TRAILMASTER TAURUS 400 (S) UTV

SERVICE MANUAL

NOTICE

This manual was produced by the BV Powersports primarily for use by BV Powersports dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual, so it is assumed that anyone who uses this book to perform maintenance and repairs on BV Powersports vehicle has a basic understanding of the mechanical ideas and the procedures of vehicle repair. Repairs attempted by anyone without this knowledge are likely to render the vehicle unsafe and unfit for use.

BV Powersports is continually striving to improve all its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized BV Powersports dealers and will appear in future editions of this manual where applicable.

NOTE:

Designs and specifications are subject to change without notice.

IMPORTANT INFORMATION

Particularly important information is distinguished in this manual by the following notations.

The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING Failure to follow WARNING instructions could result in severe injury or death to the vehicle operator, passenger, a bystander, or a person checking or repairing the vehicle.

CAUTION: A CAUTION indicates special precautions that must be taken to avoid damage to the vehicle.

NOTE: A NOTE provides key information to make procedures easier or clearer.

CONTENTS

⚠ 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 UTV. 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 UTV and parts in the UTV 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 CUV 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

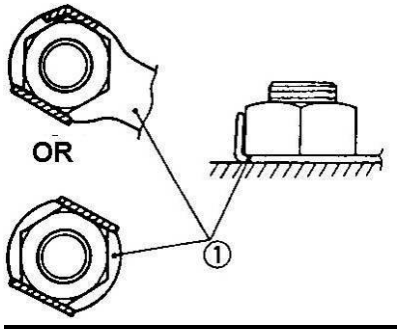
Use only genuine parts for all replacements. Use recommended oil and grease for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

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

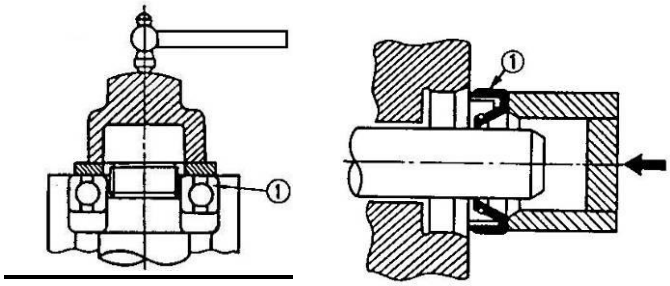
Install bearings and oil seals so that the manufacturer’s marks or numbers are visible. When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips. Oil bearings liberally when installing, if appropriate.

① oil seal

CAUTION:

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

① Bearing

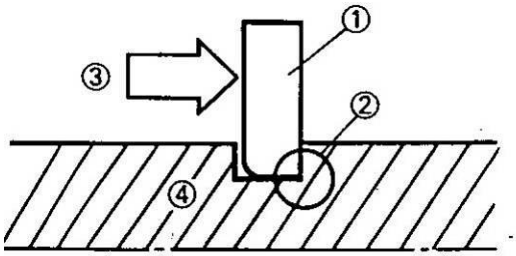


CIRCLIPS

1. Check all circlips carefully before reassembly. Always replace piston pin clips after one use.

Replace distorted circlips. When installing a circlip①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ it receives. See sectional view.

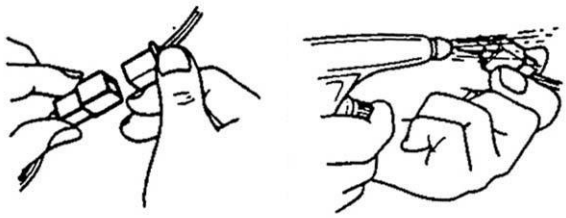
④Shaft



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 reinset the terminal into the connector.
6. Connect:
   - ● Connector



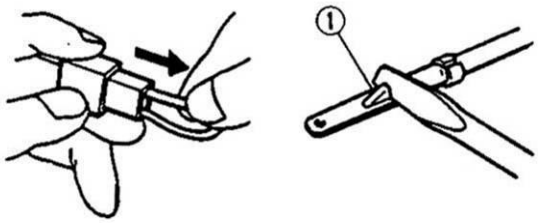
NOTE:

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.



⚠ 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 CUV. 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 CUV and parts in the CUV 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.

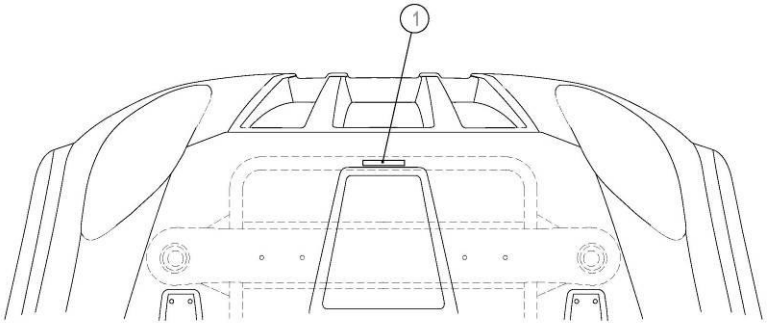
METRIC		MULIPLIER		IMP
**mm	x	0. 3937	=	**in
**cm	x	0.03937	=	**in

CONVERSION TABLE

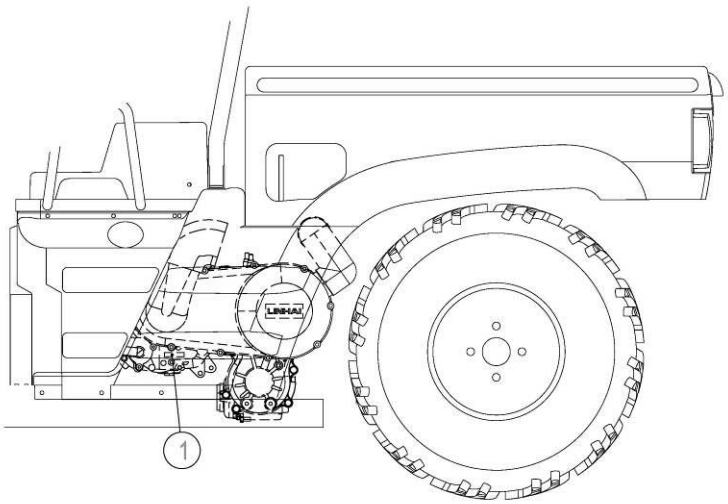
METRIC TO IMP			
	Known	Multiplier	Result
Torque	m • kg m • kg cm • kg cm • kg	7.233 86.794 0.0723 0.8679	ft • lb In • lb ft • lb In • lb
Weight	kg g	2.205 0.03527	lb oz
Distance	km/h km m m cm mm	0.6214 0.6214 3.281 1.094 0.3927 0.03927	mph mi ft yd in in
Volume/ Capacity	cc(cm^3) cc(cm^3) lit(liter)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

1.2 V.I.N AND ENGINE SERIAL NUMBER

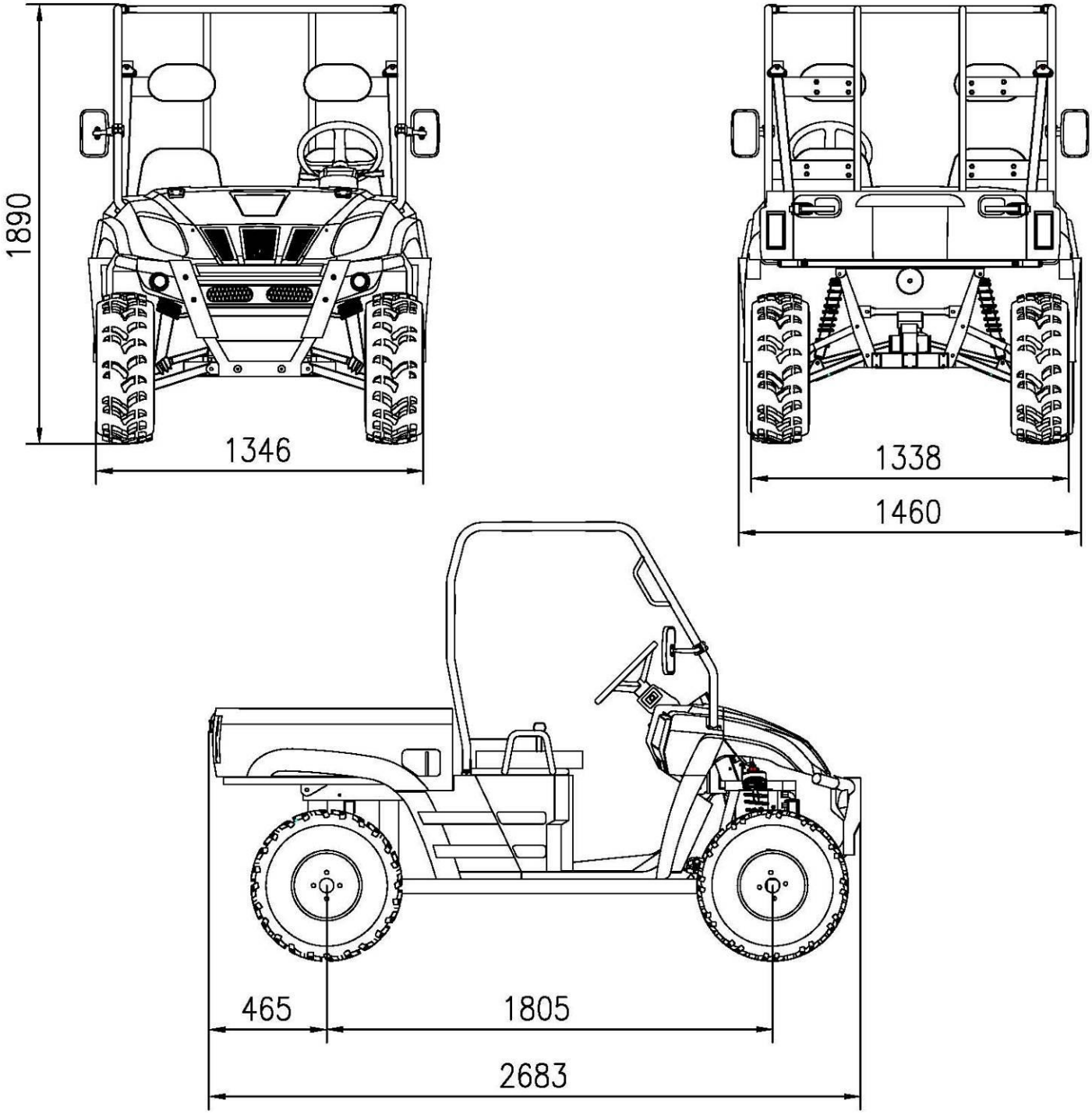
The vehicle identification number ① is stamped into the front of the frame tube.



The engine serial number ① is stamped into left side of engine crankcase.



1.3 VEHICLE DIMENSIONS



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

NOTES

CHAPTER 2 MAINTENANCE

⚠ 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 CUV model for spare parts information and service.

2.1 PERIODIC MAINTENANCE

GENARAL

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
	Parking Brake	/	Pre-ride	I
	Tires	/	Pre-ride	I
	Wheels	/	Pre-ride	I
	Frame nuts, bolts fasteners	/	Pre-ride	I
▲	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

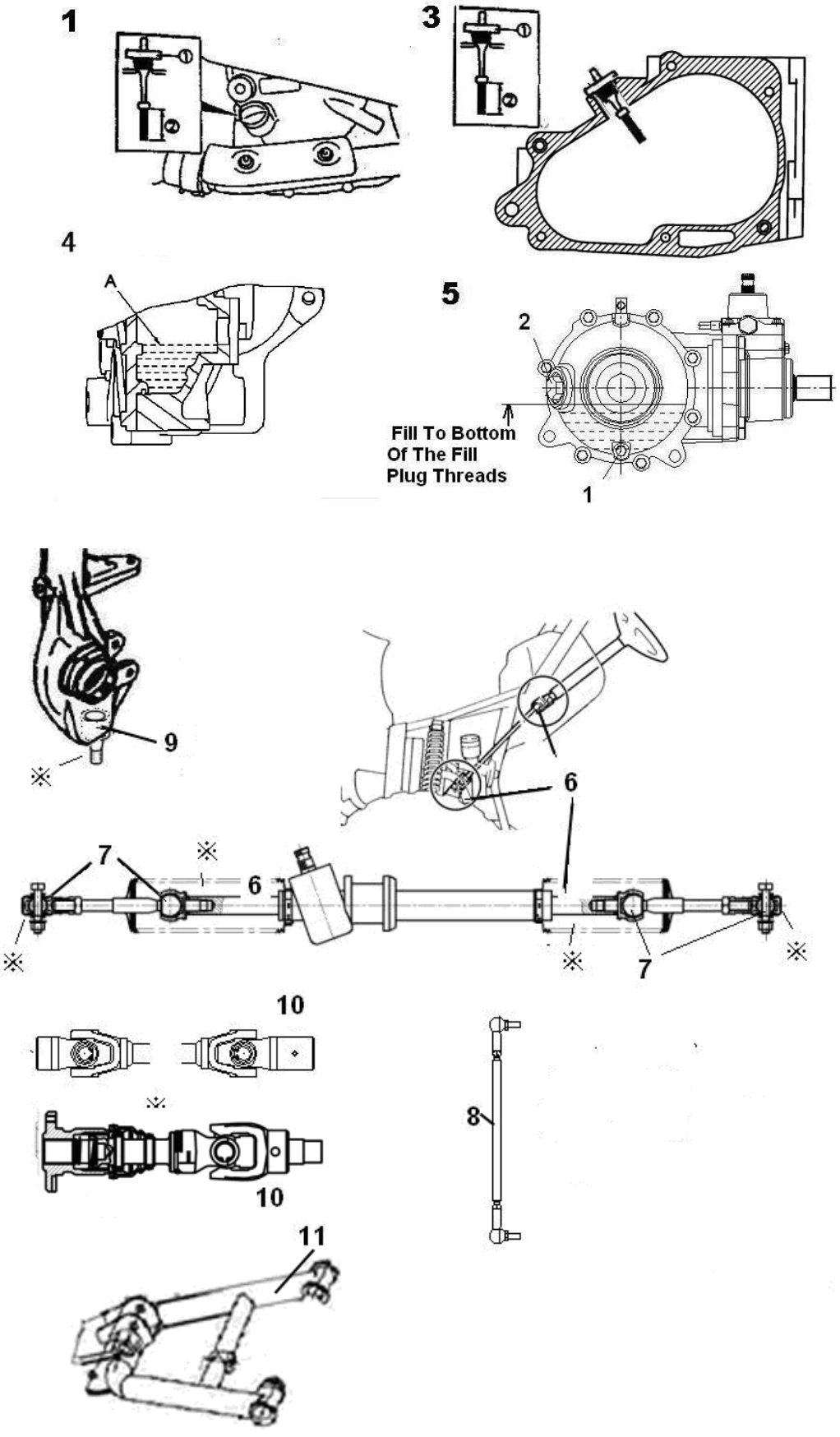
	Headlamp Inspection	/	Daily	C apply dielectric grease to connector when replaced
	Tail lamp inspection	/	Daily	C apply dielectric grease to socket when replaced
▲	Air Filter-Main Element	2	Weekly	I C Replace if necessary
▲	Transmission Oil Level	10	Monthly	I change annually
	Battery Terminals	10	Monthly	I C
	Battery fluid level	10	Monthly	I
DL	Brake pad wear	10	Monthly	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/Throttle pedal	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
▲	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 (H/L/R/N)	200 hrs	24 months	Change grease every two years
	Exhaust system	100hrs	12 months	I
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	Ball joint (A arm- strut)	10 hrs	monthly	I, (for damage, wear, and play) R. 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.	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 (only for 4WD Model)	SEA 80W/90GL5	Add to proper level	Change annually or at 100 hours
	6.Steering system	Grease	Lubricate the pivoting and sliding parts	Every 3 months or 50 hours
	7.Tie rods	Grease	Grease	Semi-annually
	8.Shift Linkages	Grease	Locate fittings and Grease	Semi-annually
	9.Ball joints	Grease	Inspect, Locate fittings and Grease, or replace it if necessary	Semi-annually
	10.Prop Shaft & Shaft Yoke, Spline Joint	Grease	Locate fitting and Grease	Semi-annually
	11.Front/Rear A-arm pivot Shaft	Grease	Locate fitting on pivot shaft and grease with grease gun	Every 3 months or 50 hours
	12.Throttle Cable	Grease M	Grease, inspect and replace it if necessary	Monthly or 20 hours
	13.Accelerator pedal and brake pedal	Grease	Grease, inspect	Monthly or 20 hours



※---Check the protective boots for holes or tears. If any damage is found, have them replaced by an authorized dealer.

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_2) grease (water resistant).

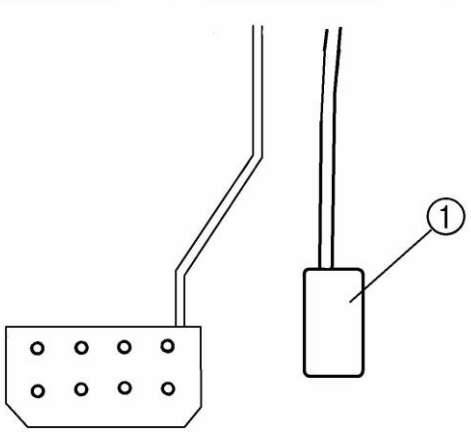
4.When suspension action becomes stiff or after washing.

5.Hours are based on 10 mph(16Km/h) average.

2.2 THROTTLE PEDAL INSPECTION

THROTTLE FREEPLAY

If the throttle pedal has excessive play due to cable stretch or cable misadjustment, it will cause a delay in throttle speed. Also, the throttle may not open fully. If the throttle pedal has no play, the throttle may be hard to control, and the idle speed may be erratic. Check the throttle pedal play periodically in accordance with the Periodic Maintenance Chart and adjust the play if necessary.

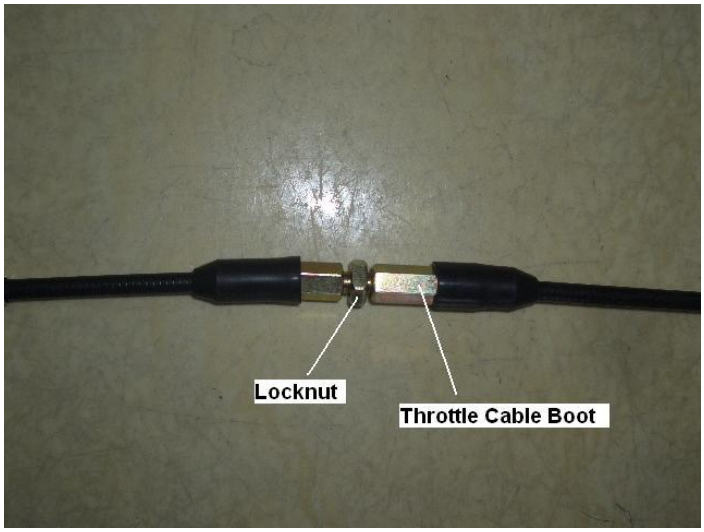


THROTTLE FREEPLAY INSPECTION

1. Apply the parking brake.
2. Put the gear shift lever in the N(Neutral) position.
3. Start the engine, and warm it up thoroughly.
4. Measure the distance the throttle pedal moves before the engine begins to pick up speed. Free play should be 1.5 – 3 mm.

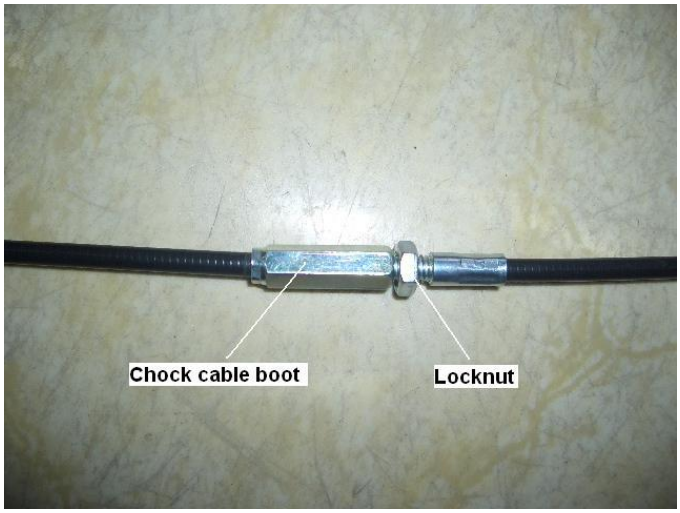
Adjustment

1. Slide the boot off inline cable adjuster sleeve. Loosen adjuster locknut.
2. Turn adjuster until 1.5 to 3 mm, freeplay is achieved pedal. NOTE: While adjusting freeplay, it is important you flip the throttle lever back and forth.
3. Tighten locknut.



2.3 CHOKE ADJUSTMETN

If the choke knob does not stay out when pulled, adjust the choke tension by tightening (clockwise) the chock cable boot until the choke slider freely but stays out when pulled.
If smooth choke operation is not obtainable, inspect choke cable for kinks or sharp bends in routing



2.4 FUEL SYSTEM

⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions.

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

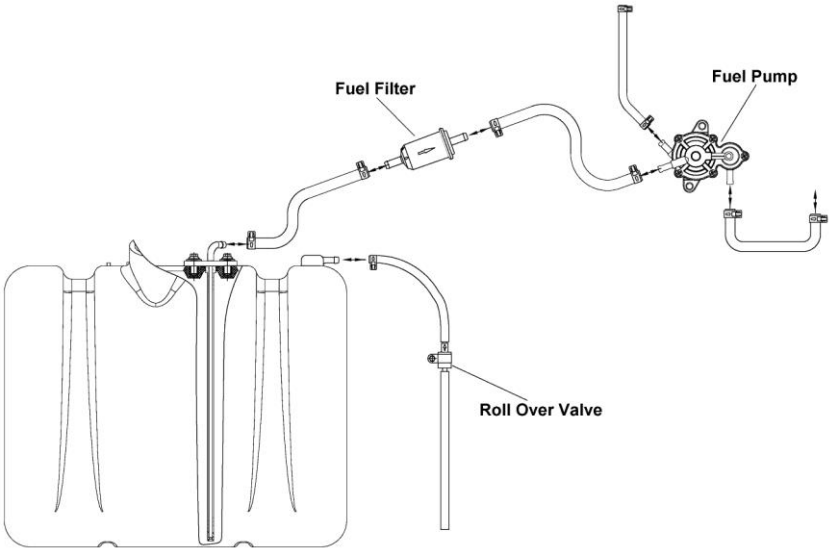
FUEL LINES

1. Check fuel lines for signs of wear, deterioration, damage or leakage. Replace if necessary.
2. Be sure fuel lines are routed properly and secured with cable ties.

CAUTION:

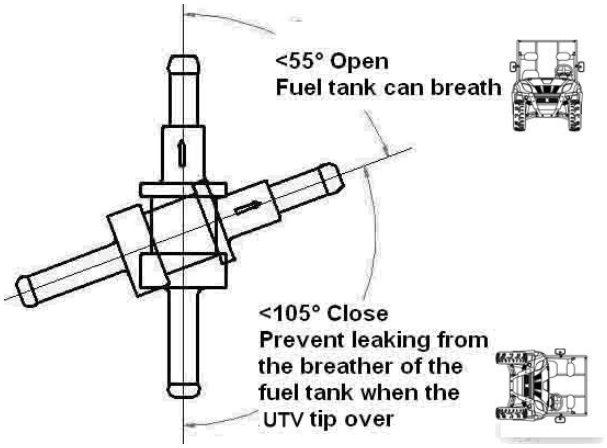
Make sure lines are not kinked or pinched.

Replace all fuel lines every two years.



VENT LINES AND ROLL OVER VALVE

1. Check fuel tank, oil tank, carburetor, battery and transmission vent lines for signs of wear, deterioration, damage of leakage. Replace every two years.
2. Be sure vent lines are routed properly and secured with cable ties.



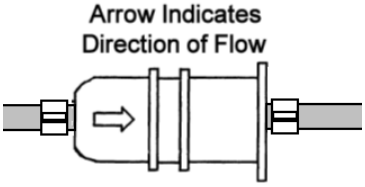
CAUTION: Make sure lines are not kinked or pinched.

NOTE: Make sure the ↑ mark on the roll over valve is upwards.

FUEL FILTER

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

1. Remove line clamps at both ends of the filter.
2. Remove fuel lines from filer.
3. Install new filter and calmps onto fuel lines with arrow pointed in direction of fuel flow.
4. Install clamps on fuel line.
5. Start engine and inspect for leaks.



2.5 TOE ALIGNMENT

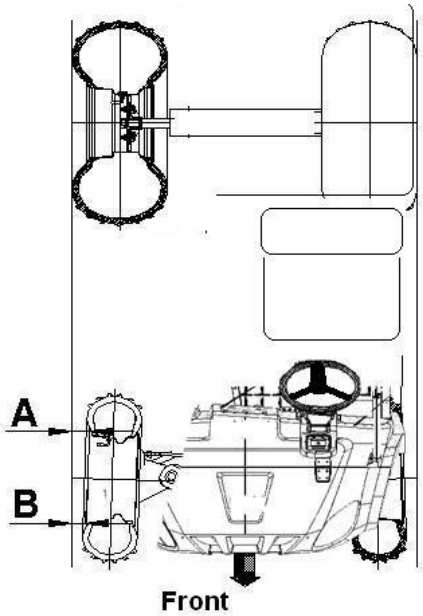
METHOD: STRAIGHTEDGE OR STRING

Be sure the steering wheel in a straight ahead position.

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

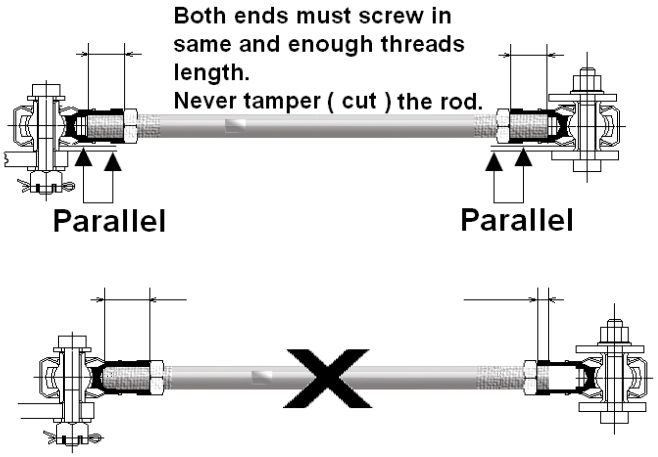
Measure from string to rim at front and rear of rim.

Rear rim measurement (A) should be 1/8" to 1/4" (3 to 6 mm) more than front rim measurement (B).

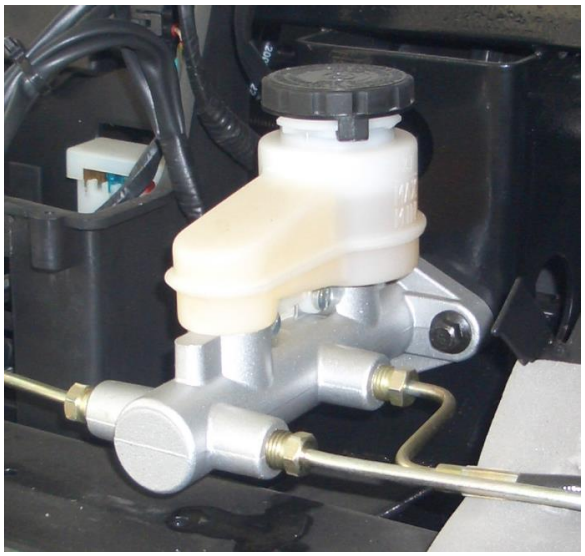


⚠ WARNING

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



2.6 BRAKING SYSTEM INSPECTION

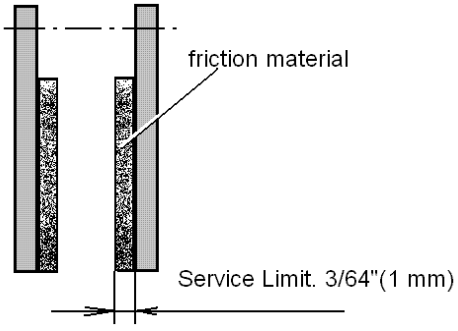


The following checks are recommended to keep the braking system in good operating condition. Service life of braking system components depends on operating conditions. Inspect brakes in accordance with the maintenance schedule and before each ride

- 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.

ADJUSTING THE BRAKE PEDAL

Check the brake pedal free play. Free play should be 8 – 12mm. Out of specification → Adjust.

1. Loosen the locknut
2. Turn brake rod in or out until the correct free play

is obtained.
Turning in: Free play is increased.
Turning out: Free play is decreased.

3. Tighten the locknut

ADJUSTING THE PARKING BRAKE

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.

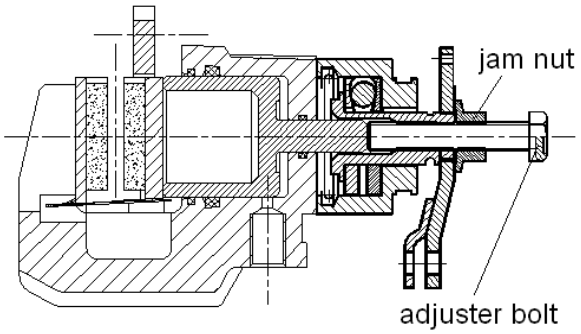
1. With the engine off, apply the parking brake lever and attempt to move the CUV.
2. If the rear wheels are locked, it is adjusted properly.
3. If the wheels are not locked, it must be adjusted.

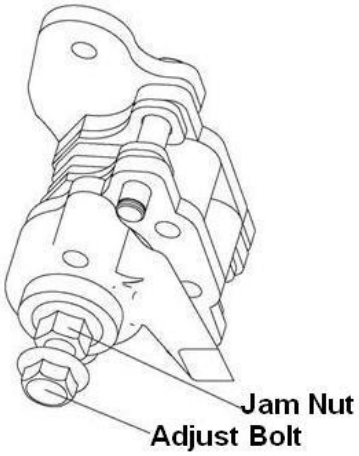
To adjust (set up) the mechanical parking brake, use the following procedure

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 adjuster on the caliper.
3. Turn the adjuster (bolt) CW (clockwise) by hand till the pad touch the brake disc, turn the adjuster 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.
8. Field test for parking. It must be capable of holding the laden CUV 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.





2.7 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.

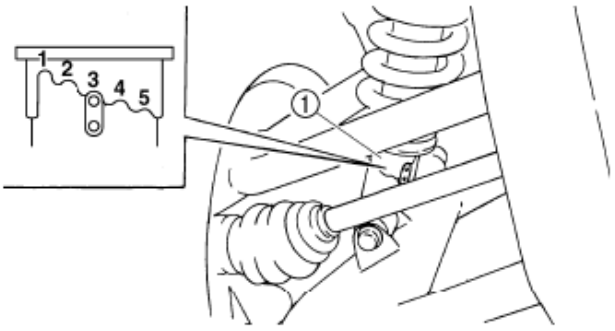
Inspect shock for leakage

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

⚠ WARNING

Always adjust both shock absorber spring preload to the same setting. Uneven adjustment can cause poor handling and loss of stability.

Turn the adjuster ① to increase or decrease the spring preload.
Standard position: 3
Minimum (Soft) position: 1
Maximum (Hard) position: 5



2.8 WHEELS

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

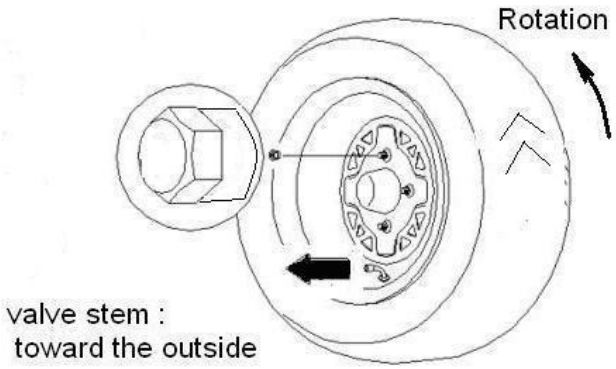
WHEEL REMOVAL

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 and finger tighten them. Install as shown at left 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. On wheel nuts, Make sure tapered end of nut goes into taper on wheel.



Front and rear

Wheel Nut Torque Specifications

Bolt Size	Specification	
Front M12X1.25	59Ft.Lbs	66Nm
Rear M12X1.25	59Ft.Lbs	66Nm

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

2.9 TIRE PRESSURE

TIRE INSPECTION

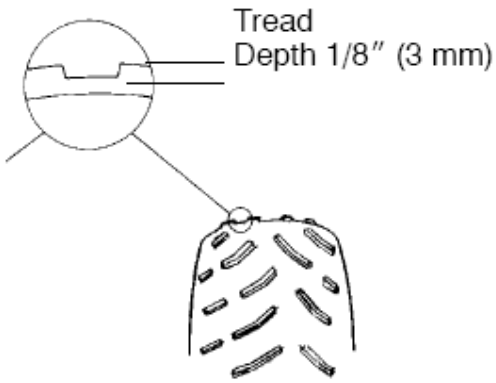
CAUTION:

- Maintain proper tire pressure. Refer to the warning tire pressure decal applied to the vehicle.
- Improper tire inflation may affect CUV maneuverability.
- When replacing a tire always use original equipment size and type and replace in pairs, especially in 4X4 model.
- The use of non- standard size or type tires may affect CUV handling and cause machine damage, especially in 4X4 model.

Tire Pressure Inspection	
Front	**Rear**
7PSI(48±0.5KPa)	7PSI(48±0.5KPa)

TIRE TREAD DEPTH

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



⚠ WARNING

Operating an CUV 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.

3.0 FRAME , NUTS, BOLTS, FASTENERS

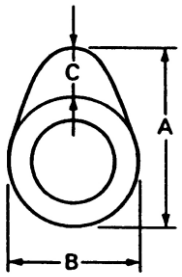
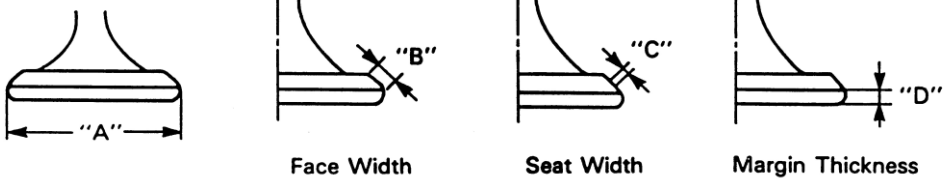
Periodically inspect the tightness of all fasteners in accordance with the maintenance schedule. Check that all cotter pins are in place. Refer to specific fastener torques listed in each chapter.

NOTES

CHAPTER 3 ENGINE

3.1 MAINTENANCE SPECIFICATIONS

3.1.1SPECIFICATIONS

Item		Standard	Limit
Cylinder head : Warp limit			0.03 mm
Cylinder: Bore size Out of round limit		80.000- 80.014 mm	80.025 mm 0.03 mm
Camshaft: Cam dimensions Intake "A" "B" "C" Exhaust "A" "B" "C" Camshaft runout limit		 36 .545- 36 .645 mm 30.021-30.121 mm 6.524 mm 36 .547- 36 .647 mm 30 .067- 30.167 mm 6.48 mm …..	 36 .45 mm 29.92 mm … 36 .45 mm 29 .97 mm … 0.03m m
Cam chain: Cam chain type/No. of links		DID SC.A-0404A SDH/108	…
Rocker arm /rocker armshaft: Rocker arm inside diameter Rocker shaft outside diameter Rocker arm - to- rocker arm shaft clearance		 12.000- 12.018 mm 11.981- 11.991 mm 0.009- 0.012 mm	 12 .03 mm 11.95 mm …
Valve, Valve seat, Valve guide: Valve clearance (cold) Valve dimensions	 IN EX	 0.08-0.12 mm 0.16-0.20 mm	 … …
Valve dimensions 			
"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		…	0.01 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	36.1 mm
(Outer)	IN/EX	36.93 mm	35.0 mm
Set length (valve closed) (Inner)	IN/EX	30.1 mm	…
(Outer)	IN/EX	31.6 mm	…
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		0.02 - 0.049mm	0.15m m
Piston size "D"		79.965-79.980 mm	…
Measuring point "H"		5mm	…
Piston pin bore inside diameter		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		Barrel	…
End gap (installed)		0.2-0.35 mm	0.5 mm
Side clearance (installed)		0.03-0.065 mm	0.1 mm
2nd ring :			
Type		Taper	…
End gap (installed)		0.28-0.48 mm	0.73 mm
Side clearance		0.02-0.052 mm	0.1 mm
Oil ring :			
End gap (installed)		0. 15-0.4 mm	…
Crankshaft:			
Crank width "A"		59.95-60.00 mm	…
Runout limit "C "		0.03 mm	…
Big end side clearance "D"		0.35- 0.85 mm	…

Item		Standard	Limit
Automatic centrifugal clutch:			
Clutch shoe thickness		3.0 mm	2.0 mm
Clutch hosing inside diameter		135 mm	135.5 mm
Clutch shoe spring free length		28.1 mm	…
W eight outside diameter		20 mm	19 .5 mm
Clutch- in revolution		2 ,100- 2,700 r/m in	…
V-belt:			
V-belt width		22.6 mm	21.0 mm
Carburetor:			
Type		CVK	
I.D. mark		CVK32	
Ventuly outside diameter		ϕ 47	
Main jet	(M .J)	# 138	…
Jet needle	(M .A.J)	NPCA	…
Throttle valve size	(J.N)	ϕ 31	…
Pilot air jet	(Th .V)	11°	…
Needle jet	(P.A.J.1)	ϕ 2.6	…
Pilot outlet	(N.J)	ϕ 3.4	…
Pilot jet	(P.O)	#140	…
Bypass	(B.P)	ϕ 0.7X4	…
Pilot screw	(P.S)	1*7/8	…
Valve seat size	(V.S)	ϕ 1.2	…
Starter jet 1	(G.S.1)	#140	…
Float height	(F.H)	17	…
Engine idle speed		1,350-1,650 r/m	…
Intake vacuum		30kPa	…
Oil pump:			
Type		Trochoid type	
Tip clearance		0.1- 0.34 mm	0 .4 mm
Side clearance		0.013- 0.036 mm	0.15 mm
Housing and rotor clearance		0 .04- 0.09 mm	0.15 mm

Item	Standard	Limit
Radiator:		
Type	Cooling fin with electric fan	…
Width/height/thickness	360/246/68 mm	…
Radiator cap opening pressure	110-140kPa (1.1-1.4kg/cm^2, 1.1-1.4bar)	…
Radiator capacity	2 L	…
Reservoir tank capacity	0.35 L	…
Thermostatic valve:		
Valve opening temperature	70- 74℃	
Valve full open temperature	83 ℃	
Valve full open lift	4 mm	

3.1.2TIGHTENING TORQUES

Part to be tightened	Part name	Thread size	Q'ty	Tightening Torque N.m	Tightening Torque m.kg	Remarks
Oil check bolt	_	M 6	1	7	0.7	
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	Nut	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	M16	1	8	0 .8	
One way clutch	_	M 8	3	30	3.0	
Clutch housing	Bolt	M14	1	60	6.0	
Grease stopper (Primary sheave)	_	M 4	4	3	0 .3	
Primary fixed sheave	_	M14	1	60	6.0	
Clutch carrier assembly	_	M36	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	_	M16	1	23	2 .3	
Thermo unit	_	P t1/8	1	8	0 .8	

3.2 PARTS INSPECTION AND SERVICE

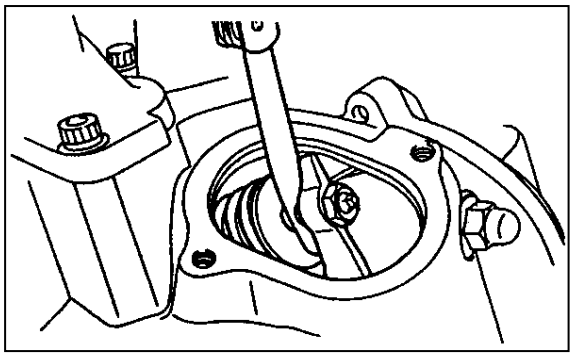
3.2.1VALVE CLEARANCE ADJUSTMENT

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.

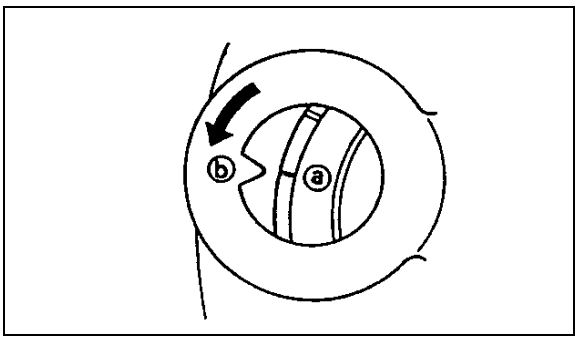
1. Remove :
●Crankcase cover
2. Remove :
●Spark plug
● Valve cover (intake side)
●Valve cover (exhaust side)
3. Remove:
●Timing check plug
4.Measure:
●Valve clearance
Out of specification → Adjust.

Valve clearance (cold):
Intake valve 0.08- 0.12m m
Exhaust valve 0.13- 0.16mm



Measurement steps:

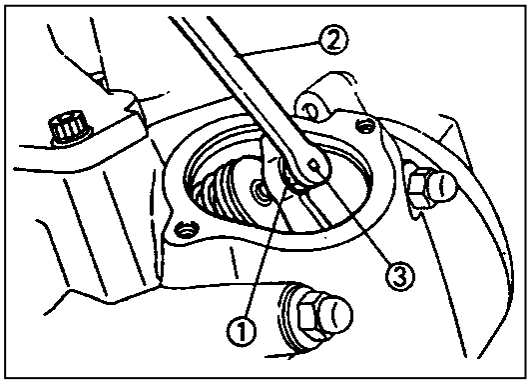
●Rotate the primary fixed sheave counterclockwise to align the slit a on the rotor with the stationary pointer b on the crankcover 1 when the piston is Top Dead Center (TDC).
●Measure the valve clearance by using a feeler gauge.



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:

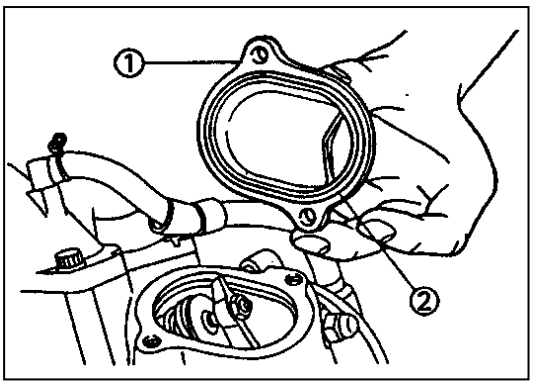
●**Valve cover(exhaust side)** 10Nm(1.0m·kg)

●**O-ring**

●**Spark plug** 18Nm(1.8m·kg)

●**Timing check window screw**

●**Crankcase cover** 10Nm(1.0m·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. **Engine idling speed:** **1,350-1,650 r/min**

4. Adjust:

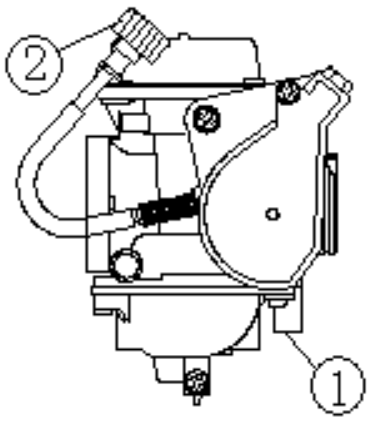
● Engine idle speed

Adjustment steps:

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

	Pilot screw: **1 $^{3}/_{8}$ 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.

3.2.3SPARK PLUG INSPECTION

1.Remove :
- Spark plug cap
- Spark plug

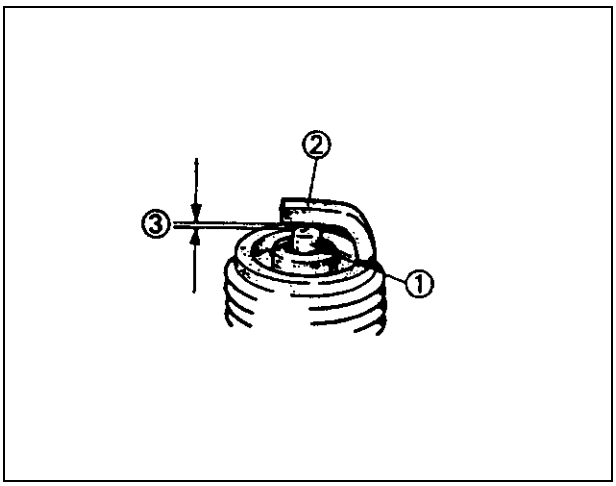
CAUTION:

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.



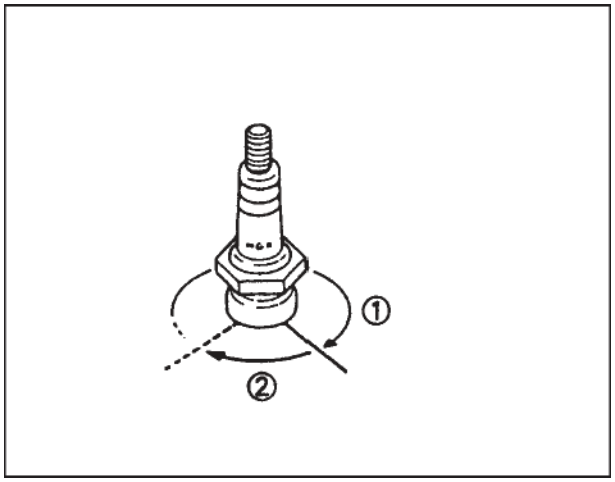
3.Clean:
●Spark plug
(with spark plug cleaner or w ire brush)
4.Measure:
●Spark plug gap ③
(with a wire gauge)
Out of specification → Adjust gap.

	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.



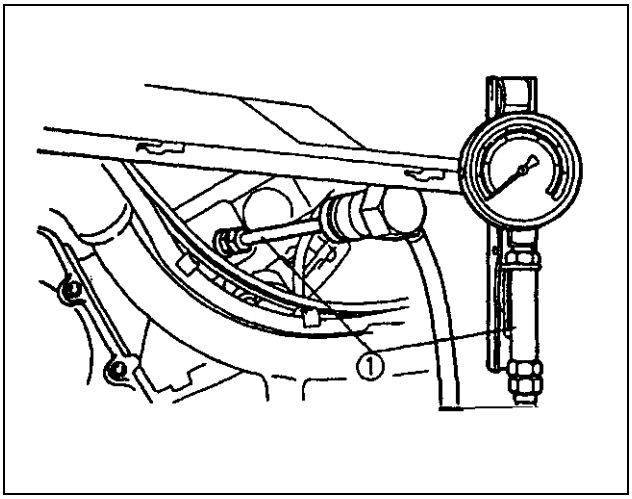
3.2.4COMPRESSION PRESSURE MEASUREMENT

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 com pressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.



5. Attach:
●Compression gauge①
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^2, 14 bar) Minimum : 1,120 kP a (11.2 kg /cm ^{2}, 11.2 bar)

Measurement steps :

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

WARNING :

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

8. Install:

● Spark plug 18Nm(1.8m·kg)

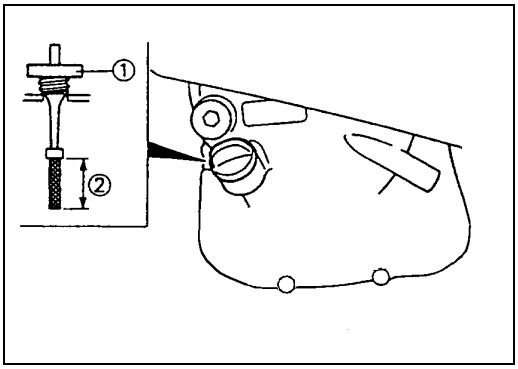
3.2.5ENGINE OIL LEVEL INSPECTION

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 ①and minimum ①marks .

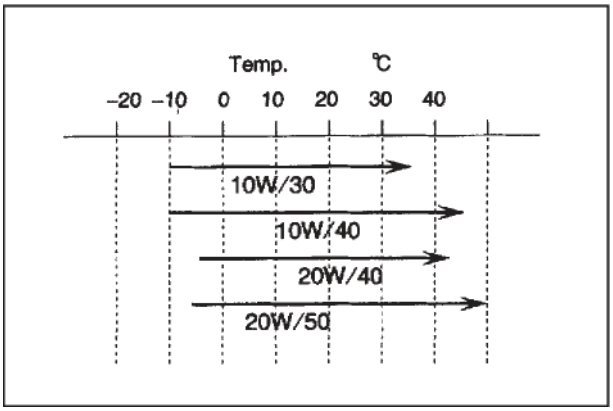
Oil level is below the minimum mark Add oil up to the proper lever.



RECOMMENDED ENGINE OIL

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

	API STANDARD: **API SE or higher grade**



CAUTION:

●Do not put in any chemical additives or use oils with a grade of CD or higher.

●Be sure not to use oils labeled "ENERGY CONSERVING 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 filer plug

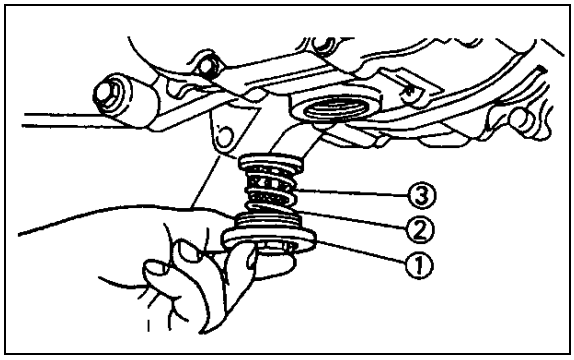
●Drain plug ① 32Nm(3.2m·kg)

●Compression spring ②

●Oil strainer ③

●O-ring

●Drain the crankcase of its oil.



4. Install:

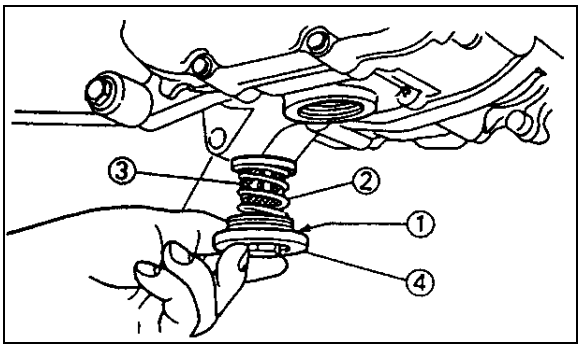
●O-ring ① NEW

●Compression spring ②

●Oil strainer ③

●Drain plug ④

●Oil filer 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

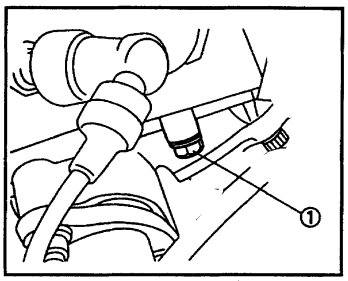
ENGINE OIL PRESSURE INSPECTION

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.

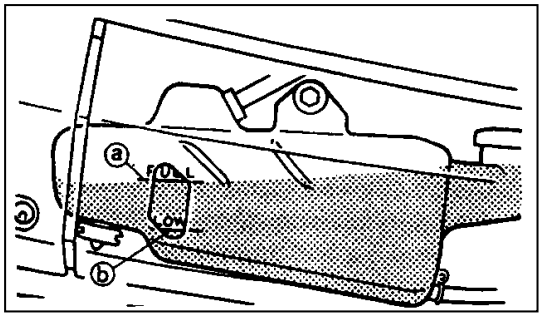
3.2.6COOLANT LEVEL INSPECTION

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:

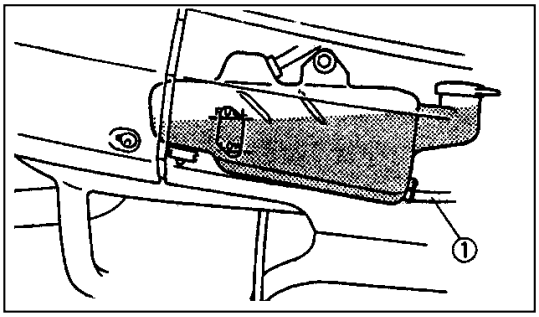
Wait a few minutes until the coolant settles before inspecting the coolant level.

COOLANTRE PLACE MENT

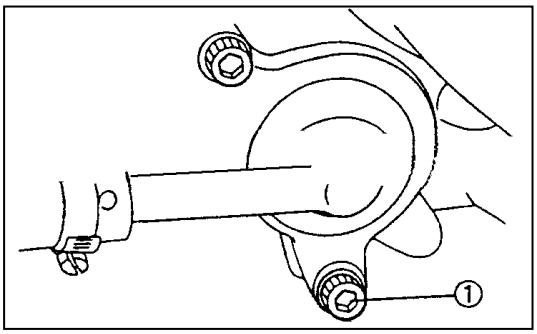
1. Remove:

●Front cover of ATV plastic body work.

●Seat.



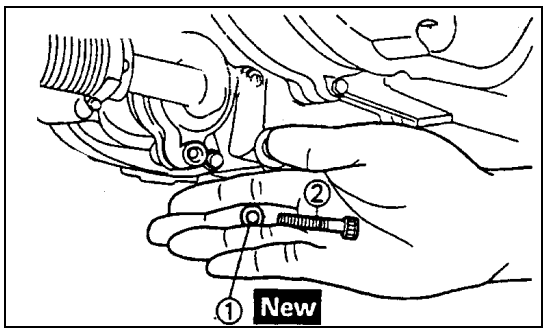
2. Remove:
●Hose ① (reservoir tank)
Drain the reservoir tank of its coolant.
3. Remove:
●Drain bolt ①
●Radiator cap



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.

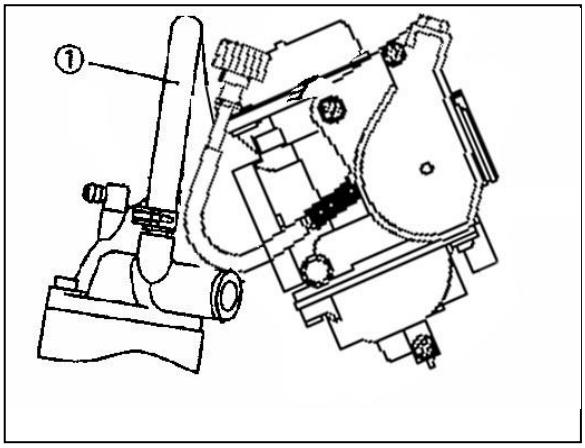
NOTE:
●Remove the radiator cap after removing the drain bolt.

4. Clean:
●Radiator
Fill soft water into the filer neck support ① (reservoir tank).
5. Install:
●Gasket ① NEW



●Drain bolt② 10Nm(1.0m·kg)

6. Loosen:
●Hose①

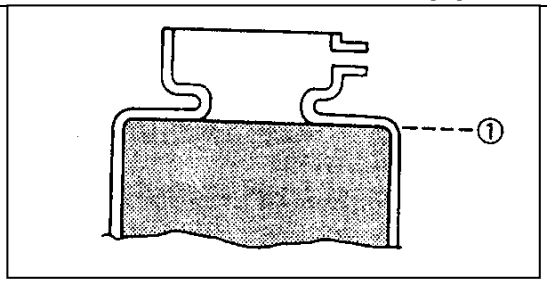


7. Connect:
●Hose (reservoir tank)
8. Fill:
●Radiator
(to specified level①)

Fill the coolant slowly, until the coolant comes out from the head hose.

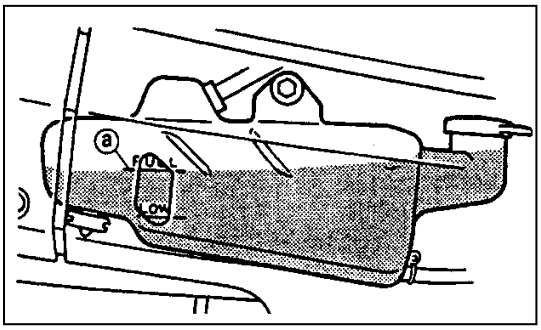
●Reservoir tank

(to maximum level ⓐ)

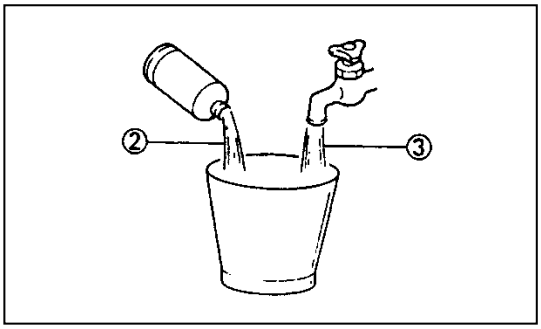


Recommended coolant:
High quality ethylene glycol anti-freeze containing corrosion inhibitors for aluminum engine.

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



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.

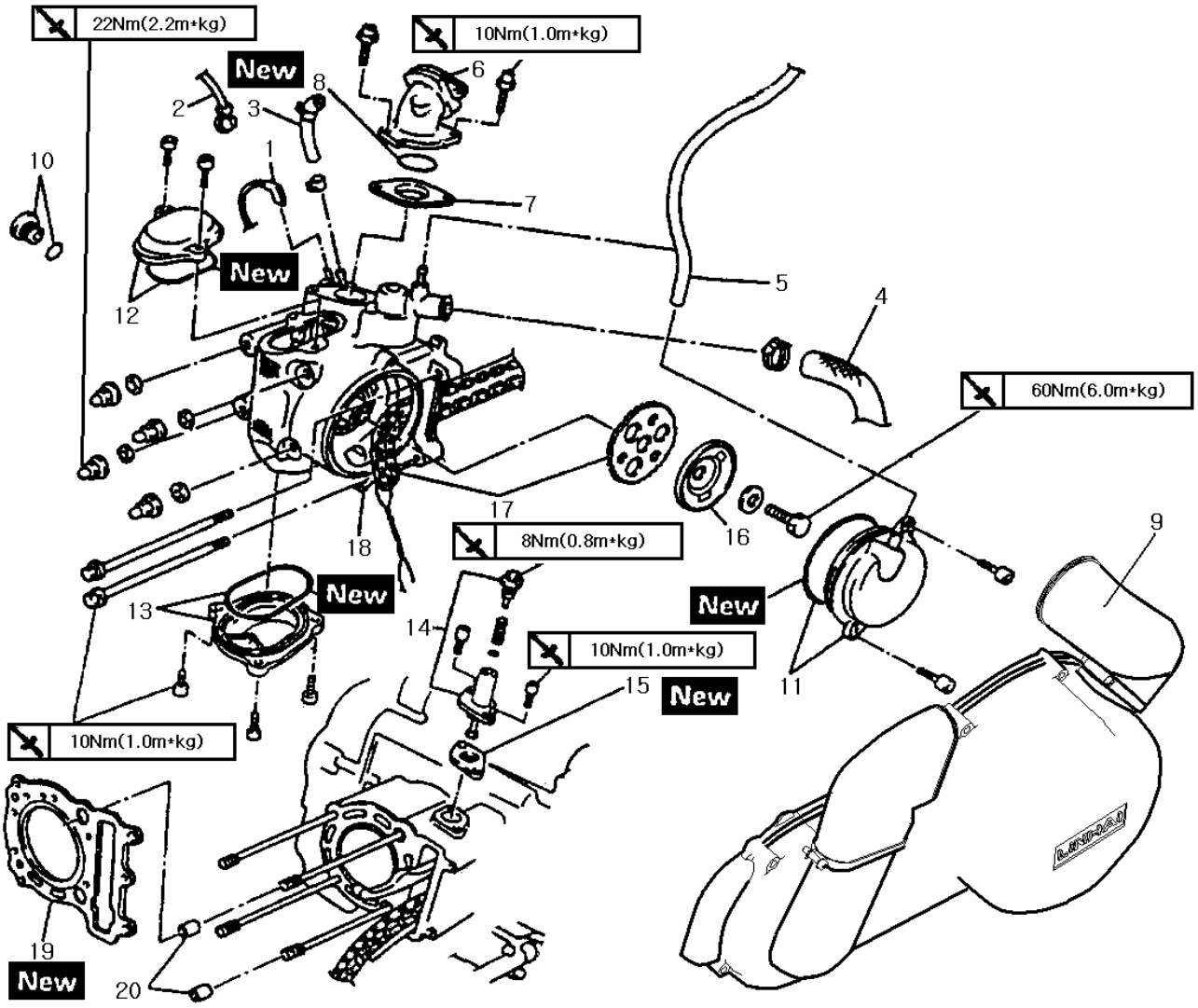
12. Stop the engine and inspect the level.

NOTE:

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

13. Install: Remain parts.

3.3CYLINDER HEAD

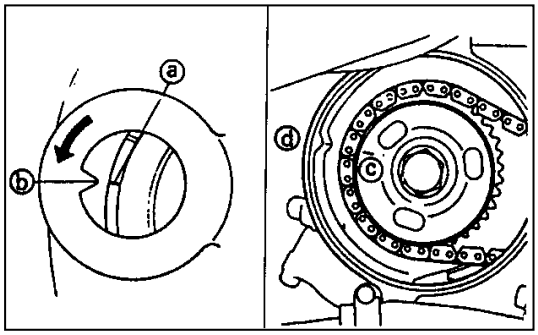


Order	Job name / Part name	Q 'ty	Remarks
	Cylinder head removal		Remove the parts in order.
	Drain the coolant.		
	Side panel		
	Footrest board		
	Carburetor		
1	Thermo unit lead		Refer to "CARBURETOR"
2	Plug cap	1	section .
3	Crankcase breather hose	1	
4	Outlet hose (cylinder head)	2	
5	Breather hose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

9	Crankcase cover	1	
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	
15	Timing chain tensioner assembly	1	Refer to "CYLINDER HEAD
16	Timing chain tensioner gasket	1	REMOVAL AND
17	Breather plate	1/1	INSTALLATION" section.
18	Cam sprocket/Timing chain	1	Reverse the removal
19	Cylinder head	1	procedure for installation.
20	Cylinder head gasket	2	
	Dowel pin		

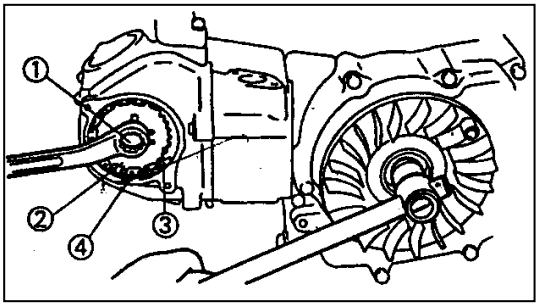
CYLINDER HEAD REMOVAL

1. Align:
"I" mark ⓐ on the rotor
(with stationary pointer ⓑ 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 ⓒ with the cylinder head match mark ⓓ when the piston is at TDC on the compression

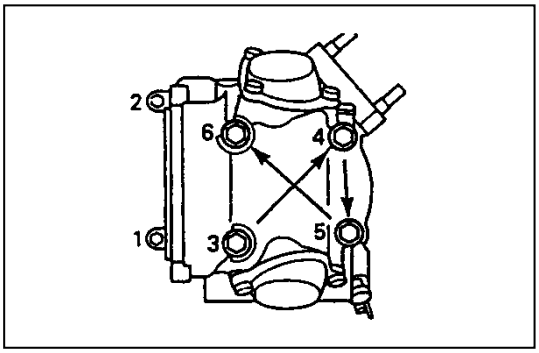
2. Loosen:
●Bolt ①
3. Remove:
●Timing chain tensioner assembly
●Timing chain tensioner gasket
4. Remove:
●Breather plate ②
●Cam sprocket ③
●Timing chain④



NOTE:
●Fasten a safety w ire 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.

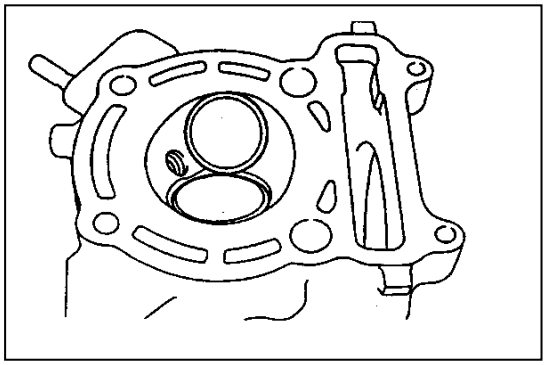
5. Remove:
● Cylinder head

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.



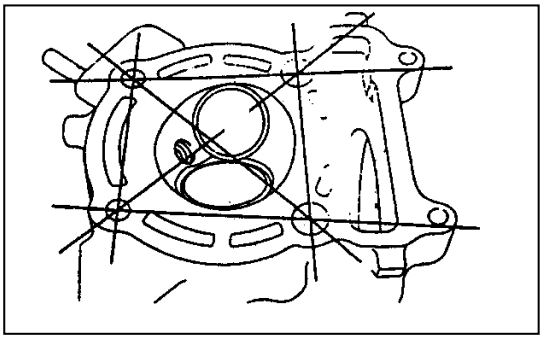
NOTE:
Do not use a sharp instrument to avoid damaging or scratching:
- Spark plug threads
- Valve seats

2. Inspect:
- Cylinder head

Scratches/damage → Replace.

3. Measure:
- Cylinder head warpage

Out of secification → Resurface .



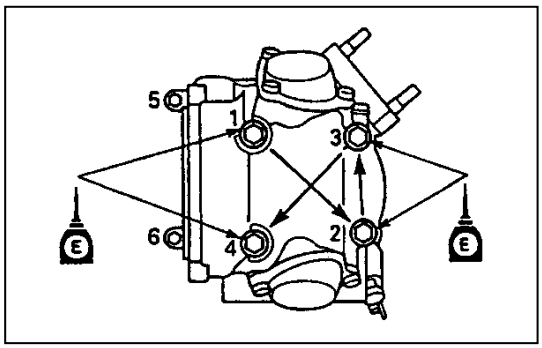
	Cylinder head warpage : Less than 0.03 mm

Warpage measurement and resurfacement steps:
- Place a straight edge and a feeler gauge across the cylinder head.
- Measure the warpage.

If the warpage is out of specification, resurface the cylinder head.
- Place a 400 ~ 600 grit wet abrasive pape on the surface plate, and resurface the head using a figure eight sanding patten.

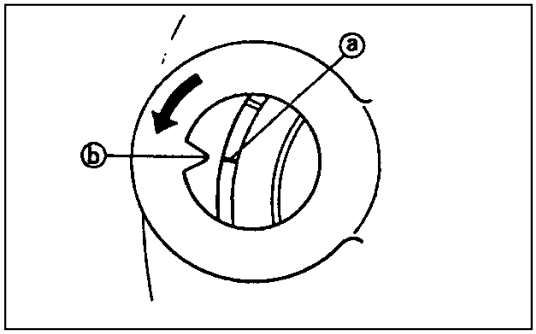
NOTE:
Rotate the cylinder head several times for an even resurfacement.

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)



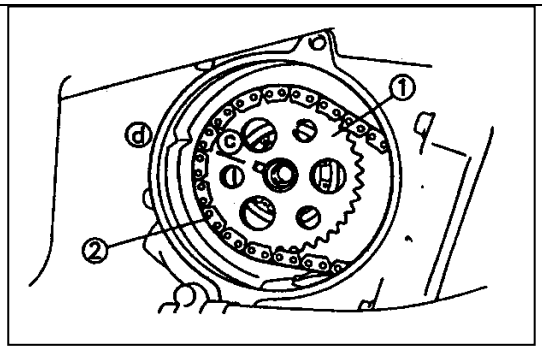
3. Install:
- Cam sprocket ①
- Timing chain ②

Installing steps :
- Turn the primary sheave counterclockwise until

the TDC mark ⓐ matches the stationary pointer ⓑ.

●Align the "I" mark ⓒ on the cam sprocket with the stationary pointer ⓓ 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 ⓒ on the cam sprocket with the stationary pointer ⓓ 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.

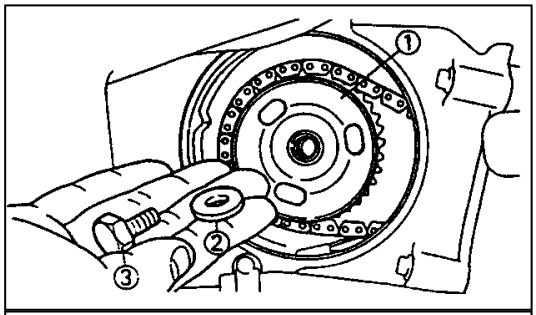
●While holding the camshaft, temporarily tighten the bolts .

●Remove the safety wire from the timing chain.

4. Install:

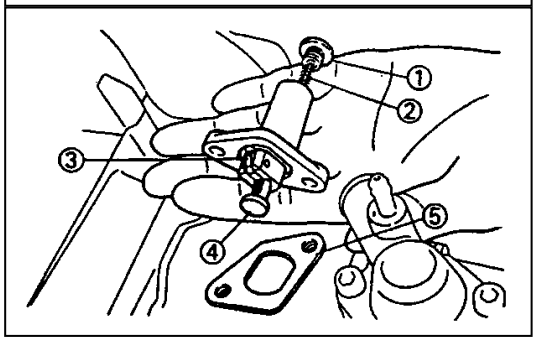
●Breather plate ①

●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-w ay cam ③ and push the tensioner rod ④ all the way in.

●Install the tensioner with a new gasket ⑤onto the cylinder.

●Install the springs ② and cap bolt ①.

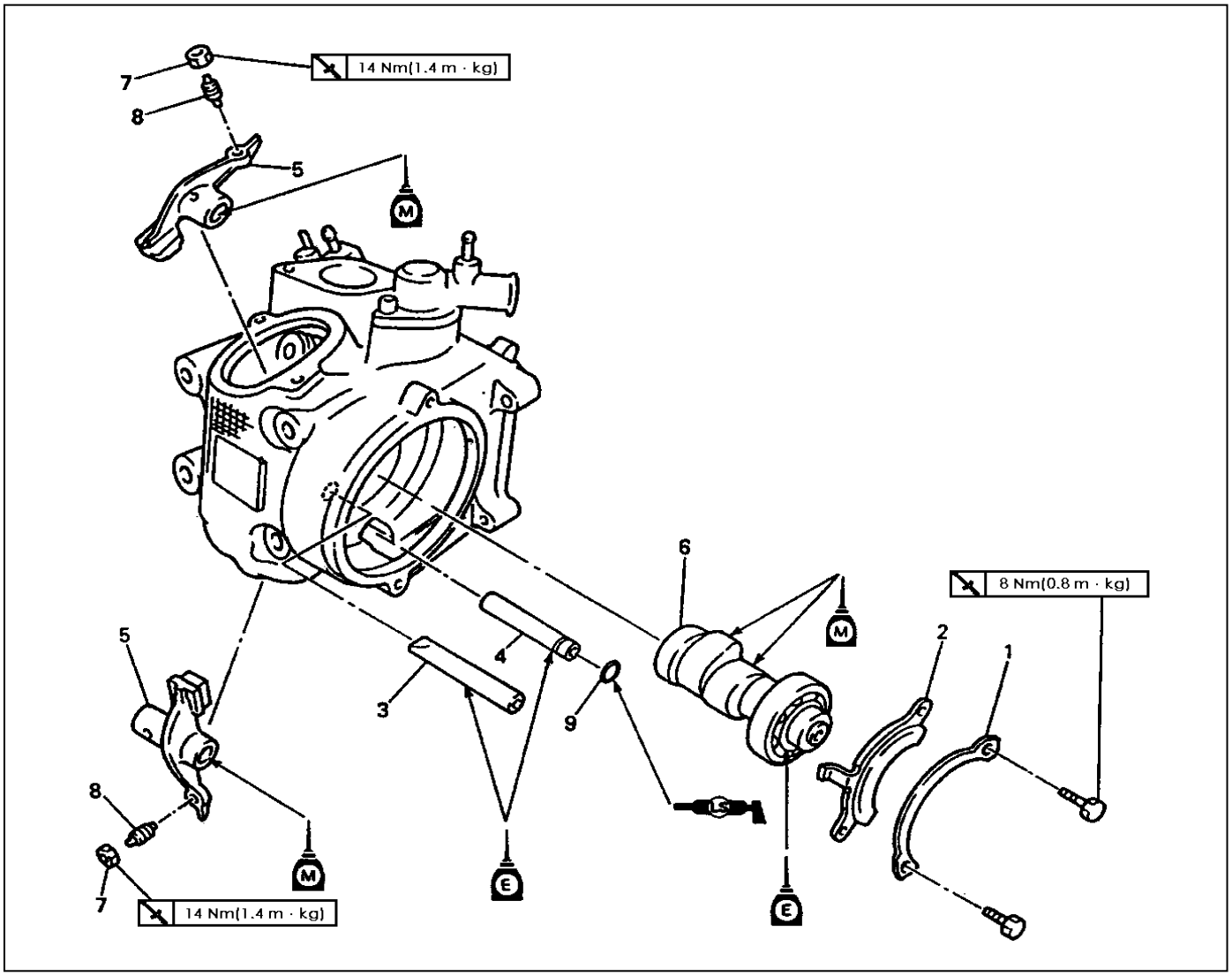
●Tighten the bolt (with gasket) to the specified torque .

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.

3.4CAMSHAFT AND ROCKER ARMS

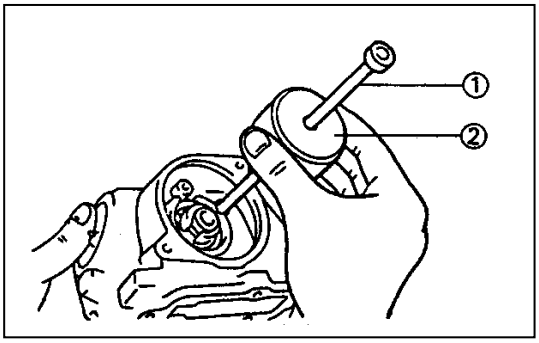


Order	Job name / Part name	Q 'ty	Remarks
	Cam shaft and rocker arms removal		Remove the parts in order. Refer to "CYLINDER HEAD" section.
	Cylinder head		
1	Lock washer	1	
2	Plate	1	Refer to "ROCKER ARM AND ROCKER

3	Rocker arm shaft (intake)	1	SHAFT REMOVAL AND INSTALLATION"
4	Rocker arm shaft (exhaust)	1	section..
5	Rocker arm	2	
6	Camshaft	1	Refer to "CAMSHAFT INSTALLATION"
7	Locknut	2	section .
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)



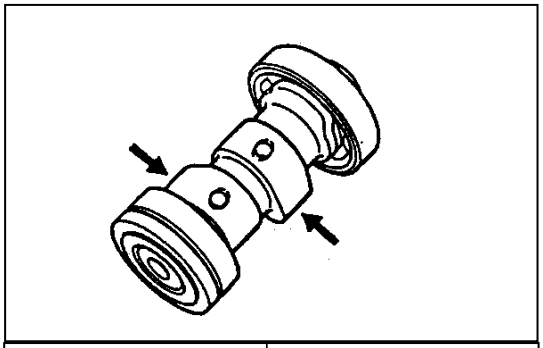
NOTE:

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

CAM SHAFT INSPECTION

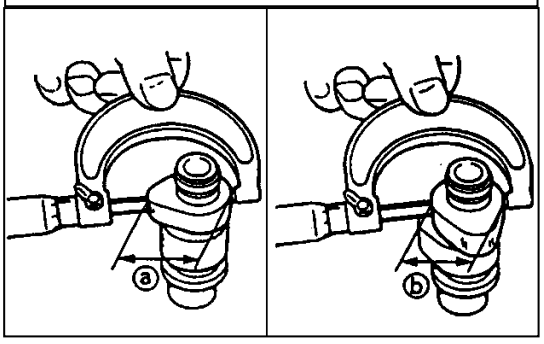
1. Inspect:
- ●Cam lobes

Pitting/Scratches/Blue discoloration → Replace .



2. Measure:
- ●Cam lobes length ⓐ and ⓑ

Out of specification → Replace.



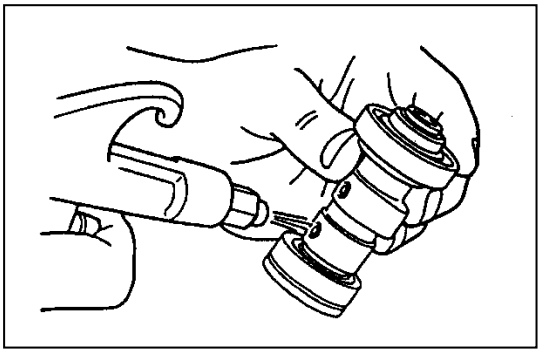
Cam lobes length:

Intake:

ⓐ 36 .545- 36 .645 mm
<Lim it: 36.45 mm>
ⓑ 30.021-30.121 mm
<Lim it: 29.92 mm>

Exhaust:

ⓐ 36 .547- 36 .647 mm
<Lim it: 36.45 mm>
ⓑ 30.067- 30.167 mm
<Lim it: 29.97 mm>



3. Inspect:
- ●Cam shaft oil passage

Stuffed → Blow out oil passage with

compressed air.

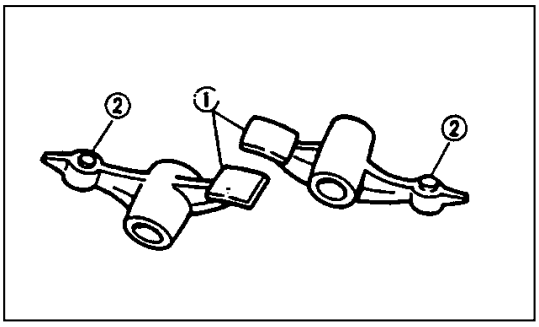
ROCKER ARMS AND ROCKER ARM SHAFTS INSPECTION

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.

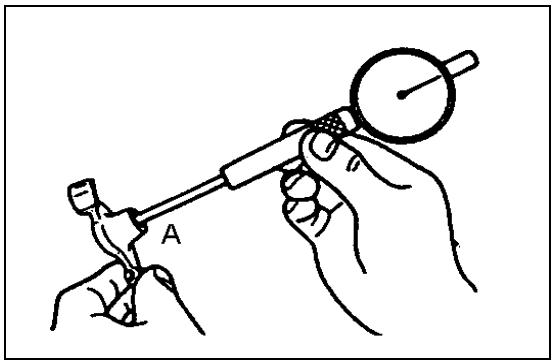
Excessive wear → Replace.

●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.

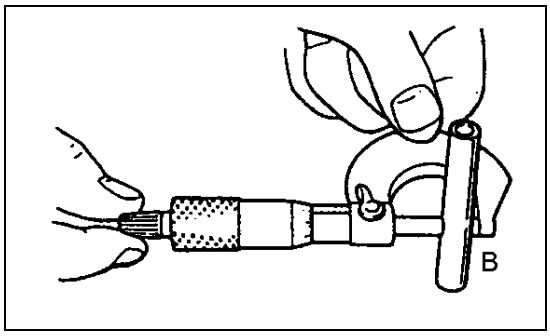
Out of specification → Replace.



Inside diameter (rocker arm):
12.000- 12.018mm
< Lim it: 12.030 mm >

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

Out of specification → Replace.

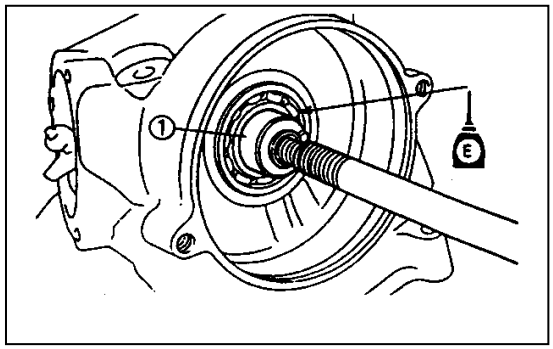


Outside diameter(rocker arm shaft):
11.981-11.991 mm
<Lim it: 11.95 mm>

CAMSHAFT AND ROCKER ARM INSTALLATION

1. Lubricate:

●Cam shaft ①



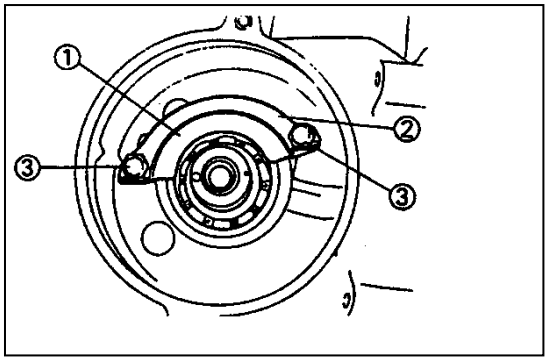
Camshaft:
Molybdenum disulfide oil
Camshaft bearing:
Engine oil

2. Install:

●Plate①

●Lockwasher ② **NEW**

●Bolt ③ 8Nm(0.8m·kg)

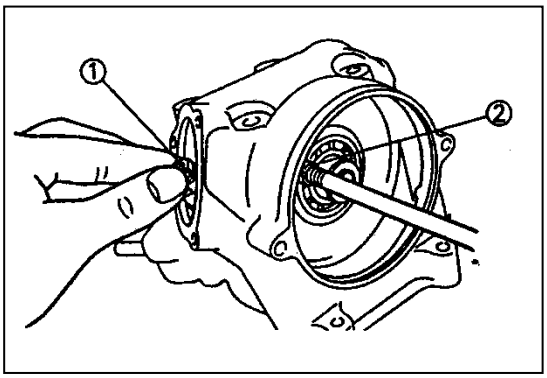


NOTE:
Bend the lockwasher tabs along the bolt ③ falts.

3. Apply:
●Molybdenum disulfide oil onto the rocker arm and rocker arm shaft.

	Molybdenum disulfide oil

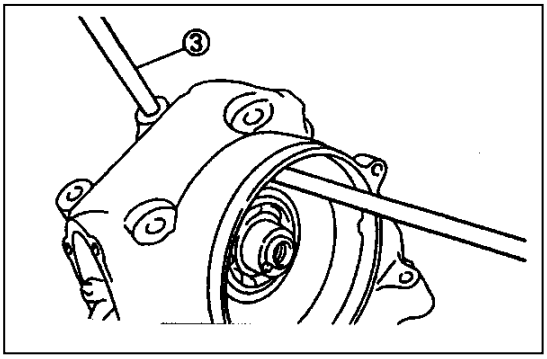
4. Install:
●Rocker arm ①
●Rocker arm shaft ② (exhaust)



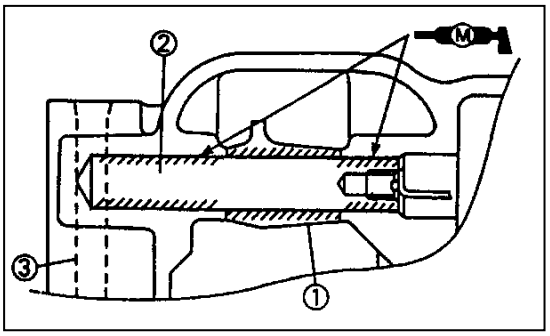
NOTE:
Exhaust:
Install the rocker arm shaft (exhaust) completely pushed in.

5. Install:
●Rocker arm ①
●Rocker arm shaft ② (intake)

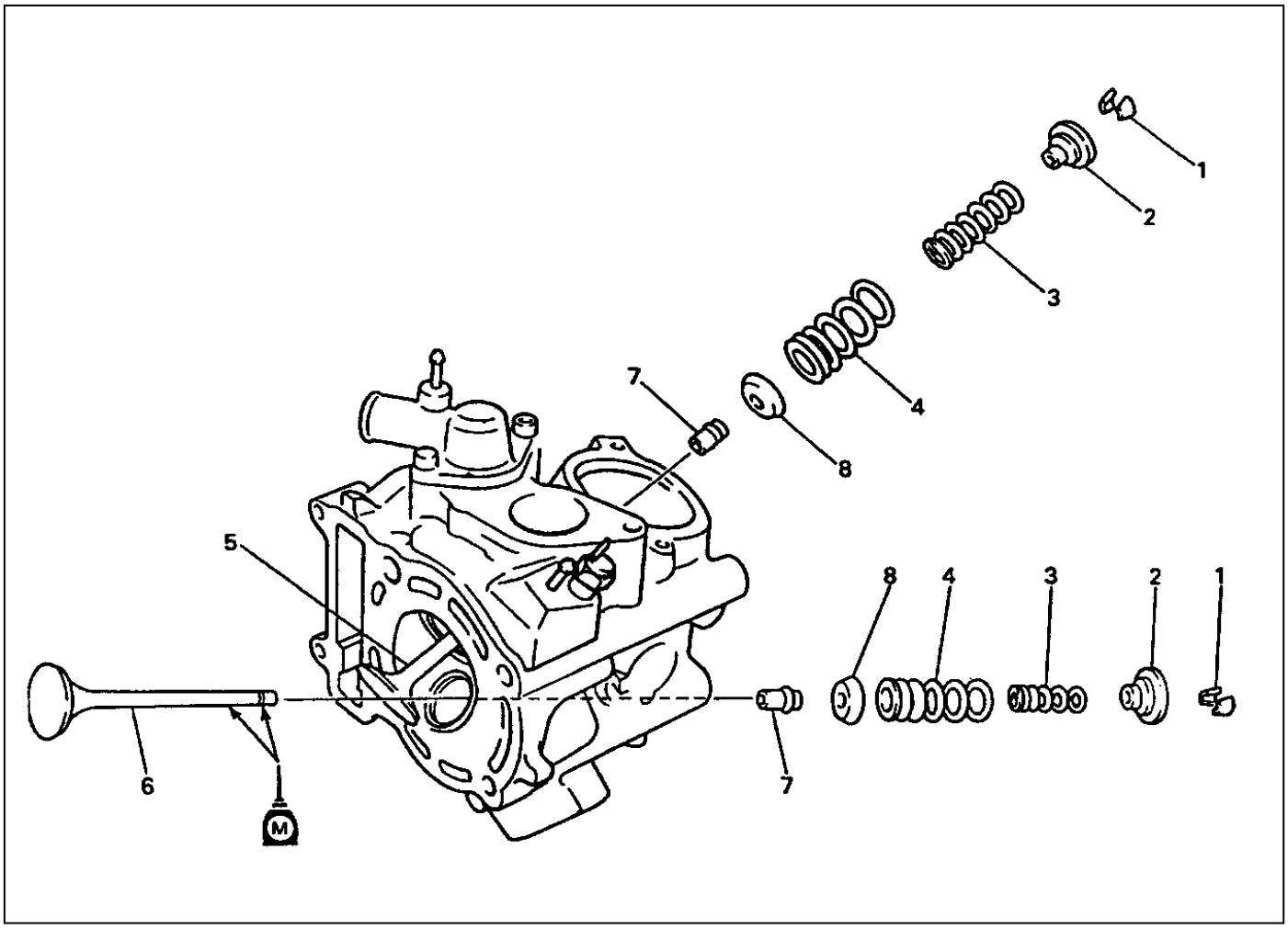
NOTE:
Intake:
Insert the guide shaft (8 mm) ③ into the stud bolt hole in the cylinder head to the rocker arm shaft (intake).



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



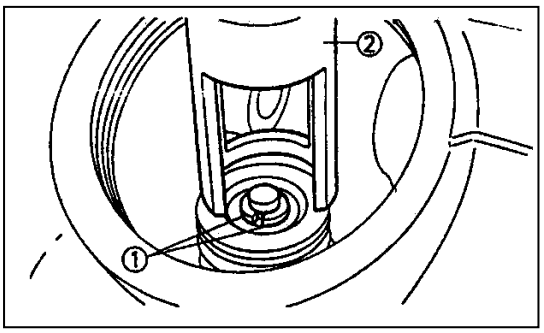
3.5VALVES AND VALVE SPRINGS



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

VALVES AND VALVE SPRINGS REMOVAL

1. Remove:
● Valve cotters ①

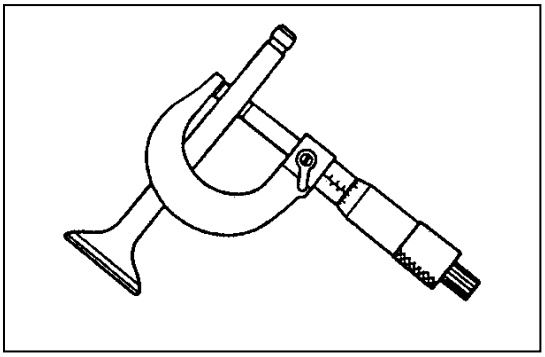


NOTE:
Attach a valve spring compressor and attachment ② between the valve spring retainer and cylinder head to remove the valve cotters.

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

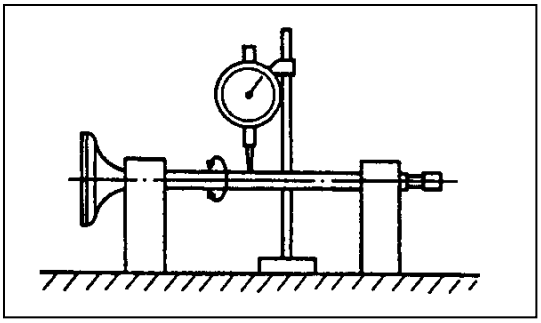
VALVE AND VALVE SPRINGS INSPECTION

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



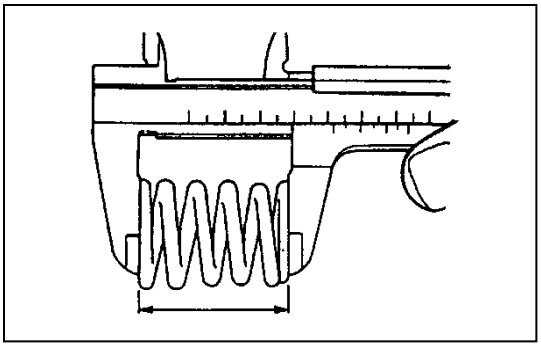
Valve stem diameter:
Intake:
5.975-5.990mm
<Limit: 5.94mm>
Exhaust:
5.960-5.975mm
<Limit: 5.92mm>

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



●Runout limit:
0.01 mm

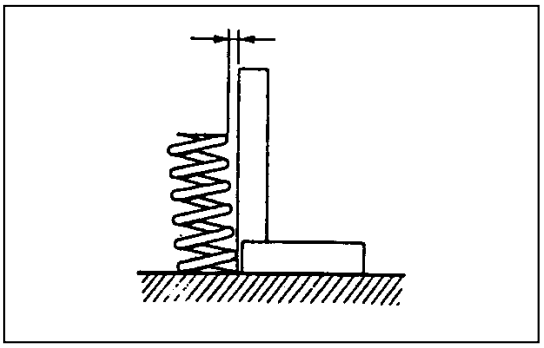
3. Measure:
●Free length (valve spring)
Out of specification → Replace.



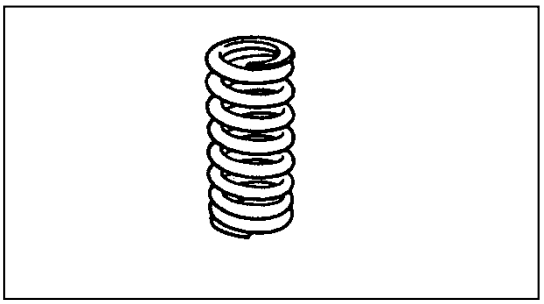
Valve spring free length:
Inner spring:
38.1 mm
<Limit: 36.1mm>
Outer spring:
36.93 mm
<Limit: 35.0mm>

4. Measure:
●Spring tilt
Out of specification → Replace.

	Spring tilt limit: 1.7mm (2.5°)

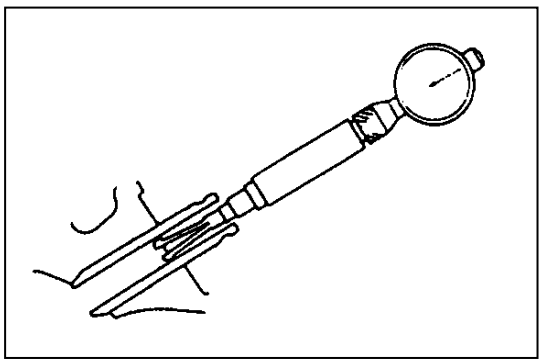


5. Inspect:
● Spring contact face
Wear/Pitting/Scratches → Replace.



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**

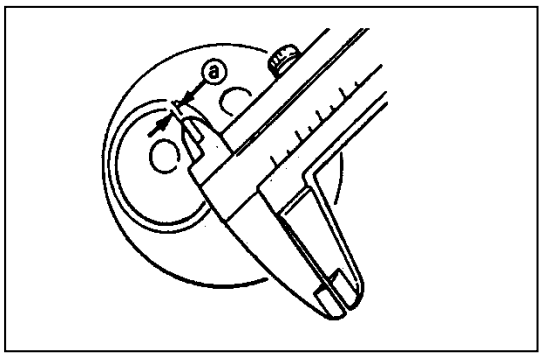
Out of specification → Replace the valve guide.

	Stem-to-guide clearance limit: **Intake:** **0.08 mm** **Exhaust:** **0.10 mm**

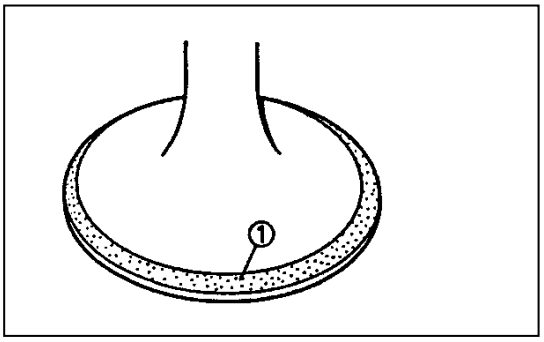
VALVE SEATS INSPECTION
1. Eliminate:
●Carbon deposits
(from the valve face and valve seat)
2. Inspect:
●Valve seats
Pitting/wear → Reface the valve seat.

3. Measure:
●Valve seat width ⓐ
Out of specification → Reface the valve seat.

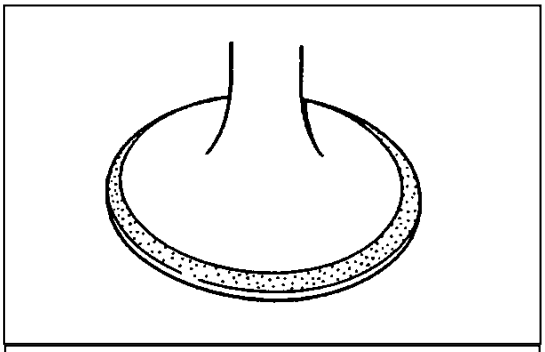
Valve seat width:
Intake:
0.9-1.1mm
<Limit:1.6mm>
Exhaust:
0.9-1.1mm
<Limit:1.6mm>



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.

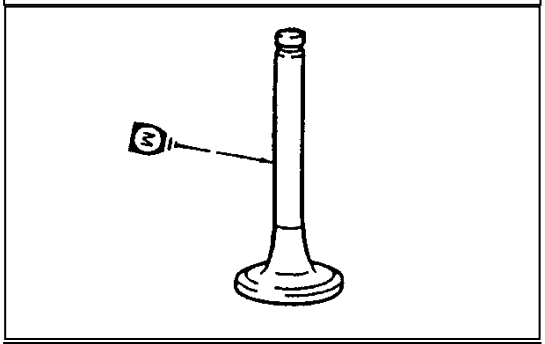


4. Lap:
●Valve face
●Valve seat
NOTE:
After replacing the valve seat, valve and valve guide, the valve seat and valve face should be lapped.

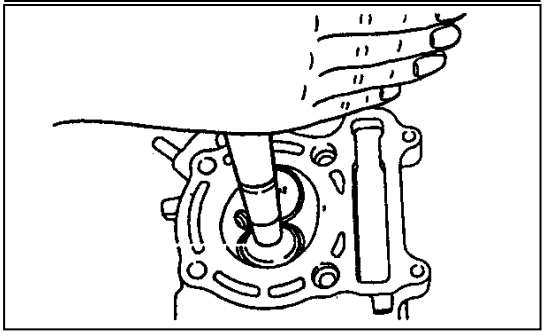


Lapping steps:
●Apply a coarse lapping com pound ⓐ to the valve face.

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 com pound.
NOTE:

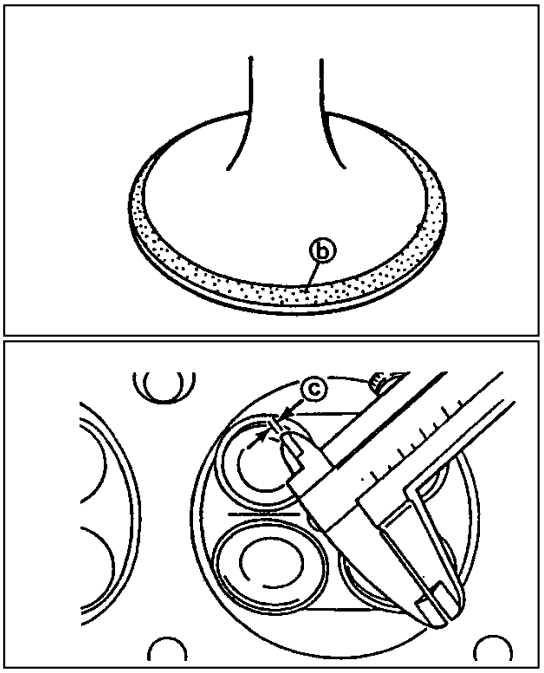


For best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.

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

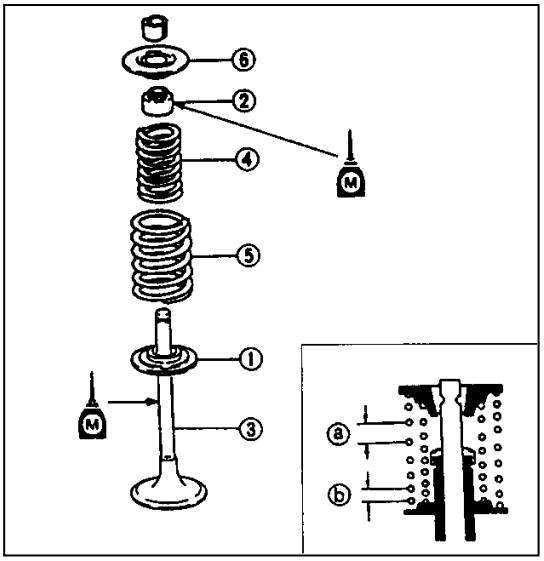
NOTE:
Make sure to clean off all compound from the valve face and valve seat after every lapping operation.

●Apply Mechanic's blueing dye (Dykem) ⓑ 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 ⓒ 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)

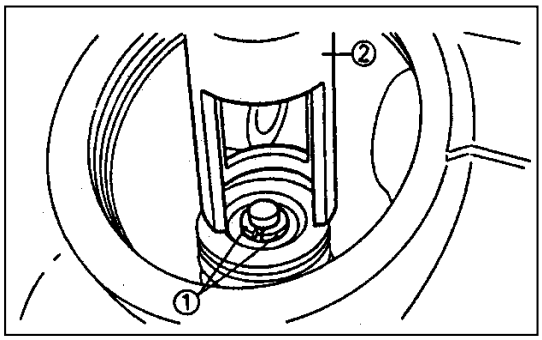
	Molybdenum disulfide oil



3. Install:
●Valve spring seat ①
●Valve stem seal②NEW
●Valve ③
(into the cylinder head)
●Valve spring (under) ④
●Valve spring (outer) ⑤
●Spring retainer ⑥

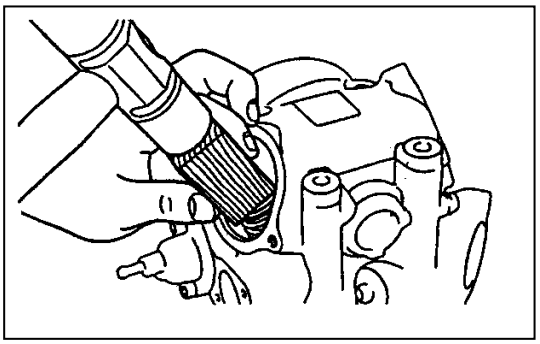
NOTE:
Install the valve spring with the larger pitch ⓐ facing upwards.
ⓑ Smaller pitch

4. Instal:
●Valve cotters ①
NOTE:
Install the valve cotters while com pressing the valve spring with a valve spring compressor and attachment ②.

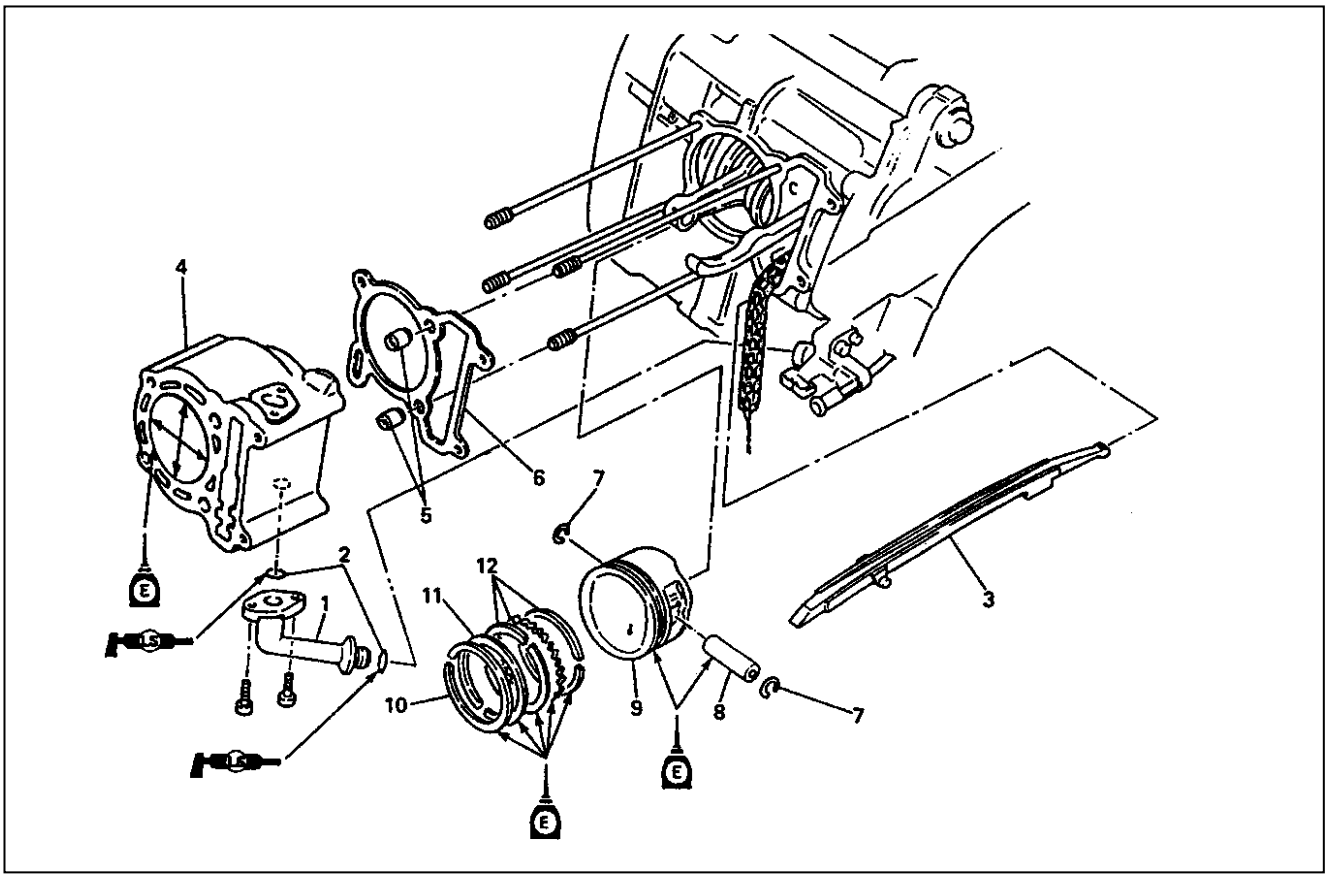


5. Secure the valve cotters onto the valve stem by tapping lightly with a piece of wood.

CAUTION:
Do not hit so much as to damage the valve.



3.6CYLINDER AND PISTON

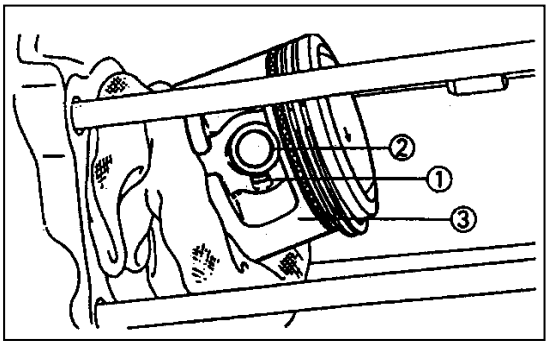


Order	Job name / Part name	Q 'ty	Remarks
	Cylinder and piston removal		Remove the parts in order.
	Cylinder head		Refer to " CYLINDER HEAD " section .
1	Joint	1	
2	O-ring	2	
3	Timing chain guide (exhaust side)	1	Refer to " PISTON RINGS, PISTON AND CYLINDER INSTALLATION" section.
4	Cylinder	1	
5	Dowel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

12	Side rail/Spacer	2/1	INSTALLATION " section . Reverse the removal procedure for installation .

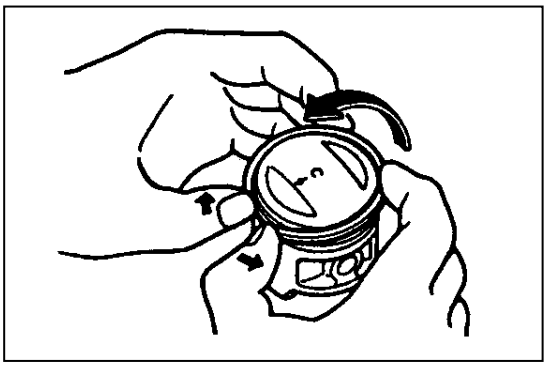
PISTON AND PISTON RINGS REMOVAL

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 tow el or rag to prevent the circlip from falling into the crankcase cavity.

2. Remove:
- ●Top ring
- ●2nd ring
- ●Oil ring



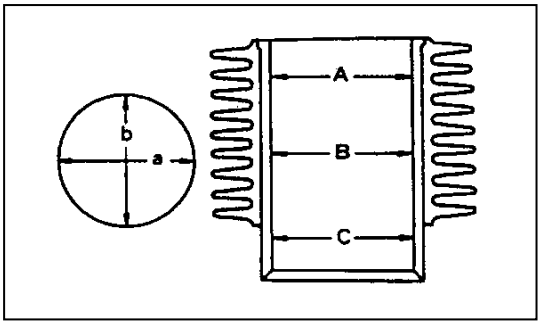
NOTE:
When removing the piston ring, open the end gap of the ring by fingers, and push up the other side of the ring.

CYLINDER INSPECTION

1. Measure:
- ●Cylinder bore

Out of specification → Rebore or replace.

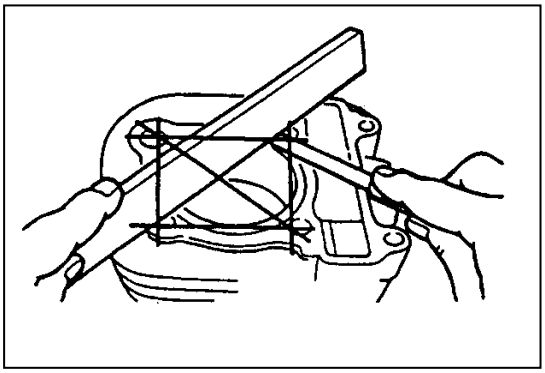
NOTE:
- ●Measure the cylinder bore with a cylinder bore gauge.
- ●Measure the cylinder bore in parallel to and a right angle to the crankshaft. Then, find the average of the measurements.



Cylinder bore:
70.000- 70.014mm
< Limit:70.025mm>
< Difference limit between A,B and C :0.03m m >

2. Measure:
- ●Warpage

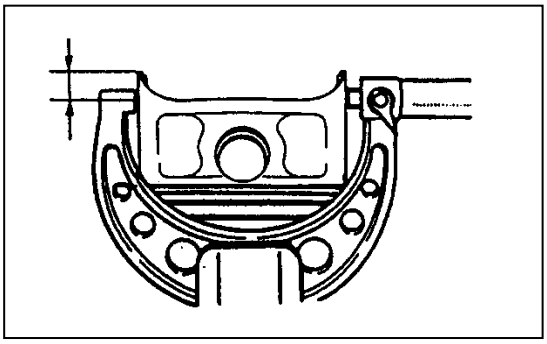
Out of specification → Replace.



	Cylinder warpage limit: 0.03mm

PISTON AND PISTON PIN INSPECTION

1. Measure:
●Piston skirt diameter
Out of specification → Replace .
ⓐ 5.0mm from the piston bottom edge.



	Valve skirt diameter: 69.965-69.980 mm

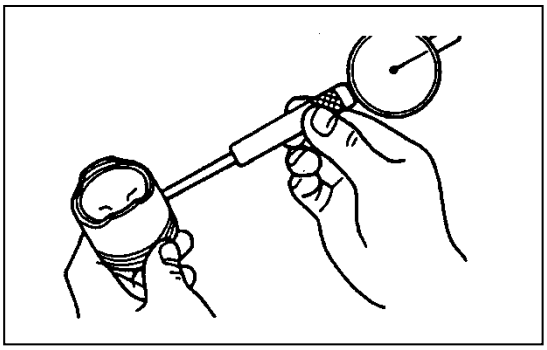
2. Calculate:
●Piston-to-cylinder clearance

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

Refer to “CYLINDER” section for cylinder bore measurement.
Out of specification → Replace the piston and piston rings as a set.

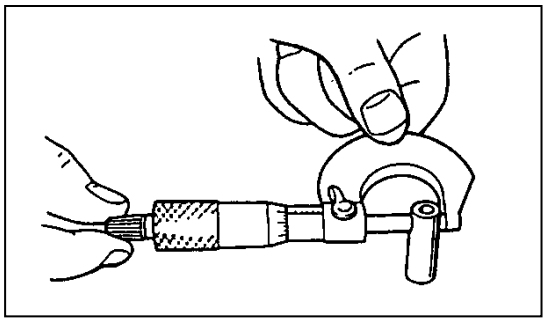
	Piston-to-cylinder clearance: 0.02-0.04mm

3. Measure:
●Piston pin bore diameter
Out of specification → Replace.



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

4. Measure:
●Piston pin outside diameter
Out of specification → Replace.



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

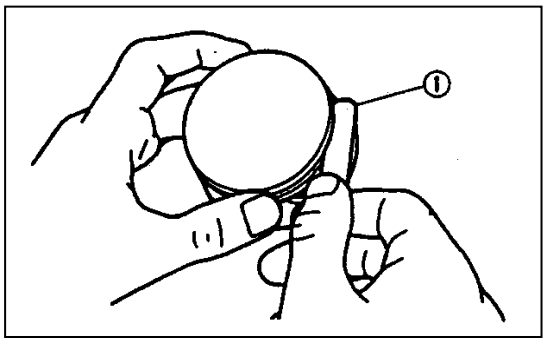
5. Inspect:
●Piston pin
Blue discoloration/groove → Clean or replace.

PISTON RINGS INSPECTION

1. Measure:

●Side clearance 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.

Side clearance (piston ring):
Top ring:
0.04- 0.08m m
<Limit: 0.12mm>
2nd ring:
0.03 - 0.07mm
<Limit: 0.12mm>

2.Position:

●Piston ring into the cylinder

NOTE :

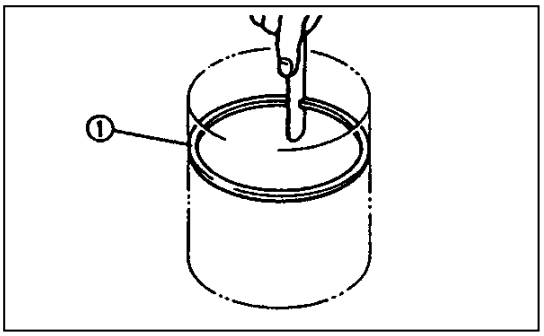
Push the ring with the piston crown so that the ring will be at a right angle to the cylinder bore.

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.

End gap:
Top ring:
0.15-0.30mm
<Limit:0.45mm>
2nd ring:
0.30-0.45mm
<Limit:0.70m m>
Oil ring:
0.20-0.70mm

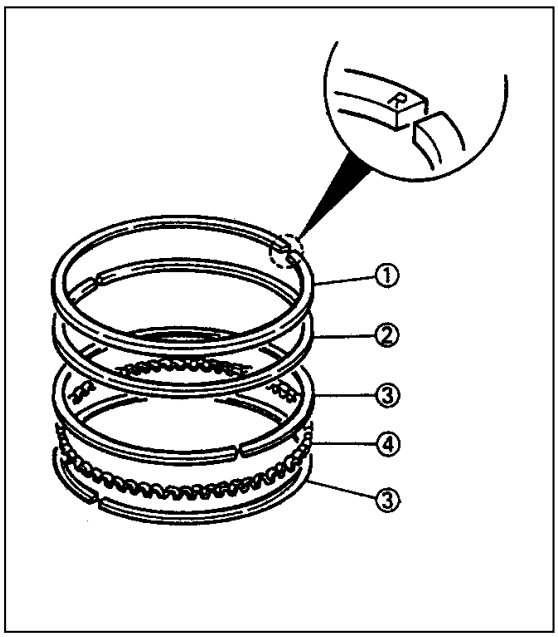
PISTON RINGS, PISTON AND CYLINDER INSTALLATION

1. Install:

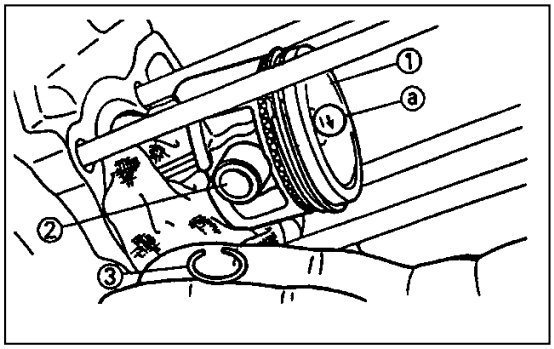
●Top ring ①

●2nd ring ②
●Side rails (oil ring) ③
●Expander spacer (oil ring) ④

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



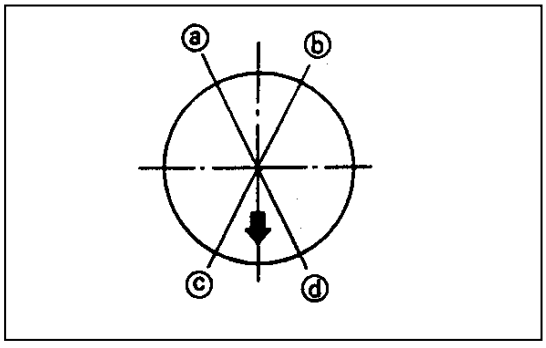
2.Install:
●Piston ①
●Piston pin ②
●Piston pin clip ③ NEW



NOTE:
●Apply engine oil to the piston pins.
●The " → " mark ⓐ 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.



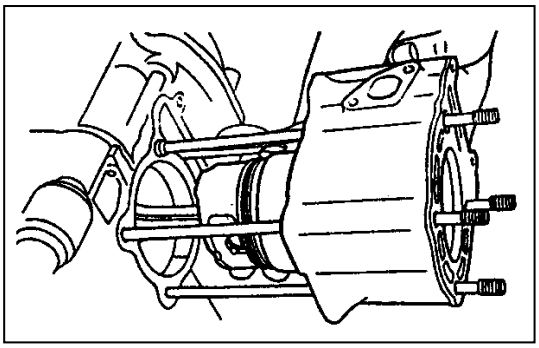
ⓐ Top ring end
ⓑ Oil ring end (lower)
ⓒ Oil ring end (upper)
ⓓ 2nd ring end

5. Lubricate:
- Piston outer surface
- Piston ring
- Cylinder inner surface

	Engine oil

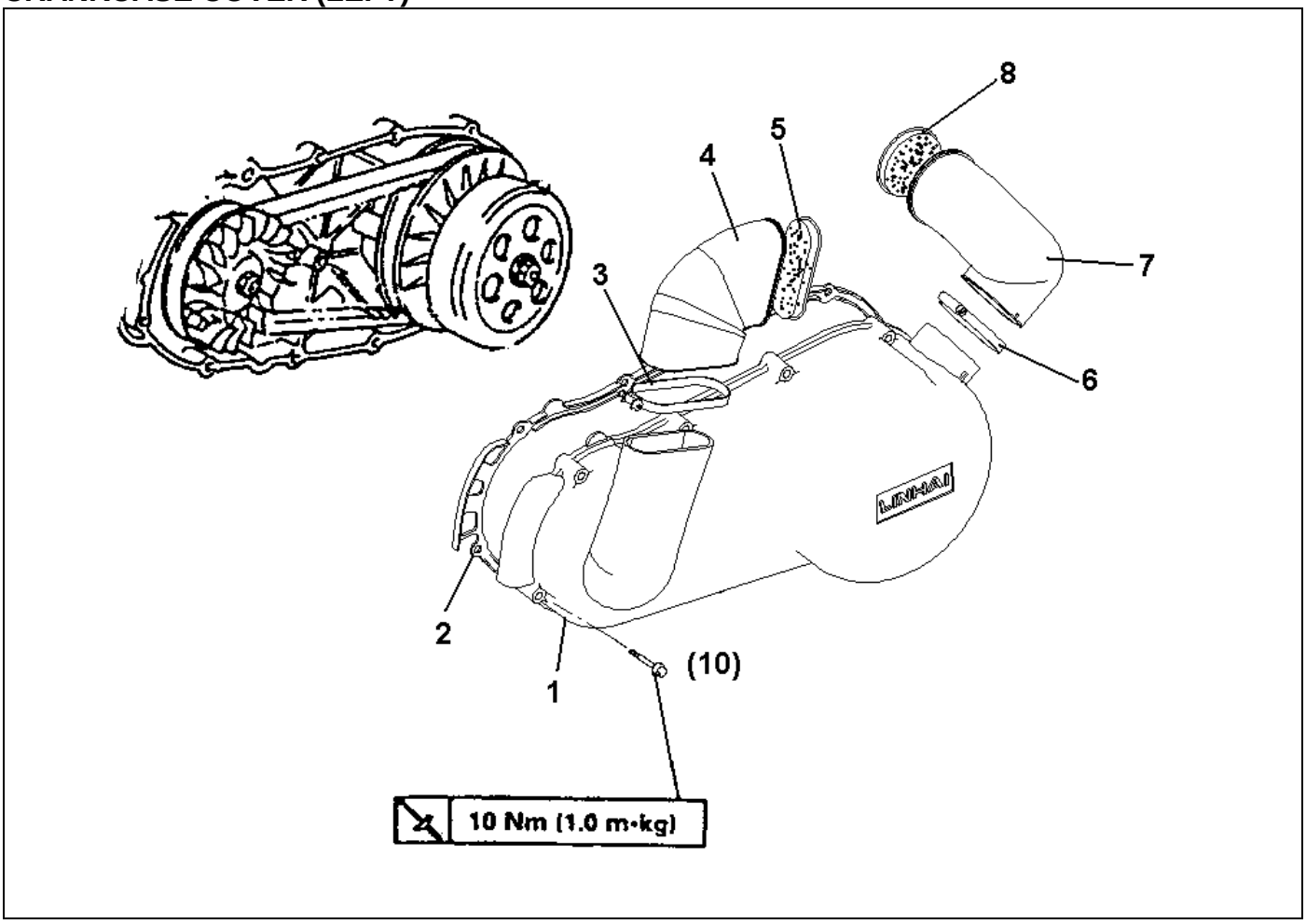
6. Install:
- Cylinder

NOTE:
- Install the cylinder with one hand while com pressing 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)

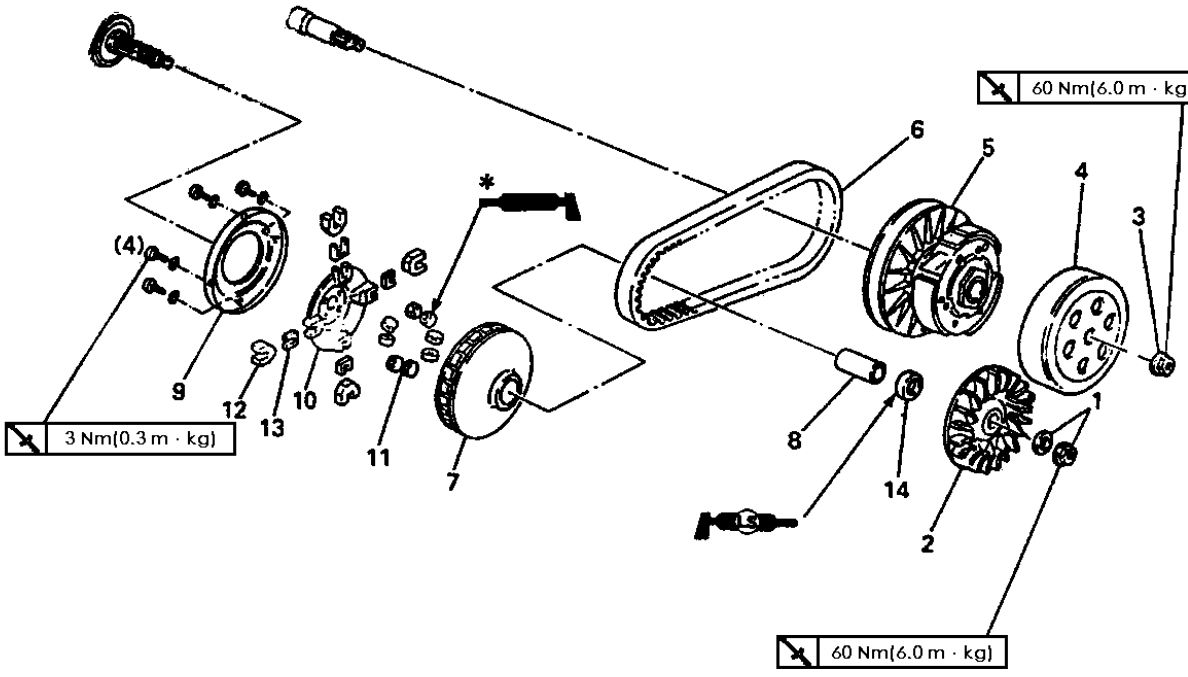


Order	Job name / Part name	Q 'ty	Remarks
	Crankcase cover (left) removal		**Remove the parts in order.**
1	Crankcase cover (left)	1	
2		1	
3	Hose clamp B	1	
4	Joint B	1	
5	Air strainer B	1	
6	Hose clamp A	1	
7	Joint A	1	

8	Air strainer A	1	Reverse the removal procedure for installation .

PRIMARY SHEAVE

*Apply molybdenum disulfide grease

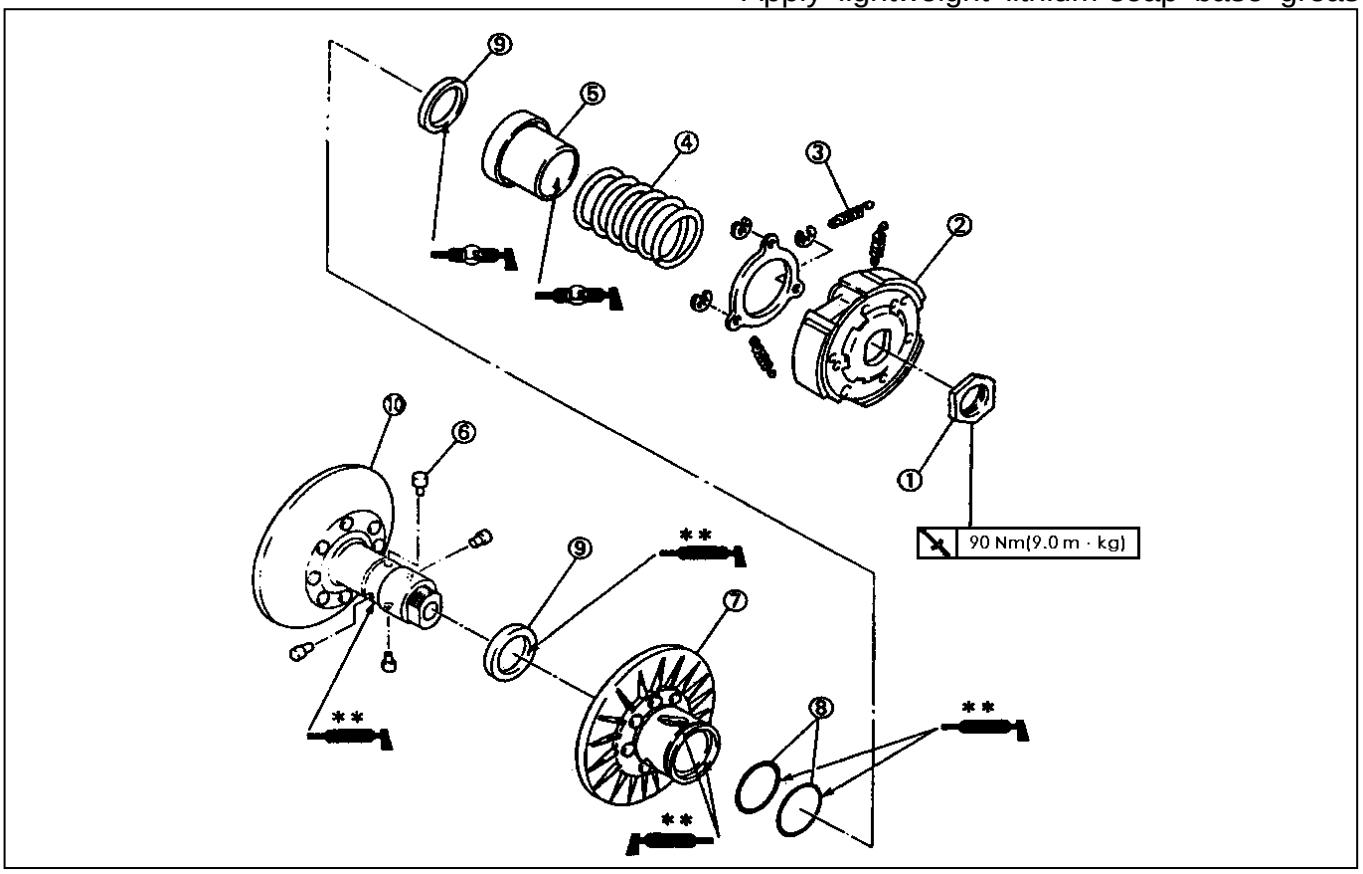


Order	Job name / Part name	Q 'ty	Remarks
	V-belt, clutch and secondary/ primary sheave removal		Remove the parts in order
1	Nut/Plain washer	1/1	Refer to "PRIMARY SHEA VE
2	Primary fixed sheave	1	REMOVAL" section.
3	Nut	1	Refer to "SECONDARY SHEAVE
4	Clutch housing	1	AND V-BELT REMOVAL"
5	Clutch assembly	1	section.
6	V-belt	1	Refer to "SECONDARY SHEAVE
7	Primary sliding sheave	1	INSTALLATION" section.
8	Collar	1	
9	Primary sheave cap	1	Refer to "PRIMARY SHEAVE

10	Cam	1	ASSEMBLY" section.
11	Weight	8	
12	Slider	4	Refer to "PRIMARY SHEAVE
13	Spacer	4	ASSEMBLY" section.
14	Oil seal	1	Reverse the removal Procedure for installation.

SECONDARY SHEAVE

**Apply lightweight lithium-soap base grease



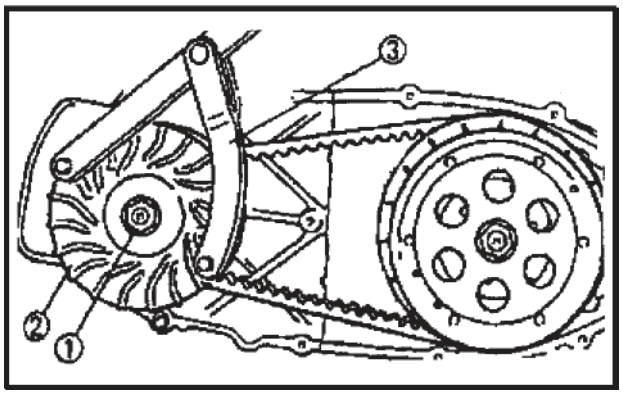
Order	Job name / Part name	Q 'ty	Remarks
	Secondary sheave disassembly		Disassemble the parts in order.
1	Nut	1	
2	Clutch carrier	1	Refer to "SECONDARY SHEAVE
3	Clutch shoe spring	3	DISASSEMBLY" section.
4	Compression spring	1	
5	Spring seat	1	Refer to "SECONDARY SHEAVE
6	Guide pin	4	INSTALLATION " section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

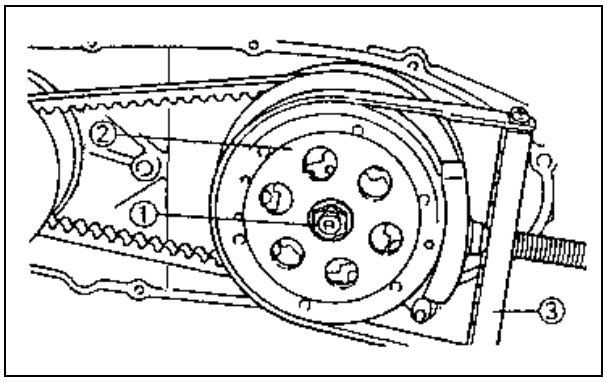
NOTE:
Loosen the nut (primary fixed sheave) while holding the primary fixed sheave with the rotor holder③.



SECONDARY SHEAVE AND V-BELT REMOVAL

1. Remove:
- ●Nut ① (secondary sheave)
- ●Clutch housing ②

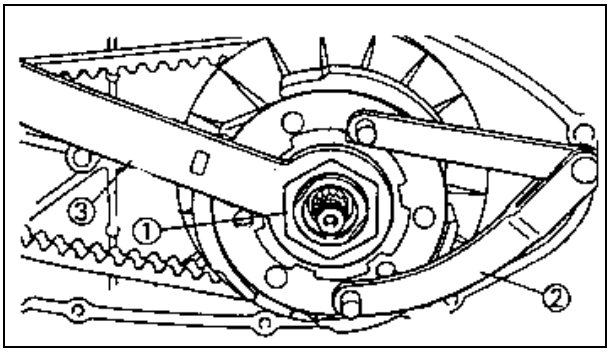
NOTE:
Loosen the nut (secondary sheave) while holding the clutch housing with the sheave holder③.



2. Remove:
- ●Nut ① (clutch carrier)

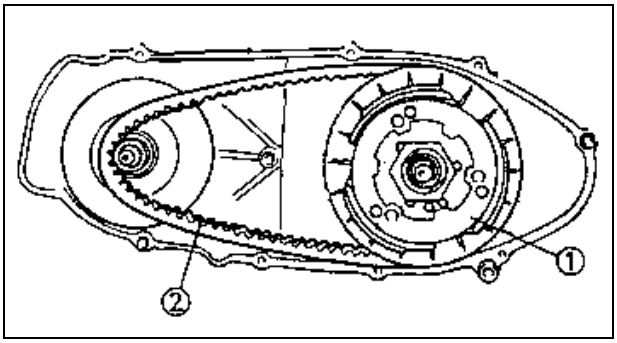
CAUTION:
Do not remove the nut (clutch carrier) yet.

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.



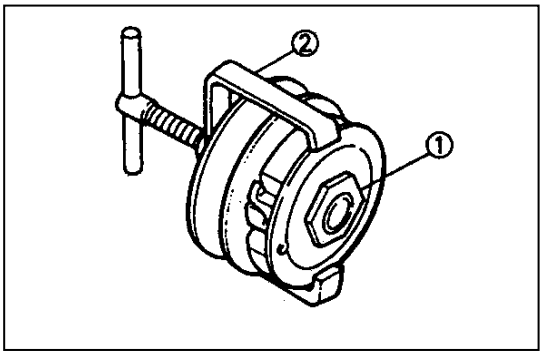
SECONDARY SHEAVE DISASSEMBLY

1. Remove:

● Nut ① (secondary sheave)

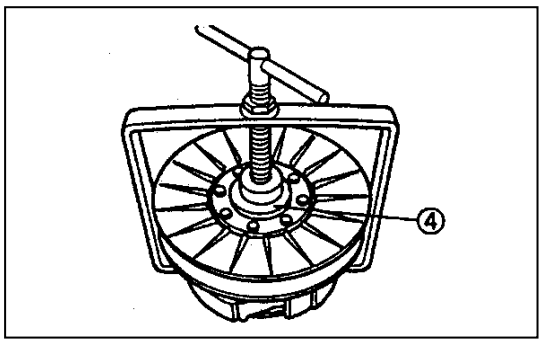
NOTE:

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: ¢ 30mm thickness: 2-3mm).



CLUTCH INSPECTION

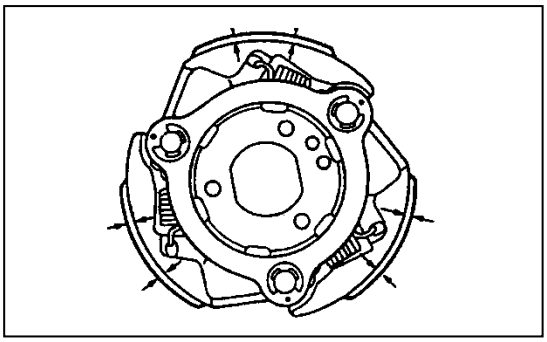
1.Measure:

●Clutch shoe thickness

Scratches → Glaze using coarse sandpaper.

Wear /Damage → Replace

Clutch shoe thickness:
3.0mm
<Limit:2.0mm>



NOTE:

●After using the sandpaper, clean off the polished particles.

●Inspect the other clutch shoes.

●Replace all three as a set.

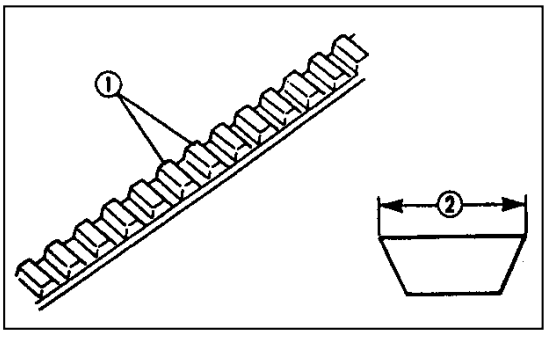
V-BELT INSPECTION

1.Inspect:

●V-belt ①

Cracks/Wear /Scaling /Chipping → Replace.

Oil/Grease → Check primary sheave and secondary sheave.



2. Measure:

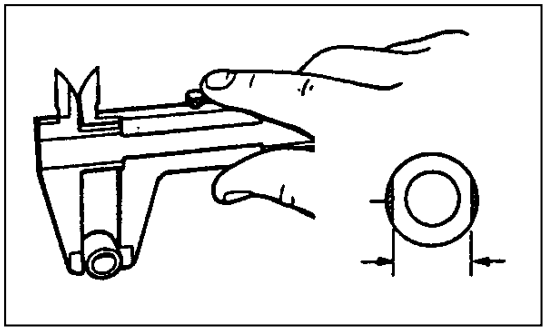
●V-belt width ②

Out of specification → Replace

V-belt width:
22.6mm
(Limit:21.0mm)

WEIGHT INSPECTION

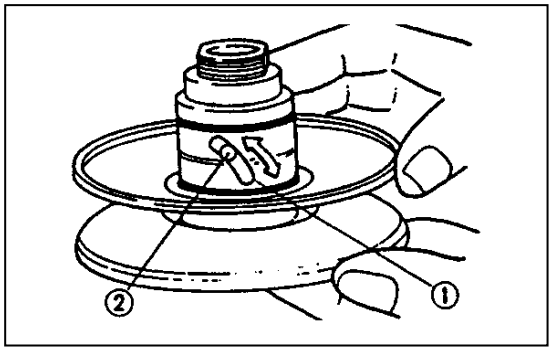
1. Inspect:
● Weight minimum outside diameter
Cracks/Wear /Scaling /Chipping → Replace.
Out of specification → Replace



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

SECOMDARY SHEAVE INSPECTION

1. Inspect:
●Secondary fixed sheave smooth operation
●Secondary sliding sheave smooth operation

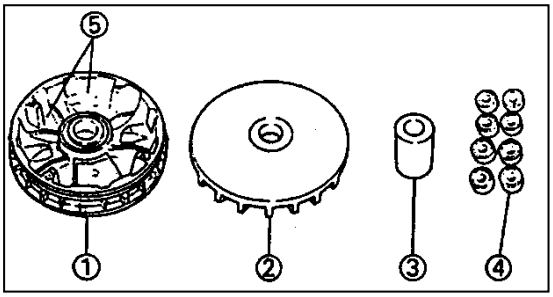


2. Inspect:
●Torque cam groove ①
Wear /Damage → Replace.

3. Inspect:
●Guide pin ②
Wear /Damage → Replace.

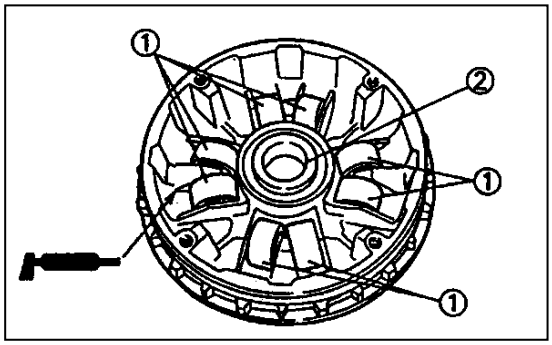
PRIMARY SHEAVE ASSEMEBLY

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



NOTE:
Remove any excess grease.

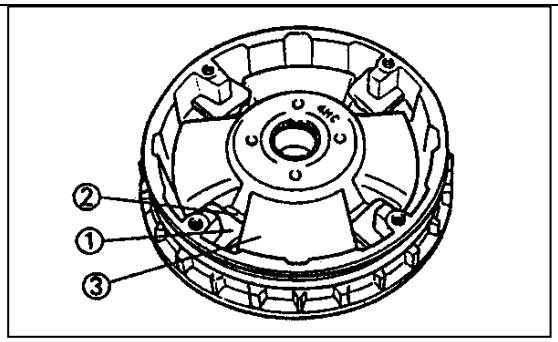
2. Install:
●Weight ①
●Collar ②



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)

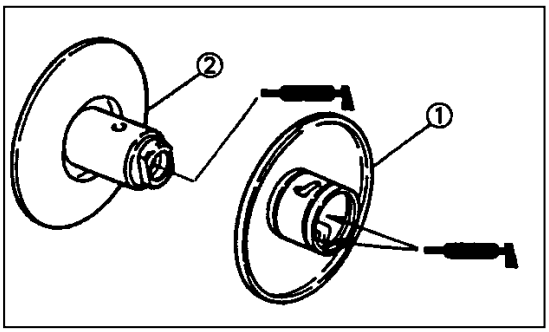


SECOMDARY SHEAVE INSTALLATION

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

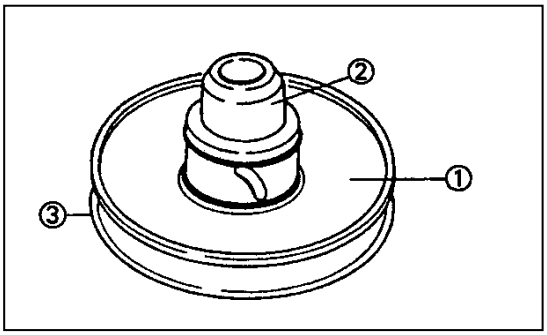
(to the bearings, oil seals and inner surface of the secondary fixed sheave ②)



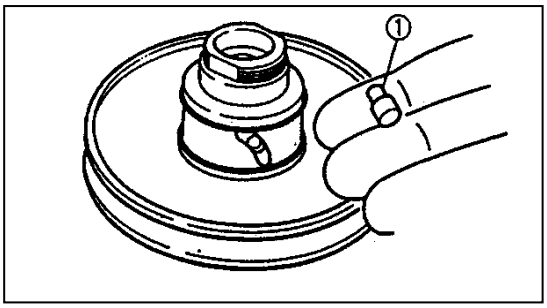
2. Install:
- Secondary sliding sheave ①

NOTE:

Install the secondary sliding sheave ①using the oil seal guide ② to the secondary fixed sheave③.

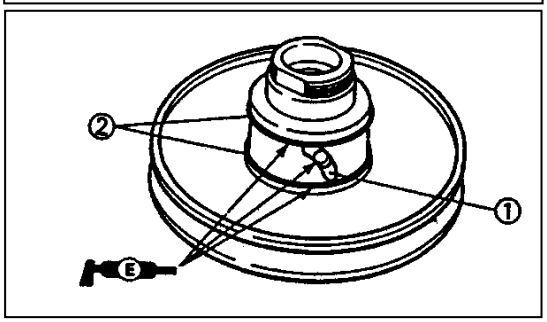


3. Install:
- Guide pin①

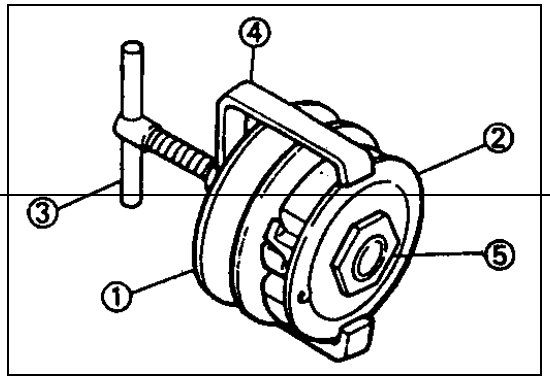


4. Apply:
- Lightweight lithium-soap base grease

(to the guide pin sliding groove ①, and oil seal ② NEW)

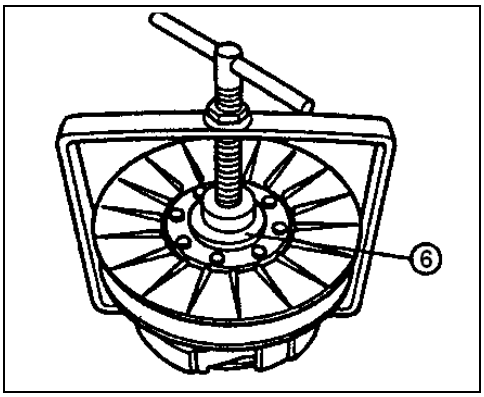


5. Install:
- Secondary sheave complete ①
- Compression spring
- Clutch carrier ②

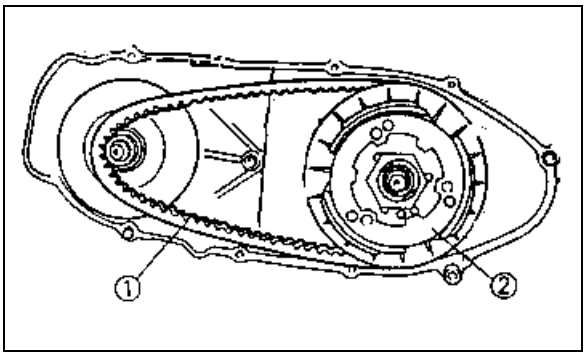


NOTE:
Temporarily tighten the nut ⑤while attaching the clutch spring holder ③ and clutch spring holder arm ④ and compress the spring.

CAUTION:
Use the spacer ⑥ (30mm, thickness: 2-3mm).



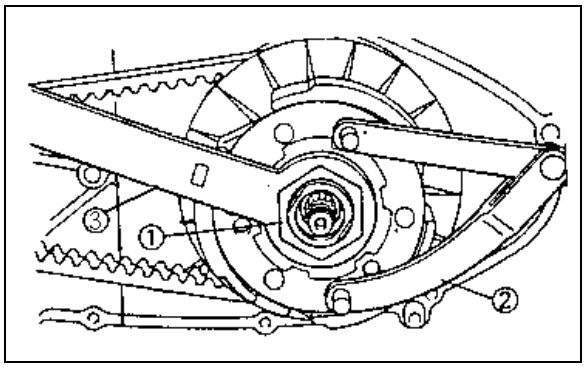
6. Install:
●V-belt ①
●Clutch assembly ②



NOTE:
Install the V-bet with clutch assembly to the primary sheave side.

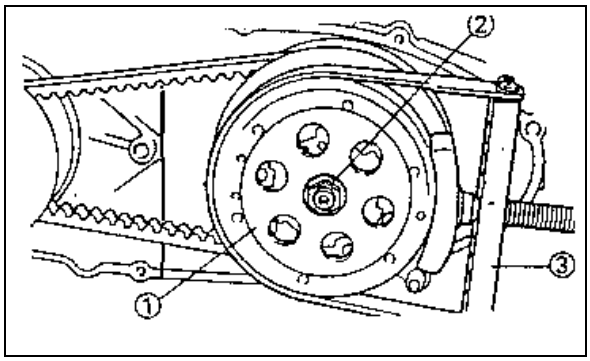
CAUTION:
Never smear grease to the V-belt, secondary sheave and clutch.

7. Install:
●Nut ① (clutch carrier)



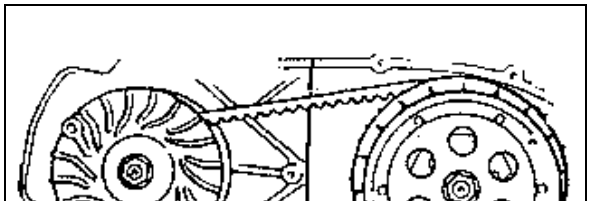
NOTE:
Tighten the nut (clutch carrier), using the locknut wrench ③ while holding the clutch carrier with the rotor holder ②

8. Install:
●Clutch housing ①
●Nut (clutch housing) ②



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

9. Set:

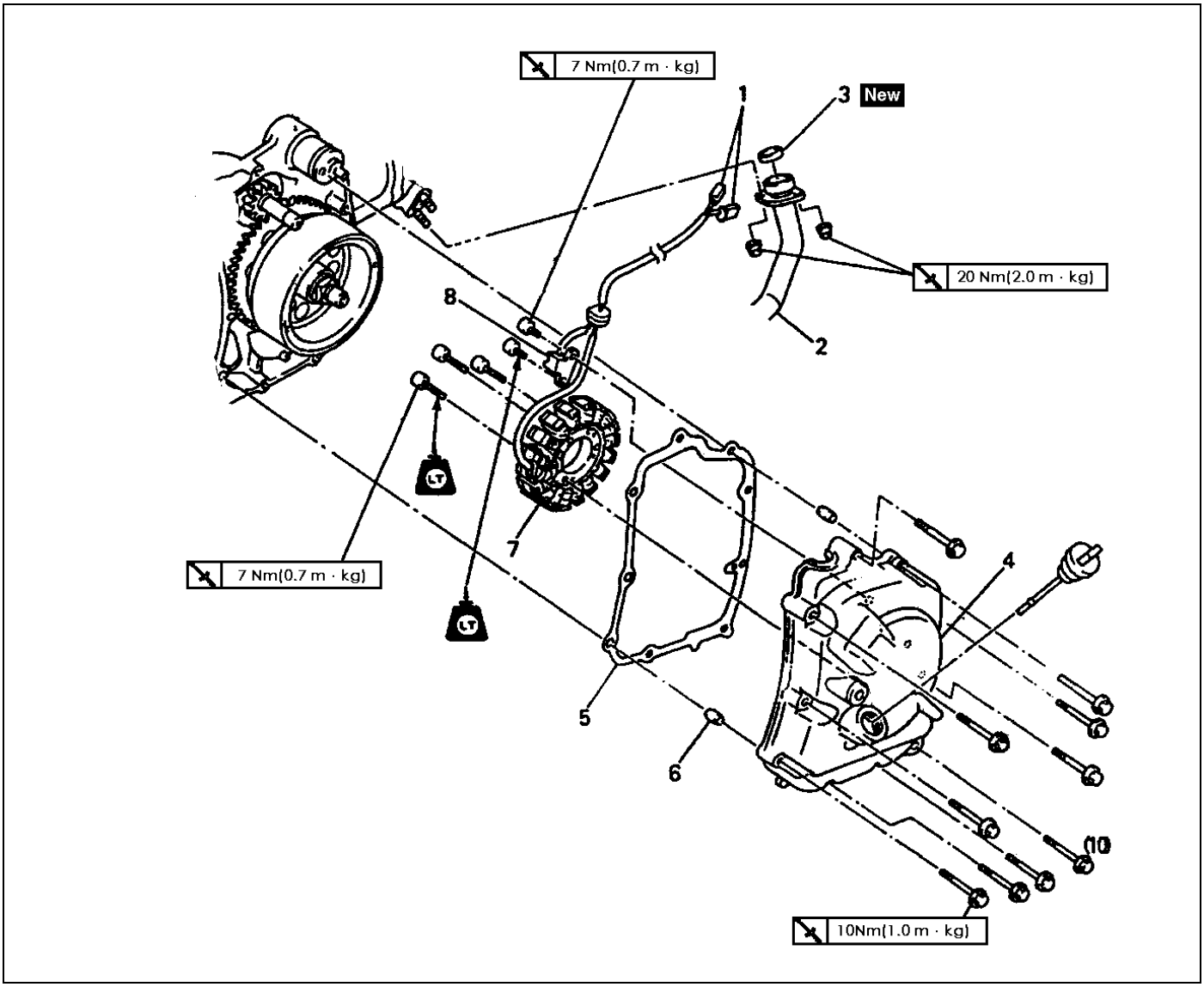


●V- belt ①

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

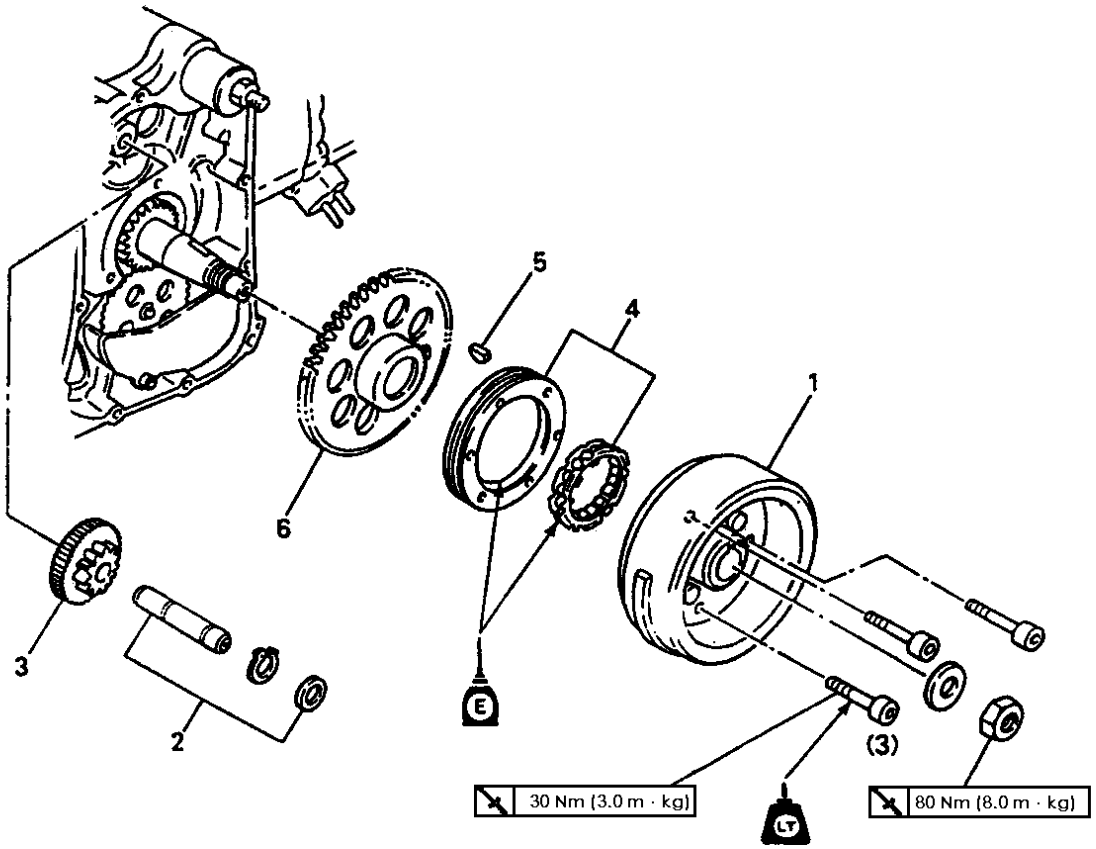
MAGNETO COVER AND STATOR COIL



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

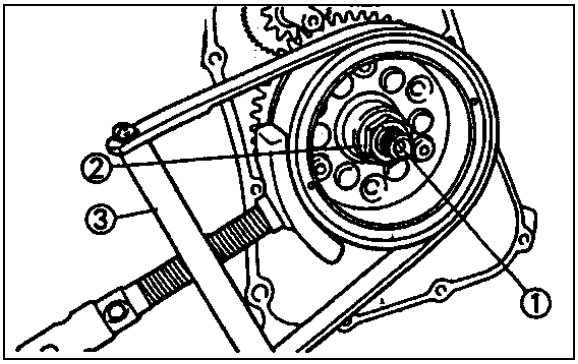


Order	Job name/ Part name	Q'ty	Remarks

	A.C. magneto and starter clutch removal		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	Refer to "ROTOR INSTALLATION" section.
6	Starter wheel gear	1	
			Reverse the removal procedure for installation.

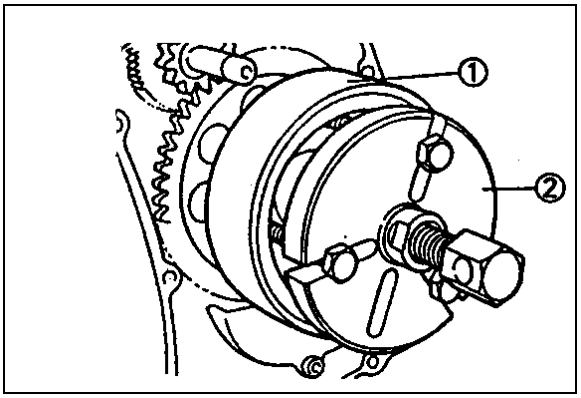
A.C. MAGNETO ROTOR REMOVAL

1. Remove:
- Nut ① (rotor)
- Plain 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.

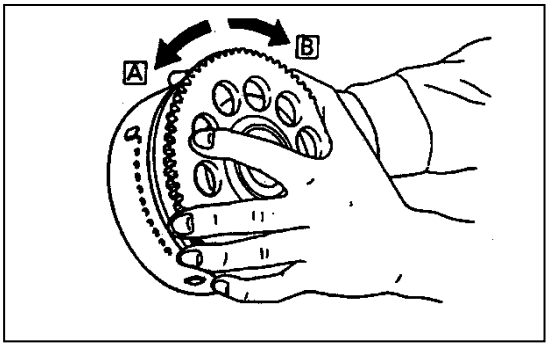
Make sure after installing the holding bolts that the clearance between the flywheel puller and the rotor is the same everywhere. If necessary, one holding bolt may be turned out slightly to adjust the flywheel puller's position.

CAUTION:
Cover the crankshaft end with the box wrench for protection.

STARTER DRIVE GEAR INSPECTION

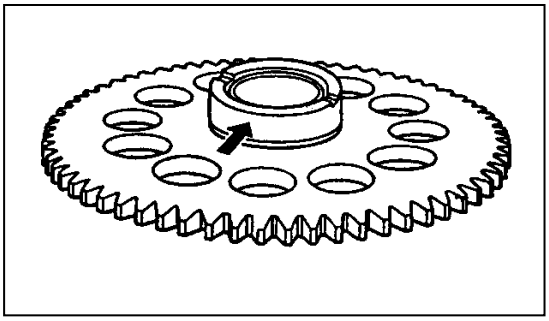
1. Inspect:
- Starter idle gear teeth
- Starter drive gear teeth
- Starter wheel gear teeth

Burrs /chips /roughness /wear → Replace.



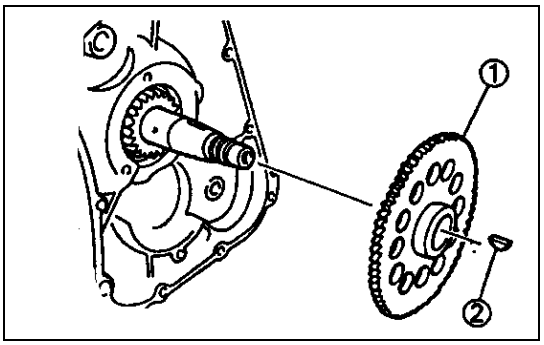
2. Check:
●Starter clutch operation
Push the dowel pins to the arrow direction.
Unsmooth operation → Replace.

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.



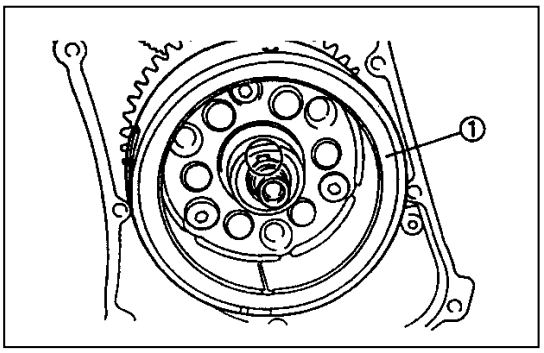
A.C. MAGNETO ROTOR INSTALLATION
1. Install:
●Starter wheel gear ①.
●Woodruff key ②

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



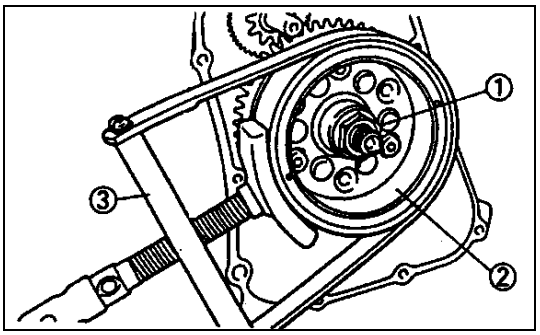
2. Install:
●Plain washer
●Rotor ①

NOTE:
●Clean the tapered portion of the crankshaft and the rotor hub.
●When installing the magneto rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.

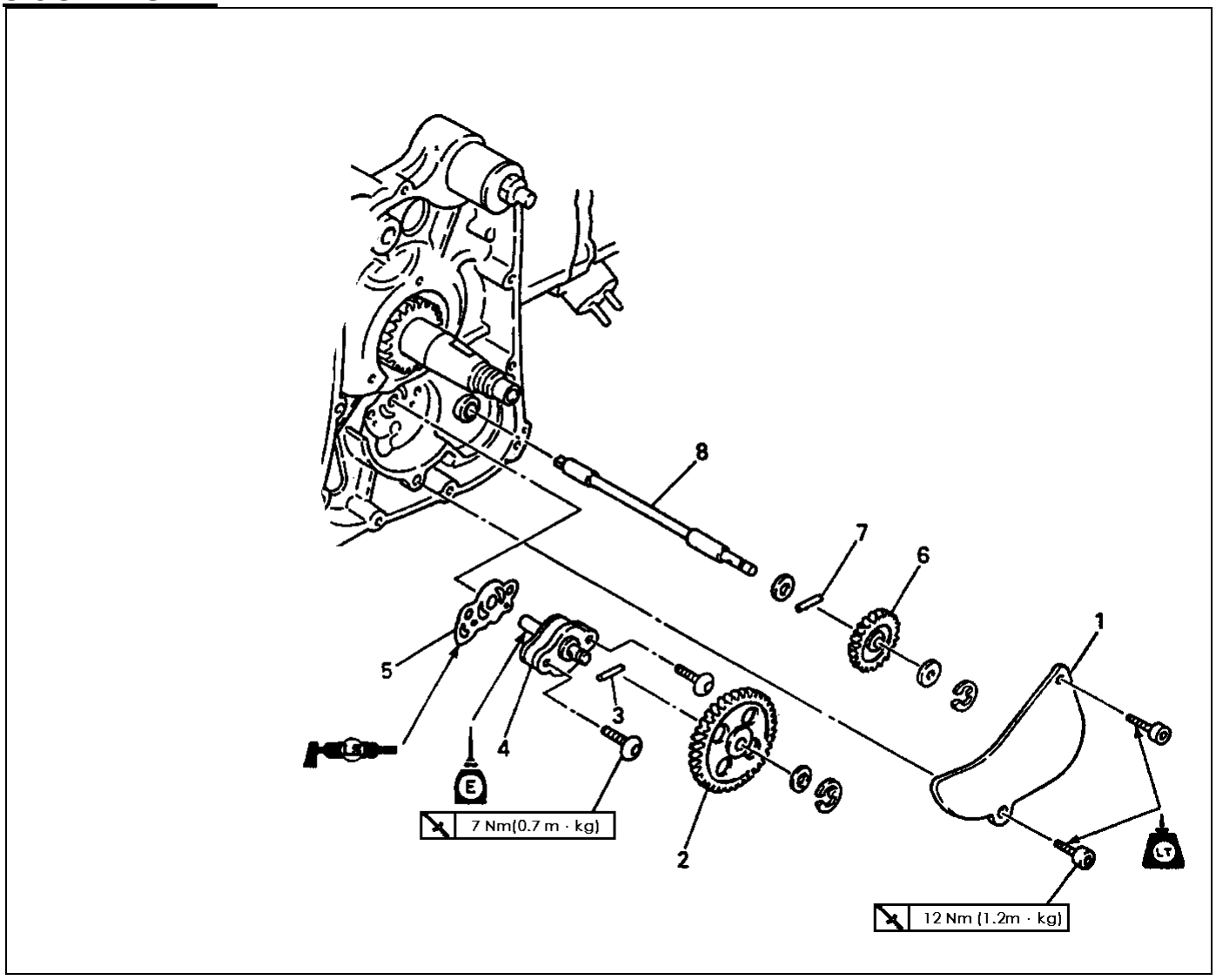


3.Tighten:
●Nut(rotor)① 80Nm(8.0m·kg)

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



3.9OIL PUMP



Order	Job name/ Part name	Q'ty	Remarks

	Oil pump removal		Remove the parts in order.
	A.C. magneto		Refer to "A.C. MAGNETO AND STARTER
1	Cover	1	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.

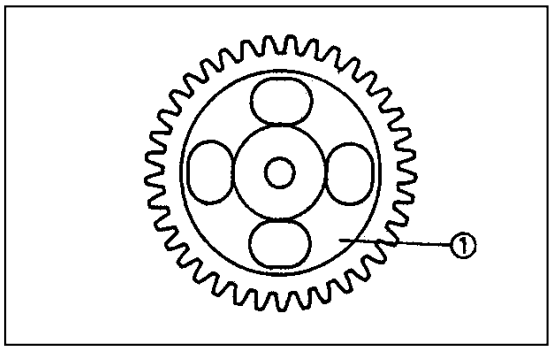
2. Measure:
- ● Tip clearance

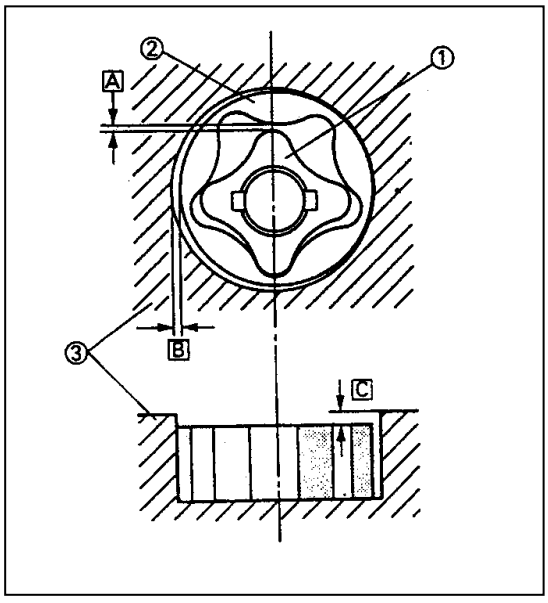
(between the inner rotor ① and the outer rotor②)
- ●Side clearance

(between the outer rotor ② and the pump housing ③)
- ●Housing and rotor clearance

(between the pump housing ③ and the rotors ① ②)

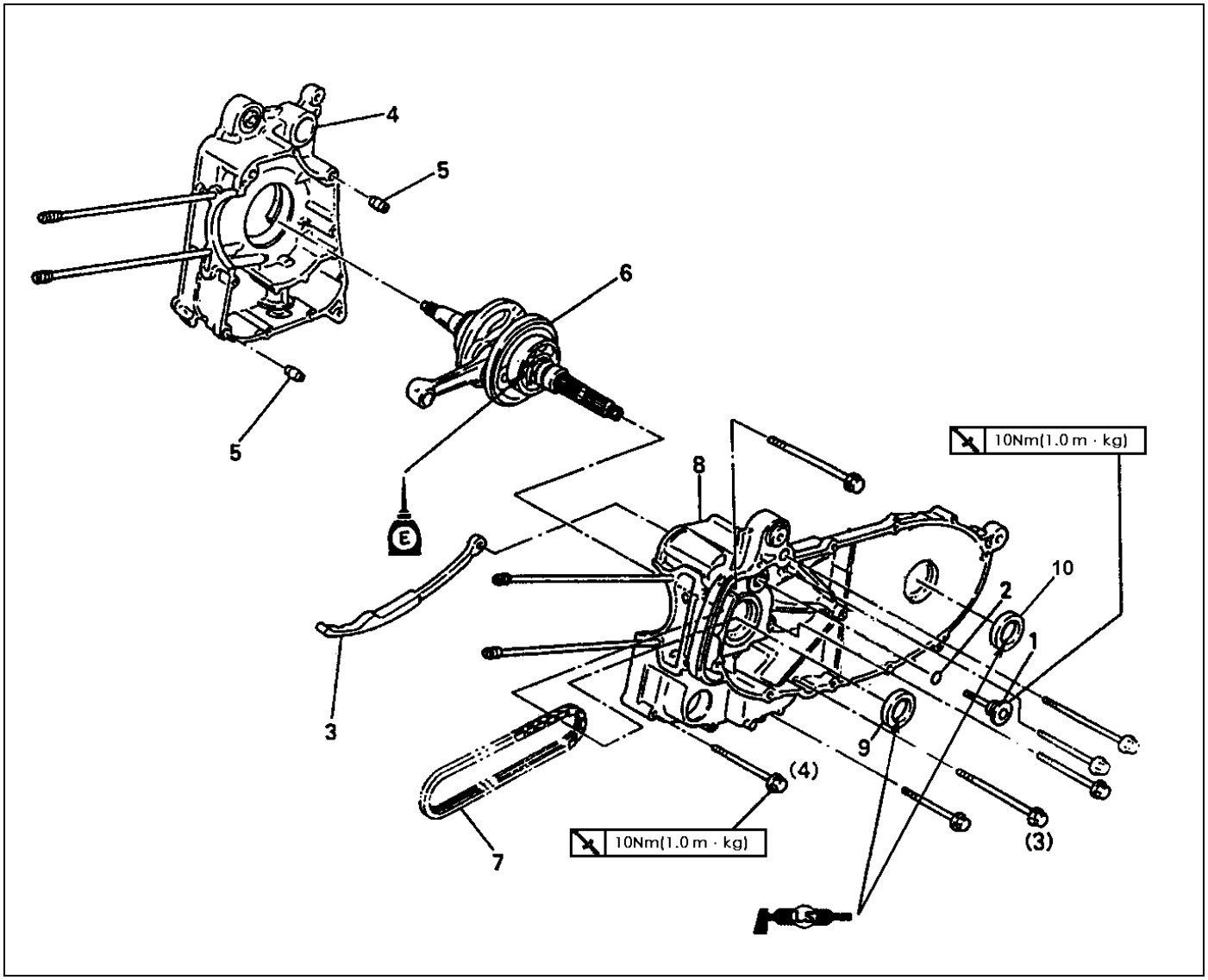
Out of specification → Replace the oil pump assembly.



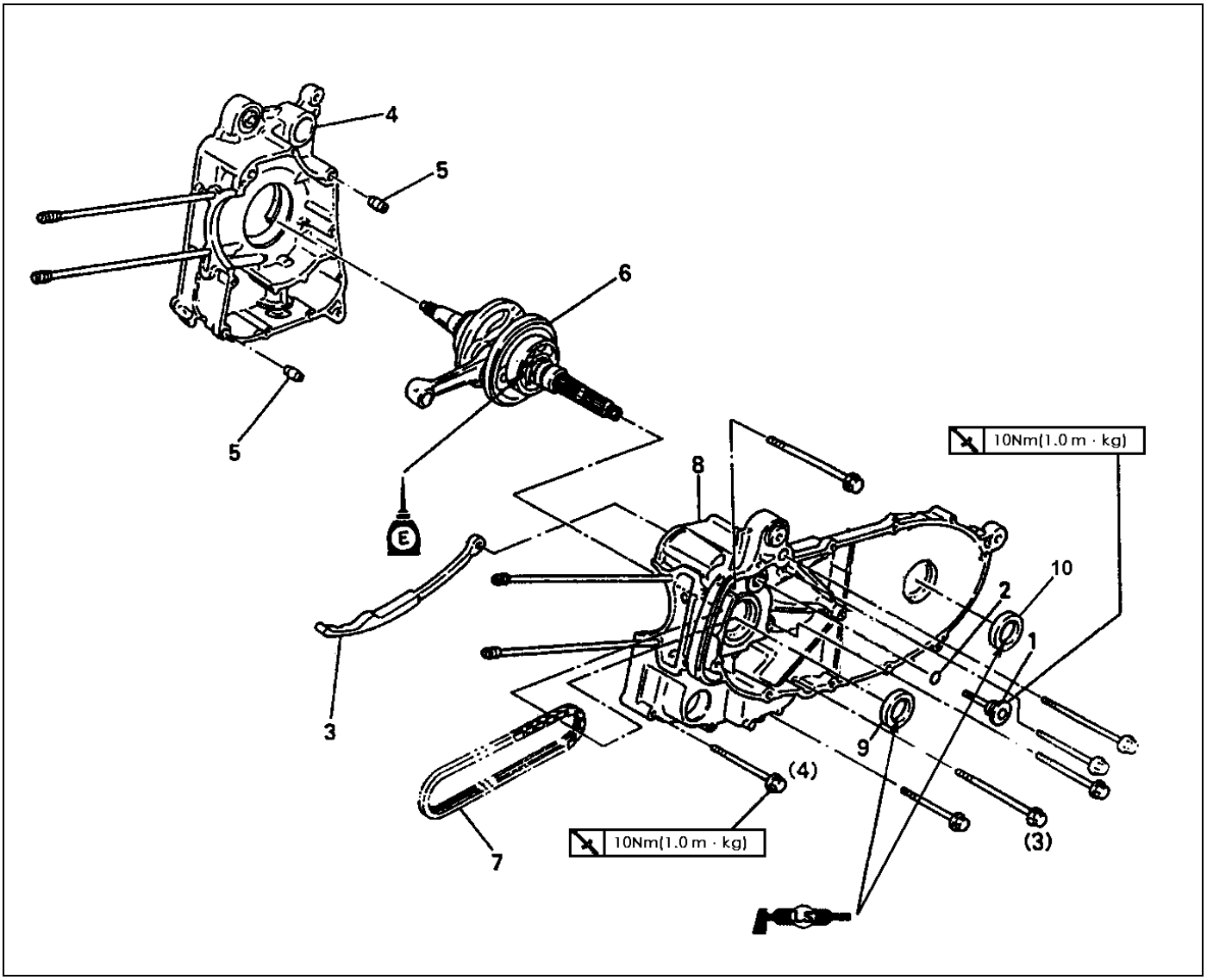


Tip clearance A:
0.10-0.34 mm <Limit: 0.40mm>
Side clearance B:
0.013-0.036mm <Limit:0.15mm>
Housing and rotor clearance C:
0.04-0.09 mm <Limit: 0.15mm>

3.10CRANKCASE AND CRANKSHAFT



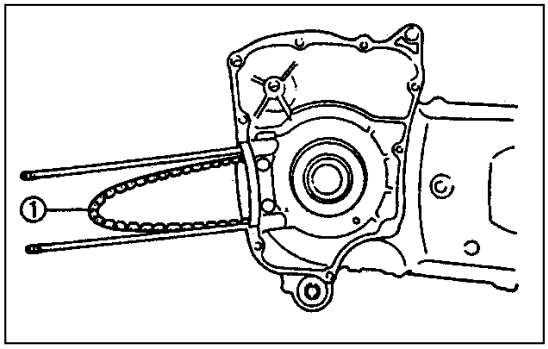
Order	Job name/ Part name	Q'ty	Remarks
	Crankcase and crankshaft removal		Remove the parts in the order.
	Engine removal		Refer to "ENGINE REMOVAL" section.
	Cylinder head		Refer to "CYLINDER HEAD" section.
	Cylinder, and piston		Refer to "CYLINDER AND PISTION" section.
	V-belt, clutch, secondary/ primary 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	
6	Crankshaft assembly	1	Refer to "CRANKSHAFT REMOVAL/ INSTALLATION" section.
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:

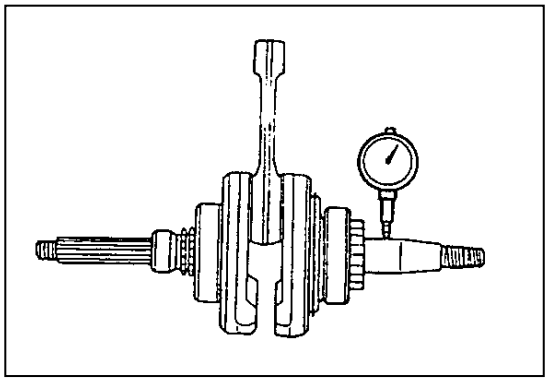
●Before removing the crankshaft assembly, remove the timing chain from the crankshaft sprocket.

●If the timing chain hooks to the crankshaft sprocket, the crankshaft cannot be removed.

CRANKSHAFT INSPECTION

1. Measure:
- ●Crankshaft runout

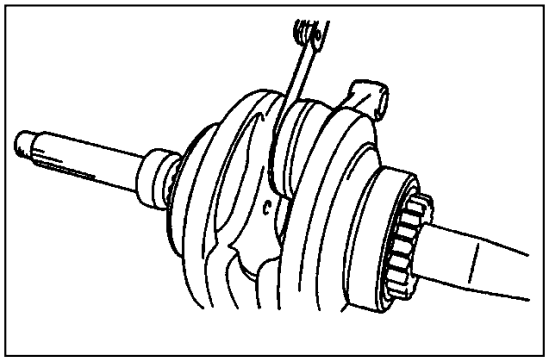
Out of specification → Replace crankshaft and/or bearing.



NOTE:

Measure the crankshaft runout with the crankshaft assembly running slowly.

	Runout limit: 0.03 mm



2. Measure:
- ●Big end side clearance

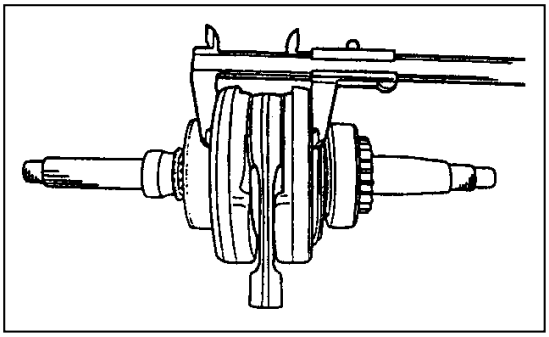
Out of specification → Replace big end bearing, crank pin and/or connecting rod.

	Big end side clearance:

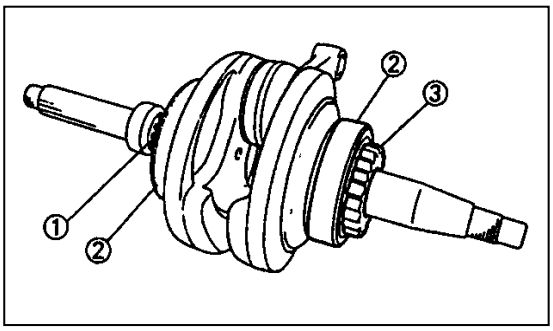
	0.35-0.85 mm

3. Measure:
●Crank width
Out of specification → Replace crankshaft.

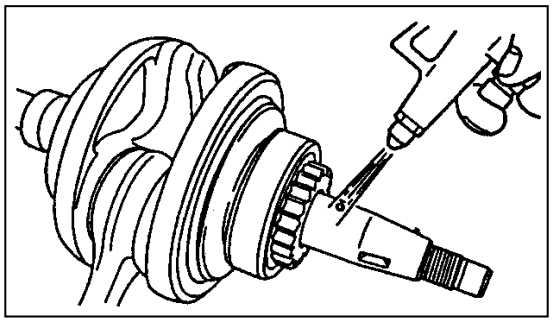
	Crank width: 59.95-60.00 mm



4. Inspect:
●Crankshaft sprocket ①
Wear/ Damage → Replace crankshaft.
●Bearing ②
Wear/ Crack /Damage → Replace crankshaft.
●Pump drive gear ③
Wear/ Damage → Replace crankshaft.

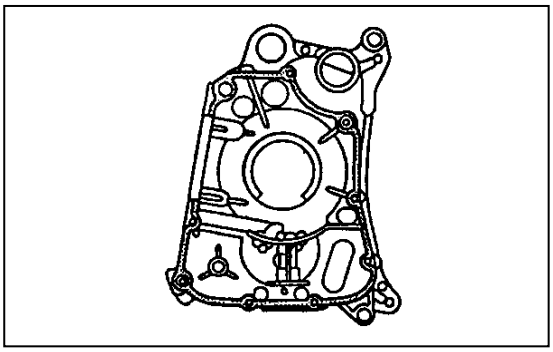


5. Inspect:
●Crankshaft journal
Clogged → Blow out the journal with compressed air.

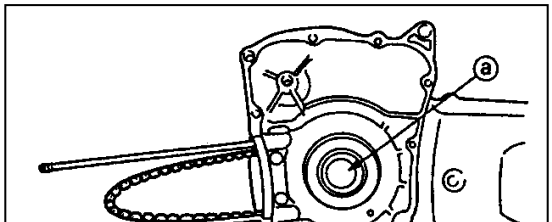


CRANKCASE INSTALLATION
1. Clean all the gasket mating surface and crankcase mating surface thoroughly.
2. Apply:
●Sealant
(onto the crankcase mating surfaces)

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



3. Install:

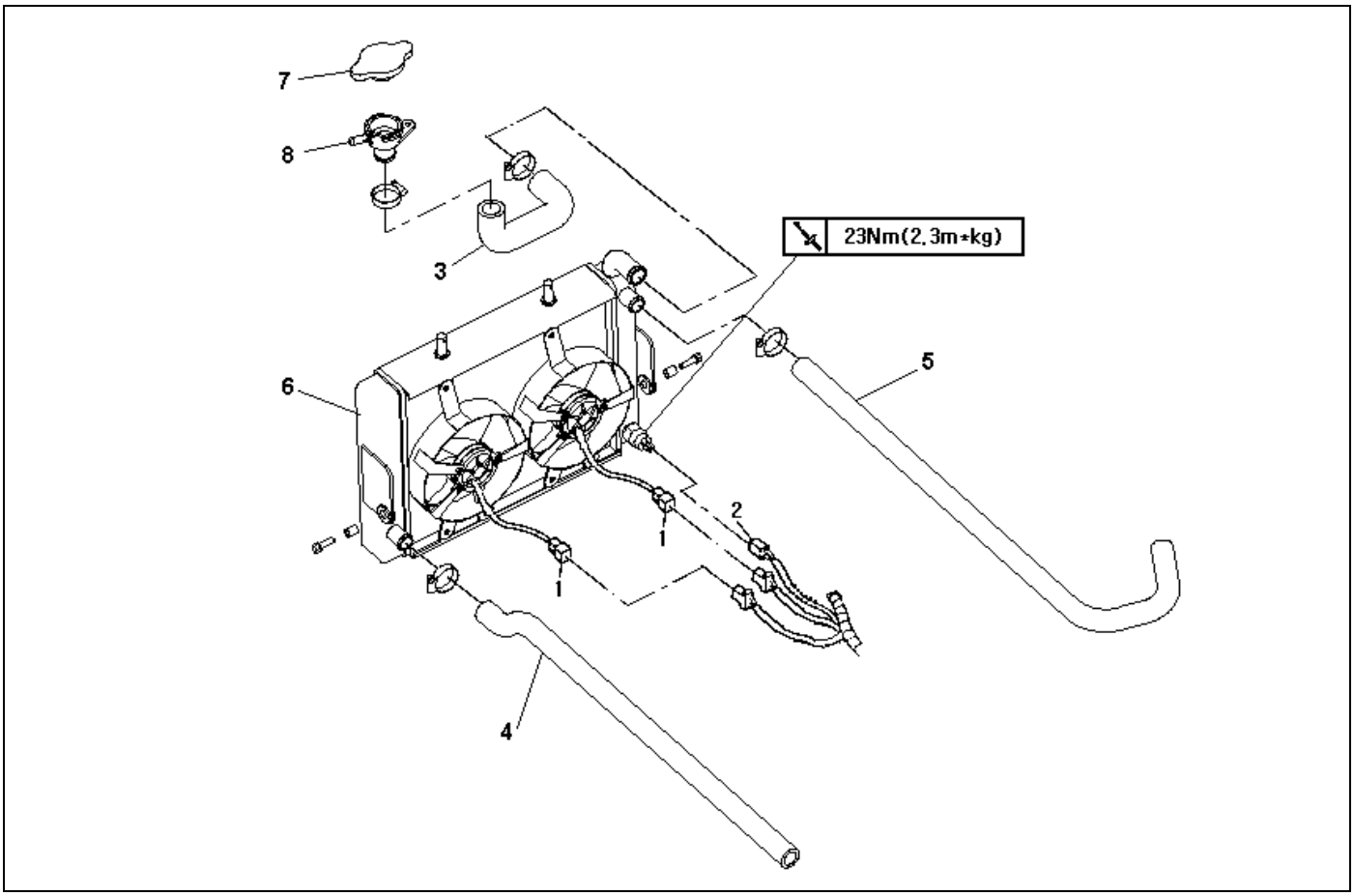


●Dowel pins
●Timing chain ①

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

3.11COOLING SYSTEM

3.11.1RADIATOR

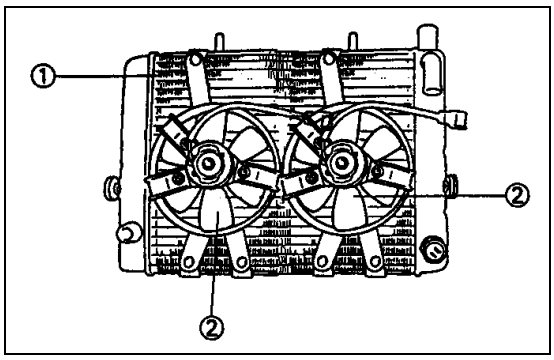


Order	Job name/ Part name	Q'ty	Remarks

	Radiator removal 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.



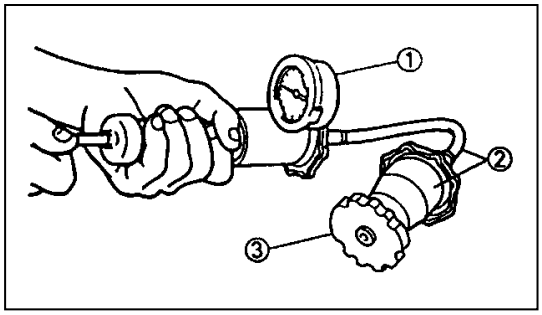
CAUTION:
Use only specified adhesive to repair the radiator.

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.

Radiator cap opening pressure: 110-140kPa (1.1-1.4kg/cm^2, 1.1-1.4 bar)

Measurement steps:
●Attach the radiator cap tester ①and adapter ② to the radiator cap ③.
●Apply the specified pressure for 10 seconds,

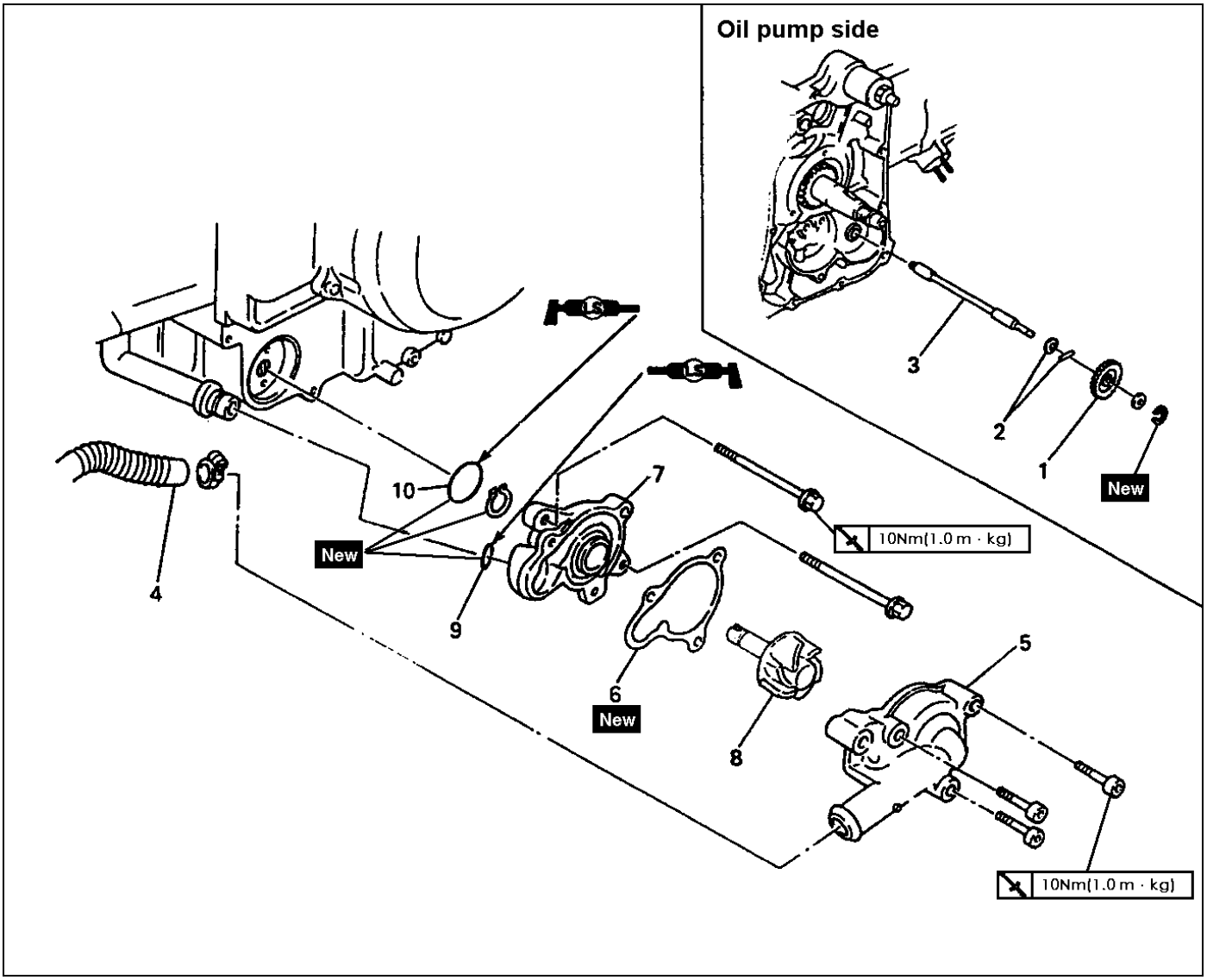


and make sure there is no pressure drop.

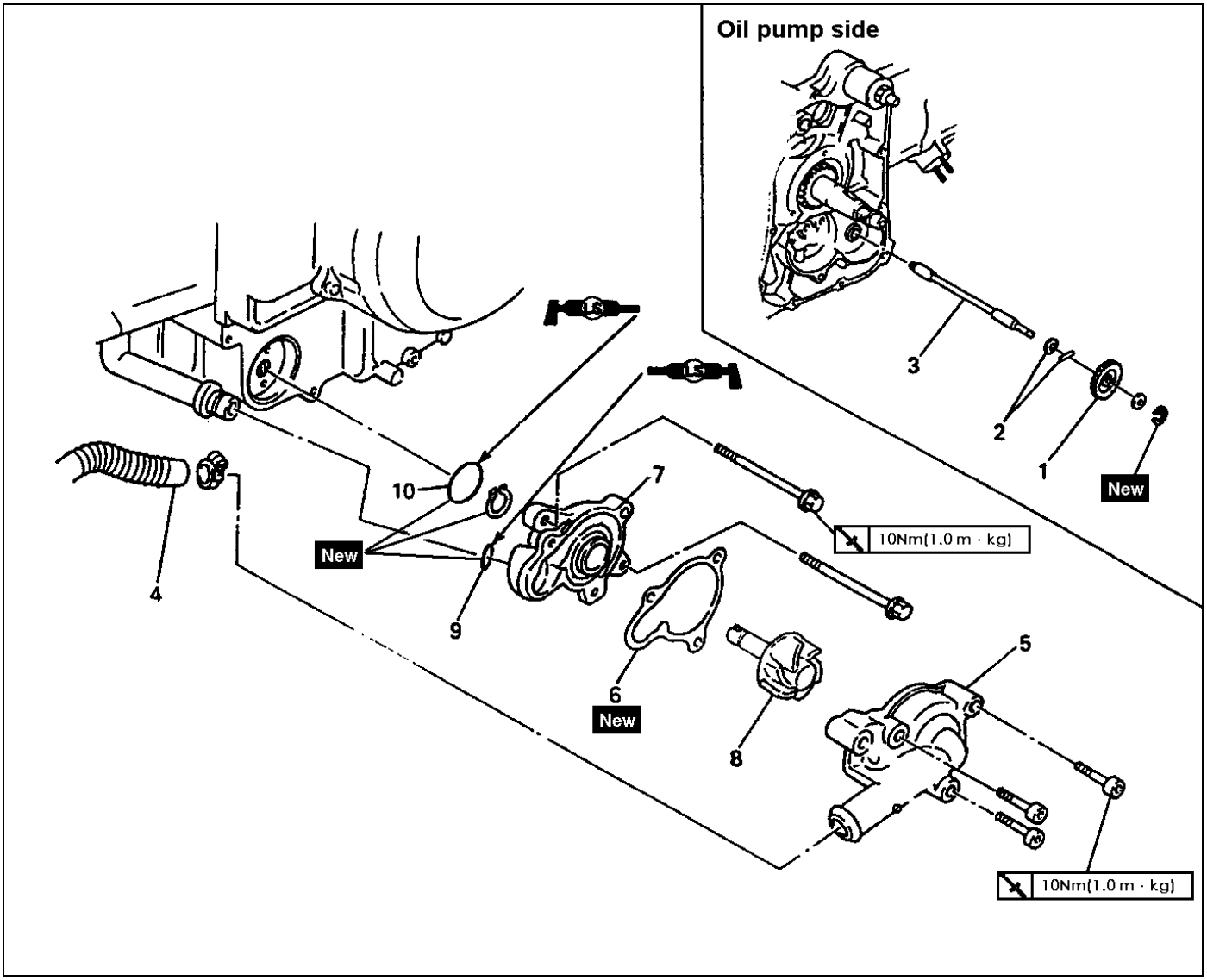
4. Inspect:
●Fan motor assembly
Damage → Replace.
Malfunction → Check and repair.
Refer to "COOLING SYSTEM ".

5. Inspect:
●Pipes
Cracks/damage → Replace.

3.11.2WATER PUMP

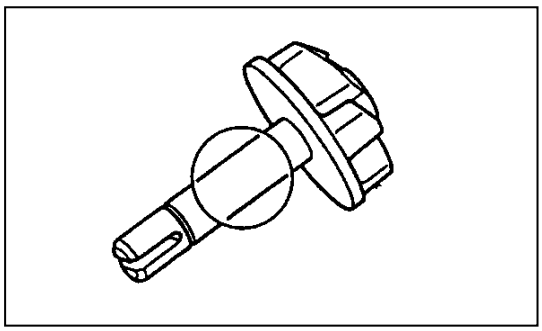


Order	Job name/ Part name	Q'ty	Remarks
	Water pump removal Drain the coolant.		Remove the parts in order. Refer to "COOLANT REPLACEMENT" section.
	A.C. magneto		Refer to "A.C. MAGNETO AND STARTER CLUTCH" section.
1	Impeller shaft gear	1	
2	Dowel pin/plain washer	1/1	
3	Shaft	1	Refer to "WATER PUMP INSTALLATION"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

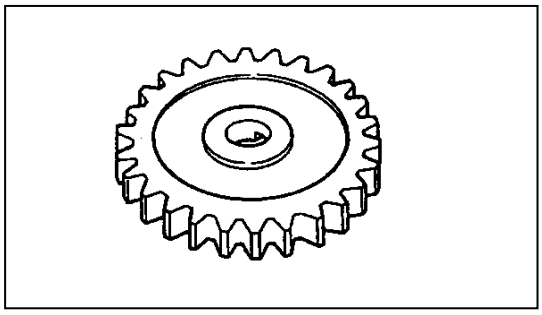


Order	Job name/Part name	Q'ty	Remarks
8	Impeller shaft	1	Refer to "WATER PUMPINSTALLATION" section.
9	O-ring	1	
10	O-ring	1	
			Reverse the removal procedure for installation.

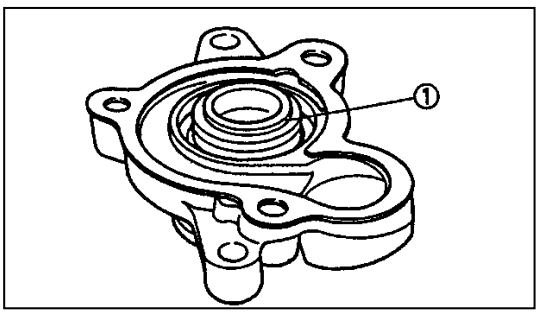
NOTE:
●It is not necessary to disassemble the water pump, unless there is an abnormality such as excessive change in coolant temperature and/ or level, discoloration of coolant, or milky transmission oil.
●If necessary, replace water pump as an assembly.



INSPECTION
1. Inspect:
●Impeller shaft
Wear/damage → Replace.
Fur deposits → Clean.



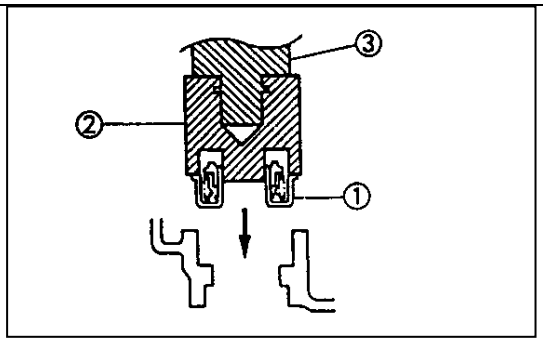
2. Inspect:
●Impeller shaft gear
Wear/damage → Replace.



3. Inspect:
●Mechanical seal ①
Damage/worn/wear → Replace.

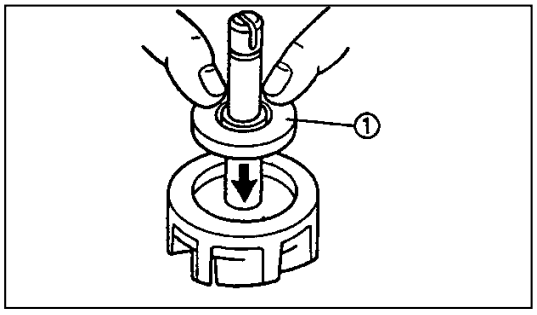
WATER PUMP INSTALLATION

1. Install:
●Mechanical seal ① NEW



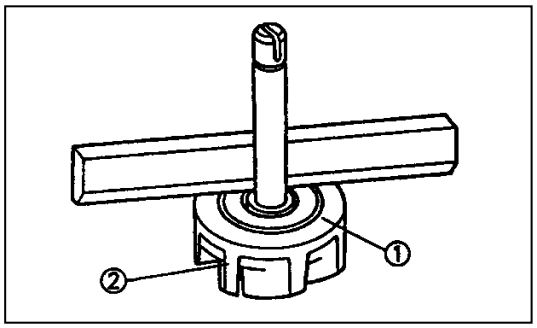
Installation steps:
●Apply the bond to the outside of the mechanical seal.
●Install the mechanical seal by using the mechanical seal installer ② and middle shaft bearing driver ③

2. Install:
●Mechanical seal ① NEW
Apply coolant to the outside of the mechanical seal before installing.

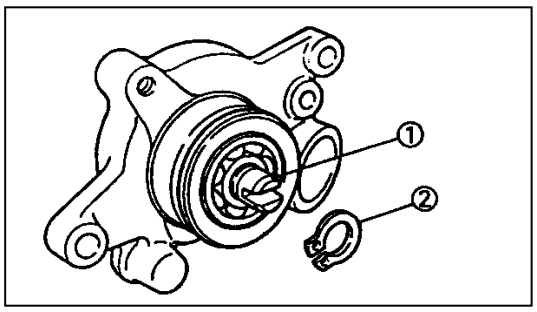


NOTE:
Do not smear any oils or grease on the ring side of the mechanical seal.

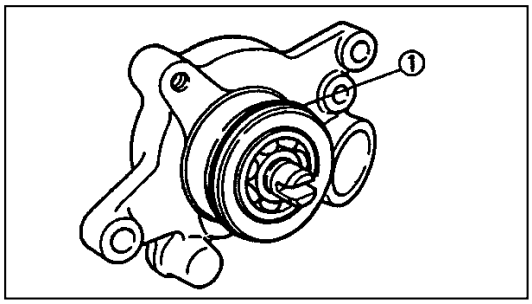
3. Inspect:
●Mechanical sea , slip ring side ①
Inspect the slip ring side of the mechanical seal and the impeller ② for level installation.
Incorrect level → Reinstall.



4. Install:
●Impeller shaft①
●Circ lip ② NEW



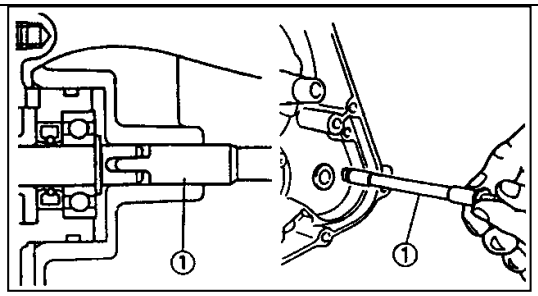
Installation steps:
●Apply a small amount of grease to the impeller shaft tip.
●Install the impeller shaft while turning it. Use care so that the oil seal is not damaged or the spring does not slip off its position.
NOTE:
After installing the impeller shaft, check it for smooth rotation.



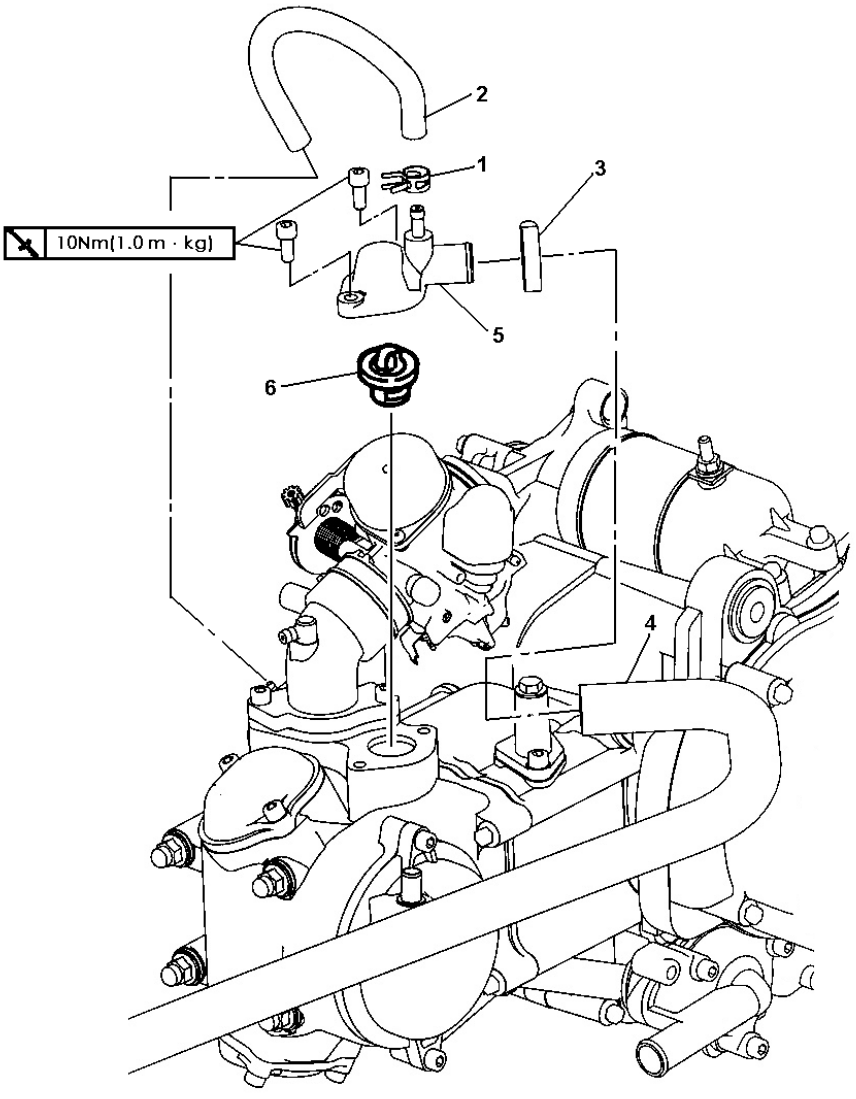
5.Install:
●O-ring①NEW

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.



3.11.3THERMOSTAT



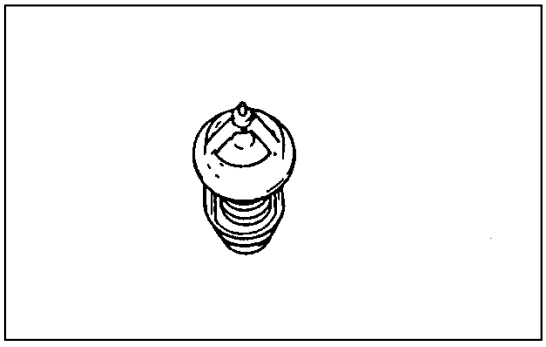
Order	Job name/ Part name	Q'ty	Remarks
	Thermostat removal Drain the coolant		Remove the parts in order. Refer to "COOLANT REPLACEMENT" section.
1	Clip	1	
2	Hose	1	
3	Hose clamp	1	
4	Inlet hose (radiator)	1	
5	Thermostatic cover	1	Refer to "THERMOSTAT INSTALLATION" section.
6	Thermostatic valve	1	Reverse the removal procedure for installation.

INSTALLATION

1. Inspect:

●Thermostatic valve

Valve does not open at 70-74℃→Replace.

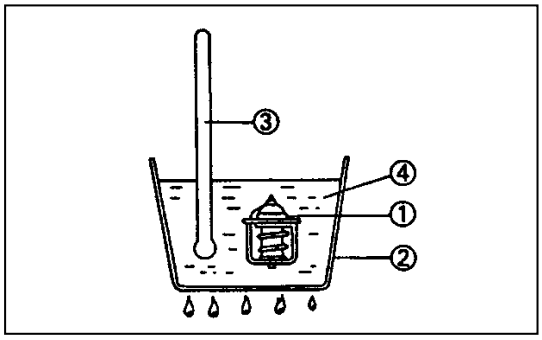


Inspection steps:

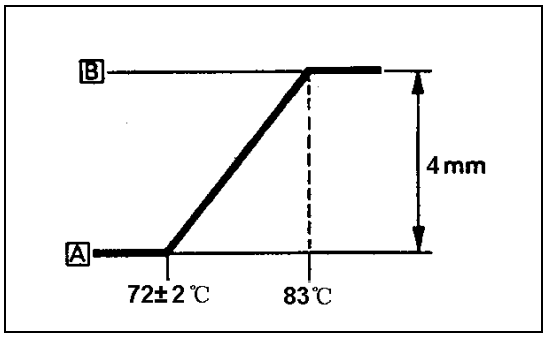
●Suspend the thermostatic valve in a vessel.

●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

3.12CARBURETOR

1. Remove:
●Fuel hose

2. Remove:
●Manual enriching starter rope①

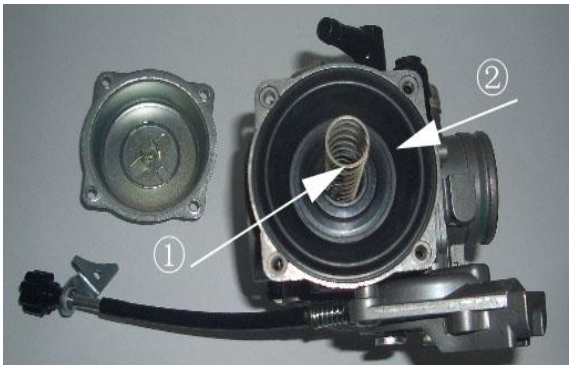
3. Remove:
●Nut②
●Throttle cable

4.Lossen:
●Bolt③
●Bolt④

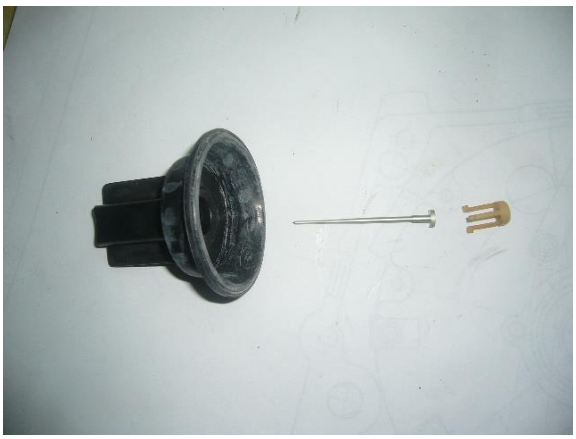
5. Remove:
●Carburetor assy

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.

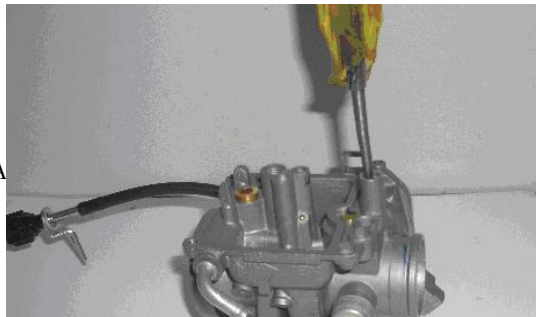
11.Remove:
●Idling jet

12.Remove:
●Pilot jet

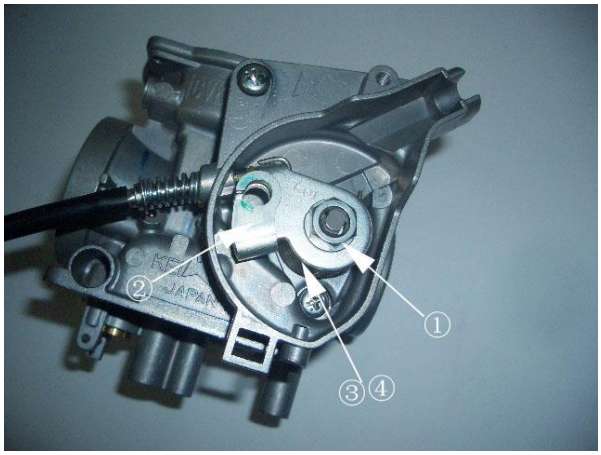
13.Remove:
●Main jet

14.Remove:
●Main nozzle

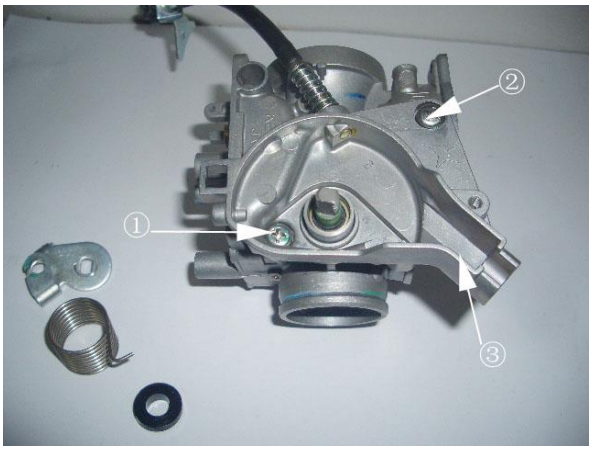
15.Remove
●Mixture adjusting screw



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.

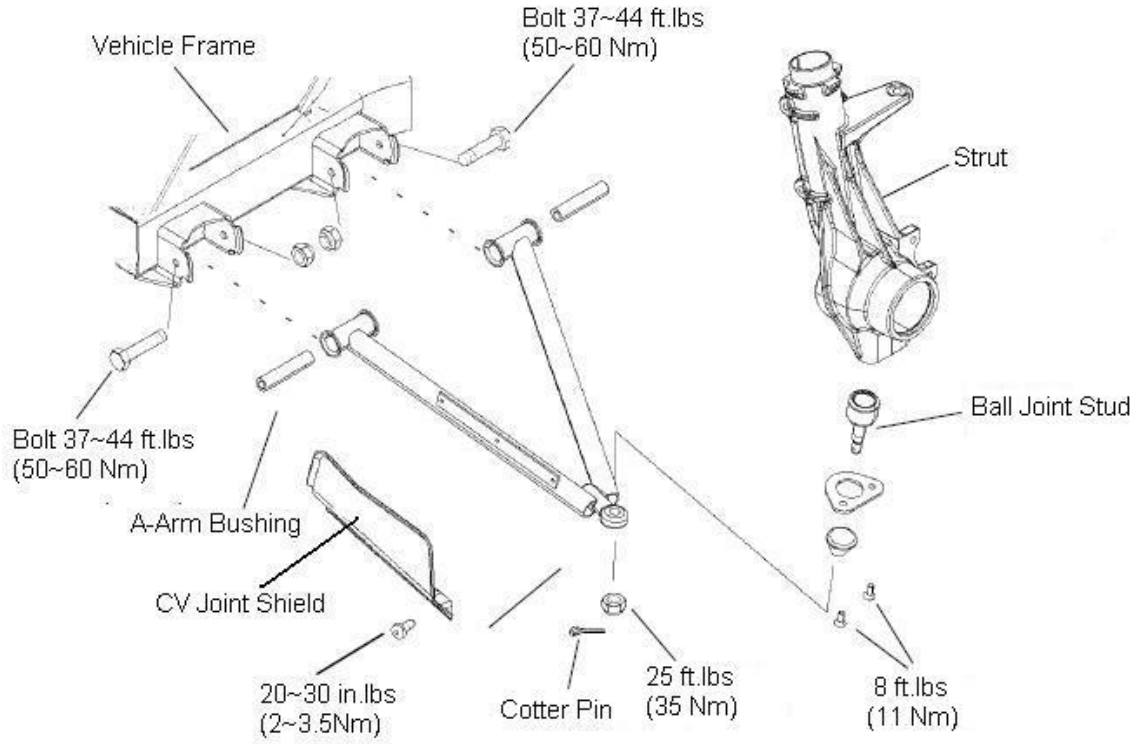
NOTES

CHAPTER 4 CHASSIS

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 CUV model for spare parts information and service.

4.1 FRONT A-ARM REPLACEMENT



1. Elevate and safely support vehicle with weight removed from front wheel(s).
2. Remove cotter pin from ball joint stud at wheel end of A- arm and loosen nut until it is flush with end of stud.
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 A-arm 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

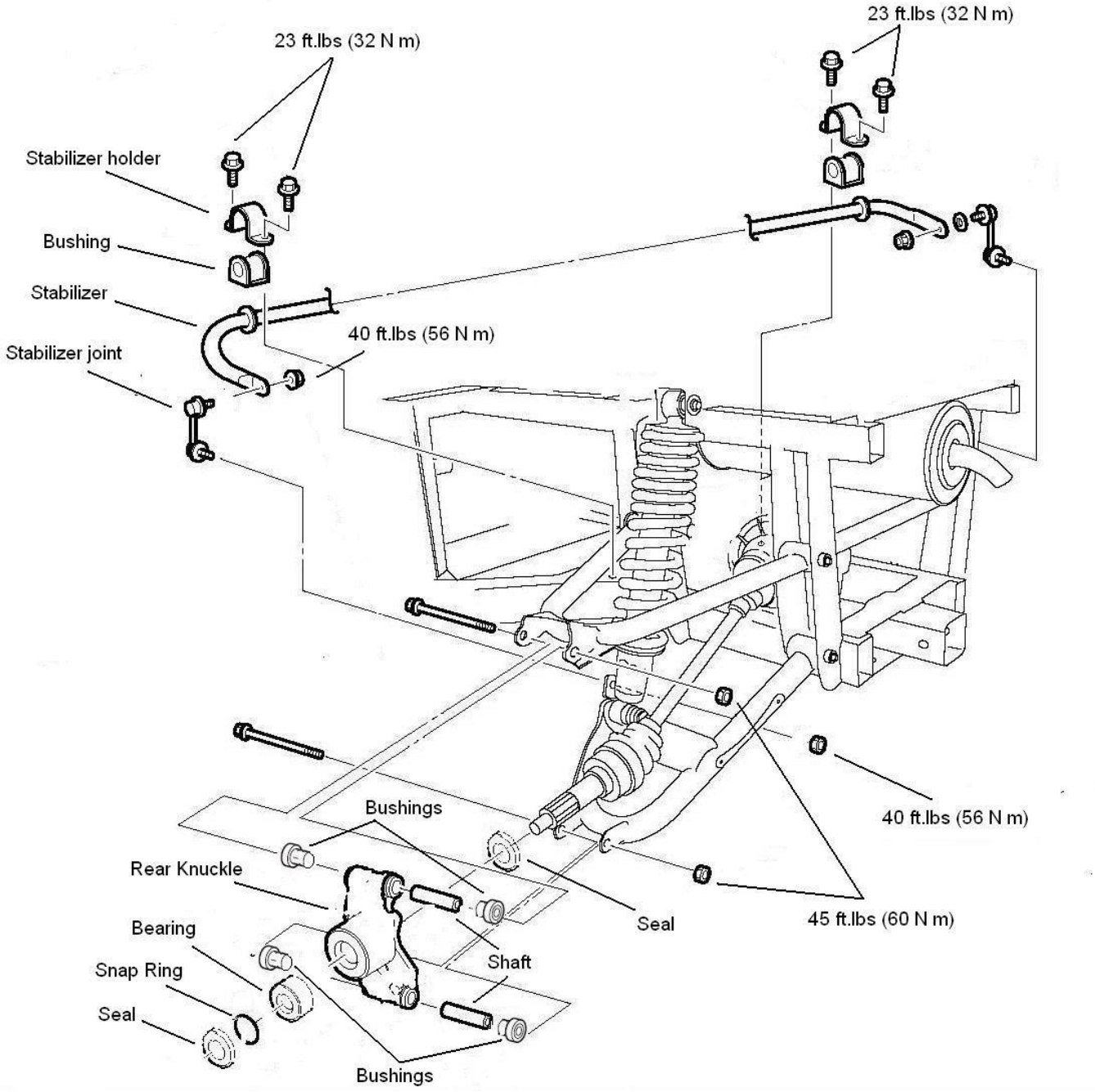
DO NOT reuse old bolts. Serious injury or death could result if fasteners come loose during operation.

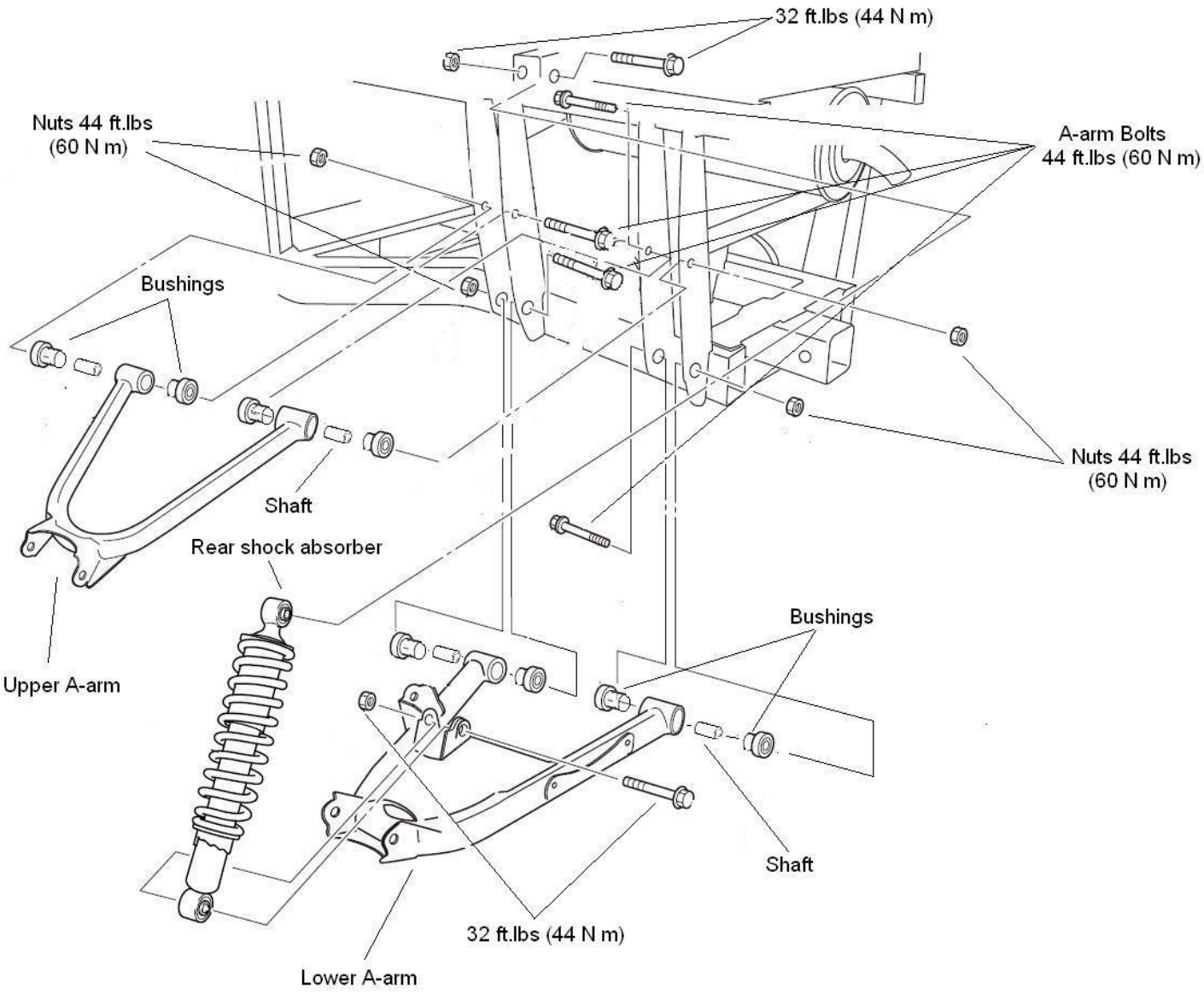
7. Attach A-arm to strut assembly. Tighten ball joint nut to 25 ft. lbs. (35 Nm). If cotter pin holes are not aligned, tighten nut slightly to align. Install a new cotter pin with open ends toward rear of machine. Bend both ends in opposite directions around nut.
8. Install hubs, calipers and wheels, 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 REAR A-ARM REPLACEMENT





1. Elevate and safely support vehicle with weight removed from the rear wheel(s).

2. Remove the wheel nuts and wheel.

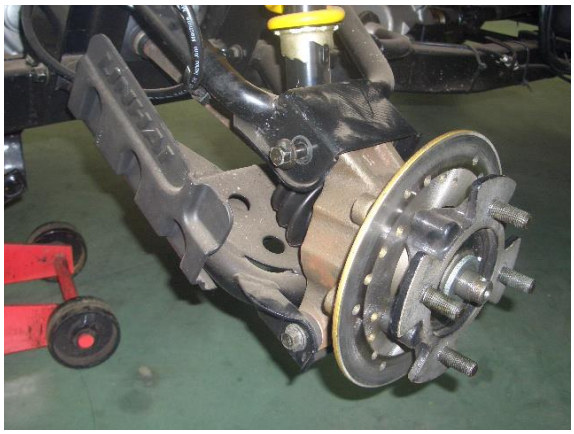
NOTE: To ease the removal of the spindle bolt, remove the hub cap and loosen the spindle bolts before removing the wheel.

3. Remove the hub cap, cotter pin, spindle bolt, and washer.

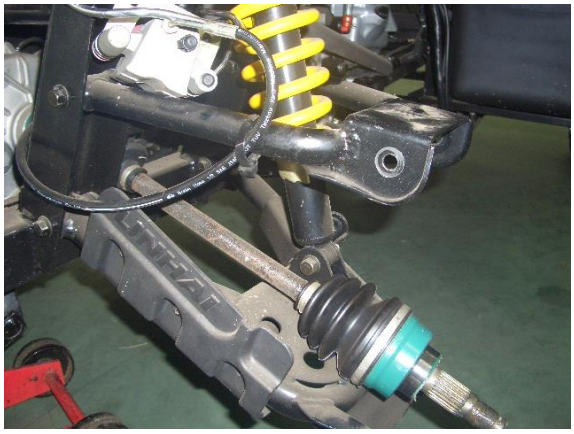
4. Remove the brake caliper. Suspend the brake caliper from the frame with a wire.

NOTE: Do not let the brake caliper hand from the brake line or damage may occur.

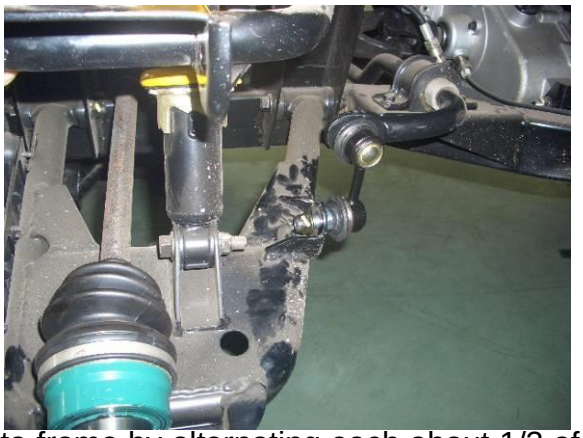
5. Loosen two bolts that secure the rear knuckle to the A-arm. Remove the rear knuckle assembly by sliding it off of the axle.



6. Remove the bolt that secures the shock and coil to the lower A-arm.



7. Loosen two bolts that secure the A-arm to frame by alternating each about 1/3 of the way until A-arm can be removed. Perform this procedure on the upper A-arm.
8. Examine the A-arm bushing and A-arm shaft. Replace if worn. Discard hardware.



9. Remove the bottom stabilizer bar nut.
10. Loosen two bolts that secure the A –arm bushing to frame by alternating each about 1/3 of the way until the A-arm can be removed. The lower A-arm should now be free to remove.

11. Insert new A-arm bushings and new A-arm shaft into new A-arm.
12. Install new A-arm assembly onto vehicle frame. Apply Loctite™ 242 to screw threads of the A arm bolts and torque bolts to 44 ft. lbs. (60 Nm).

⚠ WARNING

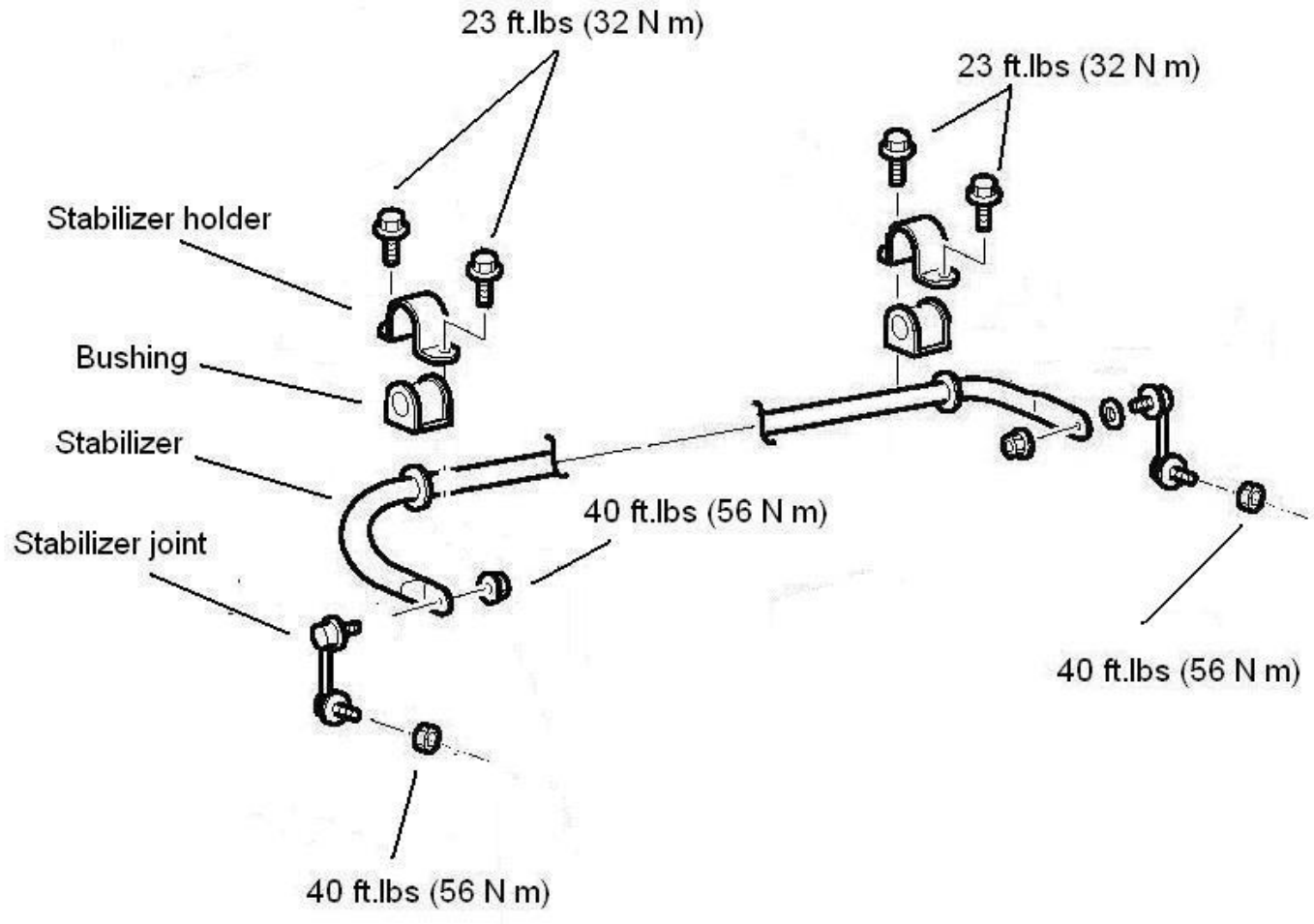
DO NOT reuse old bolts. Serious injury or death could result if fasteners come loose during operation.

13. Attach A-arm to rear knuckle. Tighten upper and lower bolts to 44 ft. lbs. (60 Nm).
14. Install the shock and tighten shock bolt to 32 ft.lbs. (44 Nm).
15. Install the stabilizer and tighten nut to 40 ft.lbs. (56 Nm).
16. Re-install wheel and caliper.

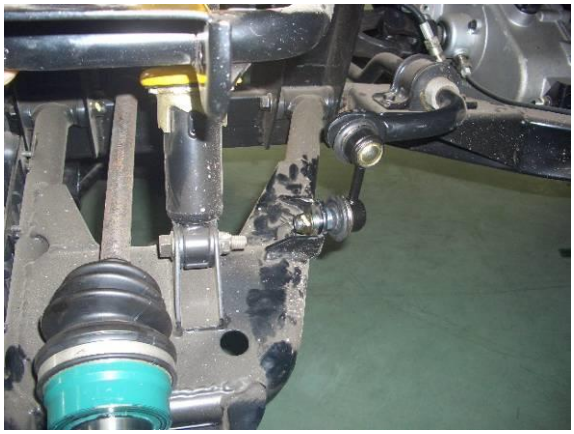
⚠ WARNING

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

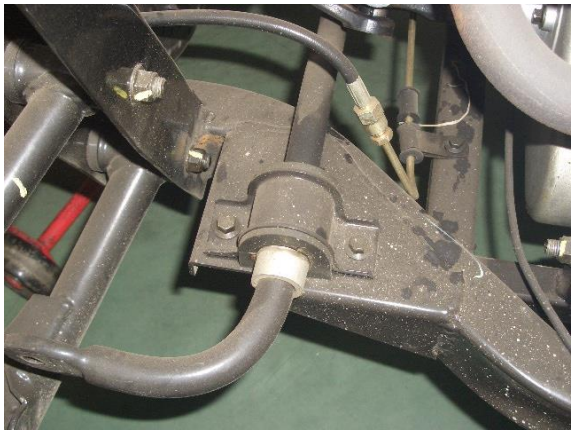
4.3 REAR STABILIZER BAR REMOVAL/INSTALLATION



1. Elevate and safely support vehicle with weight removed from the rear wheel(s).
2. Remove the rear wheel to gain access to the stabilizer bar, each side.

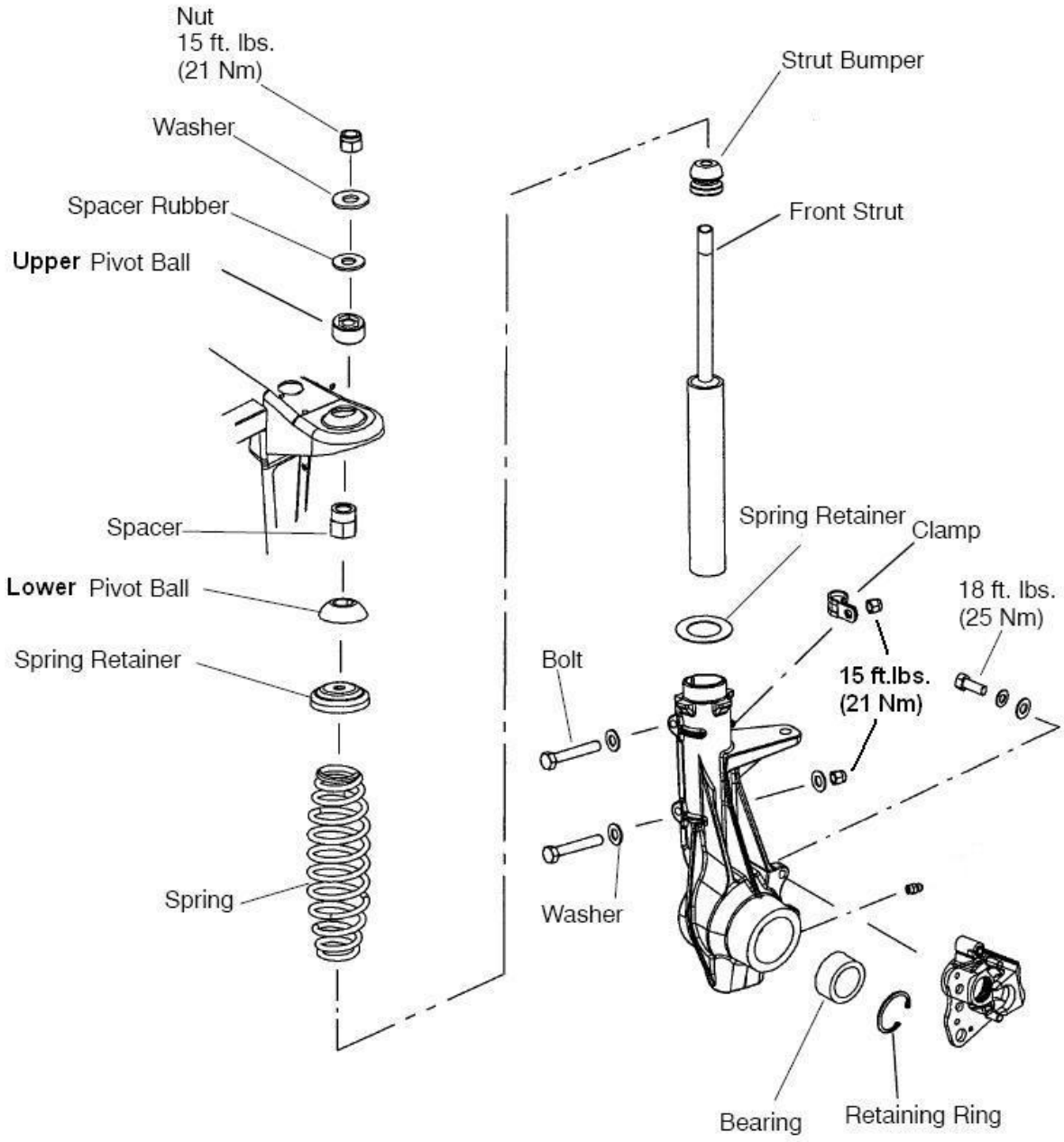


3. Remove the stabilizer bar nut from the lower A-arm, each side.



4. Remove the two bolts that secure the stabilizer bar to the main frame, each side.
5. Remove the stabilizer from the fram.
6. Inspect the stabilizer bar. Inspect the bushings and replace if needed.
7. Inspect the stabilizer joint and replace if needed.
8. Reverse the procedure for installation.Torque the stabilizer bolts to 23 ft.lbs (32 Nm).

4.4 FRONT STRUT REPLACEMENT



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)

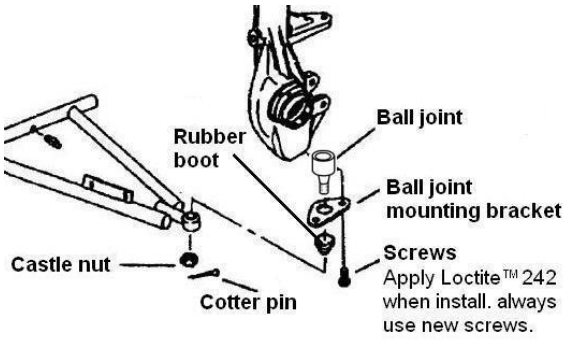
4.5 FRONT STRUT BALL JOINT REPLACEMENT

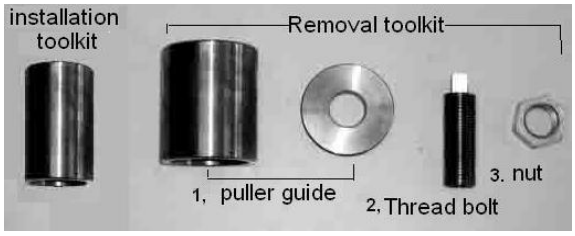
1. Loosen front wheel nuts.
2. Elevate and safely support CUV under footrest/frame area. .

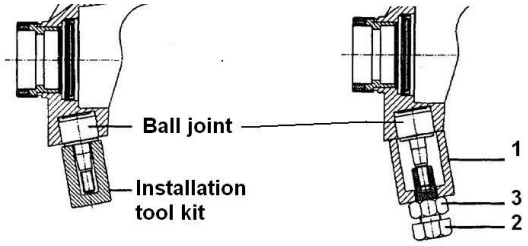
CAUTION: Serious injury may result if CUV tips or falls. Be sure CUV is secure before beginning this service procedure.

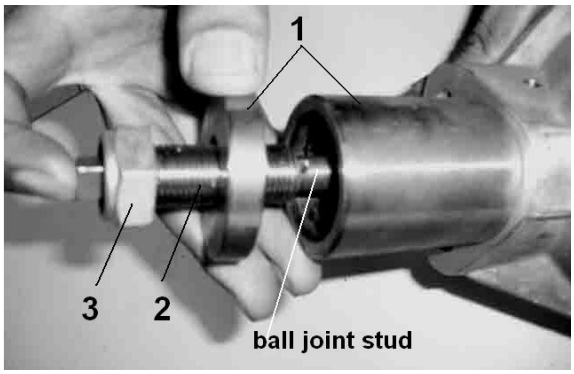
3. Remove wheel nuts and wheels.
4. Remove cotter pin from ball joint
5. Remove castle nut and separate A- arm from ball joint stud.
6. Remove screws and ball joint mounting bracket.
7. Using ball joint cup removal/installation toolkit, remove ball joint cup from strut housing. Refer to photos at right.
   - Install puller guide (1) .
   - Thread bolt (2) with nut (3) onto bal 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.

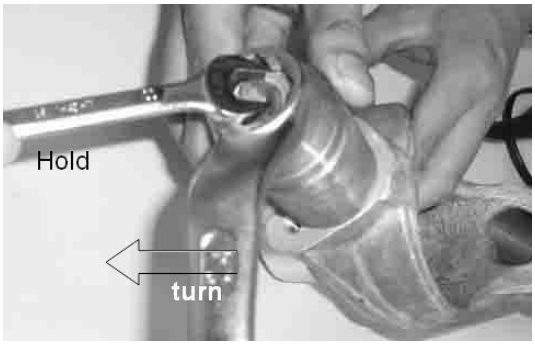
   Torque screw s to 8 ft.lbs. (11 Nm).
10. Install A- arm on bal joint cup and torque castle nut to 25 ft. lbs. (35 Nm).
11. Reinstall cotter pin with open ends toward rear of machine.



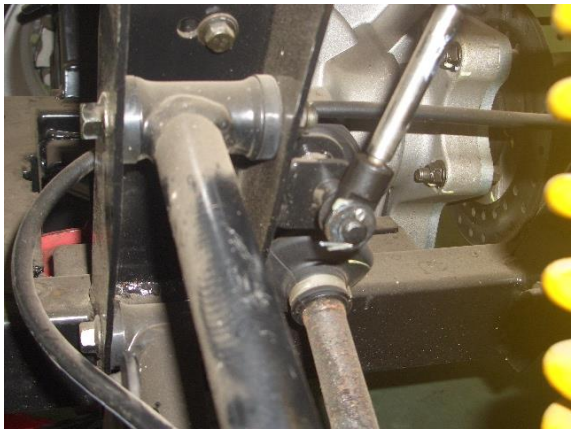


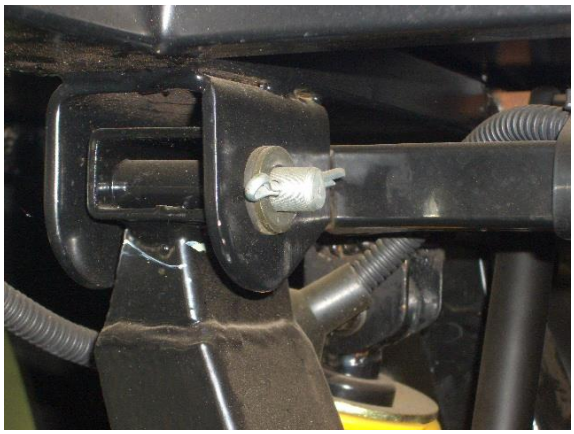






4.6 BOX REMOVAL/INSTALLATION





Box Removal

1. Disconnect the license light coupler.
2. Lift the box into the dump position.
3. Remove the box shock pin from the frame (both sides).
4. Remove the shocks from the shock brackets. Let the shocks fully extend.

CAUTION: Safely support the box during the rest of the removal process. The box is not as stable with the shocks removed.

5. Remove the cotter pin from the hinge pin.
6. Remove the hinge pin (both sides).

CAUTION: Safely support the box during the rest of the removal process. The box is not as stable with the hinge pin removed.

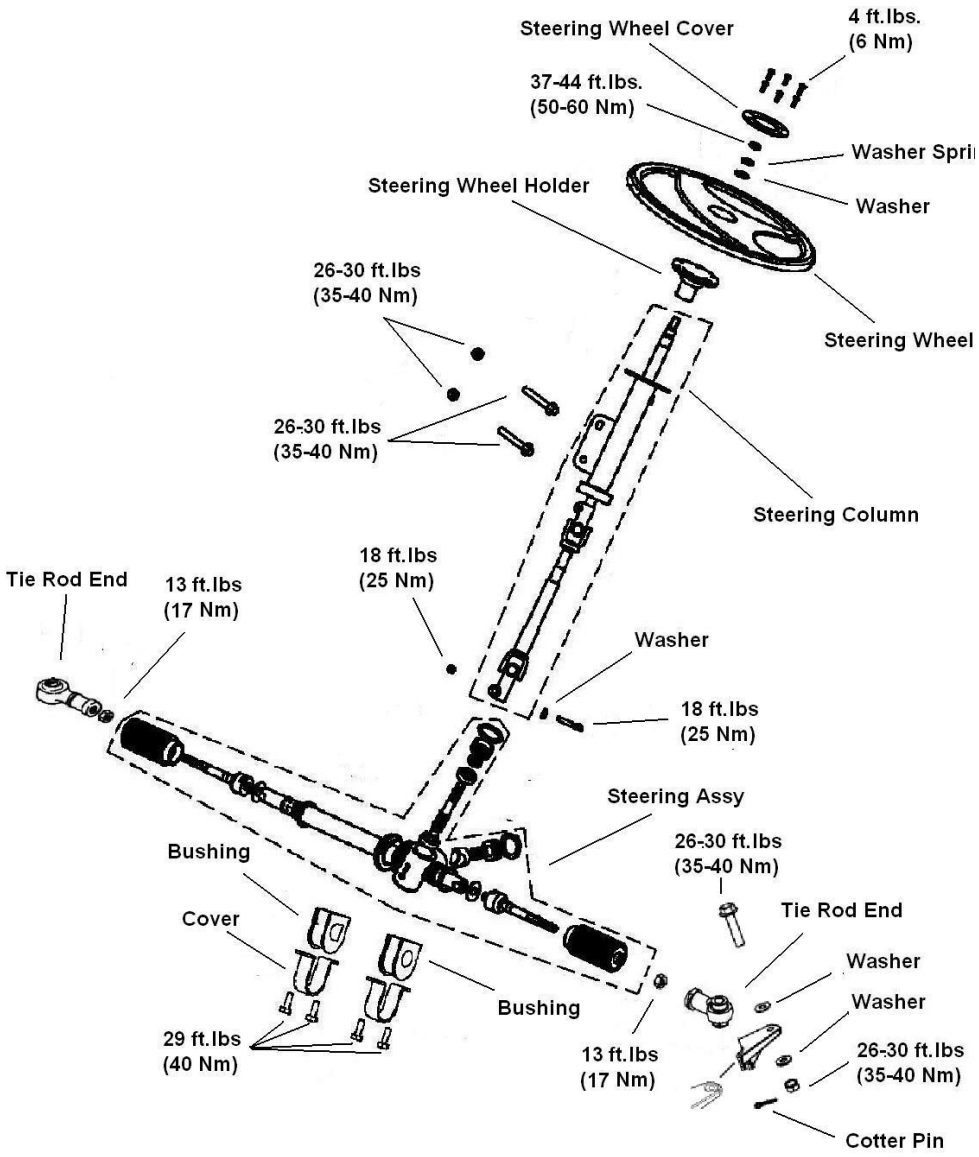
7. With the hinge pins removed, remov the box from the frame. Two people maybe needed to remove the bed from the frame.

CAUTION: Use caution when removing the box. It is recommended to have two people to carefully remove the box from the frame.

Box Installationg

1. Place the box onto the frame. Align the hinges of the box with the frame.
2. Install the box hinges (both sides).
3. Secure the box hinges with the cotter pins (both sides).
4. With the hinges installed, decompress the box shocks and place them into the shock brackets on the frame (both sides).
5. Secure the box shocks with the shock pin (both sides).
6. Lower the box and secure the latch.
7. Connect the license light coupler.

4.7 STEERING ASSEMBLY REMOVAL/INSTALLATION



1. With the steering wheel cover bolts removed, remove the steering wheel cover and the steering wheel.
2. With the steering wheel holder nut removed, remove the steering wheel holder.
3. Remove the steering column bolts.
4. Remove the upper of the steering column.
5. Remove the cotter pins and the tie rod end bolts (both sides).
6. With the cover bolts removed, remove the steering assy and the lower of the steering column.
7. Reverse the procedure for installation.

NOTES

CHAPTER 5 FINAL 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 CUV model for spare parts information and service.

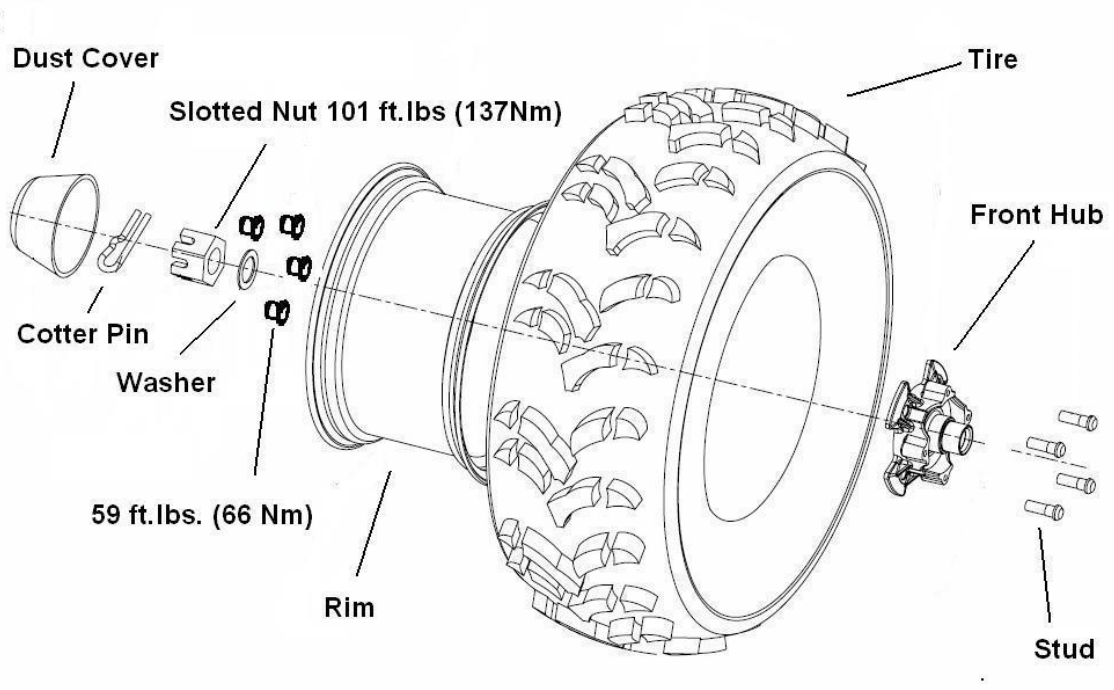
5.1 WHEEL, HUB, AND SPINDLE TORQUE TABLE

Item	Specification
Front Wheel Nuts	59 Ft.Lbs 66 Nm
Rear Wheel Nuts	59 Ft.Lbs 66 Nm
Front Hub Nut on Spindle/ outer CV joint	101 Ft.Lbs 137 Nm
Rear Hub Retaining Nut	101 Ft.Lbs 137 Nm

Refer to exploded views and text for torque values of other fasteners.

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

5.2 FRONT HUB EXPLODED VIEW



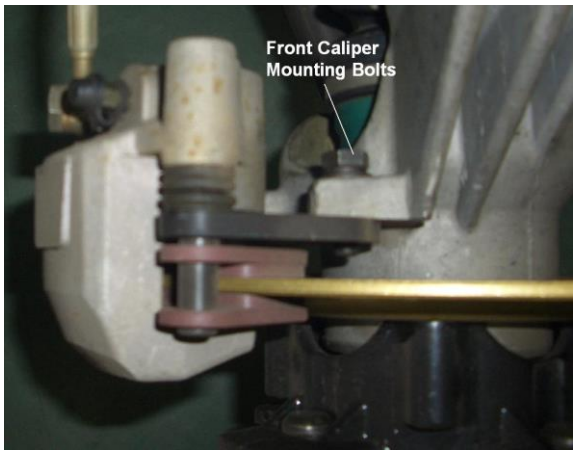
5.3 FRONT HUB REMOVAL/INSPECTION

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.

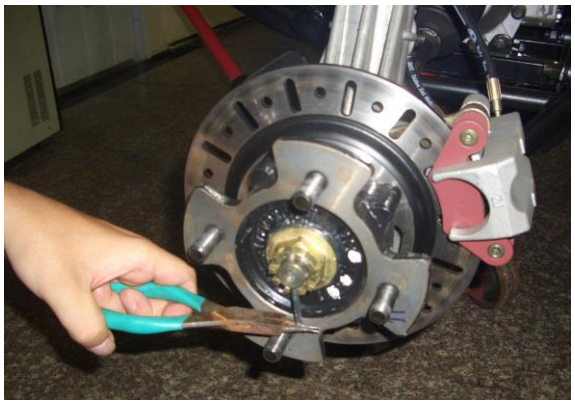
2. Check bearings for side play by grasping the tire/Wheel firmly and checking for movement.

3. Grasp the top and bottom of the tire. The tire should rotate smoothly without binding or rough spots.
4. Remove wheel nuts and wheel.
5. Remove the two brake caliper mounting bolts.

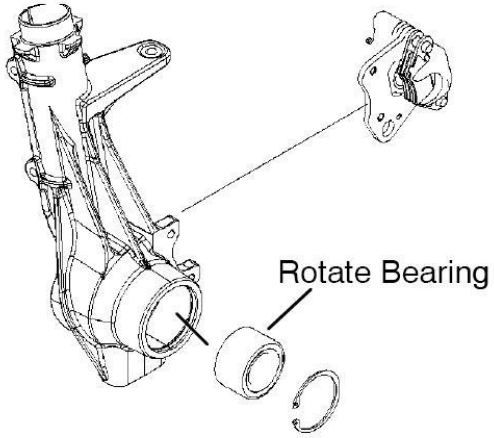


CAUTION: Do not hang the caliper by the brake line. Use wire to hang the caliper to prevent possible damage to the brake line.

6. Remove hub cap, cotter pin, front spindle nut, and washer.

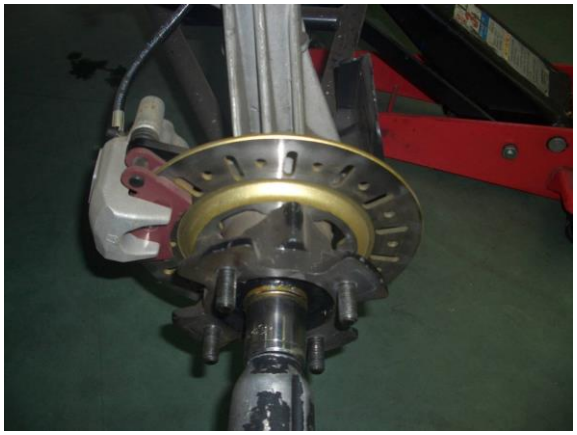


7. Rotate each bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion, or roughness is evident.

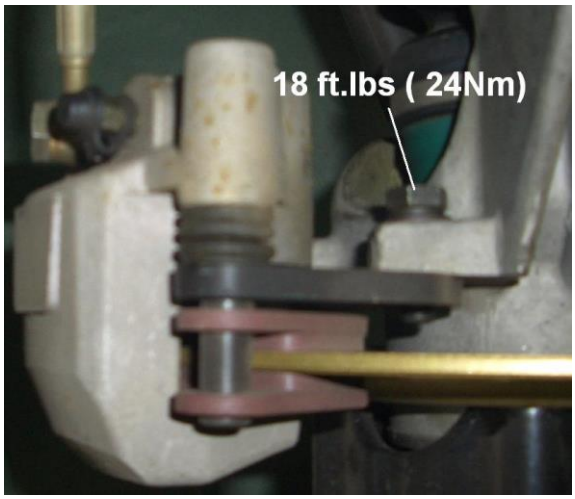


5.4 FRONT HUB INSTALLATION

1. Inspect the hubstrut bearing surface for wear or damage.
2. Apply grease to drive axle spindle.
3. Install spindle through the backside of the hubstrut. Install the hub onto the spindle.
4. Install spindle nut and tighten to 101 ft.lbs (137 Nm).
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. Install hub cap.



7. Rotate hub. It should rotate smoothly without binding or rough spots or side play.
8. Install brake caliper using new bolts. (Apply Loctite™ 242 to threads) Tighten bolts to 18 ft.lbs (24 Nm)

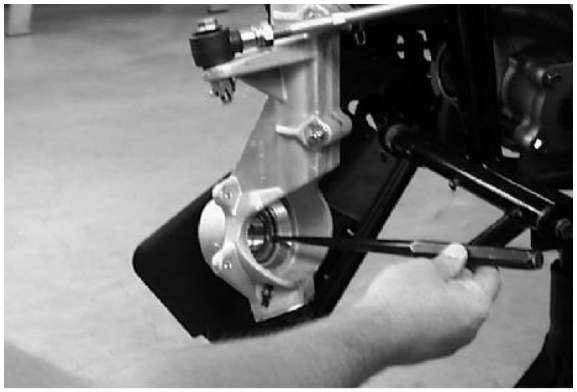


CAUTION: New bolts have a pre-applied locking agent which is destroyed bolts upon removal. Always use new brake caliper mounting bolts upon assembly.

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

5.5 FRONT HUB BEARING REPLACEMENT

1. Remove outer snap ring.



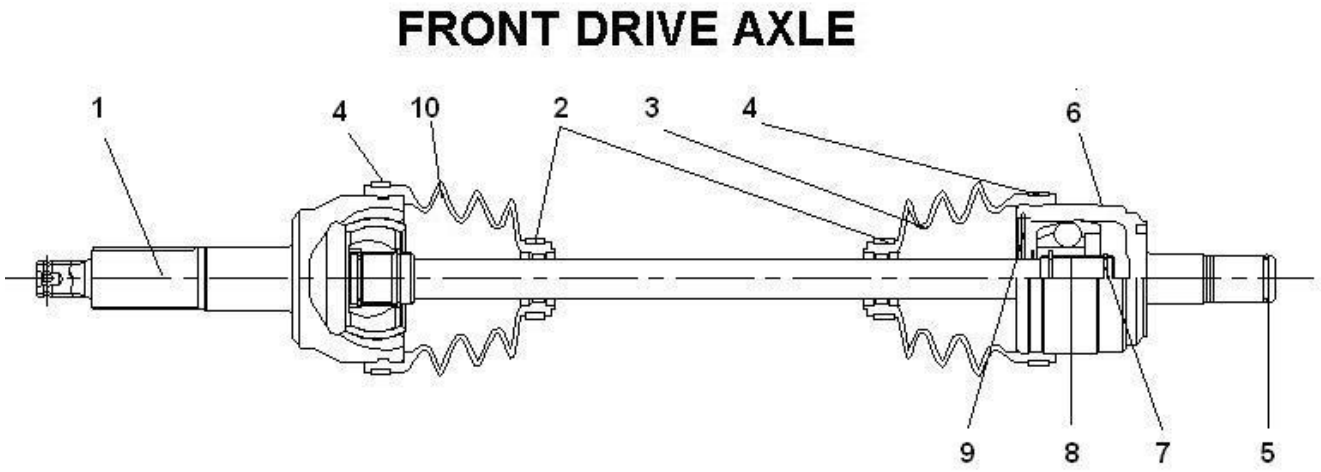
2. Form the back side, tap on the outer bearing race with a drift punch in the reliefs as shown.
3. Drive bearing out evenly by tapping on outer race only. Once bearing is at bottom of casting, support casting on outer edges so bearing can be removed.

4. Inspect bearing.

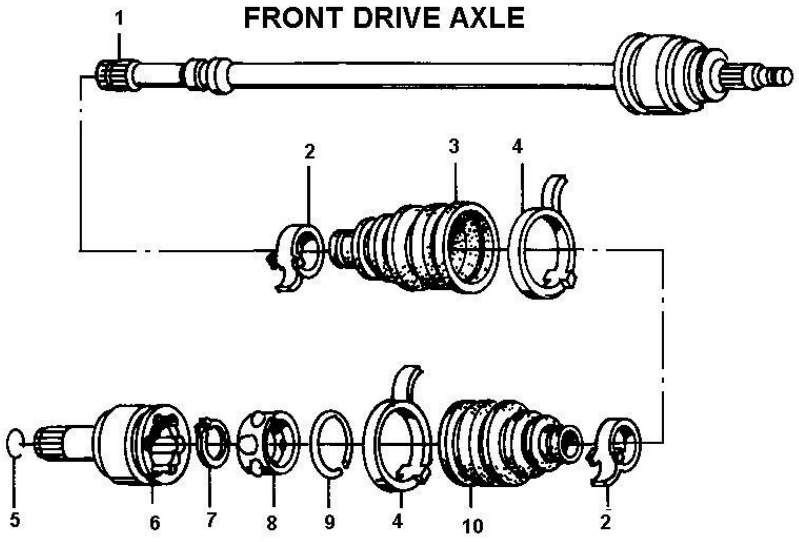
NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement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

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

5.6 FRONT DRIVE AXLE REMOVAL/INSPECTION (4X4)



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. Plunging Joint
7. Circlip
8. Bearing
9. Stopper ring
10. Inboard boot.

NOTE: Always order and replace 6 and 8 together.

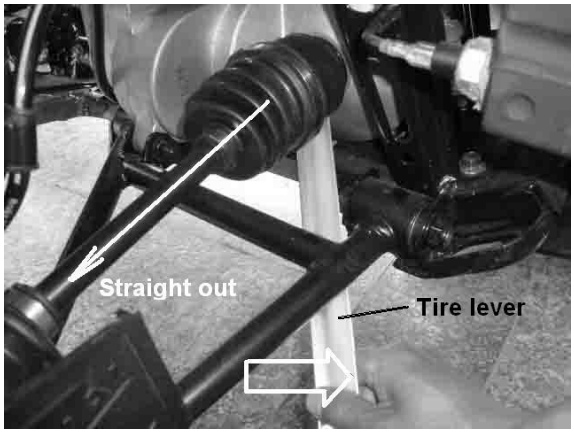
REMOVAL

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 gearcase 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 gearcase.



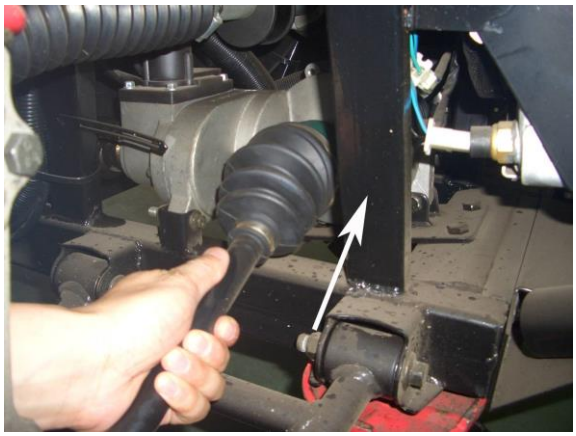
INSPECTION

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.

5.7 FRONT DRIVE AXLE INSTALLATION (4X4)

CAUTION: To avoid damage to the front gearcase 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.

5.8 FRONT DRIVE AXLE DISASSEMBLY/ INSPECTION(4X4)

INNER CV JOINT DISASSEMBLY

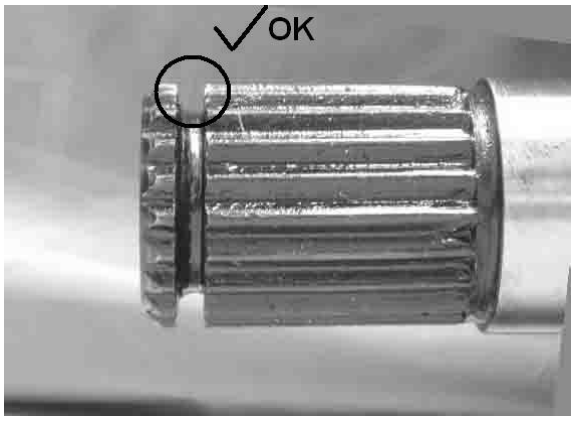
NOTE: The outer CV joint cannot be disassembled or repaired, if damage or faulty the drive axle assembly must be replace.

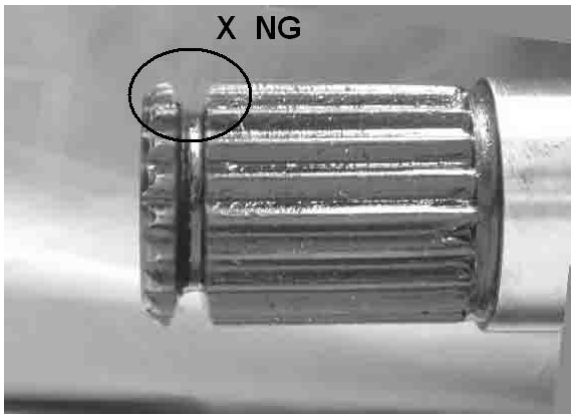
1. Open the clamps on both boot band ”A” and ”B” on the inner CV joint, then remove boot band ”B”. Discard the boot band, it cannot be reused.
2. Carefully slide the boot (A) onto the drive axle and off the inboard joint.
3. Wipe out all of the molybdenum disulfide grease within the inboard joint cavity.
4. Remove the stopper ring from the inboard joint.
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

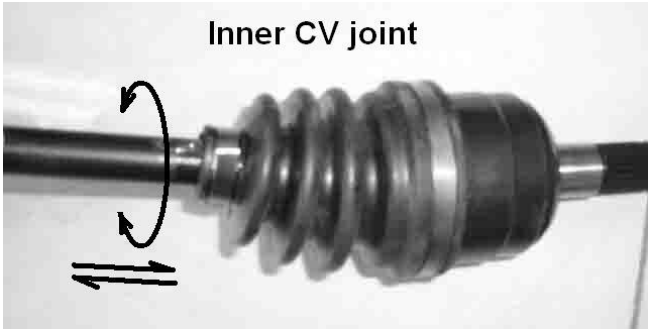
1. Clean the bearing assembly in solvent and thoroughly dry.
2. Inspect the steel balls, bearing case and the bearing race for wear or damage.

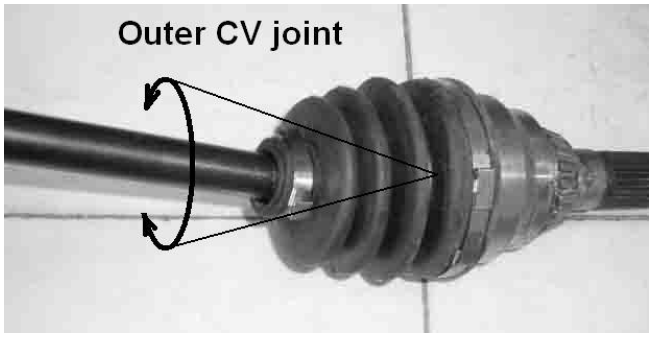
3. Check for wear or damage to the inner splines of the bearing race.
4. If necessary, disassembly the bearing assembly for further inspection. Carefully remove the steel balls from the bearing cage then remove the bearing race from the bearing cage.
5. If any of the components of the bearing assembly 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 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. See right picture.
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.





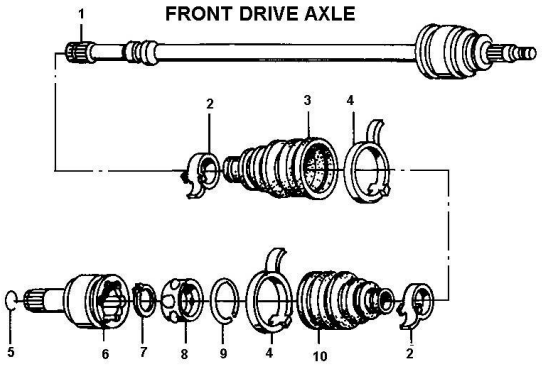
Check the movement of the joint





NOTE: Inner CV joint must be replaced with the bearing as an assembly.

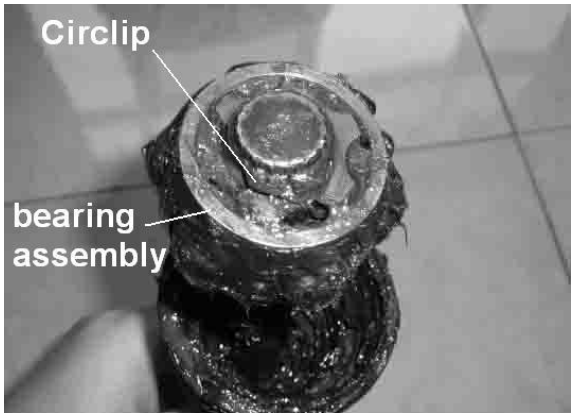
5.9 FRONT DRIVE AXLE ASSEMBLY (4X4)

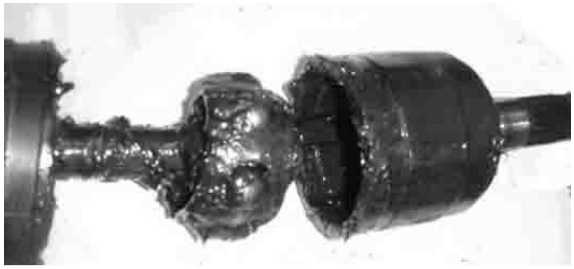


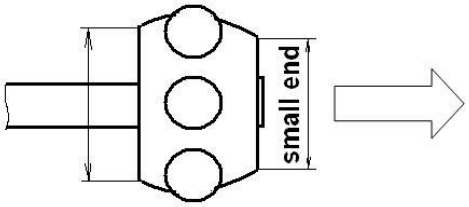
1. The rubber boots are not identical and must be installed on the correct joint. The boots are marked as follows:
   a. Inner CV joint boot : “inner”,
   b. Outer CV joint boot: “outer”.
2. If the outboard boot was removed, install a new boot onto the drive axle at this time.

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.

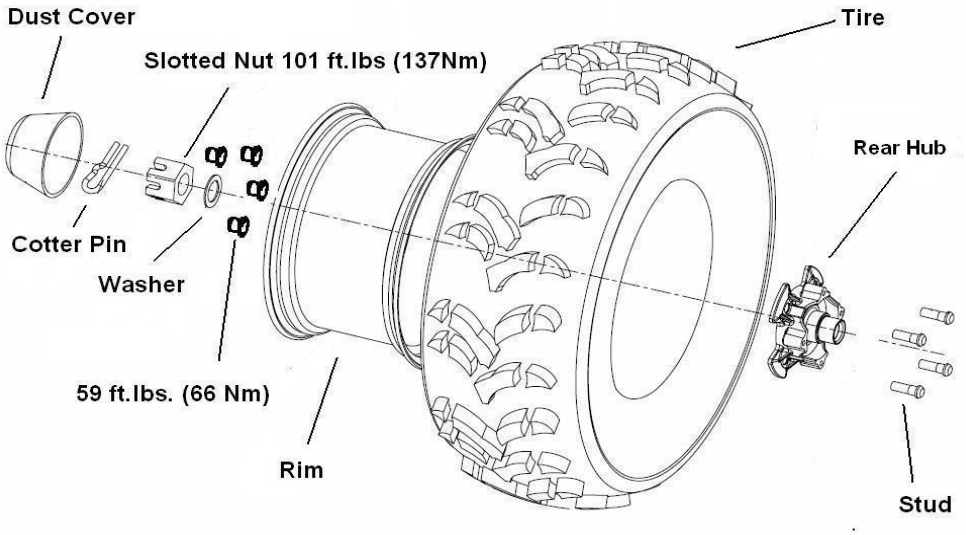
NOTE: Position the new boot bands with their tabs facing toward the rear of the vehicle .

14. 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.
15. 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.

16. 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.
17. If removed, install the stopper ring and make sure it is seated correctly in the drive axle groove.
18. Apply molybdenum disulfide grease to the end splines.

5.10 REAR HUB EXPLODED VIEW



5.11 REAR HUB AND KNUCKLE REMOVAL/INSPECTION

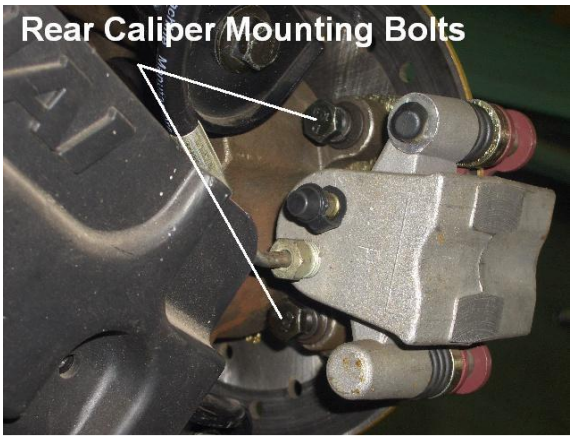
1. Elevate rear end and safely support machine under main frame area.

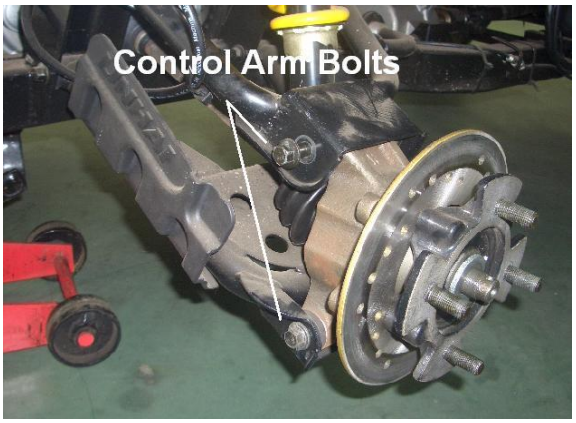
CAUTION: Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

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.

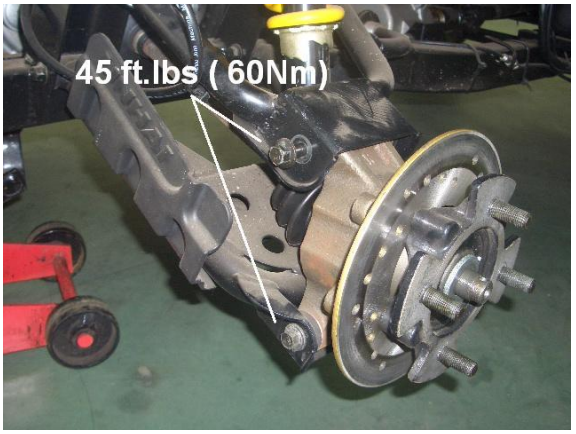
5. Remove hub cap, cotter pin, front spindle nut, and washer.
6. Remove the upper and lower control arm bolts.
7. Slide the rear hub and knuckle from the rear drive axle.
8. Inspect the rear hub and knuckle assembly by hand for smoothness and side to side movement, replace as needed.





5.12 REAR HUB AND KNUCKLE INSTALLATION

1. Start the rear hub and knuckle assembly onto the drive shaft.
2. Align the bottom of knuckle and lower control arm. Secure with the lower control arm bolt.
3. With the driveshaft placed in the knuckle, align the knuckle with the top control arm. Secure with the upper control arm bolt.
4. Torque the top and bottom A-arm bolts as shown in the photo.
5. Install the washer and the spindle retainer nut.
6. Install the wheel and wheel nuts. Torque wheel nuts to 59 ft.lbs. (66 Nm).
7. Lower the vehicle. Torque the spindle retaining

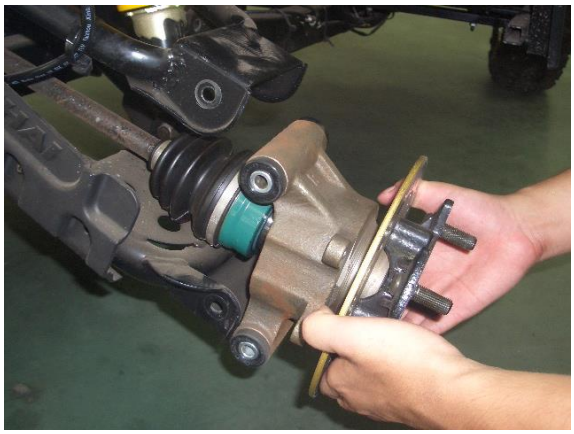


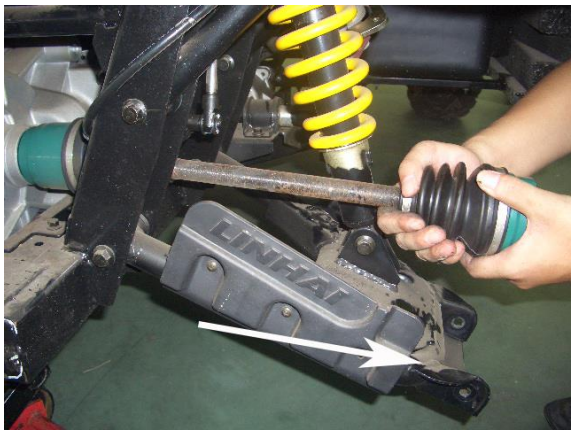
nut to 101 ft.lbs. (137 Nm). Install a new cotter key and the hub cap.

8. Install brake caliper using new bolts. (Apply Loctite™ 242 to threads) Tighten bolts to 18 ft.lbs (24 Nm)

5.13 REAR DRIVE SHAFT REMOVAL

1. Repeat of the steps in the “REAR HUB AND KNUCKLE REMOVAL” section.
2. Slide the rear drive axle out of the knuckle by pulling the hub and knuckle assembly outward and down.

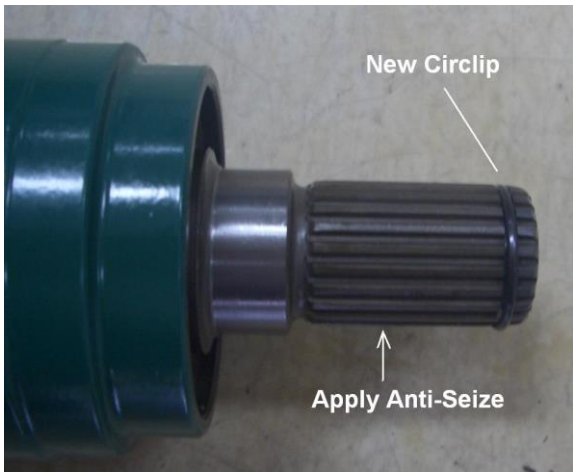


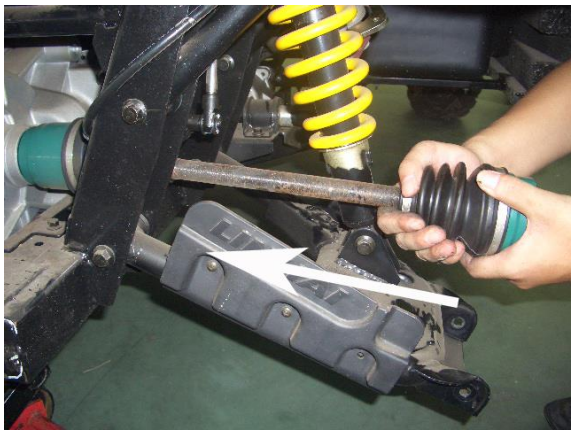


3. Pull the rear drive axle straight out of the frame. Use short sharp jerks to free the circlip from the gearcase. The circlip holds the axle in the gearcase.
4. Inspect the axle splines and cv boots for any damage.

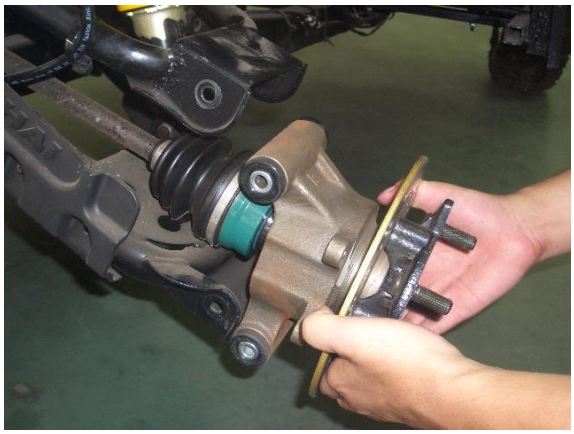
5.14 REAR DRIVE SHAFT INSTALLATION

1. Install a new circlip onto the rear drive shaft. Apply Anti-Seize Compound onto the rear driveshaft splines (both ends).





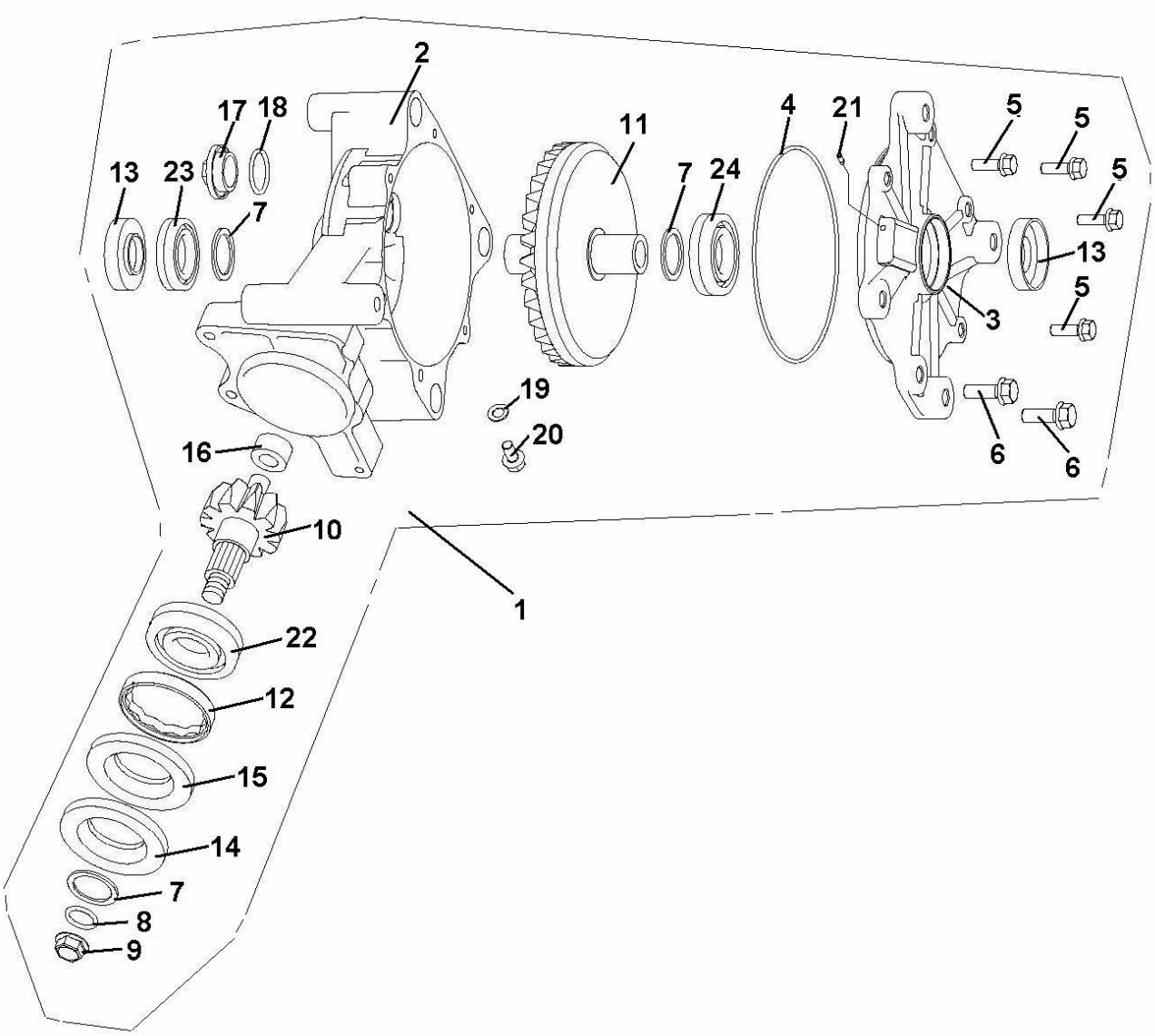
2. Reinstall the rear driveshaft into the rear gearcase. Be sure the circlip is securely fit into the rear gearcase. Use a rubber mallet to tap on the outboard end of the driveshaft if necessary.



3. Slide the rear drive axle into the knuckle.

4. Lift knuckle into place and install bolt to upper and lower control arm. Torque bolt to 44 ft.lbs (60 Nm).
5. Install the washer and the spindle retainer nut.
6. Install the wheel and wheel nuts. Torque wheel nuts to 59 ft.lbs. (66 Nm).
7. Lower the vehicle. Torque the spindle retaining nut to 101 ft.lbs. (137 Nm). Install a new cotter key and the hub cap.
8. Install brake caliper using new bolts. (Apply Loctite™ 242 to threads) Tighten bolts to 18 ft.lbs (24 Nm)

5.15 REAR GEARCASE EXPLODED VIEW



1. REAR GEAR-BOX ASSY 2. DRIVE HOUSING 3. OUTPUT COVER
4. O-RING 160X2.65 5. BOLT M8X28 6. BOLT M10X1.25X28
7. WASHER 31 8. O-RING 20X3 9. NUT M16X1.5
10. OUTPUT AXLE, RING REAR GEAR-BOX 11. INPUT AXLE, RING REAR GEAR-BOX
12. LOCK NUT 13. SEAL 30X55X11 14. SEAL 38X85X8
15. SEAL 38X80X8 16. BEARING 15NQ2815 17. OIL SCREEN CAP
18. O-RING 19. WASHER 20. OIL PLUG
21.TUBE, REAR GEAR-BOX BREATHER 22. BEARING 6306
23. BEARING 6006 24. BEARING

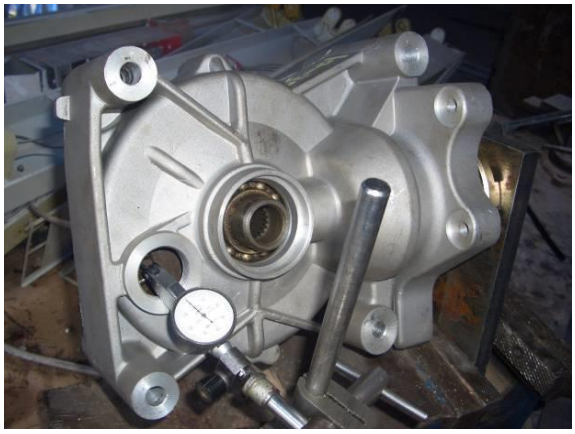
5.16 REAR GEARCASE DISASSEMBLY

1. Drain and properly dispose of used oil.
2. Loosen the cover bolts in a crisscross pattern in several steps and remove them.
3. Pry the cover at the prying points using a screw-driver and remove the output cover. Remove the o-ring.
4. Remove the ring gear and bearing assembly.
5. Remove the oil seals and o-ring.
6. Unstuck the pinion bearing lock nut with a drill or grinder. Remove the lock nut using the special tool.
7. Remove the pinion bearing assembly.

5.17 REAR GEARCASE ASSEMBLY

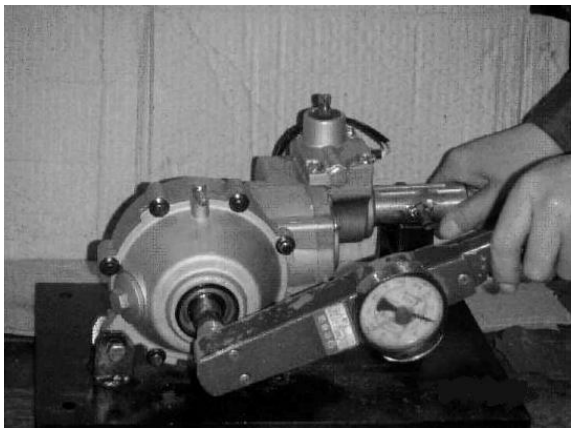
1. Drive the pinion gear assembly into the drive housing.
2. Install a new lock nut and tighten it using the special tool.
3. Stake the lock into the case groove.
4. Coat a new O-ring with grease and install it onto the pinion gear shaft.
5. Apply grease to the lips of new oil seals. Install the inner oil seal into the drive housing until it is flush with the stepped edge.
6. Install the outer oil seal into the drive housing until with the drive housing outer surface.
7. Coat a new O-ring with grease and install it into the cover groove.
8. Install the outer cover onto the drive housing.
9. Install the cover bolts and tighten them in several steps until the cover evenly touches the drive housing. Then while rotating the pinion gear, tighten the bolts to the specified torque in a crisscross pattern in several steps.
   TORQUE:
   10mm bolt: 45Nm
   8mm bolt: 20Nm
10. Check that the gear assembly turns smoothly without binding.

5.18 BACKLASH INSPECTION



1. Remove the oil filler cap.
2. Install the special tool into the pinion joint, and set the final drive assembly and tool in a vise.
3. Install the drive shaft into the final drive assembly and hold it.
4. Set a horizontal type dial indicator on the ring gear through the filler hole.
5. Turn the ring gear back and forth with the drive shaft to read backlash.
   STANDARD:0.05-0.25mm
   SERVICE LIMIT:0.4mm
6. Remove the dial indicator. Turn the ring gear 120° and measure backlash.
7. Repeat this procedure once more.
8. Compare the difference of the three measurements.
   SERVICE LIMIT:0.2mm
9. If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed.
10. Inspect the bearings and case.
11. If the backlash is excessive, replace the ring gear right shim with a thinner one.
12. If the backlash is small, replace the ring gear right shim with a thicker one.
13. Backlash is changed by about 0.06mm when thickness of the spacer is changed by 0.12mm.

5.19 FRONT GEARCASE SLIP LIMIT TORQUE TEST（4X4）



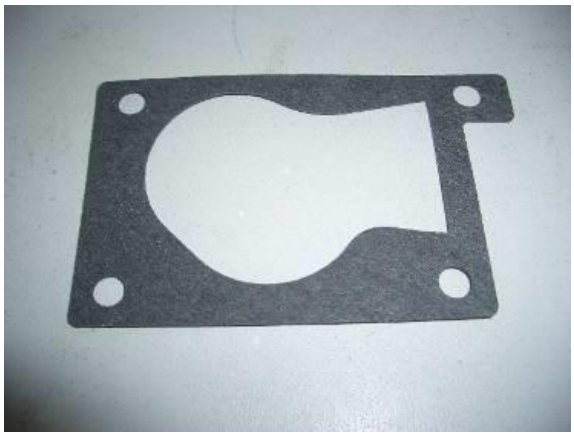
CAUTION: Slip limit torque relate to the preload on the differential (see 5.22 FRONT DIFFRENTIAL ASSEMBLY), and affect the Steering Effort (heavy steering). Always field test the CUV carefully and thoroughly after front gearcase and differential service for vehicle maneuvers and operation. Mount the 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 DIFFRENTIAL as an assembly when out of specification.

5.20 FRONT GEARCASE DISASSEMBLY/ INSPECTION (4X4)

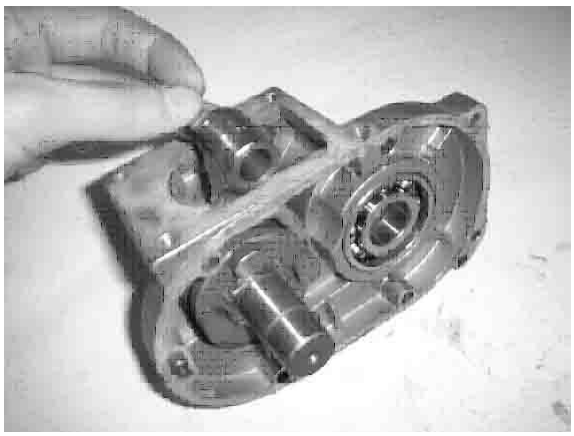
1. Drain and properly dispose of used oil.



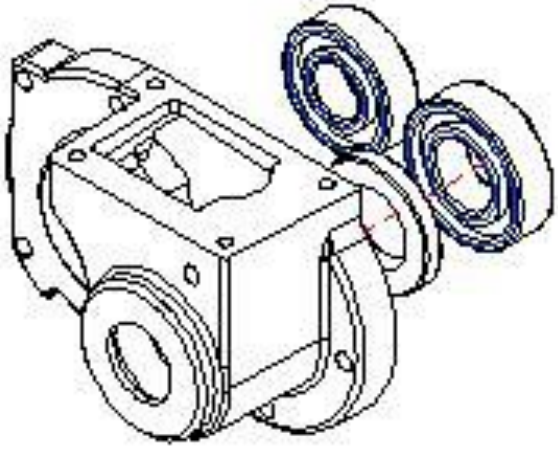
2. Remove bolts, gasket and shift motor.

3. Remove bolts and diff case cover.
4. Remove pins, gear and selector rail.

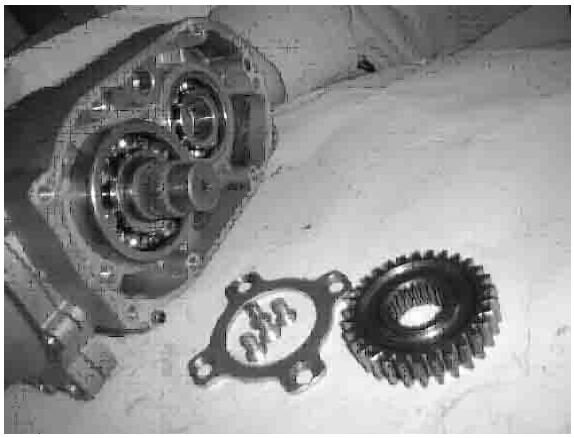
5. Remove selector fork, splined dog and input shaft.



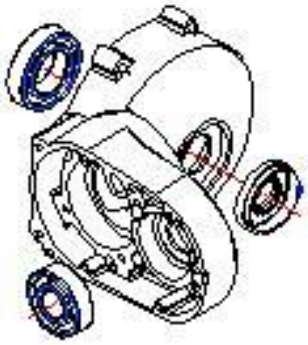
6. Remove bearing and seal.



7. Remove gear, screws, pinion shaft retainer plate and pinion shaft.

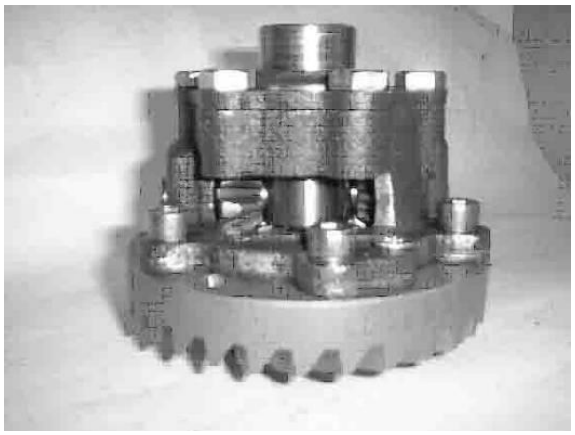


8. Remove seal from the case.

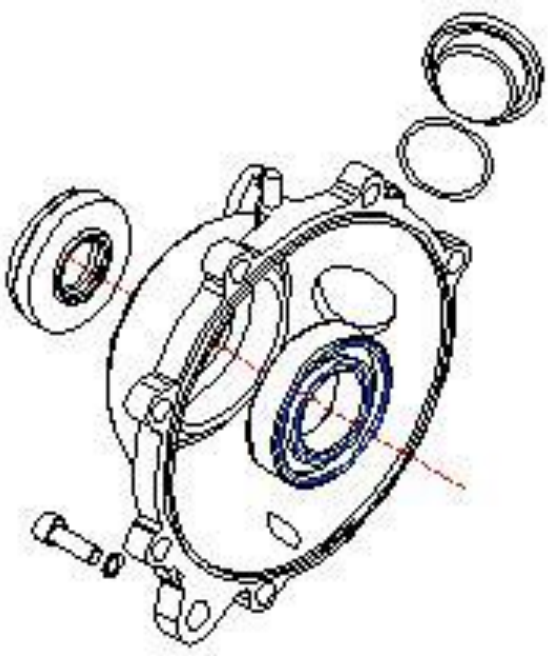


9. Remove bolts, left cover and differential.

Differential →



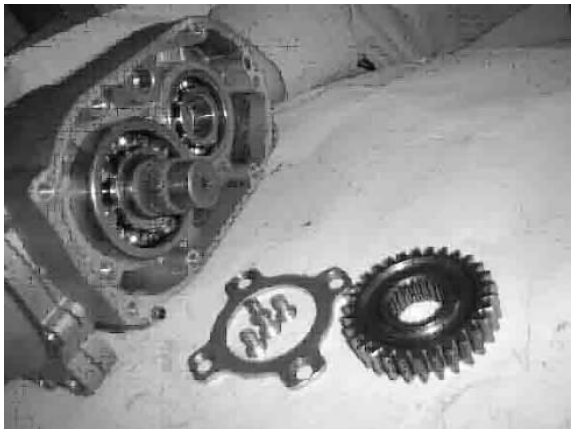
10. Remove seal from left cover.



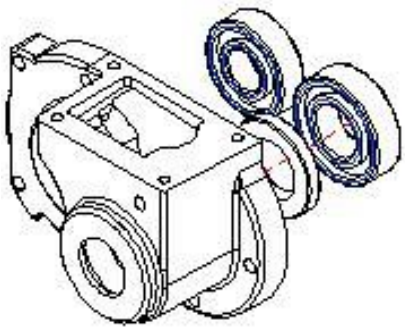
11. Clean all components and inspect for wear. Inspect gears for wear, cracks, chips or broken teeth. Inspect engagement dogs and detent ball housing, replace if edges are rounded. Inspect casting for crack. Inspect bearings for smooth operation. Check for excessive play between inner and outer race. Inspect detent spring and finger spring for wear, cracks, relaxation. Replace part with any defects.

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

5.21 FRONT GEARCASE ASSEMBLY (4X4)



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)

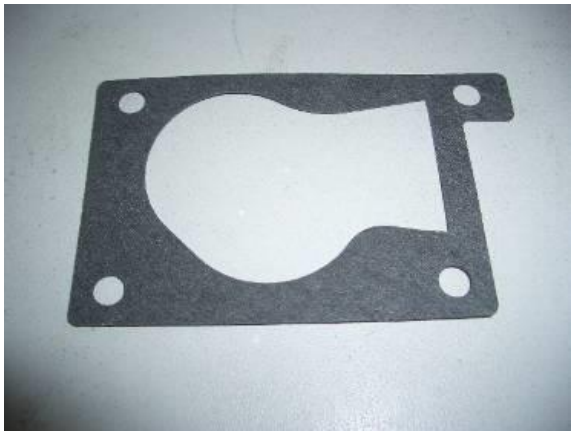


3. Install gear.
4. Install oil seal.

CAUTION: 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. Reinstall gasket and shift motor and torque bolts.
   2ft.lbs. (3Nm)

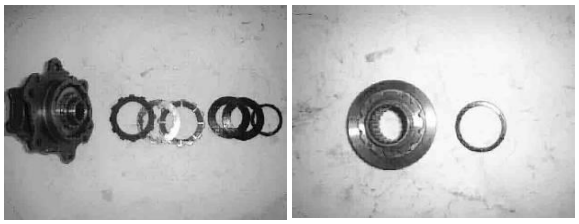
9. Install differential into case.
   Apply LocTiteTM 518 to mating surfaces, reinstall left cover and torque bolts.
   14ft.lbs. (20Nm)
10. Install new seals.

5.22 FRONT DIFFRENTIAL DISASSEMBLY/ INSPECTION (4X4)

1. Remove bolts and bevel crownwheel.

2. Remove bolts and differential cap A.

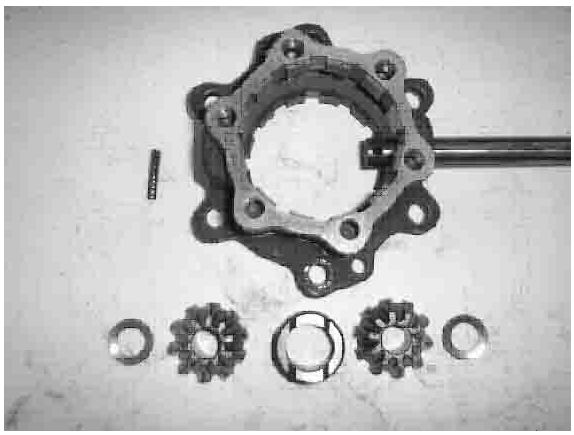
3. Remove spring seat, springs, outer single clutch plate, differential plat, outer double clutch plate, bevel gear and gear axle washer.



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.

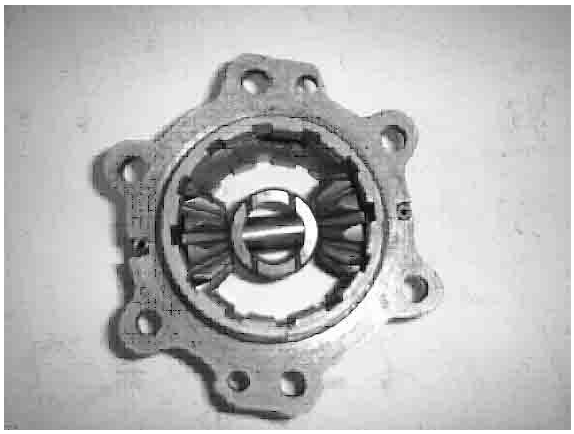
6. Remove roll pin from center pin.
7. Remove center pin, bevel pinion washers, bevel pinions and center spacer from differential housing.



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.

5.23 FRONT DIFFRENTIAL ASSEMBLY (4X4)

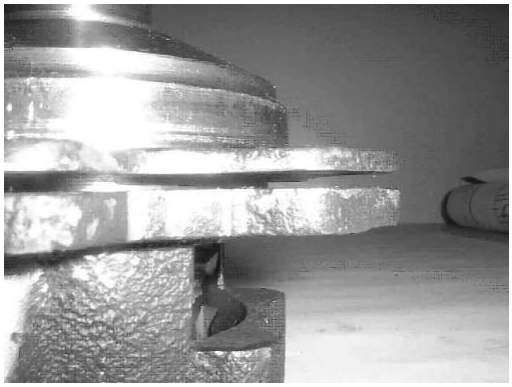
1. Install center pin, bevel pinion washers, bevel pinions and center spacer into differential housing.



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.

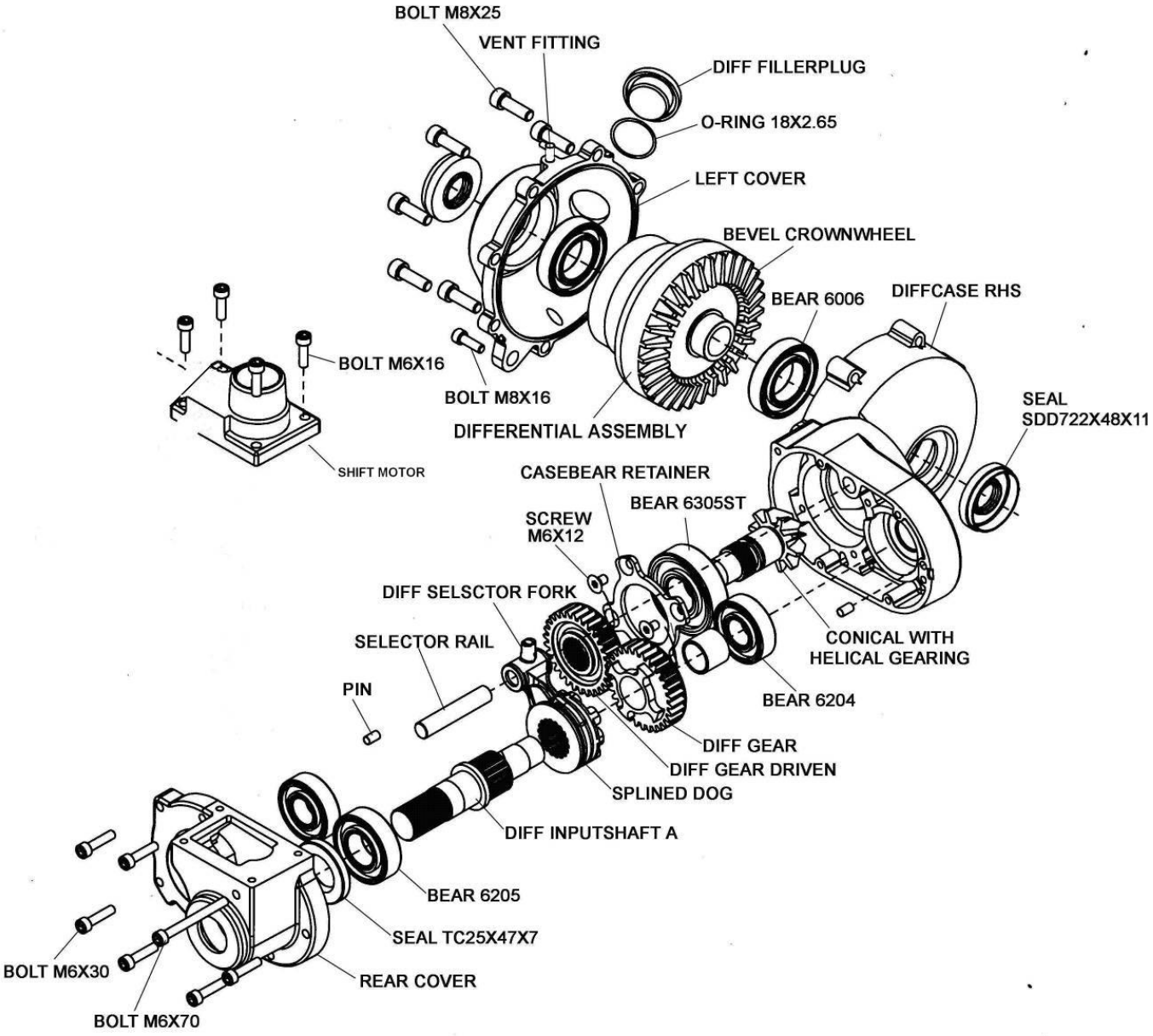
7. Install differential cap B.

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 CUV carefully and thoroughly after front gearcase and differential service for vehicle maneuvers and operation.

5.24 FRONT GEARCASE EXPLODED VIEW



5.25 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 rear gearcase must be disassembly from the frame before the rear prop shaft removal).

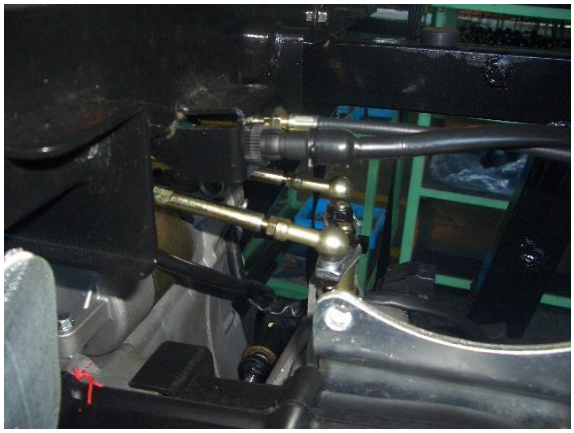
NOTES

CHAPTER 6 TRANSMISSION

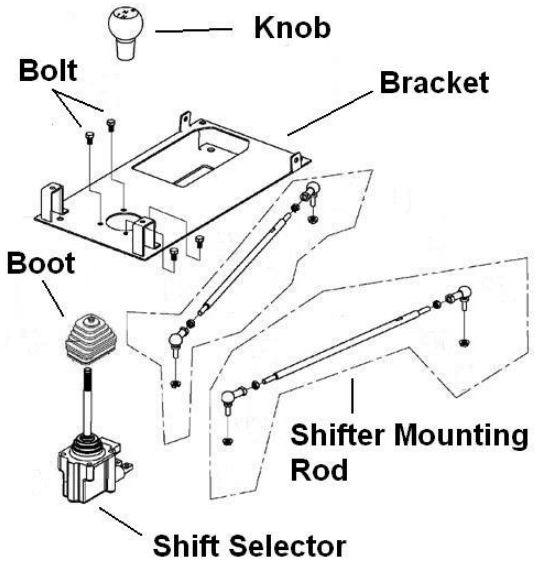
WARNING

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

6.1 GEAR SHIFTER REMOVAL

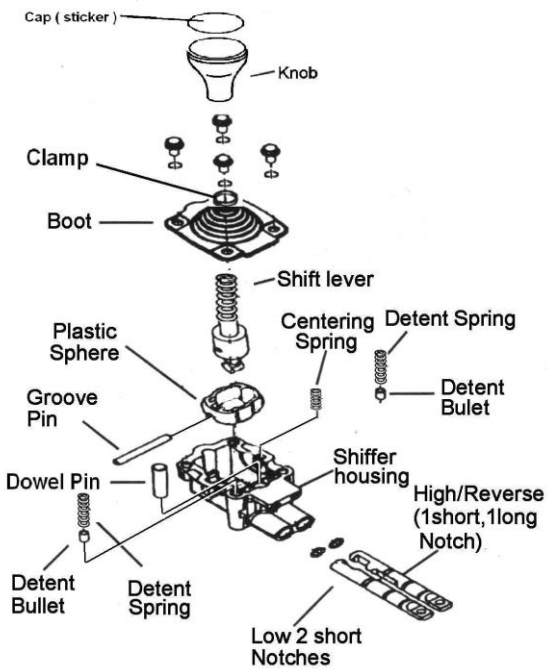


1. Remove parts that interfere with access to shift selector (seat, cover etc.)
2. Disconnect the two linkage rods from transmission slides.



3. Remove four bolts attaching gear shift selector to the mounting bracket.

4. Lift gear selector out of mounting bracket and away from frame.



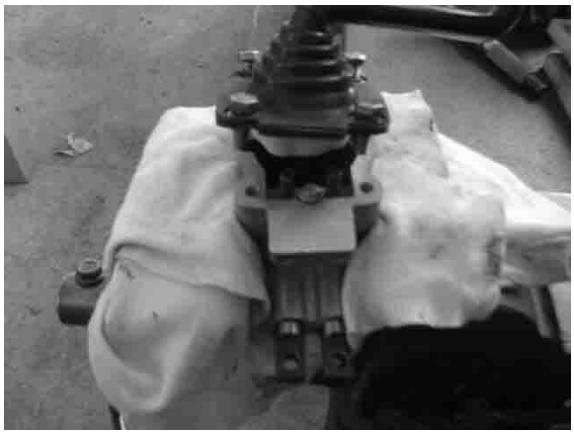
6.2 SHIFTER DISASSEMBLY

CAUTION: Wear eye protection during this procedure. Read each step completely before proceeding .Essential parts maybe 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 screw s 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.

5. Tap shifter housing, top down, against ahard, smooth, flat surface to jar the dowel pin and two detent bullets loose. Pulte detent bullets and the dowel pin out of the shifter housing .
6. 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.

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

6.3 SHIFTER ASSEMBLY

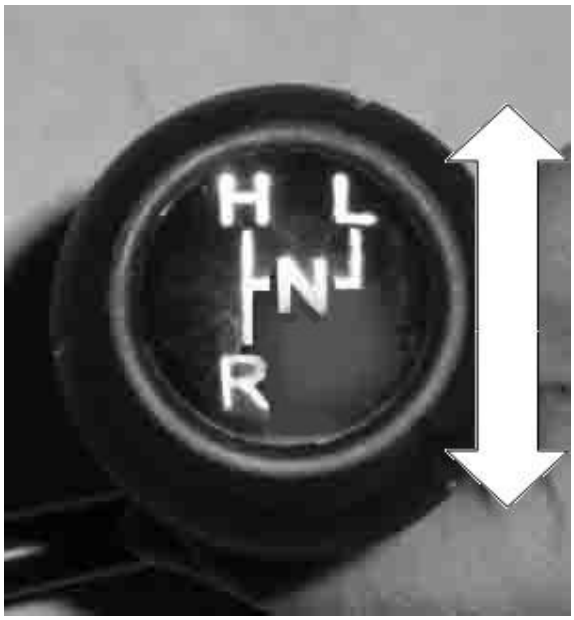
1. Grease and insert slides into shifter housing, taking care not to cut or tear O-ring in the process.

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 CUV. 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 INSTALL ATION

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.

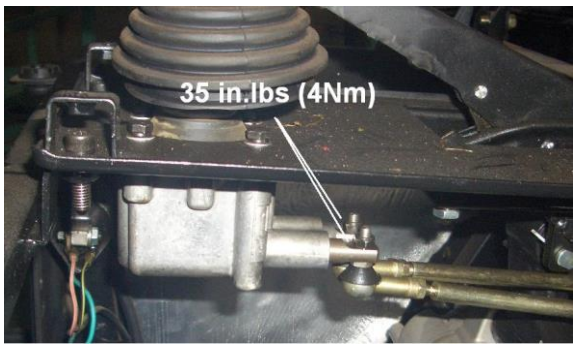
1. Inspect shift linkage tie rod ends, and pivot bushings and replace if worn or damaged. Lubricate the tie rod ends with a light aerosol lubricant or grease.
2. Loosen all rod end adjuster jam nuts.
3. Note orientation of tie rod end studs with stud up or down. Remove both rod end studs from transmission bell cranks.
4. Be sure idle speed is adjusted properly.

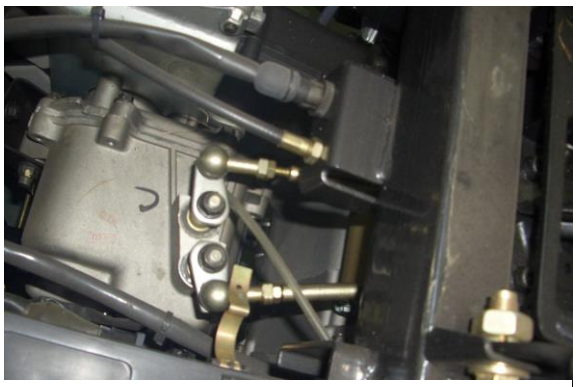
NOTE: It is important to disconnect both rod ends from the transmission bell cranks. If one linkage rod is incorrectly adjusted, it can affect the adjustment of the other rod.

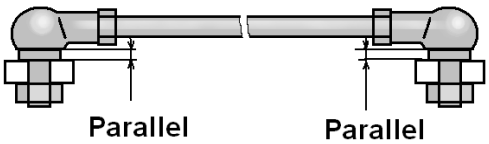
5. Place gear selector in neutral. Make sure the transmission bell cranks are engaged in the

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 unit resistance is felt. Mark the rod so revolutions can be easily counter.
8. Rotate the linkage rod counterclockwise unit 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.

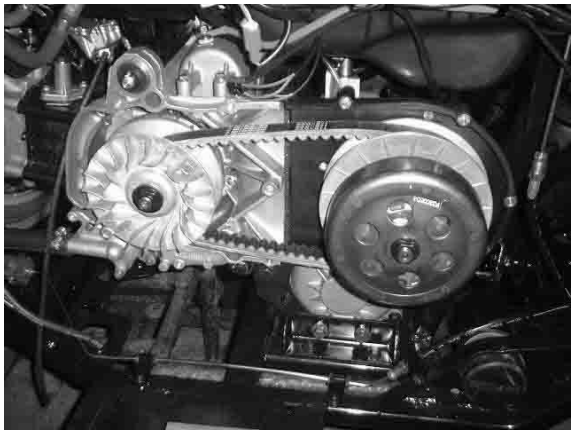






6.6 ENGINE AND TRANSMISSION REMOVAL

1. Remove seat, side panel cover L, side panel cover R, protect cover, seat frame, fuel tank , shift rods and tool box.

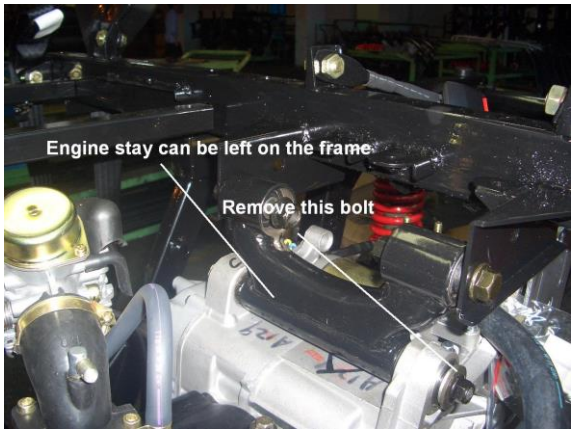


2. Remove CTV outer cover, drive and driven clutches, feed and return hoses (refer to Engine chapters).
3. Remove throttle cable wire connected to carburetor.
4. Disconnect engine from wiring harness completely.
5. Disconnect gear position indicator switches.
6. Remove fuel line connected to carburetor and drain line.

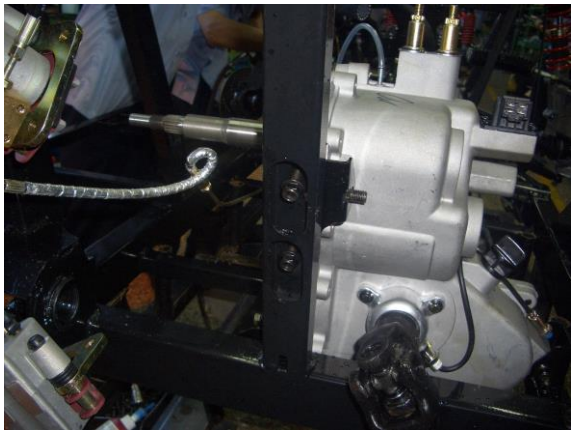
7. Loose all bolts on the brackets which connect the engine/ transmission between the frame, except the 2 brackets between the engine and transmission and left them on the transmission. See picture.

2 brackets between the engine and transmission

8. Remove right and left side engine mount bolts, and remove engine from engine stay.



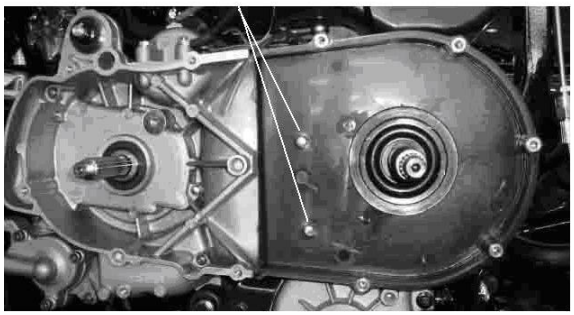
9. Remove front drive shaft (4WD, see chapter 5).
10. Remove lower left bracket, rear bracket and right mount bolts .(M10x1.25x70)



11. Remove transmission from frame and remove drive shaft.

6.7 ENGINE AND TRANSMSSION INSTALL

These 2 holes are only for jig use.
Don't install any bolts after assembled.



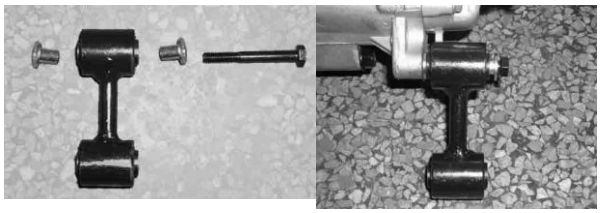
Transmission

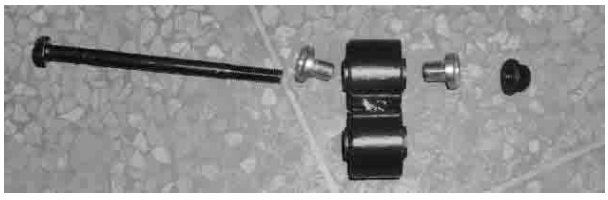
1. Position transmission in frame, Align rear drive shaft and slide shaft into the yoke.
2. Install all brackets, loosely install new fasteners.
3. Tighten fasteners in “right -left– rear” order.

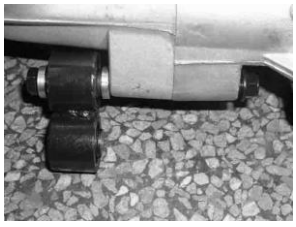
NOTE: While tightening, it is important to turn the rear drive shaft by hand to check the position of transmission. If the rear drive axle can not turn freely, it is necessary to loose (but not remove) the fasteners to re-position the transmission by tightening the fasteners in different order.

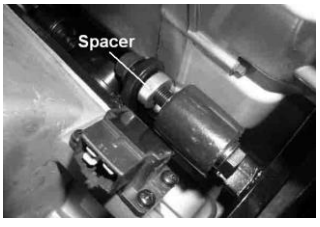
Transmission Mounting Bolts Torque: 25 ft. lbs. (35 Nm).

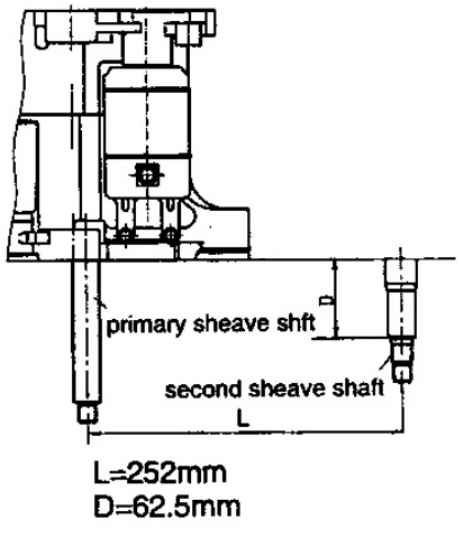
4. Drive in a new roll pin.
5. Position Engine in frame, Install all brackets, loosely install new fasteners, but not tighten fasteners.
6. Make sure those spacers are in correct position.
7. Link engine and transmission together with engine mount jig. (center distance of engine shaft and transmission main shaft is 252 mm and distance of side surface and shaft shoulder 62.5 mm)











8. Tighten engine mounting fasteners in top-to bottom order.
9. Remove jig.
10. Install both drive and driven clutches and outer CVT cover.

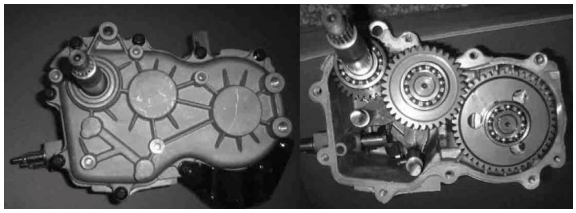
Engine Mounting Bolts Torque: 25 ft. lbs. (35 Nm).

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.

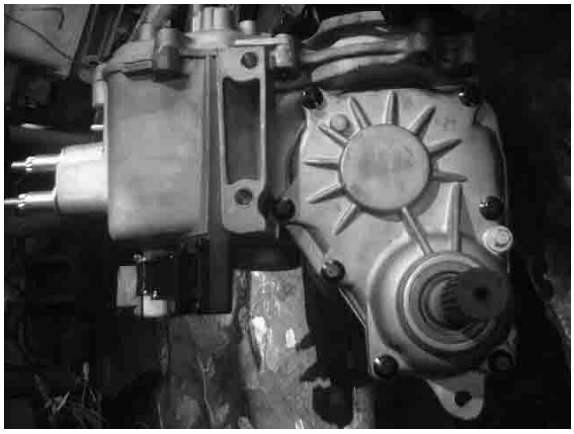
3. Remove the transmission cover bolts.
4. Carefully remove the cover with a soft face hammer tap on the cover bosses.



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.

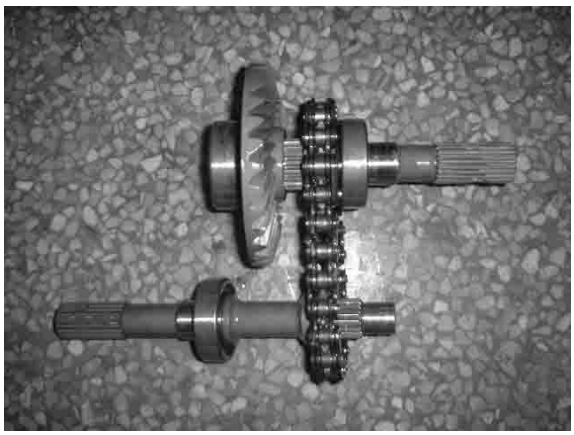
9. Note position of shim washers and thrust button.
10. Remove shafts as an assembly.
11. Clean all components and inspect for wear.
12. Inspect engagement dogs of gears and replace if edges are rounded.
13. Inspect gear teeth for wear, cracks, chips or broken teeth.
14. Remove seals from transmission 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.

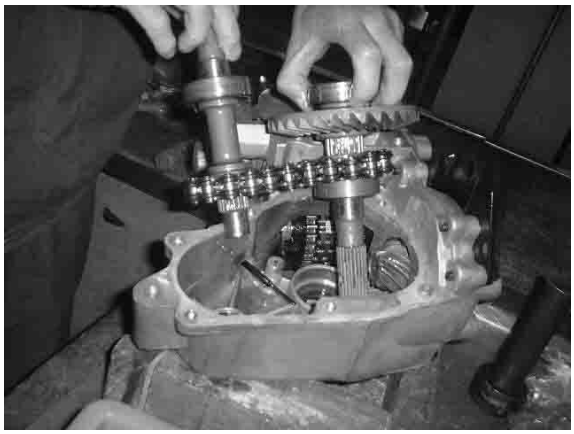
6.9 TRANSMISSION ASSEMBLY

1. Install sprocket on front output shaft with sprocket step side inward as shown (only for 4X4).

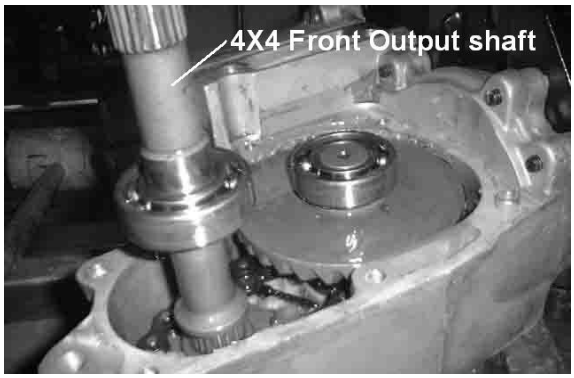


2. Assemble front (only for 4X4).and rear output shafts

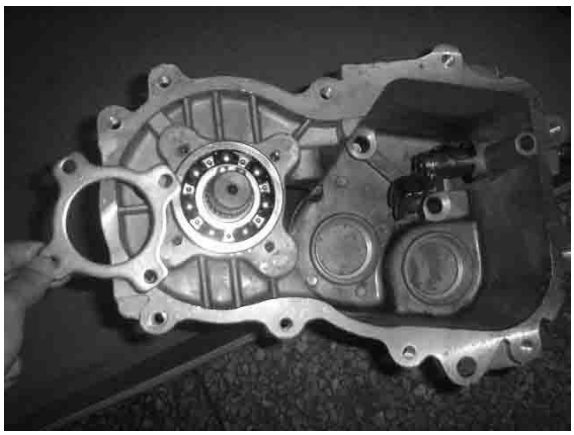
3. a. (4X4) Install front and rear output shafts with chain as an assembly.
   b. (2X4) Install rear output shaft.



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 crisscross 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 LoctiteTM 242(Blue) to screw threads and torque screws to 8 ft-lb. (12Nm).

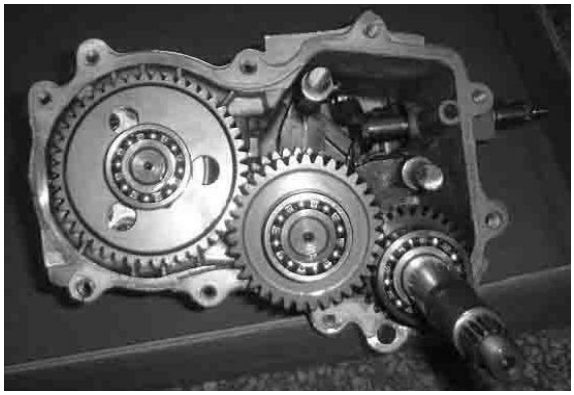
10. Assemble shafts with chain and shift forks.

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.

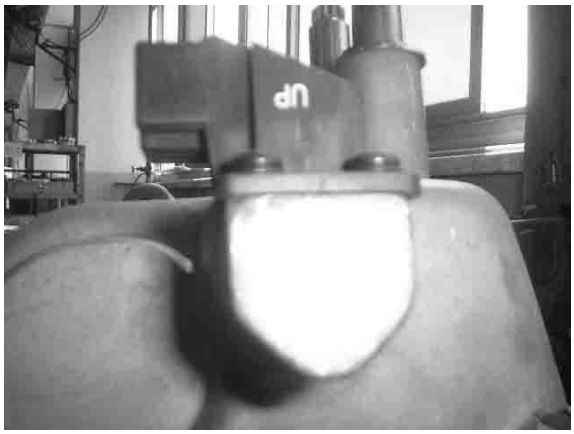
NOTE: Make sure shift shaft pins are properly positioned in the slot on selector arms.

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 LoctiteTM 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

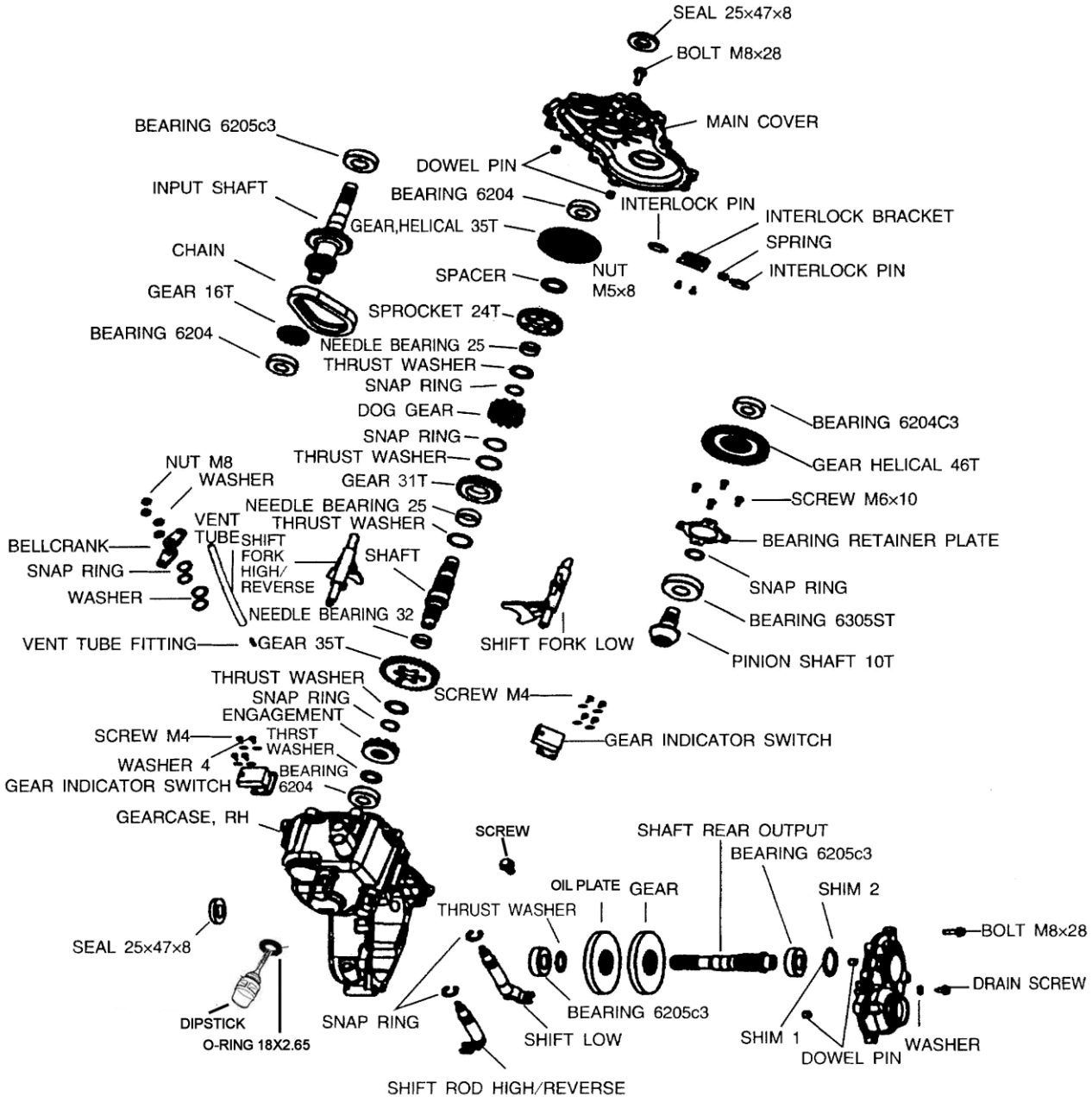
Check the following items when transmission locked

- Gear shifter malfunction (Selector lever end come out from slides notches), engage the Hi and Lo Gear at the same time.

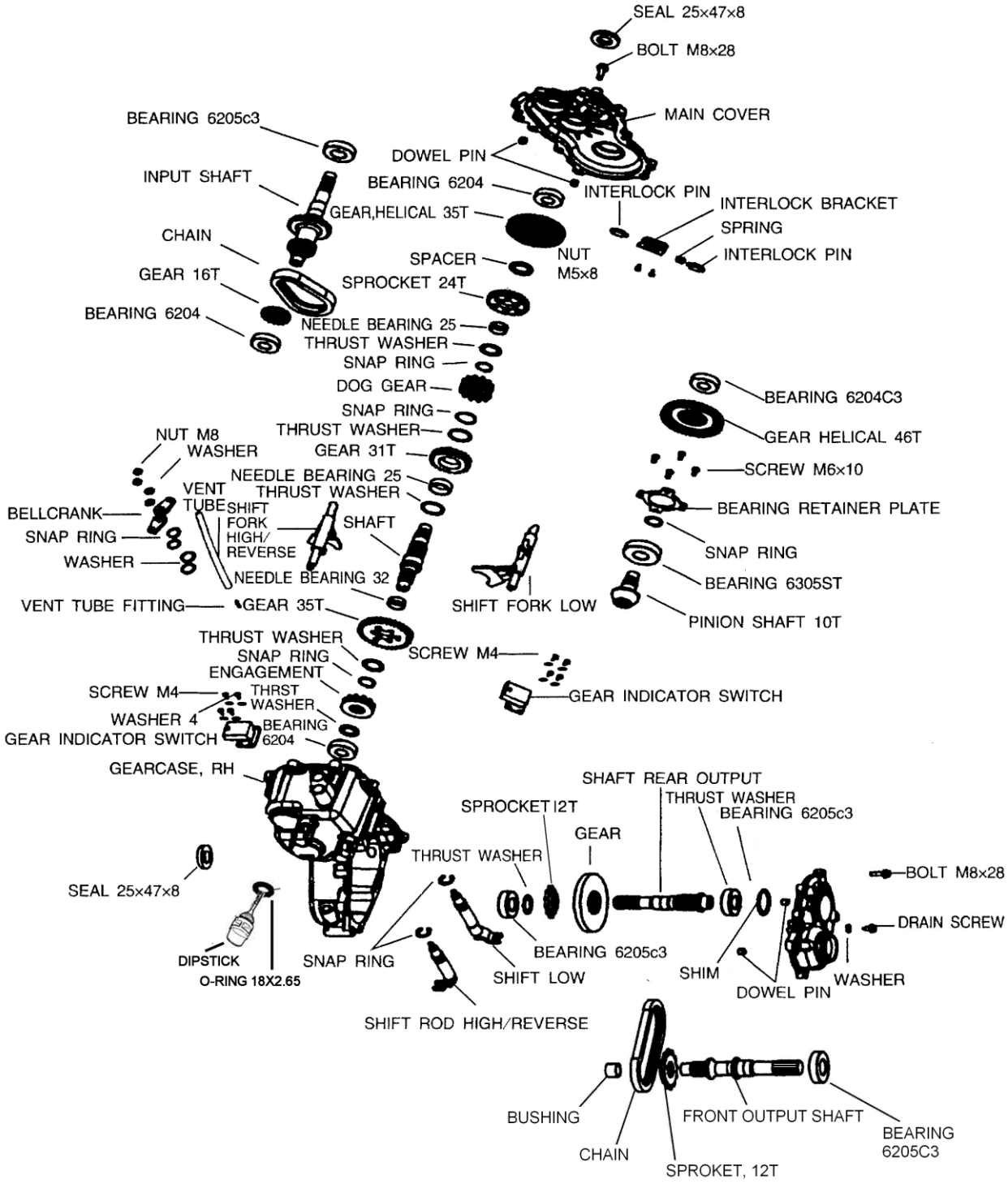
NOTE: To determine if shifting difficulty or problem is caused by an internal transmission problem , isolate the transmission by disconnecting linkage rods from transmission bell cranks . Manually select each gear range at the transmission bell crank, and test ride vehicle. If it functions properly,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

2X4 TRANSMISSION EXPLODED VIEW



4X4 TRANSMISSION EXPLODED VIEW



NOTES

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.

7.1 SPECIFICATIONS

Front Brake Caliper		
Item	**Standard**	**Service Limit**
Brake Pad Friction material Thickness	0.157"/ 4mm	0.04"/ 1mm
B rake Disc Thickness	0.150- 0.164"/3.810- 4.166mm	0.140"/ 3.556mm
Brake Disc Thickness Variance Between Measurements	-	0.002 "/ .051m m
Brake Disc Runout	-	0.005 "/ .127mm

Rear Brake Caliper			
Item		**Standard**	**Service Limit**
Brake Pad Friction material Thickness	hydraulic	0.157"/ 4mm	0.04"/ 1mm
	Hydraulic with mechanics park	0.236"/ 6mm	
	mechanics park	0.197"/ 5mm	
Brake Disc Thickness		0.177-0.187"/4.496-4.750m m	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

Item	Torque (ft. lbs. except where noted*)	Torque (Nm)
Front Caliper Mounting Bolts	18.0	25
Rear Caliper Mounting Bolts	18.0	25
Front Brake Disc	18.0	25
Rear Brake Disc	18.0	25
Park Brake Mouting Bolts	18.0	25
Banjo Bolt	15.0	21

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.
- DO NOT lubricate or clean the brake components with aerosol or petroleum products. Use only approved brake cleaning products.

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 CUV 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 BRAKE BLEEDING-FLUID CHANGE

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

CAUTION:

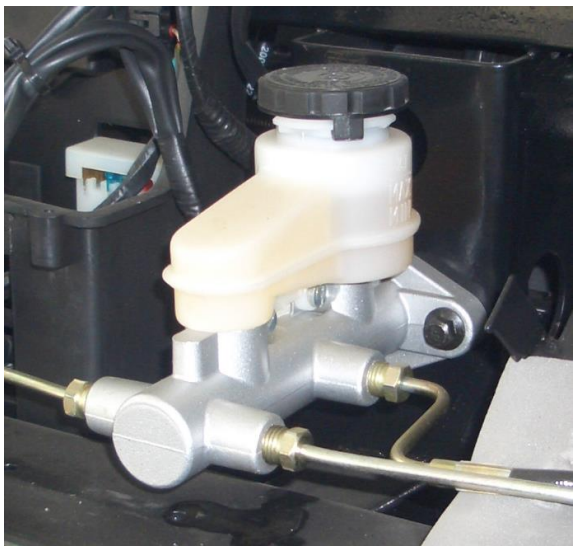
Always wear safety glasses.

CAUTION:

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the CUV

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

1. Clean reservoir cover thoroughly.



2. Remove cover from reservoir.

3. If changing fluid, remove old fluid from reservoir with a brake fluid pump or similar tool.
4. Add brake fluid up to the indicated MAX level on the reservoir.

DOT 3 Brake Fluid

5. 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.
6. Slowly pump foot pedal until pressure builds and holds.
7. Hold brake pedal on to maintain pedal pressure, and open bleeder screw. Close bleeder screw and release foot pedal.

NOTE: Do not release foot pedal before bleeder screw is tight or air may be drawn into master cylinder.

8. Repeat procedure until clean fluid appears in bleeder hose and al 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.

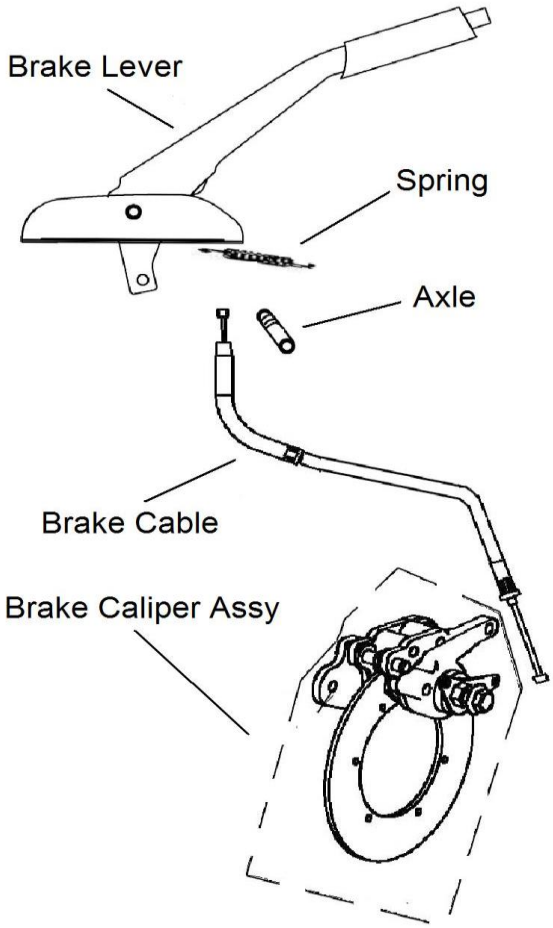
9. Tighten bleeder screw securely and remove bleeder hose.
10. Repeat procedure steps 5- 9 for the remaining

calipers.

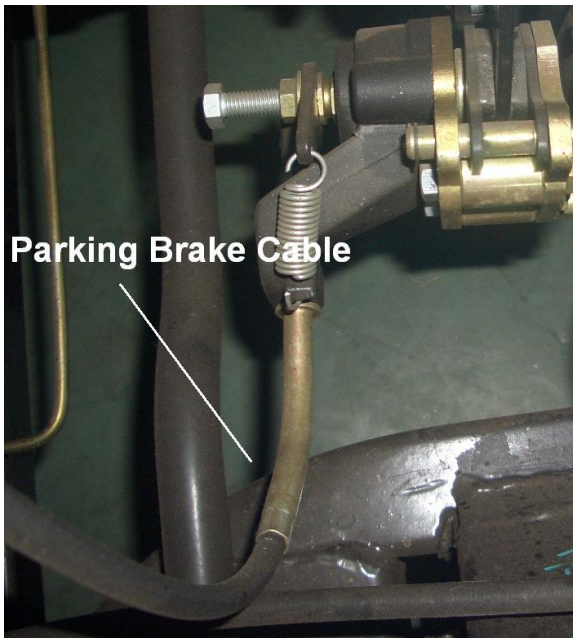
11. Add brake fluid to MAX level inside reservoir.
    Master Cylinder Fluid Level
    Between the MIN line and the MAX line of reservoir.
12. Install master cylinder reservoir cover.
13. Field test machine at low speed before putting into service. Check for proper braking action and pedal reserve. With pedal firmly applied, pedal reserve should be no less than 1/2 " (1.3cm).
14. Check brake system for fluid leaks and inspect all hoses and lines for wear or abrasion. Replace hose if w ear or abrasion is found.

7.6 PARKING BRAKE AND BRAKE LINE INSPECTION

1. Inspect the spring on the parking brake lever assembly.



2. Inspect the parking brake cable at the parking brake lever assembly on the brake caliper.



3. Inspect the brake lines and brake line connections for possible leaks or loose lines.

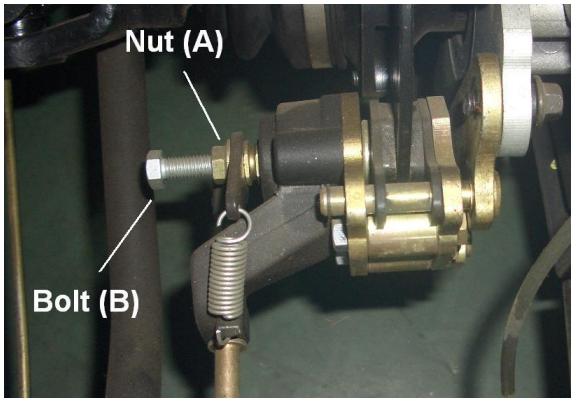
7.7 PARKING BRAKE ADJUSTMENT

Parking Brake Inspection

1. Push the parking brake up with your hand.
2. After 2 to 4 clicks of lever travel, the vehicle should not roll while parked.
3. If the vehicle moves, adjustment is necessary.
4. Adjust the parking brake where the cable attaches to the lever assembly on the rear brake caliper.

Parking Brake Adjustment

1. Place the vehicle in neutral on a flat level surface.
2. Carefully lift the rear of the vehicle off the ground and stabilize on jack stands.
3. Loosen the jam nut (A) on the rear caliper adjustment bolt (B).
4. Tighten the adjustment bolt (B) until the rear tire will not roate.
5. Back the adjustment bolt (B) out 1/4 turn.
6. Tighten the jam nut (A) while holding the adjustment nut (B) in place.

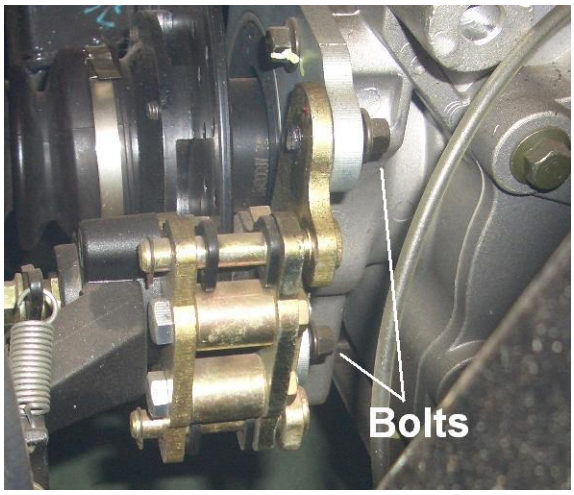


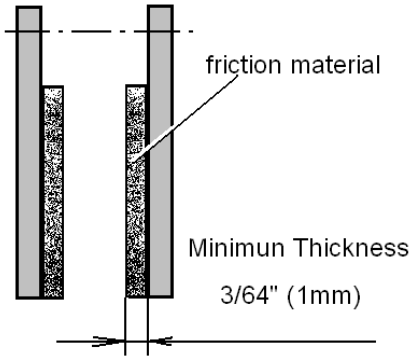
7.8 PARKING BRAKE REAR CALIPER REMOVAL / INSTALL

Park Brake Caliper Disassembly / Pad Inspection

NOTE: Do not get oil, grease, or fluid on the park brake pads. Damage to the pads may cause the pads to function improperly.

1. Loosen the two brake caliper bolts in equal increments. Remove the bolts from the bracket and lift park brake assembly out.

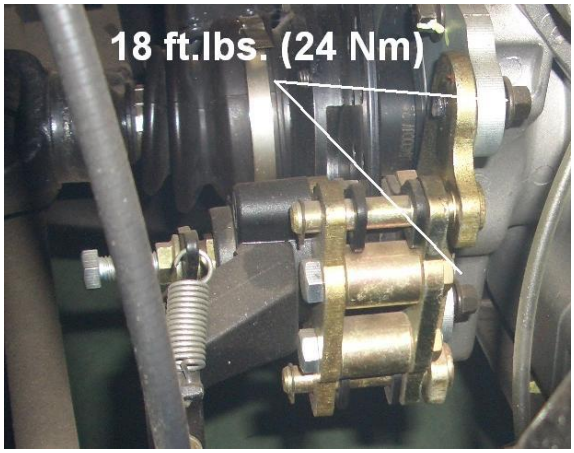




2. Measure the thickness of the caliper parking brake pads. Replace pads if worn beyond the service limit.
   Service Limit 0.3/64"(1 mm)

Park Brake Caliper Installation

1. Install the park brake assembly into place. Tighten the two bolts in increments for proper installation.



2. Torque the two bolts to 18 ft.lbs. (24 Nm).
3. Test the park brake for proper function.

7.9 FRONT PAD REMOVAL / INSPECTION / INSTALLATION

NOTE: The brake pads should be replaced as a set

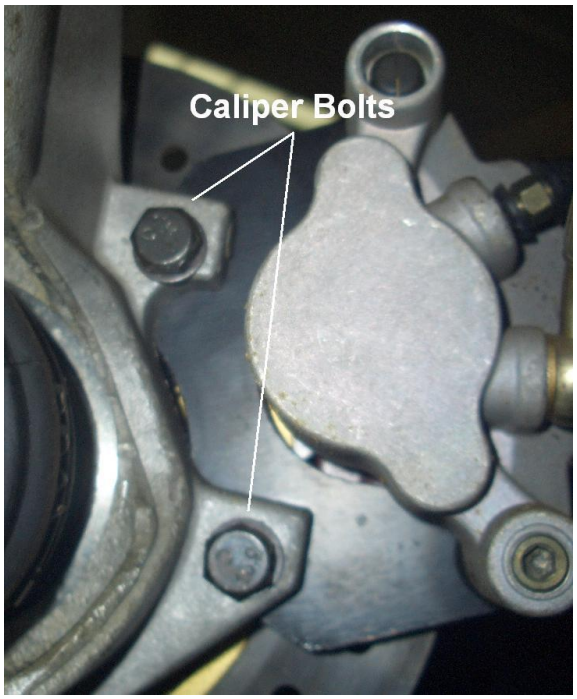
REMOVAL

1. Elevate and support front of CUV 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 the two caliper bolts and caliper from mounting bracket.

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

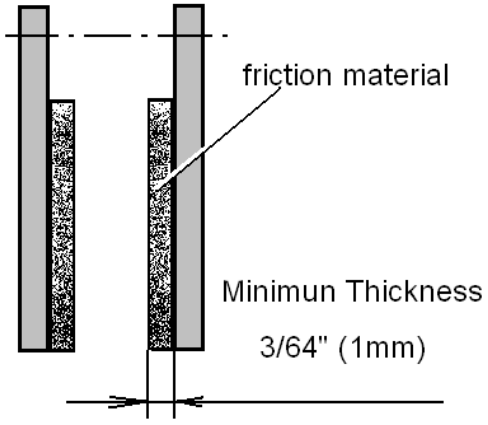
NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

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

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.
3. Install caliper on hub strut, and torque mounting bolts.
   Front Caliper Mounting Bolts
   Torque 18 ft. lbs. (25 Nm)
4. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2 ". (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. Be sure fluid level in reservoir is up to MAX line inside reservoir and install reservoir cap.
   Master Cylinder Fluid
   Up to MAX line inside reservoir
7. Install wheels and torque wheel nuts.
8. It is recommended that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise. Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Repeat procedure 10 times.

7.10 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 - 4.166 mm)
   Service Limit 0.140" / 3.556 mm

Brake Disc Thickness Variance
Service Limit 0.002 " (0.051 mm)
difference between measurements

3. Mount dial indicator as shown to measure disc runout on the dial indicator. Replace the disc if runout exceeds specifications.
   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 and tighten to specified.

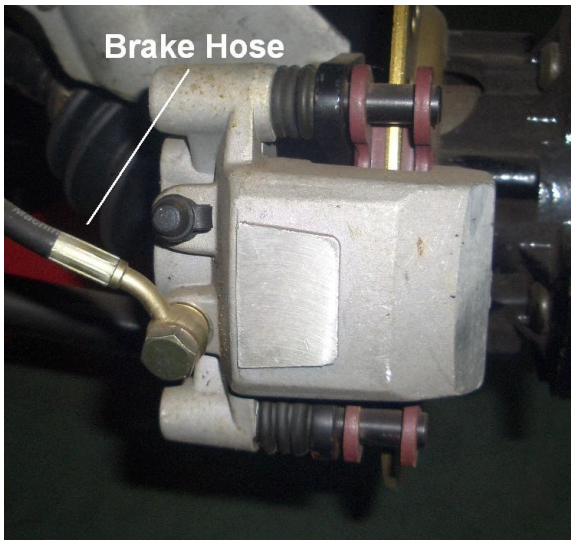
CAUTION:

Always use new brake disc mounting bolts.
Front Brake Disc Mounting Bolt Torque :
18 ft. lbs. (25 Nm)

7.11 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 CUV 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 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 to specified torque.
   Banjo Bolt Torque: 15 ft. lbs. (21 Nm)

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

7.12 REAR BRAKE PAD REMOVAL/ INSPECTION / INSTALLATION

NOTE: The brake pads should be replaced as a set.

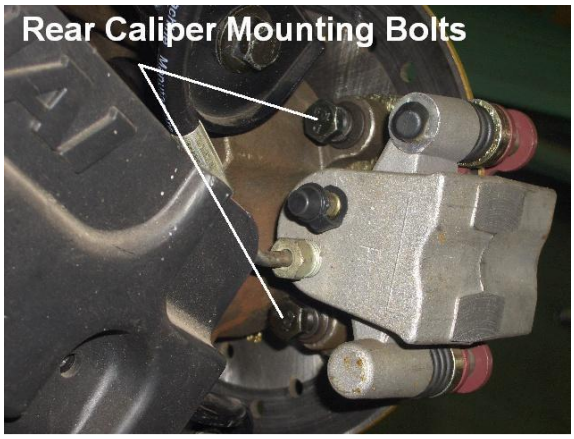
REMOVAL

1. Elevate and support rear of CUV 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 rear wheel.
3. Remove the two caliper bolts and lift caliper off of disc.



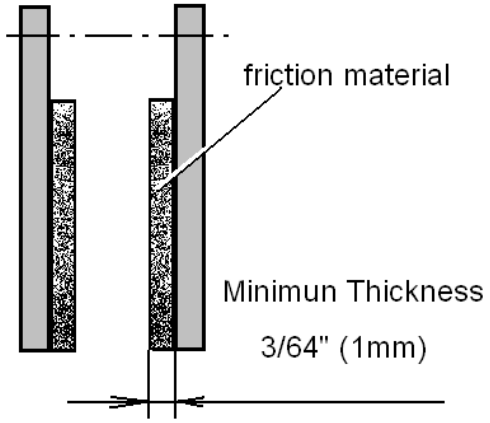
NOTE: When removing caliper, be careful not to damage brake line. Support caliper so as not to kink or bend brake line.

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. Remove the brake pads.
6. Clean the caliper with brake cleaner or alcohol.



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

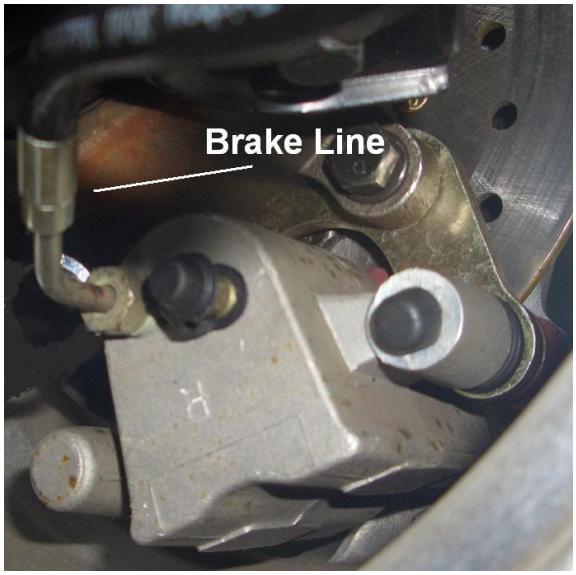
1. Install new pads in caliper body.
2. Install caliper and torque mounting bolts.
   Brake Caliper Torque: 18 ft. lbs. (25 Nm)
3. Turn adjuster screw back in finger tight using a hex wrench.
4. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2 ". (13 mm) of brake fluid in the reservoir to prevent air from entering the brake system.
5. Install wheels, burnishing procedure should be performed.

7.13 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 CUV manufacture via the agent for the parts and special instruction.



CAUTION:

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

1. Safely support the rear of the machine.
2. Use a wrench to remove the brake line. Place a container to catch brake fluid draining from brake

lines.

3. After the fluid has drained into the container, remove the caliper mounting bolts and 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 to 18 ft.lbs. (25 Nm).
8. Install brake hose and tighten to specified torque.
   Banjo Bolt Torque: 15 ft. lbs. (21 Nm)
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.
11. Install the rear wheel and wheel nuts. Carefully lower the vehicle.

NOTE: If new brake pads are installed, it is recommended that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

7.14 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 0.150-0.164" (3.810 - 4.166 mm)
   Service Limit 0.140" / 3.556 mm
   Brake Disc Thickness Variance
   Service Limit 0.002 " (0.051 mm)

difference between measurements

3. Mount dial indicator as shown to measure disc runout on the dial indicator. Replace the disc if runout exceeds specifications.

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.
   Tighten to specified.
   Rear Brake Disc Mounting Bolt Torque :
   18 ft. lbs. (25 Nm)

CAUTION:

Always use new brake disc mounting bolts.

NOTES

CHAPTER 8 ELECTRICAL

8.1 PARTS INSPECTION AND SERVICE

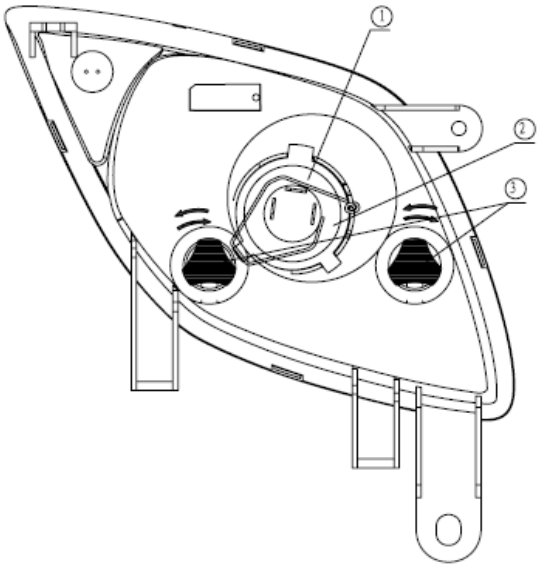
A HEADLIGHT ADJUSTMENT

1. Use bulb 12V 35W/35W.
2. Pull the cable plug off the conducting strip in the socket, remove the clip① 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

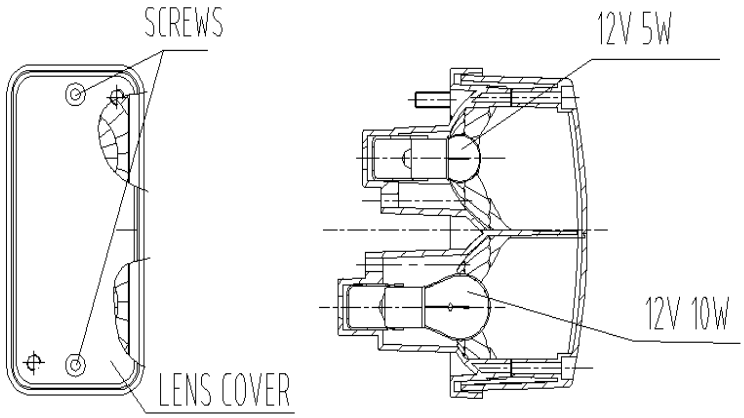
1. The headlight beam can be adjusted vertically (all models) and horizontally (except the light on handlebar).
2. Place the vehicle on a level surface with the headlight approximately 25'(7.6m) from a wall.
3. Measure the distance from the floor to the center of the headlight and make a mark on the 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.



To turn the two adjusting screws ③clockwise 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.



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.
KEER 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.

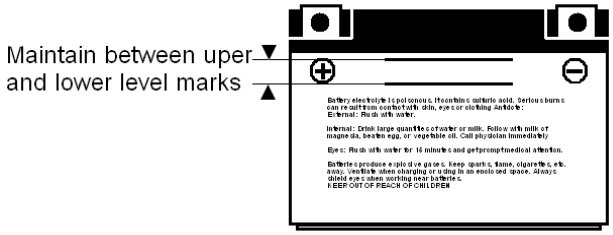
NOTE: This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.

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 multitester. 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 multitester 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.

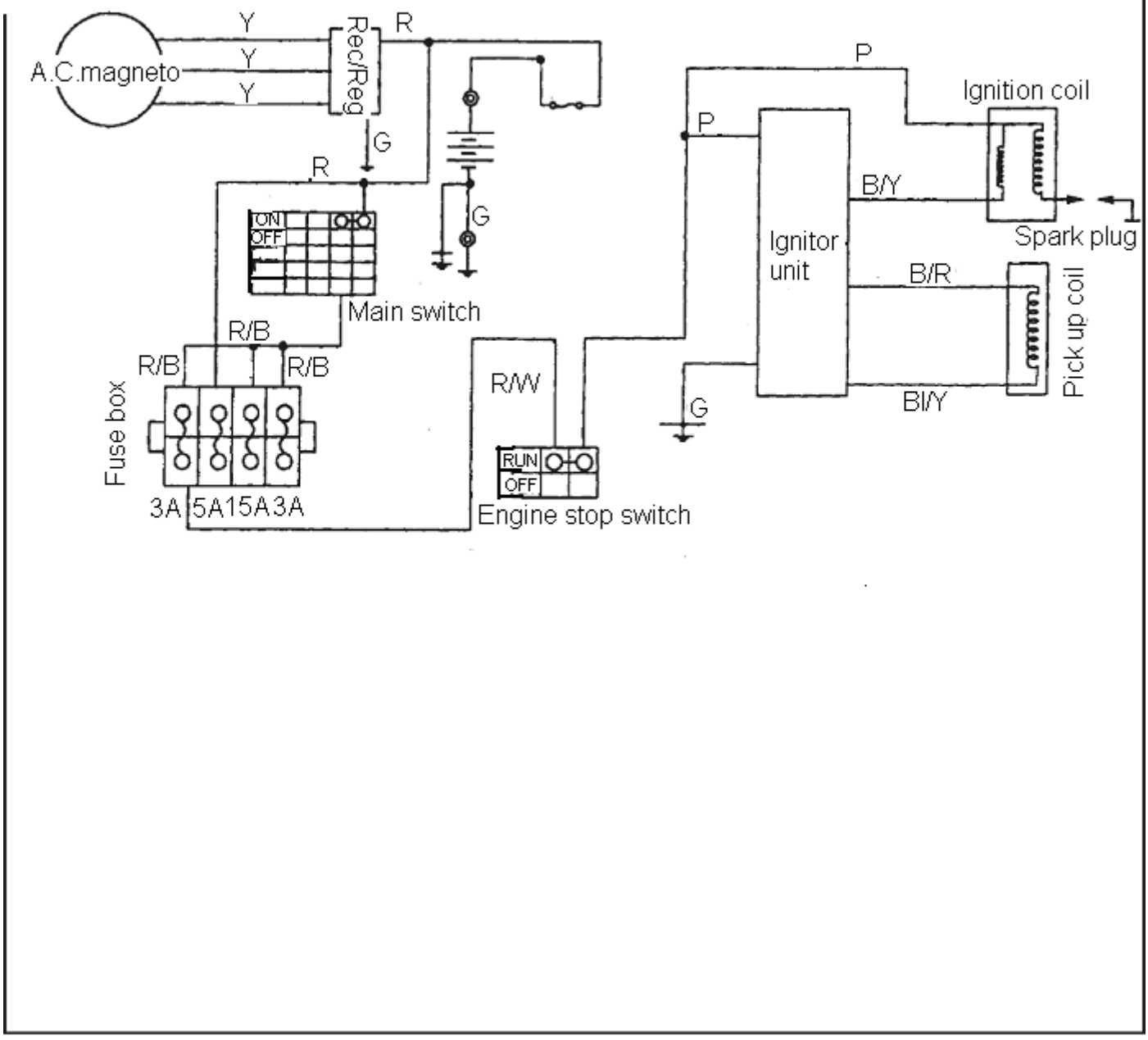
8.3 IGNITION SYSTEM

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

1.Fuse → NO CONTINUITY → Replace the fuse.

Check switches

⇩ CONTINUITY

2. Battery → INCORRECT

- Check the battery condition.

Refer to "BATTERY INSPECTION"

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

⇩ CORRECT

Standard spark plug: DR8EA / NGK

3.Spark plug → OUT OF SPECIFICATION

- 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

⇩

*

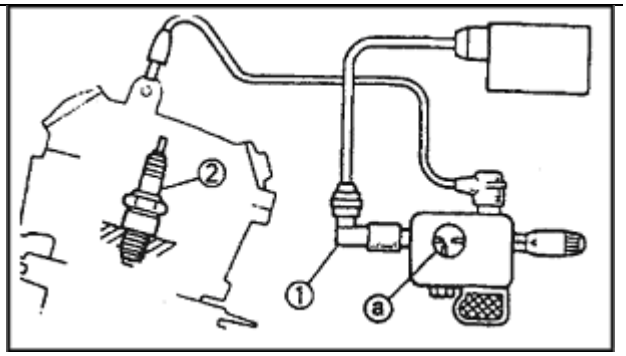
*

⇩

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)

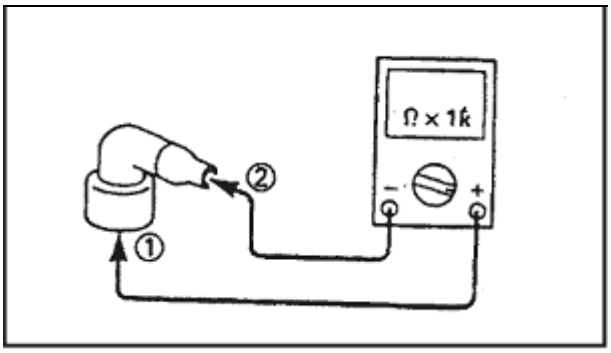
⇩ OUT OF SPECIFICATION OR NO SPARK

5.Spark plug cap resistance

●Remover the spark plug cap.

●Connect the pocket tester (ΩX1 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 side①
Tester (—) lead→
High tension cord side ②



OUT OF SPECIFICATION

↓

Replace the spark plug cap

Spark plug cap resistance: 5KΩ(20 ℃)

⇩ CORRECT

*

*

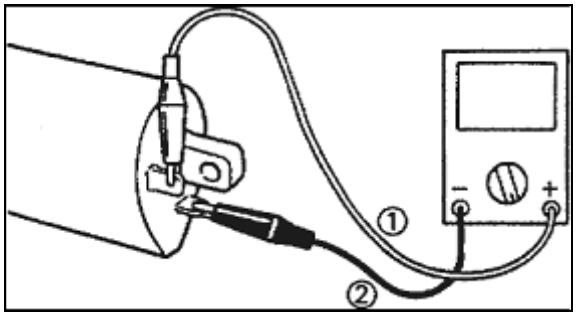
⇩

6. Ignition coil resistance

Disconnect the ignition coil connector from the wire harness.

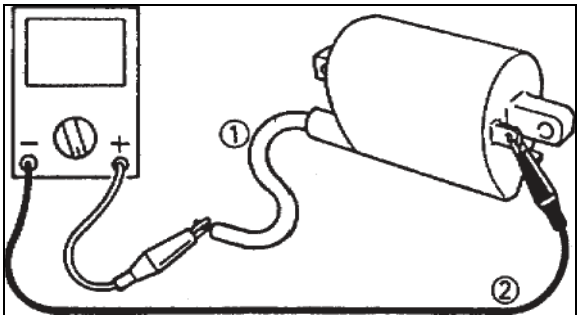
- Connect the pocket tester (1) to the ignition coil.
- Check if the primary coil has the specified resistance.

Tester (+) lead
Pink Terminal
Tester ( ) lead B/Y
Terminal



Primary coil resistance: 3.6-4.8Ω(20 ℃)

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℃)

OUT OF SPECIFICATION

⇩

BOTH MEET SPECIFICATION

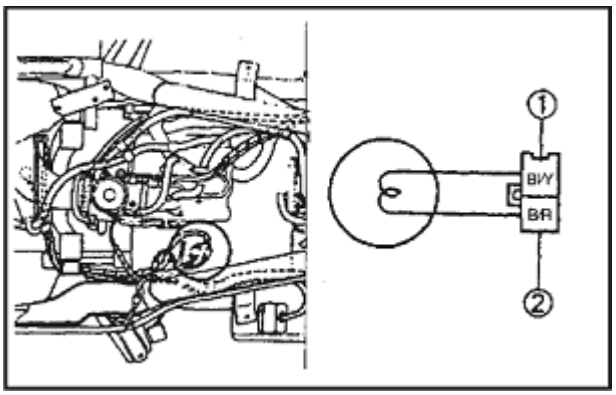
Replace the ignition coil.

*

*

7. Pickup coil resistance

● Disconnect the pickup coil coupler from the wire harness.
●Connect the pocket tester (Ω 100) to the pickup coil coupler.



Tester (+) lead →

BI/Y Terminal ①

Tester (-) lead→

B/R Terminal ②

● Check the pickup coil has the specified resistance.

Primary coil resistance:
168 -252Ω (20°C)

OUT OF SPECIFICATION

Replace the pickup coil.

MEETS SPECIFICATION

8.Main switch

CHECK SWITCHES

NO CONTINUITY

Replace the main switch

CONTINIUTY

9.Engine stop switch (for USA model)

NO CONTINUITY

Replace the handlebar switch.

CONTINIUTY

10.Wiring connection

●Check the connection of the entire ignition system
Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTIONS

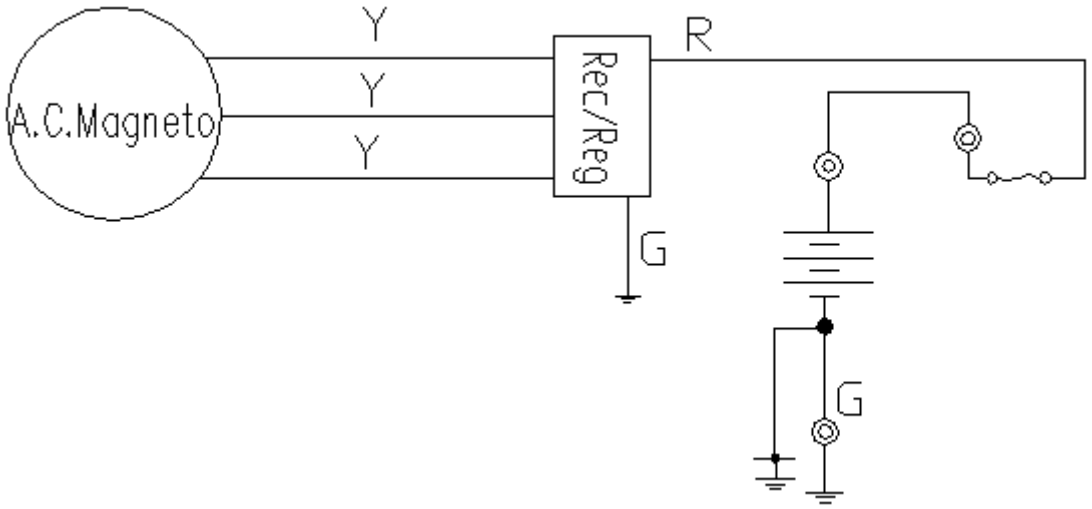
Correct

CORRECT

Replace the igniter unit.

8.4 CHARGING SYSTEM

CHARGING SYSTEM CIRCUIT DIAGRAM

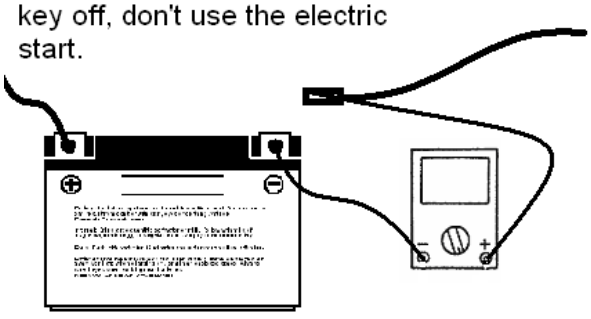


CURRENT DRAW - KEY OFF

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)

key off, don't use the electric start.



CHARGING SYSTEM

Procedure

Check:

1. Fuse (Main)
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring system (entire charging system)

1. fuse

NO CONTINUITY

Replace the fuse

2. Battery

Check the battery condition.
Refer to "BATTERY INSPECTION"

INCORRECT

Clean battery terminals
Recharge or replace the battery

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 changed battery.

MEETS SPECITICATION

The charging circuit is not faulty
Replace the battery

OUT OF SPECICATION

4. Starter coil resistance
Remove the A.C. magneto coupler from wire harness
Connect the pocket tester (ΩX1) to the stator coil
Tester (+) lead –yellow terminal
Tester (-) lead –yellow terminal
Measure the stator coil resistance
Stator coil resistance 0.5-0.8Ω（20℃）

OUT OF SPECITICATION

Replace the stator coil

MEETS SPECIFICATION

5.Wiring connection
check the entire charging system for connections
Refer to “CIRCUIT DIAGRAM”

POOR CONNECTION

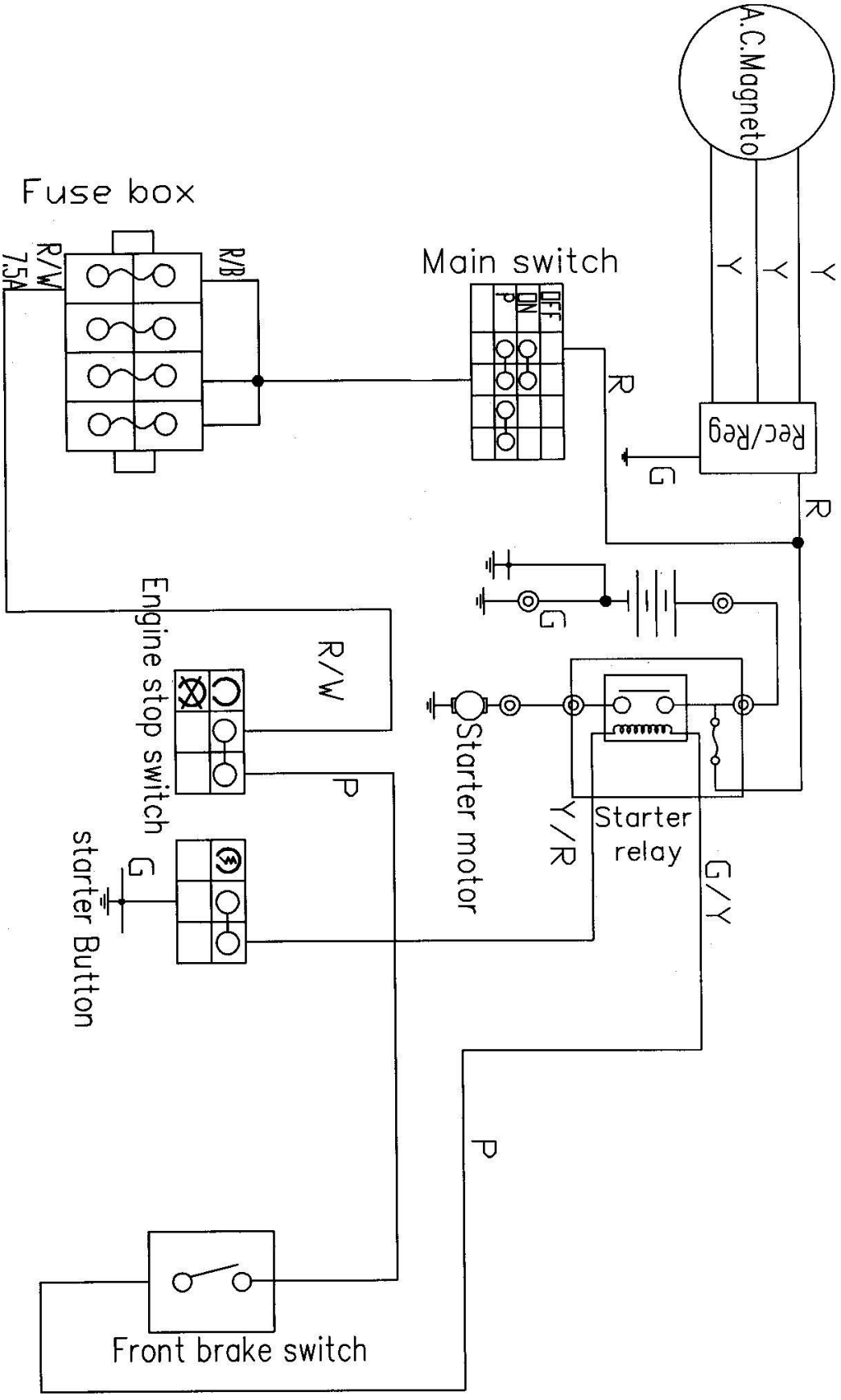
correct

CORRECT

Replace the rectifier/regulator

8.5 ELECTRICS STARTING SYSTEM

DIAGRAM



TROUBLESHOOTING

IF THE STARTER MOTOR FAILS TO OPERATE

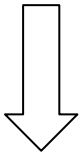
Procedure

Check:

1. Fuse (Main)
2. Battery
3. starter motor
4. starter relay
5. starting circuit cut-off relay
6. main switch
7. Engine stop switch
8. front/rear brake switch
9. starter switch
10. wiring connection (entire starting system)

1. fuse

refer to "CHECKING SWITCHES" section

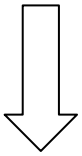


NO CONTINUITY

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 (Ωx1) and battery (12V) to the relay unit coupler terminals.

Battery (+) lead→
Green/Yellow terminal ①
Battery (-) lead→
Yellow/Red terminal ②

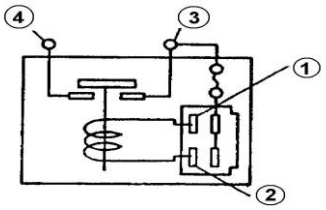
●Check the starter relay for continuity.

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



CONTINUITY ⇩

Replace the starter replay

5. .Starting circuit cut-off relay

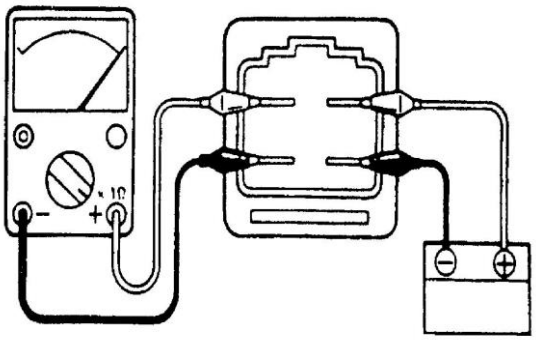
●Disconnect the starting circuit cut-off relay coupler from the wireharness.

●Connect the pocket tester (Ωx1) 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



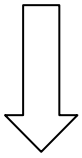
⇩

Replace the starting circuit cut-off relay

6. Main switch

CHECK SWITCHES

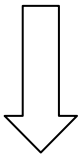
NO CONTINUITY



Replace the main switch

7. Engine stop switch

NO CONTINUITY

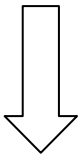


Replace the handlebar switch

8 Front /rear brake switch

CHECKING SWITCHES

NO CONTINUITY

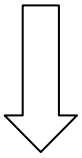


Replace the brake switch

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

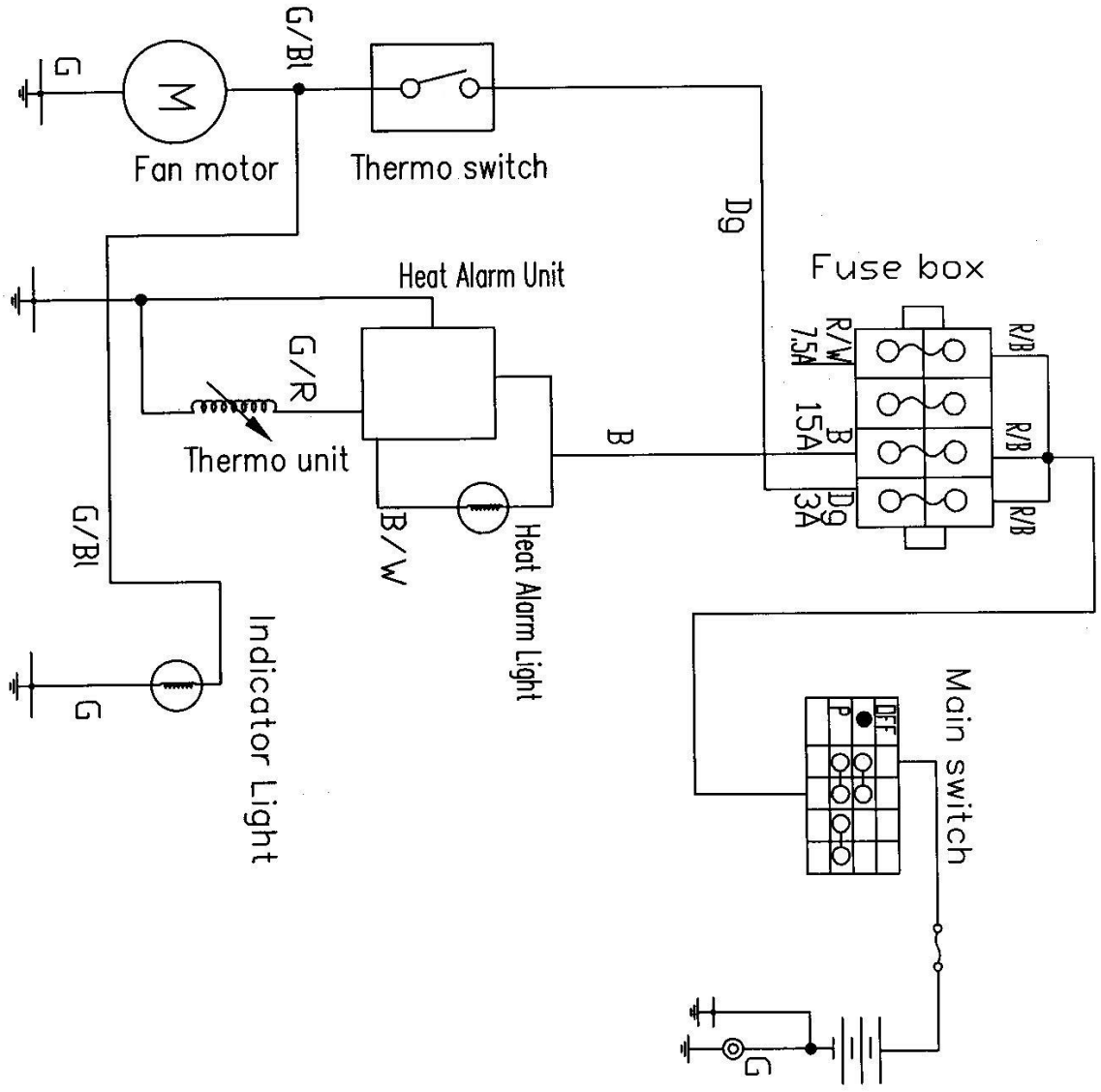
POOR CONNECTION

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

2. Battery
Check the battery condition.
Refer to "BATTERY INSPECTION" section → INCORRECT → Clean battery terminals
Recharge or replace the battery

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 ①
Battery (-) lead→Green ground ②
Check the fan motor operation → DOES NOT MOVE → Replace fan motor

5. Fan motor (inspection 2)
Turn the main switch to off.
- Remove the thermo switch lead from thermo switch.
- Connect jumper lead to thermo switch leads.
- Turn the main switch to on

→ DOES NOT MOVE → The wiring circuit from battery to fan motor is faulty. Repair

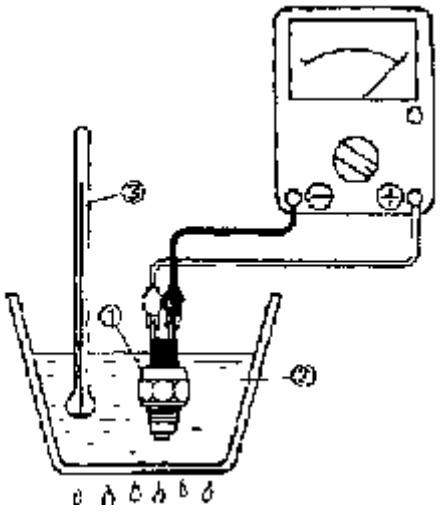
6. Thermo switch

Remove the thermo switch from the radiator.

- Connect the pocket tester (ΩX1) to the thermo switch①.
- 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℃ Thermo switch "ON"
80 ℃ 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℃ 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℃ 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 → NO CONTINUITY → Replace the fuse

2. Battery

Check the battery condition.
Refer to "BATTERY INSPECTION"

→ INCORRECT → Clean battery terminals
Recharge or replace the battery

3.Main switch

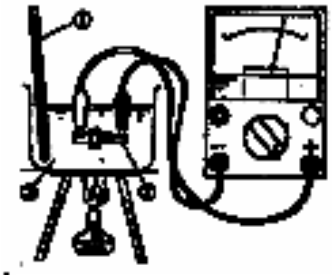
CHECKING SWITCHES → NO CONTINUITY → Replace the main switch

4.Thermo unit

●Drain the coolant and remove the thermo unit from the cylinder head.

●Immerse the thermo unit ②in the coolant③ .

①Thermometer.



Coolant temperature	Resistance
80℃	47.5~56.8Ω
100℃	26.2~29.3Ω

Handle the thermo unit with special care.
Never subject it to strong shocks or allow it to be dropped.
Should it be dropped, it must be replaced.
Do not touch the thermo unit to the bottom of the heated vessel.

OUT OF SPECIFICATION →

Replace the thermo unit

MEETS SPECIFICATION ↓

8. 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.

OUT OF SPECIFICATION →

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

↓

8. Wiring connection check the connections of the entire cooling system.

Refer to “CIRCUIT DIAGRAM”

POOR CONNECTION →

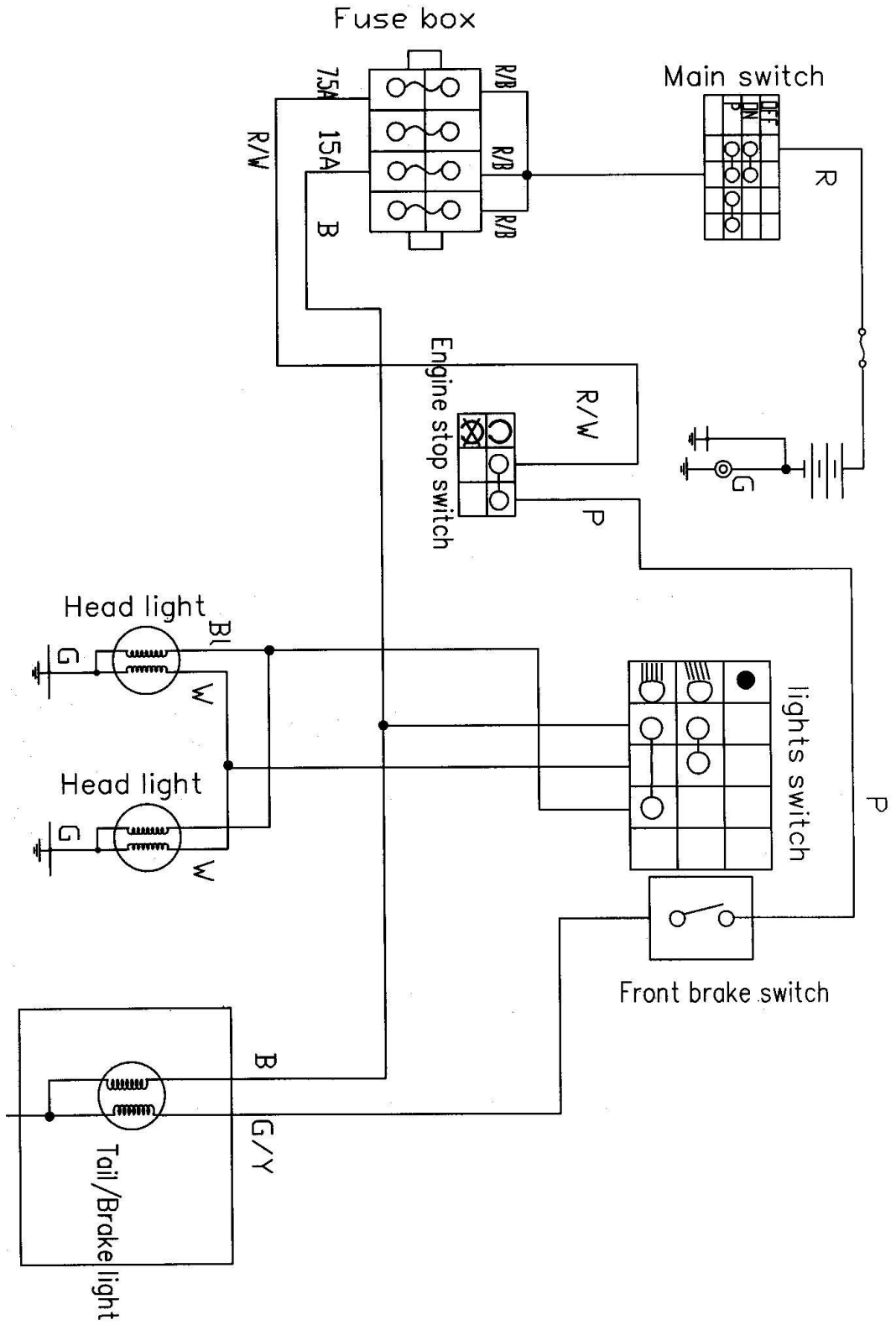
CORRECT

↓

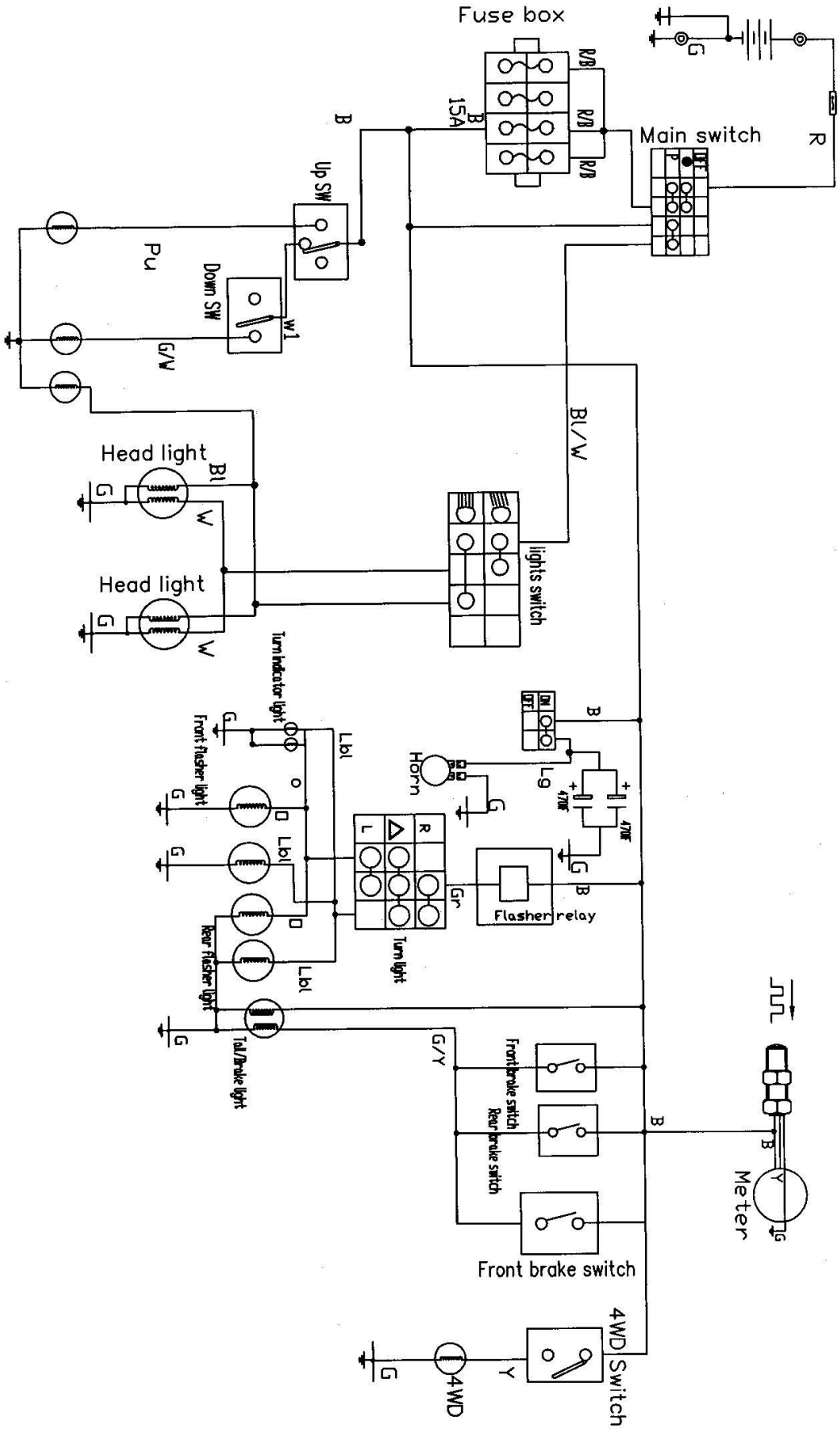
Replace the temperature gauge

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

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. Main switch

CHECK SWITCHES

NO CONTINUITY

Replace the main switch

4. Light switch

CHECK SWITCHES

NO CONTINUITY

Replace the right handlebar switch

5. Dimmer sw

CHECK SWITCHES

NO CONTINUITY

Replace the left handlebar switch

6. Wiring connection

Check the connection of the entire lighting system

POOR CONNECTIONS

correct

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.Blub and bulb socket

CHECK SWITCHES

NO CONTINUITY

Replace the bulb and/ or bulb socket

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 ①or Blue ②lead

Tester negative (-) lead →Green ③lead

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

OUT OF SPECIFICATION

The wiring circuit from the main switch to

bulb socket connector is faulty.

Repair

This circuit is not faulty

2. the taillight fails to come on

1. Bulb and bulb socket

CHECK SWITCHES

NO CONTINUITY

Replace the bulb and /or bulb socket

CONTINUITY

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

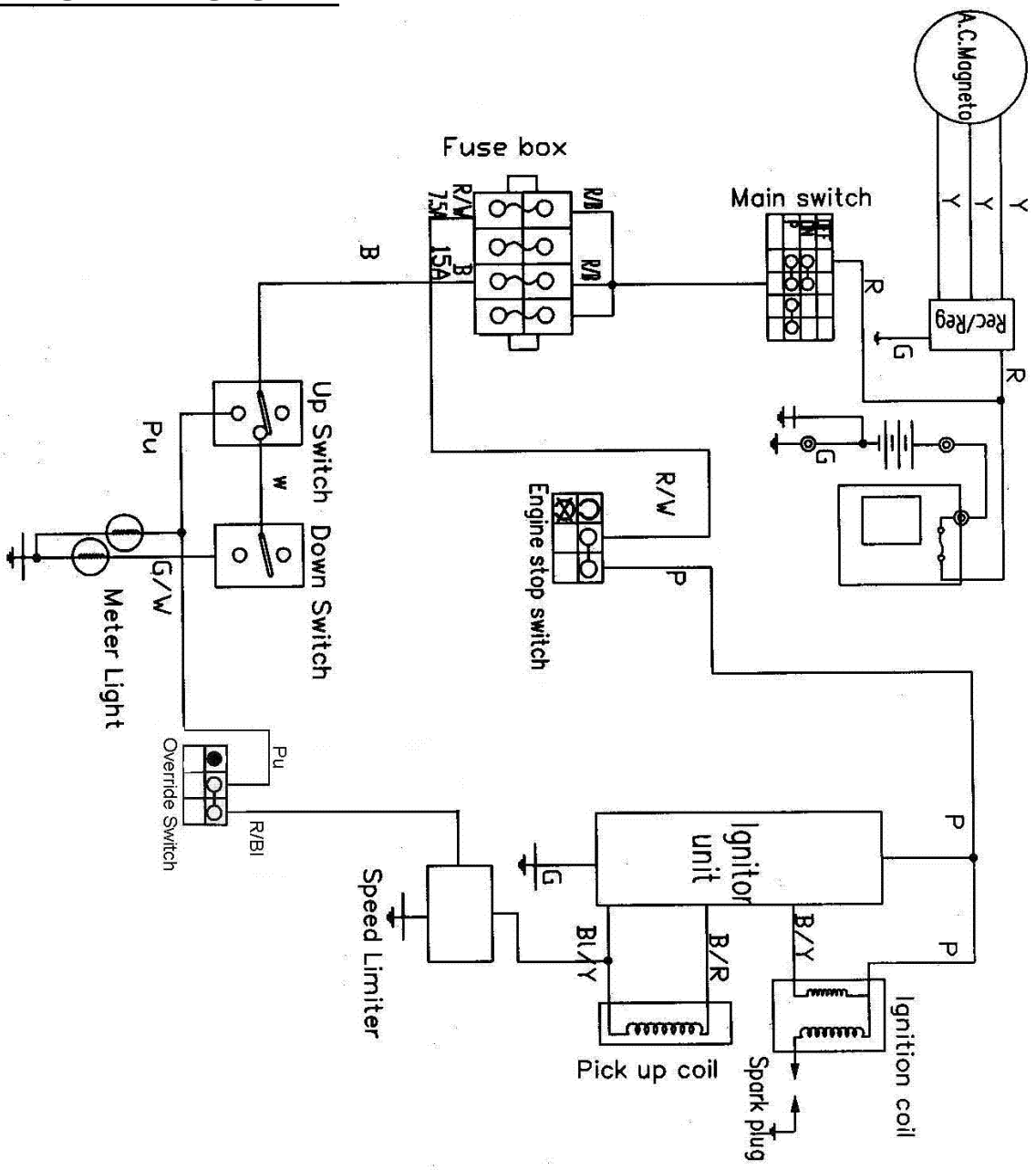
OUT OF SPECIFICATION

The wiring circuit from main switch to bulb connector of faulty.

Repair

This circuit is not faulty

8.8 REVERSE LIMIT SYSTEM



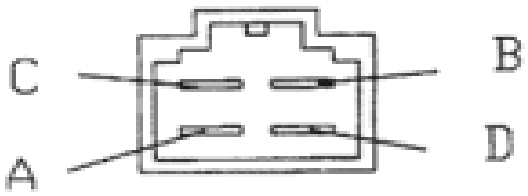
The limit set for the speed limiter by the manufacturer is 13~15 km/h, which can be reset in accordance with the user's practice. Turning the adjusting bolt clockwise is to increase the speed, while counterclockwise decrease it.

NOTE. This limit can be released by the override switch.

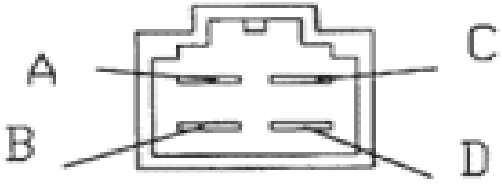
8.9 GEAR POSITION INDICATOR SWITCH TEST

Switch table

High /Neutral/Reverse Switch



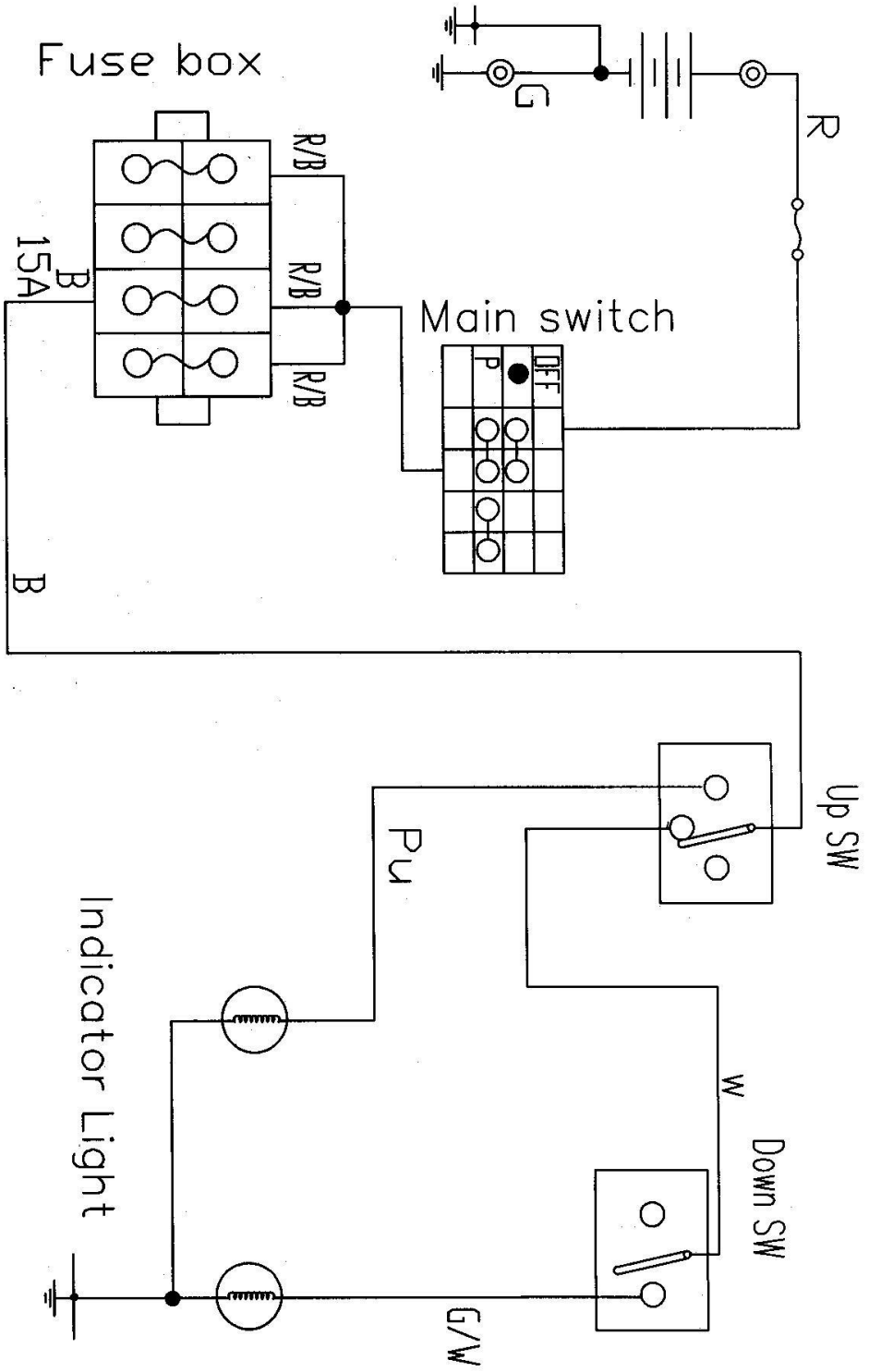
Low/Neutral/Switch



	D	A	B	C
High Range	●		●	
Reverse	●	●		
Neutral	●			●
Low Range	●			●

	D	C	B	A
	●	●		
	●	●		
	●	●		
	●		●	

Switch schematic



8.10 SPEEDMETER SYSTEM

OPERATION OF SPPED SENSOR

Speed Sensor is on the rear axle

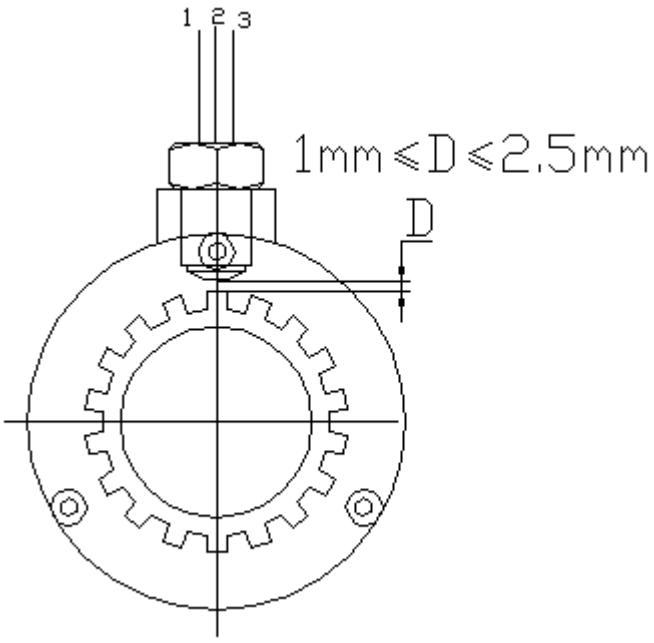
Operation Instructions of Electric Dial Meter and Speed Sensor/ Operation Instructions of LCD Meter and Speed Sensor

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 senor in (CW) by hand slightly until resistance is felt.

3. Turn the sensor CCW by 1 to 2 turn(s).

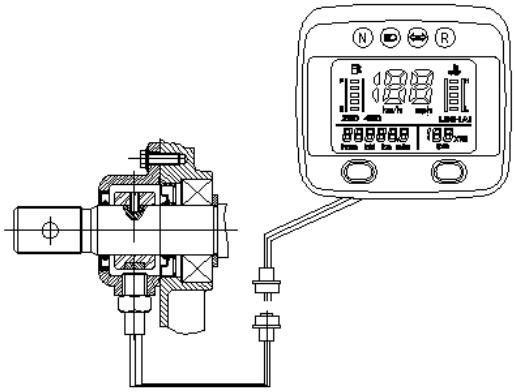
4. Tighten the jam nut.

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。



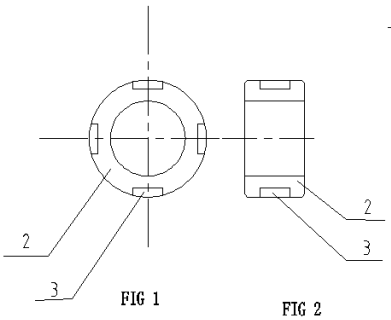


FIG 1

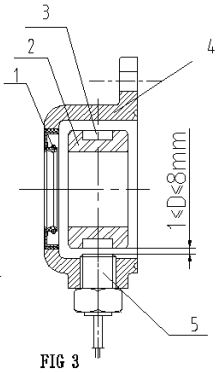
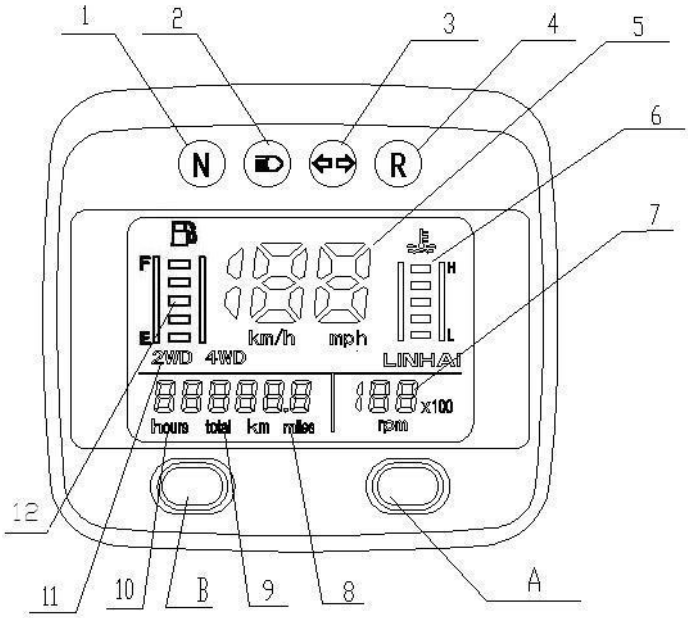


FIG 2

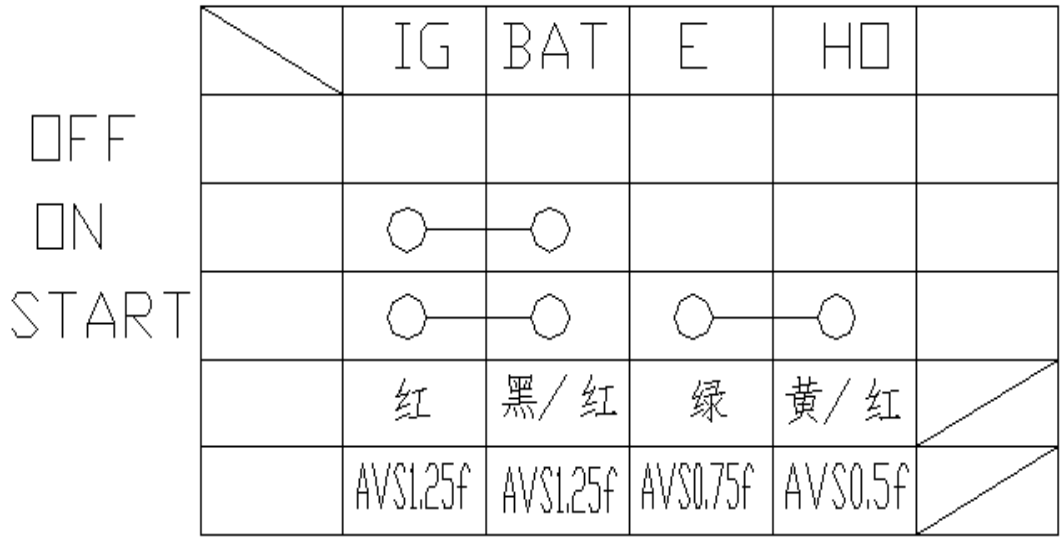
FIG 3



1. OIL SEAL	4. THE COVER
2. DOWEL PIN	5. THE HALL SENSOR
3. MAGNET	

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

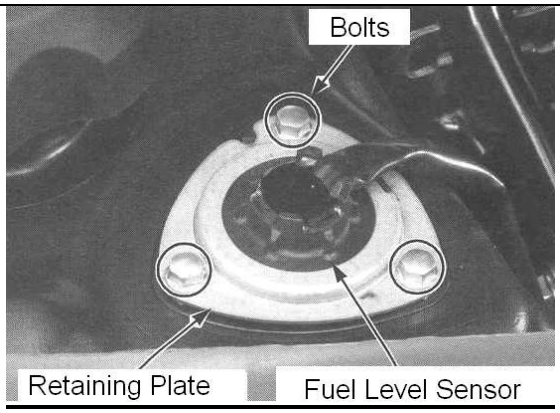
8.11 MAIN SWITCH AND HANDLE SWITCH



8.12 FUEL GAUGE/ FUEL LEVEL SENSOR

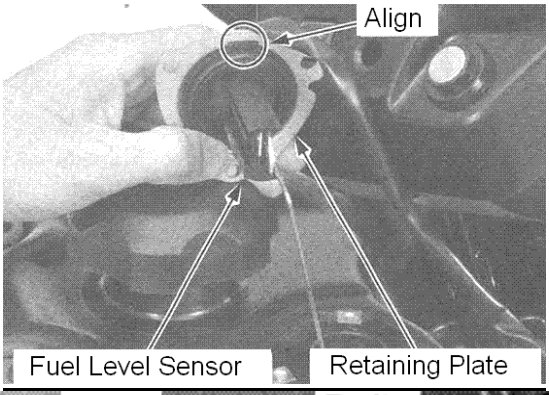
Removal

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.

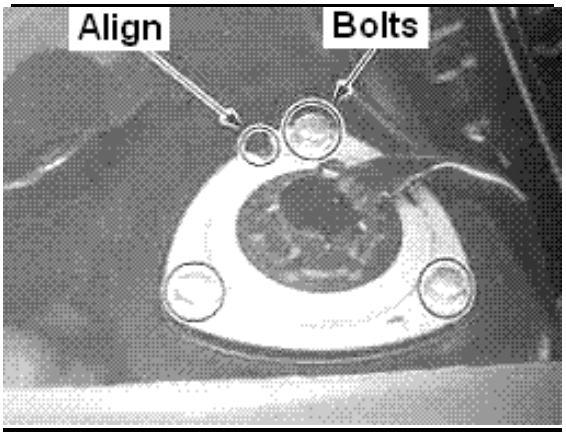


Installation

Install a new seal rubber onto the fuel level sensor.
Install the retainer plate onto the sensor by aligning the tab with the grove.

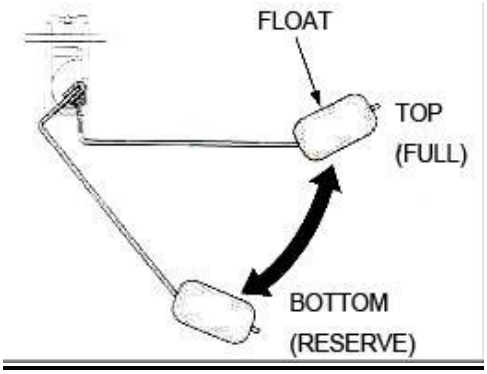


Install the sensor into the fuel tank while aligning the grove in the plate with the boss on the fuel tank.
Install and tighten the bolts securely.
Install the removed parts in the reverse order of removal.

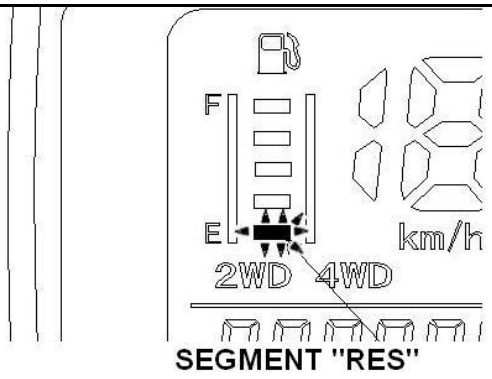


Fuel Gauge / Fuel level Sensor Inspection

Move the float to the bottom (RESERVE) position, turn the ignition switch to "ON" and check the fuel gauge.

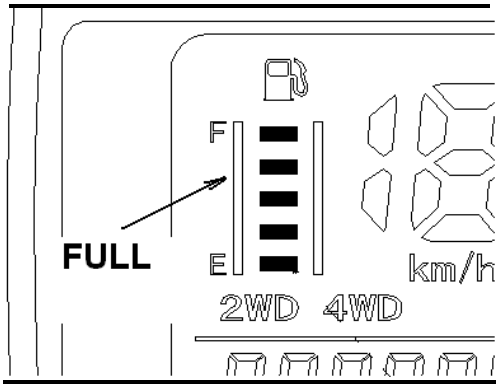


Segment “RES” should blink.



SEGMENT "RES"

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.

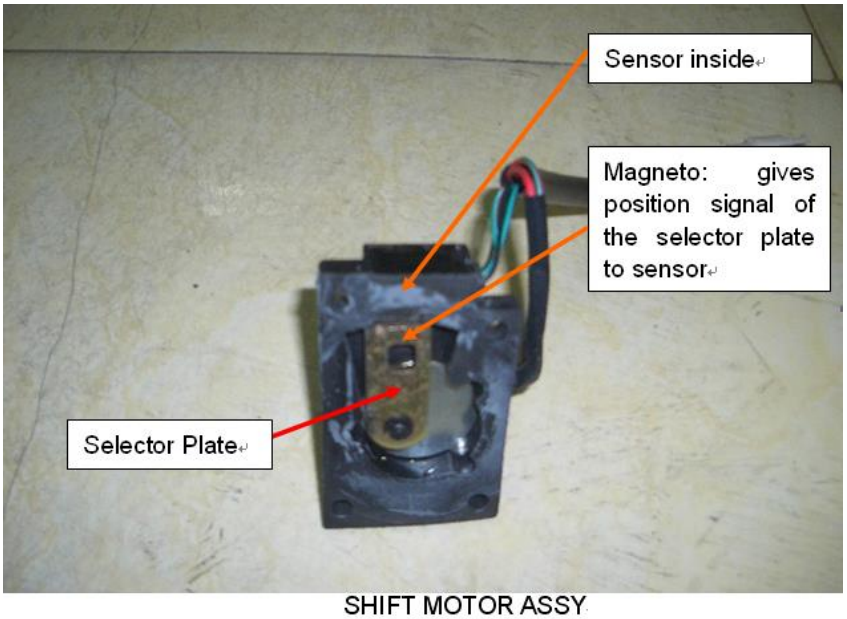


If the fuel gauge does not function properly, check the fuel level sensor
If the fuel level sensor is OK, replace the LCD Meter.

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℃/ 68°)
TOP(FULL)	4-10Ω
BOTTOM(RESERVE)	100-110Ω

8.13 THE OPERATION PRINCIPLE OF THE ELECTRIC 4WD SHIFT



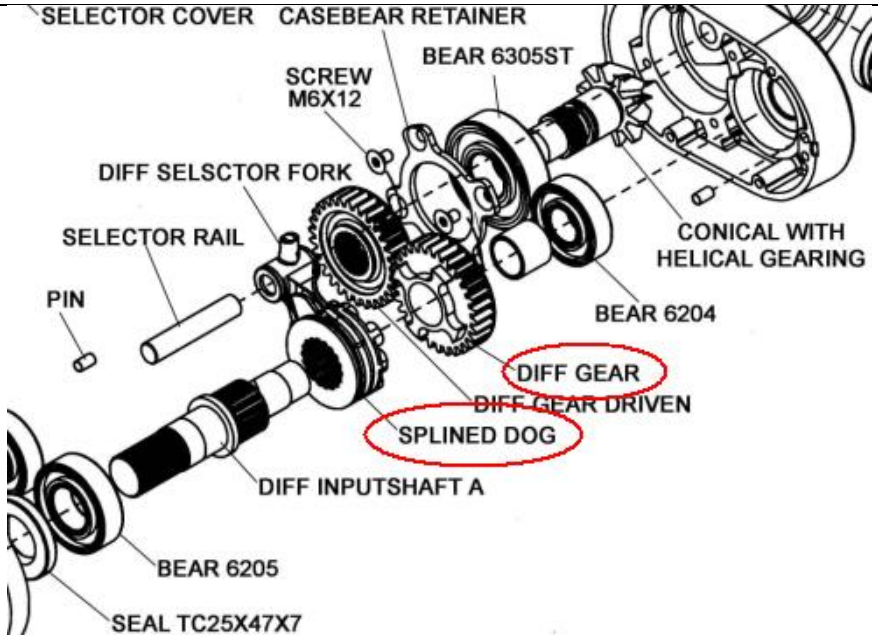
SHIFT MOTOR ASSY

(Fig 1)

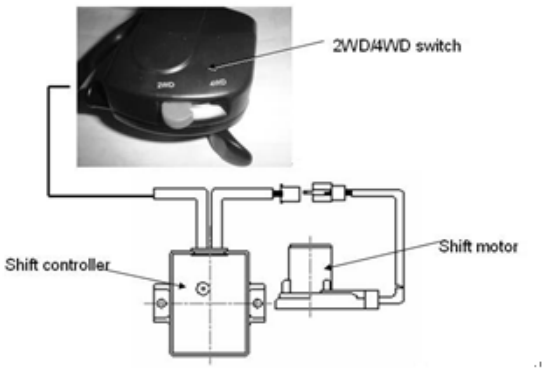
1, The rider shifts 2WD to 4WD by the Switch on handlebar.
2. The Switch gives signal to Controller.
3, The controller gives power to the Shift Motor.
4, If the Splined Dog (Fig 2) is in right position, 4WD will engage immediately. This information will be given to the Sensor by the Magneto on the Selector 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.

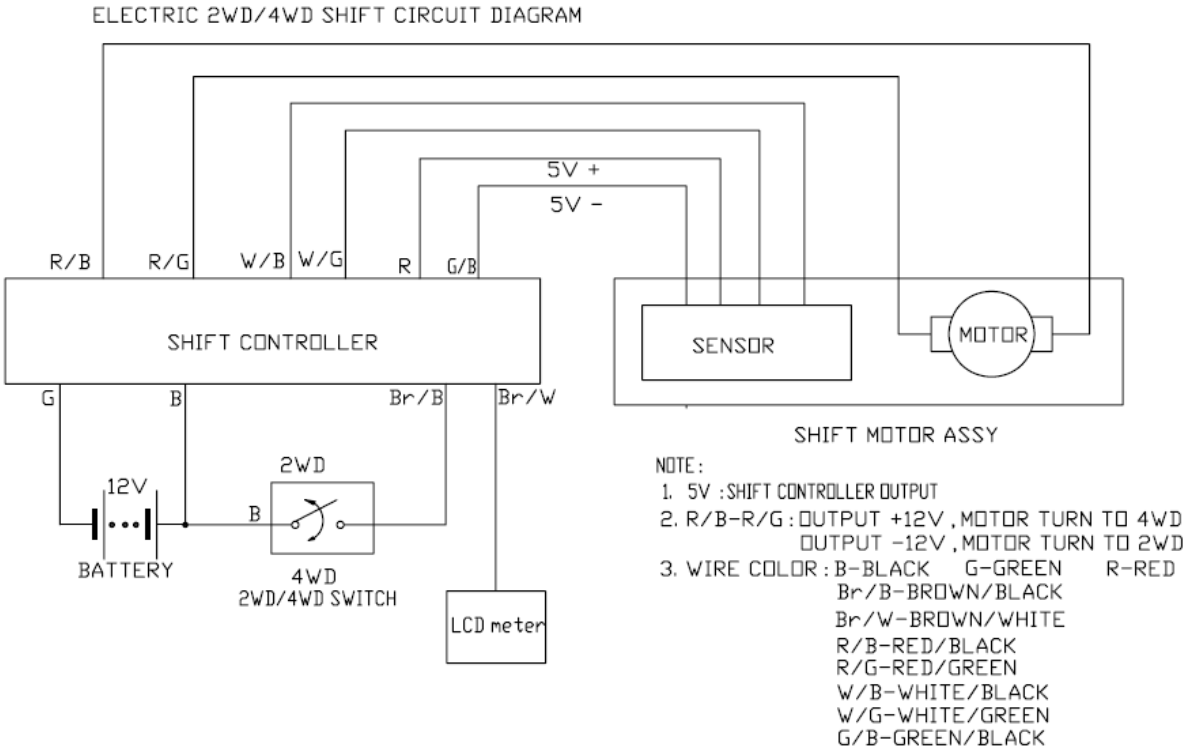
The buzzer will beep if the procedure which list above is not done in 1 minute.

Re-shift to stop the buzzer.

CAUTION

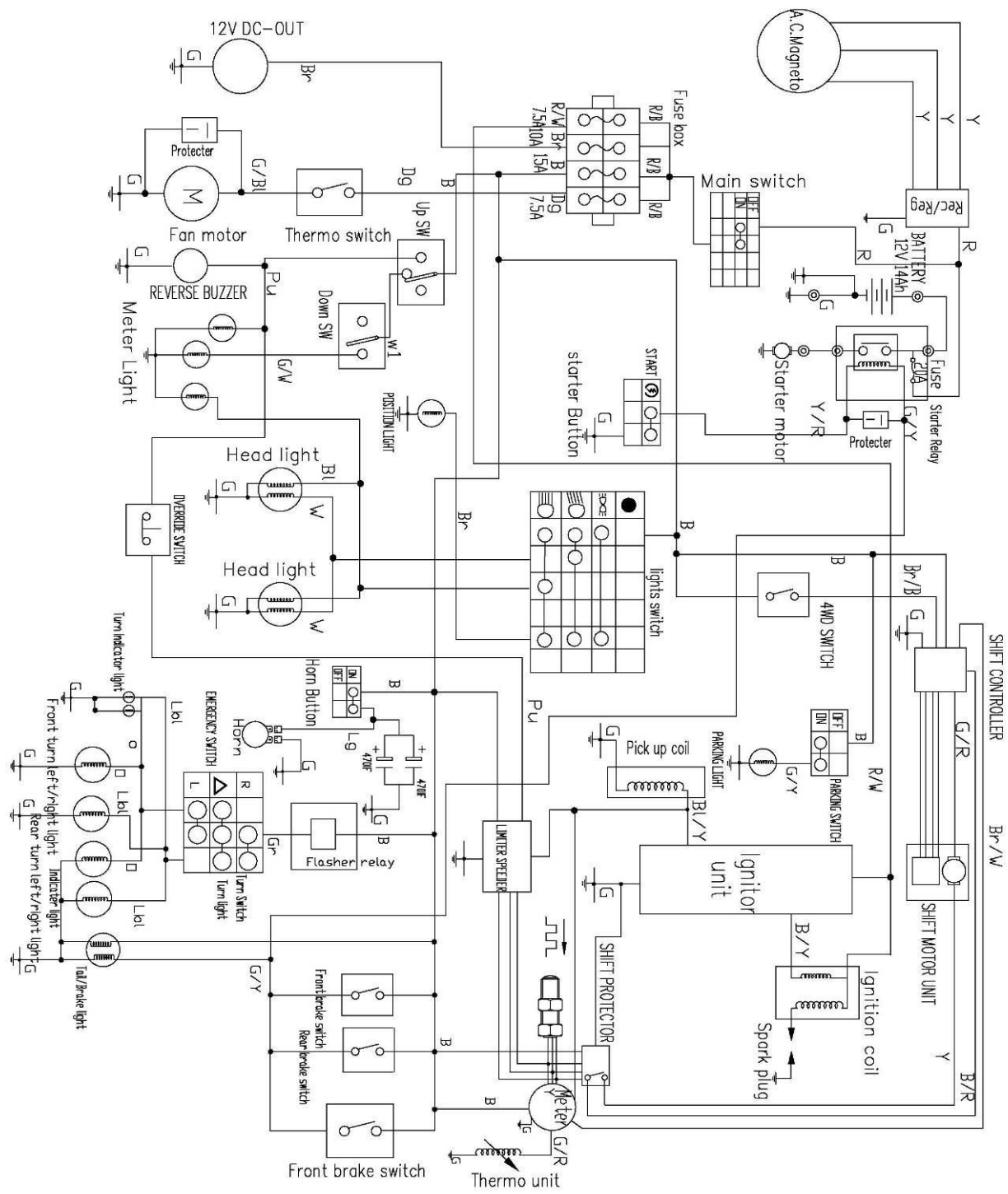
Do not switch on 4WD if the rear wheels are spining. This may cause severe machine damage. When switch on 4WD, the button will stay in 4WD position but 4WD mechanics maybe still disengaged. Always apply throttle gently and let the wheels move slightly to allow the 4WD mechanics finally engage. The 4WD indicator on the speedometer will come on when 4WD engaged.

（Fig 3）Page from owner's manual

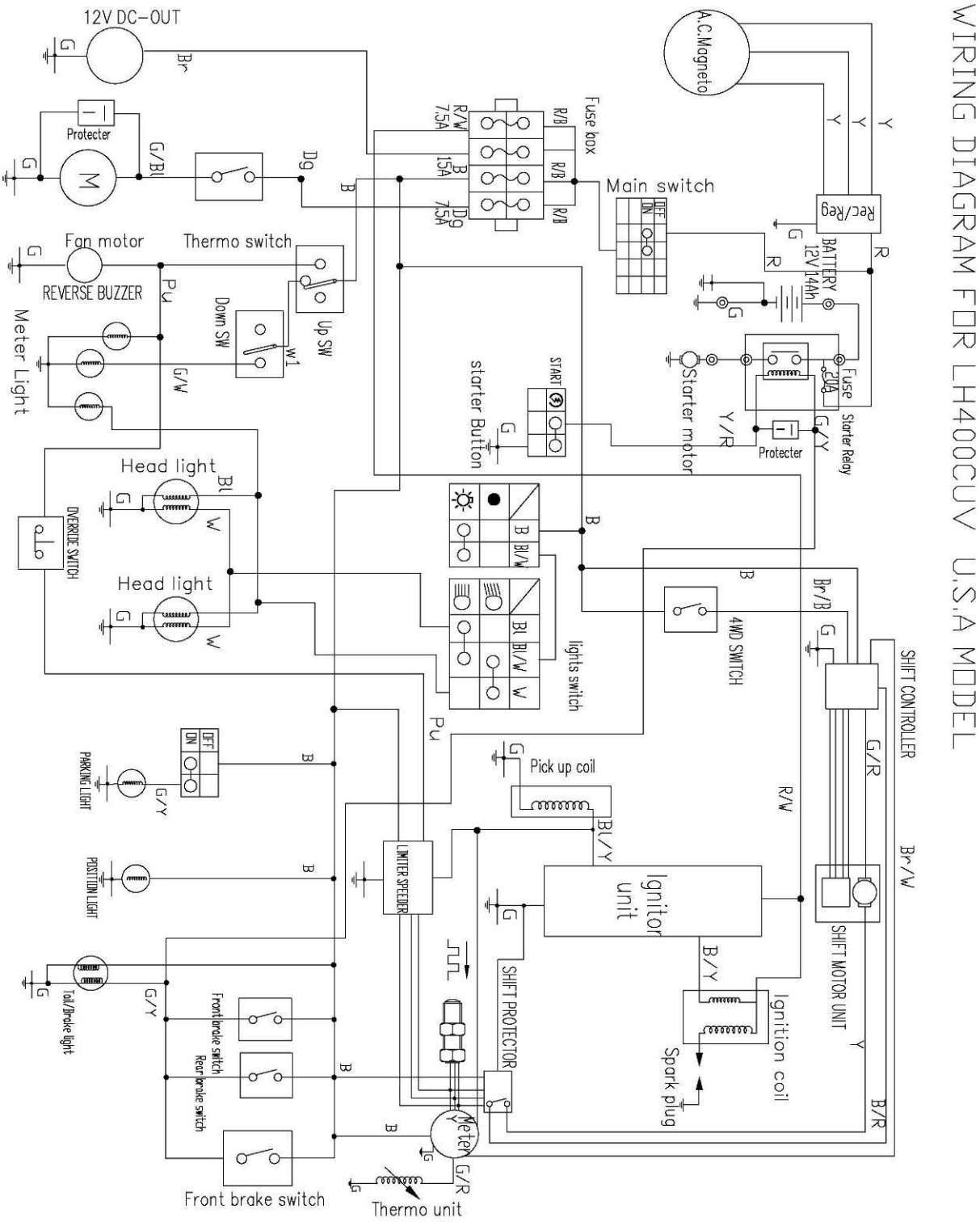

ELECTRIC 2WD/4WD SHIFT CIRCUIT DIAGRAM
5V +
5V -
R/B
R/G
W/B
W/G
R
G/B
SHIFT CONTROLLER
SENSOR
MOTOR
G
B
Br/B
Br/W
SHIFT MOTOR ASSY
2WD
12V
B
BATTERY
4WD
2WD/4WD SWITCH
LCD meter
NOTE:
1. 5V :SHIFT CONTROLLER OUTPUT
2. R/B-R/G : OUTPUT +12V , MOTOR TURN TO 4WD
OUTPUT -12V , MOTOR TURN TO 2WD
3. WIRE COLOR : B-BLACK G-GREEN R-RED
Br/B-BROWN/BLACK
Br/W-BROWN/WHITE
R/B-RED/BLACK
R/G-RED/GREEN
W/B-WHITE/BLACK
W/G-WHITE/GREEN
G/B-GREEN/BLACK

（Fig 4）

8.14 WIRING DIAGR



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



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

NOTES