9 Starter system

- 3.9.1 Installation information
- 3.9.2 Starter Motor
- 3.9.3 Starter pinion

### 3.10 Magneto

- 3.10.1 Dismantling:
- 3.10.2 Assembling

### 3.11 Ignition System

#### WARNING

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

**3.1 Scheduled Maintenance**

**3.1.1 General information**

**Warning**

- Always make sure it is well-ventilated around before the engine starts. Never start the engine in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death.

Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

**Specifications**

Throttle free play:2-6mm

Spark plug gap:0.6-0.7mm

Spark plug type: NGK:C7HSA  
LD: A7TC

Valve gap: IN:0.04-0.06mm

EX: 0.04-0.06mm

Idling speed:1900±190rpm

Engine oil quantity:

Normal range:0.8L

**3.1.2 Air Filter**

**Filter Replacement**

Remove air filter cap fix screw and remove air filter cap.

Check filter for dirt or damage.

Replace as necessary.

Do not attempt to clean the filter element.



screw air filter cap

**Replacing Frequency**

More frequency replacement is required if vehicle is driven on dusty roads or in rain.

Make sure Air Filter Cover is securely in place.



air filter

**3.1.3 Spark plug**

Remove spark plug.

Check spark plug for burning, dirt or deposit.

Clean it with a spark-plug cleaner or steel brush in case of dirt or carbon deposit.



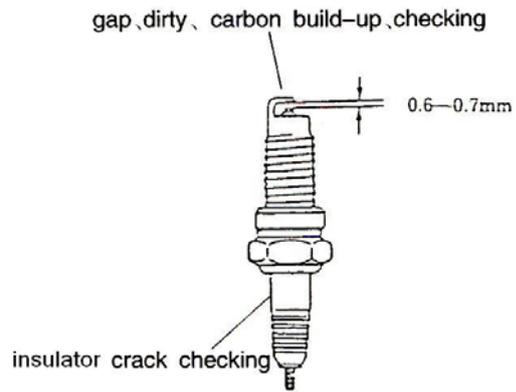
spark plug

**Specified spark plug:** NGK:C7HSA  
LD: A7TC

Check spark plug gap:

0.6-0.7mm

Check plug for dirt, carbon build-up, cracking of insulator.



**3.1.4 Valve Adjustment**

Always check and adjustment with engine temperature lower than 35°C(95°F)

Remove cylinder head cover.



Rotate cooling fan to camshaft locate mark at top dead-center, aligning magneto fly wheel "T" mark with mark on crankcase.



Valve gap checking and adjustment

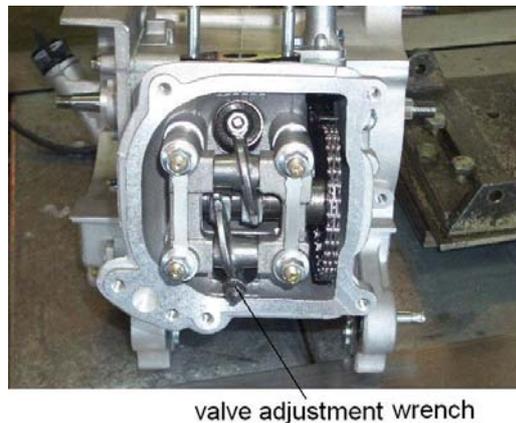
Valve gap: IN:0.04-0.06mm

EX: 0.04-0.06mm

To adjust valve gap, loosen jam nut and rotate adjusting nut.

**Valve adjustment wrench**

- Be sure to check valve gap again after locking jam nut.



**3.1.5 Carburetor idle speed**

- Idle adjustment should be made with the engine warmed up.

Remove cover

After the engine warms up, connect it to an engine revolution counter.

Adjust idle screw until specified revolution is obtained.

Minimum idling stabilized speed:  $1900 \pm 190$ rpm

Readjust the screw if idle speed is not steady or fuel cannot be properly applied.



idle screw

**3.1.6 Ignition time**

- Equipped with CDI, there is no need for ignition setting.
- Check ignition system if ignition time is incorrect.

Dismount right body cover.

Remove ignition timing inspection plus.



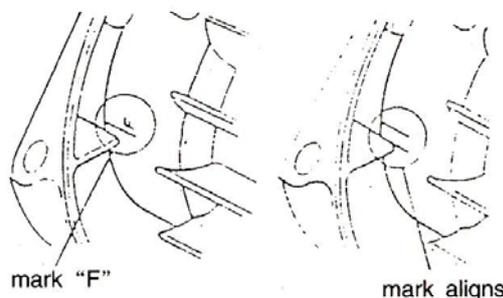
inspection plus

Check ignition timing, using timing light.

Crankcase mark must be aligned with mark "F" on flywheel while engine is at idle speed.

The timing should advance as the RPM is increased.

The timing mark should align with the crankcase mark at 3000 RPM.



**3.1.7 Cylinder pressure**

Measure cylinder pressure with the engine warmed up.

Remove spark plug

Install a cylinder pressure gauge.

With throttle fully open, start starter motor to measure cylinder pressure.

**Compression pressure:**  $15\text{kg/cm}^2$ -600rpm

If the pressure is excessively low, check for following:

- Valve leakage
- Valve gap too tight
- Cylinder head gasket damaged
- Piston ring worn

Piston or cylinder worn

Check combustion chamber and piston top for excessive carbon deposit if compression pressure is too high.

**3.1.8 Final reduction gear oil checking**

Checking oil volume, build up main foot rest so that build up body becomes vertical on plain ground.

Dismount gear oil adjusting bolt after stopping engine.

It is good that oil level just under regulation screw bolt hole, add gear oil when oil level is too low.

**Gear oil recommended: SEA 15W/40SE**

Build up gear oil regulator screw bolt.

Confirm packing washer broken or not.

**Changing gear oil**

Remove gear oil adjusting bolt and drain oil.

Confirm packing washer broken or not.

Add gear oil recommended:

gear oil capacity:0.12L

Bolt torque:19N.m(14ft.lbs)

Check if there is any leakage after work.



gear oil adjusting bolt/packing washer



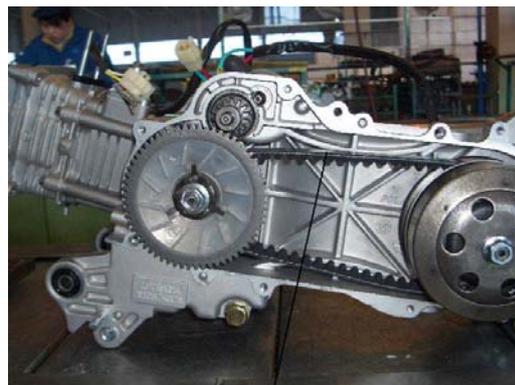
oil drain bolt/and washer

**3.1.9 Transmission belt**

Detach the left crankcase cover

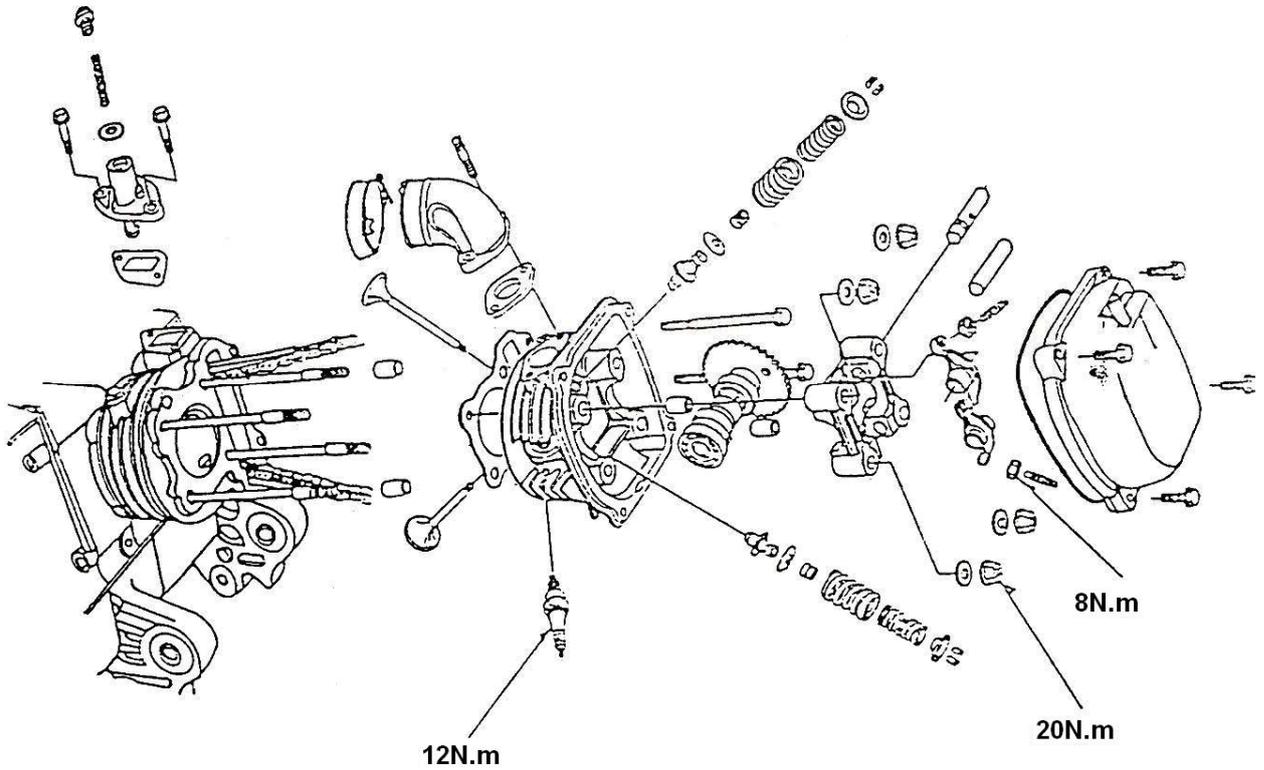
Check whether there is wear and tear of transmission belt.

Change with new one when necessary or timely maintenance.



transmission belt

3.2 Cylinder head、Valve



3.2.1 Important information

- When working on the cylinder head and valve train, always use engine oil to lubricate sliding parts when assembling. Never assembly dry parts into the valve train.
- The camshaft is lubricated by engine oil supplied via an oil passage in the cylinder head. Make sure this passage is clean and open when you reassemble the head.
- When measuring parts to determine wear, wash the parts with solvent and dry them in order to get accurate measurements.
- When disassembling the valve components, keep them in order, and reinstall them in the reverse order.

Standards

item		Standard value	Used limit
Valve gap (cold)	IN	0.04-0.06	—
	EX	0.04-0.06	—
Cylinder head compressed pressure		15kg/cm <sup>2</sup> -600rpm	—
Cylinder head surface twisting			0.05
Camshaft convert angle height	IN	25.749	25.681
	EX	25.55	25.524
Valve rocker arm inner diameter	IN	10.0-10.022	10.10
	EX	10.0-10.022	10.10
Valve rocker arm bearing outer diameter	IN	9.972-9.987	9.91
	EX	9.972-9.987	9.91
Valve seat angle	IN	1.0	1.8
	EX	1.0	1.8

Valve bar outer diameter	IN	4.975-4.990	4.9
	EX	4.955-4.970	4.9
Valve guide pipe inner diameter	IN	5.0-5.012	5.3
	EX	5.0-5.012	5.3
Gap between valve bar and guide pipe	IN	0.010-0.037	0.08
	EX	0.030-0.057	0.10
Valve spring	Inner spring	30.5	26.1
	Outer spring	33.5	30.5

**Torque Value**

Camshaft bolt	20N.m	15 ft . lbs	lubricate threads with oil
Valve gap adjusting screw cap	8N. m	6 ft . lbs	

**Tools:**

**General tools**

Valve spring compressor		45° IN/EX
Valve seat reamer	24.5mm	Plane reamer 30° IN
Valve seat reamer	25mm	Plane reamer 32° EX
Valve seat reamer	22mm	Plane reamer 60° IN/ EX
Valve seat reamer	26mm	
Reamer damping fixture	5mm	

**Special tools**

- Valve spring compressor accessories
- Valve gap regulatory spanner
- Valve guide screwdriver
- Valve guide reamer

**Trouble diagnosis**

- Confirm poor operation of cylinder head by measuring pressure or by noise produced by engine upper end.

**Slow speed hitch**

- too low compression pressure
- bad valve gap
- burning or curving of valve
- bad valve timing
- broken valve spring
- bad valve seat
- leakage of cylinder head gasket
- cylinder head surface warping or cracking
- bad spark plug

**Too high compressed pressure**

- too much carbon build-up in combustion chamber

**White smoke from exhaust pipe**

- wearing of valve guide
- broken oil seal

**Abnormal noise**

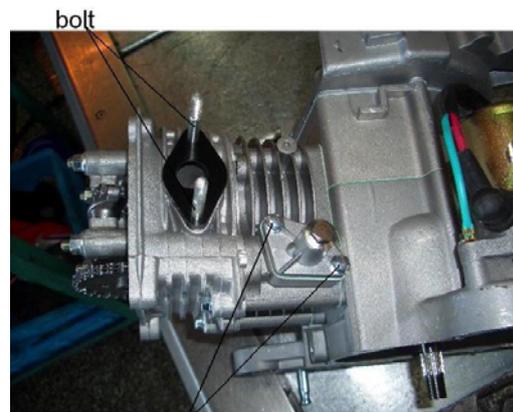
- bad valve gap
- broken or burning of valve or valve spring
- wearing and breaking of camshaft
- wearing of inner chain adjusting plate
- wearing of camshaft and valve rocker arm

**3.2.2 Disassembling of camshaft**

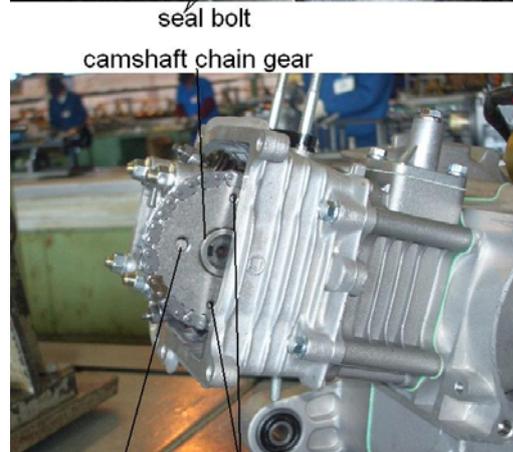
Remove four bolts and two nuts and take off cylinder head cover.



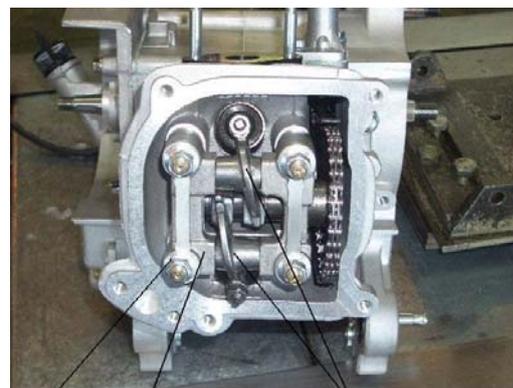
Disassemble tension seal bolt and spring.



Use the kick start lever to turn engine slowly until "T" mark on flywheel lines up with indicator on crankcase and check position of camshaft to find if both valves are closed. The hole in the cam gear should be away from the engine, if this is not correct rotate the crank one revolution to achieve this alignment.

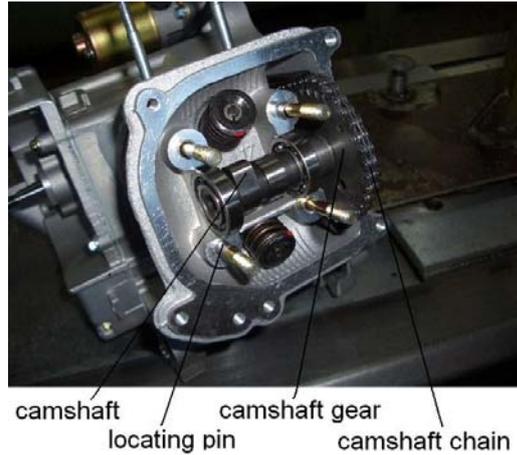


Remove four bolts and remove camshaft fixed seat.  
Remove rocker arms and pivots.



Remove camshaft gear from camshaft chain.

Remove camshaft.



Check camshaft

Check cam lift.

Use limit :IN: 25.681mm below change

EX:25.524mm below change

Check surface of cam lobes for weary surface break down, scuffing or cracking.



Check camshaft and bearing for loose fit or damage.

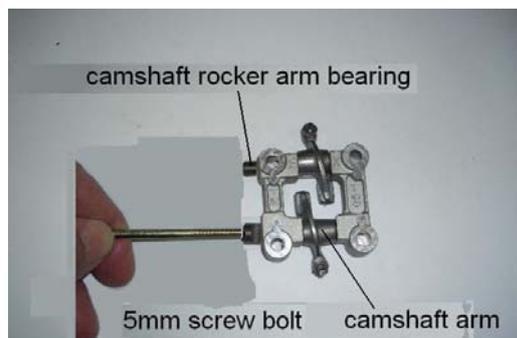
If any excessive wear or damage is found, replace the camshaft.



**Disassembly of camshaft seat and rocker arm assembly**

Take out camshaft rocker arm bearing by using 5mm screw.

Take off camshaft rocker arm.



**Checking of camshaft bearing rocker arm.**

Check if camshaft fixed seat and camshaft rocker arm and camshaft rocker arm bearing is worn or broken.



Measure outer diameter of camshaft rocker arm bearing and inner diameter of camshaft rocker arm.

Inner diameter of camshaft rocker arm

Used limit: 10.10mm, change if worn larger

Outer diameter of camshaft rocker arm bearing

Used limit: 9.91mm, change if worn larger

The gap between camshaft rocker arm and camshaft rocker arm bearing.

Used limit: 0.10mm ,change if worn larger



**3.2.3 Disassembly of cylinder head**

Remove camshaft bearing.

Remove carburetor.

Remove exhaust pipe.

Remove inlet manifold.

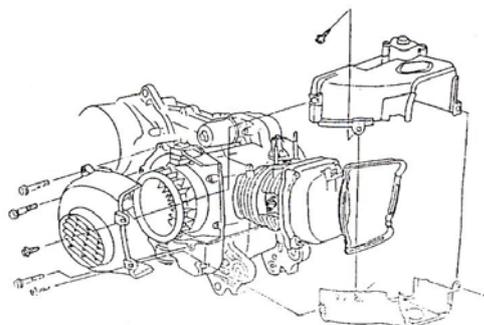


inlet manifold of carburetor

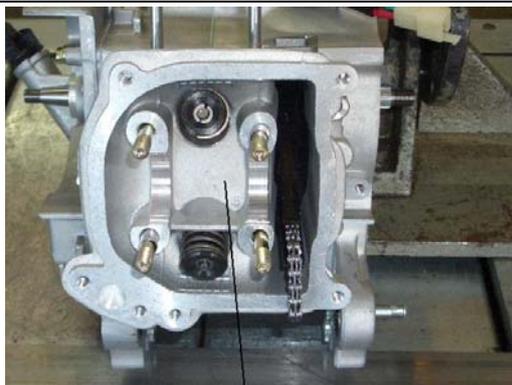
Remover fan cover.

Remover bolt and screw of engine cover.

Disassemble + remove engine cover.



Disassembly cylinder head



cylinder head

Take off location pin and cylinder head gasket.

Take off camshaft chain guide bar.



camshaft chain guide bar

**Breaking down cylinder head**

Use valve spring compressor to take off lock clip, supporter, valve spring and valve.

- Place parts in a sequence after disassembling and assemble at a reverse process.



spring valve compressor

Clean carbon deposit from combustion chamber.

Get rid of gasket material on cylinder head surface

Don't damage cylinder head sealing surface.

**Checking**

**Cylinder head**

Check spark plug hole for damage.

Check valve spring seats for alignment.

**Used limit: 0.05mm above align**



Measure length of inner and outer springs

**Used limit:**

**Inner spring below 26.1mm change**

**Outer spring below 30.5mm change**



**Valve and valve guide**

Check if valve is curved, burnt or broken.

Check if valve and valve guide is blocked.

Measure every valve stem outer diameter.

Used limit: below 4.9mm change



Remove carbon deposit from valve guide using a reamer.

**Special tools**

Rotate reamer in proper direction and do not stop rotation to push in or pull out.



valve guide pipe reamer

Measure inner diameter of every valve guide.

Used limit: IN: above 5.3mm change

EX: above 5.3mm change

**Valve guide replacement**

Operate cylinder at the temperature of about 100°C ~ 115°C ( 212°F ~ 239°F).

Heat cylinder head quickly and evenly to prevent warpage.



pry out valve guide pipe

Be careful to not damage cylinder head Surface.

Press in the new valve guide pipe.  
 Spread engine oil on new O-ring and build up new valve guide pipe.  
 Make sure cylinder head is still warm when pressing in new guides.



Size valve guide with reamer after installing.

- Use cutting oil on reamer.
- Rotate reamer in proper direction and do not stop rotation to push in or pull out.

Clean cylinder head and get rid of cut bits of metal and dust.

**Special tools**

Valve guide pipe reamer



**Valve seat checking and correcting**

**Valve seat checking**

Get rid of carbon deposit from combustion chamber and valves.

Spread emery on seat surface between valve and valve seat.

Use polishing bar to wear-in valve.

Take out valve and check valve seat surface.

Change if valve surface is coarse or facial polished.

Valve seat surface width checking.

**Used limit: above 1.8mm correct.**

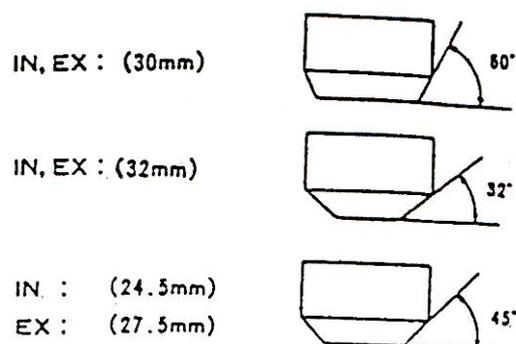
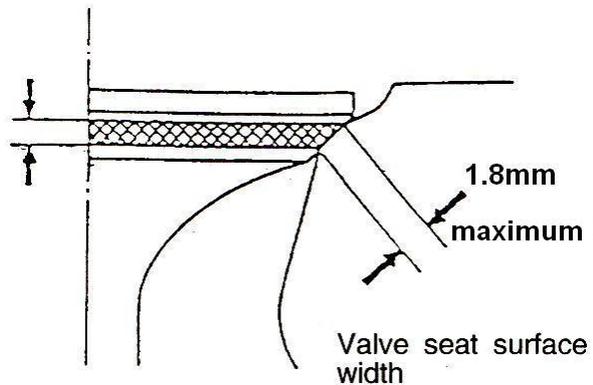
Correct valve seat by chamfered tool if surface width is not even or too wide and too narrow.

**Valve seat chamfer cutting tools**

Refer to valve chamfered tool handbook for detailed.

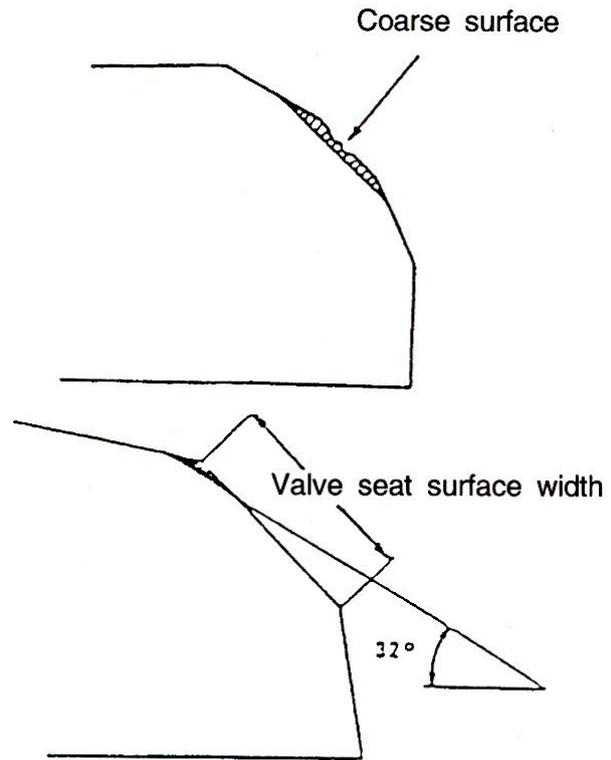
Press and rotate with 4-5 kg (10-12lb) force to polish and cut when correcting.

Use chamfered tool after spreading engine oil on it.

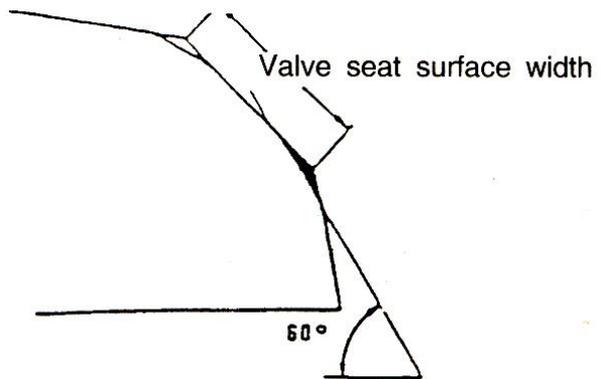


**Valve seat cutting**

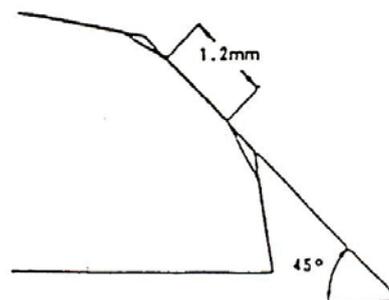
Do not polish or cut excessively.



Cut primary surface with 45° cutting head.  
Chamfer inner edge with 32° cutting head.  
Chamfer outer edge with 60° cutting head.  
Correct inner surface by 60° chamfered tool.



Trim valve seat to assigned width with 45° chamfered cutting tool.  
Standard valve: 1.0mm



Check contact place of valve seat.

Polish by 30° chamfered cutting tool if the contact place is too low.

Trim to assigned width by 45° chamfered cutting tool.

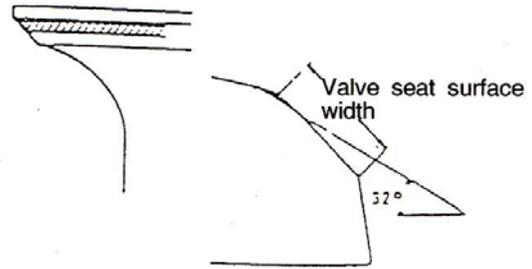
Polish valve contact surface with emery and polishing bar after correcting bar.

Wash and clean cylinder and valve after polishing and grinding.

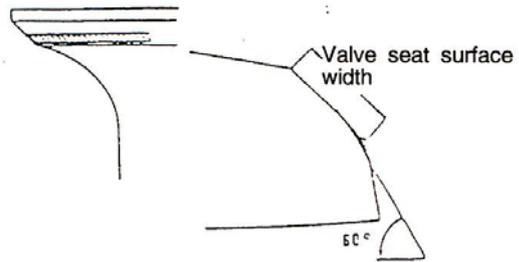
- Rotate and press softly, when polishing
- Don't put emery into valve and valve guide pipe when polishing

Spread red inkpad on 45° seat surface and confirm if the centre of contact surface of valve is even after correcting.

Contact place too high



Contact place too low



**Building-up of cylinder head**

Build up spring seat

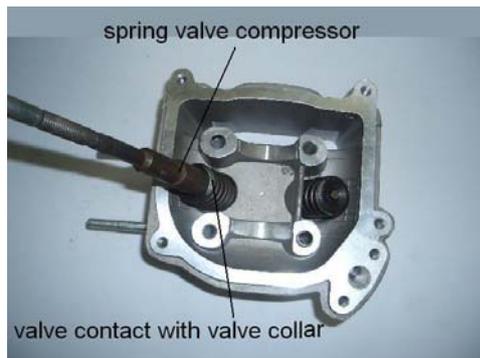
Use new oil seals when reassembling.

Spread engine oil on valve stem and put into valve guide.



Build up inner and outer valve spring and put in valve collar using spring compressor.

Use Valve spring compressor accessorially to make valve contact with valve collar.



Use plastic mallet to beat edge on ends of valve to seat collars two or three times softly.

When using mallet be careful not to damage valves.

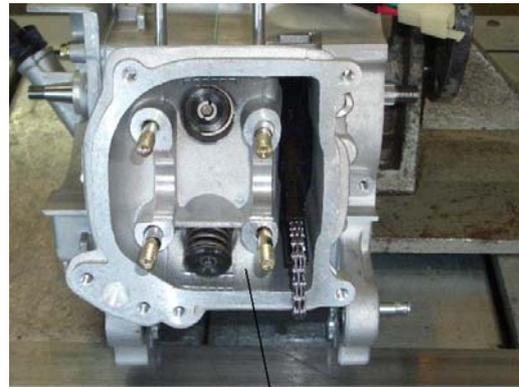


**Installing Cylinder Head**

- Install locating pin and gasket.
- Install cam chain adjuster plate.
- Slide cylinder head over studs and into place



locating pin  
camshaft chain adjuster plate  
gasket



cylinder head

**3.2.4 Camshaft assembly**

- Install camshaft fixed seat.
- Assemble rocker arm and rocker shaft.

Make alignment between shaft end and hole of camshaft seat when valve rocker shaft is assembled.



camshaft fixed seat

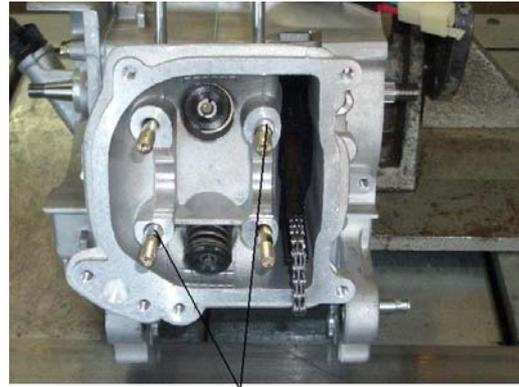
**Assembling of camshaft fixed seat**

- Rotate fly wheel and align "T" mark on fly wheel with crankcase mark..
- Align camshaft chain gear round hole away from engine.
- Install camshaft on fixed seat and check alignment.
- Install camshaft chain on camshaft gear.



camshaft chain round hole camshaft gear

Assemble locating pin.



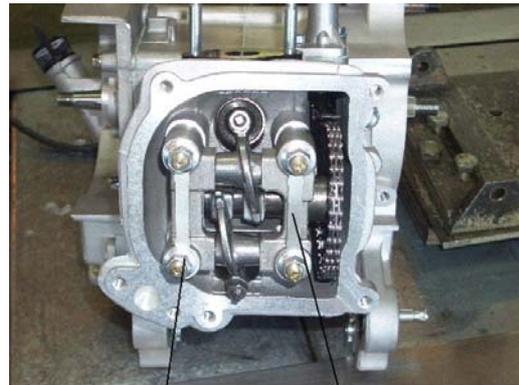
locating pin

Assemble camshaft seat and nut into cylinder head.

Lock cylinder head nuts securely.

**Torque value:**

**Camshaft fixed nut: 20N.m 15 ft lbs**



nut camshaft fixed seat

**Camshaft chain regulator assembling**

Firstly build up camshaft chain regulator and spacer.

Secondly lock two fixed bolts.

Thirdly put spring into camshaft chain regulator Finally assemble O-ring and fixed bolt.

Press down regulator master jaw and drive down driving bar when camshaft chain regulator is assembled.

**Torsion value:8-12 N.m**

Regulate valve gap

Change the ring of cylinder head cover and assemble cylinder head cover.



camshaft chain regulator bolt

Put O-ring into furrow.

Lock fixed screws of cylinder head cover

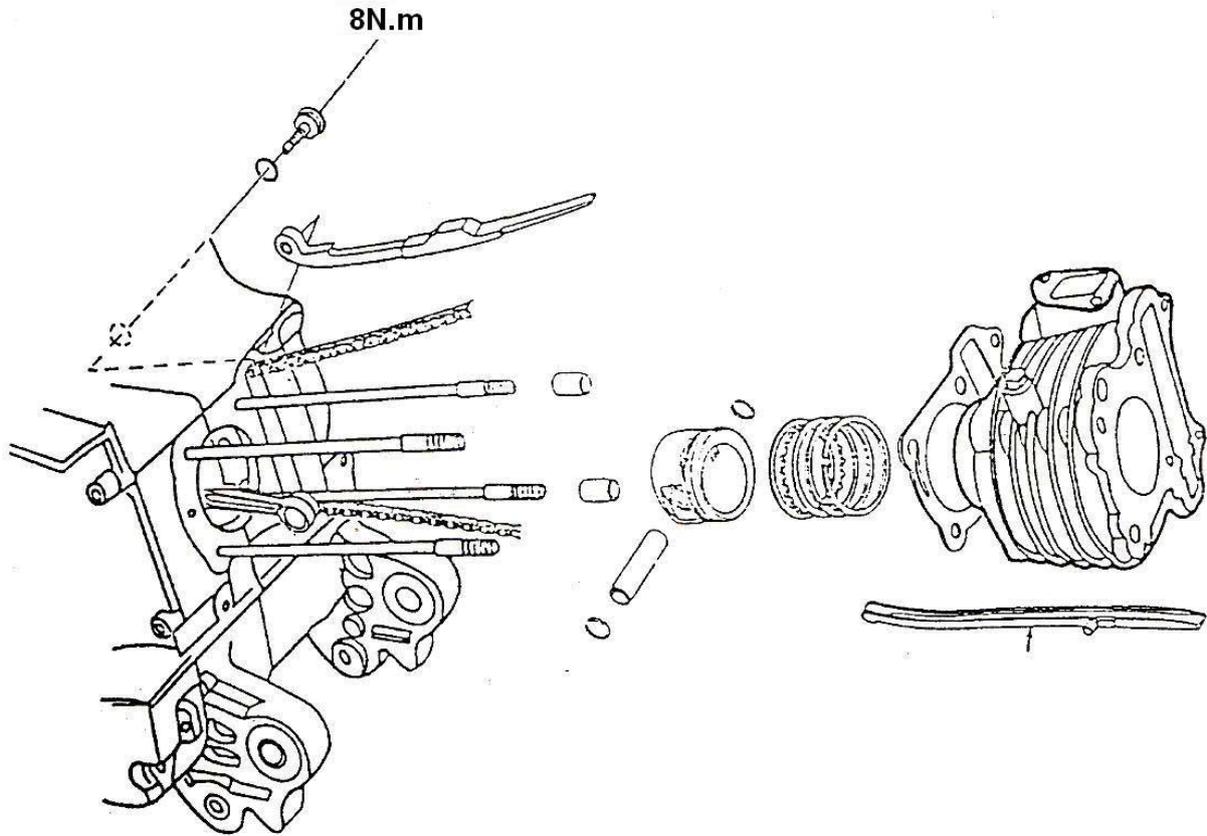
Torsion value:5-8N.m

- Spread glue on threading position of camshaft fixed seat screw.
- Lock two or three times at diagonal of camshaft fixed seat screws.



O-ring cylinder head cover

3.3 The cylinder and the piston



3.3.1 Important points

- The work on the cylinder and piston can be done on the engine without complete disassemble.
- After taking them apart, clean and dry the cylinder and piston with the compressed air before measuring and testing.

Tech criterion

Item		Normal Size	Max. Service Allowance	
<b>Cylinder</b>	ID(50cc)	39-39.01	39.10	
	ID(80cc)	47-47.01	47.10	
	Distortion	-----	0.05	
	Cylindricity	-----	0.05	
	Out-of-roundness	-----	0.05	
<b>Piston ring</b>	Clearance between the ring and the ring groove	the top ring	0.015-0.055	0.09
		the 2nd ring	0.015-0.055	0.09
	end gap	the top ring	0.08-0.20	0.45
		the 2nd ring	0.05-0.20	0.45
		the oil side ring	0.20-0.70	-----
<b>Piston</b>	OD of piston(50cc)	38.942-38.982	38.9	
	OD of piston(80cc)	46.963-46.993	46.9	
	Check point of OD	10mm away from skirt	-----	
	Clearance between piston and cylinder	0.010-0.040	0.1	

	ID of piston pin hole	13.002-13.008	13.04
	OD of the piston pin	13.992-13.000	12.96
	Clearance between the piston pin and the hole	0.002-0.014	0.02
	ID of the small end of the connecting rod	13.016-13.027	13.06

**Trouble shooting**

- In case of difficult starting, unsteady low speed running, check if there is any problem.

**Low compression pressure**

- The piston ring worn, burnt/broken
- The cylinder or the piston worn or damage.

**Too high compression press**

- carbon deposit on the piston and the combustion chamber.

**White smoke out of the exhaust pipe**

- The piston ring worn/damaged.
- The piston/cylinder worn or damaged.

**Knocking noise by the piston.**

- The cylinder, the piston or the piston ring worn
- The piston pin and piston hole worn.

**3.3.2 Removing the cylinder**

Detach the cylinder head

Remove the chain guide of the cam chain

Remove the cylinder

Remove the cylinder gasket and the locating pin from the the cylinder.



cylinder

**3.3.3 Removing the piston**

Remove the piston pin circlip.

**Attention:**  
Don't drop the circlip into the crankcase

Take out the piston pin and then the piston  
Push the piston pin from the side opposite the removed snap ring

Pay attention to avoid scratching the piston surfaces

Checking the piston, the piston pin and the piston ring.



piston pin piston ring piston

**Attention:**  
Don't damage or break the rings.

Clear off all the carbon deposit from the ring groove.



Install the ring and measure the clearance of the ring groove.

**Max. service allowance:**

**The top ring: Replace when it goes beyond 0.09mm.**

**The 2nd ring: Replace when it goes beyond 0.09mm**

Remove the piston rings.

Install the piston into the bottom of the cylinder,

**Attention:**

Use the piston head to press the rings in place in the cylinder.



Measure the piston ring end gap in bore

**Max service allowance:**

**Replace when it goes beyond 0.45mm.**

Measure the ID of the piston pin hole.

**Max service allowance:**

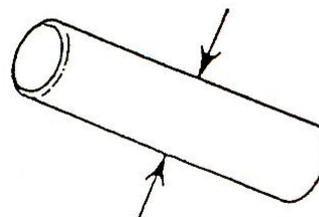
**Replace when it goes beyond 13.04mm.**



Measure the OD of the piston pin.

**Max service allowance:**

**Replace when it is below 12.96mm**



Measure the OD of the piston

**Attention:**

Measure it in a position which is 90° from the center of the piston pin, and it is 10mm away from the skirt.

**Max. service allowance:**

**Replace when it is below 38.9mm (50cc)**

**Replace when it is below 46.9mm (80cc)**

**Measure the clearance between the piston pin and the pin hole**

**Max service allowance:**

**Replace when it goes beyond 0.02mm**



**Checking the cylinder**

Check whether it's scratched, worn or damaged in it's inner surface.

Measure its ID in three positions(upper, middle and lower) which is 90°(x-y direction) from the piston pin hole.

**Replace if it goes beyond 39.1mm (50cc)**

**Replace if it goes beyond 47.1mm (80cc)**

**Between the piston and the cylinder.**

**Max. service allowance:**

**Repair or replace when it goes beyond 0.1mm**

The difference between X and Y directions is out-of-roundness

The cylindricity is the ID difference (between X and Y directions), measuring at three positions (upper, middle and lower).The largest measured value will be considered the result. This indicate taper of the cylinder.

**Max. service allowance:**

**Out-of-roundness:**

**Repair or replace when it goes beyond 0.05mm.**

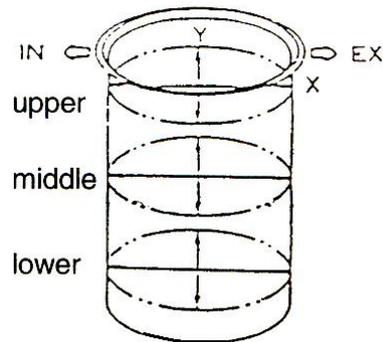
**Cylindricity:**

**Repair or replace when it goes beyond 0.05mm.**

Check the distortion of the cylinder

**Max service allowance:**

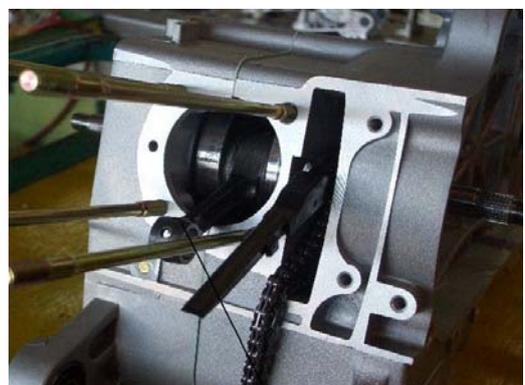
**Repair or replace when it goes beyond 0.05mm**



Measure the ID of the small end of the connecting rod

**Max service allowance:**

**Replace when is goes beyond 13.06mm**



connecting rod

**Attention:**

- Don't scratch the piston and break the piston ring.
- When replacing the ring, keep the surface with a mark facing upwards.
- After assembling make sure that the ring can be turned freely in the ring groove.

Lubricate the rings with engine oil before installing them on piston.

Make sure to offset ring end gaps at 120°.

Lubricate the piston and rings liberally with engine oil

Install the chain guide lever of the cam

**Attention:**

Make sure that the guide lever enters the notch of the cylinder.

**3.3.4 Assembling the piston**

Scrape away the gasket adhering on the surface of the crankcase

**Attention:**

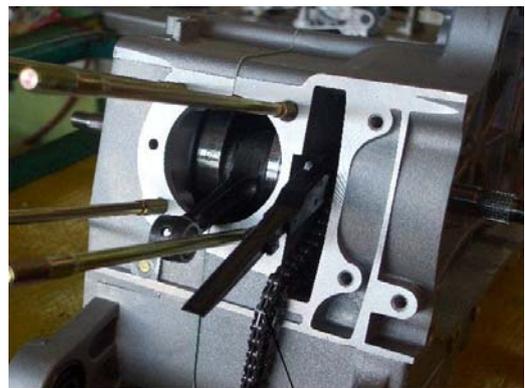
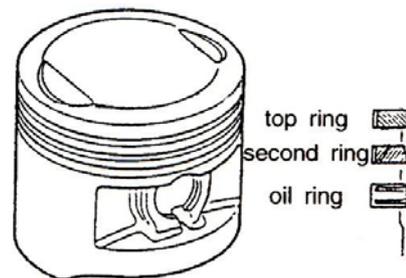
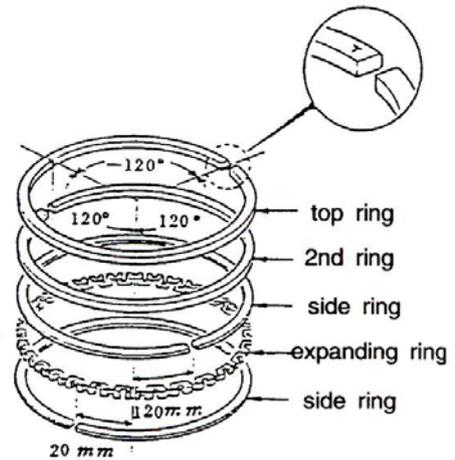
Be sure not to let any matter drop into the crankcase.

Assemble the piston, and piston pin

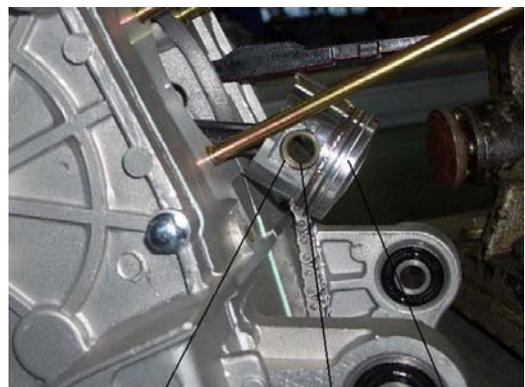
**Attention:**

- When assembling, keep the mark "in" (on the top of piston) towards the inlet valve
- Be sure not to let the piston pin circlip fall into the crankcase.

Use a cloth to keep debris out of the crankcase..



chain guide lever of the cam



piston pin circlip piston pin piston

### 3.3.5 Assembling the cylinder

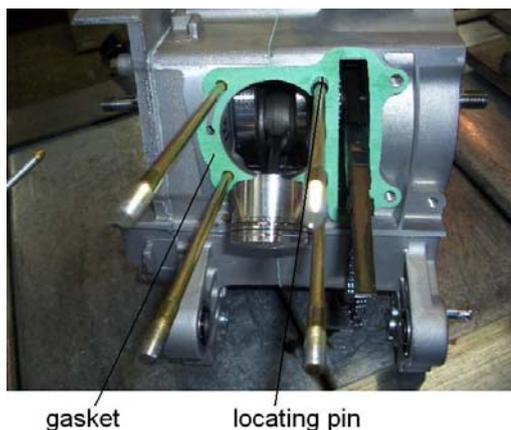
Install the locating pin and the gasket to the crankcase.

Lubricate the inner surface of the cylinder, the piston and the piston ring with engine oil.

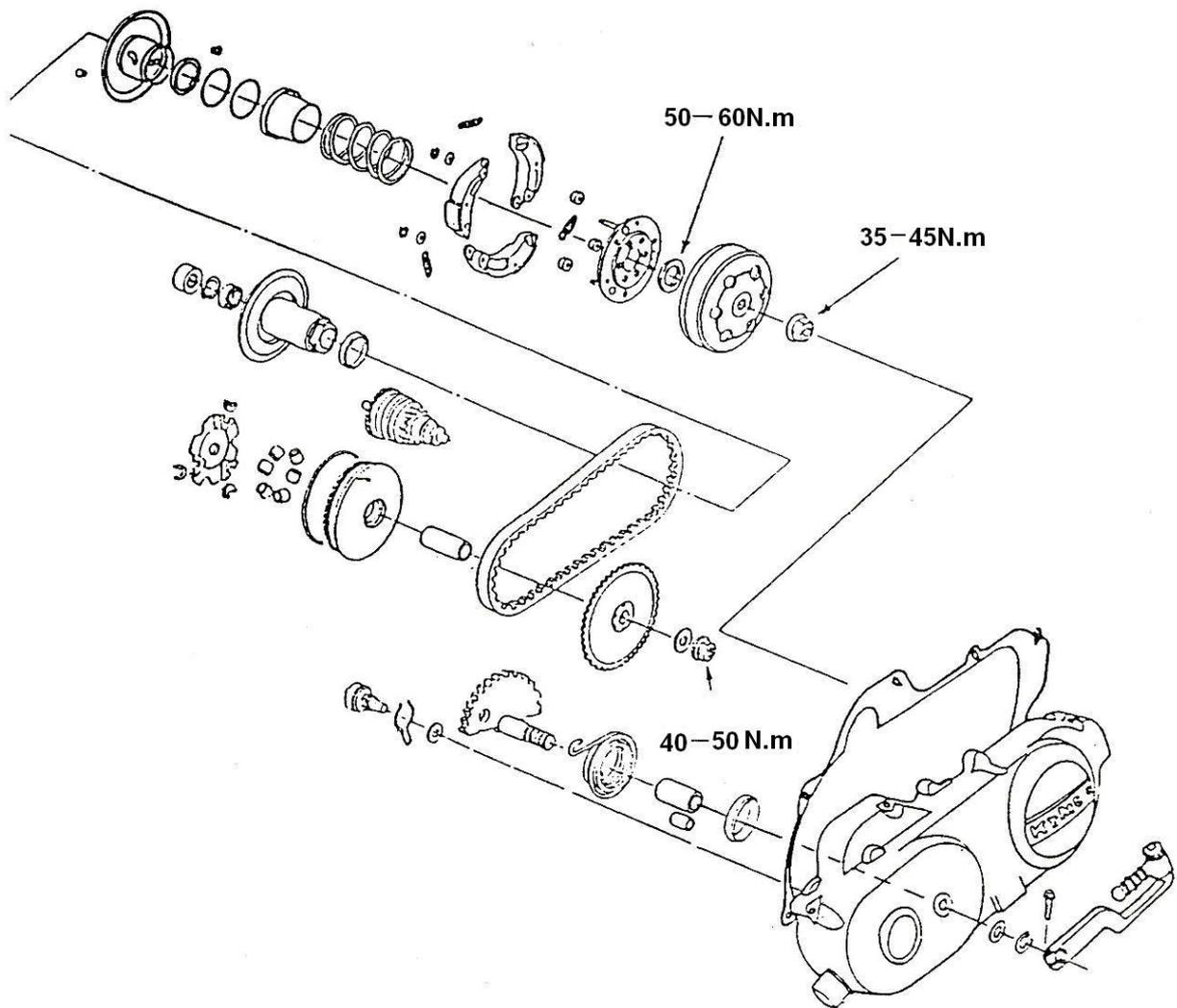
When assembling the piston rings, they must be compressed into the cylinder.

**Attention:**

- Don't damage or break the piston ring.
- Be sure not to make the position of the ring end gaps point to the inlet and outlet valves and parallel with the piston pin.



3.4 Driving belt device & the starting lever



3.4.1 Important points

- This chapter is about the driving unit, the clutch / driven unit and the starting lever.  
The assembly and disassembly of the driving unit can be done without dismantling the engine.
- The surface of the driving belt and the drive units are not allowed any oil, if there is any, remove it to minimize the slip between the belt and the drive units.

Tech Criterion

Unit. mm

Item	Normal Size	Max Service Allowance
ID of the driving pulley	20.0-20.012	20.062
OD of the driving pulley sleeve	19.947-19.96	19.9
Width of the driving belt	18	17
Thickness of the clutch brake lining		2.0
ID of the clutch housing	106.9-107.1	107.5
Free length of the driven belt spring	92.5	87.2
OD of the transmission pulley	33.955-33.98	33.93
ID of the transmission pulley	33.995-34.03	34.06
OD of the roller	15.9-16.1	15.4

**Torque**

The nut of the driving plate	45N.m 33ft lbs
The nut of the clutch housing	40N.m 30ft lbs
The locknut clutch assembly	55N.m 40ft lbs

**Tool(Common)**

Universal stand	(special)
Driver rod A	compressing device for clutch spring
Driver(for housing)32X35mm	Socket (39mm) for the fix nut
Guide rod 20mm	Bearing driver
	Bearing driver

**Trouble shooting**

**The motorcycle doesn't run after the engine starting**

- The driving belt worn
- The driving plate broken
- The brake lining worn or broken
- The spring of the clutch assembly fractured

**Power can't develop fully**

- The driving belt worn
- Distortion of the driven belt spring
- The roller worn
- The driving plate surface dirty

**Sudden breakdown during running**

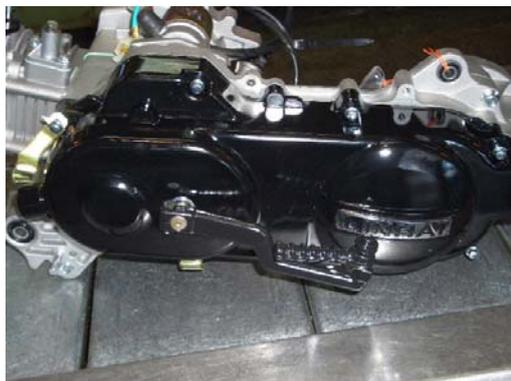
- The spring of the brake lining fractured

**3.4.2 The left crankcase cover detaching**

Unlock the clip of the air tube form the left crankcase.

Remove eight bolts and then take off the left crankcase cover and locating pins.

Check whether the gasket is damaged or fractured.



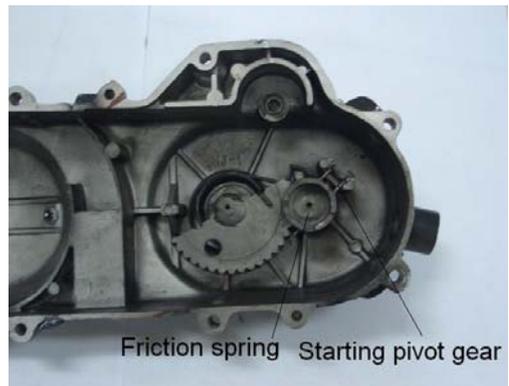
**Removing the starting pivot**

Remove the starting lever from the pivot.

Remove the circlip and the washer from the starting pivot.



Turn the starting pivot gently, and remove the driving gear and the friction spring together.

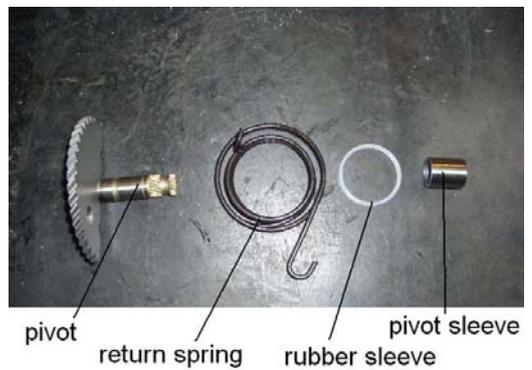


Remove the starting pivot and the return spring. Detach the starting pivot sleeve.

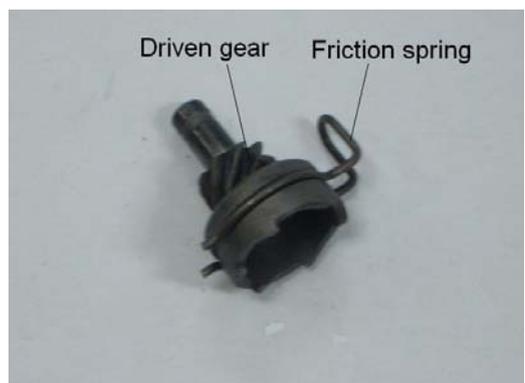


**Checking the starting pivot**

Check if the pivot and the gear are worn.  
 Check if there is any softness of the starting return spring.  
 Check if there is any excessive worn on the pivot sleeve.

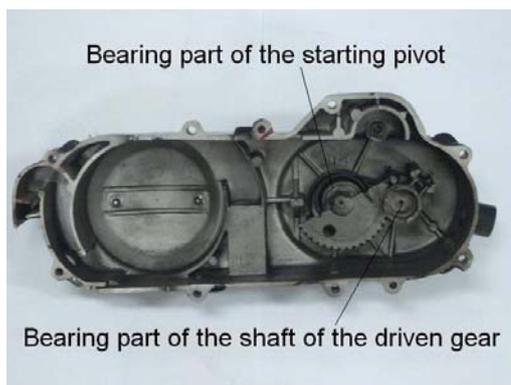


Check if the driven gear is worn / failed.  
 Check if the friction spring is worn / fractured.



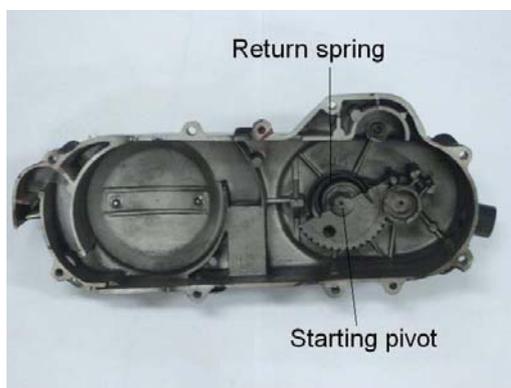
Check if there is any excessive wear on the bearing part of the starting pivot and of the shaft of the driven gear.

Replace any parts showing excessive or unusual wear.



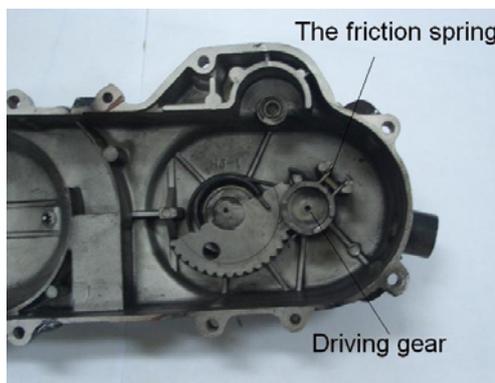
**3.4.3 Installing the starting assembly**

Install the starting pivot sleeve and the return spring to the crankcase cover.



As shown in the picture on the right, assemble driven gear and the friction spring. Maintain the orientation as shown.

Install the starter pivot.



Install the washer, then the circlip.



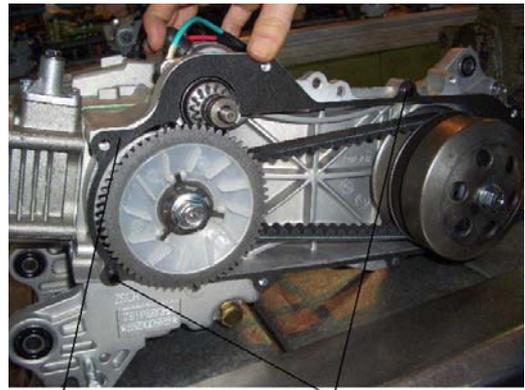
**Assembling the left crankcase cover**

First, install the locating pin.

Then, the gasket.

Assemble the left crankcase cover, then tighten the eight fix bolts diagonally.

Install the air tube to the left crankcase, then install the clip.



gasket                      locating pin

**3.4.4 The driving belt**

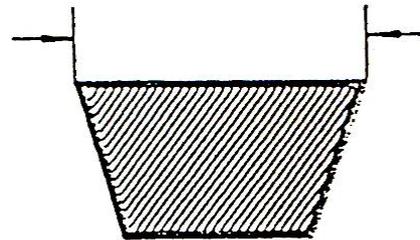
Detach the left crankcase cover.

**Checking**

Check if the driving belt is cracked, frayed, or abnormal wear.

Measure the width of the belt.

**Max service allowance:17mm**



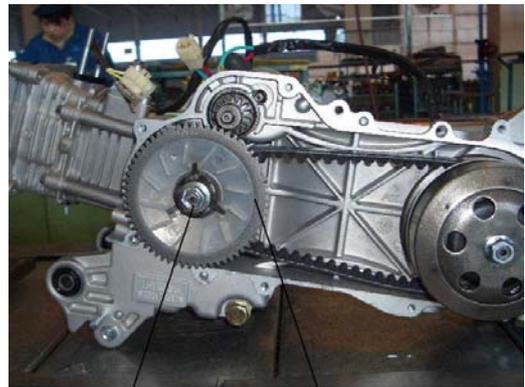
**Replacing**

Remove the eight fix bolts, then remove the crankcase cover.

Remove driving pulley

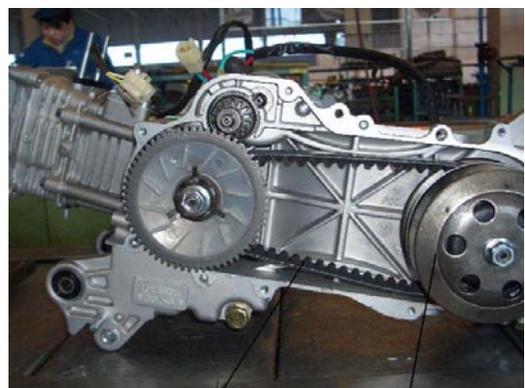
Use a retaining device to hold the driving pulley and screw out the 12mm bolt.

Remove the driving pulley.



fix nut                      driving pulley

Remove the driving belt from the clutch driving pulley.



driving belt                      cluth driving pulley

**Assembling the driving belt**

Turn the driving pulley clockwise to keep the notches of the belt in expanded condition, then install the new driving belt.

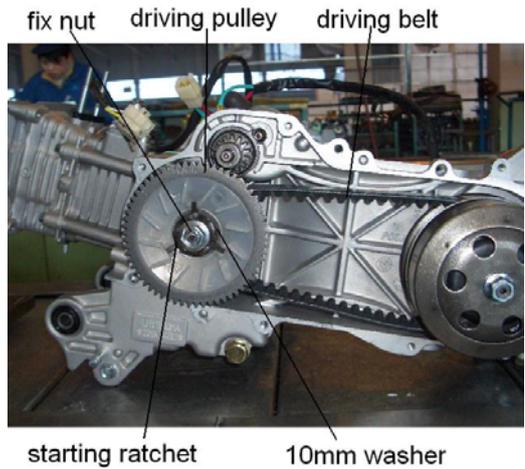


Install the driving belt on the driving pulley. Install the driving pulley, the starting ratchet and 12mm washer. The install and tighten the nut.

**Torque: 45N.m 33ft lbs**

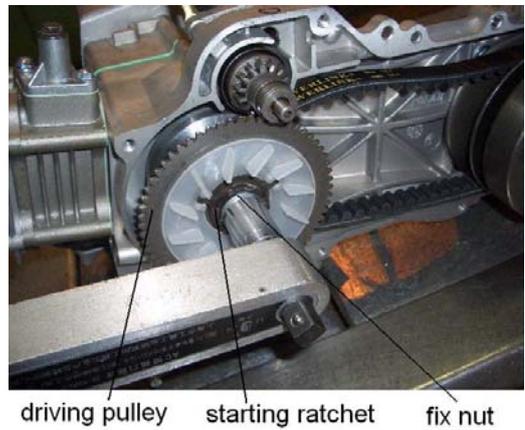
**Attention:**

During assembly, be sure to align the splints of the driving unit, is correct ratchet with those on the crank shift.



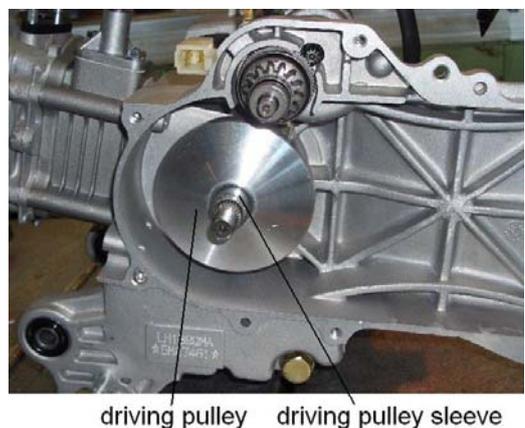
**3.4.5The driving pulley dismounting**

Use a retaining device or spanner wrench to hold the driving pulley, screw out the 12mm nut, then remove the ratchet, the 12mm nut and the driving pulley.



**Taking the driving pulley apart**

Remove the driving pulley and the sleeve from the crankshaft.



Remove the retainer



Remove the rollers

Checking the driving pulley.

Measure the ID of the driving pulley

**Max service allowance:**

**Replace, when it is beyond 20.062mm.**

Check the wear of the rollers.

Measure the OD of the roller.

**Max service allowance:**

**Replace, when it is below 15.4mm.**

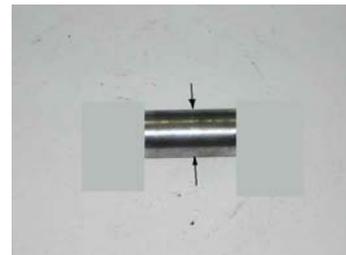


Check the wear of the driving pulley sleeve.

Measure the OD of the driving pulley sleeve.

**Max service allowance:**

**Replace, when it is below 19.9mm.**



### 3.4.6 Assembling the driving pulley

Install driving pulley sleeve and the driving pulley on the crankshaft.

Install driving belt on the crankshaft.

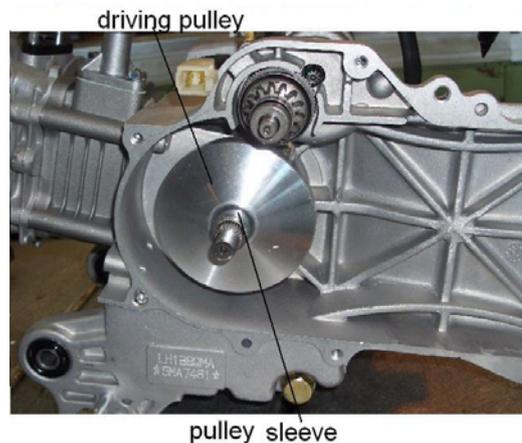
Install the driving pulley and the washer.

Tighten 12mm nut .

**Torque:45N.m 33ft lbs**

**Attention:**

There mustn't be any grease on the surface of the driven belt and the driving pulley.



### The overrunning clutch (starter pinion)

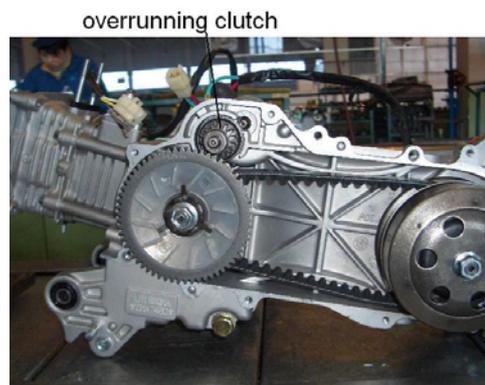
**Removal**

Remove the left crankcase cover .

Remove the driving pulley.

Remove the seat of the overrunning clutch.

Remove the overrunning clutch.



**Checking**

Check if the bearing part of the overrunning clutch shaft is worn.

Check if the clutch runs smoothly.

Check the wear of the gear and the bearing part of the shaft.

**Assembling**

Lubricate the bearing part of the clutch shaft with a bit of grease. Assemble it in the opposite sequence of removal.

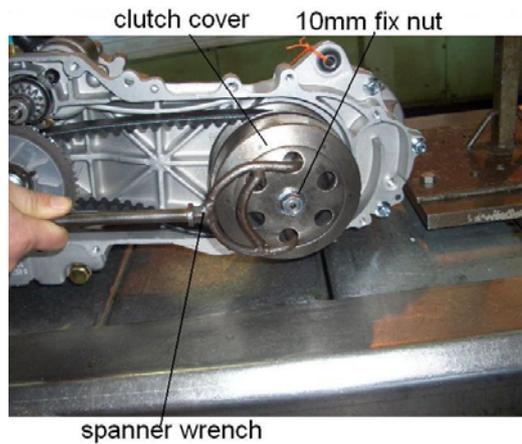
**3.4.7 The clutch/transmission pulley**

**Removing the clutch/transmission pulley**

Remove the driving pulley

Then, use a spanner wrench to hold the clutch housing to screw out the 10mm nut.

Remove the clutch housing.



Remove the clutch/transmission pulley.

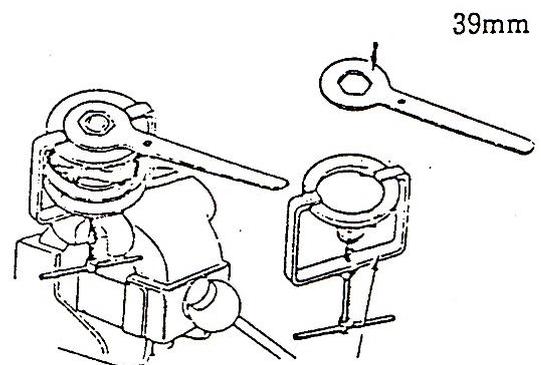
Remove the driving belt from the clutch/transmission pulley.



**Disassembling the clutch/ transmission pulley**

Use a spring compressor for the clutch spring to press down the transmission pulley spring to remove the special nut (28mm).

Remove the clutch spring.



Remove the sealing cover of the shaft collar.



Remove the guide rolling pin from the transmission pulley assembly, then take out the o-ring and the oil seal.



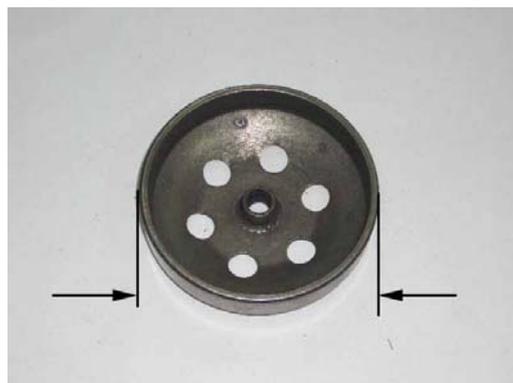
**Checking the clutch transmission pulley**

Check the wear of the clutch housing.

Measure the ID of the clutch housing.

**Max service allowance:**

**Replace, when it goes beyond 107.5mm.**



Check the wear of the clutch lining

Measure the thickness of the lining

**Max service allowance:**

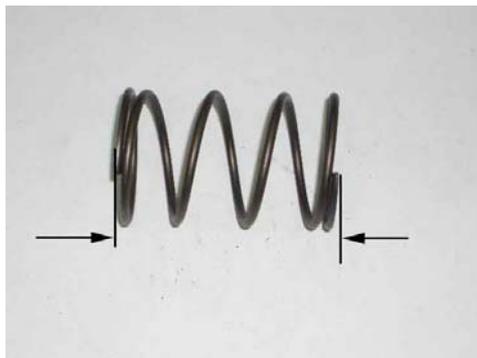
**Replace, when it is below 2.0mm.**



Measure the free length of the transmission pulley spring.

**Max service allowance:**

**Replace, when it is below 87.2mm.**



Check the wear of the transmission pulley  
Measure the OD of the pulley

**Max service allowance**

**Replace, when it is below 33.93mm**

Check the wear of the transmission pulley.

Measure the ID of the pulley

**Max service allowance:**

**Replace, when it goes beyond 34.06mm**

Check if the guide rolling pin is excessively worn or unevenly worn.

Replace as necessary.



Replacing the transmission pulley and the bearing.

Check the needle bearing for wear or excessive free play, gritty feel or noise.

Replace as necessary.

Check the housing bearing for wear.



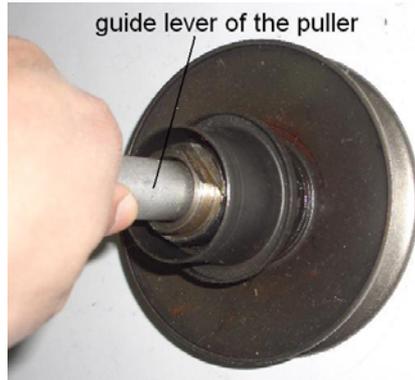
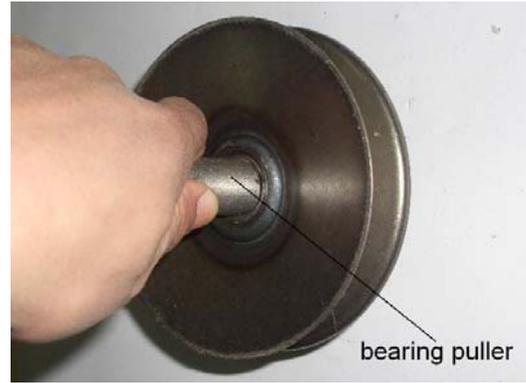
Remove the retainer and take out the housing bearing

Driving in the new housing bearing, keeping the lid side facing upwards.

**Attention:**

Grease new bearings  
 When installing  
 Grease able to resist > 230°C.

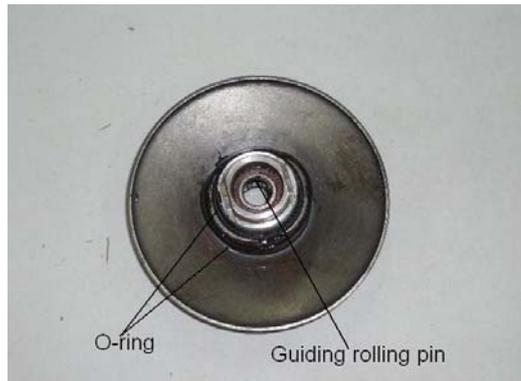
Drive in the new needle bearing, keeping the “mark” side up.



**The clutch / transmission Pulley assembly**

Assemble the transmission pulley guide pin and oil seal.

Install the sealing cover of the collar.

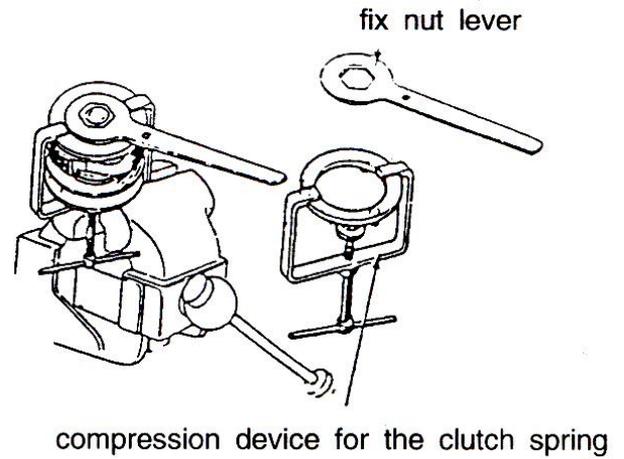


Assemble the transmission pulley disk and the spring to the clutch assembly, pressing down with the spring compressor for the clutch spring.



Install the 28mm fix nut and tighten it.

**Torque:50~60kg·m 35~40ft lbs**



Assembling the clutch/transmission pulley

Put the driving belt onto the clutch/transmission pulley, then onto the driving shaft.



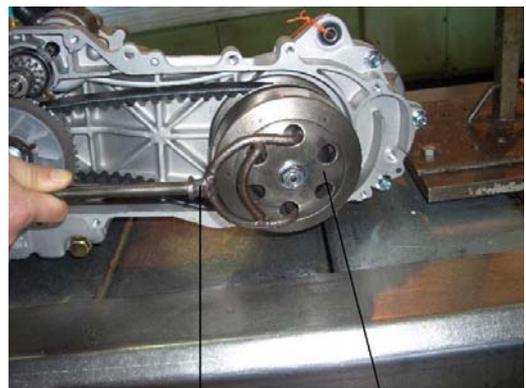
clutch/transmission pulley

Assembly the clutch housing

Use a spanner wrench to hold the housing, then install the 10mm nut and tighten it

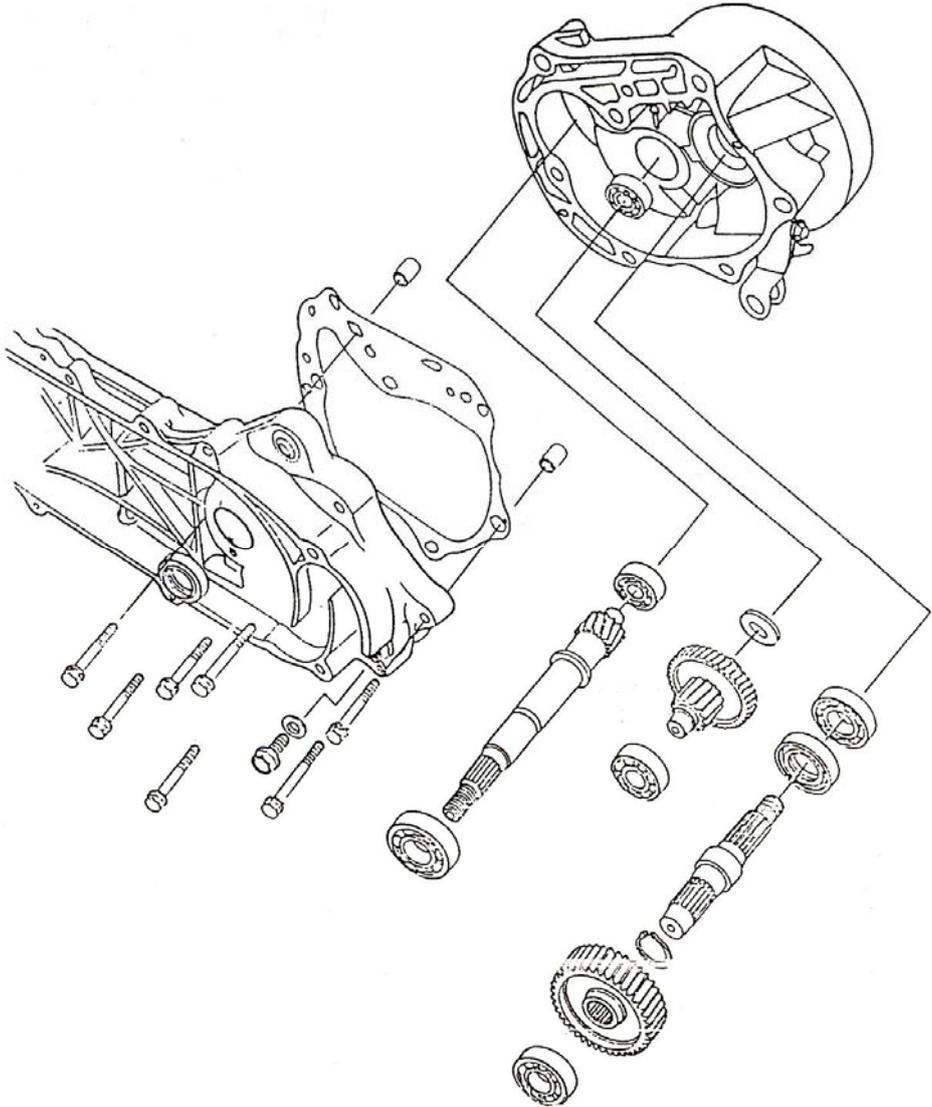
**Torque:40N·m 30ft lbs**

Assemble the left crankcase cover



spanner wrench clutch housing

3.5 The final transmission assembly



3.5.1 Instructions

Designated oil: SEA 15W/40SE

Filling 0.12L

Changing 0.1L

### Tool

Special tool

Bearing pulling set 12mm

Bearing pulling set 15mm

Sleeve shaft for assembling the crankshaft

Sleeve lever for assembling the crankshaft

### Common tool

Bearing outer race driver 3740mm

Bearing outer race drive 3235mm

Guide lever for the bearing driver 17mm

Guide lever for the bearing driver 15mm

Guide lever for the bearing driver 12mm

Bearing driver

### Trouble shooting

#### The scooter doesn't run after the engine starting

- The transmission gear failed
- The driving belt worn or broken
- The clutch failed

#### Developing abnormal noise when it runs

- The gear worn or burnt, or damaged on teeth
- The bearing worn and getting loose

#### Oil leakage

- Too much oil
- The oil seal broken

### 3.5.2 Dismantling the final transmission assembly

Remove the left crankcase cover

Remove the driven pulley of the clutch

Drain the oil out of the final transmission.

Remove the bolts of the final transmission gearbox.



Fix bolt

Remove the transmission gearbox cover.

Remove the gasket and locating pin.

**3.5.3 Detach the final transmission gearbox cover**

Checking the final transmission assembly.

Check if countershaft gear is worn or damaged.

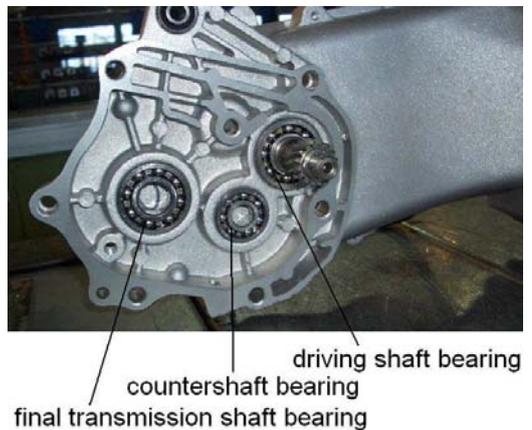
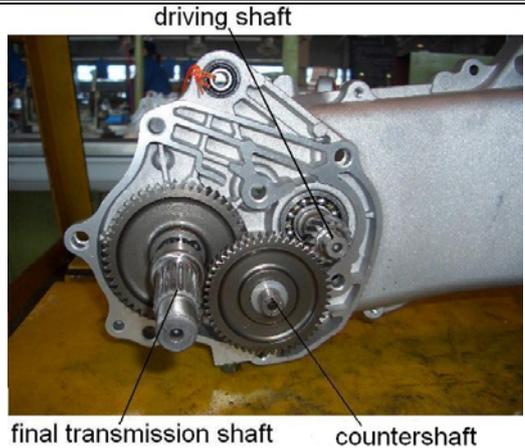
Check if the final transmission gear is burn or damaged.

Check if the bearing in the left crankcase and the oil seal are worn / damaged.

Check if the driving shaft (the main clutch shaft) and the gear are worn / damaged.

Check if the oil seals are worn / failed.

**Replacing bearing (on the side of the transmission gearbox cover)**



Remove the oil seal on the final transmission shaft.  
 Heat the final transmission gearbox to 120°C to remove the bearing.  
 Drive in the new bearing to the final transmission cover.



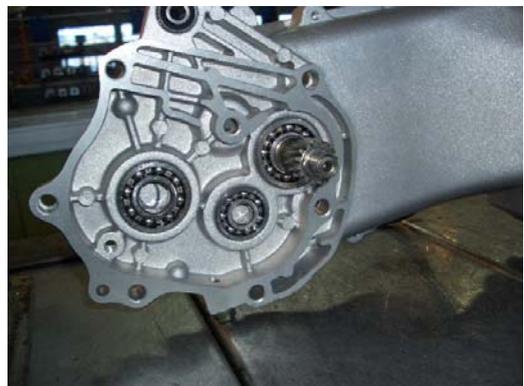
bearing driver

**Oil leakage**

- Too much oil
- The oil seal broken

**Replacing the bearing (on the side of the crankcase)**

Remove the driving shaft (the clutch main shaft).  
 Then, remove the oil seal of the shaft.  
 Heat the final transmission gearbox to 120°C to remove the bearing  
 Drive the new bearing into the final transmission gearbox. Install the new oil seal for the driving shaft.



**3.5.4 Assembling the final gear set**

First, install the driving shaft to final gearbox.  
 Then install the final transmission gear shaft (output shaft) to the final gearbox.



Driving shaft

Attach the countershaft to the final transmission gearbox. Install the resin washer to the countershaft, install the locating pin and the new gasket.



gasket locating pin resin washer countershaft

Put on the final gearbox cover.

Tighten the bolts of the final gearbox cover.  
 Assemble the clutch/driving pulley disk.



Fix bolt

After assembling, fill it with the gear oil.

**Designated gear oil: SEA 15W/40SE**

**Volume of the gearbox:**

**Filling: 0.12L**

**Changing:0.10L**

Screw up the oil screw and tighten it

**Torque: 17-23N • m 12.5-17ft lbs**

Start the engine to check if there is oil leakage.

Check the oil level.

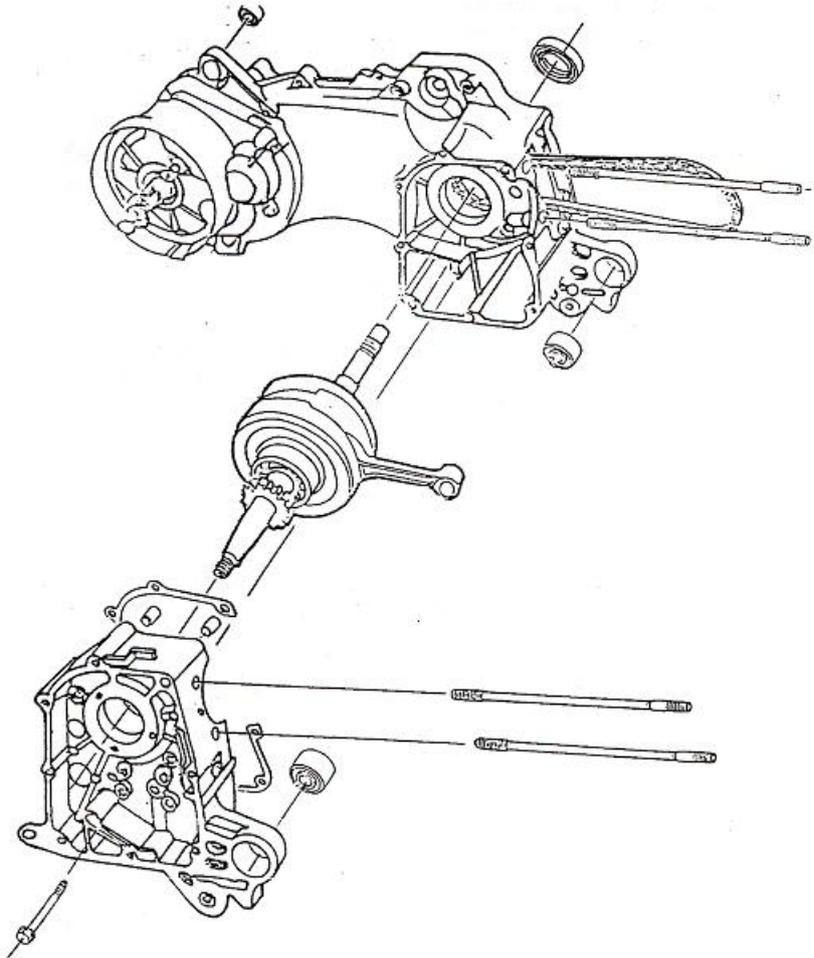
Replenish it with the designated gear oil when the oil is not sufficient (through the oil checking hole)



oil discharge screw

gear oil inlet hole/  
check hole

**3.6 The crankcase & the crankshaft**



**3.6.1 Important points**

- The chapter gives instructions related to the crankshaft and dismantling the crankcase Before striking, it's necessary to take the engine apart.
- Complete the following work before taking the crankcase apart. Remove the following.
  - The cylinder head
  - The cylinder & the piston
  - The driving plate & the driven plate
  - AC generator
  - The carburetor & the air filter
  - The starting motor
  - The oil pump

**Tech Criteria**

Unit: mm

Item		Normal Size	Max Service Allowance
Crankshaft	The clearance of the both sides of the big end of the connecting rod	0.10—0.35	0.55
	The clearance of X—Y Directions of the journal of the big end of the connecting rod	0—0.008	0.05
	Run out		0.10

**Torque:**

Crankcase bolt

9 N.m 6.6ft.lbs

Bolt for the chain adjusting guide lever the cam

10N.m 7.4ft.lbs

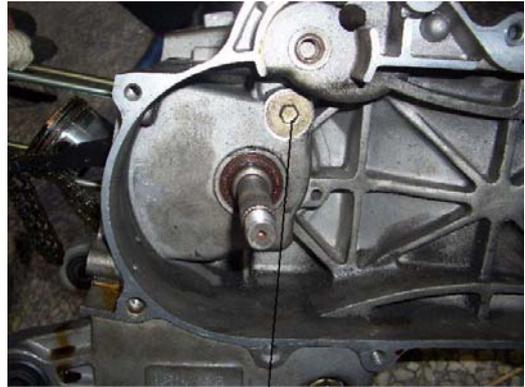
**Trouble Shooting**

**Abnormal noise from the engine**

- The crankshaft bearing getting slack
- The crankshaft pin bearing getting loose

**3.6.2 Dismantling the crankcase**

Detach the bolt of the chain adjusting guide lever of the cam and remove the lever.



retaining screw of the chain guide lever

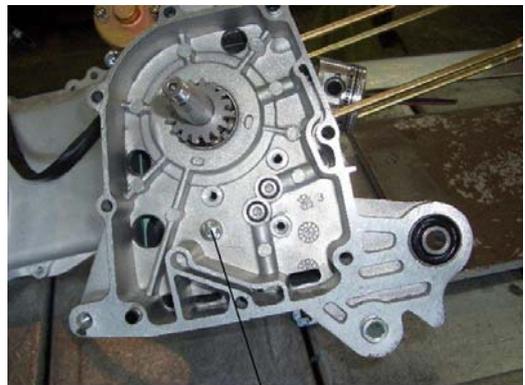
**Remove assembly**

Bolt of the crankcase.

Dismantle the right and left crankcases.

**Attention:**

- Don't damage the gasket surface
- When separating the crankcases, don't use screw driver to try them apart.



crankshaft bolt

Remove the gasket and the locating pin.



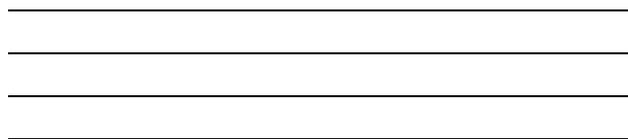
locating pin

Remove the crankshaft from the crankcase.

Take out the cam chain.



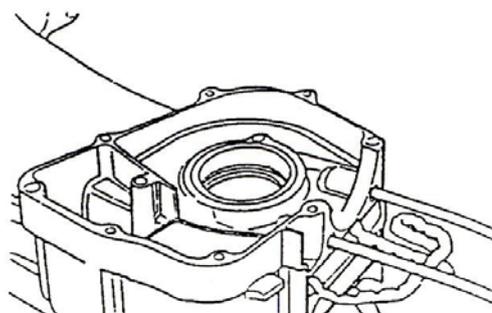
cam chain



Scrape the gasket away from the joint surfaces.

**Attention:**

Be sure not to scratch the joint surfaces.



Remove the oil seal from the left crankcase.



oil seal

Remove the oil seal from the right crankcase.



oil seal

**3.6.3 The crankshaft**

Measure the left and right clearance between both sides of the big end of the connecting rod.

**Max. service allowance:**

**Replace, when it goes beyond 0.55mm**



big end of the connecting rod

Check the clearance of the journal of the big end of the connecting rod in X—Y directions

**Max. service allowance:**

**Replace, when it goes beyond 0.05mm**



measure

Measure the run out of the crankshaft

**Max service allowance:**

**Replace, when it goes beyond 0.10mm**



Check if there is any abnormal noise and looseness, when the crankshaft bearing revolves. Replace totally, if any abnormal noise/looseness is detected.



crankshaft bearing

### 3.6.4 Assembling the crankcase

Use the following tools to install the oil seal of the crankcase.

Bearing outer race driver

Bearing outer race 32x35mm



Install the cam chain into the left crankcase.  
 Assemble the crankshaft into the left crankcase.

**Attention:**  
 Be sure not to let the chain damaged the oil seal.



cam chain

Put the new locating pin and gasket onto the left crankcase.

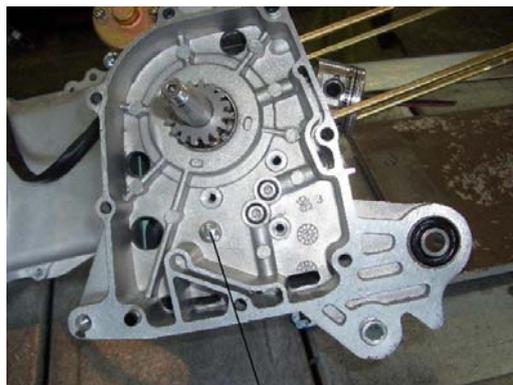
**Attention:**  
 Keep the left crankcase downward to assemble with the right crankcase.



locating pin

**Tighten the bolts of the crankcase.**

**Torque:9N.m 6.6ft.lbs**



crankshaft bolt

Install the cam chain adjusting lever.  
 Install the O-ring onto the bolt of the chain adjusting lever.

Coat the O-ring with oil, then lock it.

**Torque:10N.m 7.4 ft • lbs**

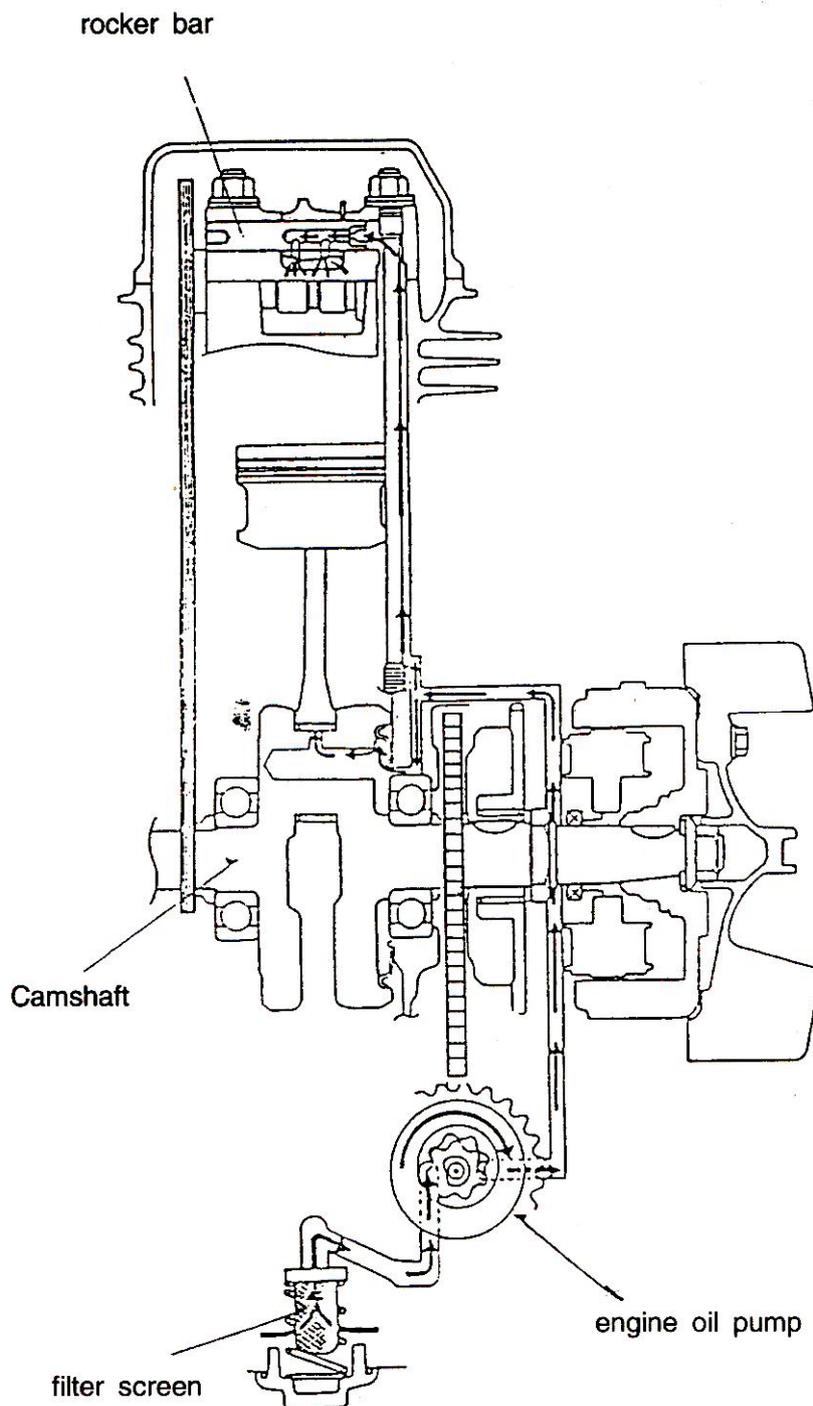
**Attention:**

Be sure to put the O-ring into the groove.



retaining screw of the chain guide lever

**3.7 Lubricating system**



**3.7.1 Over all engine requirements**

**Special attention**

- Use proper Motor oil SAE 15W/40SE
- Use only clean fresh oil.
- Do not rebuild oil pump. Replace with a new pump when needed.
- Check for leakage after replacing pump.

**Basic material**

item		Standard value	Replace at
Engine oil pump	gap between inner rotator and external rotor	---	0.12mm 0.005in
	gap between external rotor and pump body	---	0.12mm 0.005in
	gap between and surface of rotor and pump body	0.05-0.10mm 0.001-0.004in	0.2mm 0.008in

**Problem diagnosis**

**Loss of engine oil**

- engine oil natural consumption
- engine oil leakage
- piston ring wear bad assembly
- valve guide oil seal worn

**No oil pressure**

- pump worn
- use of wrong oil
- oil level low

**3.7.2 Engine oil / filter screen**

**Oil volume**

- check oil with scooter parked on level ground on center stand.
- put motorcycle on the plain place when oil volume is checked.
- run engine for two or three minutes and stop. After 2-3 minutes check oil level.

Check oil level when oil dipstick is screwed out.

Add oil to upper limit on dipstick.

**Oil changed**

It is easier to drain oil when motor is warms.

Remove drain bolt to drain oil completely.

Disassemble oil filter screen cover and take off oil filter screen. Use high pressure air to clean filter screen, wash with solvent and dry before reinstalling.

Check O-ring for damage.

Replace if necessary.

Assemble engine oil filter screen and filter screen cover.

Torsion value:15N.m 10.8ft.lbs

Add assigned oil to determined volume.

Engine oil capacity:0.8L

**Check for oil leaks.**

**Run engine for 1-2 minutes at idle speed.**

**Turn engine off and check oil lever.**

**Add if necessary.**

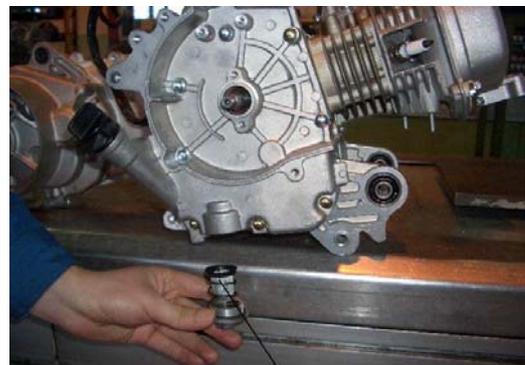
**3.7.3 Oil pump removal**

**Engine burning excessive oil**

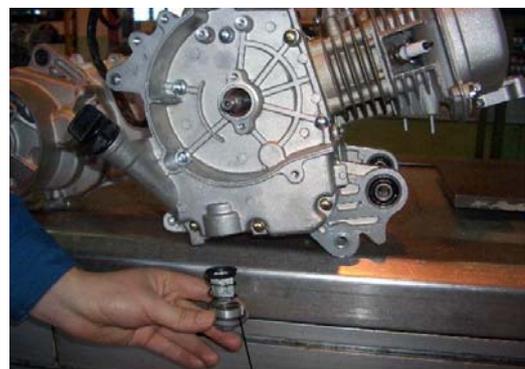
- blocked oil passage
- use of wrong oil
- worn rings
- valves worn or damaged



dipstick

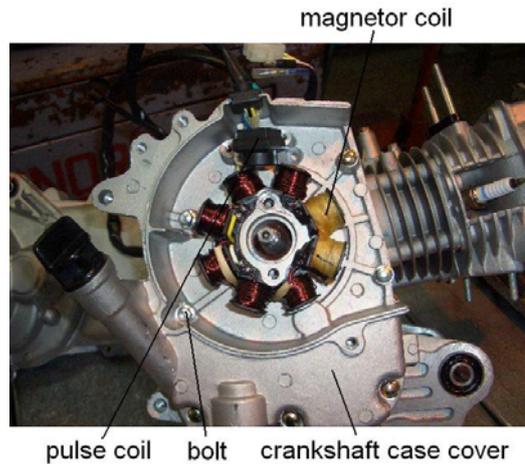


oil filter screen

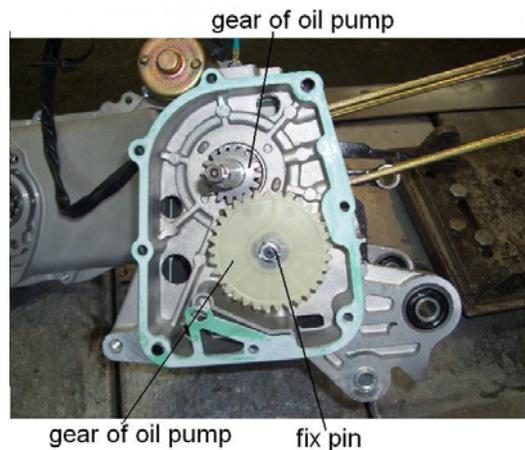


O-ring

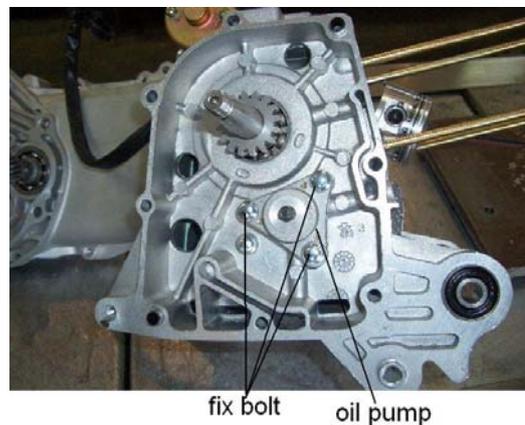
Remove engine right outer cover fan magnetor.  
 Remove alternator rotor.  
 Remove stator pulse coil.  
 Remove 8 bolts of right crankshaft case cover and  
 take off crankshaft case cover.



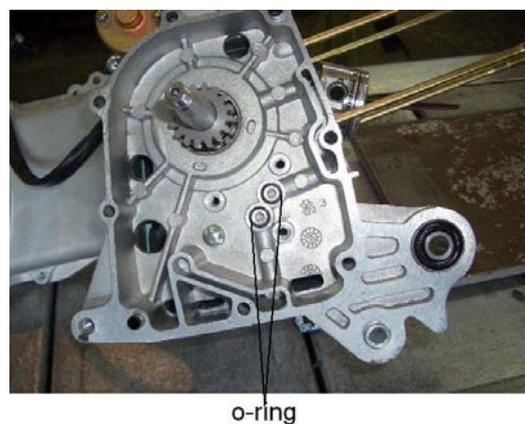
Remove washer and fixed pin.  
 Remove the fixed nut of gear in oil pump.  
 Take off gear of oil pump.



Remove fixed bolts of oil pump.  
 Take off oil pump.

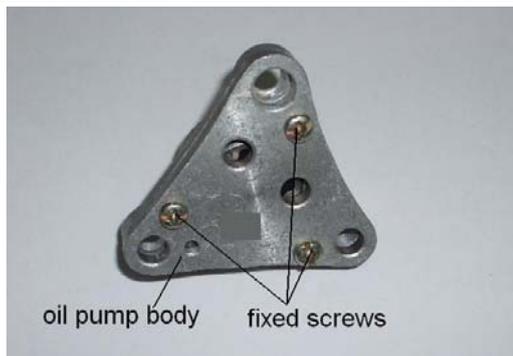


Take off two O-rings.  
 Check O-rings for damage.  
 Replace if necessary.



**Oil pump disassembly**

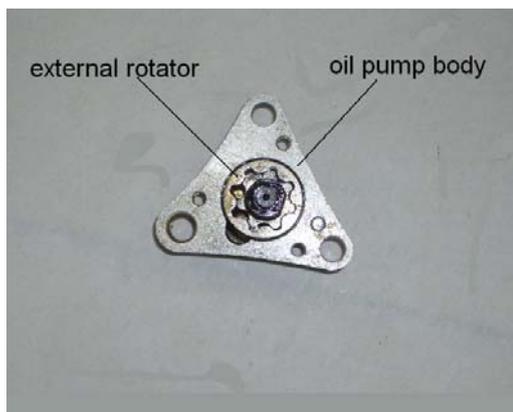
Remove three fixed screws in oil pump body.  
Disassembly oil pump.



**Checking**

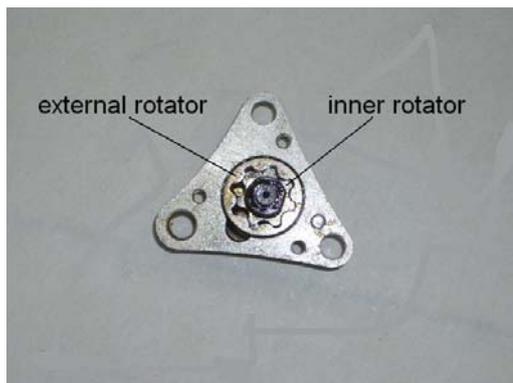
Check the gap between oil pump body and external rotator.

Used limited: 0.12mm(0.005inch)



Check the gap between inner rotator and external rotator.

Used limited: 0.12mm(0.005inch)



Check the gap between surface of rotator and body.

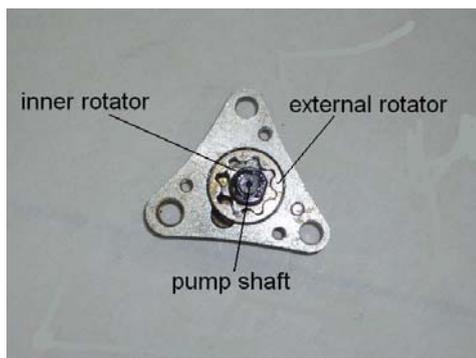
Used limited: 0.2mm(0.008inch)



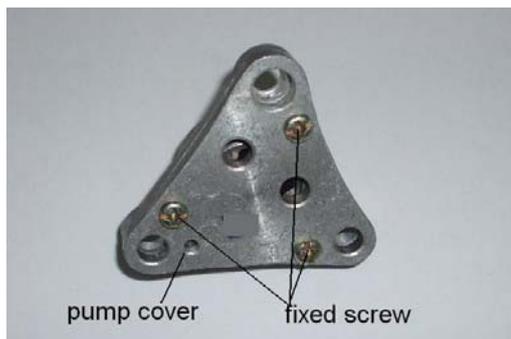
**Assembling**

Assemble inner and outer rotators and oil pump shaft.

Be careful of alignment between pump bearing unfilled corner and inner rotator unfilled corner.

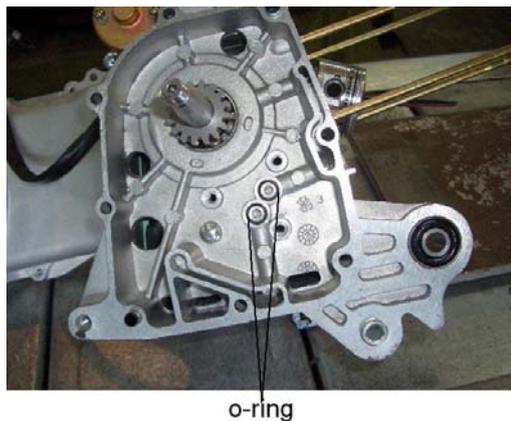


Assemble pump cover and tighten screws.



**Installation**

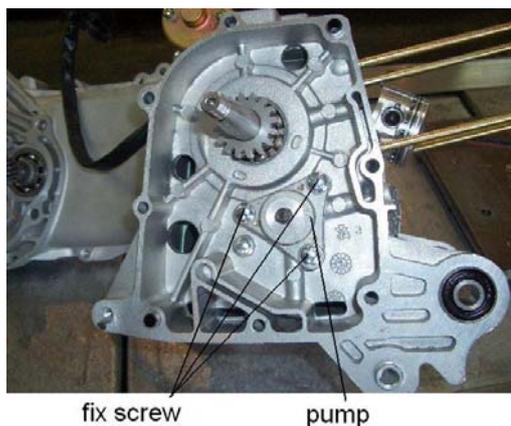
First put two O-rings at oil pump seat.



Put oil pump in crankshaft case.

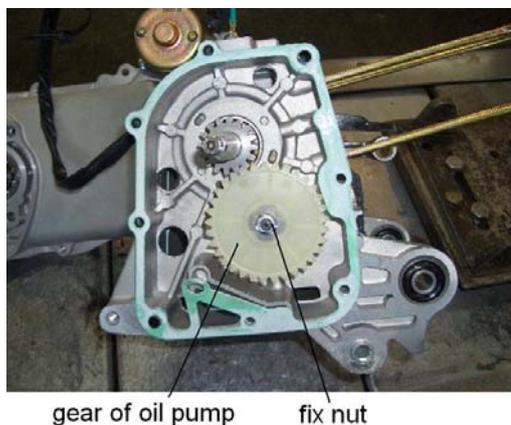
First add oil to pump and then assembly.

Tighten three fixed screws.



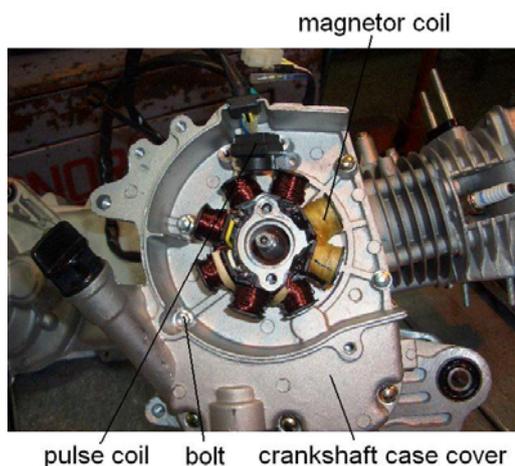
Install gear of oil pump and then fixed nut.

**Torsion value:** 5-8N.m(3.6-5.8ft.lbs)

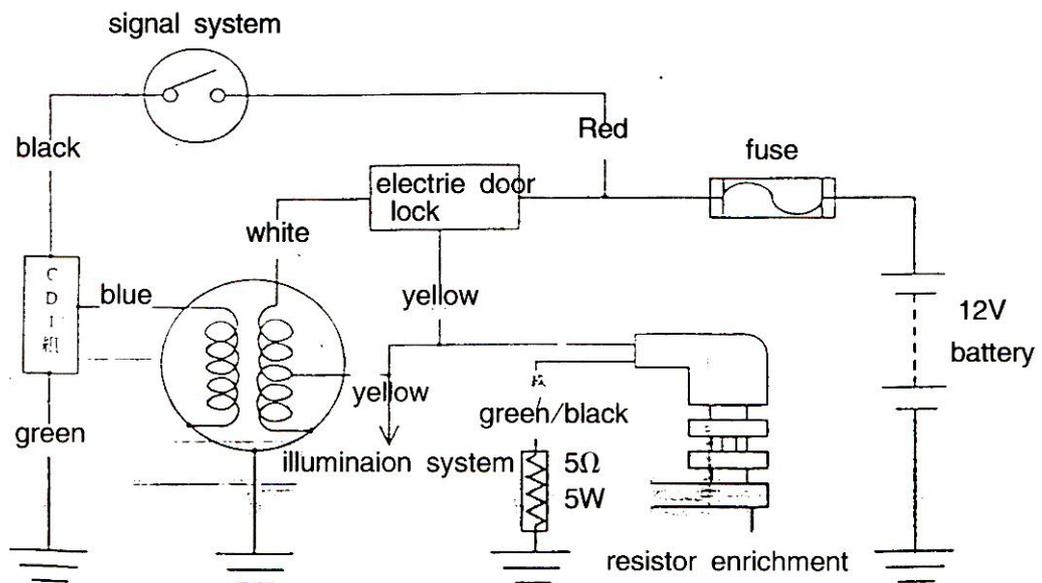
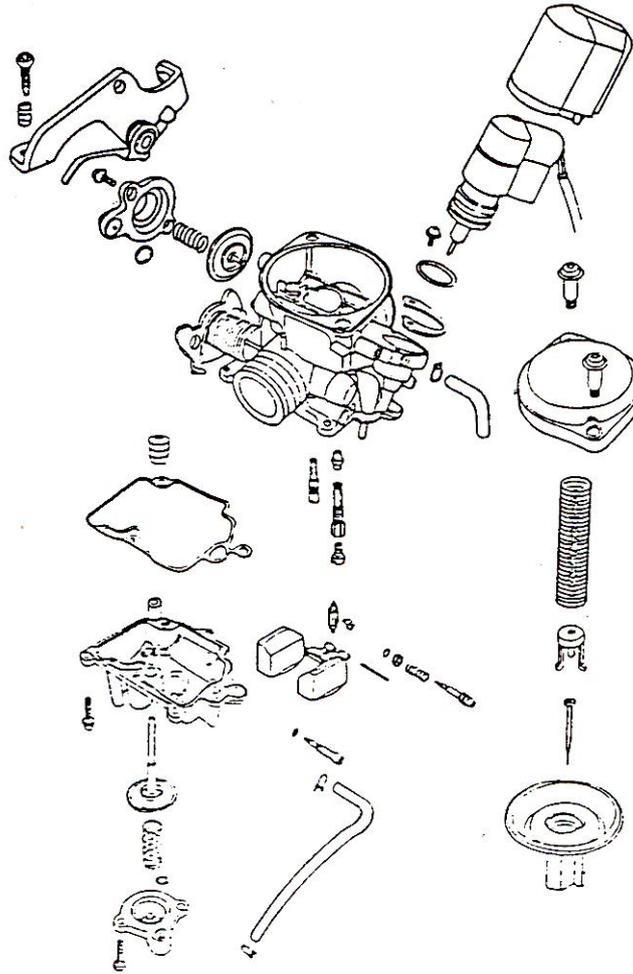


Assemble right crankshaft case cover, tighten 8 screws .

Assemble pulse coil and stator and rotor. Install fan and cover.



3.8 Carburetor



**3.8.1 General Information:**

WARNING! Work on the fuel system in a well-ventilated area free from sparks or open flames. Do not breathe the vapors from the gasoline. Wear protective gloves to prevent skin irritation.

- Open the bowl drain and allow all gasoline in the carburetor to drain into an appropriate container prior to removing or servicing it.
- Remove control cables and wires carefully to prevent damage.
- Check all 'O' rings for damage. Replace as necessary.
- Remove carburetor from the scooter before attempting to service the fuel bowl or vacuum diaphragm.
- When cleaning the carburetor, remove the vacuum diaphragm before using air or solvents for cleaning. This will prevent damage to the diaphragm.
- When storing the scooter for any period of time exceeding one month, use a quality fuel stabilizer to prevent deterioration of the fuel and damage to the carburetor.

**Repairing material**

Specification	standard valve
Carburetor	Constant velocity-CVK
Venturi Bore	18mm
Fuel level	20.5 mm
Main Jet	#82
Idle Jet	#35
Idle Speed	1900 ± 190 RPM
Throttle Free Play	2-6mm
Mixture screw setting	2 turns ± 1/4 turn

**Special tools required- Float Gage**

**Troubleshooting**

**Hard Starting Engine**

- No Spark
- Low Compression
- No fuel in carburetor
- Blocked fuel line
- Blocked fuel filter
- Blocked vacuum line
- Leaky vacuum line
- Dirty float needle
- Float set too high

**Too much fuel to engine**

- Blocked air filter
- Manifold air leak
- Bad auto choke
- Blocked air passage in carburetor

**Air/Fuel mixture too rich or too lean**

- Bad auto choke
- Plugged idle jet
- Float needle stuck or dirty

**Poor Drivability**

- Weak spark/Bad Ignition System
- Blocked fuel line
- Blocked fuel filter
- Bad fuel
- Water in fuel
- Air leak at carburetor or manifold
- Improper float level
- Bad auto chock
- Obstructed jet in carburetor
- Vacuum slide stuck
- Damaged vacuum diaphragm
- Dirt in carburetor

- Blocked air passage in carburetor
- Dirty air filter
- Air leak at carburetor or manifold

**Backfire from exhaust at idle**

- Air mixture screw set too lean
- Bad auto choke operation

**Misfire under acceleration**

- Poor spark
- Air mixture screw too lean
- Bad accelerator pump

**3.8.2 Disassembly of carburetor**

Disconnect cable connector for auto chock.



Loosen carb drain screw and drain fuel from float bowl.



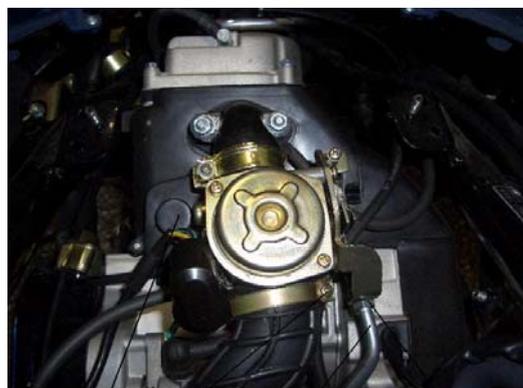
fuel line

Loosen throttle cable and remove from support and throttle control plate.

Remove fuel line from carburetor.

Remove air inlet tube from carburetor and pull carburetor straight back out of intake manifold.

Remove auto choke from carburetor.



auto choke  
air tube screw  
throttle cable  
throttle screw

**Checking auto choke**

Check resistance value.

Standard value below 5 Ω when cold.

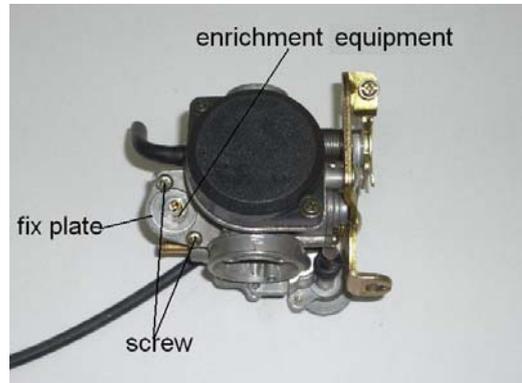
Connect auto choke to 12V battery.

Plunger should extend 3/8 inch in 5 minutes.

**Disassembling**

Disassemble fixed plate screw and take off fixed plate.

Take off enrichment equipment from carburetor.



Check pin and seat for wear.

Replace if necessary.

Place auto choke in mounting location and press down firmly.

Put lock ring in position and fasten screw.



**Air cut off valve**

**Disassembling**

Disassemble two screws in fuel guide fixed plate and remove fixed plate.

Disassemble two screws in air cut off valve.

Take off spring and vacuum plate.

Check for wear on plate, replace if necessary.

Clean the passage way to remove dirt.

**Assembling**

Install plate to carburetor.

Install spring and cover of air cut-off valve.

Build up fuel guide line fixed plate and tight two screws.



- Be sure that furrow of vacuum plate is aligned with carburetor furrow.
- Make sure that cover tightens into place.

**Vacuum Chamber break-down**

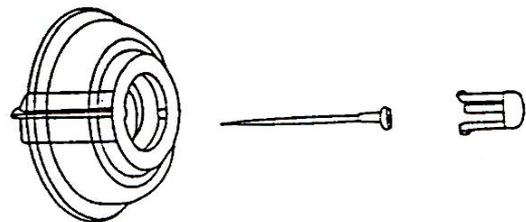
Remove two screws and take off cover.



Remove spring, diaphragm piston.  
Remove needle and slide.

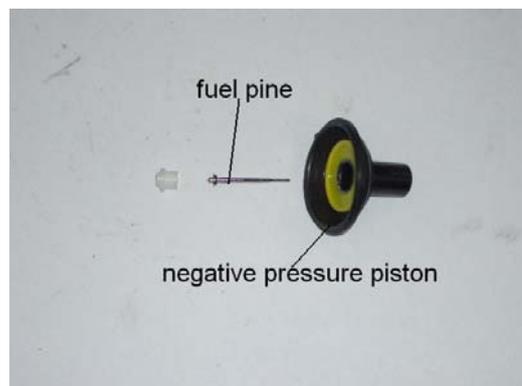


Take special care to not or damage diaphragm replace if damaged.



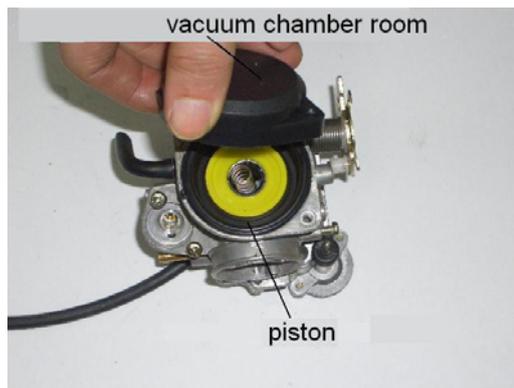
**Checking**

Check pin for wear and replace if necessary.



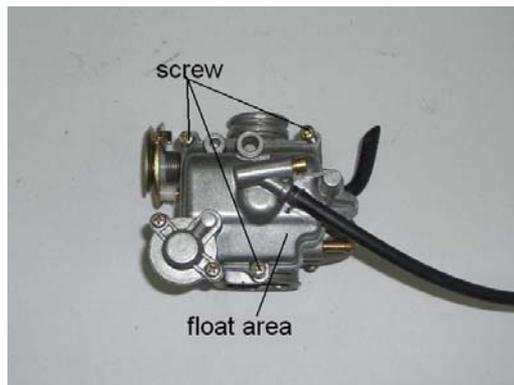
**Assembling**

Install piston or plate to body of carburetor.  
Push the bottom of the piston to vacuum chamber side and keep open completely.  
Install spring and cover.  
Install and tighten screw.  
Be sure to hold slide and piston in up position when installing cover and tighten screw.



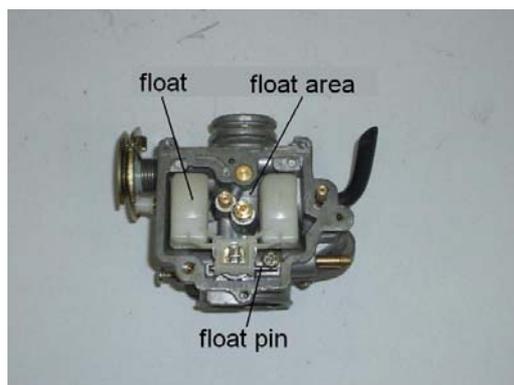
**Float Bowl Disassembling**

Disassembling three screws and take off float bowl.  
Remove float pin spring.



Remove high speed jet, low speed jet and fuel volume control screw.

- Be careful not to break fuel jets and control screw.
- Count the turns when removing the fuel volume control screw.
- When reinstalling jets and screws do not over tighten.



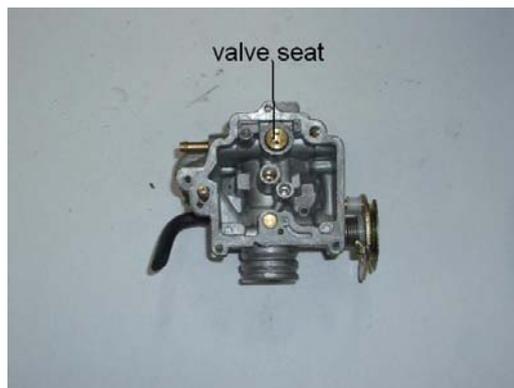
Clean jets with solvent and compressed air.  
Clean body of carburetor by air blowing through all passages.



**Checking**

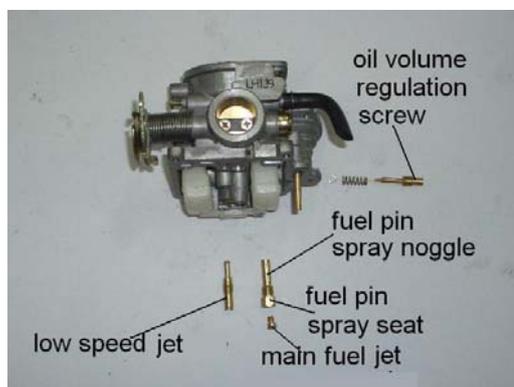
Check float valve, and valve seat for damage.  
Check float valve and valve seat wear, pitting or build up of dirt.

Any leakage of the valve or a build up of dirt will affect the fuel level in the float bowl and cause drivability problems.

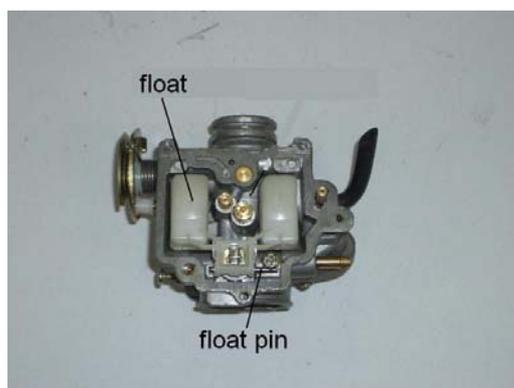


Assemble the low speed jet, fuel pin spray nozzle, fuel pin spray seat and main jet into the bottom of the carburetor housing.

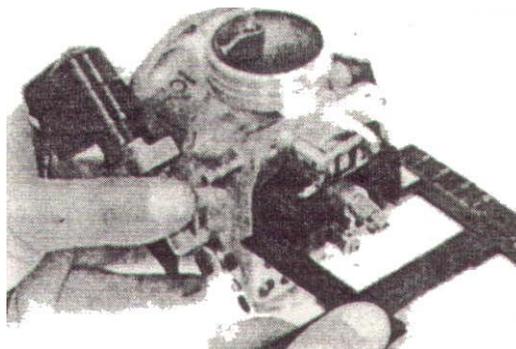
Set the fuel level in the bowl by adjusting the fuel regulation screw. The standard setting is 2 turns+ or -1/4 turn.



Assemble the float valve, float and float pin to the bottom of the carburetor using the retainer pin. Check the operation of the float and valve. All part should move freely.



After assembling the float, check for proper fuel level using a small ruler or a float gage. The proper fuel level is 20.5mm.



**Accelerator pump disassembling**

Remove two screws on pump and take off cover.  
Take off spring and acceleration pump plate.



**Checking**

Check acceleration pump plate for cracks or hardening of the rubber.  
Replace if necessary.



Check for blocked fuel passages.  
Clean by high pressure air.  
Reverse steps to reassemble.  
Take special care with the accelerator pump plate to avoid damage.



**3.8.3 Assembly of carburetor**

Slide carburetor carefully into the manifold making sure to align the tab on the manifold with notch on the carburetor.

Securely tighten the clamp screw to fix the carburetor in place. Do not over tighten the screws as this can cause damage to the manifold.

Attach the inlet pipe to the rear of the carburetor and tighten the clamp screw.

Attach the throttle cable to the throttle on the throttle plage.



fuel line  
intake manifold      throttle cable adjustment

Use the adjusting nut and stop nut to set the cable tension,

Correct adjustment should allow 1/4 inch of free play in the cable.

Attach the fuel line from the tank to the inlet on the carburetor and clamp securely.

Connect the wiring harness form the auto choke to the proper connection on the main wiring harness.

After starting the engine, set the idle speed using the idle adjusting screw.



**Carburetor Adjustment**

• It is generally not necessary to adjust the mixture screw on the side of the carburetor. This screw is preset at the factory and will have little affect on the performance of the carburetor.

If this screw has been removed for cleaning of the carburetor, it should be reset carefully.

The standard setting is 2 turns out + -1/4 turn.



air/fuel mixture screw

•To set this position, run the engine until warm and allow it to idle. Turn the screw in or out a little at a time and measure the idle RPM. The correct setting is achieved when the idle speed is maximized.

Adjust the idle speed of the engine once the engine had been warmed up.

Set the warm idle speed to 1900RPM +or- 190RPM.



**Troubleshooting**

**Starter motor does not turn**

- Fuse broken
- Battery discharged
- Faulty main switch
- Faulty starter clutch
- Faulty brake switch
- Faulty starter relay
- Poor or faulty cable connections
- Faulty starter motor

**Starter motor turns over slowly**

- Battery discharged
- Poor or faulty cable connections
- Starter motor gear seized by a foreign object

**Starter motor turns- Engine does not rotate**

- Faulty starter clutch
- Starter motor reversal
- Battery discharged

**3.9.2 Starter motor removal**

Never work on starter motor until main switch is turned off, battery ground-wire disconnected to ensure that starter motor cannot turn.



Remove the two bolts and remove the starter motor.

Roll up the water-proof rubber cover to disconnect the starter motor.



**Disassembly**

Remove the two bolts and remove the motor housing and the other parts.



**Inspection**

Other components inspection.

Inspect them for wear, damage or discoloration.

Replace them if necessary.

Clean attached metal particles from the commutator surfaces.

Measure the resistance between each contact surface of the components.

Make sure there is no conduction current between each commutator segment and the armature shaft.



Check starter motor housing conductivity.

Be sure there is no conduction current between the cable terminal and starter motor housing.



Check conductivity between the lead terminal and brush.

Replace them if necessary.

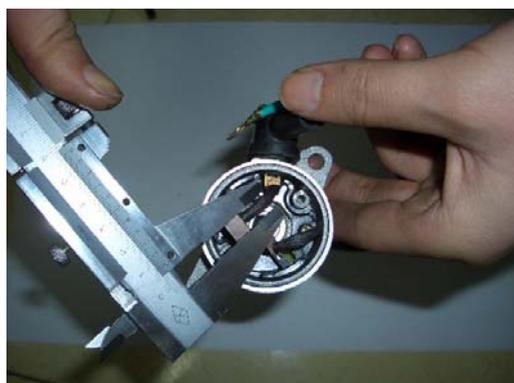


Measure brush length. Its service limit is 5mm.

Replace it if necessary.

Inspect brush holder for conduction current.

Replace it if necessary.



Inspect bearing in front bracket for smooth rotation

and for looseness when installed.

Replace it if necessary.

Inspect dust cover for wear or damage.

Apply grease to the dust cover.

Install spring brush in its holder.

Apply a light film of grease to both ends sliding surfaces of armature shaft.

Install armature in front bracket.

- Make sure the surfaces between the brush and armature are not damaged.
- Be sure the dust cover lip is not damaged by the armature mount shaft.

Install a new O-ring in front bracket.

Engage motor housing with that of front bracket.

Install two housing bolts.

When engaging the housing with front bracket, install the armature first, hold the armature shaft and then install the housing in case the armature is drawn out by the magnet.

**Starter motor installation**

Apply grease to starter motor O-ring and install the starter motor.

Install the two bolts.

Connect the starter motor terminals to the harness.



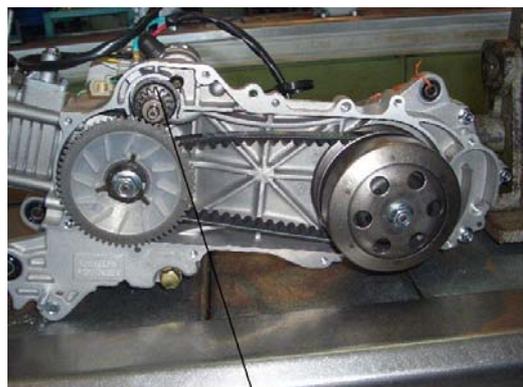
starting motor      bolt

**3.9.3 Starter pinion removal**

Remove the left crankcase cover.

Remove the pinion.

Make sure not to damage the drive belt during the removal.



starter pinion

**INSPECTION**

Check if the starter pinion operates properly.

Check the gears and bearing for wear or damage.

Check for extensions of driver gear.

Check for spring return of driver gear.

Clean assembly with solvent and lube with dry graphite or light grease.

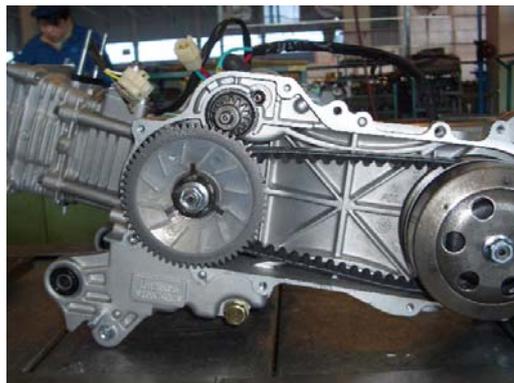
Do not use heavy grease. This will limit the fast movement of the starter pinion.



### INSTALLATION

Apply a light film of grease to the gears and install the starter pinion by reversing the removal procedure.

Install the left crankcase cover.



### 3.10 Magneto

#### 3.10.1 Dismantling:

Remove the four screws, and remove the fan cover.



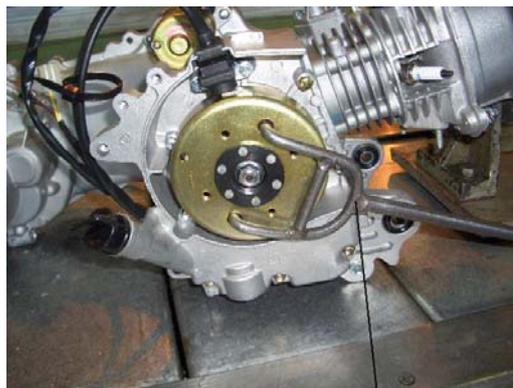
fan cover

Remove the four bolts and remove the cooling fan.



cooling fan

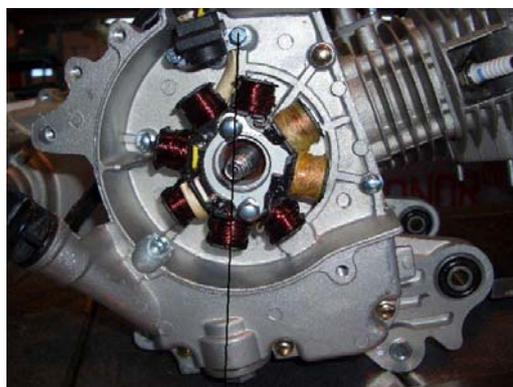
Use a universal solid wrench to secure the flywheel. Detach the fix nuts of the flywheel.



spanner wrench

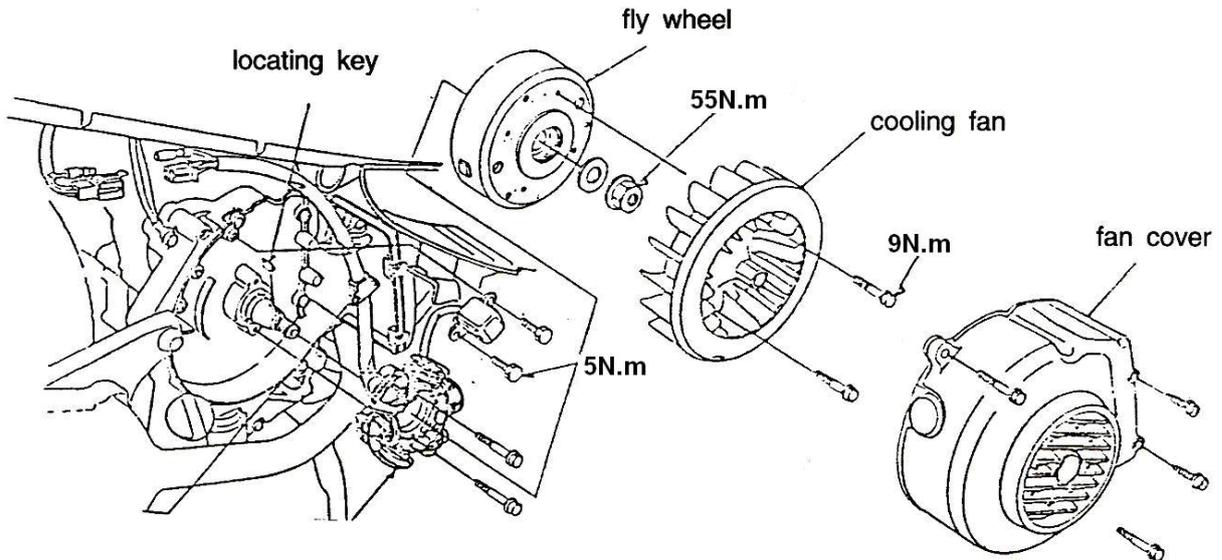
Use a spanner wrench hold fly wheel while removing the retaining nut.  
Use a fly wheel puller to remover the flywheel.  
Remove and save the key.

Detach the stator of the magneto.  
Remove the bolts of the triggering coil.  
Remove the rubber sleeve of the magneto wire from the right crankcase..  
Remove the triggering coil.



bolt

## 3.10.2 Assembling



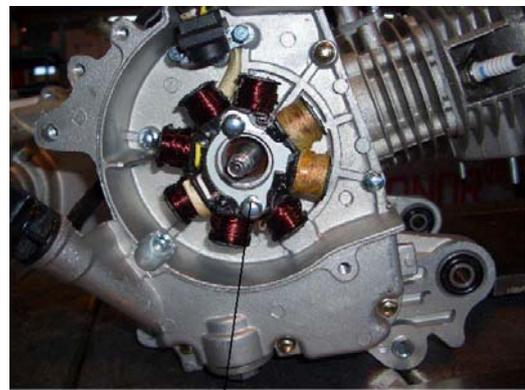
Attach the triggering coil to the right crankcase.  
Lock the fix bolts of the triggering coil.

**Torque:**

**The triggering coil:5N.m 44in.lbs**

**the staror:9N.m 6.6ft.lbs**

Set up the rubber sleeve of the magneto wire.



bolt

Clean the cone part of the crankshaft and of the flywheel.

Be sure to lay the locating key of the flywheel into the keyway on the crankshaft precisely.

Point the groove of the flywheel to the locating key on the crankshaft and then assemble it.



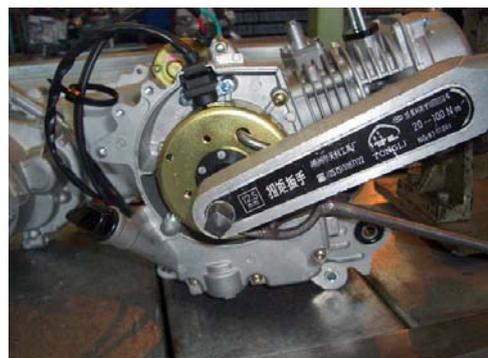
locating key

**Attention:**

Make sure that there is no bolt/nut inside the flywheel, then assemble it.

Use a universal solid wrench to hold the flywheel, then lock the nut.

Torque:55N.m



Universal tool

Universal solid wrench  
Set up the cooling fan  
Torque:9N.m



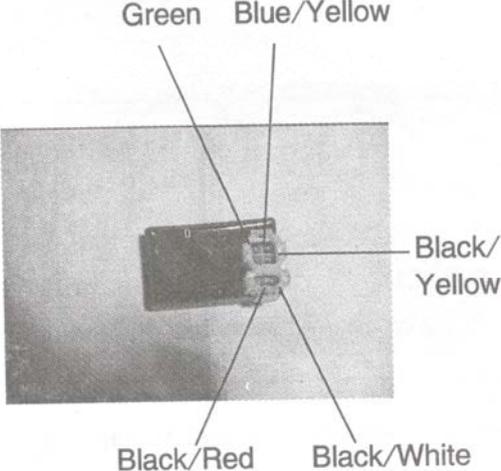
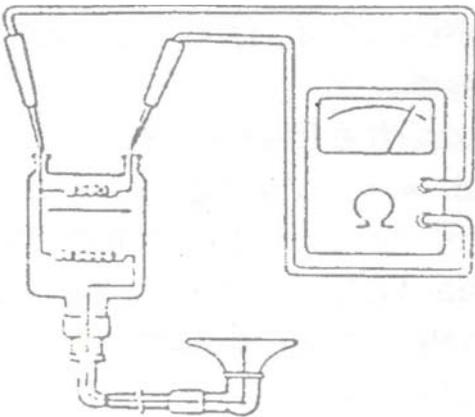
cooling fan

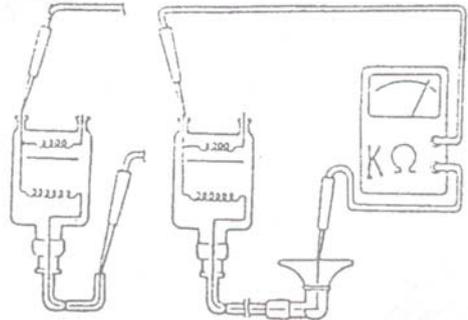
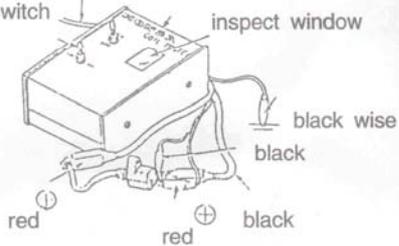
Install the fan cover and securely tighten fastness.



fan cover

<b>3.11 IGNITION SYSTEM</b>			
<b>3.11.1 INSTALLATION INFORMATION</b>			
<b>OPERATING POINTS</b>			
<ul style="list-style-type: none"> <li>• Check ignition system in accordance with the troubleshooting procedure in section 3.11.2</li> <li>• As the ignition system has an electric automatic spark control in CDI unit, there is no need for spark advance angle adjustment.</li> <li>• Poor contact may be the cause of many ignition system faulty cases. Check all terminal connections to be sure they are clean and tight whenever troubleshooting an electrical problem.</li> <li>• Make sure spark plug heat range is correct. Using incorrect spark plug will result in improper engine operation or spark plug damage.</li> <li>• Peak voltage is used as reference point in tests. Record coil resistance tests.</li> </ul>			
<b>REFERENCE STANDARD</b>			
item		Standard value	
Specific spark plug		(NGK)C7HSA (LD)A7TC	
spark plug gap		0.6-0.7mm	
spark plug angle	Maximum advance in "F" position	13° ± 1° (1500r/min)	
Ignition coil resistance(20℃)	Primary coil	0.1-1.0 Ω	
	Secondary	With cap	7-9k Ω
		Without cap	3-4k Ω
Pickup coil resistance(20℃)		80-160 Ω	
Primary Ignition coil peak voltage		Over 120V	
Pickup coil peak voltage		Over 2.1V	
<b>3.11.2 TROUBLESHOOTING</b>			
<b>High Tension Voltage Too Low</b>			
<ul style="list-style-type: none"> <li>• Crankshaft revolution too low or battery voltage too low</li> <li>• Ignition system wiring loose</li> <li>• Faulty Ignition coil</li> <li>• Faulty CDI unit</li> <li>• Faulty pickup coil</li> </ul>			
<b>High Tension Voltage Intermittent</b>			
<ul style="list-style-type: none"> <li>• Faulty main switch</li> <li>• Poor CDI terminal connection</li> <li>• Poor CDI ground</li> <li>• Faulty pickup coil</li> <li>• Poor high tension lead terminal connection</li> <li>• Faulty CDI unit</li> </ul>			
<b>High Tension Voltage Normal but No Spark</b>			
<ul style="list-style-type: none"> <li>• Faulty spark plug</li> <li>• Faulty spark plug cap</li> </ul>			
<b>No High Tension Voltage</b>			

<ul style="list-style-type: none"> <li>• Faulty main switch</li> </ul>	
<ul style="list-style-type: none"> <li>• Faulty Ignition coil</li> </ul>	
<ul style="list-style-type: none"> <li>• Faulty CDI unit</li> </ul>	
<p><b>No or Intermittent High Tension Voltage</b></p>	
<ul style="list-style-type: none"> <li>• Faulty Ignition coil</li> </ul>	
<p><b>3.11.3 CDI INSPECTION</b></p>	
<p>Remove the three screws from the battery case cover.</p>	
<p>Disconnect the CDI module from the wire harness</p>	
<p>Test resistance of the terminals with an multi-meter.</p>	
<ul style="list-style-type: none"> <li>• Since there is semiconductor in return circuit, testing result may be significantly different if different multi-meter are used.</li> <li>• If the pointer on the dial flickers and finally stops at <math>\infty</math> in testing, it should be regarded as normal. Because the capacitor in the CDI module is charged while being tested and it cannot discharge at this time.</li> </ul>	
<p><b>3.11.4 IGNITION COIL</b></p>	
<p><b>Removal Steps</b></p>	
<p>Remove the middle box.</p>	
<p>Remove the spark plug cap.</p>	
<p>Disconnect the wires, remove ignition coil</p>	
<p>Jam nuts and remove the ignition coil.</p>	
<p><b>Inspection</b></p>	
<p>Check the ignition coil circuit.</p>	
<p>The spark advance angle does not need to be adjusted. If spark advance is abnormal, check the CDI, pickup coil or magneto. Replace the ignition coil if necessary.</p>	
<p>Test the primary coil resistance, the standard value of which should be 0.1-1.0 <math>\Omega</math>.</p>	

<p>Test the secondary coil resistance from spark plug cap negative terminals, the standard value of which should be 7-9k <math>\Omega</math> (with cap) and 3-4k <math>\Omega</math> (without cap). Coil test using after market spark tester.</p>	
<p>Perform the following inspection in accordance with the operating instructions in the Manual.</p>	<p>AC100V source ignition coil testing 6V/12V switch inspect window black wire black red ⊖ red ⊕ black</p> 
<ol style="list-style-type: none"> <li>1. Set the ignition coil tester switch in 12V and connect the tester to the ignition coil.</li> <li>2. Turn the switch to the ON position to check spark frequency from the inspection door.</li> </ol>	
<ul style="list-style-type: none"> <li>• In good condition: Sparking continuously</li> </ul>	
<ul style="list-style-type: none"> <li>• In faulty condition: Sparking abnormally</li> </ul>	
<p><b>3.11.5 MAGNETO</b></p>	
<p><b>Pickup Coil Inspection</b></p>	
<p>This test is to be conducted with the stator mounted in the engine.</p>	
<p>Remove the cover.</p>	
<p>Disconnect the magneto.</p>	
<p>Test the pickup coil resistance between the blue/yellow and the green lead terminals, whose standard value is 80-160 <math>\Omega</math>.</p>	
<p>Dismounting the magneto.</p>	
<p><b>Charging Coil Inspection</b></p>	
<p>Test the charging coil resistance between the black/red and the green lead terminals, whose standard value is 300-400 <math>\Omega</math>.</p>	
<p><b>Spark Advance Angle Inspection</b></p>	
<p>Since CDI is used, there is no need to adjust the timing advance.</p>	
<p>If the spark advance is abnormal, inspect CDI, pickup coil or magneto. Replace if necessary.</p>	
<p>Remove timing lid.</p>	
<p>After the engine is warmed up, check the spark advance angle by the spark timing lamp. It is proper for "F" to</p>	

align within $\pm 2^\circ$ with the engine revolving at a speed of 1500rpm.	
The spark advance angle should be $13^\circ \pm 1^\circ$ (1500r/min)	



# CHAPTER 3C ENGINE

100cc/125cc Chain Drive

150cc /200cc Shaft Drive

## WARNING

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

## 3.1 PREPARATION FOR REMOVAL PROCEDURES

## 3.2 REPLACEMENT PARTS

3.2.1 Gaskets, oil seals and o-rings

3.2.2 Bearings and oil seals

## 3.3 PERIODIC INSPECTION AND ADJUSTMENT

3.3.1 Air filter

3.3.2 Spark plug

3.3.3 Valve clearance adjustment

3.3.4 Carburetor idle adjustment

3.3.5 Transmission oil inspection (for MINI ATV100/150)

3.3.6 Transmission oil inspection (for B-type 150/200)

3.3.7 Crankcase oil inspection

## 3.4 ENGINE REMOVAL AND INSTALLATION

3.4.1 Cylinder head

3.4.2 Cylinder body, piston and piston ring

3.4.3 V-belt, AND CVT

3.4.4 Transmission (for MINI ATV100/150)

3.4.5 Transmission (for B-type 150/200)

3.4.6 Crankcase and crankshaft

3.4.7 Magneto

3.4.8 Electric starter

3.4.9 Oil pump

## 3.5 CARBURATION

## 3.6 TIGHTENING TORQUES OF ENGINE MAIN FASTENERS

## 3.7 IGNITION SYSTEM

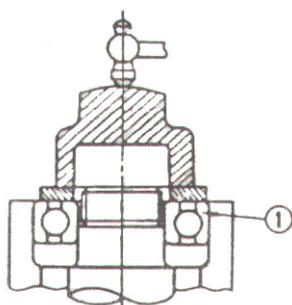
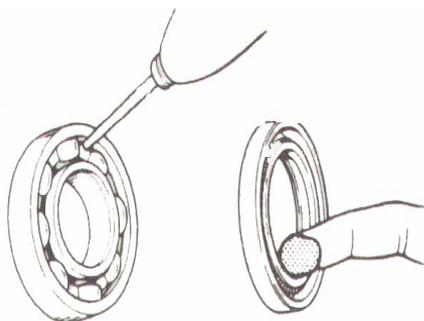
3.7.1 INSTALLATION INFORMATION

3.7.2 TROUBLESHOOTING

3.7.3 CDI INSPECTION

3.7.4 IGNITION COIL

3.7.5 MAGNETO



### 3.1 PREPARATION FOR REMOVAL

#### PROCEDURES

1. Remove all dust and dirt before removal and disassembly.
2. Use proper tools and cleaning equipment.
3. During machine disassembly, clean all parts and place them in the order of disassembly, which will speed up assembly and allow for the correct installation of all parts.
4. Keep all parts away from any source of fire.

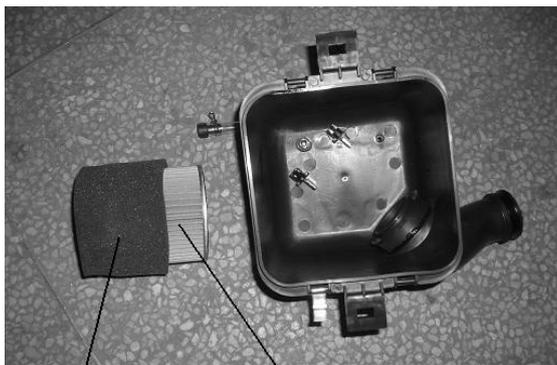
### 3.2 REPLACEMENT PARTS

#### 3.2.1 Gaskets, oil seals and o-rings

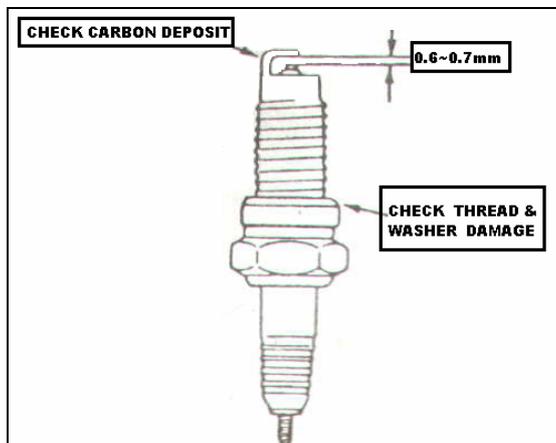
1. Replace all gaskets, seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned
2. Properly oil all mating parts and bearings during reassembly and apply grease to the oil seal lips.

#### 3.2.2 Bearings and oil seals

Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips and oil bearings liberally when installing.



pre-filter      main filter



### 3.3 PERIODIC INSPECTION AND ADJUSTMENT

#### 3.3.1 Air filter (for MINI ATV100/150)

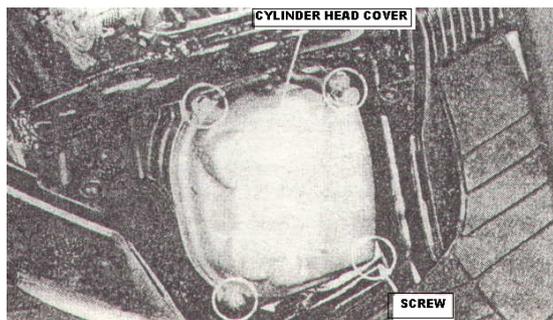
1. Remove air filter case cover and fixing screws.
2. Remove filter element and wash in soapy water and dry it.
3. Install the air filter in the reverse order of removal.

#### Air filter (for B-type 150/200)

1. Remove seat.
2. Release clips and remove cover.
3. Loosen screw and remove filter.
4. Remove fabric type pre-filter from main filter. Wash pre-filter in soapy water and dry it.
5. Reinstall pre-filter over main filter. Replace main filter as required.
6. Reinstall filter into air box and tighten screw.

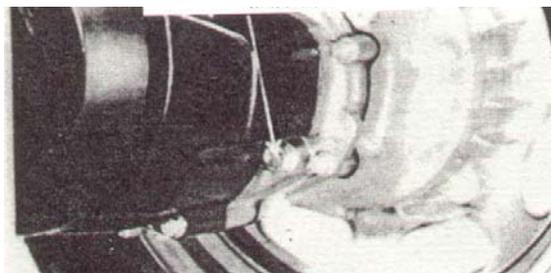
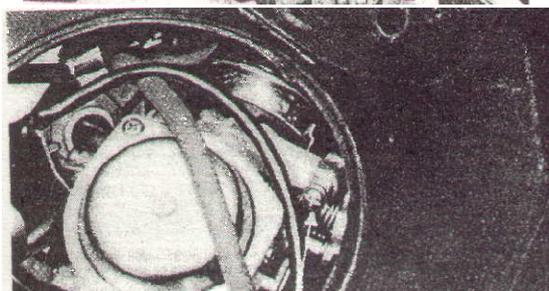
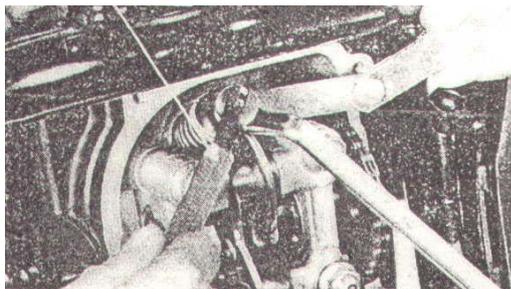
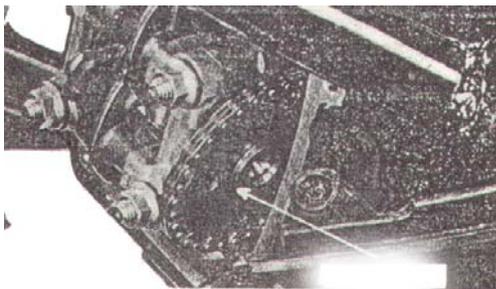
#### 3.3.2 Spark plug

1. Remove spark plug.
2. Check for burnout, dirt or carbon deposit. Clean them away with a sparkplug cleaner or a cast-steel wire brush.
3. Spark plug gap specification: 0.6-0.7mm
4. Check for screw thread damage
5. Such spark plug as NGK (C7HSA, C6HSA) and CHAMPION Z9Y are recommended in replacement.



#### 3.3.3 Valve clearance adjustment

1. Remove cylinder head cover.
2. Rotate cooling fan to set the mark on camshaft sprocket in Top Dead Center position, that is, to align the timing line on the rotor with the mark on the crankcase.

**NOTE:**

Since the crankshaft is equipped with a decompression, the fan cannot be rotated counterclockwise, or it is impossible to adjust the valve.

3. Measure the valve clearance by using a feeler gauge.

**Valve clearance specification:**

**Intake valve 0.04—0.06mm;**

**Exhaust valve 0.04—0.06mm**

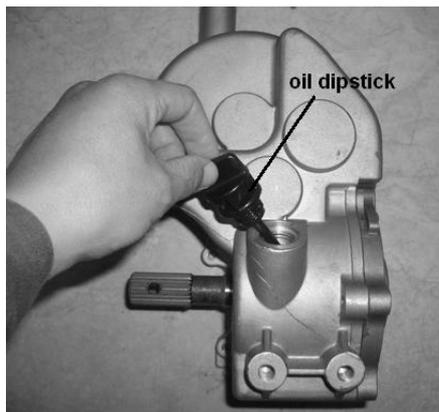
4. To adjust valve clearance, loosen the locknut, turn the adjuster in or out with valve adjusting tool until specified clearance is obtained. Measure the valve clearance once more after the locknut is tightened.

**3.3.4 Carburetor idle adjustment**

1. Start the engine and let it warm up for several minutes.
2. Turn the idling adjusting screw in or out until specified idling speed is obtained.
3. Idling speed specification:  $1700 \pm 170$ rpm
4. If the idling speed is unstable or it is not smooth when accelerating the throttle slightly, adjust the fuel quantity adjusting screw, which is better to be done by professionals.

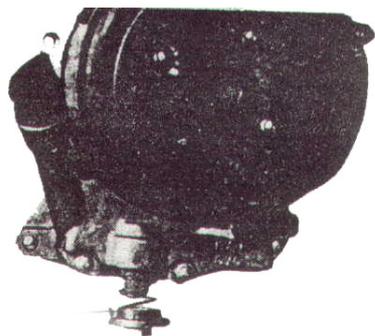
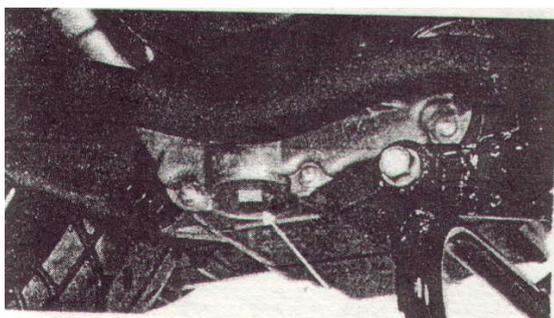
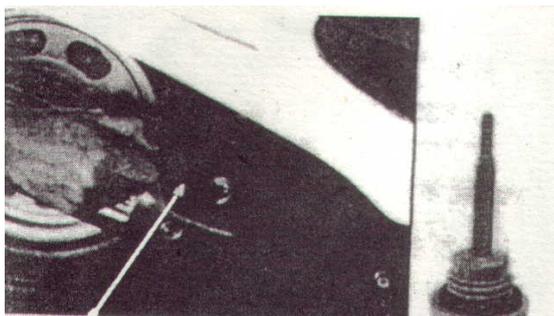
**3.3.5 Transmission oil inspection (for MINI ATV100/150)**

1. Stand the engine on a level surface.
2. Remove the oil filler cap after the engine stops.
3. Check if the oil level reaches the lower edge of the filling orifice.
4. Always use the same type of oil when refilling. The type used for this engine: SAE15W/40SG
5. Tighten the oil filler cap.
6. If the oil needs replacing, warm up the engine and then stop. Remove the drain bolt to drain the oil. And fill the case with new oil.
7. The oil capacity of a new engine: 110ml The top filling for replacement: 90ml



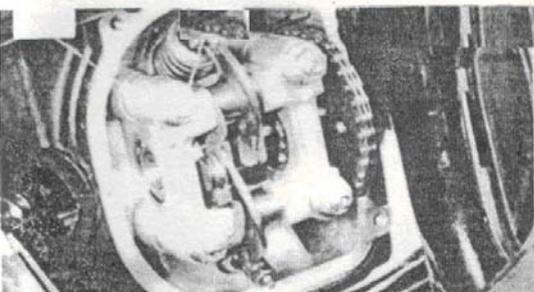
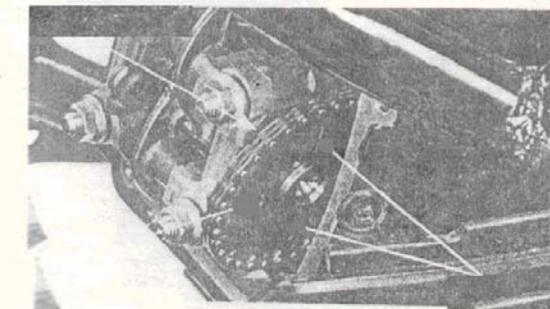
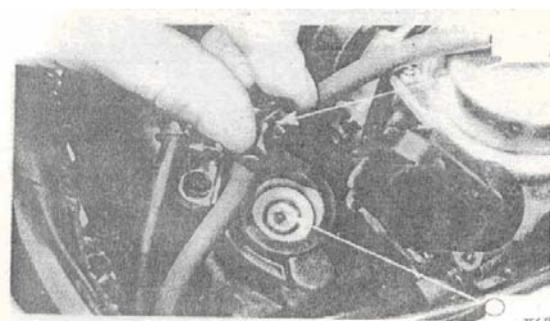
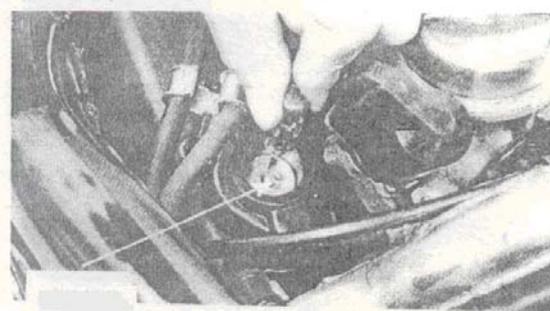
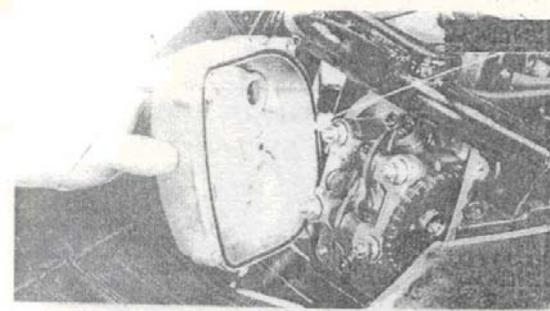
### 3.3.6 Transmission oil inspection (for B-type 150/200)

1. Remove the oil level plug.
2. Wipe the oil on the plug and insert it into the filler hole without screwing. The oil level should reach the fourth mark.
3. When replacing the oil, remove transmission case drain plug located on the front cover and drain the oil..
4. Check the O-ring for damage and replace it if necessary.
5. Install the drain plug.
6. Add SAE80W/90GL5 oil in the recommended amount. Install oil dipstick.
7. The oil capacity of a new engine: 500ml. The top filling for replacement: 450ml.



### 3.3.7 Crankcase oil inspection

8. Stand the engine on a level surface.
9. Have the engine run at idle speed for several minutes. Inspect the oil level after the engine is turned off 2-3 minutes.
10. Remove the oil level plug.
11. Wipe the oil on the plug and insert it into the filler hole without screwing. The oil level should reach the mark.
12. When replacing the oil, perform the first two steps and remove the oil strainer to drain the oil.
13. Check the O-ring for damage and replace it if necessary.
14. Add SAE15W/40SG oil in the recommended amount.
15. The oil capacity of a new engine: 900ml. The replacement volume: 750ml.
16. Install the oil strainer, spring and strainer lid.
17. After replacement, start the engine and keep it idling for 2-3 minutes and inspect the oil level according to the above instructions.



## 3.4 ENGINE REMOVAL AND INSTALLATION

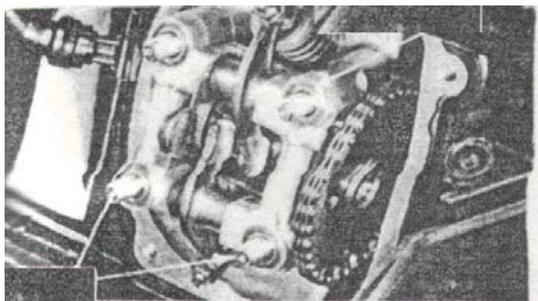
### 3.4.1 Cylinder head

#### A. Camshaft removal

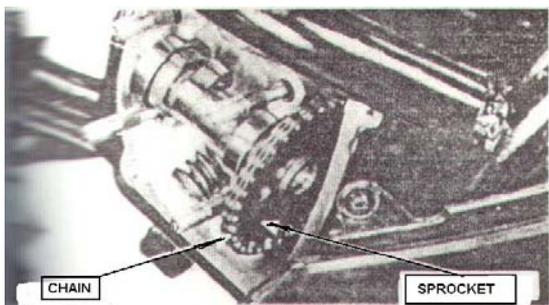
1. Remove cylinder head cover
2. Remove camshaft chain tensioner screw and then O-ring.
3. Lock camshaft chain tensioner by turning it clockwise.
4. Rotate fan to have the mark on the camshaft chain in an upward position, which is TDC of engine compression stroke.
5. Remove cylinder head bolts, fixing nuts and gasket of camshaft holder.

#### **NOTE:**

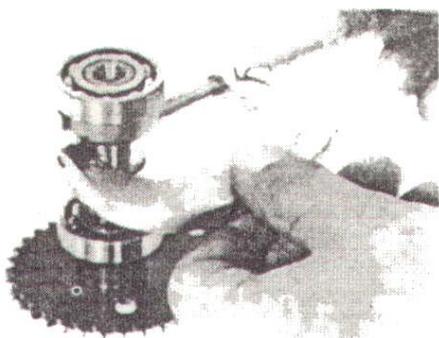
Tighten the nuts in a crisscross pattern, each 1/2 or 1/3 turn at a time.



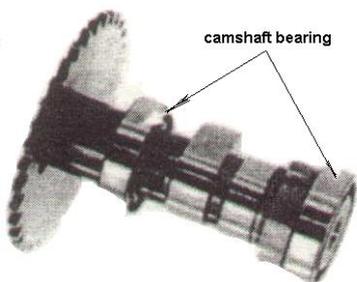
6. Remove camshaft holder and pins



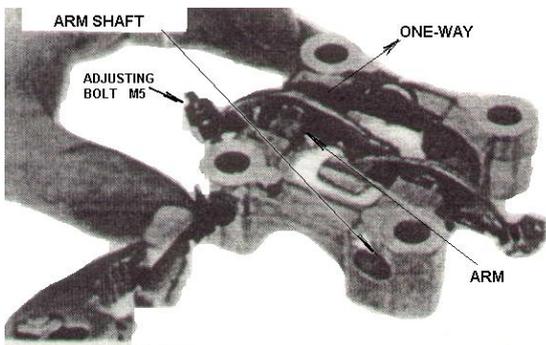
7. Remove camshaft.



8. Check for intake and exhaust cam damage.  
 Replace when  
 intake valve : below 25.75mm exhaust  
 valve : below 25.41mm.

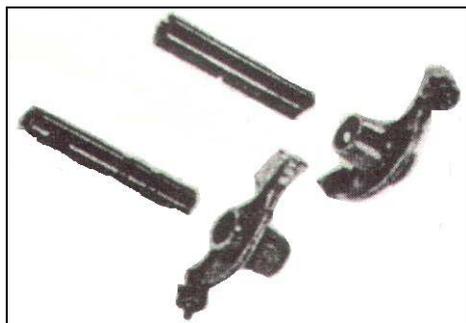
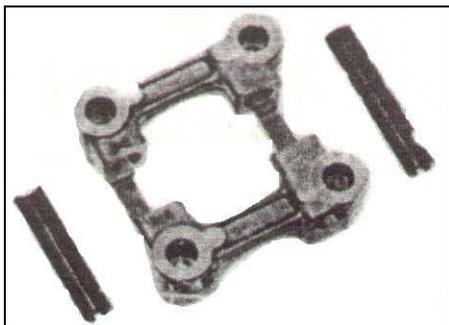


9. Check camshaft bearing for looseness and wear and tear and sprocket for abnormal wear. If so, replace as a whole.



**B. Camshaft holder removal and installation**

1. Remove rocker arm shafts by using a bolt of 5mm. Remove one-way exhaust valve and rocker arm.



2. Check camshaft holder, rocker arms and rocker arm shafts for abnormal wear and tear.

3. Measure the inside diameter of rocker arm shaft hole in camshaft holder.

Limit: 10.10mm.

4. Measure the inside diameter of rocker arm hole.

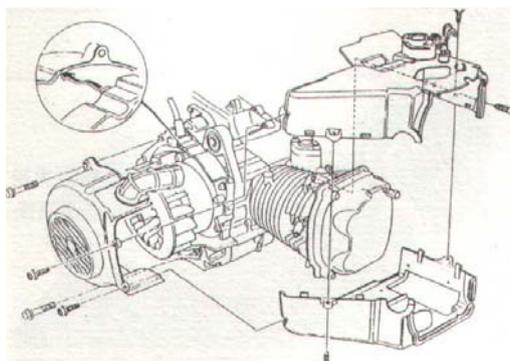
Limit: 10.10mm.

5. Measure the diameter of rocker arm shaft.

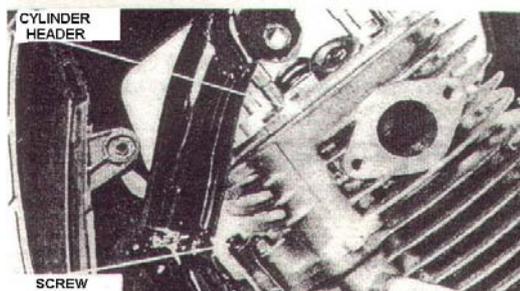
Limit: 9.91mm.

### C. Cylinder head removal

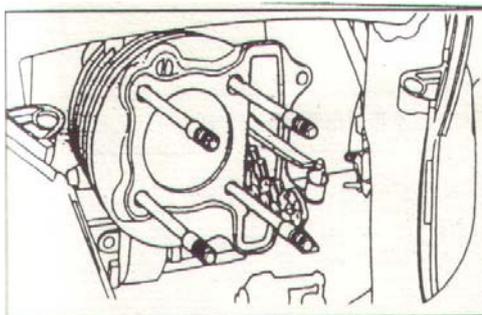
1. Remove the pipe composition of carburetor intake valve.



2. Remove fan cover composition.
3. Remove upper and lower shrouds.



4. Remove cylinder head.



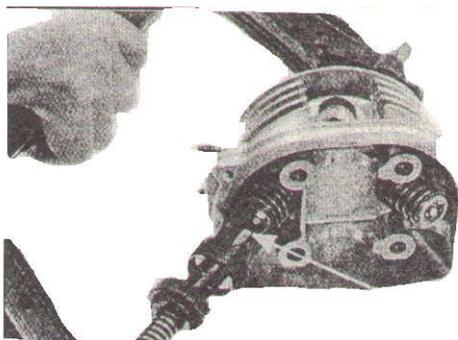
5. Remove dowel pin, cylinder head gasket and take out chain guide.
6. Remove the gasket on cylinder surface.

**NOTE:**

Make sure the contact cylinder surfaces are not scratched.  
 Make no other objects fall into the crankcase.

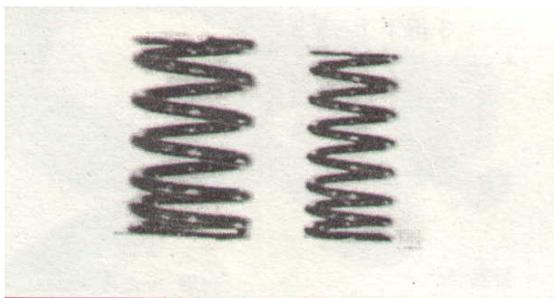
**NOTE:**

The cylinder head gasket must not be reused.



7. Take out valve seat, lock plate, spring, oil seal and valve by using a compressor.
8. Clean off carbon deposits in the combustion chamber.
9. Check spark plug, valve guide and their surrounding areas for cracks.
10. Check contact face evenness.

Limit: 0.05mm.



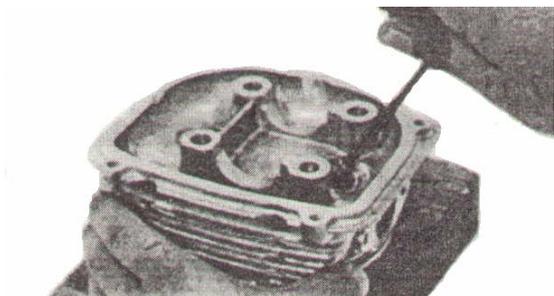
11. Measure valve spring free length.

Limit: inner spring : 31.2mm  
 outer spring : 34.1mm.



12. Check valve stem bend and check for burnout. Clean carbon deposits off its surface.
13. Measure valve stem diameter.

Limit: 4.9mm.



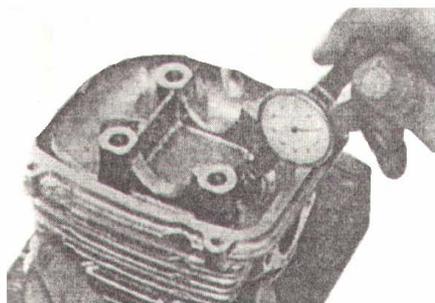
14. Clean off carbon deposits in valve guide.



15. Eliminate carbon deposits from valve seat.

**NOTE:**

Be sure not to scratch the valve seat contact face.

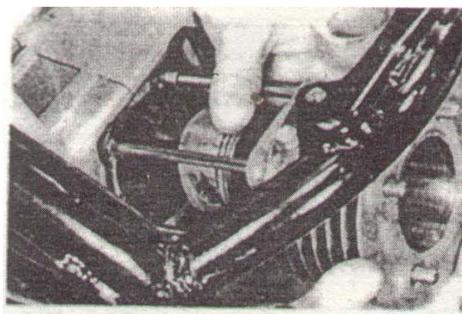


16. Measure valve guide inside diameter.

Limit: Intake: 5.08mm

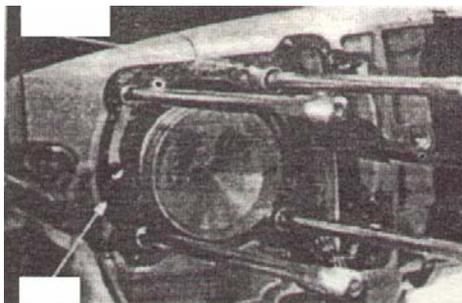
exhaust : 5.10mm

Install cylinder head in the reverse order of removal.

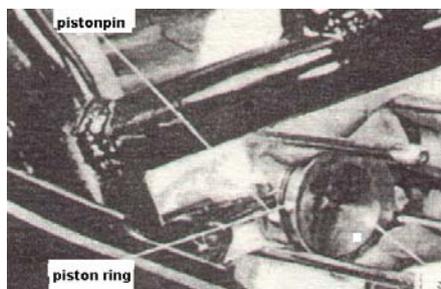


**3.4.2 Cylinder body, piston and piston ring**

1. Remove cylinder body.



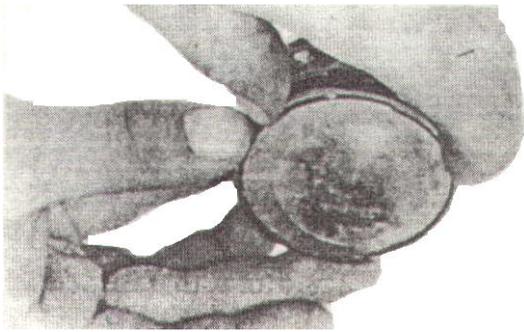
2. Remove cylinder gasket dowel pin.  
Eliminate carbon deposits from gasket.



3. Remove piston pin circlip, piston pin and piston.

**NOTE:**

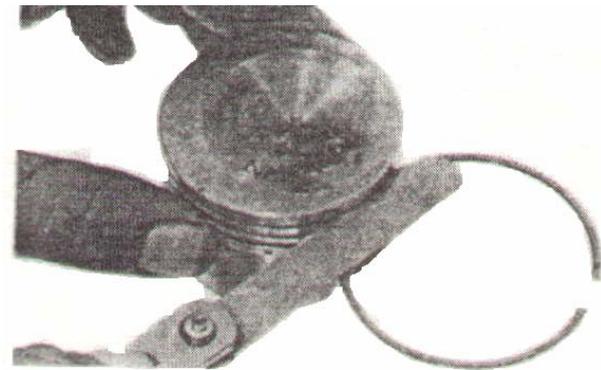
Make sure the circlip does not fall into the crankcase.



4. Remove piston ring. Eliminate the carbon deposits from the piston ring grooves and rings.

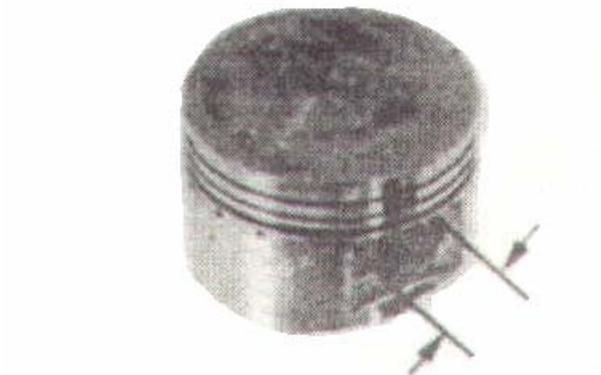
**NOTE:**

Be sure to keep the piston ring undamaged.

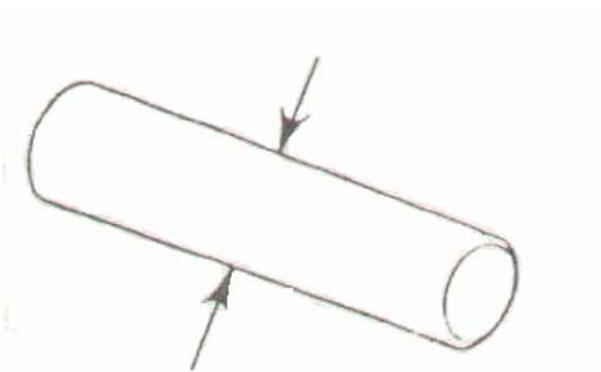


5. Position piston ring. Measure the gap between piston ring and ring groove.

Limit: first ring: 0.09mm  
2<sup>nd</sup> ring: 0.09mm.

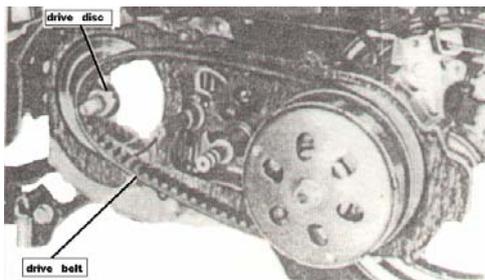


6. Measure piston pin bore diameter,  
Limit: 15.04mm.

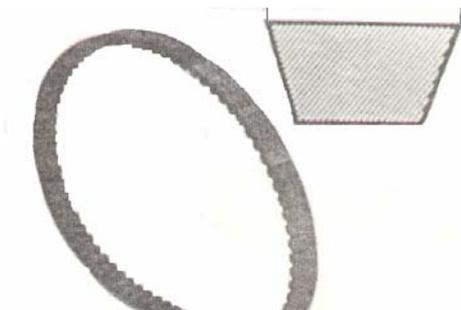


7. Measure piston pin outside diameter  
Limit : 14.96mm.



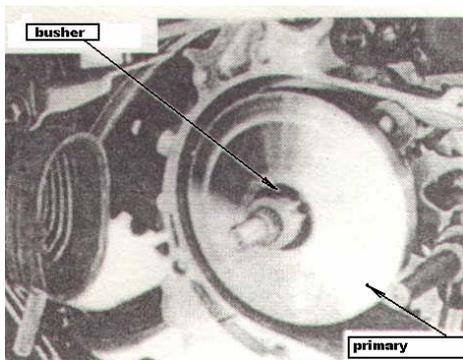


3. Take out V-belt.

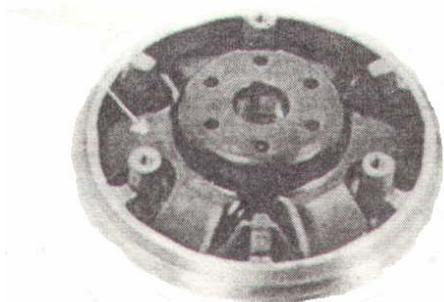


4. Check belt for cracks, wear, scaling or chipping.

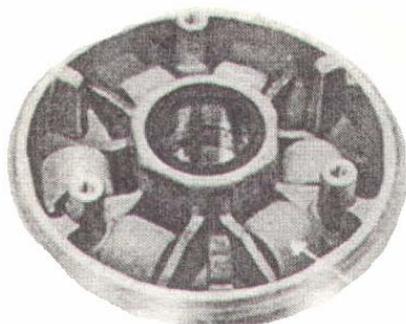
5. Measure V-belt width.  
limit : 19.0mm,



6. Remove sliding sheave.



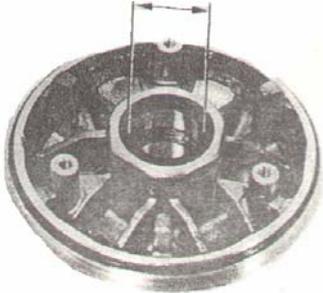
7. Remove movable cams.



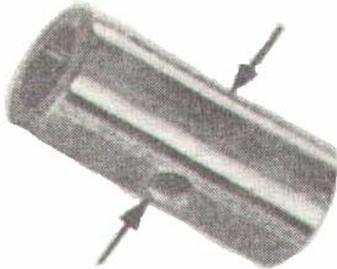
8. Remove clutch weights.



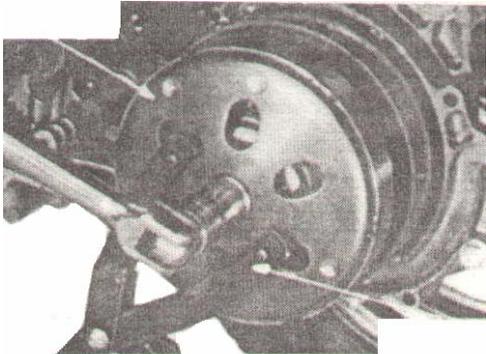
- 9. Check weights wear.
- 10. Measure weight outside diameter.  
Limit : 17.44mm



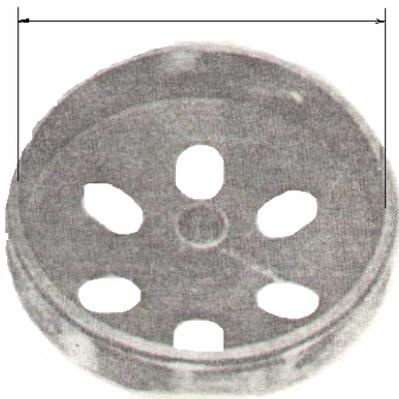
- 11. Measure sliding sheave inside diameter  
Limit : 24.06mm.



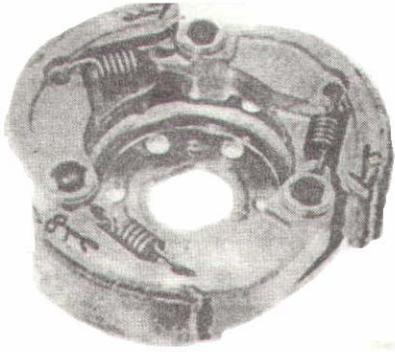
- 12. Check collar wear. Measure collar outside diameter.  
Limit : 23.94mm, replace.



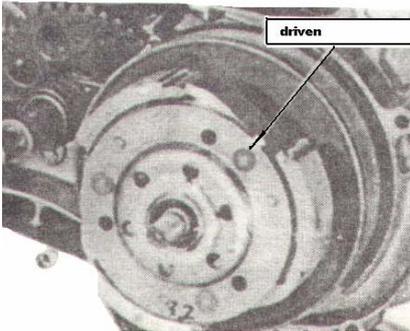
- 13. Remove clutch.



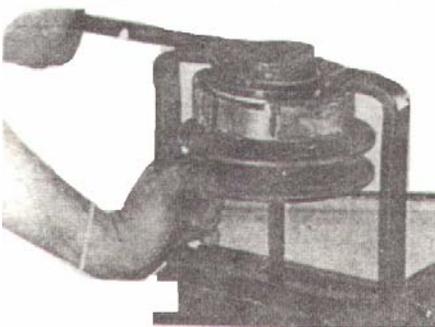
- 14. Check clutch disk wear.  
Limit : 125.5mm



15. Check spacer wear. Measure its thickness.  
Limit : 1.5mm



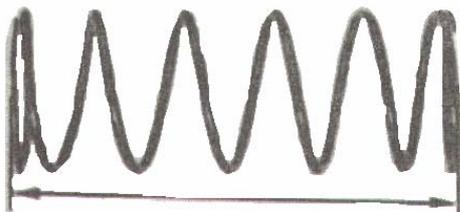
16. Remove clutch assembly.



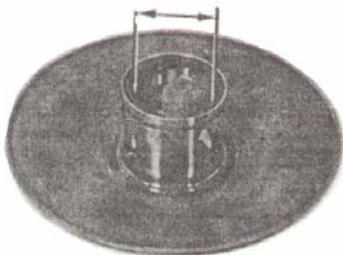
17. Remove clutch locknut.



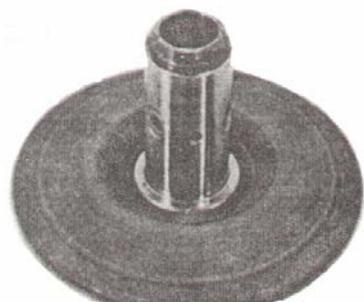
18. Take out secondary fixed sheave and sliding sheave.



19. Measure compression spring free length.  
Limit: 163mm



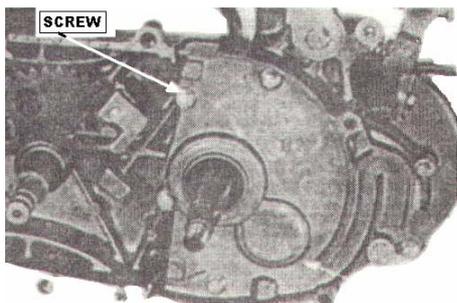
- 20. Check secondary sliding sheave wear.  
Measure its shaft inside diameter.  
Limit : 34.06mm



- 21. Check secondary fixed sheave wear.  
Measure its shaft diameter.  
Limit : 33.94mm  
Install them in the reverse order of removal.

**NOTE:**

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

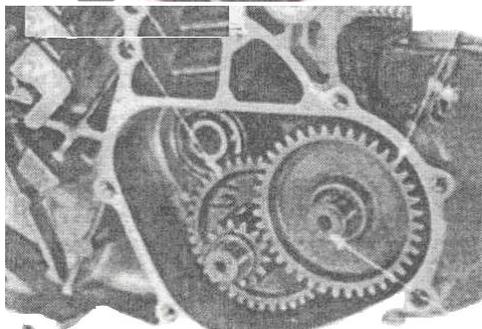


**3.4.4 Transmission (for MINI ATV100/150)**

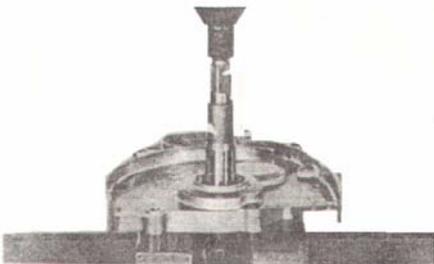
- 1. Remove drain cock to drain transmission oil.
- 2. Remove transmission case cover.



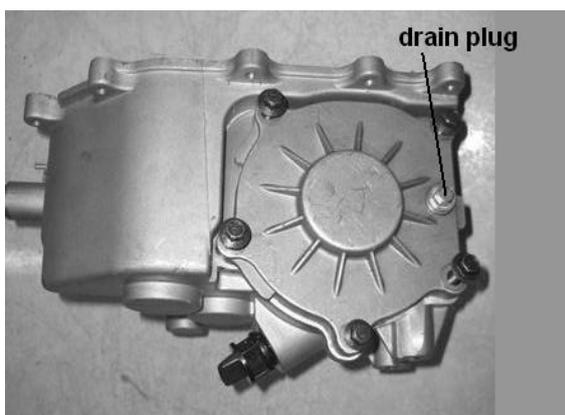
- 4. Remove gasket and dowel pins.
- 5. Remove middle gear set, secondary driven gear and secondary driven axle. Check each for wear.



- 6. Inspect axles for proper operation. Check if secondary driven axle oil seal is abnormal. If so, replace.



7. Check oil seals and axles wear.
8. Take out primary gear axle and check its wear. Install it in the reverse order of removal. And add sufficient oil.

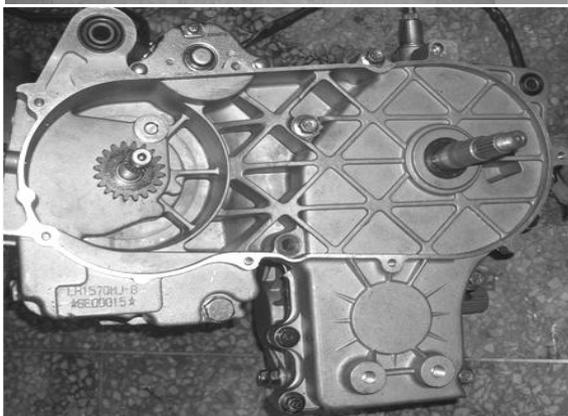


### 3.4.5 Transmission (for B-type 150/200)

#### 3.4.5.1 Transmission Disassembly

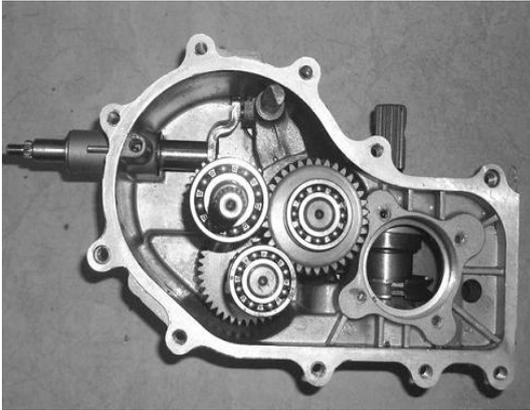
1. Remove transmission case drain plug located on the front cover and drain the oil.

2. Remove transmission case fixing bolts.

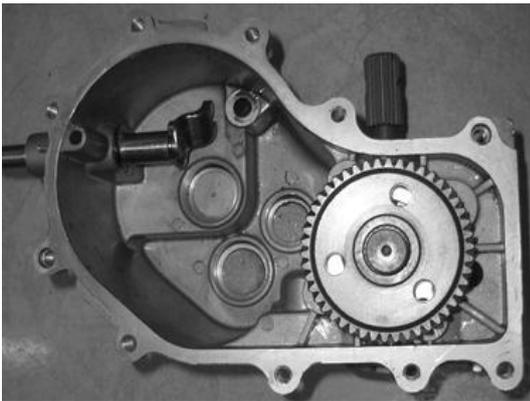


3. Knock the input shaft carefully with a soft face hammer to separate the transmission case from the left crankcase.

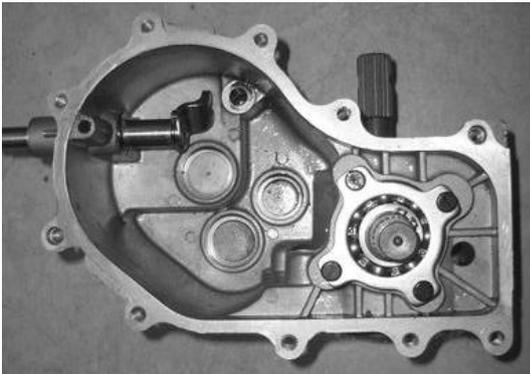




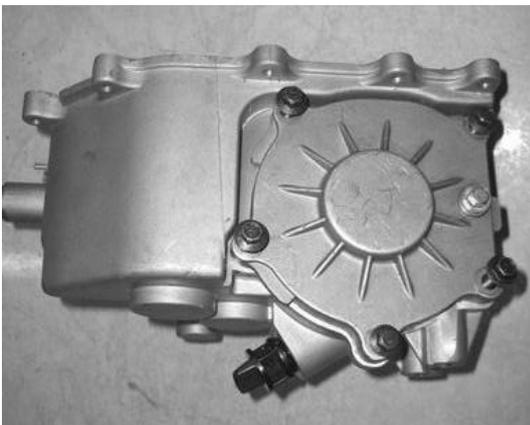
4. Remove input shaft, forward/reverse shaft, middle shaft and shift fork as an assembly.



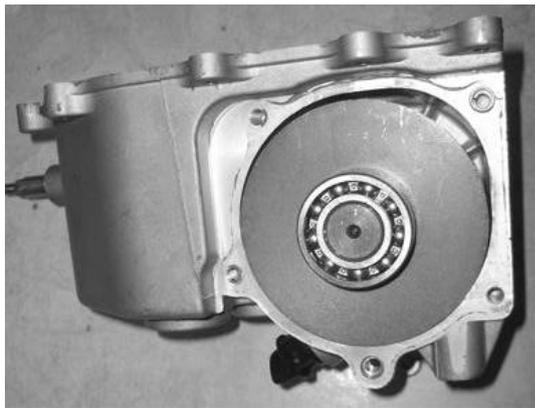
5. Remove bearing and helical gear.



6. Remove pinion shaft retainer plate and pinion shaft.



7. Remove front cover bolts from the transmission case.



8. Remove output shaft.
9. Clean all components and inspect for wear.
10. Inspect engagement dogs of gears and replace if edges are rounded.
11. Inspect gear teeth for wear, cracks, chips or broken teeth.
12. Remove seals from transmission case.

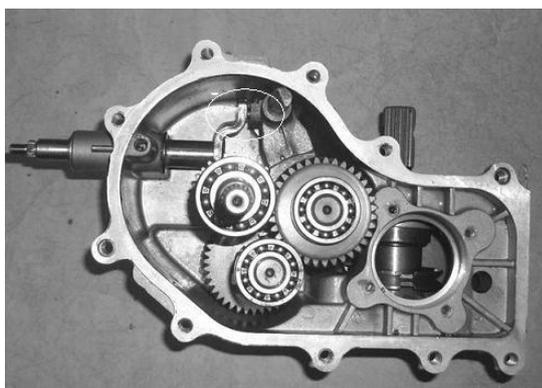
**IMPORTANT:** New seals should be installed

after the transmission is completely assembled.

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

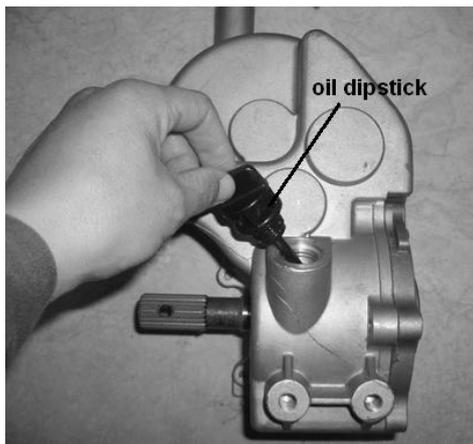
### 3.4.5.2 Transmission Assembly

1. Install output shaft.
2. Before installing the front cover make sure the sealing surfaces are clean and dry, and shafts are fully seated in the transmission case. Apply silicon glue to mating surfaces.
3. Reinstall cover and torque bolts in a cross pattern in 3 steps to 14.5 ft. lbs. (20 Nm).
4. Install new output shaft seal.
5. Install pinion shaft with bearing.
6. Install retainer plate with flat side toward bearing.
7. Apply Loctite™ 242(Blue) to screw threads and torque screws to 7.2 ft-lbs. (10N.m).
8. Assemble shafts and shift fork.
9. Carefully install forward/reverse shaft and middle shaft assembly and gear cluster as a unit into their respective bearing case areas. Tap with a soft face hammer to seat shaft assemblies.



**NOTE:** Make sure shift fork pins is properly positioned in the slot on selector arm.

**NOTE:** Be sure gear indicator switch are removed from transmission case before installing shafts.



10. Prior to reinstalling the transmission make sure the mating surfaces are clean and dry, and shafts are fully seated in transmission case. Apply silicon glue to mating surfaces.

11. Reinstall left crankcase and torque bolts in a cross pattern in 3 step to 14.5 ft.lbs. (20Nm).

12. Install new input shaft seal.

13. Install drain plug with a new sealing washer. Torque drain plug to 14 ft.lbs. (19Nm).

14. Add SAE80W/90GL5 oil in the recommended amount. Install oil dipstick.

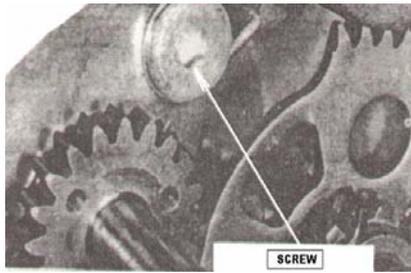
15. Install gear indicator switch. Apply Loctite™ 242 (blue) to screw threads and torque screws to 13-16 in. lbs. (1.5-1.9 Nm).

### 3.4.5.3 TROUBLE SHOOTING CHECKLIST

Check the following items when shifting difficulty is encountered

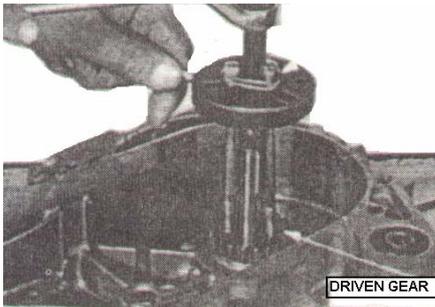
- Idle speed adjustment
- Transmission oil type/quality
- Driven clutch (CVT) deflection
- Loose fasteners on rod ends
- Loose fasteners on gear shift box
- Worn rod ends, clevis pins, or pivot arm bushings
- Linkage rod adjustment and rod end positioning
- Shift selector rail travel
- \*Worn, broken or damaged internal transmission components

**\*NOTE** : To determine if shifting difficulty or problem is caused by an internal transmission problem, disassemble transmission and inspect all gear dogs for wear (rounding), damage. Inspect all bearings, circlips, thrust washers and shafts for wear.

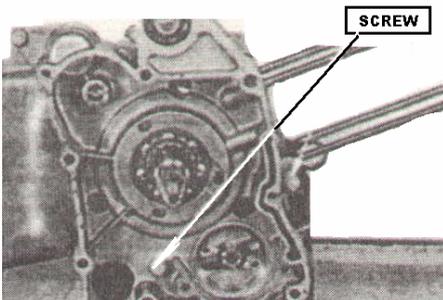


### 3.4.6 Crankcase and crankshaft

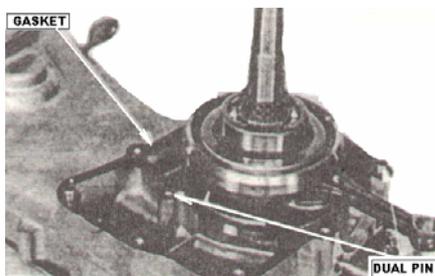
13. Remove chain guide fixing bolt to take out chain.



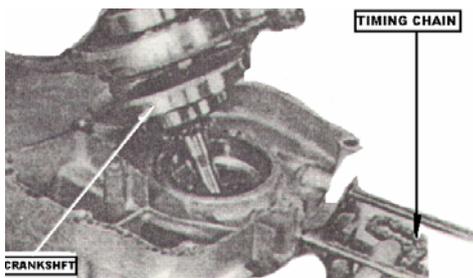
14. Remove driven gear from crankshaft and inspect gear for wear.



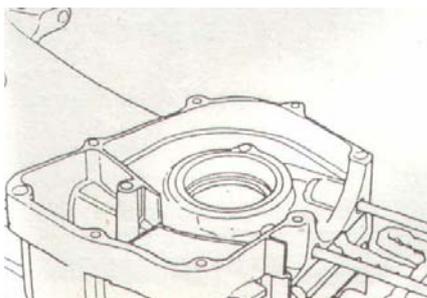
15. Remove crankcase fixing bolts and separate the left crankcase from the right one.



16. Remove gasket fitting pin.



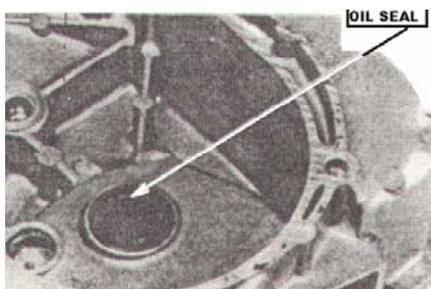
17. Take out crankshaft and timing chain.



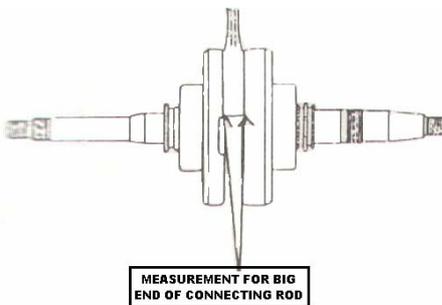
18. Clean gasket on crankcase contact face .

**NOTE:**

Make sure the contact faces are not scratched to avoid oil leakage.

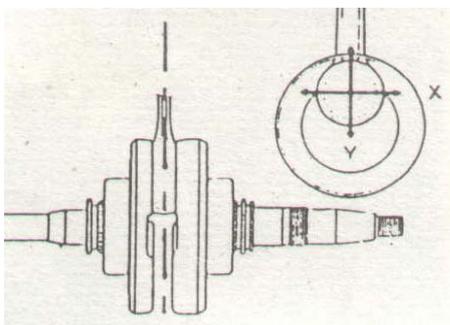


19. Remove oil seal from crankcase. Inspect oil seal for wear.



20. Measure connecting rod big end side clearance.

Limit : 0.55mm.

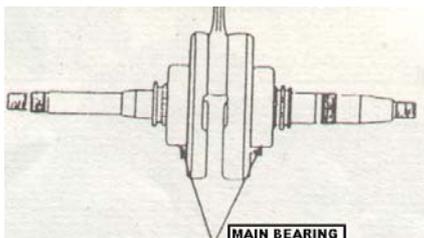


21. Measure big end crankpin diametral clearance.

limit : 0.55mm

22. Measure small end orifice inside diameter.

limit : 15.06mm

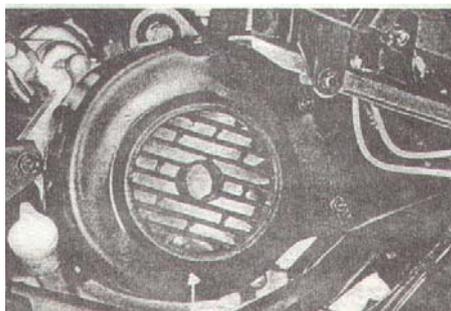


23. Inspect crankshaft bearings for abnormal noise and looseness. If so, replace.

Install them in the reverse order of removal.

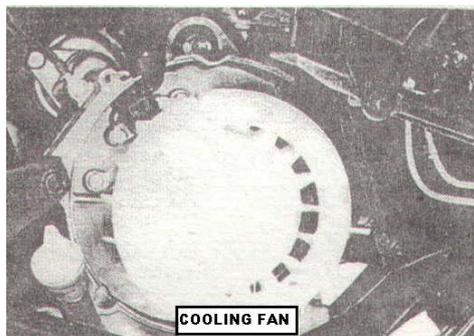
**NOTE:**

Be sure to drain crankcase oil before crankcase removal.

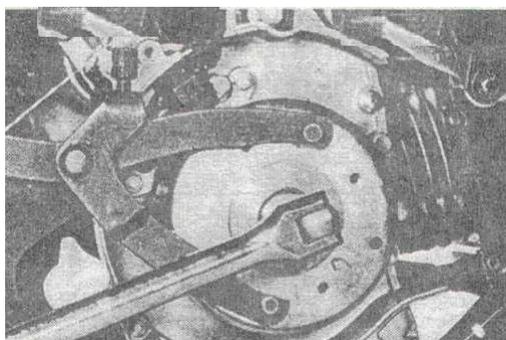


### 3.4.7 Magneto

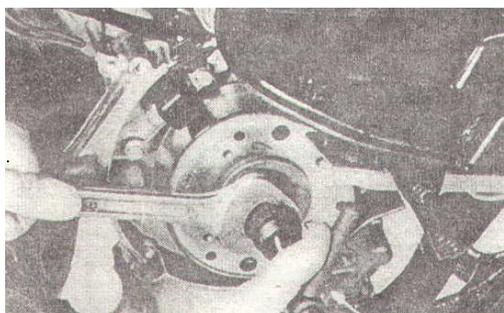
1. Remove magneto cover fixing bolts and screws to dismount magneto cover. Inspect cover for damage and cracks.



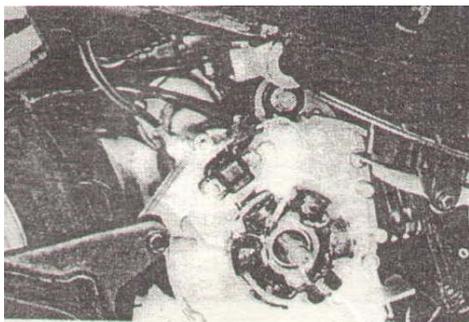
2. Remove 4 fixing bolts to take out fan. Inspect fan for blade aging and cracks. If so, replace.



3. Remove magneto flywheel locknut.



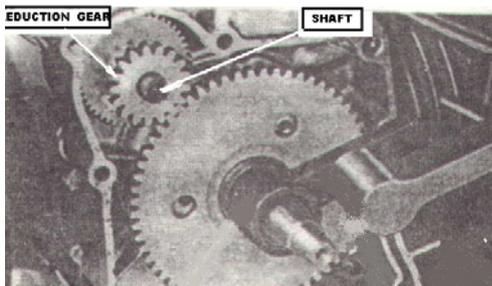
4. Take out magneto rotor using the flywheel puller. Inspect magneto flywheel tapered orifice and key way for wear, scratches and cracks. If so, replace.



5. Remove stator fixing screw to take out stator.  
Install it in the reverse order of removal.

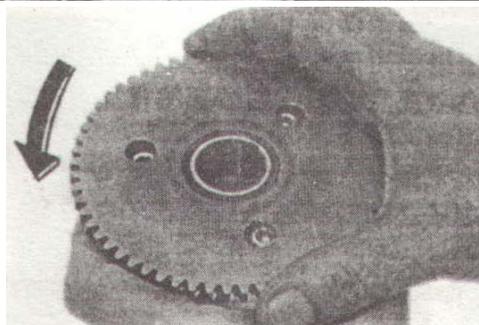
**NOTE:**

As there is magnetism inside the magneto rotor, make sure no metal object is taken in and the inside of the rotor is cleaned out before installation.

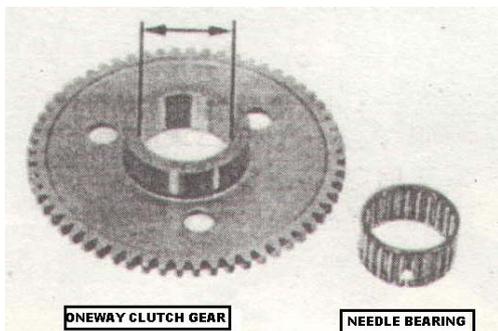


**3.4.8 Electric starter**

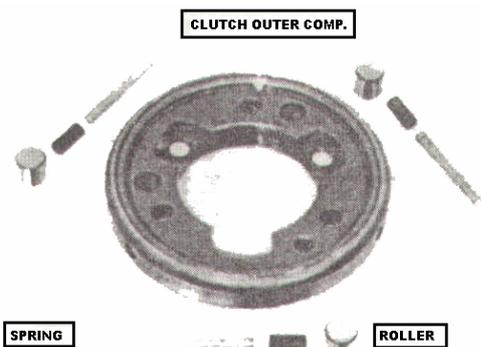
1. Remove starter clutch.
2. Remove idler gear and idle gear shaft.



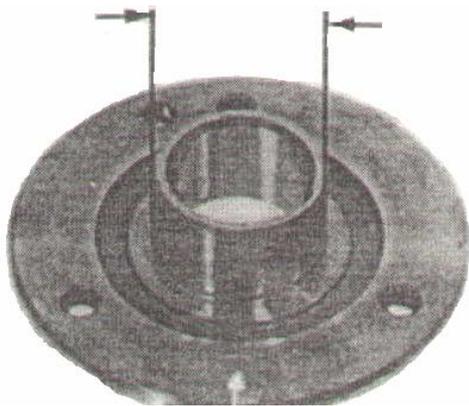
3. When turning the starter wheel gear counterclockwise, it should turn freely. When turning the starter wheel gear clockwise, it should be engaged.



4. Inspect clutch wheel gear for abnormal wear. If so, replace it with a new one.
5. Measure gear wheel orifice inside diameter. If it goes beyond the limit of 32.06mm, replace.
6. Inspect needle roller bearing for wear. Check if needle roller turns freely in its holder. If it works improperly, replace it with a new one.

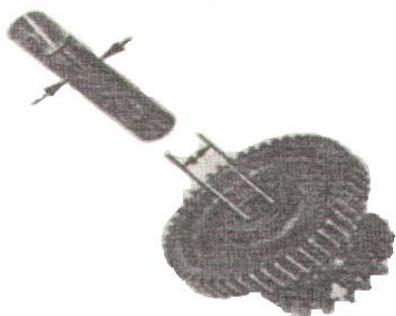


7. Take spring, spring sleeve and roller out of clutch outer race. Inspect roller for wear, spring for distortion and out race for wear. If there appears anything abnormal, replace.



8. Measure clutch disk hub outside diameter.

Limit : 27.94mm



9. Inspect idler gear and idle gear shaft for abnormal wear. If so, replace.

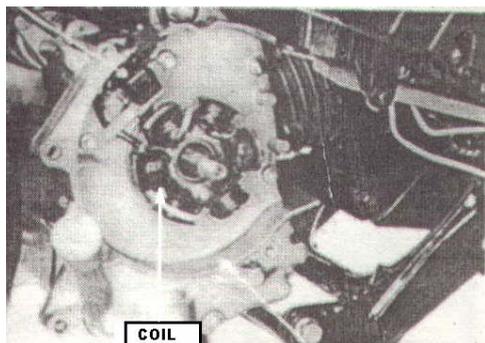
10. Measure idle gear shaft orifice inside diameter.

Limit : 10.05mm

11. Measure idle gear shaft outside diameter.

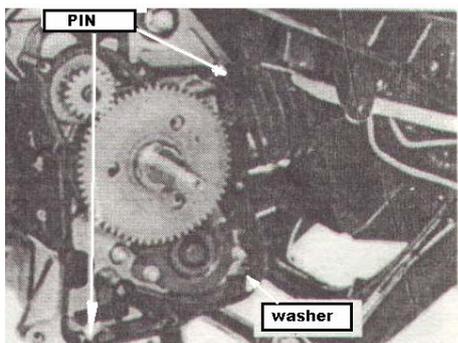
Limit : 9.94mm

Install them in the reverse order of removal.

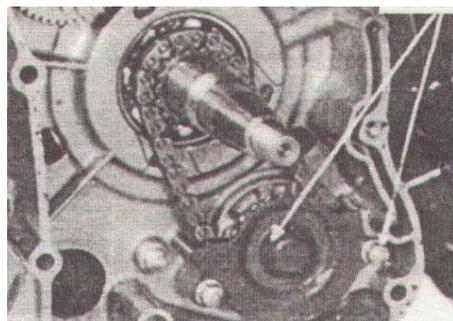


### 3.4.9 Oil pump

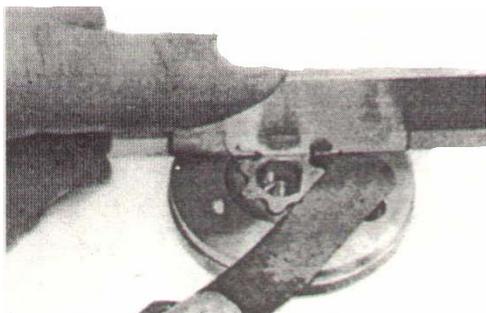
1. Remove bolts to dismount right crankcase cover.



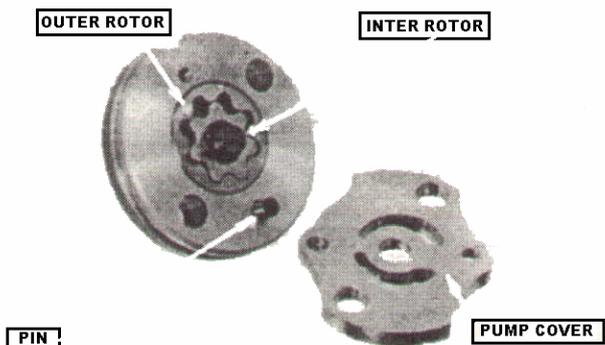
2. Remove gasket and dowel pin. Remove clutch.



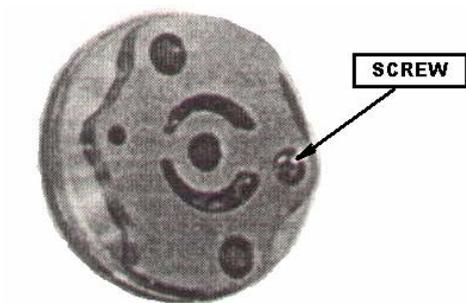
3. Remove oil pump cover.  
 4. Remove nut to take out oil pump sprocket and chain. Inspect them for abnormal wear. If so, replace



5. Measure tip clearance between rotors and pump housing.  
Limit : 0.2mm



6. Inspect oil pump inner and outer rotors for abnormal wear. If so, replace the oil pump assembly.

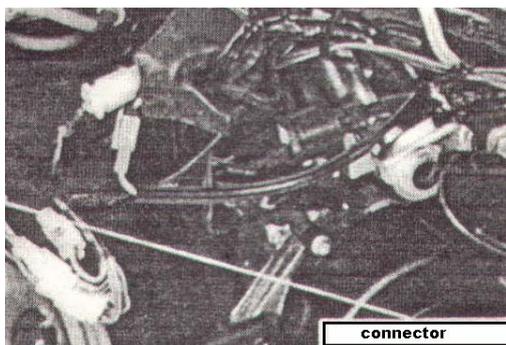
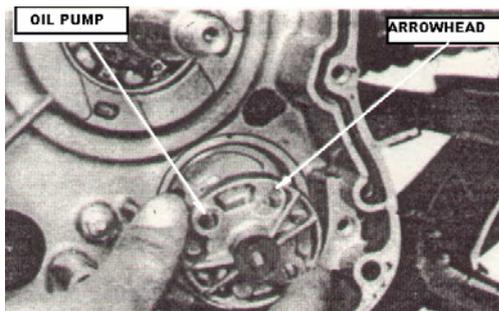


7. Fasten oil pump with screws after assembling.

Install oil pump in the reverse order of removal.

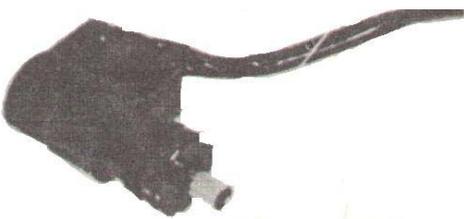
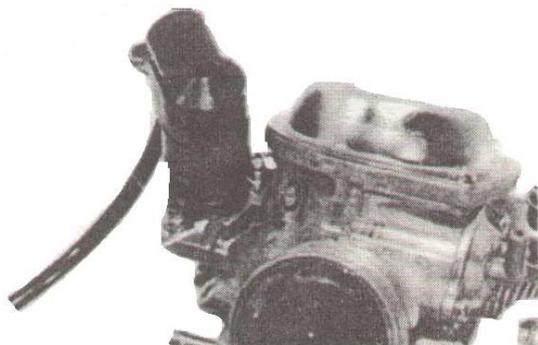
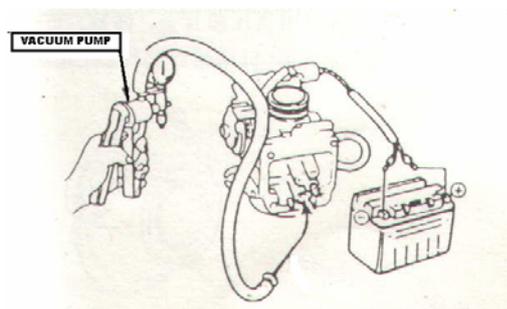
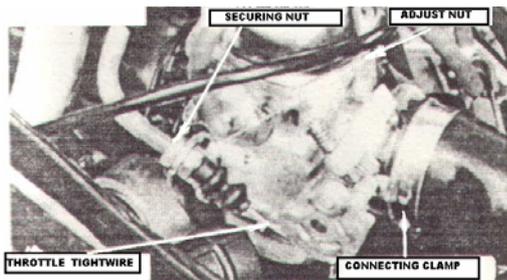
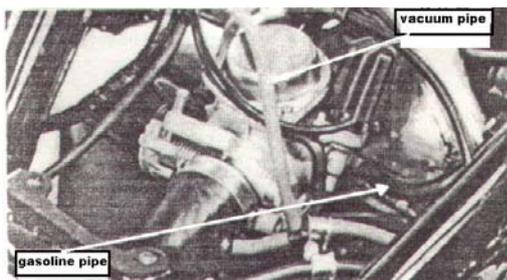
**NOTE:**

Be sure to point the arrow on the oil pump to the direction of crankshaft in installation and infuse some oil into the pump beforehand.



### 3.5 CARBURETION

1. Remove auto choke lead coupler.



2. Remove fuel hose and air pressure tube.

3. Remove throttle cable locknut to take out throttle cable. Loosen inlet-valve seat screw and air filter fixing screw to remove carburetor.

**NOTE:**

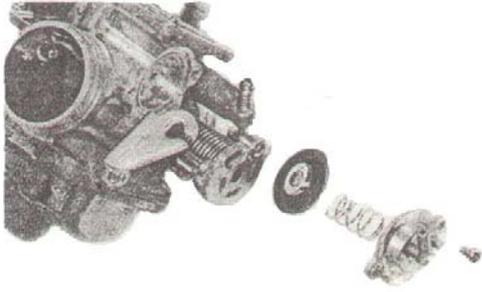
Make sure the fuel in the fuel bowl is drained before the carburetor removal lest the cylinder head be sprinkled with the fuel, which is likely to bring about a fire.

4. Inspect auto choke unit.  
 Connect yellow auto choke unit lead to the positive pole (+) of a battery and green lead to the negative pole (-). Some 5 minutes later, connect a pipe to idle port and blow it with the mouth. Being blocked up means a good condition of the unit. Disconnect the leads from the battery. Around 30 minutes later, blow the pipe with the mouth or a vacuum pump. If it is unblocked, the unit is in good condition.

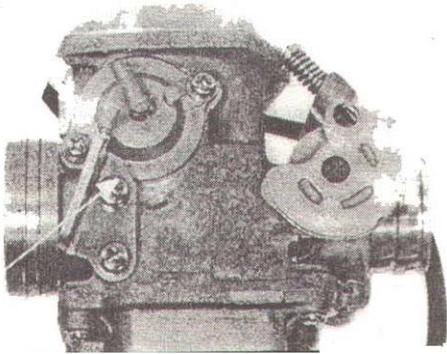
5. Remove fixing screw to take out auto choke unit.

6. Inspect auto choke unit, piston and needle for abnormal wear. If so, replace as a set.

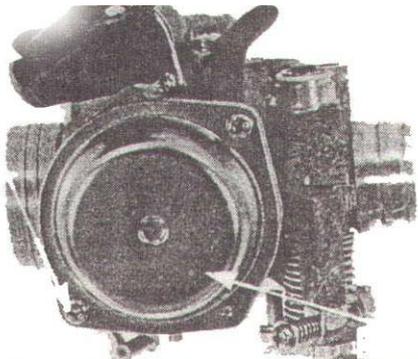
7. Fit auto choke unit on carburetor.



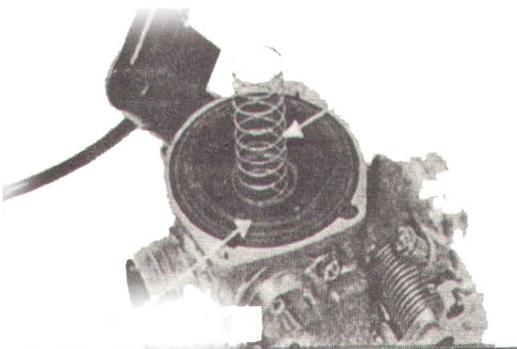
8. Remove screw to take out air pressure diaphragm cover, spring and diaphragm. Inspect spring for distortion and diaphragm for damage. If that is the case, replace as a set. Install in the reverse order of removal.

**NOTE:**

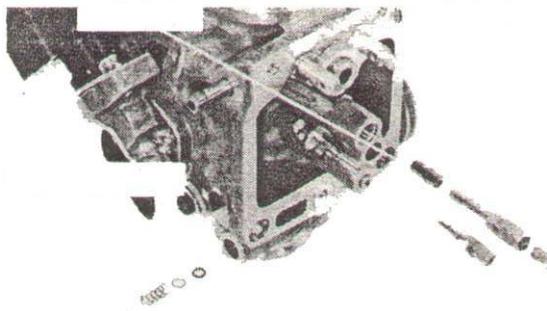
Make sure the slot on the air pressure diaphragm is in alignment with the corresponding setting slot on the carburetor.



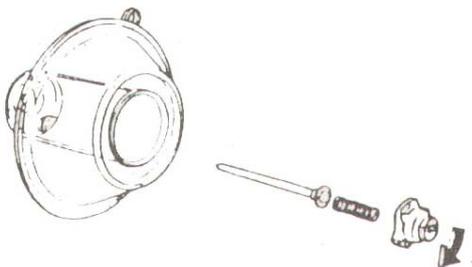
9. Remove two screws to take out air pressure chamber cover.



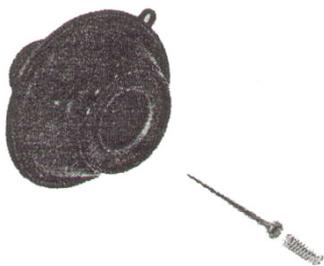
10. Remove spring, air pressure diaphragm and piston.



11. Remove fixing device on top of needle by depressing the device and turning it left. Remove spring and needle.



12. Inspect needle for wear, air pressure piston for damage and diaphragm for cracks and aging. Replace as a set if necessary.



13. Remove fuel bowl, float and needle valve.



14. Inspect needle valve and valve seat for damage and blockage.

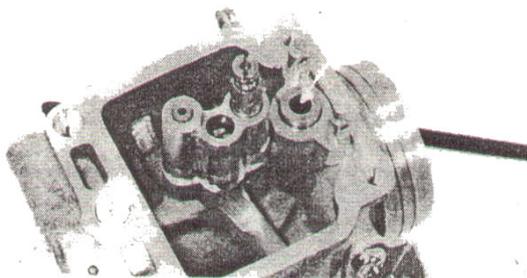
**NOTE:**

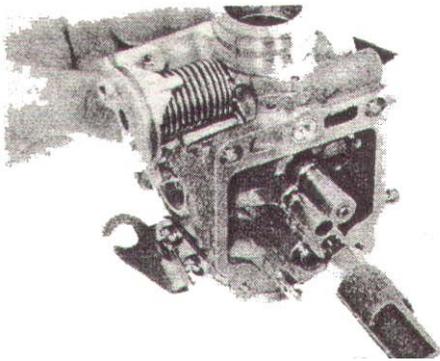
If the needle valve is damaged or blocked, the air-tightness between the valve and valve seat is not proper, which results in float height raise and then oil leakage. In such a case, the valve must be replaced with a new one.

15. Remove main jet, needle valve seat, idle metering jet and jet adjuster.

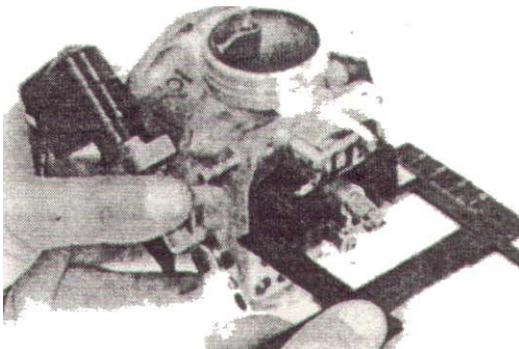
**NOTE:**

Make sure the jet, the nozzle seat and the adjuster are not damaged. Note down the turns given to the adjusting screw in removal.





16. Wash jet and nozzle in clean gasoline and clear them of filth with compressed air. Blow each fuel passage of carburetor clean with compressed air. And install them in their original positions.



17. Measure fuel level by holding the gauge vertically to the float chamber and in alignment with the main jet. The standard fuel level is 18.5mm. After inspection, fit the lid on the float chamber and install the carburetor.

**NOTE:**

Generally, fuel level adjusting screw has already been adjusted before leaving factory. There is no need for adjusting. If need be, it should be done by a professional.

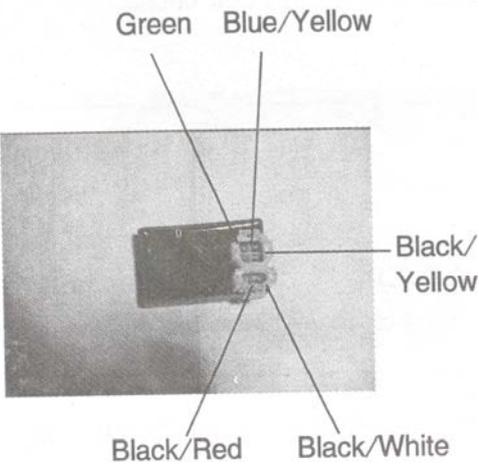
Adjustment steps:

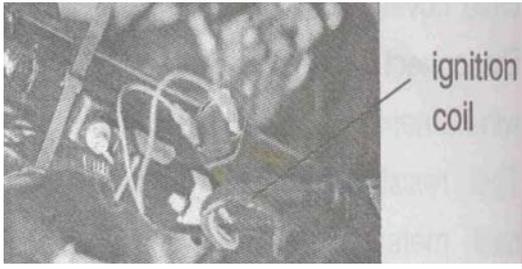
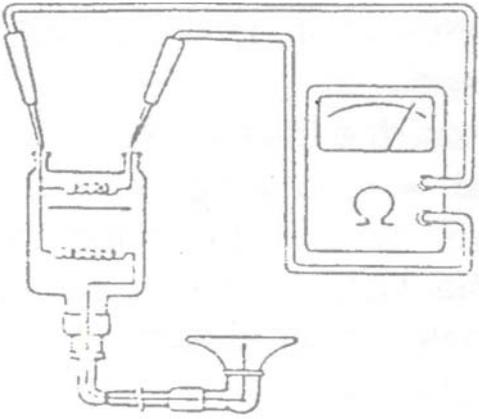
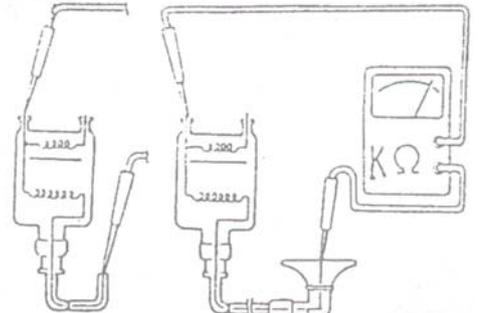
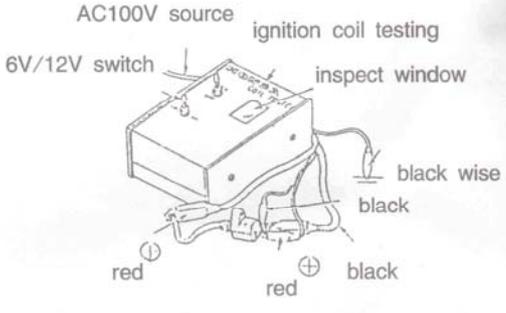
Run the engine 3-5 minutes. Adjust the idle screw with a screw driver to keep the revolution within the range of  $1700 \pm 170$  rpm. The adjusting screw should usually be screwed in gently and screw out by  $2 \frac{3}{8}$ - $3 \frac{7}{8}$  turns.

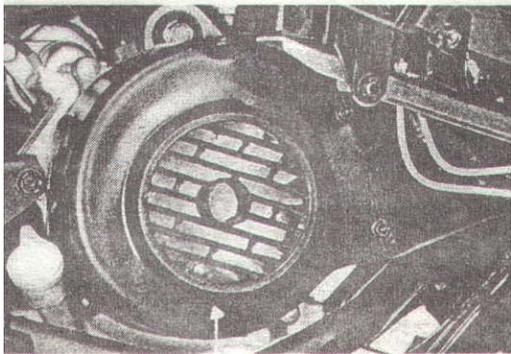
### 3.6 TIGHTENING TORQUES OF ENGINE MAIN FASTENERS

Description	Thread size	Tightening torque (Nm)
Cylinder head bolt	M6	9
Oil filter screen cover bolt	M30	15
Exhaust pipe nut	M6	9
Camshaft seat nut	M8	20
Valve adjuster locknut	M5	9
Cam chain tensioner bolt	M6	10
Transmission case drain bolt	M8	19
Clutch drive plate nut	M12	55
Clutch driven disk nut	M12	55
Starter clutch nut	M12	55
Spark plug	M10	12
Driven clutch woodruff key nut	M22	45
Case (right & left) and case cover (right & left)	M16	9

<b>3.7 IGNITION SYSTEM</b>			
<b>3.7.1 INSTALLATION INFORMATION</b>			
<b>OPERATING POINTS</b>			
<ul style="list-style-type: none"> <li>• Check ignition system in accordance with the troubleshooting procedure in section 3.11.2</li> <li>• As the ignition system has an electric automatic spark control in CDI unit, there is no need for spark advance angle adjustment.</li> <li>• Poor contact may be the cause of many ignition system faulty cases. Check all terminal connections to be sure they are clean and tight whenever troubleshooting an electrical problem.</li> <li>• Make sure spark plug heat range is correct. Using incorrect spark plug will result in improper engine operation or spark plug damage.</li> <li>• Peak voltage is used as reference point in tests. Record coil resistance tests.</li> </ul>			
<b>REFERENCE STANDARD</b>			
item		Standard value	
Specific spark plug		(NGK)C7HSA	
spark plug gap		0.6-0.7mm	
spark plug angle	Maximum advance in "F" position	13°±1°(1700r/min)	
Ignition coil resistance(20°C)	Primary coil		0.1-1.0Ω
	S	Wit	7-9kΩ
	e	h	
c	ca	3-4kΩ	
o	p		
n	Wit		
d	ho	80-160Ω	
ar	ut		
y	ca		
Pickup coil resistance(20°C)		80-160Ω	
Primary Ignition coil peak voltage		Over 120V	
Pickup coil peak voltage		Over 2.1V	
<b>3.7.2 TROUBLESHOOTING</b>			
<b>High Tension Voltage Too Low</b>			
<ul style="list-style-type: none"> <li>• Crankshaft revolution too low or battery voltage too low</li> <li>• Ignition system wiring loose</li> <li>• Faulty Ignition coil</li> <li>• Faulty CDI unit</li> <li>• Faulty pickup coil</li> </ul>			

<b>High Tension Voltage Intermittent</b>	
<ul style="list-style-type: none"> <li>• Faulty main switch</li> <li>• Poor CDI terminal connection</li> <li>• Poor CDI ground</li> <li>• Faulty pickup coil</li> <li>• Poor high tension lead terminal connection</li> <li>• Faulty CDI unit</li> </ul>	
<b>High Tension Voltage Normal but No Spark</b>	
<ul style="list-style-type: none"> <li>• Faulty spark plug</li> <li>• Faulty spark plug cap</li> </ul>	
<b>No High Tension Voltage</b>	
<ul style="list-style-type: none"> <li>• Faulty main switch</li> <li>• Faulty Ignition coil</li> <li>• Faulty CDI unit</li> </ul>	
<b>No or Intermittent High Tension Voltage</b>	
<ul style="list-style-type: none"> <li>• Faulty Ignition coil</li> </ul>	
<b>3.7.3 CDI INSPECTION</b>	
Disconnect the CDI module from the wire harness	<p><b>(CDI for MINI ATV100/150):</b></p> 
Test resistance of the terminals with a multi-meter.	
<ul style="list-style-type: none"> <li>• Since there is semiconductor in return circuit, testing result may be significantly different if different multi-meter are used.</li> <li>• If the pointer on the dial flickers and finally stops at ∞ in testing, it should be regarded as normal. Because the capacitor in the CDI module is charged while being tested and it cannot discharge at this time.</li> </ul>	
	<p><b>(CDI for B-type 150/200):</b></p> 

<p><b>3.7.4 IGNITION COIL</b></p>	
<p><b>Removal Steps</b></p>	
<p>Remove the middle box.</p>	
<p>Remove the spark plug cap.</p>	
<p>Disconnect the wires, remove ignition coil</p>	
<p>Jam nuts and remove the ignition coil.</p>	
<p><b>Inspection</b></p>	
<p>Check the ignition coil circuit.</p>	
<p>The spark advance angle does not need to be adjusted. If spark advance is abnormal, check the CDI, pickup coil or magneto. Replace the ignition coil if necessary.</p>	
<p>Test the primary coil resistance, the standard value of which should be 0.1-1.0Ω.</p>	
<p>Test the secondary coil resistance from spark plug cap negative terminals, the standard value of which should be 7-9kΩ(with cap) and 3-4kΩ(without cap). Coil test using after market spark tester.</p>	
<p>Perform the following inspection in accordance with the operating instructions in the Manual.</p>	
<p>1. Set the ignition coil tester switch in 12V and connect the tester to the ignition coil. 2. Turn the switch to the ON position to check spark frequency from the inspection door.</p>	
<ul style="list-style-type: none"> <li>• In good condition: Sparking continuously</li> </ul>	
<ul style="list-style-type: none"> <li>• In faulty condition: Sparking abnormally</li> </ul>	

<p><b>3.7.5 MAGNETO</b></p>	
<p><b>Pickup Coil Inspection</b></p>	
<p>This test is to be conducted with the stator mounted in the engine.</p>	
<p>Remove the cover.</p>	
<p>Disconnect the magneto.</p>	
<p>Test the pickup coil resistance between the blue/yellow and the green lead terminals, whose standard value is 80-160Ω.</p>	
<p>Dismounting the magneto.</p>	
<p><b>Charging Coil Inspection(for MINI ATV100/150)</b></p>	
<p>Test the charging coil resistance between the black/red and the green lead terminals, whose standard value is 450-550Ω.</p>	
<p><b>Spark Advance Angle Inspection</b></p>	
<p>Since CDI is used, there is no need to adjust the timing advance. If the spark advance is abnormal, inspect CDI, pickup coil or magneto. Replace if necessary.</p>	
<p>Remove timing lid.</p>	
<p>After the engine is warmed up, check the spark advance angle by the spark timing lamp. It is proper for "F" to align within ±2°with the engine revolving at a speed of 1700rpm.</p>	
<p>The spark advance angle should be 13°±1°(1700r/min)</p>	



# **CHAPTER 4A CHASSIS**

## **ATV 260 / 300 / 400 and B-Type ATV400-2 / ATV400-2B**

### **WARNING**

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

#### **4.1 A-RM REPLACEMENT**

#### **4.2 SWING ARM**

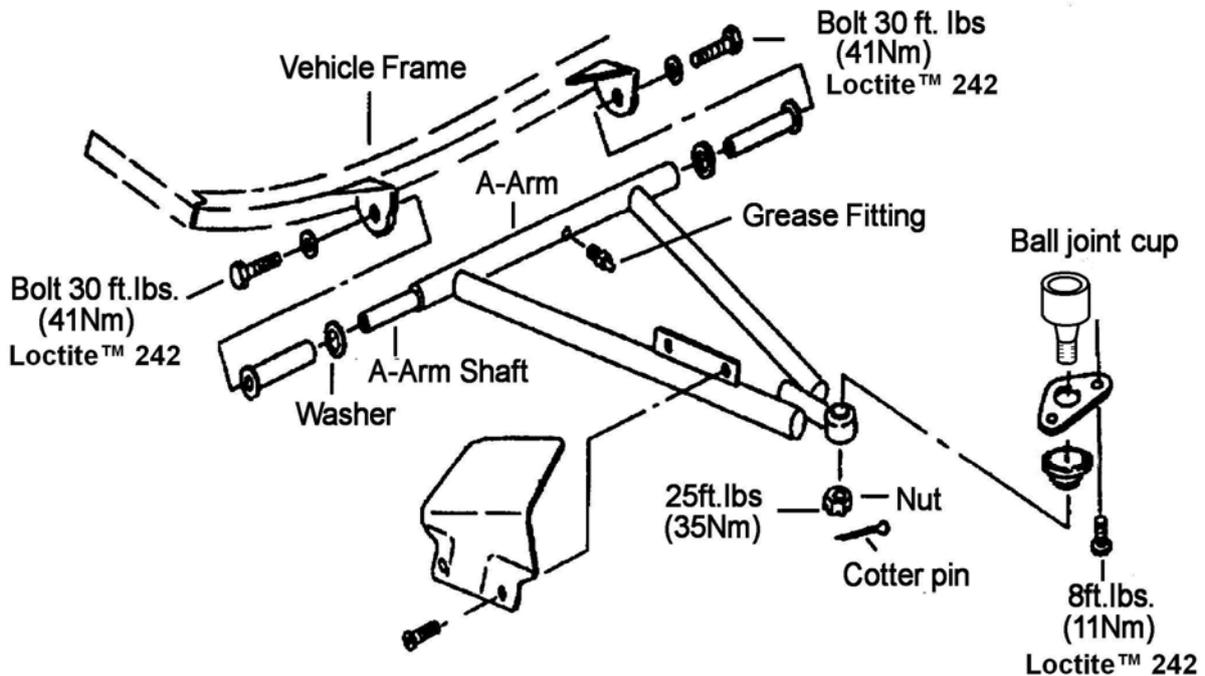
#### **4.3 FRONT STRUT REPLACEMENT**

#### **4.4 FRONT STRUT BALL JOINT REPLACEMENT**

#### **4.5 STEERING POST ASSEMBLY**

## 4.1 A-RM REPLACEMENT (MacPherson)

### EARLY DESIGN ( Only ATV 260 EARLY MODEL)



1. Elevate and safely support vehicle
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. Apply Loctite™ 242 to screw threads and Install new bolts. Torque new bolts to 30 ft. lbs. (41.4 Nm ).

#### WARNING

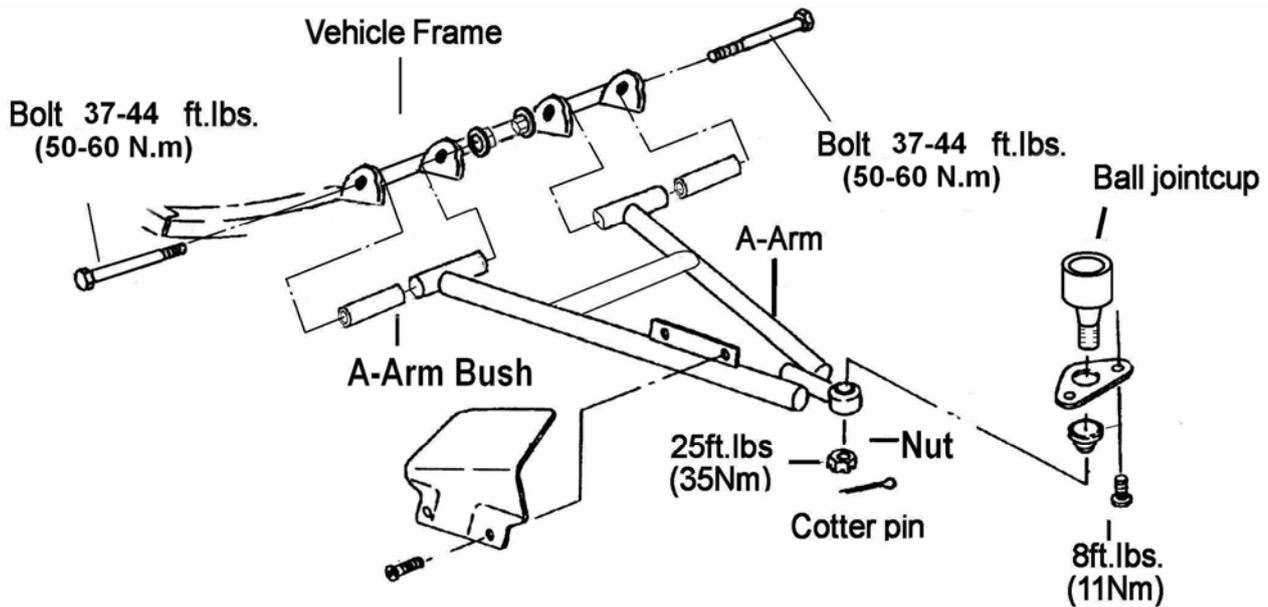
DO NOT reuse old bolts. Serious injury or death could result if fasteners come loose during operation.

8. Attach A-arm to 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.

## MAINTENANCE-FREE PIVOT DESIGN



1. Elevate and safely support vehicle
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 and remove two bolts on A-arm, and remove A-arm.
5. Examine bushing. Replace if worn or tore. Discard hardware.
6. Install new A-arm assembly onto vehicle frame. Install new bolts and new nuts.  
**NOTE.** Tighten the nuts only finger-tighten at this time. They will be tightened to the final torque after the front wheels are installed and the vehicle is on the ground.

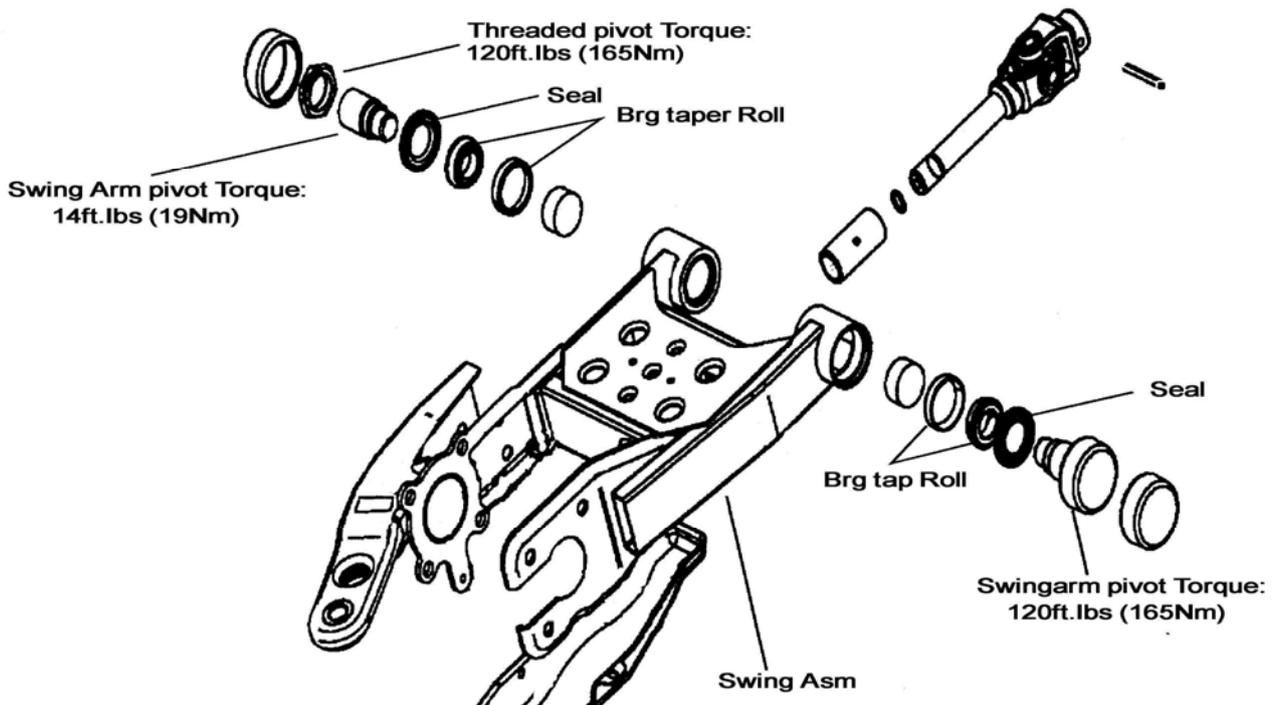
**WARNING**

DO NOT reuse old bolts. Serious injury or death could result if fasteners come loose during operation.

7. Attach A-arm to 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.
8. Install hubs, calipers and wheels, lower the vehicle to the ground. Apply Loctite™ 242 to screw threads of the A arm bolts and torque bolts to 37-44 ft. lbs. (50-60 Nm ).

**WARNING**

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

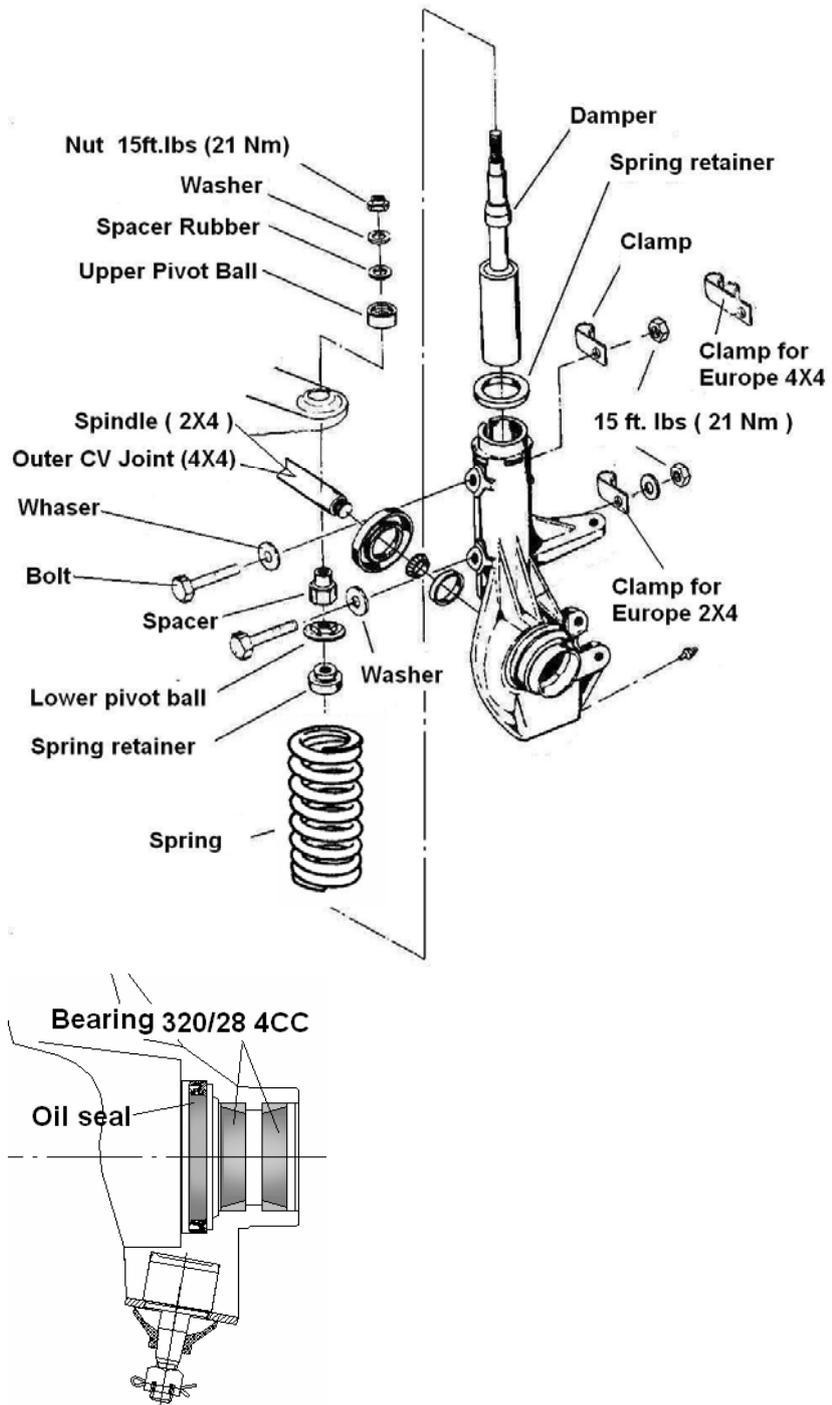
**4.2 SWING ARM ( EXCEPT ATV400-2, ATV400-2B )****Swing Arm Assembly Installation**

- 1, Screw swing arm pivots into frame on each side (about 3 turns).
- 2, Install swing arm assembly in frame with lubricated bearing taper roll, and install seal in each side of swing arm asm .
- 3, Apply Loctite 242 to R H swing arm pivot.
- 4, Tighten swing arm pivot until both are engaged in tapered roll.
- 5, Adjust right side swing arm pivot in ward until firmly seated against bearing, torque to 120 ft. lbs. (165Nm) and apply Loctite 271.
- 6, Torque left side swing arm pivot to 14 ft. lbs. (19 Nm ) and apply Loctite 271 .
- 7, Apply Loctite™ 242 (Blue) to exposed threads of swing arm pivot and threaded pivot.
- 8, Torque threaded pivot to 120 ft. lbs. (165 Nm) and apply Loctite 271.

**4.3 FRONT STRUT REPLACEMENT ATV260/ 300 /400 /400-2 /400-2B**

1. Hold strut rod with wrench and remove top nut
2. Compress spring.
3. Remove upper strut pivot assembly.
4. Remove coil spring and collapse strut body.
5. Remove two pinch bolts from strut body.
6. Remove strut body.
7. Install front shock cartridge until bottomed in strut casting.
8. Install pinch bolts with clamp(s).  
Torque pinch bolts to 15ft.lbs.(21Nm).
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.

**Strut Rod Nut Torque  
15 ft. lbs. (21 Nm)**

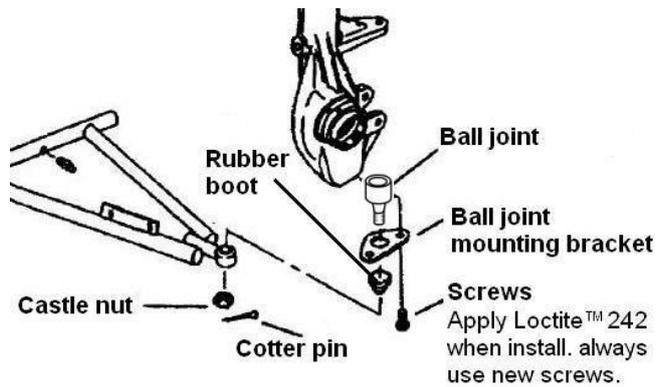


**4.4 FRONT STRUT BALL JOINT REPLACEMENT ATV260/300/400/400-2B**

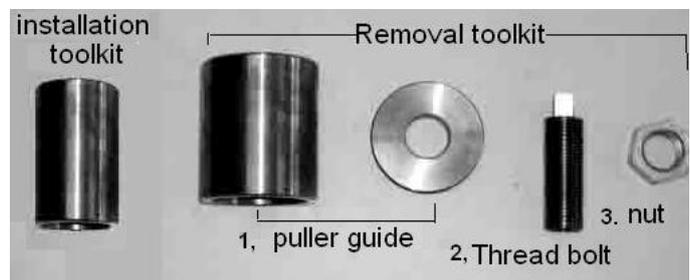
1. Loosen front wheel nuts.
2. Elevate and safely support ATV under footrest/frame area. .

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

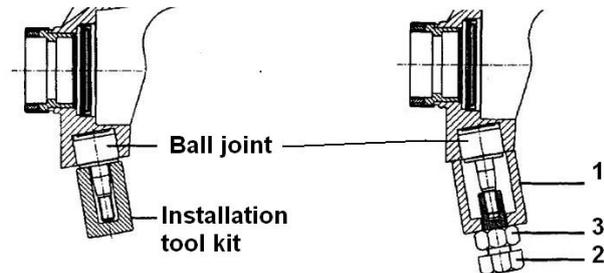
3. Remove wheel nuts and wheels.
4. Remove cotter pin from ball joint
5. Remove castle nut and separate A-arm from ball joint stud.
6. Remove screws and ball joint mounting bracket.



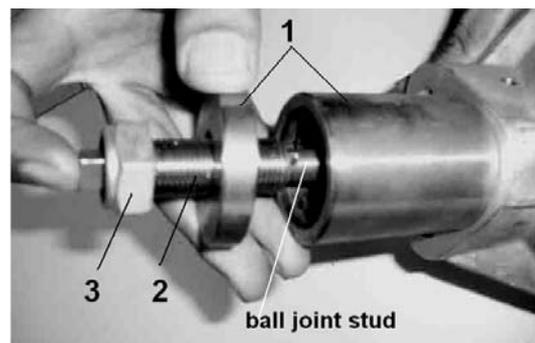
7. Using ball joint cup removal/installation toolkit, remove ball joint cup from strut housing. Refer to photos at right.
  - Install puller guide (1) .
  - Thread bolt (2) with nut (3) onto ball joint stud as shown .
  - Hold bolt (2) and turn nut (3) clockwise until ball joint is removed from strut housing.



8. To install new ball joint cup.
  - Insert new ball joint into driver (installation toolkit).
  - Drive new ball joint cup into strut housing until fully seated.



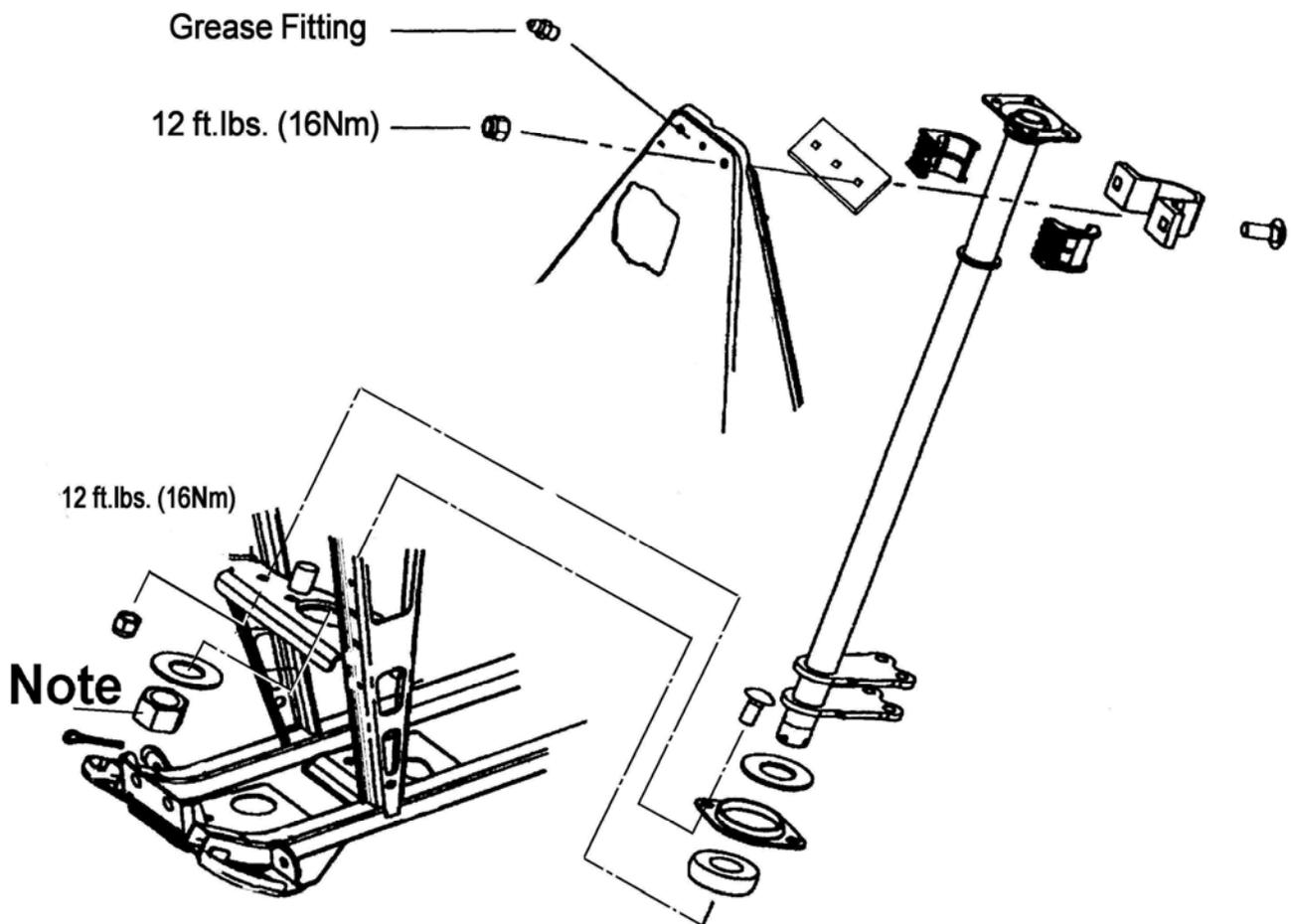
9. Apply Loctite 242 (blue) to threads of mounting bracket new screws. Torque screws to 8 ft.lbs. (11 Nm).



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.



## 4.5 STEERING POST ASSEMBLY

**Note:**

- 1, Hand tighten the crown nut of the steering post.
- 2, Align cotter pin hole.
- 3, Install cotter pin. Bend both ends of cotter pin around nut in opposite directions.
- 4, Check steering, must move freely and easily from full left to full right without binding.



# **CHAPTER 4 B CHASSIS**

**Youth ATV for USA: 50 / 80**

**Mini ATV for Europe: 50 / 100 /125 / 150**

## **WARNING**

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

4.1 FRONT WHEEL / HUB / DRUM BRAKE

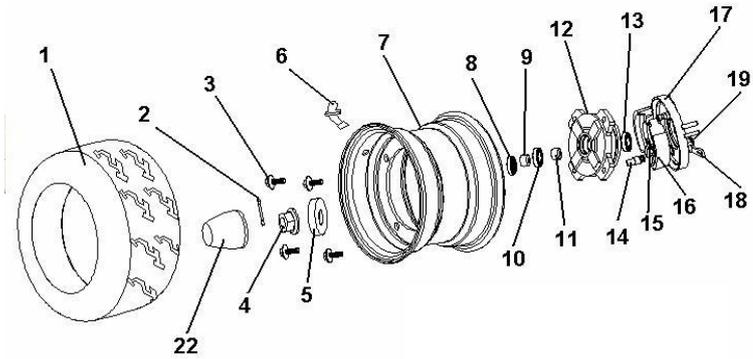
4.2 A-RM REPLACEMENT

4.3 FINAL DRIVE

4.4 SWING ARM

**4.1 FRONT WHEEL/ HUB**

1	TIRE FRONT
2	COTTER PIN
3	BOLT M10X1.25X20
4	CASTLE NUT M12X1.25
5	WASHER
6	VALVE
7	WHEEL FRONT
8	OIL SEAL
9	SPACER 1
10	BEARING 6002Z
11	SPACER 2
12	HUB ASSY
13	BEARING 6003Z
14	BRAKE CAM
15	RETURN SPRING
16	BRAKE SHOE SET
17	BRAKE PANEL. LEFT/ RIGHT
18	BRAKE ARM. LEFT/ RIGHT



19	SPRING. LEFT/ RIGHT
22	RUBBER CAP

**FRONT WHEEL REMOVAL**

1. Place the vehicle on level ground with engine off and fuel off, set the parking brake,
2. Loosen the 4 bolts (3), but not removal.
3. Elevate front end and safely support machine under frame area, Removal the bolts.
4. Remove the front wheel.  
Inspect all wheels for runout and damage.

**FRONT HUB REMOVAL**

1. Remove the wheel as described above.
2. Remove the RUBBER CAP (22), and cotter pin.
3. Loosen and remove the CASTLE NUT (4) and washer.
4. (Release the front parking brake) Removal the front hub.

**FRONT HUB/ DRUM/ BRAKE SHOE/ BRAKE PANEL/ BRAKE CAM and ARM INSPECTION**

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. Inspect the whole hub for damage replace if necessary.  
Inspect the drum/ shoes and springs/ panel/ cam/ arm for any damage or fracture, replace if necessary.  
See the CHAPTER 2 MAINTENANCE for the service limit of the brake shoe and drum.

**NOTE:** Replace the brake shoes as a set either is worn to the limit.

### HUB BEARING REPLACEMENT

1. Remove the oil seals.
2. Remove the SPACER 1.
3. Remove the bearings.
  1. Apply grease to the bearings.
  2. Drive the bearing 6002Z in first, seal side facing out,
  3. Put in the SPACER 2.
  4. Drive the bearing 6003Z in, seal side out,
  5. Install **new seal** into hub (with numbers facing out) until flush with end of seal bore. Do not damage the surface of the seal. Coat the lip with special grease.

**NOTE.** Drive the bearing 6002Z in first.

**Reverse the wheel and hub removal procedure for installation.**

### DRUM BRAKE

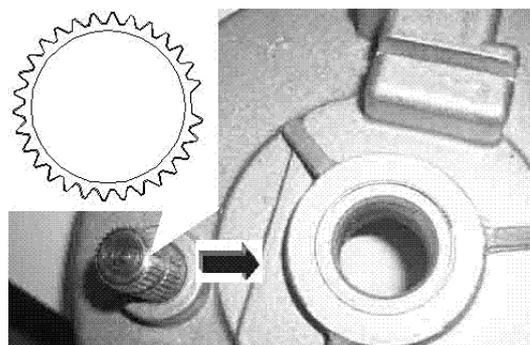
#### Disassembly

**NOTE:** If the brake shoes are going to be reinstalled, they must be installed in their original locations. Mark the brake shoes with "R U", "L U", "L U", "L L".

R-right, L-left, U-upper, L-lower

#### Assembly

1. Install the BRAKE CAM, notch facing the center of the BRAKE PANEL.



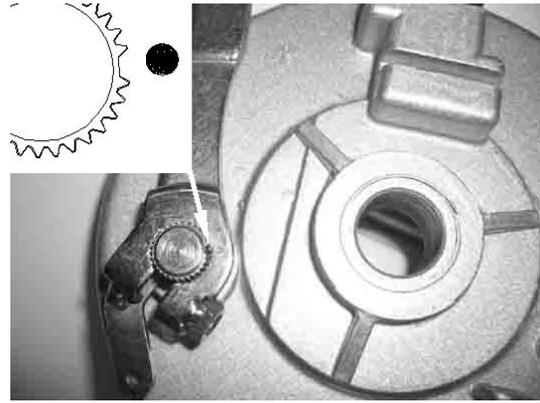
2. Install the SHOE SET.
3. Install the BRAKE ARM. align the point mark to the notch.

**NOTE:** Always replace the shoes as a set. Replace the brake shoes as a set either is worn to the limit.

**NOTE:** If reinstalling old brake shoes, install them into their correct locations on the brake panel. Refer to the “R U”, “L U”, “L U”, “L L” \*marks made in the Note of Disassembly.

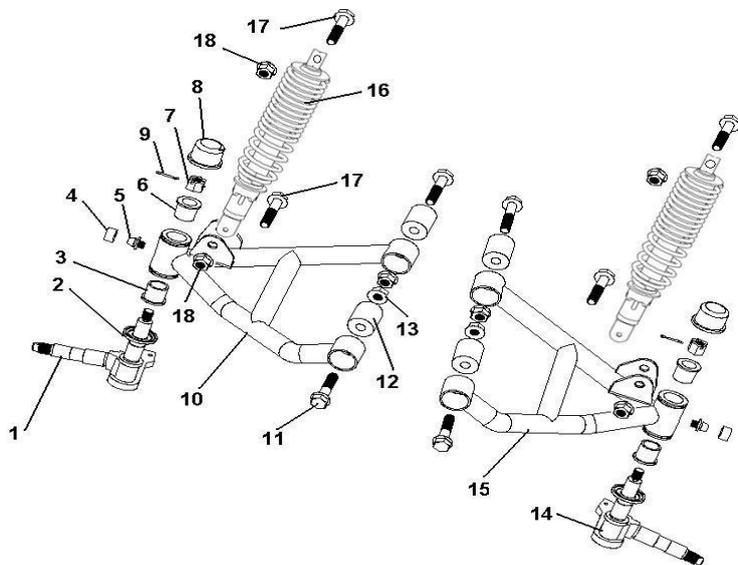
\*R-right, L-left, U-upper, L-lower

**NOTE:** If new linings are being installed, file off the leading edge of each shoe a little so that the brake will not grab when applied.



**4.2. A-ARM REPLACEMENT**

- 1 A-ARM PIVOT SHAFT RIGHT
- 2 A-ARM PIVOT SHAFT SEALED RING
- 3 BUSHING 1
- 4 GREASE FITTING
- 5 GREASE FITTING CAP
- 6 BUSHING 2
- 7 NUT M10X1.25
- 8 A-ARM PIVOT SHAFT CAP
- 9 COTTER PIN 2.5X20
- 10 A-ARM RIGHT
- 11 BOLT M10X1.25X48
- 12 A-ARM RUBBER BUSHING
- 13 CASTLE NUT M10X1.25
- 14 A-ARM PIVOT SHAFT LEFT
- 15 A-ARM LEFT
- 16 FRONT SHOCK ABSORBER
- 17 BOLT M10X1.25X38
- 18 NUT M10X1.25



**REMOVAL**

1. Remove wheel/ hub as described above.
2. Remove CAP (8), COTTER PIN (9), CASTLE NUT (13), and removal the PIVOT SHAFT (14/ 1).
3. Remove BOLTS (17) and removal FRONT SHOCK ABSORBER.
4. Remove 4 bolts (11) and removal A-ARM.

**INSPECTION**

Clean and Inspect the bushing 1, bushing 2, A-ARM RUBBER BUSHING, FRONT SHOCK RUBBER BUSHING and the PIVOT SHAFT for nicks, scratches, or damage. Replace if necessary.

**INSTALLATION**

**NOTE:** Always use new A-ARM PIVOT SHAFT SEALED RING for re-installation.  
Apply grease on A-ARM PIVOT SHAFT

Reverse the hub removal procedure for installation.

**4.3 FINAL DRIVE****REAR WHEEL****Removal**

1. Place the vehicle on level ground with engine off and fuel off, set the front parking brake,
2. Loosen the 4 bolts (3), but not removal.
3. Elevate rear end and safely support machine under frame area, Removal the bolts.
4. Removal the wheel.

**Inspection**

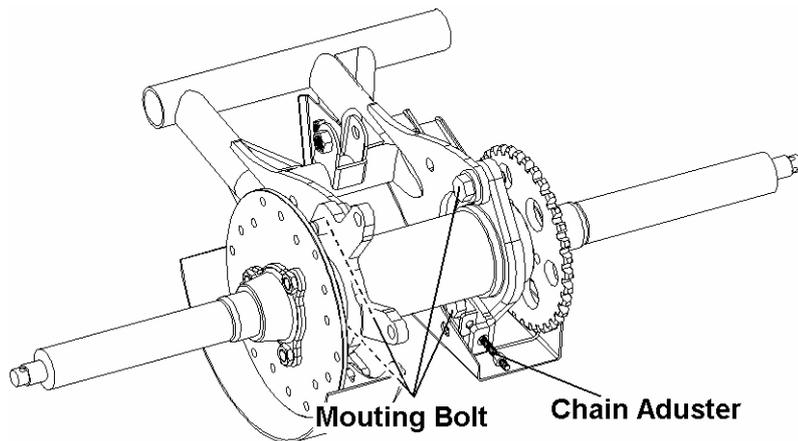
Inspect all wheels for runout and damage.

**Installation**

Reverse the wheel removal procedure for installation.

**DRIVE CHAIN****Chain Removal**

1. Place the vehicle on level ground with engine off and fuel off, set the front parking brake,
2. Rotate rear wheel to place master link in accessible position between two sprockets.
3. Remove the rear wheels as described above.
4. Loosen, but not removal the four mounting bolts. Loosen the chain adjuster.
5. Slide the retaining clip of the master link and remove clip and side plate.
6. Slide master link out and remove the chain.



### Chain Inspection, Installation and Adjustment

1. Clean and Inspect chain and chain sprocket for wear.

**NOTE:** To clean the chain, remove the chain from the ATV, dip it in solvent, and clean out as much dirt as possible. Take the chain out of the solvent and dry it. Immediately lubricate the chain to prevent rust.

2. If sprockets are worn, replace sprockets and chain as a set.

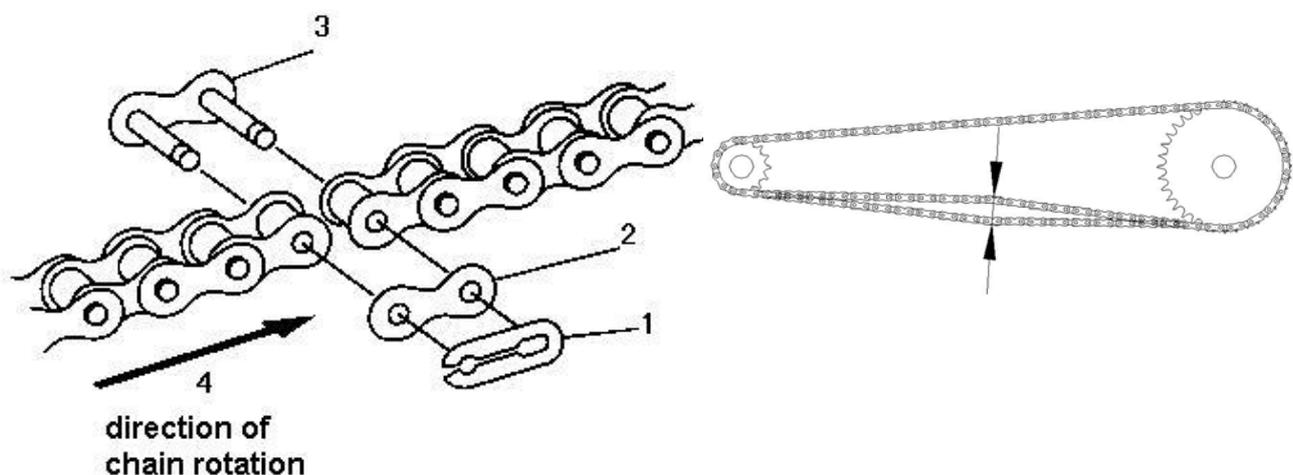
3. Replace guards if damaged.

4. Slide the pin portion of the master link(3) in to each end of chain to be connected.

5. Slide the side plate(2) portion of the master link on to the pins.

6. Slide the retaining clip(1) on to the pins until clip snaps securely in to place.

**CAUTION:** The master link should be installed with the open end of the retaining clip (1) facing away from direction of chain rotation (4).



7. Turn the chain adjuster to obtain 1/4" (6mm) to 3/8" (10mm) chain flex. To tighten the chain, turn the chain adjuster clockwise. To loosen the chain, turn the chain adjuster count clockwise and push the rear axle forward.

8. Securely tighten the mounting bolts.

**Torque Specifications:** 41-44Ft.Lbs (55-60N.m)

9. Recheck the chain tension: At the center point between the two sprockets, push and pull the chain and note total flex. If flex is more than 1/2" (12mm), readjust chain.

10. Apply proper type spray-on chain lubricant thoroughly inside and outside plates and rollers of chain. Move ATV as needed to access entire chain.

## FINAL DRIVE

### Removal

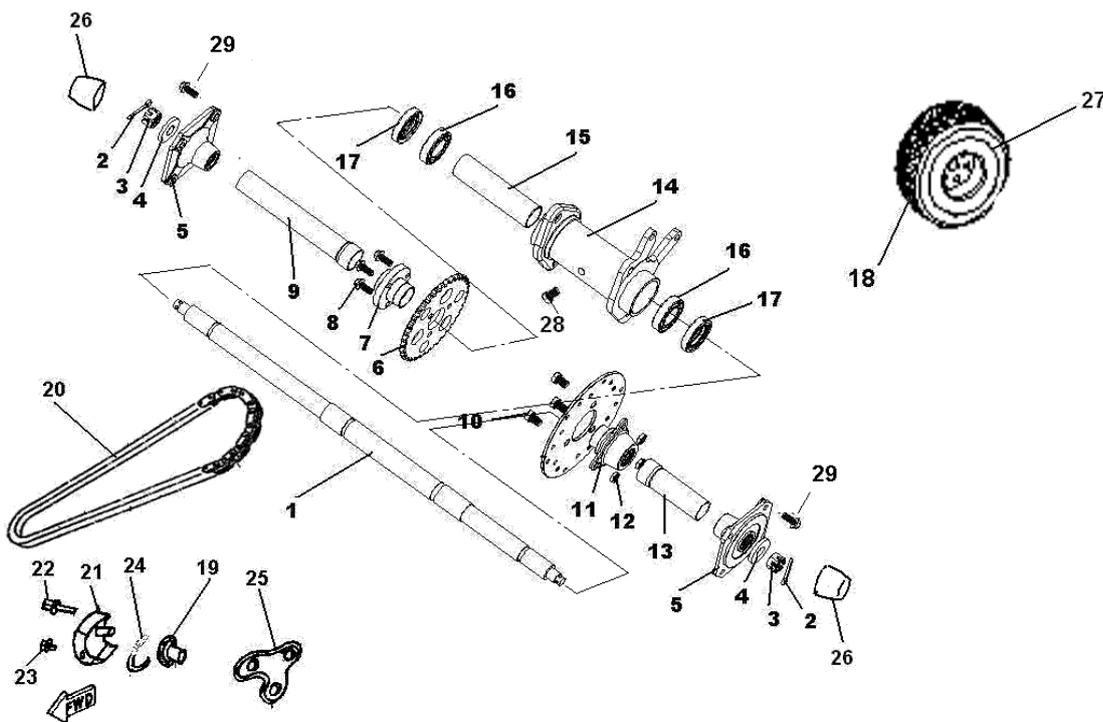
1. Remove wheels, chain as described above.
2. Remove the 4 M12X1.25X28 mounting bolts.
3. Remove the final drive assembly from the swing arm,

### Installation

Reverse the removal procedure for installation. Adjust chain tension as described above. Securely tighten the mounting bolts (1).

**Torque Specifications:** 41-44Ft.Lbs (55-60N.m)

### Final Drive Disassembly



1	REAR AXLE		
2	COTTER PIN		
3	CASTLE NUT	50/ 80	M16X1.5
		100/125/150	M20X2
4	WASHER 1		
5	REAR HUB		
6	SPROCKET		
7	HUB. SPROCKET		
8	BOLT M10X1.25X28		
9	SPACER RIGHT		
10	BOLT M10X1.25X20		
11	BRAKE DISC FLANGE		
12	NUT M10X1.25		
13	SPACER LEFT		
14	AXLE TUBE		
15	SPACER		
16	BEARING		
17	OIL SEAL, REAR AXLE		
18	TIRE REAR AT19X7-8		
	TIRE REAR AT18X7-8 (FOR EUROPE)		
19	SPROCKET 2		
20	CHAIN		
21	CHAIN COVER		
22	BOLT M6X75 (only for 50/ 80)		
23	BOLT M6X10		
24	RUBBER STICK		
25	BRACKET		
26	RUBBER CAP		
27	RIM REAR		
28	PLUG		
29	BOLT M10X1.25X28		

1. Remove the RUBBER CAP (26) and cotter pin.
2. Loosen and removal the CASTLE NUT (3) and washer.
3. Remove the rear hub.
4. Remove the SPACER RIGHT (9) and SPACER LEFT (13).
5. Remove the BRAKE DISC with FLANGE and removal the sprocket.
6. Remove the rear axle.

### Final Drive Inspection

Remove the oil seal from the AXLE TUBE. 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. Inspect the whole things for damage replace if necessary.

**Final Drive Assembly**

1. Drive in bearings to the AXLE TUBE.

**NOTE:** Drive the bearing which near the brake disc first by press the bearing outer race, then put in the SPACER (15) and drive in another bearing by press the bearing both inner and outer race till it touch the SPACER (15).

2. Install new oil seals.

3. Install the rear axle from the brake disc side.

4. Reverse the rest procedure for installation till the hub.

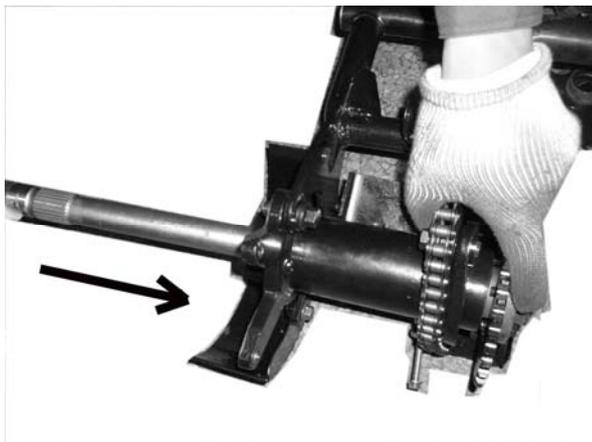
5. Screw in the left side castle nut and align the hole to the notch of the nut. Install the right side castle nut and securely tighten the nut, install a new cotter pin.

6. Securely tighten the left nut and install a new cotter pin.

**Torque Specifications:**

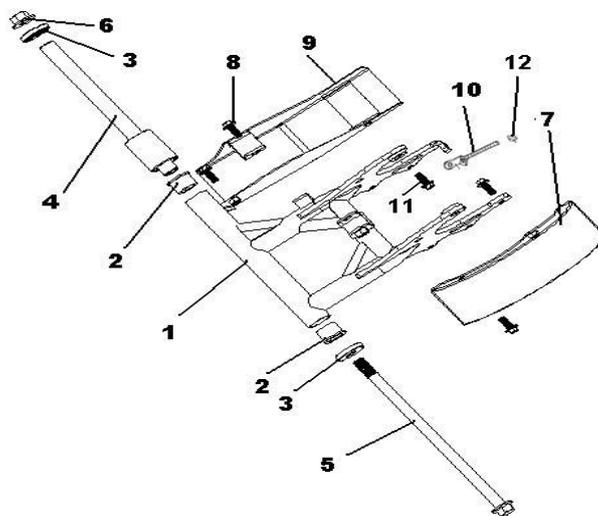
50/ 80	M 16 X 1.5	62Ft.Lbs ( 83N.m )
100/ 125/ 150	M 20 X 2	81Ft.Lbs ( 110N.m )

7. Install the rubber cap.



**4.4 SWING ARM**

- 1 SWINGARM ASSY
- 2 SWING ARM PIVOT BUSHING
- 3 SEAL
- 4 SWING ARM PIVOT BUSHING 3
- 5 SWING ARM PIVOT
- 6 NUT M14X1.25
- 7 DISK BRAKE MANTLE
- 8 BOLT M8X12
- 9 CHAIN WHEEL MANTLE
- 10 CHAIN ADJUSTER
- 11 BOLT M10X1.25X28
- 12 NUT M6



**Removal**

1. Removal rear shock absorber.
2. Removal NUT (6), washer, and SWING ARM PIVOT (5).

**Inspection**

Inspect the SWING ARM PIVOT BUSHINGS and the SWING ARM PIVOT shaft for nicks, scratches, or damage. Replace if necessary.

**Installation**

Reverse the removal procedure for installation.

**Note.** Install **new** seal. Coat the lip, bush, and pivot with grease.

**Torque Specifications:** NUT(6) M14X1.25: 40-44Ft.Lbs (55~60N.m )  
Bolt for rear shock absorber: 21-24Ft.Lbs (28~32N.m)



# CHAPTER 5 FINAL DRIVE

## ATV 260/300/400-2 and B-Type/400-2B

### WARNING

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

**(PLEASE SEE CHAPTER 4B IN THIS MANUAL FOR THE WHEEL, HUB, AND DRIVE CHAIN OF MINE/ YOUTH ATV)**

- 5.1 WHEEL, HUB, AND SPINDLE TORQUE TABLE
- 5.2 FRONT HUB DISASSEMBLY/INSPECTION
- 5.3 FRONT HUB ASSEMBLY
- 5.4 FRONT HUB INSTALLATION (2WD)
- 5.5 FRONT DRIVE AXLE (INNER AND OUTER CV JOINT) REMOVAL/INSPECTION (4X4)
- 5.6 FRONT DRIVE AXLE INSTALLATION (4X4)
- 5.7 FRONT DRIVE AXLE DISASSEMBLY/ INSPECTION (4X4)
- 5.8 FRONT DRIVE AXLE ASSEMBLY (4X4)
- 5.9 REAR HUB INSPECTION
- 5.10 REAR AXLE REMOVAL
- 5.11 REAR AXLE INSTALLATION
- 5.12 REAR AXLE BEARING REMOVAL
- 5.13 REAR AXLE BEARING INSTALLATION
- 5.14 REAR GEARCASE DISASSEMBLY
- 5.15 REAR GEARCASE ASSEMBLY
- 5.16 FRONT GEARCASE SLIP LIMIT TORQUE TEST (4X4)
- 5.17 FRONT GEARCASE DISASSEMBLY/ INSPECTION (4X4)
- 5.18 FRONT GEARCASE ASSEMBLY (4X4)
- 5.19 FRONT DIFFERENTIAL DISASSEMBLY/ INSPECTION (4X4)
- 5.20 FRONT DIFFERENTIAL ASSEMBLY (4X4)
- NOTE.** *ELECTRIC 4WD SHIFT---See CHAPTER 8 ELECTRICAL*
- 5.21 REAR, FRONT PROP SHAFT REMOVAL

## 5.1 WHEEL, HUB, AND SPINDLE TORQUE TABLE

Item	Specification
Front Wheel Nuts	ATV26./300/B Type: 20 Ft.Lbs 27 N.m
	ATV400: 48 Ft.Lbs 66 N.m
Rear Wheel Nuts	ATV26./300/B Type: 50 Ft.Lbs 69 N.m
	ATV400: 48 Ft.Lbs 66 N.m
Front Hub Nut on Spindle/ outer CV joint	Refer to FRONT HUB INSTALLATION
Rear Hub Retaining Nut	ATV26./300/B Type: 80 Ft.Lbs 110.6 N.m
	ATV400: 101Ft.Lbs 137N.m

**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.

## 5.2 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.

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. Drive bearing out through opposite side of hub and discard.
9. Drive other bearing out and discard.
10. Clean hub and spacer thoroughly.



## **5.2 FRONT HUB REMOVAL/INSPECTION 4x4(ATV400-2 / ATV400-2B)**

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 the tire/Wheel firmly and checking for movement. Grasp The top and bottom of the tire. The tire should rotate smoothly without binding or rough spots.
3. Remove wheel nuts and wheel.
4. Remove the two brake caliper attaching bolts.

### **CAUTION:**

Do not hang the caliper by the brake Line. Use wire to hang the caliper to prevent. Possible damage to the brake line.

5. Remove hub cap, cotter pin, front spindle nut, and Washer.
6. Rotate each bearing by hand and check for smooth rotation. Visually inspect



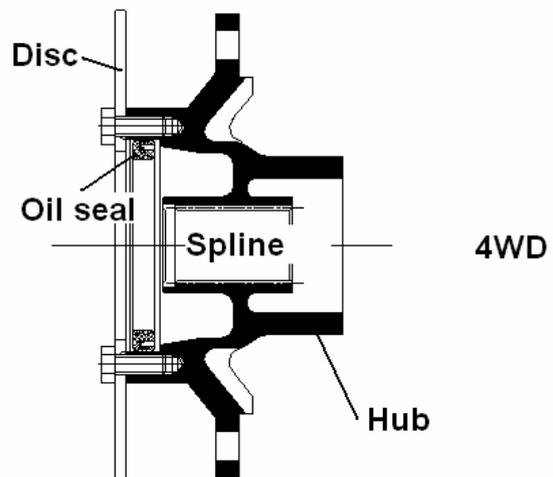
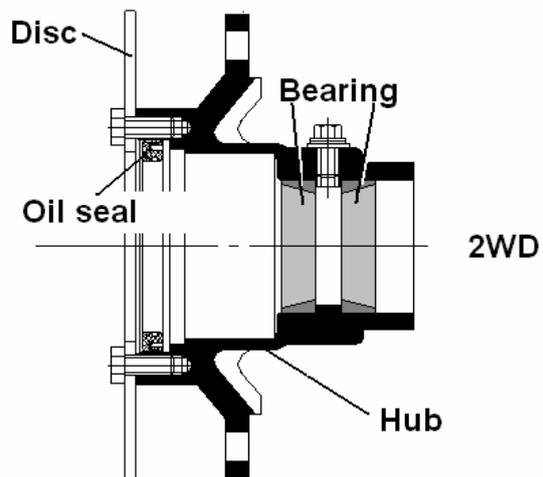
bearing for moisture, dirt, or corrosion, or roughness is evident.



**5.3 a. FRONT HUB ASSEMBLY (ATV150/200/260/300)**

1. Drive or press one new bearing in to hub using a bearing driver (2WD).
2. Drive or press the other bearing into hub until seated against the hub shoulder (2WD).
3. Coat the new bearing with grease (2WD).
4. Coat the spline with grease (4WD)
5. Install new seal into hub (with numbers facing out) until flush with end of seal bore. Do not damage the surface of the seal. Coat the lip with special grease.

**FRONT HUB ASSEMBLY**



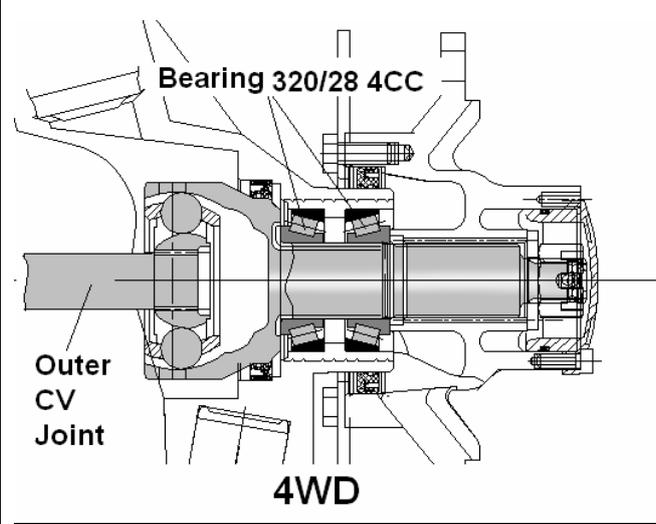
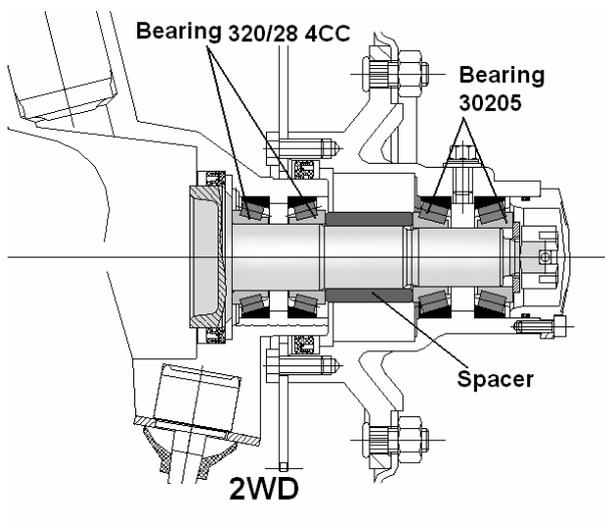
**5.3 b. FRONT HUB INSTALLATION 4X4 (ATV400-2 / ATV400-2B)**

1. Inspect the hub strut bearing surface for wear or damage.
2. Apply grease to drive axle spindle.
3. Install spindle through the backside of the hub strut. Install the hub onto the spindle.
4. Install spindle nut and tighten to specification.
5. Install a new cotter pin. Tighten nut slightly if necessary to align cotter pin holes.
6. Rotate wheel and check for smooth operation. Bend both ends of cotter pin around end of Spindle in different directions.
7. Install hub cap.
8. Rotate hub. It should rotate smoothly without binding or rough spots or side play.
9. 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.

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



**5.4 .a .FRONT HUB INSTALLATION (ATV150/200/260/300)**

1. Inspect spindle seal on strut and bearing surface for wear or damage.
2. Apply grease to spindle and bearing.
3. Install spindle into strut.



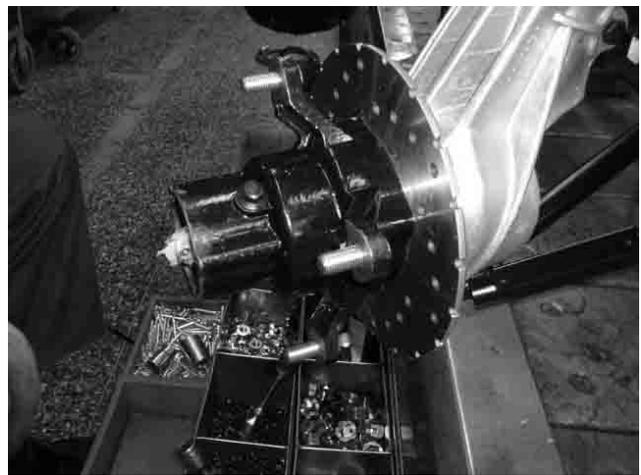
4. Install bearing to spindle.
5. Install spacer on spindle (2WD).



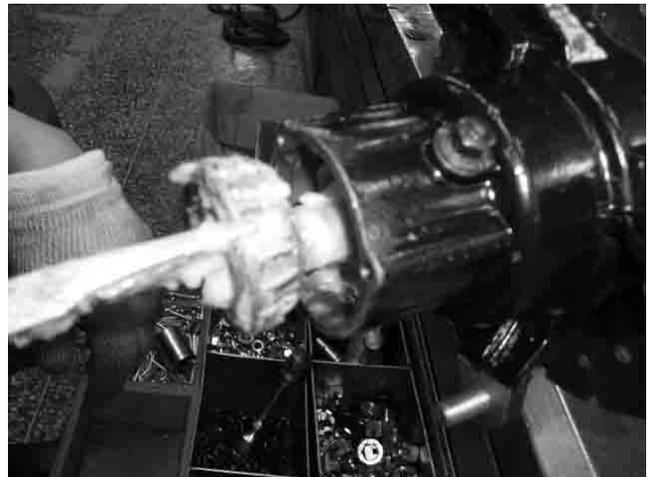
6. Install bearing 30205 on spindle (2WD) .
7. Apply grease.



8. Install hub.



9. Install bearing 30205 on spindle.



10. Install washer and spindle nut. Torque spindle nut to 160-170 inch lbs (18-19N.m), while rotating hub continuously, back off nut 1/2 turn, and rotate the hub several turns. Re-torque spindle nut to 110-140 inch lbs



(12-16N.m).

11. Install a new cotter pin. Tighten nut slightly if necessary to align cotter pin holes.

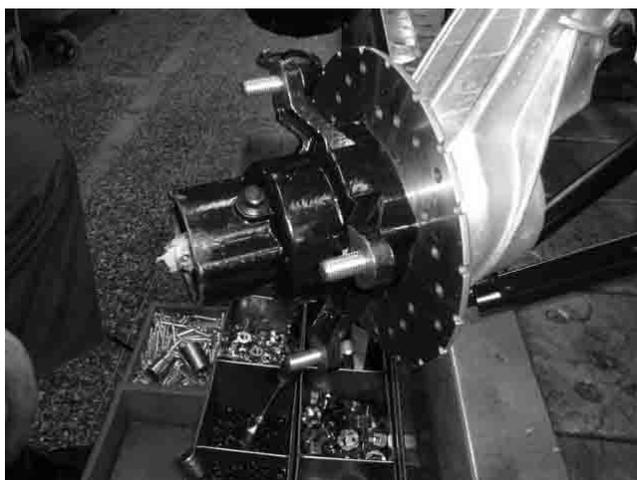
12. Rotate hub and check for smooth operation. Bend both ends of cotter pin around end

13. Lightly grease a new O- ring and install on hub cap.

14. Install hub cap.

15. Rotate hub. It should rotate smoothly without binding or rough spots or side play.

16. Install brake caliper using new bolts (Apply Loctite™ 242 (blue) to threads). Tighten bolts to specified torque.



### CAUTION

Always use new brake caliper mounting bolts upon assembly.

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

### **5.4 b. FRONT HUB BEARING REPLACEMENT 4X4 (ATV400-2 / ATV400-2B)**

1. Remove outer snap ring.

2. Form the back side, tap on the outer bearing race with a drift punch in the relief as shown.

3. Drive bearing out evenly by tapping on outer race only. Once bearing is at bottom of casting, support casting on outer edges so bearing can be removed.

4. Inspect bearing.



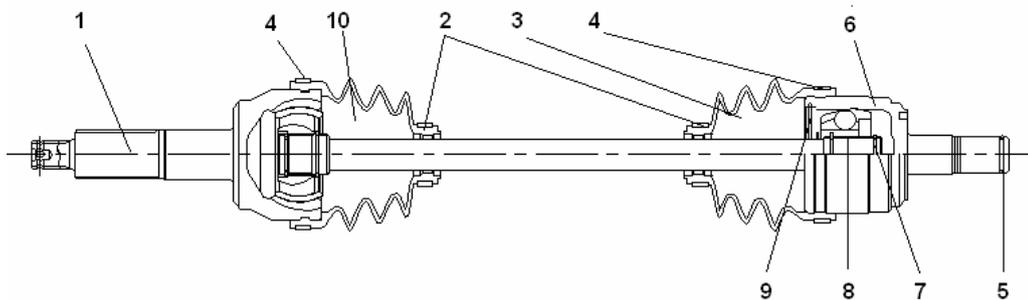
**NOTE:** Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. inspect for rough spots, discoloration, The bearings should turn smoothly and quietly, no detectable up and down movement and minimal movement sideways between inner and outer race.



5. Inspect bearing housing for scratches, wear or damage. Replace housing if damaged.

**5.5 FRONT DRIVE AXLE (INNER AND OUTER CV JOINT) REMAVAL/INSPECTION (4X4)**

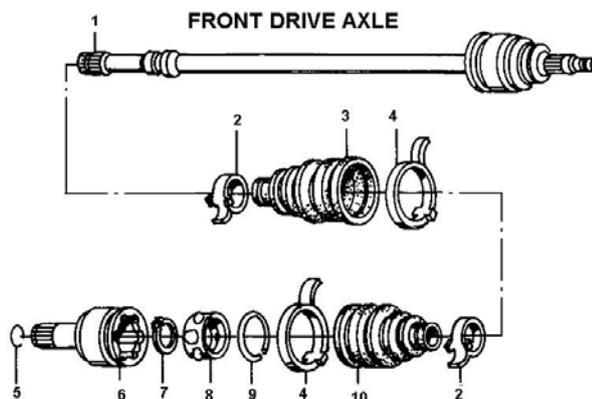
**FRONT DRIVE AXLE**



**NOTE**

The outer CV joint cannot be disassembled or repaired, if damage or faulty the drive axle assembly must be replace.

- 1. Drive axle/ outer CV joint assembly.
- 2. Boot band "A".
- 3. Outer board boot.
- 4. Boot band "B".
- 5. Stopper ring
- 6. Outer CV joint \*
- 7. Circlip
- 8. Bearing \*
- 9. stopper ring
- 10. Inboard boot.



**NOTE:** Always order and replace 6 and 8 together.

**REMOVAL**

1. Place the vehicle on level ground and set the parking brake, Block the rear wheels so the vehicle will not roll in either direction.
2. Remove the front wheels, steering tie rods, disconnect the A arm on the ball joint end as described in this Chapter and Chapter 4.

**CAUTION**

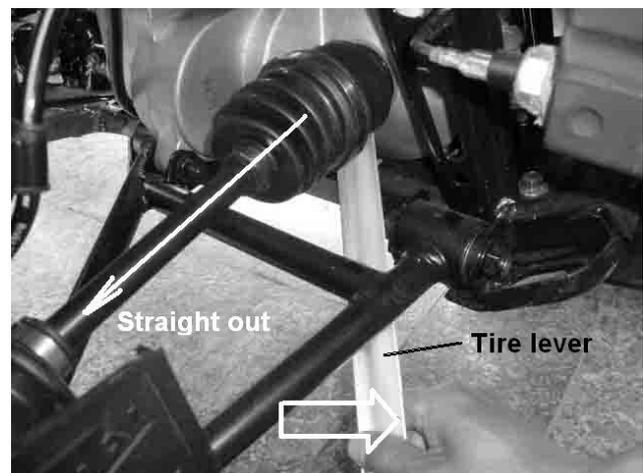
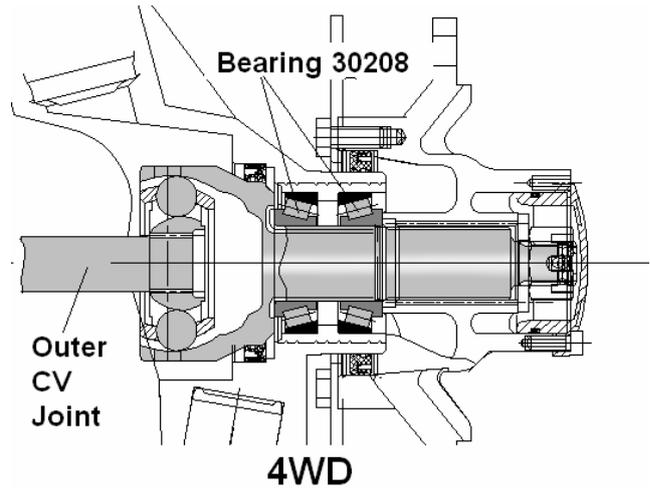
To avoid damage to the front differential oil seal, hold the front drive shaft horizontal and straight out from the front differential during removal.

3. Hold the drive shaft straight out.
4. Place a tire lever between the inner CV joint and the differential housing, with a small piece of wood against the housing to help get "leverage" and protect the casting. "pop" the in inner CV joint out from the front differential.

**INSPECTION**

**NOTE** The boots are subjected to a lot of abuse if the vehicle is ridden in rough terrain. If the boots are damage and left un-repaired, the driveshaft joints will fair prematurely by allowing the joint to be exposed to dirt, mud and moisture. This also allow the loss of critical lubrication.

1. Check the rubber boots for wear, cuts or damage and replace if necessary as described under the Disassembly / Assembly procedure in this chapter.
2. Move each end of the drive shaft in a circular motion (and also a reciprocate for inner one) and check the drive shaft joints for excessive wear or play.
3. This inner CV joint (inboard pivot joint) can be serviced if there is wear or play. The outer CV joint (outboard pivot joint) cannot be serviced if worn or damage and if necessary, the drive shaft assembly must be replaced.

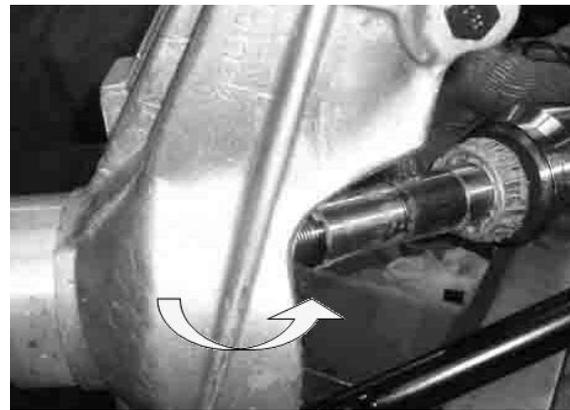
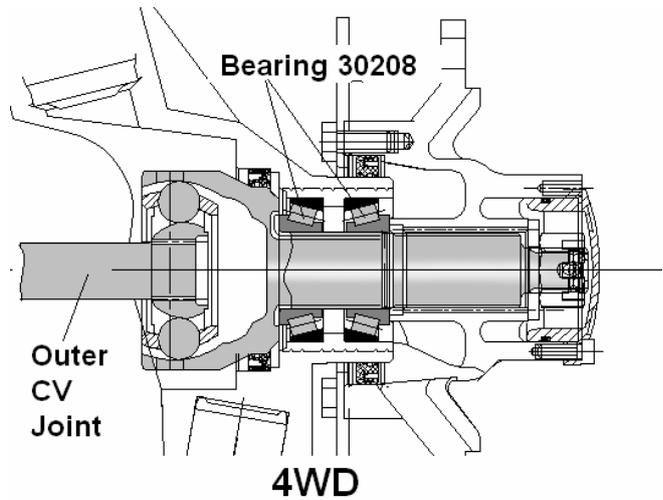


**5.6 FRONT DRIVE AXLE INSTALLATION (4X4)**

**CAUTION**

To avoid damage to the front differential oil seal and the strut oil seal, hold the front drive shaft horizontal and straight into the strut during installation.

1. Hold the drive shaft straight in from the front differential.
2. Push the drive shaft straight into the front differential and push it in all the way until it bottoms out. If necessary, carefully tap on the outer end of the drive shaft with a rubber mallet or soft-faced mallet.
3. After the drive shaft is installed, pull the inner CV joint a little to make sure the drive shaft stopper ring has locked into the front differential side gear groove.
4. Carefully install the outer CV joint (spindle) into the strut, install the front hub and wheel.
5. Install the ball joint on the A arm, the steering tie rods, the hubs and the wheels as described in this Chapter and Chapter 4.



**5.7 FRONT DRIVE AXLE DISASSEMBLY/ INSPECTION (4X4)**

**INNER CV JOINT DISASSEMBLY**

**NOTE**

The outer CV joint cannot be disassembled or repaired, if damage or faulty the drive axle assembly must be replace.

1. Open the clamps on both boot band “A” and “B” on the inner CV joint, then remove boot band “B” .Discard the boot band, it cannot be reused.
2. Carefully slide the boot (A) onto the drive axle and off the inboard joint.
3. Wipe out all of the molybdenum disulfide grease within the inboard joint cavity.
4. Remove the stopper ring from the inboard joint.



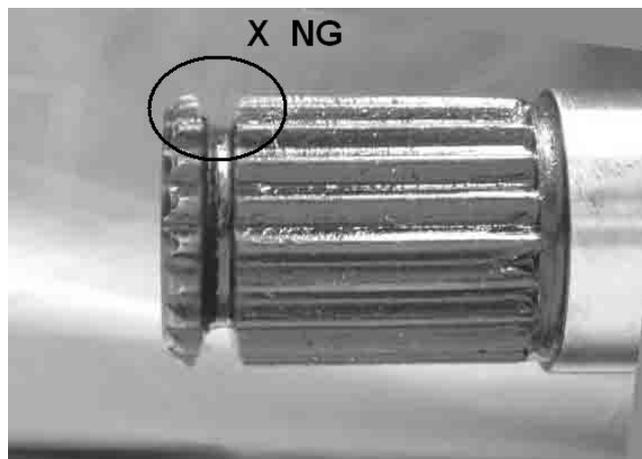
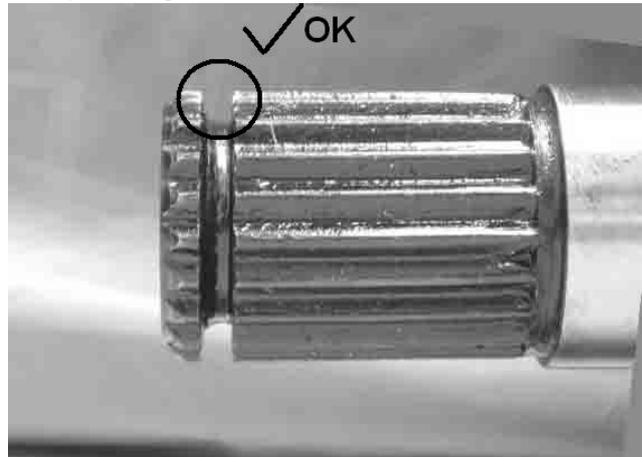
Remove the stopper ring

5. Remove the inner CV joint.
6. Remove the circlip and slide off the bearing assembly. Be careful not to drop any of the steel balls from the bearing cage.
7. slide the inner CV off the drive axle and discard the boot band "A", it cannot be reused.
8. If the outboard boot requires replacement, perform the following:
  - a. Open the clamps on both boot bands "A" and "B" on the outer CV joint, then remove boot band "B" .Discard the boot band, it cannot be reused.
  - b. Slide the outboard boot off the drive axle and discard the boot band "A" , it cannot be reused.
9. Inspect the drive axle as described in this chapter.

**INNER CV JOINT INSPECTION**

1. Clean the bearing assembly in solvent and thoroughly dry.
2. Inspect the steel balls, bearing case and the bearing race for wear or damage.
3. Check for wear or damage to the inner splines of the bearing race.
4. If necessary, disassembly the bearing assembly for further inspection. Carefully remove the steel balls from the bearing cage then remove the bearing race from the bearing cage.
5. If any of the components of the bearing assembly are damaged, replace the entire assembly as no replacement parts are available.
6. Clean the inner CV joint in solvent and thoroughly dry.
7. Inspect the interior of the inboard joint where the steel balls ride. Check for wear or damage and replace the joint if necessary.
8. Inspect the snap ring groove on the inboard joint for wear or damage.
9. Inspect the splines on the inner CV joint

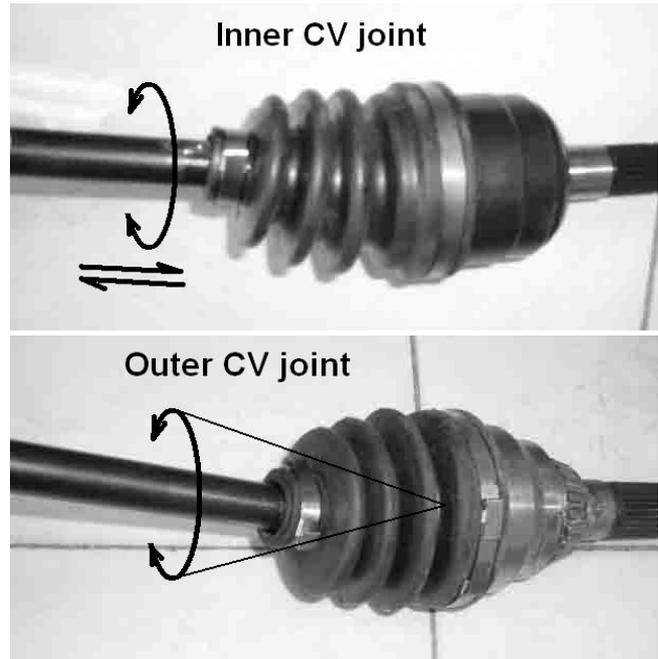
Inspect groove



for wear or damage.

10. Check the stopper ring in the end of the inboard joint. Make sure it seats in the groove correctly, if damage the ring must be replaced.
11. Inspect the exterior of the inner CV joint for cracks or damage, replace if necessary. Check the movement of the joint for excessive play or noise by moving the drive axle in a circular and reciprocate direction.
12. Inspect the drive axle for bending, wear or damage.
13. Inspect the inner end splines, the outer end splines and the front hub cotter pin hole for wear or damage. If any of these areas are worn or damaged, replace the drive axle.

Check the movement of the joint



**NOTE.** Inner CV joint must be replaced with the bearing as an assembly.

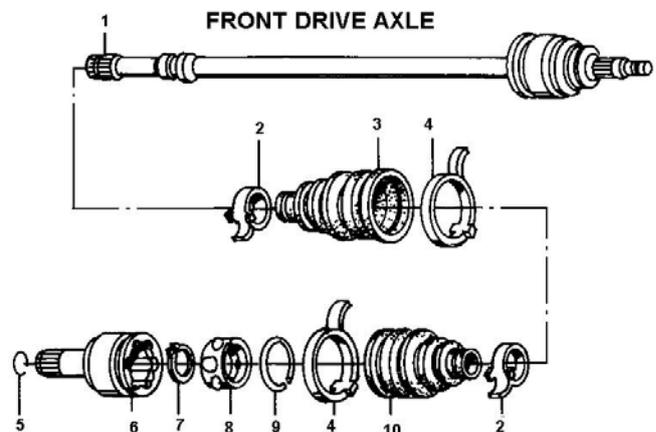
**5.8 FRONT DRIVE AXLE ASSEMBLY (4X4)**

1. The rubber boots are not identical and must be installed on the correct joint. The boots are marked as follows:
  - a. Inner CV joint boot : “inner”,
  - b. Outer CV joint boot: “outer”.
2. IF the outboard boot was removed, install a new boot onto the drive axle at this time.

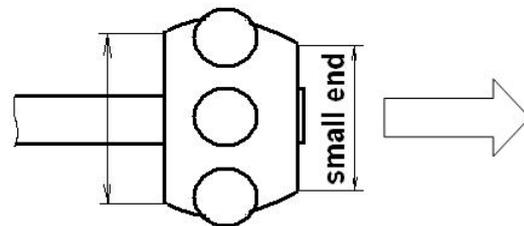
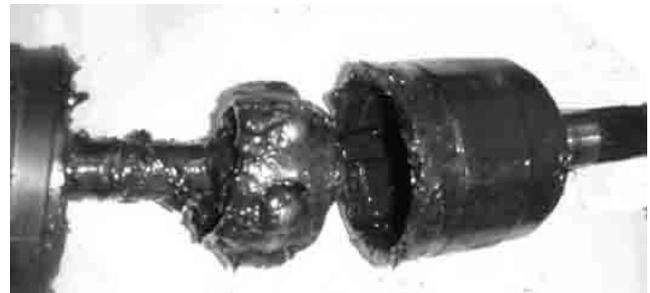
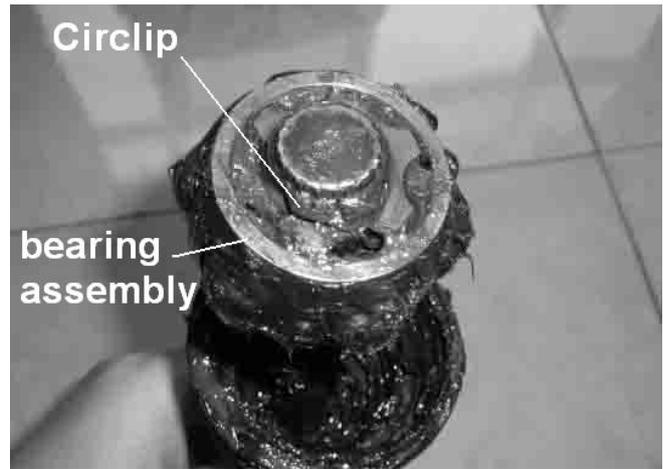
**NOTE**

Position the new boot bands with their tabs facing toward the rear of the vehicle.

3. Install 2 new small boot bands onto the drive axle.
4. Install the inboard boot and move the small boot band onto the boot. Bend down the tab on the boot band and secure the tab with the locking clips and tap them with a plastic hammer. Make sure they are locked in place.
5. If the bearing assembly was disassembled, assemble the bearing as follows:



- a. Position the bearing race and install the race into the bearing case. Align the steel ball receptacles in both parts.
  - b. Install the steel balls into their receptacles in the bearing case.
  - c. Pack the bearing assembly with molybdenum disulfide grease. This will help hold the steel balls in place.
6. Position the bearing assembly with the small end of the bearing going on first and install the bearing onto the drive axle.
  7. Push the bearing assembly on until it stops, then install the circlip, Make sure the circlip seats correctly in the drive axle groove.
  8. Apply a liberal amount of molybdenum disulfide grease to the bearing assembly. Work the grease in between the balls, the race and the case. Make sure all voids are filled with grease.
  9. Apply a liberal amount of molybdenum disulfide grease to the inner surfaces of the inboard joint.
  10. Install the inboard joint over the bearing assembly and install the stopper ring. Make sure it is seated correctly in the inboard joint groove.
  11. After the stopper ring is in place, fill the inboard joint cavity behind the bearing assembly with additional molybdenum disulfide grease.
  12. Pack each boot with the following amounts of molybdenum disulfide grease:
    - a. Inboard boot:35-55grams(1.2-1.9oz.).
    - b. Outboard boot:30-50grams(1.1-1.8oz.).
  13. Move the inboard boot onto the inner CV joint.
  14. Move the inboard joint on the drive axle.



**NOTE**

Position the new boot bands with their tabs facing toward the rear of the

vehicle .

15. Move the small boot band onto the boot. Bend down the tab on the boot band and secure the tab with the locking clips and tap them with a plastic hammer. Make sure they are locked in place.
16. Install the large boot bands onto each boot.

### **CAUTION**

It is critical to avoid undue stress on the rubber boots after the drive axle is installed and the vehicle is run. Don't twist the boot, and always set the both ends in designed position.

17. Secure all large boot bands. Bend down the tab on the boot band and secure the tab with the locking clip and tap them with a plastic hammer. Make sure they are locked in place.
18. If removed, install the stopper ring and make sure it is seated correctly in the drive axle groove.
19. Apply molybdenum disulfide grease to the end splines.



## **5.9 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.

## **5.10 REAR AXLE**

### **REMOVAL (EXCEPT**

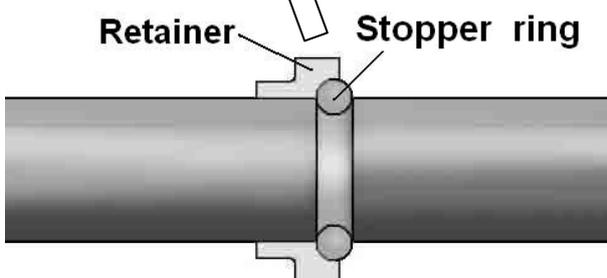
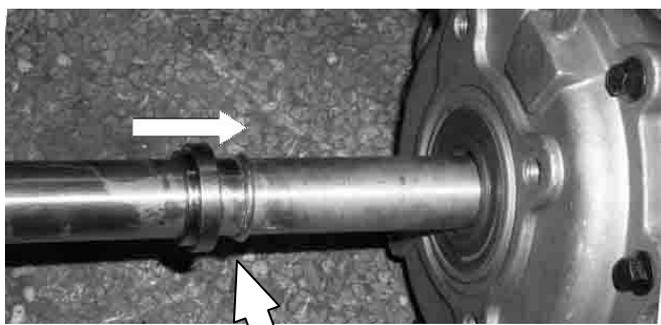
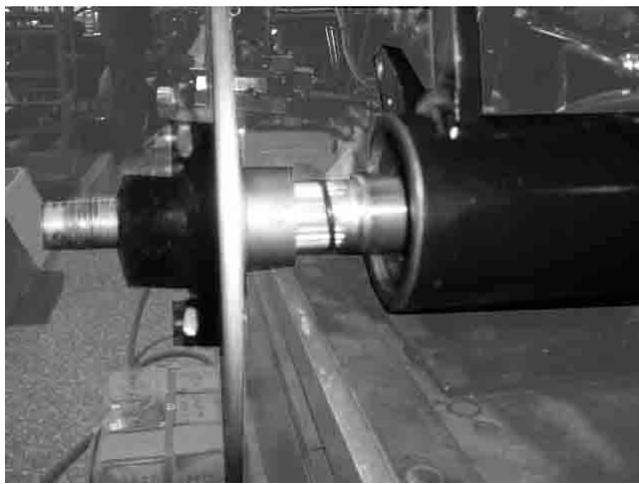
### **ATV400-2/ ATV400-2B)**

1. Lock the parking brake. Remove rear axle cap.

2. Remove cotter pin.
3. Loosen- but do not remove- the hub retaining nut.
4. Loosen- but do not remove- the wheel nuts.
5. Safely support the rear of the ATV.

**CAUTION**

7. Serious injury could occur if machine tips or falls.
8. Remove wheels.
9. Remove hubs.
10. Remove brake hose clamp and brake shield(s).
11. Remove rear brake caliper(s) and support it from machine frame.
12. Remove rear brake disc(s).
13. Remove skid plate(s).
14. Remove left swing arm asm bolts.
15. Remove axle tube(s) bolts from rear gear case (and remove the right side tube).
16. Slide axle through rear gearcase to the right enough to allow the axle tube to slip off between axle and swing arm asm.
17. Remove ring retainer (the hog ring) and spacer (collar) from axle.
18. Slide axle through the gear case and remove from vehicle.
19. Remove o-ring seals from both sides of gear case and discard.



**5.11 REAR AXLE INSTALLATION**

1. Grease and install new o - rings on rear gearcase.
2. Slide axle through rear gearcase until ring retainer groove is accessible to the left of gearcase.
3. Install new hog ring and retainer.

**NOTE**

Retainer (Spacer) should enclose stopper ring (hog ring).

4. Slide axle tube assembly over axle shaft

until

it engages the swing arm asm .

5. Install new axle tube bolts loosely.
6. Install left swing arm asm bolts and torque to 59-67 ft. lbs ( 80-90Nm).
7. Torque axle tube bolts in a cross pattern to 60 ft. lbs( 80 Nm).
8. Re- install skid plate and torque bolts to 25 ft.lbs (34Nm).

Install new greased o - ring on axle and slide brake disc on splines of the axle.

Install brake caliper on brake disc and torque bolts to 20 ft.lbs( 25 Nm) .

Anchor the brake hoses to the swing arm asm using the hold down clamp.

Install wheel hub, large flat washer.

Install cone nuts with domed side facing outward.

Torque axle nut and wheel nuts.

Install a new cotter pin. Tighten nut slightly to align holes if required.

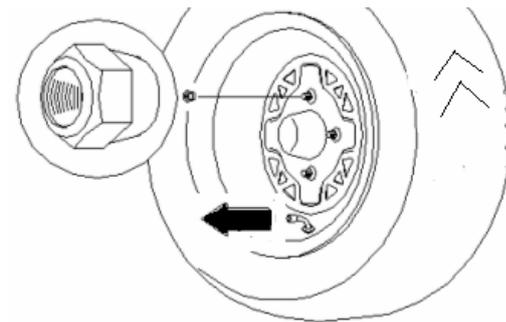
Install hub cap.

Rear Hub Nut Torque:

80 ft.lbs.(110.6Nm)

Rear Wheel Nut Torque:

50 ft.lbs.(69Nm)



Rear.

Tapered nuts: install with tapered side against wheel



**5.12 REAR AXLE BEARING**

**REMOVAL**

1. Remove the axle tube from the machine.
2. Remove outer axle seal and discard
3. Remove outer bearing and spacer.
4. Remove inner bearing retaining ring and inner bearing.

**5.13 REAR AXLE BEARING INSTALLATION**

1. Clean bearing surface on axle tube and

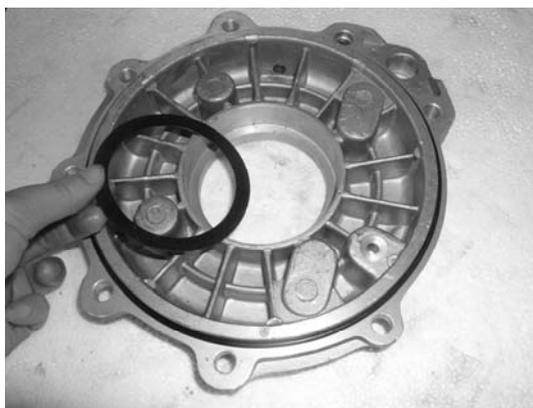
install new bearing (s), retaining ring and seals reversing steps of rear axle bearing removal..

2. Torque brake caliper, rear hub nut, and rear wheel nuts to specifications.

### **5.14 REAR GEARCASE DISASSEMBLY**

1. Drain and properly dispose of used oil.
2. Remove bolts and output shaft cover.
3. Remove ring gear assembly from the act put cover.
4. Remove ring gear bearing shim from the cover and retain for re-assembly.
5. Remove and discard the output cover seal and O- ring.
6. Remove input cover and O- ring.

Remove pinion shaft assembly. Inspect pinion gear for chipped, broken or missing teeth .Replace assembly if necessary.

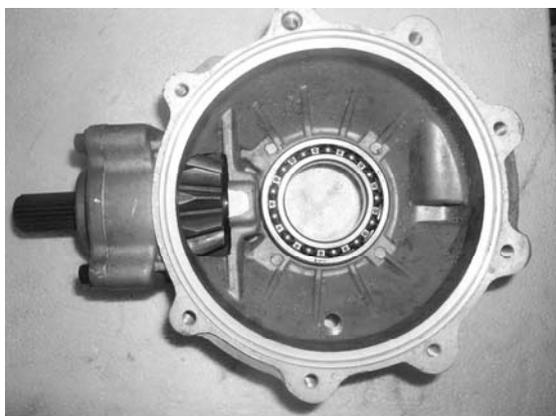


### **5.15 REAR GEARCASE ASSEMBLY**

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.

#### **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 and apply Loctite™ 242 to threads. Tighten lock nut to specification.
6. Install pinion shaft and input cover plate with new o- ring and torque bolts to 14 ft. lbs.

Cover Bolts Torque  
14ft.lbs.(20 Nm)

7. Install ring gear assembly

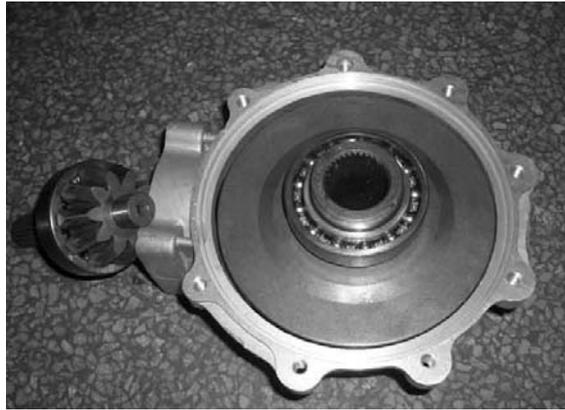
**NOTE**

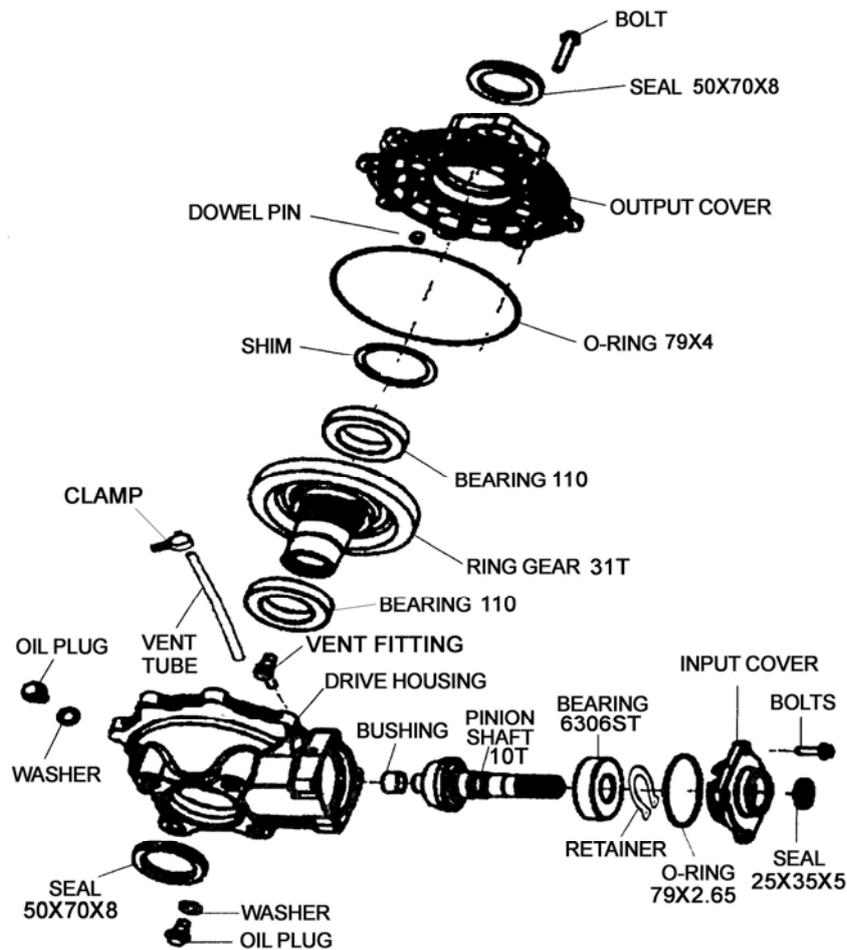
The same shim thickness placed behind ring gear bearing must also be put behind the cover button.

8. Install out put cover with new o- ring and torque bolts to 14 ft. lbs.

**Cover Bolts Torque**

14ft.lbs.(20Nm)

**REAR GEARCASE EXPLODED VIEW**



### 5.16 FRONT GEARCASE SLIP LIMIT TORQUE TEST

**CAUTION:** Slip limit torque relate to the preload on the differential (see 5.20 FRONT DIFFERENTIAL ASSEMBLY), and affect the Steering Effort (heavy steering). Always field test the ATV carefully and thoroughly after front gearcase and differential service for vehicle maneuvers and operation.

Mount the front gear case assembly to Torque Test Jig. The input shaft must be firmly held by the jig, and measure one side output shaft by turning with a torque gauge until another side start to spin counter wise.

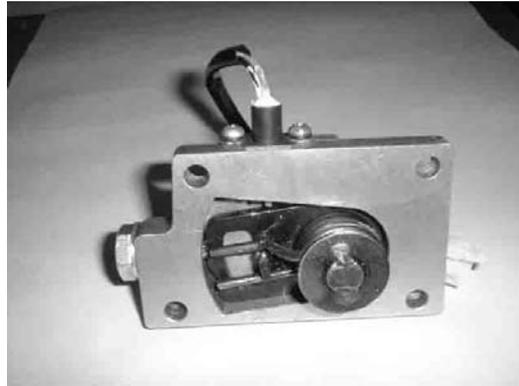
**Slip torque: 35---45N.m for Europe**  
**45---55N.m for USA**

**Note:** It is recommended to replace the FRONT DIFFERENTIAL as an assembly when out of specification.

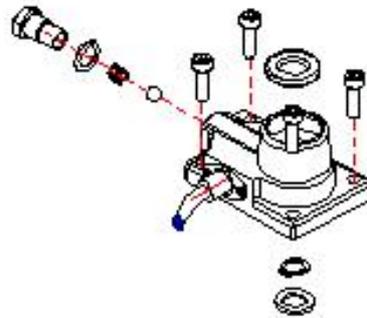


**5.17 FRONT GEARCASE DISASSEMBLY/ INSPECTION**

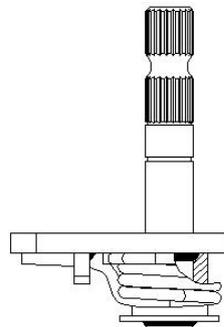
1. Drain and properly dispose of used oil.
2. Remove bolts and selector cover..



3. Remove screws and selector switch from the selector cover.
4. Remove bolt, washer, spring and detent ball from the selector cover.



5. Remove seal, washers, circlip and selector shaft assembly from the selector cover.



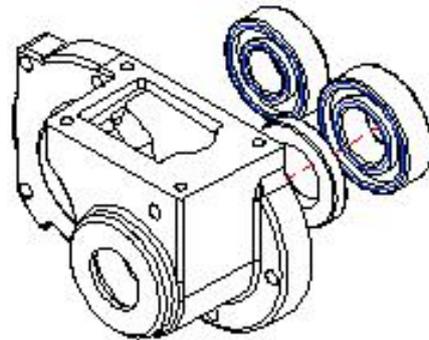
6. Remove bolts and diff case cover.
7. Remove pins, gear and selector rail.



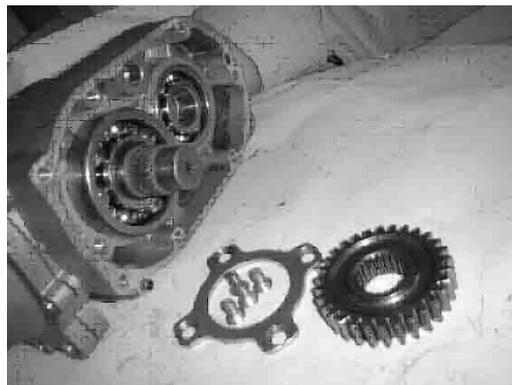
8. Remove selector fork, splined dog and input shaft.



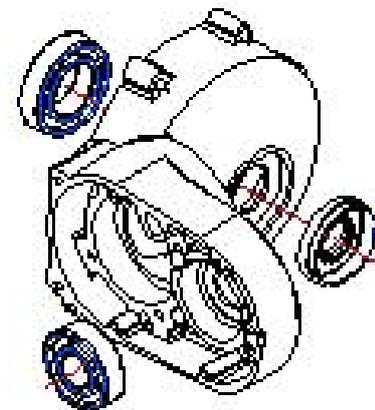
9. Remove bearing and seal.



10. Remove gear, screws, pinion shaft retainer plate and pinion shaft.



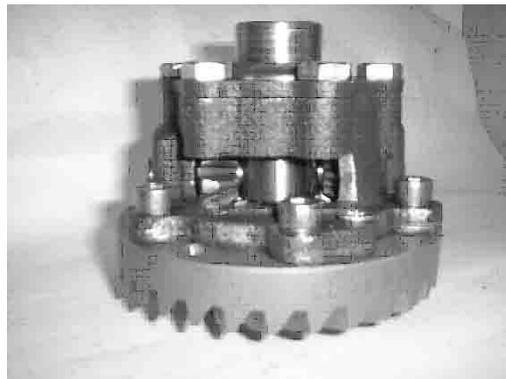
11. Remove seal from the case.



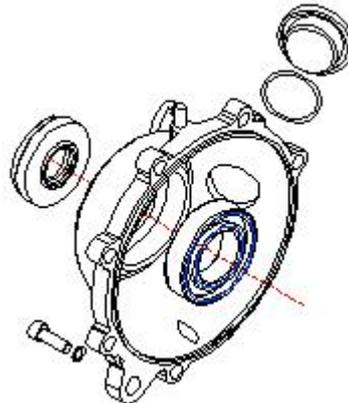
12. Remove bolts, left cover and differential.



Differential →



13. Remove seal from left cover.

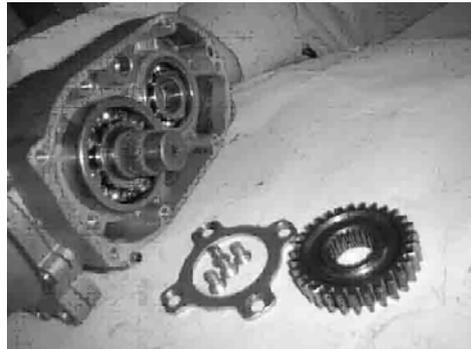


14. Clean all components and inspect for wear. Inspect gears for wear, cracks, chips or broken teeth. Inspect engagement dogs and detent ball housing, replace if edges are rounded. Inspect casting for crack. Inspect bearings for smooth operation. Check for excessive play between inner and outer race. Inspect detent spring and finger spring for wear, cracks, relaxation. Replace part with any defects.

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

**5.18 FRONT GEARCASE ASSEMBLY**

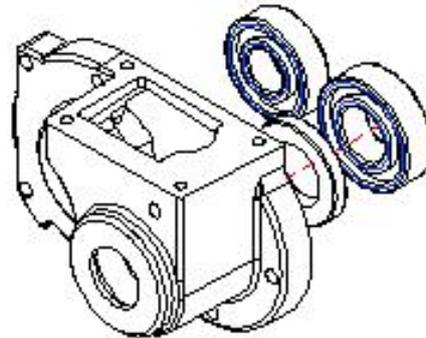
1. Install pinion shaft with bearing.
2. Install retainer plate with flat side toward bearing and torque screws.  
Apply Loctite™ 243(Blue) to screw threads and torque screws to 8ft.lbs. (12Nm)



3. Install gear.

4. Install oil seal.

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



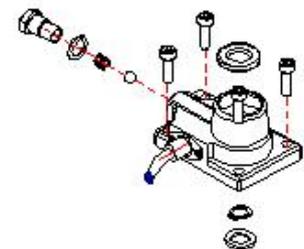
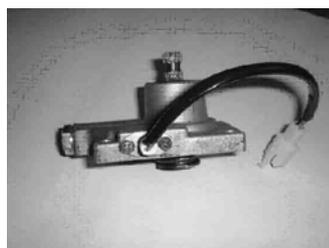
5. Install input shaft, splined dog, selector fork.
6. Install selector rail, gear and pins.



7. Apply LocTite™ 518 to mating surfaces, reinstall cover and torque bolts.  
8ft.lbs. (12Nm)



8. Install selector shaft assembly, washers, circlip, and new seal into the selector cover.
9. Install detent ball, spring, washer and bolt.
10. Install selector switch with new O-ring and screws.



11. Apply LocTite™ 518 to mating surfaces, reinstall selector cover and torque bolts.

8ft.lbs. (12Nm)

12. Install differential into case.,  
Apply LocTite™ 518 to mating surfaces,  
reinstall left cover and torque bolts.  
14ft.lbs. (20Nm)
13. Install new seals.



**5.19 FRONT DIFFERENTIAL DISASSEMBLY/ INSPECTION**

1. Remove bolts and bevel crownwheel.



2. Remove bolts and differential cap A.
3. Remove spring seat, springs, outer single clutch plate, differential plat, outer double clutch plate, bevel gear and gear axle washer.



4. Remove bolts and differential cap B.



5. Remove spring seat, springs, outer single clutch plate, differential plat, outer double clutch plate, bevel gear and gear axle washer.



6. Remove roll pin from center pin.
7. Remove center pin, bevel pinion washers, bevel pinions and center spacer from differential housing.



8 Clean all components and inspect for wear. Inspect gears for wear, cracks, chips or broken teeth. Inspect inner and outer splines on the spider gears and friction plates, replace if edges are rounded. Inspect casting for crack. Inspect axletree for smooth operation, check for excessive play between inner and outer race. Inspect dish spring for wear, cracks, relaxation. Replace part with any defects.

## **5.20 FRONT DIFFERENTIAL ASSEMBLY**

1. Install center pin, bevel pinion washers, bevel pinions and center spacer into differential housing.



2. Install bevel gear, gear axle washer, outer double clutch plate, differential plate, outer single clutch plate, springs, spring seat.



3. Install differential cap A.



4. Check the preload clearance.

**Clearance: 1.2—1.5mm**

Out of specification → change spring seat, spring, .replace clutch plate as necessary,



5. Install bevel crownwheel, Apply Loctite™ 271 (red) to screw threads and torque bolts to 24ft.lbs. (32Nm)



6. Install bevel gear, gear axle washer, outer double clutch plate, differential plate, outer single clutch plate, springs, spring seat.



7. Install differential cap B.



8. Check the preload clearance.

**Clearance: 1.2—1.5mm**

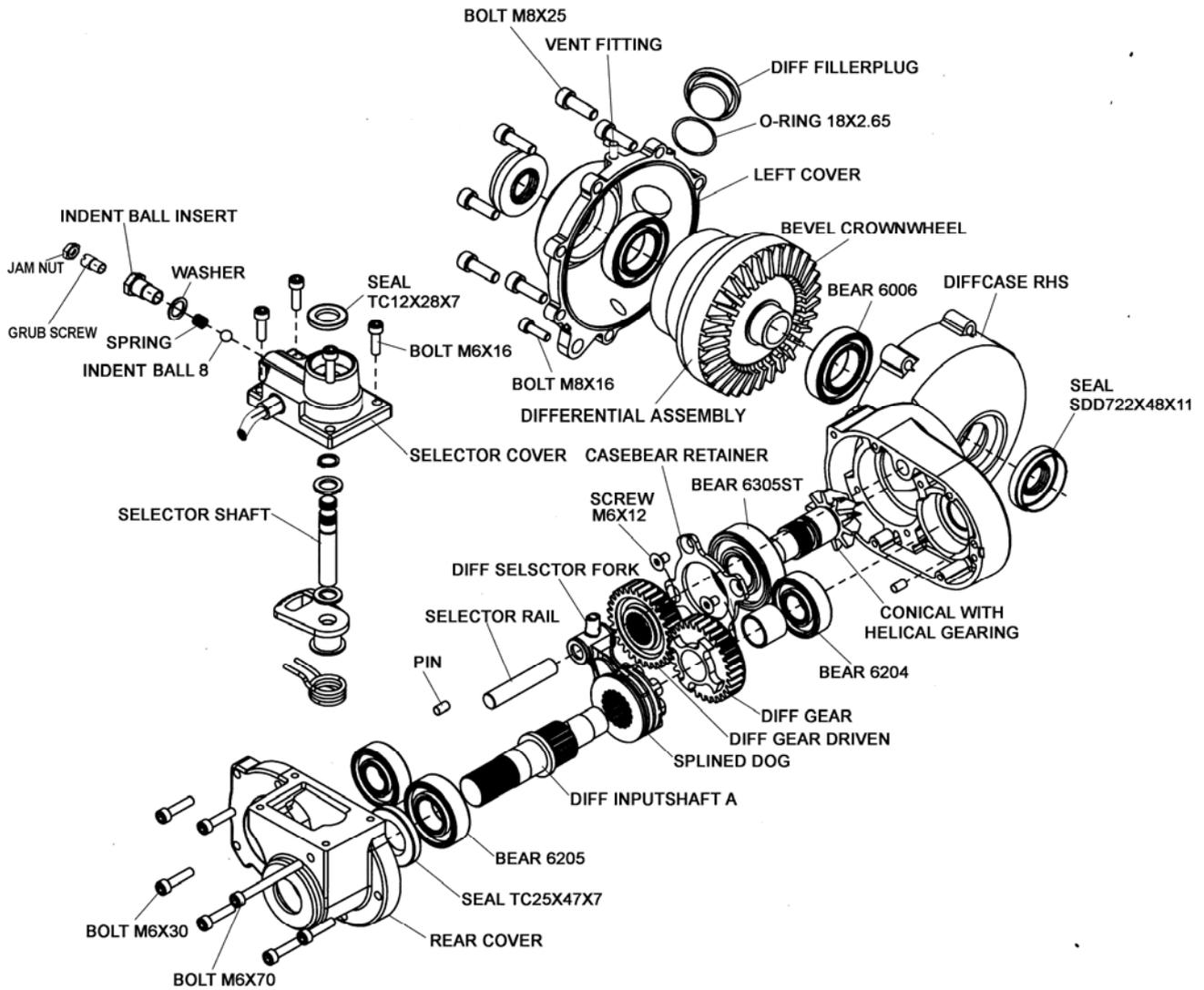
Out of specification → change spring seat, spring, .replace clutch plate as necessary,

9. Apply Loctite™ 271(red) to screw threads and torque bolts to 16ft.lbs. (22Nm)



**CAUTION:** Slip limit torque relate to the preload clearance on the differential, and affect the Steering Effort (heavy steering). Always field test the ATV carefully and thoroughly after front gearcase and differential service for vehicle maneuvers and operation.

FRONT GEARCASE EXPLODED VIEW



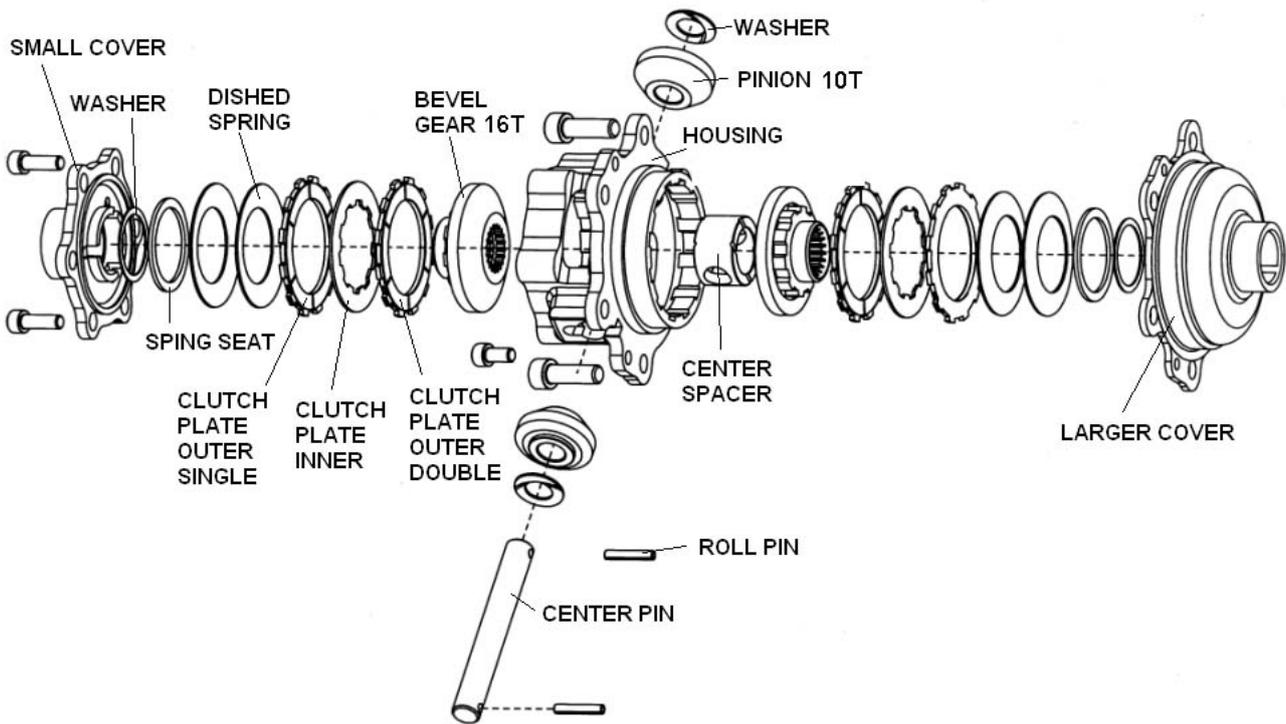
**TROUBLE SHOOTING**

Symptom: Gears won't stay in position when shift 2WD/ 4WD.

Solution: Increase the preload to indent ball by turning the grub screw or change a new spring.

**Note:** Make sure not to over press the spring by shifting 2WD/ 4WD. Remember to tighten the jam nut on the grub screw.

DIFFERENTIAL CENTRE EXPLODED VIEW

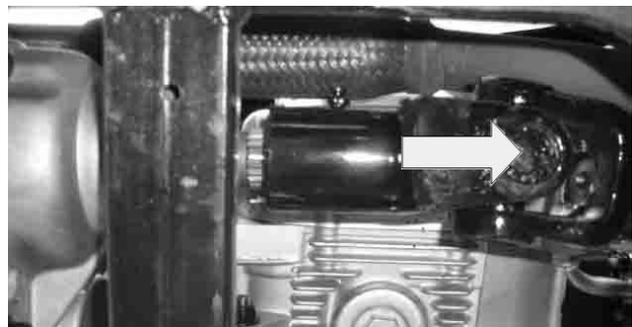


**5.21 REAR, FRONT PROP SHAFT REMOVAL**

Using roll pin remover, remove the roll pin from prop shaft



Slide the prop shaft back and away from the gear case. (The swing arm must be disassembly from the frame before the rear prop shaft removal).





# CHAPTER 6 TRANSMISSION

## ATV 260/300/400-2 and B-Type 260/300/400-2B

### **WARNING**

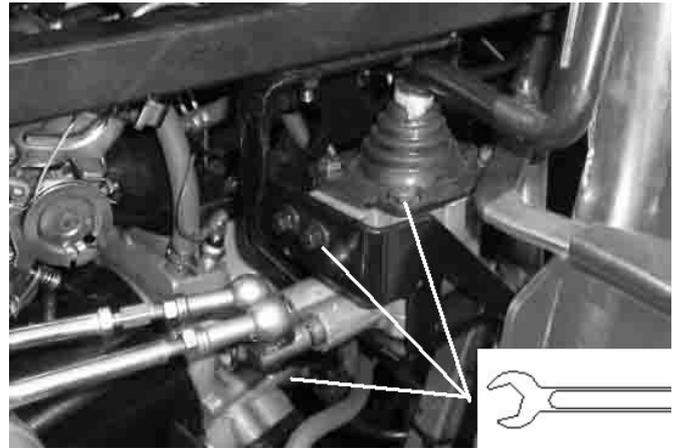
The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

**(PLEASE SEE CHAPTER 3B IN THIS MANUAL FOR THE TRANSMISSION OF YOUTH/ MINI ATV 50/80, CHAPTER 3C FOR MINI ATV100/150 AND B-TYPE 150/200.)**

- 6.1 GEAR SHIFTER REMOVAL
- 6.2 GEAR SHIFTER DISASSEMBLY
- 6.3 GEAR SHIFTER ASSEMBLY
- 6.4 GEAR SHIFTER INSTALLATION
- 6.5 SHIFT LINKAGE ADJUSTMENT
- 6.6 ENGINE AND TRANSMISSION REMOVAL
- 6.7 ENGINE AND TRANSMISSION INSTALLATION
- 6.8 TRANSMISSION DISASSEMBLY
- 6.9 TRANSMISSION ASSEMBLY
- 6.10 TROUBLE SHOOTING CHECKLIST

**6.1 SHIFTER REMOVAL**

1. Remove parts that interfere with access to shift selector (seat, right side panel 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.



**6.2 SHIFTER 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.

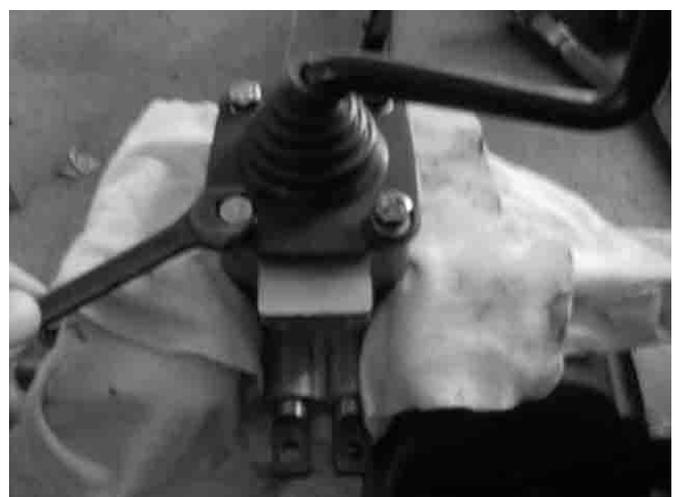
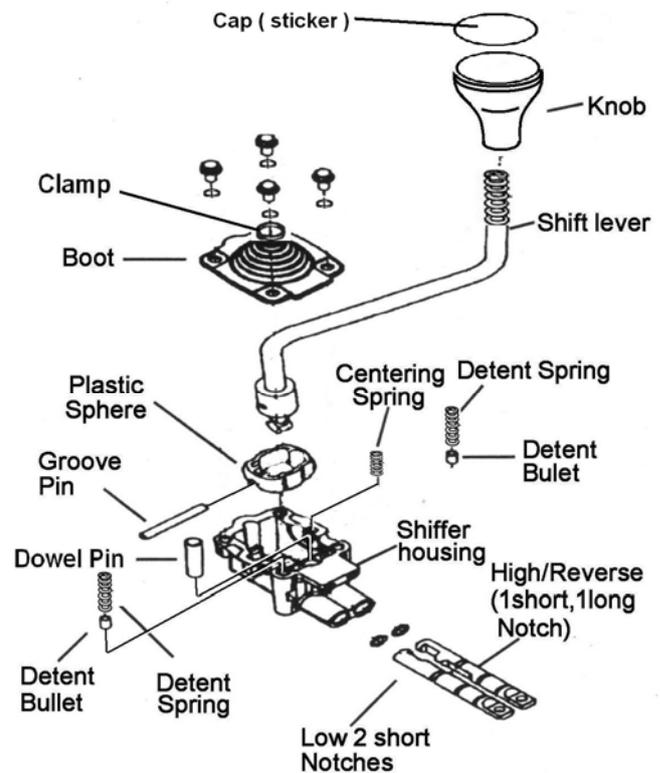
**NOTE:** These parts are under pressure from the internal springs.

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.

**NOTE:** 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. Pulse



detent bullets and the dowel pin out of the shifter housing .

7. Remove the two slides, one at a time.

**NOTE:** The LH (low ) slide has two short notches and the R H (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.



**6.3 SHIFTER ASSEMBLY**

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

**NOTE:** The LH slide has two short notches and the R H 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. Apply grease to notches and the slides.

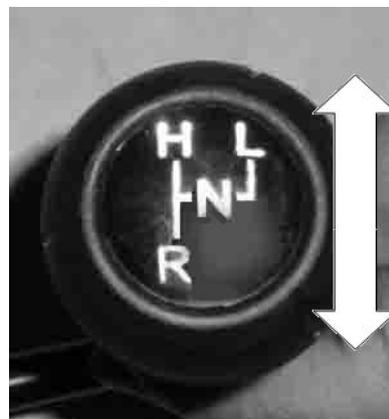
5. Carefully reattach shift cover lever assembly to shifter housing. Make sure slides are in neutral, or parts may be damaged.

6. Torque cover screws to 12 ft. lbs. (16Nm).

7. If re-install the knob, apply Loctite™ 406 and screw the knob in the lever firmly, install the gear shifter on the ATV. Put a new sticker on the knob in correct direction.



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



## 6.4 SHIFTER 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.

## 6.5 SHIFT LINKAGE ADJUSTMENT

Linkage rod adjustment is necessary when symptoms include:

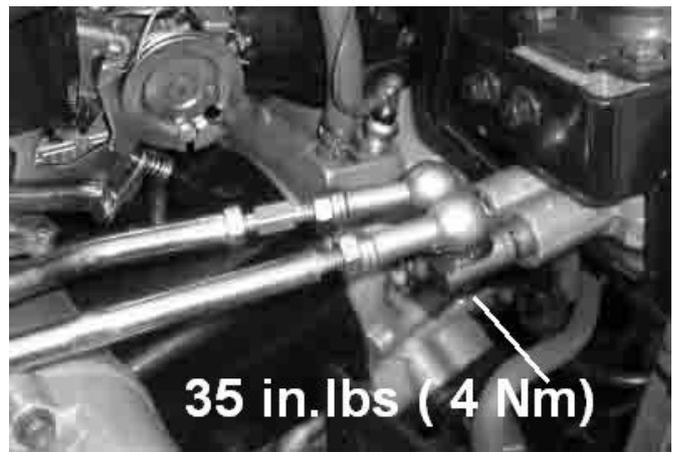
- Noise on deceleration
- Inability to engage a gear
- Excessive gear clash(noise)
- Shift selectors moving out of desired range

NOTE: When adjusting linkage, always adjust both linkage rods. The adjustment of one rod can prevent proper adjustment of the other rod. Remove necessary components to gain access to shift linkage rod ends.

1. Inspect shift linkage tie rod ends, and pivot bushings and replace if worn or damaged. Lubricate the tie rod ends with a light aerosol lubricant or grease.
2. Loosen all rod end adjuster jam nuts.
3. Note orientation of tie rod end studs with stud up or down. Remove both rod end studs from transmission bell cranks.
4. Be sure idle speed is adjusted properly.

NOTE: It is important to disconnect both rod ends from the transmission bell cranks. If one linkage rod is incorrectly adjusted, it can affect the adjustment of the other rod.

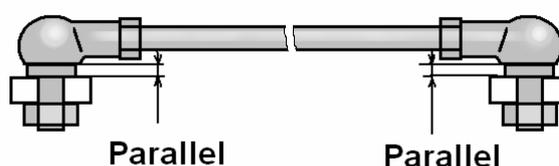
5. Place gear selector in neutral. Make sure the transmission bell cranks are engaged in the neutral position detents.
6. Be sure the shift linkage rod ends are firmly



attached to the gear selector slides. Adjust the low range (inside) rod so the rod end is centered on the transmission bell crank. Install the lock nut to the rod end and torque to 35 in.lbs ( 4 Nm).

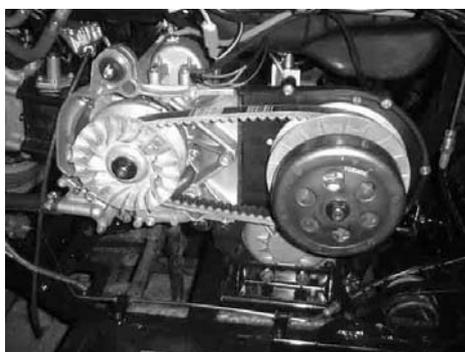
7. Rotate the linkage rod clockwise until resistance is felt. Mark the rod so revolutions can be easily counted.
8. Rotate the linkage rod counterclockwise until the same resistance is felt, counting the revolutions as the rod is turned.
9. Turn the rod clockwise again one half of the revolutions counted in Step 8.
10. Tighten the rod end jam nuts securely while holding the rod end. The jam nuts must be tightened with both front and rear rod ends parallel to each other. If jam nuts are properly tightened, the rod should rotate freely 1/4 turn without binding.
11. Repeat steps 7-10 for the High/Reverse rod.

### Mark for counter



## 6.6 ENGINE AND TRANSMISSION REMOVAL

1. Switch fuel valve to "OFF".
2. Remove seat, rack(s), plastic body work, air box and exhaust system.
3. Remove CTV outer cover, drive and driven clutches, feed and return hoses ( refer to Engine chapters).
4. Remove shift rods.
5. Remove throttle cable wire connected to carburetor.
6. Disconnect engine from wiring harness completely.
7. Disconnect gear position indicator switches.
8. Remove fuel line connected to carburetor and drain line.



9. Loose all bolts on the brackets which

connect the engine/ transmission between the frame, except the 2 brackets between the engine and transmission and left them on the transmission. See picture.

2 brackets between the engine and transmission



10. Remove right and left side engine mount bolts, and remove engine from engine stay.



11. Remove front drive shaft (4WD, see chapter 5).

12. Remove lower left bracket, rear bracket and right mount bolts .(M 10x1.25x70 )

13. Remove transmission from frame and remove drive shaft.

**6.7 ENGINE AND TRANSMSSION INSTALL**

**Transmission**

1. Position transmission in frame, Align rear drive shaft and slide shaft into the yoke.
2. Install all brackets, loosely install new fasteners.
3. Tighten fasteners in “right -left– rear” order.

**NOTE:** While tightening, it is important to turn the rear drive shaft by hand to check the position of transmission. If the rear drive axle can not turn freely, it is necessary to loose (but not remove) the fasteners to re-position the transmission by tightening the fasteners in



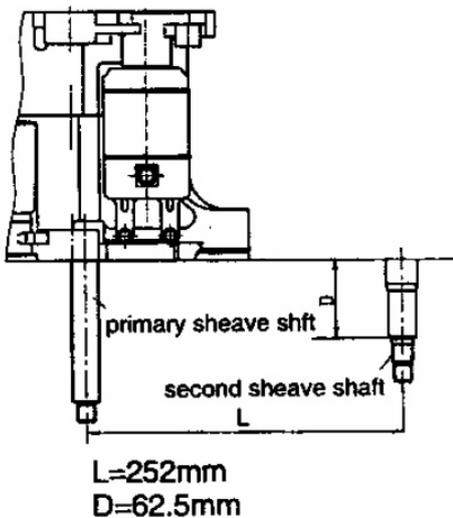
different order.

Transmission Mounting Bolts Torque: 25 ft. lbs. (35 Nm ).

4. Drive in a new roll pin.

**Engine**

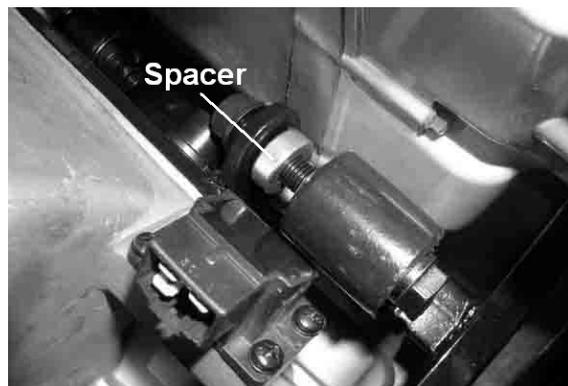
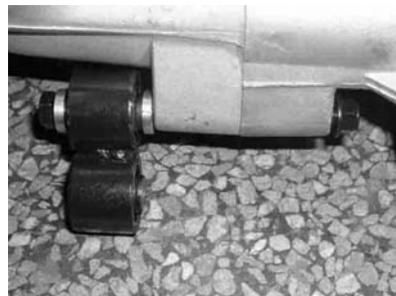
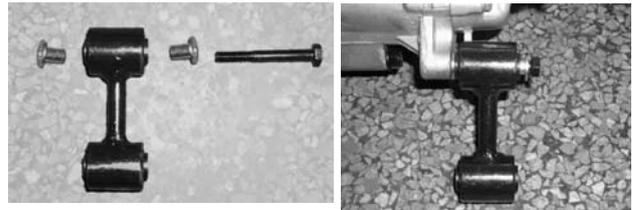
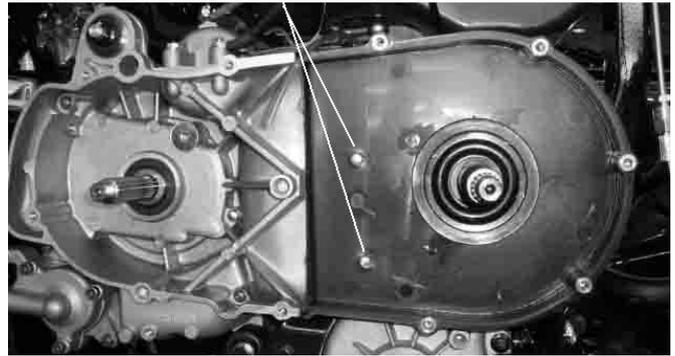
5. Position Engine in frame, Install all brackets, loosely install new fasteners, but not tighten fasteners.
6. Make sure those spacers are in correct position.
7. Install rear inside cover components on transmission (in new model there is no removable rear inside cover).
8. Link engine and transmission together with engine mount jig, (center distance of engine shaft and transmission main shaft is 252 mm and distance of side surface and shaft shoulder 62.5 mm)



9. Tighten engine mounting fasteners in top-to bottom order.
10. Remove jig.
14. Install both drive and driven clutches and outer CVT cover.

Engine Mounting Bolts Torque:  
25 ft. lbs. (35 N.m).

These 2 holes are only for jig use. Don't install any bolts after assembled.



## 6.8 TRANSMISSION DISASSEMBLY

1. Place gears in neutral.
2. Remove gear position indicator switches.

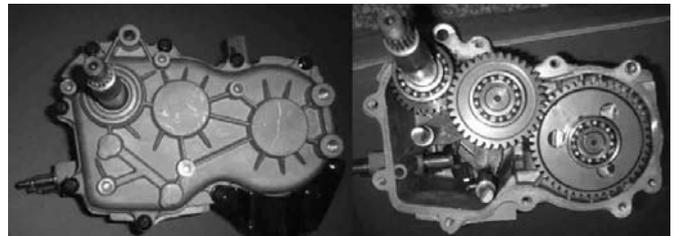
**IMPORTANT:** The gear position indicator switches must be removed prior to disassembly.

3. Remove the transmission cover bolts.
4. Carefully remove the cover with a soft face hammer tap on the cover bosses.

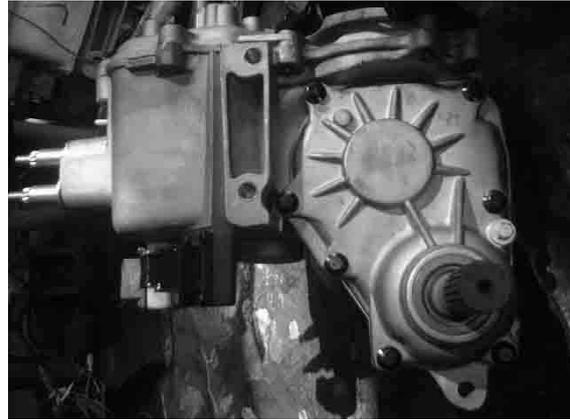
5. Remove bearing and helical gear.

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

7. Remove pinion shaft retainer plate and pinion shaft.



8. Remove front drive output housing cover screws. Carefully remove the cover with a soft face hammer tap on the cover bosses.



9. Note position of shim washers and thrust button.
10. Remove shafts as an assembly.
11. Clean all components and inspect for wear.
12. Inspect engagement dogs of gears and replace if edges are rounded.
13. Inspect gear teeth for wear, cracks, chips or broken teeth.
- 14 . Remove seals from transmission case.

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

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



## 6.9 TRANSMISSION ASSEMBLY

1. Install sprocket on front output shaft with sprocket step side inward as shown (only for 4X4).



2. Assemble front ( only for 4X4).and rear output shafts



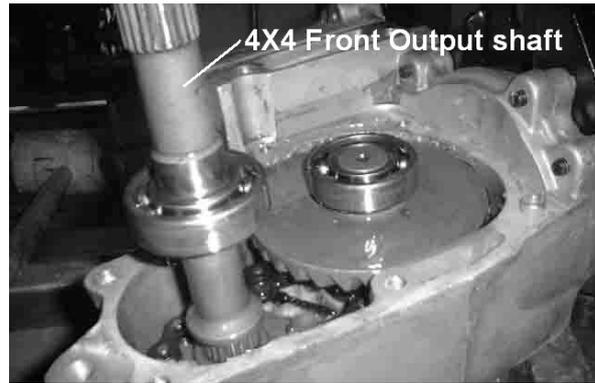
3. a. (4X4) Install front and rear output shafts with chain as an assembly.

3. b. (2X4) Install rear output shaft.



4. Before installing the cover make sure the sealing surfaces are clean and dry, and shafts are fully seated in the transmission case. Apply silicon glue to mating surfaces.
5. Reinstall cover and torque bolts in a criss-cross pattern in 3 steps to 14 ft. lbs. (20 Nm).

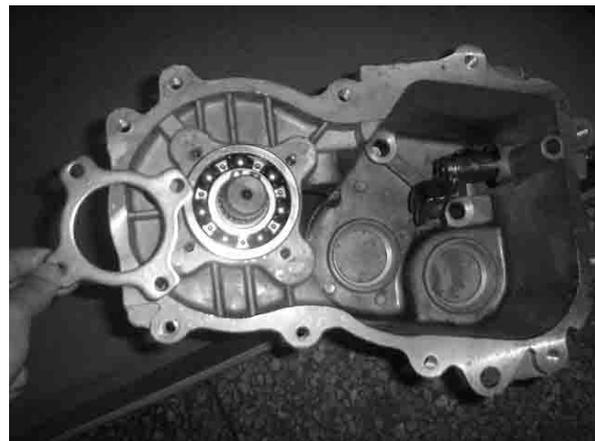
6. Install new front ( only for 4X4) and rear output shaft seals.



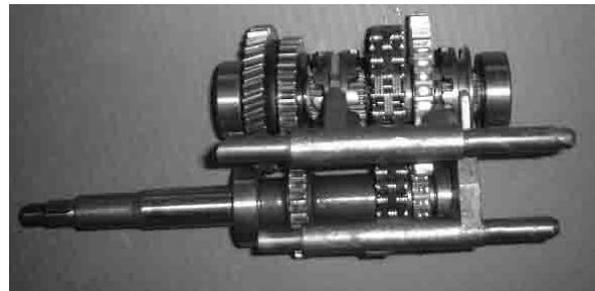
7. Install pinion shaft with bearing .

8. Install retainer plate with flat side toward bearing.

9. Apply Loctite™ 242(Blue) to screw threads and torque screws to 8 ft-lb. (12Nm).



10. Assemble shafts with chain and shift forks.



11. 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.



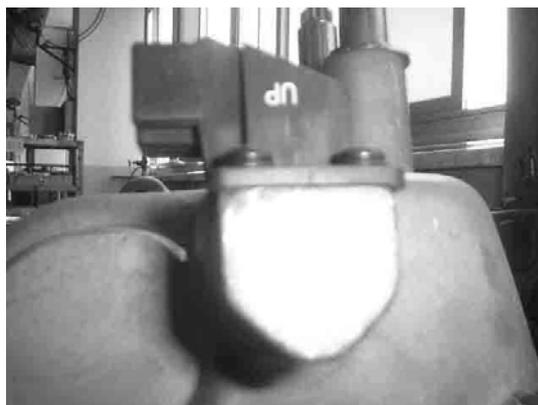
**NOTE:** Make sure shift shaft pins are properly positioned in the slot on selector arms.

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

12. Install output shaft and gear assembly

along with sprocket and chain.

13. Prior to reinstalling the cover make sure the mating cover surfaces are clean and dry, and shafts are fully seated in transmission case. Apply silicon to mating surfaces.
14. Reinstall main cover and torque bolts in a cross pattern in 3 step to 14 ft.lbs. (20Nm).
15. Install new input shaft seal.
16. Install drain plug with a new sealing washer. Torque drain plug to 14 ft.lb. (19Nm).
17. Install transmission and add 80W/90 oil in the recommended amount. Refer to Maintenance Chapter.
18. 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).



## **6.10 TROUBLE SHOOTING CHECKLIST**

Check the following items when shifting difficulty is encountered

- Idle speed adjustment
- Transmission oil type/quality
- Driven clutch (CVT) deflection
- Loose fasteners on rod ends
- Loose fasteners on gear shift 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

Check the following items when transmission locked

- Gear shifter malfunction (Selector lever end come out from slides notches), engage the Hi and Lo Gear at the same time.

**\*NOTE :** To determine if shifting difficulty or problem is caused by an internal transmission problem, isolate the transmission by disconnecting linkage rods from transmission bell cranks. Manually select each gear range at the transmission bell crank, 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.



4X4 TRANSMISSION EXPLODED VIEW





# CHAPTER 7 BRAKES

## WARNING

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

## NOTE

Also See Chapter 2 for Maintenance Information.

See Chapter 4B for Assembling information about Drum Brake of Youth/ Mini.ATV.

### 7.1 SPECIFICATIONS

### 7.2 TORQUE

### 7.3 BRAKE SYSTEM SERVICE NOTES

### 7.4 BURNISHING PROCEDURE

### 7.5 FLUID REPLACEMENT/BLEEDING PROCEDURE

### 7.6 HAND BRAKE MASTER CYLINDER REMOVAL/ INSPECTION /INSTALLATION

### 7.7 FRONT PAD REMOVAL / INSPECTION / INSTALLATION

### 7.8 FRONT DISC INSPECTION / REMOVAL / REPLACEMENT

### 7.9 FRONT CALIPER REMOVAL/ INSPECTION / INSTALLATION

### 7.10 REAR BRAKE PAD REMOVAL/ INSPECTION / INSTALLATION

### 7.11 REAR CALIPER REMOVAL/ INSPECTION/ INSTALLATION

### 7.12 REAR BRAKE DISC INSPECTION / REMOVAL / REPLACEMENT

**7.1 SPECIFICATIONS**

<b>Front Brake Caliper</b>		
<b>Item</b>	<b>Standard</b>	<b>Service Limit</b>
Brake Pad Friction material Thickness	0.157"/ 4mm	0.04"/ 1mm
Brake Disc Thickness	0.150- 0.164"/3.810- 4.166mm	0.140"/3 .556mm
Brake Disc Thickness Variance Between Measurements	-	0.002 " / .051mm
Brake Disc Runout	-	0.005 " / .127mm
<b>Rear Brake Caliper</b>		
<b>Item</b>	<b>Standard</b>	<b>Service Limit</b>
Brake Pad Friction material Thickness	hydraulic	0.04"/ 1mm
	Hydraulic with mechanics park	
	mechanics park	
Brake Disc Thickness	0.177-0.187"/4.496-4.750mm	0.167"/4.242mm
Brake Disc Thickness Variance Between Measurements	-	0.002 " / 0.051mm
Brake Disc Run out	-	0.005 " / 0.127mm

**7.2 TORQUE**

<b>Item</b>	<b>Torque (ft. lbs. except where noted*)</b>	<b>Torque (Nm )</b>
Front Caliper Mounting Bolts	18.0	25
Rear Caliper Mounting Bolts	18 .0	25
Master Cylinder Mounting Bolts	*55 in. lbs	6.0
Master Cylinder Reservoir Cover Bolts	*5 in. lbs	.6
Hand Brake Hose Banjo Bolt	15 .0	21
Front Brake Disc	18 .0	25
Front Wheel Mounting Nuts	20 .0	27

**7.3 BRAKE SYSTEM SERVICE NOTES**

- It is strongly recommended always change the caliper and (or) the master cylinder as an assembly. The parts inside maybe not interchangeable due to different brake manufactures and (or) different brake type.
- Do not over – fill the master cylinder fluid reservoir.
- Make sure the brake lever and pedal returns freely and completely.

- Check and adjust master cylinder reservoir fluid level after pad service.
- Make sure atmospheric vent on reservoir is unobstructed.
- Adjust foot 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 install new pads to maximize service life.

## **7.4 BURNISHING PROCEDURE**

Brake pads (both hydraulic and mechanical) must be burnished to achieve full braking effectiveness. Braking distance will be extended until brake pads are properly burnished. To properly burnish the brake pads, use the following procedure.

1. Choose an area large enough to safely accelerate the ATV to 50 km/h (30 mph ) and to brake to a stop.
2. Using hi gear, accelerate to 50 km/h (30 mph); then compress brake lever (pedal) to decelerate to 0-8km/h (5 mph).
3. Repeat procedure on each brake system 20 times until brake pads are burnished.
- (4. Adjust the mechanical parking brake (if necessary).)
5. Verify that the brake light illuminates when the hand lever is compressed or the brake pedal is depressed.

### **WARNING**

Failure to properly burnish the brake pads could lead to premature brake pad wear or brake loss. Brake loss can result in severe injury.

## **7.5 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 is highly corrosive. Do not spill brake fluid on any surface of the ATV.



## **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 from reservoir.
3. Inspect vent slots in cover and remove any debris or blockage.
4. If changing fluid, remove old fluid from reservoir with a brake fluid pump or similar tool.

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

5. Add brake fluid up to the indicated MAX level on the reservoir.
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 when brake lever is pumped. Place diaphragm in reservoir to prevent spills. Do not install cover.

#### DOT 3 Brake Fluid

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

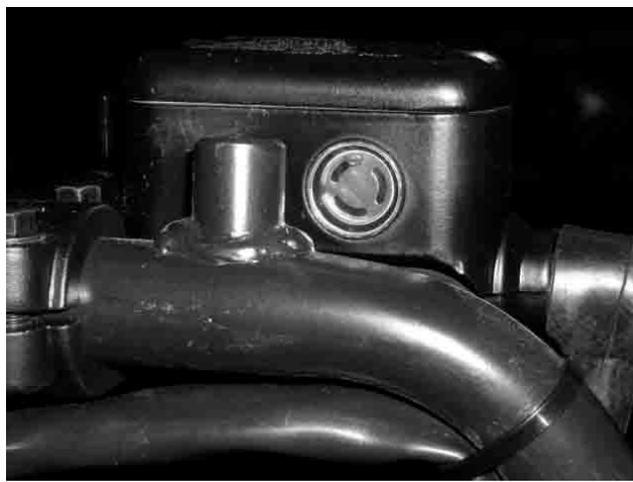
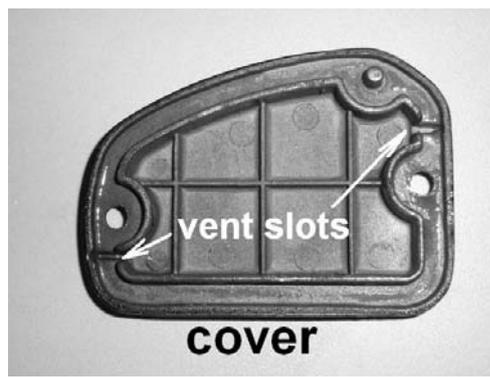
7. Slowly pump brake lever (D) until pressure builds and holds.
8. While maintaining lever pressure, open bleeder screw. Close bleeder screw and release brake lever.

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

**NOTE:** In some versions of brake, there are 2 hydraulic circuits in one caliper for foot brake and hand brake. Make sure you bleed the right circuit.

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 " (13mm) of brake fluid in the reservoir to prevent air from entering the master cylinder.

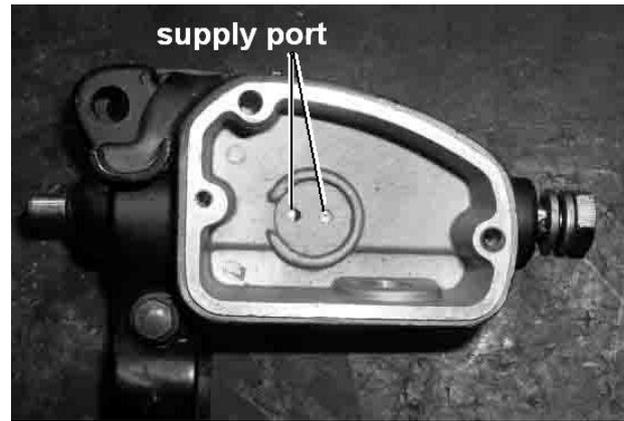
10. Tighten bleeder screw securely and remove bleeder hose.
11. Repeat procedure steps 5- 9 for the remaining caliper (s).
12. Add brake fluid to MAX level on reservoir.

#### Master Cylinder Fluid Level:

#### MAX level or

**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.
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 " (13mm ) 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.



## 7.6 HAND BRAKE MASTER CYLINDER REMOVAL/ INSPECTION

### INSTALLATION

**CAUTION:** The master cylinder is a non-serviceable Component; it must be replaced as an assembly.

**NOTE:** If any special service needed, contact the ATV manufacture via the agent for the parts and special instruction.

**REMOVAL**

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 m aster cylinder. Loosen bolt, remove bolt and sealing washers.



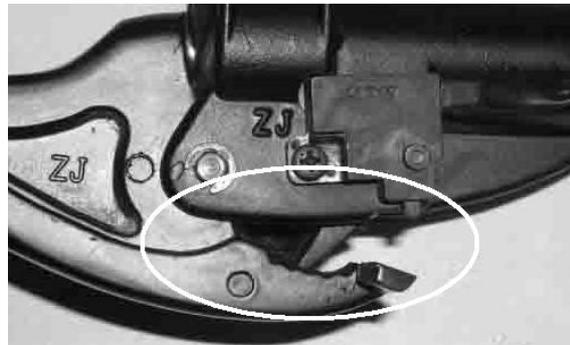
**CAUTION**

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

3. Remove master cylinder from handlebars.

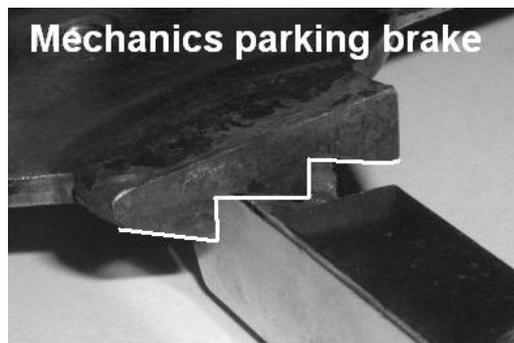
**INSPECTION**

Inspect parking brake for wear. If teeth or locking cam are worn, replace lever and test the parking performance, if any locking problem exists, Replace the master cylinder as an assembly. **NOTE:** Mechanics parking brake is equipped for new Europe model.



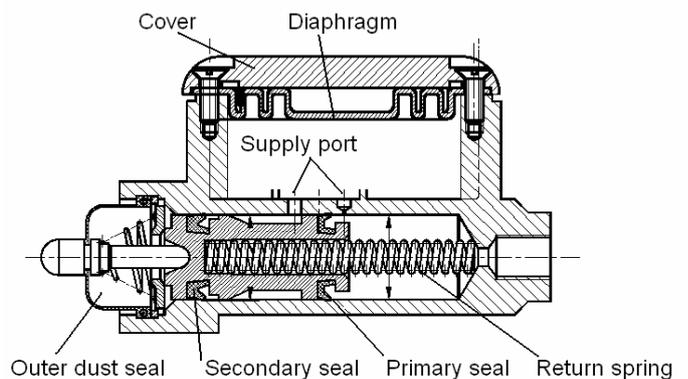
**INSTALLATION**

1. Install master cylinder on handlebars. Torque mounting bolts to 55 in. lbs. (6 N m). **NOTE:** To speed up the brake bleeding procedure the m aster 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 N m)**  
**Brake Line Banjo Bolt Torque 15 ft. lbs. (21 Nm )**

3. Fill reservoir with **DOT 3** fluid.
4. Follow bleeding procedure, Check all connections for leaks and repair if necessary.



**7.7 FRONT PAD REMOVAL / INSPECTION / INSTALLATION**

**NOTE:** The brake pads should be replaced as a set.

**REMOVAL**

1. Elevate and support front of ATV safely.

**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.
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.

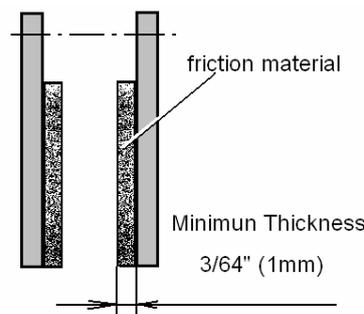
**INSPECTION**

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

Service Limit 0.3/64"(1 mm)

**INSTALLATION**

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.  
Front Caliper Mounting Bolts Torque 18 ft. lbs. (25 Nm)
3. Install caliper on hub strut, and torque mounting bolts.
4. Slowly pump the brake lever until pressure



has been built up. Maintain at least 1/2 ". (13 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 (counter clockwise).

6. Install reservoir cap.

### Hand and (or) Foot Brake Master

#### Cylinder(s) Fluid Level:

#### Between MIN and MAX lines

7. Install wheels and torque wheel nuts, test and burnish.

See **BURNISHING PROCEDURE**

## **7.8 FRONT DISC INSPECTION / REMOVAL / REPLACEMENT**

### 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 and a dial indicator. Replace disc if worn beyond service limit.

#### Brake Disc Thickness

New 0.150-0.164" (3.810-4.166mm)

Service Limit 0.140"/3 .556 mm

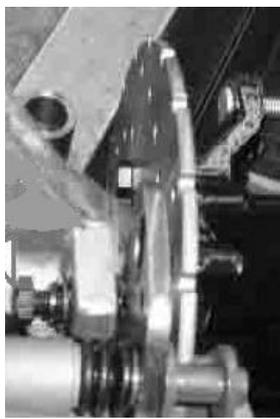
#### Brake Disc Thickness Variance

Service Limit 0.002 " (0.051mm)

difference between measurements

#### Brake Disc Runout

Service Limit 0.005" (0.127 mm)



### REMOVAL/ REPLACEMENT

1. Removal caliper and hub. 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 new disc on hub.

5. and tighten to specified.

**CAUTION:** Always use new brake disc mounting bolts.

Front Brake Disc Mounting Bolt Torque :  
18 ft. lbs. (25 Nm )

## 7.9 FRONT CALIPER REMOVAL/ INSPECTION / INSTALLATION

**CAUTION:** The caliper is a non-serviceable Component; it must be replaced as an assembly.

**NOTE:** If any special service needed, contact the ATV manufacture via the agent for the parts and special instruction.

### REMOVAL

1. Remove wheel, remove caliper from the strut.
2. Loosen and remove brake hose(s) to caliper. Place a container under caliper to catch fluid draining.

### INSPECTION

Inspect caliper body for nicks, scratches or worn. Replace caliper as an assembly if any problem exists.

### INSTALLATION

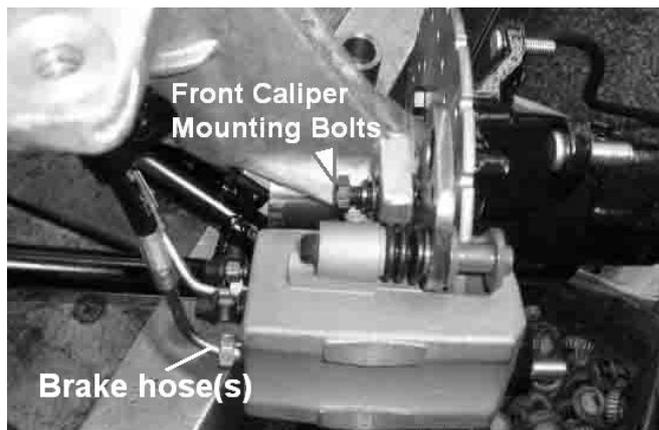
1. Install caliper on hub strut, Apply Loctite™ 242 to screw threads and Install new bolts.

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

2. Install brake hose and tighten securely.

**NOTE:** In some versions of brake, there are 2 hydraulic circulates (for foot brake and hand brake) in one caliper. Make sure you install the right hose.

3. Bleeding and Install wheels, If new brake pads are installed, burnishing procedure should be performed. See **BURNISHING PROCEDURE**, And 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, recheck assembly and installation.



**7.10 REAR BRAKE PAD REMOVAL/ INSPECTION / INSTALLATION**

**NOTE:** The brake pads should be replaced as a set.

**REMOVAL and INSPECTION**

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:** Do not over spread this spring pin a part farther than necessary to remove it.

4. Clean.

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

Rear Brake Pad Service Limit 0.3/64"(1 mm)

**INSTALLATION**

1. Install new pads in caliper body. Be sure to put spacer between pads.

2. Install caliper and torque mounting bolts.

Brake Caliper Torque: 18 ft. lbs. (25 Nm )

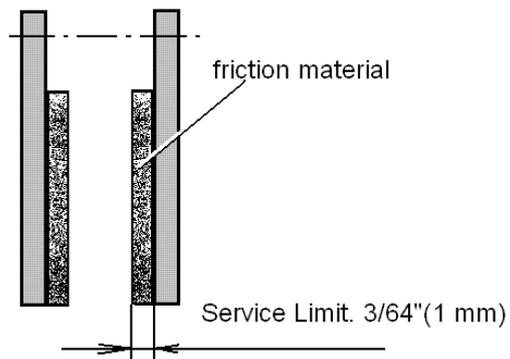
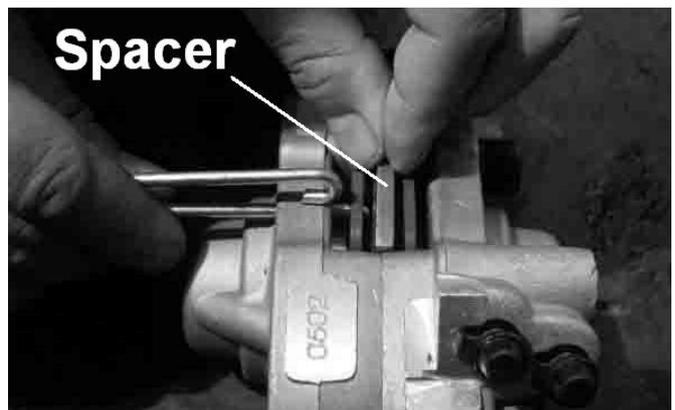
3. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2 " (13 mm) of brake fluid in the reservoir to prevent air from entering the master cylinder.

**Hand and (or) Foot Brake Master Cylinder(s) Fluid Level:**

**Between MIN and MAX lines**

4. Install wheels, burnishing procedure should be performed. See **BURNISHING PROCEDURE**, And 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, recheck assembly and installation.

## **7.11 REAR CALIPER REMOVAL/ INSPECTION/ INSTALLATION**

**CAUTION:** The caliper is a non-serviceable Component; it must be replaced as an assembly.

**NOTE:** If any special service needed, contact the ATV manufacture via the agent for the parts and special instruction.

1. Clean caliper area.
2. Using a flare nut wrench, remove hose(s). Place a container to catch brake fluid draining from brake hose.
3. Remove caliper.
4. Remove brake pad as described above.
5. Inspect surface of caliper for nicks, scratches or damage and replace if necessary.
6. Install brake pads in caliper body with friction material facing each other, with the spacer between the pads. Install retaining pin through outer pad, pad spacer and inner pad.
7. Install caliper and torque mounting bolts.

**Caliper Mounting Bolt/ Caliper body Bolt Torque:**

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

8. Install brake hose and tighten to specified torque.

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

**NOTE:** In some versions of brake, there are 2 hydraulic circulates (for foot brake and hand brake) in one caliper. Make sure you install the right hose.

9. Bleed.
10. 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, recheck assembly and installation.



## 7.12 REAR BRAKE DISC INSPECTION / REMOVAL / REPLACEMENT

### 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 and a dial indicator. Replace disc if worn beyond service limit.

Brake Disc Thickness

New 0.177-0.187" (4.496-4.750mm)

Service Limit 0.167" (4.242 mm)

Brake Disc Thickness Variance

Service Limit 0.002 " (0.051mm)

difference between measurements

Brake Disc Runout

Service Limit 0.005" (0.127 mm)

### REMOVAL/ REPLACEMENT

1. Removal wheel/ hub and caliper.
2. Remove bolts and disc from the flange.
3. Clean mating surface of disc and hub.
4. Install new disc on flange.
5. Tighten to specified.

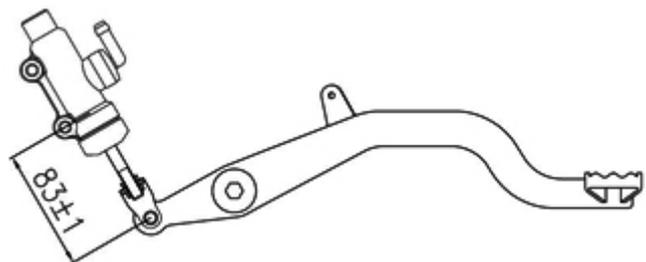
**CAUTION:** Always use new brake disc mounting bolts.

Rear Brake Disc Mounting Bolt Torque :  
18 ft. lbs. (25 Nm )

## 7.13 FOOT BRAKE PEDAL FOR B-TYPE

### ADJUSTING

If the push rod joint is reinstalled, adjust the push rod length so that the distance between the centers of the master cylinder lower mounting bolt hole and joint pin hole is  $83\pm 1$ mm. After adjustment, tighten the joint nut.





# **CHAPTER 8 ELECTRICAL**

- 8.1 PARTS INSPECTION AND SERVICE
- 8.2 BATTERY
- 8.3 IGNITION SYSTEM
- 8.4 CHARGING SYSTEM
- 8.5 ELECTRICS STARTING SYSTEM
- 8.6 COOLING SYSTEM
- 8.7 LIGHTING SYSTEM
- 8.8 REVERSE LIMIT SYSTEM
- 8.9 GEAR POSITION INDICATOR SWITCH TEST
- 8.10 SPEEDOMETER SYSTEM
- 8.11 MAIN SWITCH AND HANDLE SWITCH
- 8.12 FUEL GAUGE/ FUEL LEVEL SENSOR
- 8.13 THE OPERATION PRINCIPLE OF THE ELECTRIC 4WD SHIFT
- 8.14 WIRING DIAGRAM

**8.1 PARTS INSPECTION AND SERVICE****HEADLIGHT LAMP REPLACEMENT****A. '05 model**

1. Remove the cover 1 from the ATV.
2. Remove the bulb socket with the wire harness from the backside of the lens unit by turn the socket CCW.
3. Remove the bulb from the bulb socket carefully.
4. Replace the bulb with a new one (12V 35W/35W), Align the tab with the groove, locating it properly and securely.
5. Reinstall the bulb socket, Align the tab with the groove, locating it properly and securely.
6. Reinstall the cover.
7. Adjust the aim.

**B. Headlight on handlebar**

1. Remove the front cover of the handlebar from the ATV.
2. Remove the bulb socket with the wire harness from the backside of the lens unit by turn the socket CCW.
3. Remove the bulb from the bulb socket carefully.
4. Replace the bulb with a new one (12V 35W/35W), Align the tab with the groove, locating it properly and securely.
5. Reinstall the bulb socket, Align the tab with the groove, locating it properly and securely.
6. Reinstall the cover.
7. Adjust the aim.

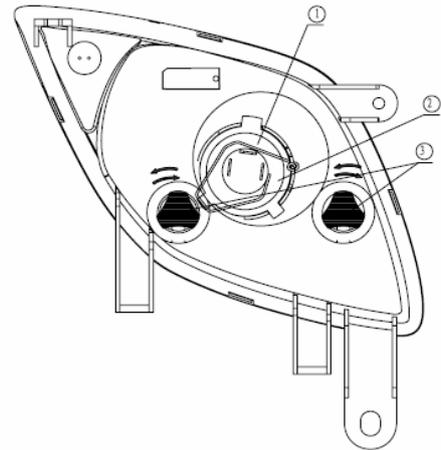
**C. '04 and early model**

1. Remove lens unit from the headlight.
2. Remove the bulb socket with the wire harness from the backside of the lens unit by turn the socket CCW.
3. Remove the bulb from the bulb socket carefully.
4. Replace the bulb with a new one (12V 35W/35W), Align the tab with the groove, locating it properly and securely.
5. Reinstall the bulb socket, Align the tab with the groove, locating it properly and securely.
6. Reinstall the cover.
7. Adjust the aim.



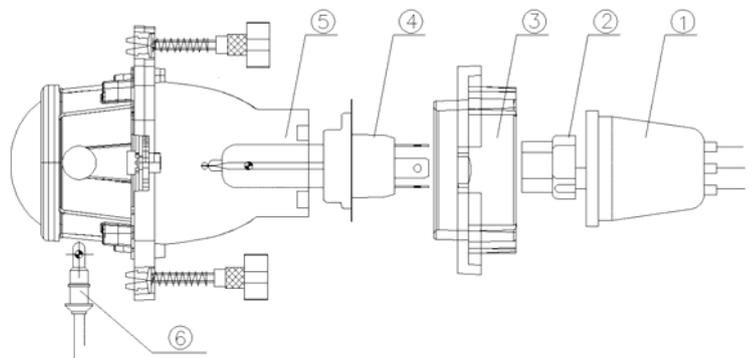
**D. Special Edition – Anniversary and B-Type /400ATV-2**

1. Use bulb 12V 35W/35W.
2. Pull the cable plug off the conducting strip in the socket, remove the clip ① before dismounting the bulb.
3. Fit a new bulb into the socket, sitting properly in the three slots, install the clip as shown in the fig. and connect the cable plug to the conducting strip.
4. Change the bulb.



**E. ATV400-2B**

1. Use bulb 12V 35W/35W.
2. Pull the cable plug off the conducting strip in the socket, remove the clip ① before dismounting the bulb.
3. Fit a new bulb into the socket, sitting properly in the three slots, install the clip as shown in the fig. and connect the cable plug to the conducting strip.
4. Change the bulb.

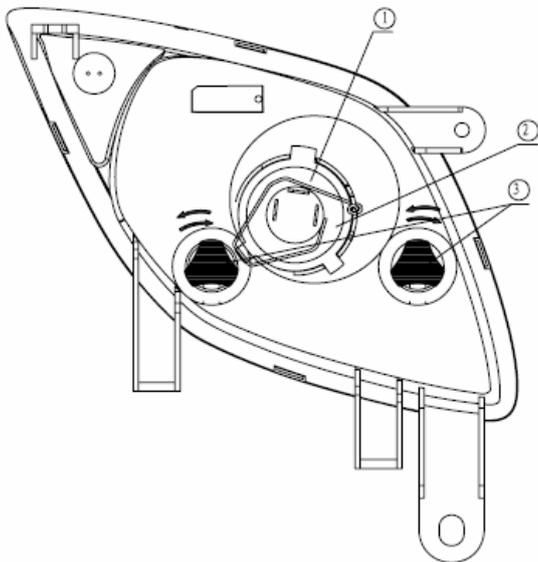
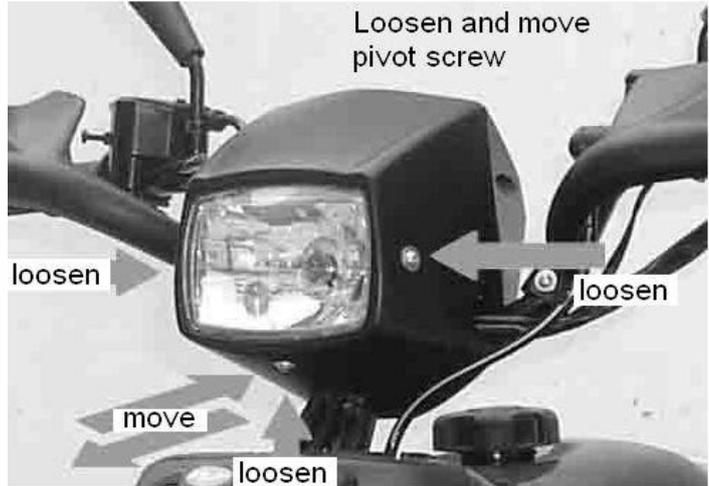
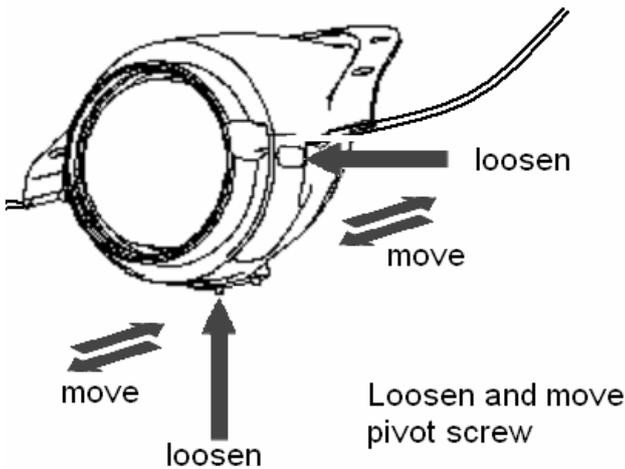


**HEADLIGHT ADJUSTMENT**

1. The headlight beam can be adjusted vertically (all models) and horizontally (except the light on handlebar).
2. Place the vehicle on a level surface with the headlight approximately 25' (7.6m) from a wall.
3. Measure the distance from the floor to the center of the headlight and make a mark on the wall at the same height.
4. Start the engine and turn the headlight switch to high beam.
5. Observe headlight aim. The most intense part of the headlight beam should be aimed 2' (51mm) below the mark placed on the wall in step 2. NOTE : Riding weight must be included on the seat.
6. Loosen but not remove pivot bolt/ screw and adjust beam to desired position.
7. Tighten nut and bolt / screw.

'05 model

Headlight on handlebar

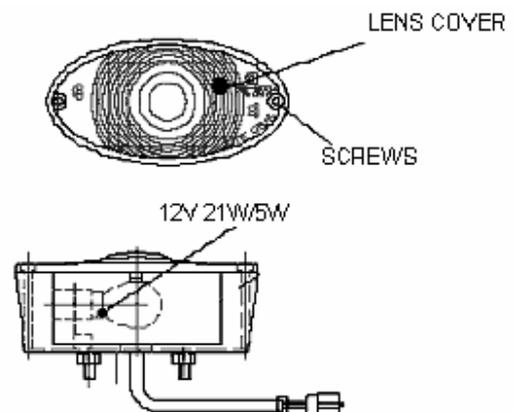


Special Edition – Anniversary and B-Type and 400ATV-2

To turn the two adjusting screws ③ clockwise is to lower the beam. To turn the two adjusting screws ③ counterclockwise is to heighten the beam.

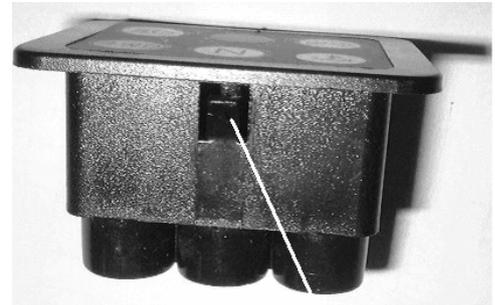
**TAILLIGHT / BRAKELIGHT LAMP REPLACEMENT**

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 / brake light.



**INDICATOR LAMP REPLACEMENT**

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



Depress locking tabs to remove

**8.2 BATTERY**

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 must be fully charged before use.

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.

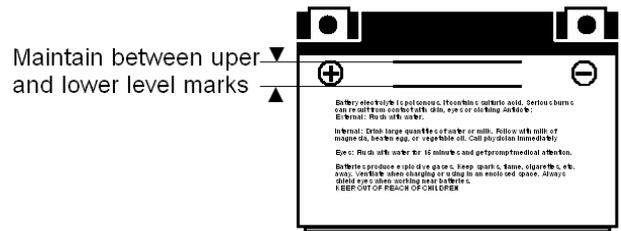
**NOTE:** This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.

5. Charge battery at 1 /10 of its amp /hour rating. Examples: 1 /10 of 14 amp battery = 1.4 amp; 1/10 of 7 amp battery = 0.7 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 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.

5. 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.
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 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.

**MF (Maintenance Free) battery does not require the Specific Gravity Test and Refill**

**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.

**NOTE:** Lead acid batteries should be kept at or near a full charge as possible.

**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.

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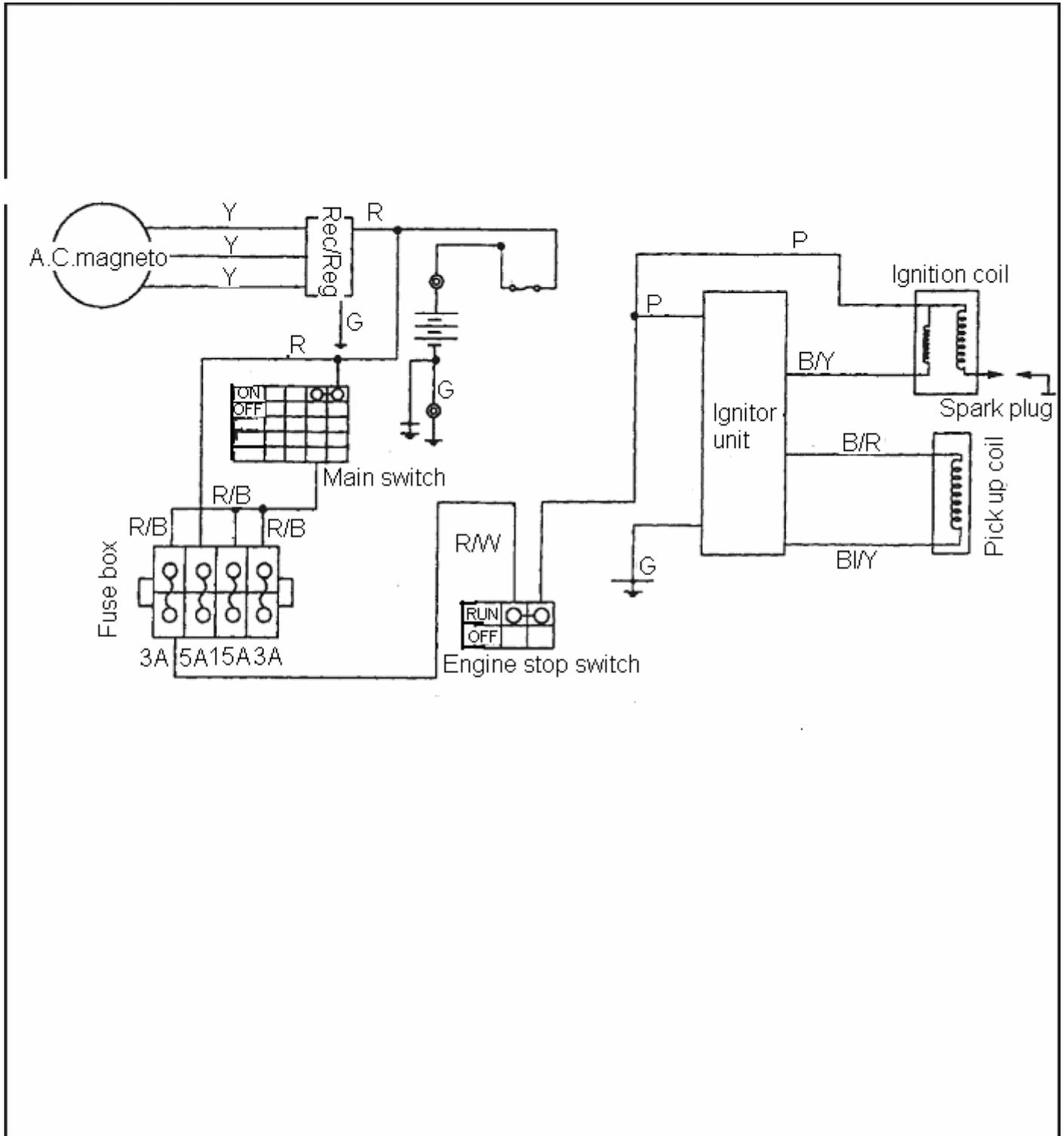
## **8.3 IGNITION SYSTEM**

### **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
- 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 0.030-0 .050" (0. 75-1.25 mm)
- Excessive crankshaft run out on magneto (RH) end should not exceed 0.005" (0.13mm)
- Faulty CDI module

CIRCUIT DIAGRAM



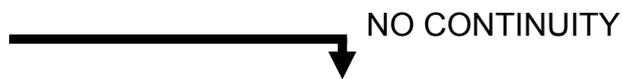
**IF THE IGNITION SYSTEM FAILS TO OPERATE**

**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. Wiring connection     |
| 5. Spark plug cap resistance | (entire ignition system)  |
| 6. Ignition coil             |                           |

1. Fuse



Check switches

Replace the fuse.



2. Battery



- Check the battery condition.

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

Refer to "BATTERY INSPECTION"



**Standard spark plug: DR8EA / NGK**

3. Spark plug



- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.

Repair or replace the spark plug



Spark plug gap: 0.6 ~ 0.7mm



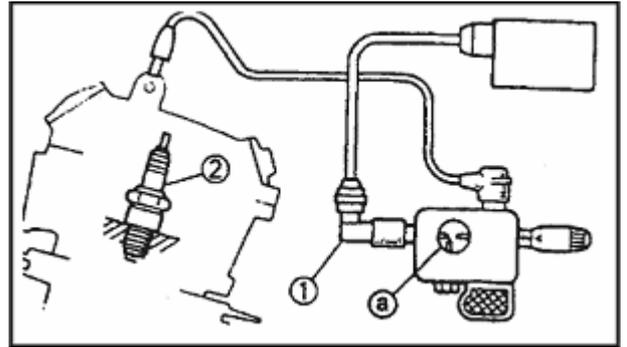
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\*



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 .
- Check the spark by pushing the starter switch, and increase the spark gap until a misfire occurs.



MEETS SPECIFICATION



The ignition system is not faulty.



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

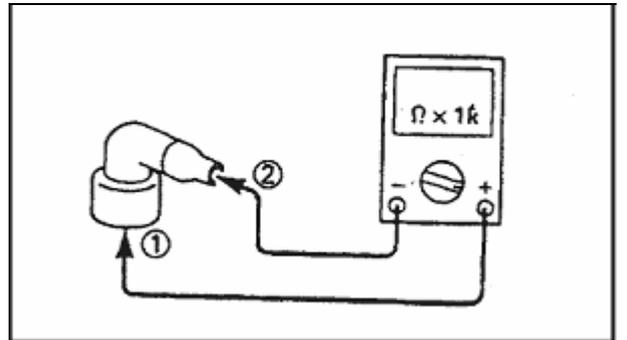


OUT OF SPECIFICATION  
OR  
NO SPARK

5. Spark plug cap resistance

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

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



OUT OF SPECIFICATION



Replace the spark plug cap



**Spark plug cap  
resistance:  
 $5\text{K}\Omega (20^\circ\text{C})$**



CORRECT

\*

\*

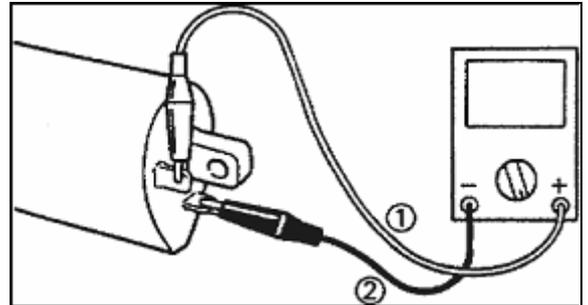


6. Ignition coil resistance

Disconnect the ignition coil connector from the wire harness.

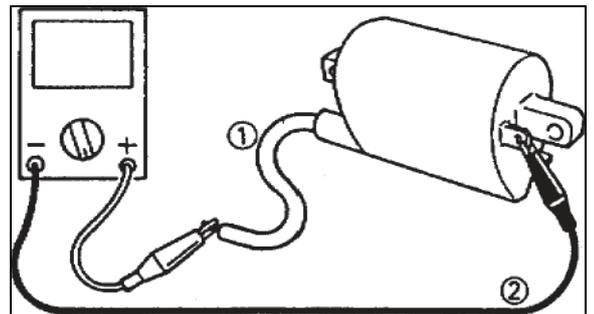
- Connect the pocket tester (1) to the ignition coil.
- Check if the primary coil has the specified resistance.

Tester (+) lead  
Pink Terminal  
Tester ( ) lead B/Y  
Terminal



**Primary coil resistance:**  
3.6-4.8Ω(20 °C)

Tester (+) lead  
Spark plug lead  
Tester (—) lead  
Pink Terminal



- Connect the pocket tester (Ω×1k ) to the ignition coil.
- Check the secondary has the specified resistance



**Secondary coil resistance:**  
10.7-14.5 KΩ (20°C)



BOTH MEET  
SPECIFICATION

OUT OF SPECIFICATION



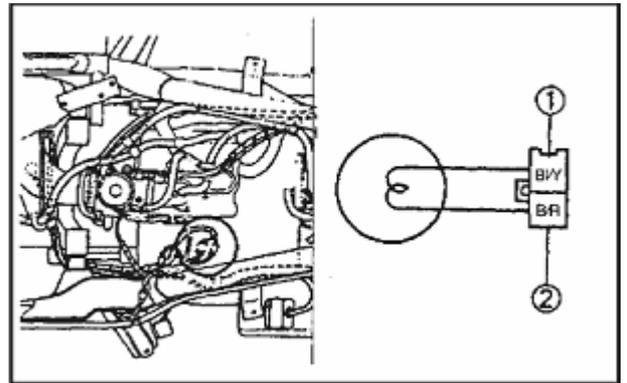
Replace the ignition coil.

\*



7. Pickup coil resistance

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



Tester (+) lead →

B/Y Terminal ①

Tester (-) lead →

B/R Terminal ②

- Check the pickup coil has the specified resistance.



Primary coil resistance:  
168 -252 $\Omega$  (20°C)



MEETS  
SPECIFICATION

8. Main switch

CHECK SWITCHES



CONTINIUTY

9. Engine stop switch ( for USA model)



CONTINIUTY

10. Wiring connection

- Check the connection of the entire ignition system Refer to "CIRCUIT DIAGRAM".



CORRECT

Replace the igniter unit.

OUT OF SPECIFICATION



Replace the pickup coil.

NO CONTINUITY



Replace the main switch

NO CONTINUITY



Replace the handlebar switch.

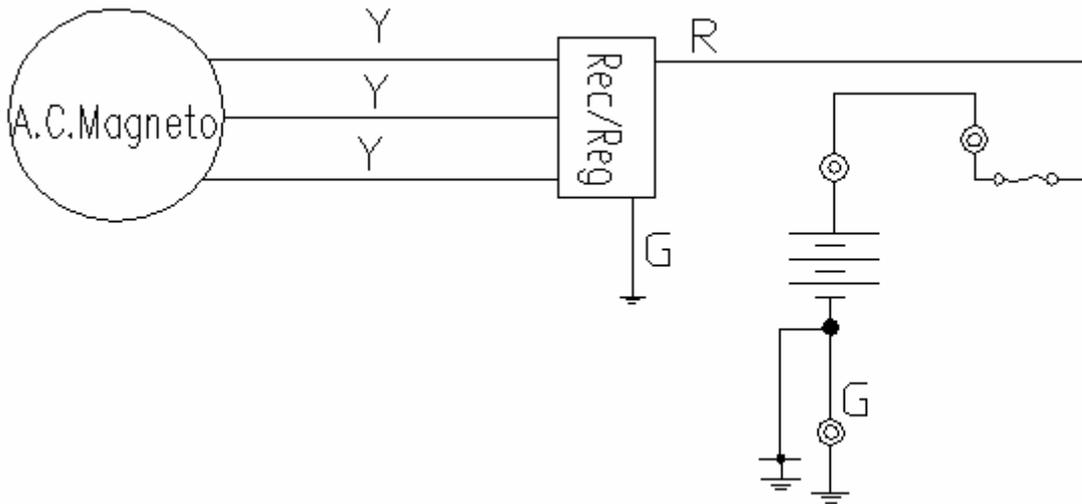
POOR CONNECTIONS



Correct

**8.4 CHARGING SYSTEM**

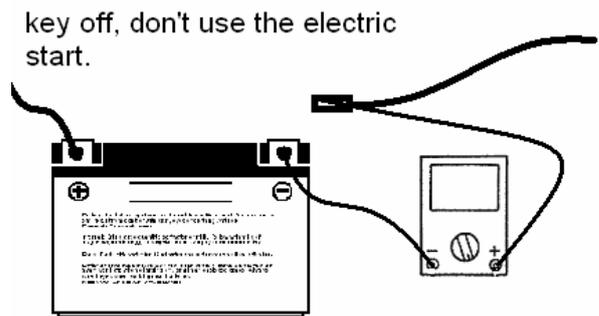
**CHARGING SYSTEM CIRCUIT DIAGRAM**



**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 0.01DCA(10mA)**



**CHARGING SYSTEM**

**Procedure**

Check:

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

- 4. Stator coil resistance
- 5. Wiring system (entire charging system)

1. fuse

2. Battery

Check the battery condition.  
Refer to "BATTERY INSPECTION"

3. Charging voltage

Connect the engine tachometer to the spark plug lead.

● Connect the pocket tester (DC20V) to the battery

**Test (+) lead**→

**Battery (+) terminal ①**

**Tester (-) lead**→

**Battery (-) terminal ②**

Measure the battery terminal voltage.

start the engine and accelerate to about 5,000rpm

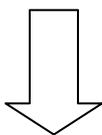
● check the terminal voltage

**Measured voltage-terminal**

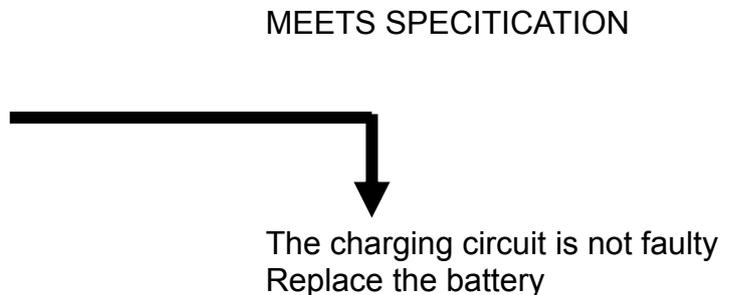
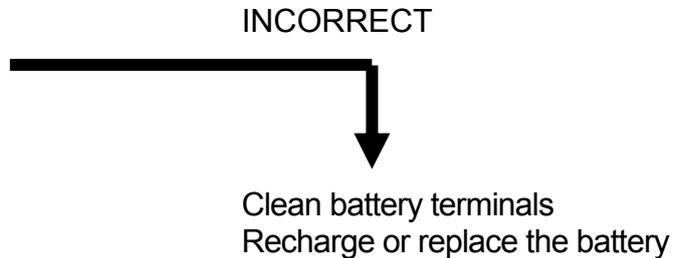
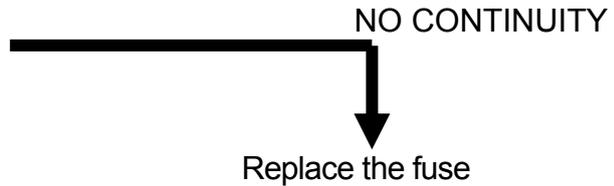
**Voltage:**

**0.2-2.5V up**

**NOTE:** Use a fully charged battery.



OUT OF SPECIFICATION



4. Starter coil resistance

Remove the A.C. magneto coupler from wire harness

Connect the pocket tester ( $\Omega X1$ ) to the stator coil

Tester (+) lead –yellow terminal

Tester (-) lead –yellow terminal

Measure the stator coil resistance

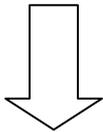
Stator coil resistance  $0.5-0.8\Omega$  ( $20^{\circ}\text{C}$ )

OUT OF SPECIFICATION



Replace the stator coil

MEETS SPECIFICATION



5. Wiring connection

check the entire charging system for connections

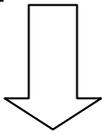
Refer to "CIRCUIT DIAGRAM"

POOR CONNECTION



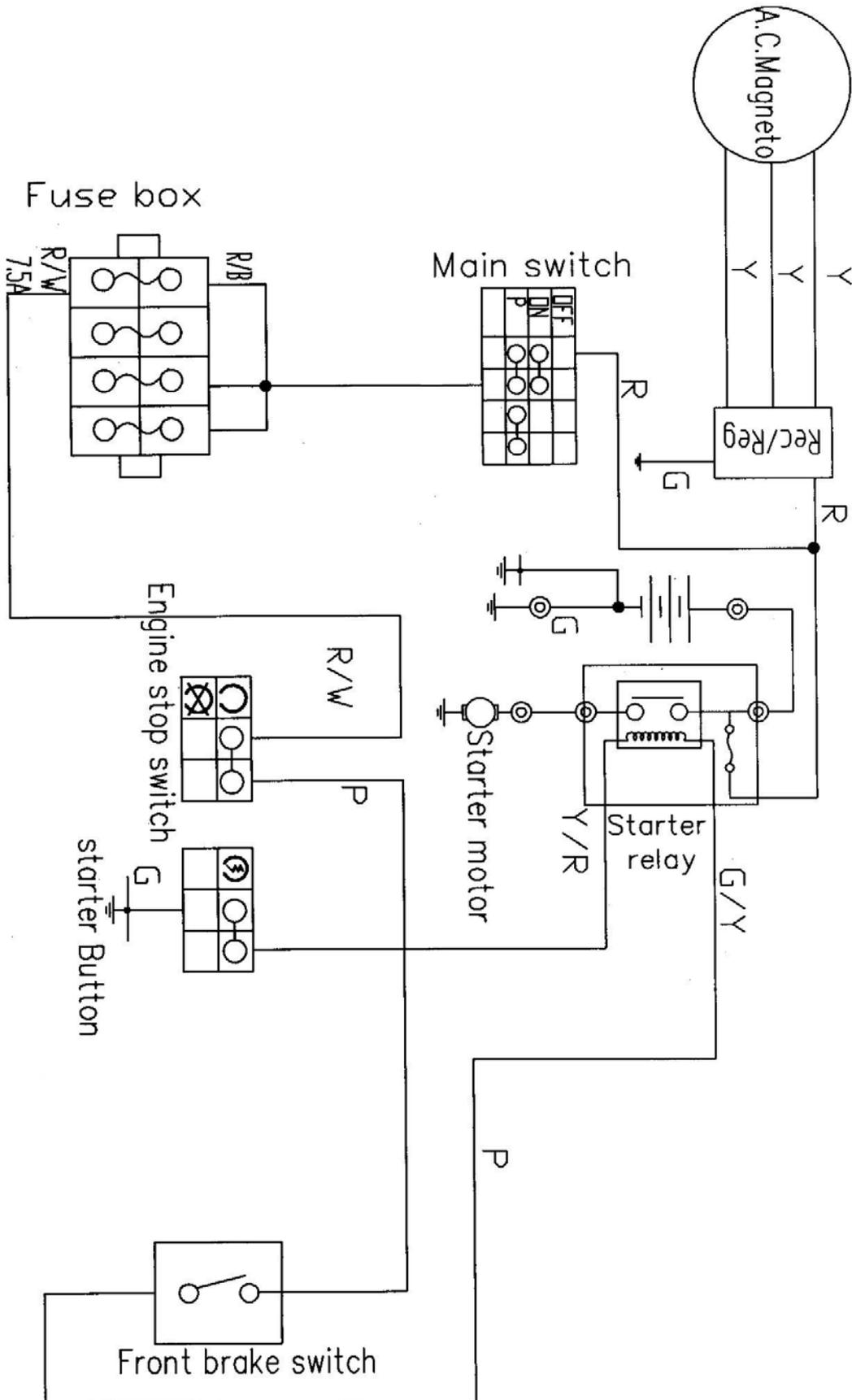
correct

CORRECT



Replace the rectifier/regulator

**8.5 ELECTRICS STARTING SYSTEM  
DIAGRAM**



**TROUBLESHOOTING**

**IF THE STARTER MOTOR FAILS TO OPERATE**

**Procedure**

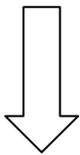
Check:

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Fuse (Main)</li> <li>2. Battery</li> <li>3. starter motor</li> <li>4. starter relay</li> <li>5. starting circuit cut-off relay</li> </ol> | <ol style="list-style-type: none"> <li>7. Engine stop switch</li> <li>8. front/rear brake switch</li> <li>9. starter switch</li> <li>10. wiring connection (entire starting system)</li> </ol> |
|---|--|

6. main switch

1. fuse

refer to "CHECKING SWITCHES" section



NO CONTINUITY

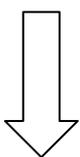


Replace the fuse

2. Battery

Check the battery condition.

Refer to "BATTERY INSPECTION" section in CHAPTER 3



INCORRECT



Clean battery terminals  
Recharge or replace the battery

3. Starter motor

Connect the battery positive terminal and starter motor cable using a jumper lead.

Check the starter motor operation

DOES NOT MOVE



Repair or replace the starter motor

4. Starter relay

●Disconnect the relay unit coupler from the wire harness.

●Connect the pocket tester ( $\Omega \times 1$ ) and battery (12V) to the relay unit coupler terminals.

- Battery (+) lead →  
Green/Yellow terminal ①
- Battery (-) lead →  
Yellow/Red terminal ②

●Check the starter relay for continuity.

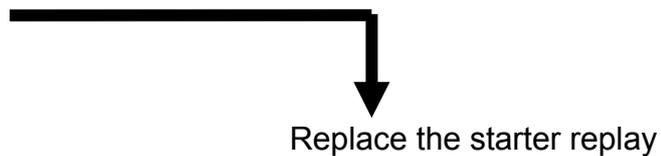
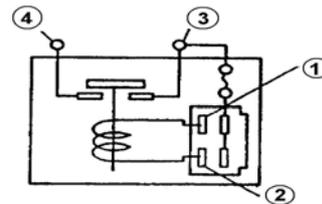
- Test (+) lead → ③ terminal
- Test (-) lead → ④ terminal



**WARNING**

A wire used as a jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may burn.

This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity



5. Starting circuit cut-off relay

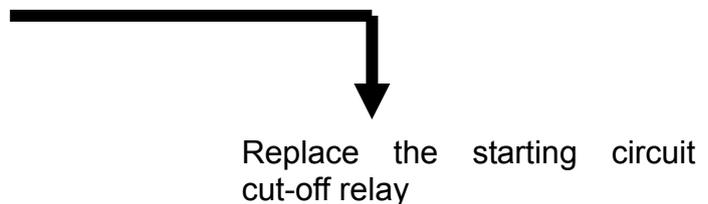
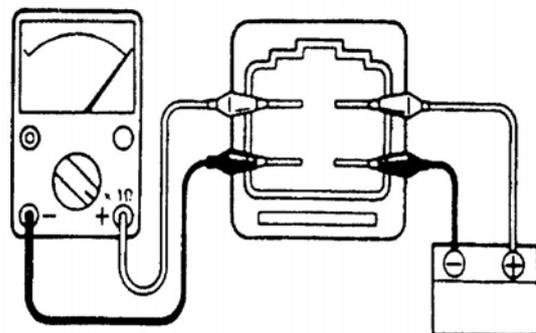
●Disconnect the starting circuit cut-off relay coupler from the wireharness.

●Connect the pocket tester ( $\Omega \times 1$ ) and battery (12V) to the starting circuit cut-off relay coupler terminals.

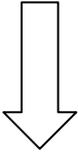
- Battery (+) lead → terminal ②
- Battery (-) lead → terminal ④

●Check the starting circuit cut-off relay for continuity.

- Test (+) lead → ① terminal
- Test (-) lead → ③ terminal



6. Main switch  
CHECK SWITCHES

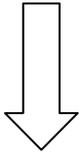


NO CONTINUITY



Replace the main switch

7. Engine stop switch



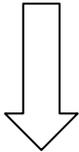
NO CONTINUITY



Replace the handlebar switch

8 Front /rear brake switch

CHECKING SWITCHES



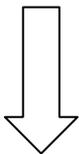
NO CONTINUITY



Replace the brake switch

9. Starter switch

CHECKING SWITCHES



NO CONTINUITY



Replace the handlebar switch

10. Wiring connection

Check the connections of the entire starting system.

Refer to "CIRCUIT DIAGRAM

POOR CONNECTION



Correct

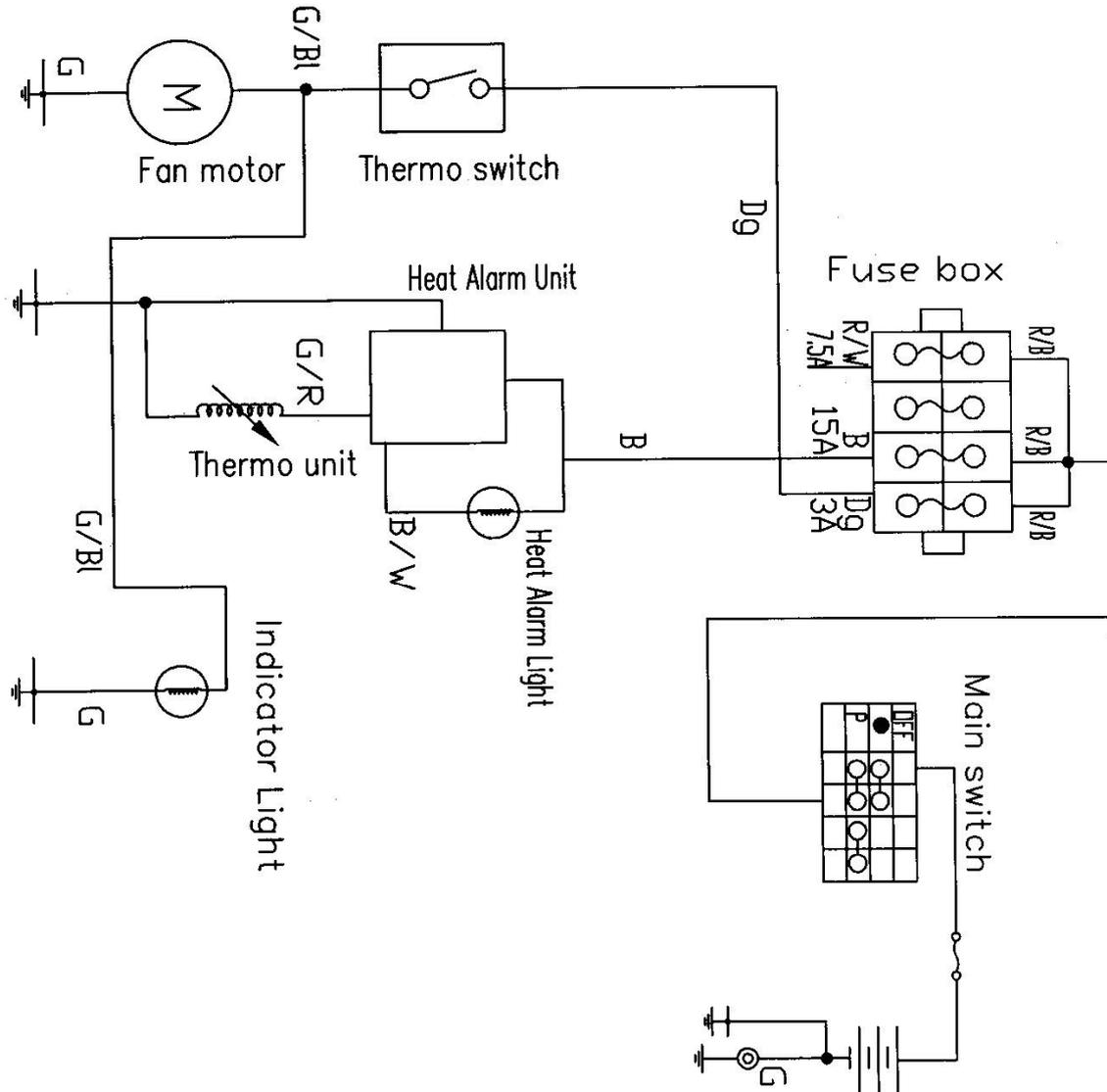
**8.6 COOLING SYSTEM**

**IF THE FAN MOTOR FAILS TO TURN**

Procedure

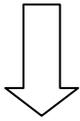
Check:

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



1. fuse

CHECK SWITCHES



NO CONTINUITY



Replace the fuse

INCORRECT

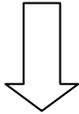


Clean battery terminals  
Recharge or replace the battery

2. Battery

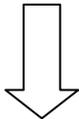
Check the battery condition.

Refer to "BATTERY INSPECTION" section



3 Main switch

CHECK SWITCHES



NO CONTINUITY



Replace the main switch

4. Fan motor(inspection 1)

Connect the battery to the fan motor.

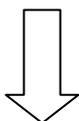
**Battery (+) lead**→**Green/Blue terminal**

DOES NOT MOVE

①

**Battery (-) lead**→**Green ground** ②

Check the fan motor operation



Replace fan motor

5. Fan motor (inspection 2)

Turn the main switch to off.

●Remove the thermo switch lead from thermo switch.

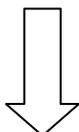
DOES NOT MOVE

●Connect jumper lead to thermo switch leads.

●Turn the main switch to on



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

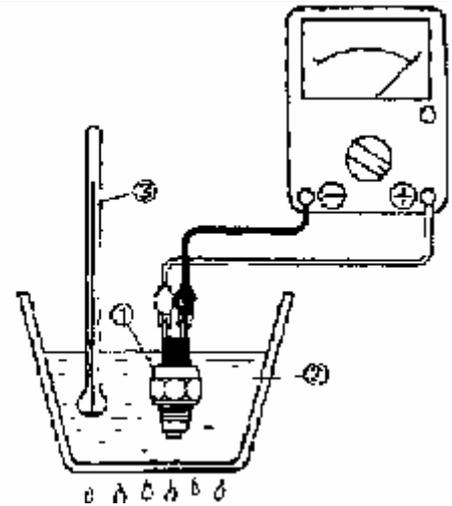


6. Thermo switch

Remove the thermo switch from the radiator.

- Connect the pocket tester ( $\Omega X1$ ) 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



**WARNING**

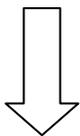
- Handle the thermo switch with special care. Never subject it to strong shocks or allow it to be dropped. Should it be dropped, it must be replaced.
- Do not touch the thermo switch to the bottom of the heated vessel.

88±3°C Thermo switch "ON"  
80 °C Thermo switch "OFF"

OUT OF SPECIFICATION



Replace the thermo switch



Wring connection

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

UPPER CONNECTION



Correct

IF THE HEAT ALARM UNIT WORKING

When the main switch is turned on, the temperature of the engine begins to go up. As it comes to 88±3°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±5°C with the buzzer sounding and the signal flashing. Stop the engine now to have the circuit fixed.

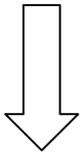
Procedure

Check:

- 1. Fuse(Main, Fan)
- 2. Battery
- 3. Main switch
- 4. Thermo unit
- 5. Voltage
- 6. Wiring connection (entire cooling system)

1. fuse

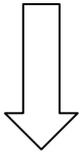
CHECKING SWITCHES



2. Battery

Check the battery condition.

Refer to "BATTERY INSPECTION"



3. Main switch

CHECKING SWITCHES



NO CONTINUITY



Replace the fuse

INCORRECT



Clean battery terminals  
Recharge or replace the battery

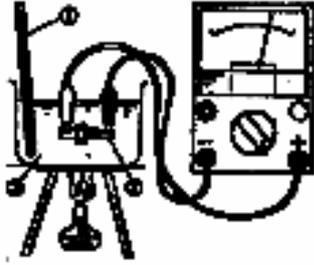
NO CONTINUITY



Replace the main switch

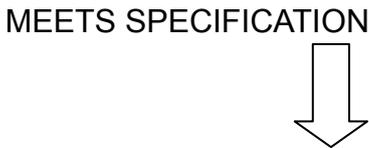
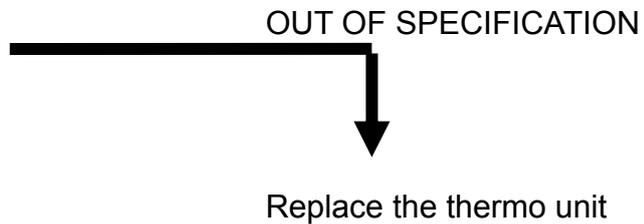
4. Thermo unit

- Drain the coolant and remove the thermo unit from the cylinder head.
- Immerse the thermo unit ② in the coolant ③ .
- ① Thermometer.



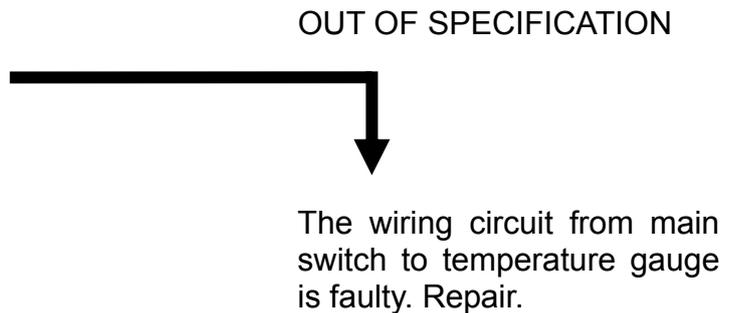
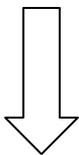
Handle the thermo unit with special care. Never subject it to strong shocks or allow it to be dropped. Should it be dropped, it must be replaced. Do not touch the thermo unit to the bottom of the heated vessel.

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



8.1 Voltage

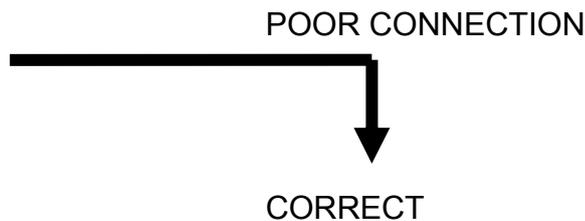
- Connect the pocket tester (DC20V) to the Temperature gauge couple.
- Tester (+) lead → Green/Blue terminal**
- Tester (-) lead → Green ground**
- Turn the main switch to on.
- Check for voltage (12V) on the temperature gauge lead.



- 8.2 Wiring connection check the connections of the entire cooling system. Refer to "CIRCUIT DIAGRAM"

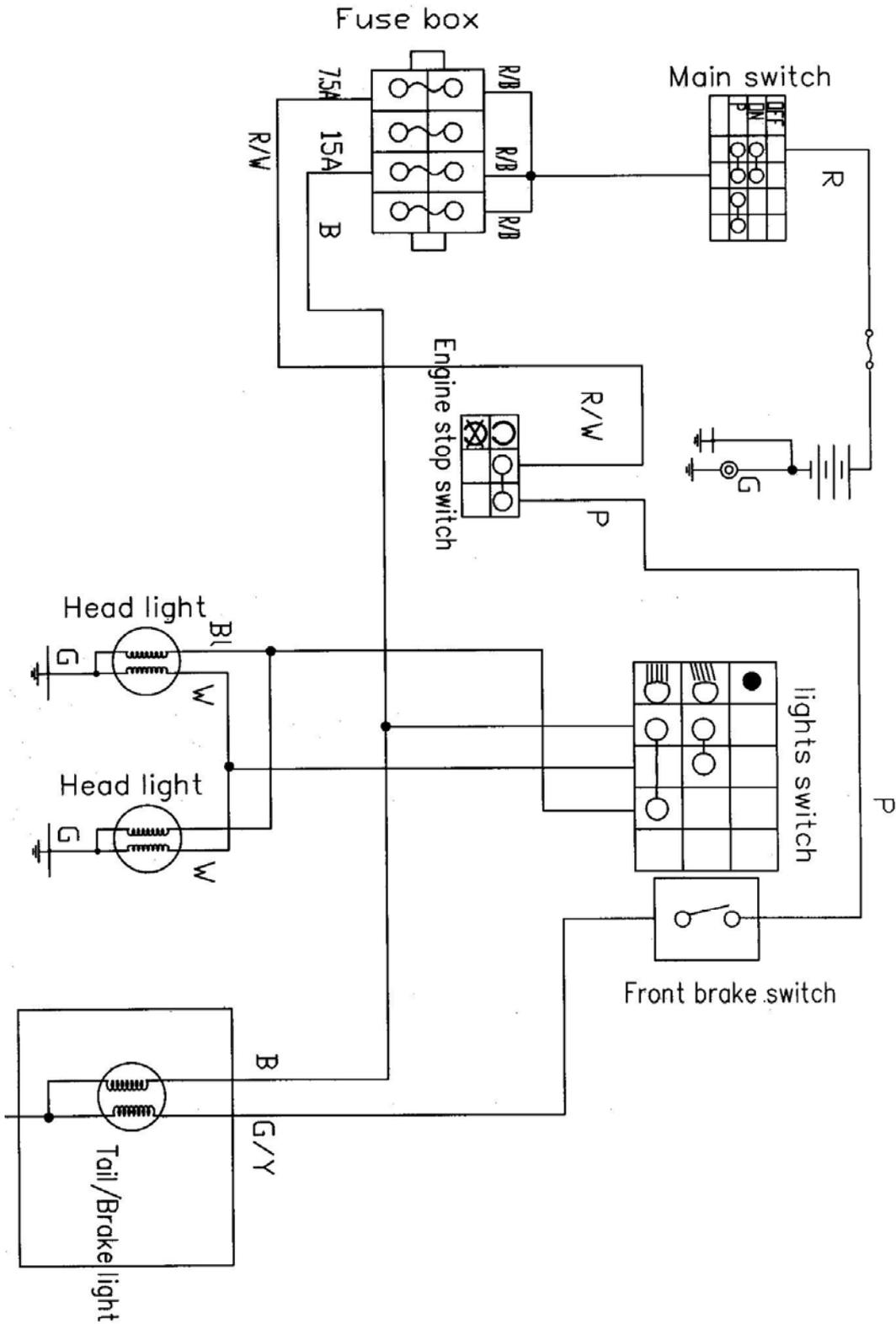


Replace the temperature gauge

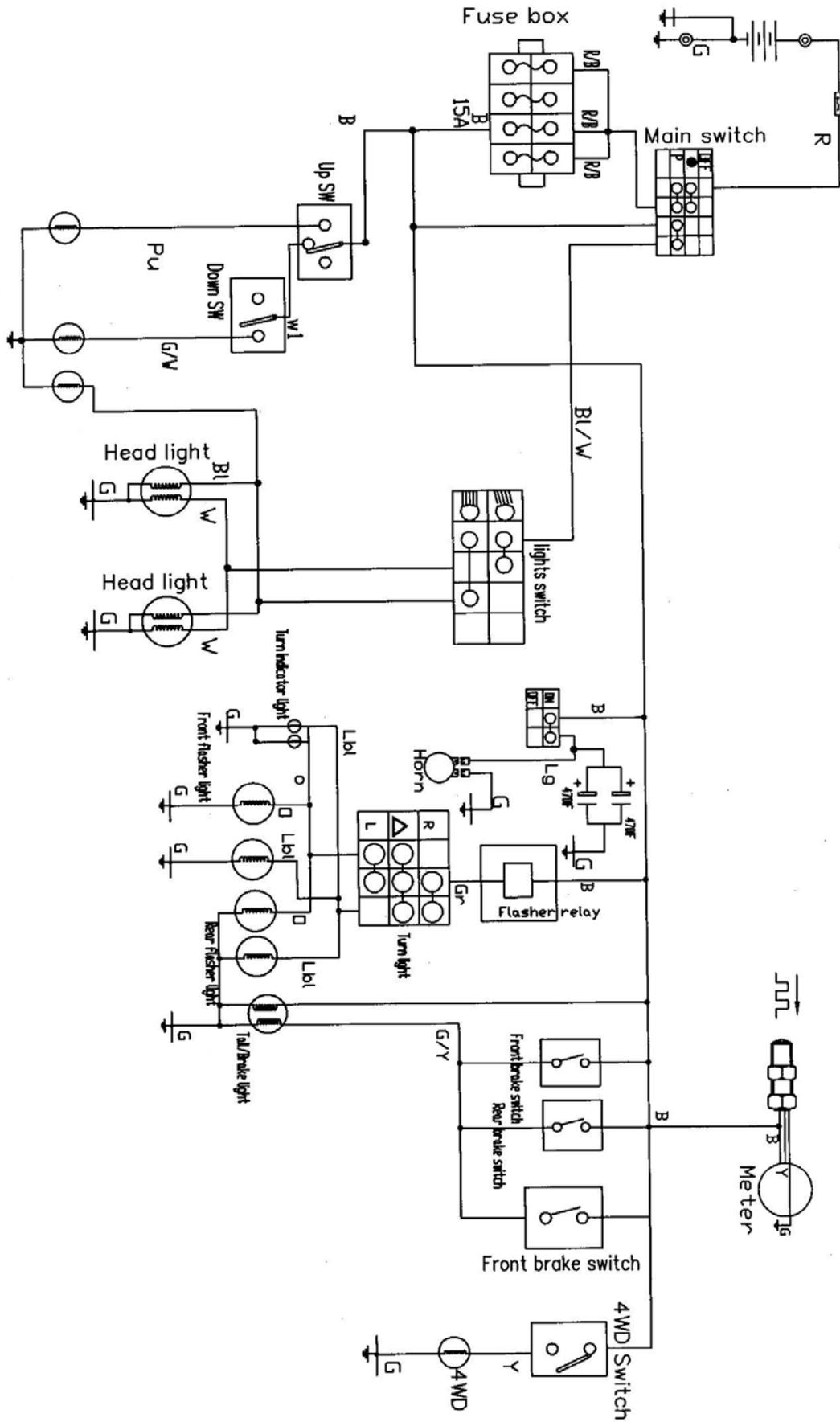


**8.7 LIGHTING SYSTEM**

FOR USA MODEL



FOR EUROPE MODEL



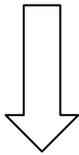
**TROUBLESHOOTING**

**Procedure**

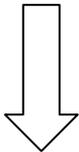
Check:

- 1. Fuse (Main)
- 2. Battery
- 3. Main switch
- 4. Lights switch
- 5. Dimmer switch
- 6. Wiring connection (entire lighting system)

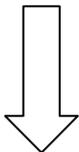
1. fuse  
refer to "CHECKING SWITCHES" section



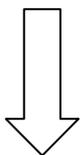
2. Battery  
Check the battery condition.  
Refer to "BATTERY INSPECTION" section in CHAPTER 3



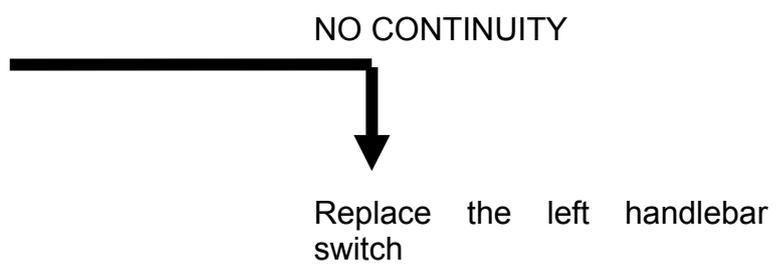
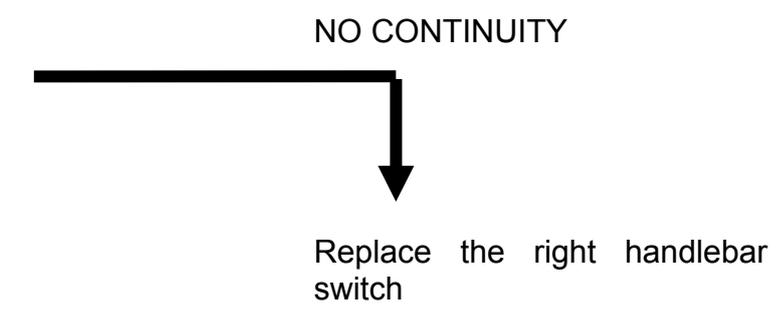
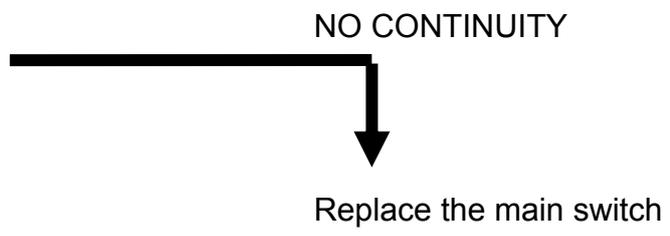
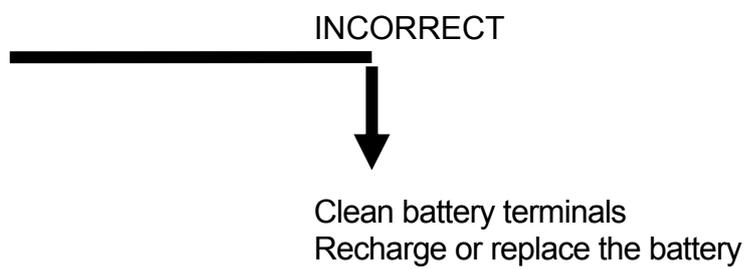
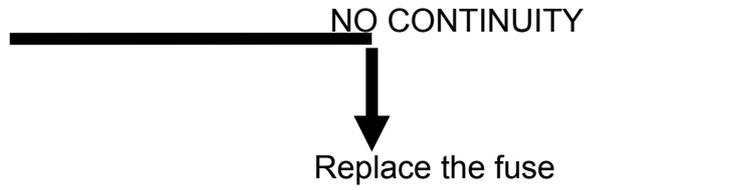
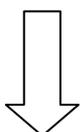
3. Main switch  
CHECK SWITCHES



4. Light switch  
CHECK SWITCHES

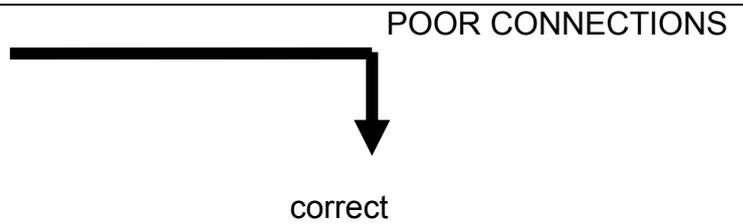
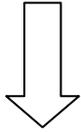


5. Dimmer sw  
CHECK SWITCHES



6. Wiring connection

Check the connection of the entire lighting system



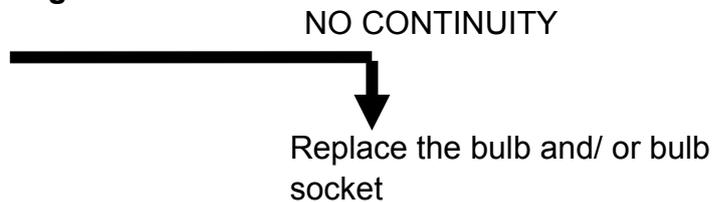
7. check the condition of each of the lighting system's circuits

Refer to "LIGHTING SYSTEM CHECK"

**LIGHT SYSTEM CHECK**

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

1. Bulb and bulb socket  
CHECK SWITCHES



2. Voltage

Connect the pocket tester (DC20V) to the headlight and high beam indicator light couplers.

**A** When the dimmer switch is on low beam.

**B** When dimmer switch is on high beam

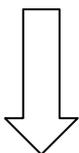
Headlight::

Tester (+) lead → White ① or Blue ② lead

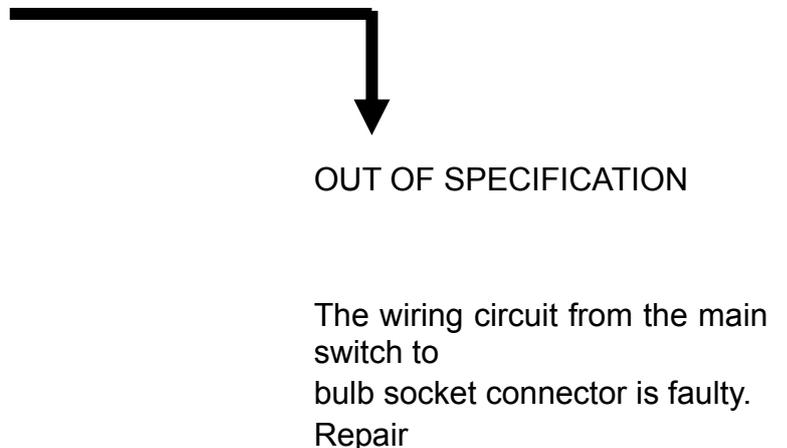
Tester negative (-) lead → Green ③ lead

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



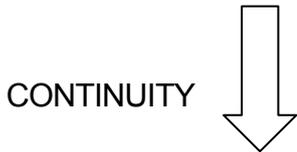
This circuit is not faulty



2. the taillight fails to come on

1. Bulb and bulb socket

CHECK SWITCHES



2. Voltage

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

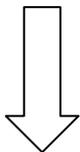
**Tester (+) lead** →  
**Black terminal ①**

**Tester (-) lead** →  
**Green terminal ②**

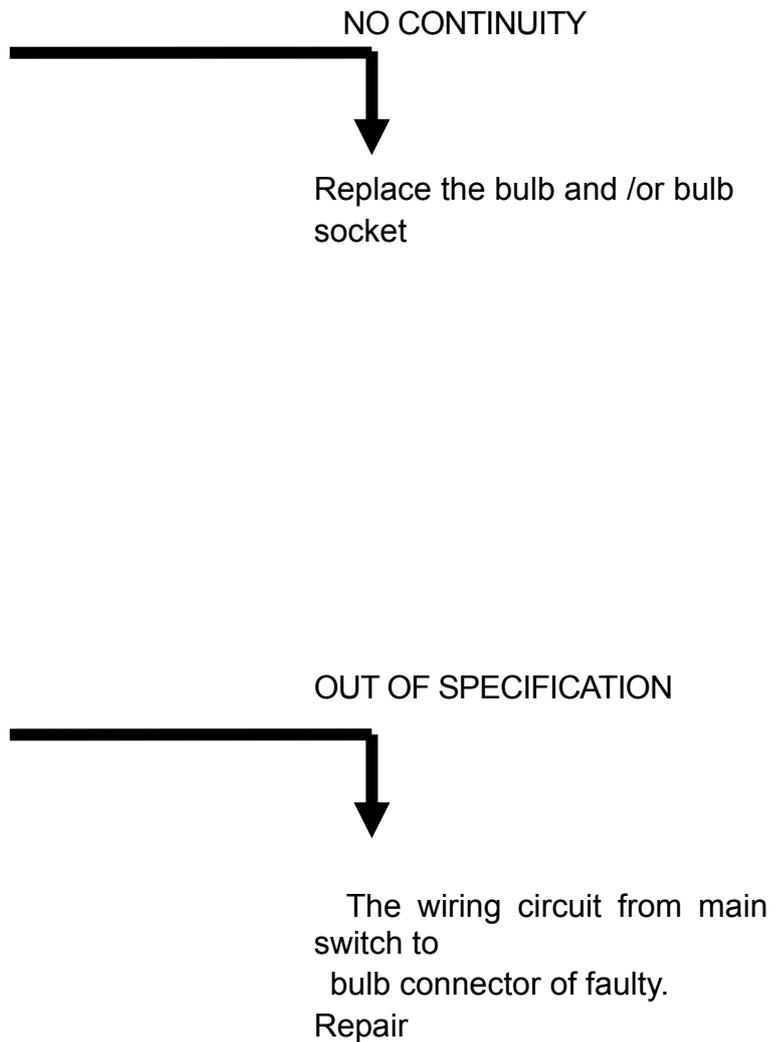
Turn the main switch to on.

Turn the lights switch to on pilot position.

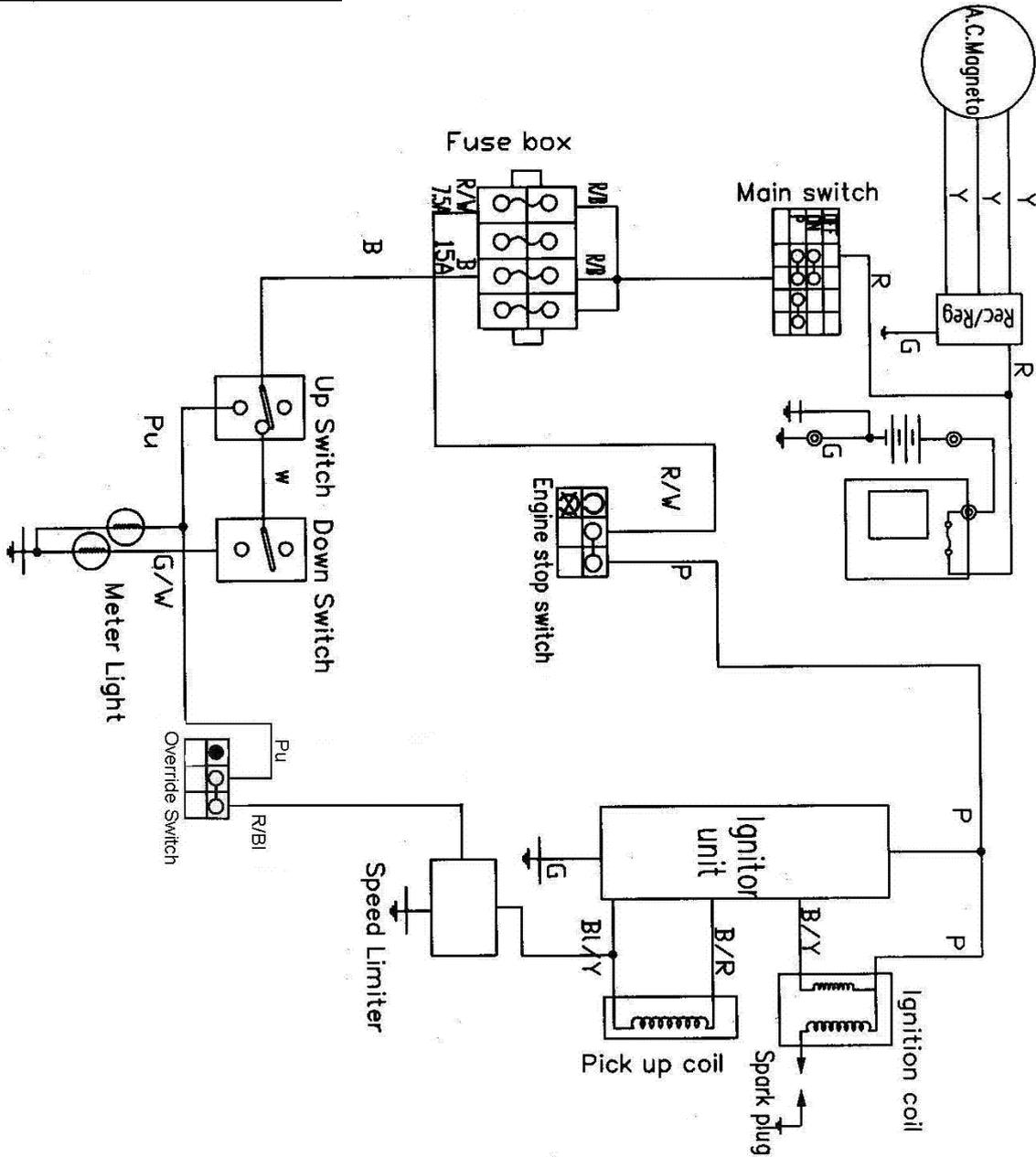
Check the voltage (12V) on the bulb socket connector



This circuit is not faulty



**8.8 REVERSE LIMIT SYSTEM**



The limit set for the speed limiter by the manufacturer is 13~15 km/h, which can be reset in accordance with the user's practice. Turning the adjusting bolt clockwise is to increase the speed, while counterclockwise decrease it.

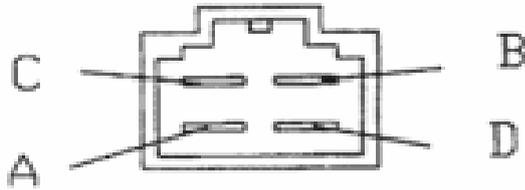
**NOTE.** This limit can be released by the override switch.



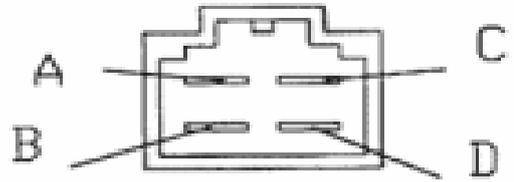
**8.9 GEAR POSITION INDICATOR SWITCH TEST**

Switch table

High /Neutral/Reverse  
Switch



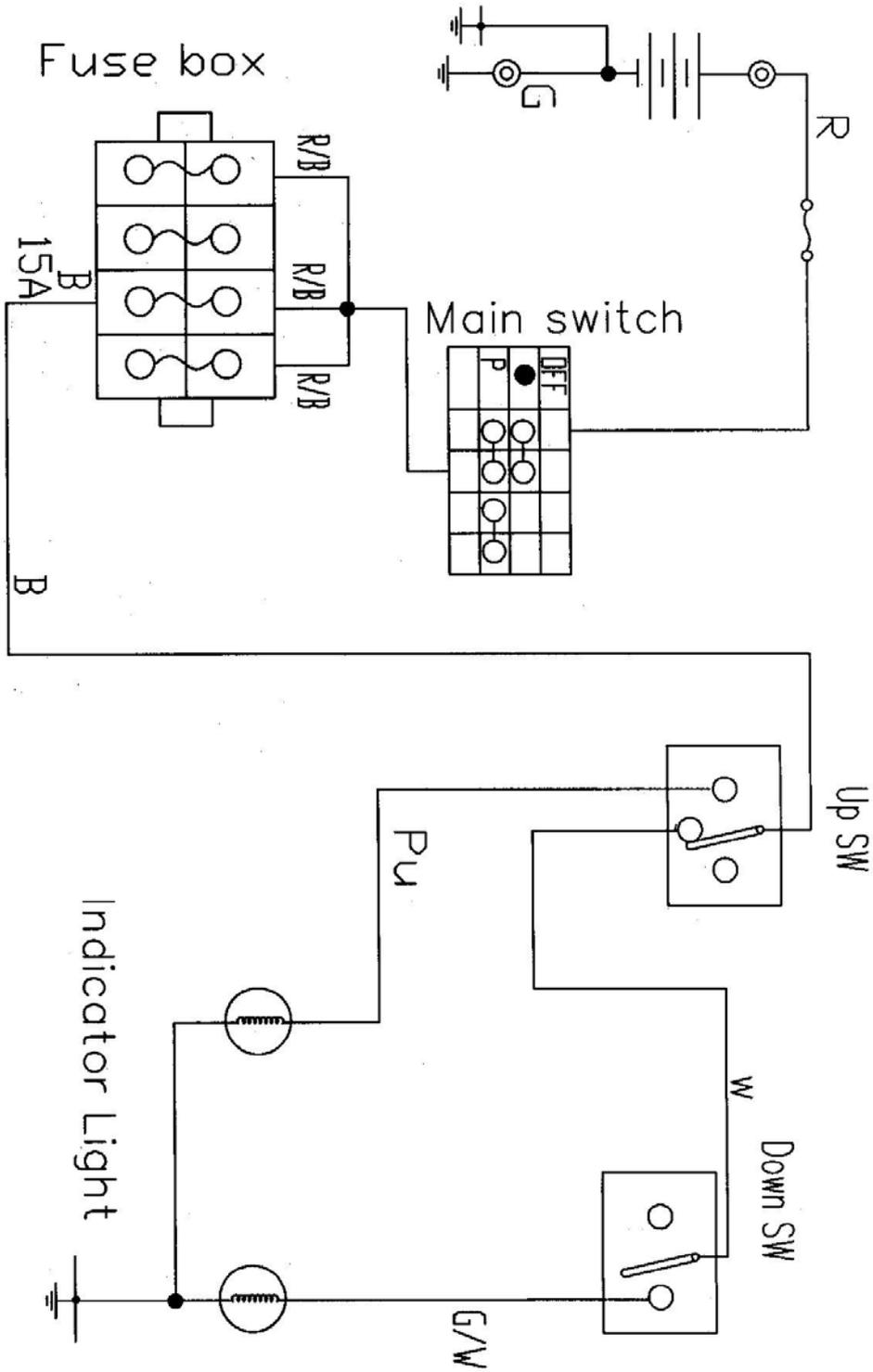
Low/Neutral/Switch



	D	A	B	C
High Range	●		●	
Reverse	●	●		
Neutral	●			●
Low Range	●			●

	D	C	B	A
High Range	●	●		
Reverse	●	●		
Neutral	●	●		
Low Range	●		●	

Switch schematic



**8.10 SPEEDMETER SYSTEM**

**OPERATION OF SPPED SENSOR**

**Speed Sensor is on the rear axle**

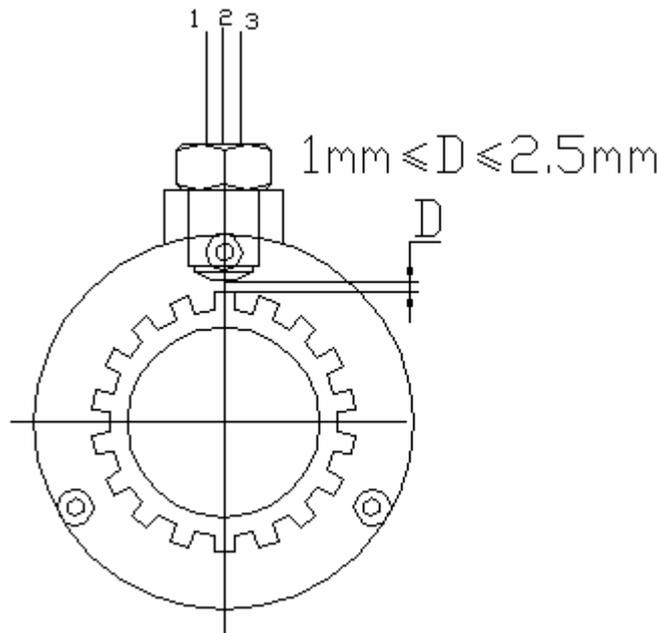
Operation Instructions of Electric Dial Meter and Speed Sensor/ Operation Instructions of LCD Meter and Speed Sensor

A. Hall Sensor is a new type sensor used to measure speed, angle, revolution and length, etc by means of voltage pulse signals converted from sensing gear ratio of black metal gear or gear rack.

B. Main Technical Parameter for sensor:

Item	Code	Vol value	Unit
Operating voltage	Vcc	5-20	V
Operating current	Icc	≤15	mA
Low voltage output	Vol	≤ 0.4	V
Hight voltage output	Voh	≥ (Vcc-1)	V
Operating distance	D	1mm ≤ D ≤ 2.5mm	mm

C. The following is the graphic illustration for sensor installation, Wire 1 (red) is positive and wire 2 (black) negative, Wire 3 (yellow) works as the one to output signals.



**Note:** Always screw in the sensor by hand when installation or adjustment.

1. Align one tooth of the splines to the centre of the hole of the sensor by turning the rear axle.
2. Screw the sensor in (CW) by hand slightly until resistance is felt.
3. Turn the sensor CCW by 1 to 2 turn(s).
4. Tighten the jam nut.

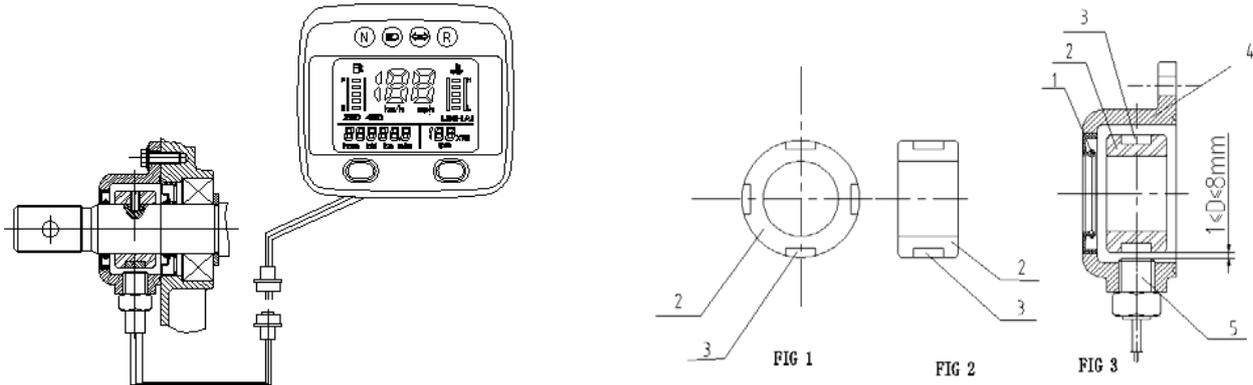
**Speed Sensor on the Transmission Out Put Shaft.**

Operation Instructions of LCD Meter and Speed Sensor

Main Technical Parameter:

Item	Code	Vol value	Unit
Operating voltage	Vcc	5-20	V
Operating current	Icc	≤15	mA
Operating distance	D	1mm≤D≤8mm	mm

The following is the graphic illustration for sensor installation.

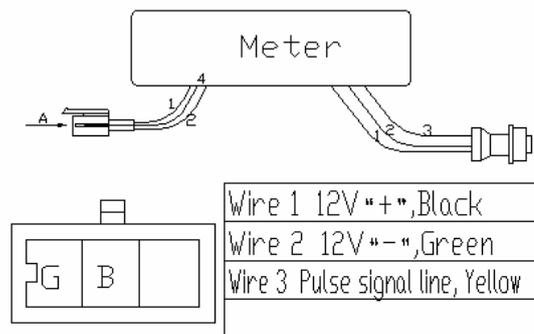
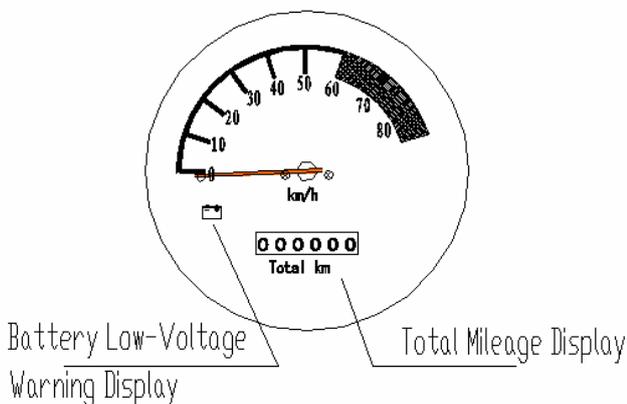


1. OIL SEAL	4. THE COVER
2. DOWEL PIN	5. THE HALL SENSOR
3. MAGNET	

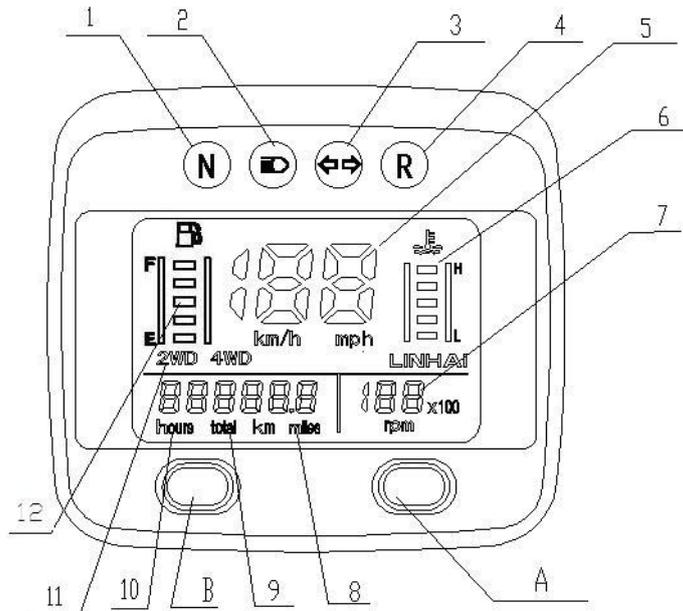
**METER**

**Dial Meter**

Item	Vol value	Unit
Operating voltage	10V~18V	V
Operating current	≤ 500mA	A
Operating Environmental temperature	-10°C~65°C	°C
Battery warning voltage	≤11.5V	V

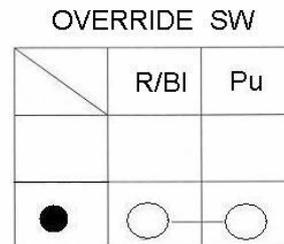
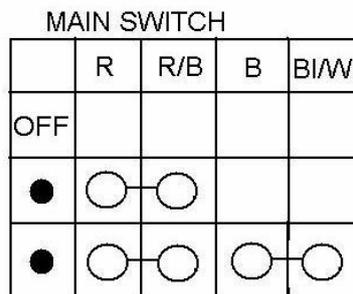


**LCD Meter**



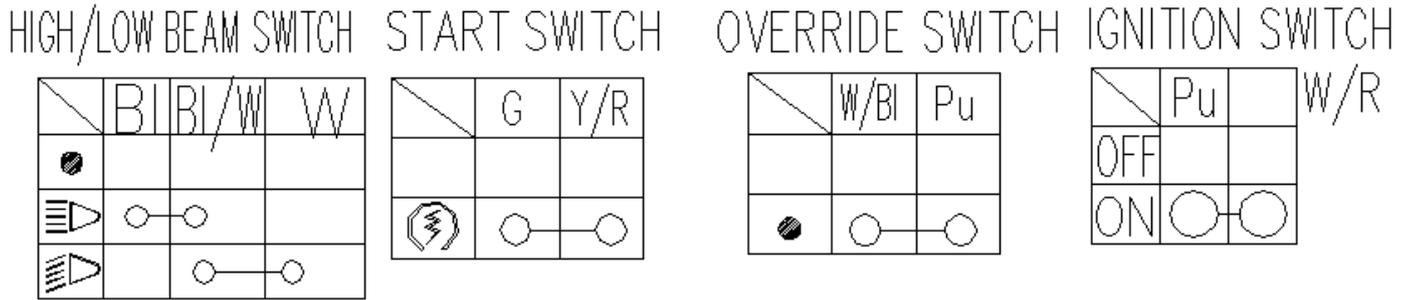
- 1. Neutral indicator light
- 2. High beam indicator light
- 3. Turn indicator light
- 4. Reverse indicator light
- 5. Speedometer
- 6. Coolant temperature meter\*
- 7. Engine rpm meter
- 8、9. The odometer
- 10.Engine working hour counter
- 11.2WD/4WD indicator\*
- A: km/ mile selector
- B: hour / distance selector
- 12. Fuel gauge Indicator

**8.11 MAIN SWITCH AND HANDLE SWITCH**

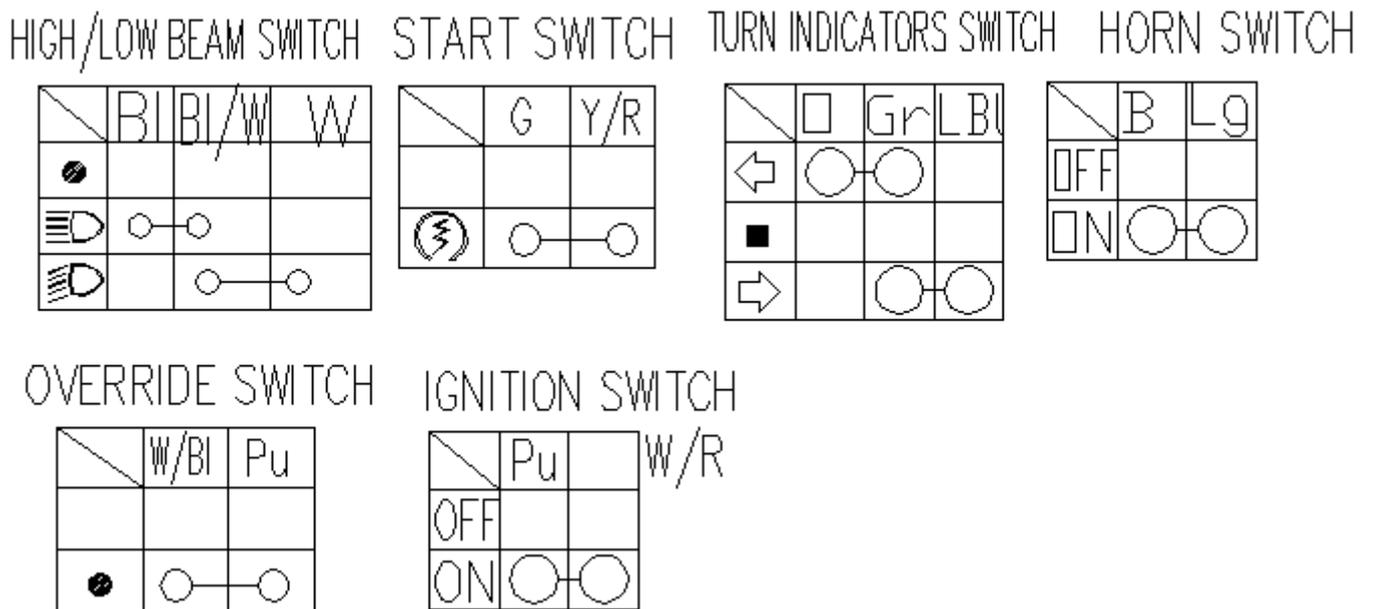


**HANDLE SWITCH SCHEMATIC FOR USA MODEL**

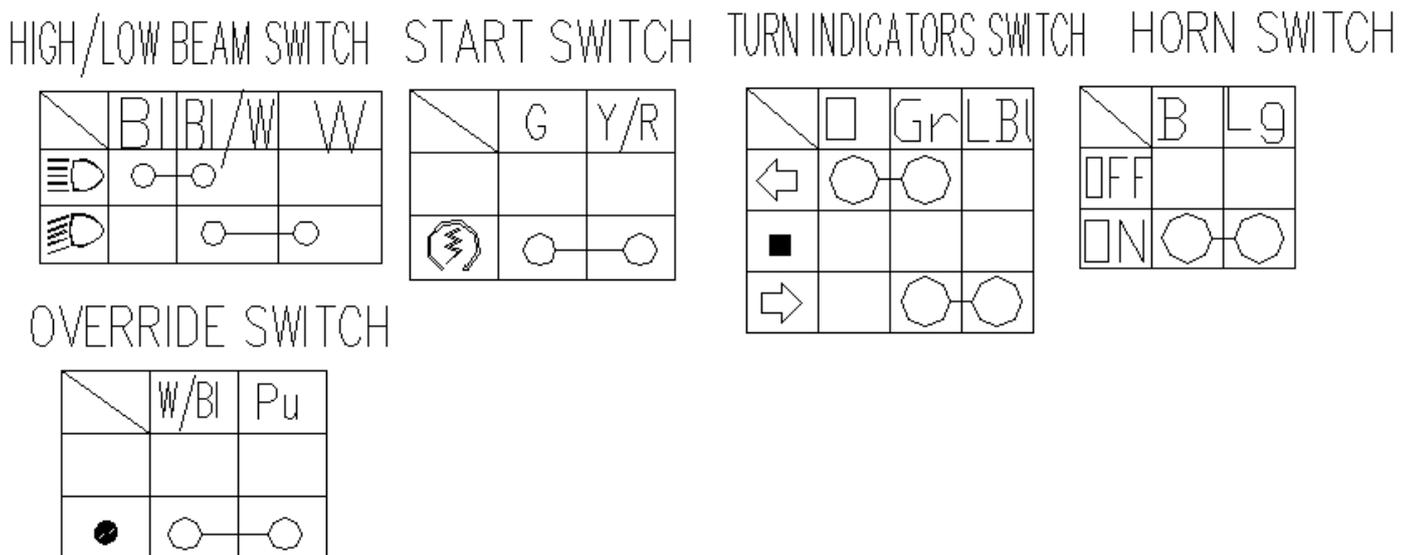
2004 model



2005 model

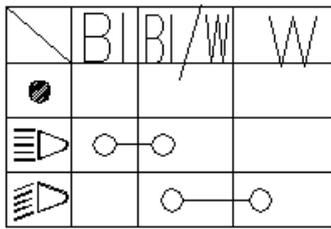


**HANDLE SWITCH SCHEMATIC FOR EUROPE MODEL**

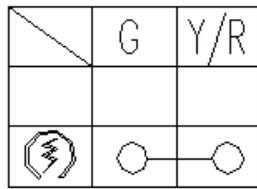


400ATV-2 / 400ATV-2B HANDLE SWITCH SCHEMATIC FOR USA MODEL

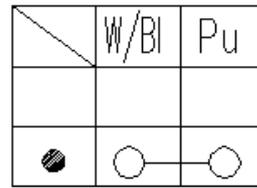
HIGH/LOW BEAM SWITCH



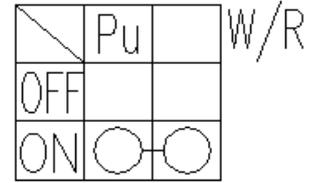
START SWITCH



OVERRIDE SWITCH

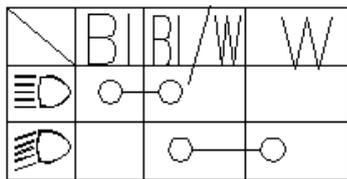


IGNITION SWITCH

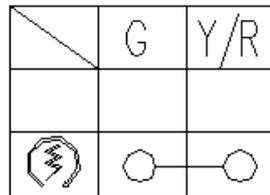


400ATV-2 / 400ATV-2B HANDLE SWITCH SCHEMATIC FOR EUROPE MODEL

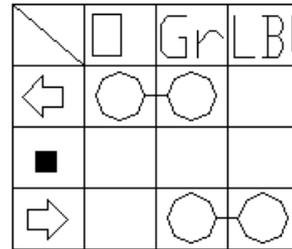
HIGH/LOW BEAM SWITCH



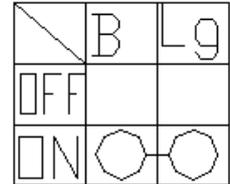
START SWITCH



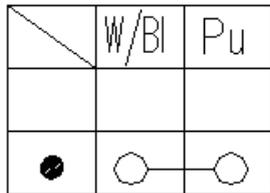
TURN INDICATORS SWITCH



HORN SWITCH



OVERRIDE SWITCH



**8.12 FUEL GAUGE/ FUEL LEVEL SENSOR**

**Removal**

Turn the ignition switch to “OFF” .  
 Remove the fuel tank cover.  
 Remove the three bolts, retaining plate and fuel level sensor from the fuel tank.

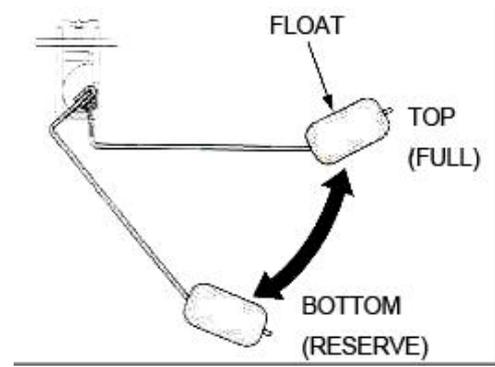
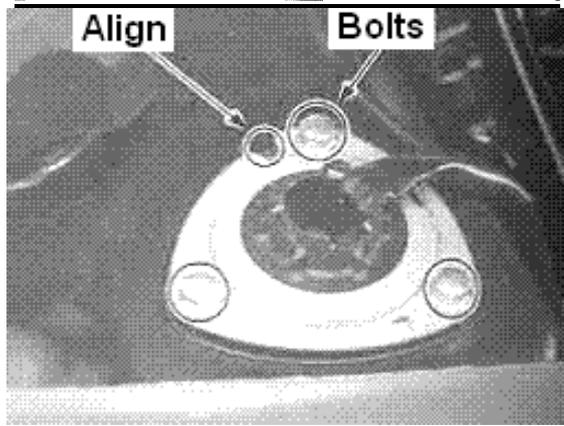
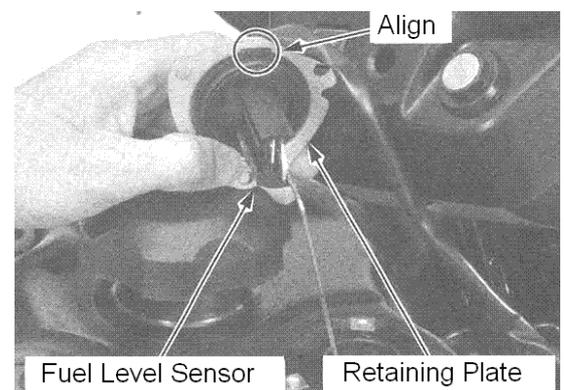
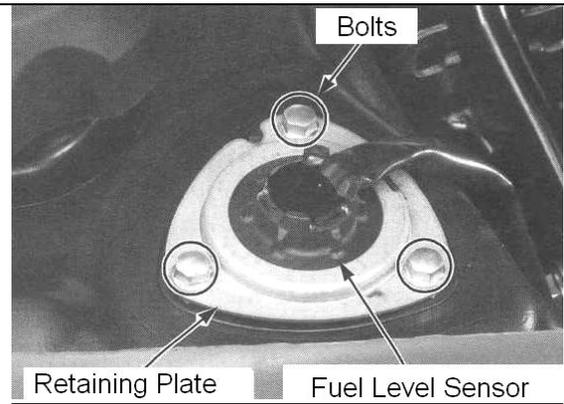
**Installation**

Install a new seal rubber onto the fuel level sensor.  
 Install the retainer plate onto the sensor by aligning the tab with the groove.

Install the sensor into the fuel tank while aligning the groove in the plate with the boss on the fuel tank.  
 Install and tighten the bolts securely.  
 Install the removed parts in the reverse order of removal.

**Fuel Gauge / Fuel level Sensor Inspection**

Move the float to the bottom (RESERVE) position, turn the ignition switch to “ON” and check the fuel gauge.



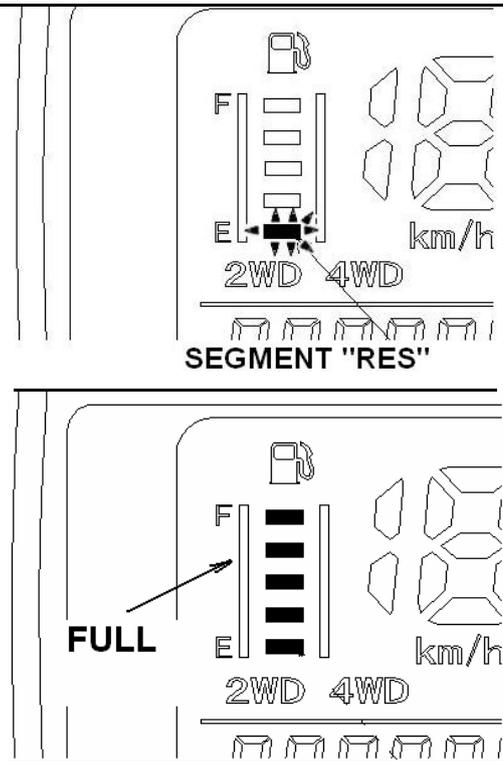
Segment “RES” should blink.

With the fuel level sensor float at the top (FULL) position, turn the ignition switch to “ON” and check the fuel gauge. All segments up to segment “F” should come on.

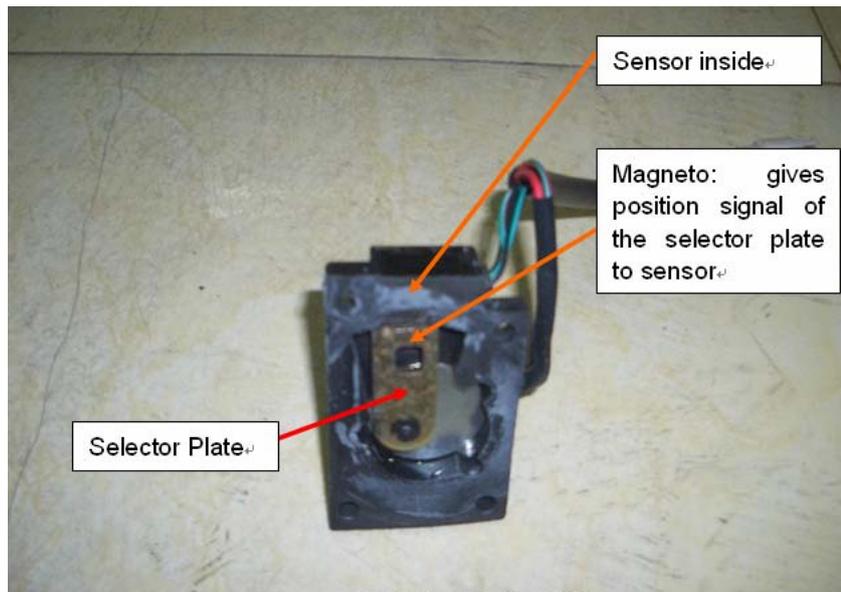
If the fuel gauge does not function properly, check the fuel level sensor  
 If the fuel level sensor is OK, replace the LCD Meter.

**Fuel level Sensor Inspection**

Disconnect the fuel level sensor 2p Green connector and connect the ohmmeter to the sensor side connector terminals.  
 Measure the fuel level sensor resistance with the float at the top (FULL)  
 And bottom (RESERVE) positions.



FLOAT POSITION	RESISTANCE(20°C/ 68° )
TOP(FULL)	4-10 Ω
BOTTOM(RESERVE)	100-110 Ω

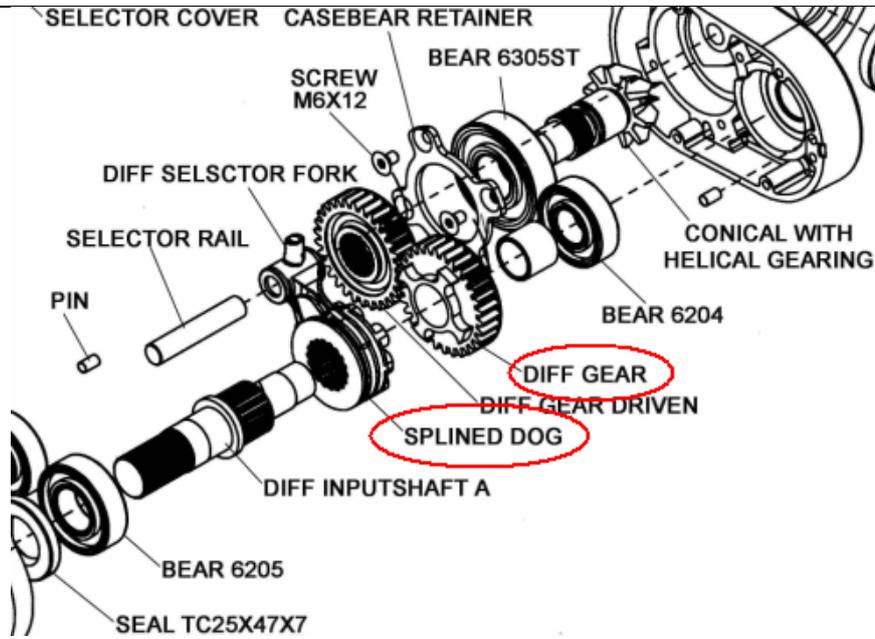
**8.13 THE OPERATION PRINCIPLE OF THE ELECTRIC 4WD SHIFT**

SHIFT MOTOR ASSY.

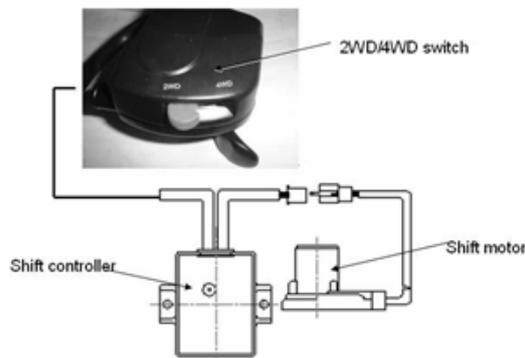
(Fig 1)

- 1, The rider shifts 2WD to 4WD by the Switch on handlebar.
  2. The Switch gives signal to Controller.
  - 3, The controller gives power to the Shift Motor.
  - 4, If the Splined Dog (Fig 2) is in right position, 4WD will engage immediately. This information will be given to the Sensor by the Magneto on the Selector Plate, and then to the Controller. Controller lights the 4WD indicator.
  5. If the Splined Dog is not in right position, 4WD won't engage, this information will be given to the Sensor by the Magneto on the Selector Plate, and then to the Controller. The controller will try to drive the Shift Motor several times in 1 min.
- During this time, the 4WD indicator is not on, this requires the rider to back or move (ride) the ATV a little to allow the Dog change position for engagement. ( See owner's manual or decal).
- If the rider doesn't do as the owner's manual, after 1 min, the buzzer comes on and 4WD indicator blinks, remind the rider to re-shift.

Shift from 4WD to 2WD is same as above.



(Fig 2)



**CAUTION:**

Always shift as the vehicle stop.

**NOTE:**

When shift 2WD/ 4WD, the mechanics in the front gear box maybe still engaged/ disengaged, the mechanics would finally disengaged/ engaged when rides on a hard surface or rides in reverse.

The buzzer will beep if the procedure which list above is not done in 1 minute.

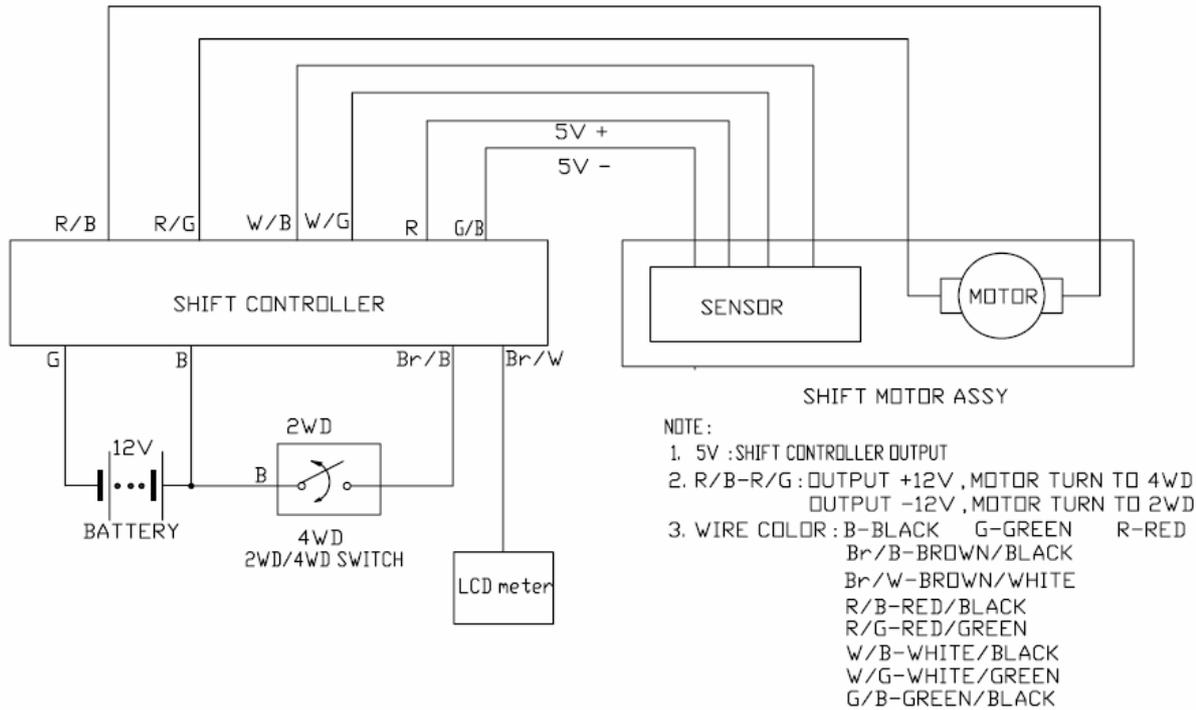
Re-shift to stop the buzzer.

**CAUTION**

Do not switch on 4WD if the rear wheels are spinning. This may cause severe machine damage. When switch on 4WD, the button will stay in 4WD position but 4WD mechanics maybe still disengaged. Always apply throttle gently and let the wheels move slightly to allow the 4WD mechanics finally engage. The 4WD indicator on the speedometer will come on when 4WD engaged.

(Fig 3) Page from owner's manual

ELECTRIC 2WD/4WD SHIFT CIRCUIT DIAGRAM

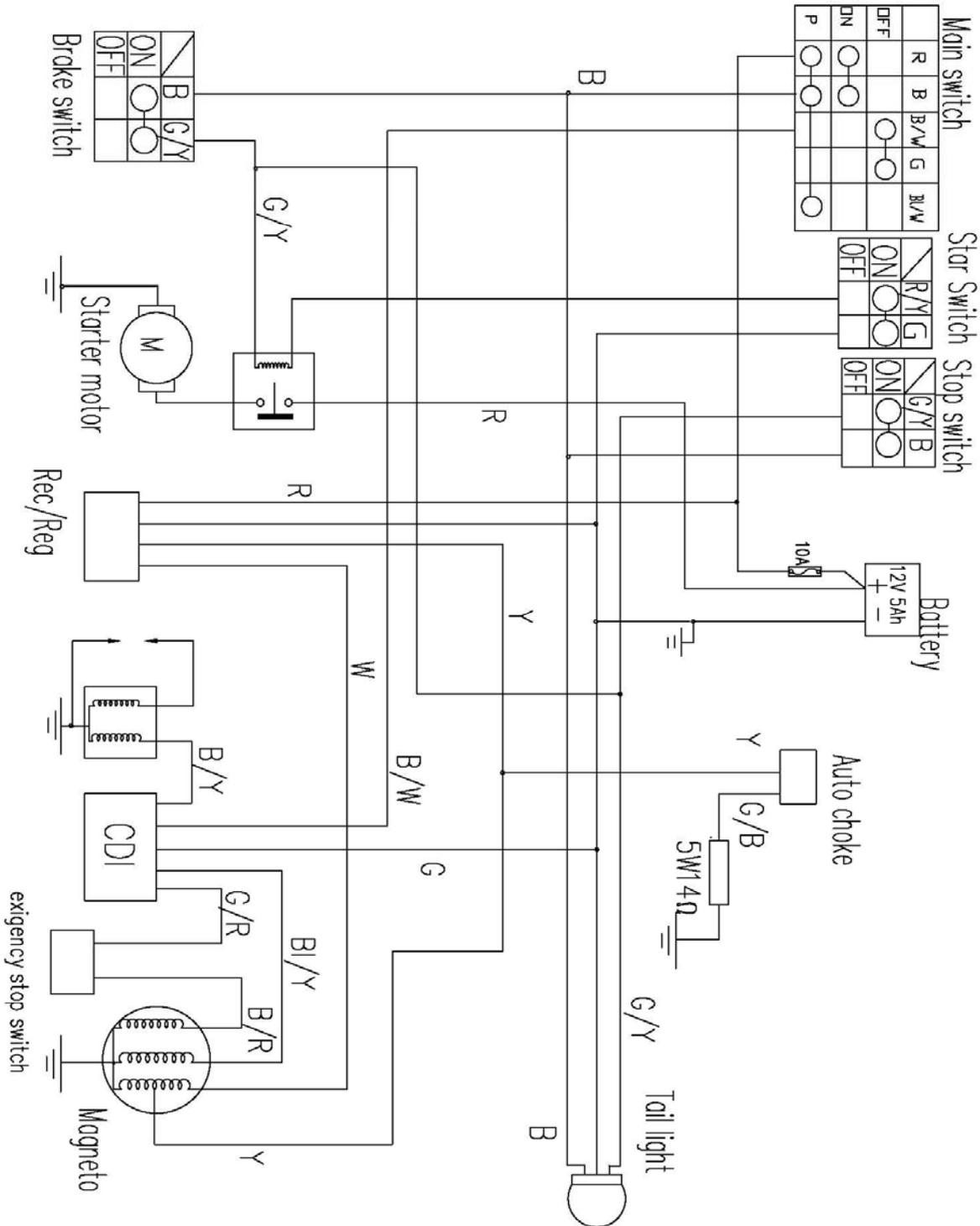


(Fig 4)

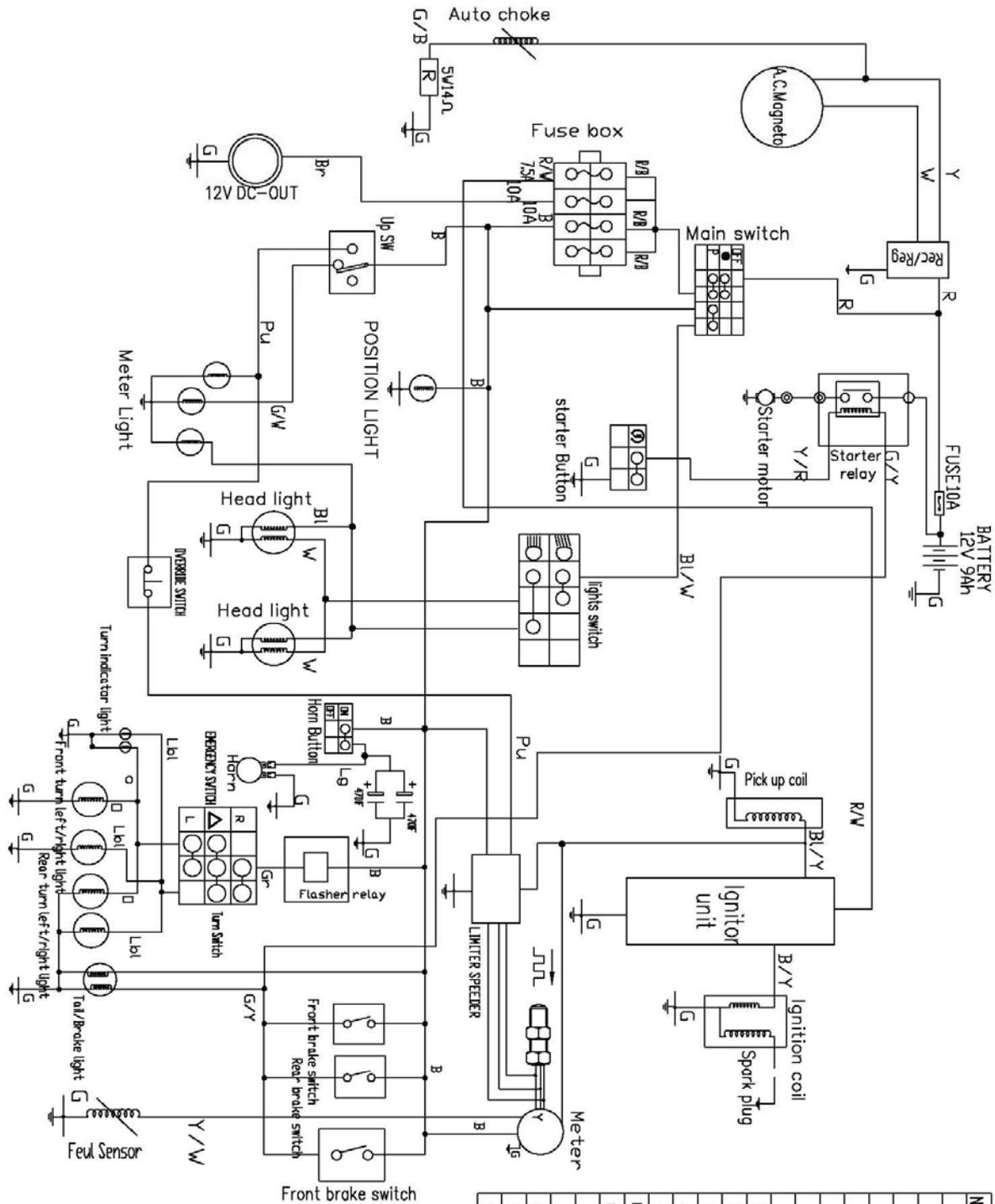
**8.14 WIRING DIAGR**



WIRING DIAGRAM FOR LH50/80ATV U.S.A MODEL LH100/125/150ATV OFF ROAD EUROPE MODEL



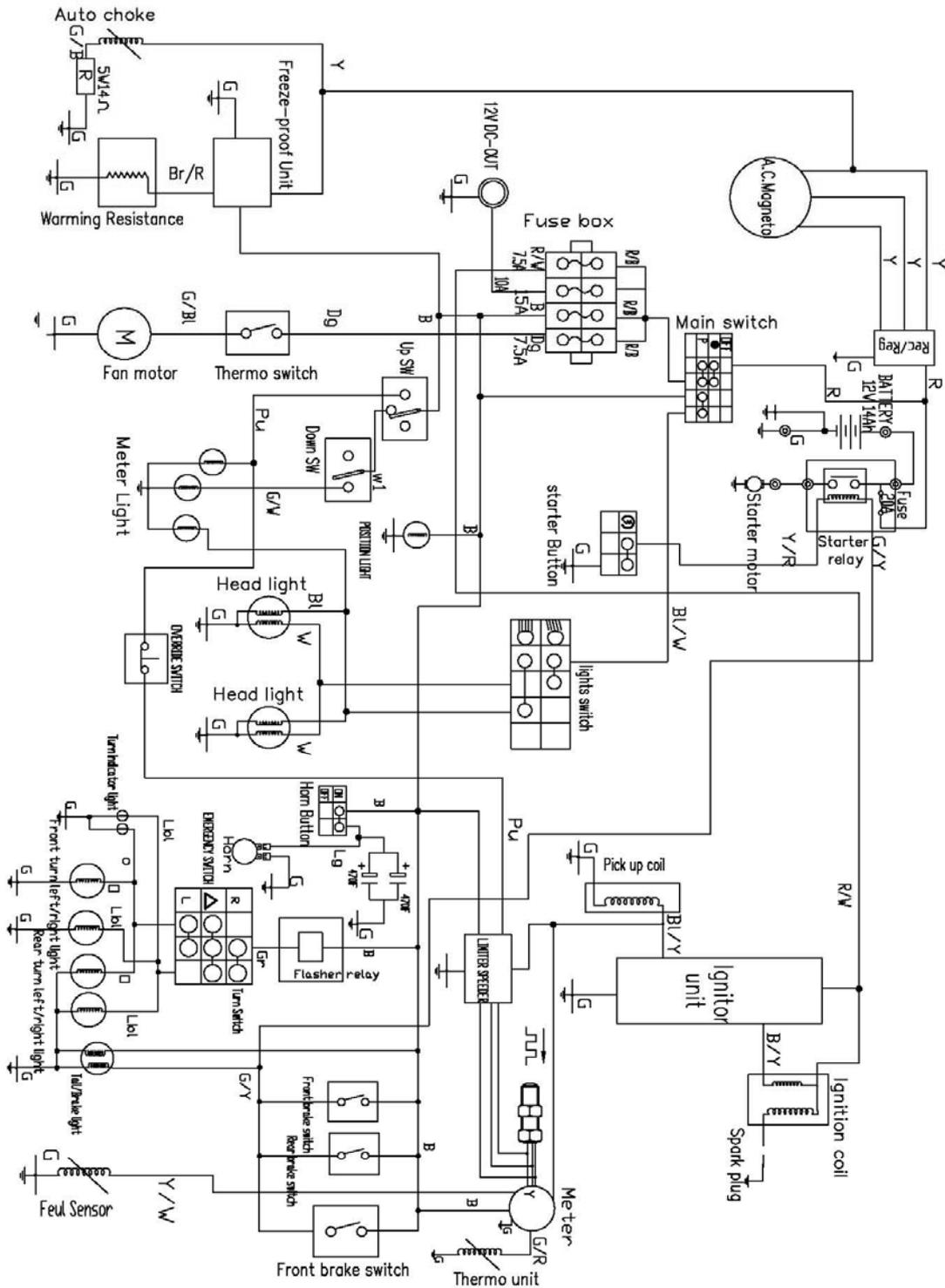
WIRING DIAGRAM 2X4 FOR LH200ATV-B, LH150ATV-B EUROPE MODEL



Note	Colour
B	Black
Y	Yellow
P	Pink
R	Red
Br	Brown
W	White
Bl	Blue
G	Green
G/B	Green/Blue
G/W	Green/White
Y/R	Yellow/Red
B/W	Black/White
B/W	Brown/White
G/R	Green/Red
G/Y	Green/Yellow
B/R	Black/Red
Pu	Purple
B/Y	Black/Yellow
Br/R	Brown/Red
Gr	Gray

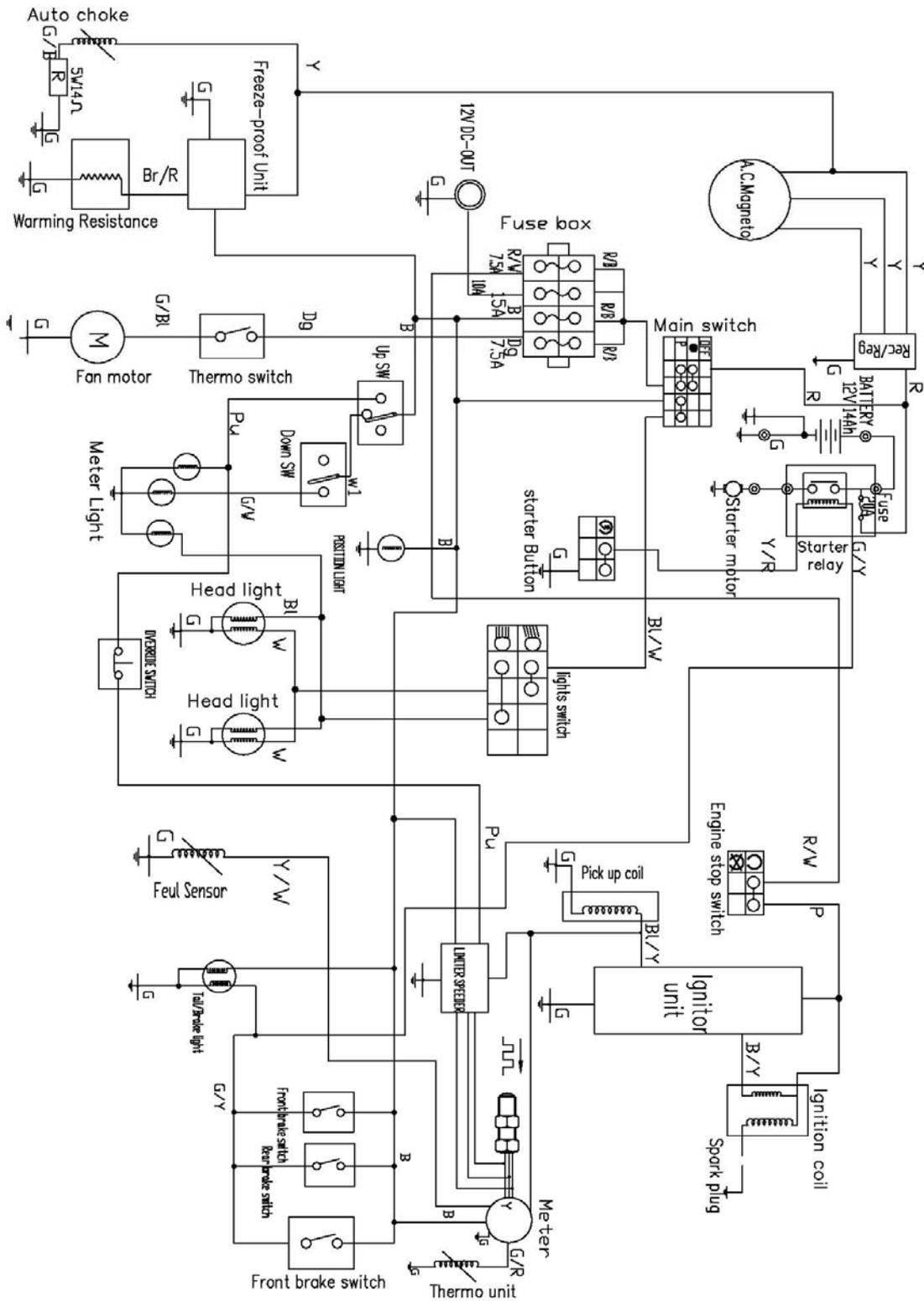


WIRING DIAGRAM EUROPE MODEL 2X4 FOR LH260ATV-B, ATV260/300, 2004/2005, DEMON



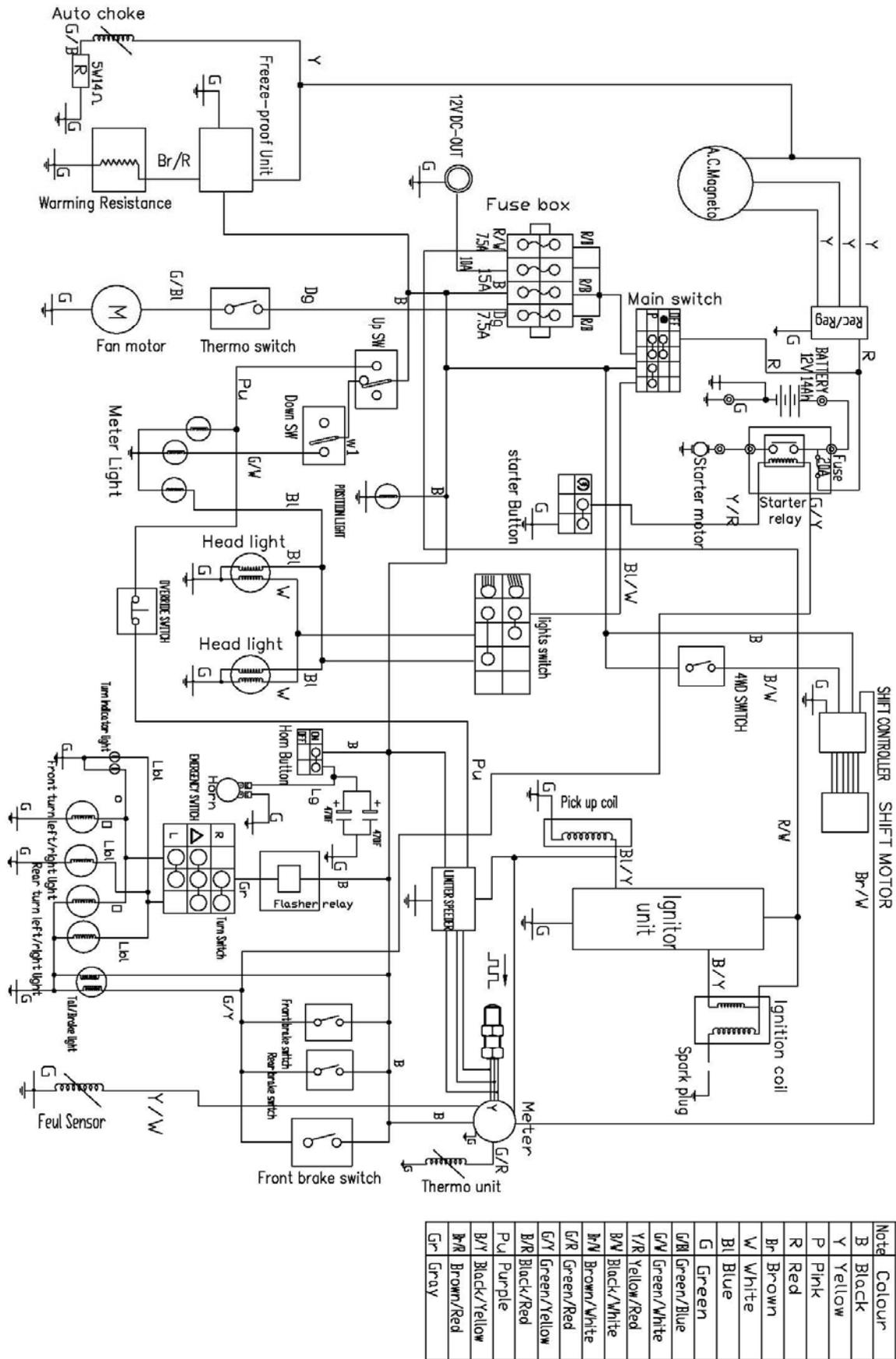
Note	Colour
B	Black
Y	Yellow
P	Pink
R	Red
Br	Brown
W	White
Bl	Blue
G	Green
G/Bl	Green/Blue
G/W	Green/White
Y/R	Yellow/Red
B/W	Black/White
B/W	Brown/White
G/R	Green/Red
G/Y	Green/Yellow
B/R	Black/Red
Pu	Purple
B/Y	Black/Yellow
Br/R	Brown/Red
Gr	Grey

WIRING DIAGRAM 2X4 FOR LH260ATV-B, LH260/300 U.S.A MODEL

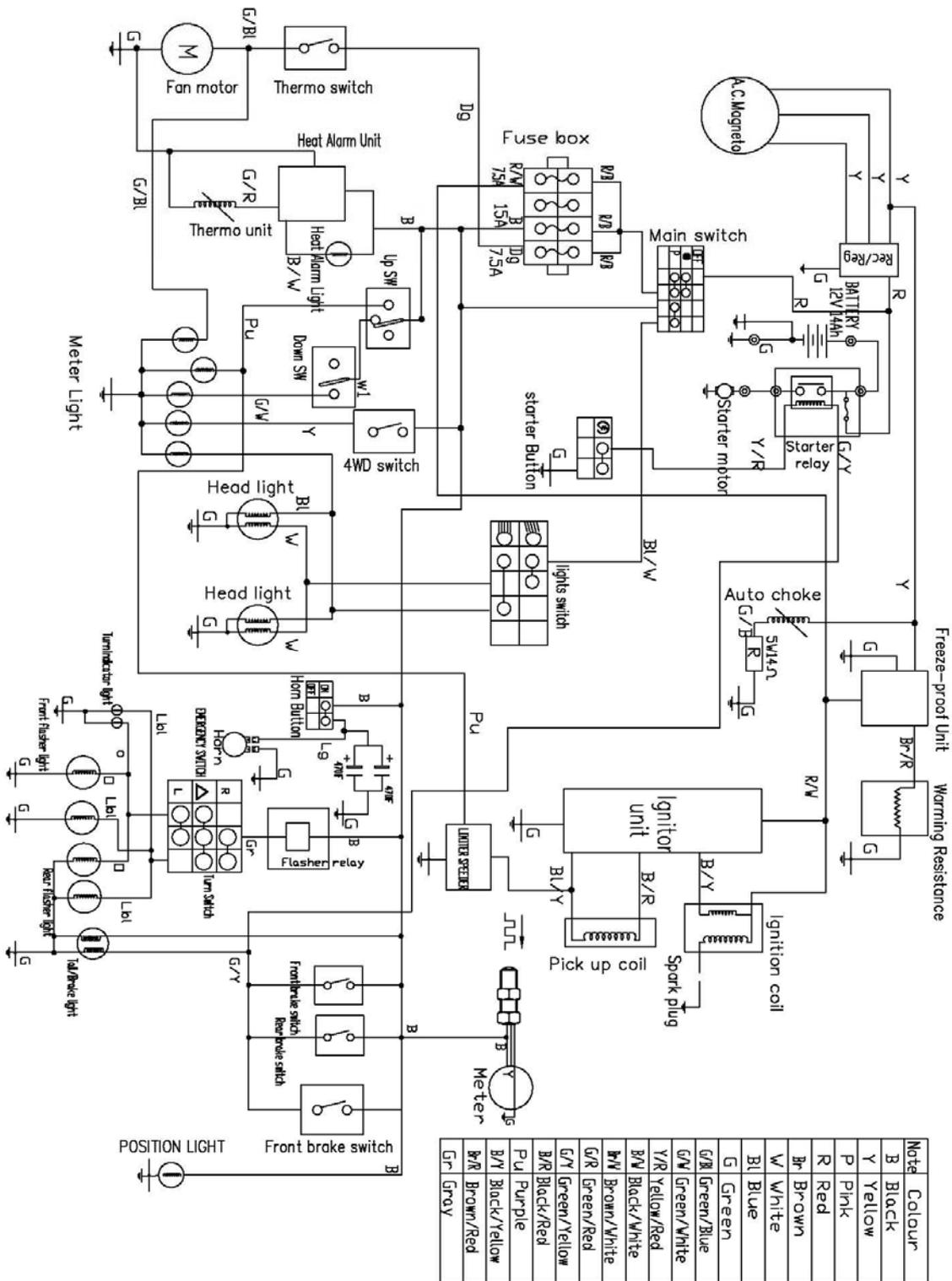


Note	Colour
B	Black
Y	Yellow
P	Pink
R	Red
Br	Brown
W	White
Bl	Blue
G	Green
G/B	Green/Blue
G/W	Green/White
Y/R	Yellow/Red
B/W	Black/White
Br/W	Brown/White
G/R	Green/Red
G/Y	Green/Yellow
B/R	Black/Red
P/Y	Purple
B/Y	Black/Yellow
Br/R	Brown/Red
Gr	Gray

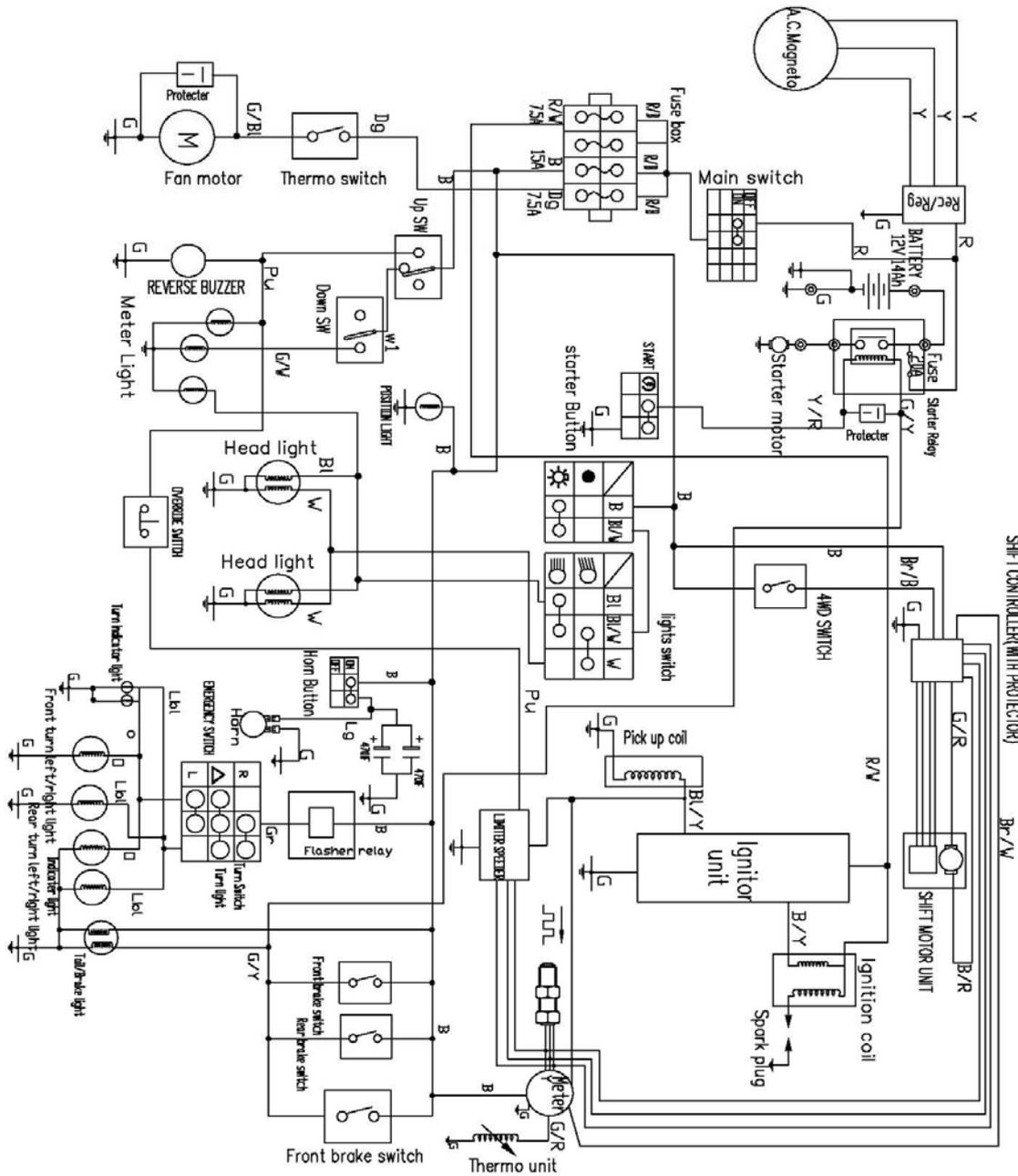
WIRING DIAGRAM EUROPE MODEL 4X4 FOR LH260ATV-B, ATV260/300, DEMON



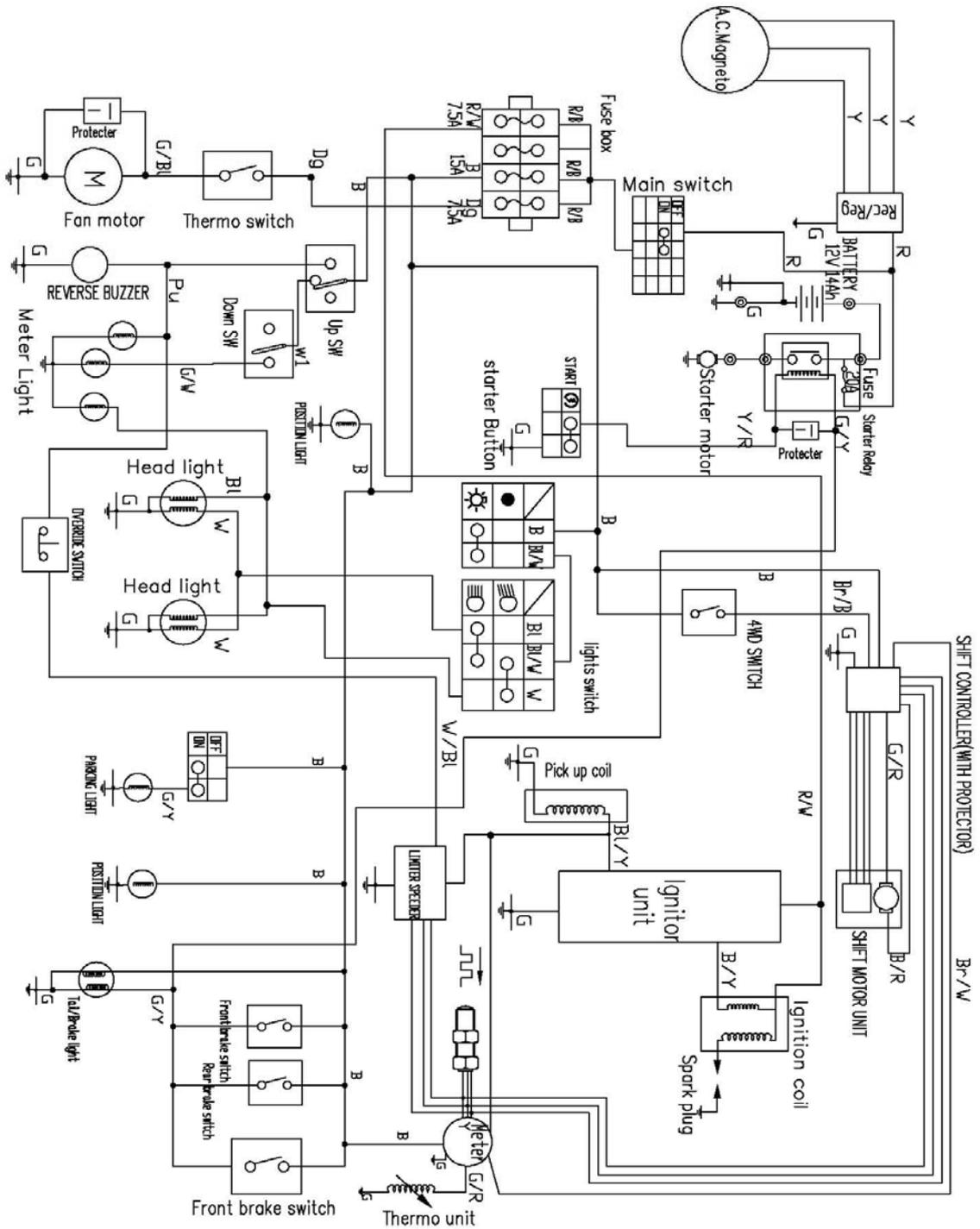
EUROPE MODEL 4X4 WIRING DIAGRAM FOR LH260ATV-2004/2005



WIRING DIAGRAM FOR LH400ATV EUROPE MODEL



WIRING DIAGRAM FOR LH400ATV U.S.A MODEL



Note	Colour
B	Black
Y	Yellow
P	Pink
R	Red
Br	Brown
W	White
Bl	Blue
G	Green
G/Bl	Green/Blue
G/W	Green/White
Y/R	Yellow/Red
B/W	Black/White
Br/W	Brown/White
G/R	Green/Red
G/Y	Green/Yellow
B/R	Black/Red
Pu	Purple
B/Y	Black/Yellow
Br/R	Brown/Red
Gr	Gray





**ATV SERVICE MANUAL EUROPE 09.0**  
**PN. F010102A01**

ATV 第一综合维修手册欧标英文 版本 09.0 零件代号 F010102A01